

- a) 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

- b) 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
 - e) reliability of proposed environmental impact mitigation measures
 - f) 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 (e.g. rainfall, temperature and evaporation, wind speed and direction)
 - b) topography (landform element, slope type, gradient and length)
 - c) surrounding land uses (potential synergies and conflicts)
 - d) geomorphology (rates of landform change and current erosion and deposition processes)
 - e) soil types and properties (including erodibility; engineering and structural properties; dispersibility; permeability; presence of acid sulfate soils and potential acid sulfate soils)
 - f) ecological information (water system habitat, vegetation, fauna)
 - g) availability of services and the accessibility of the site for passenger and freight transport.

2. Air

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

3. Noise and vibration

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

4. Water

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

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
 - f) consultation with stakeholders.
- Provide a summary of the outcomes of the process including:
 - a) all issues identified including local, regional and global impacts (e.g. increased/ decreased greenhouse emissions)
 - b) key issues which will require a full analysis (including comprehensive baseline assessment)
 - c) issues not needing full analysis though they may be addressed in the mitigation strategy
 - d) justification for the level of analysis proposed (the capacity of the proposal to give rise to high concentrations of pollution compared with the ambient environment or environmental outcomes is an important factor in setting the level of assessment).

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 e.g. assessment of impacts on air quality will often need to draw on the analysis of traffic, health, social, soil and/or ecological systems impacts; etc.
- The assessment needs to consider impacts at all phases of the project cycle including: exploration (if relevant or significant), construction, routine operation, start-up operations, upset operations and decommissioning if relevant.
- The level of assessment should be commensurate with the risk to the environment.

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.

1. Air

Describe baseline conditions

Provide a description of existing air quality and meteorology, using existing information and site representative ambient monitoring data. This description should include the following parameters;

- Coarse particulates
- PM10 and PM2.5
- Odour; and
- Any other potential pollutants identified in the assessment process.

Assess impacts

- Identify all pollutants of concern and estimate emissions by quantity (and size for particles), source and discharge point.
- Estimate the resulting ground level concentrations of all pollutants. Where necessary (e.g. potentially significant impacts and complex terrain effects), use an appropriate dispersion model to estimate ambient pollutant concentrations. Discuss choice of model and parameters with the EPA.
- Describe the effects and significance of pollutant concentration on the environment, human health, amenity and regional ambient air quality standards or goals.
- Describe the contribution that the development will make to regional and global pollution, particularly in sensitive locations.
- For potentially odorous emissions provide the emission rates in terms of odour units (determined by techniques compatible with EPA procedures). Use sampling and analysis techniques for individual or complex odours and for point or diffuse sources, as appropriate.

Note: With dust and odour, it may be possible to use data from existing similar activities to generate emission rates.

- Reference should be made to *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (DEC, 2016); *Approved Methods for the Sampling and Analysis of Air Pollutants in NSW* (DEC, 2007); *Assessment and Management of Odour from Stationary Sources in NSW* (DEC, 2006); *Technical Notes: Assessment and Management of Odour from Stationary Sources in NSW* (DEC, 2006); *Load Calculation Protocol for use by holders of NSW Environment Protection Licences when calculating Assessable Pollutant Loads* (DECC, 2009)>.

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.

2. Noise and vibration

Describe baseline conditions

- Determine the existing background (LA90) and ambient (LAeq) noise levels in accordance with the *NSW Industrial Noise Policy*.
- Determine the existing road traffic noise levels in accordance with the *NSW Environmental Criteria for Road Traffic Noise*, where road traffic noise impacts may occur.
- The noise impact assessment report should provide details of all monitoring of existing ambient noise levels including:
 - a) details of equipment used for the measurements
 - b) a brief description of where the equipment was positioned
 - c) a statement justifying the choice of monitoring site, including the procedure used to choose the site, having regards to the definition of 'noise sensitive locations(s)' and 'most affected locations(s)' described in Section 3.1.2 of the *NSW Industrial Noise Policy*
 - d) details of the exact location of the monitoring site and a description of land uses in surrounding areas
 - e) a description of the dominant and background noise sources at the site
 - f) day, evening and night assessment background levels for each day of the monitoring period
 - g) the final Rating Background Level (RBL) value
 - h) graphs of the measured noise levels for each day should be provided
 - i) a record of periods of affected data (due to adverse weather and extraneous noise), methods used to exclude invalid data and a statement indicating the need for any re-monitoring under Step 1 in Section B1.3 of the *NSW Industrial Noise Policy*
 - j) determination of LAeq noise levels from existing industry.

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 effects on sleep. Where LA1(1min) noise levels from the site are less than 15 dB above the background LA90 noise level, sleep disturbance impacts are unlikely. Where this is not the case, further analysis is required. Additional guidance is provided in Appendix B of the *NSW Environmental Criteria for Road Traffic Noise*.
- Determine expected noise level and noise character (e.g. tonality, impulsiveness, vibration, etc) likely to be generated from noise sources during:
 - a) site establishment
 - b) construction
 - c) operational phases
 - d) transport including traffic noise generated by the proposal
 - e) other services.

Note: The noise impact assessment report should include noise source data for each source in 1/1 or 1/3 octave band frequencies including methods for references used to determine noise source levels. Noise source levels and characteristics can be sourced from direct measurement of similar activities or from literature (if full references are provided).

- Determine the noise levels likely to be received at the most sensitive locations (these may vary for different activities at each phase of the development). Potential impacts should be determined for any identified significant adverse meteorological conditions. Predicted noise levels under calm conditions may also aid in quantifying the extent of impact where this is not the most adverse condition.
- 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 façade to reduce internal noise levels buildings where the night-time criteria is a major concern
- f) more stringent limits for noise emission from vehicles (i.e. using specially designed 'quite' trucks and/or trucks to use air bag suspension)
- g) driver education
- h) appropriate truck routes
- i) limit usage of exhaust breaks
- j) use of premium muffles on trucks
- k) reducing speed limits for trucks
- l) ongoing community liaison and monitoring of complaints
- m) phasing in the increased road use.

4. Water

Describe baseline conditions

- Describe existing surface and groundwater quality – an assessment needs to be undertaken for any water resource likely to be affected by the proposal and for all conditions (e.g. a wet weather sampling program is needed if runoff events may cause impacts).
Note: Methods of sampling and analysis need to conform with an accepted standard (e.g. Approved Methods for the Sampling and Analysis of Water Pollutants in NSW (DEC 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: <http://www.environment.nsw.gov.au/ieo/index.htm>. The EIS should state the environmental values listed for the catchment and waterway type relevant to your proposal. NB: A consolidated and approved list of environmental values are not available for groundwater resources. Where groundwater may be affected the EIS should identify appropriate groundwater environmental values and justify the choice.
- State the indicators and associated trigger values or criteria for the identified environmental values. This information should be sourced from the ANZECC 2000 *Guidelines for Fresh and Marine Water Quality* (<http://www.environment.gov.au/water/publications/quality/nwqms-guidelines-4-vol1.html>) (Note that, as at 2004, the NSW Water Quality Objectives booklets and website contain technical criteria derived from the 1992 version of the ANZECC Guidelines. The Water Quality Objectives remain as Government Policy, reflecting the community's environmental values and long-term goals, but the

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

- State any locally specific objectives, criteria or targets, which have been endorsed by the government e.g. the Healthy Rivers Commission Inquiries or the NSW Salinity Strategy (DLWC, 2000) (<http://www.environment.nsw.gov.au/salinity/government/nswstrategy.htm>).
- Where site specific studies are proposed to revise the trigger values supporting the ambient Water Quality and River Flow Objectives, and the results are to be used for regulatory purposes (e.g. to assess whether a licensed discharge impacts on water quality objectives), then prior agreement from the EPA on the approach and study design must be obtained.
- 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 EPA's guidelines section 'Bunding and Spill Management' at <http://www.epa.nsw.gov.au/mao/bundingspill.htm> and the most recent versions of the Australian Standards referred to in the Guidelines. Containment should be designed for no-discharge.
- The significance of the impacts listed above should be predicted. When doing this it is important to predict the ambient water quality and river flow outcomes associated with the proposal and to demonstrate whether these are acceptable in terms of achieving protection of the Water Quality and River Flow Objectives. In particular the following questions should be answered:
 - a) will the proposal protect Water Quality and River Flow Objectives where they are currently achieved in the ambient waters; and
 - b) will the proposal contribute towards the achievement of Water Quality and River Flow Objectives over time, where they are not currently achieved in the ambient waters.
- 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 relevant guidelines eg. *Managing Urban Stormwater: Soils and Construction* (DECC, 2008), *Guidelines for Fresh and Marine Water Quality* ANZECC 2000), *Environmental Guidelines: Use of effluent by Irrigation* (DEC, 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 (e.g. preparation of contingency plans), appropriate disposal methods, and generation of leachate.

- Describe hydrological impact mitigation measures including:
 - a) site selection (avoiding sites prone to flooding and waterlogging, actively eroding or affected by deposition)
 - b) minimising runoff
 - c) minimising reductions or modifications to flow regimes
 - d) avoiding modifications to groundwater.
- Describe groundwater impact mitigation measures including:
 - a) site selection
 - b) retention of native vegetation and revegetation
 - c) artificial recharge
 - d) providing surface storages with impervious linings
 - e) monitoring program.
- Describe geomorphological impact mitigation measures including:
 - a) site selection
 - b) erosion and sediment controls
 - c) minimising instream works
 - d) treating existing accelerated erosion and deposition
 - e) monitoring program.
- Any proposed monitoring should be undertaken in accordance with the *Approved Methods for the Sampling and Analysis of Water Pollutants in NSW* (DEC 2004).

5. Soils and contamination

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* (OEH, 2011); *Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997* (EPA, 2015).

Describe management and mitigation measures

- Describe and assess the effectiveness or adequacy of any soil management and mitigation measures during construction and operation of the proposal including:
 - a) erosion and sediment control measures
 - b) proposals for site remediation – see *Managing Land Contamination, Planning Guidelines SEPP 55 – Remediation of Land* (Department of Urban Affairs and Planning and Environment Protection Authority, 1998)
 - c) proposals for the management of these soils – see *Acid Sulfate Soil Manual* (Acid Sulfate Soil Advisory Committee 1998) and *Acid Sulfate Soils Assessment Guidelines* (Acid Sulfate Soil Advisory Committee 1998).

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 EPA's *Waste Classification Guidelines 2014*
 - describe how waste would be treated, stored, used, disposed and handled on site, and transported to and from the site, and the potential impacts associated with these issues, including current and future offsite waste disposal methods; and
 - identify the measures that would be implemented to ensure that the development is consistent with the aims, objectives and guidance in the *NSW Waste Avoidance and Resource Recovery Strategy 2014-21*.

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 (e.g. water and sewerage services, transport infrastructure upgrades).
- Assess likely impacts from such additional infrastructure and measures reasonably available to the proponent to contain such requirements or mitigate their impacts (e.g. travel demand management strategies).

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 (e.g. outline of an environmental management plan).
- The mitigation strategy should include the environmental management and cleaner production principles which would be followed when planning, designing, establishing and operating the proposal. It should include two sections, one setting out the program for managing the proposal and the other outlining the monitoring program with a feedback loop to the management program.

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	
<i>Contaminated Land Management Act 1997</i>	http://www.legislation.nsw.gov.au/#/view/act/1997/140
<i>Environmentally Hazardous Chemicals Act 1985</i>	http://www.legislation.nsw.gov.au/#/view/act/1985/14
<i>Environmental Planning and Assessment Act 1979</i>	http://www.legislation.nsw.gov.au/#/view/act/1979/203
<i>Protection of the Environment Operations Act 1997</i>	http://www.legislation.nsw.gov.au/#/view/act/1997/156
<i>Water Management Act 2000</i>	http://www.legislation.nsw.gov.au/#/view/act/2000/92
Licensing	
Guide to Licensing	www.epa.nsw.gov.au/licensing/licenceguide.htm
Air Issues	
Air Quality	
Approved methods for modelling and assessment of air pollutants in NSW (2016)	http://www.epa.nsw.gov.au/air/appmethods.htm
POEO (Clean Air) Regulation 2010	http://www.legislation.nsw.gov.au/#/view/regulation/2010/428_
Noise and Vibration	
Interim Construction Noise Guideline (DECC, 2009)	http://www.epa.nsw.gov.au/noise/constructnoise.htm
Assessing Vibration: a technical guideline (DEC, 2006)	http://www.epa.nsw.gov.au/noise/vibrationguide.htm
Industrial Noise Policy Application Notes	http://www.epa.nsw.gov.au/noise/applicnotesindustnoise.htm
Environmental Criteria for Road Traffic Noise (EPA, 1999)	http://www.epa.nsw.gov.au/resources/noise/roadnoise.pdf
Interim Guideline for the Assessment of Noise from Rail Infrastructure Projects (DECC, 2007)	http://www.epa.nsw.gov.au/noise/railinfranoise.htm
Environmental assessment requirements for rail traffic-generating developments	http://www.epa.nsw.gov.au/noise/railnoise.htm

Human Health Risk Assessment	
Environmental Health Risk Assessment: Guidelines for assessing human health risks from environmental hazards (enHealth, 2012)	http://www.eh.org.au/documents/item/916
Waste, Chemicals and Hazardous Materials and Radiation	
Waste	
Environmental Guidelines: Solid Waste Landfills (EPA, 2016)	http://www.epa.nsw.gov.au/waste/landfill-sites.htm
Draft Environmental Guidelines - Industrial Waste Landfilling (April 1998)	http://www.epa.nsw.gov.au/resources/waste/envguidlms/industrialfill.pdf
EPA's Waste Classification Guidelines 2014	http://www.epa.nsw.gov.au/wasteregulation/classify-guidelines.htm
Resource recovery orders and exemptions	http://www.epa.nsw.gov.au/wasteregulation/orders-exemptions.htm
European Union's Waste Incineration Directive 2000	http://ec.europa.eu/environment/archives/air/stationary/wid/legislation.htm
EPA's Energy from Waste Policy Statement	http://www.epa.nsw.gov.au/wastestrategy/energy-from-waste.htm
NSW Waste Avoidance and Resource Recovery Strategy 2014-2021	http://www.epa.nsw.gov.au/wastestrategy/warr.htm
Chemicals subject to Chemical Control Orders	
Chemical Control Orders (regulated through the EHC Act)	http://www.epa.nsw.gov.au/pesticides/CCOs.htm
National Protocol - Approval/Licensing of Trials of Technologies for the Treatment/Disposal of Schedule X Wastes - July 1994	Available in libraries
National Protocol for Approval/Licensing of Commercial Scale Facilities for the Treatment/Disposal of Schedule X Wastes - July 1994	Available in libraries
Water and Soils	
Acid sulphate soils	
Coastal acid sulfate soils guidance material	http://www.environment.nsw.gov.au/acidsulfatesoil/ and http://www.epa.nsw.gov.au/mao/acidsulfatesoils.htm
Acid Sulfate Soils Planning Maps	http://www.environment.nsw.gov.au/acidsulfatesoil/riskmaps.htm
Contaminated Sites Assessment and Remediation	

Managing land contamination: Planning Guidelines – SEPP 55 Remediation of Land	http://www.epa.nsw.gov.au/clm/planning.htm
Guidelines for Consultants Reporting on Contaminated Sites (EPA, 2000)	http://www.epa.nsw.gov.au/resources/clm/20110650consultantsguidelines.pdf
Guidelines for the NSW Site Auditor Scheme - 2nd edition (DEC, 2006)	http://www.epa.nsw.gov.au/resources/clm/auditorguidelines06121.pdf
Sampling Design Guidelines (EPA, 1995)	http://www.epa.nsw.gov.au/resources/clm/95059samplingdesign.pdf
National Environment Protection (Assessment of Site Contamination) Measure 1999 (or update)	http://www.scew.gov.au/nepms/assessment-site-contamination
Soils – general	
Managing land and soil	http://www.environment.nsw.gov.au/soils/landandsoil.htm
Managing urban stormwater for the protection of soils	http://www.environment.nsw.gov.au/stormwater/publications.htm
Landslide risk management guidelines	http://australiangeomechanics.org/admin/wp-content/uploads/2010/11/LRM2000-Concepts.pdf
Site Investigations for Urban Salinity (DLWC, 2002)	http://www.environment.nsw.gov.au/resources/salinity/booklet3siteinvestigationsforurbansalinity.pdf
Local Government Salinity Initiative Booklets	http://www.environment.nsw.gov.au/salinity/solutions/urban.htm
Water	
Water Quality Objectives	http://www.environment.nsw.gov.au/ieo/index.htm
ANZECC (2000) Guidelines for Fresh and Marine Water Quality	http://www.environment.gov.au/water/publications/quality/nwqms-guidelines-4-vol1.html
Applying Goals for Ambient Water Quality Guidance for Operations Officers – Mixing Zones	Contact the EPA on 131555
Approved Methods for the Sampling and Analysis of Water Pollutant in NSW (2004)	http://www.environment.nsw.gov.au/resources/legislation/approvedmethods-water.pdf

Max Chipchase

From: NAJARI ALAMOUTI Zhaleh <Zhaleh.ALAMOUTI@rms.nsw.gov.au>
Sent: Thursday, 6 April 2017 9:23 AM
To: Max Chipchase
Subject: RE: Request for Input - SEAR 1142 - Expansion of Waste Management Facility - 33-37 Plasser Crescent, North St Marys - Penrith LGA

Hi Max,

Reference is made to your email below requesting Roads and Maritime Services (Roads and Maritime) to provide details of key issues and assessment requirements regarding the abovementioned development for inclusion in the Secretary's Environmental Assessment Requirements (SEARs).

Roads and Maritime require the following issues to be included in the transport and traffic impact assessment of the proposed development:

1. Daily and peak traffic movements likely to be generated by the proposed development including the impact on nearby intersections and the need/associated funding for upgrading or road improvement works (if required).

The following signalised intersection is to be examined/modelled as a result of the development:

- Glossop Street/Kurrajong Road/Forthorn Place
2. Details of the proposed accesses and the parking provisions associated with the proposed development including compliance with the requirements of the relevant Australian Standards (ie: turn paths, sight distance requirements, aisle width, etc).
 3. Type of heavy vehicles and haulage routes
 4. Proposed number of car parking spaces and compliance with the appropriate parking codes.
 5. Details of service vehicle movements (including vehicle type and likely arrival and departure times).

Any inquiries in relation to this application can be directed to me or by email at development.sydney@rms.nsw.gov.au

Regards
Zhaleh

Zhaleh Alamouti
Land Use Planner
Network Management | Journey Management
T 02 8849 2331 M 0427 825 855

www.rms.nsw.gov.au

Every journey matters

Roads and Maritime Services

Level 5, 27 Argyle Street Parramatta NSW 2150

From: Max Chipchase [<mailto:Max.Chipchase@planning.nsw.gov.au>]

Sent: Thursday, 23 March 2017 4:11 PM

To: planning.matters@environment.nsw.gov.au; 'landuse.enquiries@dpi.nsw.gov.au'; Development Sydney

Subject: Request for Input - SEAR 1142 - Expansion of Waste Management Facility - 33-37 Plasser Crescent, North St Marys - Penrith LGA

Proposal – Expansion of Waste Management Facility, 33-37 Plasser Crescent, North St Marys (Lot 16 in DP 263353), SEARs ID No. 1142

Good afternoon,

KMH Environmental on behalf of the applicant has requested the requirements of the Secretary of the Department of Planning and Environment for the preparation of an Environmental Impact Statement (EIS) for the above local designated development located in the Penrith LGA. The proposed development includes the expansion of the existing Waste Management Facility.

The proposal is considered to be designated development under Schedule 3, Clause 32 (1)(b)(iii) Waste Management Facilities that have an intended handling capacity of more than 30,000 tonnes per year of waste. Under Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*, the Secretary is requesting your requirements for the EIS.

It would be greatly appreciated if we could receive your advice by **COB 6 April 2017**, otherwise the Secretary (or Delegate) will advise the Applicant to consult you directly for your requirements. If this occurs, it would be appreciated if you would forward a copy of any requirements to us for our records.

I have attached a copy of the applicant's request for your reference. If you have any questions regarding the proposal, please do not hesitate to contact me on the details below.

Kind regards

Max Chipchase

Student Planner

Industry Assessments

320 Pitt Street | GPO Box 39 | Sydney NSW 2001

T 02 9274 6304 E max.chipchase@planning.nsw.gov.au



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Environment



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I wish to acknowledge the Traditional Custodians of the land and pay respect to all Elders past and present.



Roads &
Maritime

Before printing, please consider the environment

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Transport
Roads & Maritime
Services



Locked Bag 5123, Parramatta NSW 2124
Level 11, 10 Valentine Ave
Parramatta NSW 2150
www.watarnsw.com.au
ABN 21 147 934 787

Via email: max.chipchase@planning.nsw.gov.au

Department of Planning & Environment
Industry Assessments
GPO Box 39
SYDNEY NSW 2001

Contact: Wayne Conners

Phone: 02 8838 7531

Fax: 02 8838 7554

Email: wayne.conners@watarnsw.com.au

Your ref: SEAR 1142

Attention: Mr Max Chipchase

Dear Mr Chipchase

**Request for Secretary's Environmental Assessment Requirements – SEAR 1142
Expansion of Waste Management Facility – 33-37 Plasser Crescent, North St Marys
(Lot 16 DP263353)**

Thank you for your email of 23 March 2017 concerning the request for Secretary's Environmental Assessment Requirements for the above project.

Water NSW has reviewed the supporting documentation accompanying the request for Secretary's Environmental Assessment Requirements (SEAR's) and provides the following comments below, and further detail in **Attachment A**.

It is recommended that the EIS be required to include, where applicable:

- Annual volumes of surface water and groundwater proposed to be taken by the activity (including through inflow and seepage) from each surface and groundwater source as defined by the relevant water sharing plan.
- Assessment of any volumetric water licensing requirements (including those for ongoing water take following completion of the project).
- The identification of an adequate and secure water supply for the life of the project. Confirmation that water can be sourced from an appropriately authorised and reliable supply. This is to include an assessment of the current market depth where water entitlement is required to be purchased.
- A detailed and consolidated site water balance.
- Assessment of impacts on surface and ground water sources (both quality and quantity), related infrastructure, adjacent licensed water users, basic landholder rights, watercourses, riparian land, and groundwater dependent ecosystems, and measures proposed to reduce and mitigate these impacts.
- Full technical details and data of all surface and groundwater modelling.

