ENVIRONMENTAL IMPACT STATEMENT
RESOURCE RECOVERY FACILITY
55 MARTIN ROAD, BADGERYS CREEK

Prepared for: AMJ Demolition and Excavations
Claron Consulting

Prepared by: Emma Hansma, Environmental Engineer
Lauren O'Brien, Environmental Intern
Patrick Finnerty, Graduate Environmental Scientist
Jessica Roy, Environmental Scientist
Peter Gangemi, Acoustic Engineer
Linda Zanotto, Senior Environmental Engineer
R T Benbow, Principal Consultant

Report No: 171127_EIS-Rev2
March 2018
(Released: 22 March 2018)

Benbow
ENVIRONMENTAL

Engineering a Sustainable Future for Our Environment

Head Office: 13 Daking Street North Parramatta NSW 2151 AUSTRALIA
Tel: 61 2 9890 5099 Fax: 61 2 9890 5399
Email: admin@benbowenviro.com.au
Visit our website: www.benbowenviro.com.au

Form 2

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

development application

applicant name	AMJ Demolition and Excavations
applicant address	44 Pearson St, South Wentworthville NSW 2145
land to be developed: address	55 Martin Road, Badgerys Creek, NSW 2555
lot no, DP/MPS, vol/fol etc	Lot 4 DP611519
proposed development	Establishment of a resource recovery facility that handles up to 95,000 tonnes per annum of construction and demolition waste.

or
☐ map(s) attached

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	xx R T Benbow
name	Richard T Benbow
date	22 March 2018

LIMITATIONS

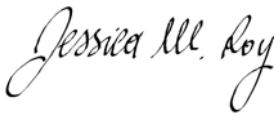
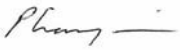
Our services for this project are carried out in accordance with our current professional standards for site assessment investigations. No guarantees are either expressed or implied.

This report has been prepared solely for the use of AMJ Demolition and Excavation, as per our agreement for providing environmental services. Only AMJ Demolition and Excavation is entitled to rely upon the findings in the report within the scope of work described in this report. Otherwise, no responsibility is accepted for the use of any part of the report by another in any other context or for any other purpose.

Although all due care has been taken in the preparation of this study, no warranty is given, nor liability accepted (except that otherwise required by law) in relation to any of the information contained within this document. We accept no responsibility for the accuracy of any data or information provided to us by AMJ Demolition and Excavation for the purposes of preparing this report.

Any opinions and judgements expressed herein, which are based on our understanding and interpretation of current regulatory standards, should not be construed as legal advice.

DOCUMENT CONTROL

Prepared by:	Position:	Signature:	Date:
Lauren O'Brien,	Environmental Intern		22 March 2018
Jessica Roy	Environmental Scientist		22 March 2018
Emma Hansma	Environmental Engineer		22 March 2018
Patrick Finnerty	Graduate Environmental Scientist		22 March 2018
Peter Gangemi	Senior Acoustic Engineer		22 March 2018
Linda Zanotto	Senior Environmental Engineer		22 March 2018
R T Benbow	Principal Consultant		22 March 2018
Reviewed by:	**Position:**	**Signature:**	**Date:**
R T Benbow	Principal Consultant		22 March 2018
Approved by:	**Position:**	**Signature:**	**Date:**
R T Benbow	Principal Consultant		22 March 2018

DOCUMENT REVISION RECORD

Revision	Date	Description	Checked	Approved
1	27-2-2018	Draft / Rev1	R T Benbow	R T Benbow
2	22-3-2018	Rev2	R T Benbow	R T Benbow

DOCUMENT DISTRIBUTION

Revision	Issue Date	Issued To	Issued By
1	27-2-2018	AMJ Demolition and Excavation	Benbow Environmental
2	22-3-2018	AMJ Demolition and Excavation	Benbow Environmental

Benbow ENVIRONMENTAL

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
E-mail: admin@benbowenviro.com.au
Visit our Website at www.benbowenviro.com.au

STUDY TEAM

R.T. Benbow	Benbow Environmental	Project Manager Consultation, Justification, Alternatives, Description of Proposal, Environmental Impact Statement Compilation
Nicolas Israel	National Integrated Creative Solutio	Project Technical Review
Linda Zanotto	Benbow Environmental	Water Management, Waste, Environmental Impact Statement Compilation
Lauren O'Brien	Benbow Environmental	Air Quality Assessment, Environmental Impact Statement Compilation
Peter Gangemi	Benbow Environmental	Noise Impact Assessment
Emma Hansma	Benbow Environmental	Air Quality Assessment, Description of the existing environment, Health, Socio-economic impacts, Soil, Flora & Fauna, Waste, Visual, Greenhouse Gas Assessment, ESD, Cumulative Impacts, Summary of Impacts & Mitigation Measures, Environmental Impact Statement Compilation
Patrick Finnerty	Benbow Environmental	Environmental Impact Statement Compilation
Vince Wang	Project Tourism International Architecture Pty Ltd	Architectural Drawings, Site Plans
Laurie Ihnativ	STS GeoEnvironmental	Geotechnical investigation, Preliminary Acid Sulfate Soils Assessment, Salinity Assessment, Wastewater Assessment, Preliminary Site Investigation
Matt Green	STS GeoEnvironmental	Geotechnical investigation, Preliminary Acid Sulfate Soils Assessment, Salinity Assessment, Wastewater Assessment
J A. Pierre	STS GeoEnvironmental	Preliminary Site Investigation
Lisa Jones	Ecological Consultants Australia Pty Ltd	Flora and Fauna Survey and Impact Assessment
Mia Dalby-Ball	Ecological Consultants Australia Pty Ltd	Flora and Fauna Survey and Impact Assessment
Nicholas Yu	Ecological Consultants Australia Pty Ltd	Flora and Fauna Survey and Impact Assessment
Glenyss Laws	Glenyss Law Consulting Arborist	Arboricultural Impact Assessment
Geoff Morris	Transport and Urban Planning	Traffic Assessment

ABBREVIATIONS

ABL	Assessment background level
AHD	Australian Height Datum
BCA	Building Code of Australia
C&D	Construction and Demolition
DA	Development Application
DCP	Development Control Plan
DPI	Department of Primary Industry
DP&E	Department of Planning and Environment
DoP	Department of Planning
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
ENM	Excavated Natural Material
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	Ecologically Sustainable Development
GDE	Groundwater Dependent Ecosystem
GHS	Globally Harmonised System of Classification and Labelling of Chemicals
LEP	Local Environmental Plan
LPG	Liquefied petroleum gas
NRC	Natural Resources Commission
NSW	New South Wales
NSW EPA	New South Wales Environment Protection Authority
OSD	On-site detention
$PM_{2.5}$	Particulate matter less than 2.5 μm in aerodynamic equivalent diameter
PM_{10}	Particulate matter less than 10 μm in aerodynamic equivalent diameter
RBL	Rating background level
RNP	NSW EPA Road Noise Policy
RMS	Roads and Maritime Services
SEARS	Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
TIAR	Traffic Impact Assessment Report
TSP	Total suspended particulates
VENM	Virgin Excavated Natural Material
WMP	Waste Management Plan
WSP	Water Sharing Plan

UNITS OF MEASUREMENT

°C	degree centigrade	(unit of temperature)
dB(A)	A-weighted decibels	(unit of noise)
ha	hectares	(unit of area)
g	gram	(unit of mass)
kg	kilogram	(unit of mass)
kL	kilolitre	(unit of volume)
km	kilometre	(unit of length)
Mt	million tonnes	(unit of mass)
m	metre	(unit of length)
m^2	squared metre	(unit of area)
m^3	cubic meter	(unit of volume)
ODU	odour detection unit	(unit of odour)
OU	odour unit	(unit of odour)
T	Tonne (1000 kg)	(unit of mass)
μg	microgram	(10^{-6} gm – unit of mass)

EXECUTIVE SUMMARY

AMJ Demolition and Excavation proposes to establish a resource recovery facility at 55 Martin Road, Badgerys Creek NSW 2555. The facility would receive, handle and process both Construction and Demolition (C&D) waste, including soil (VENM/ENM) and green waste (only garden waste). The amount of waste to be processed is estimated to be approximately 95,000 tonnes per year.

The construction of the facility involves building a large shed to enclose the processing operations. This would house a crushing plant and screening operations, stockpile areas and storage bays. Additionally, the following components would be installed/built: weighbridge, wheel wash, and car park. No demolition works would be needed. Construction waste, from the facility construction phase, is expected to consist of General Solid Waste (non-putrescible) and would be recycled or disposed of offsite. The one storey brick residence that will function as an office and associated amenities is already present on site.

The operation of the facility involves the following activities to be undertaken on site:

- Unloading and loading of materials;
- Material handling and sorting;
- Crushing and screening of concrete, bricks, and other waste materials;
- Material storage.

Benbow Environmental was commissioned by AMJ Demolition and Excavation to prepare the EIS to support the development application. This EIS addresses the requirements of the Department of Planning and Environment, Liverpool City Council, the NSW Environment Protection Authority and Department of Primary Industries- Water. The environmental and planning issues that were raised in these requirements and in the consultation undertaken for the project that warrant detailed assessment include strategic context, noise and vibration, air quality, soil and water, flora and fauna, waste management, hazards and risk, traffic and transport, visual amenity. Other minor issues that have been addressed include chemical management, heritage and human health.

A summary of the detailed assessments is included below:

Strategic Context

The project has been driven by the need to match market demands for processing construction and demolition waste in the region. This has provided an opportunity for this successful and viable business to further expand its production capacity. The justifications for implementing the proposed expansion include:

- Reduce the quantity of construction and demolition wastes in landfill;
- Reduce transportation costs of the removal of construction and demolition wastes;
- Generation of local employment;
- The proposal presents no significant threats to the environment;
- The proposal supports ecologically sustainable development; and
- Extensive environmental safeguards have been designed into the development to minimise environmental impacts.

The land zoning for the subject land is described as RU1 – Primary Production under the provisions of the *Liverpool Local Environmental Plan* (LLEP) *2008*, which applies to the subject site. The proposed development is not a permitted use with consent within the RU1 Zone, under the Liverpool LEP 2008. However, the proposal is permitted with consent under Clause 121 of Division 23, Part 3, of the *State Environmental Planning Policy* (SEPP) *(Infrastructure) 2007*.

The proposal constitutes designated development under Schedule 3, Part 1 of the *Environmental Planning and Assessment Regulation 2000*, as it is captured by Clauses 32(1)(b)(iii), 32(1)(c) and, partly, 32(1)(d).

The proposal constitutes integrated development as it includes a number of scheduled activities as defined by clauses 34, 41 and 42 under the *Protection of the Environment Operations Act 1997* and, therefore, it constitutes integrated development and requires an Environment Protection Licence (EPL).

A planning assessment undertaken in Section 3 demonstrates that the proposal is consistent with all relevant planning strategies, environmental planning instruments and development control plans.

The Study Area

The EIS addresses a study area that includes the immediate neighbouring properties within a radius of 0.37 km from the subject site.

Consultation

Consultation has been undertaken with the local Council, the NSW EPA and the local residents in Martin Road and Lawson Road. A community information sheet was hand delivered to residents or left in their letterboxes if the property entrance was locked or it was likely no-one was home.

Justification

This site was selected as it was well placed to receive this type of waste and need will increase with the development of the airport. The land is suited to this type of activity as it is reasonably flat, and has the following good features:

- Adequate area;
- Good road access; and
- Sufficiently separated from residences that amenity criteria can be satisfied by designing adequate controls which would not affect the viability of the business.

The purpose of the proposal is to reduce the quantity of wastes going to landfill and recovery materials so these can be resources for reuse.

Alternatives

There are numerous sites that could be used for this purpose. This site has advantages as it is removed from waterways, removed from heavily populated areas, within land uses that are reasonable and amendable to a well-designed resource recovery facility. Other alternate sites were not fully evaluated as this site is within an area that will benefit from having access to a well-run, compliant facility and the site is owned by the proponent. The need to consider other alternative sites in greater detail was not considered to be required.

Objectives of the Proposal

The proposal has many objectives:

- Operate a construction and demolition waste resource recovery facility.
  - Process approximately 95,000 tonnes of waste per year;
  - Process construction and demolition waste, including bricks, concrete, timber, glass, metal, as well as garden waste, soil (VENM/ENM) and general waste;
  - Process this waste via sorting, crushing and screening operations.
- Operate the facility with a minimal waste going to landfill.
- Design, plan, construct and operate the development with high environmental standards, meeting the relevant legislative requirements and adhering to cleaner production principles.
- A modern resource recovery facility, with the processing activities undercover, benefits the long term environmental management of this industry.
- This industry needs to adopt having processes with weather protection. This is a requirement of the NSW EPA which is strongly supported. This objective would be met.
- Similarly, another major objective is having in place a surface water management plan that prevents offsite discharges.
- To accept waste materials and convert these so that the majority of the waste may be reused.
- Provide local employment opportunities.

Air Quality

An Air Quality Impact Assessment has been undertaken for the proposed development. A full copy of the AQIA is provided as Appendix 6.

A brief summary of the findings is presented below.

The predicted cumulative impacts of TSP, PM_{10} and $PM_{2.5}$ at all identified receptors for an annual averaging period were below the specified criteria.

The subject site is located in a region that can experience 24 hour periods of elevated background PM_{10} and $PM_{2.5}$ levels. No additional exceedances were predicted to occur under a 24 hour averaging period for PM_{10} or $PM_{2.5}$ as a result of the proposal.

Therefore, the "*Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales*" criteria are satisfied at all residential receptors for all particulate air pollutants modelled. No further controls are recommended.

Noise

A full Noise Impact Assessment (NIA) has been undertaken for the proposed development and is provided in Appendix 8.

The noise impact assessment was undertaken in accordance with the following guidelines:

- NSW Environment Protection Authority Noise Policy for Industry 2017;
- Department of Environment, Climate Change and Water NSW Road Noise Policy 2011; and
- Department of Environment, Climate Change and Water NSW Interim Construction Noise Guideline 2009.

The nearest receivers and noise criteria were identified. The site operations were modelled using the predictive noise software, Sound Plan V7.3.

The activities proposed by the proponent were found to be within the framework of the NSW Noise Policy for Industry. The noise generating scenarios are predicted to comply with the project specific noise levels at all receivers. Recommendations for noise controls are given in section 8.2.1.4, including sound power levels for the front end loader, perimeter fencing, equipment and usage of automated roller doors for noise control.

Compliance with the guidelines set out in the NSW Road Noise Policy was predicted at all considered receptors.

Construction activities are recommended to be limited to standard hours in accordance with the Interim Construction Noise Guideline.

Soil and Water

Stormwater drainage has been designed in accordance with Council's Development Control Plan. A Stormwater Management Plan and Report was prepared by Robert Peterson of Ultramark Pty Ltd and includes and assessment of the stormwater management requirements for the proposed development and proposes a best practice stormwater management strategy.

A 633 m^3 underground OSD tank is to be located at the western end of the hardstand area and would include a 100 kL rainwater tank and stormfilter treatment system. The lower 0.65 ha portion of the site would bypass the detention tank. The roof areas of the shed and bins would be directed to the rainwater tank and the remaining 1.89 ha site area would drain to the OSD tank.

The roof area of the existing office and amenities building would be captured in a smaller 3 kL rainwater tank that would be connected to the toilets and local irrigation. Overflow from this tank would be directed to the main rainwater tank.

The existing dam located on the western end of the site would remain to maintain the current conditions of the existing Cumberland Plain vegetation in this area of the site. The dam and vegetation would not be part of the stormwater management for the proposed development.

The treated water from the stormfilter system would be discharged via the outlet on the boundary of Lawson Road.

The potential for impacts to soil and water are greatly minimised due to the safeguards and controls designed into the facility. In addition to the stormwater drainage system, the following would be implemented:

- Purpose built shed for all processing activities;
- Covered material storage area;
- Hardstand area such as compacted road base material or similar;
- Closed loop wheel wash system;
- Bunded diesel storage system;
- Spill kits;
- Water monitoring program; and
- Regular workplace inspections.

Flora and Fauna

An arboriculture impact assessment for the subject site is provided in Appendix 10. A flora and fauna survey and impact assessment is provided in Appendix 9.

The NSW Government's Biodiversity Values Map identifies the Lawson Road frontage of the property to be of biodiversity significance. The trees assessed are recognized as the dominant canopy species which form part of the Cumberland Plain Woodland. Cumberland Plain Woodland is listed as a Critically Endangered Ecological Community.

The following mitigation measures are recommended in order to minimise the impact of the proposed development on the surrounding environment:

- Delineation of work areas;
- Removal of weeds prior to construction;
- Seed collection from native vegetation on site prior to removal;
- Dead wood and logs to be retained upon removal;
- Bush hygiene controls during construction;
- Weed management during construction;
- Revegetation works once construction is complete including reintroduction of seeds and dead wood; and
- Two (2) nest boxes (one for microbats and another for local lorikeets) would be installed onsite after construction is complete.

Waste

The main waste type generated as a result of the proposed development during construction and ongoing operations would be that of General solid waste (non-putrescible), together with small amounts of General solid waste (putrescible). The main waste type accepted on site as part of the ongoing business operations of the proposed development would also be that of General solid waste (non-putrescible). Occasionally, other waste types like Hazardous waste may enter the subject site; for example, in the case of asbestos containing material being found within the C&D waste loads accepted at the proposed facility. The necessary management plans to prevent acceptance of unwanted waste types on site have been identified in Section 8.6.3.

Hazards and Risks

The main hazards and risks associated with the proposal include:

- Storage and use of hazardous chemicals - for this site diesel fuel would be the only chemical;
- Fire risk; and
- Spillage incidents.

A preliminary risk screening of the proposed development in accordance with State Environment Planning Policy No. 33 has been undertaken and a preliminary hazard analysis (PHA) is not required due to the fact that the quantity of dangerous goods required to be stored on site does not exceed SEPP 33 thresholds.

Traffic

A Traffic Impact Assessment (TIA) has been undertaken for the proposed development. A full copy of the TIA is provided as Appendix 4.

A brief summary of the findings is presented below.

- Martin Road and Elizabeth Drive have adequate capacity to accommodate estimated low volume of light and heavy vehicles.
- SIDRA modelling shows that with the additional truck volumes added to the intersection, its operation will continue to be Level of Service B, with only minor changes to average delays.
- The traffic impact of the proposed development is therefore assessed as low and acceptable.
- The site access driveways are well designed and are fully in accordance with AS 2890 Parts 1 and 2, for light and heavy vehicles.
- The internal traffic circulation provides generous room for trucks to manoeuvre on site, and all vehicles will be able to enter and leave the site in a forward direction.
- The car park is designed fully in accordance with AS 2890 Parts 1 and 6.
- The traffic impact during construction of the development has been identified to be of a lower level than when the development is completed and is operating. Construction traffic impact is therefore also assessed as low and acceptable.

All access and internal traffic arrangements are designed fully in accordance with relevant Australian Standards.

Conclusions

The environmental assessment process has enabled the potential impacts of the proposed development to be evaluated, and control strategies to be devised in order to ensure compliance with regulatory standards.

To ensure the impacts of the proposed development are kept low, AMJ Demolition and Excavation will update the following plans prior to the operation commencing: Emergency Plan, Environmental Management Plan (EMP), and Pollution Incident Response Management Plan.

A Statement of Commitments is provided as Section 13. The Statement of Commitments summarises the commitment made by AMJ Demolition and Excavation to implement the environmental controls designed into the development. The size and nature of the proposed development is considered to be suited to this site and the request is made that approval be granted.

Approval is requested.

Contents Page

Tables Page

Figures Page

Appendices

EIS Appendix 1: Site Plans
EIS Appendix 2: Geotechnical Investigation, Preliminary Acid Sulfate Soils Assessment, Salinity Assessment & Wastewater Assessment
EIS Appendix 3: Stormwater Management Plan and Report
EIS Appendix 4: Traffic Assessment
EIS Appendix 5: Waste Management Plan (WMP)
EIS Appendix 6: Air Quality Impact Assessment
EIS Appendix 7: Community Consultation Leaflet
EIS Appendix 8: Noise Impact Assessment
EIS Appendix 9: Flora and Fauna Survey and Impact Assessment
EIS Appendix 10: Arboriculture Impact Assessment
EIS Appendix 11: Preliminary Site Investigation
EIS Appendix 12: Visual Impact Assessment
EIS Appendix 13: Landscaping Plan

Attachments

EIS Attachment 1: Secretary's Environmental Assessment Requirements (SEARs)
EIS Attachment 2: Section 149 Certificate

1. INTRODUCTION

Benbow Environmental have been engaged by AMJ Demolition and Excavations to prepare an Environmental Impact Statement (EIS) for the proposed resource recovery facility.

AMJ Demolition and Excavation proposes to establish a resource recovery facility at 55 Martin Road, Badgerys Creek NSW 2555. The facility would receive, handle and process both Construction and Demolition (C&D) waste, including soil (VENM/ENM) and green waste (only garden waste). The amount of waste to be processed annually is estimated to be approximately 95,000 tonnes per year. The consent would be for this quantity.

1.1 PROPOSAL OVERVIEW

The proposed development consists of the construction and operation of a resource recovery facility which would receive, handle and process construction and demolition (C&D) waste, including soil and green waste (comprising of garden waste only). The amount of overall waste to be processed will be approximately 95,000 tonnes per year.

The construction of the facility involves building a large shed to enclose the processing operations. This would house a crushing plant, screening operations and stockpile areas. Storage bays would be under a roofed area that would be constructed. Additionally, the following components would be installed/built: weighbridge, wheel wash, and car park. No demolition works would be needed. Construction waste, from the facility construction phase, is expected to consist of General Solid Waste (non-putrescible) and would be recycled or disposed of offsite. The one storey brick residence that will function as an office and associated amenities, is already present on site. The site plans are presented in Appendix 1.

The operation of the facility involves the following activities to be undertaken on site:

- Unloading and loading of materials;
- Material handling and sorting;
- Crushing and screening of concrete, bricks, untreated timber and similar waste materials; and
- Material storage.

Wastes to be accepted on site are typical building materials, including bricks, concrete, timber, glass, metal, as well as garden waste, soil (VENM/ENM) and general waste. The quantity for each material may vary significantly depending on the source that generated the waste. Nevertheless, all incoming material will be unloaded and sorted within shed. The hardstand area will be made of compacted road base material such as crushed concrete and sandstone or similar. It will be compacted to specifications to ensure that heavy machinery can use it safely and to assist in surface water management. The shed that would be located in the processing area, along the northern boundary of the site, would act as a truck depot and undercover sorting area. The finished product (recovered materials) will then be stored in in the materials stockpile bays; a total of five bays would be available and these are under a roofed area.

Processed waste would be stored in the storage bays for re-selling, either directly from site to trade clients or to a landscape supply outlet offsite. Any waste that is not suitable for resource recovery on site would be stored in designated recycling waste bins and recycled offsite at lawfully licensed facilities for each material. If material cannot be recycled offsite it will be removed offsite for final disposal at a licensed landfill.

A closed-loop wheel wash will be located in close proximity of the site entrance for the washing of trucks entering and exiting the property. Water used in the wheel wash will be recycled and reused within the system. A weighbridge will be installed immediately beyond the wheel wash to measure all incoming and outgoing loads.

The site has ample space for truck turning and manoeuvring in the processing area, as well as a total of 14 car parking spaces for employees and visitors including 2 disabled spaces, adjacent to the office building. Landscaping is planned to line the whole length of the northern and southern site boundaries, while another landscaped area would be established at the front of the property.

1.1.1 Objectives of the Proposal

The objectives of the proposal are:

- Operate a construction and demolition waste resource recovery facility;
  - Process approximately 95,000 tonnes of waste per year;
  - Process construction and demolition waste, including bricks, concrete, timber, glass, metal, as well as garden waste, soil (VENM/ENM) and general waste;
  - Process this waste via sorting, crushing and screening operations.
- Operate the facility with a minimal waste going to landfill;
- Design, plan, construct and operate the development with high environmental standards, meeting the relevant legislative requirements and adhering to cleaner production principles.
- Provide a modern resource recovery facility, with the processing activities undercover, to benefit the long term environmental management of this industry.
- This industry needs to adopt having processes with weather protection. This is a requirement of the NSW EPA which is strongly supported. This objective would be met.
- Similarly, another major objective is having in place a surface water management plan that effectively manages offsite discharges.
- To accept waste materials and convert these so that the majority of the waste may be reused.
- Provide local employment opportunities.

1.1.2 Staging of the Proposal

The proposed development will occur in two stages (construction and operation).

1.2 THE PROPONENT

AMJ Demolition and Excavation is a business trading under its parent company, Antouns Construction which has developed an experienced team to undertake work in the demolition and excavation industry.

1.2.1 Industry Background

Antoun's Construction, parent company of AMJ Demolition and Excavation is a family owned business which has operated for over 10 years in various applications in the construction industry.

AMJ specialises in the following:

- Demolition (commercial, industrial & residential);
- Strip outs;
- Friable and bonded asbestos removal;
- Bulk & Detailed Excavations; and
- Environmental remediation.

1.2.2 Relationship with other Industries or Facilities

The proponent has a strong professional relationship between AMJ Demolition and Excavation, construction companies and related subcontractors across Sydney. The proponent is committed to "no waste" solutions for this industry.

A major source of the construction and demolition waste would be from AMJ Demolition and Excavation projects as well as from other construction and demolition firms undertaking work at sites in the vicinity to the subject site.

1.3 NEED FOR DEVELOPMENT

Badgerys Creek and its surrounding suburbs is a rapidly growing area of NSW. The construction of the airport and the demand for residential developments means this region generates significant quantities of construction and demolition (C&D) waste. In order to reduce transport costs for both the receipt of (C&D) waste and the supply of final product it is ideal to situate a resource recovery facility in this area.

1.4 DEVELOPMENT ALTERNATIVES

1.4.1 Criteria for Selection

The site has been selected for the resource recovery facility because it is a suitable size and is located in an area with easy access to Elizabeth Drive.

The benefits of utilising the site for the proposed facility are as follows:

- The existing site has sufficient room available for the proposed development;
- The cost of establishing the business on this site is low;
- The site is not in a sensitive land use area;
- The development is a permitted use with consent;
- The development is a beneficial use which would fulfil the principles of ecologically sustainable development and is to be encouraged;

- The development generates local employment;
- Transport routes are readily available; and
- The site has sufficient room for on-site parking and truck manoeuvring.

1.4.2 Alternative Sites

Alternative sites were not evaluated due to the fact that the proponent is also the owner of the property. There was no justification to consider alternative sites as the existing site is fully able to satisfy the business needs.

1.4.3 Alternative Design and Methods

Site Layout, Access Modes and Routes

The site is accessed by trucks for material delivery and pickup from the western side via Lawson Road which provides direct access to the process area and material storage. The site is accessed by staff cars and visitor cars from the eastern side of the site via Martin Road this provides direct access to the office. This access configuration isolates the industrial operation to the west and the shop front office area to the eastern side of the site preventing unnecessary conflict with vehicles. The existing dwelling on the site will be converted to the office and amenities, this prevents the need to construct a new building. Alternative designs could be cars and trucks access from one side of the site; however this could cause conflict between cars and trucks. If the trucks entered from the east and the cars from the west then the vehicles would not have direct access to their respective areas.

The process building and the storage bays being located on the northern boundary and mid-way of the eastern, optimises the available space in the middle of the site. Due to the location of the drainage easement, this is ideal as the storage bays are located away from the truck manoeuvring areas, providing more available space. This allows for more storage without conflict with the drainage easement and site drainage. Any alternatives would result in less available storage and/or conflict with the drainage easement.

Materials Handling and Production Processes

The material handling and production process of receiving, sorting, crushing is standard for a C&D resource recovery facility and considering alternatives for this process is not warranted. The processing is undertaken within the building and this significantly reduces dust and noise impacts.

Waste and Water Management

The proposal is designed to minimise waste and recover the maximum amount of waste practicable from the C&D materials received. Waste management is assessed in Section 8.6.3. No alternatives to the waste management process are considered warranted. The site utilises the natural fall of the site for surface water management/drainage; any alternatives would require unnecessary earthwork; a detailed assessment of alternative water management designs is not considered warranted.

Impact Mitigation Measures

The site is designed to use the natural fall of the site for drainage purposes, and the processing would be undertaken within the building minimising environmental impacts for dust, noise, soil and water. There are no practical alternatives to the proposed design that would significantly improve the environmental impacts.

Energy Source

The site is connected to the electricity network. No alternatives are considered warranted. However, it is proposed that a backup diesel powered electrical generator be purchased and stored on site just in case it is required in an emergency.

1.4.4 The "No Project" Option

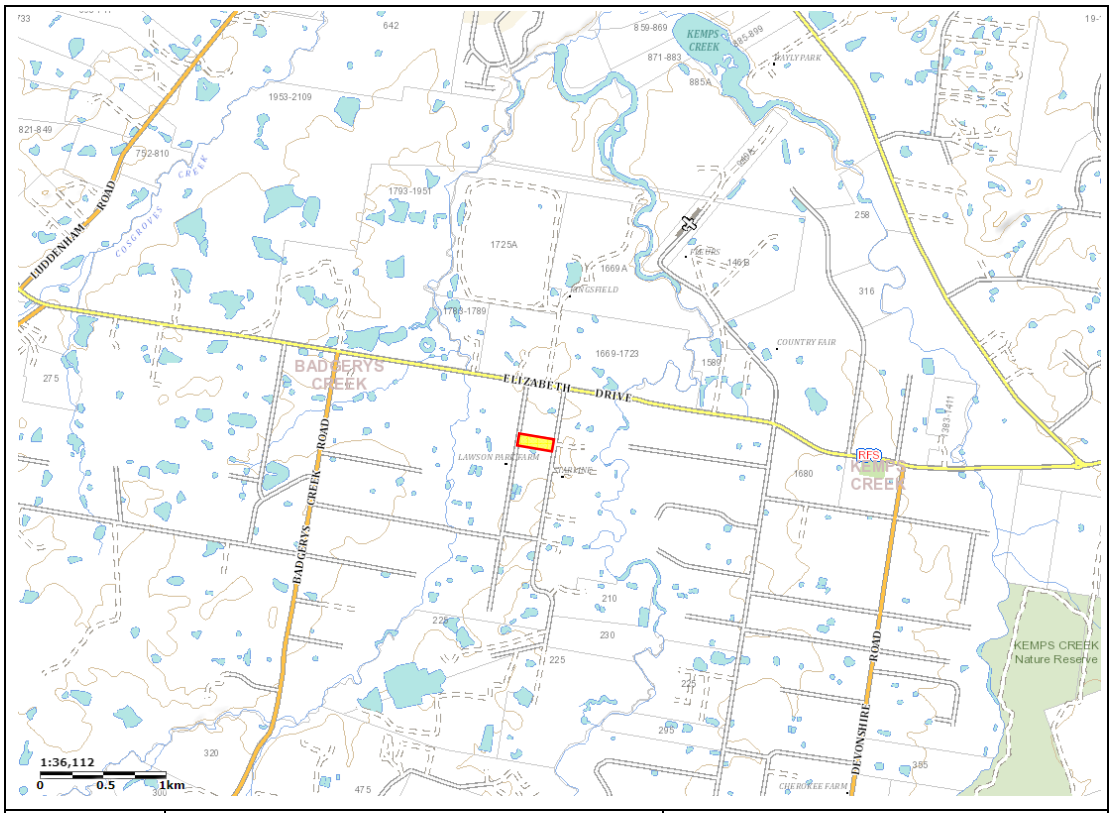
If this proposed development does not go ahead, then C&D waste in the area may end up collected by unauthorised illegal waste collectors, while some may end up in landfill. The "No Project" option is therefore not relevant for clear reasons and further discussion is not warranted.

2. LOCATION AND SETTINGS

2.1 SITE LOCATION AND BOUNDARIES

The proposed development is to be located at 55 Martin Road, Badgerys Creek NSW 2555 ("the subject site"), legally described as Lot 4 DP611519. The location of the subject site is shown in Figure 2-1; the aerial view in Figure 2-2 shows the site in its local context.

Figure 2-1: Location of Subject Site



↑N	**Source:** SIX Maps 2017 **Legend:** Site boundaries	Benbow Environmental 13 Daking Street, North Parramatta NSW 2151

Figure 2-2: Aerial View of the Locality

N	**Source:** SIX Maps 2017 **Legend:** Site boundaries	Benbow Environmental 13 Daking Street, North Parramatta NSW 2151

2.2 SITE LAYOUT AND PLANS

The following site layout shows the process building and final product storage bays the material stockpile area. The existing dwelling will be converted to an office and associated amenities building. Trucks access the site via Lawson Road and staff and visitors access the office via Martin Road. The site layout is presented in Appendix 1. The first figure in Appendix 1 shows the Lawson Road half of the site. This half of the site includes approximately two-thirds of the Colorbond shed used for crushing, screening and storage. The hardstand area in front of the shed is shown. The road across into the site is shown in the southwest corner of the site. The onsite detention basin is shown on this figure, under the hardstand area. The second figure in Appendix 1 shows the rest of the Colorbond shed. Letters AA on each of the first figure of Appendix 1 (far right hand side) and second figure in Appendix 1 (far left hand side) show where the two figures join. The second figure in Appendix 1 shows the Martin Road half of the site. The hardstand area in front of the shed and the covered storage bays – Bay 1 to Bay 5 are shown. Finished product for sale would be stored in these bays. The second figure in Appendix 1 shows the existing residence converted to an office. Trucks would depart the site using Lawson Road.

2.3 EXISTING FACILITIES

The existing site is typical of a rural property. The site is mostly cleared with a dwelling and some trees near the western border and in the south eastern corner of the site.

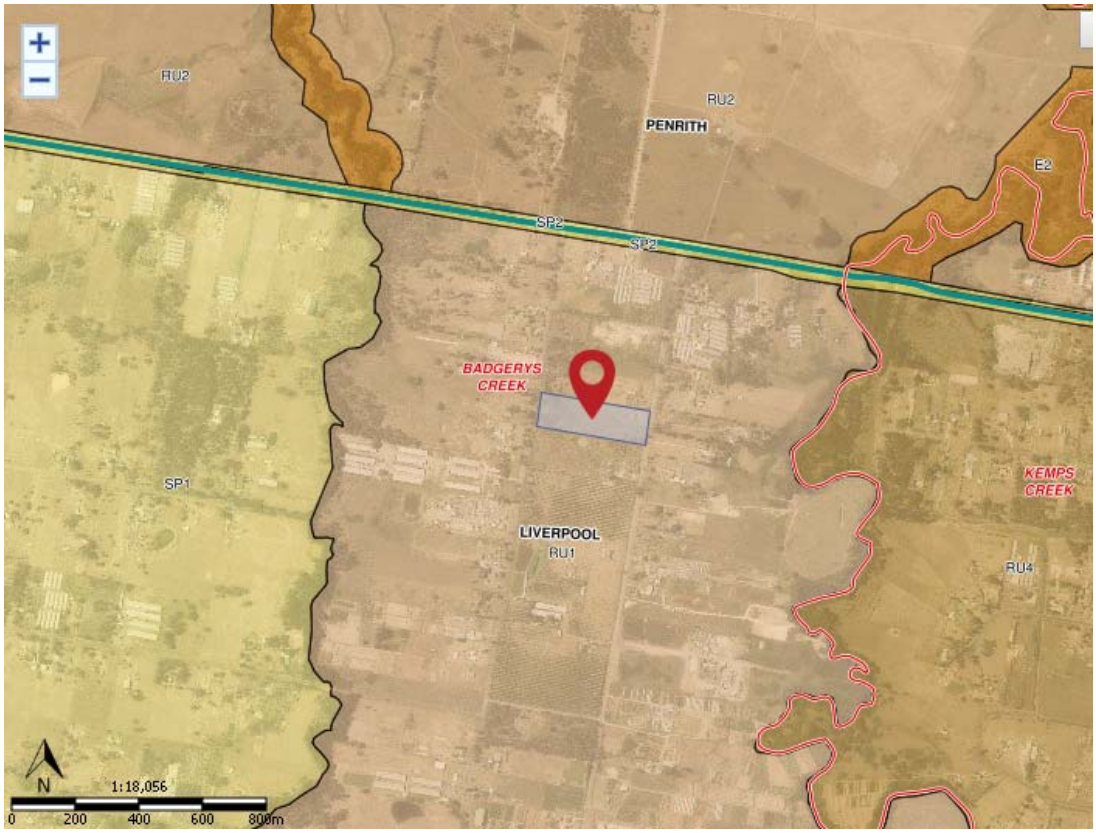
The site is connected to potable water, electricity, phone and internet but not a public sewer system. The dwelling greywater is drained to a septic tank.

2.4 LAND USE

The site is zoned RU1–Primary Production under the Liverpool Local Environment Plan 2008. The surrounding developments are typical of this zone including poultry farms, plantations, stockpiling, crop growing, greenhouse horticulture and rural residences. The land use zoning is presented in Figure 2-3.

The proposed use is consistent with the surrounding development. Environmental impacts on the nearest residences is assessed in detail this EIS.

Figure 2-3: Surrounding land use zoning



Source: https://www.planningportal.nsw.gov.au

Legend:

- B1 - Neighbourhood Centre
- B2 - Local Centre
- B3 - Commercial Core
- B4 - Mixed Use
- B5 - Business Development
- B6 - Enterprise Corridor
- B7 - Business Park
- E2 - Environmental Conservation
- IN1 - General Industrial
- IN2 - Light Industrial
- R2 - Low Density Residential
- R3 - Medium Density Residential
- R4 - High Density Residential
- RE1 - Public Recreation
- RE2 - Private Recreation
- RU1 - Primary Production
- RU2 - Rural Landscape
- RU4 - Primary Production Small Lots
- SP1 - Special Activities
- SP2 - Infrastructure
- UL - Unzoned Land
- DM - Deferred Matter

2.5 LOCAL COMMUNITY

2.5.1 Badgerys Creek and Surrounds

Badgerys Creek is located approximately 40 km west of the Sydney CBD. Surrounding suburbs include Luddenham, Kemps Creek, Bringelly and, Rossmore. The region is predominantly primary production and rural properties.

2.5.2 Population Demographics

The Australian Bureau of Statistics conducts a national census every 4 years. Statistics have been taken from the latest census with available data, carried out in 2016.

At the time of the census, the population within the state suburb of Badgerys Creek consisted of 255 people, 50.5% of which were males and 49.5% female. Of the total persons residing in Badgerys Creek, 84 people were reportedly employed in 2016, of which approximately 63% worked full-time and 32% part-time. The occupations with the largest representation are managers – 25.3%, machinery operators and drivers – 19.5%, clerical and administrative workers – 12.6%, labourers – 12.6%, professionals – 10.3% and technicians and trades workers – 10.3%.

2.5.3 Nearest Sensitive Receivers

The nearest residences are located adjacent to the site to the South, 50 m to the East, 70 m to the southwest and West, and 150 m to the North.

The nearest industrial receivers are located approximately 150 m to the north, 270 m to the North-East and 220 m to the South-West.

The nearest waterway is a small tributary of South Creek approximately 250 m to the east of the site and a small tributary of Badgerys Creek approximately 230 m west of the site.

The nearest areas of biodiversity significance are onsite. Vegetation at the western end of the site is recognized as Cumberland Plain Woodland, a Critically Endangered Ecological Community.

2.6 SITE HISTORY

The site has been used for residential purposes only for at least the last 45 years based on information from the current owners who lived there for the last 40 years.

Historical aerials from Google Earth have confirmed that the site has remained unchanged from 2002 – present.

2.7 EIS FUNCTION AND STRUCTURE

2.7.1 EIS Function

The function 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 criteria are those required for the protection of health and amenity.

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

2.7.2 EIS Structure

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 and Attachments**
  The Attachments contain the requirements of the Secretary's Environmental Assessment Requirements (SEARs), and technical supporting documents.

2.7.3 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 Secretary's Environmental Assessment Requirements (SEARS Reference No. 1182) relating to applicable environmental planning instruments that apply to the site.

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

- Strategic context;
- Waste management;
- Hazards and risk;
- Soil and water;
- Air quality;
- Noise and vibration;
- Traffic and transport; and
- Heritage – including Aboriginal and non-Aboriginal heritage.

A copy of the requirements has been included in Attachment 1 to the EIS and includes requirements of NSW Planning and Environment, Roads and Maritime Services, NSW EPA and WaterNSW. All the SEARS have been considered in the preparation of the EIS.

The Statement of Compliance is listed in Section 4.3 and titled “Compliance with Secretary’s Environmental Assessment Requirements”. There are tables that list the section and page where required information has been provided.

3. PLANNING FRAMEWORK

This section describes the approval process in general terms and provides an assessment of the proposed development in accordance with all relevant statutory planning controls.

3.1 APPROVAL PROCESS

The EIS assesses the potential environmental and socio-economic impacts associated with the proposed development and is prepared in accordance with the requirements of the federal, state and local legislation. A draft version of the EIS will be placed on public exhibition for a period determined by Liverpool City Council.

During the public exhibition period, any person, group, corporation or agency can submit comment on the EIS to Liverpool City Council. If necessary, the EIS is revised taking account of comments received during the exhibition period. The finalised EIS will also provide any additional information that may be required by regulatory authorities, such as the NSW Department of Planning and the Environment (DP&E), NSW Department of Primary Industries and Water, NSW Environment Protection Authority (EPA) upon consideration of the environmental impacts of the proposal.

Liverpool City Council will then consider the finalised EIS to determine development approval. The EIS could also be used to formulate any specific conditions or provisions for purpose of protecting the environment that would be included in the determination.

3.2 PLANNING FRAMEWORK

3.2.1 Commonwealth Controls

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

3.2.2 State Controls

3.2.2.1 State Significant development

Under Clause 8 (1) of the *State Environmental Planning Policy (State and Regional Development) 2011*, development is potentially state significant development if it is specified in Schedule 1 or Schedule 2.

Schedule 1 of the *State Environmental Planning Policy (State and Regional Development) 2011* applies to the development. Clause 23(3) could potentially be relevant to the proposed activities:

23 Waste and resource management facilities

(1) Development for the purpose of regional putrescible landfills or an extension to a regional putrescible landfill that:

(a) has a capacity to receive more than 75,000 tonnes per year of putrescible waste, or
(b) has a capacity to receive more than 650,000 tonnes per year of putrescible waste over the life of the site, or
(c) is located in an environmentally sensitive area of State significance.

(2) 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.

(3) Development for the purpose of resource recovery or recycling facilities that handle more than 100,000 tonnes per year of waste.

(4) Development for the purpose of waste incineration that handles more than 1,000 tonnes per year of waste.

(5) Development for the purpose of hazardous waste facilities that transfer, store or dispose of solid or liquid waste classified in the Australian Dangerous Goods Code or medical, cytotoxic or quarantine waste that handles more than 1,000 tonnes per year of waste.

(6) Development for the purpose of any other liquid waste depot that treats, stores or disposes of industrial liquid waste and:

(a) handles more than 10,000 tonnes per year of liquid food or grease trap waste, or
(b) handles more than 1,000 tonnes per year of other aqueous or non-aqueous liquid industrial waste.

The proposed development is <u>not</u> state significant as the amount of waste to be processed is estimated to be approximately 95,000 tonnes per year. The waste will consist of Construction and Demolition (C&D) waste, including soil (VENM/ENM) and green waste (only garden waste). The waste would not be putrescible, hazardous or liquid waste. The proposed activities would not involve incineration.

The subject site is not an identified site under Schedule 2.

3.2.2.2 Environmental Planning and Assessment Act and Regulation

The *Environmental Planning and Assessment Act 1979* and the *Environmental Planning and Assessment Regulation 2000* provide the framework for environmental planning in NSW. The Act and the Regulation include Provisions to ensure that proposals, which have the potential to impact on the environment, are subject to detailed assessment. Under this legislation the proposed development is defined as both designated and integrated development.

