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Borg Plantations Pty Ltd
Bark/Timber Processing and Landscape Supplies Production Facility
26 Endeavour St, Oberon, NSW

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This Environmental Impact Statement has been prepared by the following staff of Jackson Environment and Planning Pty Ltd, Suite 102, Level 1, 25-29 Berry St, North Sydney NSW 2060; in association with Spectrum Acoustics Pty Ltd, Todoroski Air Sciences Pty Ltd, Sustainability Workshop, Bushfire Planning & Design, Barker Ryan Stewart, Envirowest Consulting Pty Ltd, Narla Environmental; Borg Manufacturing Pty Ltd and Muller Partnership.

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We declare that:
The statement has been prepared in accordance with clauses 6 and 7 of Schedule 2 of the *Environmental Planning and Assessment Regulation* 2000.

The statement contains all available information that is relevant to the environmental assessment of the development, activity or infrastructure to which the statement relates, and the information contained in the statement is neither false nor misleading.

Report version	Authors	Date	Reviewer	Approved for issue	Date
v1.0	Dr J.Lethlean, and Dr M. Jackson	14/03/19	Dr M.Jackson	Dr M.Jackson	15/03/19
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Executive Summary

About the development

Borg Manufacturing is a leading manufacturer of medium-density fibreboard (MDF), particle board, shelving and components. A subsidiary, Borg Plantations Pty Ltd, proposes to establish a Bark/Timber Processing and Landscape Supplies Production facility to process and recycle up to 99,000 tonnes per annum of wood material, primarily pine bark residuals, sawdust and pallets, including from Borg Manufacturing's nearby Oberon MDF Manufacturing Facility.

The proposed wood waste processing facility will be located at 26 Endeavour Street, Oberon (also known as 60 Hawken Street). The site is current vacant farmland, located within an established industrial area approximately 500m to the north of the centre of Oberon.

The intent of the facility is to provide a best practice, sustainable and well-designed facility to enable the beneficial recycling of pine bark, pallets (clean, heat treated) and clean untreated timbers into value-added landscape materials, with a focus on quality horticultural mulches for gardens and landscaping. No MDF, particle board or any other form of manufactured timber products will be accepted at the site. No mixed waste or any other type of waste will be accepted at the site.

No composting will take place on site, and products will be transported from the site shortly after processing.

Purpose of the Environmental Impact Statement

The EIS study evaluates the social, environmental and economic impacts and benefits of the project. The EIS defines the context of the proposed development, and examines those issues considered to be relevant. This EIS considers the potential environmental effects of the proposal during construction and operation, and proposes mitigation measures to prevent, reduce or offset significant adverse impacts on the environment. The aims of this EIS are to:

- Identify all constraints affecting future development on the subject site;
- Consider the economic, social and environmental impacts of the proposed development; and
- Assess the capability of the subject site to support the proposed development.

In delivering this EIS, Jackson Environment and Planning Pty Ltd has undertaken all statutory planning assessments, including the preliminary hazard analysis and environmental risk assessment, and stakeholder consultation. Consultation was undertaken with neighbours, Oberon Council, NSW Department of Planning and Environment, NSW Environment Protection Authority, Roads and Maritime Services, NSW Rural Fire Service, and NSW Office of Environment and Heritage. We have also prepared the waste management, waste and chemical impact assessments, and a review of heritage issues in the area.

Todoroski Air Sciences Pty Ltd has undertaken the specialist air quality assessment, and Spectrum Acoustics has undertaken the noise and vibration impact assessment. Barker Ryan Stewart has undertaken the transport and traffic impact assessment. The Sustainability Workshop has undertaken the engineering design, and the soil and water management study. Soil and contamination assessment has been undertaken by Envirowest Consulting Pty Ltd. The fauna and flora study has been undertaken by Narla Environmental. The fire and incident management study has been undertaken by Bushfire Planning & Design. The visual impact assessment has been undertaken by Borg Manufacturing Pty Ltd. The Capital Investment Value report has been completed by Muller Partnership.

The EIS has considered a range of social, environment and economic factors of the project, with a focus on Ecologically Sustainable Development principles. The study found that there were no significant environmental impacts that could not be mitigated by appropriate mitigation measures and management strategies.

The environmental assessment process has been used to inform the design of the site and ensure operations will be sustainable and create minimal disruption to neighbours and the local community. Bark and timber receival, processing and recycling operations have been designed to minimise traffic impact on local roads, effective management of wastes, protection of soils, protection of surface and ground water quality, and minimise noise and dust emissions.

Planning and approvals pathway

The EIS addresses the NSW Department of Planning and Environment's Secretary's Environmental Assessment Requirements (SEAR1238). Consent is now sought for the proposal under the *Environmental Planning and Assessment* Act 1979.

This EIS has been prepared in accordance with the requirements of the *Environmental Planning and Assessment Act* 1979, and Clause 6 and 7 of the *Environmental Planning and Assessment Regulation* 2000. The EIS has also been delivered to meet the Secretary's Environmental Assessment Requirements (SEARs), which were issued on 6 July 2018, and updated 30 November 2018.

The development is considered designated as it will process more than 30,000 tonnes of wood per annum as per Clause 32(1)(b)(iii) of Schedule 3 of the *Environmental Planning and Assessment Regulation* 2000. Under Section 4.10 of the *Environmental Planning and Assessment Act* 1979 the proposed development being a Designated Development would also require an EIS to be submitted with the development application.

The proposed development will require an environment protection licence from the NSW Environment Protection Authority, under Schedule 1 Clause 34 (1) of the *Protection of the Environment Operation Act* 1997. It is also noted that a weighbridge will need to be included with the development application as per Section 36 of the *Protection of the Environment Operations (Waste) Regulation* 2014.

This EIS has assessed the potential environmental impacts associated with the development of a wood waste processing facility at 26 Endeavour Street, Oberon (also known as 60 Hawken Street).

General overview of the proposed development

The site will receive and process up to 99,000 of clean waste wood each year. The waste wood will comprise primarily bark, with some clean pallets and sawdust also processed. The waste wood will be shredded, screened and sold as mulch and landscaping products. The Facility will be designed according to best practice and will seek to recycle 99% of all incoming bark/timber materials into the Facility.

A new site entrance and driveway will be developed, with sufficient width to accommodate the largest expected vehicle (23m B-Double truck) and turning path. This entrance will be a minimum of 8.1m in width to meet Australian Standard 2890.2 for articulated vehicles.

A weighbridge and site office will be installed near the site entry, and all non-staff vehicles entering the site will be required to enter the facility via the weighbridge (as required under Clause 36 of the *Protection of the Environment Operations (Waste) Regulation* 2014). Parking will also be provided near the entrance to the site. A wheel wash will be installed at the entrance to the site to prevent sediment from leaving the facility.

An internal loop access roadway will be developed to enable vehicles to enter and exit the site in a forward direction. Loading and unloading areas will be separated and clearly allocated to minimise vehicle conflicts. Movable concrete bays will be used for flexible storage of material waiting to be processed and processed product. A separate waste tipping bay for pallets and timber waste only will be constructed, where incoming loads will be inspected for contamination (e.g. treated pallets). These will be removed and disposed at a lawful facility.

The site will be sealed with an either concrete or other hardstand to reduce soil disturbance and to improve the quality of runoff water. Drainage bioswales will be put in place around site boundaries to capture contaminants in runoff. Dust control mitigation systems will be installed, such as misting systems around the perimeter of the site. Gross pollutant traps will treat all runoff from the hardstand areas to remove gross pollutants, sediment, (some) nitrogen and phosphorus and oil/grease. Water then will be directed to a stormwater detention pond, which will be used for dust suppression, and sufficiently sized to contain a 1 in 100-year rainfall event.

A static water supply will be installed for fire-fighting and fire protection. Systems for containment of up to four hours of fire water in the existing stormwater detention pond system has been allowed for in accordance with draft NSW Fire and Rescue *Fire Safety Guideline – Fire Safety in Waste Facilities* (2018).

Site feedstocks will include bark residuals and sawdust, along with pallets. Pallets and timbers will also be trucked via backloading to Oberon from Borg's other sites for recycling. Delivery vehicles will enter the facility over the weighbridge. Pallets and timbers will be tipped into a dedicated waste tipping and inspection area, where treated timbers and manufactured timbers (e.g. MDF) will be removed and disposed lawfully off-site. Any other contaminants in loads will be removed.

Incoming loads of bark from pine log processing in the MDF Manufacturing Facility will bypass the dedicated waste tipping and inspection area and be stored separately in a large concrete block storage bay, awaiting processing. Pre-inspection of this feedstock is not necessary, as it will contain clean, separated pine bark only.

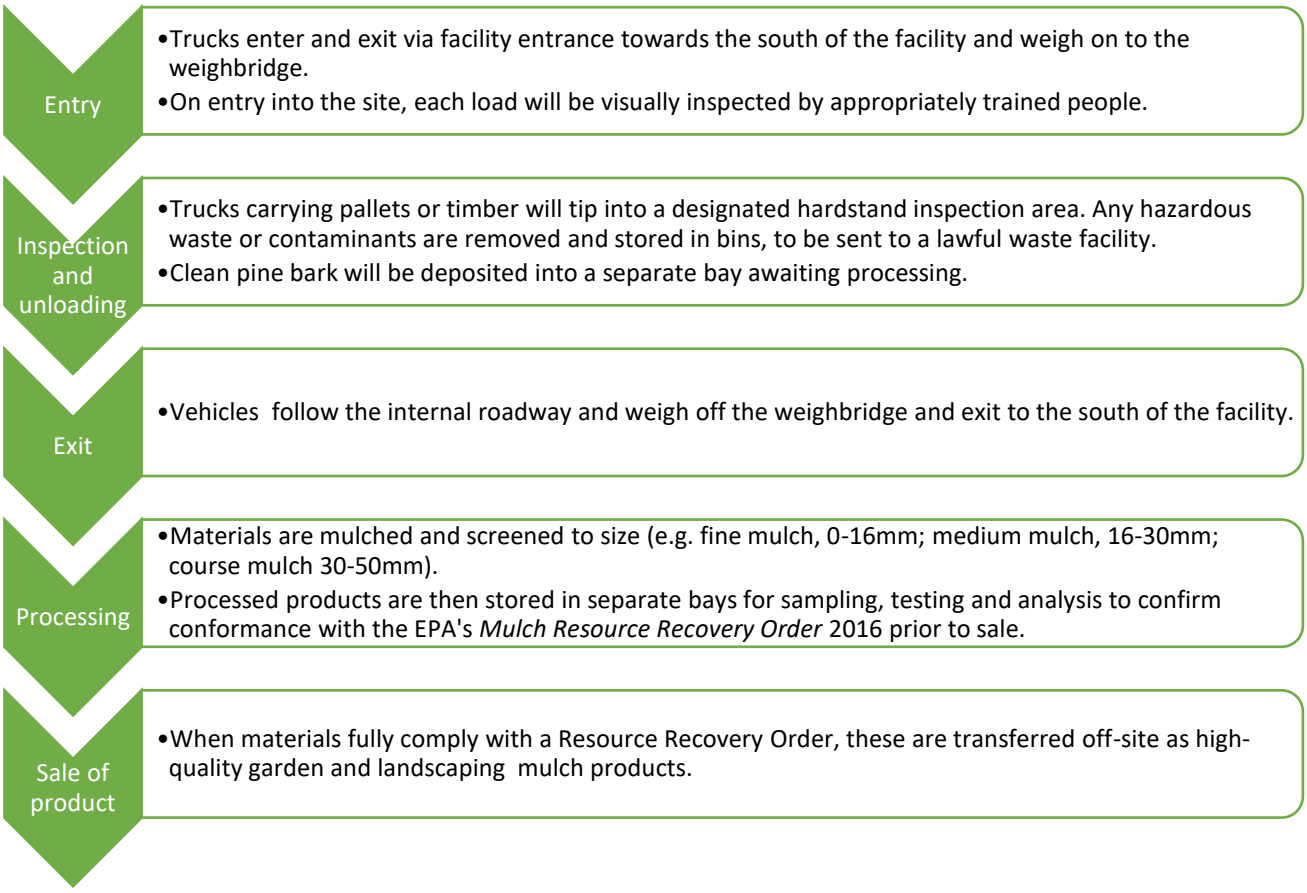
It is further noted that no other form of waste material will be accepted at the site.

Processing of feedstock is expected to include mulching via grinders and shredders, with screening by a trommel for sizing processed material. No composting will take place on site, and products will be transported from the site shortly after processing.

Processed landscaping materials will be stored in dedicated concrete block bays. To ensure the recovered products are consistently fit for purpose, and comply with *The Mulch Order* 2016, regular sampling will be undertaken in accordance with a quality assurance program and quality control measures.

The facility is proposed to be operated from 7am to 6pm, Monday to Friday, and 8am to 1pm on Saturdays. The site will be closed on Sundays and public holidays. However, it is proposed that the site be accessible 24 hours per day, 7 days per week for delivery and export of material. This is to allow delivery of sawdust from the nearby timber panel plant as it is generated. It will also allow the site to receive other feedstocks and export products outside operational hours, if necessary for long-haul deliveries. Machinery on site will only operate during the nominated operational hours.

Figure E1: Process flow chart for the operation of the Bark/Timber Processing and Landscape Supplies Production Facility.



Summary of Environmental Issues

Waste Management

A Waste Management Plan was prepared by Jackson Environment and Planning Pty Ltd

The main sources of waste during the demolition / construction phase will be cutting and filling, and construction of stormwater detention pond, stormwater and drainage infrastructure, the hardstand, noise barriers and office building. Soil from the earthworks and site levelling will be re-used on site in filling operations to prepare the required gradient for construction of the concrete hardstand. It is anticipated that any clean soil excavated at the site will be used to construct the earth mounds to surround the site. Waste generated during the construction of the office building, etc. will be separated, with as much recycled as possible. It is expected that the recycling rate during the demolition / construction phase will be 95-100%.

During the operational phase, wood waste in the form of pinebark residue, wooden pallets and sawdust will be brought onto site for processing into mulch. The expected waste generation during the operational phase is expected to be a small amount of contamination from the incoming waste and municipal-type waste generated by employees (i.e. from lunches, etc.). Metal will be separated and sent off-site for recycling. Other contaminants will be disposed to landfill. It is expected that the recycling rate during the operational phase will be 95-100%.

Wood and pinebark-based mulches manufactured at the site will be processed, manufactured, tested and sold in accordance with the NSW EPA *Mulch Resource Recovery Order* 2016, being a requirement under Clause 93 of the *Protection of the Environment Operations (Waste) Regulation* 2014.

Borg Plantations Pty Ltd will seek authorisation to store up to 2,900 tonnes of material (both waste and product) at any one time under the proposed consent.

By accepting and processing wooden pallets, the facility will contribute towards the Commercial and Industrial recycling target of 70% by 2020-21, as set out in the *NSW Waste Avoidance and Resource Recovery Strategy 2014-21*.

A copy of the Waste Management Plan is provided at Appendix E – Waste Management Plan.

Air Quality

An Air Quality Impact Assessment was prepared by Todoroski Air Sciences Pty Ltd. The assessment included air quality modelling.

The prevailing wind flows in the area surrounding the proposed facility are influenced by the local topography. The nearest ambient air quality data, which are collected at Bathurst, indicate that air quality is generally good and is typically below the relevant New South Wales Environment Protection Authority goals with the exception of occasional short-term (24-hour average) particulate matter less than 10 micrometres in diameter (PM10) levels, as occurs at most locations across the state.

Potential construction dust emissions associated with the Project are temporary in nature and will only occur during the three-month construction period. The total amount of dust generated from the construction process is unlikely to be significant given the nature of the activities and no significant or prolonged effect at any off-site receptor is predicted to arise.

A worst-case operating scenario is modelled to represent the potential likely worst-case air quality impacts for the Project. Air dispersion modelling with the CALPUFF modelling suite has been used in conjunction with estimated emission rates for the air pollutants generated by the various activities associated with the Project. The modelling takes into account other air emissions sources in the vicinity of the Project with potential to generate dust emissions and contribute to the cumulative impacts in the area and includes various timber manufacturing facilities and a wood waste processing operation.

The assessment predicts potential dust levels generated by the operation of the Project would comply with the applicable assessment criteria at the assessed sensitive receptors and therefore would not lead to any unacceptable level of environmental harm or impact in the surrounding area.

To ensure activities associated with the Project have a minimal effect on the surrounding environment, operational and physical mitigation measures are recommended to be implemented where feasible and reasonable.

A copy of the Air Quality Impact Assessment is provided at Appendix J – Air Quality Impact Assessment.

Noise and Vibration

Spectrum Acoustics prepared a Noise and Vibration Impact Assessment for the proposed development (NVIA). The objective of the NVIA was to assess the potential noise and vibration impacts associated with construction, operation and transport activity associated with the Facility.

Noise criteria were established in accordance with procedures in the “Noise Policy for Industry”, “Interim Construction Noise Guideline” and “Assessing Vibration: a technical guideline”.

Noise levels associated with the operation of the Facility were determined by noise modelling using ENM noise modelling software for applicable atmospheric conditions. Noise levels associated with construction noise were theoretically determined by direct calculation.

Operational noise levels due to emissions from the Facility were predicted to comply with the project noise trigger levels at all receivers. The modelling of operational noise included the effects of 10m high and 2.5m high acoustic barriers around parts of the site boundary. No other noise control is recommended.

Noise levels associated with the construction of the Facility were found to comply with the construction noise management levels at all receivers. No specific noise mitigation measures for construction noise have been identified other than the general construction noise management practices (which are detailed in the report).

Noise from traffic generated by the operational and construction phases of the Facility will not exceed the relevant traffic noise criteria.

The predicted vibration levels associated with the construction of the Facility were found to comply with the adopted human comfort criteria and be significantly lower than any building damage criteria.

A copy of the Noise and Vibration Impact Assessment is provided at Appendix G – Noise Assessment.

Water Quality

The Sustainability Workshop was engaged to prepare a Water Quality Impact Assessment and Management Plan.

The report found that it is highly likely that:

- There will be no decline or detectable change in aquatic health either locally within Kings Stockyard Creek or within the broader Fish River catchment.
- There will be no discernible increase in any water quality parameters at almost any point in the catchment except for concentrations of TN immediately downstream of the pond and as explained above this will not result in ecological stress occurring at any point in the catchment.

All stormwater run-off will be directed, via a drainage system, into a sediment pond. The water quality mitigation measures to be installed at the site include gross pollutant traps, grass swales and a sediment pond. The impact of any overflow from the pond on surrounding areas will be mitigated by a series of leaky weirs.

Water captured on-site will be filtered and re-used for dust control.

It is noted there will be an increase in the TN load discharged from the proposed development but this is unlikely to result in any detectable aquatic impacts such as nuisance plant growth.

A Water Quality Impact Assessment is provided at Appendix I – Soil and Water Plan.

Contaminated Sites

A Contaminated Site Assessment was conducted by Envirowest Consulting Pty Ltd, including soil sampling and analysis. An inspection of the site was made on 20 September 2018.

The site has an agricultural land-use history of stock grazing with recent storage of equipment and machinery in the western section of the proposed lot boundaries. The south western section of the site had undergone earthworks including site cut to level the site.

There is no evidence of underground storage tanks, mines, sheep dips or mixing sheds on the site from the review of site history or site walkover.

No staining or odour was observed across the surface of the site.

Asbestos was not detected in any soil sample. One sample of fibrous sheeting was collected from a stockpile of rubble. No asbestos was identified in the sample.

A large stockpile was located on the site comprising topsoil and organic material from adjacent sites. The material is reportedly being removed off the site prior to the proposed industrial land-use. The topsoil stockpile was not assessed.

Stockpiles from an unknown source are located north of the pine trees. The material is suitable to remain on-site for proposed industrial land-use.

The soil sampling program did not detect elevated levels of the analysed metals, pesticides, hydrocarbons, polycyclic biphenyls or asbestos. The levels of all substances evaluated were below the adopted thresholds for industrial land-use.

The site is suitable for proposed industrial land-use following removal of stockpiled topsoil material and machinery and equipment.

Removal of stockpiled topsoil material and machinery and equipment including brick and chipboard stockpiles is required prior to development.

A copy of the Contaminated Site Assessment is provided at Appendix M – Contamination Investigation Report.

Traffic and Transport

A Traffic Impact Study was prepared in accordance with the requirements of the SEAR's issued 30 November 2018, the letter from Roads and Maritime Services (RMS) dated 6 July 2018, Oberon Council DCP and the RMS 'Guide to Traffic Generating Developments'.

Council's DCP and the RMS Guide require the development to provide 2 parking spaces and 6 parking spaces, respectively. In response, the development provides nine spaces that are designed in compliance with the Australian Standards. Oberon Council DCP does not require accessible spaces, however, one has been provided.

Approximately 21 truck movements per day is expected to be generated from the development, however as a worst-case scenario the intersection modelling assumed all 21 trucks movements occur in each peak period. The development will be operated by seven staff who are expected to arrive during the morning and depart in the afternoon peak period.

The overall impact of the proposed development on the efficiency of the local traffic network is anticipated to be negligible with nearby intersections operating at Level of Service A. Based on the results of SIDRA analysis there is significant capacity available in the intersections assessed in this report, and therefore the development traffic can be accommodated within the external road network without significant increase in delay to nearby intersections.

Swept path analysis demonstrates site access and internal circulation for vehicles up to 26m B-doubles. These facilities are also considered practical and safe ensuring that all traffic generated by the development can enter and exit the site in a forward direction. Swept path assessment of the intersections of the eastern and western haulage routes have been undertaken and show that B-Double vehicles are able to manoeuvre through these intersections without the need to upgrade the existing road pavement.

The Traffic Impact Study concludes that the subject site is suitable for the proposed development in relation to the impact of traffic, car parking provision, vehicle and pedestrian access and safety considerations.

A copy of the Traffic Impact Assessment is provided at Appendix F – Traffic Impact Assessment.

Biodiversity

Narla Environmental Pty Ltd (Narla) was engaged to prepare a Flora and Fauna Assessment Report (FFA) for the proposed development.

Narla determined that the vegetation assemblage within the Subject Site was representative of non- native vegetation. This does not constitute a Threatened Ecological Community (TEC).

Direct (wholesale) vegetation clearing will occur for the construction of the facility and will occur in consultation with the Project Ecologist and Oberon City Council's Environmental Officer. However, several existing trees will be maintained.

No threatened fauna were identified on the Subject Site during field survey. However, flowering and fruit- bearing trees that are proposed for management within the proposed APZ have the potential to offer intermittent sheltering and foraging habitat for threatened fauna. Due to the poor condition and lack of suitable habitat within the Subject Property (and surrounding locality) it was determined that the removal of potential habitat is unlikely to significantly impact upon a viable population of any of potentially occurring threatened species.

Owing to the lack of any perceived significant effects upon threatened biodiversity from the proposed development, it is expected that the proposed development can be achieved within minimal environmental impact. The proposed development may progress without further impact assessment.

A copy of the Flora and Fauna Assessment is provided at Appendix K – Flora and Fauna Assessment.

Bushfire Risk Assessment

Bushfire Planning and Design was engaged to undertake a bushfire hazard assessment for the proposed development.

The subject site is located in a split zoned IN1 (general industrial) and RU1 (primary production) area in Oberon which is under the jurisdiction of Oberon Council. The land is zoned IN1 and RU1 to the north, IN1 to the west and south and RU1 to the east. The site is accessed from Maher Drive on the south west boundary. Managed industrial land is located to the south of the site. The subject site is dominated by grassland which occurs on undulating topography. Grassland is located to the north, east and west.

The National Construction Code (NCC 2016) does not provide for any bush fire specific performance requirements for Class 7 buildings and as such AS 3959 (2009) does not apply as a set of 'deemed to satisfy' provisions. The general fire safety construction provisions are taken as acceptable solutions, but the aim and objectives of PBP apply in relation to other matters such as access, water and services, emergency planning and landscaping/vegetation management (PBP 2006).

There is sufficient space within the site to provide an asset protection zone (APZ). A 50m grassland APZ is required to achieve a construction rating of BAL-LOW (AS3959 2009). All adjacent grass, including grass planting on the proposed perimeter earth berms can be managed. All grass within 50m of the proposed industrial shed is to be managed as short cropped grass < 100mm high.

The proposed concrete storage bays are separated from potential grass fire by a swale, a perimeter emergency vehicular access road and a 10m high earth berm. The proposed earth berms are to be planted with grass and the grass on the earth berms are to be managed as short cropped < 100mm high. The proposed vegetation management will keep all grass in the vicinity of the proposed stock pile are in minimal fuel condition and will therefore mitigate the potential for grass fire to encroach onto the site. A 30m managed zone, consisting of a swale, a perimeter emergency vehicular access road and a 10m high earth berm is provided between the proposed storage areas and surrounding grassland to the north, east and west. This will mitigate the risk of accidental fire occurring within the subject site, spreading onto adjoining grassland.

The proposed shed, awning and weighbridge are assessed as BAL-LOW and as specified in AS3959 (2009), the Australian Standard for the Construction of Buildings in a Bushfire Prone Area. There are no specific bushfire construction standards that relate to the proposed Class 7 building and associated works. We recommend that proposed walls surrounding each storage bays are constructed from non-combustible materials.

The development complies with *Planning for Bushfire Protection* (2006) with regards to the provision of water. The requirements for electricity and gas (if applicable) can also be complied with. Site access, including access via the public road system is suitable for emergency response vehicles.

We recommend that at bushfire emergency evacuation plan is prepared such that employees and visitors are informed about suitable egress routes away from the site in the event of bushfire.

The development complies with the specific objectives and performance requirements of PBP (2006). Compliance with the NCC (2016) via compliance with AS3959 (2009), the Australian Standard for the Construction of Buildings in Bushfire Prone Areas is also achieved.

A copy of the Bushfire Risk Assessment is provided at Appendix H – Fire Risk Assessment.

Visual Impacts

The existing landscape character is a mix of industrial development, rural properties and bushland ridgelines and corridors. The scale of the built form in the proposal is small compared to existing industrial developments adjoining, mainly the Borgs Panel site, which dominates views from the surrounding area.

The recommended design principles outlined in the VIA seek to avoid, reduce and where possible, remedy adverse effects on the environment arising from the proposed development. The proposed mitigation measures will reduce any visual impacts of the development.

A copy of the Visual Impact Assessment is provided at Appendix N – Visual Impact Assessment Report.

Heritage

No sites or items of heritage significance were found within 500m of the proposed development site. The development is unlikely to have an adverse impact on heritage values in the area.

A summary of the heritage investigation is provided in Chapter 12.

Economic and social impacts

The proposed development will provide a broader range of recycling options and make progress towards the NSW Government's recycling targets. It will also deliver on key priorities of the NSW Government to develop new recycling infrastructure to boost the recovery of commercial and industrial waste in the region.

The project will create 5 jobs in construction over a 3-month period and up to 7 new permanent jobs, injecting more than $110 million into the local economy over a 15-year period. The project will involve an estimated capital investment of $11.13million, helping to further boost the local economy.

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Appendix B – Site plans

Appendix C – Capital Investment Valuation

Appendix D – Consultation report and responses

Appendix E – Waste Management Plan

Appendix F – Traffic Impact Assessment

Appendix G – Noise Assessment

Appendix H – Fire Risk Assessment

Appendix I – Water Quality Impact Assessment

Appendix J – Air Quality Impact Assessment

Appendix K – Flora and Fauna Assessment

Appendix L – Pollution Incident Response Management Plan

Appendix M – Contamination Investigation Report

Appendix N – Visual Impact Assessment Report

1. Introduction

This Environmental Impact Statement (EIS) has been prepared for a proposed 99,000 tonne per annum bark/timber recycling facility (the Facility) at 26 Endeavour St, Oberon (Lot 18 DP1249431 and parts of Lot 33 and 34 DP1228591). The Facility will be developed within an established industrial area.

1.1. Purpose of Report

The EIS has prepared by Jackson Environment and Planning Pty Ltd on behalf of Borg Plantations Pty Ltd. It presents the findings of a comprehensive environmental evaluation which has been undertaken to establish the potential impacts associated with the establishment of a Bark/Timber Processing and Landscape Supplies Facility at 26 Endeavour Street, Oberon (also known as 60 Hawken Street). The site is currently vacant farmland, located within an established industrial area approximately 500m to the north of the centre of Oberon.

The EIS study evaluates the social, environmental and economic impacts and benefits of the project. The EIS defines the context of the proposed development, and examines those issues considered to be relevant. This EIS considers the potential environmental effects of the proposal during construction and operation, and proposes mitigation measures to prevent, reduce or offset significant adverse impacts on the environment. The aims of this EIS are to:

- Identify all constraints affecting future development on the subject site;
- Consider the economic, social and environmental impacts of the proposed development; and
- Assess the capability of the subject site to support the proposed development.

In delivering this EIS, Jackson Environment and Planning Pty Ltd has undertaken all statutory planning assessments, including the preliminary hazard analysis and environmental risk assessment, and stakeholder consultation. Consultation was undertaken with neighbours, Oberon Council, NSW Department of Planning and Environment, NSW Environment Protection Authority, Roads and Maritime Services, NSW Rural Fire Service, and NSW Office of Environment and Heritage. We have also prepared the waste management, waste and chemical impact assessments, and a review of heritage issues in the area.

Todoroski Air Sciences Pty Ltd has undertaken the specialist air quality assessment, and Spectrum Acoustics has undertaken the noise and vibration impact assessment. Barker Ryan Stewart has undertaken the transport and traffic impact assessment. The Sustainability Workshop has undertaken the engineering design, and the soil and water management study. Soil and contamination assessment has been undertaken by Envirowest Consulting Pty Ltd. The fauna and flora study has been undertaken by Narla Environmental. The fire and incident management study has been undertaken by Bushfire Planning & Design. The visual impact assessment has been undertaken by Borg Manufacturing Pty Ltd. The Capital Investment Value (CIV) estimate has been completed the Muller Partnership.

The EIS has considered a range of social, environment and economic factors of the project, with a focus on Ecologically Sustainable Development principles. The study found that there were no significant environmental impacts that could not be mitigated by appropriate mitigation measures and management strategies.

The environmental assessment process has been used to inform the design of the site and ensure operations will be sustainable and create minimal disruption to neighbours and the local community. Bark and timber receival, processing and recycling operations have been designed to minimise traffic impact on local roads, effective management of wastes, protection of soils, protection of surface and ground water quality, and minimise noise and dust emissions.

Under Schedule 3, Clause 32(1)(b)(iii), of the *Environmental Planning and Assessment Regulation* 2000, the proposed development is classified as a designated development as it will process more than 30,000 tonnes of wood related materials per annum.

Under Section 4.10 of the *Environmental Planning and Assessment Act* 1979 the proposed development being a Designated Development would also require an EIS to be submitted with the development application.

This EIS has been prepared in accordance with the requirements of the *Environmental Planning and Assessment Act* 1979, and Clause 6 and 7 of the *Environmental Planning and Assessment Regulation* 2000. The EIS has also been delivered to meet the NSW Department of Planning and Environment's Secretary's Environmental Assessment Requirements (SEARs 1238), which were issued on 23 July 2018 by Chris Ritchie, Director, Industry Assessments as a delegate of the Secretary, and further amended on 30 November 2018 (Appendix A).

The EIS prepared will assist Oberon Council and the Western Regional Planning Panel assess the merits of the proposed development.

1.2. The Proponent

Borg Manufacturing Pty Ltd is a leading Australian manufacturer of melamine panels and components for all joinery applications. Their manufactured products include a range of medium-density fibreboard (MDF), particle board, shelving and components.

In 2010, Borg purchased the former Carter Holt Harvey MDF facility in Oberon. Borg Manufacturing operate MDF and particle board manufacturing lines at the facility. The range of products manufactured at the facility include standard MDF, Moisture Resistant MDF, E0 (Low Formaldehyde Emitting) MDF and ultraprime MDF mouldings.

Borg Manufacturing operate two other major sites in New South Wales, in Charmhaven and Somersby. The Charmhaven site is the leading manufacturer of cabinet doors in Australia, utilising world class production and manufacturing techniques. The three manufacturing sites are supported by a 25,000 m^2 warehouse and distribution facility at Somersby, NSW.

Borg Plantations Pty Ltd was established as a subsidiary of Borg in 2007. Initially providing haulage and chipping services, then moving into forest ownership, Borg Plantations Pty Ltd is committed to an eco-friendly and sustainable environment to be able to supply a consistent and cost effective source of fibre. Borg Plantation's plans are to continue to find new sources of wood, including developing Australia wide recycling facilities. Borg Plantations Pty Ltd supports the operation of Borg Manufacturing.

1.3. Secretary's Environmental Assessment Requirements (SEAR)

The SEAR for the proposed development (SEAR 1238) was issued by the NSW Department of Planning and Environment on 23 July 2018 to enable the EIS to commence. An updated SEAR 1238 was issued on 30 November 2018, after the Department of Planning and Environment was informed of proposed changes to the development.

The key project issues identified by the Secretary for consideration in the EIS are given in Table 1.1. Note that all these requirements have been addressed in the EIS, and the relevant sections are highlighted for easy cross-referencing.

Table 1.1. SEARs addressed in the EIS report.

Secretary's Environmental Assessment Requirements	EIS Section where this requirement is addressed
Strategic context	Chapter 2
Suitability of the site	Chapter 2
Consideration of all relevant planning instruments	Chapter 3
Detailed assessment of the key issues, including issues discussed in Attachment 2 of the SEARs (public authority responses to key issues):	Chapter 6 to 14
Waste management	Chapter 6 and Appendix E
Traffic and transport	Chapter 7 and Appendix F
Air quality	Chapter 11 and Appendix J
Fire and incident management	Chapter 9 and Appendix H
Noise and vibration	Chapter 8 and Appendix G
Soil and water	Chapter 10, Appendix B and Appendix I
Biodiversity	Chapter 12 and Appendix K
Hazards and risk	Chapter 14 and Appendix L
Visual	Chapter 13 and Appendix N
Heritage	Chapter 12
Consolidated summary of all the proposed environmental management and monitoring measures	Chapter 15
Consultation	Chapter 5 and Appendix D
Quantity surveyor report providing a detailed calculation of the capital investment value and a close estimate of the jobs that will be created during the construction and operational phases of the development.	Chapter 4 and Appendix C
Engineering design	Section 2.3 and Appendix B.
Landscape concept design	Section 2.3 and Appendix B.

1.4. Project team

Jackson Environment and Planning Pty Ltd engaged a project team on behalf of Borg Plantations Pty Ltd to undertake the design and specialist investigations for the EIS. The role of each team member is given below:

- Town planning – Jackson Environment and Planning Pty Ltd;
- Community consultation – Jackson Environment and Planning Pty Ltd;
- Waste management – Jackson Environment and Planning Pty Ltd;
- Air quality – Todoroski Air Sciences Pty Ltd;
- Noise and Vibration – Spectrum Acoustics Pty Ltd;
- Soil, water and flooding study – The Sustainability Workshop;
- Soils and contamination – Envirowest Consulting Pty Ltd;
- Biodiversity – Narla Environmental;
- Heritage - Jackson Environment and Planning Pty Ltd;
- Hazards – Jackson Environment and Planning Pty Ltd;
- Fire and incident management – Bushfire Planning & Design;

- Transport and traffic – Barker Ryan Stewart;
- Engineering design – The Sustainability Workshop;
- Capital Investment Value (CIV) estimate – Muller Partnership.

1.5. Accompanying documentation

The body of the report provides details of the proposed development and a summary of the findings of each of the environmental studies. The details of the environmental assessments for each issue is provided in the individual reports attached to this report as appendices.

The documentation attached to this report includes:

- Names, addresses and qualifications of persons who prepared this Environmental Impact Statement;
- SEAR requirements;
- SEPP55 Contaminated site assessment;
- Engineering design and proposed site layout;
- Waste management plan;
- Air quality assessment report;
- Noise assessment report;
- Traffic assessment report;
- Bushfire Risk Assessment report;
- Flora and fauna assessment report;
- Hazards assessment;
- Heritage assessment report;
- Visual impact assessment report;
- Consultation report; and a
- Capital Investment Value report.

2. Description of the Proposed Development, Strategic Context

2.1. Site History and Approvals

The site is currently cleared, but undeveloped. Most of the proposed development site is owned by Borg Plantations Pty Ltd. However, Lot 18 DP1249431 (60 Hawken Street) is currently owned by Oberon Council. The proponent has approached Oberon Council regarding purchasing the lot to allow access to the proposed development site. Oberon Council has been receptive to selling the land to the proponent.

The site was formerly farmland. However, it has not been used for this purpose for some years. A historical search of the site's titles and aerial photographs determined that the land use to be:

1929 – 2016	Agricultural grazing land
2016 – present	Storage of equipment and machinery

There are no known development consents associated with the site.

2.2. Site Description

The site is located at 26 Endeavour St, Oberon, within the Oberon Council local government area. It should be noted that the proposed address for the site will be 60 Hawken Street, following sale of the access land to Borg. Oberon is in the Central Plains region of New South Wales, 46 km south east of Bathurst, 77 km west of Katoomba and 195 km west of Sydney.

Aerial views of the site are given in Figure 2.1 to Figure 2.4. The proposed site will occupy Lot 18 DP1249431 and parts of Lot 33 and 34 DP1228591.

The proposed site has a total area of approximately 5.09 hectares. This area was previously used for agricultural purposes but is currently vacant and unused. The site is unsealed, largely clear of vegetation and does not include any existing dwellings.

The proposed site is situated mainly on land zoned IN1, General Industrial. The development site will also include a portion of land zoned RU1 Primary Production (see Figure 2.2).

There are a small number of nearby land use zones, including RU1 Primary Production to the north and adjoining to the east, R1 General Residential to the south, and B2 Local Centre further south. The nearest residential zoned land is approximately 500m to the south of the site boundary. The nearest residential receivers are separated by other industrial activities (including other un-associated outdoor waste processing and recycling activities) and a heavy vehicle bypass.

An overview of the site's details is given in Table 2.1 below.

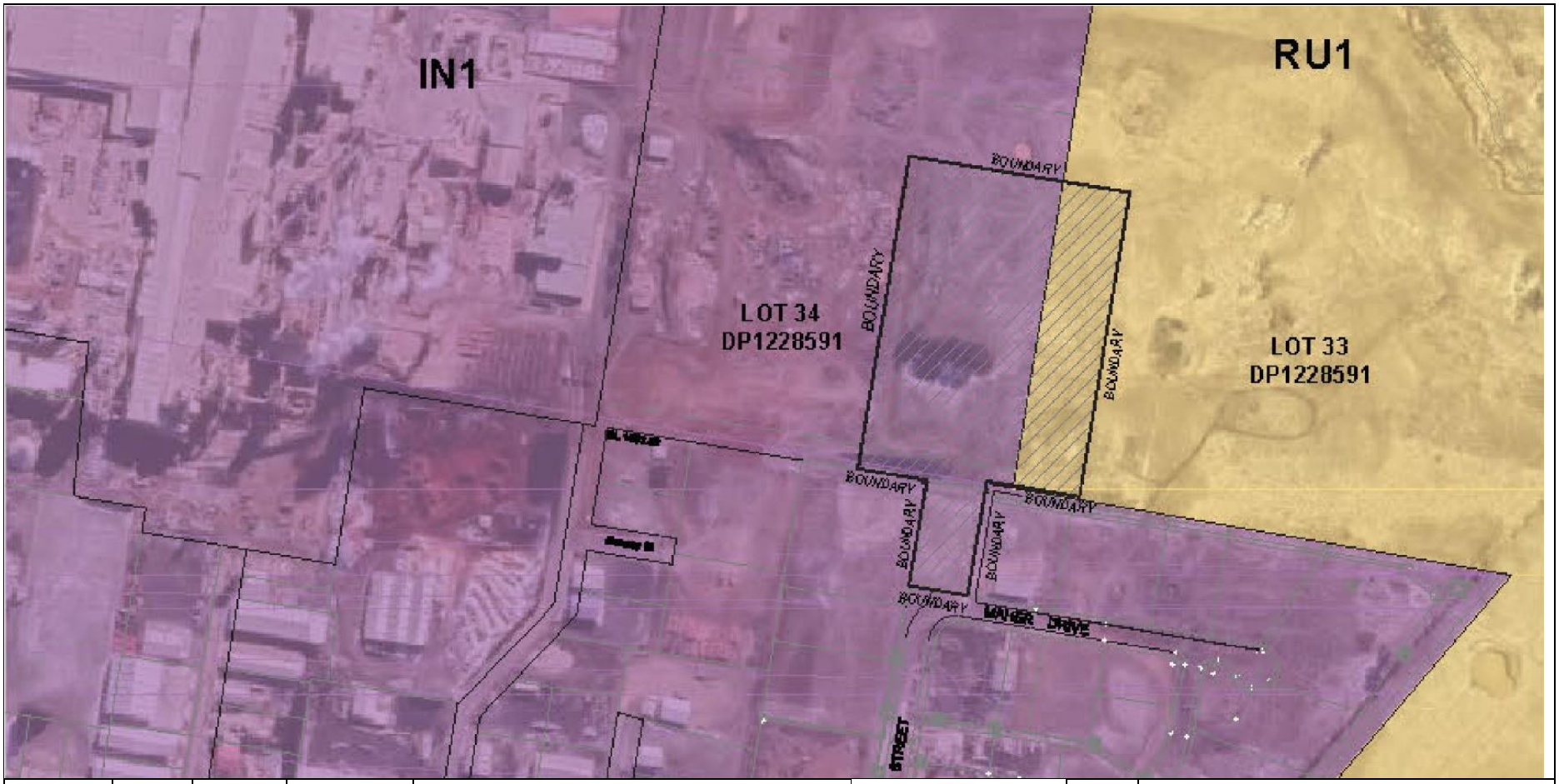
Table 2.1. Site details for Borg Bark/Timber Recycling Facility at 26 Endeavour St, Oberon.

Site address	• 26 Endeavour St, Oberon, NSW, 2787 • (recently renamed 60 Hawken St)
Lot numbers	• Lot 18/DP1249431 • Part of Lot 33/DP1228591 • Part of Lot 34/DP1228591
Site area	• Total development site area is 50,885 m^2
Local government area	• Oberon Council
Lots and Land zones	• Lot 18/DP1249431 - IN1 General Industrial • Lot 33/DP1228591 - RU1 Primary Production & IN1 General Industry • Lot 34/DP1228591 - IN1 General Industrial

Figure 2.1. Aerial view of the subject site – development site coloured red.

Date	Revision	Drawn By	Site description	Jackson Environment and Planning Pty Ltd		Client	Borg Plantations
11/2/19	Revision A	J Lethlean	26 Endeavour St, Oberon	**Strategy | Infrastructure | Compliance | Procurement** **A: Suite 102, Level 1, 25-29 Berry St, North Sydney NSW 2060** **E:** admin@jacksonenvironment.com.au **T: 02 8056 1849** **W:** http://www.jacksonenvironment.com.au	JACKSON ENVIRONMENT AND PLANNING STRATEGY | INFRASTRUCTURE | COMPLIANCE | PROCUREMENT	Project	Bark/Timber Processing and Landscape Supplies Facility
						Title	Aerial photo of site
						Scale	As shown
						Source	Google

Figure 2.2. Land use zoning of the site and surrounds.



Date	Revision	Drawn By	Site description
24/05/18	Revision A	M.McGee	26 Endeavour St, Oberon

Jackson Environment and Planning Pty Ltd
Strategy | Infrastructure | Compliance | Procurement
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T: 02 8056 1849
W: http://www.jacksonenvironment.com.au

Client	Borg Plantations
Project	Bark/Timber Processing and Landscape Supplies Facility
Title	Land zoning of the site and surrounds
Scale	Not to Scale
Source	NSW Department of Planning and Environment

Figure 2.3. Sensitive receptors – development site is coloured red.