- Proposed surface and groundwater monitoring activities and methodologies.
- Assessment of any potential cumulative impacts on water resources, and any proposed options to manage the cumulative impacts.
- Consideration of relevant policies and guidelines.
- A statement of where each element of the SEARs is addressed in the EIS (i.e. in the form of a table).

Should you have any enquiries about this matter, please contact Wayne Conners at Water NSW's Parramatta office on (02) 8838-7531.

Yours sincerely

Wayne Conners

Wayne Conners
Senior Water Regulation Officer
Water Regulation Coastal
4 April, 2017

ATTACHMENT A

Water NSW General Assessment Requirements for general projects

The following detailed assessment requirements are provided to assist in adequately addressing the assessment requirements for this proposal.

For further information visit the DPI Water website, www.water.nsw.gov.au

Key Relevant Legislative Instruments

This section provides a basic summary to aid proponents in the development of an Environmental Impact Statement (EIS), and should not be considered a complete list or comprehensive summary of relevant legislative instruments that may apply to the regulation of water resources for a project.

The EIS should take into account the objects and regulatory requirements of the *Water Act 1912* (WA 1912) and *Water Management Act 2000* (WMA 2000), and associated regulations and instruments, as applicable.

Water Management Act 2000 (WMA 2000)

Key points:

- Volumetric licensing in areas covered by water sharing plans
- Works within 40m of waterfront land
- SSD & SSI projects are exempt from requiring water supply work approvals and controlled activity approvals as a result of the *Environmental Planning & Assessment Act 1979* (EP&A Act).
- No exemptions for volumetric licensing apply as a result of the EP&A Act.
- Basic landholder rights, including harvestable rights dams
- Aquifer interference activity approval and flood management work approval provisions have not yet commenced and are regulated by the *Water Act 1912*
- Maximum penalties of \$2.2 million plus \$264,000 for each day an offence continues apply under the *WMA 2000*

Water Act 1912 (WA 1912)

Key points:

- Volumetric licensing in areas where no water sharing plan applies
- Monitoring bores
- Aquifer interference activities that are not regulated as a water supply work under the *WMA 2000*.
- Flood management works
- No exemptions apply to licences or permits under the *WA 1912* as a result of the EP&A Act.
- Regulation of water bore driller licensing.

Water Management (General) Regulation 2011

Key points:

- Provides various exemptions for volumetric licensing and activity approvals
- Provides further detail on requirements for dealings and applications.

Water Sharing Plans – these are considered regulations under the *WMA 2000*

Access Licence Dealing Principles Order 2004

Harvestable Rights Orders

Water Sharing Plans

It is important that the proponent understands and describes the ground and surface water sharing plans, water sources, and management zones that apply to the project. The relevant water sharing plans can be determined spatially at www.ourwater.nsw.gov.au. Multiple water sharing plans may apply and these must all be described.

The *Water Act 1912* applies to all water sources not yet covered by a commenced water sharing plan.

The EIS is required to:

- Demonstrate how the proposal is consistent with the relevant rules of the Water Sharing Plan including rules for access licences, distance restrictions for water supply works and rules for the management of local impacts in respect of surface water and groundwater sources, ecosystem protection (including groundwater dependent ecosystems), water quality and surface-groundwater connectivity.
- Provide a description of any site water use (amount of water to be taken from each water source) and management including all sediment dams, clear water diversion structures with detail on the location, design specifications and storage capacities for all the existing and proposed water management structures.
- Provide an analysis of the proposed water supply arrangements against the rules for access licences and other applicable requirements of any relevant WSP, including:
 - Sufficient market depth to acquire the necessary entitlements for each water source.
 - Ability to carry out a “dealing” to transfer the water to relevant location under the rules of the WSP.
 - Daily and long-term access rules.
 - Account management and carryover provisions.
- Provide a detailed and consolidated site water balance.
- Further detail on licensing requirements is provided below.

Relevant Policies and Guidelines

The EIS should take into account the following policies (as applicable):

- State Environmental Policy (Sydney Drinking Water Catchment) 2011
- NSW Guidelines for Controlled Activities on Waterfront Land (NOW, 2012)
- NSW Aquifer Interference Policy (NOW, 2012)
- Risk Assessment Guidelines for Groundwater Dependent Ecosystems (NOW, 2012)
- Australian Groundwater Modelling Guidelines (NWC, 2012)
- NSW State Rivers and Estuary Policy (1993)
- NSW Wetlands Policy (2010)

- NSW State Groundwater Policy Framework Document (1997)
- NSW State Groundwater Quality Protection Policy (1998)
- NSW State Groundwater Dependent Ecosystems Policy (2002)
- NSW Water Extraction Monitoring Policy (2007)

The EIS will need to ensure that the project is consistent with Controlled Activity Approval guidelines and that any Controlled Activity Approval requirements are addressed. Guidelines for instream works on waterfront land can be found at:

http://www.water.nsw.gov.au/__data/assets/pdf_file/0020/547040/licensing_approvals_controlled_activities_instream_works.pdf

DPI Water policies can be accessed at the following links:

<http://www.water.nsw.gov.au/Water-management/Law-and-policy/Key-policies/default.aspx>

<http://www.water.nsw.gov.au/Water-licensing/Approvals/Controlled-activities/default.aspx>

An assessment framework for the NSW Aquifer Interference Policy can be found online at:

<http://www.water.nsw.gov.au/Water-management/Law-and-policy/Key-policies/Aquifer-interference>.

Licensing Considerations

The EIS is required to provide:

- Identification of water requirements for the life of the project in terms of both volume and timing (including predictions of potential ongoing groundwater take following the cessation of operations at the site – such as evaporative loss from open voids or inflows).
- Details of the water supply source(s) for the proposal including any proposed surface water and groundwater extraction from each water source as defined in the relevant Water Sharing Plan/s and all water supply works to take water.
- Explanation of how the required water entitlements will be obtained (i.e. through a new or existing licence/s, trading on the water market, controlled allocations etc.).
- Information on the purpose, location, construction and expected annual extraction volumes including details on all existing and proposed water supply works which take surface water, (pumps, dams, diversions, etc).
- Details on all bores and excavations for the purpose of investigation, extraction, dewatering, testing and monitoring. All predicted groundwater take must be accounted for through adequate licensing.
- Details on existing dams/storages (including the date of construction, location, purpose, size and capacity) and any proposal to change the purpose of existing dams/storages
- Details on the location, purpose, size and capacity of any new proposed dams/storages.
- Applicability of any exemptions under the *Water Management (General) Regulation 2011* to the project.

Water allocation account management rules, total daily extraction limits and rules governing environmental protection and access licence dealings also need to be considered.

The Harvestable Right gives landholders the right to capture and use for any purpose 10% of the average annual runoff from their property. The Harvestable Right has been defined in terms of an equivalent dam capacity called the Maximum Harvestable Right Dam Capacity (MHRDC). The MHRDC is determined by the area of the property (in hectares) and a site-specific run-off factor. The MHRDC includes the capacity of all existing dams on the property that do not have a current water licence. Storages capturing up to the harvestable right capacity are not required to be licensed but any capacity of the total of all storages/dams on the property greater than the MHRDC may require a licence.

For more information on Harvestable Right dams, including a calculator, visit:

<http://www.water.nsw.gov.au/Water-licensing/Basic-water-rights/Harvesting-runoff/Harvesting-runoff>

Dam Safety

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

See www.damsafety.nsw.gov.au for further information.

Surface Water Assessment

The predictive assessment of the impact of the proposed project on surface water sources should include the following:

- Identification of all surface water features including watercourses, wetlands and floodplains transected by or adjacent to the proposed project.
- Identification of all surface water sources as described by the relevant water sharing plan.
- Detailed description of dependent ecosystems and existing surface water users within the area, including basic landholder rights to water and adjacent/downstream licensed water users.
- Description of all works and surface infrastructure that will intercept, store, convey, or otherwise interact with surface water resources.
- Assessment of predicted impacts on the following:
 - flow of surface water, sediment movement, channel stability, and hydraulic regime,
 - water quality,
 - flood regime,
 - dependent ecosystems,
 - existing surface water users, and
 - planned environmental water and water sharing arrangements prescribed in the relevant water sharing plans.

Groundwater Assessment

To ensure the sustainable and integrated management of groundwater sources, the EIS needs to include adequate details to assess the impact of the project on all groundwater sources.

Where it is considered unlikely that groundwater will be intercepted or impacted (for example by infiltration), a brief site assessment and justification for the minimal impacts may be sufficient, accompanied by suitable contingency measures in place in the event that groundwater is intercepted, and appropriate measures to ensure that groundwater is not contaminated.

Where groundwater is expected to be intercepted or impacted, the following requirements should be used to assist the groundwater assessment for the proposal.

- The known or predicted highest groundwater table at the site.
- Works likely to intercept, connect with or infiltrate the groundwater sources.
- Identification of any predicted impacts on groundwater resulting from proposed earthworks at the construction phase.
- Any proposed groundwater extraction, including purpose, location and construction details of all proposed bores and expected annual extraction volumes.
- Bore construction information is to be supplied to DPI Water by submitting a "Form A" template. DPI Water will supply "GW" registration numbers (and licence/approval numbers if required) which must be used as consistent and unique bore identifiers for all future reporting.
- A description of the watertable and groundwater pressure configuration, flow directions and rates and physical and chemical characteristics of the groundwater source (including connectivity with other groundwater and surface water sources).
- Sufficient baseline monitoring for groundwater quantity and quality for all aquifers and GDEs to establish a baseline incorporating typical temporal and spatial variations.
- The predicted impacts of any final landform on the groundwater regime.
- The existing groundwater users within the area (including the environment), any potential impacts on these users and safeguard measures to mitigate impacts.
- An assessment of groundwater quality, its beneficial use classification and prediction of any impacts on groundwater quality.
- An assessment of the potential for groundwater contamination (considering both the impacts of the proposal on groundwater contamination and the impacts of contamination on the proposal).
- Measures proposed to protect groundwater quality, both in the short and long term.
- Measures for preventing groundwater pollution so that remediation is not required.
- Protective measures for any groundwater dependent ecosystems (GDEs).
- Proposed methods of the disposal of waste water and approval from the relevant authority.
- The results of any models or predictive tools used.

Where potential impact/s are identified the assessment will need to identify limits to the level of impact and contingency measures that would remediate, reduce or manage potential impacts to the existing groundwater resource and any dependent groundwater environment or water users, including information on:

- Any proposed monitoring programs, including water levels and quality data.
- Reporting procedures for any monitoring program including mechanism for transfer of information.
- An assessment of any groundwater source/aquifer that may be sterilised from future use as a water supply as a consequence of the proposal.
- Identification of any nominal thresholds as to the level of impact beyond which remedial measures or contingency plans would be initiated (this may entail water level triggers or a beneficial use category).
- Description of the remedial measures or contingency plans proposed.
- Any funding assurances covering the anticipated post development maintenance cost, for example on-going groundwater monitoring for the nominated period.

Groundwater Dependent Ecosystems

The EIS must consider the potential impacts on any Groundwater Dependent Ecosystems (GDEs) at the site and in the vicinity of the site and:

- Identify any potential impacts on GDEs as a result of the proposal including:
 - the effect of the proposal on the recharge to groundwater systems;
 - the potential to adversely affect the water quality of the underlying groundwater system and adjoining groundwater systems in hydraulic connections; and
 - the effect on the function of GDEs (habitat, groundwater levels, connectivity).
- Provide safeguard measures for any GDEs.

Watercourses, Wetlands and Riparian Land

The EIS should address the potential impacts of the project on all watercourses likely to be affected by the project, existing riparian vegetation and the rehabilitation of riparian land. It is recommended the EIS provides details on all watercourses potentially affected by the proposal, including:

- Scaled plans showing the location of:
 - wetlands/swamps, watercourses and top of bank;
 - riparian corridor widths to be established along the creeks;
 - existing riparian vegetation surrounding the watercourses (identify any areas to be protected and any riparian vegetation proposed to be removed);
 - the site boundary, the footprint of the proposal in relation to the watercourses and riparian areas; and
 - proposed location of any asset protection zones.
- Photographs of the watercourses/wetlands and a map showing the point from which the photos were taken.
- A detailed description of all potential impacts on the watercourses/riparian land.
- A detailed description of all potential impacts on the wetlands, including potential impacts to the wetlands hydrologic regime; groundwater recharge; habitat and any species that depend on the wetlands.
- A description of the design features and measures to be incorporated to mitigate potential impacts.

- Geomorphic and hydrological assessment of water courses including details of stream order (Strahler System), river style and energy regimes both in channel and on adjacent floodplains.

Landform rehabilitation

Where significant modification to landform is proposed, the EIS must include:

- Justification of the proposed final landform with regard to its impact on local and regional surface and groundwater systems;
- A detailed description of how the site would be progressively rehabilitated and integrated into the surrounding landscape;
- Outline of proposed construction and restoration of topography and surface drainage features if affected by the project; and
- An outline of the measures to be put in place to ensure that sufficient resources are available to implement the proposed rehabilitation.

Stream rehabilitation

The Environmental Impact Statement should include:

- A Stream Rehabilitation Plan and Vegetation Management Plan with details on how the watercourse and riparian corridor within the site would be progressively rehabilitated to mimic a natural system from the local area. The riparian corridor should be planted with suitable native species from the local vegetation community.
- An outline of measures to minimise erosion and sedimentation impacts to the local stream environment,
- An outline of measures to minimise impacts to bed and bank stability.
- An outline of measures to be put in place to ensure that sufficient resources are available to implement the proposed stream rehabilitation.
- Guidelines for Vegetation Management plans on waterfront land can be found at:

http://www.water.nsw.gov.au/data/assets/pdf_file/0010/547219/licensing_approvals_controlled_activities_veg_mgt_plans.pdf

Consultation and general enquiries

General licensing enquiries can be made to Advisory Services: water.enquiries@dpi.nsw.gov.au, 1800 353 104.

Assessment or state significant development enquiries, or requests for review or consultation should be directed to the Strategic Stakeholder Liaison Unit, water.referrals@dpi.nsw.gov.au.

A consultation guideline and further information is available online at:

www.water.nsw.gov.au/water-management/law-and-policy/planning-and-assessment

End Attachment A

Appendix B

SEARs Cross Reference Table

Table 1 Cross reference to SEARs Requirements

Assessment Requirements	Reference in EIS
Department of Planning and Environment Environmental Assessment Requirements Section 78A (8) of the Environmental Planning and Assessment Act 1979	
The EIS must include an assessment of all potential impacts of the proposed development on the existing environment (including cumulative impacts if necessary) and develop appropriate measures to avoid, minimise, mitigate and/or manage these potential impacts.	Chapters 7-19
Strategic Context:	
A detailed justification for the proposal and suitability of the site for the development.	Section 1.8
A demonstration that the proposal is consistent with all relevant planning strategies, environmental planning instruments, development control plans (DCPs) or justification for any inconsistencies.	Chapter 4
A list of any approvals that must be obtained under any other Act or law before the development may lawfully be carried out.	Section 4.4
A description of how the proposed recycling management centre integrates with the on-site operation.	Section 3.7
A description of any additional license(s) or approval(s) required to carry out the development.	Section 4.4
Waste Management:	
Details of the type, quantity and classification of waste to be received at the site.	Section 3.6
Details of the resource outputs and any additional processes for residual waste.	Sections 3.6 and 3.7
Details of waste handling including transport, identification, receipt, stockpiling and quality control.	Sections 3.6 and 3.7
Details of how the EPA's record keeping and reporting requirements will be met.	Sections 3.6 and 3.7
The measures that would be implemented to ensure that the proposed development is consistent with the aims, objectives and guidelines in the NSW Waste Avoidance and Resource Recovery Strategy 2014-21.	Section 1.8, Sections 3.6 and 3.7
Hazards and risk:	
A preliminary risk screening completed in accordance with State Environmental Planning Policy No. 33 - Hazardous and Offensive Development and Applying SEPP 33 (DoP, 2011), with a clear indication of class, quantity and location of all dangerous goods and hazardous materials associated with the development. Should preliminary screening indicate that the project is "potentially hazardous" a Preliminary Hazard Analysis (PHA) must be prepared in accordance with Hazardous Industry Planning Advisory Paper No. 6 - Guidelines for Hazard Analysis (DoP, 2011) and Multi-Level Risk Assessment (DoP, 2011).	Section 16.3.3
Air Quality:	
A description of all potential sources of air and odour emissions.	Section 7.3.1, Appendix E Air Quality Impact Assessment
An air quality impact assessment in accordance with relevant Environment Protection Authority Guidelines.	Chapter 7, Appendix E Air Quality Impact Assessment

A description and appraisal of air quality impact mitigation and monitoring measures.	Section 7.4, Appendix E Air Quality Impact Assessment
Traffic and Transport:	
Details of road transport routes and access to the site.	Appendix G Traffic and Transport Impact Assessment, EIS Section 9.3
Road traffic predictions for the development during construction and operation.	Appendix G Traffic and Transport Impact Assessment, EIS Section 9.2
An assessment of impacts to the safety and function of the road network and details of any road upgrades required for the development.	Appendix G Traffic and Transport Impact Assessment, EIS Section 9.3 and 9.4
A Traffic Impact Statement (TIA) in accordance with Roads and Maritime Services Guidelines.	Appendix G Traffic and Transport Impact Assessment
A transport and traffic study taking into account the cumulative study area traffic impacts associated with the development.	Appendix G Traffic and Transport Impact Assessment, EIS Chapter 9
Soil and Water:	
A description of local soils, topography, drainage and landscapes.	Section 12.1
Details of water usage for the proposal including existing and proposed water licencing requirements in accordance with the <i>Water Act 1912</i> and/or the <i>Water Management Act 2000</i> .	Section 13.1
An assessment of potential impacts on floodplain and stormwater management and any impact to flooding in the catchment.	Section 13.1
A detailed site water balance.	Not applicable
Details of the proposed stormwater and wastewater management systems (including sewage), water monitoring program and other measures to mitigate surface and groundwater impacts.	Sections 13.1 and 13.3
An assessment of any potential cumulative impacts on water resources and any proposed options to manage the cumulative impacts.	Section 13.3
description and appraisal of impact mitigation and monitoring measures	Section 13.3, and Section 12.3
Noise and Vibration:	
A description of all potential noise and vibration sources during construction and operation, including road traffic noise.	Appendix F Noise and Vibration Impact Assessment, EIS Section 8.4
A noise and vibration assessment in accordance with the relevant Environment Protection Authority Guidelines.	Appendix F Noise and Vibration Impact Assessment, EIS Section 8.4

A description and appraisal of noise and vibration mitigation and monitoring measures.	Appendix F Noise and Vibration Impact Assessment, EIS Section 8.5
Biodiversity:	
A description of any potential vegetation clearing needed to undertake the proposal and any impacts to flora and fauna.	Section 10.2
Heritage:	
Include Aboriginal and non-Aboriginal cultural heritage.	Chapter 11
Environmental Planning Instruments and other Policies:	
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 State Environmental Planning Policy No. 55 Remediation of Land Penrith Local Environmental Plan 2010 Relevant development control plans and section 94 plans.	Sections 4.2.7 and 4.3
Guidelines:	
Consult the Department's Register of Development Assessment Guidelines which is available on the Department's website at planning.nsw.gov.au under Development Proposals/Register of Development Assessment Guidelines. Whilst not exhaustive, this Register contains some of the guidelines, policies, and plans that must be taken into account in the environmental assessment of the proposed development.	Chapter 18
Consultation:	
Consult the relevant local, State and Commonwealth government authorities, service providers and community groups, and address any issues they may raise in the EIS.	Chapter 5
Details of the consultation carried out with the Environmental Protection Authority and issues raised.	Section 5.3
Details of the consultation carried out with the Roads and Maritime Services and issues raised.	Section 5.3
Details of the consultation carried out with the WaterNSW and issues raised.	Section 5.3
Details of the consultation carried out with the Penrith City Council and issues raised.	Section 5.3
Details of the consultation carried out with the surrounding landowners and occupiers likely to be impacted by the proposal and issues raised	Section 5.4
NSW Environmental Protection Authority EA Requirements	
Air Quality and Odour	

Detailed assessment of all airborne emissions generated by the increase in vehicle movements, higher volumes of waste being processed and an increase in stockpiled waste and recovered material at the premises. The assessment should cover the following: Source points for all dust emissions should be identified and the environmental controls to manage dust; Identify all potential airborne emissions and includes but is not limited to coarse particulates, PM10, PM2.5 and odour; Details of equipment and plant operating at the Premises that could cause dust and sediment tracking; and Details and locations of dust suppression systems at the Premises.	Sections 7.2, 7.3.1, 7.4
Noise and Vibration	
Noise and vibration impacts on all receivers for all proposed on site activities must be assessed.	Section 8.4
Demonstrate that noise and vibration levels from operational activities, including during construction and meet the requirements of the relevant EPA guidelines.	Section 8.4
Water Management	
Stormwater and wastewater management during both construction and operation must be included in the EIS.	Section 13.3
Consideration must be provided for the following: potential increase in the load going to stormwater from additional dust suppression activities; details of the flow of clean and contaminated water and how it will be diverted around the Premises; water storage capacity and water source for dust suppression; measures the proponent intends to employ to mitigate any impacts of contaminated and /or sediment laden water reaching stormwater and offsite receptors; and controls for increased sediment and mud tracking from vehicles leaving the Premises during wet weather.	Section 13.2 and Section 7.4
Waste Management	
Waste management processes must be detailed in the EIS and the proposed controls to ensure all waste material will be managed and include; details of the types and quantities of waste types received at the Premises; details of the maximum volume of waste to be stored at the Premises; a description of waste processing procedures; details of how the proponent will meet the EPA's record keeping requirements; the type and quantity of output materials and their end use; details of any materials that will be produced under a Resource Recovery Order and the controls in place for meeting the conditions of that order; and a detailed description of procedures for dealing with non-conforming waste.	Sections 3.6 and 3.7, Chapter 14, Chapter 16
The EPA requires that all waste storage and processing takes place inside an enclosed building.	Section 3.7
Fire and Emergency Management	
Fire risk management and containment as well as emergency plans should be detailed in the EIS in the case of an unforeseen spill or pollution incident occurring.	Section 16.3.2
General Information	

