Proposed Changes to Queanbeyan Resource Recovery and Waste Transfer Facility

Gilmore Road, Queanbeyan West

SUEZ Environnement (SITA Australia Pty Ltd)

Environmental Impact Statement – Volume 2

September 2015

wildenvironment
environmental planning and management solutions
PO Box 66,
Annandale NSW 2038

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LIST OF APPENDICES

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Appendix A – DoPI, OEH & EPA Requirements

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NSW GOVERNMENT | Planning & Infrastructure

Industry Social Projects and Key Sites
Contact: Ben Jones
Phone: (02) 9228 6517
Fax: (02) 9228 6466
Email: ben.jones@planning.nsw.gov.au

Our ref: 13/12990

Ms Rebecca Smith
Wild Environment Pty Ltd
PO Box 66
ANNANDALE NSW 2038

Dear Ms Smith

Resource Recovery Facility – Queanbeyan West (DGR 761)
Director-General's Requirements

I refer to your request for the Director-General's Requirements (DGRs) for the preparation on an Environmental Impact Statement (EIS) for the above development proposal. I have attached a copy of these requirements.

In your Form A, you indicated that your proposal would require a license and/or approval under the *Protection of the Environment Operations Act 1997*.

The Department has consulted with the Environment Protection Authority (EPA) and Office of Environment & Heritage (OEH) on your proposal and a copy of their requirements for your EIS is attached.

If other integrated approvals are identified before the Development Application (DA) is lodged, you must undertake your own direct consultation with the relevant agencies, and address their requirements in the EIS.

When you lodge the DA for the proposal, you must provide:

- Three (two hard and one electronic) copies of the EIS to the Department;
- A suitable number of copies of the EIS to each integrated approval authority (you should consult each agency to determine the number of copies required); and
- A cheque for $320 to each integrated approval authority, to offset costs involved in the review of the DA and EIS.

If your proposal contains any actions that could have a significant impact on matters of National Environmental Significance, then it will require an additional approval under the *Commonwealth Environment Protection Biodiversity Conservation Act 1999* (EPBC Act). This approval is in addition to any approvals required under NSW legislation. If you have any questions about the application of the EPBC Act to your proposal, you should contact the Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) in Canberra on 6274 1111 or www.environment.gov.au.

If you have any enquiries about these requirements, please contact Ben Jones on 9228 6517.

Yours sincerely

C. Ritchie 13/9/13

Chris Ritchie
Manager – Industry
Development Assessment Systems and Approvals
as the Director-General's nominee

Director-General's Requirements

Section 78A (8) of the *Environmental Planning and Assessment Act 1979.*

Designated Development

DGR Number	761
Proposal	Resource Recovery Facility in the Queanbeyan City Council local government area
Location	Gilmore Road, Queanbeyan West (Lot 348, 349, 350 DP 8456; Lot 2 DP 1000911 and Part Lot 1 DP 1169293)
Applicant	SITA Australia Pty Ltd
Date of Expiry	September 2015
General Requirements	The Environmental Impact Statement (EIS) must meet the minimum form and content requirements in clauses 6 and 7 of Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*.
Key Issues	• **waste management** – including: – the measures that would be implemented to ensure that the project is consistent with the aims, objectives, and guidance in the *NSW Waste Avoidance and Resource Recovery Strategy 2007* and other relevant NSW government policy; – identification of the quantity and type of waste that would be accepted, handled, stored, processed or disposed of at the facility; and – a description of how this waste would be stored and handled on site, and transported to and from the site. • **air quality** – including odour, dust and greenhouse gas emissions in accordance with relevant EPA guidelines. This assessment must consider any potential impacts on nearby private receptors; • **noise** – including construction, operation and traffic noise in accordance with relevant EPA guidelines. This assessment must consider any potential impacts on nearby private receptors; • **visual amenity** – including any potential impacts on nearby private receptors. • **traffic and transport** – including: – an assessment of potential traffic impacts on the capacity, efficiency and safety of the road network; and – a description of the measures that would be implemented to maintain and/or improve the capacity, efficiency and safety of the road network in the surrounding area. • **soil and water** - including: – consideration of any contaminated soil (including acid sulphate soils) and water on-site, in accordance with relevant guidelines; – identification of any licensing requirements or other approvals under the *Water Act 1912* and/or *Water Management Act 2000*; – an assessment of potential impacts on the quality and quantity of existing surface and groundwater resources, any potential impacts from flooding and any potential impacts on nearby sensitive catchments and/or waters; – a detailed description of the proposed water management system (including sewage), water monitoring program and other measures to mitigate surface and groundwater impacts; and – details of leachate collection and management. • **hazards and risk** – including a preliminary risk screening undertaken in accordance with *State Environmental Planning Policy No. 33 – Hazardous and Offensive Development* (SEPP 33) and *Applying SEPP 33* (DoP, 2011), and if necessary, a Preliminary Hazard Analysis (PHA); • **fire and incident management** – including technical information on the environmental protection equipment to be installed on the premises such as dust and noise controls, spill cleanup equipment and fire management and containment measures; and • **cumulative impacts** – particularly in relation to the environmental impacts of the existing facility and other nearby industries.

Environmental Planning Instruments	The EIS must assess the proposal against the relevant environmental planning instruments, including but not limited to • *State Environmental Planning Policy (Infrastructure) 2007;* • *State Environmental Planning Policy No. 33 – Hazardous and Offensive Development;* • *Sydney Canberra Corridor Regional Strategy;* • *Queanbeyan Local Environmental Plan 2012;* and • relevant development control plans and section 94 plans.
Guidelines	There are no specific guidelines for waste or resource transfer stations. However, Attachment No.1 provides some guidance on the preparation of the EIS.
Consultation	During the preparation of the EIS, you should/must consult the relevant local, State and Commonwealth government authorities, service providers and community groups, and address any issues they may raise in the EIS. In particular, you should consult with the: • Queanbeyan Coty Council; • Environment Protection Authority; • Office of Environment & Heritage; • Roads and Maritime Services; and • surrounding landowners and occupiers that are likely to be impacted by the proposal. Details of the consultations carried out and issues raised must be included in the EIS.

ATTACHMENT NO. 1

ADVICE ON THE PREPARATION OF AN ENVIRONMENTAL IMPACT STATEMENT (EIS) FOR WASTE MANAGEMENT

The purpose of this paper is to outline various issues relevant to the preparation and consideration of an EIS for a waste management facility. It is intended to assist the preparation of the EIS. However, it is the applicant's responsibility to identify and address as fully as possible the matters relevant to the specific development proposal in complying with the requirements for EIS preparation (see Attachment No 1).

The matters nominated in this paper are not intended as a comprehensive identification of all issues, which may arise in respect of a waste management facility. Some of the issues nominated may not be relevant to a specific proposal. On the other hand, there may be other issues, not included, that are appropriate for consideration in the EIS.

Information provided should be clear, succinct and objective and where appropriate be supported by maps, plans, diagrams or other descriptive detail. The purpose of the EIS is to enable members of the public, the consent authority (usually the Council) and the Department of Planning to properly understand the environmental consequences of the proposed development.

The particular matters outlined in the following should be included in the EIS.

1. Background information

Sufficient background information should be provided and include:

- objectives of proposal;
- relationship with any regional waste management strategies;
- location of the operations and indication of existing and proposed adjacent developments;
- broad nature and extent of operations proposed;
- land tenure, boundaries, site details in relation to environmental planning instrument zonings and any other land use constraints.

2. Detailed description of proposal

This description should not only describe the proposal at the site but also describe all associated operations such as handling and transport of materials, disposal of wastes and residues, and safety, pollution and environmental controls incorporated into the proposal.

Particular matters to be covered include:

- construction programme and practices;
- plans of operations, reception, segregation and control of incoming waste;
- nature of waste stream including chemical and physical properties, sources and volumes;
- quantities of waste stored and storage arrangements and safeguards of materials, particularly in regard to the storage and disposal of flammable, toxic or hazardous chemicals;
- nature, volume and disposal methods of waste produced by the management facility including fly ash, sludge and the like;
- resources recovery;
- air, odour, noise and vibration emission levels;
- site drainage and contamination controls particularly in regard to leachates, washdown and stormwater run off and contaminated fire water in the event of an emergency;
- plant capacity and major components, types of machinery and equipment to be used;
- stack height and characteristics including dispersion zone requirements;
- expected life of the plant;
- number of persons to be employed;
- hours of operation;
- access arrangements - truck routes and number of truck movements;
- daily operational plan;
- security, fire fighting and counter disaster provisions;
- proposals for landscaping.

3. Alternatives

The EIS should canvass alternatives to the proposed means/strategy of waste management, the proposed site and the proposed methods to undertake the operation.
In particular the EIS should:

- assess strategies which may enable resource recovery, or recycling as an alternative to this proposal or to reduce the scale of this proposal especially in regard to glass, ferrous metal, aluminium, paper, certain plastics and organic material suitable for composting;
- outline the criteria used in selecting the proposed site and justification of that selection, (particularly in terms of safety and pollution issues), including consideration of feasible alternative locations to the proposal and reasons for their rejection as well as the consequences of not undertaking the activity as proposed;
- review the existing performance of the proposed waste management method having regard to overseas experience and technologies as well as local landfill and waste minimising strategies.

4. Description of the environment

This description shall provide details of the environment in the vicinity of the development site and also of aspects of the environment likely to be affected by any facets of the proposal. In this regard, physical, natural, social, archaeological and economic aspects of the environment should be described to the extent necessary for assessment of the environmental impact of the proposed development. Particular attention should focus on existing air quality, ambient noise levels, climatic conditions, amenity and utility provision.

5. Analysis of impacts

The assessment of environmental impact and measures to be taken to reduce the impact should have particular respect to:

- air emission controls, dispersion analysis which indicates ground level emission concentrations under likely atmospheric and weather conditions;
- water pollution controls, surface and groundwater;
- health implications for nearby residents, pedestrians, workers, school children and the like;
- likely noise and odour disturbance caused by the operations, including transport operations, on nearby residences;
- other impacts of trucking movements;
- potential for soil contamination;
- litter and dust control and any nuisance likely to be caused;
- treatment and disposal of residues and leachates;
- litter controls and site maintenance;
- landscaping measures and effects on the visual environment;
- monitoring (especially for emissions and leachates) and site management requirements.

The EIS should clearly specify whether any medical or quarantine wastes, asbestos bearing material and toxic and hazardous wastes are to be received and outline proposals for safe handling of these substances to avoid risk to public health.

In the event that toxic or hazardous substances are to be disposed of, treated or created, either temporarily or permanently, through the process of incineration or waste handling, the EIS should include a preliminary hazard analysis.

6. Authorities contacted

In preparing the EIS, it is suggested that authorities, such as those listed below, should be consulted and their comments taken into account in the EIS.

- The Department of Environment and Climate Change (formerly Environment Protection Authority) in regard to air, water and noise impacts and relevant pollution control legislation requirements;
- The Heritage Office (now part of the Department of Planning) if the proposal is likely to affect any place or building having heritage significance for the State;
- the Department of Environment and Climate Change (formerly National Parks and Wildlife Service) if Aboriginal places or relics are likely to be affected;
- Department of Primary Industries should be contacted if prime agricultural land or areas of significant fish habitat may be affected by the proposal.

- Department of Water and Energy or The Department of Environment and Climate Change if the proposal may have implications for soil erosion, or will disturb acid sulphate soils, or on water bodies subject to the legislative responsibilities of these agencies.

It is the responsibility of the person preparing the EIS to determine those Departments relevant to the proposed development.

Our reference: DOC13/48936; EF13/5017

NSW EPA

NSW Department of Planning & Infrastructure
GPO Box 39
SYDNEY NSW 2001

Attention: Mr Ben Jones

Notice Number	1516759
File Number	EF13/5017
Date	03-Sep-2013

Dear Mr Jones

RE: Proposed Resource Recovery Facility – Queanbeyan (DGR ID No. 761)

I refer to your request for the Environment Protection Authority's (EPA) requirements for the environmental impact statement (EIS) for the above proposal received by the EPA on 21 August 2013.

The EPA has considered the details of the proposal as provided by Wild Environment and has identified the information it requires to assess the project and if appropriate issue its general terms of approval in **Attachment A**. The proponent should ensure that the EIS is sufficiently comprehensive to enable the EPA to determine the extent of the impact(s) of the proposal. If the necessary information is not adequately provided in the EIS then delays in the development application process may occur as a result of this.

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

1. Baseline conditions that exist at the site of the proposed development;
2. Potential environmental impacts arising from the development and its ongoing activities, including dust, odour, noise and water quality; and
3. Actions that will be taken to avoid or mitigate impacts or compensate for unavoidable impacts identified in paragraph 2 above.

In carrying out the preparation of the EIS the proponent should refer to the relevant legislation and guidelines as listed in **Attachment B** and any relevant industry codes of practice and best practice management guidelines.

Based upon the information provided to the EPA, the proponent may require an environment protection licence (EPL) under the *Protection of the Environment Operation Act 1997* in regard to the following:

- Carry out scheduled development work; and
- Carry out scheduled activities - resource recovery, waste processing and waste storage.

The proponent should be aware that any commitments made in the EIS may be formalised as approval conditions. Consequently pollution control measures should not be proposed if they are impractical, unrealistic or beyond the financial viability of the development. It is important that all conclusions are supported by adequate data.

To assist the EPA in assessing the EIS it is requested that the EIS follow the format of Department of Planning and Infrastructure's EIS guidelines and addresses the EPA's specific EIS requirements as outlined in the following attachments. The EPA also requests that the proponent is provided with the EPA's assessment requirements and guidelines as set out in **Attachments A** and **B**.

If you have any queries regarding this matter please contact Sharon Peters on 6229 7002.

Yours sincerely

Stefan Press

Acting Unit Head (North Unit)

South East - Queanbeyan

(by Delegation)

cc Jason Stewart

SITA Australia Pty Ltd

ATTACHMENT A: EIS REQUIREMENTS

Proposed Resource Recovery and Waste Transfer Facility, Queanbeyan

How to use these requirements

The EPA requirements have been structured in accordance with the DIPNR EIS Guidelines, as follows. It is suggested that the EIS follow the same structure:

A. Executive summary

B. The proposal

C. The location

D. Identification and prioritisation of issues

E. The environmental issues

F. List of approvals and licences

G. Compilation of mitigation measures

H. Justification for the proposal

A Executive summary

The executive summary should include a brief discussion of the extent to which the proposal achieves identified environmental outcomes.

B The proposal

1. Objectives of the proposal

- The objectives of the proposal should be clearly stated and refer to:
  a) the size and type of the operation, the nature of the processes and the products, by-products and wastes produced
  b) a life cycle approach to the production, use or disposal of products
  c) the anticipated level of performance in meeting required environmental standards and cleaner production principles
  d) the staging and timing of the proposal and any plans for future expansion
  e) the proposal's relationship to any other industry or facility.

2. Description of the proposal

General

- Outline the production process including:
  a) the environmental "mass balance" for the process – quantify in-flow and out-flow of materials, any points of discharge to the environment and their respective destinations (sewer, stormwater, atmosphere, recycling, landfill etc)
  b) any life-cycle strategies for the products.
- Outline cleaner production actions, including:
  a) measures to minimise waste (typically through addressing source reduction)
  b) proposals for use or recycling of by-products
  c) proposed disposal methods for solid and liquid waste
  d) air management systems including all potential sources of air emissions, proposals to re-use or treat emissions, emission levels relative to relevant standards in regulations, discharge points
  e) water management system including all potential sources of water pollution, proposals for re-use, treatment etc, emission levels of any wastewater discharged, discharge points, summary of options explored to avoid a discharge, reduce its frequency or reduce its impacts, and rationale for selection of option to discharge.
  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.

Air

- Identify all sources of air emissions from the development.
  Note: emissions can be classed as either:
  - *point (eg emissions from stack or vent) or*
  - *fugitive (from wind erosion, leakages or spillages, associated with loading or unloading, conveyors, storage facilities, plant and yard operation, vehicle movements (dust from road, exhausts, loss from load), land clearing and construction works).*
- Provide details of the project that are essential for predicting and assessing air impacts including:
  a) the quantities and physio-chemical parameters (eg concentration, moisture content, bulk density, particle sizes etc) of materials to be used, transported, produced or stored
  b) an outline of procedures for handling, transport, production and storage
  c) the management of solid, liquid and gaseous waste streams with potential for significant air impacts.

Noise and vibration

- Identify all noise sources from the development (including both construction and operation phases). Detail all potentially noisy activities including ancillary activities such as transport of goods and raw materials.
- Specify the times of operation for all phases of the development and for all noise producing activities.
- For projects with a significant potential traffic noise impact provide details of road alignment (include gradients, road surface, topography, bridges, culverts etc), and land use along the proposed road and measurement locations – diagrams should be to a scale sufficient to delineate individual residential blocks.

Water

- Provide details of the project that are essential for predicting and assessing impacts to waters:
  a) including the quantity and physio-chemical properties of all potential water pollutants and the risks they pose to the environment and human health, including the risks they pose to Water Quality Objectives in the ambient waters (as defined on www.environment.nsw.gov.au/ieo, using technical criteria derived from the Australian and New Zealand Guidelines for Fresh and Marine Water Quality, ANZECC 2000)
  b) the management of discharges with potential for water impacts
  c) drainage works and associated infrastructure; land-forming and excavations; working capacity of structures; and water resource requirements of the proposal.

- Outline site layout, demonstrating efforts to avoid proximity to water resources (especially for activities with significant potential impacts eg effluent ponds) and showing potential areas of modification of contours, drainage etc.
- Outline how total water cycle considerations are to be addressed showing total water balances for the development (with the objective of minimising demands and impacts on water resources). Include water requirements (quantity, quality and source(s)) and proposed storm and wastewater disposal, including type, volumes, proposed treatment and management methods and re-use options.

Waste and chemicals

- Provide details of the quantity and type of both liquid waste and non-liquid waste generated, handled, processed or disposed of at the premises. Waste must be classified according to the *Waste Classification Guidelines (2008)*.
- 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: *Waste Classification Guidelines (EPA 2008)*.

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.

3. Rehabilitation

- Outline considerations of site maintenance, and proposed plans for the final condition of the site (ensuring its suitability for future uses).

4. Consideration of alternatives and justification for the proposal

- Consider the environmental consequences of adopting alternatives, including alternative:
  a) sites and site layouts
  b) access modes and routes
  c) materials handling and production processes
  d) waste and water management
  e) impact mitigation measures
  f) energy sources
- Selection of the preferred option should be justified in terms of:
  a) ability to satisfy the objectives of the proposal
  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
  reliability of proposed environmental impact mitigation measures
  e) efficient use (including maximising re-use) of land, raw materials, energy and other resources.

C The location

1. General

- Provide an overview of the affected environment to place the proposal in its local and regional environmental context including:
  a) meteorological data (eg rainfall, temperature and evaporation, wind speed and direction)
  b) 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. Air

- Describe the topography and surrounding land uses. Provide details of the exact locations of dwellings, schools and hospitals. Where appropriate provide a perspective view of the study area such as the terrain file used in dispersion models.
- Describe surrounding buildings that may effect plume dispersion.
- Provide and analyse site representative data on following meteorological parameters:
  a) temperature and humidity;
  b) rainfall, evaporation and cloud cover;
  c) wind speed and direction;
  d) atmospheric stability class;
  e) mixing height (the height that emissions will be ultimately mixed in the atmosphere);
  f) katabatic air drainage; and
  g) air re-circulation.

3. Noise and vibration

- Identify any noise sensitive locations likely to be affected by activities at the site, such as residential properties, schools, churches, and hospitals. Typically the location of any noise sensitive locations in relation to the site should be included on a map of the locality.
- Identify the land use zoning of the site and the immediate vicinity and the potentially affected areas.

4. Water

- Describe the catchment including proximity of the development to any waterways and provide an assessment of their sensitivity/significance from a public health, ecological and/or economic perspective. The Water Quality and River Flow Objectives on the website: www.environment.nsw.gov.au/ieo should be used to identify the agreed environmental values and human uses for any affected waterways. This will help with the description of the local and regional area.

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.

D Identification and prioritisation of issues / scoping of impact assessment

- Provide an overview of the methodology used to identify and prioritise issues. The methodology should take into account:
  a) relevant NSW government guidelines;
  b) industry guidelines;
  c) EISs for similar projects;
  d) relevant research and reference material;
  e) relevant preliminary studies or reports for the proposal; and
  f) consultation with stakeholders.
- Provide a summary of the outcomes of the process including:
  a) all issues identified including local, regional and global impacts (eg increased/ decreased greenhouse emissions);
  b) key issues which will require a full analysis (including comprehensive baseline assessment);
  c) issues not needing full analysis though they may be addressed in the mitigation strategy;
  d) justification for the level of analysis proposed (the capacity of the proposal to give rise to high concentrations of pollution compared with the ambient environment or environmental outcomes is an important factor in setting the level of assessment).

E The environmental issues

1. General

- The potential impacts identified in the scoping study need to be assessed to determine their significance, particularly in terms of achieving environmental outcomes, and minimising environmental pollution.
- Identify gaps in information and data relevant to significant impacts of the proposal and any actions proposed to fill those information gaps so as to enable development of appropriate management and mitigation measures. This is in accordance with ESD requirements.

Note: The level of detail should match the level of importance of the issue in decision making which is dependent on the environmental risk.

Describe baseline conditions

- Provide a description of existing environmental conditions for any potential impacts.

Assess impacts

- For any potential impacts relevant for the assessment of the proposal provide a detailed analysis of the impacts of the proposal on the environment including the cumulative impact of the proposal on the receiving environment especially where there are sensitive receivers.
- Describe the methodology used and assumptions made in undertaking this analysis (including any modelling or monitoring undertaken) and indicate the level of confidence in the predicted outcomes and the resilience of the environment to cope with the predicted impacts.
- The analysis should also make linkages between different areas of assessment where necessary to enable a full assessment of environmental impacts eg assessment of impacts on air quality will often need to draw on the analysis of traffic, health, social, soil and/or ecological systems impacts; etc.
- The assessment needs to consider impacts at all phases of the project cycle including: exploration (if relevant or significant), construction, routine operation, start-up operations, upset operations and decommissioning if relevant.
- The level of assessment should be commensurate with the risk to the environment.

Describe management and mitigation measures

- Describe any mitigation measures and management options proposed to prevent, control, abate or mitigate identified environmental impacts associated with the proposal and to reduce risks to human health and prevent the degradation of the environment. This should include an assessment of the effectiveness and reliability of the measures and any residual impacts after these measures are implemented.
- Proponents are expected to implement a 'reasonable level of performance' to minimise environmental impacts. The proponent must indicate how the proposal meets reasonable levels of performance. For example, reference technology based criteria if available, or identify good practice for this type of activity or development. A 'reasonable level of performance' involves adopting and implementing

technology and management practices to achieve certain pollutant emissions levels in economically viable operations. Technology-based criteria evolve gradually over time as technologies and practices change.

- Use environmental impacts as key criteria in selecting between alternative sites, designs and technologies, and to avoid options having the highest environmental impacts.
- Outline any proposed approach (such as an Environmental Management Plan) that will demonstrate how commitments made in the EIS will be implemented. Areas that should be described include:

  a) operational procedures to manage environmental impacts;

  b) monitoring procedures;

  c) training programs;

  d) community consultation;

  e) complaint mechanisms including site contacts;

  f) strategies to use monitoring information to improve performance;

  g) strategies to achieve acceptable environmental impacts and to respond in event of exceedences.

4. Air

Describe baseline conditions

- Provide a description of existing air quality and meteorology, using existing information and site representative ambient monitoring data.

Assess impacts

- Identify all pollutants of concern and estimate emissions by quantity (and size for particles), source and discharge point.
- Estimate the resulting ground level concentrations of all pollutants. Where necessary (eg potentially significant impacts and complex terrain effects), use an appropriate dispersion model to estimate ambient pollutant concentrations. Discuss choice of model and parameters with the EPA.
- Describe the effects and significance of pollutant concentration on the environment, human health, amenity and regional ambient air quality standards or goals.
- Describe the contribution that the development will make to regional and global pollution, particularly in sensitive locations.
- 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 and Guidance for the Modelling and Assessment of Air Pollutants in NSW* (EPA, 2001); *Approved Methods for the Sampling and Analysis of Air Pollutants*

in NSW (EPA, 2001); *Assessment and Management of Odour from Stationary Sources in NSW* (EPA, 2001); *Technical Notes: Draft Policy: Assessment and Management of Odour from Stationary Sources in NSW (EPA, 2001); Load Calculation Protocol for use by holders of NSW Environment Protection Licences when calculating Assessable Pollutant Loads* (EPA, 1999).

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.

5. 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 Road Noise Policy*, 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.

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 the *NSW Road Noise Policy*.
- Determine expected noise level and noise character (eg tonality, impulsiveness, vibration, etc) likely to be generated from noise sources during:
  a) site establishment
  b) construction
  c) operational phases
  d) transport including traffic noise generated by the proposal
  e) other services.

  Note: The noise impact assessment report should include noise source data for each source in 1/1 or 1/3 octave band frequencies including methods for references used to determine noise source levels. Noise source levels and characteristics can be sourced from direct measurement of similar activities or from literature (if full references are provided).
- Determine the noise levels likely to be received at the most sensitive locations (these may vary for different activities at each phase of the development). Potential impacts should be determined for any identified significant adverse meteorological conditions. Predicted noise levels under calm conditions may also aid in quantifying the extent of impact where this is not the most adverse condition.
- The noise impact assessment report should include:
  a) a plan showing the assumed location of each noise source for each prediction scenario;
  b) a list of the number and type of noise sources used in each prediction scenario to simulate all potential significant operating conditions on the site;
  c) any assumptions made in the predictions in terms of source heights, directivity effects, shielding from topography, buildings or barriers, etc;
  d) methods used to predict noise impacts including identification of any noise models used. Where modelling approaches other than the use of the ENM or SoundPlan computer models are adopted, the approach should be appropriately justified and validated;
  e) an assessment of appropriate weather conditions for the noise predictions including reference to any weather data used to justify the assumed conditions;

f) the predicted noise impacts from each noise source as well as the combined noise level for each prediction scenario under any identified significant adverse weather conditions as well as calm conditions where appropriate;

g) for developments where a significant level of noise impact is likely to occur, noise contours for the key prediction scenarios should be derived;

h) an assessment of the need to include modification factors as detailed in Section 4 of the *NSW Industrial Noise Policy*.

- Discuss the findings from the predictive modelling and, where relevant noise criteria have not been met, recommend additional mitigation measures.
- The noise impact assessment report should include details of any mitigation proposed including the attenuation that will be achieved and the revised noise impact predictions following mitigation.
- Where relevant noise/vibration criteria cannot be met after application of all feasible and cost effective mitigation measures the residual level of noise impact needs to be quantified by identifying:

  a) locations where the noise level exceeds the criteria and extent of exceedence;

  b) numbers of people (or areas) affected;

  c) times when criteria will be exceeded;

  d) likely impact on activities (speech, sleep, relaxation, listening, etc);

  e) change on ambient conditions;

  f) the result of any community consultation or negotiated agreement.

- For the assessment of existing and future traffic noise, details of data for the road should be included such as assumed traffic volume; percentage heavy vehicles by time of day; and details of the calculation process. These details should be consistent with any traffic study carried out in the EIS.
- 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.

Describe management and mitigation measures

- Determine the most appropriate noise mitigation measures and expected noise reduction including both noise controls and management of impacts for both construction and operational noise. This will include selecting quiet equipment and construction methods, noise barriers or acoustic screens, location of stockpiles, temporary offices, compounds and vehicle routes, scheduling of activities, etc.
- For traffic noise impacts, provide a description of the ameliorative measures considered (if required), reasons for inclusion or exclusion, and procedures for calculation of noise levels including ameliorative measures. Also include, where necessary, a discussion of any potential problems associated with the proposed ameliorative measures, such as overshadowing effects from barriers. Appropriate ameliorative measures may include:

a) use of alternative transportation modes, alternative routes, or other methods of avoiding the new road usage;

b) control of traffic (eg: limiting times of access or speed limitations);

c) resurfacing of the road using a quiet surface;

d) use of (additional) noise barriers or bunds;

e) treatment of the facade to reduce internal noise levels buildings where the night-time criteria is a major concern;

f) more stringent limits for noise emission from vehicles (i.e. using specially designed 'quite' trucks and/or trucks to use air bag suspension;

g) driver education;

h) appropriate truck routes;

i) limit usage of exhaust breaks;

j) use of premium muffles on trucks;

k) reducing speed limits for trucks;

l) ongoing community liaison and monitoring of complaints;

m) phasing in the increased road use.

4. Water

Describe baseline conditions

- Describe existing surface and groundwater quality – an assessment needs to be undertaken for any water resource likely to be affected by the proposal and for all conditions (e.g. a wet weather sampling program is needed if runoff events may cause impacts).

  Note: Methods of sampling and analysis need to conform with an accepted standard (e.g. Approved Methods for the Sampling and Analysis of Water Pollutants in NSW (DECCW 2004) *or be approved and analyses undertaken by accredited laboratories).*

- Provide site drainage details and surface runoff yield.

- State the ambient Water Quality and River Flow Objectives for the receiving waters. These refer to the community's agreed environmental values and human uses endorsed by the Government as goals for the ambient waters. These environmental values are published on the website: www.environment.nsw.gov.au/ieo. The EIS should state the environmental values listed for the catchment and waterway type relevant to your proposal. NB: A consolidated and approved list of environmental values are not available for groundwater resources. Where groundwater may be affected the EIS should identify appropriate groundwater environmental values and justify the choice.

- State the indicators and associated trigger values or criteria for the identified environmental values. This information should be sourced from the ANZECC 2000 *Guidelines for Fresh and Marine Water Quality* (http://www.deh.gov.au/water/quality/nwqms/volume1.html)(Note that, as at 2004, the NSW Water Quality Objectives booklets and website contain technical criteria derived from the 1992 version of the ANZECC Guidelines. The Water Quality Objectives remain as Government Policy, reflecting the community's environmental values and long-term goals, but the technical criteria are replaced by the

more recent ANZECC 2000 Guidelines). NB: While specific guidelines for groundwater are not available, the ANCECC 2000 Guidelines endorse the application of the trigger values and decision trees as a tool to assess risk to environmental values in groundwater.

- State any locally specific objectives, criteria or targets, which have been endorsed by the government e.g. the Healthy Rivers Commission Inquiries (www.hrc.nsw.gov.au) or the NSW Salinity Strategy (DLWC, 2000) (www.dlwc.nsw.gov.au/care/salinity/#Strategy).
- Where site specific studies are proposed to revise the trigger values supporting the ambient Water Quality and River Flow Objectives, and the results are to be used for regulatory purposes (e.g. to assess whether a licensed discharge impacts on water quality objectives), then prior agreement from the EPA on the approach and study design must be obtained.

Describe the state of the receiving waters and relate this to the relevant Water Quality and River Flow Objectives (i.e. are Water Quality and River Flow Objectives being achieved?). Proponents are generally only expected to source available data and information. However, proponents of large or high risk developments may be required to collect some ambient water quality / river flow / groundwater data to enable a suitable level of impact assessment. Issues to include in the description of the receiving waters could include:

a) lake or estuary flushing characteristics;

b) specific human uses (e.g. exact location of drinking water offtake);

c) sensitive ecosystems or species conservation values;

d) a description of the condition of the local catchment e.g. erosion levels, soils, vegetation cover, etc ;

e) an outline of baseline groundwater information, including, but not restricted to, depth to watertable, flow direction and gradient, groundwater quality, reliance on groundwater by surrounding users and by the environment;

f) historic river flow data where available for the catchment.

Assess impacts

- No proposal should breach clause 120 of the *Protection of the Environment Operations Act* 1997 (i.e. pollution of waters is prohibited unless undertaken in accordance with relevant regulations).
- Identify and estimate the quantity of all pollutants that may be introduced into the water cycle by source and discharge point including residual discharges after mitigation measures are implemented.
- Include a rationale, along with relevant calculations, supporting the prediction of the discharges.
- Describe the effects and significance of any pollutant loads on the receiving environment. This should include impacts of residual discharges through modelling, monitoring or both, depending on the scale of the proposal. Determine changes to hydrology (including drainage patterns, surface runoff yield, flow regimes, wetland hydrologic regimes and groundwater).
- Describe water quality impacts resulting from changes to hydrologic flow regimes (such as nutrient enrichment or turbidity resulting from changes in frequency and magnitude of stream flow).
- Identify any potential impacts on quality or quantity of groundwater describing their source.
- Identify potential impacts associated with geomorphological activities with potential to increase surface water and sediment runoff or to reduce surface runoff and sediment transport. Also consider possible impacts such as bed lowering, bank lowering, instream siltation, floodplain erosion and floodplain siltation.

- Identify impacts associated with the disturbance of acid sulfate soils and potential acid sulfate soils.
- Containment of spills and leaks shall be in accordance with the technical guidelines section 'Bunding and Spill Management' of the *Authorised Officers Manual* (EPA, 1995) (http://www.environment.nsw.gov.au/mao/bundingspill.htm) and the most recent versions of the Australian Standards referred to in the Guidelines. Containment should be designed for no-discharge.
- The significance of the impacts listed above should be predicted. When doing this it is important to predict the ambient water quality and river flow outcomes associated with the proposal and to demonstrate whether these are acceptable in terms of achieving protection of the Water Quality and River Flow Objectives. In particular the following questions should be answered:
  a) will the proposal protect Water Quality and River Flow Objectives where they are currently achieved in the ambient waters; and
  b) will the proposal contribute towards the achievement of Water Quality and River Flow Objectives over time, where they are not currently achieved in the ambient waters.
- Consult with the EPA as soon as possible if a mixing zone is proposed (a mixing zone could exist where effluent is discharged into a receiving water body, where the quality of the water being discharged does not immediately meet water quality objectives. The mixing zone could result in dilution, assimilation and decay of the effluent to allow water quality objectives to be met further downstream, at the edge of the mixing zone). The EPA will advise the proponent under what conditions a mixing zone will and will not be acceptable, as well as the information and modelling requirements for assessment.

  Note: The assessment of water quality impacts needs to be undertaken in a total catchment management context to provide a wide perspective on development impacts, in particular cumulative impacts.

- Where a licensed discharge is proposed, provide the rationale as to why it cannot be avoided through application of a reasonable level of performance, using available technology, management practice and industry guidelines.
- Where a licensed discharge is proposed, provide the rationale as to why it represents the best environmental outcome and what measures can be taken to reduce its environmental impact.
- Reference should be made to *Managing Urban Stormwater: Soils and Construction* (Landcom, 2004), *Guidelines for Fresh and Marine Water Quality* ANZECC 2000), *Environmental Guidelines: Use of effluent by Irrigation* (DECCW, 2004).

Describe management and mitigation measures

- Outline stormwater management to control pollutants at the source and contain them within the site. Also describe measures for maintaining and monitoring any stormwater controls.
- Outline erosion and sediment control measures directed at minimising disturbance of land, minimising water flow through the site and filtering, trapping or detaining sediment. Also include measures to maintain and monitor controls as well as rehabilitation strategies.
- Describe waste water treatment measures that are appropriate to the type and volume of waste water and are based on a hierarchy of avoiding generation of waste water; capturing all contaminated water (including stormwater) on the site; reusing/recycling waste water; and treating any unavoidable discharge from the site to meet specified water quality requirements.

- Outline pollution control measures relating to storage of materials, possibility of accidental spills (eg preparation of contingency plans), appropriate disposal methods, and generation of leachate.
- Describe hydrological impact mitigation measures including:
  a) site selection (avoiding sites prone to flooding and waterlogging, actively eroding or affected by deposition);
  b) minimising runoff;
  c) minimising reductions or modifications to flow regimes;
  d) avoiding modifications to groundwater.
- Describe groundwater impact mitigation measures including:
  a) site selection;
  b) retention of native vegetation and revegetation;
  c) artificial recharge;
  d) providing surface storages with impervious linings;
  e) monitoring program.
- Describe geomorphological impact mitigation measures including:
  a) site selection;
  b) erosion and sediment controls;
  c) minimising instream works;
  d) treating existing accelerated erosion and deposition;
  e) monitoring program.
- Any proposed monitoring should be undertaken in accordance with the *Approved Methods for the Sampling and Analysis of Water Pollutants in NSW* (DECCW 2004).

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.

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 *Contaminated Sites – Guidelines for Consultants Reporting on Contaminated Sites* (EPA, 1997); *Contaminated Sites – Guidelines on Significant Risk of Harm and Duty to Report* (EPA, 1999).

Describe management and mitigation measures

- Describe and assess the effectiveness or adequacy of any soil management and mitigation measures during construction and operation of the proposal including:

  a) erosion and sediment control measures;

  b) proposals for site remediation – see *Managing Land Contamination, Planning Guidelines SEPP 55 – Remediation of Land* (Department of Urban Affairs and Planning and Environment Protection Authority, 1998);

  c) proposals for the management of these soils – see *Assessing and Managing Acid Sulfate Soils*, Environment Protection Authority, 1995 (note that this is the only methodology accepted by the EPA).

6. Waste and chemicals

Describe baseline conditions

- Describe any existing waste or chemicals operations related to the proposal.

Assess impacts

- Assess the adequacy of proposed measures to minimise natural resource consumption and minimise impacts from the handling, transporting, storage, processing and reprocessing of waste and/or chemicals.
- Reference should be made to the *Waste Classification Guidelines (EPA 2008)*.

Describe management and mitigation measures

- Outline measures to minimise the consumption of natural resources.
- Outline measures to avoid the generation of waste and promote the re-use and recycling and reprocessing of any waste.
- Outline measures to support any approved regional or industry waste plans.

7. 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 (eg 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 (eg travel demand management strategies).

F. List of approvals and licences

- Identify all approvals and licences required under environment protection legislation including details of all scheduled activities, types of ancillary activities and types of discharges (to air, land, water).

G. Compilation of mitigation measures

- Outline how the proposal and its environmental protection measures would be implemented and managed in an integrated manner so as to demonstrate that the proposal is capable of complying with statutory obligations under EPA licences or approvals (eg outline of an environmental management plan).
- The mitigation strategy should include the environmental management and cleaner production principles which would be followed when planning, designing, establishing and operating the proposal. It should include two sections, one setting out the program for managing the proposal and the other outlining the monitoring program with a feedback loop to the management program.

H. Justification for the Proposal

- Reasons should be included which justify undertaking the proposal in the manner proposed, having regard to the potential environmental impacts.

ATTACHMENT B: GUIDANCE MATERIAL

Title	Web address
Relevant Legislation	
Contaminated Land Management Act 1997	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+140+1997+cd+0+N
Environmental Planning and Assessment Act 1979	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+203+1979+cd+0+N
Protection of the Environment Operations Act 1997	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+156+1997+cd+0+N
Licensing	
Guide to Licensing	http://www.epa.nsw.gov.au/licensing/licenceguide.htm
Air Issues	
Air Quality	
Approved methods for modelling and assessment of air pollutants in NSW (2005)	http://www.epa.nsw.gov.au/resources/air/ammodelling05361.pdf
Approved Methods for the Sampling and Analysis of Air Pollutants in NSW (DEC, 2007)	http://www.epa.nsw.gov.au/resources/air/ammodelling05361.pdf
Technical Framework, Assessment and Management of Odour from Stationery Sources in NSW (DEC, 2006)	http://www.epa.nsw.gov.au/aqms/index.htm
Technical Notes, Assessment and Management of Odour from Stationery Sources in NSW (DEC, 2006)	http://www.epa.nsw.gov.au/air/odour.htm
Protection of the Environment Operations (Clean Air) Regulation 2010	http://www.legislation.nsw.gov.au/maintop/view/inforce/subordleg+428+2010+cd+0+N
Noise and Vibration	
NSW Industrial Noise Policy	http://www.epa.nsw.gov.au/noise/industrial.htm
Industrial Noise Policy Application Notes	http://www.epa.nsw.gov.au/noise/applicnotesindustnoise.htm
Interim Construction Noise Guideline (DECC, 2009)	http://www.epa.nsw.gov.au/resources/noise/09265cng.pdf
Assessing Vibration: A technical Guideline (DECC, 2006)	http://www.epa.nsw.gov.au/noise/VIBRATIONGUIDE.htm
Australian and New Zealand Environment Council – Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration (ANZEC, 1990)	http://www.epa.nsw.gov.au/noise/blasting.htm

NSW Road Noise Policy	http://www.epa.nsw.gov.au/noise/traffic.htm
Waste	
Waste	
Waste Classification Guidelines (EPA, 2008)	http://www.epa.nsw.gov.au/waste/envguidlns/index.htm
Protection of the Environment Operations (Waste) Regulation 2005	http://www.legislation.nsw.gov.au/maintop/view/inforce/subordleg+497+2005+cd+0+N
The NSW Waste Avoidance and Resource Recovery Strategy 2007 (DECC, 2007)	http://www.epa.nsw.gov.au/warr/WARRStrategy2007.htm
Environmental Guidelines: Solid Waste Landfills (EPA 1996)	http://www.environment.nsw.gov.au/resources/waste/envguidlns/solidlandfill.pdf
Soils	
Contaminated Sites Assessment and Remediation	
Managing land contamination: Planning Guidelines – SEPP 55 Remediation of Land	http://www.planning.nsw.gov.au/DevelopmentAssessments/RegisterofDevelopmentAssessmentGuidelines/tabid/207/language/en-US/Default.aspx
Guidelines for Consultants Reporting on Contaminated Sites (EPA, 2000)	http://www.epa.nsw.gov.au/resources/clm/20110650consultantsolines.pdf
Contaminated Sites – Guidelines on Significant Risk of Harm and Duty to Report (EPA, 1999)	http://www.epa.nsw.gov.au/resources/clm/09438gldutycontclma.pdf
Soils – general	
Soil and Landscape Issues in Environmental Impact Assessment (DLWC 2000)	http://www.dnr.nsw.gov.au/care/soil/soil_pubs/pdfs/tech_rep_34_new.pdf
Managing urban stormwater: soils and construction, vol. 1 (Landcom 2004)	Vol 1 - Available for purchase at http://www.landcom.com.au/whats-new/publications-reports/the-blue-book.aspx
Water	
Water Quality Objectives	http://www.environment.nsw.gov.au/ieo/index.htm http://www.environment.gov.au/water/publications/quality/pubs/nwqms-guidelines-4-vol1.pdf
ANZECC (2000) Guidelines for Fresh and Marine Water Quality	http://www.mincos.gov.au/publications/australian_and_new_zealand_guidelines_for_fresh_and_marine_water_quality http://www.environment.gov.au/water/publications/quality/nwqms-guidelines-4-vol1.html http://www.environment.gov.au/water/publications/quality/pubs/nwq

	ms-guidelines-4-vol1.pdf
Approved Methods for the Sampling and Analysis of Water Pollutant in NSW (2004)	http://www.environment.nsw.gov.au/resources/legislation/approvedmethods-water.pdf
National Water Quality Management Strategy: Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC & ARMCANZ, 2000)	http://www.mincos.gov.au/publications/australian_and_new_zealand_guidelines_for_fresh_and_marine_water_quality
National Water Quality Management Strategy: Australian Guidelines for Water Quality Monitoring and Reporting (ANZECC & ARMCANZ, 2000)	http://www.mincos.gov.au/publications/australian_guidelines_for_water_quality_monitoring_and_reporting

NSW GOVERNMENT | Office of Environment & Heritage

Your reference : DGR ID 761
Our reference : DOC13/45218
Contact : Jack8ie Taylor (02) 6229 7089

Ben Jones
Student Planner
Industry, Social Projects and Key Sites
NSW Department of Planning & Infrastructure
GPO Box 39
Sydney NSW 2001

Dear Mr Jones,

RE: Request for DGRs for Resource Recovery Facility - Queanbeyan West - Queanbeyan LGA
DGR ID No. 761

Thankyou for your email on 21 August 2013 requesting Director-General Requirements (DGRs) from the Office of Environment and Heritage (OEH) as part of the preparation of an Environmental Impact Statement for the aforementioned development application.

The *Environmental Planning and Assessment Act 1979* requires that proponents of a development/ activity and the determining authority adequately assess the impact of a development or activity on both biodiversity and Aboriginal cultural heritage values.

OEH notes that the development is considered integrated because a concurrent approval for an Environmental Protection Licence will be required. OEH advises that matters relating to the *Protection of the Environment Operations Act 1997* are administered by the Environment Protection Agency. As such, this response is in regard to statutory matters relating to application of the *National Parks and Wildlife Act 1974* and the *Threatened Species Conservation Act 1995*.

Biodiversity

OEH has reviewed the accompanying information provided and considers that the proposal does not currently trigger any statutory provisions in legislation administered by OEH in relation to biodiversity issues given the already highly modified area nature of the proposed development area.

Aboriginal cultural heritage

OEH notes that Heritage has briefly been considered within Table 2: Preliminary Environmental Assessment of the Concept Outline (page 26) whereby the Queanbeyan City Council Local Environment Plan 2012 indicates no heritage items on or near the site.

The *National Parks and Wildlife Act 1974* (NPW Act) however, protects Aboriginal objects and Aboriginal places in NSW. Aboriginal sites are widespread throughout New South Wales with considerable regional variation in the types of sites, their age, their contents and how they are situated in the landscape. It is an offence to do any of the following without an exemption or defence (penalties apply):

- knowingly harm or desecrate an Aboriginal object (the 'knowing' offence)
- harm or desecrate an Aboriginal object or Aboriginal place (the 'strict liability' offence)

PO Box 733, Queanbeyan NSW 2620
11 Farrer Place, Queanbeyan NSW
Tel: (02) 6229 7188 Fax: (02) 6229 7001
ABN 30 841 387 271
www.environment.nsw.gov.au

The NPW Act provides a number of exemptions and defences to these offences and also excludes certain acts and omissions from the definition of harm. For more information about the regulation of Aboriginal cultural heritage, go to the OEH website:
http://www.environment.nsw.gov.au/licences/achregulation.htm

OEH keeps a register of notified Aboriginal objects and declared Aboriginal places in NSW. The register is called the Aboriginal Heritage Information Management System (AHIMS). You can search AHIMS to discover if an Aboriginal object has been recorded, or an Aboriginal place declared, on a parcel of land. For more information about accessing AHIMS, go to the OEH website:
http://www.environment.nsw.gov.au/licences/WhatInformationCanYouObtainFromAHIMS.htm

Please note that surveys for Aboriginal objects have not been done in many parts of NSW. Aboriginal objects may exist on a parcel of land even though they have not been recorded in AHIMS. A number of Aboriginal heritage surveys have also shown that areas considered to be built up or heavily developed are still yielding the capacity for undisturbed Aboriginal objects.

