ENVIRONMENTAL IMPACT STATEMENT
FOR
GLASS RECOVERY SERVICE PTY LTD
126 ANDREWS ROAD, PENRITH

Prepared for: Glass Recovery Service Pty Ltd

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BENBOW ENVIRONMENTAL

Report No: 111144_EIS_Rep_Final
May 2013
(Released: 29 May 2013)

Benbow
ENVIRONMENTAL

Engineering a Sustainable Future for Our Environment

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Submission of
Environmental Impact Statement (EIS)
prepared under the Environmental Planning and Assessment Act 1979 Section 78(A)

EIS prepared by

name	Richard T Benbow
qualifications	Bachelor of Science (Engineering) With Merit
address	Benbow Environmental
	13 Daking Street
	North Parramatta NSW 2151
in respect of	A proposed glass beneficiation facility to process used glass into cullet for recycling.

development application

applicant name	Dom Tenace
applicant address	94 Maffra Street
	COOLAROO VIC 3048
land to be developed: address	126 Andrews Road
	PENRITH NSW 2570
lot no, DP/MPS, vol/fol etc	Lot 1 DP 747153
proposed development	Occupation and operation of an existing building for crushing and separation of used glass into cullet to be used as in the adjacent glass making plant.

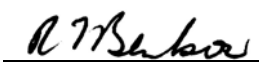
environmental impact statement

☑ an environmental impact statement (EIS) is attached

certificate

I certify that I have prepared the contents of this Statement and to the best of my knowledge

- it is in accordance with Schedule 2 of the Environmental Planning and Assessment Regulation 2000,
- contains all available information that is relevant to the environmental assessment of the development, activity or infrastructure to which the statement relates, and
- the information contained in the statement is neither false nor misleading.

signature	
name	Richard T Benbow
date	29 May 2013

LIMITATIONS

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APPENDICES

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DOCUMENT REVISION AND DISTRIBUTION

Version	Copies	Comments	Issued to	Date
1	1	Revision 1	Dom Tenace & Brent Winning	20 June 2012
2	1	Revision 2	Brent Winning	20 July 2012
3	1	Revision 3 – Issues addressed in response from government agencies in letter dated 6/9/12	Brent Winning	6 February 2012
FINAL		Revision 4 - issues raised by NSW EPA and NOW have been addressed.	Department of Planning and Infrastructure	29 May 2013

ABBREVIATIONS

Abbreviation	
ABL	Assessment background level
ABS	Australian Bureau of Statistics
AHD	Australian Height Datum
AMMAAP	Approved Methods for the Modelling and Assessment of Air Pollutants in NSW
BOM	Bureau of Meteorology
DA	Development Application
DCP	Development Control Plan
DECC	Department of Environment and Climate Change (now NSW EPA)
DEWHA	Department of the Environment, Water, Heritage and the Arts
DPI	Department of Primary Industry
DNR	Department of Natural Resources
DoP	Department of Planning
DoPI	Department of Planning and Infrastructure
DWE	Department of Water and Energy
EEC	Endangered Ecological Community
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EPA	Environment Protection Authority
EP&A Act	Environmental Planning and Assessment Act 1979
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999 (Cmth)
EPL	Environment Protection Licence
ESD	Ecological Sustainable Development
GDE	Groundwater Dependent Ecosystem
GRS	Glass Recovery Service Pty Ltd
Ha	Hectares
INP	Industrial Noise Policy (guidelines developed by the EPA)
KT	Kilo Tonnes
LALC	Local Aboriginal Land Council
LEP	Local Environment Plan
Mbgl	Metres below ground level
Mt	Million tonnes
NES	National Environmental Significance
NOW	New South Wales Office of Water
NSW	New South Wales
NSW EPA	New South Wales Environment Protection Authority
NSW RNP	New South Wales Road Noise Policy
O-I	Owens Illinois
PM_{10}	Particulate matter of size 10 μm
RBL	Rating background level
RNP	NSW EPA Road Noise Policy
ROW	Right of Way
RSD	Roller Shutter Door
RTA	Roads and Traffic Authority
SEPP	State Environmental Planning Policy
T	Tonne (1000kg)
TMP	Traffic Management Plan
Tpa	Tonnes per annum
TSC Act	Threatened Species Conservation Act 1995
TSP	Total suspended particulates
VENM	Virgin Excavated Natural Material

EXECUTIVE SUMMARY

Glass Recovery Service Pty Ltd (GRS) is an Australian owned company with its head office based in Victoria. It commenced operations in 2007 as a glass recycler. It runs a Glass Beneficiation facility at Coolaroo, Victoria processing around 80,000 tonnes per annum. GRS is owned by ITL Investments Pty Ltd which also owns and runs other businesses including SKM Recycling which commenced operations in 1999.

The benefits of recycling glass have been well known for a number of decades. Glass is one of the few materials that can be recycled over and over to create the same high quality products.

Glass is made of sand, silica and limestone. The glass recycling process involves crushing used glass products and removing impurities to produce "cullet". Glass is separated firstly by chemical composition. As glass retains its colour after recycling, it then needs to be separated by colour during the recycling process.

The recycling process uses much less energy to make new glass products than manufacturing glass from virgin raw materials. Every tonne of waste glass recycled saves 315kg of carbon dioxide from being released into the atmosphere during the creation of new glass (Waste Online, 2004). Further benefits include:

- Conserving natural resources by making products from used glass instead of virgin raw materials;
- Prevention of pollution since the glass recycling process creates less air and water pollution than making new glass from virgin materials;
- Saving energy - making products from recycled glass takes much less energy than making new glass; and
- Saving landfill space.

Approval is sought to operate at an initial capacity of 105,000 tonnes per annum with potential to increase throughput to 150,000 tonnes in the future. The production process would involve simple activities, including sorting, crushing and storage of recycled glass. The colour separated and crushed cullet would be stored external to the building in above ground bunkers. The sorted material would be sold to the adjacent glass container manufacturing facility of Owens Illinois for reprocessing the cullet into new glass products.

The selection of the site within the established industrial estate and adjacent to the Owens Illinois (O-I) site would allow GRS to supply colour separated cullet to O-I for use in place of their current raw materials.

The preparation of the EIS has been project managed for the proponent by Brent Winning of Claron Consulting Pty Ltd and Richard T Benbow of Benbow Environmental.

The EIS has been compiled from expert reports and plans prepared by:

- Rhodes Haskew & Associates – Planning Assessment;
- Transport and Urban Planning – Traffic Assessment;
- Algorry Zappia & Associates – Site plans and elevations;
- Brown Consulting – Earthworks and Flood Volumes;
- BioDesign & Associates – Landscaping plans; and
- Building Code & Bushfire Hazard Solutions Pty Limited – Bushfire Hazard Assessment Report.

The EIS has been compiled after consultation with the following persons and Government bodies:

- Adjoining industrial plants;
- The Department of Planning and Infrastructure;
- Penrith City Council;
- Service providers;
- Environment Protection Authority (NSW EPA);
- NSW Department of Primary Industries (NSW Office of Water);
- Nearest residents; and
- Adjacent sporting facility – Stocklands Riverside Management.

The proposed site is identified as 126 Andrews Road, Penrith. Its property description is Lot 1, D.P. 747153.

The local regional area of the subject site location is predominantly populated by industrial premises such as the glass works, building materials manufacturing facilities, warehousing and commercial premises. The site was previously used as an industrial warehouse for the production of fertilisers. An existing warehouse building, workshop, office, vehicle parking area and hardstand areas are found onsite.

The EIS addresses issues raised through the consultation process with the local government, statutory authorities, the proponent and residents. The assessment process has given strong consideration to cumulative issues associated with the existing activities in the area.

The proposed development, besides being state significant development, is also designated and integrated and the activities would need to be licensed by the NSW EPA.

Outline of the Proposal

The proposed development would be located at 126 Andrews Road, Penrith, and the property is described as Lot 1, DP 747153.

The proposed development would involve the following:

- Conversion of an existing building on site into a glass beneficiation plant.
- Processing of used glass into "cullet".
- Erection of a series of steel framed and sheet steel walled storage bunkers to the hardstand area to the south and east of the building. The existing hardstand area is to be increased with additional area as per the Consent issued by Penrith City Council DA No. DA12/0539 dated 23 April 2013 that is provided in Appendix 12.

The glass beneficiation plant would initially have a capacity of 105,000 tonnes per annum and would be increased in a later stage to 150,000 tonnes of cullet processed. The facility would operate three shifts per day on a 24 hour per day, 7 days per week basis once noise compliance at night time is assured by testing.

The operational phase of the proposed development would generate approximately 25-30 new employment positions.

The construction phase of the development, being the installation of the glass processing equipment, structural steel requirements including site welding and erection, minor building works, external bunkers, stormwater works and landscaping would be undertaken by contractors. It is estimated that the construction works would create 20-25 jobs. The construction phase would typically be undertaken during day time hours i.e. 7:00am-6:00pm Monday to Friday and 7:00am-4:00pm Saturday.

The development would house the glass beneficiation processing plant within the existing building. The industrial building has previously been compartmentalised along a north-south direction using a fire rated wall. The building has internal storage rooms along the eastern outside wall. Access doorways are along the two sides and rear. In the corner of the rear yard area is a shed. This has previously been used to store dangerous goods.

The incoming glass for recycling would be delivered by trucks and stored inside the building. The glass recycling process involves crushing used glass products and removing impurities to produce "cullet". Cullet is crushed glass that is ready to be re-melted. The colour separated and crushed cullet would be stored external to the building in a set of aboveground bunkers. The cullet would be transported to the adjoining glass bottling plant operated by Owens Illinois, using trucks travelling the short distance along Andrews Road between the two sites.

There is a contractual arrangement between Glass Recovery Service and Owens Illinois for the supply of colour separated cullet. Owens Illinois would use this cullet in place of raw materials.

The proposed glass beneficiation plant is able to colour separate and process glass bottles to a significantly higher quality than other glass bottle recycling plants in NSW. Higher recovery rates are achieved using world's best practice processes. The equipment is sourced from Germany, with there being no Australian manufacturer.

Given that there is an existing wetland on the site and the land is identified as being flood liable, the need to maintain the control of environmental impacts from the site is important.

The proposed development would be required to operate in accordance with conditions of consent, Environment Protection Licence conditions, and an Environmental Management Plan (EMP) prepared to the principles of ISO 14001.

The consent and licence conditions, as well as the EMP, and the statement of compliance presented in the EIS establish an ongoing compliance monitoring program. This program involves ongoing liaison with the residential community and industries within the vicinity of the site.

The Study Area

The EIS addresses a study area that encompasses the immediate neighbouring properties within a 3 km radius from the subject site.

Consultation

Individual meetings were held with the local community on a one-on-one basis and statutory authorities. These provided the forum to identify issues and to include these in the EIS. Appropriate guidelines and criteria to be satisfied were advised at this time.

The community consultation program initially involved a letter drop to immediate neighbours north, south, adjacent and to the east of the site.

The letter drop was followed by visits with many of the adjacent properties and the offer was made for further access to the consulting team as the resident's need arose.

Justification

The site was previously used for production of fertilisers. The proponent aims to use this existing industrial site for the first stage in the glass recycling process due to its suitability for this industrial activity and the proximity of the site to the customer, significantly reducing transportation requirements. A proposed future stage of the project would be to install an overland conveyor to transport the cullet directly to the customer, thereby eliminating the need for road transport of finished goods. This future stage would require a new development application due to the project involving another land owner.

Community Benefits

There are a number of community benefits to the residential community residing in the vicinity of the development. Local employment will receive a boost and there will be an economic flow on to businesses extending beyond the Penrith City Council region.

The wider community would have greater benefits from the project. The proposal meets the precautionary principle of Ecological Sustainable Development and will reuse valuable materials that replace virgin raw materials in the production of glass containers and bottles.

Alternatives

There are alternatives and these relate to the type of technology that could be used and the location of alternative sites.

The purpose of the development is to provide Owens Illinois with glass cullet for use in their glass making processes so this requires use of a technology that is able to colour separate to a high level of accuracy and generate minimal waste. The glass sorting process has to be able to remove any metal particulate matter as well as any impurities that can cause product quality issues in the finished glass products.

The process that has been selected uses the Mogensen on Microsoft System from Germany. This system is world's best practice and will achieve the high quality standards that are needed.

Other processes would be available that would use variations on the process that has been selected. All require a similar site layout and all need similar site areas with external bunkers available for loading the cullet into trucks for transport.

There would be alternative site layouts available and alternative site locations.

Alternative site layouts could have the bunkers located alongside the building or in front of the building.

The site layout chosen preserves the visual appearance of the "street scape" and for noise control makes maximum use of the acoustic shielding provided by the building and the bunkers towards nearest residences.

A number of alternative sites were examined. There were other sites in Penrith and St Marys that would require construction of a building. These were at greater distances from the Owens Illinois site and this adds transport costs to the delivery of the cullet.

There would be alternative sites across Sydney however the proponents favoured a site in close proximity to the end user.

The site chosen was already developed and provided a number of advantages.

- An unused site with the majority of the necessary features was available.
- The building lent itself to housing the process.
- Concreted hard stand areas were existing.
- Office space is generous and ample car parking exists.
- Penrith City Council has strong policies in place promoting resource recovery and sustainable industries.

The site chosen is well suited to the development.

Objectives of the Proposal

The objectives of the proposal are:

- Occupation and fit out of an existing industrial building into a glass beneficiation facility;
- Process used glass products to produce crushed glass or "cullet" that would be sold to an adjacent glass making facility for further processing; and
- Distribute the resulting cullet to the adjacent glass making facility to be used in place of virgin raw materials.

Assessment of the Impacts

The preparation of the EIS has considered impacts to the surrounding community and deliberate steps have been taken in the design of the proposal to minimise off-site environmental impacts.

Engineered controls to minimise potential impacts have been considered as inherent design features to be incorporated into the proposed development.

A brief summary of the main environmental impacts is presented below.

Land Use Zoning

The land is zoned as IN1 (General Industrial) and the development as proposed is permissible with consent. The development as designed is consistent with the objectives of this zoning.

Site Contamination

A Phase I Contamination Study and limited Phase II Contamination Study found no evidence of contamination at the site.

Identification and Prioritisation of Issues

The identification and prioritisation of the potential environmental impacts of the proposed development was a fundamental step in preparing the EIS.

This process involved the following stages:

- Air quality issues including odour and dust management;
- Noise impact;
- Stormwater management;
- Flooding issues;
- Waste management;
- Traffic and transport;
- Ecological sustainable development;
- Greenhouse gas assessment;

- Native Flora & Fauna;
- Native vegetation;
- Visual impacts;
- Fire risk;
- Socio-economic impacts;
- Heritage;
- Planning requirements;
- Assessment of Penrith City Council requirements and expectations; and
- Assessment of requirements for the EIS from the DoPI and NSW EPA.

These steps led to the design and setting of the objectives of the Proposal.

The statutory requirements and government guidelines in conjunction with the government consultation process confirmed the presence of issues including:

- Air quality issues including odour and dust management;
- Noise impact;
- Stormwater management;
- Flooding;
- Waste management;
- Ecological sustainable development;
- Greenhouse gas assessment;
- Hazards including potential fire risk;
- Visual amenity;
- Aboriginal cultural heritage;
- Socio-economic;
- Native Flora & Fauna; and
- Native vegetation.

Groundwater, Surface Water, and Salinity

Expert advice has been provided by Brown Consulting. A design of the site to satisfy any concerns of these matters has been provided in accompanying specialist reports and plans.

The potential risk of surface water contamination is present in the event of an incident resulting in release of diesel, general litter or sediment in stormwater runoff. Raw materials are unloaded directly from heavy vehicles into bays within the building. Risk of contamination is deemed to be low due to the hardstand areas, a bunded and roofed diesel storage tank area as well as adequate and proper roofing equipped with all the necessary guttering and downpipes.

Regular housekeeping practices, particularly at the external storage bunkers, as well as the provision of rubbish bins on site shall serve to prevent sediment from hardstand areas entering the stormwater system. All stormwater pits/drains have been painted blue or green around the periphery of the pit with the words “flows to creek” stencilled.

Flooding Issues

The land is flood liable land. The subject area is considered to be a flood plain and not a floodway due to the flat nature of the land and the distance from the Nepean River.

Flooding has been addressed in the report and civil design by Brown Smart Consulting. The "volume balance" method has been utilised and the proposed development would have a nett nil impact on the existing flood capacity of the land.

Visual Impacts

The proposed processes of the development would be housed within the existing building located at the subject site. Minor modifications would be made to the building and there would be external bunkers erected at the rear of the site for storage purposes. These would be visible from the adjacent sporting field.

Detailed landscaping plans have been prepared and provide a planting program that would be undertaken as part of the proposed development. There is a corridor between the site and Andrews Road that would be maintained and vegetated.

The site is not clearly visible from residential areas or the new Stockland Riverside residential development-. It would be clearly visible from future commercial premises on the north site of Andrews Road however this is not considered to be an impact.

Due to the minor changes in visual appearance, the extensive landscape plan and the restricted visibility of the site from residential areas, the proposed development is not expected to have a negative visual impact on the surrounding areas.

Noise Amenity

The need to protect the acoustic amenity of the surrounding suburban residences was considered paramount in preparing the EIS. If noise levels associated with the operations of the proposed facility could not comply with the NSW EPA Industrial Noise Policy (INP) then the development process would have been stopped.

The applicable noise criteria established utilising measurement results from the long term environmental noise logging can be satisfied with the implementation of all the recommended noise control measures. The results of this assessment are contained in Section 5 of the EIS.

Construction noise is not expected to affect the surrounding residential receivers. Construction associated with the proposal is limited to internal modifications and installation of the concrete area and external bunkers. No major construction works is proposed as part of the development.

Air Quality

An assessment has been conducted to quantify the emissions from the proposed development. Air emissions from the development were limited to particulate emissions associated with the material handling and transfer of raw materials, processed goods and finished products. Most of the activities that provide fugitive emissions are adequately mitigated by air emission controls that have been proposed during the design stage of the development. These controls include the use of an enclosed building to house the operations that release fugitive emissions, water foggers, misters and sprays, and the use of a dust collector.

The odour assessment is limited to a desktop study. Due to the nature of the raw materials that would be accepted at the site, odour is not considered to be an issue associated with the proposed activities. No putrescible materials would be accepted and recycled glass used as a raw material would be sourced from suppliers already pre-treated, eliminating most contaminants.

Predicted impacts from the air dispersion modelling phase of the assessment have determined that emissions are within the NSW EPA health based criteria. This indicates that no health impacts are expected to occur at any of the nearest potentially affected receptors as a result of establishing the development.

Ecological (Flora and Fauna)

It was determined that a detailed ecological assessment is not required, given that the site location of the proposed development is developed land. A targeted Flora and Fauna search undertaken indicates there are no threatened or endangered flora and fauna populations or recorded sightings in the immediate surrounding area of the site recorded on the NPWS Atlas for threatened and endangered species database. The closest reported sighting of an endangered species is the Spiked Rice Flower (*Pimelea spicata*). It has been reported within 0.1 kilometres north-east of the site. The Eastern Freetail Bat and Eastern Bentwing Bat have been sighted approximately 1.5km east of the site. The flora survey of the site undertaken by BioDesign Pty Limited confirmed there were no heritage listed trees or tree species subject to the Threatened Species Act, 1995 on or adjacent to the site.

Traffic

A traffic assessment has been undertaken by Transport and Urban Planning. The assessment found the following:

- The proposed development would generate an average of 70 vehicle movements per day during construction and 128 vehicle movements per day during operation.
- Improvements to the intersection of the site and Andrews Road would be required to accommodate B doubles.
- There would be ample parking available at the site.

The projected traffic impacts of the proposal with the improved site access provisions in place are likely to be minor with acceptable traffic service levels and performance levels maintained.

Road Traffic Noise

Predictive noise model SoundPLAN V7.1, recognised by the NSW EPA, has been utilised to calculate noise impacts associated with the increase of vehicles frequenting the proposed facility. Results have shown that the NSW EPA Road Noise Policy (RNP) noise criteria for off-site road traffic were readily achieved.

Fire Risk

The potential fire risk from the processes is limited to failure of an electric motor or a conveyor belt resulting in a fire. The cullet is inert and non-combustible and risk of a fire is very low.

The dust generated is not combustible and therefore there is no presence of a hazardous zone for dust.

Bushfire Hazard

The site is identified as Bushfire Prone Land. A Bushfire Hazard Assessment Report prepared by Building Code and Bushfire Hazard Solutions Pty Limited found that if all bushfire safety measures recommended are implemented at the site, a reasonable and satisfactory level of bushfire protection would be provided.

Environmental Management Plan

An environmental management plan would be developed to the principles of ISO 14001 and this would provide the methods of operation to satisfy the following:

- Statement of Commitments;
- Environmental Protection Licence; and
- Conditions of Consent.

The EMP would therefore be addressing the concerns of the community and enable the residents to know that these concerns are not diminished in importance once approval is granted. This is seen as a critical issue by Benbow Environmental and the Project Manager.

Ecological Sustainable Development

Ecological Sustainable Development (ESD) is growing in its acceptance amongst the community.

The Department of Environment and Heritage website defines ESD as "*development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs*".

The main environmental safeguards to be implemented so that the environment is maintained include:

- Visibility;
- Noise;
- Dust and particulates;
- Surface water runoff and flooding; and
- Environmental Management System.

Lastly, yet fundamental to the proposal, is ongoing community involvement through consultation that the environmental management system would highlight.

Greenhouse Gas Emissions

Increasingly, developments within our communities will need to address the consequences of such a development on greenhouse gas emissions.

The proposal will generate greenhouse gas emissions from the use of fossil fuel and electricity.

The positives are that the proposal involves the first step in the glass recycling process and this would save virgin raw materials used to manufacture glass, indirectly saving on greenhouse gas emissions.

The further positive is that the location of the proposed development is adjacent to the facility where the second and final stages of the glass recycling process are undertaken. This would significantly reduce the transportation requirements, and therefore greenhouse emissions associated with transporting the cullet produced at the proposed facility via road.

Concluding Remarks

The EIS has undertaken detailed consideration of potential issues related to the proposed development and designed methods of solving any issues that may arise.

The studies undertaken have assessed the issues from the Department of Planning and Infrastructure, Penrith City Council, and NSW Environment Protection Authority. The skills of the various experts involved in the design of the development have resulted in a development appropriate for this site.

Approval of the development is requested.

1. INTRODUCTION

Glass Recovery Service Pty Ltd (GRS) is proposing to occupy an existing warehouse located at 126 Andrews Road, Penrith NSW for the installation and operation of a glass recycling facility.

The proposed development would involve conversion of an existing building on site into a glass beneficiation plant for processing of used glass into "cullet". The facility would initially have a capacity of 105,000 tonnes per annum and would be increased in a later stage to 150,000 tonnes of cullet processed. Hours of operation would be over three shifts per day on a 24 hour per day, 7 days per week basis based on noise compliance testing establishing night time noise criteria can be satisfied.

The production process would involve simple activities, including sorting, crushing and storage of recycled glass. The colour separated and crushed cullet would be stored external to the building in above-ground bunkers. The bunkers would be erected as part of the development. The sorted material would be sold to Owens Illinois for reprocessing into new glass products.

The selection of the site within the established industrial estate and adjacent to the Owens Illinois (O-I) site would allow GRS to supply colour separated cullet to O-I for use in place of their current raw materials. There is a contractual arrangement between Glass Recovery Service and Owens Illinois for the supply of colour separated cullet.

The construction phase would create 20-25 jobs whilst approximately 25-30 new employment positions would be generated for the operation of the facility.

The development would house the glass beneficiation processing plant within the existing building. The industrial building has been previously compartmentalised along its north-south direction using a fire rated wall. The building has internal store rooms along the eastern outside wall. Access doorways are along the two sides and rear. In the corner of the rear yard area is a shed. This has previously been used to store dangerous goods.

The incoming glass for recycling would be delivered by truck and stored inside the building. The glass recycling process involves crushing used glass products and removing impurities to produce "cullet". Cullet is crushed glass that is ready to be re-melted. The colour separated and crushed cullet would be stored external to the building in a set of above-ground bunkers. The cullet would be transported to the adjoining glass bottling plant operated by Owens Illinois, using trucks travelling the short distance along Andrews Road between the two sites.

The proposal constitutes integrated development as the proposed activities require a licence under the *Protection of the Environment Operations Act, 1997*.

The proposed development as described in this Environmental Impact Statement is state significant development under Schedule 1, Clause 23(2) of the *State Environmental Planning Policy (State and Regional Development) 2011* as follows:

> *Development for the purposes of waste or resource transfer stations in metropolitan areas of the Sydney region that handle more than 100,000 tonnes per year of waste.*

Benbow Environmental was commissioned by Glass Recovery Service Pty Ltd to prepare the EIS to support the development application. This EIS addresses the requirements of the Department of Planning and Infrastructure, Penrith City Council, the NSW Environment Protection Authority and Office of Water.

The EIS facilitates the assessments of the environmental impacts considered necessary to be assessed for the proposed development and includes the following:

- Planning, legislative, regulatory considerations and traffic impacts. This was prepared by Rhodes Haskew & Associates.
- Traffic assessment. This was prepared by Transport and Urban Planning.
- Earthworks and Flooding Study. This was prepared by Brown Consulting.
- Water emissions and assessment. This was prepared by Benbow Environmental.
- Noise emissions and assessment. This was prepared by Benbow Environmental.
- Air emissions and assessment. This was prepared by Benbow Environmental.
- Economic and social aspects. This was compiled by Benbow Environmental.
- Ecological, greenhouse gas emissions and assessment. This was prepared by Benbow Environmental.
- Landscaping plans were prepared by Bio Design & Associates.

The EIS results in a compilation of environmental safeguards recommended for the proposed development.

A Statement of Commitments is provided as Section 8. The Statement of Commitments summarises the commitment made by the proponents to the environmental controls designed into the development. This statement bears the signatures of the proponents.

1.1 INTRODUCTION TO THE PROPONENT

Glass Recovery Service Pty Ltd is an Australian owned company with its head office based in Victoria. It commenced operations in 2007 as a glass recycler. It runs a Glass Beneficiation facility at Coolaroo, Victoria processing around 80,000 tonnes per annum. GRS is owned by ITL Investments Pty Ltd of which also owns and runs other businesses including SKM Recycling which commenced operations in 1999.

SKM Recycling is involved in the sorting of recyclables from households and business. It provides these services at various locations to Councils in Victoria and provides collection of recyclables from commercial and industrial business, schools, hospitals and various government departments. Recyclable material collected is transported to one of SKM's three (3) sites in Coolaroo, Mornington and Laverton where is it sorted then sold to clients such as paper and cardboard mills and other manufacturing facilities for reprocessing into products including packaging, clothing and outdoor plastic furniture. SKM Recycling is able to recover the highest levels of recyclable materials using purpose-built sorting equipment.

There are currently twelve (12) Councils and Regional Waste Management Groups that are serviced by SKM, including:

- City of Ballarat
- City of Brimbank
- City of Hume
- City of Maribyrnong
- City of Melbourne
- City of Moonee Valley
- City of Moreland
- Shire of Mornington Peninsula
- Shire of Murrindindi
- Shire of Nillumbik
- City of Port Phillip
- Shire of Pyreenes

More than 500 tonnes are recycled daily, including:

- Paper;
- Cardboard;
- Aluminium and Steel Cans;
- Plastic Bottles and Jars; and
- Glass Packaging.

The existing glass recovery plant at Coolaroo was used as the source of operational data, noise source levels, air emission controls and particle sizes of the glass cullet for use in the air emissions assessment.

1.2 BACKGROUND

The need for the project arose due to the end user of the cullet being unable to find a suitable supplier of recycled-class cullet.

Glass has been recovered from kerbside collection for many years and production of cullet has been undertaken at Botany.

The need for a world's best practice site led to the proposed development as it has the capacity to be expanded to satisfy demand and would use the world's best technology to achieve high levels of colour separation and removal of impurities.

Owens Illinois are Australia's largest producer of glass products. These products are predominantly used throughout the food industry for the consumer market.

1.3 PROJECT OUTLINE

This section of the EIS outlines the project. This includes the objectives of the project, the need for the project, purposes of the EIS, structure of the document, and statutory requirements.

1.3.1 Objectives of the Proposal

The purpose of this development is simply as follows:

- Occupation and fit out of an existing industrial building into a glass beneficiation facility;
- Process used glass products to produce crushed glass or "cullet" that would be sold to an adjacent glass container and bottle production facility for further processing; and
- Distribute the resulting cullet to the adjacent glass making facility to be used in place of virgin raw materials.

1.3.2 Need for the Project

The proposal is needed by the proponents to efficiently allow the production of cullet for use as a raw material at the adjacent Owens Illinois facility. The cullet would be used in place of virgin raw materials and the development would significantly reduce the current transportation requirement of raw materials to the O-I site.

The proponent currently has the expertise to colour separate and process glass bottles to a significantly higher quality than other glass bottle recycling plants in NSW. Higher recovery rates would be achieved using world's best practice processes.

The design inherently follows the principles of cleaner production and sustainability, and has established the principles of ecologically sustainable development. In addition, the proposal is relevant to targets 1, 2 and 4 within the *NSW Waste Avoidance and Resource Recovery Strategy 2007*, including:

Target 1 – Preventing and avoiding waste – By providing the infrastructure to convert used glass into cullet to supply Owens Illinois for the production of recycled glass products, this indirectly avoids the need for glass products made from virgin raw materials, thereby reducing the waste associated with the mining of virgin raw materials.

Target 2 – Increasing recovery and use of secondary materials – The proposal is relevant to target 2 as it will provide the infrastructure to increase the recovery and use of used glass by converting it into a raw material (cullet) ready for further processing into usable goods.

Target 4 – reducing litter and illegal dumping – The proposal is relevant to target 4 as it provides new recycling infrastructure and therefore an incentive for recycling of glass as opposed to dumping.

1.3.3 Purposes of the EIS

The purpose of this EIS is to document the existing environment and assess the potential environmental impacts from the proposal.

The EIS process for the proposed development has identified the constraints on the development and the engineered controls needed to achieve compliance with the criteria that have been applied.

The purpose of the EIS is also to provide the consent authority, the community, government authorities, and the applicant with sufficient information to make informed decisions in relation to the proposed development.

The consent authority is the Minister for Planning & Infrastructure. The site currently contains an existing industrial building and associated offices, car parking and hardstand areas.

The site is similar to the industrial premises residing within the Industrial Estate, which would have equal or larger capacities compared to the proposal's production capacity. Its development to allow the installation of the proposed glass beneficiation plant (along with its ancillary activities) is enabled by the EIS.

1.3.4 Structure of the EIS

The EIS is organised into the following three main sections:

- Executive Summary
  This summarises the proposed development, justification and the environmental assessment of the proposal.
- Main Contents of the EIS
  The main contents of the EIS describe the development in detail, the environmental assessment of the issues, the impacts, and safeguard measures.
- Appendices
  The Appendices contain the requirements of the Director General of the Department of Planning & Infrastructure, and technical support documents.

1.3.5 Statutory Requirements

The statutory requirements to be satisfied are those contained within the Environmental Planning and Assessment Act 1979 and the associated Environmental Planning Instruments and Regulations.

The report also addresses the Director General's Requirements (DGR Reference No. SSD 5267) relating to applicable environmental planning instruments that apply to the site.

In accordance with requirements under the EP&A Regulation, 2000, the Director General's Requirements for the preparation of an EIS for the proposed development were obtained.

The key environmental planning issues that were raised in these requirements included the following:

- Assessment of the development against relevant legislation and environmental planning instruments;
- Waste management including waste streams from operation and potential impacts associated with receiving, processing and storing the incoming glass and with dispatching of the cullet product;
- Soils and water including flooding impacts and impacts on surface water, stormwater and groundwater;
- Noise impacts during construction, operation and traffic noise contributions;
- Air quality impacts during construction and operation, particularly dust and potential for odour to be an issue;
- Traffic and transport management;
- Hazards including potential fire risks;
- Greenhouse gases including quantitative assessment of scopes 1 and 2 greenhouse gases;
- Visual impacts on the amenity of the surrounding area;
- Socio-economic including potential impacts of the development on waste minimisation and resource recovery in the region; and
- Biodiversity including impacts on flora and fauna.

A copy of the requirements has been included in Appendix 1 to the EIS. All the requirements of the Director General have been considered in the preparation of the EIS.

The Statement of Compliance is listed in Table 2-2 of Section 2.3 and titled "Compliance with Director General Requirements". This table lists the section and page where requested information has been provided.

1.4 DEVELOPMENT ALTERNATIVES

This section of the EIS discusses alternatives to the development in regard to both the site and proposed methods of operation. The criteria for selection is firstly discussed.

1.4.1 Criteria for Selection

This site has been selected for several reasons:

- Adjacent to the glass plant.
- The site has ample room available to cater for the proposed operation.
- The site is located in a well established industrial area with adequate services.
- The site is not in a sensitive land use area.
- The development is a permitted use with consent.
- The development is a beneficial use as it would minimise the distance and amount of traffic movements required when compared to having to establish the site elsewhere. This would minimise transport costs and would achieve the principles of ecologically sustainable development (which is to be encouraged).
- The development will generate additional local employment.
- The development supports the principles of ecologically sustainable development as the conversion of glass bottles into colour separated cullet will provide the adjacent glass bottle plant with energy savings as well as reduced use of raw materials.

The proposal depends on the following being available:

- Successful acquisition of the warehouse by the proponent;
- The development is located a sufficient distance from urban and suburban areas;
- On land that has long term development opportunities;
- On land free of encumbrances such as presence of contamination issues;
- On land sufficiently cleared of native vegetation and heritage land or items (including Aboriginal), and non-environmentally sensitive;
- On land suited to environmental noise control; and
- Ample room for the storage and production. Room for raw materials as well as final product storage required.

The land and location of the proposed site meets the selection criteria and was selected for the location of the proposal.

1.4.2 Alternative Sites

The proponent investigated alternative sites in Penrith and St Marys with Penrith City Council. They also investigated alternative sites at Ingleburn, Wetherill Park and Camellia.

The relationship between the development and the end user of the cullet was the driving factor behind deciding on the proposed site.

This site has a number of benefits as already discussed, and of these, the ability to meet night time noise criteria was the most critical.

This occurs due to the location of the site, the building materials used in the facade of the building and the height of the building providing a high degree of acoustic shielding. Within the building there are internal walls which provide additional noise reduction in a northerly direction towards nearest residences.

1.4.3 Alternative Design and Methods

The driving factors in the choice of the preferred technology are the ability to separate glass by colour and detect the presence of impurities which can reduce product quality. The chosen technology is able to perform these tasks proficiently, when compared with alternative technologies available.

The layout of the site was considered for better alternatives but none were found.

The design that is proposed is the most efficient for productivity and environmental factors.

1.4.4 The "No Project" Option

The consequences of not proceeding with the project is that the glass making plant of Owens Illinois, located adjacent to the proposed site, will need to source their clean, high quality cullet from a supplier from a different state, the closest being Victoria (Melbourne).

Glass packaging has been converted to cullet at other existing plants within NSW at Botany and Chullora. However, these processes are dated, and the contract between the proponents and Owens Illinois enables the world's best technology to be used to reduce the amount of glass packaging that is not able to be re used as cullet due to poor colour separation processes.

Not proceeding with the project would mean the long distance transportation of glass cullet would remain and the project would not contribute to the community's recycling programs nor generate employment that would have flow on financial benefits to the Penrith area.

1.5 LICENCES AND APPROVALS

A number of approvals, permits and licences would be required prior to operations of the proposed development commencing on site. The following table identifies the majority of these approvals and the responsible regulatory/governing body.

Table 1-1: Approvals Required

Approval Required	Approving Body	Description/Comment
Development Consent	Minister for Planning and Infrastructure	Under Environmental Planning & Assessment Act 1979.
Environment Protection Licence	New South Wales Environment Protection Authority (NSW EPA)	Scheduled Activity under Schedule 1 of POEO Act 1997.

1.6 IDENTIFICATION AND PRIORITISATION OF ISSUES

As noted in the Executive Summary, the identification and prioritisation of the potential environmental impacts of the proposed development was a fundamental step in preparing the EIS.

This process involved the following stages:

- Air quality issues including odour and dust management;
- Noise impact;
- Stormwater management;
- Flooding issues;
- Waste management;
- Traffic and transport;
- Ecological sustainable development;
- Greenhouse gas assessment;
- Native Flora & Fauna;
- Native vegetation;
- Visual impacts;
- Fire risk;
- Socio-economic impacts;
- Heritage;
- Planning requirements;
- Assessment of Penrith City Council requirements and expectations; and
- Assessment of requirements for the EIS from the DoPI and EPA.

These steps led to the design and objectives of the Proposal.

The statutory requirements and government guidelines in conjunction with the government consultation process confirmed the presence of issues including:

- Air quality issues including odour and dust management;
- Noise impact;
- Stormwater management;
- Flooding;
- Waste management;
- Ecological sustainable development;
- Greenhouse gas assessment;
- Hazards including potential fire risk;
- Visual amenity;
- Aboriginal cultural heritage;
- Socio-economic;
- Native Flora & Fauna; and
- Native vegetation.

1.7 RELATIONSHIP WITH OTHER INDUSTRIES AND FACILITIES

There is a contractual arrangement between Glass Recovery Service and Owens Illinois for the supply of colour separated cullet. The Owens Illinois facility is located adjacent to the subject site.

This is the main relationship with other industries and facilities. There would be other relationships to secure supply of glass packaging from kerbside collections and the activities for other waste recovery operations. The details of these relationships have not been disclosed due to the importance of confidentiality in these business relationships.

2. DEVELOPMENT ISSUES

This section of the EIS provides details on the following matters:

- Planning issues to do with the site, the existing development surrounding land use and the legislative statutes that apply to the proposed development; and
- The Director General's requirements are listed and the relevant sections of the EIS that deal with each requirement are referenced.

2.1 PLANNING

The Planning report was prepared by Rhodes Haskew.

2.1.1 Introduction

This section of the Environmental impact Statement (EIS) provides an assessment of the proposed development in accordance with all relevant statutory planning controls.

2.1.2 Site Details

The subject land is situated on the southern side of Andrews Road about midway between The Northern Road and Castlereagh Road within the suburb of Penrith and the Local Government Area of Penrith.

Figure 2-1 below indicates the location of the land and Figure 2-2 shows the site in a regional context.

Figure 2-1: Location of Subject Land

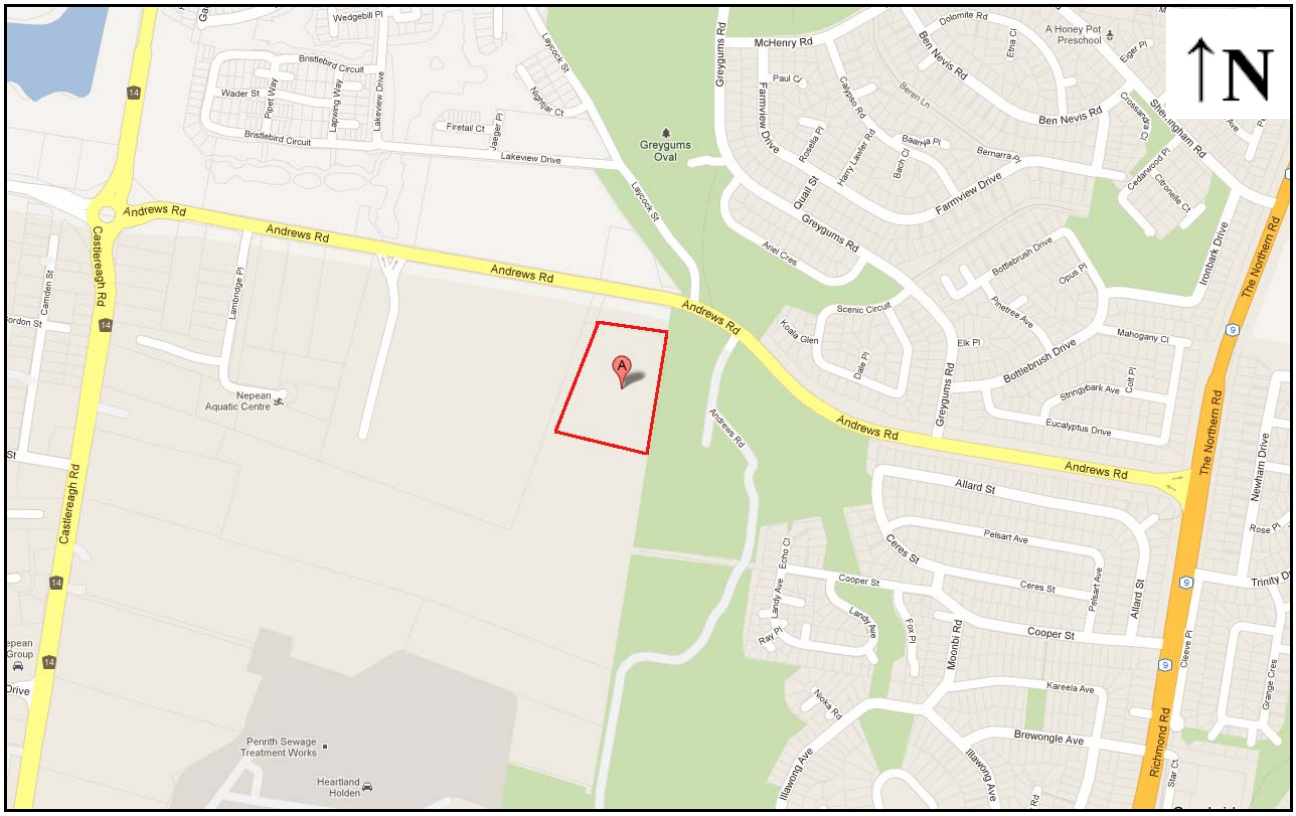
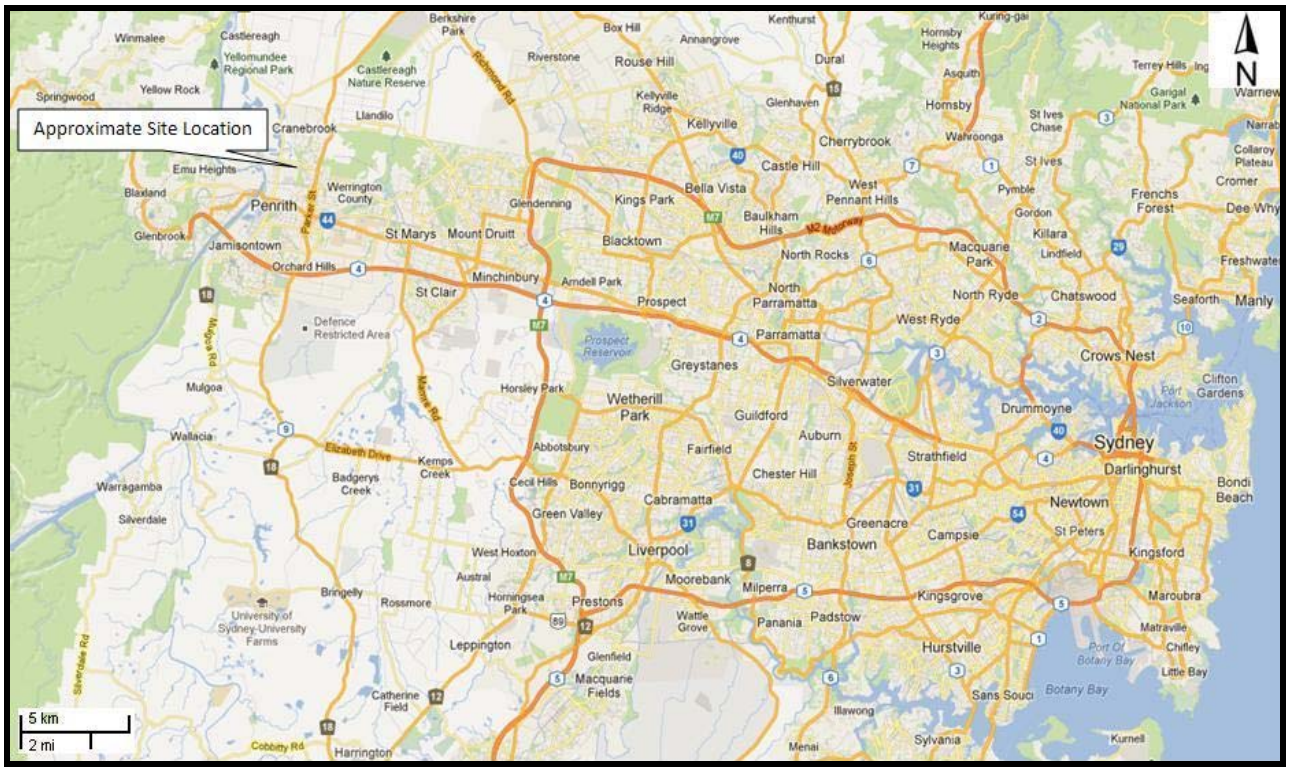


Figure 2-2: Regional Context Map



The subject land is described as Lot 1 DP 747153 and is commonly known as No. 126 Andrews Road Penrith. It is a regular shaped parcel with a frontage of 161.6m to Andrews Road (northern boundary) with this boundary some 55m from the road reservation boundary with the intervening land being a drainage reserve. The land has a southern boundary of 204.43m, a western boundary of 226.77m and an eastern boundary of 232.48m. The land has an area of 4.221 hectares.

2.1.2.1 Surrounding Development

The following Figure 2-3 provides an aerial view of the subject land and the surrounding development.

The subject land is located at the eastern edge of the Penrith industrial area with open space (Penrith Rugby Club and baseball complex) adjoining to the east. Further to the east, beyond the open space, is residential development. To the south is land zoned for industrial purposes (IN1) and the sewerage treatment plant. To the west is further land zoned for industrial purposes extending up to and beyond Castlereagh Road. To the north across Andrews Road is also land zoned for industrial purposes (IN2), thence residential development further to the north.

Figure 2-3: Aerial View of the Subject Land and the Surrounding Development



2.1.2.2 Existing Development

Currently erected on the land is a freestanding brick and metal clad factory building located generally central to the site. The building has a floor space of 7500sqm with a further 500sqm as office floor space. The boundary setbacks are:

Front	40m (95m from Andrews Road)
Eastern side	55m to 70m – average 62m
Western side	50m to 55m – average 53m
Southern side	72m to 80m – average 76m

The following aerial photograph as Figure 2-4 indicates the built form.

The factory building, which was erected circa 1986, has a finished floor level of RL 25.44m AHD. In 1993 the use of the building for the manufacture of fertilizers commenced and some additional hardstand was provided in 1994.

That use has now ceased and the building is now vacant. It is noted that the proposed use does not involve extensions to the building with additional works involving only the provision of external storage bunkers (10) to the south and east of the existing hard stand. These bunkers have dimensions of 15m by 2.5m and will occupy 3700sqm of the site. Some additional filling and concrete pavement of 3000sqm is required to accommodate vehicle access to these bunkers.

Figure 2-4: Existing Built Form



Access is obtained via a combined ingress/egress driveway off Andrews Road at the western boundary and this includes the use of a ROW over Lots 3 and then Lot 2 DP 747153. Two existing weighbridges located to the west of the factory building and within the driveway access are to be retained.

Car parking (106 spaces) is provided at the building's frontage and service access is provided around the building.

2.1.2.3 Topography

The land is level with it having been filled to provide a building platform and associated access. Map FLD-012 of the LEP indicates all of the land is within a Flood Planning Area and the Provisions of Clause 6.3 of the LEP apply. This issue has been addressed by Brown Smart Consulting and is discussed in their report which is Appendix 3 of the EIS. It is noted that the finished floor level of the factory building is RL 25.44 AHD against a 1% flood level of RL 24.5m AHD. Compensatory works are proposed to offset the additional filling required to provide the bunkers and associated access.

2.1.2.4 Vegetation

Vegetation is restricted to site landscaping provided as part of the original development of the site and this is generally provided around the perimeter of the built form.

BioDesign have provided the following advice:

> *'A visual survey of the portion of the site where works are proposed identified that is has been previously cleared of almost all indigenous vegetation with the exception of a single, large Eucalyptus tereticornis specimen. The southern portion of the site where no works are proposed contains some small trees and shrubs that were not surveyed due to their distance from the works but it was noted that they included Melaleuca spp. likely indigenous to the area. The whole landscape surrounding the existing development consists mainly of Kikuyu grass that is heavily weed infested with tree plantings along the boundaries. The trees are a mixture of locally indigenous species and species that are indigenous to Sydney. They include a mature Eucalyptus tereticornis specimen that appears to be regrowth.*
>
> *Due to the highly disturbed site conditions and the lack of vegetation layers, a flora survey was not carried out. The proposed works include a landscape plan that will:*
>
> *1. Control weeds*
> *2. Establish locally indigenous plant species on the site*
> *3. Create layers of vegetation that are consistent with the natural ecological communities in the immediate vicinity of the site (including the wetland area)*
> *4. Retain the large logs of felled trees for habitat*
> *5. Work with the drainage on the site to ensure wetland flows are maintained.*
>
> *The landscape plan was prepared in close consultation with the hydrological engineer.*
>
> *On the basis that the proposed Flood Storage measures developed by Brown Smart Consulting and detailed in their report of 26 April 2012 will not adversely impact on wetland flows, it can be expected that the ecological values of this site will be greatly enhanced and improved under the proposed landscape and that adverse impacts on the local catchment associated with weeds will be reduced. Over time it can be expected that the habitat values of the site for local fauna species will improve significantly.'*

Landscaping plans have been prepared by Claron Consulting Pty Ltd and these plans indicate that there are 19 trees on-site with two to be removed to accommodate the bunkers and associated access (Shown as trees 9 and 10 in the schedule to sheet 1 of the plans). Additional tree planting as well as mass planting are proposed as detailed in sheet 3 of the landscape plans.

2.1.3 Planning Framework

2.1.3.1 Commonwealth Controls

Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act) would apply to the development of the subject land. The EPBC Act provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places—defined in the EPBC Act as matters of national environmental significance.

The eight matters of national environmental significance to which the EPBC Act applies are:

- World heritage sites;
- National heritage places;
- Wetlands of international importance (often called 'Ramsar' wetlands after the international treaty under which such wetlands are listed);
- Nationally threatened species and ecological communities;
- Migratory species;
- Commonwealth marine areas;
- The Great Barrier Reef Marine Park; and
- Nuclear actions.

In addition, the EPBC Act confers jurisdiction over actions that have a significant impact on the environment where the actions affect, or are taken on, Commonwealth land, or are carried out by a Commonwealth agency (even if that significant impact is not on one of the eight matters of 'national environmental significance'). Information about this special Commonwealth category is not included in this fact sheet.

Specifically, the EPBC Act aims to:

- Provide for the protection of the environment, especially matters of national environmental significance;
- Conserve Australia's biodiversity;
- Protect biodiversity internationally by controlling the international movement of wildlife;
- Provide a streamlined environmental assessment and approvals process where matters of national environmental significance are involved;
- Protect our world and national heritage; and
- Promote ecologically sustainable development.

The Federal Environment Minister's role under the EPBC Act is to protect areas of national environmental significance in accordance with the guiding principles of the EPBC Act. The Minister's role does not extend to development where there is no significant impact on one of the eight matters of national environmental significance set out above.

The proposed development would not have a significant impact on matters of National environment significance and as it is not on Commonwealth land the Provisions of the Act do not have application and the approval of the Minister is not required.

2.1.3.2 State Controls

2.1.3.2.1 Environmental Planning and Assessment Act 1979

The Environmental Planning and Assessment Act 1979 (EP&A) and the Environmental Planning and Assessment Regulation 2000 made there under contain Provisions to provide the framework for environmental planning in NSW. The Act and the Regulations include Provisions to ensure that proposals, which have the potential to impact on the environment, are subject to detailed assessment. Provisions for public involvement are also included.

Designated development

Section 77A of the Act contains Provisions in respect of Designated Development being:

> *Designated development is development that is declared to be designated development by an environmental planning instrument or the regulations.*

Section 79 of the Act contains Provisions in respect of Public participation—designated development and these Provisions will apply to the subject application.

Clause 4 (1) of the Regulations provide for development as described in Part 1 of Schedule 3 of the Regulations to be declared designated development.

In this regard the following definitions have relevance:

16 Crushing, grinding or separating works

(1) Crushing, grinding or separating works, being works that process materials (such as sand, gravel, rock or minerals) or materials for recycling or reuse (such as slag, road base, concrete, bricks, tiles, bituminous material, metal or timber) by crushing, grinding or separating into different sizes:

(a) that have an intended processing capacity of more than 150 tonnes per day or 30,000 tonnes per year, or

(b) that are located:

(i) within 40 metres of a natural waterbody or wetland, or

(ii) within 250 metres of a residential zone or dwelling not associated with the development.

(2) This clause does not apply to development specifically referred to elsewhere in this Schedule.

32 Waste management facilities or works

(1) Waste management facilities or works that store, treat, purify or dispose of waste or sort, process, recycle, recover, use or reuse material from waste and:

(a) that dispose (by landfilling, incinerating, storing, placing or other means) of solid or liquid waste:

(i) that includes any substance classified in the Australian Dangerous Goods Code or medical, cytotoxic or quarantine waste, or

(ii) that comprises more than 100,000 tonnes of "clean fill" (such as soil, sand, gravel, bricks or other excavated or hard material) in a manner that, in the opinion of the consent authority, is likely to cause significant impacts on drainage or flooding, or

(iii) that comprises more than 1,000 tonnes per year of sludge or effluent, or

(iv) that comprises more than 200 tonnes per year of other waste material, or

(b) that sort, consolidate or temporarily store waste at transfer stations or materials recycling facilities for transfer to another site for final disposal, permanent storage, reprocessing, recycling, use or reuse and:

(i) that handle substances classified in the Australian Dangerous Goods Code or medical, cytotoxic or quarantine waste, or

(ii) that have an intended handling capacity of more than 10,000 tonnes per year of waste containing food or livestock, agricultural or food processing industries waste or similar substances, or

(iii) that have an intended handling capacity of more than 30,000 tonnes per year of waste such as glass, plastic, paper, wood, metal, rubber or building demolition material, or

(c) that purify, recover, reprocess or process more than 5,000 tonnes per year of solid or liquid organic materials, or

(d) that are located:

(i) in or within 100 metres of a natural waterbody, wetland, coastal dune field or environmentally sensitive area, or

(ii) in an area of high watertable, highly permeable soils, acid sulphate, sodic or saline soils, or

(iii) within a drinking water catchment, or

(iv) within a catchment of an estuary where the entrance to the sea is intermittently open, or

(v) on a floodplain, or

(vi) within 500 metres of a residential zone or 250 metres of a dwelling not associated with the development and, in the opinion of the consent authority, having regard to topography and local meteorological conditions, are likely to significantly affect the amenity of the neighbourhood by reason of noise, visual impacts, air pollution (including odour, smoke, fumes or dust), vermin or traffic.

(2) This clause does not apply to:

(a) development comprising or involving any use of sludge or effluent if:

(i) the dominant purpose is not waste disposal, and

(ii) the development is carried out in a location other than one listed in subclause (1) (d), above, or

(b) development comprising or involving waste management facilities or works specifically referred to elsewhere in this Schedule, or

(c) development for which State Environmental Planning Policy No 52—Farm Dams and Other Works in Land and Water Management Plan Areas requires consent.

Waste is defined as:

Waste includes any matter or thing whether solid, gaseous or liquid or a combination of any solids, gases or liquids that is discarded or is refuse from processes or uses (such as domestic, medical, industrial, mining, agricultural or commercial processes or uses). A substance is not precluded from being waste for the purposes of this Schedule merely because it can be reprocessed, re-used or recycled or because it is sold or intended for sale.

The proposed use is Designated Development based on its locational characteristics in that the land is within 500m of residentially zoned land (in the case of a waste management facility or works) and is within 250m of a dwelling (in the case of both crushing, grinding or separating works and waste management facility or works). Further, the proposed use will have a handling capacity of in excess of 30,000 tonnes per year. Accordingly the proposed development would be declared as designated development. Public exhibition and notification is required pursuant to the Provisions of Section 79 of the Act.

Pursuant to the Provisions of Section 78A(8)(a) of the Act, an Environmental Impact Statement (EIS) is required to accompany an application that proposes a designated development. The Regulations detail the information required to be provided in the EIS and this information is so provided in this EIS.

The general matters for consideration are set out in Section 79C of the EP&A Act. The following table summarises these matters for consideration.

Table 2-1: Matters for Consideration Pursuant to Section 79c of the Act.

Matter	Comments
(a) the provisions of:	
(i) any environmental planning instrument, and	The proposed use is permissible with consent as Industry pursuant to the Provisions of Penrith LEP 2010 or as a Resource Recovery Facility pursuant to the provisions of SEPP (Infrastructure) 2007. See later comments.
(ii) any proposed instrument that is or has been the subject of public consultation under this Act and that has been notified to the consent authority (unless the Director-General has notified the consent authority that the making of the proposed instrument has been deferred indefinitely or has not been approved), and	None relevant at this stage.
(iii) any development control plan, and	Penrith DCP 2011 applies the provisions of which are discussed at Section 2.1.3.2.6. The proposed development is not inconsistent with the relevant provisions.
(iiia) any planning agreement that has been entered into under section 93F, or any draft planning agreement that a developer has offered to enter into under section 93F, and	There is no Planning Agreement applying.
(iv) the regulations (to the extent that they prescribe matters for the purposes of this paragraph), and	The proposed development represents designated development pursuant to Schedule 3 of the Regulations.
(v) any coastal zone management plan (within the meaning of the Coastal Protection Act 1979), *that apply to the land to which the development application relates,*	Not applicable.

Table 2-1: Matters for Consideration Pursuant to Section 79c of the Act.	
Matter	Comments
(b) the likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality,	As assessed and determined within this EIS.
(c) the suitability of the site for the development,	As assessed in this EIS the site is considered to be suitable for the proposed development.
(d) any submissions made in accordance with this Act or the regulations,	None made at this stage. Proposed development will be subject to the Public participation process.
(e) the public interest.	The proposed development is considered to be in the public interest.

Integrated development

Part 4 Division 5 of the EP&A Act contains provisions in respect of Integrated Development and Section 91 details what development requires other approvals. In this regard the following additional approvals are required:

- Protection of the Environment Operations Act 1997 - The proposed use is listed as Item 41 of Schedule 1 of the Act and an Environment Protection Licence (EPL) is required prior to carrying out any work.
- Rural Fires Act 1997 – Some of the land is shown on Council records as being bushfire prone (Section 149 Certificate).
- Roads Act 1993 – Works are to be carried out on St Andrews Road to facilitate safe and efficient access.
- Water Management Act 2000 – Topographic mapping by a blue line does not indicate the presence of a "river" within or adjoining the subject land, however, the NSW Office of Water has raised the possibility of a watercourse in the vicinity of the western boundary.

The office of Environment and Heritage requirements include the following matters:

2.1.3.2.2 Threatened Species Conservation Act 1995

The subject land is not biodiversity certified land (within the meaning of Part 7AA of the Threatened Species Conservation Act 1995). There is no approved bio banking agreement that applies to the land.

The subject land is not identified as containing threatened species. The subject land is not identified as being Natural Resources Sensitive land.

2.1.3.2.3 NSW Heritage Act 1977

No indigenous heritage issues are identified within or near the subject land (Section 149 Certificate, Clause 5.10 and Schedule 5 of the LEP and PLEP 2010 Heritage Map sheet HER_012).

2.1.3.2.4 Native Vegetation Act 2003

The *Native Vegetation Act 2003* (NV Act) provides for the protection from clearing of native vegetation, primarily within regional areas of NSW.

The subject land does not contain Native Vegetation.

2.1.3.2.5 State and Regional Environmental Planning Policies

The following table lists those policies that apply to the subject land.

Table 2-2: State and Regional Environmental Planning Policies

Policy	Comments
SEPP No 4 – Development Without Consent and Miscellaneous Exempt and Complying Development	No application
SEPP No 6 – Number of Storeys in a Building	No application
SEPP No 19 – Bushland in Urban Areas	No application
SEPP No 21 – Caravan Parks	No application
SEPP No 22 – Shops and Commercial Premises	No application
SEPP No 30 – Intensive Agriculture	No application
SEPP No 32 – Urban Consolidation (Redevelopment of Urban Lands)	No application
SEPP No 33 – Hazardous and Offensive Development.	No application. As discussed in Section 2.1.3.2.6 of this EIS, measures can be put in place such that the use is neither offensive nor hazardous.
SEPP No 50 – Canal Estate Development.	No application
SEPP No 55 – Remediation of Land.	The history of the use of the land would suggest that the land is not contaminated.
SEPP No 62 – Sustainable Agriculture	No application.
SEPP No 64 – Advertising and Signage.	Subject to future application.
SEPP No 65 – Design Quality of Residential Flat Development.	No application
SEPP No 70 – Affordable Housing (Revised Schemes)	No application
SEPP (Major Development) 2005.	No application
SEPP (Temporary Structures) 2007	No application
SEPP (Infrastructure) 2007.	Refer to Note 1 below.

Table 2-2: State and Regional Environmental Planning Policies	
Policy	Comments
SEPP (Mining, Petroleum Production and Extractive Industries) 2007	No application
SEPP (Major Development) 2005	No application as now amended
SEPP (State and Regional (Development) 2011	The proposed use as a "Resource recovery facility" as a type of "Waste and resource management facilities" is a use not listed as permissible with consent under PLEP 2010. As such it is State significant development pursuant to Clause 8 (1) and Schedule 1 - 23 (3) of the SEPP.
SEPP (State and Regional (Development) 2011	No application
SEPP (Building Sustainability Index: BASIX) 2004	No application
SEPP (Housing for Seniors or People with a Disability) 2004	No application
SEPP (Exempt and Complying Development Codes) 2008.	No application
SEPP (Affordable Rental Housing) 2009.	No application
Sydney REP No 9 – Extractive Industry (No 2 - 1995).	No application
Regional Environmental Plan No. 20 – Hawkesbury- Nepean River (No 2 – 1997)	Refer to comments below as Note 3.
Sydney Regional Environmental Plan No 11 – Penrith Lakes Scheme.	No application

Note 1 - SEPP (Infrastructure) 2007.

Clause 8 of the SEPP provides:

> *(1) Except as provided by subclause (2), if there is an inconsistency between this Policy and any other environmental planning instrument, whether made before or after the commencement of this Policy, this Policy prevails to the extent of the inconsistency.*

The Clause carries the following Note:

> *Note. Subclause (1) does not prevent a local environmental plan from making provision about development of a kind specified in Part 3 in a particular zone if the provisions of this Policy dealing with development of that kind do not apply in that zone.*

Penrith LEP 2010 does not contain a Provision that would limit the application of subclause (1).

Similarly Subclause (2) does not limit the application of Subclause (1).

Division 23 of the SEPP contains the following provisions in respect of Waste or resource management facilities.

> *120 Definitions*
>
> *In this Division: **prescribed zone** means any of the following land use zones or a land use zone that is equivalent to any of those zones:*
>
> *(a) RU1 Primary Production,*
> *(b) RU2 Rural Landscape,*
> *(c) IN1 General Industrial,*
> *(d) IN3 Heavy Industrial,*
> *(e) SP1 Special Activities,*
> *(f) SP2 Infrastructure.*

Comment – The subject land is within Zone IN1 General Industrial and as such is a prescribed zone.

Relevant definitions are:

***resource recovery facility** means a facility for the recovery of resources from waste, including such works or activities as separating and sorting, processing or treating the waste, composting, temporary storage, transfer or sale of recovered resources, energy generation from waste gases and water treatment, but not including re-manufacture of material or goods or disposal of the material by landfill or incineration.*

***waste disposal facility** means a facility for the disposal of waste by landfill, incineration or other means, including associated works or activities such as recycling, resource recovery and other resource management activities, energy generation from waste gases, leachate management, odour control and the winning of extractive material to generate a void for disposal of waste or to cover waste after its disposal.*

***waste or resource management facility** means a waste or resource transfer station, a resource recovery facility or a waste disposal facility.*

***waste or resource transfer station** means a facility for the collection and transfer of waste material or resources, including the receipt, sorting, compacting, temporary storage and distribution of waste or resources and the loading or unloading of waste or resources onto or from road or rail transport.*

Comment - The proposed use falls within the definition of a "*resource recovery facility*", which in turn falls within the definition of a "*waste or resource management facility*".

Clause 121 details Development that is permitted with consent as:

> *(1) Development for the purpose of waste or resource management facilities, other than development referred to in subclause (2), may be carried out by any person with consent on land in a prescribed zone.*

(2) Development for the purposes of a waste or resource transfer station may be carried out by any person with consent on:

(a) land in a prescribed zone, or

(b) land in any of the following land use zones or equivalent land use zones:

(i) B5 Business Development,

(ii) B6 Enterprise Corridor,

(iii) IN2 Light Industrial,

(iv) IN4 Working Waterfront, or

(c) land on which development for any of the following purposes is permitted with consent under any environmental planning instrument:

(i) industry,

(ii) business premises or retail premises,

(iii) freight transport facilities.

(3) Development for the purpose of the recycling of construction and demolition material, or the disposal of virgin excavated natural material (as defined by the Protection of the Environment Operations Act 1997) or clean fill, may be carried out by any person with consent on land on which development for the purpose of industries, extractive industries or mining may be carried out with consent under any environmental planning instrument.

Comment - The subject land is within a prescribed zone and as such is permitted with consent.

Clauses 122 and 123 have no application to the subject proposal.

Note 3 - Regional Environmental Plan No. 20 – Hawkesbury- Nepean River (No 2 – 1997)

The aim of this plan is to protect the environment of the Hawkesbury-Nepean River system by ensuring that the impacts of future land uses are considered in a regional context.

Clause 11 (18) includes particular Provisions in respect of Waste management facilities or works being:

(18) Waste management facilities or works

Definition:

Development for the purpose of waste management facilities or works described in Schedule 3 (Designated Development) to the Environmental Planning and Assessment Regulation 1994.
Consent required.
Additional matters for consideration by the consent authority:
(a) Any potential for groundwater contamination.
(b) The adequacy of the proposed leachate management system and surface water controls.
(c) The long-term stability of the final landform and the adequacy of the site management plan.
(d) If extraction of material is involved in the creation or other development of the waste management site, whether the extractive operation will have an adverse impact on the river system.

These matters for consideration have been considered in the assessment of the proposal as set out in the EIS.

2.1.3.2.6 Local Planning Controls

The subject land is located within the Local Government Area of Penrith City Council. Penrith Local Environmental Plan 2010 (PLEP 2010) applies to the land. Clause 1.9 of the LEP applies as:

> *1.9 Application of SEPPs*
>
> *(1) This Plan is subject to the provisions of any State environmental planning policy that prevails over this Plan as provided by section 36 of the Act.*
>
> *(2) The following State environmental planning policies (or provisions) do not apply to the land to which this Plan applies:*
>
> *State Environmental Planning Policy No 1—Development Standards*
> *State Environmental Planning Policy No 4—Development Without Consent and Miscellaneous Exempt and Complying Development* (clause 6 and Parts 3 and 4)
> *State Environmental Planning Policy No 60—Exempt and Complying Development*

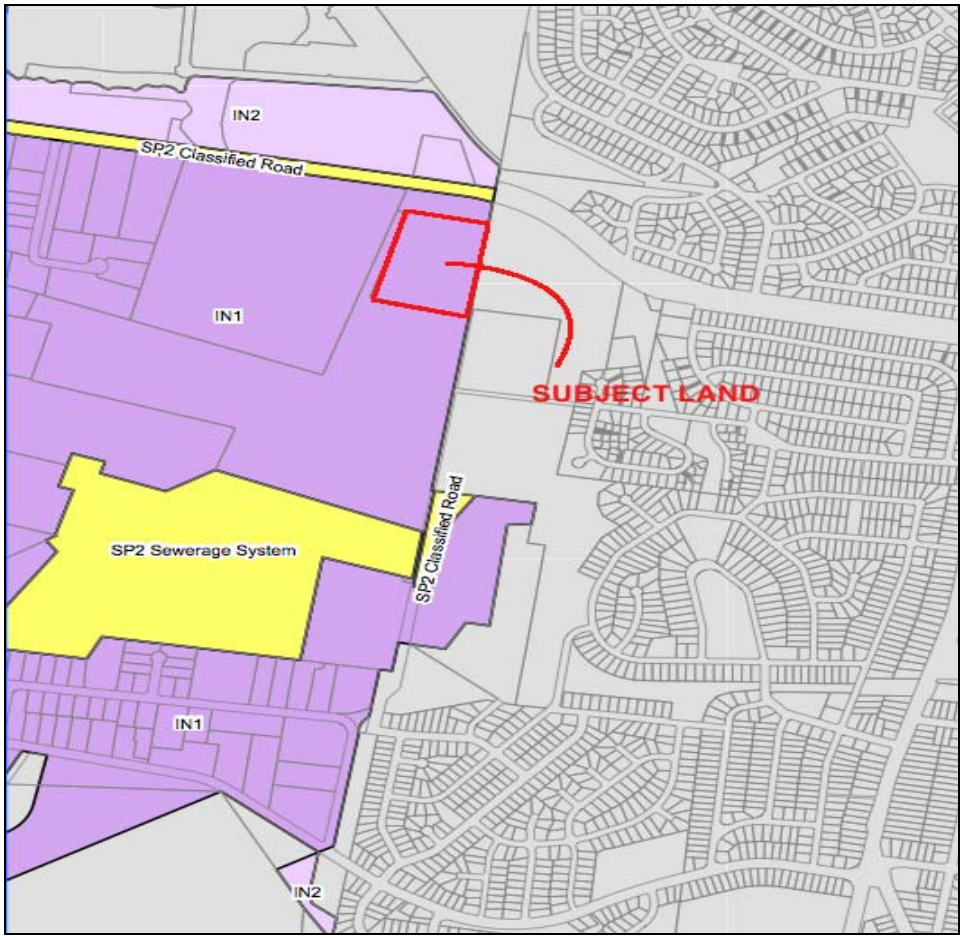
SEPP (Infrastructure) 2007 (among others) applies to the extent that despite the Provisions of the Land Use Table. This is confirmed in the note to that Land Use Table states:

> *Land Use Table*
>
> Note. A type of development referred to in the Land Use Table is a reference to that type of development only to the extent it is not regulated by an applicable State environmental planning policy. The following State environmental planning policies in particular may be relevant to development on land to which this Plan applies:
>
> *State Environmental Planning Policy (Affordable Rental Housing) 2009* (including provision for secondary dwellings).
> *State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004*.
> *State Environmental Planning Policy (Infrastructure) 2007*—relating to infrastructure facilities such as those that comprise, or are for, air transport, correction, education, electricity generating works and solar energy systems, health services, ports, railways, roads, waste management and water supply systems.
> *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007*.
> *State Environmental Planning Policy (Rural Lands) 2008*.
> *State Environmental Planning Policy No 33—Hazardous and Offensive Development*.
> *State Environmental Planning Policy No 50—Canal Estate Development*.
> *State Environmental Planning Policy No 62—Sustainable Aquaculture*.
> *State Environmental Planning Policy No 64—Advertising and Signage*.

It can be determined that the proposed use as a Resource Recovery Facility is a use permitted with consent under the Provisions of SEPP (Infrastructure) 2007.

For completeness the subject land is within Zone IN1 General Industrial. Figure 2-5 below is an extract of the Zoning Map with the subject land indicated.

Figure 2-5: Extract Of Zoning Map



The Land Use Table for this zone is:

Zone IN1 General Industrial

1 Objectives of zone

- *To provide a wide range of industrial and warehouse land uses.*
- *To encourage employment opportunities.*
- *To minimise any adverse effect of industry on other land uses.*
- *To support and protect industrial land for industrial uses.*
- *To promote development that makes efficient use of industrial land.*
- *To permit facilities that serve the daily recreation and convenience needs of persons working in industrial areas.*

2 Permitted without consent
Roads

3 Permitted with consent
Animal boarding or training establishments; Car parks; Depots; Environmental facilities; Environmental protection works; Flood mitigation works; Freight transport facilities; General industries; Hardware and building supplies; Industrial retail outlets; Industrial training facilities; Industries; Landscaping material supplies; Light industries; Neighbourhood shops; Plant nurseries; Recreation areas; Sawmill or log processing works; Self-storage units; Signage; Take away food and drink premises; Timber yards; Transport depots; Truck depots; Vehicle body repair workshops; Vehicle repair stations; Warehouse or distribution centres

4 Prohibited
Hazardous industries; Offensive industries; Any other development not specified in item 2 or 3
Relevant definitions contained within the LEP are:

general industry *means a building or place (other than a heavy industry or light industry) that is used to carry out an industrial activity.*
Note. General industries are a type of ***industry****—see the definition of that term in this Dictionary.*

industrial activity *means the manufacturing, production, assembling, altering, formulating, repairing, renovating, ornamenting, finishing, cleaning, washing, dismantling, transforming, processing, recycling, adapting or servicing of, or the research and development of, any goods, substances, food, products or articles for commercial purposes, and includes any storage or transportation associated with any such activity.*

industry *means any of the following:*
(a) general industry,
(b) heavy industry,
(c) light industry,
but does not include:
(d) rural industry, or
(e) extractive industry, or
(f) mining.

heavy industry *means a building or place used to carry out an industrial activity that requires separation from other development because of the nature of the processes involved, or the materials used, stored or produced, and includes:*
(a) hazardous industry, or
(b) offensive industry.
It may also involve the use of a hazardous storage establishment or offensive storage establishment.
Note. Heavy industries are a type of ***industry****—see the definition of that term in this Dictionary.*

> ***light industry*** *means a building or place used to carry out an industrial activity that does not interfere with the amenity of the neighbourhood by reason of noise, vibration, smell, fumes, smoke, vapour, steam, soot, ash, dust, waste water, waste products, grit or oil, or otherwise, and includes any of the following:*
> *(a) high technology industry,*
> *(b) home industry.*
> *Note. Light industries are a type of* ***industry****—see the definition of that term in this Dictionary.*

Absent a definition of a "Resource recovery facility" being a type of "Waste or resource management facility" the proposed use would fall within the definition of "Industry" and for the reasons set out in this EIS the use is not one that requires separation from other uses as it is not hazardous or offensive. The proposed use is permissible with consent; however, the Provisions of SEPP (Infrastructure) 2007 prevail as to the definition of the use.

The LEP also contains the following definition:

> ***waste or resource management facility*** *means any of the following:*
> *(a) a resource recovery facility,*
> *(b) a waste disposal facility,*
> *(c) a waste or resource transfer station,*
> *(d) a building or place that is a combination of any of the things referred to in paragraphs (a)–(c).*

This use is not listed as being permissible with consent in the Land Use table, however, as indicated earlier the Provisions of SEPP (Infrastructure) 2007 apply and, as discussed at Section 2.1.3.2.5 the use as a Resource Recovery Facility is permissible with consent.

The subject development is neither exempt nor complying development. The subject land does not contain an item of heritage. The proposed use is consistent with the relevant development standards as contained within Part 4 of the LEP. Other Provisions within Part 6 Clause 6 of the LEP that have relevance include:

6.1 Earthworks
The application involves the use of existing premises and there are no earthworks required.

6.2 Salinity
The application involves the use of existing premises and there are no salinity issues.

6.3 Flood planning

The subject land is within a flood planning area (PLEP Flood planning land map – sheet FLD_012). As indicated earlier some filling is required to accommodate the proposed bunkers and associated access. This matter is addressed in the report prepared by Brown Smart Consulting.

6.4 Development on natural resources land
The subject land is not natural resources land.

6.5 Protection of scenic character and landscape values

The land is identified as being land with scenic and landscape qualities (PLEP 2010 Scenic and landscape values map – sheet SLV_012). The application involves the use of existing premises and there will be no change to the existing building. External works involve the erection of 10 storage bunkers covering an area of 3700sqm and with height of 3m. View corridors are identified from the adjoining rugby park located to the east. A combination of mounding and dense planting is proposed as screening of the bunkers as well as the existing factory building.

6.6 Services

The subject land is provided with all necessary services.

Draft Local Planning Policies

Draft Penrith LEP (Environmental Heritage) 2011 applies. It has been exhibited and is with the DoPI for final assessment. This Draft Policy does not introduce any heritage issues in respect of the existing building and use of same.

The other reference to amendment no.1 has been completed and forms part of the LEP addressed above.

Penrith Development Control Plan 2010 (PDCP 2010)

This DCP applies to the subject land and the relevant sections are Part B - Principles, Part C – Controls applying to all land uses and Part D4 – Industrial Development. These Provisions have been considered in the context that the application does not involve new development and is a use application only.

Part B contains a series of 10 principles on which the DCP is based being:

Principle 1 - Provide a long term vision for cities, based on sustainability; intergenerational, social, economic and political equity; and their individuality.
Principle 2 - Achieve long term economic and social security.
Principle 3 - Recognise the intrinsic value of biodiversity and natural ecosystems, and protect and restore them.
Principle 4 - Enable communities to minimise their ecological footprint.
Principle 5 - Build on the characteristics of ecosystems in the development and nurturing of healthy and sustainable cities.
Principle 6 - Recognise and build on the distinctive characteristics of cities, including their human and cultural values, history and natural systems.
Principle 7 - Empower people and foster participation.
Principle 8 - Expand and enable cooperative networks to work towards a common, sustainable future.
Principle 9 - Promote sustainable production and consumption, through appropriate use of environmentally sound technologies and effective demand management.
Principle 10 - Enable continual improvement, based on accountability, transparency and good governance.

The proposed development is not inconsistent with these principles. The application involves the use of currently vacant and unproductive industrial floor space in a sustainable manner whilst providing social and economic benefits. The use can occur without environmental impact whilst promoting reuse of materials and creating employment opportunities.

Part C includes controls that apply to all land uses which need to be considered in the context of the application, which involves the use of an existing building with some additional external works (bunkers and associated access).

Site planning includes the maintenance of the existing built form, access parking and circulation. The proposed bunkers will cover an area of 3700sqm and are to be located in the rear section of the land such that they can be accessed off an extended circulation driveway. The height of the bunkers (and the associated storage) is 3m compared to the factory building height of 10m. Setbacks for the bunkers range from 19m to 27m east, 20m to 30m south and 40m to the west. The available setback areas provide ample opportunity for landscaping as demonstrated in the landscaping plans. The application involves the removal of 2 of the 19 trees on-site with more than compensatory planting proposed. Provision of the bunkers and associated access will require some filling together with compensatory works as detailed in the report prepared by Brown Smart Consulting. Waste management is detailed at Section 5.6 of this EIS. Landscaping plans form part of the application and a general upgrading of the site can be anticipated. There are no cultural or heritage issues. There will be negligible impact on the public domain with only minor additional pavement to Andrews Road to facilitate safe entry and exit. This represents a positive benefit. Advertising will involve use identification and will be the subject of a future application as required. Traffic matters have been addressed in the Traffic Impact Assessment carried out by Transport and Urban Planning Pty Ltd. No subdivision is involved. Noise and vibration issues are addressed within this EIS. The site is fully serviced.

Part D includes controls that apply to Industrial development and again these need to be considered in the context of use of an existing factory building. The subject land is located within Precinct 5.

Building Height – Existing building height is 10m and no change is proposed. Proposed bunkers are to have a height of 3m.

Building setbacks – Current factory building setbacks are:

Front	40m (95m from Andrews Road)
Eastern side	55m to 70m – average 62m
Western side	50m to 55m – average 53m
Southern side	72m to 80m – average 76m

No changes are proposed. Front and side setbacks exceed DCP controls. Bunker setbacks range from 19m to 27m east, 20m to 30m south and 40m west. Available setbacks (not built upon or concreted) are 40m west, 25m (average) south and minimum 20m east and these provide ample opportunities for landscaping as detailed in the landscaping plans. Overall site improvement in landscaping can be anticipated.

Building Design – Existing building to be maintained and upgraded as required. Additional works (storage bunkers) are to be constructed at rear of the site with extensive landscaping to screen these areas from the adjoining rugby park.

Storage of Materials and Chemicals – Proposed bunkers to provide external storage of product to a height of 3m and located on the rear sections of the site. Potentially visual from rugby park, however, extensive landscaping proposed to negate impact as well as significantly improving the visual impact of the existing building and associated service areas.

Access and Servicing – Existing access to be maintained with some additional pavement to Andrews Road as recommended by Transport and Urban Planning. Circulation around the building to be enhanced. Existing car parking to be maintained at 106 spaces including two disabled spaces. DCP parking rate for industries is 1 space per 75sqm which when applied to the floor space (8000sqm) requires 106 spaces. This provision will well exceed actual demand based on employment numbers.

It is determined that the proposed development is consistent with the DCP controls.

2.2 CONSULTATION

Consultation with government departments and the local community plays an important role in ensuring all potential environmental impacts are evaluated. The consultation process provides the opportunity to identify and prioritise issues. Key aspects identified through both the government and community consultation process are addressed in varying degrees throughout this report.

2.2.1 Regulatory Consultation

Key regulatory stakeholders including the Department of Planning and Infrastructure, NSW Environment Protection Authority, Penrith City Council, the NSW Department of Primary Industries - Office of Water were consulted as part of this development application.

2.2.1.1 Department of Planning and Infrastructure

The NSW Department of Planning and Infrastructure (DoPI) provides the initial contact between the proponent and State Government authorities during the planning and approval process of proposed developments. An application form and a concept report outlining the proposed development (see Appendix 2), was submitted to the DoPI to allow preparation of the Director General's Requirements. The following government departments were contacted to provide requirements for the proposed development:

- NSW Environment Protection Authority (NSW EPA);
- Penrith City Council; and
- NSW Department of Primary Industries – NSW Office of Water.

During consultation with the Department of Planning and Infrastructure, it was determined that the development constituted State Significant Development and the Minister for Planning and Infrastructure is the Consent Authority for the proposal. Director General's Requirements are detailed in Section 2.3 of this report.

2.2.1.2 Penrith City Council

Discussions were held between the proponent's representatives and Council officers.

2.2.1.3 NSW Environment Protection Authority

Discussions were held between the proponent's representatives and NSW EPA.

2.2.1.4 NSW Department of Primary Industries – NSW Office of Water

Discussions were held between the proponent's representatives and NSW Department of Primary Industries.

2.2.1.5 RTA

No Consultation was considered necessary as it is a Council controlled road.

2.2.2 Community Consultation

Benbow Environmental undertook community consultation with residences, property owners and stakeholders surrounding the project site including:

- Nearest Identified Residents to the Site;
- Stockland Holdings;
- Adjoining Industrial Premises; and
- Adjacent Rugby Union Club.

Representatives from Benbow Environmental visited residential properties nearest to the project site to follow up information provided in the leaflet, invite comment and answer any concerns regarding the project.
The letter is presented in Appendix 7.

The main issue of concern was noise and this has been assessed in detail to ensure there would be no excessive night time activities or intrusive issues.

2.2.3 Public Participation on Submission of Development Application

In accordance with s. 89(F) of the Environmental Planning and Assessment Act, 1979, this EIS must be advertised through a process of public notification and the EIS put on public display.

During the 30 day public exhibition period, the public is invited to make comment and forward submissions to the consent authority, the Minister for Planning and Infrastructure.

2.3 DIRECTOR GENERAL'S REQUIREMENTS

In accordance with requirements under Schedule 2, Part 2(3) of the *Environmental Planning and Assessment (EP&A) Regulation 2000*, Director General's Requirements were obtained for the proposed development. A copy of the Director General's Requirements are presented below and in Appendix 1.

Key environmental planning issues raised by the requirements and subsequently addressed in this EIS are identified in the table below:

Table 2-3: Compliance with Director General's Requirements

Director General's Requirement	EIS Reference	
	Section	Page No
DEPARTMENT OF PLANNING		
General Requirements		
The Environmental Impact Statement (EIS) for the development must meet the form and content requirements in Clauses 6 and 7 of Schedule 2 of the *Environmental Planning and Assessment Regulation 2000.*		
In addition, the EIS must include a:		
• detailed description of the development, including:		
- need for the proposed development having particular regard to the aims, objectives, and guidance in the *NSW Waste Avoidance and Resource Recovery Strategy 2007;*	1.3.2	1-4
- justification for the proposed development;	9.1	9-1
- likely staging of the development - including construction, and operational stage/s;	3.7	3-35
- likely interactions between the development and existing, approved and proposed operations in the vicinity of the site;	1.7, 4	1-10, 4-1
- plans of any proposed building works;		
• consideration of all relevant environmental planning instruments, including identification and justification of any inconsistencies with these instruments;	3.2.1	3-11
• risk assessment of the potential environmental impacts of the development, identifying the key issues for further assessment;	2.1.3	2-7
• detailed assessment of the key issues specified below, and any other significant issues identified in this risk assessment, which includes:	1.6	1-9
- a description of the existing environment, using sufficient baseline data;	4	4-1
- an assessment of the potential impacts of all stages of the development, including any cumulative impacts, taking into consideration relevant guidelines, policies, plans and statutes;	5, 6, 7	5-1, 6-1, 7-1
- a description of the measures that would be implemented to avoid, minimise and if necessary, offset the potential impacts of the development, including proposals for adaptive management and/or contingency plans to manage any significant risks to the environment;	8	8-1

Table 2-3: Compliance with Director General's Requirements

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- consolidated summary of all the proposed environmental management and monitoring measures, highlighting commitments included in the EIS.	10	10-1
Form of Environmental Impact Statement (Clause 6 of Schedule 2 of *Environmental Planning and Assessment Regulation 2000*): (a) the name, address and professional qualifications of the person by whom the statement is prepared, (b) the name and address of the responsible person, (c) the address of the land: (i) in respect of which the development application is to be made, or (ii) on which the activity or infrastructure to which the statement relates is to be carried out, (d) a description of the development, activity or infrastructure to which the statement relates, (e) an assessment by the person by whom the statement is prepared of the environmental impact of the development, activity or infrastructure to which the statement relates, dealing with the matters referred to in this Schedule, (f) a declaration by the person by whom the statement is prepared to the effect that: (i) the statement has been prepared in accordance with this Schedule, and (ii) the statement contains all available information that is relevant to the environmental assessment of the development, activity or infrastructure to which the statement relates, and (iii) that the information contained in the statement is neither false nor misleading.	Front As above As above As above As above 3 5, 6, 7 Front As above As above As above	Front As above As above As above As above 3-1 5-1, 6-1, 7-1 Front As above As above As above
Content of environmental impact statement (Clause 7 of Schedule 2 of *Environmental Planning and Assessment Regulation 2000*): (a) a summary of the environmental impact statement, (b) a statement of the objectives of the development, activity or infrastructure, (c) an analysis of any feasible alternatives to the carrying out of the development, activity or infrastructure, having regard to its objectives, including the consequences of not carrying out the development, activity or infrastructure, (d) an analysis of the development, activity or infrastructure, including: (i) a full description of the development, activity or infrastructure, and (ii) a general description of the environment likely to be affected by the development, activity or infrastructure, together with a detailed description of those aspects of the environment that are likely to be significantly affected, and (iii) the likely impact on the environment of the development, activity or infrastructure, and	EXECUTIVE SUMMARY 1.3.1 1.4 3 4 5, 6, 7	i 1-4 1-6 3-1 4-1 5-1, 6-1, 7-1

Table 2-3: Compliance with Director General's Requirements		
Director General's Requirement	EIS Reference	
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(iv) a full description of the measures proposed to mitigate any adverse effects of the development, activity or infrastructure on the environment, and	5, 6, 7, 8	5-1, 6-1, 7-1, 8-1
(v) a list of any approvals that must be obtained under any other Act or law before the development, activity or infrastructure may lawfully be carried out,	1.5	1-8
(e) a compilation (in a single section of the environmental impact statement) of the measures referred to in item (d) (iv),	8	8-1
(f) the reasons justifying the carrying out of the development, activity or infrastructure in the manner proposed, having regard to biophysical, economic and social considerations, including the principles of ecologically sustainable development	9.1	9-1
Key Issues		
The EIS must address the following specific matters:		
Statutory – a consideration of the proposal against all relevant planning instruments including, but not limited to the *Penrith Local Environment Plan 2010* and the relevant *Development Control Plans* (DCP's), and *Sydney Regional Environmental Plan No. 20 – Hawkesbury Nepean River.*	2.1.3	2-7
Waste Management – including:		
• identify, classify and quantify the likely waste streams that would be handled/stored/disposed of at the facility;	5.6.2, 5.6.3	5-181, 5-182
• describe how this waste would be stored and handled on site, and transported to and from the site including waste sources;	3.2.3, 5.6.3	3-21, 5-182
• clearly describe the glass beneficiation technology, timeframes for processing waste and the quality control measures that would be implemented;	3.2.2, 5.6.3	3-15, 5-182
• detail how the proposed plant would operate in conjunction with the neighbouring glass container manufacturing plant; and	3.2.2	3-15
• detail the potential impacts associated with receiving, processing and storing the incoming glass and with dispatching of the cullet product.	3.4	3-24
Soil & Water – including:		
• consideration of potential local and mainstream flooding impacts;	5.3.1.4	5-147
• potential impacts on watercourses and riparian areas, wetlands, watercourses and riparian areas, groundwater and groundwater dependent communities nearby;	5.3.1, 5.3.4 - 5.3.9	5-146, 5-155,
• any proposed erosion and sediment controls (during construction);	5.3.9	5-166
• the proposed stormwater management system;	5.3.1.3	5-147
• a detailed water balance for the development including water supply and an outline of the measures that would be implemented to minimise the use of water on site and wastewater disposal; and	5.3.1.6	5-148
• consideration of the nature and extent of any contamination on the site and potential contamination impacts.	5.4.1, 5.4.2	5-169, 5-169

Table 2-3: Compliance with Director General's Requirements

Director General's Requirement	EIS Reference	
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Noise – including a quantitative assessment of potential: • construction, operational and traffic noise impacts; and • details of the proposed management and monitoring measures.	5.2	5-53
Air Quality – including: • air quality impacts arising from the construction and operation of the proposed plant, particularly in relation to dust during processing and impacts on sensitive receptors (both current and proposed); and • details of the proposed management and monitoring measures.	5.1	5-1
Traffic and Transport – including: • details of truck routes; • predictions of the traffic volumes likely to be generated during construction and operation; • an assessment of the impacts of this traffic on the safety, capacity and efficiency of the surrounding road network; • modelling of key intersections (including any nearby existing or proposed developments); • detailed assessment on the need for upgrading or road improvement works on Andrews Road; • details of the availability of non-car travel modes and measures to encourage greater use of these travel modes; and • access and parking.	6.7	6-30
Hazards – including an assessment of the potential fire risks of the development.	5.7	5-184
Greenhouse Gas – including: • a quantitative assessment of the potential scope 1 and 2 greenhouse gas emissions of the development; and	6.5.3	6-22
• a detailed description of the measures that would be implemented on site to ensure that the development is energy efficient.	6.5.4	6-27
Visual – including; • an assessment of the potential visual impacts of the development on the amenity of the surrounding area; and	6.2.2	6-11
• a detailed description of the measures that would be implemented to minimise the visual impacts of the development, including the design features, landscaping and measures to minimise the lighting and signage impacts of the development.	6.2.3	6-12
Socio-Economic – including a comprehensive assessment of the potential economic and social impacts of the development, demonstrating that it would have a net benefit for the community, paying particular attention to the potential impacts of the development on waste minimisation and resource recovery in the region.	6.4	6-13

Table 2-3: Compliance with Director General's Requirements		
Director General's Requirement	EIS Reference	
	Section	Page No
Biodiversity – including impacts on flora and fauna located on the site and surrounds.	5.5	5-171
Plans and Documents		
The EIS must include all relevant plans, architectural drawings, diagrams and relevant documentation required under Schedule 1 of the *Environmental Planning and Assessment Regulation 2000*. These documents should be included as part of the EIS rather than as separate documents.	Yes	
Consultation		
During the preparation of the EIS, you must consult with the relevant local, State or Commonwealth Government authorities, service providers, community groups and affected landowners. In particular you must consult with: • Environment Protection Authority; • Department of Primary Industries (including the NSW Office of Water); • Transport for NSW (including Roads and Maritime Services); • Penrith City Council; and • the local community and stakeholders. The EIS must describe the consultation process and the issues raised, and identify where the design of the development has been amended in response to these issues. Where amendments have not been made to address an issue, a short explanation should be provided.	2.2	2-23
References		
The assessment of the key issues listed above must take into account relevant guidelines, policies, and plans as identified. While not exhaustive, Appendix 1 contains a list of some of the guidelines, policies, and plans that may be relevant to the environmental assessment of this development.	2.1.3.2, 11	2-8 11-1
PENRITH CITY COUNCIL		
• General site affectations The property is identified as being partly bushfire prone land, subject to flood related development controls and as having scenic and landscape values.	5.7.3, 5.3.1.4	5-185, 5-147
• Planning Policies The following planning policies are relevant to the proposed development and are to be addressed in any application for development: *State Planning Policy* State Planning Policy No. 33 – Hazardous and Offensive Development, Protection of the Environment Operations Act, 1997, Roads Act, 1993 and Rural Fires Act, 1997 apply to the proposal. *Regional Planning Policy* Sydney Regional Environmental Plan No. 20 – Hawkesbury Nepean River applies to the site.	2.1.3.2.5 2.1.3.2.5 (note 3)	2-13

Table 2-3: Compliance with Director General's Requirements

Director General's Requirement	EIS Reference	
	Section	Page No
Local Planning Policy The Penrith Local Environment Plan 2010 applies to the site. The site is zoned IN1 (General Industrial). This policy contains aims and objectives for the zone and the plan, provisions relating to the development including, but not limited to, earthworks, salinity, flood planning and scenic & landscape values.	2.1.3.2.6	2-17
Draft Local Planning Policy There is a planning proposal, "Amendments to Penrith Local Environment Plan 2010 and draft Penrith Local Environment Plan (Environmental Heritage Conservation) 2011" that applies to the subject site. Its gazettal is imminent.	2.1.3.2.6	
Development Control Plans Penrith Development Control Plan 2010 applies to the site. The most pertinent chapters to consider are C3 (Water Management), C4 (Landscape Management), C5 (Waste Management), C6 (Landscape Design), C10 (Transport, Access and Parking), C12 (Noise and Vibration), D4 (Industrial Development) and E4 (Waterside Corporate); the latter being relevant given it's proximity to residential land.	2.1.3.2.6	
• Planning Issues		
Flooding and other engineering matters You are advised to comply with Council's policies pertaining to water management and flood liable land as referred above as well as the State Government Floodplain Development Manual. The following comments are provided from Council's Development Engineers: a) The proposal must not have an adverse impact with regard to local and mainstream flooding; and b) The location of the bunkers on the eastern side of the building are within the flood path and are unlikely to be supported; c) The site is affected by mainstream flooding from the Nepean River; d) The flood level for the site is 25.4m Australian Height Datum (AHD); e) Please note the following: i) There is a current application from Stocklands for the development of Waterside Corporate which will require upgrades to Andrews Road; ii) Council currently holds a bond for access works at the front of this site within Council owned land;	Appendix 3	
Traffic generation and car parking You are advised to require a traffic report considering (but not limited to) the following issues:	Appendix 5	

Table 2-3: Compliance with Director General's Requirements

Director General's Requirement	EIS Reference	
	Section	Page No
a) Traffic generation potential including times and split proportion of vehicles and trucks; b) Adequacy of proposed car parking for the proposed demand; c) Requirement for trucks to enter and exit the site in a forward direction; d) If Andrews Road is not an existing B-Double route then road improvements/upgrades may be required (please confirm with RMS); e) Subject to the above point, swept path allowance and queuing storage for B-Double vehicles on Andrews Road; f) Requirement for traffic controls on Andrews Road and the access to the site; g) Proximity of opposing driveways on Andrews Road and potential for conflict; h) RMS consideration as this is a significant regional road corridor; i) Adequate turnaround and parking provision for trucks and vehicles; and j) Internal and external cycling and pedestrian movement assessment to ensure safety and connectivity and promote these two forms of transport to the site. In this regard, shared pathway connectivity would be recommended. The proposal must demonstrate no adverse traffic impacts on Andrews Road allowing for all required turning movements.		
Noise and acoustic performance The nearby residential estate of Waterside was planned to ensure existing nearby industrial land uses were not going to impact upon the residential use. The LEP and DCP that provides for Waterside set a threshold where development could not occur until compliance could be demonstrated, as modelled on industries in existence at the time. Therefore, the proposed development would need to demonstrate either: a) The proposed use is not additional noise source; or b) Any proposed noise can be mitigated enough not to effect nearby residential development. Any acoustic analysis is to address any noise source including crushing, smashing, traffic, machinery operation including trucks and ventilation systems on a 24 hour basis to align with the proposed hours of operations. All noise sources are not to be assessed in isolation but rather modelled for their cumulative impact with other existing/planned industries (practically those surrounding Andrews Road) as undertaken in previous noise modelling for the area.	5.2	5-53

Table 2-3: Compliance with Director General's Requirements

Director General's Requirement	EIS Reference	
	Section	Page No
Environmental The EIS should adequately outline the likely impacts of the development and include details on all proposed mitigation measures including:		
a) The likely impact/mitigation strategies for Wetland 158 which is identified in SREP 20 (Wetland 158 is located to the rear of the site).	8.1	8-1
b) Any impact on the flora and fauna located on the site and surrounds. Test of significance to satisfy the requirement of Section 5A of the Environmental Planning & Assessment Act 1979.	5.3, 5.3.1.5, 5.3.9 5.5	5-146, 5-148, 5-166 5-171
c) Details on the impact on stormwater and how it will be managed both on and off site.	5.3.1.3, 5.3.4, 5.3.8	5-147, 5-155, 5-165
d) Any odour proposed to be emitted as part of the proposed operations.	3.2.3, 3.4.1.4, 5.1.8.1	3-21, 3-25, 5-24
e) Whether any new furnaces are proposed in either site.	3.2.2	3-15
Community Consultation Council is able to provide a list of adjoining property owner/occupies and their postal address on your request to assist you to notify our community of the proposed development and the likely impacts.	2.2.2	2-24
NSW Environmental Protection Authority		
• Key Information Requirements		
1. Air qualities issues (including odour and dust management)	5.1	5-1
2. Noise impacts	5.2	5-53
3. Stormwater management and wastewater managements	5.3	5-146
4. Waste management	5.6	5-179
5. Ecologically sustainable development	6.6	6-28
6. Greenhouse gas assessment	6.5	6-20
7. Aboriginal cultural heritage	6.3.1	6-13
8. Native flora and fauna	5.5	5-171
9. Native vegetation	5.5.3	5-174

Table 2-3: Compliance with Director General's Requirements

Director General's Requirement	EIS Reference	
	Section	Page No
• Objectives of the Proposal 1. The objectives of the proposal should be clearly stated and refer to: a) the size and type of the operation, the nature of the processes and the products, by-products and wastes produced b) a life cycle approach to the production, use or disposal of products c) the anticipated level of performance in meeting required environmental standards and cleaner production principles d) the staging and timing of the proposal and any plans for future expansion e) the proposal's relationship to any other industry or facility	1.3.1	1-4
• Description of the Proposal – General	3	3-1
1. Outline the production process including:		
a) the environmental "mass balance" for the process – quantify in-flow and out-flow of materials, any points of discharge to the environment and their respective destinations (sewer, stormwater, atmosphere, recycling, landfill, etc)	Figure 3-13	3-20
b) any life-cycle strategies for the products.	3.2.4	3-22
2. Outline cleaner production actions, including: a) measures to minimise waste (typically through addressing source reduction) b) proposals for use or recycling of by-products c) proposed disposal methods for solid and liquid waste d) air management systems, including all potential sources of air emissions, proposals to re-use or treat emissions, emission levels relative to relevant standards in regulations, discharge points e) water management system including all potential sources of water pollution, proposals for re-use, treatment etc, emission levels of any wastewater discharged, discharge points, summary of options explored to avoid a discharge, reduce its frequency or reduce its impacts, and rationale for selection of option to discharge	0	3-34
3. Outline construction works, including:		
a) any earthworks or site clearing; re-use and disposal of cleared material (including use of spoil on site)	3.2.1	3-11
b) construction timetable and staging; hours of construction; proposed construction methods	3.2.1.2	3-15
c) environment protection measures, including noise mitigation measures, dust control measures and erosion and sediment control measures.	3.2.1.1	3-14

Table 2-3: Compliance with Director General's Requirements

Director General's Requirement	EIS Reference	
	Section	Page No
• Key Issues Relating to Air	5.1	5-1
1. Identify all sources of air emissions from the development	5.1.7.1, 5.1.8.1	5-20, 5-24
2. Provide details of the project that are essential for predicting and assessing air impacts including: a) the quantities and physio-chemical parameters (e.g. concentration, moisture content, bulk density, particle sizes, etc) of materials to be used, transported, produced or stored b) an outline of procedures for handling, transport, production and storage c) the management of solid, liquid and gaseous waste streams with potential for significant air impacts.	5.1.7, 5.1.8	5-20, 5-24
3. Describe the topography and surrounding land uses. Provide details of the exact locations of dwellings, schools, shopping centres, childcare centres and hospitals. Where appropriate, provide a perspective view of the study area such as the terrain file used in dispersion models.	5.1.4.4, 5.1.6, 5.1.3	5-10, 5-18, 5-2
4. Describe surrounding buildings that may affect plume dispersion.	5.1.4.4	5-10
5. Provide and analyse site representative data on following meteorological parameters: a) temperature and humidity b) rainfall, evaporation and cloud cover c) wind speed and direction d) atmospheric stability class e) mixing height (the height that emissions will be ultimately mixed in the atmosphere) f) katabatic air drainage g) air re-circulation	5.1.4	5-5
6. Describe baseline conditions: a) Provide a description of existing air quality and meteorology, using existing information and site representative ambient monitoring data b) For odour provide the emission rates in terms of odour units (determined by techniques compatible with EPA procedures). Use sampling and analysis techniques for individual or complex odours and for point or diffuse sources, as appropriate.	5.1.4.1 Not applicable	5-5
7. Assess impacts: a) Identify all pollutants of concern and estimate emissions by quantity (and size of particles), source and discharge point.	5.1.5, 5.1.7, 5.1.8, 5.1.9	5-16, 5-20, 5-24, 5-33

Table 2-3: Compliance with Director General's Requirements		
Director General's Requirement	EIS Reference	
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b) Estimate the resulting ground level concentrations of all pollutants. Where necessary (e.g. potentially significant impacts and complex terrain effects), use an appropriate dispersion model to estimate ambient pollutant concentrations. Discuss choice of model and parameters with EPA. c) Describe the effects and significance of pollutant concentration on the environment, human health, amenity and regional ambient air quality standards or goals. d) Describe the contribution that the development will make to regional and global pollution, particularly in sensitive locations. e) Reference should be made to relevant guidelines		
8. Describe management and mitigation measures: a) Outline specifications of pollution control equipment to be used at the site (including manufacturer's performance guarantees where available) and the management protocols for both point and fugitive emissions. Where possible, this should include cleaner production processes.	5.1.9.4	5-50
• Key Issues Relating to Noise and Vibration 1. Identify all noise sources from the development (including both construction and operation phases). Detail all potentially noisy activities including ancillary activities such as transport of goods and raw materials. 2. Specify the times of operation for all phases of the development and for all noise producing activities.	5.2	5-53
3. For projects with a significant potential traffic noise impact, provide details of road alignment (include gradients, road surface, topography, bridges, culverts, etc), and land use along the proposed road and measurement locations – diagrams should be to a scale sufficient to delineate individual residential blocks. 4. Identify any noise sensitive locations likely to be affected by activities at the site, such as residential properties, schools, churches, shopping centres, childcare centres and hospitals. Typically, the location of any noise sensitive locations in relation to the site should be included on a map of the locality. 5. Identify the land use zoning of the site and the immediate vicinity and the potentially affected areas. 6. Describe baseline conditions: a) Determine the existing background (L_{A90}) and ambient (L_{Aeq}) noise levels in accordance with *NSW Industrial Noise Policy*.		

Table 2-3: Compliance with Director General's Requirements		
Director General's Requirement	EIS Reference	
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b) Determine the existing road traffic noise levels in accordance with *NSW Environmental Criteria for Road Traffic Noise* where road traffic noise impacts may occur. c) The noise impact assessment report should provide details of all monitoring of existing ambient noise levels including: • details of equipment used for the measurements • a brief description of where the equipment was positioned • a statement justifying the choice of monitoring site, including the procedure used to choose the site, having regards to the definition of 'noise sensitive locations(s)' and 'most affected locations(s)' described in Section 3.1.2 of *NSW Industrial Noise Policy* • details of the exact location of the monitoring site and a description of land uses in surrounding areas • a description of the dominant and background noise sources at the site • day, evening and night assessment background levels for each day of the monitoring period • the final Rating Background Level (RBL) value • graphs of the measured noise levels for each day should be provided • a record of periods of affected data (due to adverse weather and extraneous noise), methods used to exclude invalid data and a statement indicating the need for any re-monitoring under Step 1 in Section B1.3 of *NSW Industrial Noise Policy* • determination of L_{Aeq} noise levels from existing industry.		
7. Assess impacts: a) Determine the project specific noise levels for the site. For each identified potentially affected receiver, this should include: • determination of the intrusive criterion for each identified potentially affected receiver • selection and justification of the appropriate amenity category for each identified potentially affected receiver • determination of the amenity criterion for each receiver • determination of the appropriate sleep disturbance limit. b) Maximum noise levels during night-time period (10pm-7am) should be assessed to analyse possible effects on sleep. Where $L_{A1(1min)}$ noise levels from the site are less than 15 dB above the background L_{A90} noise level, sleep disturbance impacts are unlikely. Where this is not the case, further analysis is required. Additional guidance is provided in Appendix B of *NSW Environmental Criteria for Road Traffic Noise*.		

Table 2-3: Compliance with Director General's Requirements

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	Section	Page No
c) Determine expected noise level and noise character (e.g. tonality, impulsiveness, vibration, etc) likely to be generated from noise sources during: • site establishment • construction • operational phases • transport including traffic noise generated by the proposal • other services. d) Determine the noise levels likely to be received at the most sensitive locations (these may vary for different activities at each phase of the development). Potential impacts should be determined for any identified significant adverse meteorological conditions. Predicted noise levels under calm conditions may also aid in quantifying the extent of impact where this is not the most adverse condition. e) The noise impact assessment report should include: • a plan showing the assumed location of each noise source for each prediction scenario • a list of the number and type of noise sources used in each prediction scenario to simulate all potential significant operating conditions on the site • any assumptions made in the predictions in terms of source heights, directivity effects, shielding from topography, buildings or barriers, etc • methods used to predict noise impacts including identification of any noise models used. Where modelling approaches other than the use of the ENM or SoundPlan computer models are adopted, the approach should be appropriately justified and validated • an assessment of appropriate weather conditions for the noise predictions including reference to any weather data used to justify the assumed conditions • the predicted noise impacts from each noise source as well as the combined noise level for each prediction scenario under any identified significant adverse weather conditions as well as calm conditions where appropriate • for developments where a significant level of noise impact is likely to occur, noise contours for the key prediction scenarios should be derived • an assessment for the need to include modification factors as detailed in Section 4 of *NSW Industrial Noise Policy*		

Table 2-3: Compliance with Director General's Requirements		
Director General's Requirement	EIS Reference	
	Section	Page No
f) Discuss the findings from the predicting modelling and, where relevant noise criteria have not been met, recommend additional mitigation measures. g) The noise impact assessment report should include details of any mitigation proposed including the attenuation that will be achieved and the revised noise impact predictions following mitigation. h) Where relevant noise/vibration criteria cannot be met after application of all feasible and cost effective mitigation measures the residual level of noise impact needs to be quantified by identifying: • locations where the noise level exceeds the criteria and extent of exceedance • numbers of people (or areas) affected • times when criteria will be exceeded • likely impact on activities (speech, sleep, relaxation, listening, etc) • change on ambient conditions • the result of any community consultation or negotiated agreement i) For the assessment of existing and future traffic noise, details of data for the road should be included such as assumed traffic volume; percentage heavy vehicles by time of day; and details of the calculation process. These details should be consistent with any traffic study carried out in the EIS.		

Table 2-3: Compliance with Director General's Requirements

Director General's Requirement	EIS Reference	
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8. Describe management and mitigation measures: a) Determine the most appropriate noise mitigation measures and expected noise reduction including both noise controls and management of impacts for both construction and operational noise. This will include selecting quiet equipment and construction methods, noise barriers or acoustic screens, location of stockpiles, temporary offices, compounds and vehicle routes, scheduling of activities, etc. b) For traffic noise impacts, provide a description of the ameliorative measures considered (if required), reasons for inclusion or exclusion, and procedures for calculation of noise levels including ameliorative measures. Also include, where necessary, a discussion of any potential problems associated with the proposed ameliorative measures, such as overshadowing effects from barriers. Appropriate ameliorative measures may include: • use of alternative transportation modes, alternative routes, or other methods of avoiding the new road usage • control of traffic (e.g. limiting times of access or speed limitations) • resurfacing of the road using a quiet surface • use of (additional) noise barriers or bunds • treatment of the façade to reduce internal noise levels buildings where the night-time criteria is a major concern • more stringent limits for noise emission from vehicles (i.e. using specially designed 'quiet' trucks and/or trucks to use air bag suspension • driver education • appropriate truck routes • limit usage of exhaust breaks • use of premium mufflers on trucks • reducing speed limits for trucks • ongoing community liaison and monitoring complaints • phasing in the increased road use.		
• Key Issues Relating to Water 1. Provide details of the project that are essential for predicting and assessing impacts to waters: a) including the quantity and physio-chemical properties of all potential water pollutants and the risks they pose to the environment and human health, including the risks they pose to Water Quality Objectives in the ambient waters (as defined on www.environment.nsw.gov.au/ieo, using technical criteria derived from the Australian and New Zealand Guidelines for Fresh and Marine Water Quality, ANZECC 2000) b) the management of discharges with potential for water impacts	4.6, 5.3 Appendices 3 & 4	4-13, 5-146

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c) drainage works and associated infrastructure; land-forming and excavations; working capacity of structures; and water resource requirements of the proposal d) Outline site layout, demonstrating efforts to avoid proximity to water resources (especially for activities with significant potential impacts i.e. effluent ponds) and showing potential areas of modification of contours, drainage, etc. e) Outline how total water cycle considerations are to be addressed showing total water balances for the development (with the objective of minimising demands and impacts on water resources). Include water requirements (quantity, quality and source(s)) and proposed storm and wastewater disposal, including type, volumes, proposed treatment and management methods and re-use options.		
2. Describe the catchment including proximity of the development to any waterways and provide an assessment of their sensitivity / significance from a public health, ecological and/or economic perspective. The Water Quality and River Flow Objectives on the website: www.environment.nsw.gov.au/ieo should be used to identify the agreed environmental values and human uses for any affected waterways. This will help with the description of the local and regional area. 3. Describe baseline conditions: a) Describe existing surface and groundwater quality – an assessment needs to be undertaken for any water resource likely to be affected by the proposal and for all conditions (e.g. a wet weather sampling program is needed if runoff events may cause impacts) b) Provide site drainage details and surface runoff yield c) State the ambient Water Quality and river Flow Objectives for the receiving waters. These refer to the community's agreed environmental values and human uses endorsed by the Government as goals for the ambient waters. These environmental values are published on the website: www.environment.nsw.gov.au/ieo. The EIS should state the environmental values listed for the catchment and waterway type relevant to your proposal. d) State the indicators and associated trigger values or criteria for the identified environmental values. This information should be sourced from the ANZECC 2000 *Guidelines for Fresh and Marine Water Quality*. e) State any locally specific objectives, criteria or targets, which have been endorsed by the government e.g. the Healthy Rivers Commission Inquiries (www.hrc.nsw.gov.au) or the NSW Salinity Strategy (DLWC, 2000) (www.dlwc.nsw.gov.au/care/salinity/#strategy) f) Where the site specific studies are proposed to revise the trigger values supporting the ambient Water Quality and River Flow Objectives, and the results are to be used for regulatory purposes (e.g. to assess whether a licensed discharge impacts on water quality objectives), then prior agreement from DECCW on the approach and study design must be obtained.		

Table 2-3: Compliance with Director General's Requirements

Director General's Requirement	EIS Reference	
	Section	Page No
g) Describe the state of the receiving waters and relate this to the relevant Water Quality and River Flow Objectives (i.e. are Water Quality and River Flow Objectives being achieved). Issues to include in the description of receiving waters could include: • lake or estuary flushing characteristics • specific human uses (e.g. exact location of drinking water off take) • sensitive ecosystems or species conservation values • a description of the condition of the local catchment e.g. erosion levels, soils, vegetation cover, etc • an outline of baseline groundwater information, including, but not restricted to, depth to watertable, flow direction and gradient, groundwater quality, reliance on groundwater by surrounding users and by the environment • historic river flow data where available for the catchment.		
4. Assess impacts: a) No proposal should breach clause 120 of the *Protection of the Environment Operations Act* 1997. b) Identify and estimate the quantity of all pollutants that may be introduced into the water cycle by source and discharge point including residual discharges after mitigation measures are implemented. c) Include a rationale, along with relevant calculations, supporting the prediction of the discharges. d) Describe the effects and significance of any pollutant loads on the receiving environment. This should include impacts of residual discharges through modelling, monitoring or both, depending on the scale of the proposal. Determine changes to hydrology (including drainage patterns, surface runoff yield, flow regimes, wetland hydrologic regimes and groundwater). e) Describe water quality impacts resulting from changes to hydrologic flow regimes (such as nutrient enrichment or turbidity results from changes in frequency and magnitude of stream flow). f) Identify any potential impacts on quality or quantity of groundwater describing their source g) Identify potential impacts associated with geomorphological activities with potential to increase surface water and sediment runoff or to reduce surface runoff and sediment transport. Also consider possible impacts such as bed lowering, bank lowering, in stream siltation, floodplain erosion and floodplain siltation. h) Identify impacts associated with the disturbance of acid sulphate soils and potential acid sulphate soils.		

Table 2-3: Compliance with Director General's Requirements

Director General's Requirement	EIS Reference	
	Section	Page No
i) Containment of spills and leaks shall be in accordance with the *Storing and Handling Liquids: Environmental Protection – Participants Manual* (DECWW, 2007), *Environmental Compliance Report: Liquid Chemical Storage, Handling and Spill Management – Part B Review of Best Practice and Regulation* (DEC, 2005) and the most recent versions of the Australian Standards referred to in the Guidelines. Containment should be designed for no-discharge. j) The significance of the impacts listed above should be predicted. When doing this it is important to predict the ambient water quality and river flow outcomes associated with the proposal and to demonstrate whether these are acceptable in terms of achieving protection of the Water Quality and River Flow Objectives. In particular, the following questions should be answered: • will the proposal protect Water Quality and River Flow Objectives where they are currently achieved in the ambient waters; and • will the proposal contribute towards the achievement of Water Quality and River Flow Objectives over time, where they are not currently achieved in the ambient waters. k) Consult with EPA as soon as possible if a mixing zone is proposed. l) Where a licensed discharge is proposed, provide the rationale as to why it cannot be avoided through application of a reasonable level of performance, using available technology, management practice and industry guidelines. m) Where a licensed discharge is proposed, provide the rationale as to why it represents the best environmental outcome and what measures can be taken to reduce its environmental impact. n) Reference should be made to relevant guidelines e.g. *Managing Urban Stormwater: Soils and Construction*, *Guidelines for Fresh and Marine Water Quality ANZECC 2000, Environmental Guidelines: Use of effluent by Irrigation*.		

Table 2-3: Compliance with Director General's Requirements

Director General's Requirement	EIS Reference	
	Section	Page No
5. Describe management and mitigation measures: a) Outline stormwater management to control pollutants at the source and contain them within the site. Also describe measures for maintaining and monitoring any stormwater controls. b) Outline erosion and sediment control measures directed at minimising disturbance of land, minimising water flow through the site and filtering, trapping or detaining sediment. Also include measures to maintain and monitor controls as well as rehabilitation strategies. c) Describe waste water treatment measures that are appropriate to the type and volume of waste water and are based on a hierarchy of avoiding generation of waste water; capturing all contaminated water (including stormwater) on the site; reusing / recycling waste water; and treating any unavoidable discharge from the site to meet specified water quality requirements. d) Outline pollution control measures relating to storage of materials, possibility of accidental spills (e.g. preparation of contingency plans), appropriate disposal methods, and generation of leachate. e) Describe hydrological impact mitigation measures including: • site selection • minimising runoff • minimising reductions or modifications to flow regimes • avoiding modifications to groundwater f) Describe groundwater impact mitigation measures including: • site selection • retention of native vegetation and revegetation • artificial recharge • providing surface storages with impervious linings • monitoring program • Describe geomorphological impact mitigation measures including: • site selection • erosion and sediment controls • minimising in stream works • treating existing accelerated erosion and deposition • monitoring program. h) Any proposed monitoring should be undertaken in accordance with the *Approved Methods for the Sampling and Analysis of Water Pollutants in NSW* (EPA 2004).		

Table 2-3: Compliance with Director General's Requirements

Director General's Requirement	EIS Reference	
	Section	Page No
• Key Issues Relating to Waste and Chemicals 1. Provide details of the quantity and type of waste that is generated, received, handled, processed or disposed of at the premises. Waste must be classified according to *Waste Classification Guidelines* (2008). 2. Provide details of all waste management at the facility, including: a) the transportation, assessment and handling of waste arriving at or generated at the site b) any stockpiling of wastes or recovered materials at the site c) any waste processing related to the facility, including re-use, recycling, reprocessing or treatment both on- and off-site d) the method for disposing of all wastes or recovered materials at the facility e) the emissions arising from the handling, storage, processing and reprocessing of waste at the facility f) the proposed controls for managing the environmental impacts of these activities 3. Provide details of procedures for the assessment, handling, storage, transport, and disposal of all hazardous and dangerous goods materials used, stored, processed, or disposed of at the site, in addition to the requirements for liquid and non-liquid wastes. 4. Provide details of the type and quantity of any chemical substances to be used or stored and describe arrangements for their safe use and storage. 5. Reference should be made to the guidelines. 6. Describe baseline conditions: a) Describe any existing waste or chemicals operations related to the proposal. 7. Assess impacts a) Assess the adequacy of proposed measures to minimise natural resource consumption and minimise environmental impacts (e.g. odours, noise, water pollution) from the handling, transporting, storage, recycling, processing and reprocessing of waste and/or chemicals. b) Reference should be made to *Waste Classification Guidelines (2008)* c) Describe management and mitigation measures: • Outline measures to minimise the consumption of natural resources. • Outline measures to avoid the generation of waste and promote the re-use and recycling and reprocessing of any waste. • Outline measures to support any approved regional or industry waste plans.	5.6, 5.7	5-179, 5-184

Table 2-3: Compliance with Director General's Requirements

Director General's Requirement	EIS Reference	
	Section	Page No
• Key Issues Relating to Greenhouse Gas Assessment 1. Describe baseline conditions: a) The EA should include a comprehensive assessment of, and report on, the project's predicted greenhouse gas emissions (tCO2e). Emissions should be reported and broken down by: • Direct emissions (scope 1 as defined by the Greenhouse Gas protocol – see reference below), • Indirect emissions from electricity (scope 2), and • Upstream and downstream emissions (scope 3) Before and after implementation of the project, including annual emissions for each year of the project (construction, operation and decommissioning). b) The EA should include an estimate of the greenhouse emissions intensity (per unit of production). Emissions intensity should be compared with best practice if possible. c) The emissions should be estimated using an appropriate methodology, in accordance with NSW, Australian and international guidelines (see below). 2. Describe management and mitigation measures a) The proponent should also evaluate and report on the feasibility of measures to reduce greenhouse gas emissions associated with the project. This could include a consideration of energy efficiency opportunities or undertaking an energy use audit for the site. b) Reference should be made to: • The Greenhouse Gas Protocol: Corporate Standard, World Council for Sustainable Business Development & World Resources Institute • http://www.ghgprotocol.org/standards/corporate-standard • National Greenhouse Accounts (NGA) Factors, Australian Department of Climate Change (Latest release), • National Greenhouse and Energy Reporting System, Technical Guidelines (latest release) http://www.climatechange.gov.au/en/government/initiatives/national-greenhouse-energy-reporting/tools-resources.aspx • National Carbon Accounting Toolbox http://www.climatechange.gov.au/government/initiatives/ncat.aspx • Australian Greenhouse Emissions Information Systems (AGEIS) http://ageis.climatechange.gov.au/	6.5	6-20

Table 2-3: Compliance with Director General's Requirements

Director General's Requirement	EIS Reference	
	Section	Page No
• Key Issues Relating to Impacts on Native Vegetation The EA needs to address the potential impact on native vegetation, specifically: a) The hectares of native vegetation that will have to be cleared to accommodate the resource recovery park and associated infrastructure. b) Full floristics of the vegetation types that will need to be cleared. c) A description and map of the dominant vegetation types must be provided. Vegetation types mapped should be assigned to corresponding vegetation types included in the Biometric tool vegetation database. d) The extent of native vegetation on the site which may be remnant vegetation, protection regrowth or non-protected re-growth as defined by the Native Vegetation Act 2003 e) The general requirements of the Native Vegetation Act 2003, especially in relation to Vulnerable Land.	2.1.2.4, 4.3, 5.5, Appendices 4 & 11	2-6, 4-9, 5-171
• Key Issues Relating to Ecologically Sustainable Development (ESD) 1. Demonstrate that the planning process and any subsequent development incorporates objectives and mechanisms for achieving ESD, including: a) an assessment of a range of options available for use of the resource, including the benefits of each option to future generations b) proper valuation and pricing of environmental resources c) identification of who will bear the environmental costs of the proposal	6.6	6-28
• Key Issues Relating to Threatened Species, Population, Ecological Communities and their Habitat Undertake an assessment on the likely impact on threatened species, population, ecological communities and their habitat. This should include: • A field survey • Likely impacts on threatened species and their habitat need to be assessed, evaluated and reported on. • A description of the actions that will be taken to avoid impacts, or to mitigate unavoidable impacts of the project on threatened species and their habitat. This should include an assessment of the effectiveness and reliability of the measures and any residual impacts after these measures are implemented. • Impacts on Aboriginal Cultural Heritage Values: 1. Address and document the information requirements set out in the draft *Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* involving surveys and consultation with the Aboriginal community; 2. Identify the nature and extent of impacts on Aboriginal cultural heritage values across the project area;	5.5 6.3.1	5-171 6-13

Table 2-3: Compliance with Director General's Requirements		
Director General's Requirement	EIS Reference	
	Section	Page No
3. Describe the actions that will be taken to avoid or mitigate impacts or compensate to prevent unavoidable impacts of the project on Aboriginal cultural heritage values. This should include an assessment of the effectiveness and reliability of the measures and any residual impacts after these measures are implemented; and 4. Demonstrate that effective community consultation with Aboriginal communities has been undertaken in determining and assessing impacts, developing options and making final recommendations.		
• Consideration of Alternatives and Justification for the Proposal 1. Consider the environmental consequences of adopting alternatives, including alternative: a) sites and site layouts b) access modes and routes c) materials handling and production processes d) waste and water management e) impact mitigation measures f) energy sources 2. Selection of the preferred option should be justified in terms of: a) ability to satisfy the objectives of the proposal b) relative environmental and other costs of each alternative c) acceptability of environmental impacts and contribution to identified environmental objectives d) acceptability of any environmental risks or uncertainties e) reliability of proposed environmental impact mitigation measures f) efficient use (including maximising re-use) of land, raw materials, energy and other resources.	1.4	1-6
• Site Location 1. Provide an overview of the affected environment to place the proposal in its local and regional environmental context including: a) meteorological data (e.g. rainfall, temperature and evaporation, wind speed and direction) b) surrounding land uses (potential synergies and conflicts) c) ecological information (water system habitat, vegetation, fauna) d) availability of services and accessibility of the site for passenger and freight transportation	3.1, 3.8.1, 4	3-1, 3-36, 4-1

Table 2-3: Compliance with Director General's Requirements

Director General's Requirement	EIS Reference	
	Section	Page No
• Identification and Prioritisation of Issues / Scoping of Impact Assessment 1. Provide an overview of the methodology used to identify and prioritise issues. The methodology should take into account: a) Relevant NSW government guidelines b) Industry guidelines c) Environmental Assessments / Environmental Impact Statements for similar projects d) Relevant research and reference material e) Relevant preliminary studies or reports for the proposal f) Consultation with stakeholders	1.6	1-9
2. Provide a summary of the outcomes of the process including: a) all issues identified including local, regional and global impacts (i.e. increased / decreased greenhouse emissions) b) key issues which will require a full analysis (including comprehensive baseline assessment) c) issues not needing full analysis though they may be addressed in the mitigation strategy d) justification for the level of analysis proposed (the capacity of the proposal to give rise to high concentrations of pollution compared with the ambient environment or environmental outcomes is an important factor in setting the level of assessment)	1.6, 2.2, 3.4.1	1-9, 2-23, 3-25
• Environmental Issues – General 1. The potential impacts identified in the scoping study need to be assessed to determine their significance, particularly in terms of achieving environmental outcomes, and minimising environmental pollution. 2. Identify gaps in information and data relevant to significant impacts of the proposal and any actions proposed to fill those information gaps so as to enable development of appropriate management and mitigation measures. This is in accordance with ESD requirements. 3. Describe baseline conditions – provide a description of existing environmental conditions for any potential impacts 4. Assess impacts: a) For any potential impacts relevant for the assessment of the proposal, provide a detailed analysis of the impacts of the proposal on the environment including the cumulative impact of the proposal on the receiving environment especially where there are sensitive receivers.	5,6,7,8 Throughout EIS 4, 5,6,7 5,6,7	5-1,6-1,7-1,8-1 4-1, 5-1,6-1,7-1 5-1,6-1,7-1

Table 2-3: Compliance with Director General's Requirements

Director General's Requirement	EIS Reference	
	Section	Page No
b) Describe the methodology used and assumptions made in undertaking this analysis (including any modelling or monitoring undertaken) and indicate the level of confidence in the predicted outcomes and the resilience of the environment to cope with the predicted impacts. c) The analysis should also make linkages between different areas of assessment where necessary to enable a full assessment of environmental impacts e.g. assessment of impacts on air quality will often need to draw on the analysis of traffic, health, social, soil and/or ecological systems impacts, etc d) The assessment needs to consider impacts at all phases of the project cycle including: exploration (if relevant or significant), construction, routine operation, start-up operations, upset operations and decommissioning if relevant. e) The level of assessment should be commensurate with the risk to the environment.		
5. Describe management and mitigation measures: a) Describe any mitigation measures and management options proposed to prevent, control, abate or mitigate identified environmental impacts associated with the proposal and to reduce risks to human health and prevent the degradation of the environment. This should include an assessment of the effectiveness and reliability of the measures and any residual impacts after these measures are implemented. b) Proponents are expected to implement a 'reasonable level of performance' to minimise environmental impacts. The proponent must indicate how the proposal meets reasonable levels of performance. For example, reference technology based criteria if available, or identify good practice for this type of activity or development. A 'reasonable level of performance' involves adopting and implementing technology and management practices to achieve certain pollutant emissions levels in economically viable operations. Technology-based criteria evolve gradually over time as technologies and practices change. c) Use environmental impacts as key criteria in selecting between alternative sites, designs and technologies, and to avoid options having the highest environmental impacts. d) Outline any proposed approach (such as an Environmental Management Plan) that will demonstrate how commitments made in the Environmental Impact Statement will be implemented. Areas that should be described include: • operational procedures to manage environmental impacts • monitoring procedures • training programs	8.1 1.4, 5, 6 8.2	8-1 1-6, 5-1, 6-1 8-7

Table 2-3: Compliance with Director General's Requirements

Director General's Requirement	EIS Reference	
	Section	Page No
• community consultation • complaint mechanisms including site contacts • strategies to use monitoring information to improve performance • strategies to achieve acceptable environmental impacts and to respond in event of exceedances.		
• List of approvals and licences 1. Identify all approvals and licences required under environmental protection legislation including details of all scheduled activities, types of ancillary activities and types of discharges (to air, land, water).	1.5	1-8
• Compilation of mitigation measures 1. Outline how the proposal and its environmental protection measures would be implemented and managed in an integrated manner so as to demonstrate that the proposal is capable of complying with statutory obligations under DECCW licences or approvals (eg outline of a detailed environmental management plan). 2. The mitigation strategy should include the environmental management and cleaner production principles which would be followed when planning, designing, establishing and operating the proposal. It should include two sections, one setting out the program for managing the proposal and the other outlining the monitoring program with a feedback loop to the management program.	8	8-1
• Justification of the proposal 1. Reasons should be included which justify undertaking the proposal in the manner proposed, having regard to the potential environmental impacts.	9	9-1
• Key Issues a) Compliance with the rules in any Water Sharing Plan (WSP) and legislation; b) An assessment of the impact of the proposal on watercourses and riparian areas, SREP 20 wetlands, groundwater sources and groundwater dependent ecosystems; c) Adequate mitigation and monitoring requirements to address impacts to surface water and groundwater sources and groundwater dependent ecosystems.	5.3.3 5.3 5.3.9	5-154 5-146 5-166

3. DESCRIPTION OF THE PROPOSED DEVELOPMENT

This section of the EIS provides details of the site, the site's history of uses, the proposed development is described, the processes are explained and the design of the development as it relates to potential environmental impacts described.

Site layouts are presented in this Section of the EIS. Cleaner production initiatives are discussed, operational details relating to services are explained and proposed hours of operation listed.

3.1 SITE DETAILS

The site details are provided in the following sub-sections.

3.1.1 Site Location

The site located at 126 Andrews Road, Penrith (Lot 1 in DP 747153) is currently zoned IN1 – General Industrial under the Penrith City Council Local Environmental Plan 2010.

The site location in a regional context of the proposed development is presented as Figure 3-1 and in the local context in Figure 3-2.

3.1.2 Site Description

The land is a rectangular allotment serviced by a single entry and exit driveway, 8.5 metres in width, accessed from Andrews Road. As shown on Figure 3-1 the entry off Andrews Road crosses a culvert that is used for surface water drainage adjacent to the site.

The site has been developed for industrial uses. The existing infrastructure on the site includes a large factory building, shed, and a designated car parking area. The remainder of the site consists of hardstand areas and grassed and landscaped areas.

The site is flat and the developed area has been filled to elevate it slightly above the surrounding land form. The site has a single access on the western side of the site with a double width driveway.

The car parking is provided at the front of the site, the car park is sealed as are all trafficked areas.

The site has rear access along the western side of the large stand alone industrial building. A weighbridge exists at the north western corner of the site adjacent to the building. At the rear of the site is a relatively large concreted and asphalted yard area, ideally suited for truck manoeuvring. A roadway continues partially around the eastern side of the site stopping at the front of the industrial building.

The industrial building has been compartmentalised along its north-south direction using a fire rated wall. The building has internal store rooms along the eastern outside wall. Offices and amenities are located on the northern side of the main building. Access doorways are along the two sides and rear.

The electrical substation is adjacent to the north east corner of the site. It was free of any visible staining.

3.1.3 Site Layout

A site plan is shown as Figure 3-3.

This plan shows the location of the processing equipment within the building. The plan shows the location of the extended bunkers that are needed to provide storage for the colour separated cullet. The plan shows the location of the weigh bridge, access roadways within the site, hardstand areas and carparking.

The processes are described in more detail in Section 3.2.2 Process Description.

The bunkers are shown in detail on Figure 3-8.

The original development of the building placed two storey offices across the northern end of the building. The external construction of the northern wall is brickwork and windows. Internally the offices are separated from the process areas by further full roof height partition walls. These will provide noise insulation towards the residential areas in the northerly sectors from the site.

The site plan shows the process areas to be located in both halves of the building. The layout is similar to the plant studied at Coolaroo in preparation of the EIS.

Within the eastern half of the building the glass is received and placed in the bunkers shown at the southern end of this half of the building. A front end loader transfers the glass into a floor mounted hopper where the glass begins the passage through the unit operations which will convert the glass into colour separated cullet in the western half of the building.

The colour separated cullet is held in three bunkers shown at the southern end of the process (in the western half of the building). The cullet is then transferred to the external bunkers by front end loader. Trucks acoustically and visually shielded by the bunkers are loaded from the hardstand area in front of the bunkers i.e. on the northern and eastern sides of the bunkers. There is no mobile equipment or vehicle access around the rear of the bunkers.

The processing equipment is therefore wholly contained within the building. External activities are limited to truck movements and the front end loader.

There are no uncontrolled air emissions released within the building. A dust capture and air cleaning using high efficiency reverse pulse dust collector is located external to the building at the north-east corner so that it is acoustically shielded by the height of the building to the west and the construction of walls around the cyclone and dust collector.

3.1.4 Surrounding Area

An aerial photograph showing the location of the site and its surrounds is shown in Figure 3-4.

The proposed site is within an existing industrial estate and is bordered by neighbouring industrial facilities to the west, northwest and southwest. To the east, northeast and southeast are residential areas. Sporting ovals are also located to the immediate east and southeast. There is a drainage easement to the immediate north, between the site and Andrews Road. The main access driveway runs along the west of the drainage easement at the northern end of the site.

Adjacent to the proposed site is the Owens Illinois (O-I) site. This would allow Glass Recovery Services to supply colour separated cullet to O-I for use in place of part of their current raw materials.

It is also noted that developments are anticipated to occur north-west of the subject site. The proposed developments include the use of the land to include a light commercial zone, as well as a residential zone to be located further north-west from the subject site. These areas were highlighted in Figure 3-2. Future potential receptors from this proposed residential zone were included in each of the individual environmental assessments prepared as part of the EIS.

3.1.5 Land Use Zoning

The current land use plan from Penrith City council is presented as Figure 3-5 . This shows the land to the rear of the site as being General Industrial IN1.

No easements are shown for the surface water overland flow which indicates the land could be further developed however this would need to be confirmed by correspondence with Penrith City Council and is outside the scope of this study.

Figure 3-1: Regional Context of Proposed Development

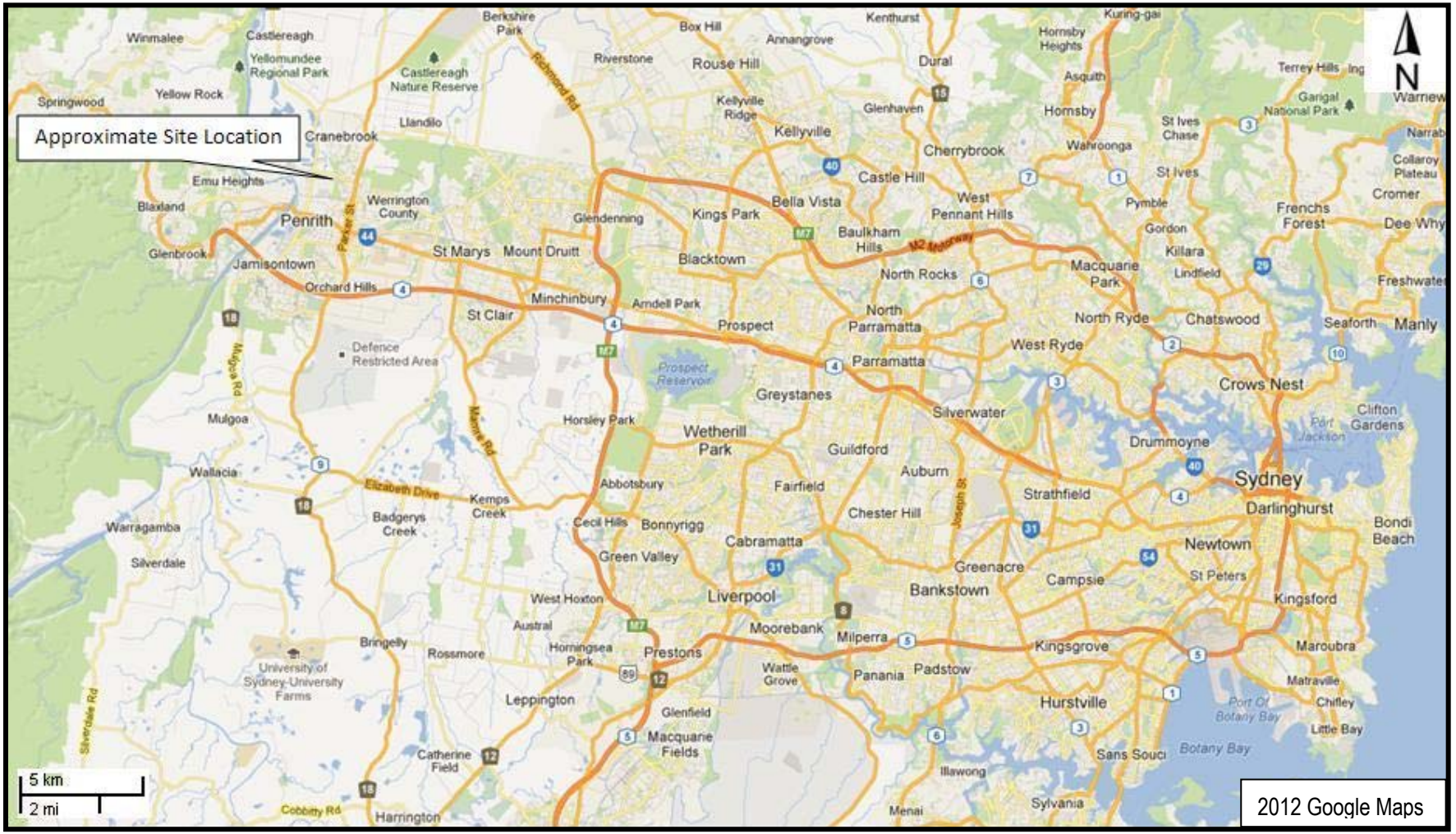
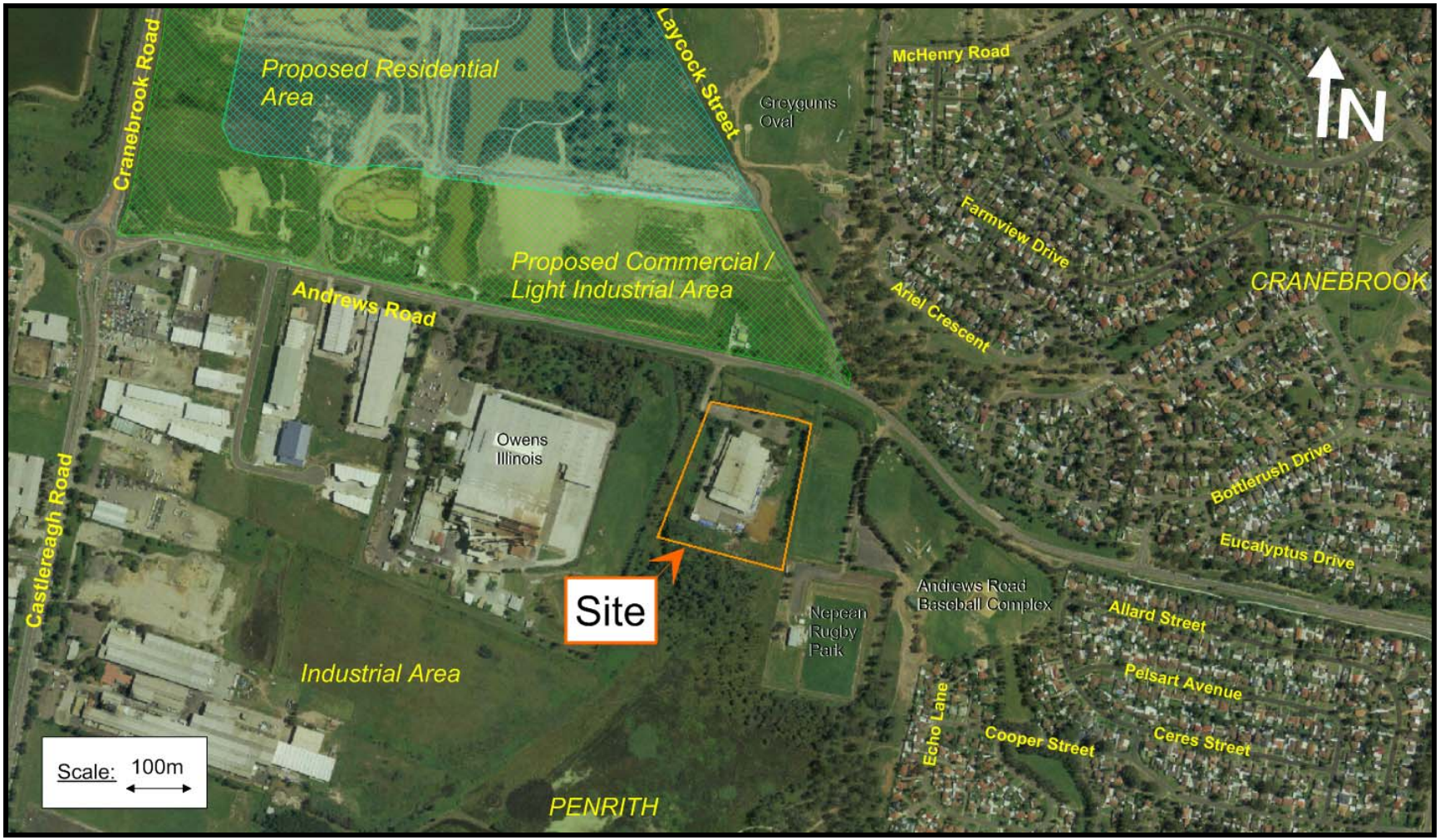


Figure 3-2: Site Locality – Local Context



Source: © Land and Property Information 2008

Figure 3-3: Site Layout

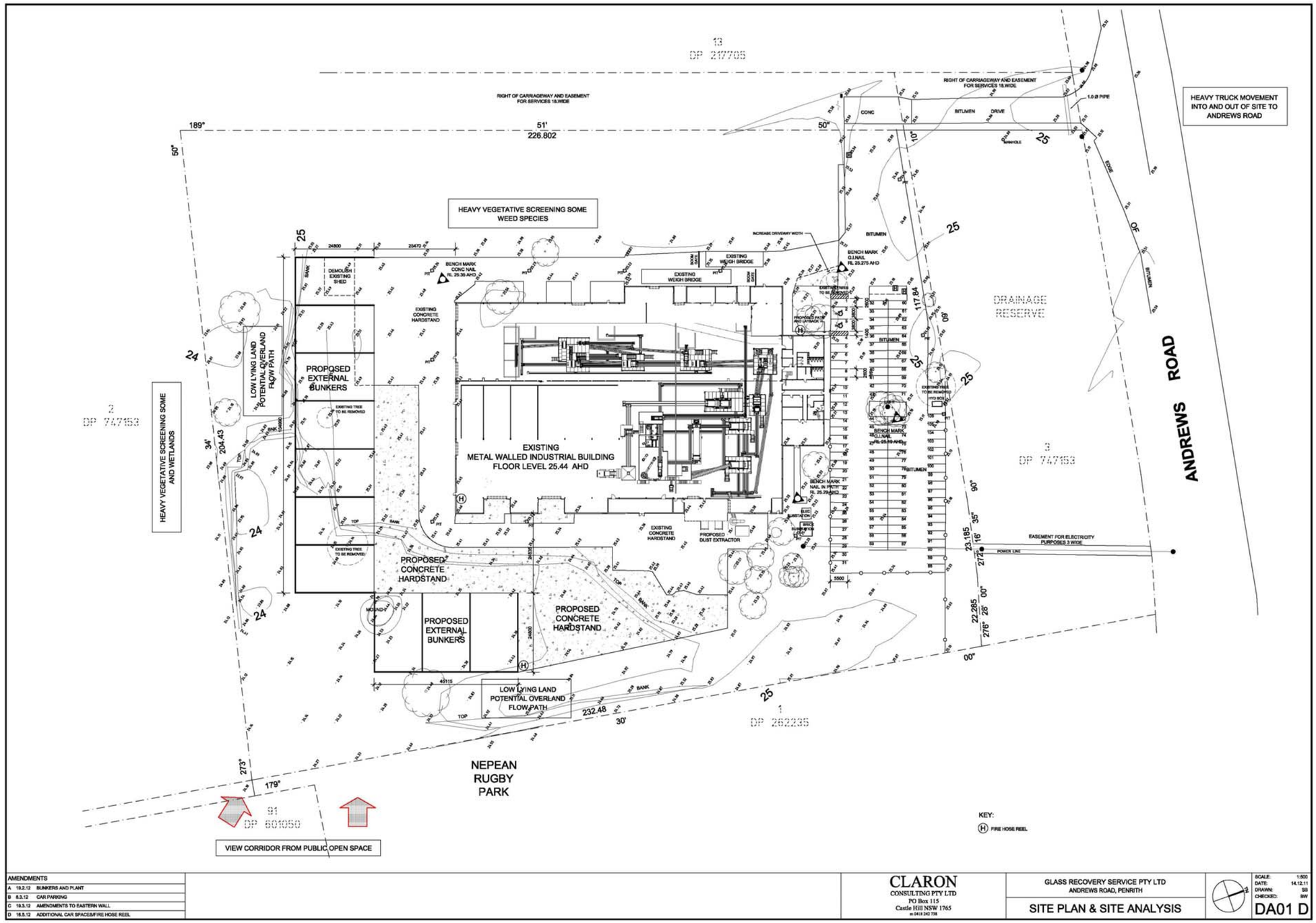
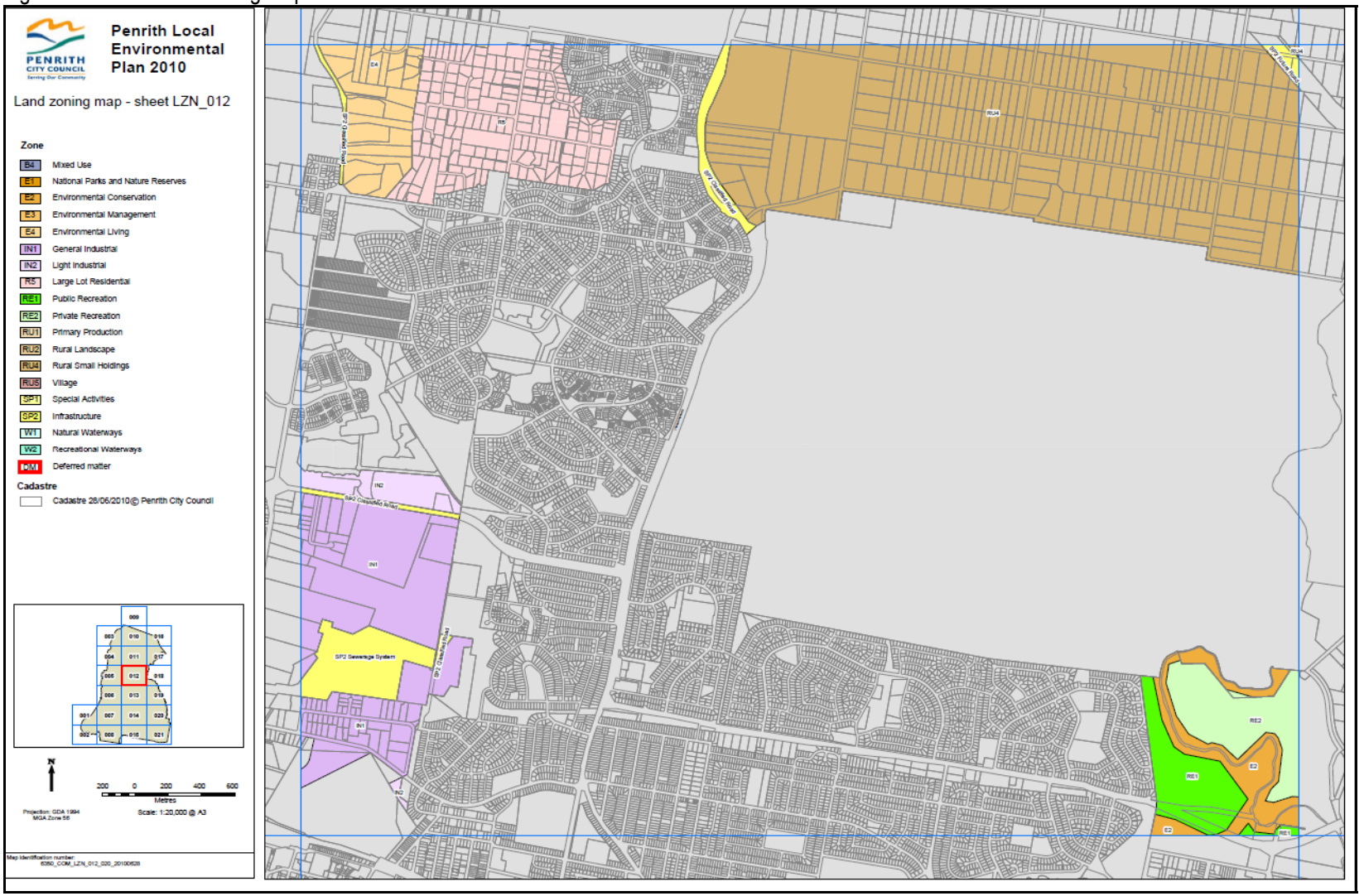


Figure 3-4: Aerial Photograph of Site and Surrounds



Source: Six Viewer ©

Figure 3-5: Land Use Zoning Map



3.1.6 Site Terrain

The site is situated on relatively flat terrain. There are no observed elevations directly to the north, south and west of the site; however toward the north-east, east and south-east, slight inclinations can be seen. Three-dimensional terrain elevation maps are provided as Figure 3-6 and Figure 3-7.

Figure 3-6: Three-Dimensional View of the Terrain of the Site Location's Regional Area (Z-Axis Scaled by a Factor of 5)

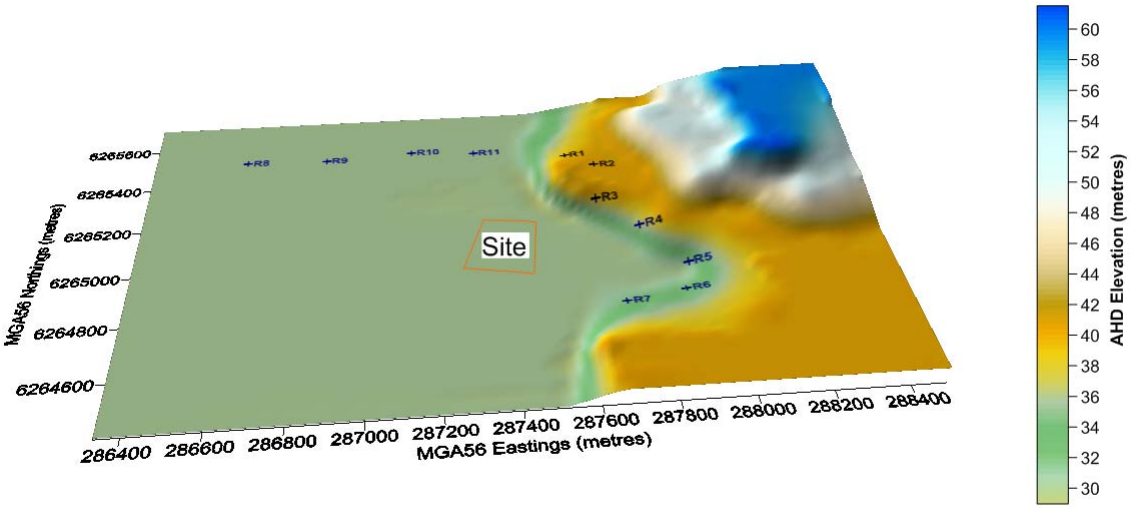
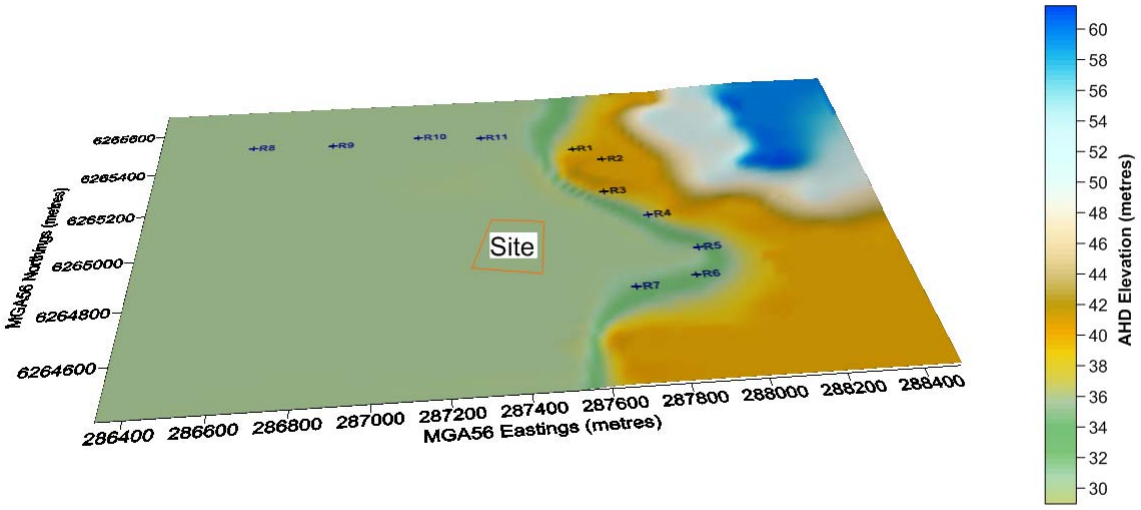


Figure 3-7: Three-Dimensional View of the Terrain of the Site Location's Regional Area (Z-Axis Unscaled)



3.1.7 Land Ownership

The land is owned by Geelapp Pty Ltd atf 16A Discretionary Trust. The proponent has the land owner's consent for the proposed development.

3.1.8 Current Land Use

The site located at 126 Andrews Road, Penrith is described as Lot 1 DP 747153. This land is currently zoned IN1 – General Industrial under the Penrith City Council Local Environmental Plan 2010.

The proposed site is within an existing industrial estate and is bordered by neighbouring industrial facilities to the West and South West. Future commercial and light industrial premises will be located to the immediate North West.

Previous uses of the site included manufacture and storage of fertilisers from 1993.

3.1.9 Site History

A review of the site history has been undertaken.

The following process was followed for this site:

- Establish previous owners;
- Interview previous owners and occupants if possible;
- Review Council files available;
- Discuss past site uses with Council staff;
- Review and interpret aerial photographs;
- Undertake a physical site inspection; and
- Review any past contamination studies.

The objective of the site history review is to identify potential contamination sources arising as a consequence of the site's former uses.

3.1.9.1 Prior Land Use

- Agriculture prior to and at 1955.
- 1978. The site remains undeveloped.
- 1986. The site is developed with similar foot print of the buildings as exists today.
- 1994. The concreted area at the rear has been extended.
- 2005. The foot print remains unchanged from 1994.

The Principal Consultant of Benbow Environmental has previously inspected the site during its use for storage of fertiliser. The site was recently inspected for Phase I contamination assessment and the condition of the site was free of any visual evidence of surface contamination from storage of chemicals and in particular fertilisers.

The use of the site for manufacturing and storage of plumbing and house ware products may have occurred. There is no evidence of any surface contamination from this previous use.

3.1.9.2 Previous Site Owners

Previous site owners included the following:

- GE Crane and Sons Limited;
- Peshawar Pty Ltd; and
- Wallaroo Pty Ltd.

3.1.10 Adjacent Land Use

The land to the west is vacant and from the aerial site history has not been previously developed. Land further west is occupied by the Owens Illinois facility.

Similarly land to the rear of the site and land adjoining on the eastern boundary is also vacant. Further to the east the land is used for recreational purposes.

Opposite the site to the north, the land is undeveloped and will be used for commercial and light industrial use. Further to the north is suburban land that is slightly elevated to the site. Other residential areas are more distant to the east and south east.

3.2 PROPOSED DEVELOPMENT ACTIVITIES AND SITE USE

3.2.1 Proposed Building Works

The proposed development does not involve new buildings to be constructed. Minor changes to the existing building proposed include new roller doors on the eastern wall of the building.

The only change to the site that is proposed is the installation of ten (10) bunkers for storage of the crushed cullet on the southern and eastern sides of the existing building. There would be seven (7) along the rear southern side of the site and another three (3) along the south-eastern end of the site. The bunkers would be constructed of steel and would be 3 metres in height. Each bunker would be 24.8 metres in length and 14.9 metres wide. This would involve some shallow excavation works. Figure 3-8 provides details of the proposed storage bunkers.

Concrete is unable to be used in the construction of the bunkers as any chips of concrete removed by the loading out operations would cause quality issues for O-I.

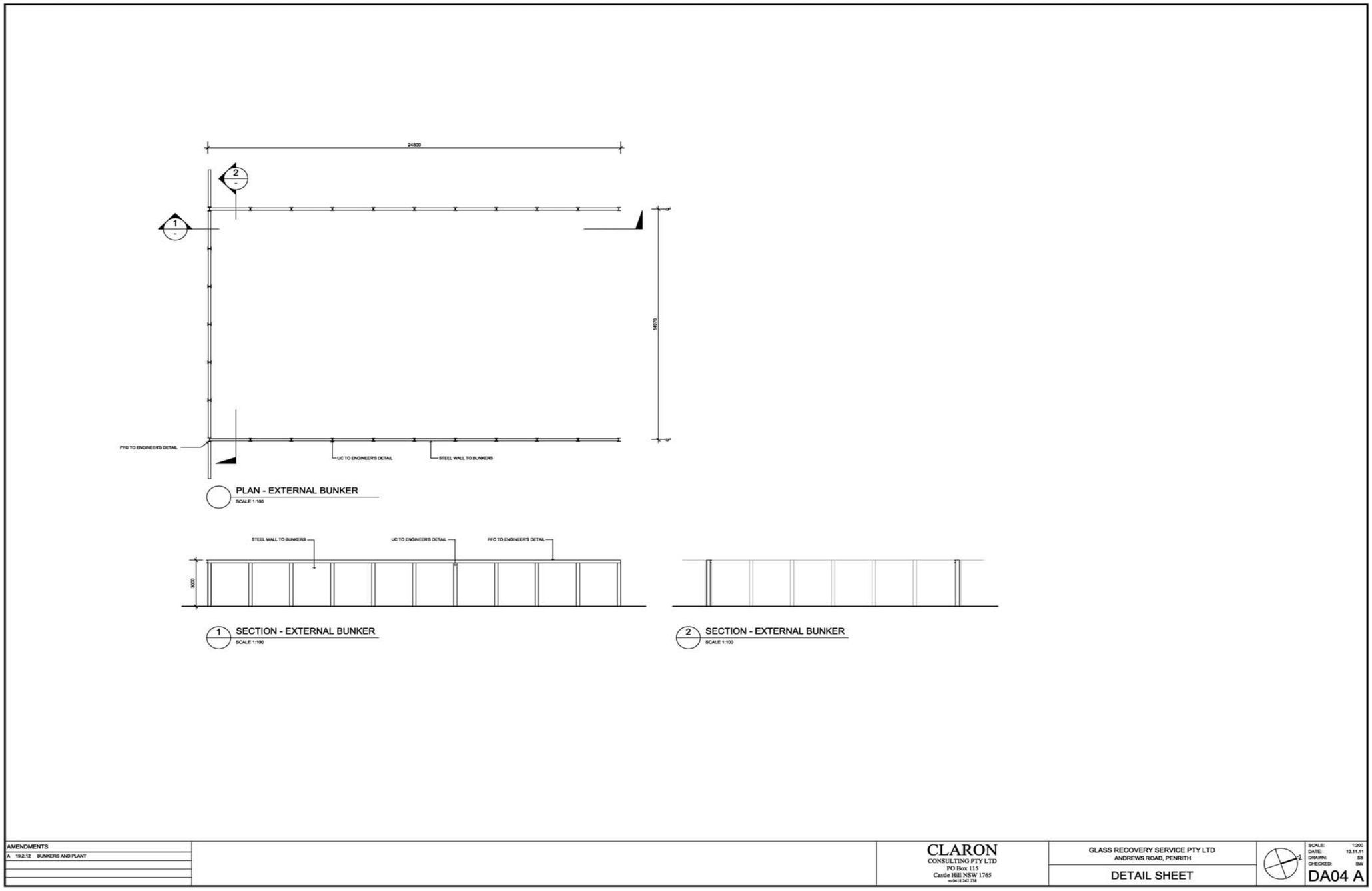
The storage bunkers would not be covered and would be open to rainwater. It is proposed to widen the existing channel along the eastern boundary of the site to provide a water quality wetland that stormwater from the bunkers would drain to. A swale would be constructed within this area to manage stormwater that drains from this area of the site. Details of these proposed changes are provided in the Earthworks and Flood Volumes drawings provided in the Hydrological Report by Brown Smart Consulting (Appendix 3).

The shed located in the rear yard area would be removed.

Utilities and services including water, electricity and sewerage for office areas are already established and would continue to be used for the proposed activities.

A 2000L self-bunded diesel fuel storage tank would be located in an existing storage room designed for flammable liquid storage. This room is on the eastern side of the plant building. The room is bunded and ventilated. The tank could be refilled up to twice a week.

Figure 3-8: External Bunkers



3.2.1.1 Construction Details

Construction activities associated with the proposed development include the following:

- Minor building modifications to the eastern facade; and
- Installation of the external bunkers.

These modifications are shown in the site plans and drawings submitted with the application. In addition to these site modifications, landscaping would be undertaken that would improve the stormwater runoff leaving the site, improve the condition of the adjacent wetland and unnamed watercourse and improve the biodiversity that currently exists at the site. Reference to the hydrological and earthworks report by Brown Smart Consulting in Appendix 3 and the Landscaping plans by BioDesign in Appendix 4 should be made.

There would be shallow excavation required for installation of the external bunkers. This would involve minor cut and fill and onsite reuse of any excavated material. Soil contamination would not be an issue as previous Phase I and partial Phase II contamination reports have indicated that there is no evidence of contamination at the site.

Details of erosion and sediment control measures to be used during this Phase are provided in the drawings accompanying the report by Brown Smart Consulting.

Estimated quantities of waste that would be generated by the construction phase is presented in Table 3-1.

Table 3-1: Construction Waste

Waste Type	Estimated Quantity	Management
Excavation Material	Nil	All construction waste would be removed for off site recycling.
Garden Organics	Nil	
Bricks	1 tonne	
Concrete	2 tonnes	
Timber	0.5 tonnes	
Plasterboard	Nil	
Metals	5 tonnes	
Hazardous Material, e.g. asbestos and lead based paints	Nil	None is to be removed.

3.2.1.2 Construction Timetable

Construction would be undertaken in 2 stages:

Stage 1: Debris removal

This stage has been assumed to take place over 2 days and involves site preparation and relocation of topsoil on the site. The following construction equipment is expected to be required:

- Scrapers removing topsoil; and
- Trucks for the transport / relocation of debris

Stage 2: Site preparation and construction

This stage involves the installation of the external bunkers and building modifications on the eastern façade. The installation of bunkers and minor building modifications would take up to one week.

Installation of the glass processing equipment within the building would also be undertaken during Stage 2 and the shed at the rear of the property would be demolished.

The proposed development would generate an average of 70 vehicle movements per day during construction.

Hours of construction would be limited to:

- Monday to Friday: 7am – 6pm
- Saturday: 8am – 1pm
- No work on Sundays or Public Holidays

3.2.2 Process Description

The proposed activities involve the processing of used glass collected from a glass collection centre in the local area. Simple processes would be employed including crushing, sorting and screening into "cullet" ready for further processing at Owens Illinois.

Used glass products would be collected by trucks from a glass collection centre in the local area and MRFs and brought onto the site. The trucks will pass over a weigh bridge; two weighbridges exist on the western side of the building on site. The trucks will then travel to the rear of the building and enter into the building, unloading the bottles into ground level hoppers. The incoming glass would be stored in bays within the factory building. Manual sorting would involve hand removal of contaminants such as ceramics, brick and plastics.

Front end loaders of typical size 3m and 3.6 cubic metre buckets would transfer the glass and the cullet. Non-glass and non-putrescible impurities are controlled to not exceed certain limits. German standards set limits of the content of ceramic, stone and porcelain impurities at <10 g/t and metal content is limited to 5g/t within the cullet. These standards have been adopted in the design of the process.

After crushing, the cullet would be transferred to a number of sorting and screening equipment where non-glass and non-putrescible impurities including ceramics, stone, porcelain, pyroceramics, ferrous and non-ferrous metals are removed.

Once these impurities are removed, the cullet is separated into colours and sizes and transferred to the external bunkers. The cullet is now ready to be dispatched to O-I for further processing.

The general concept used in the impurity and colour sorting machinery is generally associated with the use of optical sensors fitted to a signal processor, and therefore it is important that glass materials are free of stains and contaminants that could hinder this sorting process.

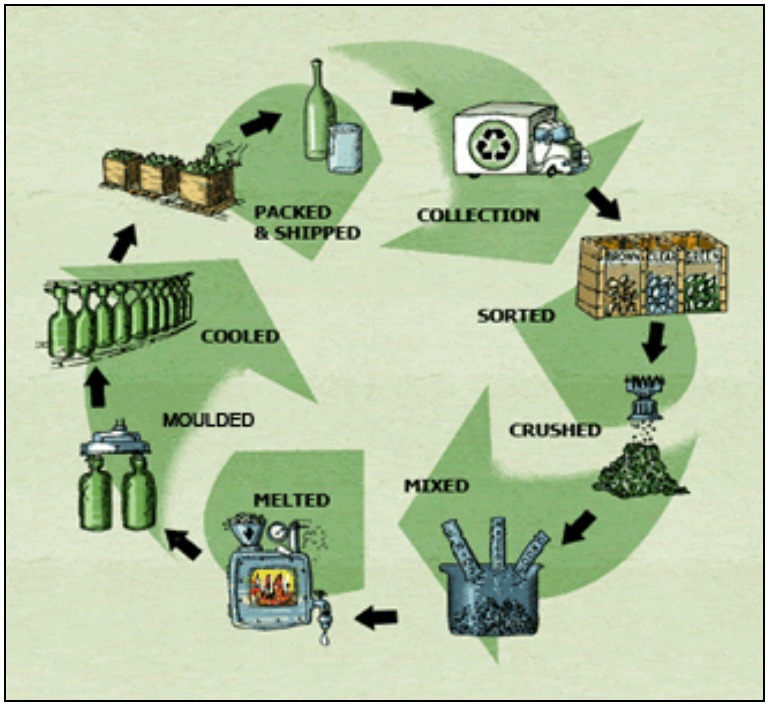
Figure 3-10 provides a diagrammatic representation of the processes involved in the removal of impurities and separation of cullet.

Future stages of the project propose to install an overland conveyor which would transfer the cullet directly to O-I without the use of heavy vehicles. This future stage would require a new development application.

There would be no thermal treatment of the cullet on the site of the proposed development. There would be no new furnaces required as part of this development at the subject site or at the O-I site.

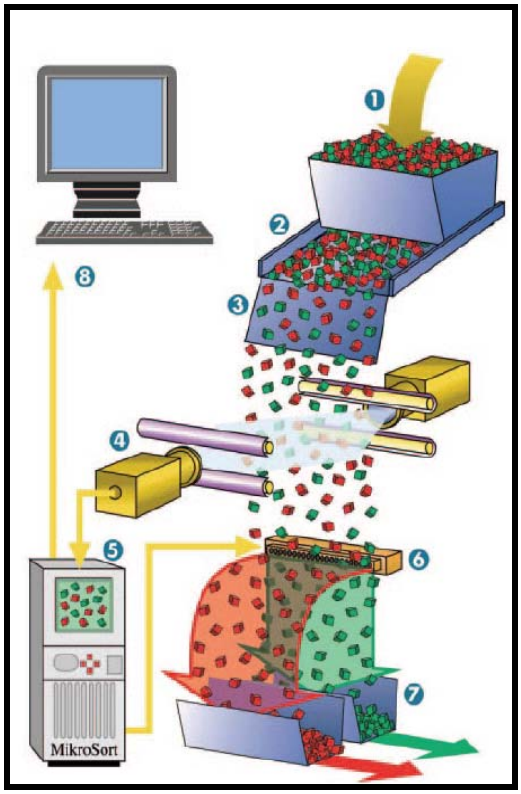
Figure 3-9 is an example process flow diagram of the glass recycling process. The proposed development would include the process steps of “collection”, “sorted”, “crushed” and “mixed” at the facility. The resulting cullet from these process steps would be transported to the O-I facility for the further process steps indicated in the figure.

Figure 3-9: Example of Glass Recycling Process Flow



Source: http://www.theglassrecyclingcompany.com

Figure 3-10: The Sorting of Crushed Collected Glass

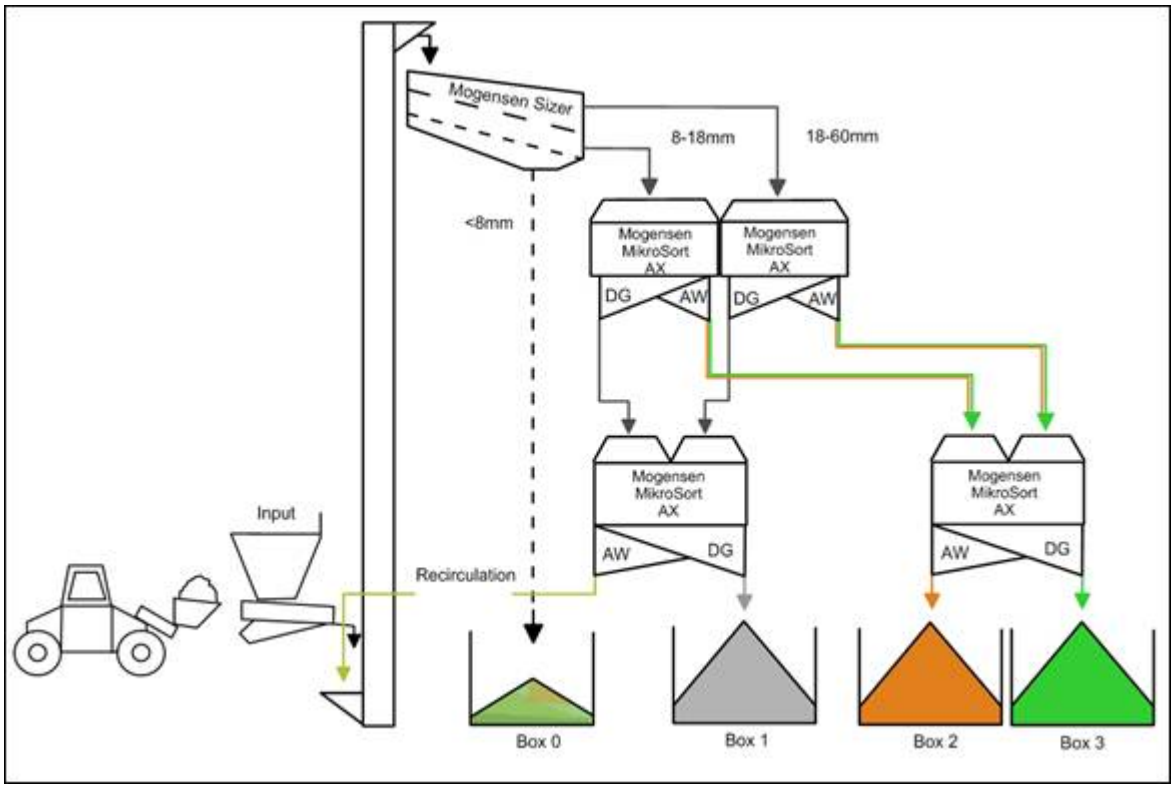


Source: "Glass Recycling with Mogensen Sorting and Screening Systems (2005)

Figure 3-10 is a schematic of the crushed collected glass sorting process.

The crushed collected glass is fed into the machine on an integrated vibrating conveyor (1) and flows onto an inclined glass chute (2). The glass then passes a line camera (3) with colour image processing that classifies the glass by true colour. Signal processor technology (4) allows the processing of 30 million measuring points. An all metal detector (5) enables detection of unwanted ferrous and non-ferrous metals. Particles are separated by means of compressed air impulses and the pass stream (6) and reject stream (7) are discharged separately. (Mogensen Sorting and Screening Systems, 2005)

Figure 3-11: Process Flow Diagram of the Sizing Process



Source: Prospekt MikroSort-E_11_08 Mogensen brochure (attached)

A process flow diagram detailing the processes involved and the waste streams associated with the production of cullet is provided in Figure 3-12.

An environmental mass balance diagram for the operation of the glass beneficiation plant is provided as Figure 3-13.

Figure 3-12: Process Flow Diagram

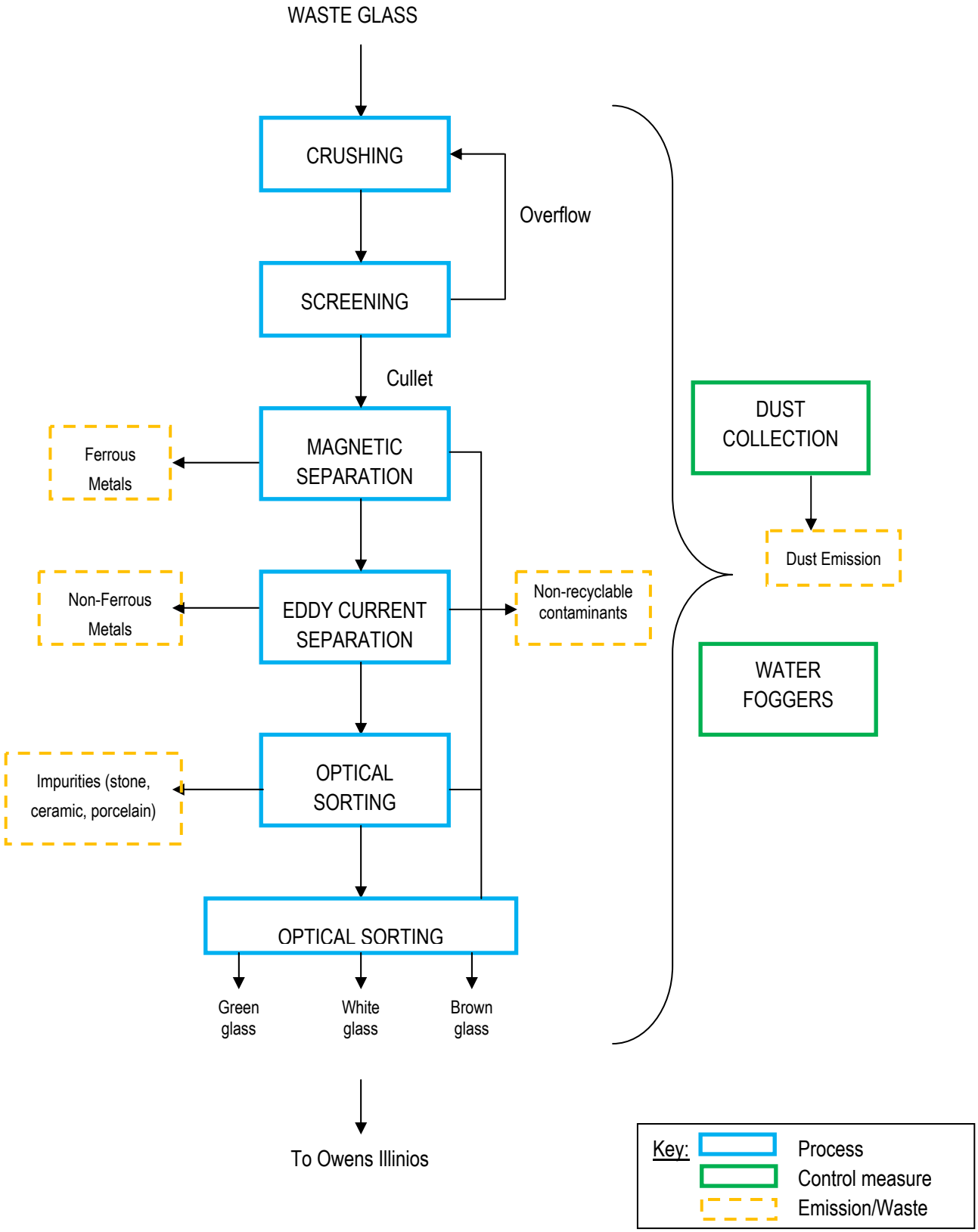
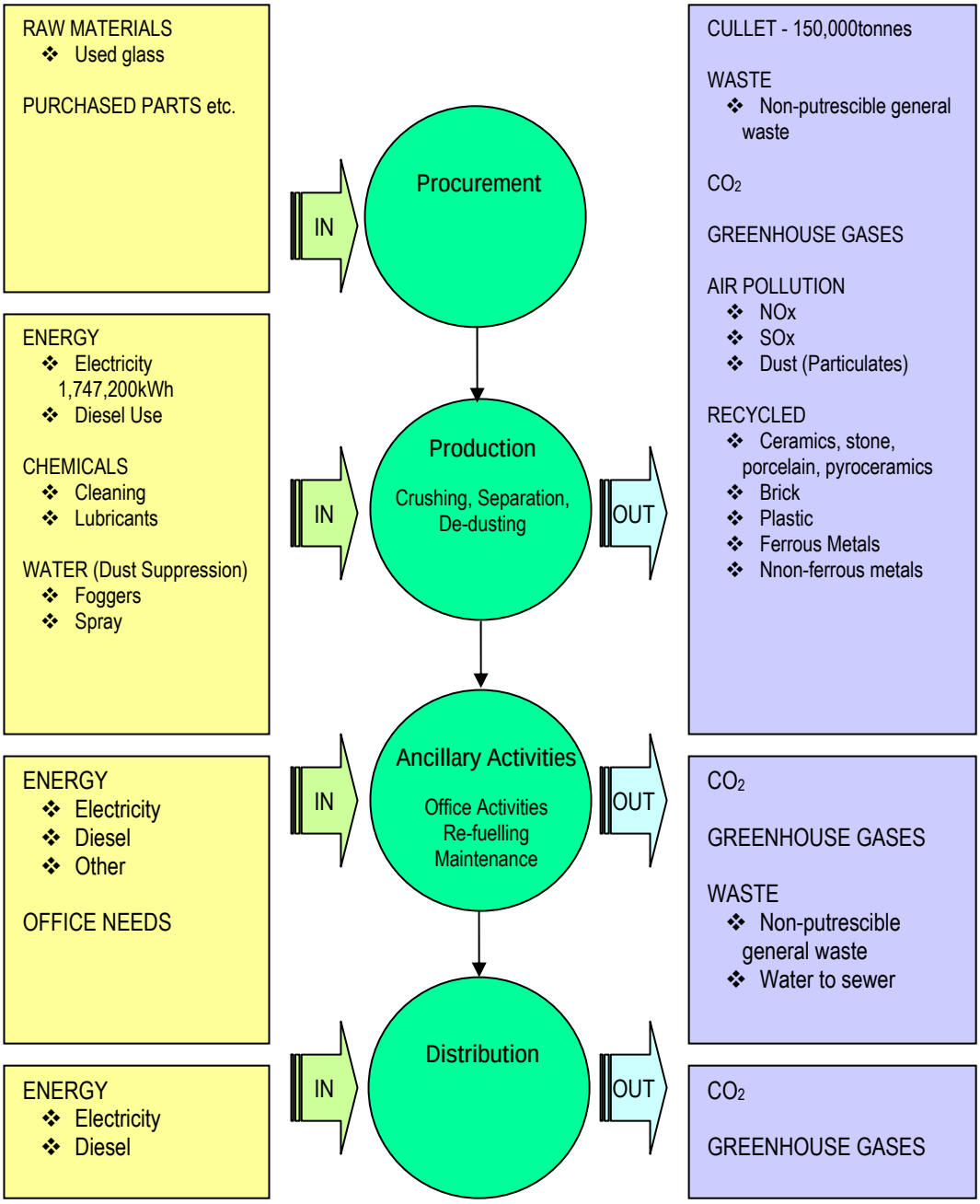


Figure 3-13: Environmental Mass Balance for the operation of the facility



3.2.3 Raw Materials

The raw materials would consist of incoming used glass bottles and other used glass products. The glass accepted onto site as a raw material has been pre-sorted and pre-processed at MRF's prior to arrival on site. The material from the MRF's is trucked to the site as broken bottles, generally <80 mm fragments. Thus there is no liquid contained in the source material. Only pre-processed glass would be accepted from MRFs. Thus contaminant levels in the raw materials would be low.