3.2.2.2.1 Designated development

The proposed development constitutes designated development as it is captured by Clauses 32(1)(b)(iii), 32(1)(c) and, partly, 32(1)(d) under Schedule 3, Part 1 of the *Environmental Planning and Assessment Regulation 2000,* reported below.

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.

The proposed development would fit the description of a waste management facility, with an intended handling capacity of more than 30,000 tonnes per year of building demolition material, and which processes more than 5,000 tonnes per year of solid organic materials. The site is known to be located in an area with high sodicity and salinity levels in the soil. The site is also located within 250 m of a dwelling not associated with the development.

An Environmental Impact Statement (EIS) is required to accompany an application for designated development.

3.2.2.2.2 Integrated development

Clause 91 of the EP&A Act defines what constitutes an "Integrated development". Integrated development is development (not being State significant development or complying development) that requires development consent and one or more of the following licences or approvals listed in Table 3-1.

Table 3-1: Licence/Approval Requirements as Integrated Development

Legislation	Require License or Approval
Fisheries Management Act 1994	No
Heritage Act 1977	No
Mines Subsidence Compensation Act 1961	No
Mining Act 1992	No
National Parks and Wildlife Act 1974	No
Petroleum (Onshore) Act 1991	No
Protection of the Environment Operations Act 1997	Yes
Roads Act 1993	No
Rural Fires Act 1997	No
Water Management Act 2000	No

The proposed development includes a number of scheduled activities as defined by clauses 34, 41 and 42 under the *Protection of the Environment Operations Act 1997* and, therefore, it constitutes integrated development and requires an Environment Protection Licence (EPL).

3.2.2.3 Threatened Species Conservation Act 1995

The subject land is 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 under Part 7A of the same Act. This report address the results and findings from the Flora and Fauna Survey and Impact Assessment provided by sub-consultant 'Ecological Consultants Australia Pty Ld' (Appendix 9).

3.2.2.4 NSW Heritage Act 1977

The subject land does not contain an item of environmental heritage and there are no items of environmental heritage in the immediate vicinity of the subject land that would be impacted by its proposed use. Therefore, there are no issues in relation to the *NSW Heritage Act 1977*.

3.2.2.5 Local Land Services Act 2013

Part 5A Land management (native vegetation) details native vegetation regulatory map categories as follows:

- category 1-exempt land: where the clearing of native vegetation is not regulated under this Part
- category 2-regulated land: where the clearing of native vegetation is regulated under this Part
- category 2-vulnerable regulated land: where the clearing of native vegetation is regulated under this Part but (because of its vulnerability) is subject to additional restrictions and extended to the clearing of dead and non-native plants.

The subject site, 55 Martin Road Badgerys Creek is classified as category 1-exempt land in the native vegetation regulatory map and is not subject to this Part 5A of the Act.

The Local Land Services Act 2013 has no further application regarding the proposed development.

3.2.2.6 Biodiversity Conservation Act 2016

According to the S149 certificate, part/all of the land is bio-certified land (within the meaning of Part 7AA of the Threatened Species Conservation Act 1995). The Threatened Species Conservation Act 1995 and Biodiversity Conservation Act 2016 are currently in transitional arrangements. The sub-consultants who provided the Flora and Fauna Survey and Impact Assessment (Appendix 9) completed the report using the *Threatened Species Conservation Act* from 1995 and the sub-consultants who provided the Arboricultural Impact Assessment Report referred to both *Threatened Species Conservation Act 1995* and *Biodiversity Conservation Act 2016.*

3.2.2.7 State and Regional Environmental Planning Policies

A number of State Environmental Planning Policies (SEPPs) and Deemed SEPPs (previously known as Regional Environmental Plans) as well as Draft SEPPs, apply to the subject land and are listed in Table 3-2. The most relevant SEPPs are then discussed in greater detail.

Table 3-2: State and Regional Environmental Planning Policies

Policy	Comments
SEPP No 19 – Bushland In Urban Areas	No application
SEPP No 21 – Caravan Parks	No application
SEPP No 30 – Intensive Agriculture	No application
SEPP No 33 – Hazardous and Offensive Development	**No application: Discussed below**
SEPP No 44 – Koala Habitat Protection	No application
SEPP No 50 – Canal Estate Development	No application
SEPP No 55 – Remediation of Land	**No application: Discussed below**
SEPP No 62 – Sustainable Aquaculture	No application
SEPP No 64 – Advertising and Signage	No application
SEPP No 65 – Design Quality of Residential Flat Developments	No application
SEPP (Affordable Rental Housing) 2009	No application
SEPP (Building Sustainability Index: BASIX) 2004	No application

Table 3-2: State and Regional Environmental Planning Policies

Policy	Comments
SEPP (Exempt and Complying Development Codes) 2008	No application
SEPP (Infrastructure) 2007	**Applies: Discussed below**
SEPP (Mining, Petroleum Production and Extractive Industries) 2007	No application
SEPP (Miscellaneous Consent Provisions) 2007	No application
SEPP (State and Regional Development) 2011	**No application: Discussed below**
SEPP (Sydney Region Growth Centres) 2006	No application
Deemed SEPP: Sydney Regional Environmental Plan (SREP) No 20 – Hawkesbury - Nepean River (No.2 – 1997)	**No application: Discussed below**
Draft SEPP: Draft SEPP (Competition) 2010	No application

3.2.2.7.1 State Environmental Planning Policy No. 33 – Hazardous and Offensive Development

The proposed development would only store minor quantities of chemicals and dangerous goods site and, therefore does not trigger the thresholds listed in SEPP No. 33 – Hazardous and Offensive Development and would not fit the definition of 'potentially hazardous industry' or 'hazardous storage establishment'. This is demonstrated in Section 8.7.2.

3.2.2.7.2 State Environmental Planning Policy No. 55 – Remediation of Land

The construction and installation of the resource recovery facility may require excavation works and therefore the proposal would be assessable under SEPP No. 55 – Remediation of Land. A Phase I and II Environmental Site Assessment (contamination report) have been undertaken as part of the environmental assessment process.

The findings of the Contamination Report (provided in Appendix 2) are briefly summarised below.

Historical information shows that the site has mostly been used for residential purposes and there is no evidence of onsite activities that may have caused contamination.

Soil samples were taken at nineteen borehole sites throughout the site and tested for a range of organic and inorganic contaminants. All measured contaminant concentrations are low and below the NEPM human health and environment criteria. No asbestos fibres were detected.

The site is considered to be suitable for the proposed development in its current condition, and therefore no remediation is required.

3.2.2.7.3 State Environmental Planning Policy (Infrastructure) 2007

The proposal is permitted with consent under Clause 121 of Division 23, Part 3, of the *State Environmental Planning Policy* (SEPP) *(Infrastructure) 2007*, as reported below.

121 Development permitted with consent

(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.

Where:

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.

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

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 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.*

Under Clause 8 of the SEPP (infrastructure) 2007, where there is an inconsistency between this Policy and other environmental planning instruments, such as the Liverpool LEP 2008, this Policy prevails.

3.2.2.7.4 State Environmental Planning Policy (State and Regional Development) 2011

The aims of SEPP (State and Regional Development) 2011 is to identify development that is state significant development, state significant infrastructure or critical state significant infrastructure. Under Clause 8 (1) of the *State Environmental Planning Policy (State and Regional Development) 2011*, development is potentially state significant development if it is specified in Schedule 1 or Schedule 2. Clause 23(3) of Schedule 1 is relevant to the proposed activities:

23 Waste and resource management facilities

(1) Development for the purpose of regional putrescible landfills or an extension to a regional putrescible landfill that:

(a) has a capacity to receive more than 75,000 tonnes per year of putrescible waste, or
(b) has a capacity to receive more than 650,000 tonnes per year of putrescible waste over the life of the site, or
(c) is located in an environmentally sensitive area of State significance.

(2) 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.

(3) Development for the purpose of resource recovery or recycling facilities that handle more than 100,000 tonnes per year of waste.

(4) Development for the purpose of waste incineration that handles more than 1,000 tonnes per year of waste.

(5) Development for the purpose of hazardous waste facilities that transfer, store or dispose of solid or liquid waste classified in the Australian Dangerous Goods Code or medical, cytotoxic or quarantine waste that handles more than 1,000 tonnes per year of waste.

(6) Development for the purpose of any other liquid waste depot that treats, stores or disposes of industrial liquid waste and:
(a) handles more than 10,000 tonnes per year of liquid food or grease trap waste, or
(b) handles more than 1,000 tonnes per year of other aqueous or non-aqueous liquid industrial waste.

The proposed development is not state significant as it involves the handling of less than 100,000 tonnes per year of waste. Additionally, the subject site is not an identified site under Schedule 2.

3.2.2.7.5 SREP No 20 – Hawkesbury Nepean River (No.2 – 1997)

The Sydney Regional Environmental Plan No. 20 (SREP 20) applies to the subject land. The following provides an assessment of the proposed development in accordance with SREP 20.

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 addressed in this EIS. It can be determined that the proposed use is not inconsistent with the Aims and Objectives of the Policy, whilst the matters for consideration are satisfied.

3.2.3 Local Controls

The land zoning for the subject land is described as RU1 – Primary Production under the provisions of the *Liverpool Local Environmental Plan* (LLEP) *2008*, which applies to the subject site. The proposed development is not a permitted use with consent within the RU1 Zone, under the Liverpool LEP 2008. However, the proposal is permitted with consent under Clause 121 of Division 23, Part 3, of the *State Environmental Planning Policy* (SEPP) *(Infrastructure) 2007*, as discussed in Section 3.2.2.7.3.

3.2.3.1 Liverpool Local Environmental Plan 2008

The subject land is located within the Local Government Area of Liverpool City Council. Liverpool Local Environmental Plan 2008 (LLEP 2008) applies to the land. Clause 1.9 of the LEP applies as:

> ***1.9 Application of SEPPs and REPs***
>
> *(1) This Plan is subject to the provisions of any State environmental planning policy and any regional environmental plan that prevail over this Plan as provided by section 36 of the Act.*
>
> ***Note**. Section 36 of the Act generally provides that SEPPs prevail over REPs and LEPs and that REPs prevail over LEPs. However, a LEP may (by an additional provision included in the Plan) displace or amend a SEPP or REP to deal specifically with the relationship between this Plan and the SEPP or REP.*
>
> *(2) The following State environmental planning policies and regional environmental plans (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 9—Group Homes*
>
> *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:

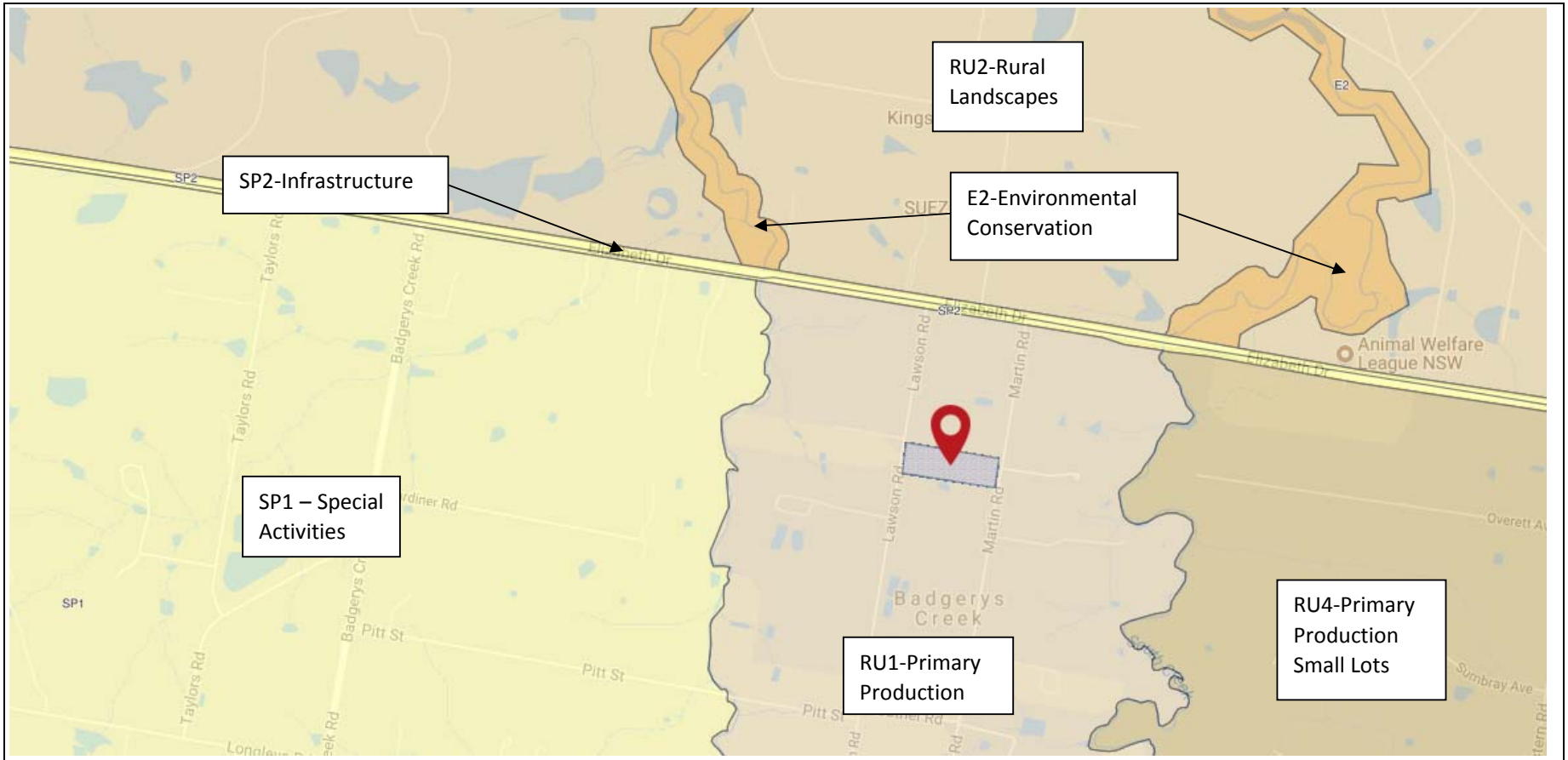
> ***Land Use Table***
>
> **Note.** A type of development referred to in the Land Use Table is a reference to that type of development only to the extent it is not regulated by an applicable State environmental planning policy. The following State environmental planning policies in particular may be 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 C&D recycling facility is a use permitted with consent under the Provisions of SEPP (Infrastructure) 2007.

For completeness the subject land is within Zone RU1 – Primary Production. Figure 3-1 is an extract of the Zoning Map with the subject land indicated.

Figure 3-1: Extract Of Zoning Map



Source: NSW Planning Portal 2018

↑N

Benbow Environmental
13 Daking Street,
North Parramatta NSW 2151

The Land Use Table for this zone is:

Zone RU1
Primary Production
1Objectives of zone
• To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.
• To encourage diversity in primary industry enterprises and systems appropriate for the area.
• To minimise the fragmentation and alienation of resource lands.
• To minimise conflict between land uses within this zone and land uses within adjoining zones.
• To ensure that development does not unreasonably increase the demand for public services or public facilities.
• To ensure that development does not hinder the development or operation of an airport on Commonwealth land in Badgery's Creek.
• To preserve bushland, wildlife corridors and natural habitat.
2Permitted without consent
Environmental protection works; Extensive agriculture; Home-based child care; Home occupations
3Permitted with consent
Agriculture; Airstrips; Animal boarding or training establishments; Bed and breakfast accommodation; Building identification signs; Business identification signs; Cemeteries; Community facilities; Crematoria; Dual occupancies; Dwelling houses; Environmental facilities; Extractive industries; Farm buildings; Farm stay accommodation; Flood mitigation works; Forestry; Hazardous storage establishments; Health consulting rooms; Helipads; Heliports; Home businesses; Home industries; Landscaping material supplies; Offensive storage establishments; Open cut mining; Plant nurseries; Recreation areas; Recreation facilities (outdoor); Roads; Roadside stalls; Rural industries; Rural supplies; Rural workers' dwellings; Secondary dwellings; Veterinary hospitals; Water recreation structures
4Prohibited
Any development not specified in item 2 or 3

The proposed use is principally a C&D recycling facility. The proposed development is not a permitted use with consent within the RU1 Zone, under the Liverpool LEP 2008. However, the proposal is permitted with consent under Clause 121 of Division 23, Part 3, of the *State Environmental Planning Policy* (SEPP) *(Infrastructure) 2007*, as reported below.

121 Development permitted with consent
(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.

Where:
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.

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

***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 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.*

Under Clause 8 of the SEPP (infrastructure) 2007, where there is an inconsistency between this Policy and other environmental planning instruments, such as the Liverpool LEP 2008, this Policy prevails.

The proposed use is consistent with the relevant development standards as contained within Part 4 of the LEP. Part 4 Principal development standards are provided in the following table.

Table 3-3: Part 4 Principal development standards of the Liverpool LEP

Clause	Comments	Compliance
4.1 Minimum subdivision lot size	The proposed development does not involve the subdivision of land.	No application
4.1A Minimum subdivision lot size community title schemes	The proposed development does not involve community title subdivision of land.	No application
4.2 Rural subdivision	The proposed development does not involve the subdivision of rural land.	No application
4.2A Restrictions on strata or community title subdivisions in certain rural or environmental protection zones	The proposed development does not involve the subdivision of rural or environmental protection zones land.	No application
4.3 Height of buildings	Existing building to be occupied as an office. The height of the process shed is detailed in the elevation plans.	Complies
4.4 Floor space ratio	Existing building to be occupied.	Complies
4.5 Calculation of floor space ratio and site area	For information purposes only the proposed floor space is approximately 1745 sqm and site area is 25,500 sqm.	No application
4.6 Exceptions to development standards	No variation of development standards is required.	No application

The following table provides details contained within Part 5 of the Liverpool LEP.

Table 3-4: Part 5 Miscellaneous provisions of the LEP

Clause	Comments	Compliance
5.1 Relevant acquisition authority	No part of the land is required to be acquired for a public purpose.	No application
5.1A Development on land intended to be acquired for a public purpose	No part of the land is intended to be acquired for a public purpose.	No application
5.2 Classification and reclassification of public land	No part of the subject land is public land.	No application
5.3 Development near zone boundaries	The site is not located near zone boundaries.	No application
5.4 Controls relating to miscellaneous permissible uses	The proposed development is not of a type provided for in the sub clause.	No application
5.5 Development within the coastal zone	Subject land is not within a coastal zone.	No application
5.6 Architectural roof features	See elevation plans.	Complies
5.7 Development below mean high water mark	Not applicable	Not applicable
5.8 Conversion of fire alarms	Not applicable	No application
5.9 Preservation of trees or vegetation	Repealed	Repealed
5.10 Heritage conservation	The subject land does not contain a heritage item nor is the immediate land within the vicinity of land containing such an item.	No application
5.11 Bush fire hazard reduction	The subject land is not identified as being bush fire prone.	No application
5.12 Infrastructure development and use of existing buildings of the Crown	Building is not a building of the Crown.	No application
5.13 Eco-tourist facilities	The application does not involve eco-tourist facilities.	No application

Other Provisions within Part 6 of the LEP are not relevant. The following table provides Part 7 Additional Local provisions that are applicable to the proposed development:

Table 3-5: Part 7 Additional Local provisions of the Liverpool LEP

Clause	Comments	Compliance
7.1 Objectives for development in Liverpool city centre	Not applicable	No application
7.2 Sun access in Liverpool city centre	Proposed site is not in the vicinity of Liverpool city centre.	No application
7.3 Car parking in Liverpool city centre	Proposed site is not in the vicinity of Liverpool city centre.	No application
7.4 Building separation in Liverpool city centre	Proposed site is not in the vicinity of Liverpool city centre.	No application
7.5 Design excellence in Liverpool city centre	Proposed site is not in the vicinity of Liverpool city centre.	No application
7.6 Environmentally significant land	The proposed site is not environmentally significant land as shown on the Environmentally Significant Land Map.	No application
7.7 Acid sulfate soils	Section 6.1.2 of this report shows that there is an extremely low probability of finding acid sulfate soils on the subject site.	Complies
7.8 Development on flood prone land	Part of the land is affected by flood inundation and therefore flood related development controls apply to the land. These are addressed in Sections 6.3.3 and 8.3.6.4.	Complies
7.9 Foreshore building line	The foreshore building line does not apply to the proposed site as shown on the Foreshore Building Line Map.	No application
7.10 Minimum allotment size for dual occupancies in rural zones	No application	No application
7.11 Minimum dwelling density	The proposed development does not involve the subdivision of land.	No application
7.12 Maximum number of lots	The proposed development does not involve the subdivision of land.	No application
7.13 Minimum lot width in Zones R1, R2, R3 and R4	The proposed development is not within zones R1, R2, R3 and R4	No application
7.14 Minimum building street frontage	Existing building to be occupied.	No application
7.15 Minimum building street frontage in Zone B6	The proposed development is not within zone B6	No application
7.16 Ground floor development in Zones B1, B2, B4 and B6	The proposed development is not within zones B1, B2, B4 and B6	No application
7.17 Development in flight paths	No application	No application

Table 3-5: Part 7 Additional Local provisions of the Liverpool LEP

Clause	Comments	Compliance
7.18 Development in areas subject to potential airport noise	No application	No application
7.19 Serviced apartments	No application	No application
7.20 Council infrastructure development	No application	No application
7.21 Delayed rezoning of certain land	The proposed site is not identified for rezoning	No application
7.22 Development in Zone B6	The proposed development is not within zone B6	No application
7.23 Bulky goods premises and retail premises in Zone B6	The proposed development is not within zone B6	No application
7.24 Dual occupancies in Zone RU1, RU2 and RU4	The proposed development does not involve dual occupancy	No application
7.25 Food and drink premises and shops in Zone B1	The proposed development is not within zone B1	No application
7.26 Restaurants, take away food and drink premises, child care centres and hotel or motel accommodation in Zones IN1 and IN2	No application	No application
7.27 Development of certain land at Moorebank	No application	No application
7.28 Minimum rear setbacks at Georges Fair Moorebank	No application	No application
7.29 Maximum floor area that may be used for business premises for certain land in Zone B2 at Middleton Grange	No application	No application
7.30 Maximum floor area that may be used for retail premises for certain land in Zone B1 at Hoxton Park	No application	No application

3.2.3.2 Liverpool Development Control Plan 2008

Part 1 – General controls for all developments, Part 5 – Development in rural and environmental zones of the *Liverpool Development Control Plan 2008* (LDCP) apply to the proposed development.

Table 3-6: Comments on Liverpool DCP 2008 – Parts 1 and 5

DCP Requirements	Comments
Part 1 – General controls for all developments	
1. Preliminary	Not applicable
2. Tree Preservation	Addressed in Arboricultural Impact Assessment Report. Tree removal application is required. Trees to be removed near the Lawson Road are subject to the Biodiversity Conservation Act 2016 offset scheme.
3. Landscaping and Incorporation of Exiting Trees	Addressed in Arboricultural Impact Assessment Report and site plans.
4. Bushland and Fauna Habitat Preservation	Addressed in Arboricultural Impact Assessment Report and Flora and Fauna Survey and Impact Assessment. Tree removal application is required.
5. Bushfire Risk	Addressed in Bushfire Assessment
6. Water Cycle Management	Addressed in Stormwater Water Management Plan and Report
7. Development near a watercourse	Addressed in Stormwater Water Management Plan and Report
8. Erosion and Sediment Control	Addressed in Stormwater Water Management Plan and Report
9. Flooding Risk	Addressed in Stormwater Water Management Plan and Report
10. Contaminated Land Risk	Addressed in Geotechnical Investigation, Preliminary Acid Sulfate Soils Assessment, Salinity Assessment & Wastewater Assessment.
11. Salinity Risk	Addressed in Geotechnical Investigation, Preliminary Acid Sulfate Soils Assessment, Salinity Assessment & Wastewater Assessment.
12. Acid Sulfate Soils Risk	Addressed in Geotechnical Investigation, Preliminary Acid Sulfate Soils Assessment, Salinity Assessment & Wastewater Assessment.
13. Weeds	Addressed in Flora and Fauna Survey and Impact Assessment.
14. Demolition of Existing Developments	No demolition is required.
15. On-Site Sewage Management Systems (OSMS)	The site has a private septic system. This system is considered adequate for the proposed development. (See Hydrology Report – Appendix 3)
16. Aboriginal Archaeology	Addressed in Heritage section
17. Heritage and Archaeological Sites	Addressed in Heritage section
18. Notification of Applications	Council responsibility
19. Used Clothing Bins	Not applicable.
20. Carparking and Access	Carparking addressed in Section 5.5.5.
21. Subdivision of Land and Buildings	Subdivision is not proposed. Not applicable.
22. Water Conservation	Addressed in Stormwater Water Management Plan and Report and Water Section of EIS

Table 3-6: Comments on Liverpool DCP 2008 – Parts 1 and 5

DCP Requirements	Comments
23. Energy Conservation	Applicable — Proposed development is not considered energy intensive. Complies
24. Landfill	Applicable – Some cut and fill will be required: All fill will be VENM, all fill near native vegetation will be local material. No excavations will be with zones of influence of any other building. Salinity is assessed in the Geotechnical Investigation, Preliminary Acid Sulfate Soils Assessment, Salinity Assessment & Wastewater Assessment. No structures are proposed within easements.
25. Waste Disposal & re-use Facilities	Addressed in Waste Section. A Waste Management Plan is provided as Appendix 5.
26. Outdoor Advertising and Signage	Signage will comply with the Rural Zone requirements of the DCP.
27. Social Impact Assessment	The proposed development is not listed in Table 20 of the DCP and therefore does not require a Social Impact Assessment.
Part 5 – Development in rural and environmental zones (Relevant Clauses)	
1. Site Planning	New buildings would be set back behind existing buildings and a landscaped area would be established at the street frontage of the site. Therefore, the proposed development complied with the site planning requirements of the DCP.
2. Setbacks	Setbacks would comply
3. Private Open Space and Landscaped Area	The existing dwelling would be converted to an office and associated amenities. Therefore this is not relevant.
4. Building Design, Style and Streetscape	Buildings comply with height requirements. Roof design, building materials and colours would comply.
5. Landscaping and Fencing	Refer to landscaping plan.
6. Car Parking and Access	Car parking addressed in Section 5.5.5.
7. Amenity and Environmental Impact	Noise, Air, Water Cycle and Hazardous Materials Storage issues would be adequately controlled as detailed throughout this EIS.
8. Site Services	Site services would be provided in accordance with these requirements
9. Additional Requirements	Not relevant.

3.2.4 Section 79C (1) – Matters for Consideration

In determining a development application a consent authority is to take into consideration such of the following matters as are relevant to the development, the subject of the development application.

(a) The provisions of:

(i) Any environmental planning instrument

The *Liverpool Local Environmental Plan* (LLEP) *2008* applies to the subject land. The subject land is zoned RU1 – Primary Production. It can be determined that the proposed use as a C&D recycling facility is a use permitted with consent under the Provisions of SEPP (Infrastructure) 2007 which prevails over the LLEP 2008.

(ii) Any draft environmental planning instruments that have been placed on public exhibition.

None at this stage.

(iii) Any Development Control Plans

The proposed use will be assessed in accordance with the Liverpool DCP 2008.

(iv) Any matters prescribed by the regulations.

None at this stage.

(b) The likely impact of the development including environmental impacts in both the natural and built environment and social and economic impacts in the locality.

- *Context and Setting*

The proposed use will complement the development and strengthen the overall economic development of the area.

- *Potential Impact on Adjoining Properties*

There will be no negative impact on the adjoining or surrounding developments.

- *Access, Transport and Traffic*

Traffic is assessed in the Traffic Impact Assessment and summarised in section 9.4.

- *Public Domain*

The proposed use will have a positive contribution to the public domain.

- *Utilities*

The existing utilities are provided to service the proposed development.

- *Heritage*

There are no heritage issues.

- *Other Land Resources*

The proposed development will utilise the existing industrial development.

- *Critical Habitat*

In accordance with the Arboricultural Impact Assessment Report: the trees assessed are recognized as the dominant canopy species which form part of the Cumberland Plain Woodland. Cumberland Plain Woodland is listed as a Critically Endangered Ecological Community (Schedule 2) under the Biodiversity Conservation Act 2016. This is addressed in Arboricultural Impact Assessment Report and Flora and Fauna Survey and Impact Assessment.

- *Air and Microclimate*

There are no microclimate issues. An air quality impact assessment is provided in Appendix 6.

- *Waste*

Waste is assessed in section 8.6.

- *Energy*

The proposed operation would not involve energy intensive activities therefore there are no energy issues.

- *Noise*

The noise impact assessments conducted in accordance with the NSW Noise Policy for Industry, the NSW Interim Construction Noise Guideline and the NSW Road Noise Policy is provided in Section 8.2.

- *Natural Hazards*

There are no acknowledged natural hazards.

- *Social Impact in the Locality*

There are no negative social impacts.

- *Economic Impact in the Locality*

The proposed use will contribute to the economic development of the area.

- *Site Design and Building Form*

The existing building would be utilised as an office and amenities. The process shed will be constructed in accordance with the Liverpool DCP 2008.

- *Construction*

The construction works include the construction of the process shed, material storage bays and a hardstand area made of a compacted road base material.

- *Cumulative Impacts*

There are no cumulative impact issues.

(c) The suitability of the site for the development.

The proposed developments are appropriate for this site.

(d) Any submissions made in accordance with the Act.

No submissions at this stage.

(e) The public interest

There are no aspects of the proposed use that would be contrary to the public interest.

4. CONSULTATION

Consultation with government departments and the local community plays an important role in ensuring that all potential environmental impacts are evaluated and the most important issues are prioritised. The following sections provide details on consultation and stakeholder engagement, such as that with regulators and government bodies. Key aspects and assessment requirements identified through the consultation process are also summarized in the following sections, together with the reference to where these aspects and requirements have been addressed in the report.

4.1 STAKEHOLDER ENGAGEMENT

Liaison with all relevant government authorities regarding the proposed development and requirements of the EIS has been ongoing since the inception of the project. Consultation has been undertaken on a formal basis. Summarised below are all the regulatory stakeholders that have been consulted as part of this development application, together with the details of such consultation.

- Department of Planning and Environment (DP&E)
  A request for the Secretary's Environmental Assessment Requirements (SEARs) and related Scoping Report was sent to the Planning Services Division on 19 September 2017. The SEARs (document reference 1182) were provided on 06 November 2017 with requirements attached (Attachment 1). The DP&E has included input from NSW Environment Protection Authority (EPA), the Office of Environment and Heritage, the Department of Primary Industries and WaterNSW, and Roads and Maritime Services (RMS). Input from these stakeholders is addressed below.

- NSW Environment Protection Authority (EPA)
  Key issues and assessment requirements from the EPA are included in the SEARs.

- Office of Environment and Heritage (OEH)
  A request for input was sent to the OEH from the DP&E. The OEH Greater Sydney Planning Team has concluded that the matter does not contain biodiversity, natural hazards or Aboriginal cultural heritage issues that require a formal OEH response.

- Department of Primary Industries (DPI)
  The Department of Industry, Crown Lands and Water Division (formerly DPI Water) have specified that the EIS should take into account the objects and regulatory requirements of the *Water Act 1912* and *Water Management Act 2000* and associated regulations and instruments. The NSW DPI Agriculture provided a requirement for contingency and environmental management plans and the following guidelines:
  - Land Use Conflict Risk Assessment Guide
  - Agricultural Issues for Extractive Industry Development
  - Agricultural issues for Landfill Developments
  - Infrastructure Proposals on Rural Land

  The NSW DPI Fisheries has no comment on this matter.

- WaterNSW
  A request for input was sent to WaterNSW from the DP&E. WaterNSW advised that they have no particular requirements for the EIS, unless a Water Supply Work Approval is needed.

4.2 COMMUNITY CONSULTATION

A community information sheet that explained the proposed development was distributed to residential premises near to the site along both Martin and Lawson Road on Wednesday 22 February 2018. An information sheet was either given to the occupant or placed in the letterbox of the following residential premises:

Martin Road – 10A, 10B, 30, 35, 65, 70, 90, 100,110, 115, 120, 140, 150, 160, 165, 170, and 186 of the adjoining road.

Lawson Road – 15, 25, 35, 45, 55, 65, 75, 83, 87, 115, 125, 135, 145, and 155.

Of these personally contacted one had a negative comment about the project that the resident does not like waste – implying waste industry. The design of the site with noise and dust controls was explained.

Residents who were able to be spoken to were advised that a development application was to be submitted to Council and if they wanted further information Benbow Environmental staff would be available to assist them. The community consultation leaflet is provided in Appendix 7.

4.3 ASSESSMENT REQUIREMENTS

The Secretary's Environmental Assessment Requirements (SEARs) obtained for the proposed development include key issues and requirements identified by the DP&E, DPI and the EPA which have been provided in the following tables (Table 4-1, Table 4-2 and Table 4-3 respectively). A copy of the SEARs is also provided in Attachment 2.

Table 4-1: DP&E Assessment Requirements and EIS Reference

Environmental Assessment Requirements – Key Issues	EIS Reference	
	Section	Page No
Strategic context and Suitability of the Site		
Justification for the proposal	1.3	1-3
A demonstration that the proposal is consistent with all relevant planning strategies, environmental planning instruments, development control plans (DCPs), or justification for any inconsistencies.	3	3-1
A list of any approvals that must be obtained under any other Act or law before the development may lawfully be carried out;	3.1	3-1
A detailed description of how the proposed expansion integrates with existing on-site or nearby operations and details of any other state, local or regulatory approvals that apply to the site, including Ministerial Consent DA 7/98 as modified;	5	5-1
A description of any additional licence(s) or approval(s) required to carry out the proposed development; and	3.2.2.2.2	3-4
A detailed justification that the site can accommodate the proposed processing capacity, having regard to the scope of the operations and its environmental impacts and relevant mitigation measures	14.1	14-1

Table 4-1: DP&E Assessment Requirements and EIS Reference

Environmental Assessment Requirements – Key Issues	EIS Reference	
	Section	Page No
Traffic and transport		
Details of road transport routes and access to the site; Road traffic predictions for the development during construction and operation and; An assessment of impacts to the safety and function of the road network and the details of any road upgrades required for the development.	9.4	9-3
Air quality and odour		
A description of all potential sources of air and odour emissions; An air quality impact assessment in accordance with relevant Environment Protection Authority Guidelines; and A description and appraisal of air quality impact mitigation and monitoring measures.	8.1	8-1
Noise and vibration		
A description of all potential noise and vibration sources during construction and operation, including road traffic noise; A noise and vibration assessment in accordance with the relevant Environment Protection Authority guidelines; and A description and appraisal of noise and vibration mitigation and monitoring measures.	8.2	8-1
Soil and water		
An assessment of potential impacts to soil and water resources, topography, hydrology, drainage lines, watercourses and riparian lands on or nearby to the site; A detailed site water balance, including identification of water requirements for the life of the project, measures that would be implemented to ensure an adequate and secure water supply is available for the proposal and a detailed description of the measures to minimise water use at the site; Details of any groundwater extraction and any works with the potential to intercept the groundwater table; Characterisation of water quality at the point of discharge to surface and/or groundwater against the relevant water quality criteria (including details of the contaminants of concern that may leach from the waste into the wastewater and proposed mitigation measures to manage any impacts to receiving waters); Details of stormwater/wastewater/leachate/firewater management systems including the capacity of onsite detention systems, and measures to treat, reuse or dispose of waters); A description of erosion and sediment controls; An assessment of flooding impacts associated with the development including details of the flood liability of the site and changes to flooding behaviour; Consideration of salinity and acid sulfate soil impacts; and Characterisation of the nature and extent of any contamination on the site and a description of proposed management measures.	8.3 8.4	8-12 8-27

Table 4-1: DP&E Assessment Requirements and EIS Reference

Environmental Assessment Requirements – Key Issues	EIS Reference	
	Section	Page No
Hazards and risk		
The Environmental Impact Statement must include a preliminary risk screening completed in accordance with State Environmental Planning Policy No. 33 – Hazardous and Offensive Development and Applying SEPP 33 (DoP, 2011) with a clear indication of class, quantity and location of all dangerous goods and hazardous materials associated with the development. Should preliminary screening indicate that the project is "potentially hazardous" a Preliminary Hazard Analysis (PHA) must be prepared in accordance with Hazardous Industry Planning Advisory Paper No. 6 – Guidelines for Hazard Analysis (DoP, 2011) and Multi-Level Risk Assessment (DoP, 2011).	8.7	8-40
Waste management		
Details of the type, quantity and classification of waste to be received at the site; Details of the resource outputs and any additional processes for residual waste; Details of waste handling including transport, identification, receipt, stockpiling and quality control; and The measures that would be implemented to ensure that the proposed development is consistent with the aims, objectives and guidelines in the *NSW Waste Avoidance and Resource Recovery Strategy 2014-21.*	8.6	8-29
Fire and incident management		
Technical information on the environmental protection equipment to be installed on the premises such as air, water and noise controls, spill clean-up equipment and fire (including location of fire hydrants and water flow rates at the hydrant) management and containment measures; and Details of size and volume of stockpiles and their arrangement and separation to minimise fire spread and facilitate emergency vehicle access.		
Biodiversity		
A description of any potential vegetation clearing needed to undertake the proposal and any impacts to flora and fauna.	8.5	8-28
Visual		
An impact assessment at private receptors and public vantage points.	9.2	9-3
Heritage		
Including Aboriginal and non-Aboriginal cultural heritage.	9.3	9-3

Table 4-2: DPI – Water - Assessment Requirements and EIS Reference

Environmental Assessment Requirements – Key Issues	EIS Reference	
	Section	Page No
DPI – Water General Requirements		
Annual volumes of surface water and groundwater proposed to be taken by the activity (including through inflow and seepage) from each surface and groundwater source as defined by the relevant water sharing plan.	8.3.3.1	8-13
Assessment of any volumetric water licensing requirements (including those for ongoing water take following completion of the project).	8.3.3.1	8-13
The identification of an adequate and secure water supply for the life of the project. Confirmation that water can be sourced from an appropriately authorised and reliable supply. This is to include an assessment of the current market depth where water entitlement is required to be purchased.	8.3.3.2	8-14
A detailed and consolidated site water balance.	8.3.4	8-15

Table 4-2: DPI – Water - Assessment Requirements and EIS Reference

Environmental Assessment Requirements – Key Issues	EIS Reference	
	Section	Page No
Assessment of impacts on surface and groundwater sources (both quality and quantity), related infrastructure, adjacent licensed water users, basic landholder rights, watercourses, riparian land, and groundwater dependent ecosystems, and measures proposed to reduce and mitigate these impacts.	8.3.6	8-17
Assessment of any potential cumulative impacts on water resources, and any proposed options to manage the cumulative impacts.	10.3	10-2
Consideration of relevant policies and guidelines.	8.3	8-12
A statement of where each element of the SEARs is addressed in the EIS in the form of a table.	4.3	4-2
Full technical details and data of all surface and groundwater modelling.	N/A	N/A
Ground Water		
It is noted the resource recovery facility may require excavation works (page 12). The EIS needs to provide details on the maximum depth of the excavation and the depth to groundwater. If groundwater is likely to be intercepted or extracted by the proposal, depending on the volumes encountered and the duration of pumping, a licence may be required from Crown Lands and Water Division in relation to construction excavation / dewatering activities.	8.3.6.3	8-20
Key Relevant Legislative Instruments		
The EIS should take into account the objects and regulatory requirements of the Water Act 1912 (WA 1912) and Water Management Act 2000 (WM Act), and associated regulations and instruments, as applicable.	8.3.1	8-13
Demonstrate how the proposal is consistent with the relevant rules of the Water Sharing Plan 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 (including groundwater dependent ecosystems), water quality and surface-groundwater connectivity.	8.3.2	8-13
Provide a description of any site water use (amount of water to be taken 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.	8.3.3	8-13
Provide an analysis of the proposed water supply arrangements against the rules for access licences and other applicable requirements of any relevant WSP, including: o Sufficient market depth to acquire the necessary entitlements for each water source. o Ability to carry out a “dealing” to transfer the water to relevant location under the rules of the WSP. o Daily and long-term access rules. o Account management and carryover provisions.	8.3.2	8-13
Provide a detailed and consolidated site water balance.	8.3.4	8-15
Licensing Considerations		
Identification of water requirements for the life of the project in terms of both volume and timing (including predictions of potential ongoing groundwater take following the cessation of operations at the site – such as evaporative loss from open voids or inflows).	8.3.3	8-13
Details of the water supply source(s) for the proposal including any proposed surface water and groundwater extraction from each water source as defined in the relevant Water Sharing Plan/s and all water supply works to take water.	8.3.3	8-13
Explanation of how the required water entitlements will be obtained (i.e. through a new or existing licence/s, trading on the water market, controlled allocations etc.).	8.3.3	8-13

Table 4-2: DPI – Water - Assessment Requirements and EIS Reference

Environmental Assessment Requirements – Key Issues	EIS Reference	
	Section	Page No
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).	8.3.3.1	8-13
Details on all bores and excavations for the purpose of investigation, extraction, dewatering, testing and monitoring. All predicted groundwater take must be accounted for through adequate licensing.	6.3.2	6-6
Details on existing dams/storages (including the date of construction, location, purpose, size and capacity) and any proposal to change the purpose of existing dams/storages	N/A	N/A
Details on the location, purpose, size and capacity of any new proposed dams/storages.	8.3	8-12
Applicability of any exemptions under the Water Management (General) Regulation 2011 to the project.	N/A	N/A
Water allocation account management rules, total daily extraction limits and rules governing environmental protection and access licence dealings also need to be considered.	8.3.2	8-13
The Harvestable Right gives landholders the right to capture and use for any purpose 10 % of the average annual runoff from their property if in the Eastern and Central Divisions. The Harvestable Right has been defined in terms of an equivalent dam capacity called the Maximum Harvestable Right Dam Capacity (MHRDC). The MHRDC is determined by the area of the property (in hectares) and a site-specific run-off factor. The MHRDC includes the capacity of all existing dams on the property that do not have a current water licence. Storages capturing up to the harvestable right capacity are not required to be licensed but any capacity of the total of all storages/dams on the property greater than the MHRDC may require a licence.	N/A	N/A
Dam Safety		
Where new or modified dams are proposed, or where new development will occur below an existing dam, the NSW Dams Safety Committee should be consulted in relation to any safety issues that may arise. Conditions of approval may be recommended to ensure safety in relation to any new or existing dams.	8.3.3.3	8-14
Surface Water Assessment		
Identification of all surface water features including watercourses, wetlands and floodplains transected by or adjacent to the proposed project.	6.3	6-4
Identification of all surface water sources as described by the relevant water sharing plan.		
Detailed description of dependent ecosystems and existing surface water users within the area, including basic landholder rights to water and adjacent/downstream licensed water users.	6.3	6-4
Description of all works and surface infrastructure that will intercept, store, convey, or otherwise interact with surface water resources.	8.3.6.2.1	8-19
Assessment of predicted impacts on the following: o flow of surface water, sediment movement, channel stability, and hydraulic regime, o water quality, o flood regime, o dependent ecosystems, o existing surface water users, and o planned environmental water and water sharing arrangements prescribed in the relevant water sharing plans.	8.3.6.2	8-19