Therefore, to ensure compliance with legislation protecting Aboriginal Cultural Heritage, the following documents should be reviewed by the proponent to provide additional background to the consideration of Aboriginal Cultural Heritage impacts:

- *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (DECCW 2010)
  http://www.environment.nsw.gov.au/resources/cultureheritage/ddcop/10798ddcop.pdf
- *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW, 2010)
  http://www.environment.nsw.gov.au/licences/consultation.htm
- *Code of Practice for the Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010) http://www.environment.nsw.gov.au/licences/archinvestigations.htm

If Aboriginal objects and/or places are known to be directly or indirectly adversely affected, the proponent will need to apply for, and be issued, an Aboriginal Heritage Impact Permit (AHIP) by OEH to comply with the NPW Act. Further information regarding about Aboriginal Heritage Impact Permits can be obtained from the OEH website at:
http://www.environment.nsw.gov.au/licences/Section87Section90.htm

In the event that Aboriginal objects are identified during construction, works must cease immediately and the nature and extent of the objects assessed, as described above. Accordingly, to avoid delays during construction and the possibility that the development may need to be amended if an AHIP is not granted, a comprehensive assessment for Aboriginal Cultural Heritage values should be undertaken.

Please contact me on (02) 6229 7089 if you have any queries in relation to this matter.

Yours sincerely

04 September 2013

JACKIE TAYLOR
Team Leader, Aboriginal Heritage - South East
Regional Operations Group
Office of Environment and Heritage

Table A1: DoPI DG Requirements

Type	Requirement	Section
Key Issues	▪ Waste Management – including:	
	o The measures that would be implemented to ensure that the project is consistent with the aims, objectives, and guidance in the *NSW Waste Avoidance and Resource Recovery Strategy 2007* and other relevant NSW government policy;	**Section 6.5**
	o Identification of the quantity and type of waste that would be accepted, handled, stored and processed or disposed of at the facility; and	**Section 5.2**
	o A description of how this waste would be stored and handled on site, and transported to and from the site.	**Section 5.2**
	▪ Air quality – including odour, dust and greenhouse gas emissions in accordance with relevant EPA guidelines. This assessment must consider any potential impacts on nearby private receptors;	**Section 6.2** **Section 6.12** **Appendix D**
	▪ Noise – including construction, operation and traffic noise in accordance with relevant EPA guidelines. This assessment must consider any potential impacts on nearby private receptors;	**Section 6.3** **Appendix F**
	▪ Visual amenity – including any potential impacts on nearby private receptors	**Section 6.11**
	▪ Traffic and Transport – including:	
	o An assessment of potential traffic impacts on the capacity, efficiency and safety of the road network; and	**Section 6.8** **Appendix G**
	o A description of the measures that would be implemented to maintain and/or improve the capacity, efficiency and safety of the road network in the surrounding area.	**Section 6.8**
	▪ Soil and water - including	
	o Consideration of any contaminated soil (including acid sulphate soils) and water on-site, in accordance with relevant guidelines;	**Section 6.4**
	o Identification of any licensing requirements or other approvals under the *Water Act 1912* and/or *Water Management Act 2000*;	**Section 2.5**
	o An assessment of potential impacts on the quality and quantity of existing surface and groundwater resources, any potential impacts from flooding and any potential impacts on nearby sensitive catchments and/or waters;	**Section 6.4**
	o A detailed description of the proposed water management system (including sewage), water monitoring program and other measures to mitigate surface and groundwater impacts; and	**Section 5.3** **Appendix E**
	o Details of leachate collection and management.	**Section 5.3**

Type	Requirement	Section
	▪ Hazards and risk – including a preliminary risk screening undertaken in accordance with *State Environmental Planning Policy No. 33 – Hazardous and Offensive Development (SEPP 33)* and *Applying SEPP 33* (DoP, 2011), and if necessary, a Preliminary Hazard Analysis (PHA);	**Section 6.7**
	▪ Fire and incident management – including technical information on the environmental protection equipment to be installed on the premises such as dust and noise controls, spill cleanup equipment and fire management and containment measures; and	**Section 6.7**
	▪ Cumulative impacts – particularly in relation to the environmental impacts of the existing facility and other nearby industries.	**Section 6.14**
Environmental Planning Instruments	The EIS must assess the proposal against the relevant environmental planning instruments, including but not limited to ▪ *State Environmental Planning Policy (Infrastructure) 2007* ▪ *State Environmental Planning Policy No. 33 – Hazardous and Offensive Development;* ▪ *Sydney Canberra Corridor Regional Strategy;* ▪ *Queanbeyan Local Environmental Plan 2012;* and ▪ Relevant development control plans and section 94 plans.	**Section 2**
Guidelines	There are no specific guidelines for waste or resource transfer stations. However, Attachment No. 1 provides some guidance on the preparation of the EIS.	**Noted.**
Consultation	During the preparation of the EIS, you should/must consult the relevant local, State and Commonwealth government authorities, service providers and community groups, and address any issues they may raise in the EIS. In particular, you should consult with the: ▪ Queanbeyan City Council; ▪ Environment Protection Authority; ▪ Office of Environment & Heritage; ▪ Roads and Maritime Services; and ▪ Surrounding landowners and occupiers that are likely to be impacts by the proposal. Details of the consultations carried out and issues raised must be included in the EIS.	**Section 3**

Table A2: OEH DG Requirements

Type	Requirement	Section
Biodiversity	OEH has reviewed the accompanying information provided and considers that the proposal does not currently trigger any statutory provisions in legislation administered by OEH in relation to biodiversity issues given the already highly modified area nature of the proposed development area.	**Noted.**
Aboriginal cultural heritage	OEH notes that Heritage has briefly been considered within Table 2: of the Concept Outline (page 26) whereby the Queanbeyan City Council Local Environment Plan 2012 indicates no heritage items in or near the site. The *National Parks and Wildlife Act 1974* (NPW Act) however, protects Aboriginal objects and Aboriginal places in NSW. Aboriginal sites are widespread throughout New South Wales with considerable regional variation in the types of sites, their age, their contents and how they are situated in the landscape. It is an offence to do any of the following without an exemption or defence (penalties apply): ▪ Knowingly harm or desecrate an Aboriginal object (the 'knowing' offence) ▪ Harm or desecrate an Aboriginal object or Aboriginal place (the 'strict liability' offence) The NPW Act provides a number of exemptions and defences to these offences and also includes certain acts and omissions from the definition of harm. OEH keeps a register of notified Aboriginal objects and declared Aboriginal places in NSW. The register is called the Aboriginal Heritage Information Management System (AHIMS). You can search AHIMS to discover if an Aboriginal object has been recorded, or an Aboriginal place declared, on a parcel of land. Please note that surveys for Aboriginal objects have not been done in many parts of NSW. Aboriginal objects may exist on a parcel of land even though they have not been recorded in AHIMS. A number of Aboriginal heritage surveys have also shown that areas considered to be built up or heavily developed are still yielding the capacity for undisturbed Aboriginal objects.	**Noted. Extensive excavation works have been completed in rock prior to this EIS. It is not anticipated for any Aboriginal heritage items to be found at the site.**
	Therefore, to ensure compliance with legislation protecting Aboriginal Cultural Heritage, the following documents should be reviewed by the proponent to provide additional background to the consideration of Aboriginal Cultural Heritage impacts: ▪ *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (DECCW 2010) ▪ *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW, 2010) ▪ *Code of Practice for the Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010)	**As above.**
	If Aboriginal objects and/or places are known to be directly or indirectly adversely affected, the proponent will need to apply for, and be issued, an Aboriginal Heritage Impact Permit (AHIP) by OEH to comply with the NPW Act.	**As above.**
	In the event that Aboriginal objects are identified during	**Noted.**

Type	Requirement	Section
	construction, works must cease immediately and the nature and extent of the objects assessed, as described above. Accordingly, to avoid delays during construction and the possibility that the development may need to be amended if an AHIP is not granted, a comprehensive assessment for Aboriginal Cultural Heritage values should be undertaken.	

Table A3: OEH DG Requirements

Type	Requirement	Section
Executive summary	The executive summary should include a brief discussion of the extent to which the proposal achieves identified environmental outcomes.	**Executive summary**
Objectives of the proposal	The objectives of the proposal should be clearly stated and refer to:	**Section 1.3** **Section 4**
	▪ The size and type of the operation, the nature of the processes and the products, by-products and wastes produced.	
	▪ A life cycle approach to the production, use or disposal of products	
	▪ The anticipated level of performance in meeting required environmental standards and cleaner production principles.	
	▪ The staging and timing of the proposal and any plans for future expansion.	
	▪ The proposal's relationship to any other industry or facility.	
Description of the proposal	*General* Outline the production process including:	**Section 5**
	▪ 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)	
	▪ Any life-cycle strategies for the products.	
	Outline cleaner production actions, including	
	▪ Measures to minimise waste (typically through addressing source reduction)	**Section 6.5**
	▪ Proposals for use or recycling of by-products	**Section 6.5**
	▪ Proposed disposal methods for solid and liquid waste	**Section 5**
	▪ 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.	**Section 5.3** **Section 6.2**
	▪ Water management system including all potential sources or 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.	**Section 5.3** **Appendix E**
	▪ Soil contamination treatment and prevention systems.	**N/A no soil contamination expected.** **Section 6.4**
	Outline construction works including:	
	▪ Actions to address any existing soil contamination	**N/A no soil contamination expected**

Type	Requirement	Section
	▪ Any earthworks or site clearing, re-use and disposal of cleared material (including use of spoil on-site)	**Site clearing is not expected. Additional excavation works at the site are proposed for the basement carpark, underground water storage tanks, footings and utilities. Refer to Section 5 for details.**
	▪ Construction timetable and staging; hours of construction; proposed construction methods	**Section 5.4**
	▪ Environment protection measures, including noise mitigation measures, dust control measures and erosion and sediment control measures.	**Section 6** **Section 7.5**
	Air	
	Identify all 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).*	**Section 6.2** **Appendix D**
	Provide details of the project that are essential for predicting and assessing air impacts including:	
	▪ 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.	**Appendix D**
	▪ An outline of procedures for handling, transport, production and storage.	**Section 5**
	▪ The management of solid, liquid and gaseous waste streams with potential for significant air impacts.	**Section 6.2** **Appendix D**
	Noise and vibration	
	Identify all noise sources from the development (including both construction and operation phases). Detail all potentially noisy activities including ancillary activities such as transport of goods and raw materials.	**Section 6.3** **Appendix F**
	Specify the times of operation for all phases of the development and for all noise producing activities.	**Appendix F**
	For projects with a significant potential traffic noise impact provide details of road alignment (include gradients, road surface,	**Appendix F**

Type	Requirement	Section
	topography, bridges, culverts, etc) and land use along the proposed road and measurement locations – diagrams should be to a scale sufficient to delineate individual residential blocks.	
	Water	
	Provide details of the project that are essential for predicting and assessing impacts to waters:	
	▪ Including the quantity and physio-chemical properties of all potential water pollutants and the risks they pose to the environment and human health, including the risks they pose to Water Quality Objectives in the ambient waters, using technical criteria derived from the Australian and New Zealand Guidelines for Fresh and Marine Water Quality, ANZECC 2000)	**Section 6.4**
	▪ The management of discharges with potential for water impacts.	**Section 5.3** **Section 6.4** **Appendix E**
	▪ Drainage works and associated infrastructure; land-forming and excavations; working capacity of structures; and water resource requirements of the proposal.	**Section 5.3** **Section 6.4** **Appendix E**
	Outline site layout, demonstrating efforts to avoid proximity to water resources (especially for activities with significant potential impacts eg effluent ponds) and showing potential areas of modification of contours, drainage, etc.	**Appendix B**
	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 types, volumes, proposed treatment and management methods and re-use options.	**Section 5.3** **Section 6.4** **Appendix E**
	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 *Waste Classification Guidelines (2008).*	**Section 5.2** **Section 6.5**
	Provide details of liquid waste and non-liquid waste management at the facility, including:	
	▪ The transportation, assessment and handling of waste arriving at or generated at the site.	**Section 5.2**
	▪ Any stockpiling of wastes or recovered materials at the site	**Section 5.2**
	▪ Any waste processing related to the facility, including reuse, recycling, reprocessing (including composting) or treatment both on- and off-site.	**Section 5.2**
	▪ The method for disposing of all wastes or recovered materials at the facility.	**Section 5.2**
	▪ The emissions arising from the handling, storage, processing and reprocessing of waste at the facility.	**Section 6.12** **Appendix D**

Type	Requirement	Section
	▪ The proposed controls for managing the environmental impacts of these activities.	**Section 6.5** **Section 6.2** **Section 6.12**
	Provide details of spoil disposal with particular attention to:	
	▪ The quantity of spoil material likely to be generated.	**Excavation works at the site are proposed for the basement carpark, underground water storage tanks, footings and utilities. Refer to Section 5 for details.**
	▪ Proposed strategies for the handling, stockpiling, reuse/recycling and disposal of spoil.	**Section 6.4**
	▪ The need to maximise reuse of spoil material in the construction industry.	**Section 6.4**
	▪ Identification of the history of spoil material and whether there is any likelihood of contaminated materials, and if so, measures for the management of any contaminated material.	**Section 6.4**
	▪ Designation of transportation routes for transport of spoil.	**Section 6.8**
	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.	**Section 6.7** **Section 7.4**
	Provide details of the type and quantity of any chemical substances to be used or stored and describe arrangements for their safe use and storage.	**Section 6.7**
	Reference should be made to the guidelines: *Waste Classification Guidelines (EPA 2008).*	**Section 6.5**
	ESD	
	Demonstrate that the planning process and any subsequent development incorporates objectives and mechanisms for achieving ESD, including	**Section 4** **Section 8.2**
	▪ An assessment of a range of options available for use of the resource, including the benefits of each option to future generations.	
	▪ Proper valuation and pricing of environmental resources.	
	▪ Identification of who will bear the environmental costs of the proposal.	
Rehabilitation	Outline considerations of site maintenance, and proposed plans for the final condition of the site (ensuring its suitability for future uses).	**Appendix B**
Consideration	Consider the environmental consequences of adopting	**Section 4**

Type	Requirement	Section
of alternatives and justification for the proposal	alternatives, including alternative: ▪ Sites and site layouts ▪ Access modes and routes ▪ Materials handling and production processes ▪ Waste and water management ▪ Impact mitigation measures ▪ Energy sources	
	Selection of the preferred option should be justified in terms of: ▪ Ability to satisfy the objectives of the proposal. ▪ Relative environmental and other costs of each alternative. ▪ Acceptability of environmental impacts and contribution to identified environmental objectives. ▪ Acceptability of any environmental risks or uncertainties. ▪ Reliability of proposed environmental impact mitigation measures. ▪ Efficient use (including maximising re-use) of land, raw materials, energy and other resources.	**Section 4**
The location - General	Provide an overview of the affected environment to place the proposal in its local and regional context including: ▪ Meteorological data (e.g rainfall, temperature and evaporation, windspeed and direction) ▪ Topography (landform element, slope type, gradient and length) ▪ Surrounding land uses (potential synergies and conflicts) ▪ Geomorphology (rates of landform change and current erosion and deposition processes) ▪ Soil types and properties (including erodibility, engineering and structural properties, dispersibility, permeability, presence of acid sulphate soils and potential acid sulphate soils). ▪ Ecological information (water system habitat, vegetation, fauna) ▪ Availability of services and the accessibility of the site for passenger and freight transport.	**Section 5.1** **Section 6**
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.	**Section 6.2** **Appendix D**
	Describe surrounding buildings that may effect plume dispersion.	**Appendix D**
	Provide and analyse site representative data on following meteorological parameters: ▪ Temperature and humidity; ▪ Rainfall, evaporation and cloud cover ▪ Wind speed and direction ▪ Atmospheric stability class	**Appendix D**

Type	Requirement	Section
	▪ Mixing height (the height that emissions will be ultimately mixed in the atmosphere) ▪ Katabatic air drainage; and ▪ Air re-circulation.	
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.	**Section 6.3** **Appendix F**
	Identify the land use zoning of the site and the immediate vicinity and the potentially affected areas.	**Section 5.1** **Section 6.1**
Water	Describe the catchment including proximity of the development to any waterways and provide an assessment of their sensitivity/significance from a public health, ecological and/or economic perspective. The Water Quality and River Flow Objectives on the website: www.environment.nsw.gov.au/ieo should be used to identify the agreed environmental values and human uses for any affected waterways. This will help with the description of the local and regional area.	**Section 6.4**
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.	**Section 6.4**
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: ▪ Relevant NSW government guidelines; ▪ Industry guidelines; ▪ EISs for similar projects; ▪ Relevant research and reference material; ▪ Relevant preliminary studies or reports for the proposal; and ▪ Consultation with stakeholders.	**Section 6.1**
	Provide a summary of the outcomes of the process including: ▪ All issues identified including local, regional and global impacts (e.g. increased/decreased greenhouse emissions); ▪ Key issues which will require a full analysis (including comprehensive baseline assessment); ▪ Issues not needing full analysis though they may be addressed in the mitigation strategy; ▪ 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.)	**Section 6.1**
Environmental Issues - 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.	**Section 6**

Type	Requirement	Section
	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.	**Section 6**
Describe baseline conditions	Provide a description of existing environmental conditions for any potential impacts.	**Section 6**
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 especially where there are sensitive receivers.	**Section 6**
	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.	**Section 6** **Specialist reports in Appendices**
	The analysis should also make linkages between different areas of assessment where necessary to enable a full assessment of environmental impacts eg assessment of impacts on air quality will often need to draw on the analysis of traffic, health, social, soil and/or ecological systems impacts; etc	**Section 6** **Specialist reports in Appendices**
	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.	**Section 6** **Specialist reports in Appendices**
	The level of assessment should be commensurate with the risk to the environment.	**Section 6** **Specialist reports in Appendices**
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.	**Section 6** **Specialist reports in Appendices**
	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. A 'reasonable level of performance' involves adopting and implementing technology and management practices to achieve certain pollutant emission levels in economically viable operations. Technology-based criteria evolve gradually over time as technologies and practices change.	**Section 6** **Specialist reports in Appendices**
	Use environmental impacts as key criteria in selecting between alternative sites, designs and technologies, and to avoid options having the highest environmental impacts.	**Section 6** **Specialist reports in Appendices**
	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	**Section 7**

Type	Requirement	Section
	include: ▪ Operational procedures to manage environmental impacts; ▪ Monitoring procedures; ▪ Training programs; ▪ Community consultation; ▪ Complaint mechanisms including site contacts; ▪ Strategies to use monitoring information to improve performance; ▪ Strategies to achieve acceptable environmental impacts and to respond in event of exceedances.	
Air – describe baseline conditions	Provide a description of existing air quality and meteorology, using existing information and site representative ambient monitoring data.	**Section 6.2** **Appendix D**
Assess Impacts	Identify all pollutants of concern and estimate emissions by quantity (and size for particles), source and discharge point.	**Section 6.2** **Appendix D**
	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.	**Section 6.2** **Appendix D**
	Describe the effects and significance of pollutant concentration on the environment, human health, amenity and regional ambient air quality standards or goals.	**Section 6.2** **Appendix D**
	Describe the concentration that the development will make to regional and global pollution, particularly in sensitive locations.	**Section 6.2** **Appendix D**
	For potentially odourous 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.	**Section 6.2** **Appendix D**
	Reference should be made to *Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in NSW (EPA, 2001); Approved Methods for the Sampling and Analysis of Air Pollutants in NSW (EPA, 2001); Assessment and Management of Odour from Stationary Sources in NSW (EPA, 2001); Technical Notes: Draft Policy: Assessment and Management of Odour from Stationary Sources in NSW (EPA, 2001); Load Calculation Protocol for use by holders of NSW Environment Protection Licences when calculating Assessable Pollutant Loads (EPA, 1999)*.	**Section 6.2** **Appendix D**
Describe management and mitigation measures	Outline specifications of pollutant 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.	**Section 6.2** **Appendix D**
Noise and vibration – describe baseline conditions	Determine the existing background (LA90) and ambient (LAeq) noise levels in accordance with the *NSW Industrial Noise Policy.*	**Section 6.3** **Appendix F**
	Determine the existing road traffic noise levels in accordance with the *NSW Road Noise Policy*, where road traffic noise impacts may	**Section 6.3**

Type	Requirement	Section
	occur.	**Appendix F**
	The noise impact assessment report should provide details of all monitoring of existing ambient noise levels including: ▪ Details of equipment used for the measurements ▪ A brief description of where the equipment was positioned; ▪ A statement justifying the choice of monitoring site, including the procedure used to choose the site, having regards to the definition of 'noise sensitive location(s)' and 'most affected location(s)' described in Section 3.1.2 of the *NSW Industrial Noise Policy;* ▪ Details of the exact location of the monitoring site and a description of land uses in surrounding areas; ▪ A description of the dominant and background noise sources at the site; ▪ Day, evening and night assessment background levels for each day of the monitoring period; ▪ The final Rating Background Level (RBL) value; ▪ Graphs of the measured noise levels for each day should be provided; ▪ A record of periods of affected data (due to adverse weather and extraneous noise), methods used to exclude invalid data and a statement indicating the need for any re-monitoring under Step 1 in Section B1.3 of the *NSW Industrial Noise Policy*; ▪ Determination of LAeq noise levels from existing industry.	**Section 6.3** **Appendix F**
Assess impacts	Determine the project specific noise levels for the site. For each identified potentially affected receiver, this should include: ▪ Determination of the intrusive criterion for each identified potentially affected receiver: ▪ Selection and justification of the appropriate category for each identified potentially affected receiver; ▪ Determination of the amenity criterion for each receiver; ▪ Determination of the appropriate sleep disturbance limit.	**Section 6.3** **Appendix F**
	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 15dB above the background LA90 noise level, sleep disturbance impacts are unlikely. Where this is not the case, further analysis is required. Additional guidance in the *NSW Road Noise Policy*.	**Section 6.3** **Appendix F**
	Determine expected noise level and noise character (eg tonality, impulsiveness, vibration, etc) likely to be generated from noise sources during: ▪ Site establishment ▪ Construction ▪ Operational phases ▪ Transport including traffic noise generated by the proposal.	**Section 6.3** **Appendix F**

Type	Requirement	Section
	▪ 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.	**Section 6.3** **Appendix F**
	The noise impact assessment report should include: ▪ A plan showing the assumed location of each noise source for each prediction scenario; ▪ A list of the number and type of noise sources used in each prediction scenario to simulate all potential significant operating conditions on the site; ▪ Any assumptions made in the predictions in terms of source heights, directivity effects, shielding from topography, buildings or barriers, etc; ▪ Methods used to predict noise impacts including identification of any noise models used. Where modelling approaches other than the use of the ENM or SoundPlan computer models are adopted, the approach should be appropriately justified and validated; ▪ An assessment of appropriate weather conditions for the noise predictions including reference to any weather data used to justify the assumed conditions; ▪ The predicted noise impacts from each noise source as well as the combined noise level for each prediction scenario under any identified significant adverse weather conditions as well as calm conditions where appropriate; ▪ For developments where a significant level of noise impact is likely to occur, noise contours for the key prediction scenarios should be derived; ▪ An assessment of the need to include modification factors as detailed in Section 4of the *NSW Industrial Noise Policy*;	**Section 6.3** **Appendix F**
	Discuss the findings from the predictive modelling and, where relevant noise criteria have not been met, recommend additional mitigation measures.	**Section 6.3** **Appendix F**
	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.	**Section 6.3** **Appendix F**
	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:	**Section 6.3** **Appendix F**

Type	Requirement	Section
	▪ Locations where the noise level exceeds the criteria and extent of exceedance; ▪ Numbers of people (or areas) affected; ▪ Times when criteria will be exceeded; ▪ Likely impact on activities (speech, sleep, relaxation, listening, etc); ▪ Change on ambient conditions; ▪ The result of any community consultation or negotiated agreement.	
	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.	**Section 6.3** **Appendix F**
	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: ▪ Bench height, burden spacing, spacing burden ratio; ▪ Blast hole diameter, inclination and spacing; ▪ Type of explosive, maximum instantaneous charge, initiation, blast block size, blast frequency.	**N/A no blasting is anticipated.**
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.	**Section 6.3** **Appendix F**
	For traffic noise impacts, provide a description of the ameliorative measures considered (if require), reasons for inclusion or exclusion, and procedures for calculation of noise levels including ameliorative measures. Also include, where necessary, a discussion of any potential problems associated with the proposed ameliorative measures, such as overshadowing effects from barriers. Appropriate ameliorative measures may include: ▪ Use of alternative transportation modes, alternative routes, or other methods of avoiding the new road usage; ▪ Control of traffic (e.g. limiting times of access or speed limitations); ▪ Resurfacing of the road using a quiet surface; ▪ Use of (additional) noise barriers or bunds; ▪ Treatment of the façade to reduce internal noise levels buildings where the night-time criteria is a major concern; ▪ More stringent limits for noise emission from vehicles (i.e. using specially designed 'quiet' trucks and/or trucks to use air bag suspension;	**Section 6.3** **Appendix F**

Type	Requirement	Section
	▪ Driver education; ▪ Appropriate truck routes; ▪ Limit usage of exhaust breaks; ▪ Use of premium muffles on trucks; ▪ Reducing speed limits for trucks; ▪ Ongoing community liaison and monitoring of complaints; ▪ Phasing in the increased road use.	
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).	**Section 6.4**
	Provide site drainage details and surface runoff yield.	**Section 5**
	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. 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.	**N/A discharges are not anticipated**
	State the indicators and associated trigger values or criteria for the identified environmental values. NB: While specific guidelines for groundwater are not available, the ANZECC 2000 Guidelines endorse the application of the trigger values and decision trees as a tool to assess risk to environmental values in groundwater.	**N/A discharges are not anticipated**
	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).	**N/A discharges are not anticipated**
	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.	**N/A discharges are not anticipated**
	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: ▪ Lake or estuary flushing characteristics; ▪ Specific human uses (e.g. exact location of drinking water offtake);	**N/A discharges are not anticipated**

Type	Requirement	Section
	▪ Sensitive ecosystems or species conservation values; ▪ A description of the condition of the local catchment e.g. erosion levels, soil, vegetation cover, etc; ▪ An outline of baseline groundwater information, including, but not restricted to, depth to watertable, flow direction and gradient, groundwater quality, reliance on groundwater by surrounding users and by the environment; ▪ Historic river flow data where available for the catchment.	
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).	**Section 6.4**
	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.	**N/A discharges are not anticipated**
	Include a rationale, along with relevant calculations, supporting the prediction of the discharges.	**N/A discharges are not anticipated**
	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).	**N/A discharges are not anticipated**
	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).	**N/A discharges are not anticipated**
	Identify any potential impacts on quality or quantity of groundwater describing their source.	**Section 6.4**
	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 discharges are not anticipated**
	Identify impacts associated with the disturbance of acid sulphate soils and potential acid sulphate soils.	**N/A ASS are not anticipated at the site**
	Containment of spills and leaks shall be in accordance with the technical guidelines section 'Bunding and Spill Management' of the *Authorised Officers Manual* (EPA, 1995) and the most recent versions of the Australian Standards referred to in the Guidelines. Containment should be designed for no-discharge.	**Section 6.4**
	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	**N/A discharges are not anticipated**

Type	Requirement	Section
	particular the following questions should be answered: ▪ Will the proposal protect Water Quality and River Flow Objectives where they are currently achieved in the ambient waters; and ▪ Will the proposal contribute towards the achievement of Water Quality and River Flow Objectives over time, where they are not currently achieved in the ambient waters.	
	Consult with the EPA as soon as possible if a mixing zone is proposed.	**N/A a mixing zone is not proposed.**
	Where a licensed discharge is proposed, provide the rationale as to why it cannot be avoided through application of a reasonable level of performance, using available technology, management practice and industry guidelines.	**N/A a licensed discharge is not proposed.**
	Where a licensed discharge is proposed, provide the rationale as to why it represents the best environmental outcome and what measures can be taken to reduce its environmental impact.	**N/A a licensed discharge is not proposed.**
	Reference should be made to *Managing Urban Stormwater: Soils and Construction* (Landcom, 2004), *Guidelines for Fresh and Marine Water Quality* (ANZECC, 2000), *Environmental Guidelines: Use of effluent by Irrigation* (DECCW, 2004).	**Section 6.4**
Describe management and mitigation measures	Outline the stormwater management to control pollutants at the source and contain them within the site. Also describe measures for maintaining and monitoring any stormwater controls.	**Section 5.3** **Section 6.4**
	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.	**Section 6.4**
	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.	**Section 5.3** **Section 6.4**
	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.	**Section 6.4** **Section 7.4**
	Describe hydrological impact mitigation measures including: ▪ Site selection (avoiding sites prone to flooding and waterlogging, actively eroding or affected by deposition); ▪ Minimising runoff; ▪ Minimising reductions or modifications of flow regimes; ▪ Avoiding modifications to groundwater.	**Section 6.4**
	Describe groundwater impact mitigation measures including: ▪ Site selection; ▪ Retention of native vegetation and revegetation;	**Section 6.4**

Type	Requirement	Section
	▪ Artificial recharge; ▪ Providing surface storages with impervious linings; ▪ Monitoring program.	
	Describe geomorphological impact mitigation measures including: ▪ Site selection; ▪ Erosion and sediment controls; ▪ Minimising instream works; ▪ Treating existing accelerated erosion and deposition; ▪ Monitoring program.	**Section 6.4**
	Any proposed monitoring should be undertaken in accordance with the *Approved Methods for the Sampling and Analysis of Water Pollutants in NSW* (DECCW, 2004).	**N/A**
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 of soil types and properties and soil contamination.	**Section 6.4**
Assess impacts	Identify any likely impacts resulting from the construction or operation of the proposal, including the likelihood of: ▪ Disturbing any existing contaminated soil; ▪ Contamination of soil by operation of the activity; ▪ Subsidence or instability; ▪ Soil erosion; ▪ Disturbing acid sulphate or potential acid sulphate soils.	**Section 6.4**
	Reference should be made to *Contaminated Sites – Guidelines for Consultants Reporting on Contaminated Sites* (EPA, 1997); *Contaminated Sites on Significant Risk of Harm and Duty to Report* (EPA, 1999).	**Contact with contaminated soil is not anticipated.**
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: ▪ Erosion and sediment control measures; ▪ Proposals for site remediation – see *Managing Land Contamination, Planning Guidelines SEPP 55 – Remediation of Land* (Department of Urbane Affairs and Planning and Environment Protection Authority, 1998). ▪ Proposals for the management of these soils – see *Assessing and Managing Acid Sulphate Soils,* Environment Protection Authority, 1995 (note that this is the only methodology accepted by the EPA).	**Section 6.4**
Waste and chemicals – Describe baseline conditions	Describe any existing waste or chemicals operations related to the proposal.	**Section 5** **Section 6.5**
Assess	Assess the adequacy of proposed measures to minimise natural	**Section 6.5**

Type	Requirement	Section
impacts	resource consumption and minimise impacts from the handling, transporting, storage, processing and reprocessing of waste and/or chemicals.	
	Reference should be made to the *Waste Classification Guidelines* (EPA, 2008).	**Section 6.5**
Describe management and mitigation measures	Outline measures to minimise the consumption of natural resources.	**Section 6.5**
	Outline measures to avoid the generation of waste and promote the re-use and recycling and reprocessing of any waste.	**Section 6.5**
	Outline measures to support any approved regional or industry waste plans.	**Section 6.5**
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.	**Section 6.14**
	Assess the impact of the proposal against the long term air, noise and water quality objectives for the area or region.	**Section 6.14**
	Identify infrastructure requirements flowing from the proposal (e.g. water and sewerage services, transport infrastructure upgrades).	**Section 6.14**
	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).	**Section 6.14**
List of approvals and licences	Identify all approvals and licences required under environment protection legislation including all scheduled activities, types of ancillary activities and types of discharges (to air, land, water).	**Section 2.5**
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).	**Section 6** **Section 7.5**
	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.	**Section 6** **Section 7.5**
Justification for the proposal	Reasons should be included which justify undertaking the proposal in the manner proposed, having regard to the potential environmental impacts.	**Section 8**

Appendix B – Design and Site Survey Plans

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LOCATION PLAN
SCALE NTS

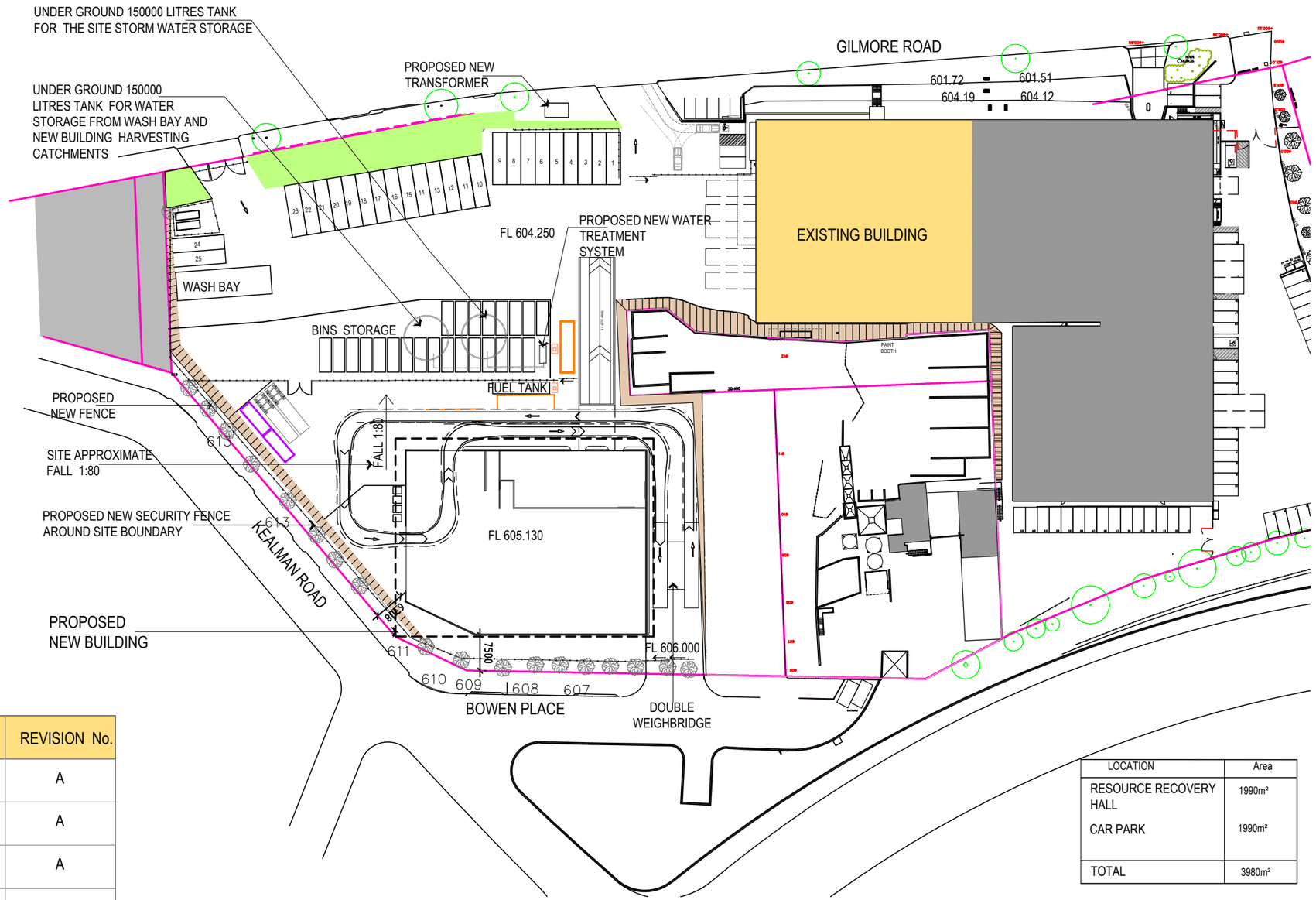
GENERAL NOTES:

1. All site water run off / leachate that has come into contact with maintenance, waste storage areas,washdown or refuelling areas would be captured and treated prior to discharge- for details wild environment (SEE)

2.Fire detection and prevention system would be installed to meet the Building Code of Australia (BCA)and SITA policy requirements. This would include hydrants, hose reels, fire extinguishers, sprays and detectors. The site would be staffed at all times during operation and all staff would be trained in fire detection and fire-fighting.

DRAWINGS LIST

DRAWING No.	DRAWING DESCRIPTION	DRAWING SCALE	REVISION No.
1404/DA/001	LOCATION AND SITE PLAN	NTS	A
1404/DA/101	GROUND and FIRST FLOOR DEMOLITION PLAN	1:200	A
1404/DA/102	BASEMENT PLAN	1:200	A
1404/DA/201	ELEVATIONS	1:200	A
1404/DA/202	ELEVATIONS	1:200	A
1404/DA/301	SECTION	1:200	A



LOCATION	Area
RESOURCE RECOVERY HALL	1990m²
CAR PARK	1990m²
TOTAL	3980m²

SITE PLAN
SCALE NTS

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REV _ - DD/MM/YY ___

CONSULTANT

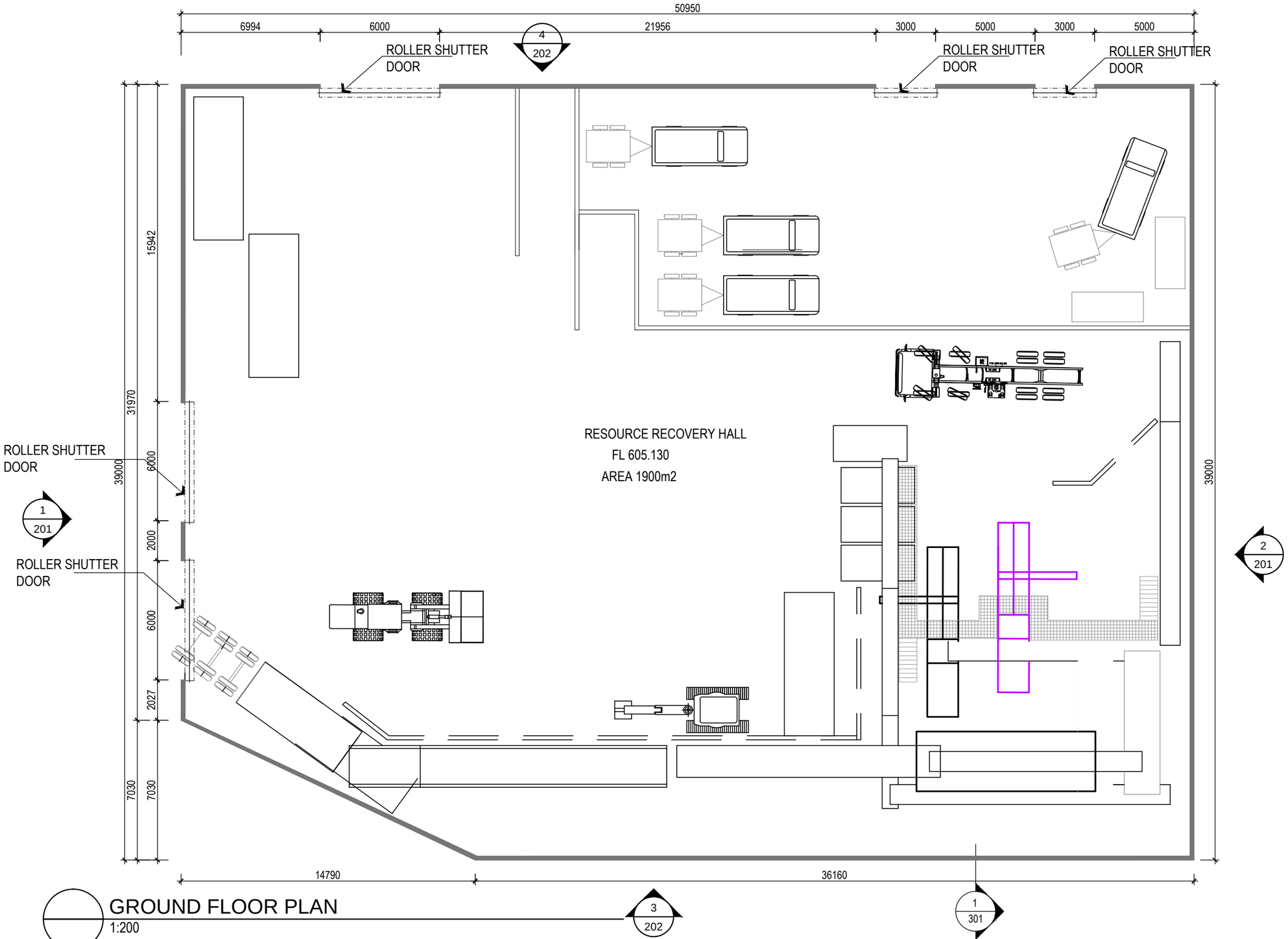
PROJECT
SITA ENVIRONMENTAL
184 GILMORE ROAD
QUEANBEYAN

CLIENT
SITA ENVIRONMENTAL

TITLE
RESOURCE RECOVERY FACILITY
LOCATION PLAN AND SITE PLAN

DRAWING NO. 1404/DA/001
REV. A
DATE APRIL 2014
SCALE AS SHOWN @ A3
CHECKED EB 08-09-15
VERIFIED CL 08-09-15

ISO 9001 BUREAU VERITAS Certification



GROUND FLOOR PLAN

1:200

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PROJECT
SITA ENVIRONMENTAL
184 GILMORE ROAD
QUEANBEYAN

CLIENT
SITA ENVIRONMENTAL

TITLE
RESOURCE RECOVERY FACILITY
GROUND FLOOR PLAN

DRAWING NO. 1404/DA/101
REV. A
DATE APRIL 2014
SCALE AS SHOWN @ A3
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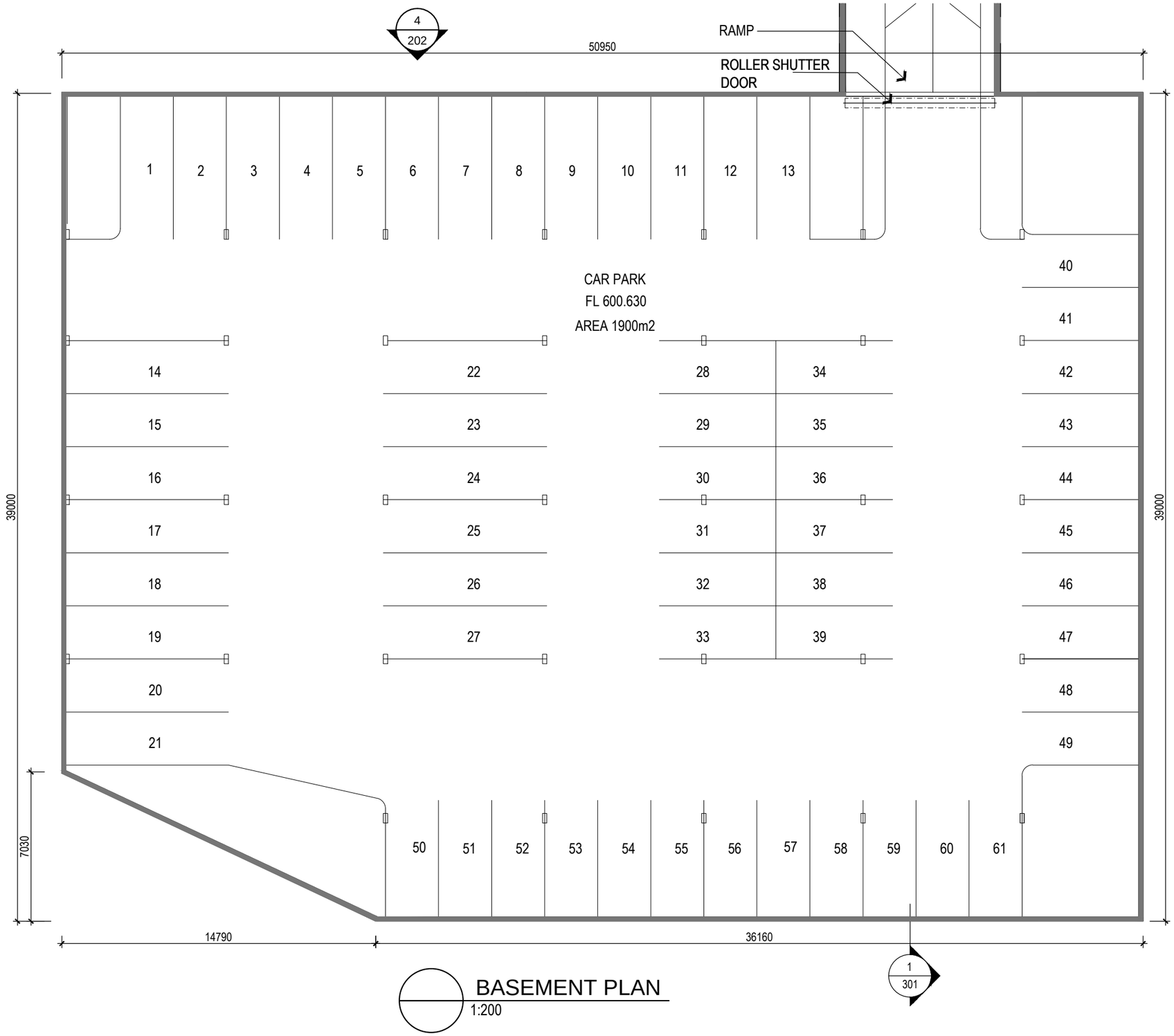