When the glass material is delivered it is unloaded directly into the building. The incoming glass would be stored in bays within the factory building. The maximum volume of glass that could be accepted and stored within the building at any one time would be no more than 2,000m^3.

This glass is considered clean when it arrives on site and then undergoes a rigorous sorting and decontamination process. This includes air sorting for paper and plastics, removal of organics, a magnetic system for ferrous metals and a separate system for non-ferrous metals to produce "cullet". It is a specific technical requirement of the specialised processing equipment that the glass is clean before entering the processing line. If the glass is not clean it cannot be processed.

Non-glass materials removed during the process are stored in waste bins and removed from the site to an appropriate landfill.

The nature of the proposed equipment that would be used for sorting and classifying glass materials was shown in Figure 3-10. The concept used to provide the deliverables requires raw materials to be clean in order to allow the optical sorting equipment to accurately sort the materials. The sorting equipment uses optical sensors to detect the colour and transparency of glass. In order to consistently and cost-effectively allow the facility to provide the deliverables, it is essential that raw materials are free of stains and contaminants. Furthermore, experience by site management with optical sorting equipment indicates that contaminants in the glass raw materials could eventually cause long term damage to this equipment.

No raw material washing or cleaning equipment is proposed to be constructed on site, nor the necessary resources are available to establish this. As such, the glass would be sourced from suppliers including:

- Polytrade
- Parr Recycling
- Sita
- Glass Granulates
- Bottle Cyclers

The fact that the glass cannot be processed if it is not clean means that if the source material changes in the future, for instance if contractual arrangements alter, then regardless of the source, the material must still be clean in order for the plant to operate.

3.2.4 Finished Goods

Finished goods would be the cullet separated into different colours and sizes.

The processed cullet is considered to be a finished good and not a "waste material". This is explained in detail in Section 3.2.3. Crushed glass of this nature is non-permeable and inert, properties that allow it to be used in a variety of applications including:

- Aggregate in road base, asphalt, tiles and concrete;
- Select Fill;
- Bedding material;
- Dirt stabiliser and enhancer by increasing silica levels in soils;
- Sand blasting media;
- Grit type products such as sand paper; and
- Drainage medium / filtration material in water filtration systems.

The material description and specification of the glass cullet that would be the finished product at the site is provided as follows:

GENERAL DESCRIPTION:	Glass similar in composition to container glass	
CHEMICAL DESCRIPTION:	Soda-lime-silica glass	
SPECIFICATION:		
Chemical Composition:	$Na_2O + K_2O + Li_2O$	12 – 15%
	CaO + MgO	10 – 13%
	$A1_2O_3$	1 – 2%
	Other Oxides (except SiO_2)	0 – 1%
	SiO_2	Balance
Colour:	Mixed – A combination of Flint, Amber, Arctic Blue and Green – including Emerald, Classic, Antique, Georgia and French green	

The following publications demonstrate the use of crushed glass in the above listed applications and specifications required for specific uses.

- Institute of Public Works Engineering Australia (NSW Division) 2010, *Specification for Supply of Recycled Material for pavements, earthworks and drainage 2010*, Department of Environment, Climate Change and Water NSW, Sydney

- Packaging Stewardship Forum, Australian Food and Grocery Council 2008, *The use of Crushed* Glass *as both an Aggregate Substitute in Road Base and in Asphalt in Australia (Business Case)*, GHD, Sydney

- Waverly Council 2011, National Waste Policy: Case Study: Recycled Glass in Roads, Department of Sustainability, Environment, Water, Population and Communities.

The document entitled: *Specification for Supply of Recycled Material for pavements, earthworks and drainage 2010* addresses the environmental considerations of the use of crushed glass in roadway construction. An excerpt from this document is provided as follows:

> " Chemical testing of crushed glass was completed as part of the *DECC's Recycled Glass as a Pipe Embedment Material* Trial (2006). The study made the following conclusions:
>
> - Chemical and physical contaminants detected were at most background or trace levels; and
> - The presence of any aluminium metal and/or metal compounds in the glass fines is not expected to present an unacceptable human health and/or environmental impact.
>
> Herrington et. al (2006) additionally demonstrated that the addition of crushed glass does not result in the leaching of toxic chemical residue."

Cullet would be stored within the external bunkers at the rear of the facility. The bunkers have the capacity to hold a maximum of 11,000m^3 of material.

A consent for extension of the hardstand area has been issued by Penrith City Council, DA12/0539. A copy of this consent can be found in Appendix 12.

3.2.5 Equipment

Table 3-2 provides a list of equipment that is proposed to be installed at the site for sorting and screening of glass. Brochures with technical details of this equipment have been provided in Appendix 10.

Table 3-2: List of Proposed Equipment

Name	Manufacturer	Use
Non-Ferrous Separator	Wagner Magnete	Used to remove non-ferrous metals from the material feed using eddy current separation.
Permanent Magnetic Belt Separator	Wagner Magnete	Used for separation of ferrous items from the material feed using a magnetic field.
MikroSort X-ray Sorter Type: AQ12XX	Mogensen	Used for the removal of pyroceramics from the material feed.
Ballistic Separators	Stadler	Used for the sorting of various co-mingled materials into different fractions.
Flip Flop Screen	Spaleck Conveying and Separation Technology	Used for screening of difficult, sticky or wet materials to a variety of sizes using vibrating screens.
Mogensen Sizer	Mogensen	Used to separate material flow into different sizes.
Prospekt MikroSort Opto-electronic sorting system	Mogensen	Sorts bulk goods using optical distinction. Recognises differences in colour, density, size, shape. Also recognises ferrous and non-ferrous metals.
Mogensen LongSizer Type SC	Mogensen	Separates material flow into different sizes.
ZZS Air Sifter	TST Trennso Technik	For separating bulk goods of various specific gravity.
Dust Collector	N/A	Collection of dust generated from the processes within the building. Capacity: 46,000 cubic metres per hour (approx 110kW).

3.3 RESOURCES

The main raw materials utilised in the glass beneficiation plant would be used glass bottles and other used glass products. These would be collected from households and businesses and after separating at materials recovery facilities would be brought onto the site by trucks. These raw materials would be stored in bays within the building.

The maximum volume of glass that would be stored on site is 13,000m^3. This volume is based on the capacity of the external bunkers to hold a maximum of 11,000m^3 of cullet and raw material bays within the building to hold a maximum of 2,000m^3 of raw materials.

3.4 DESIGN OF THE DEVELOPMENT

The design of the development is limited by the space available on the existing site. The location selected presents the best option in terms of space, process flow and proximity to the glass container manufacturing site (O-I).

The following section outlines relevant environmental factors that have been considered in the design phase.

3.4.1 Environmental Factors and Design Features

3.4.1.1 Water Quality

There is potential for contaminants from the external storage of cullet to enter stormwater if not managed appropriately. There is also a potential risk of contamination of stormwater from the storage and handling of diesel fuel at the site. A designated covered and bunded area would be established for the diesel tank and for refuelling of on-site vehicles to take place. Housekeeping would be maintained to a high standard.

Swales would be established in the low-lying areas of the site which are predominantly at the southern end of the site. Stormwater runoff would be directed to these swales. The swales would be designed with gentle slopes and grassed to aid in the deposition of solids washed off the hardstand areas, improving the water quality of runoff leaving the site. Details of these are provided in the accompanying landscape plans.

Water is discussed further in Section 5.3.

3.4.1.2 Air Quality

Dust and particulate impacts resulting from material storage, handling and transfer can be expected. Control measures have been considered to minimise these impacts.

Most of the activities that provide fugitive emissions are adequately mitigated by air emission controls that have been proposed during the design stage of the development. These controls include the use of an enclosed building to house the operations that release fugitive emissions, water foggers, misters and sprays, and the use of a dust collector. Air quality is assessed in Section 5.1

3.4.1.3 Noise Amenity

Noise would be generated by the proposed activities. The main sources of noise would be from the crushing and separation processes within the building, the movement and handling of materials around the site and the use of the dust collector and on-site vehicles.

After examining the details and associated noise controls of the process using SoundPLAN V7.1, it can be concluded that the noise impacts from the subject site are predicted to comply with the requirements provided by the NSW EPA guidelines. Provided that all recommendations and controls are adhered to and regularly maintained no noise impacts are anticipated to occur as a result of the proposed development. Noise is assessed in Section 5.2.

3.4.1.4 Odour

Odour is unlikely to be emitted from the raw materials brought onto the site, given that the only raw material would be glass that has been pre-sorted at existing Material Recovery Facility (MRF). Strictly no putrescible material would be present nor accepted on site.

The most likely source of odour for the proposed facility would be from residual liquid contained within the incoming raw materials (pre-sorted glass). The sources of raw material to the proposed site would be from existing MRF within the Sydney area. All sources of glass received at the site would be pre-sorted and often partially crushed prior to arriving at site. Given the pre-treatment prior to arrival on site, contaminant levels of residual liquid are considered to be low. The suppliers of pre-sorted glass include:

- Polytrade
- Parr Recycling
- Sita
- Glass Granulates
- Bottle Cyclers

The above listed facilities are established MRFs and glass received at these facilities are known to contain very little residue. Once processed within the MRF, the potential for odour has been further reduced. It is this processed glass that is provided as a raw material to the proposed development. Odour studies undertaken at MRFs have been addressed in the following Section.

3.4.1.4.1 Previous Odour Studies at MRFs

Benbow Environmental (BE) have prepared environmental studies for MRFs located at Botany and Chullora in 2004 (BE Reference no: 13147_EIS) and 2005 (BE Reference no, 15092) respectively. These MRFs receive used glass from commercial facilities and residential areas (kerbside recycling). Findings of these studies in relation to odour are summarised as follows:

- Material received at these facilities does not contain significant amounts of liquid, food scraps or green waste;
- Loads of waste material received at the MRF containing putrescible material is identified early in the process as a non-conforming load and immediately segregated;
- Any putrescible material identified is removed and stored within a sealed container and moved off-site daily;
- The strongest source of odour is from remnant beverage in glass bottles. Examination of the existing MRFs found that no strong odours are generated on site nor are observable at site boundaries;
- The processes of sorting and crushing undertaken at these MRFs rely on mechanical means and hence no application of heat would alter the material in any way that would give rise to the emission of odour;
- No chemical processes are undertaken and no chemicals are added to the materials being processed;
- Materials are processed on a continuous basis and materials of an organic nature are not retained in equipment where degradation could take place;
- All sorting and crushing operations are undertaken within an enclosed building; and
- Based on the above, no odour source measurements or odour modelling were considered warranted at these MRFs.

The catalogue of potential odour emissions for MRF processes and incoming glass is presented in Table 3-3.

Table 3-3: Catalogue of Potential Odour Emissions for Suppliers of Pre-Sorted Glass				
Unit Operation	Potential for Odour to be present	Occurrence	Risk Level	Controls Needed
Removal of Non-Conforming Loads Description of odour – decaying, organic waste, strong, unpleasant	High	Frequent	High	YES
Receival Area Unload of truck Front end loader lifting material Description of odour –musty, damp paper, earthy	Low	Frequent	Low	NO
Front-End Loader Empty Bucket material into conveyor Description of odour – musty, damp paper, earthy	Low	Frequent	Low	NO
Conveyor Uncovered transfer of material at speed Description of odour – musty, damp paper, earthy	Negligible	Frequent	Low	NO
Pre-Sort Non-recyclables To trommel screen Description of odour – musty, damp paper, earthy	Low	Frequent	Low	NO
Glass – Wet Description of odour – sugary, yeasty, alcohol	Moderate	Frequent	Moderate	YES
Glass – Dry Description of odour – none	Negligible	Frequent	Low	NO

The categorising process in Table 3-3 identifies two potentially high strength odour sources at MRFs with need for controls. Control measures listed previously were designed into the existing MRFs and no further controls were considered necessary.

3.4.1.4.2 Potential for Odour to be Generated

Odour is unlikely to be generated at the proposed development. As previously mentioned, the main source of odour would be from the incoming raw materials.

However, these raw materials are sourced from MRFs where they have been pre-processed prior to arrival onsite, significantly reducing the likelihood of odour. Furthermore, controls that would be established at the proposed development include:

- All raw materials would be transported in covered loads and unloaded within the existing building on site;
- All loads of raw material would be inspected upon arrival and non-conforming loads returned;
- All raw materials would remain stored within storage bays in the enclosed building onsite prior to processing; and
- The misting sprays would be used within the building for containing dust would also be relevant in reducing any potential odour.

In addition to the above controls, the following is noted:

- The proposed operations involve mechanical processes including crushing, sorting and screening of glass into "cullet";
- There would be no thermal treatment of the cullet on the site of the proposed development;
- No chemical processes would be undertaken and no chemicals would be added to the materials being processed;
- Materials are processed on a continuous basis and materials of an organic nature are not retained in equipment where degradation and generation of odour could take place; and
- Water foggers would not increase the potential for odour to be generated, given that the glass raw materials received on site are clean, and would not have putrescible components nor residues of putrescible materials which (if mixed with water from the foggers) are typically the causes of odour. A description of the raw materials is provided in Section 3.2.3.

In light of the previous studies undertaken at raw material supplier's (i.e. MRF) facilities, the uncontaminated nature of the raw materials being received on site, processes proposed to be undertaken on site and the control measures that would be in place, a quantitative odour assessment was not considered warranted.

3.4.1.5 Fire

Buildings on site exist. Fire protection requirements under the BCA will be provided for the entire site. The risk of a fire starting on site as a result of the proposed activities is addressed in Section 5.7.2.

The site is identified on Penrith Council's Bushfire Prone Land Map as being marginally within the 100 metre buffer zone from designated Category 1 Vegetation. A Bushfire Hazard Assessment Report was prepared by Building Code and Bushfire Hazard Solutions Pty Limited and is presented as Appendix 8.

3.4.1.6 Waste

Waste generated on site would be minor quantities of inert waste from the industrial activities and some office waste. All waste would be appropriately classified in accordance with the NSW EPA *Waste Classification Guidelines*. There is expected to be negligible risks associated with waste generation from the proposed development. Further details on waste generation and management are provided in Section 5.6.

3.4.1.7 Visual Impact

The existing building on site would be utilised for the development. There would be minor changes to the eastern side of the building including installation of two new roller shutters and installation of a dust collector external to the building. No other changes to the existing building are proposed as part of the development.

The proposed development would not impede on the visual amenity of the site or surrounding area. The minor changes to the building and proposed landscaping is more likely to enhance the visual aspects of the site. Visual impact of the proposed development is further discussed in Section 6.

3.4.1.8 Traffic Impact

A traffic and transport assessment was undertaken by Urban Transport and Planning. The assessment found the following:

- The proposed development would generate an average of 70 vehicle movements per day during construction and 128 vehicle movements per day during operation.
- Improvements to the intersection of the site and Andrews Road would be required to accommodate B doubles.
- There would be ample parking available at the site.

The projected traffic impacts of the proposal with the improved site access provisions in place are likely to be minor with acceptable traffic service levels and performance levels maintained. Traffic is discussed in Section 6 and the specialist report is provided in Appendix 5.

3.5 SITE LAYOUT PLANS

The subject site is an existing industrial facility with an established industrial building, car parking area and landscaping. The existing site plan is shown in Figure 3-14. There would be minor changes to the exterior of the existing building and installation of external storage bunkers.

Internal modifications would include installation of the equipment described in Section 3.2.5 as well as designated internal storage areas for incoming glass. Details are shown in the site plan in Figure 3-14, the landscape plan in Figure 3-15 and the elevation plan in Figure 3-16.

Proposed site changes include:

- Minor modifications to the eastern side of the existing building;
- Location of the equipment associated with the proposed activity inside the building;
- Removal of the shed in the southwest corner of the site;
- Location of the proposed dust extractor;
- Location of the external storage bunkers;
- Designated car parking;
- Location of the two weighbridges;
- Office areas;
- Existing storage rooms along the eastern side of the building where the 2000L self-bunded diesel storage tank would be located; and
- Proposed landscaping.

The following are also featured in the site layout:

- Location of electrical substations on site;
- Entrances and exit to the site;
- Location of internal driveways;
- Location of Andrews Road;
- Location of the additions to the existing concrete hardstand area;
- Location of the drainage easement that separates the site from Andrews Road;
- Location of low lying areas; and
- Site boundaries.

Figure 3-14: Proposed Site Plan

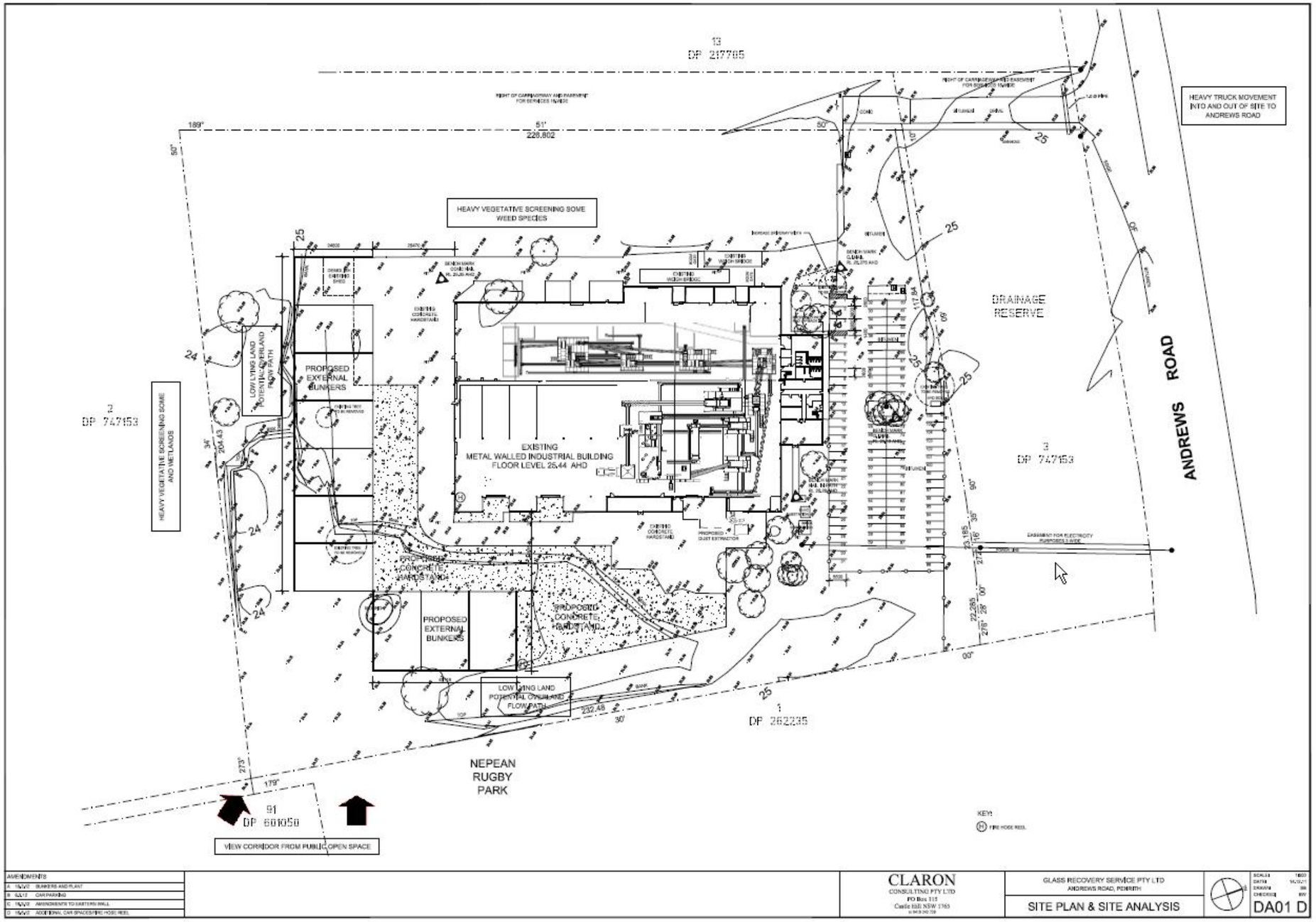
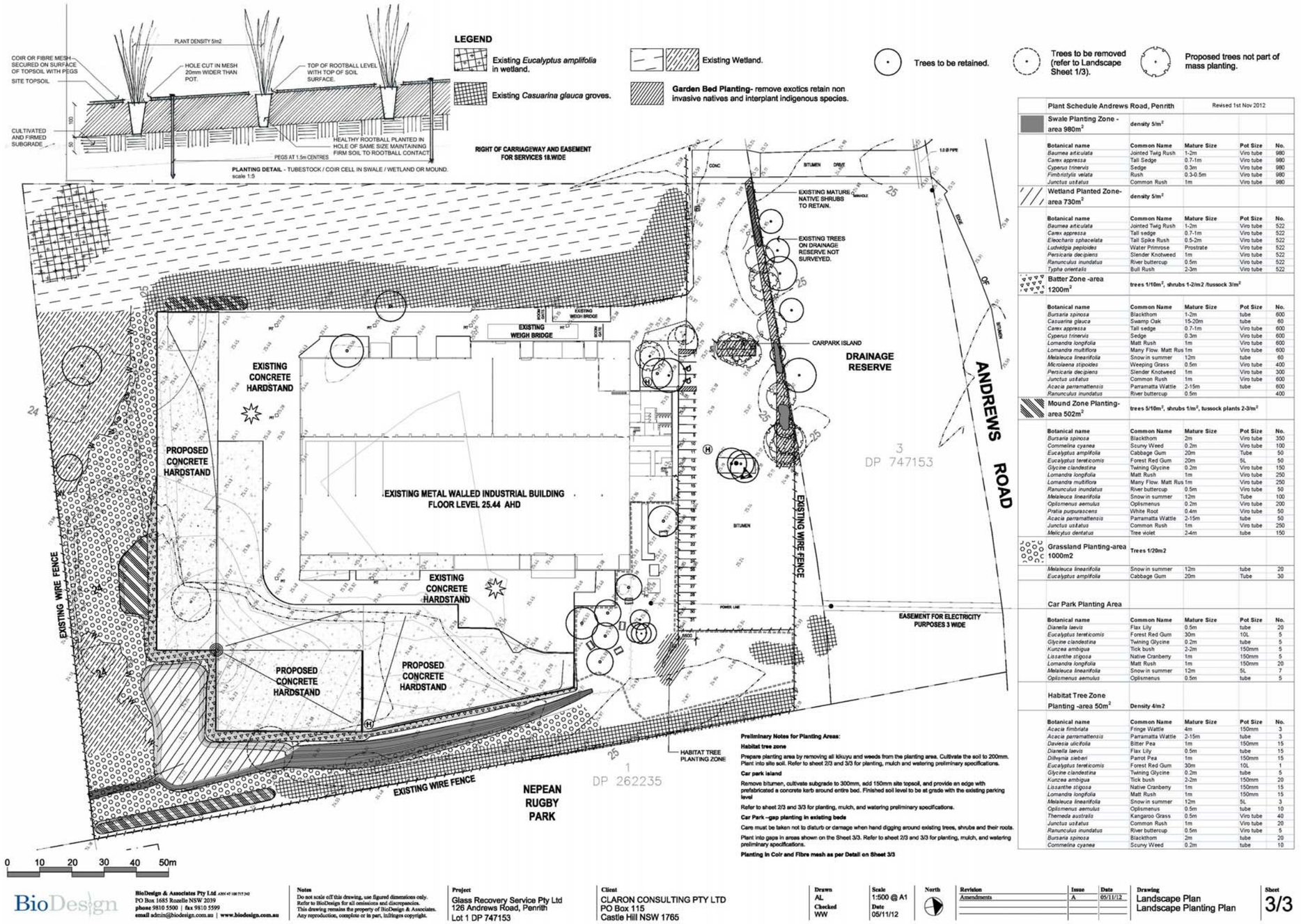
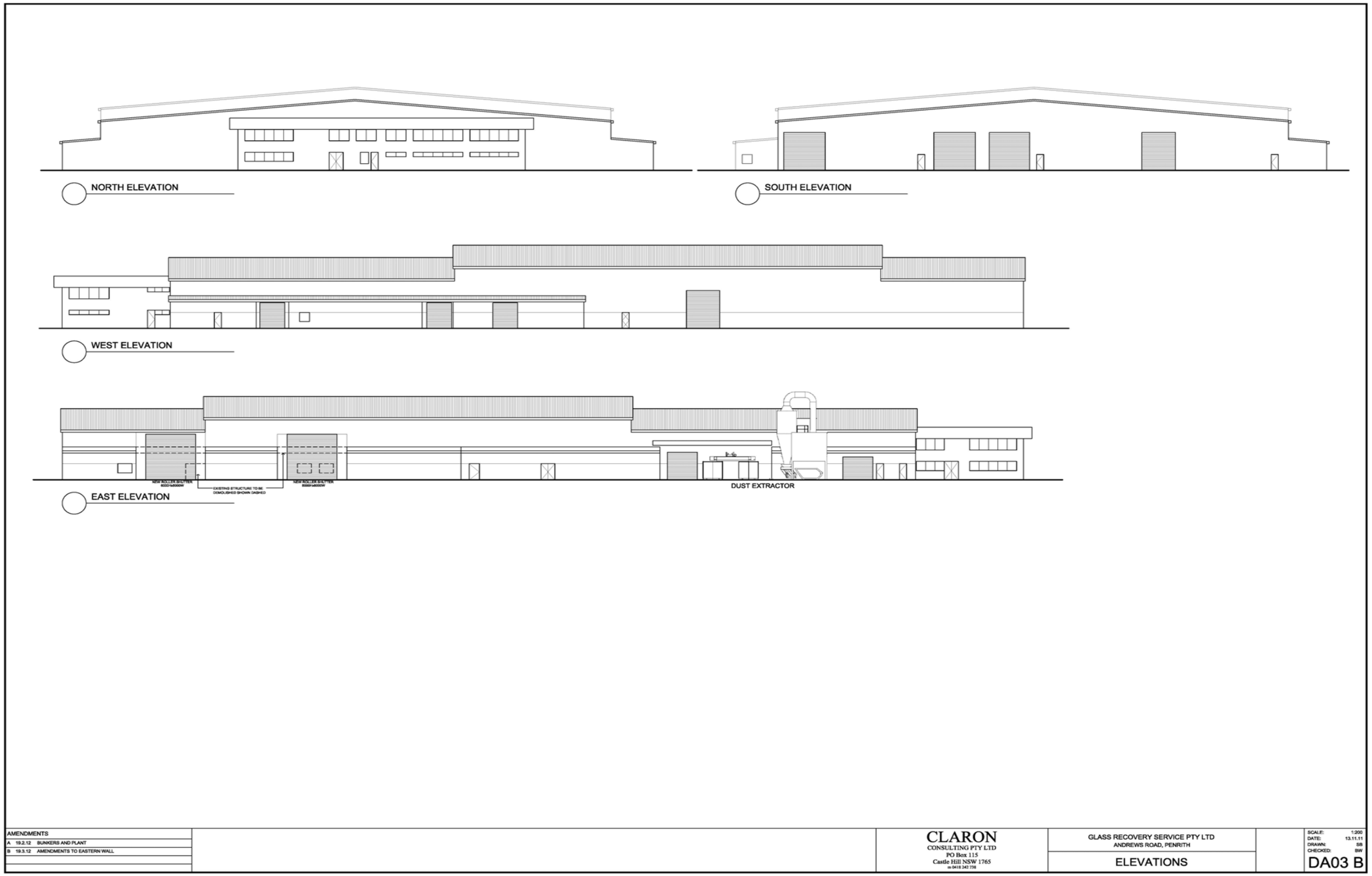


Figure 3-15: Landscaping Plan



Source: BioDesign

Figure 3-16: Building Elevation Plan



3.6 CLEANER PRODUCTION ACTIONS

"Cleaner Production" is a continuous approach to improving business sustainability by implementing techniques to reduce resource usage including energy, water & raw materials and waste to increase efficiency, reduce costs and improve environmental performance.

Cleaner Production actions would be implemented at the site through a comprehensive Environmental Management Plan (EMP). Training on Cleaner production principles would be included as part of the EMP and induction program at the proposed facility.

A 'cleaner production team' consisting of staff members from a cross-section of the major business areas (i.e.: maintenance, operation, management) would assist in maintaining records and data and identifying cleaner production opportunities. Examples of cleaner production actions that would be implemented at the site include:

System maintenance and improvements

The use of the most up to date technologies for production of glass cullet would be employed in the initial development of the site. The system would be maintained in accordance with manufacturer's specifications and continuous check for leaks and wear would be undertaken and rectified to ensure a high standard of efficiency in order to keep energy and resource use as low as possible.

Further, improvements in related technologies and equipment would be explored. This would be an ongoing process and consideration for installation of higher efficiency equipment would be assessed.

Measures to minimise waste

Waste will be minimised by:

- Maintaining accurate and up to date waste records in order to identify opportunities to reduce waste from the source,
- Segregate impurities from the separation process for ease of recycling; and
- Implement recycling programs.

This method would also be adopted to identify opportunities to reduce energy and water usage.

Proposed disposal methods for solid and liquid wastes

Where solid waste cannot currently be reused or recycled, disposal would be in accordance with relevant environmental legislation as detailed in the Waste Management section of the EIS. As part of the EMP, exploring opportunities to reduce, reuse and recycle wastes generated from the operation would be an ongoing process. Liquid waste would be limited to the office kitchen and amenities.

Air management systems

Continuous review of air management systems including all potential sources of air emissions, proposals to re-use or treat emissions, emission levels relative to relevant standards in regulations, discharge points would be undertaken on a regular basis as stipulated in the site's EMP. Upgrade of such systems would be undertaken as required although limited opportunities would exist as new equipment representing current best practice would be installed.

Water Management Systems

Continuous review of water management systems including all potential sources of water pollution and upkeep of erosion and sediment controls on site would be undertaken on a regular basis in accordance with the site's EMP.

Land and Soil Protection systems

Exploring options to protect land and soil from contamination would be an ongoing action and undertaken as stipulated in the site's EMP. Options to eliminate or reduce any potential sources of contamination, upgrade of protection measures employed on site to minimise soil and land contamination and pathways for contaminants to enter land and soil would be continuously reviewed.

3.7 STAGING OF THE DEVELOPMENT

The proposed development would be carried out in a single stage.

This development would involve converting the existing building on site into a glass beneficiation plant and to process used glass into cullet.

No additional building works is proposed. The proposal includes construction of bunkers at the rear of the existing building.

The construction phase of the development involves the installation of the glass processing equipment, structural steel requirements such as site welding and erection, minor building works, external bunkers, stormwater works and landscaping. These constructions would be undertaken by contractors.

The existing building would be used to house the glass beneficiation processing plant.

External bunkers would be installed adjacent to the concrete hardstand area. There would be seven (7) along the rear southern side of the site and another three (3) along the south-eastern end of the site.

The shed at the rear of the property would be demolished.

The operations on site would involve receiving incoming glass for recycling, crushing the glass, removing impurities, and separating the cullet by colour. The cullet would be stored in external bunkers before delivery to Owens Illinois adjacent to the site.

Dangerous goods involving minor storage of diesel fuel, a combustible material, would be associated with the proposed development therefore notification to WorkCover is not required.

3.8 OPERATIONAL DETAILS

3.8.1 Infrastructure and Services

The existing infrastructure on the site includes a large factory building, shed, and a designated car parking area. The remainder of the site consists of hardstand areas and grassed and landscaped areas.

The industrial building has been compartmentalised along its north-south direction using a fire rated wall. The building has internal store rooms along the eastern outside wall. Offices and amenities are located on the northern side of the main building. Access doorways are along the two sides and rear.

Two existing weighbridges and boom gates are located on the western side of the building.

The site expects to process 105,000 T of recycled glass into crushed cullet. A contractual agreement has been made with Owens Illinois (O-I) to allow GRS to supply cullet to (O-I) adjacent to the site. Delivery would occur daily.

3.8.1.1 Water

The site will be using mains water supply. This is already available on site. No wastewater will be generated on site.

3.8.1.2 Sewage

The current site has an existing sewer system. The sewerage system onsite is expected to be sufficient in handling sewerage generated by amenities onsite. No tradewaste would be generated.

3.8.1.3 Electricity and Telecommunications

Electricity and telecommunication lines currently provided to site would be used.

3.8.1.4 Fuel and Chemicals

Minor storage of diesel fuel in quantities of 2,000L would occur on site. The diesel would be stored in a self-bunded tank within a store room previously designed for storage of flammable liquids and therefore suited to this use. This area is bunded and would be in compliance with AS 1940-2004: *The storage of flammable and combustible liquids.*

Paint would be stored in quantities of less than 100 L. These would be used for maintenance purposes.

Lubricating oils for equipment would also be stored on site. There would typically be two 205 L drums stored on a bunded pallet.

3.8.2 Hours of Operations

The facility requests approval to operate 24 hours a day and 7 days per week. The facility would operate on a three (3) shift basis as follows:

Day Shift: 7:00am to 3:00pm
Afternoon Shift: 3:00pm to 11:00pm
Night Shift: 11:00pm to 7:00am

Noise compliance testing is recommended prior to night time operations commencing other than for a trial basis to ensure the project specific night time noise limits are satisfied.

3.8.3 Employment

The number of employees positions created would be 25-30 full time positions with eight (8) staff per shift including:

- 3 Pickers;
- 1 Operator / Forklift Driver;
- 1 Quality Control;
- 1 Loader Driver, and
- 1 Fitter.

There would be two (2) office staff employed 5 days per week, dayshift only including:

- 1 Production Manager; and
- 1 Office Administration.

4. EXISTING ENVIRONMENT

The following section describes the existing site and the location for the proposed development. The surroundings are characterised and a general description of the environment that is likely to be affected is provided.

The existing environment is described in the following terms:

- Existing and surrounding land use
- Community of Penrith City Council
- Flora and fauna around the site
- Topography
- Geology
- Hydrology
  This is an aspect that is discussed in detail due to its significance
- Noise amenity
  Noise amenity has been assessed in detail at the nearest residential areas through long term and short term measurements of noise levels. The existing contribution from industry has been determined.
- Road traffic noise
  Road traffic noise along the preferred route to the site has been determined by long term noise measurements.
- Air quality
  Air quality has been assessed by examining existing levels of air pollutants based on data provided by the nearest NSW EPA measurement site.
- Climate and meteorology

The assessment of the existing environment importantly enables the environmental design requirements of the proposed development to be established.

4.1 EXISTING AND SURROUNDING LAND USE

The subject site is located at 126 Andrews Road, Penrith NSW 2750. Penrith is a suburb approximately 43 km north-west of the Sydney Central Business District (CBD). The site's location is described by Figure 4-1, Figure 4-2 and Figure 4-3. (This is similar to information presented in Section 3.) The existing land is within the local government area of Penrith City Council.

The subject site is located within an industrial area zoned under the Penrith City Council Local Environment Plan land zoning map as Zone IN1 – General Industrial.

With reference to the Penrith City Council's Land Use Zoning Maps, the land use zones within the region of the subject site location are considered to be described as follows:

- Adjoining Premises/Land Uses:

  - North of Site: Classified Road – SP2
    Further north: Industrial Zone – IN2 (across the road)
  - West of Site: Industrial Zone – IN1
  - East of Site: Classified Road – SP2
    Further east: not classified on map
  - South of Site: Industrial Zone – IN1

- Areas acknowledged to be potentially affected as part of the assessment:

  - 0.53 km South-east of Site: Special Zone – 5(a) General Special Use (Day Care Centre)
  - 1.1 km North of Site: Special Zone – 5(a) General Special Use (Pre-School)
  - 1.1 South-east of Site: Special Zone – 5(a) General Special Use (School)

Figure 4-1 shows the various land uses surrounding the location of the subject site.

The subject site land is approximately 41,000 m^2 in area (the site is roughly rectangular in shape) with frontage to Andrews Road to the north.

Impacts at potentially affected areas that are considered sensitive according to the relevant environmental guidelines and under the definitions of land use zones from Penrith City Council LEP were considered in each of the individual environmental assessments included in Section 5.

Figure 4-1: Penrith City Council Land Use Zoning Map

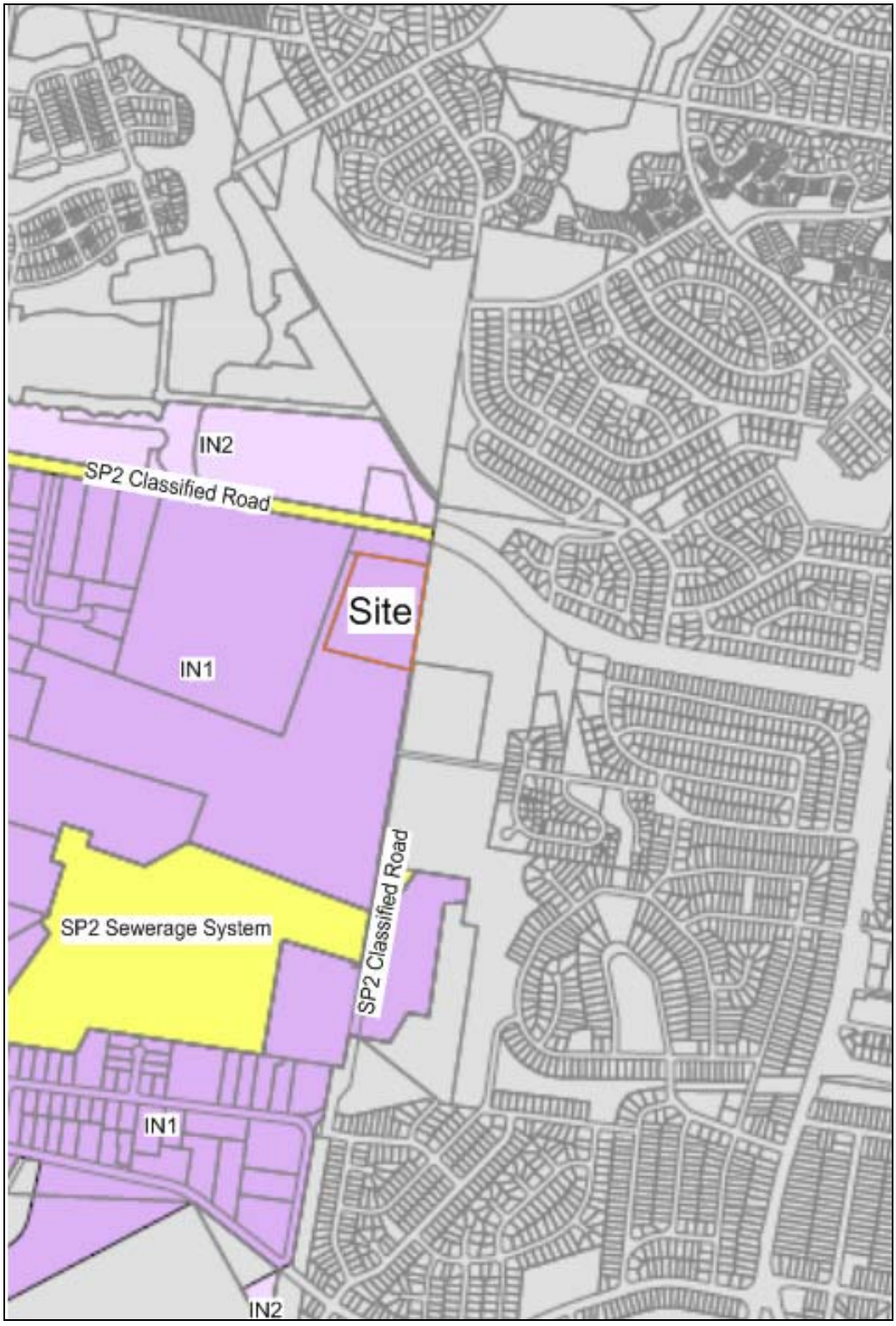
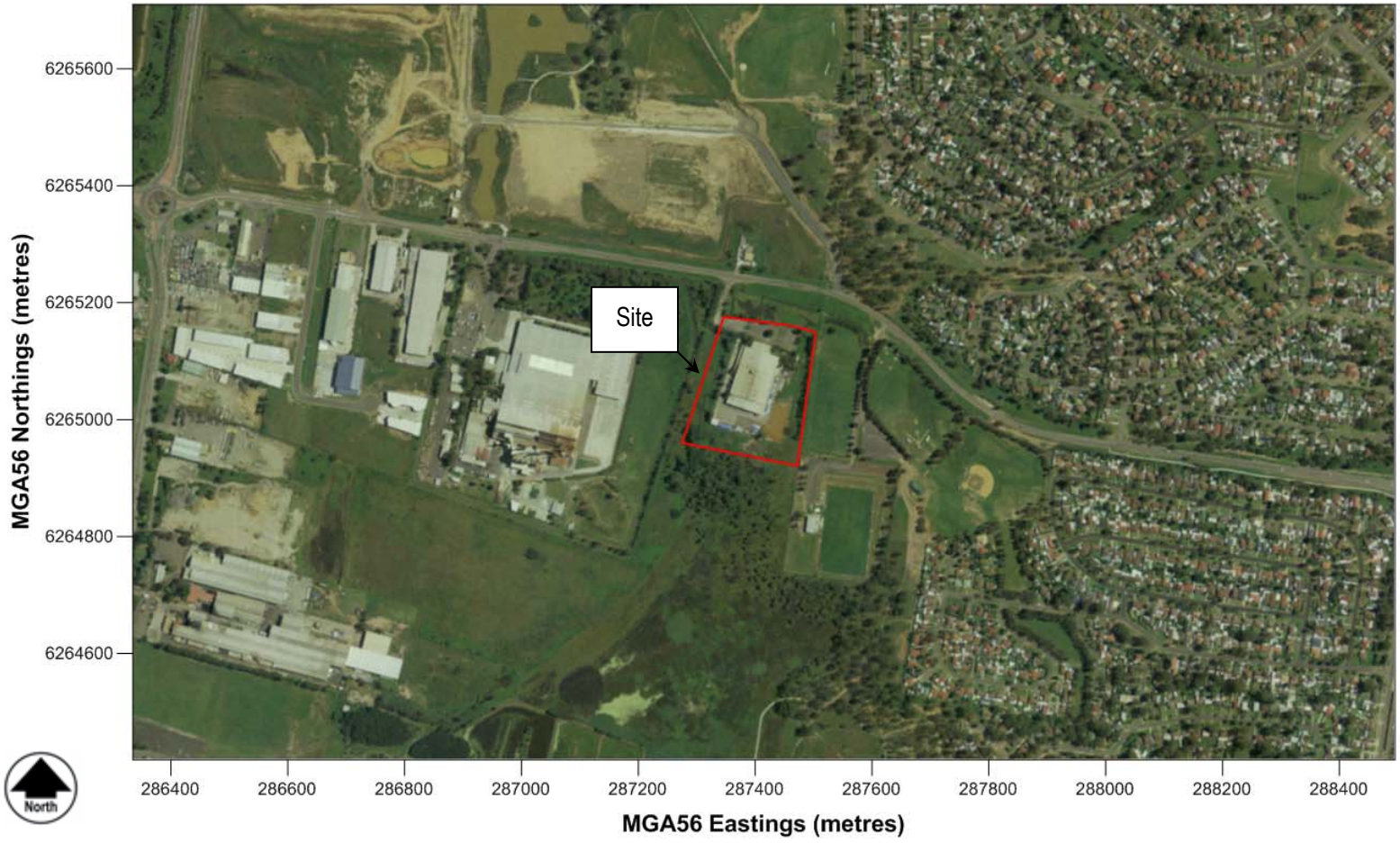
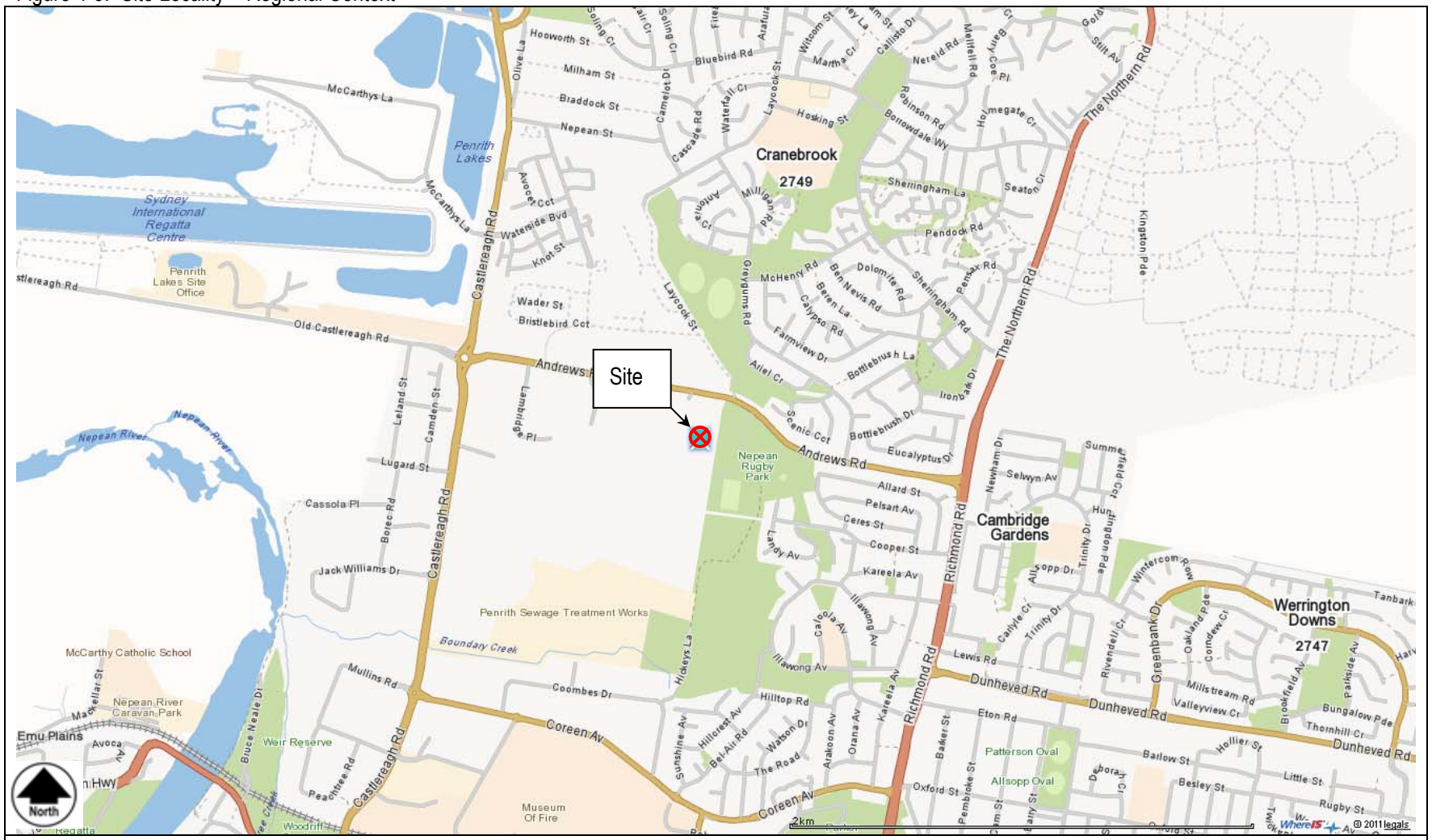


Figure 4-2: Subject Site in Local Context – Aerial Photograph



Source: Department of Lands © 2008 – SIX Viewer

Figure 4-3: Site Locality – Regional Context



Source: Where Is © 2012

4.1.1 Existing Infrastructure

The site is fully developed. The existing infrastructure on the site includes a large factory building, shed, and a designated car parking area. The remainder of the site consists of hardstand areas and landscaped or grassed areas.

The industrial building has been compartmentalised along its north-south direction using a fire rated wall. The building has internal store rooms along the eastern outside wall. Access doorways are along the two sides and rear. One of these store rooms was designed for storage of flammable liquids.

In the corner of the rear yard area is a shed that would be demolished. This has previously been used to store dangerous goods.

Utilities and services including water, electricity and sewerage for office areas are already established and would continue to be used for the proposed activities.

4.2 LOCAL COMMUNITY

This section provides information on the local community and the surrounding areas.

4.2.1 Penrith and Surrounds

Penrith is located approximately 54 km by road west of the Sydney CBD. It is both an agricultural centre and an industrial region for manufacturing industries. Surrounding suburbs include Cranebrook, Cambridge Park, Glenmore Park, Orchard Hills, Emu Plains and Werrington. The region also has a developed suburban infrastructure and has a large number of parks/reserves in the area. Immediately adjacent to the proposed site are other industrial businesses.

4.2.2 Population Demographics

The Australian Bureau of Statistics conducts a national census every 4 years. Statistics have been taken from the latest census carried out in 2010.

The population within the Penrith region, as determined during the 2010 census conducted by the Australian Bureau of Statistics, was 186,221 people, consisting of 92,172 males and 94,049 females. The population density is 459.9 persons/km^2.

Of the total employed persons residing in Penrith, 19.1% are employed as Clerical and Administrative Workers, 15.9% as Technicians and Trade Workers, and 12.*% as Professionals. Other occupations include Labourers (10.5%), Machinery Operators and Drivers (10.5%), Sales Workers (10.4%), Managers (10.1%), and Community and Personal Service Workers (8.6%).

Further demographic information is supplied in Section 7.

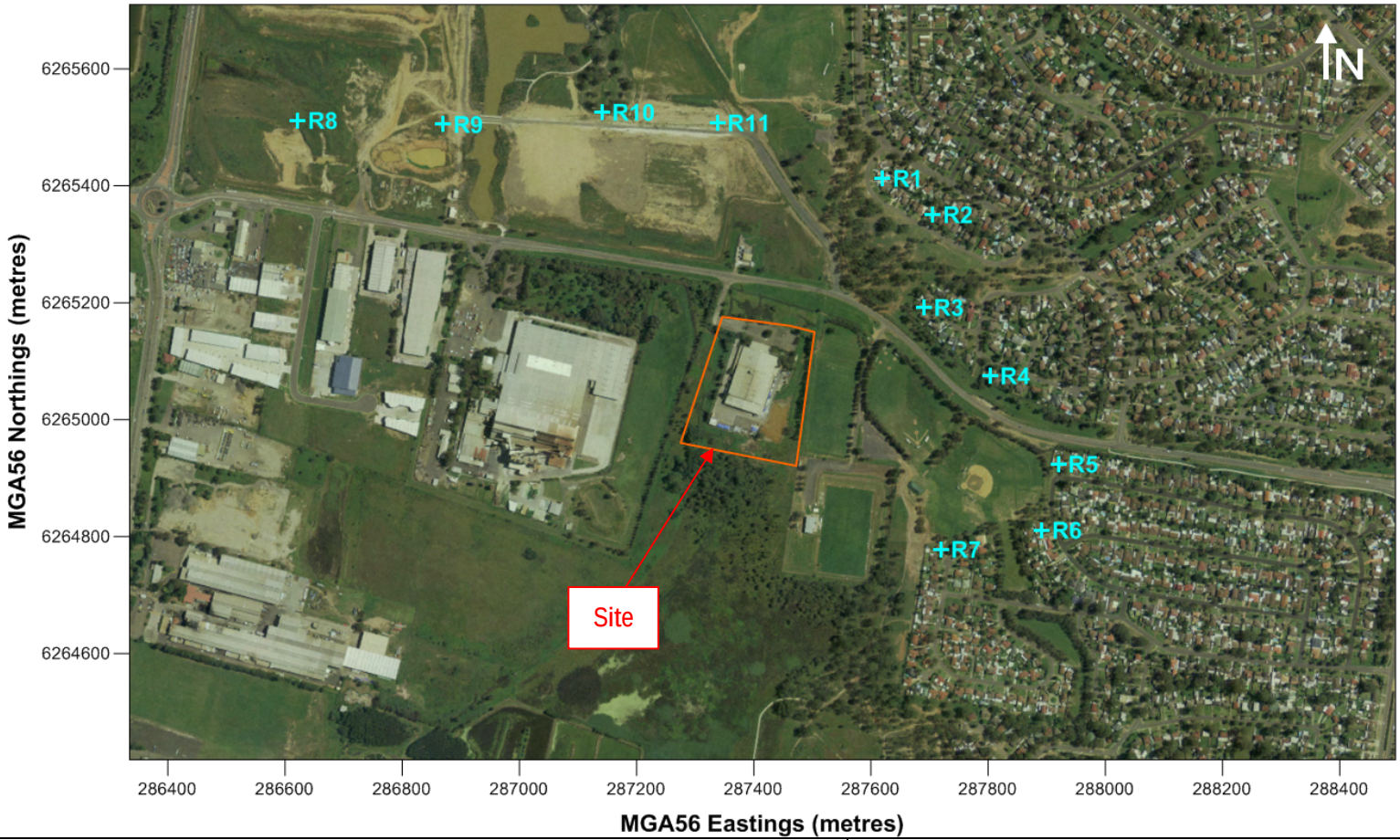
4.2.3 Nearest Residences

The nearest affected sensitive receptors, by definition, include residential premises, hospitals, schools and other dwellings that are potentially occupied by health-compromised persons. The locations of the nearest receptors are presented as Receptors R1 to R11 in Table 4-1 and Figure 4-4.

Table 4-1: Nearest Potentially Affected Receivers Considered

Receptors ID	Address	Direction	Approximate Distance to Site Boundary (m)
R1	31 Ariel Crescent, Cranebrook 2749	NE	285
R2	19 Ariel Crescent, Cranebrook 2749	NE	297
R3	6 Koala Glen, Cranebrook 2749	NE	150
R4	42 Scenic Circuit, Cranebrook 2749	E	341
R5	93 Allard Street, Penrith 2750	E	476
R6	58 Ceres Street, Penrith 2750	SE	463
R7	5 Echo Place, Penrith 2750	SE	323
R8	42 Gannet Drive, Cranebrook 2749	NW	766
R9	57 Lakeview Drive, Cranebrook 2749	NW	550
R10	36-40 Nepean Street, Cranebrook 2749 / 8 Andrews Road, Cranebrook 2749	NW	379
R11	36-40 Nepean Street, Cranebrook 2749 / 8 Andrews Road, Cranebrook 2749	N	320

Figure 4-4: Aerial Photograph Outlining the Nearest Identified Receptors



Legend:
Receptors
Site Boundary

Source:
© Land & Property Information – SIX Viewer (2008)

4.3 FLORA AND FAUNA

The original vegetation community that would have existed at the site was Alluvial Woodland with some cross over with Riparian Woodland. Development of the site has resulted in removal of this original vegetation.

At present, existing casurina groves provide shielding to Nepean Rugby park and to the neighbouring land on the western side of the site. The wetland along the western side contains casurina groves and *Eucalyptus amplifolia*. There are also existing planting beds in the carpark that provide shade and intermittent screening from Andrews Road. Exotic weed species are also present in these planting beds.

The existing wetland along the southern boundary contains dense vegetation and screens views from southern properties. Some weed species are present in this wetland.

There are significant weed infestations at the site including a major blackberry infestation on the drainage reserve. The drainage zone on the north eastern boundary contains moderate weeds as does the existing wetland on the western side.

There are no threatened or endangered flora or fauna populations or sightings listed or recorded on the NPWS Atlas for threatened or endangered species at the site. Flora and fauna as well as native vegetation are discussed further in Section 5.

4.4 TOPOGRAPHY

4.4.1 Regional and Local Topography

The site and its immediate surrounds are situated on relatively flat terrain at an AHD (Australian Height Datum) elevation of approximately 32 metres. There are no observed changes in elevation within approximately 100 metres from the site boundary. A slight increase in terrain elevation is however observed towards the east, especially north-east where terrain elevation in AHD is seen to reach up to 60 metres. Topography and 3D terrain elevation maps have been provided as Figure 4-5 and Figure 4-6 (these are duplicated from Figures 3-6 and 3-7).

Figure 4-5: Three-Dimensional View of the Terrain of the Site Location's Regional Area (Z-Axis Scaled by a Factor of 20)

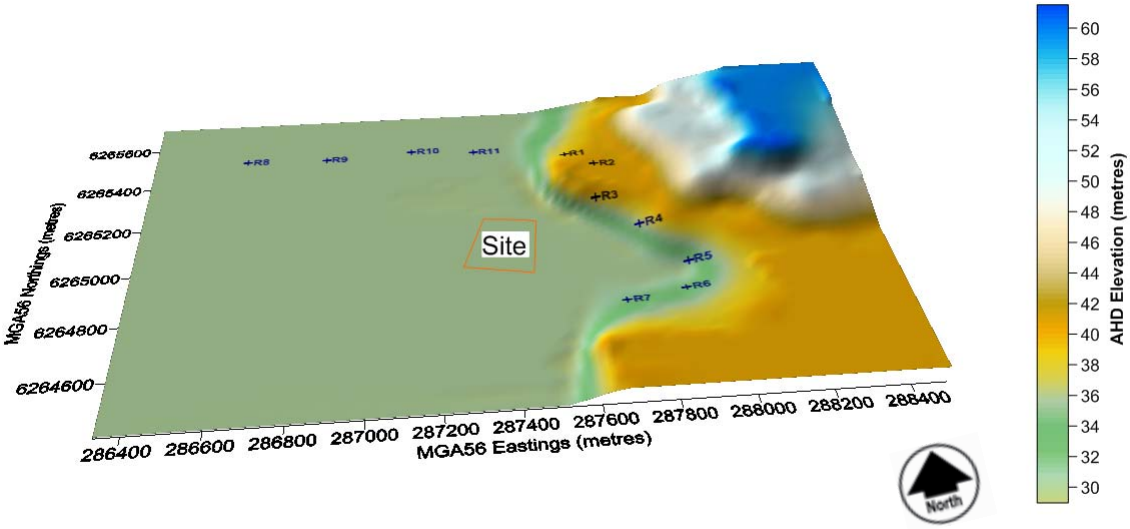
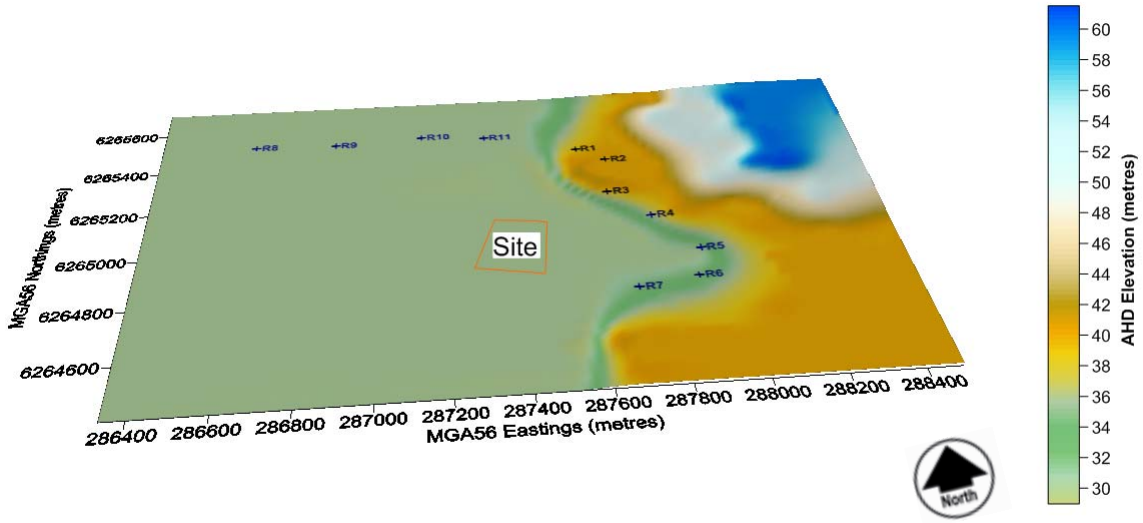


Figure 4-6: Three-Dimensional View of the Terrain of the Site Location's Regional Area (Z-Axis Unscaled)



4.4.2 Site

The terrain of the subject site is considered relatively flat, with a general elevation of 32 m AHD along the allocated boundaries of the site. The site is located at lowest elevation of the regional area.

4.5 GEOLOGY

The geology of the site is Quaternary alluvium consisting of sand, silt and gravels from sandstone and shale.

4.5.1 Soil

The site is located on fluvial landscape, Richmond soils.

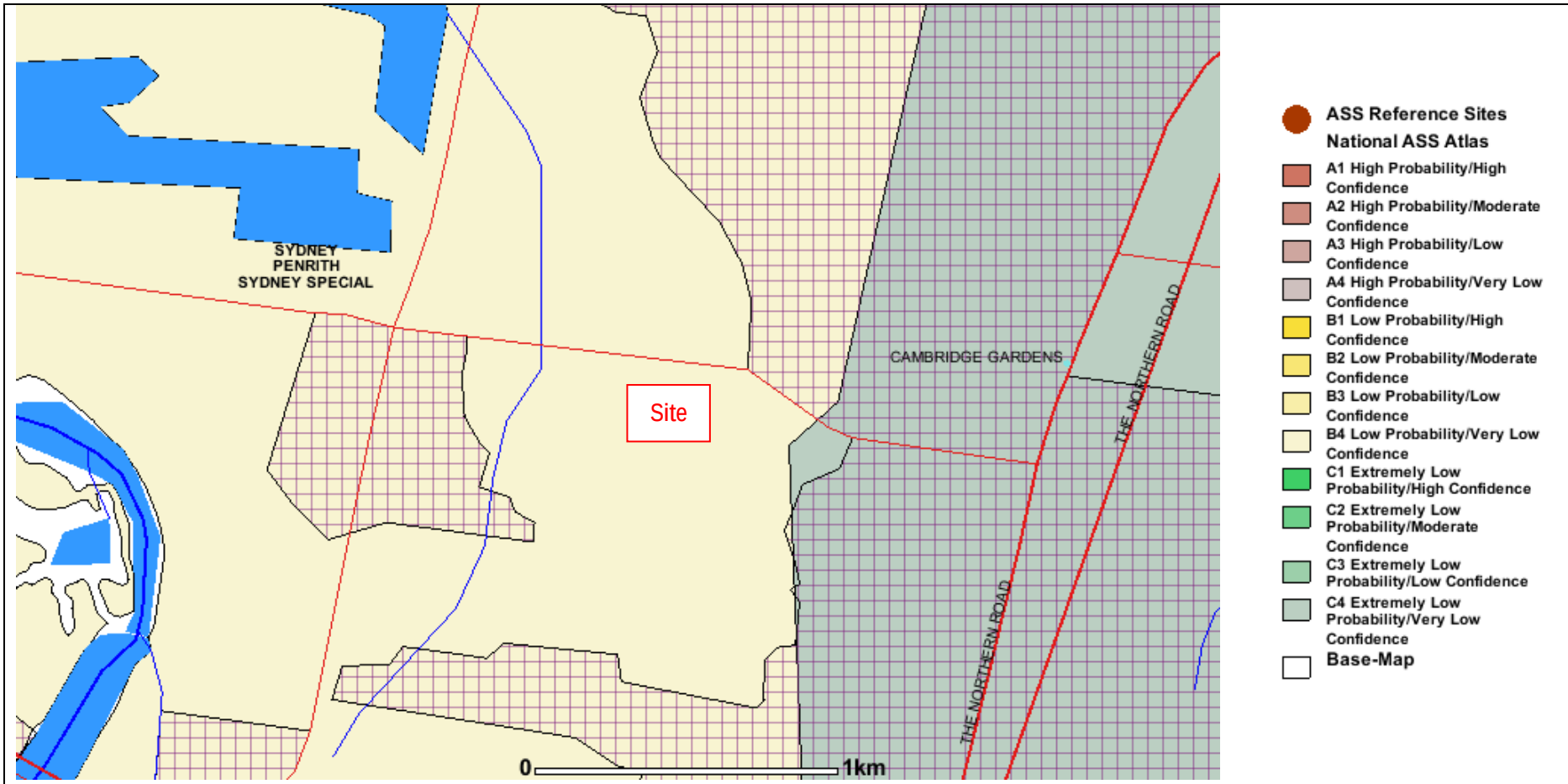
A Phase I and limited Phase II contamination study was undertaken at the subject site. This study found minimal evidence of staining and no evidence to suggest that there would be subsoil or groundwater contamination due to past uses of the site. The report is provided in Appendix 6. A Phase II study was not considered warranted.

4.5.2 Acid Sulphate Soils

A search from the Atlas of Australian Acid Sulfate Soils database developed by the CSIRO shows that there is a low probability of finding acid sulphate soils on the subject site or within close proximity to the site. A map is shown in Figure 4-7 to illustrate these findings.

Given the outcomes of this search, further acid sulfate soil investigations and assessments were neither required nor undertaken.

Figure 4-7: Acid Sulphate Soils Map



Source: Australian Soil Resource Information System (2012)

4.6 HYDROLOGY

The following section details the hydrological aspect of the site and region. Specifics on the surface water, waterways and groundwater have been addressed, as well as overall catchment issues.

4.6.1 Catchment

The site is located 1.8 km east of the Nepean River. To the north-west of the site is Penrith Lakes. Boundary creek is located 845 m south of the site which flows westward towards Nepean River.

The site is located within the Middle Hawkesbury-Nepean Catchment which extends from Mulgoa to Lower Portland. Middle Hawkesbury-Nepean Catchment is a sub catchment of the Hawkesbury Nepean River Catchment or Basin which covers an area of 22,000 km^2.

The catchment is managed by the Hawkesbury Nepean Catchment Management Authority (HNCMA) which was established in 2004. The primary role of the Authority is to ensure the protection and sustainable development of land, vegetation and water resources within the catchment.

The HNCMA along with the Hawkesbury Nepean Local Government Advisory board (HNLGAG) and the Hawkesbury Nepean Catchment Management Board was devised and approved in 2008 and aims to improve river health, protect biodiversity of the river and encourage best practice soil and land management.

4.6.1.1 State of the Catchments (SOC) – Hawkesbury-Nepean Region

The catchment conditions for the Hawkesbury-Nepean region are discussed in the document State of the Catchments 2010 which is available from the NSW EPA website. The most recent conditions available were prepared for the year 2008 and are given in Figure 4-8.

Figure 4-8: Hawkesbury-Nepean region SOC ratings for 2008 (NSW EPA, 2010)

State-wide target	Region condition
Native vegetation	
Fauna	
Threatened species	
Invasive species (impact)*	
Riverine ecosystems	
Groundwater	
Marine waters and ecosystems	
Wetlands	
Estuaries and coastal lakes	
Soil condition	
Land management within capability (LMwC)	
Economic sustainability and social well-being	
Capacity to manage natural resources	

Condition	Rating
Very good	
Good	
Fair	
Poor	
Very poor	
Not rated	

4.6.2 Surface Water

The proposed site is predominantly flat with no dominant direction of fall. The area to the west of the site is an established industrial site with a category 2 and an unnamed water course running along this boundary. To the east of the site is the Nepean Rugby Park and located to the south is a classified wetland.

The subject area is considered to be a flood plain and not a floodway due to the flat nature of the land and the distance from the Nepean River.

An unnamed watercourse exists on the western boundary of the site which has flows coming from the catchment areas to the north and drains eastward before turning southward. The unnamed watercourse also has flows coming from the east of the site which drain through the drainage reserve on the northern boundary. Both flows meet before flowing southward down the unnamed watercourse.

The unnamed watercourse discharges to the wetland on the southern boundary of the site. This wetland then discharges southwards toward Boundary Creek before flowing to the Nepean River.

The site stormwater system is already established and requires minor alterations.

4.6.2.1 Nearest Waterway

The nearest waterway is the unnamed watercourse that runs along the western boundary of the site.

Penrith Lakes is located approximately 1.2km north-west of the site and the Nepean River is approximately 2km to the west.

Penrith Lakes was the largest sand and gravel quarry in Australia and is located on the floodplain of the Nepean River. A sustainable aquatic recreation area has been developed.

4.6.2.2 Water Quality and River Flow Objectives

The ambient Water Quality and River Flow Objectives for the receiving waters have been investigated for the site. The NSW Water Quality Objectives identify the agreed environmental values and long-term goals for NSW's surface waters.

These objectives set out:

> *The community's values and uses for our rivers, creeks, estuaries and lakes (i.e. healthy aquatic life, water suitable for recreational activities like swimming and boating, and drinking water); and*
>
> *A range of water quality indicators to help us assess whether the current condition of our waterways supports those values and uses.*

However, the NSW Water Quality Objectives does not provide objectives for the Hawkesbury-Nepean catchment area. Public enquiries for this catchment had been completed or substantially completed by the Healthy Rivers Commission (HRC).

4.6.2.3 Healthy Rivers Commission (HRC)

The Healthy Rivers Commission was discontinued in 2004 and replaced by the Natural Resources Commission (NRC). Outstanding Healthy Rivers Commission recommendations have been incorporated by the NRC into Catchment Action Plans and Government programs.

4.6.2.4 Catchment Action Plan (CAP)

A Catchment Action Plan has been developed by NRC for the Hawkesbury-Nepean Catchment and is available on the Hawkesbury-Nepean Catchment Management Authority website. The NSW Government have endorsed state-wide targets from the recommendations of the NRC.

The targets for water include:

Macro-environmental targets consist of:

- *By 2015 there is an improvement in the condition of riverine ecosystems;*
- *By 2015 there is an improvement in the ability of groundwater systems to support groundwater-dependent ecosystems and designated beneficial uses; and*
- *By 2015 there is no decline in the condition of marine waters and ecosystems*

Specific priorities include:

- *By 2015 there is an improvement in the condition of important wetlands and the extent of those wetlands is maintained; and*
- *By 2015 there is an improvement in the conditions of estuaries and coastal lake systems*

4.6.2.5 NSW Salinity Strategy

The NSW Salinity Strategy was introduced by the NSW government to slow down the increase in salinity over the next 10 years. However, management targets and actions for the site specific Hawkesbury-Nepean Catchment area have yet to be published. The NSW Government is working with the Hawkesbury-Nepean Catchment Management trust to develop these targets and actions.

4.6.3 Groundwater

The site is an existing industrial facility which contains existing buildings and concrete hardstand areas. The installation of external bunkers is proposed. Additions to the existing hardstand area and drainage works are proposed as part of a separate development application.

There are no activities on site or visible evidence to suggest that there would be groundwater contamination due to past uses of the site. The site has no history of underground tanks having been installed.

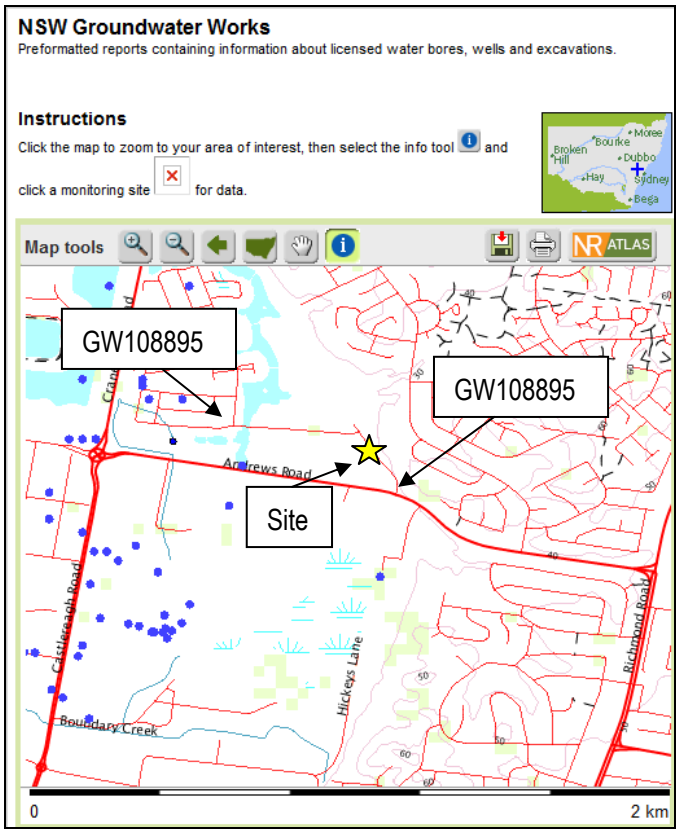
Data from two groundwater wells within close proximity of the site indicate that the standing water level (or depth from the surface to groundwater) is 6.0 – 6.3 metres. The location of the groundwater wells are shown in Figure 4-9 and data from the wells are presented in Table 4-2.

This data was sourced from the NSW Natural Resources Atlas at http://nratlas.nsw.gov.au.

Table 4-2: Groundwater Well Data

Well ID	Approximate location from site	Standing Water Level (S-W-L)	Salinity
GW108895	100m SE	6.3m	9.3 mg/L
GW004788	400m W	6.0m	unknown

Figure 4-9: Location of Groundwater Wells



Source: http://nratlas.nsw.gov.au

4.7 NOISE AMENITY

4.7.1 Nearest Receptors

The nearest noise sensitive receivers are presented in Table 4-3 and shown in Figure 4-10, Figure 4-11 and Figure 4-12 below, which reflect the receptors considered in Section 4.2.3.

Long term environmental noise monitoring was conducted at four strategic locations (R2, R7, R7 Northern and R4 Mulgoa) which were identified as being representative of the nearest potentially affected residential receiver locations. Operator attended noise monitoring was similarly undertaken at residential receivers R1 – R7 throughout the Day, Evening and Night time periods in order to assess the level of existing industrial noise.

Table 4-3: Potentially Sensitive Receptors

Receptors	Address	Direction	Distance from Centre of Building (m)
R1	31 Ariel Crescent, Cranebrook	N	416
R2*	19 Ariel Crescent, Cranebrook	NE	415
R3	6 Koala Glen, Cranebrook	NE	291
R4	42 Scenic Circuit, Cranebrook	E	394
R5	93 Allard Street, Penrith	E	532
R6	58 Ceres Street, Penrith	SE	542
R7*	5 Echo Place, Penrith	SE	427
R8	Proposed residential dwelling	NW	890
R9	Proposed residential dwelling	NW	710
R10	Proposed residential dwelling	NW	565
R11	Proposed residential dwelling	N	445
R1 Northern	-	E	613
R2 Northern	-	E	809
R3 Northern	-	E	974
R4 Northern	-	E	1,113
R5 Northern	-	E	1,215
R6 Northern	-	SE	1,174
R7* Northern	-	SE	1,244
R8 Northern	-	SE	1,327
R9 Northern	-	SE	1,436
R10 Northern	-	SE	1,470
R1 Mulgoa	-	SW	5,363
R2 Mulgoa	-	SW	5,264
R3 Mulgoa	-	SW	5,184
R4* Mulgoa	-	SW	5,053
R5 Mulgoa	-	SW	4,995

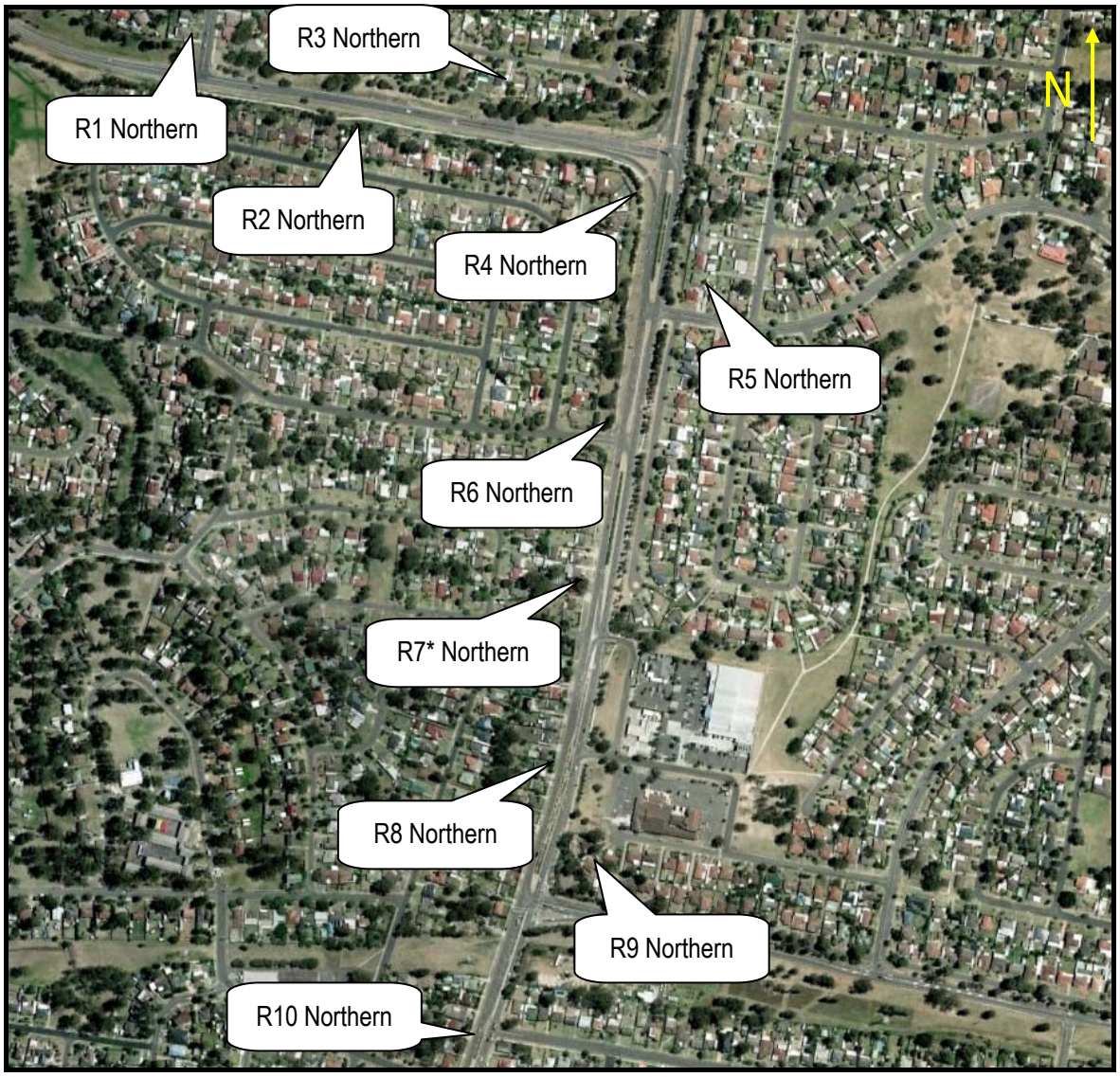
Note: * indicates location of long term environmental noise logger
- indicates address was not recorded

Figure 4-10: Operational Receivers, Site Location and Environmental Noise Logger Location



Note: * indicates location of long term environmental noise logger

Figure 4-11: Road Traffic Noise Receivers and Environmental Noise Logger Location



Note: * indicates location of environmental noise logger utilised for measuring existing traffic noise levels along Northern Road.

Figure 4-12: Road Traffic Noise Receivers and Environmental Noise Logger Location



Note: * indicates location of environmental noise logger utilised for measuring existing traffic noise levels along Mulgoa Road.

4.7.2 Existing Acoustic Environment

The level of background noise varies over the course of any 24-hour period, typically from a minimum at 3.00am to a maximum during morning and afternoon traffic peak hours. Therefore, the NSW Environment Protection Authority (EPA) *Industrial Noise Policy (*INP, Environment Protection Authority 2000) requires that the level of background and ambient noise be assessed separately for the daytime, evening and night time periods relevant to the proposed operating times of the development in question. The INP defines these periods as follows:

- Day is defined as 7.00am to 6.00pm, Monday to Saturday and 8.00am to 6.00pm Sundays and Public Holidays;
- Evening is defined as 6.00pm to 10.00pm, Monday to Sunday and Public Holidays; and
- Night is defined as 10.00pm to 7.00am, Monday to Saturday and 10.00pm to 8.00am Sundays and Public Holidays.

Table 4-4 below summarises the existing L_{Aeq} ambient noise levels and L_{A90} rating background noise levels for each day, evening and night period, in accordance with the NSW INP. An overall representative L_{Aeq} noise level is determined by logarithmic averaging of each assessment period for the entire monitoring period, where L_{A90} is determined by median averaging of each assessment period for the entire monitoring period.

Table 4-4: Measured L_{A90} and L_{Aeq} Noise Levels – Unattended Noise Monitoring (values expressed as dB(A))

Monitoring Locations	L_{A90} Background noise levels			L_{Aeq} Ambient noise levels		
	Day 7:00 – 18:00	Evening 18:00 – 22:00	Night 22:00 – 7:00	Day 7:00 – 18:00	Evening 18:00 – 22:00	Night 22:00 – 7:00
19 Ariel Cr	41	41	41	52	47	46
5 Echo Pl	41	42	40	53	50	49

Table 4-5 below summarises the existing $L_{Aeq(15\ hour)}$, $L_{Aeq(9\ hour)}$ and $L_{Aeq(1\ hour)}$ road traffic noise levels for each day and night period, in accordance with the New South Wales Road Noise Policy (NSW RNP). An overall representative $L_{Aeq(15\ hour)}$ and $L_{Aeq(9\ hour)}$ noise level is determined by logarithmic averaging of each assessment period for the entire monitoring period, where the $L_{Aeq(1\ hour)}$ is determined by the tenth percentile of each assessment period for the entire monitoring period.

Table 4-5: Measured L_{A90} and L_{Aeq} Noise Levels – Unattended Noise Monitoring (values expressed as dB(A))

Monitoring Locations	$L_{Aeq(15\ hour)}$	$L_{Aeq(9\ hour)}$	$L_{Aeq(1\ hour)}$	
	Day 7:00 – 22:00	Night 22:00 – 7:00	Day 7:00 – 22:00	Night 22:00 – 7:00
221 Richmond Rd	65	60	66	62
3 Huron Pl	65	63	67	66

Short term operator attended noise measurements were undertaken over the course of several days including the 6th of March, the 14th of March, the 27th of March and the 28th of March 2012. Operator observations highlighted that at all residential locations, the primary contributions to existing noise levels in the area are attributable to industrial noise and road traffic noise.

Results of the operator attended noise measurements are detailed in Table 4-6, Table 4-7 and Table 4-8 below.

Table 4-6: Measured Background Noise Levels, Attended Noise Monitoring – Day Time Period, dB(A)

Measurement Location	Noise Descriptor		Observed Meteorological Conditions	Comments and Observations dB(A)
R1 31 Ariel Crescent 2:17 pm – 2:32pm 14/03/12	L_{A1}	64.7	No wind; No rain; Partially Cloudy.	• Owens Illinois not audible • Cars on Andrews Rd ≤ 54, 57, 58, 56, 63 • Trucks on Andrews Rd ≤ 68, 56 • Hand drill ≤ 45 • Insects ≤ 42 • Birds singing ≤ 51 • Dogs barking ≤ 64, 65, 69, 71 • Lawn mower audible • Reverse beeper audible (road works)
	L_{A10}	55.6		
	L_{Aeq}	53.0		
	L_{A90}	42.7		
R2 19 Ariel Crescent 1:08pm – 1:23pm 6/03/12	L_{A1}	58.0	Slight breeze; No rain; Cloudy.	• Owens Illinois ≤ 43 • Trucks on Andrews Rd ≤ 53 • Excavator ≤ 48 – 63 • Excavator reverse alarm ≤ 51 • Metallic bang ≤ 53 • Tractor and reverse alarm ≤ 60 • Birds singing ≤ 63, 64
	L_{A10}	51.9		
	L_{Aeq}	50.2		
	L_{A90}	46.0		
R3 6 Koala Glen 2:47pm – 3:02pm 14/03/12	L_{A1}	69.1	No wind; No rain; Partially Cloudy.	• Owens Illinois barely audible • Cars on Andrews Rd ≤ 53, 57, 60, 57, 54 • Trucks on Andrews Rd ≤ 63, 61, 64, 61, 62, 70, 70 • Excavator ≤ 70, 73, 72, 68, 75 • Tractor ≤ 67 • Motor bike ≤ 56 • Birds singing ≤ 55, 56, 57
	L_{A10}	62.3		
	L_{Aeq}	59.4		
	L_{A90}	50.8		
R4 42 Scenic Circuit 3:18pm – 3:33pm 14/03/12	L_{A1}	71.8	No wind; No rain; Partially Cloudy	• Owens Illinois not audible • Car on Andrews Rd ≤ 64, 65, 62, 63, 65, 69 • Trucks on Andrews Rd ≤ 72, 72, 73, 82, 75, 68, 70, 68, 65, 73, • Bus on Andrews Rd ≤ 67 • Excavator ≤ 54 • Dog bark ≤ 57, 59
	L_{A10}	65.8		
	L_{Aeq}	62.6		
	L_{A90}	51.5		
R5 93 Allard 4:32pm – 4:47pm 14/03/12	L_{A1}	64.5	No wind; No rain; Cloudy	• Owens Illinois not audible • Cars on Andrews Rd ≤ 54, 55, 57, 59, 58 • Trucks on Andrews Rd ≤ 60, 67, 61, 66, 61, 58, 66, 62, 66, 67, 61 • Motor bike ≤ 62, 63 • Ride on mower ≤ 47 • Motorised toy car ≤ 58
	L_{A10}	58.6		
	L_{Aeq}	55.8		
	L_{A90}	49.6		

Table 4-6: Measured Background Noise Levels, Attended Noise Monitoring – Day Time Period, dB(A)				
Measurement Location	Noise Descriptor		Observed Meteorological Conditions	Comments and Observations dB(A)
R6 58 Ceres St 4:52pm – 5:07pm 14/3/12	L_{A1}	62.5	No wind; No rain; Cloudy.	• Owens Illinois not audible • Cars on Andrews ≤ 60, 55 • Trucks on Andrews ≤ 61, 59, 61, 64 • Bang at nearby residence ≤ 61 • Reverse alarm audible
	L_{A10}	58.9		
	L_{Aeq}	55.9		
	L_{A90}	51.4		
R7 5 Echo Place 2:03pm – 2:18pm 6/03/12	L_{A1}	58.9	No wind; No rain; Cloudy.	• Owens Illinois ≤ 40 • Vehicles on Andrews Rd primary noise source • Trucks on Andrews Rd ≤ 54, 60, 61, 63 • Insects ≤ 45 – 50 • Dogs barking ≤ 45 • Doors of residence closing ≤ 51, 54 • Distant car horn ≤ 48
	L_{A10}	51.7		
	L_{Aeq}	49.5		
	L_{A90}	44.3		

Table 4-7: Measured Background Noise Levels, Attended Noise Monitoring – Evening Time Period, dB(A)				
Measurement Location	Noise Descriptor		Observed Meteorological Conditions	Comments and Observations
R1 31 Ariel Crescent 6:05 pm – 6:20pm 27/03/12	L_{A1}	64.2	No wind; No rain; Cloudy.	• Cars on Andrews Rd ≤ 45, 42, 43, 46 • Owens Illinois ≤ 40 (constant hum), audible • Truck on Andrews Rd ≤ 45, 49, 53 (semi-trailer) • Cars on other roads ≤ 52 • Owens Illinois Reverse Beeper ≤ 41
	L_{A10}	58.3		
	L_{Aeq}	55.5		
	L_{A90}	43.2		
R2 19 Ariel Crescent 6:25pm – 6:40pm 27/03/12	L_{A1}	58.0	No wind; No rain; Cloudy.	• Owens Illinois ≤ 40 (constant hum), audible • Cars on Andrews Rd ≤ 44, 47, 47, 46 • Trucks on Andrews Rd ≤ 46, 48
	L_{A10}	55.7		
	L_{Aeq}	54.1		
	L_{A90}	42.1		
R3 6 Koala Glen 7:03pm – 7:18pm 27/03/12	L_{A1}	76.3	No wind; No rain; Cloudy.	• Owens Illinois ≤ 42 (constant hum), audible • Car on Andrews Rd ≤ 58, 56, 57, 59 • Truck on Andrews Rd ≤ 69, 65, 68 • Insects ≤ 50 – 52
	L_{A10}	70.0		
	L_{Aeq}	68.0		
	L_{A90}	51.5		

Table 4-7: Measured Background Noise Levels, Attended Noise Monitoring – Evening Time Period, dB(A)				
Measurement Location	Noise Descriptor		Observed Meteorological Conditions	Comments and Observations
R4 42 Scenic Circuit 7:27pm – 7:42pm 27/03/12	L_{A1}	82.2	No wind; No rain; Cloudy.	• Owens Illinois ≤ 40 (constant hum), audible • Car on Andrews Rd ≤ 66, 67, 65, 68, 59 • Trucks on Andrews Rd ≤ 72, 78, 80 • Insects ≤ 45 – 48 • Dog bark ≤ 60
	L_{A10}	69.9		
	L_{Aeq}	67.6		
	L_{A90}	46.7		
R5 93 Allard 8:01pm – 8:16pm 27/03/12	L_{A1}	77.2	No wind; No rain; Cloudy.	• Owens Illinois ≤ 41 (constant hum), audible • Cars on Andrews Rd ≤ 60, 54, 57, 60, 58 • Trucks on Andrews Rd ≤ 66, 64, 65, 67 • Insects ≤ 46 – 48
	L_{A10}	64.2		
	L_{Aeq}	61.8		
	L_{A90}	47.2		
R6 58 Ceres St 8:21pm – 8:36pm 27/03/12	L_{A1}	73.8	No wind; No rain; Cloudy.	• Owens Illinois ≤ 41 (constant hum), audible • Cars on Andrews ≤ 53, 52, 49, 50, 54 • Trucks on Andrews ≤ 59, 60, 58, 62 • Insects ≤ 45 – 48 • Glass bottles ≤ 46
	L_{A10}	61.2		
	L_{Aeq}	58.2		
	L_{A90}	46.0		
R7 5 Echo Place 8:48pm – 9:03pm 27/03/12	L_{A1}	65.5	No wind; No rain; Cloudy.	• Owens Illinois ≤ 42 (constant hum), audible • Cars on Andrews Rd ≤ 47, 46, 45, 46, 45 • Trucks on Andrews ≤ 56, 55, 58 • Bang on Owens Illinois site ≤ 45
	L_{A10}	55.7		
	L_{Aeq}	53.7		
	L_{A90}	43.8		

Table 4-8: Measured Background Noise Levels, Attended Noise Monitoring – Night Time Period, dB(A)

Measurement Location	Noise Descriptor		Observed Meteorological Conditions	Comments and Observations
R1 31 Ariel Crescent 10:03 pm – 10:18pm 27/03/12	L_{A1}	51.5	No wind; No rain; Cloudy.	• Cars on Andrews Rd ≤ 43, 44, 45 • Owens Illinois ≤ 40 (constant hum), clearly audible • Truck on Andrews Rd ≤ 47, 53 (semi-trailer) • Insects ≤ 42 • Cars on other roads ≤ 51, 50 • Bird ≤ 45 • Cars on both roads ≤ 48 • Owens Illinois Reverse Beeper ≤ 42 • Over head aeroplane ≤ 50-52
	L_{A10}	47.0		
	L_{Aeq}	44.9		
	L_{A90}	42.2		
R2 19 Ariel Crescent 10:25pm – 10:40pm 27/03/12	L_{A1}	46.8	No wind; No rain; Cloudy.	• Owens Illinois ≤ 40 (constant hum), clearly audible • Cars on Andrews Rd ≤ 45, 46, 44, 47 • Trucks on Andrews Rd ≤ 48 • Insects ≤ 42 – 44 • Bang from OI site ≤ 46
	L_{A10}	45.0		
	L_{Aeq}	43.8		
	L_{A90}	42.3		
R3 6 Koala Glen 11:12pm – 11:27pm 27/03/12	L_{A1}	60.7	No wind; No rain; Cloudy.	• Owens Illinois ≤ 42 • Car on Andrews Rd ≤ 56, 58, 57, 58) • Truck on Andrews Rd ≤ 66 • Insects ≤ 50 – 52 • Truck Braking at OI ≤ 56
	L_{A10}	55.9		
	L_{Aeq}	54.4		
	L_{A90}	51.7		
R4 42 Scenic Circuit 10:47pm – 11:02pm 27/03/12	L_{A1}	65.2	No wind; No rain; Cloudy.	• Owens Illinois ≤ 40 • Car on Andrews Rd ≤ 65, 67, 64, 65 • Trucks on Andrews Rd ≤ 74 • Insects ≤ 42 – 44 • Dog bark ≤ 57
	L_{A10}	55.8		
	L_{Aeq}	54.1		
	L_{A90}	42.0		
R5 93 Allard 11:38pm – 11:53pm 27/03/12	L_{A1}	61.4	No wind; No rain; Cloudy.	• Owens Illinois ≤ 41 (constant hum) • Cars on Andrews Rd ≤ 55, 58, 59, 55, 54 • Trucks on Andrews Rd ≤ 66, 62, 66, 66 • Insects ≤ 45 – 47 • Dogs Barking ≤ 47 • Unidentified banging ≤ 47 • Accelerating car in distance ≤ 45
	L_{A10}	51.5		
	L_{Aeq}	49.7		
	L_{A90}	42.4		

Table 4-8: Measured Background Noise Levels, Attended Noise Monitoring – Night Time Period, dB(A)				
Measurement Location	Noise Descriptor		Observed Meteorological Conditions	Comments and Observations
R6 58 Ceres St 11:57pm – 00:12am 27/03/12	L_{A1}	58.8	No wind; No rain; Cloudy.	• Owens Illinois ≤ 40 • Cars on Andrews ≤ 48, 49, 52, 53 • Trucks on Andrews ≤ 60, 62 • Insects ≤ 40 – 42 • Glass bottles ≤ 45 • Reverse Beeper ≤ 43 – 46
	L_{A10}	49.2		
	L_{Aeq}	46.9		
	L_{A90}	39.9		
R7 5 Echo Place 00:22am – 00:37am 28/03/12	L_{A1}	52.5	No wind; No rain; Cloudy.	• Owens Illinois ≤ 42 (constant hum) • Cars on Andrews Rd ≤ 48, 45, 45 • Trucks on Andrews ≤ 56, 54 • Insects ≤ 40 – 44 • Bang on Owens Illinois site ≤ 45, 45 • Dog barking in distance ≤ 45 – 47
	L_{A10}	45.0		
	L_{Aeq}	43.5		
	L_{A90}	40.7		

4.8 AIR QUALITY

4.8.1 Background Air Quality

The air quality in the regional area of interest is primarily affected by exhaust emissions from road traffic and industrial emissions from the neighbouring premises in the local area of the site location. Particulates in the area are caused by these air emission sources. Wind also affects the air quality of the region, albeit to a lesser extent.

Particulates, dust, individual toxic and odorous pollutants are considered to be the air quality indicators used to classify air quality at the proposed site. Background air quality parameters were obtained from the nearest monitoring station located at Mamre Road, St Marys. The relevant measurable pollutant parameters available from the monitoring station are PM_{10} 24-hour and monthly values. These are summarised in Table 4-9. The data is referenced from the NSW Environment Protection Authority (NSW EPA). Monitoring stations such as this record background concentrations of major pollutants of concern and have been established for the purposes of monitoring Australia's goals with the nationally-recognised limits called the Environment Protection Measures (NEPMs). The NSW EPA St Marys monitoring station has been referenced, as it was found to be the closest monitoring station to Penrith and is considered to be similar to Penrith's overall land use.

Table 4-9: Referenced Background PM_{10} Data – NSW EPA Monitoring Station at Mamre Road, St Marys (2011)

PM_{10}	Value Recorded Within Each Month ($\mu g/m^3$)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Av.
Mamre Road, St Marys													
24-Hour Maximum	33	38	29	22	37	20	31	29	74	32	26	17	32.2
Monthly Average	18	19	15	12	14	11	12	14	19	16	16	13	14.8

Source: NSW EPA 2011

Given the data provided in Table 4-9, the most applicable PM_{10} background concentrations are 32.2 $\mu g/m^3$ under a 24-hour averaging period and 14.8 $\mu g/m^3$ under a 1-year averaging period.

Using the worst-case particle size distribution data provided by the U.S. Environmental Protection Agency (USEPA) AP 42 Emissions Database, a PM_{10}-to-TSP ratio of 0.51 was used to estimate the TSP background concentration level of 29$\mu g/m^3$ for an annual averaging period.

Dust deposition background data were unavailable from the referenced NSW EPA ambient air monitoring station and so a conservative background dust deposition value of 2 g/m^2/month was utilised in this assessment for assessing cumulative deposited dust impacts.

4.9 CLIMATE

This section will provide background information on the meteorological condition of the existing area surrounding the proposed site. This referenced meteorological information has been sourced from the Bureau of Meteorology (BoM) monitoring station at Penrith Lakes AWS, Station No. 67113, operated by BoM on behalf of NSW EPA. This station is located approximately 2.4 km north-west of the subject site and is considered suitable for reference to climate conditions in the local area.

4.9.1 Temperature

Temperature statistics have been referenced from the Penrith Lakes AWS. This data is shown in Table 4-10.

The mean annual temperature at Penrith Lakes AWS ranges between 12.3°C and 24.5°C. The lowest temperatures occur in July where the average temperature ranges between 5.5°C and 17.7°C. The hottest temperatures are recorded in January when temperatures reach an average maximum of 30.7°C.

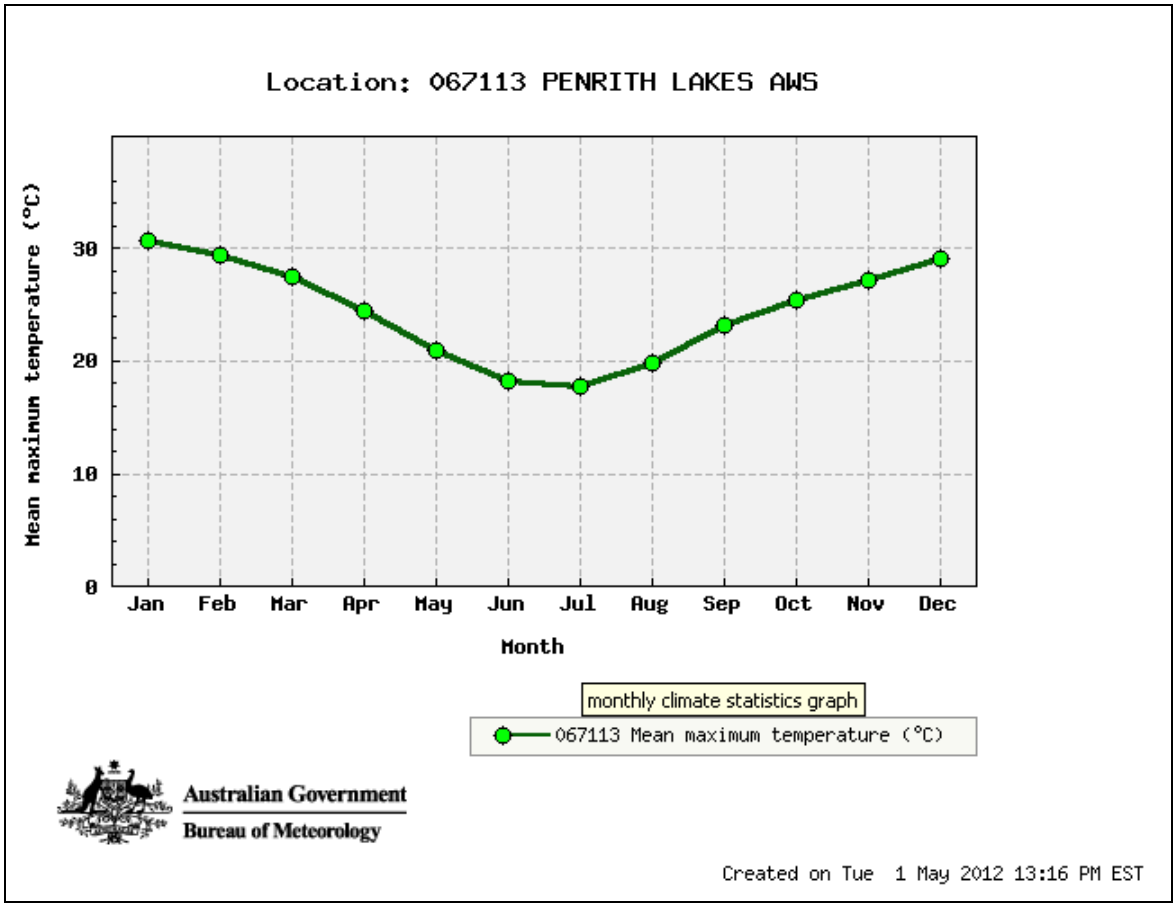
Table 4-10: Temperature Statistics from Bureau of Meteorology – Penrith Lakes AWS

Parameter \ Months	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean Maximum Temperature (°C)	30.7	29.4	27.5	24.4	20.9	18.2	17.7	19.8	23.2	25.4	27.1	29.1	24.5
Mean Minimum Temperature	18.4	18.5	16.6	13.0	9.5	6.7	5.5	6.2	9.4	12.0	14.9	16.8	12.3

Source: Bureau of Meteorology, 2012

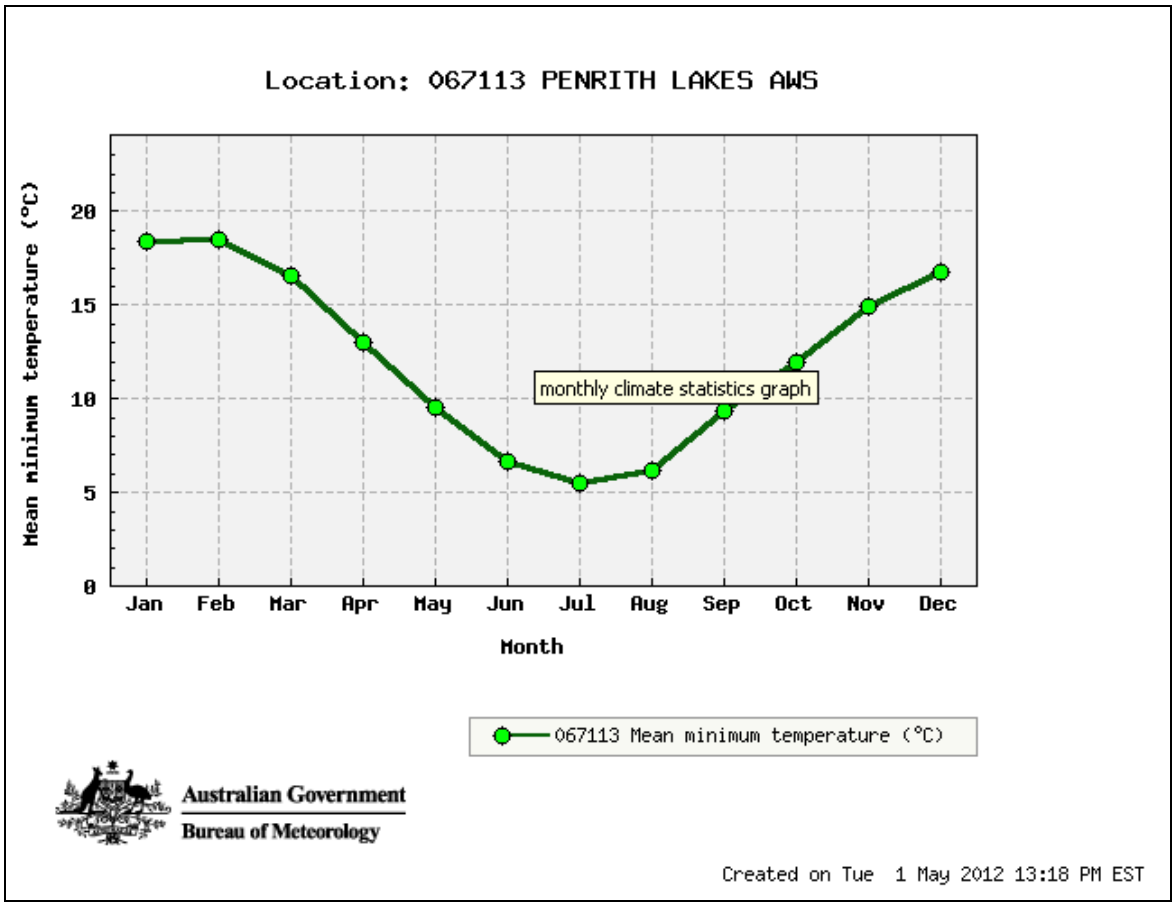
Note: Statistics are based on data collected from the Year 1995 to 2012

Figure 4-13: Mean Maximum Temperature from Penrith Lakes AWS



Source: Bureau of Meteorology, 2012

Figure 4-14: Mean Minimum Temperature from Penrith Lakes AWS



Source: Bureau of Meteorology, 2012

4.9.2 Rainfall

The rainfall statistics have been referenced from the BoM Penrith Lakes AWS. This data is shown in Table 4-11.

Rainfall data collected by the Penrith Lakes AWS shows mean rainfall of 59.8 mm using the average of the monthly mean rainfall data. February is the wettest month, where the mean rainfall reading is averaged as 134.2 mm. The mean annual rainfall is 724.5 mm. The annual mean number of rainy days (with rainfall above 1mm) is calculated as 71.0 days.

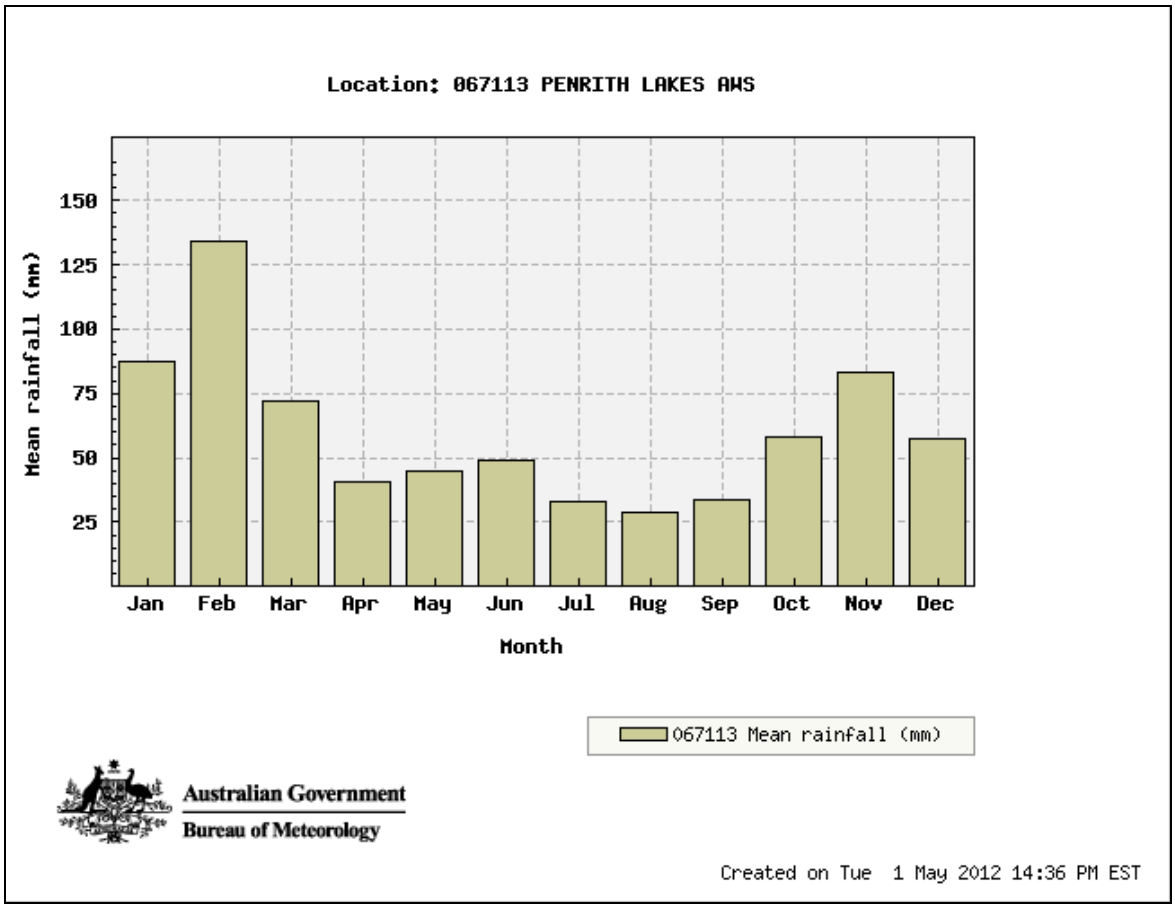
Table 4-11: Rainfall Statistics from Bureau of Meteorology – Penrith Lakes AWS

Months / Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean Rainfall (mm)	87.7	134.2	71.9	37.2	44.6	48.7	32.9	28.9	33.9	57.8	82.9	57.2	724.5
Decile 5 (Median) Rainfall (mm)	106.8	136.2	48.0	27.1	33.8	27.2	26.9	20.2	28.2	52.0	65.6	58.8	691.9
Mean Number of Days of Rain ≥ 1 mm	7.4	7.8	7.4	5.4	4.9	5.1	4.3	3.6	4.7	5.6	7.9	6.9	71.0

Source: Bureau of Meteorology, 2012

Note: Statistics are based on data collected from the Year 1995 to 2012

Figure 4-15: Mean Rainfall from Penrith Lakes AWS



Source: Bureau of Meteorology, 2012

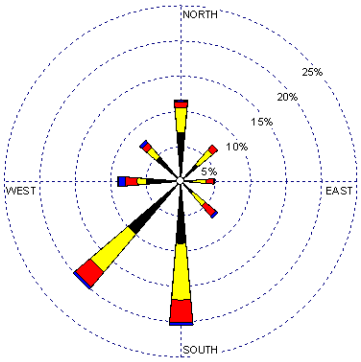
4.9.3 Wind

Wind rose plots show the direction from which the wind is coming from with triangles known as “petals”. The petals of the plots in the figure summarise wind direction data into 8 compass directions i.e. north, north-east, east, south-east, etc. The length of the triangles, or “petals”, indicates the frequency that the wind blows from the direction presented. Longer petals for a given direction indicate a higher frequency of wind from that direction. Each petal is divided into segments, with each segment representing one of the six wind speed classes. Thus, the segments of a petal show what proportion of wind for a given direction falls into each class. The proportion of time, for which wind speed is less than speeds in the first class (i.e. 0.5 m/s), when speed is negligible, is referred to as calm hours or “calms”. Calms are not shown on a wind rose as they have no direction, but the proportion of time that constitutes the period under consideration is noted under each wind rose.

Figure 4-16 and Figure 4-17 present the statistical information for the Penrith Lakes meteorological file (Station No. 67113). An annual average wind speed of 2.1 m/s was determined for the Penrith Lakes meteorological file. Winds experienced within the local area of the subject site are mostly from the south followed closely by winds from the south-west and north direction. Winds were least likely to originate from the east.

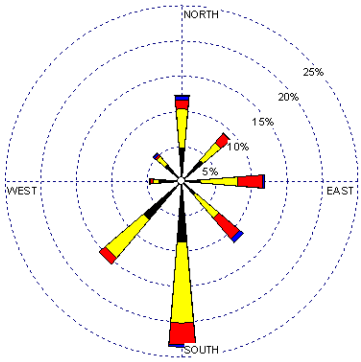
Figure 4-16: Wind Rose Plots for the Referenced Meteorological Station - Bureau of Meteorology Penrith Lakes (2011)

All Seasons



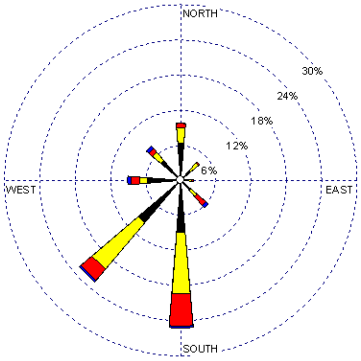
Average Wind Speed: 2.11 m/s
Calms Frequency: 12.55 %
Axis Frequencies: 5%, 10%, 15%, 20%, 25%

Summer (December – February)



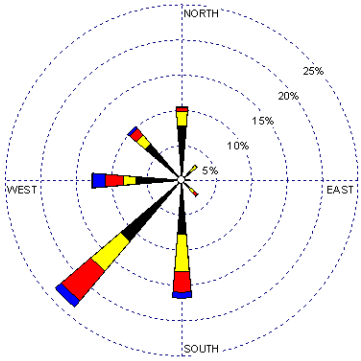
Average Wind Speed: 2.46 m/s
Calms Frequency: 6.28 %
Axis Frequencies: 5%, 10%, 15%, 20%, 25%

Autumn (March – May)



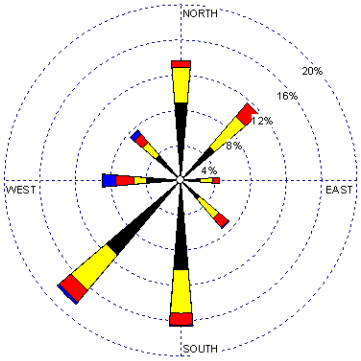
Average Wind Speed: 2.08 m/s
Calms Frequency: 12.89 %
Axis Frequencies: 6%, 12%, 18%, 24%, 30%

Winter (June – August)



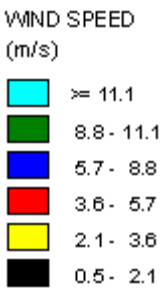
Average Wind Speed: 1.93 m/s
Calms Frequency: 19.02 %
Axis Frequencies: 5%, 10%, 15%, 20%, 25%

Spring (September – November)



Average Wind Speed: 2.00 m/s
Calms Frequency: 11.64 %
Axis Frequencies: 4%, 8%, 12%, 16%, 20%

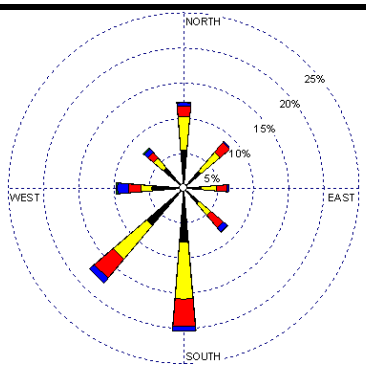
Legend



Note: Calms are defined as wind events that occur at a wind speed of equal to or less than 0.5 m/s.

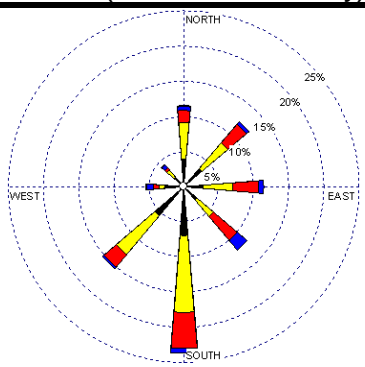
Figure 4-17: Wind Rose Plots for the Referenced Meteorological Station - Bureau of Meteorology Penrith Lakes (Long-Term 2007-2011)

All Seasons



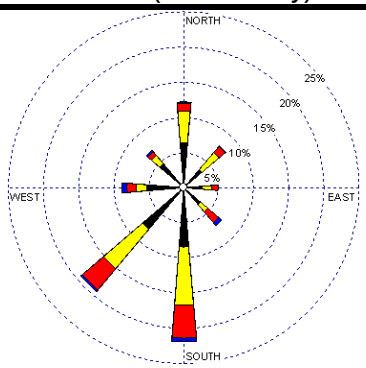
Average Wind Speed: 2.58 m/s
Calms Frequency: 8.81 %
Axis Frequencies: 5%, 10%, 15%, 20%, 25%

Summer (December – February)



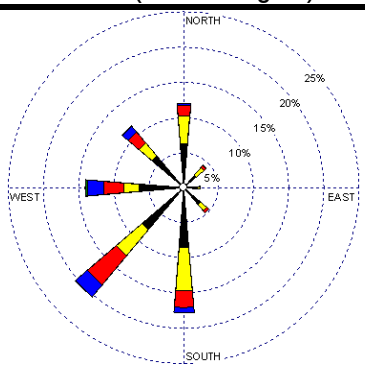
Average Wind Speed: 2.93 m/s
Calms Frequency: 4.40 %
Axis Frequencies: 5%, 10%, 15%, 20%, 25%

Autumn (March – May)



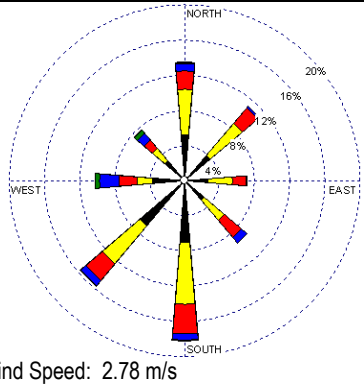
Average Wind Speed: 2.25 m/s
Calms Frequency: 10.73 %
Axis Frequencies: 5%, 10%, 15%, 20%, 25%

Winter (June – August)



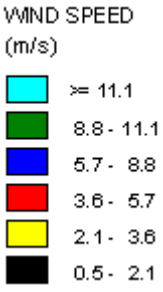
Average Wind Speed: 2.36 m/s
Calms Frequency: 12.82 %
Axis Frequencies: 5%, 10%, 15%, 20%, 25%

Spring (September – November)



Average Wind Speed: 2.78 m/s
Calms Frequency: 7.12 %
Axis Frequencies: 4%, 8%, 12%, 16%, 20%

Legend



Note: Calms are defined as wind events that occur at a wind speed of equal to or less than 0.5 m/s.

At Penrith Lakes, Figure 4-16 shows that south and south westerly winds dominate over the course of the year, with frequencies of approximately 21% and 20% respectively. All other directions contribute wind with frequencies of approximately 12% or less. During the summer period, Figure 4-16 shows that low to moderate winds frequently blow from the south (23%), south-west (16%), north (13%) and east (12%). Winds from the south (25%) continue to prevail in autumn, followed by winds from the south-west (23%). Low to moderate winds are seen during winter blowing from the south-west (24%), south (17%) and west (13%). In spring, low to moderate winds frequently blow from the south-west (18%), south (17%), north (14%), and north-east (12%).

Similarly, the long-term data in Figure 4-17 shows that south and south westerly winds dominate throughout the year, with frequencies of approximately 20% and 18% respectively. All other directions contribute wind with frequencies of approximately 13% or less. Winds from the south (24%) also dominate in summer in the long-term, followed by winds from the south-west (15%). During the autumn season, winds also frequently blow from the south (22%) and south-west (19%). Like 2011, long term data shows that low to moderate winds are seen during winter blowing from the south-west (25%), south (17%) and west (14%). In spring, low to moderate winds frequently blow from the south (18%), south-west (16%), north (14%), and north-east (11%).

Average wind speed values for the 2011 data ranges from 1.9 m/s (winter) up to 2.5 m/s (summer). Calms were observed to range from 6.3% (summer) to 19.0% (winter). The long term data however has average wind speed values that range from 2.3 m/s (autumn) up to 2.9 m/s (summer). Calms were observed to range from 4.4% (summer) to 12.8% (winter).

5. ENVIRONMENTAL IMPACTS AND SAFEGUARDS – PHYSICAL ENVIRONMENT

This section of the EIS presents the findings of the assessment of the following impacts from the proposed development.

The controls required to achieve compliance with environmental criteria are discussed as are the techniques used to undertake the assessments. The criteria to be satisfied are presented in this Section of the EIS. The areas of the environment assessed are described as the "Physical Environment". These include:

- Air Quality;
- Noise;
- Water;
- Flora and Fauna;
- Waste Generation and Management; and
- Hazards and Risks.

The assessment of each of these impacts arrives at recommendations. The recommendations are then included in Section 8 where a summary of impacts, controls and mitigation measures is presented.

5.1 AIR QUALITY

5.1.1 Introduction

This section presents the air quality assessment of the proposal. The air quality assessment is conducted in accordance with the NSW Environment Protection Authority (NSW EPA) document "Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales" (NSW EPA 2005). This study aims to identify all potential air emission sources on site, quantify the associated impacts by utilising an air dispersion modelling program, and assess the impacts and outcomes by comparing these against the relevant statutory legislation, standards, criteria and guidelines.

The following aspects have been examined in this assessment:

- The existing air quality of the site location;
- The nature and location of nearest affected sensitive receptors to the site;
- The surrounding land use within proximity to the site; and
- These sources of air emissions from the construction and operations of the proposed development and how they would impact on the air quality of the area.

5.1.2 Duplication

This section of the EIS will duplicate information presented in Section 4 so that the appropriate regulatory authority has the air assessment as a complete subsection without having to refer to the Sections of the EIS.

5.1.3 Sensitive Receivers

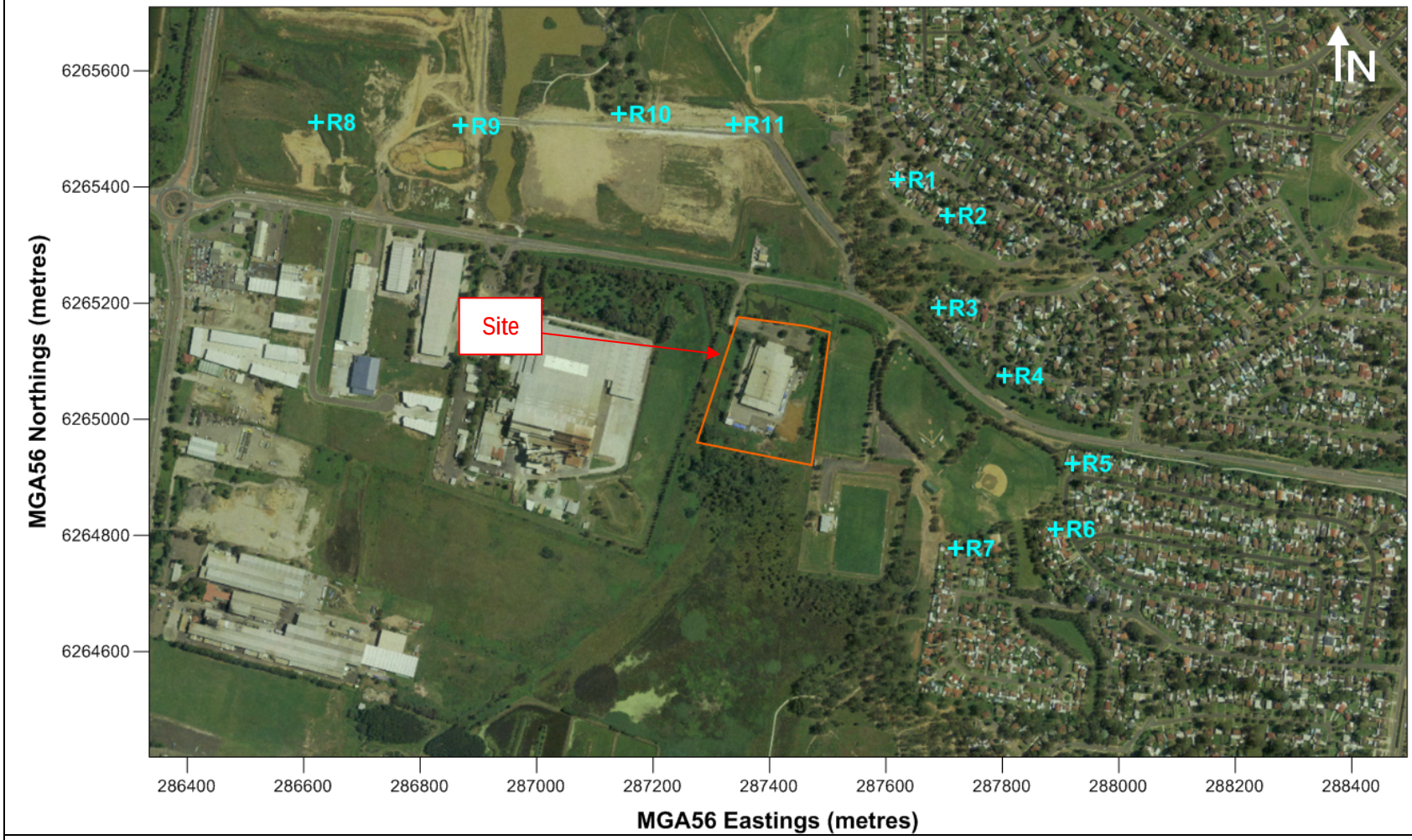
The nearest affected sensitive receptors, by definition, are areas dwellings or premises occupied by health-sensitive persons. These include residential premises, hospitals, schools and other dwelling types that are potentially occupied by health-compromised persons at a longer period of time. The list of the nearest potentially affected receptors for this development have been summarised in Table 4-1 and again in Table 5-1 with locations of these as shown in Figure 4-4 and again in Figure 5-1.

Table 5-1: Nearest Potentially Affected Sensitive Receptors Considered in the Air Quality Assessment

Receptor ID	Address	Eastings	Northings	Lot	DP	Distance from Site Boundary (m)
R1	31 Ariel Crescent, Cranebrook 2749	287620	6265413	430	261493	285
R2	19 Ariel Crescent, Cranebrook 2749	287706	6265351	52	261489	297
R3	6 Koala Glen, Cranebrook 2749	287690	6265192	124	261703	150
R4	42 Scenic Circuit, Cranebrook 2749	287804	6265076	117	261703	341
R5	93 Allard Street, Penrith 2750	287920	6264924	1642	262866	476
R6	58 Ceres Street, Penrith 2750	287892	6264811	1643	262866	463
R7	5 Echo Place, Penrith 2750	287720	6264778	5	736126	323
R8	42 Gannet Drive, Cranebrook 2749	286622	6265512	94	286343	766
R9	57 Lakeview Drive, Cranebrook 2749	286870	6265505	121	286343	550
R10	36-40 Nepean Street, Cranebrook 2749 / 8 Andrews Road, Cranebrook 2749	287141	6265526	8	270488	379
R11	36-40 Nepean Street, Cranebrook 2749 / 8 Andrews Road, Cranebrook 2749	287338	6265508	8	270488	320

It is to be noted that Receptors R8 to R11 as listed in the table above belong to residential premises that could exist in the future as per the proposed residential zoned development to occur in the area at an approximately 400 metre-distance away north-west of the subject site's boundary.

Figure 5-1: Aerial Photograph of Nearest Sensitive Receptors



Source: © Land Property and Information – SIX Viewer (2008)

5.1.4 Meteorology and Local Air Quality

This information is duplicated from Section 4 for the benefit of the NSW EPA officers providing a complete air impact assessment on this subsection of the EIS.

5.1.4.1 Site Representative Meteorological Data

The closest monitoring station to the subject site is the Penrith Lakes AWS (Station No. 67113) operated by the Bureau of Meteorology (BoM). This monitoring station is located approximately 2.4 kilometres north-west of the subject site. Data at this monitoring station are logged hourly and was used in accordance with the NSW EPA air dispersion modelling guidelines. The year selected for the assessment was 2011, which has been found to be the most complete and most recent data available to represent the meteorology of the subject region.

To validate the use of the 2011 meteorological file, its wind patterns were compared to the 5 year (also referred to as 'long term') meteorological data from the nearest BoM monitoring station. This is discussed in further detail in Section 5.1.4.2.

5.1.4.2 Wind Rose Plots

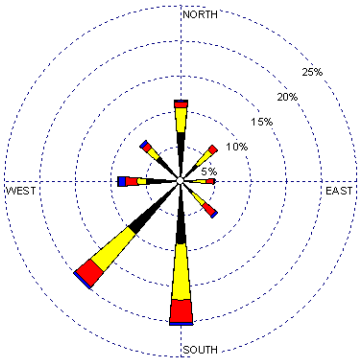
At Penrith Lakes, Figure 4-16 shows that south and south westerly winds dominate over the course of the year, with frequencies of approximately 21% and 20% respectively. All other directions contribute winds with frequencies of approximately 12% or less. During the summer period, Figure 4-16 shows that low to moderate winds frequently blow from the south (23%), south-west (16%), north (13%) and east (12%) directions. Winds from the south (25%) continue to prevail in autumn, followed by winds from the south-west (23%). Low to moderate winds are seen during winter blowing from the south-west (24%), south (17%) and west (13%). In spring, low to moderate winds frequently blow from the south-west (18%), south (17%), north (14%), and north-east (12%).

Similarly, the long-term data in Figure 4-17 shows that south and south westerly winds dominate throughout the year, with frequencies of approximately 20% and 18% respectively. All other directions contribute wind with frequencies of approximately 13% or less. Winds from the south (24%) also dominate in summer in the long-term, followed by winds from the south-west (15%). During the autumn season, winds also frequently blow from the south (22%) and south-west (19%). Similar to what is observed from the 2011 data, long term data shows that low to moderate winds are seen during winter blowing from the south-west (25%), south (17%) and west (14%). In spring, low to moderate winds frequently blow from the south (18%), south-west (16%), north (14%), and north-east (11%).

Average wind speed values for the 2011 data ranges from 1.9 m/s (winter) up to 2.5 m/s (summer). Calms were observed to range from 6.3% (summer) to 19.0% (winter). The long term data however has average wind speed values that range from 2.3 m/s (autumn) up to 2.9 m/s (summer). Calms were observed to range from 4.4% (summer) to 12.8% (winter).

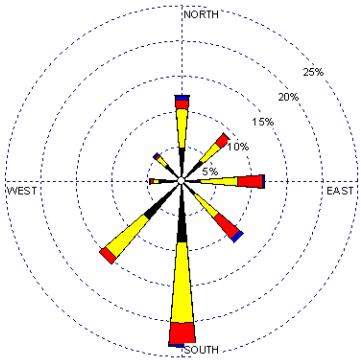
Figure 5-2: Wind Rose Plots for the Referenced Meteorological Station - Bureau of Meteorology Penrith Lakes (2011)

All Seasons



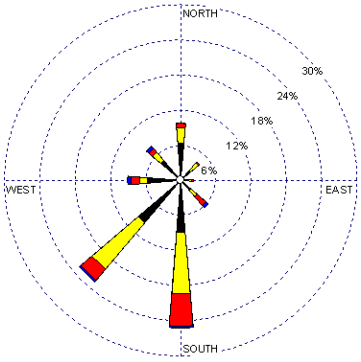
Average Wind Speed: 2.11 m/s
Calms Frequency: 12.55 %
Axis Frequencies: 5%, 10%, 15%, 20%, 25%

Summer (December – February)



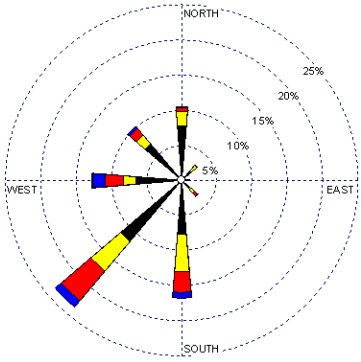
Average Wind Speed: 2.46 m/s
Calms Frequency: 6.28 %
Axis Frequencies: 5%, 10%, 15%, 20%, 25%

Autumn (March – May)



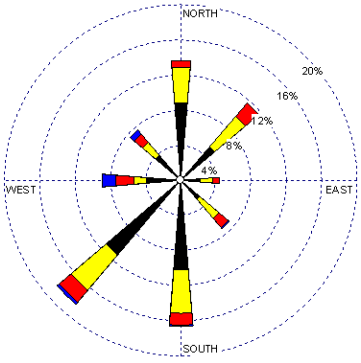
Average Wind Speed: 2.08 m/s
Calms Frequency: 12.89 %
Axis Frequencies: 6%, 12%, 18%, 24%, 30%

Winter (June – August)



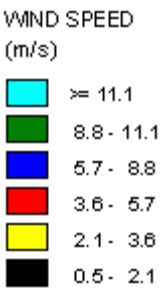
Average Wind Speed: 1.93 m/s
Calms Frequency: 19.02 %
Axis Frequencies: 5%, 10%, 15%, 20%, 25%

Spring (September – November)



Average Wind Speed: 2.00 m/s
Calms Frequency: 11.64 %
Axis Frequencies: 4%, 8%, 12%, 16%, 20%

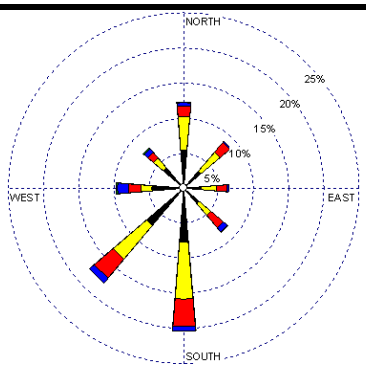
Legend



Note: Calms are defined as wind events that occur at a wind speed of equal to or less than 0.5 m/s.

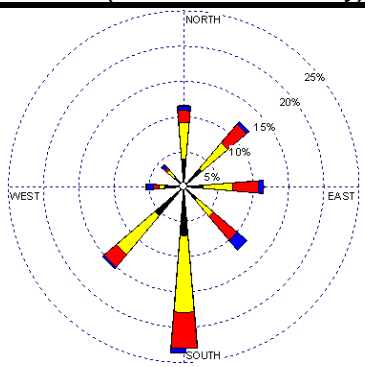
Figure 5-3: Wind Rose Plots for the Referenced Meteorological Station - Bureau of Meteorology Penrith Lakes (Long-Term 2007-2011)

All Seasons



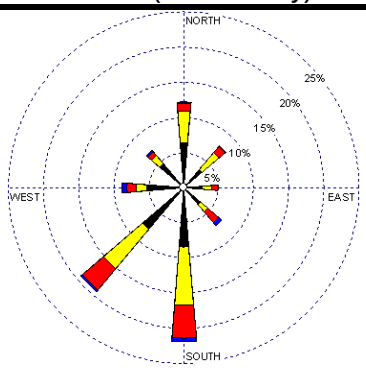
Average Wind Speed: 2.58 m/s
Calms Frequency: 8.81 %
Axis Frequencies: 5%, 10%, 15%, 20%, 25%

Summer (December – February)



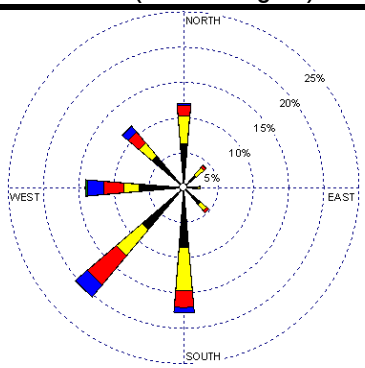
Average Wind Speed: 2.93 m/s
Calms Frequency: 4.40 %
Axis Frequencies: 5%, 10%, 15%, 20%, 25%

Autumn (March – May)



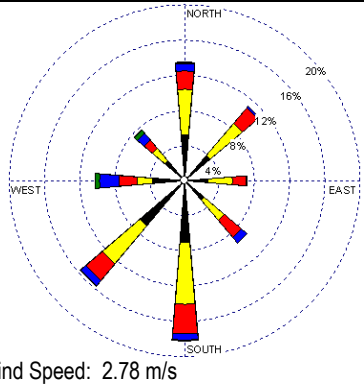
Average Wind Speed: 2.25 m/s
Calms Frequency: 10.73 %
Axis Frequencies: 5%, 10%, 15%, 20%, 25%

Winter (June – August)



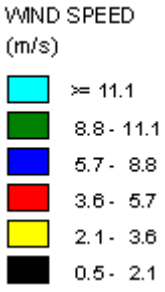
Average Wind Speed: 2.36 m/s
Calms Frequency: 12.82 %
Axis Frequencies: 5%, 10%, 15%, 20%, 25%

Spring (September – November)



Average Wind Speed: 2.78 m/s
Calms Frequency: 7.12 %
Axis Frequencies: 4%, 8%, 12%, 16%, 20%

Legend



Note: Calms are defined as wind events that occur at a wind speed of equal to or less than 0.5 m/s.

5.1.4.3 Atmospheric Stability

The "stability" of the atmosphere is a classification used to describe the structure of the atmosphere in terms of temperature, specifically, how temperature changes in the atmosphere with altitude. This classification is often based in accordance with the Pasquill-Gifford classification system that consists of six stability class groups, as shown in Table 5-2. The class "A" describes an atmosphere where the air is well mixed and there is little hindrance of dispersion into the atmosphere. At the other end of the scale is class "F", which describes conditions under which temperature inversions would occur, where winds are calm or absent and air close to the earth's surface cannot rise into the atmosphere due to the presence of warmer air layers above. The classes in between A and F indicate changing degrees of stability due to variations in temperature in the atmosphere.

Table 5-2: Pasquill-Gifford Stability Class System

Stability Class	Description
A	Extremely Unstable
B	Unstable
C	Slightly Unstable
D	Neutral
E	Slightly Stable
F	Very Stable

Table 5-3 and Table 5-4 present the statistical information for the Penrith Lakes meteorological file. An annual average wind speed of 2.1 m/s was determined for the Penrith Lakes meteorological file. The tables show that the primary wind directions were from the south followed closely by winds from the south-west. Winds were least likely to originate from the east.

Worst case dispersion conditions for emissions would occur during F-class stability conditions – generally associated with still / light winds and clear skies during the night time or early morning period (stable conditions).

Analysis of the referenced site-specific meteorological data indicates the F-class dispersion conditions were present for approximately 15.3% of the time in the Penrith Lakes (2011) meteorological file, suggesting a potential risk of enhanced impacts due to this weather condition.

Looking at Table 5-4, it can be seen that stability class frequencies in the meteorological file are not biased towards giving enhanced dispersive conditions. Stability class D is the most frequent, with an occurrence of approximately 44%. Stability classes A, B, and C, which offer the best dispersion conditions, occur with frequencies of 13.2%, 6.3% and 12.4% respectively.

Table 5-3: Wind Direction/Stability Class Frequency Distribution (Count) for Referenced Meteorological Data Input File – Penrith Lakes Meteorological File 2011							
Frequency Distribution (Count)							
Direction (Blowing From)	Stability Class						
	A	B	C	D	E	F	Total
N	243	128	210	490	109	240	1420
NE	60	38	74	230	95	138	635
E	44	7	31	197	60	91	430
SE	74	33	52	328	89	50	626
S	282	119	308	921	121	168	1919
SW	216	123	229	955	153	262	1938
W	90	50	86	364	86	211	887
NW	126	45	76	301	53	157	758
Total	1135	543	1066	3786	766	1317	8613

Table 5-4: Wind Direction/Stability Class Frequency Distribution (Percentage) for Referenced Meteorological Data Input File – Penrith Lakes Meteorological File 2011							
Frequency Distribution (Percentage %)							
Direction (Blowing From)	Stability Class						
	A	B	C	D	E	F	Total
N	2.82	1.49	2.44	5.69	1.27	2.79	16.49
NE	0.70	0.44	0.86	2.67	1.10	1.60	7.37
E	0.51	0.08	0.36	2.29	0.70	1.06	4.99
SE	0.86	0.38	0.60	3.81	1.03	0.58	7.27
S	3.27	1.38	3.58	10.69	1.40	1.95	22.28
SW	2.51	1.43	2.66	11.09	1.78	3.04	22.50
W	1.04	0.58	1.00	4.23	1.00	2.45	10.30
NW	1.46	0.52	0.88	3.49	0.62	1.82	8.80
Total	13.18	6.30	12.38	43.96	8.89	15.29	100.00

5.1.4.4 Terrain and Structural Effects on Dispersion

The meteorological condition known as katabatic flow (or katabatic drift) is often identified as the condition under which maximum environmental impacts from primarily ground-based sources are likely to occur. Katabatic flow is simply the movement of cold air down a slope, generally under stable atmospheric conditions. Under such circumstances, dispersion of airborne pollutants is generally slow and the associated impacts can reach their peak.

Katabatic flow is unlikely to affect any emissions from the subject site because katabatic flow only affects receptors that are located at a lower terrain elevation compared to the subject site's site elevation. Figure 3-6 and Figure 3-7 shows these elevation differences, highlighted by the exaggerated z-axis image. As such, no wind direction-specific katabatic flow would be expected to occur that could enhance the air emissions from the proposed development.

Figures below have been reproduced from Section 4.4.1.

Figure 5-4: Three-Dimensional View of the Terrain of the Site Location's Regional Area (Z-Axis Exaggerated by a Factor of 5)

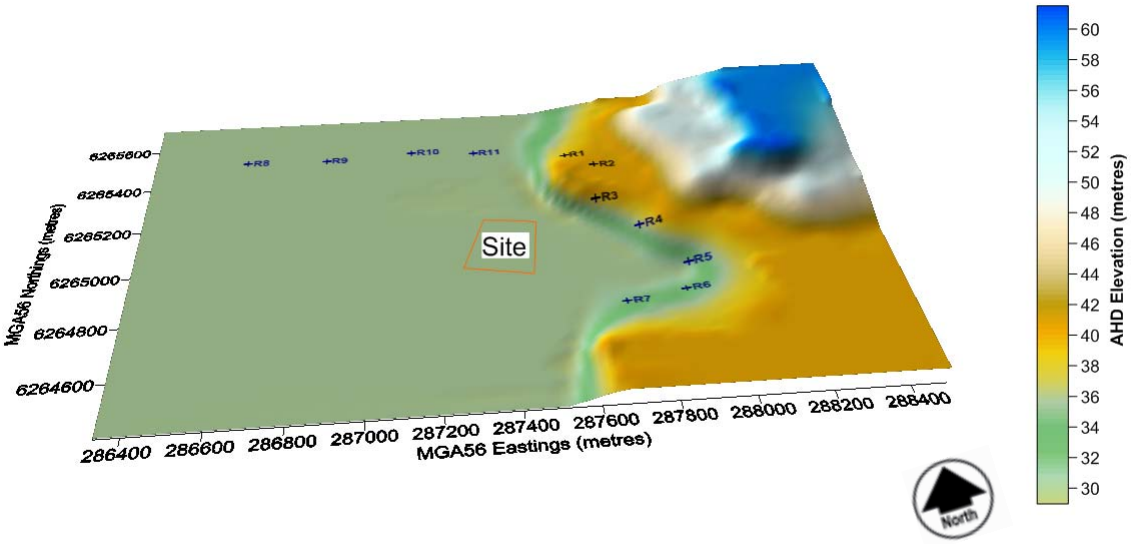
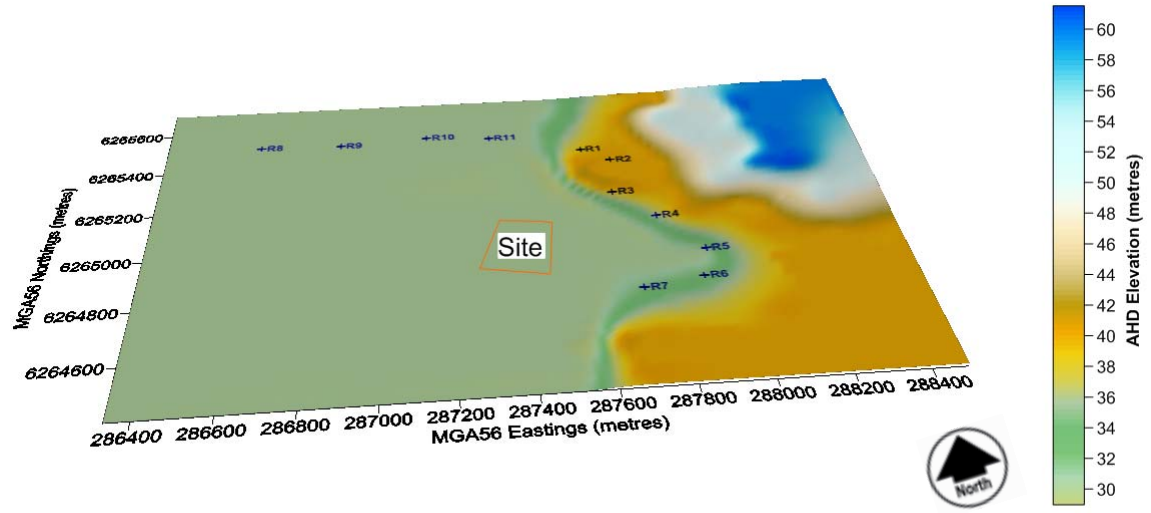


Figure 5-5: Three-Dimensional View of the Terrain of the Site Location's Regional Area (All Axes Equally Scaled)



5.1.4.5 Local Air Quality

Background air quality parameters were obtained from the nearest ambient air monitoring station operated by the NSW EPA, which is located at Mamre Road, St Marys (NSW EPA 2011). The regional area of St Marys is considered to be similar to Penrith's overall land use, meaning that the referenced PM_{10} background data is a suitable substitute for use in the assessment.

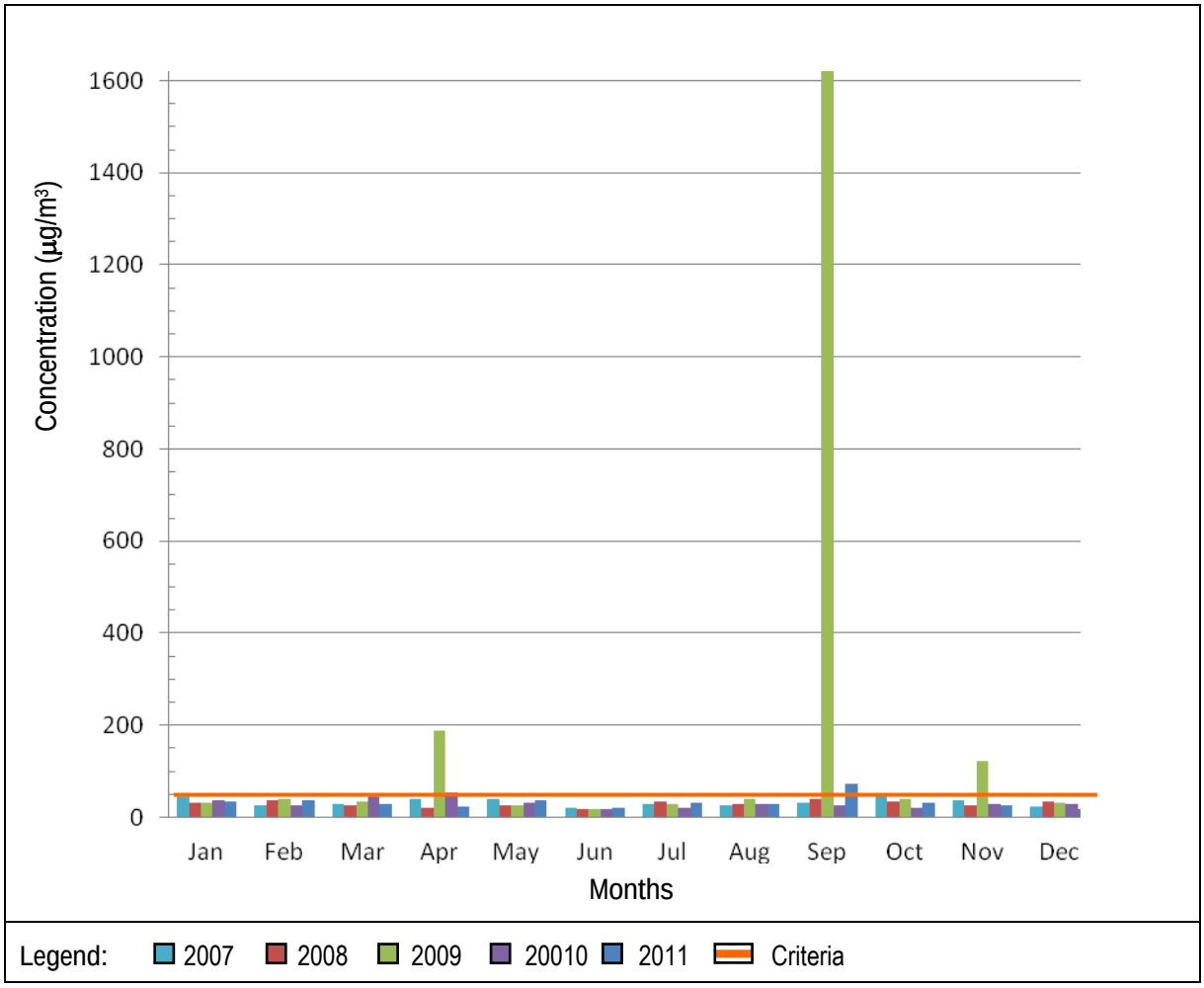
The relevant assessable pollutant parameters available from the monitoring station are PM_{10} 24-hour and monthly average values for 2011, which have been provided in Table 4-9 below (which has been reproduced from Section 4.7 for convenience).

Table 5-5: Referenced Background PM_{10} Data – NSW EPA Monitoring Station at Mamre Road, St Marys

PM_{10}	Monthly Averaged Values ($\mu g/m^3$)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Av.
Mamre Road, St Marys													
24-Hour Maximum	33	38	29	22	37	20	31	29	74	32	26	17	32.2
Monthly Average	18	19	15	12	14	11	12	14	19	16	16	13	14.8

Figure 5-6 shows a graph displaying the various maximum 24-hour PM_{10} values recorded at the St Marys monitoring station from 2007 to 2011.

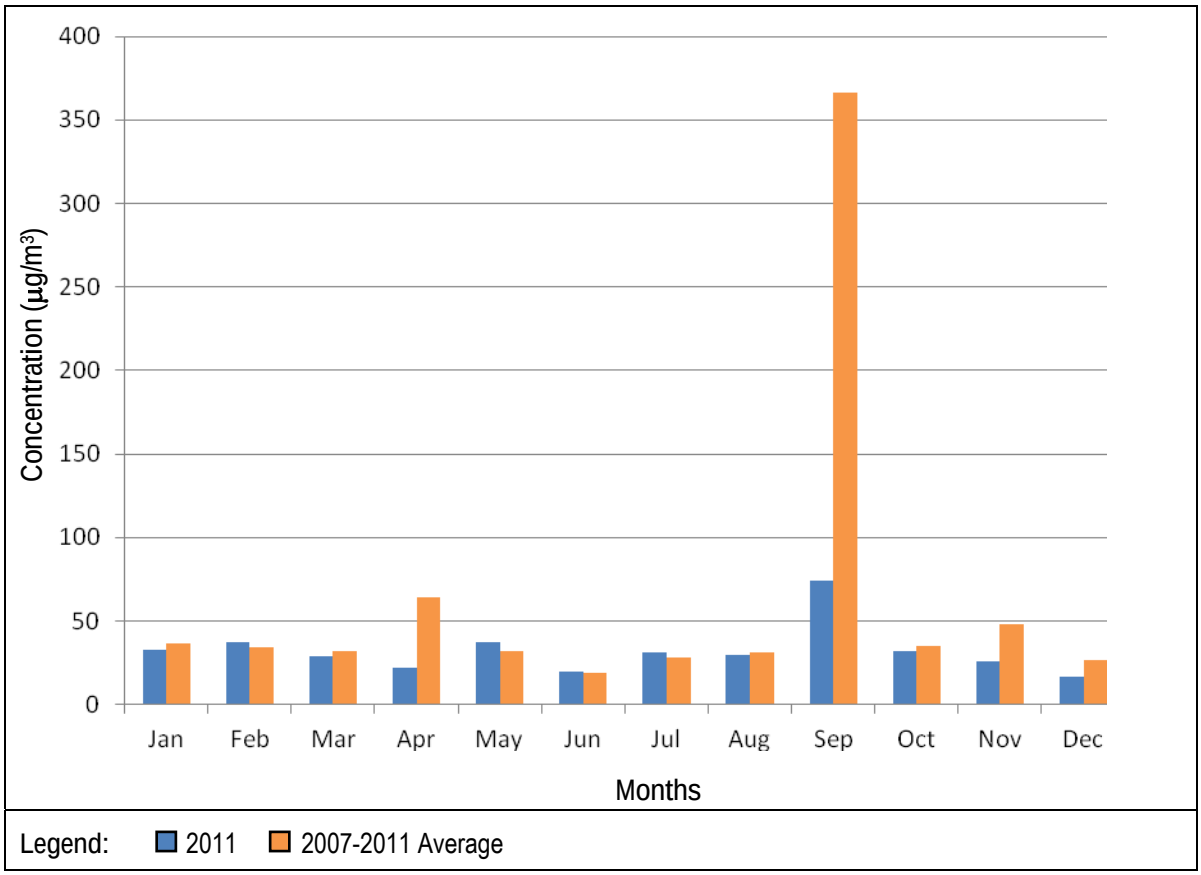
Figure 5-6: PM_{10} 24-Hour Maximum Values Recorded at St Marys Monitoring Station, 2007-2011



Peaks are seen in Figure 5-6 from the data collected for the year 2009, which may have been caused by events such as bushfires, dust storms, and other unexpected or uncontrolled occurrences. Results from the years 2007, 2008, 2010 and 2011 were found to be either within a range of ±10 µg/m^3 or well below the criteria.

Data from the year 2011, which is the most recent and complete data available from the monitoring station, was plotted against the average values from previous years and is shown in Figure 5-7.

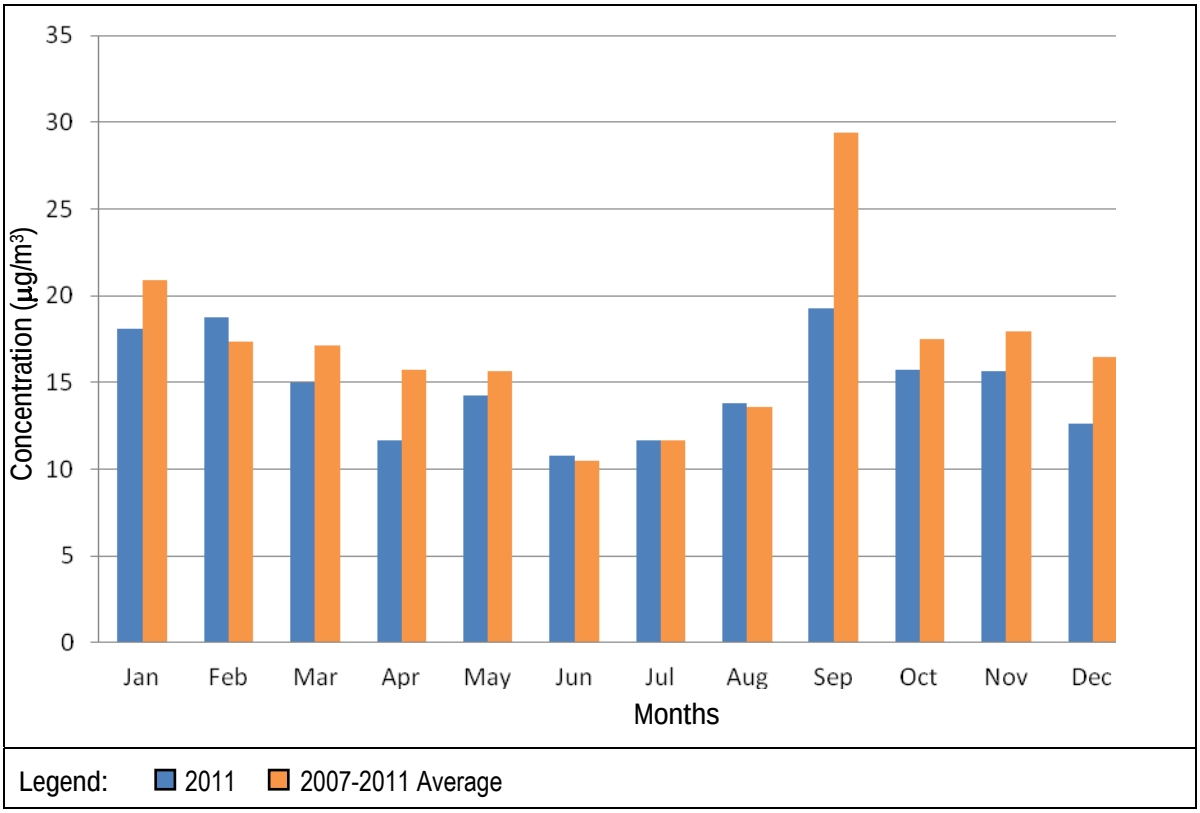
Figure 5-7: PM_{10} 24-Hour Maximum Concentration Levels for the Year 2011 and Averaged Maximum Values for 2007-2011



Disregarding the high values observed from the year 2009 which are shown as the observable peaks in April, September and November in Figure 5-7, the 2011 monitoring values follow a similar trend of concentration levels to the average of previous years' recorded data. It was found that the average of maximum PM_{10} values in the year 2011 was 32.2 µg/m³, which does not exceed the ambient air PM_{10} criteria. This was used as a conservative and most suitable background concentration for PM_{10} under the averaging period of 24 hours.

Similarly, the recorded PM_{10} monthly averages during 2011 were plotted against the monthly average values from previous years and are shown in Figure 5-8.

Figure 5-8: PM_{10} Monthly Averaged Concentration Levels for the Year 2011 and Monthly Averaged Values for 2007-2011



Disregarding the high values observed in 2009, the recorded values from the year 2011 are found to follow a similar pattern to the averaged values from the previous years. The average of PM_{10} concentration for all months in the year 2011 was calculated to be 14.8 µg/m³. This was used as a conservative PM_{10} background concentration for all hours under the averaging time of 1 year in the dispersion modelling.

Using the worst-case particle size distribution data provided by the U.S. Environmental Protection Agency (USEPA) AP 42 Emissions Database, a PM_{10}-to-TSP ratio of 0.51 was used to estimate the TSP background concentration level of 29 µg/m³ for an annual averaging period.

Dust deposition background data were unavailable from the referenced NSW EPA ambient air monitoring station and so a conservative background dust deposition value of 2 g/m²/month was utilised in this assessment for assessing cumulative deposited dust impacts.

5.1.5 Air Quality Criteria and Guidelines

5.1.5.1 *Protection of the Environment Operations Act 1997*

The proposed development would be required to adhere with the requirements of the *Protection of the Environment Operations Act 1997* (POEO Act). The POEO Act applies the following definitions relating to air pollution:

> *"Air pollution" means the emission into the air of any air impurity.*
>
> *While "air impurity" includes smoke, dust (including fly ash), cinders, solid particles of any kind, gases, fumes, mists odours, and radioactive substances.*

The following clauses of this Act have most relevance to the site:

- *Clause 124 Operation of plant*

  The occupier of any premises who operates any plant in or on those premises in such a manner as to cause air pollution from those premises is guilty of an offence if the air pollution so caused, or any part of the air pollution so caused, is caused by the occupier's failure:

  (a) to maintain the plant in an efficient condition, or

  (b) to operate the plant in a proper and efficient manner.

- *Clause 126 Dealing with Materials*

  (1) The occupier of any premises who deals with materials in or on those premises in such a manner as to cause air pollution from those premises is guilty of an offence if the air pollution so caused, or any part of the air pollution so caused, is caused by the occupier's failure to deal with those materials in a proper and efficient manner.

  (2) In this section:

  deal with materials means process, handle, move, store or dispose of the materials.

  materials includes raw materials, materials in the process of manufacture, manufactured materials, by-products or waste materials.

- *Clause 127 Proof of causing pollution*

  To prove that air pollution was caused from premises, within the meaning of sections 124 – 126, it is sufficient to prove that air pollution was caused on the premises, unless the defendant satisfies the court that the air pollution did not cause air pollution outside the premises.

- *Clause 128 Standards of air impurities not to be exceeded*

  (1) The occupier of any premises must not carry on any activity, or operate any plant, in or on the premises in such a manner as to cause or permit the emission at any point specified in or determined in accordance with the regulations of air impurities in excess of:

  (a) the standard of concentration and the rate, or

  (b) the standard of concentration or the rate.

  prescribed by the regulations in respect of any such activity or any such plant.

  (2) Where neither such a standard nor rate has been so prescribed, the occupier of any premises must carry on any activity, or operate any plant, in or on the premises by such practicable means as may be necessary to prevent or minimise air pollution.

  (3) A person who contravenes this section is guilty of an offence.

According to Chapter 3, this *Act permits (but does not require) a licence to be issued for a non-scheduled activity*.

5.1.5.2 *Protection of Environment Operations (Clean Air) Regulation 2010*

In accordance with Part 5 of the *Protection of the Environment Operations (Clean Air) Regulation 2010* (Clean Air Regulation), the activities and plant would belong to Group 6 as it is to be *commenced to be carried on, or to operate, on or after 1 September 2005 as a result of development consent granted pursuant to a development application made on or after 1 September 2005*.

Schedule 4 of the Clean Air Regulation provides standards of concentration for scheduled premises for general activities and plant. The applicable limit from this regulation is 20 mg/m^3, which apply for "*any crushing, grinding, separating or materials handling activity*".

The proposed development would be required to meet the requirements of this regulation, as described above.

5.1.5.3 NSW Environment Protection Authority Guidelines

The document, "*Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales*" (AMMAAP) published by the NSW Environment Protection Authority (NSW EPA) provides guidance on methodology and thresholds that are to be used as part of the air impact assessment to be prepared for a proposed development. This air impact assessment has been conducted in accordance with this guideline, and the relevant assessable pollutants (along with their corresponding limits) for the development have been summarised in Table 5-6 for reference.

Table 5-6: Relevant Limits from the Approved Methods for Modelling and Assessment of Air Pollutants in New South Wales (2005)

Pollutant	Averaging Period	Concentration		Source
		pphm	µg/m^3	
PM_{10}	24 hours	-	50	NEPC (1998)
	Annual	-	30	EPA (1998)
Total Suspended Particulates (TSP)	Annual	-	90	NHMRC (1996)
		g/m^2/month[a]	g/m^2/month[b]	
Deposited Dust	Annual	2	4	NERDDC (1988)

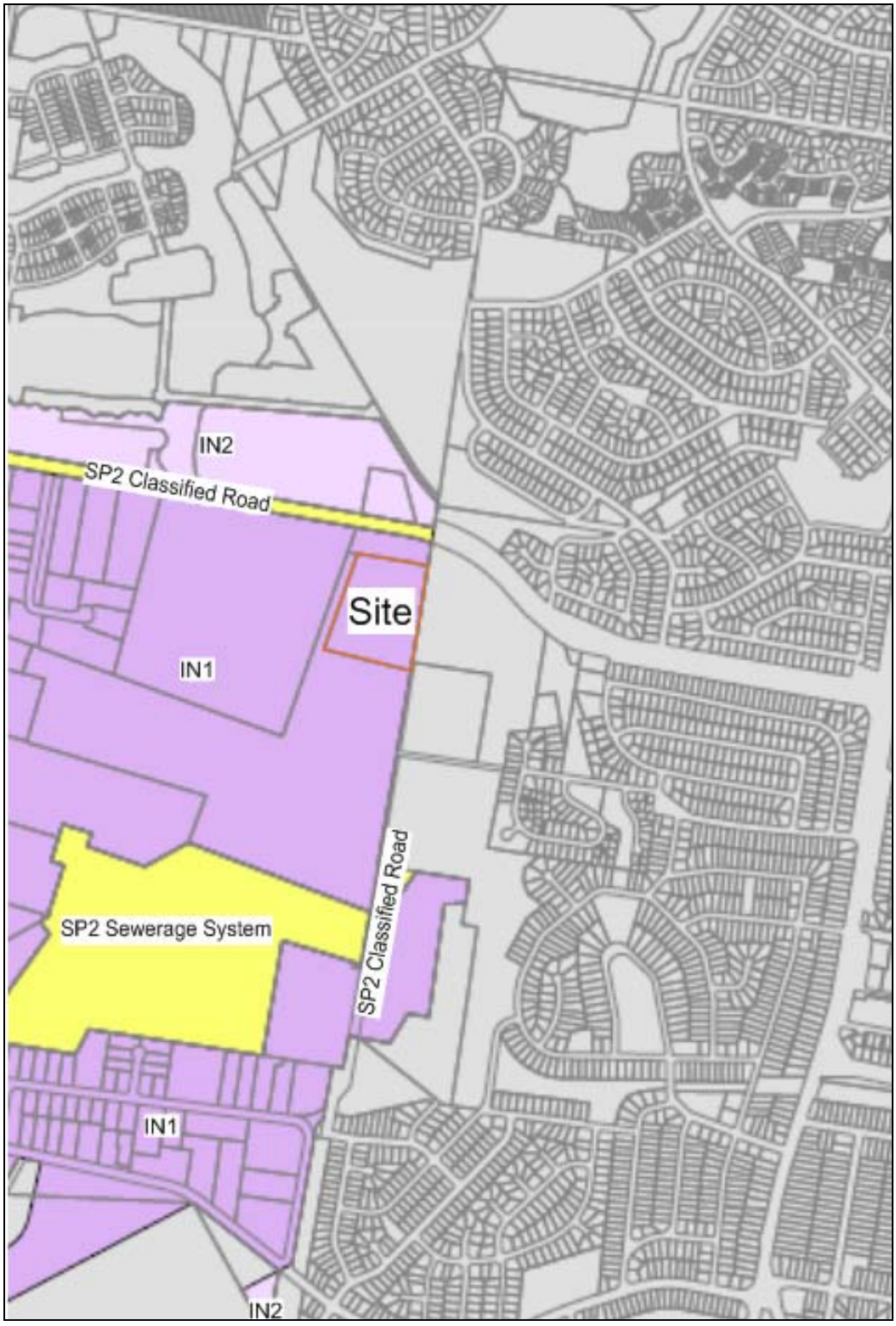
5.1.6 Land Use of the Regional Site Location

With reference to the Penrith City Council Land Zoning Map (2010), the site location is considered to be IN1, General Industrial.

The site is surrounded on the east, south and west boundaries by IN1 General Industrial land, with the northern boundary facing an SP2 Classified Road (Infrastructure). The land on the other side of this road is classified as IN2, Light Industrial.

Figure 4-1 shows the various land uses surrounding the location of the subject site.

Figure 5-9: Penrith City Council Land Use Zoning Map



IN1 General Industrial
IN2 Light Industrial
SP2 Infrastructure

Source: Penrith City Council
Available at URL:
http://www.penrithcity.nsw.gov.au

5.1.7 Assessment of Air Quality Impacts from Construction

5.1.7.1 Air Emission Sources and Assumptions Used

The construction phase of the development involves the provision of 10 external storage bunkers. The extension of the concrete pavements to the south and east of the existing building that form part of a separate DA have also been considered. No significant additional works would be made to the building. The predicted emission source from this activity would be dust emissions generated from earth moving works and wheel generated emissions from vehicles on unpaved roads. The area source would consist of the locations of the proposed bunkers and concrete pavements, illustrated in Figure 5-10. Due to the flat nature of the land, minimal earth moving works is required. For the purpose of estimating emissions from the construction of the development, conservative assumptions have been made. These assumptions are listed below:

- Construction will be carried out in 2 stages:

1. Debris removal stage;

   This stage has been assumed to take place over 2 days to be conservative and involves:
   - Scrapers removing topsoil (9am-5pm).
   - Loading of debris onto trucks (2pm-5pm).
   - Truck transport of debris (2pm-5pm).

2. Site preparation and construction stage;

   This stage has been assumed to take place over 1 day to be conservative and involves:
   - Truck transport of fill material e.g. concrete (9am-11am).
   - Truck dumping of fill material e.g. concrete (9am-5pm).
   - Manual pavement of concrete.
     - The manual pavement of concrete would not generate significant amounts of emissions due to its liquid form.
     - 670 m^3 of topsoil will be removed from an area of 6700 m^2, shown in Figure 5-10.
     - 670 m^3 of cement will be used for the construction of bunkers and concrete pavement.
     - Truck transporting debris on unpaved areas on site will cover a distance of approximately 500 m per hour.
     - Truck transporting fill materials on unpaved areas will cover a distance of approximately 400 m per hour.
     - One vehicle will be involved for each activity at any one time.
     - Emissions were modelled as a polygon area source in AUSPLUME, represented in Figure 5-10.
     - Generalised particle size distribution for 'Mechanically Generated Aggregate Unprocessed Ores' was used to represent debris/topsoil material.
     - No control measures have been used or have been proposed during construction to assess the need for any additional controls.

5.1.7.2 Air Emission Factors

Emission factors utilised for this assessment were obtained from the following list of sources:

- National Pollutant Inventory (NPI) Emission Estimation Technique Manuals; and
- U.S. Environmental Protection Agency (USEPA) AP 42, Compilation of Air Pollutant Emission Factors.

5.1.7.3 Emission Rates

Emission rates for the main activities of the site were estimated based on the adopted emission factors listed in Table 5-9, which were obtained from the USEPA AP 42 and NPI Emission Estimation Technique Manuals. The emission factors selected were based on the recommendations suggested in the NPI manual for Fugitive Emissions for Earth Moving, Excavation and Demolition Operations (NPI 2012).

Table 5-7: Adopted Emission Factors for Construction Phase

Emission Source Activity	TSP Emission Factor	PM_{10} Emission Factor	Units
Stage 1			
Scrapers (removing topsoil)	0.029	0.0073	kg/T
Loading of debris onto truck (Miscellaneous transfer and conveying)	0.00032	0.00015	kg/T/Transfer point
Truck transport of debris (Wheel generated dust from unpaved roads at industrial sites)	4.23	1.25	kg/VKT
Stage 2			
Truck transport of fill material (Wheel generated dust from unpaved roads at industrial sites)	4.23	1.25	kg/VKT
Truck dumping of fill material (Miscellaneous transfer and conveying)	0.00032	0.00015	kg/T/Transfer point

Note: VKT = Vehicle kilometres travelled

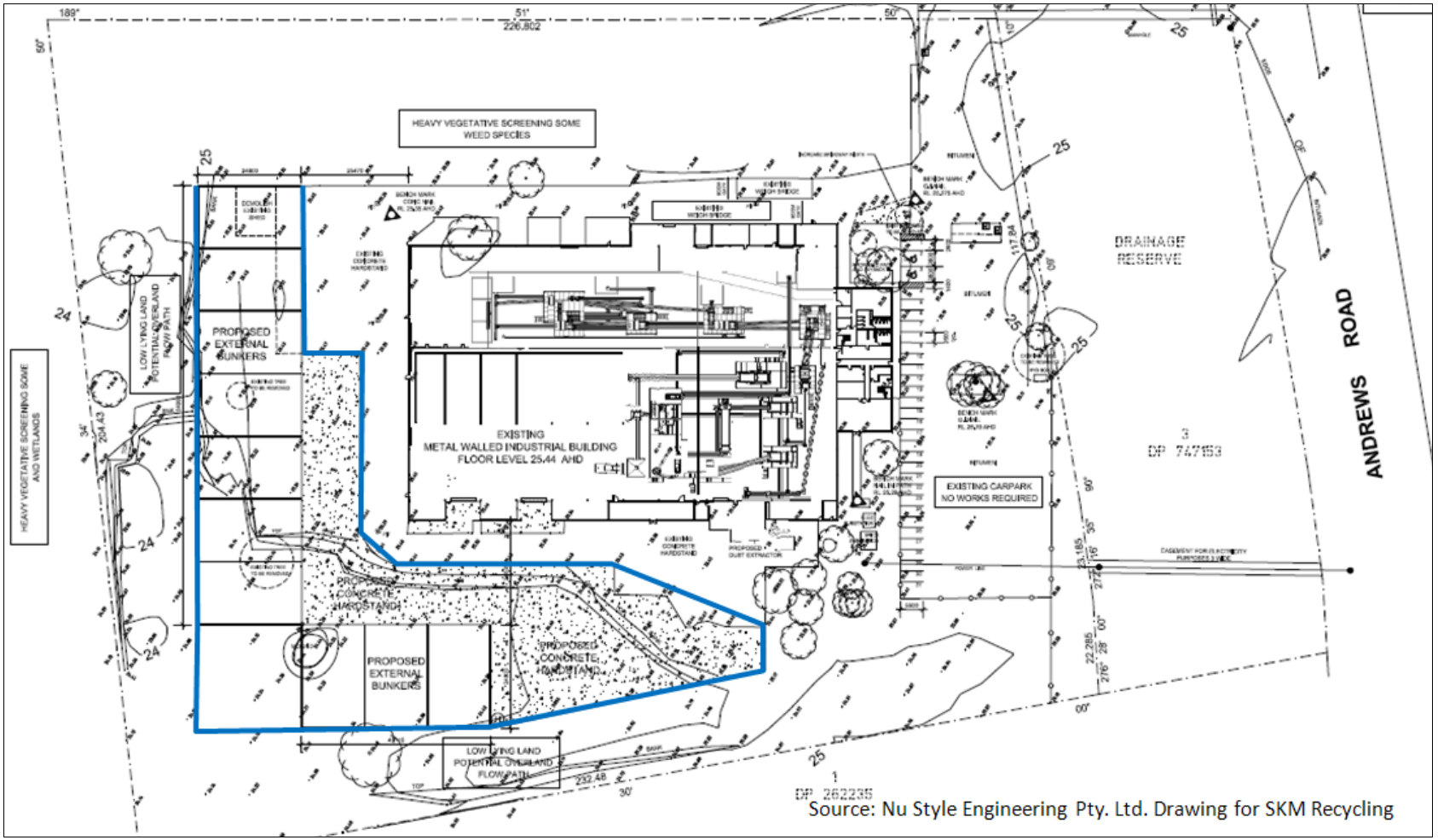
5.1.7.4 Air Emissions Inventory

The following information provides the emission rates and input parameter details for each pollutant and emission source during construction for air dispersion modelling.

Table 5-8: Summary of Emission Rates Used for Construction Phase

Pollutant	Time	Emission Activities	Controls	Emission Rate (g/s)	Averaging Period
Stage 1					
TSP & Dust Deposition	9am-2pm	Scrapers	N/A	5.82×10^{-5}	Annual
	2pm-5pm	Scrapers, loading and truck transport	N/A	1.48×10^{-4}	Annual
PM10	9am-2pm	Scrapers	N/A	1.46×10^{-5}	24 hour/annual
	2pm-5pm	Scrapers, loading and truck transport	N/A	4.15×10^{-5}	24 hour/annual
Stage 2					
TSP & Dust Deposition	9am-11am	Truck transport	N/A	7.01×10^{-5}	24 hour/annual
	11am-5pm	Truck dumping	N/A	2.40×10^{-6}	24 hour/annual
PM10	9am-11am	Truck transport	N/A	2.07×10^{-5}	24 hour/annual
	11am-5pm	Truck dumping	N/A	1.10×10^{-6}	24 hour/annual

Figure 5-10: Location of Emission Source from Construction – Site Plan View



Note: Diagram above not to scale and is only used for representation purposes.

5.1.8 Assessment of Air Quality Impacts from Operations

5.1.8.1 Air Emission Sources

Considering only the most dominant emissions from the site, the main areas of which emissions could be emitted from the proposed development are as follows:

- Dust emissions from the truck unloading of raw materials;
- Dust emissions from the truck loading of processed materials;
- Dust emissions from the transfer of materials using front-end loaders;
- Dust emissions at the conveyor transfer point;
- Dust emissions from the crushing of glass in the building;
- Dust emissions from the transfer of glass through a conveyor between the GRS building and Owens Illinois building; and
- Dust emissions from the storage of cullet in stockpiles (wind erosion).

Odour is unlikely to be emitted from the raw materials brought onto the site, given that the nature of the raw materials would predominantly contain glass waste and no putrescible material would be present nor accepted on site. This has been previously discussed in Section 3.4.1.4. Hence, further analyses of odour emissions from the subject site have not been included in this assessment.

There are no thermal processes on the site and the development would not require the addition of furnace at the O-I Plant

Truck loading and unloading dust emissions would depend on the frequency and duration of the operation. It was estimated that the site would require 41 truck visits per day for both the unloading of raw materials and the loading of processed materials. The hours of operation would be 25 trucks during 6am-8am, 4 trucks during 8am-4pm, and 12 trucks during 4pm-6pm. Truck movements within the warehouse would be controlled by water sprays to inhibit the development of any dust emissions from unloading of material from trucks (if any, although very minimal is anticipated given the size of the waste glass that is delivered on site).

Raw materials would be transferred within the warehouse using front-end loaders during operating hours. As these raw materials are converted into glass cullet, these processed materials are temporarily placed at the south-western portion of the building. Processed materials at this location would also need to be transferred to the external bunkers that are located outside the building. Transfer activities are likely to generate small amounts of dust and particulate emissions and were considered in this assessment. Transfer activities that occur at the south-western portion of the building, where processed glass cullet material is temporarily stored before being transferred to the external bunkers, would be anticipated to generate dust and particulate emissions and was considered in the assessment. This would be advertently be suppressed by the walls (often referred to as the “enclosure effect”) of the building, as this activity is still conducted inside the building on site. This reduction factor was considered in the assessment. At the external bunker area, transfer activities conducted at the external bunker area would be passively controlled by wind breaks due to the proposed external bunker walls. This reduction factor was also considered in the assessment.

Emissions generated from the conversion of waste glass into glass cullet (which is the core activity of the development) is extracted internally inside the building and would be controlled by the proposed dust collector, which is to be located externally at the north-eastern section of the building. The remaining emissions are expected to be insignificant, given that the dust collector provides a significant reduction of emissions generated from this process. The dust collector would be a reverse pulse high efficiency type using dry fabric filters. The collected particulate would be emptied out of the base of the dust collector using a rotary valve and a sealed bin. This particulate would be reused offsite.

Wind erosion from stockpiles can cause the emission of particulates and dust when sufficient winds would pass through these stockpiles. Buildings and vegetation located on the premise, as well as those surrounding the site, would act as wind breaks to minimise wind erosion. This has been accounted for in the modelling of the external bunkers.

Combustion emissions from the use of trucks and front-end loaders on site are considered to have minimal contribution to the overall impacts from the subject site. Hence, this has been excluded in this assessment.

5.1.8.2 Air Emission Factors

Emission factors utilised for this assessment were obtained from the following list of sources:

- National Pollutant Inventory (NPI) Emission Estimation Technique Manuals; and
- U.S. Environmental Protection Agency (USEPA) AP 42, Compilation of Air Pollutant Emission Factors.

Estimation of emissions has been outlined in the remainder of this section. Particulate and dust emissions were estimated using the conservative emission factor from the NPI Emission Estimation Technique Manual and the USEPA AP 42.

A dust collector is used to collect dust and particulate emissions extracted from the localised hoods installed along the process line of the glass cullet core operations. A dust / particulate collection efficiency of 90% was conservatively assumed for the dust collector, which is the lowest efficiency figure attainable from a typical dust collector.

5.1.8.3 Emission Rates

Emission rates for the main activities of the site were estimated based on the adopted emission factors listed in Table 5-9, which were obtained from the USEPA AP 42 and NPI Emission Estimation Technique Manuals.

Table 5-9: Adopted Emission Factors			
Emission Source Activity	TSP Emission Factor	PM_{10} Emission Factor	Units
Truck Unloading	$1.6x10^{-5}$	$8.0x10^{-6}$	kg/T
Truck Loading	$9.8x10^{-5}$	$5.0\ x10^{-5}$	kg/T
Conveyor Transfer Point	0.0014	0.0007	kg/T
Transfer Activity – Front End Loaders	0..029	0.014	kg/T
Crushing (Fines)	0.0195	0.0075	kg/T

The text "*Dust Emissions*" published by F.W. Parrett (Parett 1992) contains a methodology of calculating dust emission rates from wind eroded stockpiles based on the parameters of silt content, wind speed and moisture. Compared to generic emission factors, the referenced equation focuses on developing a site-specific emission factor based on site-specific conditions and properties, shown in Equation 5-1.