Table 4-2: DPI – Water - Assessment Requirements and EIS Reference

Environmental Assessment Requirements – Key Issues	EIS Reference	
	Section	Page No
Groundwater Assessment		
Where it is considered unlikely that groundwater will be intercepted or impacted (for example by infiltration), a brief site assessment and justification for the minimal impacts may be sufficient, accompanied by suitable contingency measures in place in the event that groundwater is intercepted, and appropriate measures to ensure that groundwater is not contaminated.	8.3.6.3	8-20
Groundwater Dependent Ecosystems		
The EIS must consider the potential impacts on any Groundwater Dependent Ecosystems (GDEs) at the site and in the vicinity of the site and: Identify any potential impacts on GDEs as a result of the proposal including: o the effect of the proposal on the recharge to groundwater systems; o the potential to adversely affect the water quality of the underlying groundwater system and adjoining groundwater systems in hydraulic connections; and o the effect on the function of GDEs (habitat, groundwater levels, connectivity). • Provide safeguard measures for any GDEs	8.3.6.3.3	8-23
Watercourses, Wetlands and Riparian Land		
The EIS should address the potential impacts of the project on all watercourses likely to be affected by the project, existing riparian vegetation and the rehabilitation of riparian land.	8.3.6	8-17
Landform rehabilitation		
Where significant modification to landform is proposed, the EIS must include: • Justification of the proposed final landform with regard to its impact on local and regional surface and groundwater systems; • A detailed description of how the site would be progressively rehabilitated and integrated into the surrounding landscape; • Outline of proposed construction and restoration of topography and surface drainage features if affected by the project; and • An outline of the measures to be put in place to ensure that sufficient resources are available to implement the proposed rehabilitation.	N/A	N/A

Table 4-3: EPA Assessment and EIS Reference

Environmental Assessment Requirements	EIS Reference	
	Section	Page No.
The Proposal		
1. Objectives of the Proposal		
The objectives of the proposal should be clearly state 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	1.1.1	1-2
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. f) soil contamination treatment and prevention systems Outline construction works including a) actions to address any existing soil contamination b) any earthworks or site clearing; re-use and disposal of cleared material (including use of spoil on-site) c) construction timetable and staging; hours of construction; proposed construction methods d) environment protection measures, including noise mitigation measures, dust control measures and erosion and sediment control measures. Include a site diagram showing the site layout and location of environmental controls	5	5-1
2. Description of the Proposal - *Air*		
Identify all sources or potential sources of air emissions from the development *Note: emissions can be classed as either:* *-point (e.g. 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 (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 to generate emissions to air.	See Appendix 6	
2. Description of the Proposal – *Noise and Vibration*		
Identify all noise sources or potential 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.	See Appendix 8	

Table 4-3: EPA Assessment and EIS Reference

Environmental Assessment Requirements	EIS Reference	
	Section	Page No.
2. Description of the Proposal - *Water*		
Provide details of the project that are essential for predicting and assessing impacts to waters including: a) 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 http://www.environment.nsw.gov.au/ieo/index.htm, 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 e.g. 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.	8.3	8-12
2. Description of Proposal – *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 EPA's Waste Classification Guidelines 2014 (as amended from time to time) 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 spoil disposal with particular attention to: a) the quantity of spoil material likely to be generated b) proposed strategies for the handling, stockpiling, reuse/recycling and disposal of spoil c) the need to maximise reuse of spoil material in the construction industry d) identification of the history of spoil material and whether there is any likelihood of contaminated material, and if so, measures for the management of any contaminated material e) designation of transportation routes for transport of spoil. 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: EPA's Waste Classification Guidelines 2014 (as amended from time to time)*	8.6	8-29
2. Description of the Proposal - *ESD*		
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	11	11-1
3. Rehabilitation		
Outline considerations of site maintenance, and proposed plans for the final condition of the site (ensuring its suitability for future uses).	8.4	8-27

Table 4-3: EPA Assessment and EIS Reference

Environmental Assessment Requirements	EIS Reference	
	Section	Page No.
4. Consideration of Alternatives and Justifications 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	1.4	1-3
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.	14	14-1
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 (e.g. rainfall, temperature and evaporation, wind speed and direction) b) topography (landform element, slope type, gradient and length) c) surrounding land uses (potential synergies and conflicts) d) geomorphology (rates of landform change and current erosion and deposition processes) e) soil types and properties (including erodibility; engineering and structural properties; dispersibility; permeability; presence of acid sulfate soils and potential acid sulfate soils) f) ecological information (water system habitat, vegetation, fauna) g) availability of services and the accessibility of the site for passenger and freight transport.	2	2-1
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 the 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.	6.6 6.7	6-18 6-19
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: http://www.environment.nsw.gov.au/ieo/index.htm 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.	6.3	6-4
5. Soil Contamination Issues		
Provide details of site history – if earthworks are proposed, this needs to be considered with regard to possible soil contamination, for example if the site was previously a landfill site or if irrigation of effluent has occurred.	6.1	6-1

Table 4-3: EPA Assessment and EIS Reference

Environmental Assessment Requirements	EIS Reference	
	Section	Page No.
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 (e.g. 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).	7	7-1
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.		
1. General - *Describe baseline conditions*		
Provide a description of existing environmental conditions for any potential impacts.	6	6-1
1. General - *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 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. 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.	8	8-1
1. General - *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.	8	8-1

Table 4-3: EPA Assessment and EIS Reference

Environmental Assessment Requirements	EIS Reference	
	Section	Page No.
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		
2. Air - *Describe baseline conditions*		
Provide a description of existing air quality and meteorology, using existing information and site representative ambient monitoring data. This description should include the following parameters: a) coarse particulates; b) PM10 and PM2.5; c) odour; and d) any other potential pollutants identified in the assessment process.	See Appendix 6	
2. Air - *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 (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 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. For potentially odorous emissions 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*. Reference should be made to Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (DEC, 2016); Approved Methods for the Sampling and Analysis of Air Pollutants in NSW (DEC, 2007); Assessment and Management of Odour from Stationary Sources in NSW (DEC, 2006); Technical Notes: Assessment and Management of Odour from Stationary Sources in NSW (DEC, 2006).	See Appendix 6	
2. Air - *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.	See Appendix 6	

Table 4-3: EPA Assessment and EIS Reference

Environmental Assessment Requirements	EIS Reference	
	Section	Page No.
3. Noise and Vibration		
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 f) day, evening and night assessment background levels for each day of the monitoring period g) the final Rating Background Level (RBL) value h) graphs of the measured noise levels for each day should be provided i) 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 j) determination of LAeq noise levels from existing industry.	See Appendix 8	
3. Noise and Vibration - *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 (e.g. 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.	See Appendix 8	

Table 4-3: EPA Assessment and EIS Reference

Environmental Assessment Requirements	EIS Reference	
	Section	Page No.
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. Where blasting is intended an assessment in accordance with the *Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration* (ANZECC, 1990) should be undertaken. The following details of the blast design should be included in the noise assessment: a) bench height, burden spacing, spacing burden ratio b) blast hole diameter, inclination and spacing c) type of explosive, maximum instantaneous charge, initiation, blast block size, blast frequency.		

Table 4-3: EPA Assessment and EIS Reference

Environmental Assessment Requirements	EIS Reference	
	Section	Page No.
3. Noise and Vibration - *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.	See Appendix 8	
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.	See Appendix 8	
4. Water		
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 (DEC 2004) or be approved and analyses undertaken by accredited laboratories).* Provide site drainage details and surface runoff yield.	6.3	6-4
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: http://www.environment.nsw.gov.au/ieo/index.htm. 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.	6.3	6-4
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.environment.gov.au/water/publications/quality/nwqms-guidelines-4-vol1.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 or the NSW Salinity Strategy (DLWC, 2000) (http://www.environment.nsw.gov.au/salinity/government/nswstrategy.htm). 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.	6.3	6-4

Table 4-3: EPA Assessment and EIS Reference

Environmental Assessment Requirements	EIS Reference	
	Section	Page No.
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.	6.3	6-4
4. Water - *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.	8.3	8-12
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.	N/A	N/A
Identify impacts associated with the disturbance of acid sulfate soils and potential acid sulfate soils.	6.1.2	6-1
Containment of spills and leaks shall be in accordance with EPA's guidelines section 'Bunding and Spill Management' at http://www.epa.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.	8.3.5.2	8-16
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.*	N/A	N/A
4. Water - *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.	8.3.6	8-17

Table 4-3: EPA Assessment and EIS Reference

Environmental Assessment Requirements	EIS Reference	
	Section	Page No.
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. 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 (DEC 2004).		
5. Soils and Contamination		
5. Soils and Contamination – *Describe Baseline Conditions*		
Provide any details (in addition to those provided in the location description - Section C) that are needed to describe the existing situation in terms of soil types and properties and soil contamination.	6.1	6-1
5. Soils and Contamination - *Assess impacts*		
Identify any likely impacts resulting from the construction or operation of the proposal, including the likelihood of: a) disturbing any existing contaminated soil b) contamination of soil by operation of the activity c) subsidence or instability d) soil erosion e) disturbing acid sulfate or potential acid sulfate soils. Reference should be made to the following guidelines: Contaminated Sites – Guidelines for Consultants Reporting on Contaminated Sites (OEH, 2011); Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997 (EPA, 2015).	8.4	8-27
5. Soils and Contamination - *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 Acid Sulfate Soil Manual (Acid Sulfate Soil Advisory Committee 1998) and Acid Sulfate Soils Assessment Guidelines (Acid Sulfate Soil Advisory Committee 1998).	8.4.2	8-28
6. Waste and Chemicals		
6. Waste and Chemicals - *Describe baseline conditions*		
Describe any waste or chemical operations related to the proposal.	8.6	8-29
6. Waste and Chemicals – *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.	8.6 8.7.1	8-29 8-40
Reference should be made to: the EPA's Waste Classification Guidelines 2014 (as in force from time to time).	8.6.1.1	8-30
6. Waste and Chemicals – *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.	8.6 8.7.1	8-29 8-40

Table 4-3: EPA Assessment and EIS Reference

Environmental Assessment Requirements	EIS Reference	
	Section	Page No.
7. Cumulative Impacts		
Identify the extent that the receiving environment is already stressed by existing development and background levels of emissions to which this proposal will contribute. Assess the impact of the proposal against the long term air, noise and water quality objectives for the area or region. Identify infrastructure requirements flowing from the proposal (e.g. water and sewerage services, transport infrastructure upgrades). Assess likely impacts from such additional infrastructure and measures reasonably available to the proponent to contain such requirements or mitigate their impacts (e.g. travel demand management strategies).	10	10-1
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).	3.2.2.2.2	3-4
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 (e.g. 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.	12	12-1
Justification for the Proposal		
Reasons should be included which justify undertaking the proposal in the manner proposed, having regard to the potential environmental impacts.	14	14-1

5. DESCRIPTION OF PROPOSED DEVELOPMENT

5.1 PROPOSED ACTIVITIES AND SITE USE

The proposed development consists of the construction and operation of a resource recovery facility which would receive, handle and process construction and demolition (C&D) waste, including soil and green waste (comprising of garden waste only). The amount of overall waste to be processed will be approximately 95,000 tonnes per year.

The operation of the facility involves the following activities to be undertaken on site:

- Unloading and loading of materials;
- Material handling and sorting;
- Crushing and screening of concrete, bricks, and similar waste materials;
- Material storage.

Wastes to be accepted on site are typical building materials, including bricks, concrete, timber, glass, metal, as well as garden waste, soil (VENM/ENM) and general solid waste (non-putrescible). The quantity for each material may vary significantly depending on the source that generated the waste. Nevertheless, all incoming material will be unloaded and sorted within the processing shed. Concrete bricks and similar waste would be crushed and screened within the processing shed.

Processed waste would be stored in the undercover storage bays for re-selling, either directly from site to trade clients or to a landscape supply outlet offsite. Any waste that is not suitable for resource recovery will be collected by licensed waste contractor for final disposal to landfill.

A weighbridge will be located in close proximity of the site entrance to measure all incoming and outgoing loads. A closed-loop wheel wash will be installed immediately beyond the weighbridge for the washing the wheels of trucks entering and exiting the property. Water used in the wheel wash will be recycled and reused within the system.

The site has ample space for truck turning and manoeuvring in the processing area, as well as 13 car parking spaces for employees and visitors, adjacent to the office building. Screen plantings of *Casuarina Cunninghamiana* are planned to line the whole length of the northern and southern site boundaries, while another landscaped area would be established at the front of the property. The site plans are presented in Appendix 1.

5.2 CONSTRUCTION WORKS

The construction of the facility involves building a large shed to enclose the processing operations. This would house a crushing plant, screening operations and stockpile areas. Covered storage bays would also be constructed. Additionally, the following components would be installed/built: weighbridge, wheel wash, material storage bays and car park. No demolition works would be needed. Construction waste, from the facility construction phase, is expected to consist of General Solid Waste (non-putrescible) and would be recycled or disposed of offsite. The one storey brick residence that will function as an office and associated amenities is already present on site.

5.3 RESOURCES AND FINISHED GOODS

5.3.1 Raw Materials

The materials received on site are typical building materials including the following:

- Bricks;
- Concrete;
- Timber;
- Glass;
- Metal;
- Garden waste;
- Soil (ENM); and
- Residual General solid waste (non-putrescible).

5.3.2 Final Products

The products produced and sold or sent off site for recycling are as follows:

- Crushed bricks – graded;
- Crushed concrete – graded;
- Timber;
- Glass;
- Metal;
- Garden waste;
- Soil (VENM/ENM); and
- Residual General solid waste (non-putrescible).

5.4 EQUIPMENT

The following equipment will be used on site:

- 2xTruck & Dog (32T);
- 2x15T Truck;
- 42T Crusher;
- Triple Deck Screen;
- 25T Excavator;
- Front End Loader;
- Water cart (to be confirmed); and
- Electricity generator.

5.5 OPERATIONAL DETAILS

5.5.1 Utility Connections

5.5.1.1 Water

The site is connected to the public mains water system. The existing dam on the western end of the property will remain on site to maintain the current conditions within the Cumberland Plain vegetation and is not part of the stormwater management of the proposed development.

A combined tank is proposed to be construction under the hardstand area and will contain a rainwater tank, an on-site detention (OSD) tank and stormwater treatment within the detention tank. A smaller 3 kL rainwater tank would capture roof water from the office and amenities building and be connected to the toilets and local irrigation. Stormwater runoff from higher 1.89 ha portion of the site would be captured in the OSD. Roof areas of the shed and bins would be directed to the larger rainwater tank. Rainwater would be used for dust suppression and landscaping purposes. Mains water would be used within the buildings office and kitchen areas.

A closed loop wheel wash would be installed for the purpose of washing truck wheels entering and leaving the premises. Water would be recirculated within the system and no wastewater would be generated.

5.5.1.2 Sewage and Wastewater

The site is not connected to the public sewer system. The existing dwelling's greywater and sewerage system is connected to a septic tank on site.

5.5.1.3 Electricity

The site is connected to the public electricity network. Electricity will be used for the office and amenity, lighting, security systems and possibly water pumps if required.

5.5.1.4 Telecommunications

The site is connected to the public phone and internet network.

5.5.1.5 Gas, Petrol and Diesel

Diesel will be used for most of the heavy equipment including, mobile plant, crusher, screen, and trucks.

Petrol will be used for most employees' private vehicles.

5.5.2 Hours of Operations

For the **construction** stage (standard construction hours):
Monday to Friday 7am to 6pm
Saturday 8am to 1pm
No work on Sundays or public holidays

For the **operation** stage:
Monday to Friday 7am to 6 pm
Saturday 7am to5 pm
No work on Sundays or public holidays

5.5.3 Employment

The proposed development is expected to generate employment for 10 people at the subject site, as well as additional employment for trucking contractors, once operational. Construction of the facility will also result in the generation of temporary employment for approximately 30 people.

5.5.4 Traffic

The proposed development will result in a moderate increase of traffic generation, mainly from heavy vehicle movements associated with incoming and outgoing deliveries. Table 5-1 provides details on additional cars and heavy vehicle movements, to and from the site.

Light vehicle movements only will occur on Martin Road. Up to five light vehicle movements in each peak hour, in one direction only, will be generated by staff, which equates to one movement every 12 minutes. Martin Road and Elizabeth Drive have adequate capacity to accommodate this low volume of light vehicles.

Up to three truck movements per hour in each direction will occur on Lawson Road. SIDRA analysis of the key access intersection of Lawson Road at Elizabeth Drive shows that the intersection currently operates at Level of Service B (acceptable with spare capacity). The modelling shows that with the additional truck volumes added to the intersection, its operation will continue to be Level of Service B, with only minor changes to average delays. Minor traffic generation from heavy vehicle movements is expected in association with the minor installation/construction works proposed.

Table 5-1: Proposed Vehicle Movements

Material Delivered	Delivery Type	Vehicle Type	Total Movements/Day
HEAVY VEHICLES			
C&D Waste	Incoming	HRV Truck	8
C&D Waste	Incoming	AV Truck	6
C&D Waste	Outgoing	HRV Truck	6
C&D Waste	Outgoing	AV Truck	5
Total Daily Heavy Vehicle Movements/Day			~ 25
LIGHT VEHICLES			
Staff	Incoming	Passenger car	8
Staff	Outgoing	Passenger car	8
		Total Daily Light Vehicle Movements	16
		Total Daily Vehicle Movements	**~ 16**

5.5.5 Parking

The car park is designed fully in accordance with AS 2890 Parts 1 and 6, and provides parking for 11 cars plus two spaces for the disabled. This amount of parking is assessed as sufficient to meet peak demand.

The Liverpool DCP 2008 Section 20 Parking:

Industry:

- ***1 space per 35 sqm of office LFA***
- *1 space per 75 sqm factory/warehouse LFA or 1 space per 2 employees, whichever is the greater*
- ***Warehouse developments of GFA >1000 sqm: 1 space per 250 sqm in GFA***

The office has approximately 194 sqm LFA and the GFA for the processing shed is approximately 1745 sqm. To satisfy the minimum parking requirements for the office, 6 car parking spaces are required. To satisfy the car parking spaces for the processing building, 7 car parking spaces are required. A total of 13 car parking spaces are required in accordance with the Liverpool DCP. The proposed development complies with this requirement.

6. EXISTING NATURAL AND BUILT ENVIRONMENT

6.1 GEOLOGY AND SOILS

6.1.1 Geological and Soil Landscapes

The 'Penrith 1:100,000 Geological Map Sheet 9030' describes the geology of the area as Wianamatta Group with underlying Bringelly Shale (Rwb), which is described as follows:

> *'Rwb: Shale, carbonaceous claystone, claystone, laminite, fine to medium-grained lithic sandstone, rare coal and tuff.'*

The soil map 'Soil Landscape of Penrith 1:100,000 Sheet 9030' shows that the subject site mainly is located in an area classified as Residual Landscapes 'Blacktown', which is described as follows:

> *'Landscape: Gently undulating rises on Wianamatta Group shales. Local relief to 30 m, slopes usually 5%. Broad rounded crests and ridges with gently inclined slopes. Cleared woodland and tall open-forest (dry sclerophyll forests).*
>
> *Soils: Shallow to moderately deep (>100 cm) hard setting mottled texture contrast soils, Red and Brown Podzolic Soils on crests grading to Yellow Podzolic Soils on lower slopes and in drainage lines.*
>
> *Limitations: Moderately reactive highly plastic subsoil, low soil fertility, poor soil drainage.'*

The driller logs from a nearby groundwater monitoring bore (GW105016) also recorded shale and sandstone to be the predominant substrata, past the initial topsoil and clay layers.

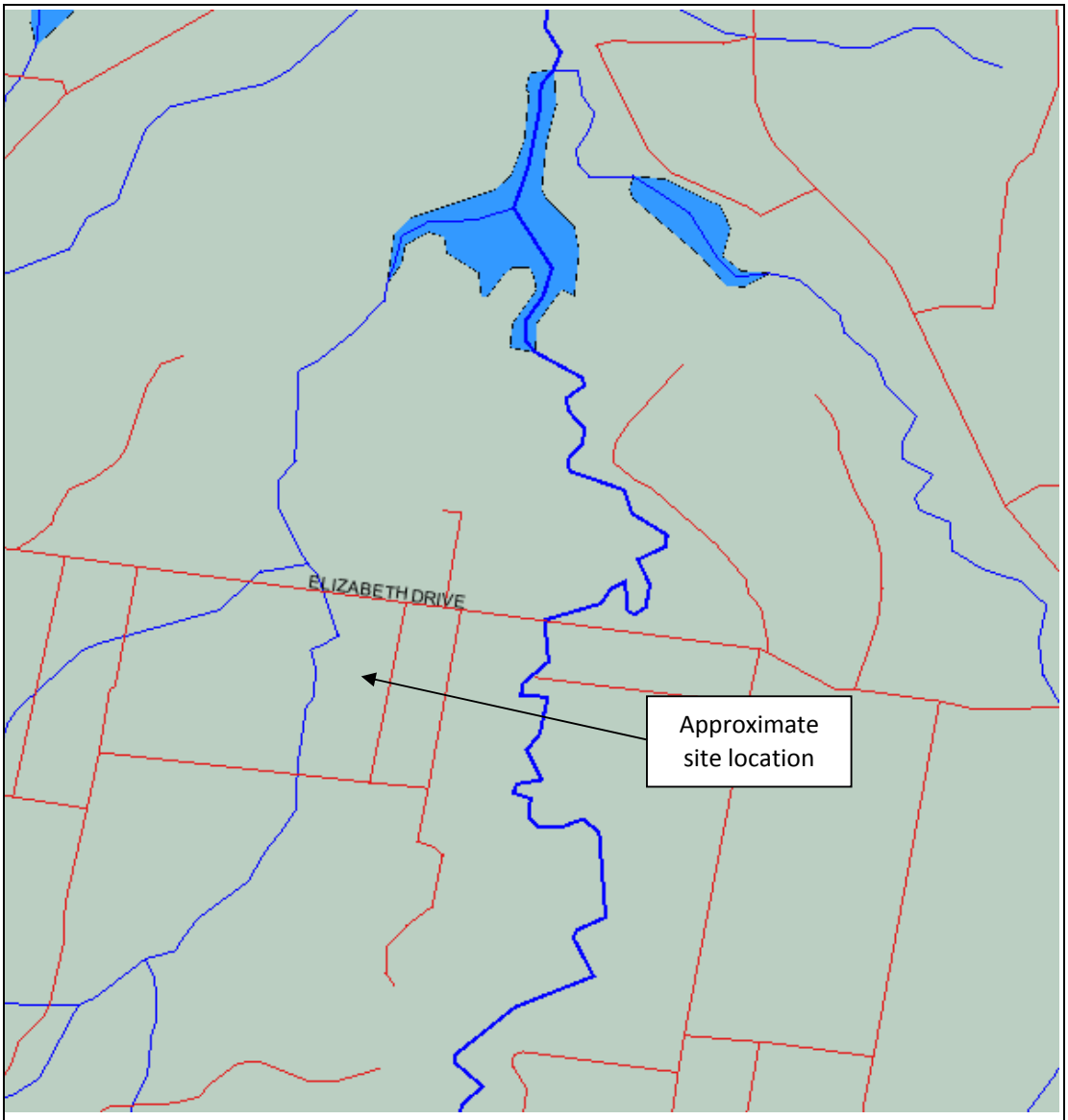
6.1.2 Acid Sulphate Soils

A search from the Atlas of Australian Acid Sulfate Soils database developed by the CSIRO shows that there is an extremely low probability of finding Acid Sulfate Soils (ASS) on the subject site or within close proximity to the site; however, with a low level of confidence. A map is shown in Figure 6-1 to illustrate these findings. No additional Acid Sulfate Soils risk mapping has been undertaken by the local Council.

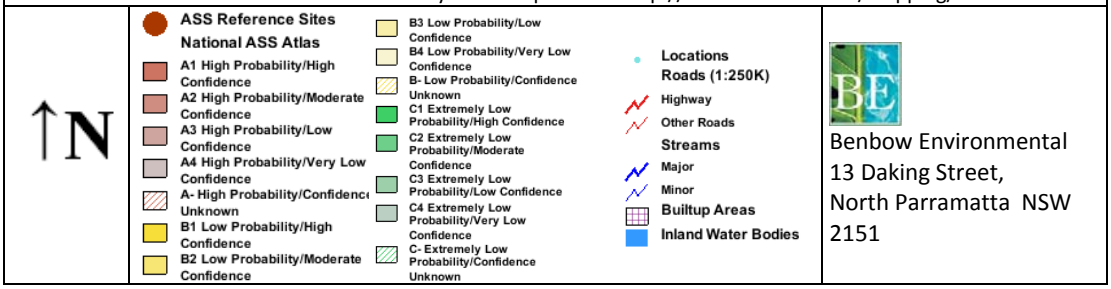
A preliminary ASS Assessment was conducted (see Appendix 2). The property lies at an elevation of approximately RL50 m AHD and is underlain by Bringelly Shale, neither of which are characteristics consistent with the geomorphic criteria necessary for the presence of ASS. Onsite borehole sampling revealed subsurface conditions consistent with this finding. In addition, piezometer testing showed that groundwater seepage is minor and excavations would not result in a lowering of the groundwater table, which has potential to expose ASS.

Given the outcomes of the preliminary ASS assessment, and the nature of the proposed works (i.e. involving minor soil disturbance), an ASS Management Plan will not be required.

Figure 6-1: Acid Sulphate Soil Map



Source: Australian Soil Resource Information System. Map viewer: http://www.asris.csiro.au/mapping/viewer.htm



Benbow Environmental
13 Daking Street,
North Parramatta NSW
2151

6.1.3 Sodicity and Salinity

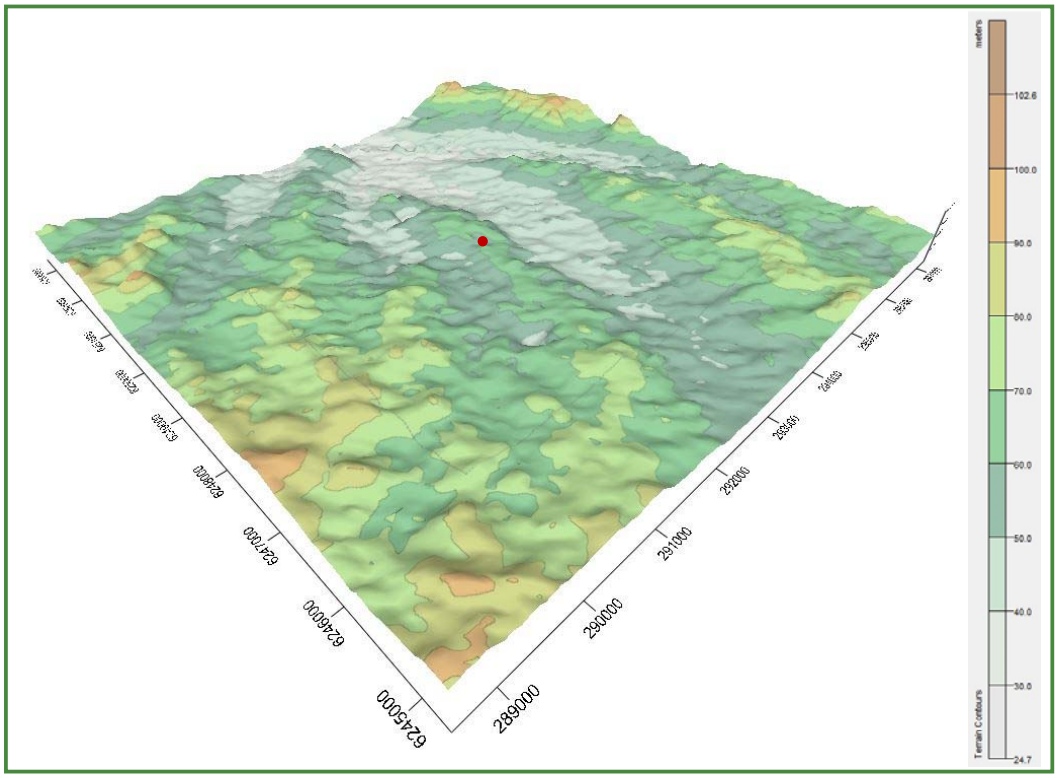
The site is known to be located in an area with high solidity and salinity levels in the soil. A salinity assessment was conducted, and is provided in Appendix 2. Soil sampling demonstrated that on-site soils may be classified as non-saline to moderately saline. Soils which overly shale bedrock are sodic to highly sodic, and soils which overly sandstone bedrock are non-sodic to sodic.

6.2 TOPOGRAPHY

The terrain rises gently by approximately 6.5 m from the north-west towards the east boundary of the site. The proposed truck entrance would be located on the west of the site from Lawson Road. The materials stockpiles and bays, and unloading and processing shed would be located on the mid-elevations near the middle of the site, and the office, associated amenities and carpark would be located near the highest elevations of the site, closest to Martin Road.

A three-dimensional view of the local topography surrounding the site has been provided in Figure 6-2, with the terrain/vertical axis exaggerated by a factor of 10. It should be noted that this figure is an approximation of the actual terrain, based on information that has been digitised from local contour maps.

Figure 6-2: Local Topography with Vertical Exaggeration of 10



6.3 HYDROLOGY

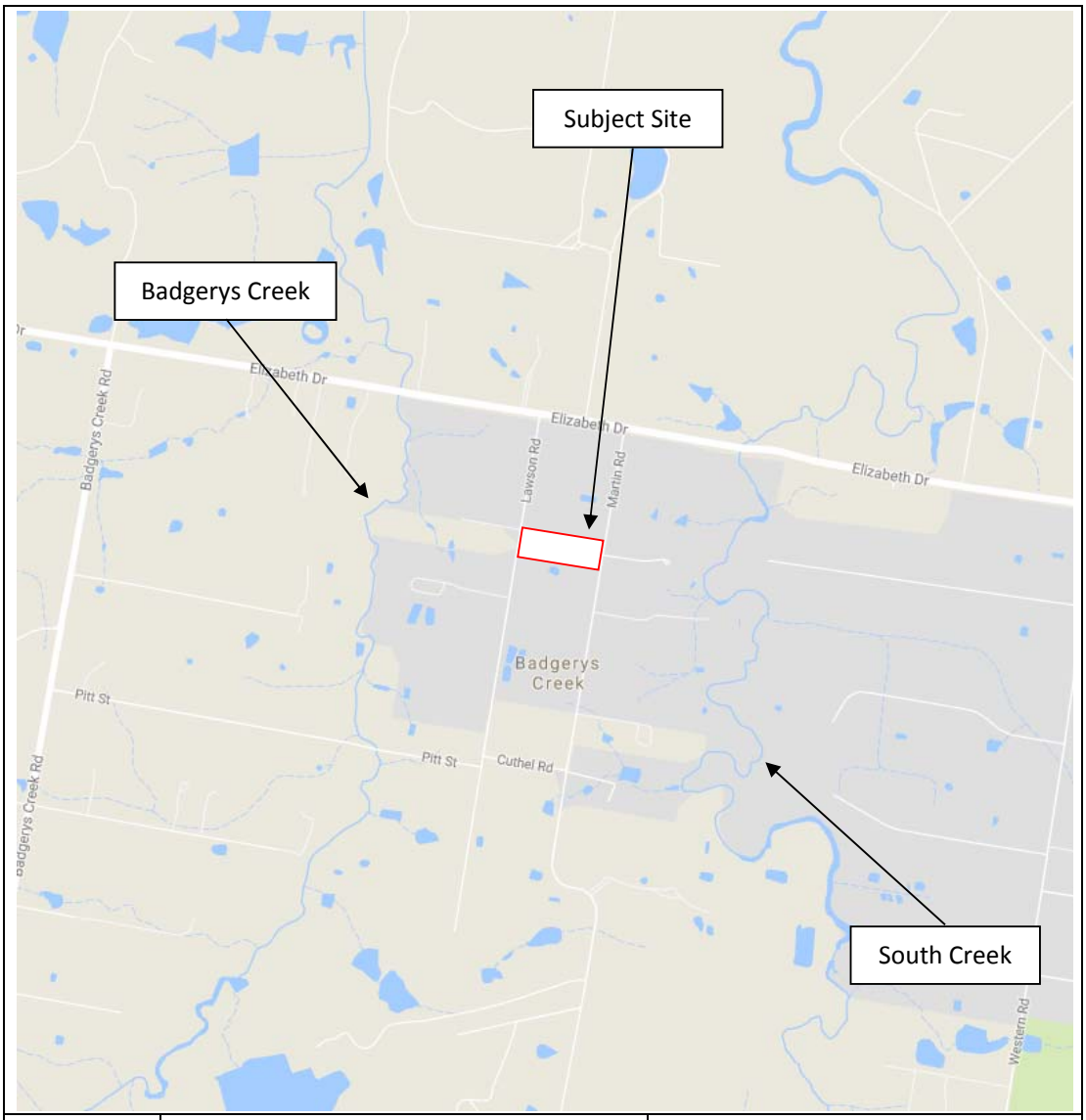
The following section details the hydrological aspect of the site and surrounding region. Specifics on surface water, waterways and groundwater have been described, together with overall catchment issues such as salinity and flooding.

6.3.1 Waterways and Catchment

The nearest waterways are a small tributary of South Creek, approximately 250 m to the east of the site, and a small tributary of Badgerys Creek, approximately 230 m west of the site, as shown in Figure 6-3. Badgerys Creek is itself a tributary of South Creek, joining it approximately 4 km up north, from the point closest to the subject site. South Creek, also referred to a Wianamatta, is a 70 km long waterway which joins the Hawkesbury River near the locality of Windsor. As such, Badgerys Creek and South Creek form part of the Hawkesbury-Nepean catchment.

The site is not located within a drinking water catchment.

Figure 6-3: Nearest Waterway



6.3.1.1 Water Quality and River Flow Objectives

Water Quality Objectives (WQOs) and the River Flow Objectives (RFOs) identify the agreed environmental values and long-term goals for NSW's surface waters. The WQOs and RFOs of the relevant catchment have been investigated for the site, despite the fact that there are no discharges to waterways associated with the proposed development which would affect water quality and river health.

Unfortunately, the NSW Water Quality Objectives website does not provide objectives for the Hawkesbury-Nepean catchment area. Public enquiries for this and other three catchments have been completed or substantially completed by the Healthy Rivers Commission (HRC).

The HRC was discontinued in 2004 and was replaced by the Natural Resources Commission (NRC). Outstanding Healthy River Commission recommendations have been incorporated by the NRC into Catchment Action Plans and Government programs. The Hawkesbury-Nepean Catchment Action Plan is discussed in the following section.

6.3.1.2 Catchment Management Plan

The Hawkesbury-Nepean Catchment Action Plan 2007-2016 (Hawkesbury-Nepean Catchment Management Authority, 2008) sets out an action plan to improve the catchment area. 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 increase in native vegetation extent and an improvement in native vegetation condition*
- *By 2015 there is an increase in the number of sustainable populations of a range of native fauna species*
- *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*
- *By 2015 there is no decline in the condition of marine waters and ecosystems*
- *By 2015 there is an improvement in soil condition Specific priorities*

Specific priorities include:

- *By 2015 there is an increase in the recovery of threatened species, populations and ecological communities*
- *By 2015 there is a reduction in the impact of invasive species*
- *By 2015 there is an improvement in the condition of important wetlands and the extent of those wetlands is maintained*
- *By 2015 there is an improvement in the condition of estuaries and coastal lake systems*
- *By 2015 there is an increase in the area of land that is managed within its capability*
- *Natural resource decisions contribute to improving or maintaining economic sustainability and social wellbeing*
- *There is an increase in the capacity of natural resource managers to contribute to regionally relevant natural resource management*

6.3.2 Groundwater

According to the groundwater map by the NSW Department of Primary Industries - Office of Water, there is only one groundwater monitoring bore (GW105016) within 500 m of the subject site. The bore was drilled for stock / domestic purposes, to a depth of 96 m and was recorded to have three Water Bearing Zones (from 137.50 to 138 m, from 155.5 to 155.7 m, and from 207 to 210 m), with Standing Water Level at 53 m. Salinity yield is equal to 0.200.

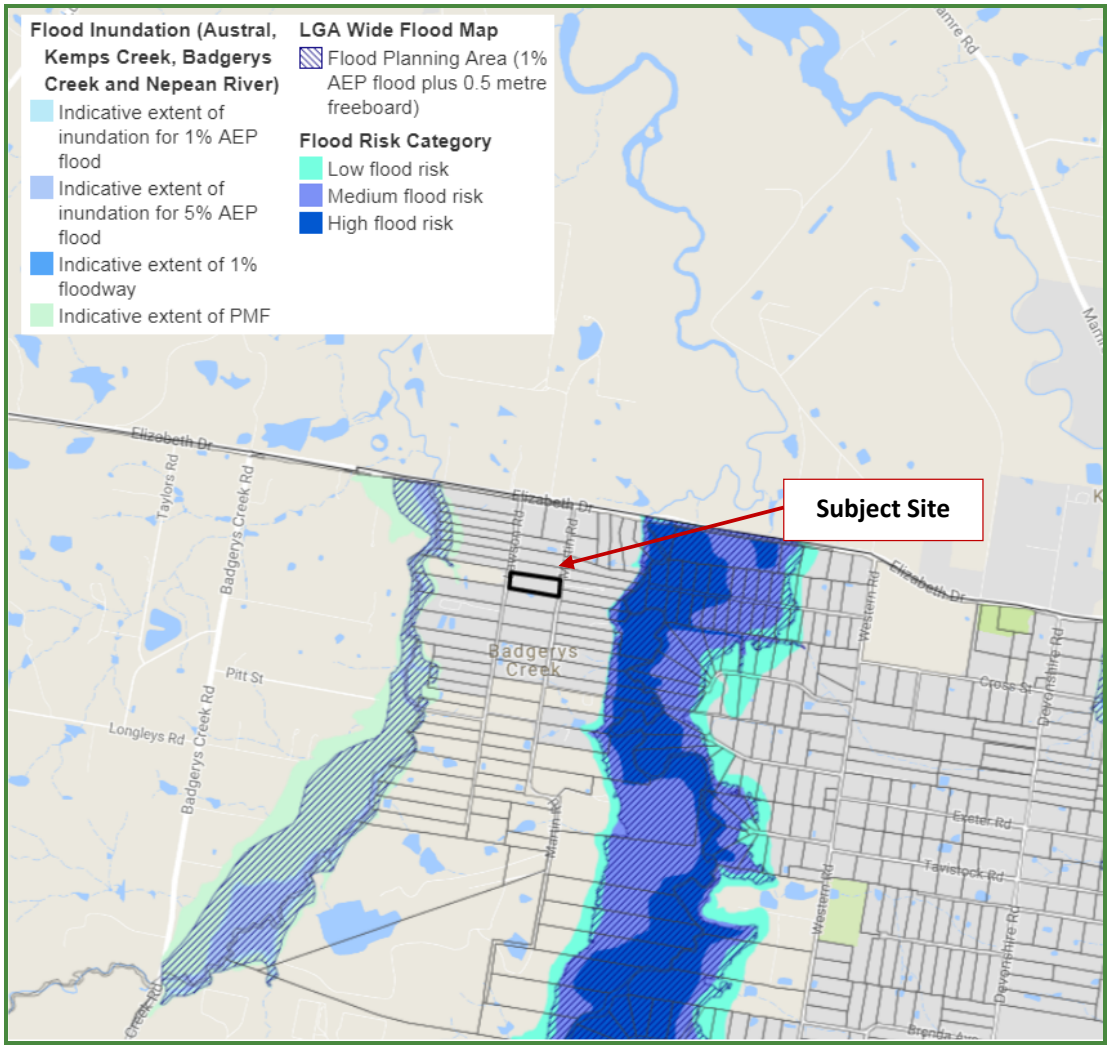
The site has no history of underground tanks having been installed.

6.3.3 Flooding

The S149 Certificate for the subject site (No. 1366), provided in Attachment 2, indicates that the land is not within a flood planning area and is not subject to flood planning controls or flood-related development controls.

Liverpool City Council has prepared flood risk mapping for the majority of the floodplains within the Liverpool LGA, through a number of Floodplain Risk Management Studies and Plans adopted by Council. The subject site is not located on land with a Flood Risk or within a Flood Planning Area or within the probable extent of inundation, as shown in Figure 6-4. However, the site is located between two areas that have medium to high flood risk.

Figure 6-4: Floor Risk Category and Flood Planning Area Maps



6.4 FLORA AND FAUNA

A flora and fauna survey and impact assessment for the subject site is provided in Appendix 9. An arboricultural impact assessment for the subject site is provided in Appendix 10.

A targeted search was undertaken using data from the BioNet Atlas of NSW Wildlife website to identify any threatened species in the area surrounding the proposed development. The search criteria included all valid records, from the past five years, of entities threatened in NSW (listed under the *Threatened Species Conservation Act 1995*) and entities threatened nationally (listed under the *Environment Protection and Biodiversity Conservation Act 1999*) within a selected area. The proposed development is located in the middle of the selected area, a 10 km × 10 km extent with the following coordinates: North -33.83, West 150.70, East 150.80, South -33.93. The results from the search are listed in Table 6-1, and presented in their geographical context in Figure 6-5.

The targeted search shows there are no threatened species, or populations, sited within or in close proximity to the subject site. The closest reported sightings of endangered species are two plant species, *Marsdenia viridiflora subsp. Viridiflora,* and *Dillwynia tenuifolia,* a rare plant endemic to NSW. The sightings have occurred approximately 1.7 km west and 2.4 km east of the site, respectively.

No threatened flora or fauna species were found on-site during the site surveys, however the site may be providing habitat for numerous threatened microbat species and the Grey-headed Flying-Fox. A Test of Significance (7-Part test) was conducted to assess the impacts of the proposal on these species and concluded that the removal of trees from the site will have an insignificant impact on those populations.

Additionally, the S149 Certificate for the subject site (No. 1366), provided in Attachment 2 indicates that the land does not include or comprise critical habitat, is not in a conservation area and does not contain an item of environmental heritage. The site also does not contain terrestrial biodiversity according to the Terrestrial biodiversity map provided by Liverpool City Council, although it is close to areas biodiversity mapped areas, as shown in Figure 6-6.

The subject site is biodiversity certified land (within the meaning of Part 7AA of the Threatened Species Conservation Act 1995), as declared in the S149 Certificate and as shown on the Biodiversity Certification map provided by Liverpool City Council.

Table 6-1: Threatened and endangered species near the subject site

Kingdom	Scientific Name	NSW Status	Sightings
Plantae	*Marsdenia viridiflora subsp. viridiflora*	E2 - Endangered Population	1
Plantae	*Dillwynia tenuifolia*	E2 - Endangered Population V - Vulnerable P - Protected	25

6.4.1 Ecological Community

The trees assessed on the property have been recognized as part of the Cumberland Plain Woodland, which is listed as a Critically Endangered Ecological Community under the Biodiversity Conservation Act 2016, and Critically Endangered under the Environment Protection and Biodiversity Conservation Act 1999.