BASEMENT PLAN

1:200

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PROJECT
SITA ENVIRONMENTAL
184 GILMORE ROAD
QUEANBEYAN

CLIENT
SITA ENVIRONMENTAL

TITLE
RESOURCE RECOVERY FACILITY
BASEMENT PLAN

DRAWING NO. 1404/DA/102
REV. A
DATE APRIL 2014
SCALE AS SHOWN @ A3
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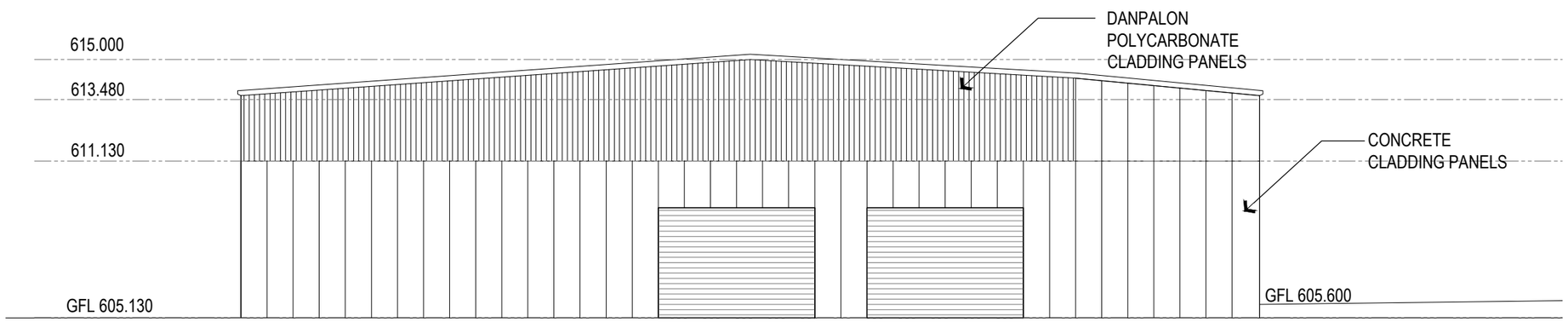
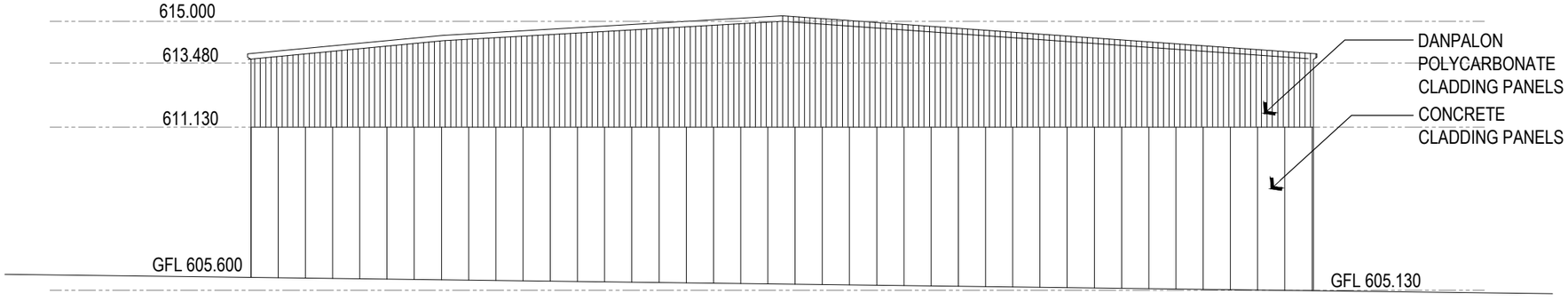


ELEVATION 1
SCALE 1:200



ELEVATION 2
SCALE 1:200

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CONSULTANT

PROJECT
SITA ENVIRONMENTAL
184 GILMORE ROAD
QUEANBEYAN

CLIENT
SITA ENVIRONMENTAL

TITLE
RESOURCE RECOVERY FACILITY
ELEVATIONS

DRAWING NO. 1404/DA/201
REV. A
DATE APRIL 2014
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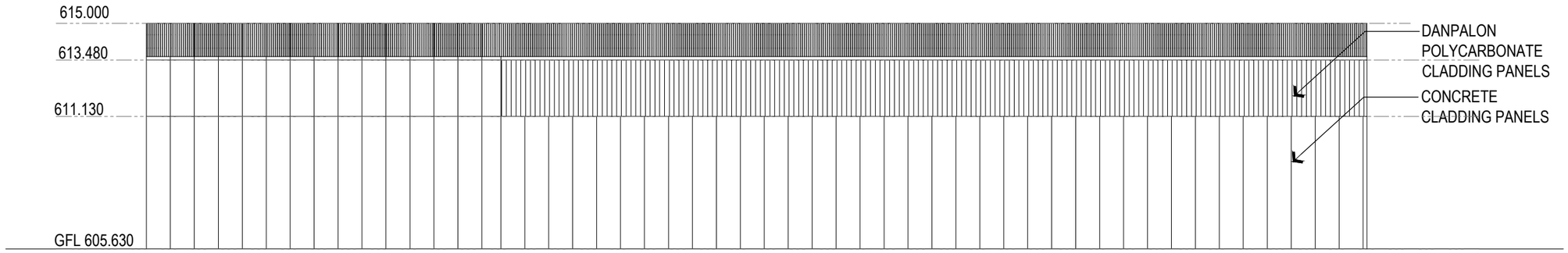
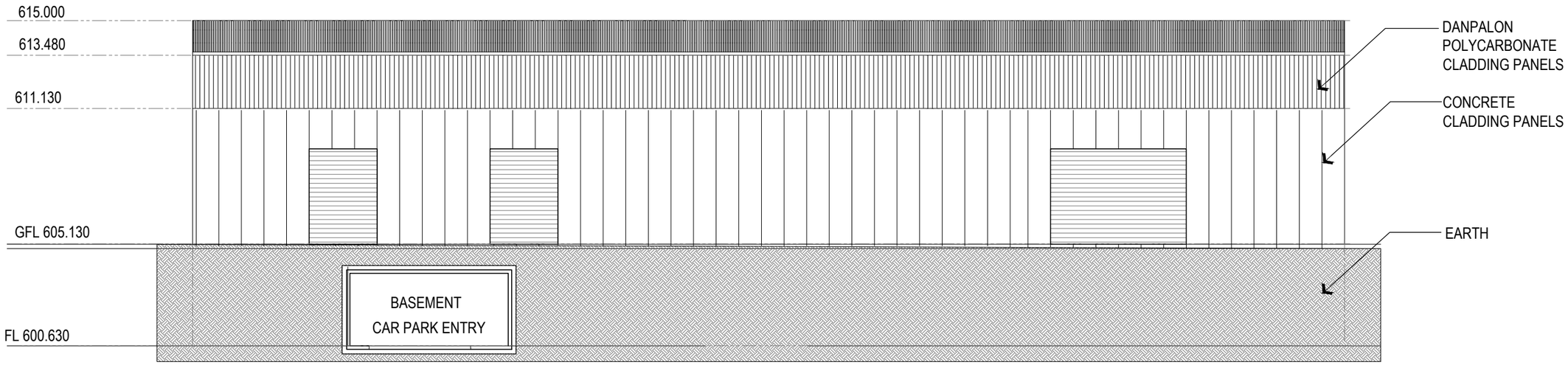


ELEVATION 3
SCALE 1:200



ELEVATION 4
SCALE 1:200

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CONSULTANT

PROJECT
SITA ENVIRONMENTAL
184 GILMORE ROAD
QUEANBEYAN

CLIENT
SITA ENVIRONMENTAL

TITLE
RESOURCE RECOVERY FACILITY
ELEVATIONS

DRAWING NO. 1404/DA/202
REV. A
DATE APRIL 2014
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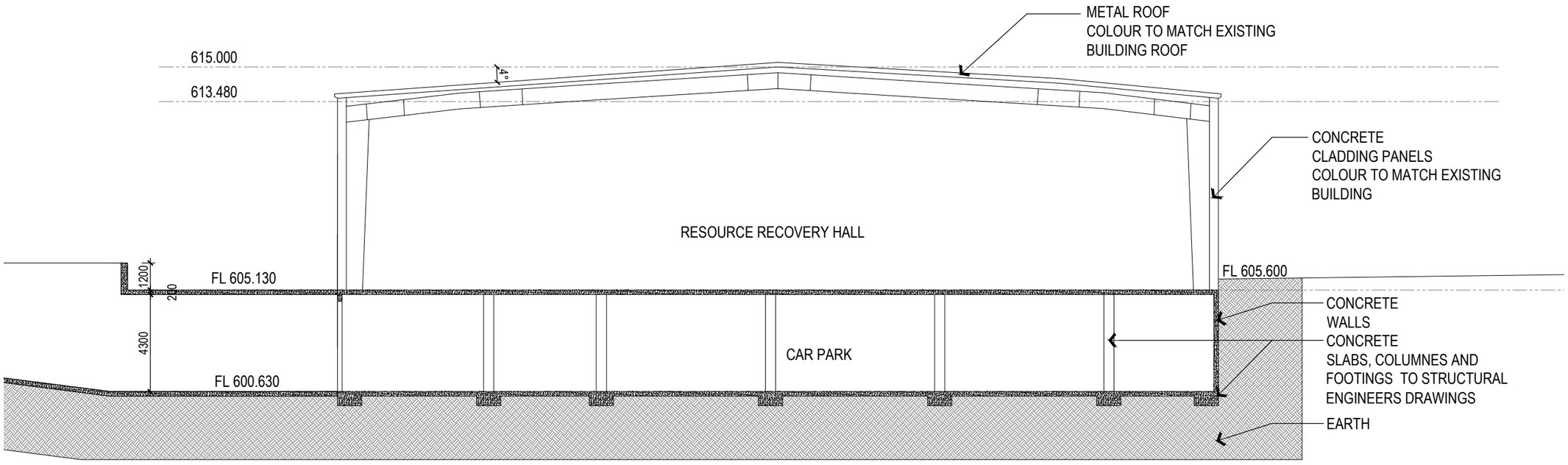
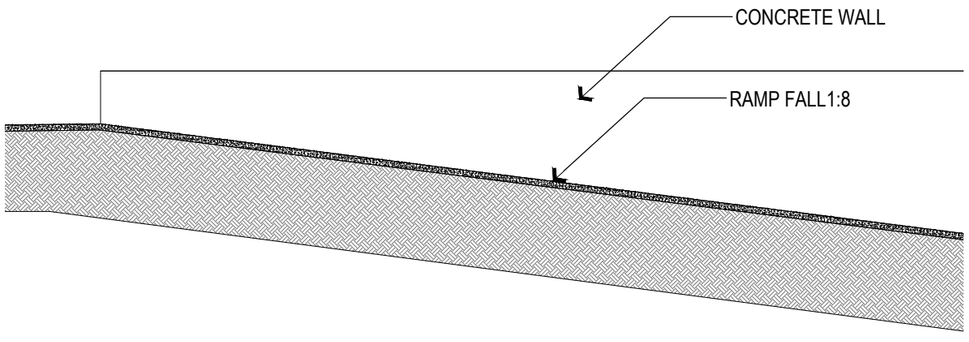


SECTION 1
SCALE 1:200



SECTION 1 CONTINUED
SCALE 1:200

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SITA ENVIRONMENTAL
184 GILMORE ROAD
QUEANBEYAN

CLIENT
SITA ENVIRONMENTAL

TITLE
RESOURCE RECOVERY FACILITY
SECTION

DRAWING NO. 1404/DA/301
REV. A
DATE APRIL 2014
SCALE AS SHOWN @ A3
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Appendix C – Fire Safety Study / SEPP 33

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PRELIMINARY HAZARD ANALYSIS
FOR
WILD ENVIRONMENT PTY LTD
UNIT 3, 184 GILMORE ROAD, QUEANBEYAN WEST

Prepared for: Wild Environment Pty Ltd

Prepared by: R T Benbow, Principal Consultant

Report No: 148189_PHA_Rep_Rev1
April 2015
(Released: 30 April 2015)

Benbow
ENVIRONMENTAL

Engineering a Sustainable Future for Our Environment

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Approved by:	Position:	Signature:	Date:
Richard Benbow	Principal Consultant		30 April 2015

DOCUMENT REVISION RECORD

Revision	Date	Description	Checked	Approved
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DOCUMENT DISTRIBUTION

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1	30-04-2015	Wild Environment Pty Ltd	Benbow Environmental

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EXECUTIVE SUMMARY

Benbow Environmental has been commissioned by Wild Environment Pty Ltd to prepare a Preliminary Hazard Analysis (PHA) for the proposed expansion of a Resource Recovery and Waste Transfer Facility at Unit 3, 184 Gilmore Road, Queanbeyan West, NSW 2620.

Wild Environment Pty Ltd currently operates a truck maintenance depot and waste transfer station from this site and propose to expand their operations to also include the recovery of reusable materials from a range of waste sources and customers.

This PHA is in support of an Environmental Impact Statement prepared to expand the use of the site.

The site already involves the following operations which are approved:

- Up to 3,000 tonnes per year of paper and cardboard for recycling.
- Minor quantities of fluorescent tubes and batteries.
  Batteries are Class 8 dangerous goods for storage and transport. Management practices to follow are industry standard already adopted at the proponent's sites.
- Minor truck maintenance.
  This would require minor storage of combustible liquids. These would be stored following industry best practices using bunded pallets which are already in place at the proponent's sites.
- A spray painting bay.
  This would require storage of minor quantities of solvents and paints in accordance with AS 1940—2004 *The storage and handling of flammable and combustible liquids.*
- A wash bay.
  This would require use of detergents and waste wash water would be collected.

The proposed expansion involves extending the waste types and the existing quantity of paper and cardboard to the following:

- Up to 70,000 tonne per year of general solid waste including putrescible and non-putrescible.
- Increase the tonnage of paper and cardboard from 3,000 tonne per annum to 12,000 tonne. For this assessment, 100 tonne may be on site at any one time.
- J120 waste liquids. These are mainly water that contains waste oil/hydrocarbon mixtures and emulsions. These would be held on site in a bunded storage tank.
- Diesel fuel would be held on site in a self-bunded storage tank of capacity ~10,000 L.
- Medical wastes are to be brought to site stored and trucked off-site for treatment.

The Preliminary Hazard Analysis (PHA) has been prepared in accordance with the Multi-Level Risk Assessment and Hazardous Industry Planning Advisory Papers (HIPAPs) guidelines stipulated by the Department of Planning and Environment (DoP&E) NSW. The purpose of the PHA is to assess whether the proposed volume of dangerous goods stored and the operations that occur at the site are offensive or hazardous, thereby posing an unacceptable risk to the surrounding community.

Safeguard measures have also been considered and included in the design and operation of the facility to ensure that the safety and amenity of the neighbouring premises would not be affected by the proposed development.

Section 5 of the report has identified and examined a number of potential events/consequence scenarios that could occur on site. The prevention and protection measures designed into the operations of each of the activities associated with each event are listed and discussed in a Hazard Identification Chart.

From the Hazard Identification Chart, the hazardous events were deemed as unlikely to occur due to the nature of the operations and the proposed prevention and protection measures designed for the facility.

Given the outcomes of the assessment, the Preliminary Hazard Analysis has found that the operation of the proposed development readily meets the criteria laid down in HIPAP No. 4 *Risk Criteria for Land Use Safety Planning* and would not cause any risk, significant or minor, to the community, with the recommended safeguards in place.

Throughout the preparation of this PHA, it has been determined that the proposed development meets all the safety requirements stipulated by DoP&E and hence would not be considered to be an offensive or hazardous development.

Contents

Page

Tables

Figures

1. INTRODUCTION

Benbow Environmental has been commissioned by Wild Environment Pty Ltd to prepare a Preliminary Hazard Analysis (PHA) for the proposed expansion of a Resource Recovery and Waste Transfer Facility at Unit 3, 184 Gilmore Road, Queanbeyan West, NSW 2620.

The facility currently has approval to store minor quantities of Class 8 dangerous goods, being batteries.

The proposed expansion would not substantially change the quantities of dangerous goods on site that would exceed the threshold screening quantities of dangerous goods.

The proposed changes involve the following aspects which are the main cause of the proposal being potentially hazardous or offensive in combination, rather than each individual proposed operation causing the proposal to be hazardous.

- Up to 70,000 tonne per year of general solid waste including putrescible and non-putrescible.
- J120 waste liquids. These are mainly water that contains waste oil/hydrocarbon mixtures and emulsions. These would be held on site in a bunded storage tank.
- Diesel fuel would be held on site in a self-bunded storage tank of capacity ~10,000 L.
- Medical wastes are to be brought to site stored and trucked off-site for treatment.

A Preliminary Hazard Analysis (PHA) has been prepared to ensure that all potential hazards and risks from the proposed site are appropriately identified, managed and controlled (if controls are deemed necessary).

The PHA has been prepared in accordance with the documents entitled *"Multi-Level Risk Assessment"*, "*Hazardous Industry Planning Advisory Paper No. 4 – Risk Criteria for Land Use Safety Planning"* (HIPAP No. 4)" and the "*Hazardous Industry Planning Advisory Paper No. 6 – Guideline for Hazard Analysis"* (HIPAP No. 6), all published by the Department of Planning and Environment (DoP&E).

The study includes the following key aspects of the assessment:

- Assessment of the proposed development with consideration to the provisions of State Environmental Planning Policy (SEPP) 33 and the compliance with WorkCover requirements.

- Evaluation of any potential hazards imposed by the proposed site operations on the surrounding environment and communities.

- Making recommendations on the relevant prevention/protection strategies necessary to minimise the impact and risk of human fatalities, property damage and environmental pollution.

2. OVERVIEW OF THE DEVELOPMENT

The proposed changes include the addition of a number of waste types being accepted at the site, the construction of a large enclosed building and additional operations.

The following waste streams are proposed to be accepted at the facility:

- General solid waste (non-putrescible);
- General solid waste (putrescible);
- Paper, cardboard, and plastics recyclables;
- J120 waste (Oil/Hydrocarbon Mixtures/Emulsions in Water) – Liquid Waste; and
- Grease trap waste.

The waste recovery hall would be designed to screen up to 95,000 tonnes per annum.

The facility currently consists of the following structures:

- Enclosed building for ancillary office space, truck workshop, bin storage and paper shredding and bailing;
- Enclosed paint bay; and
- Wash bay.

The additional operations would consist of:

- Bulk tankers delivering liquid waste and grease trap wastes;
- Refuelling at a self-bunded aboveground diesel storage tank;
- Medical wastes in the regulated bins would be brought to site, stored in a dedicated area and trucked off-site for treatment and subsequent disposal.

2.1 CURRENT DEVELOPMENT

The current development consists of a partially developed site with the following facilities:

- Hardstand area for truck and car parking, bin storage and dangerous goods storage containers. The dangerous goods are for site use only.
- A wash bay.
- Existing structures used for the storage and recovery of wastes, ancillary facilities including offices, truck maintenance and spray booth.

The current activities are approved and are not assessed in this PHA as these would not have a cumulative effect on the potential hazardous or offensive nature of the proposed development.

The proposed activities would present hazards that have been assessed following the methodology of the Multi-Level Risk Assessment of the Department of Planning and Environment.

2.2 PROCESS DESCRIPTION

An overview of the operational processes to be undertaken within the site is provided below.

A new building described as the Resource Recovery Hall would be erected. It has a floor area of 1506 sq metres so it is not a major building.

The design has placed emphasis on the ease of allowing trucks to enter and unload the materials to be processed.

Importantly as regards the potentially offensive assessment, the building space will use the industry best practice of dust and odour suppression using misting sprays. This method has been demonstrated in several MHFs witnessed by the author to be very effective in removing visible dust and preventing odour escaping the buildings.

Waste water treatment is an area of the proposed facility that has been designed to treat the liquid wastes brought to site and the waste water generated from cleaning of the Resource Recovery Hall. From experience at other facilities established to process similar liquid wastes, the type of waste water treatment equipment proposed is effective in preventing uncontrolled odours being released.

Medical wastes have limited potential to release offensive odours due to the controls that are inherent in the transport system used by the health system. Experience at several facilities has shown that the handling processes proposed to not extend to a destruction or autoclaving process. Therefore opportunities for offensive smells to be released do not exist. The proposal is not extending to processing of the medical wastes.

2.3 HOURS OF OPERATION

Site operations would be 24 hours per day, seven days per week. This would allow services to be offered in peak waste collection times and minimise congestion and travel time associated with operations during peak hours. Sufficient storage would be incorporated to enable off peak deliveries to and from the facility.

3. SITE DETAILS

3.1 SITE LOCATION

The site is located at Unit 3, 184 Gilmore Road, Queanbeyan West NSW and is described as Lots 348, 349, 350 DP 8456; Lot 2 DP 1000911; and part of Lot 1 DP 1169293. The site is comprised of approximately 1,400 m^2. The proposed site is located within the Queanbeyan Local Government Area. Figure 3-1 and Figure 3-2 show the location of the site in its local context.

The subject site is zoned IN1-General Industrial Use.

These figures show the site within the industrial/commercial area of Queanbeyan.

Shown on Figure 3-1 are nearest receiver locations R1 to R4 that are identified further in Sub-Section 3.2.

Figure 3-4 shows the site layout.

3.2 NEAREST IDENTIFIED SENSITIVE RECEPTORS

The following residences and sensitive receivers were considered as the nearest receptors for the assessment.

Table 3-1: Location of the Nearest Sensitive Receptors

Receptor ID	Address/Location	Bearing	Approximate Distance (m)
R1	Woods Lane, Harman	W	503
R2	54 Lorn Road, Crestwood	NE	238
R3	15 John Bull Street, Queanbeyan West	SE	228
R4	27 Graham Place, Queanbeyan West	S	578

As noted earlier, Figure 3-1 provides an aerial photograph of the site and the nearest sensitive receptor locations.

Figure 3-1: Site Location

Source: Google Earth Pro © 2015

Figure 3-2: Site Location – close up view

Source: https://maps.six.nsw.gov.au/

Figure 3-3: LEP 2012

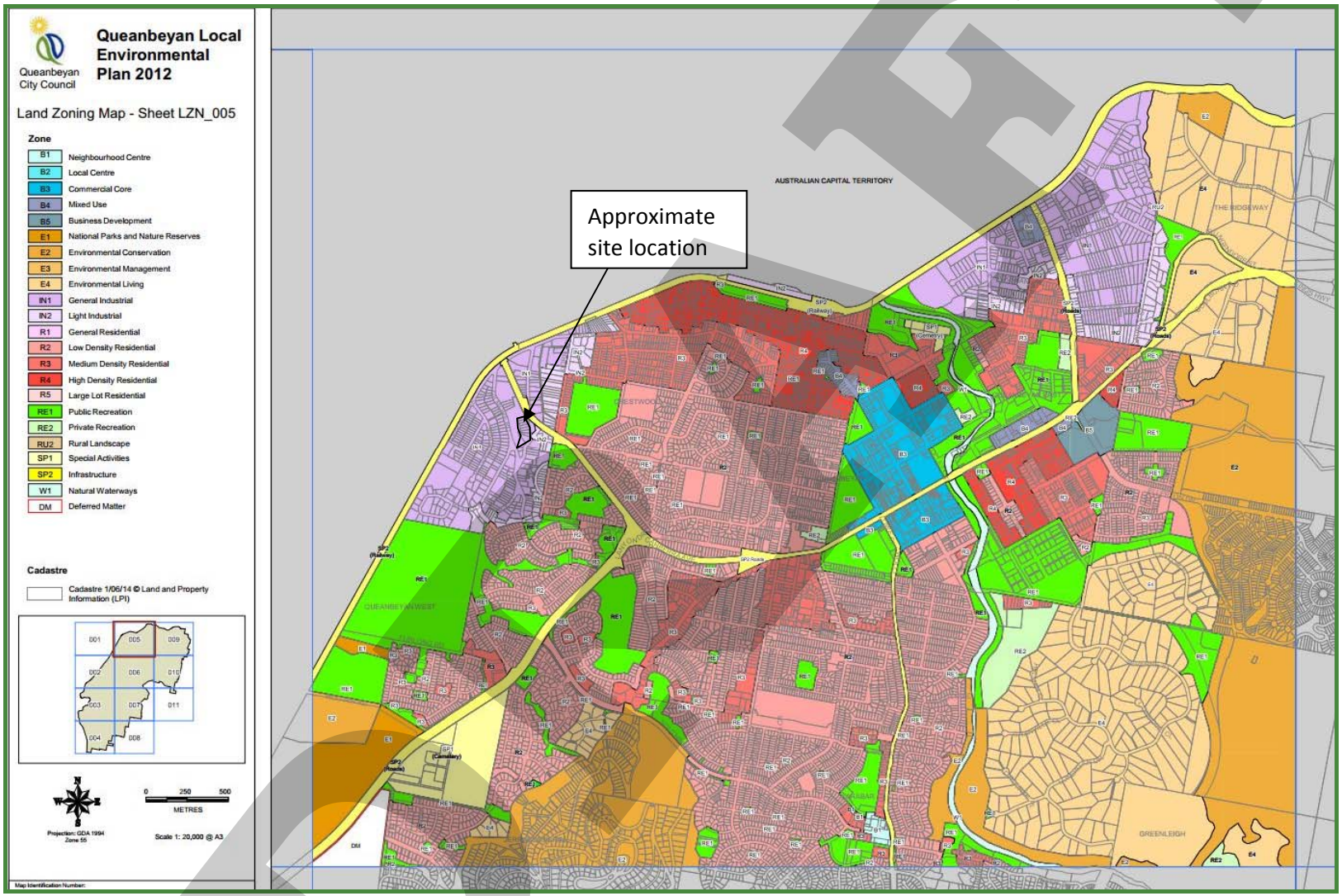
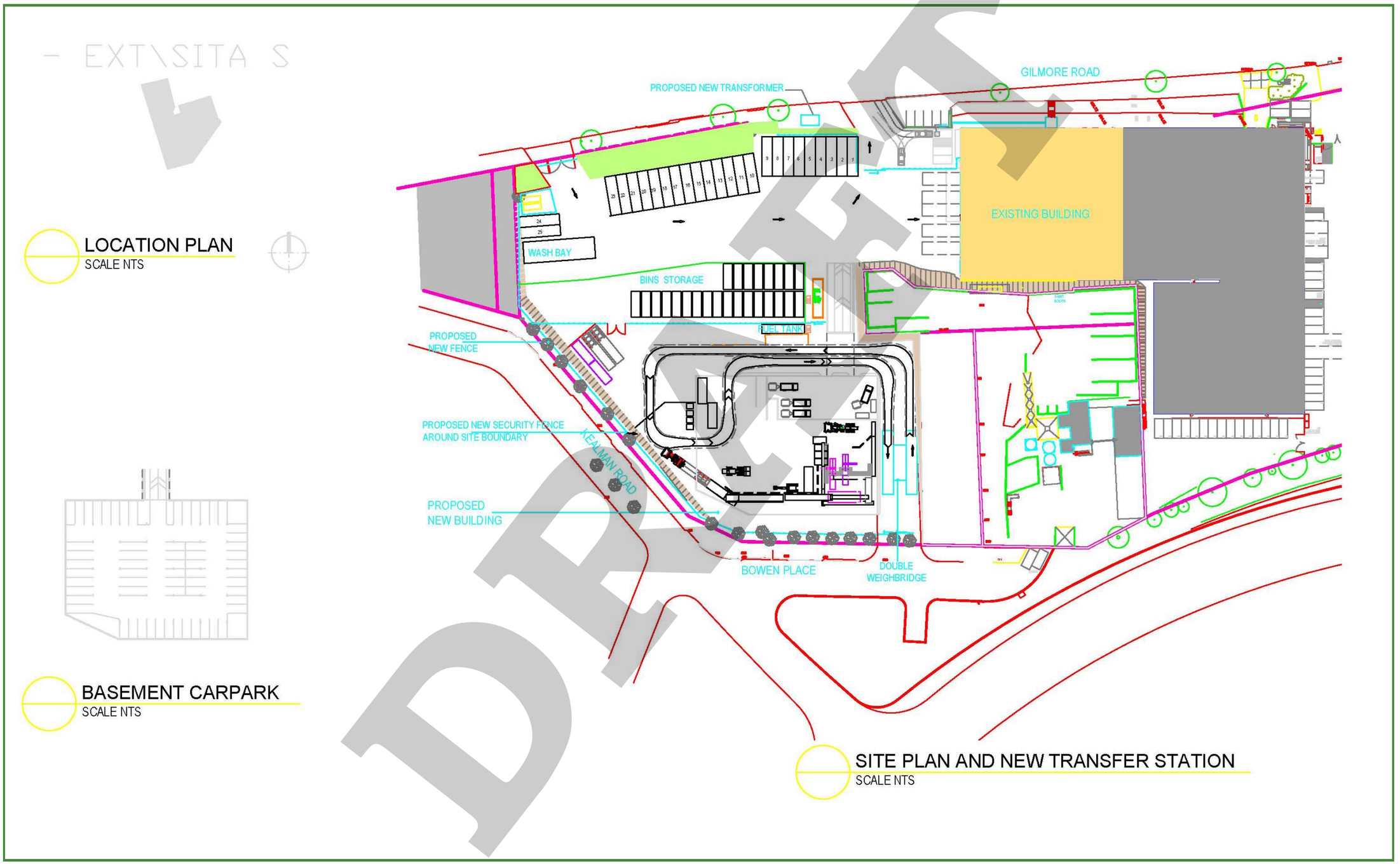


Figure 3-4: Site Plan



4. DANGEROUS GOODS STORAGE & HANDLING

4.1 QUANTITIES OF DANGEROUS GOODS

Dangerous goods in the process of changing to being classified as equivalent Global Harmonised System (GHS) categories under the Work Health and Safety Regulations. However, as the relevant guidelines including those published by the Department of Planning & Environment still refer to chemicals using the Australian Dangerous Goods Code (ADGC), the original DG classes have been referred to in this assessment.

The proposed facility will store several types of dangerous goods. The maximum storage quantities of chemicals will include the following:

- Class 3 PG II/III – paints and solvents <500 L
- C1 Combustible Liquids – diesel fuel 10,000 L
- C2 Combustible liquid – oils 820 L
- Class 6.2 Medical/clinical wastes
- Class 8 PG III – 200 kg battery acid

The chemicals stored and handled onsite have been assessed against the screening threshold of SEPP 33 as a preliminary assessment to identify whether or not the proposed operation is considered to be potentially hazardous or offensive.

4.2 DANGEROUS GOODS SCREENING AGAINST SEPP33 THRESHOLDS

Dangerous Goods to be stored onsite have been assessed against the screening threshold limits outlined in *"Applying SEPP 33,"* a guideline published by the Department of Planning and Environment. This initial screening process determines whether the proposal is potentially hazardous, and provides guidance on the level of analysis that is required.

Table 4-1 presents the Classes of dangerous goods – the quantity that exceeds the threshold quantity and would therefore trigger SEPP 33.

In this table where there is none to be stored, the threshold quantity is not applicable to the assessment.

In the screening table, combustible liquids are not relevant. Diesel fuel is a C1 combustible liquid and is not a flammable liquid although it is frequently misinterpreted as being a flammable liquid. The flashpoint of diesel is above the flashpoint of class 3 PGIII flammable liquid.

The medical wastes, although not including the types of clinical wastes that can be generated, would be limited to needles (sharps), tissues and similar medical wastes with low level risks. The more potentially infectious medical wastes – usually termed clinical and may contain pathological or anatomical wastes, are not being brought to site in this assessment.

Table 4-1: Comparison of Screening Threshold Quantities by SEPP 33

Class	Description	Quantity to be stored	Threshold Quantity	Triggers SEPP33
Class 1.2	Explosives	None	N/A	N/A
Class 1.3	Explosives	None	N/A	N/A
Class 2.1	Flammable Gases	None	N/A	N/A
Class 2.2	Non-Flammable Gases	None	N/A	N/A
Class 2.3	Toxic gases	None	N/A	N/A
Class 3 PGI	Flammable Liquid	None	N/A	N/A
Class 3 PGII and PGIII	Flammable Liquids	500 L	10 tonnes at 1 m from site boundary	**No**
Class 4.1	Flammable Solid	None	N/A	N/A
Class 4.2	Flammable Solid	None	N/A	N/A
Class 4.3	Dangerous when wet	None	N/A	N/A
Class 5.1	Oxidising Substances	None	N/A	N/A
Class 5.2	Organic Peroxides	None	N/A	N/A
Class 6.1 PGII and PGIII	Toxic Substances	None	N/A	N/A
Class 6.2	Infectious Substances	0.5 T	0.5 T	**Yes**
Class 8 PGI	Corrosive Substances	None	N/A	N/A
Class 8 PGII	Corrosive Substances	None	N/A	N/A
Class 8 PGIII	Corrosive Substances	200 kg	50 tonne	**No**
Class 9	Miscellaneous	None	N/A	N/A

4.3 DANGEROUS GOODS STORAGE REQUIREMENTS

The site would be designed to conform to the *Work Health and Safety Regulation 2011,* and relevant Australian Standards.

All dangerous good storage and handling practices would comply with:

- Work Health and Safety Act 2011;
- Work Health and Safety Regulation 2011;
- Dangerous Goods (Road and Rail Transport) Act 2008;
- Dangerous Goods (Road and Rail Transport) Regulation 2009;
- How to Manage Work Health and Safety Risks Code of Practice 2011;
- AS/NZS 4804:2001 – "Occupational Health and Safety Management Systems – General Guidelines on Principles, Systems and Supporting Techniques";
- AS 3780—2008 – "The Storage and Handling of Corrosive Substances";
- AS 1940:—2004 – "The Storage and Handling of Flammable and Combustible Liquids";
- SafeWork Australia – National Standard for the Storage and Handling of Dangerous Goods [NOHSC:1015 (2001)];
- SafeWork Australia – National Code of Practice for the Storage and Handling of Dangerous Goods [NOHSC:2017 (2001)];

- How to manage risk of hazardous chemicals (N.S.W. Code of Practice provided as guidance until approved in 2012);
- Globally Harmonised System of Classification and Labelling of Chemicals 5th Revised Edition (2011);
- Guidance on the Classification of Hazardous Chemicals under the WHS Regulations;
- Safe Work Australia ISBN 978-0-642-78340-0; and
- Australian Dangerous Goods (ADG) Code 7th Edition.

Dangerous goods would be stored based on their compatibilities. Incompatible substances would be segregated in accordance with AS/NZS 3833:2007.

The following classes would be kept separate by at least 5m:

- Class 3 flammable liquids and Class 8 corrosive substances

The presence of these two dangerous goods was previously assessed and granted approval.

The medical wastes held in the "yellow" bins transported from hospital and medical clinics would be brought to site and stored in a separate area until sufficient numbers of "yellow" bins are available for transport to the treatment site.

The operation is therefore limited to a holding facility and the bins remain sealed shut and are not opened.

Therefore the hazard generated by their presence on site is very limited.

5. HAZARD ANALYSIS

5.1 LEVEL OF ASSESSMENT

The Multi-Level Risk Assessment approach has been developed and recommended by the Department of Planning and Environment (DoP&E). It relies on a systematic and analytical approach to the identification and analysis of hazards and the quantification of offsite risks assessing any risk tolerability and landing use safety implications. The DoP&E has advocated a merit-based approach, wherein the level and extent of analysis must be appropriate to the hazards present and therefore, need only progress to the extent necessary for the particular case.

There are three levels of assessment specified in the Multi-Level Risk Assessment (DoPI 2011) document and they are listed below.

Level 1 – Qualitative Analysis: primarily based on the hazard identification techniques. A level 1 assessment can be justified if the analysis of the facility demonstrates Societal Risk in the *negligible zone* and there are no potential accidents with significant off-site consequences.

Level 2 – Partially Quantitative Analysis: using hazard identification and the focused quantification of key potential off-site risk contributors. A level 2 assessment can be justified when the Societal Risk estimates fall within the middle *ALARP zone* or if one or more significant risk contributors had been identified but the frequency of risk contributors having off-site consequences is relatively low.

Level 3 – Fully Quantitative Risk Analysis: based on the full and detailed quantification of risks, consistent with HIPAP No. 6. A level 3 assessment is required where the Societal Risk from the facility estimates fall within the *intolerable zone* or where there are significant off-site risk contributors, and a level 2 assessment is unable to demonstrate that the risk criteria will be met.

5.2 METHODOLOGY

The procedures adopted in assessing hazardous impacts, depending on the level of risk assessment required, may involve the following steps:

Step 1: Hazard identification;
Step 2: Hazard analysis (consequence and probability estimations); and
Step 3: Risk evaluation and assessment against specific criteria.

The following sections of the report discuss the hazard identification process as prescribed by the Department of Planning and Infrastructure (DoPI 2011) in the documents *Multi-Level Risk Assessment* and *Hazardous Industry Planning Advisory Paper No* 4 (*HIPAP No. 6) – Guidelines for Hazard Analysis.*

5.2.1 Hazard Identification

This is the first step in the risk assessment. It involves the identification of all theoretically possible hazardous events as the basis for further quantification and analysis. This does not in any way imply that the hazard identified or its theoretically possible impact will occur in practice. Essentially, it identifies the particular characteristics and nature of hazards to be further evaluated in order to quantify potential risks.

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 HIPAP 6, these events do not include occurrences that are a normal part of the operation cycles of the site but rather the atypical and abnormal, such as the occurrence of a significant liquid spill during product transfer operations.

5.2.2 Hazard Analysis

After a review of the events identified in the hazard identification stage and the identification of prevention/protection measures incorporated into the design of the site, any events which are considered to have the potential to result in impacts offsite or which have the potential to escalate to larger incidents are carried over to the next stage of analysis.

5.2.2.1 Consequence Estimation

This aspect involves the analysis and modelling of the credible events carried forward from the hazard identification process in order to quantify their impacts outside the boundaries of the site. In this case, these events typically include fire and the potential effects on people and/or damage to property.

5.2.2.2 Probability Likelihood Estimation

If necessary, the likelihood of incidents are quantified by adopting probability and likelihood factors derived from published data.

5.2.3 Risk Evaluation and Assessment against Specific Criteria

The risk analysis includes the assessment of consequences for each hazardous event and the frequencies of each initiating failure. The results of these consequence calculations together with the probabilities and likelihood figures estimated were then compared against the accepted criteria, as specified by DoP&E. Whether it is considered necessary to conduct the predictions would depend on the probability figures, likelihood estimations, and if the risk criteria are exceeded.

5.3 ASSESSMENT CRITERIA

The risk criteria applied by Department of Planning and Environment are published in the document *Hazardous Industry Planning Advisory Paper No 4* (HIPAP No. 4) - *Risk Criteria for Land Use Safety Planning* (DoPI 2011). The following is a general discussion of the criteria that is used to assess the risk of a development on the surrounding community and environment.

5.3.1 Individual Fatality Risk Levels

The following paragraphs have been reproduced from HIPAP No. 4 to describe individual fatality risk levels:

> *"People in hospitals, children at school or old-aged people are more vulnerable to hazards and less able to take evasive action, if need be, relative to the average residential population. A lower risk than the one in a million criteria (applicable for residential areas) may be more appropriate for such cases. On the other hand, land uses such as commercial and open space do not involve continuous occupancy by the same people.*
>
> *The individual's occupancy of these areas is on an intermittent basis and the people present are generally mobile. As such, a higher level of risk (relative to the permanent housing occupancy exposure) may be tolerated. A higher level of risk still is generally considered acceptable in industrial areas."* (DoPI 2011)

The risk assessment criteria for individual fatality risk are presented below.

Table 5-1: Individual Fatality Risk Criteria (HIPAP No. 4)

Land Use	Risk Criteria x 10^{-6} (per year)
Hospitals, schools, childcare facilities, old age housing	0.5
Residential, hotels, motels, tourist resorts	1
Commercial developments including retail centres, offices and entertainment centres	5
Sporting complexes and active open space	10
Industrial	50

Figures in the table above have been utilised in this assessment.

5.3.2 Injury Risk Levels

HIPAP No. 4 provides guideline criteria for heat of radiation, explosion overpressure and toxic exposure. The quoted requirements from the referenced document have been summarised as follows:

- Guideline criteria for heat of radiation:

  "Incident heat flux radiation at residential and sensitive use areas should not exceed 4.7 kW/m^2, at frequencies of more than 50 chances in a million per year."

- Guideline criteria for explosion overpressure:

  "Incident explosion overpressure at residential and sensitive use areas should not exceed 7 kPa at frequencies of more than 50 chances in a million per year."

- Guideline criteria for toxic exposure:

  "Toxic concentrations in residential areas should not exceed a level that would be seriously injurious to sensitive members of the community following a relatively short period of exposure at maximum frequency of 10 in a million per year."

  and

  "Toxic concentrations in residential areas should not cause irritation to the eyes or throat, coughing or other acute physiological responses in sensitive members of the community over a maximum frequency of 50 in a million per year."

Please note that a risk hazard assessment only examines events that are considered to have the potential for significant off-site consequences and may not entirely reflect all variations in people's vulnerability to risk.

5.3.3 Risk of Property Damage and Accident Propagation

HIPAP No. 4 indicates that siting of a hazardous installation must account for the potential for propagation of an accident, causing a "domino" effect on adjoining premises. This risk would be expected within an industrial estate where siting of hazardous materials on one site may potentially cause hazardous materials on an adjoining premises to further develop the size of the accident.

The criteria for risk of damage to property and of accident propagation are stated as follows:

"Incident heat flux at neighbouring potentially hazardous installations or at land zones to accommodate such installations should not exceed a risk of 50 in a million per year for the 23 kW/m^2 heat flux level."

and

"Incident explosion overpressure at neighbouring potentially hazardous installations, at land zoned to accommodate such installations or at nearest public buildings should not exceed a risk of 50 in a million per year for the 14 kPa explosion overpressure level."

5.3.4 Criteria for Risk Assessment to the Biophysical Environment

The assessment of the ultimate effects from toxic releases into the natural ecosystem is difficult, particularly in the case of atypical accidental releases. Consequence data is limited and factors influencing the outcome are variable and complex. In many cases, it may not be possible or practical to establish the final impact of any particular release. Because of such complexity, it is inappropriate to provide generalised criteria to cover any scenario. The acceptability of the risk will depend upon the value of the potentially affected zone or ecosystem to the local community and wider society.

The suggested criteria for sensitive environmental areas relate to the potential effects of an accidental release or an emission on the long-term viability of the ecosystem or any species within it and are expressed as follows:

"Industrial developments should not be sited in proximity to sensitive natural environmental areas where the effects or consequences of the more likely accidental emissions may threaten the long-term viability of the ecosystem or any species within it."

and

"Industrial developments should not be sited in proximity to sensitive natural environmental areas where the likelihood or probability of impacts that may threaten the long-term viability of the ecosystem or any species within it is not substantially lower than the existing background level threat to the ecosystem."

5.4 Assessment Criteria Applicable to the Proposed Development Application

In accordance with *HIPAP No 4 Risk Criteria for Land Use Safety Planning*, the following discussion of the risk assessment criteria considered applicable to the proposed development has been provided.

5.4.1 Heat-Flux Radiation Criteria

As the chemical to be stored on site include Class 3 flammable goods, the heat flux radiation criteria have been deemed applicable to the site. Heat radiation models have been conducted to determine compliance with these criteria.

The effects of various heat fluxes (radiation) as a result of a fire incident are given in Table 5-2. The HIPAP No 4 paper (DoPI 2011) suggests a heat flux of 4.7 kW/m^2 and a frequency of 50 in a million per year to be used as the risk injury criterion for thermal effects at residential and sensitive use areas.

Table 5-2: Heat Radiation Impact (DoP&E HIPAP No. 4)

Heat Flux Level	Effect
4.7 kW/m^2	Heat radiation level for possibility of injury to persons exposed. This heat radiation level is regarded to be high enough to potentially cause pain in 15-20 seconds and injury after 30 seconds of exposure.
12.6 kW/m^2	Heat radiation level for possibility of fatality at extended exposure and structural failure of nearby affected structures. At this level, injury is highly probable with a significant possibility for fatality to occur. Thin steel may undergo structural failure due to thermal stress and the temperature of wooden structures may increase to a heat where exposure to a naked flame can trigger ignition.
23 kW/m^2	Heat radiation level for possibility of fatality at instantaneous exposure and definite structural failure of nearby unprotected structures. The possibility for fatality is likely at this level, with spontaneous ignition of wood after long exposure and structural failure of unprotected steel due to thermal stress.
35 kW/m^2	Cellulosic material will pilot ignite within one minute's exposure. Significant chance of fatality for people exposed instantaneously.

5.4.2 Explosion Over-Pressure Criteria

As no explosive materials will be stored onsite, the explosion over-pressure criteria has been deemed not applicable.

5.4.3 Toxic Criteria

The toxic exposure criteria have been deemed applicable due to the potential for toxic vapour releases and toxic combustion emissions from the storage of Class 3 flammable liquids. HIPAP No. 4 indicates that citing of potentially hazardous developments also needs to consider the risk from accidental releases into the biophysical environment.

The National Institute for Occupational Safety and Health (NIOSH) and the American Industrial Hygiene Association (AIHA) provides the following 4 categories of health impact criteria which are of relevance during an emergency event:

- Immediately Dangerous to Life or Health (IDLH).
- Emergency Response Planning Guideline 1 (ERPG1).
- Emergency Response Planning Guideline 2 (ERPG2).
- Emergency Response Planning Guideline 3 (ERPG3).

The purpose of the values given for each of these limits for a particular chemical is to assess the capabilities of mitigation safeguards and emergency or accident response plans for the workplace.