Date	Revision	Drawn By	Site description
26/05/18	Revision A	M.McGee	26 Endeavour St, Oberon
12/2/19	Revision B	J Lethlean	

Jackson Environment and Planning Pty Ltd
Strategy | Infrastructure | Compliance | Procurement
A: Suite 102, Level 1, 25-29 Berry St, North Sydney NSW 2060
E: admin@jacksonenvironment.com.au
T: 02 8056 1849
W: http://www.jacksonenvironment.com.au

Client	Borg Plantations
Project	Bark/Timber Processing and Landscape Supplies Facility
Title	Sensitive receptors
Scale	As shown

Figure 2.4. Named watercourse near the proposed development (Kings Stockyard Creek, in blue shading).

Date	Revision	Drawn By	Site description	Jackson Environment and Planning Pty Ltd	Client	Borg Plantations
26/05/18	Revision A	M.McGee	26 Endeavour St, Oberon	Strategy | Infrastructure | Compliance | Procurement	Project	Bark/Timber Processing and Landscape Supplies Facility
12/2/19	Revision B	J Lethlean		A: Suite 102, Level 1, 25-29 Berry St, North Sydney NSW 2060	Title	Named Watercourse
				E: admin@jacksonenvironment.com.au	Scale	As shown on diagram
				T: 02 8056 1849	Source	Google
				W: http://www.jacksonenvironment.com.au		

2.2.1. Local context

The site is located within an IN1 General Industrial area, with the Eastern portion of the site within the RU1 Primary Production zoning. The *Oberon Local Environmental Plan* 2013 states that the objectives of the IN1 General Industrial zoning are to:

- To provide a wide range of industrial and warehouse land uses.
- To encourage employment opportunities.
- To minimise any adverse effect of industry on other land uses.
- To support and protect industrial land for industrial uses.

The objectives of the RU1 Primary Production zoning are to:

- To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.
- To encourage diversity in primary industry enterprises and systems appropriate for the area.
- To minimise the fragmentation and alienation of resource lands.
- To minimise conflict between land uses within this zone and land uses within adjoining zones.
- To enable other forms of development associated with primary production activities, which may require an isolated location or which support tourism or recreational activities

The township of Oberon is to the South of the site.

Land use zoning is shown in Figure 2.2.

2.2.2. Regional and environmental context

The site is located within an industrial area, and within a designated “timber zone” (see Figure 3.1).

Timber processing is a key industry for the Oberon area. Borg Manufacturing Pty Ltd operate a timber panel processing plant nearby, within the same industrial area as the proposed development site. ANL operate a mulching and composting plant within the same area.

2.2.3. Neighbouring properties and sensitive receptors

The subject site is located 500m north of the residential zoned area (see Figure 2.3).

Land to the immediate south of the site consists of an industrial subdivision, with varied operators including automotive, self-storage, building supplies and recycling facilities. The area directly to the north and west of the site is owned and managed by Borg. Land adjoining to the east of the site is zoned RU1 Primary Production.

The nearest residential zoned land is approximately 500m to the south of the proposed site boundaries, and the closest residential premises are approximately 600m to the south east of the site. Other key nearby sensitive receptors include:

- Oberon High School located approximately 650m south of the site;
- A caravan park located approximately 720m south west of the site;
- Rural premises in RU1 zoned land approximately 650m north east of the site.

The only non-Borg owned premises currently directly adjoining the site is a National Parks and Wildlife storage shed and depot. There are other adjoining lots zoned IN1, and under the *Oberon Local Environment Plan* 2013 the following land uses are permitted in this area with consent:

- Depots;
- Freight transport facilities;
- Funeral homes;
- Garden centres;
- General industries;
- Hardware and building supplies;
- Industrial training facilities;
- Kiosks;
- Landscaping material supplies;
- Light industries;
- Liquid fuel depots;
- Neighbourhood shops;
- Places of public worship;
- Plant nurseries; Roads;
- Rural supplies;
- Take away food and drink premises;
- Timber yards;
- Vehicle sales or hire premises;
- Warehouse or distribution centres

The nearby and adjoining premises can be considered as sensitive receptors and impacts on these properties will need to be carefully considered and mitigated as part of the environmental planning investigations in preparing the Environmental Impact Statement for the development.

The Site is adjacent to land zoned RU1 Primary Production. The nearest residential zoning is located 500m away.

The site design, infrastructure location and management practices will minimise any impact on nearby receptors.

Managing runoff and minimising its effect on water quality will be necessary to ensure that nearby creeks including Kings Stockyard Creek are not negatively impacted. The location of the named Kings Stockyard Creek is given in Figure 2.4.

2.3. Overview of proposed development

It is proposed that the facility will process and recycle up to 99,000 tonnes per annum of pine bark residuals, including from Borg's MDF Manufacturing Facility, as well as pallets. The site may also accept clean timber from other sources. The intent of the facility is to provide a best practice, sustainable and well-designed facility to enable the beneficial recycling of pine bark, (clean, heat treated) pallets and clean untreated timber into value-added

landscape materials, with a focus on quality horticultural mulches for gardens and landscaping. No MDF, particular board or any other form of manufactured timber products will be accepted at the site. No mixed waste or any other type of waste will be accepted at the site.

The proposed development of the site seeks a new Development Consent with a maximum tonnage of waste processing of up to 99,000 tonnes per year. Approval is sought to construct a bark/timber processing facility, including an office, weighbridge, wheel wash, dedicated waste tipping and storage areas, including processing and product storage areas. The development will also involve construction of a hardstand, roads, drainage infrastructure, stormwater treatment infrastructure, landscaping and noise attenuation mounds / barriers. Car parking will also be established as part of the development.

2.3.1. Site Layout and Installation.

A concept site plan providing an overview of the proposed layout of the site is given at Figure 2.6 and Appendix B.

A new site entrance and driveway will be developed, with sufficient width to accommodate the largest expected vehicle (23m B-Double truck) and turning path. This entrance will be a minimum of 8.1m in width to meet Australian Standard 2890.2 for articulated vehicles.

A weighbridge and site office will be installed near site entry, and all non-staff vehicles entering the site will be required to enter the facility via the weighbridge (as required under Clause 36 of the *Protection of the Environment Operations (Waste) Regulation* 2014). Parking will also be provided near the entrance to the site. A wheel wash will be installed at the entrance to the site to prevent sediment from leaving the facility.

An internal loop access roadway will be developed to enable vehicles to enter and exit the site in a forward direction. Loading and unloading areas will be separated and clearly allocated to minimise vehicle conflicts. Movable concrete bays will be used for flexible storage of material waiting to be processed and processed product. A separate waste tipping bay for pallets and timber waste only will be constructed, where incoming loads will be inspected for contamination (e.g. treated pallets). These will be removed and disposed at a lawful facility.

The site will be sealed with either concrete or other hardstand to reduce soil disturbance and to improve the quality of runoff water. Perimeter bunding and drainage will be put in place around site boundaries to prevent the release of contaminated stormwater. Dust control mitigation systems will be installed, such as misting systems around the perimeter of the site. Runoff from hardstand areas will be directed to grassed bioswales to enhance the removal of sediment and nutrients. Gross pollutant traps will treat all runoff from the hardstand areas to remove gross pollutants, sediment, (some) nitrogen and phosphorus and oil/grease. Water then will be directed to a stormwater detention pond, which will be sufficiently sized to contain a 1 in 100-year rainfall event. Water from the detention pond will be filtered and re-used on-site for dust suppression.

The Facility will be designed according to best practice and will seek to recycle 99% of all incoming bark/timber materials into the Facility.

2.3.2. Process description

Site feedstocks will include bark residuals and sawdust, along with pallets. Pallets and timbers will also be trucked via backloading to Oberon from Borg's other sites for recycling. Clean bark and timber from other sources may be accepted at the site in future. Delivery vehicles will enter the facility over the weighbridge. Pallets and timbers will be tipped into a dedicated waste tipping and inspection area, where treated timbers and manufactured timbers (e.g. MDF) will be removed and disposed lawfully off-site. Any other contaminants in loads will be removed.

Incoming loads of bark from pine log processing in the nearby MDF Manufacturing Facility will bypass the dedicated waste tipping and inspection area and be stored separately in a large concrete block storage bay, awaiting processing. Pre-inspection of this feedstock is not necessary, as it will contain clean, separated pine bark only.

It is further noted that no other form of waste material will be accepted at the site.

Processing of feedstock is expected to include mulching via grinders and shredders, with screening by a trommel for sizing processed material. No composting will take place on site, and products will be transported from the site shortly after processing.

Processed landscaping materials will be stored in dedicated concrete block bays. To ensure the recovered products are consistently fit for purpose, and comply with *The Mulch Order* 2016, regular sampling will be undertaken in accordance with a quality assurance program and quality control measures.

The facility is proposed to be operated from 7am to 6pm, Monday to Friday, and 8am to 1pm on Saturdays. The site will be closed on Sundays and public holidays. However, it is proposed that the site be accessible 24 hours per day, 7 days per week for delivery of material. This is to allow delivery of sawdust from the nearby timber panel plant as generated. It may also be necessary to receive other feedstocks and export of product outside operational hours. Machinery on site will only operate during the nominated operational hours.

Figure 2.5. Process flow chart for the operation of the Bark/Timber Processing and Landscape Supplies Production Facility.

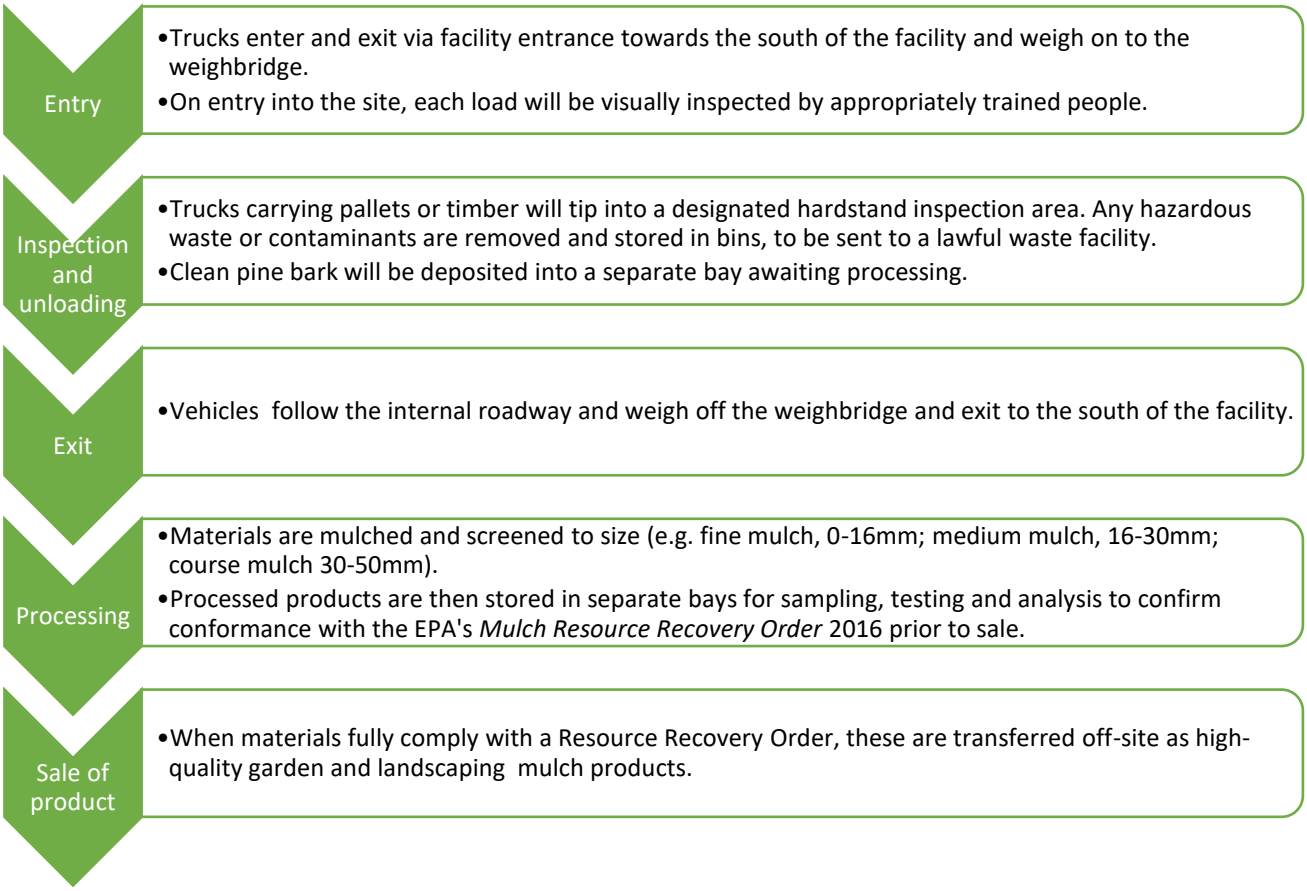
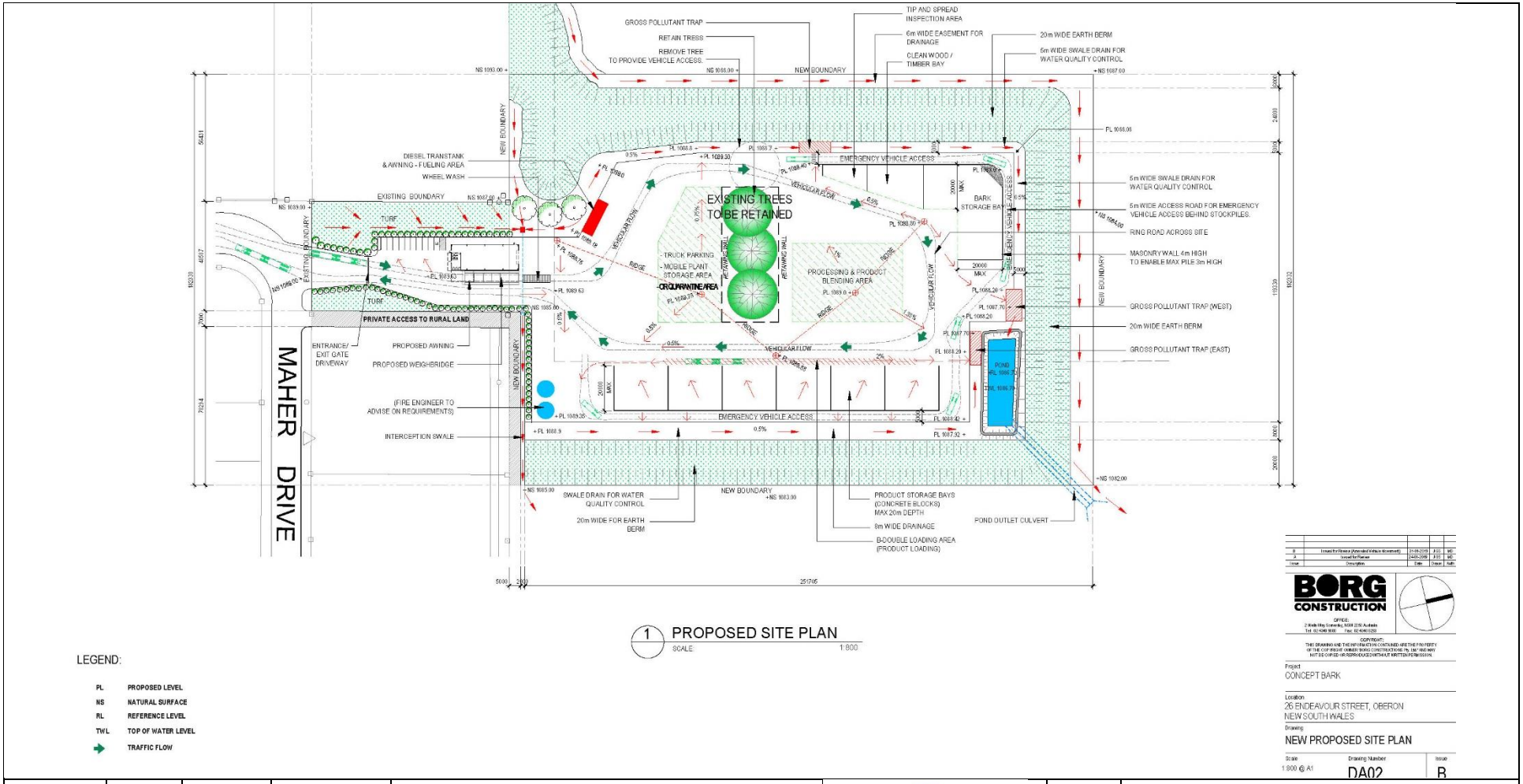


Figure 2.6. Concept Site Plan.



Date	Revision	Drawn By	Site description	Jackson Environment and Planning Pty Ltd		Client	Borg Plantations
24/05/18	Revision A	Borg	26 Endeavour St, Oberon	Strategy | Infrastructure | Compliance | Procurement A: Suite 102, Level 1, 25-29 Berry St, North Sydney NSW 2060 E: admin@jacksonenvironment.com.au T: 02 8056 1849 W: http://www.jacksonenvironment.com.au		Project	Bark/Timber Processing and Landscape Supplies Facility
4/2/19	Revision B	Borg				Title	Site Plan
						Scale	As shown
						Source	Borg Plantations Pty Ltd

2.3.3. Quantities of waste materials to be received

The proposed waste materials to be accepted and recycled at the site are given below. The waste classification of each material under the NSW EPA's *Waste Classification Guidelines* (2014) is also given (Table 2.2).

Table 2.2. Types, quantities and classification of waste materials to be accepted at the Bark/Timber Processing and Landscape Supplies Production Facility.

NSW EPA Waste Classification[1]	Material description	% of waste received	Maximum tonnage to be received / yr
General solid waste (non-putrescible)	Wood waste (bark, sawdust, pallets, other timbers)	100	99,000
Total (tonnes per annum)			99,000

[1] As per NSW EPA (2015). Waste Classification Guidelines. Part 1: Classifying Waste. Internet publication: https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/wasteregulation/140796-classify-waste.pdf?la=en&hash=604056398F558C9DB6818E7B1CAC777E17E78233

The assumed relative quantities of bark to timber received at the site is discussed in the Waste Management Plan summarised in Chapter 6 and provided at Appendix E.

2.3.4. Power requirements

Power for the facility will be supplied by Essential Energy. Consideration of power requirements for the Facility, as well as for spare network capacity in the area, will need to be considered as part of the planning for the proposed development.

2.3.5. Water requirements

The facility will be connected to the town water supply for the office and amenities. Recycled water from the stormwater detention pond will be required during the development and operational stages for dust control (such as misting systems).

The environmental and human health risks associated with the application of recycled water for dust suppression will be considered based on the guidelines published by the Department of Environment and Conservation in 2007, *Managing Urban Stormwater, Harvesting and Re-use*.

Recycled water will be also required for watering of natural vegetation around the site perimeter.

2.3.6. Sewerage requirements

It is understood the site has access to the council sewerage system, and this will be used for toilet and kitchen facilities within the office. No trade waste will be disposed to sewer.

2.3.7. Vehicular and pedestrian access

Access to the site will be via Maher Drive. All heavy traffic movements will be in the forward direction.

2.3.8. Traffic management

The facility is expected to generate up to 21 large vehicles per day, as well as cars for employees. A traffic study has been conducted of the impact of the facility on local traffic infrastructure. This is summarised in Chapter 10 and a full copy of the Traffic Impact Assessment is provided as Appendix F.

2.3.9. Weighbridge operations

All material delivered to and leaving the site will be weighed.

2.3.10. List of plant and equipment to be used during operations

The equipment on site is primarily for shredding and screening the waste wood feedstock, as well as moving the waste wood and products around the site. Table lists the plant and equipment to be used on site. It should be noted, other similar makes or models of equipment may be substituted. However, the size and function remain the same.

Table 2.3. Plant and equipment to be used in the operation.

Operational Area	Make	Model	Function
All areas	Front end loader (x 3)	Volvo L150 Front End Loader	Material handling and movement
	Excavator	CAT 329F Excavator	Material handling and movement
Processing and blending area	Wood shredder - primary shredder	Hammel 950 D/E	Waste size reduction
	Wood shredder - secondary shredder	Hammel NZS 1000	Waste size reduction
	Trommel screen	Hammel HZ 52	Screening and sorting by size
	Magnet separator	Included in screen	Removing ferrous metal

2.3.11. Site suitability

The selected site is suitable as a bark/timber processing facility:

- It is located within an industrial estate away from residential areas;
- It is easy for heavy vehicles to access using major roads for the majority of their journey;
- The site is within easy reach for its customers, both projects generating used glass items and potential customers requiring the processed product;
- The site is relatively flat, making it suitable for processing equipment and heavy vehicle maneuvering;
- The site is a low risk for flooding;
- There is sufficient area on the site allowing for a suitable processing area; and
- As discussed in detail in this EIS, the potential emissions can be mitigated to ensure there is no impact on surrounding properties.

2.3.12. Environmental benefits

The proposed development will consider environmental best practice and sustainability to reduce the impact of the development on the environment. The waste wood recycling facility will use best practice fixed and mobile plant and equipment for glass processing to enable the processing of up to 99,000 tonnes per year of recovered bark/timber.

The proposed development will expand recycling infrastructure in regional NSW and will make an important contribution towards increasing the recycling rate of business waste from 57% (in 2010/11) to 70% by 2021, supporting the *NSW Waste and Resource Recovery Strategy 2014-21* [1].

2.3.13. Economic benefits

The new facility will represent a major piece of infrastructure that will assist in creating jobs within the Central West region. The project has the capacity to inject $110 million into the local economy over the twenty-year life of the project (comprising capital and operating expenditure from the plant, and product revenue).

The project will create up to 5 jobs in construction over a 3-month period, and up to 7 new full-time jobs during the operational phase.

The proposed development will also assist Borg Plantations Pty Ltd to increase recycling rates for wood/timber and reduce costs associated with wood waste disposal from its sites.

2.3.14. Social benefits

The project will create up to 7 local employment positions within the community. The Central West NSW region has an unemployment rate of over 5%, according to the ABS April 2016 Labour Force Survey. The project will also deliver educational and demonstration opportunities for the promotion of sustainable waste management practices.

2.4. Project justification

2.4.1. Strategic drivers

2.4.1.1. NSW EPA's Strategic Plan and the WARR Strategy 2014-2021

In NSW, the State Government has committed to ambitious targets for recycling across the State. These targets are published in the NSW Waste Avoidance and Resource Recovery Strategy. By 2021–22, the NSW Government intends to increase recycling rates for:

- Municipal waste from 52% (in 2010–11) to 70%;
- Commercial and industrial waste from 57% (in 2010–11) to 70%;
- Construction and demolition waste from 75% (in 2010-11) to 80%; and
- Waste diverted from landfill from 63% (in 2010–11) to 75%.

A critical pathway to achieving these recycling targets is investment in new infrastructure. To encourage investment in new recycling facilities, the NSW Government is investing $337 million between 2017 and 2021 to build new recycling facilities. This investment is required to capture an additional 3.3 million tonnes of waste per year and have this material sustainably diverted from landfill[2].

[1] NSW EPA (2014). *NSW Waste Avoidance and Resource Recovery Strategy: 2014 – 2021*. Internet publication: http://www.epa.nsw.gov.au/wastestrategy/warr.htm

[2] NSW EPA (2014). *NSW Waste Avoidance and Resource Recovery Strategy: 2014 – 2021*. Internet publication: http://www.epa.nsw.gov.au/wastestrategy/warr.htm

2.4.1.2. NSW Waste Less, Recycle More Initiative

The NSW Government's $337 million Waste Less, Recycle More program includes $48 million to support the development of new infrastructure for both municipal, commercial and construction and demolition waste materials. A further $57 million is allocated to establishment and servicing of Community Recycling Centres across NSW to collect household problem wastes.

2.4.1.3. NSW EPA Waste and Resource Recovery Infrastructure Strategy 2017-2021

In August 2017, the NSW EPA published the State's first draft strategy for prioritising new recycling infrastructure required across NSW by regional council groupings. The NSW EPA recognises that to achieve the diversion from landfill targets, significant investment in new infrastructure is still needed.

2.4.2. NetWaste Regional Waste Strategy 2017 – 2021

NetWaste is a voluntary peak organisation of councils in the Central West region of NSW. Netwaste consists of 26 councils, including Oberon Council. The group works collaboratively for better regional outcomes in waste management and various other service areas. Netwaste leads numerous programs to improve waste management and resource recovery activities in the region.

In 2017, NetWaste released a Regional Waste Strategy[3] setting out a plan for the region to avoid and recover waste to meet the NSW Government's recycling targets by 2021, as per the NSW Waste Avoidance and Resource Recovery Strategy.

The Regional Waste Avoidance and Recovery Strategy sets out a framework of themes, strategic objectives and targets. The primary aim of the Strategy is to facilitate a collaborative approach to ongoing enhancement of regional waste and resource management. The key strategy objectives include:

- Reducing the amount of waste being generated;
- Increasing resource recovery;
- Reducing greenhouse gas emissions;
- Delivering environmentally responsible waste management systems;
- Improving awareness of waste minimization and resource recovery principles and influencing behavioural change;
- Improving recycling and composting;
- Reducing litter and illegal dumping;
- Managing problem wastes;
- Facilitating information exchange and skills development; and
- Optimise procurement of grant funding.

This NetWaste Regional Waste Strategy also aims to progress towards the following key waste reduction targets:

[3] NetWaste (2017). *Netwaste Regional Waste Strategy 2017 – 2021*. Internet publication: http://www.netwaste.org.au/wp-content/uploads/2018/04/NetWaste-Strategy-2017-21-FINAL.pdf

- Growth in waste generation is held to the level of population growth by 2021-2022;
- Recycling waste increase to 70% for municipal solid waste and commercial and industrial waste, and 80% for construction and demolition waste by 2021-2022;
- Waste diverted from landfill increases to 75% by 2021-2022;
- Problem waste collection services are available for 80% of households by 2021-2022;
- Reduce the volume of litter in NSW by 40% by 2020; and
- Protecting local environments from pollution by reducing illegal dumping incidents by 30% by 2020.

The proposed project will assist the region in achieving its strategy objectives by providing greater opportunities for recycling wood waste, including commercial sources of wood waste.

3. Planning and legislative requirements

3.1. Project approval

Borg Plantations has met with Oberon Council to discuss the potential development. Council was generally supportive of the development.

The development is considered designated as it will process more than 30,000 tonnes of wood per annum as per Clause 32(1)(b)(iii) of Schedule 3 of the *Environmental Planning and Assessment Regulation* 2000. Under Section 4.10 of the *Environmental Planning and Assessment Act* 1979 the proposed development being a Designated Development would also require an EIS to be submitted with the development application.

The proposed development will require an environment protection licence from the NSW Environment Protection Authority, under Schedule 1 Clause 34 (1) of the *Protection of the Environment Operation Act* 1997. It is also noted that a weighbridge will need to be included with the development application as per Section 36 of the *Protection of the Environment Operations (Waste) Regulation* 2014.

The determining authority for the development will be the Western Regional Planning Panel.

3.2. Commonwealth policy and legislation

3.2.1. Commonwealth Environment Protection and Biodiversity Conservation Act 1999

The Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act) came into force from 16 July 2000. The EPBC Act requires actions which are likely to have a significant impact on matters of National Environmental Significance, or which have a significant impact on Commonwealth land, to be referred to the Commonwealth Minister for the Environment for approval.

The subject site is not listed as a national heritage place and the proposed development would not impact on any national heritage places. A search of the area on 4 July 2018 using the Protected Matters Search Tool[4] found no federally protected areas in the vicinity of the proposed development.

No National Environmental Significance matters would be impacted by the proposed development.

3.3. NSW statutory legislation and policy

3.3.1. Environmental Planning and Assessment Act 1979

The proposed development is consistent with the overall objectives of the *Environmental Planning and Assessment Act* 1979. Section 5 of the *Environmental Planning and Assessment Act* 1979 and the accompanying Regulation provide the framework for environmental planning in NSW and include provisions to ensure that proposals which have the potential to impact the environment are subject to detailed assessment, and to provide opportunity for public involvement.

[4] Australian Government, *Protected Matters Search Tool*, online tool http://www.environment.gov.au/webgis-framework/apps/pmst/pmst.jsf

The proposed development is consistent with the nominated objectives of the Act and is considered capable of fulfilling the statutory requirements. The preliminary environmental assessment determined that the proposed development will not result in any significant negative impacts that cannot be adequately mitigated or managed. This will be assessed in detail at the development application stage.

The proposed project is considered to be a designated development requiring assessment under Part 4 of the *Environmental Planning and Assessment Act* 1979.

3.3.2. Environmental Planning and Assessment Regulation 2000

Under Clause 32(1)(b)(iii) of Schedule 3 of the *Environmental Planning and Assessment Regulation* 2000, the proposed facility is a designated development:

Clause 32: Waste management facilities or works:

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

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

Or for developments:

(d) that are located:

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

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

(iii) within a drinking water catchment, or

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

(v) on a floodplain, or

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

As the facility will process 99,000 tpa, the development is classified as a designated development.

3.3.3. State Environmental Planning Policy (Infrastructure) 2007

The aim of the *State Environmental Planning Policy (Infrastructure)* 2007 is to facilitate the effective delivery of infrastructure across the State by improving regulatory certainty and efficiency through a consistent planning regime for infrastructure and the provision of services, and by providing greater flexibility in the location of infrastructure and service facilities.

Other key aims of the policy are to allow for the efficient development, redevelopment or disposal of surplus government owned land, and identify the environmental assessment category into which different types of infrastructure and services development fall (including identifying certain development of minimal environmental impact as exempt development). The policy also seeks to help proponents identify matters to

be considered in the assessment of development adjacent to particular types of infrastructure development and providing for consultation with relevant public authorities about certain development during the assessment process or prior to development commencing.

The following waste and recycling facilities are covered under Section 120 of the *State Environmental Planning Policy (Infrastructure)* 2007:

- "Resource recovery facility" means a facility for the recovery of resources from waste, including such works or activities as separating and sorting, processing or treating the waste, composting, temporary storage, transfer or sale of recovered resources, energy generation from waste gases and water treatment, but not including re-manufacture of material or goods or disposal of the material by landfill or incineration.
- "Waste disposal facility" means a facility for the disposal of waste by landfill, incineration or other means, including associated works or activities such as recycling, resource recovery and other resource management activities, energy generation from waste gases, leachate management, odour control and the winning of extractive material to generate a void for disposal of waste or to cover waste after its disposal.
- "Waste or resource management facility" means a waste or resource transfer station, a resource recovery facility or a waste disposal facility.
- "Waste or resource transfer station" means a facility for the collection and transfer of waste material or resources, including the receipt, sorting, compacting, temporary storage and distribution of waste or resources and the loading or unloading of waste or resources onto or from road or rail transport.

Under Section 121 of the Policy, the following activities are permitted with consent:

- Development for waste or resource management facilities, other than development referred to below, may be carried out by any person with consent on land in a prescribed zone.
- Development for the purposes of a waste or resource transfer station may be carried out by any person with consent on land in a prescribed zone.

The policy defines 'prescribed zones' as being compatible with waste or resource recovery facilities:

- RU1 Primary Production
- RU2 Rural Landscape
- IN1 General Industrial
- IN3 Heavy Industrial
- SP1 Special Activities
- SP2 Infrastructure

The proposed development meets the definition of a "Resource recovery facility" under Section 120 of the *State Environmental Planning Policy (Infrastructure)* 2007. Given the proposed development is to occur in a prescribed IN1 General Industrial and RU1 Primary Production zoning, the development is consistent with Section 120 of the *State Environmental Planning Policy (Infrastructure)* 2007, being development, which is permissible subject to development consent.

3.3.4. Protection of the Environment Operations Act 1997

The *Protection of the Environment Operation Act* 1997 (POEO Act) prohibits any person from causing pollution of waters, or air and provides penalties for air, water and noise pollution offences. Section 48 of the Act requires a person to obtain an Environment Protection License (EPL) from the NSW Environment Protection Authority before carrying out any of the premise based activities described in Schedule 1 of the Act.

Schedule 1 of the Act (34) details "Resource Recovery" as an activity. This clause applies to the following activities:

- Recovery of general waste, meaning the receiving of waste (other than hazardous waste, restricted solid waste, liquid waste or special waste) from off site and its processing, otherwise than for the recovery of energy.
- Recovery of hazardous and other waste, meaning the receiving of hazardous waste, restricted solid waste or special waste (other than asbestos waste or waste tyres) from off site and its processing, otherwise than for the recovery of energy.
- Recovery of waste oil, meaning the receiving of waste oil from off site and its processing, otherwise than for the recovery of energy.
- Recovery of waste tyres, meaning the receiving of waste tyres from off site and their processing, otherwise than for the recovery of energy.

These activities are declared to be a scheduled activity if it meets the following criteria (Table 3.1).

Table 3.1. Scheduled activities as per Schedule 1 of the Protection of the Environment Operations Act 1997.

Activity	Criteria
Recovery of general waste	if the premises are in the regulated area:(a) involves having on site at any time more than 1,000 tonnes or 1,000 cubic metres of waste, or (b) involves processing more than 6,000 tonnes of waste per year. If the premises are outside the regulated area:(a) involves having on site at any time more than 2,500 tonnes or 2,500 cubic metres of waste, or(b) involves processing more than 12,000 tonnes of waste per year
Recovery of hazardous and other waste	involves having on site at any time more than 200 kilograms of waste
Recovery of waste oil	involves processing more than 20 tonnes of waste oil per year or having on site at any time more than 2,000 litres of waste oil
Recovery of waste tyres	involves having on site at any time (other than in or on a vehicle used to transport the tyres to or from the premises) more than 5 tonnes of waste tyres or 500 waste tyres, or involves processing more than 5,000 tonnes of waste tyres per year

Given the proposed facility will process more than 6,000 tonnes of wood waste per year, an Environment Protection Licence for the facility will be required from the NSW EPA.

3.3.5. *Protection of the Environment Operations (Waste) Regulation* 2014

As a licensed waste facility, Borg Plantations Pty Ltd will be required to accurately measure all waste received and leaving the facility. The amount of waste received and transported off-site will need to be reported to the EPA through the Waste and Resource Reporting Portal (WARRP).

Products manufactured by the site will also need to comply with the *Mulch Resource Recovery Order* 2016, as required under Clause 93 of the *Protection of the Environment Operations (Waste) Regulation* 2014.

3.3.6. State Environmental Planning Policy No 33: Hazardous and Offensive Development Assessment

The aims of the State Environmental Planning Policy No. 33 Hazardous and Offensive Development (SEPP 33) are to amend the definitions of hazardous and offensive industries where used in environmental planning instruments. The SEPP 33 also renders ineffective a provision of any environmental planning instrument that prohibits development for the purpose of a storage facility on the grounds that the facility is hazardous or offensive if it is not a hazardous or offensive storage establishment as defined in this Policy.

In addition, the SEPP 33 sets out a requirement for development consent for hazardous or offensive development proposed to be carried out in the Western Division and seeks to ensure that in determining whether a development is a hazardous or offensive industry, any measures proposed to be employed to reduce the impact of the development are taken into account. The SEPP 33 also helps to ensure that in considering any application to carry out potentially hazardous or offensive development, the consent authority has sufficient information to assess whether the development is hazardous or offensive and to impose conditions to reduce or minimise any adverse impact, and to require the advertising of applications to carry out any such development.

Development that is potentially hazardous and/or offensive is permissible under SEPP 33 if the facility is capable of securing an EPL from the NSW Environment Protection Authority.

3.3.6.1. Relevance to the proposed development

A Preliminary Hazard Analysis has been prepared to address the proposed increase in receipt, sorting and processing of up to 99,000 tonnes of wood waste per annum, with associated waste storage, stockpile areas and ancillary structures (i.e. plant and equipment). The Preliminary Hazard Assessment (see Chapter 17) addresses the requirements of SEPP 33; the Hazardous and Offensive Development Application Guidelines - Applying SEPP 33 (NSW Department of Planning, 2011) , AS/NZ ISO 31000: 2009 Risk Management Principles and Guidelines ; and Hazardous and Offensive Development Application Guidelines – Risk Criteria for Land Use Safety Planning (NSW Department of Planning, 2011).

The objective of this assessment was to identify the risks posed to people, property and the environment. The assessment also considers off-site risks to people, property and the environment (in the presence of controls) arising from atypical and abnormal hazardous events and conditions (i.e. equipment failure, operator error and external events). The hazard treatment measures that have been proposed assist in producing a 'low' to 'moderate' level of risk in accordance with the risk acceptance criteria.

3.3.7. State Environmental Planning Policy No 55: Remediation of Land

Under State Environmental Planning Policy, No 55: Remediation of Land (SEPP 55), applicants for consent must carry out a preliminary site investigation for any development consent sought on land previously used for activities that may cause contamination. Agricultural activities are included as a use that may cause contamination.

As the proposed site was previously used for agricultural purposes, a preliminary site investigation was undertaken and a report included with this Environmental Impact Statement (see Chapter 14 and Appendix

M). The principal aim of a preliminary site investigation is to identify any past or present potentially contaminating activities and to provide a preliminary assessment of the extent and nature of site contamination if it exists. It typically includes an appraisal of the site history and may include some initial site sampling.

3.3.8. Roads Act 1993

The *Roads Act* 1993 provides for several issues including the establishment of procedures for opening and closing public roads, acquisition of land for roadways in addition to regulating the carrying out of various activities on public roads including roadwork and road widening operations.

No closure of public roads would be required to gain access to the subject site. The site access road, Maher Road, is constructed, any internal access roadways will be built by the developer. The project does not seek to alter the access arrangements from the public roadway.

3.4. Local environmental planning instruments

3.4.1. Oberon Local Environmental Plan 2013 (OLEP)

The applicable Local Environmental Planning Instrument is the *Oberon Local Environmental Plan* 2013 (the LEP). While the LEP does not specifically state that 'Waste Management Facilities or Work's or 'Resource Recovery Facilities' are a permissible form of development, it states that any development that is not specifically prohibited or permitted without consent is permitted with consent. Waste Management Facilities and Resource Recovery Facilities are not specifically prohibited or permitted without consent. Landscaping material supplies facilities, however, are explicitly permitted with consent under the LEP.

Section 120 of the *State Environmental Planning Policy (Infrastructure)* 2007 defines 'Waste or Resource Management Facilities' a form of development which is permissible subject to development consent.

The proposed development will focus on developing resource recovery activities on land zoned as IN1 General Industrial and RU1 Primary Production. The objectives of the zone are:

- To encourage employment opportunities;
- To minimise any adverse effect of industry on other land uses;
- To support and protect industrial land for industrial uses.

There are no specific building height of building limits or floor space ratio restrictions that apply to the site area.

The Oberon LEP sets out the following requirements for land located within an industrial buffer zone. The map for this zone is shown in Figure 3.1. The relevant clause (6.6) states:

1) The objectives of this clause are as follows:
    a. to protect the operational environment of industries operating within the Oberon Timber Complex,
    b. to control development near the Oberon Timber Complex and waste disposal facilities to minimise land use conflict.
2) This clause applies to land identified as "Oberon Timber Complex" on the Industrial Buffer Map.

3) Before granting development consent to development on land to which this clause applies, the consent authority must consider the following:

    a. the impact that any noise, odour or other emissions associated with existing land uses may have on the development;

    b. any proposed measures incorporated into the development that limit the impact of such noise and other emissions associated with the existing land use.

4) Any opportunities to relocate the development outside the land to which this clause applies;

5) Whether the development is likely to adversely affect the operational environment of any existing development on the land to which this clause applies.

The proposed development is located within the industrial buffer area. The Bark/Timber Processing and Landscape Supplies Production Facility may be considered to be part of the "Oberon Timber Complex", as the facility activities are directly part of the timber manufacturing supply chain. In any case, suitable mitigation methods will be put in place to minimise the impact of the development on adjoining and nearby premises.

Figure 3.1. Oberon Timber Complex and buffer zone (approximate site location marked in red).

Date	Revision	Drawn By	Site description
24/05/18	Revision A	M.McGee	26 Endeavour St, Oberon

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Client	Borg Plantations
Project	Bark/Timber Processing and Landscape Supplies Facility
Title	Oberon Timber Complex
Scale	Not to Scale
Source	NSW Department of Planning and Environment

3.4.2. Oberon Development Control Plan 2001

The general objectives of the *Oberon Development Control Plan* 2001 are:

- To provide development controls and guidelines which will assist in achieving the objectives of the Oberon Local Environmental Plan, 1998;
- To provide development controls and guidelines that are flexible, in order to promote innovative and imaginative building and development that will relate well to its surroundings both man-made and natural;
- To promote and encourage a high quality of design and amenity for all developments in the area;
- To provide for and require well considered development that is environmentally and economically sustainable.

The development is required to demonstrate full compliance with the following elements of the *Oberon Development Control Plan* 2001:

1. Part D: Commercial and Industrial Development;
2. Part F: Vehicle Circulation and Parking; and
3. Part H: Notification of Development Applications.

The Environmental Impact Statement will describe how these controls are complied with.

Table 3.2. Summary of measures to comply with Oberon DCP.

Chapter	DCP Controls	Impact on development	Compliance measures
Part D: Commercial and Industrial Development	D.2 AIMS and OBJECTIVES (a) The aim of this plan is promote the development of a visually pleasing and appealing development of the Commercial Centre and industrial area. (b) The objectives of this plan are to: i) control the material to be used in the façade of commercial and industrial development. ii) apply specific controls for the setback of development. iii) apply requirements for traffic management and parking. iv) allow flexibility in the application of the controls.	DCP applies to the proposed development site.	Overall lot complies.
	D.3 LAND TO WHICH THIS PLAN APPLIES This plan applies to land within the Village of Oberon and to the other areas of the Council area when commercial and/or industrial development is proposed.	DCP applies to the proposed development site.	Complies.
	D.4 DEVELOPMENT CONTROLS Except as provided in Clause D.5, all developments will be required to:	DCP applies to the proposed development site.	Complies.
	D.4.1 Building Setback Provide a building setback minimum of 6 metres from the Street and 4.5 metres from any side street. This area is not in any circumstance to be utilised for car parking. Where an existing development provides for parking within an existing setback area, where	Office building to be setback from Maher Drive	Complies.

Chapter	DCP Controls	Impact on development	Compliance measures
	practicable, provision should be made for that parking to be provided on the rear of the site, upon the redevelopment or extension of the development. Where there is an existing development which is built to the front boundary along the Street, the Plan does not require that building to be set back upon redevelopment or extension. If there is a development proposed which adjoins an existing development built to the front boundary, or closer than 6 metres to the front boundary, the setback requirement may be reduced having regard to the adjoining development and the overall appearance of the proposed development in the streetscape.		
	D.4.2 Building Façade The building facade should be designed to enhance the visual amenity of the area. The building designer will be required to give special consideration to the building facade and the site landscaping.	Building design and landscaping.	Complies.
	D.4.3 Setback Area Use Each development will be considered on its merits and having regard to the adjoining development and the development when considered within the existing streetscape.	Landscaping design at front of site	Complies.
	D.4.4 Parking The development will be required to provide for car parking at the rear of the development site in accordance with Council's Parking Code.	Car park locations.	Parking provided near the office at the front of the site for convenience and safety.
	D.4.5 Access Driveways The access driveways must be designed in accordance with appropriate Engineering Specifications at full cost to the Developer to Councils satisfaction. The access crossing over the footpath from the kerb of the road/street to the gateway of the development is to be concreted.	Driveway design	Complies.
	D.4.6 Site Access The design of the driveways and manoeuvring areas are to be, wherever possible, accessible to rigid trucks for loading and unloading and will enable on site reversing movements for the **forwards direction entry and exit of all vehicles**, including the rigid trucks. Council will require turning circles to be detailed on the site plan. Council may consider a variation to this standard for minor commercial &/or industrial development that is not serviced by heavy vehicles.	Entrance / exit design. On-site manoeuvrability.	Complies.
	D.4.7 Signs	Design of signage at site entrance.	Complies.