Figure 6-5: Threatened flora and fauna sightings

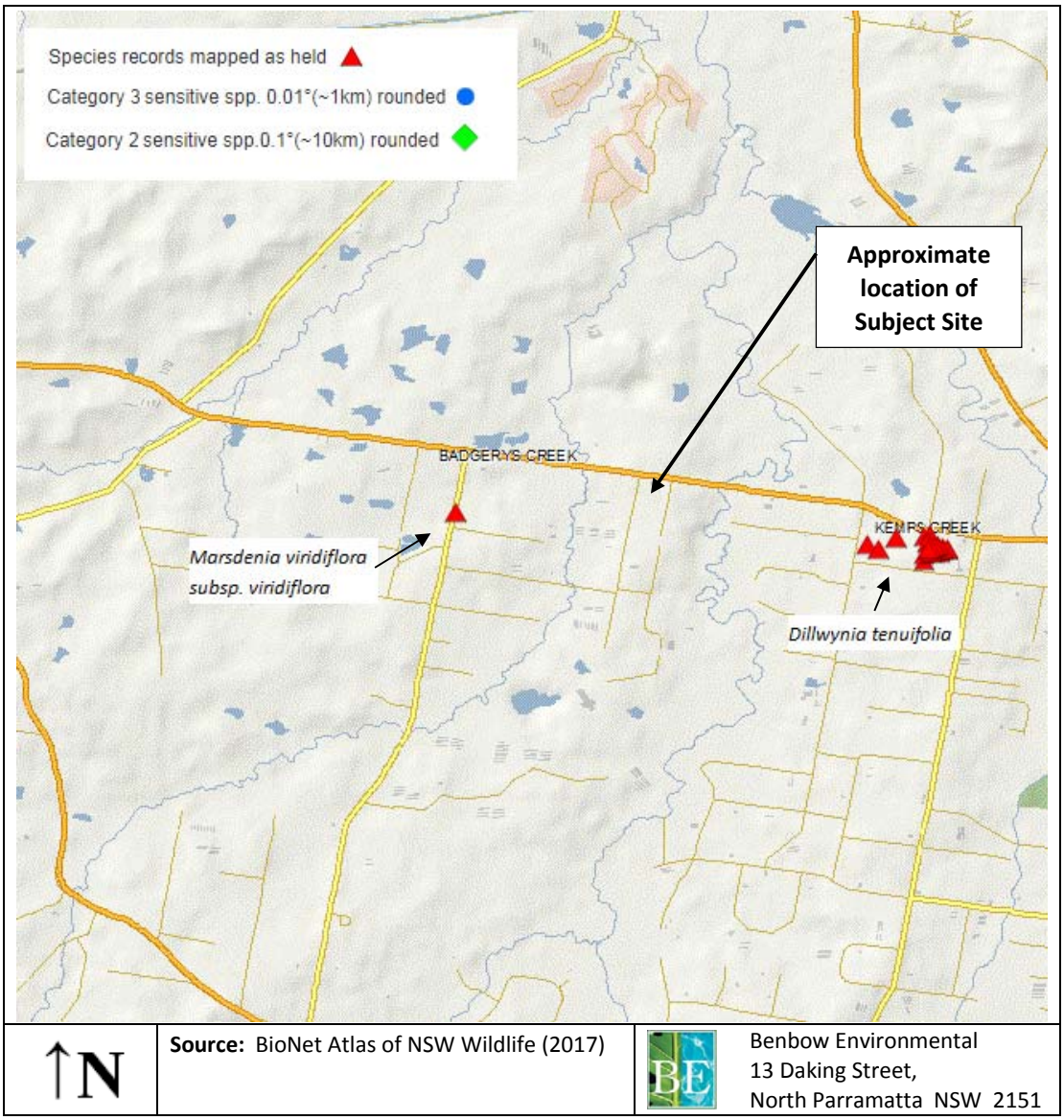


Figure 6-6: Terrestrial Biodiversity map

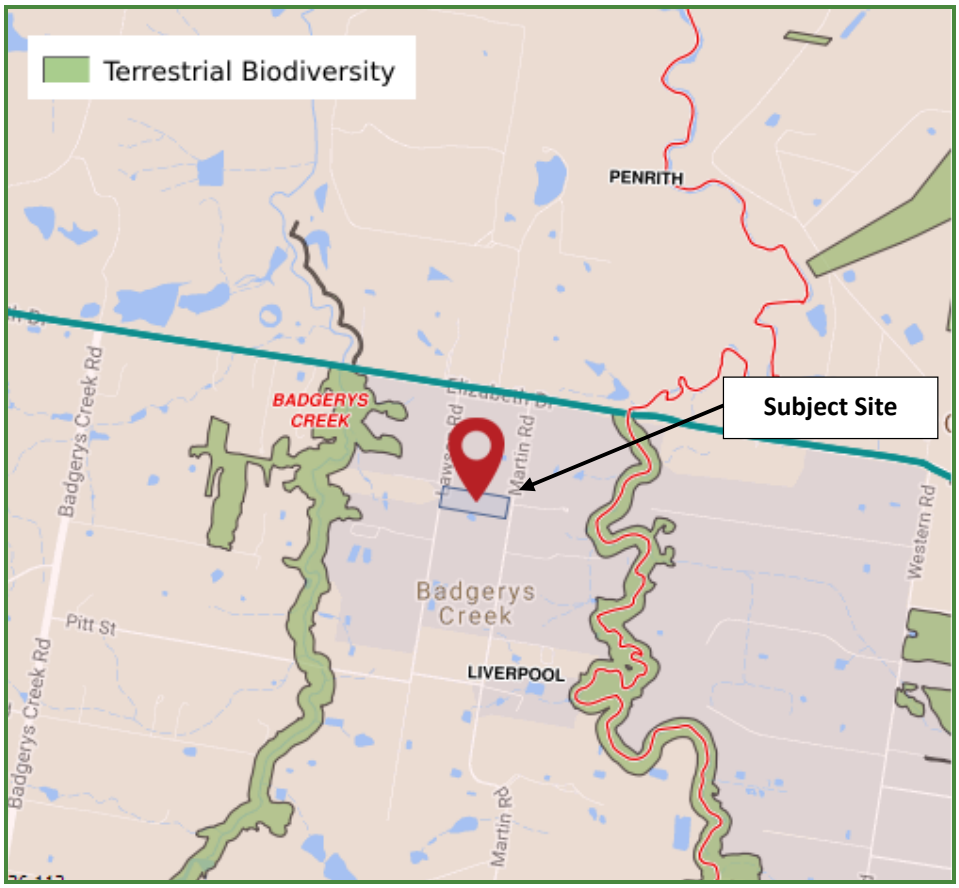
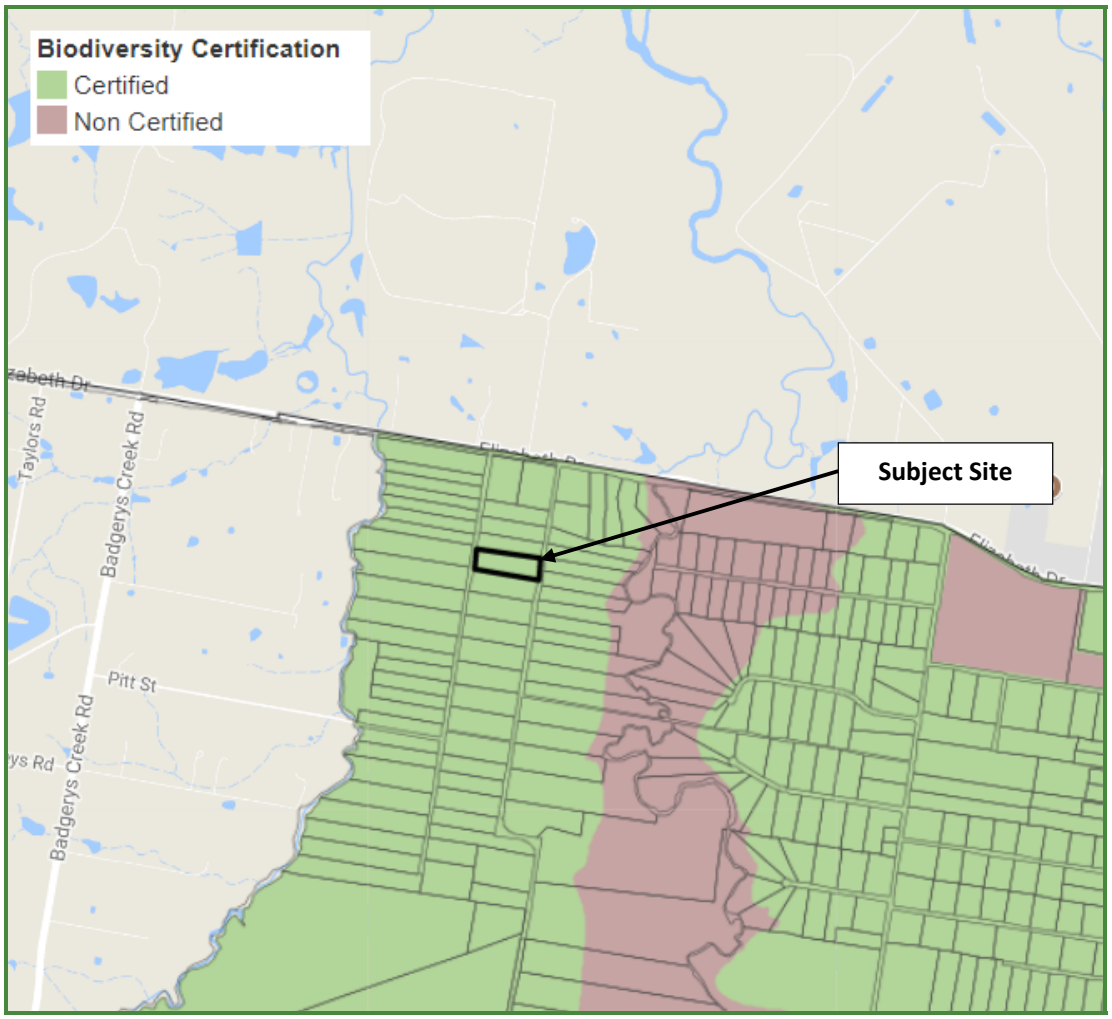


Figure 6-7: Biodiversity Certification map



6.5 NOISE AMENITY

The following sections describe the existing acoustical environment of the site and surrounding area, with specifics on the nearest sensitive receivers, noise monitoring results and relevant meteorological conditions. For more details refer to the Noise Impact Assessment, provided in Appendix 8.

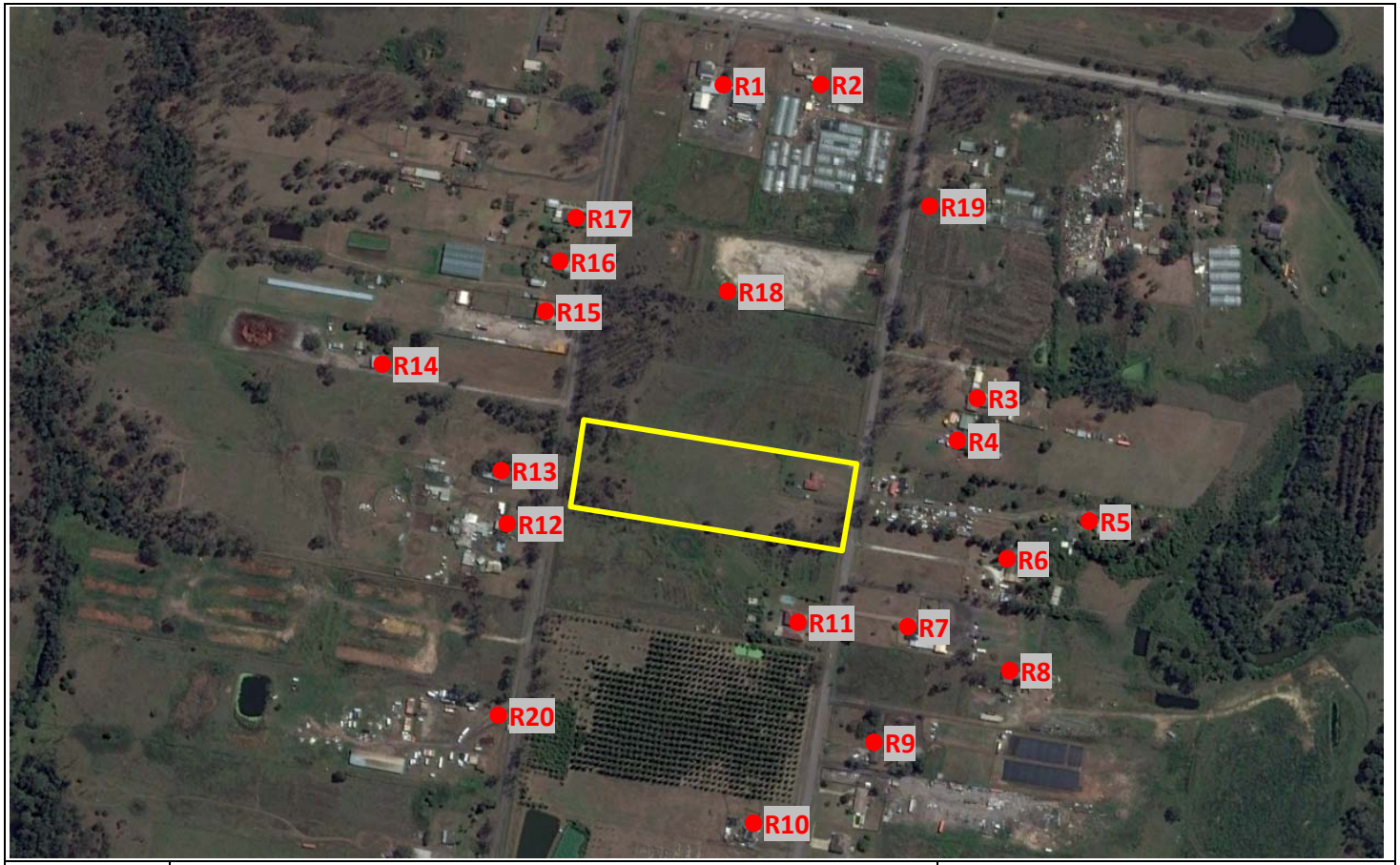
6.5.1 Nearest Receptors

Table 6-2 identifies the nearest sensitive receptors that have the potential to be affected by the proposal. The aerial photographs of the sensitive residential and non-residential receivers are shown in Figure 6-8. These receptors were selected based on their proximity and directional bearing from the subject site.

Table 6-2: Residential and Non-Residential Receivers

Receptor ID	Address	Lot & DP	Approx. Distance from Proposed Development	Type of Receptor
R1	1990 Elizabeth Drive, Badgerys Creek	Lot 10 DP 860338	370 m N	Residential
R2	1970 Elizabeth Drive, Badgerys Creek	Lot 11 DP 860338	370 m N	Residential
R3	30 Martin Road, Badgerys Creek	Lot 8 DP 226448	150 m NE	Residential
R4	40 Martin Road, Badgerys Creek	Lot 7 DP 226448	110 m NE	Residential
R5	50 Martin Road, Badgerys Creek	Lot 6 DP 226448	50 m E	Residential
R6	60 Martin Road, Badgerys Creek	Lot 5 DP 226448	170 m E	Residential
R7	70 Martin Road, Badgerys Creek	Lot 4 DP 226448	130 m SE	Residential
R8	80 Martin Road, Badgerys Creek	Lot 2 DP 530595	220 m SE	Residential
R9	90 Martin Road, Badgerys Creek	Lot 2 DP 226448	210 m SE	Residential
R10	75 Martin Road, Badgerys Creek	Lot 34 DP 3050	290 m S	Residential
R11	65 Martin Road, Badgerys Creek	Lot 36 DP 3050	Adjacent S	Residential
R12	83-87 Lawson Road, Badgerys Creek	Lot 6 DP 3050	70 m SW	Residential
R13	75 Lawson Road, Badgerys Creek	Lot 5 DP 3050	70 m W	Residential
R14	65 Lawson Road, Badgerys Creek	Lot 1 DP 104049	200 m W	Residential
R15	55 Lawson Road, Badgerys Creek	Lot 1 DP 1084967	110 m NW	Residential
R16	45 Lawson Road, Badgerys Creek	Lot 14 DP 531743	170 m NW	Residential
R17	35 Lawson Road, Badgerys Creek	Lot 13 DP 531743	200 m NW	Residential
R18	25 Martin Road, Badgerys Creek	Lot 1 DP 611519	150 m N	Industrial
R19	10 Martin Road, Badgerys Creek	Lot 10 DP 226448	270 m NE	Industrial
R20	105 Lawson Road, Badgerys Creek	Lot 8 DP 3050	220 m SW	Industrial

Figure 6-8: Residential and Non-Residential Receptors



6.5.2 Existing Acoustic Environment

The level of background and ambient noise is assessed separately for the daytime, evening and night time assessment periods. The NSW EPA Noise Policy for Industry 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.

Unattended long-term noise monitoring was undertaken from 29th September 2017 to 10th October 2017 at two (2) residential locations.

For details regarding the monitoring equipment and methodology, refer to the Noise Impact Assessment, provided in Appendix 8.

6.5.2.1 Measurement Locations

The environmental noise loggers were utilised to measure the existing ambient and background noise levels. Unattended long-term noise monitoring was undertaken from 29th September 2017 to 10th October 2017 at two (2) residential locations. The monitoring locations were selected, to represent the closest receivers off Martin Road and Lawson Road.

Attended noise monitoring was undertaken on 29th September 2017.

The noise logger locations are shown in Figure 6-9 and listed in Table 6-3. Noise logger charts are presented in the Noise Impact Assessment.

Table 6-3: Noise Monitoring Locations

Monitoring Location	Methodology	Address
A	Attended monitoring and unattended monitoring	55 Martin Road, Badgerys Creek
B	Attended monitoring and unattended monitoring	83-87 Lawson Road, Badgerys Creek

Figure 6-9: Logger Locations

↑N	LEGEND: Site Logger Location	Benbow Environmental 13 Daking Street, North Parramatta NSW 2151

Table 6-4 identifies the receptor locations that have been associated with the two (2) noise logger locations and will therefore utilise the noise criteria derived from the measurement data obtained from the respective noise logger.

Table 6-4: Associated Residential Receptors

Logger	Associated Residential Receptor Locations
A	R1-R11
B	R12-R17

6.5.2.2 Measured Noise Levels

6.5.2.2.1 Long-Term Unattended Noise Monitoring Results

The data was analysed to determine a single assessment background level (ABL) for each day, evening and night time period, in accordance with the Noise Policy for Industry. That is, the ABL is established by determining the lowest tenth-percentile level of the L_{A90} noise data over each period of interest. The background noise level or rating background level (RBL) representing the day, evening and night assessment periods is based on the median of individual ABL's determined over the entire monitoring period. The results of the long-term unattended noise monitoring are displayed in Table 6-5.

Existing road noise levels are presented in Table 6-6.

Table 6-5: Unattended Noise Monitoring Results, dB(A)

Monitoring Location and associated receptors	Assessment Background Level ABL (L_{90})			Equivalent Ambient Noise Level L_{eq}		
	Day	Evening	Night	Day	Evening	Night
Logger A	37	33	29	50	46	47
Logger B	37	35	30	51	49	48

Table 6-6: Road Traffic Noise Data at Locations A and B

Date	Existing Road Traffic Noise – dB(A)			
	Daytime (7am to 10pm)		Night-time (10pm to 7am)	
	$L_{eq\ (15\ hour)}$	$L_{eq\ (1\ hour)}$	$L_{eq\ (9\ hour)}$	$L_{eq\ (1\ hour)}$
Logger A	51	52	45	48
Logger B	51	52	45	49

6.5.2.2.2 Short Term Operator Attended Noise Monitoring Results

Given that the results of the unattended noise monitoring are affected by all ambient noise sources such as local fauna, road traffic and industrial sources, it is not possible to determine with precision the contribution of each component based on unattended monitoring alone. Therefore, the attended noise monitoring allows for a more detailed understanding of the existing ambient noise characteristics and a more meaningful final analysis to be undertaken. The results of the short-term attended noise monitoring are displayed in Table 6-7.

The attended measurements showed that the background noise levels consisted of traffic from Elizabeth Drive, birds and trees rustling in the wind. Ambient noise levels were dominated by vehicles on Martin Road and Lawson Road, aeroplanes and surrounding industrial noise.

Table 6-7: Operator Attended Noise Measurements, dB(A)

Location & Date/Time	L_{Aeq}	L_{A90}	L_{A10}	L_{A1}	Comments
Location A Friday 29/09/2017 12:55 Daytime Period	61	38	59	81	Cars Martin Road < 74 dB(A) Trucks Martin Road < 83 dB(A) Background traffic Elizabeth Drive < 35 dB(A) **Distant fan < 30 dB(A)** Birds in trees < 45 dB(A) Wind in trees < 35 dB(A) Dog barking < 44 dB(A) Aeroplane < 58 dB(A) **Tractor < 40 dB(A), 90 seconds** **Distant excavator < 30 dB(A), 30 seconds** **Estimated L_{Aeq} noise level from industrial sources = 31 dB(A)**
Location B Friday 29/09/2017 12:28 Daytime Period	53	38	54	65	Cars Lawson Road < 68 dB(A) Trucks Lawson Road < 75 dB(A) Background traffic Elizabeth Drive < 32 dB(A) **Truck revving < 35 dB(A), 10 seconds** Birds < 55 dB(A) Light wind in trees < 40 dB(A) Aeroplane < 56 dB(A) **Industrial scraping/banging < 40 dB(A), 2 minutes** **Estimated L_{Aeq} noise level from industrial sources = 31 dB(A)**

6.5.3 Metrological Conditions

The full Noise Impact Assessment (Appendix 8) assessed whether wind and temperature inversions are considered to be a feature of the area with the following conclusions:

- Source-to receiver wind speeds of 3 m/s or below are present for less than 30% of the time therefore wind effects have not been included in the assessment.

- Operations are to take place during the day period, Monday to Friday 7am to 6pm and Saturday from 7am to 5pm. As the night period is not being utilised, temperature inversions are therefore not considered any further.

The following conditions will be considered in this noise impact assessment considered:

- Condition A: Neutral Weather Conditions.

Details of the considered meteorological conditions have been displayed in Table 6-8.

Table 6-8: Meteorological Conditions Assessed in Noise Propagation Modelling

Condition	Classification	Ambient Temp.	Ambient Humidity	Wind Speed	Wind Direction (blowing from)	Temperature Inversion	Affected Receiver	Applicability
A	Neutral	10 °C	70%	-	-	No	All	All periods

6.6 BACKGROUND AIR QUALITY

Background air quality parameters were obtained from the closest NSW OEH ambient air monitoring station located at Bringelly, approximately 4.5 km south of the subject site. The relevant assessable pollutant parameters available from the monitoring station are PM_{10} values for 2015, 2016 and 2017, and $PM_{2.5}$ values for the first six months of 2016, and 2017.

A summary of the background data is provided in Table 6-9.

Table 6-9: Referenced Background Particulate Matter Data

Pollutant	Parameter	Concentration (µg/m^3)			
		2015	2016	2017	2015-2017
PM_{10}	Annual Average Concentration	15.84	16.92	19.77	17.54
	Peak 24 Hour Concentration	57 (06/05)	61.6 (07/05)	83.7 (11/07)	83.7 (11/07/17)
	Number of 24 Hour Ground Level Impact Criteria (50 µg/m^3) Exceedances	1	3	6	10
$PM_{2.5}$	Annual Average Concentration	N/A	7.64	7.47	7.55
	Peak 24 Hour Concentration	N/A	21.6 (04/07)	52.5 (14/08)	52.5 (14/08/17)
	Number of 24 Hour Ground Level Impact Criteria (25 µg/m^3) Exceedances	N/A	0	2	2

6.7 CLIMATE

This section provides background information on the meteorological conditions of the existing area surrounding the proposed development. The referenced meteorological information has been sourced from the Badgerys Creek Automatic Weather Station (AWS), Station No. 067108. This station is located within 4 km south-west of the subject site. As such, this monitoring station is considered suitable for reference to general climate conditions in the local area.

6.7.1 Temperature

The mean annual minimum and maximum temperatures at Badgerys Creek are 23.9°C and 10.8°C respectively. The lowest temperatures occur in July, with a mean minimum of 4.1°C. The hottest temperatures are recorded during January, with the highest maximum average of 30.0°C. This data is shown in Table 6-10.

Table 6-10: Temperature Statistics

Months / Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean Maximum Temperature (ºC)	30.0	28.8	26.8	23.9	20.7	17.8	17.4	19.2	22.5	24.9	26.5	28.4	23.9
Mean Minimum Temperature	17.1	17.1	15.2	11.4	7.7	5.6	4.1	4.7	7.8	10.3	13.5	15.4	10.8

Source: Bureau of Meteorology, 2017
Note: Statistics are based on data collected from the Year 1995 to 2017

6.7.2 Rainfall

Rainfall data from Badgerys Creek shows mean annual rainfall of 683.0 mm, which results in a monthly mean of 57.4 mm. February is the wettest month, where the mean rainfall reading is 99.7 mm, while the driest month is July with 23.6 mm mean rainfall. The annual mean number of rainy days (with rainfall above 1 mm) is calculated as 68.4 days. This data is shown in Table 6-11.

Table 6-11: Rainfall Statistics

Months / Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean Rainfall (mm)	81.6	99.7	83.7	50.9	38.3	61.8	23.6	36.8	32.3	51.2	71.0	58.3	683.0
Decile 5 (Median) Rainfall (mm)	71.5	89.3	57.3	30.2	23.4	49.8	20.0	20.5	27.9	42.8	52.4	47.2	669.8
Mean Number of Days of Rain ≥ 1 mm	7.2	7.5	7.5	5.9	3.9	5.4	3.9	3.5	4.6	5.5	7.0	6.5	68.4

Source: Bureau of Meteorology, 2017
Note: Statistics are based on data collected from the Year 1995 to 2017

6.7.3 Wind

Seasonal wind rose plots representing the annual frequency of wind speed and direction for the subject site were created using Badgerys Creek AWS 2016 data. Trends in wind speed and direction are described in detail below and wind rose plots have been included in Figure 6-10.

The representative meteorological year of 2016 was selected based on long term averages from Badgerys Creek AWS. Meteorological data for 2016 was compared with long term averages for minimum temperature, maximum temperature, and wind run and found to be consistent. Wind roses were also compared for the five most recent meteorological years and found to be reasonably consistent.

The 2016 annual average wind speeds were estimated to be 2.39 m/s with a calms frequency of 5.67%. Annual winds from the south-west were found to be dominant and were present for approximately 21% of the time.

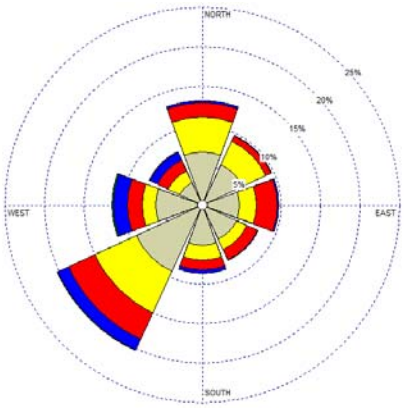
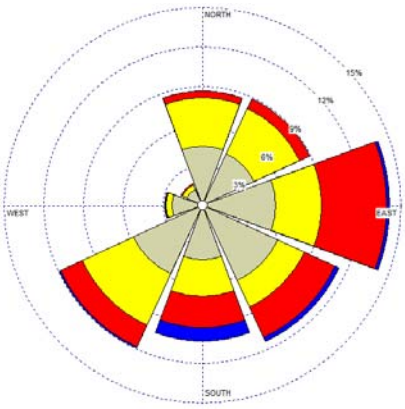
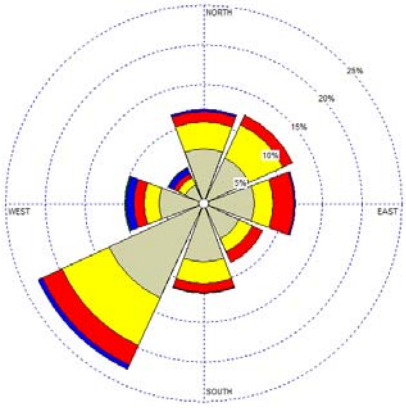
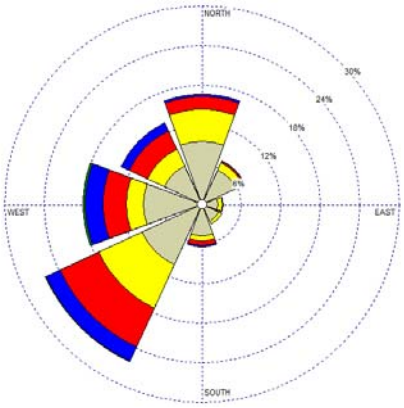
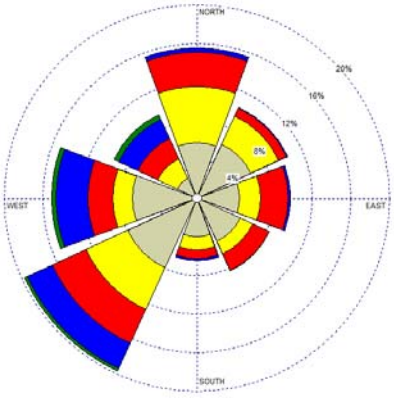
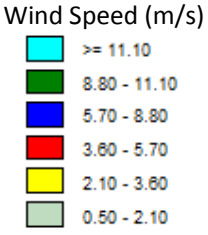
The average 2016 summer wind speed was estimated to be 2.24 m/s, with a calms frequency of 5.27%. Easterly winds were found to be dominant at a frequency of around 14%. Winds from the south-west to the south-east were found to be present for approximately 12-14% of the time.

In autumn 2016, dominant winds blew from the south-west (24%) and all other wind directions occurred at frequencies less than 15%. The average autumn wind speed was 2.07 m/s with a calms frequency of 6.93%.

The 2016 winter data showed the prevalence of winds from the south-west and west at frequencies of 29% and 19% respectively. The average winter wind speed was 2.45 m/s with a calms frequency of 5.30%.

In spring 2016, average wind speeds of 2.77 m/s with a calms frequency of 5.18% were recorded. Dominant winds were found to be present from the south west (20%), with winds from the north and west occurring at a frequency of 16% each.

Figure 6-10: Wind Rose Plots for the Referenced Meteorological Station – Bureau of Meteorology Badgerys Creek AWS for 2016

All Seasons	Summer Season (December – February)
	
Average Wind Speed: 2.39 m/s Calms Frequency: 5.67% Axis Frequencies: 5%, 10%, 15%, 20%, 25%	Average Wind Speed: 2.24 m/s Calms Frequency: 5.27% Axis Frequencies: 3%, 6%, 9%, 12%, 15%
Autumn Season (March – May)	**Winter Season (June – August)**
	
Average Wind Speed: 2.07 m/s Calms Frequency: 6.93% Axis Frequencies: 5%, 10%, 15%, 20%, 25%	Average Wind Speed: 2.45 m/s Calms Frequency: 5.30% Axis Frequencies: 6%, 12%, 18%, 24%, 30%
Spring Season (September – November)	**Legend**
	
Average Wind Speed: 2.77 m/s Calms Frequency: 5.18% Axis Frequencies: 4%, 8%, 12%, 16%, 20%	

6.8 HERITAGE

A search for heritage places and items was conducted via the OE&H State Heritage Inventory, an online heritage database which includes listings from Aboriginal Places, State Heritage Register, Interim Heritage Orders, State Agency Heritage Registers and Local Environmental Plans.

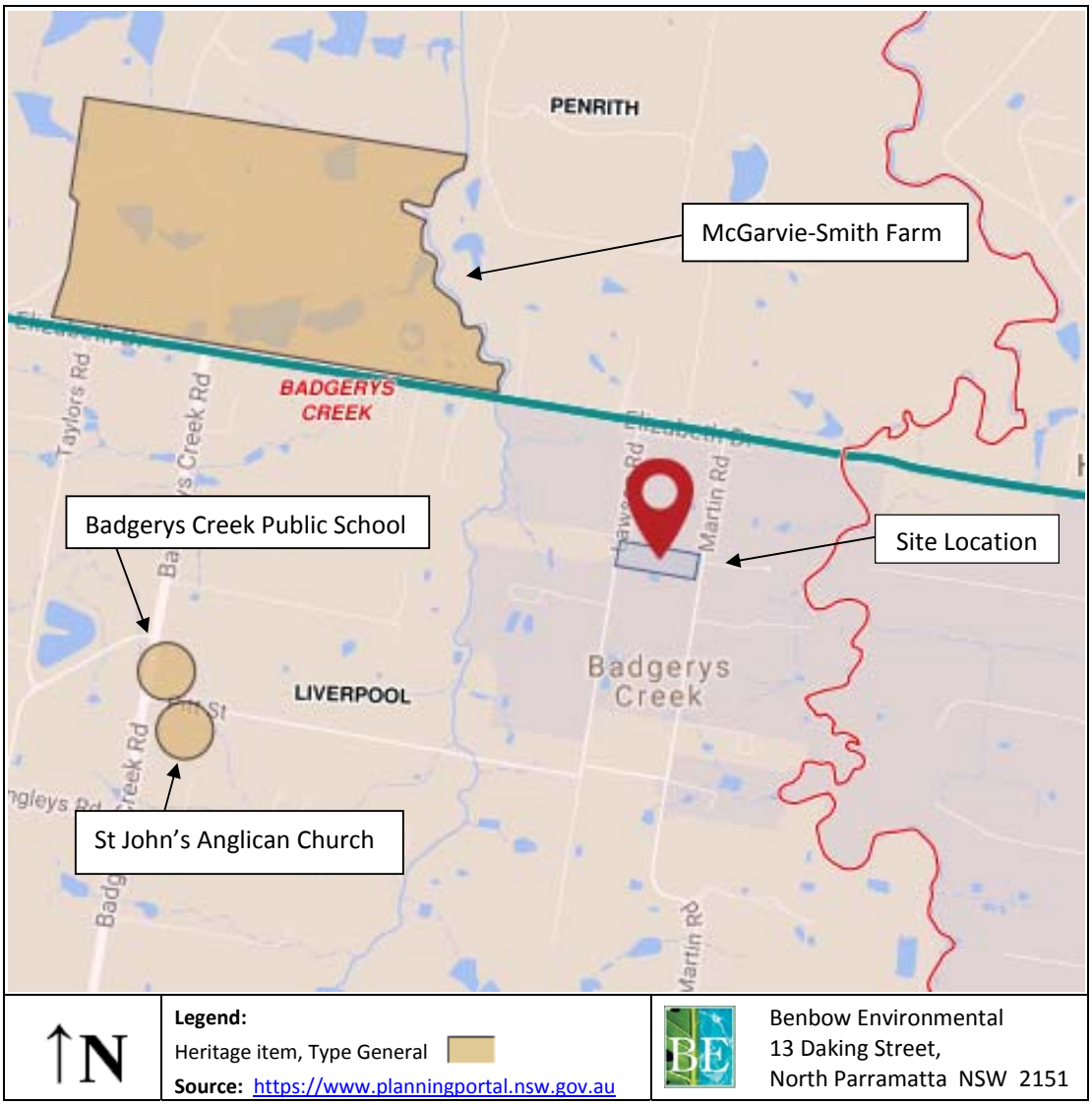
The subject land does not contain and is not in the vicinity of any Aboriginal Places and State Heritage Register items; it is also not affected by an Interim Heritage Order under the provisions of the NSW *Heritage Act 1977*.

The site is also not listed as being a heritage item or containing heritage items under the Liverpool LEP 2013. However, three local heritage items were listed in the vicinity of the subject site, approximately between 0.7 and 1.5 km from the subject site (see details in Table 6-12). The location of the heritage items relative to the subject site is shown in Figure 6-5.

Table 6-12: Local Heritage Items near Subject Site

Item Name	Heritage Type	Heritage Significance	Address	Distance from Site	EPI listing
Badgerys Creek Public School	General	Local	Corner of Pitt St and Badgerys Creek Rd, Badgerys Creek	1.53 km	Liverpool LEP 2008
St John's Anglican Church	General	Local	Pitt St, Badgerys Creek	1.54 km	Liverpool LEP 2008
McGarvie-Smith Farm	General	Local	1793-1951 Elizabeth Dr, Badgerys Creek	710 m	Penrith LEP 2010

Figure 6-11: Local Heritage Items near Subject Site



7. IDENTIFICATION AND PRIORITISATION OF ISSUES

The identification and prioritisation of the potential environmental impacts of the proposed development were fundamental steps in preparing the EIS.

This process involved the following stages:

1. Review of the proposal and existing site operations

Initial meetings with the proponent were undertaken to discuss the details of the proposal. This established the nature of the proposal. An inspection of the site and surrounding areas was undertaken which lead to identification of potential sensitive receptors.

2. Identification of planning requirements

Review of planning instruments that apply to the land was undertaken to determine any planning constraints and zoning rules affecting the property.

3. Guidelines and reference material

Past reports for the existing site were reviewed. There are no relevant NSW government guidelines or industry guidelines for the industry.

4. Preparation of Scoping Report

Experience with past projects at the site assisted in development of a Scoping Report that outlined the proposal and potential environmental impacts.

5. Consultation with regulatory authorities & stakeholders

Consultation with Fairfield Council and EPA determined EIS requirements and expectations. Secretary's Environmental Assessment Requirements for the EIS from the DP&E were obtained.

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

7.1 SUMMARY OF POTENTIAL ISSUES

The statutory requirements and past reports in conjunction with the government consultation process enabled the identification of the potential issues associated with the proposal. These are listed below in alphabetical order:

- Air quality;
- Chemical management;
- Cumulative impacts;
- Fire and incident management;
- Flooding;
- Flora and Fauna;
- Greenhouse gas emissions;
- Hazards and risk;

- Heritage;
- Human health and safety;
- Noise and vibration;
- Soil;
- Strategic context;
- Traffic and transport;
- Visual amenity;
- Waste management; and
- Water.

SEARs (document reference 1182) were provided on 06 November 2017 by the DP&E (refer to Attachment 1) provides general requirements for the EIS as well as key issues to assess. The DP&E stated that the EIS must include an assessment of all potential impacts of the proposed development on the existing environment (including cumulative impacts) and develop appropriate measures to avoid, minimise, mitigate and/or manage these potential impacts. As part of the EIS assessment, the following key issues must be addressed:

- Strategic context;
- Traffic and transport;
- Air quality and odour;
- Noise and vibration;
- Soil and water;
- Hazards and risk;
- Waste management;
- Fire and incident management; and
- Heritage.

Additionally, the EPA's key information requirements for the proposal include an adequate assessment of:

- Wastewater management;
- Water management;
- Air quality; and
- Noise.

Additionally the Department of Primary Industries – Water requested details regarding:

- Key legislation;
- Licensing considerations;
- Surface water impacts;
- Groundwater impacts;
- Dam safety;
- Groundwater dependant ecosystems;
- Watercourses;
- Wetlands and riparian land; and
- Landform rehabilitation.

Based on all the above considerations, potential issues have been divided in three categories: key issues requiring a full assessment, issues requiring a detailed assessment and minor issues requiring only a brief assessment or no further investigation.

Key issues warranting a full assessment (including comprehensive baseline data) are the following:

- Noise and vibration
  A noise impact assessment is required due to the large number of noise generating sources proposed and the proximity to sensitive receptors.

- Air quality and odour
  An air quality assessment is required due to the dust generated from the process. Therefore, a quantitative assessment has been undertaken.

- Traffic and transport
  A full traffic assessment has been undertaken due to the potential for traffic increases to impact on the existing road network.

- Flora and Fauna
  A full flora and fauna assessment and arborist assessment has been undertaken due to the potential to impact on the ecological community.

Issues warranting a detailed, but not full, assessment are the following:

- Strategic Context
  A detailed justification for the proposal and suitability of the site was undertaken. The proposal also needed to be assessed against relevant planning strategies, environmental planning instruments and development control plans.

- Hazards and Risks (including Chemical Management and Fire)
  No chemicals are to be used in the process. Chemical management has been assessed. Quantities of chemicals are relatively minor and do not trigger SEPP 33, therefore a preliminary hazard analysis was not required.

  Fire is a potential environmental issue as the site will contain some combustible materials and liquids. Therefore, the fire risk has been assessed.

- Water
  The proposed operations require some water use and have a comprehensive water management system. Additionally, there is potential for contamination of stormwater system. Therefore, a qualitative water assessment has been undertaken.

- Waste management
  The proposed operations generate various types and large quantities of wastes. Therefore, waste has been assessed in detail.

- Greenhouse Gas
  The proposed operations generate greenhouse gases through the use of electricity for operating the majority of equipment on site. An assessment estimating the greenhouse gas emissions from the site has been undertaken.

- Soil
  The proposed construction will require some excavation and the proposed operations may impact the soil. Therefore, Preliminary Site Investigation, Geotechnical Investigation, Preliminary Acid Sulfate Soils Assessment, Salinity Assessment & Wastewater Assessment and a qualitative soil assessment has been undertaken.

Minor issues requiring only a brief assessment or no further investigation are the following:

- Flooding
  The site is not flood affected. Therefore, a detailed assessment is not warranted.

- Visual amenity
  The proposed use will occupy a new industrial rural shed. The waste processing operation will be entirely located within this building, such that there would be negligible impacts to the visual amenity of the area. Therefore, a detailed assessment is not warranted however a series of visual perspectives of the shed have been produced.

- Heritage
  The site does not contain any heritage items. Therefore, a detailed assessment is not warranted.

- Cumulative Impacts
  Due to the size and nature of the proposed development, controlling for direct environmental impacts would minimise any cumulative impacts from the proposed development. Therefore, a detailed assessment is not warranted.

- Human Health and Safety
  The potential impacts to human health resulting from the proposed development are either negligible or appropriately mitigated therefore a detailed assessment is not warranted.

8. ENVIRONMENTAL IMPACTS AND SAFEGUARDS

8.1 AIR QUALITY

An Air Quality Impact Assessment has been undertaken for the proposed development. A full copy of the AQIA is provided as Appendix 6.

TSP, PM_{10} and $PM_{2.5}$ emissions were modelled for the operation of the proposed resource recovery facility in accordance with the "*Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales*" (EPA 2016).

Odour is not considered as a potential emission that would be generated from the proposed development and therefore was not assessed.

A brief summary of the findings is presented below.

The predicted cumulative impacts of TSP, PM_{10} and $PM_{2.5}$ at all identified receptors for an annual averaging period were below the specified criteria.

The subject site is located in a region that can experience 24 hour periods of elevated background PM_{10} and $PM_{2.5}$ levels. No additional exceedances were predicted to occur under a 24 hour averaging period for PM_{10} or $PM_{2.5}$ as a result of the proposal.

Therefore, the "*Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales*" criteria are satisfied at all residential receptors for all particulate air pollutants modelled. No further controls are recommended.

8.2 NOISE

A Noise Impact Assessment has been undertaken for the proposed development. A full copy of is provided as Appendix 8.

8.2.1 Operational Noise

8.2.1.1 Project Noise Trigger Levels

The project noise trigger levels for the site have been established in accordance with the principles and methodologies of the NSW Noise Policy for Industry (EPA, 2017) and shown in Table 8-1.

Table 8-1: Project Noise Trigger Levels (PNTL) for Operational Activities, dB(A)

Receiver	Type of Receptor	Time of day	Rating background noise level	Project intrusiveness noise level ($L_{eq(15\ minute)}$)	Recommended amenity noise level $L_{Aeq\ period}$	Project amenity noise level $L_{Aeq\ 15\ minute}$[2]	PNTL $L_{Aeq\ 15\ minute}$
R1-R11	Residential - Rural	Day	37	**42**	50	48	**42**
		Evening	33	**38**	45	43	**38**
		Night	30	**35**[1]	40	38	**35**
R12-R17	Residential - Rural	Day	37	**42**	50	48	**42**
		Evening	35	**40**	45	43	**40**
		Night	30	**35**	40	38	**35**
R18-R20	Industrial	When in use	-	-	70	68	**68**

Notes:
1) This value is based on the minimum assumed rating background level of 30 dB(A) for night time.
2) These levels have been converted to $L_{Aeq\ 15\ minute}$ using the following: $L_{Aeq\ 15\ minute} = L_{Aeq\ period} + 3$ dB (NSW Noise Policy for Industry Section 2.2)

8.2.1.2 Operational Noise Impact Assessment

Three operational scenarios were considered in the noise model. The first noise generating scenario considered a situation where all noise sources on site were operating over the 15 minute assessment period, and the roller doors to the building were closed. The second scenario considered the roller doors to the building to be closed, except for the middle roller door which is open for 3 minutes of the 15 minute period. Scenario 2 enables a truck or front end loader to enter or exit the building. The third scenario considered the roller doors to the building to be open for transfer of materials to the stockpile area via front end loader, but with the crusher and excavator not running. It is understood from the client that the crusher and associated excavator will only operate for a little under half of the operational hours.