In carrying out the assessment, the proponent should refer to the relevant guidelines as listed in Attachment B and any relevant industry codes of practice and best practice management guidelines. Please note that this response does not cover biodiversity or Aboriginal cultural heritage issues, which are the responsibility of the Office of Environment and Heritage. The Proponent should be made aware that any commitments made in the SEAR's may be formalised as approval conditions and may also be placed as formal licence conditions. The Proponent should be made aware that, consistent with provisions under Part 9.4 of the Protection of the Environment Operations Act 1997 ("the Act") the EPA may require the provision of a financial assurance and/or assurances. The amount and form of the assurance(s) would be determined by the EPA and required as a condition of an Environment Protection Licence ("EPL"). In addition, as a requirement of an EPL, the EPA will require the Proponent to prepare, test and implement a Pollution Incident Response Management Plan and/or Plans in accordance with Section 153A of the Act.	Noted
Executive Summary	
The executive summary should include a brief discussion of the extent to which the proposal achieves identified environmental outcomes.	EIS Executive Summary
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.	Section 1.1, Chapter 3, Chapter 18
Description of the Proposal	
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.	Sections 3.6, 3.7, and 13.1
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.	Sections 3.7 and 14.3; Chapters 7, 12, and 13

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.	Sections 12.2 and 12.3, Section 14.2, Chapter 3, Chapter 19
Include a site diagram showing the site layout and location of environmental controls.	Appendix D
Air	
Identify all sources or potential sources of air emissions from the development. Note: emissions can be classed as either: - point (e.g. emissions from stack or vent) or - fugitive (from wind erosion, leakages or spillages, associated with loading or unloading, conveyors, storage facilities, plant and yard operation, vehicle movements (dust from road, exhausts, loss from load), land clearing and construction works).	Section 7.3
Provide details of the project that are essential for predicting and assessing air impacts including: a) the quantities and physio-chemical parameters (e.g. concentration, moisture content, bulk density, particle sizes etc.) of materials to be used, transported, produced or stored b) an outline of procedures for handling, transport, production and storage c) the management of solid, liquid and gaseous waste streams with potential for significant air impacts.	Section 7.3
Noise and Vibration	
Identify all noise sources or potential sources from the development (including both construction and operation phases). Detail all potentially noisy activities including ancillary activities such as transport of goods and raw materials.	Section 8.4
Specify the times of operation for all phases of the development and for all noise producing activities.	Section 8.4
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.	Chapter 9
Water	
Provide details of the project that are essential for predicting and assessing impacts to waters including: a) the quantity and physio-chemical properties of all potential water pollutants and the risks they pose to the environment and human health, including the risks they pose to Water Quality Objectives in the ambient waters (as defined on http://www.environment.nsw.gov.au/ieo/index.htm , using technical criteria derived from the Australian and New Zealand Guidelines for Fresh and Marine Water Quality, ANZECC 2000) b) the management of discharges with potential for water impacts c) drainage works and associated infrastructure; land-forming and excavations; working capacity of structures; and water resource requirements of the proposal	Sections 3.8.1 and 3.8.2, Chapter 13
Outline site layout, demonstrating efforts to avoid proximity to water resources (especially for activities with significant potential impacts e.g. effluent ponds) and showing potential areas of modification of contours, drainage etc.	Section 3.8, Chapter 13, and Appendix D

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).	Not applicable
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.	Chapter 13
Waste and Chemicals	
Provide details of the quantity and type of both liquid waste and non-liquid waste generated, handled, processed or disposed of at the premises. Waste must be classified according to the EPA's Waste Classification Guidelines 2014 (as amended from time to time)	Section 14.2
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.	Sections 3.6 and 3.7, Section 7.3, Chapter 14
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.	Sections 3.8.2, 10.2, 10.3, and 12.2
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.	Sections 3.6 and 3.7, Chapters 14 and 16
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.	Chapter 16
Reference should be made to the guidelines: EPA's Waste Classification Guidelines 2014 (as amended from time to time).	Section 14.2
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 proper valuation and pricing of environmental resources b) identification of who will bear the environmental costs of the proposal.	Section 20.3
Rehabilitation	
Outline considerations of site maintenance, and proposed plans for the final condition of the site (ensuring its suitability for future uses).	Appendix H Landscape Plan
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	Sections 1.8 and 1.9
Selection of the preferred option should be justified in terms of: a) ability to satisfy the objectives of the proposal b) relative environmental and other costs of each alternative c) acceptability of environmental impacts and contribution to identified environmental objectives d) acceptability of any environmental risks or uncertainties e) reliability of proposed environmental impact mitigation measures f) efficient use (including maximising re-use) of land, raw materials, energy and other resources.	Section 1.8
Location - General	
Provide an overview of the affected environment to place the proposal in its local and regional environmental context including: a) meteorological data (e.g. rainfall, temperature and evaporation, wind speed and direction) b) topography (landform element, slope type, gradient and length) c) surrounding land uses (potential synergies and conflicts) d) geomorphology (rates of landform change and current erosion and deposition processes) e) soil types and properties (including erodibility; engineering and structural properties; dispersibility; permeability; presence of acid sulfate soils and potential acid sulfate soils) f) ecological information (water system habitat, vegetation, fauna) g) availability of services and the accessibility of the site for passenger and freight transport.	Chapters 10 and 12, Appendix E Air Quality Impact Assessment
Location - 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 7.2
Describe surrounding buildings that may effect plume dispersion.	Appendix E Air Quality Impact Assessment
Provide and analyse site representative data on following meteorological parameters: a) temperature and humidity b) rainfall, evaporation and cloud cover c) wind speed and direction d) atmospheric stability class e) mixing height (the height that emissions will be ultimately mixed in the atmosphere) f) katabatic air drainage g) air re-circulation.	Section 7.2, Appendix E Air Quality Impact Assessment
Location – 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 8.2
Identify the land use zoning of the site and the immediate vicinity and the potentially affected areas.	Section 8.2
Location – Water	
Describe the catchment including proximity of the development to any waterways and provide an assessment of their sensitivity/significance from a public health, ecological and/or economic perspective. The Water Quality and River Flow Objectives on the website: http://www.environment.nsw.gov.au/ieo/index.htm should be used to identify the agreed environmental values and human uses for any affected waterways. This will help with the description of the local and regional area.	Section 2.2
Location – 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 12.2
Identification and prioritisation of issues / scoping of impact assessment	
Provide an overview of the methodology used to identify and prioritise issues. The methodology should take into account: a) relevant NSW government guidelines b) industry guidelines c) EISs for similar projects d) relevant research and reference material e) relevant preliminary studies or reports for the proposal f) consultation with stakeholders.	Sections 1.4 and 6.1
Provide a summary of the outcomes of the process including: a) all issues identified including local, regional and global impacts (e.g. increased/ decreased greenhouse emissions) b) key issues which will require a full analysis (including comprehensive baseline assessment). c) issues not needing full analysis though they may be addressed in the mitigation strategy. d) justification for the level of analysis proposed (the capacity of the proposal to give rise to high concentrations of pollution compared with the ambient environment or environmental outcomes is an important factor in setting the level of assessment).	Chapters 6-19
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.	Chapters 6-19
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.	Chapters 6-19, Section 20.3
Provide a description of existing environmental conditions for any potential impacts.	Chapters 7-15

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.	Chapters 6-19
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.	Chapters 6-19
The analysis should also make linkages between different areas of assessment where necessary to enable a full assessment of environmental impacts e.g. assessment of impacts on air quality will often need to draw on the analysis of traffic, health, social, soil and/or ecological systems impacts; etc.	Chapters 7-18
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.	Chapter 3
The level of assessment should be commensurate with the risk to the environment.	Chapters 6-17
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.	Chapters 7-17
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.	Section 19.1
Environmental Issues - Air	
Provide a description of existing air quality and meteorology, using existing information and site representative ambient monitoring data. This description should include the following parameters; - Coarse particulates - PM10 and PM2.5 - Odour; and - Any other potential pollutants identified in the assessment process.	Section 7.2, Appendix E Air Quality Impact Assessment
Identify all pollutants of concern and estimate emissions by quantity (and size for particles), source and discharge point.	Section 7.3, Appendix E Air Quality Impact Assessment
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 7.2, Appendix E Air Quality Impact Assessment
Describe the effects and significance of pollutant concentration on the environment, human health, amenity and regional ambient air quality standards or goals.	Appendix E Air Quality Impact Assessment
Describe the contribution that the development will make to regional and global pollution, particularly in sensitive locations	Appendix E Air Quality Impact Assessment

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.	Section 7.3, Appendix E Air Quality Impact Assessment
Reference should be made to Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (DEC, 2016); Approved Methods for the Sampling and Analysis of Air Pollutants in NSW (DEC, 2007); Assessment and Management of Odour from Stationary Sources in NSW (DEC, 2006); Technical Notes: Assessment and Management of Odour from Stationary Sources in NSW (DEC, 2006); Load Calculation Protocol for use by holders of NSW Environment Protection Licences when calculating Assessable Pollutant Loads (DECC, 2009)>.	Section 7.1, Appendix E Air Quality Impact Assessment
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.	Section 7.4
Environmental Issues – Noise and Vibration	
Determine the existing background (LA90) and ambient (LAeq) noise levels in accordance with the NSW Industrial Noise Policy.	Chapter 8, Appendix F Noise and Vibration Impact Assessment
Determine the existing road traffic noise levels in accordance with the NSW Environmental Criteria for Road Traffic Noise, where road traffic noise impacts may occur.	Chapter 8, Appendix F Noise and Vibration Impact Assessment
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 81.3 of the NSW Industrial Noise Policy determination of LAeq noise levels from existing industry.	Appendix F Noise and Vibration Impact Assessment
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.	Chapter 8, Appendix F Noise and Vibration Impact Assessment

Maximum noise levels during night-time period (10pm-7am) should be assessed to analyse possible effects on sleep. Where LA1(1min) noise levels from the site are less than 15 dB above the background LA90 noise level, sleep disturbance impacts are unlikely. Where this is not the case, further analysis is required. Additional guidance is provided in Appendix B of the NSW Environmental Criteria for Road Traffic Noise.	Chapter 8, Appendix F Noise and Vibration Impact Assessment
Determine expected noise level and noise character (e.g. tonality, impulsiveness, vibration, etc.) likely to be generated from noise sources during: a) site establishment b) construction c) operational phases d) transport including traffic noise generated by the proposal e) other services. Note: The noise impact assessment report should include noise source data for each source in 111 or 113 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).	Chapter 8, Appendix F Noise and Vibration Impact Assessment
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.	Chapter 8, Appendix F Noise and Vibration Impact Assessment
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.	Chapter 8, Appendix F Noise and Vibration Impact Assessment
Discuss the findings from the predictive modelling and, where relevant noise criteria have not been met, recommend additional mitigation measures.	Chapter 8, Appendix F Noise and Vibration Impact Assessment
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.	Chapter 8, Appendix F Noise and Vibration Impact Assessment

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 exceedance 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.	Appendix F Noise and Vibration Impact Assessment
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.	Chapter 8, Appendix F Noise and Vibration Impact Assessment
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.	Appendix F Noise and Vibration Impact Assessment
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.	Chapter 8, Appendix F Noise and Vibration Impact Assessment
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.	Chapter 8, Appendix F Noise and Vibration Impact Assessment

Environmental Issues – Water	
Describe existing surface and groundwater quality- an assessment needs to be undertaken for any water resource likely to be affected by the proposal and for all conditions (e.g. a wet weather sampling program is needed if runoff events may cause impacts). Note: Methods of sampling and analysis need to conform with an accepted standard (e.g. Approved Methods for the Sampling and Analysis of Water Pollutants in NSW (DEC 2004) or be approved and analyses undertaken by accredited laboratories).	Chapter 13
Provide site drainage details and surface runoff yield.	Chapter 13
State the ambient Water Quality and River Flow Objectives for the receiving waters. These refer to the community's agreed environmental values and human uses endorsed by the Government as goals for the ambient waters. These environmental values are published on the website: http://www.environment.nsw.gov.au/ieo/index.htm . The EIS should state the environmental values listed for the catchment and waterway type relevant to your proposal. NB: A consolidated and approved list of environmental values are not available for groundwater resources. Where groundwater may be affected the EIS should identify appropriate groundwater environmental values and justify the choice.	Not applicable
State the indicators and associated trigger values or criteria for the identified environmental values. This information should be sourced from the ANZECC 2000 Guidelines for Fresh and Marine Water Quality (http://www.environment.gov.au/water/publications/guality/nwgms-guidelines-4-vol1.html) (Note that, as at 2004, the NSW Water Quality Objectives booklets and website contain technical criteria derived from the 1992 version of the ANZECC Guidelines. The Water Quality Objectives remain as Government Policy, reflecting the community's environmental values and long-term goals, but the technical criteria are replaced by the more recent ANZECC 2000 Guidelines). NB: While specific guidelines for groundwater are not available, the ANZECC 2000 Guidelines endorse the application of the trigger values and decision trees as a tool to assess risk to environmental values in groundwater.	Not applicable
State any locally specific objectives, criteria or targets, which have been endorsed by the government e.g. the Healthy Rivers Commission Inquiries or the NSW Salinity Strategy (DLWC, 2000) (http://www.environment.nsw.gov.au/salinity/government/nswstrategy.htm).	Not applicable
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.	Not applicable
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?). Proponent 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.	Not applicable
No proposal should breach clause 120 of the <i>Protection of the Environment Operations Act</i> 1997 (i.e. pollution of waters is prohibited unless undertaken in accordance with relevant regulations).	Section 4.2.2
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.	Chapter 13
Include a rationale, along with relevant calculations, supporting the prediction of the discharges.	Not applicable

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).	Not applicable
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).	Not applicable
Identify any potential impacts on quality or quantity of groundwater describing their source.	Chapter 13
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.	Chapter 13
Identify impacts associated with the disturbance of acid sulfate soils and potential acid sulfate soils.	Chapter 12
Containment of spills and leaks shall be in accordance with EPA's guidelines section 'Bunding and Spill Management' at http://www.epa.nsw.qov.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.	Chapter 16
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.	Not applicable
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.	Not applicable
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.	Not applicable
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.	Not applicable
Reference should be made to relevant guidelines eg. Managing Urban Stormwater: Soils and Construction (DECC, 2008), Guidelines for Fresh and Marine Water Quality ANZECC 2000), Environmental Guidelines: Use of effluent by Irrigation (DEC, 2004).	Noted
Outline stormwater management to control pollutants at the source and contain them within the site.	Chapter 13

Describe measures for maintaining and monitoring any stormwater controls.	Chapter 13
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.	Chapters 12 and 13
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 13.2.3
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.	Chapter 16
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.	Chapter 13
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.	Chapter 13
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.	Chapter 12
Any proposed monitoring should be undertaken in accordance with the Approved Methods for the Sampling and Analysis of Water Pollutants in NSW (DEC 2004).	Not applicable
Environmental Issues – Soils and Contamination	
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.	Chapter 12
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.	Chapter 12

Reference should be made to Contaminated Sites- Guidelines for Consultants Reporting on Contaminated Sites (OEH, 2011);Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997 (EPA, 2015).	Noted
Describe and assess the effectiveness or adequacy of any soil management and mitigation measures during construction and operation of the proposal including: a) erosion and sediment control measures b) proposals for site remediation- see Managing Land Contamination, Planning Guidelines SEPP 55- Remediation of Land (Department of Urban Affairs and Planning and Environment Protection Authority, 1998) c) proposals for the management of these soils- see Acid Sulfate Soil Manual (Acid Sulfate Soil Advisory Committee 1998) and Acid Sulfate Soils Assessment Guidelines (Acid Sulfate Soil Advisory Committee 1998).	Chapter 12
Environmental Issues – Waste and Chemicals	
Describe any existing waste or chemicals operations related to the proposal.	Sections 3.6 and 3.7, Chapters 14 and 16
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.	Sections 3.6 and 3.7, Chapters 14 and 16
Reference should be made to: the EPA's Waste Classification Guidelines 2014	Section 3.6, Chapter 14
describe how waste would be treated, stored, used, disposed and handled on site, and transported to and from the site, and the potential impacts associated with these issues, including current and future offsite waste disposal methods	Sections 3.6 and 3.7, Chapter 14
identify the measures that would be implemented to ensure that the development is consistent with the aims, objectives and guidance in the NSW Waste Avoidance and Resource Recovery Strategy 2014-21.	Sections 1.8, 4.2.2, 4.2.3, and 4.3.7
Outline measures to minimise the consumption of natural resources.	Sections 3.6 and 3.7, Chapter 14
Outline measures to avoid the generation of waste and promote the re-use and recycling and reprocessing of any waste.	Sections 3.6 and 3.7, Chapter 14
Outline measures to support any approved regional or industry waste plans.	Section 1.8
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 18.1
Assess the impact of the proposal against the long term air, noise and water quality objectives for the area or region.	Chapters 7, 8 and 13
Identify infrastructure requirements flowing from the proposal (e.g. water and sewerage services, transport infrastructure upgrades).	Section 3.8
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	Chapters 7-17
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).	Section 4.4
Compilation of mitigation measures	
Outline how the proposal and its environmental protection measures would be implemented and managed in an integrated manner so as to demonstrate that the proposal is capable of complying with statutory obligations under EPA licences or approvals (e.g. outline of an environmental management plan).	Section 3.5.4
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.	Noted
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 1.8
Roads and Maritime Services Requirements	
Daily and peak traffic movements likely to be generated by the proposed development including the impact on nearby intersections and the need/associated funding for upgrading or road improvement works (if required).	Chapter 9
The following signalised intersection is to be examined/modelled as a result of the development: Glossop Street/Kurrajong Road/Forthorn Place	Chapter 9
Details of the proposed accesses and the parking provisions associated with the proposed development including compliance with the requirements of the relevant Australian Standards (ie: turn paths, sight distance requirements, aisle width, etc).	Chapter 9
Type of heavy vehicles and haulage routes	Chapter 9
Proposed number of car parking spaces and compliance with the appropriate parking codes.	Section 9.3
Details of service vehicle movements (including vehicle type and likely arrival and departure times).	Chapter 9
Water NSW Requirements	
Annual volumes of surface water and groundwater proposed to be taken by the activity (including through inflow and seepage) from each surface and groundwater source as defined by the relevant water sharing plan.	Not applicable
Assessment of any volumetric water licensing requirements (including those for ongoing water take following completion of the project).	Not applicable
The identification of an adequate and secure water supply for the life of the project.	Chapter 13
Confirmation that water can be sourced from an appropriately authorised and reliable supply. This is to include an assessment of the current market depth where water entitlement is required to be purchased.	Chapter 13
A detailed and consolidated site water balance.	Not applicable

Assessment of impacts on surface and ground water sources (both quality and quantity), related infrastructure, adjacent licensed water users, basic landholder rights, watercourses, riparian land, and groundwater dependent ecosystems, and measures proposed to reduce and mitigate these impacts.	Chapter 13
Full technical details and data of all surface and groundwater modelling.	Not applicable
Proposed surface and groundwater monitoring activities and methodologies.	Not applicable
Assessment of any potential cumulative impacts on water resources, and any proposed options to manage the cumulative impacts.	Chapter 13
Consideration of relevant policies and guidelines.	Chapter 13
A statement of where each element of the SEARs is addressed in the EIS (i.e. in the form of a table).	This table
Key Relevant Legislative Instruments	
The EIS should take into account the objects and regulatory requirements of the Water Act 1912 (WA 1912) and Water Management Act 2000 (WMA 2000), and associated regulations and instruments, as applicable.	Section 4.3
Water Sharing Plans	
It is important that the proponent understands and describes the ground and surface water sharing plans, water sources, and management zones that apply to the project. The relevant water sharing plans can be determined spatially at www.ourwater.nsw.gov.au . Multiple water sharing plans may apply and these must all be described. The Water Act 1912 applies to all water sources not yet covered by a commenced water sharing plan.	Not applicable
Demonstrate how the proposal is consistent with the relevant rules of the Water Sharing Plan including rules for access licences, distance restrictions for water supply works and rules for the management of local impacts in respect of surface water and groundwater sources, ecosystem protection (including groundwater dependent ecosystems), water quality and surface-groundwater connectivity.	Not applicable
Provide a description of any site water use (amount of water to be taken from each water source) and management including all sediment dams, clear water diversion structures with detail on the location, design specifications and storage capacities for all the existing and proposed water management structures.	Chapter 13
Provide an analysis of the proposed water supply arrangements against the rules for access licences and other applicable requirements of any relevant WSP, including: Sufficient market depth to acquire the necessary entitlements for each water source. Ability to carry out a "dealing" to transfer the water to relevant location under the rules of the WSP. Daily and long-term access rules. Account management and carryover provisions.	Not applicable
Provide a detailed and consolidated site water balance.	Not applicable
Relevant Policies and Guidelines	

The EIS should take into account the following policies (as applicable): State Environmental Policy (Sydney Drinking Water Catchment) 2011 NSW Guidelines for Controlled Activities on Waterfront Land (NOW, 2012) NSW Aquifer Interference Policy (NOW, 2012) Risk Assessment Guidelines for Groundwater Dependent Ecosystems (NOW, 2012) Australian Groundwater Modelling Guidelines (NWC, 2012) NSW State Rivers and Estuary Policy (1993) NSW Wetlands Policy (2010) NSW State Groundwater Policy Framework Document (1997) NSW State Groundwater Quality Protection Policy (1998) NSW State Groundwater Dependent Ecosystems Policy (2002) NSW Water Extraction Monitoring Policy (2007)	Chapter 4
The EIS will need to ensure that the project is consistent with Controlled Activity Approval guidelines and that any Controlled Activity Approval requirements are addressed. Guidelines for instream works on waterfront land can be found at: http://www.water.nsw.gov.au/_data/assets/pdf_file/0020/547040/licensing_approvals_controlled_activities_instream_works.pdf	Not applicable
Licensing Considerations	
Identification of water requirements for the life of the project in terms of both volume and timing (including predictions of potential ongoing groundwater take following the cessation of operations at the site- such as evaporative loss from open voids or inflows).	Not applicable
Details of the water supply source(s) for the proposal including any proposed surface water and groundwater extraction from each water source as defined in the relevant Water Sharing Plan/s and all water supply works to take water.	Not applicable
Explanation of how the required water entitlements will be obtained (i.e. through a new or existing licence/s, trading on the water market, controlled allocations etc.).	Not applicable
Information on the purpose, location, construction and expected annual extraction volumes including details on all existing and proposed water supply works which take surface water, (pumps, dams, diversions, etc).	Not applicable
Details on all bores and excavations for the purpose of investigation, extraction, dewatering, testing and monitoring. All predicted groundwater take must be accounted for through adequate licensing.	Not applicable
Details on existing dams/storages (including the date of construction, location, purpose, size and capacity) and any proposal to change the purpose of existing dams/storages	Not applicable
Details on the location, purpose, size and capacity of any new proposed dams/storages.	Not applicable
Applicability of any exemptions under the Water Management (General) Regulation 2011 to the project.	Not applicable
Water allocation account management rules, total daily extraction limits and rules governing environmental protection and access licence dealings also need to be considered.	Not applicable
Dam Safety	
Where new or modified dams are proposed, or where new development will occur below an existing dam, the NSW Dams Safety Committee should be consulted in relation to any safety issues that may arise. Conditions of approval may be recommended to ensure safety in relation to any new or existing dams. See www.damsafety.nsw.gov.au for further information.	Not applicable

Surface Water Assessment	
The predictive assessment of the impact of the proposed project on surface water sources should include the following: Identification of all surface water features including watercourses, wetlands and floodplains transected by or adjacent to the proposed project. Identification of all surface water sources as described by the relevant water sharing plan. Detailed description of dependent ecosystems and existing surface water users within the area, including basic landholder rights to water and adjacent/downstream licensed water users. Description of all works and surface infrastructure that will intercept, store, convey, or otherwise interact with surface water resources. Assessment of predicted impacts on the following: flow of surface water, sediment movement, channel stability, and hydraulic regime, water quality, flood regime, dependent ecosystems, existing surface water users, and planned environmental water and water sharing arrangements prescribed in the relevant water sharing plans.	Chapter 13
Groundwater Assessment	
To ensure the sustainable and integrated management of groundwater sources, the EIS needs to include adequate details to assess the impact of the project on all groundwater sources.	Chapter 13
Where it is considered unlikely that groundwater will be intercepted or impacted (for example by infiltration), a brief site assessment and justification for the minimal impacts may be sufficient, accompanied by suitable contingency measures in place in the event that groundwater is intercepted, and appropriate measures to ensure that groundwater is not contaminated.	