Chapter	DCP Controls	Impact on development	Compliance measures
	The development will be required to ensure that no sign is projecting over the front boundary of the lot. Refer to State Environmental Planning Policy 64 – Advertising and Signage for the requirements for signage. The SEPP 64 provides for business and building identification signs. Development consent is required for signage. NB. Signage design/details may be included in the Development application submission for the commercial or industrial activity.		
	D.4.8 Awnings Council will require all commercial development in the Oberon Street to provide awnings over the adjacent footpath to provide weather protection for pedestrians.	Not applicable.	Not applicable.
	D.5 OTHER MATTERS The above provisions are to be considered and provided for in each development where possible, having regard to site and surrounding circumstances. The design of the development should contribute to the enhancement of the Oberon's visual amenity. The design should allow for the development to be neat and tidy. Landscape design forms a crucial part of this – accordingly Council would like the designer to consider and specify the proposed landscaping to include vegetation types, carparking, retaining walls, surface drainage, vehicle access and turning circles.	Landscape and site entrance design.	Complies.
PART F: Vehicle Circulation & Parking	F.2 CITATION This plan, which may be cited as the "Oberon Development Control Plan 2001, Part F: "Vehicle Circulation and Parking" or as the "Oberon Car Parking Code", and constitutes part of a development control plan as provided for by Section 72 of the Environmental Planning and Assessment Act, 1979.	Car park and on-site traffic design.	Complies.
	F.3 OBJECTIVES To outline the vehicle parking requirements relating to all forms of development. To encourage the creation of car parking and service vehicle areas that enhances the function and appearance of the development. To ensure that adequate provision is made for off street parking and vehicle access in accordance with the volume and turnover of traffic likely to be generated by the development. To assist those involved in the design of service and parking areas to provide efficient, useable space for those activities.	Car park numbers and parking design.	Complies.

Chapter	DCP Controls	Impact on development	Compliance measures
	To preserve the safety and efficiency of the existing road system as a carrier of through traffic.		
	F.4 PERFORMANCE STANDARDS In determining the position of car parking, vehicle access and associated works, the designer must take the following matters into account. The location, types and scale of the proposed development While this code provides detailed standards relating to the provision of car parking and vehicle access, each proposal must recognise the inherent characteristics of the site and/or the development that may necessitate some variation of standard requirements. The availability and accessibility of existing public car parking areas Under certain circumstances, it may be of greater benefit to utilise, enhance or expand existing public parking areas, than to provide on site parking. In such cases, Council may require a monetary contribution in lieu of on site provision of parking via Council's Contributions Plan 2000. The compatibility of the car parking location and design with adjoining properties Small fragmented parking areas are often not as efficient as larger, consolidated layouts. Accordingly, the developer should attempt where possible, to integrate parking areas in order to minimise traffic interference, maximise parking yields and ensure good car park design. The existing level of on site car parking, when the proposal is for redevelopment Council will consider the amount of car parking provided for any existing development or on street parking which complements the development.	Car park numbers and parking design.	Complies.
	F.5.3 Parking Schedules In the following schedules, where reference is made to car parking spaces per rooms, units, beds, the reference should be taken to mean that number or a part thereof, eg; 1 per 2 bedrooms, means 1 car parking space for every 2 bedrooms or part thereof. Where the number of spaces is expressed as a decimal, eg. 1.25 per unit, the total number of spaces so determined will be rounded up to the next whole number. For example, if 1.25 spaces are required per unit, then for 5 units, the requirement will be 6.25 spaces, i.e. when rounded up equals 7	Car park numbers and parking design.	Complies.

Chapter	DCP Controls	Impact on development	Compliance measures
	spaces. Similarly, 7 units at 1.25 per unit will require 9 car parking spaces.		
	F.5.7 Industrial Type of Development Minimum Car Parking Spaces Retailing of Bulky Goods - 1 per 50 m^2 gross floor area Bulk Store Warehouse 1 per 300 m^2 gross floor area **or** 0.75 per employee (rounded up) whichever is the lesser. Factory - 1 per 100 m^2 gross floor area **or** 2 per factory unit, or 0.75 per employee per shift (rounded up), whichever is the greater Transport Terminal - 1 truck space for each truck associated with the development. **plus** 1 car space per Driver **plus** 1 per 2 on site Employees	Car park numbers and parking design.	Complies.
	F.6 CAR PARKING LAYOUTS F.6.1 General Many factors will influence the design and layout of parking areas. The minimum standards that will be acceptable for approval are contained in AS. 2890.1 (1993 or equivalent). Where a dimension range is shown, the greater dimension must be adopted for areas of high turnover (parking for less than three hours).	Car park numbers and parking design.	Complies.
F.7 DESIGN, ACCESS AND CONSTRUCTION	F.7.1 Materials All internal roads and car parking access aisles shall be constructed of hard standing all weather surface and shall be drained and marked to the appropriate Australian Standard. A Construction Certificate is to be obtained for the design plans and specifications prior to work commencing. Wheel stops in the form of extended kerbing shall be provided to protect walls, landscaping, shade trees and pedestrian areas from vehicle encroachment.	Engineering design.	Complies.
	F.7.2 Design For Disabled Disabled parking shall be provided where practical, as close as possible to the entry and exit points of buildings where appropriate and comply with the appropriate Australian Standard.	Car park numbers and parking design.	Complies.
	F.7.3 Landscaping Suitable landscaping shall need to be provided. Detailed plan and specifications are to accompany the application.	Landscaping near car parking	Complies.
	F.7.4 Visibility On corner sites, applicants shall ensure that there is no loss or restriction of visibility by motorists on adjacent lands. The dedication of	Site entrance design	Complies.

Chapter	DCP Controls	Impact on development	Compliance measures
	a 3 metres by 3 metres corner splay is suggested.		
	F.7.5 Signs And Marking Parking areas shall be well signposted to indicate the availability of off street parking. The location and signposting of entry and exit points shall be clearly visible from both the street and within the site. Vehicle circulation shall be clearly indicated by pavement arrows. Parking spaces for specific uses, e.g. disabled employees, visitors shall be clearly signposted. Pedestrian and other hazard areas should be clearly indicated. Where car parking areas are used frequently at night, signposting and line marking using reflective background materials or paint shall be used. Adequate lighting will be required during normal hours of operation. Signs shall be simple in character and be well designed so that it is not out of character with the surrounding area. Details of proposed signs are to be detailed on the Development Application.	Car park numbers and parking design. Signage near car parks.	Complies.
	F.7.6 Vehicle Access In determining the suitability of proposed locations for vehicle entry and exit points, Council will consider the following principles: (a) Parking areas should have a limited number of entry points; (b) Good lighting should be provided; (c) Exit and entry point shall not be closer than 6 metres to an intersection. All vehicles must move in a forward direction when entering and leaving the site and entry and exit points are to be separated in major developments.	Site entrance design	Complies.
	F.7.7 Existing Access Points All new entry and exit points shall achieve a minimum of potential conflict with existing access points	Site entrance design	Complies.
	F.7.8 Sight Distance The maximum sight distance should be utilised.	Site entrance design	Complies.
	F.7.9 On Street Queuing / Street Intersections Design and location of access should ensure the minimum potential for on street vehicle queuing.	Site entrance design	Complies.
	F.7.10 Pedestrian Movements Parking areas shall be designed to minimise conflict with vehicles and pedestrians.	Car park numbers and parking design. Pedestrian access on-site.	Complies.
	F.7.11 Coach, Bicycle And Motor Cycle Parking Adequate provision shall be made for access, safe manoeuvring and parking of coaches in proposals for tourist, commercial and recreational developments.	Not applicable.	Not applicable.

Chapter	DCP Controls	Impact on development	Compliance measures
	Provision should also be made for the parking of bicycles and motor cycles as appropriate.		
F.8 SERVICE, LOADING AND GARBAGE AREAS.	F.8.1 General As the size of service vehicles varies considerably, it is not possible to specify parking and access dimensions which will be suitable for all situations. Accordingly, the design of service areas will have to be tailored to each particular site, type of development and the anticipated types of service vehicles. Loading and unloading from the street and laneways must comply with current traffic regulations and is generally discouraged for new development.	Traffic management Waste management	Complies.
	F.8.2 Design Principles Council shall give consideration to the following principles in determining the appropriateness of service areas: The service area should be physically defined, screened from public view and not used for purposes other than servicing, loading and unloading. Requirements for storage and collection of waste should be taken into account in service area design. All service vehicles should be able to enter and leave the site in a forward direction and therefore, adequate manoeuvring space is required on site. Internal roadways should be of a size adequate for the largest vehicle likely to use the site.	Traffic management Waste management	Complies.
F.9 MONETARY CONTRIBUTION	F.9.1 General For commercial and/or industrial development, Council may accept a cash contribution in lieu of the provision of on-site car parking spaces as per Council's Development Contribution Plan 2000.	Car parking	Complies. Sufficient parking provided.
F.10 DESIGN / DIMENSIONS	F.10.1 Car Spaces Parking spaces are not normally permitted to be between the building line and the property boundary.	Car parking	Complies.
	F.10.2 Driveways A minimum driveway width adjacent to garages is to be 6.5 metres to allow for manoeuvring. A combined entry / exit driveway is to be a minimum 6 metres *(minor road)* and a minimum 9 metres *(major road)* in width at the footpath crossing. Internal driveway widths are to be minimum 3.5 metres *(25 vehicles per day)* and 5 metres *(over 25 per day).* Passing bays are to be provided on longer lengths of driveways where necessary.	Traffic design and management	Complies.

Chapter	DCP Controls	Impact on development	Compliance measures
	Adequate visibility is to be provided at corners and intersections. As a minimum requirement, vehicle parking and manoeuvring areas are to be constructed of all weather, compacted, and decomposed granite or, similar hard stand approved material. The access crossing over the footpath from the kerb of the road/street to the gateway of the development is to be concreted. Maximum driveway grades for ramps shall be 1:20 for the first 3 metres from the property boundary and then 1: 7.		

Consideration of all relevant aspects of the *Oberon Development Control Plan* 2001 has been taken into account in preparing the development application for the project.

4. Capital Investment Value

A Capital Investment Value estimate was prepared by Muller Partnership. A summary of the expected capital investment is provided below. A copy of the full Capital Investment Value report is provided at Appendix C.

Table 4.1. Capital Investment Value summary

Ref	Description	%	Sub Total ($)	Total ($)
1.0	SITEWORKS	0.69	77,216	77,216
2.0	BULK EARTHWORKS	18.91	2,104,420	2,104,420
3.0	HARDSTANDS & STORAGE BAYS	27.44	3,053,942	3,053,942
4.0	BUILDINGS & AWNINGS	5.60	623,461	623,461
5.0	SITE SERVICES	6.92	769,722	769,722
6.0	LANDSCAPING	1.88	209,412	209,412
7.0	PRELIMINARIES AND MARGIN	9.81	1,091,827	1,091,827
8.0	**SUBTOTAL [EXCL GST]**			*7,930,000*
9.0	PLANT & EQUIPMENT	28.75	3,200,000	3,200,000
10.0	**TOTAL [EXCL GST]**	**100.00**	**$11,130,000**	**$11,130,000**

5. Consultation

A consultation report was prepared to help brief neighbouring residential properties and businesses, Council and agencies on the project and the key environmental issues. The consultation summary report was sent to key stakeholders, including State Government agencies, Oberon City Council and 53 properties within 500m of the site. This included owners of vacant land, facilitated by Council through their rates database. This report is provided in Appendix D. The consultation phase for the project addresses all of the SEARs requirements under SEARs 1238.

5.1. SEARs consultation requirements

The SEARs included the requirement to consult with key government agencies, Council and local residents and properties. This included:

- Environment Protection Authority;
- Office of Environment and Heritage;
- Roads and Maritime Services;
- Rural Fire Service;
- Oberon City Council;
- The surrounding land owners and occupiers that are likely to be impacted by the proposal.

A copy of the SEARs 1238 is provided at Appendix A.

5.2. Consultation with Oberon City Council

A meeting was held with Oberon City Council on 15 November 2018 which included a summary of the project and current project status. This included an overview of the proposed development and potential environmental issues arising from the development. Council had previously been sent a Project Summary Consultation Report as part of the consultation process.

Council was not provided the opportunity for comment on the request for SEARs issued by DPE however, council noted that it agreed with the SEARs issued and had no further planning advice to provide.

Council raised issues such as dust and noise controls, stormwater management, water quality, traffic and related mitigation measures and suggested a number of mitigation measures that need to be considered as part of the Development Application process.

Council advised that the measures recommended in the environmental studies undertaken for the project, and those requiring consideration as discussed at the meeting will need to be addressed as a condition of consent.

Council confirmed it will require detailed designs for the driveway, fencing, stormwater detention, meeting water quality targets and water treatment, acoustic mounds and walls. Council will also require modelling where required to substantiate the validity and effectiveness of proposed environmental management and control measures proposed.

5.3. Agency and Council consultation

Consultation with a number of different State Government agencies was a requirement under the SEARs. In the first instance, a SEAR summary report was prepared, and submitted to the Department of Planning and Environment. This was circulated to agencies for their comments and for them to provide input into the SEARs.

In addition each of the agencies were sent a copy of the consultation summary report, to provide the agency with the opportunity to provide any additional input, as they saw fit. A meeting was held with Oberon City Council on 15 November 2018 to further brief them on the project status as they were not provided the SEARs by DPE.

The section below summarises the key requirements in the SEARs from each agency. Full details of the requirements by each agency is provided in the copy of the SEAR at Appendix A.

5.3.1. NSW Department of Planning and Environment

The Department of Planning and Environment (DPE) required that an Environmental Impact Statement (EIS) be prepared, which specifically addressed the following issues:

- Strategic context;
- Suitability of the site;
- Waste management;
- Hazards and risks;
- Air quality and odour;
- Noise and Vibration;
- Soil and water;
- Traffic and transport;
- Fire and Incident management;
- Biodiversity;
- Visual impact.
- Environmental Planning Instruments and other policies;
- Guidelines; and
- Consultation.

DPE also listed the key stakeholders to be consulted during the preparation of the development application. DPE confirmed no additional issues need to be considered in the EIS.

5.3.2. NSW Environment Protection Authority

The NSW Environment Protection Authority (EPA) provided comprehensive details of the requirements of the EIS. In addition, it specifically highlighted the following issues to be addressed:

- Environmental Impacts of the proposal;
- Air and Odour;

- Noise and Vibration;
- Waste; and
- Surface water controls.

The EPA provided relevant legislation and guidelines with which to assess the above requirements. As a result of the consultation, the EPA confirmed they have no additional issues that need to be considered in the EIS.

5.3.3. Office of Environment and Heritage

The Office of Environment and Heritage (OEH) recommended that the EIS specifically address the following issues:

- Biodiversity and offsetting;
- Aboriginal culture heritage;
- Historic heritage;
- Water and soils; and
- Flooding.

OEH provided details on how to investigate and address each of the above issues. OEH confirmed no additional issues need to be considered in the EIS.

5.3.4. Roads and Maritime Services

The Transport Division of NSW Roads and Maritime Services (RMS) required that a traffic impact study be prepared in accordance with Section 2 of the *RTA's Guide to Traffic Generating Developments* (2002) including:

Specific requirements by RMS included:

- Road transport volumes and types;
- Details of projected transport operations;
- Assessment of cumulative impacts during construction and operations of the project and details of how proposed operations will interact with other road users;
- Any oversize and over mass vehicles and loads expected for the construction and operation of the project;
- Temporary and permanent staff numbers (including employees and contractors) and staff parking arrangements;
- The impact of generated traffic and measures employed to ensure efficiency and safety on the public road network during construction and operation of the project;
- Any mitigating measures required to address expected traffic generation.

As a result of the consultation process, RMS confirmed they have no additional issues that need to be considered in the EIS.

5.3.1. NSW Rural Fire Service

The NSW Rural Fire Service required that a Bush Fire Assessment report be prepared that demonstrates compliance with the guideline *Planning for Bush Fire Protection 2006*.

5.4. Neighbours consulted

The SEAR required the proponent to consult with the surrounding land owners and occupiers that may be affect by the proposal. A copy of the Consultation Summary Report was mailed to all properties within 500m of the main processing area. Property occupiers were encouraged to provide feedback. Figure 5.1 shows the area encompassed by the 500m consultation distance. Table 5.1 provides a list of all the properties attempted to be contacted as part of the pre-submission consultation.

There are a number of properties in the surrounding area that are currently vacant and undeveloped. Assistance was sought from Council to contact them to obtain feedback on the project. Of the 53 properties contacted, three property owners requested information on the project. The comments received are included in Table 5.2.

Figure 5.1. Aerial map showing 500m radius around the proposed development site.

Date	Revision	Drawn By	Site description	Client	Borg Manufacturing Pty Ltd
4/9//2018	Revision A	J. Lethlean	26 Endeavour St, Oberon (Lot 34 DP 1228591)	Project	Bark/Timber Processing and Landscape Supplies Facility
				Title	500m Consultation Radius

Table 5.1. List of properties within the consultation area.

No.	Street number	Street	Suburb	Zone	Zone Description
1	30	Albion Street	Oberon	IN1	General Industrial
2	36	Albion Street	Oberon	IN1	General Industrial
3	38	Albion Street	Oberon	IN1	General Industrial
4	41	Albion Street	Oberon	R1	General Residential
5	46	Albion Street	Oberon	IN1	General Industrial
6	53	Albion Street	Oberon	R1	General Residential

No.	Street number	Street	Suburb	Zone	Zone Description
7	57	Albion Street	Oberon	R1	General Residential
8	66	Albion Street	Oberon	IN1	General Industrial
9	72	Albion Street	Oberon	IN1	General Industrial
10	37-39	Albion Street	Oberon	R1	General Residential
11	45-51	Albion Street	Oberon	R1	General Residential
12	1	Dudley Street	Oberon	R1	General Residential
13	1	Endeavour Street	Oberon	IN1	General Industrial
14	2	Endeavour Street	Oberon	IN1	General Industrial
15	4	Endeavour Street	Oberon	IN1	General Industrial
16	6	Endeavour Street	Oberon	IN1	General Industrial
17	7	Endeavour Street	Oberon	IN1	General Industrial
18	8	Endeavour Street	Oberon	IN1	General Industrial
19	9	Endeavour Street	Oberon	IN1	General Industrial
20	10	Endeavour Street	Oberon	IN1	General Industrial
21	11	Endeavour Street	Oberon	IN1	General Industrial
22	12	Endeavour Street	Oberon	IN1	General Industrial
23	13	Endeavour Street	Oberon	IN1	General Industrial
24	14	Endeavour Street	Oberon	IN1	General Industrial
25	15	Endeavour Street	Oberon	IN1	General Industrial
26	17	Endeavour Street	Oberon	IN1	General Industrial
27	31	Endeavour Street	Oberon	IN1	General Industrial
28	3-5	Endeavour Street	Oberon	IN1	General Industrial
29	10	Hawken Street	Oberon	IN1	General Industrial
30	25	Hawken Street	Oberon	IN1	General Industrial
31	45	Hawken Street	Oberon	IN1	General Industrial
32	50	Hawken Street	Oberon	IN1	General Industrial
33	1	Hazelgrove Rd	Oberon	RU1	Primary Production
34	123	Hazelgrove Rd	Oberon	RU1	Primary Production
35	125	Hazelgrove Rd	Oberon	RU1	Primary Production
36	8	Horace Street	Oberon	IN1	General Industrial
37	11	Horace Street	Oberon	IN1	General Industrial
38	13-15	Horace Street	Oberon	IN1	General Industrial
39	17-19	Horace Street	Oberon	IN1	General Industrial
40	4	Maher Drive	Oberon	IN1	General Industrial
41	9	Maher Drive	Oberon	IN1	General Industrial
42	26	Maher Drive	Oberon	IN1	General Industrial
43	57	Maher Drive	Oberon	IN1	General Industrial
44	96-106	Maher Drive	Oberon	IN1	General Industrial
45	1	Sirius Street	Oberon	IN1	General Industrial
46	2	Sirius Street	Oberon	IN1	General Industrial
47	3	Sirius Street	Oberon	IN1	General Industrial
48	4	Sirius Street	Oberon	IN1	General Industrial
49	5	Sirius Street	Oberon	IN1	General Industrial

No.	Street number	Street	Suburb	Zone	Zone Description
50	6	Sirius Street	Oberon	IN1	General Industrial
51	7	Sirius Street	Oberon	IN1	General Industrial
52	8	Sirius Street	Oberon	IN1	General Industrial
53	10	Sirius Street	Oberon	IN1	General Industrial

5.5. Consultation outcomes

There was little feedback received on the project beyond the original agency requirements of the SEARs. Of the 53 properties within 500m, three provided feedback. The main concerns are noise, dust and traffic. Table 5.2 provides a summary of the feedback received during the consultation.

These issues have been assessed in detail as part of the EIS investigations. The impact assessment studies conducted show that the environmental and amenity impacts on surrounding properties will be minimal, and within acceptable thresholds.

Table 5.2. Summary of consultation outcomes.

Neighbour / Organisation	Reason for consultation	Issue	How issue has been addressed in EIS
NSW Department of Planning and Environment	SEARS Requirement	No further feedback beyond SEARs requirements	Fully addressed in the EIS
NSW EPA	SEARS Requirement	No further feedback beyond SEARs requirements	Fully addressed in the EIS
NSW Roads and Maritime Services	SEARS Requirement	No further feedback beyond SEARs requirements	Fully addressed in the EIS
Oberon City Council	SEARS Requirement	No further feedback beyond SEARs requirements	Fully addressed in the EIS
Office of Environment and Heritage	SEARS Requirement	No further feedback beyond SEARs requirements	Fully addressed in the EIS
Surrounding Properties			

Neighbour / Organisation	Reason for consultation	Issue	How issue has been addressed in EIS
123 Hazelgrove Rd Oberon	Nearby property	Raised concerns regarding the impact of any of any dust or airborne contaminant reaching the owner's property which is within 500m proximity of the proposed development. The owner is not on the Oberon town water supply and relies solely on rain water to service his household and animals. He is aware that Borg Plantation Pty Ltd are installing state of the art preventive measures to contain any pollutants, but remains concerned regarding system failure and requires adequate measures to be in place should his tank water or dam water be contaminated by any airborne pollutants. The owner is already impacted by dust and odour from the existing Borg facility located on Lowes Mount Road.	An Air Quality Impact Assessment (AQIA) has been undertaken. The assessment predicts potential dust levels generated by the operation of the project comply with the applicable assessment criteria and would not lead to any unacceptable level of environmental harm or impact in the surrounding area. The AQIA recommends physical mitigation measures e.g. dampening stockpiles, visual monitoring, and ceasing activity where reasonable levels of visible dust cannot be maintained. The results of the AQIA indicate that all of the assessed sensitive receptors are predicted to experience levels below the relevant criteria for each of the assessed dust metrics and that no adverse odour would be associated with the proposed activity.
14 Endeavour Street Oberon	Nearby property	The owner is concerned about dust and fine material from processing the bark & pallets as ANL operate a similar plant across the road of his transport yard / shed. The owner claims there appear to be none or very little containment in place at ANL and that his property is affected by fine material and dust in his shed / workshop. He attributes this to the large number of windy days in Oberon. He is concerned about mitigation measures the project will be required to adhere to in containing dust saying it needs to be contained properly with high concrete walls and have a watering system in place to contain the dust / fine material.	The results of the AQIA indicate that all of the assessed sensitive receptors are predicted to experience levels below the relevant criteria for each of the assessed dust metrics and that no adverse odour would be associated with the proposed activity.

Neighbour / Organisation	Reason for consultation	Issue	How issue has been addressed in EIS
125 Hazelgrove Rd Oberon	Nearby property	Generally supportive of the opportunity the development will have on the local community with respect to jobs has raised concerns about noise and dust. Owner is concerned about the level of dust that will be generated by the development and the cumulative effects with the existing Borg plant and the proposed development. E.g. use of a 'chipper' at the existing facility had a major impact on the owners - one who is a shift worker with a newborn in the family. There is further concern about the need to, and financial ramifications of soundproofing their new home which is soon to be built. Raised concerns about the levels of dust which can be problematic with the existing Borg facility and potential issues relating to the cumulative and long term effects of existing Borg plant and the new development with respect to air quality.	The results of the AQIA indicate that all of the assessed sensitive receptors are predicted to experience levels below the relevant criteria for each of the assessed dust metrics and that no adverse odour would be associated with the proposed activity.

Neighbour / Organisation	Reason for consultation	Issue	How issue has been addressed in EIS
Hugh Sutton Ranger, NPWS 96-106 Maher Drive Oberon	Nearby property	NPWs occupy the site (a NPWS depot) directly to the east of the proposed driveway off Maher Drive. Hugh was generally satisfied with the response with respect to the environmental controls proposed for the site. The main concerns raised are the cumulative effects of dust as wood fibres appear to be emitted to air via the Borg plant. He is concerned about noise from shredder, trucks as the proposed driveway is next to their site. Also raised concerns regarding and stormwater runoff and the need to ensure stormwater from the site does not impact on their site. Hugh also mentioned the NPWS helipad which is next door and that the development cannot impact on this (height of buildings etc.)	The results of the AQIA indicate that all of the assessed sensitive receptors are predicted to experience levels below the relevant criteria for each of the assessed dust metrics and that no adverse odour would be associated with the proposed activity. A Noise and Vibration has been undertaken and found that ooperational noise levels due to emissions from the Facility will comply with the project noise trigger levels at all receivers. It is proposed that a 3.6m high acoustic barrier will be constructed to mitigate noise levels and no other noise control is recommended. Noise from traffic generated by the operational and construction phases of the Facility will not exceed the relevant traffic noise criteria. The predicted vibration levels associated with the construction of the Facility were found to comply with the adopted human comfort criteria and be significantly lower than any building damage criteria.

5.6. Conclusion

A small number of submissions were receive in response to the consultation process, mainly from nearby residences. The main concerns were about increased levels of dust and noise in the area. The site design and mitigation measures should minimise the dust and noise emissions from the site. However, the site operators will need to remain mindful of how these issues impact neighbouring properties.

6. Waste Management

A Waste Management Plan was prepared by Jackson Environment and Planning Pty Ltd. A brief summary of the plan is provided in this chapter. The full Waste Management Plan is provided as Appendix E.

6.1. Methodology

The waste management plan was compiled using the following steps:

1. Estimate waste stream types and amounts based on the site activities – during both construction and operational phases;
2. Identify management options for each waste stream suitable within the regulatory framework;
3. Select most appropriate waste management option for each waste stream, aiming to recover as much waste as possible.

6.2. Existing environment

The current site is vacant. Therefore, there are currently no waste management systems on the site.

6.3. Impact assessment

6.3.1. Demolition and construction phase

The waste streams that are likely to be produced during the construction phases of the project, as well as the potential reuse options for each stream, are summarised in Table 6.1.

Table 6.1. Management of construction waste – during construction phase only.

Waste source	Description	Estimated amount	Treatment and Destination	Expected recovery rate (wt%)
Site clearing	Timber, tree stumps, shrubs, grass, topsoil	100m^3	Woody garden organics will be shredded and either used as mulch on site or sold as mulch in the landscape products business.	100%
Site levelling and grading	Soil	None	All soil will be re-used on site for landforming or construction of earth noise attenuation mounds	100%
Stormwater detention pond and GPT installation	Soil (Excavated Natural Material)	None	All soil will be re-used on site for landforming or construction of earth noise attenuation mounds	100%
Office building construction	Mixed building waste	250 tonnes	Mixed building waste will be collected in skip bins, and disposed at Oberon landfill.	0%

Waste source	Description	Estimated amount	Treatment and Destination	Expected recovery rate (wt%)
Employee waste	Small amounts of packaging waste and other MSW will be generated by employees on site conducting the development project.	240L per week for 12 weeks	MSW will be collected in a MGB and removed weekly by a licensed waste removal contractor, and disposed at a licensed landfill.	0%

6.3.2. Operation phase

The expected waste volumes (incoming material and outgoing product/residuals) are presented in Table 6.3. The management of wastes is summarised in Table 6.2. Figure 6.1 provides a general site layout including the location of waste storage areas, recycling bins and truck access.

Also note that bins during the construction and operational phase of the development will be located in a fixed position along the northern side of the factory warehouse. The position of the bins inside the warehouse will also avoid possible traffic hazards (pedestrian/vehicular) likely to be caused by the storage and collection of waste.

Table 6.2. Estimates of incoming waste amounts.

Waste material	2019	2020	2021	2022	2023	2024	2025
Pine bark residuals	6,500	13,000	26,000	48,750	64,350	64,350	64,350
Used wooden pallets	3,000	6,000	12,000	22,500	29,700	29,700	29,700
Sawdust	500	1,000	2,000	3,750	4,950	4,950	4,950
TOTAL	10,000	20,000	40,000	75,000	99,000	99,000	99,000

Table 6.3. Estimates of product and waste materials to be exported off-site.

Product or waste exported from site	2019	2020	2021	2023	2024	2025
Timber mulch	9,935	19,870	39,740	74,513	98,357	98,357
Metal	15	30	60	113	149	149
Residual waste sent to landfill	50	100	200	375	495	495
TOTAL	10,000	20,000	40,000	75,000	99,000	99,000

Table 6.4. Estimated waste storage amounts.

Waste or product storage area	Waste material or product storage	Bay or pile dimensions (m)	Volume stored (maximum) (m^3)	Bulk density (t/m^3)	Maximum storage capacity (tonnes)
Waste storage bays	Pine bark residuals	≈1100m^2 (area) x 3 m (high)	3,300	0.25	825
	Wooden pallets / clean wood	≈350m^2 (area) x 3 m (high)	1,050	0.156	164

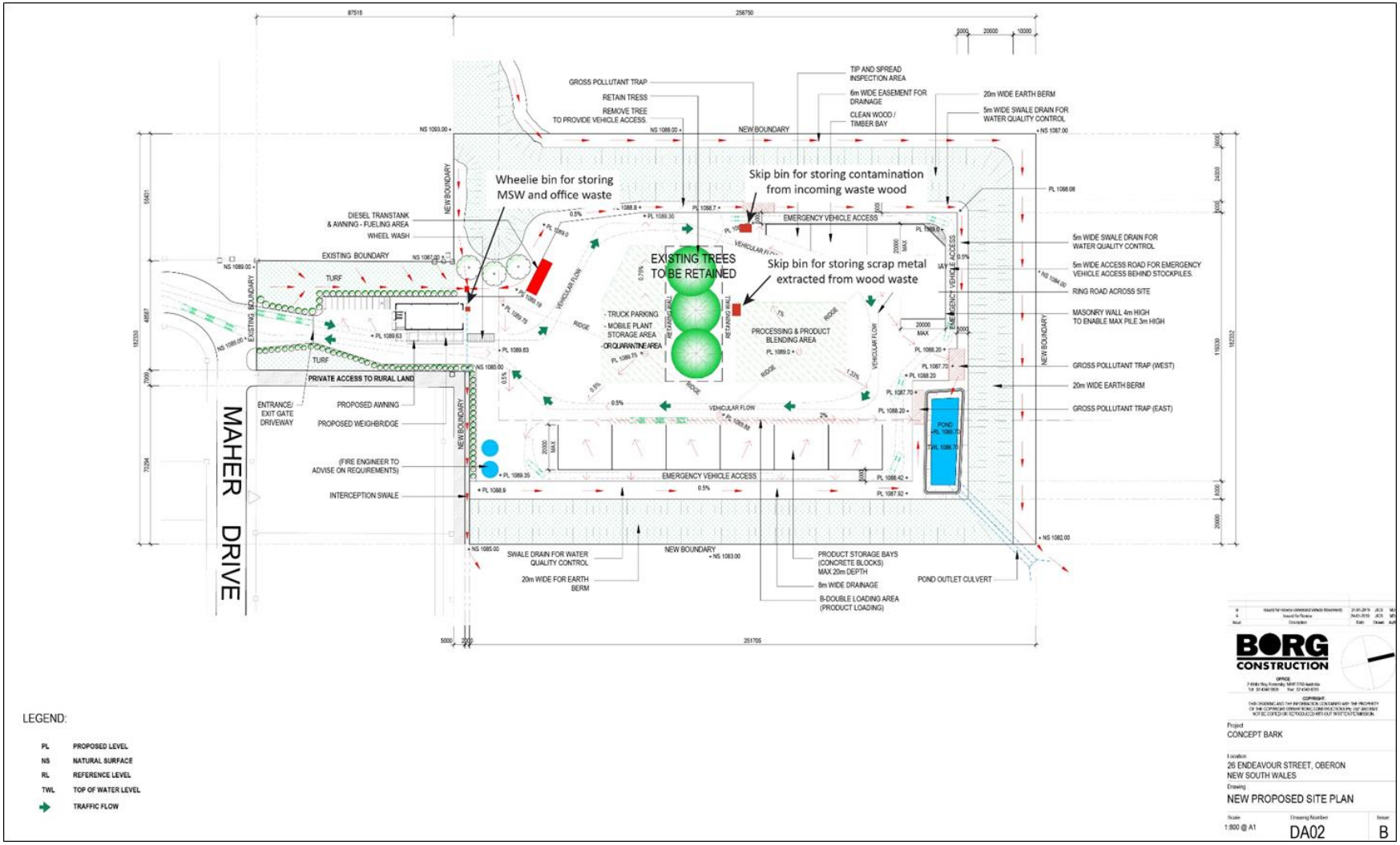
Waste or product storage area	Waste material or product storage	Bay or pile dimensions (m)	Volume stored (maximum) (m^3)	Bulk density (t/m^3)	Maximum storage capacity (tonnes)
	Sawdust	combined with pine bark residuals	0	0.25	-
Tip and spread area	Tip and spread area 1	Assume no storage	-	-	-
	Tip and spread area 2	Assume no storage	-	-	-
	Tip and spread area 3	Assume no storage	-	-	-
Processing area	Waste for shredding and processed product in piles	Assume no storage in processing area	-	-	-
Blending area	Processed products awaiting blending of blended awaiting for storage in landscaping supplies bays	2 x 10m x 10m x 2 m high	400	0.25	100
Landscape storage (6 bays total)	Landscaping supplies - wood chip mulch	Total storage area in bays ≈6 bays x 20m x 20m x 3m high	7,200	0.25	1,800
Recovered metals storage	Recovered metals	Skip bin - $20m^3$	20	0.5	10
Residuals storage	Residual waste destined for landfill.	Skip bin - $20m^3$	20	0.15	3
Total estimated site storage capacity			**11,990**		**2,902**

Table 6.5. Management of operational waste streams.

Incoming Material	Description	Processing / treatment	Destination	Resource Recovery Order for Products	Expected recovery rate (wt%)
Pinebark residuals	Pine bark from processing of pine logs in the Borg MDF production plant	Loads will be received separately in B-Doubles, semi-trailers, skip bins or rigid trucks, tipped in the unloading bay associated with the 'Waste receiving area', then moved via front end loader to the 'Pinebark Residual' storage bay. Material will then be subject to a primary sorting process using a grab excavator to remove concrete, steel and timber. Residual waste to be stored in skip bin or a separate bunker and disposed off-site. Clean pinebark from the primary sorting process will be separated and shredded and screened to specifications to produce saleable products. Residual waste from the primary sorting process will be stored in a skip bin prior to being disposed off-site at a landfill.	Recovered materials will be processed into saleable products and sold either directly to customers or through commercial landscapers or nurseries. Residual waste will be collected in a separate hook lift bin and regularly removed from site for disposal in a licensed landfill (Oberon landfill).	Mulch Resource Recovery Order 2016	99.5%
Wooden pallets	Clean, used wooden pallets	Loads will be received separately in B-Doubles or semi-trailers, tipped in the unloading bay associated with the 'Waste receiving area', then moved via front end loader to the 'Wooden Pallets' storage bay. Material will then be shredded / screened in the 'Processing area' then stored in a pile then moved to the 'Landscape supplies' bunker for sale.	Clean, inspected material will be crushed, screened and blended to produce mulch. These will then be sold either directly to customers or through the on-site building supplies business. Any contaminants will be collected in a separate bunker or skip bin and regularly removed from site for disposal in a licensed landfill (Oberon Landfill).	Mulch Resource Recovery Order 2016	99%

Incoming Material	Description	Processing / treatment	Destination	Resource Recovery Order for Products	Expected recovery rate (wt%)
Sawdust	Clean sawdust from the timber panel manufacturing plant nearby.	Loads will be received separately in rigid trucks, tipped in the 'Sawdust' storage bay. Material will be moved, as required, via front end loader to the blending area or to a storage bay the landscape supplies area.	Clean, inspected material will be shredded, screened and blended to produce a range of mulches and landscape products. These will then be sold either directly to customers or through the on-site building supplies business. Any contaminants will be collected in a separate bunker or skip bin and regularly removed from site for disposal in a licensed landfill (Oberon Landfill, EPL 20289).	Mulch Resource Recovery Order 2016	100%
Metal	Steel staples and metal strapping associated with wooden pallets.	A magnet will be attached to the shredder. The magnet will direct any staples or metal in the pallets into a separate container.	Recovered metal will be removed to a metal recycler off-site (One-Steel, EPL: 1977).	n/a	100%
Residual waste	Contaminants Employee waste	Contaminants found in the incoming waste streams will be extracted and stored in a skip bin. MSW generated by employees will be collected in trash cans around the office building.	Residual waste will be collected in a skip bin and regularly removed from site for disposal in a licensed landfill (Oberon landfill, EPL20289).		0%

Figure 6.1 Site layout for Borg bark/timber recycling facility at 26 Endeavour Street, Oberon, showing waste storage facilities.



A risk assessment has been undertaken to identify the level of risk that construction and operations activities may present to waste management.

The following points summarise the key activities identified in the risk assessment relevant to waste management for construction works and operation of the Facility.

- Litter (e.g. food waste, packaging) from site amenities reaching local waterways;
- Leakage of effluent from site amenities;
- Excessive use of water resources;
- Excess packaging material deliveries increasing waste generated;
- Inappropriate reuse or disposal of waste items which may be hazardous;
- Fuel and oil spills during plant and equipment maintenance; and
- The location and storage of waste on site prior to reuse or disposal.

6.4. Mitigation measures

Table 6.6 provides the environmental control measures and safeguards that will be implemented in order to minimise waste generated during the construction and operation phases of the Facility.

Table 6.6. Environmental control measures.

Control Measures and Safeguards	Timing	Responsibility
Waste management and minimisation will form part of the induction program (which includes environmental due diligence training). All Project and site personnel will be trained in the requirements of this document including minimising wastes, recognising which types of materials are recyclable and their obligations to use recycling facilities provided on site.	Prior to starting on site / Ongoing	Operations Manager
Specific locations for waste management (e.g. sorting area locations, recycling bin locations, material stockpile locations) will be established on site and signposted appropriately.	Ongoing	Operations Manager
Waste management areas will be adequately managed to prevent sediment runoff and dust generation.	Ongoing	Operations Manager
Construction Method Statements (CMS) will include practices to minimise waste generation and to maximise recycling and reuse of materials including oils, greases, lubricants, timber, glass, and metal.	Prior to start of construction and ongoing	Operations Manager
Packaging minimisation and reuse initiatives will be implemented as part of procurement protocols.	Ongoing	Operations Manager
Segregated waste disposal containers for the collection and recycling/disposal of all waste streams generated during the construction and operation phases will be provided onsite. Waste disposal containers will have clear signage and instructions for use to avoid cross-contamination. No rubbish shall be disposed of on site.	Ongoing	Operations Manager
Waste will be disposed to an appropriate licensed facility. A Waste Management Register of all waste collected for disposal and / recycling, including amounts, data and time and details and location of disposal will be maintained at all times.	Ongoing	Operations Manager
All waste being transported off site must be covered. The transportation must be appropriately licensed to carry that material.	Ongoing	Operations Manager
Storage of all hazardous substances and dangerous goods will be in accordance with SDS requirements in a bunded area. Solid and hazardous wastes will be contained and separated from inert waste.	Ongoing	Operations Manager
Any hazardous waste (e.g. asbestos) will be managed and handled by an appropriately licensed contractor and transported for disposal to a licensed facility approved site	Ongoing	Operations Manager
Any material contaminated by spills i.e. fuel, oil, lubricants etc., including empty fuel, oil and chemical containers, will be stored in a sealed secure container within a bunded area and will be transported to a waste disposal site approved by the NSW EPA to accept such material.	Ongoing	Operations Manager

Control Measures and Safeguards	Timing	Responsibility
Incompatible wastes will not be mixed.	Ongoing	Operations Manager
Storage areas would be located away from waterways and the stormwater system.	Ongoing	Operations Manager
Biodegradable products will be used wherever practicable.	Ongoing	Operations Manager
Regular collection of wastes will ensure air emissions are at a satisfactory level. Inappropriate waste and wastewater management systems will be regularly inspected and audited.	Ongoing	Operations Manager
Conduct regular litter patrols to ensure litter is effectively controlled on site.	Ongoing	Operations Manager

6.5. Conclusion

This Waste Management Plan (WMP) has been prepared for the proposed Bark/Timber Processing and Landscape Supplies Production Facility (the Facility), at 26 Endeavour St, Oberon. The site is located on Lot 18 DP1249431 and parts of Lot 33 and 34 DP1228591, on land that was previously used for agricultural purposes but is currently unused. It is cleared and has no significant vegetation.

The proposed facility will process and recycle up to 99,000 tonnes per annum of pine bark residuals, including pallets. The site may also accept timbers from other sources. The intent of the facility is to provide a best practice, sustainable and well-designed facility to enable the beneficial recycling of pine bark, pallets and timbers into value-added landscape materials, with a focus on quality horticultural mulches for gardens and landscaping.

The proposed development will include an office, weighbridge, wheel wash, dedicated waste tipping and storage areas, including processing and product storage areas. The development will also involve construction of a hardstand, roads, drainage infrastructure, stormwater treatment infrastructure, landscaping and noise attenuation mounds / barriers. Car parking will also be established as part of the development.

The main sources of waste during the demolition / construction phase will be site clearing and construction of the hardstand and office building. The green waste resulting from site clearing will be mulched and re-used on site. Soil from the earthworks and site levelling will be re-used on site. Waste generated during the construction of the office building, etc. will be separated, with as much recycled as possible. It is expected that the recycling rate during the demolition / construction phase will be 95-100%.

During the operational phase, wood waste in the form of pinebark residue, wooden pallets and sawdust will be brought onto site for processing into mulch. The expected waste generation during the operational phase is expected to be a small amount of contamination from the incoming waste and municipal-type waste generated by employees (i.e. from lunches, etc.) Metal will be separated and sent off-site for recycling. Other contaminants will be disposed to landfill. It is expected that the recycling rate during the operational phase will be 95-100%.

Borg Plantations will seek authorisation to store up to 2,900 tonnes of material (both waste and product) at any one time as part of its Environmental Protection Licence.

By accepting and processing wooden pallets, the facility will contribute towards the C&I target of 70% in 2020-21, as set out in the *NSW Waste Avoidance and Resource Recovery Strategy 2014-21*.

7. Air quality

Todoroski Air Sciences Pty Ltd was engaged to conduct an Air Quality Impact Assessment (AQIA) for the development. The report presents an assessment of potential air quality impacts associated with the construction and operation of the proposed bark-timber processing and landscape supplies production facility. A copy of the full AQIA report is provided at Appendix J.

7.1. Methodology

7.1.1. Particulate matter

Particulate matter consists of dust particles of varying size and composition. Air quality goals refer to measures of the total mass of all particles suspended in air defined as the Total Suspended Particulate matter (TSP). The upper size range for TSP is nominally taken to be 30 micrometres (µm) as in practice particles larger than 30 to 50µm 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 goals, namely PM10, particulate matter with equivalent aerodynamic diameters of 10µm or less, and PM2.5, particulate matter with equivalent aerodynamic diameters of 2.5µm 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.

7.1.1.1. NSW EPA impact assessment criteria

Table 7.1 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*[5].

The air quality goals for total impact relate to the total dust burden in the air and not just the dust from the Project. Consideration of background dust levels needs to be made when using these goals to assess potential impacts.