Equation 5-1:

$$E_w = 0.05 (S / 5) (D / 90) (d / 235) (f / 15)$$

Where

E_w = emission factor for wind erosion in lb/ton of material stored
S = silt content (weight percent of material stored)
D = number of days material is stored
d = number of dry days per year
f = percentage of time wind speed exceeds 12 miles per hour (equivalent to 5.36 m/s)

Emission rates were estimated by multiplying the emission factors shown in Table 5-9 with the proposed quantities to be processed, followed by the application of the appropriate emission control factor listed in Table 5-10 (which are referenced from the NPI Emission Estimation Technique Manuals). Data used to calculate emission rates for crushed cullet was obtained from particle size distribution results from analysing samples that were collected from GRS's existing glass cullet facility at Coolaroo VIC, which have been provided as Appendix 6. Emission rates for dust deposition were conservatively assumed to equal that of TSP emissions.

Table 5-10: Referenced Control Factors from NPI Emission Estimation Technique Manuals	
Control Type	Control Factor
Dust Collector	90%
Within an Enclosed Building (Enclosure Effect)	70%
Water Spray	50%
Wind Breaks	30%

5.1.8.4 Summary of Assumptions Utilised

The following assumptions were used in the air dispersion modelling phase of the assessment:

- A total maximum annual production capacity of 150,000 tonnes were used to estimate the emissions from the subject site;
- Emissions from the site have been conservatively assessed as 24 hours per day, 7 days per week;
- The emission generating operations were assumed to include the following:
  - Crushed cullet stored in bunkers emits 24 hours per day, with emissions controlled by wind breaks;
  - Truck loading at bunkers occurs from 6.00am to 5.00pm, transfer activity occurs from 4pm to 6pm, and emissions are controlled by wind breaks;
  - At Source S1, conveying occurs from 8.00am to 6.00pm, transfer activity occurs from 4.00pm to 6.00pm, and emissions are controlled by an enclosed building;
  - At Source S2, truck unloading occurs from 6.00am to 6.00pm, transfer activity occurs from 4pm to 6.00pm, and emissions are controlled by an enclosed building with water sprays; and
  - At Source S3, crushing occurs from 8.00am to 6.00pm and emissions are controlled by a dust collector.
- Emission control efficiency for the dust collector was conservatively assumed to be 90%, despite some of the modern dust collectors being able to achieve efficiencies up to 95-98%; and
- Scope of air emissions are limited to what has been described in Section 3.1.2.

The locations of the modelled emission sources are illustrated in Figure 5-11, Figure 5-12, Figure 5-13 and Figure 5-14, and the modelling parameters used for these operations are given in Section 5.1.8.5. Stack sources 1, 2 and 3 are shown below as S1, S2 and S3 respectively. Emissions from the external bunkers are represented in the figures below by A, for area sources from loading activities, and V, for volume sources from external storage.

The following conditions were also utilised as inputs into the model using the AUSPLUME modelling program:

- Exit air velocities for all pseudostacks (Sources S1 & S2) were conservatively assumed to be 0.1 m/s;
- Source S1 and Source S2 were modelled as 3 pseudostacks each to account for temperature effects;
- Stack tip heights for Source S1 and S2 were assumed to be 1.5 m for each pseudostack;
- Stack tip height for Source S3 was assumed to be 1 m above ground;
- Stack tip diameters for all stack sources on site were assumed to be 2 m;
- Stack temperatures for all stacks were set to ambient temperature;
- Loading areas were modelled as area sources (10 in total);
- Area source diameters and heights were assumed to be 2 m and 1 m respectively; and
- External bunkers were modelled as volume sources (10 in total).

Figure 5-11: Location of Emission Sources – Aerial Photograph of Subject Site



Where:

S1: Stack source 1: conveying and transfer activity; enclosed building control

S2: Stack source 2: unloading and transfer activity; enclosed building and water spray control

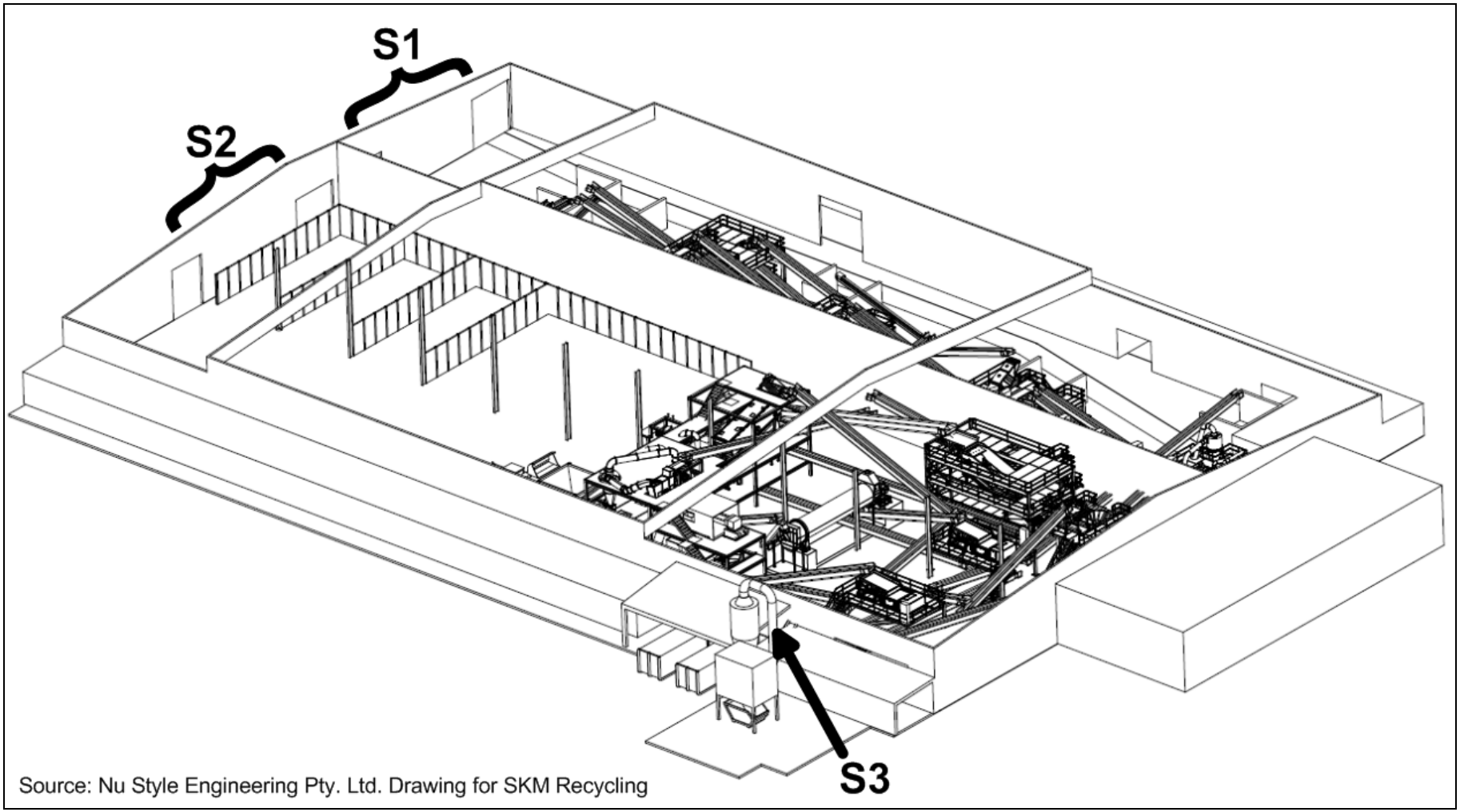
S3: Stack source 3: crushing activity; dust collector control

A: Area source: loading activity from external bunkers

V: Volume source: external bunker storage

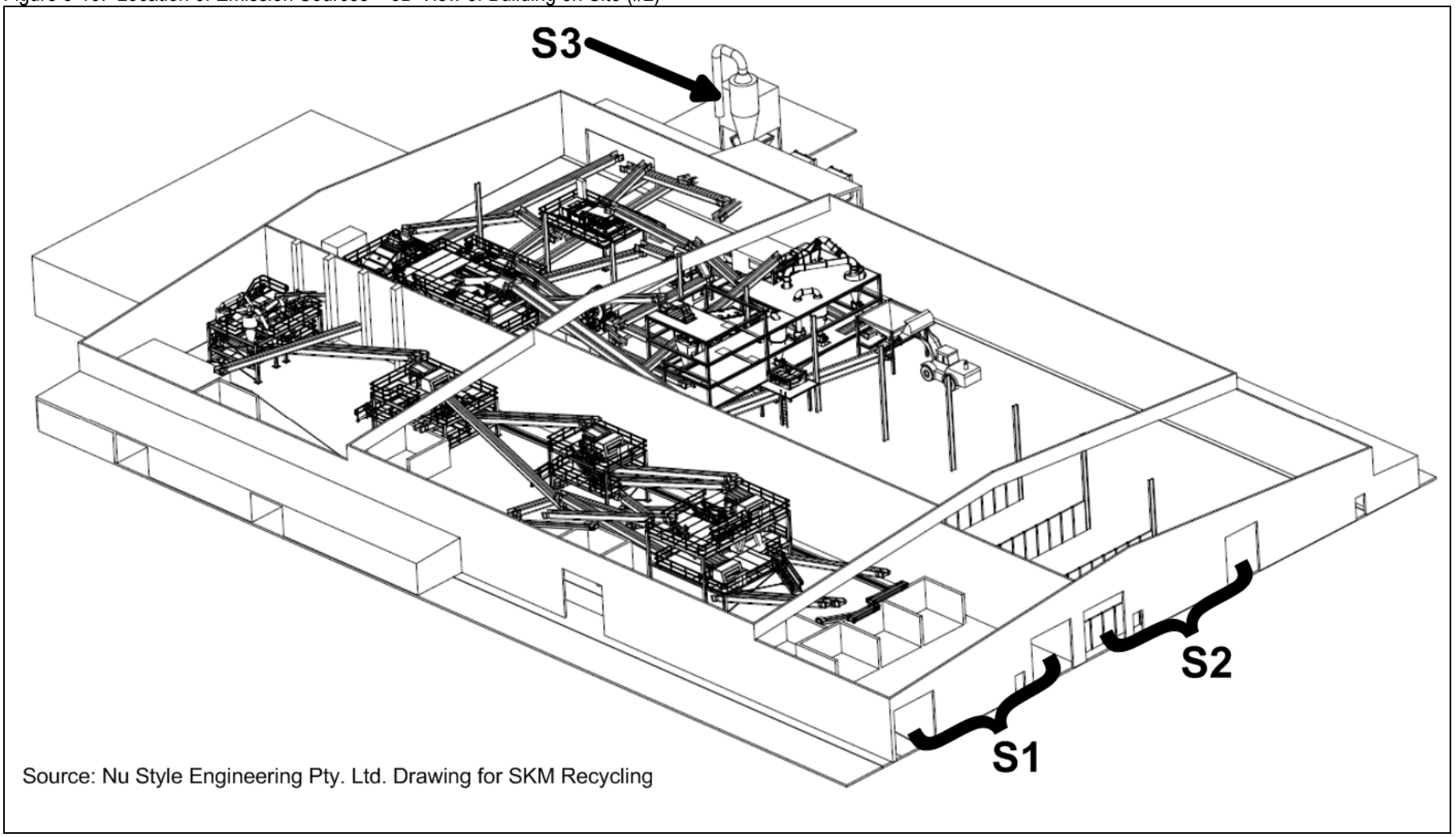
Note: Diagram above not to scale and is only used for representation purposes. Refer to Section 5.1.8.4 for details of the sources described above.

Figure 5-12: Location of Emission Sources – 3D View of Building on Site (#1)



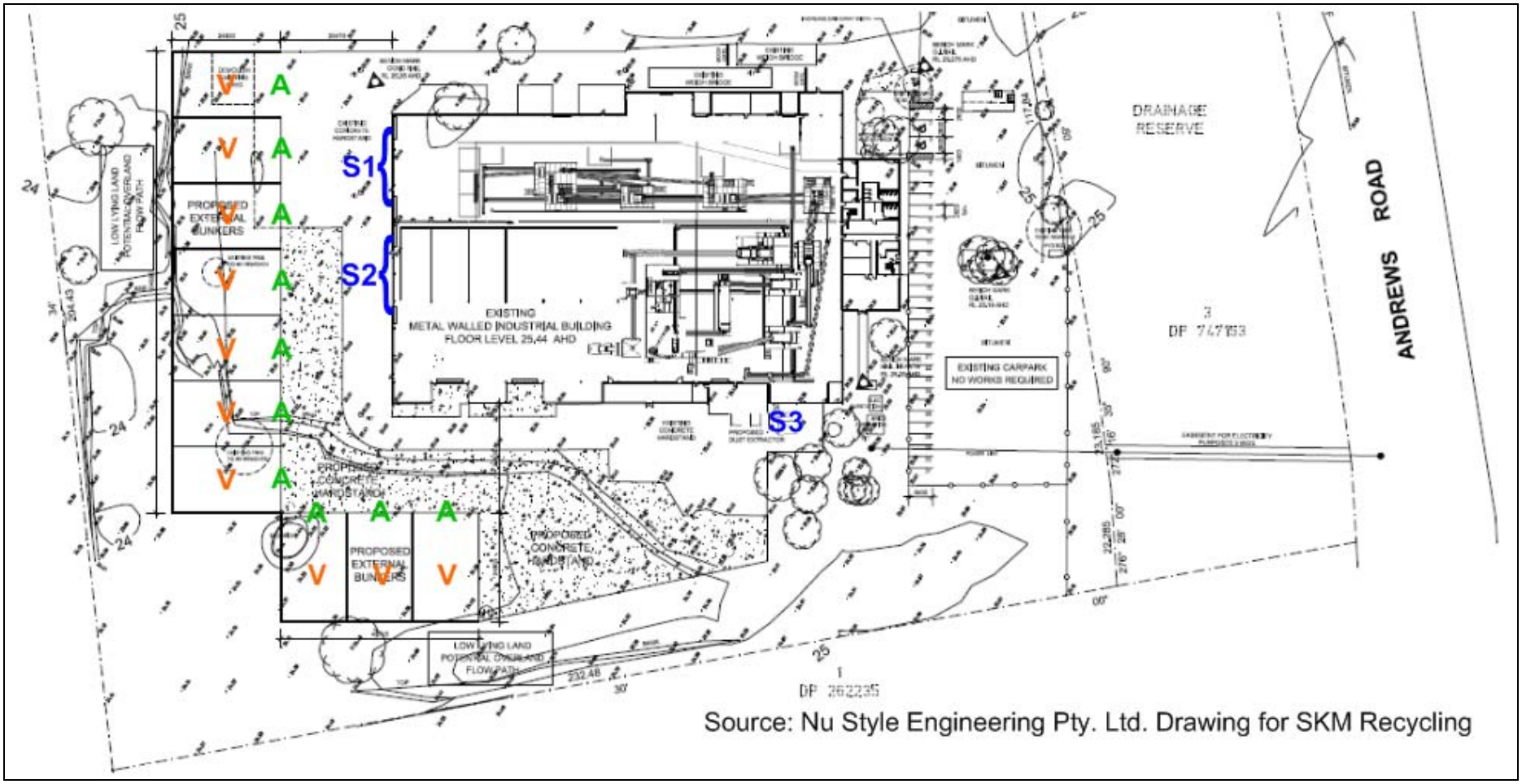
Note: Diagram above not to scale and is only used for representation purposes. Refer to Section 5.1.8.4 for details of the sources described above.

Figure 5-13: Location of Emission Sources – 3D View of Building on Site (#2)



Note: Diagram above not to scale and is only used for representation purposes. Refer to Section 5.1.8.4 for details of the sources described above.

Figure 5-14: Location of Emission Sources – Site Plan View



Note: Diagram above not to scale and is only used for representation purposes. Refer to Section 5.1.8.4 for details of the sources described above.

5.1.8.5 Air Emissions Inventory

The following information provides the emission rates and input parameter details for each pollutant and emission source for air dispersion modelling.

Table 5-11: Summary of Emission Rates at Each Source for PM_{10}

Emission Source	Time	Emission Activities	Controls	Emission Rate (g/s)	Averaging Period
Stack 1	8am-4pm	Conveying	Within enclosed building	2.74×10^{-3}	24 hour/annual
	4pm-6pm	Conveying and transfer activity	Within enclosed building	2.42×10^{-1}	24 hour/annual
Stack 2	6am-8am	Truck unloading	Within enclosed building, Water spray	7.47×10^{-6}	24 hour/annual
	8am-4pm	Truck unloading and transfer activity	Within enclosed building, Water spray	2.66×10^{-2}	24 hour/annual
	4pm-6pm	Truck unloading and transfer activity	Within enclosed building, Water spray	2.66×10^{-2}	24 hour/annual
Stack 3	8am-6pm	Crushing	Dust collector[1]	9.51×10^{-3}	24 hour/annual
Bunkers (V)	24 hours	Wind erosion	Wind breaks	8.57×10^{-5}	24 hour/annual
Loading areas (A)	6am-8am	Truck loading	Wind breaks	2.18×10^{-4}	24 hour/annual
	8am-4pm	Truck loading	Wind breaks	3.63×10^{-5}	24 hour/annual
	4pm-6pm	Truck loading and transfer activity	Wind breaks	5.59×10^{-1}	24 hour/annual

Note: [1] Dust collector efficiency of 90% was conservatively used in the estimation of the figure.

Table 5-12: Summary of Emission Rates at Each Source for TSP and Dust Deposition

Emission Source	Time	Emission Activities	Controls	Emission Rate (g/s)	Averaging Period
Stack 1	8am-4pm	Conveying	Within enclosed building	5.37×10^{-3}	Annual
	4pm-6pm	Conveying and transfer activity	Within enclosed building	5.03×10^{-1}	Annual
Stack 2	6am-8am	Truck unloading	Within enclosed building, Water spray	1.47×10^{-5}	Annual
	8am-4pm	Truck unloading and transfer activity	Within enclosed building, Water spray	5.52×10^{-2}	Annual
	4pm-6pm	Truck unloading and transfer activity	Within enclosed building, Water spray	5.52×10^{-2}	Annual
Stack 3	8am-6pm	Crushing	Dust collector[1]	2.47×10^{-2}	Annual
Bunkers (V)	24 hours	Wind erosion	Wind breaks	1.68×10^{-4}	Annual
Loading area (A)	6am-8am	Truck loading	Wind breaks	4.27×10^{-4}	Annual
	8am-4pm	Truck loading	Wind breaks	7.12×10^{-5}	Annual
	4pm-6pm	Truck loading and transfer activity	Wind breaks	1.16	Annual

Note: [1] Dust collector efficiency of 90% was conservatively used in the estimation of the figure.

5.1.9 Air Dispersion Modelling

5.1.9.1 Methodology

The NSW EPA-approved air dispersion model, AUSPLUME (version 6.0), was used for the quantification of air impacts from the proposed development. The methods used to quantify the impacts through AUSPLUME have been conducted in accordance with the document *"Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales"* (AMMAAP) published by the NSW EPA.

AUSPLUME is a steady-state plume model that is accepted by the NSW EPA with regards to air assessments where local topography does not adversely affect plume migration. The model was used to estimate the concentration impacts on receptors for each hour of input meteorology. Within the AUSPLUME dispersion model technical options are available to simulate plume behaviour affected by the presence of buildings. Atmospheric dispersion curves and surface roughness heights were selected which specifically represented the site conditions present.

A site-specific meteorological data was used (described in Section 5.1.4) in accordance with the NSW EPA AMMAAP guidelines. Contribution due to the effects associated with the presence of buildings on and within proximity to the subject site was also accounted for in the AUSPLUME model using the BPIP Prime Input Information Module within the program. Emission rates were estimated using emission factor databases and were used conservatively using the assumptions provided in Section 5.1.8.4.

Dust deposition emissions were modelled with guidance from the particle size distribution data provided by the U.S. Environmental Protection Agency (USEPA) AP 42 Emissions Database that falls under the same category as the type of operation conducted on site. The same mean diameter range from this source, using the analysis results that were obtained from the Coolaroo facility, was used in the model.

5.1.9.2 Results of Dispersion Modelling

The following sub-sections provide the results from AUSPLUME for each of the respective scenarios. A sample AUSPLUME output file is provided in Appendix 9.

The results for the predicted 100th percentile particulate impacts caused by the construction of the development are presented in Table 5-13 and Table 5-14, for Stage 1 and Stage 2 of the construction phase respectively. The graphical representations of these predicted impacts are found in Figure 5-15 to Figure 5-18 for Stage 1, and in Figure 5-19 to Figure 5-22 for Stage 2.

The results for the impacts from the operations of the development are presented in Table 5-15 for this scenario. A summary of the results from Table 5-15 has been provided in Table 5-16 to show the maximum predicted incremental impacts[1] and to compare them as a percentage of the relevant criteria. Graphical representations of the predicted impact results, shown as concentration isopleth contours, are outlined in Figure 5-23 to Figure 5-26 for all assessable pollutants.

[1] Incremental impacts - *Impacts caused by the site alone; excludes the impact contribution from background air concentrations.*

Table 5-13: Predicted Air Quality Impacts from Construction (Stage 1) at the Nearest Potentially Affected Receptors

Substances	Averaging Time & Impact	Scenario Description	Predicted Concentration at Receptor (μg/m³)											Units	Criteria	Pass
			R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11			
Fine Particulates (PM_{10})	24 hour Incremental Impacts	All emission sources.	3.66	6.52	5.66	4.18	2.82	2.63	4.08	0.57	1.98	1.16	2.07	μg/m³	50 μg/m³	Yes
	24 hour Cumulative Impacts[1]	All emission sources.	35.86	38.72	37.86	36.38	35.02	34.83	36.28	32.77	34.18	33.36	34.27	μg/m³		Yes
	Annual Incremental Impacts	All emission sources.	0.30	0.30	0.35	0.20	0.13	0.13	0.24	0.03	0.06	0.10	0.16	μg/m³	30 μg/m³	Yes
	Annual Cumulative Impacts[1]	All emission sources.	15.10	15.10	15.15	15.00	14.93	14.93	15.04	14.83	14.86	14.90	14.96	μg/m³		Yes
Total Suspended Particulates (TSP)	Annual Incremental Impacts	All emission sources.	1.16	1.13	1.30	0.73	0.49	0.49	0.91	0.12	0.21	0.36	0.61	μg/m³	90 μg/m³	Yes
	Annual Cumulative Impacts[2]	All emission sources.	30.16	30.13	30.30	29.73	29.49	29.49	29.91	29.12	29.21	29.36	29.61	μg/m³		Yes
Deposited Dust	Annual Incremental Impacts	All emission sources.	0.22	0.16	0.19	0.15	0.11	0.10	0.15	0.03	0.04	0.08	0.12	g/m²/month	2 g/m²/month	Yes
	Annual Cumulative Impacts[3]	All emission sources.	2.218	2.162	2.186	2.153	2.106	2.100	2.148	2.026	2.044	2.078	2.119	g/m²/month	4 g/m²/month	Yes

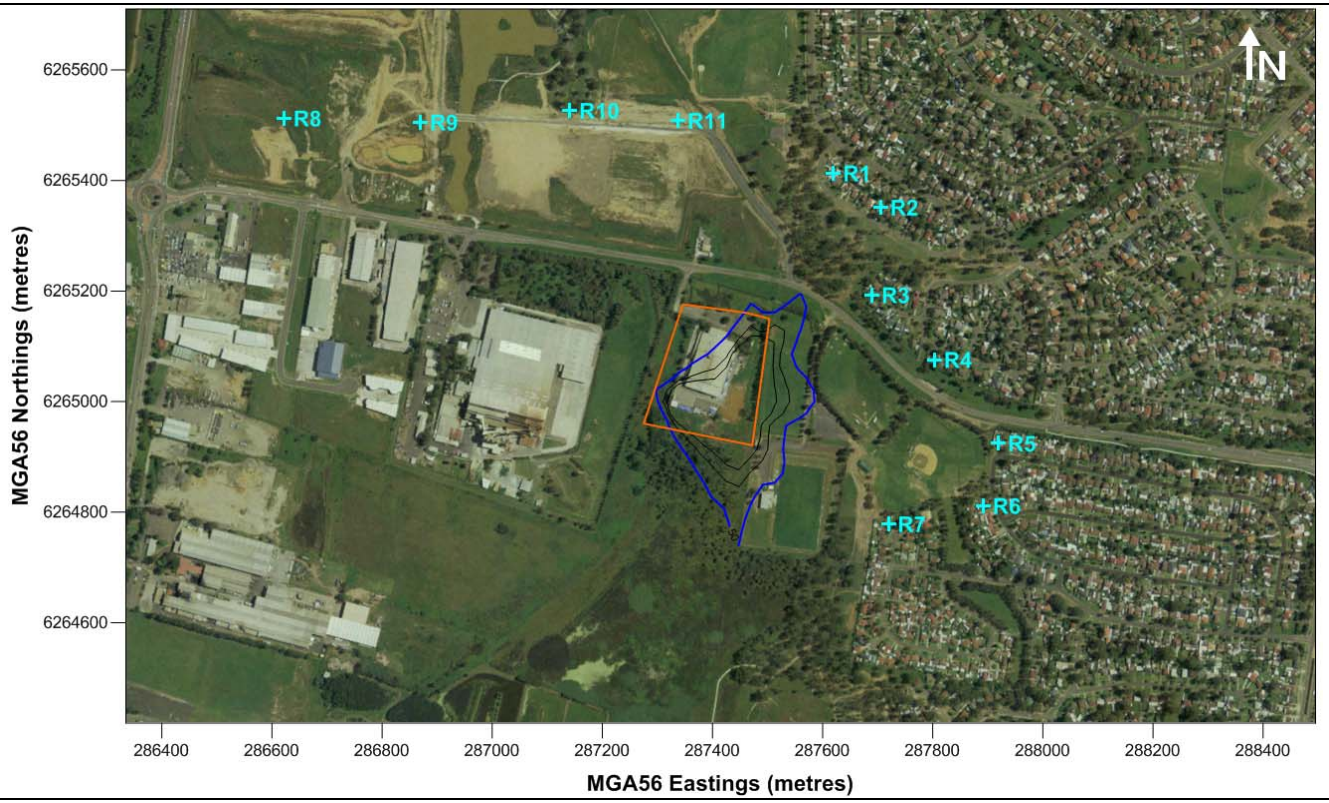
Note: [1] Background concentration data for PM_{10} used.
[2] Background concentration data for TSP used.
[3] Background concentration value of 2 g/m²/month used.

Table 5-14: Predicted Air Quality Impacts from Construction (Stage 2) at the Nearest Potentially Affected Receptors

Substances	Averaging Time & Impact	Scenario Description	Predicted Concentration at Receptor (μg/m³)											Units	Criteria	Pass
			R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11			
Fine Particulates (PM_{10})	24 hour Incremental Impacts	All emission sources.	3.99	3.72	4.98	1.93	2.27	1.70	2.19	0.81	2.80	1.63	2.32	μg/m³	50 μg/m³	Yes
	24 hour Cumulative Impacts[1]	All emission sources.	36.19	35.92	37.18	34.13	34.47	33.90	34.39	33.01	35.00	33.83	34.52	μg/m³		Yes
	Annual Incremental Impacts	All emission sources.	0.14	0.13	0.14	0.06	0.05	0.05	0.08	0.01	0.02	0.04	0.08	μg/m³	30 μg/m³	Yes
	Annual Cumulative Impacts[1]	All emission sources.	14.94	14.93	14.94	14.86	14.85	14.85	14.88	14.81	14.82	14.84	14.88	μg/m³		Yes
Total Suspended Particulates (TSP)	Annual Incremental Impacts	All emission sources.	0.48	0.44	0.47	0.18	0.16	0.16	0.27	0.04	0.08	0.13	0.26	μg/m³	90 μg/m³	Yes
	Annual Cumulative Impacts[2]	All emission sources.	29.48	29.44	29.47	29.18	29.16	29.16	29.27	29.04	29.08	29.13	29.26	μg/m³		Yes
Deposited Dust	Annual Incremental Impacts	All emission sources.	0.07	0.05	0.03	0.01	0.01	0.01	0.01	0.00	0.00	0.01	0.02	g/m²/month	2 g/m²/month	Yes
	Annual Cumulative Impacts[3]	All emission sources.	2.075	2.049	2.030	2.013	2.010	2.009	2.013	2.002	2.003	2.008	2.022	g/m²/month	4 g/m²/month	Yes

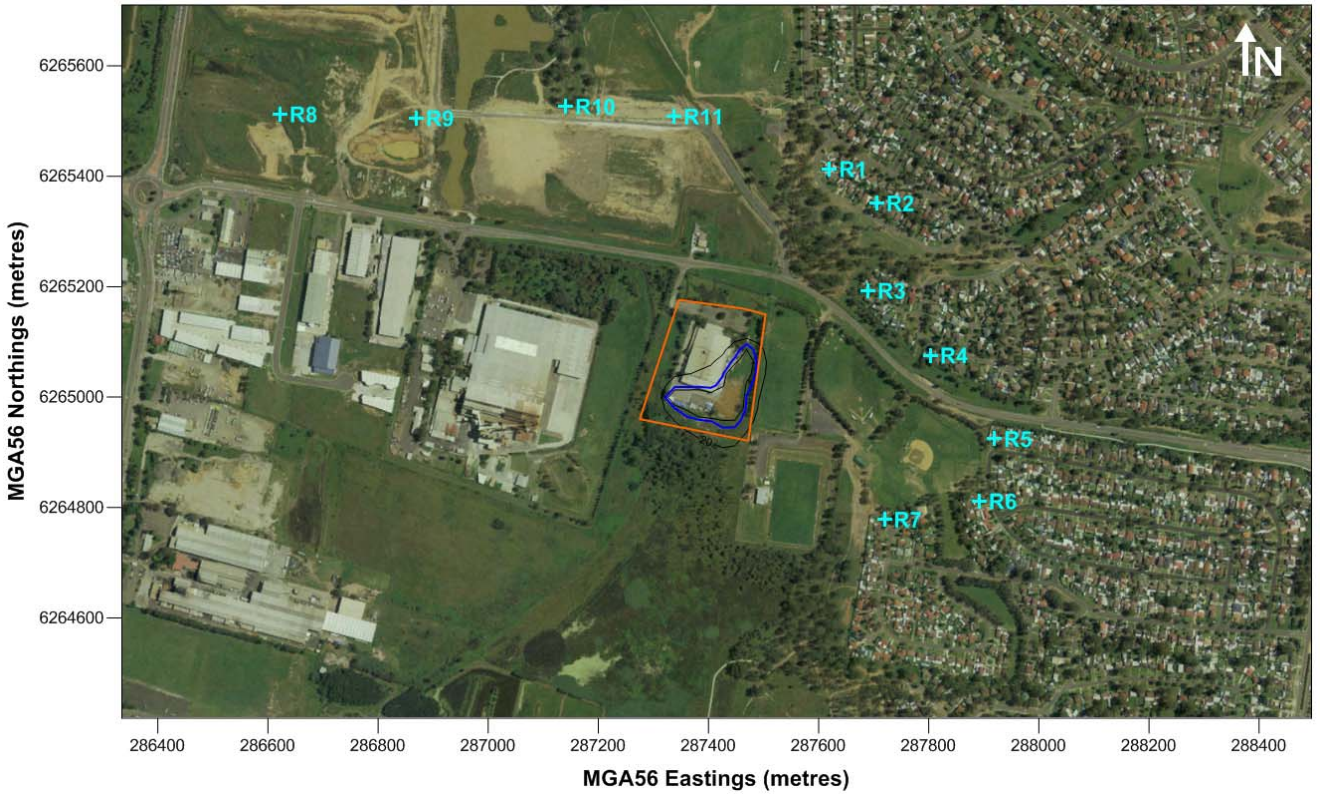
Note: [1] Background concentration data for PM_{10} used.
[2] Background concentration data for TSP used.
[3] Background concentration value of 2 g/m²/month used.

Figure 5-15: Predicted PM_{10} Impacts from Construction (Stage 1) - 24-Hour Averaging Time with Background Concentration (Cumulative Impacts)



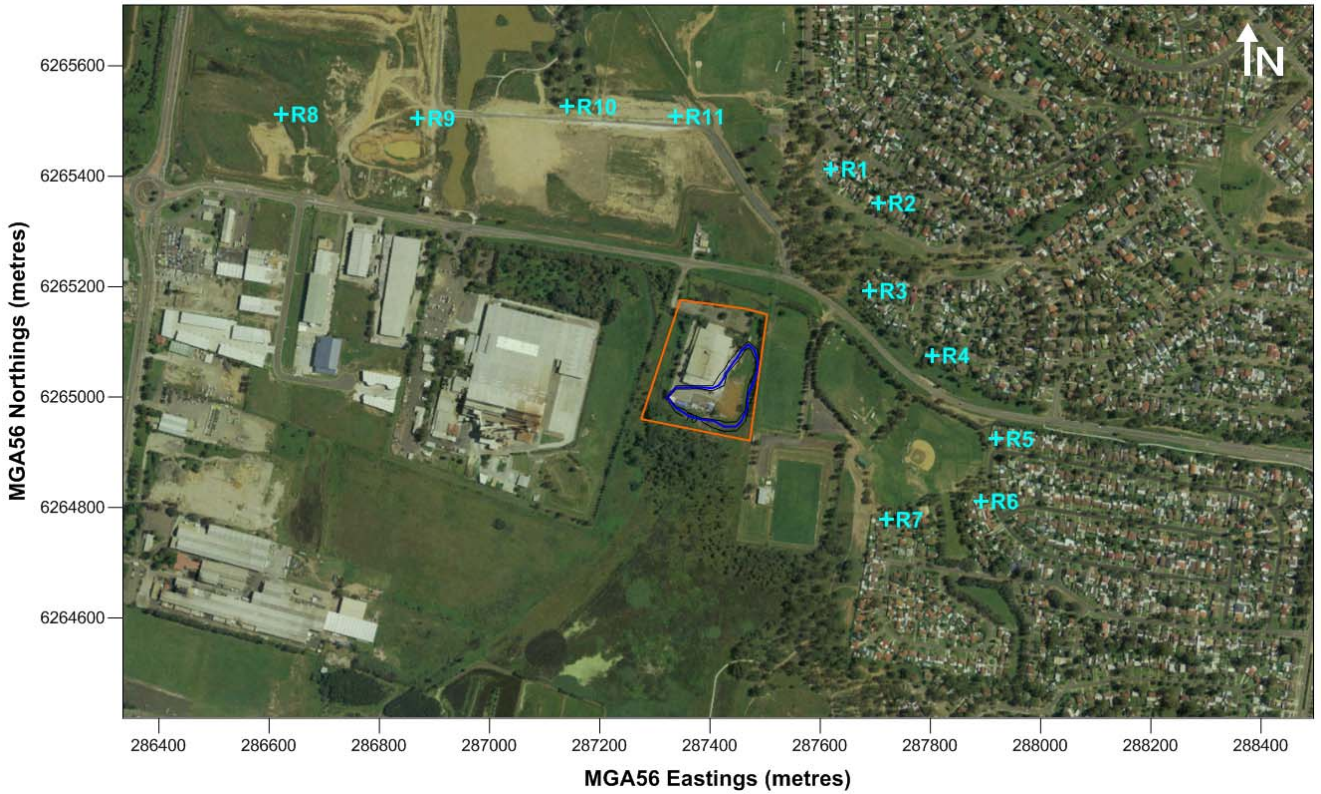
Averaging Time:	24 hour
Percentile:	100
Criteria:	50 μg/m^3
Concentration contours shown:	50 μg/m^3 (blue), 60 μg/m^3, 70 μg/m^3

Figure 5-16: Predicted PM_{10} Impacts from Construction (Stage 1) – 1 Year Averaging Time with Background Concentration (Cumulative Impacts)



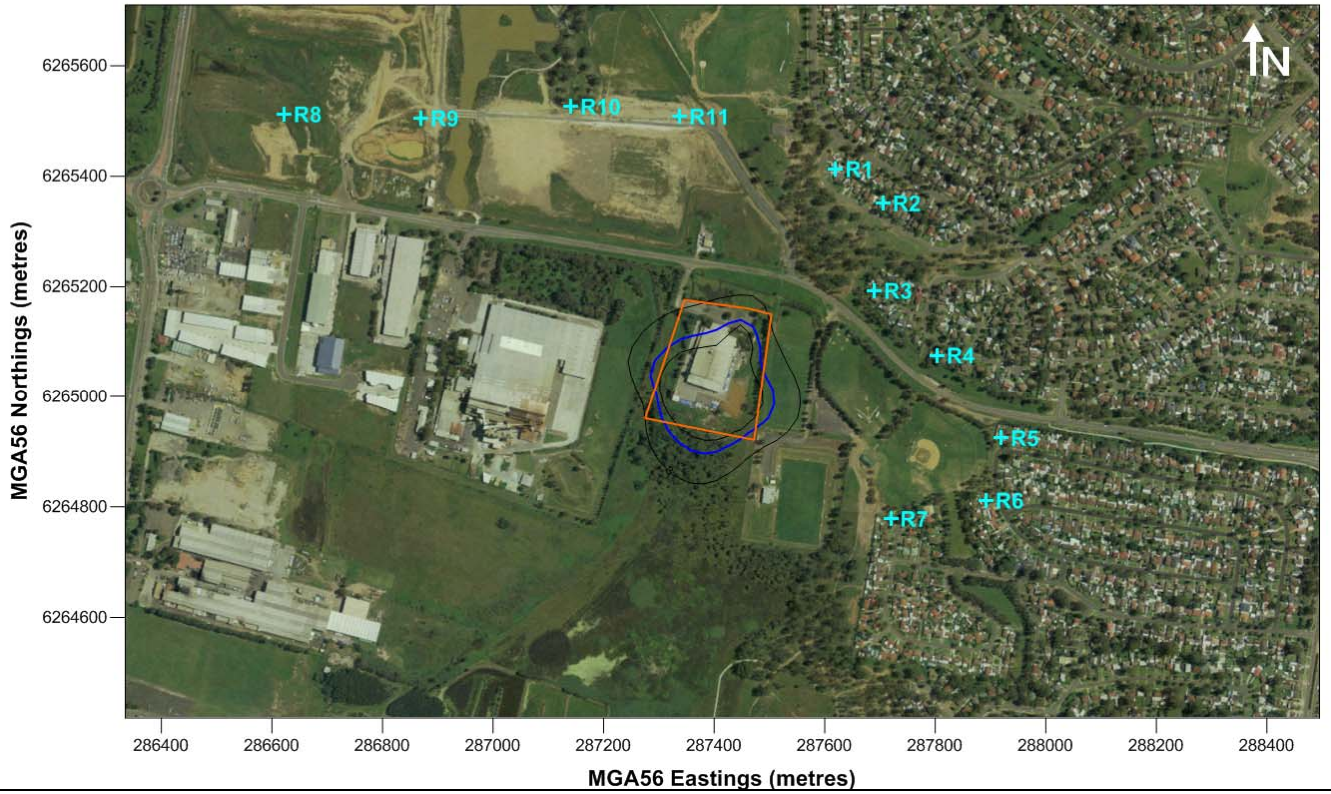
Averaging Time:	1 Year
Percentile:	100
Criteria:	30 μg/m^3
Concentration contours shown:	20 μg/m^3, 30 μg/m^3 (blue), 40 μg/m^3

Figure 5-17: Predicted TSP Impacts from Construction (Stage 1) – 1 Year Averaging Time with Background Concentration (Cumulative Impacts)



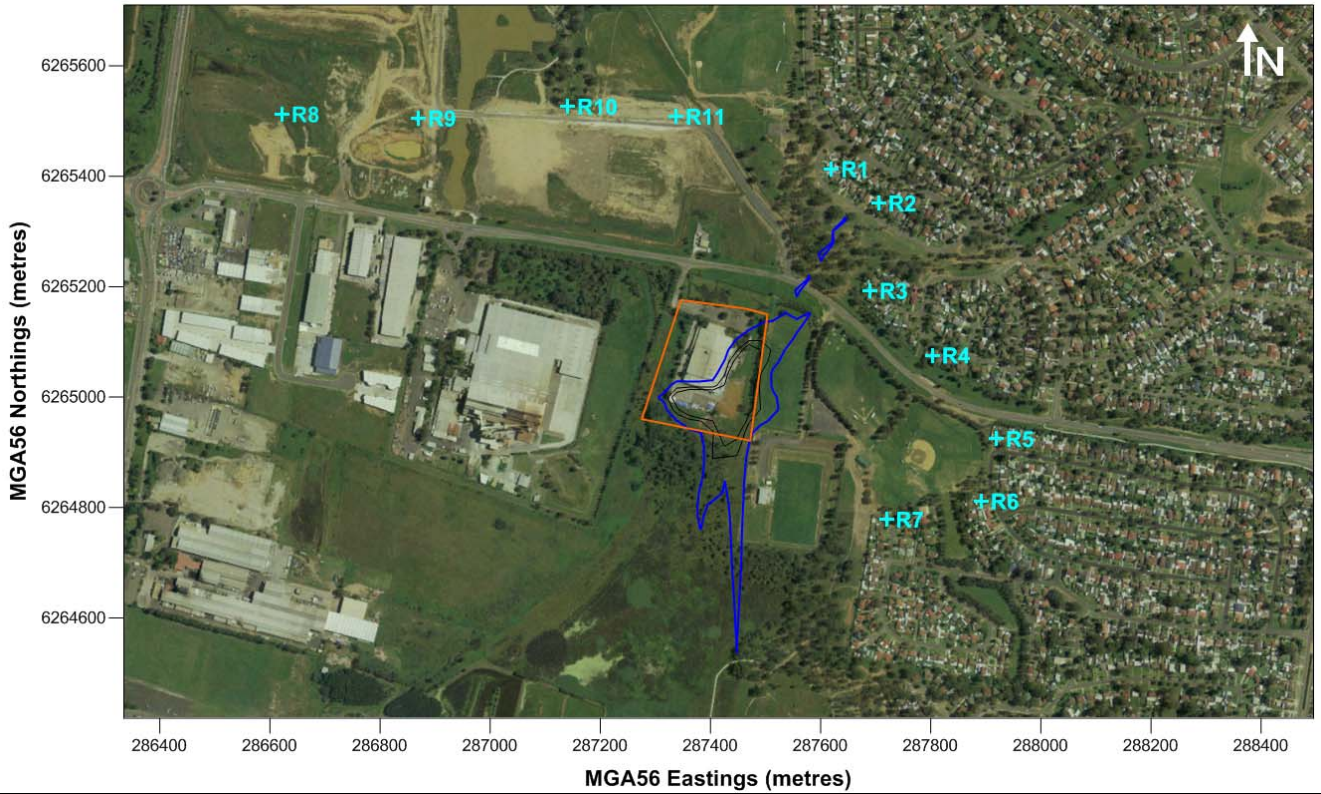
Averaging Time:	1 Year
Percentile:	100
Criteria:	90 μg/m^3
Concentration contours shown:	70 μg/m^3, 90 μg/m^3 (blue), 110 μg/m^3

Figure 5-18: Predicted Deposited Dust Impacts from Construction (Stage 1)- 1 Year Averaging Time with Background Concentrations (Cumulative Impacts)



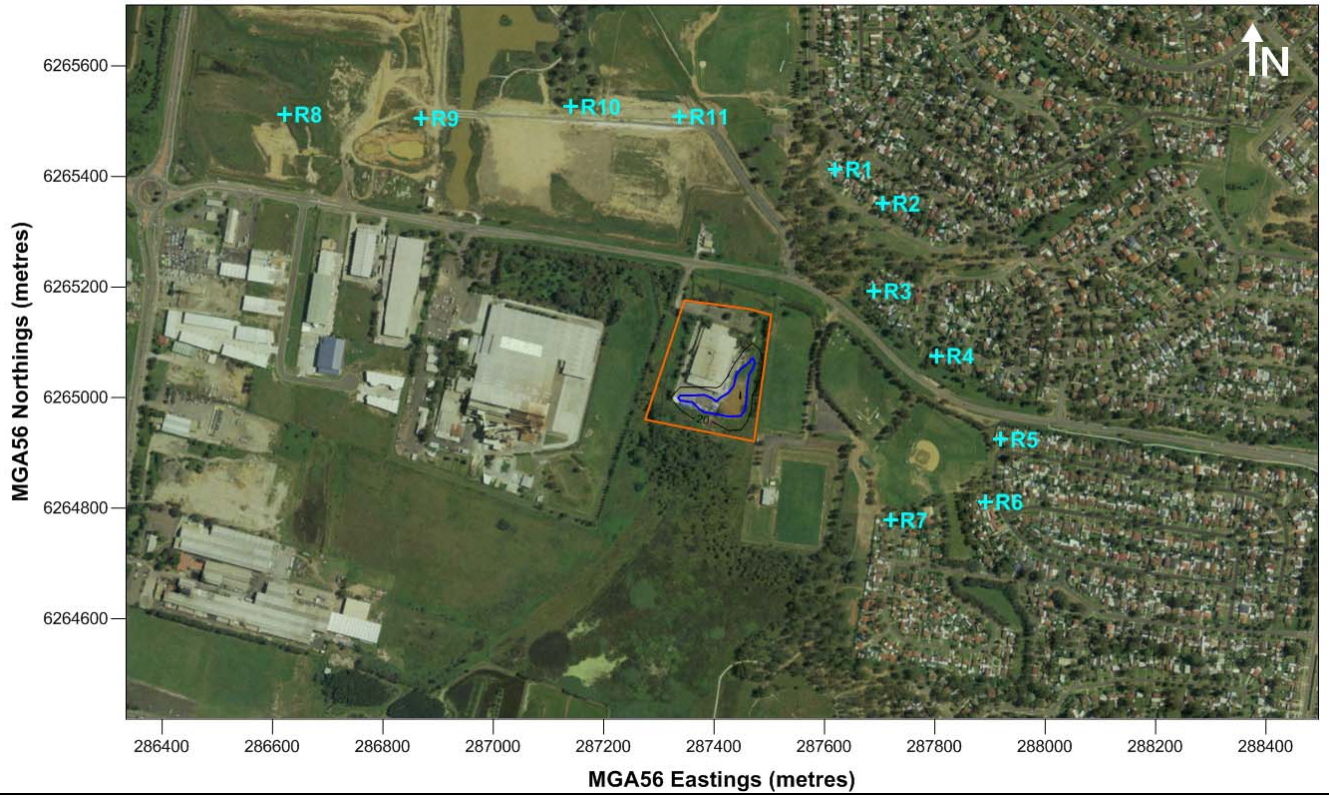
Averaging Time:	1 Year
Percentile:	100
Criteria:	4 g/m^2/month
Concentration contours shown:	3 g/m^2/month, 4 g/m^2/month (blue), 5 g/m^2/month

Figure 5-19: Predicted PM_{10} Impacts from Construction (Stage 2) - 24-Hour Averaging Time with Background Concentration (Cumulative Impacts)



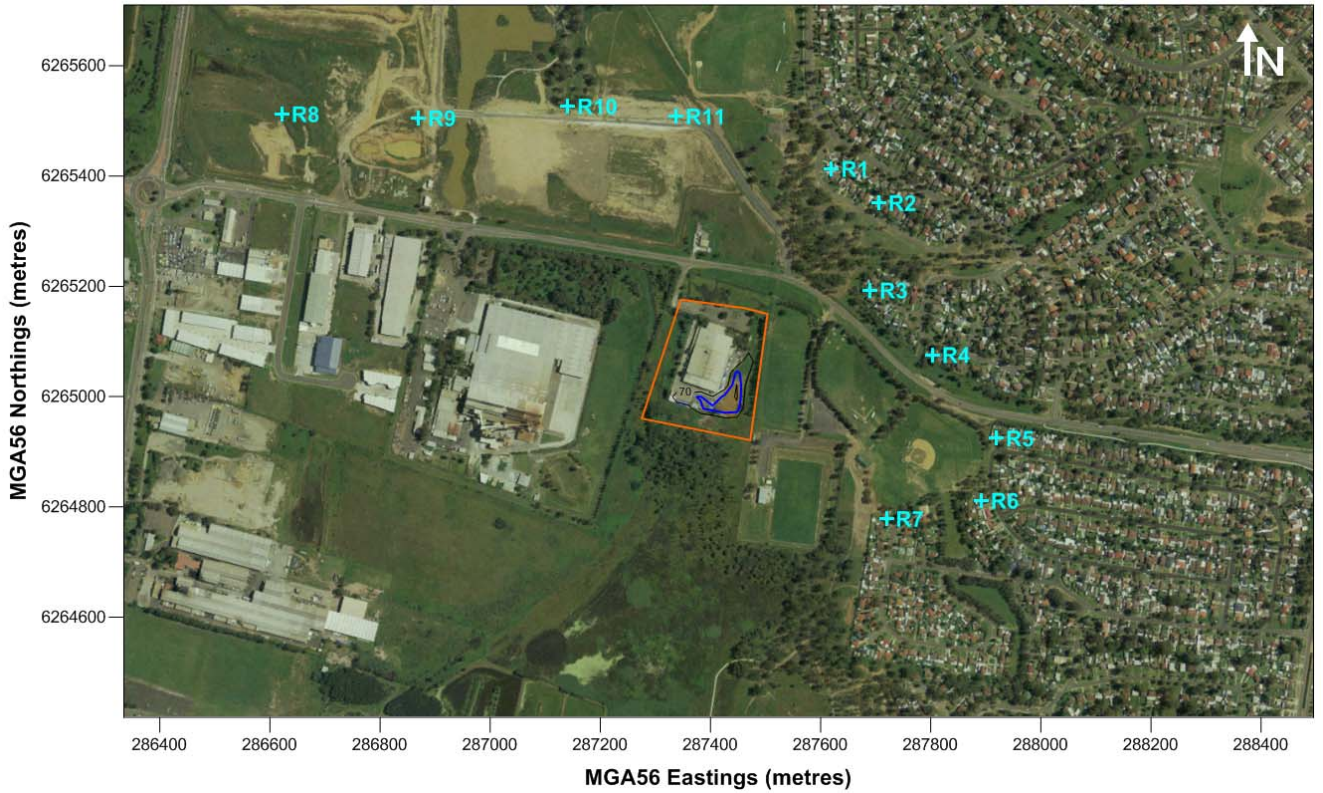
Averaging Time:	24 hour
Percentile:	100
Criteria:	50 μg/m^3
Concentration contours shown:	50 μg/m^3 (blue), 60 μg/m^3, 70 μg/m^3

Figure 5-20: Predicted PM_{10} Impacts from Construction (Stage 2) – 1 Year Averaging Time with Background Concentration (Cumulative Impacts)



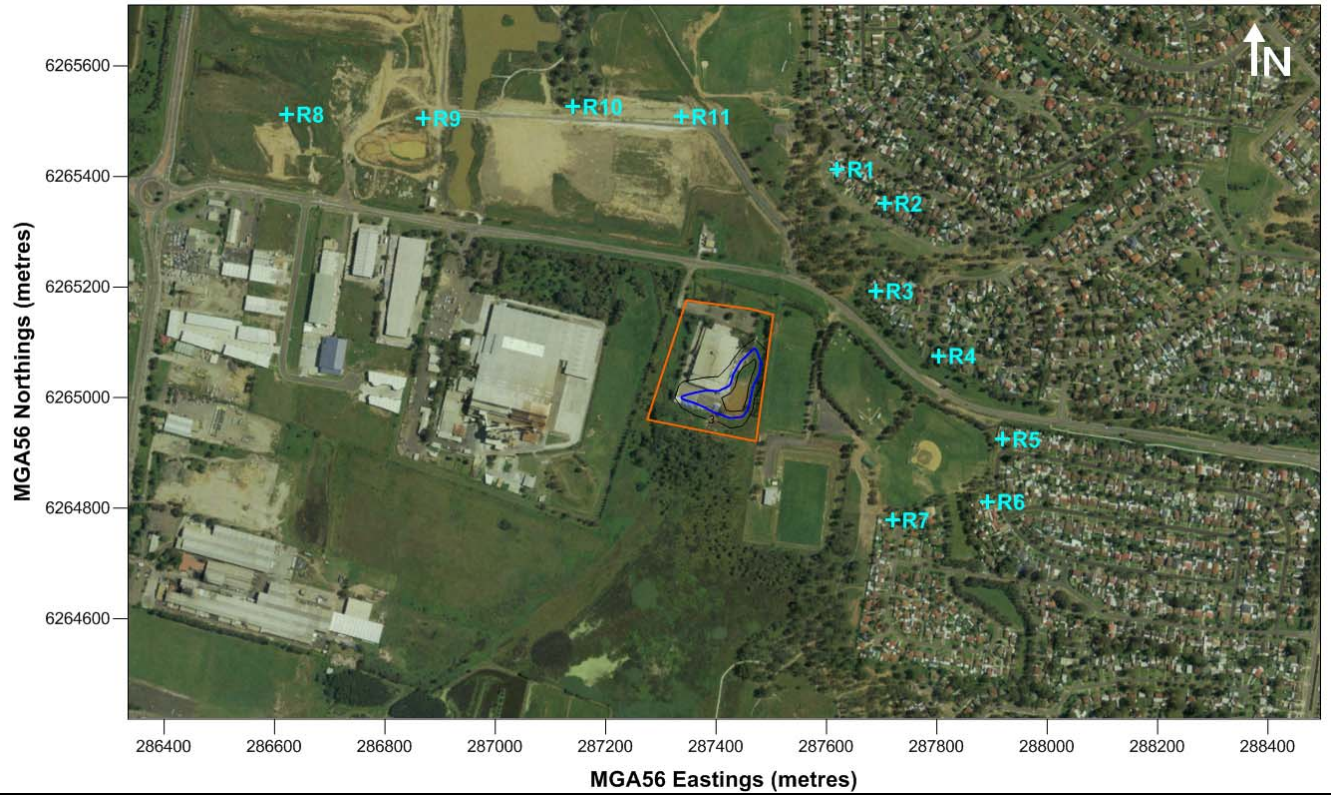
Averaging Time:	1 Year
Percentile:	100
Criteria:	30 μg/m^3
Concentration contours shown:	20 μg/m^3, 30 μg/m^3 (blue)

Figure 5-21: Predicted TSP Impacts from Construction (Stage 2) – 1 Year Averaging Time with Background Concentration (Cumulative Impacts)



Averaging Time:	1 Year
Percentile:	100
Criteria:	90 μg/m^3
Concentration contours shown:	70 μg/m^3, 90 μg/m^3 (blue), 110 μg/m^3

Figure 5-22: Predicted Deposited Dust Impacts from Construction (Stage 2)- 1 Year Averaging Time with Background Concentrations (Cumulative Impacts)



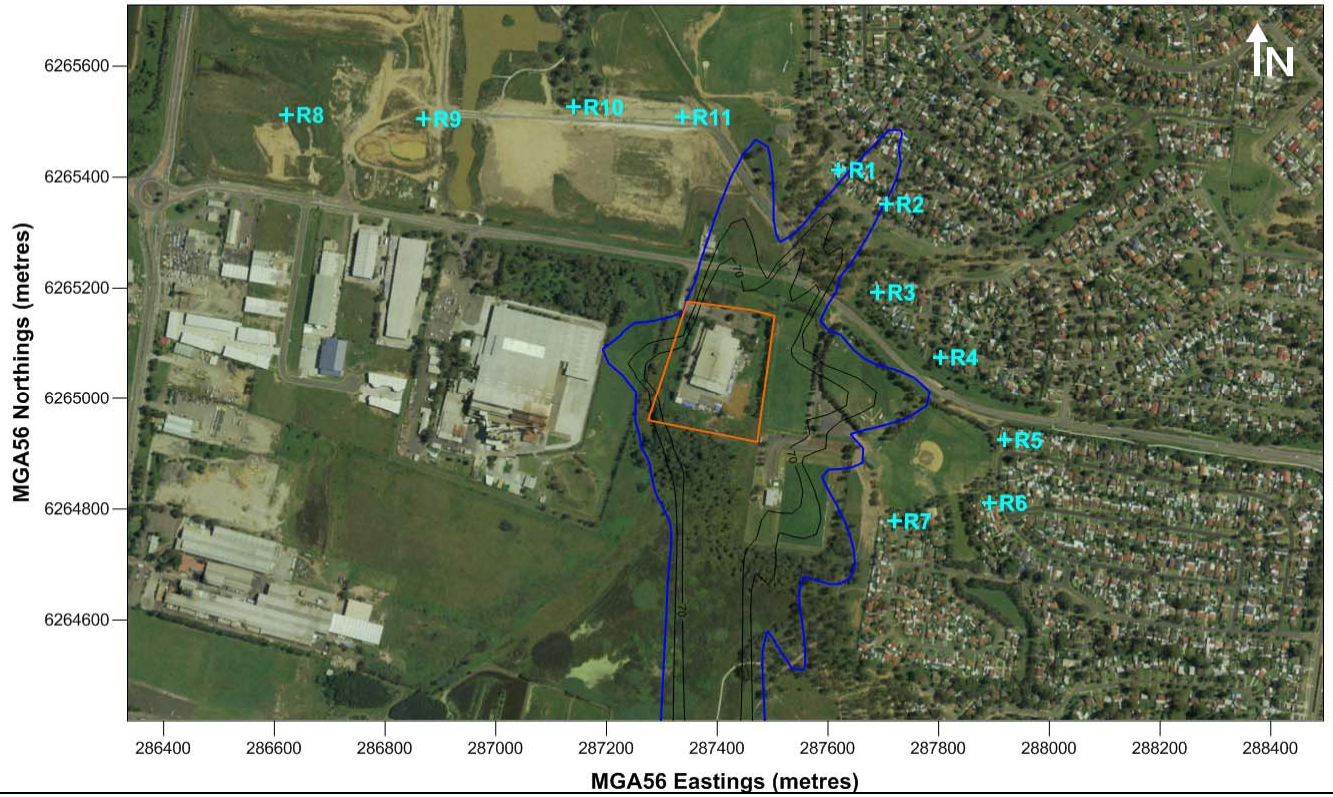
Averaging Time:	1 Year
Percentile:	100
Criteria:	4 g/m^2/month
Concentration contours shown:	3 g/m^2/month, 4 g/m^2/month (blue), 5 g/m^2/month

Table 5-15: Predicted Air Quality Impacts from the Proposed Operations of the Development

Substances	Averaging Time & Impact	Scenario Description	Predicted Concentration at Receptor (µg/m³)											Units	Criteria	Pass
			R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11			
Fine Particulates (PM_{10})	24 hour Incremental Impacts	All emission sources.	9.99	17.69	8.71	10.86	7.89	6.81	6.71	1.31	2.22	2.24	3.22	µg/m³	50 µg/m³	Yes
	24 hour Cumulative Impacts[1]	All emission sources.	42.19	49.89	40.91	43.06	40.09	39.01	38.91	33.51	34.42	34.44	35.42	µg/m³		Yes
	Annual Incremental Impacts	All emission sources.	0.53	0.50	0.58	0.41	0.25	0.23	0.38	0.08	0.13	0.21	0.30	µg/m³	30 µg/m³	Yes
	Annual Cumulative Impacts[1]	All emission sources.	15.33	15.30	15.38	15.21	15.05	15.03	15.18	14.88	14.93	15.01	15.10	µg/m³		Yes
Total Suspended Particulates (TSP)	Annual Incremental Impacts	All emission sources.	1.11	1.06	1.23	0.86	0.52	0.49	0.80	0.17	0.26	0.44	0.62	µg/m³	90 µg/m³	Yes
	Annual Cumulative Impacts[2]	All emission sources.	30.11	30.06	30.23	29.86	29.52	29.49	29.80	29.17	29.26	29.44	29.62	µg/m³		Yes
Deposited Dust	Annual Incremental Impacts	All emission sources.	0.26	0.20	0.27	0.24	0.17	0.16	0.23	0.06	0.09	0.15	0.19	g/m²/month	2 g/m²/month	Yes
	Annual Cumulative Impacts[3]	All emission sources.	2.257	2.200	2.268	2.242	2.168	2.158	2.227	2.060	2.093	2.152	2.188	g/m²/month	4 g/m²/month	Yes

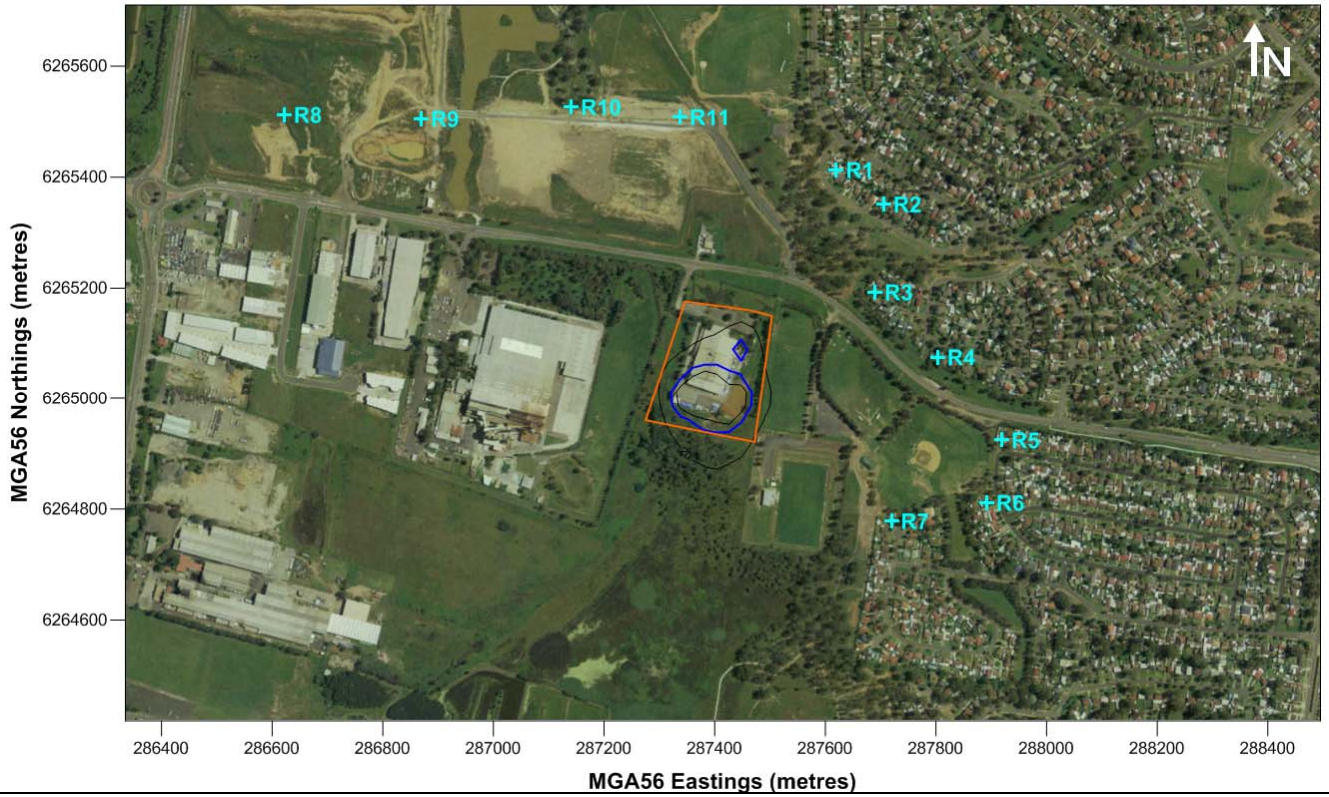
Note: [1] Background concentration data for PM_{10} used.
[2] Background concentration data for TSP used.
[3] Background concentration value of 2 g/m²/month used.

Figure 5-23: Predicted PM_{10} Impacts - 24-Hour Averaging Time with Background Concentration (Cumulative Impacts - Total Emissions) – Proposed Operations



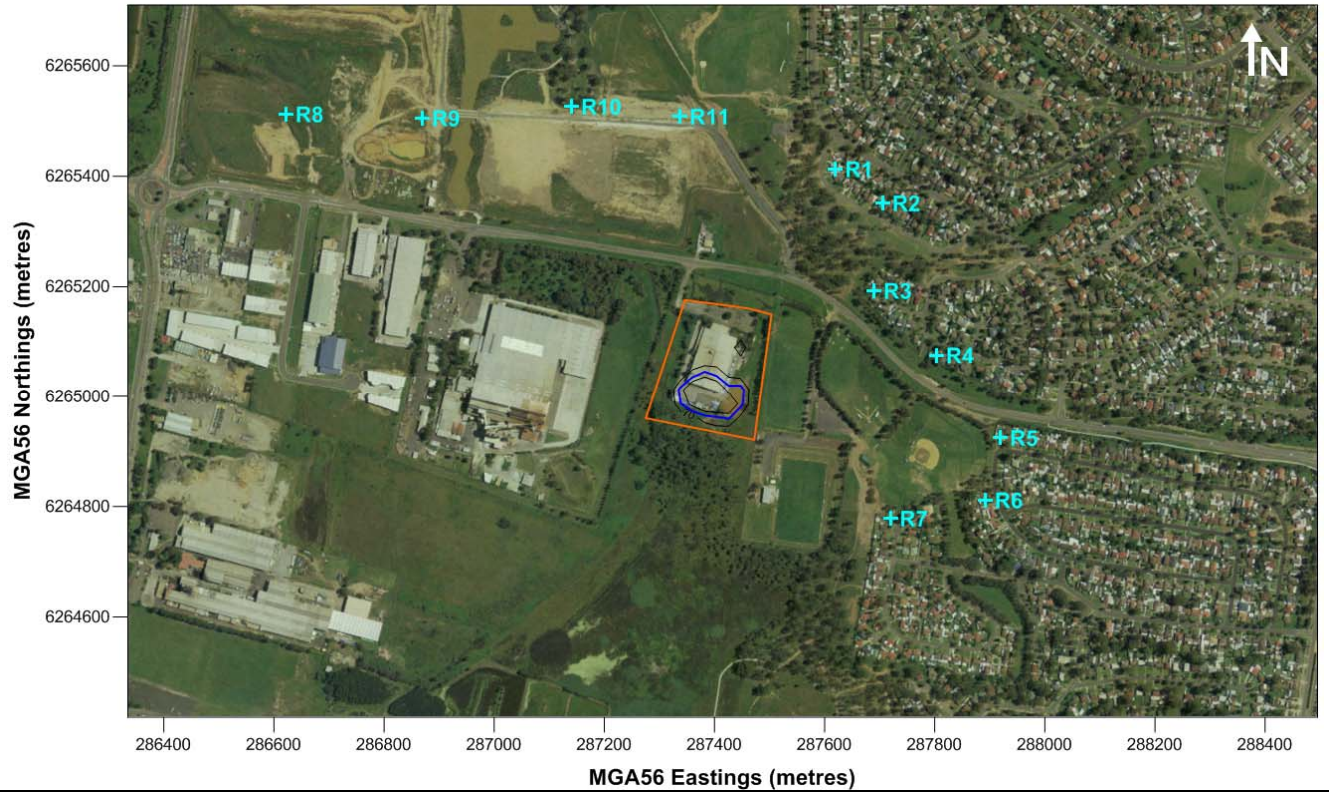
Averaging Time:	24 hour
Percentile:	100
Criteria:	50 μg/m³
Concentration contours shown:	50 μg/m³ (blue), 60 μg/m³, 70 μg/m³

Figure 5-24: Predicted PM_{10} Impacts – 1 Year Averaging Time with Background Concentration (Cumulative Impacts - Total Emissions) – Proposed Operations



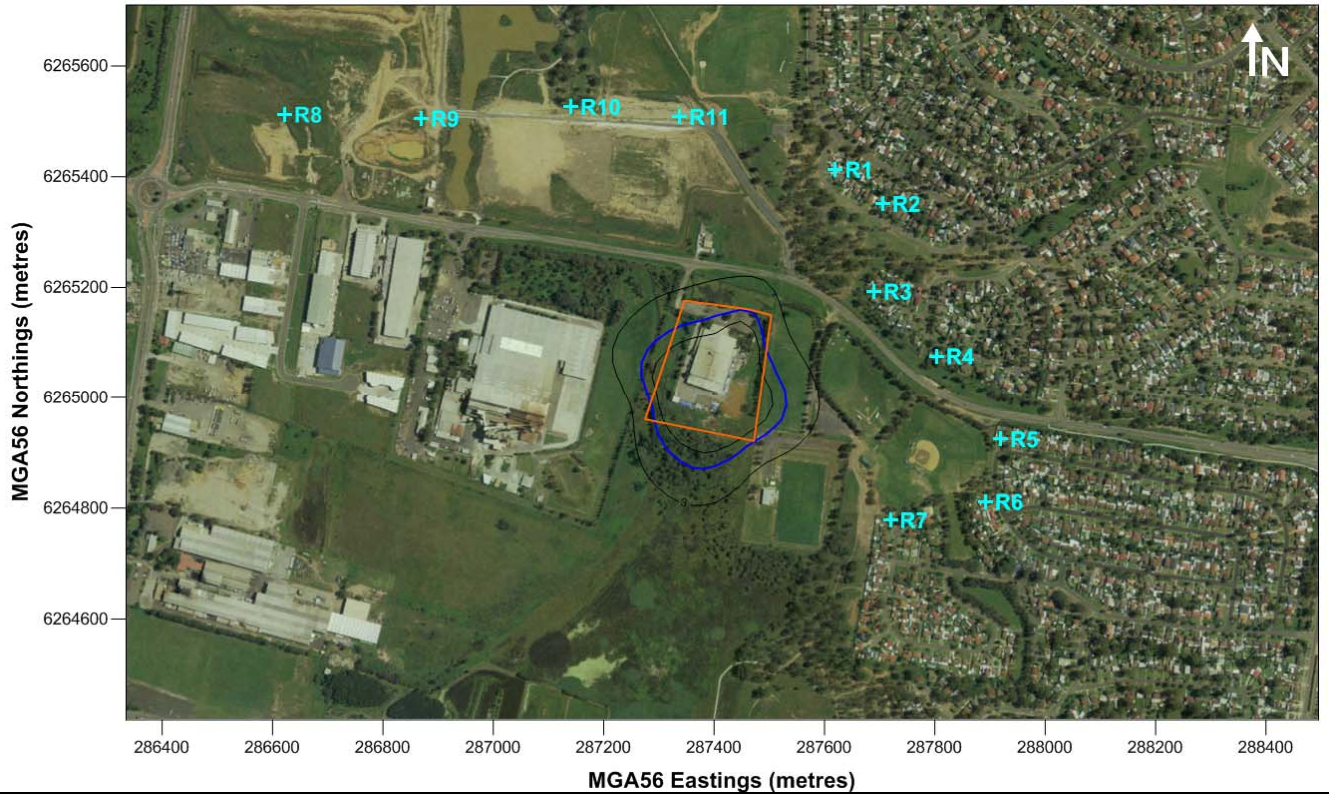
Averaging Time:	1 Year
Percentile:	100
Criteria:	30 μg/m^3
Concentration contours shown:	20 μg/m^3, 30 μg/m^3 (blue), 40 μg/m^3

Figure 5-25: Predicted TSP Impacts - 1 Year Averaging Time with Background Concentrations (Cumulative Impacts - Total Emissions) – Proposed Operations



Averaging Time:	1 Year
Percentile:	100
Criteria:	90 μg/m^3
Concentration contours shown:	70 μg/m^3, 90 μg/m^3 (blue), 110 μg/m^3

Figure 5-26: Predicted Deposited Dust Impacts - 1 Yr Avg. Time with Background Concentrations (Cumulative Impacts - Total Emissions) – Proposed Operations



Averaging Time:	1 Year
Percentile:	100
Criteria:	4 g/m^2/month
Concentration contours shown:	3 g/m^2/month, 4 g/m^2/month (blue), 5 g/m^2/month

Table 5-16: Predicted 100th Percentile Particulate Impacts Summary - Maximum Predicted Incremental Impacts – Stage 2

Substance	Scenario Description	Receptor of Maximum Incremental Impact	Maximum Incremental Impact	Criteria	Max Impact/Criteria (%)	Averaging Time
PM_{10}	All emission sources.	R2	17.69 μg/m³	50 μg/m³	35.38	24 Hours
	All emission sources.	R3	0.58 μg/m³	30 μg/m³	1.9	Annual
TSP	All emission sources.	R3	1.23 μg/m³	90 μg/m³	1.4	Annual
Deposited Dust	All emission sources.	R3	0.27 g/m²/month	2 g/m²/month	13.5	Annual

5.1.9.3 Discussion of Predicted Impacts

The results for the predicted particulate impacts at the nearest receptors were obtained from modelling based on a site-specific meteorological dataset, site-representative maximum background concentration values, and site activity conditions. The incremental and cumulative impacts for PM_{10}, TSP, and deposited dust were all below the respective criterion at these receptors. No exceedances were recorded.

In the absence of full TSP background data, the calculated maximum impact/criteria percentage in Table 5-16 suggests that a maximum elevated background concentration of 99% of the criteria limit would still not cause any cases of exceedances. This concludes that the predicted TSP impacts would readily satisfy the TSP criteria.

From these results, it is concluded that the proposed site emissions from both construction and operations sufficiently satisfy the criteria limits for these particulates.

5.1.9.4 Recommendations

Air dispersion modelling results show that no exceedances have been detected under all assessable pollutants for the construction phase of the development. However, the operational phase of the development shows exceedances can potentially be observed under PM_{10} 24-hour averaging period during operational phase of the development (especially when referring to the contours as shown in Figure 5-23). Hence, it was recommended that additional particulate controls are required to mitigate this impact. No other assessable pollutants were detected to exceed the NSW EPA AMMAAP criteria.

Predicted impacts were analysed on a source-to-source basis and outcomes from this analysis has determined that emissions are predominantly caused by the transfer of crushed cullet exiting the process to the external bunkers with the use of front-end loaders.

These activities have been assumed conservatively to occur between the hours of 4pm – 6pm daily, as the internal bunkers can take approximately 7 – 10 hours to fill using mass-volume calculations on the capacity of the machine and the proposed annual capacity.

To reduce these emissions, water foggers have been proposed to be used at the doorway that has been modelled as Source S1 and the use of water sprays at the Loading Areas.

The total PM_{10} predicted impacts from the site with the additional use of water foggers and sprays for the two identified areas have been presented in Figure 5-27. This figure illustrates the significant reduction in PM_{10}, resulting in PM_{10} 24-hour emissions sufficiently satisfying the NSW EPA-based assessment criteria.

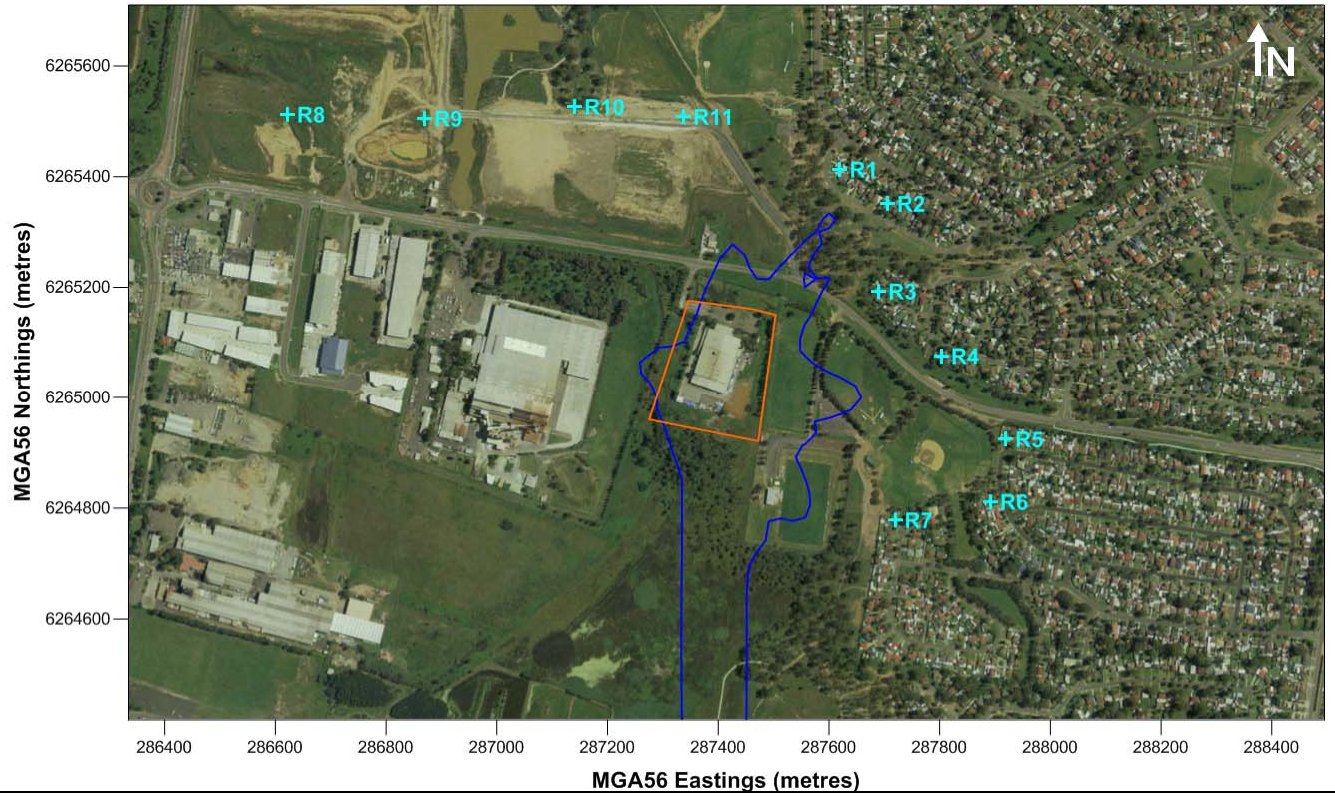
A 50% reduction in PM_{10} emissions is expected to be achieved from the use of water foggers. This is based on the reported estimated control factors for having moisture or watersprays provided in the National Pollutant Inventory's Emissions Estimation Technique Manual for Mining (January 2012). The results provided in the Air Assessment have incorporated the use of this particular control factor in estimating the emission rates of PM_{10} where water foggers are used.

Construction phase should be limited to the conservative assumptions used in the modelling of emissions, as listed in Section 5.1.7.1. If these assumptions were to be exceeded such that emissions generated would be greater than those listed in Table 5-8, control measures such as water sprays may be required.

Staff and management on site would ensure there is continued use of the proposed air emission controls, especially in the event of any noticeable increase in dust emissions. As this air impact assessment accounts for these control measures being in place, the controls would need to be sustained throughout the lifespan of the facility.

It is also recommended that a complaints register be kept on site, in any case that complaints are received regarding dust deposition impacts. Although the assessment has identified that dust deposition impacts would not be an issue, the complaints register would be a critical tool that can be used by management as evidence for compliance, especially in the absence of these complaints.

Figure 5-27: Predicted PM_{10} Impacts from Site with Additional Water Spray – (24-Hour Averaging Time with Background Concentration – Proposed Operations)



Averaging Time:	24 hour
Percentile:	100
Criteria:	50 μg/m^3
Concentration contours shown:	50 μg/m^3 (blue)

5.1.10 Statement of Potential Air Impact

The NSW EPA "*Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales*" was followed in the preparation of this air assessment. The impact criteria for the pollutants considered were used to determine whether the potential impacts from the site were within reasonable limits or were to exceed the guidelines.

The impacts on residential areas within the vicinity of the subject site were determined. The emissions from the operation of the proposed site were assessed using AUSPLUME, and no exceedances to the NSW EPA criteria attributable to the site were predicted for the proposed development. Compliance was predicted to be achieved based on the assumption that the proposed site configuration and controls are to be established, and provided that this is sustained, compliance to the NSW EPA guidelines air impact criteria would be achieved by the development.

5.2 NOISE

5.2.1 Background Information

The proposed development involves the conversion of the existing building on site into a glass beneficiation plant.

Colour separated and crushed cullet would be stored external to the building in a set of aboveground bunkers. Cullet is crushed glass that is ready to be re-melted. The glass for recycling would be received by truck and stored inside the building.

There is a contractual arrangement between Glass Recovery Service and Owens Illinois for the supply of colour separated cullet. Owens Illinois would use this cullet partly in place of raw materials. The Owens Illinois site is located adjacent to the proposed site. The cullet would be transported to the adjoining glass bottling plant using trucks travelling the short distance along Andrews Road between the two sites.

The proposed glass beneficiation plant is able to colour separate and process glass bottles to a significantly higher quality than other glass bottle recycling plants in NSW.

The proponent operates a similar plant in Melbourne.

5.2.2 Site Locality

Figure 5-28: Penrith Local Environment Plan 2010



Note: - Sourced from Land Zoning Map – Sheet LZN_012
- IN1 indicates the area is classified as General Industrial
- IN2 indicates the area is classified as Light Industrial
- SP2 indicates the area is classified as Infrastructure
- Grey shaded areas are un-classified

Figure 5-29: Site Location & Considered Receiver Locations



Note: * indicates location of environmental noise logger utilised for measuring existing traffic noise levels along Northern Road.

Figure 5-30: Northern Road Receiver Locations and Road Traffic Noise Source Locations



Note: * indicates location of environmental noise logger utilised for measuring existing traffic noise levels along Northern Road.

Figure 5-31: Mulgoa Road Receiver Locations and Road Traffic Noise Source Locations



Note: * indicates location of environmental noise logger utilised for measuring existing traffic noise levels along Mulgoa Road.

5.2.3 Existing Acoustic Environment

The level of background noise would vary over the course of any 24 hour period, typically from a minimum at 3.00am in the morning to a maximum during morning and afternoon traffic peak hours. Therefore the NSW Environment Protection Authority (EPA) *Industrial Noise Policy (*INP, Environment Protection Authority 2000) requires that the level of background and ambient noise be assessed separately for the daytime, evening and night time periods. The INP defines these periods as follows:

- Day is defined as 7.00am to 6.00pm, Monday to Saturday and 8.00am to 6.00pm Sundays and Public Holidays;
- Evenings is defined as 6.00pm to 10.00pm, Monday to Sunday and Public Holidays; and
- Night is defined as 10.00pm to 7.00am, Monday to Saturday and 10.00pm to 8.00am Sundays and Public Holidays.

For the purposes of this assessment, ambient and background noise measurements were undertaken at the potentially most affected residential areas as following:

- Location R1 – 31 Ariel Crescent, Cranebrook;
- Location R2 – 19 Ariel Crescent, Cranebrook (Unattended long-term noise monitoring);
- Location R3 – 6 Koala Glen, Cranebrook;
- Location R4 – 42 Scenic Circuit, Cranebrook;
- Location R5 – 93 Allard Street, Penrith;
- Location R6 – 58 Ceres Street, Penrith; and
- Location R7 – 5 Echo Place, Penrith (Unattended long-term noise monitoring)

Unattended long-term noise monitoring was conducted over nine days, from Tuesday 6th March to Wednesday 14th March 2012 at monitoring Locations R2 and R7. Locations R2 and R7 were selected for long-term unattended noise monitoring as they were considered to represent the potential 'most affected locations' due to their close proximity to the subject site, their elevations relative to the subject site and the ability of the two noise loggers to measure the existing industrial noise from the adjacent industrial site (Owens Illinois).

The monitoring locations are shown in Figure 5-29 above.

Additionally, unattended noise monitoring was undertaken in accordance to the NSW Environment Protection Authority (EPA) *Road Noise Policy (*RNP, Environment Protection Authority 2000) at the following locations:

- Location R7 Northern – 221 Richmond Rd, Penrith (Unattended long-term noise monitoring); and
- Location R4 Mulgoa – 3 Huron Pl, Cranebrook (Unattended long-term noise monitoring)

The monitoring locations are shown in Figure 5-30 and Figure 5-31 above.

5.2.3.1 Long-Term Unattended Noise Monitoring Results

The results of the long-term noise monitoring are summarised in Table 5-17 and Table 5-18 for residential background noise monitoring while Table 5-19 and Table 5-20 summarise the existing traffic noise monitoring results.

Figure 5-32: Logger Location – R2: 19 Ariel Cr, Cranebrook



Table 5-17: Measured Noise Levels – R2: 19 Ariel Cr, Cranebrook (dB(A))

Date	Average L_{A1}			Average L_{A10}			ABL (L_{A90})			L_{Aeq}		
	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night
6/03/2012	55	51	49	49	47	47	42	43	44	49	46	46
7/03/2012	-	-	-	-	-	-	-	-	-	-	-	-
8/03/2012	-	53	-	-	50	-	-	45	-	-	50	-
9/03/2012	57	53	49	51	49	47	44	42	41	50	50	46
10/03/2012	61	50	48	53	46	45	41	41	41	58	45	45
11/03/2012	55	51	47	49	45	44	38	39	40	48	45	44
12/03/2012	55	49	48	48	45	45	40	41	40	47	45	45
13/03/2012	54	50	49	48	46	46	40	41	42	47	47	46
14/03/2012	58	-	50	50	-	46	41	-	42	53	-	49
Average	56	51	49	50	47	46	/	/	/	/	/	/
Median (RBL)	/	/	/	/	/	/	41	41	41	/	/	/
Logarithmic Average	/	/	/	/	/	/	/	/	/	52	47	46

Figure 5-33: Logger Location – R7: 5 Echo Pl, Penrith

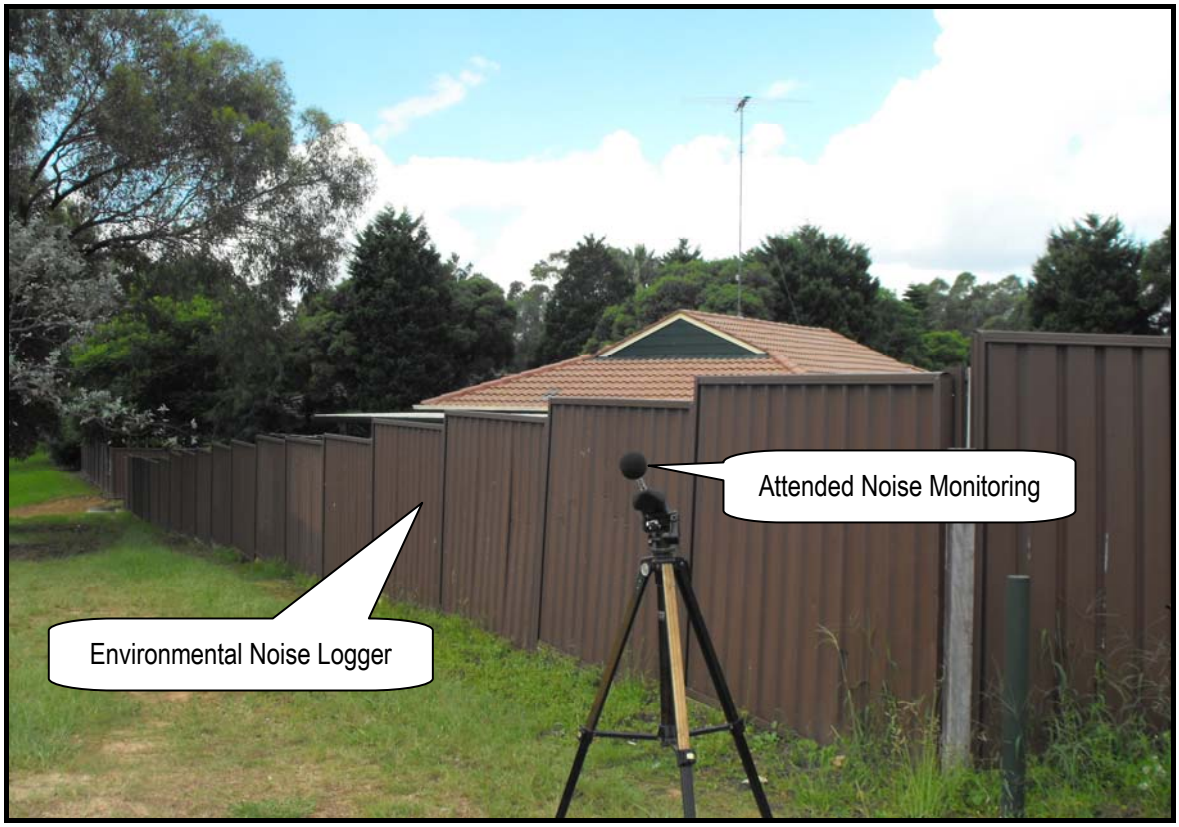


Table 5-18: Measured Noise Levels – R7: 5 Echo Pl, Penrith (dB(A))

Date	Average L_{A1}			Average L_{A10}			ABL (L_{A90})			L_{Aeq}		
	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night
6/03/2012	59	53	50	52	48	45	43	42	38	53	47	45
7/03/2012	-	-	-	-	-	-	-	-	-	-	-	-
8/03/2012	-	57	-	-	52	-	-	44	-	-	53	-
9/03/2012	58	56	53	52	53	49	42	45	40	53	53	49
10/03/2012	58	51	53	52	48	49	41	39	41	52	47	49
11/03/2012	58	54	52	52	48	49	39	42	40	53	48	48
12/03/2012	57	57	53	51	51	49	40	41	39	51	51	49
13/03/2012	58	56	53	53	49	50	42	42	43	54	49	49
14/03/2012	59	-	54	51	-	50	41	-	45	54	-	50
Average	58	55	53	52	50	49	/	/	/	/	/	/
Median (RBL)	/	/	/	/	/	/	41	42	40	/	/	/
Logarithmic Average	/	/	/	/	/	/	/	/	/	53	50	49

Figure 5-34: Logger Location – R7 Northern: 221 Richmond Rd, Penrith

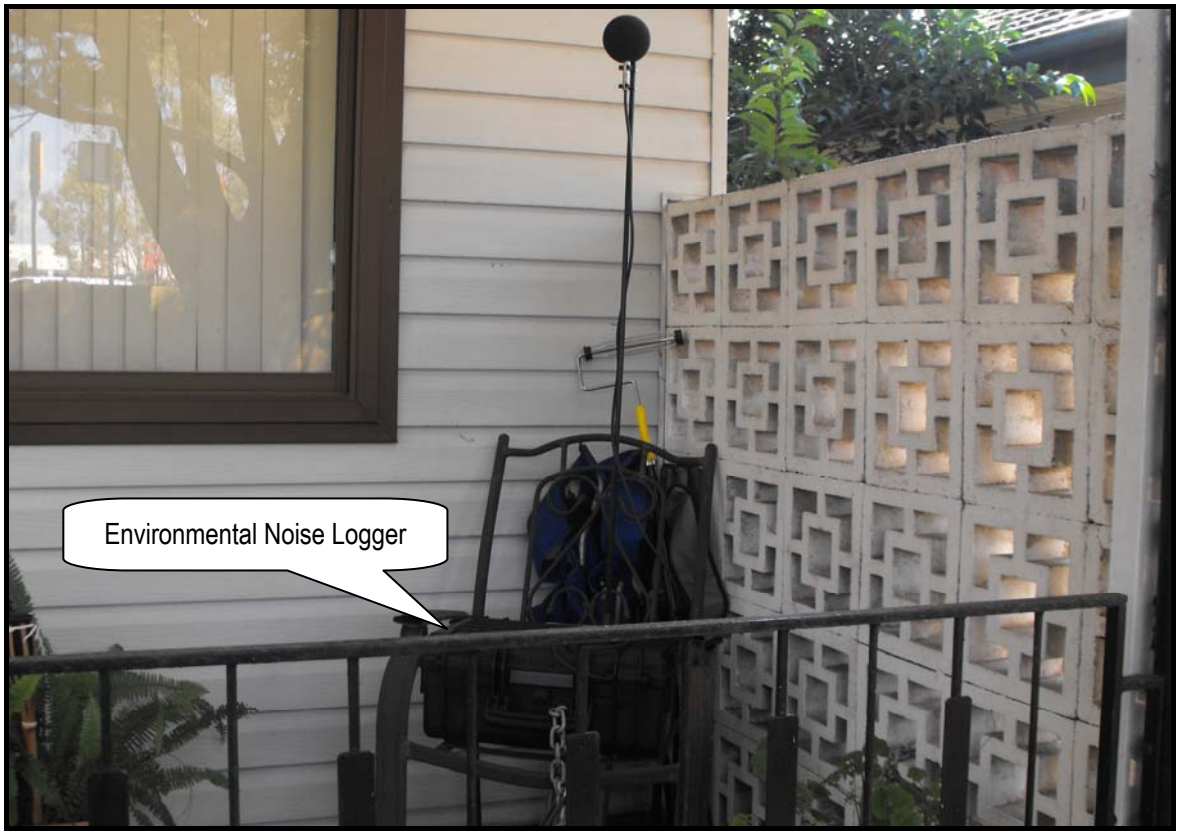


Table 5-19: Measured Noise Levels – R7 Northern : 221 Richmond Rd, Penrith (dB(A))

Date	$L_{Aeq(15\ hour)}$	$L_{Aeq(9\ hour)}$	$L_{Aeq(1\ hour)}$ Exceeded For 10% Of The Time	
	7am – 10pm	10pm – 7am	7am - 10pm	10pm - 7am
6/03/2012	65	59	66	62
7/03/2012	65	60	67	66
8/03/2012	66	63	69	63
9/03/2012	65	60	66	62
10/03/2012	65	59	66	62
11/03/2012	65	59	67	62
12/03/2012	65	59	66	62
13/03/2012	66	59	67	62
14/03/2012	65	59	66	-
Median	/	/	66	62
Logarithmic Average	65	60	/	/

Figure 5-35: Logger Location – R4 Mulgoa : 3 Huron Pl, Cranebrook



Table 5-20: Measured Noise Levels – R4 Mulgoa : 3 Huron Pl, Cranebrook (dB(A))

Date	$L_{Aeq(15\ hour)}$	$L_{Aeq(9\ hour)}$	$L_{Aeq(1\ hour)}$ Exceeded For 10% Of The Time	
	7am – 10pm	10pm – 7am	7am - 10pm	10pm - 7am
6/03/2012	65	60	67	66
7/03/2012	66	63	67	68
8/03/2012	66	66	69	65
9/03/2012	66	63	67	66
10/03/2012	66	62	69	61
11/03/2012	63	58	64	65
12/03/2012	65	62	66	67
13/03/2012	65	63	66	67
14/03/2012	66	64	67	-
Median	/	/	67	66
Logarithmic Average	65	63	/	/

Table 5-21 below summarises the existing L_{Aeq} ambient noise levels and L_{A90} rating background noise levels for each day, evening and night period, in accordance with the NSW INP. An overall representative L_{Aeq} noise level is determined by logarithmic averaging of each assessment period for the entire monitoring period, where L_{A90} is determined by median averaging of each assessment period for the entire monitoring period.

Table 5-21: Measured L_{A90} and L_{Aeq} Noise Levels – Unattended Noise Monitoring
(values expressed as dB(A))

Monitoring Locations	L_{A90} Background noise levels			L_{Aeq} Ambient noise levels		
	Day 7:00 – 18:00	Evening 18:00 – 22:00	Night 22:00 – 7:00	Day 7:00 – 18:00	Evening 18:00 – 22:00	Night 22:00 – 7:00
R2: 19 Ariel Cr	41	41	41	52	47	46
R7: 5 Echo Pl	41	42	40	53	50	49

All measured noise data considered in the assessment of the background noise level altered by adverse weather conditions has been discarded according to the requirements given by the NSW INP. The weather data has been collected from the Bureau of Meteorology, the data was sourced from the Automatic Weather Station (AWS) located in Penrith Lakes.

Table 5-22 below summarises the existing $L_{Aeq(15\ hour)}$, $L_{Aeq(9\ hour)}$ and $L_{Aeq(1\ hour)}$ road traffic noise levels for each day and night period, in accordance with the NSW RNP. An overall representative $L_{Aeq(15\ hour)}$ and $L_{Aeq(9\ hour)}$ noise level is determined by logarithmic averaging of each assessment period for the entire monitoring period, where the $L_{Aeq(1\ hour)}$ is determined by the tenth percentile of each assessment period for the entire monitoring period.

Table 5-22: Measured L_{A90} and L_{Aeq} Noise Levels – Unattended Noise Monitoring
(values expressed as dB(A))

Monitoring Locations	$L_{Aeq(15\ hour)}$	$L_{Aeq(9\ hour)}$	$L_{Aeq(1\ hour)}$	
	Day 7:00 – 22:00	Night 22:00 – 7:00	Day 7:00 – 22:00	Night 22:00 – 7:00
221 Richmond Rd	65	60	66	62
3 Huron Pl	65	63	67	66

5.2.3.2 Short Term Operator Attended Noise Monitoring Results

Short term operator attended noise measurements were undertaken over the course of several days including the 6th of March, the 14th of March, the 27th of March and the 28th of March 2012. Operator observations highlighted that at all residential locations, the primary contributions to existing noise levels in the area are attributable to industrial noise and road traffic noise. The results of the short term operator attended noise measurements are detailed in Table 5-23, Table 5-24 and Table 5-25 below.

Table 5-23: Measured Background Noise Levels, Attended Noise Monitoring – Day Time Period, dB(A)

Measurement Location	Noise Descriptor		Observed Meteorological Conditions	Comments and Observations dB(A)
R1 31 Ariel Crescent 2:17 pm – 2:32pm 14/03/12	L_{A1}	64.7	No wind; No rain; Partially Cloudy.	• Owens Illinois not audible • Cars on Andrews Rd ≤ 54, 57, 58, 56, 63 • Trucks on Andrews Rd ≤ 68, 56 • Hand drill ≤ 45 • Insects ≤ 42 • Birds singing ≤ 51 • Dogs barking ≤ 64, 65, 69, 71 • Lawn mower audible • Reverse beeper audible (road works)
	L_{A10}	55.6		
	L_{Aeq}	53.0		
	L_{A90}	42.7		
R2 19 Ariel Crescent 1:08pm – 1:23pm 6/03/12	L_{A1}	58.0	Slight breeze; No rain; Cloudy.	• Owens Illinois ≤ 43 • Trucks on Andrews Rd ≤ 53 • Excavator ≤ 48 – 63 • Excavator reverse alarm ≤ 51 • Metallic bang ≤ 53 • Tractor and reverse alarm ≤ 60 • Birds singing ≤ 63, 64
	L_{A10}	51.9		
	L_{Aeq}	50.2		
	L_{A90}	46.0		
R3 6 Koala Glen 2:47pm – 3:02pm 14/03/12	L_{A1}	69.1	No wind; No rain; Partially Cloudy.	• Owens Illinois barely audible • Cars on Andrews Rd ≤ 53, 57, 60, 57, 54 • Trucks on Andrews Rd ≤ 63, 61, 64, 61, 62, 70, 70 • Excavator ≤ 70, 73, 72, 68, 75 • Tractor ≤ 67 • Motor bike ≤ 56 • Birds singing ≤ 55, 56, 57
	L_{A10}	62.3		
	L_{Aeq}	59.4		
	L_{A90}	50.8		
R4 42 Scenic Circuit 3:18pm – 3:33pm 14/03/12	L_{A1}	71.8	No wind; No rain; Partially Cloudy	• Owens Illinois not audible • Car on Andrews Rd ≤ 64, 65, 62, 63, 65, 69 • Trucks on Andrews Rd ≤ 72, 72, 73, 82, 75, 68, 70, 68, 65, 73, • Bus on Andrews Rd ≤ 67 • Excavator ≤ 54 • Dog bark ≤ 57, 59
	L_{A10}	65.8		
	L_{Aeq}	62.6		
	L_{A90}	51.5		

Table 5-23: Measured Background Noise Levels, Attended Noise Monitoring – Day Time Period, dB(A)

Measurement Location	Noise Descriptor		Observed Meteorological Conditions	Comments and Observations dB(A)
R5 93 Allard 4:32pm – 4:47pm 14/03/12	L_{A1}	64.5	No wind; No rain; Cloudy	• Owens Illinois not audible • Cars on Andrews Rd ≤ 54, 55, 57, 59, 58 • Trucks on Andrews Rd ≤ 60, 67, 61, 66, 61, 58, 66, 62, 66, 67, 61 • Motor bike ≤ 62, 63 • Ride on mower ≤ 47 • Motorise toy car ≤ 58
	L_{A10}	58.6		
	L_{Aeq}	55.8		
	L_{A90}	49.6		
R6 58 Ceres St 4:52pm – 5:07pm 14/3/12	L_{A1}	62.5	No wind; No rain; Cloudy.	• Owens Illinois not audible • Cars on Andrews ≤ 60, 55 • Trucks on Andrews ≤ 61, 59, 61, 64 • Bang at nearby residence ≤ 61 • Reverse alarm audible
	L_{A10}	58.9		
	L_{Aeq}	55.9		
	L_{A90}	51.4		
R7 5 Echo Place 2:03pm – 2:18pm 6/03/12	L_{A1}	58.9	No wind; No rain; Cloudy.	• Owens Illinois ≤ 40 • Vehicles on Andrews Rd primary noise source • Trucks on Andrews Rd ≤ 54, 60, 61, 63 • Insects ≤ 45 – 50 • Dogs barking ≤ 45 • Doors of residence closing ≤ 51, 54 • Distant car horn ≤ 48
	L_{A10}	51.7		
	L_{Aeq}	49.5		
	L_{A90}	44.3		

Table 5-24: Measured Background Noise Levels, Attended Noise Monitoring – Evening Time Period, dB(A)				
Measurement Location	Noise Descriptor		Observed Meteorological Conditions	Comments and Observations
R1 31 Ariel Crescent 6:05 pm – 6:20pm 27/03/12	L_{A1}	64.2	No wind; No rain; Cloudy.	• Cars on Andrews Rd ≤ 45, 42, 43, 46 • Owens Illinois ≤ 40 (constant hum), audible • Truck on Andrews Rd ≤ 45, 49, 53 (semi-trailer) • Cars on other roads ≤ 52 • Owens Illinois Reverse Beeper ≤ 41
	L_{A10}	58.3		
	L_{Aeq}	55.5		
	L_{A90}	43.2		
R2 19 Ariel Crescent 6:25pm – 6:40pm 27/03/12	L_{A1}	58.0	No wind; No rain; Cloudy.	• Owens Illinois ≤ 40 (constant hum), audible • Cars on Andrews Rd ≤ 44, 47, 47, 46 • Trucks on Andrews Rd ≤ 46, 48
	L_{A10}	55.7		
	L_{Aeq}	54.1		
	L_{A90}	42.1		
R3 6 Koala Glen 7:03pm – 7:18pm 27/03/12	L_{A1}	76.3	No wind; No rain; Cloudy.	• Owens Illinois ≤ 42 (constant hum), audible • Car on Andrews Rd ≤ 58, 56, 57, 59 • Truck on Andrews Rd ≤ 69, 65, 68 • Insects ≤ 50 – 52
	L_{A10}	70.0		
	L_{Aeq}	68.0		
	L_{A90}	51.5		
R4 42 Scenic Circuit 7:27pm – 7:42pm 27/03/12	L_{A1}	82.2	No wind; No rain; Cloudy.	• Owens Illinois ≤ 40 (constant hum), audible • Car on Andrews Rd ≤ 66, 67, 65, 68, 59 • Trucks on Andrews Rd ≤ 72, 78, 80 • Insects ≤ 45 – 48 • Dog bark ≤ 60
	L_{A10}	69.9		
	L_{Aeq}	67.6		
	L_{A90}	46.7		
R5 93 Allard 8:01pm – 8:16pm 27/03/12	L_{A1}	77.2	No wind; No rain; Cloudy.	• Owens Illinois ≤ 41 (constant hum), audible • Cars on Andrews Rd ≤ 60, 54, 57, 60, 58 • Trucks on Andrews Rd ≤ 66, 64, 65, 67 • Insects ≤ 46 – 48
	L_{A10}	64.2		
	L_{Aeq}	61.8		
	L_{A90}	47.2		

Table 5-24: Measured Background Noise Levels, Attended Noise Monitoring – Evening Time Period, dB(A)

Measurement Location	Noise Descriptor		Observed Meteorological Conditions	Comments and Observations
R6 58 Ceres St 8:21pm – 8:36pm 27/03/12	L_{A1}	73.8	No wind; No rain; Cloudy.	• Owens Illinois ≤ 41 (constant hum), audible • Cars on Andrews ≤ 53, 52, 49, 50, 54 • Trucks on Andrews ≤ 59, 60, 58, 62 • Insects ≤ 45 – 48 • Glass bottles ≤ 46
	L_{A10}	61.2		
	L_{Aeq}	58.2		
	L_{A90}	46.0		
R7 5 Echo Place 8:48pm – 9:03pm 27/03/12	L_{A1}	65.5	No wind; No rain; Cloudy.	• Owens Illinois ≤ 42 (constant hum), audible • Cars on Andrews Rd ≤ 47, 46, 45, 46, 45 • Trucks on Andrews ≤ 56, 55, 58 • Bang on Owens Illinois site ≤ 45
	L_{A10}	55.7		
	L_{Aeq}	53.7		
	L_{A90}	43.8		

Table 5-25: Measured Background Noise Levels, Attended Noise Monitoring – Night Time Period, dB(A)

Measurement Location	Noise Descriptor		Observed Meteorological Conditions	Comments and Observations
R1 31 Ariel Crescent 10:03 pm – 10:18pm 27/03/12	L_{A1}	51.5	No wind; No rain; Cloudy.	• Cars on Andrews Rd ≤ 43, 44, 45 • Owens Illinois ≤ 40 (constant hum), clearly audible • Truck on Andrews Rd ≤ 47, 53 (semi-trailer) • Insects ≤ 42 • Cars on other roads ≤ 51, 50 • Bird ≤ 45 • Cars on both roads ≤ 48 • Owens Illinois Reverse Beeper ≤ 42 • Over head aeroplane ≤ 50-52
	L_{A10}	47.0		
	L_{Aeq}	44.9		
	L_{A90}	42.2		
R2 19 Ariel Crescent 10:25pm – 10:40pm 27/03/12	L_{A1}	46.8	No wind; No rain; Cloudy.	• Owens Illinois ≤ 40 (constant hum), clearly audible • Cars on Andrews Rd ≤ 45, 46, 44, 47 • Trucks on Andrews Rd ≤ 48 • Insects ≤ 42 – 44 • Bang from OI site ≤ 46
	L_{A10}	45.0		
	L_{Aeq}	43.8		
	L_{A90}	42.3		
R3 6 Koala Glen 11:12pm – 11:27pm 27/03/12	L_{A1}	60.7	No wind; No rain; Cloudy.	• Owens Illinois ≤ 42 • Car on Andrews Rd ≤ 56, 58, 57, 58) • Truck on Andrews Rd ≤ 66 • Insects ≤ 50 – 52 • Truck Braking at OI ≤ 56
	L_{A10}	55.9		
	L_{Aeq}	54.4		
	L_{A90}	51.7		
R4 42 Scenic Circuit 10:47pm – 11:02pm 27/03/12	L_{A1}	65.2	No wind; No rain; Cloudy.	• Owens Illinois ≤ 40 • Car on Andrews Rd ≤ 65, 67, 64, 65 • Trucks on Andrews Rd ≤ 74 • Insects ≤ 42 – 44 • Dog bark ≤ 57
	L_{A10}	55.8		
	L_{Aeq}	54.1		
	L_{A90}	42.0		

Table 5-25: Measured Background Noise Levels, Attended Noise Monitoring – Night Time Period, dB(A)				
Measurement Location	Noise Descriptor		Observed Meteorological Conditions	Comments and Observations
R5 93 Allard 11:38pm – 11:53pm 27/03/12	L_{A1}	61.4	No wind; No rain; Cloudy.	• Owens Illinois ≤ 41 (constant hum) • Cars on Andrews Rd ≤ 55, 58, 59, 55, 54 • Trucks on Andrews Rd ≤ 66, 62, 66, 66 • Insects ≤ 45 – 47 • Dogs Barking ≤ 47 • Unidentified banging ≤ 47 • Accelerating car in distance ≤ 45
	L_{A10}	51.5		
	L_{Aeq}	49.7		
	L_{A90}	42.4		
R6 58 Ceres St 11:57pm – 00:12am 27/03/12	L_{A1}	58.8	No wind; No rain; Cloudy.	• Owens Illinois ≤ 40 • Cars on Andrews ≤ 48, 49, 52, 53 • Trucks on Andrews ≤ 60, 62 • Insects ≤ 40 – 42 • Glass bottles ≤ 45 • Reverse Beeper ≤ 43 – 46
	L_{A10}	49.2		
	L_{Aeq}	46.9		
	L_{A90}	39.9		
R7 5 Echo Place 00:22am – 00:37am 28/03/12	L_{A1}	52.5	No wind; No rain; Cloudy.	• Owens Illinois ≤ 42 (constant hum) • Cars on Andrews Rd ≤ 48, 45, 45 • Trucks on Andrews ≤ 56, 54 • Insects ≤ 40 – 44 • Bang on Owens Illinois site ≤ 45, 45 • Dog barking in distance ≤ 45 – 47
	L_{A10}	45.0		
	L_{Aeq}	43.5		
	L_{A90}	40.7		

5.2.4 Current Legislation and Guidelines

5.2.4.1 NSW Interim Construction Noise Guideline

5.2.4.1.1 Airborne Noise

Residential Criteria

Table 5-26 sets out management levels for noise at residences and how they are to be applied. Restrictions to the hours of construction may apply to activities that generate noise at residences above the 'highly noise affected' noise management level.

Table 5-26: Management Levels for at Residences Using Quantitative Assessment		
Time of Day	Management Level $L_{Aeq(15\ minute)*}$	How to Apply
Recommended Standard Hours: Monday to Friday 7am – 6pm Saturday 8am – 1pm No work on Sundays or Public Holidays	Noise Affected RBL + 10 dB	The noise affected level represents the point above which there may be some community reaction to noise. • Where the predicted or measured $L_{Aeq(15\ minute)}$ is greater than the noise affected level, the proponent should apply all feasible and reasonable work practises to meet the noise affected level. • The proponent should also inform all potentially affected residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.
	Highly Noise Affected 75 dB(A)	The highly noise affected level represents the point above which there may be strong community reaction to noise. • Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: 1. times identified by the community when they are less sensitive to noise (such as before and after school, or mid-morning or mid-afternoon for works near residents 2. if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times

Other Sensitive Land Uses

Other sensitive land uses, such as schools typically consider noise from construction to be disruptive when the properties are being used. Table 5-27 presents management levels for noise at other sensitive land uses based on the principal that the characteristic activities for each of these land uses should not be unduly disturbed.

Table 5-27: Noise at Sensitive Land Uses (other than residences) using qualitative assessment	
Land Use	Management Level $L_{Aeq(15\ minute)}$
Classrooms at school and other educational institutions	Internal noise level 45 dB(A)
Hospital wards and operating theatres	Internal noise level 45 dB(A)
Places of worship	Internal noise level 45 dB(A)
Active recreational areas	External noise level 65 dB(A)
Passive recreational areas	External noise level 60 dB(A)
Community centres	Depends on the intended use of the centre. Refer to the recommended 'maximum' internal levels in AS 2107 for specific uses.

Commercial and Industrial Premises

Due to the broad range of sensitivities that commercial or industrial land can have to noise from construction, the process of defining management levels is separated into three categories. Table 5-28 presents the management levels for noise at commercial or industrial land uses.

Table 5-28: Commercial and Industrial Premises using qualitative assessment	
Industrial Category	Management Level $L_{Aeq(15\ minute)}$
Industrial Premises	External noise level 75 dB(A)
Offices, Retail Outlets	External noise level 70 dB(A)
Other businesses that may be sensitive to noise	Project Specific Refer to AS 2107 to assist in determining relevant noise levels

5.2.4.1.2 Ground Borne Noise

Often ground-borne noise can be more noticeable than airborne noise. It is generated from works such as tunnelling or piling which occur under ground and causes vibrations to be transmitted through the ground and into a structure. As a result ground-borne noise levels for residential locations have been established and provide an indication for management of the site when action should be taken to reduce the ground-borne noise caused by the construction of the site. Ground-borne noise levels are for evening and night-time periods only and are to be assessed inside the most affected habitable room of the residence.

Table 5-29: Ground-Borne Noise Levels*

Time Period	Ground-Borne Noise Levels dB(A)
Evening	40
Night-time	35

Note: * Only applicable when ground-borne noise levels are higher than airborne noise levels

5.2.4.2 NSW Industrial Noise Policy

The NSW Industrial Noise Policy was developed by the NSW EPA primarily for the assessment of noise emissions from industrial sites regulated by the NSW EPA. However, the policy can also be used by Planning NSW and local government to assist in their assessment of potential noise issues.

An important point to note in the policy is presented in Section 1.4.1. This section states:

> *"The industrial noise source criteria set down in Section 2 are best regarded as planning tools. They are not mandatory, and an application for a noise-producing development is not determined purely on the basis of compliance or otherwise with the noise criteria. Numerous other factors need to be taken into account in the determination. These factors include economic consequences, other environmental effects and the social worth of the development."*

The policy sets out two criteria that are used to assess potential site related noise impacts. The first criterion aims at controlling intrusive noise impacts in the short-term for residences. This criterion is therefore called the intrusive criterion.

The second criterion aims at maintaining a suitable amenity for particular land uses including residences in the long-term. This criterion is called the amenity criterion.

In addition to the two criteria detailed above the policy also recognises that some situations call for different assessment periods. In particular, where early morning (5am to 7am) operations are proposed, it may be unduly stringent to assess such operations against the night time critera especially if existing background noise levels are steadily rising in these early morning hours. As a result the policy deems it appropriate to assign a 'shoulder period' rating background level upon which the more appropriate noise criterion is to be based. The 'shoulder period' rating background level is described as the mid-point value between the rating background levels of the two assessment periods that are on either side of the 'shoulder period'.

5.2.4.2.1 Intrusive Criterion

The intrusive criterion can be summarised as:

$L_{Aeq,(15minute)} \leq$ rating background level + 5 dB(A)

Where the $L_{Aeq,(15minute)}$ is the predicted or measured L_{Aeq} from the site over a fifteen minute interval at the receiver. The rating background level is the existing background noise level at the receiver and has been determined for this project.

5.2.4.2.2 Amenity Criterion

To limit continuing increases in noise levels, the maximum ambient noise level within an area from industrial noise sources should not normally exceed the acceptable noise levels specified in Table 2.1 of the NSW INP, the applicable parts of which are reproduced in Table 5-30.

Table 5-30: NSW EPA Amenity Criteria
Recommended L_{Aeq} Noise Levels from Industrial Noise Sources

Type of Receiver	Indicative noise amenity area	Time of Day	Recommended L_{Aeq} noise level (dB(A))	
			Acceptable	Recommended Maximum
Residence	Suburban	Day	55	60
		Evening	45	50
		Night	40	45
Industrial Premises	All	When in use	70	75
Active Recreation Area	All	When in use	55	60

The existing industrial noise levels are compared to the acceptable level and Table 5-31 below is used to derive the amenity criteria.

Table 5-31: Modification to Acceptable Noise Level (ANL1) to Account for Exist. Level of Stationary Noise (values expressed as dB(A))

Total existing L_{Aeq} noise level from industrial sources	Maximum L_{Aeq} noise level for noise from new sources alone
≥ ANL + 2	If existing noise level is likely to decrease in future: ANL – 10 If existing noise level is unlikely to decrease in the future: Existing level – 10
ANL + 1	ANL – 9
ANL	ANL – 8
ANL – 1	ANL – 6
ANL – 2	ANL – 4
ANL – 3	ANL – 3
ANL – 4	ANL – 2
ANL – 5	ANL – 2
ANL – 6	ANL –1
< ANL - 6	ANL

Further to the above, where the character of the noise in question is assessed as particularly annoying (i.e. if it has an inherently tonal, low frequency, impulsive or intermittent character), then an adjustment of 5 dB(A) for each annoyance aspect, up to a total of 10 dB(A), is to be added to the measured value to penalise the noise for its potential increase in annoyance.

Table 4.1 of Chapter 4 of the NSW INP provides definitive procedures for determining whether a penalty or adjustment should be applied for increased annoyance. Specifically for tonal noise, a one-third octave (or narrow band analysis) is required and a 5 dB(A) penalty is applied to the measured or predicted level when the level of one-third octave band exceeds the level of the adjacent bands on both sides by:

- 5 dB(A) or more if the centre frequency of the band containing the tone is above 400 Hz;
- 8 dB(A) or more if the centre frequency of the bank containing the tone is 160 to 400 Hz inclusive; and
- 15 dB(A) or more if the centre frequency of the band containing the tone is below 160 Hz.

Noise emissions from the proposed operations are determined not to be tonal or impulsive in character once all the noise control recommendations are fully implemented, and therefore this penalty does not apply.

5.2.4.3 Sleep Disturbance Criteria

The occurrence of instantaneous maximum noise levels or maximum noise levels over a very short time period have potential to cause sleep disturbance to nearby residents. The World Health Organisation recommends individual noise events to be contained under 45dB(A) L_{Amax} indoors (fast response) in order to minimise sleep disturbance. Generally, the number of such events should be less than 10-15 events per night for a 'good night's sleep'.

Section 5.4 of the NSW Road Noise Policy details the effects of disruption of a person's normal sleep patterns due to road traffic noise, outlines research regarding the causes of sleep disturbance, and states conclusions regarding the noise levels from road traffic noise correlating to sleep disturbance.

From the research on sleep disturbance to date it can be concluded that:

- Maximum internal noise levels below 50-55 dB(A) are unlikely to awaken people from sleep; and
- One or two noise events per night, with maximum internal noise levels of 65-70 dB(A), are not likely to affect health and well being significantly.

An appropriate sleep disturbance guideline of 45 dB(A) L_{Amax} (internal) was considered for all residential premises surrounding the subject site with respect to onsite noise generating activities. This approach of setting an internal limit, as opposed to an external limit, has been applied to similar noise assessments that consider night time truck movements and has been accepted as a suitable management level.

It is more than likely that during the evening and night time periods throughout the cooler months of the year, the residences located in this area will have the windows and doors fully closed. A conservative 10 dB(A) reduction in sound pressure level resulting from the façade and ceiling of the house has been considered in order to derive an acceptable noise limit that is to be achieved outside the house. This is based on windows being partially open, equivalent to a summer period.

Therefore if the recommended internal noise level is to be below 45 dB(A) L_{Amax}, and the house envelope offers a 10 dB(A) reduction in sound pressure level with the windows partially open, the exterior sound pressure level should be no greater than 55 dB(A) L_{Amax}.

5.2.4.4 NSW EPA Road Noise Policy

The NSW Road Noise Policy (RNP) was developed by the NSW EPA primarily to identify the strategies that address the issue of road traffic noise from:

- Existing roads;
- New road projects;
- Road redevelopment projects; and
- New traffic-generating developments.

The RNP also defines criteria to be used in assessing the impacts of such noise.

5.2.4.4.1 Road Category

The NSW Road Noise Policy states the following:

> *"Roads are functionally classified by a range of factors, including their role in facilitating traffic movement; their relationship to other road categories; and whether they support through or local traffic, access to adjacent land uses and applicable traffic management options".*

Andrews Road, Castlereagh Road and The Northern Road are all classified as 'Sub Arterial Roads' defined in the *'NSW Road Traffic Noise Policy'*. The functional role of a 'Sub Arterial Road' is explained as follows:

- Provide connection between arterial roads and local roads;
- May provide a support role to arterial roads during peak periods;
- May have been designed as local streets but can serve major traffic generators or non-local traffic functions; and
- Previously designated as 'collector' roads in *Environmental criteria for road traffic noise* (Environment Protection Authority 1999).

5.2.4.4.2 Noise Assessment Criteria

Section 2.3 of the NSW RNP outlines the criteria for assessing road traffic noise. The relevant sections of Table 3 of the RNP are shown in Table 5-32 below.

Table 5-32: Road Traffic Noise Assessment Criteria For Residential Land Uses, dB(A)

Road Category	Type of Project/Land Use	Assessment Criteria, dB(A)	
		Day (7 am-10 pm)	Night (10 pm-7 am)
Sub Arterial Roads	3. Existing residences affected by additional traffic on existing freeways/arterial/sub-arterial roads generated by land use developments	$L_{Aeq\ (15\ hour)}$ 60 dB (external)	$L_{Aeq\ (9\ hour)}$ 55 dB (external)
Local Roads	4. Existing residences affected by additional traffic on existing local roads generated by land use developments	$L_{Aeq\ (1\ hour)}$ 55 dB (external)	$L_{Aeq\ (1\ hour)}$ 50 dB (external)

The noise level descriptor that has been adopted by the NSW RNP for use with the above criteria is the L_{Aeq} noise level.

- $L_{Aeq(15\ hour)}$ represents the L_{Aeq} noise level for the period 7am – 10pm;
- $L_{Aeq(9\ hour)}$ represents the L_{Aeq} noise level for the period 10pm – 7am; and
- $L_{Aeq(1\ hour)}$ is the L_{Aeq} noise level for a specific one hour period.

5.2.4.4.3 Relative Increase Criteria

In addition to the assessment criteria outlined above, any increase in the total traffic noise level at a location due to a proposed project or traffic-generating development must be considered. Residences experiencing increases in total traffic noise level above the relative criteria in Table 5-33 should also be considered for mitigation as described in Section 3.4 of the RNP.

Table 6 of the RNP outlines the relative increase criteria for residential land uses and is shown in Table 5-33 below.

Table 5-33: Relative Increase Criteria For Residential Land Uses, dB(A)

Road Category	Type of Project/Land Use	Total Traffic Noise Level Increase, dB(A)	
		Day (7 am-10 pm)	Night (10 pm-7 am)
Sub Arterial Roads	New road corridor/redevelopment of existing road/land use development with potential to generate additional traffic on existing road	Existing traffic $L_{Aeq\ (15\ hour)}$ + 12 dB (external)	Existing traffic $L_{Aeq\ (9\ hour)}$ + 12 dB (external)

In Table 5-33 above, the 'existing' traffic noise level refers to the level from all road categories which would occur for the relevant 'no build' option as described in Section 2.5.3 of the NSW RNP. Where existing $L_{Aeq\ (period)}$ road traffic noise levels are found to be less than 30 dB(A), it is deemed to be 30 dB(A). For example, in an area where the existing traffic $L_{Aeq\ (period)}$ is 25 dB(A), it is deemed to be 30 dB(A). The relative increase criteria of this area would be 30 dB(A) + 12 dB(A), i.e. 42 dB(A).

The assessment criteria provided in Table 5-32 and the relative increase criteria provided in Table 5-33 should both be considered when designing project specific noise limits, and the lower of the two criteria should be adopted. For example, if the assessment criteria is 60 dB(A) and the relative increase criteria is 42 dB(A), a project specific noise limit of 42 dB(A) should be adopted. Similarly, if the assessment criteria is 60 dB(A) and the relative increase criteria is 65 dB(A), a project specific noise limit of 60 dB(A) should be adopted.

5.2.4.4.4 Exceedance of Criteria

If the criteria shown in both Table 5-32 and Table 5-33 cannot be achieved, justification should be provided that all feasible and reasonable mitigation has been applied.

For existing residences and other sensitive land uses affected by additional traffic on existing roads generated by land use developments, any increase in the total traffic noise level should be limited to 2 dB above that of the corresponding 'no build option'.

5.2.4.4.5 Assessment Locations for Existing Land Uses

Table 5-34: Assessment Locations for Existing Land Uses

Assessment Type	Assessment Location
External noise levels at residences	The noise level should be assessed at 1 metre from the façade and at a height of 1.5 metres from the floor. Separate noise criteria should be set and assessment carried out for each façade of a residence, except in straightforward situations where the residential façade most affected by road traffic noise can be readily identified. The residential noise level criterion includes an allowance for noise reflected from the façade ('façade correction'). Therefore, when taking a measurement in the free field where reflection during measurement is unlikely (as, for instance, when measuring an open land before a residence is built), an appropriate correction – generally 2.5 dB – should be added to the measured value. The 'façade correction' should not be added to measurements taken 1 metre from the façade of an existing building. Free measurements should be taken at least 15 metres from any wall, building or other reflecting pavement surfaces on the opposite side of the roadway, and at least 3.5 metres from any wall, building or other pavement surface, behind or at the sides of the measurement point which would reflect the sound.
Noise levels at multi-level residential buildings	The external points of reference for measurement are the two floors of the building that are most exposed to traffic noise. On other floors, the internal noise level should be at least 10 dB less than the relevant external noise level on the basis of openable windows being opened sufficiently to provide adequate ventilation (Refer to the Building Code of Australia (Australian Building Codes Board 2010) for additional information).
Internal noise levels	Internal noise levels refer to the noise level at the centre of the habitable room that is most exposed to the traffic noise with openable windows being opened sufficiently to provide adequate ventilation (Refer to the Building Code of Australia (Australian Building Codes Board 2010) for additional information).
Open space – passive or active use	The noise level is to be assessed at the time(s) and location(s) regularly attended by people using the space. In this regard, 'regular' attendance at a location means at least once a week.

5.2.4.5 Project Specific Noise Levels

Noise limits for the development can now be established based on the guidelines provided in Section 5.2.4 of this report, the measured background noise levels and the measured traffic noise levels. In measuring existing ambient and background noise levels at the residential locations, and including amenity limits, any potential cumulative impacts would be accounted for.

The measured noise levels and the observations presented demonstrate the local industrial noise sources are influencing the existing ambient noise environment for those receivers within close proximity to the subject site and the adjacent existing glass factory.

Project specific noise limits can be set based on the results of the background noise monitoring at the nearest residents to the site and the requirements outlined by the NSW EPA. The selected criteria and calculated limits are presented in Table 5-35, Table 5-36 and Table 5-37 below.

Table 5-35: Project Specific Noise Limits for Construction Noise (values expressed as dB(A))

Receiver	Receiver Type	Time Of Day	RBL L_{A90}	Management Level $L_{Aeq(15\ minute)*}$
R1	Residential	Monday to Friday 7am – 6pm	41[R2]	41 + 10 = 51
		Saturday 8am – 1pm	41 [R2]	41 + 10 = 51
R2	Residential	Monday to Friday 7am – 6pm	41	41 + 10 = 51
		Saturday 8am – 1pm	41	41 + 10 = 51
R3	Residential	Monday to Friday 7am – 6pm	41 [R2]	41 + 10 = 51
		Saturday 8am – 1pm	41 [R2]	41 + 10 = 51
R4	Residential	Monday to Friday 7am – 6pm	41 [R2]	41 + 10 = 51
		Saturday 8am – 1pm	41 [R2]	41 + 10 = 51
R5	Residential	Monday to Friday 7am – 6pm	41[R7]	41 + 10 = 51
		Saturday 8am – 1pm	41 [R7]	41 + 10 = 51
R6	Residential	Monday to Friday 7am – 6pm	41 [R7]	41 + 10 = 51
		Saturday 8am – 1pm	41[R7]	41 + 10 = 51
R7	Residential	Monday to Friday 7am – 6pm	41	41 + 10 = 51
		Saturday 8am – 1pm	41	41 + 10 = 51

Table 5-35: Project Specific Noise Limits for Construction Noise (values expressed as dB(A))				
Receiver	Receiver Type	Time Of Day	RBL L_{A90}	Management Level $L_{Aeq(15\ minute)*}$
R8	Residential	Monday to Friday 7am – 6pm	41[R2]	41 + 10 = 51
		Saturday 8am – 1pm	41 [R2]	41 + 10 = 51
R9	Residential	Monday to Friday 7am – 6pm	41[R2]	41 + 10 = 51
		Saturday 8am – 1pm	41 [R2]	41 + 10 = 51
R10	Residential	Monday to Friday 7am – 6pm	41[R2]	41 + 10 = 51
		Saturday 8am – 1pm	41 [R2]	41 + 10 = 51
R11	Residential	Monday to Friday 7am – 6pm	41[R2]	41 + 10 = 51
		Saturday 8am – 1pm	41 [R2]	41 + 10 = 51
R12	Active Recreational Area	When in use	NA	65 External
R13	Active Recreational Area	When in use	NA	65 External

Note: Bold vales indicate the applicable Construction Noise Management Level

Table 5-36: Project Specific Noise Limits for On-Site Operational Noise (values expressed as dB(A))

Receiver	Indicative Noise Amenity Area	Period	Acceptable Noise Level	L_{A90} Background Noise Level	L_{Aeq} Existing Industrial Noise	Intrusive Limit ($L_{Aeq,15minute}$)	Amenity Limit (L_{Aeq})
R1	Suburban	day	55	41[R2]	42	41 + 5 = 46	55
		evening	45	41 [R2]	42	41 + 5 = 46	42
		night	40	41 [R2]	42	41 + 5 = 46	32
		shoulder	48	41 [R2]	42	41 + 5 = 46	47
R2	Suburban	day	55	41	42	41 + 5 = 46	55
		evening	45	41	42	41 + 5 = 46	42
		night	40	41	42	41 + 5 = 46	32
		shoulder	48	41	42	41 + 5 = 46	47
R3	Suburban	day	55	41 [R2]	42	41 + 5 = 46	55
		evening	45	41 [R2]	42	41 + 5 = 46	42
		night	40	41 [R2]	42	41 + 5 = 46	32
		shoulder	48	41 [R2]	42	41 + 5 = 46	47
R4	Suburban	day	55	41 [R2]	42	41 + 5 = 46	55
		evening	45	41 [R2]	42	41 + 5 = 46	42
		night	40	41 [R2]	42	41 + 5 = 46	32
		shoulder	48	41 [R2]	42	41 + 5 = 46	47
R5	Suburban	day	55	41[R7]	42	41 + 5 = 46	55
		evening	45	42 [R7]	42	42 + 5 = 47	42
		night	40	40 [R7]	42	40 + 5 = 45	32
		shoulder	48	41[R7]	42	41 + 5 = 46	47
R6	Suburban	day	55	41 [R7]	42	41 + 5 = 46	55
		evening	45	42 [R7]	42	42 + 5 = 47	42
		night	40	40 [R7]	42	40 + 5 = 45	32
		shoulder	48	41[R7]	42	41 + 5 = 46	47
R7	Suburban	day	55	41	42	41 + 5 = 46	55
		evening	45	42	42	42 + 5 = 47	42
		night	40	40	42	40 + 5 = 45	32
		shoulder	48	41	42	41 + 5 = 46	47

Table 5-36: Project Specific Noise Limits for On-Site Operational Noise (values expressed as dB(A))

Receiver	Indicative Noise Amenity Area	Period	Acceptable Noise Level	L_{A90} Background Noise Level	L_{Aeq} Existing Industrial Noise	Intrusive Limit ($L_{Aeq,15minute}$)	Amenity Limit (L_{Aeq})
R8	Suburban	day	55	41[R2]	42	41 + 5 = 46	55
		evening	45	41 [R2]	42	41 + 5 = 46	42
		night	40	41 [R2]	42	41 + 5 = 46	32
		shoulder	48	41 [R2]	42	41 + 5 = 46	47
R9	Suburban	day	55	41[R2]	42	41 + 5 = 46	55
		evening	45	41 [R2]	42	41 + 5 = 46	42
		night	40	41 [R2]	42	41 + 5 = 46	32
		shoulder	48	41 [R2]	42	41 + 5 = 46	47
R10	Suburban	day	55	41[R2]	42	41 + 5 = 46	55
		evening	45	41 [R2]	42	41 + 5 = 46	42
		night	40	41 [R2]	42	41 + 5 = 46	32
		shoulder	48	41 [R2]	2	41 + 5 = 46	47
R11	Suburban	day	55	41[R2]	42	41 + 5 = 46	55
		evening	45	41 [R2]	42	41 + 5 = 46	42
		night	40	41 [R2]	42	41 + 5 = 46	32
		shoulder	48	41 [R2]	42	41 + 5 = 46	47
R12	Active Recreational Area	When in use	55	41 [R7]	45	N/A	55
				42 [R7]	45	N/A	55
				40 [R7]	45	N/A	55
R13	Active Recreational Area	When in use	55	41 [R7]	45	N/A	55
				42 [R7]	45	N/A	55
				40 [R7]	45	N/A	55

Note: - For 'Active Recreational Area's' only the Amenity Criterion assessed.

Table 5-37: Project Specific Noise Limits for Off-Site Traffic Noise Impacts (values expressed as dB(A))

Receiver	Road Category	Period	Assessment Criteria	L_{Aeq} Existing Road Traffic Noise	L_{Aeq} Relative Increase Criteria	L_{Aeq} Criteria for Already Exceeded
			L_{Aeq}	L_{Aeq}	L_{Aeq}	L_{Aeq}
R1	Local Road $L_{Aeq\ (1\ hour)}$	day	55	49[R2]	49 + 12 = 61	N/A
		night	50	47[R2]	47 + 12 = 59	N/A
R2		day	55	51	51 + 12 = 63	N/A
		night	50	49	49 + 12 = 61	N/A
R3		day	55	67[R2]	67 + 12 = 79	67 + 2 = 69
		night	50	65[R2]	65 + 12 = 77	65 + 2 = 67
R4		day	55	69[R2]	69 + 12 = 81	69 + 2 = 71
		night	50	67[R2]	67 + 12 = 79	67 + 2 = 69
R5		day	55	70[R7]	70 + 12 = 82	70 + 2 = 72
		night	50	67[R7]	67 + 12 = 79	67 + 2 = 69
R6		day	55	59[R7]	59 + 12 = 71	59 + 2 = 61
		night	50	56[R7]	56 + 12 = 68	56 + 2 = 58
R7		day	55	55	55 + 12 = 67	N/A
		night	50	52	52 + 12 = 64	52 + 2 = 54
R8		day	55	52[R2]	52 + 12 = 64	N/A
		night	50	50[R2]	50 + 12 = 62	N/A
R9		day	55	50[R2]	50 + 12 = 62	N/A
		night	50	48[R2]	48 + 12 = 60	N/A
R10		day	55	48[R2]	48 + 12 = 60	N/A
		night	50	46[R2]	46 + 12 = 58	N/A
R11		day	55	47[R2]	47 + 12 = 59	N/A
		night	50	45[R2]	45 + 12 = 57	N/A
R1 Northern to R10 Northern	Sub-Arterial Road $L_{Aeq\ (15\ hour)}$ & $L_{Aeq\ (9\ hour)}$	day	60	65	65 + 12 = 77	65 + 2 = 67
		night	55	60	60 + 12 = 72	60 + 2 = 62
R1 Mulgoa to R5 Mulgoa		day	60	65	65 + 12 = 77	65 + 2 = 67
		night	55	63	63 + 12 = 75	63 + 2 = 65

Note: Bold values indicate the applicable Off-Site Traffic Noise Criteria

5.2.5 Predicted Noise Levels

An outline of the predictive noise modelling methodology and operating scenarios has been provided below.

5.2.5.1 Construction Noise

The quantitative assessment method (predictive noise modelling) has not been considered for the construction stage of this development based on the following points:

- The construction project is not considered to be 'major' as it does not resemble the 'major' project examples (Section 3 Page 10) provided within the *'NSW Interim Construction Noise Guideline'*;
- The construction project is scheduled to take place between the recommended standard hours for construction with no construction work taking place outside of these hours; and
- While the construction project is not scheduled to be completed within three weeks, a large portion of the works will be undertaken inside the existing warehouse building which has the benefit of offering sound transmission loss properties.

The range of proposed construction activities to be undertaken on-site has been identified as follows;

- Internal fit out of existing building;
- Construction of proposed internal concrete bunkers;
- Fit out of two proposed roller shutter doors;
- Pouring of concrete hard stand area;
- Construction of proposed external concrete bunkers; and
- Installation of proposed truck weigh bridge.

Based on the required machinery and tools necessary to complete the above construction activities (no blasting and or piling), adherence to the recommended standard hours for construction and the presence of the existing warehouse building, construction noise is not expected to significantly affect the surrounding residential receivers.

For the above reasons no further consideration has been given to construction noise.

5.2.5.2 Operational Noise Sources

The 'one-third octave' and 'octave' sound power levels for the identified noise sources have been either calculated from on-site measurements of sound pressure levels undertaken by an acoustic engineer or sourced from Benbow Environmental's extensive noise source database.

Noise measurements undertaken on-site were taken, where possible, at the nearest façade to individual pieces of equipment or processes under typical operating conditions.

The results of all noise source data are presented in Table 5-38 and Table 5-39 below and the data was used to model noise emissions from the site at the nearest potentially affected sensitive receivers.

5.2.5.2.1 Mobile Noise Sources

Table 5-38: Noise Source Data – dB & dB(A) respectively

Front End Loader										
	25Hz	31Hz	40Hz	50Hz	63Hz	80Hz	100Hz	125Hz	160Hz	200Hz
	94.4	95.7	94.1	98.3	101.9	111.1	110.6	98.3	97.7	98
	49.7	56.3	59.5	68.1	75.7	88.6	91.5	82.2	84.3	87.1
Sum	250Hz	315Hz	400Hz	500Hz	630Hz	800Hz	1kHz	1.25kHz	1.6kHz	2kHz
114.9	96.4	90	92.3	91.8	89.3	90	89.1	89.6	89.3	88.9
101.5	87.8	83.4	87.5	88.6	87.4	89.2	89.1	90.2	90.3	90.1
	2.5kHz	3.15kHz	4kHz	5kHz	6.3kHz	8kHz	10kHz	12.5kHz	16kHz	20kHz
	87.8	87.8	87.3	87.4	85.9	85.4	82.3	76.4	74.6	72.5
	89.1	89	88.3	87.9	85.8	84.3	79.8	72.1	68	63.2
Semi Trailer										
	25Hz	31Hz	40Hz	50Hz	63Hz	80Hz	100Hz	125Hz	160Hz	200Hz
	95.7	104.4	98.6	99.2	96.2	94.5	95.1	93.1	95.4	97.9
	51.0	65.0	64.0	69.0	70.0	72.0	76.0	77.0	82.0	87.0
Sum	250Hz	315Hz	400Hz	500Hz	630Hz	800Hz	1kHz	1.25kHz	1.6kHz	2kHz
109.6	95.6	90.6	92.8	94.2	93.9	92.8	94.0	92.4	91.0	90.8
102	87.0	84.0	88.0	91.0	92.0	92.0	94.0	93.0	92.0	92.0
	2.5kHz	3.15kHz	4kHz	5kHz	6.3kHz	8kHz	10kHz	12.5kHz	16kHz	20kHz
	87.7	84.8	83.0	79.5	76.1	74.1	72.5	69.3	66.6	66.3
	89.0	86.0	84.0	80.0	76.0	73.0	70.0	65.0	60.0	57.0
Air Brakes										
	25Hz	31Hz	40Hz	50Hz	63Hz	80Hz	100Hz	125Hz	160Hz	200Hz
	87.7	100.4	91.6	93.2	91.2	93.5	101.1	88.1	86.4	84.9
	43.0	61.0	57.0	63.0	65.0	71.0	82.0	72.0	73.0	74.0
Sum	250Hz	315Hz	400Hz	500Hz	630Hz	800Hz	1kHz	1.25kHz	1.6kHz	2kHz
112.5	78.6	80.6	83.8	80.2	80.9	85.8	88.0	90.4	102.0	93.8
110.8	70.0	74.0	79.0	77.0	79.0	85.0	88.0	91.0	103.0	95.0
	2.5kHz	3.15kHz	4kHz	5kHz	6.3kHz	8kHz	10kHz	12.5kHz	16kHz	20kHz
	92.7	94.8	97.0	99.5	102.1	105.1	107.5	-	-	-
	94.0	96.0	98.0	100.0	102.0	104.0	105.0	-	-	-
Articulated Dump Truck 28t										
Sum	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	10kHz	12.5kHz
119.4	114.0	112.0	114.0	111.0	107.0	104.0	100.0	95.0	-	-
113.0	87.8	95.9	105.4	107.8	107.0	105.2	101.0	93.9	-	-

Table 5-38: Noise Source Data – dB & dB(A) respectively										
Articulated Dump Truck 35t										
Sum	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	10kHz	12.5kHz
122.6	119.0	118.0	111.0	111.0	109.0	107.0	98.0	89.0	-	-
114.0	92.8	101.9	102.4	107.8	109.0	108.2	99.0	87.9	-	-
Dumper 5t										
Sum	25Hz	31Hz	40Hz	50Hz	63Hz	80Hz	100Hz	125Hz	160Hz	200Hz
119.6	118.0	114.0	100.0	99.0	99.0	99.0	94.0	87.0	-	-
105.4	91.8	97.9	91.4	95.8	99.0	100.2	95.0	85.9	-	-
Dumper 5t (Idling)										
Sum	25Hz	31Hz	40Hz	50Hz	63Hz	80Hz	100Hz	125Hz	160Hz	200Hz
96.5	96.0	84.0	75.0	77.0	80.0	78.0	69.0	60.0	-	-
83.8	69.8	67.9	66.4	73.8	80.0	79.2	70.0	58.9	-	-

5.2.5.2.2 Stationary Noise Sources

Table 5-39: Noise Source Data – dB & dB(A) respectively										
Western Facade										
Sum	25Hz	31Hz	40Hz	50Hz	63Hz	80Hz	100Hz	125Hz	160Hz	200Hz
	95.2	79.3	78.2	100.8	84.5	78.7	86.5	78.9	79.7	78.4
	50.5	39.9	43.6	70.6	58.3	56.2	67.4	62.8	66.3	67.5
	250Hz	315Hz	400Hz	500Hz	630Hz	800Hz	1kHz	1.25kHz	1.6kHz	2kHz
102.3	77	75	73.8	74.4	72.9	72.4	71	71.9	72.5	72.9
85.5	68.4	68.4	69	71.2	71	71.6	71	72.5	73.5	74.1
	2.5kHz	3.15kHz	4kHz	5kHz	6.3kHz	8kHz	10kHz	12.5kHz	16kHz	20kHz
	73.5	74.2	74.4	73.8	73.6	73.3	72	72.4	72.5	70.4
	74.8	75.4	75.4	74.3	73.5	72.2	69.5	68.1	65.9	61.1
Eastern Facade										
Sum	25Hz	31Hz	40Hz	50Hz	63Hz	80Hz	100Hz	125Hz	160Hz	200Hz
	97.1	80.8	82.6	83.6	78	79.1	78.1	78.6	79.2	76.6
	52.4	41.4	48	53.4	51.8	56.6	59	62.5	65.8	65.7
	250Hz	315Hz	400Hz	500Hz	630Hz	800Hz	1kHz	1.25kHz	1.6kHz	2kHz
98.2	75.7	75.5	74.6	74.2	74.3	72.9	72.4	72.9	73.2	72.7
85.7	67.1	68.9	69.8	71	72.4	72.1	72.4	73.5	74.2	73.9
	2.5kHz	3.15kHz	4kHz	5kHz	6.3kHz	8kHz	10kHz	12.5kHz	16kHz	20kHz
	72.8	73	73.6	73.1	73.7	75.2	75.3	77	77.3	74.7
	74.1	74.2	74.6	73.6	73.6	74.1	72.8	72.7	70.7	65.4

Table 5-39: Noise Source Data – dB & dB(A) respectively

Roof

Sum	25Hz	31Hz	40Hz	50Hz	63Hz	80Hz	100Hz	125Hz	160Hz	200Hz
	99.5	82.2	82.9	98	84.8	83.5	82.3	80.1	78.2	76.4
	54.8	42.8	48.3	67.8	58.6	61	63.2	64	64.8	65.5
	250Hz	315Hz	400Hz	500Hz	630Hz	800Hz	1kHz	1.25kHz	1.6kHz	2kHz
102.4	77.6	79.7	75.9	76.8	74.5	73.5	72.7	73.7	74.5	74.5
87.1	69	73.1	71.1	73.6	72.6	72.7	72.7	74.3	75.5	75.7
	2.5kHz	3.15kHz	4kHz	5kHz	6.3kHz	8kHz	10kHz	12.5kHz	16kHz	20kHz
	74.8	75.6	75.7	75.4	75.2	75.4	74.5	75.5	75.9	74.3
	76.1	76.8	76.7	75.9	75.1	74.3	72	71.2	69.3	65

Southern Façade (East)

Sum	25Hz	31Hz	40Hz	50Hz	63Hz	80Hz	100Hz	125Hz	160Hz	200Hz
	88.3	73.1	80.5	83.2	73.9	76.7	75.3	74.4	75	72.4
	43.6	33.7	45.9	53	47.7	54.2	56.2	58.3	61.6	61.5
	250Hz	315Hz	400Hz	500Hz	630Hz	800Hz	1kHz	1.25kHz	1.6kHz	2kHz
91.3	72.4	71.9	71.1	71	70.1	69.2	68.8	70	70.8	70
80.96	63.8	65.3	66.3	67.8	68.2	68.4	68.8	70.6	71.8	71.2
	2.5kHz	3.15kHz	4kHz	5kHz	6.3kHz	8kHz	10kHz	12.5kHz	16kHz	20kHz
	68.2	68.3	68.8	67.6	66.4	65.5	63.1	62.7	61.8	58.7
	69.5	69.5	69.8	68.1	66.3	64.4	60.6	58.4	55.2	49.4

Southern façade (West)

Sum	25Hz	31Hz	40Hz	50Hz	63Hz	80Hz	100Hz	125Hz	160Hz	200Hz
	96	78.9	72.9	91.8	77	69.9	77.7	72.5	74.6	73.2
	51.3	39.5	38.3	61.6	50.8	47.4	58.6	56.4	61.2	62.3
	250Hz	315Hz	400Hz	500Hz	630Hz	800Hz	1kHz	1.25kHz	1.6kHz	2kHz
97.8	73	72.7	70.8	70.5	70	69.4	68.5	69.2	70	70.9
82.8	64.4	66.1	66	67.3	68.1	68.6	68.5	69.8	71	72.1
	2.5kHz	3.15kHz	4kHz	5kHz	6.3kHz	8kHz	10kHz	12.5kHz	16kHz	20kHz
	71.7	72.3	72.4	72	71.1	69.8	66.9	65.3	63.8	60.3
	73	73.5	73.4	72.5	71	68.7	64.4	61	57.2	51

It is noted that the one-third octave sound power level data provided in the tables above, in particular the noise level at the western façade of the building, contain tonal components as determined by the NSW (INP) modifying factor adjustments (Table 4.1 of NSW INP). Therefore the spectral content predicted at each receiver location will be analysed in order to determine the presence of potential tonal components at the receiver location. A summary of this analysis has been provided in Section 5.2.5.10.

5.2.5.3 Modelling Methodology

5.2.5.3.1 SoundPLAN Predictive Noise Model

Noise emissions from the proposed operations were modelled using the Concawe algorithm within SoundPLAN V7.1. This model is recognised by the NSW EPA for modelling environmental noise emissions and has been used by this firm on many projects achieving highly accurate and repeatable results.

Reference was made to the topographical contours for the area. Based on inspection, the local topography for the area appears to be consistent with levels as printed on the topographic map.

5.2.5.3.2 Modelling Scenarios

Model scenarios were configured to provide a realistic assessment of potential site-related noise emissions. Each model configuration was used to calculate noise levels at the nearest potentially affected receivers under the proposed operations.

Four (4) operating scenarios were established for the modelling of on-site noise generation in order to provide an accurate estimation of the potential noise impacts during the Day, Evening and Night time periods under varying operations.

Each of the four operating scenarios has been assessed against both the 'Intrusiveness Criterion' and the 'Amenity Criterion' as per the NSW INP application notes where it states:

"Where the predicted amenity noise level is lower than the intrusive level for the proposed development, the proponent needs to ensure that both levels will be satisfied."

As established within Section 5.2.4.5 the more stringent noise criteria for Evening and Night time periods was found to be the 'Amenity Criterion' therefore both criterions must be assessed.

Scenario 1: Considers noise emissions associated with internal operations only and considers all roller shutter doors to be fully opened.

Scenario 2: Considers noise emissions associated with internal operations only and considers all roller shutter doors to be fully closed.

Scenario 3: Considers noise emissions associated with internal operations and on-site vehicle movements considering all roller shutter doors to be fully opened.

Scenario 4: Considers noise emissions associated with internal operations and on-site vehicle movements considering all roller shutter doors to be fully closed.

Each scenario is further detailed in Table 5-40 below.

Table 5-40: Modelled Noise Scenarios

Scenario	Description	Noise Sources	Source Locations
1	Internal Operations RSD's Opened	Industrial Building Front End Loader	Figure 5-36
2	Internal Operations RSD's Closed	Industrial Building Front End Loader	
3	Internal Operations On-Site Vehicles RSD's Opened	Industrial Building Front End Loader Semi-Trailer Truck & Dog Small truck	
4	Internal Operations On-Site Vehicles RSD's Closed	Industrial Building Front End Loader Semi-Trailer Truck & Dog Small truck	

Figure 5-36: On-Site Noise Source Locations



Each scenario was run with noise enhancing meteorological conditions, in accordance with the NSW INP. The following conditions were considered:

- Condition A: neutral weather conditions;
- Condition B: 3 m/s wind from source to receiver; and
- Condition C: 3 °C/100m temperature inversion with 2m/s wind from source to receiver.

These meteorological conditions have been displayed in detail in Table 5-41 below.

Table 5-41: Meteorological Conditions Assessed in Noise Propagation Modelling

Condition	Classification	Ambient Temp.	Ambient Humidity	Wind Speed	Wind Direction	Temperature Inversion	Affected Receiver	Applicability
A	Neutral	10 °C	70%	-	-	-	All	All periods
B	Gradient Flow	10 °C	70%	3m/s	Receiver	-	All	All periods
C	Inversion	10 °C	70%	2m/s	Receiver	3 °C/100m	All	All periods

5.2.5.3.3 Assumptions

In establishing configurations within a noise-modelling package, it is inherent that several reasonable assumptions be made. It should be noted that the relevant assessment period for this noise impact assessment is 15 minutes when assessing noise levels against the Intrusive Criterion and the entire operational period when assessing noise levels againsts the Amenity Criterion.

- Receiver heights were modelled at 1.5m and 4.3m above ground level in order to consider two story houses;
- The industrial building was modelled as three separate buildings within the predictive model in order to account for the three different heights of the overall building;
- The dust collector was considered to be located inside the existing warehouse;
- The existing concrete dado walls of the industrial building were modelled at a height of 2m and were given an overall Rw value of 45 dB;
- The existing steel cladding walls of the industrial building were given an overall Rw value of 21 dB representative of Trimdek steel cladding zincalume finish BMT 0.42mm;
- The existing steel cladding roof of the industrial building was given an overall Rw value of 22 dB representative of Trimdek steel cladding zincalume finish BMT 0.42mm plus additional internal material;
- The existing skylights of the industrial building were given an overall Rw value of 18 dB representative of 2mm thick Perspex;
- The administrative and office rooms located on the northern, north western and north eastern sides of the industrial building were modelled as typical building structures (not sources of industrial noise);
- The external bunkers were modelled as perfect acoustic barriers at a height of 3m above ground level;

- The external ground area surrounding the industrial building has been modelled considering a ground absorption coefficient of 0 resulting in 100% of the acoustic energy being reflected and 0% of the acoustic energy being absorbed;

- All on-site trucks were modelled as two moving point sources at heights of 1.5m and 3m above ground level in order to account for the engine (1.5m) and the exhaust outlet (3m). Trucks were considered to travel at a speed of 10km/h whilst onsite. Information regarding the types of trucks, frequency of trucks and hourly distribution of trucks has been provided by site management. This information has been summarised in Table 5-42 below.

- Truck air brakes were modelled as single point sources at a height of 3m above ground level. Air brakes were considered to last for duration 5 seconds each per occurrence and each truck totalling two occurrences whilst on site;

- All other ground areas surrounding the subject site and the nearby residential receivers has been modelled considering a ground absorption coefficient of 0.6 resulting in 40% of the acoustic energy being reflected off it and 60% of the acoustic energy being absorbed; and

- Two commercial buildings have been modelled at heights of 5m directly adjacent the subject site and the existing Owens Illinois site on the north side of Andrews Road in order to account for the acoustic shielding that would occur when the commercial buildings are constructed.

Table 5-42: Truck Frequency Data

Truck Type	% of Total Annual Tonnage	Annual Tonnage	Daily Tonnage	Truck Capacity (T)	Truck/ Day	6am - 8am	8am - 4pm	4pm - 5pm
8t Truck	10	15,000	41	8	5	3	1	1
Truck & Dog	75	112,500	308	29	11	7	1	3
B-double	15	22,500	62	42	1	1	1	1
Total	100	150,000	411		17	11	3	5

5.2.5.4 On-Site Operational Predicted Noise Levels Intrusive

Table 5-43: Scenario 1 – Condition A: Building Only & RSD's Open

Receiver	Level	Day dB(A)	Evening dB(A)	Night dB(A)	Shoulder Period dB(A)
Residential					
R1	1	37	37	37	37
R1	2	38	37	37	37
R2	1	37	36	36	36
R2	2	38	37	37	37
R3	1	42	41	41	41
R3	2	42	42	42	42
R4	1	38	37	37	37
R4	2	39	38	38	38
R5	1	34	33	33	33
R5	2	34	33	33	33
R6	1	35	34	34	34
R6	2	35	34	34	34
R7	1	38	37	37	37
R7	2	39	38	38	38
R8	1	26	25	25	25
R8	2	26	25	25	25
R9	1	29	28	28	28
R9	2	29	29	29	29
R10	1	32	32	32	32
R10	2	33	33	33	33
R11	1	34	34	34	34
R11	2	35	35	35	35
Recreational					
R12*	1	48	47	47	47
R13*	1	46	46	46	46

Note: Cells containing bold values have exceeded the 'Intrusive Criterion' detailed within Table 5-36;
* indicates that the receiver does not need to be assessed against the 'Intrusive Criterion' as the receiver type is deemed 'Active Recreational';

The predicted noise levels displayed in Table 5-43 above comply when assessed against the Intrusive Criterion at all considered receiver locations.

Table 5-44: Scenario 1 – Condition B/C: Building Only & RSD's Open

Receiver	Level	Day dB(A)	Evening dB(A)	Night dB(A)	Shoulder Period dB(A)
Residential					
R1	1	40	39	39	39
R1	2	40	40	40	40
R2	1	40	39	39	39
R2	2	40	39	39	39
R3	1	44	43	43	43
R3	2	44	44	44	44
R4	1	41	40	40	40
R4	2	41	40	40	40
R5	1	37	36	36	36
R5	2	37	36	36	36
R6	1	38	37	37	37
R6	2	38	37	37	37
R7	1	41	40	40	40
R7	2	41	41	41	41
R8	1	29	28	28	28
R8	2	29	28	28	28
R9	1	32	31	31	31
R9	2	32	32	32	32
R10	1	35	35	34	34
R10	2	35	35	35	35
R11	1	37	37	37	37
R11	2	37	37	37	37
Recreational					
R12*	1	49	49	49	49
R13*	1	48	47	47	47

Note: Cells containing bold values have exceeded the 'Intrusive Criterion' detailed within Table 5-36;
* indicates that the receiver does not need to be assessed against the 'Intrusive Criterion' as the receiver type is deemed 'Active Recreational';

The predicted noise levels displayed in Table 5-44 above comply when assessed against the Intrusive Criterion at all considered receiver locations.

Table 5-45: Scenario 2 – Condition A: Building Only & RSD's Closed

Receiver	Level	Day dB(A)	Evening dB(A)	Night dB(A)	Shoulder Period dB(A)
Residential					
R1	1	35	35	35	35
R1	2	36	35	35	35
R2	1	35	35	35	35
R2	2	36	35	35	35
R3	1	40	39	39	39
R3	2	40	40	40	40
R4	1	36	35	35	35
R4	2	37	36	35	35
R5	1	32	31	31	31
R5	2	33	31	31	31
R6	1	33	31	31	31
R6	2	33	32	32	32
R7	1	35	34	34	34
R7	2	36	35	35	35
R8	1	25	24	24	24
R8	2	25	25	25	25
R9	1	28	27	27	27
R9	2	29	28	28	28
R10	1	31	31	31	31
R10	2	32	32	32	32
R11	1	33	33	33	33
R11	2	34	34	34	34
Recreational					
R12*	1	44	42	42	42
R13*	1	44	42	42	42

Note: Cells containing bold values have exceeded the 'Intrusive Criterion' detailed within Table 5-36;
* indicates that the receiver does not need to be assessed against the 'Intrusive Criterion' as the receiver type is deemed 'Active Recreational';

The predicted noise levels displayed in Table 5-45 above comply when assessed against the Intrusive Criterion at all considered receiver locations.

Table 5-46: Scenario 2 – Condition B/C: Building Only & RSD's Closed

Receiver	Level	Day dB(A)	Evening dB(A)	Night dB(A)	Shoulder Period dB(A)
Residential					
R1	1	38	37	37	37
R1	2	38	37	37	37
R2	1	38	37	36	36
R2	2	38	37	37	37
R3	1	42	40	40	40
R3	2	42	40	40	40
R4	1	39	37	37	37
R4	2	39	37	37	37
R5	1	35	33	33	33
R5	2	35	33	33	33
R6	1	36	33	33	33
R6	2	36	34	33	33
R7	1	38	36	36	36
R7	2	38	36	36	36
R8	1	28	27	27	27
R8	2	29	27	27	27
R9	1	31	30	30	30
R9	2	31	30	30	30
R10	1	34	33	33	33
R10	2	34	34	34	34
R11	1	35	35	35	35
R11	2	36	36	36	36
Recreational					
R12*	1	45	43	43	43
R13*	1	45	43	43	43

Note: Cells containing bold values have exceeded the 'Intrusive Criterion' detailed within Table 5-36;
* indicates that the receiver does not need to be assessed against the 'Intrusive Criterion' as the receiver type is deemed 'Active Recreational';

The predicted noise levels displayed in Table 5-46 above comply when assessed against the Intrusive Criterion at all considered receiver locations.

Table 5-47: Scenario 3 – Condition A: Building & On Site Traffic & RSD's Open					
Receiver	Level	Day dB(A)	Evening dB(A)	Night dB(A)	Shoulder Period dB(A)
Residential					
R1	1	43	37	37	42
R1	2	44	37	37	43
R2	1	43	36	36	41
R2	2	41	37	37	42
R3	1	47	41	41	45
R3	2	47	42	42	46
R4	1	46	37	37	40
R4	2	40	38	38	41
R5	1	41	33	33	36
R5	2	36	33	33	36
R6	1	36	34	34	36
R6	2	36	34	34	37
R7	1	37	37	37	40
R7	2	40	38	38	41
R8	1	41	25	25	33
R8	2	33	25	25	34
R9	1	34	28	28	37
R9	2	37	29	29	37
R10	1	37	32	32	40
R10	2	40	33	33	41
R11	1	42	34	34	42
R11	2	42	35	35	43
Recreational					
R12*	1	53	48	48	50
R13*	1	50	46	46	47

Note: Cells containing bold values have exceeded the 'Intrusive Criterion' detailed within Table 5-36;
* indicates that the receiver does not need to be assessed against the 'Intrusive Criterion' as the receiver type is deemed 'Active Recreational';

The predicted noise levels displayed in Table 5-47 above comply during the Day at all considered receiver locations excluding R3 (Level 1 and Level2), comply during the Evening at all considered receiver locations, comply during the Night at all considered receiver locations and comply during the Shoulder Period at all considered receiver locations when assessed against the Intrusive Criterion.

Table 5-48: Scenario 3 – Condition B/C: Building & On Site Traffic & RSD's Open					
Receiver	Level	Day dB(A)	Evening dB(A)	Night dB(A)	Shoulder Period dB(A)
Residential					
R1	1	46	39	39	45
R1	2	47	40	40	46
R2	1	46	39	39	45
R2	2	47	39	39	45
R3	1	50	43	43	48
R3	2	50	44	44	48
R4	1	46	40	40	44
R4	2	46	40	40	44
R5	1	42	36	36	39
R5	2	43	36	36	40
R6	1	43	37	37	40
R6	2	43	37	37	40
R7	1	47	40	40	44
R7	2	47	41	41	44
R8	1	38	28	28	38
R8	2	38	28	28	38
R9	1	41	31	31	41
R9	2	41	32	32	41
R10	1	44	35	35	44
R10	2	45	35	35	45
R11	1	46	37	37	46
R11	2	47	37	37	47
Recreational					
R12*	1	56*	49	49	53
R13*	1	53	47	47	50

Note: Cells containing bold values have exceeded the 'Intrusive Criterion' detailed within Table 5-36;
* indicates that the receiver does not need to be assessed against the 'Intrusive Criterion' as the receiver type is deemed 'Active Recreational';

The predicted noise levels displayed in Table 5-48 above comply during the Day at all considered receiver locations excluding R1 (Level 2), R2 (Level 2), R3 (Level 1 and Level 2), R7 (Level 1 and Level 2) and R11 (Level 2), comply during the Evening at all considered receiver locations, comply during the Night at all considered receiver locations and comply during the Shoulder Period at all considered receiver locations excluding R3 (Level 1 and Level 2) when assessed against the Intrusive Criterion.

Table 5-49: Scenario 4 – Condition A: Building & On Site Traffic & RSD's Closed					
Receiver	Level	Day dB(A)	Evening dB(A)	Night dB(A)	Shoulder Period dB(A)
Residential					
R1	1	42	35	35	42
R1	2	43	35	35	43
R2	1	42	35	35	41
R2	2	43	35	35	42
R3	1	46	39	39	44
R3	2	47	40	40	45
R4	1	42	35	35	39
R4	2	43	35	35	40
R5	1	38	31	31	35
R5	2	38	31	31	35
R6	1	38	31	31	35
R6	2	39	32	32	36
R7	1	42	34	34	39
R7	2	43	35	35	40
R8	1	33	24	24	33
R8	2	34	25	25	34
R9	1	37	28	28	37
R9	2	37	28	28	37
R10	1	40	31	31	40
R10	2	41	32	32	41
R11	1	42	34	34	42
R11	2	43	34	34	43
Recreational					
R12*	1	53	42	42	48
R13*	1	50	42	42	45

Note: Cells containing bold values have exceeded the 'Intrusive Criterion' detailed within Table 5-36;
* indicates that the receiver does not need to be assessed against the 'Intrusive Criterion' as the receiver type is deemed 'Active Recreational';

The predicted noise levels displayed in Table 5-49 above comply during the Day at all considered receiver locations excluding R3 (Level2), comply during the Evening at all considered receiver locations, comply during the Night at all considered receiver locations and comply during the Shoulder Period at all considered receiver locations when assessed against the Intrusive Criterion.

Table 5-50: Scenario 4 – Condition B/C: Building & On Site Traffic & RSD's Closed					
Receiver	Level	Day dB(A)	Evening dB(A)	Night dB(A)	Shoulder Period dB(A)
Residential					
R1	1	46	37	37	45
R1	2	47	37	37	46
R2	1	46	37	37	44
R2	2	46	37	37	45
R3	1	49	40	40	47
R3	2	50	40	40	47
R4	1	46	37	37	43
R4	2	46	37	37	43
R5	1	42	33	33	39
R5	2	42	33	33	39
R6	1	42	33	33	39
R6	2	42	34	34	39
R7	1	46	36	36	42
R7	2	46	36	36	43
R8	1	38	27	27	38
R8	2	38	28	28	38
R9	1	41	30	30	41
R9	2	41	31	31	41
R10	1	44	34	34	44
R10	2	45	34	34	45
R11	1	46	36	36	46
R11	2	46	36	36	46
Recreational					
R12*	1	55	43	43	50
R13*	1	52	43	43	47

Note: Cells containing bold values have exceeded the 'Intrusive Criterion' detailed within Table 5-36;
* indicates that the receiver does not need to be assessed against the 'Intrusive Criterion' as the receiver type is deemed 'Active Recreational';

The predicted noise levels displayed in Table 5-50 above comply during the Day at all considered receiver locations excluding R1 (Level 2) and R3 (Level 1 and Level 2), comply during the Evening at all considered receiver locations, comply during the Night at all considered receiver locations and comply during the Shoulder Period at all considered receiver locations excluding R3 (Level 1 and Level 2) when assessed against the Intrusive Criterion.

Table 5-51: Summary of On-Site Operational Predicted Noise Levels Considering The Intrusive Criterion

Receiver	Level	Scenario 1 - Condition A			Scenario 1 - Condition B/C			Scenario 2 - Condition A			Scenario 2 - Condition B/C			Scenario 3 - Condition A			Scenario 3 - Condition B/C			Scenario 4 - Condition A			Scenario 4 - Condition B/C		
		Day	Evening	Night	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night
		dB(A)			dB(A)			dB(A)			dB(A)			dB(A)			dB(A)			dB(A)			dB(A)		
Residential																									
R1	1	37	37	37	40	39	39	35	35	35	38	37	37	43	37	37	46	39	39	42	35	35	46	37	37
R1	2	38	37	37	40	40	40	36	35	35	38	37	37	44	37	37	47	40	40	43	35	35	47	37	37
R2	1	37	36	36	40	39	39	35	35	35	38	37	36	43	36	36	46	39	39	42	35	35	46	37	37
R2	2	38	37	37	40	39	39	36	35	35	38	37	37	41	37	37	47	39	39	43	35	35	46	37	37
R3	1	42	41	41	44	43	43	40	39	39	42	40	40	47	41	41	50	43	43	46	39	39	49	40	40
R3	2	42	42	42	44	44	44	40	40	40	42	40	40	47	42	42	50	44	44	47	40	40	50	40	40
R4	1	38	37	37	41	40	40	36	35	35	39	37	37	46	37	37	46	40	40	42	35	35	46	37	37
R4	2	39	38	38	41	40	40	37	36	35	39	37	37	40	38	38	46	40	40	43	35	35	46	37	37
R5	1	34	33	33	37	36	36	32	31	31	35	33	33	41	33	33	42	36	36	38	31	31	42	33	33
R5	2	34	33	33	37	36	36	33	31	31	35	33	33	36	33	33	43	36	36	38	31	31	42	33	33
R6	1	35	34	34	38	37	37	33	31	31	36	33	33	36	34	34	43	37	37	38	31	31	42	33	33
R6	2	35	34	34	38	37	37	33	32	32	36	34	33	36	34	34	43	37	37	39	32	32	42	34	34
R7	1	38	37	37	41	40	40	35	34	34	38	36	36	37	37	37	47	40	40	42	34	34	46	36	36
R7	2	39	38	38	41	41	41	36	35	35	38	36	36	40	38	38	47	41	41	43	35	35	46	36	36
R8	1	26	25	25	29	28	28	25	24	24	28	27	27	41	25	25	38	28	28	33	24	24	38	27	27
R8	2	26	25	25	29	28	28	25	25	25	29	27	27	33	25	25	38	28	28	34	25	25	38	28	28
R9	1	29	28	28	32	31	31	28	27	27	31	30	30	34	28	28	41	31	31	37	28	28	41	30	30
R9	2	29	29	29	32	32	32	29	28	28	31	30	30	37	29	29	41	32	32	37	28	28	41	31	31
R10	1	32	32	32	35	35	34	31	31	31	34	33	33	37	32	32	44	35	35	40	31	31	44	34	34
R10	2	33	33	33	35	35	35	32	32	32	34	34	34	40	33	33	45	35	35	41	32	32	45	34	34
R11	1	34	34	34	37	37	37	33	33	33	35	35	35	42	34	34	46	37	37	42	34	34	46	36	36
R11	2	35	35	35	37	37	37	34	34	34	36	36	36	42	35	35	47	37	37	43	34	34	46	36	36
Recreational																									
R12*	1	48	47	47	49	49	49	44	42	42	45	43	43	53	48	48	56*	49	49	53	42	42	55	43	43
R13*	1	46	46	46	48	47	47	44	42	42	45	43	43	50	46	46	53	47	47	50	42	42	52	43	43

Note: Cells containing bold values have exceeded the 'Intrusive Criterion' detailed within Table 5-36;
* indicates that the receiver does not need to be assessed against the 'Intrusive Criterion' as the receiver type is deemed 'Active Recreational';

5.2.5.5 On-Site Operational Predicted Noise Levels Amenity

Table 5-52: Scenario 1 – Condition A: Building Only & RSD's Open

Receiver	Level	Day dB(A)	Evening dB(A)	Night dB(A)	Shoulder Period dB(A)
Residential					
R1	1	37	37	37	37
R1	2	38	37	37	37
R2	1	37	36	36	36
R2	2	38	37	37	37
R3	1	42	41	41	41
R3	2	42	42	42	42
R4	1	38	37	37	37
R4	2	39	38	38	38
R5	1	34	33	33	33
R5	2	34	33	33	33
R6	1	35	34	34	34
R6	2	35	34	34	34
R7	1	38	37	37	37
R7	2	39	38	38	38
R8	1	26	25	25	25
R8	2	26	25	25	25
R9	1	29	28	28	28
R9	2	29	29	29	29
R10	1	32	32	32	32
R10	2	33	33	33	33
R11	1	34	34	34	34
R11	2	35	35	35	35
Recreational					
R12	1	48	47	47	47
R13	1	46	46	46	46

Note: Cells containing bold values have exceeded the 'Amenity Criterion' detailed within Table 5-36;

The predicted noise levels displayed in Table 5-52 above comply during the Day at all considered receiver locations, comply during the Evening at all considered receiver locations, and do not comply during the Night at all considered receiver locations excluding R8 (Level 1 and Level 2), R9 (Level 1 and Level 2) and R10 (Level 1) when assessed against the Amenity Criterion.

Table 5-53: Scenario 1 – Condition B/C: Building Only & RSD's Open

Receiver	Level	Day dB(A)	Evening dB(A)	Night dB(A)	Shoulder Period dB(A)
Residential					
R1	1	40	39	39	39
R1	2	40	40	40	40
R2	1	40	39	39	39
R2	2	40	39	39	39
R3	1	44	43	43	43
R3	2	44	44	44	44
R4	1	41	40	40	40
R4	2	41	40	40	40
R5	1	37	36	36	36
R5	2	37	36	36	36
R6	1	38	37	37	37
R6	2	38	37	37	37
R7	1	41	40	40	40
R7	2	41	41	41	41
R8	1	29	28	28	28
R8	2	29	28	28	28
R9	1	32	31	31	31
R9	2	32	32	32	32
R10	1	35	35	34	34
R10	2	35	35	35	35
R11	1	37	37	37	37
R11	2	37	37	37	37
Recreational					
R12	1	49	49	49	49
R13	1	48	47	47	47

Note: Cells containing bold values have exceeded the 'Amenity Criterion' detailed within Table 5-36;

The predicted noise levels displayed in Table 5-53 above comply during the Day at all considered receiver locations, comply during the Evening at all considered receiver locations excluding R3 (Level1 and Level 2), and do not comply during the Night at all considered receiver locations excluding R8 (Level 1 and Level 2) and R9 (Level 1 and Level 2) when assessed against the Amenity Criterion.

Table 5-54: Scenario 2 – Condition A: Building Only & RSD's Closed

Receiver	Level	Day dB(A)	Evening dB(A)	Night dB(A)	Shoulder Period dB(A)
Residential					
R1	1	35	35	35	35
R1	2	36	35	35	35
R2	1	35	35	35	35
R2	2	36	35	35	35
R3	1	40	39	39	39
R3	2	40	40	40	40
R4	1	36	35	35	35
R4	2	37	36	35	35
R5	1	32	31	31	31
R5	2	33	31	31	31
R6	1	33	31	31	31
R6	2	33	32	32	32
R7	1	35	34	34	34
R7	2	36	35	35	35
R8	1	25	24	24	24
R8	2	25	25	25	25
R9	1	28	27	27	27
R9	2	29	28	28	28
R10	1	31	31	31	31
R10	2	32	32	32	32
R11	1	33	33	33	33
R11	2	34	34	34	34
Recreational					
R12	1	44	42	42	42
R13	1	44	42	42	42

Note: Cells containing bold values have exceeded the 'Amenity Criterion' detailed within Table 5-36;

The predicted noise levels displayed in Table 5-54 above comply during the Day at all considered receiver locations, comply during the Evening at all considered receiver locations, and do not comply during the Night at all considered receiver locations excluding R5 (Level 1 and Level 2), R6 (Level 1 and Level 2), R8 (Level 1 and Level 2), R9 (Level 1 and Level 2) and R10 (Level 1 and Level 2) when assessed against the Amenity Criterion.

Table 5-55: Scenario 2 – Condition B/C: Building Only & RSD's Closed

Receiver	Level	Day dB(A)	Evening dB(A)	Night dB(A)	Shoulder Period dB(A)
Residential					
R1	1	38	37	37	37
R1	2	38	37	37	37
R2	1	38	37	36	36
R2	2	38	37	37	37
R3	1	42	40	40	40
R3	2	42	40	40	40
R4	1	39	37	37	37
R4	2	39	37	37	37
R5	1	35	33	33	33
R5	2	35	33	33	33
R6	1	36	33	33	33
R6	2	36	34	33	33
R7	1	38	36	36	36
R7	2	38	36	36	36
R8	1	28	27	27	27
R8	2	29	27	27	27
R9	1	31	30	30	30
R9	2	31	30	30	30
R10	1	34	33	33	33
R10	2	34	34	34	34
R11	1	35	35	35	35
R11	2	36	36	36	36
Recreational					
R12	1	45	43	43	43
R13	1	45	43	43	43

Note: Cells containing bold values have exceeded the 'Amenity Criterion' detailed within Table 5-36;

The predicted noise levels displayed in Table 5-55 above comply during the Day at all considered receiver locations, comply during the Evening at all considered receiver locations, and do not comply during the Night at all considered receiver locations excluding R8 (Level 1 and Level 2) and R9 (Level 1 and Level 2) when assessed against the Amenity Criterion.

Table 5-56: Scenario 3 – Condition A: Building & On Site Traffic & RSD's Open					
Receiver	Level	Day dB(A)	Evening dB(A)	Night dB(A)	Shoulder Period dB(A)
Residential					
R1	1	38	37	37	40
R1	2	39	37	37	41
R2	1	38	36	36	40
R2	2	39	37	37	40
R3	1	43	41	41	44
R3	2	43	42	42	44
R4	1	39	37	37	40
R4	2	40	38	38	40
R5	1	35	33	33	35
R5	2	35	33	33	36
R6	1	36	34	34	36
R6	2	36	34	34	37
R7	1	39	37	37	40
R7	2	40	38	38	41
R8	1	28	25	25	30
R8	2	28	25	25	30
R9	1	31	28	28	33
R9	2	32	29	29	34
R10	1	35	32	32	37
R10	2	35	33	33	38
R11	1	37	34	34	39
R11	2	38	35	35	40
Recreational					
R12	1	48	47	47	49
R13	1	47	46	46	48

Note: Cells containing bold values have exceeded the 'Amenity Criterion' detailed within Table 5-36;

The predicted noise levels displayed in Table 5-56 above comply during the Day at all considered receiver locations, comply during the Evening at all considered receiver locations excluding, and do not comply during the Night at all considered receiver locations excluding R8 (Level 1 and Level 2), R9 (Level 1 and Level 2) and R10 (Level 1) when assessed against the Amenity Criterion.

Table 5-57: Scenario 3 – Condition B/C: Building & On Site Traffic & RSD's Open					
Receiver	Level	Day dB(A)	Evening dB(A)	Night dB(A)	Shoulder Period dB(A)
Residential					
R1	1	42	39	39	43
R1	2	42	40	40	43
R2	1	41	39	39	43
R2	2	42	39	39	43
R3	1	45	43	43	47
R3	2	46	44	44	47
R4	1	42	40	40	43
R4	2	42	40	40	43
R5	1	38	36	36	39
R5	2	38	36	36	39
R6	1	39	37	37	40
R6	2	39	37	37	40
R7	1	42	40	40	43
R7	2	43	41	41	44
R8	1	32	28	28	34
R8	2	32	28	28	35
R9	1	35	31	31	37
R9	2	35	32	32	38
R10	1	38	35	35	41
R10	2	38	35	35	41
R11	1	40	37	37	42
R11	2	40	37	37	43
Recreational					
R12	1	50	49	49	51
R13	1	49	47	47	50

Note: Cells containing bold values have exceeded the 'Amenity Criterion' detailed within Table 5-36;

The predicted noise levels displayed in Table 5-57 above comply during the Day at all considered receiver locations, comply during the Evening at all considered receiver locations excluding R3 (Level 1 and Level 2), and does not comply during the Night at all considered receiver locations excluding R8 (Level 1 and Level 2) and R9 (Level 1 and Level 2) when assessed against the Amenity Criterion.

Table 5-58: Scenario 4 – Condition A: Building & On Site Traffic & RSD's Closed					
Receiver	Level	Day dB(A)	Evening dB(A)	Night dB(A)	Shoulder Period dB(A)
Residential					
R1	1	37	35	35	39
R1	2	38	35	35	40
R2	1	37	35	35	39
R2	2	38	35	35	39
R3	1	41	39	39	43
R3	2	42	40	40	43
R4	1	38	35	35	38
R4	2	38	36	36	39
R5	1	33	31	31	34
R5	2	34	31	31	35
R6	1	34	31	31	34
R6	2	34	32	32	35
R7	1	37	34	34	38
R7	2	38	35	35	39
R8	1	28	24	24	30
R8	2	28	25	25	30
R9	1	31	27	27	33
R9	2	31	28	28	34
R10	1	34	31	31	37
R10	2	35	32	32	37
R11	1	36	33	33	38
R11	2	37	34	34	40
Recreational					
R12	1	46	42	42	47
R13	1	45	42	42	46

Note: Cells containing bold values have exceeded the 'Amenity Criterion' detailed within Table 5-36;

The predicted noise levels displayed in Table 5-58 above comply during the Day at all considered receiver locations, comply during the Evening at all considered receiver locations, and do not comply during the Night at all considered receiver locations excluding R5 (Level 1 and Level 2), R6 (Level 1 and Level 2), R8 (Level 1 and Level 2), R9 (Level 1 and Level 2) and R10 (Level 1 and Level 2) when assessed against the Amenity Criterion.

Table 5-59: Scenario 4 – Condition B/C: Building & On Site Traffic & RSD's Closed					
Receiver	Level	Day dB(A)	Evening dB(A)	Night dB(A)	Shoulder Period dB(A)
Residential					
R1	1	40	37	37	42
R1	2	41	37	37	43
R2	1	40	37	37	42
R2	2	40	37	37	42
R3	1	44	40	40	46
R3	2	44	40	40	46
R4	1	41	37	37	42
R4	2	41	37	37	42
R5	1	37	33	33	38
R5	2	37	33	33	38
R6	1	37	33	33	38
R6	2	38	34	34	38
R7	1	40	36	36	42
R7	2	41	36	36	42
R8	1	32	27	27	34
R8	2	32	27	27	34
R9	1	35	30	30	37
R9	2	35	30	30	37
R10	1	38	33	33	40
R10	2	38	34	34	41
R11	1	39	35	35	42
R11	2	40	36	36	43
Recreational					
R12	1	47	43	43	49
R13	1	47	43	43	48

Note: Cells containing bold values have exceeded the 'Amenity Criterion' detailed within Table 5-36;

The predicted noise levels displayed in Table 5-59 above comply during the Day at all considered receiver locations, comply during the Evening at all considered receiver locations, and do not comply during the Night at all considered receiver locations excluding R8 (Level 1 and Level 2) and R9 (Level 1 and Level 2) when assessed against the Amenity Criterion.