Where groundwater is expected to be intercepted or impacted, the following requirements should be used to assist the groundwater assessment for the proposal. The known or predicted highest groundwater table at the site. Works likely to intercept, connect with or infiltrate the groundwater sources. Identification of any predicted impacts on groundwater resulting from proposed earthworks at the construction phase. Any proposed groundwater extraction, including purpose, location and construction details of all proposed bores and expected annual extraction volumes. Bore construction information is to be supplied to OPI Water by submitting a "Form A" template. OPI Water will supply "GW" registration numbers (and licence/approval numbers if required) which must be used as consistent and unique bore identifiers for all future reporting. A description of the watertable and groundwater pressure configuration, flow directions and rates and physical and chemical characteristics of the groundwater source (including connectivity with other groundwater and surface water sources). Sufficient baseline monitoring for groundwater quantity and quality for all aquifers and GOEs to establish a baseline incorporating typical temporal and spatial variations. The predicted impacts of any final landform on the groundwater regime. The existing groundwater users within the area (including the environment), any potential impacts on these users and safeguard measures to mitigate impacts. An assessment of groundwater quality, its beneficial use classification and prediction of any impacts on groundwater quality. An assessment of the potential for groundwater contamination (considering both the impacts of the proposal on groundwater contamination and the impacts of contamination on the proposal). Measures proposed to protect groundwater quality, both in the short and long term. Measures for preventing groundwater pollution so that remediation is not required. Protective measures for any groundwater dependent ecosystems (GOEs). Proposed methods of the disposal of waste water and approval from the relevant authority. The results of any models or predictive tools used.	Chapter 13
Where potential impact/s are identified the assessment will need to identify limits to the level of impact and contingency measures that would remediate, reduce or manage potential impacts to the existing groundwater resource and any dependent groundwater environment or water users, including information on: Any proposed monitoring programs, including water levels and quality data. Reporting procedures for any monitoring program including mechanism for transfer of information. An assessment of any groundwater source/aquifer that may be sterilised from future use as a water supply as a consequence of the proposal. Identification of any nominal thresholds as to the level of impact beyond which remedial measures or contingency plans would be initiated (this may entail water level triggers or a beneficial use category). Description of the remedial measures or contingency plans proposed. Any funding assurances covering the anticipated post development maintenance cost, for example on-going groundwater monitoring for the nominated period.	Not applicable
Groundwater Dependent Ecosystems	
The EIS must consider the potential impacts on any Groundwater Dependent Ecosystems (GOEs) at the site and in the vicinity of the site.	Not applicable

Identify any potential impacts on GOEs as a result of the proposal including: the effect of the proposal on the recharge to groundwater systems; the potential to adversely affect the water quality of the underlying groundwater system and adjoining groundwater systems in hydraulic connections; and the effect on the function of GOEs (habitat, groundwater levels, connectivity).	Not applicable
Provide safeguard measures for any GOEs.	Not applicable
Watercourses, Wetlands and Riparian Land	
The EIS should address the potential impacts of the project on all watercourses likely to be affected by the project, existing riparian vegetation and the rehabilitation of riparian land.	Chapter 13
It is recommended the EIS provides details on all watercourses potentially affected by the proposal, including: Scaled plans showing the location of: wetlands/swamps, watercourses and top of bank; riparian corridor widths to be established along the creeks; existing riparian vegetation surrounding the watercourses (identify any areas to be protected and any riparian vegetation proposed to be removed); the site boundary, the footprint of the proposal in relation to the watercourses and riparian areas; and proposed location of any asset protection zones.	Chapter 13
Photographs of the watercourses/wetlands and a map showing the point from which the photos were taken.	Chapter 13
A detailed description of all potential impacts on the watercourses/riparian land.	Chapter 13
A detailed description of all potential impacts on the wetlands, including potential impacts to the wetlands hydrologic regime; groundwater recharge; habitat and any species that depend on the wetlands.	Not applicable
A description of the design features and measures to be incorporated to mitigate potential impacts	Chapter 13
Geomorphic and hydrological assessment of water courses including details of stream order (Strahler System), river style and energy regimes both in channel and on adjacent floodplains.	Chapter 13
Landform rehabilitation	
Where significant modification to landform is proposed, the EIS must include: Justification of the proposed final landform with regard to its impact on local and regional surface and groundwater systems; A detailed description of how the site would be progressively rehabilitated and integrated into the surrounding landscape; Outline of proposed construction and restoration of topography and surface drainage features if affected by the project; and An outline of the measures to be put in place to ensure that sufficient resources are available to implement the proposed rehabilitation.	Not applicable
Stream Rehabilitation	
A Stream Rehabilitation Plan and Vegetation Management Plan with details on how the watercourse and riparian corridor within the site would be progressively rehabilitated to mimic a natural system from the local area. The riparian corridor should be planted with suitable native species from the local vegetation community.	Not applicable

An outline of measures to minimise erosion and sedimentation impacts to the local stream environment	Sections 7.4, 12.3 and 13.3
An outline of measures to minimise impacts to bed and bank stability.	Not applicable
An outline of measures to be put in place to ensure that sufficient resources are available to implement the proposed stream rehabilitation.	Not applicable

Appendix C

Letter Box Drop



**Proposed Facility Upgrade
Macleans Waste Management – North St Marys**

Dear Resident/Business Owner,

This letter has been prepared to provide information on a Development Application (DA) for a proposed upgrade to the existing Macleans Waste Management Facility in North St Marys.

Macleans Waste Management (MWM) owns and operates a waste management facility at 33-37 Plasser Crescent in North St Marys. The facility currently processes approximately 5,500 tonnes per annum (tpa) of construction waste which is sorted and transported offsite for further processing. The waste includes brick, soil, sand, concrete, and plastics, cardboard, metal and timber generated from the construction of new homes.

Proposed Upgrade

In response to the increasing quantities of residential construction waste being generated throughout Western Sydney, and limited facilities in the area to process this waste, MWM propose to upgrade the current facility to enable processing of 30,000tpa (the "Proposal").

Key components of the Proposal include:

- Installation of a new weighbridge and a raised site office;
- Additional storage areas and associated plant and equipment to operate within the existing shed; and
- Additional staff car parking spaces and landscaping of the site perimeter.

Operating hours and access arrangements will remain unchanged. Traffic movements are expected to increase in proportion to the increased volume of waste.

Planning and environmental assessment process

The proposed upgrade will be subject to a DA accompanied by an Environmental Impact Statement (EIS) for submission to Penrith City Council and be determined by the Sydney West Joint Regional Planning Panel (JRPP). The EIS is currently being prepared by KMH Environmental on behalf of MWM to assess the potential impacts of the proposed upgrade.

Approvals will also be sought from the Environment Protection Agency (EPA) as a variation to the Environment Protection Licence for the site.

As part of the EIS process, local residents and businesses who wish to obtain more information on the proposal or provide feedback are invited to contact MWM as outlined below.

More information

A locality plan and contact details are provided overleaf.

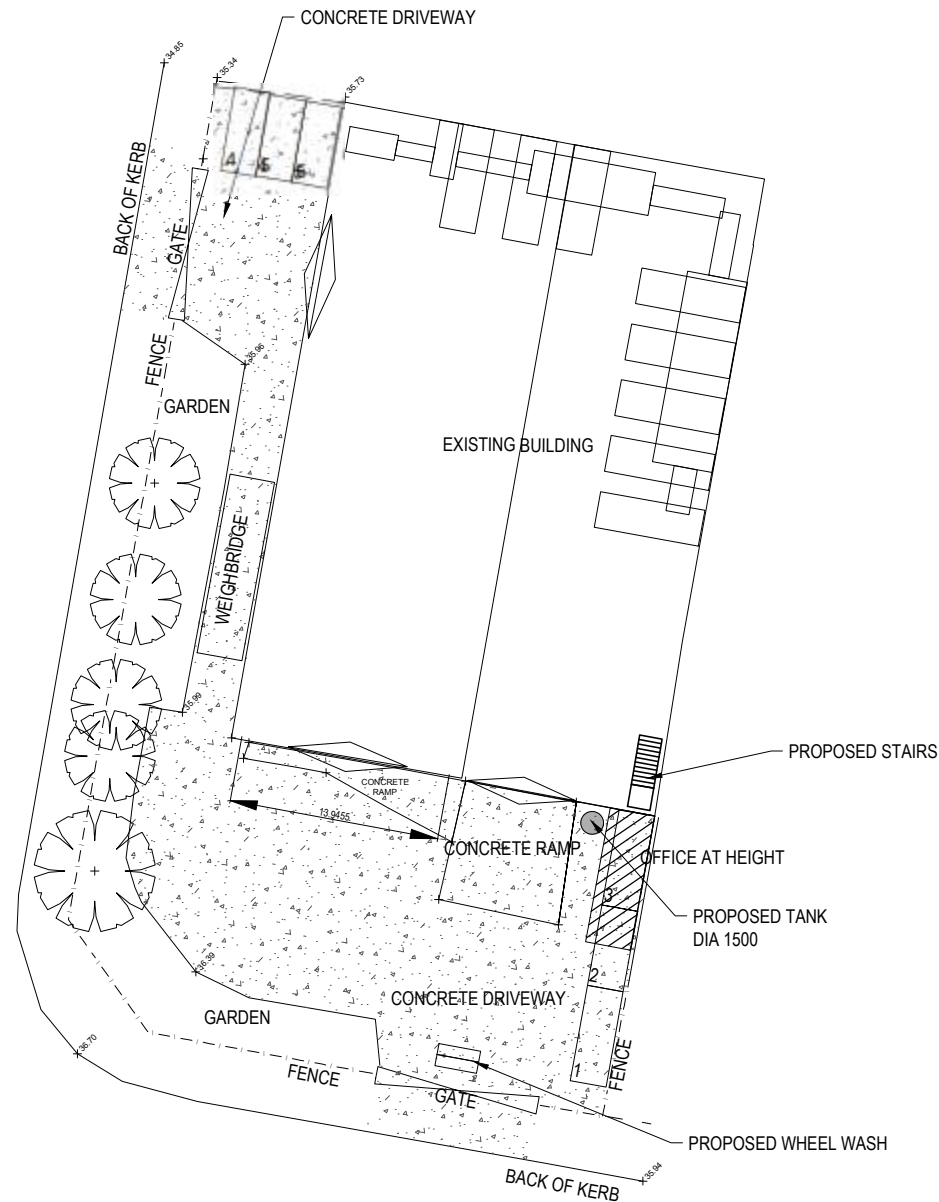


To provide any feedback or if you wish to discuss the Proposal further, please contact MWM on (02) 4735 6700.

Alternatively written submissions can be made at <http://www.macleanswaste.com.au/contact.html> or by post to P.O Box 35, Glenbrook NSW 2773

Appendix D

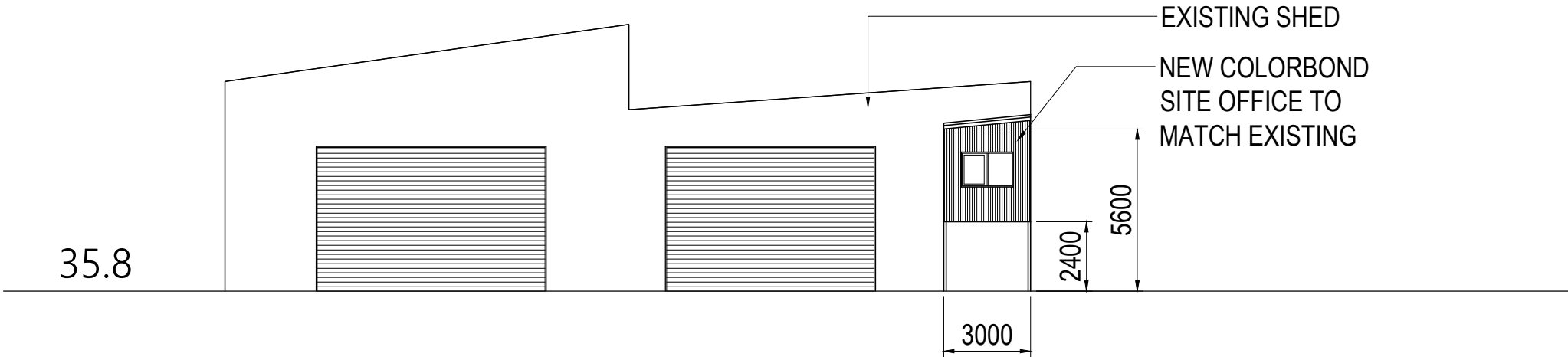
Preliminary Engineering Designs



REFERENCE FILES ATTACHED: 47871_KMH_NORTH ST MARYS DETAIL_01

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No.	DESCRIPTION	DRAWN	DESIGNED	REVIEWED					PROJECT PLASSER CRESCENT NORTH ST MARYS NSW		DATUMS: AHD / MGA	
									STATUS PRELIMINARY		DRAWING No. SY17065 - SK01 A3	
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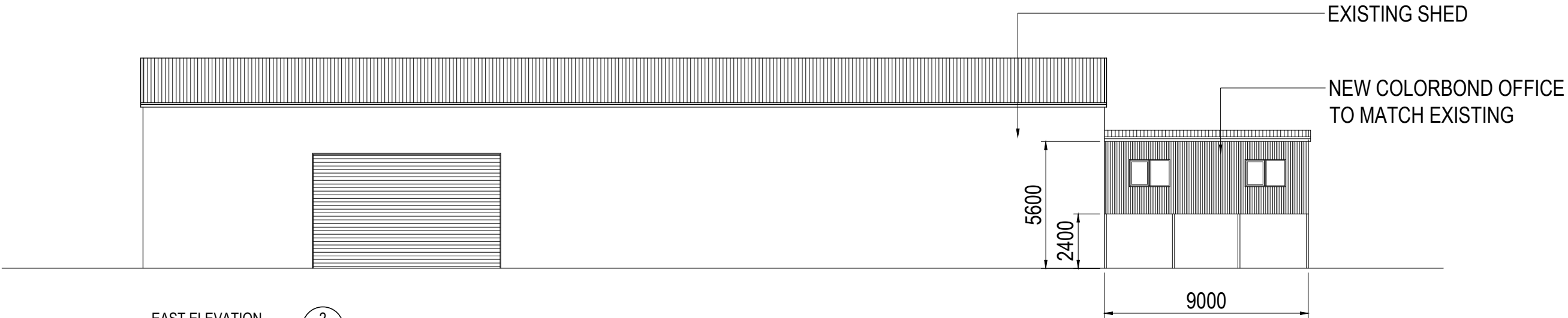
PBS FORM DRG-A3 REV - 8



SOUTH ELEVATION
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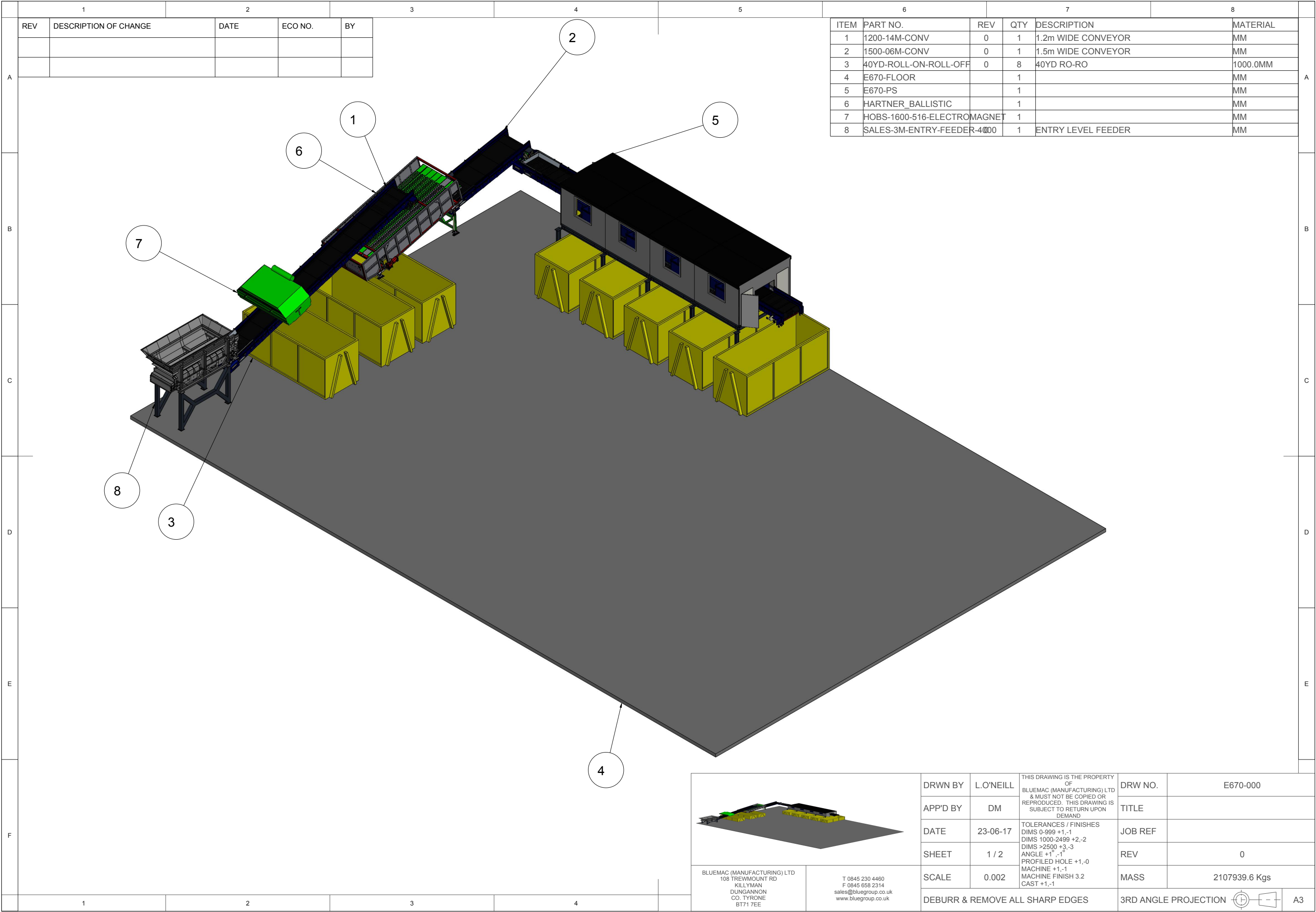