In all three scenarios, pedestrian doors are open for 30 seconds per 15 minute scenario, to allow occasional foot traffic in and out of the building. The equipment list is detailed in Table 8-2, with equipment location diagrams for scenarios 1-3 in Figure 8-1 to Figure 8-3.

Table 8-2: Modelled Noise Scenarios for Proposed Operations

Scenario	Time of the day	Noise Sources for Worst 15-minute Period
Scenario 1. All operations (all roller doors closed)	Monday – Friday 7am to 6pm Saturday 7am to 5pm	Indoor Noise Sources • Generator • Excavator • Triple decker screen • Concrete crusher Outdoor Noise sources • Truck manoeuvring • Front end loader
Scenario 2. Selected operations (all roller doors closed except for the middle roller door, open for 3 minutes out of a 15 minute period)	Monday – Friday 7am to 6pm Saturday 7am to 5pm	Indoor Noise Sources • Generator • Excavator • Triple decker screen • Concrete crusher Outdoor Noise sources • Truck manoeuvring • Front end loader
Scenario 3. Selected operations (all roller doors open)	Monday – Friday 7am to 6pm Saturday 7am to 5pm	Indoor Noise Sources • Generator • Triple decker screen Outdoor Noise sources • Truck manoeuvring • Front end loader

Figure 8-1: Scenario 1 – Roller Doors Closed – Operational noise sources

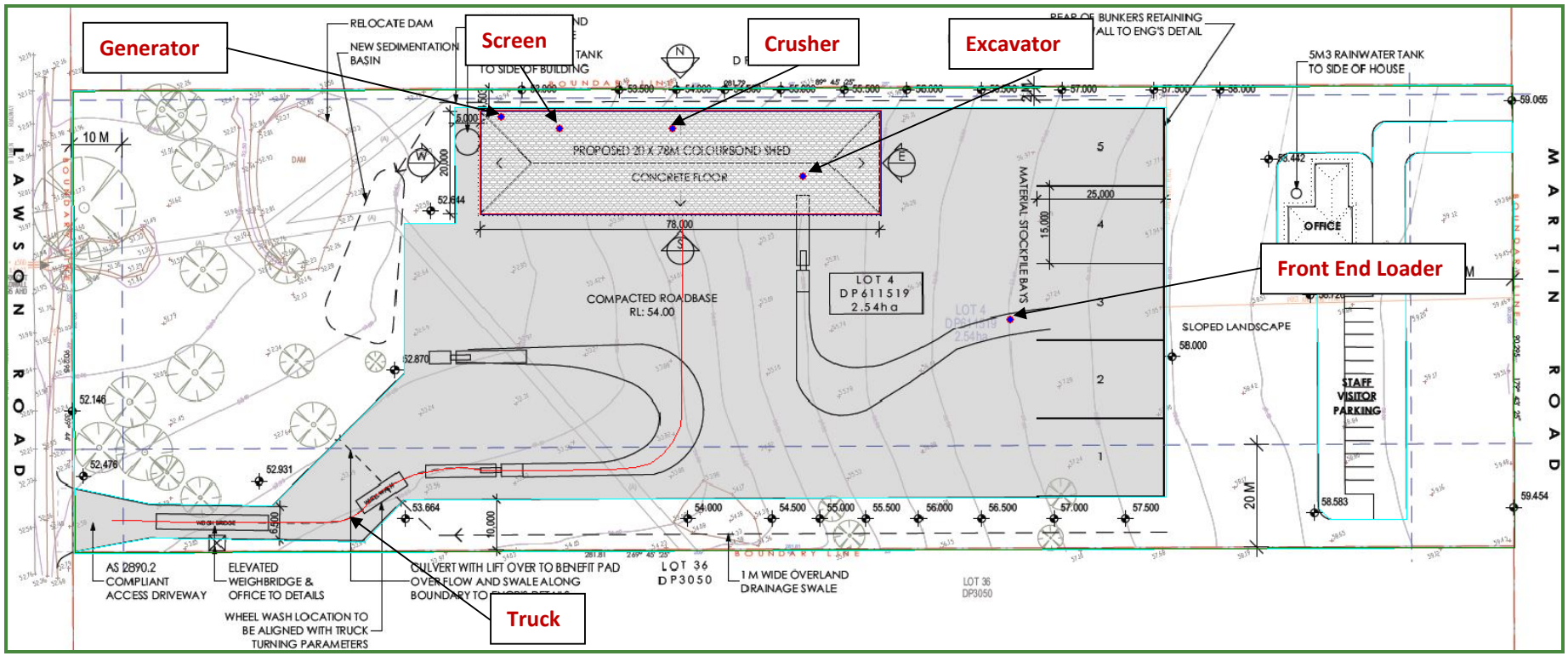


Figure 8-2: Scenario 2 – Roller Doors Mainly Closed – Operational noise sources

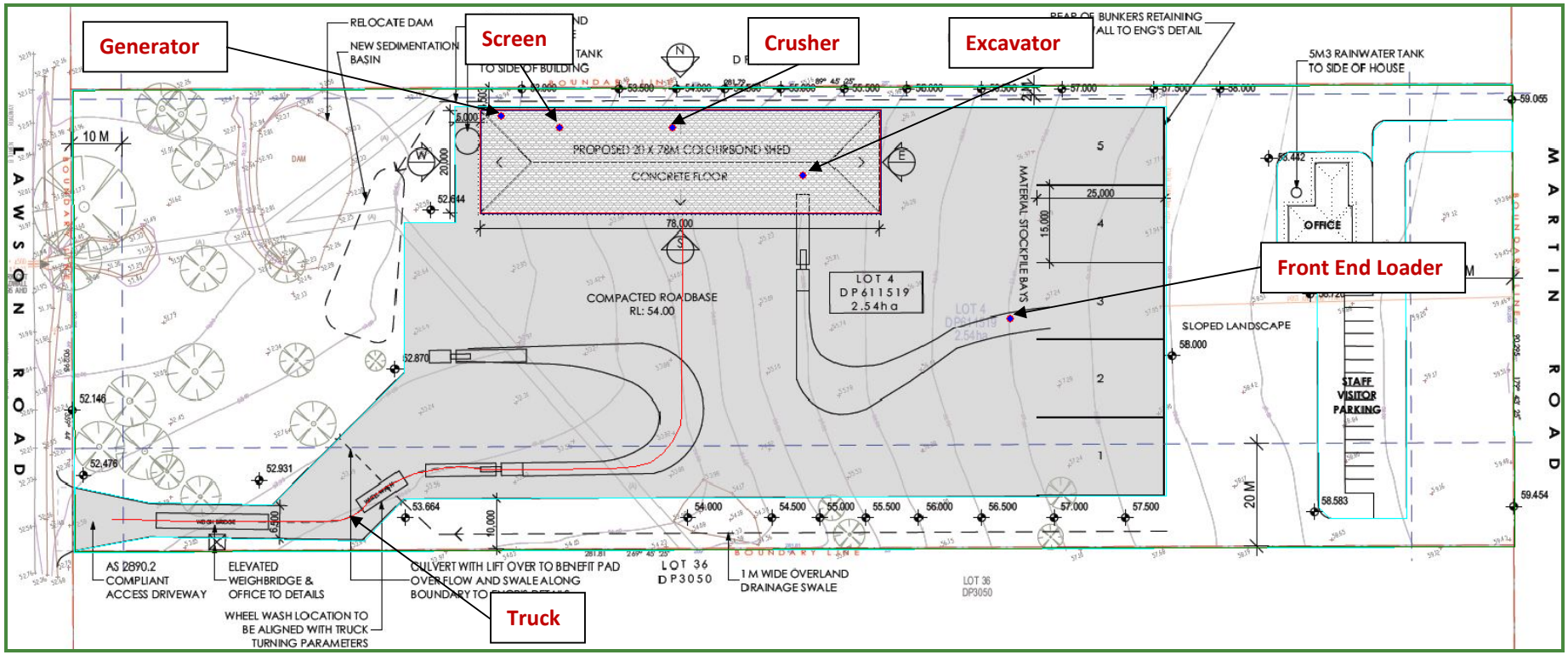
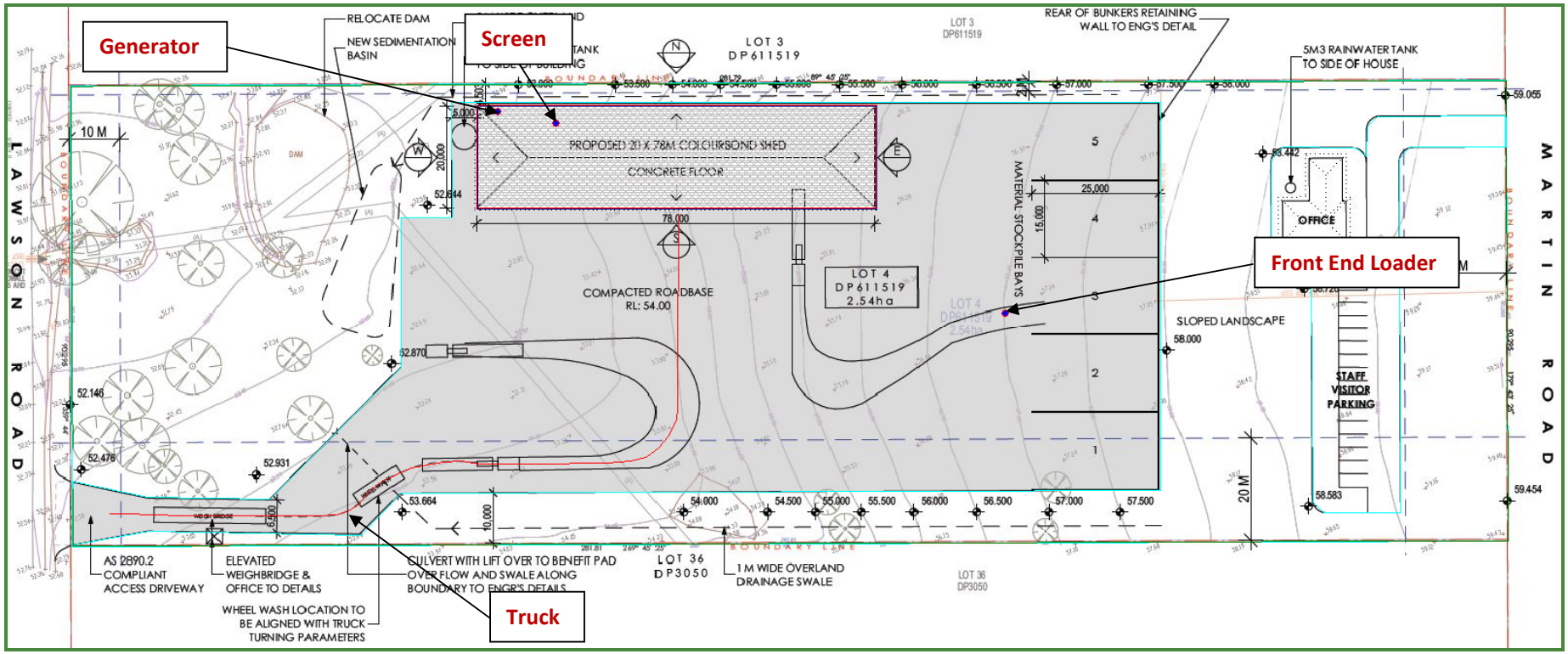


Figure 8-3: Scenario 3 – Roller Doors Open – Operational noise sources



8.2.1.3 Operational Predicted Noise Levels

Results of the predictive noise modelling of the operational activities are shown in Table 8-3.

During operations, noise levels are predicted to comply with the Noise Policy for Industry criteria at all receivers during all scenarios.

It is therefore concluded that the proposed site activities will not have a detrimental impact on the neighbouring receivers, if the noise control measures in section 8.2.1.4 are carried out.

Table 8-3: Noise Modelling Results Associated with Operational Activities, L_{eq}, dB(A)

Receiver	Criteria: PNTL ($L_{eq,15\ minute}$ dB(A)) – Day	Predicted: Scenario 1 (L_{eq}, dB(A))	Predicted: Scenario 2 (L_{eq}, dB(A))	Predicted: Scenario 3 (L_{eq}, dB(A))
R1	42	32 ✓	32 ✓	28 ✓
R2	42	31 ✓	31 ✓	28 ✓
R3	42	37 ✓	37 ✓	34 ✓
R4	42	37 ✓	37 ✓	36 ✓
R5	42	31 ✓	31 ✓	30 ✓
R6	42	34 ✓	35 ✓	35 ✓
R7	42	37 ✓	38 ✓	38 ✓
R8	42	33 ✓	34 ✓	34 ✓
R9	42	34 ✓	35 ✓	35 ✓
R10	42	32 ✓	33 ✓	33 ✓
R11	42	42 ✓	42 ✓	42 ✓
R12	42	40 ✓	41 ✓	41 ✓
R13	42	39 ✓	40 ✓	41 ✓
R14	42	33 ✓	33 ✓	30 ✓
R15	42	38 ✓	38 ✓	30 ✓
R16	42	36 ✓	36 ✓	28 ✓
R17	42	35 ✓	35 ✓	27 ✓
R18	68	40 ✓	40 ✓	35 ✓
R19	68	33 ✓	33 ✓	30 ✓
R20	68	33 ✓	34 ✓	34 ✓

8.2.1.4 Noise Control Measures

In order to achieve the predicted compliance levels at the nearest receptors, the following control measures are recommended to be implemented.

- A 2.1 m colorbond fence is recommended to be constructed surrounding the perimeter of the site.
- As per the assumptions detailed in the Noise Impact Assessment, the front end loader is recommended to have a sound power level of 97 dB(A) or lower. This is a relatively low level compared to other loaders on the market, so it will be a relatively small FEL.
- It is recommended that the client purchase a front end loader which has a guarantee that it is below a sound power level of 97 dB(A), or alternatively post commissioning testing of the equipment be carried out by an acoustic consultant to ascertain the sound power level of the equipment.
- Pedestrian doors are to self-closing, so the doors automatically close once a pedestrian is no longer using the door.
- The following equipment is restricted to indoors only:
  - Crusher;
  - Generator;
  - Screen; and
  - Excavator.
- When either the crusher or excavator is operating indoors, one roller shutter door is recommended to be open for only 3 minutes out of a 15 minute scenario (scenario 2). To enable this to practically occur, for example, for the arrival of a truck, it is recommended that automated roller shutter doors be installed to assist in the opening and closing of doors as fast as possible.
- The roller shutter doors should be selected based on their acoustic performance with regards to minimising breakout noise and minimising noise generated from opening and closing operations.
- Should the roller doors need to be opened for extended periods to enable the transfer of materials to the stockpile area (scenario 3), the crusher and excavator are to be stopped and only the front end loader is recommended to be used.
- It is recommended mobile equipment regularly used onsite such as the excavator and front end loader be fitted with reversing lights or a white noise reversing alarm.

It is also recommended the following additional management practices be implemented:

- Prohibition of extended periods of on-site revving/idling;
- Minimisation of the use of truck exhaust brakes on site;
- Enforcement of low on-site speed limits;
- On-site vehicles to be maintained in accordance with a preventative maintenance program to ensure optimum performance and early detection of wearing or noisy components;
- Ensure condition of roadway surface is maintained (by responsible party) to ensure deterioration of internal access road surface does not lead to increased noise sources; and
- Vehicles awaiting loading, unloading or servicing shall be parked on site with their engines turned off.

8.2.2 Road Traffic Noise

8.2.2.1 Road Traffic Project Specific Noise Levels

Based on the traffic noise data obtained though the long term road traffic noise measurement, the current existing road traffic noise levels exceed the assessment criteria.

The selected project specific noise levels associated with road traffic noise are presented in Table 8-4.

Where existing traffic noise levels are above the noise assessment criteria, any increase in the total traffic noise level should be limited to 2 dB above that of the corresponding 'no build option'.

Table 8-4: Project Specific Noise Levels Associated with Road Traffic, dB(A)

Receptor along	Period	Existing Road Traffic Noise L_{eq}	Assessment Criteria L_{eq}	PSNL Cumulative Road Traffic Noise Level L_{eq}
R4, Martin Road (Local Road)	Day	48	55	**55**
	Night	44	50	**50**
R17, Lawson Road (Local Road)	Day	56	55	**58**
	Night	53	50	**55**

8.2.2.2 Road Traffic Noise Impact Assessment

Trucks are proposed to access the site from Lawson Road. Light vehicles are proposed to access the site from Martin Road. Calculation of road traffic noise contribution has been undertaken using the Calculation of Road Traffic Noise (CoRTN) algorithm within SoundPLAN v7.3.

The predicted noise levels are displayed in Table 8-5. The highest noise levels would be predicted at these location, therefore they are the only results displayed.

Table 8-5: Predicted Levels for Road Traffic Noise

Receptor	Noise Criteria		Existing Traffic		Site Contribution		Cumulative Road Traffic Noise	
	Day $L_{Aeq, 1\ hour}$	Night $L_{Aeq, 1\ hour}$	Day $L_{Aeq, 1\ hour}$	Night $L_{Aeq, 1\ hour}$	Day $L_{Aeq, 1\ hour}$	Night $L_{Aeq, 1\ hour}$	Day $L_{Aeq, 1\ hour}$	Night $L_{Aeq, 1\ hour}$
R4, 40 Martin Road, Badgerys Creek	55	50	48	44	36 ✓	N/A ✓	48 ✓	44 ✓
R17, 35 Lawson Road, Badgerys Creek	58	55	56	53	52 ✓	N/A ✓	57 ✓	53 ✓

For residential dwellings that front onto Martin Road and Lawson Road, the predicted noise levels associated with the vehicle movements from the site would be below the daytime criteria of $L_{Aeq\ (1\ hour)}$ 55 dB for local roads. From Table 8-5, the predicted cumulative daytime $L_{Aeq,1\ hour}$ road traffic noise are below the noise criteria, as established from the NSW Road Noise Policy (RNP).

8.2.3 Construction Noise

8.2.3.1 Construction Noise Criterion

The noise criterion for construction noise is presented in Table 8-6.

Table 8-6: Construction Noise Criterion dB(A)

Receiver	Land Use	Period	RBL L_{A90}	Management Level $L_{Aeq(15\ minute)}$
R1-R11	Residential	Standard Hours	37	47
R12-R17	Residential	Standard Hours	37	47
R18-R20	Industrial	Standard Hours	–	75

8.2.3.2 Construction Noise Impact Assessment

Construction activities are proposed to include the following:

- Site establishment;
- The building of the unloading and processing shed;
- The installation of a wheel wash and weighbridge;
- The setup of five storage bays; and
- Construction of the car park and landscaped area

The current residential dwelling is proposed to be kept, therefore no demolition works are proposed.

Three construction stages: civil works (stage 1), concreting works (stage 2) and structure works (stage 3) have been modelled. The noise generating stages consider a worst case scenario in which all equipment is running for 100% of the time over the 15 minute assessment period.

Results of the predictive noise modelling of the construction activities are shown in Table 8-7. For stage 1, compliance is predicted at all receivers except for a 3 dB exceedance predicted at R11, and a 1 dB predicted at R12. For stage 2, compliance is predicted to be achieved at all receivers except for R11-R13 and R15. A maximum exceedance of a 5 dB is predicted at R11 in stage 2. For stage 3, compliance is predicted to be achieved at all receivers except R11-R13 and R15-R16. A maximum exceedance of 6 dB is predicted in stage 3.

Compliance with the construction noise criteria is therefore predicted to be achieved at the vast majority of receivers across the three stages during standard construction hours.

Construction activities are therefore proposed to take place during standard **construction** hours only as follows:

Monday to Friday:	7am to 5pm (with no hammering or saw-cutting to occur before 7.30am)
Saturday:	8am to 1pm (with no hammering or saw-cutting to occur before 8.30am)
Sunday and Public Holidays:	No works permitted

The predicted exceedances are minor in nature, and well below the 75 dB(A) "highly affected" noise criteria in the Interim Construction Noise Guideline. The following noise mitigation measures are therefore recommended:

- Construction works are recommended to take place during standard construction hours; and
- The 2.1 m colorbond fence is recommended to be installed on site prior to the remainder of the construction works taking place.

Table 8-7: Noise Modelling Results Associated with Construction Activities for L_{eq}, dB(A)

Receiver	Criteria: PSNL ($L_{eq,15\ minute}$ dB(A))	Predicted Levels: Stage (Standard Hours) (L_{eq}, dB(A))		
	Standard Hours	1	2	3
R1	47	41 ✓	43 ✓	43 ✓
R2	47	39 ✓	40 ✓	42 ✓
R3	47	45 ✓	46 ✓	47 ✓
R4	47	46 ✓	47 ✓	47 ✓
R5	47	41 ✓	42 ✓	43 ✓
R6	47	44 ✓	45 ✓	45 ✓
R7	47	46 ✓	47 ✓	47 ✓
R8	47	42 ✓	43 ✓	44 ✓
R9	47	44 ✓	44 ✓	45 ✓
R10	47	42 ✓	43 ✓	44 ✓
R11	47	50 ✗	52 ✗	52 ✗
R12	47	48 ✗	50 ✗	53 ✗
R13	47	47 ✓	49 ✗	52 ✗
R14	47	42 ✓	43 ✓	46 ✓
R15	47	47 ✓	48 ✗	51 ✗
R16	47	45 ✓	47 ✓	49 ✗
R17	47	44 ✓	45 ✓	47 ✓
R18	75	48 ✓	50 ✓	50 ✓
R19	75	41 ✓	42 ✓	43 ✓
R20	75	42 ✓	43 ✓	46 ✓

✓Complies ✗ Non-compliance

8.2.4 Statement of Potential Noise Impacts

A noise impact assessment was undertaken to assess the potential noise emissions from the proposed resource recovery facility at 55 Martin Road, Badgerys Creek.

The noise impact assessment was undertaken in accordance with the following guidelines:

- NSW Environment Protection Authority Noise Policy for Industry 2017;
- Department of Environment, Climate Change and Water NSW Road Noise Policy 2011; and
- Department of Environment, Climate Change and Water NSW Interim Construction Noise Guideline 2009.

The nearest receivers and noise criteria were identified. The site operations were modelled using the predictive noise software, Sound Plan V7.3.

The activities proposed by the proponent were found to be within the framework of the NSW Noise Policy for Industry. The noise generating scenarios are predicted to comply with the project specific noise levels at all receivers. Recommendations for noise controls are given in section 8.2.1.4, including sound power levels for the front end loader, perimeter fencing, equipment and automated roller doors usage.

Compliance with the guidelines set out in the NSW Road Noise Policy was predicted at all considered receptors.

Construction activities are recommended to be limited to standard hours in accordance with the Interim Construction Noise Guideline.

8.3 WATER

This water assessment addresses the following:

- Details of water usage for the proposal including existing and proposed water licencing requirements in accordance with *Water Act 1912* and/or *Water Management Act 2000*;
- Details of all potential water pollutants and associated risks;
- An assessment of potential impacts on floodplain and stormwater management and any impact to flooding in the catchment;
- Details of sediment and erosion controls;
- A detailed site water balance;
- An assessment of potential impacts on the quality and quantity of surface and groundwater resources;
- Details of the proposed stormwater and wastewater management systems (including sewage) for both construction and operation, water monitoring program and other measures to mitigate surface and groundwater impacts;
- Address exceedances for heavy metals from the *Preliminary Environmental Site Assessment* prepared by Environmental Investigation Services;
- An assessment of any potential cumulative impacts on water resources, and any proposed options to manage cumulative impacts; and
- A description and appraisal of impact mitigation and monitoring measures.

8.3.1 Licensing Requirements

The two key pieces of legislation for the management of water in NSW are the *Water Act 1912* and the *Water Management Act 2000*.

8.3.1.1 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.

8.3.1.2 Water Management Act 2000

The *Water Management Act 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 proposed development does not include the above activities and therefore approval is not required.

8.3.2 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.

These do not apply to the proposed development.

8.3.3 Water Usage and Supply

Water use would include use of mains water and rainwater captured in on-site tanks. Mains water would be used in office and amenities, and replenishment of the wheel wash when required. Rainwater would be used for dust suppression and landscaping purposes.

Dust suppression would consist of water sprays that provide a mist to adequately dampen stockpiles and working areas within the process building and storage bins. This would be a fine mist that would be switched off once stockpiles are damp. Therefore no leachate would be generated.

8.3.3.1 Annual Volumes

No water will be taken from the existing dam. No groundwater will be taken for the proposed development.

8.3.3.2 Identification of Secure Water Supply

The site is connected to mains water which is the site's most secure water supply. Dam water use and rainwater use would be additional water consumption.

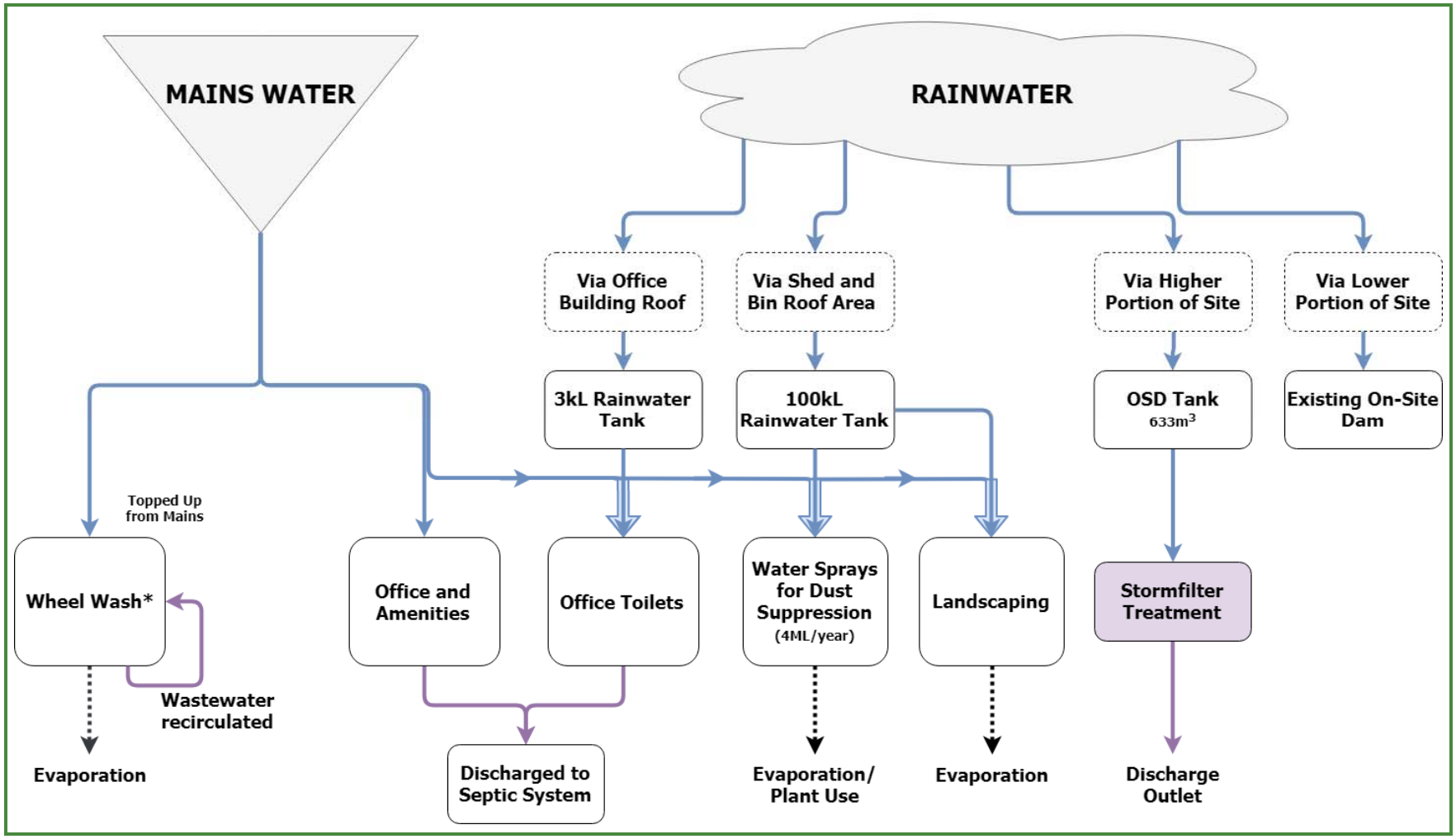
8.3.3.3 Dam Safety

Where new or modified dams are proposed, or where new development will occur below an existing dam, the NSW Dams Safety Committee should be consulted in relation to any safety issues that may arise.

No new or modified dams are proposed. The existing dam will be maintained. It is not considered warranted to consult the NSW Dams Safety Committee.

8.3.4 Site Water Balance

Figure 8-4: Site Water Balance Diagram



8.3.5 Stormwater and Wastewater Management

This section discusses the management of stormwater and wastewater that would be undertaken as part of the proposed development.

8.3.5.1 Stormwater System

Stormwater drainage has been designed in accordance with Council's Development Control Plan. A Stormwater Management Plan and Report was prepared by Robert Peterson of Ultramark Pty Ltd and includes and assessment of the stormwater management requirements for the proposed development and proposes a best practice stormwater management strategy. This report is provided as Appendix 3.

In summary, the appropriate discharge control for the site and external flows was designed using the DRAINS hydrological/hydraulic computer model software. The analysis of stormwater quality treatment was undertaken using the MUSIC model.

A 633 m^3 underground OSD tank is to be located at the western end of the hardstand area and would include a 100 kL rainwater tank and stormfilter treatment system. The lower 0.65 ha portion of the site would bypass the detention tank. The roof areas of the shed and bins would be directed to the rainwater tank and the remaining 1.89 ha site area would drain to the OSD tank.

The roof area of the existing office and amenities building would be captured in a smaller 3 kL rainwater tank that would be connected to the toilets and local irrigation. Overflow from this tank would be directed to the underground OSD rainwater tank.

The existing dam located on the western end of the site would remain to maintain the current conditions of the existing Cumberland Plain vegetation in this area of the site. The dam and vegetation would not be part of the stormwater management for the proposed development.

The treated water from the stormfilter system would be discharged via the outlet on the boundary of Lawson Road.

8.3.5.2 Bunded Areas

Bunded areas would be required for the following:

- Diesel tank; and
- Engine, hydraulic and lubricating oils (drums stored within the building on a bunded pallet).

The bunding of the diesel tanks and oils would be in accordance with AS 1940-2017.

The truck wheel wash would be essentially bunded, made from impermeable material and totally sealed to ensure there is no discharge of water from the wheel wash.

8.3.5.3 Wastewater

No wastewater would be generated by the proposed site activities.

8.3.5.4 Wheel Wash

The wheel wash is a closed loop system that would recirculate water for the washing of truck wheels. The system may need periodic top up with mains water. No wastewater would be generated. Regular servicing of the system would be undertaken. Any residual waste generated as part of the regular maintenance would be removed from site by a licenced waste contractor.

8.3.6 Assessment of Potential Impacts on Water

Assessment of potential impacts of the proposed development to surface and groundwater resources, and flooding is presented in this section.

8.3.6.1 C&D Comtaminates

The proposed resource recovery facility may handle, separate and store a broad range of material at any given time, however, most material can generally be classified into the following categories:

- Concrete and bricks,
- Asphalt,
- Metals,
- Timber,
- Plastics,
- Plasterboard,
- Rock and excavation stone,
- Soil and Sand,
- Garden waste,
- Soil (VENM/ENM),
- General waste.

Due to the nature of the facility there is a potential for hazardous material to be mixed in with the waste that is brought onto the site. These could contain a range of potential contaminants which may cause harm to the environment if not identified and managed.

Contamination is minimised by the processing activities being undertaken within the building and the material storage bays being undercover. However some debris or material could be tracked onto the hardstand area and could enter the surface water or ground water over time.

Table 8-8 identifies the potential pollutants of concern at the site, the source relevant source C&D materials. The risk of potential contamination to surrounding surface and groundwater is low due to the safeguards and control measures that have been designed into the site.

Table 8-8: Conceptual Model of Potential Contaminants and their Source

Known and Potential Sources of Contamination	Primary Release Mechanism	Contaminants of Potential Concern	Surface Water/Ground Water
Treated Timbers	Debris generated during sorting procedures	Arsenic, Chromium and Copper	Surface Water/Ground Water
Asbestos Containing Materials	Contaminated waste material containing asbestos	Asbestos	Surface Water/Ground Water
Lead Based Paints	Waste received containing remnants of buildings with Lead Based Paints	Lead	Surface Water/Ground Water
Diesel Fuel and Oils	Leaks/spills from transport vehicles	TRH, BTEX, PAH	Surface Water/Ground Water
Plasterboard	Debris generated during sorting procedures	Sulfate, Calcium	Surface Water/Ground Water
Metal C&D Waste	Debris generated during sorting procedures and metal ions dissolved in water	Zinc, Chromium, Cadmium, Copper, Lead, Manganese, Iron, Aluminum	Surface Water/Ground Water
Pesticides/Herbicides	Soil/sand material containing pesticide/herbicide contaminated soil/sand	OCP and OPP	Surface Water/Ground Water
Soil, Organic Matter or fertilisers	Release of chemicals of concern. Debris generated during material handling	Nitrogen and Phosphorous	Surface Water/Ground Water
Asphalt Waste	Debris generated during sorting procedures	Hydrocarbons, polycyclic aromatic hydrocarbons	Surface Water/Ground Water
Concrete/Bricks	Debris generated during sorting crushing and screening	Sediment (Total Suspended Particles (TSP))	Surface Water

8.3.6.2 Surface Water

8.3.6.2.1 Surface Water Description

The site would generate negligible surface water, some water would be generated from the dust sprays although these would be a fine mist that would be used within the processing building and the undercover material storage bays. The water from the dust sprays are unlikely to contribute to surface waters as the volume of water would be negligible and would evaporate from the areas used.

Surface waters would be generated from a rain event where water would land on the building and material storage awning and hardstand area. While some of the water may seep through the hardstand and drainage channels the majority of water would flow into the drainage channels and then into the on-site detention tank or the existing dam. This is detailed on the site's stormwater plan (Appendix 3).

8.3.6.2.2 Surface Water Impacts

Based on the proposed operations and infrastructure associated with the development, assessment of the potential impacts on surface water is discussed as follows:

- Spillages or releases of dangerous goods, being diesel or lubricating oil from the storage tanks or drums, entering and contaminating surface waters.

- The potential pathway would be via stormwater drainage channels. The diesel tank would be self bunded in accordance with AS 1940–2017. This would prevent escape of any spillage from the tank. The drums of lubricating oil would be stored within the building on bunded pallets preventing escape of spillages. Potential spillages of diesel and lubricating oil could occur during refuelling and equipment maintenance; the risk would be minimised through procedures and training in appropriate methods, and signage showing how to avoid spills. It is recommended that spill kits be provided as an additional precaution.

- Product/Waste releases entering and contaminating surface waters.

- Waste processed by the facility would be stored in designated storage bays within the building then loaded into trucks for removal off site. There is potential, for spillages of products/wastes to occur and be tracked onto external hardstand areas. Any such spillage would be removed at the end of each shift, and added to the waste storage bay within the building. There is a low risk of waste materials entering waters due to the processing area being fully enclosed and the hardstand area being made from compacted road base or similar material. Good housekeeping practices would ensure any spillage would be attended to and minimise the potential for tracking onto roadways off site. Stormwater would be directed to an OSD tank with a stormfilter treatment system to remove any pollutants. An additional measure would be to provide gross pollutant traps to stormwater drains to capture any sediment or debris before it enters the OSD tank after heavy rain. These pollution control devices would be regularly inspected, cleaned and maintained.

- During the construction phase erosion and sediment controls will be implemented. These are shown in section 8.3.7.

The site would contain adequate controls to prevent the contamination of waters. Implementation of an Environmental Management Plan (EMP) would also ensure appropriate management of on-site stormwater.

In addition it is recommended a water monitoring program be put in place to test water in the on-site detention tank and dam at the site to ensure no pollutants have entered the stormwater system.

8.3.6.3 Groundwater

The proposed development would require minor excavations. The proposed development would excavate to an approximate maximum depth of 3 m.

The *Preliminary Environmental Site Assessment* prepared by STS GeoEnvironmental provided in Appendix 11 states:

> *In view of the very low concentrations of chemical contaminants detected in the soils at the site and an assumed deep groundwater table, the site in not likely to have contributed to unacceptable groundwater impacts.*

The *Geotechnical Investigation, Preliminary Acid Sulfate Soils Assessment, Salinity Assessment & Wastewater Assessment* prepared by STS GeoEnvironmental is provided in Appendix 2.

Three (3) of the 19 boreholes drilled were used to monitor groundwater levels and obtain water samples, (BH2, BH8, BH15). Groundwater seepage was not observed during auger drilling of the boreholes. Six days later the water levels in the piezometers were recorded at 2.05 m below the existing ground surface level in BH2 and 2.6 metres in BH8. BH15 remained dry.

Foundation Design

The *Geotechnical Investigation, Preliminary Acid Sulfate Soils Assessment, Salinity Assessment & Wastewater Assessment* prepared by STS GeoEnvironmental provided in Appendix 2 states:

> *The possible presence of groundwater needs to be considered when drilling piers and pouring concrete.*

Retaining Wall Design

The *Geotechnical Investigation, Preliminary Acid Sulfate Soils Assessment, Salinity Assessment & Wastewater Assessment* prepared by STS GeoEnvironmental provided in Appendix 2 states:

> *As with all retaining walls, the above coefficient must be adjusted for ground surface slope, groundwater and external loads, such as buildings and vehicles.*

8.3.6.3.1 Groundwater Salinity

The *Geotechnical Investigation, Preliminary Acid Sulfate Soils Assessment, Salinity Assessment & Wastewater Assessment* prepared by STS GeoEnvironmental provided in Appendix 2 found:

> *The electrical conductivity measured in SAL1 (BH8) is 35500 µS/cm, the electrical conductivity measured in SAL2 (BH2) is 33000 µS/cm. BH15 remained dry. This indicates the groundwater can be classified as saline.*

Potential Impacts on the Development

The *Geotechnical Investigation, Preliminary Acid Sulfate Soils Assessment, Salinity Assessment & Wastewater Assessment* prepared by STS GeoEnvironmental provided in Appendix 2 states:

> *The general impacts that have the potential to occur may be summarised as:*
> - *Damage to and subsequent reduction of the lifespan of buildings and associated infrastructure such as roads and underground services as a result of construction close to aggressive soil and groundwater. This may include:*
>   - *Degradation of bricks, concrete, road base and curbing materials leading to expansion, cracking, strength and mass loss;*
>   - *Corrosion of reinforcement and loss of structural integrity;*
>   - *Rising/falling damp; and*
>   - *Non-structural impacts, such as efflorescence on bricks.*
> - *Degradation of drainage infrastructure by a rise in the groundwater level. Damage to pipes has the potential to exacerbate the problem by further recharging the shallow groundwater; and*
> - *Damage to or prevention of the cultivation of salt-sensitive vegetation in landscaped areas and gardens may arise across the site due to the salinity levels in surface soils.*
>
> *The risks considered to be potentially posed to individual assets and activities and appropriate management options are detailed below.*
>
> *The construction and maintenance stages of the proposed development have the potential to adversely affect salinity conditions on the site and in the surrounding area, mostly by altering the current hydrological cycle. Potential impacts include:*
>
> - *A rise in the groundwater level due to increased water inputs associated with urban development. e.g. irrigation and leaking pipes. Reduced infiltration due to the construction of hardstand across the site may offset this to some extent;*
> - *Altered flow and drainage patterns which may result in increased water accumulation and associated salinity issues in areas of impeded flow, as a consequence of e.g. the construction of drainage lines, footings and roads;*
> - *Interception of groundwater should local groundwater levels be raised by prolonged periods of precipitation, creation of a perched water table, or increased recharge of the regional or localized aquifer may result from cutting or compaction within the perched or permanent aquifer;*
> - *Excavation and redistribution of saline soil during excavation and filling operations around the site.*

These impacts have the potential to lead to an increase in the surface expression of soil salinity and adversely affect downstream water quality.

Conclusion

The *Geotechnical Investigation, Preliminary Acid Sulfate Soils Assessment, Salinity Assessment & Wastewater Assessment* prepared by STS GeoEnvironmental provided in Appendix 2 concludes that:

The groundwater beneath the site should not be extracted for use as an irrigation source;

Standard landscaping procedures for urban development sites would be sufficient to prevent any surface expression of salinity or impacts due to sodic soils. Such procedures would include the design and installation of appropriate drainage, covering landscaping zones in topsoil and revegetating.

Selection of appropriate building designs and materials would also be necessary to ensure that the integrity of building foundations and floor slabs is not compromised due to the natural acidity, electrical conductivity and concentrations of key anions in the soils.

8.3.6.3.2 Potential Impacts from the Development

- Waste processed by the facility would be stored in designated storage bays within the building then loaded into trucks for removal off site. There is potential, for spillages of products/wastes to occur and be tracked onto external hardstand areas. Any such spillage would be removed at the end of each shift, and added to the waste storage bay within the building. There is a low risk of waste materials entering ground waters due to the processing area being fully enclosed and the hardstand area being made of a compacted road base or similar material. Good housekeeping practices would ensure any spillage would be attended to and minimise the potential for tracking onto roadways off site.

- Spillages or releases of dangerous goods, being diesel or lubricating oil from the storage tanks or drums, entering the groundwater. The diesel tank would be self bunded in accordance with AS 1940–2017. This would prevent escape of any spillage from the tank. The drums of lubricating oil would be stored within the building on bunded pallets preventing escape of spillages. Potential spillages of diesel and lubricating oil could occur during refuelling and equipment maintenance; the risk would be minimised through procedures and training in appropriate methods, and signage showing how to avoid spills. It is recommended that spill kits be provided as an additional precaution.

The site has been designed with safeguards to prevent the contamination of ground waters. Implementation of an Environmental Management Plan (EMP) would also ensure appropriate management of on-site stormwater.

In addition it is recommended a water monitoring program be put in place to test ground water, discharge water from the on-site detention tank as well as dam water at the site.

8.3.6.3.3 Groundwater Dependent Ecosystems (GDEs)

GDEs are defined ecosystems which require access to groundwater on a permanent or intermittent basis to meet all or some of their water requirements so as to maintain their communities of plants, animals, ecological processes and ecosystem services.

Types of GDEs have been defined which can be split into three categories:

1. Ecosystems that depend on the surface expression of groundwater (lacustrine, palustrine, riverine, estuarine and marine);
2. Ecosystems that depend on the subsurface presence of groundwater (riverine wetlands, terrestrial) and;
3. Ecosystems dependent on the subterranean presence of groundwater (aquifer, cave)

If groundwater sources are altered, polluted or contaminated, surrounding GDEs would be impacted.

Site Flora, Vegetation Communities and Site Specific GDES

Groundwater

According to the groundwater map by the NSW Department of Primary Industries – Office of Water, there is only one groundwater monitoring bore (GW105016) within 500 m of the subject site (Figure 3-1). The bore was drilled for stock / domestic purposes, to a depth of 96 m and was recorded to have three Water Bearing Zones (from 137.50 to 138 m, from 155.5 to 155.7 m, and from 207 to 210 m), with Standing Water Level at 53 m. Salinity yield is equal to 0.200.