Table 7.1. NSW EPA air quality impact assessment criteria. Source: NSW EPA, 2017[5]

Pollutant	Averaging Period	Impact	Criterion
TSP	Annual	Total	90µg/m^3
PM_{10}	Annual	Total	25µg/m^3
	24 hour	Total	50µg/m^3
$PM_{2.5}$	Annual	Total	8µg/m^3
	24 hour	Total	25µg/m^3
Deposited dust	Annual	Incremental	2g/m^2/month
		Total	4g/m^2/month

µg/m^3 = micrograms per cubic metre
g/m^2/month = grams per square metre per month

[5] NSW EPA (2017) Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales, NSW EPA, January 2017

7.1.2. Odour

7.1.2.1. Introduction

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

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

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

The range of a person's ability to detect odour varies greatly in the population, as does their sensitivity to the type of odour. The wide ranging response in how any particular odour is perceived by any individual poses specific challenges in the assessment of odour impacts and the application of specific air quality goals related to odour. The Technical Framework[6] (NSW DEC, 2006) sets out a framework specifically to deal with such issues.

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

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

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

7.1.2.2. Complex Mixtures of Odorous Air Pollutants

Table 7.2 presents the assessment criteria as outlined in the NSW EPA document *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales*[7]. This criterion has been refined to take into account the population densities of specific areas and is based on a 99th percentile of dispersion model predictions calculated as 1-second averages (nose-response time).

[6] NSW DEC (2006) *Technical Framework Assessment and Management of Odour from Stationary Sources in NSW*, Department of Environment and Conservation (DEC) NSW, November 2006.

[7] NSW EPA (2017) Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales, NSW EPA, January 2017

Table 7.2. Impact assessment criteria for complex mixtures of odorous air pollutants (nose-response-time average, 99th percentile). Source: NSW EPA, 2017[6]

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

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

7.1.3. Protection of the Environment Operations Act 1997

The general obligations of the Protection of the Environment Operations Act, 1997 and the Regulations made under the Act (namely the *Protection of the Environment Operations (Clean Air) Regulation* 2010) would be followed at the Project and the Project would be operated in accordance with the relevant regulatory framework for air quality to ensure compliance with this legislation.

7.1.4. Dispersion modelling

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

Details of the dispersion modelling methodology is provided in Chapter 7 of the attached Air Quality Impact Assessment (Appendix M).

7.2. Existing environment

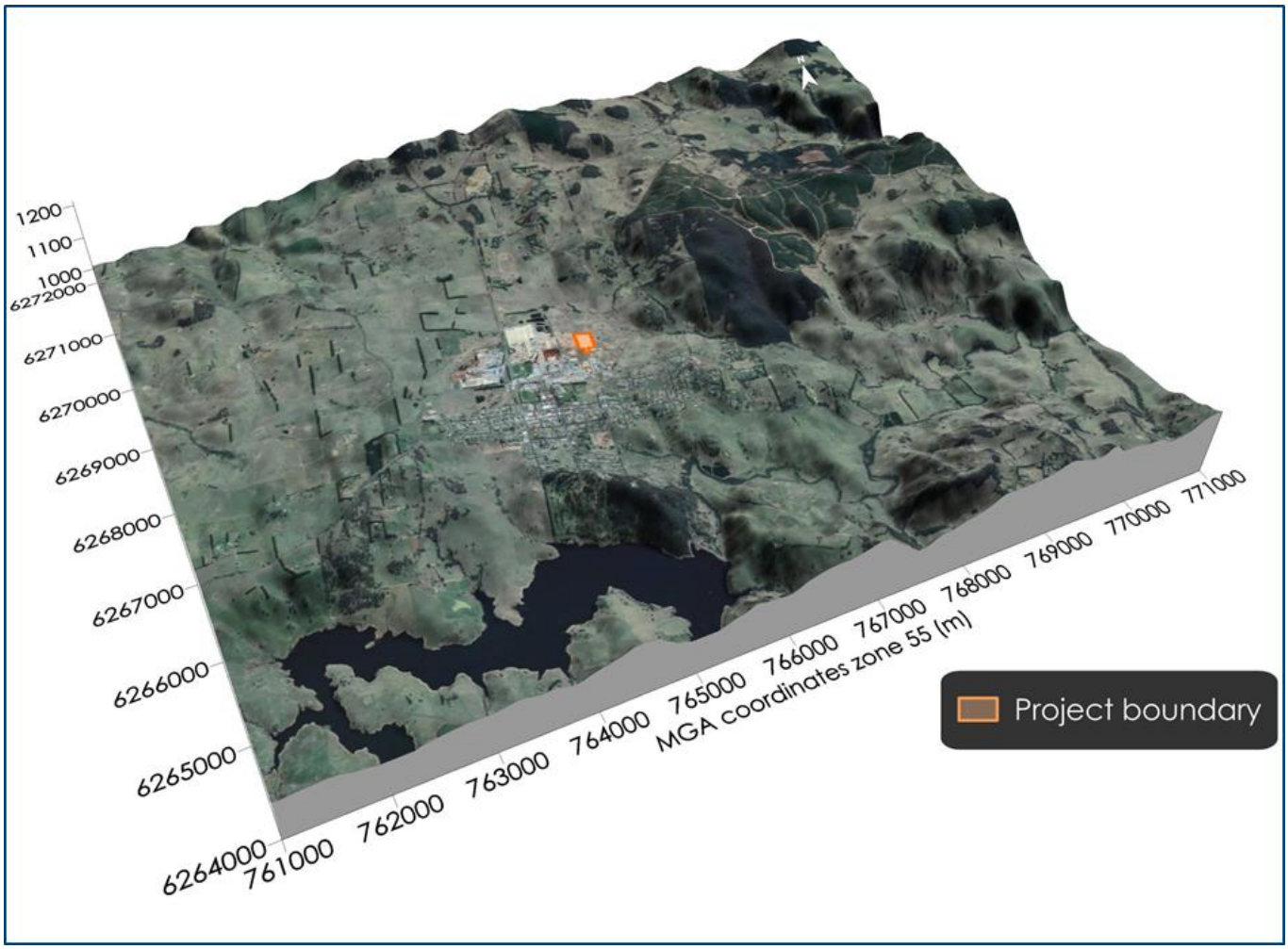
The land use in the surrounding area is characterised by predominantly agricultural land to the north and east, with the residential areas of Oberon to the south of the industrial precinct in which the Project is located.

Figure 7.1 presents the location of the Project and nearby sensitive receptors considered in this study. The nearest sensitive receptors are located approximately 600 metres (m) to the south of the Project.

Figure 7.1. Project site overview.

Figure 7.2 presents a pseudo three-dimensional visualisation of the topography in the general vicinity of the Project area. The Project site is situated in a relatively flat zone that is surrounded by areas of higher elevation with Lake Oberon located to the south.

Figure 7.2. Representative visualisation of topography in the area surrounding the Project.



7.2.1. Local climatic conditions

Long-term climatic data from the closest Bureau of Meteorology (BoM) weather station at Bathurst Airport AWS (Automatic weather station) (Site No. 063291) were analysed to characterise the local climate in the proximity of the Project. The Bathurst Airport AWS is located approximately 37 kilometres (km) northwest of the Project.

Table 7.3 and Figure 7.3 present a summary of data from the Bathurst Airport AWS collected over an 18 to 27 year period for the various meteorological parameters.

The data indicate that January is the hottest month with a mean maximum temperature of 28.7 degrees Celsius (ºC) and July is the coldest month with a mean minimum temperature of 0.8ºC.

Rainfall is higher during the warmer months of the year and declines during the colder months, with an annual average rainfall of 607.6 millimetres (mm) over 69.9 days. The data indicate that December is the wettest month with an average rainfall of 74.2mm over 7.0 days and May is the driest month with an average rainfall of 32.5mm over 4.5 days.

Relative humidity is higher during the colder months of the year. Mean 9am relative humidity ranges from 66% in December to 91% in June. Mean 3pm relative humidity levels range from 40% in December and January to 64% in June.

Wind speeds decrease slightly in the colder months and are highest during spring. Mean 9am wind speeds range from 8.1 kilometres per hour (km/h) in May to 12.5km/h in September and October. Mean 3pm wind speeds range from 15.9 km/h in May to 21.0 km/h in September.

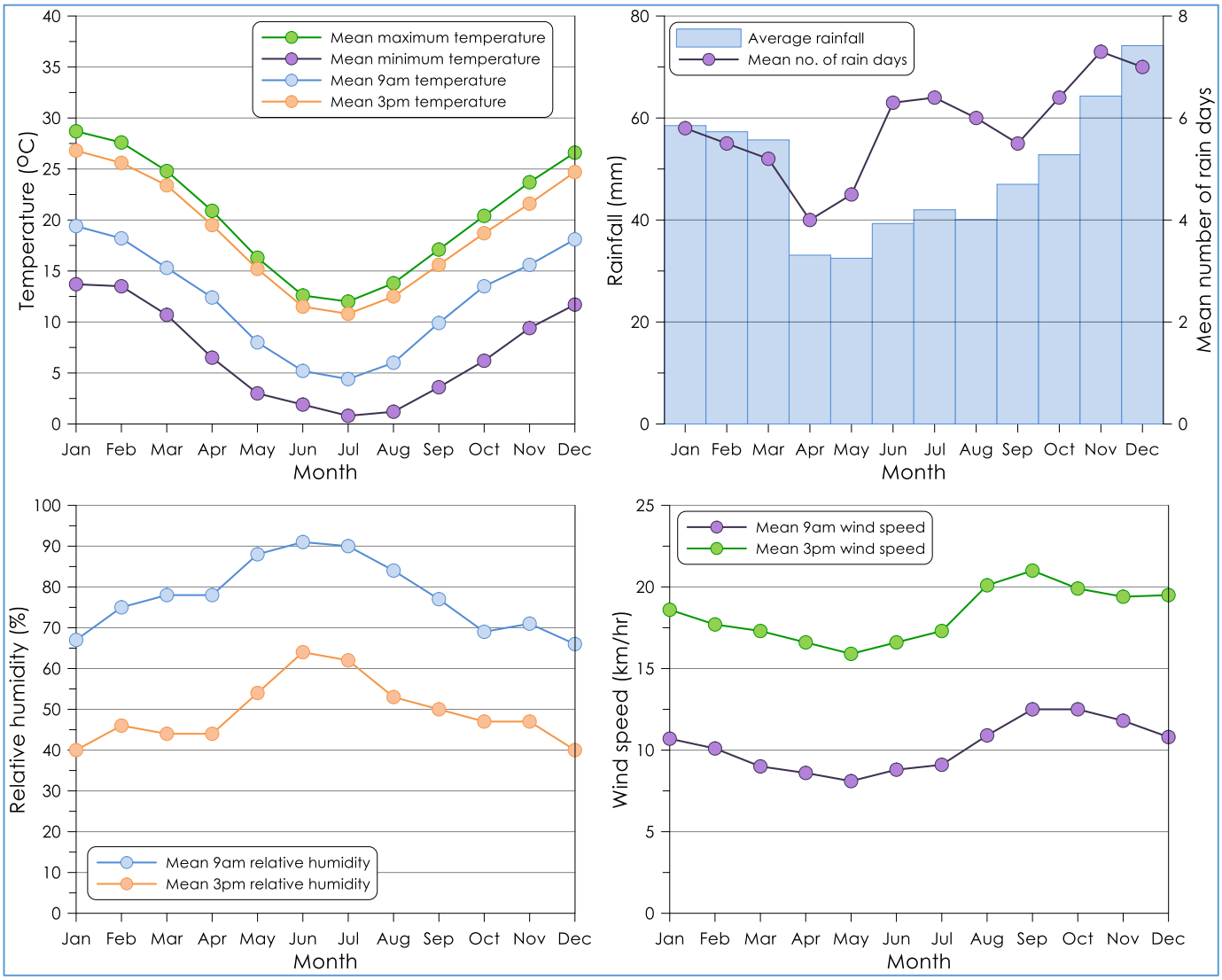
Table 7.3. Monthly climate statistics summary – Bathurst Airport AWS. Source: Bureau of Meteorology, 2018[8]

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann.
Temperature													
Mean max. temp. (°C)	28.7	27.6	24.8	20.9	16.3	12.6	12.0	13.8	17.1	20.4	23.7	26.6	20.4
Mean min. temp. (°C)	13.7	13.5	10.7	6.5	3.0	1.9	0.8	1.2	3.6	6.2	9.4	11.7	6.9
Rainfall													
Rainfall (mm)	58.5	57.3	55.7	33.1	32.5	39.3	42.0	40.1	47.0	52.8	64.3	74.2	607.6
No. of rain days (≥1mm)	5.8	5.5	5.2	4.0	4.5	6.3	6.4	6.0	5.5	6.4	7.3	7.0	69.9
9am conditions													
Mean temp. (°C)	19.4	18.2	15.3	12.4	8.0	5.2	4.4	6.0	9.9	13.5	15.6	18.1	12.2
Mean R.H. (%)	67	75	78	78	88	91	90	84	77	69	71	66	78
Mean W.S. (km/h)	10.7	10.1	9.0	8.6	8.1	8.8	9.1	10.9	12.5	12.5	11.8	10.8	10.2
3pm conditions													
Mean temperature (°C)	26.8	25.6	23.4	19.5	15.2	11.5	10.8	12.5	15.6	18.7	21.6	24.7	18.8
Mean R.H. (%)	40	46	44	44	54	64	62	53	50	47	47	40	49
Mean W.S. (km/h)	18.6	17.7	17.3	16.6	15.9	16.6	17.3	20.1	21.0	19.9	19.4	19.5	18.3

R.H. – Relative Humidity, W.S. – wind speed

[8] Bureau of Meteorology (2018) Climate Averages Australia, Bureau of Meteorology website.

Figure 7.3. Monthly climate statistics summary – Bathurst Airport AWS.



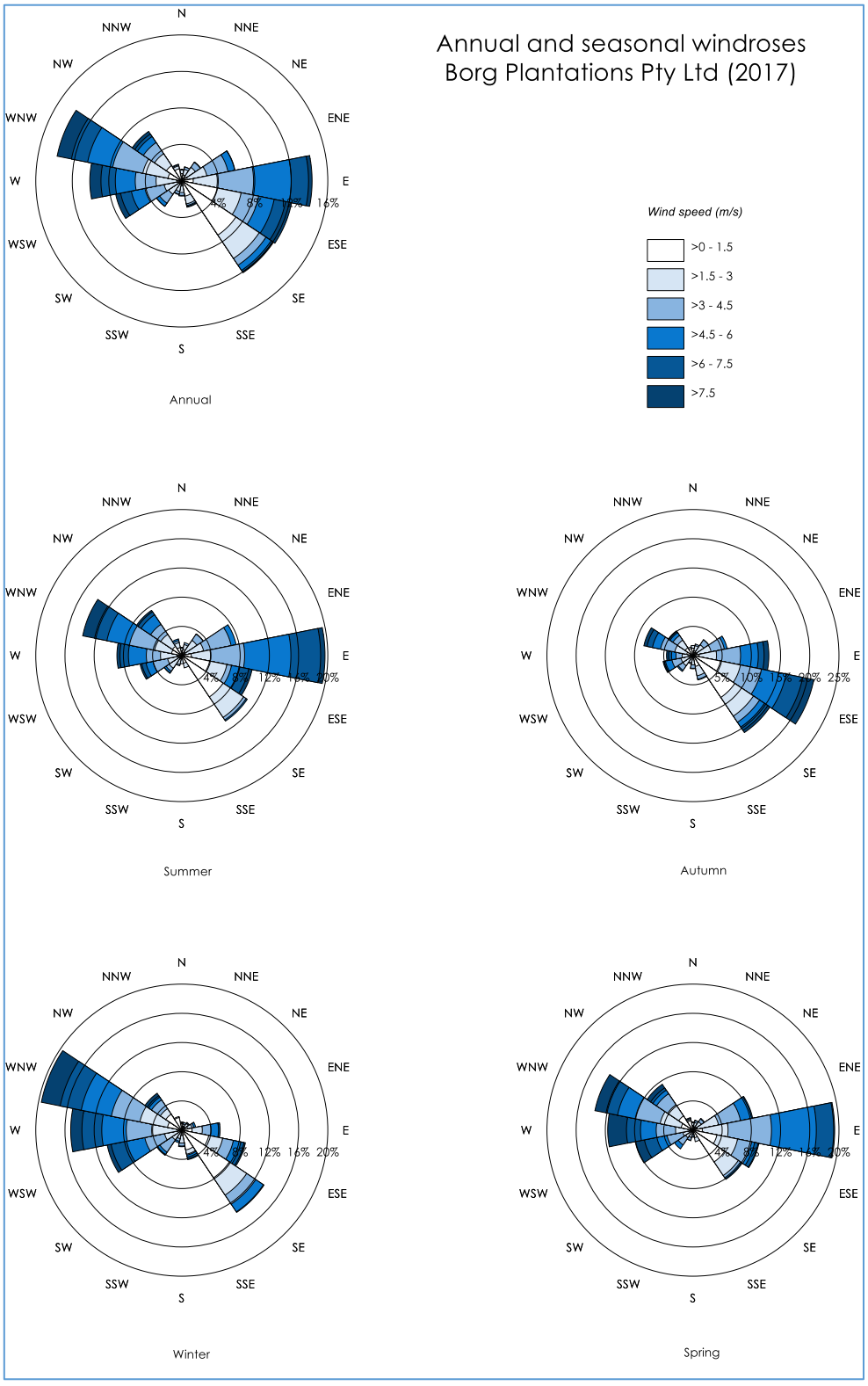
7.2.2. Local meteorological conditions

Annual and seasonal windroses for the Borg Plantations Pty Ltd weather station during the 2017 calendar period are presented in Figure 7.4.

The 2017 calendar year was selected as the meteorological year for the dispersion modelling based on analysis of meteorological data recorded for the area and other parameters as outlined in Appendix A of the AQIA (Appendix M).

On an annual basis, the winds predominantly arise from the west-northwest and from the east to the southeast. In summer, winds are predominantly from the west-northwest and the east. In autumn, winds from the east to the southeast are the most frequent. During winter, winds typically arise from the west-northwest to the west-southwest and from the southeast. Spring has a similar wind distribution to summer, with frequent winds from the east.

Figure 7.4. Annual and seasonal windroses – Borg Plantations Pty Ltd weather station (2017).



7.2.3. Local air quality monitoring

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.

Ambient air quality monitoring data for the Project site are not available. Therefore the 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 monitor at Bathurst is approximately 42.1km northwest of the site.

7.2.3.1. PM_{10} monitoring

A summary of the available data from the Bathurst monitoring station from 2013 to 2017 is presented in Table 7.4. Recorded 24-hour average PM_{10} concentrations are presented in Figure 11.5.

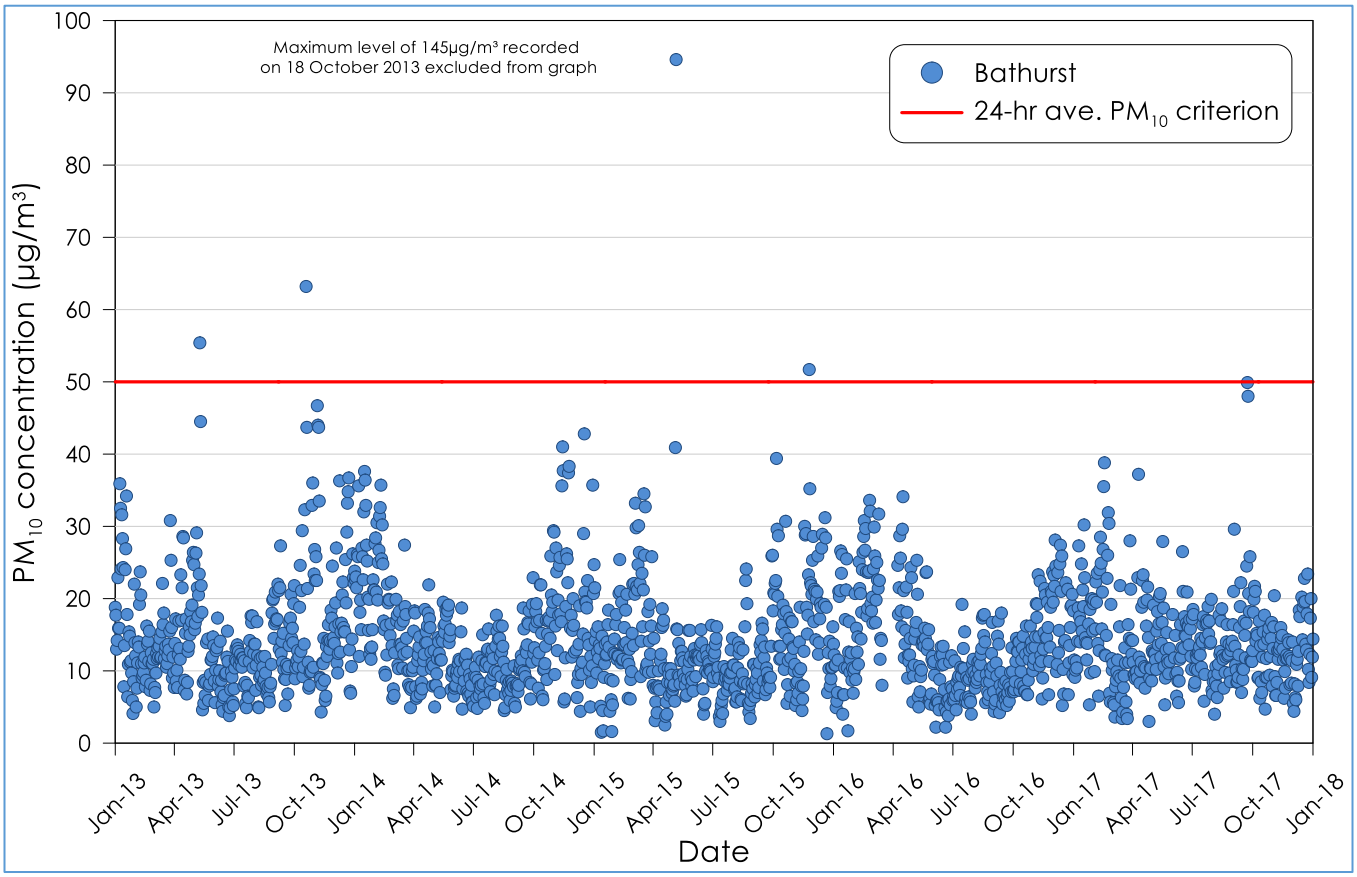
A review of Table 7.4 indicates that the annual average PM_{10} concentrations for the Bathurst monitoring station were below the relevant criterion of 25µg/m³ during the review period. The maximum 24-hour average PM_{10} concentration recorded at the station was found to exceed the relevant criterion of 50µg/m³ on occasion during the review period.

It can be seen from Figure 7.5 that PM_{10} 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 increased pollen levels.

Table 7.4. Summary of PM_{10} levels from Bathurst (µg/m³).

Year	Bathurst Annual average	Criterion
2013	15.1	25
2014	14.6	25
2015	13.4	25
2016	13.3	25
2017	14.1	25
	Maximum 24-hour average	
2013	145.0	50
2014	42.8	50
2015	94.6	50
2016	34.1	50
2017	49.9	50

Figure 7.5. 24-hour average PM_{10} concentrations.



7.2.3.2. $PM_{2.5}$ monitoring

A summary of the $PM_{2.5}$ readings from the Bathurst monitoring station is presented in Table 7.5. The recorded 24-hour average $PM_{2.5}$ concentrations are presented in Figure 11.6.

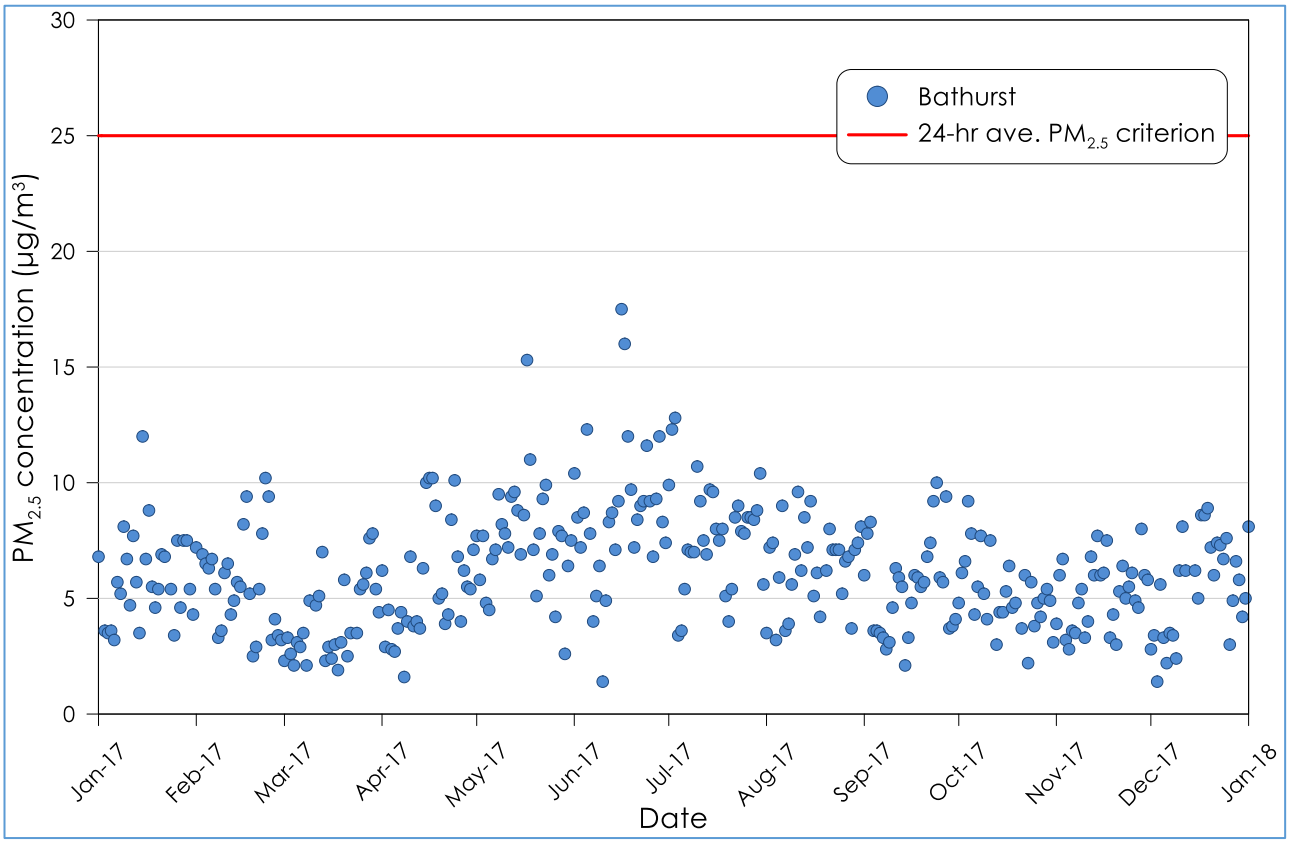
Data were only available for 2017 and indicate that $PM_{2.5}$ levels were below the annual average criterion of 8µg/m³ during this period and that the maximum 24-hour average levels were also below the criterion of 25µg/m³.

It can be seen from Figure 7.6 that $PM_{2.5}$ concentrations are higher in the cooler months compared to the warmer months, which may be attributed to the contribution of wood smoke emitted by wood heaters and other combustion sources.

Table 7.5. Summary of $PM_{2.5}$ levels from Bathurst (µg/m³).

Year	Bathurst Annual average	Criterion
2017	6.1	8
	Maximum 24-hour average	
2017	17.5	25

Figure 7.6. 24-hour average $PM_{2.5}$ concentrations.



7.2.4. Estimated background dust levels

7.2.4.1. PM_{10} and $PM_{2.5}$ concentrations

As outlined above, there are no readily available site specific monitoring data, and therefore, the background dust levels around the Project site were estimated to be similar to those recorded at the Bathurst monitoring site.

Annual average PM_{10} and $PM_{2.5}$ values from the Bathurst monitoring station, for the 2017 calendar period were used to represent the background levels for the Project (see Table 7.4 and Table 7.5). The 2017 calendar period corresponds to the period of meteorological modelling used in this assessment.

The background levels for air quality data at the Project site would likely be lower than in the urban environments of Bathurst.

7.2.4.2. 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 PM_{10}, TSP and deposited dust concentrations and the measured PM_{10} levels.

This relationship assumes that an annual average PM_{10} concentration of 25 µg/m^3 corresponds to a TSP concentration of 90 µg/m^3 and a dust deposition value of 4 g/m^2/month. This assumption is based on the NSW EPA air quality impact criteria.

Applying this relationship with the measured annual average PM_{10} concentration of 14.1 µg/m^3 indicates an approximate annual average TSP concentration and deposition value of 50.8 µg/m³ and 2.3 g/m^2/month, respectively.

7.2.4.3. Summary of background dust levels

The annual average background air quality levels applied in this assessment are as follows:

- $PM_{2.5}$ concentrations – 6.1 µg/m³;
- PM_{10} concentrations – 14.1 µg/m³;
- TSP concentrations – 50.8 µg/m³; and,
- Deposited dust levels – 2.3 g/m²/month.

7.3. Impact assessment

7.3.1. Construction phase – assessment of potential dust emissions

The establishment of the Project would involve the construction of the associated infrastructure. This construction activity has the potential to generate dust emissions.

Potential construction dust emissions will be primarily generated due to material handling, vehicle movements, windblown dust generated from exposed areas and stockpiles. Exhaust emissions from the operation of construction vehicles and plant.

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

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

7.3.2. Operational phase – dispersion modelling results

This section provides a summary of the modelling results for the operational phase of the project. More details are provided in the AQIA at Appendix M.

7.3.2.1. Dust concentrations

Table 7.6 presents the predicted incremental 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 7.6. Particulate dispersion modelling results for sensitive receptor – Incremental impact.

Receptor ID	$PM_{2.5}$ (µg/m³) 24-hour average	$PM_{2.5}$ (µg/m³) Annual average	PM_{10} (µg/m³) 24-hour average	PM_{10} (µg/m³) Annual average	TSP (µg/m³) Annual average	DD (g/m²/month) Annual average
Air quality impact criteria	-	-	-	-	-	2
R1	0.1	<0.01	0.5	<0.1	0.1	0.01
R2	0.2	0.01	1.3	0.1	0.2	0.03
R3	0.2	0.01	1.1	<0.1	0.1	0.01
R4	0.2	0.01	1.4	<0.1	0.1	0.01
R5	0.3	0.01	1.8	0.1	0.2	0.01
R6	0.2	0.01	1.2	<0.1	0.1	<0.01
R7	0.2	0.01	1.3	<0.1	0.1	<0.01
R8	0.2	0.01	1.3	<0.1	0.1	<0.01
R9	0.2	0.01	1.4	<0.1	0.1	<0.01
R10	0.2	0.01	1.2	<0.1	0.1	<0.01
R11	0.2	0.01	1.4	0.1	0.1	<0.01
R12	0.2	0.01	1.1	0.1	0.1	0.01
R13	0.2	0.01	1.1	0.1	0.2	0.01
R14	0.2	0.01	1.1	0.1	0.2	0.01
R15	0.2	0.01	1.1	0.1	0.2	0.01
R16	0.2	0.02	1.2	0.1	0.2	0.01
R17	0.1	<0.01	0.4	<0.1	<0.1	<0.01
R18	<0.1	<0.01	0.3	<0.1	<0.1	<0.01
R19	<0.1	<0.01	0.3	<0.1	<0.1	<0.01
R20	0.1	0.01	0.9	0.1	0.1	0.02
R21	<0.1	<0.01	0.3	<0.1	<0.1	<0.01
R22	<0.1	<0.01	0.3	<0.1	<0.1	<0.01
R23	<0.1	<0.01	0.3	<0.1	<0.1	<0.01
R24	<0.1	<0.01	0.3	<0.1	<0.1	<0.01
R25	<0.1	<0.01	0.3	<0.1	<0.1	<0.01
R26	0.1	0.01	0.6	0.1	0.1	0.01
R27	0.1	0.01	0.7	0.1	0.2	0.01
R28	0.1	0.01	0.9	0.1	0.2	0.01
R29	0.1	0.01	0.6	0.1	0.1	0.01
R30	0.1	0.01	0.6	<0.1	0.1	<0.01
R31	0.1	<0.01	0.4	<0.1	<0.1	<0.01
R32	0.1	<0.01	0.4	<0.1	<0.1	<0.01
R33	0.1	<0.01	0.4	<0.1	<0.1	<0.01
R34	0.1	<0.01	0.4	<0.1	<0.1	<0.01
R35	0.1	<0.01	0.5	<0.1	0.1	<0.01
R36	0.1	<0.01	0.5	<0.1	0.1	<0.01
R37	0.1	0.01	0.9	0.1	0.1	0.01

The cumulative (total) impact is defined as the modelling impact associated with the operation of the Project combined with the other existing sources and the estimated ambient background levels in Section 7.2. The predicted cumulative annual average $PM_{2.5}$, PM_{10}, TSP and dust deposition levels due to the Project with the estimated background levels are presented in Table 7.7.

Cumulative 24-hour $PM_{2.5}$ and PM_{10} impacts are considered in detail below.

The results in Table 7.7 indicate that all of the assessed sensitive receptors are predicted to experience levels below the relevant criteria for each of the assessed dust metrics.

Table 7.7. Particulate dispersion modelling results for sensitive receivers – Cumulative impact.

Receptor ID	$PM_{2.5}$ (µg/m³)	PM_{10} (µg/m³)	TSP (µg/m³)	DD (g/m²/month)
	Annual average Air quality impact criteria			
	8	25	90	4
R1	6.1	15.7	53.2	2.3
R2	6.1	23.7	64.0	2.3
R3	6.1	16.1	53.9	2.3
R4	6.1	16.0	53.9	2.3
R5	6.1	16.3	54.0	2.3
R6	6.1	15.3	52.5	2.3
R7	6.1	15.4	52.6	2.3
R8	6.1	15.5	52.7	2.3
R9	6.1	15.7	53.0	2.3
R10	6.1	15.3	52.7	2.3
R11	6.1	15.7	53.0	2.3
R12	6.1	15.7	53.1	2.3
R13	6.1	15.8	53.3	2.3
R14	6.1	15.8	53.2	2.3
R15	6.1	15.7	53.2	2.3
R16	6.1	15.7	53.2	2.3
R17	6.1	15.3	52.6	2.3
R18	6.1	15.6	52.9	2.3
R19	6.1	18.9	57.2	2.3
R20	6.1	18.6	57.5	2.3
R21	6.1	14.7	51.9	2.3
R22	6.1	14.7	51.8	2.3
R23	6.1	14.6	51.7	2.3
R24	6.1	14.8	52.0	2.3
R25	6.1	14.8	51.9	2.3
R26	6.1	15.3	52.7	2.3
R27	6.1	15.7	53.3	2.3
R28	6.1	15.8	53.5	2.3
R29	6.1	15.5	53.0	2.3
R30	6.1	15.5	53.0	2.3
R31	6.1	14.6	51.6	2.3
R32	6.1	15.0	52.3	2.3
R33	6.1	15.1	52.4	2.3
R34	6.1	15.2	52.6	2.3
R35	6.1	15.3	52.7	2.3
R36	6.1	15.3	52.7	2.3
R37	6.1	18.2	56.9	2.3

7.3.2.2. Assessment of Total (Cumulative) 24-hour average $PM_{2.5}$ and PM_{10} Concentrations

An assessment of total (cumulative) 24-hour average $PM_{2.5}$ and PM_{10} impacts was undertaken in general accordance with the methods outlined in the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales*[9].

A Level 1 contemporaneous assessment approach where the maximum measured background level is added to the maximum predicted dust level from the Project and other sources has been applied to assess cumulative $PM_{2.5}$ impacts.

A Level 2 contemporaneous assessment approach where the measured background levels are added to the days corresponding predicted dust level from the Project and other sources has been applied to assess cumulative PM_{10} impacts.

Ambient (background) $PM_{2.5}$ and PM_{10} concentration data corresponding with the year of modelling (2017) from the NSW OEH monitoring site at Bathurst have been applied in this case to represent the prevailing background levels in the vicinity of the Project and representative sensitive receptor locations.

Assessment of cumulative 24-hour average $PM_{2.5}$ and PM_{10} was conducted in accordance with the NSW EPA Level 1 and Level 2 contemporaneous assessment methods as outlined in the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales*[9] to examine the potential maximum total (cumulative) 24-hour average $PM_{2.5}$ and PM10 impacts for the Project.

Table 7.8 provides a summary of the findings from the Level 2 assessment at representative receptor locations for both PM_{10} and $PM_{2.5}$. Detailed tables of the assessment results are provided in AQIA, provided at Appendix M.

The results indicate that the Project does not increase the number of days above the 24-hour average criterion at the assessed receptors.

Table 7.8. NSW EPA contemporaneous assessment - maximum number of additional days above 24-hour average criterion.

Receptor ID	$PM_{2.5}$	PM_{10}
R5	0	0
R20	0	0
R24	0	0
R28	0	0
R30	0	0

Time series plots of the predicted cumulative 24-hour average PM_{10} concentrations for R5 and R20 are presented in Figure 7.7 and Figure 7.8.

The orange bars in the figures represent the contribution from the Project, the blue bars represent the contribution from the modelled existing sources and the purple bars represent the background levels from Bathurst. It is clear from the figures that the Project has a relatively small influence at the receptor locations.

[9] NSW EPA (2017) Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales, NSW EPA, January 2017

Figure 7.7. Time series plots of predicted cumulative 24-hour average PM_{10} concentrations for R5.

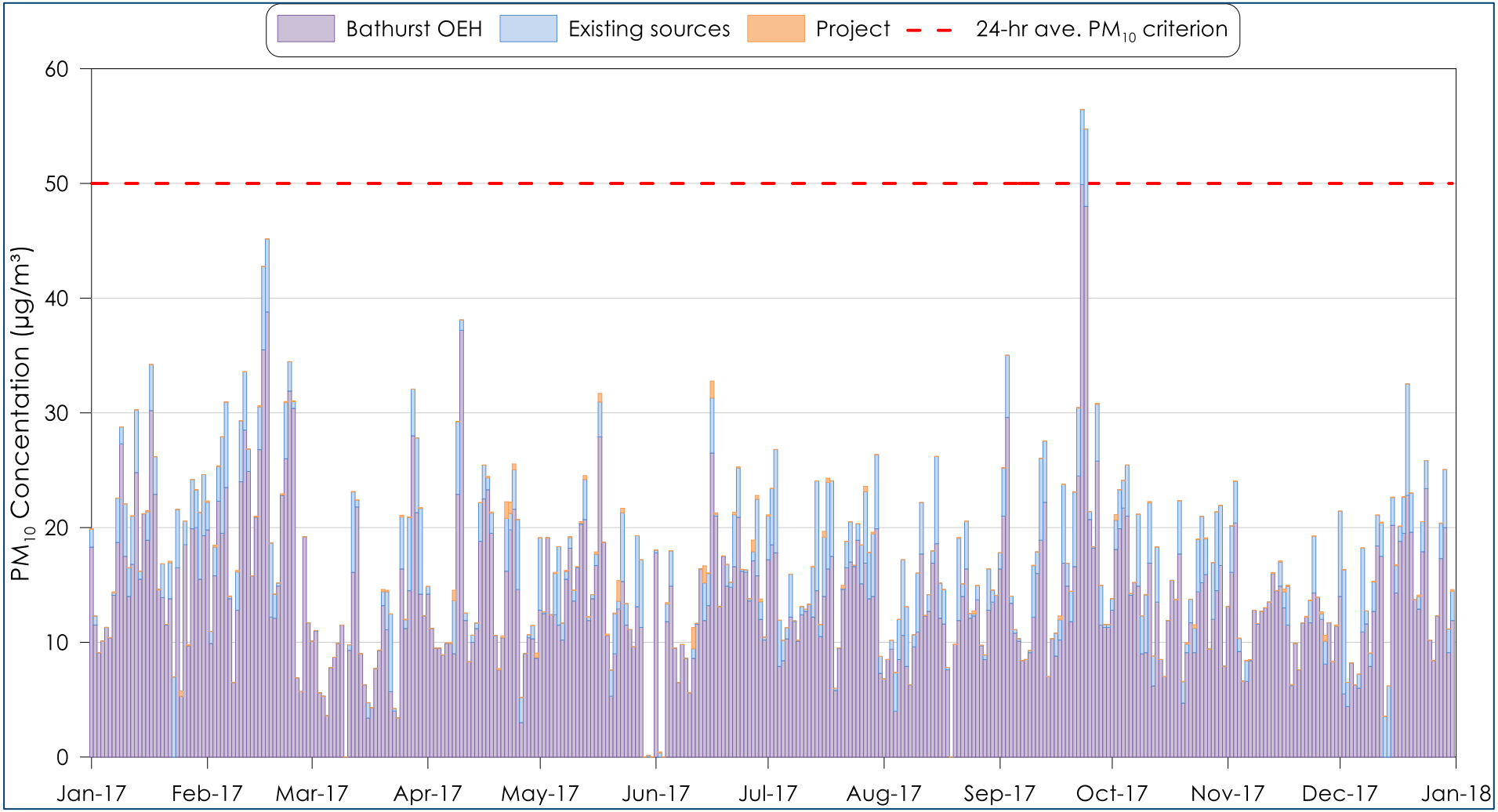
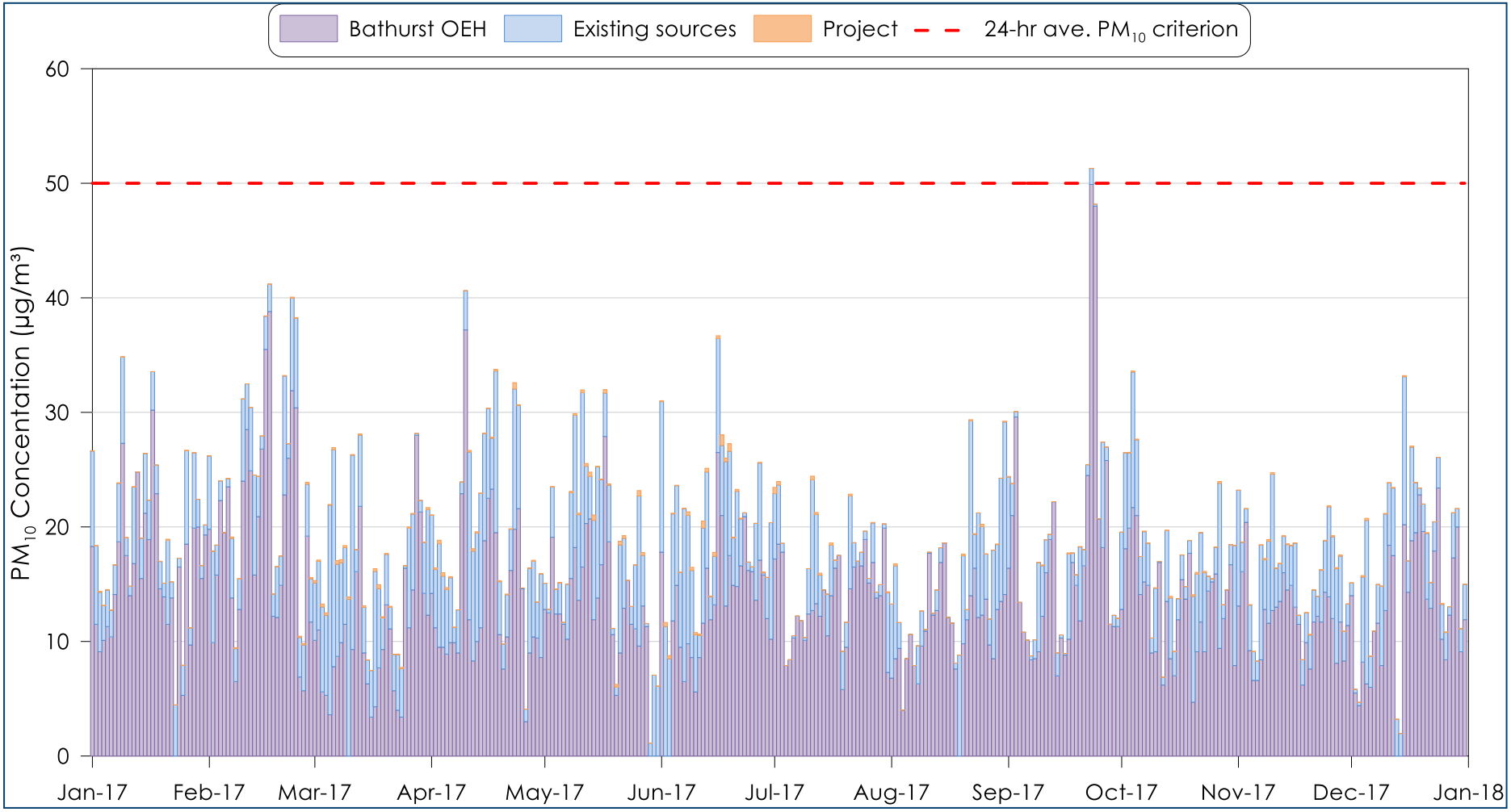


Figure 7.8. Time series plots of predicted cumulative 24-hour average PM_{10} concentrations for R20.