Table 5-60: Summary of On-Site Operational Predicted Noise Levels Considering The Amenity Criterion

Receiver	Level	Scenario 1 - Condition A			Scenario 1 - Condition B/C			Scenario 2 - Condition A			Scenario 2 - Condition B/C			Scenario 3 - Condition A			Scenario 3 - Condition B/C			Scenario 4 - Condition A			Scenario 4 - Condition B/C		
		Day	Evening	Night	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night
		dB(A)			dB(A)			dB(A)			dB(A)			dB(A)			dB(A)			dB(A)			dB(A)		
Residential																									
R1	1	37	37	37	40	39	39	35	35	35	38	37	37	38	37	37	42	39	39	37	35	35	40	37	37
R1	2	38	37	37	40	40	40	36	35	35	38	37	37	39	37	37	42	40	40	38	35	35	41	37	37
R2	1	37	36	36	40	39	39	35	35	35	38	37	36	38	36	36	41	39	39	37	35	35	40	37	37
R2	2	38	37	37	40	39	39	36	35	35	38	37	37	39	37	37	42	39	39	38	35	35	40	37	37
R3	1	42	41	41	44	43	43	40	39	39	42	40	40	43	41	41	45	43	43	41	39	39	44	40	40
R3	2	42	42	42	44	44	44	40	40	40	42	40	40	43	42	42	46	44	44	42	40	40	44	40	40
R4	1	38	37	37	41	40	40	36	35	35	39	37	37	39	37	37	42	40	40	38	35	35	41	37	37
R4	2	39	38	38	41	40	40	37	36	35	39	37	37	40	38	38	42	40	40	38	36	36	41	37	37
R5	1	34	33	33	37	36	36	32	31	31	35	33	33	35	33	33	38	36	36	33	31	31	37	33	33
R5	2	34	33	33	37	36	36	33	31	31	35	33	33	35	33	33	38	36	36	34	31	31	37	33	33
R6	1	35	34	34	38	37	37	33	31	31	36	33	33	36	34	34	39	37	37	34	31	31	37	33	33
R6	2	35	34	34	38	37	37	33	32	32	36	34	33	36	34	34	39	37	37	34	32	32	38	34	34
R7	1	38	37	37	41	40	40	35	34	34	38	36	36	39	37	37	42	40	40	37	34	34	40	36	36
R7	2	39	38	38	41	41	41	36	35	35	38	36	36	40	38	38	43	41	41	38	35	35	41	36	36
R8	1	26	25	25	29	28	28	25	24	24	28	27	27	28	25	25	32	28	28	28	24	24	32	27	27
R8	2	26	25	25	29	28	28	25	25	25	29	27	27	28	25	25	32	28	28	28	25	25	32	27	27
R9	1	29	28	28	32	31	31	28	27	27	31	30	30	31	28	28	35	31	31	31	27	27	35	30	30
R9	2	29	29	29	32	32	32	29	28	28	31	30	30	32	29	29	35	32	32	31	28	28	35	30	30
R10	1	32	32	32	35	35	34	31	31	31	34	33	33	35	32	32	38	35	35	34	31	31	38	33	33
R10	2	33	33	33	35	35	35	32	32	32	34	34	34	35	33	33	38	35	35	35	32	32	38	34	34
R11	1	34	34	34	37	37	37	33	33	33	35	35	35	37	34	34	40	37	37	36	33	33	39	35	35
R11	2	35	35	35	37	37	37	34	34	34	36	36	36	38	35	35	40	37	37	37	34	34	40	36	36
Recreational																									
R12	1	48	47	47	49	49	49	44	42	42	45	43	43	48	47	47	50	49	49	46	42	42	47	43	43
R13	1	46	46	46	48	47	47	44	42	42	45	43	43	47	46	46	49	47	47	45	42	42	47	43	43

Note: Cells containing bold values have exceeded the 'Amenity Criterion' detailed within Table 5-36;

5.2.5.6 Noise Control Measures

Due to the predicted exceedances throughout the Day and Shoulder Period, when assessing noise levels against the Intrusive Criterion, and the noise exceedances throughout the Evening and Night time periods, when assessing noise levels against the Amenity Criterion, noise control measures have been recommended in order to mitigate the noise emissions.

The primary noise source contributors were identified as being the open Roller Shutter Doors (RSD's) (particularly along the eastern façade of the building), trucks (particularly when entering the site and when on the eastern side of the building), sections of steel roof cladding and perspex roof skylights, and sections of steel cladding along the eastern façade of the building.

Listed below are the recommended noise control measures.

1. Throughout the night time hours (10pm – 7am) all roller shutter doors must remain in the closed position;

2. Throughout the night time hours (10pm – 7am) all vehicles frequenting the site, namely trucks, must not use engine brakes;

3. Throughout the early morning shoulder period hours (5am – 7am) all trucks frequenting the site must not travel any further than the middle of the southern façade of the warehouse;

4. Truck numbers must not exceed the numbers provided in Table 5-42 above. If future increase is desired a supplementary noise assessment should be undertaken;

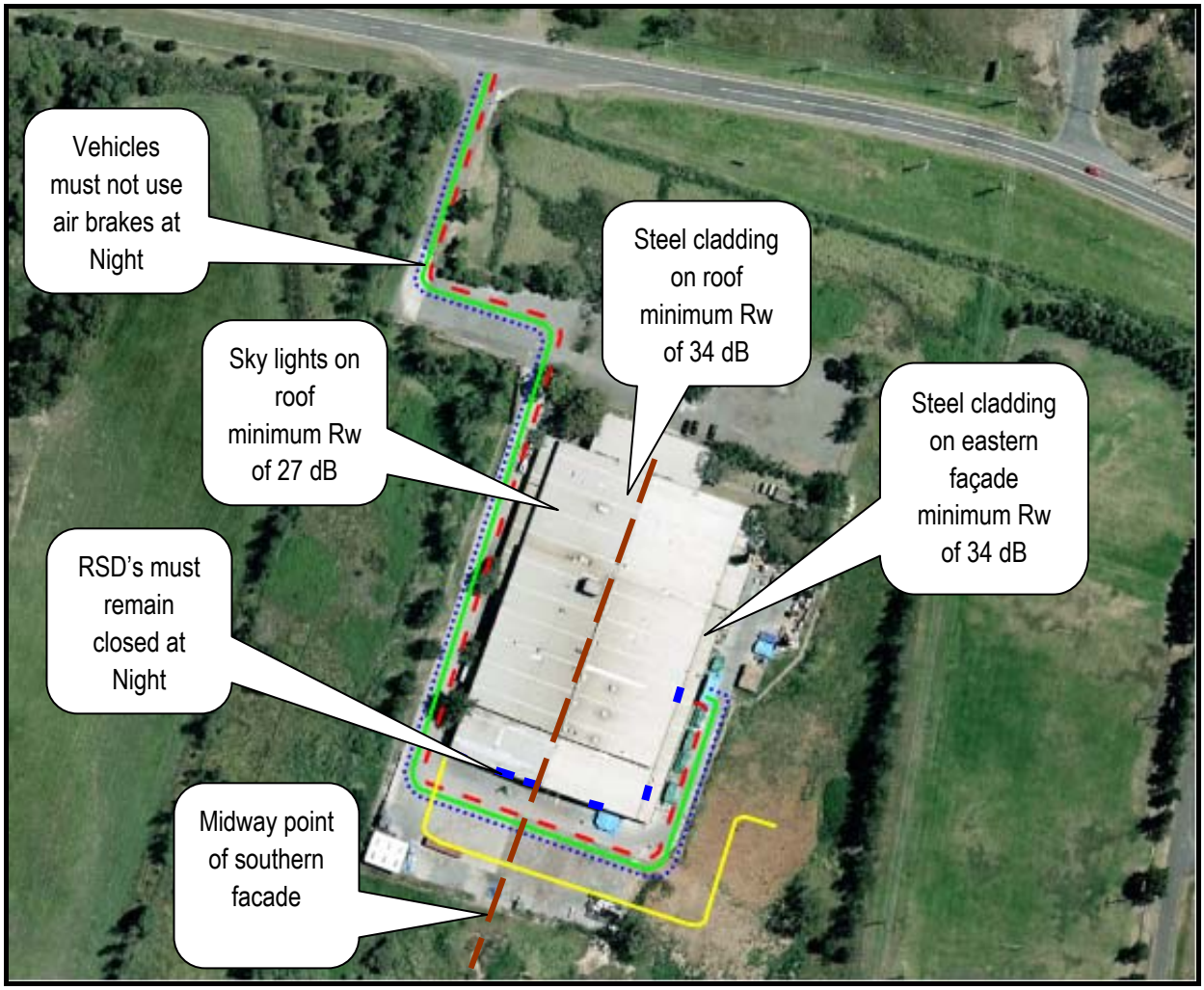
5. The steel cladding components of the existing roof must achieve a minimum Rw (Weighted Reduction Index) of 34 dB;

6. The sky light components of the existing roof must achieve a minimum Rw (Weighted Reduction Index) of 27 dB; and

7. The steel cladding components of the eastern façade must achieve a minimum Rw (Weighted Reduction Index) of 34 dB.

These noise controls were introduced into the predictive noise model and the noise levels recalculated. Figure 5-37 below identifies the location of the noise treatments.

Figure 5-37: Noise Control Measures



5.2.5.7 On-Site Operational Predicted Noise Levels with Recommended Noise Controls Intrusive

Table 5-61: Scenario 1 – Condition A: Building Only & RSD's Open

Receiver	Level	Day dB(A)	Evening dB(A)	Night dB(A)	Shoulder Period dB(A)
Residential					
R1	1	34	33	33	33
R1	2	35	34	34	34
R2	1	34	33	33	33
R2	2	35	34	34	34
R3	1	39	38	38	38
R3	2	40	39	39	39
R4	1	36	34	34	34
R4	2	36	35	35	35
R5	1	31	29	29	29
R5	2	32	30	30	30
R6	1	33	31	31	31
R6	2	33	32	32	32
R7	1	36	35	35	35
R7	2	37	36	36	36
R8	1	23	22	22	22
R8	2	24	22	22	22
R9	1	26	25	25	25
R9	2	26	25	25	25
R10	1	28	28	28	28
R10	2	29	29	29	29
R11	1	30	30	30	30
R11	2	31	31	31	31
Recreational					
R12*	1	46	46	46	46
R13*	1	45	44	44	44

Note: Cells containing bold values have exceeded the 'Intrusive Criterion' detailed within Table 5-36;
* indicates that the receiver does not need to be assessed against the 'Intrusive Criterion' as the receiver type is deemed 'Active Recreational';

The predicted noise levels displayed in Table 5-61 above comply when assessed against the Intrusive Criterion at all considered receiver locations.

Table 5-62: Scenario 1 – Condition B/C: Building Only & RSD's Open

Receiver	Level	Day dB(A)	Evening dB(A)	Night dB(A)	Shoulder Period dB(A)
Residential					
R1	1	38	37	37	37
R1	2	38	37	37	37
R2	1	38	36	36	36
R2	2	38	37	37	37
R3	1	42	41	41	41
R3	2	42	41	41	41
R4	1	39	37	37	37
R4	2	40	38	38	38
R5	1	35	33	33	33
R5	2	35	33	33	33
R6	1	37	35	35	35
R6	2	37	35	35	35
R7	1	40	39	39	39
R7	2	40	39	39	39
R8	1	27	25	25	25
R8	2	27	25	25	25
R9	1	29	28	28	28
R9	2	30	28	28	28
R10	1	32	31	31	31
R10	2	32	31	31	31
R11	1	33	33	33	33
R11	2	34	34	34	34
Recreational					
R12*	1	49	48	48	48
R13*	1	47	46	46	46

Note: Cells containing bold values have exceeded the 'Intrusive Criterion' detailed within Table 5-36;
* indicates that the receiver does not need to be assessed against the 'Intrusive Criterion' as the receiver type is deemed 'Active Recreational';

The predicted noise levels displayed in Table 5-62 above comply when assessed against the Intrusive Criterion at all considered receiver locations.

Table 5-63: Scenario 2 – Condition A: Building Only & RSD's Closed

Receiver	Level	Day dB(A)	Evening dB(A)	Night dB(A)	Shoulder Period dB(A)
Residential					
R1	1	30	27	27	27
R1	2	30	28	28	28
R2	1	30	27	27	27
R2	2	30	27	27	27
R3	1	34	31	31	31
R3	2	35	31	31	31
R4	1	32	27	27	27
R4	2	32	27	27	27
R5	1	28	23	23	23
R5	2	29	23	23	23
R6	1	29	24	24	24
R6	2	30	24	24	24
R7	1	31	27	27	27
R7	2	32	27	27	27
R8	1	22	19	19	19
R8	2	22	20	20	20
R9	1	24	22	22	22
R9	2	25	23	23	23
R10	1	26	26	26	26
R10	2	27	26	26	26
R11	1	28	27	27	27
R11	2	28	28	28	28
Recreational					
R12*	1	40	35	35	35
R13*	1	40	34	34	34

Note: Cells containing bold values have exceeded the 'Intrusive Criterion' detailed within Table 5-36;
* indicates that the receiver does not need to be assessed against the 'Intrusive Criterion' as the receiver type is deemed 'Active Recreational';

The predicted noise levels displayed in Table 5-63 above comply when assessed against the Intrusive Criterion at all considered receiver locations.

Table 5-64: Scenario 2 – Condition B/C: Building Only & RSD's Closed

Receiver	Level	Day dB(A)	Evening dB(A)	Night dB(A)	Shoulder Period dB(A)
Residential					
R1	1	33	29	29	29
R1	2	33	29	29	29
R2	1	34	29	29	29
R2	2	34	29	29	29
R3	1	37	32	32	32
R3	2	38	32	32	32
R4	1	36	29	29	29
R4	2	36	29	29	29
R5	1	32	25	25	25
R5	2	32	25	25	25
R6	1	33	26	26	26
R6	2	33	26	26	26
R7	1	35	29	29	29
R7	2	35	29	29	29
R8	1	25	22	22	22
R8	2	25	22	22	22
R9	1	27	25	25	25
R9	2	28	25	25	25
R10	1	29	28	28	28
R10	2	29	28	28	28
R11	1	30	30	29	29
R11	2	30	30	30	30
Recreational					
R12*	1	41	36	36	36
R13*	1	43	35	35	35

Note: Cells containing bold values have exceeded the 'Intrusive Criterion' detailed within Table 5-36;
* indicates that the receiver does not need to be assessed against the 'Intrusive Criterion' as the receiver type is deemed 'Active Recreational';

The predicted noise levels displayed in Table 5-64 above comply when assessed against the Intrusive Criterion at all considered receiver locations.

Table 5-65: Scenario 3 – Condition A: Building & On Site Traffic & RSD's Open					
Receiver	Level	Day dB(A)	Evening dB(A)	Night dB(A)	Shoulder Period
Residential					
R1	1	42	33	33	41
R1	2	43	34	34	42
R2	1	42	33	33	40
R2	2	42	34	34	41
R3	1	46	38	38	44
R3	2	46	39	39	44
R4	1	42	34	34	39
R4	2	42	35	35	39
R5	1	37	29	34	34
R5	2	38	30	30	35
R6	1	38	31	31	35
R6	2	39	32	32	35
R7	1	42	35	35	39
R7	2	43	36	36	40
R8	1	33	22	22	33
R8	2	34	22	22	33
R9	1	36	25	25	36
R9	2	37	25	25	37
R10	1	40	28	28	40
R10	2	41	29	29	41
R11	1	42	30	30	42
R11	2	43	31	31	43
Recreational					
R12*	1	53	46	46	49
R13*	1	49	48	48	45

Note: Cells containing bold values have exceeded the 'Intrusive Criterion' detailed within Table 5-36;
* indicates that the receiver does not need to be assessed against the 'Intrusive Criterion' as the receiver type is deemed 'Active Recreational';

The predicted noise levels displayed in Table 5-65 above comply when assessed against the Intrusive Criterion at all considered receiver locations.

Table 5-66: Scenario 3 – Condition B/C: Building & On Site Traffic & RSD's Open

Receiver	Level	Day dB(A)	Evening dB(A)	Night dB(A)	Shoulder Period dB(A)
Residential					
R1	1	46	37	37	45
R1	2	46	37	37	45
R2	1	46	36	36	44
R2	2	46	37	37	44
R3	1	49	41	41	47
R3	2	49	41	41	47
R4	1	46	37	37	43
R4	2	46	38	38	43
R5	1	42	33	33	38
R5	2	42	33	33	38
R6	1	42	35	35	39
R6	2	43	35	35	39
R7	1	46	39	39	43
R7	2	46	39	39	43
R8	1	38	25	25	38
R8	2	38	25	25	38
R9	1	41	28	28	41
R9	2	41	28	28	41
R10	1	44	31	31	44
R10	2	44	31	31	44
R11	1	45	33	33	45
R11	2	46	34	34	46
Recreational					
R12*	1	55	49	49	52
R13*	1	52	46	46	48

Note: Cells containing bold values have exceeded the 'Intrusive Criterion' detailed within Table 5-36;
* indicates that the receiver does not need to be assessed against the 'Intrusive Criterion' as the receiver type is deemed 'Active Recreational';

The predicted noise levels displayed in Table 5-66 above comply during the Day at all considered receiver locations excluding R3 (Level 1 and Level2), comply during the Evening at all considered receiver locations, comply during the Night at all considered receiver locations and comply during the Shoulder Period at all considered receiver locations excluding R3 (Level 1 and Level2) when assessed against the Intrusive Criterion.

Table 5-67: Scenario 4 – Condition A: Building & On Site Traffic & RSD's Closed					
Receiver	Level	Day dB(A)	Evening dB(A)	Night dB(A)	Shoulder Period dB(A)
Residential					
R1	1	42	27	27	40
R1	2	43	28	28	42
R2	1	41	27	27	40
R2	2	42	27	27	40
R3	1	45	31	31	42
R3	2	46	31	31	43
R4	1	41	27	27	37
R4	2	42	27	27	38
R5	1	37	23	23	33
R5	2	37	23	23	33
R6	1	37	24	24	33
R6	2	38	24	24	33
R7	1	41	27	27	37
R7	2	42	27	27	38
R8	1	33	19	19	33
R8	2	33	20	20	33
R9	1	36	22	22	36
R9	2	37	23	23	37
R10	1	40	26	26	40
R10	2	41	26	26	40
R11	1	41	27	27	41
R11	2	43	28	28	43
Recreational					
R12*	1	52	35	35	46
R13*	1	48	34	34	41

Note: Cells containing bold values have exceeded the 'Intrusive Criterion' detailed within Table 5-36;
* indicates that the receiver does not need to be assessed against the 'Intrusive Criterion' as the receiver type is deemed 'Active Recreational';

The predicted noise levels displayed in Table 5-67 above comply when assessed against the Intrusive Criterion at all considered receiver locations.

Table 5-68: Scenario 4 – Condition B/C: Building & On Site Traffic & RSD's Closed					
Receiver	Level	Day dB(A)	Evening dB(A)	Night dB(A)	Shoulder Period dB(A)
Residential					
R1	1	45	29	29	44
R1	2	46	29	29	45
R2	1	45	29	29	43
R2	2	46	29	29	44
R3	1	49	32	32	46
R3	2	49	32	32	46
R4	1	45	29	29	41
R4	2	45	29	29	41
R5	1	41	25	25	37
R5	2	41	25	25	37
R6	1	42	26	26	37
R6	2	42	26	26	37
R7	1	45	29	29	41
R7	2	46	29	29	41
R8	1	38	22	22	38
R8	2	38	22	22	38
R9	1	41	25	25	41
R9	2	41	25	25	41
R10	1	44	28	28	44
R10	2	44	28	28	44
R11	1	45	30	30	45
R11	2	46	30	30	46
Recreational					
R12*	1	54	36	36	49
R13*	1	51	35	35	44

Note: Cells containing bold values have exceeded the 'Intrusive Criterion' detailed within Table 5-36;
* indicates that the receiver does not need to be assessed against the 'Intrusive Criterion' as the receiver type is deemed 'Active Recreational';

The predicted noise levels displayed in Table 5-68 above comply during the Day at all considered receiver locations excluding R3 (Level 1 and Level2), comply during the Evening at all considered receiver locations, comply during the Night at all considered receiver locations and comply during the Shoulder Period at all considered receiver locations when assessed against the Intrusive Criterion.

Table 5-69: Summary of On-Site Operational Predicted Noise Levels Considering The Intrusive Criterion and Noise Control Measures

Receiver	Level	Scenario 1 - Condition A			Scenario 1 - Condition B/C			Scenario 2 - Condition A			Scenario 2 - Condition B/C			Scenario 3 - Condition A			Scenario 3 - Condition B/C			Scenario 4 - Condition A			Scenario 4 - Condition B/C		
		Day	Evening	Night	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night
		dB(A)			dB(A)			dB(A)			dB(A)			dB(A)			dB(A)			dB(A)			dB(A)		
Residential																									
R1	1	34	33	33	38	37	37	30	27	27	33	29	29	42	33	33	46	37	37	42	27	27	45	29	29
R1	2	35	34	34	38	37	37	30	28	28	33	29	29	43	34	34	46	37	37	43	28	28	46	29	29
R2	1	34	33	33	38	36	36	30	27	27	34	29	29	42	33	33	46	36	36	41	27	27	45	29	29
R2	2	35	34	34	38	37	37	30	27	27	34	29	29	42	34	34	46	37	37	42	27	27	46	29	29
R3	1	39	38	38	42	41	41	34	31	31	37	32	32	46	38	38	49	41	41	45	31	31	49	32	32
R3	2	40	39	39	42	41	41	35	31	31	38	32	32	46	39	39	49	41	41	46	31	31	49	32	32
R4	1	36	34	34	39	37	37	32	27	27	36	29	29	42	34	34	46	37	37	41	27	27	45	29	29
R4	2	36	35	35	40	38	38	32	27	27	36	29	29	42	35	35	46	38	38	42	27	27	45	29	29
R5	1	31	29	29	35	33	33	28	23	23	32	25	25	37	29	34	42	33	33	37	23	23	41	25	25
R5	2	32	30	30	35	33	33	29	23	23	32	25	25	38	30	30	42	33	33	37	23	23	41	25	25
R6	1	33	31	31	37	35	35	29	24	24	33	26	26	38	31	31	42	35	35	37	24	24	42	26	26
R6	2	33	32	32	37	35	35	30	24	24	33	26	26	39	32	32	43	35	35	38	24	24	42	26	26
R7	1	36	35	35	40	39	39	31	27	27	35	29	29	42	35	35	46	39	39	41	27	27	45	29	29
R7	2	37	36	36	40	39	39	32	27	27	35	29	29	43	36	36	46	39	39	42	27	27	46	29	29
R8	1	23	22	22	27	25	25	22	19	19	25	22	22	33	22	22	38	25	25	33	19	19	38	22	22
R8	2	24	22	22	27	25	25	22	20	20	25	22	22	34	22	22	38	25	25	33	20	20	38	22	22
R9	1	26	25	25	29	28	28	24	22	22	27	25	25	36	25	25	41	28	28	36	22	22	41	25	25
R9	2	26	25	25	30	28	28	25	23	23	28	25	25	37	25	25	41	28	28	37	23	23	41	25	25
R10	1	28	28	28	32	31	31	26	26	26	29	28	28	40	28	28	44	31	31	40	26	26	44	28	28
R10	2	29	29	29	32	31	31	27	26	26	29	28	28	41	29	29	44	31	31	41	26	26	44	28	28
R11	1	30	30	30	33	33	33	28	27	27	30	30	29	42	30	30	45	33	33	41	27	27	45	30	30
R11	2	31	31	31	34	34	34	28	28	28	30	30	30	43	31	31	46	34	34	43	28	28	46	30	30
Recreational																									
R12*	1	46	46	46	49	48	48	40	35	35	41	36	36	53	46	46	55	49	49	52	35	35	54	36	36
R13*	1	45	44	44	47	46	46	40	34	34	43	35	35	49	48	48	52	46	46	48	34	34	51	35	35

Note: Cells containing bold values have exceeded the 'Intrusive Criterion' detailed within Table 5-36;
* indicates that the receiver does not need to be assessed against the 'Intrusive Criterion' as the receiver type is deemed 'Active Recreational';

5.2.5.8 On-Site Operational Predicted Noise Levels with Recommended Noise Controls Amenity

Table 5-70: Scenario 1 – Condition A: Building Only & RSD's Open

Receiver	Level	Day dB(A)	Evening dB(A)	Night dB(A)	Shoulder Period dB(A)
Residential					
R1	1	34	33	33	33
R1	2	35	34	34	34
R2	1	34	33	33	33
R2	2	35	34	34	34
R3	1	39	38	38	38
R3	2	40	39	39	39
R4	1	36	34	34	34
R4	2	36	35	35	35
R5	1	31	29	29	29
R5	2	32	30	30	30
R6	1	33	31	31	31
R6	2	33	32	32	32
R7	1	36	35	35	35
R7	2	37	36	36	36
R8	1	23	22	22	21
R8	2	24	22	22	22
R9	1	26	25	25	25
R9	2	26	25	25	25
R10	1	28	28	28	28
R10	2	29	29	29	28
R11	1	30	30	30	30
R11	2	31	31	31	31
Recreational					
R12	1	46	46	46	46
R13	1	45	44	44	44

Note: Cells containing bold values have exceeded the 'Amenity Criterion' detailed within Table 5-36;

The predicted noise levels displayed in Table 5-70 above comply during the Day at all considered receiver locations, comply during the Evening at all considered receiver locations, and comply during the Night at all considered receiver locations excluding R1 (Level 1 and Level 2), R2 (Level 1 and Level 2), R3 (Level 1 and Level 2), R4 (Level 1 and Level 2) and R7 (Level 1 and Level 2) when assessed against the Amenity Criterion.

Table 5-71: Scenario 1 – Condition B/C: Building Only & RSD's Open					
Receiver	Level	Day dB(A)	Evening dB(A)	Night dB(A)	Shoulder Period dB(A)
Residential					
R1	1	38	37	37	37
R1	2	38	37	37	37
R2	1	38	36	36	36
R2	2	38	37	37	37
R3	1	42	41	41	41
R3	2	42	41	41	41
R4	1	39	37	37	37
R4	2	40	38	38	38
R5	1	35	33	33	33
R5	2	35	33	33	33
R6	1	37	35	35	35
R6	2	37	35	35	35
R7	1	40	39	39	39
R7	2	40	39	39	39
R8	1	27	25	25	25
R8	2	27	25	25	25
R9	1	29	28	28	28
R9	2	30	28	28	28
R10	1	32	31	31	31
R10	2	32	31	31	31
R11	1	33	33	33	33
R11	2	34	34	34	33
Recreational					
R12	1	49	48	48	48
R13	1	47	46	46	46

Note: Cells containing bold values have exceeded the 'Amenity Criterion' detailed within Table 5-36;

The predicted noise levels displayed in Table 5-71 above comply during the Day at all considered receiver locations, comply during the Evening at all considered receiver locations, and do not comply during the Night at all considered receiver locations excluding R8 (Level 1 and Level 2), R9 (Level 1 and Level 2) and R10 (Level 1 and Level 2) when assessed against the Amenity Criterion.

Table 5-72: Scenario 2 – Condition A: Building Only & RSD's Closed					
Receiver	Level	Day dB(A)	Evening dB(A)	Night dB(A)	Shoulder Period dB(A)
Residential					
R1	1	30	27	27	27
R1	2	30	28	28	28
R2	1	30	27	27	27
R2	2	30	27	27	27
R3	1	34	31	31	31
R3	2	35	31	31	31
R4	1	32	27	27	27
R4	2	32	27	27	27
R5	1	28	23	23	23
R5	2	29	23	23	23
R6	1	29	24	24	24
R6	2	30	24	24	24
R7	1	31	27	27	27
R7	2	32	27	27	27
R8	1	22	19	19	19
R8	2	22	20	20	20
R9	1	24	22	22	22
R9	2	25	23	23	23
R10	1	26	26	26	26
R10	2	27	26	26	26
R11	1	28	27	27	27
R11	2	28	28	28	28
Recreational					
R12	1	40	35	35	35
R13	1	40	34	34	34

Note: Cells containing bold values have exceeded the 'Amenity Criterion' detailed within Table 5-36;

The predicted noise levels displayed in Table 5-72 above comply during the Day at all considered receiver locations, comply during the Evening at all considered receiver locations, and comply during the Night at all considered receiver locations when assessed against the Amenity Criterion.

Table 5-73: Scenario 2 – Condition B/C: Building Only & RSD's Closed

Receiver	Level	Day dB(A)	Evening dB(A)	Night dB(A)	Shoulder Period dB(A)
Residential					
R1	1	33	29	29	29
R1	2	33	29	29	29
R2	1	34	29	29	29
R2	2	34	29	29	29
R3	1	37	32	32	32
R3	2	38	32	32	32
R4	1	36	29	29	29
R4	2	36	29	29	29
R5	1	32	25	25	25
R5	2	32	25	25	25
R6	1	33	26	26	26
R6	2	33	26	26	26
R7	1	35	29	29	29
R7	2	35	29	29	29
R8	1	25	22	22	22
R8	2	25	22	22	22
R9	1	27	25	25	25
R9	2	28	25	25	25
R10	1	29	28	28	28
R10	2	29	28	28	28
R11	1	30	30	29	29
R11	2	30	30	30	30
Recreational					
R12	1	41	36	36	36
R13	1	43	35	35	35

Note: Cells containing bold values have exceeded the 'Amenity Criterion' detailed within Table 5-36;

The predicted noise levels displayed in Table 5-73 above comply during the Day at all considered receiver locations, comply during the Evening at all considered receiver locations, and comply during the Night at all considered receiver locations when assessed against the Amenity Criterion.

Table 5-74: Scenario 3 – Condition A: Building & On Site Traffic & RSD's Open					
Receiver	Level	Day dB(A)	Evening dB(A)	Night dB(A)	Shoulder Period dB(A)
Residential					
R1	1	36	33	33	38
R1	2	37	34	34	39
R2	1	36	33	33	38
R2	2	37	34	34	39
R3	1	41	38	38	42
R3	2	42	39	39	43
R4	1	37	34	34	38
R4	2	38	35	35	39
R5	1	33	29	29	34
R5	2	33	30	30	34
R6	1	34	31	31	35
R6	2	35	32	32	35
R7	1	38	35	35	39
R7	2	38	36	36	39
R8	1	27	22	22	29
R8	2	27	22	22	29
R9	1	30	25	25	32
R9	2	30	25	25	33
R10	1	33	28	28	36
R10	2	34	29	29	37
R11	1	35	30	30	38
R11	2	36	31	31	39
Recreational					
R12	1	48	46	46	49
R13	1	46	44	44	47

Note: Cells containing bold values have exceeded the 'Amenity Criterion' detailed within Table 5-36;

The predicted noise levels displayed in Table 5-74 above comply during the Day at all considered receiver locations, comply during the Evening at all considered receiver locations, and comply during the Night at all considered receiver locations excluding R1 (Level 1 and Level 2), R2 (Level 1 and Level 2), R3 (Level 1 and Level 2) and R7 (Level 1 and Level 2) when assessed against the Amenity Criterion.

Table 5-75: Scenario 3 – Condition B/C: Building & On Site Traffic & RSD's Open					
Receiver	Level	Day dB(A)	Evening dB(A)	Night dB(A)	Shoulder Period dB(A)
Residential					
R1	1	40	37	37	43
R1	2	41	37	37	43
R2	1	40	36	36	42
R2	2	40	37	37	42
R3	1	44	41	41	46
R3	2	44	41	41	46
R4	1	41	37	37	42
R4	2	41	38	38	42
R5	1	37	33	33	38
R5	2	37	33	33	38
R6	1	38	35	35	39
R6	2	38	35	35	39
R7	1	41	39	39	43
R7	2	42	39	39	43
R8	1	31	25	25	34
R8	2	31	25	25	34
R9	1	34	28	28	37
R9	2	34	28	28	37
R10	1	37	31	31	40
R10	2	37	31	31	40
R11	1	38	33	33	42
R11	2	39	34	34	42
Recreational					
R12	1	50	48	48	51
R13	1	49	46	46	49

Note: Cells containing bold values have exceeded the 'Amenity Criterion' detailed within Table 5-36;

The predicted noise levels displayed in Table 5-75 above comply during the Day at all considered receiver locations, comply during the Evening at all considered receiver locations, and do not comply during the Night at all considered receiver locations excluding R8 (Level 1 and Level 2), R9 (Level 1 and Level 2) and R10 (Level 1 and Level 2 when assessed against the Amenity Criterion.

Table 5-76: Scenario 4 – Condition A: Building & On Site Traffic & RSD's Closed					
Receiver	Level	Day dB(A)	Evening dB(A)	Night dB(A)	Shoulder Period dB(A)
Residential					
R1	1	34	27	27	37
R1	2	35	28	28	38
R2	1	34	27	27	37
R2	2	35	27	27	38
R3	1	38	31	31	41
R3	2	39	31	31	41
R4	1	35	27	27	37
R4	2	35	27	27	37
R5	1	31	23	23	32
R5	2	31	23	23	33
R6	1	32	24	24	33
R6	2	32	24	24	33
R7	1	35	27	27	37
R7	2	35	27	27	38
R8	1	26	19	19	29
R8	2	26	20	20	29
R9	1	29	22	22	32
R9	2	30	23	23	33
R10	1	32	26	26	36
R10	2	33	26	26	36
R11	1	34	27	27	37
R11	2	35	28	28	39
Recreational					
R12	1	43	35	35	46
R13	1	43	34	34	44

Note: Cells containing bold values have exceeded the 'Amenity Criterion' detailed within Table 5-36;

The predicted noise levels displayed in Table 5-76 above comply during the Day at all considered receiver locations, comply during the Evening at all considered receiver locations, and comply during the Night at all considered receiver locations when assessed against the Amenity Criterion.

Table 5-77: Scenario 4 – Condition B/C: Building & On-Site Traffic & RSD's Closed					
Receiver	Level	Day dB(A)	Evening dB(A)	Night dB(A)	Shoulder Period dB(A)
Residential					
R1	1	38	29	29	41
R1	2	39	29	29	42
R2	1	38	29	29	41
R2	2	38	29	29	41
R3	1	42	32	32	44
R3	2	42	32	32	44
R4	1	39	29	29	40
R4	2	39	29	29	41
R5	1	35	25	25	37
R5	2	35	25	25	37
R6	1	36	26	26	37
R6	2	36	26	26	37
R7	1	39	29	29	40
R7	2	39	29	29	41
R8	1	31	22	22	34
R8	2	31	22	22	34
R9	1	33	25	25	37
R9	2	34	25	25	37
R10	1	36	28	28	40
R10	2	36	28	28	40
R11	1	37	30	30	41
R11	2	38	30	30	42
Recreational					
R12	1	45	36	36	48
R13	1	46	35	35	46

Note: Cells containing bold values have exceeded the 'Amenity Criterion' detailed within Table 5-36;

The predicted noise levels displayed in Table 5-77 above comply during the Day at all considered receiver locations, comply during the Evening at all considered receiver locations, and comply during the Night at all considered receiver locations when assessed against the Amenity Criterion.

Table 5-78: Summary of On-Site Operational Predicted Noise Levels Considering the Amenity Criterion and Noise Control Measures

Receiver	Level	Scenario 1 - Condition A			Scenario 1 - Condition B/C			Scenario 2 - Condition A			Scenario 2 - Condition B/C			Scenario 3 - Condition A			Scenario 3 - Condition B/C			Scenario 4 - Condition A			Scenario 4 - Condition B/C		
		Day	Evening	Night	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night
		dB(A)			dB(A)			dB(A)			dB(A)			dB(A)			dB(A)			dB(A)			dB(A)		
Residential																									
R1	1	34	33	33	38	37	37	30	27	27	33	29	29	36	33	33	40	37	37	34	27	27	38	29	29
R1	2	35	34	34	38	37	37	30	28	28	33	29	29	37	34	34	41	37	37	35	28	28	39	29	29
R2	1	34	33	33	38	36	36	30	27	27	34	29	29	36	33	33	40	36	36	34	27	27	38	29	29
R2	2	35	34	34	38	37	37	30	27	27	34	29	29	37	34	34	40	37	37	35	27	27	38	29	29
R3	1	39	38	38	42	41	41	34	31	31	37	32	32	41	38	38	44	41	41	38	31	31	42	32	32
R3	2	40	39	39	42	41	41	35	31	31	38	32	32	42	39	39	44	41	41	39	31	31	42	32	32
R4	1	36	34	34	39	37	37	32	27	27	36	29	29	37	34	34	41	37	37	35	27	27	39	29	29
R4	2	36	35	35	40	38	38	32	27	27	36	29	29	38	35	35	41	38	38	35	27	27	39	29	29
R5	1	31	29	29	35	33	33	28	23	23	32	25	25	33	29	29	37	33	33	31	23	23	35	25	25
R5	2	32	30	30	35	33	33	29	23	23	32	25	25	33	30	30	37	33	33	31	23	23	35	25	25
R6	1	33	31	31	37	35	35	29	24	24	33	26	26	34	31	31	38	35	35	32	24	24	36	26	26
R6	2	33	32	32	37	35	35	30	24	24	33	26	26	35	32	32	38	35	35	32	24	24	36	26	26
R7	1	36	35	35	40	39	39	31	27	27	35	29	29	38	35	35	41	39	39	35	27	27	39	29	29
R7	2	37	36	36	40	39	39	32	27	27	35	29	29	38	36	36	42	39	39	35	27	27	39	29	29
R8	1	23	22	22	27	25	25	22	19	19	25	22	22	27	22	22	31	25	25	26	19	19	31	22	22
R8	2	24	22	22	27	25	25	22	20	20	25	22	22	27	22	22	31	25	25	26	20	20	31	22	22
R9	1	26	25	25	29	28	28	24	22	22	27	25	25	30	25	25	34	28	28	29	22	22	33	25	25
R9	2	26	25	25	30	28	28	25	23	23	28	25	25	30	25	25	34	28	28	30	23	23	34	25	25
R10	1	28	28	28	32	31	31	26	26	26	29	28	28	33	28	28	37	31	31	32	26	26	36	28	28
R10	2	29	29	29	32	31	31	27	26	26	29	28	28	34	29	29	37	31	31	33	26	26	36	28	28
R11	1	30	30	30	33	33	33	28	27	27	30	30	29	35	30	30	38	33	33	34	27	27	37	30	30
R11	2	31	31	31	34	34	34	28	28	28	30	30	30	36	31	31	39	34	34	35	28	28	38	30	30
Recreational																									
R12	1	46	46	46	49	48	48	40	35	35	41	36	36	48	46	46	50	48	48	43	35	35	45	36	36
R13	1	45	44	44	47	46	46	40	34	34	43	35	35	46	44	44	49	46	46	43	34	34	46	35	35

Note: Cells containing bold values have exceeded the 'Amenity Criterion' detailed within Table 5-36;

5.2.5.9 On-Site Maximum Predicted Noise Levels with Recommended Noise Controls

The below table displays the predicted maximum noise levels from on-site activities during the 'shoulder period' as sleep disturbance could potential be an issue for the surrounding residence. The below results are external noise levels and are associated to noise levels from the 42 tonne truck exhaust.

Table 5-79: Maximum Noise Levels

Receiver	Level	Scenario 4 Condition B & C dB(A) L_{Amax}
Residential		
R1	1	54
R1	2	54
R2	1	54
R2	2	54
R3	1	58
R3	2	58
R4	1	55
R4	2	55
R5	1	51
R5	2	51
R6	1	51
R6	2	51
R7	1	54
R7	2	55
R8	1	46
R8	2	46
R9	1	49
R9	2	50
R10	1	51
R10	2	52
R11	1	54
R11	2	55

Note: Cells containing bold values have exceeded the 'Sleep Disturbance Criterion' detailed within Section 5.2.4.3;

The predicted maximum noise levels displayed in Table 5-79 above comply during the 'Shoulder Period' at all considered receiver locations with the exception of R3 (Level 1 and Level 2) when assessed against the Sleep Disturbance Noise Criterion.

5.2.5.10 Comments on Predicted Results

The predicted results displayed in Table 5-69 above indicate that predicted noise levels comply at all considered receiver locations with the implementation of the recommended noise control measures, detailed in Section 5.2.5.6, with the exception of R3 when considering weather conditions B and C for Scenarios 3 and 4. The predicted exceedance at R3 is 3 dB greater than the applicable noise limit however this exceedance is predicted to potentially occur during 3m/s source to receiver drainage wind. In the event of such windy conditions the resulting background noise level in the area will similarly increase due to wind and vegetation noise effectively reducing the perceived noise impact from the site. Additionally it should be noted that for residential receivers R8, R9, R10 and R11 representing the nearby residential estate of Waterside, predicted site noise emissions, considering the correct application of all recommended noise controls to be in place, will not affect the development primarily due to the level of existing road traffic noise within the immediate area and the application of noise controls to the subject site

Similarly the predicted results displayed in Table 5-78 above indicate that predicted noise levels similarly comply at all considered receiver locations with the implementation of the recommended noise control measures, detailed in Section 5.2.5.6, during Day time and Evening time operations. It can be seen that if the roller shutter doors are left in the open position throughout the night time hours that noise exceedances will occur. However with all roller shutter doors closed and all other noise control measures implemented compliance can be achieved at all considered receiver locations considering weather conditions A, B and C.

Spectral analysis has been undertaken of the predicted noise levels at each receiver location in order to determine if tonal components exist resulting in the application of modifying factors adjustments. The spectral analysis has been limited to the predicted results representative of noise control measures detailed in Section 5.2.5.6 and excludes noise emissions generated by on-site trucks. On-site trucks have been excluded from the tonal analysis as they are intermittent noise sources and the tonal analysis has been primarily focussed on constant noise sources such as those generated from within the existing warehouse building.

No presence of tonal components was found considering weather conditions A, B and C.

Regarding the 3 dB(A) maximum noise level exceedance at residential location R3, it is noted that existing maximum noise levels, relating to light and heavy vehicles, currently exceed the Sleep Disturbance Criteria at R3. This is evident from the operator attended noise monitoring (Table 5-25) displayed in Section 5.2.3.2 of this report. Considering the nature of the existing maximum noise levels present at location R3, Benbow Environmental believes that the development should not be refused on the grounds of a 3 dB(A) exceedance at location R3.

Benbow Environmental considers noise emissions associated with the operations of the proposed site to not significantly exceed the PSNL's at R3 and to comply at all the other receiver locations assuming all recommended noise control measures are implemented.

5.2.6 Off-Site Road Traffic

5.2.6.1 Modelling Methodology

5.2.6.1.1 SoundPLAN Predictive Noise Model

Noise emissions from the proposed road traffic operations were modelled using the Concawe algorithm within SoundPLAN V7.1. This model is recognised by the NSW EPA for modelling environmental noise emissions and has been used by this firm on many projects achieving highly accurate and repeatable results.

Reference was made to the topographical contours for the area. Based on inspection, the local topography for the area appears to be consistent with levels as printed on the topographic map.

5.2.6.1.2 Modelling Scenarios

Model scenarios were configured to provide a realistic assessment of potential site-related noise emissions. Each model configuration was used to calculate noise levels at the nearest potentially affected receivers under the proposed operations.

Three (3) scenarios were established for the modelling of off-site traffic noise generation in order to provide an accurate estimation of the potential noise impacts throughout the 6:00am – 5:00pm period under varying operations.

The number of vehicles frequenting the site has been based on information provided by the client and summarise with Table 5-42.

Scenario 1: Assessment of truck noise along Andrews Road considering the $L_{Aeq(1\ Hour)}$ noise descriptor.
Scenario 2: Assessment of truck noise along Northern Road considering the $L_{Aeq(15\ Hour)}$ and $L_{Aeq(9\ Hour}$ noise descriptors.
Scenario 3: Assessment of truck noise along Mulgoa Road considering the $L_{Aeq(15\ Hour)}$ and $L_{Aeq(9\ Hour}$ noise descriptors.

Each scenario was run with noise enhancing meteorological conditions, in accordance with the NSW RNP. The following conditions were considered:

- Condition A: neutral weather conditions;
- Condition B: 3 m/s wind from source to receiver; and
- Condition C: 3 °C/100m temperature inversion with 2m/s wind from source to receiver.

These meteorological conditions have been displayed in Table 5-80 below.

Table 5-80: Meteorological Conditions Assessed in Noise Propagation Modelling

Condition	Classification	Ambient Temp.	Ambient Humidity	Wind Speed	Wind Direction	Temperature Inversion	Affected Receiver	Applicability
A	Neutral	10 °C	70%	-	-	-	All	All periods
B	Gradient Flow	10 °C	70%	3m/s	Receiver	-	All	All periods
C	Inversion	10 °C	70%	2m/s	Receiver	3 °C/100m	All	All periods

5.2.6.1.3 Assumptions

In establishing configurations within a noise-modelling package, it is inherent that several reasonable assumptions be made. It should be noted that the relevant assessment period for this Road Noise Impact Assessment is 1 hour, 9 hour and 15 hours depending on the road classification as per the NSW Road Noise Policy.

- Receiver heights were modelled at 1.5m and 4.3m above ground level in order to consider two story houses;

- Trucks were modelled as two moving point sources at heights of 1.5m and 3m above ground level in order to account for the engine (1.5m) and the exhaust outlet (3m). Trucks were considered to travel at an average speed of 60km/h whilst travelling along Mulgoa Road and Northern Road;

- Truck engines idling were modelled as single point sources at a height of 1.5m above ground level. Noise generated by truck engines idling was considered to last for duration 1 minute each at every red traffic light;

- Truck air brakes were modelled as single point sources at a height of 3m above ground level. Noise generated by truck air brakes was considered to last for duration 5 seconds each approaching every red traffic light; and

- Mulgoa Road, Northern Road and Andrews Road have been modelled considering a ground absorption coefficient of 0 resulting in 100% of the acoustic energy being reflected off it and 0% of the acoustic energy being absorbed. All other ground areas has been modelled considering a ground absorption coefficient of 0.6 resulting in 40% of the acoustic energy being reflected off it and 60% of the acoustic energy being absorbed.

5.2.6.2 Off-Site Road Traffic Predicted Noise Levels

Table 5-81: Andrews Road – Road Traffic Noise Condition A

Name	Floor	Scenario 1 – Condition A									
		Day					Night				
		$L_{Aeq(1\ Hr)}$					$L_{Aeq(1\ Hr)}$				
		Predicted	Existing	Combined	Criteria	Compliance	Predicted	Existing	Combined	Criteria	Compliance
R1	1	41	49	50	55	Yes	41	47	48	50	Yes
	2	43	49	50	55	Yes	43	47	49	50	Yes
R2	1	42	51	51	55	Yes	42	49	50	50	Yes
	2	44	51	52	55	Yes	44	49	50	50	Yes
R3	1	58	67	68	69	Yes	58	65	66	67	Yes
	2	58	67	68	69	Yes	59	65	66	67	Yes
R4	1	60	69	70	71	Yes	61	67	68	69	Yes
	2	61	69	70	71	Yes	61	67	68	69	Yes
R5	1	56	70	70	72	Yes	57	67	68	69	Yes
	2	56	70	70	72	Yes	57	67	68	69	Yes
R6	1	47	59	59	61	Yes	47	56	56	58	Yes
	2	48	59	59	61	Yes	48	56	56	58	Yes
R7	1	42	55	55	55	Yes	43	52	52	54	Yes
	2	43	55	55	55	Yes	43	52	53	54	Yes
R8	1	28	52	52	55	Yes	28	50	50	50	Yes
	2	28	52	52	55	Yes	28	50	50	50	Yes
R9	1	30	50	51	55	Yes	31	48	49	50	Yes
	2	31	50	51	55	Yes	31	48	49	50	Yes
R10	1	34	48	48	55	Yes	35	46	46	50	Yes
	2	35	48	48	55	Yes	35	46	46	50	Yes
R11	1	38	47	48	55	Yes	38	45	46	50	Yes
	2	39	47	48	55	Yes	39	45	46	50	Yes

Table 5-82: Andrews Road – Road Traffic Noise Condition B & C

Name	Floor	Scenario 1 – Condition B/C									
		Day					Night				
		$L_{Aeq(1\ Hr)}$					$L_{Aeq(1\ Hr)}$				
		Predicted	Existing	Combined	Criteria	Compliance	Predicted	Existing	Combined	Criteria	Compliance
R1	1	44	49	50	55	Yes	45	47	49	50	Yes
	2	46	49	51	55	Yes	46	47	50	50	Yes
R2	1	45	51	52	55	Yes	45	49	50	50	Yes
	2	45	51	52	55	Yes	45	49	50	50	Yes
R3	1	58	67	68	69	Yes	59	65	66	67	Yes
	2	59	67	68	69	Yes	59	65	66	67	Yes
R4	1	61	69	70	71	Yes	61	67	68	69	Yes
	2	61	69	70	71	Yes	61	67	68	69	Yes
R5	1	57	70	70	72	Yes	57	67	68	69	Yes
	2	57	70	70	72	Yes	57	67	68	69	Yes
R6	1	49	59	59	61	Yes	50	56	57	58	Yes
	2	50	59	59	61	Yes	50	56	57	58	Yes
R7	1	46	55	55	55	Yes	46	52	53	54	Yes
	2	46	55	55	55	Yes	46	52	53	54	Yes
R8	1	33	52	52	55	Yes	33	50	50	50	Yes
	2	33	52	52	55	Yes	33	50	50	50	Yes
R9	1	35	50	51	55	Yes	36	48	49	50	Yes
	2	36	50	51	55	Yes	36	48	49	50	Yes
R10	1	39	48	48	55	Yes	39	46	47	50	Yes
	2	39	48	48	55	Yes	40	46	47	50	Yes
R11	1	42	47	48	55	Yes	42	45	47	50	Yes
	2	42	47	48	55	Yes	42	45	47	50	Yes

Table 5-83: Northern Road – Road Traffic Noise Condition A

Name	Floor	Scenario 2 – Condition A									
		Day					Night				
		$L_{Aeq(15\ Hr)}$					$L_{Aeq(9\ Hr)}$				
		Predicted	Existing	Combined	Criteria	Compliance	Predicted	Existing	Combined	Criteria	Compliance
R1	1	51	65	65	67	Yes	50	60	60	62	Yes
Northern	2	51	65	65	67	Yes	50	60	60	62	Yes
R2	1	52	65	65	67	Yes	51	60	61	62	Yes
Northern	2	52	65	65	67	Yes	51	60	61	62	Yes
R3	1	50	65	65	67	Yes	49	60	60	62	Yes
Northern	2	50	65	65	67	Yes	49	60	60	62	Yes
R4	1	52	65	65	67	Yes	51	60	61	62	Yes
Northern	2	53	65	65	67	Yes	52	60	61	62	Yes
R5	1	50	65	65	67	Yes	49	60	60	62	Yes
Northern	2	50	65	65	67	Yes	49	60	60	62	Yes
R6	1	49	65	65	67	Yes	48	60	60	62	Yes
Northern	2	49	65	65	67	Yes	48	60	60	62	Yes
R7	1	52	65	65	67	Yes	51	60	61	62	Yes
Northern	2	52	65	65	67	Yes	51	60	61	62	Yes
R8	1	53	65	65	67	Yes	52	60	61	62	Yes
Northern	2	53	65	65	67	Yes	52	60	61	62	Yes
R9	1	49	65	65	67	Yes	48	60	60	62	Yes
Northern	2	49	65	65	67	Yes	48	60	60	62	Yes
R10	1	52	65	65	67	Yes	51	60	60	62	Yes
Northern	2	52	65	65	67	Yes	51	60	61	62	Yes

Table 5-84: Northern Road – Road Traffic Noise Condition B & C

Name	Floor	Scenario 2 – Condition B/C									
		Day					Night				
		$L_{Aeq(15\ Hr)}$					$L_{Aeq(9\ Hr)}$				
		Predicted	Existing	Combined	Criteria	Compliance	Predicted	Existing	Combined	Criteria	Compliance
R1	1	51	65	65	67	Yes	50	60	60	62	Yes
Northern	2	51	65	65	67	Yes	50	60	60	62	Yes
R2	1	53	65	65	67	Yes	52	60	61	62	Yes
Northern	2	53	65	65	67	Yes	52	60	61	62	Yes
R3	1	51	65	65	67	Yes	50	60	60	62	Yes
Northern	2	51	65	65	67	Yes	50	60	60	62	Yes
R4	1	53	65	65	67	Yes	52	60	61	62	Yes
Northern	2	53	65	65	67	Yes	52	60	61	62	Yes
R5	1	51	65	65	67	Yes	50	60	60	62	Yes
Northern	2	51	65	65	67	Yes	50	60	60	62	Yes
R6	1	49	65	65	67	Yes	48	60	60	62	Yes
Northern	2	50	65	65	67	Yes	49	60	60	62	Yes
R7	1	53	65	65	67	Yes	52	60	61	62	Yes
Northern	2	53	65	65	67	Yes	52	60	61	62	Yes
R8	1	53	65	65	67	Yes	52	60	61	62	Yes
Northern	2	54	65	65	67	Yes	52	60	61	62	Yes
R9	1	50	65	65	67	Yes	49	60	60	62	Yes
Northern	2	50	65	65	67	Yes	49	60	60	62	Yes
R10	1	52	65	65	67	Yes	51	60	61	62	Yes
Northern	2	53	65	65	67	Yes	52	60	61	62	Yes

Table 5-85: Mulgoa Road – Road Traffic Noise Condition A

Name	Floor	Scenario 3 – Condition A									
		Day					Night				
		$L_{Aeq(15\ Hr)}$					$L_{Aeq(9\ Hr)}$				
		Predicted	Existing	Combined	Criteria	Compliance	Predicted	Existing	Combined	Criteria	Compliance
R1	1	52	65	65	67	Yes	51	63	63	65	Yes
Northern	2	52	65	65	67	Yes	51	63	63	65	Yes
R2	1	50	65	65	67	Yes	49	63	63	65	Yes
Northern	2	50	65	65	67	Yes	49	63	63	65	Yes
R3	1	50	65	65	67	Yes	49	63	63	65	Yes
Northern	2	50	65	65	67	Yes	49	63	63	65	Yes
R4	1	51	65	65	67	Yes	50	63	63	65	Yes
Northern	2	51	65	65	67	Yes	50	63	63	65	Yes
R5	1	51	65	65	67	Yes	50	63	63	65	Yes
Northern	2	52	65	65	67	Yes	51	63	63	65	Yes

Table 5-86: Mulgoa Road – Road Traffic Noise Condition B & C

Name	Floor	Scenario 3 – Condition B/C									
		Day					Night				
		$L_{Aeq(15\ Hr)}$					$L_{Aeq(9\ Hr)}$				
		Predicted	Existing	Combined	Criteria	Compliance	Predicted	Existing	Combined	Criteria	Compliance
R1	1	53	65	65	67	Yes	52	63	63	65	Yes
Northern	2	53	65	65	67	Yes	52	63	63	65	Yes
R2	1	51	65	65	67	Yes	50	63	63	65	Yes
Northern	2	51	65	65	67	Yes	50	63	63	65	Yes
R3	1	51	65	65	67	Yes	50	63	63	65	Yes
Northern	2	51	65	65	67	Yes	50	63	63	65	Yes
R4	1	51	65	65	67	Yes	50	63	63	65	Yes
Northern	2	52	65	65	67	Yes	51	63	63	65	Yes
R5	1	52	65	65	67	Yes	51	63	63	65	Yes
Northern	2	52	65	65	67	Yes	51	63	63	65	Yes

5.2.6.3 Comments on Predicted Results

As can be seen from the above predicted road traffic noise results contained within Table 5-81 through to Table 5-86, noise emissions associated with additional road traffic generated by the operation of the proposed facility will not exceed the noise criteria detailed within Section 5.2.4.5 of this report.

5.2.7 Statement of Potential Noise Impacts

An assessment of the existing background and ambient noise environment, detailed noise generating activities on and off site, location of nearby sensitive receptors, existing land use of the regional area of the site, and the nature of the proposed operations and associated noise emission sources have been undertaken.

The NSW "Industrial Noise Policy" and "Road Noise Policy" were followed in the preparation of this detailed noise impact assessment. Assessment criteria for noise emissions from the subject site were used to determine whether the potential noise impacts from the site were within the derived limits or in exceedance with the guidelines.

After examining the details and associated noise controls of the process using SoundPLAN V7.1, it can be concluded that the noise impacts from the subject site are predicted to comply with the requirements provided by the EPA guidelines. Provided that all recommendations and controls are adhered to and regularly maintained; no noise impacts are anticipated to occur as a result of the proposed development.

5.2.8 Summary of Noise Findings

On-site operational noise levels, considering both the Intrusive and Amenity Criterions, were predicted to exceed for several of the considered residential receiver locations as can be seen within Table 5-51 and Table 5-60 However the primary concern relates to the assessment of noise levels against the Amenity Criterion as the large majority of residential receiver locations experienced non compliant noise levels without the implementation of any control measures.

In order to address the potential for non-compliant intrusive and amenity noise levels at nearby residential receiver locations, several noise mitigation measures (noise controls) were assessed and consequently implemented into the predictive noise model (Section 5.2.5.6 and Figure 5-37).

Re-calculation of on-site operational noise levels, inclusive of all noise mitigation measures, resulted in compliant intrusive noise levels at all considered receiver locations with the exception of a 3dB(A) exceedance at location R3 during 3m/s source to receiver drainage wind conditions and compliant amenity noise levels at all considered receiver locations for all scenarios and weather conditions. The 3 dB(A) intrusive noise level exceedance at location R3 has been justified due to increased background noise levels during windy periods.

Similarly, maximum noise levels were predicted in order to assess the potential for sleep disturbance. Maximum noise levels were predicted to comply at all considered receiver locations with the exception of R3. Based on the observed existing maximum noise levels in the area, this 3 dB(A) exceedance is not expected to cause any significant additional noise impact and for this reason is considered by Benbow Environmental to not be reason for refusal.

Noise levels associated with off-site road traffic (primarily trucks frequenting the subject site) were predicted in order to determine the level of impact on nearby residential receivers considered within the assessment. The predictive results concluded that off-site road traffic noise levels are expected to comply with the applicable road traffic noise criterion regarding $L_{Aeq\ 1\ Hour}$ (day), $L_{Aeq\ 1\ Hour}$ (night), $L_{Aeq\ 15\ Hour}$ (day) and $L_{Aeq\ 9\ Hour}$ (night) noise levels. However in order to further minimise off site road traffic noise impacts it is recommended to limit the use of air brakes (particularly between the hours of 6am – 8am) in addition to maintaining appropriate driver behaviour.

5.3 WATER

Water management has been identified by key the government stakeholders as an environmental aspect requiring careful consideration given that the site is located on the fringe of a 100 year flood zone and a watercourse that runs along the boundary of the site. There is also a classified wetland area to the south of the site.

Further, access to the site from Andrews Road is gained via a right of carriageway over a drainage reserve. This drainage reserve runs between the northern boundary of the site and Andrews Road.

The following sections provide further details of the water interactions and management of water resources to be conducted on site. Much of this information has been sourced from the Brown Consulting Letter Report No X11354 provided as Appendix 3 and the Phase I and Phase II Contamination Report provided as Appendix 6.

5.3.1 Water Interactions

The proposed site is predominantly flat with no dominant direction of fall. The area to the west of the site is an established industrial site with a category 2 and an unnamed water course running along this boundary. To the east of the site is the Nepean Rugby Park and located to the south is a classified wetland.

The subject area is considered to be a flood plain and not a floodway due to the flat nature of the land and the distance from the Nepean River.

5.3.1.1 Surface Water

An unnamed watercourse exists on the western boundary of the site which has flows coming from the catchment areas to the north and drains eastward before turning southward. The unnamed watercourse also has flows coming from the east of the site which drain through the drainage reserve on the northern boundary. Both flows meet before flowing southward down the unnamed watercourse.

The unnamed watercourse discharges to the wetland on the southern boundary of the site. This wetland then discharges southwards toward Boundary Creek flows to the Nepean River.

5.3.1.2 Groundwater

The site is an existing industrial facility which contains existing buildings and concrete hardstand areas. The installation of external bunkers is proposed.

Data from two groundwater wells within close proximity of the site indicate that the standing water level (or depth from the surface to groundwater) is 6.0 – 6.3 metres. Further information can be found in Section 4.6.3.

There are no activities on site or visible evidence to suggest that there would be groundwater contamination due to past uses of the site. The site has no history of underground tanks having been installed.

5.3.1.3 Stormwater

The site stormwater system is already established and requires minor alterations. The existing downpipes on the building and site and stormwater drains would be maintained and are considered sufficient for control of stormwater runoff from the site. All stormwater drains would be fitted with fabric particulate filters.

Swales would be established in the low-lying areas of the site which are predominantly at the southern end of the site. Stormwater runoff would be directed to these swales. The swales would be designed with gentle slopes and grassed to aid in the deposition of solids washed off the hardstand areas, improving the water quality of runoff leaving the site.

5.3.1.4 Flooding

The planning certificate under Section 149 of the Environmental Planning and Assessment Act, 1979, the land is subject to Penrith DCP 2010 Section C3.5 Flood liable lands. All or part of the land is identified in PLEP 2010 Clause 6.3 Flood planning.

The subject area is considered to be a flood plain and not a floodway due to the flat nature of the land and the distance from the Nepean River.

Flooding has been addressed in the report and civil design by Brown Smart Consulting. The “volume balance” method has been utilised and the proposed development would have a nett nil impact on the existing flood capacity of the land.

The finished goods storage bunkers that are proposed to store the processed glass cullet would be located within the 1 in 100 year flood polygon at the rear of the site due to constraints posed by the existing building at the site.

The design of the bunkers to cope during flood events is discussed in Section 5.3.6.

5.3.1.5 Wetland

A classified wetland exists to the south of the site. The existing wetland area also extends along the western boundary. The existing wetland areas are in poor condition and contain low to moderate weeds. The boundary of the wetland edge is clearly identified on the Landscape plans (Appendix 11). These plans show the extent of the wetland on the site and that the closest point of the wetland to the proposed bunker storage area is approximately 10m on both the south eastern corner and south western corner.

An unnamed watercourse exists on the western boundary of the site which has flows coming from the catchment areas to the north and drains eastward before turning southward. The unnamed watercourse also has flows coming from the east of the site which drain through the drainage reserve on the northern boundary. Both flows meet before flowing southward down the unnamed watercourse.

The unnamed watercourse discharges to the wetland on the southern boundary of the site. This wetland then discharges southwards toward Boundary Creek and ends up at the Nepean River.

5.3.1.6 Water Supply and Use

Water use would be limited to dust control on site and water used in the office and amenities. Mains water would be used for these purposes. No water would be required in the glass crushing and screening processes and no vehicle washing would take place on site.

Water sprays would be used for dust suppression purposes during loading and unloading practices and in the external storage area.

Water foggers would be used for dust suppression within the building and from the material handling areas external to the building (refer to Section 5.1.9.4).

Water sprays and foggers are used to increase the moisture content in the material to prevent dust becoming airborne or adding moisture to the air to capture the dust that is already airborne. Spray nozzles are used to apply a mist of water to dust particles. Water foggers use low quantities of water under high pressure to generate very fine droplets of water. Millions of tiny particles of water surround the dust particles and bind them together creating a heavy mass which falls to the ground. This removes the airborne dust without wetting the area. Leachate would therefore not be generated from the use of water foggers.

The estimated annual water use for the site is:

Water sprays: 135.8kL
Water foggers: 22,164.5kL
Office and amenities: 436.8 kL

Total Annual Water Use: 22,737.1 kL

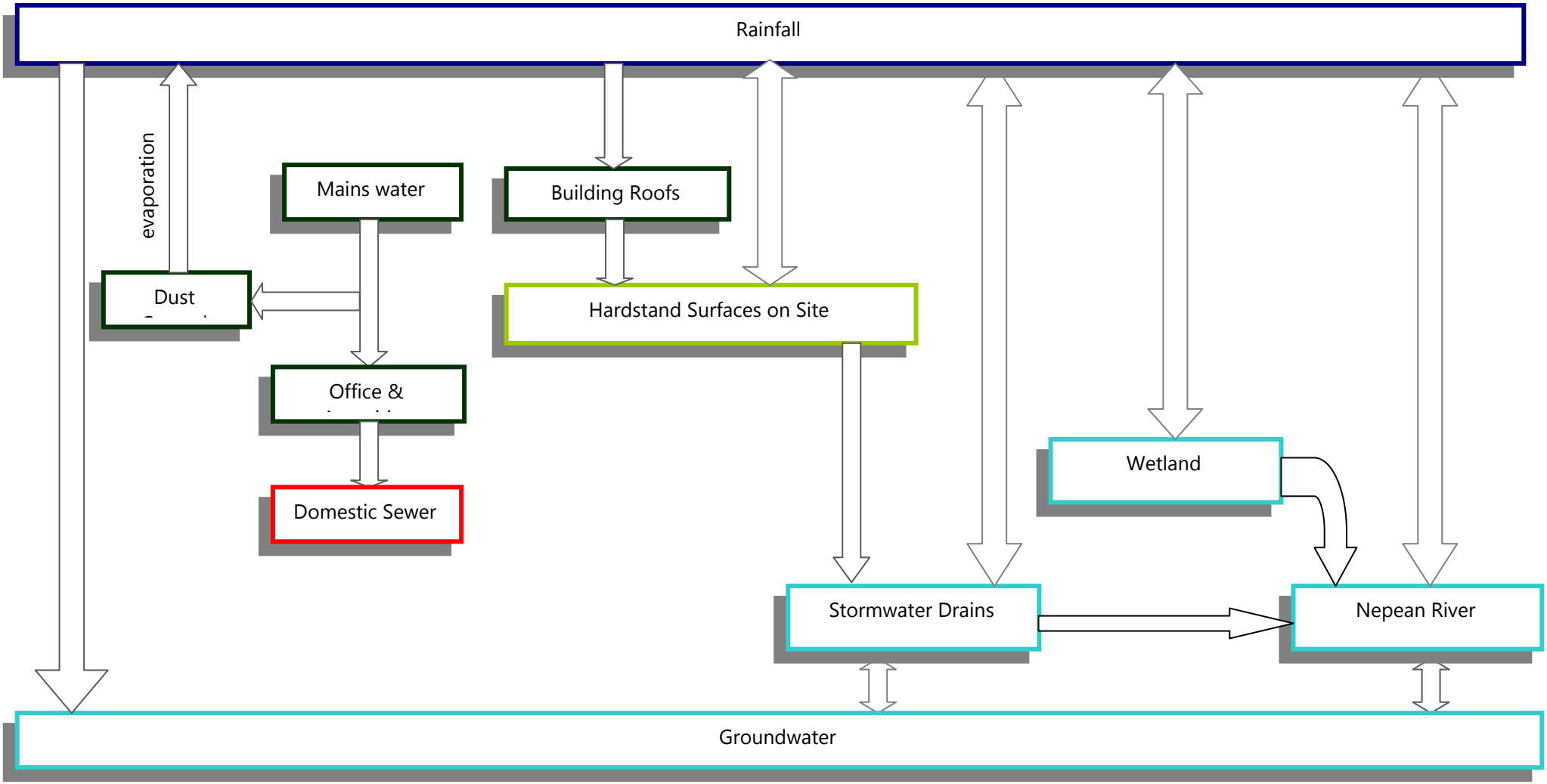
The water balance for the site would involve two separate streams:

- Mains water would be used on site for dust control and in the office and amenities. Water for dust control would be applied as a mist or spray and would then evaporate. Office wastewater from kitchen and amenity areas would be sent to the domestic sewer.

- Rainwater would fall on roofs and hardstand surfaces and either evaporate or be directed through existing downpipes and stormwater drains on site to the wetland and adjacent unnamed watercourse and eventually flow to the Nepean River. Water that falls on permeable surfaces such as the vegetated or grassed areas of the site would infiltrate to groundwater.

A water balance diagram is presented as Figure 5-38.

Figure 5-38: Water Balance of the Proposed Development



5.3.2 Legislation

The two key pieces of legislation for the management of water in NSW are the *Water Act 1912* and the *Water Management Act 2000*.

5.3.2.1 Water Act, 1912

Licences for water conservation, irrigation, water supply or drainage as well as changing the course of a river can be applied for under the Water Act 1912.

The proposed development does not involve works for water conservation, irrigation, water supply or drainage and does not involve works that would change the course of a river, therefore the Water Act 1912 does not apply.

5.3.2.2 Water Management Act, 2000

The Water Management Act (WMA) 2000 provides requirements for the extraction of water, water use, floodplain and drainage management, the construction of works such as dams and weirs, and undertaking activities on or near water sources in NSW.

Approvals for the extraction and use of water and for the construction of works relating to water use can be obtained under the Act.

The objects and principles of the Act are set out in Section 3 and 5 of the Act respectively and are presented below:

Objects of the WMA are as follows:

> *The objects of this Act are to provide for the sustainable and integrated management of the water sources of the State for the benefit of both present and future generations and, in particular:*
>
> *(a) to apply the principles of ecologically sustainable development, and*
> *(b) to protect, enhance and restore water sources, their associated ecosystems, ecological processes and biological diversity and their water quality, and*
> *(c) to recognise and foster the significant social and economic benefits to the State that result from the sustainable and efficient use of water, including:*
> *(i) benefits to the environment, and*
> *(ii) benefits to urban communities, agriculture, fisheries, industry and recreation, and*
> *(iii) benefits to culture and heritage, and*
> *(iv) benefits to the Aboriginal people in relation to their spiritual, social, customary and economic use of land and water,*
> *(d) to recognise the role of the community, as a partner with government, in resolving issues relating to the management of water sources,*
> *(e) to provide for the orderly, efficient and equitable sharing of water from water sources,*
> *(f) to integrate the management of water sources with the management of other aspects of the environment, including the land, its soil, its native vegetation and its native fauna,*

(g) to encourage the sharing of responsibility for the sustainable and efficient use of water between the Government and water users,
(h) to encourage best practice in the management and use of water.

The principles of the WMA are presented in the following table to demonstrate how the proposed development meets these principles.

Table 5-87: Water Management Principles

Principles generally	Compliance of proposal
(a) water sources, floodplains and dependent ecosystems (including groundwater and wetlands) should be protected and restored and, where possible, land should not be degraded	There would be negligible impacts on water sources, floodplains and dependent ecosystems.
(b) habitats, animals and plants that benefit from water or are potentially affected by managed activities should be protected and (in the case of habitats) restored	No animals and plants are likely to be affected by the proposed activities as discussed in Section 5.5.
(c) the water quality of all water sources should be protected and, wherever possible, enhanced	The proposal involves mitigation measures for stormwater, erosion and sediment controls to ensure this principle is complied with.
(d) the cumulative impacts of water management licences and approvals and other activities on water sources and their dependent ecosystems, should be considered and minimised	A water management licence is not required.
(e) geographical and other features of indigenous significance should be protected	There are no heritage items located at or near the site.
(f) geographical and other features of major cultural, heritage or spiritual significance should be protected	There are no heritage items located at or near the site.
(g) the social and economic benefits to the community should be maximised	Yes, as discussed in Section 6.
(h) the principles of adaptive management should be applied, which should be responsive to monitoring and improvements in understanding of ecological water requirements	Not applicable.
Principle – In relation to water sharing	
(a) sharing of water from a water source must protect the water source and its dependent ecosystems	No water sharing is proposed.
(b) sharing of water from a water source must protect basic landholder rights	No water sharing is proposed.
(c) sharing or extraction of water under any other right must not prejudice the principles set out in paragraphs (a) and (b).	No water sharing is proposed.

Table 5-87: Water Management Principles	
Principles generally	Compliance of proposal
Principle – In relation to water use	
(a) water use should avoid or minimise land degradation, including soil erosion, compaction, geomorphic instability, contamination, acidity, waterlogging, decline of native vegetation or, where appropriate, salinity and, where possible, land should be rehabilitated	Water use is limited to dust control and office uses.
(b) water use should be consistent with the maintenance of productivity of land in the long term and should maximise the social and economic benefits to the community	Water use is limited to dust control and office uses.
(c) the impacts of water use on other water users should be avoided or minimised	Water use is limited to dust control and office uses.
Principle – In relation to drainage management	
(a) drainage activities should avoid or minimise land degradation, including soil erosion, compaction, geomorphic instability, contamination, acidity, waterlogging, decline of native vegetation or, where appropriate, salinity and, where possible, land should be rehabilitated	Addressed in Brown Smart Consulting Report at (Appendix 3)
(b) the impacts of drainage activities on other water users should be avoided or minimised	Addressed in Brown Smart Consulting Report at (Appendix 3)
Principle – In relation to floodplain management	
(a) floodplain management must avoid or minimise land degradation, including soil erosion, compaction, geomorphic instability, contamination, acidity, waterlogging, decline of native vegetation or, where appropriate, salinity and, where possible, land must be rehabilitated	Addressed in Brown Smart Consulting Report at (Appendix 3)
(b) the impacts of flood works on other water users should be avoided or minimised	Addressed in Brown Smart Consulting Report at (Appendix 3)
(c) the existing and future risk to human life and property arising from occupation of floodplains must be minimised	Addressed in Brown Smart Consulting Report at (Appendix 3)
Principle – In relation to controlled activities	
(a) the carrying out of controlled activities must avoid or minimise land degradation, including soil erosion, compaction, geomorphic instability, contamination, acidity, waterlogging, decline of native vegetation or, where appropriate, salinity and, where possible, land must be rehabilitated	Changes to the building and the operation of the facility would meet this principle as demonstrated throughout this section of the EIS.
(b) the impacts of the carrying out of controlled activities on other water users must be avoided or minimised	The proposed activities would not impact on other water users.

Table 5-87: Water Management Principles	
Principles generally	Compliance of proposal
Principle – In relation to aquifer interference activities	
(a) the carrying out of aquifer interference activities must avoid or minimise land degradation, including soil erosion, compaction, geomorphic instability, contamination, acidity, waterlogging, decline of native vegetation or, where appropriate, salinity and, where possible, land must be rehabilitated	No aquifer interference activities are proposed.
(b) the impacts of the carrying out of aquifer interference activities on other water users must be avoided or minimised	No aquifer interference activities are proposed.

5.3.3 Water Sharing Plans

Two water sharing plans apply to the area where the subject site is located. These are:

- Water Sharing Plan for the Greater Metropolitan Region Unregulated River Sources; and
- Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources

5.3.3.1 Water Sharing Plan for the Greater Metropolitan Region Unregulated River Sources

The Department of Primary Industries Office of Water website states that the "*Water Sharing Plan for the Greater Metropolitan Region Unregulated River Sources* includes rules for protecting the environment, extractions, managing licence holders' water accounts, and water trading in the plan area". The plan also sets management rules for water access licences, the extraction of water, the operation of dams and the management of water flows.

The proposed development does not require extraction of water from a water source. Water use would be limited to mains water for dust control and for office use. No works such as pumps, pipes, bores or weirs used for extracting water are proposed. Therefore a licence under the WMA is not required.

Further, alterations to the site would not affect the flow of water in the nearby unnamed watercourse and wetland. Stormwater from the site would be managed through a number of controls discussed in Section 5.3.9.

5.3.3.2 Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources

The proposed development does not require extraction of groundwater. Water use would be limited to mains water for dust control and for office use. No works such as pumps, pipes, bores or weirs used for extracting water are proposed. Therefore a licence under the WMA is not required.

Further, alterations to the site would have a negligible impact on the wetland which is considered a groundwater dependent ecosystem as discussed in the Brown Smart Consulting (Appendix 3). Stormwater from the site would be managed through a number of controls discussed in Section 5.3.9.

5.3.4 Surface Water Assessment

Under Sydney *Regional Environmental Plan No 20—Hawkesbury-Nepean River, a* wetland is identified within close proximity of the site – on the southern boundary.

Plans showing the location of the wetland, remnant vegetation surrounding the wetland and the location of the proposed development in relation to the wetland have been provided in the landscaping plans and earthwork and flood volume plans submitted as part of this EIS. In particular, reference should be made to the following drawings:

- Brown Smart Consulting Drawing No. 001 – General Plan Layout.
- Brown Smart Consulting Drawing No. 201 – Erosion and Sediment Control Plan and Details.
- Biodesign Drawing No. 1/3 – Landscape Plan Site Analysis, Tree Survey and Assessment.
- Biodesign Drawing No. 2/3 – Landscape Plan Landscape Concept Plan.
- Biodesign Drawing No. 3/3 – Landscape Plan Landscape Planting Plan.

The existing wetland is currently in a very poor condition. Photographs of the wetland are provided as follows:

Photograph 1: South-east portion of the site taken from the existing raised concrete apron.



Photograph 2: South of the site - The wetland is located in the low ground in the distance.



Photograph 3: View to south-western corner of the property across wetland zone (grass and weeds). The tree in the left of the image is to be removed.



Photograph 4: View along the western boundary to the south of the site. The tree is to be removed. The wetland flows through the lower area.

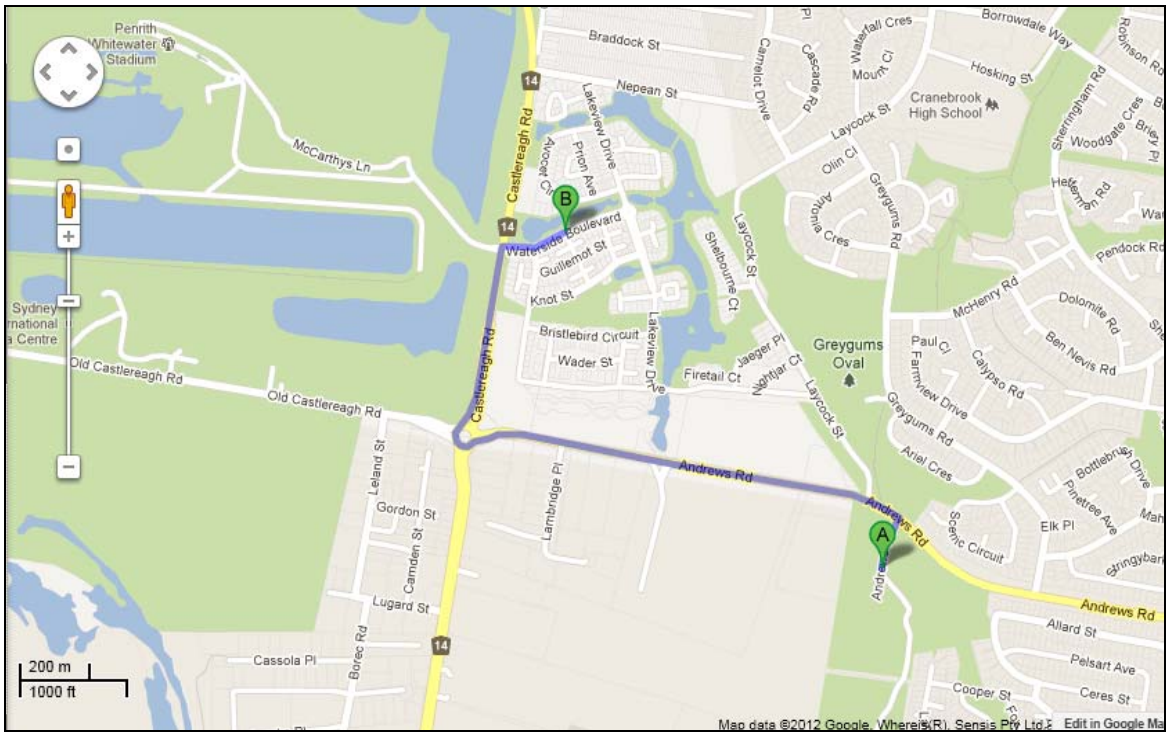


The report by Brown Smart Consulting indicates that there would be no impact on the wetland as a result of the proposed development. In fact, with the implementation of a number of mitigation measures, the water quality of the wetland would be improved. Mitigation measures are described in Section 5.3.9.

5.3.5 Riparian Land

There is an unnamed watercourse located along the western boundary of the site which has flows coming from the catchment areas to the north and drains eastward before turning southward. The Waterside Green development 'B' is in this area north west of Andrews Road and the subject site 'A', as shown in Figure 5-39. The unnamed watercourse also has flows coming from the east of the site which drain through the drainage reserve on the northern boundary. Both flows meet before flowing southward down the unnamed watercourse.

Figure 5-39: Location of site and Waterside Green



The riparian land that lies between the existing wetland area and the proposed development is an existing grassland with some sedges (grasslike plants) and contains low to moderate weeds. The proposed development has been designed with this area in mind and improvements to the riparian land are proposed. These improvements include:

- Weed management would be used to control weeds within the existing grassland areas. This will allow the natural regeneration of existing indigenous species in the wetland.
- A planting program for the grassland area consisting of tube stock of Melaluca linearifolia and Eucalyptus amplifolia.
- Extended earth batters would be constructed for screen planting – Mound planting zone with an area of 502m^2 of various trees, shrubs and tube stock.
- A water quality treatment wetland that extends along the eastern boundary is proposed as part of the development. This channel would be widened to maintain flood storage of the site and would have an area of 730m^2 as shown on the landscape plans and would be planted with viro tube of various indigenous species. This would allow for any stormwater generated on site to be treated within this area. Water quality swales would be installed in this area at strategic locations as shown on the plans and a sediment fence at the outlet of the proposed water treatment wetland would remain until vegetation is established in earth mound areas.
- A retaining wall along the southern side of the proposed bunkers would be installed. Filling of the land along this area would be required to establish the ground level for the storage bunkers. The filling of this area would be balanced by the removal of fill to create the water quality treatment wetland.
- A 24 month program of maintenance of landscaped areas would be undertaken and any plants that are unsuccessful during this period are to be replaced.

The riparian corridor is consistent with Condition 23 of the NSW Office of Water's General Terms of Approval that states that *the consent holder must establish a riparian corridor along the wetland in accordance with a plan approved by the NSW Office of Water*.

The proposed works detailed above would result in no reduction in the flood carrying capacity and there would be no negative impact on the riparian zone in terms of water quality or vegetation. Weed control and planting programs in these areas as well as the improved management of water flows using swales and the widening of the channel to create a water treatment wetland is likely to improve the riparian land associated with this area.

5.3.6 Storage Bunkers

The external storage bunkers would be used for storage of the processed glass cullet. This glass cullet is clean and uncontaminated once it leaves the production line and is stored within the bunkers.

The existing building floor level is set at RL 25.44m AHD, just above the 100 year flood level and the existing pavement is flat (ranges between RL 25.41 to 25.46m AHD). The storage bunkers have been positioned below the 100 year ARI flood level of RL 25.4m AHD to ensure that the pavements be directed away from the building to reduce the possibility of nuisance flooding of the building in the smaller more frequent rainfall events.

The area is essentially bunded by the storage bins with all the runoff being directed to 2 sag points on either side of the bin on the eastern side of the site. Before the water is discharged from the paved areas the plan shows that there is a gross pollutant trap (GPT) located at each of the low points. All water from this paved area has to pass through the GPTs. Once the water has passed through the GPT it will then be treated by the wetland proposed on the site along the eastern boundary.

Given that the bins will only be inundated in the larger storm events (greater than the 20 year ARI) the above approach is a suitable treatment, given the site constraints with the existing building.

The following sub-sections have been provided using information from the Brown Smart Consulting letter report dated 3 May 2013. For further clarification, please refer to this letter report X11354.W which has been provided as Appendix 13.

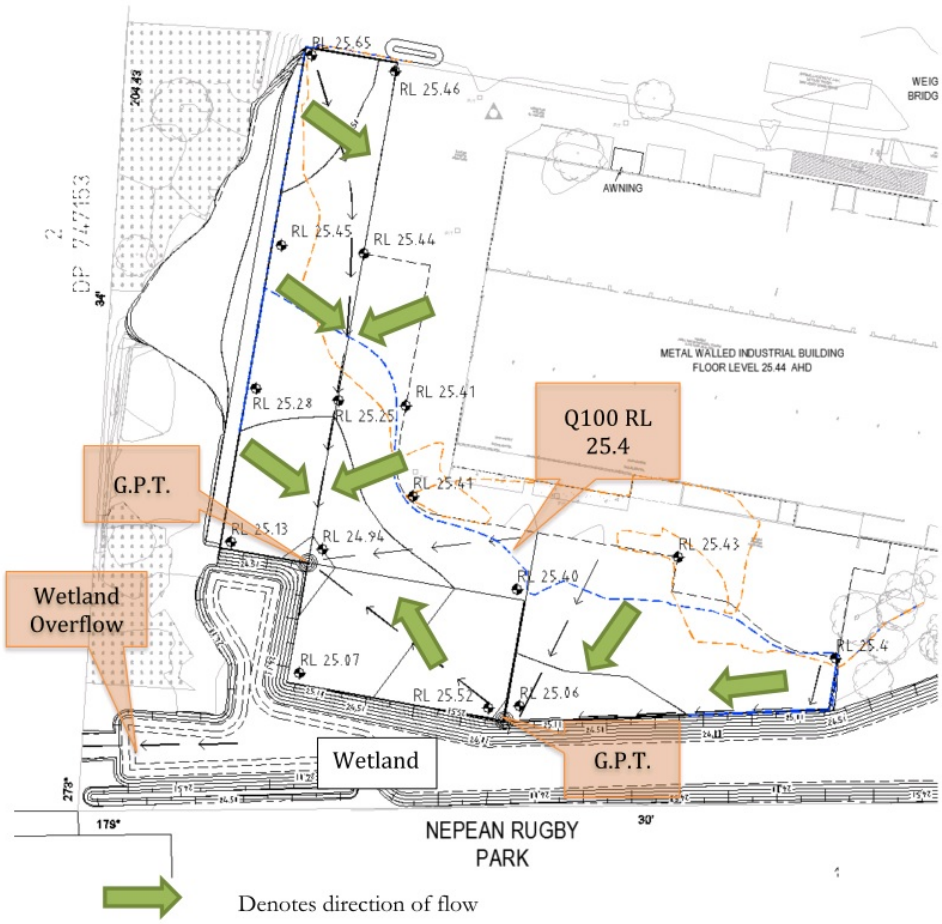
5.3.6.1 Flooding

During a 1 in 100 year ARI flood event the bunkers will be inundated however the site is to drain in such a manner that flows are directed to GPT's as further explained in the following sections.

5.3.6.2 Drainage

The bunkers are designed to drain to the wetlands but not before draining to the proposed GTP's as shown in the figure below.

Figure 5-40: Drainage concept



The GTP's proposed are CDS type units or equivalent and will be capable to capture any glass cullet carried by runoff before overflowing into the proposed wetland.

The wetland was sized in *MUSIC*. The wetland and GTP's were sized in order to meet the pollution reduction targets of 85% reduction of total suspended solids, 45% reduction of total phosphorus, and 45% of Total Nitrogen generated from the area of new works on site. Modelled rainfall data used in the *MUSIC* model was modified to suit local Penrith conditions and the catchment pollutant concentration parameters based on those specified in *Draft NSW MUSIC Modelling Guidelines (Sydney Metro CMA, August 2010)*. The pollutant concentration parameters used are given below in Table 5-88.

Table 5-88: MUSIC Concentration Parameters

Base Flow Concentration Parameters

Concentration (mg/L-log$_{10}$)						
	TSS		TP		TN	
	mean	std. dev	mean	std. dev	mean	std. dev
Land use/zoning						
Residential	1.20	0.17	-0.85	0.19	0.11	0.12
Commercial	1.20	0.17	-0.85	0.19	0.11	0.12
Industrial	1.20	0.17	-0.85	0.19	0.11	0.12
Rural residential	1.15	0.17	-1.22	0.19	-0.05	0.12
Agricultural	1.30	0.13	-1.05	0.13	0.04	0.13
Forest	0.78	0.13	-1.52	0.13	-0.52	0.13
Surface type						
Roofs	n/a	n/a	n/a	n/a	n/a	n/a
Sealed roads (if contains a pervious fraction e.g. verge)	1.20	0.17	-0.85	0.19	0.11	0.12
Unsealed roads[1]	1.20	0.17	-0.85	0.19	0.11	0.12
Eroding gullies[1]	1.20	0.17	-0.85	0.19	0.11	0.12

Storm Flow Concentration Parameters

Concentration (mg/L-log$_{10}$)						
	TSS		TP		TN	
	mean	std. dev	mean	std. dev	mean	std. dev
Land use/zoning						
Residential	2.15	0.32	-0.60	0.25	0.30	0.19
Commercial	2.15	0.32	-0.60	0.25	0.30	0.19
Industrial	2.15	0.32	-0.60	0.25	0.30	0.19
Rural residential	1.95	0.32	-0.66	0.25	0.30	0.19
Agricultural	2.15	0.31	-0.22	0.30	0.48	0.26
Forest	1.60	0.20	-1.10	0.22	-0.05	0.24
Surface type						
Roofs	1.30	0.32	-0.89	0.25	0.30	0.19
Sealed roads	2.43	0.32	-0.30	0.25	0.34	0.19
Unsealed roads[1]	3.00	0.32	-0.30	0.25	0.34	0.19
Eroding gullies[1]	3.00	0.32	-0.30	0.25	0.34	0.19

All water quality monitoring was performed on the basis that the glass cullet material was sufficiently cleaned prior to storage in the outdoor bunkers therefore no specific modelling parameters were introduced. All surface drainage on the proposed hardstand concrete areas and bunker locations are designed to be directed to GTPs prior to discharge into the proposed wetland for further treatment.

5.3.7 Groundwater Assessment

There are no activities on site or visible evidence to suggest that there would be subsoil or groundwater contamination due to past uses of the site. No extraction of groundwater is proposed.

The site has no history of underground tanks having been installed. Potentially contaminating activities and potential pathways are the following:

Site Construction

- Source:
  - Fill material may have been used during construction.
- Contamination of Concern:
  - Various
- Likelihood or Risk of Contamination:
  - Low
- Borehole sampling undertaken for Wallaroo (previous site owner) found no contamination of significance for a commercial/industrial site.

Carparks – Front of Site

- Sources:
  - Fuel Releases;
  - Oil Leakages;
  - Sediment; and
  - Bitumen Pavement.
- Contamination of Concern:
  - Heavy Metals;
  - Total petroleum hydrocarbons; and
  - BTEX (Benzene, toluene, ethylbenzene, xylene).
- Likelihood or Risk of Contamination:
  - Low to Negligible.

Warehouse/Factory/Shed

- Source:
  - Past uses - Fertiliser storage;
  - Lubrication in any machinery; and
  - Forklifts.
- Contaminants of Concern:
  - Total petroleum hydrocarbons;
  - BTEX; and
  - Ammonium phosphate.

- Likelihood or Risk of Contamination:
  - Low to Minimal.

Rear Yard Area

- Similar to Car parks

Aargus undertook a limited Phase II environmental site assessment in October 2009 releasing the report in November 2009. This study was undertaken for Wallaroo Pty Limited. Eight Boreholes were drilled to a depth of 1.8 m.

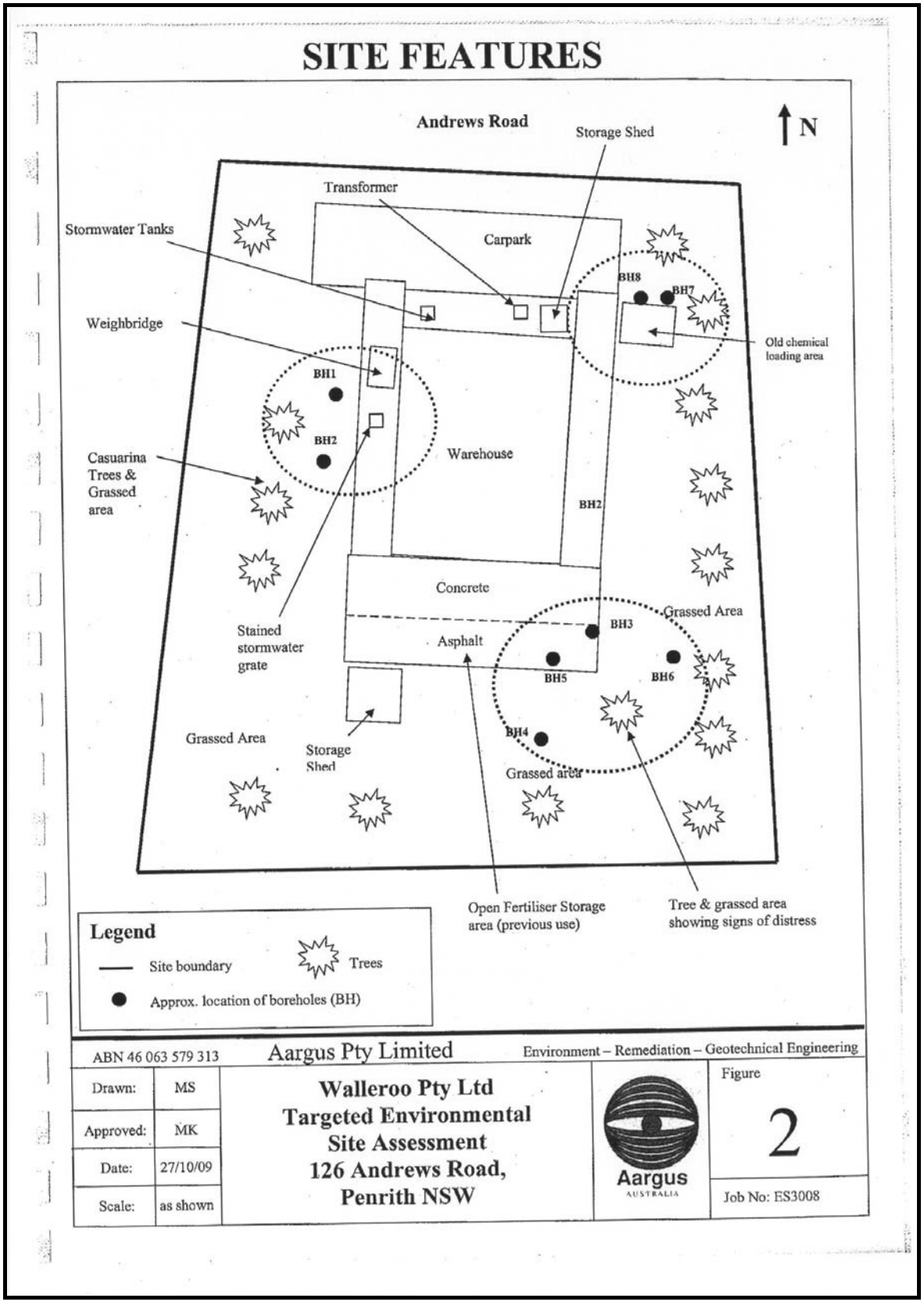
The locations are shown on Figure 5-42 and listed below.

Figure 5-41: Rationale for Sample Locations

Borehole	Rationale
BH1	• Adjacent to the stained stormwater grate
BH2	• Adjacent to the stained stormwater grate
BH3	• In vicinity of stored open fertiliser area
BH4	• Downgradient of open fertiliser area (unsealed area) • In the vicinity of tree & grassed areas showing signs of distress
BH5	• In vicinity of stored open fertiliser area
BH6	• Downgradient of open fertiliser area (unsealed area) • In vicinity of previous asbestos fragment location • In the vicinity of tree & grassed areas showing signs of distress
BH7	• In vicinity of old chemical loading area
BH8	• In vicinity of old chemical loading area

The findings were no presence of contamination at levels of concern for commercial/industrial land use.

Figure 5-42: Site Features



The proposed development will implement control measures and actions that will enable the site to not alter any of the current groundwater interactions on site. Shallow excavations to a depth of no more than 1-1.5m would be required to widen the existing channel to create a water quality treatment wetland along the eastern boundary. Fill would be used to provide a higher ground level for construction of the storage bunkers. Given that the depth of the groundwater below the surface is 6.0m at groundwater wells within close proximity to the site, it is unlikely groundwater would be disturbed as a result of the proposed development. The natural water balance would be maintained through the proposed water management practices and design.

- Rainwater would be collected via the existing stormwater collection system and would be segregated from areas where diesel fuel is stored. This is established by:
  - Roofing of diesel storage areas; and
  - Bunding of diesel storage areas where spills may occur;
- Stormwater, erosion and sediment controls would be installed and maintained at the site to ensure pollution load in the stormwater is minimised before release;
- Implementation of a landscape plan that includes removal of weeds and planting of indigenous species would be undertaken that would enhance the biodiversity of the area and minimise impacts on groundwater; and
- Swales would be established in the low-lying areas of the site which are predominantly at the southern end of the site.

5.3.8 Swales

Swales would be established at strategic locations within the water quality treatment wetland along the eastern boundary of the site. Stormwater runoff would be directed to these swales. The swales would be designed with gentle slopes and grassed to aid in the deposition of solids washed off the hardstand areas, improving the water quality of runoff leaving the site.

Swale treatment would include:

- An open weave coir mesh mat will be secured in a trench along the top of the drainage swale and along its length with pegs at 1m centres. All plantings would be directly in this mesh. Overlap mesh would be against the direction of flow;
- Fibre mulch matting would be secured in a trench at the top of the mounds and pegged at 1.5m centres along its length; and
- Fibre mulch would be secured in the low water inundated areas as shown on the plan and secured as above.

Location of the swales are shown on the landscape plans.

To maintain the pollutant removal efficiency of the swales, routine inspection and maintenance would be undertaken and would include:

- Remove any sediment accumulating to ensure water drains freely toward outlet;
- Ensure inlet/outlet areas are free of sediment and rubbish/litter;
- There should be no areas of standing water within the swale once inflow has ceased. Remove any blockages as needed;
- Vegetation cover needs to be more than 90% of the swale bottom and excessive weeds need to be removed; and
- Ensure that erosion and scouring of the swale bottom is rehabilitated by filing the damaged area with crushed gravel. Any large bare areas would need to be re-graded and re-sealed.

5.3.9 Potential Water Impacts and Safeguards

The main potential impact to ground and surface water would be from contaminated stormwater leaving the site. In particular, dust as a result of loading and unloading activities and the external storage of cullet may result in sedimentation of local waterways when the dust settles. The use of water foggers and sprays during these activities would significantly reduce the dust emissions and hence the potential for dust to settle on surface water.

The site stormwater system is already established and requires minor alterations. Surface water has the potential to become contaminated by pollution load from the external storage area, the warehouse storage and sorting activities and the use of the car pack and driveway. Processed materials (cullet) are stored in designated external bunkers. Housekeeping would be maintained regularly and gross pollutant traps would be placed on all stormwater drains to prevent stormwater contamination. As an additional safeguard, all stormwater pits/drains should be painted blue or green around the border of the pit (or drain) with words stencilled “flows to creek”. Fabric filters would also be installed in all stormwater pits potentially exposed to sediment.

General litter, plastic materials also have the potential to enter the unnamed watercourse. Designated rubbish bins are provided on site and regular housekeeping practices and floor sweeping shall serve to prevent litter and sediment from warehouse and hardstand areas entering the stormwater system.

There is also a potential risk of contamination of stormwater from the storage and handling of diesel fuel at the site. A chemical storage room would be used for the diesel tank. Warning signage for these areas would also be provided. A procedure for the receipt of diesel fuel and re-fuelling practices would be established and implemented at the site as part of the Environmental Management Plan.

In addition, the existing downpipes on the building and site and stormwater drains would be maintained and are considered sufficient for control of stormwater runoff from the site. Swales established in low-lying areas would improve water quality of runoff leaving the site. Swales would be located within the widened water quality treatment wetland along the eastern boundary of the site. This area would be vegetated and able to accept site stormwater runoff. This has been specifically designed to capture and treat site stormwater so that once it exits the outlet, the water would be of acceptable quality to release into natural waterways. A program of monitoring would be undertaken to establish the quality of water and to ensure that this treatment system is achieving desired results in terms of water quality leaving the site. Therefore, there is minimal potential for contamination of surface water.

Given that the location of the proposed works is not in the floodway, there will be no reduction in the flood carrying capacity. In addition, the development will not impact the riparian zone of the unnamed watercourse.

During works to establish the external bunkers, appropriate erosion and sediment controls would need to be installed and maintained to prevent stormwater contamination in accordance with the document 'Managing Urban Stormwater – Soil & Construction', 4th Edition (Landcom 2004). These controls are detailed on the site and landscape plans prepared as part of the development application.

There is potential for contaminated fire fighting water to enter the stormwater should a significant fire occur on site. The risk of a fire occurring is low as the glass cullet is not combustible.

Potential impacts to water from the proposed development and control measures that would be employed to mitigate these are summarised in the table below.

Table 5-89: Potential Impacts to Water and Control Measure

Potential Contaminant & Source	Potential Impact	Controls
Loose material, grit, dirt, sediment and general litter from external storage areas.	Items enter into the stormwater system, increasing the pollutant load.	• Designated storage areas; • Daily workplace inspection to ensure high standard of housekeeping is maintained and loose material is secure; • Daily sweeping; • Particulate filters on all stormwater pits as well as regular maintenance checks; • Incoming material inspection to ensure unwanted items are not accepted onto site; • Water quality treatment wetland with vegetated swales; • Water monitoring program.

Table 5-89: Potential Impacts to Water and Control Measure

Potential Contaminant & Source	Potential Impact	Controls
General litter and sediment/dirt from warehouse storage and sorting activities.	Littering of the stormwater system.	• Designated Rubbish bins; • Designated storage areas; • Maintenance of high standard of housekeeping; • Roof structures fitted with stormwater gutters and pipelines; • Water quality treatment wetland with vegetated swales; • Water monitoring program
Dust from loading and unloading activities and from external storage of cullet	Sedimentation of local waterways	• Use of water foggers and sprays to reduce dust emissions; • Water quality treatment wetland with vegetated swales; • Water monitoring program
Diesel Fuel	Incident during refuelling activities resulting in release of diesel fuel.	• Diesel storage tank is self-bunded and located in a bunded chemical storage room that was originally designed for storing flammable liquids; • Designated storage tank and warning signage; • Stringent procedures for refuelling practices.
Petrol, oil, fuel, sediment from car parking and use of driveways.	Spills of fuel and build up of sediment causing contamination of stormwater and sedimentation of local waterways.	• Daily Road sweeping; • Vehicle maintenance; • Location of diesel tank in covered, bunded area; • Particulate filters on stormwater pits; • Sealed surfaces; • Water quality treatment wetland with vegetated swales; • Water monitoring program
Contaminated fire fighting water	Contamination of stormwater	• Fire rated walls in building; • Risk is considered to be very low.
Grit, sediment, litter from works to install external bunkers	Contamination of stormwater and sedimentation of local waterways.	• Erosion and sediment controls maintained during construction phase including geotextile sock inlet filter and sediment fences.

The potential for proposed site activities to impact on surface water and groundwater are greatly minimised by the use of environmental controls and safeguards that have been designed into the proposed development.

5.4 SOIL

There would be minimal disturbance to soils as a result of the proposed development. The erection of the external storage bunkers would require minor excavation works.

During operation, there would be safeguards in place to prevent the contamination of soil. The nature of the proposed development is such that there would be minor storage of dangerous goods at the site, thereby significantly reducing the risk for contamination of soil to occur. Potential impacts and mitigation measures are discussed in the following sections.

5.4.1 Existing Soil Contamination

A phase I contamination study of site subject (Report no. 115011) was undertaken in 2011 by Benbow Environmental and following points within the report are noted:

- *The site is understood to be currently owned by Wallaroo Pty Limited.*
- *The site has been developed as an office and warehouse. It is been previously used for storage of large quantities of fertilisers for Paton Fertilizers.*
- *A Phase I and limited soils sampling was prepared in 2009 for Wallaroo. The soil sampling although limited found there to be no contamination of significance and no contamination that would prevent ongoing use of the land for industrial/commercial premises.*
- *The site was recently inspected for this Phase I contamination assessment and the condition of the site is free of any visual evidence of surface contamination from storage of chemicals and in particular fertilisers.*
- *The site has no history of underground tanks having been installed.*

The findings of the Phase I contamination study indicated that there was no evidence to suggest that there would be subsoil or groundwater contamination due to past uses of the site. The Phase I contamination study is provided as Appendix 6.

5.4.2 Potential Impacts on Soil

The risk for contamination of the soil and land due to the proposed development would be related to:

- Works required for the installation of the external bunkers, in particular the excavation required. However, once the proposed hardstand area has been completed, this would greatly reduce the potential for soil and land contamination from site activities.

- Inappropriate storage and handling of diesel. There would be minor storage of diesel. Diesel would be stored within an appropriately bunded and covered area in accordance with dangerous goods legislation. Employees would be made aware of storage and handling requirements.

- Windblown litter and rubbish around the external storage area. This would be reduced by ensuring all external storage of materials is entirely within bays provided and the height of stockpiles within the bays does not exceed three (3) metres.

- Use of car parks and on-site driveways may result in fuel releases, oil leakages and sediment. Contaminants of concern include heavy metals, total petroleum hydrocarbons, BTEX (benzene, toluene, ethylbenzene and xylene). The likelihood or risk of contamination is low to negligible.

- Use of equipment and machinery within the building due to the lubrication of machinery and use of forklifts may result in the release of fuel and oils. Contaminants of concern include total petroleum hydrocarbons, BTEX and aluminium phosphate however the likelihood or risk of contamination is low to minimal.

Littering would also have a negative impact on the local landscape however can be maintained through the use of designated rubbish bins and regular housekeeping practices. In addition to ensuring materials are stored entirely within storage bays, daily sweeping of external storage areas and inspections to ensure that loose material is secure would need to be undertaken. This would greatly reduce the risk of litter contaminating the land.

5.4.3 Safeguards and Mitigation Measures

Table 5-90 provides a summary of the proposed activities with potential to cause contamination of soil and details the controls that are recommended to be established in relation to this issue.

Table 5-90: Potential Soil Contaminants and Control

Activity	Potential Contaminant	Potential Pathway	Controls
Vehicular movements, driveways, car parking	Heavy metals, total petroleum hydrocarbons, BTEX	Incident involving release of oil or fuel	• Spill kits • Environmental awareness training • Sealed surfaces
Use of equipment and machinery inside building	Total petroleum hydrocarbons, BTEX and aluminium phosphate	Incident involving release of oil or fuel	• Spill kits • Environmental awareness training • Sealed surfaces

Table 5-90: Potential Soil Contaminants and Control

Activity	Potential Contaminant	Potential Pathway	Controls
Storage and handling of Diesel fuel	Diesel fuel	Inappropriate management, incident causing a rupture and release or spill from tank during receipt of fuel or during refuelling activities, overfilling of tank	• Bunding of diesel storage tank and refuelling area to 110% of tank capacity • Diesel stored in covered area • Trained personnel • Spill and emergency procedures • Spill kits
External Storage and material transfer	Litter and sediment	Inappropriate management & storage practices, high winds	• Cullet and waste to be stored in designated areas • Cullet to be stored entirely within bunker at no higher than 3m (the height of the bunker) • Vehicles to be tarped when transporting loads from the site • Good housekeeping practices to be implemented • Regular sweeping
Installation of external bunkers and landscaping	Excavated soil, windblown waste and litter, fuel from earthwork vehicles	Excavation activities, landscaping activities, stockpiling of soil or release of soil on site due to an incident	• Silt fences, hay bales during excavation and landscaping • Sampling and analysis according to EPA Waste Guidelines and • Removal of excavated soil from site by a licensed contractor for appropriate disposal or reuse

Note: BTEX = benzene, toluene, ethylbenzene and xylene

The controls listed in the table in addition to stringent management procedures and practices that would be put in place during operation would ensure potential soil and land impacts are greatly minimised.

5.4.4 Statement of Potential Soil Impacts

Evidence from previous studies suggest the site is not contaminated. Minor construction activities and the proposed use of the site have a low to negligible risk of causing contamination of the soil. Appropriate control measures have been recommended.

5.5 FLORA AND FAUNA

This section addresses impacts on threatened and endangered species and native vegetation to satisfy Section 5A of the Environmental Planning and Assessment Act, 1979.

5.5.1 Field Survey

A visual survey of the site was undertaken by BioDesign during daylight hours on 6th on December 2012 and based on the Tree Report (Appendix 4) the following is noted:

- The area of the site where the works is proposed has been substantially cleared of almost all indigenous vegetation.

- No heritage listed trees or tree species subject to the Threatened Species Act (1995) were surveyed on or adjacent to the site.

- The existing footprint and site layout for flood management impose constraints on tree management. Five (5) trees in total would need to be removed.

- The approach taken in the design of the development was to maximise retention of existing trees and to plant out the landscape with as many locally indigenous trees as possible, while taking into account the management of flood and stormwater associated with the site.

- The proposed landscape plans would:

    1. Control weeds
    2. Establish locally indigenous plant species on the site
    3. Create layers of vegetation that are consistent with the natural ecological communities in the immediate vicinity of the site (including the wetland area)
    4. Retain the large logs of felled trees for habitat
    5. Work with the drainage on the site to ensure wetland flows are maintained

    Over time it can be expected that the habitat values of the site for local fauna species will improve significantly.

For the above reasons, a field survey was not considered warranted.

5.5.2 Threatened species, population, ecological communities and their habitat

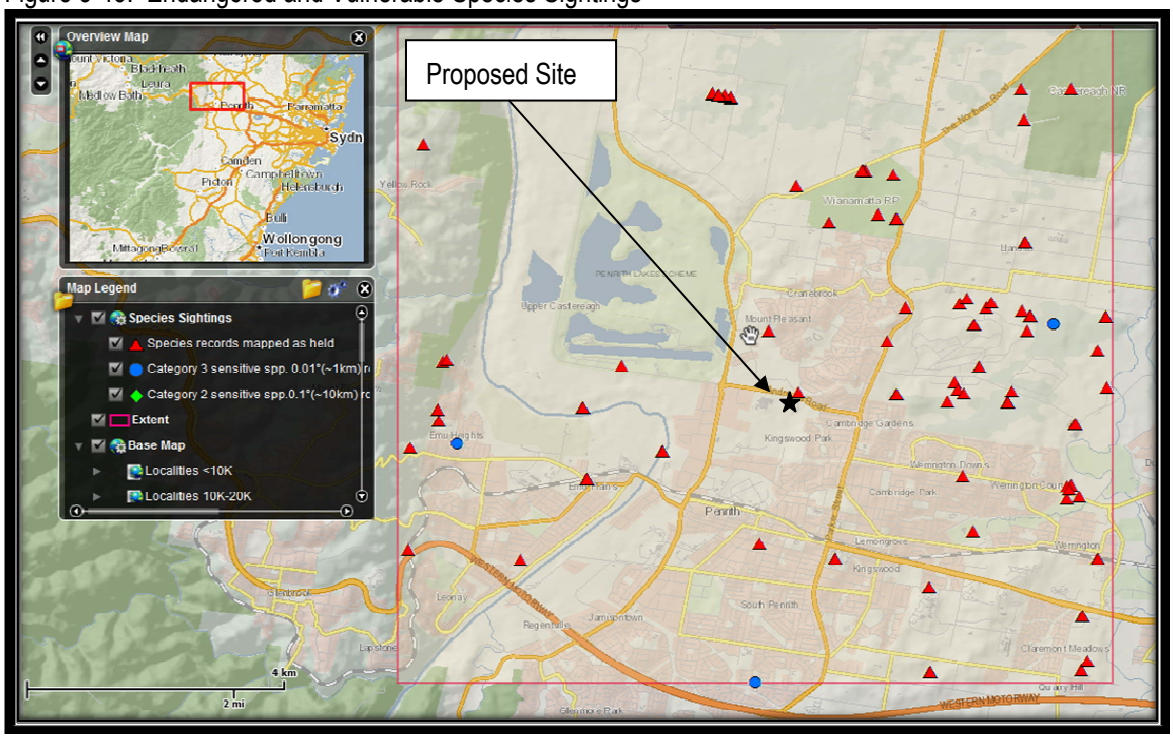
A targeted search was conducted for threatened and endangered species at the subject site and the surrounding area to assess any possible impacts of the development on these species. The search was undertaken using data from the BioNet Atlas of NSW Wildlife website. The search criteria was an area approximately 10km x 10km with the proposed site in the centre of the area. The selected area was: North: -33.67 West: 150.64 East: 150.76 South: -33.78 and included public report of all valid records of plants and animals within this selected area from 1st February 2007 until 2nd February 2012 (a period of 5 years).

Figure 5-43 provides a map locating the threatened and endangered flora and fauna with reference to the location of the subject site. A list of threatened, endangered and vulnerable species found using the targeted search is provided as Table 5-91.

Table 5-91: List of Endangered and Vulnerable Flora and Fauna in Surrounding Area

Kingdom	Scientific Name	Common Name	NSW Status	Sightings
Fauna	*Lophoictinia isura*	Square-tailed Kite	Vulnerable	1
Fauna	*Lathamus discolor*	Swift Parrot	Endangered (E1)	1
Fauna	*Glossopsitta pusilla*	Little Lorikeet	Vulnerable	1
Fauna	Ninox strenua	Powerful Owl	Vulnerable	1
Fauna	*Tyto tenebricosa*	Sooty Owl	Vulnerable	1
Fauna	*Chthonicola sagittata*	Speckled Warbler	Vulnerable	1
Fauna	Daphoenositta chrysoptera	Varied Sittella	Vulnerable	2
Fauna	*Pteropus poliocephalus*	Grey-headed Flying-fox	Vulnerable	10
Fauna	Mormopterus norfolkensis	Eastern Freetail-bat	Vulnerable	5
Fauna	*Miniopterus schreibersii oceanensis*	Eastern Bentwing-bat	Vulnerable	5
Fauna	*Myotis macropus*	Southern Myotis	Vulnerable	1
Fauna	*Scoteanax rueppellii*	Greater Broad-nosed Bat	Vulnerable	3
Fauna	*Meridolum corneovirens*	Cumberland Plain Land Snail	Endangered (E1)	2
Flora	*Dillwynia tenuifolia*	-	Vulnerable	1
Flora	Pultenaea parviflora	-	Endangered (E1)	1
Flora	*Acacia bynoeana*	Bynoe's Wattle	Endangered (E1)	6
Flora	*Micromyrtus minutiflora*	-	Endangered (E1)	1
Flora	*Grevillea juniperina subsp. juniperina*	Juniper-leaved Grevillea	Vulnerable	8
Flora	*Persoonia nutans*	Nodding Geebung	Endangered (E1)	34
Flora	*Pimelea spicata*	Spiked Rice-flower	Endangered (E1)	2

Figure 5-43: Endangered and Vulnerable Species Sightings



There are no threatened or endangered flora or fauna populations or sightings listed or recorded on the NPWS Atlas for threatened or endangered species at the site. The closest reported sighting of an endangered species is the Spiked Rice Flower (*Pimelea spicata*). It has been reported within 0.1 kilometres north-east of the site. The Eastern Freetail Bat and Eastern Bentwing Bat have been sighted approximately 1.5km east of the site.

Given the site is located within an existing industrial estate and the proposed development would not significantly alter features of this built environment, the development is not expected to impact threatened flora and fauna in the local area.

5.5.3 Impacts on Native Vegetation

As discussed in Section 4.3, previous development of the site has resulted in removal of almost all of the indigenous vegetation. Biodesign have indicated in their Tree Report (Appendix 4) that the site is highly disturbed and lacks vegetation layers. Indigenous vegetation that remains on the site includes:

- A single, large *Eucalyptus tereticornis* specimen located in the area where development is proposed;
- *Melaleuca* spp. likely indigenous to the area located in he southern portion of the site where no works are proposed; and
- A mixture of locally indigenous species and species that are indigenous to Sydney including a mature *Eucalyptus tereticornis* specimen that appears to be regrowth located along the boundaries in the area surrounding the existing development. This surrounding area mainly consists of Kikuyu grass that is heavily weed infested.

Also at the site are casurina groves within the wetlands, planting beds in the carpark and desnse vegetation along the southern boundary. Weed infestations currently exist throughout the vegetation of the site.

Removal of the following trees is required and is shown on the Landscape Plan – Site Analysis, Tree Survey and Assessment, provided as Appendix 4.

- Three (3) *Eucalyptus oreades* (Blue Mountain Ash) trees located adjacent to the office building and car park;
- One (1) *Eucalyptus sideroxylen* (Red Ironbark) tree located on the boundary between the car park and drainage reserve; and
- Two (2) *Eucalyptus tereticornis* (Forest Red Gum) located in the area where the external storage bunkers are proposed.

Proposed landscape plans provided in Figure 5-44 and Figure 5-45 would establish locally indigenous plant species on the site and control weeds thus ensuring that the ecological values of this site will be greatly enhanced and improved.

Figure 5-44: Landscape Plan – Site Analysis, Tree Survey and Assessment

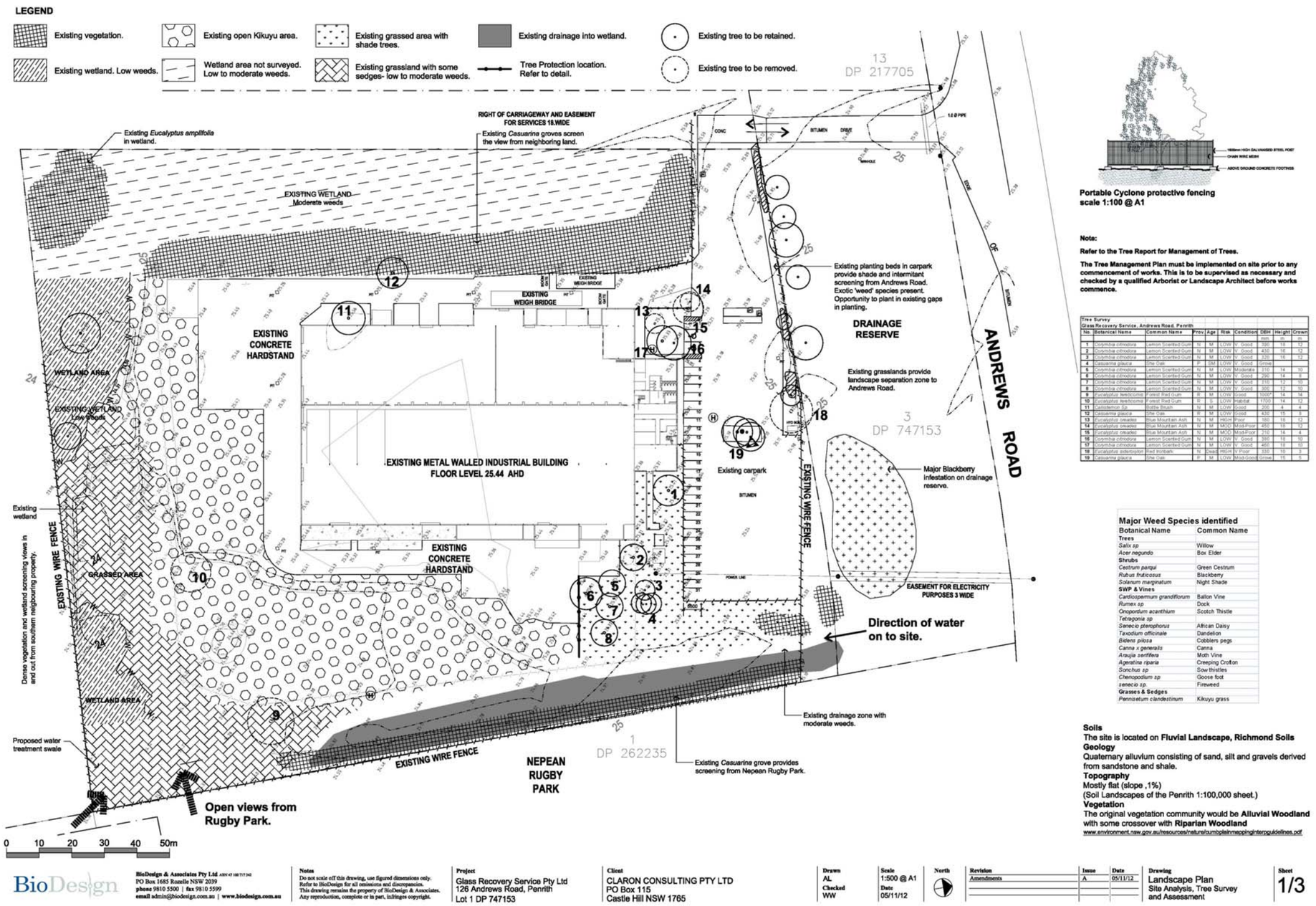


Figure 5-45: Landscape Concept Plan

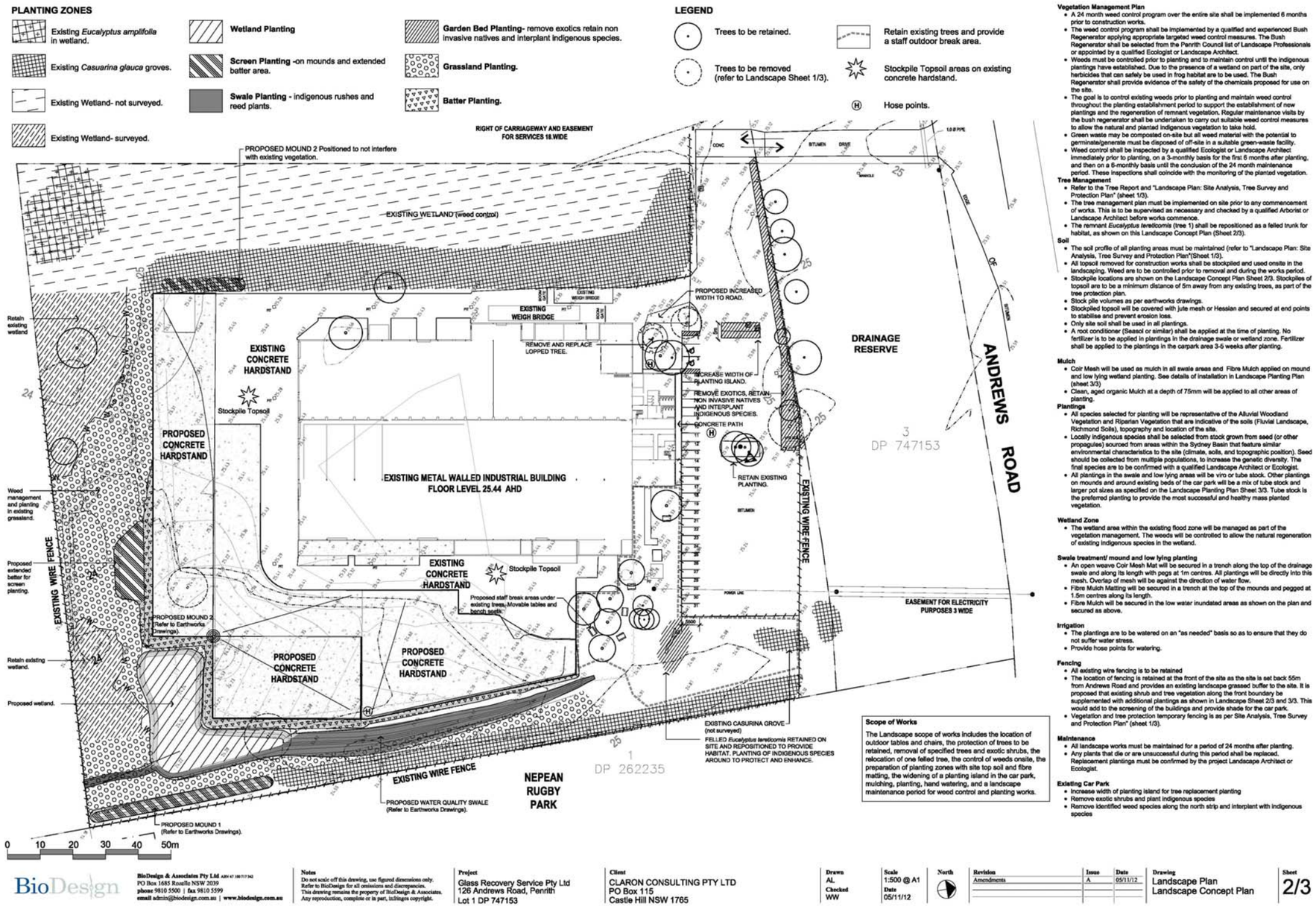
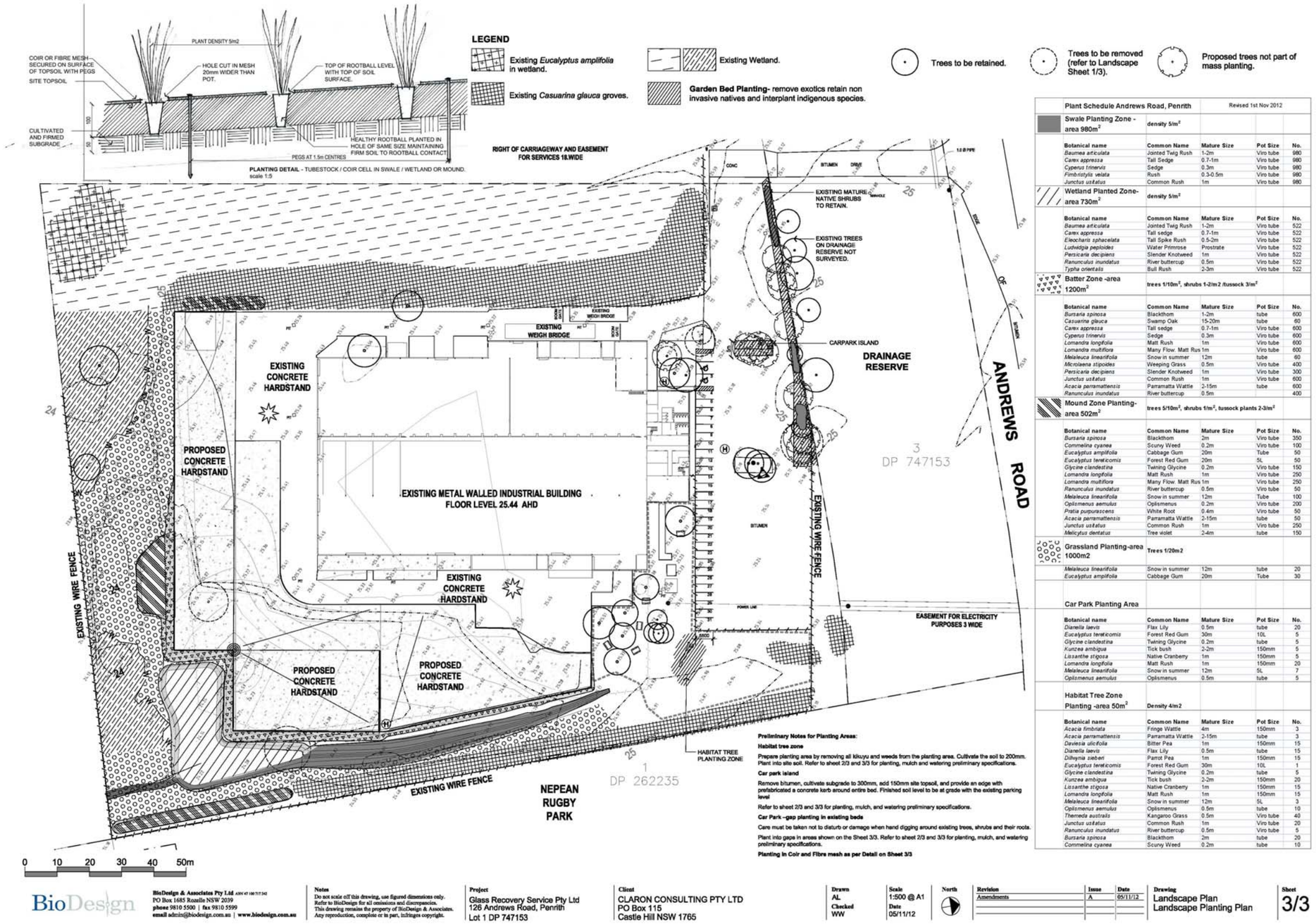


Figure 5-46: Landscape Planting Plan



Plant Schedule Andrews Road, Penrith					Revised 1st Nov 2012
Swale Planting Zone - area 980m²	density 5/m²				
	Botanical name	Common Name	Mature Size	Pot Size	No.
	Baumea articulata	Jointed Twig Rush	1-2m	Viro tube	980
	Carex appressa	Tall Sedge	0.7-1m	Viro tube	980
	Cyperus trinervis	Sedge	0.3m	Viro tube	980
	Fimbristylis velata	Rush	0.3-0.5m	Viro tube	980
	Juncus usitatus	Common Rush	1m	Viro tube	980
Wetland Planted Zone- area 730m²	density 5/m²				
	Botanical name	Common Name	Mature Size	Pot Size	No.
	Baumea articulata	Jointed Twig Rush	1-2m	Viro tube	522
	Carex appressa	Tall sedge	0.7-1m	Viro tube	522
	Eleocharis sphacelata	Tall Spike Rush	0.5-2m	Viro tube	522
	Ludwidgia peploides	Water Primrose	Prostrate	Viro tube	522
	Persicaria decipiens	Slender Knotweed	1m	Viro tube	522
	Ranunculus inundatus	River buttercup	0.5m	Viro tube	522
	Typha orientalis	Bull Rush	2-3m	Viro tube	522
Batter Zone -area 1200m²	trees 1/10m², shrubs 1-2/m2 /tussock 3/m²				
	Botanical name	Common Name	Mature Size	Pot Size	No.
	Bursaria spinosa	Blackthorn	1-2m	tube	600
	Casuarina glauca	Swamp Oak	15-20m	tube	60
	Carex appressa	Tall sedge	0.7-1m	Viro tube	600
	Cyperus trinervis	Sedge	0.3m	Viro tube	600
	Lomandra longifolia	Matt Rush	1m	Viro tube	600
	Lomandra multiflora	Many Flow. Matt Rus	1m	Viro tube	600
	Melaleuca linearifolia	Snow in summer	12m	tube	60
	Microlaena stipoides	Weeping Grass	0.5m	Viro tube	400
	Persicaria decipiens	Slender Knotweed	1m	Viro tube	300
	Juncus usitatus	Common Rush	1m	Viro tube	600
	Acacia parramattensis	Parramatta Wattle	2-15m	tube	600
	Ranunculus inundatus	River buttercup	0.5m		400
Mound Zone Planting- area 502m²	trees 5/10m², shrubs 1/m², tussock plants 2-3/m²				
	Botanical name	Common Name	Mature Size	Pot Size	No.
	Bursaria spinosa	Blackthorn	2m	Viro tube	350
	Commelina cyanea	Scurvy Weed	0.2m	Viro tube	100
	Eucalyptus amplifolia	Cabbage Gum	20m	Tube	50
	Eucalyptus tereticornis	Forest Red Gum	20m	5L	50
	Glycine clandestina	Twining Glycine	0.2m	Viro tube	150
	Lomandra longifolia	Matt Rush	1m	Viro tube	250
	Lomandra multiflora	Many Flow. Matt Rus	1m	Viro tube	250
	Ranunculus inundatus	River buttercup	0.5m	Viro tube	50
	Melaleuca linearifolia	Snow in summer	12m	Tube	100
	Oplismenus aemulus	Oplismenus	0.2m	Viro tube	200
	Pratia purpurascens	White Root	0.4m	Viro tube	50
	Acacia parramattensis	Parramatta Wattle	2-15m	tube	50
	Juncus usitatus	Common Rush	1m	Viro tube	250
	Melicytus dentatus	Tree violet	2-4m	tube	150
Grassland Planting-area 1000m2	Trees 1/20m2				
	Melaleuca linearifolia	Snow in summer	12m	tube	20
	Eucalyptus amplifolia	Cabbage Gum	20m	Tube	30
Car Park Planting Area					
	Botanical name	Common Name	Mature Size	Pot Size	No.
	Dianella laevis	Flax Lily	0.5m	tube	20
	Eucalyptus tereticornis	Forest Red Gum	30m	10L	5
	Glycine clandestina	Twining Glycine	0.2m	tube	5
	Kunzea ambigua	Tick bush	2-2m	150mm	5
	Lissanthe stigosa	Native Cranberry	1m	150mm	5
	Lomandra longifolia	Matt Rush	1m	150mm	20
	Melaleuca linearifolia	Snow in summer	12m	5L	7
	Oplismenus aemulus	Oplismenus	0.5m	tube	5
Habitat Tree Zone Planting -area 50m²	Density 4/m2				
	Botanical name	Common Name	Mature Size	Pot Size	No.
	Acacia fimbriata	Fringe Wattle	4m	150mm	3
	Acacia parramattensis	Parramatta Wattle	2-15m	tube	3
	Daviesia ulicifolia	Bitter Pea	1m	150mm	15
	Dianella laevis	Flax Lily	0.5m	tube	15
	Dilwynia sieberi	Parrot Pea	1m	150mm	15
	Eucalyptus tereticornis	Forest Red Gum	30m	10L	1
	Glycine clandestina	Twining Glycine	0.2m	tube	5
	Kunzea ambigua	Tick bush	2-2m	150mm	20
	Lissanthe stigosa	Native Cranberry	1m	150mm	15
	Lomandra longifolia	Matt Rush	1m	150mm	15
	Melaleuca linearifolia	Snow in summer	12m	5L	3
	Oplismenus aemulus	Oplismenus	0.5m	tube	10
	Themeda australis	Kangaroo Grass	0.5m	Viro tube	40
	Juncus usitatus	Common Rush	1m	Viro tube	20
	Ranunculus inundatus	River buttercup	0.5m	Viro tube	5
	Bursaria spinosa	Blackthorn	2m	tube	20
	Commelina cyanea	Scurvy Weed	0.2m	tube	10

Preliminary Notes for Planting Areas:

Habitat tree zone

Prepare planting area by removing all kikuyu and weeds from the planting area. Cultivate the soil to 200mm. Plant into site soil. Refer to sheet 2/3 and 3/3 for planting, mulch and watering preliminary specifications.

Car park island

Remove bitumen, cultivate subgrade to 300mm, add 150mm site topsoil, and provide an edge with prefabricated a concrete kerb around entire bed. Finished soil level to be at grade with the existing parking level

Refer to sheet 2/3 and 3/3 for planting, mulch, and watering preliminary specifications.

Car Park –gap planting in existing beds

Care must be taken not to disturb or damage when hand digging around existing trees, shrubs and their roots.

Plant into gaps in areas shown on the Sheet 3/3. Refer to sheet 2/3 and 3/3 for planting, mulch, and watering preliminary specifications.

Planting in Coir and Fibre mesh as per Detail on Sheet 3/3

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Project
Glass Recovery Service Pty Ltd
126 Andrews Road, Penrith
Lot 1 DP 747153

Client
CLARON CONSULTING PTY LTD
PO Box 115
Castle Hill NSW 1765

Drawn AL
Checked WW
Scale 1:500 @ A1
Date 05/11/12
North

Revision	Issue	Date
Amendments	A	05/11/12

Drawing
Landscape Plan
Landscape Planting Plan

Sheet 3/3

5.5.4 Statement of Potential Flora and Fauna Impact

Given the outcomes from the analyses provided, it can be concluded that no flora and fauna impacts are anticipated to occur given the already established nature of the industrial site. Further, implementation of the landscape plans is expected to significantly improve the habitat values of the site for local fauna species in the long term.

5.6 WASTE GENERATION AND MANAGEMENT

This section addresses the waste generation and management of the proposed development.

Waste is described within the NSW EPA Waste Classification Guidelines as:

> *a) any substance whether solid, liquid or gaseous that is discharged, emitted or deposited in the environment in such volume, constituency or manner as to cause an alteration in the environment; or*
> *b) any discarded, rejected, unwanted, surplus or abandoned substance; or*
> *c) any otherwise discarded, rejected, unwanted, surplus or abandoned substance intended for sale or for recycling, reprocessing, recovery or purification.*

Waste would be generated and handled throughout each stage of the development. The raw materials of the operation are also considered to be a recyclable waste product. All waste material handled on site must be classified in accordance with the NSW EPA Waste Classification Guidelines as one of the following:

- Special waste;
- Liquid waste;
- Hazardous waste;
- Restricted solid waste;
- General solid waste (putrescible); and
- General solid waste (non-putrescible).

Classification of waste enables the generator to determine the appropriate handling, transport and disposal requirements if the waste cannot be reused or recycled.

5.6.1 Relevant Legislation

5.6.1.1 Protection of the Environment Operations Act 1997

The Protection of the Environment Operations (Waste) Regulation 2005 is administered under the POEO Act 1997. This regulation identifies provisions relating to waste management and disposal.

Part 3 of this Regulation details the requirements associated with tracking waste. Certain types of waste (listed in Schedule 1 of this legislation) which have the potential to be harmful to the environment are required to be tracked from the source to the waste disposal facility. The proposed development would not generate waste that requires tracking under this legislation.

Section 48 of this Regulation also states: "A person who stores waste on premises (whether or not the waste was produced on the premises) must ensure that it is stored in an environmentally safe manner." Storage of waste generated on site is discussed in Section 5.6.3.

5.6.1.2 Waste Avoidance and Resource Recovery Act 2001

The Waste Avoidance and Resource Recovery Act 2001 does not directly identify waste management requirements for companies such as Glass Recovery Service. Rather, it provides an overview of the guiding principles of waste management.

The objective of this Act is to ensure, among other items, the following:

- Efficient resource use is encouraged in accordance with the principles of Environmentally Sustainable Development;
- Waste management is considered where avoidance of unnecessary resource consumption is considered first, resource recovery is the second option, and finally disposal where alternative management methods are exhausted;
- The amount of waste being generated is continually reduced; and
- Waste management – reduce, reuse, recycle is further encouraged to minimise consumption and waste disposal.

5.6.1.3 NSW Waste Avoidance and Resource Recovery Strategy 2007

NSW Waste Avoidance and Resource Recovery Strategy 2007 provides a framework in NSW for "maximising conservation of our natural resources and minimising environmental harm from waste management and disposal of solid waste."

This glass beneficiation plant is an important initiative that contributes to waste reduction and resource recovery in NSW. The project would provide new infrastructure and systems that would improve the quality of glass cullet for recycling.

5.6.1.4 NSW Waste Classification Guidelines

To ensure appropriate waste management and disposal, all waste must be classified according to waste classification guidelines.

Waste classification guidelines were updated in April 2008. In accordance with this document, waste can be classified into 6 different streams.

Table 5-92: Waste Classes Identified in the NSW Waste Classification Guidelines

Class	Example
1) Special waste	• Clinical and related wastes • Asbestos waste • Waste tyres
2) Liquid waste	• Waste that has an angle of repose <5degrees • Waste that becomes free flowing at or below 60ºC • Is not generally capable of being picked up by a spade or shovel
3) Hazardous waste	• Waste with a pH ≤ 2 or ≥12.5 • Containers that have not been cleaned and contained dangerous goods within the meaning of the Australian Code for the Transport of Dangerous Goods by Road and Rail
4) Restricted solid waste	• This type of waste is determined by chemical tests.
5) General solid waste (putrescible)	• Waste from litter bins collected by local councils • Food waste • Grit or screenings from sewage treatment systems that have been dewatered so that the grit of screenings do not contain free liquids
6) General solid waste (non-putrescible)	• Paper or cardboard • Glass, plastic, rubber, plasterboard, ceramic, bricks, concrete or metal • Containers previously containing dangerous goods as defined under the Australian Code for the Transport of Dangerous Goods by Road and Rail, from which residues have been removed by washing or vacuuming

Waste produced by the activities at the site would need to be classed into the categories listed above.

5.6.2 Construction Waste

Construction activities would be limited to the following:

- Minor building modifications to the eastern facade; and
- Installation of the external bunkers.

Construction activities are detailed in Section 3.2.1.1. Waste that would be generated as a result of these activities is presented in the following table.

Table 5-93: Construction Waste		
Waste Type	Estimated Quantity	Management
Excavation Material	Nil	All construction waste would be removed for off site recycling.
Garden Organics	Nil	
Bricks	1 tonne	
Concrete	2 tonnes	
Timber	0.5 tonnes	
Plasterboard	Nil	
Metals	5 tonnes	
Hazardous Material, e.g. asbestos and lead based paints	Nil	

All construction waste would be removed for off-site recycling.

5.6.3 Operational Waste Streams and Management

There would be two main waste streams at the site:

1. Office & domestic waste - General solid waste (putrescible), and
2. Process waste - From the sorting process which would generate mostly recyclable material contained in the incoming glass - General solid waste (non-putrescible).

Waste generated within the process would be brought onto site with the incoming raw materials. This waste would be removed from the process streams during the sorting/screening processes. It is anticipated that the waste would include minor quantities of contaminants such as ferrous and non-ferrous metals, fragments of metal, ceramics, bricks, stones and some grit or dirt. The majority of this waste would be recycled with only office waste and the grit/dirt, sweepings etc being sent to off site reuse.

Recycling bins would be located on site to store any recyclable material. Site management would arrange for any recyclable waste to be sent to the appropriate recycling facility. Any waste that cannot otherwise be recycled would be disposed of into the general waste bins located on site. Quantities of such waste are difficult to estimate and would be dependent on the material brought to the site. No hazardous waste material is likely to be generated at the site.

Further, the facility would have stringent inspection procedures that would ensure that only clean glass would be allowed onto the site, thereby generating only minimal waste quantities.

There would be a designated storage bin for all office and domestic waste that would be serviced by a licensed waste contractor.

Table 5-94 presents a summary of the waste generation and management associated with the proposed development including the waste types that would be generated, the estimated quantity, classification in accordance with the *Waste Classification Guidelines* and how each waste type would be managed. The estimated quantity is based on the annual production of 150,000 tonnes of cullet.

Table 5-94: Waste Management – Operational Waste Generated by the Proposed Development

Waste Type	Estimated Annual Quantity	Classification	Management
Office & domestic waste	2 T	General solid waste (non-putrescible)	Designated receptacles for rubbish and recycling. Serviced on an as needs basis by a licensed Waste Contractor.
Ferrous Metal	2,250 T	General solid waste (non-putrescible) (100% Recyclable)	Temporarily stored on site prior to being recycled at a recycling facility.
Non-ferrous Metal	1,500 T	General solid waste (non-putrescible) (100% Recyclable)	Temporarily stored on site prior to being recycled at a recycling facility.
Stone, Ceramic, Porcelain & brick etc	3,750 T	General solid waste (non-putrescible) (100% Recyclable)	Temporarily stored on site prior to being recycled at a recycling facility.
Other impurities and contaminants – grit/dirt, sweepings etc., plastics and other non-recyclable material	4,500 T	General solid waste (non-putrescible)	Stored in designated bin on site and serviced by a licensed waste contractor to be sent to an inert landfill.
Oils from maintenance activities	50 L	Liquid Waste (100% Recyclable)	Stored in 25L sealed containers and sent to an oil recycling facility.

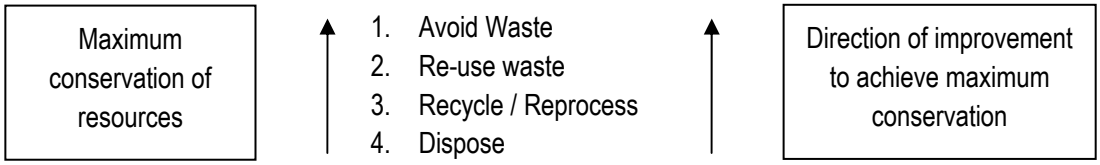
5.6.4 Waste Management Discussion

Waste streams that would be generated as a result of the proposed development and would include General solid waste (putrescible) and General solid waste (non-putrescible). Most of this waste would be recycled.

It is considered that in regards to the nature of the proposed development the appropriate waste management practices would be in place where general wastes are stored in a designated and covered containers awaiting transport off site by appropriate contractors for recycling or disposal. The proposed development would thus comply with S48 of the Protection of the Environment Operations Regulation 1997 which states the facility must store and manage waste in an environmentally safe manner.

In accordance with the Waste Avoidance and Resource Recovery Act 2007, GRS would participate in waste avoidance and reuse.

Figure 5-47: Hierarchy of Waste Management



Waste minimisation and resource recovery would be practised as part of the company's commitment to the principles of Ecologically Sustainable Development (ESD) and the Waste Avoidance and Resource Recovery Act. Waste minimisation can benefit the operation of the facility by the following:

- Reducing the cost of the material inputs into the production processes;
- Recycling and reuse of waste materials generated on site;
- Reducing the quantities of waste removed off site; and
- Encouraging material suppliers to take back packaging materials.

The following techniques aid in minimising waste:

- Segregation of Waste Streams;
- Housekeeping using workplace inspections to reduce raw material losses, spillages and overuse;
- Process Improvements & Production Upgrading; and
- Recycling of Waste.

5.6.5 Waste Management Recommendations

To further manage their waste on site the following needs to be considered:

- Adopting an incoming raw material inspection to ensure that waste materials brought onto site with incoming loads can be minimised;
- Undertaking regular waste audits via workplace inspections – items to consider include: checking that wastes are segregated into recyclable and non-recyclable wastes and that chemicals (if any) are stored in a bunded area; and
- Should new streams be developed, classify waste in accordance with the NSW Waste Classification guidelines to ensure appropriate waste management and disposal.

5.7 HAZARDS AND RISKS

There are no quantities of dangerous goods stored on site that would trigger SEPP33 being relevant.

5.7.1 Chemicals and Dangerous Goods

A limited number of chemicals considered to be dangerous goods would be stored and handled on site. A dangerous good is an article or substance capable of posing significant risk to health, safety or property. Dangerous goods are divided into different classes based on the particular risk posed by the product.

The only dangerous goods stored on site will be as follows:

- Diesel fuel, minor storage quantities of 2,000 L stored in a self-bunded tank within a dedicated store room in a bunded area;
- Paint for maintenance, less than 100 L stored; and
- Lubricating oils for equipment, typically 2 x 205 L drums stored a bunded pallet.

These dangerous would be stored in compliance with AS 1940-2004.

Dangerous goods of minor storage only would be used at the site and no placarding or notification to WorkCover is required.

5.7.2 Potential Fire Risk

The potential fire risk from the processes is limited to failure of an electric motor or a conveyor belt resulting in a fire. The cullet is inert and non-combustible and risk of a fire is very low.

The dust generated is not combustible and therefore there is no presence of a hazardous zone for dust.

The following safeguards and recommendations would be adhered to at the site to control potential fire risks:

- Fire hydrant systems are provided in accordance with AS 2419-2005.
- Hose reel systems are provided in accordance with AS 2441-2005.
- Fire services at the site are to be maintained in accordance with AS 1851-2012.
- Emergency lighting and exit signage are to be provided in accordance with the BCA and AS 2293-2005.
- Specific on site personnel are to be trained in specific site procedures, emergency procedures and the use of hose reels.
- Strict control of ignition sources to be enforced on site.
- Maintenance and housekeeping practices provided in accordance with AS/NZS 4745-2012.

5.7.3 Bushfire Hazard

A Bushfire Hazard Assessment Report was prepared by Building Code and Bushfire Hazard Solutions Pty Limited and is presented as Appendix 8. The following section provides a summary of the report.

The report was prepared due to the land being designated a bushfire prone area. The assessment determines the bushfire hazard and provides recommendations for both building and construction as well as bushfire mitigation measures.

The proposed development was assessed against the principles of Planning for Bush Fire Protection 2006 under Section 4.3.6 "PBP and other buildings".

Vegetation

The vegetation identified as being the hazard is:

- Northeast of the site within vacant allotments consisting of woodland vegetation;
- South of the site within a large vacant allotment consisting of forested wetlands; and
- West within the subject site and on a large vacant allotment to the immediate west consisting of grasslands.

Asset Protection Zones

Asset protection zones (APZs) are set back distances applied to a development that is on bush fire prone land. No minimum required asset protection zones are required since the proposed development does not contain a residential component and is not considered Special Fire Protection Purpose.

The available Asset Protection Zones measured onsite are:

- >160 metres to the northeast;
- >140 metres to the south; and
- >30 metres to the west.

The APZs consist of maintained grounds within the subject property and grounds in neighbouring allotments and the formed area of Andrews Road.

Property Access, Fire Services and Water Supply

The following are considered adequate for the property:

- The existing water supply for the replenishment of attending fire services
- The existing access provisions; and
- Access for fire services and opportunities for occupant evacuation

Bushfire Attack Level

Under AS 3959 – 2009, the highest Bushfire Attack Level (BAL) to the existing office building was found to be BAL 12.5 (table 2.4.2). Retrofitting recommendations to the office component of the building to achieve BAL 12.5 were made to prevent entry of smoke and embers.

Recommendations

- Landscaping around the subject building needs to comply with "Landscaping and Property Maintenance" of *Planning for Bush Fire Protection 2006*;

- The office component of the existing building needs to include:
  - Installation of aluminium, steel or bronze metal mesh screens having an aperture size of 2 mm over all openable windows (internal or external) in such a way that the entire opening remains screened when the window is in the open position;
  - The installation of aluminium, steel or bronze metal mesh screens having an aperture size of 2 mm over all vents and weepholes;
  - The installation of draft excluders on all external side hung doors; and
  - The installation of draft excluders on all internal side hung doors that separate the office and industrial components of the building.

- An emergency / evacuation plan needs to be prepared consistent with the NSW Rural Fire Service document Guidelines for the Preparation of Emergency/Evacuation Plans.

Conclusion

In accordance with the bushfire safety measures contained in this report, and consideration of the site specific bushfire risk assessment it is our opinion that when combined, they will provide a reasonable and satisfactory level of bushfire protection to the subject development.

We are therefore in support of the development.

6. ENVIRONMENTAL IMPACTS AND SAFEGUARDS – SOCIAL IMPACTS ASPECTS

This section of the EIS addresses issues that may have social impacts. These include the following:

- Health;
- Visual;
- Heritage;
- Socio-economic;
- Greenhouse gas emissions;
- Ecologically sustainable development; and
- Road, traffic and transport.

The assessment of these issues found that with the recommended controls in place there would be no adverse impacts.

6.1 HEALTH

6.1.1 Introduction

Health impacts of this development have been addressed with reference to the Health Impact Assessment Guidelines (enHealth, 2001). The Health Impact Assessment (HIA) process covers the following steps:

1. Screening – Determining the need for a Health Impact Statement;
2. Scoping – Identifying the potential impacts that need to be assessed, the boundaries of these impacts, and additional tasks and requirements to complete the assessment;
3. Profiling – Establishing a profile of communities likely to be impacted. Collecting data required to assess health impacts;
4. Risk Assessment – Assessing the significance of health impacts by qualitative and/or quantitative measures;
5. Risk Management – Investigation options to minimise potential risks;
6. Implementation and decision making – Justifying significant health impacts and providing recommendations to reduce potential impacts; and
7. Monitoring, environmental and health auditing, post-project evaluation – Evaluating health impacts and the success of the Health Impact Assessment and monitoring plans following development approval and implementation of recommendations.

Each of these seven aspects has been examined.

6.1.2 Screening

Screening is an integral part of the HIA and the overall screening process. All proposed developments that are required to undergo an EIA should be screened for possible health impacts (enHealth, 2001).

Providing the nature of the health concerns are common for many industries, and the potential for impacts to be mitigated, a full scale Health Impact Assessment is not considered to be warranted. This is the case for this proposal as there would be no hazardous materials being brought to the site or handled on site.

6.1.3 Scoping

Potential environmental, physical and social health impacts associated with the development are listed in the following table.

Table 6-1: Potential Health Impacts Associated with the Development

Health Aspect	Positive Impacts	Negative Impacts
Environmental	• The proposed development would be located adjacent to the end user, reducing health impacts associated with long-distance transport. eg. Greenhouse gas emissions, air pollution, potential vehicle accidents.	• Increased resource use (energy and water) on site. • Noise and dust impacts from the crushing and separating processes. These will have minimal off-site impacts due to the presence of air emission control equipment and noise controls. • Should environmental impacts not be controlled, there is the potential for contaminants (litter, sediment, windblown waste) to escape the site and enter the adjacent waterbody or groundwater.
Physical	-	• Health impacts associated with dust. Due to the production process being enclosed within a building and the presence of dust emission controls and appropriate PPE, off-site impacts will be minimal.
Social	• The development would increase employment opportunities in the region. • Economic "spin-off" effects in the local region.	–

Dust associated with the production process and the on-site transport and storage of cullet, although minor, have been identified as presenting the greatest concern and form the main focus in this section. These include:

- Fine particulate matter (PM10) - particles 10µm (0.01mm) in size or less.
- Total Suspended Particulates (TSP) - particles 50µm (micrometers) (0.05mm diameter) in size or less.
- Deposited Dust – dust that falls out of suspension in the atmosphere.

6.1.4 Profiling

The proposed site is situated approximately 50 km west of the Sydney, within the Penrith City Council jurisdiction. The community most affected by potential health impacts of the site are the residences closest to the site. These residences have been modelled in the air and noise impact assessment where they are referred to as receptors. Demographic information on these receptors is not known.

The demographic profile of the Penrith local government area, as indicated by the 2010 Australian Census (Australian Bureau of Statistics 2006) is as follows:

Table 6-2: Penrith Local Government Area Demographics (2010 Australian Census)

Profile Parameter	Quantity
Personal Characteristics	
• Population	186,221
• Female	94,049
• Male	92,172
Age	
• 0-14 years	39,647
• 15-24 years	29,632
• 25-34 years	29,458
• 35-44 years	25,937
• 45-54 years	24,682
• 55-64 years	20,104
• 65-74 years	9,773
• 75-84 years	5,065
• 85 years and over	1,923

6.1.5 Risk Assessment and Management

Dust including deposited dust, total suspended particulates (TSP) and particulate matter of less than 10 μm in diameter (PM_{10}) are likely emitted particularly during the crushing and screening processes as well as loading and handling of materials on site.

Control measures specifically to minimise emissions of dust have been designed into the facility. There will be a dust collection system for the crushing and screening processes that has a 90% removal efficiency. Furthermore, the external storage of materials would be within bunkers on a hardstand surface. Materials stored within external bunkers would be the cullet separated according to grade and colour. The internal road and driveways of the site would be sealed and materials would be delivered in covered trucks therefore the level of emission due to transport is considered insignificant.

Generally, only fine particles (PM_{10}) of dust present a health concern. Fine particulate matter would enter the body through inhalation and may be deposited in the upper sections of the lungs.

Particulate matter could have the following health effects:

- Toxic effects by absorption of the toxic material into the blood (e.g. lead, cadmium, zinc);
- Allergic or hypersensitivity effects;
- Irritation of mucous membranes; and
- Increased respiratory symptoms, aggravation of asthma and premature death. The risks are highest for sensitive groups such as the elderly and children (Department of the Environment, Water, Heritage and the Arts).

If appropriate storage and handling of materials is conducted, and employees wear appropriate PPE; gloves, full length clothing, safety glasses, appropriate respirator and workspace has adequate ventilation, risks are low due to actual pollutant levels being evolved from the site. Risks to the general public are even lower considering the use of dust collection equipment and the separation distances of the nearest receptors to the site.

6.1.6 Statement of Potential Health Impacts

The potential off-site health impacts from dust generation are considered minimal as all activities associated with the glass recycling activities would be adequately controlled to achieve minimal or negligible emissions.

Windborne dust is not expected to affect neighbouring properties since the dust deposition modelling indicates compliance. The proposed crushing and screening processes would be undertaken inside the building with a dust collection system in operation at all times. An audit of compliance with the recommendations is a useful safeguard as well as use of appropriate PPE by employees to avoid potential health impacts.

The monitoring, auditing and evaluation stage of the HIA process is typically undertaken 12-18 months following the HIA completion (http://www.health.nsw.gov.au). As such it is not considered within the context of this report.

6.1.7 Employee Health and Safety

The health and safety issues associated with the facility would relate to handling and processing of incoming used glass (raw materials) and cullet (finished product) and associated ancillary activities.

All employees would undergo appropriate training as part of site induction and be provided with appropriate Personal Protective Equipment (PPE) for their role. The employer would ensure the operation is conducted as approved and appropriate resources are available for work safety. The development operation would be required to comply with the following Acts and Regulations relating to health and safety:

- Work Health & Safety Act 2011
- Work Health & Safety Regulations 2011

Employees would also be fitted and trained in the appropriate safety procedures and equipment to be used.

6.2 VISUAL IMPACTS

This section addresses the visual aspects of the proposed development.

6.2.1 Existing Visual Amenity

The existing visual amenity is one that is typical of an industrial area. The land surrounded the subject site is dominated by industrial installations. There is currently a large industrial building that takes up the majority of the site, a shed, car parking, hardstand areas around the building and landscaped areas.

The site can be viewed from sporting fields on the east, vacant land and an industrial facility (Owens Illinois) to the west, Andrews Road to the north. Immediately south of the site, there is vacant vegetated land.

The following provides a series of photographs of the site how it appears today.

Photograph 1: A view to the east across the front of the site.



Photograph 2: The north facing (front) side of the two storey offices.



Photograph 3: The north east corner of the carpark.



Photograph 4: A view across the front carpark to the west.



Photograph 5: Rear concreted yard area with shed to be demolished.



Photograph 6: Rear view to the east.



Photograph 7: View to north east from end (southern end).



Photograph 8: Southern end of the site.

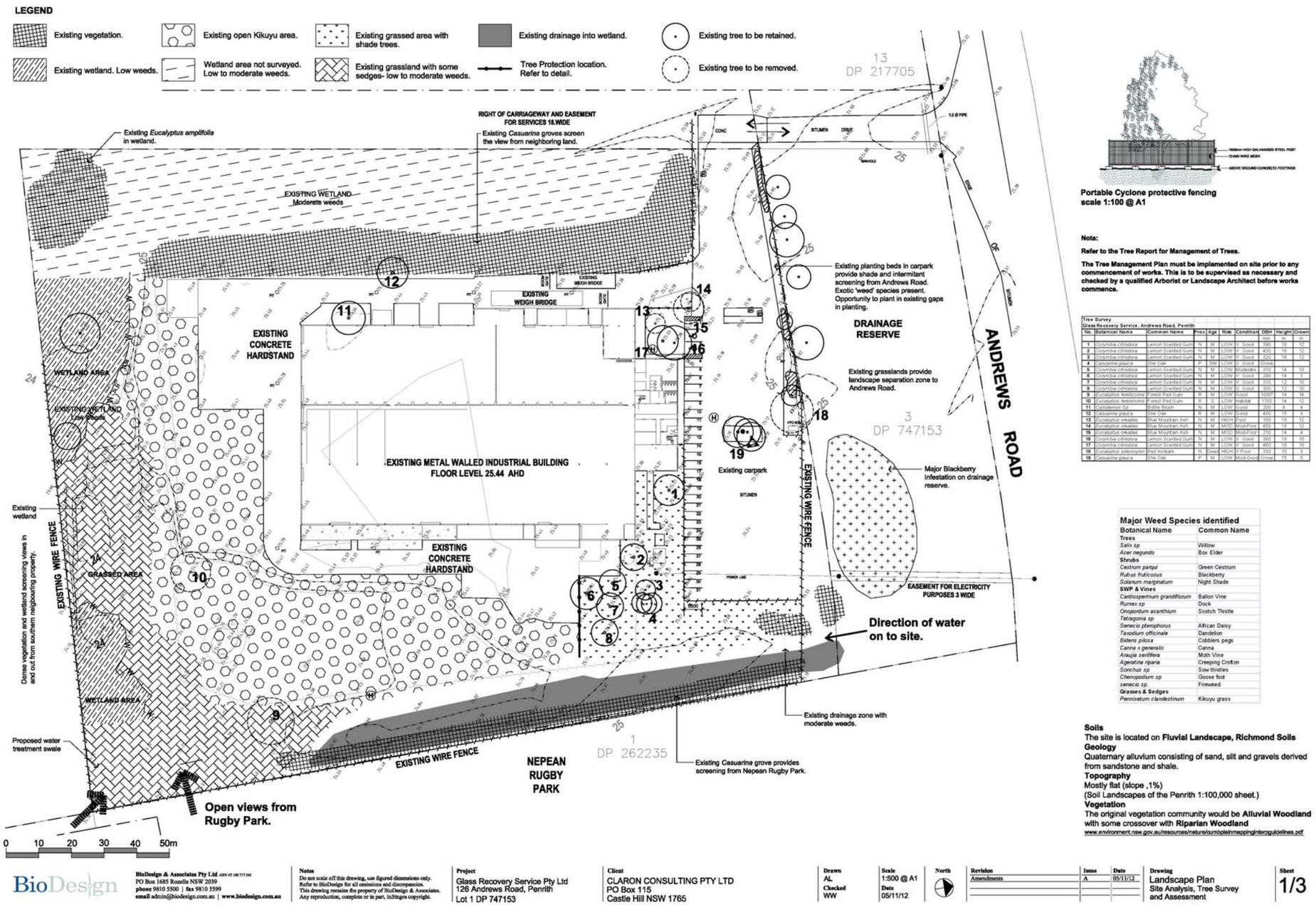


Photograph 9: View along the eastern wall.



The existing vegetation on the site contains a large number of weeds that will be removed in accordance with the landscaping plans prepared by Biodesign. The proposed landscape plan is provided as Figure 6-1.

Figure 6-1: Landscape Plan



Note:

Refer to the Tree Report for Management of Trees.

The Tree Management Plan must be implemented on site prior to any commencement of works. This is to be supervised as necessary and checked by a qualified Arborist or Landscape Architect before works commence.

Tree Survey
Glass Recovery Service, Andrews Road, Penrith

No.	Botanical Name	Common Name	Prov	Age	Rate	Condition	DBH mm	Height m	Crown m
1	Corymbia citriodora	Lemon Scented Gum	N	M	LOW	V. Good	380	18	12
2	Corymbia citriodora	Lemon Scented Gum	N	M	LOW	V. Good	430	16	12
3	Corymbia citriodora	Lemon Scented Gum	N	M	LOW	V. Good	320	16	12
4	Casuarina glauca	She Oak	P	SM	LOW	V. Good	Group		
5	Corymbia citriodora	Lemon Scented Gum	N	M	LOW	Moderate	310	14	10
6	Corymbia citriodora	Lemon Scented Gum	N	M	LOW	V. Good	290	14	8
7	Corymbia citriodora	Lemon Scented Gum	N	M	LOW	V. Good	310	12	10
8	Corymbia citriodora	Lemon Scented Gum	N	M	LOW	V. Good	300	12	10
9	Eucalyptus tereticornis	Forest Red Gum	R	M	LOW	Good	1030*	14	14
10	Eucalyptus tereticornis	Forest Red Gum	R	S	LOW	Habitat	1700	14	12
11	Callistemon Sp.	Bottle Brush	N	M	LOW	Good	300	4	4
12	Casuarina glauca	She Oak	R	M	LOW	Good	430	15	8
13	Eucalyptus oreades	Blue Mountain Ash	N	M	HIGH	Poor	180	15	12
14	Eucalyptus oreades	Blue Mountain Ash	N	M	MOD	Mod-Poor	450	15	12
15	Eucalyptus oreades	Blue Mountain Ash	N	M	MOD	Mod-Poor	210	14	4
16	Corymbia citriodora	Lemon Scented Gum	N	M	LOW	V. Good	350	18	10
17	Corymbia citriodora	Lemon Scented Gum	N	M	LOW	V. Good	460	18	10
18	Eucalyptus sideroxylon	Red Ironbark	N	Dead	HIGH	V.Poor	330	10	3
19	Casuarina glauca	She Oak	R	M	LOW	Mod-Good	Group	15	5

Major Weed Species identified

Botanical Name	Common Name
Trees	
Salix sp	Willow
Acer negundo	Box Elder
Shrubs	
Cestrum parqui	Green Cestrum
Rubus fruticosus	Blackberry
Solanum marginatum	Night Shade
SWP & Vines	
Cardiospermum grandiflorum	Ballon Vine
Rumex sp	Dock
Onopordum acanthium	Scotch Thistle
Tetragonia sp	
Senecio pterophorus	African Daisy
Taxodium officinale	Dandelion
Bidens pilosa	Cobblers pegs
Canna x generalis	Canna
Araujia sentifera	Moth Vine
Ageratina riparia	Creeping Croton
Sonchus sp	Sow thistles
Chenopodium sp	Goose foot
senecio sp.	Fireweed
Grasses & Sedges	
Pennisetum clandestinum	Kikuyu grass

Soils
The site is located on **Fluvial Landscape, Richmond Soils**
Geology
Quaternary alluvium consisting of sand, silt and gravels derived from sandstone and shale.
Topography
Mostly flat (slope ,1%)
(Soil Landscapes of the Penrith 1:100,000 sheet.)
Vegetation
The original vegetation community would be **Alluvial Woodland** with some crossover with **Riparian Woodland**
www.environment.nsw.gov.au/resources/nature/cumberlainmappinginterguidelines.pdf

BioDesign

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Notes
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Project
Glass Recovery Service Pty Ltd
126 Andrews Road, Penrith
Lot 1 DP 747153

Client
CLARON CONSULTING PTY LTD
PO Box 115
Castle Hill NSW 1765

Drawn AL
Checked WW
Scale 1:500 @ A1
Date 05/11/12
North

Revision	Issue	Date
Amendments	A	05/11/12

Drawing
Landscape Plan
Site Analysis, Tree Survey and Assessment

Sheet 1/3

6.2.2 Visual Impacts of the Development

Changes to the site's appearance as a result of the proposed development would include:

- Erection of storage bunkers that would be visible from the vacant land to the south and the sporting fields on the east of the site;
- Minor alteration to the roller doors and installation of a dust collection system on the eastern side of the existing factory building that would be visible from the sporting fields on the east of the site;
- Demolition of the shed that exists on the south-western corner of the site and would no longer be visible from the vacant land and industrial facility within line of sight; and
- Improvements to the landscaped areas of the site, the most visible of which would be from Andrews Road.

Under Clause 6.5 of the Penrith LEP 2010, the site is considered to be land with scenic character and landscape values. Clause 6.5 relates to the protection of scenic character and landscape values as follows:

> *"(1) The objectives of this clause are as follows:*
>
> *(a) to identify areas that have particular scenic value either from major roads, identified heritage items or other public places,*
> *(b) to ensure development in these areas is located and designed to minimise its visual impact.*
>
> *(2) This clause applies to land identified as "Land with scenic and landscape values" on the Scenic and landscape values map.*
>
> *(3) Development consent must not be granted for any development on land to which this clause applies unless the consent authority is satisfied that measures will be taken, including in relation to the location and design of the proposed development, to minimise the visual impact of the development from major roads, identified heritage items and other public places."*

Key considerations raised by Council in the pre-lodgement meeting regarding the protection of scenic character and landscape related to the building design, car park layout, landscape plantings and proposed signage. The addition of proposed external bunkers has also been considered. These issues are discussed in the following sub-sections.

6.2.2.1 Building Design

The existing building on site would be utilised for the development. There would be minor changes to the eastern side of the building including installation of two new roller shutters and installation of a dust collector external to the building. No other changes to the existing building are proposed as part of the development.

The minor alterations to the building design are considered to be insignificant in their visual impact of neighbouring premises and to the view of the general public from Andrews Road.

6.2.2.2 Car Park Layout

The existing car park layout would remain unchanged. In addition, there is existing vegetation that restricts the view of the car park from Andrews Road as well as existing grassland that provides a landscape separation zone. The vegetation and grassland would remain and be enhanced with new plantings as proposed on the landscape plans.

Taking into consideration the proposed landscaping that would be provided as part of the proposed development, the visual aspect of the site is likely to be enhanced.

6.2.2.3 Landscape Plantings

Landscape plans have been prepared in relation to the proposed development. A weed management plan would be implemented to remove existing weed infestations on the site. Planting of indigenous species is proposed. Landscape plantings would enhance the visual amenity of the site. The proposed landscaping plan is provided as Figure 5-44.

6.2.2.4 Proposed Signage

Any signage installed at the site would be undertaken in accordance with the Penrith LEP 2010.

The proposed development would not impede on the visual amenity of the site or surrounding area. The minor changes to the building and proposed landscaping is more likely to enhance the visual aspects of the site.

6.2.2.5 External Bunkers

External bunkers would be installed adjacent to the concrete hardstand area. There would be seven (7) along the rear southern side of the site and another three (3) along the south-eastern end of the site. The bunkers would be constructed of steel and would be 3 metres in height. Each bunker would be 24.8 metres in length and 14.9 metres wide.

Bunkers would be visible from the vacant land to the south and from the sporting fields to the east. They would be slightly visible from the industrial facility to the west, however the bunkers are expected to have an insignificant impact on the scenic character of the area.

6.2.3 Statement of Potential Visual Impacts

Changes to the subject site as a result of the proposed development are considered minor when viewed from areas surrounding the site. The potential visual impacts from the proposed glass beneficiation facility would be minimised through the control measures including shielding of storage areas, vegetation and landscaping.

The detailed landscaping plans would improve the visual appeal of the site, particularly from Andrews Road. The proposed development would therefore have a minimal impact to the existing visual amenities.

6.3 HERITAGE

The site is not listed as being a heritage item or containing items under the Penrith Local Environmental Plan 1991.

A search of the NSW State Heritage Register also concluded there are no Heritage listed sites within the vicinity of the subject site. Consequently, no further heritage studies were justified.

6.3.1 Aboriginal Heritage

No Aboriginal heritage locations have been identified or uncovered on or in the vicinity of the site as stated in the local heritage register.

6.3.2 European Heritage

No European heritage locations have been identified or uncovered on or in the vicinity of the site as stated in the local heritage register.

6.4 SOCIO-ECONOMIC ASSESSMENT

This section provides a qualitative socio-economic assessment of the proposal. It provides a description of the existing socio-economic situation of the surrounding area and defines the underlying principle of the development.

The proposal's core ideas and approach are defined and a justification for the development is provided. The project deliverables and their practicality are considered and the implementation and long term sustainability of these deliverables are assessed. This approach allows an understanding of the project's impacts from a socio-economic perspective.

6.4.1 Introduction

The suburb of Penrith is part of the Penrith local government area, known as the City of Penrith, located approximately 54km west of Sydney by road. The area is both an agricultural and industrial region for manufacturing activities. The region has a developed suburban infrastructure and has a large number of parks and reserves. Other industrial facilities are located immediately adjacent to the proposed site and a new Stocklands development is proposed in the immediate surrounding area.

The following description is an extract from *Penrith City Local Area Profile,* published by Penrith City Council in January 2010. In this document, the Penrith local government area is referred to as "the City".

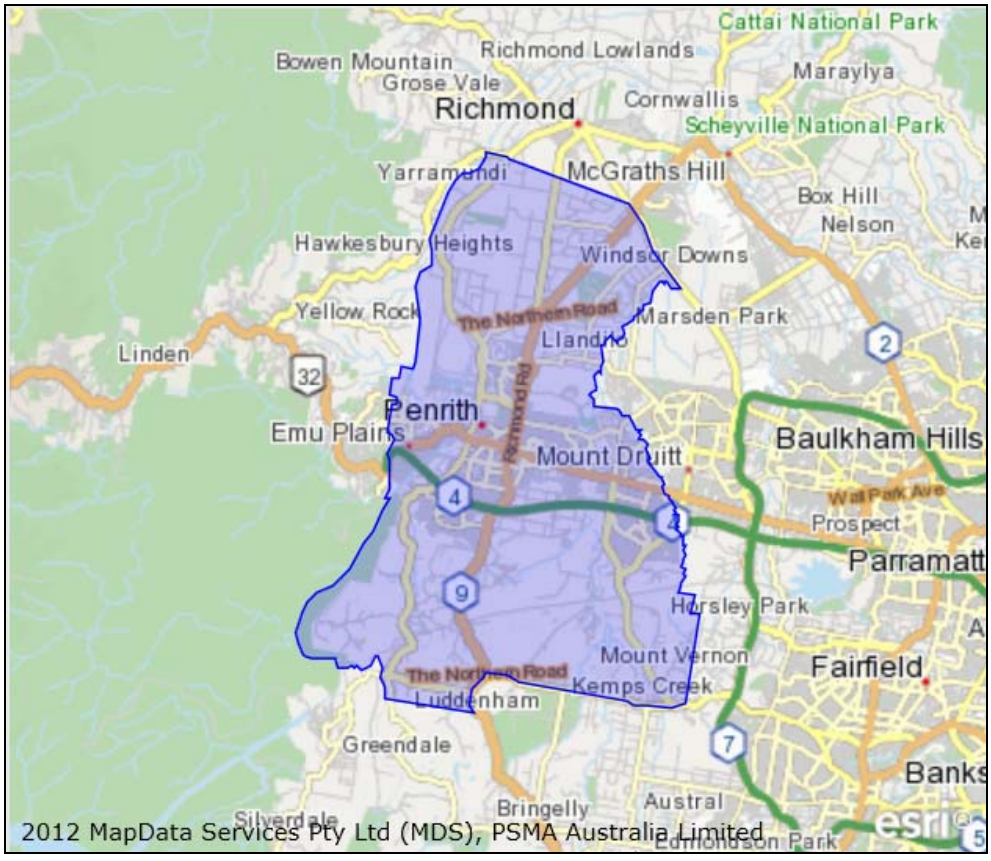
"The City covers an area of 407 square kilometres, bounded by Ropes Creek and South Creek corridors on the east, Elizabeth Drive and Wallacia on the south, Nepean River valley and Blue Mountains Eastern Escarpment on the west, and the Richmond district to the north.

The City is characterised by the two principal town centres at Penrith and St Marys, a number of historic villages including Castlereagh, Emu Plains, Luddenham, Llandilo, Mulgoa and Wallacia, with new suburb identities accommodating the majority of more recent population growth, such as Glenmore Park, Erskine Park, St Clair, Claremont Meadows and North Cranebrook.

...In addition to its urban areas, Penrith is also a productive agricultural locality as well as a focal point for manufacturing industries. Service, information and cultural industries include transport, tourism, commerce and education."

The Penrith local government area is defined by the blue shaded area in Figure 6-2.

Figure 6-2: Penrith Local Government Area



6.4.2 Community Profile

This section provides the demographics of the Penrith local government area The Australian Bureau of Statistics conducts a national census every 4 years. Statistics have been taken from the latest census carried out in 2011.

6.4.2.1 Population

The population within the Penrith region, as determined during the 2011 census conducted by the Australian Bureau of Statistics, was 178,467 people, consisting of 88,089 males and 90,378 females. The median age was 34. Data is provided in the following tables.

Table 6-3: 2011 Population Statistics for Penrith LGA

People	Number	%
Male	88,089	49.4
Female	90,378	50.6
TOTAL	178,467	100.0

Table 6-4: 2011 Age Statistics for Penrith LGA		
Age	Number	%
0-4 years	13,559	7.6
5-9 years	12,490	7.0
10-14 years	12,662	7.1
15-19 years	13,086	7.3
20-24 years	13,293	7.4
25-29 years	13,436	7.5
30-34 years	12,878	7.2
35-39 years	12,927	7.2
40-44 years	12,330	6.9
45-49 years	12,040	6.7
50-54 years	12,258	6.9
55-59 years	10,748	6.0
60-64 years	9,603	5.4
65-69 years	6,165	3.5
70-74 years	4,106	2.3
75-79 years	2,877	1.6
80-84 years	2,112	1.2
85 years and over	1,895	1.1
MEDIAN AGE	34	

6.4.2.2 Education

In 2011, 31% of the Penrith LGA population were attending an educational institution. Of these, 18.5% were attending a tertiary or technical institution.

6.4.2.3 Employment

Of the total employed persons residing in Penrith in 2011 (15 years and older), 19.1% were employed as Clerical and Administrative Workers, 15.2% as Technicians and Trade Workers, and 13.9% as Professionals. Other occupations include Machinery Operators and Drivers (10.7%), Managers (10.1%), Sales Workers (9.9%), Community and Personal Service Workers (9.7%) and Labourers (9.6%).

The proportion of unemployed persons in the Penrith area in 2011 was 5.5%.

6.4.2.4 Income

The median personal income for people aged 15 years and over in the Penrith LGA in 2011 was $623 per week. 18.9% of households had a weekly household income of less than $600 and 10.7% of households had a weekly income of more than $3,000.

6.4.2.5 Economic Activities

Penrith City is one of Sydney's largest municipalities and is a major industrial centre for the outer Western Sydney area. Key industries include manufacturing, construction and retail trade.

Penrith City Council welcomes and supports investors who intend to do business in the area. Below are some of the advantages that Penrith City offers for businesses, as stated on the Penrith City Council website:

> *"Penrith is a City on the move, driven by a Council that has successfully engaged with its residents, businesses and City partners to create a place that can meet the demands of a fast evolving and urbanising society. It is attracting high value adding businesses that seek both talent and a broad-skills base as well as an environment that fosters ongoing learning and strong enterprise support.*
>
> *The City continues to grow as the major administrative, retail, educational and cultural centre for Outer Western Sydney. As a regional centre Penrith Valley now serves a diverse catchment of some 400,000 people from the Hawkesbury region to the north and the Blue Mountains to the west.*
>
> *Penrith Valley is also a major lifestyle destination offering a unique lifestyle built on harmonising its urban and rural qualities that is unmatched in Sydney. For the new genre of company executives and professionals it offers housing choices to suit their lifestyles, culture and entertainment, quality medical services and a learning and research environment supported by such institutions as the University of Western Sydney, TAFE and the Nepean Teaching Hospital.*
>
> *To help build a vibrant local business community and create skilled jobs Council has established an independent Penrith Business Alliance, which is the principal vehicle for collaboration for the City's industry partners and education and training providers.*
>
> *Penrith City Council is committed to facilitating the conversion of prospective business enquiries to real investment opportunities, which deliver quality jobs to the City."*

Penrith City Council aims to reach 40,000 additional jobs in the local economy by 2031, with the aid of the Penrith Business Alliance. Together, they seek to ensure the continuing growth of the local economy, as well as to employ more residents and become increasingly competitive.

6.4.3 Developmental Rationale

The underlying principle of the development is to produce crushed glass cullet to a high quality for use as a raw material in the adjacent glass container manufacturing facility owned by Owens Illinois. The development not only would develop a recycled product that can be used in place of virgin raw materials, but the proposed processes would enable production of significantly higher quality cullet than any other recycling plant in NSW can currently generate. Higher recovery rates would be achieved using world's best practice processes.

The site location has been selected to considerably reduce the current transportation requirement currently required to bring raw materials to the Owens Illinois site. Further, the site was selected due to its suitability for the proposed operations in that it is within an established industrial area and already contains industrial buildings that would house the processes.

The project is consistent with the development goals of the Penrith LGA and can be considered a "high value adding business" that will attract a broad skills base. The proposal would create 25-30 new employment positions, including site workers, administrative workers and maintenance workers. This will provide an economic flow on to businesses extending beyond the Penrith City Council area.

The wider community would have greater benefits. The proposal meets the precautionary principle of Ecological Sustainable Development and will reuse valuable materials that replace virgin raw materials in the recycling of glass.

Recycling uses much less energy to make new glass products than manufacturing glass from virgin raw materials. Every tonne of waste glass recycled saves 315kg of carbon dioxide from being released into the atmosphere during the creation of new glass (Waste Online, 2004). Further benefits include:

- Conserving natural resources by making products from used glass instead of virgin raw materials;
- Prevention of pollution since the glass recycling process creates less air and water pollution than making new glass from virgin materials;
- Saving energy - making products from recycled glass takes much less energy than making new glass; and
- Saving landfill space.

Having a business of this nature operating in the region would be beneficial socio-economically for the following reasons:

- Communities working together – nowadays, there is a growing concern for recycling and the environment in communities. People are working together to promote recycling and environmental sustainability.
- Job creation – new recycling infrastructure creates new jobs for the local community.
- Building a stronger economy – Every improvement that can be made in recycling technology has a positive impact in terms of jobs, energy savings and conservation of resources.

6.4.4 Stakeholders

Stakeholders include:

- Local businesses – will benefit from the flow on effects from having a new business in the local area.
- The local community – will benefit from employment opportunities and the nature of the activities that are associated with the development, namely, recycling as a positive addition to the area.
- Government – promotion of new and improved technology that
- Contractors / Suppliers – the new development would utilise contractors and suppliers from the local area and within the state of NSW improving the economies of scale.
- Customers – There is a contractual agreement between GRS and Owens Illinois to provide glass cullet. The Owens Illinois site is another business located within the Penrith LGA, therefore providing the benefit of high quality raw material at a reduced transport expense.