Vegetation Community

The site sits across 3 major vegetation community types (Figure 3-2), one of which, the Cumberland Shale Plains Woodland (which is classified as a GDE, especially in low rainfall and drought), has been classified as a critically endangered ecological community under the BC act (2016) and critically endangered under the EPBC act (1999). The subject site is biodiversity certified land (within the meaning of Part 7AA of the Threatened Species Conservation Act 1995), as declared in the S149 Certificate and as shown on the Biodiversity Certification map provided by Liverpool City Council.

Flora

The targeted search shows there are no threatened species, or populations, sited within or in close proximity to the subject site. The closest reported sightings of endangered species are two plant species, *Marsdenia viridiflora subsp. Viridiflora,* and *Dillwynia tenuifolia,* a rare plant endemic to NSW. The sightings have occurred approximately 1.7 km west and 2.4 km east of the site, respectively.

Fauna

No threatened fauna species were found on-site during the site surveys, however the site may be providing habitat for numerous threatened microbat species and the Grey-headed Flying-Fox. A Test of Significance (7-Part test) was conducted to assess the impacts of the proposal on these species and concluded that the removal of trees from the site will have an insignificant impact on those populations.

Additionally, the S149 Certificate for the subject site (No. 1366) indicates that the land does not include or comprise critical habitat, is not in a conservation area and does not contain an item of environmental heritage. The site also does not contain terrestrial biodiversity according to the Terrestrial biodiversity map provided by Liverpool City Council, although it is close to areas biodiversity mapped areas, as shown in Figure 6-6.

Figure 8-5: Groundwater bore map

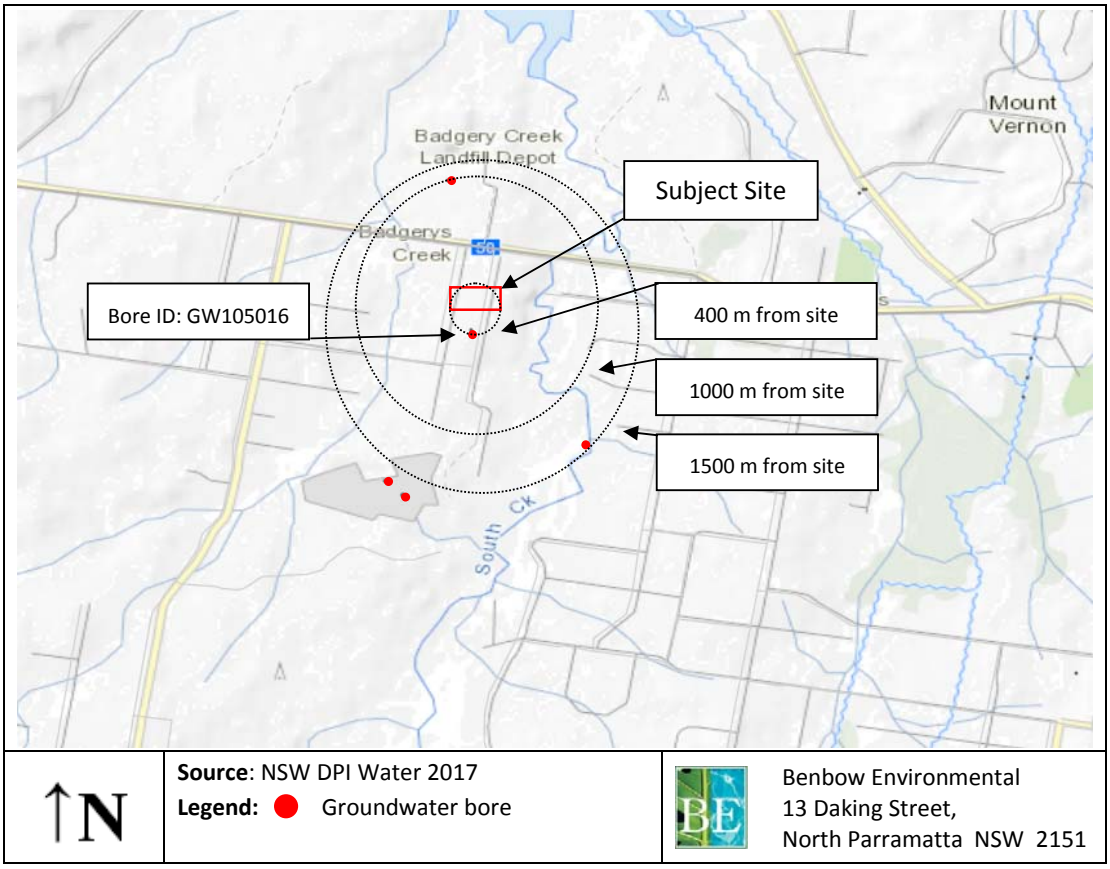
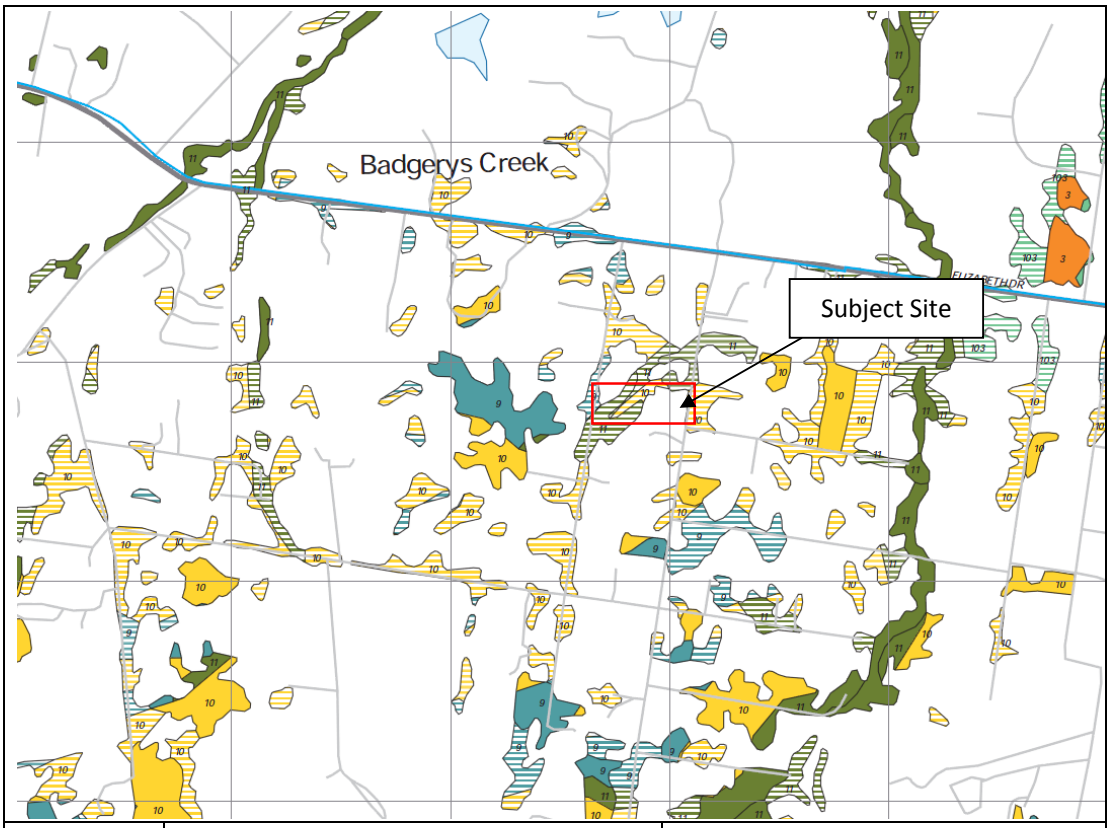


Figure 8-6: Vegetation Communities



Source: NSW Environment, Climate Change and Water 2017

Endangered ecological communities listed under the Threatened Species Conservation Act 1995 as of 1 June 2002

Cumberland Plain Woodland
9 - Shale Hills Woodland
10 - Shale Plains Woodland

Sydney Coastal River-flat Forest
11 - Alluvial Woodland
12 - Riparian Forest

Vegetation Condition Classes

Canopy Cover > 10% (Unless Remnant > 5ha, Where Canopy Cover > 5%)
(Areas mapped as classes: A, B, C, SA)

Canopy Cover < 10%
(Areas mapped as classes: Cmin, Tx, Txr)

Canopy Cover < 10% (Urban Areas)
(Areas mapped as class: Txu)

↑N

Benbow Environmental
13 Daking Street,
North Parramatta NSW 2151

Effects on the function of GDEs (Habitat, groundwater level, connectivity)

Potential contamination of groundwater sources can have significant impacts on GDEs. Any gaining or losing stream connectivity to groundwater sources connected to the nearby Badgery's Creek will result in the spread of contaminated waters. This is vital to consider given the site borders Cumberland Shale Plains Woodland (which is classified as a GDE, especially in low rainfall and drought and a critically endangered ecological community). An increase in contaminates such as heavy metals, shifts in levels of nitrogen and phosphorous in the soils and changes to the soils pH and salinity levels (i.e. via sulphate and calcium) will be damaging to surrounding GDEs.

Targeted searches showed there are no threatened floral or faunal species, or populations, sited within or in close proximity to the subject site. The risk of potential contamination through groundwater connectivity to surrounding water bodies is low due to the safeguards and control measures that have been designed into the site.

Potential Safeguard Measures for and GDEs

A number of mitigation and monitoring protocols will be put in place to minimise the potential for contamination of groundwater sources, thus acting as 'safeguard' measures for surrounding GDEs. These protocols will include:

- Install a monitoring bore to test periodically levels of any contaminates.
- Ensuring that all processing activities are undercover.
- Regularly monitoring and ensuring hardstand areas are clean and free of contaminates (i.e. spills and leaks of engine oils and fuels)
- Ensuring hardstand areas are compacted in such manner that this area will simply filter through clean water whilst the sediments are trapped in the top layers of materials.
- Undertaking regular inspections of all areas of the site to ensure safeguards and control measures are maintained in good working order and areas containing vegetation remain healthy.

8.3.6.4 Flooding

As discussed in section 6.3.3 the subject site is not located on land with a Flood Risk or within a Flood Planning Area or within the probable extent of inundation. Therefore a flood assessment and flood related surface water controls are not considered warranted.

8.3.6.5 Water Monitoring Regime

The water quality of the discharge from the onsite detention tank and the dam will be monitored.

A ground water monitoring bore will be installed in the hardstand area for monitoring.

It is recommended the onsite detention tank outlet, dam and groundwater be monitored every 6 months. The onsite detention tank outlet and dam will also be monitored after major rain events (greater than 4 mm/hour).

A water monitoring program would be detailed within the site's EMP and would include sampling methods, equipment and frequency, water quality indicators and laboratory requirements and test methods. The monitoring regime may be revised after the first 2 years of operations.

8.3.7 Erosion and Sediment Controls

Sediment and erosion controls would be required during the construction phase of the development.

The existing building is to be retained, therefore no demolition works are proposed.

Construction would involve:

- Construction of a weighbridge and wheel wash;
- Construction of the new process shed, hardstand area and external undercover material storage bays;
- Installation of bunded diesel tank storage area;
- Establishment of car parking areas and landscaping; and
- Stormwater infrastructure including dam/sediment pond, drainage swales, pipework, rainwater and onsite detention tanks.

It is expected that this work would take up to 6 months to complete. The following would need to be considered:

- Phasing of work to ensure minimal disturbance of land;
- Stockpiling of soil should be kept to a minimum;
- Minimise the impact of run-off water by diverting stormwater around the works; and
- Implementation of a Soil and Water Management Plan (SWMP) that will incorporate the design and installation of erosion controls in accordance with *Soils and Construction – Managing Urban Stormwater* (Landcom, 2004), also known as the "Blue Book. Details for what will be included in this plan is provided in the Stormwater Water Management Plan and Report (Appendix 3).

8.4 SOIL

This section presents the soil assessment, Section 6.1 describes the existing geology and soils.

8.4.1 Existing Contaminated Soil

The *Preliminary Environmental Site Assessment* undertaken by STS GeoEnvironmental concluded that: Based on the results of this preliminary site investigation the following conclusions and recommendations are made:

- *the assessment indicates that activities associated with former and current land use at the site and immediate surrounding to be low.*
- *All measured contaminant concentrations are low and below the NEPM human health and environmental criteria. Further, no asbestos fibres were detected.*
- *the site is not likely to contain sources of contaminants which would adversely impact groundwater or other offsite receptors.*
- *there is low potential for contaminants presently located at the site which would adversely affect the proposed development and the site is considered suitable for the proposed commercial/industrial use.*

- *if during development, potentially contaminated soil is encountered, a contaminated land consultant needs to be contacted. that "All soil laboratory results were below soil assessment criteria." The presence of soil contamination within the subject site is unlikely.*

No remediation of the site is warranted. An unexpected finds protocol is to be included as part of the site's construction environmental management plan.

8.4.2 Potential Impacts on Soil

Construction

An impact to soil during the demolition and construction phase is soil erosion; this is addressed in Section 8.3.7.

The *Geotechnical Investigation, Preliminary Acid Sulfate Soils Assessment, Salinity Assessment & Wastewater Assessment* undertaken by STS GeoEnvironmental states:

> *Based on our onsite observations and the subsurface conditions exposed in the boreholes, it is our opinion that the proposed construction will not intercept any ASS. Based on the observations undertaken in the piezometers, it appears that any seepage into any excavations would be minor and as a consequence, construction will not result in the lowering of any groundwater that may be present in the area.*

There are no likely impacts to soil based on the construction activities proposed.

Operation

The potential sources of contamination are the storage and use of diesel and lubricating oils and waste as well as any contamination of surface waters migrating into the soil.

- Spillages or releases of contaminants, being primarily diesel from the storage tank, would be contained within the bunded tank. Likewise, spillages of lubricating oil would be contained within a bunded pallet within the building. Potential spillages of diesel and lubricating oil could occur during refuelling and equipment maintenance; the risk would be minimised through procedures and training in appropriate methods and signage showing how to avoid spills. It is recommended that spill kits be provided as an additional precaution.

- Drainage swales, on site detention tank and dam capture the majority of sediments and would prevent the release of sediment related wastes to surrounding land through the stormwater system.

- Good housekeeping practices are important to prevent contamination. These include regular cleaning of all hardstand areas, inspection of the integrity of bunding and inspection, cleaning and maintenance of stormwater/surface water system.

8.5 FLORA AND FAUNA

An arboriculture impact assessment for the subject site is provided in Appendix 10. A flora and fauna survey and impact assessment is provided in Appendix 9.

The NSW Government's Biodiversity Values Map identifies the Lawson St frontage of the property to be of biodiversity significance. The trees assessed are recognized as the dominant canopy species which form part of the Cumberland Plain Woodland. Cumberland Plain Woodland is listed as a Critically Endangered Ecological Community.

Trees identified as 6, 7, 8, 9, 10, 11 and 17x6 within the arboricultural report are of high retention value with footprint or a major encroachment area of the tree protection zone. Trees 6, 7, 8, 9, 10, 11 are within the area of biodiversity significance subject to the biodiversity conservation act. Tree cluster 17 is not within an area of biodiversity significance.

As discussed in Section 6.4 no threatened and endangered species have been sited within 1 km of the subject site, nor were they observed during the site surveys. Therefore the only flora and fauna impact is on the trees within the Cumberland Plain Woodland identified within the arboriculture impact assessment and therefore the proponent is required to submit an application for tree removal to Liverpool Council.

The following mitigation measures are recommended in order to minimise the impact of the proposed development on the surrounding environment.

- Delineation of work areas;
- Removal of weeds prior to construction;
- Seed collection from native vegetation on site prior to removal;
- Dead wood and logs to be retained upon removal;
- Bush hygiene controls during construction;
- Weed management during construction;
- Revegetation works once construction is complete including reintroduction of seeds and dead wood; and
- Two (2) nest boxes (one for microbats and another for local lorikeets) should be installed onsite after construction is complete.

In addition the area near Lawson St frontage of biodiversity significance not within the development footprint or a major encroachment area of the tree protection zone should be regularly inspected to ensure the plants are healthy and not affected by the proposed development. The inspection procedure should be prepared as part of the sites operational environmental management plan.

No further flora and fauna controls are considered warranted.

8.6 WASTE GENERATION AND MANAGEMENT

The scope of this section is limited to the following objectives:

- Provide information required for the assessment, including details of the quantity and type of waste generated, handled, processed or disposed of at the premises;
- Describe waste management processes and outline mitigation measures; and
- Enable the assessment of proposed management and mitigation measures, in accordance with relevant guidelines and regulatory requirements.

8.6.1 Relevant Legislation and Guidelines

The main legislation and guidelines that have been addressed in the writing of this report are:

- *Waste Classification Guidelines* – Part 1: *Classification of waste* (NSW EPA, 2014);
- *Protection of the Environment Operations Act 1997*;
- *Protection of the Environment Operations (Waste) Regulation 2014;* and
- *Waste Avoidance and Resource Recovery Act 2001.*

The relevance of each piece of legislation and guideline is described in the following sections. Legislation and guidelines are then addressed in regards to planning issues and regulatory compliance in Section 8.6.1.4.

8.6.1.1 Waste Classification Guidelines

In the NSW EPA's *Waste Classification Guidelines* (2014), waste is described 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.*

All waste materials generated or received on the subject site must be classified into one of six different categories described the *Waste Classification Guidelines* (see table below).

Table 8-9: Classes of Waste from Waste Classification Guidelines

Class	Definitions / Examples
Special waste	• Clinical and related wastes; • Asbestos waste; • Waste tyres.
Liquid waste	• Waste that has an angle of repose <5 degrees; • Waste that becomes free flowing at or below 60ºC; • Is not generally capable of being picked up by a spade or shovel.
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 Transport of Dangerous Goods Code; • Lead-acid or nickel-cadmium batteries.
Restricted solid waste	• This type of waste is determined by chemical tests.
General solid waste (putrescible)	• Waste from litter bins collected by local councils; • Animal waste and food waste; • Grit or screenings from sewage treatment systems that have been dewatered so that the grit of screenings do not contain free liquids.

Table 8-9: Classes of Waste from Waste Classification Guidelines

Class	Definitions / Examples
General solid waste (non-putrescible)	• Paper or cardboard; • Glass, plastic, rubber, plasterboard, ceramic, bricks, concrete or metal; • Grit, sediment, litter and gross pollutants collected in, and removed from, stormwater treatment devices and/or stormwater management systems, that has been dewatered so that they do not contain free liquids

8.6.1.2 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (POEO Act) is the principal environmental protection legislation for NSW. It defines 'waste' for regulatory purposes and establishes management and licensing requirements for waste. It defines offences relating to waste and sets penalties. The POEO Act also establishes the ability to set various waste management requirements via the *Protection of the Environment Operations (Waste) Regulation 2014*.

8.6.1.3 Protection of the Environment Operations (Waste) Regulation 2014

The *Protection of the Environment Operations (Waste) Regulation 2014*, referred to as the 'Waste Regulation', identifies provisions relating to waste management and disposal. Specifically, it provides for contributions to be paid by occupiers of scheduled waste facilities for each tonne of waste received at the facility or generated in a particular area, exempts certain occupiers or types of waste from these contributions, and allows deductions to be claimed in relation to certain types of waste. The Waste Regulation also sets out provisions covering:

- the proximity principle;
- record-keeping requirements, measurement of waste and monitoring for waste facilities;
- tracking of certain wastes (listed in Schedule 1 of this legislation);
- reporting;
- transportation of waste;
- transportation and management of asbestos waste;
- recycling of consumer packaging; and
- the classification of waste containing immobilised contaminants.

Part 4 of the *Protection of the Environment Operations (Waste) Regulation 2014*, referred to as the 'Waste Regulation', details the requirements associated with tracking waste. Certain types of waste listed in Schedule 1 of the Waste Regulation have the potential to be harmful to the environment and are required to be tracked from the source to the waste disposal facility. The proposed development is not expected to generate, receive, handle or process waste types that require tracking under the Waste Regulation.

This legislation also identifies other provisions relating to waste management and disposal; for example, Part 3 of the Regulation requires scheduled waste facilities to keep records in relation to each delivery of waste received at the facility and each load of waste transported from the facility. The most relevant provisions for the proposed development are listed as follows. All levy paying waste facilities within NSW must keep records in accordance with the EPA's publication "*Output required for each transaction at Levy Paying Facilities*".

Record keeping for waste received at the facility

The occupier of a scheduled waste facility must record the following information in relation to each delivery of waste or other material received at the facility:

- the amount of any waste delivered, its waste type and its waste stream;
- the amount of any other material delivered and a description of the nature of that other material;
- the date and time the delivery is made; and
- the registration number of the vehicle used to make the delivery.

Record keeping for waste transported from the facility

The occupier of a scheduled waste facility must record the following information in relation to each load of waste or other material transported from the facility for use, recovery, recycling, processing or disposal at another place:

- the amount of any waste contained in the load, its waste type and its waste stream;
- the amount of any other material contained in the load and a description of the nature of that other material;
- the date and time the load is transported from the facility;
- the registration number of the vehicle used to transport the load;
- the name and address of the place to which the load is transported and the code or number of any environment protection licence for that place;
- the unique identification number in the case of waste or other material in the load that is removed from a stockpile required to have a unique identification number under clause 31 (1) (a); and
- details of any recycling, mixing, blending or processing of any waste in the load.

Record keeping for vehicles

The occupier of a scheduled waste facility must record the following particulars in relation to vehicles that enter the facility for a purpose related to the operation of the facility (whether or not the vehicle is being, or is intended to be, used to deliver or transport waste):

- the date and time on which the vehicle enters the facility;
- the date and time on which the vehicle leaves the facility;
- the registration number of the vehicle;
- the purpose of entry; and
- the weight of the vehicle.

Record keeping for waste stockpiled at facility

The occupier of a scheduled waste facility who is required to pay contributions under Section 88 of the POEO Act must record the following information in relation to any waste and any other material stockpiled at the facility:

- a unique identification number for each stockpile;
- the quantity of any waste (and its waste type) or other material held in each stockpile as at 30 June and 31 December of each year; and
- the quantity of any waste (and its waste type) or other material that is added to or removed from each stockpile each day.

Keeping, retention and availability of records

The occupier of a scheduled waste facility who is required to record information must:

- record and keep the information in accordance with any requirements of the Waste Levy Guidelines;
- ensure that each record is retained for at least 6 years after the record is made; and
- make any of the records available for inspection and copying by an authorised officer on request.

Measurement of waste: weighbridges

The occupier of a scheduled waste facility who is required to pay contributions under Section 88 of the POEO Act must ensure that there is a weighbridge installed at the waste facility and must:

- submit to the EPA, within 30 days after installing the weighbridge, a plan of the waste facility indicating the proposed vehicle flow controls, with the entry and exit points where waste is transported into and out of the waste facility (a vehicle flow control plan);
- keep a copy of the latest vehicle flow control plan on the premises and make the plan available for inspection and copying by an authorised officer on request;
- ensure that each vehicle that enters/leaves the waste facility for a purpose relating to the operation of the facility is weighed by the weighbridge on entering/leaving the facility;
- ensure that the weighbridge is verified (within the meaning of the *National Measurement Act 1960*) at least once a year;
- ensure that the weighbridge has related software that records quantities of waste in any form and manner specified in the Waste Levy Guidelines; and
- notify the EPA of any incident that results in the weighbridge being out of operation for any period of more than 24 hours.

The proposed development will have a verified weighbridge on site, for trucks entering the facility.

8.6.1.3.1 Waste Levy Guidelines 2015

The *Waste Levy Guidelines* (NSW EPA, 2015) contain specific legal requirements which occupiers of scheduled waste facilities must meet in addition to their obligations under the Waste Regulation. The guidelines include how waste is measured to calculate levy liability, when certain levy deductions can be claimed, and how records, surveys and reports are required to be made, kept and provided to the EPA in order for the occupier to fulfil their obligations.

In fact, the POEO Act requires certain licensed waste facilities in NSW to pay a contribution for each tonne of waste received at the facility (referred to as the 'waste levy'), with the aims to reduce the amount of waste being landfilled and promote recycling and resource recovery.

Scheduled waste facilities are required to hold a levy liability on all waste received at the facility, which will be extinguished once the waste is transported back off site for lawful re-use or disposal. Payment of the levy is only triggered where:

- waste is stockpiled on-site for more than 12 months, unless the waste has been processed at the facility to a standard required by a resource recovery order;
- waste is stockpiled above lawful limits; and
- waste is transported for unlawful disposal.

8.6.1.4 Waste Avoidance and Resource Recovery Act 2001

The *Waste Avoidance and Resource Recovery Act 2001* (WARR Act) promotes waste avoidance and resource recovery to achieve a continual reduction in waste generation. Among other miscellaneous provisions, the WARR Act sets out provisions for waste strategies and programs, and industry actions for waste reduction.

Waste minimisation and resource recovery would be practised as part of AMJ's commitment to the principles of Ecologically Sustainable Development and the *Waste Avoidance and Resource Recovery Act 2001* (WARR Act). With the proposed development being a resource recovery facility, resource recovery practices implemented at the site would also be in accordance with the primary goal of the *NSW Waste Avoidance and Resource Recovery Strategy 2014-2021*, which is "*to enable all of the NSW community to improve environment and community well-being by reducing the environmental impact of waste and using resources more efficiently.*" Overall, the type of development that is proposed has an important positive impact on the waste management practices in the subject region since it enables the recovery and recycling of various C&D waste streams, which could otherwise be send to landfill.

The company would also follow the NSW EPA's hierarchy of waste management for the management of wastes generated as a result of its ongoing operations. For example, a significant reduction of fresh water usage in the wash down area will be achieved by installing a wash bay able to continually re-use the water within the system. The EPA's hierarchy of waste management will also be followed during the construction phase, as most of the wastes generated are either reused on site or recycled offsite.

8.6.2 Waste Generation and Management

This section provided information on the expected quantity and types of waste to be generated or to be received, handled, processed and stored at the subject site, as well as wastes associated with the proposed development to be removed offsite. There are three stages of waste generation: demolition, construction and ongoing waste. Ongoing waste also included two different streams, as follows:

- Operational: waste generated as a result of the day to day operations of the facility, such as paper waste from offices, general waste from the kitchen and amenities, and garden waste.
- Business Line: wastes received on site that are processed and stored until transfer offsite for sale, further processing or for final disposal.

The following sections list and describe the expected wastes associated with each stage, as well as the waste management proposed. This information is similarly presented in the Waste Management Plan completed for Cumberland Council as a requirement of the DA process, and is provided in Appendix 5. All waste described have been classified in accordance with the *Waste Classification Guidelines* (NSW EPA, 2014).

8.6.2.1 Demolition Waste

The existing building is to be retained and used as an office and associated amenities. Therefore no demolition waste would be generated.

8.6.2.2 Construction Waste

Construction of the proposed resource recovery facility will result in the generation of waste. The expected type, quantity and fate of these wastes are outlined in the following table.

Table 8-10: Construction Waste

Waste Type	Estimated Quantity Generated	EPA Waste Classification	Proposed Management
Bricks	0	General solid waste (non-putrescible)	N/A
Concrete	2 tonne	General solid waste (non-putrescible)	Re-used onsite/recycled offsite Concrete will be crushed and re-used as fill material. Residual concrete will be recycled offsite by a licensed waste recovery facility.
Timber (Pallets, board finishes)	1 tonne	General solid waste (non-putrescible)	Recycled offsite Timber will be sent offsite for recycling to landscaping suppliers and composting facilities.

Table 8-10: Construction Waste

Waste Type	Estimated Quantity Generated	EPA Waste Classification	Proposed Management
Plasterboard	0	General solid waste (non-putrescible)	N/A
Metals (Copper, aluminium)	0.05 tonne	General solid waste (non-putrescible)	Recycled offsite To be re-used or recycled offsite by recycling facility.
Other wastes (Electrical fittings, PVC Plastic, etc.)	0.025 tonne	*Expected to be* General solid waste (non-putrescible)	Recycled offsite/Landfill To be re-used or recycled offsite where possible, otherwise sent to landfill for disposal.

8.6.2.3 Ongoing Waste – Operational

Day to day operations at the proposed resource recovery facility will result in the generation of waste. The expected type, quantity and fate of these wastes are outlined in the following table.

Waste Type	Estimated Quantity Generated	EPA Waste Classification	Proposed Management
General waste from office and amenities (including kitchen scraps)	6 tonnes per year	General solid waste (putrescible)	Disposed offsite Stored in a designated general waste bin and collected by a waste contractor appointed by Council.
Recyclable general waste from office and amenities	4 tonnes per year	General solid waste (non-putrescible)	Recycled offsite Stored in a designated recycling waste bins and collected for recycling by a waste contractor appointed by Council.
Recyclable general waste (i.e. paper and cardboard)	6 tonnes per year	General solid waste (non-putrescible)	Recycled offsite Stored in a designated recycling waste bin and collected by licensed waste contractors for recycling.

8.6.2.4 Ongoing Waste – Business Line

The proposed resource recovery facility sets out to accept a variety of wastes from the C&D sector. Generally, batches of mixed C&D waste would be received on site and then sorted into the following categories: bricks, concrete, timber, glass, metal, and general waste, which is the residual waste from the sorting process.

The expected type, quantity, onsite management and offsite fate of these wastes are outlined in the following table. The expected quantity is a gross estimation based on current experience of similar projects. In fact, the quantity for each waste type will vary significantly depending on the source that generated the waste.

Table 8-11: Ongoing Waste – Business Line

Waste Type	Estimated Quantity Processed	EPA Waste Classification	Proposed Management
Bricks	40,000 tonnes per year	General solid waste (non-putrescible)	Bricks are sorted from mixed C&D waste, stockpiled and then allocated to a designated storage bay. They are then crushed, screened and stored in a designated bay. Processed material is segregated and stored until transfer offsite for further processing by a licensed recycling facility.
Concrete	23,000 tonnes per year	General solid waste (non-putrescible)	Concrete is sorted from mixed C&D waste, stockpiled and then allocated to a designated storage bay. It is then crushed, screened and stored in a designated bay. Processed material is segregated and stored until transfer offsite for further processing by a licensed recycling facility.
Timber	14,000 tonnes per year	General solid waste (non-putrescible)	Timber is sorted from mixed C&D waste, stockpiled and then allocated to a designated storage bay until transfer offsite for further processing by a licensed recycling facility.
Glass	55 tonnes per year	General solid waste (non-putrescible)	Glass is sorted from mixed C&D waste, stockpiled and then allocated to a designated storage bay. Material is stored until transfer offsite for further processing by a licensed recycling facility.
Metal	1,500 tonnes per year	General solid waste (non-putrescible)	Metal is sorted from mixed C&D waste, stockpiled and then allocated to a designated storage bay. Material is stored until transfer offsite for further processing by a licensed recycling facility.
Residual general waste	14,000 tonnes per year	*Expected to be* General solid waste (non-putrescible)	Residual C&D waste that cannot be recovered from the sorting process is stockpiled and then allocated to a designated storage bay, until collection by a licensed waste contractor for final disposal offsite.

Table 8-11: Ongoing Waste – Business Line

Waste Type	Estimated Quantity Processed	EPA Waste Classification	Proposed Management
Wheel wash residual waste	2,000 tonnes per year	N/A	Residual waste from the wheel wash may be generated from time to time. Any sediment removed during regular maintenance would be removed periodically by a licensed waste contractor for final disposal offsite.

8.6.3 Waste Management Discussion

The main waste type generated as a result of the proposed development during construction and ongoing operations would be that of General solid waste (non-putrescible), together with small amounts of General solid waste (putrescible). The main waste type accepted on site as part of the ongoing business operations of the proposed development would also be that of General solid waste (non-putrescible).

All expected wastes generated during construction works to be undertaken at the subject site will be either re-used on site or recycled/re-used offsite at licensed waste management facilities. Waste would be segregated on site into stockpiles for excavated material and green waste, and into designated industrial sized waste bins for all other materials.

An *unexpected finds protocol* would provide instruction on what to do in the event that suspect materials identified by unusual staining, odour, discolouration or inclusions such as building rubble, asbestos, ash material etc. are encountered during any stage of earthworks, site preparation and construction. Works would cease immediately and temporary barricades set up to prevent access to area. Erosion and sediment controls would need to be installed around the area. Inspection of the suspect material by a suitably qualified person followed by laboratory testing and analysis (if deemed required) would identify the nature of the material and the extent (if any) of remediation that is required.

Ongoing operational waste such as general office and amenities waste, as well as recyclable kitchen waste and office paper will be stored, until collection by waste contractors, in standard bins for general waste and recycling waste.

The recovered and processed wastes will be stored in the storage bays until transfer to a secondary recycling facility for further processing. Crushed bricks and concrete are likely to be re-used as road base following further processing off-site. Any waste that is not suitable for resource recovery will be collected by licensed waste contractor for final disposal to landfill.

Waste resulting from the wheel wash during regular maintenance would be collected by a licensed waste contractor for final disposal to landfill.

Overall, waste management practices to be implemented at the subject site are considered adequate and, if undertaken correctly, would ensure that the proposed development is compliant with the *Protection of the Environment Operations Act 1997*, in particular, the proposed facility will have an environmental protection licence for the proposed activities (as per Section 48 of the POEO Act); it will not wilfully or negligently dispose of waste in a manner that harms or is likely to harm the environment (Section 115); and will not transport waste to a place that cannot lawfully be used as a waste facility for that waste, or cause or permit waste to be so transported (Section 143).

Management of waste on site will also follow the *Better Practice Guidelines for Waste Management and Recycling in Commercial and Industrial Facilities* (EPA December 2012) as it will include the following best practices:

- Visually screening designated waste areas and receptacles from public places (in building);
- Ensuring waste is stored adequately and cannot escape receptacles/storage areas; and
- Ensuring easy access to each waste storage area for collection services.

Furthermore, the on site management of ongoing waste (from both operational and business line streams) would continue to be improved through the implementation of an Environmental Management Plan (EMP). The site's EMP would include an *incoming waste procedure*, developed to confirm the type of C&D wastes arriving on site and to deal with any unexpected or non-conforming wastes (e.g. hazardous wastes like asbestos) mixed with accepted waste types. The *incoming waste procedure* would be included in the site's EMP and be prepared in accordance with the EPA's guidelines:

- "Draft Protocol for managing asbestos during resource recovery of construction and demolition waste" (NSW EPA, 2014); and
- "Consultation Paper: New minimum standards for manging construction and demolition waste in NSW" (NSW EPA, 2016).

The *incoming waste procedure* would need to be implemented from the first load accepted at the facility. All staff involved in the acceptance of waste at the site would need to be trained in this and all other environmental procedures detailed in the EMP.

Additional recommendations for best practice waste management include the option of undertaking regular waste audits via workplace inspections. Voluntary audits would assist in ensuring that wastes are appropriately segregated, housekeeping and storage is adequate, and that records of waste management, transport and disposal are up to date and accurate.

Finally, a Waste Management Plan is required to be completed as part of the Liverpool City Council development application process and is provided as Appendix 5. Similarly to this WMA, the plan identifies the waste generated during demolition, construction and operational stages and the associated management of these wastes.

8.7 HAZARDS AND RISKS

The main environmental site hazards include:

- Generation and release of dust emissions;
- Fuel spills, mainly diesel;
- Excessive noise from on-site operations and activities;
- Exposure to silica dust; and
- Fire.

8.7.1 Chemicals and Dangerous Goods Storage

The site stores diesel, LPG, engine and hydraulic oil, grease and oxygen. Diesel is used to power the machinery, oil and grease is used in machinery maintenance. The diesel will be stored in a 10,000 L self bunded tank in accordance with AS 1940. The engine and hydraulic oils are stored in standard drums on a bunded pallet inside the building. The grease is stored in 450 g tubes also on a bunded pallet inside the building. The LPG cylinders are stored in a locked cage external to the building. Details of use and quantities are shown in the following table:

Table 8-12: Chemical Storage

Product Name	UN/CAS # (if known)	Quantities stored (maximum)	Storage type	Storage location
Liquefied Petroleum Gas (LPG)	1075	2×45 kg	2 cylinders	Outside in locked cage
Oxygen	1072	1×0.48 m^3	1 cylinder	Inside workshop shed
Diesel	1202	10,000 L	1 double skin tank	Outside on impermeable concrete slab
Engine Oil	1268	200 L	1 Drum	Inside workshop shed on bunded pallet
Hydraulic Oil	1268	200 L	1 Drum	Inside workshop shed on bunded pallet
Grease	1268	10×450 g	10 Tubes	Inside workshop shed on bunded pallet

8.7.2 Preliminary Risk Screening

Details of Dangerous Goods (DG Code) and/or Hazardous Chemicals (GHS Classification) typically used and stored on site, with current and proposed storage quantities and annual usage quantities, have been provided in Table 8-13. Safety Data Sheets (SDS) of all the listed chemicals are available on request.

The only dangerous goods to be stored on site are two cylinders of LPG, Class 2.1, stored in a locked cage outside and the one cylinder of oxygen Class 2.2(5.1).

In addition, 10,000 L of diesel, C1 combustible liquid, will be stored in a self bunded tank outside. An estimated 400 L of engine and hydraulic oils, C2 combustible liquids, will also be stored on site, within the building.

Chemical management requires a site to comply with the requirements of the *Work, Health and Safety Regulation 2011*. Notification to SafeWork Australia is not required as chemical quantities do not exceed the manifest quantities. Placarding of diesel storage is required. An emergency plan is also required. Details of the locations of the chemical storage depots required for the proposed development must be presented in the emergency plan.

Requirements in Australian Standards also need to be applied when a site stores more than minor quantities of a hazardous substance/chemical belonging to one of the nine Classes of Dangerous Goods. The basis of chemical management safeguards for some of these classes are described in the following Australian Standards:

- AS 1940–2017 *The storage and handling of flammable and combustible liquids;*
- AS/NZS 1596:2014 *The storage and handling of LP Gas;* and
- AS 4332–2004 *The storage and handling of gases in cylinders.*

Storage of all hazardous chemicals would comply with the above standards. General controls that need to be met for adequate chemical management at the site are as follows:

- Placarding of the site and of combustible liquid (diesel) storage areas;
- Bunding of flammable and combustible liquid storage areas in accordance with AS 1940–2017;
- Storage of LPG cylinders outside the building, inside a lockable cage, in accordance with AS/NZS 1596:2014;
- Storage of engine, hydraulic oils and grease on bunded pallets within the building;
- Provision of adequate fire protection services;
- Provision of spill kits near refuelling area;
- Site securely locked when not in operation;
- Up to date environmental and safety management procedures and systems; and
- Personnel regularly trained and competency tested in matters regarding the use of firefighting equipment.

A preliminary risk screening of the proposed development in accordance with *State Environment Planning Policy No. 33 – Hazardous and Offensive Development* (SEPP 33) has been undertaken, with results provided below. This includes the dangerous goods associated with the proposed development. The quantities of dangerous goods do not exceed the threshold quantities for applying SEPP 33. Therefore, a Preliminary Hazard Analysis (PHA) is not required.

Table 8-13: SEPP 33 Preliminary Risk Screening

Class	Screening Threshold	Description	Site Specific Description	Quantity to be stored based on separation distances	Triggers SEPP 33
Class 1.2	5 tonne	Explosives	None on site	None	No
Class 1.3	10 tonne	Explosives	None on site	None	No
Class 2.1	10 tonne or 16 m^3 if stored above ground 40 tonnes or 64 m^3 if stored underground or mounded	(LPG only – Not including auto retail outlets) Flammable Gases	Forklift cylinders	2 cylinders (approx. 90 kg total)	No
Class 2.2	Not Relevant	Not relevant	Compressed oxygen	1 cylinder	Not relevant
Combustible Liquid C1	Not relevant	Combustible liquid such as diesel	Diesel in onsite storage tank	10,000 L	Not Applicable
Combustible Liquid C2	Not relevant	Lubricating oils/hydraulic oils	Lubricant / hydraulic oils	400 L	Not Applicable
Class 2.3	5 tonne	Anhydrous ammonia, kept in the same manner as for liquefied flammable gases and not kept for sale	None on site	None	No
Class 2.3	1 tonne	Chlorine and sulphur dioxide stored as liquefied gas in contains <100 kg	None on site	None	No
Class 2.3	2.5 tonne	Chlorine and sulphur dioxide stored as liquefied gas in containers >100 kg	None on site	None	No
Class 2.3	100 kg	Liquefied gas kept in or on premises	None on site	None	No
Class 2.3	100 kg	Other poisonous gases	None on site	None	No
Class 3	Assessed by reference to figures 8 & 9 of applying SEPP 33	Flammable liquids PG I, II and III	Cleaning product & Boiler Chemicals	None	No
Class 4.1	5 tonne	Flammable Solids	None on site	None	No
Class 4.2	1 tonne	Reactive in the air	None on site	None	No
Class 4.3	1 tonne	Spontaneous combustion in contact with water	None on site	None	No

Table 8-13: SEPP 33 Preliminary Risk Screening

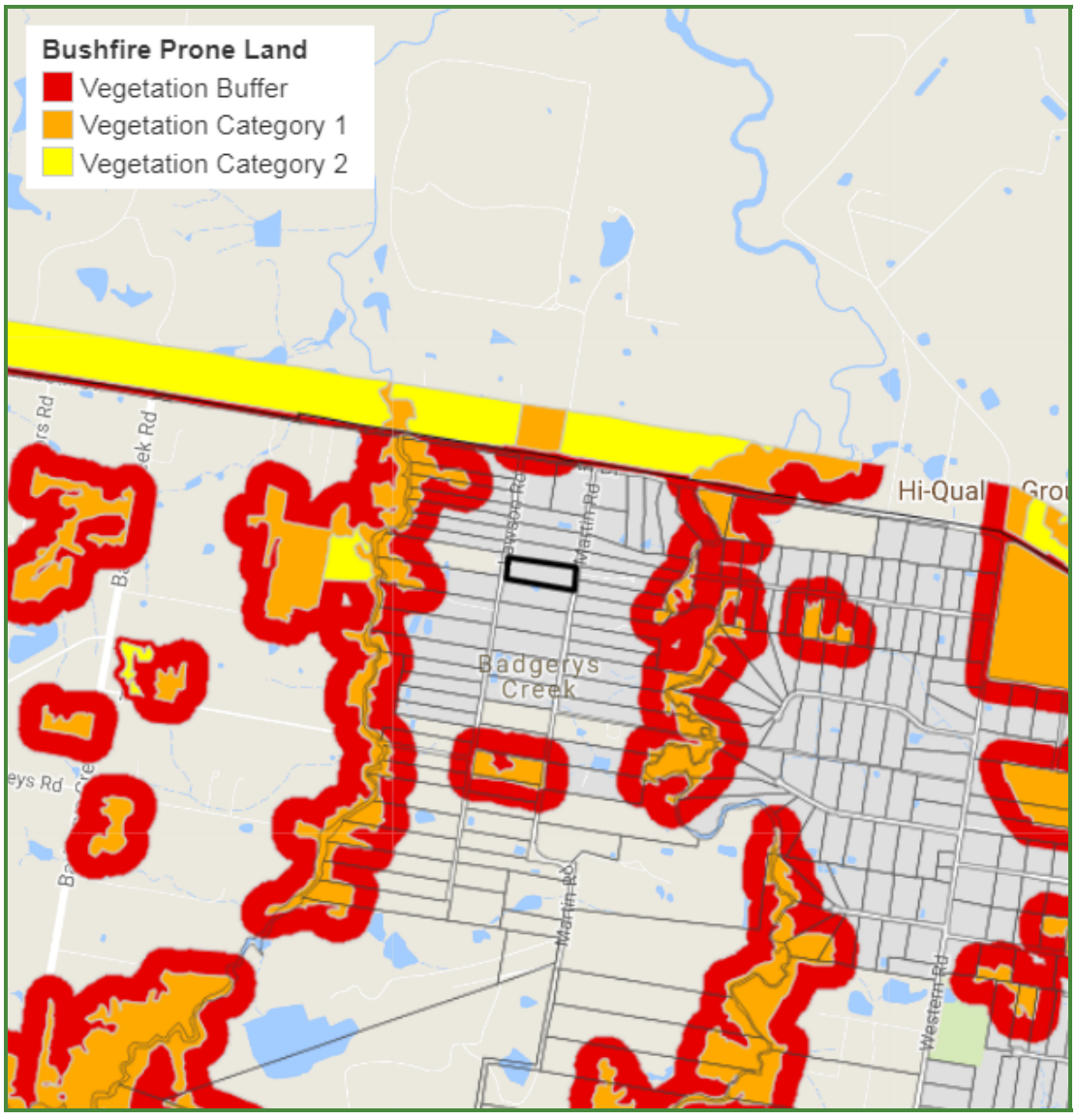
Class	Screening Threshold	Description	Site Specific Description	Quantity to be stored based on separation distances	Triggers SEPP 33
Class 5.1	25 tonne	Ammonium nitrate – high density fertiliser grade, kept on land zoned rural where rural industry is carried out, if the depot is at least 50 metres from the site boundary.	None on site	None	No
Class 5.1	5 tonne	Oxidising substances	None on site	1 cylinder of oxygen	No
Class 5.1	2.5 tonne	Dry pool chlorine – if at a dedicated pool supply shop, in containers <30 kg	None on site	None	No
Class 5.1	1 tonne	Dry pool chlorine – if at a dedicated pool supply shop, in containers >30 kg	None on site	None	No
Class 5.1	5 tonne	Any other Class 5.1	None on site	None	No
Class 5.2	10 tonne	Organic peroxide	None on site	None	No
Class 6.1 PG1	0.5 tonne	Toxic substances	None on site	None	No
Class 6.1 PGII & III	2.5 tonne	Toxic substances	None on site	None	No
Class 6.2	0.5 tonne	Includes clinical waste	None on site	None	No
Class 7	All	Should demonstrate compliance with Australian codes	None on site	None	No
Class 8 PGI	5 tonne	Corrosive substance	None on site	None	No
Class 8 PGII	25 tonne	Corrosive substance	Caustic Soda	None	No
Class 8 PGIII	50 tonne	Corrosive substance	Cooling water and Boiler Chemicals	None	No

8.7.3 Fire

8.7.3.1 Bushfire Prone Land

The S149 Certificate for the subject site (No. 1366), provided in Attachment 2 indicates that the land is not bushfire prone land as defined by the EP&A Act 1979. Figure 8-7 provided by Liverpool City Council shows the site being located outside bushfire prone land.