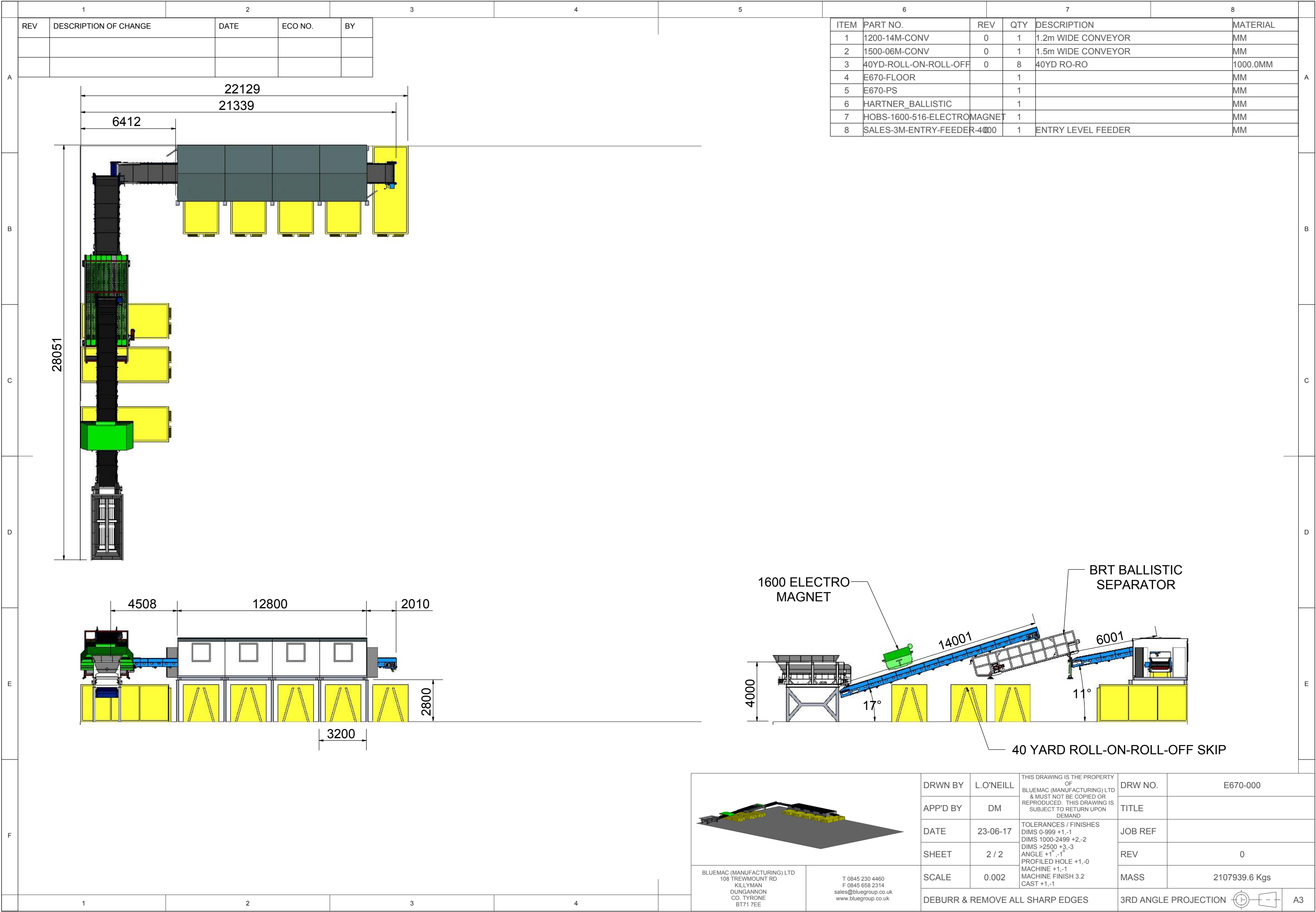
EAST ELEVATION
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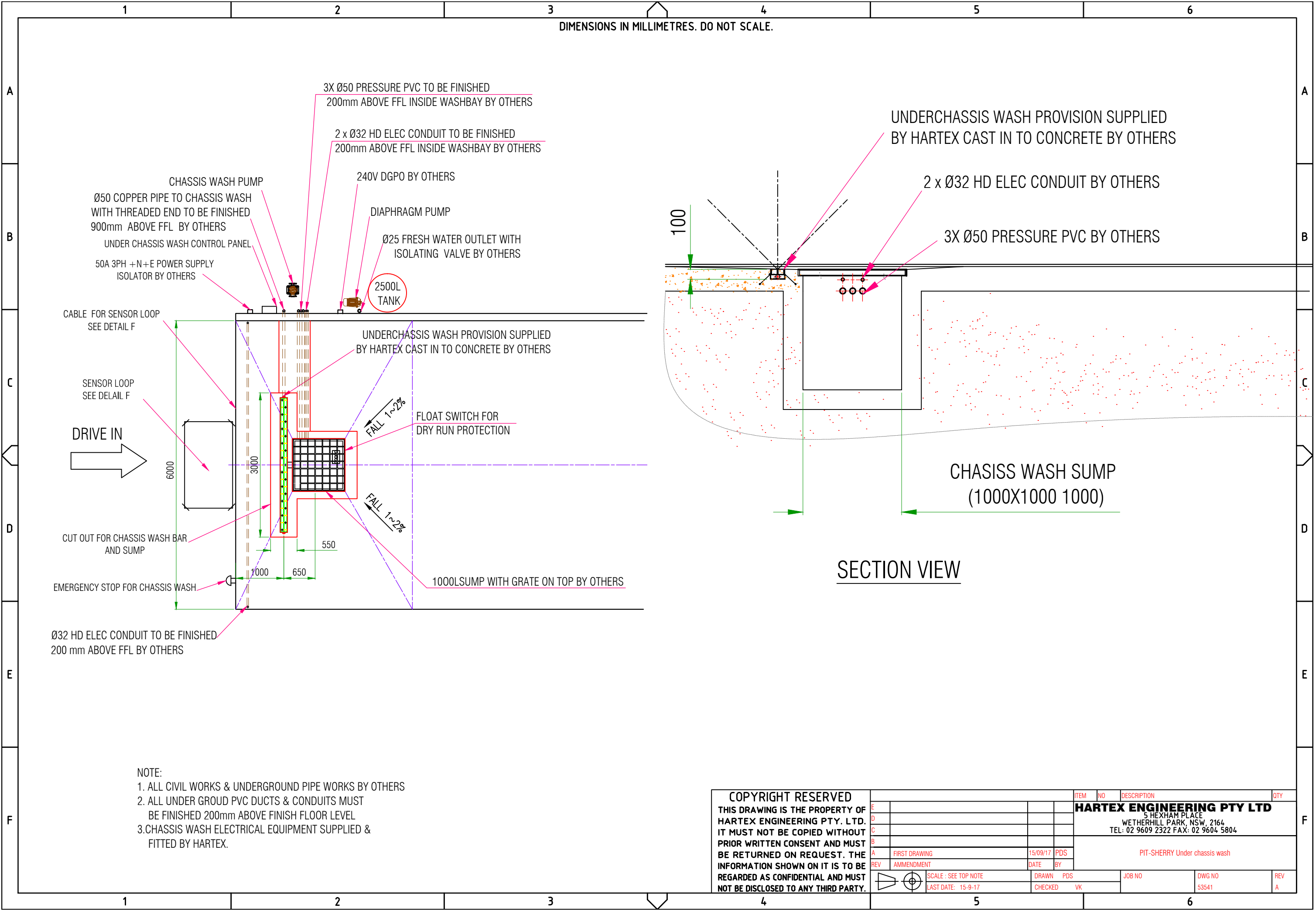
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						MELBOURNE OFFICE HWT Tower 40 City Road Southbank Victoria 3006 Ph. (03) 9682 5290 Fax. (03) 9682 5292 www.pittsh.com.au ABN: 67 140 184 309		
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						PROJECT PLASSER CRESCENT & NORTH STREET ST MARY'S		
						STATUS PRELIMINARY		
						DRAWING TITLE PROPOSED SITE OFFICE ELEVATIONS		
						DATUMS: AHD / MGA		
						CLIENT No. -		
						DRAWING No. ML16467-A1		
						REVISION A		
						Aug. 1, 17 - 17:37:09 Name: ML16467-A1.dwg Updated By: Madonna Cecil		







Appendix E

Air Quality Impact Assessment



AIR QUALITY IMPACT ASSESSMENT MACLEAN'S WASTE MANAGEMENT

Pitt & Sherry

8 January 2018

Job Number 17030674A

Prepared by

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Air Quality Impact Assessment Maclean's Waste Management

DOCUMENT CONTROL

Report Version	Date	Prepared by	Reviewed by
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FINAL – 001	31/08/2017	K Trahair	P Henschke
FINAL – 002	5/09/2017	K Trahair	P Henschke
DRAFT – 002	22/12/2017	K Trahair	P Henschke
FINAL – 003	8/01/2018	K Trahair	P Henschke

This report has been prepared in accordance with the scope of works between Todoroski Air Sciences Pty Ltd (TAS) and the client. TAS relies on and presumes accurate the information (or lack thereof) made available to it to conduct the work. If this is not the case, the findings of the report may change. TAS has applied the usual care and diligence of the profession prevailing at the time of preparing this report and commensurate with the information available. No other warranty or guarantee is implied in regard to the content and findings of the report. The report has been prepared exclusively for the use of the client, for the stated purpose and must be read in full. No responsibility is accepted for the use of the report or part thereof in any other context or by any third party.

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1 INTRODUCTION

Todoroski Air Sciences has prepared this report for Pitt & Sherry on behalf of Maclean's Waste Management. It provides an assessment of the potential air quality impacts associated with the proposed expansion of the existing waste management facility located at 33-37 Plasser Crescent, North St Marys New South Wales (NSW) (hereafter referred to as the Project).

To assess the potential air quality impacts associated with the Project, this report incorporates the following aspects:

- ✦ Background and description of the Project;
- ✦ Review of the existing meteorological and air quality environment surrounding the Project site;
- ✦ Description of the dispersion modelling approach used to assess potential air quality impacts;
- ✦ Presentation of the predicted operational air quality levels in the surrounding environment; and
- ✦ Discussion of the potential air quality impacts.

This air quality assessment has been prepared in general accordance with the NSW Environment Protection Authority (EPA) document *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (**NSW EPA, 2016**).

Where relevant, the following documents were also considered in this assessment:

- ✦ *Generic Guidance and Optimum Model Settings for the CALPUFF Modeling System for Inclusion into the 'Approved Methods for the Modeling and Assessments of Air Pollutants in NSW, Australia* (**TRC, 2011**)
- ✦ *Approved Methods for the Sampling and Analysis of Air Pollutants in NSW* (**DEC, 2007**);
- ✦ *Technical Framework: Assessment and Management of Odour from Stationary Sources in NSW* (**DEC, 2006a**);
- ✦ *Technical Notes: Assessment and Management of Odour from Stationary Sources in NSW* (**DEC, 2006b**);
- ✦ *Load Calculation Protocol for use by holders of NSW Environment Protection Licenses when calculating Assessable Pollutant Loads* (**DECC, 2009**).

2 STUDY REQUIREMENTS

This air quality assessment has been prepared in general accordance with the Secretary's Environmental Assessment Requirements (presented in **Table 2-1**) and recommendations by the NSW EPA (presented in **Table 2-2**).

Table 2-1: Secretary's Environmental Assessment Requirements

Specific matter	Requirement	Section
Air – including:	A description of all potential sources of air and odour emissions	6.3
	An air quality impact assessment in accordance with the relevant Environment Protection Authority Guidelines	This report
	A description and appraisal of air quality impact mitigation and monitoring measures	8

Table 2-2: NSW EPA Recommended Environmental Assessment Requirements

Specific matter	Requirement	Section
Air quality		
Assessment Objective	Source points for all dust emissions should be identified and the environmental controls to manage dust.	3.2, 6.3 & 8
	Identify all potential airborne emissions and includes but is not limited to coarse particulates, PM ₁₀ , PM _{2.5} and odour.	6.3
	Details of equipment and plant operating at the premises that could cause dust and sediment tracking.	6.3.1
	Details and locations of dust suppression systems at the premises.	8
Description of the Proposal	Identify all sources or potential sources of air emissions from the development	6.3
	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; - An outline of procedures for handling, transport, production and storage; and - The management of solid, liquid and gaseous waste streams with potential for significant air impacts.	3.2 & 6.3
Location	Describe the topography and surrounding land use. 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.	3.1
	Describe surrounding buildings that may affect plume dispersion	3.1 & 6.2.2
	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; - Mixing height; - Katabatic air drainage; and - Air re-circulation.	5 & 6.2.1
Baseline Conditions	Provide a description of the existing air quality and meteorology, using existing information and site representative ambient monitoring data. This description should include the following parameters: - Coarse particulates; - PM₁₀ and PM_{2.5}; - Odour; and	5.3

Specific matter	Requirement	Section
	Any other potential pollutants identified in the assessment process.	
Assess Impacts	Identify all pollutants of concern and estimate emissions by quantity (and size for particles), source and discharge point.	6.3
	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.	7
	Describe the effects and significance of pollutant concentration on the environment, human health, amenity and regional ambient air quality standards or goals.	9
	Describe the contribution that the development will make to regional and global pollution, particularly in sensitive locations.	9
	For potentially odorous emission provide 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.	6.3.2
	Reference should be made to Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (DEC, 2016); Approved Methods for the Sampling and Analysis of Air Pollutants in NSW (DEC, 2007); Assessment and Management of Odour from Stationary Sources in NSW (DEC, 2006); Technical Notes: Assessment and Management of Odour from Stationary Sources in NSW (DEC, 2006); Load Calculation Protocol for use by holders of NSW Environment Protection Licenses when calculating Assessable Pollutant Loads (DECC, 2009).	1

3 PROJECT SETTING AND DESCRIPTION

3.1 Project setting

The Project site is located at 33-37 Plasser Crescent, North St Marys, also known as Lot 16 DP 263353, approximately 11 kilometres (km) west of Blacktown, NSW. The site is located in a general industrial area with the land use in the surrounding area characterised as a mix of commercial/industrial, residential and recreational.

Figure 3-1 presents the location of the Project and the sensitive receptor locations assessed as discrete receptors in this study. The nearest sensitive receptors to the Project are identified as the residences located at 2 Kurrajong Road, North St Marys (identified as Receptor 10) located approximately 140 metres (m) to the north of the Project boundary and 2 Australia Street, St Marys (identified as Receptor 3) located approximately 190 metres (m) to the south from the Project boundary to the nearest residential building. St Marys North Public School is located approximately 500m north of the Project on Willow Road.

Figure 3-2 presents a pseudo three-dimensional visualisation of the topography surrounding the Project location. The Project site can be characterised as relatively flat, with gently undulating hills in all directions.

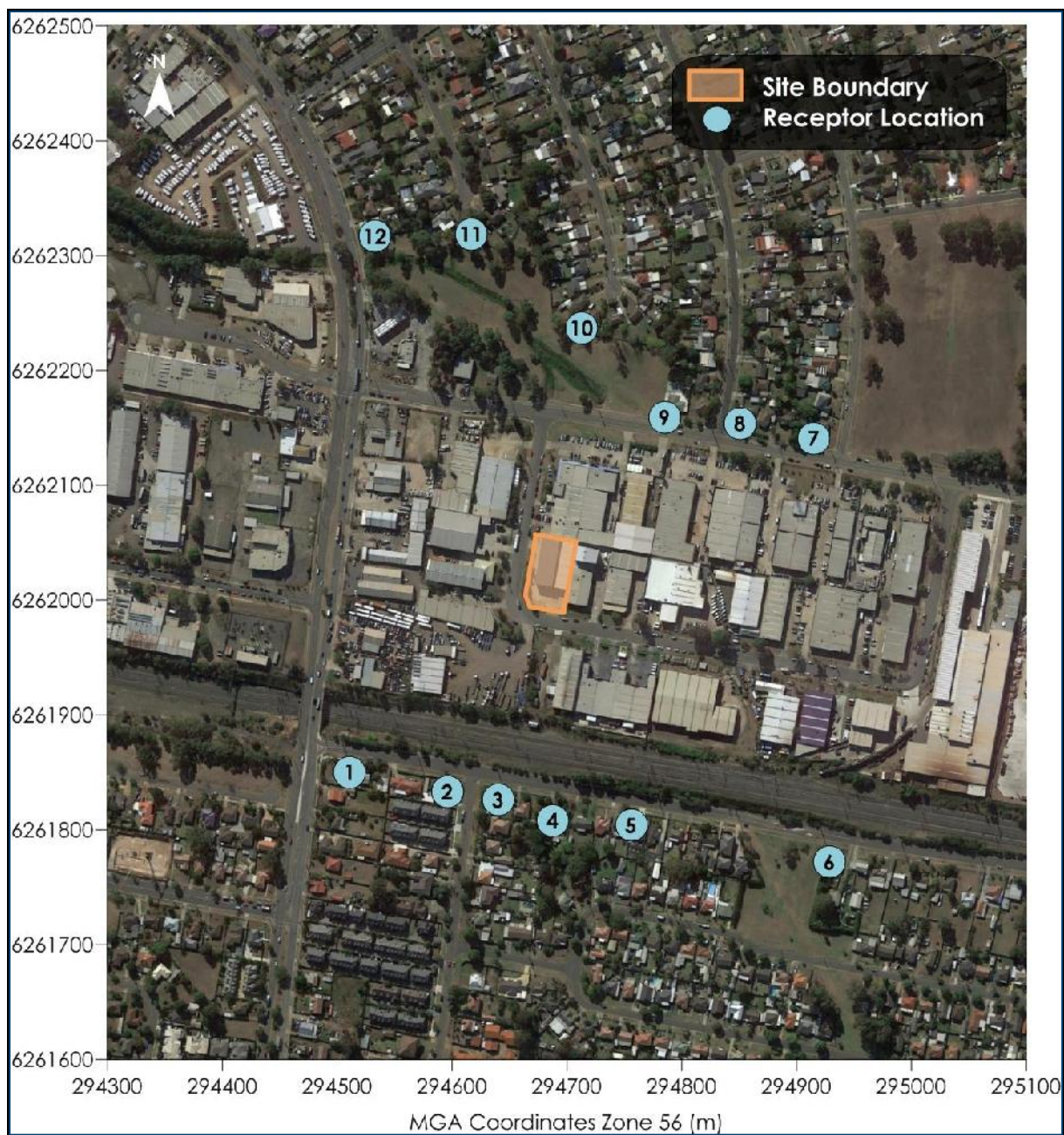


Figure 3-1: Project location

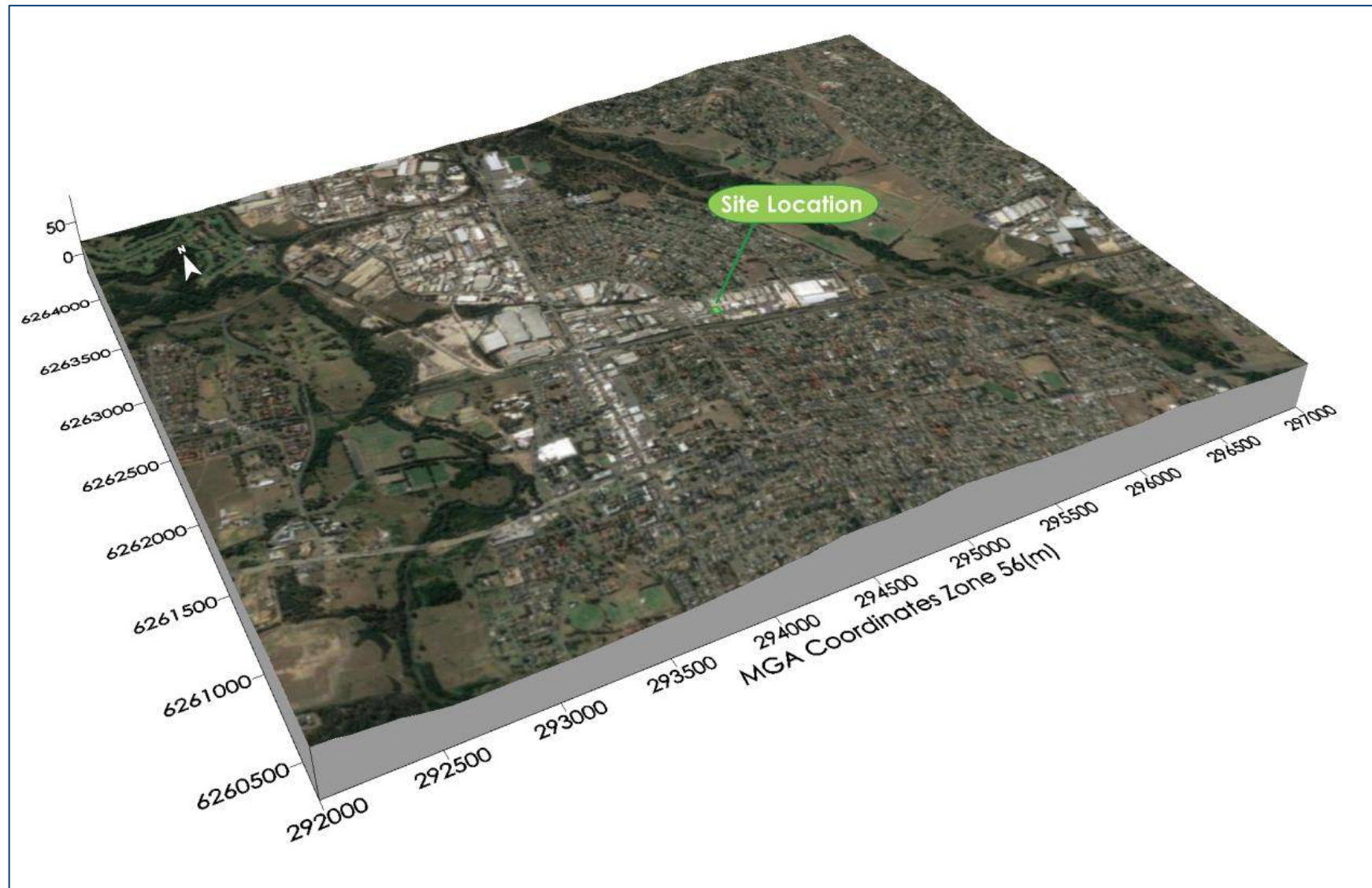


Figure 3-2: Representative view of topography surrounding the Project location

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3.2 Project description

The Project involves the expansion and upgrade of the existing waste management facility with an increase in the annual processing capacity from 5,500 tonnes per annum to 30,000 tonnes per annum.

The proposed expansion will utilise the existing site building and plant equipment, with the addition of a weighbridge, installation of additional indoor plant equipment and construction of additional storage areas within the existing building.

A raised site office would be constructed with provision of five additional car parking spaces. An indicative site layout is provided as **Figure 3-3**.

3.2.1 Materials

The site accepts construction and demolition waste materials. These include:

- ✦ Cardboard;
- ✦ Timber;
- ✦ Gyprock;
- ✦ Plastics;
- ✦ Ferrous and nonferrous metals;
- ✦ Mixed lights (medium density cladding, plastics, timber and metal, cardboard and paper);
- ✦ Mixed heavies (bricks, soil, sand, concrete); and
- ✦ General waste.

No odorous waste materials are accepted on site.

3.2.2 Process Description

Following the upgrade, the facility will sort waste materials into six separate streams (timber, masonry/non-contaminated heavies, steel, cardboard, plastics and contaminated heavies) to be transported to appropriate recovery facilities.

Waste which cannot be recycled would be transported to landfill. This is estimated to be approximately 10% of the total materials received at the site.