6.4.5 Project Deliverables and Practicality

Project deliverables include the high quality glass cullet. This quality product is being produced at GRS sites in Victoria and processes are feasible in terms of cost and available technology. The project would be the first to produce cullet of such high quality within NSW.

6.4.6 Long term Sustainability

A proposed future stage of the project would be to install an overland conveyor to transport the cullet directly to the customer, thereby eliminating the need for road transport of finished goods. This future stage would require a new development application due to the project involving another land owner.

Further, due to the nature of glass being continually recyclable and the improved technology being implemented as part of the development, the long term sustainability of the project is considered justified.

6.4.7 Socio-Economic Impacts of the Development

The qualitative socio-economic assessment supports the proposed development in regard to the community benefits that would be provided at its implementation. The development is consistent with the development goals of the Penrith local government. Not only would the development generate new employment opportunities, it would have a multiplier effect within the local economy as local products and services would be purchased by the new facility and the local employees and contractors spend wages within the vicinity.

The project would provide a number of benefits to the wider community. Recycling encourages communities to work together creating a sense of community pride, new recycling infrastructure creates jobs and builds a stronger economy.

The development would achieve long term sustainability due to the nature of glass being continually recyclable as well as through the installation of improved recycling infrastructure that would generate the highest quality glass cullet in NSW.

The operations would also support Australian business investments, generating resources for the government through tax which are distributed for the wider benefit of the community through community services, infrastructure and government.

6.5 GREENHOUSE GAS EMISSIONS

Greenhouse gases are essential to sustain life on earth by trapping the sun's heat and preventing this warmth escaping the atmosphere. Without these naturally occurring, heat trapping gases – mainly water vapour, CO_2 and methane, the earth would be too cold to inhabit.

The rapid increase of carbon dioxide and other greenhouse gases during the 20th Century are of a growing concern due to their impact on climate change. The UN Intergovernmental Panel on Climate Change states "There is new and stronger evidence that most of the warming observed over the last 50 years is attributable to human activity".

The proposed development involves a number of activities, such as operation of machinery and transportation associated with the glass beneficiation process. All of these activities impact the generation of greenhouse gases.

Fossil fuels such as coal, oil and natural gas, are a major source of the world's energy and one of the significant contributors to human generated greenhouse gas emissions. Methane, another of the greenhouse gases has 21 times as much global warming potential as carbon dioxide.

The generation of greenhouse gases such as, carbon dioxide (CO_2), carbon monoxide (CO), oxides of nitrogen (NO_x), sulphides (SO_x) and traces of non-combustible hydrocarbons (C_xH_x) are considered in the following sections. Greenhouse gas emissions related to the development also need to be considered in the broader context of the associated reduction of greenhouse gases related to the end use and full life cycle of the products produced.

An estimation of the greenhouse gas emissions from the proposed development have been conducted and outlined in sections to follow. The proposed operations consist of separation of glass waste to be reused for manufacturing glass product. A study found that the energy requirement for re-melting glass can be reduced by up to 20% if around 65% cullet (recycled glass) is used as the raw material feed *(Glass Recycling with Mogensen Sorting and Screening Systems, 2005).*

6.5.1 GHG Standards and Guidelines

There are a number of standards and guidelines available that can be used to estimate the emissions of greenhouse gases. Some of these include:

- The Greenhouse Gas Protocol: Corporate Standard, World Council for Sustainable Business Development & World Resources Institute;
- National Greenhouse Accounts (NGA) Factors, Australian Department of Climate Change;
- National Greenhouse and Energy Reporting System, Technical Guidelines;
- National Carbon Accounting Toolbox; and
- Australian Greenhouse Emissions Information Systems (AGEIS).

6.5.1.1 The Greenhouse Gas Protocol Corporate Standard

The GHG Protocol Corporate standard is guidance for companies to account for the six greenhouse gases of the Kyoto Protocol. It uses standardised approaches and principles to assist companies prepare a GHG inventory and provides information to build an effective strategy to minimise GHG emissions. The protocol also enables consistency in GHG accounting and reporting over various companies and GHG programs.

6.5.1.2 National Greenhouse Accounts (NGA) Factors

At the time of writing, the latest issue of NGA factors was July 2011. The *National Greenhouse Accounts (NGA) Factors* are default emission factors estimated by the Department of Climate Change and Energy Efficiency for use to estimate greenhouse gas emissions. The NGA factors are not published for purposes of reporting under the *National Greenhouse and Energy Reporting Act 2007* (NGER Act).

6.5.1.3 National Greenhouse and Energy Reporting System, Technical Guidelines, July 2011

The National Greenhouse and Energy Reporting System Technical Guidelines provide the methods for estimating emissions for reporting under the NGER Act. They are largely concerned with Scope 1 emissions.

6.5.1.4 National Carbon Accounting Toolbox

The National Carbon Accounting Toolbox allows users to estimate changes in emissions resulting from changed land management actions such as forest establishment and harvesting, soil cultivation, fire management and fertiliser application.

6.5.1.5 Australian Greenhouse Emissions Information Systems

The AGEIS provides detailed greenhouse gas emissions data from the National Greenhouse Accounts.

The calculations used throughout this section are based on the GHG Protocol Corporate Standard and the National Greenhouse Accounts (NGA) Factors.

6.5.2 Direct and Indirect Emissions

The GHG Protocol defines direct and indirect emissions as follows:

- *Direct GHG emissions are emissions from sources that are owned or controlled by the reporting entity;*
- *Indirect GHG emissions are emissions that are a consequence of the activities of the reporting entity, but occur at sources owned or controlled by another entity*

Direct and indirect emissions are further categorised into three (3) broad scopes:

- *Scope 1: All direct GHG emissions;*
- *Scope 2: Indirect emissions from consumption of purchased electricity, heat or steam;*
- *Scope 3: Other indirect emissions, such as the extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned or controlled by the reporting entity, electricity-related activities (e.g. T&D losses) not covered in Scope 2, outsourced activities, waste disposal, etc.*

6.5.3 Greenhouse Gas Emissions from Site Operations

The site is currently vacant with no activities when the EIS was prepared. The proposed site operation would involve activities that require energy and fuel consumption; hence there will be greenhouse gas emissions. The operation of the glass beneficiation plant and the associated equipment would be driven by electricity which would contribute to indirect greenhouse gas emissions (Scope 2). Mobile vehicles used onsite and to transport finished product to the adjoining glass recycling plant are LPG or diesel fuelled – this activity contributes to direct greenhouse emissions (Scope 1).

The glass sorting equipment has been selected due to its efficiency, both in energy consumption and in delivering the desired throughput. Around 150 machines are currently in operation for glass recycling around the world *(Glass Recycling with Mogensen Sorting and Screening Systems, 2005).* The equipment was further improved in 2003 with the following energy saving features:

- Adjustable compressed air level and blowing time in respective to particle size to be separated – this allows reduction in compressed air use by up to 45%, which represents major operating costs; and
- Automatic cleaning system which keeps the sensors and lamp in a reasonably clean condition to still effectively operate even in unfavourable (e.g. high moisture feed) conditions – this feature would reduce the frequency of product rework due to inefficient product separation and in addition, maintenance requirements would also be minimised.

The site operations and management have environmental commitment at the forefront of management thinking. The management of the site activities will be undertaken to ensure all impacts from site operations, including greenhouse gas emissions are mitigated and minimised. Apart from physical controls, procedural control to be implemented would include a site environmental management system which would ensure ongoing compliance and identify opportunities for continual improvement.

6.5.3.1 Estimation of Scope 1 Greenhouse Gas Emissions

Scope 1 greenhouse gas emission would be contributed due to the use of diesel fuel for trucks as well as front end loaders for product loading purposes. The volume of fuel consumption over a year period was estimated based on the following assumptions:

- The average use of front end loader is 9 hours per day;
- The fuel consumption rate for a typical front loader used in Material Recovery Facility is 2.5 L/hr (Environmental Benefits of Recycling, 2010);
- Assuming 80 tonnes per each delivery, it is assumed that there are 6 deliveries per day of finished product to Owens Illinois plant – the approximate distance travelled is 1 km per trip. This equates to close to 175,200 tonnes per year, which is sufficient capacity to meet the 150,000 tonnes/yr production capacity (projected capacity in the future);
- There are in average of two deliveries per day of finished product to Owens Illinois plant – the approximate distance travelled is 1 km per trip;
- The truck used to deliver the finished product has a typical fuel consumption rate of 0.56 km/L (ABS Survey of Motor Vehicle Use, 2011); and
- The heat content for diesel fuel is 38.6 GJ/kL.

The National Greenhouse Accounts (NGA) Factors, July 2011 was used to estimate the greenhouse gas emissions. The following formula was adopted:

$$E = \frac{Q \times EC \times EF}{1{,}000}$$

Where:
E is the volume of estimated greenhouse gas in $CO_{2\text{-}e}$ tonnes
Q is the volume of fuel combusted in kL
EC is the heat content of specific fuel type in GJ/kL
EF is the greenhouse gas emission factor specific to fuel type in kg $CO_{2\text{-}e}$/GJ

The following table summarised the activities contributing to Scope 1 emissions and the estimated annual volume of greenhouse gas emissions.

Table 6-5: Estimated Scope 1 (Direct) Greenhouse Gas Emissions

Activity	Annual Consumption (GJ)	Emission Factor (kg $CO_{2\text{-}e}$/GJ)			Annual GHG Emissions (Tonne $CO_{2\text{-}e}$)
		CO_2	CH_4	N_2O	
Diesel use in trucks	9.6	69.2	0.2	0.5	0.7
Diesel use in front end loader	317.0	59.6	0.6	0.6	19.3
Total Annual Scope 1 GHG Emissions					20.0

6.5.3.2 Estimation of Scope 2 Greenhouse Gas Emissions

Electricity consumption would contribute to Scope 2 greenhouse gas emission. The amount of electricity consumption is estimated based on installed power and operating the plant for 14 hours per day, 5 days per week. Note that the proposed hours of operation remain to be 24 hours 7 days a week but the glass beneficiation plant itself would only run for the hours specified above and assuming no downturn periods (which involve prolonged plant shut down) over the year of operation.

Electricity consumption for supporting activities such as administrative office activities is considered negligible compared to electricity consumed for operating the glass beneficiation plant.

The National Greenhouse Accounts (NGA) Factors, July 2011 was used to estimate the greenhouse gas emissions. The following formula was adopted:

$$E = \frac{Q \times EF}{1{,}000}$$

Where:
E is the volume of estimated greenhouse gas in $CO_{2\text{-}e}$ tonnes
Q is the quantity of electricity purchased in kWh
EF is the greenhouse gas emission factor specific to fuel type in kg $CO_{2\text{-}e}$/GJ

The estimated annual Scope 2 greenhouse gas emissions is summarised in the following table.

Table 6-6: Estimated Scope 2 (Indirect) Greenhouse Gas Emissions

Activity	Annual Consumption (kWh)	Emission Factor (kg $CO_{2\text{-}e}$/kWh)	Annual GHG Emissions (Tonne CO_2-e)
Electricity consumption	1,747,200	0.89	1,555
Total Annual Scope 2 GHG Emissions			1,555

6.5.3.3 Estimation of Scope 3 Greenhouse Gas Emissions

The following activities are considered to primarily contribute to other indirect (Scope 3) greenhouse gas emissions:

- Transport of raw materials (used glass) to the site by contractor; and
- Employees commuting to site.

Other activities that have been excluded from estimation of Scope 3 emissions due to its insignificance and/or complexity in determining the boundary of assessment include:

- Extraction of raw materials - The raw materials are used glass, therefore as it is considered other industry's waste, it would be reasonable to exclude the emission associated with extraction or production of raw materials from Scope 3 emissions;
- Business travel – as the proposed operation is supplementary to another process (Owens Illinois), no significant business travel is expected; and
- Waste disposal – due to the nature of the proposed development Scope 3 emissions from disposal of waste would be minimal as the volume of waste likely to be generated is small.

The following assumptions are used in estimating Scope 3 greenhouse gas emissions:

- Used glass raw materials are sourced from local collection centres. The average distance travelled by the trucks delivering raw materials to the site is assumed to be 20 km per trip;

- The raw materials would be delivered to the site by a variety of truck types below. These vehicles are diesel fuelled with average fuel consumption rate of 0.28 L/km for rigid trucks and 0.56 L/km for articulated trucks (ABS Survey of Motor Vehicle Use, 2011):
  - Rigid trucks: medium size truck (5 tonne) – 38 times per day;
  - Articulated trucks:
    - Truck and a trailer (25 tonne) – 3 times per day; and
    - B double truck (35 tonne) – once per day;

- The proposed development would attract up to 30 employees. Although some employees may take public transport, it is assumed that all employees are driving to work using a medium size car with approximate travel distance of 20 km per day one way;

- All employees drive a medium size car with an average fuel consumption rate of 0.11 L of petrol per km travelled (ABS Survey of Motor Vehicle Use, 2011); and

- The heat content for diesel and petrol are 38.6 GJ/kL and 34.2 GJ/kL respectively.

The volume of greenhouse gas emissions was calculated using the same methodology used in calculating Scope 1 emissions. The estimated annual Scope 3 emissions contributed by the abovementioned activities are summarised in the table below.

Table 6-7: Estimated Scope 3 (Direct) Greenhouse Gas Emissions					
Activity	Annual Consumption (GJ)	Emission Factor (kg CO_{2-e}/GJ)			Annual GHG Emissions (Tonne CO_2-e)
		CO_2	CH_4	N_2O	
Diesel use in trucks – raw material delivery	3,632	69.2	0.2	0.5	253.9
Petrol use in cars – employee commuting	1,693	59.6	0.6	0.6	102.9
Total Annual Scope 3 GHG Emissions					356.7

6.5.3.4 Summary

The annual greenhouse gas emissions have been calculated using relevant emission factors the National Greenhouse Accounts Factors, July 2011. The results have been summarised in the following table.

Table 6-8: Estimated Annual GHG Emissions for the Proposed Development			
Emission Type	Annual GHG Emissions (Tonne CO_2-e)	Annual GHG Emissions per Tonne of Product (Tonne CO_2-e/ Tonne Cullet)	%
Scope 1	20.0	0.0002	1.1%
Scope 2	1,555.0	0.0148	80.0%
Scope 3	356.9	0.0034	18.9%
Total	1,931.9	0.0184	100%

The total amount of greenhouse gas emissions from the proposed development is approximately 1,932 tonne of CO_2-e per annum or 0.018 tonne of CO_{2-e}/tonne of product.

The largest contributor of greenhouse to gas emission is the use of electricity therefore, reduction of electricity use would present an opportunity to greatly reduce the greenhouse emission from the site. Indirect activities which contribute to Scope 3 emissions were the second contributor to the site's greenhouse gas emissions.

In general, due to the limitation of available data, some assumptions have to be derived in estimating the greenhouse gas emissions from the proposed development. According to a study performed by DECCW there is a great variation in greenhouse gas emissions contributed throughout the whole life cycle of recycling glass containers. Current studies showed that the estimated greenhouse gas emissions for glass recycling activities starting from collection of glass waste, resorting, reprocessing and transport of finished recycled glass product to consumers range from 0.35 to 0.62 tonne of CO_{2-e} per tonne of glass waste processed (Environmental Benefits of Recycling, 2010).

Although it is not relevant to directly compared the site's estimated emission to these figures, it can be concluded that emissions from the sorting and separation stage is minimal.

6.5.4 Measures to Reduce Greenhouse Emissions

Opportunities to reduce greenhouse gas emissions need to be considered as an ongoing environmental objective within the site's Environmental Management Plan. Understanding where the greenhouse gas emissions are generated is the first step in determining ways to reduce emission per unit of output. The estimation of scope 1, 2, and 3 emissions has been conducted based on primary activities only which include the use of fossil fuels in mobile vehicles and use of purchased electricity. These estimated figures need to be verified by real measurements during operational phase to further affirm which of the following recommended options would give the most benefit when implemented.

Options to reduce the above sources of greenhouse emissions include:

- Improve process monitoring and control systems including implementing an energy management program and/or undertaking regular energy audits of the site;

- Use of high efficiency motors for pumps fans and compressors that consider strategic motor selection, maintenance, proper size, adjustable speed drives, power factor correction and minimise voltage unbalances;

- Use of variable speed drives to better match speed to load requirements of the motors;

- Optimise compressed air systems by implementing a maintenance plan that incorporates keeping compressor and intercooling surfaces clean, ensuring motors are properly lubricated and cleaned, Inspecting drain traps, maintaining the coolers, checking belts for wear, replacing air lubricant separators as recommended and checking water cooling systems (Worrell and Galitsky (2005, 2008)). Other energy saving opportunities include reducing system leaks, reducing air inlet temperature and recovering heat loss;

- Improvements in lighting systems including automated lighting controls in office areas that shut off lights when not needed. Options for improving energy efficiency of lighting within the whole of the facility include replacing T-12 fluorescent lights with T-8 lights, replacing mercury lights with metal halide or high pressure sodium lights and substituting electronic ballasts for magnetic ballasts;

- Reduce transport needs by installing an overland conveyor to directly transfer finished cullet to the customer's site (adjacent to the facility). This is a potential future development that warrants consideration; and

- Switch to other fuels should be considered including purchasing electricity generated from renewable energy and use of E10 fuel.

6.6 ECOLOGICALLY SUSTAINABLE DEVELOPMENT (ESD)

Ecologically sustainable development is defined as "development that meets the need of the present generation without compromising the ability of future generations to meet their own needs".

Ecological sustainability requires a combination of good planning and an effective and environmentally sound approach to design, operations and management. The principles of ESD throughout the project's life cycle are outlined in the following paragraphs.

Decision making should be based on sound environmental management principles which consider not only the present, but also the future, particularly in relation to:

- Precautionary principle – if threats of serious or irreversible environmental damage exist, lack of full scientific evidence should not be used as a reason for postponing measures to prevent environmental degradation;
- Inter-generational equity – the present generation should ensure that health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations;
- The conservation of biodiversity and ecological integrity – the conservation of biological diversity and ecological integrity should be a fundamental consideration; and
- The valuation of the environment and resources and the establishment for the efficient use of resources.

The above principles have been incorporated into the need for the project and overall design which is reflected in the studies prepared in this document. One notable measure incorporated is the selection of the site location for the proposed development – the subject site was intentionally selected due to its proximity to the end user of glass cullet that would be produced at the facility. The location of the site significantly reduces transportation requirements, thereby saving energy, noise, air emissions and other environmental impacts associated with transporting of finished product. The nature of the proposed development being the reprocessing of used glass is also in line with ESD principles.

Further, the EIS outlines safeguards that would be implemented on site so that the proposed operations would cause minimal harm to the environment and resources would be sustained to ensure availability to future generations, through reducing the communities need for virgin resources.

The main environmental safeguards to be implemented so that environmental harm is minimised as much as practicable are as follows:

- Air emission controls
- Noise controls
- Hardstand area integrity management and maintenance
- Waste management
- Stormwater (erosion and sediment) controls and management
- Landscape management
- Environmental management system

The proponents would pro-actively manage those areas of their operations that have the potential to impact on the surrounding environment. Management Plans including noise, air, landscaping and surface water releases would be introduced to control these potential impacts.

Multiple indicators, including those indicated in the Environmental Management Plan would continue to monitor the sustainable performance of the development.

The multiple indicators used to measure sustainability cover a broad range. These indicators are outlined below.

Table 6-9: Indicators Used to Measure Sustainability

Indicators	Comments and Description
Input rule	Renewables: The depletion rates of renewable resources would be within the regenerative capacity of the natural system that generates them. Non-renewables: The depletion rates of non-renewable resources would be equal to the rate at which sustained income or renewable substitutes are developed by human intervention or investment.
Output rule	The waste emission rates or other forms of degradation will be reduced from current levels, which is within the capacity of the environment to assimilate or regenerate, without unacceptable degradation of the ecological integrity, biodiversity or its future waste absorptive capacity.
Community	• Increase in employment opportunities; • Level of social services available increased; • Strengthening of local economy; • Level of education/knowledge based/research investment increased; • No net loss of heritage or other features, buildings, places of high community importance; • No net loss of flora and fauna species or natural environments of high community importance; • No loss of community integrity; • Increase in resource recovery; and • Increase in waste re-use and recycling.
Ecosystems	• No net reduction in richness or abundance of plant species in aquatic or terrestrial environments; • No net reduction in richness or abundance of fauna species in aquatic or terrestrial environments; • Net gain in the existing landscaping of the site to provide diversity and further habitat for local fauna; • Increased or improved knowledge of ecosystem resources and management of threats; • No net increase of pests or disease threats to the health of the ecosystem; and • Reduction of natural hazards which are threats to the health of the ecosystem (fire, pollution, etc.).
Soils	• No net topsoil erosion; • No increase in area of land affected by salinisation; and • No reduction in soil pH below certain levels.

Table 6-9: Indicators Used to Measure Sustainability	
Indicators	Comments and Description
Water	• Stormwater controls in place, No wastewater generated; • No net increase in levels of acidification or toxic substances, heavy metals, nutrient and sediment levels; and • No net reduction of water bodies as aquatic habitats.
Air	• No net reduction in air quality; Air controls in place; and • Comparable reduction in the use of "greenhouse" gas emissions through site location and management.
Energy	• Programs to reduce the use of fossil fuels for transportation; • Reduction in energy consumption through increase in recycling content in product, consolidation, location and facility design; and • Increase in efficiency of transport for inputs and outputs.

The environmental management plan will be used to maintain the principles of ESD. The environmental management plan will be continually updated to ensure all new environmental measures are incorporated in line with the precautionary principle.

6.7 ROAD, TRAFFIC AND TRANSPORT

6.7.1 Summary of Findings

A Specialist Traffic and Transport Assessment of the proposed development was undertaken by Transport and Urban Planning. The report assesses the baseline traffic conditions and implications of the proposal including:

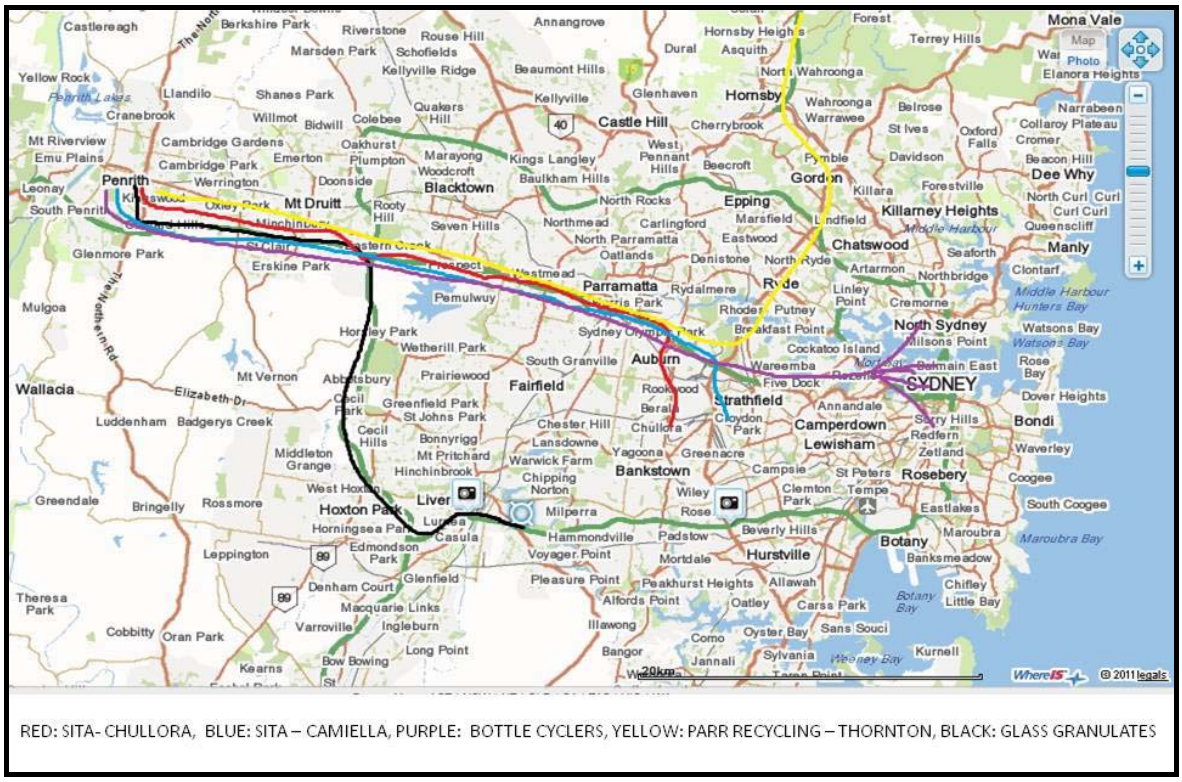
- Details of truck routes;
- Prediction of traffic volumes during construction and operation;
- Assessment of impacts of this traffic on the surrounding road network;
- Modelling of key intersections;
- Detailed assessment on the need for upgrading or road improvement works on Andrews Road;
- Details of availability of non-car travel modes; and
- Access and parking.

The report is provided as Appendix 5 of this EIS.

Truck Routes

All incoming raw materials will arrive via the M4 and either Castlereagh Road or Richmond Road with origins from the east or south of the M4. All finished product would be transported to the Owens Illinois facility at 5 Andrews Road, Penrith, approximately 1km from the site. Figure 6-3 shows the proposed truck routes for incoming raw materials.

Figure 6-3: Truck Routes for Incoming Glass Material



Predicted Traffic Volumes & Impacts on Road Network

Existing two-way peak flows on Andrews Road occur between 8 – 9am and 5 – 6pm. 16% of all vehicles utilising Andrews Road are heavy vehicles.

During construction, there would be 25 car trips with workers arriving during the peak hours 6 – 7am and leaving between 4 – 5 pm. There would be 20 vehicle movements associated with the construction phase with arrivals and departures spread throughout the day.

Glass would be transported using a variety of truck types including 5 tonne trucks, 25 tonne semi trailers and 35 tonne B doubles. Based on the production of 2,100 tonnes per week during operation, there would be 42 average daily truck trips. Staff would generate 44 vehicle movements per day with 24 staff employed over 3 shifts per day.

Table 6-10 provides a summary of the predicted traffic movements associated with the proposed development.

Table 6-10: Predicted Traffic Movements	
Construction Traffic	Predicted Movements (Daily)
Cars / Light Vehicles	50
Trucks / Heavy Vehicles	20
Total Average	70
Operational Traffic	Predicted Movements (Daily)
5T trucks delivering and removing materials	76
25T semi-trailer trucks delivering and removing materials	6
35T semi-trailer trucks delivering and removing materials	2
Employee Cars	44
Total Average	128

Impacts of the increased traffic resulting from the proposed development are likely to include the following:

- It is expected that the majority of construction traffic would occur outside peak hours and therefore would have a minimal impact on existing traffic conditions;
- Modelling of the site access road and Andrews Road intersection indicated that increased traffic associated with the proposed development would have little or no delay during the peak hour periods;
- Given that the expected traffic generation arising from the proposal is just over 1 vehicle per minute during peak periods, there is expected to be no noticeable impacts at the adjoining Andrews Road / Castlereagh Road or Richmond Road intersections; and
- Due to the relatively small increase in traffic, road safety is not expected to be adversely affected by the development.

Need for Upgrading or Road Improvements

To accommodate future B-Double truck movements at the access intersection road widening (pavement and shoulder works) will be required between Andrews Road and the existing access road including the northern side of Andrews Road.

Availability of non-car Travel Modes

The site is located within 4km of Penrith Railway Station. Bus services travel along Andrews Road with bus stops within 400m of the site.

Vehicle Access and Parking

Andrews Road is an undivided 2 lane route with a generally level road alignment and good sight lines. A 70km/h speed zone applies. The site has good access to Andrews Road via an 8m wide, 2 way access road which is 60m in length.

On-site car parking is provided and would enable 106 staff and visitor cars in marked bays. This significantly exceeds any likely car parking demand based on the predicted number of staff and visitors associated with the development.

There are 10 heavy vehicle spaces proposed.

Conclusions

The projected traffic impacts of the proposal with the improved site access provisions in place are likely to be minor with acceptable traffic service levels and performance levels maintained.

7. ENVIRONMENTAL IMPACTS AND SAFEGUARDS – CUMULATIVE IMPACTS

Cumulative effects are changes to the environment that are caused by an action in combination with other past, present and future human actions (Hegmann *et al.* 1999). An assessment of cumulative effects considers the combined and incremental impacts of a proposed development with existing and future developments in mind.

There is no prescribed method to undertake a cumulative impact assessment, the approach is usually dependent on the nature and scale of the proposal. This cumulative impact assessment broadly follows the guiding principles of the "Cumulative Effects Assessment Practitioners Guide", prepared for the Canadian Environmental Assessment Agency (Hegmann et al 1999).

The proposed development is for a glass beneficiation facility to be located within an industrial area of Penrith.

This cumulative assessment considers the local impacts on potential land use, water, noise, air quality, traffic, flora and fauna, heritage, and visual impacts associated with the proposed development.

7.1 METHODOLOGY

Valued Ecosystem Components (VEC) were determined based on issues raised by Regulatory Authorities during the planning process and outcomes of assessments undertaken as part of the EIS. Table 7-1 presents the VEC's and the related regional issues of concern and indicators. It has been used as a guide in assisting assessment of cumulative impacts.

Table 7-1: Valued Ecosystem Components

Environmental Component	Regional Issues of Concern	Indicators
Noise	Annoyance due to noise generated by the glass recycling facility equipment on site, change of vehicles entering the site	Noise levels at sensitive receptors
Air	Dust, particulates, greenhouse gas emissions and regional air quality and impact of these emissions on nearby private receptors	Dust and particulate concentrations at sensitive receptors, ground level concentration isopleths
Traffic	Increased traffic in existing road network and the ability to support this increase	Traffic volumes and noise levels
Water	Contamination of stormwater run-off and off-site impacts on nearby wetland and unnamed watercourse – and subsequently groundwater. Flooding issues.	Changes in water quality of nearby watercourse and wetland.

Table 7-1: Valued Ecosystem Components		
Environmental Component	Regional Issues of Concern	Indicators
Waste and chemicals	Potential environmental and off-site impacts associated with the generation of waste and use of chemicals (diesel fuel) on site	Waste output, waste classification, Material Safety Data Sheets
Heritage	Potential impacts on any existing heritage items	Presence of Heritage items on or close to site
Flora and Fauna (including Threatened Species and Native Vegetation)	Potential impacts on any existing Flora and Fauna	Presence of Flora and Fauna (including Threatened Species and Native Vegetation)
Visibility	Visual impacts of the proposed site changes	Site Concept Plan, Landscaping Plan

7.2 SURROUNDING LAND USES

The proposed site is within an existing industrial estate and is bordered by neighbouring industrial facilities to the west, northwest and southwest. To the east, northeast and southeast is a residential area. Sporting ovals are also located to the immediate east and southeast. There is a drainage easement to the immediate north, between the site and Andrews Road. The main access driveway runs along the west of the drainage easement at the northern end of the site.

It is also noted that developments are anticipated to occur north-west of the subject site. The proposed developments include the re-zoning of the land to include a light commercial zone, as well as a residential zone to be located further north-west from the subject site.

With reference to the Penrith City Council's Land Zoning Map, the land use zones within the region of the subject site location is considered to be described as follows:

- Adjoining Premises/Land Uses:
  - North of Site: IN2 – Light Industrial
  - West of Site: IN1 – General Industrial
  - East of Site: IN1 – General Industrial
  - South of Site: IN1 – General Industrial

- Areas acknowledged to be potentially affected as part of the assessment:
  - North-west of Site: IN2 – Light Industrial (Future Stockland Holdings and residential development)
  - East of Site: Sporting fields
  - North-East of Site: Existing residential areas

The existing residential area to the north east of the site in Koala Gin is identified to be one of the closest sensitive receptors within proximity to the subject site, along with the adjacent sporting fields. It is noted that the residential receptors are separated from the site by an easement and Andrews Road and there would be vegetative screening to separate the sporting fields from the proposed development. Section 4 outlines the locations of these receptors in further detail.

Cumulative impacts associated with the proposed development and surrounding land uses listed above have been divided into biophysical and socio-economic impacts and presented in the following sections.

7.3 CUMULATIVE BIOPHYSICAL IMPACTS

7.3.1 Noise

Operational noise is a critical environmental impact in any industrial area with surrounding residential receivers. This, in itself, should not preclude development but rather result in the development and application of management plans for these employment generating areas. The existing background noise levels were used in the modelling of potential environmental impacts associated with the operational phase of the proposed development. Traffic noise was also assessed, hence assessing the cumulative impact on the community.

All relevant EPA noise criteria were readily satisfied, provided that all recommended noise controls are maintained throughout the life of the facilities operation.

7.3.2 Water

Water use and the interactions between the site (existing and proposed) and water (stormwater and adjacent water bodies) have been examined in the EIS.

Water use would be limited to mains water for use in water foggers and sprays for dust control and use in the offices and amenities. Water used for the dust controls would evaporate. No water would be required in the process and no wastewater would be generated.

Changes to the site affecting water interactions include the installation of external bunkers that would be used to store cullet and landscaping.

The hydrological report by Brown Smart Consulting in Appendix 3 details the works to be undertaken in order to manage the stormwater leaving the site. Swales would be established in the low-lying areas of the site that would divert runoff to the wetland. The swales would be designed with gentle slopes and grassed to aid in the deposition of solids washed off the hardstand areas, improving the water quality of runoff leaving the site. The report also details the flood capacity and determined that the proposed development would have a nett nil impact on the existing flood capacity of the land.

Detailed landscape plans prepared by BioDesign as part of the proposed development that would establish local indigenous plant species at the site and work with the drainage of the site to ensure the wetland flows are maintained.

External storage may result in a slight increase in the pollutant load to stormwater and therefore entering adjacent water bodies. Use of erosion and sediment controls that would be regularly maintained would minimise this impact. The additional concreted area would reduce the direct pathway to water bodies and allow for capture of any additional pollutant load prior to release into these water bodies. Refer to section 5 for details on interactions and mitigating steps to avoid water quality, stormwater and groundwater potential impacts.

It is expected that in the long term, water quality impacts would be improved as a result of the establishment of swales and improved landscaping. Provided that all water impact controls and measures are implemented and maintained throughout the life of the proposed development's operations, it is expected that the water quality of the local waterways would be enhanced.

7.3.3 Air

The air quality impact from the proposed development has been assessed using the latest background data (year 2011) released by the Bureau of Meteorology from the Penrith Lakes AWS (Station No. 67113) air quality monitoring station and the nearest ambient air monitoring station operated by the NSW EPA, which is located at Mamre Road, St Marys (NSW EPA 2011). This allows the cumulative air impacts to be determined, hence assessing the cumulative impact on the community. The following was considered within the study:

- Dust emissions from the truck unloading of raw materials;
- Dust emissions from the truck loading of processed materials;
- Dust emissions from the transfer of materials using front-end loaders;
- Dust emissions at the conveyor transfer point;
- Dust emissions from the crushing of glass in the building; and
- Dust emissions from the storage of cullet in stockpiles (wind erosion).

Fine particulate matter (PM_{10}), Total suspended particulates (TSP) and Deposited Dust emissions were modelled. Odour was not considered given that the nature of the raw materials would predominantly contain glass waste and no putrescible material would be present nor accepted on site, odour is not likely to be generated. Odour is discussed in Section 3.4.1.4.

A cumulative impact between 2 biophysical aspects have been examined – which is the potential for fugitive dust emissions to cause a build-up of material on any surface of open areas, which are routes for stormwater flow and would then result in contamination and off-site water impacts.

Emissions from the external storage of products produced on site would be managed by the proposed control measures, which include the use of wind breaks to mitigate wind erosion emissions from stockpiles and the use of watersprays during the material handling and transfer of glass cullet.

No cumulative impacts would be associated with the use of bunker walls as wind breaks, and is anticipated to additionally suppress any noise impacts generated from the development. The amount of water used would be controlled and would be limited to the suppression of dust, reducing the potential for an increased pollution load in the stormwater. In addition, given that glass is inert, no leaching of chemicals or substances would be anticipated to occur.

All processing activities associated with the proposed development would be undertaken within a fully enclosed building. A dust collection system would capture dust generated from the processes.

The assessment showed that implementing and maintaining the recommended controls would ensure all the EPA air quality criteria are met in the long term.

7.3.4 Waste and Chemicals

All waste generated as part of the construction and the operational phases of the proposed development would be managed in accordance with the current waste guidelines. The nature of the proposal is such that the majority of waste generated in the process is recyclable. As advances in both the process and recycling technologies are made, there may be future potential for further segregation and recycling of waste streams.

The cumulative aspects of waste would remain to be minimal and would remain unchanged as per the existing activities on site.

Waste Streams include:

- Office waste and recycling (paper etc) will comprise one (1) commercial waste bin collected weekly;
- Recyclable materials including ferrous and non-ferrous metals as well as ceramics, stone, porcelain materials which could be recycled as building waste;
- Non-recyclable material including grit and sediment captured as well as sweepings; and
- Minor quantity of oil from maintenance and repairs of equipment on site.

No hazardous waste would be generated.

Chemicals stored on site would be limited to a minor quantity of diesel fuel kept in a bunded and roofed area. Refuelling of the diesel would be conducted within an enclosed building and areas where this is conducted would be bunded.

Similar to the potential issue with Air Quality, the risk of stormwater contamination due to waste or chemical spills have also been considered as part of this cumulative impact assessment. Bunding proposed and the enclosure of areas where diesel is handled and storing oil on bunded pallet(s) within the building would be implemented. Further, other than oil, waste generated would be dry waste and would be stored in enclosed designated bays. These control measures would eliminate this potential issue.

7.3.5 Flora and Fauna

A preliminary study indicated that no flora and fauna onsite or offsite would be affected as a result of the proposed development.

7.4 CUMULATIVE SOCIO-ECONOMIC IMPACTS

7.4.1 Traffic

There is no significant cumulative traffic impacts associated with the planned operations for the subject site. There will be an increase in localised traffic during raw material delivery and final product pick-up. As there are 24 employees to operate the site over three shifts, it has been concluded that the overall traffic impact of the proposal is negligible.

7.4.2 Visibility

The site is an established industrial facility and the proposed changes to the site and building are minor in relation to visual amenity. There will be landscaping of the vegetated areas on the boundaries of the site to reduce weeds and beautify the site. This would reduce the line of sight from the adjacent sporting fields and Andrews Road.

7.4.3 Heritage

No heritage items were identified to be present within and around the location of the subject site. Hence, it is anticipated that there would not be any cumulative impacts regarding heritage as a result of the proposed development.

8. MITIGATION MEASURES

8.1 SUMMARY OF IMPACTS, CONTROLS AND MITIGATION MEASURES

Table 8-1 presents a summary of potential impacts of the proposed development and identifies the environmental safeguards and control measures recommended throughout the EIS that are considered to provide a sufficient level of protection to the surrounding built and natural environment.

Table 8-1: Summary of Potential Impacts, Environmental Safeguards and Control Measures

Environmental Aspect	Aspect of Proposed Development	Potential Impacts	Environmental Safeguards and Control Measures
Noise	• Cumulative Impact	• Night time noise emissions from within the existing building (Roof & Eastern Façade). • Trucks frequenting the site (6am – 7am).	• Throughout the night time hours (10pm – 7am) all roller shutter doors must remain in the closed position. • Throughout the night time hours (10pm – 7am) all vehicles frequenting the site, namely trucks, must not utilise the engine brakes. • Throughout the early morning shoulder period hours (5am – 7am) all trucks frequenting the site must not travel any further than the middle of the southern façade of the warehouse. • Truck numbers must not exceed the numbers provided in Table 5-42 above. • The steel cladding components of the existing roof must achieve a minimum Rw (Weighted Reduction Index) of 34 dB. • The sky light components of the existing roof must achieve a minimum Rw (Weighted Reduction Index) of 27 dB.

Table 8-1: Summary of Potential Impacts, Environmental Safeguards and Control Measures

Environmental Aspect	Aspect of Proposed Development	Potential Impacts	Environmental Safeguards and Control Measures
			• The steel cladding components of the eastern façade must achieve a minimum Rw (Weighted Reduction Index) of 34 dB.
Road Traffic Noise	• Cumulative Impact	• Noise emissions associated with additional road traffic generated by the operation of the proposed facility will not exceed the noise criteria.	• None required.
Air Quality	• Cumulative impact	• Dust emissions resulting in reduced air quality of surrounding areas and potential health impacts associated with excessive dust.	• Water sprays applied to external storage areas and loading / unloading / transfer activities. • Water foggers applied to crushing, screening and conveying processes within the building. • Dust collector installed for crushing and screening equipment & machinery. • The existing building and proposed external storage bunkers provide windbreaks. • Covered loads of incoming and outgoing materials.
Water	• External storage area, loading and unloading activities	• Waste materials such as grit, dirt, sediment and general litter enter the stormwater system.	• Designated storage areas. • Maintain high standard of housekeeping. • Particulate filters on all stormwater drains as well as regular maintenance checks. • Incoming material inspection to ensure unwanted items are not accepted onto site. • Weed control and planting program to improve existing water quality in wetland areas. • Extended vegetated earth batters. • Water quality treatment wetland with vegetated swales to capture and treat site stormwater runoff. • Water monitoring program.

Table 8-1: Summary of Potential Impacts, Environmental Safeguards and Control Measures

Environmental Aspect	Aspect of Proposed Development	Potential Impacts	Environmental Safeguards and Control Measures
	• Flooding	• Bunker construction may reduce the flood capacity of land resulting in flooding during heavy rain event.	• The earthworks associated with the construction of the additional hardstand area below the 100 year flood level has been assessed as part of Consent DA12/0539 issued by Penrith City Council (Appendix 12). This has been designed to balance the flood storage volumes. The steel walled bunkers to be erected are raised slightly above the hardstand to allow for the unimpeded passage of stormwater to drain naturally.
	• Crushing and Screening activities	• Dust causing increased pollution load of stormwater runoff entering adjacent waterway	• Dust control – water foggers. • Designated storage areas. • Maintain high standard of housekeeping. • Roof structures fitted with stormwater gutters and pipelines. • Particulate filters on all drains.
	• Fuel on site	• Incident during refuelling activities resulting in release of diesel fuel.	• Bunded and roofed diesel storage and refuelling area. • Designated storage tank and warning signage. • Spill kits located adjacent to diesel storage area. • Stringent procedures for refuelling practices.
	• Car park and driveways	• Fuel spill and sediment contaminating stormwater.	• Daily Road sweeping. • Vehicle maintenance. • Gross pollutant traps on all drains. • Sealed surfaces.
	• Fire water	• Fire water contaminates stormwater	• Fire rated walls in building. • Risk is considered to be very low.

Table 8-1: Summary of Potential Impacts, Environmental Safeguards and Control Measures

Environmental Aspect	Aspect of Proposed Development	Potential Impacts	Environmental Safeguards and Control Measures
	• Cumulative	• Reduction in water quality of adjacent wetland and unnamed water course. Note that if all water safeguards and mitigation measures are implemented, water quality is expected to be improved.	• Detailed landscape plans. • Establishment of swales to regulate flow. • Erosion, sediment and stormwater controls as listed above.
Soil & Land	• Installation of external bunkers	• Excavated soil on site.	• Silt fences and hay bales during works. • Sampling and analysis of soil. • Removal of soil by licensed contractor for appropriate disposal or reuse.
	• Waste	• Site becomes littered with waste.	• Designated waste and cullet storage areas. • Vehicles to be tarped when transporting loads from site. • Regular housekeeping practices.
	• Fuel on site	• Incident causing release of diesel fuel.	• Bunding of diesel storage tank and refuelling area. • Training, spill procedures and spill kits.
	• Car park and driveways	• Incident involving release of oil, fuel and lubricants.	• Training, spill procedures and spill kits. • Daily Road sweeping. • Sealed surfaces.
Waste	• Generation of waste from sorting and screening activities	• Incorrect waste disposal causing inefficient or serious waste management problems further “downstream”.	• Incoming material inspections of waste. • In-process reuse of waste wherever possible. • Good housekeeping practices including regular workplace inspections and waste audits. • Designated, covered waste and recycling receptacles. • Designated bunkers for external storage of cullet. • Use of licensed waste and recycling contractors.

Table 8-1: Summary of Potential Impacts, Environmental Safeguards and Control Measures

Environmental Aspect	Aspect of Proposed Development	Potential Impacts	Environmental Safeguards and Control Measures
Flora & Fauna	• Impacts on threatened species sighted in surrounding areas	• Highly unlikely as there have been no threatened or endangered species sightings on the site. • Development is located within an existing industrial area and not likely to further impact flora and fauna in the local environment.	• Landscaping plans to be implemented that would establish locally indigenous plant species on the site and reduce weeds.
Dangerous Goods	• Minor storage of dangerous goods	• Potential spill.	• Only minor storage thus no placarding or notification to WorkCover is required. • Roofed and bunded storage area. • Spill kits and good housekeeping.
Fire Safety	• Ongoing operation	• Machinery blockage.	• Fire services provided in accordance with BCA and relevant Australian Standards. • Control of ignition sources. • Implementation of an emergency plan. • The office building requires fire safety measures such as screens and draft excluders to be installed in accordance with the Bushfire Hazard Assessment. • Employee training and awareness.
Health	• Daily Operation, correct work procedures not followed	• Irritations caused by dust.	• Wear appropriate PPE as instructed in MSDS's. • Ensure workspace has sufficient natural ventilation. • Use of water sprays and foggers for dust control.
Hazards and Security	• Ongoing	• Potential hazards would include intentional, unintentional and natural hazards. These would include chemical spills, fires (bushfires or otherwise), arson, bomb threats, civil disturbances, theft, storms and flooding.	• Potential hazards would be controlled through security systems including fences, and also emergency response procedures developed as part of an Emergency Response Plan.
Visual Amenity	• Initial	• No potential impacts have been determined.	• Landscaping plans.

Table 8-1: Summary of Potential Impacts, Environmental Safeguards and Control Measures			
Environmental Aspect	Aspect of Proposed Development	Potential Impacts	Environmental Safeguards and Control Measures
Heritage	• Initial	• No potential impacts have been determined.	• None required.
Socio-Economic Environment	• Initial Occupation and long term operation of site	• Improvements in the socio-economic environment are expected. The industry would also support the local economy with a new business enterprise, injection into the economy and associated multiplier effects.	• None required.
Road, Traffic and Transport	• Initial Occupation and Operation of site • Cumulative Impact	• Traffic volumes would increase slightly. The overall changes in traffic volumes are negligible.	• Road widening at the access intersection at Andrews Road is required to accommodate B-double truck movements.

8.2 SITE MANAGEMENT PLANS

A Site Management Plan including the flowing reports should be established by the proponent prior to operation commencing:

- Emergency and Pollution Incident Response Management Plan; and
- Environmental Management Plan (EMP)

8.2.1 Emergency and Pollution Incident Response Management Plan

Recent changes to NSW environmental legislation affected holders of environment protection licences (EPL) under the *Protection of the Environment Operations Act, 1997*. Holders of EPL's are now required to prepare and implement pollution incident response management plans for each licensed activity. The requirement to prepare and implement plans commenced on 29 February 2012 all necessary plans need to be in place within 6 months, by 1 September 2012.

The Pollution Incident Response Management Plan would be incorporated into the Emergency Plan for ease of use to make the document an "Emergency and Pollution Incident Response Management Plan".

The plan would be prepared in accordance with the following:

- NSW Rural Fire Service Guidelines for the Preparation of Emergency/Evacuation Plans;
- AS 3745: Planning for Emergencies in Facilities; and
- Environmental Guidelines: Preparation of Pollution Incident Response Management Plans.

The aims of the plan are:

- Provide a clear understanding of how to handle and react to any emergency or pollution situation that may occur at the Site in the form of effective control structures, procedures and directives;
- Prevent or minimise the impact of an emergency and pollution incident on human life, the community and surrounding environment; and
- Facilitate a return to *normal* or *safe* operations as soon as possible.

The procedures contained in the plan would be designed to protect life and where possible prevent or minimise damage to the equipment, site and installations at the site and facilitate a return to normal operations by providing effective utilisation of the safety features, systems and equipment installed at the site to protect people from fire and other emergencies.

The plan would contain information and instructions that provide a basis for handling various types of emergency situations, such as:

- fire,
- explosion,
- pollution incident,

- medical emergency,
- spills,
- gas-leaks, and
- bomb threats.

These instructions would be provided as continually improving guidelines to be adapted to cope with unanticipated situations.

8.2.2 Environmental Management Plan

It is recommended that Glass Recovery Service develops an Environmental Management Plan to aid environmental management across the whole site.

The EMP provides environmental procedures that incorporate the following major elements:

- Legal and regulatory requirements;
- Site description including environmental characteristics and general infrastructure;
- Operational conditions and controls;
- Environmental management activities in relation to particular aspects and impacts;
- Reporting, staffing and training requirements;
- Environmental monitoring and review; and
- Environmental procedures.

The EMP framework adopted from the ISO 14001 standard maximises consistency and simplicity in the administration and overriding policies, implementation and training of the EMP procedures. The specific differences relate to the identified environmental aspects and impacts of the activities and the procedures developed to manage these impacts.

The implementation and operation element of the EMP would address the critical function of training and competency of the EMP. This would be the basis of the Environmental Management System for the site.

Monitoring of water, air and noise would be carried out according to the requirements of relevant environmental protection legislation.

8.2.3 Site Procedures

Procedures that are recommended to be developed for this site would be in relation to:

- Workplace Inspections;
- Noise Control;
- Air Quality Management;
- Stormwater Management and Monitoring;
- Waste Management and Minimisation;
- Emergency Preparedness;

- Fire Fighting;
- Training and Awareness;
- Communication;
- Complaints;
- Control of Documents and Records; and
- Corrective and Preventative Actions.

A brief explanation of the content of the above procedures is provided in the following sub-sections.

8.2.3.1 Workplace Inspections

A Workplace Inspection is a procedure aimed at ensuring a high standard of housekeeping is maintained in all operational, storage and external areas. Good housekeeping practices are beneficial for providing both preventative maintenance and prompt corrective actions should an environmental incident occur. The simplest method of implementing a workplace inspection would be by using a standard checklist.

8.2.3.2 Noise Control

A noise control procedure would provide methods on how to manage noisy activities at the site. Noise monitoring, if required by licences or approvals would be detailed in this procedure.

8.2.3.3 Air Quality Management

This procedure relates to controlling air emissions such as dust and particulate matter on-site to prevent degradation to the local amenity. Among other monitoring, inspections would be carried out by the proponent to ensure compliance. Potential non-conformances would be mitigated through the use of corrective and preventative actions. Corrective actions would be monitored to ensure their suitability and effectiveness.

8.2.3.4 Stormwater Management

This procedure addresses issues relating to water movement and control on site. Maintenance of stormwater control devices and ensuring effective use of other pollution control measures is integral to ensuring the pollutant load in stormwater runoff from the site is minimised. The EMP would also incorporate any monitoring specified in Development Consent Conditions or other regulatory licences and approvals.

8.2.3.5 Waste Management and Minimisation

This procedure details waste control and management on site including classification of each waste stream and how it needs to be managed to ensure that waste requiring disposal is done so according to the EPA regulations. Several operational measures to manage waste following the waste management hierarchy would be provided for diligent waste control. Waste minimisation and resource recovery would be practised as part of the company's commitment to the principles of Ecologically Sustainable Development.

8.2.3.6 Emergency Preparedness

This procedure outlines the site's response in an emergency situation. This takes the form of the site's Emergency and Pollution Incident Response Management Plan. This is site-specific and is based on the various types of emergencies that may arise on site. This procedure would need to be modified to account for any future adjustments, different layout and systems the plant may require on the site.

8.2.3.7 Fire Fighting

Basic fire fighting training including the use of hose reels and fire extinguishers would be provided in this procedure. The identification of ignition sources and instructions on how to control these would also be provided.

8.2.3.8 Training and Awareness

It is recommended that environmental awareness be introduced to the site induction procedures, to all new and existing employees and to all contractors involved in the site activities. A training schedule would be implemented to ensure all new employees are trained and that environmental training is updated and reviewed regularly. Competency testing would also be undertaken to ensure training has been successful.

8.2.3.9 Communication

A procedure to undertake voluntary and open communications with all groups with which the company interfaces would be provided. This includes community groups, regulatory authorities, non-regulatory agencies, and certain industries.

8.2.3.10 Complaints

A procedure to deal with and record complaints would be provided. Information that should be recorded in relation to the complaint include:

- The date and time of the complaint;
- The method by which the complaint was made;
- Any personal details of the complainant, which were provided by the complainant or, if no such details were provided, a note to that effect;
- The nature of the complaint;
- The action taken by Site management in relation to the complainant, including any follow up contact with the complainant; and
- If no action was taken by Site management, the reasons why no action was taken.

8.2.3.11 Control of Documents and Records

Document control is of critical importance. It is important that all documentation relating to the environmental management of the site is kept on record. A procedure for this purpose would be provided.

8.2.3.12 Corrective and Preventative Actions

Corrective and preventative actions would be detailed to facilitate continuous improvement of environmental management across operations. These actions would need to be documented where environmental management procedures are not being followed or where inspection and maintenance issues are identified.

9. JUSTIFICATION AND CONCLUDING REMARKS

This section of the EIS examines the justification for the proposal and then concludes the EIS Project.

9.1 PROJECT JUSTIFICATION

The project is justified on the basis of there being a need in Sydney to supply the glass making plant of Owens Illinois with high quality clean glass cullet.

Glass beneficiation involves converting glass bottles and containers into cullet of different colours.

A new plant of this type is needed to supply Owens Illinois and enable the full benefit of the glass recovering that occurs throughout our community to flow through to new glass packaging. The project will benefit both the Owens Illinois plant and the community's recycling programmes by being able to achieve >95% colour separation accuracy and >99% removal of impurities.

The proposal has potential environmental impacts and these have been considered in detail. Engineering controls have been designed into the development to prevent the impacts from occurring. These have strongly influenced the siting of equipment and controls.

The site enables the proponents to take advantage of the existing buildings to achieve a highly efficient and productive process layout.

Truck movements around the site are able to be efficient. The location of the site benefits the transport of the cullet to the site and user being basically "next door".

The project will generate employment and will have flow on financial benefits to the Penrith City Council's area.

The project is needed to increase the effectiveness of the re use of glass packaging. Glass packaging has been converted to cullet at other existing plants at Botany and Chullora. However these processes are dated and the contract between the proponents and Owens Illinois are enable the world's best technology to be used to reduce the amount of glass packaging that is not able to be re used as cullet due to poor colour separation processes.

The proponents have a similar glass beneficiation plant operating in Melbourne so are able to being extensive operational knowledge experience to the plant needed by Owens Illinois.

The proposal is considered to satisfy the precautionary principle as summarised in the following subsection.

9.1.1 Precautionary Principle

There are a number of aspects to the precautionary principle to which the proposal is evaluated.

9.1.1.1 Inter-Generational Equity

In simple terms this principle equates to the current generation to give consideration to their consumption of future generation's rights to an equal share of the Earth's resources.

The current consumption of fossil fuels and the diminishing resources of oil is the most glaring example of Inter-Generational Equity.

For the proposed development the reuse of glass is not new. The benefits of re using glass as opposed to the extraction of sand, it's melting and fusion with other raw materials and the need to effectively manage air quality emissions is markedly reduced through the use of cullet.

The EIS has documented the energy and green house gas savings aspects of the proposed development.

The selection of the site avoiding the need to developed and construct new buildings provides a significant advantage in saving resources. The siting of the process adjacent to the end user benefits "just in time" logistics operations avoiding the need to store large quantities of cullet.

9.1.1.2 Conservation of Biological Diversity and Ecological Integrity

The studies of flora and fauna and other associated environmental impacts for the proposal were commissioned so that the potential for biodiversity and ecological sensitivity of the site could be evaluated.

The recommendations in the reports undertaken into these aspects have influenced the design of the development and conclude that the site if management procedures are maintained, does not pose any threat to the ecological integrity of the surrounds.

9.1.1.3 Improved Valuation, Pricing and Incentive Mechanisms

The relevance of this aspect is assessed against the opportunities that the proposed development provides for the business entity.

The proposed operation would provide competitive pricing in the glass beneficiation processes available to kerb side recycling. This would encourage efficiencies and incentives to achieve a high level of utilisation of the plant.

This is considered to fulfil the intent of the third aspect of the Precautionary Principle.

9.2 CONCLUDING REMARKS

The environmental assessment process has enabled the potential impacts to be evaluated and control strategies devised to ensure compliance with regulatory standards would be achieved.

The use of a site that is already substantially developed with buildings and infrastructure in place is a major advantage. Being readily able to prevent the rise of any amenity impacts on the residential community is a major advantage of this site.

The development as proposed is considered to be suited to this site and the request is made that approval be granted.

R T Benbow
Principal Consultant

10. STATEMENT OF COMMITMENTS

Glass Recovery Services commits to the following course of action during the construction and operation of the proposed glass beneficiation plant at 126 Andrews Road, Penrith:

1. Glass Recovery Services will abide by all legal requirements, licence conditions and approvals pertaining to the site.

2. Glass Recovery Services will restrict construction activities to the following hours:

   Monday to Friday: 7:00am - 6:00pm
   Saturday: 7:00am - 4:00pm

3. Glass Recovery Services commits to ensuring the volume of material on site is no more than 2,000 m^3 within the building and 11,000 m^3 within the external bunkers at any one time.

4. Glass Recovery Services will implement and maintain the following safeguards and mitigation measures detailed in Section 8.1 of this EIS at the site including:

   Noise

   i) Throughout the night time hours (10pm – 7am) all roller shutter doors be closed;
   ii) Throughout the night time hours (10pm – 7am) all trucks must not utilise the engine brakes;
   iii) Throughout the early morning shoulder period hours (5am – 7am) all trucks frequenting the site must not travel any further than the middle of the southern façade of the warehouse;
   iv) Truck numbers must not exceed the numbers provided in Table 5-42 above;
   v) The steel cladding components of the existing roof and the eastern façade must achieve a minimum Rw (Weighted Reduction Index) of 34 dB. This is equivalent to providing two (2) skins of Spandek steel roof and wall cladding in standard zincalume finish, both with a base metal thickness of 0.8 mm, separated by a 200 mm airspace with a 50 mm thick fibreglass insulation blanket of density 14 kg/m^3 sandwiched between the two skins with ribs of each skin running parallel; and
   vi) The sky light components of the existing roof must achieve a minimum Rw (Weighted Reduction Index) of 27 dB. This is equivalent to providing one (1) skin of Perspex with a base thickness of 14 mm and surface mass 16.4 kg/m^2.

   Air

   i) Water sprays will be applied to external storage areas and loading / unloading / transfer activities to minimise dust emissions;
   ii) Water foggers will be applied to crushing, screening and conveying processes within the building;
   iii) A dust collector will be installed for crushing and screening equipment & machinery; and
   iv) All loads of incoming and outgoing materials will be covered.

Stormwater and Flooding

i) Particulate drains on all stormwater drains will be installed and maintained;
ii) Weed control and planting program to improve water quality in wetland areas will be established;
iii) Water quality treatment wetland with vegetated swales to capture and treat site stormwater runoff will be implemented; and
iv) A stormwater monitoring program will be implemented.

Soil and Land

i) Silt fences and hay bales will be maintained during construction works;
ii) Sampling and analysis of any soil removed will be undertaken and appropriately managed;
iii) Removal of soil by licensed contractor for appropriate disposal or reuse; and
iv) Daily roadsweeping will be undertaken;

Waste

i) Undertake routine incoming raw material inspections of waste;
ii) Reuse in-process waste wherever possible;
iii) Undertaken regular workplace inspections and waste audits;
iv) Provide designated waste areas and ensure all waste areas are covered; and
v) Ensure all waste and recycling contractors used are licensed.

Dangerous Goods

i) Ensure diesel is stored in accordance with regulations within a roofed, bunded and appropriately ventilated area; and
ii) Maintain spill kits in high risk areas.

Fire Safety

i) Provide fire services in accordance with BCA and relevant Australian Standards;
ii) Ensure sources of ignition are controlled;
iii) Implement an emergency / evacuation plan consistent with the NSW Rural Fire Service document Guidelines for the Preparation of Emergency/Evacuation Plans;
iv) Provide employee training and awareness;
v) The office component of the existing building needs to include:
    a. Installation of aluminium, steel or bronze metal mesh screens having an aperture size of 2 mm over all openable windows (internal or external) in such a way that the entire opening remains screened when the window is in the open position;
    b. The installation of aluminium, steel or bronze metal mesh screens having an aperture size of 2 mm over all vents and weepholes;
    c. The installation of draft excluders on all external side hung doors; and
    d. The installation of draft excluders on all internal side hung doors that separate the office and industrial components of the building.

Health

i) Provide appropriate PPE to employees as instructed in MSDS's;
ii) Ensure workspace has sufficient natural ventilation; and
iii) Ensure water sprays and foggers for dust control are maintained in good working order.

5. Glass Recovery Services will implement the landscaping plan as detailed in this EIS and maintain landscaped areas on the site.

6. Glass Recovery Services will meet the following construction noise limits:

Project Specific Noise Limits for Construction Noise (dB(A))		
Receiver	Period	Level $L_{Aeq(15\ minute)}$
Surrounding residential receptors (R1 to R11)	Monday to Friday 7am – 6pm; Saturday 8am – 1pm	51
Sporting fields to the east of the site (R12 and R13)	When in use	65 External

7. Glass Recovery Services will meet the following operational noise limits:

Project Specific Noise Limits (PSNL) for On-Site Operational Noise		
Location	Period	PSNL
Surrounding residential receptors (R1 to R11)	Day	46
	Evening	42
	Night	32
	Shoulder Period	46
Sporting fields to the east of the site (R12 and R13)	When in use	55

8. Glass Recovery Services will develop and implement an Environmental Management Plan for the site which encompasses these commitments, safeguard measures and recommendations documented in this EIS. The EMP will follow the ISO14001 standard and provide a comprehensive set of procedures to manage all aspects of the operation that could potentially impact on the environment. Procedures included (as a minimum):

    i) Workplace Inspection;
    ii) Noise Control;
    iii) Air Quality Management;
    iv) Stormwater Management and Monitoring;
    v) Waste Management and Minimisation;
    vi) Emergency Preparedness;
    vii) Fire Fighting;
    viii) Training and Awareness;
    ix) Complaints; and
    x) Corrective and Preventative Actions.

9. Glass Recovery Services will develop and implement an Emergency & Pollution Incident Response Management Plan for the site in accordance with *AS3745 Planning for Emergencies in Facilities, NSW Rural Fire Service – Guidelines for the Preparation of Emergency/Evacuation Plans* and requirements under the *Protection of the Environment Operations Act, 1997*.

I, _____ of Glass Recovery Services commit to undertaking the above course of action to protect the community's interests during the construction and operation of the proposed development at 126 Andrews Road, Penrith as described within this Environmental Impact Statement.

_____ _____

Full Name Position, Company

_____ _____

Signature Date

11. REFERENCES

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State Environmental Planning Policy No No 21 – Caravan Parks

State Environmental Planning Policy No No 22 – Shops and Commercial Premises

State Environmental Planning Policy No No 30 – Intensive Agriculture

State Environmental Planning Policy No No 32 – Urban Consolidation (Redevelopment of Urban Lands)

State Environmental Planning Policy No No 33 – Hazardous and Offensive Development.

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APPENDICES

Major Projects Assessment
Mining & Industry Projects
Contact: Kerry Hamman
Phone: (02) 9228 6516
Fax: (02) 9228 6466
Email: kerry.hamman@planning.nsw.gov.au

Our Ref: 12/07275-1

Mr Dom Tenace
Glass Recovery Services
94 Maffra Street
COOLAROO VIC 3048

Dear Mr Tenace

State Significant Development - Director-General's Requirements
Penrith Glass Beneficiation Plant (SSD - 5267)

I have attached a copy of the Director-General's environmental assessment requirements (DGRs) for the preparation of an Environmental Impact Statement for the Penrith Glass Beneficiation Plant.

These requirements are based on the information you have provided to date and have been prepared in consultation with the relevant government agencies and Penrith City Council. Their comments, which you should address appropriately when preparing the EIS, are also attached (see Attachment 2). Please note that the Department may alter these requirements at any time, and that you must consult further with the Department if you do not lodge a development application and EIS for the development within two years of the date of issue of these DGRs. The Department will review the EIS for the development carefully before putting it on public exhibition, and will require you to submit an amended EIS if it does not adequately address the DGRs.

I wish to emphasise the importance of effective and genuine community consultation and the need for proposals to proactively respond to the community's concerns. Accordingly a comprehensive, detailed and genuine community consultation and engagement process must be undertaken during preparation of the EIS. This process must ensure that the community is both informed of the proposal and is actively engaged in issues of concern to them. Sufficient information must be provided to the community so that it has a good understanding of what is being proposed and of the potential impacts.

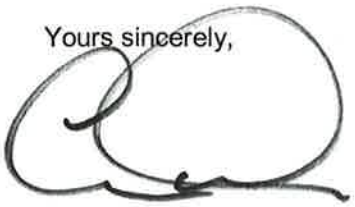
Your proposal may require a separate approval under Commonwealth *Environment Protection Biodiversity Conservation Act 1999* (EPBC Act). If an EPBC Act approval is required, I would appreciate it if you would advise the Department accordingly, as the Commonwealth approval process may be integrated into the NSW approval process, and supplementary DGR's may need to be issued.

I would appreciate it if you would contact the Department at least two weeks before you propose to submit the development application and EIS for your development. This will enable the Department to:

- confirm the applicable fee (see Division 1AA, Part 15 of the *Environmental Planning and Assessment Regulation 2000*); and
- determine the number of copies (hard-copy and CD-ROM) of the EIS required for review.

If you have any enquiries about these requirements, please contact Kerry Hamann on the details above, or Christine Chapman on (02) 9228 6537.

Yours sincerely,



16.5.12

Chris Wilson
Executive Director
Major Projects Assessment
As delegate for the Director-General

Director General's Environmental Assessment Requirements

Section 78A(8A) of the *Environmental Planning and Assessment Act*

State Significant Development

Application Number	SSD 5267
Development	The Penrith Glass Beneficiation Plant which includes: • conversion of an existing building into a glass beneficiation plant with the capacity to process up to 105,000 tonnes of glass per annum; • ancillary fit-out including external storage bunkers, stormwater and landscaping; and • utilisation of existing infrastructure such as two weighbridges, car park and offices.
Location	126 Andrews Road, Penrith, Lot 1, DP 747153, Penrith Local Government Area
Proponent	Glass Recovery Services
Date of Issue	May 2012
General Requirements	The Environmental Impact Statement (EIS) for the development must meet the form and content requirements in Clauses 6 and 7 of Schedule 2 of the *Environmental Planning and Assessment Regulation 2000.* In addition, the EIS must include a: • detailed description of the development, including: – need for the proposed development having particular regard to the aims, objectives, and guidance in the *NSW Waste Avoidance and Resource Recovery Strategy 2007;* – justification for the proposed development; – likely staging of the development - including construction, and operational stage/s; – likely interactions between the development and existing, approved and proposed operations in the vicinity of the site; – plans of any proposed building works; • consideration of all relevant environmental planning instruments, including identification and justification of any inconsistencies with these instruments; • risk assessment of the potential environmental impacts of the development, identifying the key issues for further assessment; • detailed assessment of the key issues specified below, and any other significant issues identified in this risk assessment, which includes: – a description of the existing environment, using sufficient baseline data; – an assessment of the potential impacts of all stages of the development, including any cumulative impacts, taking into consideration relevant guidelines, policies, plans and statutes; – a description of the measures that would be implemented to avoid, minimise and if necessary, offset the potential impacts of the development, including proposals for adaptive management and/or contingency plans to manage any significant risks to the environment; and – consolidated summary of all the proposed environmental management and monitoring measures, highlighting commitments included in the EIS.
Key Issues	The EIS must address the following specific matters: • **Statutory –** a consideration of the proposal against all relevant planning instruments including, but not limited to the *Penrith Local Environment Plan 2010* and the relevant *Development Control Plans* (DCP's), and *Sydney Regional Environmental Plan No. 20 – Hawkesbury Nepean River.*

	• **Waste Management** – including: - identify, classify and quantify the likely waste streams that would be handled/stored/disposed of at the facility; - describe how this waste would be stored and handled on site, and transported to and from the site including waste sources; - clearly describe the glass beneficiation technology, timeframes for processing waste and the quality control measures that would be implemented; - detail how the proposed plant would operate in conjunction with the neighbouring glass container manufacturing plant; and - detail the potential impacts associated with receiving, processing and storing the incoming glass and with dispatching of the cullet product. • **Soil & Water** – including: - consideration of potential local and mainstream flooding impacts; - potential impacts on watercourses and riparian areas, wetlands, watercourses and riparian areas, groundwater and groundwater dependent communities nearby; - any proposed erosion and sediment controls (during construction); - the proposed stormwater management system; - a detailed water balance for the development including water supply and an outline of the measures that would be implemented to minimise the use of water on site and wastewater disposal; and - consideration of the nature and extent of any contamination on the site and potential contamination impacts. • **Noise – including a quantitative assessment of potential:** - construction, operational and traffic noise impacts; and - details of the proposed management and monitoring measures. • **Air Quality –** including: - air quality impacts arising from the construction and operation of the proposed plant, particularly in relation to dust during processing and impacts on sensitive receptors (both current and proposed); and - details of the proposed management and monitoring measures. • **Traffic and Transport** – including: - details of truck routes; - predictions of the traffic volumes likely to be generated during construction and operation; - an assessment of the impacts of this traffic on the safety, capacity and efficiency of the surrounding road network; - modelling of key intersections (including any nearby existing or proposed developments); - detailed assessment on the need for upgrading or road improvement works on Andrews Road; - details of the availability of non-car travel modes and measures to encourage greater use of these travel modes; and - access and parking. • **Hazards –** including an assessment of the potential fire risks of the development. • **Greenhouse Gas –** including: - a quantitative assessment of the potential scope 1 and 2 greenhouse gas emissions of the development; and - a detailed description of the measures that would be implemented on site to ensure that the development is energy efficient. • **Visual –** including; - an assessment of the potential visual impacts of the development on the amenity of the surrounding area; and - a detailed description of the measures that would be implemented to minimise the visual impacts of the development, including the design features, landscaping and measures to minimise the lighting and signage impacts of the development. • **Socio-Economic –** including a comprehensive assessment of the potential economic and social impacts of the development, demonstrating that it would

	have a net benefit for the community, paying particular attention to the potential impacts of the development on waste minimisation and resource recovery in the region. • **Biodiversity –** including impacts on flora and fauna located on the site and surrounds.
Plans and Documents	The EIS must include all relevant plans, architectural drawings, diagrams and relevant documentation required under Schedule 1 of the *Environmental Planning and Assessment Regulation 2000*. These documents should be included as part of the EIS rather than as separate documents.
Consultation	During the preparation of the EIS, you must consult with the relevant local, State or Commonwealth Government authorities, service providers, community groups and affected landowners. In particular you must consult with: • Environment Protection Authority; • Department of Primary Industries (including the NSW Office of Water); • Transport for NSW (including Roads and Maritime Services); • Penrith City Council; and • the local community and stakeholders. The EIS must describe the consultation process and the issues raised, and identify where the design of the development has been amended in response to these issues. Where amendments have not been made to address an issue, a short explanation should be provided.
Further consultation after 2 years	If you do not lodge an EIS for the development within 2 years of the issue date of these DGRs, you must consult with the Director-General in relation to the requirements for lodgement.
References	The assessment of the key issues listed above must take into account relevant guidelines, policies, and plans as identified. While not exhaustive, Attachment 1 contains a list of some of the guidelines, policies, and plans that may be relevant to the environmental assessment of this development.

ATTACHMENT 1
Technical and Policy Guidelines

The following guidelines may assist in the preparation of the Environmental Impact Statement. This list is not exhaustive and not all of these guidelines may be relevant to your proposal.

Many of these documents can be found on the following websites:
http://www.planning.nsw.gov.au
http://www.bookshop.nsw.gov.au
http://www.publications.gov.au

Policies, Guidelines & Plans

Aspect	Policy /Methodology
Risk Assessment	
	AS/NZS 4360:2004 Risk Management (Standards Australia)
	HB 203: 203:2006 Environmental Risk Management – Principles & Process (Standards Australia)
Waste	
	Waste Avoidance and Resource Recovery Strategy 2007 (DECC)
	Waste Classification Guidelines (DECC)
	Environmental Guidelines: Assessment Classification and Management of Non-Liquid and Liquid Waste (NSW EPA)
	Environmental guidelines: Composting and Related Organics Processing Facilities (DEC)
	Environmental guidelines: Use and Disposal of Biosolid Products (NSW EPA)
	Composts, soil conditioners and mulches (Standards Australia, AS 4454)
Soil and Water	
Soil	Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites (ANZECC & NHMRC)
	National Environment Protection (Assessment of Site Contamination) Measure 1999 (NEPC)
	Draft Guidelines for the Assessment & Management if Groundwater Contamination (DECC)
	State Environmental Planning Policy No. 55 – Remediation of Land
	Managing Land Contamination – Planning Guidelines SEPP 55 – Remediation of Land (DOP)
Surface Water	Water Sharing Plan for the Greater Metropolitan Region Unregulated River Water Sources and the Water Sharing Plan for the Greater Metropolitan Region Groundwater sources National Water Quality Management Strategy: Water quality management - an outline of the policies (ANZECC/ARMCANZ)
	National Water Quality Management Strategy: Policies and principles - a reference document (ANZECC/ARMCANZ)
	National Water Quality Management Strategy: Implementation guidelines (ANZECC/ARMCANZ)
	National Water Quality Management Strategy: Australian Guidelines for Fresh and Marine Water Quality (ANZECC/ARMCANZ)
	National Water Quality Management Strategy: Australian Guidelines for Water Quality Monitoring and Reporting (ANZECC/ARMCANZ)
	Using the ANZECC Guideline and Water Quality Objectives in NSW (DEC)
	State Water Management Outcomes Plan
	NSW Government Water Quality and River Flow Environmental Objectives (DECC)

	Approved Methods for the Sampling and Analysis of Water Pollutants in NSW (DEC)
	Greater Metropolitan Regional Environmental Plan No. 2 – Georges River Catchment
	Managing Urban Stormwater: Soils & Construction (Landcom)
	Managing Urban Stormwater: Treatment Techniques (DECC)
	Managing Urban Stormwater: Source Control (DECC)
	Technical Guidelines: Bunding & Spill Management (DECC)
	Floodplain Development Manual (DIPNR)
	Floodplain Risk Management Guideline (DECC)
	A Rehabilitation Manual for Australian Streams (LWRRDC and CRCCH)
	Technical Guidelines: Bunding & Spill Management (DECC)
	Environmental Guidelines: Use of Effluent by Irrigation (DECC)
Groundwater	National Water Quality Management Strategy Guidelines for Groundwater Protection in Australia (ARMCANZ/ANZECC)
	NSW State Groundwater Policy Framework Document (DLWC)
	NSW State Groundwater Quality Protection Policy (DLWC)
	NSW State Groundwater Quantity Management Policy (DLWC) Draft
	Guidelines for the Assessment and Management of Groundwater Contamination (DECC)
Noise	
	NSW Industrial Noise Policy (DECC)
	Environmental Noise Management – Assessing Vibration: a technical guide (DEC)
	Environmental Criteria for Road Traffic Noise (NSW EPA)
	Environmental Noise Control Manual (DECC)
Air Quality	
	Protection of the Environment Operations (Clean Air) Regulation 2002
	Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (DEC)
	Approved Methods for the Sampling and Analysis of Air Pollutants in NSW (DEC)
Transport	
	Guide to Traffic Generating Development (RTA)
	Road Design Guide (RTA)
Hazards	
	State Environmental Planning Policy No. 33 – Hazardous and Offensive Development
	Hazardous and Offensive Development Application Guidelines - Applying SEPP 33
	Hazardous Industry Planning Advisory Paper No. 4 – Risk Criteria for Land Use Safety Planning
	Hazardous Industry Planning Advisory Paper No. 6 – Guidelines for Hazard Analysis
Greenhouse Gas	
	AGO Factors and Methods Workbook (AGO)
	Guidelines for Energy Savings Action Plans (DEUS, 2005)
Visual	
	Control of Obtrusive Effects of Outdoor Lighting (Standards Australia, AS 4282)
	State Environmental Planning Policy No 64 - Advertising and Signage
Social & Economic	
	Draft Economic Evaluation in Environmental Impact Assessment (DOP)
	Techniques for Effective Social Impact Assessment: A Practical Guide (Office of Social Policy, NSW Government Social Policy Directorate)
Biodiversity	
	Threatened Species Survey and Assessment Guidelines: Field Survey Methods for Fauna – Amphibians (DECCW 2009)
	Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities – Working Draft (DECC 2004)

Guidelines for Threatened Species Assessment (DoP 2005)
The Threatened Species Assessment Guideline – The Assessment of Significance (DECC 2007)
NSW State Groundwater Dependent Ecosystem Policy (DLWC)
Policy & Guidelines - Aquatic Habitat Management and Fish Conservation (NSW Fisheries)
State Environmental Planning Policy No. 44 – Koala Habitat Protection

ATTACHMENT 2
Agency Input into Key Assessment Issues



NSW GOVERNMENT | Office of Environment & Heritage

GLASS RECOVERY SERVICES PTY LTD

Department of Planning
Received
10 FEB 2012
Scanning Room

Attention: Dom Tenace

Notice Number 1503821

File Number

Date **3 February 2012**

Dear Mr Tenace,

RE: "Waste Management Facility - 126 Andrews Road, Penrith

I refer to your request for the Environment Protection Authority's ("the EPA") requirements for the environmental impact statement (EIS) in regard to the above proposal received by the EPA on 16 January 2011.

The EPA has considered the details of the proposal as provided by Glass Recovery Services Pty Ltd and has identified the information it requires to issue its general terms of approval in Attachment A. In summary, the EPA's key information requirements for the proposal include an adequate assessment of:

1. Air qualities issues (including odour and dust management)

2. Noise impacts

3. Stormwater management and wastewater managements

4. Waste management

5. Ecologically sustainable development

6. Greenhouse gas assessment

7. Aboriginal cultural heritage

8. Native flora and fauna

9. Native vegetation

Specific assessment requirements are relevant to the project and these environmental impacts are listed below. The environmental impacts should be assessed in accordance with the relevant guidelines mentioned.

The EIS must provide sufficient information for a full assessment of the proposed works against the EPA's statutory responsibilities and in particular, the requirements of section 45 of the *Protection of the*

Environment Operations Act 1997 ("POEO Act") in order for the EPA to provide appropriate general terms of approval.

If there are any questions regarding the above, please contact Jacqueline Ingham on (02) 9995 5795.

Yours sincerely,

.....

Jacqueline Ingham

Unit Head

Waste Management Section

(by Delegation)

Office of Environment & Heritage

ATTACHMENT A: EIS REQUIREMENTS FOR

126 ANDREWS ROAD, PENRITH - WASTE MANAGEMENT FACILITY

How to use these requirements

The EPA requirements have been structured in accordance with the DIPNR EIS Guidelines, as follows. It is suggested that the EIS follow the same structure:

A. Executive summary

B. The proposal

C. The location

D. Identification and prioritisation of issues

E. The environmental issues

F. List of approvals and licences

G. Compilation of mitigation measures

H. Justification for the proposal

A Executive summary

The executive summary should include a brief discussion of the extent to which the proposal achieves identified environmental outcomes.

B The proposal

1. Objectives of the proposal

- The objectives of the proposal should be clearly stated and refer to:
  a) the size and type of the operation, the nature of the processes and the products, by-products and wastes produced
  b) a life cycle approach to the production, use or disposal of products
  c) the anticipated level of performance in meeting required environmental standards and cleaner production principles
  d) the staging and timing of the proposal and any plans for future expansion
  e) the proposal's relationship to any other industry or facility.

2. Description of the proposal

General

- Outline the production process including:
  a) the environmental "mass balance" for the process – quantify in-flow and out-flow of materials, any points of discharge to the environment and their respective destinations (sewer, stormwater, atmosphere, recycling, landfill etc)
  b) any life-cycle strategies for the products.
- Outline cleaner production actions, including:
  a) measures to minimise waste (typically through addressing source reduction)
  b) proposals for use or recycling of by-products
  c) proposed disposal methods for solid and liquid waste
  d) air management systems including all potential sources of air emissions, proposals to re-use or treat emissions, emission levels relative to relevant standards in regulations, discharge points
  e) water management system including all potential sources of water pollution, proposals for re-use, treatment etc, emission levels of any wastewater discharged, discharge points, summary of options explored to avoid a discharge, reduce its frequency or reduce its impacts, and rationale for selection of option to discharge.
- Outline construction works including:
  a) any earthworks or site clearing; re-use and disposal of cleared material (including use of spoil on-site)

b) construction timetable and staging; hours of construction; proposed construction methods

c) environment protection measures, including noise mitigation measures, dust control measures and erosion and sediment control measures.

Air

- Identify all sources of air emissions from the development.
  Note: emissions can be classed as either:
  - *point (eg emissions from stack or vent) or*
  - *fugitive (from wind erosion, leakages or spillages, associated with loading or unloading, conveyors, storage facilities, plant and yard operation, vehicle movements (dust from road, exhausts, loss from load), land clearing and construction works).*
- Provide details of the project that are essential for predicting and assessing air impacts including:
  a) the quantities and physio-chemical parameters (eg concentration, moisture content, bulk density, particle sizes etc) of materials to be used, transported, produced or stored
  b) an outline of procedures for handling, transport, production and storage
  c) the management of solid, liquid and gaseous waste streams with potential for significant air impacts.

Noise and vibration

- Identify all noise sources from the development (including both construction and operation phases). Detail all potentially noisy activities including ancillary activities such as transport of goods and raw materials.
- Specify the times of operation for all phases of the development and for all noise producing activities.
- For projects with a significant potential traffic noise impact provide details of road alignment (include gradients, road surface, topography, bridges, culverts etc), and land use along the proposed road and measurement locations – diagrams should be to a scale sufficient to delineate individual residential blocks.

Water

- Provide details of the project that are essential for predicting and assessing impacts to waters:
  a) including the quantity and physio-chemical properties of all potential water pollutants and the risks they pose to the environment and human health, including the risks they pose to Water Quality Objectives in the ambient waters (as defined on www.environment.nsw.gov.au/ieo, using technical criteria derived from the Australian and New Zealand Guidelines for Fresh and Marine Water Quality, ANZECC 2000)
  b) the management of discharges with potential for water impacts
  c) drainage works and associated infrastructure; land-forming and excavations; working capacity of structures; and water resource requirements of the proposal.

- Outline site layout, demonstrating efforts to avoid proximity to water resources (especially for activities with significant potential impacts eg effluent ponds) and showing potential areas of modification of contours, drainage etc.
- Outline how total water cycle considerations are to be addressed showing total water balances for the development (with the objective of minimising demands and impacts on water resources). Include water requirements (quantity, quality and source(s)) and proposed storm and wastewater disposal, including type, volumes, proposed treatment and management methods and re-use options.

Waste and chemicals

- Provide details of the quantity and type of both liquid waste and non-liquid waste generated, handled, processed or disposed of at the premises. Waste must be classified according to the *Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-liquid Wastes* (NSW EPA, 1999).
- Provide details of liquid waste and non-liquid waste management at the facility, including:
  a) the transportation, assessment and handling of waste arriving at or generated at the site
  b) any stockpiling of wastes or recovered materials at the site
  c) any waste processing related to the facility, including reuse, recycling, reprocessing (including composting) or treatment both on- and off-site
  d) the method for disposing of all wastes or recovered materials at the facility
  e) the emissions arising from the handling, storage, processing and reprocessing of waste at the facility
  f) the proposed controls for managing the environmental impacts of these activities.
- Provide details of procedures for the assessment, handling, storage, transport and disposal of all hazardous and dangerous materials used, stored, processed or disposed of at the site, in addition to the requirements for liquid and non-liquid wastes.
- Provide details of the type and quantity of any chemical substances to be used or stored and describe arrangements for their safe use and storage.
- Reference should be made to the guidelines: *Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-Liquid Wastes* (NSW EPA, 1999).

ESD

- Demonstrate that the planning process and any subsequent development incorporates objectives and mechanisms for achieving ESD, including:

an assessment of a range of options available for use of the resource, including the benefits of each option to future generations

  g) proper valuation and pricing of environmental resources
  h) identification of who will bear the environmental costs of the proposal.

3. Consideration of alternatives and justification for the proposal

- Consider the environmental consequences of adopting alternatives, including alternative:
  a) sites and site layouts
  b) access modes and routes
  c) materials handling and production processes
  d) waste and water management
  e) impact mitigation measures
  f) energy sources
- Selection of the preferred option should be justified in terms of:
  a) ability to satisfy the objectives of the proposal
  relative environmental and other costs of each alternative
  acceptability of environmental impacts and contribution to identified environmental objectives
  b) acceptability of any environmental risks or uncertainties
  c) reliability of proposed environmental impact mitigation measures
  d) efficient use (including maximising re-use) of land, raw materials, energy and other resources.

C The location

1. General

- Provide an overview of the affected environment to place the proposal in its local and regional environmental context including:
  a) meteorological data (eg rainfall, temperature and evaporation, wind speed and direction)
  b) surrounding land uses (potential synergies and conflicts)
  c) ecological information (water system habitat, vegetation, fauna)
  d) availability of services and the accessibility of the site for passenger and freight transport.

2. Air

- Describe the topography and surrounding land uses. Provide details of the exact locations of dwellings, schools and hospitals. Where appropriate provide a perspective view of the study area such as the terrain file used in dispersion models.
- Describe surrounding buildings that may effect plume dispersion.
- Provide and analyse site representative data on following meteorological parameters:
  a) temperature and humidity
  b) rainfall, evaporation and cloud cover

c) wind speed and direction

d) atmospheric stability class

e) mixing height (the height that emissions will be ultimately mixed in the atmosphere)

f) katabatic air drainage

g) air re-circulation.

3. Noise and vibration

- Identify any noise sensitive locations likely to be affected by activities at the site, such as residential properties, schools, churches, and hospitals. Typically the location of any noise sensitive locations in relation to the site should be included on a map of the locality.
- Identify the land use zoning of the site and the immediate vicinity and the potentially affected areas.

4. Water

- Describe the catchment including proximity of the development to any waterways and provide an assessment of their sensitivity/significance from a public health, ecological and/or economic perspective. The Water Quality and River Flow Objectives on the website: www.environment.nsw.gov.au/ieo should be used to identify the agreed environmental values and human uses for any affected waterways. This will help with the description of the local and regional area.

D Identification and prioritisation of issues / scoping of impact assessment

- Provide an overview of the methodology used to identify and prioritise issues. The methodology should take into account:

  a) relevant NSW government guidelines

  b) industry guidelines

  c) EISs for similar projects

  d) relevant research and reference material

  e) relevant preliminary studies or reports for the proposal

  f) consultation with stakeholders.

- Provide a summary of the outcomes of the process including:

  a) all issues identified including local, regional and global impacts (eg increased/ decreased greenhouse emissions)

  b) key issues which will require a full analysis (including comprehensive baseline assessment)

c) issues not needing full analysis though they may be addressed in the mitigation strategy

d) justification for the level of analysis proposed (the capacity of the proposal to give rise to high concentrations of pollution compared with the ambient environment or environmental outcomes is an important factor in setting the level of assessment).

E The environmental issues

1. General

- The potential impacts identified in the scoping study need to be assessed to determine their significance, particularly in terms of achieving environmental outcomes, and minimising environmental pollution.
- Identify gaps in information and data relevant to significant impacts of the proposal and any actions proposed to fill those information gaps so as to enable development of appropriate management and mitigation measures. This is in accordance with ESD requirements.

Note: The level of detail should match the level of importance of the issue in decision making which is dependent on the environmental risk.

Describe baseline conditions

- Provide a description of existing environmental conditions for any potential impacts.

Assess impacts

- For any potential impacts relevant for the assessment of the proposal provide a detailed analysis of the impacts of the proposal on the environment including the cumulative impact of the proposal on the receiving environment especially where there are sensitive receivers.
- Describe the methodology used and assumptions made in undertaking this analysis (including any modelling or monitoring undertaken) and indicate the level of confidence in the predicted outcomes and the resilience of the environment to cope with the predicted impacts.
- The analysis should also make linkages between different areas of assessment where necessary to enable a full assessment of environmental impacts eg assessment of impacts on air quality will often need to draw on the analysis of traffic, health, social, soil and/or ecological systems impacts; etc.
- The assessment needs to consider impacts at all phases of the project cycle including: exploration (if relevant or significant), construction, routine operation, start-up operations, upset operations and decommissioning if relevant.
- The level of assessment should be commensurate with the risk to the environment.

Describe management and mitigation measures

- Describe any mitigation measures and management options proposed to prevent, control, abate or mitigate identified environmental impacts associated with the proposal and to reduce risks to human health and prevent the degradation of the environment. This should include an assessment of the

effectiveness and reliability of the measures and any residual impacts after these measures are implemented.

- Proponents are expected to implement a 'reasonable level of performance' to minimise environmental impacts. The proponent must indicate how the proposal meets reasonable levels of performance. For example, reference technology based criteria if available, or identify good practice for this type of activity or development. A 'reasonable level of performance' involves adopting and implementing technology and management practices to achieve certain pollutant emissions levels in economically viable operations. Technology-based criteria evolve gradually over time as technologies and practices change.
- Use environmental impacts as key criteria in selecting between alternative sites, designs and technologies, and to avoid options having the highest environmental impacts.
- Outline any proposed approach (such as an Environmental Management Plan) that will demonstrate how commitments made in the EIS will be implemented. Areas that should be described include:

  a) operational procedures to manage environmental impacts

  b) monitoring procedures

  c) training programs

  d) community consultation

  e) complaint mechanisms including site contacts

  f) strategies to use monitoring information to improve performance

  g) strategies to achieve acceptable environmental impacts and to respond in event of exceedences.

2. Air

Describe baseline conditions

- Provide a description of existing air quality and meteorology, using existing information and site representative ambient monitoring data.
- For odour provide the emission rates in terms of odour units (determined by techniques compatible with EPA procedures). Use sampling and analysis techniques for individual or complex odours and for point or diffuse sources, as appropriate.

  Note: With dust and odour, it may be possible to use data from existing similar activities to generate emission rates.

Assess impacts

- Identify all pollutants of concern and estimate emissions by quantity (and size for particles), source and discharge point.
- Estimate the resulting ground level concentrations of all pollutants. Where necessary (eg potentially significant impacts and complex terrain effects), use an appropriate dispersion model to estimate ambient pollutant concentrations. Discuss choice of model and parameters with the EPA.
- Describe the effects and significance of pollutant concentration on the environment, human health, amenity and regional ambient air quality standards or goals.

- Describe the contribution that the development will make to regional and global pollution, particularly in sensitive locations.

- Reference should be made to : *Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in NSW* (2005); *Approved Methods for the Sampling and Analysis of Air Pollutants in NSW* (2007); *Assessment and Management of Odour from Stationary Sources in NSW* (2006); *Technical Notes: Draft Policy: Assessment and Management of Odour from Stationary Sources in NSW (2006).*

Describe management and mitigation measures

- Outline specifications of pollution control equipment (including manufacturer's performance guarantees where available) and management protocols for both point and fugitive emissions. Where possible, this should include cleaner production processes.

3. Noise and vibration

Describe baseline conditions

- Determine the existing background (LA90) and ambient (LAeq) noise levels in accordance with the *NSW Industrial Noise Policy*.
- Determine the existing road traffic noise levels in accordance with the *NSW Environmental Criteria for Road Traffic Noise*, where road traffic noise impacts may occur.
- The noise impact assessment report should provide details of all monitoring of existing ambient noise levels including:
  a) details of equipment used for the measurements
  b) a brief description of where the equipment was positioned
  c) a statement justifying the choice of monitoring site, including the procedure used to choose the site, having regards to the definition of 'noise sensitive locations(s)' and 'most affected locations(s)' described in Section 3.1.2 of the *NSW Industrial Noise Policy*
  d) details of the exact location of the monitoring site and a description of land uses in surrounding areas
  e) a description of the dominant and background noise sources at the site

  day, evening and night assessment background levels for each day of the monitoring period

  the final Rating Background Level (RBL) value

  f) graphs of the measured noise levels for each day should be provided
  g) a record of periods of affected data (due to adverse weather and extraneous noise), methods used to exclude invalid data and a statement indicating the need for any re-monitoring under Step 1 in Section B1.3 of the *NSW Industrial Noise Policy*
  h) determination of LAeq noise levels from existing industry.

Assess impacts

- Determine the project specific noise levels for the site. For each identified potentially affected receiver, this should include:
  a) determination of the intrusive criterion for each identified potentially affected receiver
  b) selection and justification of the appropriate amenity category for each identified potentially affected receiver
  c) determination of the amenity criterion for each receiver
  d) determination of the appropriate sleep disturbance limit.
- Maximum noise levels during night-time period (10pm-7am) should be assessed to analyse possible affects on sleep. Where LA1(1min) noise levels from the site are less than 15 dB above the background LA90 noise level, sleep disturbance impacts are unlikely. Where this is not the case, further analysis is required. Additional guidance is provided in Appendix B of the *NSW Environmental Criteria for Road Traffic Noise*.
- Determine expected noise level and noise character (eg tonality, impulsiveness, vibration, etc) likely to be generated from noise sources during:
  a) site establishment
  b) construction
  c) operational phases
  d) transport including traffic noise generated by the proposal
  e) other services.

  Note: The noise impact assessment report should include noise source data for each source in 1/1 or 1/3 octave band frequencies including methods for references used to determine noise source levels. Noise source levels and characteristics can be sourced from direct measurement of similar activities or from literature (if full references are provided).
- Determine the noise levels likely to be received at the most sensitive locations (these may vary for different activities at each phase of the development). Potential impacts should be determined for any identified significant adverse meteorological conditions. Predicted noise levels under calm conditions may also aid in quantifying the extent of impact where this is not the most adverse condition.
- The noise impact assessment report should include:
  a) a plan showing the assumed location of each noise source for each prediction scenario
  b) a list of the number and type of noise sources used in each prediction scenario to simulate all potential significant operating conditions on the site
  c) any assumptions made in the predictions in terms of source heights, directivity effects, shielding from topography, buildings or barriers, etc
  d) methods used to predict noise impacts including identification of any noise models used. Where modelling approaches other than the use of the ENM or SoundPlan computer models are adopted, the approach should be appropriately justified and validated
  e) an assessment of appropriate weather conditions for the noise predictions including reference to any weather data used to justify the assumed conditions

f) the predicted noise impacts from each noise source as well as the combined noise level for each prediction scenario under any identified significant adverse weather conditions as well as calm conditions where appropriate

g) for developments where a significant level of noise impact is likely to occur, noise contours for the key prediction scenarios should be derived

h) an assessment of the need to include modification factors as detailed in Section 4 of the *NSW Industrial Noise Policy*.

- Discuss the findings from the predictive modelling and, where relevant noise criteria have not been met, recommend additional mitigation measures.
- The noise impact assessment report should include details of any mitigation proposed including the attenuation that will be achieved and the revised noise impact predictions following mitigation.
- Where relevant noise/vibration criteria cannot be met after application of all feasible and cost effective mitigation measures the residual level of noise impact needs to be quantified by identifying:

  a) locations where the noise level exceeds the criteria and extent of exceedence

  b) numbers of people (or areas) affected

  c) times when criteria will be exceeded

  d) likely impact on activities (speech, sleep, relaxation, listening, etc)

  e) change on ambient conditions

  f) the result of any community consultation or negotiated agreement.

- For the assessment of existing and future traffic noise, details of data for the road should be included such as assumed traffic volume; percentage heavy vehicles by time of day; and details of the calculation process. These details should be consistent with any traffic study carried out in the EIS.

Describe management and mitigation measures

- Determine the most appropriate noise mitigation measures and expected noise reduction including both noise controls and management of impacts for both construction and operational noise. This will include selecting quiet equipment and construction methods, noise barriers or acoustic screens, location of stockpiles, temporary offices, compounds and vehicle routes, scheduling of activities, etc.
- For traffic noise impacts, provide a description of the ameliorative measures considered (if required), reasons for inclusion or exclusion, and procedures for calculation of noise levels including ameliorative measures. Also include, where necessary, a discussion of any potential problems associated with the proposed ameliorative measures, such as overshadowing effects from barriers. Appropriate ameliorative measures may include:

  a) use of alternative transportation modes, alternative routes, or other methods of avoiding the new road usage

  b) control of traffic (eg: limiting times of access or speed limitations)

  c) resurfacing of the road using a quiet surface

  d) use of (additional) noise barriers or bunds

  e) treatment of the façade to reduce internal noise levels buildings where the night-time criteria is a major concern

f) more stringent limits for noise emission from vehicles (i.e. using specially designed 'quite' trucks and/or trucks to use air bag suspension

g) driver education

h) appropriate truck routes

i) limit usage of exhaust breaks

j) use of premium muffles on trucks

k) reducing speed limits for trucks

l) ongoing community liaison and monitoring of complaints

m) phasing in the increased road use.

4. Water

Describe baseline conditions

- Describe existing surface and groundwater quality – an assessment needs to be undertaken for any water resource likely to be affected by the proposal and for all conditions (e.g. a wet weather sampling program is needed if runoff events may cause impacts).

  Note: Methods of sampling and analysis need to conform with an accepted standard (e.g. Approved Methods for the Sampling and Analysis of Water Pollutants in NSW (EPA 2004) *or be approved and analyses undertaken by accredited laboratories).*

- Provide site drainage details and surface runoff yield.
- State the ambient Water Quality and River Flow Objectives for the receiving waters. These refer to the community's agreed environmental values and human uses endorsed by the Government as goals for the ambient waters. These environmental values are published on the website: www.environment.nsw.gov.au/ieo. The EIS should state the environmental values listed for the catchment and waterway type relevant to your proposal. NB: A consolidated and approved list of environmental values are not available for groundwater resources. Where groundwater may be affected the EIS should identify appropriate groundwater environmental values and justify the choice.
- State the indicators and associated trigger values or criteria for the identified environmental values. This information should be sourced from the ANZECC 2000 *Guidelines for Fresh and Marine Water Quality* (http://www.deh.gov.au/water/quality/nwqms/volume1.html)(Note that, as at 2004, the NSW Water Quality Objectives booklets and website contain technical criteria derived from the 1992 version of the ANZECC Guidelines. The Water Quality Objectives remain as Government Policy, reflecting the community's environmental values and long-term goals, but the technical criteria are replaced by the more recent ANZECC 2000 Guidelines). NB: While specific guidelines for groundwater are not available, the ANCECC 2000 Guidelines endorse the application of the trigger values and decision trees as a tool to assess risk to environmental values in groundwater.
- State any locally specific objectives, criteria or targets, which have been endorsed by the government e.g. the Healthy Rivers Commission Inquiries (www.hrc.nsw.gov.au) or the NSW Salinity Strategy (DLWC, 2000) (www.dlwc.nsw.gov.au/care/salinity/#Strategy).
- Where site specific studies are proposed to revise the trigger values supporting the ambient Water Quality and River Flow Objectives, and the results are to be used for regulatory purposes (e.g. to

assess whether a licensed discharge impacts on water quality objectives), then prior agreement from the EPA on the approach and study design must be obtained.

- Describe the state of the receiving waters and relate this to the relevant Water Quality and River Flow Objectives (i.e. are Water Quality and River Flow Objectives being achieved?). Proponents are generally only expected to source available data and information. However, proponents of large or high risk developments may be required to collect some ambient water quality / river flow / groundwater data to enable a suitable level of impact assessment. Issues to include in the description of the receiving waters could include:
  a) lake or estuary flushing characteristics
  b) specific human uses (e.g. exact location of drinking water offtake)
  c) sensitive ecosystems or species conservation values
  d) a description of the condition of the local catchment e.g. erosion levels, soils, vegetation cover, etc
  e) an outline of baseline groundwater information, including, but not restricted to, depth to watertable, flow direction and gradient, groundwater quality, reliance on groundwater by surrounding users and by the environment
  f) historic river flow data where available for the catchment.

Assess impacts

- No proposal should breach clause 120 of the *Protection of the Environment Operations Act* 1997 (i.e. pollution of waters is prohibited unless undertaken in accordance with relevant regulations).
- Identify and estimate the quantity of all pollutants that may be introduced into the water cycle by source and discharge point including residual discharges after mitigation measures are implemented.
- Include a rationale, along with relevant calculations, supporting the prediction of the discharges.
- Describe the effects and significance of any pollutant loads on the receiving environment. This should include impacts of residual discharges through modelling, monitoring or both, depending on the scale of the proposal. Determine changes to hydrology (including drainage patterns, surface runoff yield, flow regimes, wetland hydrologic regimes and groundwater).
- Describe water quality impacts resulting from changes to hydrologic flow regimes (such as nutrient enrichment or turbidity resulting from changes in frequency and magnitude of stream flow).
- Identify any potential impacts on quality or quantity of groundwater describing their source.
- Identify potential impacts associated with geomorphological activities with potential to increase surface water and sediment runoff or to reduce surface runoff and sediment transport. Also consider possible impacts such as bed lowering, bank lowering, instream siltation, floodplain erosion and floodplain siltation.
- Identify impacts associated with the disturbance of acid sulfate soils and potential acid sulfate soils.
- Containment of spills and leaks shall be in accordance with the technical guidelines section 'Bunding and Spill Management' of the *Authorised Officers Manual* (EPA, 1995) (http://www.environment.nsw.gov.au/mao/bundingspill.htm) and the most recent versions of the Australian Standards referred to in the Guidelines. Containment should be designed for no-discharge.
- The significance of the impacts listed above should be predicted. When doing this it is important to predict the ambient water quality and river flow outcomes associated with the proposal and to

demonstrate whether these are acceptable in terms of achieving protection of the Water Quality and River Flow Objectives. In particular the following questions should be answered:

a) will the proposal protect Water Quality and River Flow Objectives where they are currently achieved in the ambient waters; and

b) will the proposal contribute towards the achievement of Water Quality and River Flow Objectives over time, where they are not currently achieved in the ambient waters.

- Consult with the EPA as soon as possible if a mixing zone is proposed (a mixing zone could exist where effluent is discharged into a receiving water body, where the quality of the water being discharged does not immediately meet water quality objectives. The mixing zone could result in dilution, assimilation and decay of the effluent to allow water quality objectives to be met further downstream, at the edge of the mixing zone). The EPA will advise the proponent under what conditions a mixing zone will and will not be acceptable, as well as the information and modelling requirements for assessment.

  Note: The assessment of water quality impacts needs to be undertaken in a total catchment management context to provide a wide perspective on development impacts, in particular cumulative impacts.

- Where a licensed discharge is proposed, provide the rationale as to why it cannot be avoided through application of a reasonable level of performance, using available technology, management practice and industry guidelines.
- Where a licensed discharge is proposed, provide the rationale as to why it represents the best environmental outcome and what measures can be taken to reduce its environmental impact.
- Reference should be made to: *Managing Urban Stormwater: Soils and Construction* (Landcom, 2004), *Guidelines for Fresh and Marine Water Quality* ANZECC 2000).

Describe management and mitigation measures

- Outline stormwater management to control pollutants at the source and contain them within the site. Also describe measures for maintaining and monitoring any stormwater controls.
- Outline erosion and sediment control measures directed at minimising disturbance of land, minimising water flow through the site and filtering, trapping or detaining sediment. Also include measures to maintain and monitor controls as well as rehabilitation strategies.
- Describe waste water treatment measures that are appropriate to the type and volume of waste water and are based on a hierarchy of avoiding generation of waste water; capturing all contaminated water (including stormwater) on the site; reusing/recycling waste water; and treating any unavoidable discharge from the site to meet specified water quality requirements.
- Outline pollution control measures relating to storage of materials, possibility of accidental spills (eg preparation of contingency plans), appropriate disposal methods, and generation of leachate.
- Describe hydrological impact mitigation measures including:

  a) site selection (avoiding sites prone to flooding and waterlogging, actively eroding or affected by deposition)

  b) minimising runoff

  c) minimising reductions or modifications to flow regimes

  d) avoiding modifications to groundwater.

- Describe groundwater impact mitigation measures including:
  a) site selection
  b) retention of native vegetation and revegetation
  c) artificial recharge
  d) providing surface storages with impervious linings
  e) monitoring program.
- Describe geomorphological impact mitigation measures including:
  a) site selection
  b) erosion and sediment controls
  c) minimising instream works
  d) treating existing accelerated erosion and deposition
  e) monitoring program.
- Any proposed monitoring should be undertaken in accordance with the *Approved Methods for the Sampling and Analysis of Water Pollutants in NSW* EPA 2004).

Describe management and mitigation measures

- Describe and assess the effectiveness or adequacy of any soil management and mitigation measures during construction and operation of the proposal including:
  a) erosion and sediment control measures
  b) proposals for site remediation – see *Managing Land Contamination, Planning Guidelines SEPP 55 – Remediation of Land* (Department of Urban Affairs and Planning and Environment Protection Authority, 1998)
  c) proposals for the management of these soils – see *Assessing and Managing Acid Sulfate Soils,* Environment Protection Authority, 1995 (note that this is the only methodology accepted by the EPA).

6. Waste and chemicals

Describe baseline conditions

- Describe any existing waste or chemicals operations related to the proposal.

Assess impacts

- Assess the adequacy of proposed measures to minimise natural resource consumption and minimise impacts from the handling, transporting, storage, processing and reprocessing of waste and/or chemicals.
- Reference should be made to *Waste Classification Guidelines (2008).*

Describe management and mitigation measures

- Outline measures to minimise the consumption of natural resources.
- Outline measures to avoid the generation of waste and promote the re-use and recycling and reprocessing of any waste.
- Outline measures to support any approved regional or industry waste plans.

7. Greenhouse Gas Assessment

Describe baseline conditions

- The EA should include a comprehensive assessment of, and report on, the project's predicted greenhouse gas emissions (tCO2e). Emissions should be reported broken down by:

  a) direct emissions (scope 1 as defined by the Greenhouse Gas Protocol – see reference below),
  b) indirect emissions from electricity (scope 2), and
  c) upstream and downstream emissions (scope 3)

  before and after implementation of the project, including annual emissions for each year of the project (construction, operation and decommissioning).

- The EA should include an estimate of the greenhouse emissions intensity (per unit of production). Emissions intensity should be compared with best practice if possible.

- The emissions should be estimated using an appropriate methodology, in accordance with NSW, Australian and international guidelines (see below).

Describe management and mitigation measures

- The proponent should also evaluate and report on the feasibility of measures to reduce greenhouse gas emissions associated with the project. This could include a consideration of energy efficiency opportunities or undertaking an energy use audit for the site.

Reference should be made to:

- The Greenhouse Gas Protocol: Corporate Standard, World Council for Sustainable Business Development & World Resources Institute http://www.ghgprotocol.org/standards/corporate-standard
- National Greenhouse Accounts (NGA) Factors, Australian Department of Climate Change (Latest release), http://www.climatechange.gov.au/publications/greenhouse-acctg/national-greenhouse-factors.aspx
- National Greenhouse and Energy Reporting System, Technical Guidelines (latest release) http://www.climatechange.gov.au/en/government/initiatives/national-greenhouse-energy-reporting/tools-resources.aspx
- National Carbon Accounting Toolbox http://www.climatechange.gov.au/government/initiatives/ncat.aspx
- Australian Greenhouse Emissions Information System (AGEIS) http://ageis.climatechange.gov.au/

8. Impacts on Native Vegetation

The EA needs to address the potential impact on native vegetation; specifically:

- The hectares of native vegetation that will have to be cleared to accommodate the resource Recovery Park and the associated infrastructure.
- Full floristics of the vegetation types that will need to be cleared.
- A description and map of the dominate vegetation types must be provided. Vegetation types mapped should be assigned to corresponding vegetation types included in the Biometric tool vegetation database. These are available from:

  http://www.environment.nsw.au/resources/nature/Biometric_Vegetation_Type_CMA.xls
- The extent of native vegetation on the site which may be remnant vegetation, protection regrowth or non-protected re-growth as defined by the Native Vegetation Act 2003.
- The general requirements of the Native Vegetation Act 2003, especially in relation to Vulnerable Land.

9. Impacts on Aboriginal cultural heritage values

The assessment should if applicable:

- Address and document the information requirements set out in the draft *Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* involving surveys and consultation with the Aboriginal community;
- Identify the nature and extent of impacts on Aboriginal cultural heritage values across the project area;
- Describe the actions that will be taken to avoid or mitigate impacts or compensate to prevent unavoidable impacts of the project on Aboriginal cultural heritage values. This should include an assessment of the effectiveness and reliability of the measures and any residual impacts after these measures are implemented; and
- Demonstrate the effective community consultation with Aboriginal communities has been undertaken in determining and assessing impacts, developing options and making final recommendations.

10. Impacts on threatened species, population, ecological communities and their habitat

Undertake an assessment on the likely impact on impacts on threatened species, population, ecological communities and their habitat. This should include:

- A field survey
- Likely impacts on threatened species and their habitat need to be assessed, evaluated and reported on.
- A description of the actions that will be taken to avoid impacts, or to mitigate unavoidable impacts of the project on threatened species and their habitat. This should include an assessment of the effectiveness and reliability of the measures and any residual impacts after these measures are implemented.

F. List of approvals and licences

- Identify all approvals and licences required under environment protection legislation including details of all scheduled activities, types of ancillary activities and types of discharges (to air, land, water)G. Compilation of mitigation measures

G. Compilation of mitigation measures

- Outline how the proposal and its environmental protection measures would be implemented and managed in an integrated manner so as to demonstrate that the proposal is capable of complying with statutory obligations under EPA licences or approvals (eg outline of an environmental management plan).
- The mitigation strategy should include the environmental management and cleaner production principles which would be followed when planning, designing, establishing and operating the proposal. It should include two sections, one setting out the program for managing the proposal and the other outlining the monitoring program with a feedback loop to the management program.

H. Justification for the Proposal

- Reasons should be included which justify undertaking the proposal in the manner proposed, having regard to the potential environmental impacts.

Department of Primary Industries
Office of Water

Contact Janne Grose
Phone 02 4729 8262
Fax 02 4729 8141
Email janne.grose@water.nsw.gov.au

Our ref ER21871
Your ref SSD-5267

Department of Planning and Infrastructure
GPO Box 39
SYDNEY NSW 2001

Attention: Christine Chapman

Dear Ms Chapman

SSD5267 – SKM Recycling, Penrith Glass Beneficiation, 126 Andrews Road, Penrith
Key Issues and Assessment Requirements

I refer to the email of 23 April 2012 to the NSW Office of Water's (Office of Water) requesting input into the environmental assessment requirements for the preparation of the Environmental Impact Statement (EIS) for the above development proposal.

The Office of Water has reviewed the Concepts Report and provides the following key issues to be addressed in the Environmental Impact Statement (EIS) including an expanded list of assessment requirements detailed in **Attachment A.**

Key issues to be addressed in the EIS for the proposal include:

- Compliance with the rules in any relevant Water Sharing Plan (WSP) and legislation.
- An assessment of the impact of the proposal on watercourses and riparian areas, SREP 20 wetlands, groundwater sources and groundwater dependent ecosystems
- Adequate mitigating and monitoring requirements to address impacts to surface water and groundwater sources and dependent ecosystems.

The Office of Water requests that all referrals from the Department of Planning and Infrastructure for this proposal include one (1) **hard copy** and one (1) **CD** copy of the EIS and any other accompanying documentation.

Should you require further information please contact Janne Grose, Planning and Assessment Coordinator on (02) 4729 8262 at the Penrith office.

Yours sincerely

Mark Mignanelli
Manager Major Projects, Mines and Assessment
9 May 2012

NSW Office of Water Environmental Assessment Requirements

SKM Recycling Penrith Glass Beneficiation

Relevant Legislation

The Environmental Impact Statement (EIS) should take into account the objects and regulatory requirements of the *Water Act 1912* and *Water Management Act 2000* (WMA 2000), as applicable. Proposals and management plans should be consistent with the Objects (s.3) and Water Management Principles (s.5) of the *WMA*.

Water Sharing Plans

The proposal is within the area covered by the *Water Sharing Plan for the Greater Metropolitan Region Unregulated River Water Sources* and the *Water Sharing Plan for the Greater Metropolitan Region Groundwater sources*. The WSP prepared under the provisions of the WMA 2000 establishes the rules for access to, and the sharing of water between the environmental needs of the surface or groundwater source and water users. The EIS needs to:

- Demonstrate how the proposal is consistent with the relevant rules of the WSP including rules for access licences, distance restrictions for water supply works and rules for the management of local impacts in respect of surface water and groundwater sources, ecosystem protection, water quality and surface-groundwater connectivity.
- Provide a description of any site water use (amount of water from each water source) and management including all sediment dams, clear water diversion structures with detail on the location, design specifications and storage capacities for all the existing and proposed water management structures.
- Provide an analysis of the proposed water supply arrangements against the rules for access licences and other applicable requirements of any relevant WSP.

The proposal needs to ensure it is consistent with the water sharing rules. The site is located within two groundwater sources, the Hawkesbury Alluvials Groundwater Source and the Sydney Basin Central Groundwater Source. In regard to surface water, the site is located in the Lower Nepean River management zone.

Refer to: *http://www.water.nsw.gov.au/Water-Management/Water-sharing/default.aspx* .

Relevant Policies

The EIS should take into account the following policies (as applicable):

- NSW State Rivers and Estuary Policy (1993);
- NSW State Groundwater Policy Framework Document (1997);
- NSW State Groundwater Quality Protection Policy (1998);
- NSW State Groundwater Dependent Ecosystems Policy (2002); and
- Office of Water Guidelines for Controlled Activities (2010/ 2011).

http://www.water.nsw.gov.au/Water-management/Law-and-policy/Key-policies/default.aspx

Licensing Considerations

Section 1.3 of the Concepts Report notes the use of water in the proposed development will be discussed in the EIS (page 9). The EIS is required to provide:

- Details of the water supply source(s) for the proposal including any proposed surface water and groundwater extraction and all water supply works to take water.
- Information on the purpose, location, construction and expected annual extraction volumes including details on all existing and proposed water supply works which take surface water, (pumps, dams, diversions, etc) and
- Details on all bores and excavations for the purpose of investigation, extraction, dewatering, testing and monitoring and an approval obtained from the Office of Water prior to their installation. All predicted groundwater take must be accounted for through adequate licensing

Water allocation account management rules, total daily extraction limits and rules governing environmental protection and access licence dealings also need to be considered.

Surface Water Assessment

SREP 20 wetland

Map 26 of Sydney Regional Environmental Plan No. 20 – Hawkesbury–Nepean River shows a SREP 20 wetland (wetland no. 158) is located adjacent to the southern boundary of the site and another (wetland no. 156) is located approximately 1.5 km north of the site. It is recommended the EIS provides details on the wetlands including:

- scaled plans showing the location of:
  - the wetland
  - remnant vegetation surrounding the wetland (identify any areas to be protected and any native vegetation proposed to be removed)
  - the footprint of the proposal in relation to the wetland
- photographs of the wetland
- an assessment of the potential impacts of the proposal on the wetland including the water quality of the wetland, the hydrologic regime/ natural flow regime and local drainage patterns and habitat.
- safeguard measures to mitigate impacts including the rehabilitation of the wetland and provision of buffers.

Riparian Land

It appears there may be a watercourse located on, or adjacent to the western side of the site which flows into the Waterside Green site on the northern side of Andrews Road. The EIS needs to provide details on where the water flows and how it connects to the Waterside Green site. The Office of Water has issued Controlled Activity Approvals for the Waterside Green site and required a minimum 20 m riparian setback be rehabilitated either side of the lakes systems. If a watercourse is located on, or near the site it is recommended the riparian setback requirements are consistent with the riparian setbacks at the Waterside Green site.

To ensure the sustainable and integrated management of surface water sources and protection of the nearby watercourse, riparian areas and *waterfront land*, as defined in the WMA 2000, an assessment of surface water sources must include but is not limited to the following:

- scaled plans showing the location of:
  - watercourses
  - riparian setbacks

- any remnant riparian vegetation surrounding the watercourses (identify any areas to be protected and any native vegetation proposed to be removed)
- the footprint of the proposal in relation to the watercourse and riparian areas
- APZ requirements

- photographs of the watercourses
- Geomorphic assessment of the watercourses including details of stream order (using the Strahler System), river style and energy regimes both in channel and on any adjacent floodplains;
- Detailed description of all potential environmental impacts in terms of channel stability, riparian areas, sediment movement, water quality and hydraulic regime;
- Description of the design features and measures to be incorporated into the proposal to guard against long term actual and potential environmental disturbances, particularly in respect of maintaining the natural hydrological regime and sediment movement patterns and the identification of riparian buffers;
- Details of the impact on water quality and remedial measures proposed to address any possible adverse effects.

Groundwater Assessment

The site is located in an area mapped as High groundwater vulnerability. To ensure the sustainable and integrated management of groundwater sources, the EIS needs to include adequate details to assess the impact of the project on all groundwater sources including:

- the predicted highest groundwater table at the site.
- any works likely to intercept, connect with or infiltrate the groundwater sources.
- any proposed groundwater extraction, including purpose, location and construction details of all proposed bores and expected annual extraction volumes.
- a description of the flow directions and rates and physical and chemical characteristics of the groundwater source.
- the predicted impacts of any final landform on the groundwater regime.
- the existing groundwater users within the area (including the environment), any potential impacts on these users and safeguard measures to mitigate impacts.
- an assessment of the quality of the groundwater for the local groundwater catchment
- an assessment of groundwater contamination (considering both the impacts of the proposal on groundwater contamination and the impacts of contamination on the proposal).
- how the proposed development will not potentially diminish the current quality of groundwater, both in the short and long term.
- measures for preventing groundwater pollution so that remediation is not required.
- protective measures for any groundwater dependent ecosystems (GDEs).
- proposed methods of the disposal of waste water and approval from the relevant authority.
- the results of any models or predictive tools used.

Where potential impact/s are identified the assessment will need to identify limits to the level of impact and contingency measures that would remediate, reduce or manage potential impacts to the existing groundwater resource and any dependent groundwater environment or water users, including information on:

- any proposed monitoring programs, including water levels and quality data
- reporting procedures for any monitoring program including mechanism for transfer of information.
- an assessment of any groundwater source/aquifer that may be sterilised from future use as a water supply as a consequence of the proposal.
- identification of any nominal thresholds as to the level of impact beyond which remedial measures or contingency plans would be initiated (this may entail water level triggers or a beneficial use category).
- description of the remedial measures or contingency plans proposed.
- any funding assurances covering the anticipated post development maintenance cost, for example on-going groundwater monitoring for the nominated period.

Groundwater Dependent Ecosystems

The SREP 20 wetlands in the vicinity of the site are likely to be groundwater dependent ecosystems. The EIS should provide details on the presence and distribution of Groundwater Dependent Ecosystems (GDEs) in the vicinity of the site and:

- demonstrate that the proposed development would maintain natural patterns of groundwater flow and not disrupt groundwater levels that are critical to GDEs;
- identify any potential impacts on GDEs as a result of the proposal including:
  - the effect of the proposal on the recharge to groundwater systems;
  - the potential to adversely affect the water quality of the underlying groundwater system and adjoining groundwater systems in hydraulic connections;
  - the effect on the function of GDEs (habitat, groundwater levels, connectivity); and
- provide safeguard measures for any GDEs.

GDEs are ecosystems which have their species composition and natural ecological processes wholly or partially determined by groundwater. GDEs represent a vital component of the natural environment and can vary in how they depend on groundwater, from having occasional or no apparent dependence through to being entirely dependent. GDEs occur across both the surface and subsurface landscapes ranging in area from a few metres to many kilometres. Surface and groundwaters are often interlinked and aquatic ecosystems may have a dependence on both.

End Attachment A
9 May 2012

PENRITH CITY COUNCIL
Serving Our Community

Our Reference:	IMS 3473776
Your reference:	SSD 5267
Contact:	Allison Cattell
Phone:	02 4732 7909

7 May 2012

Christine Chapman
Major Projects Assessment
NSW Department of Planning & Infrastructure
GPO BOX 39
SYDNEY NSW 2001

Dear Ms Chapman,

Review of Concepts Report for a Proposed Glass Benefaction Plant
126 Andrews Road Penrith NSW 2750

I refer to the "Concepts Report" referenced 115011_SSD_Concepts_Report_Rev1, prepared by Benbow Environmental, release date 12 April 2012, received by Council 23 April 2012 as amended 2 May 2012 in email correspondence.

Thank you for the opportunity to review and provide feedback on the proposed development by close of business on Monday 7 May 2012 as agreed in our phone conversation 4 May 2012.

The following comments are made for your relay to the applicant to address in the preparation of any Environmental Impact Assessment for the proposed use at the proposed site:

General site affectations

The property is identified as being partly bushfire prone land, subject to flood-related development controls and as having scenic and landscape values.

Planning policies

The following policies are relevant to the proposed development and are to be addressed in any application for development:

State planning policy

State Environmental Planning Policy No.33 – Hazardous and Offensive Development, Protection of the Environment Operations Act 1997, Roads Act 1993 and Rural Fires Act 1997 apply to the proposal and the requirements are to be addressed in any application for development.

Tel: (02) 4732 7777 • Fax: (02) 4732 7958 • Civic Centre, 601 High Street, Penrith NSW 2750
DX 8017, Penrith • PO Box 60, Penrith NSW 2751 • E-mail: pencit@penrithcity.nsw.gov.au

Regional planning policy

Sydney Regional Environmental Plan No.20 – Hawkesbury Nepean River applies to the site. Environmental considerations throughout the instrument will apply.

Local planning policy

The Penrith Local Environmental Plan 2010 applies to the site. The site is zoned IN1 (General Industrial). This policy contains aims and objectives for the zone and the plan, provisions relating to the development including, but not limited to, earthworks, salinity, flood planning and scenic & landscape values.

Draft Local planning policy

There is a planning proposal, "Amendments to Penrith Local Environmental Plan 2010 and draft Penrith Local Environmental Plan (Environmental Heritage Conservation) 2011" that applies to the subject land. Its gazettal is imminent.

Development Control Plans

Penrith Development Control Plan 2010 applies to the site. The most pertinent chapters to consider are C3 (Water management), C4 (Landscape management), C5 (Waste management), C6 (Landscape design), C10 (Transport, access and parking), C12 (Noise and vibration), D4 (Industrial development) and E4 (Waterside Corporate); the latter being relevant given its proximity to adjoining residential land.

Planning issues

The following comments have been provided following review of the "Concepts Report" by Council's Traffic Engineers, Environmental Officers and Environmental Planners:

Flooding and other engineering matters

You are advised to comply with Council's policies pertaining to water management and flood liable land as referred above as well as the State Government Floodplain Development Manual.

The following comments are provided from Council's Development Engineers:

a) The proposal must not have and adverse impact with regard to local and mainstream flooding; and
b) The location of the bunkers on the eastern side of the building are within the flood path and are unlikely to be supported;
c) The site is affected by mainstream flooding from the Nepean River;
d) The flood level for the site is 25.4m Australian Height Datum (AHD);
e) Please note the following:
    i. There is a current application from Stocklands for the development of Waterside Corporate which will require upgrades to Andrews Road;
    ii. Council currently holds a bond for access works at the front of this site within Council owned land;
f) The following comments relate to the conveyor belt system only. Although this is no longer part of this proposal, these comments are given to assist in any planning of the site in the future:

i. The future conveyer belt system must not impact on flooding (no details have been provided). The conveyor belt system would need to be raised for flooding but required supports may still have an unacceptable impact on flooding;
ii. If a conveyor belt is used it is likely to have aesthetic concerns especially where it is raised to accommodate flooding;
iii. It appears that a conveyer belt system would require legal rights to be created over two properties. Any application is to consider consolidation of the lots.

Traffic generation and car parking

You are advised to require a traffic report considering (but not limited to) the following issues:

a) Traffic generation potential including times and split proportion of vehicles and trucks;
b) Adequacy of proposed car parking for the proposed demand;
c) Requirement for trucks to enter and exit the site in a forward direction;
d) If Andrews road is not an existing B-Double Route then road improvements/ upgrades may be required (please confirm with RMS);
e) Subject to the above point, swept path allowance and queuing storage for B-Double vehicles on Andrews Road;
f) Requirement for traffic controls on Andrews Road and the access to the site;
g) Proximity of opposing driveways on Andrews Road and potential for conflict;
h) RMS consideration as this is a significant regional road corridor;
i) Adequate turnaround and parking provision for trucks and vehicles; and
j) Internal and external cycling and pedestrian movement assessment to ensure safety and connectivity and promote these two forms of transport to the site. In this regard shared pathway connectivity would be recommended.

The proposal must demonstrate no adverse traffic impacts on Andrews Road allowing for all required turning movements.

Noise and acoustic performance

The nearby residential estate of Waterside was planned to ensure existing nearby industrial land uses were not going to impact upon the residential use. The LEP and DCP that provides for Waterside set a threshold where development could not occur until compliance could be demonstrated, as modelled on industries in existence at the time. Therefore, the proposed development would need to demonstrate either:

a) The proposed use is not an additional noise source; or
b) Any proposed noise can be mitigated enough not to effect nearby residential development.

Any acoustic analysis is to address any noise sources including crushing, smashing, traffic, machinery operation including trucks and ventilation systems on a 24 hour basis to align with the proposed hours of operation. All noise sources are not to be assessed in isolation but rather modelled for their cumulative impact with other existing/planned industries (particularly those surrounding Andrews Road) as undertaken in previous noise modelling for the area.

You are advised that Benbow Environmental were the agreed consultants engaged to carry out an independent noise assessment of the impacts of the existing glass plant on the Waterside Estate.

It is noted the conveyor is no longer proposed as advised in email correspondence dated 2 May 2012.

Environmental

The EIS should adequately outline the likely impacts of the development and include details on all proposed mitigation measures including:

a) the likely impacts / mitigation strategies for Wetland 158 which is identified in SREP 20 (Wetland 158 is located to the rear of the site);
b) any impacts on the flora and fauna located on the site and surrounds. This should include a test of significance to satisfy the requirement of Section 5A of the Environmental Planning & Assessment Act 1979;
c) details on the impact on stormwater and how it will be managed both on and off site;
d) any odour proposed to be emitted as part of the proposed operations;
e) whether any new furnaces are proposed in either site.

Community consultation

Council is able to provide a list of adjoining property owners/occupiers and their postal addresses on your request to assist you to notify our community of the proposed development and the likely impacts.

Should you have any further queries, please contact me on 02 4732 7909.

Yours faithfully,

Allison Cattell
Senior Environmental Planner
Development Services Department

Your Reference:	SSD5267
Our Reference:	SYD12/00550
Contact:	Dianne Rees
Telephone	8849 2237

NSW GOVERNMENT | Transport Roads & Maritime Services

The Director
Mining and Industry Projects
Department of Planning
GPO Box 39
SYDNEY NSW 2001

Attention: Kerry Hamann

**SKM RECYCLING – PENRITH GLASS BENEFICIATION PLANT
STATE SIGNIFICANT DEVELOPMENT – DIRECTOR GENERAL'S REQUIREMENTS. SSD5267**

Dear Sir/Madam

I refer to your letter of 23 March 2012 requesting Roads and Maritime Services (RMS) to provide details of key issues and assessment requirements regarding the abovementioned development for inclusion in the Director General's Environmental Assessment (EA) requirements.

RMS would like the following issues to be included in the transport and traffic impact assessment of the proposed development:

1. It is noted that the Metropolitan Strategy has designated Penrith as a Regional City and a major focal point for regional transport connections and jobs growth. It is important that the infrastructure, landscaping and subdivision works takes into consideration, and contributes to the achievement of, transport objectives contained in this and other high-level NSW Government strategies.

   These strategies include the NSW State Plan and draft Northwest Subregional Strategy. These policies share the aims of increasing the use of walking, cycling and public transport; appropriately co-locating new urban development with existing and improved transport services; and improving the efficiency of the road network.

   By addressing both the supply of transport services and measures to manage demand for car use, the EA report should demonstrate how users of the proposed infrastructure, landscaping and subdivision works, will be able to make travel choices that support the achievement of relevant State Plan targets.

2. Daily and peak traffic movements likely to be generated by the proposed development including the impact on nearby intersections and the need/associated funding for upgrading or road improvement works (if required).

The key intersections to be examined/modelled include but not limited to:

- Andrews Road and The Northern Road/Richmond Road intersection;
- Andrews Road and Laycock Street;
- Andrews Road and Castlereagh Road.

3. Details of the proposed accesses and the parking provisions associated with the proposed development including compliance with the requirements of the relevant Australian Standards (ie: turning paths, sight distance requirements, aisle widths, etc).

4. Proposed number of car parking spaces and compliance with the appropriate parking codes.

5. Details of service vehicle movements (including vehicle type and likely arrival and departure times).

6. RMS requires the EA report to assess the implications of the proposed development for non-car travel modes (including public transport use, walking and cycling); the potential for implementing a location-specific sustainable travel plan (eg 'Travelsmart' or other travel behaviour change initiative); and the provision of facilities to increase the non-car mode share for travel to and from the site. This will entail an assessment of the accessibility of the development site by public transport.

7. RMS requires an assessment of the likely toxicity levels of loads transported on arterial and local roads to/from the site and, consequently, the preparation of an incident management strategy for crashes involving such loads, if relevant.

8. RMS will require in due course the provision of a traffic management plan for all demolition/construction activities, detailing vehicle routes, number of trucks, hours of operation, access arrangements and traffic control measures.

Further enquiries on this matter can be directed to Dianne Rees on phone 8849 2237 or facsimile 8849 2918.

Yours faithfully

O. Hodgson

Owen Hodgson
Senior Land Use Planner
Transport Planning, Sydney Region

8 May 2012

CONCEPTS REPORT FOR
PROPOSED STATE SIGNIFICANT DEVELOPMENT
GLASS RECOVERY SERVICE
126 ANDREWS ROAD, PENRITH

Prepared for: Glass Recovery Service
Minister for Planning & Infrastructure

Prepared by: Duke Ismael, Team Leader (Air Group)
Linda Zanotto, Senior Environmental Engineer
R T Benbow, Principal Consultant
BENBOW ENVIRONMENTAL

Report No: 115011_SSD_Concepts_Report_Rev3
May 2012
(Released: 2 May 2012)

Benbow
ENVIRONMENTAL

Engineering a Sustainable Future for Our Environment

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1. INTRODUCTION

The purpose of this document is to provide information to assist Regulatory Authorities with the scope of the studies required for an Environmental Impact Statement (EIS) in relation to the proposed state significant development.

Previous discussions with the Department of Planning and Infrastructure has indicated that the proposed development constitutes state significant development under State Environmental Planning Policy (State and Regional Development) 2011. Under Schedule 1 of this SEPP, Clause 23(2) the following development is state significant:

> *Development for the purposes of waste or resource transfer stations in metropolitan areas of the Sydney region that handle more than 100,000 tonnes per year of waste.*

Based on information provided by the proponent, the proposed development falls under the above definition. The following report provides preliminary information regarding the proposal to for the purposes of obtaining the Director-General requirements.

1.1 DESCRIPTION OF THE DEVELOPMENT

The proposed development would be located at 126 Andrews Road, Penrith, and is described by Lot 1, DP 747153.

The industrial building has been compartmentalised along its north-south direction using a fire rated wall. The building has internal store rooms along the eastern outside wall. Access doorways are along the two sides and rear. In the corner of the rear yard area is a shed. This has previously been used to store dangerous goods.

The proposed development shall involve the following:

- Conversion of an existing building on site into a glass beneficiation plant.
- Processing of used glass into “cullet”.

The glass beneficiation plant would initially have a capacity of 105,000 tonne per annum and would be increased in a later stage to 150,000 tonnes of cullet processed.

The capital investment value of the proposed development is approximately $10 Million. The cost of the land and existing building is approximately $7M, the cost of the installation of processing equipment and associated works would be approximately $3M.

Number of employees would typically be 25-40.

The construction phase of the development, being the installation of the glass processing equipment, structural steel requirements including site welding and erection, minor building works, external bunkers, stormwater works and landscaping would be undertaken by contractors. It is estimated that the construction works would create 20-25 jobs.

The development would house the glass beneficiation processing plant within the existing building.

The incoming glass for recycling would be received by truck and stored inside the building. The glass recycling process involves crushing used glass products and removing impurities to produce "cullet". Cullet is crushed glass that is ready to be re-melted. The colour separated and crushed cullet would be stored external to the building in a set of aboveground bunkers. The cullet would be transported to the adjoining glass bottling plant, Owens Illinois using trucks travelling the short distance along Andrews Road between the two sites.

There is a contractual arrangement between Glass Recovery Service and Owens Illinois for the supply of colour separated cullet. Owens Illinois would use this cullet in place of raw materials.

The proposed glass beneficiation plant is able to colour separate and process glass bottles to a significantly higher quality than other glass bottle recycling plants in NSW. Higher recovery rates are achieved using world's best practice processes.

The proponent operates a similar plant in Melbourne.

The general location of the site is shown on Figure 1-2. A diagrammatic representation of the landholding is shown in Figure 1-3. The area bordered as the site on this Figure is the area investigated.

A site plan is also shown as Figure 1-4 and the land use plan from Penrith City Council is presented as Figure 1-5.

1.1.1 Process Description

1.1.1.1 Glass Beneficiation

Glass bottles are brought to the site using a variety of truck types including B doubles. The preferred transport routes have been discussed with Penrith City Council.

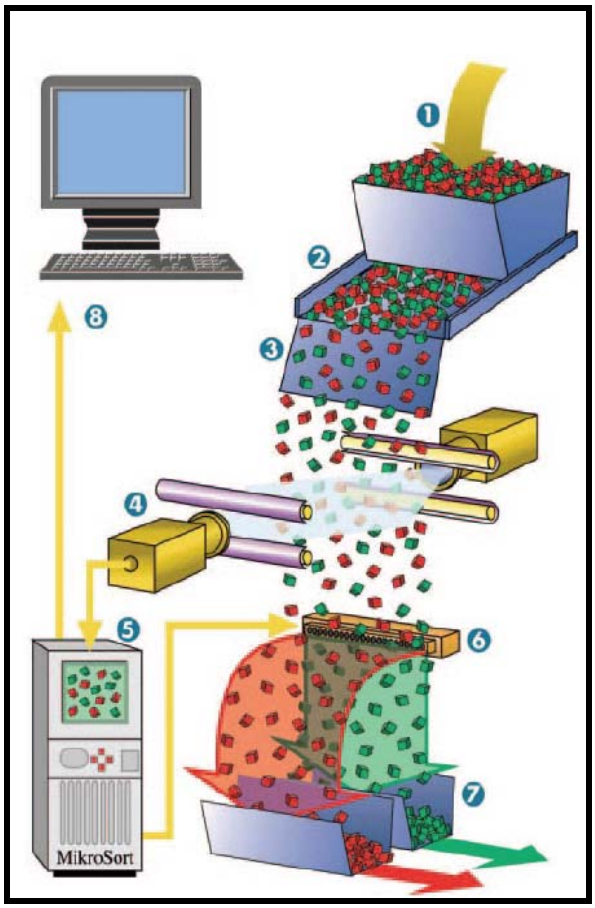
The trucks will pass over a weigh bridge, two weighbridges exist on the western side of the building on site. The trucks will then travel to the rear of the building and enter into the building, unloading the bottles into ground level hoppers.

The glass bottles are processed to achieve the following:

- Separation by colour; and
- Size reduced down to what has the appearance of coarse sand. Figure 1-1 is a diagrammatical representation of the sorting of crushed collected glass.

This is described as cullet. The cullet would then be transferred from finished product hoppers inside the plant to the external bunkers using mobile equipment. Trucks would be loaded by mobile equipment and the cullet transported across to the Owens Illinois plant and reused in the production of glass bottles.

Figure 1-1: Sorting of Crushed Collected Glass



Source: "Glass Recycling with Mogensen Sorting and Screening Systems (2005)

Figure 1-1 is a schematic of the crushed collected glass sorting process. The crushed collected glass is fed into the machine on an integrated vibrating conveyor (1) and flows onto an inclined glass chute (2). The glass then passes a line camera (3) with colour image processing that classifies the glass by true colour. Signal processor technology (4) allows the processing of 30 million measuring points. An all metal detector (5) enables detection of unwanted ferrous and non-ferrous metals.

Particles are separated by means of compressed air impulses and the pass stream (6) and reject stream (7) are discharged separately. (Mogensen Sorting and Screening Systems, 2005)

Figure 1-2: Site Location



Figure 1-3: Area Map



Source: Six Viewer ©

Figure 1-4: Site Layout

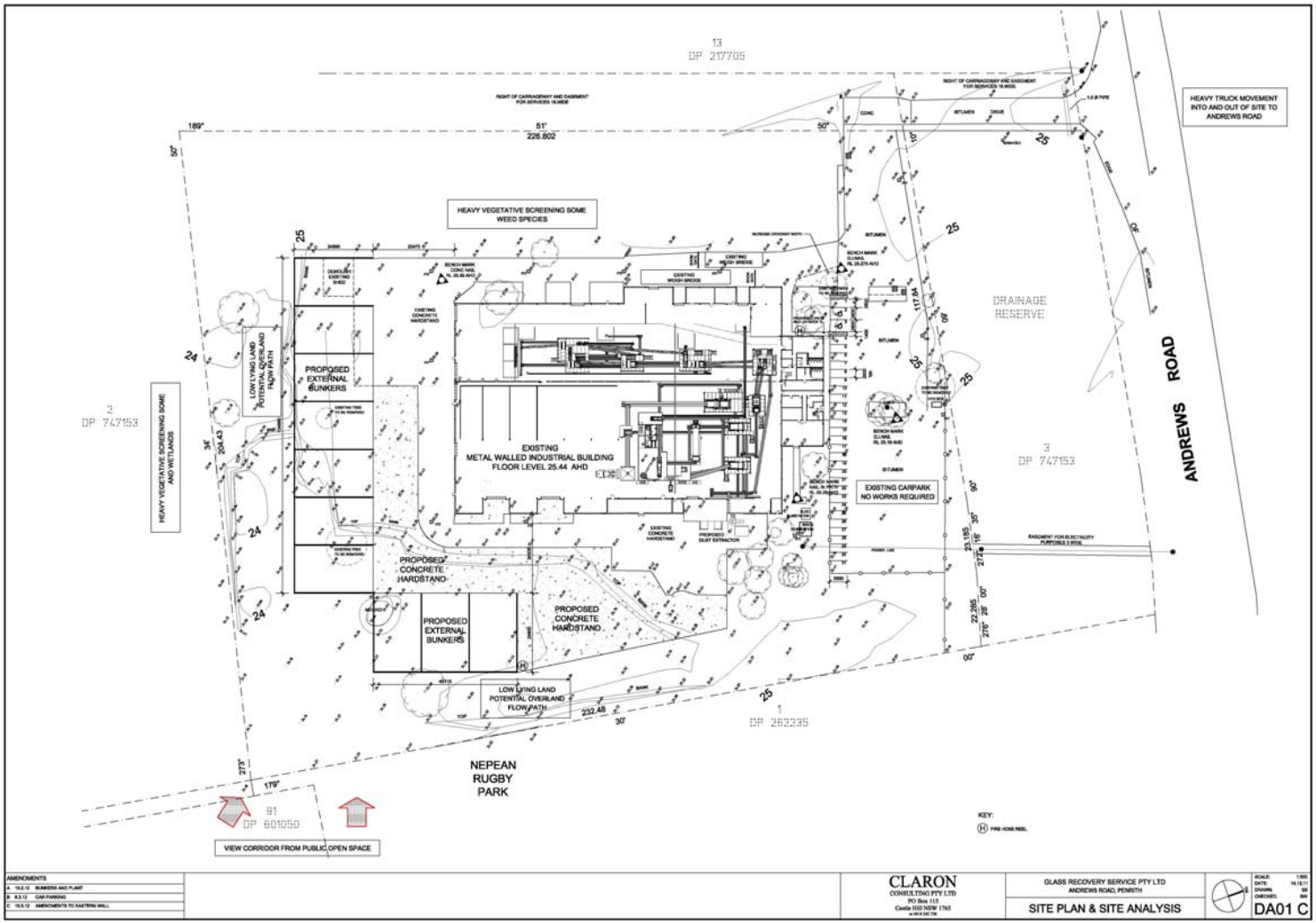
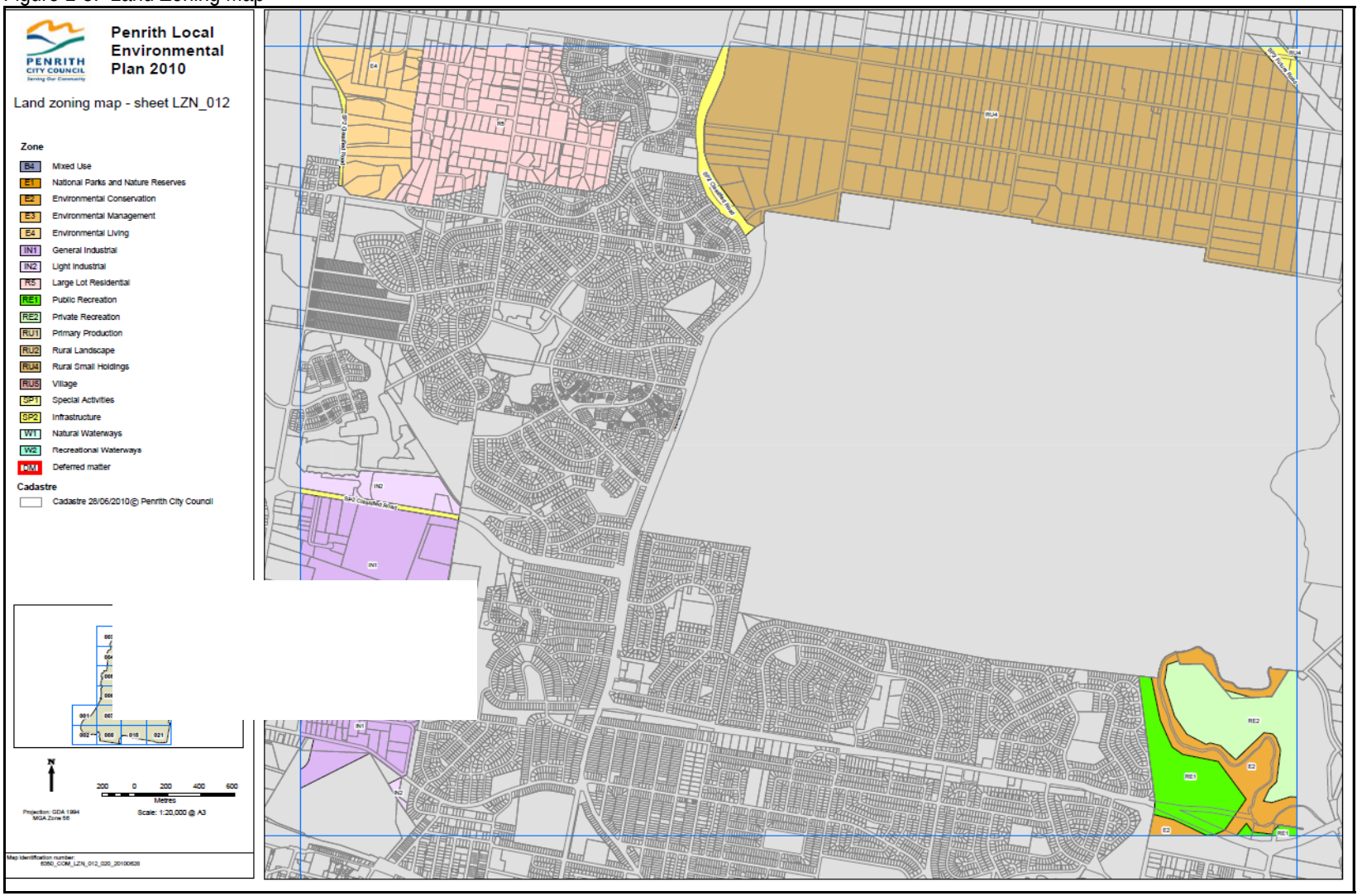


Figure 1-5: Land Zoning Map



1.2 STATUTORY CONTROLS

1.2.1 Environmental Planning & Assessment Act, 1979 – State Significant Development

The proposed development constitutes state significant development under Clause 89C(2) of the *Environmental Planning and Assessment Act, 1979*.

1.2.2 Protection of the Environment Operations Act 1997

The site would need to hold an Environment Protection Licence for the scheduled activities.

1.2.3 Development Control Plans

Development control plans that would apply would be the Penrith City Council and the proposed development would satisfy the requirements of the relevant sections of the DCP documents.

1.2.4 State Environmental Planning Policy Guidelines

The proposed development is classified as State Significant Development under Clause 23(2) of Schedule 1 of the State Environmental Planning Policy (State and Regional Development) 2011. The clause states that "*development for the purpose of waste or resource transfer stations in metropolitan areas of the Sydney region that handle more than 100,000 tonnes per year of waste*" is considered state significant.

There would be no amount of chemicals and dangerous goods on site as a result of the proposed development and would not trigger the thresholds listed in SEPP 33 – Hazardous and Offensive Development.

The proposed development would involve construction or excavation works and would be assessable under SEPP 55 – Remediation of Land.

1.3 DESCRIPTION OF THE AREA

A location plan (Figure 1-2) and an aerial view (Figure 1-3) show the general nature of the surrounding lands.

The site is flat and the developed area has been filled to elevate it slightly above the surrounding land form. The site has a single access on the western side of the site with a double width driveway.

The car parking is provided at the front of the site, the car park is sealed as are all trafficked areas.

The site has rear access along the western side of the large stand alone industrial building. There are two weighbridges at the north western corner of the site adjacent to the building. At the rear of the site is a relatively large concreted and asphalted yard area, ideally suited for truck manoeuvring.

A roadway continues partially around the eastern side of the site stopping at the front of the industrial building.

Offices are built over two levels.

The electrical substation is adjacent to the north east corner of the site. It was free of any visible staining.

The current LEP is shown as Figure 1-5. This shows the land to the rear of the site as being General Industrial IA.

It shows no easements for the surface water overland flow which indicates the land could be further developed and this is being discussed with Penrith City Council.

Opposite the site to the north the land is undeveloped and will be used for commercial and light industrial use. Further to the north is suburban land that is slightly elevated to the site. Other residential areas are more distant to the east and south east.

The site is located on the southern side of Andrews Road in an industrial area. To the north will be future industrial/commercial premises and further north is a new residential estate developed by Stockland Holdings.

To the east is a sport and recreational area and the residential areas.

The overland water flow occurs along its eastern side. This water flow drains the flat land to the south of the site. There would be no disturbance of this land and no construction activities required in this flow path. Bunkers to hold the crushed glass would be erected and discussions with officers of Penrith City Council have been fruitful in developing a satisfactory solution to preventing flood waters from reaching these bunkers.

Potential effects to the nearest catchment, stormwater run-off and the use of water in the proposed development would be discussed in the EIS.

1.4 HOURS OF OPERATION

The site would seek approval to operate 24 hours a day and 7 days per week.

Transport activities would be assessed as to acceptable hours of operation based on the routes to be used. A detailed traffic noise assessment would be conducted.

2. REASONS FOR SELECTING THIS SITE

This site has been selected for several reasons:

- Adjacent to the glass plant.
- The site has ample room available to cater for the proposed operation.
- The site is located in a well established industrial area with adequate services.
- The site is not in a sensitive land use area.
- The development is a permitted use with consent.
- The development is a beneficial use as it would minimise the distance and amount of traffic movements required when compared to having to establish the site elsewhere. This would minimise transport costs and would achieve the principles of ecologically sustainable development (which is to be encouraged).
- The development will generate additional local employment.
- The development supports the principles of ecologically sustainable development as the conversion of glass bottles into colour separated cullet will provide the adjacent glass bottle plant with energy savings as well as reduced use of raw materials.

2.1 POTENTIAL ENVIRONMENTAL IMPACTS

The proposed operations would have the potential to generate the following environmental impacts:

- Noise - site generated and road transport;
- Air - particulates;
- Stormwater run-off;
- Energy;
- Traffic;
- Waste;
- Ecological Sustainable Development (ESD);
- Visual; and
- Fire Safety.

The proposed development would be measured against the principles of ESD and the energy efficiency of the types of processes to be adopted would be examined. The proposed processes would be benchmarked against the world's best practice.

The EIS would include a summary of environmental safeguards and a statement of commitments signed by the Directors.

3. CONSULTATION

A project of this type requires a detailed consultation programme with the various stakeholders:

- Nearest Identified Residents to the Site;
- Stockland Holdings;
- Adjoining Industrial Premises;
- Penrith City Council;
- Adjacent Rugby Union Club;
- NSW EPA;
- Service Providers;
- Roads and Traffic Authority, NSW (RTA); and
- NSW Office of Water.

4. CONCLUDING REMARKS

The proposed development has been described in the previous sections.

Benbow Environmental would like to seek for the Director General's requirements applicable to the described proposed development.

This concludes the concepts report.

Prepared by:



Duke Ismael
Team Leader (Air Group)



Linda Zanotto
Senior Environmental Engineer



R T Benbow
Principal Consultant

5. LIMITATIONS

Our services for this project are carried out in accordance with our current professional standards for site assessment investigations. No guarantees are either expressed or implied.

This report has been prepared solely for the use by Glass Recovery Service as per our agreement for providing environmental assessment services. Although all due care has been taken in the preparation of this study, no warranty is given, nor liability accepted (except that required by law) in relation to the information contained within this document.

Opinions and judgements expressed herein, which are based on our understanding and interpretation of current regulatory standards, should not be construed as legal opinions.

Our Ref: X11354.W

Brent Winning
Principal Consultant
Claron Consulting
PO Box 115
Castle Hill, NSW 1765

10 December 2012

Attention: Mr Brent Winning

Dear Brent,

RE: Pavement Extensions 126 Andrews Road Penrith, Flood Storage

Introduction

Glass Recovery Services Pty Ltd proposes to redevelop the existing industrial site at 126 Andrews Road Penrith. The redevelopment will include the extension of concrete hardstanding areas and construction of bunkers for the storage of crushed glass.

Development Site

The site is legally described as LOT 1 DP 747153, is approximately 4.2ha in area and is on the fringe of the 100 year flood zone. The 100 year flood from the Nepean River has been modelled by Penrith City Council and in the site location has an expected water surface level of RL 25.4m AHD. See the enclosed flood level enquiry letters from Penrith City Council.

The site has access to Andrews Road via a right of carriageway over a drainage reserve which runs between the sites northern boundary and Andrews Road.

To the west of the site is an established industrial site, with a category 2, unnamed water course running along this boundary which appears to straddle the boundary, to the east of the site is the Nepean Rugby Park and to the south a classified wetland.

Major Drainage Network

The area to the north, west and south of the site is very flat, with no dominant direction of fall and a large amount of storage in areas such as the ponds in parts of suburb of Cranebrook. Due to the flat nature of the area and distance from the Nepean River the area is considered to be flood plain rather than part of the rivers floodway.

The unnamed watercourse on the sites western boundary is believed to have flows coming from two directions. The first is from catchment areas on the northern side of Andrews Road which drain across

Andrews Road, then eastward along the southern side of the road before turning southward and down the unnamed watercourse. The second source of flows are from the east of the site drain through the drainage reserve on the northern boundary of the site before meeting with the flows from the north and turning southward down the unnamed watercourse.

The unnamed watercourse discharges to the wetland on the sites southern boundary which in turn discharges southwards toward Boundary Creek and ultimately the Nepean River.

Proposed Development

It is proposed to extend the concrete hardstand areas and construct concrete base slabs for the future storage bunkers at the rear of the site. To provide this additional area the site will require filling of land below the 25.4m 100 year flood level and loss of flood plain storage for the 100 year flood. This filling work is proposed for the southern and eastern areas of the site, which mainly provide floodplain storage. Most of the floodplain conveyance is provided in the western or northern areas that border the overland flow paths of the unnamed watercourse and drainage reserve.

It is important to note that due to the location of the works they are not in the floodway of either the 100 year flood in the Nepean River or of the adjacent unnamed watercourse and will not impact flood carrying capacity or increase flood velocity or distribution.

The proposed filling below the 25.4m 100 year flood level will be carried out with material won from areas of the site below the 100 year flood level. To maintain the flood storage of the site it is proposed to widen the channel along the eastern boundary as part of Stage 1. The widening of the channel will require the removal of several large, mature trees that screen the site from the adjacent open space. It is also proposed to remove the uncontrolled fill that had been placed along the southern part of the site. This is the area between the proposed bunkers and the wetland area.

A detailed surveyed of the site has been carried out, see the enclosed survey plan. Earthworks calculations have been carried out using the software package 12D, see the enclosed sketch plan showing proposed levels and drainage of the additional impervious areas.

Future Works

It is understood that the council holds a bond for upgrade works to the drainage reserve on the sites northern boundary, which entail the addition of large box culverts under the existing site access. It is proposed that these works will be undertaken as part of Stage 2.

It is important that in addition to the culvert works the capacity of the remainder of the drainage reserve is assessed as, by inspection, the reserve has limited capacity. If the reserve is unable to carry the require flood flows, flood waters could be diverted through the development site in order to reach the wetland area in the south increasing flood risk to the buildings on site.

As stated above, the works associated with the upgrade of the access with box culverts will create additional flood plain storage for the 100 year flood as it will require excavation below RL 25.4m AHD. Should the drainage reserve require excavation to ensure it has sufficient capacity these works will add further flood storage above the minimum volume to balance storage of flood waters pre and post development.

Conclusion

Given that the location of the proposed works is not in the floodway, there will be no reduction in the flood carrying capacity. There will also be no impact on the riparian zone of the unnamed watercourse due to the works.

Earthworks below the 100 year flood level due to the extension of hardstand and bunker construction will be balanced to maintain flood storage volumes.

Further investigation and upgrade works are required in the drainage reserve to the north of the site to ensure it has flood carrying capacity. These upgrade works will add to the available flood plain storage and ensure flood free access across the drainage reserve to Andrews Road.

Yours sincerely
Brown Consulting (NSW) Pty Ltd



Robert Peterson
Manager - Water and Environment

Encl.
Survey Plan
Earthworks and proposed grading plan
Storage Volumes – pre and post development

NOTES

1. Bearings and distances are by Title and/or Deed only. This detail survey is not a "survey" as defined by the Surveyors Act,1929. If any construction is planned it would be advisable to carry out further survey work to determine the boundary dimensions.
2. Relationship of improvements to boundaries is diagrammatic only. Where offsets are critical they should be confirmed by further survey.
3. Contours shown depict the topography , except at spot levels shown they do not represent the exact level at any particular point.
4. Services shown hereon have been determined from visual evidence only. Prior to any demolition ,excavation or construction on the site the relevant authority should be contacted to establish detailed location and depth.
5. Australian Height Datum was established from PM 20631 RL 26.514
6. Tree locations are accurate to +/- 0.30m
7. The information is only to be used at a scale accuracy of 1:200.

NOTES

1 - —W— DENOTES EXTENT OF WETLAND AREA AS DEFINED BY SUE HOBLEY FROM BIO DESIGN AND ASSOCIATES PTY LTD ON 5-10-12

2 - THIS PLAN INCORPORATES INFORMATION IN PLAN PREPARED BY TEERMAN NEWTON RICHMOND P/L DRAWING No. 14914 DATED 30/11/2004 & SHOULD BE READ IN CONJUNCTION WITH THIS PLAN.

Notes:-

The levels and details on this plan have been determined by stadia methods and are within the general accepted accuracies for such surveys. All set out levels must be referred to the bench mark

Bearings and Distances are by title plan only and are subject to Final Survey. Except where shown by dimension, the relationship of improvements to boundaries is diagrammatic only. The true positions are subject to Final Survey.

Tree sizes are estimates and indicative only.

Services and utilities shown have been located by physical evidence and/or by reference to service plans from the relevant authorities. Pits may not have been opened to verify the type of utility. Excavation has not been carried out to confirm underground location. Service details should be confirmed with the relevant service authority during design and prior to commencement of construction.

As part of your duty of care, please contact the following where necessary :-

AGL Gas Company	Ph. 131245
Dial Before You Dig	Ph. 1100
Energy Australia	Ph. 131535
Integral Energy	Ph. 131081
Optus Communications	Ph. 1800 505 777
Sydney Water	Ph. 132092
Telstra Corporation	Ph. 132203

This plan has been prepared for the exclusive use of the client as listed in the title block.

Any construction on or near the boundaries will require further survey so that marks defining boundaries can be placed.

All set out levels must be referred to the bench mark.

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These notes must not be erased.

www.dialbeforeyoudig.com.au DIAL 1100 BEFORE YOU DIG

189°

RIGHT OF CARRIAGEWAY AND EASEMENT FOR SERVICES 18.WIDE

51'

226.802

50"

13 DP 217705

RIGHT OF CARRIAGEWAY AND EASEMENT FOR SERVICES 18.WIDE

50"

FENCE

204.43

BENCH MARK CONC NAIL RL 25.35 AHD

SHED

BENCH MARK G.I.NAIL RL 25.275 AHD

WEIGH BRIDGE

CONC

BITUMEN

DRIVE

10"

1.0 Ø PIPE

MANHOLE

EDGE

OF

BITUMEN

WETLAND AREA

TOP

BANK

CONCRETE

AWNING

PIT

BITUMEN

117.84

60

DRAINAGE RESERVE

METAL WALLED INDUSTRIAL BUILDING
FLOOR LEVEL 25.44 AHD

BNK

TOP

BANK

WIRE

GRASSED AREA

MOUND

LIGHT

HYD BOX

BENCH MARK G.I.NAIL RL 25.19 AHD

BENCH MARK NAIL IN PATH RL 25.29 AHD

ELEC SUBSTATION

BRICK SUBSTATION

FCE

CYCLONE

POWER LINE

EASEMENT FOR ELECTRICITY PURPOSES 3 WIDE

3 DP 747153

ANDREWS ROAD

90°

35"

23.185

272° 16'

276° 28' 00"

22.285

273°

179°

232.48

30'

CYCLONE

WIRE

FENCE

00"

91 DP 601050

NEPEAN RUGBY PARK

1 DP 2622235

LEGEND

= WATER METER	= BENCH MARK	= SEWER INSPECTION POINT
= TELSTRA PIT	= GAS METER	= STOP VALVE
= SIGN	= SEWER MAN HOLE	= ELECTRICITY BOX
= SEWER VENT	= FENCE LINE	= TREE
= POWER POLE	= HYDRANT	

REDUCTION RATIO				
PLAN 1:500 @A1 1:1000 @A3				
DATUM A.H.D.	DESIGN D.J.H.	CHECKED D.J.H		
SURVEY R.K.	TRACED R.K.	DATE 05-10-2012		

0 10 20 30 40 50

1 : 1000 @ A3 1 : 500 @ A1

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Telephone: 02 8808 5000 Facsimile: 02 8808 5099

Sydney Canberra Brisbane Melbourne Singapore

CLIENT :

GLASS RECOVERY SERVICE PTY LTD

DETAIL AND CONTOUR SURVEY
OVER LOT 1 DP 747153
No. 126 ANDREWS ROAD
PENRITH

ISSUE	DESCRIPTION	DATE
0	ORIGINAL ISSUE	05-10-2012

DRAWING. No. X11354-S2 AMEND. 0

SHEET 1 OF 1 SHEETS

Saved: 11.10.2012, By: ryan kelly
H:\X11\X11354 - 126 Andrews Rd Penrith\Survey\Drawings\X11354-S2.dwg

126 ANDREWS ROAD PENRITH

EARTHWORKS AND FLOOD VOLUMES

DA



LOCALITY PLAN
N.T.S.

CLARON CONSULTING PTY LTD

BROWN
Smart Consulting

DRAWING LIST

GENERAL		
000	COVER SHEET	
001	GENERAL LAYOUT PLAN	
SITE REGRADING		
101	EARTHWORKS AND DRAINAGE PLAN SHEET 1 OF 2	
102	EARTHWORKS AND DRAINAGE PLAN SHEET 2 OF 2	
103	SECTIONS	
SEDIMENT & EROSION CONTROL		
201	EROSION AND SEDIMENT CONTROL PLAN AND DETAILS	

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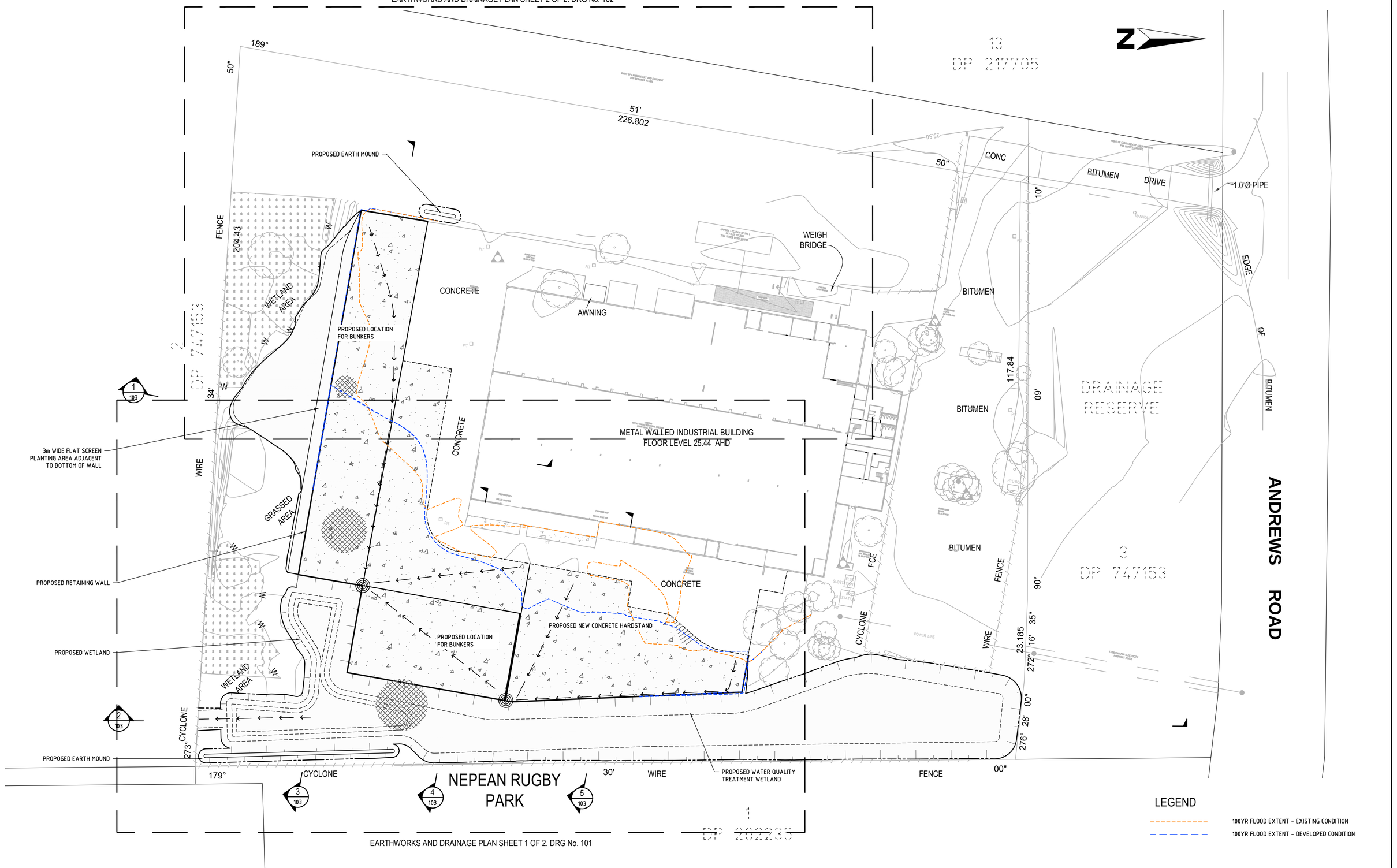
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Member Firm

126 ANDREWS ROAD PENRITH
EARTHWORKS AND FLOOD VOLUMES

Project No.:	Stage:	Milestone:	Drawing No.:	Revision:
X11354.W		DA	000	02

FILE: H:\X11\X11354.W - ANDREWS ROAD PENRITH\WATER\DRAWINGS\WATER\X11354.W_CC_000.DWG PRINTED: 12/11/21 USER: BRENDAN HILL

EARTHWORKS AND DRAINAGE PLAN SHEET 2 OF 2. DRG No. 102



EARTHWORKS AND DRAINAGE PLAN SHEET 1 OF 2. DRG No. 101

DEVELOPMENT APPLICATION

Revisions							
	01		KL	TE	RP	01/08/12	FOR DA - BUNKERS REMOVED
	02	KL	BJH	RP	RP	10/12/2012	DESIGN REVISED
First Issue		KL/PW	RJ/KL	RP	RP	26/04/12	Revision Details
		Drawn	Design	Check	Appd.	Date	

0 5 10 15 20 25 30 35 40 45 50
SCALE 1:500 (A1) SCALE 1:1000 (A3)

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Approval:
BY: ROBERT PETERSON
BE Grad Dip (Env) MIEAust
SIGN:
DATE:

Client: CLARON CONSULTING PTY LTD

Project: 126 ANDREWS ROAD PENRITH
EARTHWORKS AND FLOOD VOLUMES

BROWN Smart Consulting

Drawing Title: GENERAL LAYOUT PLAN

Project No.:	Stage:	Milestone:	Dwg No.:	Revision:
X11354.W		DA	001	02

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GRADE FROM 3m FLAT ZONE TO EDGE OF EXISTING WETLAND TO APPROX RL 24

CONSTRUCT RETAINING WALL ADJACENT TO BACK OF NEW BUNKER SLAB

CONSTRUCT 3m WIDE FLAT ZONE ADJACENT TO BOTTOM OF RETAINING WALL WITH PLANTED TREES AND SHRUBS FOR SCREENING AT RL 24.3

G.P.T.

WATER QUALITY WETLAND IL 23.6

SWALE TO DRAIN WETLAND E.D.D TAILOUT AT 0% SLOPE UNTIL SWALE INVERT MATCHES EXISTING GROUND LEVEL

MATCH SMOOTHLY TO EXISTING CONCRETE SLAB

PIT

PIT

1 IN 3 MAX

24.50

24.00

25.00

25.50

CONSTRUCT EARTH MOUND WITH PLANTED TREES AND SHRUBS FOR SCREENING

CONSTRUCT CONCRETE BASE SLAB FOR BUNKERS.

G.P.T.