7.4. Mitigation measures

7.4.1. Construction phase

To ensure dust generation is controlled during the construction activities and the potential for off-site impacts is reduced, appropriate (operational and physical) mitigation measures will be implemented as necessary. Suggested dust mitigation measures to apply during construction are outlined in Table 7.9.

Table 7.9. Suggested construction dust mitigation measures.

Source	Mitigation measure
General	Activities to be assessed during adverse weather conditions and modified as required (e.g. cease activity where reasonable levels of visible dust cannot be maintained).
	Engines of on-site vehicles and plant to be switched off when not in use.
	Vehicles and plant are to be fitted with pollution reduction devices where practicable.
	Vehicles are to be maintained and serviced according to manufacturer's specifications.
	Visual monitoring of construction activities is to be undertaken to identify dust generation.
Hauling material/ vehicle movements	Any hardstand on-site to be swept/cleaned regularly as required etc.
	Construction vehicle traffic is to be restricted to designated routes.
	Construction speed limits are to be enforced.
	Vehicle loads are to be covered when travelling off-site.
Material handling	Drop heights from loading and handling equipment are to be reduced as much as practical.
Exposed areas / stockpiles	The extent of exposed surfaces and stockpiles is to be kept to a minimum.
	Exposed areas and stockpiles are either to be covered or are to be dampened with water as far as is practicable if dust emissions are visible.

7.4.2. Operational phase

The proposed operations at the Project have the potential to generate dust emissions.

To ensure activities associated with the Project have a minimal effect on the surrounding environment and at sensitive receptor locations, it is recommended that appropriate operational and physical mitigation measures should be implemented where feasible and reasonable as outlined in Table 7.10.

Table 7.10. Potential operational dust mitigation options.

Source	Mitigation Measure
General	Activities to be assessed during adverse weather conditions and modified as required (e.g. cease activity where reasonable levels of dust cannot be maintained using the available means).
	Weather forecast to be checked prior to undertaking material handling or processing.
	Engines of on-site vehicles and plant to be switched off when not in use.
	Vehicles and plant are to be fitted with pollution reduction devices where practicable.
	Vehicles are to be maintained and serviced according to manufacturer's specifications.
	Visual monitoring of activities is to be undertaken to identify dust generation.
Exposed areas / stockpiles	The extent of exposed surfaces and stockpiles is to be kept to a minimum.
	Exposed areas and stockpiles are either to be covered or are to be dampened with water as far as is practicable if dust emissions are visible, or there is potential for dust emissions outside operating hours.
	Minimise dust generation by undertaking rehabilitation earthworks when topsoil and subsoil stockpiles are moist and/or wind speed is below 10 m/s.
Material handling	Reduce drop heights from loading and handling equipment where practical.
	Dampen material when excessively dusty during handling.

Source	Mitigation Measure
Hauling activities	Any hardstand on-site or public roads to be swept/cleaned regularly as required etc.
	Vehicle traffic is to be restricted to designated routes.
	Speed limits are to be enforced.
	Vehicle loads are to be covered when travelling off-site.

7.5. Conclusion

The AQIA assessed the potential air quality impacts associated with the operation of the Borg Plantations bark-timber processing and landscape supplies production facility.

Air dispersion modelling was used to predict the potential for off-site dust impacts in the surrounding area due to the operation the Project. The estimated emissions of dust applied in the modelling are likely to be conservative and would overestimate the actual impacts.

It is predicted that all the assessed air pollutants generated by construction and operation of the Project would comply with the applicable assessment criteria at the sensitive receptors and therefore would not lead to any unacceptable level of environmental harm or impact in the surrounding area.

Nevertheless, the site would apply appropriate dust 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 receivers in the surrounding environment.

8. Noise and Vibration

Spectrum Acoustics was engaged to conduct a noise and vibration impact assessment (NVIA) for the proposed development. The full report is provided at Appendix G.

8.1. Methodology

8.1.1. Noise assessment criteria

8.1.1.1. Operational Noise

The approval and control of noise emissions from commercial and industrial premises in NSW is usually based on procedures and criteria detailed in the Noise Policy for Industry[10] (NPI).

The NPI describes intrusive and amenity criteria applicable to potential impacts at residences as a result of industrial noise. These noise criteria depend on the existing background noise level at potentially affected residential receiver areas.

The proposed facility will be located within the Oberon Timber Complex (OTC) which is in the Oberon Industrial Area. The OTC is a collection of four individual timber processing facilities. The acoustic environment of the residential areas in and around Oberon is significantly influenced by noise emissions from the OTC.

Borgs currently operates an MDF manufacturing facility in the OTC at a location nearby to the site of the current assessment. The MDF facility operates in accordance with Environment Protection licence (EPL 3035) which contains noise limits as follows:

L4 Noise Limits

L4.1 Noise from the premises must not exceed

a) 55 dB(A) L_{eq} (15 min) during the day (7am to 6pm); and

b) 50 dB(A) L_{eq} (15 min) during the evening (6pm to 10pm); and

c) At all other times 45 dB(A) L_{eq} (15 min), except as expressly provided by this licence.

To quantify the existing acoustic environment of the area unattended noise logging was undertaken in October 2018.

All logging measurements were done in accordance with relevant OEH guidelines and AS 1055-1997 “Acoustics – Description and Measurement of Environmental Noise”. The noise loggers used comply with the requirements of AS 1259.2-1990 “Acoustics – Sound Level Meters”, and had current National Association of Testing Authorities (NATA) calibration certification.

The loggers were programmed to continuously register environmental noise levels over the 15 minute intervals, with internal software calculating and storing Ln percentile noise levels for each sampling period.

The acoustic environment of the logger locations would have been influenced by noise from the existing industrial and commercial activity in the OTC and the Oberon Industrial Area.

[10] NSW EPA (2017), Noise Policy for Industry, www.epa.nsw.gov.au/your-environment/noise/industrial-noise/noise-policy-for-industry-(2017)

Logger 1 was located at the residence at number 127 Hazelgrove Road, to the north east of the site (as shown in Figure 8.1). The residences in this area are the closest to the site. The logger was in place between 17 and 25 October, 2018. The relevant measured noise levels from Logger 1 are detailed in Table 8.4.

In setting noise goals for a particular project the NPI considers both Amenity and Intrusiveness criteria. The former is set to limit continuing increase in noise from industry, whilst the latter is set to minimise the intrusive impact of a particular noise source.

Amenity criteria are dependent upon the nature of the receiver area and the existing level of industrial noise.

Residential receivers in the Hazelgrove Road vicinity would be considered "suburban" as per the definitions in the NPI and shown below (extract from Table 2.3 of the NPI).

Suburban – an area that has local traffic with characteristically intermittent traffic flows or with some limited commerce or industry. This area often has the following characteristic:

- evening ambient noise levels defined by the natural environment and human activity.

The most potentially affected receivers to the south of the site, in Oberon, would be considered "urban" as per the definitions in the NPI and shown below (extract from Table 2.3 of the NPI).

Urban – an area with an acoustical environment that:

- is dominated by 'urban hum' or industrial source noise, where urban hum means the aggregate sound of many unidentifiable, mostly traffic and/or industrial related sound sources,
- has through-traffic with characteristically heavy and continuous traffic flows during peak periods,
- is near commercial districts or industrial districts, or
- has any combination of the above.

The project amenity noise level (as an L_{eq} (15 min)) for an industrial development is equal to the recommended amenity noise level (from Table 2.2 in the NPI, and detailed above) minus 2 dB(A) (as detailed in the notes to Table 8.1, below). The intrusiveness criteria are based on the Rating Background Level (RBL) for the time period, plus 5 dB(A). The RBL (L_{90}) is defined as the overall single figure background level representing each assessment period.

The project noise trigger level (criterion) is the lower of the intrusiveness and amenity noise levels as specified in Table 8.1 for each receiver area. As the facility will only operate during the day, only day time criteria have been determined.

Table 8.1. Noise criteria.

Location	Criterion	Day (7am – 6pm)
Hazelgrove Rd	Intrusiveness dB(A),L_{eq}(15-min.)[1]	40
	Amenity dB(A), L_{eq} (15 min)[2]	53
	Project Noise Trigger Level	40 (15 min.)
Oberon	Intrusiveness dB(A), L_{eq} (15-min.)[1]	45
	Amenity dB(A), L_{eq} (15 min)[3]	58
	Project Noise Trigger Level	47 (15 min.)

[1] Rating Background Level (RBL) + 5dB.
[2] Project amenity noise level (ANL) is suburban ANL (NPI Table 2.1) minus 5 dB(A) plus 3 dB(A) to convert from a period level to a 15-minute level.
[3] Project amenity noise level (ANL) is urban ANL (NPI Table 2.1) minus 5 dB(A) plus 3 dB(A) to convert from a period level to a 15-minute level.

The NPI contains noise criteria for other potentially sensitive receivers which are based on absolute levels and do not relate to the existing ambient noise levels. These criteria are as;

- School classroom (internal) - **35 dB(A) noisiest 1 hour**,
- Caravan Park (permanent resident) - **60 dB(A) Leq (15 min).** This being 5dB above the recommended amenity criterion for the equivalent residential receiver,
- Industrial Premises - **70 dB(A) Leq** for the period "when in use".

8.1.1.2. Sleep Disturbance

As the facility will not operate between 10pm and 7am, the potential for sleep disturbance need not be assessed as per procedures in the NPI.

8.1.2. Construction Noise

The assessment of potential construction noise impacts is undertaken in accordance with the *Interim Construction Noise Guideline* (ICNG, 2009) and *Assessing Vibration: A Technical Guideline* (AVTG, 2006). These guidelines are non-mandatory but are usually referred to by local councils and the NSW Department of Planning and Infrastructure (DP&I) when construction/demolition works require development approval.

The criteria in the ICNG cover all activities and machinery associated with construction on the site including, but not limited to, site preparation, excavation work and erection of buildings and related infrastructure. It is designed to ensure noise emissions resulting from the construction are maintained to minimise potential impacts to nearby receivers.

8.1.2.1. Interim Construction Noise Guideline (ICNG)

Section 1.5 of the ICNG outlines the steps for management of construction noise impacts as follows:

1. identify sensitive land uses that may be affected.
2. identify hours for the proposed construction works.
3. identify impacts at sensitive land uses.
4. select and apply the best work practices to minimise noise impacts.

Each of the above four points is assessed in detail in the following sections.

8.1.2.2. Surrounding Land Uses

The subject site is within a commercial/industrial zone and the acoustic environment is influenced by noise from industrial and commercial sources, as confirmed by the background noise monitoring.

Reference and scaling from Google Earth indicates that the nearest residential receivers to the site are approximately 600m to the north east of the closest boundary, 750m to the south east of the closest boundary and 950m south-south west of the closest boundary.

Oberon High School is about 900m from the closest boundary (to the south).

Potential noise impacts at these receivers will require assessment.

8.1.2.3. Operating Hours

The recommended standard hours for construction works are shown in Table 8.2**,** which is a reproduction of Table 1, section 2.2 of the ICNG.

Table 8.2. Standard construction hours.

Work Type	Recommended standard hours of work[1]
Normal construction	Monday to Friday 7 am to 6 pm Saturday 8 am to 1 pm No work on Sundays or public holidays
Blasting	Monday to Friday 9 am to 5 pm Saturday 9 am to 1 pm No blasting on Sundays or public holidays

[1] The relevant authority (consent, determining or regulatory) may impose more or less stringent construction hours

Construction work outside the hours in Table 8.2 is normally only permissible for delivery of oversized structures, emergency works, public infrastructure works that are supported by the affected community or where the proponent demonstrates and justifies a need to work outside the recommended standard hours (ICNG, p9).

8.1.2.4. Impacts at Sensitive Land Uses

The ICNG provides two assessment methodologies for construction noise impacts: a 'qualitative' assessment where works occur for less than three weeks and a 'quantitative' assessment for works of longer duration. As construction works on the site will take longer than three weeks, the quantitative methodology is applicable.

8.1.2.5. Noise Management Levels

Table 8.3 sets out noise management levels for construction works, (as reproduced from section 2.2 of the ICNG).

Table 8.3. Noise at residences using quantitative assessment.

Time of day	Management level L_{eq} (15 min)	How to apply
Recommended standard hours: **Monday to Friday 7 am to 6 pm** **Saturday 8 am to 1 pm** **No work on Sundays or public holidays**	Noise affected RBL + 10 dB	The noise affected level represents the point above which there may be some community reaction to noise. • Where the predicted or measured LA_{eq} (15 min) is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level. • The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise level and duration, as well as contact details.
	Highly noise affected 75 dB(A)	The highly noise affected level represents the point above which there may be strong community reaction to noise. • Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: 1. times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences 2. if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.

Time of day	Management level L_{eq} (15 min)	How to apply
Outside recommended standard hours	Noise affected RBL + 5 dB	• A strong justification would typically be required for works outside the recommended standard hours. • The proponent should apply all feasible and reasonable work practices to meet the noise affected level. • Where all feasible and reasonable practices have been applied and noise is more than 5 dB(A) above the noise affected level, the proponent should negotiate with the community. • For guidance on negotiating agreements see Section 7.2.2.

* Noise levels apply at the property boundary that is most exposed to construction noise, and at a height of 1.5 m above ground level. If the property boundary is more than 30 m from the residence, the location for measuring or predicting noise levels is at the most noise-affected point within 30 m of the residence. Noise levels may be higher at upper floors of the noise affected residence.

The day time ambient Leq and background noise level, obtained from the unattended logging are summarised in Table 8.4.

Table 8.4. Measured ambient noise levels.

Period	Hazelgrove Road		Oberon	
	L90	L_{eq} (15 min)	L90	L_{eq} (15 min)
Day	35	52	40	60

Based on the daytime background noise levels (RBL), the construction noise management levels are;

- **45 dB(A),L_{eq} (15 min)**, at residential receivers in Hazelgrove Rd, and
- **50 dB(A), L_{eq} (15 min)**, at residential receivers in Oberon.

The ICNG also details that due to the broad range of sensitivities that commercial or industrial land can have to noise from construction, the process of defining management levels is separated into various categories as shown below. The external noise levels should be assessed at the most-affected occupied point of the premises:

- industrial premises: external - **75 dB(A) L_{eq} (15 min)**
- offices, retail outlets: external - **70 dB(A) L_{eq} (15 min)**

For a school the construction noise management levels are;

- classrooms at schools: internal – **45 dB(A) L_{eq} (15 min)**

8.1.2.6. Assessing Vibration: A Technical Guideline (AVTG)

The AVTG recommends goals for assessing human response and potential disturbance to the occupants of buildings. Table 8.5 presents a summary of acceptable levels (rms) relevant to third-octave frequency bands adjusted by multiplying factors (in brackets) for residential receptors referenced to human response (as sourced from British Standard BS 6472-1992, Figure B1.4).

Table 8.5. Acceptable vibration levels for assessment of human comfort.

Frequency (Hz)	Vibration level, mm/s Continuous Vibration		Intermittent Vibration	
	Day (2)	Night (1.4)	Day (60)	Night (20)
1	3.2	2.2	95	31

Frequency (Hz)	Vibration level, mm/s Continuous Vibration		Intermittent Vibration	
	Day (2)	Night (1.4)	Day (60)	Night (20)
1.25	2.3	1.6	68	22
1.6	1.6	1.1	47	15
2	1.1	0.8	33	11
2.5	0.8	0.6	24	8.0
3.15	0.6	0.4	17	5.8
4	0.4	0.3	19	4.0
5	0.3	0.2	9.5	3.2
6.6	0.3	0.2	7.6	2.5
8	0.2	0.1	6.0	2.0
10	0.2	0.1	6.0	2.0
12.5	0.2	0.1	6.0	2.0
16	0.2	0.1	6.0	2.0
20	0.2	0.1	6.0	2.0
25	0.2	0.1	6.0	2.0
31.5	0.2	0.1	6.0	2.0
40	0.2	0.1	6.0	2.0
50	0.2	0.1	6.0	2.0
63	0.2	0.1	6.0	2.0
80	0.2	0.1	6.0	2.0

Table 2.1 of the AVTG defines vibration from construction works or passing heavy vehicles as an intermittent source, so the day time values in Table 8.5 for intermittent vibration will be adopted as a worst case for potential construction vibration impacts. For a comparison of vibration levels in terms of human response, Table 8.6 presents a summary of vibration levels and likely perception.

Table 8.6. Human perception of vibration.

Vibration Levels, mm/s	Likely Perception
0.15	Perception threshold
0.35	Barely noticeable
1.0	Noticeable
2.2	Easily noticeable
6.0	Strongly noticeable
14.0	Very strongly noticeable

Ref: German Standard DIN 4150 (1986)

8.1.2.7. Traffic Noise

In NSW, noise from vehicle movements associated with an industrial source is assessed in terms of the NPI if the vehicles are not on a public road. If the vehicles are on a public road, the NSW Road Noise Policy (RNP) apply. Noise from traffic movements associated with the proposal must, therefore, be assessed against the project specific noise goals of the NPI when on site and also the criteria in the RNP, when on public roads.

For vehicles travelling on public roads, the RNP recommends various criteria for different road developments and uses. Based on definitions in the RNP, Maher Drive would be classified as a sub-arterial road due to its function serving an industrial zoning. Albion Road would also be classified as a sub arterial road.

An extract from Table 3 in the RNP relating to land use developments with the potential to create traffic on sub arterial roads is shown in Table 8.7.

Table 8.7. Traffic noise objective.

Situation	Recommended criteria Day - (7am - 10pm)	Night (10pm – 7am)
3. Existing residences affected by additional traffic on existing freeways/arterial/sub-arterial roads generated by land use developments	60 L_{eq} (15hr)	55 L_{eq} (9hr)

The RNP also advises that, for existing residences and other sensitive land uses affected by **additional traffic on existing roads generated by land use developments**, any increase in the total traffic noise level as a result of the development should be limited to 2 dB above that of the noise level without the development. This limit applies wherever the noise level without the development is within 2 dB of, or exceeds, the relevant day or night noise assessment criterion."

8.2. Existing environment

Noise was logged at the site from 17 to 25 October 2018. To quantify the existing acoustic environment of the area unattended noise logging was undertaken in October 2018.

All logging measurements were done in accordance with relevant OEH guidelines and AS 1055-1997 "Acoustics – Description and Measurement of Environmental Noise". The noise loggers used comply with the requirements of AS 1259.2-1990 "Acoustics – Sound Level Meters", and had current National Association of Testing Authorities (NATA) calibration certification.

The loggers were programmed to continuously register environmental noise levels over the 15 minute intervals, with internal software calculating and storing Ln percentile noise levels for each sampling period.

The acoustic environment of the logger locations would have been influenced by noise from the existing industrial and commercial activity in the OTC and the Oberon Industrial Area.

Logger 1 was located at the residence at number 127 Hazelgrove Road, to the north east of the site (as shown in Figure 8.1). The residences in this area are the closest to the site. The logger was in place between 17 and 25 October, 2018. The relevant measured noise levels from Logger 1 are detailed in Table 8.8 and shown graphically in Appendix G.

Table 8.8. Measured ambient noise levels dB(A) – Logger 1 Hazelgrove Rd.

Period	L90	L_{eq} (15 min)
Day	35	52
Evening	31	43
Night	30	44

The results in Table 8.8 indicate that the acoustic environment of the residences in the Hazelgrove Road area is indicative of a rural residential area with low noise levels at night.

Logger 2 was located in the front yard of the residence at number 3 Stevenson Close to the south of the site (see Figure 2) for the period from 17 to 25 October, 2018. The relevant measured noise levels from Logger 2 are shown in **Table 5** and graphically in Appendix I.

Figure 8.1. Location of noise loggers.

Table 8.9. Measured ambient noise levels dB(A) - Logger 2 Stevenson Close.

Period	L90	L_{eq} (15 min)
Day	40	60
Evening	42	57
Night	41	54

The results in Table 8.9 show that the noise levels at the logger location were relatively constant throughout the day, evening and night time periods. This is consistent with observations made in the area which indicated that the acoustic environment is significantly influenced by noise from all of the existing industries in the OTC and Industrial Area.

8.3. Impact assessment

8.3.1. Site Operations and Noise Levels

As described above the site is proposed to operate between 7am and 6pm, Monday to Friday and 7am to 1pm on Saturdays.

Construction and operational details have been obtained from Jackson Environment and Planning. Peak production is expected to occur in year 5 (2023).

Incoming raw materials will be delivered to site via trucks which will enter over the weighbridge. The raw materials will be stored on a dedicated tipping area or in concrete storage bays.

Processing of feedstock will be done using a grinder and shredder with further screening using a trommel. Material will be fed into the grinder by an excavator. A conveyor will distribute the product material to the ground where it will be transferred by front end loader (FEL) to be stored in dedicated concrete storage bays prior to sale.

Sound pressure levels for the plant and equipment to be used at the facility were sourced from data obtained by Borgs from noise measurements made at the MDF facility, supplemented with spectral information in the Spectrum Acoustics technical database which contains data for similar plant items in typical operating conditions.

Table 8.10 shows the sound power level spectra of each of the modelled operational noise sources. In keeping with convention, spectral data are presented as unweighted (linear) decibel levels and the total is A-weighted.

The noise levels shown are for the various noise sources as L_{eq} over a 15 minute period.

Table 8.10. Power level spectra of measured noise sources, dB.

Noise source	TOTAL dB(A)	Octave Band Centre Frequency, Hz 63	125	250	500	1k	2k	4k	8k
Full Processing Cycle	120	124	123	117	115	115	113	111	106
Trucks on site	93	103	97	91	85	90	87	74	66
FEL	105	100	110	97	102	100	99	93	89
Wheel Wash	91	92	95	88	89	84	83	69	65

The data in Table 8.10 labelled “Full Processing Cycle” is taken from a measurement supplied by the proponent of a similar processing facility as that proposed whilst in full operation with an excavator feeding the plant and product being removed to storage. This includes the noise from grinding, a trommel, shredders and stacker. The noise level was assumed to be constant over a full 15 minute assessment period.

There will be up to three x FELs used around the storage bays to load product into various vehicles for sale and to move material about the site. This loading and moving will not, typically, be undertaken continuously over a full 15 minute assessment period. For the calculation of a 15 minute L_{eq} noise level an FEL was considered to be working for a total of 10 minutes in a 15 minute period. The L_w of this is that shown in Table 8.10. That is, the L_{eq} noise level for an FEL has been adjusted by a factor of 10xlog 10/15 to account for the duration of the noise source.

Heavy vehicles delivering raw material will enter and leave the site via a driveway off Maher Drive. The vehicles will travel along the driveway via the weighbridge and into the site. For safety reasons these vehicles will move around the site slowly.

At maximum production it is envisaged that there will be up to approximately 27 vehicle movements per day to and from the site. Of these there will be approximately 40 truck movements (as tippers, semi-trailers and B-Doubles). This is a rate of approximately four heavy vehicle movements per hour for a typical working day.

For the current assessment a single heavy vehicle in a 15 minute period was considered. The remainder of the vehicle movements will be staff cars.

A truck arriving, unloading and departing will travel approximately 800m whilst on the site. A vehicle travelling at 10kph will traverse 800m in approximately five minutes. For the calculation of a 15 minute L_{eq} noise level a 40t B-Double truck was considered to be moving slowly about the site for a total of five minutes in a 15 minute period.

To consider a realistic operational scenario a series of five point sources, representing a moving truck was modelled. The noise sources were modelled at each representative location for one minute out of a 15 minute assessment period, as shown in Figure 8.2.

The L_w of this is shown in Table 8.10. That is the L_{eq} noise level for a truck travelling at 10kph has been adjusted by a factor of 10xlog 1/15 to account for the duration of the noise source at each location.

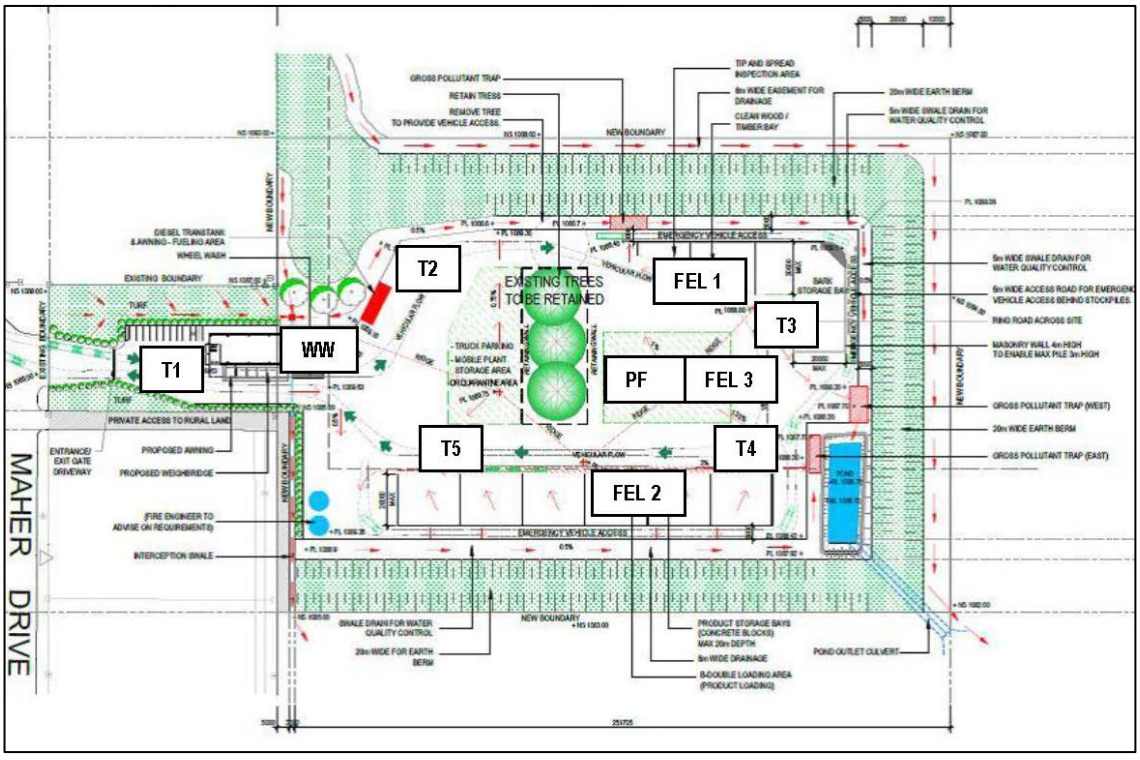
The layout of the proposed facility and the location of the modelled noise sources are shown in Figure 8.2.

Noise source details are shown in Table 8.11. The modelled noise source heights are also shown in Table 14 as the height above the finished ground level at that location.

Table 8.11. Noise source details (per Figure 8.2).

Annotation	Noise Source Details and source height
T1	Truck 1 at site entry +2.5m
T2	Truck 2 on delivery circuit +2.5m
T3	Truck 3 on delivery circuit +2.5m
T4	Truck 4 on delivery circuit +2.5m
T5	Truck 5 on delivery circuit +2.5m
WW	Wheel Wash +1.0m
FEL 1 & 2	FELs at storage bins +2.0m
FEL 3	FEL at shredder +2.0m
PF	Processing Facility (grinder, shredder, trommel, excavator) +2.5m

Figure 8.2. Site Layout and Noise Source Locations.



8.3.1.1. Predicted Operational Noise Levels

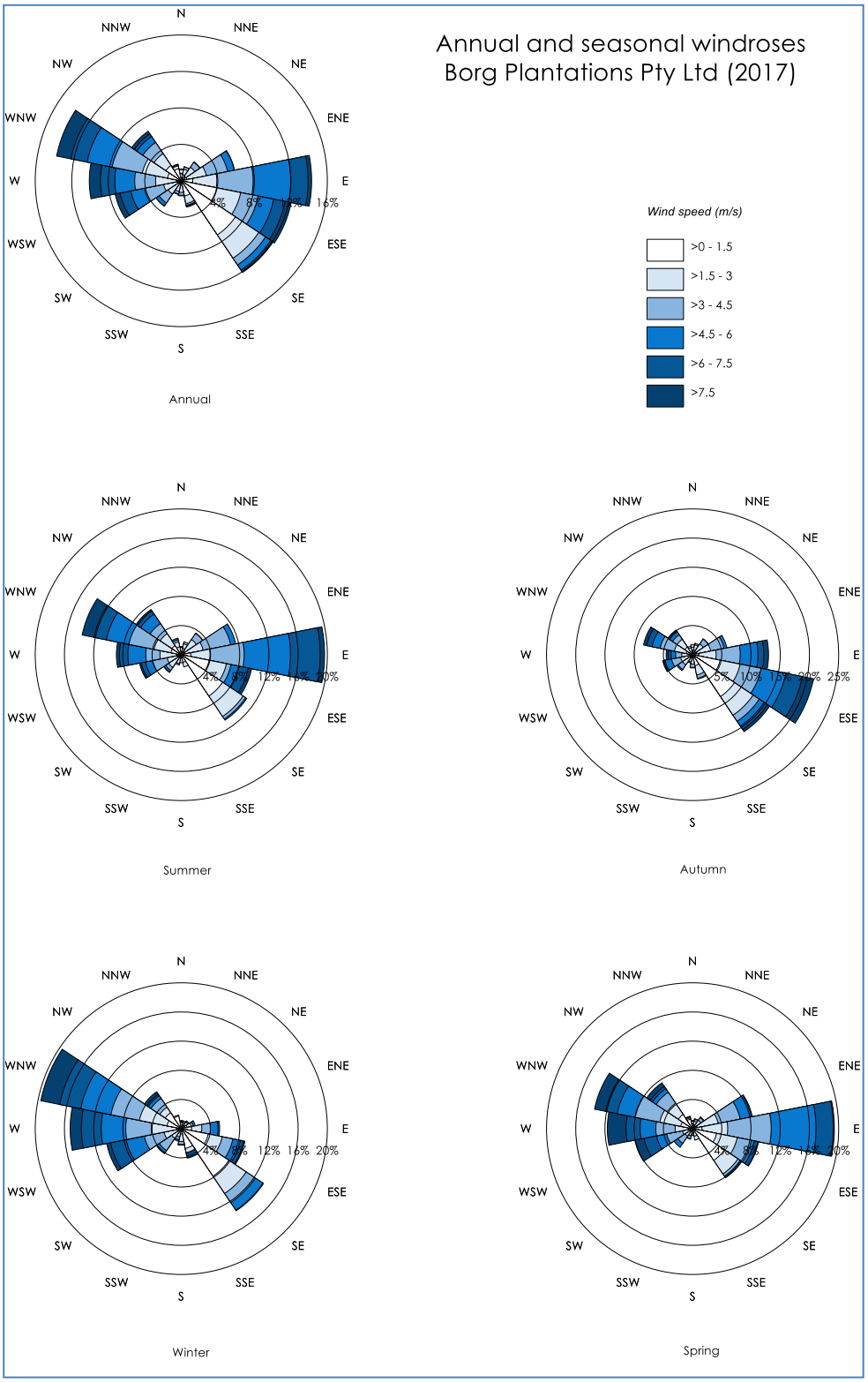
Assessment of operational noise was conducted using RTA Technologies Environmental Noise Model (ENM) v3.06. Noise contours of equal sound pressure level were generated out to the 20 dB(A) level.

The atmospheric conditions most relevant to noise assessments are temperature inversions, gentle winds (indicative of possible wind shear) and relative humidity.

The following meteorological features are, therefore, the most significant with respect to noise propagation for the proposal:

- Extremes of relative humidity (RH) are rarely experienced. For modelling purposes, a value of 70% RH was adopted;
- The NPI states that wind from any direction need only be considered in the assessment process if it occurs for more than 30% of the time (at wind speeds of less than 3m/s). An annual wind rose for the site for the 2017 is shown in Figure 8.3.
    - Analysis of the wind rose data indicates that there are no winds at speeds of less than 3m/s from any quadrant for more than 30% of the time. Typical calm daytime conditions of no wind, 70% RH and -1°C/100m vertical temperature gradient (i.e., dry adiabatic lapse rate, DALR) were, therefore, modelled to represent daytime noise levels under calm (neutral atmospheric) conditions.
    - The wind rose does show, however, that light winds from the east to southeast are a relatively significant feature of the area. A wind speed of 3m/s (at 10m above ground level) from the east south east (112.5°) was modelled to determine the noise impact under each of these 'prevailing' wind conditions.

Figure 8.3. Daily Average Wind Rose (m/s) 2017.



As the facility will not operate during the night, temperature inversions do not need to be assessed.

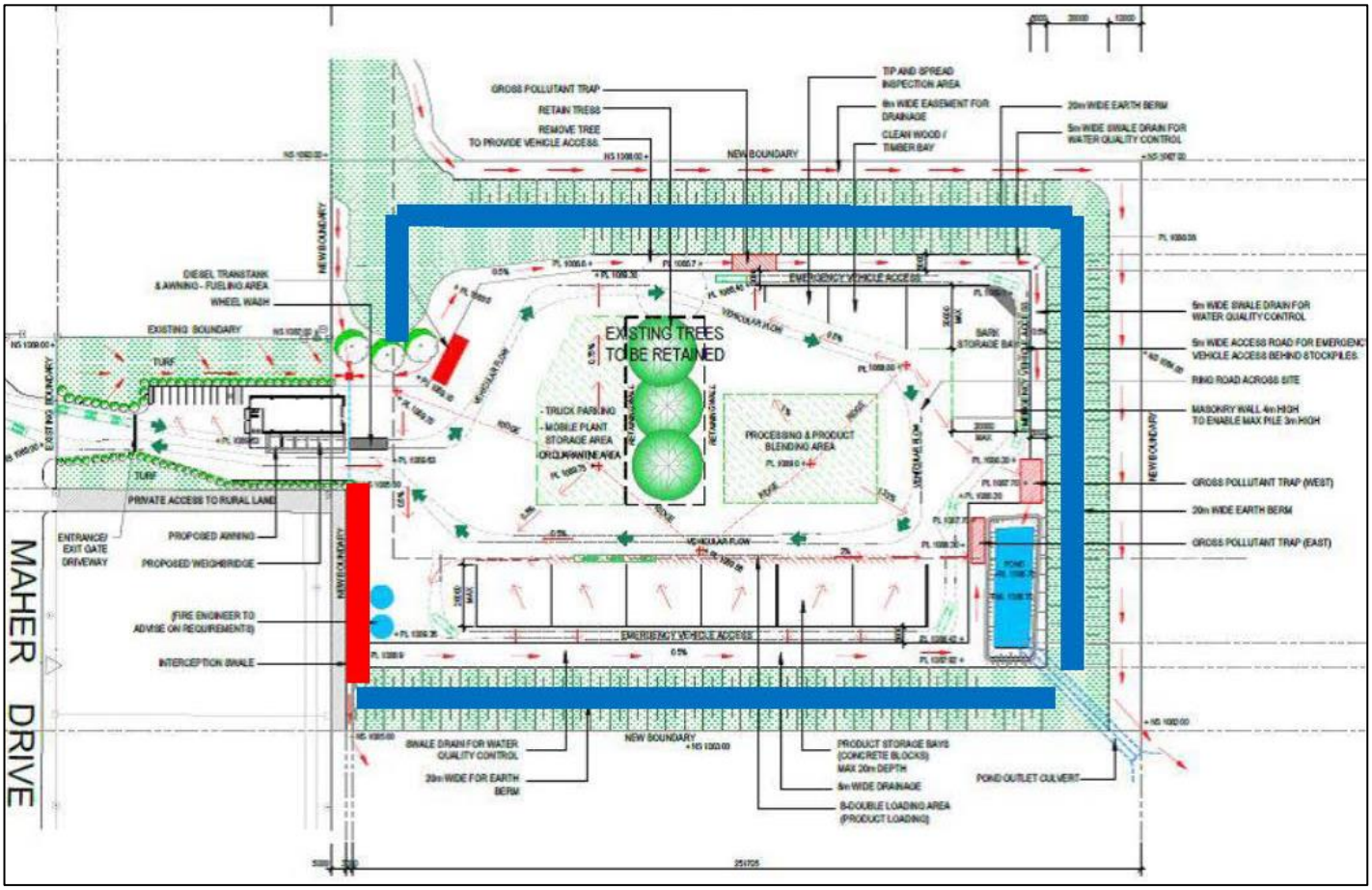
Preliminary modelling showed the potential for an exceedance of the noise criterion under some circumstances. Analysis of the modelling results showed that the worst case received noise was from emissions from the processing facility operating that is, grinder/shredder/screen and excavator.

In order to minimise the noise from these activities and achieve compliance with the criterion it will be necessary to construct acoustic barriers (earthen mound) around the site, as shown schematically in Figure 8.4. The top of the proposed bund is shown schematically as a blue line on Figure 8.4.

In addition to the earthen bund it is recommended that an acoustic barrier fence be constructed as shown in red on Figure 8.4. For the noise modelling the top of the fence was considered to be must be a minimum of 2.5m above ground level.

An acoustic barrier is one that is impervious from ground level to the required height (with no gaps for the passage of noise). It must be constructed of material with minimum surface density of 15kg/m^2.

Figure 8.4. Noise Barrier Locations.



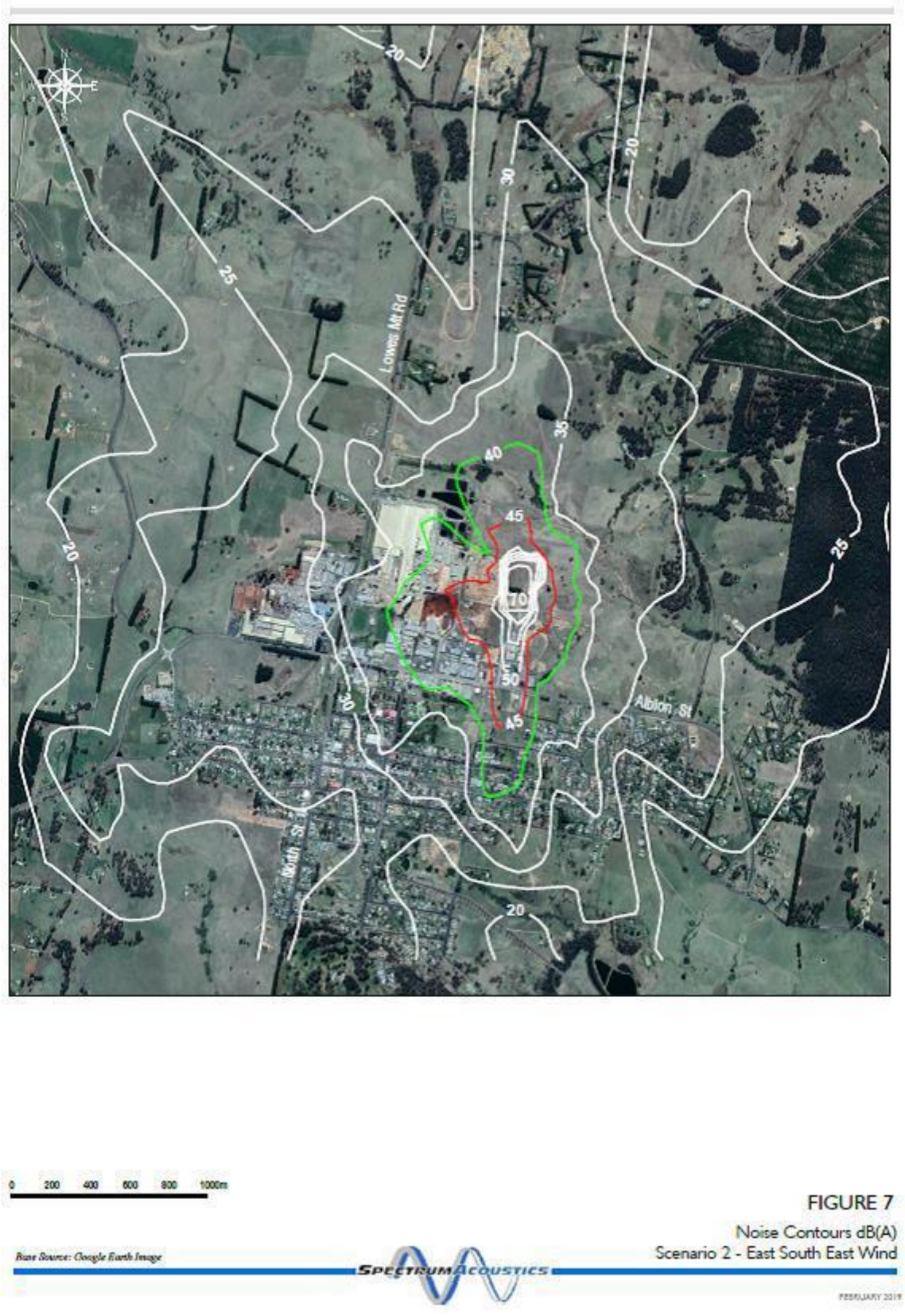
Noise levels were modelled using ENM for each of the atmospheric conditions described below.

Scenario 1 – Neutral Atmospheric - Day time operations - 20^{0}C, 70% R.H., Calm wind. Resulting noise contours are shown in Figure 8.5. The 40 dB(A) L_{eq} (15 min) contour is shown green and the 47 dB(A) L_{eq} (15 min) contour is red.

Figure 8.5. Noise contours - Scenario 1.

Scenario 2 – South Wind - Day time operations - 20^{0}C, 70% R.H., 3m/s south wind. Resulting noise contours are shown in Figure 8.6 with contour colours as for Figure 8.5.

Figure 8.6. Noise contours - Scenario 2.



The contours shown in Figure 8.5 and Figure 8.6 represent the modelled scenarios, for peak production rates, with the relevant acoustic barriers in place.

Figure 8.5 and Figure 8.6 show the noise contours for all receivers in the vicinity of the Facility. The ENM noise model was also utilised in point calculation mode to determine the actual predicted noise level at the closest representative receivers to the site. These receiver locations are shown in Appendix II of the NVIA at Appendix J and described as;

- Receiver 1 Fox Lane,
- Receiver 2 Hazelgrove Road,
- Receiver 3 Albion Street,
- Receiver 4 Corner of Ross Street and Cunynghame Street West.

The results of the point calculations for the modelled neutral atmospheric and southerly wind scenarios are shown in Table 8.12 and Table 8.13. The receivers included in the tables are considered representative of the worst case received noise at each residential area in the vicinity

Table 8.12. ENM Point Calculation Results (dB(A) L_{eq} (15 min)). Scenario 1 – Neutral.

Location	Scenario 1	Criterion
R1	24.2	40
R2	32.6	40
R3	38.1	45
R4	35.0	45

Table 8.13. ENM Point Calculation Results (dB(A) L_{eq} (15 min)). Scenario 2 – East South East Wind.