Figure 8-7: Bushfire Prone Land Map



8.7.3.2 Fire Risk Assessment

8.7.3.2.1 Methodology

The methodology described in the following sections was used in assessing the risks associated with site activities. A qualitative method was used and a review was conducted to determine whether a quantitative assessment was required.

8.7.3.2.2 Hazard Identification

Hazard identification is the first step in the risk assessment. It involves the identification of all possible hazardous events required for further quantification and analysis. This does not, in any way, imply that the hazard identified or its possible impact will occur in practice.

To identify hazards, a survey of operations was carried out to isolate the events which are outside normal operating conditions and which have the potential to impact outside the boundaries of the site. In accordance with the NSW Department of Planning's Hazardous Industry Planning Advisory Paper (HIPAP) No. 6 – *Guidelines for Hazard Analysis*, these events do not include occurrences that are a normal part of the operational cycles of the site but rather the atypical and abnormal, such as the occurrence of a significant liquid spill during product transfer operations.

8.7.3.2.3 Risk Criteria

The following sub-section defines the risk criteria used in this assessment.

8.7.3.2.4 Consequence Estimation

This aspect involves the analysis of events carried forward from the hazard identification process in order to quantify their potential on-site and off-site impacts. In this case, these events typically include fire and the potential effects on people, the environment, damage to property and the financial loss as a result of this damage.

Categories of consequences have been defined in terms of environmental, health and financial impacts and are described in the following table.

Table 8-14: Consequence Table

Level	Descriptor	Consequences Or Impact Description
1	Insignificant	Confined on-site environmental impacts able to be promptly rectified. No injuries. Financial loss less than $2,000.
2	Minor	Confined environmental impacts requiring short term recovery with potentially little or no off-site impacts. First Aid treatment. Financial loss $2,000 to $20,000.
3	Moderate	Confined environmental impacts requiring medium term recovery both on-site and off-site. Medical treatment required. Financial loss $20,000 to $200,000,
4	Severe	Unconfined environmental impacts requiring long term recovery and leaving residual damage both on-site and off-site. Extensive injuries, loss of product capability. Financial loss $200,000 to $1M.
5	Catastrophic	Widespread environmental impact requiring long term recovery and leaving major damage both on-site and off-site. Death. Financial loss more than $1M.

8.7.3.2.5 Likelihood Estimation

This aspect involves determining how likely an event is to occur. Likelihood is the chance that something might happen and is defined for the purposes of this assessment in the following table.

Table 8-15: Likelihood Table

Level	Descriptor	Likelihood Description
A	Almost Certain	Very likely. The event is expected to occur in most circumstances.
B	Likely	Strong possibility. The event will probably occur in most circumstances.
C	Possible	The event might occur at some time.
D	Unlikely	Not expected. There is a slight possibility the event could occur at some time.
E	Rare	Highly unlikely. The event may occur only in exceptional circumstances.

8.7.3.2.6 Level of Risk

The level of risk is defined by the following table.

Table 8-16: Level of Risk Table

		Consequence				
		Insignificant 1	Minor 2	Moderate 3	Severe 4	Catastrophic 5
Likelihood	A (almost certain)	III	II	I	I	I
	B (likely)	III	II	I	I	I
	C (possible)	III	II	II	I	I
	D (unlikely)	III	III	II	II	II
	E (rare)	III	III	III	II	II

The Class I area, shown in red, indicates a high level of risk which is intolerable and where risk reduction is required. This requires the reduction of the likelihood and/or the consequence.

The Class II area, shown in yellow, indicates a moderate level of risk. Whilst the risk is not unacceptable, there should be practical measures taken to lower the risk if economically viable. For risks where further mitigation is not economically viable, judgment needs to be exercised as to whether the level of risk is acceptable or not. This class is the beginning of the "As Low as Reasonably Practicable" (ALARP) region which means that while risk of an accident may be tolerable, steps still need to be taken to reduce the risk level to as low as reasonably practicable. A risk that satisfies ALARP would be considered acceptable.

The Class III area, shown in green, indicates a low level of risk and is broadly considered to be acceptable. Further risk mitigation may not be required/appropriate. However, low and accepted risks should be monitored and routinely reviewed to ensure that they remain acceptable. Few risks remain static. This class includes ALARP as well as what are known as trivial or negligible risks.

8.7.3.2.7 Risk Characterisation and Identification

8.7.3.2.7.1 Identification of Hazards

HB 203-2012: Managing Environment-Related Risk defines a **risk source** as "a tangible or intangible element that alone or in combination has the intrinsic potential to give rise to risk. It is thus an encompassing term that includes the terms 'hazard' (a source of potential harm) and 'environmental aspect'."

An **environmental aspect** could be a "*licensed discharge or emission, waste, or the consumption or reuse of a material. They could also involve noise, odour, light or vibration*."

The process of identifying hazards associated with site activities was to firstly carry out a review of the proposed site operations. The next step was a brainstorming session with a team of consultants to systematically break down each step in the process and to identify environmental aspects and, therefore, potential hazards associated with each activity. The results of this process are presented in Table 8-17.

Table 8-17: Identification of Hazards

Risk Source / Activity	Hazards
PROCESS: Unloading and Storage	
Unloading of building waste materials into dumping bays	
On-site traffic movements	Vehicle leakages of oil and fuel
Storage of materials in storage bays	Fire in stockpiles (including timber stockpile)
PROCESS: Sorting Using Excavator and Loader	
Excavator and Loader moving material	Vehicle leakages of oil and fuel
PROCESS: Crushing/Screening of Concrete Bricks	
Crushing and Screening of Concrete, Bricks	
PROCESS: Chemical Use and Storage	
Refilling of diesel fuel tank	Spillages of diesel fuel
Storage of diesel fuel	Spillages of diesel fuel
On-site refuelling of mobile equipment	Spillages of diesel fuel
Storage of LPG	Explosion/Fire
Storage of Lubricant Oil	Spillages of lubricant oil
Onsite use of lubricant oil for machinery	Spillages of lubricant oil
PROCESS: General Plant Activities	
Use of wheel wash	
Car parking and yard areas	Leakages of oil and fuel
Use of water mist for dust suppression	
NATURAL DISASTERS	
Fire	Fire from offsite or onsite sources causing damage to property, human health and/or air pollution. Contaminated firefighting water. Contamination of water and land.

Analysis of the risks associated with the hazards identified above is presented in Section 8.7.3.2.8.

8.7.3.2.8 Risk Analysis

The risk analysis was undertaken using the hazard identification table in Section 4.1 and the risk criteria established in Section 8.7.3.2.3. Risk assessment was undertaken firstly based on the site activities with no safeguards in place to determine the Existing Risk Rating. The residual risk rating is the risk re-assessed with safeguards in place.

The results are presented as a Hazard and Risk Register in Table 8-18.

Table 8-18: Fire – Risk Register

Event Number	Hazard	Event/Causes	Consequences	Consequences	Likelihood	Existing Risk Rating	Is the risk ALARP?	Prevention & Mitigation Safeguards	Residual Consequence	Residual Likelihood	Residual Risk Rating	Meet ALARP?
1	Fire	Fuel leak (e.g.: LPG, Diesel or Lubricant Oil)	- Release of toxic products of combustion - Damage to vehicle and/or property - Missiles (i.e. LPG cylinders) - Rupturing of containers and contaminated fire water runoff	Severe	Unlikely	II	NO	Enclosed chemical containers; Spill kits, spill kit training; Fire protection equipment; Smoke detectors; Emergency plan; No smoking policy; Control of ignition sources; Firefighting equipment training; Regular plant inspections; Preventative maintenance schedule; Bunding conforms to AS 1940; Fire rated wall between LPG and diesel storage; Environmental awareness training.	Moderate	Rare	III	YES
2		Fire in stockpile (including timber fire)		Severe	Unlikely	II	YES	Water sprays for dust suppression; Fire protection equipment; Smoke detectors; Emergency plan; No smoking policy; Control of ignition sources; Firefighting equipment training; Preventative maintenance schedule; Environmental awareness training.	Severe	Rare	III	YES

Table 8-18: Fire – Risk Register

Event Number	Hazard	Event/Causes	Consequences	Consequences	Likelihood	Existing Risk Rating	Is the risk ALARP?	Prevention & Mitigation Safeguards	Residual Consequence	Residual Likelihood	Residual Risk Rating	Meet ALARP?
3		Wood stockpile spontaneous combustion		Severe	Rare	II	YES	Water sprays for dust suppression, Fire protection equipment; Smoke detectors; Emergency plan; No smoking policy; Control of ignition sources; Firefighting equipment training; Inspect timbre stockpile for signs of combustion.	Severe	Rare	III	YES
4		Lightning strike		Minor	Possible	II	YES	Fire protection equipment; Smoke detectors; Emergency plan; Firefighting equipment training; Earthing (grounding) system for the building; Preventative maintenance schedule.	Minor	Possible	III	YES
5		Adjacent property fires		Severe	Unlikely	II	YES	Fire protection equipment; Smoke detectors; Emergency plan; Firefighting equipment training; Enclosed chemical containers; Bunding conforms to AS 1940;	Severe	Unlikely	III	YES

Table 8-18: Fire – Risk Register

Event Number	Hazard	Event/Causes	Consequences	Consequences	Likelihood	Existing Risk Rating	Is the risk ALARP?	Prevention & Mitigation Safeguards	Residual Consequence	Residual Likelihood	Residual Risk Rating	Meet ALARP?
6		Arson		Severe	Unlikely	II	YES	Fire protection equipment; Smoke detectors; Emergency plan; Firefighting equipment training; Security: Fully fenced site and locked gates during afterhours.	Severe	Unlikely	III	YES
7		Smoking		Severe	Possible	I	NO	Fire protection equipment; Smoke detectors; Emergency plan; No smoking policy; Firefighting equipment training; Preventative maintenance schedule; Environmental awareness training.	Severe	Unlikely	III	YES
8		Appliance fire Broken fluorescent light		Severe	Unlikely	II	YES	Fire protection equipment; Smoke detectors; Emergency plan; No smoking policy; Control of ignition sources; Firefighting equipment training.	Severe	Unlikely	III	YES

8.8 GREENHOUSE GAS EMISSIONS

The proposed development involves the construction of the facility and operations involved with the receiving, handling and processing of 95,000 tonnes of construction and demolition waste and green waste per year. All of these activities generate greenhouse gases. An assessment of the annual greenhouse gas emissions for the proposed development is provided in this section.

8.8.1 GHG Standards and Guidelines

The following standards, sources and guidelines have been used as part of this greenhouse gas (GHG) assessment:

- Australian Standard AS ISO 14064.1: 2006 – Greenhouse gases – Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals;
- Department of the Environment and Energy, July 2017. Australian National Greenhouse Accounts – National Greenhouse Accounts Factors;
- Department of the Environment and Energy, October 2017. National Greenhouse and Energy Reporting System Measurement – Technical Guidelines;
- Department of the Environment and Energy, 2017. Australian National Greenhouse Accounts, Quarterly Update of Australia's National Greenhouse Gas Inventory, June 2017; and
- Greenhouse Gas Protocol, revised edition March 2004. Corporate Accounting and Reporting Standard.

The calculations used throughout this assessment are based on the *GHG Protocol Corporate Standard* and the *National Greenhouse Accounts (NGA) Factors*. The NGA factors are default emission factors provided by the Department of Climate Change and Energy Efficiency for use in calculating an organisation's greenhouse gas emissions, and are used here.

Estimations of annual energy consumption have been provided by the proponent and/or are based on assumptions. To gain a true understanding of GHG emissions from the site, this assessment would need to be reviewed with data after the first year of operations.

Under the *National Greenhouse and Energy Reporting Act 2007*, AMJ Demolition and Excavation is not required to report GHG emissions since total emissions from the site are below the 25,000 tonne of GHG and the 100 TJ of energy consumption thresholds for mandatory reporting.

8.8.2 Direct and Indirect Emissions

Emissions are commonly classified as direct or indirect emissions. As defined by the GHG Protocol, direct GHG emissions are emissions from sources that are owned or controlled by the reporting entity, while 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 categorized into three 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.

This assessment will examine all Scope 1 and 2 GHG emissions, and also some Scope 3 emissions. Scope 1, 2 and 3 emissions from the proposed site operations include:

Scope 1: Diesel;
Scope 2: Electricity Use;
Scope 3: Upstream extraction and processing of raw materials required for producing the diesel and electricity.

8.8.3 Greenhouse Gas Emissions from Site Operations

8.8.3.1 Estimation of Scope 1 Greenhouse Gas Emissions

Scope 1 GHG emissions are produced as a result of operating equipment and on-site vehicles which are run on diesel fuel.

The National Greenhouse Accounts (NGA) Factors, August 2017 was used to estimate the Scope 1 GHG emissions. The following formula was adopted:

$$E = \frac{Q \times EC \times EF}{1{,}000}$$

Where:
E is the amount of estimated greenhouse gas emissions in tonnes $CO_{2\text{-}e}$ (carbon dioxide equivalent)
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
Note: If Q is measured in GJ, EC = 1

Diesel Fuel
Calculation of GHG emissions from use of diesel is estimated based on the following assumptions:

- The energy content (EC) for diesel used for transport energy purposes is 38.6 GJ/kL (NGA, 2017); and
- Assumed diesel consumption (Q) of approximately 530 000 L per year (530 kL per annum).

The annual Scope 1 GHG emissions from the proposed development are summarized in the following table.

Table 8-19: Estimated Scope 1 (Direct) Greenhouse Gas Emissions

Activity	Annual Consumption	Emission Factor (kg CO_2-e/GJ)			Annual GHG Emissions (tonne CO_2-e)
		CO_2	CH_4	N_2O	
Diesel Use	530 kL	69.9	0.1	0.5	1400*
Total Annual Scope 1 GHG Emissions					**1400***

Note: *Results are in 2 significant figures

8.8.3.2 Estimation of Scope 2 Greenhouse Gas Emissions

Scope 2 GHG emissions are associated with the consumption of purchased electricity due to the use of fuels (e.g. coal) upstream at power generation plants. Electricity is used on site for the operation of office areas.

The 2017 NGA Factors were used to estimate the greenhouse gas emissions. The following formula was adopted:

$$E = \frac{Q \times EF}{1{,}000}$$

Where:
E is the amount of estimated greenhouse gas in tonnes CO_2-e
Q is the quantity of purchased electricity in kWh
EF is the greenhouse gas emission factor specific to fuel type in kg CO_2-e/kWh for the state of New South Wales.

GHG calculations are based on the assumption that annual electricity consumption (Q) will be approximately 11 000 kWh, as estimated based on the office having an average daily usage of 29.1 kWh.

The annual Scope 2 GHG emissions from the proposed development are summarised in the following table.

Table 8-20: Estimated Scope 2 (Indirect) Greenhouse Gas Emissions

Activity	Annual Consumption (kWh)	Emission Factor (kg CO_2-e/kWh)	Annual GHG Emissions (tonne CO_2-e)
Electricity consumption	11,000	0.83	9.1*
Total Annual Scope 2 GHG Emissions			**9.1***

Note: *Results are in 2 significant figures

8.8.3.3 Estimation of Scope 3 Greenhouse Gas Emissions

Scope 3 emissions encompass a wide range of potential sources. For this facility, only a few sources have been studied in this report due to availability of information. These are emissions from the extraction/processing of diesel fuel and the extraction/processing of fuels burned at electricity generation plants, as well as indirect emissions due to transmission and distribution (T&D) losses.

Diesel Scope 3 emissions
The extraction, processing and transport of diesel fuel to site also have associated GHG emissions. A scope 3 emissions factor of 3.6 kg CO2-e/GJ is provided in the NGA Factors (2017). Using the same methodology as used for Scope 1, we find that diesel scope 3 emissions total 37 tCO2-e. Refer to Table 8-21 below.

Electricity Scope 3 emissions
Further GHG emissions are produced upstream of the site, due to the extraction, processing and transport of fuels to electricity power plants, as well as indirect emissions associated with compensating for transmission and distribution losses in the electricity network. A scope 3 emissions factor of 0.12 kg CO2-e/kWh, for NSW, is provided in the NGA Factors (2017). Using the same methodology as used for Scope 2, we find that electricity Scope 3 emissions total 1.3 tonnes CO2-e. Refer to Table 8-21 below.

The annual Scope 3 GHG emissions that could be calculated for the proposed development are summarised in the following table.

Table 8-21: Total Estimated Scope 3 (Other Indirect) Greenhouse Gas Emissions

Activity	Annual Consumption	Emission Factor	Annual GHG Emissions (Tonne CO_2-e)
Diesel combustion	530 kL	3.6 CO2-e/GJ	74*
Electricity consumption	11 000 kWh	0.12 CO_2-e/kWh	1.3*
		Total Annual Scope 3 GHG Emissions	**75***

Note: *Results are in 2 significant figures

8.8.3.4 Summary

A summary of the above-calculated Scope 1, 2 and 3 GHG emissions, resulting from the proposed development, are shown in the following table.

Table 8-22: Estimated Total Annual GHG Emissions

Emission Type	Annual GHG Emissions (Tonne CO_2-e)	%
Scope 1	1400	94
Scope 2	9.1	0.6
Scope 3	75	5
Total (Scope 1 + 2 + 3)	**1,500***	100

Note: *Results are in 2 significant figures

The total amount of greenhouse gas emissions from the development is approximately 1500 tonnes CO_2-e per annum. The largest source of GHG emissions is direct emissions from the combustion of diesel fuel used during the operation of site equipment and the use of trucks for material transportation (Scope 1) at 94%.

The estimation of scope 1 and 2 emissions has been conducted based on primary activities only which include the use of fossil fuels in equipment and mobile vehicles, and use of purchased electricity.

Up to the June quarter of 2017, Australia's annual emissions for 2016-17 are estimated to be 550.2 MtCO_2-e (DEE, 2017). In comparison, the estimated annual greenhouse emission for the Project is 0.0015 Mt CO2-e. Therefore, the annual contribution of greenhouse emissions from the project in comparison to the annual Australian greenhouse emissions to June 2017 is approximately 0.00027%.

8.8.4 Measures to Reduce Greenhouse Emissions

Opportunities to reduce greenhouse gas emissions are considered as an ongoing 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 material stored.

Measures that are available to reduce greenhouse gas emissions include Australian designed standards for diesel engines, regular maintenance of mobile equipment and trucks to maximise fuel efficiency and ensuring electric powered equipment are only operated as needed. Selection of new equipment should be based on electricity and diesel fuel consumption.

9. SOCIAL IMPACTS AND SAFEGUARDS

This section addresses the most significant social impacts that could result from the proposed development, including those to human health, visual amenity, heritage items, and traffic issues.

9.1 HUMAN HEALTH

Potential health impacts from the proposed development have been assessed with reference to the *Health Impact Assessment Guidelines* (enHealth, 2001). Identified issues concerning human health are related to the following operational aspects: generation of inhalable and respirable dust (including silica dust), receipt of asbestos waste within building waste, high internal noise levels and harmful consequences of a potential fire or chemical spill incident occurring on site.

9.1.1 Generation of dust

The generation of particulate matter in the form of inhalable and/or respirable dust (including silica dust) can cause health impacts to workers who are exposed to the airborne contaminants, either at high levels or for prolonged periods of time. Potential health effects include irritation to upper and lower respiratory tract and detrimental impacts to pulmonary function. Control practices that will be in place to minimise the risk of exposure to employees include the use of appropriate PPE (see Section 9.1.5), as well as workplace housekeeping practices. Additionally, occupational hygiene assessments should be carried out on a regular basis to monitor levels of airborne particles and ensure that concentrations are below prescribed exposure standards.

Potential health impacts associated with external release of dust are considered to be low based on the results from the Air Quality Impact Assessment (Appendix 6), which show that levels of particulate matter at nearest sensitive receptors are expected to be below the Approved Methods environmental criteria which is well below the occupational exposure limits.

9.1.2 Asbestos waste

The proposed development would receive demolition and construction waste (general solid waste non-putrescible), however occasional other waste types like Hazardous waste may enter the subject site; in the case of asbestos containing material being found within the C&D waste loads accepted at the proposed facility.

Asbestos can cause asbestosis, lung cancer and mesothelioma. Asbestos is a risk when asbestos fibres become airborne. Therefore it is critical the site's EMP include an *incoming waste procedure*, developed to confirm the type of C&D wastes arriving on site and to deal with any unexpected or non-conforming wastes (e.g. hazardous wastes like asbestos) mixed with accepted waste types. The suspect material would need to be segregated from other material using temporary barricades. Inspection by suitably qualified person and possible laboratory testing undertaken to determine the nature of the material and any remediation required. The incoming waste procedure in the EMP would need to be implemented from the first load accepted at the facility. The staff would need to be trained in this and all other environmental procedures in accordance with Draft Protocol for managing asbestos during resource recovery of construction and demolition waste" (NSW EPA, 2014) detailed in the EMP.

9.1.3 Generation of Noise

High internal noise levels can potentially cause health impacts (e.g. hearing loss) to workers who are exposed to it on a daily basis. Control practices that will be in place to minimise the risk of exposure to employees include the use of appropriate PPE (see Section 9.1.5) and undertaking systematic equipment maintenance. Additionally, occupational noise assessments can be carried out on a regular basis to monitor internal noise levels.

Potential health impacts associated with external environmental noise are considered to be low based on the results from the Noise Impact Assessment (Appendix 8), which show that noise impacts at nearest sensitive receptors are expected to comply with the relevant environmental criteria, which is well below the occupational exposure limits.

9.1.4 Fire and Chemical Spill Risk

One of the main concerns to human health resulting from a potential fire on site is inhalation of smoke and other air pollutants. Fire related issues are addressed in detail in Section 8.7.3, where appropriate control measures have been recommended. With adequate fire services and equipment in place the risk of a fire occurring on site is considered to be low.

Potential adverse impacts to health could also result from unintended human contact with hazardous chemicals, upon their accidental release within the building and/or externally to the site, through their release into the stormwater system. The possibility of such an event occurring is considered to be low and a number of safeguards are in place to reduce the risk of any material spill. In fact, all chemicals will be safely stored within an enclosed building (the workshop shed), in accordance with the relevant Australian Standard. Bunding for storage of dangerous goods and spill clean-up equipment is available on site to contain and clean up potential chemical spills should these occur.

Therefore, the potential health impacts from the accidental release of hazardous chemicals are considered to be minor for on-site workers and further insignificant for the local community.

9.1.5 Employee Health and Safety

All employees would undergo appropriate training as part of site induction and be provided with appropriate Personal Protective Equipment (PPE) for their role, such as ear plugs[1], dust masks[1], high visibility clothing and safety boots. The employer would ensure the operation is conducted as approved and appropriate resources are available for work safety. The proposed development would be required to comply with the following Acts and Regulations relating to health and safety:

- Work Health & Safety Act 2011; and
- Work Health & Safety Regulations 2017.

Employees would need to be trained in the appropriate safety procedures applicable to their role, including training in the use of firefighting equipment.

[1] Occupational health assessment would need to be undertaken to determine the required hearing and respiratory protection.

9.2 VISUAL IMPACTS

A visual impact assessment is included in Appendix 12 which provides conceptual views of the proposed site from Lawson and Martin Roads. The buildings are considered to be consistent with the agricultural buildings in the area and the visual impacts are considered to be minimal.

9.3 HERITAGE

As discussed in Section 6.8 no heritage items were found on the subject site; however, three local heritage items were identified within 1.5 km of the site. Given the distance of these heritage items to the site and the nature of the project – with processing operations contained in an enclosed building and several environmental safeguards in place – no impacts to the listed heritage items are expected to result from the proposed development. No further assessment of heritage issues is considered warranted.

9.4 ROAD, TRAFFIC AND TRANSPORT

A traffic impact assessment was undertaken by Transport and Urban Planning. A summary of the outcomes of this assessment are provided below:

- The traffic generation of the proposal has been identified. Light vehicle movements only will occur on Martin Road. Up to five light vehicle movements in each peak hour, in one direction only, will be generated by staff, which equates to one movement every 12 minutes. Martin Road and Elizabeth Drive have adequate capacity to accommodate this low volume of light vehicles.

- All heavy vehicle traffic will access the site via Lawson Road and Elizabeth Drive. Up to three truck movements per hour in each direction will occur on Lawson Road. SIDRA analysis of the key access intersection of Lawson Road at Elizabeth Drive shows that the intersection currently operates at Level of Service B (acceptable with spare capacity). The modelling shows that with the additional truck volumes added to the intersection, its operation will continue to be Level of Service B, with only minor changes to average delays.

- The traffic impact of the proposed development is therefore assessed as low and acceptable.

- The site access driveways are well designed and are fully in accordance with AS 2890 Parts 1 and 2, for light and heavy vehicles. Sight distances at the driveways exceed the minimum requirements contained in Austroad and RMS guidelines.

- The internal traffic circulation provides generous room for trucks to manoeuvre on site, and all vehicles will be able to enter and leave the site in a forward direction.

- The car park is designed fully in accordance with AS 2890 Parts 1 and 6, and provides parking for 11 cars plus two spaces for the disabled. This amount of parking is assessed as sufficient to meet peak demand and DCP requirements.

- The traffic impact during construction of the development has been identified to be of a lower level than when the development is completed and is operating. Construction traffic impact is therefore also assessed as low and acceptable.

In summary, the proposed development will be a low traffic generator and will have a low traffic impact on surrounding roads. It will have good access from both Lawson Road and Martin Road, and good access to the arterial classified road network at Elizabeth Drive.

All access and internal traffic arrangements are designed fully in accordance with relevant Australian Standards. The development is assessed as acceptable in all aspects of its traffic design.

The full traffic impact assessment is provided as Appendix 4.

10. CUMULATIVE IMPACTS AND SAFEGUARDS

This section provides an assessment of the potential cumulative impacts that may arise as a result of the operations from the proposed development, concurrently or sequentially with other projects in the region.

Cumulative impacts are incremental environmental impacts that are caused by past, present or future activities that, when combined, may have further cumulative effect. In fact, the environmental impacts of any single project upon a receiver or resource may not be significant when considered in isolation; however, the potential impacts may increase when individual effects are considered in combination, either with the same project or together with other projects.

The potential cumulative impacts that could arise from the operations of the proposed development are assessed in the following subsections.

10.1 AIR QUALITY

The air quality impact from the proposed development has been assessed in accordance with the NSW EPA *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales 2016*. This document specifies particular pollutants which are assessed as a cumulative impact (incremental impact from site + background). The pollutants assessed cumulatively relevant to the subject site are PM_{10}, $PM_{2.5}$ and TSP.

Odour is not considered as a potential emission that would be generated from the proposed development and therefore was not assessed.

The subject site is located in a region that can experience 24 hour periods of elevated background PM_{10} and $PM_{2.5}$ levels.

While the existing background particulate concentrations are high the incremental contribution from the proposed operations are predicted to be minimal. No additional exceedances were predicted to occur under a 24 hour averaging period for PM_{10} or $PM_{2.5}$ as a result of the proposal. It is considered that emissions to air from the proposed development are unlikely to cause harm to human health or the environment.

10.2 NOISE AND VIBRATION

Operational noise is a critical environmental issue in any area with surrounding residential receivers. The existing background noise levels were used in determining the project criteria for the noise impact assessment. The cumulative impact of the development was assessed in the road traffic noise study included in the Noise Impact Assessment (Appendix 8). All relevant noise criteria were satisfied at nearest residential receivers, provided that all the current noise controls are maintained throughout the operative life of the facility.

10.3 SURFACE WATERS

Collective contributions from the various rural and industrial facilities in the Badgerys Creek area could result in degraded quality of surrounding surface waters, potentially through the contamination of stormwater run-off due to accidental release of sediments, chemicals or waste. The potential for release of sediments is controlled using drainage channels, on site detention tanks and a stormfilter treatment system. The potential release of chemicals or waste from subject site would be unlikely, and any accidental release could be easily contained on site as a result of the current safeguards in place. Therefore, contribution of the individual site has been appropriately mitigated and cumulative long term impacts are considered to be insignificant.

10.4 WASTE MANAGEMENT

A major incident or recurring incidents involving the storage and management of waste products could have potential cumulative impacts if considered in the context of the surrounding area, which has the potential to deal with large volumes of waste generation. Incidents include accidental spillages that have the potential to enter the surrounding environment causing land and water pollution.

A number of safeguards and management measure would continue to be established at the site in order to prevent accidental release of any waste. With these procedures and safeguards in place, the contribution of the site to cumulative impacts from the incorrect handling and management of waste would be insignificant.

However, waste generated from the site that cannot be processed could also increase pressure on the ability of the waste management market to absorb cumulative waste streams. The proposed development would more likely reduce this pressure by processing and recycling the majority of the waste. Furthermore the area already handles significant volumes of waste in the, from various sources including domestic, rural, commercial and industrial premises. Nevertheless, waste facilities likely to receive the site's waste materials are considered to have sufficient capacity to handle the type and volume of waste to be generated by the proposal, in combination with those generated by the broader region.

10.5 HAZARDS AND RISK

Hazards and risk associated with the proposed development are related to the potential for fires, spillage of chemicals and release of particulates into the surrounding environment via the site's drainage/stormwater system.

There are safeguards established at the site to reduce the risk of fires as well as the risk of release of chemicals and particulates, such as the storage of chemicals according to relevant standards including bunding, provision of spill kits and appropriate staff training in emergency response.

Cumulative impacts are not expected due to the current safeguards and procedures in place. Additionally, sufficient fire services are provided to address any potential fire incidents.

10.6 TRAFFIC AND TRANSPORT

The traffic impact assessment for the proposed development, undertaken by Transport and Urban Planning, considered cumulative impacts on the existing road network by using existing traffic count data of the surrounding road networks. Key intersections were assessed for the additional traffic generated by the proposal during AM and PM peak hour traffic.

Results of this assessment are presented in Appendix 4. The report concludes that the key access intersection will experience no more than a minor traffic impact from the additional vehicle movements associated with the proposed development, and the level of service at the intersection during peak periods would remain unchanged. The proposal would have an acceptable traffic impact and there is no requirement for provision of any new traffic capacity roadworks.

10.7 GREENHOUSE GAS EMISSIONS

The contributions of the proposed development to global greenhouse gas emissions would not be material. The proposal would only account for approximately 0.00027% of Australia's total anthropogenic emissions.

11. ECOLOGICALLY SUSTAINABLE DEVELOPMENT

Ecologically sustainable development (ESD) means using, conserving and improving natural resources so that the ecological processes on which life depends can continue in the future. There are four main principles of ESD, which should be taken into account for any development:

- The precautionary principle;
- Inter-generational equity;
- Conservation of biodiversity and ecological integrity; and
- Improved valuation, pricing and incentive mechanisms such as the "polluter pays" principle.

Other ESD guiding principles are:

- Public participation in decision making;
- Access to information and to justice; and
- Application of environmental impact assessment.

The meaning of each principle and how each principle was considered and / or incorporated in the proposed development are addressed in Table 11-1.

To fulfil ESD principles in a commercial/industrial development, one requires an effective and environmentally-sound approach to the design, operation and management of the development, as well as good planning and decision making. As demonstrated in the following table, various objectives and mechanisms had been included in the development in order to achieve ESD.

Table 11-1: ESD Principles – Meaning and relevance to the Proposed Development

Principle's Meaning	Relevance to Proposed Development
The precautionary principle	
Where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.	The proposal will implement various mitigation measures and pollution safeguards (discussed in Section 12) that would prevent any serious and irreversible damage to the environment
Inter-generational equity	
The current generation should make sure that the health, diversity and productivity of the environment maintained or enhanced for the benefit of future generations.	The proposal will implement various mitigation measures and pollution safeguards (discussed in Section 12) that would avoid interference with the health, diversity and productivity of the environment.
Conservation of biodiversity and ecological integrity	
This means conserving the diversity of flora and fauna and the health and sustainability of ecosystems.	The proposal will implement various mitigation measures and pollution safeguards (discussed in Section 12) that would minimise impacts on the diversity of flora and fauna and the health and sustainability of ecosystems.

Table 11-1: ESD Principles – Meaning and relevance to the Proposed Development

Principle's Meaning	Relevance to Proposed Development
Improved valuation, pricing and incentive mechanisms such as the "polluter pays" principle	
This means integrating long-term and short-term economic, environmental, social and fairness considerations into decision-making. For example, by making sure that the price of products reflects the true costs of both production and disposal at the end of a product's life. The "polluter pays" principle means that the costs of pollution and waste should be paid by those who cause the pollution or create waste.	The proposed development is a resource recovery facility which prices in the cost of processing waste.
Public participation in decision making	
This means that members of the public should be able to participate at different stages of environmental decision-making processes.	A copy of this EIS will be published for public review and comment for a minimum statutory period (depending on the Local Government Area). After the public exhibition, all substantive comments are considered and further analysis is undertaken, if required. The final EIS is then published again with responses to substantive comments.
Access to information and to justice	
This means providing people access to information and to the courts (i.e. a legal right to bring a claim.).	People will be able to access most information during the community consultation process and public exhibition period. Additionally, the Australian public can access other information by making a request for information under the Freedom of Information Act 1982.
Application of environmental impact assessment	
This means taking the assessment of environmental impacts into account when making decisions.	Environmental impacts have been taken into account when making decisions. This is discussed throughout the EIS.

The above principles have been incorporated into the overall design of the project and into the management of operations on site.

The main environmental safeguards to be implemented in order to minimise environmental harm, in line with ESD principles, are as follows:

- Implementation of dust controls;
- Implementation of noise controls;
- Implementation of ecological controls;
- Stormwater pollution control, including drainage channels, on site detention tanks and dam/sediment pond;
- Fire protection services;

- Storage and handling of hazardous chemicals in accordance with relevant Australian Standards, including hardstand/bunded area integrity management and adequate maintenance of dangerous goods storage;
- Waste management and stringent procedures to manage the incoming and outgoing waste; and
- Environmental Management Plan (EMP).

The proposed development would not have any foreseeable negative impacts on socio-economic aspects. Instead, a positive contribution from the increased operations on site would be the creation of jobs, with additional employment opportunities being provided. Increased operations are also to focus heavily on supplying the local markets. As a result, the proposal could have positive economic "spin-off" effects in the local region, by enhancing social productivity while not undermining ecological systems. This aspect would be in accordance with the inter-generational equity principle of ESD.

In order to monitor the sustainable performance of a development, various sustainability indicators can be used.

Examples of these indicators are outlined in the table below and have been addressed in relation to the subject site and its considerations for ESD and sustainable practices. The site's EMP will be used (and be continually updated) in order to maintain the principles of ESD and monitor the sustainability indicators mentioned in the table.

Table 11-2: Sustainability Indicators

Indicator category	Comments and Description
Community	• Increase in employment opportunities; • Strengthening of local economy; • Level of knowledge based investment increased; • No net loss of heritage or other features, buildings, places of high community importance; and • No loss of community integrity.
Ecosystems	• Minimise reduction in richness or abundance of flora and fauna species in aquatic or terrestrial environments; • Minimise reduction in the existing landscaping of the site; • No net increase of pests or disease threats to the health of the ecosystem; and • Reduction of 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.
Water	• Reduction of freshwater use per unit of production; • No net increase in levels of acidification or toxic substances, heavy metals, nutrient and sediment levels; and • No net reduction in quality of water bodies as aquatic habitats.
Air	• No net reduction in air quality.
Energy	• Programs to reduce the use of fossil fuels for transportation and energy consumption

12. MITIGATION MEASURES AND MANAGEMENT

This section provides a summary of the mitigation measures required to ensure that the surrounding natural and built environment is safeguarded from potential impacts of the proposed development. An overview of the site management plans to be used on site is also provided, together with a description of incident management procedures.

12.1 SUMMARY OF CONTROLS AND MITIGATION MEASURES

Table 12-1 presents a summary of the potential impacts of the site activities discussed in Sections 8, and identifies the environmental safeguards and control measures that are recommended throughout the EIS to provide a sufficient level of protection, to both the built and natural environment surrounding the development.

Table 12-1: Summary of Potential Impacts, Environmental Safeguards and Control Measures

Potential Impacts	Safeguards and Control Measures
Air	
Generation of odour, nitrogen oxides and particulate emissions exceeding compliance levels, and resulting in impacts to air quality and complaints from the community. Residual impacts after management and mitigation measures: minor impacts from air emissions.	• Operations undertaken in the processing shed. • Stockpiles to be located within material storage bays, with retaining walls and awning. • Use of water sprays (not required for compliance). • Use of modern diesel powered machinery.
Noise	
Generation of noise by use of equipment on site and vehicle movements exceeding compliance levels and resulting in impacts to acoustic amenity and complaints from the community. Residual impacts after management and mitigation measures: noise levels found to comply at all residential receptors.	**Construction Noise** Construction activities to take place during standard **construction** hours only. **Operational Noise** A 2.1 m colorbond fence is recommended to be constructed surrounding the perimeter of the site. The front end loader is recommended to have a sound power level of 97 dB(A) or lower. Pedestrian doors are to self-closing, so the doors automatically close once a pedestrian is no longer using the door. The following equipment is restricted to indoors only: Crusher, Generator, Screen, and Excavator.

Table 12-1: Summary of Potential Impacts, Environmental Safeguards and Control Measures

Potential Impacts	Safeguards and Control Measures
	When either the crusher or excavator is operating indoors, one roller shutter door is recommended to be open for only 3 minutes out of a 15 minute scenario. To enable this to practically occur, for example, for the arrival of a truck, it is recommended that automated roller shutter doors be installed to assist in the opening and closing of doors as fast as possible. The roller shutter doors should be selected based on their acoustic performance with regards to minimising breakout noise and minimising noise generated from opening and closing operations. Should the roller doors need to be opened for extended periods to enable the transfer of materials to the stockpile area, the crusher and excavator are to be stopped and only the front end loader is recommended to be used. It is recommended mobile equipment regularly used onsite such as the excavator and front end loader be fitted with reversing lights or a white noise reversing alarm. It is also recommended the following additional management practices be implemented: • Prohibition of extended periods of on-site revving/idling; • Minimisation of the use of truck exhaust brakes on site; • Enforcement of low on-site speed limits; • On-site vehicles to be maintained in accordance with a preventative maintenance program to ensure optimum performance and early detection of wearing or noisy components; • Ensure condition of roadway surface is maintained (by responsible party) to ensure deterioration of internal access road surface does not lead to increased noise sources; and • Vehicles awaiting loading, unloading or servicing shall be parked on site with their engines turned off.

Table 12-1: Summary of Potential Impacts, Environmental Safeguards and Control Measures

Potential Impacts	Safeguards and Control Measures
Water	
Contamination of stormwater run-off and consequent impacts on nearby surface waters. Residual impacts after management and mitigation measures: insignificant impacts from potential discharges to water.	• Processing and material storage undercover; • Periodic water quality testing of OSD tank outlet, dam and groundwater; • Designated and bunded storage areas for dangerous goods and hazardous chemicals in accordance relevant Australian Standards; • Spill kits in chemical storage and high risk areas; • Maintenance of all stormwater infrastructure including drainage swales, stormwater pits, OSD tank, rainwater tanks; • Staff trained in spill response and emergency procedures, including firefighting techniques; • Regular workplace inspection and high standard of housekeeping; • Segregated and designated waste bays and bins.
Waste Management	
Potential environmental and off-site impacts associated with excessive generation of waste and potential release of waste to surrounding environment. Residual impacts after management and mitigation measures:	• Segregated and designated storage bins for appropriate storage of waste; • Licenced waste contractors for collection; • Waste minimisation and resource recovery practices implemented; • Stormwater pollution control; • Incoming waste procedure; • Additional measures recommended include: ▸ Waste audits; ▸ Continual improvement of waste minimisation and resource recovery practices.
Hazards and Risk	
Incident involving the potential for a spill or fire. Residual impacts after management and mitigation measures: potential for fire to cause serious material damage and impact on human life is low.	• Chemical storage in accordance with relevant standard; • Control of ignition sources, including “no smoking” policy; • Adequate provision for escape; • Adequate fire services; • Spill controls including, DG storage bunding, spill kits and spill kit training; • Building security; • Forklift driver training; and • Emergency plan and emergency response training.

Table 12-1: Summary of Potential Impacts, Environmental Safeguards and Control Measures

Potential Impacts	Safeguards and Control Measures
Greenhouse Gas Emissions	
Excessive greenhouse gas emissions negatively contributing to global warming. Residual impacts after management and mitigation measures: Low contribution to regional and national greenhouse gas emissions.	• Addressed in Site EMP: Measures include Australian designed standards for diesel engines, regular maintenance of equipment and trucks and selection of new equipment should be based on electricity and natural gas consumption
Human Health	
Impacts stemming from other aspects including air quality, noise and hazards and risk: airborne tissue fibres, high internal noise levels and harmful consequences of a potential fire or chemical spill incident. Residual impacts after management and mitigation measures: minor to insignificant impacts to human health of workers and local community.	• Implementation of EMP (inc. incoming waste procedure); • Use of Personal Protective Equipment; • Undertake occupational health assessments post after commencement of operations; • Regular workplace inspection and high standard of housekeeping; • Regular equipment maintenance; • Safeguards and control measures implemented for Air Quality; • Safeguards and control measures implemented for Hazards and Risks; and • Safeguards and control measures recommended for Noise.
Traffic and transport	
Low to moderate traffic impact	No requirement for road upgrades

12.2 Site Management Plans

Various site management plans would need to be prepared or updated by AMJ Demolition and Excavations prior to the operation commencing, to ensure that proposed operations will be undertaken in an environmentally safe manner and with consideration to work health and safety. The most important site management plans include the following:

- Emergency Plan (EP);
- Pollution Incident Response Management Plan (PIRMP); and
- Environmental Management Plan (EMP).