WATER QUALITY WETLAND IL 23.6

SAWCUT EXISTING CONCRETE HARDSTAND TO THIS LINE

BREAK UP EXISTING CONCRETE & PREPARE SURFACE FOR NEW HARDSTAND

LEGEND

- EXISTING TREE TO BE REMOVED
- EXISTING CONTOUR (24)
- DESIGN CONTOUR (25.0)
- TOP OF BANK
- BOTTOM OF BANK

DEVELOPMENT APPLICATION

Revisions							
01		KL	TE	RP	01/08/12	FOR DA - BUNKERS REMOVED
02	KL	BJH	RP	RP	10/12/2012	DESIGN REVISED
First Issue	KL/PW Drawn	RJ/KL Design	RP Check	RP Appd.	26/04/12 Date	Revision Details

0 2.5 5 7.5 10 12.5 15 17.5 20 22.5 25

SCALE 1:250 (A1) SCALE 1:500 (A3)

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SIGN:
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Client:
CLARON CONSULTING PTY LTD

Project:
126 ANDREWS ROAD PENRITH
EARTHWORKS AND FLOOD VOLUMES

BROWN Smart Consulting

Drawing Title:
EARTHWORKS AND DRAINAGE PLAN
SHEET 1 OF 2

Project No.:	Stage:	Milestone:	Dwg No.:	Revision:
X11354.W		DA	101	02

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LEGEND

EXISTING TREE TO BE REMOVED

EXISTING CONTOUR

DESIGN CONTOUR

TOP OF BANK

BOTTOM OF BANK

CONSTRUCT EARTH MOUND WITH PLANTED TREES AND SHRUBS FOR SCREENING

GRADE AT 1:3 MAX FROM EXISTING SURFACE AT RETURN OF RETAINING WALL TO RL 24.3

CONSTRUCT RETAINING WALL AT BACK OF NEW BUNKER SLAB

CONSTRUCT 3m WIDE FLAT ZONE ADJACENT TO BOTTOM OF RETAINING WALL WITH PLANTED TREES AND SHRUBS FOR SCREENING AT RL 24.3

CONSTRUCT RETAINING WALL AT BACK OF NEW BUNKER SLAB

GRADE FROM 3m FLAT EMBANKMENT TO EDGE OF EXISTING WETLAND AT APPROX RL 24

MATCH NEW CONCRETE SLAB TO EXISTING SLAB

25.50

PIT

PIT

PIT

PIT

PIT

DEVELOPMENT APPLICATION

Revisions							
01		KL	TE	RP	01/08/12	FOR DA - BUNKERS REMOVED
02	KL	BJH	RP	RP	10/12/2012	DESIGN REVISED
First Issue	KL/PW Drawn	RJ/KL Design	RP Check	RP Appd.	26/04/12 Date	Revision Details

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SCALE 1:250 (A1) SCALE 1:500 (A3)

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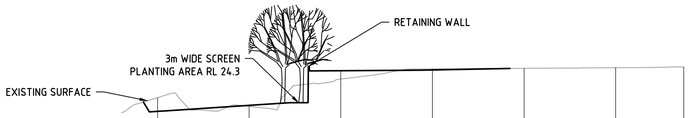
Project:
126 ANDREWS ROAD PENRITH
EARTHWORKS AND FLOOD VOLUMES

BROWN Smart Consulting

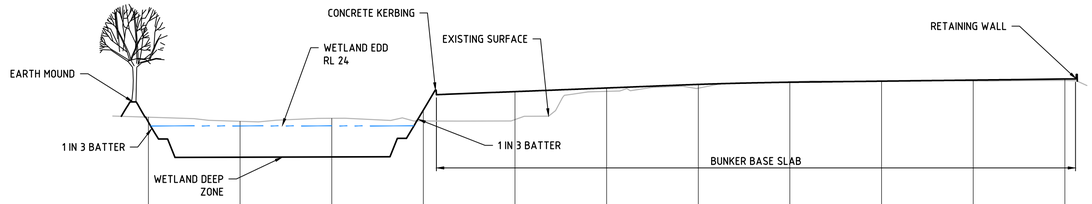
Drawing Title:
EARTHWORKS AND DRAINAGE PLAN
SHEET 2 OF 2

Project No.:	Stage:	Milestone:	Dwg No.:	Revision:
X11354.W		DA	102	02

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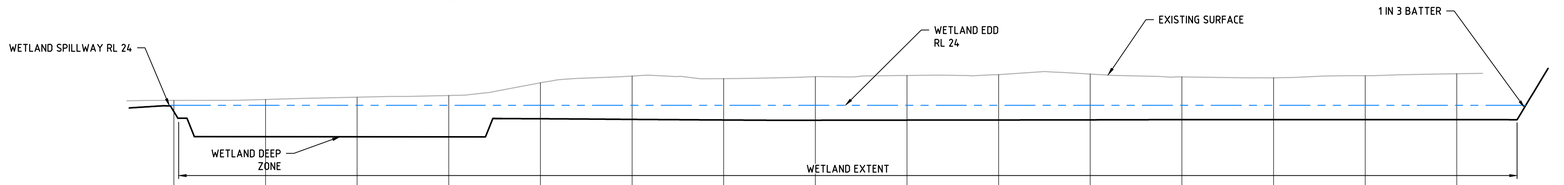


V.C.									
GRADE									
HORIZ. GEOMETRY									
DATUM R.L. 20									
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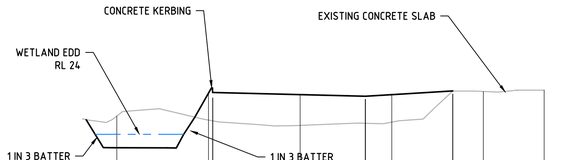
V.C.												
GRADE												
HORIZ. GEOMETRY												
DATUM R.L. 20												
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SECTION 1
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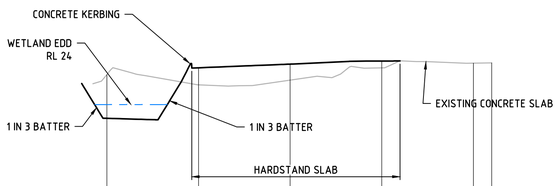
V.C.															
GRADE															
HORIZ. GEOMETRY															
DATUM R.L. 20															
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OFFSET	0	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240

SECTION 3
SCALE: 1:500 (H)
Scale: 1:100 (V)



V.C.						
GRADE						
HORIZ. GEOMETRY						
DATUM R.L. 20						
DESIGN LEVEL	23.206	25.346	25.298	25.297	25.401	25.446
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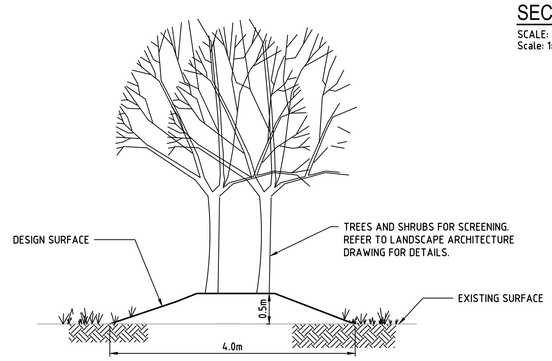
SECTION 2
SCALE: 1:500 (H)
Scale: 1:100 (V)



V.C.						
GRADE						
HORIZ. GEOMETRY						
DATUM R.L. 20						
DESIGN LEVEL	23.6	25.204	25.324	25.426	25.355	25.365
EXISTING LEVEL	24.977	24.647	24.801	25.202	25.355	25.365
OFFSET	0	15	30	45	60	75	77.994

SECTION 5
SCALE: 1:500 (H)
Scale: 1:100 (V)

SECTION 4
SCALE: 1:500 (H)
Scale: 1:100 (V)



TYPICAL SECTION OF EARTH MOUND
SCALE: 1:50 (H)
Scale: 1:50 (V)

DEVELOPMENT APPLICATION

Revisions							
01		KL	TE	RP	01/08/12	FOR DA - BUNKERS REMOVED
02	KL	BJH	RP	RP	10/12/2012	DESIGN REVISED
First Issue	KL/PW Drawn	RJ/KL Design	RP Check	RP Appd.	26/04/12 Date	Revision Details

SCALE 1:500 (A1) SCALE 1:1000 (A3)
SCALE 1:100 (A1) SCALE 1:200 (A3)
SCALE 1:50 (A1) SCALE 1:100 (A3)

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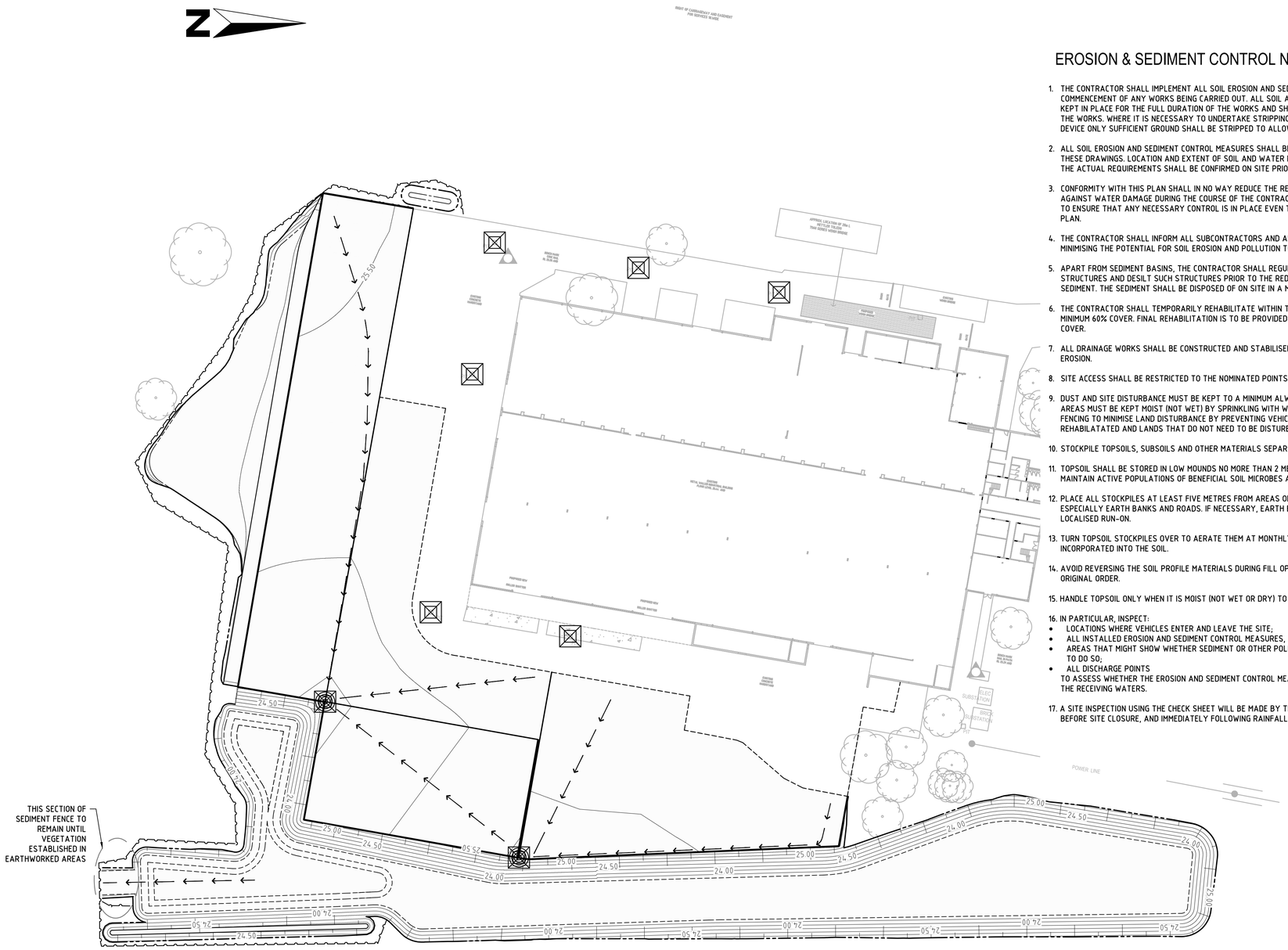
Project:
126 ANDREWS ROAD PENRITH
EARTHWORKS AND FLOOD VOLUMES

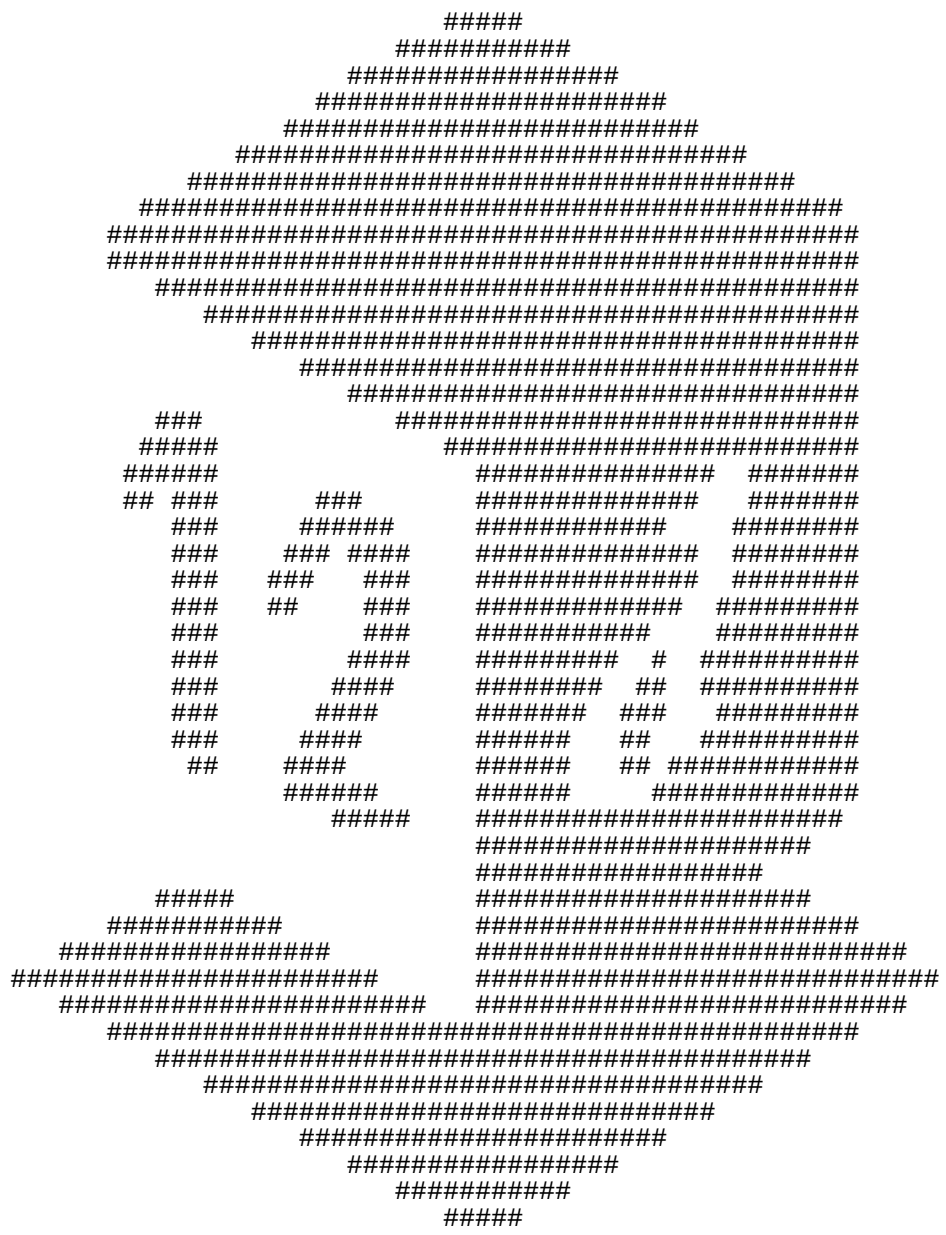
BROWN Smart Consulting

Drawing Title:
SECTIONS

Project No.:	Stage:	Milestone:	Dwg No.:	Revision:
X11354.W		DA	103	02

FILE: P:\X11354.W - ANDREWS ROAD (PENRITH) MASTER\DRAWING\DWA\PERX11354.W_WE_CC_103.DWG PRINTED: 12/11/12 (USER: BRENDAN HALL)


RIGHT OF CARRIAGEWAY AND EASEMENT FOR SERVICES 18 WIDE
APPROX LOCATION OF 33kV (TRANSGRID) 132/33kV FEEDER 7588 SERIES WORK AROUND
EXISTING CONCRETE FOOTPATH
EXISTING WATER BRIDGE
EXISTING METAL WAREHOUSE BUILDING FLOOR LEVEL RL=27.100
EXISTING METAL WAREHOUSE BUILDING FLOOR LEVEL RL=27.100
EMERGENCY ONLY ACCESS
EMERGENCY ONLY ACCESS
ELEC SUBSTATION
PROJECTION
POWER LINE
25.50
24.50
25.00
24.00
25.50
24.00
25.00
24.50
24.00
25.00
24.50
24.00
25.00
24.50



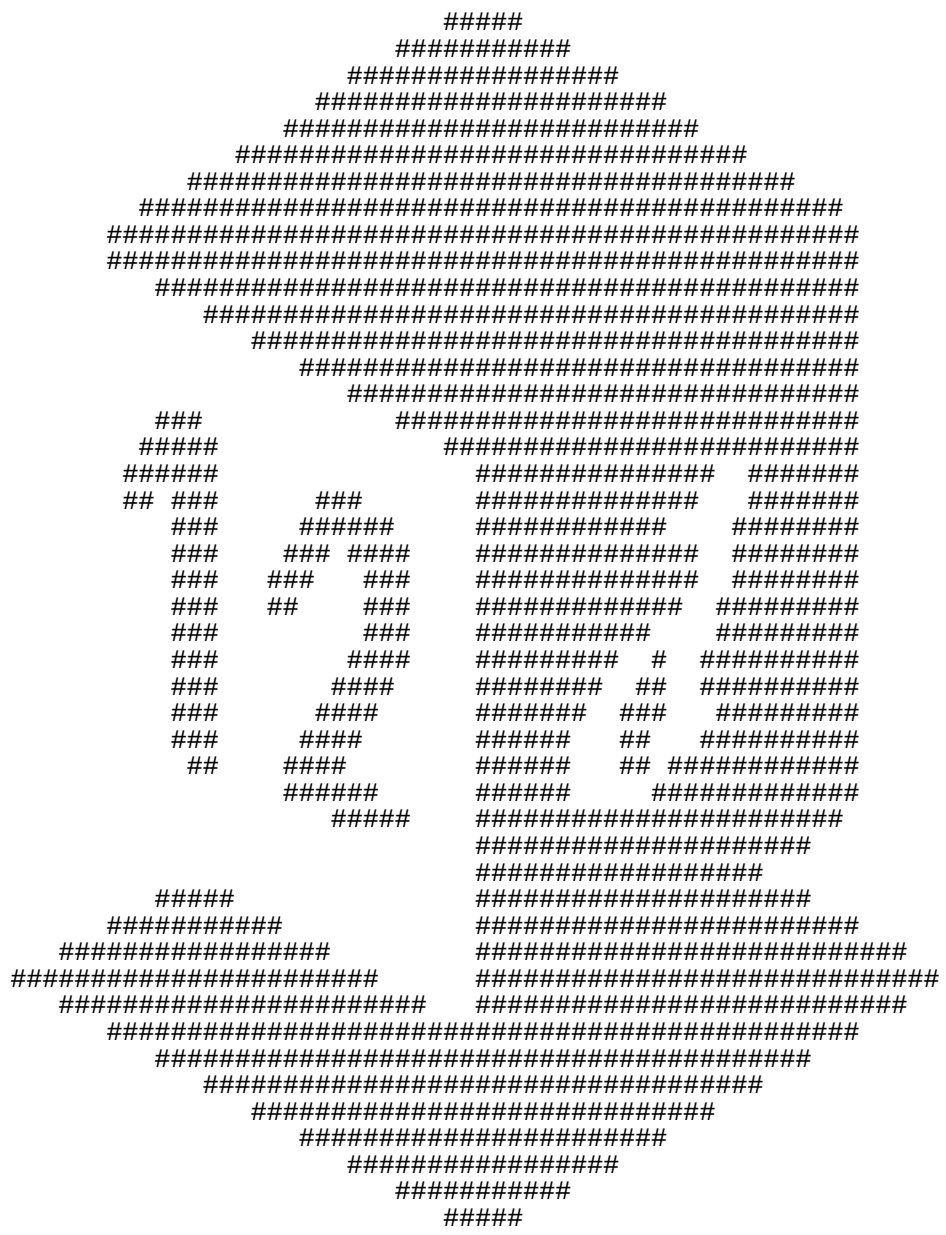
Project: X11354W Andrews Road Penrith Revised
User: Brendan Hill
Organization: Brown Consulting
Date: Mon Dec 10 10:50:13 2012
Report File: Existing Flood Volume.rpt
♀
Volumes from tin "ref survey Existing" to height 25.400 - (with no plan polygon)

cut volumes are negative
fill volumes are positive

--- Height Range ----		------ Incremental ------		--------------- Accumulative	
1	2	Cut	Fill	Cut	Fill	Balance
27.400	125.400	0.000	0.000	0.000	0.000	0.000
27.200	27.400	0.000	0.000	0.000	0.000	0.000
27.000	27.200	0.000	0.000	0.000	0.000	0.000
26.800	27.000	0.000	0.000	0.000	0.000	0.000
26.600	26.800	0.000	0.000	0.000	0.000	0.000
26.400	26.600	0.000	0.000	0.000	0.000	0.000
26.200	26.400	0.000	0.000	0.000	0.000	0.000
26.000	26.200	0.000	0.000	0.000	0.000	0.000
25.800	26.000	0.000	0.000	0.000	0.000	0.000
25.600	25.800	-0.044	0.000	-0.044	0.000	-0.044
25.400	25.600	-654.058	0.000	-654.103	0.000	-654.103
25.200	25.400	0.000	5182.051	-654.103	5182.051	4527.949
25.000	25.200	0.000	3415.058	-654.103	8597.109	7943.007
24.800	25.000	0.000	2118.971	-654.103	10716.080	10061.977
24.600	24.800	0.000	1769.023	-654.103	12485.104	11831.001
24.400	24.600	0.000	1509.085	-654.103	13994.189	13340.086
24.200	24.400	0.000	1001.463	-654.103	14995.651	14341.549
24.000	24.200	0.000	380.312	-654.103	15375.964	14721.861
23.800	24.000	0.000	14.546	-654.103	15390.510	14736.407
23.600	23.800	0.000	2.159	-654.103	15392.669	14738.566
23.400	23.600	0.000	0.479	-654.103	15393.148	14739.045
-74.600	23.400	0.000	0.008	-654.103	15393.156	14739.053

NOTE: Totals are for the above height ranges only

Total cut	-654.103
Total fill	15393.156
Total balance	14739.053
ie excess of fill over cut	14739.053



Project: X11354W Andrews Road Penrith Revised
User: Brendan Hill
Organization: Brown Consulting
Date: Mon Dec 10 10:49:11 2012
Report File: Ultimate Flood Volume.rpt
♀
Volumes from tin "Ultimate Flood Tin" to height 25.400 - (with no plan polygon)

cut volumes are negative
fill volumes are positive

--- Height Range ----		------ Incremental ------		--------------- Accumulative	
1	2	Cut	Fill	Cut	Fill	Balance
27.400	125.400	0.000	0.000	0.000	0.000	0.000
27.200	27.400	0.000	0.000	0.000	0.000	0.000
27.000	27.200	0.000	0.000	0.000	0.000	0.000
26.800	27.000	0.000	0.000	0.000	0.000	0.000
26.600	26.800	0.000	0.000	0.000	0.000	0.000
26.400	26.600	0.000	0.000	0.000	0.000	0.000
26.200	26.400	0.000	0.000	0.000	0.000	0.000
26.000	26.200	0.000	0.000	0.000	0.000	0.000
25.800	26.000	-0.000	0.000	-0.000	0.000	-0.000
25.600	25.800	-1.663	0.000	-1.663	0.000	-1.663
25.400	25.600	-699.960	0.000	-701.623	0.000	-701.623
25.200	25.400	0.000	4878.448	-701.623	4878.448	4176.825
25.000	25.200	0.000	2959.741	-701.623	7838.188	7136.566
24.800	25.000	0.000	1972.449	-701.623	9810.638	9109.015
24.600	24.800	0.000	1788.974	-701.623	11599.612	10897.989
24.400	24.600	0.000	1697.388	-701.623	13297.000	12595.378
24.200	24.400	0.000	1483.740	-701.623	14780.741	14079.118
24.000	24.200	0.000	1111.390	-701.623	15892.131	15190.508
23.800	24.000	0.000	14.544	-701.623	15906.675	15205.053
23.600	23.800	0.000	2.159	-701.623	15908.834	15207.211
23.400	23.600	0.000	0.479	-701.623	15909.313	15207.690
-74.600	23.400	0.000	0.008	-701.623	15909.321	15207.698

NOTE: Totals are for the above height ranges only

Total cut	-701.623
Total fill	15909.321
Total balance	15207.698
ie excess of fill over cut	15207.698

126 Andrews Road, Penrith
TREE REPORT

for

Glass Recovery Service Pty Ltd

Prepared by
Susan Hobley B.Sc. (Env. & Urban Hort.) Grad. Dip. Sc.
BioDesign & Associates Pty Ltd
November, 2012

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1 Introduction and Aims

This report deals with existing trees at no. 126 Andrews Road, Penrith. It has been prepared to form part of a development application for the property and provides information on impacts on existing trees from the proposed development and how those impacts are to be managed through the development and future use of the site as a glass recycling facility. Prior to the development of the site plan, the arborist visited the site with the Project Manager, Mr Brent Winning and reviewed the existing trees as part of the site planning process. The aim was to retain as many of the trees as possible under the new development. In order to achieve this aim, the lay-out of the new facilities and the stormwater management plan were developed in consultation with the arborist and landscape architect on the project. During the preliminary site inspection, it was established that one tree (No. 11 on the plan) would need to be removed to allow for the extension of the concrete apron as required for the external storage bunkers required for the proposed use of the facility. Subsequent design development has identified the need for the removal of three additional trees (Nos. 13, 14 and 15 on the plan).

2 Methods

The following activities were carried out in order to assess the impacts of the proposed development on trees and how it addresses Penrith City Council's LEP 2010 and DCP 2010:

- Assessment of the site's trees in terms of their vicinity to the proposed development.
- Assessment of individual trees on the site that are within 5 metres of any proposed development works.
- General assessment of the vegetation, including trees, that is situated outside the proposed development footprint in terms of any management requirements/recommendations as part of the proposed new use of the site.
- Review of Part 5 Section 5.9 of Penrith City Council's LEP 2010 and Part C2 of Penrith's DCP 2010.
- Consultation with the design team to identify how the design could be amended to retain valuable tree assets in accordance with the General Objectives of DCP 2010 - C2 Vegetation Management.
- Review of development proposal in terms of impacts on existing trees in order to specify protection measures for trees to be retained and recommendations for replenishment of trees to compensate for proposed removals.

A site visit to assess the trees and site conditions was carried out on 6 December 2011 during daylight hours and a rain-free period.

Assessment of the trees was conducted from ground level only, using standard visual assessment methods as described in the literature (Lonsdale,

1999, Mattheck and Breloer, 1994, Matheny and Clark, 1998, Matheny and Clark, 1994).

The following plans were reviewed during the assessment and reporting process:

- Draft Earthworks and Drainage Plan prepared by Brown Consulting (undated)
- Site Plan and Site Analysis (DAB01) prepared by Claron Consulting Pty Ltd (dated 14/12/11) issues A and B.
- The Landscape Plan (sheets 1 to 3) prepared by BioDesign & Associates dated 05/11/2012

3 Site Overview

The site is situated in the industrial zone north-west of the centre of Penrith. It has previously been substantially cleared and developed for industrial uses and contains a large warehouse-type building with ancillary facilities, parking, a truck weighbridge and concrete hardstand areas. The landscape consists of extensive open, grassed areas, perimeter stands of native trees and some tree plantings in the carpark area. A large, senescent remnant tree is located within the grassed area adjacent to the south-east corner of the existing concrete hardstand. The site contains a mapped wetland zone and contains a drainage pathway that links a floodway easement to the wetland.

4 The Proposed Development

The proposal is for alterations and additions to an existing industrial building and associated site infra-structure. External works involve the demolition of an existing shed, the construction of concrete hardstand areas to extend the existing hardstand, the extension of a portion of the driveway to improve truck access and turnaround; and modifications to the landscape to direct stormwater flow through the site.

The existing footprint and site layout for flood management impose constraints on tree management under any alterations to or expansion of the existing industrial complex. In particular, the extension of the concrete apron to support truck movements for the proposed new use will require the removal of a large remnant tree and of three young mature planted trees in the existing carpark area; the construction additional hardstand and the landscape works to improve stormwater flows and water treatment along the eastern side of the site will require the removal of a mature remnant tree.

The approach taken to the development of the design was to maximise retention of existing trees, retain the felled truck of senescent tree within the landscape for on-going habitat potential, and to plant out the landscape with as many locally indigenous trees as possible, taking into account the management issues of the floodwater and stormwater associated with the site.

5 Tree Assessments and Findings

Refer to Landscape Plan – Site Analysis, Tree Survey and Assessment for locations and numbering of trees.

5.1.1 Overview of the Site's Tree Assets

Special Values

The extensive clearing and on-going disturbance of the site has resulted in the substantial removal of any vegetation communities formerly associated with the site. No heritage-listed trees or tree species subject to the Threatened Species Act (1995) were surveyed on or adjacent to the site.

Ecological Values

The site's trees are predominantly planted native species with a few remnant and planted indigenous specimens. Two of the remnant specimens are isolated within the cleared, mown grassed areas. The understorey at the base of tree 10 consists predominantly of unmown grass and woody weeds. Due to safety issues (the site contains black and brown snakes and the grass was very high), it was not possible to examine these trees fully. However, one of them (no. 10) is in the last life phase (senescence) and contains dead wood and branch failures typically associated with the development of cavities suitable for habitat. The other (no. 9) is a younger specimen with no immediate evidence of habitat-forming processes. Due to the context of these trees as isolated specimens not directly connected to or associated with any stand of remnant woodland or forest, it is not considered that they are likely to have significant habitat values. However, it is recommended that the stem of the senescent specimen be retained within the landscape of the site after it has been felled to preserve its potential to provide nesting sites for native fauna.

The site contains a limited diversity of species in the tree plantings.

Parts of the site (particularly in the western zone containing a wetland) are heavily infested with weeds (including vines, annuals and woody weeds).

Environmental Values

The site's trees occur in deep soil both as group plantings and as individual specimens used for landscaping. With a few exceptions, they are generally in good condition and health. Most of the specimens are mature and they are generally of medium size.

Amenity Values

The plantings contribute little amenity beyond the site: the weed-infested area along the western boundary provides screening between the adjacent industrial site to the east; the plantings in the carpark provide some shade and visual amenity to the front of the building and parked cars; and a grove of Casuarinas along part of the eastern boundary provides partial screening between the site and the Nepean Rugby Park. These plantings are a mixture of species that contribute little in terms of sense of place to the site.

6 Discussion and Recommendations

It will be possible to retain most of the trees currently growing on the site. Of the nineteen trees within the vicinity of the new works, five (5) two remnant specimens (nos. 9 and 10) and three native specimens (nos. 13, 14 and 15) need to be removed to accommodate the extension of the concrete hardstand and new construction works to support the use of the site for industrial purposes within its hydrological context. It is recommended that a dead tree (no. 18) with no signs of habitat values be removed to ensure safety of persons using the carpark.

The trees to be retained are all located at setbacks from the works of greater than is required under the Australian Standard for the protection of trees on Development Sites and they therefore require standard protection within fenced-off exclusion zones.

Trees are therefore to be protected and managed in accordance with the recommendations of the Australian Standard AS 4970-2009 Protection of Trees on Development Sites. Refer to Landscape Plan – Site Analysis, Tree Survey and Assessment (sheet 1/3) for location of tree protection fencing.

Impacts of tree losses will be addressed through proposed tree plantings to provide screening and vegetation linkages. The Landscape Plan proposes the following tree plantings:

60 x *Casuarina glauca*

80 x *Eucalyptus amplifolia*

55 x *Eucalytpus tereticornis*

120 x *Melaleuca linariifolia*

The species are all locally indigenous and can therefore be expected to establish well in the site conditions and to provide ecological benefits to the area.

7 Statement

I am a qualified, practicing arborist, horticulturist and landscape design consultant. I completed a Bachelor of Science degree in Environmental and Urban Horticulture at the University of Technology, Sydney in 1998. I have worked as a consulting arborist, ecologist and landscape designer since 1997 and am a member of several relevant professional associations.



Susan Hobley

B.Sc. (Environmental and Urban Horticulture), Grad. Dip. Sc.
MISA MNAAA MLGTRA MEIA MAIH

26th November 2012

8 Table 1: Assessments of Trees at 126 Andrews Road Penrith

No.	Botanical Name	Common Name	Provenance	Age	Risk	Condition	DBH	Height	Crown	Proposed Management
							mm	m	m	
1	*Corymbia citriodora*	Lemon Scented Gum	Native	Mature	LOW	V. Good	390	18	12	Retain. Standard protection
2	*Corymbia citriodora*	Lemon Scented Gum	Native	Mature	LOW	V. Good	430	16	12	Retain. Standard protection
3	*Corymbia citriodora*	Lemon Scented Gum	Native	Mature	LOW	V. Good	320	16	12	Retain. Standard protection
4	*Casuarina glauca*	She Oak	Planted Indigenous	Semi-mature	LOW	V. Good	Grove			Retain. Standard protection
5	*Corymbia citriodora*	Lemon Scented Gum	Native	Mature	LOW	Moderate	310	14	10	Retain. Standard protection
6	*Corymbia citriodora*	Lemon Scented Gum	Native	Mature	LOW	V. Good	290	14	8	Retain. Standard protection
7	*Corymbia citriodora*	Lemon Scented Gum	Native	Mature	LOW	V. Good	310	12	10	Retain. Standard protection
8	*Corymbia citriodora*	Lemon Scented Gum	Native	Mature	LOW	V. Good	300	12	10	Retain. Standard protection
9	*Eucalyptus tereticornis*	Forest Red Gum	Remnant	Mature	LOW	Good	1000*	14	14	Remove
10	*Eucalyptus tereticornis*	Forest Red Gum	Remnant	Senescent	LOW	Habitat	1700	14	12	Remove. Reuse trunk.
11	*Callistemon sp.*	Bottle Brush	Native	Mature	LOW	Good	200	4	4	Retain. Standard protection
12	*Casuarina glauca*	She Oak	Remnant	Mature	LOW	Good	430	15	8	Retain. Standard protection
13	*Eucalyptus oreades*	Blue Mountain Ash	Native	Mature	HIGH	Poor	180	18	12	Remove
14	*Eucalyptus oreades*	Blue Mountain Ash	Native	Mature	MOD	Mod-Poor	450	18	12	Remove
15	*Eucalyptus oreades*	Blue Mountain Ash	Native	Mature	MOD	Mod-Poor	210	14	4	Remove
16	*Corymbia citriodora*	Lemon Scented Gum	Native	Mature	LOW	V. Good	380	18	10	Retain. Standard protection
17	*Corymbia citriodora*	Lemon Scented Gum	Native	Mature	LOW	V. Good	460	18	10	Retain. Standard protection
18	*Eucalyptus sideroxylon*	Red Ironbark	Native	Dead	HIGH	V Poor	330	10	3	Remove
19	*Casuarina glauca*	She Oak	Planted Indigenous	Mature	LOW	Mod-Good	Grove	15	5	Retain. Standard protection

9 Bibliography

Australian Standard AS 4970-2009 Protection of Trees on Development Sites

Lonsdale, D. (1999) *Principles of Tree Hazard Assessment and Management,* London: TSO.

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Mattheck, C. & Breloer, H. (1994) *The Body Language of Trees. A handbook for failure analysis,* London: TSO.

10 Appendix

PROCEDURES FOR PROTECTING LANDSCAPE AREAS AND VEGETATION ON WORK SITES

Overview

In any construction or building project, the adjoining area which will subsequently be retained or redeveloped as a landscape/garden, is highly sensitive to the impacts of work associated with excavation and building.

Soils are liable to be contaminated, compacted and in other ways disturbed. This has serious consequences for any plants, which are planted in their environment.

The effects of construction and machinery on any vegetation that is to be retained (e.g. trees) is also very damaging. Tree roots extend out beyond their overhanging canopy and are particularly abundant close to the soil surface. Machinery can damage and destroy them, and pollution can poison them or deprive them of essential nutrients. Additionally, the above-ground parts of the trees (trunks, branches and foliage) can easily be damaged. The consequences can be dieback, disease, reduced vigour and health, or death. These problems may occur slowly in many cases, in keeping with the different time-scale of a tree's lifespan.

When protective vegetation is removed, the remaining plants can suffer from sunburn and wind damage. If this is a risk, protective shelters should be erected.

Prevention Measures

It is essential that machinery and materials be excluded from the landscape areas and that no raw or waste materials be dumped on them.

Effective barriers that can withstand the impacts of machinery and equipment should be erected. Coloured tapes are useless. These barriers need to be erected under the supervision of a qualified horticulturalist or arborist, who can identify the areas of tree root systems and ensure that sensitive installation measures are followed. Signs explaining the purpose of the barriers should be erected.

Storage and cleaning facilities need to be set up in areas where they will not impact on the landscape area. Run-off from construction work should be prevented from entering the area.

Workers on the site need to be given appropriate induction and penalties imposed on persons who do not comply with instructions relating to tree protection measures.

In the event of damage to vegetation or soils occurring, immediate remedial work should be undertaken.

Tree Protection Zones (TPZs)

Tree Protection Zones are areas set aside to ensure that trees are adequately protected during work activities. They should encompass as substantial an area extending outwards from the base of the tree's stem (trunk) in all directions as far as possible. TPZs include the area above the fencing that contains the aerial parts of the whole tree.

The extent of the area to be protected varies according to the species and size of any tree. As a general indication, it should reach out to the outer edge of the tree's canopy (although tree roots usually extend beyond this). Any large roots beyond this extent should also be considered for inclusion.

TPZs should be protected by barriers that are sturdy enough to withstand site activities (including vehicular movements) and prevent them from impinging on the zone. (Chain wire mesh 1800mm high attached to metal posts is typically used.)

The area within the zone should be cleared of any rubbish or weeds. It should be covered with clean, aged mulch to a depth of not less than 90mm and not more than 100mm.

Erosion, run-off and sediment prevention measures (straw bails, supported geotextile, etc.) should include the TPZs.

Suitable signs that will withstand exposure to weather and site activities should be installed on the barriers. The signs should clearly state that the barriers surround a "no go" zone for the protection of the tree and that this zone is not to be breached by any unauthorized persons or by any site activities.

A water supply should be available to the TPZ.

TPZs should be monitored during the construction works to ensure they are being properly respected and maintained (weed and litter free; mulched).

After construction works are completed, the exclusion zones should be carefully removed. Mulch should be removed and replaced with clean, aged mulch to a depth of 70 to 75mm.

SPECIALIST TRAFFIC AND TRANSPORT ASSESSMENTS FOR E.I.S

PROPOSED GLASS RECYCLING FACILITY

AT

NO. 126 ANDREWS ROAD PENRITH

DRAFT

Ref. 12027r

May 2012

Prepared By

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APPENDICES

Appendix 1 7 Day Tube Traffic Counts
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DOCUMENT CONTROL

Version	Document Issue	Date	Approved	Position
1	Draft Document	29 May 2012	Michael Bridgman	Director
1	Draft Document	25 Oct 2012	Michael Bridgman	Director

1.0 INTRODUCTION

Transport and Urban Planning has been engaged by Benbow Environmental (February 2012) to undertake the relevant traffic and transport impact assessments for the proposed glass recycling plant to be located at 126 Andrews Road, Cranebrook.

The proposed development application is located on a large land parcel, Lot 1 in DP 747153 on Andrews Road at Cranebrook.

The property is accessed via Andrews Road which runs along the northern boundary of the site. Andrews Road connects directly to the state road network, Castlereagh Road or Richmond Road, which is located 1.0km to the east and west of the site. The main Western Railway runs to the south of the site, with the closest public station being Penrith around 4.0km away.

This report addressed The NSW Department of Planning and other government agency requirements for the EIS identified in Director General's Requirements dated 16 May 2012. The report contains an assessment of baseline traffic conditions and assessment of traffic implications of the proposal including consideration of the following issues:

- Details of truck routes;
- Predictions of the traffic volumes likely to be generated during construction and operation;
- An assessment of the impacts of this traffic on the safety, capacity and efficiency of the surrounding road network;
- Modelling of key intersections (including any nearby existing or proposed developments);
- Detailed assessment on the need for upgrading or road improvement works on Andrews Road;
- Details of the availability of non-car travel modes and measures to encourage greater use of these travel modes; and
- Access and parking.

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.

The existing industrial building has been compartmentalised along its north-south direction using a fire rated wall. The building has internal store rooms along the eastern outside wall. Access doorways are along the two sides and rear. In the corner of the rear yard area is a shed. This has previously been used to store dangerous goods.

The site has good access to 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.

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



1. Existing 8.0 metre access to Andrews Road



2. Existing 8.0 metre two way access from Andrews Road



3. Existing sight distance – east



4. Existing sight distance - west

3.0 DEVELOPMENT PROPOSAL

The proposed development will involve the following:

3.1 Proposal / Use

The conversion of an existing building on site into a glass beneficiation plant.

The glass beneficiation plant would have a capacity of 105,000 tonne per annum

The number of employees would typically be 24 persons (including casual staff) over three shifts and the proposal will operate 24 hours per day, Monday to Sunday.

The development would house the glass beneficiation processing plant and the materials recovery facility within the existing building and would involve the glass beneficiation processing plant.

Colour separated and crushed cullet would be stored external to the building in a set of aboveground bunkers. The glass for recycling would be received by truck and stored inside the building. Initially the cullet would be transported to the adjoining glass bottling plant using trucks travelling the short distance along Andrews Road between the two sites.

The proposed glass beneficiation plant is able to colour separate and process glass bottles to a significantly higher quality than other glass bottle recycling plants in NSW.

The proponent operates a similar plant in Melbourne.

3.2 Truck Access

All truck traffic to and from the site via Andrews Road, will utilise the state road network ie. Castlereagh Road to the west or Richmond Road to the east, both roads link to the M4 Motorway and/or Great Western Highway.

3.3 Proposed Average Truck Movements

Glass bottles are brought to the site using a variety of truck types including B doubles. The preferred transport routes have been discussed with Penrith City Council.

The trucks will pass over a weigh bridge, two weighbridges exist on the western side of the building site. The trucks will then travel to the rear of the building and enter into the building, unloading the bottles into ground level hoppers.

The glass bottles are processed to achieve the following:

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

Average truck movements based on a projected capacity of 105,000 tonnes per annum:

- 65% of total x 5t truck load

- 25% x truck and dog (25t load)
- 10% x B-double (35t load)

Assuming the facility operates 7 days per week the following applies:

- 60% of trucks arrive between 6am and 8am
- 10% between 8am and 4pm
- 30% between 4pm and 5pm

Assuming a 50 week per year operation, then an average of 2,100 tonnes of glass materials will be processed per week or 300 tonnes per day. This equates on an average day to:

- 38 x 5 tonne loads per day or 76 - 2 way truck movements;
- 3 x 25 tonne loads per day of 6 – 2 way truck and dog movements; and
- 1 x 35 tonne load per day or 2 – 2 way B-double truck movements.

Total + 84 truck movements per day, with 50 truck movements 6 – 8 am and 25 truck movements 4 – 5 pm

- 85th Percentile Day

On the 85th% day which should only occur on 52 or less days per year, projected daily 2 way truck movements be up to 100 trucks as follows:

6am – 8am	=	60 trucks
8am – 4pm	=	10 trucks
4pm – 5pm	=	30 trucks
Total	**=**	**100 trucks**

3.4 Car Parking

On site car parking (existing area) is provided at the front of the site in marked bays for 106 staff and visitor cars as shown in the site plan prepared by Claron Consulting Pty Ltd.

3.5 Hours of Operation and Staffing

The proposal would seek approval to operate 24 hours a day and 7 days a week. The proposed staffing levels are 26 new employment positions dispersed over 24 hours as follows:

- Office Staff – Business hours Monday – Friday
  (2 persons)

- Plant Staff – 3 x shifts, 7 days a week
  (24 persons)
  - Day shift 7.00am to 3.00pm
  - Afternoon shift 3.00pm to 11.00pm
  - Night shift 11.00pm to 7.00am

- 8 people per shift
  - 3 x pickers
  - 2 x operators/forklift drivers
  - 1 x quality control
  - 1 x loader driver

Daily staff movements over 24 hours are expected to be up to a maximum of 44 vehicle trips per day.

4.0 ADJOINING ROAD SYSTEM

4.1 Access Road

Andrews Road adjoining the site is an undivided 2 lane route having a 7.0 metre pavement between painted edge lines and 1 to 2 metre sealed shoulders. The road alignment is generally level and straight with good sight lines and a 70km/h speed zone applies.

Andrews Road is defined as a regional road whilst Castlereagh Road (to the west) and Richmond Road (to the east) are both designated state roads. The intersections formed by Andrews Roads with Castlereagh Road and Richmond Road are both controlled by multi phase traffic signals.

4.2 Daily Traffic Volumes

Recent, March 2012, 24 hour 7 day tube counts undertaken for the assumed are included as **Appendix 1** and summarised as follows:

TABLE 4.1

5 DAY AVERAGED MONDAY – FRIDAY COUNTS – MARCH 2012

Time	Eastbound Veh / Hr	Westbound Veh / Hr	2 Way Veh / Hr
Midnight – 1am	12	12	24
1am – 2am	10	10	20
2am – 3am	12	8	20
3am – 4am	12	18	30
4am – 5am	26	52	78
5am – 6am	110	170	280
6am – 7am	173	301	474
7am – 8am	224	363	587
8am – 9am	276*	383*	659*
9am – 10am	246	315	561
10am – 11am	236	228	464
11am – Midday	218	229	447
Midday – 1pm	235	231	466
1pm – 2pm	243	236	479
2pm – 3pm	304	268	572
3pm – 4pm	347	331*	678
4pm – 5pm	380	322	702
5pm – 6pm	404*	307	711*
6pm – 7pm	292	277	569
7pm – 8pm	203	178	381
8pm – 9pm	136	119	255
9pm – 10pm	94	90	184
10pm – 11pm	62	54	116
11pm – 12 Midnight	41	33	74
TOTAL	**4295**	**4533**	**8828**[1]

**Indicates Peak Hour*

[1]*NB. Averaged 7 day volumes are 8,324 vehicles per day*

Existing two way peak hour flows on Andrews Road occur 8 – 9am and 5 – 6pm with up to 659 and 711 vehicle movements respectively.

In addition the weekly averaged daily tube counts indicate that up to 16% of all vehicles utilising Andrews Road are heavy vehicles ie. Class 3 or higher.

4.3 Existing Service Levels

The RMS Guide to Traffic Generating Developments VER 2.2 dated October 2002 suggested indicative traffic service levels on urban road as follows:

TABLE 4.2

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

Based on Table 4.1 peak hour volumes an LOS B or C should apply to Andrews Road. This is generally accepted as a good level of service for traffic operations.

Furthermore, the RMS Guide also indicates that for level terrain with up to 15% heavy vehicles, up to 870 vehicles per hour (2 way) would be tolerated on Andrews Road before LOS C thresholds are exceeded.

4.4 Road Safety

A review of the RMS crash data base for the 3 year period to end December 2010 did not reveal any recorded accidents with vehicles entering or exiting the subject site, 126 Andrews Road. In addition there were no abnormal records or heavy vehicle related accidents on Andrews Road or at the adjoining signalised state road intersections located to the east and west of the site.

No pedestrian footway is provided along the subject section of Andrews Road and accordingly existing pedestrian activity apart to/from nearby bus stops is very low. An existing cycleway is not provided along Andrews Road although moderate bicycle use of the road shoulder can be expected outside of peak hours.

4.5 Public Transport

The site is located within 4.0km of Penrith Railway Station and route bus services travel along Andrews Road with bus stops within 400 metres of the site.

5.0 TRAFFIC ACCESS AND TRANSPORT ASSESSMENTS

5.1 Traffic Generation

5.1.1 Construction

Short term construction traffic will predominantly comprise car trips associated with construction worker journeys to and from the site. These will be concentrated around the beginning and end of the construction day (typically 6.00 – 7.00am and 4.00 and 5.00pm). A maximum of 30 workers will be on site during any stage of the construction equating to around 25 trips to and from the site each day assuming a minimum vehicle occupancy of 1.2 persons. However this value may be significantly lower if car pooling as is widely practiced amongst tradespeople is higher than 1.2 persons per vehicle.

Once delivered, construction plant will remain on site throughout the duration of the site preparation period. Following the preparation period a regular pattern of construction traffic will enter and depart the site each day. Typically this will be in the order of 10 deliveries (20 vehicle movements) per day, spread throughout the day. Deliveries will primarily consist of concrete and formwork for the refurbishment of the building, plant and machinery for the recycling operations.

Construction truck traffic will generally come from the M4 freeway and local concrete plants.

A summary of construction traffic is shown below.

TABLE 5.1

DAILY AND PEAK HOUR CONSTRUCTION TRAFFIC GENERATION MONDAY – SATURDAY

Vehicles	Daily Veh Two Way	AM Peak Hour		PM Peak	
		Veh In	Veh Out	Veh In	Veh Out
Car / Light Vehicles	50	25	-	-	25
Trucks / Heavy Vehicles	20	3	2	1	4

It is assumed 95% of private vehicles will arrive in the morning peak hour between 6am and 7am. In the evening peak 85% of private vehicles will depart the site between 4pm and 5pm.

The majority of construction materials (60%) are expected to be delivered fairly evenly across the morning period beginning at 7am. The remaining deliveries (40%) will arrive during the afternoon period up until the site shuts down at 6pm.

5.1.2 Operations

Truck Traffic

Based on advice from the proponent and site operators, during the first year of operations (year 2012) recycling would involve 2,100 tonnes of glass materials per week.

Projected averaged daily truck traffic movements for 2,100 tonnes per week of glass recycled are summarised as follows:

TABLE 5.2
AVERAGE AND 85TH PERCENTILE DAILY TRUCK TRIPS
MONDAY TO SUNDAY @ 2,100 TONNES / WEEK

Glass Recycled	Trucks In Per Day	Trucks Out Per Day	Total Trucks Two Way Per Day
Average Day	42	42	**84**
85th% Day	50	50	**100**

NB. 65% of trucks are smaller Class 3 type trucks with 5 tonne loads

Staff Traffic

With only 2 office staff on day shift and up to 24 outdoor staff employed on site over three shifts and the poor public transport provision to access the site we would allow 90% of all staff as single person vehicle trips to the site i.e. 44 two way trips daily. The projected peak hour trips are shown below.

TABLE 5.3

PROJECTED 85th% DAY AM AND PM PEAK HOUR TRAFFIC
MONDAY TO SUNDAY

Time	Car In	Trucks In	Cars Out	Trucks Out	Total Traffic
AM Peak Hour	9	15	3	15	**42 veh/hr**
PM Peak Hour	3	15	9	15	**42 veh/hr**

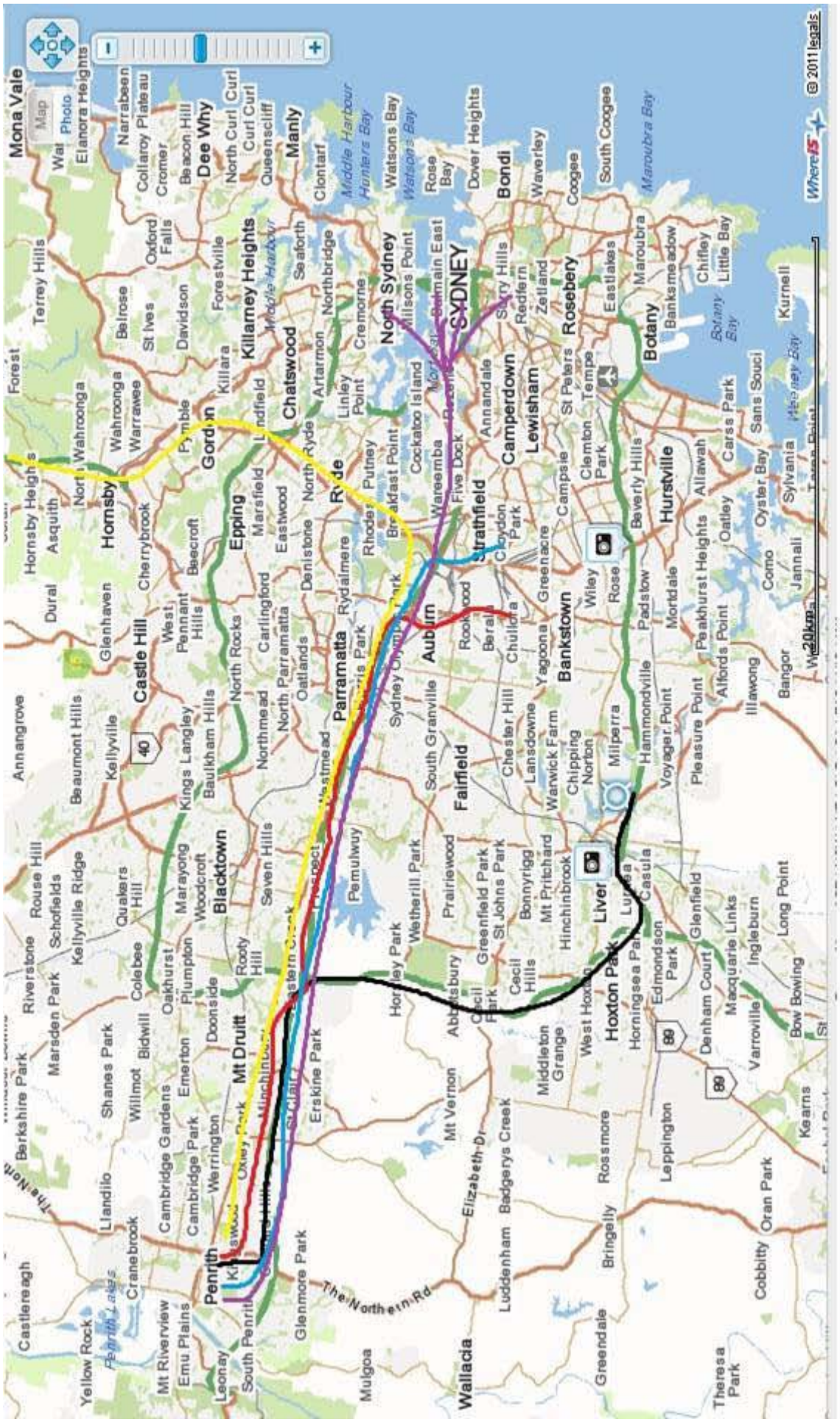
This level of peak hour traffic equates to 1 additional vehicle in or out every minute to/from Andrews Road.

5.2 Traffic Distribution

Product transportation information provided by the proponent indicates that;

- **Glass Origin**

100% of all incoming waste materials to be recycled will arrive via the M4 and Castlereagh Road or Richmond Road with origins east or south of the M4. Advice from the proposals indicate to source recycle products will arrive from locations as shown overleaf.



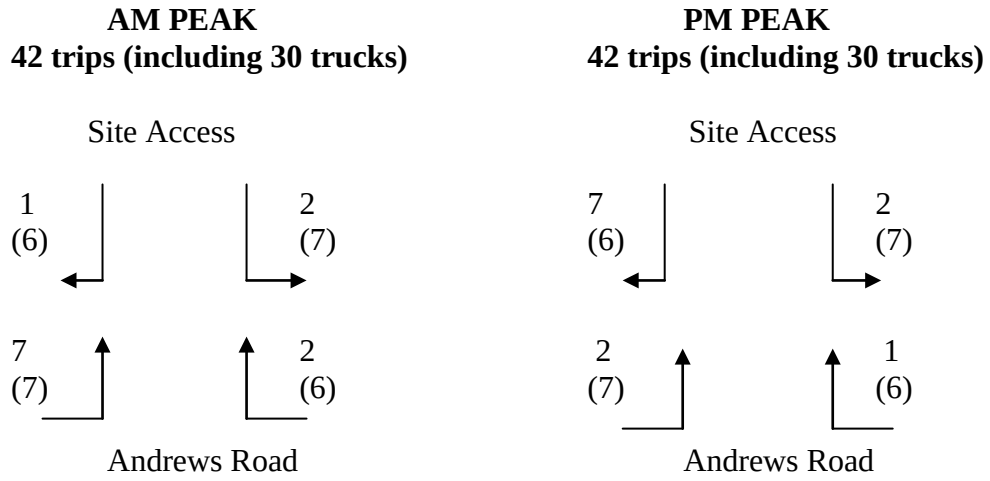
RED: SITA- CHULLORA, BLUE: SITA – CAMIELLA, PURPLE: BOTTLE CYCLERS, YELLOW: PARR RECYCLING – THORNTON, BLACK: GLASS GRANULATES

- **Recycled Product Destination**

100% of all the road transport will be transported in larger articulated or B Double trucks to the Owens Illinois site which is located at No. 5 Andrews Road approximately 1km from the subject site.

Light vehicle staff and visitor trips will mainly have origins and destinations in the order of 70% east/south bound and 30% west/north bound.

The projected arrivals and departures of the additional AM and PM peak hour traffic post development at the existing access intersection at full operation, (i.e. 2,100 tonnes per week) is shown as follows:



7 Car and light vehicles
(6) Trucks

5.3 Traffic Impacts

5.3.1 Impacts of Construction Traffic

The majority of the construction workforce will be drawn from the Nepean area 70% and the remainder 30% from the adjoining Blacktown, Blue Mountains and Windsor/Richmond LGA's and they are expected to travel to the site via either Castlereagh Road or Richmond Road. For 70% of construction traffic trips in both the morning and afternoon periods will be travelling with the peak direction of flow and are only expected to have only minimal impact on the capacity of these routes. Detailed intersection analysis of the construction stage traffic movements has not been undertaken for the construction phase of works.

Work on the construction site will normally commence at 7am and consequently private vehicle trips to the site are not expected to correspond with the normal morning peak hour travel times. In the evening period, most traffic will depart the site around 4pm well before the afternoon peak which is normally experienced between 5pm and 6pm.

5.3.2 Impacts of Post Development Traffic

- **Andrews Road Access**

The existing site access road and Andrews Road intersection has been modelled utilising SIDRA programme to assess post development performance for Year 2012 volumes with the proposal in full operation. The results show all traffic movements perform well during the peak hour periods, (except the right turn out of the Site Access Road in the AM peak) with little or no delays experienced as follows:-

TABLE 5.4

SIDRA OUTPUT SUMMARY – YEAR 2012
EXISTING ANDREWS ROAD ACCESS POST DEVELOPMENT

Movement	AM Peak			PM Peak		
	Delay (s/veh)	LOS	95% queue length (m)	Delay (s/veh)	LOS	95% queue length (m)
Site Access						
Left Turn	6.2	A	0.4	11.3	A	1.7
Right Turn	40.7	C	18.6	19.1	B	5.5
Approach	32.3	C	18.6	17.2	B	5.5
Andrews Road East						
Left Turn	4.4	A	0	4.8	A	0
Through Movement	1.1	A	0	1.1	A	0
Approach	1.3	A	0	1.1	A	0
Andrews Road West						
Through Movement	1.1	A	0	1.0	A	0
Right Turn	9.3	A	1.0	11.6	A	0.6
Approach	1.2	A	1.0	1.2	A	0.6

The RTA criteria for interpreting intersection Level of Service LOS is:-

LOS	***Give Way and Stop Signs***	***Highest Movement Delay (in seconds)***
A	*Good*	*0-14*
B	*Acceptable delays and spare capacity*	*15-28*
C	*Satisfactory but accident study required*	*29-42*
D	*Near capacity and accident study required*	*43-56*
E	*At capacity and requires other Control Delay Mode*	*57-70*
F	*Unsatisfactory and requires other Control Mode*	*>70*

The resultant post development traffic impacts arising from the proposed at Year 2012 are minimal and well within all RTA accepted intersection performance parameters.

- **Other access intersections**

SIDRA modelling has not been undertaken at the adjoining Andrews Road / Castlereagh Road or Richmond Road intersections, but given that the projected peak post

development traffic generation arising from the proposals is marginally greater than 1 vehicle per minute then it is most unlikely that these volumes would realise any measurable impacts on the favourable traffic service levels observed at these two junctions in peak times.

5.3.3 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.

The 3 year accident analysis to end year 2010 indicated relatively few heavy vehicle accidents occurred at either the Andrews Road / Castlereagh Road or Richmond Road intersections. It is therefore not expected the additional heavy trips generated by the development will result in any adverse impacts at these junctions.

5.4 Future Access

Andrews Road is identified as a key transport corridor in Council's DCP 2010 Part C10.

To accommodate future B-Double truck movements at the access intersection as shown in **Figure 3** road widening (pavement and shoulder works) will be required between Andrews Road and the existing access road including the northern side of Andrews Road.

These works primarily include (70km/h) RTA BAL and BAR treatments for a low volume intersection for an undivided 2 lane rural road.

Existing sight distance to and from this intersection comply with the best practice (RTA/Austroad) recommended sight lines for rural 70km/h speed environments.

The turn paths for 26.0 metre B double trucks into and out of the site from Andrews Road are shown in **Figures 4A** and **4B**.

5.5 Parking

Penrith City Council's Local Environmental Plan (DCP No. 2010 C10 Traffic, Access and Parking and D4 Industrial Developments) outlines requirements for the provision of off street parking at developments. However, DCP2010 does not make recommendations for truck parking for this specific land use. Alternatively, the Australian Standards AS 2890.2-2002 specifies the dimensions for truck bays as 3.5m x 19.0m for articulated trucks and 26.0m for B Doubles. For truck and carparking the following conditions apply:

- *At least one car space must be made available for disabled car parking and then one space in every one hundred should be for disabled car parking.*

- *The size of a 90 degree car parking space should be 2.6m x 5.5m with an aisle width of 6.2m.*

- *Truck bays are to be at least 3.5m x 19.0m or 26.0m in the case of B-Doubles.*

The objective for accessing and servicing the site as contained in Council's DCP 2010 (D4) for Industrial Development are:

- Ensure the safe and efficient movement into and out of an industrial development without adversely affecting the existing and future service and safe levels of the road;

- Ensure industrial development provides sufficient parking on site to accommodate all parking demands generated by the development while ensuring safe and efficient movement of vehicles within the site;

- Encourage the development of a parking layout that enhances the function and appearance of the industrial development; and

- Ensure that cyclist and pedestrian needs are adequately and safely accommodated in all industrial areas.

The on site car parking required for industrial uses as per Penrith City Council's DCP 2010 (C10) Access and Parking is 1 space per 75m^2 of gross floor area or 1 space per 2 employees, whichever is the greater.

The car and truck parking details are not to hand at present but should comply with the above standards at the time of development application.

However, the site will contain parking for the following number of vehicles.

Parking Provisions

Car Parking Spaces	**Quantity**
Employee Spaces	50
Disabled Spaces	2
Visitor Spaces	10
Additional (oversupply) spaces	44
Total	**106**
Proposed Concrete Hardstand (Heavy Vehicle spaces)	10

The level of on site car parking available (106 spaces) significantly exceeds any likely car parking demand, based on the number of staff and visitors likely to be on site at any time.

5.6 Public Transport

Future staff numbers at the proposed facility will be relatively low, never more than 50 on site at a time. Such small numbers are difficult to encourage public transport operators to change or add routes that pass the site at morning and afternoon peak times.

There could, however, be future incentives to encourage car sharing to reduce the number of employee cars entering the site.

6.0 CONCLUSIONS

The proponent envisages the conversion of an existing building, located at 126 Andrews Road, into a glass beneficiation plant and recycling facility.

The glass beneficiation plant would have a capacity of 105,000 tonne per annum

The development would house the glass beneficiation processing plant and the materials recovery facility within the existing building and would involve the glass beneficiation processing plant.

Colour separated and crushed cullet would be stored external to the building in a set of aboveground bunkers. The glass for recycling would be received by truck and stored inside the building. Initially the cullet would be transported to the adjoining glass bottling plant using trucks travelling the short distance along Andrews Road between the two sites.

The proposed glass beneficiation plant is able to colour separate and process glass bottles to a significantly higher quality than other glass bottle recycling plants in NSW.

It is anticipated that the 24 hour/7 day proposal would generate 26 full time employment positions over three shifts with full site operations including:

- Site administration and management (2 persons);
- Plant operation; and
- Material processing and handling (24 persons).

The traffic and transport impact of the proposed metal resource recovery and waste management facility has been assessed in accordance with the requirements set out in the Director General of the DIPNR requirements dated 16 May 2012. The main findings of these assessments are summarised below;

- The proposal will receive and process approximately 105,000 tonnes of glass materials at full operation (post Year 2012). All materials will arrive at the site via small to large articulated trucks. Large semi trailer and B Double trucks will remove all sorted glass for recycling.

- Under full operating conditions on the 85th percentile, the site is expected to generate 144 vehicle trips per day (including 100 trucks) in the AM and PM Monday to Friday peak hour, up to 42 vehicle trips per hour including 30 trucks can be expected.

- The existing access intersection with Andrews Road has been (SIDRA) modelled for projected Year 2012 peak hour traffic flows with the additional traffic generation by the proposal. The post development results indicate there will be acceptable traffic service levels at this junction.

- Up to 90% of all glass materials to be recycled will arrive via the M4 or Great Western Highway to Castlereagh Road or Richmond Road. The remaining 10% glass can be expected from origins to the north or west of the site.

- 100% of all recycled glass will depart the site via Andrews Road to the Owens Illinois site which is also located in Andrews Road

- A "Type C" rural intersection upgrade is suggested at the junction of the Site Access Road and Andrews Road. This will accommodate B Double truck turn paths.

- During construction the majority of vehicles are expected to arrive and depart the site outside the peak hours observed on the surrounding road network. Even with the addition of construction based traffic, the volumes on the main routes leading to the site will be well below those experienced during peak hours.

- All proposed internal vehicle movements and circulation can be adequately accommodated within the site and are free of conflict and should be designed to comply with Councils DCP No. 2010 and Australian/NZ Standard 2890.2 at the Development Application stage.

In **concluding**, the proposal is expected to be a moderate traffic generating land use, i.e. up to +42 peak hour trips on Andrews Road. The projected traffic impacts of the proposal with the improved site access provisions in place are likely to be minor, i.e. less than one additional vehicle movement per minute with acceptable traffic service levels and performance levels maintained.

Michael Bridgman
Traffic, Transport and Road Safety Consultant

PHASE 1 SITE CONTAMINATION AND PREOCCUPANCY AUDIT REPORT FOR 126 ANDREWS ROAD PENRITH NSW

Prepared for: Dom Tenace, Business Development Manager, SKM Recycling

Prepared by: R T Benbow, Principal Consultant
BENBOW ENVIRONMENTAL

Report No: 115011_Rep_Rev1
October 2011
(Released: 17 October 2011)

Benbow
ENVIRONMENTAL

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EXECUTIVE SUMMARY

SKM Recycling intend to purchase the industrial land located at 126 Andrews Road, Penrith.

The property is developed. The property description is Lot 1 DP 747153. The site is understood to be currently owned by Wallaroo Pty Limited. It has previously been owned by Peshawar Pty Limited and GE Crane & Sons Limited.

A previous owner was listed as Containers Limited but a file note from the title search indicated this was incorrect.

The site has been developed as an office and warehouse. It is been previously used for storage of large quantities of fertilisers for Paton Fertilizers.

A Phase I and limited soils sampling was prepared in 2009 for Wallaroo. The soil sampling although limited found there to be no contamination of significance and no contamination that would prevent ongoing use of the land for industrial/commercial premises.

A site inspection has taken place. A title search has been undertaken. A series of historic aerial photographs have been reviewed.

A fauna and flora search has been undertaken. A DA history has been requested from Penrith City Council and will be provided when available. There are no expected site contamination issues of concern that would prevent the site from ongoing use for industrial/commercial activities. Although chemicals belonging to Classes of dangerous goods have been stored on site, there is no visual evidence of corrosion of the concrete floor, fire rated separating wall or the structural steelwork.

The land is zoned IN1 General Industrial. The closest residential area is separated by a busy road and a distance of 260 metres. The land immediate opposite the site is to the north zoned IN2 Light Industrial. The land has an overland water course at the rear and eastern boundary which does not impact on immediate use of the site but needs to be considered in the development and use of the site.

R T Benbow
Principal Consultant

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ATTACHMENTS

Attachment 1: Planning Certificate Under Section 149
Attachment 2: Land Titles

1. INTRODUCTION

In September 2011, Benbow Environmental has conducted a Phase 1 Site Contamination Investigation and a Preoccupancy Condition Audit of the site located at 126 Andrews Road, Penrith.

SKM Recycling have requested a Phase 1 Contamination Investigation and a Preoccupancy Condition Audit as a part of their due diligence policy.

This report documents the findings of these two studies which are referred to as the "*investigation*" or "*this investigation*" for the remainder of this document.

The purpose of the investigation is to determine the following:

- Identify past and present potentially contaminating activities;
- Identify potential contamination types;
- Audit the condition of the site in terms of pavement surfaces, stormwater pathways, building surfaces for visual evidence of past staining or surface damage;
- Examine the land uses on adjoining properties for potential exposure to hazardous materials or for risk of pollution occurring across the site boundaries;
- Provide a preliminary assessment of site contamination; and
- Prepare a report.

1.1 SCOPE OF THE INVESTIGATION

The scope of the investigation extends to the following.

Assessment of the site in accordance with the following standards & procedures:

- NEPC (1999), "National Environmental Protection (Assessment of Site Contamination) Measure (NEPM)", December 1999;
- "Guidelines for Assessing Service Station Site" (NSW EPA, December 1994); and
- Standards Australia (1997), "Australian Standard, Guide to the Sampling and Investigation of Potentially Contaminated Soil. Part 1: Non-volatile and semi-volatile compounds (AS 4482.1-1997)".

Satisfying these guidelines, standards and procedures required the following steps, which in summary comprised:

- A review of site history;
- An interview with the land owner or real estate agent to ascertain site usages;
- An inspection of the site to identify the potential for environmental contamination or pollution;
- An examination of the processes used on site;
- An investigation of potential pathways for pollutants to contaminate the site;
- An examination of the nature of the chemicals used on the site;
- An examination of the presence and the adequacy of environmental safeguards; and
- An inspection of pollution or dangerous goods related regulatory licensing.

1.2 ASSESSMENT OF ISSUES

Provision of an assessment of the following:

(a) Asbestos materials (on site);
(b) Radioactive material;
(c) Lead-based paints;
(d) Air emissions of pollutants;
(e) Surface and/or groundwater pollution;
(f) Sensitive receptors;
(g) Pesticide and herbicide usage and/or contamination;
(h) Stormwater management;
(i) Electromagnetic fields;
(j) Wastewater treatment system;
(k) Potable water source;
(l) Historic land use; and
(m) Fauna and flora issues.

1.3 ENVIRONMENTAL CONTAMINATION ASSESSMENT REPORT

Compilation of a report on the findings of the environmental investigations – i.e. BE Report No. 115011_Rep.

2. SITE IDENTIFICATION

The site is identified as 126 Andrews Road, Penrith.

The general location of the site is shown on Figure 2-1. A diagrammatic representation of the landholding is shown in Figure 2-2. The area bordered as the site on this Figure is the area investigated.

2.1 SITE LOCATION

The industrial building has been compartmentalised along its north-south direction using a fire rated wall.

The building has internal store rooms along the eastern outside wall.

Access doorways are along the two sides and rear.

In the corner of the rear yard area is a shed.

This has previously been used to store dangerous goods.

A site plan is shown as Figure 2-3.

The land use plan from Penrith City Council is presented as Figure 2-4.

Figure 2-1: Site Location

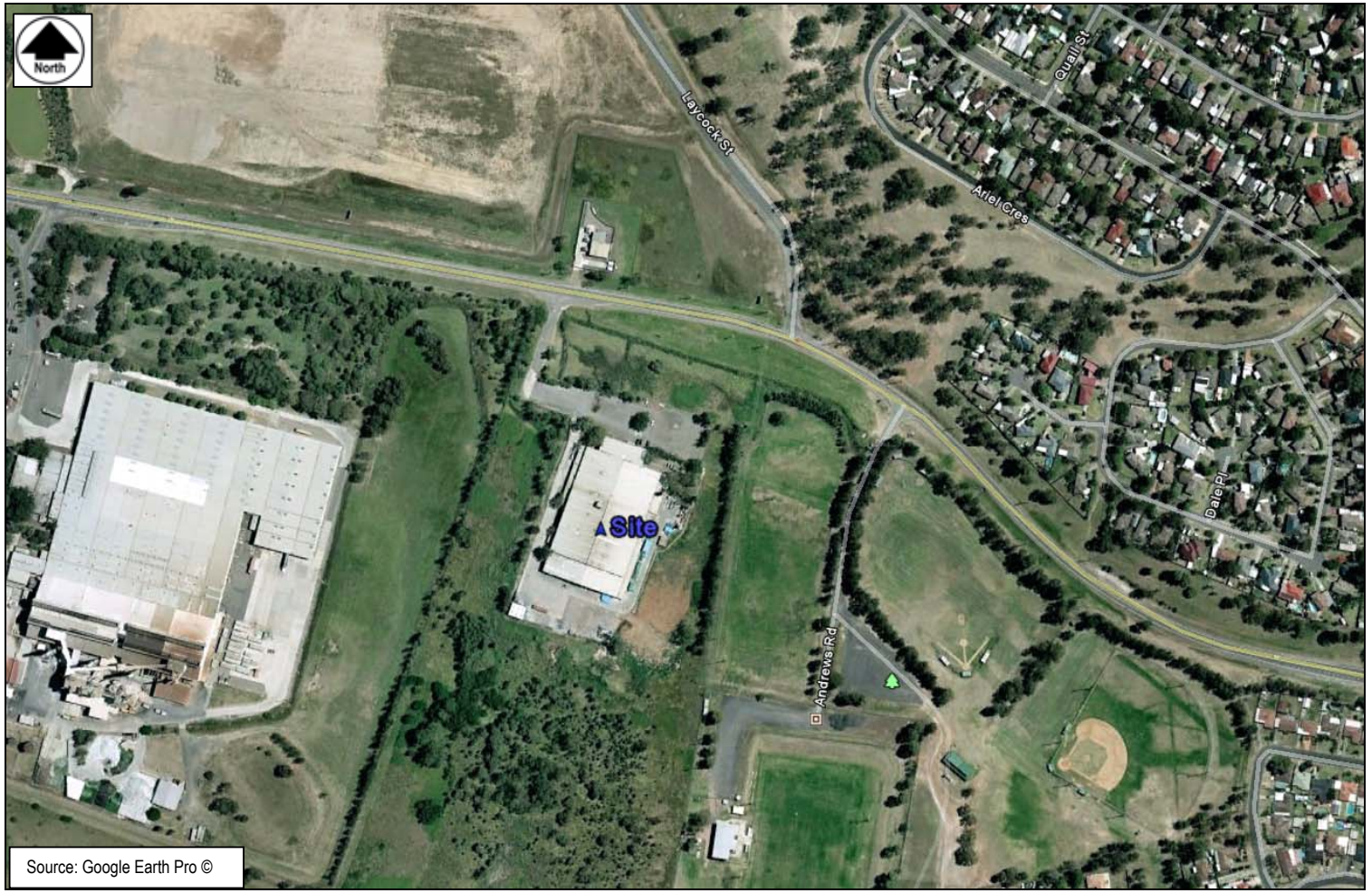


Figure 2-2: Area Map



Source: Six Viewer ©

Figure 2-3: Site Layout

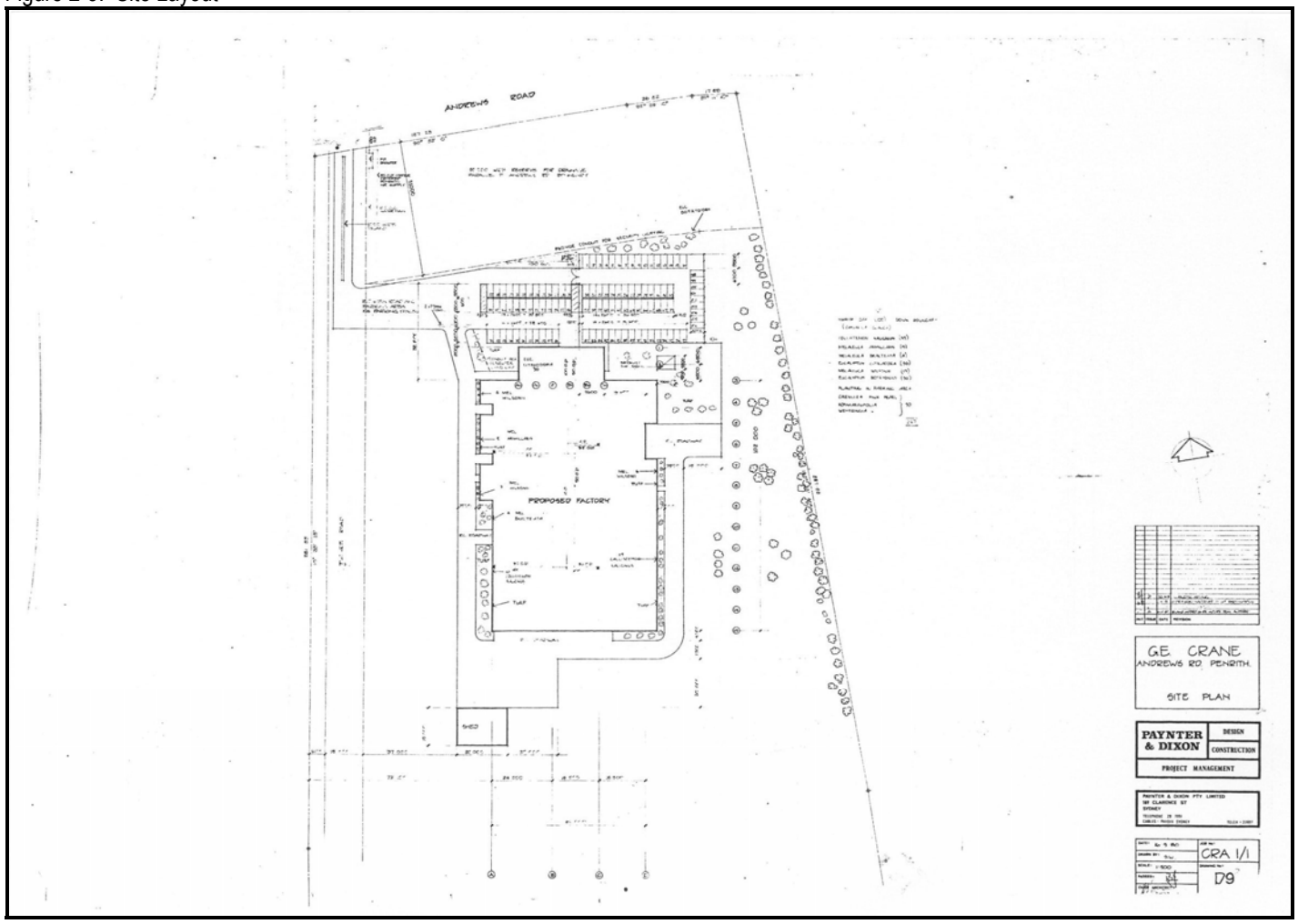
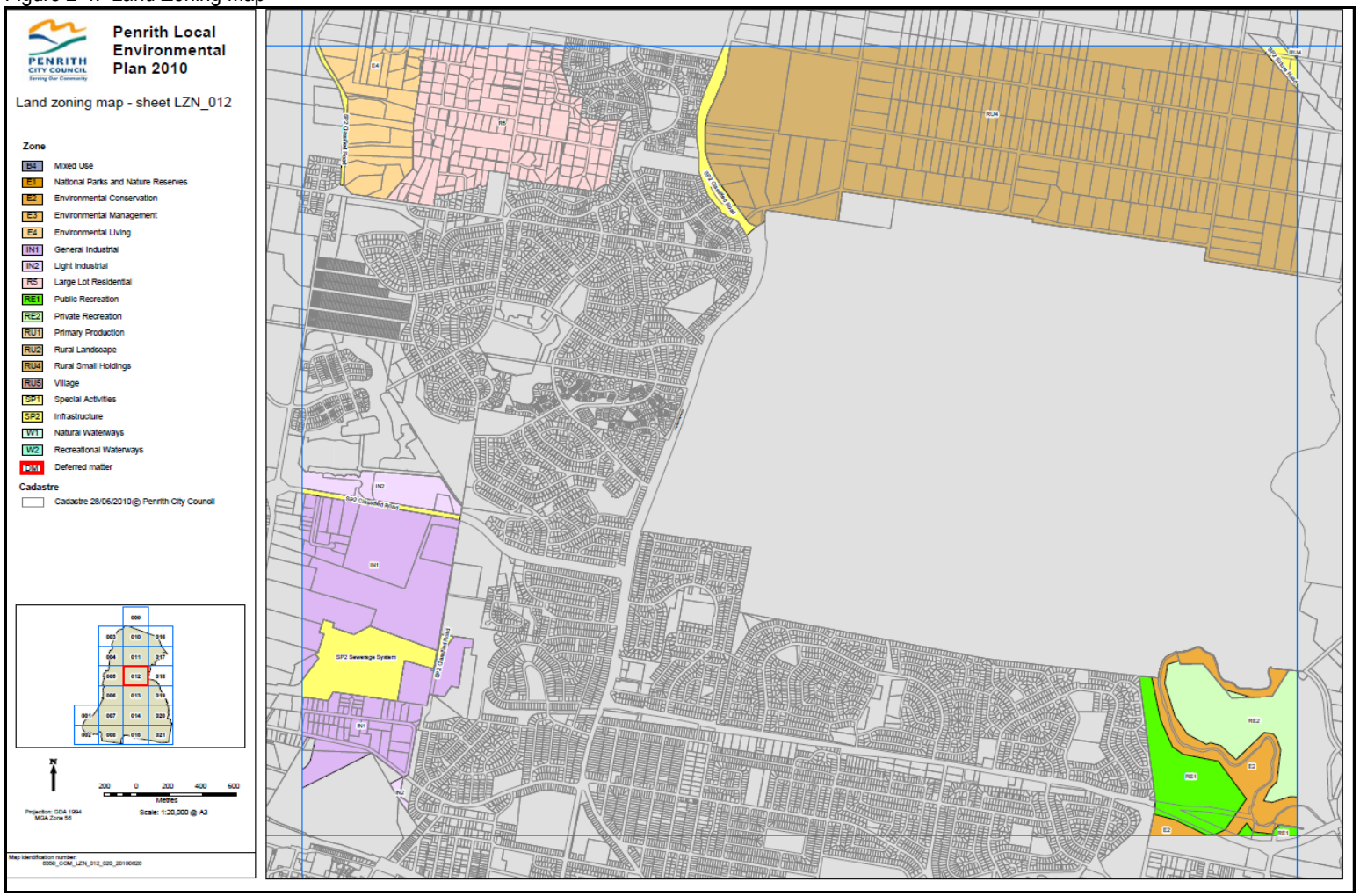


Figure 2-4: Land Zoning Map



2.2 SITE FEATURES

The main features of the land holding are summarised as follows. The photographic section will further illustrate these.

The site is flat and the developed area has been filled to elevate it slightly above the surrounding land form. The site has a single access on the western side of the site with a double width driveway.

The car parking is provided at the front of the site, the car park is sealed as are all trafficked areas.

The site has rear access along the western side of the large stand alone industrial building. A weighbridge exists at the north western corner of the site adjacent to the building. At the rear of the site is a relatively large concreted and asphalted yard area, ideally suited for truck manoeuvring. A roadway continues partially around the eastern side of the site stopping at the front of the industrial building.

Offices are built over two levels.

The electrical substation is adjacent to the north east corner of the site. It was free of any visible staining.

2.3 PHOTOGRAPHIC RECORD

Photograph 1: A view to the east across the front of the site.



Photograph 2: The north facing (front) side of the two storey offices.



Photograph 3: The north east corner of the carpark could allow for a loop road around the building.



Photograph 4: A view across the front carpark to the west. Access to the weigh bridge to the left of the tree arrowed.



Photograph 5: Front façade of the offices.



Photograph 6: Factory amenities – substantial crack of the block wall.



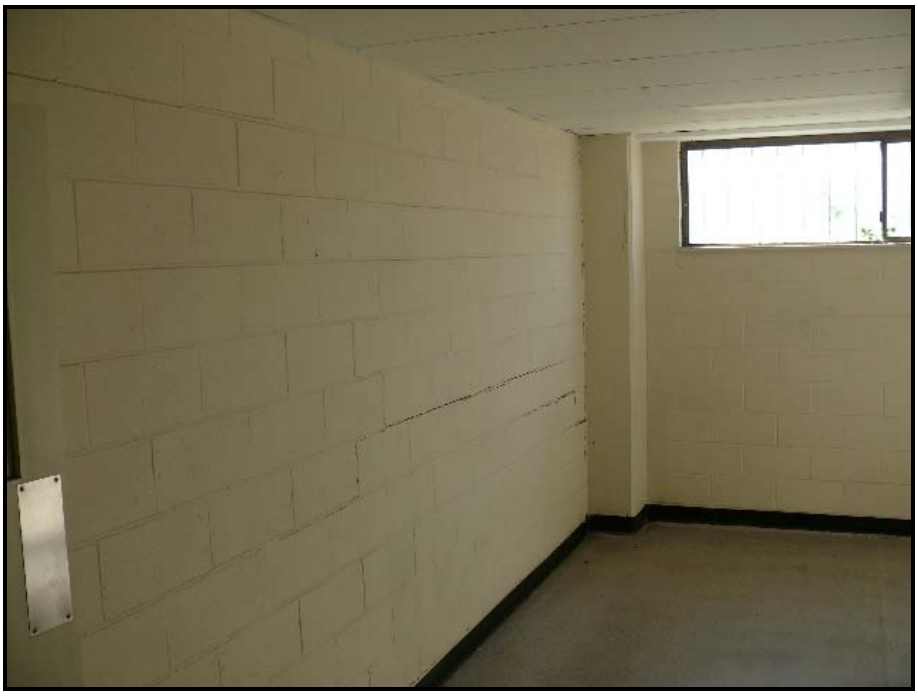
Photograph 7: Cracking extends across adjoining walls but here it is cosmetic.



Photograph 8: Slight cracking in block work evident.



Photograph 9: Rest of amenities.



Photograph 10: Rest of amenities – locker room.



Photograph 11: Eastern divided section of the plant building.

The fire wall separates the building into two compartments.

Roof height drops at the northern and southern ends.



Photograph 12: Another view of this same area across to the south east corner. Arrowed is a fire rated room as used for flammable liquid storage.



Photograph 13: A view of the roof structure in this part of the plant.





Photograph 14: The fire rated wall.

It is built to underneath the roof and not through the roof.

Photograph 15: The western half of the plant.



Photograph 16: The western half of the plant. In the southern end there is this isolated area.



Photograph 17: The fire wall again.



Photograph 18: The far south west corner with a 3T crane.



Photograph 19:



Photograph 20: Rear concreted yard area with a useful shed.



Photograph 21: Rear view to the east.



Photograph 22: View to north east from end (southern end) of the usable land.



Photograph 23: Southern end of the site is unusable.



Photograph 24: View along the eastern wall.



Photograph 25: A view from south looking north in the larger (eastern) "half" of the plant.





Photograph 26: A view back to the south from where the above photo was recorded showing drop in roof height.

Photograph 27: The fire rated wall being of concrete blocks is easy to cut openings through although these then have to be fire rated.



Photograph 28: One of the fire doors.

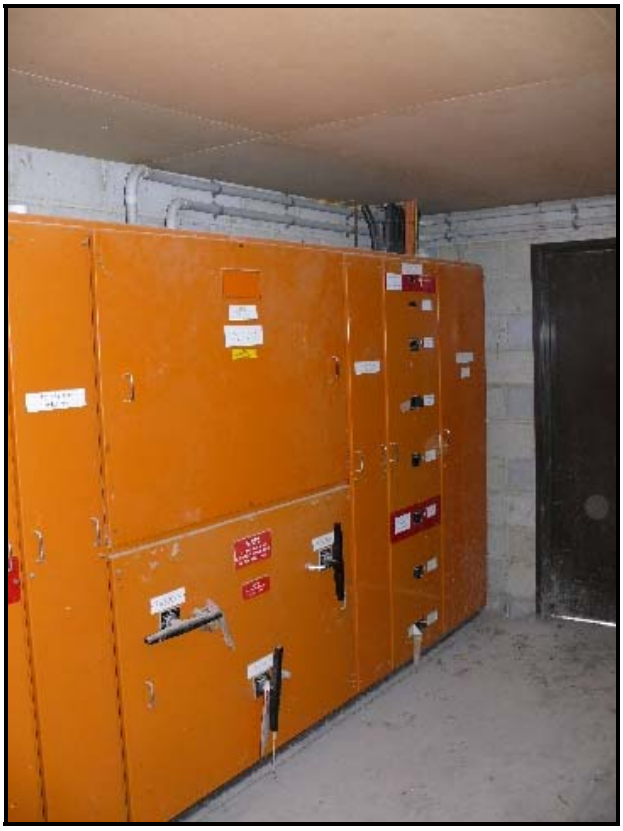


Photograph 29: View across to the inside of the eastern wall showing the lower roof height.



Photograph 30: An access hall way to the east.





Photograph 31: Power control panels.

Photograph 32: Power distribution board.



Photograph 33: Sub station has 1,000 amps per phase.



Photograph 1: Trees to be removed to make way for a loop road.



Photograph 34: Upstairs office.



Photograph 35: Upstairs lunch room.



Photograph 36: Kitchen upstairs.



Photograph 37: Upstairs offices have kitchenette, toilets, access to plant.



Photograph 38:



Photograph 39: Slight water damage.





Photograph 40: Weigh bridge.

It is short and will need two movements to weigh a “B” double.

2.4 LAND USE PLAN

The current LEP is shown as Figure 2-4. This shows the land to the rear of the site as being General Industrial IA.

It shows no easements for the surface water overland flow which indicates the land could be further developed however this would need to be confirmed by correspondence with Penrith City Council and is outside the scope of this study.

2.5 SECTION 149 CERTIFICATE

This certificate has been requested and will be presented in a later issue of this report.

2.6 ADJACENT LAND USE

The land to the west is vacant and from the aerial site history has not been previously developed.

Similarly land to the rear of the site and land adjoining on the east to boundary. Further to the east the land is used for recreational purposes.

Opposite the site to the north the land is undeveloped and will be used for commercial and light industrial use. Further to the north is suburban land that is slightly elevated to the site. Other residential areas are more distant to the east and south east.

3. SITE HISTORY

A review of the site history has been undertaken.

The following process was followed for this site:

- Establish previous owners;
- Interview previous owners and occupants if possible;
- Review Council files available;
- Discuss past site uses with Council staff;
- Review and interpret aerial photographs;
- Undertake a physical site inspection; and
- Review any past contamination studies.

The objective of the site history review is to identify potential contamination sources arising as a consequence of the site's former uses.

3.1 PRIOR LAND USE

- Agriculture prior to and at 1955.
  - ► Refer to Aerials Figure 3.2A and 3.2B.

- 1978. The site remains undeveloped.
  - ► Refer to Aerials Figures 3.3A and 3.3B.

- 1986. The site is developed with similar foot print of the buildings as exists today.
  - ► Refer to Aerials Figure 3.4A and 3.4B.

- 1994. The concreted area at the rear has been extended.
  - ► Refer to Aerials Figure 3.5A and 3.5B.

- 2005. The foot print remains unchanged from 1994.
  - ► Refer to Aerials Figures 3.6A and 3.6B.

The writer has previously inspected the site during its use for storage of fertiliser. The site was recently inspected for this Phase I contamination assessment and the condition of the site is free of any visual evidence of surface contamination from storage of chemicals and in particular fertilisers.

The land was originally owned by GE Crane & Sons. The site plan presented in Section 2 was prepared for GE Crane & Sons and the building foot print follows this plan. The use of the site for manufacturing and storage of plumbing and house ware products may have occurred. There is no evidence of any surface contamination from this previous use. The aerial photographs collected for this study included 1955, 1978, 1984, 1994, and 2005.

3.2 SITE OWNERS

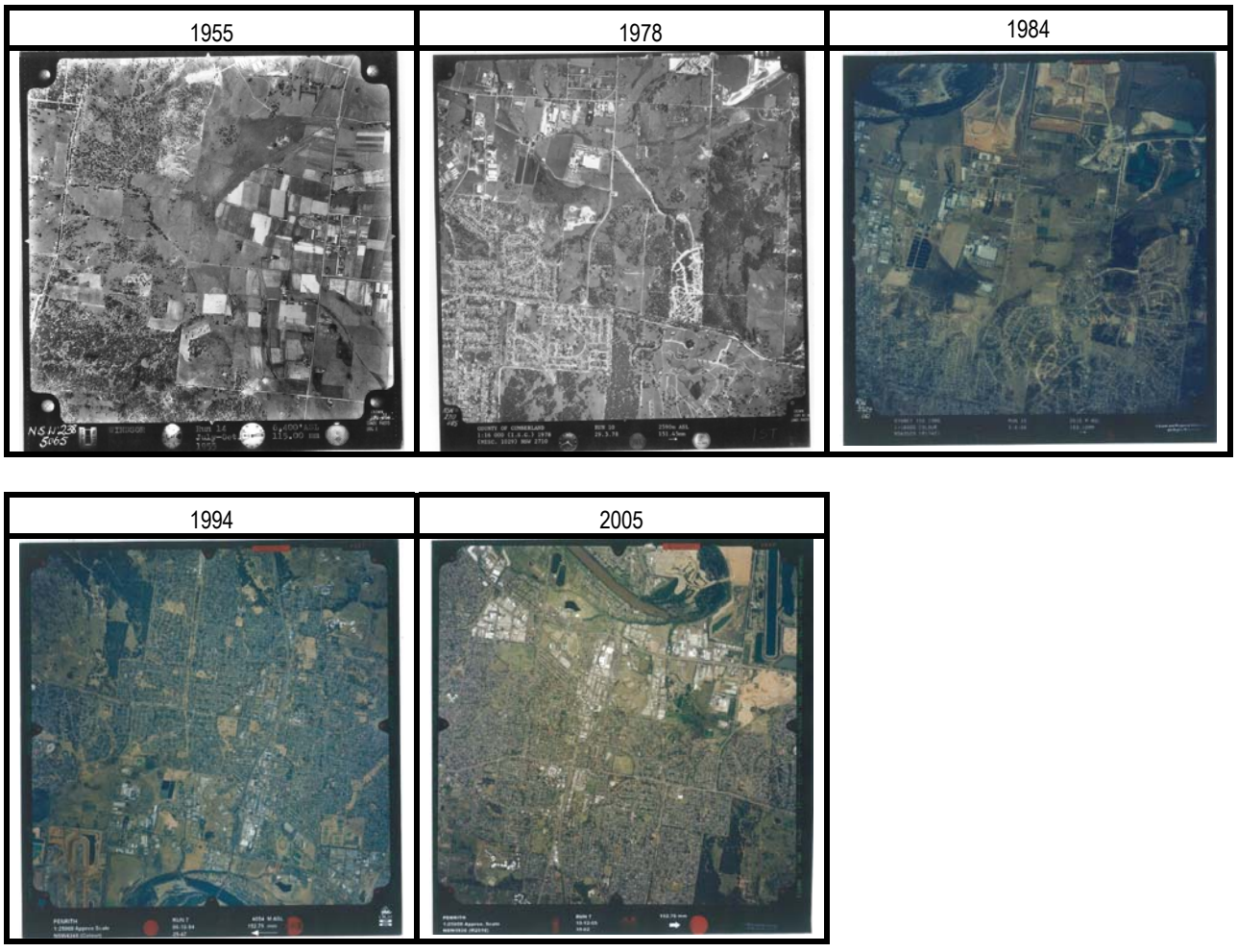
Previous site owners included the following:

- GE Crane and Sons Limited;
- Peshawar Pty Ltd; and
- Wallaroo Pty Ltd.

Land and title search information is presented in Attachment 2.

3.3 INTERPRETATION OF AERIAL PHOTOGRAPHS

Figure 3-1: Aerial Photograph Extracts Gallery



3.3.1 1955 Aerial Photograph

Figure 3-2A Aerial Photograph of the Site and its Surroundings in 1955



Figure 3-3B: Aerial Photograph of the Site and its Surroundings in 1955



3.3.2 1978 Aerial Photograph

The site and land in the immediate vicinity remains undeveloped.

Figure 3-4A: Aerial Photograph of the Site and its Surroundings in 1978



Figure 3-5B: Aerial Photograph of the Site and its Surroundings in 1978



3.3.3 1984 Aerial Photograph

The site is developed with the current industrial premises internal roadways and partially sealed rear yard.

Figure 3-6A: Aerial Photograph of the Site and its Surroundings in 1984



Figure 3-7B: Aerial Photograph of the Site and its Surroundings in 1984



3.3.4 1994 Aerial Photograph

The rear yard area has been extended to the south.

Figure 3-8A: Aerial Photograph of the Site and its Surroundings in 1994



Figure 3-9B: Aerial Photograph of the Site and its Surroundings in 1994



3.3.5 2005 Aerial Photographs

There have been no changes to the external developed areas of the site.

Figure 3-10A: Aerial Photograph of the Site and its Surroundings in 2005



Figure 3-11B: Aerial Photograph of the Site and its Surroundings in 2005



This concludes the analysis of historical aerial photography of the site and its surroundings.

3.4 ENVIRONMENTAL ASSESSMENT

The issues raised under Section 1.2 are presented in tabular form. Those requiring further discussion are then examined in more detail.

Table 3-1: Environmental Assessment Overview

Aspect	Summary Observations
Asbestos containing materials	The site has been developed in an era when asbestos containing materials were still in use.
Radioactive material	No likelihood of these occurring on site.
Lead based paints	The site has been developed in an era when lead based paints were no longer in use in buildings. Lead based paints were phased out in the early 1970's and are not present on site.
Air emissions of pollutants	The site has been used for storage of fertilisers. There is a complete absence of residual fertiliser vapour present.
Surface and/or groundwater pollution	There is negligible surface staining of the concrete. There is also minimal evidence of staining.
Sensitive receptors	Residents ~250 m from the site.
Pesticide and herbicide usage and/or contamination	Little likelihood of these materials being on site in quantities to be of concern to occupants.
Stormwater management	Stormwater discharges to the off site stormwater system.
Electromagnetic fields	EMF are not considered to be relevant to this site, there are no transmission towers present, minor EMF adjacent to the transformer at the front of the site.
Wastewater treatment system	Sewerage system on site.
Potable water source	Mains water supply.
Historic land use	Discussed in detail in Section 3 and no significant issues found.

The following issues are discussed in further depth.

- Asbestos containing materials;
- Surface and/or groundwater pollution; and
- Stormwater management.

3.5

3.5.1 Asbestos Containing Materials

An asbestos register will need to be prepared for the site. An inspection of the site found minimal areas where asbestos cement may be present – eaves of the offices. There may be electrical distribution boards with a backing board that could be made of "Zelemite" which contains asbestos.

The presence of this material requires a register for management of the risk. This is not a significant issue. There was no friable asbestos on site. Removal of any asbestos containing materials is not necessary. Labelling and ongoing management is usually sufficient and accords with WorkCover.

During the era the site was developed stormwater pipes frequently were constructed from asbestos cement. This means that during any future earthworks awareness of this possibility is needed.

3.5.2 Surface and/or Groundwater Pollution

There are no activities on site or visible evidence to suggest that there would be subsoil or groundwater contamination due to past uses of the site.

The site has no history of underground tanks having been installed. Potentially contaminating activities and potential pathways are the following:

Site Construction

- Source:
  - Fill material may have been used during construction
- Contamination of Concern:
  - Various
- Likelihood or Risk of Contamination:
  - Low
- Borehole sampling undertaken for Wallaroo found no contamination of significance for a commercial/industrial site.

Carparks – Front of Site

- Sources:
  - Fuel Releases
  - Oil Leakages
  - Sediment
  - Bitumen Pavement
- Contamination of Concern:
  - Heavy Metals
  - Total petroleum hydrocarbons
  - BTEX (Benzene, toluene, ethylbenzene, xylene)
  - Likelihood or Risk of Contamination
  - Low to Negligible

Warehouse/Factory/Shed

- Source:
  - Past uses
  - Fertiliser storage
  - Lubrication in any machinery
  - Forklifts

- Contaminants of Concern:
  - Total petroleum hydrocarbons
  - BTEX
  - Ammonium phosphate

- Likelihood or Risk of Contamination:
  - Low to Minimal

Rear Yard Area

- Similar to Car parks

Aargus undertook a limited Phase II environmental site assessment in October 2009 releasing the report in November 2009. This study was undertaken for Wallaroo Pty Limited. Eight Boreholes were drilled to a depth of 1.8 m.

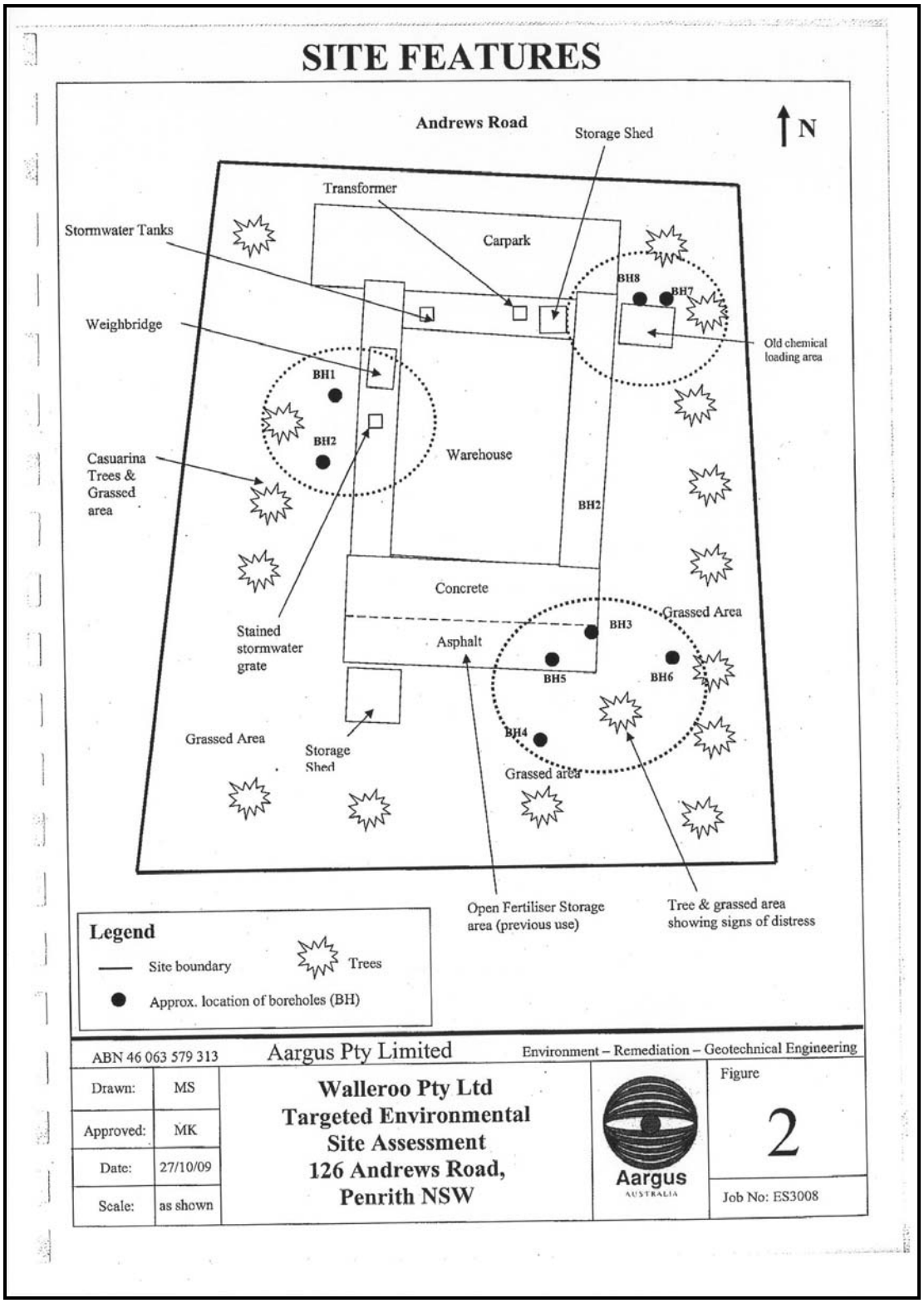
The locations are shown on Figure 3-13 and listed below.

Figure 3-12: Rationale for Sample Locations

Borehole	Rationale
BH1	• Adjacent to the stained stormwater grate
BH2	• Adjacent to the stained stormwater grate
BH3	• In vicinity of stored open fertiliser area
BH4	• Downgradient of open fertiliser area (unsealed area) • In the vicinity of tree & grassed areas showing signs of distress
BH5	• In vicinity of stored open fertiliser area
BH6	• Downgradient of open fertiliser area (unsealed area) • In vicinity of previous asbestos fragment location • In the vicinity of tree & grassed areas showing signs of distress
BH7	• In vicinity of old chemical loading area
BH8	• In vicinity of old chemical loading area

The findings were no presence of contamination at levels of concern for commercial/industrial land use.

Figure 3-13: Site Features



3.6 FAUNA AND FLORA

A targeted search was conducted for threatened and endangered species at the subject site and the surround area to assess any possible impacts of the development on these species.

Table 3-2: Threatened Species Within the Penrith City Council Area

	NAME	CONSERVATION STATUS	APPROXIMATE DISTANCE FROM SITE (km)	BEARING FROM SITE
FAUNA	Anthochaera phrygia Regent Honeyeater	E4A – Critically Endangered Species	4.1 8.6 8.6	NNW NW SW
	Meridolum corneovirens Cumberland Plain Land Snail	E1 - Endangered	2.7 3.5 4.3 5.3	W N NE E
	Lathamus discolor Swift Parrot		3.2 4.1	S NW
	Miniopterus schreibersii oceanensis Eastern Bentwing-bat	V - Vulnerable	1.3 1.6	S E
	Dasyurus maculatus Spotted-tailed Quoll		1.9	SE
	Stictonetta naevosa Freckled Duck		2.4	SW
	Daphoenositta chrysoptera Varied Sittella		3.3	NE
	Neophema pulchella Turquoise Parrot		4.1	NNW
	Circus assimilis Spotted Harrier		5.2	NW

FLORA	Marsdenia viridiflora subsp. viridiflora		5.9	NE
	Pultenaea villifera	E2 – Endangered Population	8.1 9	S NW
	Pimelea spicata Spiked Rice-flower	E1 - Endangered	0.53 1.1	E N
	Persoonia nutans		1.9	S
	Nodding Geebung		2.4 2.6	NE SE
	Persoonia hirsute Hairy Geebung		6.8	SW
	Grevillea juniperina subsp. juniperina Juniper-leaved Grevillea		1.4 2.4 2.8 6.5	NE E N SE
	Dillwynia tenuifolia	V - Vulnerable	5.9	SW

Note: E4A – Critically Endangered Species: Refers to species in the opinion of the Scientific Committee facing extremely high risk of extinction in NSW in the immediate future.
E1 – Endangered: Refers to species that are likely to become extinct in NSW unless circumstances and factors threatening its survival or evolutionary development cease to operate.
E2 – Endangered Population: Refers to a population where its numbers have been reduced to such a critical level or its habitat has been so drastically reduced that it is in immediate danger of extinction.
V – Vulnerable: Refers to species that are likely to become endangered unless circumstances and factors threatening its survival or evolutionary development cease to operate.

There are no critically endangered, endangered or vulnerable fauna species identified to be located in the immediate vicinity of the subject site. As summarised in Table 3-2 above, the nearest identified NPSW Wildlife Atlas Critically Endangered listed fauna species is the Regent Honeyeater, which been observed at an approximately closeness of 4.1km from the subject site. Due to the proposed nature of operations to be conducted at the subject site, it is anticipated that there will not be any adverse affects or alterations to the habitat of fauna within the identified area.

Endangered fauna species commonly referred to as *Spiked Rice Flower* has been identified to be located approximately 0.53m east and 1.1m north of the subject site boundary. It is assumed that these plants are located on adjacent land or possibly on the nature strip of the subject site. It is important that the proponent consider the presence of these flora species in the event of conducting site beautification or modifications beyond the current site boundary.

Overall, the Flora and Fauna study has found that given the site is an existing building with prior industrial application, the proposed development would not significantly alter the features of the site environment and hence the development and proposed operations are not expected tp impact the threatened or vulnerable flora and fauna in the local area.

4. CONCLUSIONS AND RECOMMENDATIONS

The site is considered to be uncontaminated for ongoing use for commercial and industrial purposes.

A Phase II contamination study is not considered warranted.

This concludes the report.

Prepared by:

R T Benbow
Principal Consultant

5. LIMITATIONS

Our services for this project are carried out in accordance with our current professional standards for site assessment investigations. No guarantees are either expressed or implied.

This report has been prepared solely for the use by SKM Recycling, as per our agreement for providing environmental assessment services. Although all due care has been taken in the preparation of this study, no warranty is given, nor liability accepted (except that required by law) in relation to the information contained within this document.

SKM Recycling is entitled to rely upon the findings in the report within the scope of work described in this report. No responsibility is accepted for the use of any part of the report in any other context or for any other purpose.

Opinions and judgements expressed herein, which are based on our understanding and interpretation of current regulatory standards, should not be construed as legal opinions.

ATTACHMENTS

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Email: pencit@penrithcity.nsw.gov.au

PLANNING CERTIFICATE UNDER SECTION 149

Environmental Planning and Assessment Act, 1979

Property No: 110613
Your Reference: 115011 Collect
Contact No: 9890 5099

Issue Date: 27/10/2011
Certificate No: 11/04743
Receipt Date: 27/10/2011
Receipt No: 2414868

Issued to: Richard Benbow
PO Box 687
PAARRAMATTA NSW 2151

PRECINCT 2010

DESCRIPTION OF LAND

County: CUMBERLAND **Parish: CASTLEREAGH**

Location: 126 Andrews Road PENRITH NSW 2750
Land Description: Lot 1 DP 747153

- PART 1 PRESCRIBED MATTERS –

In accordance with the provisions of Section 149(2) of the Act the following information is furnished in respect of the abovementioned land:

1 *NAMES OF RELEVANT PLANNING INSTRUMENTS AND DCPs*

1(1) The name of each environmental planning instrument that applies to the carrying out of development on the land:

Penrith Local Environmental Plan 2010, published 22nd September, 2010, applies to the land.

Sydney Regional Environmental Plan No.9 - Extractive Industry (No.2), gazetted 15 September 1995, as amended, applies to the local government area of Penrith.

Sydney Regional Environmental Plan No. 20 - Hawkesbury-Nepean River (No. 2 - 1997), gazetted 7 November 1997, as amended, applies to the local government area of Penrith (except land to which Sydney Regional Environmental Plan No. 11 - Penrith Lakes Scheme applies).

The names of each State environmental planning policy applying to the land are:
State Environmental Planning Policy No. 4 - Development Without Consent and Miscellaneous Exempt and Complying Development. (Note1: This policy may not apply to land reserved for certain public purposes. See clause 4 of the policy. Note 2: Clause 6 of the policy does not apply to land subject to Penrith City Centre Local Environmental Plan 2008 or State Environmental Planning Policy (Western Sydney Employment Area) 2009. Note 3: Clause 6 and Parts 3 and 4 of the policy do not apply to land subject to Penrith Local Environmental Plan (Glenmore Park Stage 2) 2009, Penrith Local Environmental Plan (South Werrington Urban Village) 2009, Penrith Local Environmental Plan (Caddens) 2009, or Penrith Local Environmental Plan 2010.)
State Environmental Planning Policy No. 6 - Number of Storeys in a Building.
State Environmental Planning Policy No.19 - Bushland in Urban Areas. (Note: This policy does not apply to certain land referred to in the National Parks and Wildlife Act 1974 and the Forestry Act 1916).
State Environmental Planning Policy No.21 - Caravan Parks.
State Environmental Planning Policy No.22 - Shops and Commercial Premises.

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State Environmental Planning Policy No.30 - Intensive Agriculture.
State Environmental Planning Policy No.32 - Urban Consolidation (Redevelopment of Urban Land). (Note: This policy does not apply to land identified as coastal protection, environmental protection, escarpment, floodway, natural hazard, non-urban, rural, rural residential, water catchment or wetland.)
State Environmental Planning Policy No.33 - Hazardous and Offensive Development.
State Environmental Planning Policy No.50 - Canal Estate Development. (Note: This policy does not apply to the land to which Penrith Local Environmental Plan 1998 (Lakes Environs) and Sydney Regional Environmental Plan No. 11 - Penrith Lakes Scheme apply.)
State Environmental Planning Policy No.55 - Remediation of Land.
Sate Environmental Planning Policy No.62 - Sustainable Aquaculture.
State Environmental Planning Policy No.64 - Advertising and Signage.
State Environmental Planning Policy No.65 - Design Quality of Residential Flat Development.
State Environmental Planning Policy No.70 - Affordable Housing (Revised Schemes).
State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 (Note: This policy applies to land within New South Wales that is land zoned primarily for urban purposes or land that adjoins land zoned primarily for urban purposes, but only as detailed in clause 4 of the policy.)
State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004.
State Environmental Planning Policy (Major Development) 2005.
State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007.
State Environmental Planning Policy (Temporary Structures) 2007.
State Environmental Planning Policy (Infrastructure) 2007.
State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.
State Environmental Planning Policy (Affordable Rental Housing) 2009.
State Environmental Planning Policy (State and Regional Development) 2011.

1(2) The name of each proposed environmental planning instrument that will apply to the carrying out of development on the land and that is or has been the subject of community consultation or on public exhibition under the Act:

(Information is provided in this section only if a proposed environmental planning instrument that is or has been the subject of community consultation or on public exhibition under the Act will apply to the carrying out of development on the land.)

1(3) The name of each development control plan that applies to the carrying out of development on the land:

Penrith Development Control Plan 2010 applies to all land subject to Penrith Local Environmental Plan 2010. Penrith Development Control Plan 2006 applies to all land not subject to Penrith Local Environmental Plan 2010.

2 *ZONING AND LAND USE UNDER RELEVANT LEPs*

For each environmental planning instrument or proposed instrument referred to in clause 1 (other than a SEPP or proposed SEPP) that includes the land in any zone (however described):

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2(a)-(d) the identity of the zone; the purposes that may be carried out without development consent; the purposes that may not be carried out except with development consent; and the purposes that are prohibited within the zone. Any zone(s) applying to the land is/are listed below and/or in annexures.

(Note: If no zoning appears in this section see section 1(1) for zoning and land use details (under the Sydney Regional Environmental Plan or State Environmental Planning Policy that zones this property).)

Zone IN1 General Industrial

1 Objectives of zone

- To provide a wide range of industrial and warehouse land uses.
- To encourage employment opportunities.
- To minimise any adverse effect of industry on other land uses.
- To support and protect industrial land for industrial uses.
- To promote development that makes efficient use of industrial land.
- To permit facilities that serve the daily recreation and convenience needs of persons working in industrial areas.

2 Permitted without consent

Roads

3 Permitted with consent

Animal boarding or training establishments; Car parks; Depots; Environmental facilities; Environmental protection works; Flood mitigation works; Freight transport facilities; General industries; Hardware and building supplies; Industrial retail outlets; Industrial training facilities; Industries; Landscaping material supplies; Light industries; Neighbourhood shops; Plant nurseries; Recreation areas; Sawmill or log processing works; Self-storage units; Signage; Take away food and drink premises; Timber yards; Transport depots; Truck depots; Vehicle body repair workshops; Vehicle repair stations; Warehouse or distribution centres

4 Prohibited

Hazardous industries; Offensive industries; Any other development not specified in item 2 or 3

Flood planning

All or part of the subject land is identified in Penrith Local Environmental Plan 2010 (PLEP 2010) Clause 6.3 Flood Planning. Development consent is required for any development on land to which Clause 6.3 of PLEP 2010 applies.

Additional information relating to Penrith Local Environmental Plan 2010

Note 1: Under the terms of Clause 2.4 of Penrith Local Environmental Plan 2010 development may be carried out on unzoned land only with development consent.

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Note 2: Land to which Penrith Local Environmental Plan 2010 applies may be subdivided but only with development consent. Development consent must not be granted for the subdivision of land on which a secondary dwelling is situated if the subdivision would result in the principal dwelling and the secondary dwelling being situated on separate lots, unless the resulting lots are not less than the minimum size shown on the Lot Size Map in relation to the land.

Note 3: Under the terms of Clause 2.7 of Penrith Local Environmental Plan 2010 the demolition of a building or work may be carried out only with development consent.

Note 4: A temporary use may be permitted with development consent subject to the requirements of Clause 2.8 of Penrith Local Environmental Plan 2010.

Note 5: Under the terms of Clause 5.1 of Penrith Local Environmental Plan 2010 development on land acquired by an authority of the State under the owner-initiated acquisition provisions may, before it is used for the purpose for which it is reserved, be carried out, with development consent, for any purpose.

Note 6: Under the terms of Clause 5.3 of Penrith Local Environmental Plan 2010 development consent may be granted to development of certain land for any purpose that may be carried out in an adjoining zone.

Note 7: Under the terms of Clause 5.9 of Penrith Local Environmental Plan 2010 trees or other vegetation subject to Penrith Development Control Plan 2010 must not be ringbarked, cut down, topped, lopped, removed, injured or wilfully destroyed without the authority conferred by a development consent or a Council permit.

Note 8: Clause 5.10 of Penrith Local Environmental Plan 2010 details when development consent is required/not required in relation to heritage conservation.

Note 9: Under the terms of Clause 5.11 of Penrith Local Environmental Plan 2010 bush fire hazard reduction work authorised by the *Rural Fires Act 1997* may be carried out on any land without development consent.

Note 10: Sex services premises and restricted premises may only be permitted subject to the requirements of Clause 6.15 of Penrith Local Environmental Plan 2010.

2(e) whether any development standards applying to the land fix minimum land dimensions for the erection of a dwelling-house on the land and, if so, the minimum land dimensions so fixed:

(Information is provided in this section only if any development standards applying to the land fix minimum land dimensions for the erection of a dwelling-house on the land and, if so, the minimum land dimensions so fixed.)

2(f) whether the land includes or comprises critical habitat:

(Information is provided in this section only if the land includes or comprises critical habitat.)

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2(g) whether the land is in a conservation area (however described):

(Information is provided in this section only if the land is in a conservation area (however described).)

2(h) whether an item of environmental heritage (however described) is situated on the land:

(Information is provided in this section only if an item of environmental heritage (however described) is situated on the land.)

2A ZONING AND LAND USE UNDER STATE ENVIRONMENTAL PLANNING POLICY (SYDNEY REGION GROWTH CENTRES) 2006

(Information is provided in this section only if the land is within any zone under State Environmental Planning Policy (Sydney Region Growth Centres) 2006.)

3 COMPLYING DEVELOPMENT

GENERAL HOUSING CODE

Complying development under the General Housing Code **may** be carried out on the land.

RURAL HOUSING CODE

Complying development under the Rural Housing Code **may** be carried out on the land.

HOUSING ALTERATIONS CODE

Complying development under the Housing Alterations Code **may** be carried out on the land.

GENERAL DEVELOPMENT CODE

Complying development under the General Development Code **may** be carried out on the land.

GENERAL COMMERCIAL AND INDUSTRIAL CODE

Complying development under the General Commercial and Industrial Code **may** be carried out on the land.

SUBDIVISIONS CODE

Complying development under the Subdivisions Code **may** be carried out on the land.

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PLANNING CERTIFICATE UNDER SECTION 149

Environmental Planning and Assessment Act, 1979

DEMOLITION CODE

Complying development under the Demolition Code **may** be carried out on the land.

(NOTE: (1) Council has relied on Department of Planning Circulars and Fact Sheets in the preparation of this information. Applicants should seek their own legal advice in relation to this matter with particular reference to State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.)

(2) Penrith Local Environmental Plan 2010 (if it applies to the land) contains additional complying development not specified in State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.)

4 COASTAL PROTECTION

The land is not affected by the operation of sections 38 or 39 of the Coastal Protection Act 1979, to the extent that council has been so notified by the Department of Public Works.

5 MINE SUBSIDENCE

The land is not proclaimed to be a mine subsidence district within the meaning of section 15 of the Mine Subsidence Compensation Act 1961.

6 *ROAD WIDENING AND ROAD REALIGNMENT*

The land is not affected by any road widening or road realignment under:
(a) Division 2 of Part 3 of the Roads Act 1993, or
(b) an environmental planning instrument, or
(c) a resolution of council.

7 COUNCIL AND OTHER PUBLIC AUTHORITY POLICIES ON HAZARD RISK RESTRICTIONS

(a) Councils Policies
The land is not affected by a policy adopted by the council that restricts the development of the land because of the likelihood of land slip, bushfire, tidal inundation, subsidence, acid sulphate soils or any other risk (other than flooding).

(b) Other Public Authority Policies
The Bush Fire Co-ordinating Committee has adopted a Bush Fire Risk Management Plan that covers the local government area of Penrith City Council, and includes public, private and Commonwealth lands.
The land is not affected by a policy adopted by any other public authority and notified to the council for the express purpose of its adoption by that authority being referred to in planning certificates issued by the council, that restricts the development of the land because of the likelihood of land slip, tidal inundation, subsidence, acid sulphate soils or any other risk (other than flooding).

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Email: pencit@penrithcity.nsw.gov.au

Telephone: 02 4732 7777
Facsimile: 02 4732 7958

7A FLOOD RELATED DEVELOPMENT CONTROLS INFORMATION

(1) Development on the land or part of the land for the purposes of dwelling houses, dual occupancies, multi dwelling housing or residential flat buildings (not including development for the purposes of group homes or seniors housing) (if such uses are permissible on the land) is subject to flood related development controls.

(2) Development on the land or part of the land for industrial or commercial purposes (if such uses are permissible on the land) is subject to flood related development controls.
Development on the land or part of the land for purposes other than industrial or commercial, or for purposes other than those referred to in (1) above, will be considered on a merits based approach and flood related development controls may apply.

Note: The land is subject to Penrith Development Control Plan 2010 Section C3.5 Flood Liable Lands and/or Penrith Development Control Plan 2006 Section 2.10 Flood Liable Land. On application and payment of the prescribed fee Council may be able to provide in writing a range of advice in regard to the extent of flooding affecting the property.

8 LAND RESERVED FOR ACQUISITION

No environmental planning instrument or proposed environmental planning instrument referred to in clause 1 makes provision in relation to the acquisition of the land by a public authority, as referred to in section 27 of the Act.

9 CONTRIBUTIONS PLANS

(Information is provided in this section only if a contributions plan applies to the land.)

9A BIODIVERSITY CERTIFIED LAND

(Information is provided in this section only if the land is biodiversity certified land (within the meaning of Part 7AA of the *Threatened Species Conservation Act 1995*).)

10 BIOBANKING AGREEMENTS

(Information is provided in this section only if Council has been notified by the Director-General of the Department of Environment, Climate Change and Water that the land is land to which a biobanking agreement under Part 7A of the *Threatened Species Conservation Act 1995* relates.)

11 BUSH FIRE PRONE LAND

Some of the land is identified as bush fire prone land according to Council records. Guidance as to restrictions that may be placed on the land as a result of the land being bush fire prone can be obtained by contacting Council. Such advice would be subject to further requirements of the NSW Rural Fire Services.

PENRITH CITY COUNCIL
Serving Our Community

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12 PROPERTY VEGETATION PLANS

(Information is provided in this section only if Council has been notified that the land is land to which a property vegetation plan under the Native Vegetation Act 2003 applies.)

13 ORDERS UNDER TREES (DISPUTES BETWEEN NEIGHBOURS) ACT 2006

(Information is provided in this section only if Council has been notified that an order has been made under the Trees (Disputes Between Neighbours) Act 2006 to carry out work in relation to a tree on the land.)

14 DIRECTIONS UNDER PART 3A

(Information is provided in this section only if there is a direction by the Minister in force under section 75P(2)(c1) of the Act that a provision of an environmental planning instrument prohibiting or restricting the carrying out of a project or a stage of a project on the land under Part 4 of the Act does not have effect.)

15 SITE COMPATIBILITY CERTIFICATES AND CONDITIONS AFFECTING SENIORS HOUSING

(Information is provided in this section only if:

(a) there is a current site compatibility certificate (seniors housing), of which the council is aware, issued under State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 in respect of proposed development on the land; and/or

(b) any terms of a kind referred to in clause 18(2) of State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 have been imposed as a condition of consent to a development application granted after 11 October 2007 in respect of the land.)

16 SITE COMPATIBILITY CERTIFICATES FOR INFRASTRUCTURE

(Information is provided in this section only if there is a valid site compatibility certificate (infrastructure), of which council is aware, in respect of proposed development on the land.)

17 SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR AFFORDABLE RENTAL HOUSING

(Information is provided in this section only if:

(a) there is a current site compatibility certificate (affordable rental housing), of which the council is aware, in respect of proposed development on the land; and/or

(b) any terms of a kind referred to in clause 17(1) or 37(1) of State Environmental Planning Policy (Affordable Rental Housing) 2009 have been imposed as a condition of consent to a development application in respect of the land.)

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PLANNING CERTIFICATE UNDER SECTION 149

Environmental Planning and Assessment Act, 1979

NOTE: The following matters are prescribed by section 59(2) of the Contaminated Land Management Act 1997 as additional matters to be specified in a planning certificate

(a) (Information is provided in this section only if, as at the date of this certificate, the land (or part of the land) is significantly contaminated land within the meaning of the Contaminated Land Management Act 1997.)

(b) (Information is provided in this section only if, as at the date of this certificate, the land is subject to a management order within the meaning of the Contaminated Land Management Act 1997.)

(c) (Information is provided in this section only if, as at the date of this certificate, the land is the subject of an approved voluntary management proposal within the meaning of the Contaminated Land Management Act 1997.)

(d) (Information is provided in this section only if, at the date of this certificate, the land subject to an ongoing maintenance order within the meaning of the Contaminated Land Management Act 1997.)

(e) (Information is provided in this section only if the land is the subject of a site audit statement within the meaning of the Contaminated Land Management Act 1997 – a copy of which has been provided to Council.)

Note: Section 149(5) information for this property may contain additional information regarding contamination issues.

Note: The Environmental Planning and Assessment Amendment Act 1997 commenced operation on the 1 July 1998. As a consequence of this Act the information contained in this certificate needs to be read in conjunction with the provisions of the Environmental Planning and Assessment (Amendment) Regulation 1998, Environmental Planning and Assessment (Further Amendment) Regulation 1998 and Environmental Planning and Assessment (Savings and Transitional) Regulation 1998 and Environmental Planning and Assessment Regulation 2000.

Information is provided only to the extent that Council has been notified by relevant government departments.

149(5) Certificate
This Certificate is directed to the following relevant matters affecting the land

When information pursuant to section 149(5) is requested the Council is under no obligation to furnish any of the information supplied herein pursuant to that section. Council draws your attention to section 149(6) which states that a council shall not incur any liability in respect of any advice provided in good faith pursuant to sub-section (5). The absence of any reference to any matter affecting the land shall not imply that the land is not affected by any matter not referred to in this certificate.

Note:

- Council's 149(5) information does not include development consent or easement information. Details of development consents may be obtained by making enquiries with Council's Development Services Department pursuant to section 12 of the Local Government Act 1993 or (for development applications lodged after January 2007) by viewing the Online Services area at www.penrithcity.nsw.gov.au . Details of any easements may be obtained from a Title Search at Land and Property Information New South Wales.
- This certificate does not contain information relating to Complying Development Certificates.
- This certificate may not provide full details of development rights over the land.

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PLANNING CERTIFICATE UNDER SECTION 149

Environmental Planning and Assessment Act, 1979

* When considering any development application Council must have regard to the Threatened Species Conservation Act 1995. Please note that this legislation may have application to any land throughout the city. Interested persons should make their own enquiries in regard to the impact that this legislation could have on this land.

* The land is identified as "land with scenic and landscape values" on the Penrith Local Environmental Plan 2010 Scenic and Landscape Values Map. See Clause 6.5 of Penrith Local Environmental Plan 2010 and Chapter C1 Site Planning and Design of Penrith Development Control Plan 2010.

* See Clause 5.9 of Penrith Local Environmental Plan 2010 and Chapter C2 of Penrith Development Control Plan 2010 for specific controls relating to the preservation of trees and vegetation.

* Penrith Development Control Plan 2010, which applies to the land, sets out requirements for a range of issues that apply across the Penrith Local Government Area, including:

- Site Planning and Design Principles
- Vegetation Management
- Water Management
- Land Management
- Waste Management
- Landscape Design
- Culture and Heritage
- Public Domain
- Advertising and Signage
- Transport, Access and Parking
- Subdivision
- Noise and Vibration, and
- Infrastructure and Services.

The Development Control Plan also specifies requirements relating to various types of land uses including:

- Rural Land Uses
- Residential Development
- Commercial and Retail Development, and
- Industrial Development

as well as for a number of specific activities, including child care centres; health consulting rooms; educational establishments; places of public worship; vehicle repair stations; cemeteries, crematoria and funeral chapels; extractive industries; and telecommunication facilities.

The Development Control Plan also details requirements relating to key precincts within the Penrith Local Government Area, including:

- Mulgoa Valley
- Orchard Hills
- Waterside Corporate, and
- St Marys Town Centre.

Penrith Development Control Plan 2010 may be accessed at http://www.penrithcity.nsw.gov.au/index.asp?id=5451 .

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Telephone: 02 4732 7777
Facsimile: 02 4732 7958

PLANNING CERTIFICATE UNDER SECTION 149

Environmental Planning and Assessment Act, 1979

Alan Stoneham
General Manager

PER _____

Land and Property Information Division
ABN: 84 104 377 806
GPO Box 15
Sydney NSW 2001
DX 17 SYDNEY Telephone: 1300 052 637

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE
29/9/2011 10:54AM

FOLIO: 1/747153

First Title(s): OLD SYSTEM
Prior Title(s): VOL 12505 FOL 65

Recorded	Number	Type of Instrument	C.T. Issue
6/7/1987	DP747153	DEPOSITED PLAN	FOLIO CREATED EDITION 1
17/7/1987	W995428	DEPARTMENTAL DEALING	EDITION 2
7/12/1987	X98138	WITHDRAWAL OF CAVEAT	
7/12/1987	X98139	TRANSFER	EDITION 3
17/11/1993	I801054	TRANSFER	
17/11/1993	I801055	MORTGAGE	EDITION 4
2/12/1997	3629148	DISCHARGE OF MORTGAGE	
2/12/1997	3629149	TRANSFER	
2/12/1997	3629150	MORTGAGE	EDITION 5
22/10/1998	5345869	LEASE	EDITION 6
16/12/2004	AB16717	LEASE	EDITION 7

*** END OF SEARCH ***

PRINTED ON 29/9/2011

Req:R841446 /Doc:DL W995428 /Rev:24-Sep-2010 /Sts:OK.SC /Prt:30-Sep-2011 12:16 /Pgs:ALL /Seq:1 of 1
Ref: /Src:X

W995428

DEPARTMENTAL DEALING

DD

THIS DOCUMENT IS DESIGNED TO RECORD THE EFFECT OF DEPARTMENTAL ACTIONS AND AMENDMENTS ON COMPUTER FOLIOS.

of

$ NO FEE

R1of1

FOLIO IDENTIFIER	FOLIO IDENTIFIER	FOLIO IDENTIFIER	Location
1/747153 2/747153			

REASON FOR PREPARATION: Amendment

Registered Proprietor shown incorrectly on the title should be G.E. Crane & Sons Limited

FIRST SCHEDULE DIRECTIONS

(A) FOLIO IDENTIFIER	(B) DIRECTION	(C) NAME
	S	G.E. CRANE & SONS LIMITED

SECOND SCHEDULE & OTHER DIRECTIONS

(D) FOLIO IDENTIFIER	(E) DIRECTION	(F) NOTEN TYPE	(G) DEALING NUMBER	(H) DETAILS

PREPARED BY: CMB TABLE NO: 4

DIRECTED BY:

AUTHORISED BY: RMB

LODGED BY LAND TITLES OFFICE

Delivery Box Number 10 V

REGISTERED - -19

17 JUL 1987

Delivery Directions: CT 406T

RP 26

RELODGED 27 NOV 1987 12.25

X098138

WITHDRAWAL OF CAVEAT

REAL PROPERTY ACT, 1900

WX

CB 1 of 2

$ 37

R1/2

DESCRIPTION OF LAND
Note (a)

LAND over which the caveat is registered	
Torrens Title Reference	If Part Only, Delete Whole and Give Details
VOLUME 12505 FOLIO 65 now being 1/747153, 2/747153, and ~~3/747153~~.	WHOLE

098

REGISTERED DEALING
Note (b)

LEASE, MORTGAGE, or CHARGE affected by caveat

Type of Dealing	Registered Number	Torrens Title Reference

CAVEATOR
Note (c)

CONTAINERS LIMITED of 265-275 FRANKLIN STREET, MELBOURNE, VICTORIA.

Note (d)

(the abovenamed CAVEATOR) hereby withdraws the undermentioned caveat so far as it affects the land above described. ~~abovementioned registered dealing~~.

REGISTERED NUMBER OF CAVEAT
Note (e)

CAVEAT NUMBER W460868

OFFICE USE ONLY

OFF X

DATE 14 September 1987.

I hereby certify this withdrawal of caveat to be correct for the purposes of the Real Property Act, 1900.

EXECUTION
Note (f)

Signed in my presence by the caveator who is personally known to me

THE COMMON SEAL of)
CONTAINERS LIMITED)
was hereunto affixed)
~~Signature of Witness~~
in accordance with its)
Articles of Association)

CONTAINERS LIMITED — THE COMMON SEAL OF

Director

Secretary

~~Name of Witness (BLOCK LETTERS)~~

~~Address and occupation of Witness~~

~~Signature of Caveator~~

TO BE COMPLETED BY LODGING PARTY
Notes (g) and (h)

LODGED BY
ALLEN ALLEN & HEMSLEY
MLC CENTRE
MARTIN PLACE, SYDNEY

Delivery Box Number DX 105 SYDNEY 745

LOCATION OF DOCUMENTS

CT	OTHER	
		Herewith
		In L.T.O. with
		Produced by

OFFICE USE ONLY

Checked	Passed	REGISTERED - -19
EBz.		
Signed	Extra Fee	- 7 DEC 1987

Secondary Directions		
Delivery Directions		

STAMP DUTY [redacted]

X098139

R2/2.

TRANSFER

REAL PROPERTY ACT, 1900

T 3 | 2 of 2 | X

$ 37

Torrens Title Reference	If Part Only, Delete Whole and Give Details	Location
Folio Identifier 1/747153	WHOLE	CRANEBROOK

DESCRIPTION OF LAND Note (a)

TRANSFEROR Note (b)

G.E. CRANE & SONS LIMITED, 242 BEECROFT ROAD, EPPING, NEW SOUTH WALES

ESTATE Note (c)

(the abovenamed TRANSFEROR) hereby acknowledges receipt of the consideration of $ ~~2,490.00~~ 2,490,000.00 and transfers an estate in fee simple in the land above described to the TRANSFEREE

TRANSFEREE Note (d)

CONTAINERS LIMITED, 265-275 FRANKLIN STREET, MELBOURNE, VICTORIA

OFFICE USE ONLY

5

TENANCY Note (e)

as joint tenants/tenants in common

PRIOR ENCUMBRANCES Note (f)

subject to the following PRIOR ENCUMBRANCES 1. _____ 2. _____ 3. _____

DATE

We hereby certify this dealing to be correct for the purposes of the Real Property Act, 1900.

EXECUTION Note (g)

~~Signed in my presence by the transferor who is personally known to me~~

THE COMMON SEAL of)
~~Signature of Witness~~)
G.E. CRANE & SONS LIMITED)
~~Name of Witness (BLOCK LETTERS)~~)
was hereunto affixed)
in accordance with its)
~~Address and occupation of Witness~~)
Articles of Association)

(Director)

G.E. CRANE & SONS LIMITED Common Seal

Signature of Transferor

Note (g)

~~Signed in my presence by the transferee who is personally known to me~~

(Secretary)

~~Signature of Witness~~

~~Name of Witness (BLOCK LETTERS)~~

~~Address and occupation of Witness~~

~~Signature of Transferee~~
H.K. McCANN
Solicitor for the Transferee

TO BE COMPLETED BY LODGING PARTY Notes (h) and (i)

LODGED BY
ALLEN ALLEN & HEMSLEY
MLC CENTRE
MARTIN PLACE, SYDNEY
DX: 105 SYDNEY

Delivery Box Number 745

LOCATION OF DOCUMENTS

CT	OTHER	
✓		Herewith
		In L.T.O. with
		Produced by

OFFICE USE ONLY

Checked	Passed	REGISTERED - -19	Secondary Directions	
Signed	Extra Fee	-7 DEC 1987	Delivery Directions	CT LP.

Req:R841447 /Doc:DL I801054 /Rev:15-Apr-2010 /Sts:OK.SC /Prt:30-Sep-2011 12:16 /Pgs:ALL /Seq:1 of 1
Ref: /Src:X

RP13

TRANSFER

Real Property Act, 1900

I 801054 H

Office of State Revenue use only

B

$2.00 030993 1825 04 Z0066146803

(A) LAND TRANSFERRED

Show no more than 20 References to Title.
If appropriate, specify the share transferred.

FOLIO IDENTIFIER 1/747153

(B) LODGED BY

L.T.O. Box	Name, Address or DX and Telephone
374	WESTPAC REFERENCE (max. 15 characters): 2007 9801 SE

(C) TRANSFEROR CONTAINERS LIMITED A.C.N. 004 275 165

(D) acknowledges receipt of the consideration of $2,250,000.00

and as regards the land specified above transfers to the transferee an estate in fee simple

(E) subject to the following **ENCUMBRANCES** 1. ..... 2. ..... 3. .....

(F) TRANSFEREE

T

(G) PESHAWAR PTY. LIMITED A.C.N. 000 778 003

~~as joint tenants/tenants in common~~

(H) We certify this dealing correct for the purposes of the Real Property Act, 1900. **DATE OF EXECUTION** 6/10/93.

Signed in my presence by the transferor who is personally known to me.
THE COMMON SEAL of CONTAINERS LIMITED was duly affixed in the presence of:-

CONTAINERS LIMITED THE COMMON SEAL OF A.C.N. 004 275 165

..... Signature of Witness

..... Name of Witness (BLOCK LETTERS)

..... Address of Witness

Secretary Director Signature of Transferor

~~Signed in my presence by the transferee who is personally known to me.~~
THE COMMON SEAL of PESHAWAR PTY. LIMITED was hereunto duly affixed in the presence of:

Common Seal PESHAWAR PTY. LIMITED A.C.N. 000 778 003

..... ~~Signature of Witness~~

..... ~~Name of Witness (BLOCK LETTERS)~~

..... ~~Address of Witness~~

Secretary Director Signature of Transferee

☞ **INSTRUCTIONS FOR FILLING OUT THIS FORM ARE AVAILABLE FROM THE LAND TITLES OFFICE**

CHECKED BY (office use only) Acceptable for lodgment as regards the signatures affixing the affixing of the seal & extending into the seal. P. Lauraine Deputy Registrar 13/9/93. & affixing of the seal of the Transferor P Lauraine DRG 1/10

Ausdoc Commercial and Law Stationers 1991

Req:R841453 /Doc:DL I801055 /Rev:15-Apr-2010 /Sts:OK.SC /Prt:30-Sep-2011 12:16 /Pgs:ALL /Seq:1 of 3
Ref: /Src:X

[redacted]

MORTGAGE

Real Property Act, 1900 (New South Wa

I 801055 F

Office of State Revenue use only

OFFICE OF STATE REVENUE (N.S.W. TREASURY) 1993 - 100
STAMP DUTY 20193
PRIME STAMPED $ .....
AMOUNT SECURED $ 1,350,000
DOCUMENT TYPE MP
BRANCH Kent Sts
RETURN NO. 93141-100
DUTY PAID $ 5,341—
CERTIFIED

LAND MORTGAGED
Title References
Maximum 20

FOLIO IDENTIFIER
1/747153

(a) **LODGED BY** 37Y **REFERENCE**

B.S.B.	REF. No.	LEGAL REF.
2807	9481	SE

(b) **MORTGAGOR** PESHAWAR PTY LIMITED A.C.N. 000 778 003 A COMPANY DULY INCORPORATED IN NEW SOUTH WALES AND HAVING ITS REGISTERED OFFICE AT 1st FLOOR 379 KENT STREET SYDNEY

(the "Mortgagor") and the Debtor named in the Schedule below (the "Schedule") agree with the Mortgagee named below on the terms set out in the Schedule.

In order to secure to the Mortgagee the payment of "the moneys hereby secured" described in the Memorandum to which the Schedule refers (the "Memorandum"), the Mortgagor mortgages to the Mortgagee all the Mortgagor's estate and interest in the land described above (that land is the "Mortgaged Premises" referred to in the Memorandum). This Mortgage is subject to the following prior **ENCUMBRANCES:**

(c) 1. ..... 2. ..... 3. ..... 4. .....

5. ..... 6. ..... 7. ..... 8. .....

MORTGAGEE

M

WESTPAC BANKING CORPORATION
ARBN 007 457 141 (the "Bank")

MX

SCHEDULE

Each person signing this Mortgage as Mortgagor or Debtor acknowledges, by doing so, that if the Bank now or at any future time

(a) refrains from suing immediately for indebtedness to the Bank of the Debtor (including indebtedness owed by the Debtor jointly with anyone else); or

CHECKED BY (Land Titles Office use only)

(b) makes loans or provides credit or financial assistance or accommodation to

(d) THE SAID PESHAWAR PTY LIMITED

(the "Debtor")

(or to the Debtor jointly with anyone else) on any terms,

the Bank will be doing so in accordance with that person's request.

This Mortgage is given in exchange for the Bank doing any of those things at any time. Additionally, in exchange for the Bank doing any of those things at any time, each of the Mortgagor and the Debtor separately agrees with the Bank that:

(1) Where this Mortgage uses the expression "Mortgagor" or the expression "Debtor", it is intended that the expression have the meaning given it in the Memorandum filed in the Land Titles Office as No. V581852, incorporating any alteration to that Memorandum made by a provision of this Schedule.

(2) The Memorandum forms part of this Mortgage and the Mortgagor and the Debtor are each bound by it and will each comply with its terms.

(e) (3) ~~The alterations to which Clause 1 refers are those set out in Annexure "_____"~~

DATE 30/9/93

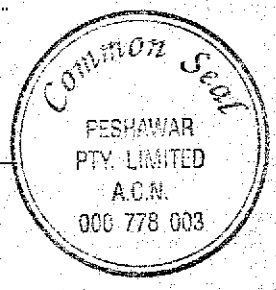
(f) We certify this dealing to be correct for the purposes of the Real Property Act, 1900.

Signed in my presence by the *Mortgagor/Debtor who is personally known to me	Signed in my presence by the *Mortgagor/Debtor who is personally known to me
Signature of Witness	*(Mortgagor/Debtor)
Signature of Witness	*(Mortgagor/Debtor)
Name of Witness (BLOCK LETTERS)	*(Mortgagor/Debtor)
Name of Witness (BLOCK LETTERS)	*(Mortgagor/Debtor)
Address of Witness	
Address of Witness	

Req:R841453 /Doc:DL I801055 /Rev:15-Apr-2010 /Sts:OK.SC /Prt:30-Sep-2011 12:16 /Pgs:ALL /Seq:2 of 3
Ref: /Src:X

The Common Seal of

PESHAWAR PTY LIMITED
was duly affixed:



B

~~Secretary~~/Director

Director

*(Mortgagor/Debtor)

The Common Seal of

was duly affixed:

*Secretary/Director

Director

*(Mortgagor/Debtor)

Signed for and on behalf of
WESTPAC BANKING CORPORATION by

DENNIS DAVID CORSON
(Full name of Attorney)
its Attorney who is personally known to me

(Witness Signature)

MARK CAMPBELL
Name of Witness (BLOCK LETTERS)

MENANGLE ROAD MENANGLE

BANK OFFICER
Address of Witness

WESTPAC BANKING CORPORATION by its Attorney who states that at the time of executing this Instrument no notice of revocation has been received of the Power of Attorney registered in the Land Titles Office No. 538 Book 4005 under the authority of which this Instrument has been executed.

(Attorney Signature)

* Branch/*Office KING AND CASTLEREAGH STS

Title MANAGER (g)

Mortgagee.

Req:R841449 /Doc:DL 3629148 /Rev:04-Dec-1997 /Sts:NO.OK /Prt:30-Sep-2011 12:16 /Pgs:ALL /Seq:1 of 2
Ref: /Src:X

Licence Number
37Y/0100/95

DISCHARGE OF MORTGAGE

3629148 G

Real Property Act 1900 (New South Wales)

(a) **LAND AFFECTED** (Title References Maximum 20)

Folio Identifier
1/747153

(b) **REGISTERED DEALING AFFECTED** (If applicable)

(c) **LODGED BY**

L.T.O. BOX
374

NAME, ADDRESS OR DX AND TELEPHONE SA

REFERENCE: 02851238-C-MT

(d) **DM**

MORTGAGE DISCHARGED I801055

MORTGAGEE **WESTPAC BANKING CORPORATION**
ARBN 007 457 141

(e) **MORTGAGOR** Peshawar Pty Limited ACN 000 778 003

Received the sum of one dollar being in full satisfaction and discharge of the abovementioned mortgage so far as it affects the land above described but reserving and without prejudice to the rights powers and remedies of the said Bank as against the balance of the land if any comprised in the said mortgage and as against the Mortgagor and all sureties and other persons whether under the said mortgage or any other security and as against the property comprised in or charged by any such other security.

CHECKED BY (Land Titles Office use only)

DATE OF EXECUTION 13 November 1997

I hereby certify this dealing to be correct for the purposes of the Real Property Act, 1900.

Signed Sealed and Delivered
for and on behalf of
WESTPAC BANKING CORPORATION by

BARRY GIBSON
.....

its duly constituted Attorney who is personally known to me

.....

Stephen John McClure
Bank Officer of Ashfield

Mortgagee.

WESTPAC BANKING CORPORATION by its Attorney who hereby states that at the time of executing this Instrument no notice of revocation has been received of the Power of Attorney registered in the Land Titles Office Book 4059 No.831 under the authority of which this Instrument has been executed.

.....

Supervisor, NSW Service Centre

Req:R834173 /Doc:DL 3629149 /Rev:04-Dec-1997 /Sts:NO.OK /Prt:29-Sep-2011 11:32 /Pgs:ALL /Seq:1 of 1
Ref: /Src:X

Form: 97-01T
Licence: 10V/0096/95
Printed: 0597LTO

TRANSFER

New South Wales
Real Property Act 1900

3629149 E

Instructions for filling out this form are available from the Land Titles Office

Office of State Revenue use only

N.S.W. STAMP DUTY
$2.00
17109? 1922 04 20134516S/03

(A) **LAND TRANSFERRED**
If appropriate, specify the share or part transferred.

Folio Identifier 1/747153

(B) **LODGED BY**

LTO Box	Name, Address or DX and Telephone SA
377	Reference (15 character maximum): 0285 1238-C-mt

OFFICE OF STATE REVENUE (N.S.W. TREASURY) 549 1996/97 ALTERATION NOTED

(C) **TRANSFEROR** PESHAWAR PTY LIMITED (IN LIQUIDATION) (ACN 000 778 003) Sec

(D) acknowledges receipt of the consideration of $2,700,000.00

and as regards the land specified above transfers to the transferee an estate in fee simple.

(E) Encumbrances (if applicable): 1. ..... 2. ..... 3. .....

(F) **TRANSFEREE**

T TS (s713 LGA) TW (Sheriff)	WALLEROO PTY LIMITED (ACN 002 172 830) of Level 2, 2 O'Connell Street, Sydney

(G) **TENANCY:**

(H) We certify this dealing correct for the purposes of the Real Property Act 1900. **DATE** .....

Signed in my presence by the transferor who is personally known to me.

Rebecca Halpin
Signature of Witness

REBECCA HALPIN
Name of Witness (BLOCK LETTERS)

6/50 MARGARET ST, SYDNEY
Address of Witness

Common Seal PESHAWAR PTY. LIMITED A.C.N. 000 778 003

Signature of Transferor
LIQUIDATOR

Signed in my presence by the transferee who is personally known to me.

.....
Signature of Witness

.....
Name of Witness (BLOCK LETTERS)

.....
Address of Witness

Steven Mackay
Signature of Transferee's solicitor
Steven Mackay
If signed on the transferee's behalf by a solicitor or licensed conveyancer, show the signatory's full name in block letters.

0340504.01

Checked by (LTO use) .....

Req:R841451 /Doc:DL 3629150 /Rev:06-Dec-1997 /Sts:NO.OK /Prt:30-Sep-2011 12:16 /Pgs:ALL /Seq:1 of 3
Ref: /Src:X

Licence Number
37Y/0103/95

MORTGAGE

3629150 V

Real Property Act 1900 (New South Wales)

Office of State Revenue use only

OFFICE OF STATE REVENUE (N.S.W TREASURY)
1996/97-95 STAMP DUTY 20196
PRIME STAMPED $.....
AMOUNT SECURED $ 1,650,000
DOCUMENT TYPE MP
BRANCH King & Castlereagh
RETURN NO. 97/48.3132
DUTY PAID $ 6591
CERTIFIED K. Stirohar

LAND MORTGAGED
Title References
Maximum 20

Folio Identifier 1/747153

(a) **LODGED BY** **37Y**

B.S.B.	BRANCH REF. No.	LEGAL REF.
REFERENCE	02851238	C-MT

(b) **MORTGAGOR** Walleroo Pty Limited ACN 002 172 830

(the "Mortgagor") and the Debtor named in the Schedule below (the "Schedule") agree with the Mortgagee named below on the terms set out in the Schedule.

In order to secure to the Mortgagee the payment of "the moneys hereby secured" described in the Memorandum to which the Schedule refers (the "Memorandum"), the Mortgagor mortgages to the Mortgagee all the Mortgagor's estate and interest in the land described above (that land is the "Mortgaged Premises" referred to in the Memorandum). This Mortgage is subject to the following prior **ENCUMBRANCES:**

(c) 1. 2. 3. 4.

MORTGAGEE

M

WESTPAC BANKING CORPORATION
ARBN 007 457 141 (the "Bank")

MX

T1/13005 (1/10/92)

CHECKED BY (Land Titles Office use only)

SCHEDULE

Each person signing this Mortgage as Mortgagor or Debtor acknowledges, by doing so, that if the Bank now or at any future time

(a) refrains from suing immediately for indebtedness to the Bank of the Debtor (including indebtedness owed by the Debtor jointly with anyone else); or

(b) makes loans or provides credit or financial assistance or accommodation to

(d) the said Walleroo Pty Limited ACN 002 172 830 (the "Debtor")

(or to the Debtor jointly with anyone else) on any terms,

the Bank will be doing so in accordance with that person's request.

This Mortgage is given in exchange for the Bank doing any of those things at any time. Additionally, in exchange for the Bank doing any of those things at any time, each of the Mortgagor and the Debtor separately agrees with the Bank that:

(1) Where this Mortgage uses the expression "Mortgagor" or the expression "Debtor", it is intended that the expression have the meaning given it in the Memorandum filed in the Land Titles Office as No. V581852, incorporating any alteration to that Memorandum made by a provision of this Schedule.

(2) The Memorandum forms part of this Mortgage and the Mortgagor and the Debtor are each bound by it and will each comply with its terms.

(e) ~~(3) The alterations to which Clause 1 refers are those set out in Annexure "....."~~.

DATE OF EXECUTION 14/11/97

(f) We hereby certify this dealing to be correct for the purposes of the Real Property Act, 1900.

The Common Seal of
Walleroo Pty Limited ACN 002 172 830
was duly affixed:

X .....

Secretary/Director

X .....

~~Director~~ Authorised Signatory

(Mortgagor/Debtor)

Common Seal
WALLEROO
PTY. LIMITED
A.C.N.
002 172 830

Signed for and on behalf of
WESTPAC BANKING CORPORATION by

Frederick Alan Holmes

(Full name of Attorney)

its Attorney who is personally known to me

.....

(Witness Signature)

MELISSA CARMICHAEL

.....

Name of Witness (BLOCK LETTERS)

1 King Street

Concord West

Address of Witness

WESTPAC BANKING CORPORATION by its Attorney who states that at the time of executing this Instrument no notice of revocation has been received of the Power of Attorney registered in the Land Titles Office Book 4059 No.831 under the authority of which this Instrument has been ~~executed~~.

.....

(Attorney Signature)

NSW Service Centre

Title: Supervisor

Mortgagee

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Ref: /Src:X

Form: 97-07L
Licence: 10V/0252/95
Printed: 1096LTO

RECEIVED
13 FEB 1998

LEASE

New South Wales
Real Property Act 190

5345869Y

ly

Instructions for filling out this form are available from the Land Titles Office

Office of State

OFFICE OF STATE REVENUE
STAMP DUTY (S.C.W. TREASURY) P47
DUTY $ 2.00 2013912 13

(A) **PROPERTY LEASED**

Show no more than 20 titles.
If appropriate, specify the part or premises.

Folio Identifier 1/747153 and
known as 126 Andrews Road, Penrith

(B) **LODGED BY**

LTO Box	Name, Address or DX and Telephone
271Q	Ebsworth & Ebsworth DX 103 SYDNEY Ph: 9234 2366 REFERENCE (15 character maximum): SJM Z

(C) **LESSOR** WALLEROO PTY LIMITED (ACN 002 172 830)

(D) The lessor leases to the lessee the property described above subject to the following **ENCUMBRANCES**

1. ..... 2. ..... 3. ..... 4. .....

(E) **LESSEE**

L

W. PATON (FERTILIZERS) PTY LTD (ACN 000 508 216)

(F) **TENANCY:**

(G) 1. **TERM:** 5 years

2. **COMMENCING DATE:** 1 November 1997

3. **TERMINATING DATE:** 31 October 2002

4. With an **OPTION TO RENEW** for a period of 5 years set out in clause 21

~~5. With an **OPTION TO PURCHASE** set out in~~

~~6. Together with and reserving the **RIGHTS** set out in~~

7. Incorporates the provisions set out in **ANNEXURE** "A" hereto.

~~8. Incorporates the provisions set out in **MEMORANDUM No.** filed in the Land Titles Office.~~

CHECKED BY (LTO use) .....

G37Y

(H) **DATE** 28 November 1997 We certify this dealing correct for the purposes of the Real Property Act 1900.

Signed in my presence by the lessor who is personally known to me.

See Annexure "A" for execution

.....
Signature of Witness

For and On Behalf of Walleroo Pty Limited

J. WALKER
Name of Witness (BLOCK LETTERS)

GPO Box 5154, SYDNEY
Address of Witness

.....
Signature of Lessor

Signed in my presence by the lessee who is personally known to me

.....
Signature of Witness

For and On Behalf of W. Paton (Fertilizers) Pty Ltd.

J. WALKER
Name of Witness (BLOCK LETTERS)

GPO Box 5154, SYDNEY
Address of Witness

.....
Signature of Lessee

STATUTORY DECLARATON

I solemnly and sincerely declare that the time for the exercise of the Option to Renew/Purchase in expired lease No. ..... has ended and the lessee under that lease has not exercised the option.

I make this solemn declaration conscientiously believing the same to be true and by virtue of the Oaths Act 1900.

Made and subscribed at ..... in the State of ..... on ..... 19.....

in the presence of

.....
Signature of Witness

.....
Name of Witness (BLOCK LETTERS)

.....
Address and Qualification of Witness

.....
Signature of Lessor

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ANNEXURE "A" REFERRED TO IN ITEM (G) 7 OF THE LEASE

Between Walleroo Pty Limited and W. Paton (Fertilizers) Pty Limited

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THIS AND THE FOLLOWING PAGES ARE THE ANNEXURE "A" REFERRED TO IN ITEM (G) 7 OF THE LEASE

BETWEEN WALLEROO PTY LIMITED
ACN 002 172 830
Level 6, 50 Margaret Street, Sydney
(LESSOR)

AND W. PATON (FERTILIZERS) PTY LIMITED
ACN 000 508 216
Level 6, 50 Margaret Street, Sydney
(LESSEE)

DATED 19th November, 1997

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ANNEXURE "A" REFERRED TO IN ITEM (G) 7 OF THE LEASE
Between Walleroo Pty Limited and W. Paton (Fertilizers) Pty Limited

CLAUSE 1 INTERPRETATION

1.01 In the interpretation of this Lease except to the extent that such interpretation shall be excluded by or be repugnant to the context where herein used

(a) "the Lessor" shall mean and include the Lessor referred to in Item 1 of the Reference Schedule together with its successors and assigns;

(b) "Managing Agent" shall mean the person for the time being appointed by the Lessor to manage the premises on the Lessor's behalf;

(c) "the Lessee" shall mean and include the Lessee referred to in Item 2 of the Reference Schedule together with its successors and permitted assigns and where there are more Lessees than one shall mean and include the Lessees and each and every one of them and each and every of their successors and permitted assigns;

(d) "the Lessee's employees and visitors" shall mean each and every of the Lessee's employees, agents, contractors, licensees and invitees (express or implied) who may at any time be in or upon the premises;

(e) "Premises" shall mean the property described in Item 3 of the Reference Schedule;

(f) "Term" shall mean the term of the Lease set out in Item 4 of the Reference Schedule.

(g) "Lease Commencement" shall mean the date set out in Item 5 of the Reference Schedule.

(h) "Rental Commencement" shall mean the date set out in Item 6 of the Reference Schedule.

(i) "Termination" shall mean the date set out in Item 7 of the Reference Schedule.

(j) "Persons" shall be deemed to include a corporation and words importing the singular or plural number shall be deemed to include the plural or singular number respectively and words importing the masculine gender only shall include the feminine or neuter gender or vice versa as the case may require;

1.02 All references to statutes herein shall include all statutes amending, consolidating or replacing the statutes referred to.

CLAUSE 2 EXCLUSION & AMENDMENT OF IMPLIED COVENANTS AND POWERS

2.01 The covenants and powers implied in every lease by virtue of Sections 84, 84A and 85 of the said Act shall not apply to or be implied in this Lease except insofar as the same or some part or parts thereof are included in the covenants hereinafter contained.

ANNEXURE "A" REFERRED TO IN ITEM (G) 7 OF THE LEASE
Between Walleroo Pty Limited and W. Paton (Fertilizers) Pty Limited

CLAUSE 3 RENT

3.01 The Lessee shall at such place(s) as the Lessor may from time to time direct and otherwise without demand from the Lessor pay to the Lessor during the term of this Lease in the manner set out in Item 8 of the Reference Schedule rent without deduction at the rate per annum set out in Item 9 of the Reference Schedule.

3.02 The rent payable hereunder shall be subject to review on the review dates referred to in Item 10A of the Reference Schedule.

3.03 For the purposes of clause 3.05(a) and (c) the revised rent following a CPI review shall be calculated referable to the Price Index last published prior to each review date which exceeds:

(a) in the case of the first review date the Price Index last published prior to the date of commencement of this Lease;

(b) in each other case the Price Index last published prior to the immediately preceding rent review date.

THEN upon and subsequent to each of the relevant review dates the rent payable by the Lessee for the period after each review date shall increase in the proportion that the Price Index last published prior to each such review date bears in the case of the first review to the Price Index last published prior to the date of commencement of this Lease and in the case of each subsequent review date to the Price Index last published prior to the immediately preceding rent review date
PROVIDED ALWAYS that the rent payable upon and subsequent to each successive rent review date shall in no case be less than the rent immediately prior to each successive date of review. The Lessor may notify the Lessee in writing of the amount which shall from the relevant rent review date become the rent for the premises payable under this Lease until the next review date and any adjustment necessary in respect of any underpayment of any instalment thereof paid after any successive rent review date as herein defined at the rate previously applicable shall be paid by the Lessee to the Lessor forthwith upon demand.

3.04 In this Lease the words "the Price Index"' shall mean:-

(a) The All Groups Consumer Price Index for Sydney published from time to time in the Commonwealth Statisticians Summary of Australian Statistics. In the event that the Commonwealth Statistician shall update the reference base of such Price Index then due conversion shall be made to preserve the intended continuity of calculation by using the appropriate arithmetical factor determined by the said Statistician, and

(b) In the event that there is any suspension or discontinuance of the Consumer Price Index by the Commonwealth Statistician, the Male Basic Wage applicable in the City of Sydney shall apply and where the words "Price Index" appear the same shall be read and construed as of the words "Male Basic Wage" were inserted in lieu thereof.

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3.05(a) The revised rent payable pursuant to the reviews specified in Item 10 of the Reference Schedule as "CPI or market review which ever the greater" shall be the greater of:

(i) The revised rent determined in accordance with clauses 3.03 and 3.04; or

(ii) The fair market rent determined in accordance with clause 3.06 hereof.

(b) The revised rent payable pursuant to the reviews specified in Item 10 of the Reference Schedule as "market review" shall be determined in accordance with clause 3.06.

(c) The revised rent payable pursuant to the reviews specified in Item 10 of the Reference Schedule as "CPI Review " shall be determined in accordance with clause 3.03 and 3.04

3.06 (a) For the reviews contemplated by clause 3.05(a) and (b) the Lessor shall not later than fourteen (14) days prior to the relevant review date notify the Lessee in writing of the amount which in its opinion represents the fair market rent of the premises as at the said date and unless within twenty-one (21) days from the date of being so advised the Lessee objects in writing to the amount stated that amount shall be deemed to be the rent payable for the next rent period.

(b) (i) Should the Lessee dispute that such amount represents the fair market rent of the premises it may by notice in writing to the Lessor given within twenty-one (21) days of receipt of the notice given by the Lessor pursuant to Clause 3.06(a) hereof require such rent to be determined on the application of the Lessor by a member of the Australian Institute of Valuers or its successor appointed by the President for the time being of the said Institute or its successor or if there be no such President then by the Chief Executive Officer for the time being of the said Institute or its successor who has been qualified for not less than five (5) years and the person so appointed shall be deemed to be acting as an expert and not as an arbitrator and his decision shall be final and binding on the parties.

(ii) The cost of such determination aforesaid shall be borne by the Lessor and the Lessee in such proportion as the person making the determination under this sub-clause shall decide and such decision shall be final and binding on both parties and in the absence of such decision then equally.

CLAUSE 4 STATUTORY OUTGOINGS AND OTHER AMOUNTS PAYABLE BY LESSEE

4.01 For the purposes of this Lease "outgoings" means the costs and expenses attributable to or payable in respect of the premises and their maintenance repair and management and includes:

(a) the rates and taxes charges and assessments paid or payable to the appropriate municipal shire or city council;

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(b) the water sewerage and drainage rates and charges paid or payable (to the extent not paid by the lessee under clause 5.02);

(c) the land tax which would be payable by the Lessor in respect of its ownership of the property of which the premises form part as if they comprised the only land owned by the Lessor;

(d) all other rates taxes charges and assessments whether statutory municipal local government or otherwise;

(e) all insurance premiums payable by the Lessor to insure the premises and the fixtures and fittings therein for their full insurable reinstatement value against fire flood lightning storm and tempest and against loss of rent and other consequential loss;

(f) all charges for water gas oil electricity sewerage garbage and other services to the premises;

(g) all costs of repairs maintenance and renovations to the premises other than work which is the responsibility of the Lessor or of any other tenant of the premises;

4.02 The Lessee shall promptly upon demand pay its proportions of all outgoings which may at any time during the term, or at any time previously or thereafter in respect, of the term, be levied imposed or charged upon or in respect of the property. The relevant proportion payable by the Lessee is as stated in Item 11 of the Reference Schedule.

4.03 The Lessee shall pay all stamp duty and all of the Lessor's legal costs and expenses of and incidental to the preparation completion stamping and registration of this Lease and of any assignment or sub-letting and of any surrender and other termination thereof otherwise than by efflux of time and in case of default by the Lessee in performing or observing any covenants herein contained or implied the Lessee shall pay to the Lessor all legal and other costs charges and expenses for which the Lessor shall become liable in consequence or in connection with such default.

4.04 The Lessor may at its discretion elect to pay any of the moneys payable by the Lessee herein and in such event the Lessee shall upon demand made by the Lessor promptly reimburse the Lessor for the full amount of such moneys.

CLAUSE 5 SERVICES

5.01 The Lessee shall not without the written consent of the Lessor make any alteration to the electrical gas water oil or other installations in or to the premises.

5.02 The Lessee shall pay all charges for gas, electricity, oil and water separately metered and consumed in or on the premises and also all charges in respect of any telephone services connected to the premises and all other charges and impositions imposed by any pubic utility or authority for the supply of any service separately supplied to the premises. Where there

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exists no separate meter for recording or measuring in respect of the premises any of the services or substances referred to in this sub-clause the Lessee shall if so required by the Lessor, arrange for the installation of the same at the cost of the Lessee.

CLAUSE 6 INSURANCES

6.01 During the term hereof the Lessor may in its absolute and unfettered discretion insure the building for such sums and against such risks and with such insurers as it shall from time to time determine and in addition the Lessor may vary or increase any or all of such insurances as aforesaid. The parties acknowledge that all premiums paid or payable by the Lessor in respect of such insurances shall be a recoverable outgoing for the purposes of Clause 4 hereof.

6.02 The Lessee will effect and keep in force in respect of the premises at all times during the term of this Lease a public risk policy for not less than the sum set out in Item 12 of the Reference Schedule for any one claim or such greater amount as the Lessor shall from time to time and in its absolute discretion determine.

6.03 The Lessee will insure in the joint names of the Lessor and the Lessee (or otherwise keep the Lessor indemnified) and in such amount (not being less than the full insurable value) and against such risks as the Lessor may require all plate glass windows and doors upon the premises.

6.04 All policies of insurance liable or required to be effected by the Lessee here under whether in respect of the property or risk either of the Lessor or the Lessee shall be taken out with an insurance office or company approved by the Lessor.

6.05 The Lessee will in respect of any policy of insurance to be effected by the Lessee here under if required by the Lessor forthwith produce to the Lessor all policies of insurance effected pursuant to this Clause and certificates of currency for same.

6.06 The Lessee will not at any time during the term of this Lease do permit or suffer to be done any act matter or thing upon the premises whereby any insurances in respect thereof may be vitiated or rendered void and voidable or whereby the rate of premium on any such insurance shall be liable to be increased except with the prior written approval of the Lessor.

6.07 The Lessee will from time to time as and when required by notice in writing from the Lessor pay any additional premiums for insurance of the premises and its contents which the Lessor may reasonably require on account of extra risk caused by the use to which the premises are put by the Lessee whether or not approved by the Lessor.

6.08 The Lessee will comply with the insurance, sprinklers and/or fire alarm regulations in respect of any partitions which may be erected by the Lessee upon the premises and the Lessee will pay to the Lessor the cost of any alterations to the sprinklers and/or fire alarm

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installation which may become necessary by reason of the non-compliance by the Lessee with the requirements of the Lessor's Insurer.

CLAUSE 7 INTEREST ON MONEYS OVERDUE

7.01 Without prejudice to any of the rights powers and remedies of the Lessor here under the Lessee shall pay to the Lessor interest at the rate set out in Item 13 of the Reference Schedule on all moneys (including rent) which are due here under but unpaid for the period of fourteen (14) days on any account whatsoever pursuant to this Lease such interest to be calculated from the original due date to the date of payment of such moneys and to be recoverable in like manner as rent in arrears.

CLAUSE 8 ALTERATIONS, REPAIRS AND MAINTENANCE

8.01 (a) The Lessee shall not make or permit to be made any alterations additions or improvements to the premises or alter put or place any fixtures thereon without the written approval of the Lessor first had and obtained.

(b) Any such work carried out pursuant to the Lessor's approval granted pursuant to sub-paragraph (a) hereof shall be carried out in a proper and workman like manner and to the satisfaction of the Lessor in all respects. Any such additions or improvements to the premises shall become the property of the Lessor upon the expiration or sooner determination of this Lease.

8.02 (a) The Lessee will at all times during the continuance of this Lease maintain and keep in good repair and condition and at the expiration or sooner determination of the term will peaceably surrender and yield up to the Lessor the premises in that state of repair and condition together with all appurtenances fixtures and other things thereto belonging or which at any time during the said term shall have been erected or placed thereon by the Lessor, reasonable wear and tear and damage by fire lightning flood or tempest (not attributable to any act or omission of the Lessee its servants, agents or workmen) only excepted.

(b) The Lessee will without affecting the generality of the foregoing and at the Lessee's expense:

(i) at all times keep the premises both inside and out (including external surfaces of windows and doors) clean and free from dirt and rubbish and keep all garbage and waste in-proper receptacles and arrange for the regular removal thereof from the premises;

(ii) at all times keep the lawns mown, maintain the garden and generally maintaining the common areas.

(iii) keep and maintain clean and in good order repair and condition all fittings plant furnishings and equipment of the Lessor;

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(iv) from time to time make good any breakage defect damage or want of repair to the premises or any facility or appurtenance thereof including the plumbing and electrical wiring;

(v) repair and or replace all broken window panes and all lighting which may from time to time require replacement and/or repair and should the Lessee fail to perform its obligations pursuant to this Clause then in such-event the Lessor may (but shall not be obliged) at the expense of the Lessee to repair or replace same within the premises and any expense incurred by the Lessor in so doing shall be deemed to be moneys due to the Lessor and all arrears of such moneys for more than fourteen (14) days shall be deemed to be overdue moneys for the purposes of Clause 7 hereof;

(vi) upon the expiration or sooner determination of the term hereof remove at its expense all lettering and distinctive marks or signs erected by the Lessee or by the Lessor for the Lessee on any of the doors, walls or windows of the premises and shall make good any damage or disfigurement caused by reason of such removal.

(c) The Lessee will give to the Lessor prompt notice in writing of any accident to or defect or want of repair in any services to or fittings in the premises and of any circumstances likely to be or cause any risk to the premises or to any person or property therein.

(d) The Lessee will during the term of this Lease and any renewal thereof and any holding over hereunder at the times set out in Item 14 of the Reference Schedule paint with at least two (2) coats of good quality paint and repaper with paper of good quality and in a good and workmanlike manner and to standards reasonably required by the Lessor all parts of the interior of the premises which at the commencement of the term are painted or papered.

8.03 The Lessor and any servant or agent of the Lessor may at all reasonable times on not less than twenty-four (24) hours' notice to the Lessee enter the premises to examine the condition and state of repair thereof and may by notice in writing served on the Lessee require the Lessee within a time fixed in the notice to repair or clean the same in accordance with the covenants or agreements contained in this Lease AND that the Lessee will repair and clean the premises in accordance with and within the time mentioned in such notice as far as the Lessee may be liable to do so under this Lease and that in default of the Lessee so doing it shall be lawful for but not obligatory on the Lessor to execute the required repairs and cleaning at the expense of the Lessee.

8.04 The Lessor and any servant or agent or workman of the Lessor may at all reasonable times during the term hereof and with all necessary materials and appliances enter the premises for the purpose of carrying out any alterations or repairs for which the Lessee may not be liable under this Lease or being liable shall neglect to do or for the purpose of complying with the terms of any legislation affecting the premises or with the terms of any notice served by any authority whatsoever having jurisdiction or authority over or in respect of the premises involving the carrying out of any cleaning, alterations, repairs or work and also for the purpose of exercising the powers and authorities of the Lessor under this Lease PROVIDED THAT such cleaning alterations repairs and works shall be carried out without unnecessary interference with the occupation and use of the premises by the Lessee.

8.05 That the Lessee will to the extent to which it may be liable in respect thereof under the terms of this Lease pay to the Lessor on demand all moneys expended by the Lessor in carrying out any such cleaning alterations repairs or works as are referred to in any of Clauses 8.03 and 8.04 hereof and in default of such payment by the Lessee the same shall be recoverable by the Lessor as rent in arrears.

8.06 The Lessee shall promptly comply with all statutes, ordinances, proclamations, orders or regulations present or future affecting or relating to the use of the premises, and with all requirements which may be made or notices or orders which may be given by any government, semi-government, municipal, health, licensing or any other authority having jurisdiction or authority in respect of the premises or the user thereof, and will keep the Lessor indemnified in respect of all such matters PROVIDED ALWAYS that the Lessee shall be under no liability in respect of any structural alterations the requirement for which was not caused or contributed to by the Lessee's use or occupation of the premises.

8.07 The Lessee will from time to time make good any breakage, defect or damage to any adjoining premises or property thereon occasioned by want of care or misuse on the part of the Lessee or the Lessee's employees and visitors, or other persons claiming through or under the Lessee or otherwise occasioned by any breach or default of the Lessee hereunder.

8.08 The Lessee in its use of the premises shall at all times take reasonable steps to ensure that the floors walls pillars or other parts of the premises shall not be damaged by overloading or from any cause whatsoever.

8.09 The Lessee shall not use or permit or suffer to be used the toilets, sinks, drainage and other plumbing facilities in the premises for any purpose other than those for which they were constructed or provided any damage or blockage caused thereto by such misuse shall be made good by the Lessee forthwith.

8.10 The Lessee will take all reasonable precautions to keep the premises free from vermin and the like and in the event of its failing so to do the Lessee will if and so often as required by the Lessor at the cost of the Lessee employ pest exterminators to eradicate the same.

8.11 The Lessee will in the event of any infectious disease occurring in the premises forthwith give notice thereof to the Lessor and to the proper authorities.

CLAUSE 9 USE OF PREMISES

9.01 The Lessee will not:

(a) use exercise or carry on or permit or suffer to be used exercised or carried on in or upon the premises or any part thereof any noxious noisy immoral or offensive act trade business occupation or permit on the premises anything which in the opinion of the Lessor may be or

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become a nuisance, disturbance or cause of damage to the Lessor or the occupiers of adjoining premises;

(b) use or permit or suffer to be used or store or permit to be stored inflammable substance upon the premises;

(c) install or use any engine or machine which shall cause or be likely to cause excessive noise or vibration in the premises, without the written consent of the Lessor;

(d) use or permit the use of the premises as a dwelling house or sleeping place;

(e) install use or allow to be used on the premises any heavy machinery without the written consent of the Lessor;

(f) without the written consent of the Lessor:-

(i) use or occupy the premises otherwise than as in connection with the trade or business as set out in Item 15 of the Reference Schedule;

(ii) store any materials or waste matter outside the building;

(g) make any use of the premises whether for the Lessee's permitted business or otherwise or permit any use to be made of the premises or to do or suffer to be done on the premises anything whereby any public or statutory authority may have cause to issue any notice requiring structural alterations or repairs to be made or carried out to the premises;

(h) paint affix or display any sign advertisement or notice on any part of the outside or inside of the premises or of the building except with the consent in writing of the Lessor and then only of such colour size and style and at such place in the premises as shall be approved by the Lessor.

CLAUSE 10 ASSIGNMENT AND SUB-LETTING

10.01 The Lessee will not during the continuance of this Lease assign transfer demise sublet or part with the possession of the premises or grant any license affecting or mortgage charge or otherwise deal with the possession or dispose of the premises or any part thereof or by any act or deed procure the premises or any part thereof to be assigned transferred demised sublet to or put into possession of any person or persons without the prior consent in writing of the Lessor which consent shall not be unreasonably withheld by the Lessor where the Lessee not being in default of the covenants and agreements on the Lessee's part herein contained proposes to assign or sub-lease to an assignee or sub-Lessee who proves to the satisfaction of the Lessor that he is a respectable responsible and solvent person and who enters into a covenant with the Lessor that he will duly perform and observe the covenants and agreements on the Lessee's part herein contained and who provides any guarantees reasonably required by the Lessor and who pays to the Lessor its costs and disbursements of and incidental to the giving of its consent, and preparation and completion of the said covenants.

ANNEXURE "A" REFERRED TO IN ITEM (G) 7 OF THE LEASE
Between Walleroo Pty Limited and W. Paton (Fertilizers) Pty Limited

CLAUSE 11 INDEMNITIES

11.01 The Lessee shall indemnify and keep indemnified the Lessor from and against all damages costs charges expenses actions claims and demands which may be sustained or suffered or recovered or made against the Lessor by any person for any injury such person may sustain when using or entering on or near any portion of the premises where such injury has arisen as a result of the negligence of or as a result of the creation of some danger by the Lessee or by the Lessee's employees and visitors and whether the existence of such danger was or ought to have been known to the Lessor or not and it is expressly agreed that the Lessor shall have no responsibility or liability for injury to any person or for the loss or damage to any fixtures or personal property of the Lessee.

11.02 The Lessee will indemnify and keep indemnified the Lessor from and against all loss and damage to the premises and all property of the Lessor or any other person therein caused by the acts, omissions or negligence of the Lessee or any of the Lessee's employees or visitors and in particular but without limiting the generality of the foregoing by the negligent or careless use or misuse, waste or abuse of water, gas fuel or electricity or faulty fittings or fixtures of the Lessee and the Lessee will give to the Lessor prompt written notice of any accident to or defects in the water pipes, gas pipes, electric light wiring or fittings or fixtures.

11.03 Without limiting the generality of Clauses 11.01 and 11.02 hereof the Lessee will indemnify the Lessor from and against all claims, actions, demands, loss, damages, costs and expenses incurred by the Lessor or for which the Lessor may become liable in respect of or arising from:

(a) the negligent or careless use, misuse, waste or abuse by the Lessee or any of the Lessee's employees or visitors or any person claiming through or under the Lessee of the water, gas, electricity, lighting and other installations in and the facilities of the premises or arising from any faulty fitting or fixture of the Lessee;

(b) overflow or leakage of water (including rain water) in or from the premises or caused or contributed to by any act or omission on the part of the Lessee or any other person referred to in sub-paragraph (a) of this Clause;

(c) loss damage or injury from any cause whatsoever to property or person caused or contributed to by the use of the premises by the Lessee or any other person as aforesaid;

(d) loss damage or injury from any cause whatsoever to the premises or to any property or person within or without the premises occasioned or contributed to by any act omission neglect breach or default by the Lessee or any other person referred to in sub-paragraph (a) of this Clause;

(e) damage to property or injury to any person which may be suffered or sustained in, upon or near any part of the premises in the occupation of the Lessee.

ANNEXURE "A" REFERRED TO IN ITEM (G) 7 OF THE LEASE
Between Walleroo Pty Limited and W. Paton (Fertilizers) Pty Limited

CLAUSE 12 LESSOR'S COVENANTS

12.01 On the Lessee paying the rent herein reserved and observing and performing all the covenants terms and conditions of the Lessee's part to be observed and performed the Lessee shall and may peaceably possess and enjoy the premises without any interruption or disturbance from the Lessor or any person or persons lawfully claiming by or from or under it subject nevertheless to the terms and conditions of this Lease.

12.02 The Lessee shall be entitled on or before the expiration of the term hereby demised and so long as the Lessee has paid all instalments of rent and other moneys due hereunder on or before the due date for payment of same and is not otherwise in default hereunder, to remove all trade fixtures including partitions (if any) erected by it with the consent of the Lessor or owned by it provided it thereupon immediately makes good all damage done to the premises by reason of such removal and if the Lessee fails to do so the Lessor may make good all such damage at the expense of the Lessee.

CLAUSE 13 HOLDING OVER

13.01 In the event of the Lessee with the consent of the Lessor continuing in occupation of the premises after the expiration or sooner determination of this Lease such occupation shall subject to all of the covenants and conditions of this Lease be a monthly tenancy only at a monthly rent equal to one-twelfth of the annual rent payable as at the last day prior to such expiration or other determination as the case may be such tenancy may be terminated by one (1) month's written notice from either party to the other.

CLAUSE 14 VACANT POSSESSION ON TERMINATION

14.01 Upon the expiration or sooner determination of this Lease the Lessee shall yield up vacant possession of the premises to the Lessor together with all keys which the Lessee may possess or have within its control.

CLAUSE 15 DEFAULT BY LESSEE

15.01 That in case the rent hereby reserved or part thereof is in arrears for a period of fourteen (14) days although no formal demand therefor has been made or in case default is made in the fulfilment of any covenant or condition hereof and on the part of the Lessee to be performed or observed and such default is continued or allowed to continue for a period of fourteen (14) days after the giving of written notice by the Lessor to the Lessee requiring the rectification by the Lessee of such default or in case the repairs required by such notice as aforesaid are not completed within the time therein reasonably specified or in case the Lessee becomes bankrupt or assigns its premises or enters into a deed of arrangement for the benefit of creditors or being a company goes into liquidation otherwise than for the purposes of reconstruction or enters into any scheme of arrangement or if a receiver of the company's property or assets or any of them or an official manager of the company is appointed or, if the term or interest of the Lessee therein or in the premises is attached or taken in execution or

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under any legal process, the Lessor shall have power immediately or at any- time thereafter and without notice or demand to or on the Lessee and notwithstanding prior waiver or failure to take action by the Lessor in respect of any such matter thing or default whether past or continuing to re-enter upon the premises or any part thereof in the name of the whole and to remove all goods and effects found on the premises but without releasing the Lessee from any liability in respect of the breach or non-observance of any covenant or provision hereof upon such re-entry by the Lessor this Lease shall terminate absolutely.

15.02 The Lessor may but shall not be obliged to remedy at any time without notice any default by the Lessee and whenever the Lessor so elects all costs and expenses incurred by the Lessor including legal costs and expenses in remedying any default shall be paid by the Lessee to the Lessor on demand.

15.03 Upon the Lessor becoming entitled to re-enter the premises and determine this Lease pursuant to any provision herein contained, and electing to do so the Lessee shall forthwith remove from the premises all goods of the Lessee and in default of the Lessee effecting such removal the Lessor upon entering into possession of the premises may remove all such goods from the premises to such place or places as to the Lessor may deem fit and shall be deemed to have the authority of the Lessee to deposit the same in the name and at the expense of the Lessee with a warehouse man selected by the Lessor and in so doing the Lessor shall not be liable or responsible for loss or damage to or warehousing expenses in respect of the whole or any part of such goods which shall be at the Lessee's risk and expense at all times and all costs and expenses incurred by the Lessor in such removal and deposit shall notwithstanding that this Lease shall then have terminated be and be deemed to be a liquidated debt payable by the Lessee to the Lessor upon demand.

15.04 No consent or waiver express or implied by the Lessor to or of any breach of any covenant condition or duty of the Lessee shall be construed as a consent or waiver to or of any other breach of the same or any other covenant condition or duty.

15.05 It is expressly agreed and declared that the Lessee hereby indemnifies and holds harmless the Lessor in respect of all loss of rent and other moneys payable hereunder suffered by the Lessor by reason of the Lessor being unable to relet the premises (upon terms and conditions not less favourable to the Lessor than those herein contained) subsequent to termination of this Lease by the Lessor as aforesaid and in the event of any such loss being suffered by the Lessor the Lessor shall be entitled to recover the amount of same from the Lessee as a debt due.

CLAUSE 16 FUNDAMENTAL BREACH

16.01 (a) Each of the covenants by the Lessee which are specified in this sub-clause are essential and fundamental terms of this Lease:

(i) the covenants in Clause 3 to pay rent;

(ii) the covenants in Clause 4 to pay statutory outgoings and other amounts;

(iii) the covenants in Clause 6 relating to insurance;

(iv) the covenants in Clause 8 relating to maintenance and repairs to the Premises;

(v) the covenants in Clause 9 relating to transfer of the lease and sub-letting or otherwise parting with or sharing the occupation or possession of the Premises or any part of the Premises;

(vi) the covenants in Clause 11 relating to indemnities.

(b) In respect of the Lessee's obligation to pay rent, the acceptance by the Lessor of arrears of rent shall not constitute a waiver of the essential nature of the Lessee's obligation to pay rent.

(c) The breach non-observance or non-performance of any one or more of the covenants referred to in paragraph (a) of this Clause shall be deemed to be a fundamental breach of this Lease on the part of the Lessee provided that nothing in this clause shall prevent any other covenants contained in this Lease from being construed as essential or fundamental terms of this Lease.

16.02 If the Lessor terminates this Lease following any fundamental breach or otherwise then without prejudice to any other right or remedy of the Lessor contained or implied in this Lease it is expressly agreed and declared that the Lessor shall be entitled to recover from the Lessee as and by way of liquidated damages for such breach arrears of rent, all expenses of and incidental to re-letting and the difference, if any, between the rent and any other moneys which would have been payable by the Lessee for the unexpired residue of the term, but for such determination calculated from the date of such determination to the date of expiration of the term and the rent and other moneys which the Lessor shall obtain by re-letting the premises for the unexpired residue of the term, provided the Lessor shall not be required or obliged to offer or accept in respect of such re-letting terms, covenants, conditions or stipulations which are the same or similar to the terms, covenants, conditions or stipulations herein contained or implied.

16.03 Nothing in this Clause whether express or implied shall be deemed to diminish or otherwise lessen any obligation that the Lessor may have at law to mitigate its loss.

CLAUSE 17 ABATEMENT OF RENT OR TERMINATION OF LEASE ON DAMAGE, DESTRUCTION OR RESUMPTION

17.01 If the whole or any part of the premises shall be taken for any public purpose or be destroyed or damaged by fire flood lightning storm tempest or other disabling cause including war damage so as to:

(a) render the premises during the term hereby granted substantially unfit for the use and occupation of the Lessee, or

(b) deprive the Lessee of substantial use of the same, or

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(c) render the rebuilding or reconstruction of the premises in their previous form impracticable or undesirable

then

(i) this Lease may be terminated without compensation by either the Lessor or the Lessee by notice in writing to the other of them SUBJECT HOWEVER in the latter case to the Lessor having failed to rebuild or reinstate the premises within a reasonable time after notice in writing from the Lessee;

(ii) any such termination as aforesaid shall be without prejudice to the rights of either party in respect of any antecedent breach matter or thing;

(iii) nothing herein contained or implied shall be deemed to impose any obligation upon the Lessor to rebuild or reinstate or make the premises fit for occupation;

(iv) upon the happening of such taking destruction or damage as aforesaid the rent hereby reserved and the outgoings payable by the Lessee hereunder or a proportionate part thereof according to the nature and extent of the taking damage or destruction sustained shall abate and all or any remedies for the recovery of such rent and outgoings or such proportionate part thereof (as the case may be) shall be suspended until this Lease has been terminated pursuant to the provisions of this Clause;

(v) in the event of any such destruction or damage occurring and this Lease not being terminated as aforesaid then the rent hereby reserved and the outgoings payable by the Lessee or a proportionate part thereof according to the nature and extent of the destruction or damage sustained shall abate and all or. any of the remedies for the recovery of such rent rates and taxes or such proportionate part thereof (as the case may be) shall be suspended until the premises have been rebuilt or reinstated or made fit for the occupation and use of the Lessee; and

(vi) in the event of any dispute arising out of this Clause the same shall be referred to arbitration under the provisions of the laws for the time being in force in the State of New South Wales.

(vii) not withstanding the above, the Lessee is not entitled to terminate the Lease, nor will rent and outgoings abate if the damage or destruction is caused or contributed to by the Lessee.

CLAUSE 18 GENERAL

18.01 The Lessor shall have the right during the last three (3) calendar months previous to the expiration of this Lease or any further lease granted pursuant to any option herein - contained to bring prospective tenants and occupiers upon and into the premises and to place thereon the usual notice "to be let" or "to let" which said notice shall not be removed by the Lessee.

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18.02 In any case where pursuant to this Lease the doing or executing of any act matter or thing by the Lessee is dependent upon the consent or approval of the Lessor, such consent or approval may be given or withheld by the Lessor in its absolute uncontrolled discretion (unless otherwise herein provided) and upon or subject to such terms conditions requirements or stipulations as the Lessor may think fit. The Lessee shall in any event pay to the Lessor upon demand any fees paid by the Lessor to consultants engaged by the Lessor to examine or advise upon any applications made by the Lessee (including any plans specifications or material submitted therewith) for the consent or approval of the Lessor where any such consent or approval is required pursuant to this Lease and also any other moneys outlaid or expenses incurred by the Lessor in connection therewith.

18.03 In any case where, pursuant to this Lease the Lessor is entitled to do any act or thing at the cost or expense of the Lessee then such cost or expense shall, without limiting the generality of such terms, include all amounts paid or payable by the Lessor to any consultant.

18.04 The Lessee shall comply promptly with and observe at its own expense all notices received from any statutory public or municipal authority with respect to the premises except such notices as would have been given irrespective of any business of the Lessee carried on by it on the premises, and further the Lessee will notify the Lessor of any notices so received and notwithstanding anything herein contained or implied the Lessee expressly agrees and declares that it shall at its own cost and expense be responsible for carrying out and completing in a proper and workmanlike manner any alterations or additions (whether structural or not) as may be required by any competent authority relating to the provisions of toilets, washbasins and any other amenities and requirements incidental thereto where such alterations or additions are required or otherwise arise by virtue of the Lessee's use and occupation of the premises hereby demised.

18.05 Without limiting the generality of anything herein contained the Lessee expressly agrees that it shall at its own expense comply with all and any provisions of any statute, regulation or ordinance restricting, regulating or in any way effecting or controlling the use to which the premises or any part thereof may from time to time be put.

18.06 The covenants and conditions contained herein or implied by statute or regulation shall comprise the whole of the agreement between the parties who acknowledge and declare that no other terms or conditions shall be deemed to be implied herein or to arise by way of collateral warranty.

CLAUSE 19 SERVICE OF NOTICES

19.01 Any notice or other document or writing required to be served delivered or given hereunder to the Lessee may be served delivered or given in any manner mentioned in Section 170 of the Conveyancing Act, 1919 (hereinafter called "the said Act") as amended and in addition thereto may be served delivered or given to the Lessee by enclosing the same in a properly stamped envelope addressed to the Lessee at its place of business or residence last known to the Lessor and placed in a receptacle provided for that purpose by the postal

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authority and any such notice or other document or writing shall be deemed to have been served delivered or given on the day following the day on which it was placed in the receptacle aforesaid.

19.02 Any notice or other document or writing required to be served delivered or given hereunder to the Lessor shall be served delivered or given by delivering or procuring the delivery of the original of the same at the principal place-of business in Sydney for the time being of the Lessor or of the Managing Agent.

CLAUSE 20 COVENANTOR

20.01 In consideration of the Lessor entering into the Lease at the request of the Covenantor named in Item 16 of the Reference Schedule the Covenantor and so as to bind himself his heirs executors administrators and assigns HEREBY COVENANTS AND AGREES with the Lessor that he will be jointly with the Lessee and each of them severally liable to the Lessor for the due and punctual payment of all rent and other moneys reserved by the Lease and for the due and punctual performance and observance of all of the terms covenants and conditions on the part of the Lessee contained in the Lease and in any renewal thereof and it is hereby acknowledged that the liability of the Covenantor hereunder shall not be affected by any matter or thing whatever and in particular but without in any way limiting the generality of the foregoing shall not be affected by:-

(a) the winding up of the Lessee or the death of the Covenantor;

(b) the giving of time or the granting of other indulgence to the Lessee or the Covenantor.

If any payment made by the Lessee or the Covenantor shall subsequently be avoided such payment shall not discharge the liability of the Covenantor in respect thereof and all parties shall be restored to the position in which they respectively would have been if such payment had not been made. Notwithstanding anything express or implied to the contrary and notwithstanding no actual service on the Covenantor notice of any fact or thing served on the Lessee shall be deemed to be service on the Covenantor for all purposes.