Location	Scenario 2	Criterion
R1	28.9	40
R2	33.0	40
R3	37.4	45
R4	36.2	45

The results of the point calculations can be seen to vary slightly from the contours. This is due to the manner in which the ENM noise model deals with the various modelling procedures. Point calculations are carried out to a specific ground location, whereas the contours are an interpolation of noise values between arbitrary radial calculation points. For this reason, the point calculations are considered more accurate and the contours should be viewed as indicative only.

The results of the point calculations show that, under the assessed atmospheric conditions, the predicted noise levels at all receivers will be in compliance with the relevant noise trigger levels.

The contours show that the worst case predicted noise at the Oberon High School is under the modelled neutral atmospheric conditions (Scenario 1). The worst case predicted noise is approximately 37 dB(A) Leq (15 min).

It is generally accepted that for a broad band noise sources (such as road traffic noise) the attenuation through the façade of a solid masonry building, with windows closed, is approximately 25 dB(A). With the windows open the loss into a room is approximately 10 dB(A) (source: Environmental Noise Management Manual).

As the noise from the Facility will be relatively broad band, it is of similar character to road traffic noise and the above assumptions are considered applicable to the current assessment. This would mean that the worst case received noise inside the rooms in the school which are closest, and most exposed to, the Facility would be

approximately 27 dB(A) L_{eq} with windows open, which is in compliance with the adopted noise criterion. With windows closed the internal noise would be approximately 12 dB(A) L_{eq} which would be virtually inaudible in that situation.

At the Jenolan Holiday Park the worst case noise levels will be approximately 40 dB(A) L_{eq} (15 min) which is significantly below the applicable noise criterion for any permanent residents at the site.

The noise contours show that the predicted noise levels at nearby industrial receivers will be less than 70 dB(A) L_{eq} (15 min) which is in compliance with the applicable noise criterion for industrial receivers.

8.3.2. Construction Noise Assessment

The proponent has advised that the construction works will be carried out over several phases.

This will entail:

- Site preparation, including ground clearing and levelling,
- Construction of concrete hardstands, storage bays and roadways etc. (this would include acoustic barriers and/or mounds), and
- Erection of the office and shed and fitout.

The excavation phase of the works will be done using an excavator, dozer and trucks.

Appendix B of the ICNG provides references for published databases of noise levels for construction equipment. Data for maximum noise emissions from the above equipment were provided in the *Roadway construction noise model user's guide*, Federal Highway Administration (FHWA), US Department of Transport, 2006 and the NSW RTA's Environmental Noise Management Manual (ENMM). Calculated L_{eq} (15 min) sound power levels (L_w dB(A)) based on the FHWA and ENMM data are summarised in Table 8.14.

The Spectrum Acoustics technical database has been referenced to determine the sound power level most applicable to the actual equipment proposed to be used on the site. This level is also shown in Table 8.14.

Table 8.14. Measured Ambient Noise Levels dB(A) L_{eq}.

Equipment	Range of Indicative L_w dB(A)	Range of Indicative Lp @ 10m dB(A)	L_w for Assessment as L_{eq} (15 min)
Dozer	102 - 114	74 - 86	105
Grader	105	81	105
Excavator	97 - 117	69 - 89	102
Dump Truck	112	89	103
Truck	107	79	100
Concrete Agitator	99 - 104	71 - 76	104
Concrete Pump	103 - 108	75 - 80	106
Vibrator	91 - 106	63 - 78	103

Noise emissions from the construction works will vary throughout individual days and also throughout the length of the overall project. The noise level at individual receivers will also be dependent upon the location of the various works, relative to those receivers, at different times.

During the construction work the mobile plant, such as that detailed in Table 8.14 will, by definition, move about and will be, be at various operating levels (and thus producing various levels of noise) throughout any 15 minute period.

Noise emission from the construction works will vary throughout individual days and also throughout the length of the overall project. The noise level at individual receivers will also be dependent upon the location of the various works, relative to those receivers, at various times.

To gauge some potential construction noise impacts a typical operational scenario for the site preparation phase of construction has been considered where an excavator, dump truck and dozer were all working in close proximity to each other. All three items were considered to be at the worst case L_{eq} (15 min) noise levels shown in Table 8.14.

Table 8.15 shows the results of a sample calculation of potential noise impacts at receivers at various distances from the site, as a result of the assessed operations taking place. The calculation shown in Table 8.15 does not include any barrier insertion loss.

Table 8.15. General Construction Noise as dB(A) L_{eq} (15 min).

	@ 100 m	@ 200 m	@ 400 m	@ 600 m
Construction works noise source	106	106	106	106
Distance loss to receiver	48	54	60	64
Received noise	58	52	46	42

The closest residential receivers to the construction works are approximately 600m to the north east in Hazelgrove Road. The results in Table 8.15 show the construction noise levels at this location will be in compliance with the relevant construction noise management level of 45 dB(A) L_{eq} (15 min).

The closest residential receivers to the construction works in Oberon are approximately 750m away. The results in Table 8.15 show the construction noise levels at this location will be in compliance with the relevant construction noise management level of 50 dB(A) L_{eq} (15 min).

Oberon High School is approximately 900m to the south of the closest parts of the proposed construction works. At this distance the received noise from the assessed construction activities will be approximately 39 dB(A) at the external areas of the school. As the construction noise management level for a school is 45 dB(A) L_{eq} inside a classroom, the predicted noise levels will be in compliance.

Further calculations show that, for the assessed construction activities, compliance with the construction noise management level for industrial premises will be achieved at distances of greater than about 10 or 15m.

The scenario considered in Table 8.15 represents the worst case for construction noise emissions from the site. The typical operating noise levels detailed in Table 8.14 show that the noise from other plant and machinery to be used on the site will be at lower levels than those calculated in Table 8.15. Resultant received noise at the nearby receivers would, therefore, also be at lower levels.

8.3.2.1. Vibration Assessment

Table 8.16 presents some published typical values of vibration for construction equipment sources, in terms of peak particle velocity (ppv) expressed as mm/sec, for various ground types at a distance of 30m from the source.

Table 8.16. General Vibration Levels ppv mm/sec (at 30m).

	Hard Competent Rock	Hard soils, dense compacted sands	Competent soils, most sands, gravel	Weak or soft soils, top soil
Vibratory Roller	1.3	1.2	0.9	0.8
Large Bulldozer	0.6	0.5	0.4	0.3
Loaded Trucks	0.5	0.4	0.3	0.3

The worst case vibration levels would occur whilst a vibratory roller was working on site, say, compacting the base for hardstands or road way construction.

It is generally accepted that the attenuation of vibration through most ground types is inversely proportional to distance (that is, a halving of vibration with doubling of distance).

Based on the data presented in Table 8.16 this indicates that the vibration levels from the vibratory roller working about on the site will be "noticeable" at distances of about 30m as per the detail in Table 8.6. Human perception of vibration. This will decrease to be "barely noticeable" at distances greater than about 100m. The closest any construction work will be to a residence is approximately 600m.

The vibration levels will be significantly lower than any building damage criteria.

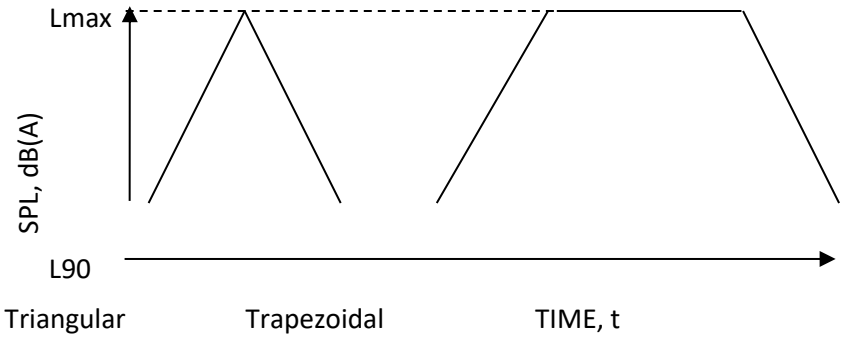
8.3.2.2. Traffic Noise

Heavy vehicles will be used to haul raw materials to and product from the site. In relation to noise from heavy vehicles, there are many methods available for calculating the cumulative noise impact arising from intermittent signals of various shapes.

The methodology employed in this section was sourced from the commonly accepted US Environmental Protection Agency document No. 550/9-74-004 "Information on Levels of Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, March 1974".

The document refers to 'triangular' and 'trapezoidal' time signals, which are illustrated in Figure 8.7. A triangular time signal rises from the background level to a peak noise level and then immediately begins to subside. A trapezoidal time signal rises from the background level to a maximum level and sustains that level for a period of time before subsiding.

Figure 8.7. Triangular and Trapezoidal Time Signals.



A triangular time signal is a good approximation to the SPL signal of a car or truck as it passes an observation point. The value of L_{eq},T for a series of identical triangular time patterns having a maximum level of L_{max} is given by Equation 1 below.

$$L_{eq},T = L_b + 10\log\left[1+\frac{ND}{T}\left(\frac{10^{(L\,\max - Lb)/10}-1}{2.3}-\frac{(L_{\max}-L_b)}{10}\right)\right]$$ **(Equation 1)**

where,

Lmax = maximum vehicle noise at residence, dB(A)

Lb = existing L_{eq} noise level, dB(A)

T = assessment period (minutes)

D = duration of noise from each vehicle (minutes)

N = number of vehicle trips during assessment period

As detailed earlier in this report, vehicles on the site are considered site noise whilst those on public roads are assessed separately. The noise from the truck movements on site is included in the operational noise modelling (shown in Figure 8.5 and Figure 8.6).

The proponent has indicated that at maximum production rate there may be up to approximately 40 heavy vehicle movements per day associated with the operation. The heavy vehicles will include 12 tonne tippers, 32 tonne semi-trailers (or trucks and dogs) and B-Doubles.

The proponent has also indicated that there will be an average of approximately 5 B-Double movements per day during construction (for delivery of fill).

For the assessment of vehicles on public roads, the sound pressure levels of a number of B-Double trucks (both laden and unladen) transporting various materials were sourced from the Spectrum Acoustics technical database.

Received noise was calculated on the basis of half of the vehicles being in the near lane of traffic and half in the far lane, with the total being the log addition of the two levels.

The results are shown in Table 8.17. Vehicles were assumed to be travelling at an average speed of 60km/hr on Albion Road. A nominal distance to a theoretical reception point 20m from the centre of the road was assessed.

Table 8.17. Traffic Noise.

Parameter	Estimated level
Typical Maximum Sound Power, dB(A)	110
Distance Loss to Receiver, (20m)	34
Received Noise dB(A)Lmax	77
Traffic Volume, (trucks/day)	40
Time each vehicle audible at 60 kph (mins)	0.1
Background Noise Level dB(A)	35
Calculated Traffic Noise, dB(A) (L_{eq} 15 hr)	50
Criteria dB(A) (L_{eq} 15 hr/Day)	60

Table 8.17 shows that traffic noise levels will be below the road noise criterion for all residential receivers greater than 20m from the centreline of the road. There are no residences closer to the road than this within Oberon or surrounds.

As construction traffic will involve much fewer vehicle movements per day than that assessed for the operational activity (at maximum production) the noise from construction traffic will not exceed the noise criterion.

The results in Table 8.17 are based on measured noise levels for trucks travelling on typical public roads. The measurements include a mixture of road configurations including where vehicles were travelling up and down hill and slowing to turn, then accelerating away etc.

As such, the results are the theoretical calculated noise levels considered applicable to the majority of conditions and scenarios that may be encountered on the haul route. In reality road conditions may vary from those modelled due to specific localised circumstances. Examples may include long straight stretches of road, or sections of particularly steep gradient. Road conditions may also vary over time due to deterioration or maintenance.

The calculations also assume a full line of sight of the road (through approximately 135^0) and do not allow for the shielding effects of intervening structures or topography (such as where the road is in cut).

As a result, the received noise levels may differ slightly from those shown in the tables. This variation may be to a level either higher or lower than that shown.

The predicted noise level is significantly lower than the applicable noise criterion and, therefore, and variation to the received noise is not likely to have any significant impact.

8.4. Mitigation measures

8.4.1. Construction noise management

The mechanisms available for control of construction noise are limited due to the necessary and mostly unchangeable location of the works and the size and type of plant and machinery which, by necessity, must be used. This is particularly the case when considering noise emissions from hammer or pier drilling.

Noise control, planning and management options are discussed below and applicable recommendations are included.

8.4.1.1. Construction Noise Control

The best ways to minimise construction noise impacts are to employ quiet work practices and use the quietest available construction equipment.

There are four main methods of controlling noise. These are:

1. Controlling noise at the source. Examples are; sound proof covers, sound reducing mufflers on plant etc. Also included here is the substitution of processes or equipment with less noisy items,
2. Controlling the transmission of noise in its path. Examples are noise barriers (such as appropriate fencing) or portable barriers which may be used around static equipment like generators,
3. Controlling noise at the receiver. Examples are insulation on buildings and thicker glazing, and
4. In addition to the above noise mitigation can involve scheduling of the more noisy activities to less sensitive periods of the day or times of the year.

For the current construction works there is little scope for the feasible and reasonable application of methods in items 2 or 3 in relation to residential and commercial receivers.

8.4.1.2. Noise Planning

The proponent should undertake noise control planning as part of project pre-planning. This will identify potential noise problems and eliminate them in the planning phase prior to site works commencing.

The contact name and phone number of a responsible person should be available so that any potentially affected residents may comment on the works and indicate any particularly significant noise sensitive times.

Similarly the name of the person responsible for accepting and dealing with complaints should be readily available. All complaints or communications should be answered promptly and a record kept of all responses and actions.

The main contractor should plan to co-ordinate subcontractors so that there are no unnecessary cumulative impacts arising from the simultaneous activities of more than one subcontractor. That is, planning to avoid, if practical, having more than one noisy activity taking place in close proximity. It is good practice to appoint a single co-ordinator to oversee all significant noise producing activities.

8.4.1.3. Construction Noise Management

Construction activity is allowed only during the period 7.00am to 6.00pm Monday to Friday and 8.00am to 1.00pm Saturday, with no work on Sundays or public holidays. All personnel working on the site must be made aware of these hours.

All personnel working on the job including subcontractors and their employees must be made aware of their obligations and responsibilities with regard to minimising noise emissions.

Site inductions and toolbox meetings to all employees and subcontractors must include information about the need to minimise noise impacts to surrounding areas.

Contractors should familiarise themselves with methods of controlling noisy machines and alternative construction procedures. These are explained in AS2436-1981 “Guide to Noise Control on Construction, Maintenance and Demolition Sites”.

Mechanical plant should be silenced using best available control technology. Noise suppression devices should be maintained to manufacturer’s specifications.

All equipment used on the site shall have exhaust systems that have been recommended by the manufacturer as having the lowest associated noise for that machine.

Machines which are used intermittently such as rollers or other earthmoving machinery should either be shut down in the intervening periods between works or throttled down to a minimum.

Any portable equipment with the potential to create high levels of noise e.g. compressors, generators etc. should only be selected for use if it incorporates effective noise control. This equipment should be located where practical so that site sheds, or previously erected structures are between it and the nearest potentially affected receivers. Where no such barriers are present this machinery should be located behind a portable screen or enclosure.

The effectiveness of a noise barrier or screen depends on its length, height and its position relative to the source and the receiver. A screen designed to reduce noise from a stationary source should, where possible, extend a distance of twice the length of the noise source beyond the direct line of sight between the source and the receiver.

Plant known to emit noise strongly in one direction should, where possible, be oriented such that the noise is directed away from the closest or the most noise sensitive receivers.

Regular and effective maintenance of all equipment including vehicles moving on and off the site should be conducted. Prompt attention must be given to repair of loose or rattling parts and broken equipment. All maintenance work should only be carried out by qualified persons.

When selecting contractors and/or equipment for the job, preference must be given to those with capacities best suited to the task at hand. That is the use of larger machines with excess capacity should be avoided unless these can be shown to be quieter than smaller capacity machines.

Site access should be designed such that delivery vehicles, and other heavy vehicles moving through the site can do so with minimum need to reverse.

Where possible loading and unloading of plant and materials should be carried out away from potentially affected receivers. No delivery of plant or materials should be accepted before 7 am Monday to Friday or 8 am on Saturday.

Care should be taken not to drop materials from height either into, or out of trucks or other rigid surfaces. The surface to which the materials are being moved should be covered by some resilient material. Particular care should be taken during the loading or unloading of any scaffolding.

8.4.1.4. Construction Subcontractor Management

It is the responsibility of the main contractor to ensure that all subcontractors comply with site requirements as well as statutory requirements. No subcontractor should be allowed on site without being able to prove duty of care for the safety of their employees and bystanders with regard to noise emissions.

8.5. Conclusion

An assessment has been carried out into the potential for adverse noise impacts due to the operation of a proposed Bark/Timber Processing and Landscape Supplies Production Facility at 26 Endeavour St, Oberon.

A typical operational scenario has been modelled, under various atmospheric conditions, and the results have shown that the predicted levels will not exceed the relevant noise criteria at any residential or industrial receivers.

Calculations of the predicted noise levels from typical construction activities have shown that the received noise will comply with the relevant construction noise management levels.

Calculations of the predicted vibration levels from typical construction activities have shown that vibration levels will be barely perceptible and will be significantly lower that any building damage criteria.

9. Water Quality

The Sustainability Workshop was engaged to prepare a Water Quality Impact Assessment & Management Plan. A copy of the report is provided at Appendix I – Water Quality Impact Assessment.

9.1. Methodology

A MUSIC (Model for Urban Stormwater Improvement Conceptualisation) water quality model for the site was constructed. MUSIC was developed by the Cooperative Research Centre for Catchment Hydrology in 2001 and the program is now widely used across Australia to predict water quality impacts arising from a proposed development, and to then design appropriate stormwater mitigation strategies.

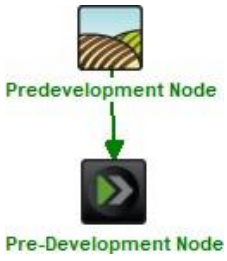
The following sections of this report describe the MUSIC models that were created to simulate both the existing site (pre-development model), the proposed development for the site (post development model), and the site as it would be if in an un-developed state (rural model).

The method used to create the climate file which contains historical rainfall data and which was used to run the MUSIC models is described below.

9.1.1. Pre-development model

The predevelopment model is a simple one node model and represents an agricultural land use. The configuration of the pre-development model can be seen below in Figure 9.1.

Figure 9.1. Predevelopment MUSIC model configuration.



The event mean concentration values adopted for this land use were based on those defined in Tables 2.43, 2.44 and 2.45 in Fletcher et al (2004)[11].

9.1.2. Post-development model

A post development model was produced to reflect the post development site conditions with 3.3 ha of impervious hardstand created, landscaped areas and drainage easements.

Key features of this models are:

- Total impervious area: The node that represents that part of the site to be developed, was modified to reflect the addition of another 3.3 hectares of impervious area.
- EMC values for the operational area were obtained from a calibrated MUSIC model which was developed as part of the State Significant Development project. That model used over 10 years of recorded Borgs site

[11] Fletcher, T., Duncan, H., Poelsma, P. and LLyod, S (2004) "Stormwater flow and quality, and the effectiveness of non-proprietary stormwater treatment measures – a review and gap analysis", Cooperative research Centre for Catchment Hydrology, Report 04/08, Melbourne.

discharge water quality data to calibrate EMC values for TSS, TP and TN.

- The post development model included 4 GPTs placed strategically through the site to minimise maintenance as much as possible. The preferred GPTs for this develop application are Barramy vane traps which deflect gross pollutants and sediment out of the flow column where it is stored in a dry state and can be readily recovered and put back into the product stockpiles.

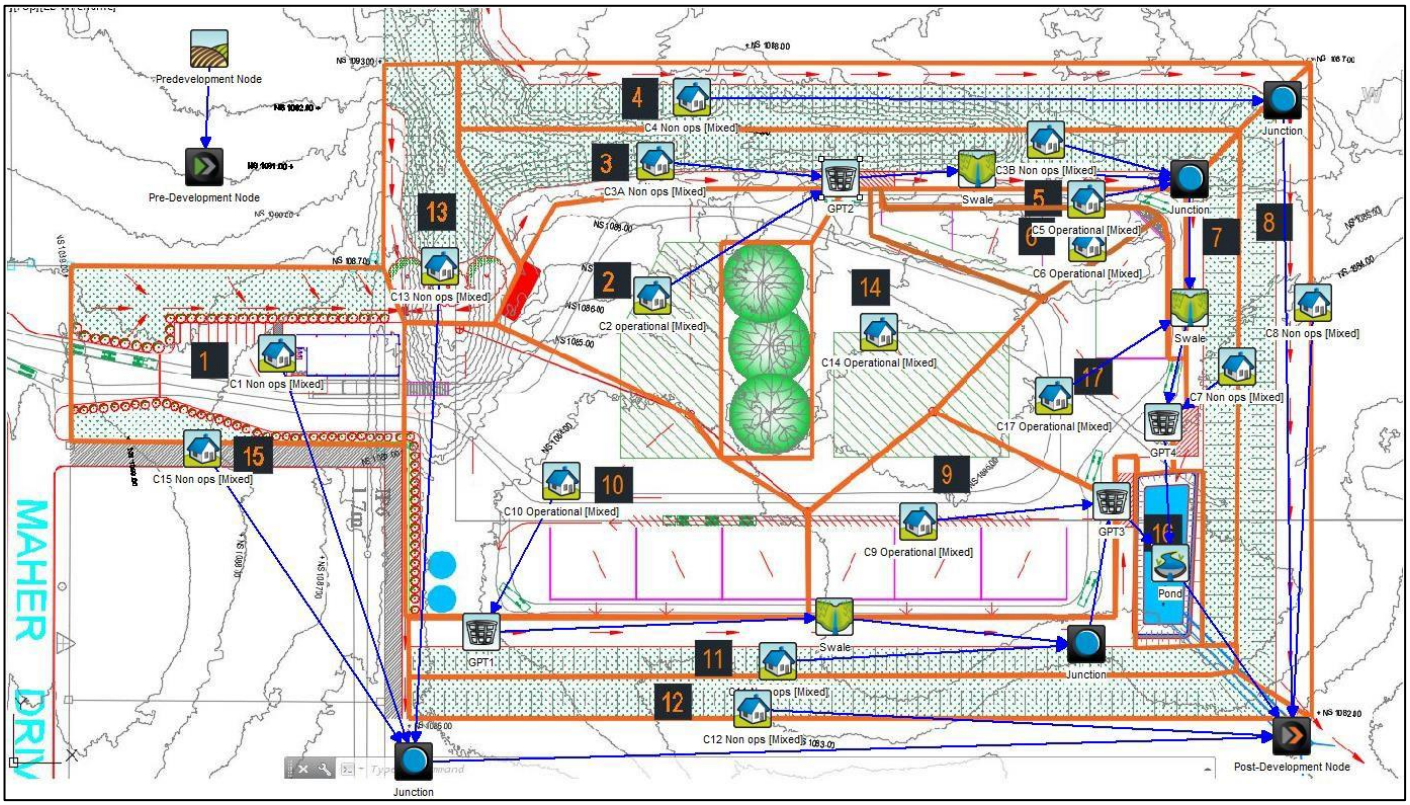
These GPTs modelled reductions in TSS, TP and TN of 30%, 20% and 20% respectively. These are considered conservative values based on extensive long term statistically significant field measured values achieved by other GPTs including SPEL Stormsacks, Humeguard, CDS unit and Enviropods.

Because the particulate loading of TP and TN would be so high on the proposed development site (relative to dissolved levels of nutrients) these removal rates are likely to be conservative.

- Addition of new 1.5ML treatment pond which has a minimum surface area of 1,000m2.
- Addition of swales conveying runoff toward the pond. The swales were modelled conservatively by directing lateral inflow into the swale into the next section of swale.
- Stormwater harvesting from the pond was included in the model with annual demands of 8935 m^3/year, scaled by potential evapotranspiration minus rainfall (water deficit) drawn from the pond when water was available. This assumed irrigation of up to 1.78Ha in area which would cover areas used for blending and storage of product as well as selected landscaped areas to a depth of 400mm per year which is the deficit between annual evaporation of 1,200mm and annual average rainfall of 800mm per year. This was scaled monthly to account for the variation in evaporation with demand amplifying from spring to summer and tapering off from autumn to winter. They key point to note here is that it has been assumed that landscaped areas would also be irrigated and in fact would need to be irrigated to help draw down the pond to help reduce the volume of runoff leaving the pond.
- Pollutant assimilation between the point of discharge from the site and King's Stockyard Creek, 575m from the site was not modelled.

The proposed mitigation measures, namely GPT, swales and pond are shown in more detail in Figure 9.2 and the site general arrangement drawing prepared by Borgs and which is included in Appendix B.

Figure 9.2. Post Development MUSIC model configuration.



It should be noted that the water *quality* analysis is conducted at the site boundary after flowing out of the pond. That is, it measures pond discharge.

EMC values for use in the post development were based on 10 years of recorded water quality site discharge monitoring data from the Borgs main licenced discharge point at the V notch weir north of Lot 34. It is assumed that because that site has a similar timber shredding operation that it would be a good analogue site on which to model the proposed bark processing facility.

Adopted EMC values for the main operational area of the site are per Table 9.1.

Table 9.1. Adopted EMC values for the post development model.

Parameter	Adopted EMC and standard deviation (mg/L)	ANZECC DGV (mg/L)
TSS	39.8 mg/L and 2	N/A
TP	0.316 and 1.333	0.02
TN	10 and 1.82	0.25

The TSS EMC values are considered low relative to default values for a typical industrial site, TP is a little higher and TN is 5 times higher. The majority of the TN would start off in a particulate form and the recommended GPT would keep the TN in that form preventing wet sump decay and conversion into readily bioavailable forms of inorganic dissolved N. Worth observing also that the EMC values are orders of magnitude different to DGVs.

These are calibrated values which when included in the Borgs model produced runoff values fairly closely matching those observed through water quality monitoring.

9.1.3. Rainfall data selection

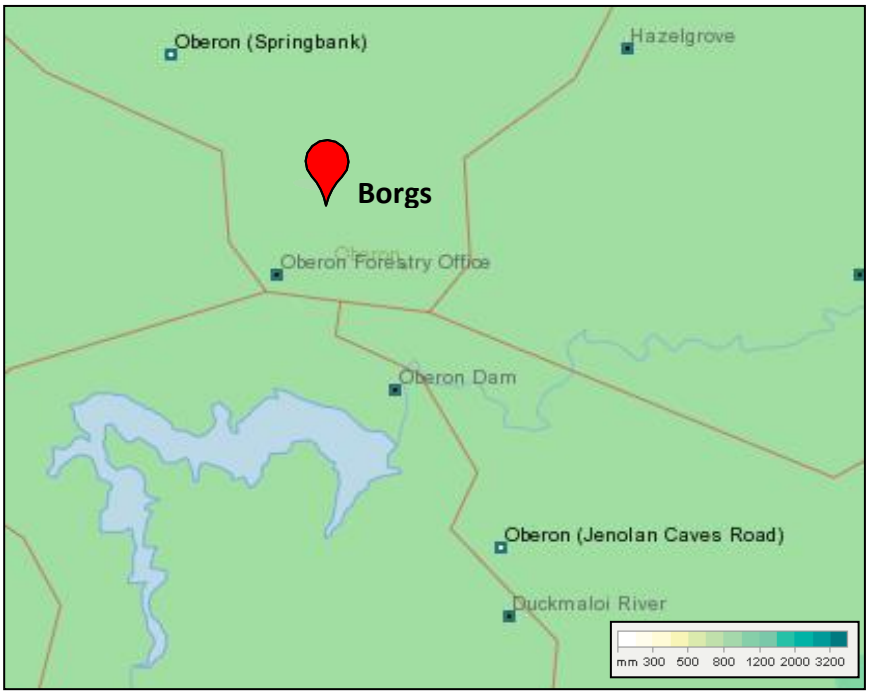
There are several pluviograph stations in close proximity to the Borgs site, which are all in the same mean annual rainfall zone, as can be seen in Figure 9.3, and the long term daily records at each site were analysed extensively in order to select a data set of sufficient length and quality to run in the MUSIC models. In order to accurately model the impacts of the proposed development, 6 minute (or "real time") rainfall data is required from a pluviograph station. It is preferable to use a long period of data, which reflects the long- term average rainfall (838mm/year), so that the results are more reliable and not affected by short-term cyclical weather variability. Furthermore, the data chosen should have no large continuous gaps where the station has failed and stopped recording.

Unfortunately, none of the weather stations around Oberon provide long-term high quality data, making it difficult to select a period for use. To overcome this, two smaller high quality periods (of approximately 10 years each) were selected, joined and run effectively creating a 20-year climate file used for simulation of the urban water cycle on the Borgs site.

The two periods selected were from 13/4/1966 to 15/6/1975 (with a mean annual rainfall of 1056mm), i.e. a wet period, and from 11/11/1977 until 20/05/1987 (with a mean annual rainfall of 592mm) i.e. a dry period, obtained from the Oberon Dam weather station (station number 063108). Since one period has a higher mean annual rainfall than the long term average, and the other has a lower one, the mean annual rainfall averaged across the two periods is about 800mm/year which closely reflects average rainfall over the last 20 years which has been slightly reduced from the very long term average of 838mm/year (probably as a result of climate change).

Evapotranspiration data for the site was modelled as 1174mm per annum based also on BOM data monthly distribution.

Figure 9.3. Location of pluviograph stations around the Borgs site. The uniform background colour indicates all stations are within the same zone of average annual rainfall around 800mm/year.



9.1.4. Stochastic Modelling Issues

Because the stochastic function in MUSIC was used to randomly generate a pollutant concentration value from a log normal distribution of pollutants (based around a specified mean and standard deviation), each model run has slightly different results.

Because it is expected that an EPL for the site specify the maximum upper limit at the 100th percentile, the maximum concentration values predicted by MUSIC become the key parameter for assessment.

There is therefore some degree of uncertainty with respect to the maximum values generated in MUSIC, i.e. the maximum values can vary considerably from run to run. We have reduced this uncertainty in two ways:

a) By having a climate file that covers 20 years of 6 minute data – this is discussed further later, i.e. a climate file that spans a very long time making it highly probable that a very high value would be generated within this very long time period, and

b) By running the model 10 times to obtain an envelope of solutions and by then adopting the largest maximum value from the set of 10 values. This provides us with statistical confidence to predict the 1 in 20 year worst single pollutant event.

9.2. Existing environment

9.2.1. Existing Conditions

The development site is currently grassed with no incised flow paths. Overland flows would be characterised as broad shallow, low velocity flows.

There is an existing dam located to the east of the site. Two overland flow paths are visible in Figure 2 flowing east toward their confluence with Kings Stockyard Creek. These overland flow areas are partly within the floodplain and function as ephemeral wet areas linking Lot 34 with the creek. It would be of value to maintain the broad shallow overland flow connection to the creek and not to create an incised high velocity drain.

The distance between the point of discharge from the proposed development and the nearest waterfront land is approximately 575m. The flow path to the creek is sinuous and well vegetated with a mix of exotic and native grasses. Substantial assimilation of pollutants will occur between then site boundary and the receiving water.

Figure 9.4. Overland flow paths (not creeks as defined in the Water Management Act) adjacent to Lot 34.

This area is also shown below in Figure 9.5.

Figure 9.5. Looking north east toward King Stockyard Creek.

9.2.2. Ambient Water Quality

No existing water quality data for this site exists however its water quality would be typical of a similar rural pastoral site. Some recent testing of water quality from within Kings Stockyard Creek at Hazelgrove Road is shown below.

Table 9.2. Recent Water Quality Results from Hazelgrove Road downstream of the industrial estate.

Parameter	Value Measured 10 Sept 2018 (mg/L)	ANZECC Default Guideline value (DGV) – upland rivers (mg/L)
TSS	7 mg/L	N/A
TP	0.01	0.02
TN	1.5	0.25

These results provide a single snapshot of water quality in the creek. Knowing the EPL limits for ANL, Borgs, CHH and HPP (with TSS set at 50 mg/L) upstream this clearly demonstrates the benefit of dilution in Kings Stockyard.

7 mg/L TSS typically indicates low TSS values with clear water. The TP is below ANZECC guidelines and considered good quality. TN is 6 times higher than the default ANZECC limit. There is no known reference creek (an undisturbed analogous creek in this locality) against which the TN value can be benchmarked and therefore we can't advise if it's high or low or typical. We can advise its considered low for a highly disturbed creek downstream of a substantial and highly productive industrial estate. By comparison typical event mean concentration values for TN from a typical roof (of any land use) are 2.0 mg/L, i.e. driven by atmospheric deposition.

9.2.3. River Water Quality Objectives for the Macquarie Bogan Catchment

NSW River water quality objectives (WQOs) for the Macquarie Bogan catchment reflect default ANZECC guideline values (DGVs).

The key parameters for assessment in this Impact Statement are the default guideline values (DGV) for TN and TP. TSS has no DGV.

The DGV for TN for upland rivers is 250 micrograms per litre. The DGV for TP for upland rivers is 20 micrograms per litre.

The objectives include turbidity and dissolved oxygen objectives too and while these are certainly important there is currently no way of assessing the impact of the proposed development on either of these except qualitatively.

It is also stated on page 8.2-9 within the ANZECC Guidelines that river flow objectives for N and P are to be applied to the median concentration occurring during low flows. Low flows are not defined in the ANZECC guidelines, however the 10th percentile flow is frequently considered to be a low flow indicator. More importantly however "ambient" water quality is defined as follows:

> "Ambient water quality refers to the quality of water when all the effects that can impact on a waterbody are considered not just the effects of a particular discharge."

Applying these guidelines and WQOs to a relatively small impervious development is for practical reasons not feasible. This is explained further. With stormwater harvesting, the development in question has no discharge more than 90% of the time. Even if one only considers periods of flow generation greater than 1 L/s, i.e. during rainfall runoff events, more than 45% of the time it is raining, there is no discharge from the site. The 45th percentile site flow (which is considered much more than a low flow event) median concentrations are therefore zero. Strictly, this indicates that the site would discharge water quality compliant with the DGVs.

It would therefore be feasible to demonstrate compliance with the DGVs because there is no low or even medium flow discharge from the site due to harvesting of stormwater.

This however would be a somewhat misleading approach and serves to demonstrate why DGVs should not be used to guide assessment of water quality impacts from such developments.

To assess the impact on ambient water quality we must assess the impact from flows greater than the 50th percentile outflow, i.e. flows above 2 L/s as these will carry most of the pollutant load from the site. WQOs are therefore discarded in favour of a body of evidence approach to risk assessment as demanded by the guidelines.

What is clear is that, due to harvesting of stormwater, as required by the SEARs, the only time runoff leaves the site is during larger storm events where pollutant concentrations would be diluted by catchment flows. This is a key part of the best practice approach on the proposed development.

9.2.4. Existing Groundwater Data – Depth and Quality

Borgs operate several bores close to the proposed development and data from these bores has been investigated to provide background data indicative of groundwater quality and depth on the proposed development site.

There are two types of aquifers present in the area. A deep aquifer is present at depth nominally 10m below the surface and this is very unlikely to be affected by the proposal and so data on the deep aquifer has not been included in this report. For information purposes the deep aquifer is located approximately 10m to 15m below the existing surface.

A shallow perched groundwater table is also present across the area. Should any groundwater impacts be experienced as a result of this proposal, this aquifer, being closest to the surface would experience potential impacts.

Groundwater depth of the shallow surficial aquifer varies depending on slope and proximity to Kings Stockyard Creek. No direct measures of groundwater depth were available over the proposed development site. Based on extensive measurement of groundwater depth on the adjacent Borgs site, nominally 300m away, groundwater could be expected to be present at approximately 2m below the existing natural surface of the site.

Groundwater quality measured at a bore labelled GW02 is presented below in Table 3. GW02 was chosen as it is close to the site (300m from the north western corner of the site) and within the shallow surface aquifer.

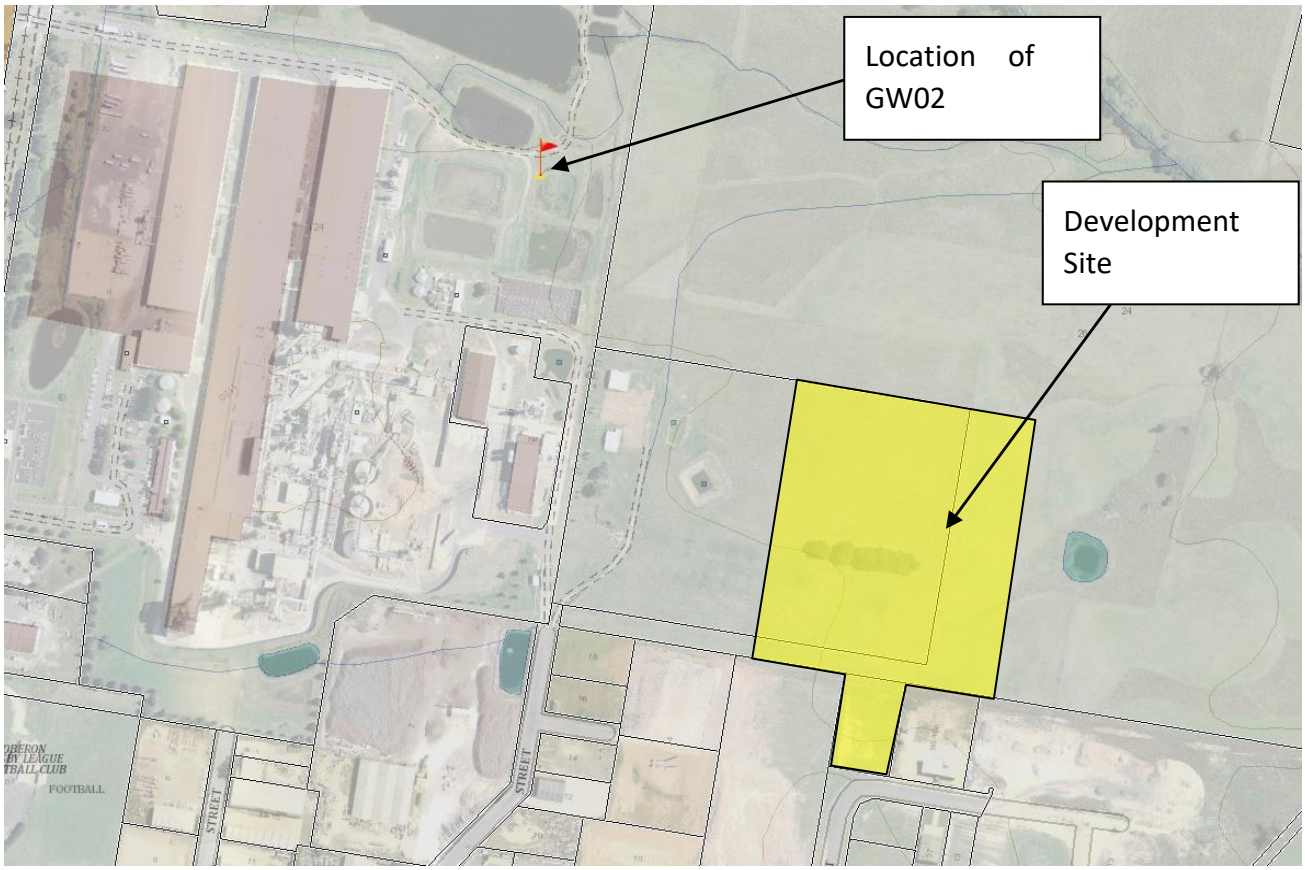
The location of GW02 is shown below in Figure 9.6.

Table 9.3. Groundwater Quality at GW02.

Analyte	Units	2018	2017	2016
Aldrin	µg/L	ND	ND	ND
Ammonia	mg/L	0.03	0.08	<0.01
Chemical Oxygen Demand	mg/L	15	56	<10
EC	µS/cm	1032	1007	1071
Delidrin	µg/L	ND	ND	ND
Formaldehyde	µg/L	ND	0.1	ND
pH		6.2	7.01	7.06
Total Dissolved Solids	mg/L	500	714	585
Total Organic Carbon	mg/L	4	6	2
Total Petroleum Hydorcarbons	µg/L	ND	ND	ND
Total Suspended Solids	mg/L	46	168	87

ND = not detected.

Figure 9.6. Location of groundwater bore GW02. The location of GW02 with a red flag and development site shown in yellow.



9.3. Impact assessment

9.3.1. Water Quality

9.3.1.1. Long term water quality risks

The storage of bark and sawn timber (pallets) in the storage bays is likely to generate coarse timber particles and leach tannin from the bark. The coarse particles will contribute to the load of total suspended solids (TSS) and total nitrogen (TN). Leachate will contribute to the load of tannin. While tannin itself is not toxic discolouration of runoff can reduce light penetration through the water column.

Additional traffic loads will result in an increase in traffic related pollutants though these are not significant by comparison with any main road.

Additional roof and hardstand areas totalling 3.3 Ha associated with the proposed development will result in an increase in the export of TSS, TN and TP from the impervious roof areas.

Key sources of stormwater pollution will arise from:

- An increase in roof areas
- An increase in paved impervious areas
- Storage of sawn timber (pallets)

- Storage of bark
- Blending of the raw materials to create a final product
- Handling, storage and transport of blended materials
- An increase in traffic volume

The key stormwater pollutants of concern will be:

- Tannins – tannic acid.
- TSS, TP and TN

The TSS generated from the wood handling parts of the process should be relatively easy to mitigate as expected particle sizes are in the gross size range, i.e. 2mm to 3mm or larger.

Equally the forms of TP and TN associated with the wood handling will be the particulate forms (provided they are kept dry) and relatively easy to remove.

The TP in the runoff is likely to be attached/bound to the TSS and therefore removal of TSS will see good removal of TP.

The TN in the hardstand runoff will be in two forms. Firstly, in a dissolved form at lower concentrations associated with atmospheric deposition. Secondly the TN will be in particulate form associated with the timber shredding and handling activities on side. Good air quality in the region is likely to see lower levels of nitrogenous pollutants emitted from the hardstand areas. Mostly, organic particulate nitrogen is at risk of emission. It is very important to keep this particulate form as dry as possible to prevent it from nitrifying and converting into a dissolved N.

The impact of the key pollutants on river health is as follows:

- TSS can smother benthic the benthos and result in siltation of creeks and an increase in turbidity of stormwater. By smothering benthos and benthic organisms TSS disrupts the natural exchange processes that occur in creeks. These processes see nutrients and sediment exchanged in different forms. Smothering of creeks with sediment reduces available habitat.
- TP and TN in the bioavailable forms (dissolved forms) contribute to the eutrophication of water bodies and waterways potentially leading to algal outbreaks and a change in the assemblage of the aquatic ecosystems from ones dominated by low nutrient levels to ones dominated by high nutrient levels. Increased nutrients can also lead to reduced dissolved oxygen levels.
- Tannic acids can discolour water and the impact is mainly aesthetic. There are many natural ecosystems (e.g. Melaleuca swamps) which have very high loads of tannic acids and which remain healthy and productive. It is also possible lower light penetration will mitigate against growth of algae.

9.3.1.2. Short term Water Quality Risks

Short term water quality risks associated with the development would include:

- Soil and water management during construction.
- The risk of an accidental spill of a chemical during operation of the plant. It is noted apart from storage of diesel fuel and fleet maintenance fluids (oils, hydraulic fluid etc.), few other chemicals will be stored on site.

The management of soil and water during construction can have devastating impacts and is often overlooked. It is known that the impacts of poor soil and water management during construction can have the same effect as water quality discharged from an operation over its entire life.

The transport of sediment from the site is the key risk during construction. It is likely that more than 1 hectare of land will be disturbed during construction and therefore the risks of sediment transport off the site are significant. The sediment could be deposited within the rehabilitated section of Kings Stockyard Creek which was subject to rehabilitation in the past from a chemical leak many years ago under different ownership. This would impact on creek ecology at a time when it is probably reaching pre-contamination levels of diversity. None the less adherence to the Blue Book would see soil and water impacts mitigated.