These are explained in more detail.

The IDLH limit is defined by the Occupational Safety and Health Administration (OSHA) as:

> *"An atmospheric concentration of any toxic, corrosive or asphyxiant substance that poses an immediate threat to life or would cause irreversible or delayed adverse health effects or would interfere with an individual's ability to escape from a dangerous atmosphere."*

The following are definitions for each ERPG level as defined by American Industrial Hygiene Association, 2008 Emergency Response Planning Guidelines (ERPG) and Workplace Environmental Exposure Levels (WEEL) Handbook:

> *"The ERPG-1 is the maximum airborne concentration below which it is believed nearly all individuals could be exposed for up to 1 hour without experiencing more than mild, transient adverse health effects or without perceiving a clearly defined objectionable odour.*
>
> *The ERPG-2 is the maximum airborne concentration below which it is believed nearly all individuals could be exposed for up to 1 hour without experiencing or developing irreversible or other serious health effects or symptoms that could impair an individual's ability to take protective action.*
>
> *The ERPG-3 is the maximum airborne concentration below which it is believed nearly all individuals could be exposed for up to 1 hour without experiencing or developing life-threatening health effects."*

The ERPG-2 level can be considered synonymous to the IDLH limit, although it has been observed that both slightly vary from each when comparing values for each contaminant. For this reason, both IDLH and ERPG limits were required to be considered in this assessment.

There are no toxic emissions associated with the proposed operations.

There are no pathogens released from the simple process of storing the bins of sharps and used tissues that form the bulk of the types of medical wastes to be handled.

A more detailed assessment would be needed if an autoclave or incinerator was to be used.

5.4.4 Biophysical Environment Risk Criteria

The site is located within an established industrial area. The proposed area would be fully paved and sufficiently bunded to accommodate the proposed storage of any chemicals, oils or fuel.

Any leaks/spills resulting from incidents would be captured within the corresponding bund provided or in the case of the diesel tank, it is of the self bunded type. Spill kits would be provided at all areas that are identified to be prone to spills. A housekeeping inspection would be undertaken regularly to ensure that no leaks or spills would occur on site.

Best practice in housekeeping and operational procedures are part of the established work practices on site. Given this consideration, the proposed development would not introduce any additional risk that may threaten the long-term viability of the development and its effect to the local environment. Consequently, the DoP&E-based criteria have been determined to be readily satisfied and no further analyses or discussions were considered necessary.

5.5 RISK CLASSIFICATION AND FREQUENCY ESTIMATION

The consequences of an accident involving a particular hazardous substance depends on the type and quantity of hazardous substance, the type of activity using the substance as well as the exposed population.

Risk classification and societal risk estimation of the proposed storage of dangerous goods have been conducted in accordance with the prescribed *"Multi-Level Risk Assessment"* guideline published by the Department of Planning and Infrastructure (DoPI). The risk classification and frequency estimation is used to determine the level of assessment required for the facility.

The following sections provide summary of the analysis and the results.

5.5.1 Risk Classification and Prioritisation Method

The Department of Planning and Infrastructure document *"Multi-Level Risk Assessment"* (DoPI 2011) outlines a method of risk classification and prioritisation to assist in assessment of risks. The technique is based on the Manual for classification of risks due to major accidents in processes and other related industries (IAEA rev 1, 1996).

The IAEA method was developed to produce a broad estimate of the risks due to major accidents from the production, storage, handling and transport of hazardous materials. This method relies on broad estimations of consequences and likelihood of accidents which outputs can be used to determine the appropriate level of further assessment. The technique involves three stages:

- Estimation of the consequences;
- Estimation of the probability of a major accident happening; and
- Estimation of societal risk.

The risk classification and prioritisation method have been carried out for the proposed storage of Class 3 dangerous goods. These goods were identified to have the potential for significant off-site impacts. The risk classification and prioritisation method does not apply to Class 8 dangerous goods so have thus been omitted from this method. These goods have been assessed in the qualitative analysis provided in Section 5.7.

5.5.1.1 Classification of Type of Activities and Inventories

The classification of the materials stored onsite is provided as Table 5-3 in accordance with the IAEA Table II.

Table 5-3: Estimation and Assessment of the Proposed Development to the IAEA Method

Scenario	Assumptions / Figures Used	IAEA Method Criteria	Scenario Criteria Comparison & Comments
Storage of 100 tonnes of Class 3 flammable liquids	Vapour pressure <0.3 bar at 20°C	IAEA Table IV(a) provides classification of BI	Maximum affected distance is 25–50 m with an effect area of 0.8 ha

5.5.1.2 Estimation of Consequences

The consequences of a major accident would depend on the type of substance, activity, the quantities of dangerous goods involved, and the population exposed to the predicted consequence. After excluding substances and activities which neither present a significant offsite risk nor could potentially affect adjacent inventories, the following steps were undertaken:

- Classify the activity;
- Estimate the effect distances and areas;
- Estimate the population distribution; and
- Consider Mitigation Correction Factors, which takes into account possible mitigation actions that people could take in the subject event, such as evacuation and sheltering.

An estimate of the external consequences of a major accident may be calculated using these factors.

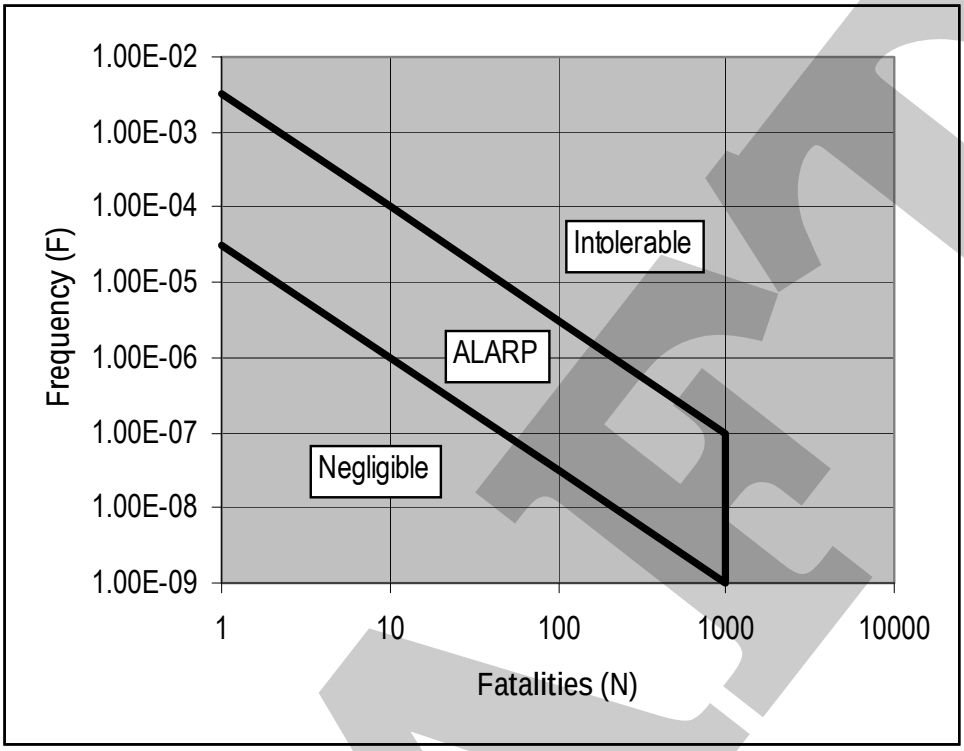
As for this proposal, the only dangerous goods that reaches the threshold is the medical wastes – class 6.2.

The Multi-Level Risk Assessment provides the following advice:

> ***"Dangerous Goods Classes 6.2–8***
> *These Classes cover infections (Class 6.2), radioactive (Class 7) and corrosive substances (Class 8) and prioritisation technique does not apply.*
>
> *Their storage and handling are generally covered either by stringent standards and codes (radioactive substances) or have limited potential for off-site harm (corrosive and infectious substances) provided appropriate technical and management controls are observed."*

Therefore there are no events that need to be further assessed based on the F-N curve (Figure 5-1).

Figure 5-1: IAEA F-N Curve – Indicative Societal Risk Criteria



5.6 ASSESSMENT OF A POTENTIALLY OFFENSIVE INDUSTRY

The management practices in place within a Resource Recovery Facility have had the benefit of many years of development of controls that are adopted by the highly professional resource recovery operators such as SITA. The EIS has correctly identified the safety and environmental management systems and plans that are required.

Licensing of the site by the NSW EPA would also require an Environmental Management Plan and Pollution Incident Risk Management Plan to be in place.

The site warrants having an Emergency Plan in place which details the finding of the PIRMP and the safeguards that are needed.

The operations would not warrant being considered to be potentially offensive with the safeguards that are recommended in the EIS.

5.7 HAZARD IDENTIFICATION

The level of assessment required is dependent on a risk-based method which relies on broad estimations of consequences and likelihood of accidents.

A level 2 risk assessment involves the hazard identification step, which examines all possible failure scenarios and their consequences to ensure that all incidents with possible off-site consequences are identified. Those events that could contribute to off-site risk will then be examined in further detail of the consequences and likelihood in order to demonstrate that quantitative risk criteria will not be exceeded.

5.7.1 Hazardous Materials

The potentially hazardous chemicals to be stored on site include combustible liquids and Class 8 dangerous goods. A summary of the properties and potential hazards of these substances is given below.

5.7.1.1 C1 Combustible Liquids

These liquids do not produce vapour under ambient temperature conditions and therefore have fewer hazards compared to flammable liquids.

The storage and handling of combustible liquids therefore present limited hazards that extend to the following:

- Risk of fire;
- Risk of spillage inside the warehouse;
- Risk of fume generation;
- Risk of subsoil contamination;
- Risk of contamination of an external area during truck unloading and loading with subsequent rainfall causing stormwater contamination.

The safeguards to mitigate and reduce the level of risk to a satisfactory level are based on adherence to recognised standards of practice. The standards applied are those based on the following:

- AS 1940–2004 *The storage and handling of flammable and combustible liquids*; and
- NFPA 30: *Flammable and Combustible Liquids Code.*

The following precautions should be observed for any storage facility of Class 3 flammable liquids and combustible liquids.

The following minimum safe working procedures need to be followed:

- Flammable and combustible liquids must be stored away from ignition sources (e.g. flames, electrical equipment, grinding and cutting operations) and excessively hot locations;
- All containers must be kept closed when not in use (including containers for waste liquids);
- Any action to open or decant from a container of flammable liquid must be carried out in a well ventilated area and sufficiently distant from any potential ignition source so as to ensure safety having due regard to the quantity being handled;
- Combustible wastes or residues must not be kept or left in areas where flammable or combustible liquids are stored or decanted;

- Materials that might interact dangerously with flammable and combustible liquids must be store separately from them. In particular oxidising agents must be stored separately;
- All people handling flammable and combustible liquids must be familiar with their hazardous properties and the necessary safety procedures for handling them;
- Any spillage must be cleaned up immediately;
- Flammable and combustible liquids must not be stored or used where they may jeopardise escape from a room or building in the event of a fire; and
- Where the quantities of flammable liquids stored is greater than minor quantities, a warning sign must be displayed (as illustrated below).

5.7.2 Class 8 Corrosive Substances

Corrosive substances have characteristics that cause corrosion to the skin, eyes and respiratory system if spillages occur and contact is made with a person's body.

Corrosive substances if spilt can readily corrode the surfaces of building floor, wall cladding and structural steel.

Different chemicals belonging to Class 8 corrosive substances can be compatible and can be reactive.

5.7.3 Hazardous Events

The identification of possible hazardous events for this facility has been prepared and a comprehensive list of credible and significant incidents is provided in the form of a Hazard Identification Chart given below.

5.7.3.1 Hazard Identification Chart

A Hazard Identification Chart has been prepared for the proposed site based on operating scenarios that are relevant to the proposed development. This chart outlines the outcomes from the hazard identification phase of the assessment.

The chart consists of four columns:

Column 1
Heading: Functional/Operation Area
The area of the site involved with the potential event is listed.

Column 2
Heading: Possible Initiating Event
The individual events that are considered to be likely or realistic are then listed. Where the possible consequences are similar the events are listed together, each one individually numbered.

Column 3
Heading: Possible Consequences
The outcomes of an event if it occurred are listed.

Column 4
Heading: Prevention/Protection Measures
The measures designed into the functional/operation area and the site are listed. These measures may include for example safeguards, design features, management methods and/or operator training.

The hazard identification chart is presented in Table 5-4.

Table 5-4: Event/Consequence Analysis Table

Functional/Operational Area	Possible Initiating Event	Possible Consequences	Prevention/Protection Measures
1. Building – storage of C1 combustible liquids	1. Spill of diesel fuel. 2. Spill causes fire.	1. Spill is immediately detected and cleaned up without incident. 2. Spillage escapes to stormwater. 3. Spilt liquid is ignited. 4. Spilt liquid finds source of ignition and results in fire. 5. Heat radiation reaches other areas causing fire. 6. Pollution via fire fighting water. 7. Toxic combustion fumes impacts on employee and neighbouring resident's health and safety.	1. All storage areas of combustible liquids would be in accordance with AS 1940—2004. 2. All storage areas of corrosive substances would be in accordance with AS 3780—2008 and is in a roofed area. 3. Site stormwater system will be designed in accordance with relevant Australian Standards. 4. Safety shower and eye wash installed. 5. Incompatible substances not stored within the same areas.
2. Loading/Receiving areas for waste liquids	1. Spill of liquids.	1. Spill of material. 2. Material escapes to stormwater. 3. Waste liquid odour impacts on employee's personal health and safety.	1. All waste liquid transfer operations are supervised by experienced operators trained in safe operating procedures. 2. Site stormwater system will be designed in accordance with relevant Australian Standards. 3. Spill control equipment is provided near the unloading area. Employees are in regular attendance to implement spill control procedures.

Table 5-4: Event/Consequence Analysis Table

Functional/Operational Area	Possible Initiating Event	Possible Consequences	Prevention/Protection Measures
2. Unloading Areas	1. Leak during waste liquid transfer.	1. Spillage contained in bunded site. 2. Spill enters stormwater drain(s).	1. The site would be protected via hose reels, hydrants and fire extinguishers and are installed and maintained in accordance with the relevant Australian Standards. 2. Spill kits are readily available for treatment of spills 3. Site induction is established on site for employees and visitors, which would address matters on safety, hazards, and procedures to adhere with on site. 4. Appropriate emergency procedures are available for the site and all staff will be trained in the appropriate emergency procedures

6. CONTAINMENT OF CONTAMINATED FIRE FIGHTING WATER

The methodology for calculating the amount of contaminated fire fighting water to be contained and the methodology of containment follow the recommendations in the document *HIPAP No. 2 - Fire Safety Study Guidelines* (2011) and the *Best Practice Guidelines for Contaminated Water Retention and Treatment Systems* (NSW Gov. 1994).

6.1 IDENTIFICATION OF MATERIALS AND HAZARDS

The principal potential hazard that could occur on the site that would produce contaminated water would be a fire. It is expected that the firewater used to fight or contain a fire would become contaminated with some of the hazardous materials that are kept at the site.

During a fire event it is expected that depending on the location and extent of the fire part of these hazardous materials would be combusted and that some would be spilt as a result of containers failing due to thermal stress. These spilt hazardous liquids would therefore contaminate the spent firewater.

6.2 CONSEQUENCES OF CONTAMINATED FIRE WATER

If no system were in place to contain used firewater then it would enter the site stormwater system, and would flow off site, into local waterways. If the water was contaminated with significant levels of hazardous materials, there is the potential for an impact on the waterways. In recognition of this a containment system has been devised and has been put into place.

6.3 ESTIMATION OF POTENTIAL CONTAMINATED FIREWATER VOLUMES

A worst-case fire scenario at the site has been used to calculate the maximum amount of contaminated firewater that would be generated in such an event. This would involve a fire consuming a large proportion of the site and Fire & Rescue NSW using a large number of services available, which include the following:

- 3 Fire Hydrants; and
- 6 Hose Reels;

Thus the discharges of these for 90 minutes will be equal to:

Table 6-1: Containment of Contaminated Firewater

Total Containment Required	
Resource Recovery Hall	
Hose reels Operational discharge of 0.3 L/s 0.3 L/s x 60 s/min x 90 min = 1,620 L 4 x 1,620 L = 6,480 L	6,480 L
Fire Hydrants Operational discharge of 10L/s 10L/s x 60s/min x 90 min. = 54,000L 2 x 54,000 L = 108,000 L	108,000 L
Total firewater containment required	**114,480 L**
Total Containment Provided	
Building Bunding Warehouse area 1,500 m^2, bund height 76 mm	**255,500 L**
Total firewater containment provided	**255,500 L**

Based on the calculations shown above, the site would have a sufficient amount of water containment to contain 90 minutes of fire fighting water on the site.

6.4 Analysis of Contaminated Fire Fighting Water, Treatment and Disposal

Fire fighting water would require analysis prior to being removed from the site. Pending the results, the water would be either disposed off-site by a licensed liquid disposal contractor or discharged to stormwater.

Analysis would involve sampling the firewater with the subsequent analysis conducted by a NATA accredited laboratory. The water would be analysed for specific analytes based on the location of fire and the types of contaminants that may have potentially contaminated the firewater. The results of the analysis would be compared against the current Australian water quality benchmarks. If the criteria are satisfied, the water would be discharged to stormwater. Otherwise the water would have to be pumped into a series of road tankers and disposed by a licensed liquid disposal contractor.

The firewater would be held on site for the time taken for analysis to be completed. The maximum time expected would be 24 hours. If at any stage rain threatened the contaminated firewater storage to overflow then the contained waters would be immediately assumed to be contaminated and a licensed contractor commissioned to pump the contaminated water and remove from site.

7. HAZARD AND RISK ANALYSIS

Table 7-1: Hazard and Risk Register

Event Number	Hazard Identification Guide Word	Hazardous Event	Causes	Prevention Safeguards	Consequences	Mitigation Safeguards	Consequences	Likelihood	Existing Risk Rating	Is the risk ALARP?	Additional Safeguards	Consequence	Likelihood	Residual Risk Rating
1. General Site Risks														
1	External Fire / Explosion	Vehicle fire	Brake fire. Tyre fire. Fuel leak (e.g. fork lift trucks (FLT) use LPG) and fire. Batteries short-circuiting. Packaging fires	Vehicle design and maintenance, vehicles registered , EPA licensed drivers, inspected vehicles, no smoking on site (except in the designated area), hot work permit	Damage to the vehicle, propagation to wastes' storage and property damage	Operator response to oil leaks, fire extinguishers, fire water available from hydrants and hand-held hoses, emergency response plan includes actions to take if a fire occurs	Significant	Unlikely	III	Yes		Significant	Unlikely	III
2	Activity Hazards	Injury to the heavy vehicle driver	Lifting the side gates into place on a heavy vehicle	Cage designed to be of minimum weight, cage supported by hangers	Injury requiring medical treatment and possibly a lost time injury	Trained First Aider on site, First Aid facilities	Severe	Possible	II	No	An additional trained First Aid person is required on site, e.g. to cover annual leave	Severe	Possible	II
3	Environmental Pollution	Potential for environmental impact from vehicle fuel or oil leaks	Fuel or oil leaks from vehicles, i.e. leaching through the bitumen or entering the stormwater system with the ultimate potential to flow off-site to the local creeks.	Vehicle design and maintenance, vehicles registered, EPA licensed drivers, inspected vehicles	Impact to the aquatic life in the local creeks.	Spill kit on liquid wastes vehicle, emergency response plan with sand bags and the requirement to close the stormwater isolation valve to the local creeks.	Significant	Possible	III	No	Obtain hydrocarbon spill kits for the site	Significant	Unlikely	III
					Potential for a fine (business impact)		Minor	Possible	III			Minor	Unlikely	III

Table 7-1: Hazard and Risk Register

Event Number	Hazard Identification Guide Word	Hazardous Event	Causes	Prevention Safeguards	Consequences	Mitigation Safeguards	Consequences	Likelihood	Existing Risk Rating	Is the risk ALARP?	Additional Safeguards	Consequence	Likelihood	Residual Risk Rating
4	Transport Hazards	Impact from FLT	Driver error. Excessive speed. Poor visibility, e.g. corners of warehouses	All FLT drivers licensed, site speed limit, observations of work practices by management, mirrors on warehouse corners	Injury to personnel	Trained First Aider on site, First Aid facilities	Severe	Possible	II	No	Formalise work practice reviews by management, e.g. via an audit program. Include in the site induction the site speed limit	Severe	Unlikely	III
					Damage to property, e.g. FLT rollover	Maintenance and repair	Minor	Possible	III	No		Minor	Unlikely	III
5	Transport Hazards	Loss of load whilst using a FLT	Rough floor surface. Tynes piercing containers and packages. Driver error. Excessive speed. Poor visibility	All FLT drivers licensed, site speed limit, observations of work practices by management, mirrors on warehouse corners	Injury to personnel if pallet dropped from a height	Routine maintenance of the roads to fix cracks and holes, trained First Aider on site, First Aid facilities	Ex. Serious	V. Unlikely	III	Yes		Ex. Serious	V. Unlikely	III
					Release of materials leading to environmental impact	Housekeeping and spill response.	Severe	Ex. Unlikely	III	Yes		Severe	Ex. Unlikely	III

Table 7-1: Hazard and Risk Register

Event Number	Hazard Identification Guide Word	Hazardous Event	Causes	Prevention Safeguards	Consequences	Mitigation Safeguards	Consequences	Likelihood	Existing Risk Rating	Is the risk ALARP?	Additional Safeguards	Consequence	Likelihood	Residual Risk Rating
6	External Fire / Explosion	Warehouse fire	Ignition of packaging (i.e. cardboard), plastic wrap, wooden pallets, wooden structures. Vehicles fires. Conveyor fires. Smoking. Lightning strike. Grass fires. Adjacent property fires. Arson. Broken fluorescent light. Appliance fire, e.g. stove in a building amenities.	Vehicle design and maintenance, licensed FLT drivers, no smoking on site (except in the designated area), hot work permit, landscaping to keep grass level low, security system including fully fenced site, locked gates when facility not in use, smoke detectors within selected buildings	This can result in toxic products of combustion equipment and property damage from radiant heat, missiles (e.g. LPG cylinders), rupturing of containers and contaminated fire water runoff.	Fire water from hydrants, emergency response including off-site evacuations, hand held hoses and extinguishers for small fires	Ex. Serious	Unlikely	II	No	Provide covers over all lights within the warehouse. Provide routine electrical testing for all electrical leads and earth leakage detectors at the site. Incompatible materials should not be stored in the same area.	Ex. Serious	Unlikely	II

Table 7-1: Hazard and Risk Register

Event Number	Hazard Identification Guide Word	Hazardous Event	Causes	Prevention Safeguards	Consequences	Mitigation Safeguards	Consequences	Likelihood	Existing Risk Rating	Is the risk ALARP?	Additional Safeguards	Consequence	Likelihood	Residual Risk Rating
7	Harmful Exposure	Splashing by a liquid waste.	Failure of a hose or pump seal. Spill of a "yellow" bin containing medical wastes.	Housekeeping and immediate clean-up of a spill, waste water pit contains water and hence dilution occurs, management observation of work practices. Separate and isolated storage area for medical wastes.	Ultimate impact is harm to people.	Work practices, preventative maintenance.	Severe	Unlikely	III	No	None required.	Severe	Unlikely	III
					This could also result in off-site impact to people (i.e. adverse public relations)		Serious	Unlikely	III			Serious	Unlikely	III

Table 7-1: Hazard and Risk Register

Event Number	Hazard Identification Guide Word	Hazardous Event	Causes	Prevention Safeguards	Consequences	Mitigation Safeguards	Consequences	Likelihood	Existing Risk Rating	Is the risk ALARP?	Additional Safeguards	Consequence	Likelihood	Residual Risk Rating
8	Activity Hazards	Manual handling injuries due to personnel lifting containers and boxes	Inadequate lifting techniques, one person lifting a 40 kg container (a two person activity)	Training program on correct lifting techniques, signage, observations by management, toolbox talks on issues such as correct lifting techniques, job rotation	Injuries, e.g. back injuries, and chemical exposure injuries (skin and eyes). Potential for spillage of solutions.	Medical treatment required	Severe	Probable	II	Yes		Severe	Probable	II
9	Activity Hazards	Personnel exposed to a strong odour	Spill cleaning. Operating waste water treatment plant	Skin protection via sprayed on barrier cream	Harm to skin, lungs, eyes	Medical treatment required	Minor	Probable	III	No		Minor	Probable	III
10	Natural and Other Occurrences	Aircraft crash	Pilot error, plane failure	Aviation standards for aircraft design, maintenance and safe operation	Significant damage and injury toll across the site	Emergency response	Catastrophic	Ex. Unlikely	III	Yes		Catastrophic	Ex. Unlikely	III
11	Activity Hazards	Lone workers	Activities on site where personnel are working in isolation	Supervisors conduct regular visits to all work areas	In an emergency, assistance may be inadequate	Emergency response	Serious	Possible	II	No	Implement means for detecting when lone workers are in need of emergency assistance	Serious	Unlikely	III

Table 7-1: Hazard and Risk Register

Event Number	Hazard Identification Guide Word	Hazardous Event	Causes	Prevention Safeguards	Consequences	Mitigation Safeguards	Consequences	Likelihood	Existing Risk Rating	Is the risk ALARP?	Additional Safeguards	Consequence	Likelihood	Residual Risk Rating
12	Harmful Exposure	Flammable or combustible liquid.	Ignition of packaging (i.e. cardboard), plastic wrap, wooden pallets, wooden structures. Vehicles fires. Conveyor fires. Hot work. Smoking. Lightning strike. Grass fires. Adjacent property fires. Arson. Broken fluorescent light. Appliance fire, e.g. stove in offices.	Vehicle design and maintenance, licensed FLT drivers, no smoking on site (except in the designated area), hot work permit, landscaping to keep grass level low, security system including fully fenced site, locked gates when facility not in use, smoke detectors within selected buildings	Potential to release decomposition products	Fire water from hydrants, emergency response including off-site evacuations, hand held hoses and extinguishers for small fires	Severe	V. Unlikely	III	Yes		Severe	V. Unlikely	III
13	Exposure to Damaging Energy	Electrocution	Contact with electricity due to poor quality electrical lead, damaged conduits, e.g. submersible pump for the waste liquid concrete underground tank	Earth leakage protection on all GPOs	Fatality	Emergency response	Ex. Serious	Unlikely	II	No	As above, implement electrical safety testing	Ex. Serious	V. Unlikely	III
14	Activity Hazards	Contact with moving parts		Observations by management, operator training and awareness	Injury if clothing and body caught in the machines	Trained First Aider on-site and First Aid facilities	Severe	Possible	II	No	As above, include formal reviews of machine safety	Severe	Unlikely	III

Table 7-1: Hazard and Risk Register

Event Number	Hazard Identification Guide Word	Hazardous Event	Causes	Prevention Safeguards	Consequences	Mitigation Safeguards	Consequences	Likelihood	Existing Risk Rating	Is the risk ALARP?	Additional Safeguards	Consequence	Likelihood	Residual Risk Rating
15	Violent Release of Energy	Compressed air hose failure	Inadequate connection, hose degradation, coupling failure	Hoses inspected annually and replaced as required, operators respond to leaking hoses for maintenance, low pressure in the hoses, hoses tied when in use	Injury to personnel if struck with a flaying hose	Medical treatment required	Significant	Unlikely	III	Yes		Significant	Unlikely	III
16	Activity Hazards	Confined space entry	Person enters a tank or pit	Work permits	Potential for fatality		Ex. Serious	V. Unlikely	III	No	Review means to prevent people falling through tank manholes. Identify all confined spaces on the site and then produce confined space risk assessments	Ex. Serious	V. Unlikely	III
17	Natural and Other Occurrences	Software theft	Hacking	Firewalls	Loss of company confidential information		Serious	V. Unlikely	III	Yes		Serious	V. Unlikely	III

Table 7-1: Hazard and Risk Register

Event Number	Hazard Identification Guide Word	Hazardous Event	Causes	Prevention Safeguards	Consequences	Mitigation Safeguards	Consequences	Likelihood	Existing Risk Rating	Is the risk ALARP?	Additional Safeguards	Consequence	Likelihood	Residual Risk Rating
2. Front Gate Activities														
18	Transport Hazards	Heavy vehicle movement resulting in impact	Heavy vehicle brake failure (i.e. unplanned movement down the slope). Driver error	Modern vehicle design includes brakes being locked when the motor is off	Injury to people and/or damage to equipment (including other vehicles). This could also result in pallets falling off the heavy vehicle resulting in spills and/or injury	Medical treatment	Ex. Serious	V. Unlikely	III	No	Use wheel chocks to prevent trucks rolling down the slope	Ex. Serious	V. Unlikely	III
19	Transport Hazards	Fork lift truck operations when pallet loaded onto a truck (applies for all similar operations across the site)	Dropping pallets off tynes. Impact with people, heavy vehicle and/or property. Piercing of containers. Pinch hazards	Licensed FLT drivers, site speed limit, observation by management, stretch wrap around the packages on the pallets	Injury to people and/or damage to equipment	Medical treatment	Ex. Serious	V. Unlikely	III	Yes		Ex. Serious	V. Unlikely	III

Table 7-1: Hazard and Risk Register

Event Number	Hazard Identification Guide Word	Hazardous Event	Causes	Prevention Safeguards	Consequences	Mitigation Safeguards	Consequences	Likelihood	Existing Risk Rating	Is the risk ALARP?	Additional Safeguards	Consequence	Likelihood	Residual Risk Rating
					Spilt material could cause environmental impact if it flows off-site through the stormwater system	Spill response, stormwater pit outlet isolation valve to be closed in an emergency	Severe	Unlikely	III	Yes		Severe	Unlikely	III
20	Environmental Pollution	Raw materials or products on a vehicle's wheels and driven off-site	Vehicles drive through a spill and material sticks to the wheels of the vehicles	Housekeeping and spill response, small size of the packages limits amount involved, stretch wrapping provides some containment	Potential for materials to pollute the environment when washed into the off-site stormwater drains	Off-site response to contaminants on the roads	Significant	Possible	III	Yes		Significant	Possible	III

8. RECOMMENDATIONS

After having examined the potential hazardous scenarios that could occur on site, the following recommendations are considered to be fundamental in aiding the control of risks presented by the proposed development:

- Dangerous good storage areas are to comply with the following Standards:
  - AS 3780—2008 "*The Storage and Handling of Corrosive Substances*"; and
  - AS 1940—2004 "*The Storage and Handling of Flammable and Combustible Liquids*".
- Specific on site personnel are to be trained in specific site procedures, emergency and first aid procedures and the use of fire extinguishers and hose reels.
- Fire extinguishers and spill control kits are to be provided near high risk areas such as near the waste water treatment plant and the self-bunded diesel tank...
- Site management to prepare and maintain operational procedures to minimise the number of hazardous incidents and accidents on site and to mitigate the consequences of incidents regarding the handling of dangerous goods and chemicals.
- A site Emergency Management Plan to be prepared and to include measures to advise neighbouring premises in the event of an emergency with potential offsite impacts.

9. CONCLUSION

This risk assessment evaluation has found that the operation of the proposed development slightly exceeded the SEPP 33 Screening Thresholds. Hence further assessments have been carried out on the proposed facility in accordance with the Multi-Level Risk Assessment and Hazardous Industry Planning Advisory Papers (HIPAPs) guidelines. The results from this assessment determined that the site's proposed operations are not an offensive or hazardous industry.

The proposed subject site is located within an industrial area. Due to the nature of the operations and the hazard prevention and protection measures proposed for the subject site, it is expected that there would be no increase in hazardous risks to the existing or future residents in the subject area or to the occupants of the industrial area.

It is the conclusion of this assessment that the proposed site and its operations would meet all the safety requirements stipulated by the Department of Planning and Environment. Hence, this facility would not be considered to be an offensive or hazardous development.

If significant changes to the types or quantities of chemicals stored on site were to occur, the reassessment of potential hazards may be required.

Prepared by:

RT Benbow
Principal Consultant

10. 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 Wild Environment Pty Ltd, as per our agreement for providing environmental services. Only Wild Environment Pty Ltd 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 Wild Environment Pty Ltd 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.

11. REFERENCES

DoPI 2011
"Applying SEPP 33," January 2011

DoPI 2011
"Multi-level Risk Assessment," January 2011

DoPI 2011
"Hazardous Industry Planning Advisory Paper No 4 (HIPAP No. 4) –Risk Criteria for Land Use Safety Planning," January 2011

DoPI 2011
"Hazardous Industry Planning Advisory Paper No 6 (HIPAP No. 6) –Hazard Analysis," January 2011

IAEA 1996
"Manual for the Classification and Prioritization of Risks due to Major Accidents in Process and Related Industries, Rev 1," International Atomic Energy Agency, November 1996

LPMA 2010
NSW Land and Property Management Authority 2010

NFPA 491M 1991
"Hazardous Chemical Reactions", National Fire Protection Association, 1991 Edition

FIRE SAFETY STUDY FOR
FOR
WILD ENVIRONMENT PTY LTD
UNIT 3, 184 GILMORE ROAD, QUEANBEYAN WEST

Prepared for: Wild Environment Pty Ltd

Prepared by: R T Benbow, Principal Consultant

Report No: 148188_FSS_Rev1
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(Released: 1 May 2015)

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EXECUTIVE SUMMARY

This Fire Safety Study (FSS) has been prepared by Benbow Environmental to assess the potential fire risk associated with the proposed expansion of a Resource Recovery and Waste Transfer Facility at Unit 3, 184 Gilmore Road, Queanbeyan West, NSW 2620.

The FSS has been prepared to the guidelines outlined in the *Hazardous Industry Planning and Advisory Paper No 2 – Fire Safety Study Guidelines* (HIPAP No 2, Department of Infrastructure and Natural Resources (DIPNR) NSW). These documents are widely applied across Australia.

The Fire Safety Study identifies the hazards relating to fire, resulting from the intended uses of the site. Assessments of the fire threats have then been undertaken and used to develop the fire prevention and fire protection strategy. Essential steps in this process that have been undertaken included:

- Examination of the heat loads from a fire involving waste paper;
- Examination of heat flux levels at adjoining premises; and
- Provide the storage requirements for diesel fuel.

The outcome of this approach is a facility with reduced risks.

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1. INTRODUCTION

This report provides the findings of a Fire Safety Study (FSS) for Wild Environment Pty Ltd's proposed expansion of a Resource Recovery and Waste Transfer Facility. The FSS has been prepared to the guidelines of the Department of Planning, outlined in the *Hazardous Industry Planning and Advisory Paper No 2 – Fire Safety Study Guidelines* (HIPAP No 2, Department of Infrastructure and Natural Resources (DIPNR), NSW). These documents are widely referred to for these studies across Australia.

This study includes an evaluation of potential fire incidents on the site and impacting the local business community. It also makes recommendations for fire fighting equipment necessary to reduce that impact and minimise risk of property damage and pollution. The fire protection strategy is based on the requirements stipulated by the Building Code of Australia (BCA), relevant fire protection codes and relevant Australian Standards.

The proposed facility is located at Unit 3, 184 Gilmore Road, Queanbeyan West. The site is located within the local government area of Queanbeyan City Council. For the purposes of this report, the facility will be referred to as the 'Site' from here on.

1.1 SCOPE OF REPORT

This FSS has been carried out in accordance with the *Hazardous Industry Planning and Advisory Paper No 2 – Fire Safety Study Guidelines* (HIPAP No 2, DIPNR 1993). This study evaluates potential fire risks imposed by the operation of the site on the surrounding environment and communities and makes recommendations on relevant fire prevention/protection strategies necessary to minimise the impact and risk of human fatalities, property damage and environmental pollution.

In the preparation and presentation of the FSS the following has been undertaken:

- Examination of warehouse layouts, product storage compatibilities, various methods of reducing the hazard to fire officers and ensuring a viable warehousing facility for the Client;
- Review of the potential fire hazard of the facility;
- Identification of areas of high fire risk; and
- Hazard assessment of areas of fire hazard to form the premise of the fire safety study;

Details on the required fire protection for the site have been detailed in a report from Defire Pty Limited.

This FSS does not make reference to the existing facilities such as the spray booth as these are already approved.

1.2 BACKGROUND TO THE PROPONENT

The site is located at Unit 3, 184 Gilmore Road, Queanbeyan West NSW and the current development consists of a partially developed site with the following facilities:

- Hardstand area for truck and car parking, bin storage and dangerous goods storage containers. The dangerous goods are for site use only.
- A wash bay.
- Existing structures used for the storage and recovery of wastes, ancillary facilities including offices, truck maintenance and spray booth.

The current activities are approved and are not assessed in this FSS as these would not have a cumulative effect on the potential hazardous or offensive nature of the proposed development.

2. DESCRIPTION OF THE SITE

The site exists as shown on the aerial view of the site presented as Figure 2-1 and Figure 2-2. This view of the site shows its location in a predominantly industrial/commercial area. The site is well located as it is relatively isolated from the nearest residential areas.

Figure 2-3 shows the site layout.

The hazard analysis will identify the nearest sensitive receptors in the vicinity of the site.

2.1 PROPOSED DEVELOPMENT

An overview of the operational processes to be undertaken within the site is provided below.

A new building described as the Resource Recovery Hall would be erected. It has a floor area of 1506 sq metres so it is not a major building.

The design has placed emphasis on the ease of allowing trucks to enter and unload the materials to be processed.

Importantly, as this regards the potentially offensive assessment, the building space will use the industry best practice of dust and odour suppression using misting sprays. This method has been demonstrated in several MHFs witnessed by the author to be very effective in removing visible dust and preventing odour escaping the buildings.

Waste water treatment is an area of the proposed facility that has been designed to treat the liquid wastes brought to site and the waste water generated from cleaning of the Resource Recovery Hall. From experience at other facilities established to process similar liquid wastes, the type of waste water treatment equipment proposed is effective in preventing uncontrolled odours being released.

Medical wastes have limited potential to release offensive odours due to the controls that are inherent in the transport system used by the health system. Experience at several facilities has shown that the handling processes proposed do not extend to a destruction or autoclaving process. Therefore opportunities for offensive smells to be released do not exist. The proposal is not extending to processing of the medical wastes.

2.2 HOURS OF OPERATION

Site operations would be 24 hours per day, seven days per week. This would allow services to be offered in peak waste collection times and minimise congestion and travel time associated with operations during peak hours. Sufficient storage would be incorporated to enable off peak deliveries to and from the facility.

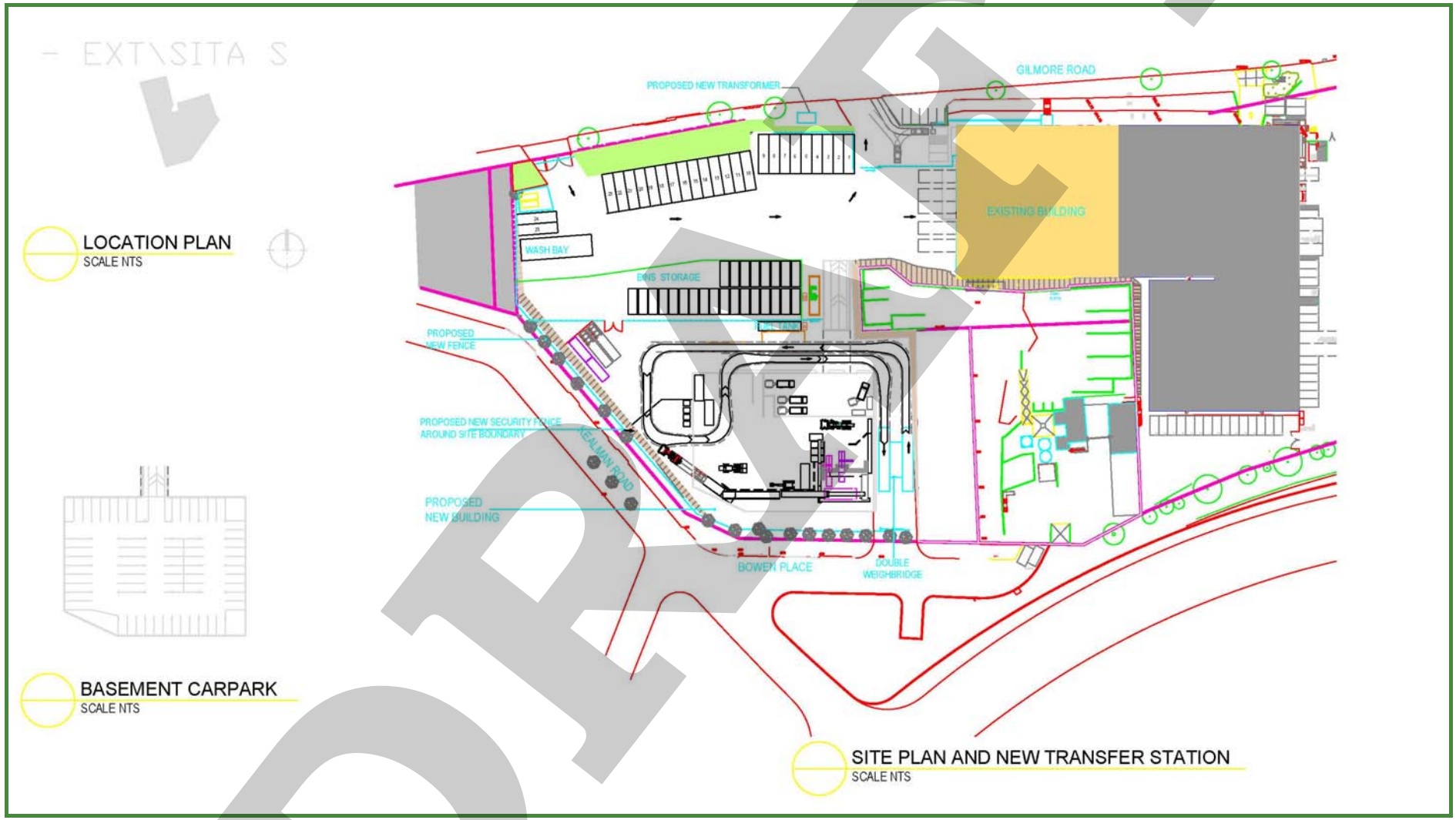
Figure 2-1: Aerial view of the site

Source: Google Earth Pro © 2015

Figure 2-2: Site Location – Close up view

Source: https://maps.six.nsw.gov.au/

Figure 2-3: Proposed Designated Dangerous Goods Storage Area



3. DANGEROUS GOODS STORAGE & HANDLING

3.1 CHEMICALS AND DANGEROUS GOODS

The site expansion would involve storage of a self-bunded diesel tank. Minor storage quantities of batteries, a Class 8 dangerous goods, would be stored on a bunded pallet in a roofed area.

Storage of diesel at the facility will be in accordance with the requirements the *Code of practice for the storage and handling of dangerous goods* as well as the following Australian Standard:

- AS 1940–2004/Amdt 2–2006 *The storage and handling of flammable and combustible liquids*.

The site will be designed to conform to the *Occupational Health and Safety Amendment (Dangerous Goods) Regulations 2005, Work Health and Safety Regulation 2011,* and relevant Australian Standards. A summary of the general requirements that need to be adhered with are as follows:

- Provision of adequate fire protection services;
- Provision of spill control kits;
- The site to be securely locked when not in operation;
- Establishing environmental work practice procedures; and
- Ensuring personnel are regularly informed about the storage and handling practices that are prescribed for particular types of dangerous goods.

The location of the diesel fuel tank needs to satisfy the following separation distances:

- To security fences and on-site protected places (offices, warehouses, workshops and other dangerous goods stores) – diameter of the tank or 7.5 m whichever is the less, but at least 3 m.

- To off-site protected places, 4.5 m.

- To site boundaries – Diameter of the tank or 7.5 m whichever is the less, but at least 3 m.

The separation distance in a straight line can be reduced through the use of a 240/240/240 fire rating level wall. If such a wall is needed further advice on its height and length needs to be obtained.

- One dry powder type extinguisher, 9 kg size of a rating 2A60B(E);
- Two foam type extinguishers, 9 kg size of a rating 2A20B;
- For the diesel tank, two of the above powder type fire extinguishers.

The diesel tank will need placarding – 'Combustible Liquid'.

HAZCHEM signage at entrances to the site would be needed.

Notification to WorkCover would not be required.

4. HAZARD ANALYSIS

4.1 LEVEL OF ASSESSMENT

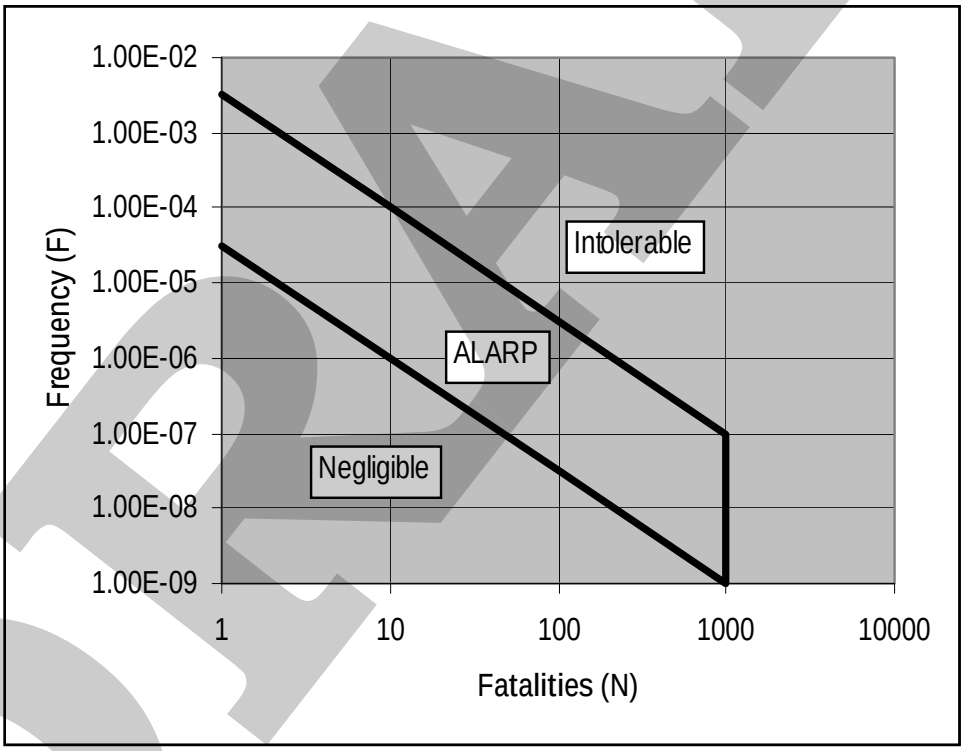
Risk criteria for potentially hazardous development provide both a qualitative and quantitative risk criteria.