A reference herein to the Covenantor shall where there are two or more persons named in Item 16 of the Reference Schedule include a reference to any or all of the persons so named and the covenants herein contained shall bind them jointly and each of them severally.

20.02 In case any one or more of the provisions herein contained should be invalid, illegal or unenforceable in any respect, the validity, legality and enforceability of the remaining provisions hereof shall not in any way be affected or impaired thereby.

CLAUSE 21 OPTION

21.01 PROVIDED THAT there is no subsisting breach by the Lessee of any of the terms or conditions herein contained then should the Lessee wish to take a further lease of the premises the Lessee shall give to the Lessor not less than sixty (60) days but not more than ninety (90)

days notice in writing prior to the expiration of the term of this Lease of its intention to exercise the option herein contained and upon compliance with the aforesaid conditions precedent the Lessor shall grant to the Lessee a further lease of the premises commencing on the date set out in Item 17 of the Reference Schedule and terminating on the date set out in Item 18 of the Reference Schedule (hereinafter called "the further lease") PROVIDED THAT the further lease shall contain the same terms and conditions that are contained in this Lease with the following alterations and amendments:-

(a) This Clause 21 and Items 17 and 18 of the Referenced Schedule shall not be included in the further Lease.

(b) The commencing rent shall be the higher of (i) the fair market rent determined in accordance with Clause 21.02 hereof, or (ii) the rent payable immediately preceding the expiration of the prior term but then adjusted in accordance with Clause 3.02 hereof.

(c) The dates and methods of rent review specified in Item 10A of the Referenced Schedule shall be replaced by the dates and methods of rent review specified in Item 10B of the Reference Schedule and Item 10B shall then be deleted.

21.02 (a) In the event that the Lessee duly exercises the option contained in this Clause then the Lessor shall not later than the expiration of the term of this Lease notify the Lessee in writing of the amount which in its opinion represents the fair market rent of the premises as at the said date and unless within twenty-one (21) days from the date of being so advised the Lessee objects in writing to the amount stated then subject to Clause 21.01 that amount shall be deemed to be the rent payable under the further lease.

(b) Should the Lessee dispute that such amount represents the fair market rent of the premises it may by notice in writing to the Lessor given within twenty-one (21) days of receipt of the notice given by the Lessor pursuant to Clause 21.01 hereof require such rent to be determined on the application of the Lessor by a member of the Australian Institute of Valuers or its successor appointed by the President for the time being of the said Institute or its successor or if there be no such President then by the Chief Executive Officer for the time being of the said Institute or its successor who has been qualified for not less than five (5) years and the person so appointed shall be deemed to be acting as an expert and not as an arbitrator and his decision shall be final and binding on the parties.

(c) The cost of such determination aforesaid shall be borne by the Lessor and the Lessee in such proportion as the person making the determination under this sub-clause shall decide and such decision shall be final and binding on both parties and in the absence of such decision then equally.

ANNEXURE "A" REFERRED TO IN ITEM (G) 7 OF THE LEASE
Between Walleroo Pty Limited and W. Paton (Fertilizers) Pty Limited

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REFERENCE SCHEDULE

ITEM I: **Lessor**
Walleroo Pty Limited
ACN 002 172 830
Of Level 6, 50 Margaret Street, Sydney

ITEM 2: **Lessee**
W. Paton (Fertilizers) Pty Limited
ACN 000 508 216
Of Level 6, 50 Margaret Street, Sydney

ITEM 3: **Premises**
Folio Identifer 1/747153
and known as 126 Andrews Road, Penrith

ITEM 4: **Term**
Five (5) years

ITEM 5: **Lease Commencement**
1 November 1997

ITEM 6: **Rental Commencement**
1 November 1997

ITEM 7 **Termination**
31 October 2002

ITEM 8: **Monthly Rental**
Twenty Five thousand dollars. ($25,000.00)

ITEM 9: **Annual Rental**
Three hundred ~~and thirty~~ thousand dollars. ($330,000.00)

ITEM 10A: **Rent Review Dates**
A 1 November 1998 - CPI
B 1 November 1999 - CPI or market review whichever the greater
C 1 November 2000 - CPI
D 1 November 2001 - CPI or market review whichever the greater

ITEM 10B: A 1 November 2003 - market review
B 1 November 2004 - CPI
C 1 November 2005 - CPI or market review whichever the greater
D 1 November 2006 - CPI

ITEM 11: **Lessee's Proportion of Outgoings**
100 %

ITEM 12: **Public Liability**
$10,000,000.00

ITEM 13: **Interest on Moneys Overdue**
12% per annum

ITEM 14: **Painting**

ITEM 15: **Permitted Use**
Manufacture and storage of fertilizer products Administration and offices

ANNEXURE "A" REFERRED TO IN ITEM (G) 7 OF THE LEASE

Between Walleroo Pty Limited and W. Paton (Fertilizers) Pty Limited

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ITEM I6 **Covenantor**
Not Applicable

ITEM 17: **Option Commencement**
1 November 2001

ITEM 18: **Option Termination**
1 November 2006

THE COMMON SEAL of WALLEROO)
PTY LIMITED ACN 002 172 830)
was hereunto affixed by)
authority of the board of)
directors in the presence of:)

Common Seal
WALLEROO
PTY. LIMITED
A.C.N.
002 172 830

Director

Secretary

THE COMMON SEAL of W. PATON)
(FERTILIZERS) PTY LIMITED)
was hereunto affixed by)
authority of the board of)
directors in the presence of:)

Common Seal
W. PATON
(FERTILIZERS)
PTY. LIMITED
A.C.N.
000 508 216

Director

Secretary

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CONSENT TO LEASE

R.P.A.

WESTPAC BANKING CORPORATION ARBN 007 457 141 (hereinafter called "the Bank") being the Mortgagee under Mortgage No 3629150 of the premises demised by the within Lease hereby consents to such Lease as from the registration thereof and not otherwise and subject to the following conditions and provisions namely:

1. THAT this consent shall be without prejudice to the rights powers and remedies of the Bank and its assigns under the said Mortgage which shall remain in full force and effect as if this consent had not been given except that so long as the covenants and provisions of the said Lease are duly observed and performed the Bank will in the event of the exercise of the power of sale or other power or remedy of the Bank or its assigns on default under the said Mortgage exercise the same subject to the then subsisting rights of the Lessee his executors administrators and assigns under the said Lease.

2. THAT so long as the Bank or its assigns is or are registered as Mortgagee of the said premises the Lessee shall obtain the consent or approval of the Bank or its assigns in addition to the consent or approval of the Lessor in all cases where under the said Lease the consent or approval of the Lessor is required.

3. THAT upon the Bank or its assigns giving notice to the Lessee of demanding to enter into receipt of the rents and profits of the said premises the covenants on the part of the Lessee expressed or implied in the said Lease shall be deemed to have been entered into by the Lessee with the Bank and its assigns and all the rights powers and remedies of the Lessor under the said Lease shall vest in and be exercisable by the Bank and its assigns until such notice be withdrawn or the said Mortgage be discharged.

4. The Bank shall in no way be bound to perform and shall not incur any liability in respect of the covenants and agreements expressed or implied in the said Lease and on the part of the Lessor to be performed and observed.

5. The word "Lessee" where used herein shall mean and include the Lessee his executors administrators or permitted assigns.

DATED this 29th day of September 1998

Signed for and on behalf of
WESTPAC BANKING CORPORATION

Frederick Alan Holmes
(Full name of Attorney)
its Attorney who is personally known to me

MB Hah MOHAMMAD BILLAH
Westpac Bank, Concord West
1 King St. Concord. NSW 2138
(Witness Signature)

WESTPAC BANKING CORPORATION by its Attorney who states that at the time of executing this instrument no notice of revocation has been received of the Power of Attorney registered in the Land Titles Office Book 4059 No.831 under the authority of which this Instrument has been executed.

.....
Supervisor, NSW Service Centre

Form: 07L
Licence:
Licensee:

LEASE

New South Wales
Real Property Act 1900

AB16717L

PRIVACY NOTE: Section 31B of the Real Property Act 1900 (RP Act) authoris information required by this form for the establishment and maintenance of the Real Property Act Register. Section 96B RP Act requires that the Register is made available to any person for search upon payment of a fee, if any.

STAMP DUTY

Office of State Revenue use only

EXEMPT B335018 $75

NEW SOUTH WALES DUTY
30-06-2004 0002039548-001
LEASE - GENERAL
DUTIABLE AMOUNT $ ******2,337,864.00
DUTY $ ********XCL182.65

(A) **TORRENS TITLE**

Property leased: if appropriate, specify the part or premises

Folio Identifier 1/747153

Premises being the two Buildings located on the Land known as 126 Andrews Road, Penrith as hatched in the attached plan

(B) **LODGED BY**

Delivery Box	Name, Address or DX and Telephone	CODE
8985 ~~509D~~	**CORRS CHAMBERS WESTGARTH** 1 Farrer Place, SYDNEY Telephone + 61 2 9210 6500 Reference (optional): ~~JGR 9001095~~ SYL 9001095	L

LLPN: 123648 F

RELODGED
15 DEC 2004
TIME: 11.00

(C) **LESSOR**

WALLEROO PTY LIMITED ACN 002 172 830

The lessor leases to the lessee the property referred to above.

(D) Encumbrances (if applicable): 1. Mortgage 3629150 2. _____ 3. _____

(E) **LESSEE**

PATON FERTILIZERS PTY LTD ACN 000 508 216

(F) ~~**TENANCY:**~~

(G) 1. **TERM:** Five years
2. **COMMENCING DATE:** 1 September 2004
3. **TERMINATING DATE:** 31 August 2009
4. With an **OPTION TO RENEW** for a period of five years set out in clause 23 of this lease
5. With an **OPTION TO PURCHASE** set out in clause 25 of this lease
6. Together with and reserving the **RIGHTS** set out in clause 26 of this lease
7. Incorporates the provisions or additional material set out in **ANNEXURE(S) A** hereto
8. Incorporates the provisions set out in **MEMORANDUM** filed / **LEASE** registered in the Department of Lands, Land and Property Information Division as No. N/A
9. The **RENT** is set out in item No. 1 of Information Table

CT PROD BY 37Y ON 13/10/04 FOR THIS L.

OFF5345869

DATE: _____ / _____ / 2004
dd mm yyyy

See Annexure A for execution

Note: where applicable, the lessor must complete the statutory declaration below.

(I) STATUTORY DECLARATION *

I

solemnly and sincerely declare that-

1. The time for the exercise of option to renew in expired lease No. has ended;
2. The lessee under that lease has not exercised the option.

I make this solemn declaration conscientiously believing the same to be true and by virtue of the Oaths Act 1900.

Made and subscribed at in the State of New South Wales on

in the presence of-

Signature of witness: Signature of lessor:

Name of witness:

Address of witness:

Qualification of witness: Justice of then Peace

* As the Department of Lands may not be able to provide the services of a justice of the peace or other qualified witness, the statutory declaration should be signed and witnessed prior to lodgment of the form at Land and Property Information Division.

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Information Table

Date

Parties

Name	**WALLEROO PTY LIMITED**
ABN	35 808 150 579
Short form name	**Landlord**
Notice details	301 McCarrs Creek Road, Terrey Hills NSW 2084 Facsimile + 61 2 9450 2544 Attention: Secretary

Name	**PATON FERTILIZERS PTY LTD**
ABN	56 000 508 216
Short form name	**Tenant**
Notice details	126 Andrews Road, Penrith NSW 2750 Facsimile +61 2 4729 2810 Attention:

Items

Item 1	**Rent** (clause 1.1 and clause 2.1) $356,594.32 per annum (plus GST) - calculated at $47.55 per m^2
Item 2	**Day of month on which rent instalments are due** (clause 1.1 and clause 2.1) First
Item 3	**Rent Review Dates (market review)** (clause 1.1 and clause 3) 1 September 2004, 1 September 2006 and 1 September 2008
Item 3A	**Dates and percentage of set rent increases** (clause 2.3) Not applicable
Item 3B	**Dates for CPI rent review (clause 2.4)** 1 September 2005 and 1 September 2007.
Item 4	**Outgoings Year** (clause 1.1) 30 June
Item 5	**Tenant's percentage of Outgoings** (clause 4) 100% - subject to survey but subject always to the provisions of **clause 4.7**

Item 6 **Cleaning Charge**

Not applicable - Tenant to clean Premises at its expense

Item 7 **Interest rate** (clause 5.6)

3% above the Westpac Banking Corporation's 'Overdraft Reference Rate' for amounts over $100,000 or 12% per annum, whichever is greater

Item 8 **Public liability insurance** (clause 6)

$10,000,000

Item 9 **Permitted Use** (clause 1.1 and clause 8)

Processing, blending, packaging and distribution of fertilizer products, administration and offices

Item 10 **Restricted access hours** Not applicable

Item 11

(a) **Redecoration required on each redecoration date** (clause 11.4)

(i) wash down the inside surfaces of the Premises; and

(ii) paint, stain, wallpaper or otherwise treat all surfaces inside the Premises in the same way that those surfaces were painted, stained, wallpapered or otherwise treated when last redecorated with the Landlord's approval or, if the Premises have not been redecorated with the Landlord's approval, then as they were at the Commencement Date;

(iii) replace floor coverings, curtains, blinds and other furnishings and decorations which are, in the Landlord's opinion, acting reasonably, worn or damaged;

(iv) repair of existing damage and further degeneration during the Term as a result of the Tenant's Permitted Use of the bituman car parks, access roads, paths, entrances and exits and all other pedestrian or vehicular facilities comprising the Complex.

(b) **Redecoration dates** (clause 11.4)

At the expiration of the Term

Item 12 **Bank Guarantee** (clause 1.1 and clause 21)

An amount equal to 6 months of Rent and Tenant's Contribution to Outgoings (exclusive of GST).

If the Tenant does not provide a bank guarantee as required above, the Tenant must pay the first 6 months Rent and Tenant's Contribution to Outgoings (inclusive of GST) in advance.

AWC

Item 13 **Particulars of new lease** (clause 23)

Term:	Five years
Commencement Date:	1 September 2009
Expiry Date:	31 September 2014
CPI Review Dates:	On 1 September 2010 and 1 September 2012
Market Review Dates:	1 September 2011 and 1 September 2013
Redecoration Dates:	At the expiration of the Term

Item 14 **Car Parking Licence** (clause 24)

Number of car parking spaces: up to 40 spaces as may be required for normal commercial business operations of the Tenant provided that the exact location of such car parking spaces may be changed to another location on the Land with an equivalent number of car parking spaces in the Landlord's sole discretion.

Car parking licence fees - Not applicable

Agreed terms

1. Defined terms and interpretation

1.1 Defined terms

In this document:

Authority means any government department, local council, government or statutory authority, public or private utility or other public or private body, which has a right to impose a requirement (including a requirement that its consent be obtained) or charge a fee in connection with the Complex or the Services.

Bank Guarantee means an irrevocable and unconditional undertaking on terms acceptable to the Landlord by a bank (or, at the Landlord's discretion, another financial institution) carrying on business in Sydney requiring the bank (or other financial institution) to pay on demand whether by one or more requests the amount in **Item 12** (or any replacement or addition to it under **clause 21**).

Building means the building or buildings (as may be the case) which from time to time are comprised in the Complex.

Car Parking Licence means the car parking licence referred to in **clause 24.**

Cleaning Charge means the monthly amount (if applicable) set out in **Item 6** as varied under this lease being the Landlord's cost of cleaning the Premises.

Commencement Date means the commencing date on the cover page of this lease.

Common Areas means those parts of the Complex which the Landlord intends for common use including any roadways or pathways.

Complex means the Building and other improvements (including without limitation the Premises) constructed on the Land and the Land.

CPI means the consumer price index published by the Australian Statistician for the area and group in 'Sydney - All Groups'.

CPI Review Date means each date in Item 3B.

Current CPI means the CPI number for the quarter ending immediately before the relevant CPI Review Date.

Current Annual Rent of the Premises is the total of:

(a) the current annual market rental value of the Premises on the relevant Rent Review Date (being the best annual rent that can reasonably be obtained for the Premises); and

(b) the annual value of any incentive, inducement, concession or benefit, in any form, that would be likely to be required to secure a tenant to lease the Premises if they were vacant as at the relevant Rent Review Date and were not subject to this lease and for a term equal to the period between the Commencement Date and the Expiry Date beginning on the relevant Rent Review Date and otherwise on the same terms as this lease.

as agreed or determined under **clause 3**.

Dangerous Goods means any item, substance or article which is either:

(a) prescribed as dangerous goods under the *Dangerous Goods Act (1975)*; or

(b) capable of constituting a risk, threat or menace to persons or property.

Deed of Surrender means the deed of surrender of registered lease no. 5345869Y between the Landlord and the Tenant entered into simultaneously with this lease.

Environmental Laws means:

(a) all planning, environmental, noise, development, health, contamination, radiation, pollution, waste disposal laws, land management and all laws relating to Dangerous Goods, or Hazardous Materials;

(b) all conditions of all consents, approvals, licences, permissions, permits issued under any such law; and

(c) regulations and any order, notice, direction or requirement of any Authority in relation to such matters.

Expiry Date means the terminating date on the cover page of this lease.

Hazardous Materials means:

(a) any substance, gas, liquid, chemical, mineral or other physical or biological matter which is or may:

(i) become toxic, flammable, inflammable; or

(ii) be otherwise harmful to the environment or any life form or which may cause pollution, contamination or any hazard or increase in toxicity in the environment or may leak or discharge or otherwise cause damage to any person, property or the environment; or

(b) any items which are Dangerous Goods; or

(c) a material or compound controlled, prohibited or regulated from time to time by any Environmental Law.

Incentive means anything the Landlord gives to or makes available to or at the direction of the Tenant to induce it to sign this lease.

Information Table means the part of the document described as Information Table.

Insolvency Event means the happening of any of these events:

(a) an application is made to a court for an order or an order is made that a body corporate be wound up; or

(b) an application is made to a court for an order appointing a liquidator or provisional liquidator in respect of a body corporate, or one of them is appointed, whether or not under an order; or

(c) except to reconstruct or amalgamate while solvent on terms approved by the Landlord, a body corporate enters into, or resolves to enter into, a scheme of arrangement or composition with, or assignment for the benefit of, all or any class of its creditors, or it proposes a reorganisation, moratorium or other administration involving any of them; or

(d) a body corporate resolves to wind itself up, or otherwise dissolve itself, or gives notice of intention to do so, except to reconstruct or amalgamate while solvent on terms approved by the Landlord or is otherwise wound up or dissolved; or

(e) a body corporate is or states that it is insolvent; or

(f) as a result of the operation of section 459F(1) of the *Corporations Act 2001* (Cth), a body corporate is taken to have failed to comply with a statutory demand; or

(g) a body corporate is, or makes a statement from which it may be reasonably deduced by the Landlord that the body corporate is, the subject of an event described in section 459C(2)(b) or section 585 of the *Corporations Act 2001* (Cth); or

(h) a body corporate takes any step to obtain protection or is granted protection from its creditors, under any applicable legislation or an administrator is appointed to a body corporate; or

(i) a person becomes an insolvent under administration as defined in section 9 of the *Corporations Act 2001* (Cth) or action is taken which could result in that event; or

(j) anything analogous or having a substantially similar effect to any of the events specified above happens under the law of any applicable jurisdiction and including without limitation deregistration or dissolution.

Institute means the Australian Property Institute Inc. (New South Wales Division).

Item means an item appearing in the Information table.

Land means the land described on the cover sheet, on which the Complex is situated and any other land which the Landlord uses from time to time as part of the Complex for any industrial estate and parking area or other related undertaking.

Landlord means the party described as Landlord in the parties section of the Information Table and being the party described as lessor on the front page of this lease and each administrator, assign, executor and successor of that person or company.

Landlord's Property means all plant, equipment, fixtures, fittings, furniture, furnishings and other property the Landlord provides in the Premises.

Lettable Area means the total lettable area of the Premises calculated by the Landlord's surveyor (and apportioned where necessary between industrial and commercial/office uses in the Premises) using the 1997 edition of the Property Council of Australia's method of measurement or such other method of measurement of lettable areas of industrial and if applicable commercial/office areas as may be endorsed by the Property Council of Australia Limited and notified in writing to the Tenant by the Landlord from time to time.

Loss of Bargain Damage means the amount being the difference between:

(a) all money which would have been received or recovered by the Landlord from the Tenant under this lease for the period of the Term remaining after termination of this lease had it been fully performed by the Tenant; and

(b) the money which the Landlord, using its reasonable endeavours, is going to receive for the Premises from a replacement tenant for the period of the Term of this lease remaining after the termination of this lease after allowing for any actual or anticipated vacancy during the letting up period and any abatement, concession, incentive or inducement in any form which has been or may be paid, allowed or conceded by the Landlord to obtain that sum of those moneys,

where in each case that money is discounted back to a net present value calculated at the date of termination of this lease by applying a discount rate equivalent to the rate (expressed as a percentage per annum) of the Commonwealth Bond 10 year Indicator Rate published in the Australian Financial Review or elsewhere on the date of that termination or, if that rate is not

published at that date, by applying a published rate which in the opinion of the valuer referred to in **clause 17.5** (acting as an expert and not as an arbitrator) equates most closely to it.

Make Good means to:

(a) remove from the Premises and the Complex, all fixtures, fittings, furnishings, cables, conduits and wires whether or not installed by the Tenant and the Tenant's Property required by the Landlord to be removed; and

(b) properly repair any damage caused by the removal of things referred to in paragraph (a) of this defined term from the Premises and the Complex; and

(c) reinstate the structure of any part of the Premises or the Complex which has been penetrated or altered by or on behalf of the Tenant, including the bituman car parks, access roads, paths, entrances and exits and all other pedestrian or vehicular facilities that have become damaged during the Term by the Tenant's Permitted Use; and

(d) thoroughly clean the Premises and remove all rubbish, waste and materials brought onto or left in or about the Premises or, the Complex by or on behalf of the Tenant; and

(e) decontaminate and remediate any part of the Complex or the Landlord's Property which is or becomes contaminated or polluted or in need of decontamination or remediation pursuant to any Environmental Law as a result of the Tenants use or occupation of the Premises

and subject to fair wear and tear:

(f) reinstate the Premises and the Services benefiting the Premises to their condition at the commencement of the Term or the term of the initial lease if this lease is a renewal under an option and leave them in good repair and condition, having regard to the Tenant's obligations under this lease, clean and free from rubbish and in a safe condition; and

(g) if the Landlord does not require it to be removed, put the carpet or other floor covering in good repair, and condition, including by replacing any cut out areas with new carpet or other floor covering approved by the Landlord which is of a standard not less than the standard of the carpet or other floor covering then provided by the Landlord to premises of a standard similar to the Premises in the Complex; and

(h) put the ceiling support grid, light fittings and ceiling tiles into good repair and condition.

Outgoings means all amounts paid or payable by the Landlord for an Outgoings Year in connection with the Complex (other than the cost of capital works except for capital works referred to in paragraph (j) below) including:

(a) rates, land taxes (on the basis that the Land is the only land owned by the Landlord and is not subject to a trust) and other charges imposed by any Authority and levies and charges imposed under strata, community title or similar legislation; and

(b) taxes (excepting any income or capital gains tax and adding any goods and services tax paid or payable by the Landlord on any amount paid or payable as an Outgoing under this lease), levies, imposts, deductions, charges, withholdings and duties imposed by any Authority; and

(c) insurance which the Landlord reasonably considers is appropriate (including for loss of rent); and

(d) cleaning the Complex (except for those parts which are let) and keeping it free of vermin and refuse and supplying items usually supplied in washrooms and toilets; and

(e) repairs, redecoration and maintenance of indoor and outdoor gardening and landscaping of the Complex and areas near it; and

(f) building staff, caretaking services, security and regulating traffic; and

(g) management and administration; and

(h) supplying, maintaining, repairing and replacing Services and upgrading them to comply with requirements of Authorities and all laws or to satisfy the requirements of the Landlord; and

(i) charges for the supply of Services which are not separately metered to an occupier including usage charges; and

(j) repairs, redecoration and maintenance of the Complex which no occupier is obliged to do and which do not form part of lettable areas (including any bituman car parks, access roads, paths, entrances and exits and all other pedestrian or vehicular facilities at any time provided by the Landlord and used by the Tenant during the Term); and

(k) the provision and upkeep of signs and directory boards and information systems; and

(l) other things including services now or in the future provided by the Landlord for the use or benefit of occupants of the Complex.

Outgoings Year means the 12 month period ending on the date specified in **Item 4** in each year or on another day specified in a notice the Landlord gives the Tenant.

Permitted Use means the use in **Item 9**.

Premises means (except when measuring the Lettable Area) that part of the Complex described as the premises on the cover sheet, the boundaries of which are:

(a) the external surface of the walls (including any paint or wall covering); and

(b) the lower surface of the soffit (above any false or suspended ceiling); and

(c) the upper surface of the floor (under any floor covering).

The Premises include the Landlord's Property.

Previous CPI means the CPI number for the quarter ending immediately before the last Rent Review Date or, if there has not been one, the Commencement Date.

Rent means the yearly amount in **Item 1** as varied under this lease.

Rent Day means the Commencement Date and, for each subsequent month, the day in **Item 2**.

Rent Review Date means each date in **Item 3**.

Rules means the rules of the Complex set out in Schedule 1 as varied or added to under this lease.

Services means services (such as water, sewerage, drainage, gas, electricity, communications, fire fighting, air conditioning, water cooling towers, lifts and escalators to or of the Complex or any premises in it or the Land provided by Authorities, the Landlord or any person authorised by the Landlord and includes all plant and equipment in connection with them.

Tenant means the party described as Tenant in the parties section of the Information Table and being the party described as lessee on the front page of this lease and each administrator, permitted assign, executor and successor of that person or company.

Tenant's Business means the business carried on from the Premises.

Tenant's Contribution means for an Outgoings Year:

$$\frac{TP \times N \times A}{Y}$$

where:

TP = the percentage in **Item 5** as may be varied under this lease

N = the number of days of the Term in that Outgoings Year

A = the Outgoings for that Outgoings Year

Y = the number of days in that Outgoings Year

Tenant's Employees and Agents means each of the Tenant's employees, officers, agents, contractors and invitees.

Tenant's Property means all property on the Premises which is not Landlord's Property or Services.

Term means the period from and including the Commencement Date to and including the Expiry Date.

Trust means the Christopher Walker Family Trust.

1.2 Interpretation

Unless the contrary intention appears:

(a) the singular includes the plural and vice versa; and

(b) **person** includes a firm, a body corporate, an unincorporated association or an Authority; and

(c) an agreement, representation or warranty:

  (i) in favour of two or more persons is for the benefit of them jointly and severally; and

  (ii) on the part of two or more persons binds them jointly and severally; and

(d) a reference to:

  (i) a person includes the person's executors, administrators, successors, substitutes (including persons taking by novation) and assigns; and

  (ii) a document includes any variation or replacement of it; and

  (iii) a law includes regulations and other instruments under it and amendments or replacements of any of them; and

  (iv) a thing includes the whole and each part of it collectively and each of them individually; and

  (v) a group of persons includes all of them collectively, any two or more of them collectively and each of them individually; and

  (vi) the president of a body or Authority includes any person acting in that capacity; and

  (vii) a body, corporation, institute, association or Authority includes any successor or replacement body corporation, institute, association or Authority; and

(viii) a clause, paragraph, schedule, information table or annexure is a reference to a clause, paragraph, schedule, information table or annexure to this lease and a reference to this lease includes any schedule, information table or annexure; and

(ix) **Guarantor** is a reference to all of the persons named as **Guarantor** jointly and each of them severally. An agreement, representation, warranty or indemnity on the part of the Guarantor binds the persons named as **Guarantor** jointly and each of them severally; and

(e) **including** (in any form) or **such as** when introducing a list of items does not limit the meaning of the words to which the list relates to those items or to items of a similar kind.

2. Rent

2.1 Equal monthly instalments

The Tenant must pay the Rent by equal monthly instalments in advance on each Rent Day.

2.2 Period less than one month

If an instalment is for a period of less than one month, then that instalment is that proportion of one twelfth of the Rent which the number of days in the period bears to the number of days in the month in which that period begins.

2.3 Fixed increases

The Rent increases from and including each of the dates in **Item 3A** by the amount or the percentage set out against the date.

2.4 CPI rent review

If the Current CPI for a CPI Review Date is more than the Previous CPI, then the Rent from and including that date is increased to the amount 'A' in the formula:

$$A = R \times \frac{C}{P}$$

where:

R = the Rent immediately before the relevant CPI Review Date

C = the Current CPI

P = the Previous CPI.

3. Rent review

3.1 Landlord's assessment of Current Annual Rent

The Landlord may give the Tenant a notice stating the Landlord's assessment of the Current Annual Rent of the Premises as at the relevant Rent Review Date at any time before the next Rent Review Date or the Expiry Date, whichever occurs first.

3.2 If Tenant disputes assessment

If the Tenant wants to dispute the Landlord's assessment, it must give a dispute notice to the Landlord within 14 days after the Landlord gives its notice.

3.3 Failure to dispute on time

If the Tenant does not give a dispute notice on time, the Rent from and including the relevant Rent Review Date is the amount stated in the Landlord's notice.

3.4 Disputes over rent review

If the Tenant gives a dispute notice on time, the Rent will be determined under **clause 3.5**. Until then the Tenant must pay, by equal monthly instalments on account of the Rent from the relevant Rent Review Date, the Rent immediately before the relevant Rent Review Date and 80% of the increase sought by the Landlord.

3.5 Procedure for rent review

The Current Annual Rent of the Premises on the relevant Rent Review Date (being the components of the Current Annual Rent in paragraphs (a) and (b) of the defined term of Current Annual Rent) must be determined by a valuer who:

(a) is appointed by the parties (and if they do not agree on who to appoint within 21 days after the Tenant gives the dispute notice, then that valuer is to be nominated at either party's request by the president of the Institute); and

(b) is a full member of the Institute and has at least five years' experience of valuing premises of a like nature in the same market; and

(c) at the time of appointment is both experienced and actively engaged in valuing premises of a like nature to the Premises; and

(d) in determining the component of the Current Annual Rent referred to in paragraph (a) of the defined term of Current Annual Rent must take into account:

(i) current annual rents for comparable premises both within and outside the Building whether those rents arise from letting vacant space, renegotiating rent on the expiry or termination of a previous lease or from rent reviews, taking into account by way of reduction from the rent reserved by a lease of comparable premises, the annual value of any incentive, inducement, concession or benefit used to secure the tenant to lease those premises; and

(ii) the provisions of this lease (or of any further lease to be granted under **clause 23**) and in particular any liability on the part of the Tenant to pay a contribution to Outgoings and the period of time until the next Rent Review Date; and

(iii) permanent structural improvements to the Premises installed at the Tenant's expense which the Tenant is not permitted to remove at the expiry or termination of this lease; and

(iv) any other use to which the Premises may be lawfully put subject to the consent of the relevant Authorities being sought and obtained

but take no account of:

(v) the value of any goodwill attributable to the Tenant's Business and any improvements or fixtures erected or installed at the Tenant's expense which the Tenant is permitted or required to remove at the expiry or termination of the lease; and

(vi) any deleterious condition of the Premises if that results from any breach of this lease by the Tenant; and

(vii) any discount which might apply if the Tenant leases or occupies more than one lettable area in the Building or the Complex or if the Premises comprise a Building or a substantial part of a Building; and

(viii) the fact that part of the Term has elapsed; and

(ix) the current annual rent for particular comparable premises if, in the opinion of the valuer, the rental payable for those premises is abnormal, or unrealistic, or otherwise does not reflect the current rental value of those premises having regard to conditions prevailing in the relevant market at the Rent Review Date; and

(e) in making a determination under this **clause 3.5**, may rely on whatever information that valuer in its expert opinion regards as sufficient for that purpose; and

(f) must give a written determination setting out the reasons for it with particular reference to what was taken into account and what was disregarded and including the amounts determined for each of paragraph (a) and paragraph (b) of the defined term of Current Annual Rent; and

(g) must act as an expert and not as an arbitrator and, subject to **clause 3.7**, whose determination is final and binding; and

(h) must determine who must pay the valuer's costs and in what proportion if they are to be shared; and

(i) must be requested to deliver a determination within 21 days after appointment.

The amount determined by the valuer is, subject to **clause 3.7**, the Rent from and including the relevant Rent Review Date.

3.6 Adjustments

On the first Rent Day after the Rent is agreed or determined under this **clause 3**, the Tenant must pay the Landlord (or the Landlord must credit the Tenant with) the difference between what the Tenant has paid on account of Rent under **clause 3.4** and the Rent for the period from and including the relevant Rent Review Date to but excluding that Rent Day.

3.7 Rent reviewed under clause 3

Despite anything in this lease (including this **clause 3**), the Rent from and including the relevant Rent Review Date is to be the highest of:

(a) the Rent determined in accordance with **clause 2.4** as if references to the CPI Review Date were a reference to the Rent Review Date; and

(b) the amount determined under this **clause 3**.

4. Outgoings and other payments

4.1 Tenant's Contribution to Outgoings

The Tenant must pay the Tenant's Contribution for each Outgoings Year within 14 days after notice is given under **clause 4.5**.

4.2 Landlord's estimate of Tenant's Contribution

The Landlord may give the Tenant a notice for each Outgoings Year stating the Landlord's estimate of the Outgoings and the Tenant's Contribution for that Outgoings Year. The Landlord may revise that estimate at any time.

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4.3 Payments on account of Tenant's Contribution

If the Landlord gives a notice under **clause 4.2**, the Tenant must pay instalments in advance on each Rent Day on account of the Tenant's Contribution. Each instalment is the Landlord's estimate of the Tenant's Contribution for the Outgoings Year divided by the number of Rent Days (excluding the Commencement Date) in that Outgoings Year.

4.4 Subsequent Outgoings Year

In each Outgoings Year after the first, until the Landlord gives the Tenant a notice of the Landlord's estimate for that Outgoings Year, the Tenant must pay on each Rent Day, on account of the Tenant's Contribution, an instalment equal to that payable on the previous Rent Day.

4.5 Notice of actual Outgoings

As soon as possible after the end of an Outgoings Year the Landlord must give the Tenant a notice giving reasonable details of the actual Outgoings.

4.6 Adjustments

On the next Rent Day after the Landlord gives the Tenant a notice of either estimated (including any revision) or actual Outgoings, the Tenant must pay the Landlord (or the Landlord must credit the Tenant with) the difference between what the Tenant has paid on account of the Tenant's Contribution for the Outgoings Year to which the notice applies and what the notice says is payable.

4.7 Change of Lettable Area

If the Landlord, acting reasonably, is satisfied that the Lettable Area of the Complex, the Building, the Premises or the areas within which the Premises are situated has changed or has been calculated incorrectly, the Landlord may change the percentage in **Item 5** by giving the Tenant a notice that the percentage is changed and from what date to the intent that the Landlord shall be entitled to recover all of the Outgoings for any applicable Outgoings Year from all occupiers of Lettable Areas in the Complex in the proportion that the Lettable Areas occupied or let to any occupant bears to the total Lettable Area of the Complex.

If the Lettable Area of the Building or the Complex changes, the percentage in **Item 5** is to be the proportion (expressed as a percentage) that the Lettable Area of the Premises bears to the changed Lettable Area of the Complex.

4.8 Access to Premises

Subject always to the Landlord's rights under this lease, or at law to limit or restrict the Tenant's access to the Premises in certain circumstances, the Landlord will permit the Tenant to have access to the Premises 24 hours a day seven days a week.

5. Payment requirements

5.1 Payments to the Landlord

The Tenant must make payments under this lease to the Landlord (or to a person nominated by the Landlord in a notice to the Tenant) by electronic funds transfer or any other method the Landlord reasonably requires without set-off, counterclaim, withholding or deduction.

5.2 No demand required

The Landlord need not make demand for any amount payable by the Tenant unless this lease says that demand must be made.

5.3 If no next Rent Day

If the Tenant must pay an amount on the next Rent Day and there is no next Rent Day, then the Tenant must pay that amount within seven days after the Landlord demands it.

5.4 Expiry or termination of lease

Expiry or termination of this lease does not affect the Tenant's obligations to make payments under this lease for periods before then.

5.5 GST

(a) Capitalised expressions which are not defined in this **clause 5.5** but which have a defined meaning in the GST Law have the same meaning in this **clause 5.5**.

(b) In this lease:

GST Amount means, in relation to a Payment, an amount arrived at by multiplying the Payment (or the relevant part of a Payment if only part of a Payment is the consideration for a Taxable Supply) by the appropriate rate of GST (being 10% when the GST Law commenced) or any lower rate notified from time to time by the person making the relevant Supply;

GST Law has the meaning given to that term in *A New Tax System (Goods and Services Tax) Act 1999*, or, if that Act is not valid or does not exist for any reason, means any Act imposing or relating to the imposition or administration of a goods and services tax in Australia and any regulation made under that Act; and

Payment means:

(i) the amount of any monetary consideration (other than a GST Amount payable under this **clause 5.5**); and

(ii) the GST Exclusive Market Value of any non-monetary consideration,

paid or provided by the Tenant for this lease or by the Landlord or the Tenant for any other Supply made under or in connection with this lease and includes:

(iii) any Rent or contribution to Outgoings; and

(iv) any amount payable by way of indemnity, reimbursement, compensation or damages.

(c) The parties agree that:

(i) all Payments have been set or determined without regard to the impact of GST;

(ii) if the whole or any part of a Payment is the consideration for a Taxable Supply, the GST Amount in respect of the Payment must be paid to the payee as an additional amount, either concurrently with the Payment or as otherwise agreed in writing; and

(iii) the payee will provide to the payer a Tax Invoice.

(d) Despite any other provision of this lease, if a Payment due under this lease (including any contribution to Outgoings) is a reimbursement or indemnification by one party of an expense, loss or liability incurred or to be incurred by the other party, the Payment shall exclude any GST forming part of the amount to be reimbursed or indemnified for which the other party can claim an Input Tax Credit.

5.6 Interest on overdue money

If the Tenant does not pay any amount payable by it under this lease on time, it must pay interest on that amount on demand by the Landlord from when it becomes due for payment until it is paid in full. The Tenant must pay accumulated interest at the end of each month without demand. Interest is calculated on daily balances at the rate set out in **Item 7**.

6. Insurances

6.1 Tenant to maintain insurance

The Tenant must:

(a) in connection with the Premises, maintain with insurers and on terms approved by the Landlord who may not unreasonably withhold its approval in the name of the Tenant and noting the interest of the Landlord and any other person named by the Landlord:

(i) public liability insurance for at least the amount in **Item 8** (as varied by notice from time to time from the Landlord to the Tenant); and

(ii) any other insurances which are required by law or which, in the Landlord's reasonable opinion, a prudent tenant would take out including those in connection with Tenant's works on the Premises; and

(b) give the Landlord evidence when asked to do so that it has complied with **clause 6.1(a)**; and

(c) notify the Landlord immediately if an insurance policy required by this **clause 6.1** is cancelled or an event occurs which may allow a claim or affect rights under an insurance policy in connection with the Premises, the Building or property in them; and

(d) comply with the relevant recommendations of the Insurance Council of Australia.

6.2 Dealing with claims

The Tenant may not enforce, conduct, settle or compromise claims under any insurance policy required by this lease, even if that policy also covers other property, if the Landlord gives the Tenant a notice that the Landlord wishes to do these things.

6.3 Actions affecting insurance

The Tenant may not, without the Landlord's approval, do anything which may affect rights under any insurance or which may increase an insurance premium payable in connection with the Premises, the Building or property in them. The Tenant must pay the actual cost to the Landlord of giving its approval under this **clause 6.3** and also any additional or excess premiums payable.

6.4 Insurance proceeds

Insurance proceeds (even if pursuant to a policy in the Tenant's name only in breach of **clause 6.1(a)**) which the insurer does not require to be used for replacement or reinstatement must be paid into a separate joint account in the names of the Landlord, the Tenant and, if required by the Landlord, any other person. The money must be used to settle claims in connection with the event insured against or to replace or reinstate the insured item and then any surplus shared between the account holders having regard to the effect on them of that event or their respective interests in that item, provided that if there is no adverse effect on the Landlord and/or any other person nominated by the Landlord, such money will be released in full to the Tenant.

7. Indemnities and releases

7.1 Tenant's risk

The Tenant occupies the Premises and uses the Building and the Land at its own risk.

7.2 Tenant indemnifies Landlord

The Tenant is liable for and indemnifies the Landlord against liability, loss or damage arising from, and cost incurred in connection with, any of the following:

(a) damage, loss, injury or death caused or contributed to by the act, negligence or default of the Tenant or of the Tenant's Employees and Agents; and

(b) the Landlord doing anything which the Tenant must do under this lease but has not done or which the Landlord considers the Tenant has not done properly; and

(c) any breach or alleged breach of any Environmental Law or occupational health and safety laws by the Tenant; and

(d) any breach by the Tenant of this lease; and

(e) any accident on or about the Premises not caused by the Landlord.

7.3 Tenant releases Landlord

The Tenant releases the Landlord from, and agrees that the Landlord is not liable for, liability or loss arising from, and cost incurred in connection with, any of the following:

(a) damage, loss, injury or death; and

(b) anything the Landlord is permitted or required to do under this lease; and

(c) a Service not being available, being interrupted or not working or not working properly for any reason; and

(d) the Landlord's plant and equipment not working or not working properly for any reason; and

(e) the Building or the Common Areas not being clean or secure; and

(f) any fire, bomb threat or other emergency drill or the Tenant evacuating the Building because of any fire, bomb threat or other emergency; and

(g) the operation of any statute, regulation or notice issued by an Authority; and

(h) any strike, accident, riot, industrial action or civil disturbance; and

(i) the Landlord being required to investigate, test, evaluate, monitor, remediate, secure or manage any contamination or environmental matter concerning the Complex

unless it is caused by the Landlord's wilfully reckless act, negligence or default.

7.4 Continuing obligation

Each indemnity is independent from the Tenant's other obligations and continues during this lease and after it expires or is terminated. The Landlord may enforce an indemnity before incurring expense.

8. Use

8.1 Permitted Use

The Tenant must use the Premises only for the Permitted Use.

8.2 Suitable for Permitted Use

The Tenant represents to the Landlord that it has satisfied itself that the Premises, the Building and the Services are suitable for the Permitted Use.

9. Tenant's additional obligations

9.1 Tenant's obligations

The Tenant must:

(a) comply on time with all laws and the requirements of Authorities in connection with the Premises, the Tenant's Business, the Tenant's Property and the use or occupation of the Premises (including obtaining and complying with all permits or approvals) but the Tenant need not carry out structural work unless it is required in connection with the use or occupation of the Premises or the act, negligence or default of the Tenant or of the Tenant's Employees and Agents; and

(b) inform the Landlord of damage to the Building or the Premises or of a faulty Service immediately it becomes aware of it; and

(c) observe the recommended maximum load weights throughout the Building and the Premises; and

(d) participate in any fire, bomb threat or other emergency drill of which the Landlord gives reasonable notice; and

(e) evacuate the Building immediately and in accordance with the Landlord's directions when informed of any actual or suspected fire, bomb threat or other emergency; and

(f) promptly, when asked by the Landlord, do everything reasonably necessary for the Tenant to do to enable the Landlord to exercise its rights under this lease; and

(g) comply with all Rules of which it has notice. The Tenant acknowledges that it has notice of the Rules in **Schedule 1**; and

(h) comply and permit the Landlord to itself comply with all Environmental Laws which are applicable to the Premises the Tenant or to the Tenant's use of the Premises; and

(i) decontaminate by appropriate treatment removal or otherwise any pollution or contamination caused or permitted to occur by the Tenant or by the Tenant's Employees and Agents and in accordance with the requirement of any relevant Authority carry out all investigative remedial or decontamination action as required by any Environmental Law and to the satisfaction of all relevant Authorities to the Land.

9.2 What Tenant may not do

The Tenant may not:

(a) alter the Landlord's Property or remove it from the Premises without the Landlord's approval; or

(b) store, bring onto, use or release Hazardous Materials or Dangerous Goods on the Premises or in the Common Areas, the Complex or the Building except as necessary for the Permitted Use; or

(c) manufacture, produce or carry on any activity which creates or leads to the creation of any Hazardous Materials or Dangerous Goods except as necessary for the Permitted Use; or

(d) permit the Premises, the Complex or the environment to be contaminated, polluted or affected by any Hazardous Material; or

(e) do or not do anything which would result in any Authority issuing any notice, direction or order requiring any audit, investigation, clean up, decontamination, remedial action or making good under any law; or

(f) do or not do anything which would constitute a violation or contravention of any Environmental Law or any law relating to occupational health and safety; or

(g) do anything in or around the Complex which in the Landlord's reasonable opinion may be annoying, dangerous or offensive or which may contravene any law imposing noise or vibration control limitation or abatement measures; or

(h) do anything to overload or interfere with the Complex's facilities or Services nor use them for anything other than their intended purpose; or

(i) allow anything to endanger or threaten the Complex, the Premises or occupants of the Complex.

9.3 More remote consequences

If the Tenant may not do something in connection with this lease, then it may not do anything which may result in it happening.

9.4 Tenant's Employees and Agents

The Tenant must ensure that the Tenant's Employees and Agents comply, if appropriate, with the Tenant's obligations under this lease.

10. Cleaning the Premises

10.1 Tenant's cleaning obligations

The Tenant must at the Tenant's expense:

(a) keep the Premises and everything in them clean, tidy and free of refuse and vermin, supply all consumable items required for the Premises or its Services and comply with the Landlord's directions in that regard; and

(b) enter into and keep in force during the Term a contract to clean the Premises with a contractor approved by the Landlord and ensure that the contractor complies with the Landlord's reasonable directions in connection with its conduct in the Complex and other contractors working in the Complex.

11. Repair, redecoration and Tenant's works

11.1 Landlord's approval

The Tenant may not carry out works (including installing fixtures or fittings or making alterations) to or in the Premises without the Landlord's approval. If the Landlord gives approval, it may when giving it, impose conditions. The Tenant must comply with these conditions.

11.2 Tenant's works

The Tenant must ensure that any works it does, including works under **clause 11.4**, are done:

(a) by contractors and consultants either nominated by or approved by the Landlord, who may not unreasonably withhold its approval; and

(b) in a proper and workmanlike manner and without disturbance or disruption to other tenants or occupants of the Land or the Building; and

(c) in accordance with any plans, specifications and schedule of finishes required and approved by the Landlord (who may not unreasonably withhold its approval) which must be accompanied by certifications to the Landlord's satisfaction from architects, engineers or other consultants nominated by the Landlord; and

(d) in accordance with all laws and the requirements of Authorities and the Tenant must promptly obtain and give to the Landlord a certificate issued under Part 4A of the *Environmental Planning and Assessment Act 1979* (NSW) and, if such a certificate can be issued for works of the kind done by the Tenant, a building certificate under section 149D of the *Environmental Planning and Assessment Act 1979* (NSW) or equivalent certificate for the works on their completion; and

(e) in accordance with the Landlord's reasonable requirements and directions from time to time.

The Tenant must stop carrying out the works if requested by the Landlord if the Landlord believes they are in breach of any provision of this lease including **clause 9.2**.

11.3 Repair of items

The Tenant acknowledges that the Premises were in good repair at the Commencement Date.

11.4 Repair, replace and redecorate

The Tenant must:

(a) keep the Premises and the Tenant's Property in good repair and condition excluding fair wear and tear; and

(b) promptly replace worn or damaged items in or attached to the Premises (including any glass, Tenant's Property and those floor coverings and furnishings which are part of the Landlord's Property) with items of similar quality as at the Commencement Date, subject to fair wear and tear; and

(c) redecorate the Premises and the Tenant's Property to the satisfaction of the Landlord acting reasonably in accordance with **Item 11**; and

(d) promptly make good any damage caused by the Tenant or the Tenant's Employees and Agents to the Premises or the Building.

12. Transfer and other dealings

12.1 Prohibited dealings

The Tenant may only transfer this lease, sublet, licence or otherwise part with possession of the Premises in accordance with **clause 12.2**.

12.2 Transfer conditions

The Tenant may only transfer this lease or sublet or licence or otherwise part with possession of the Premises if, before it does so:

(a) it satisfies the Landlord that the proposed transferee, sub-tenant, licensee or other person taking possession (each called in this clause **new tenant**) is financially sound and capable of performing the tenant's obligations under this lease and will be conducting the Permitted Use; and

(b) the proposed new tenant signs a contract relating to the transfer or other dealing in a form reasonably required by the Landlord; and

(c) any guarantee or guarantee and indemnity or other security reasonably required by the Landlord is provided; and

(d) the Landlord has obtained any consents it has agreed to obtain; and

(e) the Tenant is not in default or any default has been waived; and

(f) the Tenant and the proposed new tenant comply with all the Landlord's reasonable requirements; and

(g) it satisfies the Landlord that the new tenant, if a sub-lessee, is paying rent and other amounts payable under this lease at a rate per square metre not less than (and other money on the same basis as) that provided in this lease.

12.3 Change in control of Tenant

If:

(a) the Tenant is a company which is not listed or wholly owned by a company which is listed on the Australian Stock Exchange; and

(b) there is a proposed change in the shareholding of the Tenant or Kate Investment Holdings (Australia) Pty Limited so that a different person or group of persons from that existing at the date the Tenant acquired its interest in this lease will control the composition of the board of directors or more than 50% of the shares giving a right to vote at general meetings,

then that proposed change in control is treated as a proposed transfer of this lease, the person or group of persons acquiring control is treated as the proposed new tenant and **clause 12.2** (except for **clause 12.2(b)**) applies.

12.4 Securities

The Tenant may only create or allow to come into existence:

(a) a security over the Tenant's interest in this lease; or

(b) a lease or security affecting the Tenant's Property

with the Landlord's approval (which may not be unreasonably withheld). If the Landlord gives its approval, the Tenant must execute a waiver reasonably required by the Landlord.

13. Landlord's additional obligations and rights

13.1 Quiet enjoyment

Subject to the Landlord's rights, while the Tenant complies with its obligations under this lease, it may occupy the Premises during the Term without undue interference by the Landlord.

13.2 Rights

The Landlord may:

(a) carry out any works on the Land or in or to the Building (including alterations and redevelopment), or close or otherwise use the Common Areas, if the Landlord does not unreasonably (except in emergencies) interfere with the Tenant's Business or the Tenant's right of quiet enjoyment; and

(b) exclude or remove any person or vehicle from the Land or the Building if that person or vehicle is in breach of the conditions in this Lease; and

(c) restrict access to loading docks, delivery and pick-up areas and parking areas if the Landlord does not unreasonably (except in emergencies) interfere with the Tenant's Business or the Tenant's right of quiet enjoyment; and

(d) permit functions, displays and other activities in the Building or on the Land; and

(e) install and use public address and emergency systems throughout the Building (including the Premises); and

(f) change the direction or flow of pedestrian or vehicular traffic into, out of, through or around the Building if the Landlord does not unreasonably (except in emergencies) interfere with the Tenant's Business or the Tenant's right of quiet enjoyment; and

(g) change the name, logo of or signage of the Building; and

(h) close the Building in an emergency: and

(i) use, maintain, repair, alter and add to Services to or in the Premises, if the Landlord does not unreasonably (except in emergencies) interfere with the Tenant's Business or the Tenant's right of quiet enjoyment,

and the Tenant may not make any claim or abate any payment or terminate this lease if the Landlord exercises any of its rights under this **clause 13.2**.

13.3 To enter

The Landlord may enter the Premises at reasonable times on reasonable notice to see if the Tenant is complying with its obligations under this lease or to do anything either party must or may do under this lease or which is necessary to comply with any law or the requirements of any Authority.

If the Landlord decides there is an emergency, the Landlord may enter at any time without notice.

13.4 Prospective tenants or purchasers

After giving reasonable notice, the Landlord may:

(a) during the Term enter the Premises to show prospective purchasers through the Premises and display from the Premises a sign indicating that the Building is for sale; and

(b) during the last six months of the Term show prospective tenants through the Premises and display from the Premises a sign indicating that the Building is or the Premises are available for lease.

13.5 Enforcing rights

The Tenant acknowledges that the Landlord may enforce its rights against the Tenant whether or not the Landlord enforces its rights against other tenants or occupiers of the Building.

13.6 To deal with the Land

The Landlord may subdivide (including by strata or stratum) the Land or the Building or grant easements or other rights over it or the Premises provided the subdivision or grant does not interfere with the Tenant's Business. The Tenant must promptly sign all plans and other documents reasonably required by the Landlord to enable the Landlord to do those things, at the Landlord's cost.

13.7 Change of landlord

If the Landlord deals with its interest in the Land (including by transfer or the grant of a head or concurrent lease) so that another person becomes landlord, the Landlord is released from any obligation under this lease arising after it ceases to be landlord. If requested by the Landlord, the Tenant must, at the Landlord's expense, sign the documents which that other person reasonably requires to give it a direct contractual relationship with the Tenant.

13.8 Landlord may rectify

The Landlord may do anything which the Tenant should have done under this lease but which it has not done or which the Landlord considers the Tenant has not done properly. The Tenant must promptly pay all reasonable expenses and costs incurred by the Landlord under this **clause 13.8**.

13.9 Agents

The Landlord may appoint agents or others to exercise any of its rights or perform any of its duties under this lease. Communications from the Landlord override those from the agents or others if they are inconsistent.

13.10 Common Areas

Subject to this lease and the Rules, the Tenant and the Tenant's Employees and Agents may use the Common Areas only for the purposes for which they are intended.

13.11 Rules

The Landlord may vary Rules or make Rules which do not materially derogate from the Tenant's express rights under this lease in connection with the operation, use and occupation of the Building. The Landlord must give the Tenant a notice about Rules the Landlord makes or changes.

13.12 Authority

Any right of the Landlord under this lease may be exercised by a person authorised by the Landlord.

14. Expiry or termination

14.1 Tenant to vacate

The Tenant must vacate the Premises on the earlier of the Expiry Date and the date this lease is terminated and, before vacating the Premises, unless otherwise required by the Landlord, the Tenant must Make Good.

14.2 If Tenant's Property not removed

If the Tenant does not Make Good as required under **clause 14.1** then, without affecting any of its other rights, the Landlord may remove and store any fixtures, fittings, furnishings, cables, conduits, wires and other Tenant's Property and the Landlord may also Make Good. The Tenant must pay the Landlord on demand all costs and expenses incurred in doing these things and a fee

equivalent to the sum of the Rent, the Cleaning Charge and the Outgoings payable by the Tenant for the preceding period of 12 months divided by 365 for each day that it does not Make Good.

14.3 Landlord may notify Tenant

The Landlord may elect not to do any of the things mentioned in **clause 14.2** in which case it will notify the Tenant that unless the Tenant does those things within 14 days of the date of the notice, then the things not removed from the Premises by the Tenant will be forfeited to the Landlord.

14.4 If Tenant fails to comply

If the Tenant fails to comply with the notice referred to in **clause 14.3**, then the things mentioned in that clause will at the expiration of the 14 day period become the property of the Landlord.

14.5 When Tenant vacates

On the day the Tenant must vacate the Premises, the Tenant must give the Landlord the keys, access cards and similar devices for the Building and the Premises held by the Tenant, the Tenant's Employees and Agents and any other person they have given them to.

15. Holding over

15.1 Monthly tenancy

If the Tenant continues to occupy the Premises after the Expiry Date with the Landlord's approval, it does so under a monthly tenancy:

(a) which either party may terminate on one month's notice ending on any day; and

(b) at a rent which is the sum of:

(i) one twelfth of the total of the Rent, the Cleaning Charge and the Outgoings payable by the Tenant for the preceding period of 12 months; and

(ii) 10% of the amount calculated in **clause 15.1(b)(i)**.

On the expiration of such monthly tenancy the Tenant must Make Good.

15.2 Terms of monthly tenancy

Subject to **clause 15.1**, the monthly tenancy is on the same terms as this lease except for those changes which are necessary to make this lease appropriate for a monthly tenancy (but any bond or bank guarantee required under this lease may not be reduced).

16. Damage to the Building or Premises

16.1 If Building damaged

Clauses 16.2 to **16.8** will apply if:

(a) the Building is damaged so that the Premises are substantially unfit for the use of the Tenant or substantially inaccessible; and

(b) the damage has not been caused (in whole or in part) by the act, neglect or default of the Tenant.

16.2 Payment of Rent and Outgoings

The Tenant is not liable to pay Rent and Outgoings for the period that the Premises cannot be used or are inaccessible. If the Premises are still useable but the useability is diminished because

of the damage, the Tenant's liability to pay Rent is reduced in proportion to the reduction in useability.

16.3 Dispute as to amount

Any dispute under this **clause 16** as to the amount by which the Rent and Outgoings will reduce will be determined by a valuer who:

(a) is appointed in accordance with **clause 3.5(a)**; and

(b) is qualified in accordance with **clause 3.5(b)** and **(c)**; and

(c) acts as an expert and not as an arbitrator.

The parties must each pay half the valuer's costs.

16.4 When Tenant may terminate

If:

(a) the Tenant wants the Landlord to repair the damage and gives the Landlord a damage notice within 14 days after the Premises are damaged; and

(b) within one month after receiving the damage notice the Landlord does not give the Tenant a restoration notice stating that the Landlord intends to repair the damage,

then the Tenant may terminate this lease by giving a one month's notice to the Landlord.

16.5 If Landlord does not repair damage

If the Landlord does not repair the damage within a reasonable time (but no later than three months from the damage referred to in **clause 16.1**), the Tenant may give the Landlord a termination notice stating that the Tenant will terminate this lease by giving the Landlord 14 days notice.

16.6 When Landlord may terminate

If, in the Landlord's opinion, it is impractical or undesirable to repair the damage, then the Landlord may terminate this lease by giving a one month's notice to the Tenant.

16.7 Premises totally destroyed

If the Premises are totally destroyed, then either party may terminate this lease by giving one month's notice to the other.

16.8 Release

Each party releases the other party from liability or loss arising from and costs incurred in connection with the termination of this lease under this **clause 16** but not from any breach of this lease existing at the date of termination.

17. Default

17.1 Essential terms

Each obligation of the Tenant to pay money and to provide security to the Landlord and its obligations under **clauses 6, 8, 11** and **12** are essential terms of this lease. Other obligations under this lease may also be essential terms.

17.2 Landlord's right to terminate

The Landlord may terminate this lease by giving the Tenant notice or by re-entry if the Tenant:

(a) repudiates its obligations under this lease; or

(b) does not comply with an essential term of this lease; or

(c) does not comply with an obligation under this lease (which is not an essential term) and, in the Landlord's reasonable opinion:

(i) the non-compliance can be remedied, but the Tenant does not remedy it to the Landlord's reasonable satisfaction within a reasonable time after the Landlord gives the Tenant notice to remedy it; or

(ii) the non-compliance cannot be remedied or compensated for; or

(iii) the non-compliance cannot be remedied but the Landlord can be compensated and the Tenant does not pay the Landlord compensation satisfactory to the Landlord for the breach within 14 days after the Landlord gives the Tenant notice to pay it; or

(d) an Insolvency Event occurs in respect of the Tenant or a guarantor of the Tenant's performance under this lease.

17.3 Recovery of money

If this lease is terminated either under **clause 17.2** or **17.8** without limiting its other rights under this lease, the Landlord may in its discretion:

(a) at any time treat the event giving rise to that termination as a repudiation of this lease by the Tenant; and

(b) recover from the Tenant:

(i) all arrears of money payable by the Tenant and any interest on that money calculated in each case to that date of termination; and

(ii) all costs (including the Landlord's administration costs) incurred by the Landlord in rectifying any breaches by the Tenant of this lease; and

(iii) all costs incurred by the Landlord in recovering any money or enforcing any security and, where applicable, in having a determination made under **clause 17.3(b)(iv)**; and

(iv) the Loss of Bargain Damage calculated in accordance with **clause 1.1** and determined under **clause 17.5** and interest calculated in accordance with **clause 17.6**; and

(v) all costs incurred by the Landlord for legal fees and expenses, marketing, agency fees and to Make Good.

17.4 Tenant's acknowledgment

The Tenant agrees that:

(a) a fundamental assumption in the calculation of the Incentive was that this lease would continue until the Expiry Date;

(b) by entering into this lease the Tenant represented and warranted to the Landlord that if there was no default of the Landlord entitling the Tenant to terminate before the Expiry Date, this lease would continue until the Expiry Date;

(c) the Landlord will suffer loss if this lease is terminated before the Expiry Date, for reasons other than the default of the Landlord, including that the Incentive was calculated on the

basis of the assumption set out in **clause 17.4(a)** and that the Landlord relied on the representation and warranty set out in **clause 17.4(b)**; and

(d) the Loss of Bargain Damage represents a genuine pre-estimate of the loss which will be suffered by the Landlord in relation to the Incentive and the early termination of this lease if it does not continue until the Expiry Date for any reason other than the Landlord's default without limiting any other loss or damage which the Landlord may recover in connection with early termination of this lease and in particular the other provisions of this **clause 17**.

17.5 Landlord's determination of Loss of Bargain Damage

The Landlord may notify the Tenant of the Landlord's determination of Loss of Bargain Damage. If the Tenant disputes the Landlord's notice determining the Loss of Bargain Damage by delivering a dispute notice within seven days after receiving the Landlord's notice, or if required by the Landlord, then the Loss of Bargain Damage must be calculated by a valuer appointed by the Landlord having the qualifications set out in **clauses 3.5(b)** and **(c)** who is to determine as an expert and not as an arbitrator the Loss of Bargain Damage and who is to include in making that determination amounts for changes in market conditions which in that valuer's opinion are proper and whose determination must be in writing and will be final and binding on the parties.

17.6 Tenant must pay Loss of Bargain Damage

The Tenant must pay the Landlord the Loss of Bargain Damage together with interest on that amount calculated at the rate set out in **Item 7** from the date of termination up to and including the date of payment. Payment must be made within 14 days after the Landlord requires payment of that amount by notice given to the Tenant or, if the amount is determined by an expert under **clause 17.5**, within 14 days after the Tenant is informed of the determination.

17.7 Landlord's right not restricted

The rights and entitlements conferred on the Landlord by this **clause 17** or their exercise:

(a) do not restrict or prevent the Landlord from recovering loss or damage from the Tenant or from any security provided by or on behalf of the Tenant or from exercising any other right or remedy which the Landlord has or may acquire; and

(b) are not adversely affected by:

(i) granting the Tenant any concession, indulgence, forbearance or time to pay; or

(ii) any compounding or compromise reached or attempted to be reached with the Tenant; or

(iii) any acceptance of any moneys by the Landlord whether paid by the Tenant or by any other person; or

(iv) any postponement, non-exercise or alteration of any right or remedy available to the Landlord; or

(v) any alteration to this lease agreed in writing by the Landlord; or

(vi) the conversion of the term of this lease to a monthly tenancy under **clause 17.8**; or

(vii) the Landlord re-taking possession of the whole or any part of the Premises by any means.

17.8 Conversion to monthly tenancy

If any of the events specified in **clause 17.2** occurs, the Landlord may by notice to the Tenant convert this lease into a monthly tenancy which may be terminated by the Landlord on one

month's notice to the Tenant expiring on any date. That monthly tenancy is to be on the same terms and conditions as this lease (except for the term and any option to renew) and in particular the provisions of **clauses 17.3** to **17.7** inclusive will apply as if this lease had been terminated without being first converted to a monthly tenancy.

17.9 Confidential information

All information given to the Tenant by the Landlord in connection with the Incentive is the Landlord's confidential information and the Tenant may not disclose it to any person without the Landlord's prior approval.

17.10 Effect of this clause

This **clause 17**:

(a) continues after termination of this lease; and

(b) does not limit any other right the Landlord may have under this lease following its termination; and

(c) does not permit the Landlord to recover again any amount which has been recovered from the Tenant whether as Loss of Bargain Damage or otherwise.

18. Costs, charges and expenses

In connection with this lease and any document or matter in connection with it, the Tenant must pay promptly:

(a) for everything it must do; and

(b) all stamp duty and registration fees; and

(c) on demand, the Landlord's reasonable costs, charges and expenses including those for negotiating, preparing, executing, stamping, registereing, obtaining any consents the Landlord must obtain before giving the approvals, considering requests for approvals and exercising rights in connection with this Lease; and

(d) all costs, charges and expenses in connection with works the Tenant carries out, including those incurred by the Landlord in considering, approving and supervising the works and those of modifying or varying the Building because of the works.

19. Notices

19.1 Service of notices

A notice or approval must be:

(a) in writing; and

(b) left at the address or sent to the facsimile number of the party as specified in the notice details in the Information table , as varied by notice.

19.2 When service effective

A notice or approval is taken to be given if sent by facsimile, on the next business day after it is sent unless the sender is aware that transmission is impaired.

20. Miscellaneous

20.1 Waiver and variation to be in writing

A provision of or a right under this lease may not be waived or varied except in writing signed by whoever is to be bound.

20.2 Landlord's rights preserved

If the Landlord:

(a) accepts rent or any other money on any account (before or after termination); or

(b) fails to exercise or delays exercising any right under this lease including under **clause 17**; or

(c) gives any concession or indulgence to the Tenant; or

(d) attempts to mitigate its loss,

it is not a waiver of any breach or of the Landlord's rights under this lease. An attempt by the Landlord to mitigate its loss is not a surrender of this lease.

20.3 Approvals

The Landlord may withhold or give conditionally or unconditionally its approval in its discretion unless this lease in a particular instance expressly says otherwise.

20.4 Exclusion of statutory provisions

The covenants, powers and provisions implied in leases by sections 84, 84A, 85 and 86 of the *Conveyancing Act 1919* do not apply to this lease.

20.5 No implied covenants

In this lease words used in any of the forms of words in the first column of part 2 of schedule 4 to the *Conveyancing Act 1919* do not imply a covenant under section 86 of that act.

20.6 Prior breaches

Expiry or termination of this lease does not affect any rights in connection with a breach of this lease before then.

20.7 Caveats

The Tenant may not:

(a) lodge a caveat on the title to the Land, except a caveat noting the Tenant's interest under this lease (if this lease is not registered but must be to ensure that it is enforceable against the Landlord's successors in title); or

(b) allow a caveat lodged by a person claiming through the Tenant to remain on that title.

If the Tenant lodges a caveat permitted by this **clause 20.7**, it must do everything necessary to permit registration of any dealing if its rights under this lease are not diminished. The Tenant must withdraw that caveat on the earlier of registration and expiry or termination of this lease.

20.8 Warranties

The Tenant warrants that it:

(a) has relied only on its own enquiries in connection with this lease and not on any representation or warranty by the Landlord or any person acting or seeming to act on the Landlord's behalf; and

(b) was made aware of the Rules then current when signing this lease.

20.9 Undertakings

The Tenant must comply on time with undertakings given by or on behalf of the Tenant in connection with this lease.

20.10 Counterparts

This lease may consist of a number of counterparts and the counterparts taken together constitute one and the same instrument.

20.11 Severability

If the whole or any part of a provision of this lease is void, unenforceable or illegal in a jurisdiction, it is severed for that jurisdiction. The remainder of this lease has full force and effect and the validity or enforceability of that provision in any other jurisdiction is not affected. This **clause 20.11** has no effect if the severance alters the basic nature of this lease or is contrary to public policy.

21. Bank Guarantee

21.1 Tenant must provide Bank Guarantee

On or before the date the Tenant executes this lease, the Tenant must deliver the Bank Guarantee to the Landlord. The Bank Guarantee will be security for the performance by the Tenant under this lease.

21.2 When Landlord may call on Bank Guarantee

If the Tenant does not comply with any of its obligations under this lease, whether this lease is registered or not, then the Landlord may call on the Bank Guarantee without notice to the Tenant.

21.3 Replacement or additional Bank Guarantee

If the Landlord calls on the Bank Guarantee or the Rent or the Tenant's Contribution is increased, then no later than 14 days after the Landlord gives the Tenant a notice asking for it, the Tenant must deliver to the Landlord a replacement or additional Bank Guarantee so that the amount of that guarantee is the amount in **Item 12.**

21.4 Expiry date

The Bank Guarantee must not contain an expiry date.

21.5 Essential obligations

The Tenant's obligations under this **clause 21** are essential terms of this lease.

22. Guarantee and indemnity

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23. Option for a new lease

23.1 When Landlord must grant

The Landlord must grant a new lease under this **clause 23** on the Expiry Date to commence on the next day only if:

(a) the Tenant gives the Landlord a notice stating that it wants a new lease of the Premises for the term first specified in **Item 13**; and

(b) the Landlord receives that notice within the period beginning on the day that is nine months before the Expiry Date and ending on the day that is six months before the Expiry Date; and

(c) when the Tenant gives that notice, and from that time until the Expiry Date, the Tenant is not in breach of this lease or if in breach, that breach has been waived; and

(d) the Tenant delivers to the Landlord before the Expiry Date a guarantee of or a guarantee of and an indemnity in connection with the Tenant's obligations under the new lease by the same person, or another person acceptable to the Landlord, on the same terms as any given in connection with the Tenant's obligations under this lease.

23.2 Terms of new lease

The new lease is to be on terms similar to this lease except that:

(a) if the particulars of the new lease are the only particulars specified in **Item 13**, this **clause 23** and **Item 13** are deleted; and

(b) the term, the commencement date, the expiry date, the rent review dates and the redecoration requirements and dates are to be those first specified in **Item 13;** and

(c) the rent from the commencement date of the new lease is to be decided under **clause 3** as if that date were a Rent Review Date (and in this regard **clause 3.7** also applies); and

(d) the new lease must reflect any variations to this lease which become effective during the Term; and

(e) **clause 27** (Rent Free Period) must be deleted from the new lease; and

(f) **clause 28** (Legal Costs) must be deleted from the new lease; and

(g) **clause 29.1** (Tenant's right to terminate during Term) must be deleted from the new lease; and

(h) **clause 29.2** (Tenant's right to terminate during further term) must be amended by deleting the words "after it has exercised the option for a new lease under **clause 23**".

24. Car Parking Licence

24.1 Car parking spaces

The Landlord as a separate right incidental to the rights granted under this lease agrees to licence to the Tenant during the Term and any period of holding over the right to use up to that number of car parking spaces on the Land described in **Item 14** located on that part of the Land as may be designated for the purpose of car parking by the Landlord from time to time on the following conditions:

(a) the Tenant and the Tenant's Employees and Agents must park only in those car parking spaces which are designated from time to time by the Landlord and the Tenant acknowledges that the Landlord shall from time to time by notice in writing given to the Tenant be entitled to reallocate the locations of the car parking spaces which the Tenant is entitled to use; and

(b) the Tenant agrees with the Landlord that the Landlord shall not at any time or in any way be liable or responsible for and the Landlord is released from and shall be indemnified by

the Tenant against any liability or responsibility for any loss, damage, injury or death which may be sustained or suffered by the Tenant or the Tenant's Employees and Agents as a result of any exercise of the rights and entitlements granted to the Tenant to use or gain access to or egress from the car parking spaces; and

(c) the Tenant and the Tenant's Employees and Agents shall have the right of access to and egress from the car parking spaces by the use of such driveways entrances and exits as shall from time to time be directed by the Landlord and the Tenant acknowledges:

(i) such rights of access and egress shall be exercised in common with other occupiers of the Land and all other persons authorised from time to time by the Landlord, and

(ii) the Landlord shall be entitled at any time and from time to time to alter or re-direct such driveways entrances and exits;

(d) all of the agreements on the part of the Tenant contained in this lease for the benefit of the Landlord shall extend and apply to the Tenant's use of the car parking spaces and any breach by the Tenant of the terms of the licence conferred by this clause shall constitute a breach by the Tenant of its obligations under the lease; and

(e) the Tenant shall ensure that the car parking spaces are used for the purposes of parking motor cars only and the Tenant shall not permit the Tenant's Employees and Agents to clean, wash, grease, oil, repair any motor vehicles in the car parking spaces or at any time on the Land or use the car parking spaces for any purpose other than parking motor cars; and

(f) the rights conferred by this clause on the Tenant are acknowledged by the parties to be solely contractual and nothing in this clause shall create or confer upon the Tenant any estate or interest of a proprietary possessory or exclusive nature in or over any of the car parking spaces or any particular part of the Land; and

(g) the Licence conferred by this clause may be terminated immediately by the Landlord should the Tenant default in the performance of any of the terms of this clause or in default of the Tenant's other obligations under this lease; and

(h) the rights of the Landlord to make or vary Rules pursuant to this lease shall extend to the use by the Tenant of car parking areas associated with the Land and all means of access to and egress from those areas; and

(i) if at any time any charge or levy is imposed on the provision or use of any part of the car parking areas by any Authority or pursuant to any law then the Tenant shall pay or reimburse to the Landlord on demand all such amounts as are in the opinion of the Landlord referable to those car parking spaces as are licensed to be used by the Tenant.

24.2 Moving of vehicle

Should the Tenant or any of the Tenant's Employees or Agents park or leave any motor vehicle in any place in which the Landlord may from time to time prohibit parking then the Landlord may at any time cause that vehicle to be moved at the cost expense and risk (as to any loss or damage however caused) of the Tenant.

25. Landlord's right to subdivide

25.1 Moving to alternative car parking facilities

(a) If the Landlord carries out building work to extend, improve or change the Land and the Landlord decides that the work will affect the Tenant's right to use the car parking spaces on the Land in accordance with **clause 24**, the Landlord may require the Tenant to move to alternative car parking spaces on the Land provided the alternative car parking spaces have substantially similar access and distance to the Premises than those as existed on the Commencement Date. The Landlord must give the Tenant at least 1 months notice and give details of the alternative area with an equivalent number of car spaces on the Land to be made available to the Tenant for the purposes of **clause 24.**

(b) If the Landlord exercises its rights under this **clause 25.1**, the Tenant shall not be entitled to payment of any compensation whatsoever.

25.2 Subdivision, developments and easements

The Landlord may:

(a) subdivide, develop, lease, sub-lease or licence any part of the Land that does not comprise the Premises; or

(b) grant easements over the Land,

so long as in doing so the Landlord does not interfere with the Tenant's Business. If required, the Tenant will sign consents to any such subdivision, development, lease, sublease, licence or easement.

26. First Right of refusal

26.1 First right of refusal

(a) Subject to the provisions of this **clause 25**, the Tenant has a right of first refusal to purchase the Premises on the terms in this **clause 25**.

(b) If the Landlord decides to make available the Premises for sale, the Landlord must give the Tenant a notice offering to sell to the Tenant the Premises on terms no less favourable than those offered to a prospective purchaser. The notice must set out the name of the prospective purchaser (subject to any obligations of confidentiality), the price and any other terms of the proposed sale ("**Offer Notice**").

(c) If after receiving the Offer Notice the Tenant decides to purchase the Premises, then the Tenant must notify the Landlord within 14 days after receiving the Offer Notice of its intention to purchase the Premises.

(d) If within 14 days (in which respect time is of the essence) after receiving the Offer Notice the Tenant:

(i) does not notify the Landlord that it wants to purchase the Premises; or

(ii) notifies the Landlord that it does not want to purchase the Premises,

then from the end of the fourteen 14 days' period the Landlord may sell the Premises to any other person at any time within 3 months after the date of the Offer Notice on terms no more favourable than those originally being offered to the Tenant under **clause 26.1(b)**.

(e) If the Tenant notifies the Landlord of its intention to purchase the Premises under and in accordance with **clause 26.1(c)**:

(i) the contract for sale of the Premises will be prepared by the Landlord's solicitors; and

(ii) the Tenant must return the contract for sale of the Premises properly executed by the Tenant to the Landlord or its solicitors within 14 days (in which respect time is of the essence) after it is given to the Tenant or its solicitors.

If the Tenant fails to comply with this **clause 26.1(e)**, then the Landlord may sell the Premises to any other person and on any terms as it sees fit in its absolute discretion. The Landlord's rights under this **clause 25** are not in substitution for or derogation from any other rights the Landlord may have under this document or at law or in equity.

(f) The Tenant ceases to have any rights and the Landlord ceases to have any obligations under this **clause 25** if before the acceptance by the Tenant of the Offer Notice the Tenant:

(i) has not remedied to the Landlord's reasonable satisfaction any default of which the Landlord has given notice to the Tenant;

(ii) has persistently defaulted during the Term and the Landlord has given ntoice of those defaults to the Tenant;

(iii) has transferred this lease other than to a related body corporate (as defined in the Corporations Act 2001);

(iv) is not in occupation of the whole of the Premises; or

(v) occupies the Premises on a holding over basis.

(g) This **clause 25** shall only apply whilst Paton Fertilizers Pty Ltd is the Tenant. For the avoidance of doubt, the provisions of this **clause 25** shall not apply if:

(i) any person other than Paton Fertilizers Pty Ltd (including without limitation any assignee or licensee of Paton Fertilizers Pty Ltd) becomes the Tenant or enters into occupation of the Premises; or

(ii) the Landlord becomes entitled to terminate the lease pursuant to **clause 17** or at law; or

(iii) the Tenant is a company which is neither listed nor wholly owned by a company which is listed on the Australian Stock Exchange and there is a proposed change in the shareholding of the Tenant or Kate Investment Holdings (Australia) Pty Limited so that a different person or group of persons will control the composition of the board of directors or more than 50% of the shares giving a right to vote at general meetings.

26.2 Exceptions

Notwithstanding any other provision of this lease, this **clause 26** shall not apply:

(a) subject to **clause 26.3**, to the creation or enforcement of a security given by the Landlord with respect to the Premises;

(b) in the event the Landlord is replaced by another responsible entity, trustee or custodian of the Trust provided the replacement is not part of a structure, scheme or manner to transfer ownership of the Premises or the Land;

(c) if a subsisting Insolvency Event exists in respect of the Tenant.

26.3 Restriction on Right

The rights or benefits in this **clause 25** may not be enforced against any mortgagee of the Premises which is exercising the power of sale, provided that where the mortgagee is exercising its power of sale through a private sale or tender process, the mortgagee has included the Tenant in that process.

26.4 Conditional Sale

Nothing in this **clause 25** shall be construed as prohibiting the Landlord from selling the Premises to any person conditionally on the Tenant's rejection or non-acceptance of an offer of sale of the Premises made in accordance with this **clause 25**.

27. Rent free period

27.1 Rent Free Period

Subject to **clause 27.2** and despite any other provision contained in this lease provided that there are no unremedied breaches of this lease by the Tenant, the Landlord will grant the Tenant an eight month Rent free Period beginning on 1 March 2005.

27.2 Unremedied breaches

If there are any unremedied breaches of the lease during the Term, giving the Landlord the right to terminate this lease under **clause 17.2** and the Landlord exercises that right the Landlord will be entitled to recover from the Tenant the the Rent foregone under **clause 27.1**.

27.3 For the avoidance of doubt

For the avoidance of doubt, the Tenant will be required to pay all other monies to the Landlord as specified in this lease from the Commencement Date.

28. Legal Costs

(a) The Tenant must pay the Landlord's legal costs in connection with negotiating, preparing, executing, stamping and registering this lease.

(b) For the avoidance of doubt, the Tenant must pay stamp duty and registration fees on this lease.

29. Early termination

29.1 Tenant's right to terminate during Term

(a) If the Tenant wishes to terminate this Lease early during the Term, it must notify the Landlord and the Tenant will use its best endeavours to assist the Landlord in finding a replacement tenant for the Premises.

(b) If the Tenant vacates the Premises during the Term, the Tenant will be deemed to have repudiated its obligations under this lease under **clause 17.2(a)** and the provisions of **clause 17** will apply accordingly.

29.2 Tenant's right to terminate during further term

(a) Despite any other provisions in this Lease, the Tenant may terminate this Lease at any time after it has exercised the option for a new lease under **clause 23** by giving the Landlord 12 months notice in writing.

(b) If the Tenant terminates this lease under **clause29.2**, the parties agree that no compensation shall be payable by either party except for any antecedent breaches of this Lease. For the avoidance of doubt, all other provisions which would apply to the Tenant on expiry or termination of the lease will continue to apply.

30. Commencement Date

The Commencing Date on page 1 of this Lease shall be 1 September 2004 or such other date as the parties may mutually agree. The Terminating Date on page 1 and the dates in **Item 13** of this Lease shall be adjusted accordingly if the parties agree to vary the Commencement Date.

Schedule 1 - Rules

The provisions of the lease apply to these Rules.

1. The Tenant may not:

   (a) smoke in the Building or in any place in which smoking is at any time not permitted by law or which is or may be a nuisance or injurious to the health or well being of any person; or

   (b) put up signs, notices, advertisements, blinds or awnings, antennae or receiving dishes or install vending or amusement machines without the Landlord's approval in writing; or

   (c) hold auction, bankrupt or fire sales in the Premises; or

   (d) keep an animal or bird on the Premises; or

   (e) use a business name which includes words connecting the business name with the Building without the Landlord's approval in writing; or

   (f) remove floor coverings from where they were originally laid in the Premises without the Landlord's approval in writing; or

   (g) do anything to the floor coverings in the Building which affects any guarantee in connection with them if the Landlord has given the Tenant a notice setting out the relevant terms of the guarantee; or

   (h) use any method of heating, cooling or lighting the Premises other than those provided or approved by the Landlord; or

   (i) use the escalators or passenger lifts to carry goods or equipment; or

   (j) operate a musical instrument, radio, television or other equipment that can be heard outside the Premises; or

   (k) throw anything out of any part of the Building or down lift or light wells; or

   (l) move heavy or bulky objects through any part of the Complex in such a way as may damage or be likely to damage any part of the structure or finished surfaces of the Complex; or

   (m) obstruct or interfere with:

      (i) windows in the Premises except by internal blinds or curtains approved by the Landlord; or

      (ii) any air vents, air conditioning ducts or skylights in the Premises; or

      (iii) the Common Areas; or

   (n) interfere with directory boards provided by the Landlord; or

   (o) park or permit or suffer any of the Tenant's Employees and Agents to park or leave any motor or other vehicle in any place in which the Landlord may from time to time prohibit parking; or

   (p) store or permit any item to be left outside the Premises without the prior approval in writing of the Landlord.

2. The Tenant must:

(a) put up signs in the Premises prohibiting smoking if required by the Landlord; and

(b) if the Landlord approves the Tenant's use of a business name which is connected with the Building, terminate any right it has to use that business name on the date it must vacate the Premises; and

(c) secure the Premises when they are unoccupied and comply with the Landlord's directions about Building security; and

(d) if there are directory boards, submit the form in which it requires its name and description to appear on them to the Landlord for its approval, make whatever changes the Landlord reasonably requires and pay the Landlord on demand the cost of placing that information on the directory boards; and

(e) comply with any directions of the Landlord in connection with the disposal of or recycling of rubbish; and

(f) comply with loading and unloading regulations for the Complex which may be advised by the Landlord to the Tenant in writing from time to time.

Signing page

EXECUTED as a deed.

Certified correct for the purposes of the Real Property Act 1900 and executed on behalf of the corporation named below by the authorised person(s) whose signature(s) appear(s) below pursuant to the authority specified.

No common seal required

Corporation **WALLEROO PTY LIMITED**
Authority section 127 of the *Corporations Act 2001* (Cth)

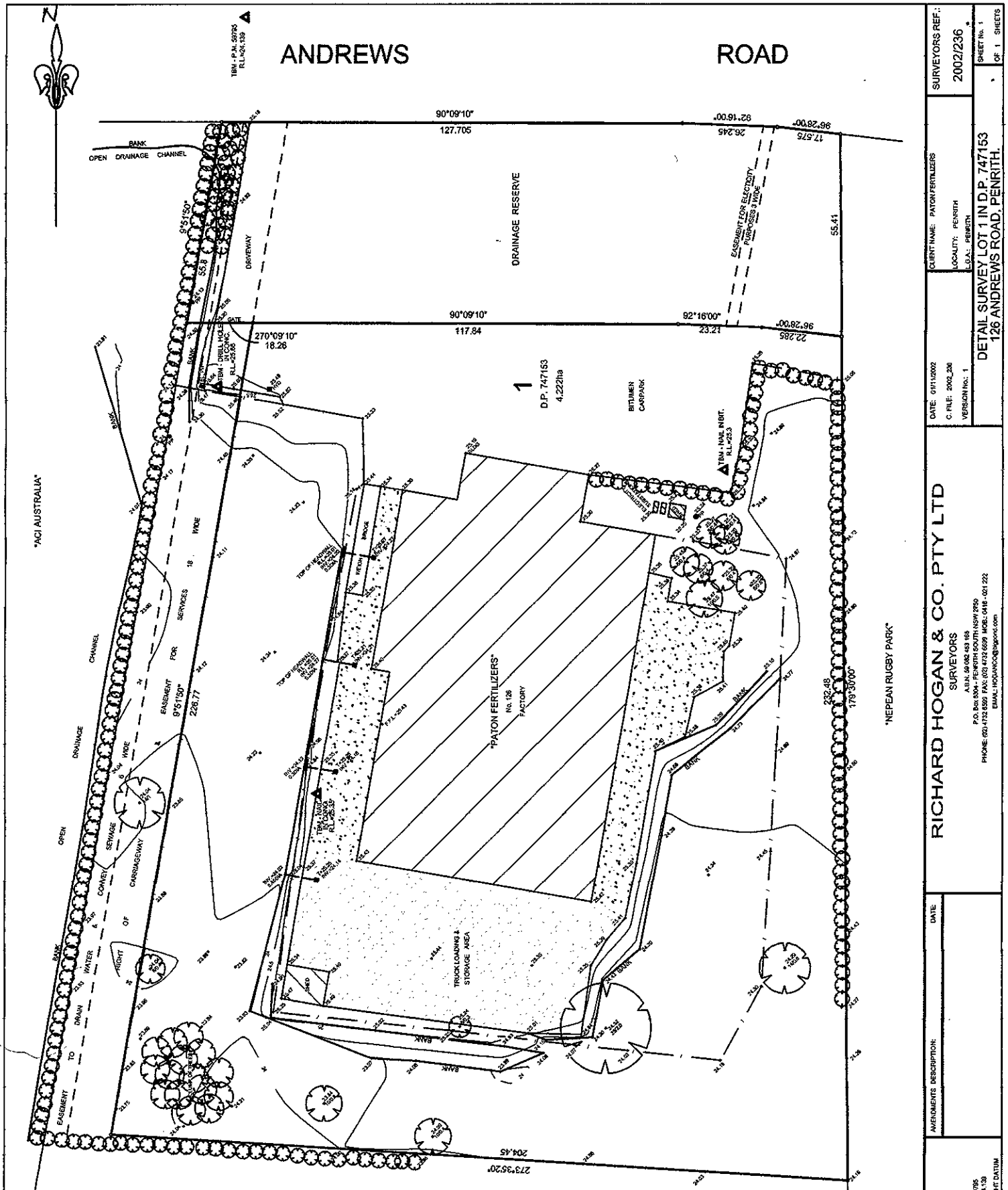
Signature of authorised person	Signature of authorised person
CHRISTOPHER WALKER	DAVID W KING
Name of authorised person	Name of authorised person
Director/~~Secretary~~	Director
Office held	Office held

Certified correct for the purposes of the Real Property Act 1900 and executed on behalf of the corporation named below by the authorised person(s) whose signature(s) appear(s) below pursuant to the authority specified.

No common seal required

Corporation **PATON FERTILIZERS PTY LIMITED**
Authority section 127 of the *Corporations Act 2001* (Cth)

Signature of authorised person	Signature of authorised person
CHRISTOPHER WALKER	DAVID W KING
Name of authorised person	Name of authorised person
Director/Secretary	Director
Office held	Office held



This is the plan referred to in item A of Form 07L of the lease in relation to Folio Identifier 1/747153 with respect to 126 Andrews Road, Penrith.

NOTES:
* THE POSITION OF FEATURES ARE INDICATIVE ONLY.
* SERVICES SHOWN HEREON HAVE BEEN LOCATED WHERE POSSIBLE BY FIELD SURVEY. PRIOR TO ANY EXCAVATION THE RELEVANT AUTHORITY SHOULD BE CONTACTED FOR POSSIBLE LOCATION OF FURTHER UNDERGROUND SERVICES AND DETAILED LOCATIONS OF ALL SERVICES
* •20.51 INDICATES NATURAL SURFACE LEVEL
* THE BOUNDARIES OF THE SUBJECT PROPERTY HAVE NOT BEEN ESTABLISHED BY THIS SURVEY. AN EXTENSIVE BOUNDARY SURVEY WILL BE REQUIRED TO DERIVE THE BOUNDARIES.

SURVEY BY: R.H. & K.K.
CALCS BY:
DESIGN BY:
DRAWN BY: R.H.
CHECKED BY: R.H.

REDUCTION RATIO: 1:500
CONTOUR INTERVAL 0.5M
ORIGIN OF LEVELS: P.M. 59795 R.L.=24.139
DATUM: AUSTRALIAN HEIGHT DATUM

AMENDMENTS DESCRIPTION: DATE:

RICHARD HOGAN & CO. PTY LTD
SURVEYORS
A.B.N. 58 002 453 165
P.O. Box 5304 - PENRITH SOUTH NSW 2750
PHONE: (02) 4732 8599 FAX: (02) 4732 8699 MOBL: 0418 - 021 222
EMAIL: HOGANCO@bigpond.com

DATE: 01/11/2002
C. FILE: 2002_236
VERSION No.: 1

CLIENT NAME: PATON FERTILIZERS
LOCALITY: PENRITH
L.G.A.: PENRITH

SURVEYORS REF.: 2002/236
SHEET No.: 1 OF 1 SHEETS

DETAIL SURVEY LOT 1 IN D.P. 747153
126 ANDREWS ROAD, PENRITH.

45 of 60

STATUTORY DECLARATION

I, DAVID WILLIAM KING of 7/24 TRYON AVE, WOOLSTONECRAFT 2065

Solemnly and sincerely declare that:-

1 I am a director of Walleroo Pty Ltd ACN 002 172 830 ("**Walleroo**"); and

2 On 22 June 2004, Walleroo ("**Lessor**") and Paton Fertilizers Pty Limited (formerly known as W. Paton (Fertilizers) Pty Ltd) ACN 000 508 216 ("**Lessee**") of expired lease 5345869Y entered into a Deed of Surrender of Lease. Annexed to this Statutory Declaration and marked "A" is a true copy of the Deed of Surrender of Lease.

I make this solemn declaration conscientiously believing the same to be true and by virtue of the Oaths Act 1900.

Made and subscribed at SYDNEY in the State of New South Wales
on December 13th 2004

In the presence of:-

Signature of witness: _____ Signature

Name of witness: SEEYAN LEE

David King
Director, Walleroo Pty Ltd

Address of witness: GOVERNOR PHILLIP TOWER
1 FARRER PLACE, SYDNEY

Qualification of witness: SOLICITOR

Req:R834083 /Doc:DL AB016717 /Rev:21-Dec-2004 /Sts:SC.OK /Prt:29-Sep-2011 11:26 /Pgs:ALL /Seq:47 of 60
Ref: /Src:X

"A"

THIS AND THE FOLLOWING 14 PAGES IS THE
ANNEXURE MARKED "A" REFERRED TO IN THE
STATUTORY DECLARATION OF DAVID WILLIAM KING
DECLARED BEFORE ME THE 13 DAY OF DECEMBER
2004

SOLICITOR/~~JUSTICE OF PEACE~~

EXECUTION VERSION

WALLEROO PTY LIMITED

PATON FERTILIZERS PTY LIMITED

DEED OF SURRENDER OF LEASE
126 Andrews Road, Penrith

CORRS CHAMBERS WESTGARTH
Lawyers
Level 32, Governor Phillip Tower
1 Farrer Place
SYDNEY NSW 2000
AUSTRALIA
Tel: (02) 9210 6500
Fax: (02) 9210 6611
DX: 133 SYDNEY

Ref: JGR/AWL
9001095
S/1789157/1

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THIS DEED is made on 22 June 2004

BETWEEN **WALLEROO PTY LIMITED** ABN 35 002 172 830 of 301 McCarrs Creek Road, Terrey Hills, NSW 2084 (**"Landlord"**)

AND **PATON FERTILIZERS PTY LIMITED** ACN 000 508 216 of 126 Andrews Road, Penrith, NSW 2750 (**"Tenant"**)

RECITALS

A The Tenant leases the Premises from the Landlord under the Lease.

B The Tenant wants to surrender its interest under the Lease and in the Premises.

C The Landlord agrees to accept the surrender on the terms in this document.

IT IS AGREED

NEW SOUTH WALES DUTY
30-06-2004 [illegible]-002
TRANSFER - SURRENDER
DUTIABLE AMOUNT $ [illegible]30.00
DUTY $ [illegible]10.00

1 INTERPRETATION

1.1 Definitions

In this document:

"Building" means the building or buildings where the Premises are located.

"Business Day" means a day other than a Saturday, Sunday or bank or public holiday in the Sydney.

"Keys" means all access cards and other security items providing access to the Premises or the building where the Premises are located.

"Lease" means registered lease no. 5345869Y and includes all schedules and annexures to it and any memorandum incorporated as part of it.

"New Lease" means the new lease for the Premises to be entered into by the Landlord and the Tenant simultaneously with this document.

"Premises" means folio identifier 1/747153 known as 126 Andrews Road, Penrith, NSW 2750.

"State" means the State or Territory of Australia where the Premises are located.

"Surrender Date" means 31 August 2004 or such other date agreed between the parties.

"Surrender Form" means, if the Lease is registered or required to be registered by law, the necessary surrender of lease form required to be lodged at the Land Property Information to record the surrender of the Lease.

"Tenant's Items" means all plant, equipment, fixtures, fittings, furnishings, furniture and other items located in the Premises and provided by the Tenant, and includes other items left with the Tenant by third parties.

1.2 Definitions in Lease

Unless the context otherwise requires, terms defined in the Lease have the same meaning in this document.

1.3 Construction

Unless expressed to the contrary, in this document:

(a) words in the singular include the plural and vice versa;

(b) any gender includes the other genders;

(c) if a word or phrase is defined its other grammatical forms have corresponding meanings;

(d) if any form of the word "include" is used, it is to be read as if followed by the words "without limitation";

(e) no rule of construction will apply to a clause to the disadvantage of a party merely because that party put forward the clause or would otherwise benefit from it;

(f) a reference to:

(i) a person includes a partnership, joint venture, unincorporated association, corporation and a government or statutory body or authority;

(ii) a person includes the person's legal personal representatives, successors, assigns and persons substituted by novation;

(iii) any thing (including any amount) includes either the whole or any part of that thing;

(iv) any legislation includes subordinate legislation under it and includes that legislation and subordinate legislation as modified or replaced;

(v) an obligation includes a warranty or representation and a reference to a failure to comply with an obligation includes a breach of warranty or representation;

(vi) a right includes a benefit, remedy, discretion or power;

(vii) time is to local time in the capital city of the State;

(viii) "$" or "dollars" is a reference to Australian currency;

(ix) this or any other document includes the document as novated, varied or replaced and despite any change in the identity of the parties;

(x) writing includes:

(A) any mode of representing or reproducing words in tangible and permanently visible form, and includes fax transmissions; and

(B) words created or stored in any electronic medium and retrievable in perceivable form;

(xi) a group of persons includes all of them together, any two or more of them together and each of them separately;

(xii) this document includes all schedules and annexures to it; and

(xiii) a clause, schedule or annexure is a reference to a clause, schedule or annexure, as the case may be, of this document;

(g) if the date on or by which any amount is payable under this document is not a Business Day, the payment must be made on or by the next Business Day; and

(h) where time is to be calculated by reference to a day or event, that day or the day of that event is excluded.

1.4 Headings

Headings do not affect the interpretation of this document.

2 LEASE SURRENDER

2.1 Tenant to surrender

Subject to its execution of the New Lease, the Tenant agrees to surrender to the Landlord the Tenant's interest under the Lease and in the Premises after the Surrender Date.

2.2 Landlord's acceptance

Subject to the terms of this document, the Landlordaccepts the surrender of the Leasewith effect from the day immediately following the Surrender Date.

2.3 Requirements of surrender

On or before the Surrender Date, the Tenant must give to the Landlord:

(a) a Surrender Form prepared by the Landlord's solicitors that is:

(i) in form and content satisfactory to the Landlord;

(ii) properly executed by the Tenant; and

in registrable form (other than for any duty payable); and

(b) any other documents necessary to enable the Lease to be surrendered.

2.4 Obligations before Surrender Date

The Tenant must comply with the terms of the Lease (as varied under this document) up to and including the Surrender Date.

2.5 Adjustments

The parties must adjust between themselves on the Surrender Date for any under or over payment of the amounts payable under the terms of the Lease as at the Surrender Date.

2.6 Tenant's acknowledgments

The Tenant acknowledges and agrees that:

(a) unless it has first executed the New Lease, it will have no right to use or occupy the Premises after the Surrender Date; and

(b) after the Surrender Date, any personal rights the Tenant has or may have under the Lease will end.

2.7 Landlord to lodge

The Landlord will lodge the Surrender Form for stamping and registration.

2.8 Mutual Release

The parties mutually release one another from any claim, loss, cost or expense paid, suffered or incurred by or available to the that party relating to the Lease or the Tenant's use or occupation of the Premises including but not limited to, any rental or monies owing or payable by the Tenant under the Lease or arising from its occupation of the Premises.

3 LANDLORD'S COVENANT

The Landlord acknowledges that the Tenant is entering into the New Lease of the Premises at the same time as the making of this document. The Landlord also acknowledges that the Tenant has not because of that abandoned its right under the Lease to remove any of the Tenant's Items from the Premises and that the Tenant:

(a) may remove any of the Tenant's Items from the Premises under the terms of the New Lease, whether they were installed before or after the Surrender Date;

(b) is not required to give vacant possession of the Premises nor to deliver up the Keys as required by the Lease provided that it executes the New Lease; and

(c) is not required to repair, reinstate or make good the Premises on or before the Surrender Date to the condition as required under the Lease, provided that it executes the New Lease.

4 TENANT'S WARRANTY

The Tenant warrants that on the Surrender Date:

(a) there will be no existing or purported sublease, licence or other right to use or occupy the Premises in favour of any other person; and

(b) the Tenant will hold the Lease and own the Tenant's Items absolutely and free from any mortgage, charge or other security.

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Ref: /Src:X

5 NOTICES

5.1 General

A notice, demand, certification, process, consent, request, waiver, agreement or other communication relating to this document must be in writing in English and may be given by an agent of the sender and is not effective unless it is in writing.

5.2 How to give a communication

In addition to any other lawful means, a communication may be given by being:

(a) personally delivered;

(b) left at the party's current address for notices;

(c) sent to the party's current address for notices by pre-paid ordinary mail or, if the address is outside Australia, by pre-paid airmail;

(d) sent by fax to the party's current fax number for notices; or

(e) emailed to the party's current email address for notices.

5.3 Particulars for delivery of notices

(a) The particulars for delivery of notices are initially as specified in **schedule 1** and are taken to be the current particulars unless **clause 5.3(b)** applies.

(b) Each party may change its particulars for delivery of notices by giving notice to each other party and the changed particulars will then be taken to be the current particulars.

5.4 Communications by post

Subject to **clause 5.7**, a communication is given if posted:

(a) within Australia to an Australian address, three Business Days after posting; or

(b) in any other case, ten Business Days after posting.

5.5 Communications by fax

Subject to **clause 5.7**, a communication is given if sent by fax, when the sender's fax machine produces a report that the fax was sent in full to the addressee. That report is conclusive evidence that the addressee received the fax in full at the time indicated on that report.

5.6 Communications by email

Subject to **clause 5.7**, if a communication is emailed, a delivery confirmation report received by the sender, which records the time that the email was delivered to the addressee's current email address is prima facie evidence of its receipt by the addressee, unless the sender receives a delivery failure notification, indicating that the email has not been delivered to the addressee.

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Ref: /Src:X

5.7 After hours communications

If a communication is given:

(a) after 5.00pm in the place of receipt; or

(b) on a day which is a Saturday, Sunday or bank or public holiday in the place of receipt,

it is taken as having been given at 9.00 am on the next day which is not a Saturday, Sunday or bank or public holiday in that place.

5.8 Process service

Any process or other document relating to litigation, administrative or arbitral proceedings relating to this document may be served by any method contemplated by this **clause 5** or in accordance with any applicable law.

6 COSTS AND DUTY

6.1 Landlord's costs

The Tenant must pay and if paid by the Landlord reimburse the Landlord on demand the Landlord's reasonable legal and other costs and expenses relating to:

(a) negotiating, preparing, executing, stamping and registering this document;

(b) obtaining the consent of any person to this document (whether or not that consent is granted);

(c) supervising anything being done by the Tenant under this document;

(d) reviewing anything ought to have been done by the Tenant under this document;

(e) doing anything that ought to have been done by the Tenant under this document;

(f) the Tenant being in default under this document;

(g) the exercise or attempted exercise by the Landlord or the preservation of any right against the Tenant; and

(h) any proceedings brought by the Landlord to enforce the compliance by the Tenant with the terms of this document that apply to the Tenant.

6.2 Extent of Landlord's costs

In relation to any matter under **clause 6.1**, the Landlord's:

(a) legal costs and expenses are payable on a solicitor and client basis or on a full indemnity basis, whichever is the higher; and

(b) other costs and expenses include:

(i) fees payable to any consultant, agent or other person retained by the Landlord; and

(ii) its administration costs.

6.3 Tenant's costs

Except as expressly stated otherwise in this document, the Tenant must pay its own legal and other costs and expenses of complying with its obligations under this document.

6.4 Duty

(a) The Tenant as between the parties is liable for and must pay all duty (including any fine or penalty except if it arises from default by any other party) on or relating to this document, any document executed under it or any dutiable transaction evidenced or effected by it.

(b) If a party other than the Tenant pays any duty (including any fine or penalty) on or relating to this document, any document executed under it or any dutiable transaction evidenced or effected by it, the Tenant must pay that amount to the paying party on demand.

7 GST

7.1 Interpretation

In this **clause 7**:

(a) words and expressions which are not defined in this document but which have a defined meaning in GST Law have the same meaning as in the GST Law; and

(b) "**GST Law**" has the meaning given to that expression in the A New Tax System (Goods and Services Tax) Act 1999 (Cth).

7.2 Consideration GST exclusive

Unless otherwise expressly stated, all amounts or other sums payable or consideration to be provided under this document are exclusive of GST.

7.3 Payment of GST

If GST is payable by a supplier, or by the representative member for a GST group of which the supplier is a member, on any supply made under this document, the recipient will pay to the supplier an amount equal to the GST payable on the supply.

7.4 Timing of GST payment

The recipient will pay the amount referred to in **clause 7.3** in addition to and at the same time that the consideration for the supply is to be provided under this document.

7.5 Tax invoice

The supplier must deliver a tax invoice or an adjustment note to the recipient before the supplier is entitled to payment of an amount under **clause 7.3**. The recipient can withhold payment of the amount until the supplier provides a tax invoice or an adjustment note, as appropriate.

7.6 Adjustment event

If an adjustment event arises in respect of a taxable supply made by a supplier under this document, the amount payable by the recipient under **clause 7.3** will be recalculated to reflect the adjustment event and a payment will be made by the recipient to the supplier or by the supplier to the recipient as the case requires.

7.7 Reimbursements

Where a party is required under this document to pay or reimburse an expense or outgoing of another party, the amount to be paid or reimbursed by the first party will be the sum of:

(a) the amount of the expense or outgoing less any input tax credits in respect of the expense or outgoing to which the other party, or to which the representative member for a GST group of which the other party is a member, is entitled; and

(b) if the payment or reimbursement is subject to GST, an amount equal to that GST.

8 MISCELLANEOUS

8.1 Statements

A notice by the Landlord stating any amount payable or determined or any other thing to be done or not done under this document is sufficient evidence of that fact unless manifestly wrong.

8.2 Binding on parties

This document binds all of the parties to it whether or not all of the parties have executed or properly executed the document.

9 GENERAL

9.1 Amendment

This document may only be varied or replaced by a document executed by the parties.

9.2 Waiver and exercise of rights

(a) A single or partial exercise or waiver by a party of a right relating to this document does not prevent any other exercise of that right or the exercise of any other right.

(b) A party is not liable for any loss, cost or expense of any other party caused or contributed to by the waiver, exercise, attempted exercise, failure to exercise or delay in the exercise of a right.

9.3 Rights cumulative

Except as expressly stated otherwise in this document, the rights of a party under this document are cumulative and are in addition to any other rights of that party.

9.4 Further steps

Each party must promptly do whatever any other party reasonably requires of it to give effect to this document and to perform its obligations under it.

9.5 Governing law and jurisdiction

(a) This document is governed by and is to be construed in accordance with the laws applicable in New South Wales.

(b) Each party irrevocably and unconditionally submits to the non-exclusive jurisdiction of the courts of New South Wales and any courts which have jurisdiction to hear appeals from any of those courts and waives any right to object to any proceedings being brought in those courts.

9.6 Liability

An obligation of two or more persons binds them separately and together.

9.7 Counterparts

This document may consist of a number of counterparts and, if so, the counterparts taken together constitute one document.

9.8 Entire understanding

(a) This document contain the entire understanding between the parties as to the subject matter of this document.

(b) All previous negotiations, understandings, representations, warranties, memoranda or commitments concerning the subject matter of this document are merged in and superseded by this document and are of no effect. No party is liable to any other party in respect of those matters.

(c) No oral explanation or information provided by any party to another:

(i) affects the meaning or interpretation of this document; or

(ii) constitutes any collateral agreement, warranty or understanding between any of the parties.

9.9 Relationship of parties

This document is not intended to create a partnership, joint venture or agency relationship between the parties.

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Ref: /Src:X

SCHEDULE 1

Delivery of notices: (clause 5)

Landlord

Address: 301 McCarrs Creek Road, Terrey Hills, NSW 2084
Fax: + 612 9450 2544
Email: walkerc@paton.com.au
Attention: Christopher Walker

Tenant

Address: 126 Andrews Road, Penrith, NSW 2750
Fax: + 612 4729 2810
Email: bcairns@paton.com.au
Attention: Bruce Cairns, Managing Director

Req:R834083 /Doc:DL AB016717 /Rev:21-Dec-2004 /Sts:SC.OK /Prt:29-Sep-2011 11:26 /Pgs:ALL /Seq:60 of 60
Ref: /Src:X

EXECUTED as a deed.

EXECUTED by **WALLEROO PTY LIMITED**)
)

.....
Company Secretary/Director

CHRISTOPHER WALKER
Name of Company Secretary/Director (print)

.....
Director

DAVID W KING
Name of Director (print)

EXECUTED by **PATON FERTILIZERS PTY LIMITED**)
)

.....
Company Secretary/Director

CHRISTOPHER WALKER
Name of Company Secretary/Director (print)

.....
Director

DAVID W KING
Name of Director (print)

Benbow
ENVIRONMENTAL
A.B.N. 61 478 755 308

Head Office:
13 Daking Street
North Parramatta
NSW 2151 Australia
P.O. Box 687 Parramatta
NSW 2124 Australia
Telephone: 61 2 9890 5099
Facsimile: 61 2 9890 5399

Wollongong:
Suite 2(B), Level 4
166 Keira Street
Wollongong NSW 2520
Telephone: 61 4228 7429

Taree:
127 Wynter Street
Taree NSW 2430
Telephone: 1800 635 509
Facsimile: 1800 689 138

Brisbane
17 Waterlily Place
Calamvale QLD 4116
Telephone: 1800 635 509
Facsimile: 1800 689 138

Hong Kong:
Benbow Environmental (Asia)
Room 2102-3, 21/F,
Allways Centre
468 Jaffe Road,
Causeway Bay,
Hong Kong
Telephone: +852 2892 2022
Facsimile: +852 2891 6749

Visit our website at:
www.benbowenviro.com.au

E-mail:
admin@benbowenviro.com.au

RTB/DI/sc
Ref: 111144_Attachment 11
19 June 2012

Dear Resident

Re: Letter to Residents

Project: Proposed Glass Recycling in Existing Industrial Building at 126 Andrews Road, Penrith

We wish to advise you of a proposed industrial development to use an existing industrial site to recycle glass bottles collected from kerb side recycling.

The glass will be separated into different colours. It would be transported by truck to the site and after processing to the adjacent glass making plant of Owens-Illinois.

Truck movements will be day time. The glass processing equipment will be inside the building.

A detailed environmental impact statement will be submitted to the Department of Planning & Infrastructure for review.

Your Council is fully aware of the proposal.

Figure 1: Location of the Proposed Development



If you would like more information, please contact us and I will bring out proposed site plans to discuss the proposal further.

Kind Regards,
for Benbow Environmental



R T Benbow
Principal Consultant
Mobile: 0418689074

Bushfire Hazard Assessment Report

Proposed:
Glass Beneficiation Plant

At:
126 Andrews Road, Penrith

Reference Number: 130393

Prepared For:
Claron Consulting Pty Ltd







13th November 2012

Prepared By:
Building Code & Bushfire Hazard Solutions Pty Limited

Tel: (02) 9457 6530
Fax: (02) 9457 6532

PO Box 124
Berowra NSW 2081
ABN 19 057 337 774

www.bushfirehazardsolutions.com.au

FPA AUSTRALIA
Certified Business
Bushfire Planning & Design
BPD-BA-02354

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11.0	Annexure	18

- List of referenced documents and attachments
- Attachments

List of Abbreviations:

APZ	Asset Protection Zone
BCA	Building Code of Australia
BPMs	Bushfire Protection Measures
BPLM	Bushfire Prone Land Map
Council	Penrith Council
DA	Development Application
EP&A Act	Environmental Planning and Assessment Act 1979
ESD	Ecologically Sustainable Development
FRNSW	Fire & Rescue NSW
IPA	Inner Protection Area
OPA	Outer Protection Area
PBP	Planning for Bush Fire Protection - 2006
RF Act	Rural Fires Act 1997
RFS	NSW Rural Fire Service
SEPP	State Environmental Planning Policy
SFPP	Special Fire Protection Purpose
SWS	Static Water Supply

1.0 Introduction

The development proposal relates to the conversion of an existing building into a glass beneficiation plant at Lot 1 in DP 747153, known as 126 Andrews Road, Penrith. The subject site has street access to Andrews Road to the north and abuts an existing vacant allotment to the north, Nepean Rugby Park to the east and a large vacant allotment to the south and west.

The vegetation identified as being the hazard is located to the northeast and south of the subject building within vacant allotments.

It is understood that this development will be assessed under Part 3a of the Environmental Planning and Assessment Act 1979.

Penrith Council's Bushfire Prone Land Map indicates that the subject property is marginally within the 100 metre buffer zone from designated Category 1 Vegetation. It should be noted that the subject building and all proposed external bunkers are located outside the 100 metre buffer zone from designated Category 1 Vegetation.

The proposed development does not contain a residential component and is not considered Special Fire Protection Purpose and is therefore not integrated development. As the property is marginally 'bushfire prone' the provisions of Planning for Bush Fire Protection can be applied where considered necessary.

The proposed development has been assessed against the principals of Planning for Bush Fire Protection 2006 under section 4.3.6 "PBP and other buildings".

The subject building was found to comprise of two main function units or compartments, first being the main industrial area where the glass will be processed and the second being the attached office.

The operation of this facility relies on the majority of openings (i.e. roller and side hung doors) and purpose created penetrations of the main industrial area remaining open to allow for vehicle and conveyor belt entry / exit. The functions of this area subsequently make treatment for smoke and ember attack extremely difficult, if not impossible. Given that the processing within the building does not involve stockpiling large amounts of combustible materials and therefore the risk of ignition from ember attack is considered low, the treatment of this facility has been concentrated on the office component.

The treatment of the office component of the building will ensure staff and occupants of the building have a suitable refuge area in the event of a bushfire in this area.

2.0 Purpose of Report

The purpose of this Bushfire Hazard Assessment Report is to provide the owners, the Department of Planning and where considered necessary the Rural Fire Service with an independent bushfire hazard determination together with appropriate recommendations for both building construction and bushfire mitigation measures considered necessary having regard to construction within a designated 'bushfire prone' area.

The recommendations contained within this report may assist in forming the basis of any specific construction conditions and/or bushfire mitigation measures that the Department of Planning and/or the NSW Rural Fire Service may elect to place within any consent conditions issued for the subject development.

3.0 Scope of this Report

The scope of this report is limited to providing a bushfire hazard assessment and recommendations for the subject property. Where reference has been made to the surrounding lands, this report does not purport to directly assess those lands; rather it may discuss bushfire impact and/or progression through those lands and possible bushfire impact to the subject property.

4.0 Referenced Documents and Persons

Comments provided are based on the requirements of the NSW Environmental Planning and Assessment Act 1979 (EP&A Act), the RFS document known as 'Planning for Bush Fire Protection – 2006' for the purposes of bushfire hazard determination and Australian Standard AS3959 – 2009 titled 'Construction of buildings in bushfire-prone areas' as amended for building/structural provisions.

The Site Plan & Site Analysis prepared by Claron Consulting Pty Ltd, DA01 C, dated 14.12.11, amendment C has also been relied upon in preparing this assessment. Company representatives have made a single site inspection of the subject property and the surrounding area.

5.0 Compliance Table and Notes – Office Component

The following table sets out the projects compliance with *Planning for Bush Fire Protection – 2006*.

	Northeast	East	South	West
Vegetation Structure	Woodland	Sports Oval	Forested Wetlands	Grassland (reeds)
Hazard Slope	0 degrees & up slope	n/a	0 degrees across slope	0 degrees across slope
Available Asset Protection Zone	>160 metres	n/a	>140 metres	>30 metres
Significant environmental features	Andrews Road	Nepean Rugby Park	Industrial component of building	Weigh bridges
Threatened species	APZ existing	APZ existing	APZ existing	APZ existing
Aboriginal Relics	APZ existing	APZ existing	APZ existing	APZ existing
Bushfire Attack Level	BAL Low	n/a	BAL Low	BAL 12.5

Asset Protection Zones Compliance

The available Asset Protection Zones were measured onsite and verified from plans provided. The Asset Protection Zones consist of maintained land within the subject property and land considered 'equivalent to an APZ' within neighbouring allotments and Andrews Road. No vegetation modification is required within the subject property to create the APZs.

Construction Level Compliance

The highest Bushfire Attack Level to the office was determined from table 2.4.2 of AS 3959 - 2009 to be 'BAL 12.5', requiring construction to that of BAL 12.5 under AS3959 – 2009. As the building is existing, retrofitting recommendations have been made to prevent the entry of smoke and embers achieving the intent of BAL 12.5 for the office component of the building.

Guideline Ref.	Proposed Development Determinations
Property Access	The property has vehicle access to Andrews Road to the north via an existing right of carriageway. The subject building has perimeter vehicle access. The existing / proposed access is considered adequate for fire services access and occupant evacuation.
Water Supply	There are existing hydrants available along Andrews Road for the replenishment of attending fire services. The subject site was also found to contain a booster / hydrant point immediately in front of the office, a hydrant point at the southern end of the industrial main building and fire hose reels.
Evacuation	Evacuation is available via the existing internal road and existing roads system. It is recommended that the operators prepare a Bushfire Evacuation Plan consistent with the NSW Rural Fire Service guidelines.
Electrical Supply	Aerial supply connected.

6.0 Aerial view of the subject allotment

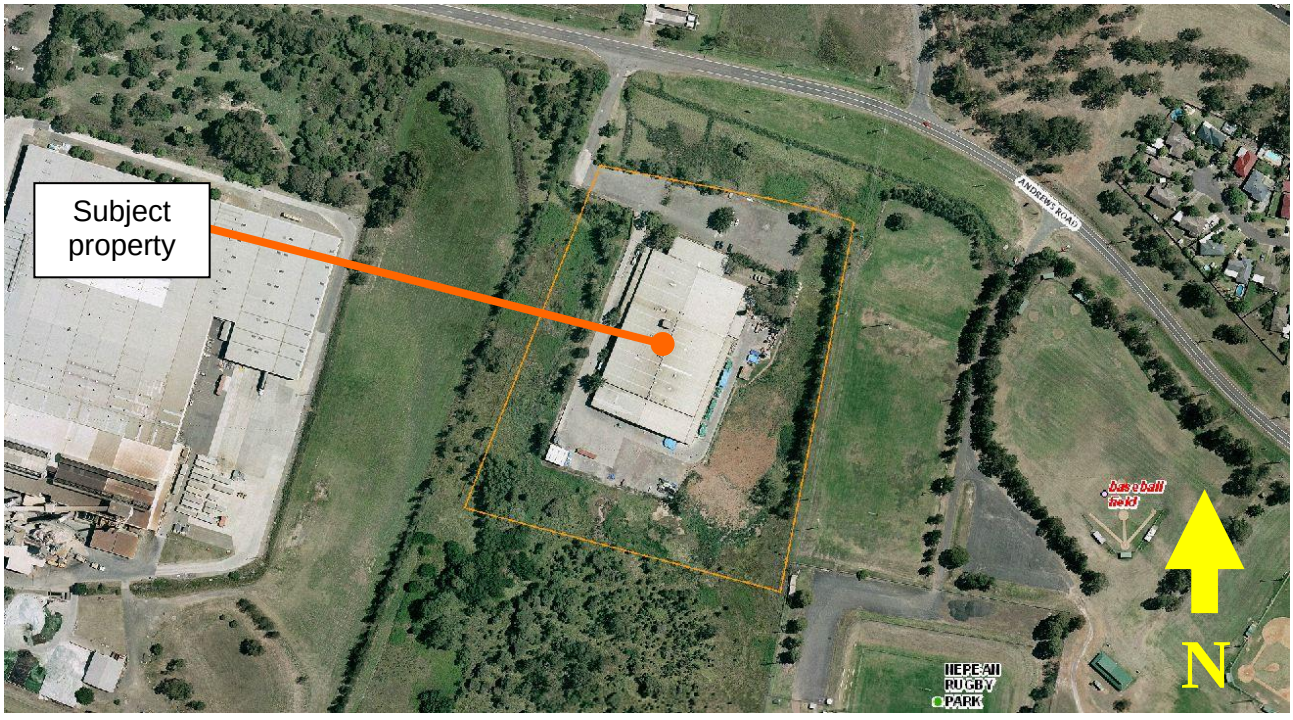


Image: Aerial view of the subject area C/- Sixviewer

7.0 Bushfire Hazard Assessment

7.01 Preface

Properties considered to be affected by possible bushfire impact are determined from the local Bushfire Prone Land Map as prepared by Council and or the Rural Fire Service. Property development within affected areas may be subject to the conditions detailed in the document 'Planning for Bush Fire Protection - 2006' (PBP). Set back distances for the purpose of creating Asset Protection Zones (APZ's) may need to be applied and any buildings may then need to conform to corresponding regulations detailed in Australian Standard 3959 – 2009 'Construction of buildings in bushfire prone areas'.

Planning for Bush Fire Protection – 2006, (PBP) formally adopted on the 1st March 2007 provides for the protection of property and life (including fire-fighters and emergency service personnel) from bushfire impact.

The thrust of the document is to ensure that developers of new properties or sub-divisions include the constraints associated with the construction of buildings in bushfire prone areas within their proposed development sites. PBP is applicable to Class 1 – 4 and 9 developments inside a determined Category 1 or 2 areas and also inside a buffer zone radius of 100m from a Category 1 bushfire area or 30m from a Category 2 bushfire area.

For Class 5 - 8 & 10 Buildings PBP 2006 states "The BCA does not provide for any bush fire specific performance requirements and as such AS 3959 does not apply as a set of 'deemed to satisfy' provisions. The general fire safety construction provisions are taken as acceptable solutions, but the aim and objectives of PBP apply in relation to other matters such as access, water and services, emergency planning and landscaping/vegetation management."

The subject development relates to the conversion of an existing building into a glass beneficiation plant. The proposed development does not contain a residential component and is not considered Special Fire Protection Purpose and is therefore not integrated development. The proposed development has been assessed against the principals of Planning for Bush Fire Protection 2006 under section 4.3.6 "PBP and other buildings".

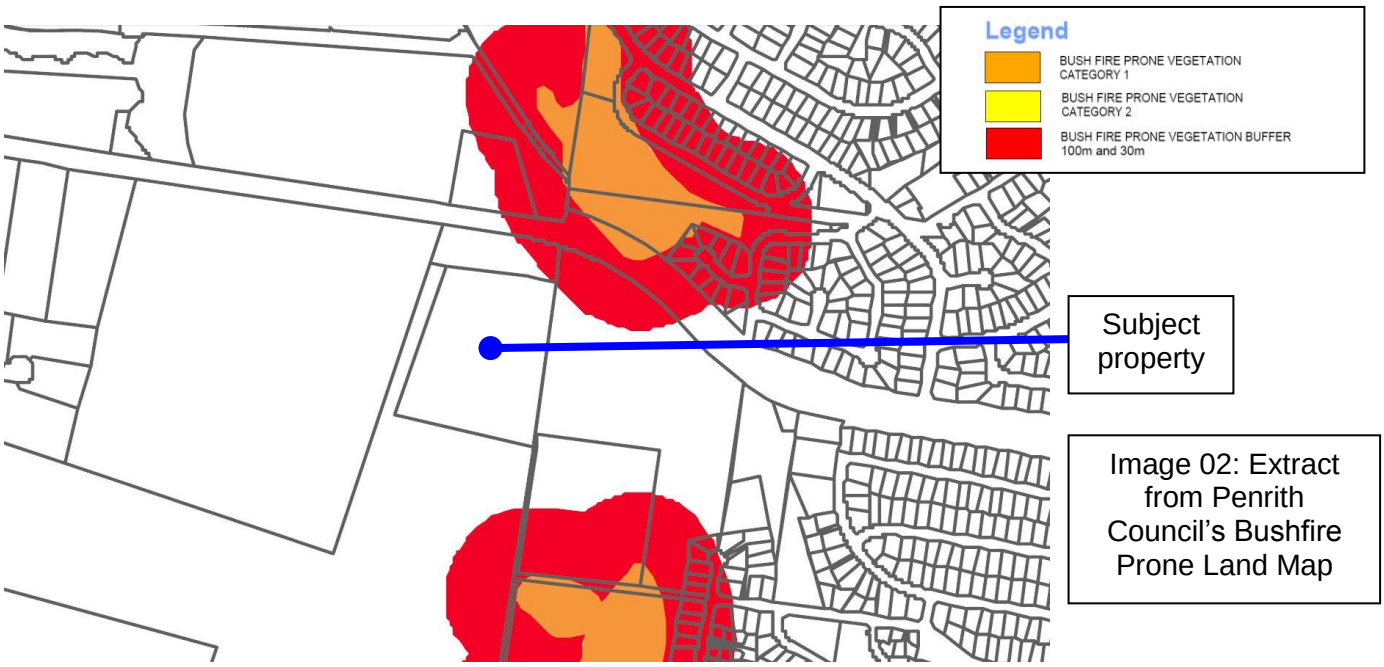


Image 02: Extract from Penrith Council's Bushfire Prone Land Map

7.02 Location

The subject property is known as 126 Andrews Road, Penrith (being Lot 1 in DP 747153) and is an existing industrial allotment within Penrith City Council Local Government Area.

The subject site has street access to Andrews Road to the north via an existing right of carriageway and abuts an existing vacant allotment to the north, Nepean Rugby Park to the east and a large vacant allotment to the south and west.

The vegetation identified as being the hazard is associated within vegetated allotments to the northeast, south and west.



Photograph 01: View south from Andrews Road along the existing right of carriageway

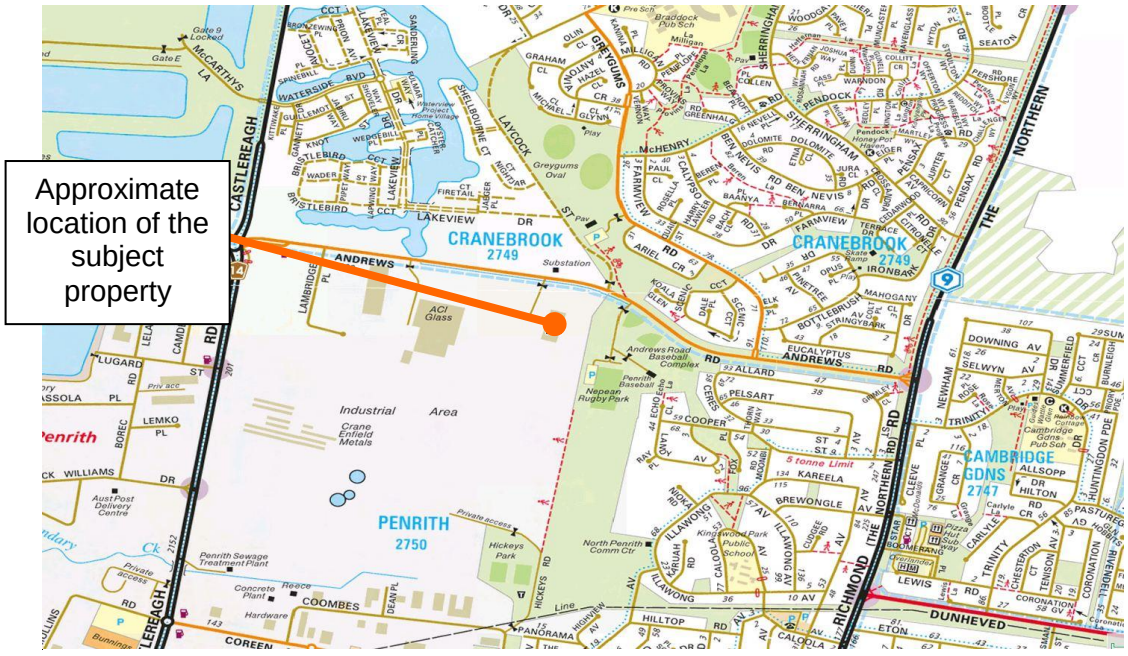


Image 03: Extract from street-directory.com.au

7.03 Vegetation

The subject property was found to be predominately developed consisting of built structures with surrounding hard stand areas. The vegetation within the site was found to be predominately disturbed comprising of re-growth, grasses and weed varieties. There was a low wetland area found adjacent the western boundary of the subject site both within the subject property and neighbouring large allotment which tracks further south to the large vacant allotment.

The vegetation posing a hazard within the subject office building is located to the northeast within vacant allotments, south within a large vacant allotment and west within the subject site and large vacant allotment.

The vegetation posing a hazard to the northeast was found to consist of trees 10-20 metres in height with a <30% foliage cover and an understorey of grasses.

The vegetation posing a hazard to the south was found to consist of trees 10 - 20 metres in height with a 30 - 70% foliage cover and an understorey of low trees and shrubs. This area would be typically referred to as a wetland.

The vegetation posing a hazard to the west was found to consist of grasses, reeds and weed varieties.

For the purpose of assessment under *Planning for Bush Fire Protection 2006* the vegetation posing a hazard was determined to be Woodland to the northeast, Forest (forested wetlands) to the south and Grassland to the west.



Photograph 02: View south from within the subject property towards the wetlands



Photograph 03: View northeast from Andrews Road toward the north-eastern hazard

7.04 Slope and Topography

The slope that would most significantly affect fire behaviour must be assessed for at least 100 metres from the building footprint. The most significant bushfire impact from any bushfire from the northeast, south or west is expected to be a fire burning across slope toward the subject site.

The slope that would **most significantly** influence bushfire impact was determined to be:

- 0 degrees and up slope within the hazard to the northeast
- 0 degrees across slope within the hazard to the south and west



Photograph 04: View west from within the subject property through the western hazard

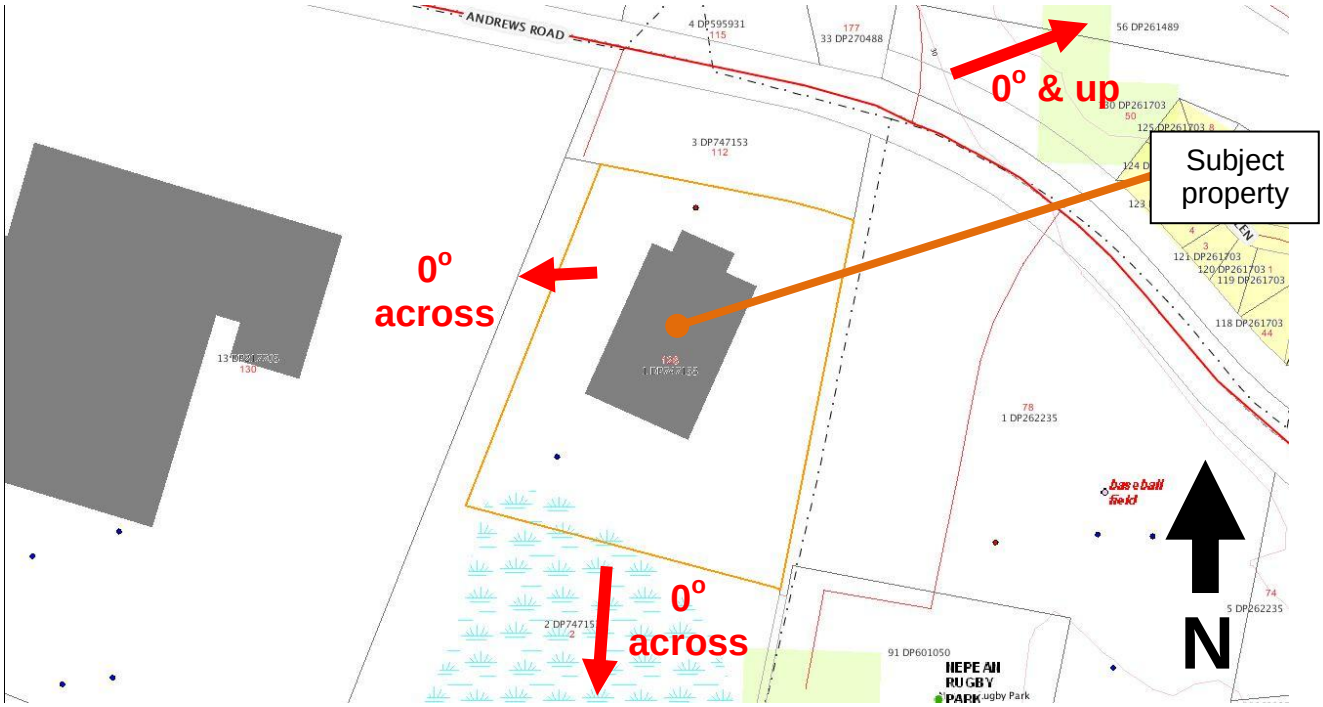


Image 04: Extract from the Land and Property Management Authority Sixviewer database

7.05 Asset Protection Zones

The proposed development does not contain a residential component and is not considered Special Fire Protection Purpose and therefore there are no minimum required Asset Protection Zones.

The available Asset Protection Zones were measured onsite and from aerial images to be >160 metres to the northeast, >140 metres to the south and >30 metres to the west. The APZs consist of maintained grounds within the subject property and land equivalent to an APZ being grounds in neighbouring allotments and the formed area of Andrews Road.

No vegetation modification is required within the subject property to create the APZs.

We recommend that any new landscaping within the subject property complies with Appendix 5 'Landscaping and Property Maintenance' of Planning for Bush Fire Protection 2006.

7.06 Fire Fighting Water Supply

There are existing hydrants available along Andrews Road for the replenishment of attending fire services. The subject site was also found to contain a booster / hydrant point immediately in front of the office and a hydrant point at the rear of the industrial component of the building. Fire hose reels where also found within the subject building.

The existing water supply is considered adequate for the replenishment of attending fire services.



Photograph 05: View east from within the subject property toward the existing booster point

7.07 Property Access – Fire Services & Evacuation

The subject property has street access to Andrews Road to the north via an existing right of way. The internal road provides perimeter access around the subject building and has been designed to accommodate B double trucks.

The existing access provisions are considered to meet the performance requirements of section 4.1.3 (2) 'Property Access' of PBP 2006.

Fire services have vehicle access to and around the building footprint. Access for fire services and opportunities for occupant evacuation are considered adequate for this property.

8.0 Site & Bushfire Hazard Determination

8.01 Planning for Bush Fire Protection - 2006

'Planning for Bush Fire Protection – 2006' (PBP) is applicable to those lands determined as being within a 'bushfire prone area' in accordance with a local Bush Fire Prone Land Map as provided by the Rural Fire Service and Council.

The most appropriate method of determining site bushfire hazard under the terms of PBP is to consider the site in a singular form.

Bushfire prone areas are defined as those areas;

- *within or within 100m of high or medium bushfire hazards; or*
- *within or within 30m of low bushfire hazards.*

In this instance the subject property has been identified as being bushfire prone land therefore it is appropriate to apply PBP as follows:

North-eastern aspect:

a) Vegetation structure Woodland
b) Hazard slope 0 degrees and up
c) A >160 metre APZ is available
d) The Bushfire Attack Level for the office was determined to be 'BAL Low' in accordance with Appendix 3 *Planning for Bush Fire Protection* 2006 and AS3959 – 2009.

Southern aspect:

a) Vegetation structure Forest (forested wetlands)
b) Hazard slope 0degrees across
c) A >140 metre APZ is available
d) The Bushfire Attack Level for the office was determined to be 'BAL Low' in accordance with Appendix 3 *Planning for Bush Fire Protection* 2006 and AS3959 – 2009.

Western aspect:

a) Vegetation structure Grassland
b) Hazard slope 0 degrees across
c) A >30 metre APZ is available
d) The Bushfire Attack Level for the office was determined to be 'BAL 12.5' in accordance with Appendix 3 *Planning for Bush Fire Protection* 2006 and AS3959 – 2009.

8.02 Australian Standard AS 3959 – 2009 'Construction of buildings in bushfire –prone areas'

Australian Standard 3959 – 2009 'Construction of buildings in bushfire-prone areas' provides for six (6) levels of building construction these being BAL - Low, BAL - 12.5, BAL - 19, BAL - 29, BAL - 40 and BAL - FZ. The Australian Standard 3959 specifies construction standards for buildings within various Bushfire Attack Levels as determined by the Planning for Bush Fire Protection – 2006 document. The NSW Rural Fire Service will not accept deemed to satisfy provisions for BAL Flame Zone and therefore have a NSW variation to the listed standard provisions of BAL FZ under AS3959 - 2009.

8.03 Correlation between AS3959 and Planning for Bush Fire Protection

Bushfire Attack Level	Maximum radiant heat impact (kW/m2)	Level of construction under AS3959-2009
Low		No special construction requirements
12.5	≤12.5	BAL - 12.5
19	12.6 to 19.0	BAL - 19
29	19.1 to 29.0	BAL - 29
40	29.1 to 40.0	BAL - 40
Flame Zone	>40.0	BAL FZ No deemed to satisfy provisions

8.04 Site Specific Bushfire Hazard Determination

All property development must be assessed on an individual basis as broad-brush approaches of documents such as PBP may not be applicable in every instance. The proposed development located at 126 Andrews Road, Penrith can comply with the requirements of Planning for Bush Fire Protection 2006. The development was assessed noting the following:

a) Water supplies for fire fighting purposes are adequate.
b) Perimeter vehicle access is available around the subject building.
c) The office component of the building will be upgraded for ember protection, satisfying the intent of BAL 12.5 and providing a refuge point for staff and occupants.

8.05 Viable Construction Method

The objectives of Planning for Bush Fire Protection – 2006 are for the protection of life including fire fighters. Provided these objectives can be met the NSW Department of Planning should be in a position to consider such applications.

The subject building was found to comprise of two main functions, the first being the main industrial area where the glass will be processed and the second being the attached office.

The operation of this facility relies on the majority of openings (i.e. roller and side hung doors) of the main industrial area remaining open to allow for vehicle and conveyor belt entry / exit. The functions of this area subsequently make treatment for smoke and ember attack extremely difficult, if not impossible. Given that this processing does not involve stockpiling large amounts of combustible materials and therefore the risk of ignition from ember attack is considered low, the treatment of this facility has been concentrated on the office component.

The treatment of the office component of the building will ensure staff and occupants of the building have a suitable refuge area in the event of a bushfire in this area.

The highest Bushfire Attack Level to the office was determined from table 2.4.2 of AS 3959 - 2009 to be ‘BAL 12.5’, requiring construction to that of BAL 12.5 under AS3959 – 2009. As the building is existing, retrofitting recommendations have been made to prevent the entry of smoke and embers achieving the intent of BAL 12.5 for the office component of the building.

The subject building was found to be a slab on ground building, with a mix of brick and steel cladding and colorbond steel roofing. Fundamentally this building would be considered to have a high resilience from the impact of bushfires.

The recommendations for the office component of the building to improve smoke and ember protection include:

- The installation of aluminium, steel or bronze metal mesh screens having an aperture size of 2 mm over all openable windows (internal or external) in such a way that the entire opening remains screened when the window is in the open position.
- The installation of aluminium, steel or bronze metal mesh screens having an aperture size of 2 mm over all vents and weepholes.
- The installation of draft excluders on all external side hung doors.
- The installation of draft excluders on all internal side hung doors that separate the office and industrial components of the building.

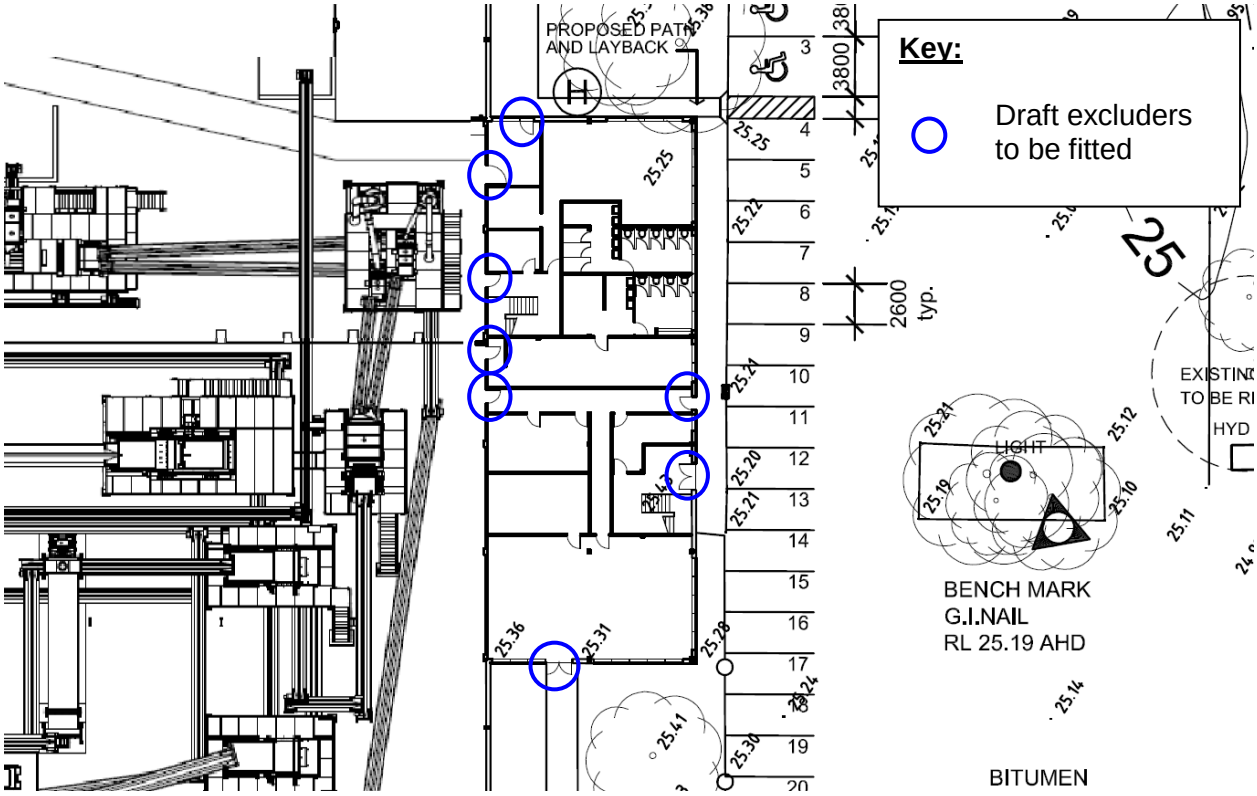


Image 05: Extract from the site plan showing doors recommended to be fitted with draft excluder

9.0 Recommendations

The following recommendations are provided as the minimum necessary for compliance with Planning for Bushfire Protection – 2006 and Australian Standard 3959 'Construction of buildings in bushfire-prone areas' - 2009. Additional recommendations are provided to supplement these minimum requirements where considered necessary.

Landscaping

1. That any new landscaping around the subject building is to comply with Appendix 5 'Landscaping and Property Maintenance' of Planning for Bush Fire Protection 2006.

Construction

2. That the office component of the subject building include:

   - The installation of aluminium, steel or bronze metal mesh screens having an aperture size of 2 mm over all openable windows (internal or external) in such a way that the entire opening remains screened when the window is in the open position.
   - The installation of aluminium, steel or bronze metal mesh screens having an aperture size of 2 mm over all vents and weepholes.
   - The installation of draft excluders on all external side hung doors.
   - The installation of draft excluders on all internal side hung doors that separate the office and industrial components of the building.

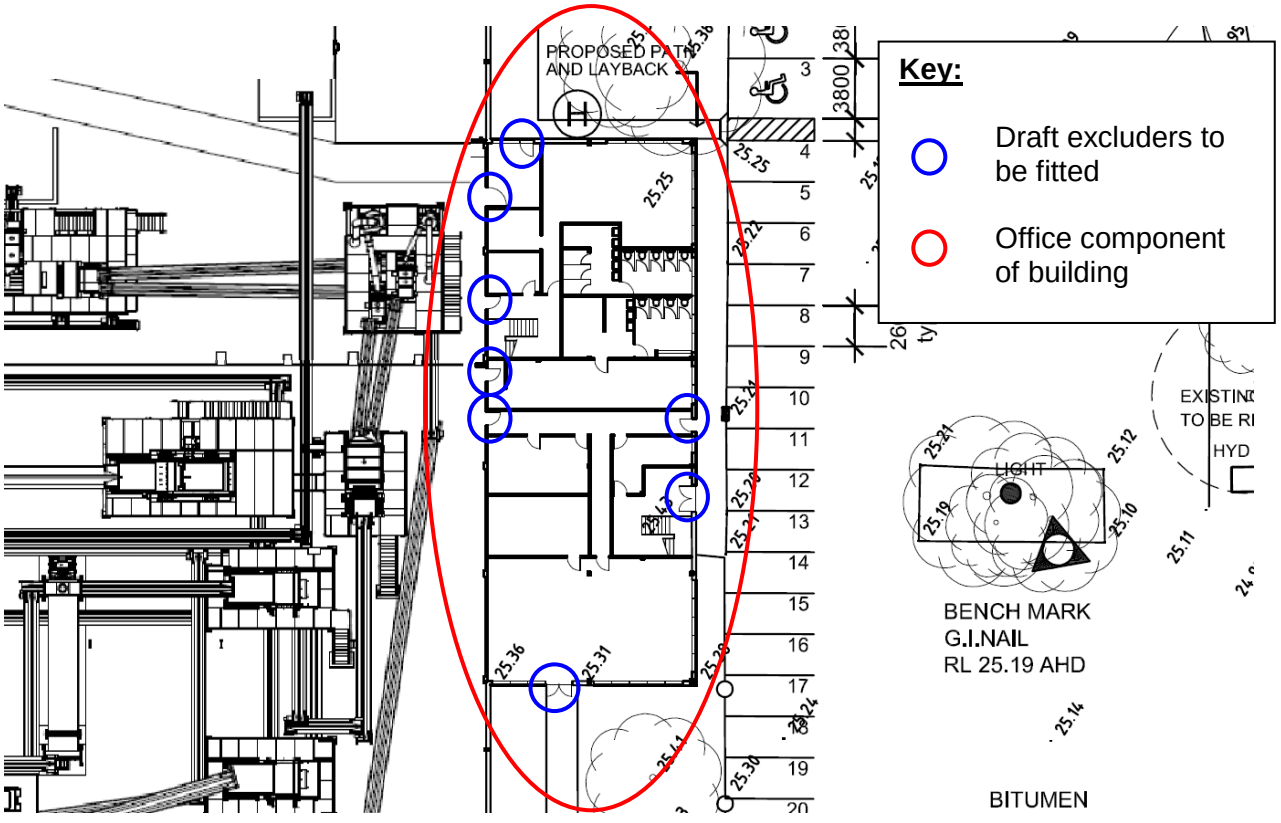


Image 06: Extract from the site plan showing doors recommended to be fitted with draft excluder

Bushfire Evacuation

3. That an emergency/evacuation plan be prepared consistent with the NSW Rural Fire Service document Guidelines for the Preparation of Emergency/Evacuation Plan.

10.0 Conclusion

The determination of any bushfire hazard must be made on a site-specific basis that includes an assessment of the local bushland area and its possible impact to the subject property.

The subject property is identified on Penrith Council's Bushfire Prone Land Map as being marginally within the 100 metre buffer zone from designated Category 1 Vegetation. It should be noted that the subject building and all proposed external bunkers are located outside the 100 metre buffer zone from designated Category 1 Vegetation.

The proposed development does not contain a residential component and is not considered Special Fire Protection Purpose and is therefore not integrated development. As the property is marginally 'bushfire prone' the provisions of Planning for Bush Fire Protection can be applied where considered necessary.

For the purpose of this assessment the proposed development has been assessed against the principals of Planning for Bush Fire Protection 2006 under section 4.3.6 "PBP and other buildings". Furthermore, given the operational requirements of the main industrial component of the subject building, this assessment has been concentrated on the office (northern) component.

The subject property is a large industrial allotment within an area of industrial, recreational and residential properties. The hazard was identified as being vegetation within neighbouring vegetated allotments to the northeast and the subject site itself and large vacant neighbouring allotment to the south and west.

The available Asset Protection Zones from the office component where found to be >160 metres to the northeast, >140 metres to the south and >30 metres to the west. The APZs consist of maintained grounds within the subject property and land equivalent to an APZ being grounds in neighbouring allotments and the formed area of Andrews Road.

No vegetation modification is required within the subject property to create the APZs.

The highest Bushfire Attack Level to the office was determined from table 2.4.2 of AS 3959 - 2009 to be 'BAL 12.5', requiring construction to that of BAL 12.5 under AS3959 – 2009. As the building is existing, retrofitting recommendations have been made to prevent the entry of smoke and embers achieving the intent of BAL 12.5 for the office component of the building.

The existing access and water supply are considered adequate. The access provisions will also be improved as part of this application.

In accordance with the bushfire safety measures contained in this report, and consideration of the site specific bushfire risk assessment it is our opinion that when combined, they will provide a reasonable and satisfactory level of bushfire protection to the subject development.

We are therefore in support of the development.

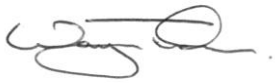
Should you have any enquiries regarding this project please contact me at our office.

Prepared by
Building Code & Bushfire Hazard Solutions



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G. D. Design in Bushfire Prone Areas.
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Certification number – BPD – PA-09400

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Fire Protection Association of Australia BPAD – A Certified Practitioner
Certification number – BPD – PA-09399

Disclaimer:

Quote from Planning for Bush Fire Protection 2006, 'Any representation, statement opinion, or advice expressed or implied in this publication is made in good faith on the basis that the State of New South Wales, the NSW Rural Fire Service, its agents and employees are not liable (whether by reason of negligence, lack of care or otherwise) to any person for any damage or loss whatsoever which has occurred or may occur in relation to that person taking or not taking (as the case may be) action in respect of any representation, statement or advice referred to above..'

Similarly the interpretations and opinions provided by Building Code and Bushfire Hazard Solutions in regard to bushfire protection are also given in the same good faith.

11.0 Annexure 01

List of Referenced Documents

a) Environmental Planning and Assessment Act 1979

b) Rural Fires Act 1997 as amended

c) 'Planning for Bush Fire Protection'- 2006 - NSW Rural Fire Service & Planning NSW

d) 'Construction of buildings in bushfire prone areas' - AS 3959 – 2009 (as - amended) – Standards Australia

e) 'Penrith Council's Bushfire Prone Land Map'

f) Acknowledgements to:

UBD Directories
NSW Department of Lands – Geospatial & Sixviewer
Street-directory.com.au

Attachments

Attachment 01: N/A

111144 Glass Discovery Service – PM10 Model – 24Hr

Concentration or deposition	Concentration
Emission rate units	grams/second
Concentration units	milligrams/m3
Units conversion factor	1.00E+03
Constant background concentration	0.00E+00
Terrain effects	Egan method
Smooth stability class changes?	No
Other stability class adjustments ("urban modes")	None
Ignore building wake effects?	No
Decay coefficient (unless overridden by met. file)	0.000
Anemometer height	10 m
Roughness height at the wind vane site	0.300 m
Use the convective PDF algorithm?	No
Averaging time for sigma-theta values	60 min.

DISPERSION CURVES

Horizontal dispersion curves for sources <100m high	Sigma-theta
Vertical dispersion curves for sources <100m high	Pasquill-Gifford
Horizontal dispersion curves for sources >100m high	Briggs Rural
Vertical dispersion curves for sources >100m high	Briggs Rural
Enhance horizontal plume spreads for buoyancy?	Yes
Enhance vertical plume spreads for buoyancy?	Yes
Adjust horizontal P-G formulae for roughness height?	Yes
Adjust vertical P-G formulae for roughness height?	Yes
Roughness height	0.600m
Adjustment for wind directional shear	None

PLUME RISE OPTIONS

Gradual plume rise?	Yes
Stack-tip downwash included?	Yes
Building downwash algorithm:	PRIME method.
Entrainment coeff. for neutral & stable lapse rates	0.60,0.60
Partial penetration of elevated inversions?	No
Disregard temp. gradients in the hourly met. file?	No

and in the absence of boundary-layer potential temperature gradients given by the hourly met. file, a value from the following table (in K/m) is used:

Wind Speed	Stability Class					
Category	A	B	C	D	E	F

1	0.000	0.000	0.000	0.000	0.020	0.035
2	0.000	0.000	0.000	0.000	0.020	0.035
3	0.000	0.000	0.000	0.000	0.020	0.035
4	0.000	0.000	0.000	0.000	0.020	0.035
5	0.000	0.000	0.000	0.000	0.020	0.035
6	0.000	0.000	0.000	0.000	0.020	0.035

WIND SPEED CATEGORIES
Boundaries between categories (in m/s) are: 1.54, 3.09, 5.14, 8.23, 10.80

WIND PROFILE EXPONENTS: "Irwin Urban" values (unless overridden by met. file)

AVERAGING TIMES
24 hours

111144 Modelling of emissions from glass crushing

SOURCE CHARACTERISTICS

STACK SOURCE: S1A

X(m)	Y(m)	Ground Elev.	Stack Height	Diameter	Temperature	Speed
287372	6265019	30m	2m	2.00m	25C	0.1m/s

No building wake effects.

Emission rates by hour of day in grams/second:

1	0.00E+00	2	0.00E+00	3	0.00E+00	4	0.00E+00
5	0.00E+00	6	0.00E+00	7	0.00E+00	8	0.00E+00
9	1.52E-04	10	1.52E-04	11	1.52E-04	12	1.52E-04
13	1.52E-04	14	1.52E-04	15	1.52E-04	16	1.52E-04
17	1.35E-02	18	1.35E-02	19	0.00E+00	20	0.00E+00
21	0.00E+00	22	0.00E+00	23	0.00E+00	24	0.00E+00

No gravitational settling or scavenging.

STACK SOURCE: S1B

X(m)	Y(m)	Ground Elev.	Stack Height	Diameter	Temperature	Speed
287372	6265019	30m	3m	2.00m	25C	0.1m/s

No building wake effects.

Emission rates by hour of day in grams/second:

1 0.00E+00	2 0.00E+00	3 0.00E+00	4 0.00E+00
5 0.00E+00	6 0.00E+00	7 0.00E+00	8 0.00E+00
9 1.52E-04	10 1.52E-04	11 1.52E-04	12 1.52E-04
13 1.52E-04	14 1.52E-04	15 1.52E-04	16 1.52E-04
17 1.35E-02	18 1.35E-02	19 0.00E+00	20 0.00E+00
21 0.00E+00	22 0.00E+00	23 0.00E+00	24 0.00E+00

No gravitational settling or scavenging.

STACK SOURCE: S1C

X(m)	Y(m)	Ground Elev.	Stack Height	Diameter	Temperature	Speed
287372	6265019	30m	5m	2.00m	25C	0.1m/s

No building wake effects.

Emission rates by hour of day in grams/second:

1 0.00E+00	2 0.00E+00	3 0.00E+00	4 0.00E+00
5 0.00E+00	6 0.00E+00	7 0.00E+00	8 0.00E+00
9 1.52E-04	10 1.52E-04	11 1.52E-04	12 1.52E-04
13 1.52E-04	14 1.52E-04	15 1.52E-04	16 1.52E-04
17 1.35E-02	18 1.35E-02	19 0.00E+00	20 0.00E+00
21 0.00E+00	22 0.00E+00	23 0.00E+00	24 0.00E+00

No gravitational settling or scavenging.

STACK SOURCE: S2A

X(m)	Y(m)	Ground Elev.	Stack Height	Diameter	Temperature	Speed
287395	6265012	30m	2m	2.00m	25C	0.1m/s

No building wake effects.

Emission rates by hour of day in grams/second:

1 0.00E+00	2 0.00E+00	3 0.00E+00	4 0.00E+00
5 0.00E+00	6 0.00E+00	7 4.00E-07	8 4.00E-07
9 1.48E-03	10 1.48E-03	11 1.48E-03	12 1.48E-03
13 1.48E-03	14 1.48E-03	15 1.48E-03	16 1.48E-03
17 1.48E-03	18 1.48E-03	19 0.00E+00	20 0.00E+00

21	0.00E+00	22	0.00E+00	23	0.00E+00	24	0.00E+00				

No gravitational settling or scavenging.

STACK SOURCE: S2B

X(m)	Y(m)	Ground Elev.	Stack Height	Diameter	Temperature	Speed
287395	6265012	30m	3m	2.00m	25C	0.1m/s

No building wake effects.

Emission rates by hour of day in grams/second:

1	0.00E+00	2	0.00E+00	3	0.00E+00	4	0.00E+00
5	0.00E+00	6	0.00E+00	7	4.00E-07	8	4.00E-07
9	1.48E-03	10	1.48E-03	11	1.48E-03	12	1.48E-03
13	1.48E-03	14	1.48E-03	15	1.48E-03	16	1.48E-03
17	1.48E-03	18	1.48E-03	19	0.00E+00	20	0.00E+00
21	0.00E+00	22	0.00E+00	23	0.00E+00	24	0.00E+00

No gravitational settling or scavenging.

STACK SOURCE: S2C

X(m)	Y(m)	Ground Elev.	Stack Height	Diameter	Temperature	Speed
287395	6265012	30m	5m	2.00m	25C	0.1m/s

No building wake effects.

Emission rates by hour of day in grams/second:

1	0.00E+00	2	0.00E+00	3	0.00E+00	4	0.00E+00
5	0.00E+00	6	0.00E+00	7	4.00E-07	8	4.00E-07
9	1.48E-03	10	1.48E-03	11	1.48E-03	12	1.48E-03
13	1.48E-03	14	1.48E-03	15	1.48E-03	16	1.48E-03
17	1.48E-03	18	1.48E-03	19	0.00E+00	20	0.00E+00
21	0.00E+00	22	0.00E+00	23	0.00E+00	24	0.00E+00

No gravitational settling or scavenging.

STACK SOURCE: S3

X(m)	Y(m)	Ground Elev.	Stack Height	Diameter	Temperature	Speed
287444	6265090	30m	1m	2.00m	25C	0.1m/s

No building wake effects.

Emission rates by hour of day in grams/second:

1	0.00E+00	2	0.00E+00	3	0.00E+00	4	0.00E+00
5	0.00E+00	6	0.00E+00	7	0.00E+00	8	0.00E+00
9	1.59E-03	10	1.59E-03	11	1.59E-03	12	1.59E-03
13	1.59E-03	14	1.59E-03	15	1.59E-03	16	1.59E-03
17	1.59E-03	18	1.59E-03	19	0.00E+00	20	0.00E+00
21	0.00E+00	22	0.00E+00	23	0.00E+00	24	0.00E+00

No gravitational settling or scavenging.

AREA SOURCE: A1

X(m)	Y(m)	Ground Elevation	Height	Side length
287353	6265001	30m	1m	2m

Emission rates by hour of day in grams/second per square metre:

1	0.00E+00	2	0.00E+00	3	0.00E+00	4	0.00E+00
5	0.00E+00	6	0.00E+00	7	1.20E-06	8	1.20E-06
9	2.00E-07	10	2.00E-07	11	2.00E-07	12	2.00E-07
13	2.00E-07	14	2.00E-07	15	2.00E-07	16	2.00E-07
17	2.97E-03	18	2.97E-03	19	0.00E+00	20	0.00E+00
21	0.00E+00	22	0.00E+00	23	0.00E+00	24	0.00E+00

No gravitational settling or scavenging.

AREA SOURCE: A2

X(m)	Y(m)	Ground Elevation	Height	Side length
287368	6264997	30m	1m	2m

Emission rates by hour of day in grams/second per square metre:

1	0.00E+00	2	0.00E+00	3	0.00E+00	4	0.00E+00
5	0.00E+00	6	0.00E+00	7	1.20E-06	8	1.20E-06
9	2.00E-07	10	2.00E-07	11	2.00E-07	12	2.00E-07
13	2.00E-07	14	2.00E-07	15	2.00E-07	16	2.00E-07
17	2.97E-03	18	2.97E-03	19	0.00E+00	20	0.00E+00
21	0.00E+00	22	0.00E+00	23	0.00E+00	24	0.00E+00

No gravitational settling or scavenging.

AREA SOURCE: A3

X(m)	Y(m)	Ground Elevation	Height	Side length

X(m)	Y(m)	Ground Elevation	Height	Side length
287382	6264992	30m	1m	2m

Emission rates by hour of day in grams/second per square metre:

1	0.00E+00	2	0.00E+00	3	0.00E+00	4	0.00E+00
5	0.00E+00	6	0.00E+00	7	1.20E-06	8	1.20E-06
9	2.00E-07	10	2.00E-07	11	2.00E-07	12	2.00E-07
13	2.00E-07	14	2.00E-07	15	2.00E-07	16	2.00E-07
17	2.97E-03	18	2.97E-03	19	0.00E+00	20	0.00E+00
21	0.00E+00	22	0.00E+00	23	0.00E+00	24	0.00E+00

No gravitational settling or scavenging.

AREA SOURCE: A4

X(m)	Y(m)	Ground Elevation	Height	Side length
287396	6264988	30m	1m	2m

Emission rates by hour of day in grams/second per square metre:

1	0.00E+00	2	0.00E+00	3	0.00E+00	4	0.00E+00
5	0.00E+00	6	0.00E+00	7	1.20E-06	8	1.20E-06
9	2.00E-07	10	2.00E-07	11	2.00E-07	12	2.00E-07
13	2.00E-07	14	2.00E-07	15	2.00E-07	16	2.00E-07
17	2.97E-03	18	2.97E-03	19	0.00E+00	20	0.00E+00
21	0.00E+00	22	0.00E+00	23	0.00E+00	24	0.00E+00

No gravitational settling or scavenging.

AREA SOURCE: A5

X(m)	Y(m)	Ground Elevation	Height	Side length
287410	6264983	30m	1m	2m

Emission rates by hour of day in grams/second per square metre:

1	0.00E+00	2	0.00E+00	3	0.00E+00	4	0.00E+00
5	0.00E+00	6	0.00E+00	7	1.20E-06	8	1.20E-06
9	2.00E-07	10	2.00E-07	11	2.00E-07	12	2.00E-07
13	2.00E-07	14	2.00E-07	15	2.00E-07	16	2.00E-07
17	2.97E-03	18	2.97E-03	19	0.00E+00	20	0.00E+00
21	0.00E+00	22	0.00E+00	23	0.00E+00	24	0.00E+00

No gravitational settling or scavenging.

AREA SOURCE: A6

X(m)	Y(m)	Ground Elevation	Height	Side length
287424	6264978	30m	1m	2m

Emission rates by hour of day in grams/second per square metre:

1	0.00E+00	2	0.00E+00	3	0.00E+00	4	0.00E+00
5	0.00E+00	6	0.00E+00	7	1.20E-06	8	1.20E-06
9	2.00E-07	10	2.00E-07	11	2.00E-07	12	2.00E-07
13	2.00E-07	14	2.00E-07	15	2.00E-07	16	2.00E-07
17	2.97E-03	18	2.97E-03	19	0.00E+00	20	0.00E+00
21	0.00E+00	22	0.00E+00	23	0.00E+00	24	0.00E+00

No gravitational settling or scavenging.

AREA SOURCE: A7

X(m)	Y(m)	Ground Elevation	Height	Side length
287432	6264982	30m	1m	2m

Emission rates by hour of day in grams/second per square metre:

1	0.00E+00	2	0.00E+00	3	0.00E+00	4	0.00E+00
5	0.00E+00	6	0.00E+00	7	1.20E-06	8	1.20E-06
9	2.00E-07	10	2.00E-07	11	2.00E-07	12	2.00E-07
13	2.00E-07	14	2.00E-07	15	2.00E-07	16	2.00E-07
17	2.97E-03	18	2.97E-03	19	0.00E+00	20	0.00E+00
21	0.00E+00	22	0.00E+00	23	0.00E+00	24	0.00E+00

No gravitational settling or scavenging.

AREA SOURCE: A8

X(m)	Y(m)	Ground Elevation	Height	Side length
287436	6264995	30m	1m	2m

Emission rates by hour of day in grams/second per square metre:

1	0.00E+00	2	0.00E+00	3	0.00E+00	4	0.00E+00
5	0.00E+00	6	0.00E+00	7	1.20E-06	8	1.20E-06
9	2.00E-07	10	2.00E-07	11	2.00E-07	12	2.00E-07
13	2.00E-07	14	2.00E-07	15	2.00E-07	16	2.00E-07
17	2.97E-03	18	2.97E-03	19	0.00E+00	20	0.00E+00
21	0.00E+00	22	0.00E+00	23	0.00E+00	24	0.00E+00

No gravitational settling or scavenging.

AREA SOURCE: A9

X(m)	Y(m)	Ground Elevation	Height	Side length
287441	6265010	30m	1m	2m

Emission rates by hour of day in grams/second per square metre:

1	0.00E+00	2	0.00E+00	3	0.00E+00	4	0.00E+00
5	0.00E+00	6	0.00E+00	7	1.20E-06	8	1.20E-06
9	2.00E-07	10	2.00E-07	11	2.00E-07	12	2.00E-07
13	2.00E-07	14	2.00E-07	15	2.00E-07	16	2.00E-07
17	2.97E-03	18	2.97E-03	19	0.00E+00	20	0.00E+00
21	0.00E+00	22	0.00E+00	23	0.00E+00	24	0.00E+00

No gravitational settling or scavenging.

AREA SOURCE: A10

X(m)	Y(m)	Ground Elevation	Height	Side length
287339	6265006	30m	1m	2m

Emission rates by hour of day in grams/second per square metre:

1	0.00E+00	2	0.00E+00	3	0.00E+00	4	0.00E+00
5	0.00E+00	6	0.00E+00	7	1.20E-06	8	1.20E-06
9	2.00E-07	10	2.00E-07	11	2.00E-07	12	2.00E-07
13	2.00E-07	14	2.00E-07	15	2.00E-07	16	2.00E-07
17	2.97E-03	18	2.97E-03	19	0.00E+00	20	0.00E+00
21	0.00E+00	22	0.00E+00	23	0.00E+00	24	0.00E+00

No gravitational settling or scavenging.

VOLUME SOURCE: V1

X(m)	Y(m)	Ground Elevation	Height	Hor. spread	Vert. spread
287349	6264988	30m	3m	2m	10m

(Constant) emission rate = 1.40E-06 grams/second
No gravitational settling or scavenging.

VOLUME SOURCE: V2

X(m)	Y(m)	Ground Elevation	Height	Hor. spread	Vert. spread
287363	6264984	30m	3m	2m	10m

(Constant) emission rate = 1.40E-06 grams/second
No gravitational settling or scavenging.

VOLUME SOURCE: V3

X(m)	Y(m)	Ground Elevation	Height	Hor. spread	Vert. spread
287377	6264979	30m	3m	2m	10m

(Constant) emission rate = 1.40E-06 grams/second
No gravitational settling or scavenging.

VOLUME SOURCE: V4

X(m)	Y(m)	Ground Elevation	Height	Hor. spread	Vert. spread
287391	6264975	30m	3m	2m	10m

(Constant) emission rate = 1.40E-06 grams/second
No gravitational settling or scavenging.

VOLUME SOURCE: V5

X(m)	Y(m)	Ground Elevation	Height	Hor. spread	Vert. spread
287405	6264969	30m	3m	2m	10m

(Constant) emission rate = 1.40E-06 grams/second
No gravitational settling or scavenging.

VOLUME SOURCE: V6

X(m)	Y(m)	Ground Elevation	Height	Hor. spread	Vert. spread
287420	6264965	30m	3m	2m	10m

(Constant) emission rate = 1.40E-06 grams/second
No gravitational settling or scavenging.

VOLUME SOURCE: V8

X(m)	Y(m)	Ground Elevation	Height	Hor. spread	Vert. spread
287450	6264993	30m	3m	2m	10m

(Constant) emission rate = 1.40E-06 grams/second
No gravitational settling or scavenging.

VOLUME SOURCE: V9

X(m)	Y(m)	Ground Elevation	Height	Hor. spread	Vert. spread
287454	6265006	30m	3m	2m	10m

(Constant) emission rate = 1.40E-06 grams/second
No gravitational settling or scavenging.

VOLUME SOURCE: V7

X(m)	Y(m)	Ground Elevation	Height	Hor. spread	Vert. spread
287445	6264978	30m	3m	2m	10m

(Constant) emission rate = 1.40E-06 grams/second
No gravitational settling or scavenging.

VOLUME SOURCE: V10

X(m)	Y(m)	Ground Elevation	Height	Hor. spread	Vert. spread
287335	6264993	30m	3m	2m	10m

(Constant) emission rate = 1.40E-06 grams/second
No gravitational settling or scavenging.

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111144 Modelling of emissions from glass crushing

RECEPTOR LOCATIONS

The Cartesian receptor grid has the following x-values (or eastings):

286687.m	286702.m	286716.m	286730.m	286745.m	286759.m	286773.m
286788.m	286802.m	286816.m	286831.m	286845.m	286859.m	286874.m
286888.m	286903.m	286917.m	286931.m	286946.m	286960.m	286974.m
286989.m	287003.m	287017.m	287032.m	287046.m	287060.m	287075.m
287089.m	287103.m	287118.m	287132.m	287146.m	287161.m	287175.m
287189.m	287204.m	287218.m	287232.m	287247.m	287261.m	287275.m
287290.m	287304.m	287318.m	287333.m	287347.m	287362.m	287376.m
287390.m	287405.m	287419.m	287433.m	287448.m	287462.m	287476.m
287491.m	287505.m	287519.m	287534.m	287548.m	287562.m	287577.m
287591.m	287605.m	287620.m	287634.m	287648.m	287663.m	287677.m

287691.m 287706.m 287720.m 287734.m 287749.m 287763.m 287777.m
287792.m 287806.m 287821.m 287835.m 287849.m 287864.m 287878.m
287892.m 287907.m 287921.m 287935.m 287950.m 287964.m 287978.m
287993.m 288007.m 288021.m 288036.m 288050.m 288064.m 288079.m
288093.m 288107.m

and these y-values (or northings):

6264727.m 6264741.m 6264755.m 6264769.m 6264783.m 6264797.m 6264811.m
6264825.m 6264839.m 6264853.m 6264867.m 6264881.m 6264895.m 6264909.m
6264923.m 6264937.m 6264951.m 6264965.m 6264979.m 6264993.m 6265007.m
6265021.m 6265035.m 6265049.m 6265063.m 6265077.m 6265091.m 6265105.m
6265119.m 6265133.m 6265147.m 6265161.m 6265175.m 6265189.m 6265203.m
6265217.m 6265231.m 6265245.m 6265259.m 6265273.m 6265287.m 6265301.m
6265315.m 6265329.m 6265343.m 6265357.m 6265371.m 6265385.m 6265399.m
6265413.m 6265427.m 6265441.m 6265455.m 6265469.m 6265483.m

DISCRETE RECEPTOR LOCATIONS (in metres)

No.	X	Y	ELEVN	HEIGHT	No.	X	Y	ELEVN	HEIGHT
1	287617	6265411	39.0	0.0	5	287921	6264929	32.0	0.0
2	287703	6265348	40.0	0.0	6	287890	6264824	30.0	0.0
3	287689	6265195	39.0	0.0	7	287721	6264785	30.0	0.0
4	287802	6265079	36.0	0.0					

METEOROLOGICAL DATA : Met File for 2011 Penrith Lakes AWS

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1 Peak values for the 100 worst cases (in milligrams/m3)
Averaging time = 24 hours

Rank	Value	Time Recorded hour,date	Coordinates (* denotes polar)
1	5.38E-01	24,13/01/11	(287376, 6265007, 0.0)
2	4.54E-01	24,20/05/11	(287376, 6265021, 0.0)
3	4.19E-01	24,01/05/11	(287376, 6265021, 0.0)
4	3.56E-01	24,04/06/11	(287376, 6265021, 0.0)
5	3.37E-01	24,21/04/11	(287376, 6265021, 0.0)
6	2.64E-01	24,20/04/11	(287433, 6264979, 0.0)
7	2.52E-01	24,15/03/11	(287376, 6265021, 0.0)
8	2.41E-01	24,26/07/11	(287376, 6265021, 0.0)
9	2.17E-01	24,15/02/11	(287376, 6265021, 0.0)

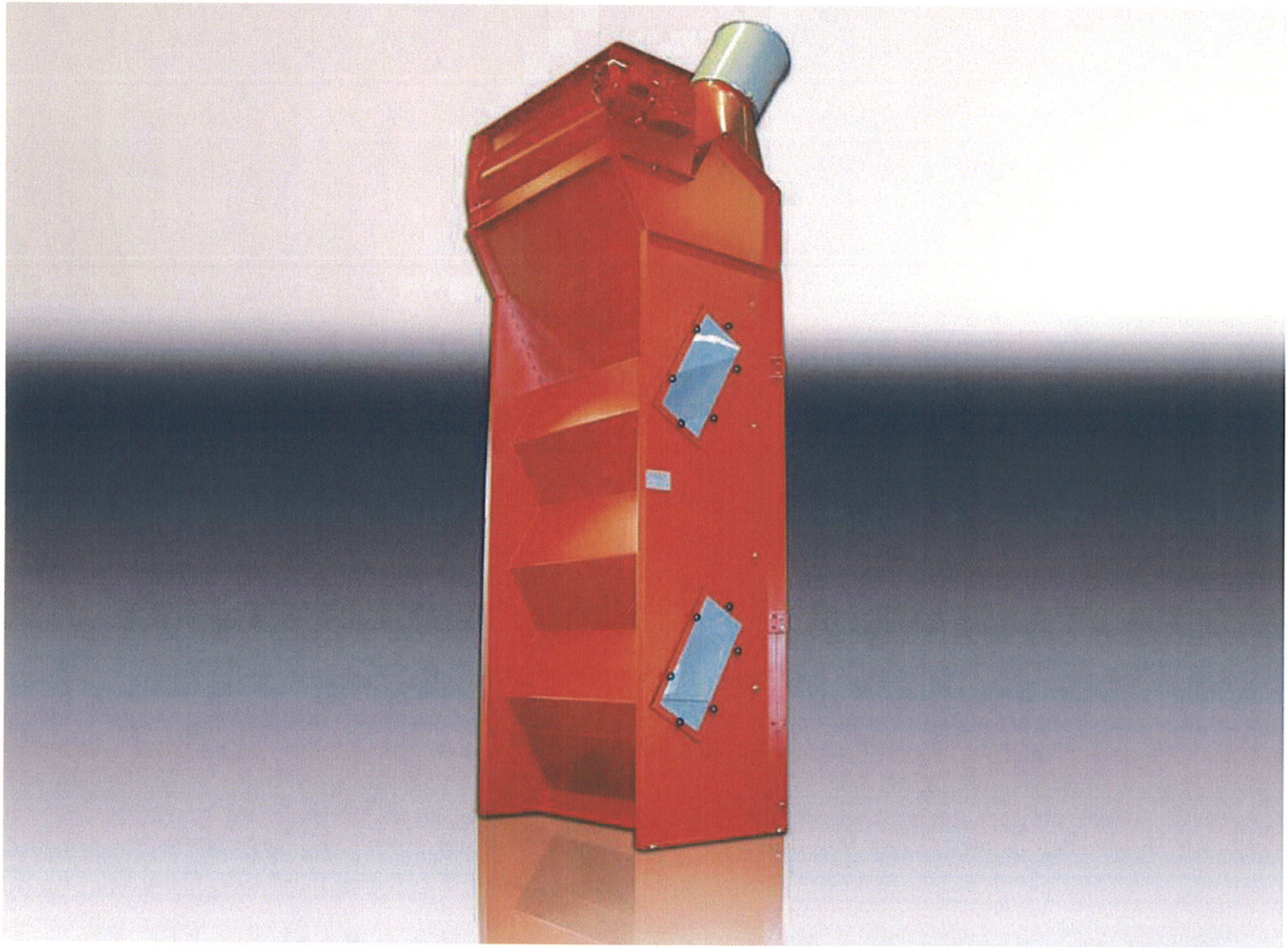
10	2.05E-01	24,22/04/11	(287376, 6265021, 0.0)
11	1.98E-01	24,23/06/11	(287376, 6265021, 0.0)
12	1.94E-01	24,09/06/11	(287376, 6265021, 0.0)
13	1.88E-01	24,09/08/11	(287376, 6265021, 0.0)
14	1.84E-01	24,11/06/11	(287376, 6265021, 0.0)
15	1.84E-01	24,14/04/11	(287376, 6265021, 0.0)
16	1.83E-01	24,18/06/11	(287376, 6265021, 0.0)
17	1.82E-01	24,14/05/11	(287376, 6265021, 0.0)
18	1.81E-01	24,08/07/11	(287433, 6264979, 0.0)
19	1.68E-01	24,23/04/11	(287376, 6265021, 0.0)
20	1.66E-01	24,24/06/11	(287376, 6265007, 0.0)
21	1.61E-01	24,25/04/11	(287433, 6264979, 0.0)
22	1.59E-01	24,09/09/11	(287376, 6265021, 0.0)
23	1.57E-01	24,10/03/11	(287376, 6265021, 0.0)
24	1.55E-01	24,11/09/11	(287376, 6265021, 0.0)
25	1.54E-01	24,21/05/11	(287376, 6265007, 0.0)
26	1.54E-01	24,08/08/11	(287376, 6265021, 0.0)
27	1.53E-01	24,07/07/11	(287376, 6265021, 0.0)
28	1.52E-01	24,12/05/11	(287376, 6265021, 0.0)
29	1.51E-01	24,26/05/11	(287376, 6265021, 0.0)
30	1.48E-01	24,09/07/11	(287376, 6265021, 0.0)
31	1.45E-01	24,05/06/11	(287376, 6265007, 0.0)
32	1.41E-01	24,09/10/11	(287376, 6265021, 0.0)
33	1.39E-01	24,10/09/11	(287376, 6265021, 0.0)
34	1.38E-01	24,19/06/11	(287390, 6264993, 0.0)
35	1.36E-01	24,19/11/11	(287376, 6265021, 0.0)
36	1.35E-01	24,08/06/11	(287376, 6265021, 0.0)
37	1.34E-01	24,16/07/11	(287433, 6264979, 0.0)
38	1.30E-01	24,30/10/11	(287376, 6265021, 0.0)
39	1.28E-01	24,23/08/11	(287433, 6264979, 0.0)
40	1.28E-01	24,27/05/11	(287376, 6265021, 0.0)
41	1.24E-01	24,25/07/11	(287376, 6265021, 0.0)
42	1.23E-01	24,14/10/11	(287376, 6265021, 0.0)
43	1.23E-01	24,17/06/11	(287376, 6265021, 0.0)
44	1.16E-01	24,20/06/11	(287376, 6265021, 0.0)
45	1.14E-01	24,03/04/11	(287376, 6265021, 0.0)
46	1.09E-01	24,12/07/11	(287376, 6265007, 0.0)
47	1.09E-01	24,31/07/11	(287433, 6264979, 0.0)
48	1.08E-01	24,28/07/11	(287376, 6265021, 0.0)
49	1.07E-01	24,03/02/11	(287376, 6265021, 0.0)
50	1.05E-01	24,26/06/11	(287376, 6265021, 0.0)
51	1.04E-01	24,16/05/11	(287376, 6265007, 0.0)
52	1.03E-01	24,24/07/11	(287433, 6264993, 0.0)
53	1.01E-01	24,28/09/11	(287433, 6264979, 0.0)
54	9.98E-02	24,11/05/11	(287376, 6265021, 0.0)
55	9.94E-02	24,13/07/11	(287433, 6264979, 0.0)
56	9.93E-02	24,10/11/11	(287376, 6265021, 0.0)

57	9.92E-02	24,24/04/11	(287376, 6265007, 0.0)
58	9.81E-02	24,20/02/11	(287376, 6265021, 0.0)
59	9.63E-02	24,16/11/11	(287376, 6265021, 0.0)
60	9.39E-02	24,27/11/11	(287376, 6265021, 0.0)
61	9.36E-02	24,13/04/11	(287419, 6264979, 0.0)
62	9.20E-02	24,23/09/11	(287376, 6265021, 0.0)
63	9.15E-02	24,21/06/11	(287376, 6265021, 0.0)
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65	8.84E-02	24,27/08/11	(287433, 6264979, 0.0)
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77	7.40E-02	24,22/06/11	(287376, 6265021, 0.0)
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79	7.35E-02	24,18/08/11	(287376, 6265021, 0.0)
80	7.32E-02	24,01/10/11	(287376, 6265021, 0.0)
81	7.26E-02	24,19/07/11	(287376, 6265021, 0.0)
82	7.22E-02	24,27/10/11	(287376, 6265021, 0.0)
83	7.18E-02	24,03/11/11	(287362, 6265021, 0.0)
84	7.03E-02	24,27/03/11	(287376, 6265021, 0.0)
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87	6.85E-02	24,27/07/11	(287376, 6265007, 0.0)
88	6.73E-02	24,03/05/11	(287376, 6265021, 0.0)
89	6.62E-02	24,04/08/11	(287433, 6264979, 0.0)
90	6.60E-02	24,02/05/11	(287433, 6264979, 0.0)
91	6.59E-02	24,02/08/11	(287433, 6264979, 0.0)
92	6.31E-02	24,21/07/11	(287376, 6265021, 0.0)
93	6.29E-02	24,11/07/11	(287376, 6265021, 0.0)
94	6.23E-02	24,17/09/11	(287433, 6264979, 0.0)
95	6.20E-02	24,29/07/11	(287433, 6264979, 0.0)
96	6.15E-02	24,09/12/11	(287362, 6265021, 0.0)
97	6.04E-02	24,31/05/11	(287376, 6265021, 0.0)
98	6.03E-02	24,04/02/11	(287390, 6264993, 0.0)
99	6.00E-02	24,24/09/11	(287362, 6265021, 0.0)
100	6.00E-02	24,11/12/11	(287376, 6265007, 0.0)

TST
TRENNSO TECHNIK

ZZS Air Sifter

For separating bulk goods of various specific gravities.









trennso-technik.de



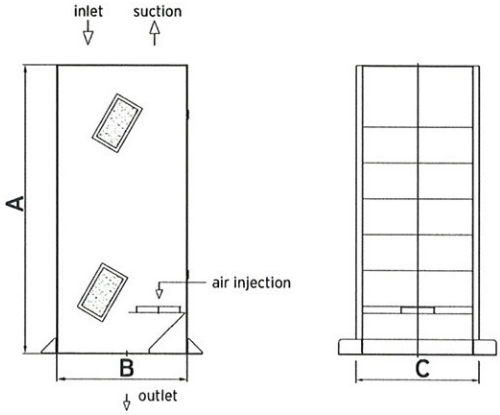
TST
TRENNSO TECHNIK

ZZS Air Sifter

Machine:

The machine sorts various bulk materials according to their specific gravity, their shape and size.