9.3.2. Geomorphology

The proposed development will not see any new structures within 40m of the top bank of a creek. However, it is proposed to construct rock lined leaky weirs at strategic locations between the site and King Stockyard Creek.

Therefore, direct geomorphic impacts will be negligible. No riparian vegetation or aquatic habitats will be removed or affected by this proposal.

The addition of approximately 2.64 Hectares of impervious area would result in an increase in the volume of runoff leaving the site. This could potentially have some minor impact on the geomorphic condition of the creek resulting in erosion of either the bed and or banks to cater for the extra water being conveyed into the creek.

This could be mitigated through harvesting of the runoff which would reduce both the frequency of runoff and the volume of runoff and theoretically lead to an improvement in creek health (Walsh et al, 2004).

The creek has also been rehabilitated in the past by CSR and has already adjusted to the presence of large impervious areas draining into it and is now stable. Some further minor adjustment is possible though it is expected to be minor and potentially negligible if mitigated. Further, inclusion in the floodplain of leaky weirs will help maintain the same broad, shallow predevelopment flow regime. This will keep the floodplain engaged and reduce velocities and erosion at minimal cost and with minimal maintenance.

9.3.3. Flooding

The catchment downstream of the proposed development is a sparsely populated rural catchment where the creek flows through an incised valley eventually to form the Fish River a few kilometres downstream of the site. This is quite a common geomorphic feature of the weathered granite landform of this region which can sustain steep hills which are not prone to erosion.

Analysis of aerial photography down to the confluence of Fish River with Slippery Creek (15 km downstream of the site) reveals that there are three buildings which could potentially be affected by flooding. The first and second are located 75m from the creek and in fact not likely to be flood prone let alone affected by the 1 in 100 year flood event. Both buildings are elevated about 20m above the creek. The third building is located 40m from the creek and is elevated between 10m and 20m above the Fish River but where the sides of the river are relatively flat, and the flood conveyance area is about 80m wide. Therefore, the risk of any potential increase in peak flows impacting on downstream property is considered negligible.

The proposal, located at an elevation of 1,100m above sea level is not located within a floodplain and therefore there would be no potential impacts from floodplain filling, and this will not be considered further.

Local overland flow paths are affected by the proposal and have been defined with easements sized to convey 1 in 100 year flows, so that they can be safely directed around the proposed development without mixing any clean run-on water with site water which would be of lower quality.

9.3.4. Water Resources

9.3.4.1. Water Supply

The proposed development will see a minor increase in demand for water which could be sourced from either:

- Town water.
- Harvested stormwater runoff. The impervious areas on the site and upstream are extensive and lend themselves to a reliable stormwater harvesting scheme.

9.3.4.2. Wastewater

A pressure sewer will be installed on site with wastewater pumped to the Council's water treatment plant.

A treatment plant will be installed to treat stormwater prior to reuse. This will concentrate particulates. The backwash water from the plant could be discharged to the town sewer or preferably thickened on-site in a filter bag which would see filtrate water being collected for use in fertiliser products. The contents of the filter bag will then need to be dried and reapplied to blended mulches on site – adding to their nutrient quality.

9.3.4.3. Groundwater

There are no expected impacts to ground water caused by the proposed development. While surface runoff across pervious surfaces can infiltrate into the groundwater storages, extensive mitigation measures have been proposed to treat the surface water such that it will pose no risk to either natural receiving waters or water bodies, or groundwater.

Critical control measures include:

- Raising the proposed development above the ground table to avoid cutting into the groundwater table. It is noted that Borgs enjoy the groundwater under an existing Water Access Licence and have a significant interest in ensuring it is not polluted or access disrupted through lowering of the water table.
- Constructing concrete hardstand areas with sealed joints.
- Installing a drainage layer under the hardstand areas with subsoil drainage which would discharge into the stormwater collection system.
- Draining the said hardstand areas to a drainage system which would be lined with clay to prevent infiltration.
- Sealing the sub-base of the pavements with clay to prevent infiltration with compaction to the requisite level specified by the EPA guidelines.
- Ensuring the refuelling area uses a self-bunded tank and that the refuelling area is covered with an appropriately sized awning.
- Having a stormwater pond lined with clay or geo-composite clay liner or HDPE both to retain water but also to protect groundwater.
- Ensuring that irrigation of pervious, landscaped areas only occurs when it is not raining and by using soil moisture probes to measure the demand for irrigation.
- Installing penstocks to ensure that firefighting water is captured on site and does not overflow from the facility into the catchment and groundwater.

9.3.4.4. Surface water quality impacts

Load based results

The predevelopment and post development MUSIC models were run 10 times and the results obtained.

Pre and post development average annual loads and treatment performance is shown below in Table 5. Table 5 has sources columns, residual load columns and percentage reductions columns. The sources columns describe the unmitigated pollutant loads running off the land surface. The residual load is the pollutant load after mitigation. The percentage reduction columns report the percentage reduction from source to residual load, i.e. the effectiveness of the treatment systems. It needs to be appreciated that this is the predicted performance for the whole site in its entirety and not just for the additional impervious area proposed as part of this development, i.e. a wholistic approach to water management on the entire site is being undertaken as part of this assessment.

Table 9.4. Annual Pollutant Export Loads and Treatment Train Performance.

	Residual Pollutant Loads		
	Pre-development	Post-development	% Reduction from pre to post development
Total Suspended Solids (kg/yr)	493	180	63% down
Total Phosphorus (kg/yr)	2.01	1.36	32% down
Total Nitrogen (kg/yr)	12.3	25.6	108% up

Table 9.4 shows that despite the addition of another 2.64 hectares of impervious area, with the additional reuse of stormwater and the additional treatment measures, the proposed development is predicted to have a beneficial effect on its catchment in terms of reducing TSS and TP while a potential detrimental effect may occur from increasing TN.

Best practice stormwater treatment is often described as follows:

- Removal of 85% of the average annual load of TSS
- Removal of 65% of the average annual load of TP
- Removal of 45% of the average annual load of TN

Table 9.5. Treatment Train Effectiveness of the Borgs Treatment System.

	Post Development without treatment in place	Post-development (with proposed treatment system)	Treatment-train Effectiveness (% Reduction of Pollutants)
Total Suspended Solids (kg/yr)	763	180	76.4
Total Phosphorus (kg/yr)	5.10	1.36	73.3
Total Nitrogen (kg/yr)	157	25.6	83.7

Table 9.5 shows that the proposed development would come close to achieving best practice for TSS removal, exceed best practice for TP and exceed the TN removal target by nearly double. Even though the treatment train would remove 90% of TN there is a predicted increase in TN. This analysis demonstrates that all practical steps are proposed to be undertaken to minimise the increase in the level of TN discharged from the site.

Concentration based results

A typical Environmental Protection Licence (EPL) for facility of this kind would specify pollutant discharge limits in terms of concentrations rather than annual loads. Although there is less confidence in MUSIC's ability to predict concentration based results (versus load based results), it remains the best tool available for doing so, and thus enabling a comparison with the EPL limits.

One difficulty in modelling the predicted maximum discharge concentrations values in MUSIC, is that the pollutant concentration values applied at the source nodes in the model, are derived stochastically from a log normal distribution, meaning that a pollutant concentration value for each pollutant is randomly synthesized by MUSIC based around a log normal distribution defined by its event mean concentration and standard deviation at each time step and is therefore different for each simulation (or run) of the model. While the mean predicted pollutant concentrations don't vary much between each model run, the maximum values do vary significantly.

To overcome this uncertainty with the model, the model was run 10 times to ensure a broad envelope of results was predicted. This is equivalent to running 200 years of six minute climate data. From the 10 runs the maximum value was selected and reported below in Table 9.6.

Table 9.6. Predicted maximum discharge concentrations from the MUSIC model (maximum of 10, 20 year 6 minute runs).

Parameter	Predicted Maximum concentrations (mg/L)
Total Suspended Solids	30.6
Total Phosphorus	0.203
Total Nitrogen	8.67

If an EPL limit of 50 mg/L would be imposed on the development, the modelling indicates this target would be achieved.

9.3.4.5. Surface water quantity impacts

In order to examine the predicted impacts of the proposed development on Kings Stockyard Creek in terms of water quantity, the post development case is compared with the predevelopment and rural site case. The purpose of modelling the predevelopment rural site, is to determine how much extra runoff is generated by the proposed development. We note the rural state is the same state of development adopted under all Water Sharing Plans formed under the *Water Management Act* (2000) regardless of the level of imperviousness of a site.

Table 9.7 below shows the results of the rural site simulation compared with the post development simulation, both with and without the reuse of the stormwater that is generated on the site. It can clearly be seen that the post development case (which includes the current infrastructure) causes a substantial increase in the volume of runoff produced on the site, more than doubling the volume of runoff that would be discharged to the creek.

Such drastic increases compared with the "natural" flow regime in the creek, can have adverse effects such as erosion of the creek bed or banks.

However it can be seen in Table 8 that by harvesting and reusing some of the stormwater, rather than disposing it to the creek, the mean annual volume of runoff can be reduced closer to the rural runoff volumes, thereby lessening the chance of any adverse effects on the creek.

Table 9.7. Mean annual flow comparison.

	Rural State (no dams)	Post development (without treatment)	Post development (with treatment and harvesting)
Mean Annual Flow (ML/year)	6.67	17.6	9.64

The SEARs indicate a need to demonstrate that all practical measures are being taken to reduce, as much as possible the volumes of polluted runoff from this site.

It would be possible to increase the volumes of irrigation and therefore reduce the volumes of runoff further however there is a risk that if the blended mulches are over irrigated, they will in fact produce leachate rich in tannin and dissolved inorganic nitrogen. This would be an undesirable outcome.

The depths of irrigation assumed in this work was identified earlier as being 400mm per annum. This is exactly enough irrigation to replace water that is lost to the atmosphere from evaporation. An irrigation controller would need to be installed on site to ensure that the right depth of irrigation occurs, and that excessive irrigation does not occur.

Because the irrigation demand is split between landscaped areas (simply to help maximise the reuse volume) during detailed design the volume at which irrigation of landscaped areas is ceased needs to be determined. This would ensure a meaningful volume of water remains with which to irrigate blended mulches to keep them moist and suppress dust.

9.4. Mitigation measures

The proposed long-term water quality treatment measures include:

- GPTs
- Swales
- Pond
- Stormwater Harvesting and Reuse
- Leaky weirs on the floodplain - these are discussed in more detail below.

9.4.1. Barramy GPTs

Barramy GPTs are recommended because they have been designed for environments such as the proposed development. They work to keep organic matter dry and prevent leaching of dissolved nutrients. They are easy to maintain using a back hoe or small loader.

The photos below show a recent installation in the Blue Mountains.

The proposed stormwater treatment pond will need to be designed with care. Batters can typically be 1 in 4 and planted with appropriate reeds and sedges. The pond water levels will fluctuate significantly so vegetation must be designed to be suitable for its depth zone.

Ephemeral wetland plants that can tolerate both extended wetting and drying would be most suitable.

If space permits, shallower batters would allow greater density and diversity of fringing vegetation and this would improve water quality and improve safety. The pond shall be designed to enable access by machinery to remove accumulated sediment from its bed on a routine basis. This will help to improve long term quality.

Figure 9.7. Barramy Gross Pollutant Trap.

Figure 9.7 shows the trap with vanes moving gross pollutants and solids to the left hand side. When flows build up water is able to flow between the vanes.

The material moved into the trap is allowed to dry as the trap slopes toward the right hand flow bypass channel. The screen at the end of the device also allows debris to be pushed to the back of the trap so that is becomes self-stacking. The debris is pushed against the screen and the debris itself forms a blinding layer which stops further debris from being washed through the screen.

Figure 9.8. Showing a side view of the Barramy Trap.

Figure 9.8 shows how the trapped material can dry out against the maximesh screen.

The material caught in this trap includes very fine wood fibres less than 1mm in size, sands and silts, leaves and litter. The trap in these plates was emptied 2 weeks prior to this photo being taken and the contents were conveyed in two storm events from a steep catchment.

Four GPTs are proposed. Two of the GPTs are proposed to be located upstream of the swales where they will intercept gross pollutants and silt and wood fibres before they are conveyed into the swale. This will help reduce the maintenance burden on the swale in the long term. Two further GPTS were proposed to be located prior to the pond.

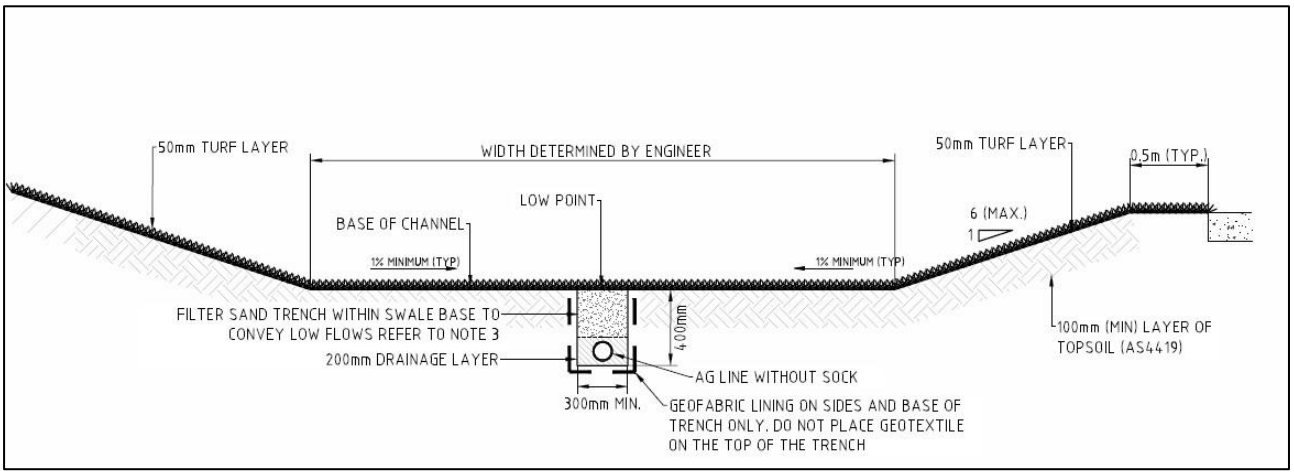
This approach must be rationalised during detailed design of the site to ensure the traps are located where they are needed and to keep the pond free of organic material.

9.4.2. Grassed Swales

Grassed swales have been included in the treatment train. The evidence from Borgs is that these swales perform well. Over time however, as they are designed to be a depositional tool, their depth will reduce and they will need to be maintained to reinstate their design depths.

A typical bioswale is shown below in Figure 9.9.

Figure 9.9. Typical grass swale.



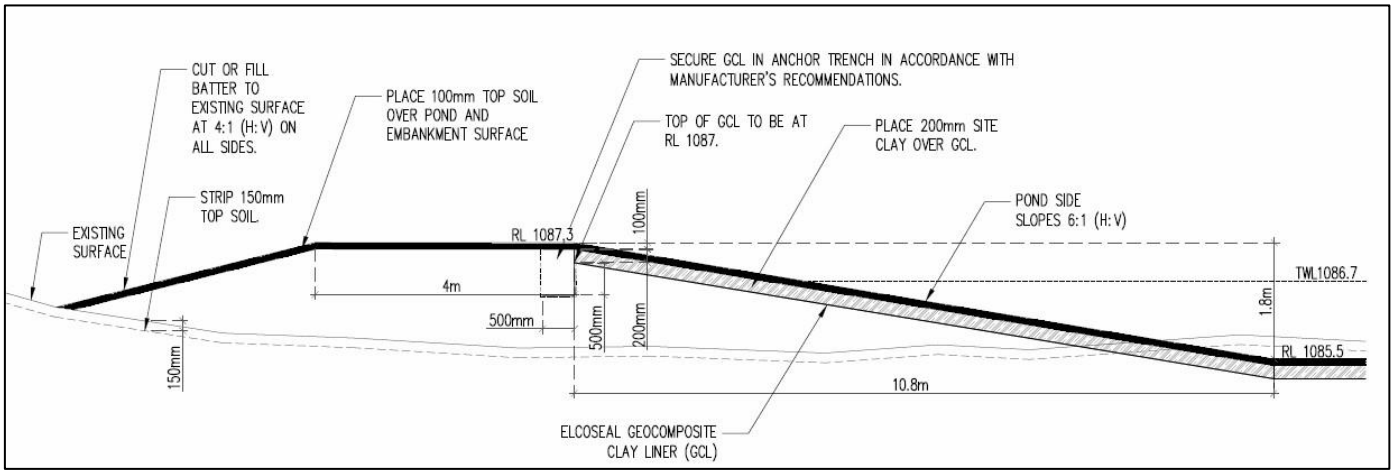
The design swale dimensions adopted in this project are:

- 1 in 4 side slopes
- 1m wide base
- 0.5m deep and 5m wide
- 0.5% longitudinal slope
- The swales would need to have subsoil drainage as shown because there will be an impermeable liner under the swales preventing groundwater impacts.

9.4.3. Water Quality Pond

An example of a pond cross section is shown below in Figure 9.10.

Figure 9.10. Typical water quality pond section.



The typical section shows a pond with a liner required to protect groundwater and also to keep water within the pond so that it can be reused.

The design pond dimensions adopted for this project are:

- Surface area of 1,000 m^2.
- Maximum depth of 1.5m to ensure no stratification occurs
- Volume of 1,500 m^3
- Lined with no infiltration.

Sufficient freeboard, (nominally 330mm) would need to exist above the overflow/spill level to allow for firefighting water to be contained on site. 330mm of freeboard would allow 330,000 litres of firefighting water runoff to be contained on site.

In order to contain the firefighting water on site, a water tight penstock(s) would need to be included to ensure that no flows leave the site. How this is arranged would be determined during detailed design. Possible configurations include headwall mounted penstocks with manual spindles left permanently in place.

Suggested manufacturers of the penstocks would be either SPEL or AWMA. Suitable macrophyte species for the pond are listed below.

PLANTING LIST

SPECIES	COMMON NAME	ZONE
Craspedia variabilis	Common Billy Buttons	Batters
Lomandra longifolia ssp. Longifolia	Spiny Headed Mat Rush	Batters
Microlaena stipoides var. stipoides	Weeping Grass	Batters
Cynadon dactylon	Couch Grass	Batters
Themeda australis	Kangaroo Grass	Batters
Poa labillardierei var. labillardierei	Tussock	Batters
Gonocarpus micranthus	Creeping Raspwort	Batters
Hypericum japonicum	Matted St Johns Wort	Batters
Utricularia dichotoma	Fairy Aprons	Ephemeral Zone
Carex gaudichaudiana	Fen Sedge	Ephemeral Zone
Scirpus polystachyus	Large Headed Club Rush	Ephemeral Zone
Carex appressa	Tall Sedge	Ephemeral Zone
Eleocharis Acuta	Common Spike Rush	Shallow Marsh
Juncus usitatus	Common Rush	Shallow Marsh
Baumea Acuta	Pale Twig Rush	Shallow Marsh
Eleocharis acuta	Common Spike Rush	Shallow Marsh
Ficinia Nidosa	Knobby Club Rush	Shallow Marsh
Baumea articulata	Jointed Twig Rush	Marsh Zone
Eleocharis sphacelata	Tall Spike Rush	Marsh Zone
Schoenoplectus validus	River Club Rush	Marsh Zone
Triglochin microtuberosum	Auqatic Herb	Marsh Zone
Triglochin procera	Water Ribbon	Marsh Zone

9.4.4. Fire Fighting Water Storage

As noted earlier 330,000 litres of firefighting water shall be capable of being stored within the pond and appropriate valves and designs must be configured to ensure this outcome. The volume of storage required is based on an assessment prepared by Jackson Environment and Planning Pty Ltd and which is repeated below.

The following estimate is based on the main fire risk on the premises being from bark and timber processing. Given the small size of the office and workshop, fire sprinklers will not be required as part of the National Construction Code (2019).

The proposed bark and timber processing and landscaping supplied facility will store both unprocessed bark and timber, and shredded bark and timber in designated concrete block bunkers in accordance with draft NSW Fire and

Rescue (2018)[12] Guidelines. It is noted that bark and timber materials are potentially combustible and require continued exposure to a heat or ignition sources in order to combust.

In order to mitigate against potential fire events, the WA Department of Fire and Emergency Services[13] recommends that a volume of 2.5L of water is applied for each cubic metre of non-mulched material in a stockpile within the first 30 minutes of a fire incident. The application of water should be increased to 4L per cubic metre of mulched material in a stockpile.

The NSW Fire and Rescue (2018) draft guidelines in Appendix A (Acceptable Solutions) requires waste facilities to be designed to be supplied with firewater for a minimum of four hours duration fire event (EP1.3). Based on the firefighting water demands of a worst case scenario fire event on the site, where all bays of unprocessed timber and pine bark, and all separately stored bays of pine bark and mulch are ignited, total water requirements for a four hour event is estimated to be 330,840L (see attachment).

9.4.5. Stormwater Harvesting

It is proposed to draw approximately 8,935 KL/year from the pond. This water would be used to keep blending and product storage bay areas containing product at optimum moisture content. In addition to irrigating products for dust suppression, drawing water from the pond to irrigate landscaped areas would help to reduce the mean annual volume of runoff from the site considerably.

Drawing 8,935 kL/year would allow for irrigation to a depth of 400mm of:

- 1,700m^2 of product blending areas
- 2,855m^2 of product storage bays
- As well as irrigation of 1.78 hectares to a depth of 400mm of selected pervious areas including the site swales. Irrigation of swales and adjoining areas would ensure optimum grass growth and optimum water quality outcomes. Water to irrigate landscaped areas would also assist in maintaining high quality, drought resistant landscape features and reduce fire risk.
- It will be necessary to optimise the reuse of harvested water so that it can be allocated preferentially to products and dust suppression when water levels get low.

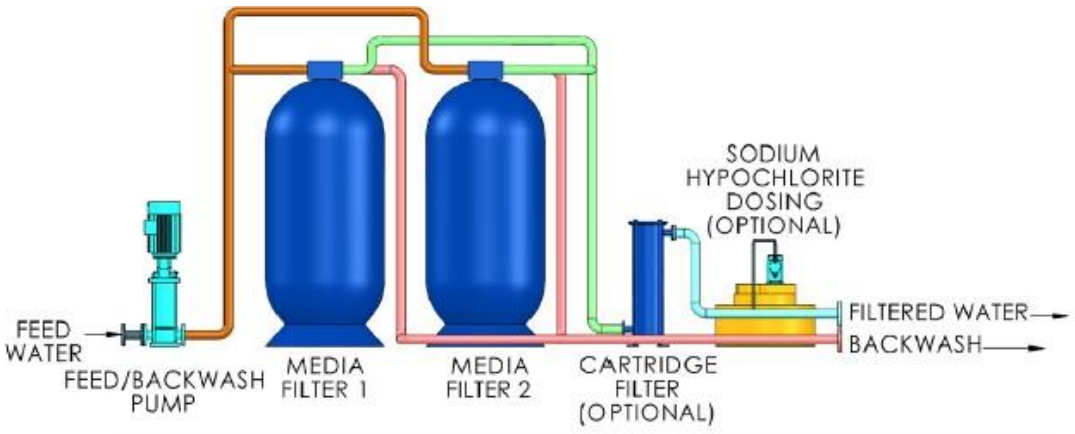
Sustainability Workshop has worked with MAK Water to develop an appropriate treatment process to ensure the stormwater would be fit for purpose and safe for use. It would need to be disinfected prior to irrigation. Because of the tannins likely to be present UV is not a disinfection option.

Instead media filtration is proposed together chlorination.

[12] NSW Fire and Rescue (2018). Fire Safety Guidelines – Fire Safety in Waste Facilities. Internet publication: https://www.fire.nsw.gov.au/gallery/files/pdf/guidelines/guidelines_fire_safety_in_waste_facilities.pdf

[13] WA Department of Fire and Emergency Services (2014). Bulk Green Waste Storage Fires. Internet publication: https://www.dfes.wa.gov.au/safetyinformation/fire/bushfire/BushfireInfoNotesPublications/DFES- InfoNote-GreenWaste.pdf.

Figure 9.11. Schematic of Media Filtration and Treatment of stormwater.



The treatment plant would come on a skid mounted 20-ft container and need to be connected to electricity. The feed pump should include a self-cleansing intake.

In addition to the treatment plant it would be necessary to store treated water in 4, 50 kL tanks on the site. This would enable a weeks irrigation demand to be stored. Because the chlorination will have a residual effect it will be safe to store the water in the tanks for shorter periods. If not used, nominally within a week, the water would need to be released back into the pond (subject to design).

Hypochlorite would need to be replenished and stored on site in a refillable, bunded container. Some WHS equipment would be required adjacent to the store – such as an emergency shower. This may require a potable water supply to the treatment plant location. The potable supply would be required anyway to make up any deficit in supply needed during very dry times when the pond was empty.

Indicative costs for the equipment would be in the order of $150,000 for the MMF plant and 4 tanks. Either a trade waste agreement with Council would need to be entered into to accept the filter backwash or the backwash could be dried out via filter bag and the sludge mixed with some of the products on-site.

During detailed design the exact plant requirements would need to be established.

An irrigation controller and moisture probes will be needed to help schedule irrigation mainly to ensure that over irrigation does not occur.

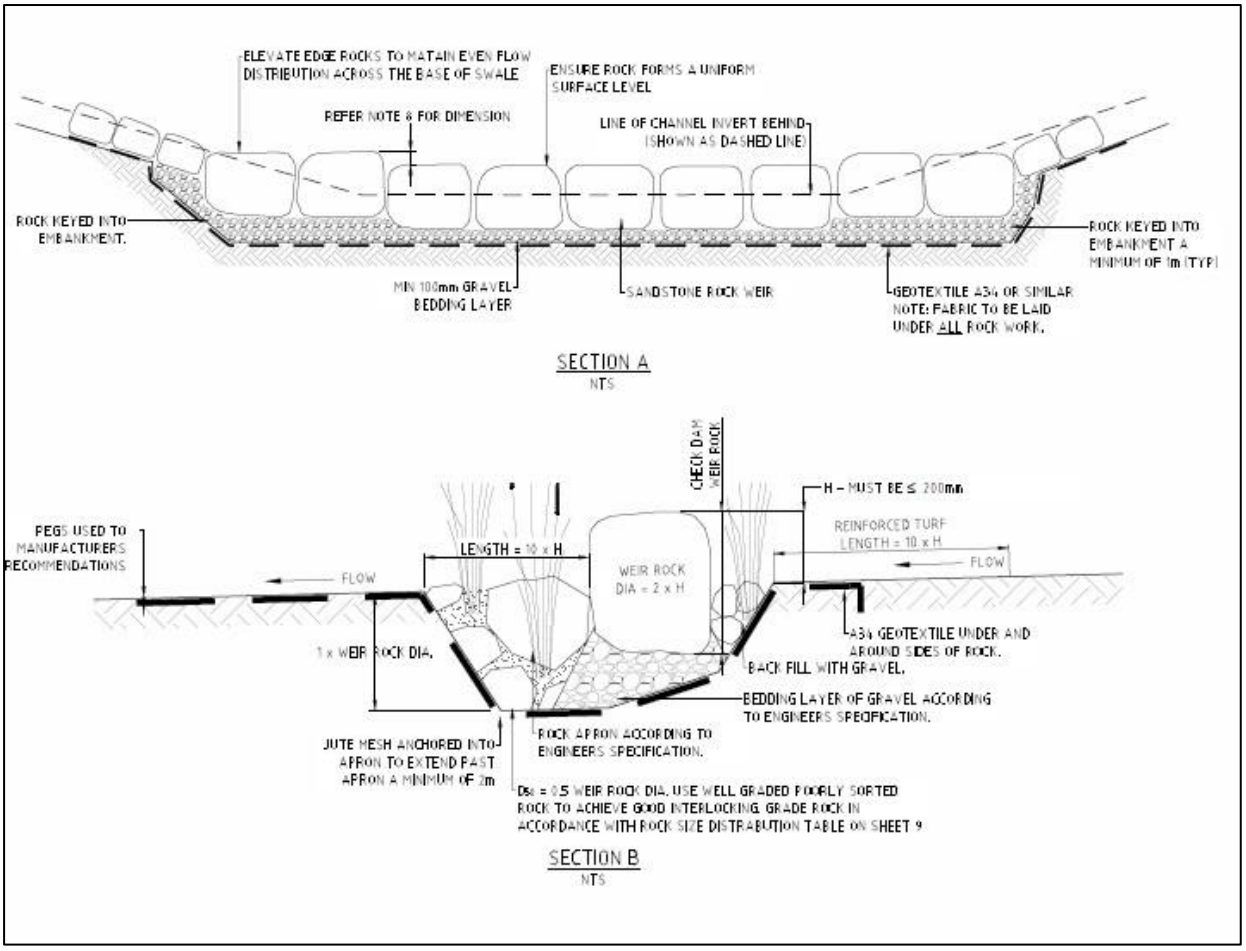
A local rainfall gauge would need to be connected to the irrigation controller to ensure that irrigation does not occur when it is raining.

9.4.6. Leaky Weirs in the Floodplain

It is proposed to place leaky weirs at two or three locations in the floodplain between the Lot 34 boundary and the creek to help reduce the velocity of flow and spread the flow across the floodplain. The final locations of the weirs would need to determined during detailed design. An easement which covered these weirs and a right to discharge flow from Lot 34 would be required as the flow crosses the property boundary onto the rural zoned land next door.

A typical detail showing a leaky weir is provided below.

Figure 9.12. Leaky Weir Typical Details.



9.4.7. Construction Phase Water Quality Management

During construction it is critical to manage sediment rich flows from the site. Dispersibility testing on the adjacent site indicated mildly dispersible, slightly colloidal soils.

As the proposed development is larger than 1 Ha it would require a soil and water management plan and would require a sediment basin.

The sediment basin would need to be designed to contain the 75th percentile, 5 day rainfall event in order to comply with the Blue Book.

Preliminary calculations indicate the following volumes would be required:

Volume of Sediment basin = Settling Zone + Sediment storage zone

Settling Zone Volume (TypeD/F) = $10*C_v*A*R$

Table 9.8. Summary of volume calculations.

Parameter	Value	Comment
Soil Hydrologic group	C	assumed - could be D which would make Cv =0.5
Mean annual rainfall (mm)	Between 744.8 (at Jenolan caves road) and 840.5 (at Springbank)	

Parameter	Value	Comment
$R_{(75\%, 5day)}$	22.5	(mean annual assumed at 800 and read from "all sites" chart. Mean annual closely matches Lithgow, and is much lower than Katoomba (see "all sites" list)
C_v	0.35	Read from chart in appendix F of the Blue Book.
Area (Hectares)	4.989	This is the total disturbed area draining to the basin.
Settling Zone volume	389 m^3	
Storage zone volume	194 m^3	
Total Volume	583 m^3	

It is proposed to excavate a whole in the place where the proposed water quality pond would be located and to use this space during construction for a sediment basin.

The temporary sediment basin would be converted into the final water quality pond close to the completion of construction.

It may also be considered beneficial to construct the permanent pond off line and if that is the case the sediment basin would need to be constructed off the site and if relevant, permission from adjoining owners obtained for that to happen.

9.5. Conclusion

In conclusion it is highly likely that:

- There will be no decline or detectable change in aquatic health either locally within Kings Stockyard Creek or within the broader Fish River catchment.
- There will be no discernible increase in any water quality parameters at almost any point in the catchment except for concentrations of TN immediately downstream of the pond and as explained above this will not result in ecological stress occurring at any point in the catchment.

The harvesting of stormwater would reduce operating costs when compared to the cost of purchasing the water from Council. Therefore, there is an economic incentive to pursue this action. It is however noted that it is not essential that harvesting is undertaken to meet any potential EPL limits. However, there would be load based water quality and geomorphological benefits from harvesting and therefore it is to be considered a core component of the mitigation measures.

It is therefore recommended that the proposed mitigation measures are adopted. The economic and environmental incentive to do so is certainly present.

It is noted there will be an increase in the TN load discharged from the proposed development but this is unlikely to result in any detectable aquatic impacts such as nuisance plant growth for the reasons explained above.

10. Traffic and Transport

Borg Plantations Pty Ltd engaged Barker Ryan Stewart to prepare a Traffic Impact Assessment for the proposed development.

A copy of the full report is provided at Appendix F – Traffic Impact Assessment.

10.1. Methodology

The Traffic Impact Study has been prepared in accordance with the requirements of the SEAR's issued 23 July 2018, RMS's letter dated 6 July 2018, Oberon Council DCP, the Road and Maritime Services (RMS) *'Guide to Traffic Generating Developments'.*

Traffic counts were undertaken at the intersection of:

- Albion Street / Lowes Mount Road / North Street
- Albion Street / Hawken Street
- Albion Street / Duckmaloi Road

Intersection performance has been assessed using the SIDRA 8 modelling software which uses the level of service (delay) model adopted by the Roads and Maritime Services (RMS) in NSW to assess intersection performance. Average delay is used to determine the level of service (LOS) based on the following table sourced from the RMS' *'Guide to Traffic Generating Developments'.*

10.2. Existing environment

10.2.1. Site Location

The site is located at 26 Endeavour Street and comprises Lot 18 DP1249431 and parts of Lot 33 and 34 DP1228591. The site is bound by industrial development and Endeavour Street to the west, industrial development to the south, and vacant land to the north and east. Further to the south is Albion Street and residential development.

Figure 10.1. Aerial photograph of site.

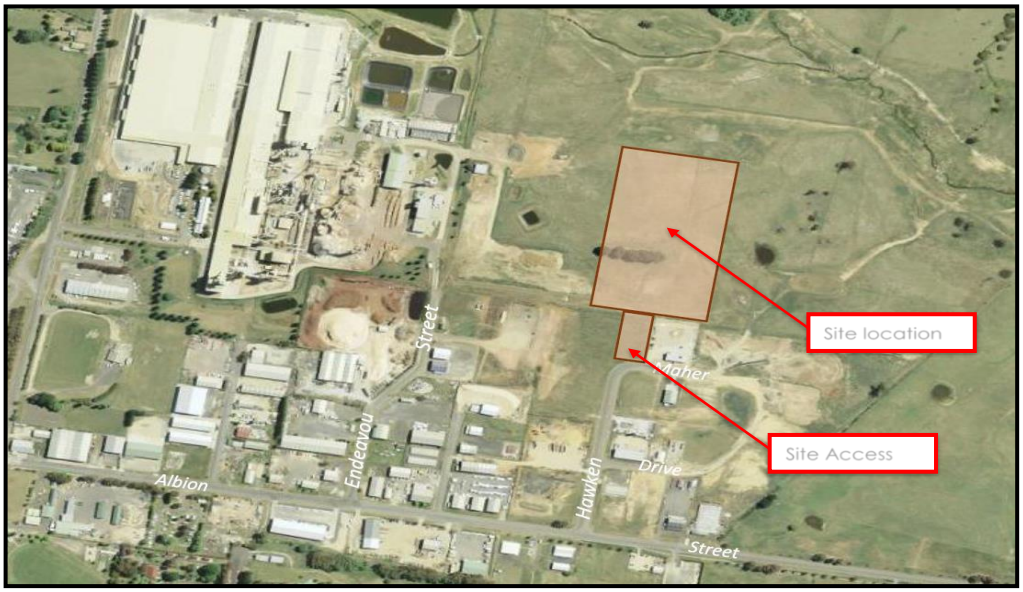
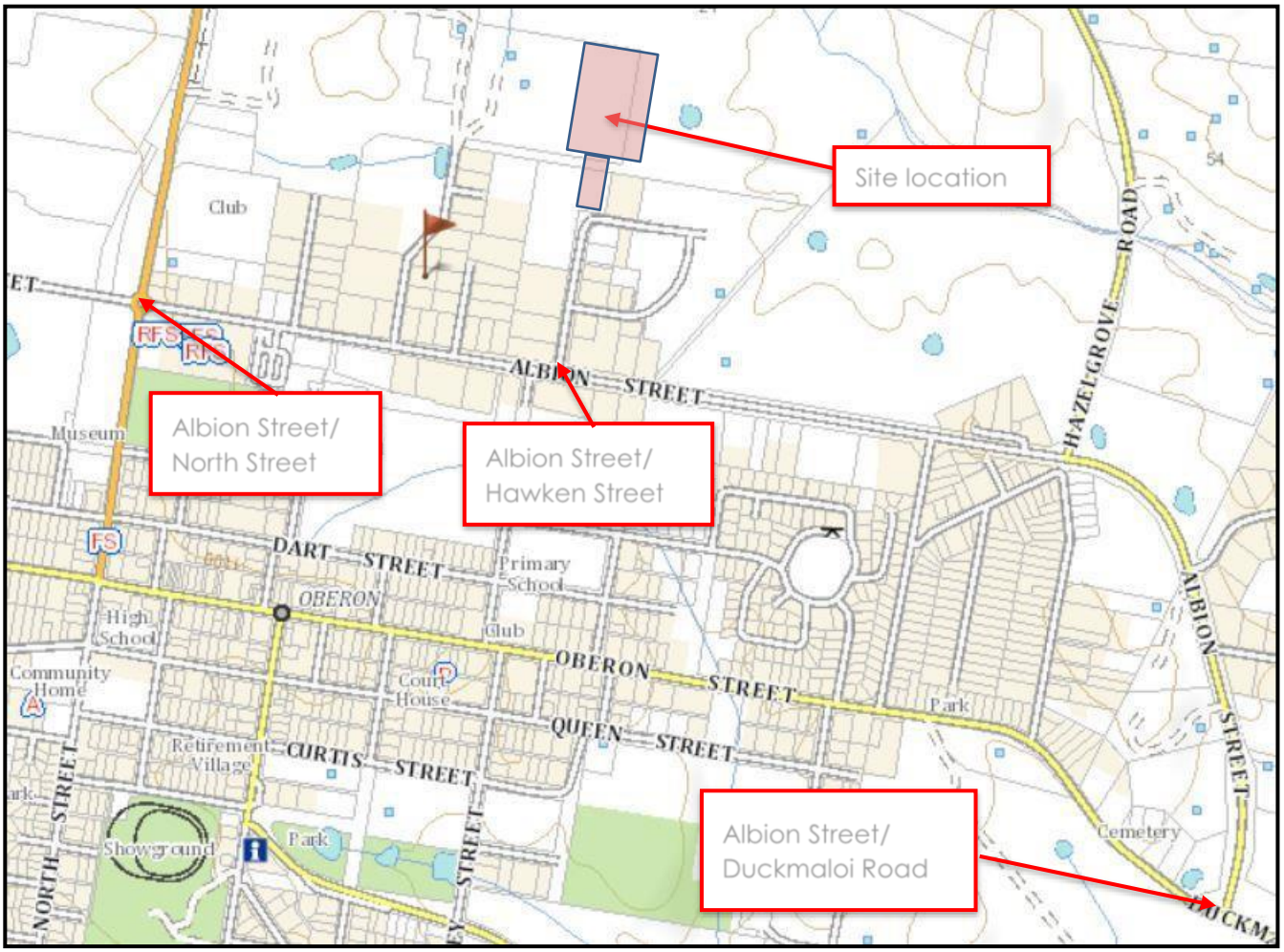


Figure 10.2. Site Location (NSW Land & Property Information SIX Maps 2013).



10.2.2. Existing Road Conditions

As stated above the site is bound by industrial development and Endeavour Street to the west, industrial development to the south, and primary production development to the north and east. Further to the South is Albion Street and residential development.

10.2.2.1.Endeavour Street

Endeavour Street is a local road with a 12m wide carriageway with kerb and gutter on both sides. It is undivided but operates as a two-lane road, one lane northbound and one lane southbound. It has unrestricted on-street parking on both sides of the road. The speed limit on this road is 50km/h.

10.2.2.2.Albion Street

Albion Street is a local road with a 16m carriageway width with kerb and gutter on both sides. It has two lanes, one eastbound and one westbound and is divided by a single divided line. The speed limit on this road is 60km/h.

10.2.2.3.Duckmaloi Road

Duckmaloi road is an arterial road with a 12m wide carriageway with no kerb and gutter on either side of the road. It has two lanes, one eastbound and one westbound and is separated by double parallel continuous lines. Both sides of the road are subject to no parking. The speed limit on this road is 60km/h in the general vicinity of the site.

10.2.2.4.Hawken Street

Hawken Street has a 17m wide carriageway with kerb and gutter on both sides. It is undivided but operates as a two-lane road. The speed limit on this road is 50km/h.

10.2.3. Traffic Counts

Traffic counts were undertaken on Thursday 18th October 2018 between 7am-9am and 4pm-6pm at the following signalised intersections:

- Albion Street / Duckmaloi Road
- Albion Street / Hawken Street
- Albion Street / North Street

The results of the traffic counts are provided in the Figures below. Full counts provided in the Traffic Impact Study report at Appendix I – Traffic Impact Assessment.

Figure 10.3. Albion Street / Duckmaloi Road Intersection Count.

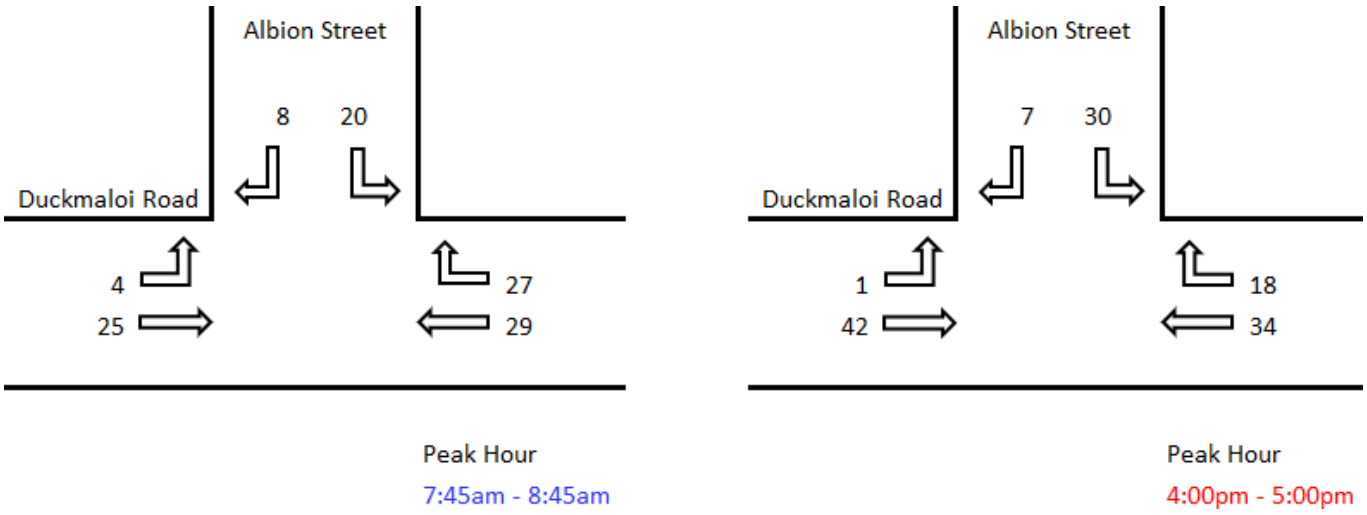


Figure 10.4. Albion Street / Hawken Street Intersection Count.