3.2.3 Operational Hours

The proposed operational hours of the Project are as follows:

- ✦ Monday to Friday: 6am – 11pm
- ✦ Saturday: 7am – 3pm
- ✦ Sunday: 10am – 2pm

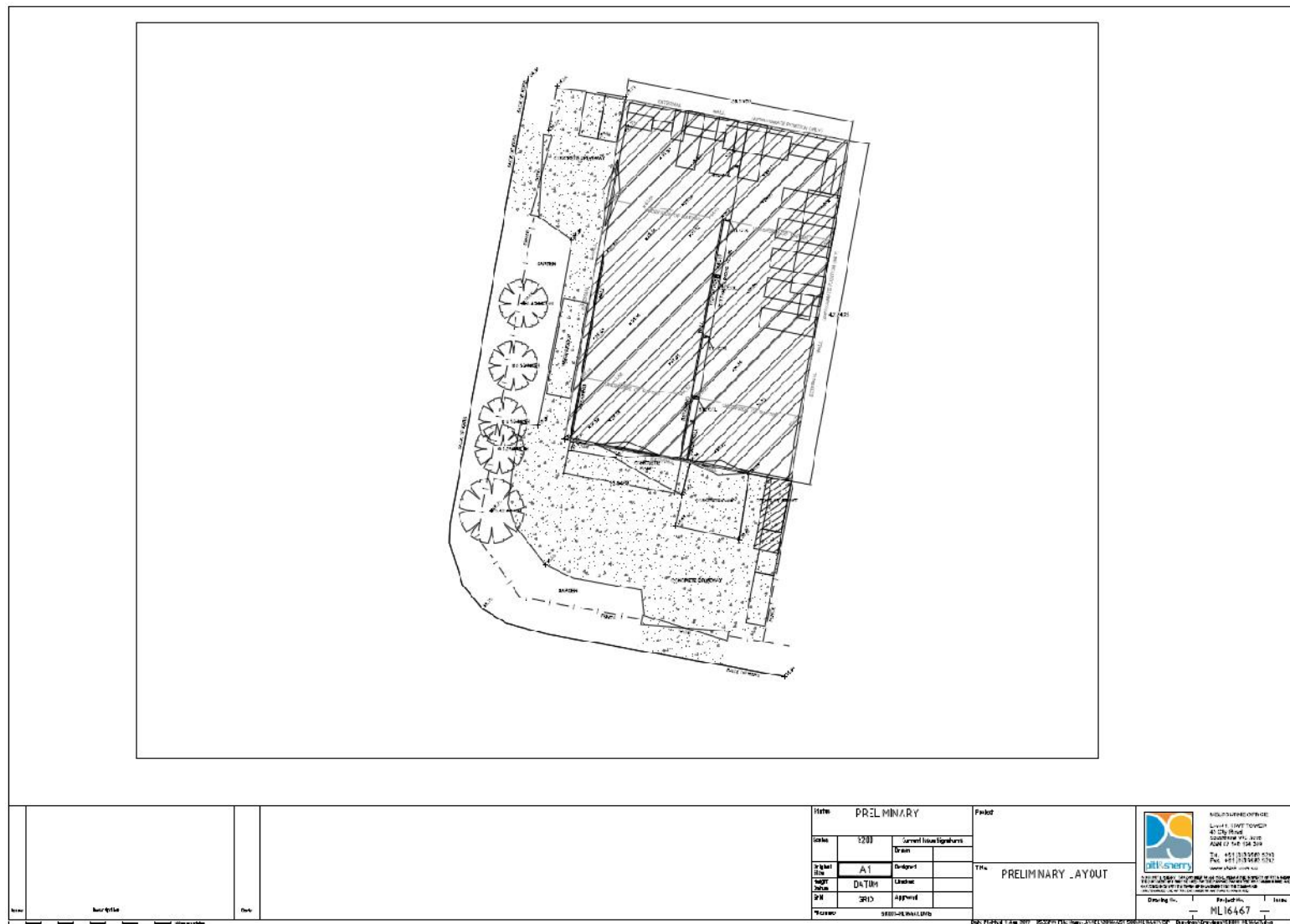


Figure 3-3: Indicative site layout

4 AIR QUALITY CRITERIA

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 proposed modification 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 New South Wales*" (NSW EPA, 2016).

Particulate matter consists of dust particles of varying size and composition. The upper size range for Total Suspended Particulate matter (TSP) is nominally taken to be 30 micrometres (μm) as in practice particles larger than 30 to 50 μm will settle out of the atmosphere too quickly to be regarded as air pollutants.

Two sub-classes of TSP are also included in the air quality criteria, namely PM_{10} , particulate matter with equivalent aerodynamic diameters of 10 μm or less, and $\text{PM}_{2.5}$, particulate matter with equivalent aerodynamic diameters of 2.5 μm or less.

Particulate matter, typically in the upper size range, that settles from the atmosphere and deposits on surfaces is characterised as deposited dust. The deposition of dust on surfaces may be considered a nuisance and can adversely affect the amenity of an area by soiling property in the vicinity.

4.1 NSW EPA impact assessment criteria

Table 4-1 summarises the air quality goals that are relevant to this assessment as outlined in the NSW EPA document *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (NSW EPA, 2016).

The air quality criteria for particulates refers to the cumulative impact and not just the dust from the proposed modification. Consideration of background dust levels needs to be made when using these criterion to assess potential impacts.

Table 4-1: NSW EPA air quality impact assessment criteria

Pollutant	Averaging Period	Impact	Criterion
TSP	Annual	Cumulative	90 $\mu\text{g}/\text{m}^3$
PM_{10}	Annual	Cumulative	25 $\mu\text{g}/\text{m}^3$
	24 hour	Cumulative	50 $\mu\text{g}/\text{m}^3$
$\text{PM}_{2.5}$	Annual	Cumulative	8 $\mu\text{g}/\text{m}^3$
	24 hour	Cumulative	25 $\mu\text{g}/\text{m}^3$
Deposited dust	Annual	Incremental	2 $\text{g}/\text{m}^2/\text{month}$
		Cumulative	4 $\text{g}/\text{m}^2/\text{month}$

Source: NSW EPA, 2016

$\mu\text{g}/\text{m}^3$ = micrograms per cubic metre

$\text{g}/\text{m}^2/\text{month}$ = grams per square metre per month

5 EXISTING ENVIRONMENT

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

5.1 Local climatic conditions

Long-term climatic data from the Bureau of Meteorology (BoM) weather station at Penrith Lakes Automatic Weather Station (AWS) (Site No. 067113) were used to characterise the local climate in the proximity of the Project. The Penrith Lakes AWS is located approximately 10.5km northwest of the Project.

Table 5-1 and **Figure 5-1** present a summary of data from the Penrith Lakes AWS collected over an approximate 14 to 22 year period for the various meteorological parameters.

The data indicate that January is the hottest month with a mean maximum temperature of 30.8 degrees Celsius (°C) and July as the coldest month with a mean minimum temperature of 5.5°C.

Rainfall peaks during the summer months and declines during winter. The data indicate that February is the wettest month with an average rainfall of 119.0 millimetres (mm) over 7.8 days and July is the driest month with an average rainfall of 30.6mm over 4.1 days.

Humidity levels exhibit variability and seasonal flux across the year. Mean 9am humidity levels range from 60 per cent (%) in October to 85% in June. Mean 3pm humidity levels range from 40% in September to 55% in June.

Mean 9am wind speeds range from 7.2 kilometres per hour (km/h) in May to 10.6km/h in October. Mean 3pm wind speeds range from 12.2km/h in May to 18.4km/h in September.

Table 5-1: Monthly climate statistics summary – Penrith Lakes AWS

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann.
Temperature													
Mean max. temperature (°C)	30.8	29.5	27.6	24.5	21.1	18.1	17.7	19.8	23.2	25.8	27.5	29.4	24.6
Mean min. temperature (°C)	18.6	18.5	16.8	13.2	9.3	6.9	5.5	6.2	9.4	12.1	15.1	17.0	12.4
Rainfall													
Rainfall (mm)	97.5	119.0	76.5	50.1	38.8	52.4	30.6	31.4	32.0	51.5	82.6	62.5	728.1
Mean No. of rain days (≥1mm)	7.6	7.8	7.7	5.6	4.5	5.8	4.1	3.6	4.8	5.3	7.9	7.1	71.8
9am conditions													
Mean temperature (°C)	22.3	21.7	19.7	17.6	13.8	10.5	9.6	11.7	15.8	18.5	19.6	21.4	16.8
Mean relative humidity (%)	73	79	80	76	81	85	83	72	64	60	68	69	74
Mean wind speed (km/h)	9.3	9.2	7.7	8.1	7.2	7.7	7.4	8.7	10.5	10.6	10.4	9.3	8.8
3pm conditions													
Mean temperature (°C)	29.0	27.7	26.1	23.3	19.8	17.1	16.6	18.6	21.7	23.7	25.3	27.6	23.0
Mean relative humidity (%)	47	53	52	49	52	55	50	41	40	41	46	45	48
Mean wind speed (km/h)	15.7	14.3	13.7	13.2	12.2	12.7	13.5	16.5	18.4	18.0	17.4	16.4	15.2

Source: **Bureau of Meteorology, 2017 (accessed May 2017)**

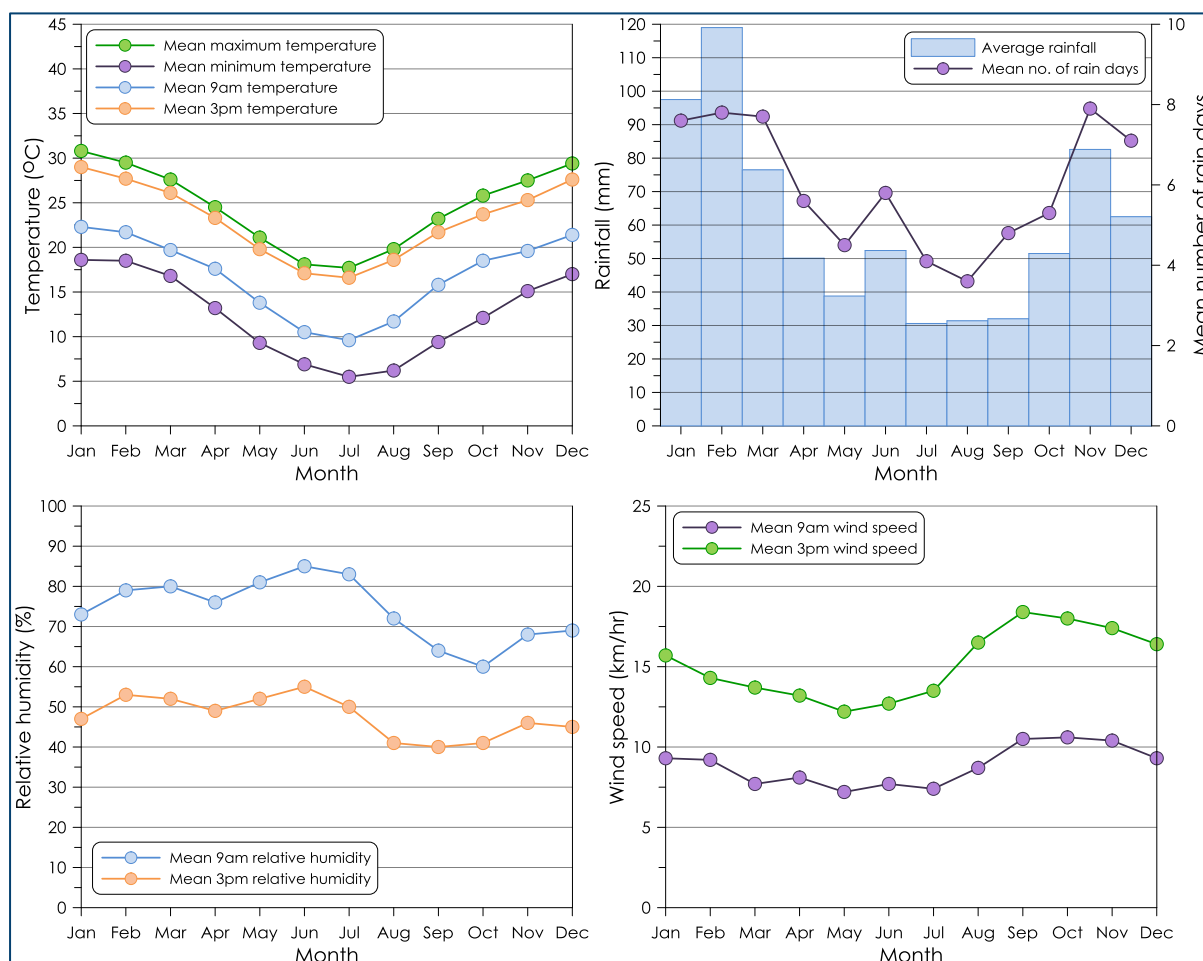


Figure 5-1: Monthly climate statistics summary – Penrith Lakes AWS

5.2 Local meteorological conditions

The Penrith Lakes Automatic Weather Station (AWS) has been used to represent local meteorological conditions that would be experienced at the Project site. From a review of the latest five years, the 2015 calendar period was found to be most representative of the area based on a long-term meteorological analysis of data collected from the Penrith Lakes AWS. Annual and seasonal windroses prepared from data collected for the 2015 calendar year are presented in **Figure 5-2**.

On an annual basis, winds are predominately from the south-southwest and south sectors. Summer, autumn and spring follow similar distributions to the annual trends with winds most frequent from the south-southwest and south. Winds during the winter period have similar distribution patterns to the rest of the year however with the percentage frequency significantly reduced in the south and south-westerly directions.

The windroses show a wind distribution pattern that is generally typical of the expected patterns for this area. Slight variances to these wind trends may occur at the Project site considering the location in relation to local terrain features.



Figure 5-2: Annual and seasonal windroses for Penrith Lakes AWS (2015)

5.3 Ambient air quality

The main sources of air pollutants in the area surrounding the Project include emissions from local anthropogenic activities such as various commercial or industrial activities, motor vehicle exhaust and domestic wood heaters.

Available data from the nearest air quality monitors operated by the NSW Office of Environment and Heritage (OEH) were used to quantify the existing background level for assessed pollutants at the Project site. The NSW OEH air quality monitors at St Marys, Prospect and Richmond are located approximately 5km southwest, 13km east-southeast and 15km north-northwest of the Project site, respectively.

5.3.1 PM₁₀ Monitoring

A summary of the available PM₁₀ data from the St Marys, Richmond and Prospect monitoring sites is presented in **Table 5-2**. Recorded 24-hour average PM₁₀ concentrations are presented in **Figure 5-3**.

A review of **Table 5-2** indicates that the annual average PM₁₀ concentrations at St Marys, Richmond and Prospect were below the relevant criterion of 25µg/m³. The maximum 24-hour average PM₁₀ concentrations recorded were found to exceed the NSW EPA 24-hour average goal of 50µg/m³ during the period reviewed.

Table 5-2: Summary of PM₁₀ levels from NSW OEH monitoring (µg/m³)

Station	Annual average					Maximum 24-hour average				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
St Marys	14.4	16.0	16.7	15.1	16.0	34.3	93.0	45.0	53.0	100.2
Richmond	15.1	17.3	15.4	12.8	15.9	99.2	104.6	40.0	49.3	102.8
Prospect	17.3	19.2	17.6	17.6	18.9	38.7	81.8	44.3	68.7	110.1

It can be seen from **Figure 5-3** that PM₁₀ concentrations are nominally highest in the spring and summer months with the warmer weather raising the potential for drier ground elevating the occurrence of windblown dust, bushfires and pollen levels.

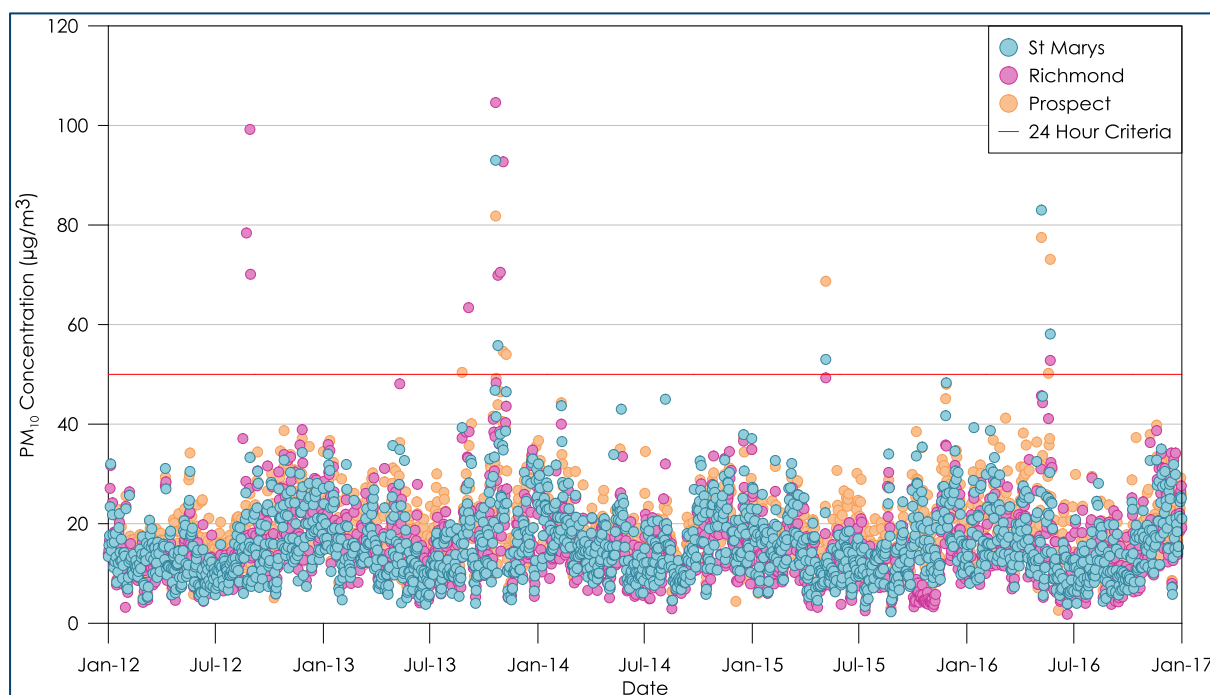


Figure 5-3: Daily 24-hour average PM₁₀ concentrations

5.3.2 PM_{2.5} Monitoring

A summary of the available PM_{2.5} data from the St Marys, Richmond and Prospect NSW OEH monitoring sites is presented in **Table 5-3**. Recorded 24-hour average PM_{2.5} concentrations are presented in **Figure 5-4**.

A review of **Table 5-3** indicates that the annual average PM_{2.5} concentrations were consistently above the relevant criterion of 8µg/m³ at Prospect and below the criterion at Richmond. **Figure 5-4** present the daily 24-hour average for PM_{2.5} concentrations recorded at the Richmond, Prospect and St Marys NSW OEH monitoring sites from January 2015 to May 2017.

The monitoring data reviewed indicate that the 24-hour average PM_{2.5} exceeded the NSW EPA 24-hour average goal of 25µg/m³ in 2016 for Richmond, during the 2015 and 2016 year periods for the Prospect site and in 2016 and 2017 at the St Marys site. The Richmond, Prospect and St Marys monitors recorded generally similar PM_{2.5} concentrations.

Table 5-3: Summary of PM_{2.5} levels from NSW OEH monitoring (µg/m³)

Station	Annual average		Maximum 24-hour average	
	2015	2016	2015	2016
St Marys*	-	-	-	93.2
Richmond	7.8	7.9	24.5	83.4
Prospect	8.2	8.7	29.6	84.9

*Data available from 15/03/2016

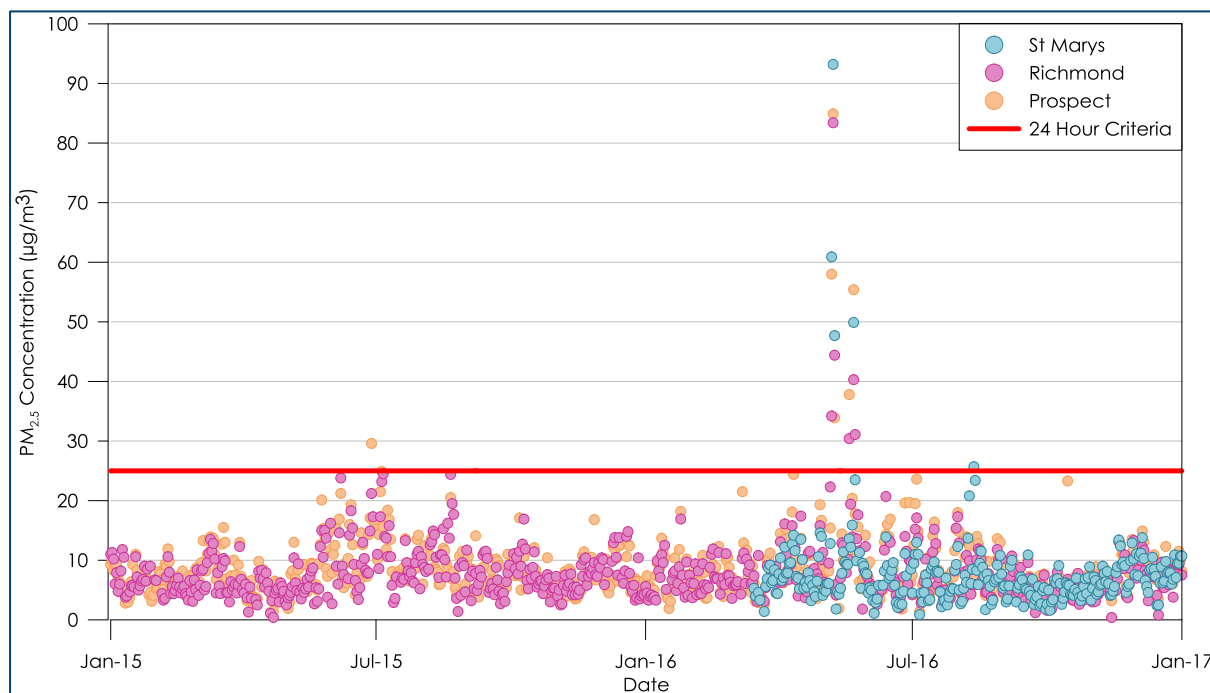


Figure 5-4: Daily 24-hour average PM_{2.5} concentrations

5.3.3 Estimated background air quality levels

5.3.3.1 *PM₁₀ and PM_{2.5} concentrations*

Data from St Marys is considered the most representative of the background levels in the vicinity of the Project site. The available data from this monitor have therefore been used to quantify the existing ambient levels of air pollutants in this study. In correlation with the meteorological data set used, the 2015 year data set was selected to represent background concentrations at the Project site and surrounding sensitive receptors.

As PM_{2.5} data for the 2015 calendar year are not available from the St Marys monitoring station, PM_{2.5} data have been retrieved from the Richmond monitoring station. Despite a slight difference in land use to the Project site, the Richmond OEH monitor PM_{2.5} data are considered reasonable to represent background concentrations for the Project site.