An outline of these reports is provided in the following sub-sections.

12.2.1 Emergency and Pollution Incident Response Management Plan

Holders of an EPL under the POEO Act are required to prepare and implement Pollution Incident Response Management Plans for each licensed activity. An Emergency Plan is also required.

A Pollution Incident Response Management Plan could be incorporated into the site's Emergency Plan for ease of use, resulting in an "Emergency and Pollution Incident Response Management Plan". The plan would be prepared in accordance with the following guidelines and standards:

- NSW Rural Fire Service Guidelines for the Preparation of Emergency/Evacuation Plans;
- AS 3745–2010 *Planning for Emergencies in Facilities*;
- NSW EPA Environmental Guidelines: Preparation of Pollution Incident Response Management Plans;
- AS 1940–2017 *The storage and handling of flammable and combustible liquids;*
- AS/NZS 1596:2014 *The storage and handling of LP Gas;* and
- AS 4332–2004 *The storage and handling of gases in cylinders.*

The aims of the plan are: to 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; to prevent or minimise the impact of an emergency and pollution incident on human life, the community and surrounding environment; and to facilitate a return to *normal* or *safe* operations as soon as possible.

The procedures contained in the plan should 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/or equipment installed at the site. The procedures would be updated as continually improving guidelines to support site management and handling of unanticipated situations.

An Incident Reporting and Investigation procedure should be included in the plan to address the following aspects and actions:

- If required, report incident within 24 hours of the occurrence of the incident;
- Undertake an incident investigation especially if multiple incidents occur or if the incident results in serious injury/death or property damage; and
- Monitor and review incidents to determine follow-up actions, prevent the recurrence of the incident and ensure that follow-up actions are implemented.

12.2.2 Environmental Management Plan

AMJ Demolition and Excavations will require an Environmental Management Plan (EMP). The EMP should address 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 including but not limited to:
  - Incoming waste procedure;
  - Dust management plan;
  - Noise management plan;
  - Stormwater management procedure;

The EMP would adopt the framework suggested by the ISO 14001 Standard. This would maximise consistency and simplicity in the administration and implementation of the EMP procedures. Specific procedures would be developed to manage the identified environmental aspects and impacts of site activities.

13. STATEMENT OF COMMITMENTS

AMJ Demolition and Excavations commits to the following course of action during the installation and operation of the proposed development at 55 Martin Road, Badgerys Creek:

1. AMJ Demolition and Excavations will abide by all legal requirements, licence conditions and approvals pertaining to the site.

2. AMJ Demolition and Excavations will ensure the external areas are kept tidy and free of items and debris to facilitate movement of vehicles on site and minimise potential pollution.

3. AMJ Demolition and Excavations will implement and maintain the following safeguards and mitigation measures at the site, as detailed in this EIS.

    - AMJ Demolition and Excavations must implement all the specified noise controls detailed in the Noise Impact Assessment.
    - Air quality control equipment (water sprays and enclosures) must be used and maintained.
    - Water monitoring must be undertaken to ensure groundwater or surface water contamination is minimised and below the relevant criteria.
    - Ecological controls detailed in the Flora and Fauna assessment much be implemented and maintained.
    - Bunding must be implemented for the storage of dangerous Goods/hazardous chemicals and combustible liquids in accordance with the relevant Australian Standards.
    - Spill kits must be provided in any chemical storage area and high risk area, and must be maintained;
    - Stormwater drainage swales, on site detention tanks, and all stormwater infrastructure and pollution control devices are to be regularly inspected and/or cleaned and maintained in good working condition;
    - Staff must be trained in spill response and emergency procedures, including firefighting techniques;
    - Regular sweeping and good housekeeping must be undertaken for all operational and storage areas at the site;
    - All waste must be segregated and stored in designated bays and bins;
    - Fire services and equipment must be provided, and the existing ones should be maintained, in accordance with BCA and relevant Australian Standards;
    - All equipment should be regularly inspected and maintained; and
    - All staff must wear PPE relevant to their role.

4. AMJ Demolition and Excavations will implement an Environmental Management Plan and ensure it incorporates the commitments, safeguards, mitigation measures and recommendations documented in this EIS.

5. AMJ Demolition and Excavations will implement an Emergency Plan and Pollution Incident Response Management Plan.

14. JUSTIFICATION AND CONCLUDING REMARKS

14.1 PROJECT JUSTIFICATION

The local demand for processing construction and demolition waste, is expected to increase in following years, which will lead to moderate industry growth on the domestic market. The construction of the airport and the demand for residential developments means this region generates significant quantities of construction and demolition waste. AMJ Demolition and Excavations expects an increase in demolition and construction waste within its own business and from external sources. Therefore, the project has been driven, and is justified, by the need to match market demands. In order to reduce transport costs for both the receipt of (C&D) waste and the supply of final product it is ideal to situate a resource recovery facility in this area.

The justifications for selecting the subject site and for implementing the proposed expansion are listed as follows:

- The subject site has ample room available to cater for the proposed operations;
- The cost of establishing the business on this site is low;
- The site is not in a sensitive land use area;
- The development is a permitted use with consent;
- The development is a beneficial use which would fulfil the principles of ecologically sustainable development and is to be encouraged;
- The development generates local employment;
- Transport routes are readily available; and
- The site has sufficient room for on-site parking and truck manoeuvring.
- The proposed development will recycle construction and demolition waste, therefore reducing the amount of waste for disposal.
- The proposed development will have extensive environmental safeguards to provide assurance in regards to the expected degree of environmental impacts.

14.2 CONCLUDING REMARKS

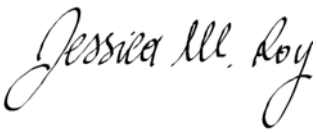
The environmental assessment process has enabled the potential impacts of the proposed expansion of an existing tissue manufacturing facility be evaluated, and control strategies to be devised in order to ensure compliance with regulatory standards.

The use of a site that is already developed with buildings and infrastructure in place is a major advantage. Being readily able to prevent the rise of amenity impacts on the residential community is also a benefit of this site.

The nature of the recycling process is considered to be suited to this site and the request is made that approval be granted.

Prepared by:

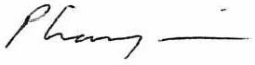
Lauren O'Brien
Environmental Intern



Jessica M Roy
Environmental Scientist

Emma Hansma
Environmental Engineer

Patrick Finnerty
Graduate Environmental Scientist



Peter Gangemi
Senior Acoustic Consultant

Linda Zanotto
Senior Environmental Engineer

R T Benbow
Principal Consultant

15. REFERENCES

New South Wales Government, 2004. *Blue Book - Managing Urban Stormwater: Soils and Construction.* [Online]
Available at: http://www.environment.nsw.gov.au/resources/water/BlueBookVol1.pdf

NSW Government, 2000. *Environmental Planning and Assessment Regulation.* [Online]
Available at: http://www.legislation.nsw.gov.au/#/view/regulation/2000/557

Australian and New Zealand Environment and Conservation Council (ANZECC), 2000. *Australian and New Zealand Guidelines for Fresh and Marine Water Quality.* [Online]
Available at: https://www.environment.gov.au/water/quality/publications/australian-and-new-zealand-guidelines-fresh-marine-water-quality-volume-1

Australian Bureau of Statistics, 2016. *2016 Census QuickStats.* [Online]
Available at:
http://www.censusdata.abs.gov.au/census_services/getproduct/census/2016/quickstat/SSC10132?opendocument
[Accessed 22 February 2018].

Australian Federal Governmet, 2011. *Work Health and Safety Act 2011.* [Online]
Available at: https://www.legislation.gov.au/Details/C2016C00887

Australian Government: Bureau of Meteorology, 2018. *Monthly Climate Statistics Badgerys Creek AWS.* [Online]
Available at: http://www.bom.gov.au/climate/averages/tables/cw_067108.shtml

Australian Government, 1999. *Environment Protection and Biodiversity Conservation Act.* [Online]
Available at: https://www.comlaw.gov.au/Details/C2015C00422

Australian Government, 2007. *National Greenhouse and Energy Reporting Act.* [Online]
Available at: https://www.legislation.gov.au/Details/C2007A00175

Australian Government, 2015. *National Measurement Act.* [Online]
Available at: https://www.legislation.gov.au/Details/C2016C00085

Australian Soil Resource Information System ASRIS, 2013. *Atlas of Australian Acid Sulfate Soils.* [Online]
Available at: http://www.asris.csiro.au/themes/AcidSulfateSoils.html

Department of Primary Industries Office of Water, n.d. *Groundwater Map.* [Online]
Available at: http://allwaterdata.water.nsw.gov.au/water.stm

Department of the Environment and Energy, 2016. *National Greenhouse Accounts Factors.* [Online]
Available at: http://www.environment.gov.au/climate-change/greenhouse-gas-measurement/publications/national-greenhouse-accounts-factors-aug-2016

Department of the Environment and Energy, 2016. *National Greenhouse and Energy Reporting Scheme Measurement Technical Guidelines for the estimation of emissions by facilities in Australia.* [Online]
Available at: http://www.environment.gov.au/system/files/resources/95cf8d59-dcf8-40c7-8bfc-5ceacc221700/files/nger-technical-guidelines-2016-17.pdf

Department of the Environment, 2015. *Quarterly Update of Australia's National Greenhouse Gas Inventory: December 2015.* [Online]
Available at: https://www.environment.gov.au/system/files/resources/7c0b18b4-f230-444a-8ccd-162c8545daa6/files/nggi-quarterly-update-dec-2015.pdf

enHEALTH, 2001. *Health Impact Assessment Guidelines.* [Online]
Available at:
http://www.pc.gov.au/inquiries/completed/freight/submissions/department_of_health_and_ageing_/sub057attachmenta.pdf

Greenhouse Gas Protocol, n.d. *A Corporate Accounting and Reporting Standard-REVISED EDITION.* [Online]
Available at: http://www.ghgprotocol.org/files/ghgp/public/ghg-protocol-revised.pdf

Hawkesbury-Nepean Catchment Management Authority, 2008. *Hawkesbury-Nepean Catchment Action Plan 2007-2016.* [Online]
Available at: https://archive.lls.nsw.gov.au/__data/assets/pdf_file/0004/496813/archive-hawkesbury-nepean-catchment-action-plan-2007-2016-complete.pdf

International Organization for Standardization, 2015. *ISO 14001:2015 Environmental management systems -- Requirements with guidance for use.* [Online]
Available at: https://www.iso.org/obp/ui/#iso:std:iso:14001:ed-3:v1:en

Liverpool City Council, 2008. *Liverpool Development Control Plan.* [Online]
Available at: http://www.liverpool.nsw.gov.au/planninganddevelopment/liverpools-planning-control/liverpool-dcp

Liverpool City Council, 2008. *Liverpool Local Environmental Plan.* [Online]
Available at: http://www.legislation.nsw.gov.au/maintop/view/inforce/epi+403+2008+cd+0+N

New South Wales Consolidated Acts, 2003. *NATIVE VEGETATION ACT.* [Online]
Available at: http://www5.austlii.edu.au/au/legis/nsw/consol_act/nva2003194/

NSW Consolidated Acts, 1977. *Heritage Act.* [Online]
Available at: http://www.austlii.edu.au/au/legis/nsw/consol_act/ha197786/

NSW Consolidated Acts, 1979. *Environmental Planning and Assessment Act.* [Online]
Available at: http://www.austlii.edu.au/au/legis/nsw/consol_act/epaaa1979389/

NSW Consolidated Acts, 1995. *Threatened Species Conservation Act.* [Online]
Available at: http://www.austlii.edu.au/au/legis/nsw/consol_act/tsca1995323/

NSW Consolidated Acts, 1997. *Protection Of the Environment Operations Act.* [Online]
Available at: http://www.austlii.edu.au/au/legis/nsw/consol_act/poteoa1997455/

NSW Consolidated Acts, 2000. *Water Management Act.* [Online]
Available at: http://www.austlii.edu.au/au/legis/nsw/consol_act/wma2000166/

NSW Department of Environment & Heritage, 2018. *NSW BioNet.* [Online]
Available at: http://www.bionet.nsw.gov.au/

NSW Department of Environmnet, Climate Change & Water, 2011. *Road Noise Policy.* [Online]
Available at: http://www.epa.nsw.gov.au/resources/noise/2011236nswroadnoisepolicy.pdf

NSW Environment Protection Authority, 2012. *Better Practice Guidelines for Waste Mangement and Recycling in Commercial and Industrial Facilities,* Sydney: NSW EPA.

NSW Environment Protection Authority, 2014. *Waste Classification Guidelines.* [Online]
Available at: http://www.environment.nsw.gov.au/resources/wasteregulation/140796-classify-waste.pdf

NSW Environment Protection Authority, 2015. *Waste Levy Guidelines,* Sydney: NSW EPA.

NSW Environment Protection Authority, 2016. *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales.* [Online]
Available at: http://www.epa.nsw.gov.au/resources/epa/approved-methods-for-modelling-and-assessment-of-air-pollutants-in-NSW-160666.pdf

NSW Environment Protection Authority, 2017. *Noise Policy for Industry.* [Online]
Available at: https://www.epa.nsw.gov.au/publications/noise/17p0524-noise-policy-for-industry

NSW EPA, 2012. *Environmental guidelines:Preparation of pollution incident response management plans.* [Online]
Available at: http://www.epa.nsw.gov.au/resources/legislation/201200227egpreppirmp.pdf

NSW EPA, 2014. *NSW Waste Avoidance and Resource Recovery Strategy 2014–21.* [Online]
Available at: http://www.epa.nsw.gov.au/resources/wastestrategy/140876-WARR-strategy-14-21.pdf

NSW Governmemt Department of Environment and Climate Change, 2009. *Interim Construction Noise Guideline.* [Online]
Available at: http://www.environment.nsw.gov.au/resources/noise/09265cng.pdf

NSW Government , 2011. *Water Management (General) Regulation.* [Online]
Available at: https://legislation.nsw.gov.au/#/view/regulation/2011/469/full

NSW Government Department of Environment, Climate Change & Water, 2010. *Soil Landscapes of Penrith 1:100,000 Sheet 9030.* [Online]
Available at: http://data.environment.nsw.gov.au/dataset/soil-landscapes-of-the-penrith-1-100000-sheet0cca7

NSW Government Department of Planning & Environment Resources & Energy, 1991. *Penrith 1:100 000 Geological Map 9030.* [Online]
Available at: http://www.resourcesandenergy.nsw.gov.au/miners-and-explorers/geoscience-information/products-and-data/maps/geological-maps/1-100-000/penrith-1100-000-geological-map

NSW Government Department of Planning & Environment, 2017. *Biodiversity Values Map.* [Online]
Available at: https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BVMap

NSW Government Office of Water, 2011. *Water Sharing Plan Greater Metropolitan Region Groundwater Sources.* [Online]
Available at:
http://www.water.nsw.gov.au/__data/assets/pdf_file/0005/548105/wsp_metro_groundwater_background.pdf

NSW Government Office of Water, 2011. *Water Sharing Plan Greater Metropolitan Region Unregulated River Water Sources.* [Online]
Available at:
http://www.water.nsw.gov.au/__data/assets/pdf_file/0003/548058/wsp_metro_surface_water_background.pdf

NSW Government: Office of Environment & Heritage, 2017. *Background Air Quality Data Search.* [Online]
Available at: http://www.environment.nsw.gov.au/AQMS/search.htm
[Accessed 2018].

NSW Government, 1992. *State Environmental Planning Policy No 33—Hazardous and Offensive Development.* [Online]
Available at: http://www.legislation.nsw.gov.au/#/view/EPI/1992/129

NSW Government, 2001. *Waste Avoidance and Resource Recovery Act.* [Online]
Available at: http://www.legislation.nsw.gov.au/acts/2001-58.pdf

NSW Government, 2007. *State Environmental Planning Policy (Infrastructure).* [Online]
Available at: http://www.legislation.nsw.gov.au/sessionalview/sessional/epi/2007-641.pdf

NSW Government, 2011. *Hazardous Industry Planning Advisory Paper No 6 Hazard Analysis.* [Online]
Available at: http://www.planning.nsw.gov.au/Policy-and-Legislation/~/media/3ACC37BE3EFE4BAAB3EBA5872AFBA8BD.ashx

NSW Government, 2011. *State Environmental Planning Policy (State and Regional Development).* [Online]
Available at: http://www.legislation.nsw.gov.au/maintop/view/inforce/epi+511+2011+cd+0+N

NSW Government, 2014. *State Environmental Planning Policy No 55 – Remediation of Land.* [Online]
Available at: http://www.legislation.nsw.gov.au/maintop/view/inforce/epi+520+1998+cd+0+N

NSW Government, 2015. *Water Act 1912 No 44.* [Online]
Available at: http://www.legislation.nsw.gov.au/#/view/act/1912/44

NSW Government, 2016. *Biodiversity Conservation Act.* [Online]
Available at: https://www.legislation.nsw.gov.au/#/view/act/2016/63

NSW Government, 2016. *Protection of the Environment Operations (Waste) Regulation 2014.* [Online]
Available at: http://www.legislation.nsw.gov.au/#/view/regulation/2014/666

NSW Government, 2016. *State Environmental Planning Policy (State Significant Precincts) 2005.* [Online]
Available at: http://www.legislation.nsw.gov.au/#/view/EPI/2005/194

NSW Government, 2016. *Sydney Regional Environmental Plan No 20—Hawkesbury-Nepean River (No 2—1997).* [Online]
Available at: http://www.legislation.nsw.gov.au/#/view/EPI/1997/592

NSW Government, 2017. *Work Health and Safety Regulation 2017.* [Online]
Available at: https://legislation.nsw.gov.au/#/view/subordleg/2017/404

Standards Australia, 2004. *AS 1940-2017 The storage and handling of flammable and combustible liquids.* [Online].

Standards Australia, 2004. *AS 4332-2004 (R2016) The storage and handling of gases in cylinders.* [Online]
Available at: https://infostore.saiglobal.com/store/details.aspx?ProductID=313443

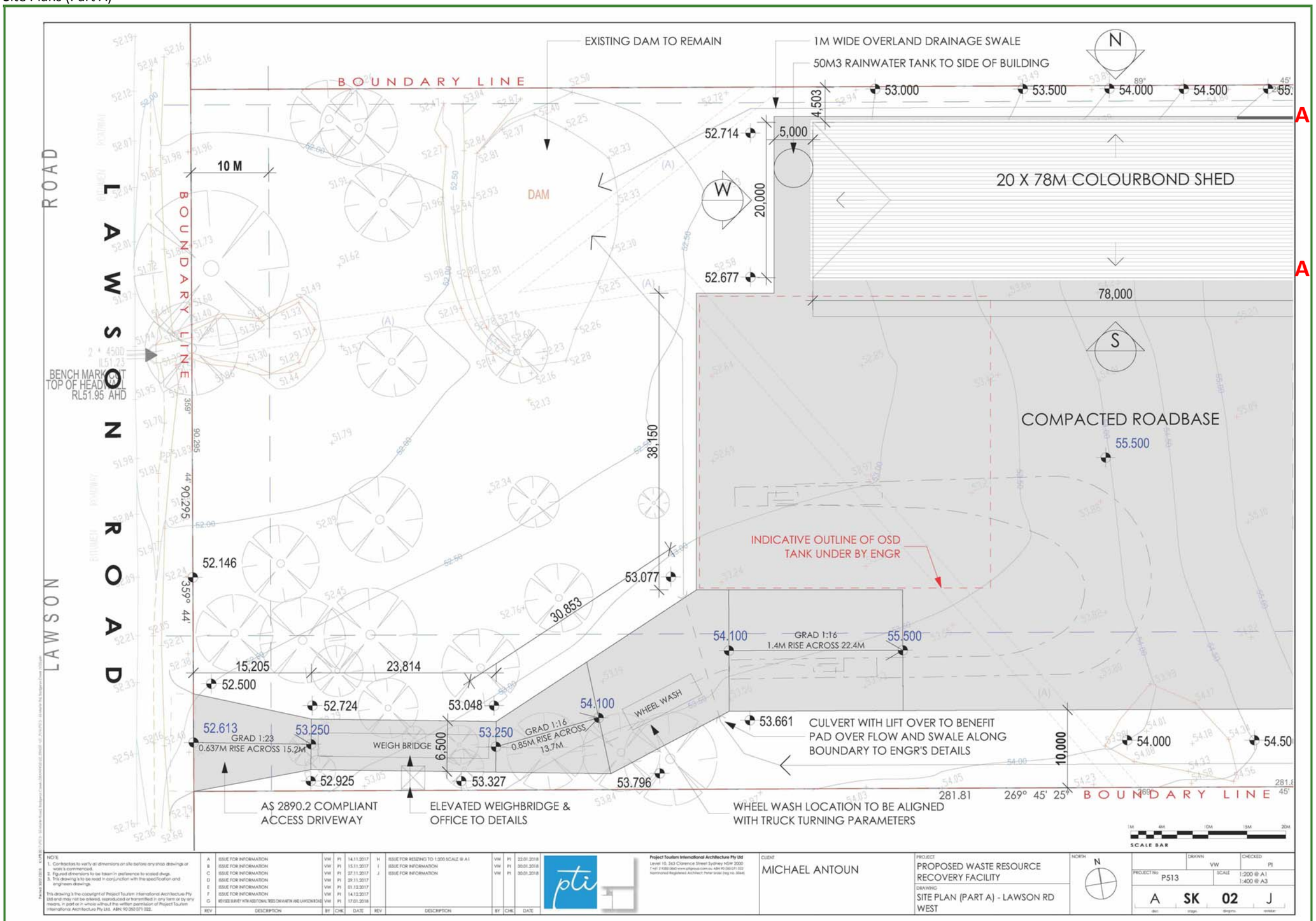
STANDARDS Australia, 2006. *AS ISO 14064.1-2006 Greenhouse gases - Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals,* s.l.: s.n.

Standards Australia, 2010. *AS 3745-2010 Planning for emergencies in facilities.* [Online]
Available at: https://infostore.saiglobal.com/store/details.aspx?ProductID=1439257

Standards Australia, 2014. *AS/NZS 1596:2014 The storage and handling of LP Gas.* [Online]
Available at: https://infostore.saiglobal.com/store/details.aspx?ProductID=1728387

APPENDICES

Site Plans (Part A)



NOTE
1. Contractors to verify all dimensions on site before any shop drawings or work is commenced.
2. Figured dimensions to be taken in preference to scaled dwgs.
3. This drawing is to be read in conjunction with the specification and engineers drawings.

This drawing is the copyright of Project Tourism International Architecture Pty Ltd and may not be altered, reproduced or transmitted in any form or by any means, in part or in whole without the written permission of Project Tourism International Architecture Pty Ltd. ABN: 90 093 071 022.

REV	DESCRIPTION	BY	CHK	DATE
A	ISSUE FOR INFORMATION	VW	PI	14.11.2017
B	ISSUE FOR INFORMATION	VW	PI	15.11.2017
C	ISSUE FOR INFORMATION	VW	PI	27.11.2017
D	ISSUE FOR INFORMATION	VW	PI	29.11.2017
E	ISSUE FOR INFORMATION	VW	PI	01.12.2017
F	ISSUE FOR INFORMATION	VW	PI	14.12.2017
G	REVISED SURVEY WITH ADDITIONAL TREES ON NORTH AND LAWSON ROAD	VW	PI	17.01.2018
H	ISSUE FOR RESIZING TO 1:200 SCALE @ A1	VW	PI	22.01.2018
I	ISSUE FOR INFORMATION	VW	PI	30.01.2018
J	ISSUE FOR INFORMATION	VW	PI	30.01.2018

Project Tourism International Architecture Pty Ltd
Level 10, 263 Clarence Street Sydney NSW 2000
T +61 2 9283 0860 www.ptigroup.com.au ABN 90 093 071 022
Nominated Registered Architect: Peter Israel (reg. no. 5564)

CLIENT: MICHAEL ANTOUN

PROJECT: PROPOSED WASTE RESOURCE RECOVERY FACILITY

DRAWING: SITE PLAN (PART A) - LAWSON RD WEST

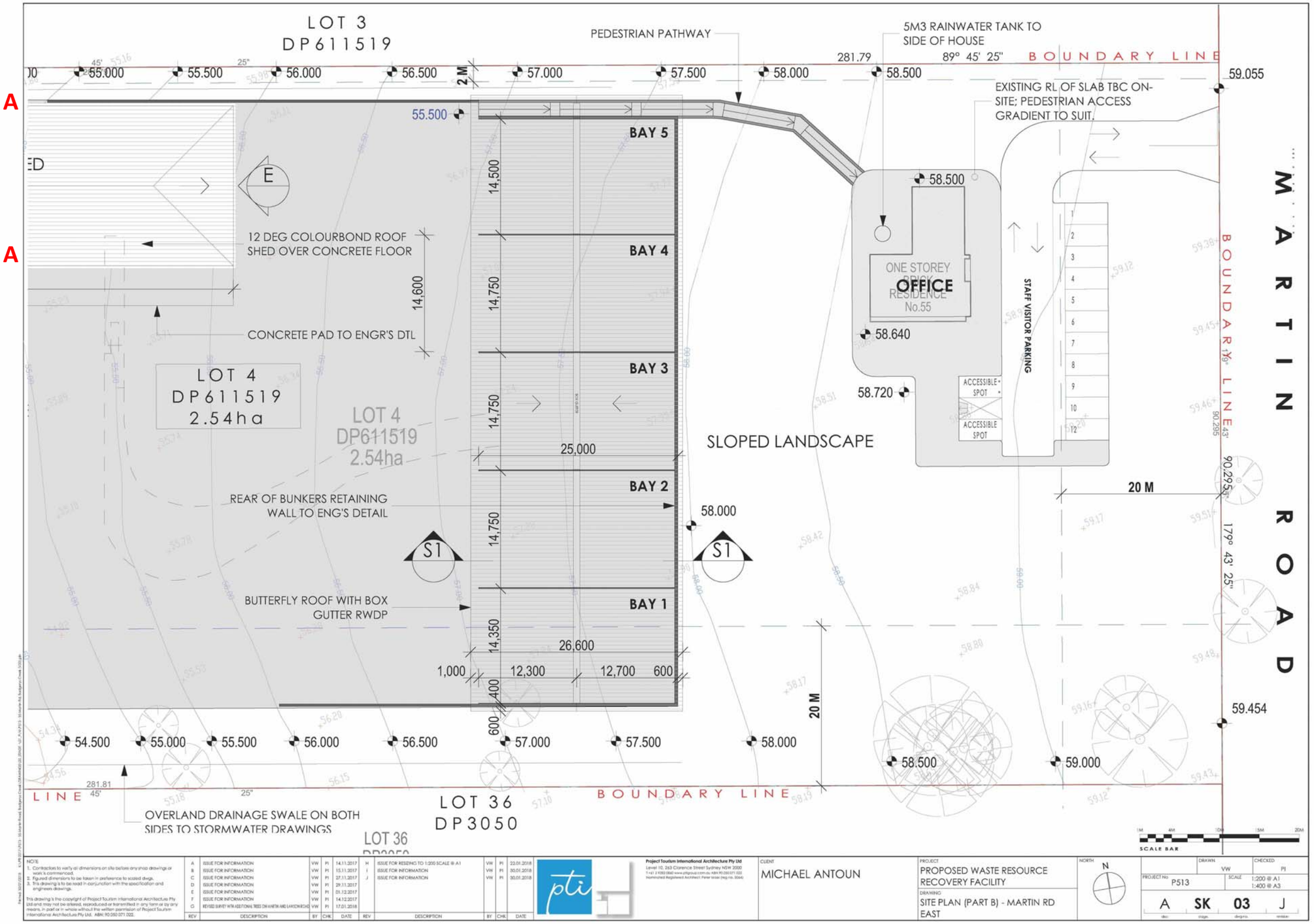
NORTH: N

DRAWN: VW | CHECKED: PI

PROJECT No: P513 | SCALE: 1:200 @ A1, 1:400 @ A3

A SK 02 J
doc. | stage | drawing | revision

Site Plans (Part B)



NOTE
1. Contractors to verify all dimensions on site before any shop drawings or work is commenced.
2. Figured dimensions to be taken in preference to scaled dwgs.
3. This drawing is to be read in conjunction with the specification and engineers drawings.

REV	DESCRIPTION	BY	CHK	DATE
A	ISSUE FOR INFORMATION	VW	PI	14.11.2017
B	ISSUE FOR INFORMATION	VW	PI	15.11.2017
C	ISSUE FOR INFORMATION	VW	PI	27.11.2017
D	ISSUE FOR INFORMATION	VW	PI	29.11.2017
E	ISSUE FOR INFORMATION	VW	PI	01.12.2017
F	ISSUE FOR INFORMATION	VW	PI	14.12.2017
G	REVISED SURVEY WITH ADDITIONAL TREES ON MARTIN AND LAWSON ROAD	VW	PI	17.01.2018
H	ISSUE FOR RESIZING TO 1:200 SCALE @ A1	VW	PI	22.01.2018
I	ISSUE FOR INFORMATION	VW	PI	30.01.2018
J	ISSUE FOR INFORMATION	VW	PI	30.01.2018

Project Tourism International Architecture Pty Ltd
Level 10, 263 Clarence Street Sydney NSW 2000
T +61 2 9262 0840 www.ptiprojects.com.au ABN 90 050 071 022
Nominated Registered Architect: Peter Israel (reg no. 5044)

CLIENT: MICHAEL ANTOUN

PROJECT: PROPOSED WASTE RESOURCE RECOVERY FACILITY

DRAWING: SITE PLAN (PART B) - MARTIN RD EAST

NORTH: N

DRAWN: VW | CHECKED: PI

PROJECT No: P513 | SCALE: 1:200 @ A1, 1:400 @ A3

A SK 03 J
dsc: stage: dwg no: revision

EIS Appendix 2: Geotechnical Investigation, Preliminary Acid Sulfate Soils Assessment, Salinity Assessment & Wastewater Assessment

STS GeoEnvironmental Pty Ltd
Geotechnical and Environmental Solutions

GEOTECHNICAL INVESTIGATION, PRELIMINARY ACID SULFATE SOILS ASSESSMENT, SALINITY ASSESSMENT & WASTEWATER ASSESSMENT

FOR

AMJ DEMOLITION & EXCAVATION PTY LIMITED

55 Martin Road, Badgerys Creek, New South Wales

Report No: 17/3905

Project No: 21649/8653C

January 2018

14/1 Cowpasture Place, Wetherill Park, NSW 2164, Australia
(PO Box 6989, Wetherill Park, NSW 2164, Australia)
T +61 2 9756 2166 | **F** +61 2 9756 1137
www.stsgeo.com.au | enquiries@stsgeo.com.au
ABN 61 162 976 543 | **ACN** 162 976 543

Table of Contents

DRAWING NO. 17/3905 – BOREHOLE AND PENETROMETER LOCATIONS

NOTES RELATING TO GEOTECHNICAL REPORTS

APPENDIX A – BOREHOLE LOGS AND EXPLANATION SHEETS

APPENDIX B – LABORATORY TEST RESULTS

APPENDIX C – BUREAU OF METEOROLOGY DATA

APPENDIX D – WATER BALANCE CALCULATIONS

1. INTRODUCTION

This report presents the results of a combined Geotechnical Investigation, Preliminary Acid Sulfate Soils Assessment, Salinity Assessment and Wastewater Assessment carried out by STS GeoEnvironmental Pty Limited (STS) for a proposed new commercial development to be constructed at 55 Martin Road, Badgerys Creek. We have been informed the works comprise the construction of a waste resource recovery centre which will include the following:

- Construction of a large (22m x 70m) shed with a concrete floor,
- Construction of an office building and staff/visitor car park,
- Construction of an unsealed stockpile and vehicle movement area,
- Construction of a wheel wash and weighbridge,
- Installation of an on-site wastewater disposal system, and
- Construction of sedimentation basins

We understand that the pavement design is required to satisfy heavy goods vehicle movements. The purpose of the salinity assessment was to determine if the site is affected by levels of soil salinity that would require specific management intervention in line with Councils DA requirements. The purpose of the Preliminary Acid Sulfate Soils Assessment was to determine if the site is affected by actual or potential Acid Sulfate Soils that would require specific management intervention in line with Councils DA requirements.

The purpose of the investigation was to:

- assess the subsurface conditions over the site,
- provide a site classification to AS2870,
- provide recommendations regarding the appropriate foundation system for the site including design parameters,
- provide retaining wall design parameters,
- comment on safe batter slopes,
- comment on soil aggressiveness to buried steel and concrete,
- provide a pavement design for rigid, flexible and un-sealed pavements,
- comment on site preparation and re-grading,
- undertake a salinity assessment,
- undertake a wastewater assessment, determining the area required for using both surface and subsurface irrigation systems,
- undertake a Preliminary Acid Sulfate Soils Assessment.

In regards to the salinity assessment, the procedures given in the publication below, have been adopted for this study:

Reference 1: DLWC (2002) publication, "Site Investigation for Urban Salinity."

The wastewater assessment has been undertaken in accordance with the following publications:

Reference 2: AS/NZS 1547:2012, "On-site domestic wastewater management" Standards Australia.

Reference 3: Department of Local Government (1998), "On-site Sewerage Management for Single Households," Environment and Health Protection Guidelines.

The investigation was undertaken at the request of Claron Consulting Pty Limited on behalf of AMJ Demolition & Excavation Pty Limited.

Our scope of included a Preliminary Site Investigation (PSI) contamination assessment. The results of the PSI have been reported separately.

2. NATURE OF THE INVESTIGATION

2.1. Fieldwork

The fieldwork consisted of drilling nineteen (19) boreholes numbered BH1 to BH19, inclusive, and undertaking ten (10) Dynamic Cone Penetrometer (DCP) tests at the locations shown on Drawing No. 17/3905. The boreholes were drilled using a combination of Christie and Edson RP70 utility mounted drilling rigs owned and operated by STS. Soils and weathered rock were drilled using rotary solid flight augers. In order to monitor groundwater levels and obtain water samples, PVC standpipe piezometers was installed in BH2, BH8 and BH15.

Drilling operations were undertaken by STS's technical officers and senior geologists who also logged the subsurface conditions encountered and collected samples for testing purposes.

The subsurface conditions observed are recorded on the borehole logs given in Appendix A. An explanation of the terms used on the logs is also given in Appendix A. Notes relating to geotechnical reports are also attached.

All soil samples were collected directly from the augers using hand tools and were transferred directly into new clean jars or bottles prepared by Australian Laboratory Services (ALS). Water samples were collected using a disposable polyurethane bailer. All jars and bottles were filled to the rim to minimize head space. The samples were then placed into ice-filled chests and transferred to ALS for testing purposes. Chain of Custody documentation was used to record and track the samples.

All sampling equipment was decontaminated prior to use and between sampling locations by washing with a mixture of water and DECON 90 and rinsing with potable water.

2.2. Laboratory Testing

In order to assess the soils for their aggressiveness, levels of salinity and to conduct the wastewater assessment, representative soil samples were tested to determine the following:

- Electrical Conductivity (EC),
- pH,
- Sulfate Content (SO4),
- Chloride Content (Cl),
- Exchangeable Sodium Precent (ESP),
- Cation exchange capacity (CEC),
- Phosphorous Sorption Index,
- Emerson Class Number, and
- Particle Size Distribution.

In order to determine the pavement thickness, the California Bearing Ratio (CBR) of the pavement subgrade material was determined. The tests were carried out on samples compacted to a density ratio of 100% of the Standard maximum dry density.

Shrink swell testing was also undertaken to assist with determining the site classification.

The detailed test reports are given in Appendix B.

3. GEOLOGY AND SITE CONDITIONS

The Penrith geological series sheet at a scale of 1:100,000 shows Triassic Age Bringelly Shale of the Wianamatta Group underlies the site. Rocks within this formation comprise shale, claystone and laminite. Sandstone lenses are known to exist.

The site is rectangular in shape with an area of approximately 2.54ha. At the time of the fieldwork, the site comprised a rural residential parcel of land consisting of grassed paddocks with sparse trees and shrubs.

The north-east portion of the site comprises an enclosed area of about 2,900m^2 with 42m frontage to Martin Road. This part of the site is occupied by a single storey brick residence with gravel driveway, a metal shed and few mature trees. The remainder of the site is undeveloped.

A small dam with a footprint of about 40m^2 is located in the north-west corner of the site.

The ground surface falls to the west with a total fall of approximately 8 metres from RL 59.5m to RL 51.5m.

The land to the north is vacant and undeveloped, whilst the land to the south is rural residential. To the east and west are Martin Road and Lawson Road respectively.

4. SUBSURFACE CONDITIONS

When assessing the subsurface conditions across a site from a limited number of boreholes there is the possibility that variations may occur between test locations. The data derived from the site investigation programme are extrapolated across the site to form a geological model and an engineering opinion is rendered about overall subsurface conditions and their likely behaviour regarding the proposed development. The actual conditions at the site may differ from those inferred, since no subsurface exploration programme, no matter how comprehensive, can reveal all subsurface details and anomalies.

The subsurface conditions generally consist of topsoil overlying silty clays, sandy clays and weathered sandstone and shale. Topsoil materials were encountered across the site in all boreholes to depths of 0.3 to 0.5 metres. Natural silty clays and sandy clays were encountered below the topsoil to depths of 1.3 to 3.6 metres. The consistency of the clays varies from firm to stiff to very stiff. Weathered shale and sandstone underlies the site to the depth of auger refusal, 3.2 to greater than 6.0 metres.

Groundwater seepage was not observed during auger drilling of the boreholes. Six days later the water levels in the piezometers were recorded at 2.05m below the existing ground surface level in BH2 and 2.6 metres in BH8. BH15 remained dry.

5. GEOTECHNICAL RECOMMENDATIONS

5.1. Site Classification to AS2870

Table 5.1 below presents the results of the shrink swell testing undertaken:

Table 5.1 – Shrink Swell Index Summary Table

Location	Depth	Material Description	Shrink Swell Index (ISS)
BH6	0.7 – 1.0	SILTY CLAY: Light brown with light grey (Natural)	1.9
BH7	0.6 – 0.9	SILTY CLAY: Light brown with light grey (Natural)	1.8
BH15	0.5 – 0.9	SILTY CLAY: Orange brown with light grey (Natural)	1.7

The classification has been prepared in accordance with the guidelines set out in the "Residential Slabs and Footings" Code, AS2870 – 2011.

Because there are trees present, abnormal moisture conditions (AMC) prevail at the site (Refer to Section 1.3.3 of AS2870).

Because of the AMC, the site is classified *a problem site (P).* Provided that the recommendations given below are adopted and the footings are founded in natural underlying any topsoil, the site may be reclassified *moderately reactive (M).*

5.2. Foundation Design

Footings that bear in firm to stiff natural soils underlying any topsoil may be proportioned using an allowable bearing pressure of 100 kPa. This value may be increased to 150 kPa in stiff soils and 300 kPa in very stiff soils. The minimum depth of founding must comply with the requirements of AS2870. In order to overcome the presence of trees, the foundations are to be designed in accordance with Appendices H and CH of AS2870.

Should a higher bearing pressure be required, then the loads should be transferred using piles to underlying stronger materials. Piles founded in the very stiff natural soils may be proportioned using an allowable bearing pressure of 450 kPa, provided that the pier depth to diameter ratio exceeds a value of 4. An allowable adhesion of 20 kPa applies to the portion of the shaft within the natural soils below a depth of 0.5 metres.

Piles founded in weathered shale/sandstone may be proportioned using an allowable bearing pressure of 700 kPa. An allowable adhesion of 70 kPa may be adopted for the portion of the shaft within the weathered shale/sandstone. These values may be increased to 1000 kPa and 100 kPa, respectively, when founding below the depth of auger refusal as shown on the borehole logs. When piles are founded in rock the adhesion in the overlying soils must be ignored.

In order to ensure the bearing values given can be achieved, care should be taken to ensure that the base of excavations are free of all loose material prior to concreting. It is recommended that all footing excavations be protected with a layer of blinding concrete as soon as possible, preferably immediately after excavating, cleaning, inspection and approval. The possible presence of groundwater needs to be considered when drilling piers and pouring concrete.

5.3. Pavement Design and Construction

5.3.1 Concrete Pavement for Heavy Vehicle Movements

The laboratory testing carried out indicated the existing subgrade has a CBR value of 1.5%. The design traffic volume is difficult to determine for this type of development. In the absence of design traffic loadings, we have adopted a design traffic loading of 1 x 10^6 Commercial Vehicle Axle Group (CVAGs). Using the above data, the suggested pavement thickness is as follows:

Table 5.2 – Concrete Pavement Thickness Design

28 Day Concrete Strength (MPa)	Concrete Base Thickness (mm)	Subbase Thickness (mm)
32	190	100
40	160	100

The above thickness assumes that the pavement extends a minimum of 600mm beyond the edge of the trafficked lane/area.

5.3.2 Concrete Pavement for Car Park Area

The laboratory testing carried out indicated the existing subgrade has a CBR value of 1.5%. The design traffic volume is difficult to determine for this type of development. In the absence of design traffic loadings, we have adopted a design traffic loading of 5 x 10^4 Commercial Vehicle Axle Group (CVAGs). This allows for infrequent use of the car park for commercial vehicles, such as weekly garage collection. Using the above data, the suggested pavement thickness is as follows:

Table 5.3 – Concrete Pavement Thickness Design

28 Day Concrete Strength (MPa)	Concrete Base Thickness (mm)	Subbase Thickness (mm)
32	170	100
40	140	100

The above thickness assumes that the pavement extends a minimum of 600mm beyond the edge of the trafficked lane/area.

5.3.3 Flexible Pavement for Heavy Vehicle Movements

The flexible pavement thicknesses have been determined using the procedures given in Australian Roads Research Board (ARRB) "Sealed Local Roads Manual." We have assumed a 95% confidence level that the pavement will perform satisfactorily during its design life. A design traffic loading of 1×10^6 ESAs is considered appropriate for the site. For a subgrade CBR value of 1.5%, the suggested pavement thickness is a recommended minimum of 610 mm, made up as follows:

Table 5.4 – Flexible Pavement Thickness Design

Material Type	Minimum Thickness (mm)
AC	50
Base Course	150
Subbase	410
TOTAL	**610**

Due to the low CBR value recorded, the above thickness assumes that he subgrade will be stabilised with 2% lime to a depth of 150mm.

The Asphaltic Concrete (AC) layer has been included as a wearing course, and has not been considered as providing structural capacity to the pavement. If an unsealed pavement is required, then the AC layer may be omitted.

5.3.4 Flexible Pavement for Car Park Area

The flexible pavement thicknesses have been determined using the procedures given in Australian Roads Research Board (ARRB) "Sealed Local Roads Manual." We have assumed a 95% confidence level that the pavement will perform satisfactorily during its design life. A design traffic loading of 6×10^4 ESAs is considered appropriate for the site. This allows for infrequent use of the car park for commercial vehicles, such as weekly garage collection For a subgrade CBR value of 1.5%, the suggested pavement thickness is a recommended minimum of 530 mm, made up as follows:

Table 5.5 – Flexible Pavement Thickness Design

Material Type	Minimum Thickness (mm)
AC	50
Base Course	100
Subbase	380
TOTAL	**530**