Three levels of assessment may be conducted as summarised below from two sources:

- Multi–Level Risk Assessment developed by NSW Department of Planning and Infrastructure.

For major developments the Level 2 analysis is considered to be satisfactory if the associated risk estimates fall within the ALARP zone as shown on the F-N diagram used to classify societal risk (Figure 4-1).

Figure 4-1: IAEA F-N Curve – Indicative Societal Risk Criteria



The site expansion as proposed falls into the Negligible ALARP zone of this diagram and warrants limited quantitative analysis to determine if off-site hazards would occur.

Level 1 – Qualitative Analysis: primarily based on the hazard identification techniques. A level 1 assessment can be justified if the analysis of the facility demonstrates Societal Risk in the *negligible zone* and there are no potential accidents with significant off-site consequences.

Level 2 – Partially Quantitative Analysis: using hazard identification and the focused quantification of key potential off-site risk contributors. A level 2 assessment can be justified when the Societal Risk estimates fall within the middle *ALARP zone* or if one or more significant risk contributors had been identified but the frequency of risk contributors having off-site consequences is relatively low.

Level 3 – Fully Quantitative Risk Analysis: based on the full and detailed quantification of risks. A level 3 assessment is required where the Societal Risk from the facility estimates fall within the *intolerable zone* or where there are significant off-site risk contributors, and a level 2 assessment is unable to demonstrate that the risk criteria will be met.

Only a level 1 analysis has been required.

4.2 METHODOLOGY

The procedures adopted in assessing hazardous impacts, depending on the level of risk assessment required, may involve the following steps:

Step 1: Hazard identification;
Step 2: Hazard analysis (consequence and probability estimations); and
Step 3: Risk evaluation and assessment against specific criteria.

The following sections of the report discuss the hazard identification process as prescribed by the Department of Planning and Infrastructure (DoPI 2011) in the documents *Multi-Level Risk Assessment* and *Hazardous Industry Planning Advisory Paper No* 4 (*HIPAP No. 6) – Guidelines for Hazard Analysis.*

4.2.1 Hazard Identification

This is the first step in the risk assessment. It involves the identification of all theoretically possible hazardous events as the basis for further quantification and analysis. This does not in any way imply that the hazard identified or its theoretically possible impact will occur in practice. Essentially, it identifies the particular characteristics and nature of hazards to be further evaluated in order to quantify potential risks.

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 HIPAP 6, these events do not include occurrences that are a normal part of the operation cycles of the site but rather the atypical and abnormal, such as the occurrence of a significant liquid spill during product transfer operations.

4.2.2 Hazard Analysis

After a review of the events identified in the hazard identification stage and the identification of prevention/protection measures incorporated into the design of the site, any events which are considered to have the potential to result in impacts offsite or which have the potential to escalate to larger incidents are carried over to the next stage of analysis.

4.2.2.1 Consequence Estimation

This aspect involves the analysis and modelling of the credible events carried forward from the hazard identification process in order to quantify their impacts outside the boundaries of the site. In this case, these events typically include fire and the potential effects on people and/or damage to property.

4.2.2.2 Probability Likelihood Estimation

If necessary, the likelihood of incidents are quantified by adopting probability and likelihood factors derived from published data.

4.2.3 Risk Evaluation and Assessment against Specific Criteria

The risk analysis includes the assessment of consequences for each hazardous event and the frequencies of each initiating failure. The results of these consequence calculations together with the probabilities and likelihood figures estimated were then compared against the accepted criteria, as specified by SC 6.1.5. Whether it is considered necessary to conduct the predictions would depend on the probability figures, likelihood estimations, and if the risk criteria are exceeded.

4.3 ASSESSMENT CRITERIA

The risk criteria applied by the Department of Planning and Infrastructure as published in the document *Hazardous Industry Planning Advisory Paper No 4* (HIPAP No. 4) - *Risk Criteria for Land Use Safety Planning* (DoPI 2011) are applied. The following is a general discussion of the criteria that is used to assess the risk of a development on the surrounding community and environment.

4.3.1 Individual Fatality Risk Levels

The following paragraphs have been reproduced from HIPAP No. 4 to describe individual fatality risk levels:

> *"People in hospitals, children at school or old-aged people are more vulnerable to hazards and less able to take evasive action, if need be, relative to the average residential population. A lower risk than the one in a million criteria (applicable for residential areas) may be more appropriate for such cases. On the other hand, land uses such as commercial and open space do not involve continuous occupancy by the same people.*
>
> *The individual's occupancy of these areas is on an intermittent basis and the people present are generally mobile. As such, a higher level of risk (relative to the permanent housing occupancy exposure) may be tolerated. A higher level of risk still is generally considered acceptable in industrial areas."* (DoPI 2011)

The risk assessment criteria for individual fatality risk are presented below.

Table 4-1: Individual Fatality Risk Criteria (HIPAP No. 4)

Land Use	Risk Criteria x 10^{-6} (per year)
Hospitals, schools, childcare facilities, old age housing	0.5
Residential, hotels, motels, tourist resorts	1
Commercial developments including retail centres, offices and entertainment centres	5
Sporting complexes and active open space	10
Industrial	50

Figures in the table above have been utilised in this assessment.

4.3.2 Injury Risk Levels

HIPAP No. 4 provides guideline criteria for heat of radiation, explosion overpressure and toxic exposure.

The quoted requirements from the referenced document have been summarised as follows:

- Guideline criteria for heat of radiation:

  "Incident heat flux radiation at residential and sensitive use areas should not exceed 4.7 kW/m^2, at frequencies of more than 50 chances in a million per year."

- Guideline criteria for explosion overpressure:

  "Incident explosion overpressure at residential and sensitive use areas should not exceed 7 kPa at frequencies of more than 50 chances in a million per year."

- Guideline criteria for toxic exposure:

  "Toxic concentrations in residential areas should not exceed a level that would be seriously injurious to sensitive members of the community following a relatively short period of exposure at maximum frequency of 10 in a million per year."

  and

  "Toxic concentrations in residential areas should not cause irritation to the eyes or throat, coughing or other acute physiological responses in sensitive members of the community over a maximum frequency of 50 in a million per year."

Please note that a risk hazard assessment only examines events that are considered to have the potential for significant off-site consequences and may not entirely reflect all variations in people's vulnerability to risk.

4.3.3 Risk of Property Damage and Accident Propagation

HIPAP No. 4 indicates that siting of a hazardous installation must account for the potential for propagation of an accident, causing a "domino" effect on adjoining premises. This risk would be expected within an industrial estate where siting of hazardous materials on one site may potentially cause hazardous materials on an adjoining premises to further develop the size of the accident.

The criteria for risk of damage to property and of accident propagation are stated as follows:

> *"Incident heat flux at neighbouring potentially hazardous installations or at land zones to accommodate such installations should not exceed a risk of 50 in a million per year for the 23 kW/m^2 heat flux level."*
>
> and
>
> *"Incident explosion overpressure at neighbouring potentially hazardous installations, at land zoned to accommodate such installations or at nearest public buildings should not exceed a risk of 50 in a million per year for the 14 kPa explosion overpressure level."*

4.3.4 Criteria for Risk Assessment to the Biophysical Environment

The assessment of the ultimate effects from toxic releases into the natural ecosystem is difficult, particularly in the case of atypical accidental releases. Consequence data is limited and factors influencing the outcome are variable and complex. In many cases, it may not be possible or practical to establish the final impact of any particular release. Because of such complexity, it is inappropriate to provide generalised criteria to cover any scenario. The acceptability of the risk will depend upon the value of the potentially affected zone or ecosystem to the local community and wider society.

The suggested criteria for sensitive environmental areas relate to the potential effects of an accidental release or an emission on the long-term viability of the ecosystem or any species within it and are expressed as follows:

> *"Industrial developments should not be sited in proximity to sensitive natural environmental areas where the effects or consequences of the more likely accidental emissions may threaten the long-term viability of the ecosystem or any species within it."*
>
> and
>
> *"Industrial developments should not be sited in proximity to sensitive natural environmental areas where the likelihood or probability of impacts that may threaten the long-term viability of the ecosystem or any species within it is not substantially lower than the existing background level threat to the ecosystem."*

4.4 ASSESSMENT CRITERIA APPLICABLE TO THE PROPOSED DEVELOPMENT APPLICATION

In accordance with *HIPAP No 4 Risk Criteria for Land Use Safety Planning*, the following discussion of the risk assessment criteria considered applicable to the proposed development has been provided.

4.4.1 Heat-Flux Radiation Criteria

As the chemical to be stored on site include Class 3 flammable goods, the heat flux radiation criteria have been deemed applicable to the site. Heat radiation models have been conducted to determine compliance with these criteria.

The effects of various heat fluxes (radiation) as a result of a fire incident are given in Table 4-2. The HIPAP No 4 paper suggests a heat flux of 4.7 kW/m^2 and a frequency of 50 in a million per year to be used as the risk injury criterion for thermal effects at residential and sensitive use areas.

Table 4-2: Heat Radiation Impact (HIPAP No. 4)

Heat Flux Level	Effect
4.7 kW/m^2	Heat radiation level for possibility of injury to persons exposed. This heat radiation level is regarded to be high enough to potentially cause pain in 15-20 seconds and injury after 30 seconds of exposure.
12.6 kW/m^2	Heat radiation level for possibility of fatality at extended exposure and structural failure of nearby affected structures. At this level, injury is highly probable with a significant possibility for fatality to occur. Thin steel may undergo structural failure due to thermal stress and the temperature of wooden structures may increase to a heat where exposure to a naked flame can trigger ignition.
23 kW/m^2	Heat radiation level for possibility of fatality at instantaneous exposure and definite structural failure of nearby unprotected structures. The possibility for fatality is likely at this level, with spontaneous ignition of wood after long exposure and structural failure of unprotected steel due to thermal stress.
35 kW/m^2	Cellulosic material will pilot ignite within one minute's exposure. Significant chance of fatality for people exposed instantaneously.

4.4.2 Explosion Over-Pressure Criteria

As no explosive materials will be stored onsite, the explosion over-pressure criteria has been deemed not applicable.

4.4.3 Toxic Criteria

The toxic exposure criteria have been deemed applicable due to the storage of Class 3 paints which can produce toxic combustion products. HIPAP No. 4 indicates that citing of potentially hazardous developments also needs to consider the risk from accidental releases into the biophysical environment.

The National Institute for Occupational Safety and Health (NIOSH) and the American Industrial Hygiene Association (AIHA) provides the following 4 categories of health impact criteria which are of relevance during an emergency event:

- Immediately Dangerous to Life or Health (IDLH).
- Emergency Response Planning Guideline 1 (ERPG1).
- Emergency Response Planning Guideline 2 (ERPG2).
- Emergency Response Planning Guideline 3 (ERPG3).

The purpose of the values given for each of these limits for a particular chemical is to assess the capabilities of mitigation safeguards and emergency or accident response plans for the workplace.

The IDLH limit is defined by the Occupational Safety and Health Administration (OSHA) as:

> *"An atmospheric concentration of any toxic, corrosive or asphyxiant substance that poses an immediate threat to life or would cause irreversible or delayed adverse health effects or would interfere with an individual's ability to escape from a dangerous atmosphere."*

The following are definitions for each ERPG level as defined by American Industrial Hygiene Association, 2008 Emergency Response Planning Guidelines (ERPG) and Workplace Environmental Exposure Levels (WEEL) Handbook:

> *"The ERPG-1 is the maximum airborne concentration below which it is believed nearly all individuals could be exposed for up to 1 hour without experiencing more than mild, transient adverse health effects or without perceiving a clearly defined objectionable odour.*
>
> *The ERPG-2 is the maximum airborne concentration below which it is believed nearly all individuals could be exposed for up to 1 hour without experiencing or developing irreversible or other serious health effects or symptoms that could impair an individual's ability to take protective action.*
>
> *The ERPG-3 is the maximum airborne concentration below which it is believed nearly all individuals could be exposed for up to 1 hour without experiencing or developing life-threatening health effects."*

The ERPG-2 level can be considered synonymous to the IDLH limit, although it has been observed that both slightly vary from each when comparing values for each contaminant. For this reason, both IDLH and ERPG limits were required to be considered in this assessment.

The toxic exposure criteria adopted in this assessment for the toxic chemicals potentially emitted from the site are defined in Table 4-3.

Table 4-3: Adopted Health Criteria Based of Potential Pollutants

Chemical	Health Limits (in mg/m^3)			
	IDLH	ERPG-1	ERPG-2	ERPG-3
Xylene	3,907.73	-	-	-
Carbon Monoxide	1,374.72	229.12	400.96	572.80
Carbon Dioxide	72,000	-	-	-

Note: - indicates that no limits are available for this substance

4.4.4 Biophysical Environment Risk Criteria

The site is located within an established industrial area. The proposed area would be fully paved and sufficiently bunded to accommodate the proposed storage of flammable liquids satisfying compliance with AS 1940–2004, storage of corrosive substances in accordance with AS 3780–2007 and miscellaneous dangerous goods accordance with AS/NZS 4681:2000.

Any leaks/spills resulting from incidents would therefore be captured within the corresponding bunds provided. Spill kits would be provided at all areas that are identified to be prone to spills. A housekeeping inspection would be undertaken regularly to ensure that no leaks or spills would occur on site. The site has a history of operating without leaks and spills occurring.

Best practice in housekeeping and operational procedures would be implemented on site. Stormwater isolation to achieve 90 minutes of fire fighting water containment would be accomplished using mats to cover stormwater pits as well as the internal bunding of the chemical storage area. Given this consideration, the proposed development would not introduce any additional risk that may threaten the long-term viability of the development and its effect to the local environment. Consequently, the biophysical environmental risk-based criteria have been determined to be readily satisfied and no further analyses or discussions were considered necessary.

4.5 HAZARD IDENTIFICATION

A level 2 risk assessment involves the hazard identification step, which examines all possible failure scenarios and their consequences to ensure that all incidents with possible off-site consequences are identified. Those events that could contribute to off-site risk will then be examined in further detail of the consequences and likelihood in order to demonstrate that quantitative risk criteria will not be exceeded.

4.5.1 Hazardous Materials

The potentially hazardous chemicals to be stored on site include Class 3 flammable liquids i.e. paint, solvents and resins. A summary of the properties and potential hazards of these substances is given below.

4.5.2 Combustible liquids

Combustible liquids C1 and C2 have less volatility and require higher temperatures to ignite. Combustible liquids do not require protection through use of hazardous zones areas. Flammable liquids within a warehouse where there is no dispensing require a Zone II hazardous area.

4.5.3 Class 8 Corrosive Substances

Corrosive substances have characteristics that cause corrosion to the skin, eyes and respiratory system if spillages occur and contact is made with a person's body.

Corrosive substances if spilt can readily corrode the surfaces of building floor, wall cladding and structural steel.

Different chemicals belonging to Class 8 corrosive substances can be compatible and can be reactive. Hence for this development Redox Australia have wisely chosen to use separate buildings with separate bunding systems – one for acids and one for alkali. The two buildings would have a shared opening.

4.5.4 Hazardous Events

The identification of possible hazardous events for this facility has been prepared and a comprehensive list of credible and significant incidents is provided in the form of a Hazard Identification Chart given below.

4.5.5 Ignition of Flammable and combustible liquids

The ignition of a flammable or combustible liquid is necessary for a fire to erupt. The ignition of such a liquid requires a source of heat that has sufficient energy to exceed the flash point of the liquid. The flash point is determined by a method that includes heating the liquid in a cup and a gas pilot is enabled to cause a flash of flame just above the surface of the liquid. The fire point is a slightly higher temperature and at this the fire on the surface will be sustained. The liquid also needs to be present in a vapour mixture with air that is sufficiently rich in presence of the flammable liquid that ignition may occur.

The flammable liquid may be heated to a temperature, in the absence of a source of ignition, where a spontaneous ignition occurs.

The range of concentration of flammable liquids that are too lean or too rich to enable ignition to occur are described as the Lower Explosive Limit (LEL) and Upper Explosive Limit (UEL). Between these two limits there are a wide range of concentrations that could be expected to occur where ignition could occur.

These presence of a source of ignition with enough heat to ignite a vapour concentration, between the LEL and UEL only needs to have a minute mass of flammable liquid presence to cause the initial fire and subsequently the release of sufficient energy to heat larger masses of the flammable liquid. The spread of a fire is rapid and once initiated rapid early response is critical if the fire is to be contained.

The release of a flammable liquid from its container will cause pooling of this liquid. The physical dimensions of the pool of liquid correlates to the size of the fire.

Spill area can be determined from the container volumes expected to be involved. The growth of the fire will be dependent on the rate at which the initial ignition is able to further heat the surface of the pool. Denying the vapour to the fire during the critical first response period would have greatest potential to suppress the spread of the fire.

The rate of the spread of a fire has been conservatively estimated at 0.2 m/sec in the gas phase above the surface of the liquid. A typical flame velocity in the liquid is 2 m/sec. Examples are quoted (*SFPE Handbook of Fire Protection Engineering, 3rd Edition*) of a 6 m diameter pool of petrol requiring 3 secs for fuel involvement at an ambient temperature of 20°C. Diesel with its much higher flash point would typically require 61 secs.

These times of a fire spreading would be beyond the reaction time of most warehouse operators.

The provision of first response means to engulf a fire with either foam or powder from a fire extinguisher or foam from a hose reel are useful fire control methods until the fire brigade are able to attend to the situation.

4.5.5.1 Hazard Identification Chart

A Hazard Identification Chart has been prepared for the proposed site based on operating scenarios that are relevant to the proposed development. This chart outlines the outcomes from the hazard identification phase of the assessment.

The chart consists of four columns:

Column 1
Heading: Functional/Operation Area
The area of the site involved with the potential event is listed.

Column 2
Heading: Possible Initiating Event
The individual events that are considered to be likely or realistic are then listed. Where the possible consequences are similar the events are listed together, each one individually numbered.

Column 3
Heading: Possible Consequences
The outcomes of an event if it occurred are listed.

Column 4
Heading: Prevention/Protection Measures
The measures designed into the functional/operation area and the site are listed. These measures may include for example safeguards, design features, management methods and/or operator training.

The hazard identification chart is presented in Table 4-4 below.

Table 4-4: Event/Consequence Analysis Table

Functional/Operational Area	Possible Initiating Event	Possible Consequences	Prevention/Protection Measures
1. Resource Facility Hall	1. Recyclable paper and cardboard subjected to sufficient heat to catch alight.	1. Fire engulfs stockpile of paper/cardboard and consumes the stockpile. 2. Fire fighting water is generated which escapes into the stormwater system. 3. Fire unable to be immediately controlled and engulfs larger tonnages of stored waste materials.	1. A hot-work permit system is in place. 2. A first response fire crew exists on site. 3. The Resource Recovery Hall has bunding to contain the first 90 minutes of fire fighting water. 4. No smoking is permitted on site except in a designated low risk area. 5. Site has BCA compliant fire services.
2. Diesel fuel tank	1. Spillage occurs onto a vehicle, hot surface vaporises the fuel and a fire erupts	1. Fire is unable to be contained and causes rupture of the diesel storage tank, pool fire occurs.	1. A self-bunded steel tank within a steel tank would be the most likely storage method and risk of fire being of sufficient size to damage the tank is very unlikely. 2. Fire extinguishers stored nearby in accordance with AS 1940–2004 and fire immediately controlled. 3. Site has trained first response fire crew. 4. Fire services on-site comply with BCA.

4.5.6 Hazard Identified for Further Analysis

The potential hazards identified for further analysis have been analysed in a scenario based risk assessment.

The hazardous scenarios identified for further analysis are described below:

Scenario 1: Fire involving 50 T of paper/cardboard.
Scenario 2: Fire involving 100 T of paper/cardboard.
Scenario 3: Fire involving 200 T of paper/cardboard.

Scenarios 1 to 3 have been analysed for heat of radiation levels as listed in Table 4-2.

4.6 CONSEQUENCE ANALYSIS – HEAT RADIATION

The heat radiation modelling was undertaken by TNO Effects (Version 7.6). TNO Effects is a modelling software developed by TNO Built Environment and Geoscience, situated in the Netherlands. The software is able to predict both physical effects and consequences of a specific incident from the proposed development.

TNO Effects was used to obtain heat radiation contours based on combustion rates of the materials involved. However, as the chemical data within the program is limited, it was not possible to model particular chemicals specific to the events; instead, chemicals listed within TNO Effects that were found to have similar heats of combustions to the materials being modelled were utilised. The radiation contours obtained from TNO Effects were mapped from the perimeter of the source area.

The following calculations and assumptions were considered in the modelling of effects for each scenario:

- A paper/cardboard density of 152 kg/m^3. This represents “medium density” waste paper based on the Waste Materials–Density data obtained from the Victorian EPA Environment and Resource Efficiency Plans (EREPs) toolkit for waste management.

4.6.1 Scenario 1: Fire involving 50 T of Paper/Cardboard

This scenario describes the event that a moderate sized fire has occurred involving the combustion of 50 T of paper/cardboard.

The heat radiation distances obtained from TNO Effects and heat radiation contours are presented in Table 4-5 and Figure 4-2 respectively.

Table 4-5: Heat Radiation Distances for Scenario 1

Level	Heat Radiation Distance from Fire Boundary (m)
4.7 kW/m^2	37.1
12.6 kW/m^2	23.2
23 kW/m^2	16.78
35 kW/m^2	13.6

Comment:

The heat of radiation levels is contained within the area.

Figure 4-2: Heat Radiation Contours for Scenario 1: Fire involving 50 T of Paper/Cardboard

Note: Isopleths illustrate the heat of radiation contours: Red = 4.7 kW/m^2; Blue = 12.6 kW/m^2; Green = 23 kW/m^2 Orange = 35 kW/m^2.

4.6.2 Scenario 2: Fire involving 100 T of Paper/Cardboard

This scenario describes the event that a large fire had occurred involving the combustion of 100 T of paper/Cardboard.

The heat radiation distances obtained from TNO Effects and heat radiation contours are presented in Table 4-6 and Figure 4-3 respectively.

Table 4-6: Heat Radiation Distances for Scenario 2

Level	Heat Radiation Distance from Fire Boundary (m)
4.7 kW/m^2	52.5
12.6 kW/m^2	31.9
23 kW/m^2	23.7
35 kW/m^2	19.2

Figure 4-3: Heat Radiation Contours for Scenario 2: Fire involving 100 T of paper/cardboard

Note: Isopleths illustrate the heat of radiation contours: Red = 4.7 kW/m^2; Blue = 12.6 kW/m^2; Green = 23 kW/m^2 Orange = 35 kW/m^2.

4.6.3 Scenario 3: Fire involving 200 T of Paper/Cardboard

This scenario describes the event that a very large fire had occurred involving the combustion of 200 T of paper/cardboard.

The heat radiation distances obtained from TNO Effects and heat radiation contours are presented in Table 4-7 and Figure 4-4 respectively.

Table 4-7: Heat Radiation Distances for Scenario 3

Level	Heat Radiation Distance from Fire Boundary (m)
4.7 kW/m^2	74.2
12.6 kW/m^2	45.4
23 kW/m^2	33.6
35 kW/m^2	27.2

Figure 4-4: Heat Radiation Contours for Scenario 3: Fire involving 200 T of Paper/Cardboard

Note: Isopleths illustrate the heat of radiation contours: Red = 4.7 kW/m^2; Blue = 12.6 kW/m^2; Green = 23 kW/m^2 orange = 35 kW/m^2.

4.7 CONSEQUENCE ANALYSIS – TOXIC COMBUSTION PRODUCT EMISSIONS

4.7.1 Incomplete Combustion

When the amount of oxygen becomes insufficient, other combustion products such as carbon monoxide, oxides of nitrogen, carbon (soot), and other hydrocarbon derivatives would be formed. Amongst all these products, toxic carbon monoxide smoke would likely be most selective according to various stoichiometric ratios. Examples of incomplete combustion would be:

$$C_8H_{10\,(l)} + 8O_{2\,(g)} \rightarrow 3CO_{\,(g)} + C_{\,(s)} + 4CO_{2\,(g)} + 5H_2O_{\,(g)}$$
$$C_8H_{10\,(l)} + 7.5O_{2\,(g)} \rightarrow 4CO_{\,(g)} + C_{\,(s)} + 3CO_{2\,(g)} + 5H_2O_{\,(g}$$
$$C_8H_{10\,(l)} + 6.5O_{2\,(g)} \rightarrow 6CO_{\,(g)} + C_{\,(s)} + CO_{2\,(g)} + 5H_2O_{\,(g}$$

There would be some extent of incomplete combustion from packaging materials such as cardboard, plastic and wood, which would contribute to smoke generation, however this has been considered much lower compared to that generated by burning flammables or combustible liquids.

The results were used for comparison to the IDLH exceedance levels to determine potential consequences to commercial and residential occupants. Table 4-9 includes a summary and comparison of the results modelled from TNO with IDLH levels.

Table 4-8: Concentration of Carbon Dioxide at Sensitive Receptors

Receptors	Address/Location	IDLH (72,000 mg/m^3) Exceeded?
R1	Woods Lane, Harman	No
R2	54 Lorn Road, Crestwood	No
R3	15 John Bull Street, Queanbeyan West	No
R4	27 Graham Place, Queanbeyan West	No

Comment:

The results indicate that a major fire under the assumptions applied may cause irritant smoke to be dispersed towards the nearest residences. None of the predicted levels exceeded life threatening concentrations (i.e. IDLH Levels) and on this basis, evacuation of residential areas is unlikely to be required.

4.8 DISCUSSION OF RESULTS

The scenarios analysed show that under normal conditions there would be no potential off site impacts.

Under worst case scenarios for major fires that would involve the whole of the quantities of paper/cardboard stored in the Resource Recovery Hall, that heat of radiation levels could expose adjoining premises to conditions that would require evacuation. This would be expected during a fire emergency event.

The scenarios analysed are worst case and do not allow for any reduction of the heat of radiation levels provided by the fire fighting water that would be applied and the reduction in the heat of radiation levels provided by the building materials.

The fire fighting services provided are considered to be sufficient to prevent incidents as analysed from occurring to the degree of severity calculated.

4.9 CONSEQUENCE ANALYSIS – TOXIC COMBUSTION PRODUCT EMISSIONS

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When the amount of oxygen becomes insufficient, other combustion products such as carbon monoxide, oxides of nitrogen, carbon (soot), and other hydrocarbon derivatives would be formed. Amongst all these products, toxic carbon monoxide smoke would likely be most selective according to various stoichiometric ratios. Examples of incomplete combustion would be:

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The fire fighting services provided are considered to be sufficient to prevent incidents as analysed from occurring to the degree of severity calculated.

5. FIRE PREVENTION AND PROTECTION STRATEGY

This section outlines the fire protection strategy including fire protection equipment provided at the Site.

5.1 BUILDING AND CONSTRUCTION

Building summary is provided Table 5-1.

Table 5-1: Building Classification Summary

Characteristic	Description
Construction	Structural steel framework clad with steel cladding. Reinforced concrete floor. Roller door access.
Floor area	Warehouse – 1,500 sq. metres Office – shared space with other tenants.
Height of the building	Approximately 8 metres

5.2 VENTILATION

Natural ventilation would be provided on the north wall in accordance with AS 1940–2004. Roof ventilation is provided in accordance with the BCA.

This combination will be more than adequate for the type of warehousing activities being undertaken.

5.3 IGNITION SOURCES

There would be a non-smoking policy throughout the Resource Recovery Hall and the site.

5.4 SECURITY AND SIGNAGE

The site would be locked and secure to prevent unauthorised access to the site outside normal operating hours. The site has security monitoring.

5.5 PROVISION FOR ESCAPE

Site operators are trained and practice simulations of emergency evacuation procedures.

5.6 FIRE DETECTION

The main system for fire detection would be the staff on the site as they would be able to quickly detect any leaks of materials, via visual or odour recognition, which may lead to an increased fire risk. Once such situations are detected appropriate first response action would be taken.

5.7 FIRE PROTECTION EQUIPMENT

The fire protection consists of fire extinguishers, hose reels and hydrants.

The independent fire services report outlined the fire services that are required.

5.7.1 Fire Hydrants

Section E1.3 of the BCA states:

(a) A fire hydrant system must be provided to serve a building-
- *(i) having a total floor area greater than 500 m^2; and*
- *(ii) where a fire brigade is available to attend a building fire.*

5.7.2 Fire Hose Reels

Section E1.4 of the BCA states:

(b) A fire hose reel system must be provided-
- *(i) to serve the whole building where one or more internal fire hydrants are installed; or*
- *(ii) where internal fire hydrants are not installed, to serve any fire compartment with a floor area greater than 500 m^2.*

The two nearest hose reels to the chemical storage area are to be equipped with foam induction and 20 L containers of foam. The fire contractor would provide training in the use of foam.

6. RECOMMENDATIONS

After having examined the potential hazardous scenarios that could occur on site, the following recommendations are considered to be fundamental in aiding the control of risks presented by the proposed development:

- Dangerous good storage areas are to comply with AS 1940–2004 *The Storage and Handling of Flammable and combustible liquid*

7. CONCLUSIONS

Due to the nature of the operations and the hazard prevention and protection measures proposed for the site, it is expected that there would be no increase in hazardous risks to the occupants of the industrial area or distant residents.

It is the conclusion of this assessment that the proposed site and its operations would meet necessary safety requirements. Hence, this facility would not be considered to be an offensive or hazardous development.

This concludes the report.

RT Benbow
Principal Consultant

8. REFERENCES

SC6.15 Industrial Hazard Risk Assessment Planning Scheme Policy from Queensland

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"Multi-level Risk Assessment," January 2011

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9. 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 Wild Environment Pty Ltd, as per our agreement for providing environmental services. Only Wild Environment Pty Ltd 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 Wild Environment Pty Ltd 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.

Appendix D – Air Quality Assessment

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AIR QUALITY AND GREENHOUSE GAS ASSESSMENT

PROPOSED RESOURCE RECOVERY FACILITY, QUEANBEYAN WEST

Wild Environment

13 February 2015

Job Number 13070211

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1 INTRODUCTION

Todoroski Air Sciences has prepared this report for Wild Environment on behalf of SITA Environmental Solutions (SITA). The report presents an air quality impact assessment for the proposed changes to the approved Truck Maintenance Depot and Resource Recovery Facility located at 184 Gilmore Road, Queanbeyan West NSW (hereafter referred to as the Project).

This report outlines the proposed changes, reviews the existing local environmental conditions, describes the dispersion modelling methodology, and presents the predicted findings of the study.

2 PROJECT SETTING AND DESCRIPTION

2.1 Project Location

The proposed Project site is located in an existing industrial estate in Queanbeyan West approximately 2km west of Queanbeyan and 5km south of Canberra Airport (see **Figure 2-1**). The Project is bounded to the west by Gilmore Road, the south by Kealman Road and to the east by Bowen Place and Canberra Avenue. The NSW/ACT border is west of the surrounding industrial estate.

Residences located to the east of the Project site are identified as the nearest sensitive receptors and have been assessed as discrete receptors in this assessment.

Figure 2-1: Project location

Figure 2-2 presents a three dimensional visualisation of the topography in the vicinity of the Project site. The surrounding topography is characterised by the elevated hilly terrain to the east forming part of the Cuumbuen Nature Reserve and the Jerrabomberra Mountain Reserve to the south of the site. To the northwest the terrain opens and is flatter as it enters the Australian Capital Territory (ACT). The terrain features of the surrounding area would have an effect on the local wind distribution patterns of the area.

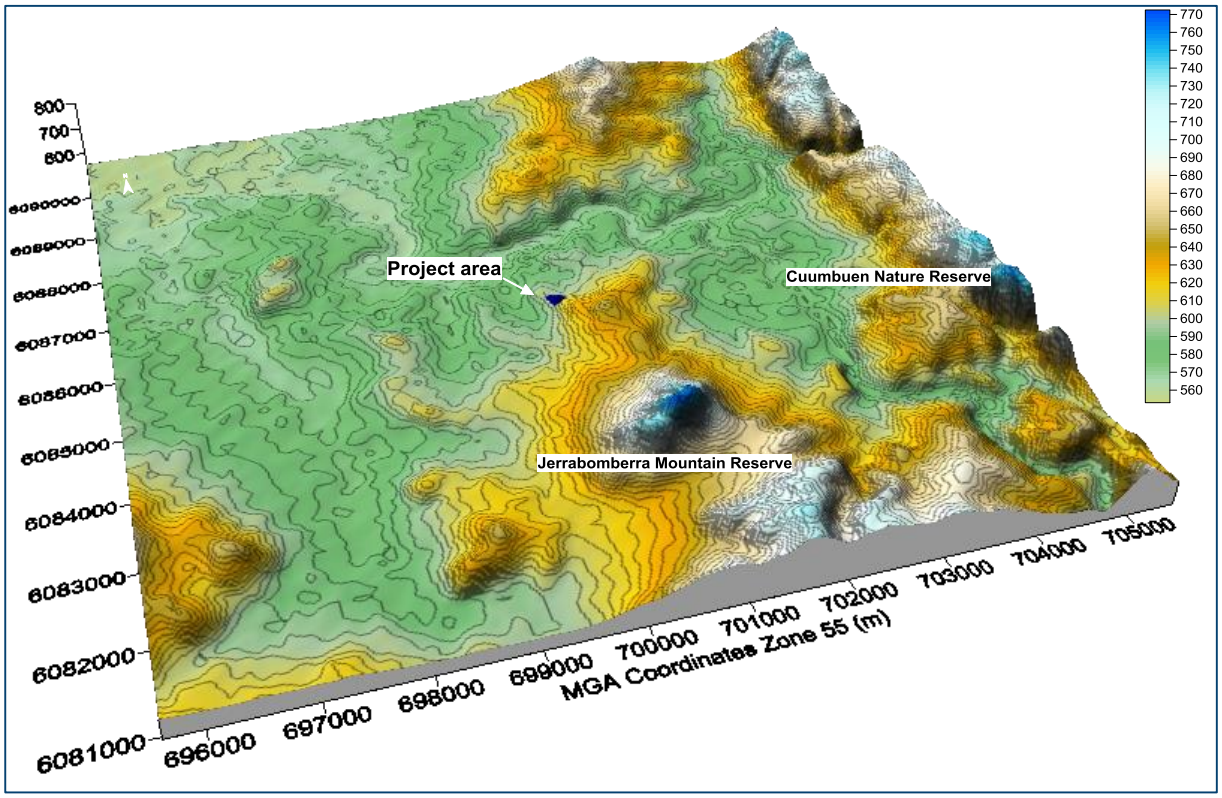

Figure 2-2: Topography surrounding the Project

2.2 Project Description

SITA's existing resource recovery facility at Hume, ACT is proposed to be relocated to this new site at Queanbeyan West in June 2015. The facility accepts cardboard and handles the secure destruction of paper. It is also used for the storage and repair of heavy vehicles and machinery, small paint bay for bin repairs, the storage of small and large bins (used for various festivals around NSW and ACT) and the storage of fluorescent tubes. A bailer and conveyor equipment is used to process approximately 3,600 tonnes per year of cardboard that is bailed at the site.

In addition to these existing services, SITA proposes to expand their operations to include the recovery of a range of waste sources. The following additional waste streams would be targeted by SITA:

- General Solid Waste (putrescible and non-putrescible);
- Paper, cardboard and plastics recyclables (source separated and co-mingled);
- K110 Grease Trap Waste (liquid waste); and
- J120 Waste oil/hydrocarbons mixtures/emulsion in water (liquid waste).

To cater for these additional waste streams, a new waste transfer station would be constructed and operated on the eastern portion of the site. It is proposed that up to 95,000 tonnes/year of material would be accepted at the site. Waste material would be processed and sorted into separate streams with putrescible waste transferred from the site within 24 hours to a Veolia operated site at Woodlawn for processing.

An indicative site layout drawing is presented in **Figure 2-3**.

Delivery trucks and vehicles travelling to the area dedicated to grease trap waste, hydrocarbon/water emulsions, paper and cardboard bailing, fluorescent tube and bin storage, would enter the site via Gilmore Road. This area is within the existing building on the site.

Delivery trucks entering the proposed new waste transfer station would enter the site from Bowen Place. Materials would be unloaded from the trucks within the building and sorted and processed into separate designated storage areas within the building. The materials will then be hauled off-site.

It is proposed to operate the site up to 24 hours per day, seven days per week, as necessary for services to occur during peak waste collection times and to minimise congestion and travel time associated with peak traffic periods. Sufficient storage will be incorporated to enable off-peak deliveries to and from the facility outside of peak traffic periods. A range of air quality mitigation and management measures will be implemented at the site to ensure air quality in the surrounding area is maintained within acceptable levels.

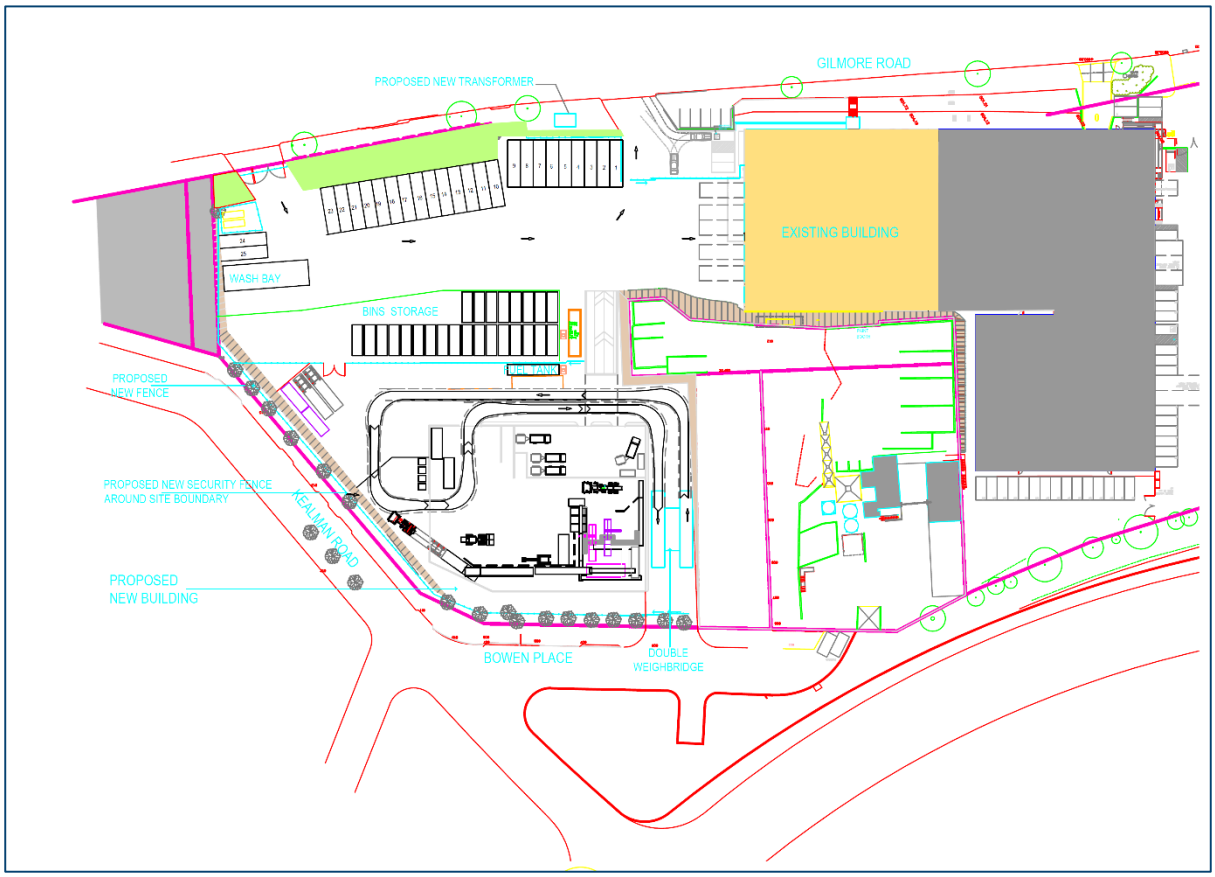

Figure 2-3: Indicative site layout

3 AIR QUALITY CRITERIA

3.1 Preamble

Air quality criteria are benchmarks set to protect the general health and amenity of the community in relation to air quality. The sections below identify the potential air emissions generated by the Project and the applicable air quality criteria.

The air quality goals that are relevant to this study are sourced from the NSW EPA document "*Approved Methods for the Modelling and Assessment of Air Pollutants in NSW*" (**NSW DEC, 2005**).

3.2 Particulate matter

Particulate matter refers to particles of varying size and composition. The air quality goals relevant to this assessment refer to three classes of particulate matter based on the sizes of the particles. The first class is referred to as Total Suspended Particulate matter (TSP) which measures the total mass of all particles suspended in air. The upper size range for TSP is nominally taken to be 30 micrometres (µm) as in practice, particles larger than 30 to 50µm settle out of the atmosphere too quickly to be regarded as air pollutants.

The second and third class are sub-classes of TSP, namely PM_{10}, particulate matter with aerodynamic diameters of 10µm or less, and $PM_{2.5}$, particulate matter with aerodynamic diameters of 2.5µm or less.

3.2.1 NSW EPA impact assessment criteria

Table 3-1 summarises the air quality goals that are relevant to this study as outlined in the NSW EPA document "*Approved Methods for the Modelling and Assessment of Air Pollutants in NSW*" (**NSW DEC, 2005**). The air quality goals for total impact relate to the total dust burden in the air and not just the dust from the proposal. Consideration of background dust levels needs to be made when using these goals to assess potential impacts.

Table 3-1: NSW EPA air quality impact assessment criteria

Pollutant	Averaging Period	Impact	Criterion
TSP	Annual	Total	90µg/m^3
PM_{10}	Annual	Total	30µg/m^3
	24 hour	Total	50µg/m^3
Deposited dust	Annual	Incremental	2g/m^2/month
		Total	4g/m^2/month

Source: **NSW DEC, 2005**

The criterion for 24-hour average PM_{10} originates from the National Environment Protection Measure (NEPM) goals (**NEPC, 1988**). These goals apply to the population as a whole, and are not recommended to be applied to "hot spots" such as locations near industry, busy roads or mining. However, in the absence of alternative measures, NSW EPA does apply the criteria to assess the potential for impacts to arise at such locations.

The NEPM permits five days annually above the 24-hour average PM_{10} criterion to allow for bush fires and similar events. It is normally the case that days where ambient dust levels are affected by such events, are excluded from assessment as per the NSW EPA criterion.

3.2.2 $PM_{2.5}$ concentrations

The NSW EPA currently does not have impact assessment criteria for $PM_{2.5}$ concentrations; however the National Environment Protection Council (NEPC) has released a variation to the NEPM (**NEPC, 2003**) to include advisory reporting standards for $PM_{2.5}$ (see **Table 3-2**).

The advisory reporting standards for $PM_{2.5}$ are a maximum 24-hour average of 25µg/m^3 and an annual average of 8µg/m^3, and as with the NEPM goals, apply to the average, or general exposure of a population, rather than to "hot spot" locations.

Table 3-2: Advisory standard for $PM_{2.5}$ concentrations

Pollutant	Averaging Period	Criterion
$PM_{2.5}$	24 hours	25µg/m^3
	Annual	8µg/m^3

Source: **NEPC, 2003**

3.3 Odour

3.3.1 Introduction

Odour in a regulatory context needs to be considered in two similar, but different ways depending on the situation.

NSW legislation prohibits emissions that cause offensive odour to occur at any off-site receptor. Offensive odour is evaluated in the field by authorised officers, who are obliged to consider the odour in the context of its receiving environment, frequency, duration, character and so on and to determine whether the odour would interfere with the comfort and repose of the normal person unreasonably. In this context, the concept of offensive odour is applied to operational facilities and relates to actual emissions in the air.

However, in the approval and planning process for proposed new operations or modifications to existing projects, no actual odour exists and it is necessary to consider hypothetical odour. In this context, odour concentrations are used and are defined in odour units. The number of odour units represents the number of times that the odour would need to be diluted to reach a level that is just detectable to the human nose. Thus by definition, odour less than odour unit (1 OU), would not be detectable to most people.

The range of a person's ability to detect odour varies greatly in the population, as does their sensitivity to the type of odour. The wide ranging response in how any particular odour is perceived by any individual poses specific challenges in the assessment of odour impacts and the application of specific air quality goals related to odour. The NSW Odour Policy (**NSW DEC, 2006**) sets out a framework specifically to deal with such issues.

It needs to be noted that the term odour refers to complex mixtures of odours, and not “pure” odour arising from a single chemical. Odour from a single, known chemical very rarely occurs (when it does, it is best to consider that specific chemical in terms of its concentration in the air). In most situations odour will be comprised of a mix of many substances that is referred to as a complex mixture of odour, or more simply odour.

For activities with potential to release significant odour it may be necessary to predict the likely odour impact that may arise. This is done by using air dispersion modelling which can calculate the level of dilution of odours emitted from the source at the point that such odour reaches surrounding receptors. This approach allows an air dispersion model to be used to produce results in terms of odour units.