5.3.3.2 *TSP and Deposited dust*

In the absence of data, estimates of the annual average background TSP and deposited dust concentrations can be determined from a relationship between PM₁₀, TSP and deposited dust concentrations and the measured PM₁₀ levels.

This relationship assumes that an annual average PM₁₀ concentration of 25µg/m³ corresponds to a TSP concentration of 90µg/m³ and a dust deposition value of 4g/m²/month. This assumption is based on the NSW EPA air quality impact criteria.

Applying this relationship with the applied annual average PM₁₀ concentration of 15.1µg/m³ indicates an approximate annual average TSP concentration and deposition value of 54.4µg/m³ and 2.4g/m²/month, respectively.

5.3.3.3 Summary of background pollutant concentrations

The annual average background air quality levels applied in this assessment are outlined in **Table 5-4**.

Table 5-4: Summary of background air quality levels

Pollutant	Averaging Period	Units	Value
PM ₁₀	Annual	µg/m ³	15.1
PM _{2.5}	Annual	µg/m ³	7.8
TSP	Annual	µg/m ³	54.4
Deposited dust	Annual	g/m ² /month	2.4

Ambient (background) concentration data for PM₁₀ from St Marys and PM_{2.5} data from Richmond have been applied in the Level 2 contemporaneous assessment of 24-hour average impacts.

6 DISPERSION MODELLING APPROACH

6.1 Introduction

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

An air dispersion model is a complex simulation of how the prevailing weather conditions affect the way air pollutants travel and disperse in the atmosphere away from the Project. Such models are used to predict the potential air quality impacts of the Project on the surrounding environment.

For this assessment, the CALPUFF modelling suite is applied to dispersion modelling. The model was setup in general accordance with methods provided in the NSW EPA document *Generic Guidance and Optimum Model Settings for the CALPUFF Modeling System for Inclusion into the 'Approved Methods for the Modeling and Assessments of Air Pollutants in NSW, Australia'* (TRC Environmental Corporation, 2011).

6.2 Modelling methodology

6.2.1 Meteorological modelling

The meteorological modelling methodology applied a 'hybrid' approach which includes a combination of prognostic model data from The Air Pollution Model (TAPM) with surface observations in the CALMET model.

The centre of analysis for TAPM was 33deg45.5min south and 150deg47min east (2946812mE, 6262027mN). The simulation involved an outer grid of 30km, with three nested grids of 10km, 3km and 1km with 35 vertical grid levels.

The 2015 calendar year was selected as the period for modelling the Project. This period was selected based on a review of the long-term meteorological and ambient air quality conditions representative of the prevailing conditions. Accordingly, the available meteorological data for January 2015 to December 2015 from two nearby meteorological monitoring sites were included in the simulation. **Table 6-1** outlines the parameters used from each station.

Table 6-1: Surface observation stations

Weather Stations	Parameters						
	WS	WD	CH	CC	T	RH	SLP
Penrith Lakes (BoM) (Station No. 067113)	✓	✓			✓	✓	
Horsley Park Equestrian Centre (BoM) (Station No. 067119)	✓	✓			✓	✓	

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

The seven critical parameters used in the CALMET modelling are presented in **Table 6-2**.

Table 6-2: Seven critical parameters used in CALMET

Parameter	Value
TERRAD	5
IEXTRP	-4
BIAS (NZ)	-1, -0.5, -0.25, 0, 0, 0, 0, 0
R1 and R2	6, 6
RMAX1 and RMAX2	12,12

The outputs of the CALMET modelling are evaluated using visual analysis of the wind fields and extracted data.

Figure 6-1 presents a visualisation of the wind field generated by CALMET for a single hour of the modelling period. The wind fields are seen to follow the terrain well and indicate the simulation produces realistic fine scale flow fields (such as terrain forced flows) in surrounding areas.

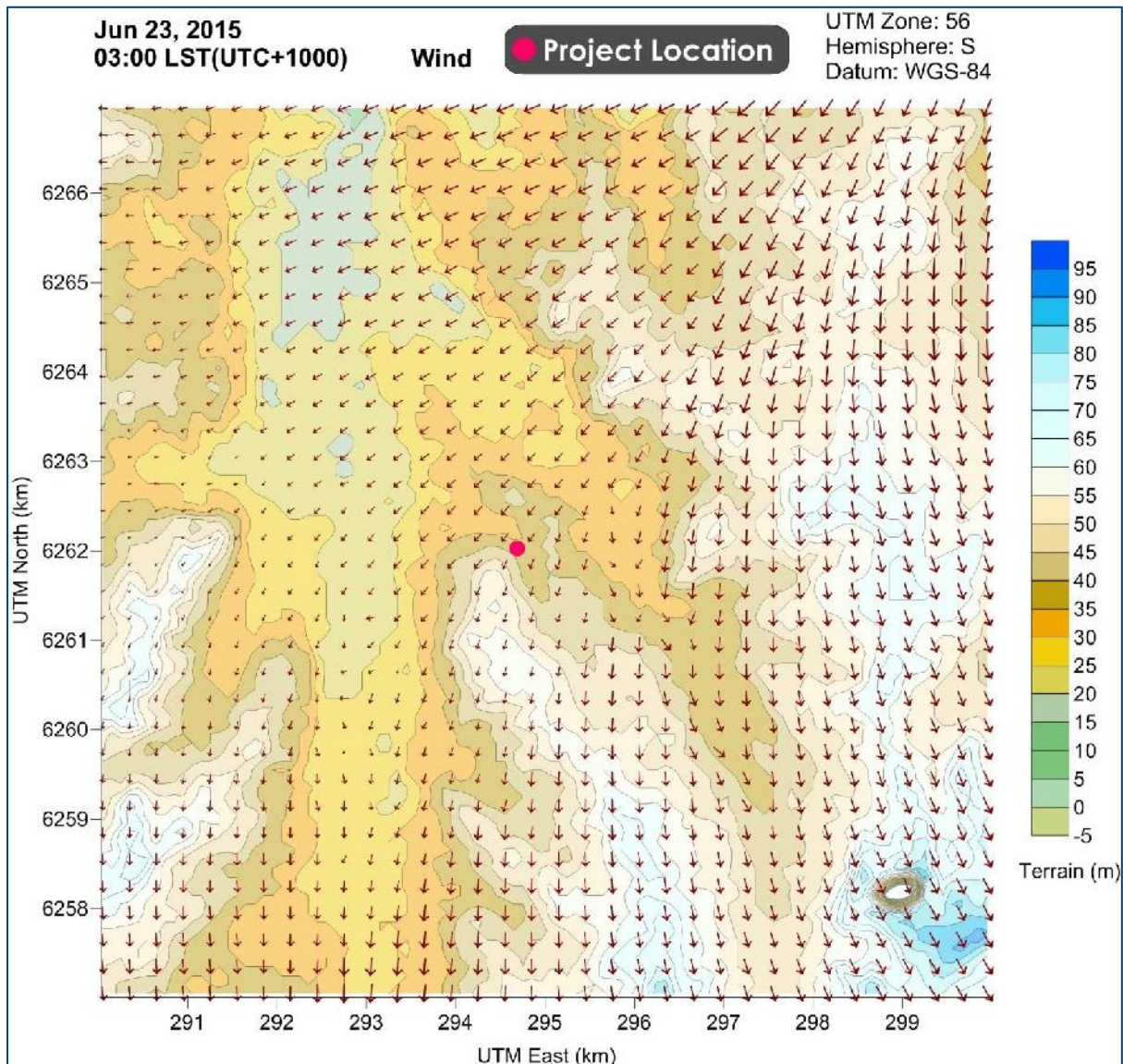


Figure 6-1: Example of the wind field for one of the 8,760 hours of the year that are modelled

CALMET generated meteorological data were extracted from a point within the CALMET domain and are represented in **Figure 6-2** and **Figure 6-3**.

Figure 6-2 presents the annual and seasonal windroses from the CALMET data. The CALMET modelling results reflect the expected wind distribution patterns of the area based on consideration of the measured data and the expected terrain effects on the prevailing winds.

Figure 6-3 includes graphs of the temperature, wind speed, mixing height and stability classification over the modelling period and is consistent with the conditions expected to occur in the area.

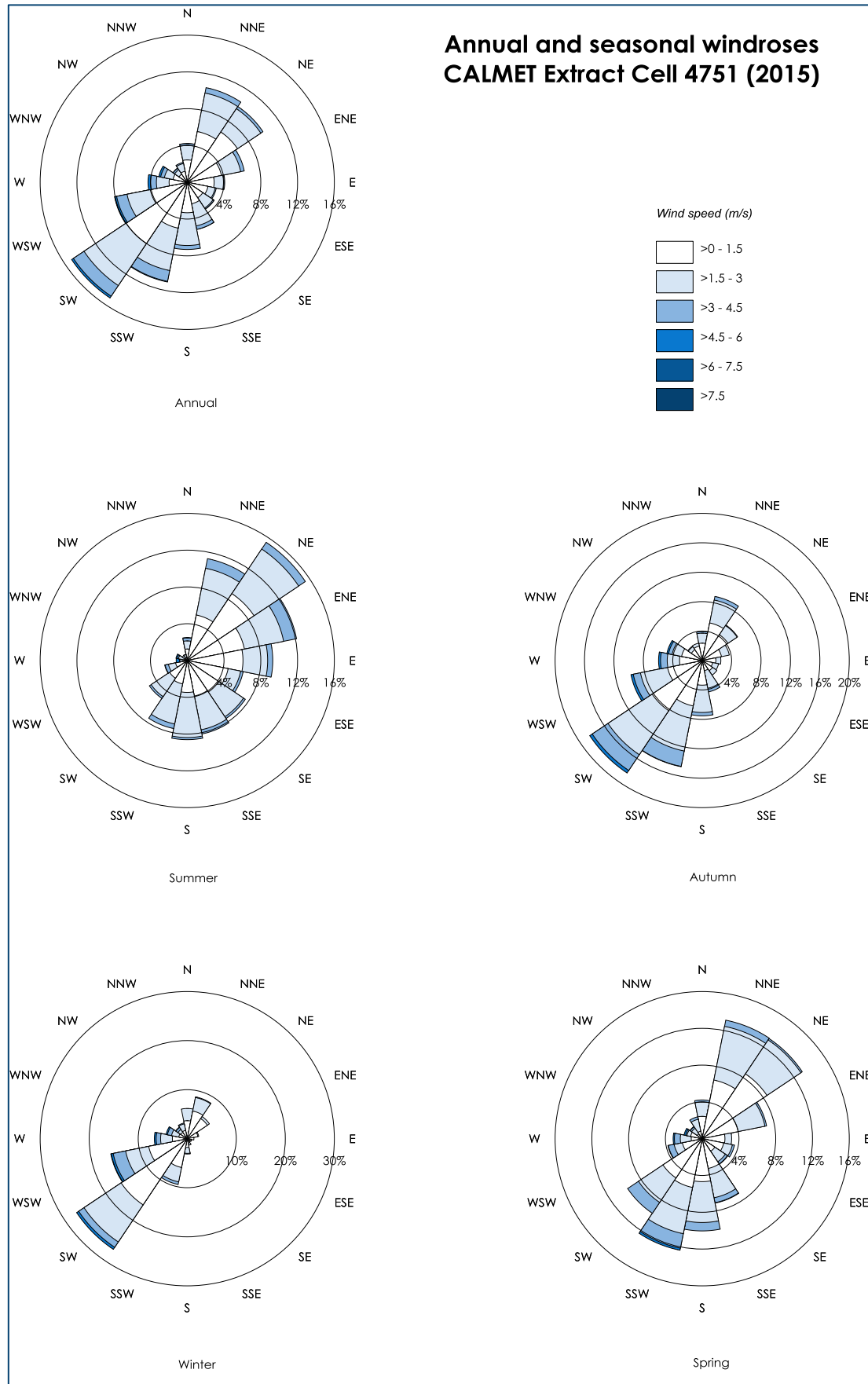


Figure 6-2: Windroses from CALMET extract (cell ref 4751)

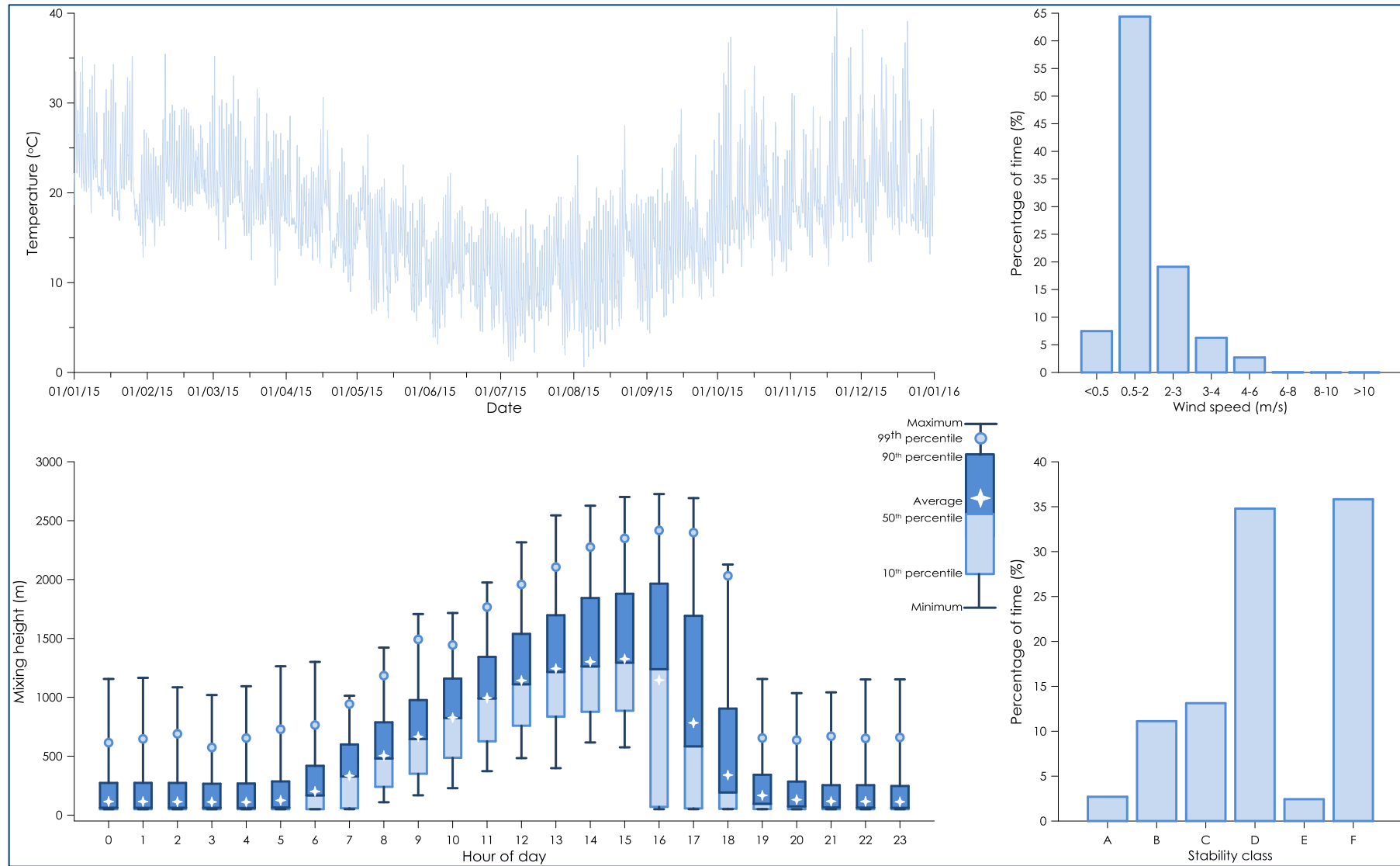


Figure 6-3: Meteorological analysis of CALMET extract (cell ref 4751)

6.2.2 Dispersion modelling

The CALPUFF dispersion model, in conjunction with a CALMET generated meteorological data file, was applied to provide predictions of the ground level concentrations of dust based on the estimated emissions.

There are no point sources such as vents or stacks associated with the Project. As such emissions from each activity were represented by a series of volume sources and were included in the CALPUFF model via an hourly varying emission file. As all sources modelled were volume, no buildings were included in the model.

6.3 Emission estimation

6.3.1 Dust

Activities associated with the Project have the potential to generate dust emissions from various activities including loading/unloading of material with excavators and front end loaders, sorting activities, conveying materials on a rubber conveyor belt, screening materials with an over band magnet and ballistic separator, and dust lift-off (windblown dust) from hardstand areas. Movements of vehicles on the site (including excavators, loaders, skid steerer hook lift trucks, compactor trucks, and truck and dog) may generate air emissions from the exhaust, brake wear and wheel generated dust when travelling on roads. **Table 6-3** provides a list of these activities and sources.

Dust emission estimates for the Project have been calculated by analysing the various types of dust generating activities taking place and utilising suitable emission factors sourced from both locally developed (**NPI 2012 and 2014**) and US EPA developed documentation (**US EPA, 2011**). The estimated dust emissions for activities associated with the proposed operation are presented in **Table 6-3**. Detailed calculations of the dust emission estimates are provided in the emissions inventory **Appendix A**.

The dust emission estimates in **Table 6-3** have not taken into account the proposed dust mitigation and management measures for the Project. These dust emission estimates can be considered conservative as they would likely to be lower in reality.

Table 6-3: Estimated annual dust emission rate for the Project (kg/year)

Activity	TSP emissions	PM ₁₀ emissions	PM _{2.5} emissions
Hauling of waste/materials (paved road)	317	61	15
Unloading of materials from truck	12	6	1
Sorting	25	12	2
Transfer of material to stockpiles	25	12	2
Loading to feeder	25	12	2
Conveying	25	12	2
Screening	375	129	31
Transfer of material to stockpiles	25	12	2
Unload materials to stockpiles	25	12	2
Loading to trucks for export off-site	25	12	2
Hauling material off-site	223	43	10
Wind erosion of the site	298	149	22
Total emissions	1,400	470	92

6.3.2 Odour

As the proposed materials accepted by the site are limited to non-putrescible construction and demolition waste materials, the potential for odour emissions arising from these materials would be low.

All incoming loads will be checked prior to unloading and processing at the site, with any loads identified to be malodorous to be removed immediately from the site.

The wood material processed on site would only be stored for a short time (less than 24 hours) and there is little potential for decomposition of the wood material at the site. Hence the potential scope for odour impacts to arise from this material is considered to be small. It is noted that processing and storage of timber waste occurs within the enclosed building therefore significantly reducing the likelihood of any off site odour migration from the Project.

Based on the above, it is concluded that the Project would be highly unlikely to generate any significant odour emissions or impact and therefore odour has not been considered further in this assessment.

7 DISPERSION MODELLING RESULTS

7.1 Dust concentrations

Figure 7-1 to **Figure 7-6** present pollutant concentration isopleths showing the spatial distribution of the predicted incremental impacts associated with the operation of the Project (alone) 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 (DD) levels.

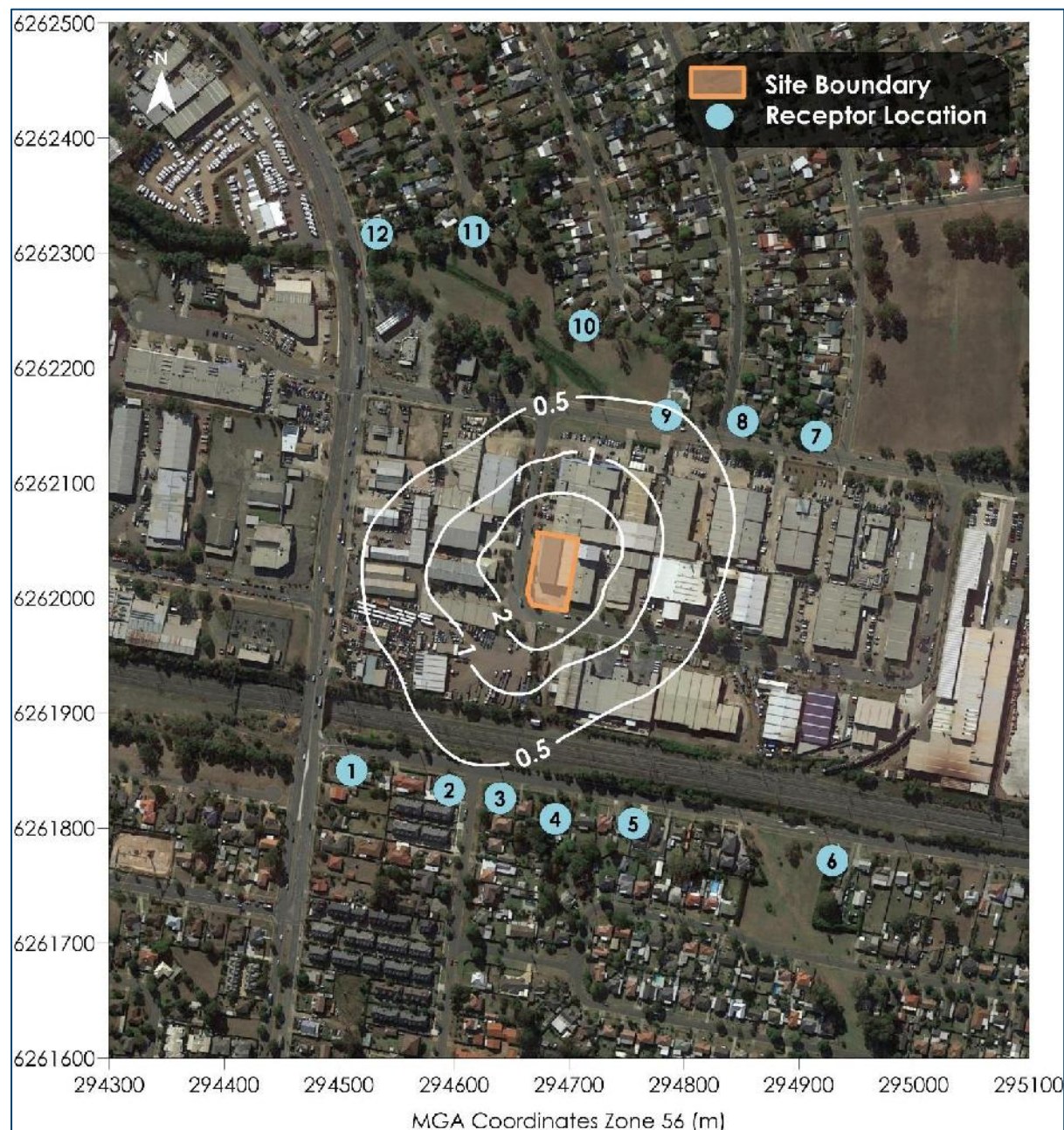


Figure 7-1: Predicted incremental maximum 24-hour average $PM_{2.5}$ concentrations ($\mu\text{g}/\text{m}^3$)