Use our pilot plant for practical experiments as a basis for selecting the required machine size.



The machine is available in various heights, widths and depths.

Functionality:

The sorting product is fed into the zigzag channel and distributed through the entire cross-section of the sorting channel. The sorting air generated by the fan flows through the sorter from the bottom to the top; this causes the material to be flooded by air and separated.

The product must cross through the air flow at every bend in the sorting channel and subsequently collides against the opposite wall of the sorter. This causes the material with a higher density to drop to the bottom in the sorting channel due to the centrifugal force. The lightweight material is sucked out of the sorting channel via the upwards directed air flow.

The depth of the airstream sorter can be adjusted; as a result, it can be operated in extract air or in air recirculation mode. The extracted air is cleaned in a downstream filtration system or by a cyclone filter.

Model	A	B	C
ZZS 115/400/6	1495	800	500
ZZS 115/500/6	1495	700	600
ZZS 180/600/4	1620	1085	720
ZZS 180/800/4	1620	1085	920
ZZS 250/1000/3	1600	1360	1120
ZZS 250/1200/3	1600	1360	1320

Extract from our product range, additional models available on request.

TRENNSO-TECHNIK
Trenn- und Sortiertechnik GmbH
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Web: www.trennso-technik.de



TST
TRENNSO TECHNIK

Windsichter QSS

Zum Trennen von Schüttgütern unterschiedlicher spezifischer Gewichte.









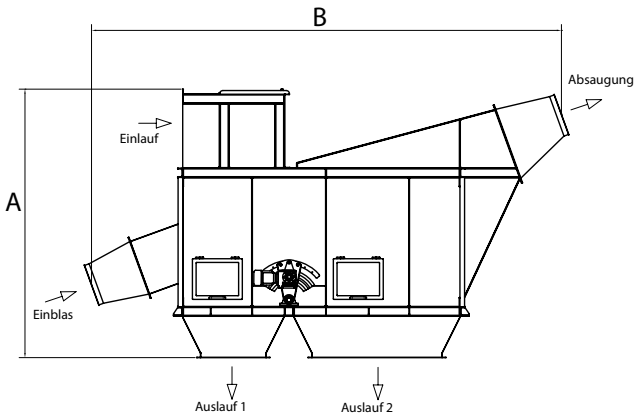


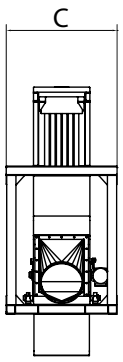
Windsichter QSS

Maschine:

Die Maschine trennt grobstückige Schüttgüter nach ihrer Form und Größe.

Nutzen Sie unser Technikum für praxisnahe Versuche als Grundlage für die Auswahl der benötigten Maschinengröße.





Die Maschine ist in verschiedenen Breiten und Längen erhältlich.

Funktionsweise:

Das Trenngut wird in den Fallschacht des Querstromsichters eingespeist und über den gesamten Sichterquerschnitt verteilt. Die vom Gebläse erzeugte Sichterluft durchströmt den Sichter horizontal über die gesamte Maschinenlänge, wobei das Aufgabematerial entsprechend seinem spezifischen Gewicht abgelenkt und damit separiert wird.

Dabei sinkt das Material mit höherer Dichte in Folge der größeren Schwerkraft schneller nach unten und wird über den Auslauf 1 ausgetragen. Mittelschwere Produkte werden durch den horizontal gerichteten Luftstrom abgelenkt und am Auslauf 2 ausgetragen. Leichtgut wird vom Luftstrom erfasst und über die Absaugung abgeschieden. Die Trennschnitte werden über Luftklappen, die Positionierung des Einblasschachtes und die Luftmenge gesteuert.

Der Windsichter kann sowohl im Abluft- als auch im Umluftbetrieb gefahren werden. Die abgeführte Luft wird über eine nachgeschaltete Filteranlage oder einen Zyklonabscheider gereinigt.

Typ	A	B	C
QSS 500	2900	4650	500
QSS 750	2900	4900	750
QSS 1000	2900	5150	1000
QSS 1250	2900	5400	1250
QSS 1500	2900	5650	1500

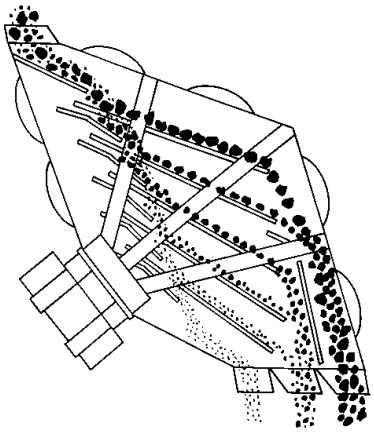
Auszug aus unserem Lieferprogramm, weitere Typen erhalten Sie gerne auf Anfrage.

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E-Mail: info@trennso-technik.de
Web: www.trennso-technik.de





MOGENSEN
Member of the ALLGAIER Group

The principle is still the same, the technology is NEW !

Mogensen LongSizer Type SC

Available screen widths: 1,0 m; 1,5 m; 2,0 m; 2,5 m and 3,0 m

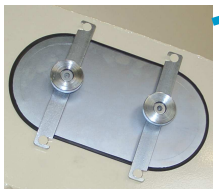
No. of screen decks: 2; 4 and 6

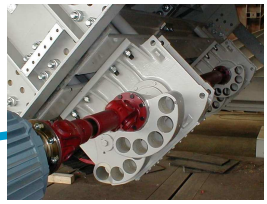


Easy access and service friendly by new wedge and pin fixing and big inspection openings.



Integrated feed distributor for equal feeding over the whole width of the Sizer.





Gear box exciters as an alternative to unbalanced motors.



Available additional options: Screen deck heating, screen deck monitoring, pneumatic screen deck cleaning.

Vibration Monitoring



Mogensen GmbH & Co.KG Kronskamp 126 D-22880 Wedel/Germany Tel.+49 4103 8042-0 Fax. +49 4103 8042-40

Info@mogensen.de www.mogensen.de

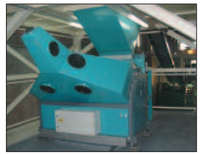
MikroSort® Product Guide



Type AF
Dry, pourable bulk materials e.g. PET flakes, crystal glass, salt, minerals, chamotte



Type AX
CSP- and colour sorting of soiled hollow glass



Type AL / AP
Dry, washed or wetted pourable bulk materials e.g. glass, salt, minerals



Type AS / AT*
Dry, washed or wetted minerals



Type AQ - Sorting of X-ray spectral analysis
Pourable material e.g. glass with glass-ceramic, special glasses



Type AG / AH*
Dry, washed or wetted minerals



Type AR - Sorting of X-ray spectral analysis
Sorting applications: minerals, glass, plastic



Mogensen Mobile
Installation of all optical Mogensen sorting machines into a semi-mobile custom-designed container

Capacity Data

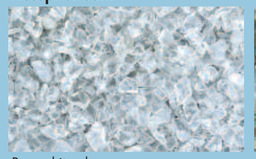
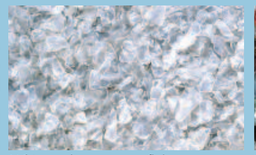
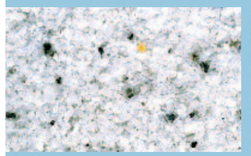
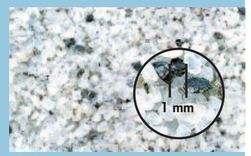
Machine type	Valve raster/mm	Particle range typical/mm	Sorting capacity t/h
MikroSort® AF	4	1 – 15	0,5 – 10
MikroSort® AL	5,5	5 – 60	5 – 40
MikroSort® AX	5,5	5 – 60	5 – 40
MikroSort® AP	5,5	5 – 40	5 – 40
MikroSort® AS/AT*	8	15 – 80	30 – 90
MikroSort® AG/AH*	5,5	80 – 250	70 – 150
MikroSort® AR	8	15 – 250	5 – 20
MikroSort® AQ	5,5	10 – 40	15 – 20

*These MikroSort® are equipped with a second camera in order to view the material from two sides.

The Opto-Electronic Sorting System MikroSort®



Examples of Application

Input material	Accept stream	Rejection stream
 Recycling glass	 Pure white glass	 Off shades and KSP
 Limestone	 White filler	 Coloured impuritees
 PET-Flakes	 White and transparent flakes	 Coloured flakes and metal particles
 Rock salt	 Pure-white rock salt	 Black impurities
 Talcum	 White talcum	 Coloured impurities

MOGENSEN
Member of the ALLGAIER-Group

Made in Germany

MOGENSEN
Member of the ALLGAIER-Group
Mogensen GmbH & Co. KG
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MikroSort®

MikroSort® is able to sort all bulk goods which are clearly identifiable by their optical distinction.

Motivation

There has always been a close relationship between the profitability of processes, the fulfilment of legal requirements and regulations, and the further development of technology.

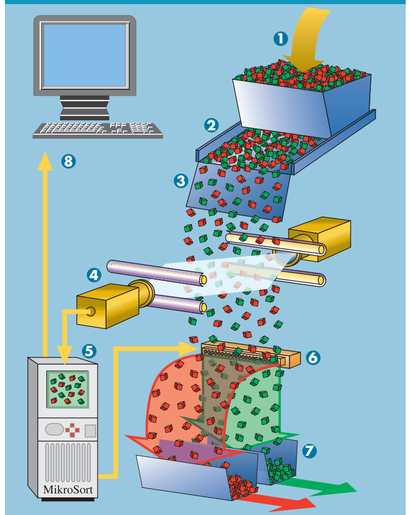
For the Mogensen team, precisely this relationship is the reason for the current status of our sorting technology and for future innovations.

For more than 10 years, the Mogensen sorting system has proven itself on the world market for:

- very fine plastic flakes
- dirty and clean waste glass
- salt
- industrial minerals and
- many other materials

Our motto: "Nothing is impossible" is true not only for our Mogensen MikroSort® sorting system, but also for all services related to it.

Schematic





Processing of PET-Flakes 3 - 12 mm

Thanks to our experience in sorting and screening technology, our comprehensive service options, and skilled personal advice, we are the right partner for long-term customer relationships based on trust.

Concept

1. material input
2. distribution and transportation
3. acceleration and isolation
4. scanning of the material by
5. various optical systems
6. evaluation by means of fast
7. parallel processing technology
8. separation by means of exact
   compressed air impulses
   discharge of the separated
   product streams
   network connection

Material recognition

Requirements, which up to the present could not be fulfilled, can now be solved using the newest hardware and software. The Mogensen MikroSort® sorting system offers the following possibilities:

Real colours and brightness
Recognition with various camera types and different forms of lighting in the range of the visible spectrum.

X-ray technology
Recognition of materials according to the mean atomic density, regardless of surface properties and colour.

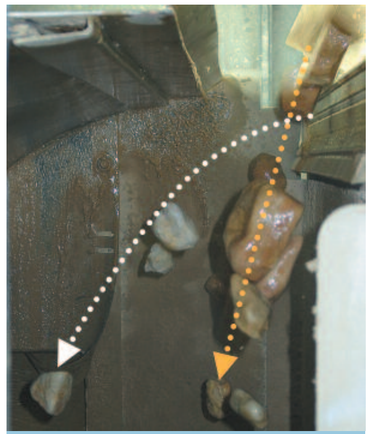
Particle size
Analysis or sorting according to the particle size of large material flows.

Particle shape
Sorting according to freely selectable length/width ratio.

Metal sensor technology
Inductive recognition of non-ferrous and ferrous metals to a very high sensitivity.

Multisensor technology
Special tasks which require the use of more than one sensor. Using Mogensen MikroSort®, various systems can be combined together, e.g.:

- Camera inspection on both sides
- Combination of inductive metal recognition with camera or X-ray system
- Combination of optical camera systems with X-ray detection



View into the separation box – Sorting of quartz



Sorting of recycling glass 5 - 60 mm

Our service and support package

From initial contact up to after sales service:

Enquiry	▶ Visit on the customer's premises ▶ Discussion about the envisaged project
Trials	▶ Carrying out sorting trials in the Mogensen technical centre using test machines of many different types
Planning	▶ Development of tailor-made sorting and screening concepts in collaboration with our customers
Manufacture	▶ Manufactured to industrial quality, ▶ Availability for operation up to 8,000 working hours per year ▶ User-friendly operating interface ▶ Robust high-capacity industrial computer
Service +	▶ Commissioning and after sales service by our highly qualified multilingual service personnel ▶ Training on your premises or at Mogensen head office ▶ Telephone hotline ▶ Remote maintenance and program optimisation via Internet connection
Pilot trials on your premises	▶ Trial machines available on rental basis

Mogensen offers:





Technical center

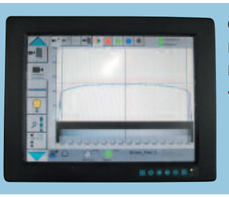
Sorting trials in the Mogensen technical centre using original machines for joint development of customer-specific concepts.

Mobile solutions

Installation of our sorting machines in semi-mobile standard containers, including the necessary additional equipment such as compressor, extraction, climate control, and control panel.





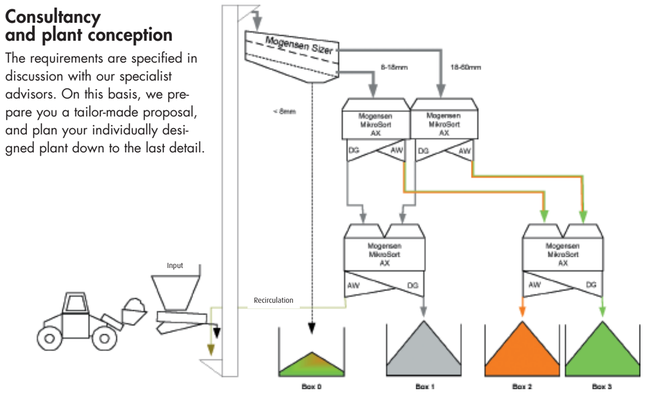


Control unit

Neatly constructed and easy to use
Rapid access to all program settings via touch screen and slider.

Consultancy and plant conception

The requirements are specified in discussion with our specialist advisors. On this basis, we prepare you a tailor-made proposal, and plan your individually designed plant down to the last detail.



Product description
X-ray sorter type: AQ 12XX

Date: 15.02.2006

Introduction

Mogensen manufactured and commissioned the first two X-ray sorting machines in 2005. These are belt sorters equipped with a single-channel sensor. Their main application is the separation between organic and inorganic material. But, because the absorption of X-rays does not only depend on the type of material but also on the material thickness, it became necessary to separate the material depending on its thickness. This duty was perfectly solved using a Mogensen Bar Sizer a special kind of finger screen. Unfortunately, the necessary space for that kind of belt sorter including a screening machine is quite considerable.

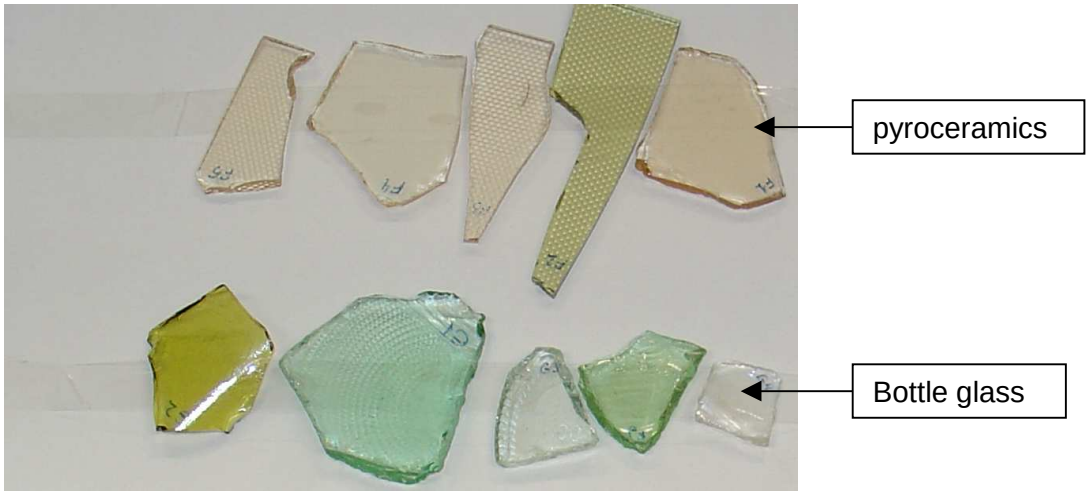
New applications and market's demand for more compact sorting machines, which can easily be integrated into existing plants, made it necessary to develop another type of sorting machine. The main characteristics of the new machine are an improved X-ray sensor system and a material feed using a vibratory feeder and a chute instead of a belt.

Application

In 2004 approximately 2.1 million tons of scrap glass were collected from households in Germany using the Green Dot System. The recycling percentage of glass therein is more than 90 % and in opposite to other packing materials glass can be recycled almost infinitely and economically. The average share of cullet in the production of new glass in Germany is approximately 65 %, peaks in green glass reach nearly 90 %. Besides the savings in raw material, the energy consumption for the glass melting can be reduced by nearly 20 % when feeding 65 % recycled cullet.

For the re-use of recycled cullet in the glass factory certain contaminants like ceramics, stones and porcelain (CPS) which melt at very high temperatures only, as well as metals may not exceed certain threshold values. To separate these contaminants from the glass a very complex processing technology is necessary. For these purposes optical sorting systems with an integrated all-metal detection device are successfully used. Mogensen GmbH & Co. KG is one of the major suppliers of these systems world-wide.

Recently a new contaminant appears inside glass recycling more and more. These are the so-called pyroceramics as found in modern hot plates, heat proof cooking utensils or oven glasses. Pyroceramics have a far higher melting point than the CPS and therefore even small cullet of pyroceramics will not melt during the fresh glass production. This could even result in a breakdown during a new bottle production. Pyroceramics are available, depending on the individual application, in all different hues up to almost totally transparent. Optical detection (visible light) can not be used to detect all types of pyroceramics. The following pictures shows a sample of pyroceramics and bottle glass.



Picture 1 showing pyroceramics (upper line) and bottle glass (lower line)

For the manufacturing of pyroceramics a certain content of heavy metal oxide is necessary for nucleation which results in a higher X-ray density of the pyroceramics in comparison to regular glass. This difference is used to separate both materials. Unfortunately this density difference is very small and additionally the glass cullet have different thickness. To cope this the new machine uses a double-channel evaluation. The main design and internal geometry of this brand-new X-ray machine remains very much alike the proven Mogensen optical sorting machines for regular glass sorting. Picture 2 shows the new X-ray sorting machine MikroSort® AQ 1101 in the Mogensen testing facilities.



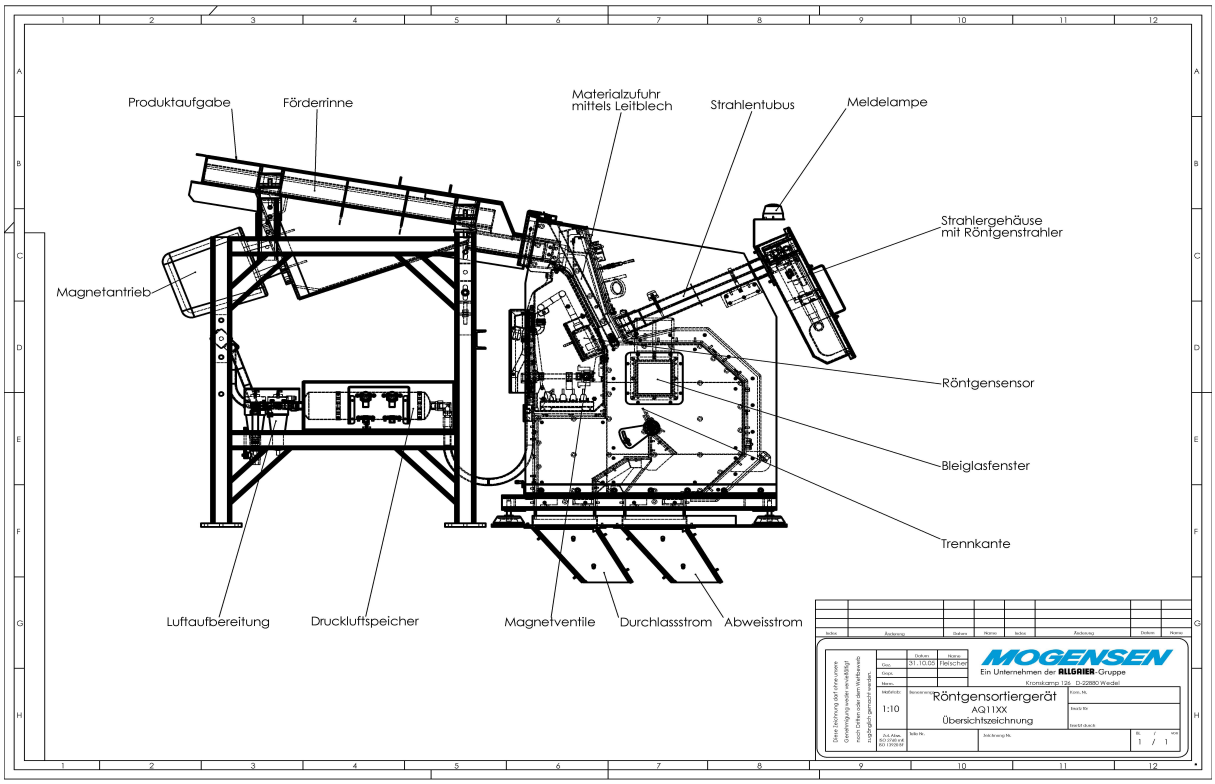
Picture 2 X-ray sorting machine MikroSort® AQ 1101

Product description
X-ray sorter type: AQ 12XX

Date: 15.02.2006

Mode of Operation

The material is fed on an electromagnetic vibratory feeder. The feeder's job is to distribute the material and deliver it in right doses to the chute. From this point the material slides into the detection zone. The particles are accelerated and therefore isolated, before they enter the free fall. Right below the chute the particles are irradiated by a pointed X-ray source with an opening angle of approximately 60°. On the opposite of the X-ray source is the double-channel X-ray sensor which measures two different X-ray outputs. The evaluation of the picture data and the classification of the individual pieces of materials is conducted by a high performance industrial computer within a few milliseconds. The actual rejection of the material is done approximately 150 mm below the plane of detection by a solenoid valve unit which emits compressed air impulses to guide the unwanted particles over a separation plate into a material hopper. Finally the reject and the accept material streams can be conveyed separately. Further details are shown on the following drawing.



Picture 3 Overview drawing

Product description **Date: 15.02.2006**
X-ray sorter type: AQ 12XX

Technical Data
X-ray Sorting Machine Type AQ 1101

Application

Sorting material	glass cullet (recycling glass; plate and bottle glass)
Sorting task	rejection of pyroceramics
Material pre-treatment	pre-processed glass cullet (contaminants as metals, plastics and paper shall mainly be removed)
Grain size band	80 – 60 mm
Bulk density	1.3 t/m3
Throughput	approx. 15 – 20 t/h
Reject percentage	max. 1 – 5 mass-%

Ambient conditions

Temperature	+5 to -40°C
Air humidity	5 – 95 % (not condensing)

Material feed

1. Vibratory feeder	consistent feed to the chute
2. Chute	acceleration and isolation
Working width	1.1 m
Product speed in sensor plane	2.5 m/s

X-ray source and sensors

X-ray source	X-ray source 160 kV „Fanbeam“ data: 160 kV, 1000 Watt focus 1.0 mm acc. EN 12543 filter 0.8 mm Be angle 60 x 25 degrees
X-ray sensor	double line with together 48 sensor modules with each 64 pixels (0.8 x 0.8 mm). The sensor is based in the valve module. Measurement frequency up to 3 kHz.

Separation technology

Valve technology	208 nozzles and high performance valves in a stainless steel cabinet
Separation housing	Mainly wear resistant execution by design and integrated wear lining.

Radiation Protection

- Dimensioning of the lead and steel screen by MCNP-simulation, executed by the German expert company TÜV-Nord Röntgentechnik.
- The design is made to be clearly far below the actual limits for a full protection device (7.5 µSv/h).
- Wear protection layers and linings were not taken into account during the simulation.
- All maintenance openings are electrically surveyed.
- Fixed covers are secured with special bolts following DIN 22424 and 22425.

Piccolo Sizer
for the laboratory and pharmaceutical business
5 screen decks
each 0.5 m long



SZ Sizer
0.5 m screen width
3–6 screen decks
each 1.3 m long



SG Circular Motion Sizer
1–1.5 m screen width
2–4 screen decks
each 1.3 m long



SH Sizer
1–1.5 m screen width
2–6 screen decks
each 1.3 m long



SK Sizer
Heavy model for robust use
1–2 m screen width
3–6 screen decks
each 1.3 m long



SC Sizer
Optimised model
1–3 m screen width
2–6 screen decks
each 2.4 m long



SL Sizer
Heavy model for harsh applications
1–3 m screen width
2–6 screen decks
each 2.4 m long



MOGENSEN SIZER
the powerful and variable classification system



MOGENSEN
ALLGAIER Gruppe

Typical applications

- Almonds
- Alternative fuels
- Alumina
- Aluminium chloride
- Aluminium nitrate
- Aluminium oxide
- Aluminium silicate
- Aluminium sulphate
- Aluminium swarf
- Anhydrous lime
- Animal feedstuff mixture
- Animal feed pellets
- Anode residues
- Anthracite
- Argillaceous shale
- Armor stones
- Ashes
- Asphalt, crushed
- Bakelite
- Barium carbonate
- Barley
- Basalt
- Bauxite
- Bauxite earth
- Beet slices
- Blast furnace slag
- Bonemeal
- Borax
- Bran
- Brick chippings
- Building rubble
- Calcium cyanamide
- Calcium salt
- Cane sugar
- Cast iron chips
- Cereals
- Cement
- Cement clinker
- Chalk
- Charcoal
- Chrome ore
- Clay
- Clinker
- Cloves
- Coal
- Coal slack
- Cocoa beans
- Cocoa powder
- Coffee beans
- Coffee powder
- Coke
- Commercial waste
- Compost
- Compound feed
- Contaminated soil
- Copper ore
- Copper sulphate
- Cork
- Crushed concrete
- Crushed rock
- Diacalcium phosphate
- Disodium phosphate
- Dolomite
- Domestic waste
- Excavated material
- Feldspar
- Fertiliser
- Fireproof clay
- Fish meal
- Flour
- Fluorspar
- Fly ash
- Foundry sand
- Glass
- Granite
- Granulate
- Gravel
- Gray wacke
- Grit
- Ground basic slag
- Gypsum
- Harbor sediment
- Hard coal
- Herb mixtures
- Icing sugar
- Iron ore
- Iron oxide
- Kainite
- Kaolin
- Kieselguhr
- Lactose
- Lava sand
- Lead oxide
- Lignite
- Limestone
- Lime hydroxide
- Lime sandstone
- Magnesite
- Maize
- Malting barley
- Manganese ore
- Marble
- Marl
- Milk powder
- Multicellular glass
- Natural pumice
- Nuts
- Oats
- Oil-bearing seeds
- Peanuts
- Peat
- Pellets
- Petroleum coke
- Phosphate
- Pit-run gravel
- Plastic flakes
- Portland cement
- Potassium carbonate
- Potassium chloride
- Potassium salt
- Potato starch
- Pumice stone
- PVC
- Quartz
- Quartz sand
- Raw coal
- Refuse incineration slag
- Rice
- Rock salt
- Rubber
- Rubble
- Rye
- Saltpetre
- Salt
- Sand
- Scrap glass
- Scrap metal
- Sea salt
- Sewage sludge granulate
- Shell limestone
- Silicon
- Silicon carbide
- Sinter
- Slate
- Sodium bicarbonate
- Sodium carbonate
- Soja beans
- Starch
- Sugar
- Sugar candy
- Talcum
- Titanium dioxide
- Tobacco
- Wheat
- Whole hazelnuts
- Woodchips
- Wood flour
- Wood pellets
- Wood shavings
- Zinc ore
- Zinc oxide

All over the world Sizer plants by Mogensen are recognized for their simple and effective screening. The combination of innovative technology, know-how, competence, creativity, and service is the key to a cost-effective optimization of your production quality.

Tell us your screening problem, we have the solution.

Made in Germany

MOGENSEN
ALLGAIER Gruppe

Mogensen GmbH & Co. KG
Kronskamp 126 · 22880 Wedel
Germany
Tel. +49 4103 8042-0
Fax +49 4103 8042-40
www.mogensen.de
info@mogensen.de

MOGENSEN SIZER – in a class of it's own

The Mogensen Sizer is a powerful and flexible classifying machine with a high level of cost effectiveness. **For more than 40 years since the patent was registered, the technology of the Mogensen Sizer has been continuously further developed, adapted to the growing requirements of our customers and proven in more than 10,000 manufacturing plants.**

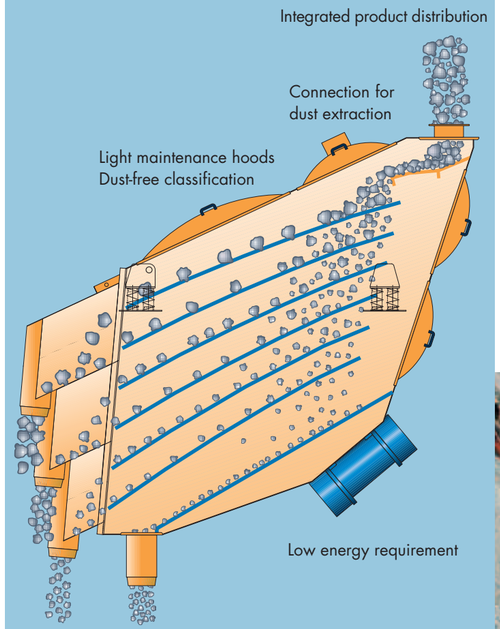




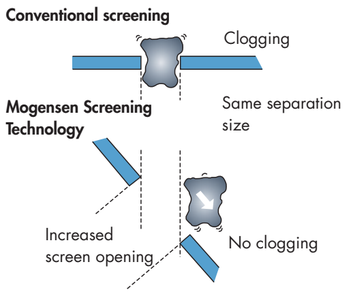
Effective principle of operation

The Mogensen Sizer® system consists of 2 to 6 superimposed screen decks at different angles; moving downward the mesh widths become finer with each successive screen deck. The maintenance-friendly screen decks are placed in vibration in a compact housing by motor vibrators or exciters. Coarser grains are screened out of the material flow while the finer grains of the feed material immediately flow almost vertically through the coarse meshes of the upper screens. Due to the screen surfaces' varying angles of incline, their openings have the effect of a smaller mesh. Consequently in comparison to conventional flat screens, unusually large mesh widths can be selected, and still provide just as good separating resolution. Separating different grain sizes out of the material flow, and the greater mesh widths of the screen surfaces, relative to the separation grain not only prevents carrot particles and layers of material from forming on the screen surfaces but also ensures high throughput performance, in addition to extremely long service life for the screen surfaces.

Function



Screening technology







High cost effectiveness

- Low energy requirement
- Low space requirement
- Compact construction
- Light steel constructions
- High operating safety
- High throughput performance
- Minimum maintenance costs
- Product-safe screening
- Long mesh life
- Rapid screen change
- Up to 7 product fractions in one pass
- Advantages of the "Building block" system when modifications are needed
- Simple modification of accessories

Control system and monitoring

- Motor- and brake control
- Electronic machine monitoring

Accessories for difficult-to-screen products

- Integrated product distribution
- Mechanical screen cleaning
- Pneumatic screen cleaning
- Screen tension monitoring
- Electric heating


Screening trials in our own test laboratory

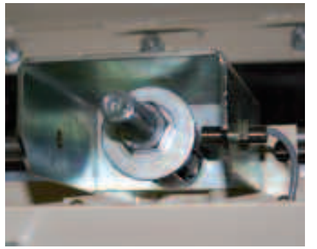
Service

More than 40 years of screen engineering experience and our proven technology guarantee competence and industry-specific know-how for your application. Individual consulting and tailor-made configuration and planning ensure an optimum solution for your screening problems. In our Mogensen Technical Center we conduct screening trials with your material on machines used in practice. This guarantees matching your specific application and optimum performance.

Use the tradition, innovation, know-how, competence, creativity and service of Mogensen for your production.


Machine monitoring


Exciter

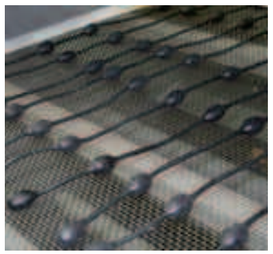

Screen tension monitoring


Switch box for screen tension monitoring


Pneumatic screen cleaning


Large inspection openings


Captive wedge connections


Mechanical screen cleaning


Screen heating unit

The new glass sorting machine MikroSort® Type AX

All our previous experience and ideas went into the design and construction of this machine.

What was it that required improving on the old glass sorting machine MikroSort® Type AE?

- Soiling in the sensing area and therefore lack of sorting stability
- Manual cleaning required for heavily soiled glass
- Film consumption for cleaning the transillumination lamp
- Standstill times for film replacement
- Poor accessibility in the separation area (nozzle bar, separating plate, wearing parts, etc.)
- High wear in the separator box, especially the reject side

What was improved on the new glass sorting machine MikroSort® Type AX?

- All relevant spots in the sensing area are automatically cleaned. (Underside of guide plate, top of blower module, nozzle bar, top of separator box, lamp). Cleaning is by means of pneumatic cylinders.
- High sorting stability due to continuous cleaning of the sensing area, even with heavily soiled glass.
- By using a wider lamp, it was possible to double the distance to the product flow, which in turn substantially reduced soiling of the lamp glass.
- Good accessibility to all important spots (lamp, nozzle bar, valves, separator lip)
- Low wear in separator box due to altered blow direction and generously designed reject side.

Further advantages:
By moving the blower module to below the guide plate, the material flow is now more uniform and the distance to the nozzles is reduced compared to the AE model, see Figure 1. A higher force acts on the shards and it was possible to reduce the sorting pressure by 25% on the new glass sorting machine. In addition, it was possible to reduce the nozzle diameter by 20%. Both measures optimise the compressed air demand, enabling it to be reduced by up to 40%, all else being equal. The reduced distance between the blower module and the material flow reduces oversorting.

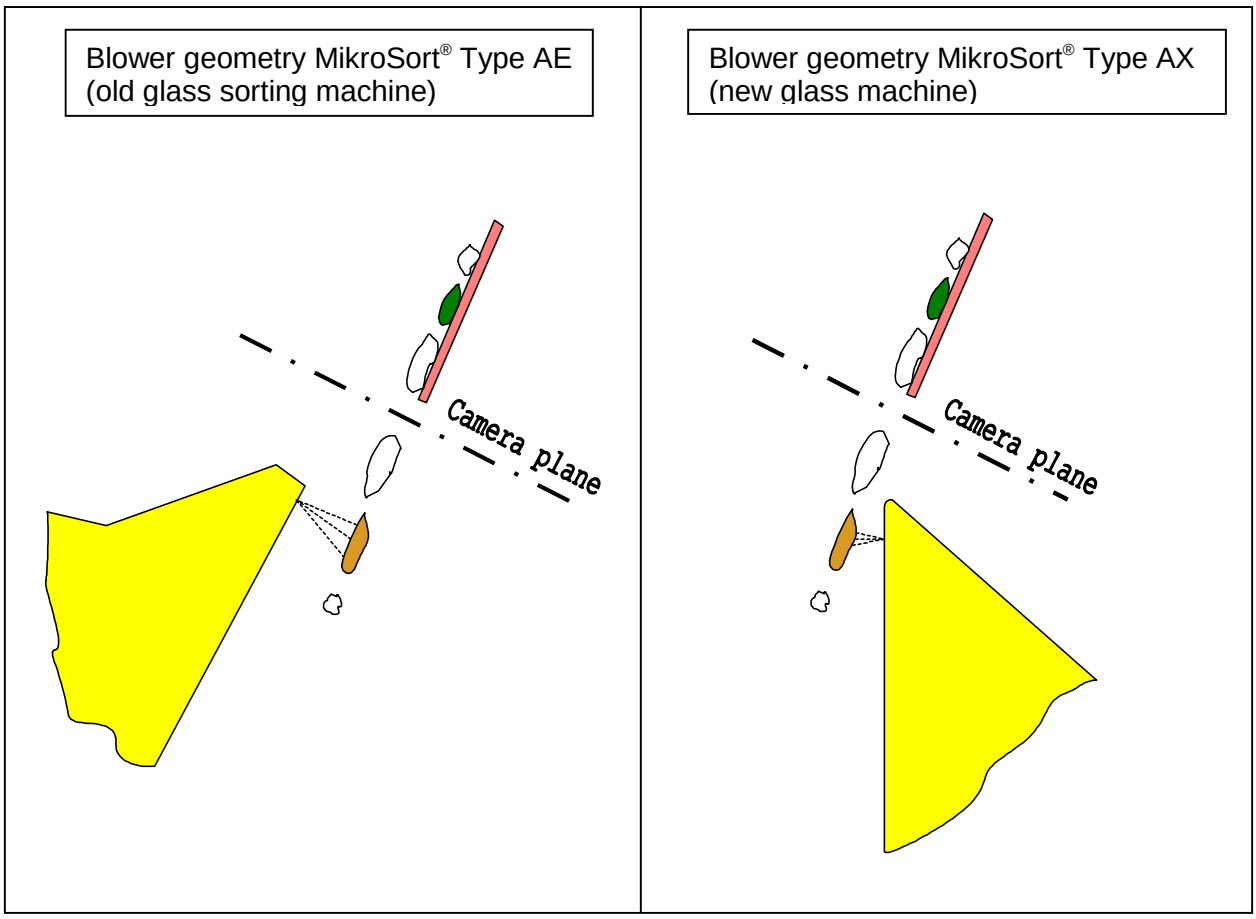
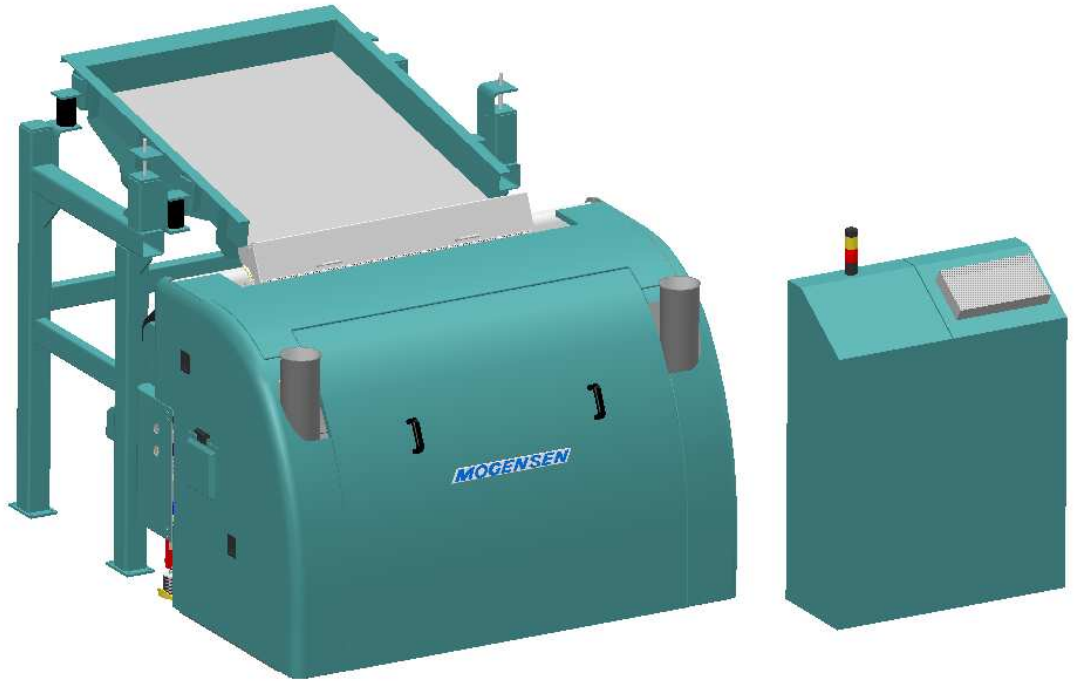
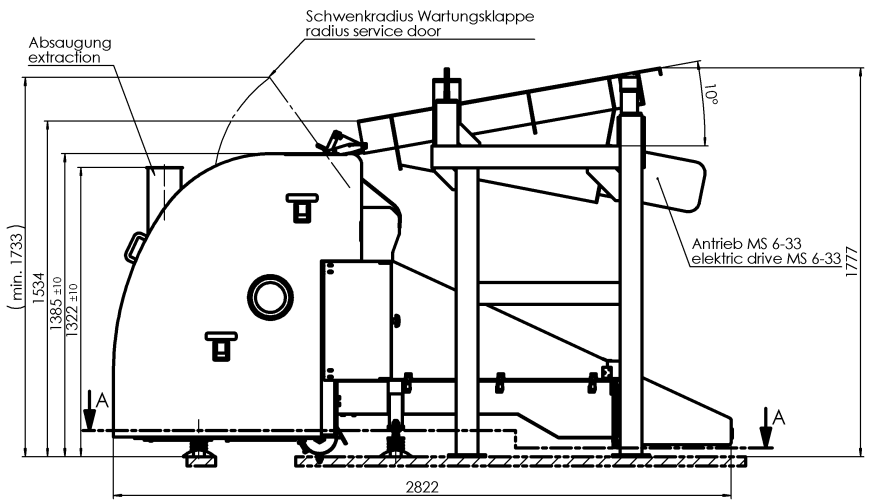


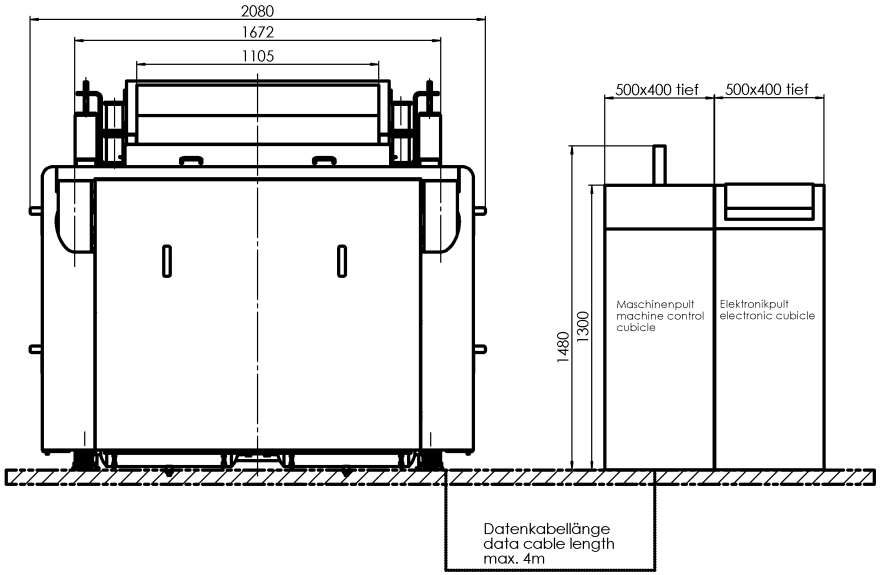
Fig. 1: Comparison of blower geometry for models AE and AX

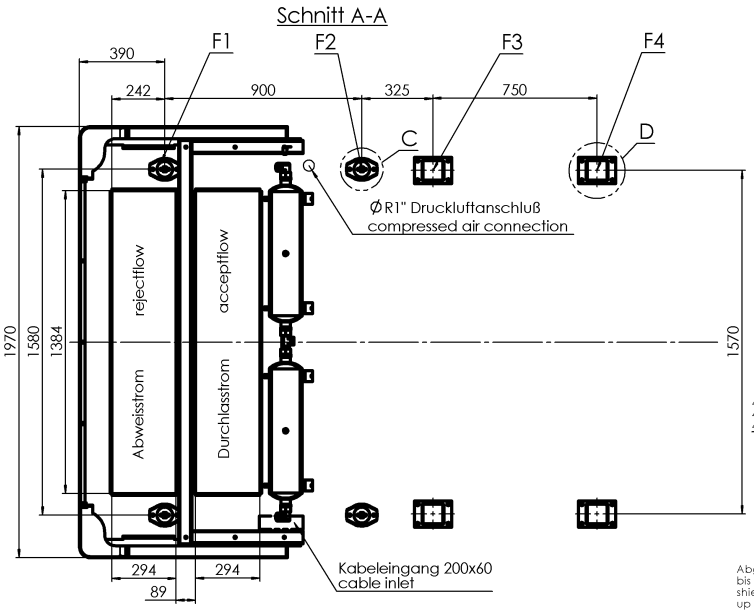
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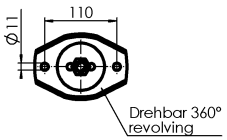
MikroSort® type AX 1213

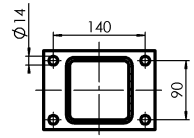










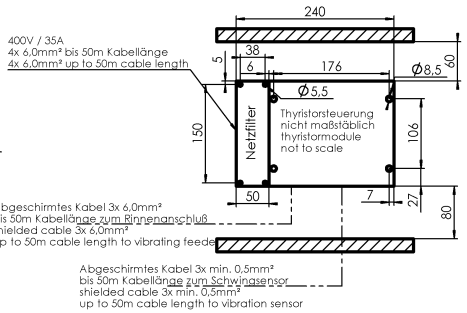


Drawing only for information!!



Betriebsbelastung Operation load Charge en service AX 1213			Betriebsbelastung Operation load Charge en service MR 1112 + Gestell		
	stat. (N)	dyn. (N)		stat. (N)	dyn. (N)
F1 vertikal	2760	±	F3 vertikal	2100	± 50
horizontal		±	horizontal		± 20
F2 vertikal	2730	±	F4 vertikal	2210	± 50
horizontal		±	horizontal		± 20
			Frequenz, Frequency, Fréquence 50 Hz		
Gewicht, Weigh, Poids ca. 1120 kg			Gewicht, Weigh, Poids ca. 495 kg		
1kp = 9,81N 1N = 0,102kp			1kp = 9,81N 1N = 0,102kp		

Bei Montage der Tyristersteuerung (JT14-26) im kundenseitigen Schaltschrank montiert.
Thyristormodule (JT14-26) installed in customer control cubicle



Index	Änderung	Datum	Name	Index	Änderung	Datum	Name

Diese Zeichnung darf ohne unsere Genehmigung weder vervielfältigt noch Dritten oder dem Wettbewerb zugänglich gemacht werden.

	Datum	Name
Gez.	05.11.02	Grüner
Gepr.		
Norm.		

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Maßstab:
Benennung: MikroSort
AX 1213 & MR 1112
Kom. Nr. MR1112: D5650
AX1213: D5651
Ersatz für
Ersetzt durch
Teile Nr.
Zeichnung Nr. 168.03M.AX1213
Bl. / von 1 / 1

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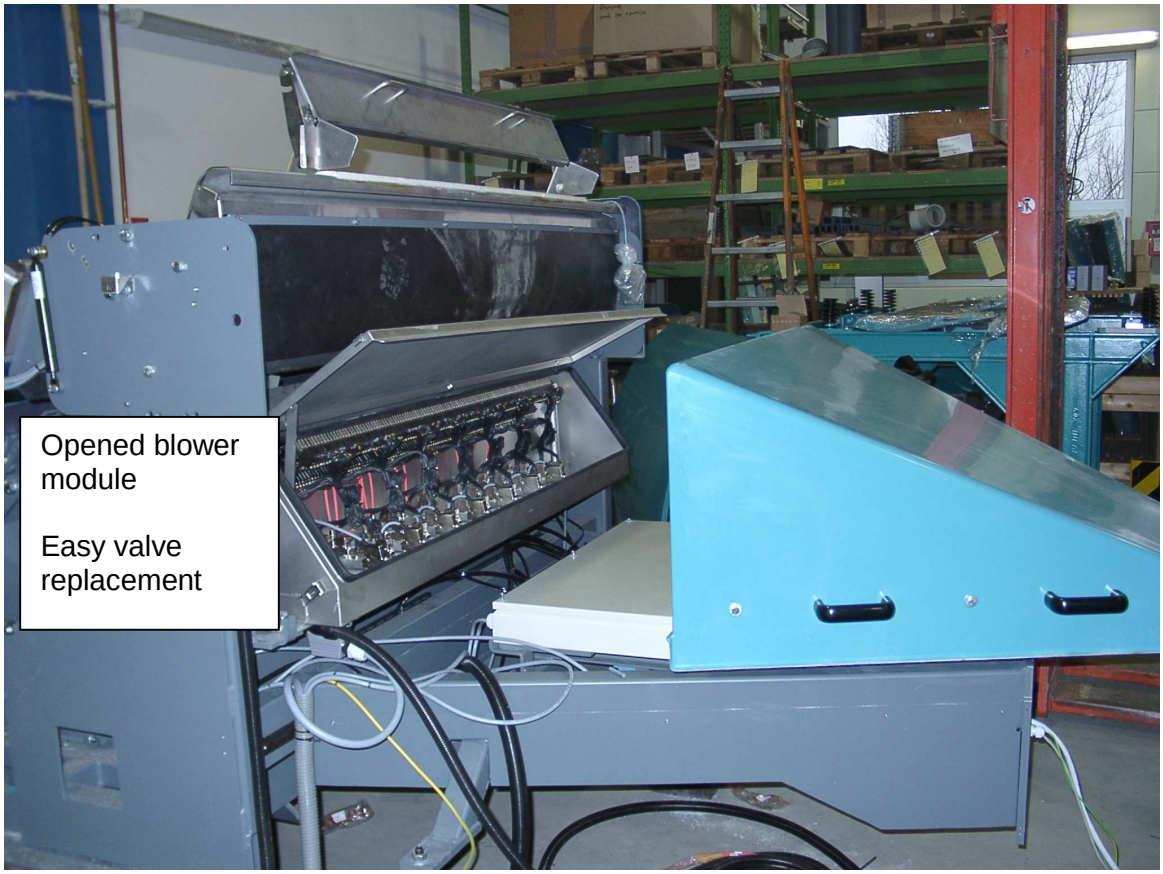
Sorting of recycling glass 5 - 60 mm



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Type AX12xx, one-sided view particle sizes 5 - 40 mm, glass 5 - 60 mm





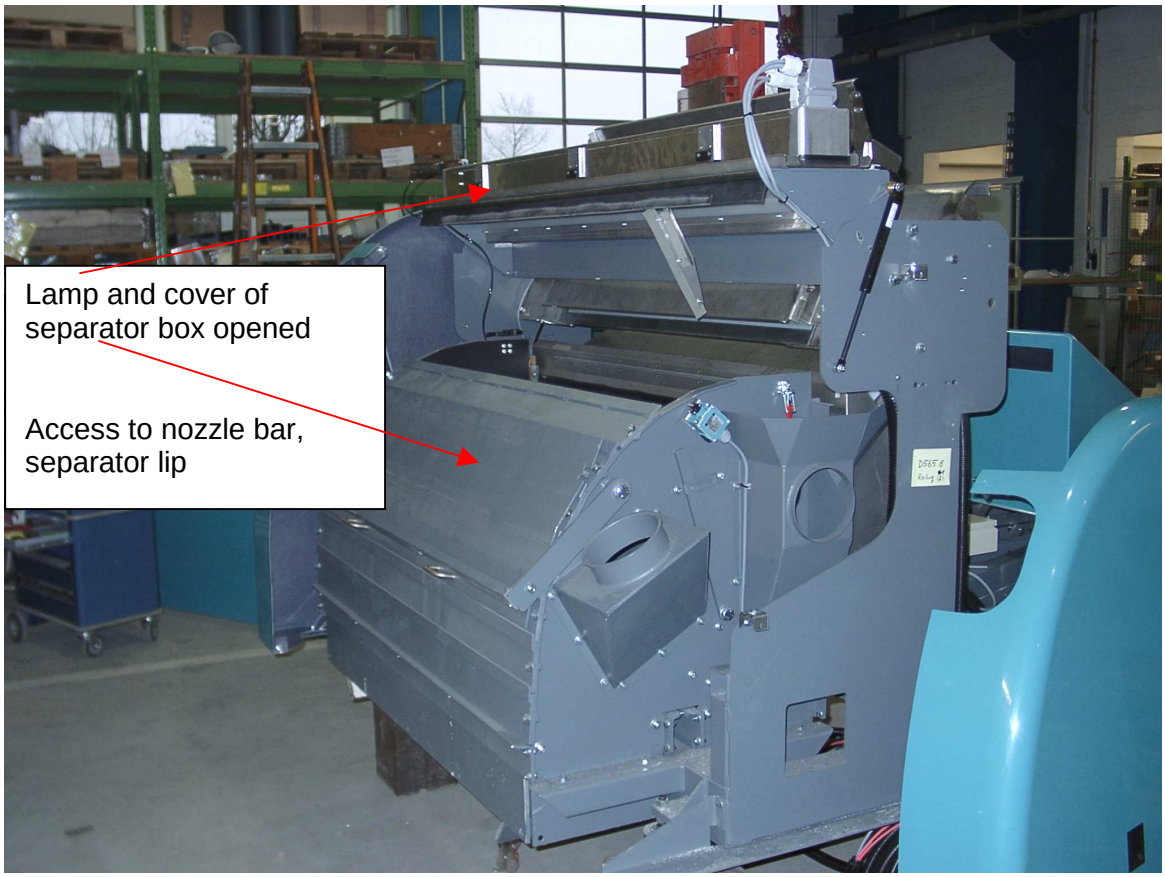
Opened blower module

Easy valve replacement



Anti-wear protection replaceable in segments


Lamp
open for tube
replacement


Lamp and cover of
separator box opened
Access to nozzle bar,
separator lip

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Glasrecycling Nord plant



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Machine in use



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Sorting of heavily soiled feed materials





MikroSort® AX on ground frame

The displayed MikroSort® AX 1225 is mounted on the frame with the conveyor and the control cabinet, completely installed mechanically and electrically. the complete unit can be moved with a forklift. Due to this, the machine can be shifted to various points and taken into service in very short time. The customer may test the machine for a certain period of time, covered by a lease contract. Larger quantities may be sorted and initial operational experience may be gained.





PERMANENT MAGNETIC BELT SEPARATOR

L 0452 e

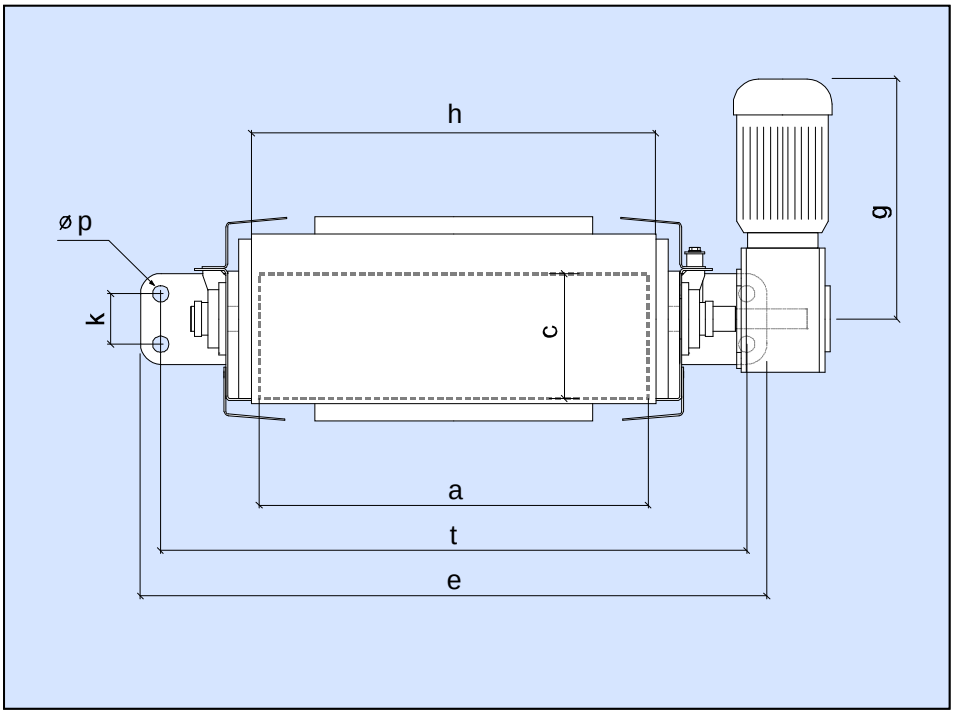
Recovery Of Valuable Raw Materials - Protection Of Machines And Plants



Technology Full Of Attraction

wagner magnete

L 0452 e



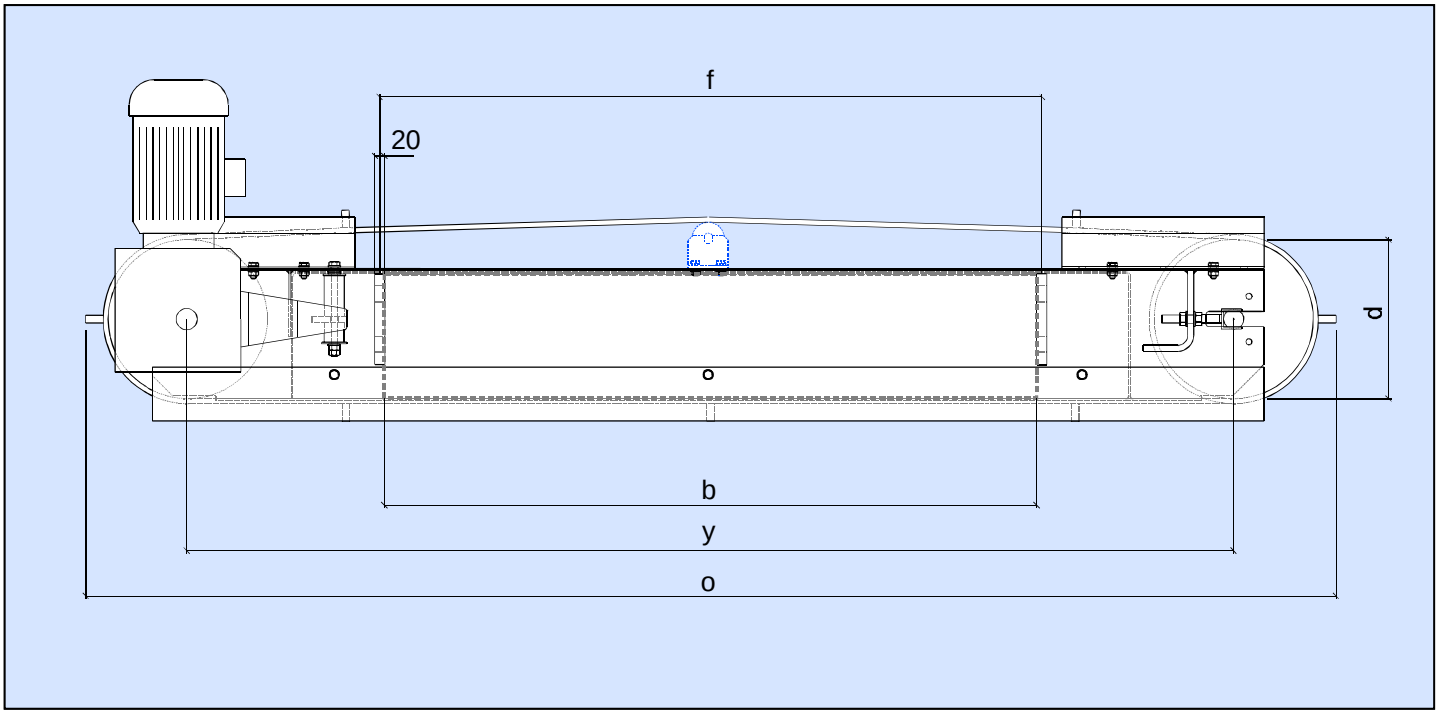
Dimensioning notes:
Iron parts needs to be in a magnetic field for at least 0.4 to 0.5 seconds in order to be magnetized and pulled out of the material flow. The size of the magnet block must be selected accordingly.

When separators are mounted across the conveyor the magnet length must be at least the width of the conveyor belt. In-line mounted magnets must be wide enough that the entire width of the belt is covered. Special designs are possible for special uses.

DIMENSIONS AND TECHNICAL DATA

Type	belt width mm		working distance mm	weight kg	drive kW	overall dimensions		
	across	inline				length	width	height
0452-40/50-200	500	400	120-160	440	1,5	1450	1000	600
0452-40/70-200	650	400	120-160	540	1,5	1650	1000	600
0452-40/90-200	800	400	120-160	640	1,5	1850	1000	600
0452-40/110-200	1000	400	120-160	740	1,5	2050	1000	600
0452-60/50-200	500	650	170-220	640	1,5	1450	1200	600
0452-60/70-200	650	650	170-220	780	1,5	1650	1200	600
0452-60/90-250	800	650	170-220	920	1,5	1850	1200	600
0452-60/110-250	1000	650	170-220	1060	1,5	2050	1200	600
0452-60/130-250	1200	650	170-220	1220	1,5	2250	1200	600
0452-75/70-250	650	800	220-270	1200	2,2	1925	1380	700
0452-75/90-250	800	800	220-270	1340	2,2	2125	1380	700
0452-75/110-250	1000	800	220-270	1660	2,2	2325	1380	700
0452-75/130-250	1200	800	220-270	1800	2,2	2525	1380	700
0452-75/150-250	1400	800	220-270	1940	2,2	2725	1380	700
0452-95/70-250	650	1000	240-320	1430	2,2	1975	1580	700
0452-95/90-250	800	1000	240-320	1650	2,2	2175	1580	700
0452-95/110-250	1000	1000	240-320	1870	2,2	2375	1580	700
0452-95/130-250	1200	1000	240-320	2100	2,2	2575	1580	700
0452-95/150-250	1400	1000	240-320	2330	2,2	2775	1580	700
0452-115/90-250	800	1200	260-350	2270	3,0	2175	1780	700
0452-115/110-250	1000	1200	260-350	2250	3,0	2375	1780	700
0452-115/130-250	1200	1200	260-350	2570	3,0	2575	1780	700
0452-115/150-250	1400	1200	260-350	2900	3,0	2775	1780	700
0452-130/110-250	1000	1400	280-370	2580	3,0	2375	1980	700
0452-130/130-250	1200	1400	280-370	2950	3,0	2575	1980	700
0452-130/150-250	1400	1400	280-370	3340	3,0	2775	1980	700
0452-130/170-250	1600	1400	280-370	3750	3,0	2975	1980	700
0452-150/130-250	1200	1600	300-390	3400	3,0	2575	2180	700
0452-150/150-250	1400	1600	300-390	3840	3,0	2775	2180	700
0452-150/170-250	1600	1600	300-390	4310	3,0	2975	2180	700
0452-150/190-250	1800	1600	300-390	4810	3,0	3175	2180	700

We would be more than happy to help you select the right magnet separator for your purposes. Please give us a call or send us a fax or e-mail. A corresponding data sheet that can be downloaded and filled in can be found at: www.wagner-magnete.de



DIMENSIONS

magnet dimensions												
a	b	c	d	e	f	g	h	k	o	p	t	y
420	500	200	215	896	480	440	450	85	1450	24	838	1115
420	700	200	215	896	680	440	450	85	1650	24	838	1315
420	900	200	215	896	880	440	450	85	1850	24	838	1515
420	1100	200	215	896	1080	440	450	85	2050	24	838	1715
620	500	200	215	1046	480	440	650	85	1450	24	988	1115
620	700	200	215	1046	680	440	650	85	1650	24	988	1315
620	900	200	215	1046	880	440	650	85	1850	24	988	1515
620	1100	200	215	1046	1080	440	650	85	2050	24	988	1715
620	1300	200	215	1046	1280	440	650	85	2250	24	988	1915
770	700	250	315	1240	710	500	800	100	1925	32	1160	1470
770	900	250	315	1240	910	500	800	100	2125	32	1160	1670
770	1100	250	315	1240	1110	500	800	100	2325	32	1160	1870
770	1300	250	315	1240	1310	500	800	100	2525	32	1160	2070
770	1500	250	315	1240	1510	500	800	100	2725	32	1160	2270
970	700	250	315	1440	710	500	1000	100	1975	32	1360	1470
970	900	250	315	1440	910	500	1000	100	2175	32	1360	1670
970	1100	250	315	1440	1110	500	1000	100	2375	32	1360	1870
970	1300	250	315	1440	1310	500	1000	100	2575	32	1360	2070
970	1500	250	315	1440	1510	500	1000	100	2775	32	1360	2270
1170	900	250	315	1640	910	500	1200	100	2175	32	1560	1670
1170	1100	250	315	1640	1110	500	1200	100	2375	32	1560	1870
1170	1300	250	315	1640	1310	500	1200	100	2575	32	1560	2070
1170	1500	250	315	1640	1510	500	1200	100	2775	32	1560	2270
1320	1100	250	315	1840	1110	500	1400	100	2375	32	1760	1870
1320	1300	250	315	1840	1310	500	1400	100	2575	32	1760	2070
1320	1500	250	315	1840	1510	500	1400	100	2775	32	1760	2270
1320	1700	250	315	1840	1710	500	1400	100	2975	32	1760	2470
1520	1100	250	315	2040	1310	500	1600	100	2575	32	1960	2070
1520	1300	250	315	2040	1510	500	1600	100	2775	32	1960	2270
1520	1500	250	315	2040	1710	500	1600	100	2975	32	1960	2470
1520	1700	250	315	2040	1910	500	1600	100	3175	32	1960	2670

Ex The non-ferrous separators can also be delivered as devices protected against explosions according to ATEX 95 (RL94/9). For additional information, please see our I Ex-1 leaflet!

L 0452 e

PERMANENT MAGNETIC BELT SEPARATOR

+ *Nonmagnetic frame*
+ *Two-pole magnetic system*
+ *Shielded magnet body*
+ *Nonmagnetic protection devices*
+ *Bearing protectors*
+ *Optimized torque bearing*

The best in the long run

The proven concept of a non-magnetic frame construction made of laser cut manganese hard steel sheet metal reliably prevents ferrous items from sticking to the magnets. The sealed magnet body is shielded over a large area and empty cavities are closed on all sides so that foreign objects cannot get into the inside of the conveyor belt area. This reduces wear and minimizes cleaning. A protective panel that extends far into the pole face protects the edges of the discharge belt and prevents ferrous items from being pulled under the belt. In general, our magnets are designed as two pole systems because they are much better than single pole systems. Compact ferrous items are attracted with a stronger force with two pole systems. Suspension equipment is not magnetized because the magnetic field only works in a downward direction.

Installation notes

The distance between a magnet and the conveyor should be as small as possible because the magnetic force decreases exponentially over distance. At the same time, it is important to make sure that the distance is at least large enough so that the studs on the discharge belt can securely remove all attracted ferrous items from the material flow. When removing items crosswise, we recommend a low trough formed conveyor belt. This improves ferrous item removal and prevents damage caused by wedging large ferrous items between the magnet and conveyor equipment. If long or bulky ferrous items are included in the material on the conveyor or the transport speed of the material on the conveyor exceeds 3 m/s, we recommend using the in-line arrangement.

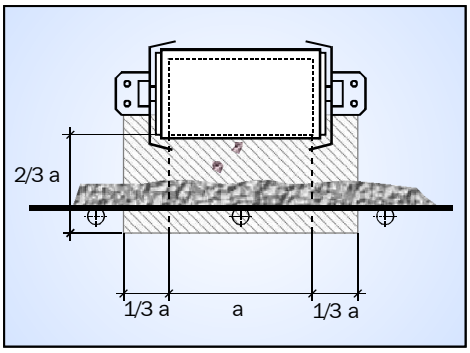
Driving motor possibilities:
G1: geared motor Flender
G2: geared motor SEW
G6: geared motor NORD
H1: hydraulic drive with clutch
H3: hydraulic drive without clutch
T7: drum motor drive Van der Graaf

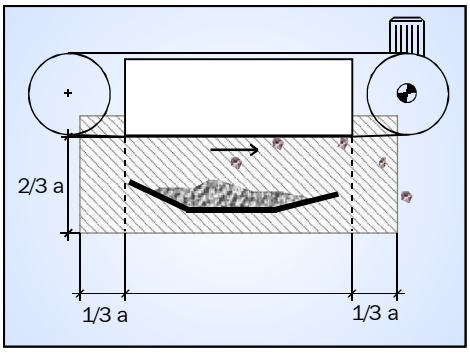
K: with temperature sensor

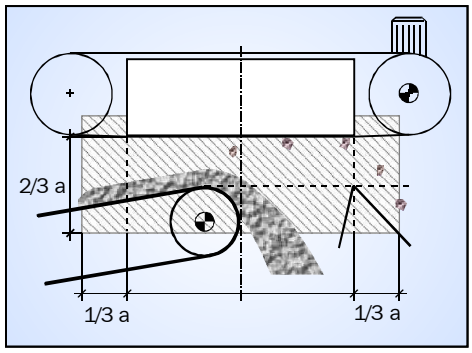
Available discharge belts:
BF: oil resistant belt
BV: improved belt
BR: belt with REMA coating
BH: heat resistant belt
BS: belt with special studs
BW: belt with 35/60 mm high studs

Special designs can be manufactured.

Accessories:
Off-track monitor
Suspension devices
Zero-speed monitor
Special protection devices
Nonmagnetic conveyor rollers







Non-magnetic area

In the hatched area, no construction parts that can be magnetized are permitted, otherwise the effectiveness of the magnets will be reduced. Carrier rollers and material guides must be removed or made of material that cannot be magnetized. When using the in-line Arrangement, the head roller must be non-magnetic

Our company has been DIN EN ISO 9001 certified since 1995. All magnet separators are manufactured and tested according to DIN VDE 0850 and correspond to CE and EMC regulations

NON-FERROUS SEPARATOR

L 0428/1 e

Recovery Of Valuable Raw Materials - Protection Of Machines And Plants



Technology Full Of Attraction

wagner magnete

L 0428/1 e

NON-FERROUS SEPARATOR

+ *Integrated ferrous separator*
+ *Protection against jamming*
+ *Wear resisting motor brake*
+ *New ceramic rotor shield*
+ *Excellent interior sealing*
+ *Large service doors*



WAGNER MAGNETE is one of the first companies to concentrate on the area of non-ferrous metal separation (metals such as aluminum and copper) in addition to well-established conventional ferrous item separation. We are gaining a great deal of experience that can be implemented during the development of the new 0428/1 series. Extensive tests and new manufacturing possibilities led to a new concept that has clear advantages for our customers, especially with regard to durability, operating security and serviceability:

A separator for remaining ferrous items is integrated in the standard device. For customers, this does away with the added expense of separating any remaining ferrous items (< 50 mm) at another location that causes waste. Use of magnetic conveyor pulleys or magnet drums before the non-ferrous separator is no longer necessary. The material on the conveyor is fed to the non-ferrous separator with a vibratory feeder; remaining ferrous items are separated from the material flow before eddy current separation actually takes place. Any remaining ferrous items can be discharged or feeded to the material goods after the non-ferrous separator as desired. The special ceramic coating on the magnet rotor, together with the extremely detailed interior sealing and high-quality belt materials, guarantee a high level of durability.

The automatically opening separation edge prevents excessively long materials from blocking or wedging against the separation edge. In this way, the separation edge can be set to the best position for operation. The separation edge can be adjusted horizontally and vertically in a wide range inside of the discharge hood. Large inspection doors make it easy to carry out adjustment and service work inside of the discharge hood. On WAGNER non-ferrous separators, speed control for the magnet rotor is handled using powerful frequency invertors with excellent dynamic properties.



If there is a power failure or the E-stop is activated, maximum braking torque is used to quickly reduce the magnet rotor to a low speed that is no longer dangerous. This modern and reliable rotor brake is not subject to wear and is maintenance-free.

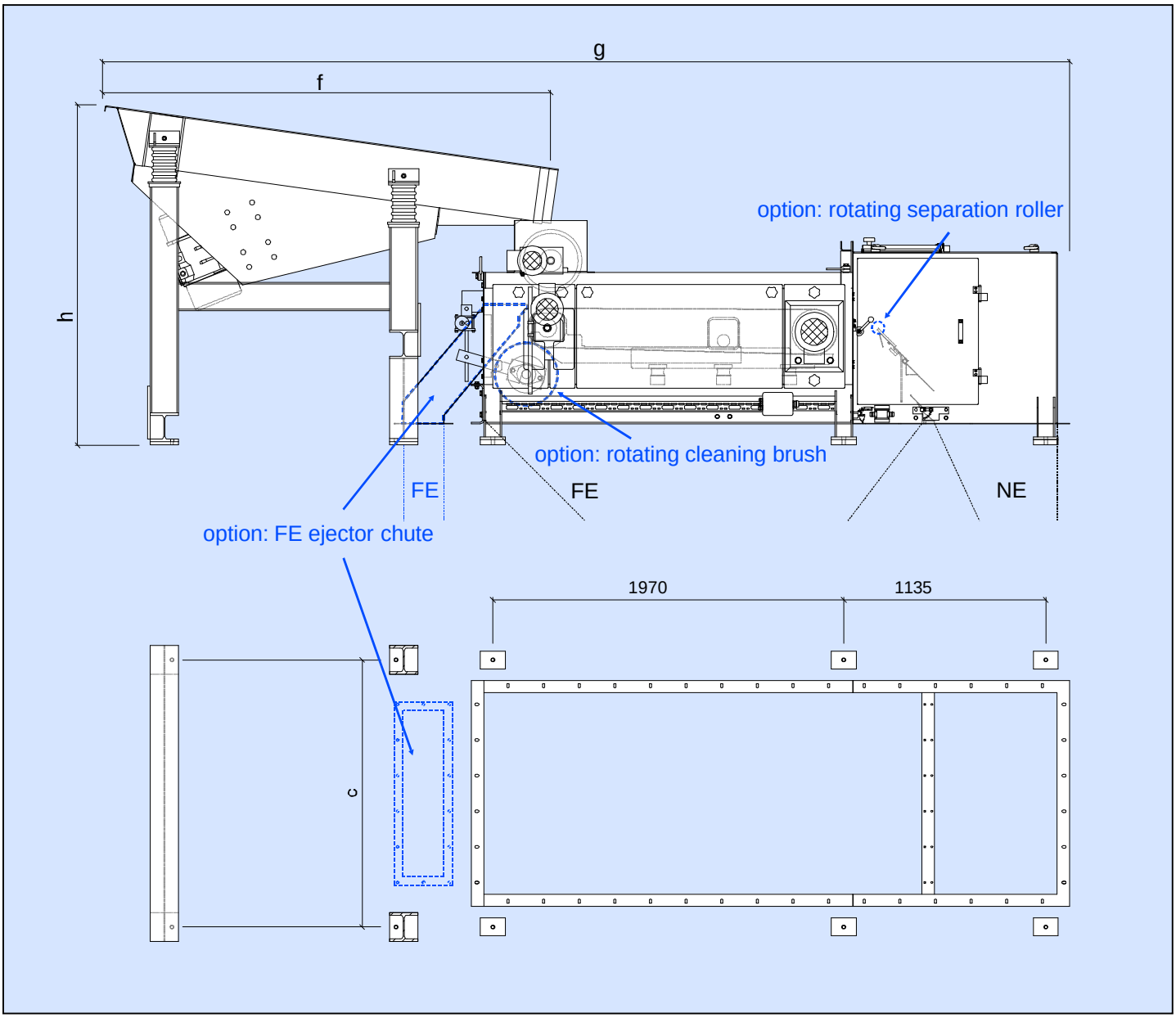
DIMENSIONS AND TECHNICAL DATA

Type	working width mm	throughput		power kW	weight kg	overall dimensions		
		typ. cbm/h	max. cbm/h			length	width	height
0428/1-25/40/6	400	15-20	25-30	5,5	1300	3360	1450	1260
0428/1-25/60/6	600	25-35	40-45	5,5	1500	3360	1650	1260
0428/1-25/90/6	900	40-50	60-65	5,5	1700	3360	1950	1260
0428/1-25/120/6	1200	60-75	80-85	5,5	1900	3360	2250	1260
0428/1-25/150/6	1500	75-90	100-110	5,5	2100	3360	2550	1260
0428/1-25/200/6	2000	100-120	130-150	7,5	2300	3360	3050	1260

We would be more than happy to help you select the right non-ferrous separator for your purposes. Please give us a call or send us a fax or e-mail. A corresponding data sheet that can be downloaded and filled in can be found at: www.wagner-magnete.de

Many different types and options are possible

Depending on the area of use, the 0428/1 series can be delivered in dust-protected design with a cover over the material on the conveyor, a rotating separating roller, an additional ejector chute for remaining ferrous items and an automatic, rotating brush for cleaning the belt. Because the material on the conveyor should always be evenly dosed using the vibratory feeder, control of the feeder and the respective brake device are integrated in the controller for the non-ferrous separator. Many special functions can be added to the controller. Integration in a complex control system via Profibus for example, allows diverse open and closed loop control possibilities.



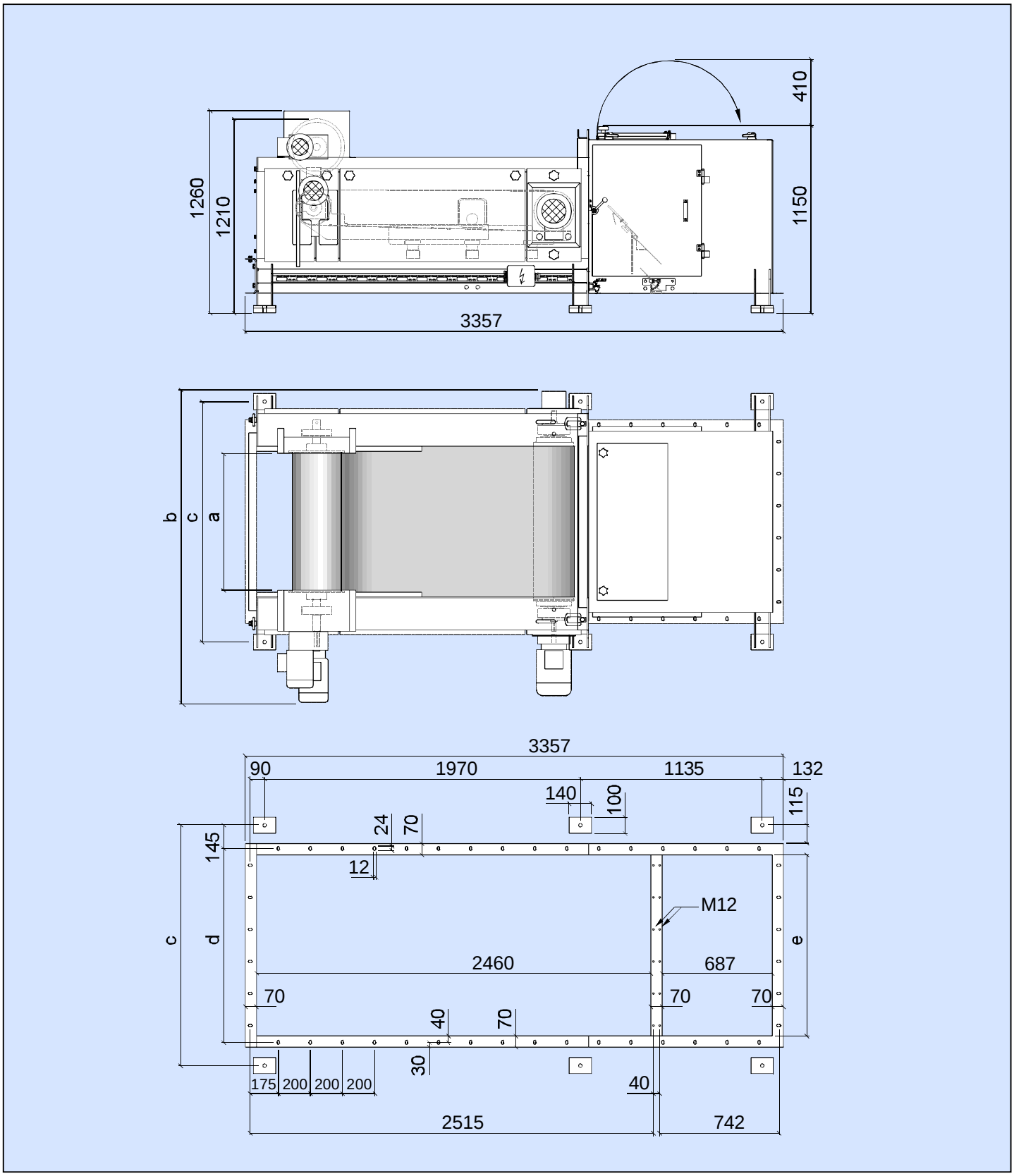
DIMENSIONS								
Type	working width a mm	b mm	c mm	d mm	e mm	f mm	g mm	h mm
0428/1-25/40/6	400	1445	1000	710	630	2000	5050	1950
0428/1-25/60/6	600	1645	1200	910	830	2000	5050	1950
0428/1-25/90/6	900	1945	1500	1210	1130	2000	5050	1950
0428/1-25/120/6	1200	2245	1800	1510	1430	2000	5050	1950
0428/1-25/150/6	1500	2545	2100	1810	1730	2000	5050	1950
0428/1-25/200/6	2000	3045	2600	2310	2230	3000	6050	2050

Ex

The non-ferrous separators can also be delivered as devices protected against explosions according to ATEX 95 (RL94/9). For additional information, please see our I Ex-1 leaflet!

Standard design

The open type includes a strong neodymium magnet drum with material feeds on the side for removing remaining ferrous items, a special wear-resistant PU conveyor belt, a magnet rotor with ceramic rotor coating as well as an discharge hood with horizontally and vertically adjustable separation edge. Within the device, remaining ferrous items are moved past the eddy current separator and placed back in the material flow. The non-ferrous separator is delivered ready for operation with controller connected. The length of the connection cable between the machine and the wall-mounted switching cabinet is five meters. All device functions can be checked and controlled via a touch screen.



We reserve the right to make changes to all measurements and technical data because of constructive revisions. Please request our current drawings as needed for actual use.

Non-ferrous separation using the eddy current technique

Operation of the non-ferrous separator is based on the induction principle. At a high frequency, a fast rotating magnet pole system induces eddy currents in the conductive non-ferrous metal parts. This creates magnetic fields on them with the same polarity as the magnet rotor, which causes a buildup of the repelling “Lorentz force”. This force works against gravity. Together with the force of inertia, this causes the items to be thrown out of the material flow. The distance they are thrown is mostly determined by the size and form of the item in addition to the specific material properties. Large items are thrown further than small ones. Flat items are subject to higher induction per volume unit than thick items. Wire formed items only create very small eddy currents

Comparison: material parameters

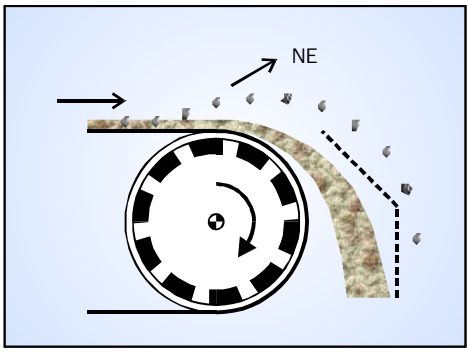
Aluminium	13,0
Magnesium	12,2
Copper	6,3
Silver	6,0
Zinc	2,3
Brass, tin	1,5
Lead	0,5
Stainless steel	0,1

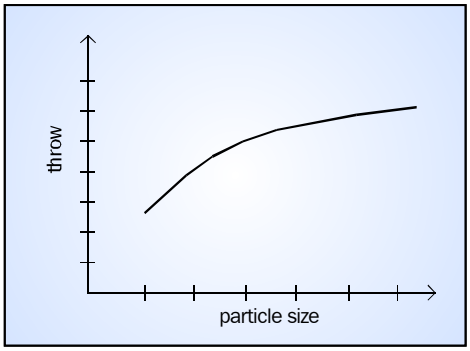
Ability to separate non-ferrous metals

The strength of the induced currents and therefore their repelling forces depends on the specific electrical conductivity of the metal. The gravitational force depends on the specific weight. Therefore the quotient of these two values (=material parameter) is a measurement of the ability to be separated. Aluminum, magnesium, copper, aluminum alloys and silver can be separated easily. The relationship of the values is not so good for zinc, brass and tin. Stainless steel, many steel alloys and lead cannot be separated.

Good material feed = effective sorting

All materials lying over non-ferrous metals that can be separated make it difficult to eject items or prevent ejection from the material flow. For this reason, the basic requirement for optimal sorting and minimal obstruction of material goods is having a single layer. We recommend that the material on the conveyor is well distributed over the entire working width and fed to the eddy current separator with a vibratory feeder. When loading the vibratory feeder, make sure that the material is placed over the entire width of the feeder.



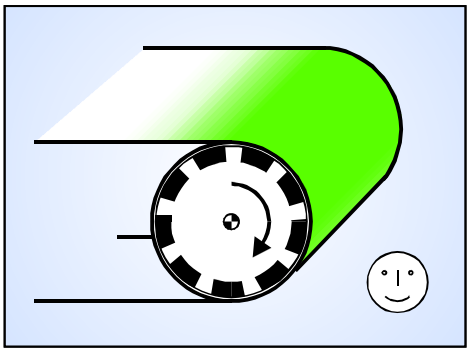


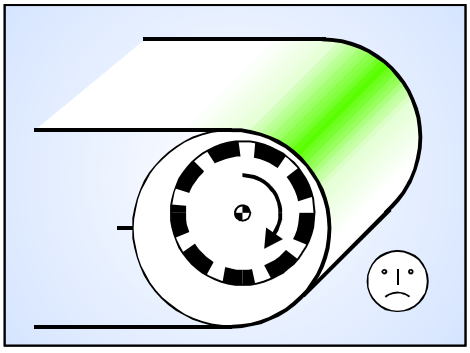
Important: Optimal material condition

Eddy current separation can achieve very high levels of separation if the material on the conveyor is dry, free of ferrous items and sized as closely as possible. The ideal size ranges from 30 to 60 mm edge length. If the material is poorly sized, the gap between the rotor and separation edge must be set according to the largest size. In this case only the metal parts above average size will be ejected over the separation edge. Additionally, poor sizing also increases obstruction of material goods.

Maximum level of separation is only possible with full rotors

Non-ferrous metals with a low specific electrical conductivity are only subject to a low acceleration force in the magnetic field. With concentric full rotors, the reach of the magnetic field across the surface of the material on the conveyor is much larger than with eccentric systems. The cause of this is the exponential relationship between the magnetic field strength and the distance to the magnet system. This distance is a minimum over the entire angle of contact for the material on the conveyor just at concentric full rotors. For this reason, the material on the conveyor is subject to the magnetic field much longer with full rotor systems than with eccentric systems. In spite of the relatively low acceleration forces, even less conductive metal items achieve a higher ejection speed with a full rotor because of the long exposure time. The images next to this text show the extended magnetic field of the WAGNER MAGNETE concentric full rotor (top) and the magnetic field of an eccentric rotor system (bottom). It is clear that the magnetic field strength is at its maximum just along a line running across the direction of the conveyor.





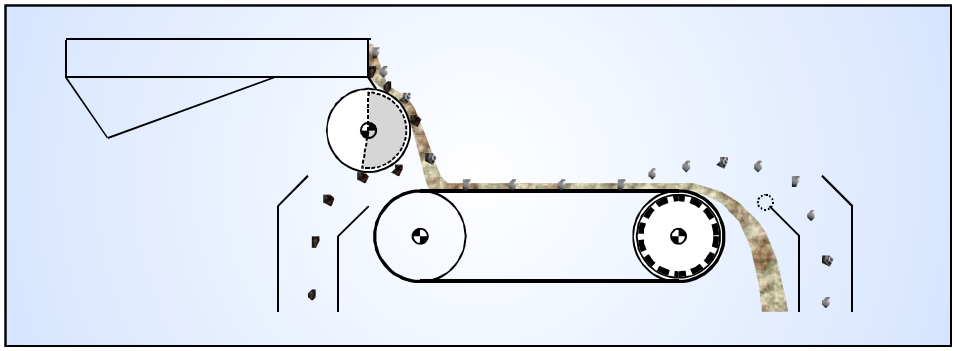
L 0428/1 e

NON-FERROUS SEPARATOR

+ *Integrated ferrous separator*
+ *Protection against jamming*
+ *Wear resisting motor brake*
+ *New ceramic rotor shield*
+ *Excellent interior sealing*
+ *Large service doors*

Eddy current technology, a real winner

During further development of the WAGNER non-ferrous separator, we have implemented ground-breaking techniques, especially to significantly increase operating security. In addition to utilizing the most modern materials to increase resistance to wear and the development of an automatically opening separation edge, the integration of an effective separator for removing remaining ferrous items are the most important new feature:
A strong neodymium magnet drum on the standard device provides very good separation of any ferrous items that are remaining in the material to be processed. This significantly increases the lifespan of the downstream eddy current separator without having to sacrifice the many advantages of the full rotor. The magnetic field of the full rotor has a much further reach across the surface of the material on the conveyor belt than other



New ceramic rotor shield

To protect the magnet rotor shield from wear, we have developed a new method for applying a special ceramic composite coating onto the shield.
This procedure provides a high level of protection against wear and breakage.

Excellent interior sealing

Well fitting brushes and an extra high side walls prevent parts of the material on the conveyor belt from going over the edge of the conveyor into the side areas of the device.
A very good interior seal is provided to further protect the device from items coming in from the sides and from dust collecting in the interior. Large service covers allow the interior sealing to be opened on both sides of the device so that service work can be completed easily.





Extremely durable WAGNER conveyor belts

We have developed extremely durable PU conveyor belts especially for our non-ferrous separator. As compared to standard plastic or rubber belts, our special belts are up to six times more durable.

Changing belts and all work on the magnet rotor can be done easily and efficiently from the sides of the device. The side covers can be easily removed throughout the entire length of the machine.

Standard design:
Open type (non-covered conveyor)
Axle base 1500mm
Belt speed 0,5 - 2,0 m/s
Rotor speed ca. 3000 U/min
Mains voltage 400V 50 Hz
SPS Siemens S7-200
Operation via touchscreen
Electronic, maintenance-free rotor brake also in case of power failure

Driving motors:
Rotor: standard motor NORD 4,0 kW
Belt: geared motor NORD 1,5 kW
Drum: geared motor NORD 0,55 kW

Separating edge: drummotor 0,37 kW

Inverters:
Toshiba, NORD

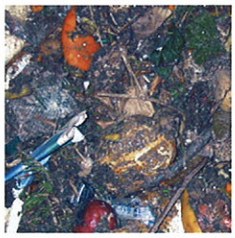
Options:
Rotating separation roller
Rotating brush for conveyor belt
Ejector chute for remaining FE
Covered (dust protected) design

Feeder control
Profibus interface
Motors with maintainance switch

SPALECK® since 1869
conveying and separation technology

Produkt product

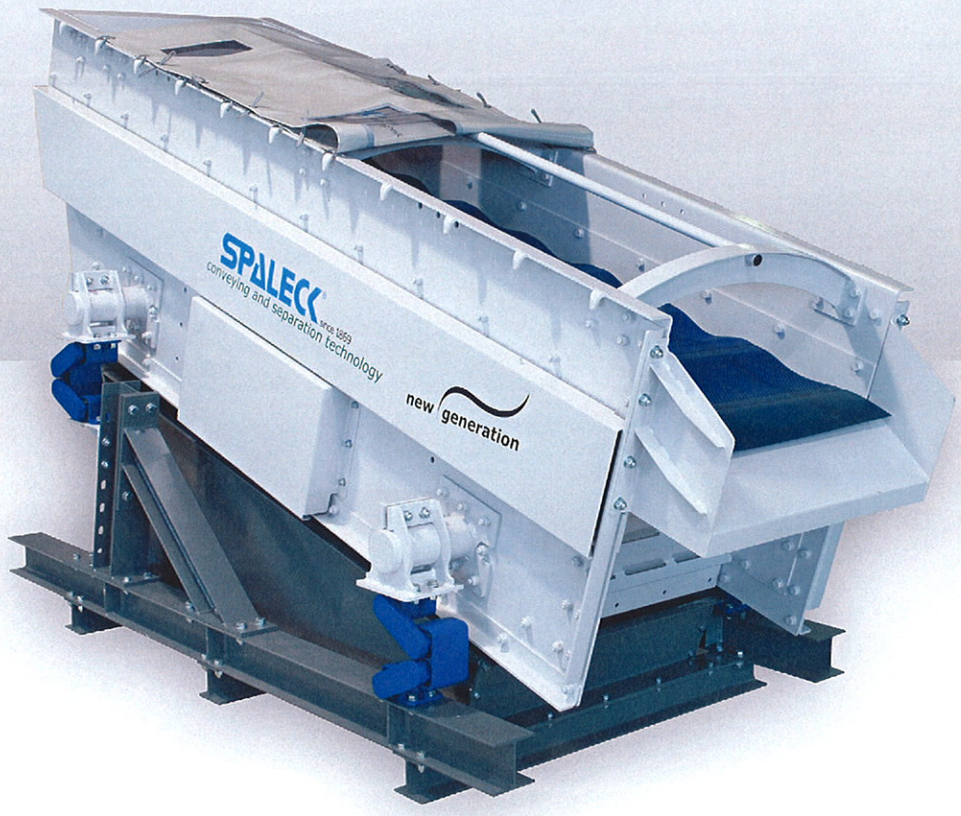




Product

Flip flop screen

The solution for screening recycling materials – without clogging



© Spaleck

Application

Screening of difficult, sticky or wet materials to an infinite variety of sizes

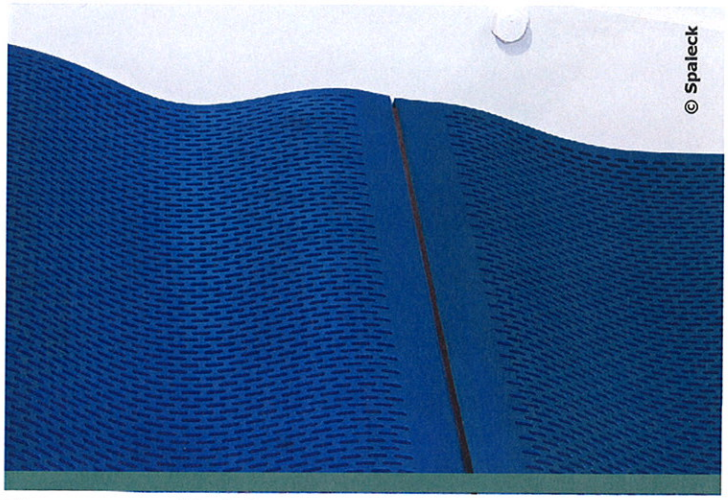
Material

Wet, moist, dry and mixed materials e.g. recycling and skip waste fines material, compost, aggregates, waste wood, timber..

Advantages

- Non blinding screens - less contamination
- Compact and modular construction
- Single or multi-deck construction
- Dynamic wear resistant screening mats allow for a fast changeover and efficient material flows - screwless mounted
- Low operating costs due to high acceleration on the screening mats ensure a self-cleaning effect
- Infinite adjustment of the vibrating parameters to match changing product properties / qualities

Produkt
product



Flip flop screen

The base frame is agitated by means of shaft and unbalance motor drive. The vibration is passed to the dynamic frame via thrust rubbers.

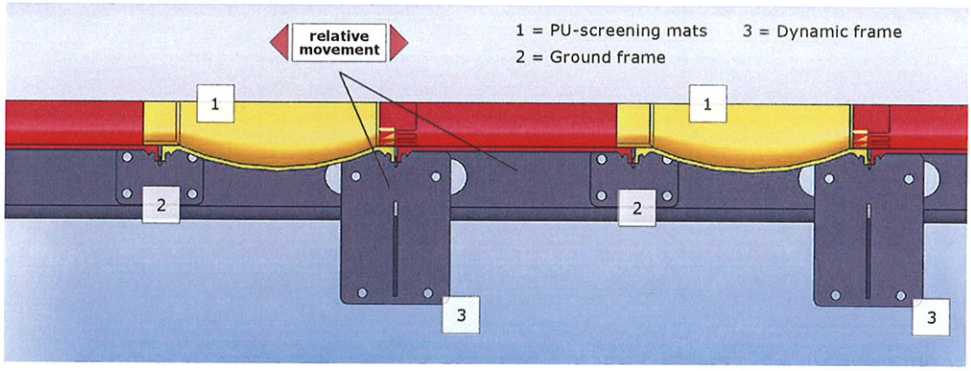
Fixed screening mats between the dynamic and the base frame are clamped and flexed by the two vibrating frames.

The modular and compact construction of the SPALECK flip flop screen ensures a wide acceptance into many different applications.

The easy assembly / changing of the screening mats, the extension to a multi-deck version and the dynamic stroke adaptation are further features.

The vibrating cover can be opened without tools. This ensures rapid and easy accessibility to the screening mats.

Functional principle:

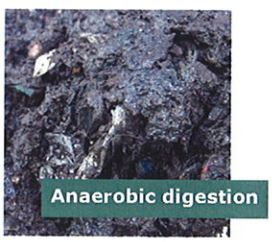


The relative movement of both screening frames creates a "trampoline effect" in the screening mats. The advantages of this effect are:

- High acceleration up to 50g in the screening mats
- Loosening-up of the product









Single-deck or multi-deck construction

Descriptions	B	L	Surface (m²)	Weight (kg)	Power (kw)
SEWS 800 x 3000	800	3000	2.4	1800	7.5
SEWS 800 x 4000	800	4000	3.2	2000	7.5
SEWS 1200 x 4000	1200	4000	4.8	2200	11
SEWS 1200 x 5000	1200	5000	6	2400	15
SEWS 1600 x 5000	1600	5000	8	2700	15
SEWS 1600 x 6500	1600	6000	9.6	2900	15
SEWS 2000 x 5000	2000	5000	10	4900	18.5
SEWS 2000 x 6000	2000	6000	12	5600	18.5
SEWS 2400 x 5000	2400	5000	12	5400	18.5
SEWS 2400 x 6000	2400	6000	14.4	6100	22.0
SEWS 2400 x 7000	2400	7000	16.8	6800	30

We reserve the right to make technical changes without notice.
The SPALECK screens can be customized to suit customer's individual requirements.

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SPALECK® since 1869
conveying and separation technology

progress through diversity

Datenblatt Spannwellensieb eng. (10-09) Misprint, technical changes and mistakes we reserve ourselves.

STADLER®

Engineering at its best



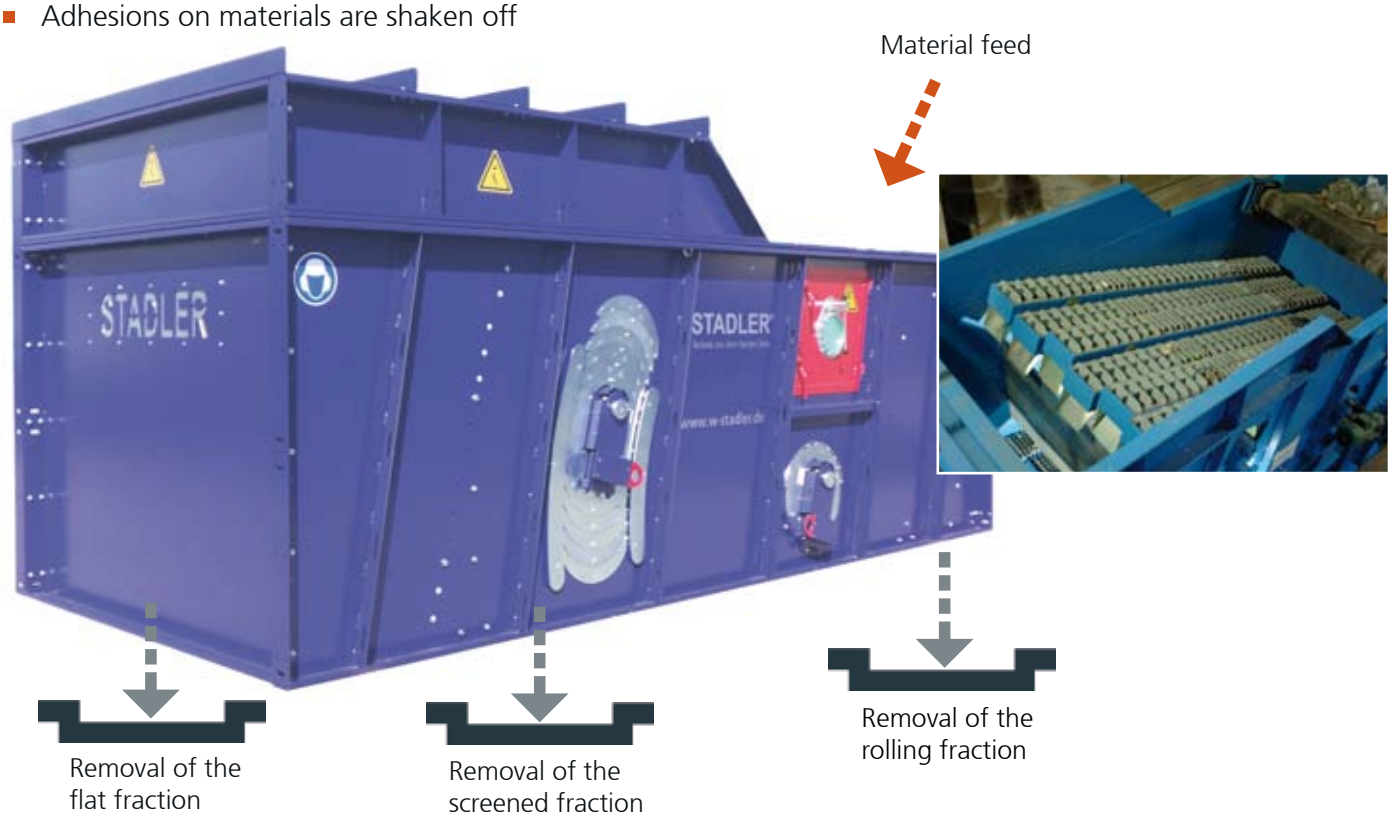
Ballistic separators

STADLER®

Capabilities:

Effective sorting of a material flow into various fractions

- Rolling and heavy materials, e.g. containers, plastic bottles, stones, wood, cans and other metal items
- Flat and light materials, e.g. films, textiles, paper, cardboard and fibrous products
- Screen fraction – various grain sizes can be separated depending on paddle perforation
- Gives an even distribution on NIR (near-infrared) acceleration belt positioned directly downstream
- Early removal of any glass present
- Adhesions on materials are shaken off



Areas of application

Sorting of various commingled materials into different fractions

Light packaging as well as mixed paper, film and containers	**STT2000**
Paper and cardboard separation	**PPK**
Industrial waste sorting	**STT5000**
Bulk waste processing	**STT5000**
Household waste systems – organic separation	**STT5000**
Construction and demolition	**STT5000**

Material recycling and energy recovery

STADLER®

Possible adjustments

Function and flexibility



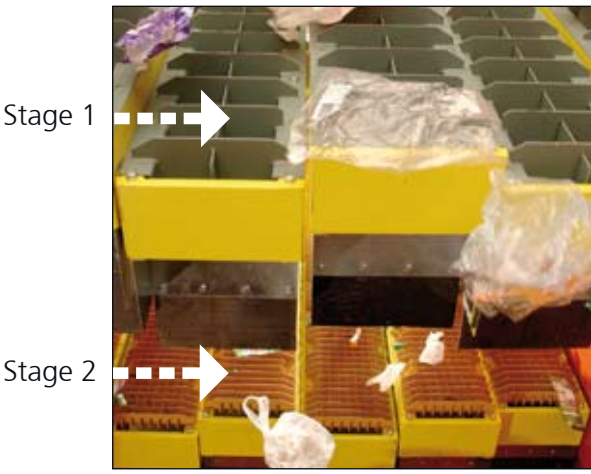
The basic principle:
The machine consists of a set of six paddles rotating offset against each other. The angle of the complete set of paddles can be adjusted manually (hydraulically with the STT5000). With the adjustment of the inclination of the paddle surface the ballistic separator can be adapted to suit the incoming material. The greater the angle of inclination of the screen surface the more the material will fall into the rolling fraction and the cleaner the flat fraction is and vice versa.

Variability

Multi-stage systems

The areas of application of the ballistic separator are very variable with quick and easy integration into a wide variety of large and small plants.

By combining several screen surfaces above or behind each other, the ballistic separator can cope with a wide variety of challenges. Higher material throughputs and exact degrees of separation can be easily achieved with multi-stage systems. Depending on requirements, various material flows can be produced.



Optimum separation quality with multi-stage screening processes!

Various screen size



Further fractions can be screened in various grain sizes according to customer's requirements. Organic material in domestic waste is separated by the oscillating movement and is screened off through the paddle perforations.

Model STT2000

STADLER®



Features

- One set of paddles per screen surface consisting of 6 screen paddles (4 mm steel plate with Hardox plating)
- The angle of the sets of paddles can be adjusted manually
- The standard screen perforation is square 45 x 45 mm
- The outer casing of the machine is made of 6 mm steel plate

Areas of application

Model	STT2000_101	STT2000_102	STT2000_103
Area of application	Light packaging, all mixed paper, film and containers	Light packaging, all mixed paper, film and containers	Light packaging, all mixed paper, film and containers
Task	Separation into 3 fractions (fine, flat and rolling)	Separation into 4 fractions (fine, flat large, flat small, rolling)	Separation into 4 fractions (fine, flat large, flat small, rolling)
Positioning in the system	Directly after the feeding hopper	Directly after the feeding hopper	Directly after the feeding hopper
Results	The rolling fraction contains containers (plastics, FE, NE) The flat fraction contains paper, cardboard and films in an even flow.	The rolling fraction is cleaned again on the second screen surface The flat large fraction contains paper, cardboard and films in an even flow. The flat small fraction contains high proportions of paper and plastics in small dimensions. Depending on the composition it can be used as mixed paper or RDF.	The rolling fraction is cleaned again on the second screen surface The flat large fraction contains paper, cardboard and films in an even flow. The flat small fraction contains high proportions of paper and plastics in small dimensions. Depending on the composition it can be used as mixed paper or RDF. With the third stage higher tonnages or better qualities are achieved.

Model STT 5000

STADLER®



Features

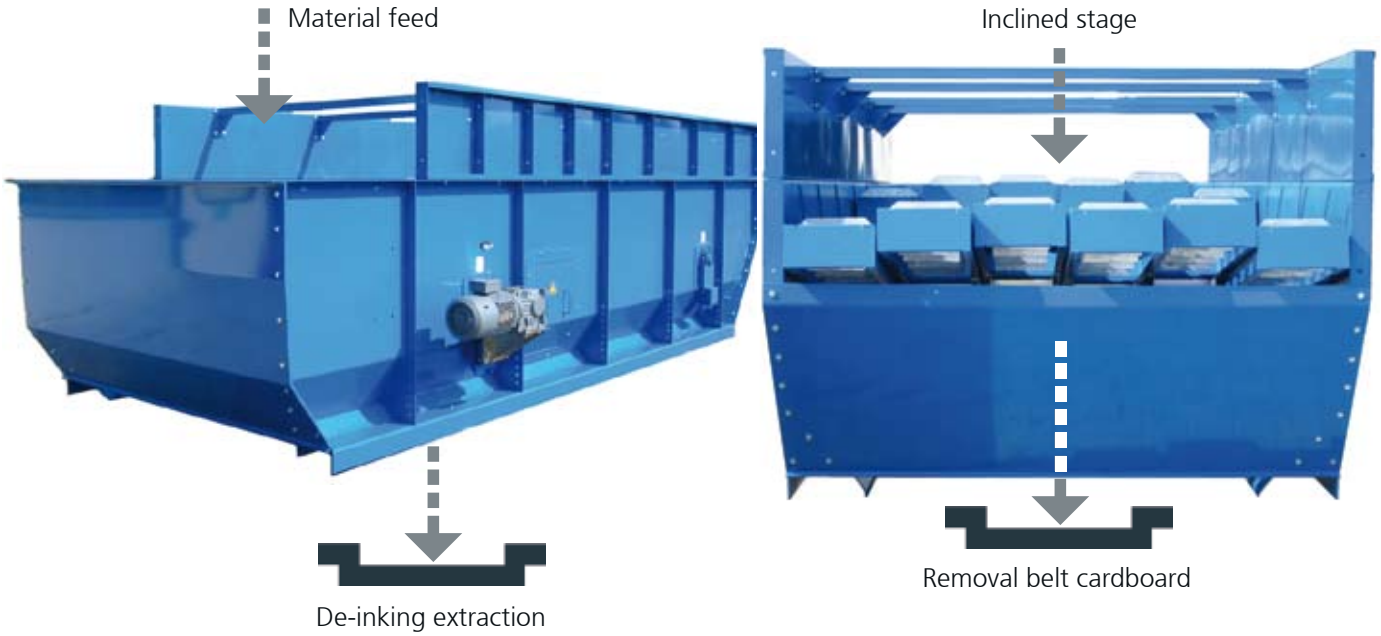
- This machine model was specifically developed for use on construction and demolition material as well as domestic and industrial waste
- An extremely robust steel construction with a support frame made of 40 mm thick steel plate and 10 mm thick side walls gives the ballistic separator sufficient stability for screening materials
- The screen paddles are made of 10 mm thick special profiles
- The screen coverings are made of highly wear resistant steel
- Adjustment of the paddles is possbile through a hydraulic system (see picture above)
- A new, modular shaft design reduces costs for replacement and wear parts
- Achieves higher throughputs

Areas of application

Model	**STT5000_101** ***STT5000_102**
Area of application	Industrial waste systems with or without pre-shredding, bulk waste processing, domestic waste systems – organic separation, processing of construction and demolition waste
Task	Creation of 3 sub-flows (fine, flat, rolling) *with STT5000_102 four sub-flows possible
Position in the system	1. Directly after the feeding hopper 2. Directly after pre-shredding 3. In medium grade range (<300 mm) after a possible screen drum
Results	The rolling fraction contains containers, metals, stones, wood and solid plastic. The flat fraction contains paper, cardboard, textiles and films in an even flow.

Model PPK

STADLER®



Areas of application for paper sorting systems

Separation of cardboard (>DIN A4) from collected waste produces a directly pressable cardboard fraction. With smaller screen perforations, additional separation of mixed paper from a news and pams fraction can be achieved.

Special features

Due to the drop step in the machine, the mixture is turned over. This ensures a very good separation.

All models at a glance

Specifications	STT2000_101	STT2000_102	STT2000_103	STT5000_101	PPK
LxWxH	5,5 x 2,41** x 2,26 m	5,5 x 2,41** x 4,02 m	5,5 x 2,41** x 5,78 m	5,96 x 2,47** x 2,6 m	5,75 x 2,4** x 2,35 m
Drive output	4kW 400V	2 x 4kW 400V	3 x 4kW 400V	11 kW 400V	4kW 400V
Working area	8,4 m²	2 x 8,4 m²	3 x 8,4 m²	10,9 m²	12,6 m²
Weight	6t	12t	18t	13t	6,5t
Angle adjustment	10 - 25 °	10 - 25 °	10 - 25 °	15 - 25 °	-
Throughput rate	up to 60 m³/h*	up to 90 m³/h*	up to 125 m³/h*	up to140 m³/h*	up to 15t/h ~ 56 m³*

* The values given are reference values and may vary according to grain size distribution, screen perforation sizes and material composition
Throughput rates can be exactly calculated based on tests carried out in our technology centre (see next page)

** Widths without motor

STADLER®



STADLER® technology centre

STADLER® Technikum

In Stadler´s testing centre in Altshausen, we offer customers the opportunity to test their material on our machines. Here waste is run through a particular machine and the resulting fractions are weighed and analysed. This is also where new machines and standard units are continuelly tested for function, wear resistance, flexibility and efficiency.

Examples of test results: mass throughputs STADLER® ballistic separators

Machine model	**Material**	**Screen perforation** L x W mm	**Material density** kg/m³	**Grading** mm	**Volume flow** m³/hr	**Mass flow** t/hr
STT2000_101	LVP	45 x 45	50	< 220	60	3
STT2000_102	LVP	top 120 x 120 bottom 45 x 45	65	Refuse bags ≤ 120 l	90	6
STT2000_103	Co-mingled (films, paper, containers, cans)	top 120 x 240 middle 120 x 120 bottom 60 x 60	80	Refuse bags ≤ 120 l	125	10
STT5000_101	Co-mingled	50 x 50	100	Refuse bags ≤ 120 l	70	7
STT5000_101	Industrial waste	50 x 50	180	< 300	80	15
STT5000_101	Industrial waste (pre-shredded)	130 x 130	200	< 300	140	28
PPK	Mixed paper	300 x 250	270	Material ≤ DIN A1	56	15

***** The values given are reference values and may vary according to grain size distribution, screen perforation sizes and material composition. Throughput rates can be exactly calculated based on tests carried out in our technical centre.

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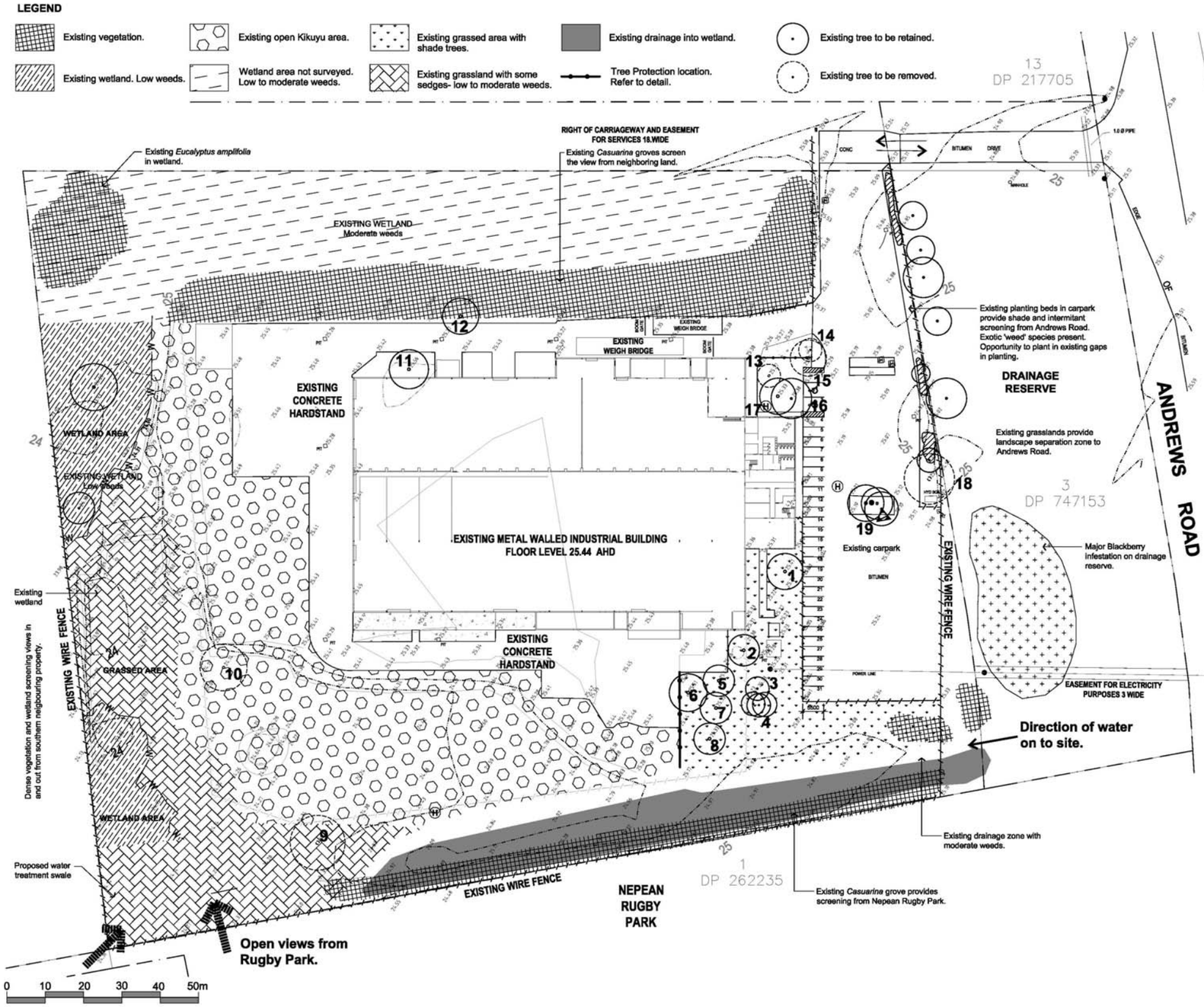
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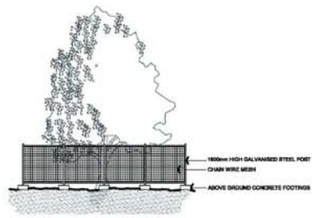
DKSH Australia Pty. Ltd.
14-17 Dansu Court Hallam VIC 3803
Tel: +61 3 9554 6666
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www.resourcerecovery.com.au



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Portable Cyclone protective fencing
scale 1:100 @ A1

Note:

Refer to the Tree Report for Management of Trees.

The Tree Management Plan must be implemented on site prior to any commencement of works. This is to be supervised as necessary and checked by a qualified Arborist or Landscape Architect before works commence.

Tree Survey
Glass Recovery Service, Andrews Road, Penrith

No.	Botanical Name	Common Name	Prov	Age	Risk	Condition	DBH mm	Height m	Crown m
1	Corymbia citriodora	Lemon Scented Gum	N	M	LOW	V. Good	390	18	12
2	Corymbia citriodora	Lemon Scented Gum	N	M	LOW	V. Good	430	16	12
3	Corymbia citriodora	Lemon Scented Gum	N	M	LOW	V. Good	320	16	12
4	Casuarina glauca	She Oak	P	SM	LOW	V. Good	Grove		
5	Corymbia citriodora	Lemon Scented Gum	N	M	LOW	Moderate	310	14	10
6	Corymbia citriodora	Lemon Scented Gum	N	M	LOW	V. Good	290	14	8
7	Corymbia citriodora	Lemon Scented Gum	N	M	LOW	V. Good	310	12	10
8	Corymbia citriodora	Lemon Scented Gum	N	M	LOW	V. Good	300	12	10
9	Eucalyptus tereticornis	Forest Red Gum	R	M	LOW	Good	1000?	14	14
10	Eucalyptus tereticornis	Forest Red Gum	R	S	LOW	Habitat	1700	14	12
11	Callistemon Sp.	Bottle Brush	N	M	LOW	Good	200	4	4
12	Casuarina glauca	She Oak	P	M	LOW	Good	420	15	8
13	Eucalyptus crebaa	Blue Mountain Ash	N	M	HIGH	Poor	150	15	12
14	Eucalyptus crebaa	Blue Mountain Ash	N	M	MOD	Mod-Poor	450	18	12
15	Eucalyptus crebaa	Blue Mountain Ash	N	M	MOD	Mod-Poor	210	14	4
16	Corymbia citriodora	Lemon Scented Gum	N	M	LOW	V. Good	380	18	10
17	Corymbia citriodora	Lemon Scented Gum	N	M	LOW	V. Good	460	18	10
18	Eucalyptus sideroxylon	Red Ironbark	N	Dead	HIGH	V Poor	330	10	3
19	Casuarina glauca	She Oak	P	M	LOW	Mod-Good	Grove	15	8

Major Weed Species identified

Botanical Name	Common Name
Trees	
Salix sp	Willow
Acer negundo	Box Elder
Shrubs	
Cestrum parqui	Green Cestrum
Rubus fruticosus	Blackberry
Solanum marginatum	Night Shade
SWP & Vines	
Cardiospermum grandiflorum	Ballon Vine
Rumex sp	Dock
Onopordum acanthium	Scotch Thistle
Tetragonia sp	
Senecio pterophorus	African Daisy
Taxodium officinale	Dandelion
Bidens pilosa	Cobblers pegs
Canna x generalis	Canna
Araujia serrifera	Moth Vine
Ageratina riparia	Creeping Crofton
Sonchus sp	Sow thistles
Chenopodium sp	Goose foot
senecio sp.	Fireweed
Grasses & Sedges	
Pennisetum clandestinum	Kikuyu grass

Soils
The site is located on **Fluvial Landscape, Richmond Soils**
Geology
Quaternary alluvium consisting of sand, silt and gravels derived from sandstone and shale.
Topography
Mostly flat (slope ,1%)
(Soil Landscapes of the Penrith 1:100,000 sheet.)
Vegetation
The original vegetation community would be **Alluvial Woodland** with some crossover with **Riparian Woodland**
www.environment.nsw.gov.au/resources/nature/cumiplainmappinginterguidelines.pdf

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Project
Glass Recovery Service Pty Ltd
126 Andrews Road, Penrith
Lot 1 DP 747153

Client
CLARON CONSULTING PTY LTD
PO Box 115
Castle Hill NSW 1765

Drawn AL
Checked WW
Scale 1:500 @ A1
Date 05/11/12
North

Revision	Issue	Date
Amendments	A	05/11/12

Drawing
Landscape Plan
Site Analysis, Tree Survey and Assessment

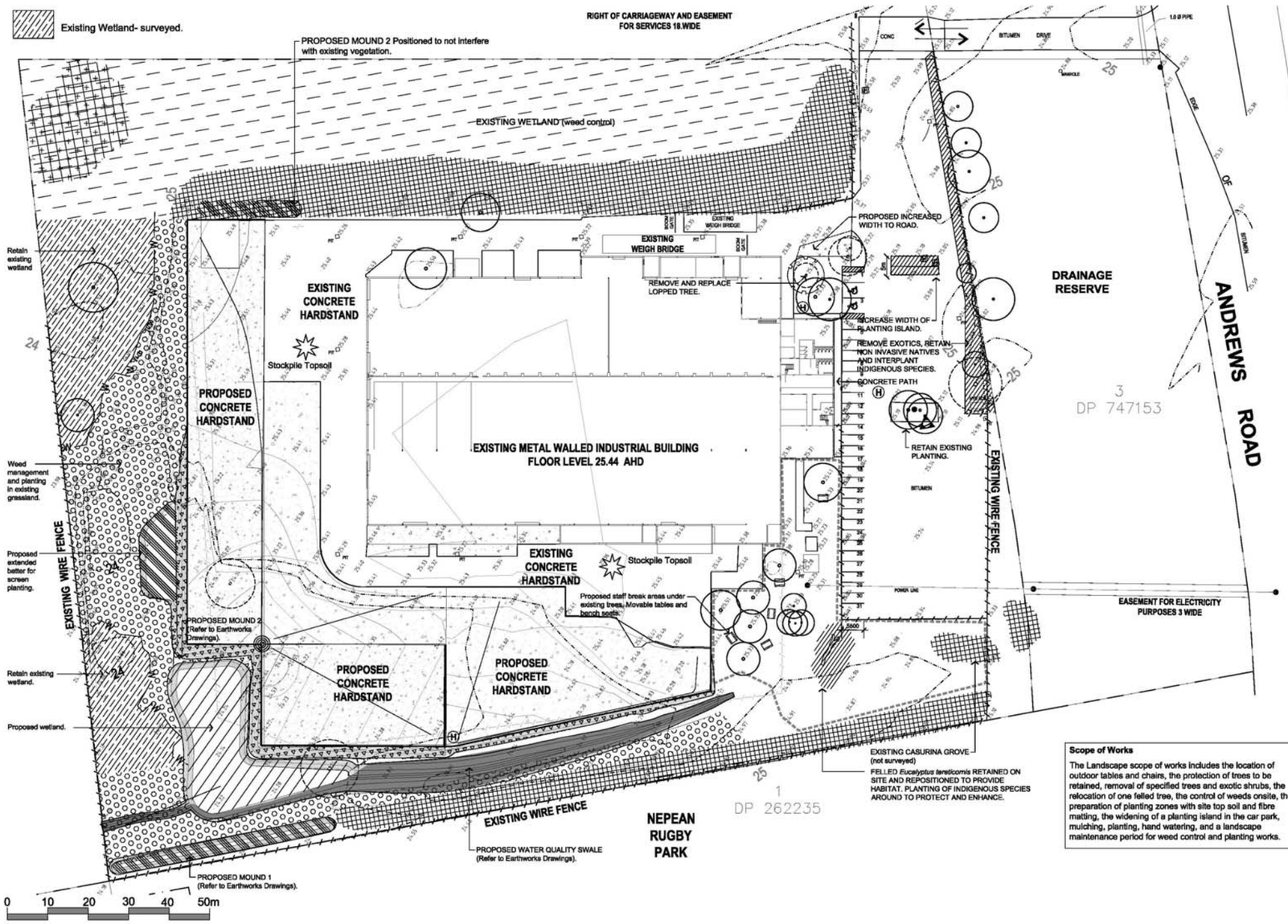
Sheet 1/3

PLANTING ZONES

- Existing *Eucalyptus amplifolia* in wetland.
- Existing *Casuarina glauca* groves.
- Existing Wetland- not surveyed.
- Existing Wetland- surveyed.
- **Wetland Planting**
- **Screen Planting** -on mounds and extended batter area.
- **Swale Planting** - indigenous rushes and reed plants.
- **Garden Bed Planting**- remove exotics retain non invasive natives and interplant indigenous species.
- **Grassland Planting.**
- **Batter Planting.**

LEGEND

- Trees to be retained.
- Trees to be removed (refer to Landscape Sheet 1/3).
- Retain existing trees and provide a staff outdoor break area.
- Stockpile Topsoil areas on existing concrete hardstand.
- (H) Hose points.



Scope of Works

The Landscape scope of works includes the location of outdoor tables and chairs, the protection of trees to be retained, removal of specified trees and exotic shrubs, the relocation of one felled tree, the control of weeds onsite, the preparation of planting zones with site top soil and fibre matting, the widening of a planting island in the car park, mulching, planting, hand watering, and a landscape maintenance period for weed control and planting works.

Vegetation Management Plan

- A 24 month weed control program over the entire site shall be implemented 6 months prior to construction works.
- The weed control program shall be implemented by a qualified and experienced Bush Regenerator applying appropriate targeted weed control measures. The Bush Regenerator shall be selected from the Penrith Council list of Landscape Professionals or appointed by a qualified Ecologist or Landscape Architect.
- Weeds must be controlled prior to planting and to maintain control until the indigenous plantings have established. Due to the presence of a wetland on part of the site, only herbicides that can safely be used in frog habitat are to be used. The Bush Regenerator shall provide evidence of the safety of the chemicals proposed for use on the site.
- The goal is to control existing weeds prior to planting and maintain weed control throughout the planting establishment period to support the establishment of new plantings and the regeneration of remnant vegetation. Regular maintenance visits by the bush regenerator shall be undertaken to carry out suitable weed control measures to allow the natural and planted indigenous vegetation to take hold.
- Green waste may be composted on-site but all weed material with the potential to germinate/generate must be disposed of off-site in a suitable green-waste facility.
- Weed control shall be inspected by a qualified Ecologist or Landscape Architect immediately prior to planting, on a 3-monthly basis for the first 6 months after planting, and then on a 6-monthly basis until the conclusion of the 24 month maintenance period. These inspections shall coincide with the monitoring of the planted vegetation.

Tree Management

- Refer to the Tree Report and "Landscape Plan: Site Analysis, Tree Survey and Protection Plan" (sheet 1/3).
- The tree management plan must be implemented on site prior to any commencement of works. This is to be supervised as necessary and checked by a qualified Arborist or Landscape Architect before works commence.
- The remnant *Eucalyptus tereticornis* (tree 1) shall be repositioned as a felled trunk for habitat, as shown on this Landscape Concept Plan (Sheet 2/3).

Soil

- The soil profile of all planting areas must be maintained (refer to "Landscape Plan: Site Analysis, Tree Survey and Protection Plan"(Sheet 1/3).
- All topsoil removed for construction works shall be stockpiled and used onsite in the landscaping. Weed are to be controlled prior to removal and during the works period.
- Stockpile locations are shown on the Landscape Concept Plan Sheet 2/3. Stockpiles of topsoil are to be a minimum distance of 5m away from any existing trees, as part of the tree protection plan.
- Stock pile volumes as per earthworks drawings.
- Stockpiled topsoil will be covered with jute mesh or Hessian and secured at end points to stabilise and prevent erosion loss.
- Only site soil shall be used in all plantings.
- A root conditioner (Seasol or similar) shall be applied at the time of planting. No fertilizer is to be applied in plantings in the drainage swale or wetland zone. Fertilizer shall be applied to the plantings in the carpark area 3-5 weeks after planting.

Mulch

- Coir Mesh will be used as mulch in all swale areas and Fibre Mulch applied on mound and low lying wetland planting. See details of installation in Landscape Planting Plan (sheet 3/3)
- Clean, aged organic Mulch at a depth of 75mm will be applied to all other areas of planting.

Plantings

- All species selected for planting will be representative of the Alluvial Woodland Vegetation and Riparian Vegetation that are indicative of the soils (Fluvial Landscape, Richmond Soils), topography and location of the site.
- Locally indigenous species shall be selected from stock grown from seed (or other propagules) sourced from areas within the Sydney Basin that feature similar environmental characteristics to the site (climate, soils, and topographic position). Seed should be collected from multiple populations, to increase the genetic diversity. The final species are to be confirmed with a qualified Landscape Architect or Ecologist.
- All plantings in the swale and low lying areas will be viro or tube stock. Other plantings on mounds and around existing beds of the car park will be a mix of tube stock and larger pot sizes as specified on the Landscape Planting Plan Sheet 3/3. Tube stock is the preferred planting to provide the most successful and healthy mass planted vegetation.

Wetland Zone

- The wetland area within the existing flood zone will be managed as part of the vegetation management. The weeds will be controlled to allow the natural regeneration of existing indigenous species in the wetland.

Swale treatment/ mound and low lying planting

- An open weave Coir Mesh Mat will be secured in a trench along the top of the drainage swale and along its length with pegs at 1m centres. All plantings will be directly into this mesh. Overlap of mesh will be against the direction of water flow.
- Fibre Mulch Matting will be secured in a trench at the top of the mounds and pegged at 1.5m centres along its length.
- Fibre Mulch will be secured in the low water inundated areas as shown on the plan and secured as above.

Irrigation

- The plantings are to be watered on an "as needed" basis so as to ensure that they do not suffer water stress.
- Provide hose points for watering.

Fencing

- All existing wire fencing is to be retained
- The location of fencing is retained at the front of the site as the site is set back 55m from Andrews Road and provides an existing landscape grassed buffer to the site. It is proposed that existing shrub and tree vegetation along the front boundary be supplemented with additional plantings as shown in Landscape Sheet 2/3 and 3/3. This would add to the screening of the buildings and provide shade for the car park.
- Vegetation and tree protection temporary fencing is as per Site Analysis, Tree Survey and Protection Plan" (sheet 1/3).

Maintenance

- All landscape works must be maintained for a period of 24 months after planting.
- Any plants that die or are unsuccessful during this period shall be replaced. Replacement plantings must be confirmed by the project Landscape Architect or Ecologist.

Existing Car Park

- Increase width of planting island for tree replacement planting
- Remove exotic shrubs and plant indigenous species
- Remove identified weed species along the north strip and interplant with indigenous species

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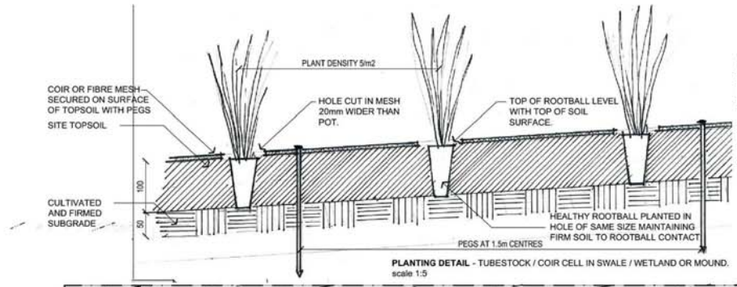
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Project
Glass Recovery Service Pty Ltd
126 Andrews Road, Penrith
Lot 1 DP 747153

Client
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PO Box 115
Castle Hill NSW 1765

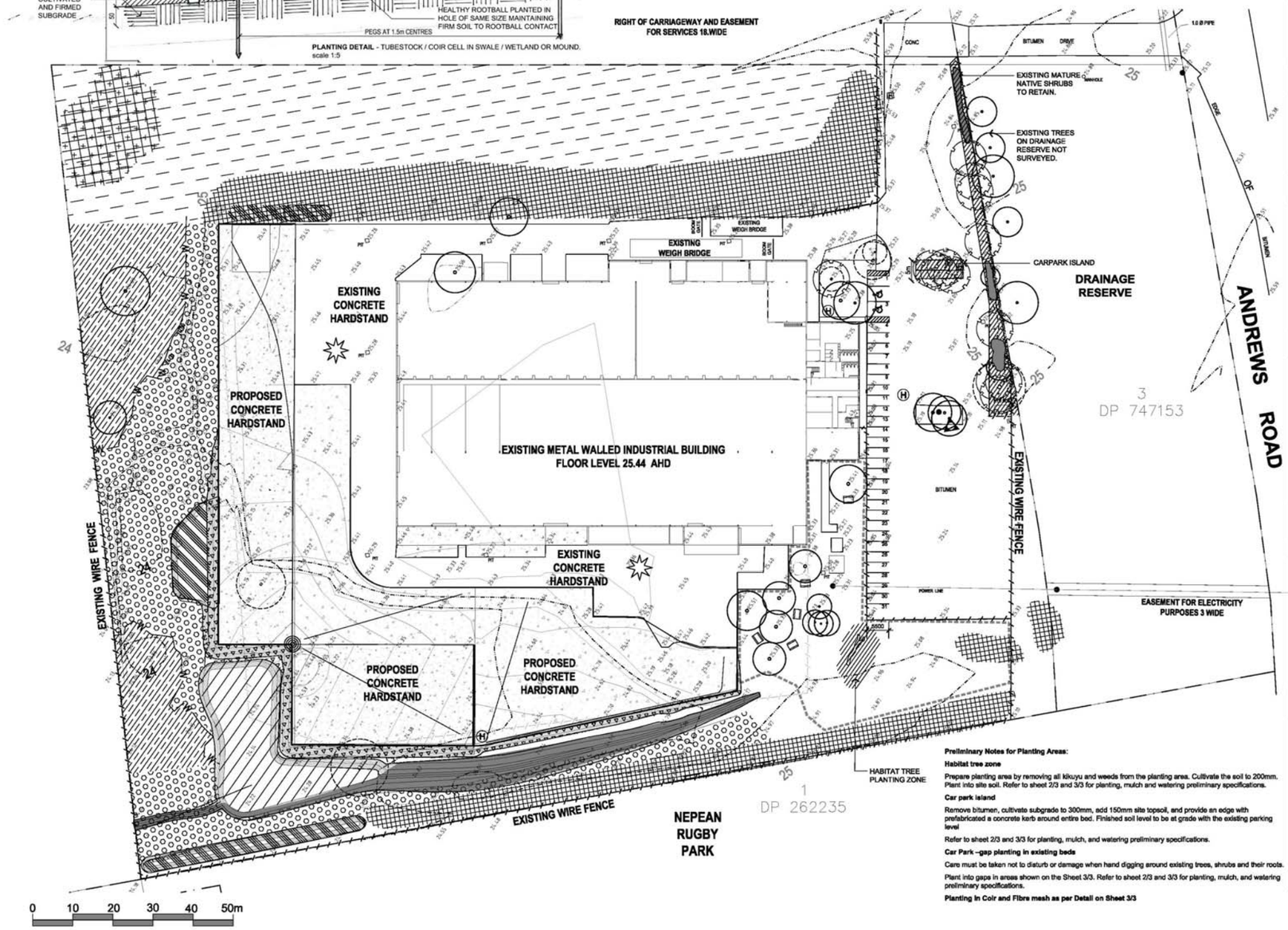
Drawn	Scale	North	Revision	Issue	Date	Drawing	Sheet
AL	1:500 @ A1		Amendments	A	05/11/12	Landscape Plan Landscape Concept Plan	2/3
Checked WW	Date 05/11/12						



PLANTING DETAIL - TUBESTOCK / COIR CELL IN SWALE / WETLAND OR MOUND.
scale 1:5

LEGEND

- Existing *Eucalyptus amplifolia* in wetland.
- Existing *Casuarina glauca* groves.
- Existing Wetland.
- **Garden Bed Planting**- remove exotics retain non invasive natives and interplant indigenous species.
- Trees to be retained.
- Trees to be removed (refer to Landscape Sheet 1/3).
- Proposed trees not part of mass planting.



Preliminary Notes for Planting Areas:

Habitat tree zone

Prepare planting area by removing all kikuyu and weeds from the planting area. Cultivate the soil to 200mm. Plant into site soil. Refer to sheet 2/3 and 3/3 for planting, mulch and watering preliminary specifications.

Car park island

Remove bitumen, cultivate subgrade to 300mm, add 150mm site topsoil, and provide an edge with prefabricated a concrete kerb around entire bed. Finished soil level to be at grade with the existing parking level

Refer to sheet 2/3 and 3/3 for planting, mulch, and watering preliminary specifications.

Car Park –gap planting in existing beds

Care must be taken not to disturb or damage when hand digging around existing trees, shrubs and their roots.

Plant into gaps in areas shown on the Sheet 3/3. Refer to sheet 2/3 and 3/3 for planting, mulch, and watering preliminary specifications.

Planting in Coir and Fibre mesh as per Detail on Sheet 3/3

Plant Schedule Andrews Road, Penrith				Revised 1st Nov 2012
Swale Planting Zone - area 980m²	**density 5/m²**			
Botanical name	**Common Name**	**Mature Size**	**Pot Size**	**No.**
Baumea articulata	Jointed Twig Rush	1-2m	Viro tube	980
Carex appressa	Tall Sedge	0.7-1m	Viro tube	980
Cyperus trinervis	Sedge	0.3m	Viro tube	980
Fimbristylis velata	Rush	0.3-0.5m	Viro tube	980
Junctus usitatus	Common Rush	1m	Viro tube	980
Wetland Planted Zone- area 730m²	**density 5/m²**			
Botanical name	**Common Name**	**Mature Size**	**Pot Size**	**No.**
Baumea articulata	Jointed Twig Rush	1-2m	Viro tube	522
Carex appressa	Tall sedge	0.7-1m	Viro tube	522
Eleocharis sphacelata	Tall Spike Rush	0.5-2m	Viro tube	522
Ludwidgia peploides	Water Primrose	Prostrate	Viro tube	522
Persicaria decipiens	Slender Knotweed	1m	Viro tube	522
Ranunculus inundatus	River buttercup	0.5m	Viro tube	522
Typha orientalis	Bull Rush	2-3m	Viro tube	522
Batter Zone -area 1200m²	**trees 1/10m², shrubs 1-2/m2 /tussock 3/m²**			
Botanical name	**Common Name**	**Mature Size**	**Pot Size**	**No.**
Bursaria spinosa	Blackthorn	1-2m	tube	600
Casuarina glauca	Swamp Oak	15-20m	tube	60
Carex appressa	Tall sedge	0.7-1m	Viro tube	600
Cyperus trinervis	Sedge	0.3m	Viro tube	600
Lomandra longifolia	Matt Rush	1m	Viro tube	600
Lomandra multiflora	Many Flow. Matt Rus	1m	Viro tube	600
Melaleuca linearifolia	Snow in summer	12m	tube	60
Microlaena stipoides	Weeping Grass	0.5m	Viro tube	400
Persicaria decipiens	Slender Knotweed	1m	Viro tube	300
Junctus usitatus	Common Rush	1m	Viro tube	600
Acacia parramattensis	Parramatta Wattle	2-15m	tube	600
Ranunculus inundatus	River buttercup	0.5m		400
Mound Zone Planting- area 502m²	**trees 5/10m², shrubs 1/m², tussock plants 2-3/m²**			
Botanical name	**Common Name**	**Mature Size**	**Pot Size**	**No.**
Bursaria spinosa	Blackthorn	2m	Viro tube	350
Commelina cyanea	Scurvy Weed	0.2m	Viro tube	100
Eucalyptus amplifolia	Cabbage Gum	20m	Tube	50
Eucalyptus tereticomis	Forest Red Gum	20m	5L	50
Glycine clandestina	Twining Glycine	0.2m	Viro tube	150
Lomandra longifolia	Matt Rush	1m	Viro tube	250
Lomandra multiflora	Many Flow. Matt Rus	1m	Viro tube	250
Ranunculus inundatus	River buttercup	0.5m	Viro tube	50
Melaleuca linearifolia	Snow in summer	12m	Tube	100
Oplismenus aemulus	Oplismenus	0.2m	Viro tube	200
Pratia purpurascens	White Root	0.4m	Viro tube	50
Acacia parramattensis	Parramatta Wattle	2-15m	tube	50
Junctus usitatus	Common Rush	1m	Viro tube	250
Melicytus dentatus	Tree violet	2-4m	tube	150
Grassland Planting-area 1000m2	**Trees 1/20m2**			
Melaleuca linearifolia	Snow in summer	12m	tube	20
Eucalyptus amplifolia	Cabbage Gum	20m	Tube	30
Car Park Planting Area				
Botanical name	**Common Name**	**Mature Size**	**Pot Size**	**No.**
Dianella laevis	Flax Lily	0.5m	tube	20
Eucalyptus tereticomis	Forest Red Gum	30m	10L	5
Glycine clandestina	Twining Glycine	0.2m	tube	5
Kunzea ambigua	Tick bush	2-2m	150mm	5
Lissanthe stigosa	Native Cranberry	1m	150mm	5
Lomandra longifolia	Matt Rush	1m	150mm	20
Melaleuca linearifolia	Snow in summer	12m	5L	7
Oplismenus aemulus	Oplismenus	0.5m	tube	5
Habitat Tree Zone Planting -area 50m²	**Density 4/m2**			
Botanical name	**Common Name**	**Mature Size**	**Pot Size**	**No.**
Acacia fimbriata	Fringe Wattle	4m	150mm	3
Acacia parramattensis	Parramatta Wattle	2-15m	tube	3
Daviesia ulicifolia	Bitter Pea	1m	150mm	15
Dianella laevis	Flax Lily	0.5m	tube	15
Dillwynia sieberi	Parrot Pea	1m	150mm	15
Eucalyptus tereticomis	Forest Red Gum	30m	10L	1
Glycine clandestina	Twining Glycine	0.2m	tube	5
Kunzea ambigua	Tick bush	2-2m	150mm	20
Lissanthe stigosa	Native Cranberry	1m	150mm	15
Lomandra longifolia	Matt Rush	1m	150mm	15
Melaleuca linearifolia	Snow in summer	12m	5L	3
Oplismenus aemulus	Oplismenus	0.5m	tube	10
Themeda australis	Kangaroo Grass	0.5m	Viro tube	40
Junctus usitatus	Common Rush	1m	Viro tube	20
Ranunculus inundatus	River buttercup	0.5m	Viro tube	5
Bursaria spinosa	Blackthorn	2m	tube	20
Commelina cyanea	Scurvy Weed	0.2m	tube	10

BioDesign

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Project
Glass Recovery Service Pty Ltd
126 Andrews Road, Penrith
Lot 1 DP 747153

Client
CLARON CONSULTING PTY LTD
PO Box 115
Castle Hill NSW 1765

Drawn AL
Checked WW
Scale 1:500 @ A1
Date 05/11/12

North

Revision	Issue	Date
Amendments	A	05/11/12

Drawing
Landscape Plan
Landscape Planting Plan

Sheet 3/3

PENRITH CITY COUNCIL
Serving Our Community

DETERMINATION OF DEVELOPMENT APPLICATION

P E N R I T H C I T Y C O U N C I L

DESCRIPTION OF DEVELOPMENT

DA No.	DA12/0539
Description of development	Extension of Hardstand Area & Associated Land Filling
Classification of development	The classification of the building(s) forming part of this consent is as follows: ▪ N/A

DETAILS OF THE APPLICANT

Name & Address	Claron Consulting Pty Ltd PO Box 115 CASTLE HILL NSW 1765

NOTES

1. Your attention is drawn to the attached conditions of consent in attachment 1.
2. You should also check if this type of development requires a construction certificate in addition to this development consent.
3. It is recommended that you read the Advisory Note enclosed with this consent.

DETAILS OF THE LAND TO BE DEVELOPED

Legal Description:	Lot 1 DP 747153
Property Address:	126 Andrews Road PENRITH NSW 2750

DECISION OF CONSENT AUTHORITY

Was a Commission of Inquiry held for the development? NO

In accordance with Section 81(1) (a) of the Environmental Planning and Assessment Act 1979, consent is granted subject to the conditions listed in attachment 1.

Date from which consent operates	This consent commences on expiration of 28 days from 30 April 2013 in accordance with Section 83 of the Environmental Planning and Assessment Act.
Date the consent expires	23 April 2016
Date of this decision	23 April 2013

Please note that this consent will lapse on the expiry date unless the development has commenced in that time.

OTHER APPROVALS

APPROVAL BODIES:

APPROVAL BODY NAME	DATE OF GENERAL TERMS OF APPROVAL	REF. NO.	NO. OF PAGES	RELEVANT LEGISLATION
Department of Primary Industries Office of Water	04 March 2013	10 ERM2012/0568	5	Water Management Act 2000

The approval bodies listed above have provided General Terms of Approval for this development in accordance with the relevant legislation. A copy of these General Terms of Approval is provided with this development consent notice. Compliance with the relevant State Government departments' General Terms of Approval are required in conjunction with the following conditions listed in Attachment 1: Conditions of Consent issued by Penrith City Council.

RIGHTS OF APPEAL

1. The applicant may request Council to review its determination pursuant to Section 82A of the Environmental Planning and Assessment Act 1979 within 6 months of receiving this Notice of Determination.

   You cannot make this request if the development is Designated Development, Integrated Development, or State Significant development.

2. If a written objection was made in respect to the Application for Designated Development, the objector can appeal against Council's decision to the Land and Environment Court within 28 days after the date of this Notice. The objector cannot appeal if a Commission of Inquiry was held.

3. If the applicant appeals against Council's decision, objector(s) will be given a notice of the appeal and the objector(s) can apply to the Land and Environment Court within 28 days after the date of this appeal notice to attend the appeal and make submissions at that appeal.

4. An appeal to the Land and Environment Court is made by lodging an application to the Court in accordance with the Rules of the Court.

REASONS

The conditions in the attached schedule have been imposed for the following reasons:

- To ensure compliance with the terms of the relevant Planning Instrument.
- To ensure that no injury is caused to the existing and likely future amenity of the neighbourhood.
- Due to the circumstances of the case and the public interest.
- To ensure that adequate road and drainage works are provided.
- To ensure that satisfactory arrangements are made to satisfy the increased demand for public recreation facilities.
- To ensure that access, parking and loading arrangements will be made to satisfy the demands created by the development.
- To ensure the structural integrity of the development.
- To ensure the protection of the health and safety of the occupants of the development.

POINT OF CONTACT

If you have any questions regarding this consent you should contact:

Assessing officer	Mahbub Alam Environmental Planner
Contact telephone number	(02) 4732 7693

SIGNATURE

Name Mahbub Alam

Signature 

For the Development Services Manager

ATTACHMENT 1: CONDITIONS OF CONSENT

GENERAL

1 The development must be substantially in accordance with the following plans:

Description	Drawing No	Drawn By	Date
Detail and Contour Survey	X11354-S2	Brown Smart Consulting	05/10/2012
Concrete Hardstand and Wetland Plan	112354.W SK901, Rev-01	Brown Smart Consulting	31/10/2012
Locality Plan	000, Revision: 02	Brown Smart Consulting	-
General Layout Plan	001, Revision: 02	Brown Smart Consulting	10/12/2012
Earthworks and Drainage Plan, Sheet 1 of 2	101, Revision: 02	Brown Smart Consulting	10/12/2012
Earthworks and Drainage Plan, Sheet 2 of 2	102, Revision: 02	Brown Smart Consulting	10/12/2012
Sections	103, Revision: 02	Brown Smart Consulting	10/12/2012
Erosion and Sediment Control Plans and Details	201, Revision: 02	Brown Smart Consulting	10/12/2012
Landscape Plan (sheet 1/3, sheet 2/3 and sheet 3/3)	Issue - B	BioDesign and Associates Pty Ltd	22/04/13
Waste Management Plan	-	Claron Consulting Pty Ltd	-

and any supporting information received with the application, except as may be amended in red on the attached plans and by the following conditions.

2 **The development shall not be used or occupied until an Occupation Certificate has been issued.**

3 A **Construction Certificate** shall be obtained prior to commencement of any building works.

4 This consent does not grant approval for the use of the site. Any future use of the site is subject to separate approval or must rely on an existing valid/operational consent.

5 The applicant shall comply with the conditions contained in the General Terms of Approval issued by the NSW Office of Water Reference 10 ERM2012/0568, dated 04 March 2013. In this regard, a Controlled Activity Approval shall be obtained prior to the issue of a Construction Certificate.

DEMOLITION

6 All demolition works are to be conducted in accordance with the provisions of AS 2601-1991 "The Demolition of Structures". **Prior to demolition**, all services shall be suitably disconnected and capped off or sealed to the satisfaction of the relevant service authority requirements.

All demolition and excavated material shall be disposed of at a Council approved site or waste facility. Details of the proposed disposal location(s) of all excavated material from the development site shall be provided to the Principal Certifying Authority **prior to commencement of demolition.**

7 You should read Council's Fact Sheet titled "Handling and Disposal of Fibrous Cement Products" **before any demolition works commence on the site.**

Prior to commencement of demolition works on site, a portaloo with appropriate washing facilities shall be located on the site and the Principal Certifying Authority is to be satisfied that:

- Measures are in place so as to comply with the WorkCover Authority's "Short Guide to Working with Asbestos Cement" and
- The person employed to undertake the works is a licensed asbestos removal contractor and is holder of a current WorkCover Asbestos Licence.

Any demolition works involving the removal of all asbestos shall only be carried out by a licensed asbestos removal contractor who has a current WorkCover Asbestos Licence.

All asbestos laden waste, including asbestos cement flat and corrugated sheeting must be disposed of at a tipping facility licensed by the Environmental Protection Authority to receive asbestos wastes.

8 Dust suppression techniques are to be employed during demolition to reduce any potential nuisances to surrounding properties.

9 Mud and soil from vehicular movements to and from the site must not be deposited on the road.

10 Demolition works will be restricted to the following hours in accordance with the NSW Environment Protection Authority Noise Control Guidelines:

- Mondays to Fridays, 7am to 6pm
- Saturdays, 7am to 1pm if inaudible on neighbouring residential premises, otherwise 8am to 1pm
- No demolition work is permitted on Sundays and Public Holidays.

In the event that the demolition relates to works inside the building and do not involve external walls or the roof, and do not involve the use of equipment that emits noise then the demolition works are not restricted to the hours stated above.

The provisions of the Protection of the Environment Operations Act, 1997 in regulating offensive noise also apply to all construction works.

ENVIRONMENTAL MATTERS

11 Erosion and sediment control measures shall be installed **prior to the commencement of works on site** including approved clearing of site vegetation. The erosion and sediment control measures are to be maintained in accordance with the approved erosion and sediment control plan(s) for the development and the Department of Housing's "Managing Urban Stormwater: Soils and Construction" 2004.

(Note: To obtain a copy of the publication, you should contact Landcom on (02) 98418600).

The approved sediment and erosion control measures are to be installed **prior to and maintained throughout the construction phase of the development until the land, that was subject to the works, has been stabilised and grass cover established.** These measures shall ensure that mud and soil from vehicular movements to and from the site does not occur during the construction of the development.

12 No fill material is to be imported to the site without the prior approval of Penrith City Council in accordance with Sydney Regional Environmental Plan No.20 (Hawkesbury-Nepean River) (No.2-1997). No recycling of material for use as fill material shall be carried out on the site without the prior approval of Council.

13 All waste materials stored on-site are to be contained within a designated area such as a waste bay or bin to ensure that no waste materials are allowed to enter the stormwater system or neighbouring properties. The designated waste storage areas shall provide at least two waste bays / bins so as to allow for the separation of wastes, and are to be fully enclosed when the site is unattended.

14 All excavated material and other wastes generated as a result of the development are to be re-used, recycled or disposed of in accordance with the approved waste management plan.

Waste materials not specified in the approved waste management plan are to be disposed of at a lawful waste management facility. Where the disposal location or waste materials have not been identified in the waste management plan, details shall be provided to the Certifying Authority as part of the waste management documentation accompanying the Construction Certificate application.

All receipts and supporting documentation must be retained in order to verify lawful disposal of materials and are to be made available to Penrith City Council on request.

15 The operating noise level of plant and equipment shall not exceed 5dB(A) above the background noise level when measured at the boundaries of the premises. The provisions of the Protection of the Environment Operations Act 1997 apply to the development, in terms of regulating offensive noise.

CONSTRUCTION

16 Stamped plans, specifications, a copy of the development consent, the Construction Certificate and any other Certificates to be relied upon shall be available on site at all times during construction.

The following details are to be displayed in a maximum of 2 signs to be erected on the site:

- the name of the Principal Certifying Authority, their address and telephone number,
- the name of the person in charge of the work site and telephone number at which that person may be contacted during work hours,
- that unauthorised entry to the work site is prohibited,
- the designated waste storage area must be covered when the site is unattended, and
- all sediment and erosion control measures shall be fully maintained until completion of the construction phase.

Signage but no more than 2 signs stating the above details is to be erected:

- at the commencement of, and for the full length of the, construction works onsite, and
- in a prominent position on the work site and in a manner that can be easily read by pedestrian traffic.

All construction signage is to be removed **when the Occupation Certificate has been issued for the development.**

17 **Prior to the commencement of construction works**:

(a) Toilet facilities at or in the vicinity of the work site shall be provided at the rate of one toilet for every 20 persons or part of 20 persons employed at the site. Each toilet provided must be:

- a standard flushing toilet connected to a public sewer, or
- if that is not practicable, an accredited sewage management facility approved by the council, or
- alternatively, any other sewage management facility approved by council.

(b) All excavations and backfilling associated with the erection or demolition of a building must be executed safely and in accordance with the appropriate professional standards. All excavations associated with the erection or demolition of a building must be properly guarded and protected to prevent them from being dangerous to life or property.

(c) If an excavation associated with the erection or demolition of a building extends below the level of the base of the footings of a building on an adjoining allotment of land, the person causing the excavation to be made:

- must preserve and protect the building from damage, and
- if necessary, must underpin and support the building in an approved manner, and
- must, at least 7 days before excavating below the level of the base of the footings of a building on an adjoining allotment of land, give notice of intention to do so to the adjoining allotment of land and furnish particulars of the excavation to the owner of the building being erected or demolished. The owner of the adjoining allotment of land is not liable for any part of the cost of work carried out for the purposes of this condition, whether carried out on the allotment of land being excavated or on the adjoining allotment of land, (includes a public road and any other public place).

(d) If the work involved in the erection or demolition of a building is likely to cause pedestrian or vehicular traffic in a public place to be obstructed or rendered inconvenient, or involves the enclosure of a public place, a hoarding or fence must be erected between the work site and the public place:

- if necessary, an awning is to be erected, sufficient to prevent any substance from, or in connection with, the work falling into the public place,
- the work site must be kept lit between sunset and sunrise if it is likely to be hazardous to persons in the public place, and any such hoarding, fence or awning is to be removed when the work has been completed.

18 Construction works or subdivision works that are carried out in accordance with an approved consent that involve the use of heavy vehicles, heavy machinery and other equipment likely to cause offence to adjoining properties shall be restricted to the following hours in accordance with the NSW Environment Protection Authority Noise Control Guidelines:

- Mondays to Fridays, 7am to 6pm
- Saturdays, 7am to 1pm if inaudible on neighbouring residential premises, otherwise 8am to 1pm
- No work is permitted on Sundays and Public Holidays.

Other construction works carried out inside a building/tenancy and that do not involve the use of equipment that emits noise are not restricted to the construction hours stated above.

The provisions of the Protection of the Environment Operations Act, 1997 in regulating offensive noise also apply to all construction works.

ENGINEERING

19 All roadworks, drainage works and dedication, required to effect the consented development shall be undertaken at no cost to Penrith City Council.

20 Any Construction Certificate issued by the Principal Certifying Authority or Certifying Authority shall incorporate plans and details for erosion and sediment control in accordance with the Department of Housing's "Managing Urban Stormwater: Soils and Construction" 2004.

21 The stormwater drainage system shall be provided generally in accordance with the concept plan/s lodged for development approval, prepared by Brown Smart Consulting, reference number X11354.W, Dwg. Nos 000, 001, 101, 102, 103, 201, revision 2, dated 10 December 2012.

The proposed development and stormwater drainage system shall be designed to ensure that stormwater runoff from upstream properties is conveyed through the site without adverse impact on the development or adjoining properties.

Engineering plans and supporting calculations for the stormwater drainage system are to be prepared by a suitably qualified person and shall accompany the application for a Construction Certificate.

Prior to the issue of a Construction Certificate, the Certifying Authority shall ensure that the stormwater drainage system has been designed in accordance with Penrith City Council's Design Guidelines and Construction Specification for Civil Works.

22 Stormwater runoff from parking, uncovered paved areas shall be directed to a stormwater pre-treatment system. The treatment devices shall be designed to remove expected pollutant loadings in accordance with the Department of Environment, Climate Change & Water's 'Managing Urban Stormwater - Environmental Targets / Treatment Techniques - October 2007' publication.

Any Construction Certificate issued by the Principal Certifying Authority or Certifying Authority shall incorporate:

- Specification & installation details of the stormwater pre-treatment system.
- The approval of an operation and maintenance manual / schedule for the proposed device.

A copy of the approved operation and maintenance manual/ schedule shall be submitted to Penrith City Council with notification of the Construction Certificate issue.

23 **Prior to the issue of a Construction Certificate,** the Certifying Authority shall ensure that the proposed development is compatible with the recommendations of the Flood Report prepared by Brown Smart Consulting, reference number X11354.W, revision 2, dated 10 December 2012.

Details prepared by a qualified person, demonstrating compliance with this report, shall form part of any Construction Certificate issued.

24 **Prior to the commencement of works on site**, including approved clearing of site vegetation, erosion and sediment control measures shall be installed. The erosion and sediment control measures are to be installed in accordance with the approved erosion and sediment control plan(s) for the development and the Department of Housing's "Managing Urban Stormwater: Soils and Construction" 2004.

25 Erosion and sediment control measures shall remain in place and be maintained until all disturbed areas have been rehabilitated and stabilised.

26 **Prior to the issue of an Occupation Certificate**, the Principal Certifying Authority shall ensure that all works within the road reserve have been inspected and approved by Penrith City Council.

27 After completion of all civil works, works-as-executed drawings and compliance documentation shall be submitted to the Principal Certifying Authority in accordance with Penrith City Council's Design Guidelines and Construction Specification for Civil Works.

An original set of works-as-executed drawings and copies of compliance documentation shall also be submitted to Penrith City Council with notification of the issue of the Occupation Certificate where Council is not the Principal Certifying Authority.

28 Prior to the issue of an Occupation Certificate, the Principal Certifying Authority shall ensure that the:

a) Stormwater pre-treatment system/s

- Have been satisfactorily completed in accordance with the approved Construction Certificate and the requirements of this consent.
- Have met the design intent with regard to any construction variations to the approved design.
- Any remedial works required to been undertaken have been satisfactorily completed.

Details of the approved and constructed system/s shall be provided as part of the works-as-executed drawings.

29 Prior to the issue of an Occupation Certificate, a restriction as to user and positive covenant relating to the:

a) Stormwater pre-treatment system/s

shall be registered on the title of the property. The restriction as to user and positive covenant shall be in Penrith City Council's standard wording as detailed in Penrith City Council's Design and Construction Guidelines and Construction Specification for Civil Works.

LANDSCAPING

30 All landscape works are to be constructed in accordance with the stamped-approved landscape concept plan (except as may be amended in red on the plan and by the conditions of this consent) and Sections C6 "Landscape Design", and F5 "Technical Information" of Penrith Council's Development Control Plan 2010.

Landscaping shall be maintained:

- in accordance with the approved plan, and
- in a healthy state, and in perpetuity by the existing or future owners and occupiers of the property.

If any of the vegetation comprising that landscaping dies or is removed, it is to be replaced with vegetation of the same species and, to the greatest extent practicable, the same maturity as the vegetation which died or was removed.

31 All trees that are required to be retained as part of the development are to be protected in accordance with the minimum tree protection standards prescribed in Sections C6 "Landscape Design" and F5 "Technical Information" of Councils Development Control Plan 2010.

32 No trees are to be removed, ringbarked, cut, topped or lopped or wilfully destroyed (other than those shown on the approved plans) without the prior consent of Penrith City Council and in accordance with Council's Tree Preservation Order and Policy.

33 Existing landscaping is to be retained and maintained at all times.

34 The recommendations of the Arborist's Statement prepared by Susan Hobley, BioDesign & Associates, dated 22 April 2013 must be implemented as part of the approved works.

CERTIFICATION

35 **Prior to the commencement of any earthworks or construction works on site**, the proponent is to:

a) employ a Principal Certifying Authority to oversee that the said works carried out on the site are in accordance with the development consent and related Construction Certificate issued for the approved development, and with the relevant provisions of the Environmental Planning and Assessment Act and accompanying Regulation, and

b) submit a Notice of Commencement to Penrith City Council.

The Principal Certifying Authority shall submit to Council an "Appointment of Principal Certifying Authority" in accordance with Section 81A of the Environmental Planning and Assessment Act 1979.

Information to accompany the Notice of Commencement

Two (2) days before any earthworks or construction/demolition works are to commence on site (including the clearing site vegetation), the proponent shall submit a "Notice of Commencement" to Council in accordance with Section 81A of the Environmental Planning and Assessment Act 1979.

36 An Occupation Certificate is to be obtained from the Principal Certifying Authority on completion of all works.

The Certificate shall not be issued if any conditions of this consent, but not the conditions relating to the operation of the development, are outstanding.

A copy of the Occupation Certificate and all necessary documentation supporting the issue of the Certificate is to be submitted to Penrith City Council, if Council is not the Principal Certifying Authority.

Name: Mahbub Alam

Signature:

For the Development Services Manager

Department of Primary Industries
Office of Water

Contact: Gina Potter
Phone: 02 8838 7566
Fax: 02 8838 7554
Email: gina.potter@water.nsw.gov.au
Our ref: 10 ERM2012/0568
Our file: 9056177
Your ref:

The General Manager
Penrith City Council
PO Box 60
Penrith NSW 2751

Attention:

4 March 2013

Dear Sir/Madam

Re: Integrated Development Referral – General Terms of Approval
Dev Ref:
Description of proposed activity: Industrial Building - alterations and additions
Site location: Lot 1 DP747153 126 Andrews Road Penrith

I refer to your recent letter regarding an integrated Development Application (DA) proposed for the subject property. Attached, please find the Office of Water's General Terms of Approval (GTA) for works requiring a controlled activity approval under the *Water Management Act 2000* (WM Act), as detailed in the subject DA.

Please note Council's statutory obligations under section 91A (3) of the *Environmental Planning and Assessment Act 1979* (EPA Act) which requires a consent, granted by a consent authority, to be consistent with the general terms of any approval proposed to be granted by the approval body.

If the proposed development is approved by Council, the Office of Water requests that these GTA be included (in their entirety) in Council's development consent. Please also note the following:

- The Office of Water should be notified if any plans or documents are amended and these amendments significantly change the proposed development or result in additional works on waterfront land (which includes (i) the bed of any river together with any land within 40 metres inland of the highest bank of the river, or (ii) the bed of any lake, together with any land within 40 metres of the shore of the lake, or (iii) the bed of any estuary, together with any land within 40 metres inland of the mean high water mark of the estuary).

- Once notified, the Office of Water will ascertain if the amended plans require review or variation/s to the GTA. This requirement applies even if the proposed works are part of Council's proposed consent conditions and do not appear in the original documentation.

- The Office of Water should be notified if Council receives an application to modify the development consent and the modifications change any activities on waterfront land.

- The Office of Water requests notification of any legal challenge to the consent.

As the controlled activity to be carried out on waterfront land cannot commence before the applicant applies for and obtains a controlled activity approval, the Office of Water recommends the following condition be included in the development consent:

> "The Construction Certificate will not be issued over any part of the site requiring a controlled activity approval until a copy of the approval has been provided to Council".

The attached GTA are not the controlled activity approval. The applicant must apply (to the Office of Water) for a controlled activity approval **after consent** has been issued by Council **and before** the commencement of any work or activity on waterfront land.

Finalisation of a controlled activity approval can take up to eight (8) weeks from the date the Office of Water receives all documentation (to its satisfaction). Applicants must complete and submit (to the undersigned) an application form for a controlled activity approval together with any required plans, documents, the appropriate fee and security deposit or bank guarantee (if required by the Office or Water) and proof of Council's development consent.

Application forms for the controlled activity approval are available from the undersigned or from the Office of Water's website:
www.water.nsw.gov.au Water licensing › Approvals › Controlled activities

The Office of Water requests that Council provide a copy of this letter to the applicant.

The Office of Water also requests that Council provides the Office of Water with a copy of the determination for this development application as required under section 91A (6) of the EPA Act.

Yours Sincerely

Gina Potter
Licensing Officer (Controlled Activities)
Office of Water - Licensing South

General Terms of Approval

for work requiring a controlled activity approval under s91 of the Water Management Act 2000

Our Reference: 10 ERM2012/0568 **File No:** 9056177

Site Address: Lot 1 DP747153 126 Andrews Road Penrith

DA Number:

LGA: Penrith City Council

Number	Condition
Plans, standards and guidelines	
1	These General Terms of Approval (GTA) only apply to the controlled activities described in the plans and associated documentation relating to and provided by Council: (i) Site plan, map and/or surveys **in relation to the proposed hardstand area, associated drainage works and VMP only** Any amendments or modifications to the proposed controlled activities may render these GTA invalid. If the proposed controlled activities are amended or modified the NSW Office of Water must be notified to determine if any variations to these GTA will be required.
2	Prior to the commencement of any controlled activity (works) on waterfront land, the consent holder must obtain a Controlled Activity Approval (CAA) under the Water Management Act from the NSW Office of Water. Waterfront land for the purposes of this DA is land and material in or within 40 metres of the top of the bank or shore of the river identified.
3	The consent holder must prepare or commission the preparation of: (i) Vegetation Management Plan (ii) Works Schedule (iii) Erosion and Sediment Control Plan (iv) Soil and Water Management Plan
4	All plans must be prepared by a suitably qualified person and submitted to the NSW Office of Water for approval prior to any controlled activity commencing. The following plans must be prepared in accordance with the NSW Office of Water's guidelines located at www.water.nsw.gov.au/Water-Licensing/Approvals/default.aspx (i) Vegetation Management Plans (ii) Riparian Corridors (iii) In-stream works (iv) Outlet structures
5	The consent holder must (i) carry out any controlled activity in accordance with approved plans and (ii) construct and/or implement any controlled activity by or under the direct supervision of a suitably qualified professional and (iii) when required, provide a certificate of completion to the NSW Office of Water.
6	The consent holder must carry out a maintenance period of two (2) years after practical completion of all controlled activities, rehabilitation and vegetation management in accordance with a plan approved by the NSW Office of Water.

www.water.nsw.gov.au
Macquarie Tower, 10 Valentine Avenue, Parramatta NSW 2150 PO Box 3720 Parramatta NSW 2124 Australia | t + 61 2 8281 7777 | f + 61 2 8838 7554 I e information@water.nsw.gov.au I ABN 47 661 556 763
170912

Our Reference: 10 ERM2012/0568 **File No:** 9056177

Site Address: Lot 1 DP747153 126 Andrews Road Penrith

DA Number:

LGA: Penrith City Council

Number	Condition
7	The consent holder must reinstate waterfront land affected by the carrying out of any controlled activity in accordance with a plan or design approved by the NSW Office of Water.
8	The consent holder must use a suitably qualified person to monitor the progress, completion, performance of works, rehabilitation and maintenance and report to the NSW Office of Water as required.
9	The consent holder must provide a security deposit (bank guarantee or cash bond) - equal to the sum of the cost of complying with the obligations under any approval - to the NSW Office of Water as and when required.
10	N/A
11	The consent holder must not locate ramps, stairs, access ways, cycle paths, pedestrian paths or any other non-vehicular form of access way in a riparian corridor other than in accordance with a plan approved by the NSW Office of Water.
12-13	N/A
14	The consent holder must ensure that no materials or cleared vegetation that may (i) obstruct flow, (ii) wash into the water body, or (iii) cause damage to river banks; are left on waterfront land other than in accordance with a plan approved by the NSW Office of Water.
15	The consent holder is to ensure that all drainage works (i) capture and convey runoffs, discharges and flood flows to low flow water level in accordance with a plan approved by the NSW Office of Water; and (ii) do not obstruct the flow of water other than in accordance with a plan approved by the NSW Office of Water.
16	The consent holder must stabilise drain discharge points to prevent erosion in accordance with a plan approved by the NSW Office of Water.
17	The consent holder must establish all erosion and sediment control works and water diversion structures in accordance with a plan approved by the NSW Office of Water. These works and structures must be inspected and maintained throughout the working period and must not be removed until the site has been fully stabilised.
18	The consent holder must ensure that no excavation is undertaken on waterfront land other than in accordance with a plan approved by the NSW Office of Water.
19	The consent holder must ensure that any excavation does not result in (i) diversion of any river (ii) bed or bank instability or (iii) damage to native vegetation within the area where a controlled activity has been authorised, other than in accordance with a plan approved by the NSW Office of Water.
20	N/A
21	The consent holder must ensure that the surfaces of river banks are graded to enable the unobstructed flow of water and bank retaining structures result in a stable river bank in accordance with a plan approved by the NSW Office of Water.
22	N/A
23	The consent holder must establish a riparian corridor along the wetland in accordance with a plan approved by the NSW Office of Water.

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170912

Our Reference:	10 ERM2012/0568	**File No:** 9056177
Site Address:	Lot 1 DP747153 126 Andrews Road Penrith	
DA Number:		
LGA:	Penrith City Council	

Number	Condition
END OF CONDITIONS	

www.water.nsw.gov.au
Macquarie Tower, 10 Valentine Avenue, Parramatta NSW 2150 PO Box 3720 Parramatta NSW 2124 Australia | t + 61 2 8281 7777 | f + 61 2 8838 7554 I e information@water.nsw.gov.au I ABN 47 661 556 763
170912

Our Ref: X11354.W

BROWN
Smart Consulting

Brent Winning
Principal Consultant
Claron Consulting
PO Box 115
Castle Hill, NSW 1765

3 May 2013

Attention: Mr Brent Winning

Dear Brent,

RE: 126 Andrews Road Penrith, EPA Clarification

Introduction

I refer you to the letter from EPA dated 25/03/13 from Jacqueline Ingham titled *Revised Adequacy Assessment – Penrith Glass Beneficiation Project SSd-5267*. The letter from EPA requested clarification with certain elements of the design with respect to drainage and water quality. Clarification to the dot points noted in the letter is given below:

- Clarify whether the bunkers will be constructed so that these will not be inundated or discharge waste and/or leachate during a 1 in 20 year ARI flood event and during the 1 in 100 year ARI flood event.
    - The 1 in 20 year ARI flood level was not provided to Brown Consulting from Penrith City Council therefore an assessment on inundation cannot be made without further information. In the 1 in 100 year ARI flood event the bunkers will be inundated however the site is to drain in such a manner that flows are directed to G.P.T's as further explained below.
- Clarify the drainage of this area is to include;
    - Whether the bunker will be designed to drain to the wetlands.
        - The bunkers are designed to drain to the wetlands but not before draining to the proposed G.P.T's as shown in **Figure 1** below.

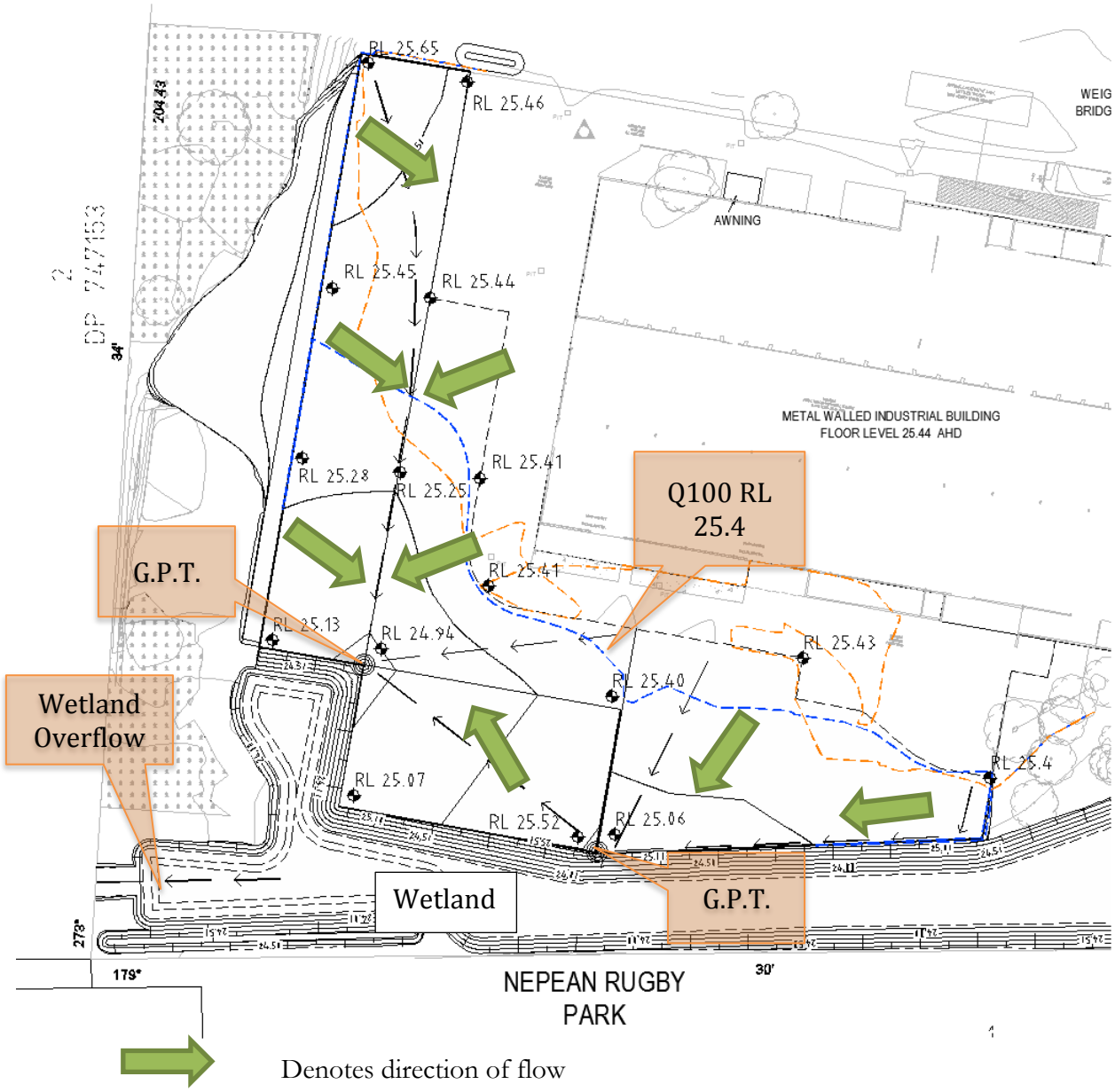


Figure 1: Drainage Concept

- Whether the GPT's constructed at the two low points will collect runoff from the bunkers and will be able to remove entrained glass cullet.
  - The GPT's proposed are CDS type units or equivalent and will be capable to capture any glass cullet carried by runoff before outflowing into the proposed wetland.

- Clarify the design parameters of the constructed wetland, to include polishing of runoff from the bunkers.
  - The wetland was sized in *MUSIC*. The wetland and GPTs were sized in order to meet the pollution reduction targets of 85% reduction of Total Suspended Solid, 45% reduction of Total Phosphorus, and 45% of Total Nitrogen generated from the area of new works on site. Modelled rainfall data used in the *MUSIC* model was modified to suit local Penrith conditions and the catchment pollutant concentration parameters based on those specified in *Draft NSW MUSIC*

Modelling Guidelines (Sydney Metro CMA, August 2010). The pollutant concentration parameters used are given below in **Table 1**.

Table 1: MUSIC Concentration Parameters

Base Flow Concentration Parameters

Concentration (mg/L-log$_{10}$)						
	TSS		TP		TN	
	mean	std. dev	mean	std. dev	mean	std. dev
Land use/zoning						
Residential	1.20	0.17	-0.85	0.19	0.11	0.12
Commercial	1.20	0.17	-0.85	0.19	0.11	0.12
Industrial	1.20	0.17	-0.85	0.19	0.11	0.12
Rural residential	1.15	0.17	-1.22	0.19	-0.05	0.12
Agricultural	1.30	0.13	-1.05	0.13	0.04	0.13
Forest	0.78	0.13	-1.52	0.13	-0.52	0.13
Surface type						
Roofs	n/a	n/a	n/a	n/a	n/a	n/a
Sealed roads (if contains a pervious fraction e.g. verge)	1.20	0.17	-0.85	0.19	0.11	0.12
Unsealed roads[1]	1.20	0.17	-0.85	0.19	0.11	0.12
Eroding gullies[1]	1.20	0.17	-0.85	0.19	0.11	0.12

Storm Flow Concentration Parameters

Concentration (mg/L-log$_{10}$)						
	TSS		TP		TN	
	mean	std. dev	mean	std. dev	mean	std. dev
Land use/zoning						
Residential	2.15	0.32	-0.60	0.25	0.30	0.19
Commercial	2.15	0.32	-0.60	0.25	0.30	0.19
Industrial	2.15	0.32	-0.60	0.25	0.30	0.19
Rural residential	1.95	0.32	-0.66	0.25	0.30	0.19
Agricultural	2.15	0.31	-0.22	0.30	0.48	0.26
Forest	1.60	0.20	-1.10	0.22	-0.05	0.24
Surface type						
Roofs	1.30	0.32	-0.89	0.25	0.30	0.19
Sealed roads	2.43	0.32	-0.30	0.25	0.34	0.19
Unsealed roads[1]	3.00	0.32	-0.30	0.25	0.34	0.19
Eroding gullies[1]	3.00	0.32	-0.30	0.25	0.34	0.19

All water quality modelling was performed on the basis that the glass cullet material was sufficiently cleaned prior to storage in the outdoor bunkers therefore no specific modelling parameters were introduced. All surface drainage on proposed concrete hardstand areas and bunker locations are

designed to be directed to GPT's prior to discharge into the proposed wetland for further treatment.

If any further clarification is require in response to EPA comments then please contact Brendan Hill on 8808 500 or the undersigned.

Yours sincerely
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