The NSW criteria for acceptable levels of odour range from 2 to 7 OU, with the more stringent 2 OU criteria applicable to densely populated urban areas and the 7 OU criteria applicable to sparsely populated rural areas, as outlined below.

3.3.2 Complex Mixtures of Odorous Air Pollutants

Table 3-3 presents the assessment criteria as outlined in the NSW EPA document "*Approved Methods for the Modelling and Assessment of Air Pollutants in NSW*" (**NSW DEC, 2005**). This criterion has been refined to take into account population densities of specific areas and is based on a 99th percentile of dispersion model predictions calculated as 1-second averages (nose-response time).

Table 3-3: Impact assessment criteria for complex mixtures of odorous air pollutants (nose-response-time average, 99th percentile)

Population of affected community	Impact assessment criteria for complex mixtures of odorous air pollutants (OU)
Urban (≥~2000) and/or schools and hospitals	2.0
~500	3.0
~125	4.0
~30	5.0
~10	6.0
Single rural residence (≤~2)	7.0

Source: **NSW DEC, 2005**

The NSW odour goals are based on the risk of odour impact within the general population of a given area. In sparsely populated areas the criteria assume there is a lower risk that some individuals within the community would find the odour unacceptable, hence higher criteria apply.

Peak-to-mean factors are applied to account for any odour fluctuation above and below the mean odour level of the 1-hour averaging time. The criteria in **Table 3-3** are compared with modelled results that include peaking factors to account for the time-averaging limitations of air dispersion models. The peak-to-mean factors developed by **Katestone Scientific Pty Ltd (1995, 1998)** for NSW EPA are applied to convert the modelled (1-hour) averaging time to 1-second peak concentrations which are appropriate.

A summary of the peak-to-mean values is provided in **Appendix A**.

4 EXISTING ENVIRONMENT

This section describes the existing climate and air quality in the area surrounding the Project.

4.1 Local climate

Long-term climatic data from the Bureau of Meteorology weather station at Tuggeranong (Isabella Plains) AWS (Site No. 070339) were analysed to characterise the local climate in the proximity of the Project. The Tuggeranong (Isabella Plains) AWS is located approximately 12.6km southwest of the Project.

Table 4-1 and **Figure 4-1** present a summary of data from the Tuggeranong (Isabella Plains) AWS collected over an approximate 17-year period.

The data indicate that January is the hottest month with a mean maximum temperature of 29.6ºC, July is the coldest month with mean minimum temperature of 0.0ºC.

Rainfall is lowest in autumn and gradually increases over the year to peak in summer. The data show that February is the wettest month with an average rainfall of 78.2 mm over 5.9 days and May is the driest month with an average rainfall of 21.9 mm over 3.4 days.

Humidity levels exhibit seasonal fluctuations. Mean 9am humidity levels range from 59 per cent in December to 83 per cent in June. Mean 3pm humidity levels vary from 34 per cent in January and December to 57 per cent in June.

Wind speed conditions at 9am and 3pm show variability over the year. The mean 9am wind speeds range from 6.5km/h in March and May to 11.3km/h in October. The mean 3pm wind speeds vary from 13.2 km/h in May to 18.7 km/h in October.

Table 4-1: Monthly climate statistics summary – Tuggeranong (Isabella Plains) AWS

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temperature												
Mean max. temperature (ºC)	29.6	28.0	25.2	21.0	16.6	13.1	12.3	14.2	17.7	20.6	24.1	27.0
Mean min. temperature (ºC)	14.2	14.3	11.3	6.7	2.5	1.3	0.0	0.9	3.9	6.2	9.7	12.1
Rainfall												
Rainfall (mm)	48.7	78.2	52.9	32.5	21.9	50.3	40.5	46.7	61.3	53.6	74.6	66.2
Mean No. of rain days (≥1mm)	4.8	5.9	4.8	3.7	3.4	5.7	5.4	5.6	6.5	6.2	7.5	5.5
9am conditions												
Mean temperature (ºC)	19.6	18.6	15.7	13.1	8.3	5.9	4.8	6.9	10.9	13.9	15.8	18.2
Mean relative humidity (%)	61	68	70	69	78	83	82	73	65	60	62	59
Mean wind speed (km/h)	8.4	7.7	6.5	8.0	6.5	7.1	7.1	8.9	10.8	11.3	10.1	9.6
3pm conditions												
Mean temperature (ºC)	27.8	26.6	24.3	20.1	15.6	12.1	11.3	12.8	16.2	19.2	22.5	25.5
Mean relative humidity (%)	34	39	38	42	50	57	56	50	46	41	39	34
Mean wind speed (km/h)	16.2	15.4	14.7	13.8	13.2	13.5	14.3	16.5	18.5	18.7	17.3	17.7

Source: **Bureau of Meteorology, 2014**

Figure 4-1: Monthly climate statistics summary – Tuggeranong (Isabella Plains) AWS

4.2 Local air quality

The main sources of particulate matter in the wider area around the Project include emissions from local anthropogenic activities such as motor vehicle exhaust and domestic wood heaters, urban activity and various other commercial and industrial activities.

There are no site-specific monitoring data available for the Project site. To characterise the local air quality in the general area surrounding the Project site, ambient monitoring data recorded at the PM_{10} monitors at Monash and Civic, and a $PM_{2.5}$ monitor at Monash operated by the ACT Government (**ACT EPA, 2014**) were reviewed and are presented in **Table 4-2**.

The Monash station is located in the Monash District Playing Fields approximately 13km southwest of Project site and the Civic station is located on the western side of the Olympic Swimming Pool in a carpark approximately 10km northwest of Project site.

Table 4-2: PM_{10} and $PM_{2.5}$ levels from ACT AAQ NEPM monitoring stations (µg/m³)

Year	PM_{10}		$PM_{2.5}$	
	Max 24-hour average (No. of days of exceedances)		Max 24-hour average (No. of days of exceedances)	Annual average
	Monash	Civic	Monash	
2009	210 (9)	-	33.5 (2)	6.2
2010	48.4 (0)	23.8 (0)	52.4 (2)	6.7
2011	40 (0)	29.2 (0)	32.8 (4)	6.4
2012	41 (0)	49.5 (0)	29.2 (3)	7.1
2013	43.5 (0)	57.8 (1)	38.4 (6)	6.9

The data in **Table 4-2** show that the maximum PM_{10} levels are generally below criteria except in 2009, when there were significant dust storms across the eastern states. Maximum $PM_{2.5}$ levels were above the criteria in every year. Annual average $PM_{2.5}$ were below the criteria.

Elevated $PM_{2.5}$ levels are generally attributed to emissions from domestic wood heaters during winter. Wood smoke from domestic wood heaters is considered the largest source of air pollution in Canberra and there are a range of programs in effect to address this issue (**ACT EPA, 2014**). Notably, wood smoke is also the largest single contributor to fine particle pollution in many other cities and towns in NSW.

5 ASSESSMENT OF POTENTIAL CONSTRUCTION DUST EMISSIONS

The Project involves the establishment and construction of related infrastructure associated with the operation. The construction activity has the potential to generate dust emissions.

Potential construction dust emissions will be primarily generated due to material handling, vehicle movements and windblown dust generated from exposed areas. Particulate emissions would also be generated from the exhaust of construction vehicles and plant.

The potential air quality impacts due to these activities are difficult to accurately quantify on any given day due to the short sporadic periods of dust generating activity that may occur over the construction time frame. The sources of dust are temporary in nature and will only occur during the construction period.

The total amount of dust generated from the construction process is unlikely to be significant given the nature of the activities proposed. As these activities would occur for a limited period, no significant or prolonged effect at any off-site receiver is predicted.

To ensure dust generation during the construction activities is controlled and the potential for off-site impacts is reduced, appropriate (operational and physical) mitigation measures may be implemented such as those listed in **Table 5-1**.

Table 5-1: Potential construction dust mitigation options

Source	Mitigation Measure
General	Activities to be assessed during adverse weather conditions and modified as required (e.g. cease activity where reasonable levels of dust cannot be maintained)
	Engines to be switched off when not in use for any prolonged period
	Vehicles and plant would be fitted with pollution reduction devices wherever possible
	Maintain and service vehicles according to manufacturer's specifications
	Haul roads/ transport routes to be sited away from sensitive receivers where possible
Exposed areas and Stockpiles	Minimise area of exposed surfaces
	Water suppression on exposed areas and stockpiles
	Minimise amount of stockpiled material
	Locate stockpiles away from sensitive receivers
	Apply barriers, covering or temporary rehabilitation
	Progressive staging of construction activities
	Rehabilitation of completed sections as soon as practicable
	Keep ancillary vehicles off exposed areas
Material handling	Reduce drop heights from loading and handling equipment
Hauling activities	Watering of haul roads (fixed or mobile) when required
	Sealed haul roads to be cleaned regularly
	Restrict vehicle traffic to designated routes, that can be managed by regular watering
	Impose speed limits
	Wheel wash, grids or coarse aggregate near exit points to minimise dirt track out
	Street cleaning to remove dirt tracked onto sealed roads
	Covering vehicle loads when transporting material off- site

6 DISPERSION MODELLING APPROACH

6.1 Introduction

The following sections are included to provide the reader with an understanding of the model and modelling approach applied for the assessment.

The CALPUFF model is an advanced "puff" model which can deal with the effects of complex local terrain on the dispersion meteorology over the entire modelling domain in a three-dimensional, hourly varying time step.

CALPUFF is an air dispersion model approved by NSW EPA for use in air quality impact assessments. The model setup used is in general accordance with methods provided in the NSW EPA document "*Generic Guidance and Optimum Model Setting for the CALPUFF Modeling System for Inclusion into the 'Approved Methods for the Modeling and Assessments of Air Pollutants in NSW, Australia*" (**TRC**, **2011**).

6.2 Modelling methodology

Modelling was undertaken using a combination of the CALPUFF Modelling System and TAPM. The CALPUFF Modelling System includes three main components: CALMET, CALPUFF and CALPOST and a large set of pre-processing programs designed to interface the model to standard, routinely available meteorological and geophysical datasets.

TAPM is a prognostic air model used to simulate the upper air data for CALMET input. The meteorological component of TAPM is an incompressible, non-hydrostatic, primitive equation model with a terrain-following vertical coordinate for three-dimensional simulations. The model predicts the flows important to local scale air pollution, such as sea breezes and terrain induced flows, against a background of larger scale meteorology provided by synoptic analysis.

CALMET is a meteorological model that uses the geophysical information and observed/simulated surface and upper air data as inputs and develops wind and temperature fields on a three-dimensional gridded modelling domain.

CALPUFF is a transport and dispersion model that advects "puffs" of material emitted from modelled sources, simulating dispersion processes along the way. It typically uses the three dimensional meteorological field generated by CALMET.

CALPOST is a post processor used to process the output of the CALPUFF model and produce tabulations that summarise the results of the simulation.

6.2.1 Meteorological modelling

The TAPM model was applied to the available data to generate a three dimensional upper air data file for use in CALMET. The centre of analysis for the TAPM modelling used is 35deg21 min south and 149deg12.5min east. The simulation involved an outer grid of 30km, with three nested grids of 10km, 3km and 1km with 35 vertical grid levels.

CALMET modelling used a nested approach where the three dimensional wind field from the coarser grid outer domain is used as the initial (or starting) field for the finer grid inner domains. This approach has several advantages over modelling a single domain. Observed surface wind field data

from the near field as well as from far field monitoring sites can be included in the model to generate a more representative three dimensional wind field for the modelled area. Off domain terrain features for the finer grid domain can be allowed to take effect within the finer domain, as would occur in reality, also the coarse scale wind flow fields give a better set of starting conditions with which to operate the finer grid run.

The CALMET initial domain was run on a 100 x 100km grid with a 2km grid resolution and refined for a second domain on a 50 x 50km grid with a 1km grid resolution and further refined for a final domain on a 10 x 10km grid with a 0.1km grid resolution.

The available meteorological data for January 2012 to December 2012 from four surrounding meteorological monitoring sites were included in this run. It was determined that the 2012 calendar year is representative of the area based on a long-term meteorological analysis.

Table 6-1 outlines the parameters used from each station. Three dimensional upper air data were sourced from TAPM output. Local land use and detailed topographical information were included to produce realistic fine scale flow fields (such as terrain forced flows) in surrounding areas.

Table 6-1: Surface observation stations

Weather Stations	Parameters						
	WS	WD	CH	CC	T	RH	SLP
Canberra Airport (BoM) (Station No. 070351)	✓	✓	✓	✓	✓	✓	✓
Tuggeranong (Isabella Plains) AWS (BoM) (Station No. 070339)	✓	✓			✓	✓	✓
Mount Ginini AWS (BoM) (Station No. 070349)	✓	✓			✓	✓	
Braidwood Racecourse AWS (BoM) (Station No. 069132)	✓	✓			✓	✓	✓

Note: WS = wind speed, WD = wind direction, CH = cloud height, CC = cloud cover, T = temperature, RH = relative humidity, SLP = sea level pressure.

CALMET generated meteorological data were extracted from a point within the CALMET domain and are graphically represented in **Figure 6-1** and **Figure 6-2**.

Figure 6-1 presents annual and seasonal windroses extracted from one point in the CALMET domain. On an annual basis, winds from the north-northwest, east-southeast and southeast are most frequent. During summer, winds ranging from the east to southeast are most prevalent. The autumn and spring wind distribution patterns are fairly similar to the annual distribution pattern, with a large proportion of winds from the northeast and southeast quadrants. The winter distribution is generally dominated by winds from the north-northwest.

Figure 6-2 includes graphs of the temperature, wind speed, mixing height and stability classification over the modelling period and shows sensible trends considered to be representative of the area.

Figure 6-1: Annual and seasonal windroses from CALMET (Cell ref 5051)

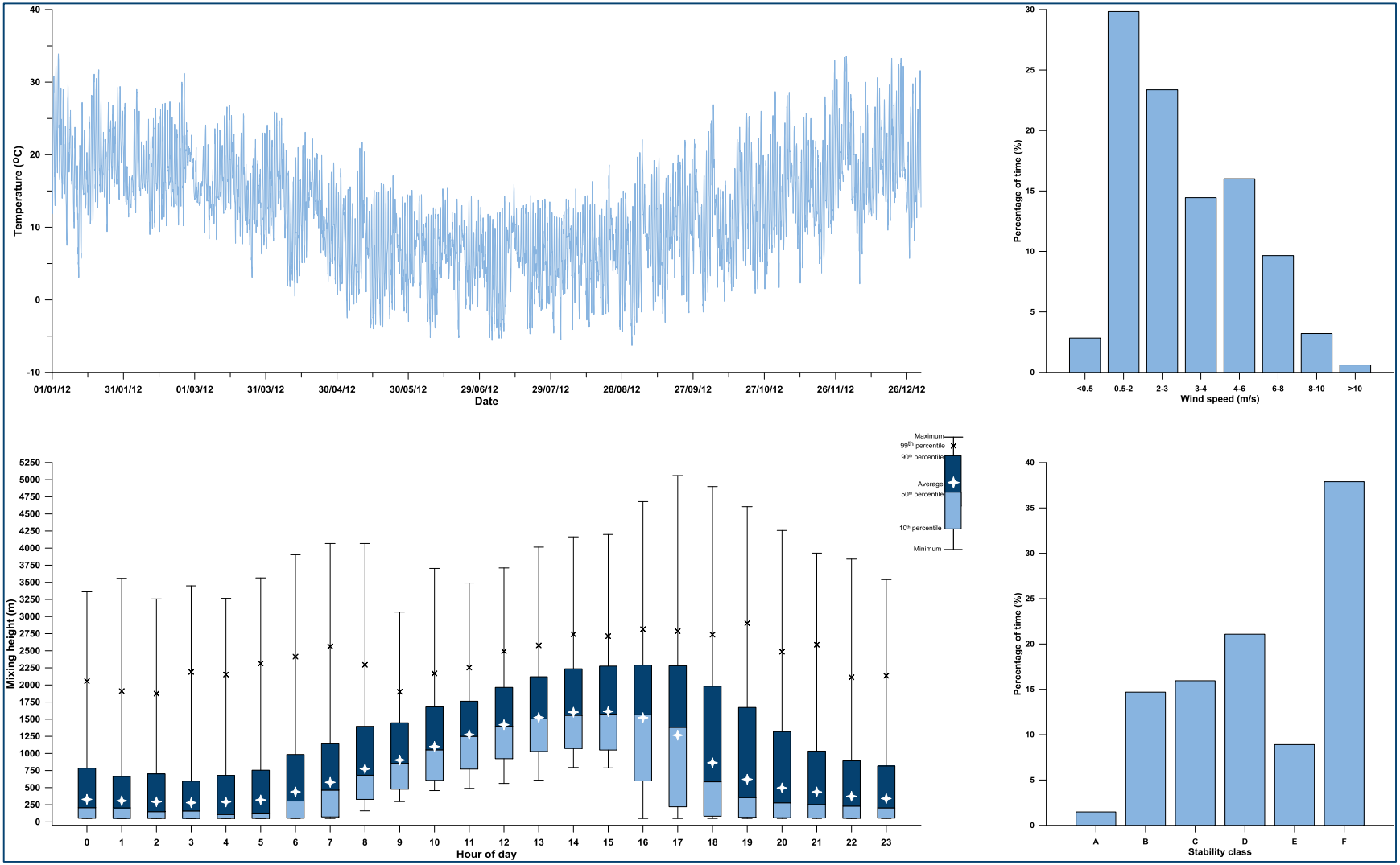

Figure 6-2: Meteorological analysis of CALMET (Cell Ref 5051)

6.2.2 Dispersion modelling

Air dispersion modelling of the key pollutants that may be emitted from the Project was conducted in accordance with the NSW EPA document "*Approved Methods for the Modelling and Assessment of Air Pollutants in NSW*" (**NSW DEC, 2005**).

The CALPUFF air dispersion model was used to predict the potential dust and odour levels in the ambient air in the wider area around the Project. Details regarding the emission rates and sources are outlined in the following section.

6.3 Emission estimation

6.3.1 Dust

Activities associated with the proposed operations have the potential to generate dust emissions and may occur from activities including, the material loading/unloading, rehandling of materials, and vehicle transport on-site.

The estimated amount of dust emissions for each activity associated with the operation are presented in **Table 6-2**. The corresponding emission factors from the US EPA AP42 Emission Factors document (**USEPA, 1985 and updates**) that were applied to estimate the potential dust emissions. Detailed calculations of the dust emission estimates are provided in **Appendix B**.

Table 6-2: Estimated annual TSP emission rate – Operational activity

Activity	TSP emissions (kg/year)
Stage 1 – Hauling of waste/materials to site	704
Stage 1 – Unloading of wastes/materials	6
Stage 1 – Rehandle of wastes	3
Stage 1 – Loading to trucks	6
Stage 1 – Hauling material off-site	704
Stage 2 – Hauling of waste/materials to site	812
Stage 2 – Unloading of wastes/materials	215
Stage 2 – Rehandle of wastes	107
Stage 2 – Loading to trucks	215
Stage 2 – Hauling material off-site	737
Total	**3,510**

Overall the total estimated amount of dust generated from the operation is considered to be low. The emission calculations apply conservative factors and variables based on the understanding of the operation. Proposed dust control measures were not taken into account in the emission calculations such as material handling occurring within an enclosed building and the use of dust suppression sprays (refer to **Section 7**). The total estimated amount of dust generated from the proposed operations is considered conservative and likely to overestimate the potential impacts.

6.4 Odour

The main source of significant odour emissions from the operations would be from the putrescible wastes on the waste floor within a fully enclosed transfer station building. Waste material received at the site would be processed and sorted into separate streams with putrescible waste transferred from

the site into enclosed containers within a 24-hour period to a Veolia operated site at Woodlawn for further processing.

It is assumed that a maximum floor space of 300m^2 may be required to cater for the putrescible waste left on site for no longer than 24 hours. Odour emission rate data for the putrescible waste was obtained from a previous air quality assessment conducted for the proposed SITA Newcastle Resource Recovery Facility in Mayfield West (**PAEHolmes, 2011**) where a specific odour emission rate of 3.65 OU.m^3/m^2/s was applied based on measurements conducted at a landfill operation.

Other potential odour sources such as parked garbage trucks and from the storage of the small and large bins were considered in this assessment. The regular cleaning of the garbage trucks and bins would take place to ensure the potential for odour generation from these sources is minimised. These sources are considered to be relatively minor however one needs to consider that it takes some time for a bin or truck to be cleaned and that during this time and in the cleaning process there would be some odour emissions.

To consider these sources in the modelling results it was assumed that 75% more odour than from the building waste floor would be emitted. The model run to represent an odour emitting area of 525m^2.

The odour emissions modelling results are considered conservative (overestimate likely effects) as it was assumed that odours would be emitted continuously for every hour of the year, and the modelling did not take into account any of the proposed odour control measures that would be applied, as presented in **Section 7**. A key conservative assumption in the modelling was to ignore the effect of the enclosed building that would prevent the release of a large fraction of the odour from the waste floor.

7 MITIGATION MEASURES

As the proposed activities will generate emissions of dust and odour, it is prudent to take reasonable and practicable measures to prevent or minimise dust and odour emissions to the surrounding environment. The mitigation measures which would be applied for the Project include the following:

- Sorting and processing of wastes within an enclosed building;
- Closing doors immediately after a truck has entered/exited to maintain building enclosure;
- Use of automated dust and odour sprays;
- Storing a maximum of 100 tonnes of putrescible waste for a period no longer than 24 hours;
- The floor of the waste recovery hall would be cleaned daily;
- Trafficked areas on-site will be paved and cleaned regularly; and
- Stored vehicles and bins will be cleaned and maintained regularly.

It should be noted that the dispersion modelling has not taken into account the use of these control measures and it is likely that the predicted air quality impacts are overestimated.

8 MODELLING RESULTS AND ANALYSIS

This section presents the predicted impacts on air quality which may arise from air emissions generated by the operations, and a brief analysis of the results.

8.1 Dust

Figure 8-1 to **Figure 8-6** present isopleths of the spatial distribution of predicted incremental impacts associated with the operation of the Project over the modelling domain for maximum 24-hour average $PM_{2.5}$ and PM_{10}, and annual average $PM_{2.5}$, PM_{10}, TSP and deposited dust levels.

Table 8-1 presents the particulate dispersion modelling results at each receptor shown in **Figure 2-1**.

Table 8-1: Particulate dispersion modelling results for discrete receptors

Receptor ID	$PM_{2.5}$ (µg/m³)		PM_{10} (µg/m³)		TSP (µg/m³)	DD (g/m²/month)
	Incremental impact					
	24-hour average	Annual average	24-hour average	Annual average	Annual average	Annual average
	Advisory*		Air quality impact criteria			
	25	8	50	-	-	2
1	0.16	0.03	1.24	0.23	0.45	0.05
2	0.13	0.02	0.99	0.14	0.27	0.02
3	0.12	0.02	0.98	0.13	0.26	0.01

* Advisory reporting standard for $PM_{2.5}$ concentration.

The dispersion modelling results show that the Project would have a negligible impact at the nearby assessed sensitive receptors even with the conservative nature of the model and assumptions applied.

The potential for cumulative air quality impacts associated with the Project is considered to be negligible when considering the predicted incremental impacts shown in **Table 8-1**. It is unlikely that the Project would result in any discernible change to existing background levels at the nearest residential receptors.

Figure 8-1: Predicted incremental maximum 24-hour average $PM_{2.5}$ concentrations (µg/m³)

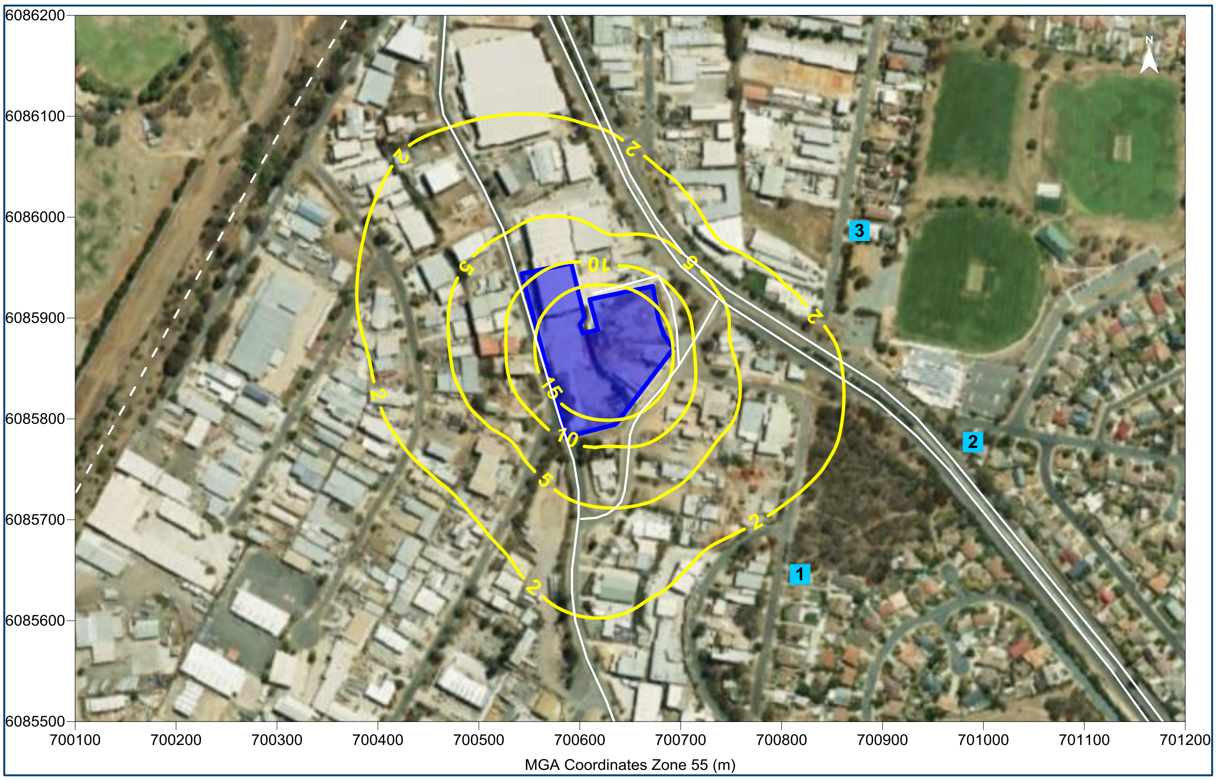

Figure 8-2: Predicted incremental maximum 24-hour average PM_{10} concentrations (µg/m³)

Figure 8-3: Predicted incremental annual average $PM_{2.5}$ concentrations (µg/m³)

Figure 8-4: Predicted incremental annual average PM_{10} concentrations (µg/m³)

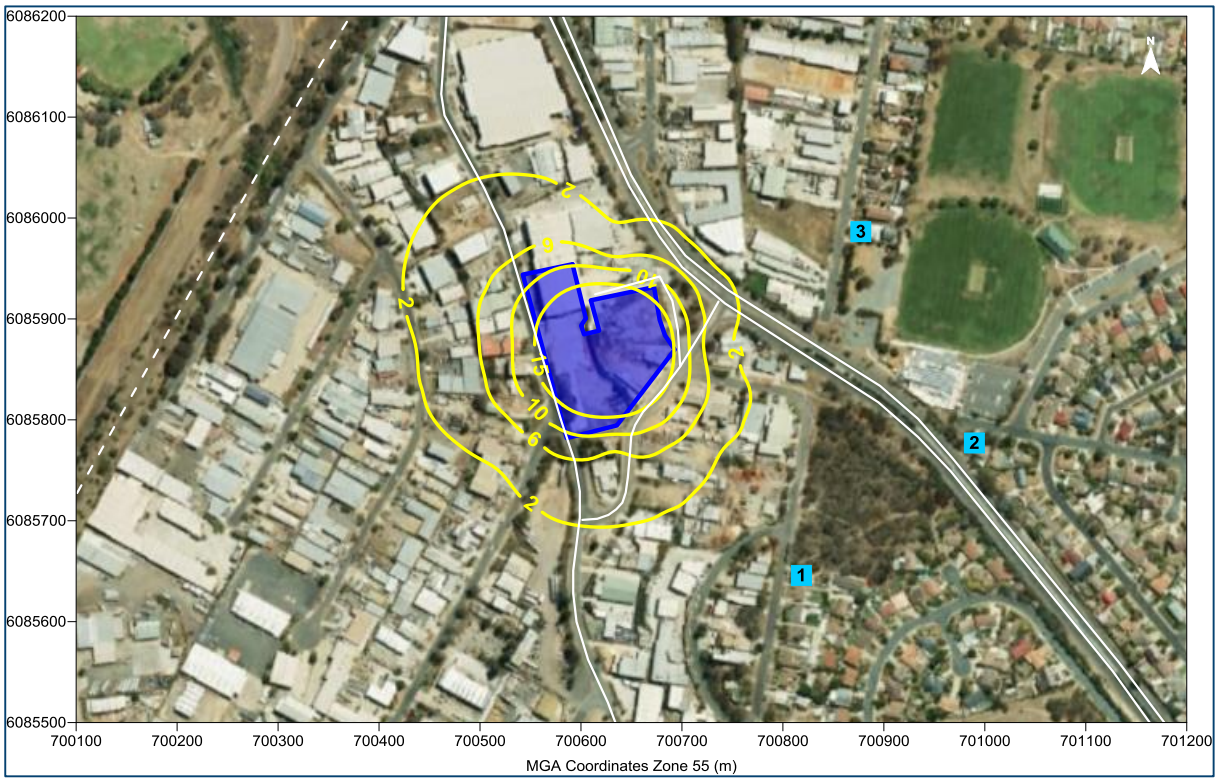

Figure 8-5: Predicted incremental annual average TSP concentrations (µg/m³)

Figure 8-6: Predicted incremental annual average dust deposition levels (g/m²/month)

8.2 Odour

Dispersion model predictions of the modelled odour source are presented as an isopleth diagram showing the predicted 99th percentile nose-response ground level odour impact in **Figure 8-7**.

Table 8-2 presents the discrete dispersion modelling results at each of the assessed sensitive receptors shown in **Figure 2-1**.

The dispersion modelling results in **Table 8-2** indicate that odour levels at the sensitive receptors resulting from estimated odour emissions emanating from the waste at the transfer station will be below the applicable criteria.

Table 8-2: 99th percentile nose-response average ground level odour concentrations (OU)

Receptor ID	Odour Units (OU)	Criteria (OU)
1	0.6	2
2	0.6	2
3	0.6	2

Figure 8-7: Predicted 99th percentile nose-response average ground level odour concentrations

9 GREENHOUSE GAS ASSESSMENT

9.1 Introduction

Dynamic interactions between the atmosphere and surface of the earth create the unique climate that enables life on earth. Solar radiation from the sun provides the heat energy necessary for this interaction to take place, with the atmosphere acting to regulate the complex equilibrium. A large part of this regulation occurs from the "greenhouse effect" with the absorption and reflection of the solar radiation dependent on the composition of specific greenhouse gases in the atmosphere.

Over the last century, the composition and concentration of greenhouse gases in the atmosphere has increased due to increased anthropogenic activity. Climatic observations indicate that the average pattern of global weather is changing as a result. The measured increase in global average surface temperatures indicate an unfavourable and unknown outcome if the rate of release of greenhouse gas emissions remain at the current rate.

This assessment aims to estimate the predicted emissions of greenhouse gases (GHG) to the atmosphere due to the Project and to provide a comparison of the direct emissions from the Project at the state and national level.

9.2 Greenhouse Gas Inventory

The National Greenhouse Accounts (NGA) Factors document published by the Department of the Environment defines three scopes (Scope 1, 2 and 3) for different emission categories based on whether the emissions generated are from "direct" or "indirect" sources.

Scope 1 emissions encompass the direct sources from the Project defined as:
"*...from sources within the boundary of an organisation as a result of that organisation's activities*" (**Department of the Environment, 2014c**).

Scope 2 and 3 emissions occur due to the indirect sources from the Project as:
"*...emissions generated in the wider economy as a consequence of an organisation's activities (particularly from its demand for goods and services), but which are physically produced by the activities of another organisation*" (**Department of the Environment, 2014c**).

For the purpose of this assessment, emissions generated in all three scopes defined above provide a suitable approximation of the total GHG emissions generated from the Project.

Scope 3 emissions can often result in a significant component of the total emissions inventory; however, these emissions are often not directly controlled by the Project. These emissions are understood to be considered in the Scope 1 emissions from other various organisations related to the Project. The primary contribution of the Scope 3 emissions from the Project occurs from the transportation of materials.

Scope 3 emissions also have the potential to arise from a greater number of sources associated with the operation of the Project. As these are often difficult to quantify due to the diversity of sources and relatively minor individual contributions, they have not been considered in this assessment.

9.2.1 Emission sources

Scope 1 and 2 GHG emission sources identified from the operation of the Project are the on-site combustion of diesel fuel and the on-site consumption of electricity.

Scope 3 emissions have been identified as resulting from the purchase of diesel, electricity for use on-site, transport of the materials to its final destination.

The estimated quantities of materials that have the potential to emit GHG emissions associated the Project have been summarised in **Table 9-1** below.

Table 9-1: Summary of quantities of materials estimated for the Project

Period	Diesel (on-site) (kL)	Electricity (on-site) (MWh)	Diesel (transport of materials) (kL)
Annual	48	140	559

The quantity of diesel fuel required to transport the materials to the final destination has been estimated based on the approximate return travel distance for the material. Approximately 85% of the materials would be transported to the Woodlawn processing facility (122km return) and 15% would be transported to various locations in Sydney (600km return). The calculated annual kilometres travelled are 968,500 km per year. To estimate the consumption of diesel fuel required for these activities, the average fuel consumption of 57.7L/100km for articulated trucks is applied (**ABS, 2013**).

9.2.2 Emission factors

To quantify the amount of carbon dioxide equivalent (CO_2-e) material generated from the project, emission factors have been obtained from the NGA Factors (**Department of the Environment, 2014c**) and other sources as required and are summarised in **Table 9-2**.

Table 9-2: Summary of emission factors

Type	Energy content factor	Emission factor			Units	Scope
		CO_2	CH_4	N_2O		
Diesel	38.6	69.2	0.2	0.5	kg CO_2-e/GJ	1
		5.3	-	-		3
Electricity	-	0.86	-	-	kg CO_2-e/kWh	2
		0.19	-	-		3

9.3 Summary of greenhouse gas emissions

Table 9-3 summarises the estimated annual CO_2-e emissions due to the operation of the Project.

Table 9-3: Summary of CO_2-e emissions for the project (t CO_2-e)

Period	Diesel		Electricity		Transport
	Scope 1	Scope 3	Scope 2	Scope 3	Scope 3
Annual	130	10	120	18	1,508

9.4 Contribution of greenhouse gas emissions

Table 9-4 summarises the emissions associated with the project based on Scopes 1, 2 and 3.

Table 9-4: Summary of CO_2-e emissions per scope (t CO_2-e)

Period	Scope 1	Scope 2	Scope 3	Scope 1+2
Annual	130	120	1,536	250

The estimated annual greenhouse emissions for Australia for the period October 2012 to September 2013 was 538.4 Mt CO_2-e (**Department of the Environment, 2014a**). In comparison, the estimated annual greenhouse emission for the Project is 0.0002Mt CO_2-e (Scope 1 and 2). Therefore, the annual contribution of greenhouse emissions from the Project in comparison to the Australian greenhouse emissions is conservatively estimated to be approximately 0.00005 per cent.

At a state level, the estimated greenhouse emissions for NSW in the 2011-12 period was 148.9 Mt CO_2-e (**Department of the Environment, 2014b**). The annual contribution of greenhouse emissions from the Project in comparison to the NSW greenhouse emissions for the 2011-12 period is conservatively estimated to be approximately 0.00017 per cent.

9.5 Greenhouse gas management

The Project will utilise various mitigation measures to minimise the overall generation of greenhouse gas emissions. These measures would include developing a basis for identifying and implementing energy efficiency opportunities and mitigation measures for various activities.

Examples of various mitigation and energy management measures to reduce GHG emissions are as follows:

- Monitor the consumption of fuel and regularly maintain diesel powered equipment to ensure operational efficiency;
- Turning diesel equipment off when not in use for extended periods;
- Minimise double handling of material and using efficient transport routes;
- Monitor the total site electricity consumption and investigate avenues to minimise the requirement;
- Conduct a review of alternative renewable energy sources;
- Provide energy awareness programs for staff and contractors; and
- Minimise the production of waste generated on site.

10 CONCLUSIONS

The study has identified the potential air quality impacts associated with the proposed Resource Recovery Facility located at 184 Gilmore Road, Queanbeyan West in NSW.

Dispersion modelling with the CALPUFF model was used to predict the potential for off-site dust and odour impacts in the surrounding area due to the operation of the Project.

It is predicted that the assessed air emissions of $PM_{2.5}$, PM_{10}, TSP, dust deposition and odour would have negligible impact on the sensitive receptors and therefore not lead to any unacceptable level of environmental harm or impact around the area.

Nevertheless, the site will apply appropriate dust and odour management measures to ensure the dust and odour emissions from the site are minimised.

Overall, the assessment shows that the Project can operate without causing any unacceptable air quality impact at the sensitive receptors in the surrounding environment even with the conservative assumptions applied.

The greenhouse gas assessment conservatively calculates the annual Scope 1 and Scope 2 emissions generated from the Project to be 0.0002Mt CO_2-e. Relative to the annual greenhouse gas emissions from Australia and NSW, it is estimated the proposal would contribute approximately 0.00005 per cent and 0.00017 per cent, respectively.

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Appendix A

Peak-to-mean ratios

Peak-to-mean ratios

The following table shows the recommended factors to be applied for estimating peak concentrations from different source types, stabilities and distances.

Source Type	Pasquill-Gifford stability class	Near field P/M 60*	Far field P/M 60*
Area	A, B, C, D	2.5	2.5
	E, F	2.3	1.9
Line	A-F	6	6
Surface point	A, B, C	12	4
	D, E, F	25	7
Tall wake-free point	A, B, C	17	3
	D, E, F	35	6
Wake-affected point	A-F	2.3	2.3
Volume	A-F	2.3	2.3

*Ratio of peak 1-second average concentrations

Appendix B

Emission Inventory

The dust emissions inventories have been formulated from the operational description provided by the Proponent. Estimated emissions are presented for all significant dust generating activities associated with the operations. The relevant emission factors used for the study are described below. **Table B-2** presents the emissions inventory for the Project.

Vehicle movements on paved roads

The emission factor used for vehicle movements on paved roads was calculated using Equation 1 according to the **US EPA (1985)**.

Equation 1

$$\boldsymbol{E_{TSP} = k(sL)^{0.91}(W)^{1.02}}$$ g/VKT

Where,
E_{TSP} = TSP emission factor
k = 3.23
sL = road surface silt loading (g/m^2)
W = average weight (tons) of vehicle travelling the road

Loading, unloading and rehandling of materials

The dust emission from this activity will depend on wind speed according to the **US EPA (1985)** emission factor equation. This means that the emissions will vary with wind speed. The emission factor equation is calculated using Equation 2.

Equation 2

$$E_{TSP} = k(0.0016)\frac{\left(\frac{U}{2.2}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}}$$ kg/tonne

where
E_{TSP} = TSP emission factor
k = 0.74
U = mean wind speed (m/s)
M = material moisture content (%)

Table B-1: Emissions Inventory

ACTIVITY	TSP emission (kg/y)	Intensity	Units	Emission Factor	Units	Variable 1	Units	Variable 2	Units	Variable 3	Units	Variable 4	Units	Variable 5	Units
Stage 1 - Hauling of waste/materials to site	704	7	VKT/day	296.7	g/VKT	3.23	g/VKT	5.0	silt loading (g/m^2)	20.0	tons ave GMV	50.0	vehicles per day	0.13	km per travel
Stage 1 - Unloading of wastes/materials	6	3,000	tonnes/year	0.00215	kg/t	1.813	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %						
Stage 1 - Rehandling of wastes	3	1,500	tonnes/year	0.00215	kg/t	1.813	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %						
Stage 1 - Loading of wastes to trucks	6	3,000	tonnes/year	0.00215	kg/t	1.813	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %						
Stage 1 - Hauling material off-site	704	7	VKT/day	296.7	g/VKT	3.23	g/VKT	5.0	silt loading (g/m^2)	20.0	tons ave GMV	50.0	vehicles per day	0.13	km per travel
Stage 2 - Hauling of waste/materials to site	812	8	VKT/day	296.7	g/VKT	3.23	g/VKT	5.0	silt loading (g/m^2)	20.0	tons ave GMV	50.0	vehicles per day	0.2	km per travel
Stage 2 - Unloading of wastes/materials	215	100,000	tonnes/year	0.00215	kg/t	1.813	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %						
Stage 2 - Rehandling of wastes	107	50,000	tonnes/year	0.00215	kg/t	1.813	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %						
Stage 2 - Loading of wastes to trucks	215	100,000	tonnes/year	0.00215	kg/t	1.813	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %						
Stage 2 - Hauling material off-site	737	5	VKT/day	448.7	g/VKT	3.23	g/VKT	5.0	silt loading (g/m^2)	30.0	tons ave GMV	30.0	vehicles per day	0.2	km per travel
Total TSP emissions (kg/yr)	**3,510**														

Appendix E – Diagram of Water Management System

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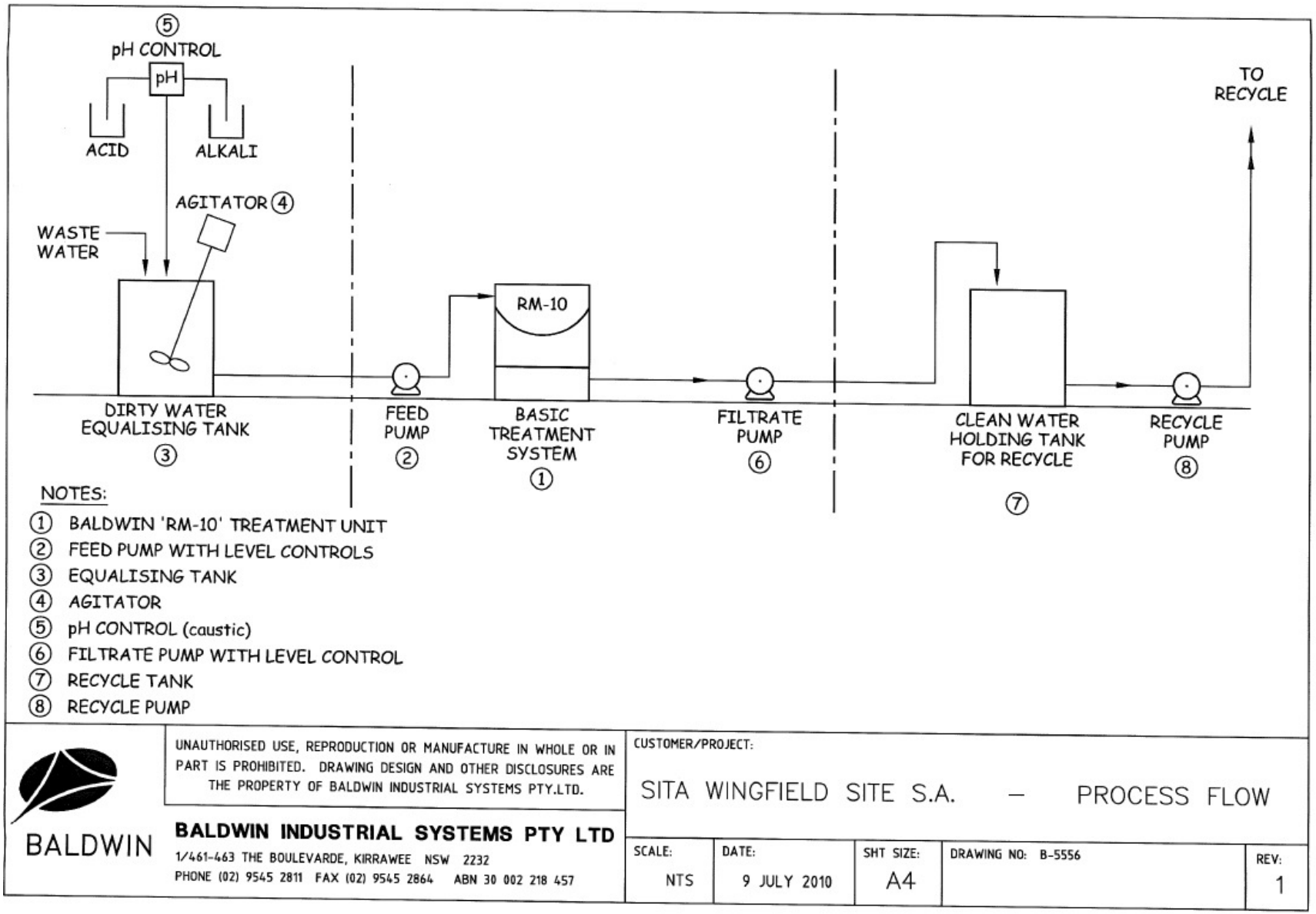
⑤
pH CONTROL
pH
ACID
ALKALI
AGITATOR ④
WASTE WATER
RM-10
TO RECYCLE
DIRTY WATER EQUALISING TANK
③
FEED PUMP
②
BASIC TREATMENT SYSTEM
①
FILTRATE PUMP
⑥
CLEAN WATER HOLDING TANK FOR RECYCLE
⑦
RECYCLE PUMP
⑧
NOTES:
① BALDWIN 'RM-10' TREATMENT UNIT
② FEED PUMP WITH LEVEL CONTROLS
③ EQUALISING TANK
④ AGITATOR
⑤ pH CONTROL (caustic)
⑥ FILTRATE PUMP WITH LEVEL CONTROL
⑦ RECYCLE TANK
⑧ RECYCLE PUMP
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SCALE: NTS
DATE: 9 JULY 2010
SHT SIZE: A4
DRAWING NO: B-5556
REV: 1

Appendix F – Noise Impact Assessment

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ACOUSTICS AND AIR

QUEANBEYAN TRANSFER STATION

NOISE IMPACT ASSESSMENT

REPORT NO. 13246
VERSION A

FEBRUARY 2015

PREPARED FOR

TODOROSKI AIR SCIENCES
SUITE 2B, 14 GLEN STREET
EASTWOOD NSW 2122

WILKINSON MURRAY

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GLOSSARY OF ACOUSTIC TERMS

Most environments are affected by environmental noise which continuously varies, largely as a result of road traffic. To describe the overall noise environment, a number of noise descriptors have been developed and these involve statistical and other analysis of the varying noise over sampling periods, typically taken as 15 minutes. These descriptors, which are demonstrated in the graph below, are here defined.