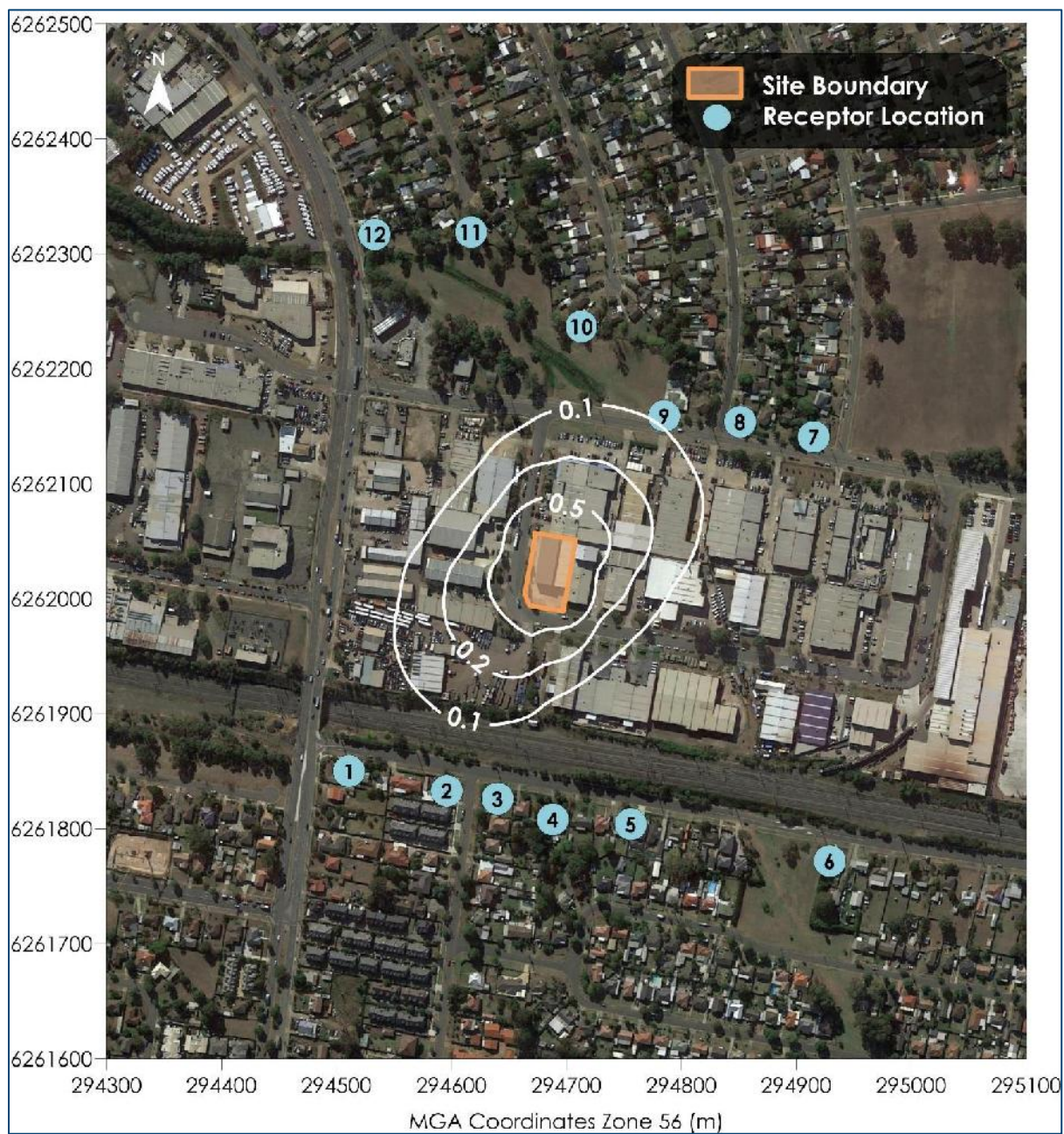
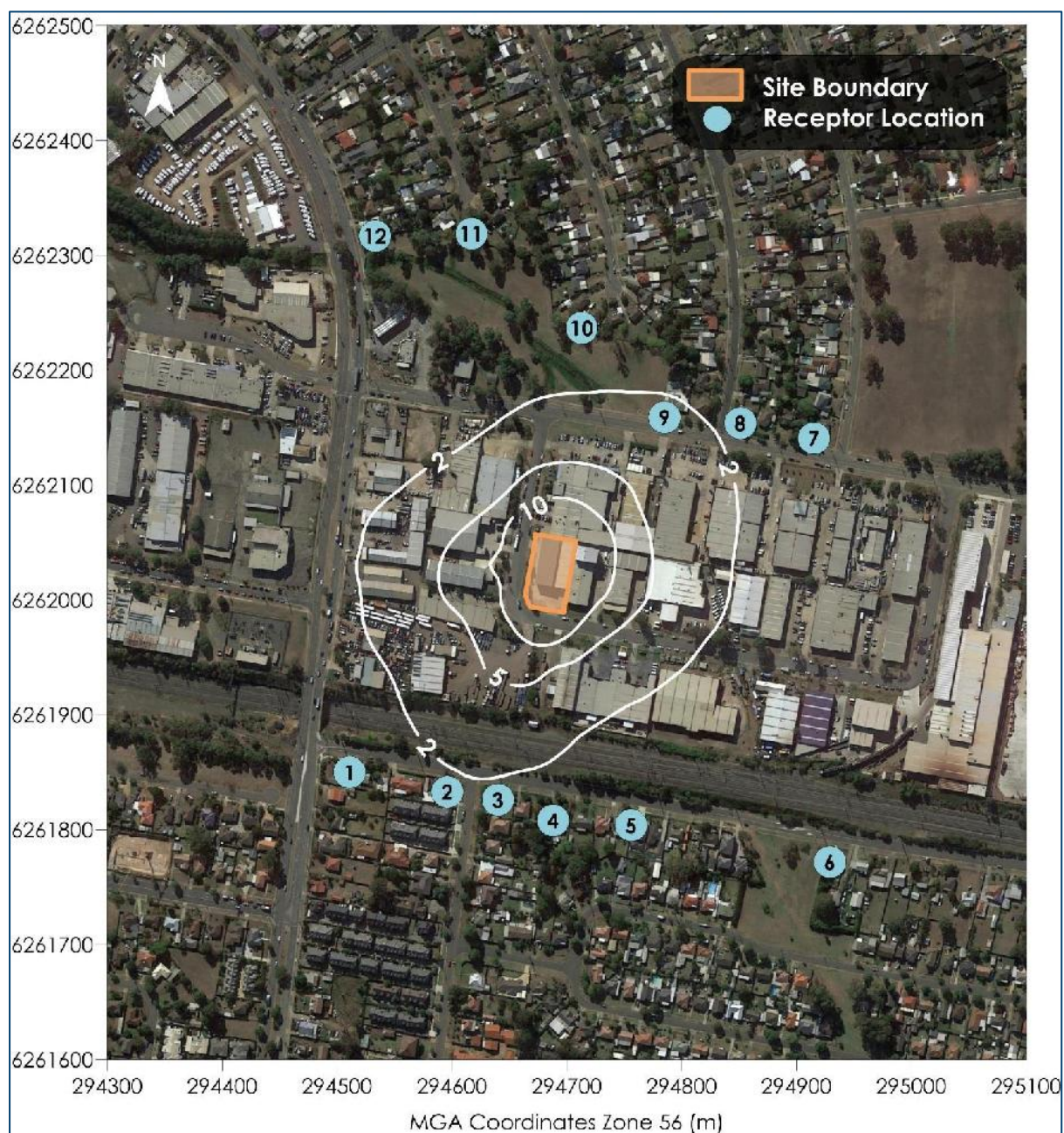


Figure 7-2: Predicted incremental annual average PM_{2.5} concentrations ($\mu\text{g}/\text{m}^3$)



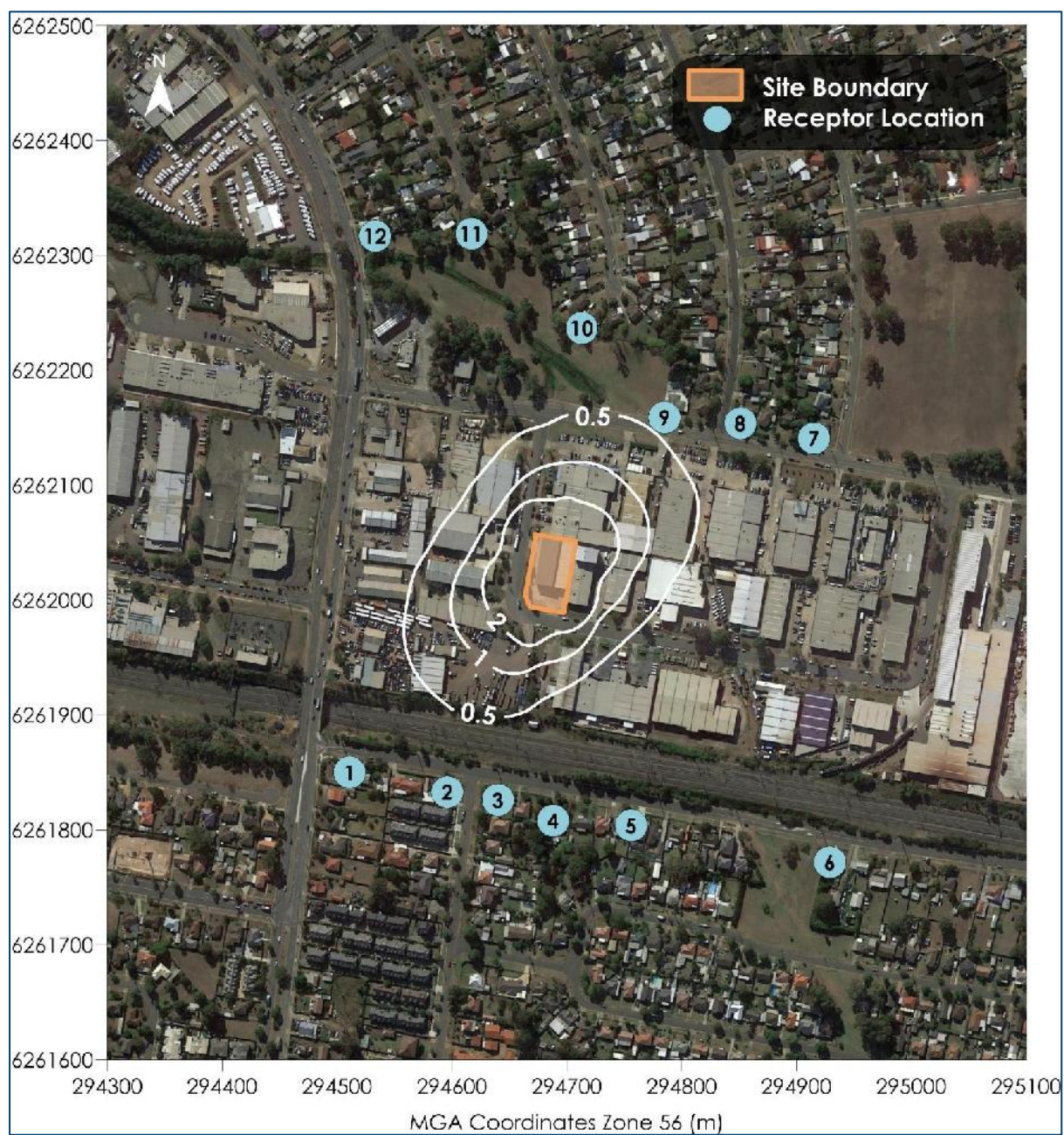


Figure 7-4: Predicted incremental annual average PM₁₀ concentrations ($\mu\text{g}/\text{m}^3$)

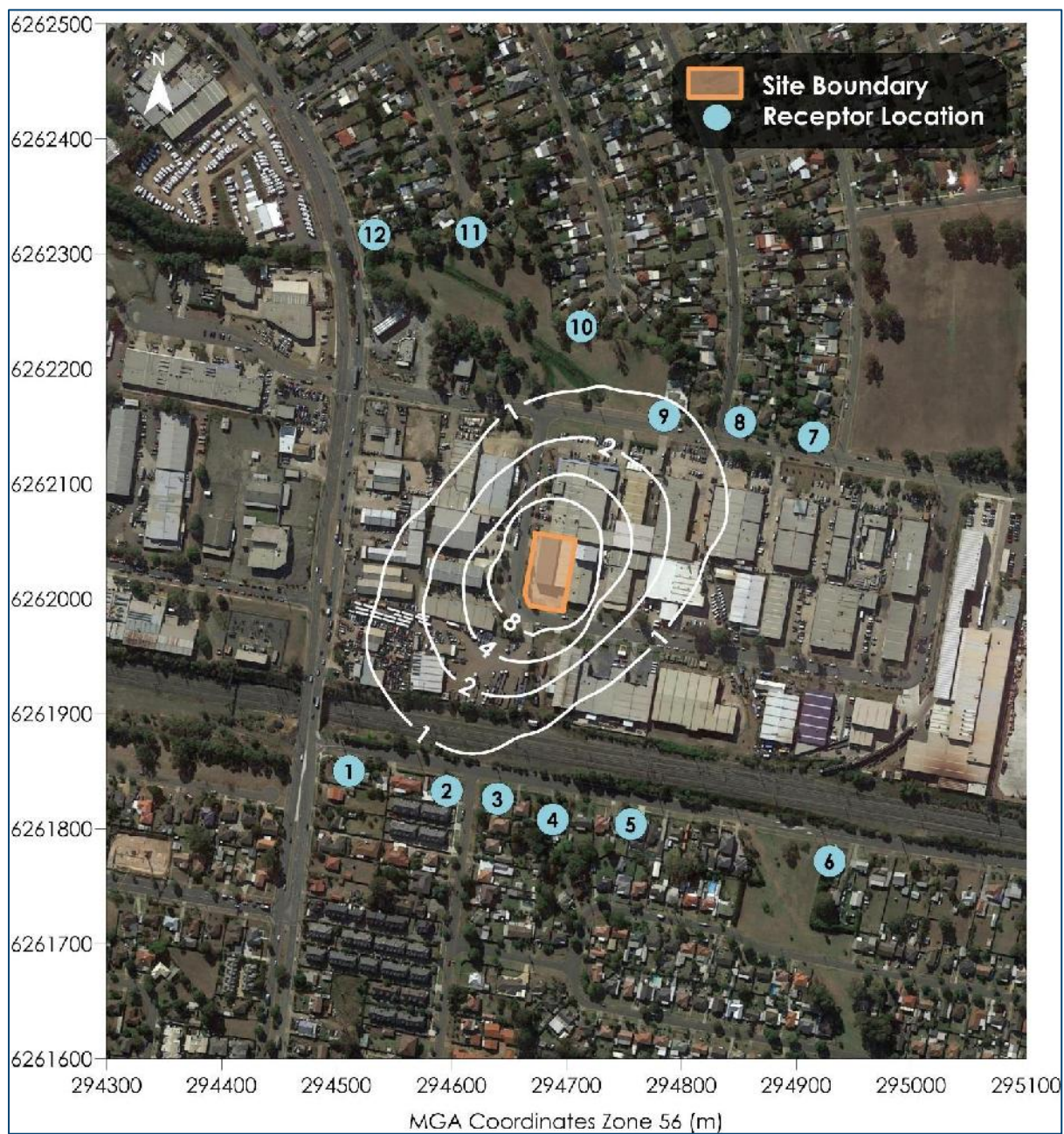


Figure 7-5: Predicted incremental annual average TSP concentrations ($\mu\text{g}/\text{m}^3$)



Figure 7-6: Predicted incremental annual average dust deposition levels ($\text{g}/\text{m}^2/\text{month}$)

Table 7-1 presents the predicted particulate dispersion modelling results at each of the assessed sensitive receptor locations. The results show minimal incremental effects would arise at the sensitive receptor locations due to the Project.

Table 7-1: Particulate dispersion modelling results for sensitive receivers – Incremental impact

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
	-	-	-	-	-	2
R1	0.2	<0.1	1.1	0.2	0.6	<0.1
R2	0.4	0.1	1.8	0.3	0.7	<0.1
R3	0.4	0.1	1.7	0.2	0.6	<0.1
R4	0.3	<0.1	1.5	0.2	0.5	<0.1
R5	0.2	<0.1	0.9	0.1	0.3	<0.1
R6	0.1	<0.1	0.6	<0.1	0.1	<0.1
R7	0.3	<0.1	1.2	0.2	0.5	<0.1
R8	0.4	0.1	1.7	0.3	0.8	<0.1
R9	0.5	0.1	2.4	0.4	1.2	0.1
R10	0.3	<0.1	1.2	0.2	0.6	<0.1
R11	0.2	<0.1	0.6	0.1	0.3	<0.1
R12	0.1	<0.1	0.5	0.1	0.2	<0.1
Maximum	0.5	0.1	2.4	0.4	1.2	0.1

The predicted annual cumulative PM_{2.5}, PM₁₀, TSP and dust deposition levels based on applying the estimated background levels in **Section 4.3.3** indicate they would be below the relevant criteria at the assessed sensitive receiver locations. A summary of the maximum cumulative impacts for an annual averaging period is shown in **Table 7-2**.

Table 7-2: Maximum annual particulate dispersion modelling results for sensitive receivers – Cumulative impact

Pollutant	Maximum incremental impact at receptor	Background concentration	Maximum cumulative impact at receptor	Criteria	Units
PM _{2.5}	0.1	7.8	7.9	8	µg/m ³
PM ₁₀	0.3	15.1	15.4	25	µg/m ³
TSP	0.8	54.4	55.2	90	µg/m ³
DD	0.1	2.4	2.5	4	g/m ² /month

7.2 Assessment of Total (Cumulative) 24-hour average PM_{2.5} and PM₁₀ Concentrations

An assessment of total (cumulative) 24-hour average PM_{2.5} and PM₁₀ impacts was undertaken in accordance with the methods outlined in the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (NSW EPA, 2016).

As shown in **Section 4.3** maximum background level data available for this assessment have in the past exceeded or come close to criterion level on occasion. As a result, the Level 1 NSW EPA approach of adding maximum background levels to maximum predicted levels from the Project would show levels above the criterion whether or not the Project was operating.

In such situations, the NSW EPA applies a Level 2 contemporaneous assessment approach where the measured background levels are added to the day's corresponding predicted dust level from the Project site. Ambient (background) dust concentration data corresponding with the year of modelling (2015) from the NSW OEH monitoring sites at St Marys and Richmond have been applied in this case to represent the prevailing background levels in the vicinity of the Project site and surrounding sensitive receptors.

Assessment of cumulative 24-hour average PM_{2.5} and PM₁₀ was therefore conducted per the NSW EPA Level 2 contemporaneous assessment method as outlined in the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (NSW EPA, 2016) to examine the potential maximum total (cumulative) 24-hour average PM_{2.5} and PM₁₀ impacts for the proposed Project

Table 7-3 provides a summary of the findings from the Level 2 assessment at each assessed receptor location. The results in **Table 7-3** indicate that it is unlikely that cumulative impacts would arise at the assessed receptor locations due to the Project. Detailed tables of the full assessment results are provided in **Appendix B**.

Table 7-3: NSW EPA contemporaneous assessment - maximum number of additional days above 24-hour average criterion

Receptor ID	PM ₁₀	PM _{2.5}
R1	0	0
R2	0	0
R3	0	0
R4	0	0
R5	0	0
R6	0	0
R7	0	0
R8	0	0
R9	0	0
R10	0	0
R11	0	0
R12	0	0

8 MITIGATION MEASURES

The proposed activities at the Project site will generate dust emissions, therefore it is prudent to take reasonable and practicable measures to prevent and minimise excessive generation of dust emissions to the surrounding environment.

To ensure that dust generation during operational activities is managed and the potential for off-site impacts is reduced, appropriate operational and physical mitigation measures would be utilised.

Table 8-1 summarises the potential mitigation strategies which may be employed.

Table 8-1: Dust mitigation and management 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 using the available means)
	Engines of on-site vehicles and plant switched off when not in use
	Maintain and service vehicles according to manufacturer's specifications
	Closing of the western and southern doors to the sorting floor while waste sorting activities are occurring
	Operate existing fan extraction system with filter in the shed during tipping and sorting operations. Replace filters regularly to ensure maximum efficiency
Wind Erosion	Restrict handling, processing and storage activities to within the building
	Minimise the amount of material stockpiled
	Use of a sweeper vehicle in the sorting area to prevent build-up and limit potential for dusts to be tracked off-site by trucks
Hauling Activities	Sealed haul roads to be cleaned regularly
	Impose on-site speed limits
	Wheel wash at exit point to minimise dirt tracked out
	Covering vehicle loads when transporting material off-site
Material Handling / Sorting Activities	Use existing extraction and filtration system during sorting operations
	Close doors to sorting floor while activities are undertaken

9 SUMMARY AND CONCLUSIONS

This report has assessed the potential worst-case air quality impacts associated with the proposed expansion of the Maclean's Waste Management facility in North St Marys, NSW.

Air dispersion modelling using the CALPUFF model was used to predict the potential for off-site air quality impacts in the surrounding area due to the operation of the Project. The estimated air emissions applied in the modelling are likely to be conservative as they have not accounted for all of the proposed dust mitigation and management measures and therefore the results of the modelling would overestimate the actual impacts.

It is predicted that all assessed air pollutants attributable to the Project would be within the applicable assessment criteria at all sensitive receivers at all times, and therefore would not lead to any unacceptable level of environmental harm or impact in the surrounding area. The Project is not expected to cause air quality impacts on a regional or global scale.

Nevertheless, the site would apply appropriate air quality management measures to ensure it minimises the potential occurrence of excessive air emissions from the site.

Overall, the assessment demonstrates that the Project can operate without causing any significant air quality impact at sensitive receiver locations in the surrounding environment at any time.