Maximum Noise Level (L_{Amax}) – The maximum noise level over a sample period is the maximum level, measured on fast response, during the sample period.

L_{A1} – The L_{A1} level is the noise level which is exceeded for 1% of the sample period. During the sample period, the noise level is below the L_{A1} level for 99% of the time.

L_{A10} – The L_{A10} level is the noise level which is exceeded for 10% of the sample period. During the sample period, the noise level is below the L_{A10} level for 90% of the time. The L_{A10} is a common noise descriptor for environmental noise and road traffic noise.

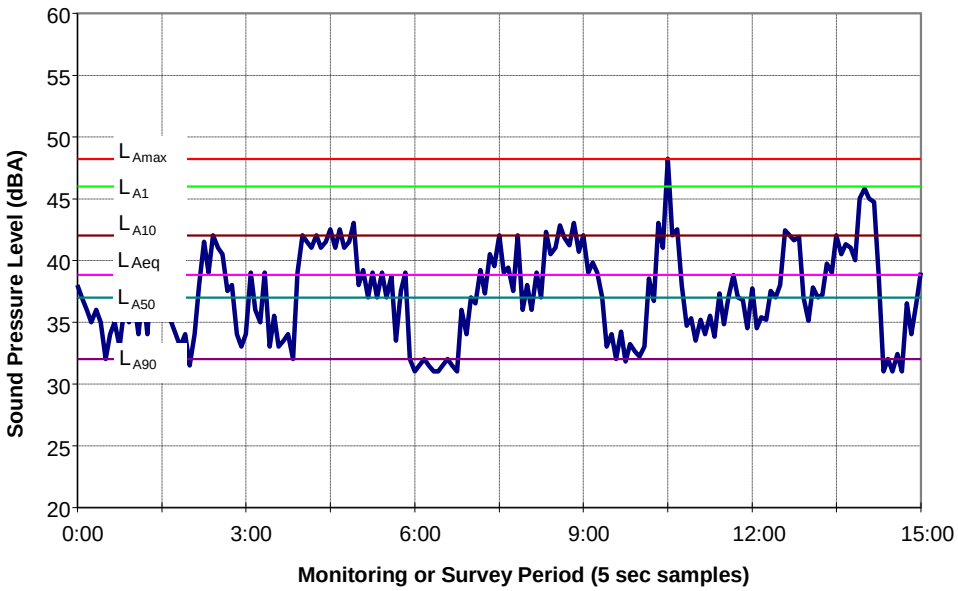
L_{A90} – The L_{A90} level is the noise level which is exceeded for 90% of the sample period. During the sample period, the noise level is below the L_{A90} level for 10% of the time. This measure is commonly referred to as the background noise level.

L_{Aeq} – The equivalent continuous sound level (L_{Aeq}) is the energy average of the varying noise over the sample period and is equivalent to the level of a constant noise which contains the same energy as the varying noise environment. This measure is also a common measure of environmental noise and road traffic noise.

ABL – The Assessment Background Level is the single figure background level representing each assessment period (daytime, evening and night time) for each day. It is determined by calculating the 10th percentile (lowest 10th percent) background level (L_{A90}) for each period.

RBL – The Rating Background Level for each period is the median value of the ABL values for the period over all of the days measured. There is therefore an RBL value for each period – daytime, evening and night time.

Typical Graph of Sound Pressure Level vs Time



1 INTRODUCTION

It is proposed to establish a Resource Recovery facility on a parcel of land at 184 Gilmore Road, Queanbeyan West.

Wilkinson Murray (WM) has been commissioned by Todoroski Air Sciences on behalf of Wild Environment and SITA Australia (SITA) to conduct a Noise Impact Assessment (NIA) for the proposed development. The assessment has been undertaken in accordance with the Director General's Requirements (DGR), pursuant to Section 78A (8) of the Environmental Planning and Assessment Act 1979.

The NIA has been conducted in general accordance with the following NSW Government guidelines and policies:

- *NSW Industrial Noise Policy* (EPA, 2000);
- *Noise Guide for Local Government* ();
- *NSW Road Noise Policy* (DECCW, 2011); and,
- *Interim Construction Noise Guideline* (DECC, 2009).

2 PROJECT SETTING

2.1 Site Location

The proposed site is located on industrial land adjacent to Canberra Avenue. The subject land is Lots 348, 349 and 350 DP 8456; Lot 2 DP 1000911; and Lot 1 DP 1169293. The site is bounded by the NSW/ACT border to the west, Canberra Avenue to the north, John Bull Street to the east and the Queanbeyan West race track to the south.

The site location is shown in Figure 2-1.

Figure 2-1 Site Location

2.2 Surrounding Land Uses and Sensitive Receivers

The land use immediately surrounding the proposed site is industrial. The nearest residential receivers to the development have been identified and are presented in Table 2-1 and Figure 2-2.

Table 2-1 Sensitive Receivers

Receiver	Address	Distance
R1	15 John Bull Street, Queanbeyan West	230
R2	31 Stuart Street, Crestwood	315
R3	54 Lorn Road, Crestwood	210

Figure 2-2 Sensitive Receivers

3 PROJECT DESCRIPTION

SITA's existing resource recovery facility at Hume, ACT is to be relocated to this new site at Queanbeyan West in June 2015. The facility accepts cardboard and temporarily stores batteries and handles the secure destruction of paper. It is also used for the storage and repair of heavy vehicles and machinery, small paint bay for bin repairs, storage of small and large bins (used for various festivals around NSW and ACT) and the storage of fluorescent tubes. A bailer and conveyor equipment is used to process approximately 3,600 tonnes per year of cardboard that that is bailed at the site.

In addition to these existing services, SITA has proposed to expand their operations to also include the recovery of a range of waste sources. The following additional waste streams would be targeted by SITA:

- General Solid Waste (putrescible and non-putrescible);
- Paper, cardboard and plastics recyclables (source separated and co-mingled);
- K110 Grease Trap Waste (liquid waste); and
- J120 Waste oil/hydrocarbons mixtures/emulsions in water (liquid waste).

To cater for the additional waste streams, a new transfer station would be constructed and operated on the eastern portion of the site. It is proposed that up to 95,000 tonnes/year of material would be accepted at the site. Waste material would be processed and sorted into separate streams with putrescible waste transferred from the site within 24 hours to a Veolia operated site at Woodlawn for processing.

An indicative site layout drawing is presented in Figure 3-1.

Delivery trucks and vehicles travelling to the area dedicated to grease trap waste, hydrocarbon/water emulsions, paper and cardboard bailing, fluorescent tubes and bin storage, would enter the site via Gilmore Road. This area is within the existing building on the site.

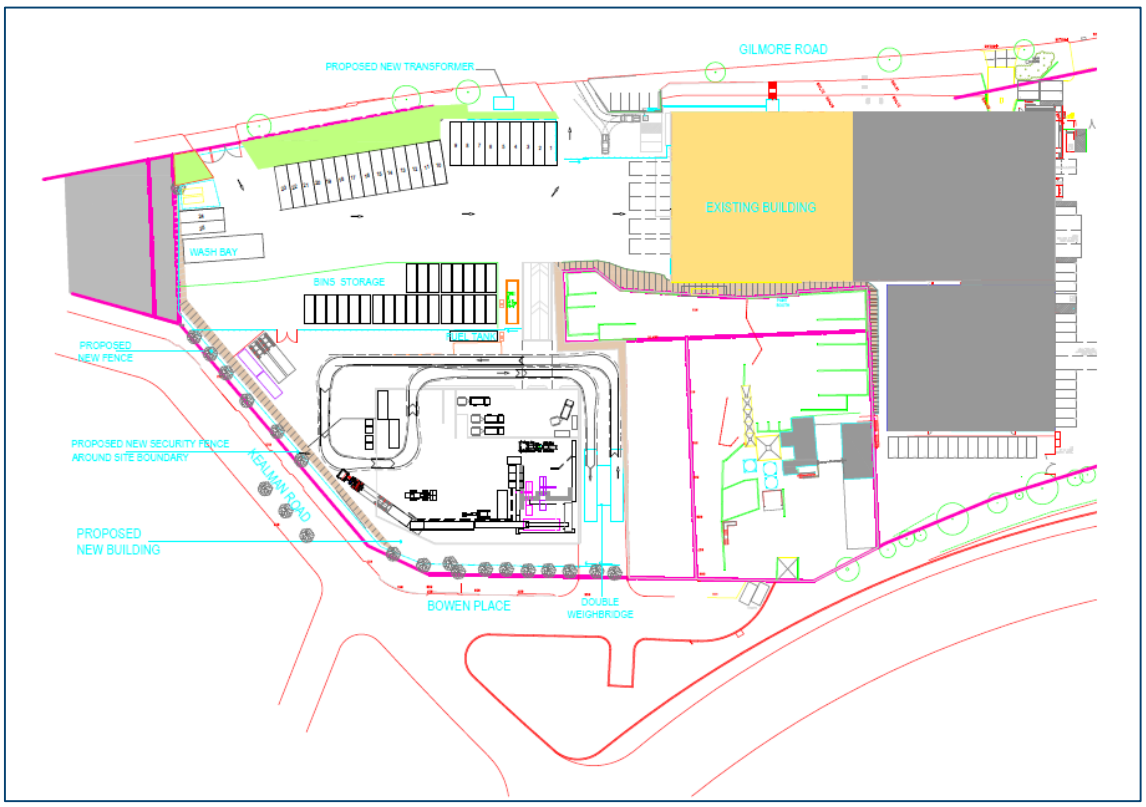
Delivery trucks entering the proposed new waste transfer station would enter the site from Bowen Place. Materials would be unloaded from the trucks within the building and sorted and processed into separate designated storage areas within the building. The materials will then be hauled off-site.

3.1 Operating Hours

The proposed site operations are 24 hours per day, seven days per week. This will allow services to be offered in peak waste collection times and minimise congestion and travel time associated with operations during peak hours. Sufficient storage will be incorporated to enable off-peak deliveries to and from the facility.

A key consideration for the extended operating hours is ensuring noise is appropriately managed. Site activities will be considered against applicable noise criteria for the day (7.00am – 6.00pm), evening (6.00pm – 10.00pm) and night time (10.00pm – 7.00am) periods. If required, site operations will be adapted throughout these time periods to ensure noise limits are met.

Figure 3-1 Site Plan



4 EXISTING NOISE ENVIRONMENT

To establish existing noise levels in the area surrounding the development, unattended noise monitoring was conducted between 27 June and 3 July 2014. The noise monitoring was conducted at 15 John Bull Street, Queanbeyan West, as shown in Figure 4-1.

Figure 4-1 Noise Monitoring Location

The noise monitoring equipment used for these measurements consisted of an environmental noise logger set to A-weighted, fast response. This equipment is capable of remotely monitoring and storing noise level descriptors for later detailed analysis. The equipment calibration was checked before and after the survey and no significant drift was noted.

From the background noise levels (L_{A90}) the Rating Background Levels (RBLs) were determined using the methodology recommended in the NSW *Industrial Noise Policy*.

The existing ambient noise levels are presented in Table 4-1. Daily plots of the noise logger data are presented in Appendix A.

Table 4-1 Existing Ambient Noise Levels

Time Period	Noise Levels (dBA)	
	L_{Aeq}	RBL
Day (7.00am – 6.00pm)	60	47
Evening (6.00pm – 10.00pm)	54	42
Night (10.00pm – 7.00am)	52	32

5 NOISE & VIBRATION CRITERIA

5.1 Operational Noise Criteria

The NSW *Industrial Noise Policy* (INP) provides the framework for establishing noise criteria and assessing impacts from sources of industrial noise. This policy seeks to promote environmental well-being through preventing and minimising noise.

There are two noise criteria which should be satisfied under the INP. The first being the "intrusiveness" criterion which assesses the likelihood of noise being intrusive above the ambient noise level. The intrusiveness criterion applies for residential receivers only.

The second noise criterion, known as the "amenity" criterion, ensures the total industrial noise from all sources in the area does not rise above a maximum acceptable level.

The INP stipulates that intrusiveness and amenity criteria are determined for the daytime (7.00am 6.00pm), evening (6.00pm 10.00pm) and night time (10.00pm 7.00am) periods, as relevant. The determined criteria apply at the most affected point on or within the receiver property boundary.

5.1.1 INP Intrusiveness Criteria

The intrusiveness criterion requires that the L_{Aeq} noise level from the source being assessed, when measured over 15 minutes, should not exceed the Rating Background Noise Level (RBL) by more than 5 dBA.

Based on the established background noise levels, as per Section 4, Table 5-1 summarises the intrusiveness noise criteria which apply to the identified receivers.

Table 5-1 Project-Specific Intrusiveness Criteria

Receiver	$L_{Aeq,15min}$ Intrusiveness Criterion (dBA)		
	Day (7am–6pm)	Evening (6pm–10pm)	Night Time (10pm–7am)
R1, R2 & R3	47+5 = 52	42+5 = 47	32+5 = 37

5.1.2 INP Amenity Criteria

The amenity criteria set limits on the total noise level from all industrial noise sources affecting a receiver. Different amenity criteria apply for different types of receivers (e.g. residential, commercial, industrial – or for areas specifically reserved for passive recreation) and different areas (e.g. urban, suburban, rural).

The INP classifies all residential receivers considered by this assessment (R1, R2 and R3) as "suburban". Accordingly, the applicable INP amenity criteria are presented in Table 5-2.

Table 5-2 Project Specific Amenity Criteria

Receiver	$L_{Aeq,period}$ Amenity Criterion (dBA)

	Day (7am–6pm)	Evening (6pm–10pm)	Night Time (10pm–7am)
R1, R2 & R3	55	45	40

The noise level to be compared with the amenity criterion is the L_{Aeq} noise level, measured over the relevant day, evening or night time period, due to all industrial noise sources, but excluding non-industrial sources such as off-site transportation, i.e. on public roads.

Where a new noise source is proposed in an area with negligible existing industrial noise, the amenity criterion for that source may be taken as being equal to the overall amenity criterion. However, where noise levels from existing industrial sources are already close to or above the acceptable amenity criterion, the INP requires that the acceptable amenity criterion for any further proposed industrial noise source is commensurately lowered, in the interest of preserving noise amenity. This provision is aimed at the prevention against cumulative noise increases over time due to industrialisation.

The land use surrounding the development and nearest receivers does not feature any significant sources of industrial noise. On this basis no adjustment to the INP amenity criteria has been applied.

5.1.3 Project-Specific Noise Levels

Table 5-3 summarises the determined Project-specific noise levels, with the controlling criteria shown in bold font.

Table 5-3 Project-Specific Noise Levels

Receiver	Intrusiveness Criterion ($L_{Aeq,15min}$ dBA)			Amenity Criterion ($L_{Aeq,Period}$ dBA)		
	Day	Evening	Night	Day	Evening	Night
R1 through R6	**57**	47	**37**	55	**45**	40

As the site is proposed to operate on a continual 24/7 basis, the focus of the operational noise assessment will be night time operations. Accordingly, the night time intrusiveness noise level of 37 dBA is the primary noise goal.

5.2 Sleep Disturbance

Noise sources that operate over short durations at night have the potential to cause sleep disturbance despite complying with criteria based upon L_{Aeq} and L_{A10} noise descriptors. For this reason, the NSW EPA's *Noise Guide for Local Government* (NGLG) suggests that a screening test be applied such that if the $L_{A1, 1min}$ or L_{Amax} noise levels do not exceed the background noise level by more than 15 dBA, then it is unlikely that the development has the potential to cause sleep disturbance.

The EPA's Application Notes state:

> *"Research on sleep disturbance is reviewed in the NSW Road Noise Policy. This review concluded that the range of results is sufficiently diverse that it was not reasonable to issue new noise criteria for sleep disturbance.*
>
> *From the research, the EPA recognised that the current sleep disturbance criterion of an $L_{A1,(1\ min)}$ not exceeding the $L_{A90,(15\ min)}$ by more than 15 dB(A) is not ideal. Nevertheless, as there is insufficient evidence to determine what should replace it, the EPA will continue to use it as a guide to identify the likelihood of sleep disturbance. This means that where the criterion is met, sleep disturbance is not likely, but where it is not met, a more detailed analysis is required."*

Based on the measured night time RBLs, sleep disturbance criteria have been established and are summarised in Table 5-4.

Table 5-4 Project-Specific Sleep Disturbance Criteria

Time Period	RBL	Sleep Disturbance Noise Criteria, L_{Amax} (dBA)
Night (10.00pm – 7.00am)	32	47

Additionally the NSW Road Noise Policy states that from the research on sleep disturbance to date it can be concluded that:

- Maximum internal noise levels below 50-55dBA are unlikely to cause awakening reactions; and,
- One or two noise events per night, with maximum internal noise levels of 65-70dBA, are not likely to affect health and wellbeing significantly.

Assuming that the typical noise reduction through a bedroom facade with normally open windows is 10dBA, then an external noise level of 60-65dBA is unlikely to cause sleep disturbance. As such it should be noted that the Project-specific sleep disturbance criterion is considerably lower than 60-65dBA.

5.3 Traffic Noise Criteria

The *NSW Road Noise Policy* (RNP) provides guidance on assessing road traffic noise impacts from traffic generating developments. The RNP road traffic noise assessment criteria for residential land uses are presented in Table 5-5.

In addition to the criteria in Table 5-5, the RNP advises that in cases where existing levels of road traffic noise exceed the applicable criteria, and that a development has the potential to increase road traffic noise levels; an increase of up to 2 dBA represents a minor impact that is considered barely perceptible to the average person.

Table 5-5 Road Traffic Noise Criteria

Road Category	Type of project/land use	Assessment Criteria - dBA	
		Day (7am – 10pm)	Night (10pm – 7am)
Freeway/ arterial/ sub-arterial roads	Existing residences affected by noise from **new** freeway/arterial/sub-arterial road corridors	$L_{Aeq,\ 15\ hour}$ 55 (external)	$L_{Aeq,\ 9\ hour}$ 50 (external)
	Existing residences affected by noise from **redevelopment** of existing freeway/arterial/sub-arterial roads	$L_{Aeq,\ 15\ hour}$ 60 (external)	$L_{Aeq,\ 9\ hour}$ 55 (external)
	Existing residences affected by **additional traffic** on existing freeway/arterial/sub-arterial roads generated by land use developments		
Local roads	Existing residences affected by noise from **new** local road corridors	$L_{Aeq,\ 1\ hour}$ 55 (external)	$L_{Aeq,\ 1\ hour}$ 50 (external)
	Existing residences affected by noise from **redevelopment** of existing local roads		
	Existing residences affected by **additional traffic** on existing local roads generated by land use developments		

Note: Land use developers must meet internal noise goals in the Infrastructure SEPP (Department of Planning NSW 2007) for sensitive developments near busy roads.

Only residents adjacent to Canberra Avenue have the potential to be impacted by noise from traffic generated by the proposed development. Canberra Avenue is classified as an 'arterial' road by the RNP.

5.4 Construction Noise Criteria

The NSW EPA's *Interim Construction Noise Guidelines (ICNG)* recommends noise management levels (NML) to reduce the likelihood of noise impacts arising from construction activities. The ICNG NML for residential receivers are shown in Table 5-6.

Table 5-6 ICNG Noise Management Levels for Residential Receivers

Time of Day	Management Level $L_{Aeq,15min}$	How to Apply
Recommended Standard Hours: Monday to Friday 7am to 6pm Saturday 8am to 1pm No work on Sundays or Public Holidays	Noise affected RBL + 10 dBA	The noise affected level represents the point above which there may be some community reaction to noise. • Where the predicted or measured $L_{Aeq,15min}$ is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level. • The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.
	Highly noise affected 75 dBA	The highly noise affected level represents the point above which there may be strong community reaction to noise. • Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: • times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences; • if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.
Outside recommended standard hours	Noise affected RBL + 5 dB	• A strong justification would typically be required for works outside the recommended standard hours. • The proponent should apply all feasible and reasonable work practices to meet the noise affected level. • Where all feasible and reasonable practices have been applied and noise is more than 5dB(A) above the noise affected level, the proponent should negotiate with the community. • For guidance on negotiating agreements see section 7.2.2.

It is expected that all construction activities will be conducted within standard construction hours. Based on the RBLs in Table 4-1, the construction noise management levels for this project are presented in Table 5-7.

Table 5-7 Project Specific Construction NML

Receiver	Acceptable $L_{Aeq, 15min}$ Noise Level (Standard daytime construction hours)
R1, R2 & R3	57

6 ASSESSMENT OF IMPACTS

6.1 Noise Modelling Methodology and Assumptions

Operational noise emissions from the site were modelled using the "CadnaA" acoustic noise prediction software. Factors that were addressed in the noise modelling are:

- Noise source levels and locations;
- Shielding from ground topography and nearby structures;
- Noise attenuation due to geometric spreading;
- Ground absorption; and,
- Atmospheric absorption.

6.2 Operational Noise Impacts

The following section identifies equipment and activities, associated with the operation of the development, which are likely to generate significant noise emissions and presents the predicted noise levels at nearby receivers.

6.2.1 Sources of Operational Noise

The most significant sources of operational noise from the site are vehicle movements within the site boundary and material handling activities within the transfer station building.

Approximately 60 truck movements associated with the transfer station are expected per day, generally during off-peak periods to reduce travel time and avoid congestion. Therefore, it is anticipated that at most four truck deliveries would occur in a given 15 minute period. Additionally, it has been assumed that another truck movement is occurring on the western side of the site, associated with other site activities.

Approximately 24 car parking spaces are located along the western site boundary, which have been approved as part of the initial development application to Queanbeyan City Council (DA#337-2014). As part of this application, it is proposed to remove these approved car spaces, and place them under the transfer station in a basement car park (64 parking spaces) It has been assumed that the worst case 15 minute car-park activities would involve 12 vehicle movements.

Within the transfer station building; trucks and other material handling machinery will generate a significant amount of noise. Based on previous experience of similar sites, the activities within the transfer station building are expected to produce an internal sound pressure level (SPL) of approximately 85 dBA. Taking into account the proposed dimensions of the transfer station building and its steel construction, the assumed internal noise level of 85 dBA has been used to calculate the amount of sound power which is transmitted through the walls and roof of the building.

6.2.2 Predicted Operational Noise Levels at Nearby Receivers

Sources of operational noise as described above were included in the computer noise model to predict noise levels at nearby receivers. The predictions also assumed that a 2.5 metre fence is to be constructed along the southern site boundary. The fence construction is assumed to be solid timber, steel or masonry.

The predicted operational noise levels at nearby residential receivers are presented in Table 6-1.

Table 6-1 Predicted $L_{Aeq, 15min}$ Operational Noise Levels at Nearby Receivers.

Receiver	Predicted Level ($L_{Aeq, 15min}$)	Criterion (Night)	Exceedance
R1	38	37	1 dBA
R2	37	37	0
R3	36	37	0

Review of Table 6-1 indicates that the predicted worst case operational $L_{Aeq, 15min}$ noise levels exceed the night time intrusiveness criterion at R1 by 1 dBA. The predicted levels comply with the criterion at R2 and R3.

An exceedance of 1 dBA is considered negligible and not perceptible to human hearing.

6.3 Sleep Disturbance Impacts

6.3.1 Transient Noise Sources

The most significant short duration, high intensity noise events associated with the operation of the facility are the application of pneumatic truck parking brakes. The worst case scenario of trucks applying parking brakes is when they stop at the weighbridge at the northern side of the transfer station building, and when they stop at the automatic entry doors at the southern side of the transfer station building.

6.3.2 Predicted Maximum Noise Levels at Nearby Receivers

Transient noise sources as described above were included in the computer noise model to predict maximum noise levels at nearby receivers. The predictions also assumed that a 2.5 metre fence is to be constructed along the southern site boundary. The fence construction is assumed to be solid timber, steel or masonry.

The predicted maximum operational noise levels at nearby residential receivers are presented in Table 6-2.

Table 6-2 Predicted L_{Amax} Operational Noise Levels at Nearby Receivers

Receiver	Predicted Level (L_{Amax})	Screening Criterion (Night)	Exceedance	RNP Criterion (Night)	Complies (Yes/No)
R1	45	47	0	60-65	Yes
R2	45		0		Yes
R3	54		7 dBA		Yes

Review of Table 6-2 indicates that predicted maximum noise levels comply with the established sleep disturbance criterion at receivers R1 and R2, however exceed the criterion by up to 7 dBA at R3.

As discussed in Section 5.2, the sleep disturbance goals based on a screening test of 15 dBA above background noise levels are considered conservative, and not ideal. The predicted maximum noise levels at R3 are at least 6 dBA below the level of 60 – 65 dBA, which the NSW Road Noise Policy would suggest are unlikely to cause sleep disturbance impacts.

The existing noise environment at R3 should be considered in more detail. Due to the proximity and exposure to traffic noise from Canberra Avenue, the existing background noise levels at R3 are expected to be significantly higher than those at R1, where the unattended background noise monitoring was conducted. Therefore the predicted 7 dBA exceedance of the sleep disturbance criterion at R3 is conservative. Also, the existing noise environment at R3 is expected to feature maximum noise events from traffic along Canberra Avenue of significant frequency and magnitude. The predicted maximum noise levels from the proposed development at R3 are expected to be less frequent and of a lower level than the existing maximum noise levels.

6.4 Traffic Noise Impacts

6.4.1 Traffic Generated by Proposed Development

Approximately 60 truck movements associated with the transfer station are expected per day, generally during off-peak periods to reduce travel time and avoid congestion. On weekends, around 10 truck movements are expected each day. In addition to truck movements, approximately 24 car movements are expected daily.

6.4.2 Predicted Increases in Traffic Noise Levels

The existing Annual Average Daily Traffic (AADT) volume on Canberra Avenue exceeds 30,000 vehicles. At residences in the vicinity of development which are adjacent to Canberra Avenue, existing traffic noise levels are expected to be in excess of 60 dBA ($L_{Aeq,15hour}$) and 55 dBA ($L_{Aeq,9hour}$) during the day time (7.00am – 10.00pm) and night time (10.00pm – 7.00am) respectively.

Assuming the worst case scenario where all truck movements generated by the development occurred during the night time period, the predicted increase in traffic noise levels at the most affected receivers (R2 & R3) would be less than 0.1 dBA. Such an increase is not perceptible to human hearing and therefore, no mitigation is warranted.

6.5 Construction Noise Impacts

The proposed facility will involve the development of a new transfer building, and associated infrastructure. The most noise intensive construction activities identified are those associated with establishing new pavement and hardstand areas and the construction of the new transfer building.

6.5.1 Typical Construction Plant

With consideration to the identified work's phases and activities, the construction plant and sound power levels set out in Table 6-3 have been assumed for the purpose of assessment. In each case, it has been assumed that all plant would operate simultaneously and continuously, which is considered to be conservatively representative of the typical worst case conditions.

Table 6-3 Indicative Sound Power Levels – Construction Equipment

Activity	Equipment	Quantity	Sound Power Level per Item ($L_{Aeq, 15min}$)	Sound Power Level per Activity ($L_{Aeq, 15min}$)
Pavement and Hardstand Construction	Backhoes or small excavators	1	108	115
	Static and vibratory rollers	1	108	
	20 tonne tip / trucks (road)	4	105	
	Delivery trucks	2	105	
	Concrete agitators	1	105	
Construction of Building Slab	Concrete agitator trucks	2	108	117
	Concrete pumping equipment	1	108	
	Air compressor	1	100	
	Concrete vibrators	1	103	
	Concrete saws	1	114	
Construction of Transfer Terminal	Mobile cranes	1	106	112
	Air compressor	1	100	
	Welder	1	105	
	Delivery trucks and low loaders	2	105	

6.5.2 Predicted Construction Noise Levels at Nearby Receivers

The noise levels generated by the indicative construction activities listed above have been predicted at each of the identified receiver locations, conservatively assuming a worst case scenario whereby all sources would operate continuously and simultaneously for a full 15 minute period.

Noise emissions would vary as construction progresses. The upper predicted $L_{Aeq,15min}$ construction noise levels are provided in **Table 6-4** with those exceeding the noise affected management level shown in bold font. As the modelled scenarios would be unlikely to occur often, the noise levels at receivers would typically be lower than identified.

Table 6-4 Predicted $L_{Aeq, 15min}$ Construction Noise Levels at Nearby Receivers

Receiver	Construction Stage			Noise Affected Management Level ($L_{Aeq, 15min}$)
	Pavement and Hardstand Construction	Construction of Building Slab	Construction of Transfer Terminal	
R1	49	51	46	57
R2	49	51	46	57
R3	50	52	47	57

Review of Table 6-4 indicates that predicted construction noise levels comply with the established noise management levels at all receivers.

7 CONCLUSION

The establishment of a Resource Recovery Facility has been proposed on a parcel of land at 184 Gilmore Road, Queanbeyan West.

Wilkinson Murray (WM) has conducted a Noise Impact Assessment (NIA) for the proposed development in accordance with the Director General's Requirements (DGR) and relevant NSW EPA guidelines.

The predicted operational, traffic and construction noise impacts from the proposed development comply with all relevant criteria.

APPENDIX A

NOISE MEASUREMENT RESULTS

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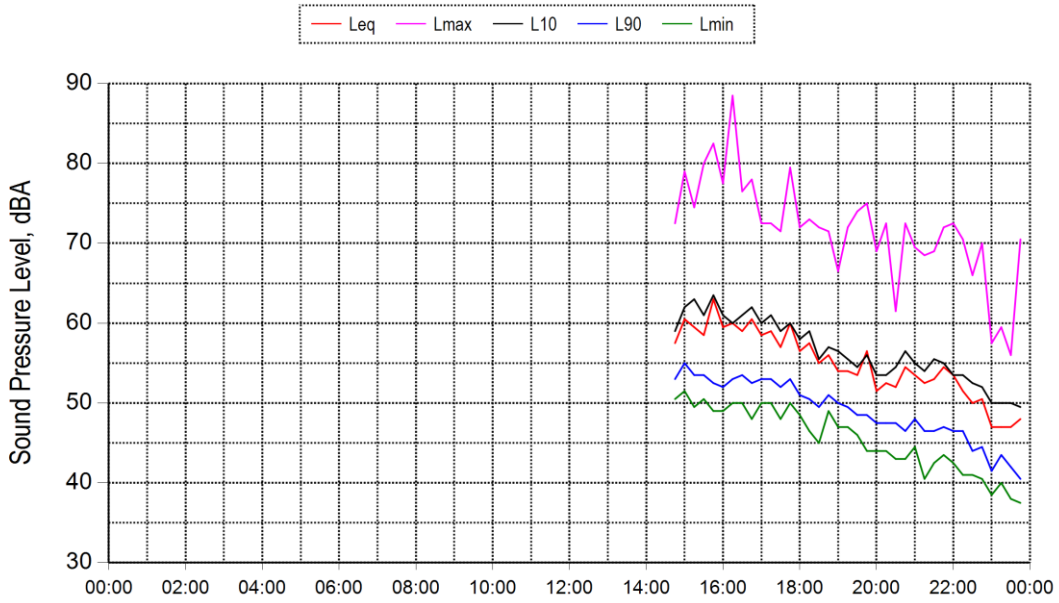

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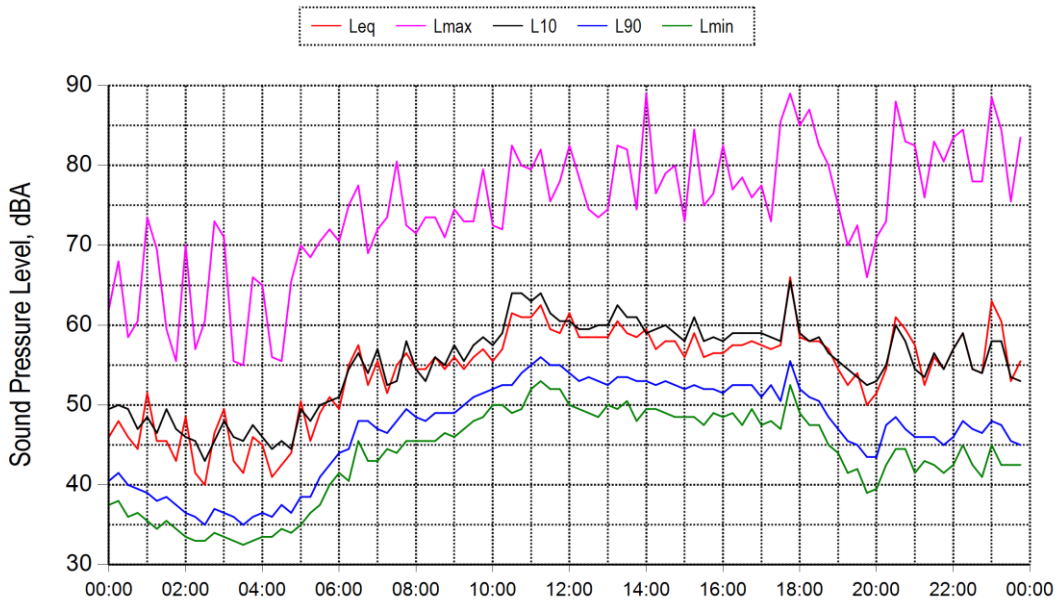

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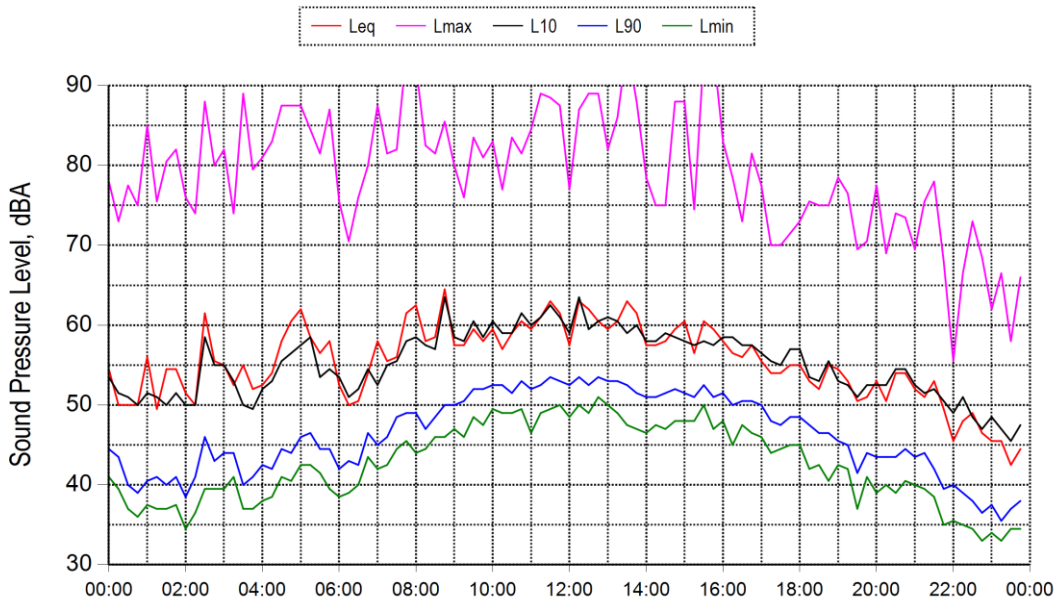

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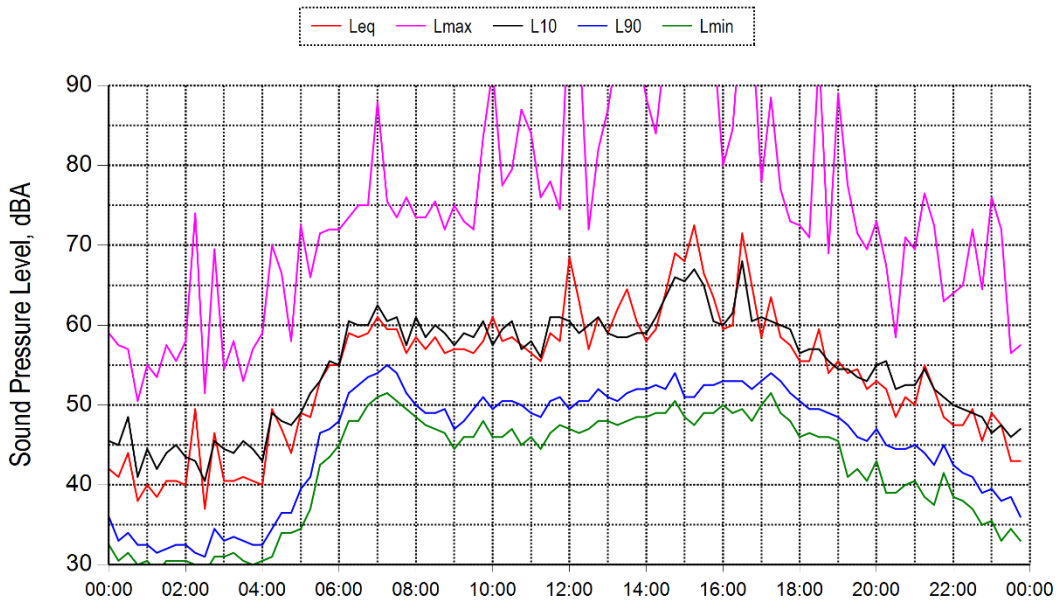

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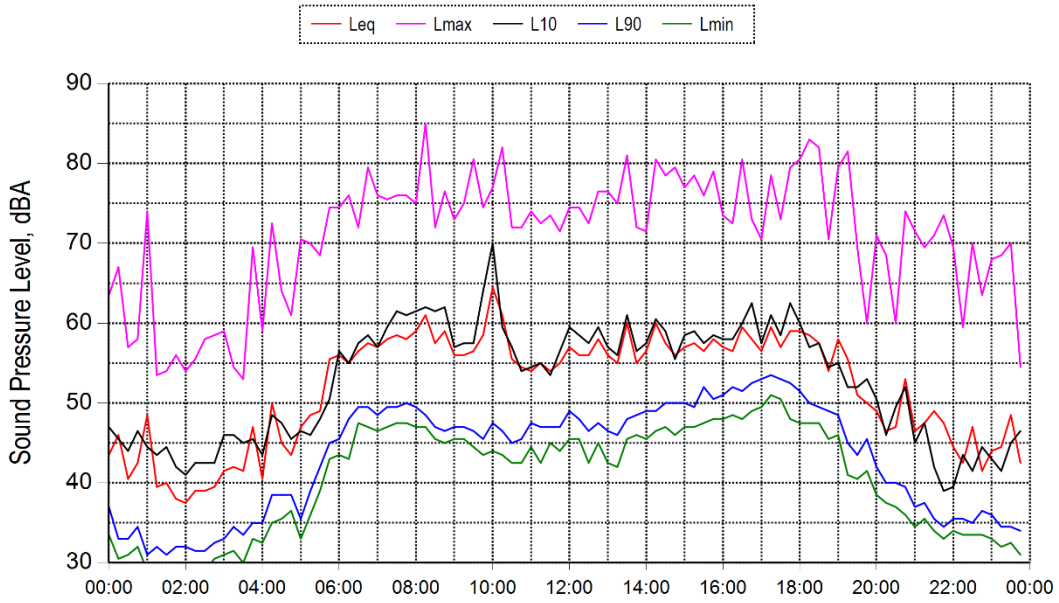

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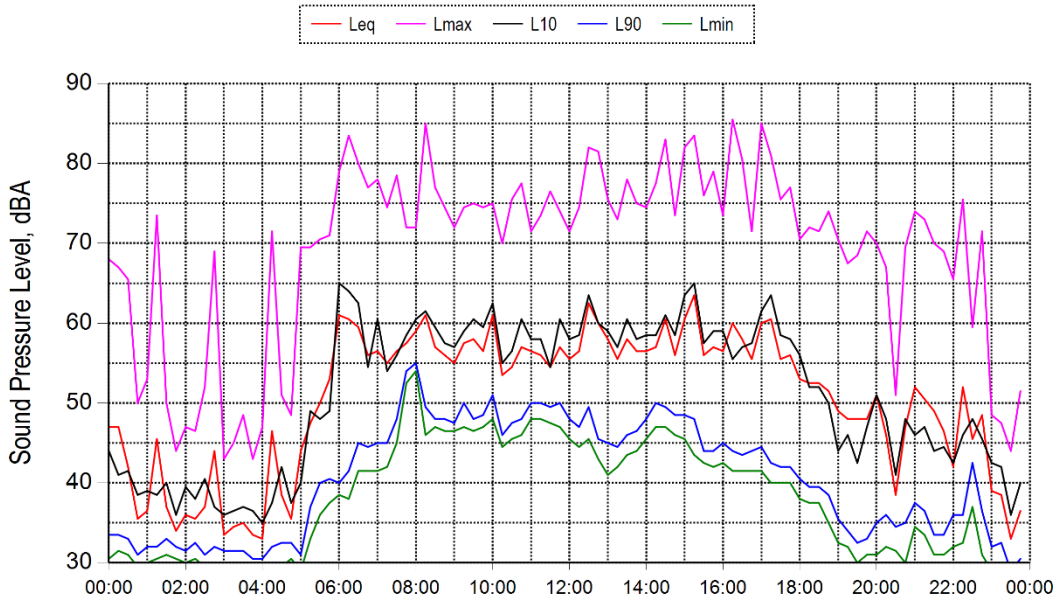

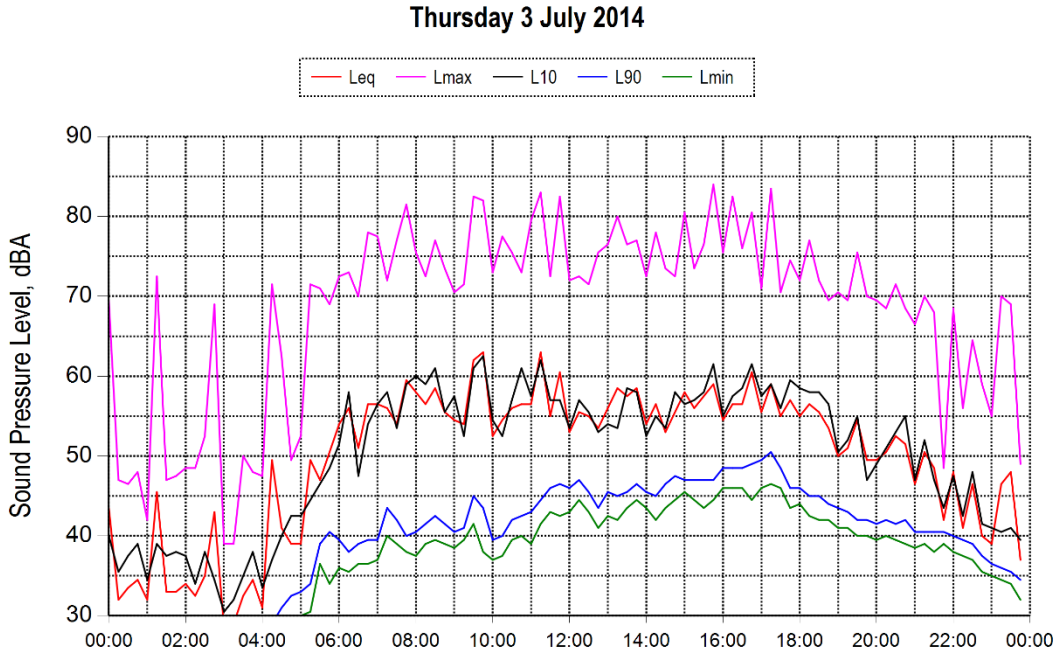
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Appendix G – Traffic Assessment

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Traffic Impact Assessment

Unit 3 – 184 Gilmore Road, Queanbeyan West NSW 2620

Proposed SITA Resource Recovery Facility

Prepared for:	Wild Environment Pty Ltd
Date Prepared:	October 2014
Revision:	2.0

INDEX

1.0 INTRODUCTION

AusWide Traffic Engineers were commissioned by Wild Environment Pty Ltd on behalf of SITA to prepare a traffic impact assessment for the proposed changes to SITA's approved Truck Maintenance Depot and Resource Recovery Facility on Gilmore Road, Queanbeyan West NSW 2620.

This report will address the following aspects relating to the proposed development;

- Review of the existing traffic and transport related conditions in the vicinity of the site;
- Qualitative description of impacts of the proposed site operations;
- Assessment of traffic and transport related impacts during proposed site operations; and
- Recommendations for appropriate mitigation measures for the impacts identified.

Ultimately, this traffic assessment will support the:

- Environmental Impact Statement;
- Subsequent Development Application to Queanbeyan City Council and Joint Regional Planning Panel; and
- Environmental Protection Licence application to the Office of Environment and Heritage.

In the course of preparing this assessment, the subject site and its environment have been inspected, plans of the development examined, and all relevant traffic data collected and analysed.

2.0 REFERENCE DOCUMENTS

This study will use the findings from previous studies and relevant standards that relate to this development, in order to develop a broader scale and more robust traffic assessment. The following documents have been reviewed during this study;

1) RMS Guide to Traffic Generating Developments (2002);
2) Australian Standards (Off-Street Parking) - AS 2890.1-2004 and AS 2890.2-2002;
3) Proposed SITA Environmental Solutions Resource Recovery Facility (Concept Outline): Gilmore Road, Queanbeyan West - Wild Environment Pty Ltd (July, 2013); and
4) Queanbeyan Development Control Plan (2012).

The subsequent sections of this report will make reference to the documents outlined above and discuss the relevance of their findings in the context of the subject development.

3.0 BACKGROUND AND EXISTING CONDITIONS

3.1 Location and Land Use

The proposed site is classified under zone IN1 – General Industrial as per the Queanbeyan City Council Local Environmental Plan (2012). The subject site includes 1,923sqm of tenancy area (including office and amenities) and a 5,728sqm hardstand yard area. In addition to the above, the site comprises a high-clearance (9m+) warehouse with offices and amenities. Outside the warehouse, a hardstand area is provided and B-double access has been allocated through entry and exit driveways.

The subject site has previously been used for industrial purposes (storage and transport) by Allied Pickfords. The overall industrial estate is bounded by the NSW border to the west, Canberra Avenue to the north, John Bull Street to the east and the Queanbeyan West race track to the south. Tenants operating in the overall estate include Stegbar, Monaro Mix Concrete Plant, Queanbeyan Industrial Supplies, Blackforest Joinery and Stairs, and Old Field Removals and Storage.

The existing building and hardstand area at the site has recently been approved by Queanbeyan City Council (DA#337-2014) as a truck maintenance depot and resource recovery facility. It is proposed to expand on these operations to include a new waste recovery hall at the rear of the property, and additional waste acceptance and sorting operations.

Access to the subject site is via Canberra Avenue/Kings Highway and is well suited for movements of heavy vehicles. Roads within the estate have been designed to accommodate this heavy vehicle traffic. The nearest residential areas are south east of the site are at Lorn Road, approximately 200m north east of the site and at John Bull Street, approximately 400m from the lot.

Figure 1 shows the site from the local road network from a street map perspective.

Figure 2 presents an aerial view of the subject site that was part of SITA's existing development approval and the surrounding areas.

Figures 3 and **4** indicate the subject site area (the existing Allied Pickfords warehouse building and the hardstand area).

Figure 5 shows an aerial of the subject site, which form part of this development application.

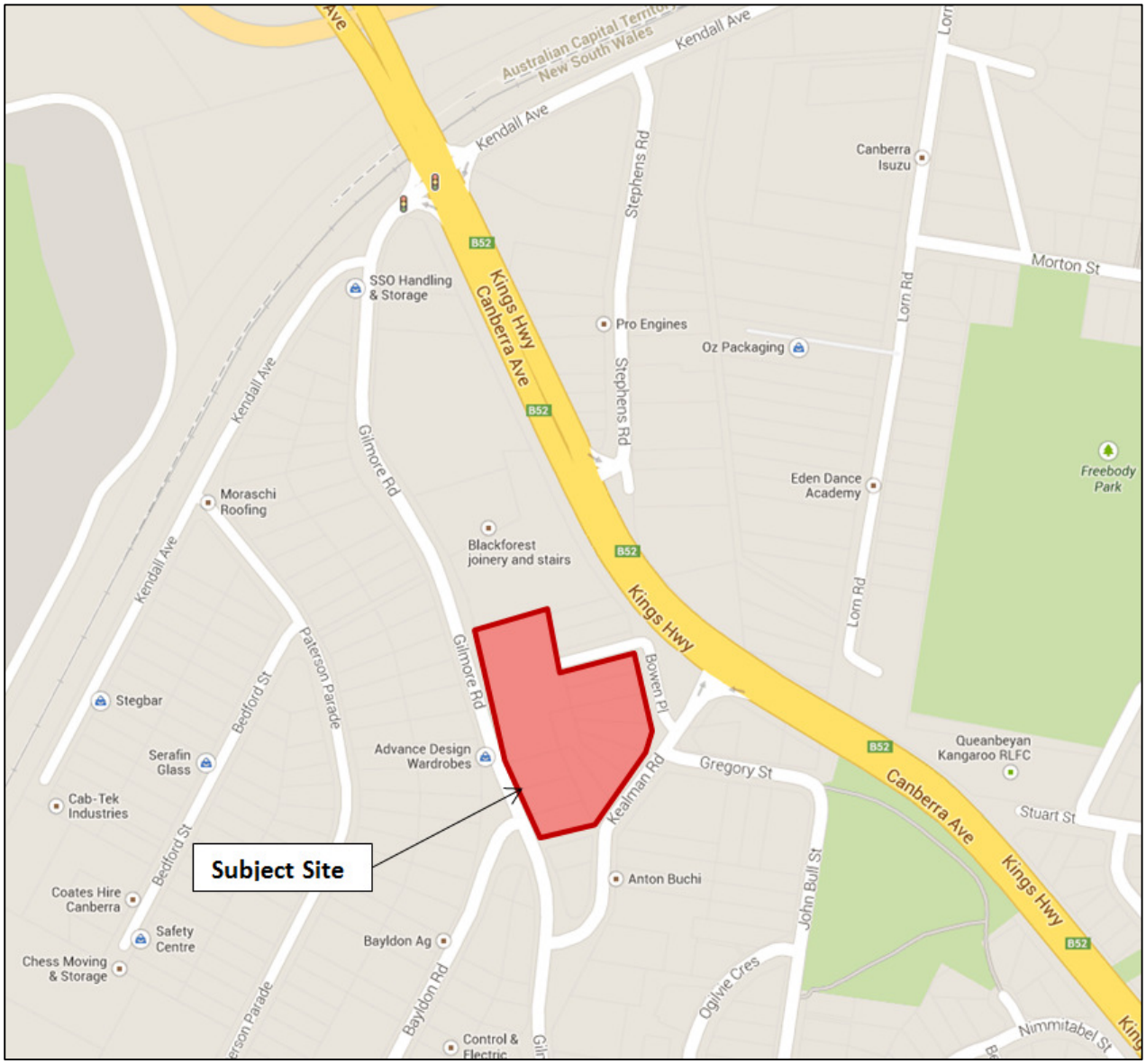


Figure 1: Location of the Subject Site on Street View

Figure 2: Aerial View of the Subject Site (Previous Assessment)

Figure 3: The Existing Allied Pickfords Warehouse Building

Figure 4: The Existing Hardstand Area

Figure 5: Aerial View of the Subject Site (Current Assessment)

3.2 Public Transport

The subject site is located in an industrial precinct adjacent to a state highway (Canberra Avenue), and therefore has limited public transport accessibility in the close vicinity. However, the following bus services can be accessed, approximately 500m (7 minute walk) to the north of the subject site, on Canberra Avenue.

- 830: Queanbeyan Interchange to Canberra City (Civic) via Kingston, Manuka, Barton and Russell.
- 831: Queanbeyan Interchange to Woden via Narrabundah and Canberra Hospital.
- 833: Queanbeyan Interchange to Canberra City Bus Station (Civic). Express service.
- 834: Queanbeyan to Brindabella Business Park (Loop) via Fyshwick and Majura Park.

The local bus service map is illustrated in the figure below.

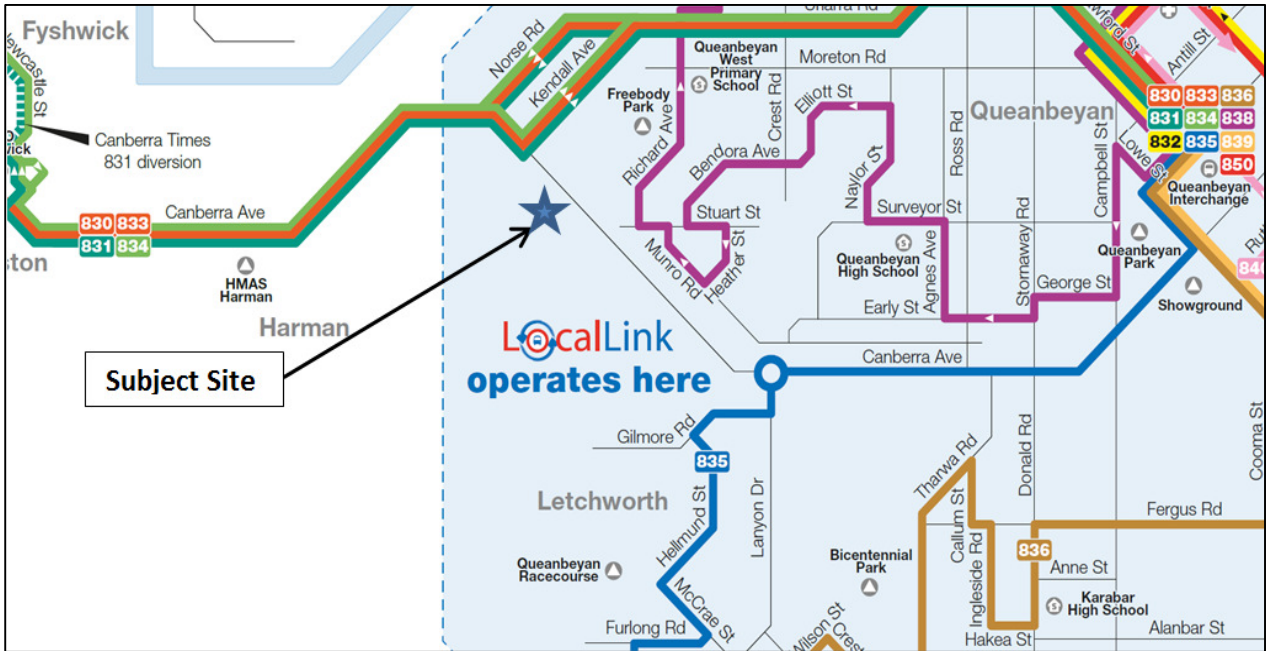
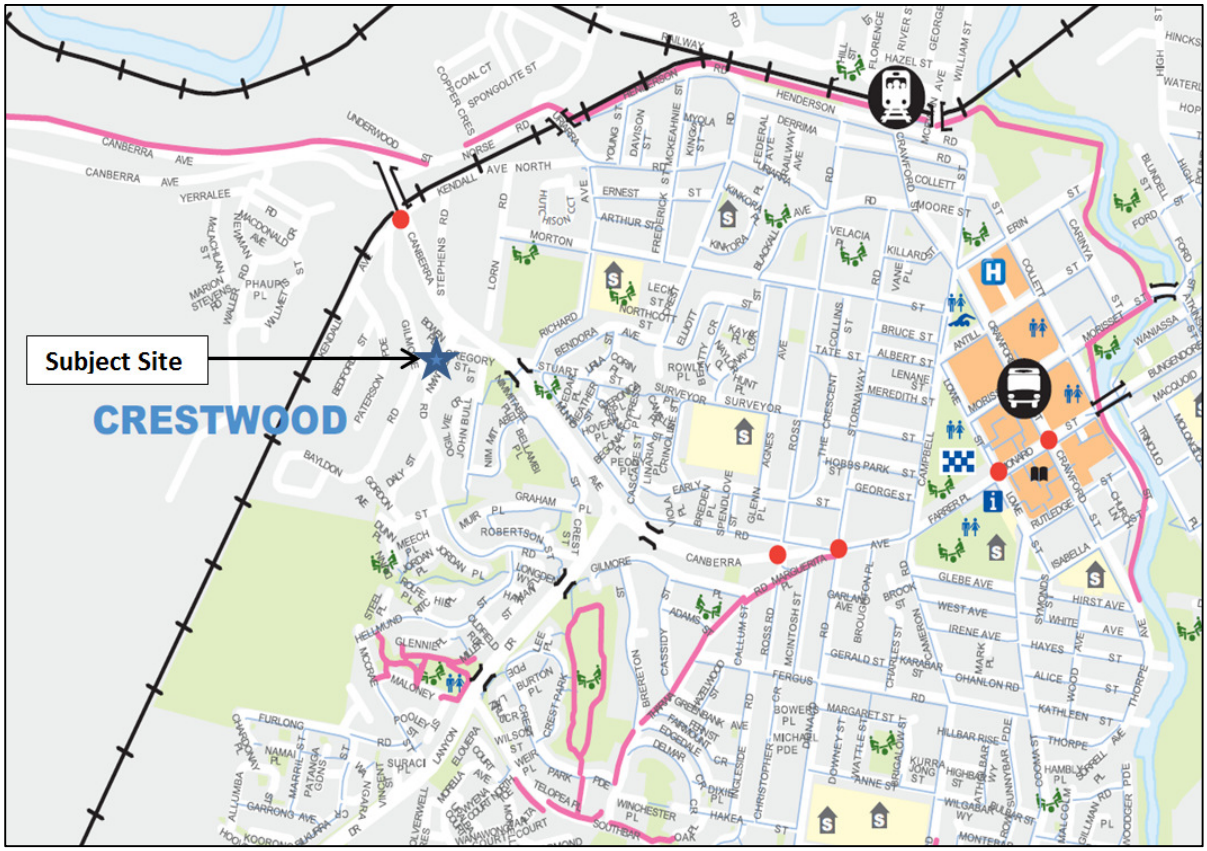


Figure 6: The Local Bus Service Map

As per the above, it is clear that the staff at the subject can utilise the public transport services to access the subject site.

3.3 Walking and Cycling

Due to the mainly industrial nature, the road network in the vicinity of the subject site has limited footpath provisions (see **Figure 7** below). As such, most of the trips to the subject site (staff and visitors) will be carried out by private vehicles.



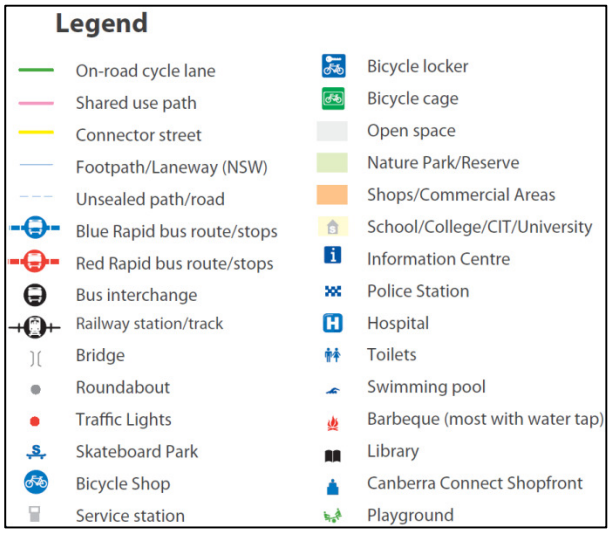


Figure 7: The Local Active Transport Route Map

4.0 EXISTING TRAFFIC CONDITIONS

The following section outlines the existing traffic and transport related infrastructure conditions both internal and external to the subject site and the traffic generating potential of the existing use of the site.

4.1 Internal Circulation

The proposed site is located on industrial land adjacent to Canberra Avenue/Kings Highway. The Industrial Estate has been developed, and includes the following features:

- Internal roadways, entry and exit driveways have been designed for B Double vehicles.
- Road access permitted 24 hours per day, 7 days per week, allowing ready access to the Kings Highway.

4.2 External Road Network

4.2.1 Canberra Avenue

Canberra Avenue is a divided four lane road and is the main route between Canberra and Queanbeyan. Canberra Avenue is classified as an arterial road and has a speed limit in this section of 60 kilometres per hour. The road corridor is generally 40 metres wide with verges varying generally between four metres and 10 metres in width. In some places, such as in the areas adjacent to the Lanyon Drive roundabout, the verge opens out substantially to more than 30 metres in width.

4.2.2 Kealman Road

Kealman Road is a local road that connects Gilmore Road with Canberra Avenue. This road comprises of a wide undivided carriageway. There is a posted speed limit of 50 km/hr along this road.

4.2.3 Gilmore Road

Gilmore Road is a local collector road which runs in a north-south direction parallel to Canberra Avenue (to the west of Canberra Avenue) providing access to the industrial precincts in the area. Gilmore Road comprises one traffic lane in each direction divided by a double barrier median line. Unrestricted on-street parking is permitted along either side of the carriageway. Gilmore Road includes a 50 km/hr posted speed limit.

The subject site includes two direct access points from Gilmore Road (approximately 100m apart). The following figures illustrate these access points to the subject site as seen from Gilmore Road.

Figure 8: The Northern Access Point to the Subject Site from Gilmore Road

Figure 9: The Southern Access Point to the Subject Site from Gilmore Road

4.2.2 Bowen Place

Bowen Place is a local road off Kealman Road. This road comprises of a wide undivided carriageway. There is a posted speed limit of 50 km/hr along this road. Access to Bowen Place is generally by staff and customers of Monaro Mix Concrete. It is a no-through road.

The proposed changes to the site would include one access point from Bowen Place. The following figure illustrates the proposed access.

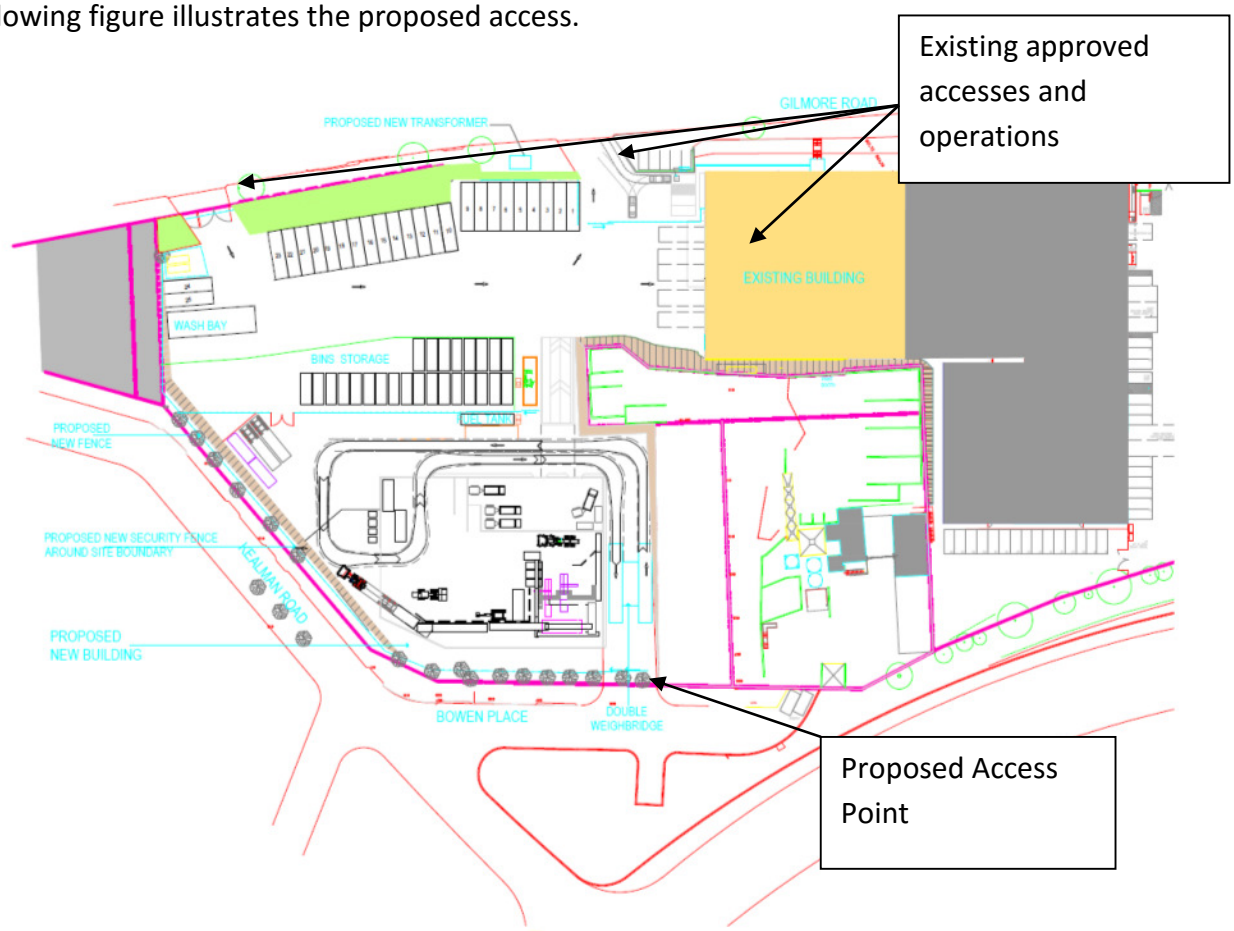


Figure 10: Proposed Access Point

4.3 Existing Land Use Traffic Generation

Recently, the subject site was occupied by Allied Pickfords – a company which provides removal services, including packing, transportation, delivery and unpacking. As such the current land use can be classified as a warehouse/storage with an associated office area. Whilst SITA have received approval to operate a truck maintenance depot and resource recovery facility at the existing building and hardstand area, they have not yet commenced operations. As such, this assessment has assessed the cumulative impact of the proposed development and the approved operations against the existing and use traffic generation by Allied Pickfords.

The following figure illustrates the site plan at the existing configuration – as used by Allied Pickfords.

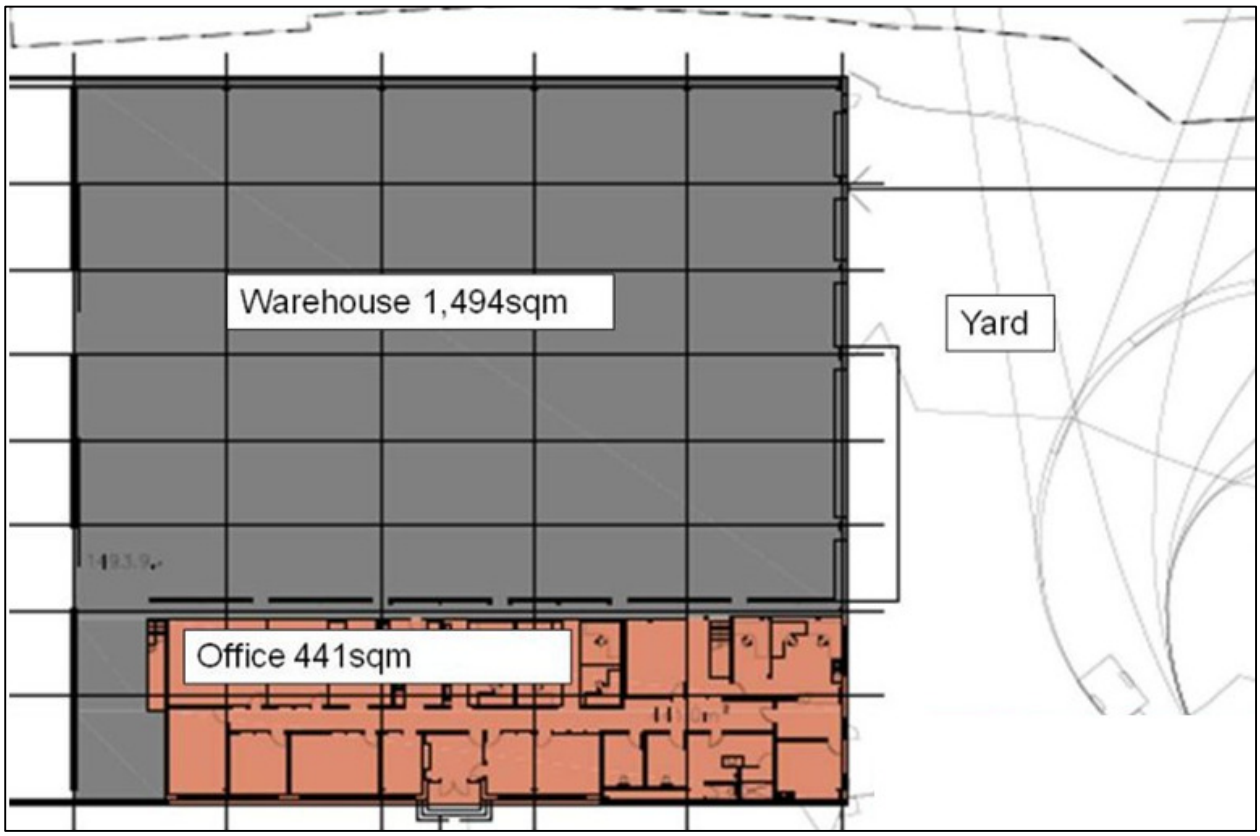


Figure 11: The Existing Site Plan – Previously Occupied by Allied Pickfords

The current traffic generation levels at the existing site can be established using the RMS Guide to Traffic Generating Developments (2002) document as illustrated in **Table 1** below;

Table 1: Existing Land Use Traffic Generation

Land Use	Area (m2)	RMS Guide Trip Rates		Trips Generated	
		Daily (per 100m2 GFA)	Peak Hour (per 100m2 GFA)	Daily	Peak Hour
Office	441	10	2	45	9
Warehouse	1491	4	0.5	60	8
Total	*1932*			*105*	*17*

The operating times for the Allied Pickfords business were confirmed to be 8:00am to 5:00pm on weekdays and no operations on Saturday and Sunday. As such, for analysis purposes, the following assumptions have been adopted;

8am to 9am and 4pm to 5pm were considered AM and PM peak hours respectively and during each of these periods, there will be a total of 17 vehicle trips generated by the existing site operations.

9am to 4pm was considered as the inter-peak period and the trip generation during this period is calculated by subtracting the peak hour traffic generation volumes from the daily trip generation volumes (i.e.: 105 daily trips *minus* 2 x 17 trips during each peak hour = 71 trips). This number of vehicular trips was assumed to be uniformly distributed across the inter-peak period. As such, during this 7 hour inter-peak period, the existing site operations will generate approximately 10 vehicular trips in each hour.

5.0 PROPOSED DEVELOPMENT

The following section outlines the key features of the proposed development.

5.1 Proposed Operations

SITA currently operates a resource recovery facility at Hume, ACT and propose to move their current operations to the new site at Queanbeyan in June 2015. The facility will utilise the existing shed at the site and an additional building.

The site is proposed to be operated in phases. Phase one would transfer the existing assets and operations from Hume. This would include the offices, truck parking, mechanical workshop, fuel storage, steel and plastic bin storage, paper shredding and bailing, fluorescent tube storage and battery storage. Phase one would also consist of the installation of a bailer and conveyor equipment for the addition of approximately 250 tonnes per month of cardboard that would be bailed at the site. Phase one was recently approved by Queanbeyan City Council (DA#337-2014) however, SITA is yet to take possession of the property.

Phase two would consist of the construction of a transfer station for putrescible waste and source separated recycling. Storage of Grease Trap Waste and Hydrocarbon/water mixtures is also proposed. It is proposed up to 95,000 tonnes/year of putrescible waste would be accepted at the site. Putrescible waste would be transferred from the site within 96 hours to a Veolia operated site at Woodlawn for processing.

During these initial stages, approximately 84 truck movements per day are anticipated, generally at off-peak periods to reduce travel time and avoid congestion. During weekends, up to 10 truck movements per day are expected. These truck movements include the approved 40 truck movements per day.

Trucks and vehicles entering the grease trap, hydrocarbon/water emulsions, paper and cardboard bailing, florescent tubes and bin storage areas of the site will enter the site via Gilmore Road. Provision for parking on-site (occasional and overnight) will be made for trucks to prevent queuing on local roads.

Trucks entering the waste transfer station at the top of the site for the delivery of putrescible and source separate waste would enter the site from Bowen Place.

Arrivals and departures will be spread out so as to prevent site and local intersection congestion. The industrial estate is positioned to allow easy access to the Kings Highway. Traffic may then enter and exit the estate at the signalled intersection at Gilmore Road and

Canberra Avenue.

Waste collection activities require that road use is as far removed as possible from peak traffic times.

Furthermore, the proposed development will include a total of 40 Full Time Equivalent employees.

The **Section 6** of this report will investigate the traffic movements associated with the business as usual operation of the proposed site.

5.2 Proposed Site Access (Current Proposal)

Access to the proposed site will be obtained via Bowen Place, off Kealman Road. Therefore, the vehicle accessing the subject site will primarily utilise Kings Highway/Kealman Road signalised intersection. The following figure illustrates the proposed site access route off Kings Highway.

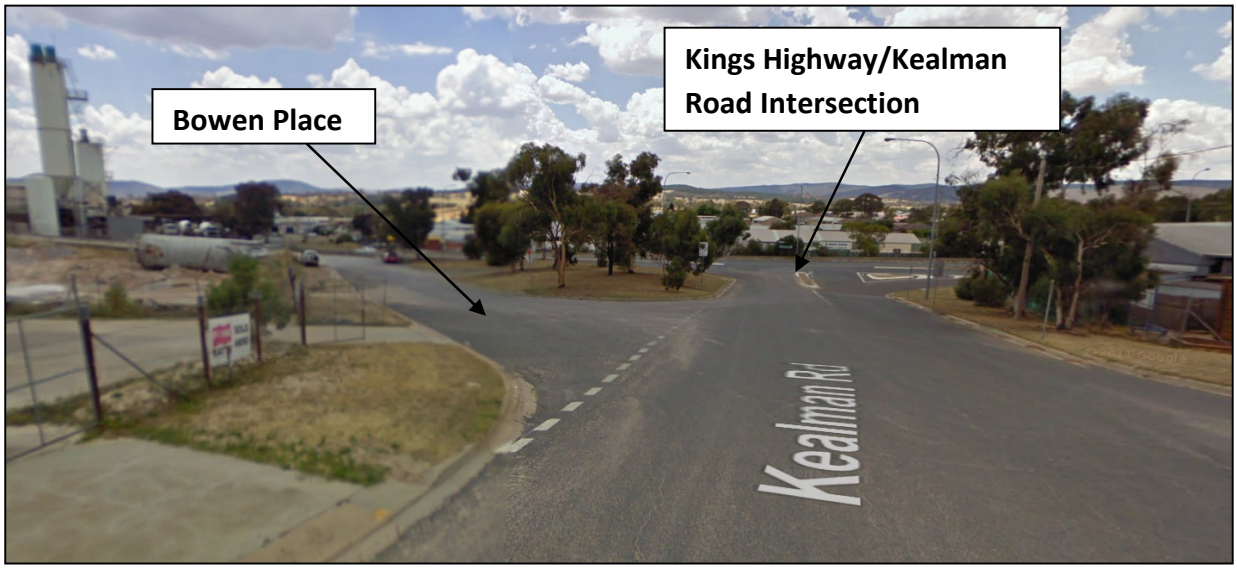


Figure 12: Proposed Site Access Route

5.3 Operating Hours

Site operations would be 24 hours / day 7 days week. This would allow services to be offered in peak waste collection times and minimised congestion and travel time associated with operations during peak hours. Sufficient storage will be incorporated to enable off peak deliveries to and from the facility.

6.0 DEVELOPMENT TRAFFIC IMPACT ASSESSMENT

This section will investigate the impacts of the proposed development on the existing traffic conditions in the vicinity of the subject site.

6.1 Anticipated Fleet Mix

A range of heavy vehicles are expected to arrive at the site during different time periods across each day. The following table outlines the anticipated fleet mix and the movement numbers during each time period. It is to be noted that these heavy vehicle numbers have been converted to Passenger Car Units (PCU) for comparison purposes as PCUs enable an equivalence to be made between cars and heavy vehicles.

Table 2: Anticipated Fleet Mix and Movements

Vehicle	Type	Number of Movements per Day (in and out of site)	Number in PCUs*	Movement Times	Operational Time Period per Day
Front End Loading (FEL) Vehicles	Heavy Rigid Vehicle	18	36	Half before 6am, Half after 12pm	18 hours
Rear End Loading (REL) Vehicles	Heavy Rigid Vehicle	12	24	Half before 6am, Half after 12pm	18 hours
Pantek Vehicles	Heavy Rigid Vehicle	18	36	All between 6am and 5pm	11 hours
RORO Skip Vehicles	Heavy Rigid Vehicle	20	40	Between 2am and 5pm	15 hours
Marrel Ship Vehicle	Heavy Rigid Vehicle	10	20	Between 5am and 5pm	12 hours
Liquid Tanker	Articulated Vehicle	6	18	All between 5am to 11am	6 hours
Total Movements (in and out)		84	174		

* Passenger Car Units (PCUs) – These are units that enable an equivalence to be made between cars and heavy vehicles. In this case: Heavy Rigid Vehicle = 2 PCU's, Articulated Vehicle = 3 PCU's

6.2 Truck Movements across 24 Hours

The truck movements outlined in **Table 2** was distributed uniformly across their respective time periods for analysis purposes. The following table outlines these movements in PCUs. It is noted that the last column includes the total truck movements in PCUs rounded up to obtain more robust and conservative results.

Table 3: Total Truck Movements Across the Day

Hour (24 hour day)	Number of Vehicles (in PCUs)						Total PCUs (rounded up)
	FEL	REL	Pantek	RORO Skip	Marrel Ship	Liquid Tanker	
1 - 2	2	1.33					4
2 - 3	2	1.33		2.67			6
3 - 4	2	1.33		2.67			6
4 - 5	2	1.33		2.67			6
5 - 6	2	1.33		2.67	1.67	3.00	11
6 - 7			3.27	2.67	1.67	3.00	11
7 - 8			3.27	2.67	1.67	3.00	11
8 - 9			3.27	2.67	1.67	3.00	11
9 - 10			3.27	2.67	1.67	3.00	11
10 - 11			3.27	2.67	1.67	3.00	11
11 - 12			3.27	2.67	1.67		8
12 - 13	2	1.33	3.27	2.67	1.67		11
13 - 14	2	1.33	3.27	2.67	1.67		11
14 - 15	2	1.33	3.27	2.67	1.67		11
15 - 16	2	1.33	3.27	2.67	1.67		11
16 - 17	2	1.33	3.27	2.67	1.67		11
17 - 18	2	1.33					4
18 - 19	2	1.33					4
19 - 20	2	1.33					4
20 - 21	2	1.33					4
21 - 22	2	1.33					4
22 - 23	2	1.33					4
23 - 24	2	1.33					4
24 - 1	2	1.33					4
Total	36	24	36	40	20	18	183

As indicated by the table above, the peak period, where the subject site generates highest number of movements, is between 5am to 5pm. However, even at the peak times, the subject site will only generate a maximum of 11 trips (in and out of the site) per hour. As such, the traffic impact generated from the subject site is considered minimal.

6.3 Net Increase in Traffic Generation

In order to determine the net increase in traffic generation from the subject site due to the proposed development, the existing land use traffic generation has been compared against the proposed land use traffic generation. The following figure illustrates a comparison of the daily traffic generation levels at the existing and proposed scenarios.

It is to be noted that the daily traffic distribution for the existing scenario has been established as per **Section 4.3** of this report and the daily traffic distribution for the proposed scenario has been established as per the number presented in **Table 3.**

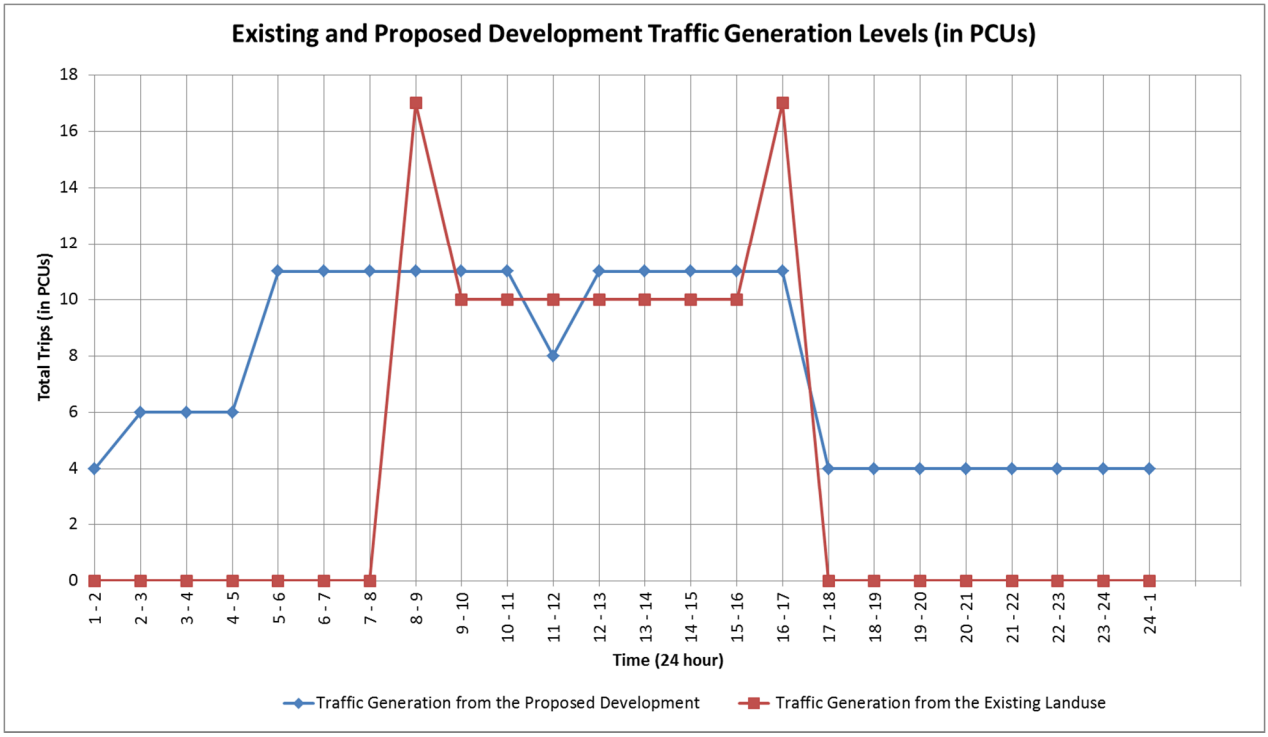


Figure 13: The Existing and Proposed Development Traffic Generation Levels (in PCUs)

As per the results indicated in the figure above, it is evident that the proposed development is not expected to generate much additional traffic with respect to the existing scenario. The highest net traffic generation is anticipated between 5am-8am where the proposed development will generate 11 vehicular trips (c.f: zero trips generated by the existing land use). Further to these heavy vehicle (PCU equivalent trips), there will also be some staff trips which will be sporadically distributed across the day (without any particular peak period due to the nature of shifts). As such, it is also acknowledged that the proposed development is deemed to generate less vehicular traffic than the existing land use during the peak periods. Therefore, the proposed development traffic generation will not impact adversely upon the existing traffic conditions in the vicinity of the subject site.

7.0 PARKING ASSESSMENT

7.1 On-Site Parking Requirements

Queanbeyan Development Control Plan (DCP) (2012) provides detailed guidelines and standards that must be considered for all new development. Particular elements of the DCP of relevance to the proposed development include Industrial Zones as well as generic controls for all aspects such as parking, access and landscaping.

As per the Queanbeyan DCP (2012), the proposed site is classed as 'General Industrial' and is required to provide 1.3 car spaces per 100 square metres of gross floor area and 1 car space per 60 square metres of gross floor area for office space ancillary to the development.

However, due to the unique nature of operations at the proposed site, the car parking requirement can also be ascertained from the specifics of the development (such as number of staff members expected to be on-site).

Given that there will be approximately 40 Full Time Equivalent Employees at the subject site, with very low numbers of visitors expected, at least 40 car spaces shall be provided on-site. The subject proposal includes a basement level car park with 64 car spaces and therefore this parking provision is deemed satisfactory.

7.2 On-Site Car Park Design

It is acknowledged that currently there are designated car and truck parking spaces provided on site. However, the following requirements shall be satisfied in the car park design.

7.2.1 Car Space Dimensions

Referring to AS/NZS 2890.1:2004, these car parking spaces are categorised under user class 1 (Employee and commuter parking; generally, all-day parking). These spaces must therefore be designed at a 90 degree angle. **Figure 14** and **Table 4** are excerpts from AS 2890.1:2004 illustrating the design requirements.

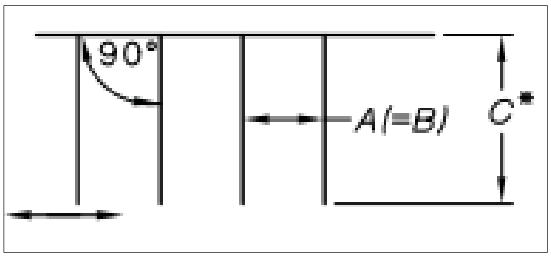


Figure 14: Design Requirements for 90 Degree Angle Parking (Excerpt From AS 2890.1:2004)

Table 4: Proposed Car Space Dimensions

Component	Standard Dimension (m)
A	2.4
C	5.4
Aisle Width	6.2

7.2.2 Disabled Car Spaces

Each disabled car space shall be designed at a width of 2.4m and a length of 5.4m along with an adjacent shared space area of same dimensions (appropriately line marked with a bollard installed).

7.2.3 Blind Aisles

At blind aisles, the aisle shall be extended a minimum of 1 m beyond the last parking space. If the last car space is bound by a wall, this space shall be extended by an additional 300mm.

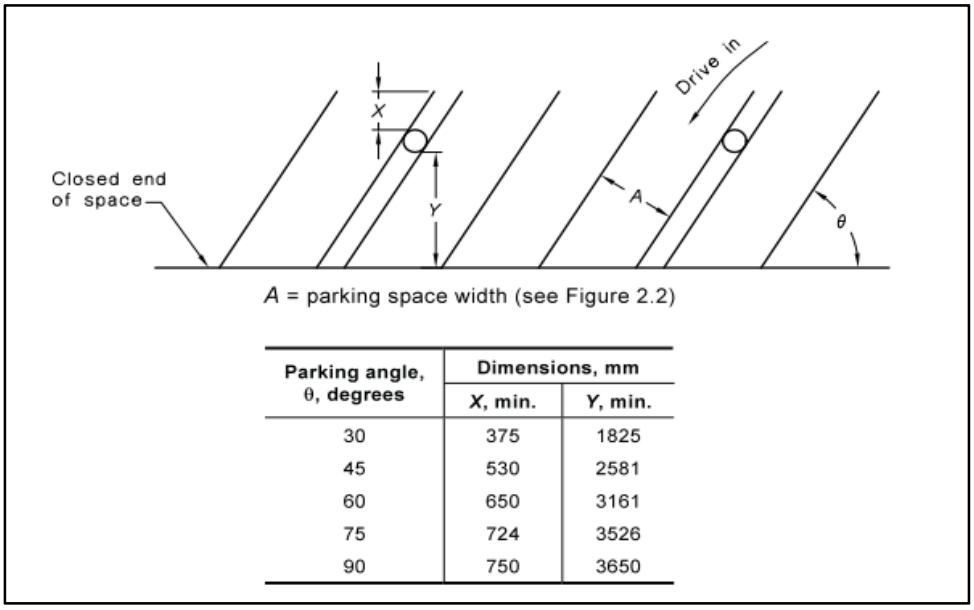
7.2.4 Ramp to the Car Park

AS 2890.1-2004 states the grade requirements for straight ramps at private or residential car parks as follows:
(i) Longer than 20 m—1 in 5 (20%) maximum.
(ii) Up to 20 m long—1 in 4 (25%) maximum. The allowable 20 m maximum length shall include any parts of grade change transitions at each end that exceed 1 in 5 (20%).
(iii) A stepped ramp comprising a series of lengths each exceeding 1 in 5 (20%) grade shall have each two lengths separated by a grade of not more than 1 in 8 (12½%) and at least 10 m long.

Also, the ramp width shall be 3.0 (if a one-way ramp) or 5.5m (if a two-way ramp), with a clearance of 300mm on either side from high obstructions, as per the Australian Standards.

7.2.5 Column Location and Spacing

There are columns supporting the building structure at the basement levels car parking. The design envelope around a parked vehicle which is to be kept clear of columns is shown in the Figure and the Table below. As per this table (an excerpt from AS/NZS 2890.1:2004, section 5.2), at the 90 degree parking angles, the minimum X and Y dimensions are to be 750mm and 3650mm respectively.



Parking angle, θ, degrees	Dimensions, mm	
	X, min.	Y, min.
30	375	1825
45	530	2581
60	650	3161
75	724	3526
90	750	3650

Figure 15: Column spacing requirements (excerpt from AS/NZS 2890.1:2004)

7.3 Heavy Vehicle Parking and Access

It is understood that the subject site currently comprises of entry and exit driveways which can accommodate B-double vehicles. As such, the existing access configuration shall be retained for the proposed use of the site.

As a part of the concept proposal, the existing hardstand area will be used to park the heavy vehicles involved in the daily operations of the proposed site. As such, these areas shall be properly designated and line marked as per the bay widths and lengths indicated in the table below.

Table 5: Design Requirements for Heavy Vehicle Bays (excerpt from AS2890.2:2002)

Vehicle class	Bay width (min.) m	Bay length (min.) m	Platform height m	Vertical clearance (min.) m
SRV	3.5	6.4	0.75 to 0.90	3.5
MRV	3.5	8.8	0.95 to 1.10	4.5*
HRV	3.5	12.5	1.10 to 1.40	4.5*
AV	3.5	19.0	1.10 to 1.40	4.5*

* 5.0 m where access to the top of a tall vehicle, e.g. pantechnicon, or load is required.

8.0 CONCLUSIONS

AusWide Traffic Engineers has undertaken a traffic assessment for the proposed development of a resource recovery facility on Gilmore Road, Queanbeyan West NSW 2620.

The following are the key findings from this assessment:

- The subject site has limited public transport accessibility in the close vicinity. However, four bus services can be accessed, approximately 500m (7 minute walk) to the north of the subject site, on Canberra Avenue. These services can therefore be used by staff members to access the site.
- Due to the industrial nature of the area, the road network in the vicinity of the subject site has limited active transport infrastructure provisions.
- The proposed development will generate minimal traffic. Comparing the anticipated traffic generation of the proposed site to the existing land use traffic generation, the net traffic generation from the proposed site is considered negligible/minimal.
- It is advised to provide car and truck parking as per the details outlined in the body of this report, once the specifics of the development has been established.
- It is understood that the subject site currently comprises of entry and exit driveways which can accommodate B-double vehicles. As such, the existing access configuration shall be retained for the proposed use of the site.

Overall, there are no major traffic or parking issues anticipated to arise from the proposed development and thus, this development is endorsed in the context of traffic and parking.