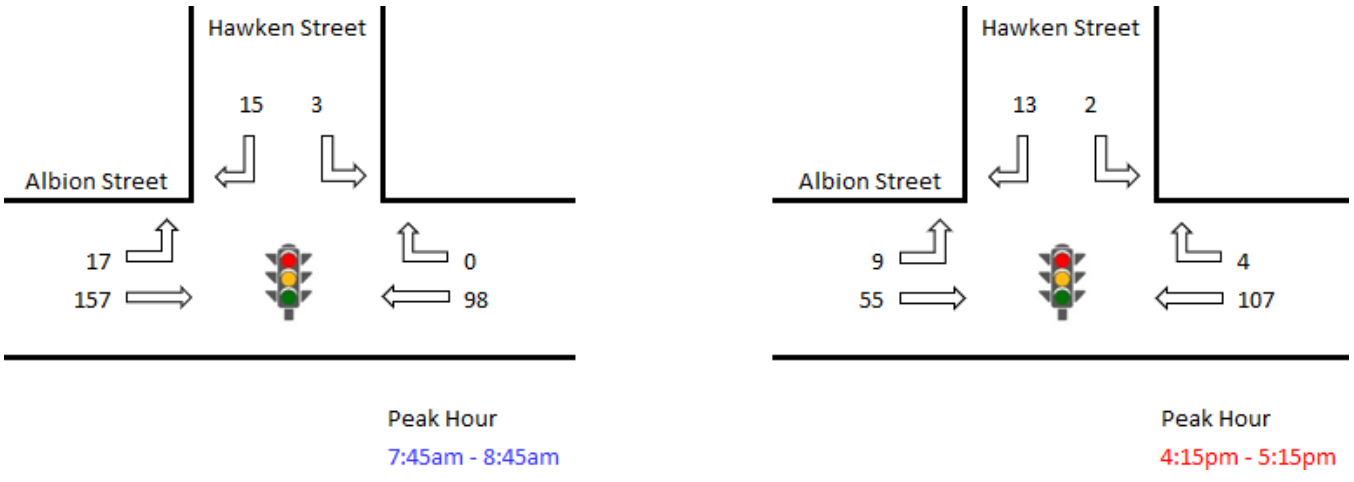
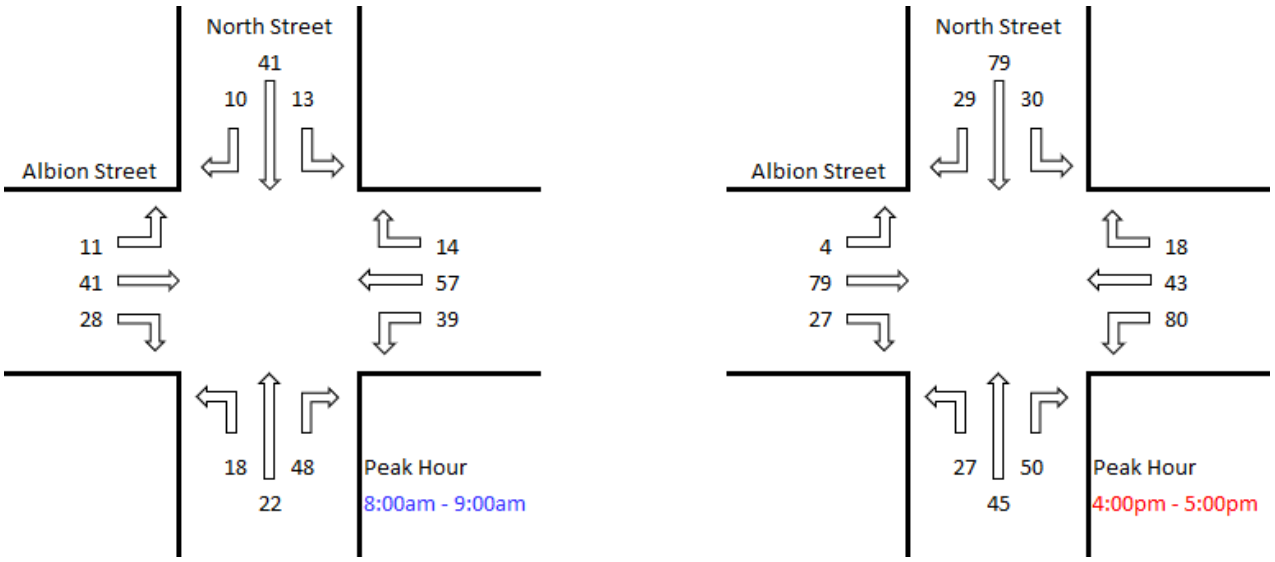


Figure 10.5. Albion Street / Lowes Mount Road / North Street Intersection Count.



10.3. Impact assessment

10.3.1. Haulage Routes

Approximately 30% of deliveries will arrive from Borg's facilities in Somersby and Charmhaven, and the remaining 70% of deliveries arriving from the Borg facility located directly adjacent (to the west) of the subject site. The haulage routes from the east and west are attached as Appendix E in the Traffic Impact Study report provided at Appendix I, with the associated swept path analysis attached as Appendix A in the Traffic Impact Study report provided at Appendix I.

Swept path assessment of the intersections of the Great Western Highway and O'Connell Road, O'Connell Road and Albion Road on the western haulage route have been undertaken and show that B-Double vehicles are able to manoeuvre through these intersections without the need to upgrade the road pavement.

Similarly, swept path assessment of the intersections of the Great Western Highway and Jenolan Caves Road, Jenolan Caves Road and Duckmaloi Road and Duckmaloi Road and Albion Street on the eastern haulage route have been undertaken and show that B-Double vehicles are able to manoeuvre through these intersections without the need to upgrade the existing road pavement.

10.3.2. Access, Parking and Circulation

Access to the proposed development will be provided by a 10m wide shared driveway connecting to Maher Drive. The proposed development will also provide nine parking spaces (including one accessible space) located near the site frontage. The delivery and export of materials will be undertaken by Heavy Rigid Vehicles, Truck and Dogs and 26m B-doubles.

The access, parking and circulation area generally complies with AS/NZS 2890.1-2004 Parking Facilities – Off Street Car Parking and AS 2890.2-2002 Parking Facilities – Off Street Commercial Vehicle Facilities suitable for vehicles up to 26m B-doubles.

Swept path analysis demonstrates access for 26m B-doubles, and the sightline assessment shows the site access provides visibility in compliance with the Australian Standards. Details are available the appendices of the Noise Impact Assessment (Appendix G).

10.3.3. Parking requirement and provision

The parking requirement has been assessed against the Oberon Council DCP and the RMS Guide for factory and warehouse developments, respectively. As such, the applicable parking rates are outlined below:

- RMS Guide 1 space per 300 m^2 GFA
- Oberon DCP Greater of 1 space per 100m^2 GFA or 0.75 spaces per employee

Application of the above parking rates requires the development to provide the following parking provision:

- RMS Guide 2 (1.2) spaces
- Oberon DCP 6 (5.3) spaces

In response, the development provides nine parking spaces near the site frontage (including one accessible parking space). Oberon DCP does not require accessible parking spaces, however one has been provided.

Accordingly, the proposed development complies with Oberon Council's parking controls and is supportable under traffic planning grounds.

During the construction phase there is sufficient space to provide on-site parking for all construction workers.

10.3.4. Impact of Generated Traffic

There will be only a small estimated increase of traffic in the morning and evening peak, which corresponds to an additional vehicle on the external road network every 2-3 minutes during the morning and afternoon peak hour.

The intersections most likely to be impacted by the development include:

- Albion Street / Lowes Mount Road / North Street
- Albion Street / Hawken Street
- Albion Street / Duckmaloi Road

Each of these intersections were modelled using SIDRA for the AM and PM peaks. The growth scenario assumes a 2% growth rate per annum. The results of this analysis are available in the full report (Appendix I) and are summarized below:

Table 10.1. Albion Street / Lowes Mount Road / North Street SIDRA Intersection Analysis Summary.

Albion Street / Lowes Mount Road / North Street		Base Case Scenario		10-Year Growth Scenario	
		Existing	Existing + Proposed Development	Existing	Existing + Proposed Development
AM	Average Delay (sec)	9.7	9.7	9.9	10.0
	LOS	A	A	A	A
PM	Average Delay (sec)	9.5	9.9	9.7	10.1
	LOS	A	A	A	A

Table 10.2. Albion Street / Hawken Street SIDRA Intersection Analysis Summary.

Albion Street / Hawken Street		Base Case Scenario		10-Year Growth Scenario	
		Existing	Existing + Proposed Development	Existing	Existing + Proposed Development
AM	Average Delay (sec)	6.7	7.2	6.7	7.2
	LOS	A	A	A	A
PM	Average Delay (sec)	7.5	8.5	7.7	8.7
	LOS	A	A	A	A

Table 10.3. Albion Street / Duckmaloi Road SIDRA Intersection Analysis Summary.

Albion Street / Duckmaloi Road		Base Case Scenario		10-Year Growth Scenario	
		Existing	Existing + Proposed Development	Existing	Existing + Proposed Development
AM	Average Delay (sec)	7.0	7.0	7.2	7.3
	LOS	A	A	A	A
PM	Average Delay (sec)	6.5	6.6	6.7	6.8
	LOS	A	A	A	A

As shown in the table above, the nearby intersections operate at LOS A. This shows that there is spare capacity within these intersections and the development traffic can be accommodated within the external road network.

In summary, no significant decrease in the performance of the local traffic network is anticipated as a result of the proposed development. There should be no warrant for any intersection upgrades, as a result of traffic generated, should this development be approved.

10.3.4.1.Internal Traffic Management

All heavy vehicles will be required to enter and exit the site via the weighbridge which will be located adjacent to the site office. The weighbridge will only be able to accommodate one vehicle at a time in either direction, therefore, in order to safely manage heavy vehicle movements, it is proposed to provide a boom gate and traffic signals on each approach to the weighbridge. A waiting area large enough to store a 26 metre B-Double will also be provided on each approach to ensure that a vehicle crossing over the weighbridge will have sufficient clearance to pass stationary vehicle waiting to access the weighbridge from the opposite direction.

Heavy vehicle movements within the site will be one-way clockwise to minimize conflicts and to ensure the safe and efficient operation of the site.

Parking for staff and visitors will be provided in marked parking bays south of the weighbridge between the site office and the access driveway off Maher Drive.

10.4. Mitigation measures

A summary of the mitigation measures is provided in Table 10.1 below.

Table 10.4. Summary of traffic mitigation measures

Issue	Mitigation measure
Traffic to and from the site	No significant decrease in the performance of the local traffic network is anticipated as a result of the proposed development. There should be no warrant for any intersection upgrades, as a result of traffic generated, should this development be approved.
On-site traffic management	Heavy vehicle movements within the site will be one-way clockwise to minimize conflicts and to ensure the safe and efficient operation of the site.
Car parking	The development provides nine parking spaces near the site frontage (including one accessible parking space)

10.5. Conclusion

The traffic impact assessment shows that the proposed development will have little or no impact on the surrounding roads and intersections, and no downgrading of Level of Service.

The access to the site has a clear view, and adequate turning path is allowed for large heavy vehicles to enter and exit the site.

Adequate car parks are provided, including a disable parking space, for employees working at the site and visitors.

11. Biodiversity

Borg Plantations Pty Ltd engaged Narla Environmental Pty Ltd (Narla) to conduct a Flora and Fauna Assessment Report for the site and the proposed development.

A copy of the full Flora and Fauna Assessment Report is provided at Appendix K – Flora and Fauna Assessment.

11.1. Legislative requirements

The list of legislation and policy are addressed in the Flora and Fauna Assessment report is provided in Table 11.1.

Table 11.1. Relevant legislation and policy addressed.

Legislation/ Policy	Relevant Ecological Feature on Site	Triggered	Action Required
Environmental Planning and Assessment Act 1979 (EP&A Act)	All features	Yes	This Flora and Fauna Assessment and all subsequent recommendations relevant to the DA (The planning process).
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	A single individual of an unidentified species of eucalyptus, possibly *Eucalyptus macarthurii,* was found in the Survey Area	Yes	An assessment of significance of impact from the proposed DA on Matters of National Environmental Significance (MNES) EPBC Act Assessment of Significant Impact Criteria
Biodiversity Conservation Act 2016 (BC Act)	A single individual of an unidentified species of eucalyptus, possibly *Eucalyptus macarthurii,* was found in the Survey Area	Yes	A test of significance of impact from the proposed DA on BC Act listed threatened species, communities and populations pursuant to Section 7.3 of the BC Act.
Biosecurity Act 2015 (Bio Act)	The following Priority weeds were identified in the Survey Area: ▪ *Rubus fruticosus*	Yes	Prohibition on Dealings: Must not be imported into the State or sold.
State Environmental Planning Policy No. 44 - Koala Habitat Protection (SEPP 44)	SEPP 44 applies to land within Oberon Council LGA and the Subject Property encompasses an area larger than 1 ha. No *Schedule 2 – Feed tree species* were identified within the Survey Area.	No	None
Water Management Act 2000	A watercourse is mapped as passing through the Subject Site, however it has been historically rerouted through manmade channels and pipes. (Peak Land Management 2016)	No	None

The proposed development will be undertaken in a manner that meets the requirements of the Oberon Local Environmental Plan 2013 (LEP). Part 5.9 and 5.9AA; 'Preservation of Trees or Vegetation' of the Oberon Local Environmental Plan applies to this proposal. The objective of this part of the LEP is to preserve the amenity of the area, including biodiversity values, through the preservation of trees and other vegetation.

11.2. Methodology

The site was assessed using a combination of a desktop review of various literature sources and databases, and an on-site inspection of the flora and potential habitats.

11.2.1. Sources of Information Used

A thorough literature review of local information relevant to the locality and the Oberon Local Government Area (LGA) was undertaken. Relevant literature that was reviewed in preparation of this report included:

- Relevant State and Commonwealth Databases
  - Protected Matters Search Tool (Commonwealth of Australia 2018)[14]
  - NSW Bionet. The website of the Atlas of NSW Wildlife (OEH 2018)[15]
  - Atlas of Living Australia Spatial Portal (ALA 2018)[16]
- Vegetation Mapping
  - Google Earth Historical imagery 2003
- Council Documents
  - Oberon Local Environmental Plan 2013;
  - Oberon Development Control Plan 2001; and
  - Priority weeds for the Central Tablelands (DPI 2018)[17].
- State and Federal Guidelines
  - Threatened Species Survey and Assessment: Guidelines for actions and activities. Working Draft. (DEC 2004)[18]
  - Threatened species survey and assessment guidelines: field survey methods for fauna: Amphibians (DEC 2013)[19]
  - NSW Guideline to Surveying Threatened Plants (OEH 2016)[20]
  - Survey guidelines for Australia's threatened birds. Guidelines for detecting birds listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999

[14] Commonwealth of Australia (2018) Protected Matters Search Tool. http://www.environment.gov.au/epbc/protect/index.html

[15] Office of Environment and Heritage (OEH) (2018) NSW Bionet. The website of the Atlas of NSW Wildlife http://www.bionet.nsw.gov.au/

[16] Atlas of Living Australia (ALA) (2018) Atlas of Living Australia. Spatial Portal http://spatial.ala.org.au/

[17] Department of Primary Industries (DPI) (2018) Priority weeds for the Central Tablelands (Oberon), NSW Weeds Wise http://weeds.dpi.nsw.gov.au/WeedBiosecurities?AreaId=103

[18] Department of Environmental Conservation (DEC) (2004) Threatened Species Survey and Assessment: Guidelines for actions and activities (working draft), New South Wales Department of Environment and Conservation, Hurstville, NSW.

[19] Department of Environment and Conservation (DEC) (2013) Threatened species survey and assessment guidelines: field survey methods for fauna: Amphibians

[20] Office of Environment and Heritage (OEH) (2016) NSW Guide to Surveying Threatened Plants.

(Commonwealth of Australia 2010a)[21]

- Survey guidelines for Australia's threatened bats. Guidelines for detecting bats listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999(Commonwealth of Australia 2010b)[22]
- Survey guidelines for Australia's threatened frogs. Guidelines for detecting frogs listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth of Australia 2010c)[23]
- Survey guidelines for Australia's threatened mammals. Guidelines for detecting mammals listed as threatened under the *Environment Protection and Biodiversity Conservation Act* 1999 (Commonwealth of Australia 2011)[24]
- Survey guidelines for Australia's threatened orchids. Guidelines for detecting orchids listed as 'threatened' under the *Environment Protection and Biodiversity Conservation Act* 1999 (Commonwealth of Australia 2013)[25]

Online databases and literature review were utilised to gain an understanding of the natural environment and ecology of the Survey Area and its surrounds to an area of approximately 10 km². Searches utilising NSW Wildlife Atlas (Bionet) and the Commonwealth Protected Matters Search Tool were conducted to identify current threatened and migratory flora and fauna records within a 10km² search area centred on the Survey Area. This data was used to assist in establishing the presence or likelihood of any such ecological values as occurring on or adjacent the Survey Area and helped inform our Ecologist on what to look for during the site assessment.

Soil landscape and geological mapping was examined to gain an understanding of the environment on the Survey Area and assist in determining whether any threatened flora or ecological communities may occur there (Murphy and Lawrie 1998)[26].

11.2.2. Ecological Site Assessment

The following sections of this report detail the site assessments undertaken by Narla Environmental including the survey methods and the weather conditions experienced in the lead-up and during each assessment.

11.2.2.1.General Survey

A site assessment was undertaken by Narla Environmental Ecologist, David Hancock on Thursday 13th September 2018. A total of 8 hours was spent surveying the entirety of the Survey Area. An additional survey was undertaken by Stefan Giessler on Tuesday 5th February 2019. The purpose of this assessment was to assess an additional area.

During the site assessment, the following activities were undertaken:

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[21] Commonwealth of Australia (2010a) Survey guidelines for Australia's threatened birds. Guidelines for detecting birds listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999

[22] Commonwealth of Australia (2010b) Survey guidelines for Australia's threatened bats. Guidelines for detecting bats listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999

[23] Commonwealth of Australia (2010c) Survey guidelines for Australia's threatened frogs. Guidelines for detecting frogs listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999

[24] Commonwealth of Australia (2011) Survey guidelines for Australia's threatened mammals. Guidelines for detecting mammals listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999

[25] Commonwealth of Australia (2013) Survey guidelines for Australia's threatened orchids. Guidelines for detecting orchids listed as 'threatened' under the Environment Protection and Biodiversity Conservation Act 1999

[26] Murphy, B.W. and Lawrie J.M (1998). Soil Landscapes of the Dubbo 1:250,000 Sheet, NSW Department of Land and Water Conservation, Sydney

- Identifying and recording the vegetation communities present on the Survey Area, with focus on identifying any Threatened Ecological Communities (TEC);
- Recording a detailed list of flora species encountered on the Survey Area, with a focus on threatened species, species diagnostic of threatened ecological communities and priority weeds;
- Recording opportunistic sightings of any fauna species seen or heard on or within the immediate surrounds of the Survey Area;
- Identifying and recording the locations of notable fauna habitat such as important nesting, roosting or foraging microhabitats;
- Targeting the habitat of any threatened and regionally significant fauna including:
    - Tree hollows (habitat for threatened large forest owls, parrots, cockatoos and arboreal mammals);
    - Caves and crevices (habitat for threatened reptiles, small mammals and microbats);
    - Termite mounds (habitat for threatened reptiles and the echidna);
    - Soaks (habitat for threatened frogs and dragonflies);
    - Wetlands (habitat for threatened fish, frogs and water birds);
    - Drainage lines (habitat for threatened fish and frogs);
    - Fruiting trees (food for threatened frugivorous birds and mammals);
    - Flowering trees (food for threatened nectivorous mammals and birds);
    - Trees and shrubs supporting nest structures (habitat for threatened birds and arboreal mammals), and
    - Logs, bark and artificial debris (habitat for threatened frogs, reptiles and snails)
- Any other habitat features that may support fauna (particularly threatened) species.

Assessing the connectivity and quality of the vegetation within the Survey Area and surrounding area.

11.2.2.2.Vegetation Community Assessment

An initial desktop assessment using aerial imagery, geological mapping, soil landscape mapping and topographic mapping was used to identify the Survey Area as currently and historically cleared.

11.2.2.3.Targeted Threatened Flora Surveys

Targeted surveys were undertaken to identify locations of the threatened flora species known or predicted to occur within the locality (within 10km of the Survey Area). Narla Environmental undertook targeted survey for all threatened flora with potential to occur, with effort focused on finding the following species:

- Eucalyptus aggregata - four (4) historical records within 10km of the Survey Area.

The Random Meander technique documented by Cropper (1993)[27] was employed with maximum effort directed toward sampling areas with suitable habitat.

Any tentative threatened species found were photographed and specimens taken for identification utilising formal keys. Where necessary this involved the use of a microscope. Any confirmed or plausible specimens identified were

[27] Cropper S.C. (1993) Management of Endangered Plants. CSIRO Publishing, Collingwood, Victoria, Australia

GPS tagged, for future reference. Where identification of plausible specimens could not be made with absolute confidence by Narla Ecologists, specimens were collected and sent to the National Herbarium for expert identification.

11.2.2.4.Opportunistic sightings and analysis of scats, tracks and traces

During all site visits throughout the project, opportunistic fauna observations including sightings, scats, tracks, characteristic scrapes on trees, burrows and bones were collected. These were identified within the site, and/or used as focus areas to position additional targeted survey techniques to determine species presence.

11.3. Existing environment

11.3.1. Landscape features

The Subject Site occurs within the South Eastern Highlands IBRA Bioregion (version 7) and within that, the Oberon (SEH10) IBRA subregion. The activity site occurs entirely within the 'Oberon' NSW Mitchell Landscape (Table 12.2).

Table 11.2. IBRA Bioregions, Subregions and NSW Mitchell Landscapes.

IBRA Bioregion	IBRA Subregion	NSW Mitchell Landscape	Subject Property Area (ha)	Subject Site Area (ha)
South Eastern Highlands	SEH10 Oberon	SEH: Oberon	8.15	8.15

Low rolling hills on plateau surface with Silurian and Ordovician slate, phyllites, felspathic sandstones and interbedded volcanics. General elevation over 1000m, relief to 150m. Red and yellow texture-contrast soils with often with prominent bleached A2 horizons. Mixed eucalyptus forest and woodlands including Peppermints (*Eucalyptus sp.*), Stringybark (*Eucalyptus sp.*), Candlebark (*Eucalyptus rubida*), Brittle Gum (*Eucalyptus mannifera*) and Snow Gum (*Eucalyptus pauciflora*). Cold air drainage hollows with grasslands and swamps.

11.3.1.1.Topography, Geology and Soils

The Survey Area is situated on a northeast facing slope on the outskirts of Oberon town with an elevation range between 1097m and 1085m above mean sea level (amsl) on the Australian Height Datum (AHD).

Soil mapping designates the site within the 'Oberon' Soil Landscape (Murphy and Lawrie, 1998)[28].

11.3.1.2.Hydrology

Owing to the topography of the Survey Area, overland stormwater flows across the site in a north- easterly direction.

A watercourse has been historically mapped within the Survey Area. However, Peak Land Management (2016)[29] states:

"The stream shown over the development site … no longer exists, with underground pipes being located from the end of Endeavour Street (which picks up stormwater from both Borg, and the public road system). This water flows through two pipes, one via easement being directed to Kings Stockyard creek from the road runoff, and the other to a small dam located over the development site for the Borg runoff water. The Borg water from this small dam then overflows through a manmade open grassed stormwater channel into Kings Stockyard Creek, via another

[28] Murphy, B.W. and Lawrie J.M (1998). Soil Landscapes of the Dubbo 1:250,000 Sheet, NSW Department of Land and Water Conservation, Sydney

[29] Peak Land Management (2016) Flora and Fauna Assessment Report – Lowes Mount Road, Oberon

manmade channel over the northern part of the development site which will not be affected by any proposed works"

The development site would require the removal of the watercourse, but as the stream no longer exists, and channels are man-made, and has little ecological value being degraded and containing formerly highly polluted water, it has not been assessed further.

11.3.2. Native Vegetation

Historical vegetation mapping shows the Subject Site and surrounding areas as being industrial or cleared land, since at least 2003, and containing no native vegetation communities.

Within the Survey Area, vegetation was in poor condition, with a high proportion of exotic species. No native plant community types (PCT) were recorded within the survey area.

No Threatened Ecological Communities (TEC) were identified within or adjoining the Subject Site.

11.3.3. Threatened Species

11.3.3.1.Threatened Flora

Desktop analysis revealed a single species of threatened flora as occurring or having the potential to occur on or within 10 km radius of the Subject Property.

Extensive targeted surveys were undertaken throughout the Survey Area for potentially occurring threatened flora. Targeted survey identified no threatened flora within the Survey Area.

However, three individual trees that showed features resemblant of the vulnerable *Eucalyptus macarthurii*, (Paddy's River Box) were found in the survey area. It is possible these trees were historically planted as they were growing in a row. However, since the Subject Property is located within the known distribution of this species, the potential for these three plants to represent a wild remnant cannot be ruled out. Samples have been sent to the herbarium for identification. Observing the precautionary principle, a 5-part test has been conducted for this species should it prove to be positively identified.

It is anticipated that there will be no significant impacts to any potential locally-occurring threatened flora should the project proceed.

11.3.3.2.Threatened Fauna

The desktop analysis and site habitat assessment revealed a three species of threatened fauna had potential to utilise habitat on the Subject Property during part of their lifecycles.

The proposed facility is to be located within historically cleared land, the proposal will require the removal of all suitable nesting trees. None of the habitat features within the Survey Area are considered to be important to the long-term survival of threatened fauna species within the locality. The impact of removal of marginal foraging habitat for these species is therefore considered to be negligible.

11.3.3.3.Threatened Fauna Habitat

No hollow-bearing trees were identified within the Survey Area, and were not found within the broader Subject Property.

Only three (3) fruit and flower-bearing trees were identified during surveys which may provide foraging habitat for local and nomadic fauna, however no threatened species likely to use this habitat were identified as occurring locally.

The Subject Site has the potential to be used by a number of threatened insectivorous *microchiropteran* bats. The Subject Property may provide intermittent foraging habitat to a suite of threatened *microchiropteran* bats but none were identified as occurring locally.

Small-medium sized mammals and birds within the Subject Property may attract large predatory birds including:

- Hieraaetus morphnoides (Little Eagle).

The total list of threatened species deemed as having potential to occur in the Subject Property is presented in Table 11.3.

Table 11.3. Assessment of threatened flora and likelihood of occurrence within the proposed development site.

Species	BC Act	EPBC Act	Habitat requirements (OEH)	Habitat Present on Site	Anticipated Impact	5-Part Test required ?
Eucalyptus aggregata	V	V	Occurs in lowest parts if the landscape on alluvial soils, on cold, poorly-drained flats and hollows adjacent to creeks and small rivers. Often grows with other cold-adapted eucalypts such as *Eucalyptus pauciflora*, *E. viminalis* and *E. ovata*. Usually occurs in open woodland formation with a grassy groundlayer dominated by River Tussock or Kangaroo Grass.	Suboptimal habitat present, due to topography, disturbed site, and areas of severe weed infestation.	None. No proximal records. Not detected in Subject Site despite extensive survey. The area is highly disturbed and it is unlikely this species is present in the seed bank.	No
Eucalyptus macarthurii	E	E	Occurs on flats and near swamps and streams, growing at moderately high altitudes between 700 and 1200m and favouring cold, wet locations with annual rainfall of 1000-1400mm.	Suboptimal habitat present, due to topography, disturbed site, and areas of severe weed infestation.	No significant impact is expected. Three individuals on site are within the clearing area completely removing this population. The loss of this individual has been assessed under a 5-part test. No significant impact is expected.	Yes

Table 11.4. Assessment of threatened fauna habitat and likelihood of occurrence within the Subject Site.

Species	BC Act	EPBC Act	Foraging Habitat Present on Site	Breeding Habitat Present on Subject Site	Anticipated Impact	5-Part Test required ?
Phascolarctos cinereus (Koala)	V	V	None. No suitable Eucalyptus spp. recorded in Subject Site	None. No suitable Eucalyptus sp. recorded in Subject Site	None. No anticipated loss of foraging or breeding habitat.	No

Species	BC Act	EPBC Act	Foraging Habitat Present on Site	Breeding Habitat Present on Subject Site	Anticipated Impact	5-Part Test required ?
Hieraaetus morphnoides (Little Eagle)	V	-	Small-medium sized mammals and birds. Negligible (if any) impacts from proposal.	Tall trees (sub-optimal habitat due to disturbance)	None. Breeding habitat is already sub-optimal due to increased human traffic within site.	No
***Litoria aurea* (Green and Golden Bell Frog)**	E	V	None. No suitable habitat	None. No soaks or ponds identified.	None. No suitable habitat on site.	No

11.3.3.4.Migratory Fauna Species

A list of three (3) EPBC Act listed migratory fauna species were considered likely to occasionally use habitat within the Subject Site for foraging or passage, these were:

- *Myiagra cyanoleuca* (Satin Flycatcher);
- *Hirundapus caudacutus* (White-throated Needletail); and
- Apus pacificus (Fork-tailed Swift).

It was deemed that the proposed works will have no significant impact on these species. Therefore, an EPBC Act Referral to Commonwealth is not required.

11.4. Impact assessment

11.4.1. Serious and Irreversible Impacts

The proposed development will not impact upon any 'Serious and Irreversible Impacts' (SAII).

11.4.2. State Environmental Planning Policy (SEPP) No. 44 – Koala Habitat Protection

SEPP 44 - Koala Habitat Protection only applies to land which:

(i) has an area of more than 1 hectare; or

(ii) has, together with any adjoining land in the same ownership, an area of more than 1 hectare whether or not the activity application applies to the whole, or only part, of the land.

The *State Environmental Planning Policy No. 44 – Koala Habitat Protection* (SEPP 44) applies to all local government areas (LGAs) listed on Schedule 2 of the policy, except land dedicated under the *National Parks and Wildlife Act 1974* or the *Forestry Act 1916*. The identification of an area of land as SEPP 44 Potential Koala Habitat is determined by the presence Koala feed tree species listed within Schedule 2 of the policy.

Site assessment revealed that there were no Schedule 2 Feed Trees within the Survey Area. Therefore no 'core Koala habitat' as defined in Clause 4 of SEPP 44 (1995) will be impacted by the proposal and as a result did not require further assessment under this SEPP.

11.4.3. Qualifying for the Biodiversity Offset Scheme

In this instance, the area of native vegetation to be removed or managed for the proposed DA is approximately 0.1ha, which falls under the required threshold, therefore:

- the BOS is not triggered,
- the BAM calculator does not apply,
- an Accredited Assessor is not required to prepare this BDAR; and
- no offset credit calculations are required.

11.4.4. Vegetation Loss

The proposed development will require the removal/modification of approximately 8.15ha of non-native vegetation.

11.4.5. Fauna habitat to be removed or modified

All foraging habitat will be lost from the Subject Property by the proposed development.

No hollow-bearing trees or other significant breeding habitat will be lost or modified as a result of the proposal.

11.4.6. Indirect impacts

Table 11.5. Indirect impacts of the proposed action

Indirect Impact	Extent and duration	Threatened species, threatened ecological communities and their habitats likely to be affected.	Consequences of the impacts for the bioregional persistence of the threatened species, threatened ecological communities and their habitats.
(a) inadvertent impacts on adjacent habitat or vegetation	The proposed development will not have inadvertent impacts on adjacent habitat or vegetation provided the actions outlined within this report are adhered to. Condition of vegetation surrounding the proposed development will improve through weed management.	No Endangered Ecological Communities will be impacted by this development. Impacts to threatened fauna habitat within surrounding vegetation will be minimised through the implementation of environmental safeguards including signage and erosion and sediment controls.	Disruption to suboptimal threatened fauna habitat adjacent to the development causing it to become unsuitable for fauna. This impact is considered insignificant when compared to the extensive amount of habitat within the locality.
(b) reduced viability of adjacent habitat due to edge effects	It is unlikely that the proposed development will result in an adverse impact to the viability of adjacent habitat due to edge effects. ▪ Hygiene controls should be adhered to prevent the transportation of pathogens and weed seed on to the Subject Site. Following installation weed management will be conducted throughout the Subject Site. ▪ Condition of vegetation in the area will improve through the revegetation and continued weed management from the proponent or contracted qualified Bush Regenerators.	No Endangered Ecological Communities will be impacted by this development. Impacts to threatened fauna habitat within surrounding vegetation will be minimised through the implementation of environmental safeguards including temporary fencing, signage and erosion and sediment controls.	Disruption to suboptimal threatened fauna habitat adjacent to the development causing it to become unsuitable for fauna. This impact is considered insignificant when compared to the extensive amount of habitat within the locality.

Indirect Impact	Extent and duration	Threatened species, threatened ecological communities and their habitats likely to be affected.	Consequences of the impacts for the bioregional persistence of the threatened species, threatened ecological communities and their habitats.
(c) reduced viability of adjacent habitat due to noise, dust or light spill	The proposed works are unlikely to significantly exacerbate any of these issues which are all currently in effect within the industrial precinct already.	NA	NA
(d) transport of weeds and pathogens from the site to adjacent vegetation	It is unlikely that the proposed development will result in transport of weeds and pathogens from the site to adjacent vegetation. Construction activities will be restricted to the development footprint. Activities should not pass through adjoining areas of bushland which may result in the transport of weed and pathogens to adjacent vegetation.	NA	NA
(e) increased risk of starvation, exposure and loss of shade or shelter	This issue is unlikely to occur on the Subject Site. It is unlikely that any threatened fauna relies on habitat within the Subject Site, such that the proposed impacts will lead to increased risks from starvation, exposure, shade and shelter. All habitat resources removed will be replaced within the Subject Property so the biodiversity value of the site is not lost.	NA	NA
(f) loss of breeding habitats	This issue is unlikely to occur on the Subject Site. It is unlikely that any threatened fauna relies on habitat within the Subject Site for breeding purposes.	NA	NA

Indirect Impact	Extent and duration	Threatened species, threatened ecological communities and their habitats likely to be affected.	Consequences of the impacts for the bioregional persistence of the threatened species, threatened ecological communities and their habitats.
(g) trampling of threatened flora species	A tentative specimen of *Eucalyptus macarthurii* was identified on the Subject Site. Therefore, it is possible the proposed development will result in the trampling of threatened flora species.	*Eucalyptus macarthurii*	Reduced survival of seedlings in this isolated population
(h) inhibition of nitrogen fixation and increased soil salinity	The proposed works is unlikely to result in an indirect impact on nitrogen fixation and increased soil salinity on the Subject Site.	NA	NA
(i) fertiliser drift	The proposed works is unlikely to result in an indirect impact on fertiliser drift on the Subject Site.	NA	NA
(j) rubbish dumping	The proposed development will not result in increased level of dumping within the Subject Site.	NA	NA
(k) wood collection	Where possible; all woody debris (fallen trees and logs), within the Survey Area is to be retained. Woody debris within the activity footprint should be relocated, as directed by the Project Ecologist.	NA	NA
(l) bush rock removal and disturbance	No bushrock will be removed or disturbed to facilitate the proposed development.	NA	NA

Indirect Impact	Extent and duration	Threatened species, threatened ecological communities and their habitats likely to be affected.	Consequences of the impacts for the bioregional persistence of the threatened species, threatened ecological communities and their habitats.
(m) increase in predatory species populations	It is unlikely that the proposed works will influence or alter predatory species populations.	NA	NA
(n) increase in pest animal populations	It is unlikely that the proposed works will influence or alter pest species populations. Pest fauna already inhabit the Subject Property.	NA	NA
(o) increased risk of fire	The installation of this facility is likely to increase the fire risk within the Subject Site. A tentative specimen of *Eucalyptus macarthurii* was identified on the Subject Site. Therefore, it is possible that the increased fire risk will pose a risk to this species.	*Eucalyptus macarthurii*	Reduced survival of individuals and seedlings in this isolated population.
(p) disturbance to specialist breeding and foraging habitat, e.g. beach nesting for shorebirds.	There is no specialist breeding habitat on the Subject Site. Flowering and fruit bearing trees may provide intermittent foraging habitat. It was determined that none of these species are likely to be affected by the proposed development	NA	NA

11.4.7. Prescribed and Uncertain Impacts

This list of impacts includes all of those impacts on biodiversity values not caused by direct vegetation clearing or development that have been prescribed by the *Biodiversity Conservation Regulation 2017*.

Table 11.6. Potential Prescribed or Uncertain Impacts of the Proposed Action.

Will there be impacts on any of the following	Yes/No	If Yes, Address all of the assessment questions in a 5-part test
Species or ecological communities associated with karst, caves, crevices, cliffs and other features of geological significance	No	NA
Habitat of threatened species or ecological communities associated with rocks	No	NA
Habitat of threatened species or ecological communities associated with human made structures	No	NA
Habitat of threatened species or ecological communities associated with non-native vegetation	Yes	Addressed in 5-part Test
Connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range	No	NA
Movement of threatened species that maintains their life cycle	No	NA
Water quality, water bodies and hydrological processes that sustain threatened species and threatened ecological communities (including subsidence or subsidence resulting from underground mining or other development)	No	NA
Wind turbine strikes on protected animals	No	NA
Vehicle strikes on threatened species of animals or on animals that are part of a TEC	No	NA

11.5. Mitigation measures

Table 11.8 provides a summary of the recommended mitigation measures for the project to ensure minimal impacts on the flora and fauna in the area.

Table 11.7. Table of measures to be implemented before, during and after construction to avoid and minimise the impacts of the project.

Action	Outcome/Measure	Risk and Consequence of Residual Impacts	Timing	Responsibility
Project Location	The location of the proposed development has been positioned within historically cleared land in order to avoid and minimise the potential resulting impacts on biodiversity values within the Subject Site.	Risk = low Consequence = Harm to native vegetation and native fauna	Pre-construction phase	▪ Proponent
Project Design	The proposed activity has been designed to avoid and minimise impacts on native vegetation and habitat where possible within the Survey Area. Where this is not possible, mitigation measures have been designed and recommended to reduce impact. A large portion of the proposed activity is situated within historically cleared and/or built areas,	Risk = low Consequence = Harm to native vegetation and native fauna	Pre-construction phase	▪ Proponent

Action	Outcome/Measure	Risk and Consequence of Residual Impacts	Timing	Responsibility
Assigning a Project Ecologist	Prior to construction, the proponent should commission the services of a qualified and experienced Ecologist Consultant (minimum 3 years' experience) with a minimum tertiary degree in Science, Conservation, Biology, Ecology, Natural Resource Management, Environmental Science or Environmental Management. The Ecologist must be licensed with a current Department of Primary Industries Animal Research Authority permit and New South Wales Scientific License issued under the BC Act. The Ecologist will be commissioned to: ▪ Assist the proponent in identifying and assigning an appropriate skilled Bushland Restoration Professional to implement vegetation restoration; ▪ Help the proponent undertake any threatened species habitat augmentation or translocation; ▪ Undertake any required targeted searches for threatened flora prior to vegetation clearing; ▪ Undertake an extensive pre-clearing survey; delineating habitat-bearing trees and shrubs to be retained/removed; and ▪ Supervise the clearance of trees and shrubs (native and exotic) in order to capture, treat and/or relocate any displaced fauna.	Risk = low Consequence = No continuity, professional advice, guidance or monitoring of management actions.	Prior to vegetation clearance works	▪ Proponent

Action	Outcome/Measure	Risk and Consequence of Residual Impacts	Timing	Responsibility
Clearing of vegetation/ fauna habitat	The following conditions must be adhered to: ▪ Before any vegetation is damaged or removed, a qualified Ecologist with flora identification experience should be assigned to undertake a pre-clearing survey to delineate areas permitted to be cleared, from areas that must be retained. Bunting or strong flagging tape should be used. ▪ Prior to vegetation being damaged or removed, a qualified Ecologist with fauna identification experience should determine the presence of any suitable habitat for roosting microbats, nesting birds or other fauna in the area of the Survey Area due to be cleared. ▪ A qualified Project Ecologist with experience in handling wildlife should be present on the Project Site during all vegetation clearing in order to supervise clearing and capture and relocate any displaced, healthy animals, or care for / rehabilitate any injured or orphaned animals.	Risk = moderate Consequence = Harm to native vegetation and native fauna.	Construction phase	▪ Bush regeneration contractor ▪ Project Ecologist ▪ Proponent
Relocation of woody debris	Where possible; all woody debris (fallen trees and logs), within the Survey Area is to be retained. Woody debris within the activity footprint should be relocated, as directed by the Project Ecologist.	Risk = low Consequence = Loss of fauna habitat.	Construction phase	▪ Bush regeneration contractor
Avoidance of hollow- bearing Trees	Any hollow-bearing trees (including dead trees) should be retained where possible. If such habitat features are to be removed, an Ecologist should be present to supervise felling.	Risk = low Consequence = Loss of fauna habitat.	Construction phase	▪ Bush regeneration contractor ▪ Project Ecologist ▪ Proponent

Action	Outcome/Measure	Risk and Consequence of Residual Impacts	Timing	Responsibility
Replacement of hollows	Wherever possible the proponent should install nestboxes on trees to enhance fauna habitat, particularly habitat for microbats. No hollow-bearing trees will be removed, as a result of the proposal. In the event that any hollow-bearing trees require removal; hollows are to be replaced nest boxes (with similar sized entry holes to the hollows lost) to the compensatory ratio of 1:2 (two replacements for each one lost), or as agreed by the Project Ecologist.	Risk = low Consequence = Loss of fauna habitat.	Construction phase	▪ Bush regeneration contractor ▪ Project Ecologist ▪ Proponent
Erosion and Sedimentation	Appropriate erosion and sediment control must be erected and maintained at all times during construction. As minimum such measures should comply with the relevant industry guidelines such as 'the Blue Book' (Landcom 2004).	Risk = low Consequence = Degradation of vegetation	Construction phase	▪ Construction Contractor
Storage and Stockpiling (Soil and Materials)	Allocate all storage, stockpile and laydown sites away from any native vegetation that is planned to be retained. Avoid importing any soil from outside the site as this can introduce weeds and pathogens to the site.	Risk = low Consequence = Harm to native vegetation and native fauna	Construction phase	▪ Construction Contractors
Tree Replacement and Revegetation	The proponent continues to actively manage the broader Subject Property including the removal of weeds and plantings of locally-indigenous trees.	Risk = moderate Consequence = Harm to native vegetation.	Post-construction phase	▪ Proponent ▪ Landscape Architect ▪ Bush Regeneration Contractor
Weed suppression and eradication	The proponent will continue to actively manage weed infestations throughout the Subject Site and broader Subject Property. Since herbaceous weeds and woody weeds exist within the Subject Area, priority must be given to manage and eliminate all weeds in order to prevent weeds from spreading into neighbouring areas. This will be undertaken using a combination of hand removal, cut/scrape and painting, brush cutting and spot spraying as required.	Risk = moderate Consequence = Harm to native vegetation and native fauna habitat.	Construction phase and Post-construction phase	▪ Proponent ▪ Bush Regeneration Contractor

Action	Outcome/Measure	Risk and Consequence of Residual Impacts	Timing	Responsibility
Sewerage	All stormwater accumulation and sewerage produced on site will be managed in an appropriate system as advised by a stormwater/wastewater engineer. Sewerage produced on site to a certified sewerage system will eliminate any adverse effects to the local ecology.	Risk = low Consequence = Harm to native vegetation and native fauna habitat.	Post-construction phase	▪ Proponent

11.6. Conclusion

Narla Environmental Pty Ltd (Narla) was engaged to prepare a Flora and Fauna Assessment Report (FFA) for the proposed development.

Narla determined that the vegetation assemblage within the Subject Site was representative of non-native vegetation. This does not constitute a Threatened Ecological Community (TEC). The proposed works, combined with an adjacent development, will result in the removal of approximately 8.15ha of non-native vegetation.

Direct (wholesale) vegetation clearing will occur for the construction of the facility and will occur in consultation with the Project Ecologist and Oberon City Council's Environmental Officer. However, several existing trees will be maintained.

No threatened fauna were identified on the Subject Site during field survey. However, flowering and fruit- bearing trees that are proposed for management within the proposed APZ have the potential to offer intermittent sheltering and foraging habitat for threatened fauna. Due to the poor condition and lack of suitable habitat within the Subject Property (and surrounding locality) it was determined that the removal of potential habitat is unlikely to significantly impact upon a viable population of any of potentially occurring threatened species.

Owing to the lack of any perceived significant effects upon threatened biodiversity from the proposed development, it is expected that the proposed development can be achieved within minimal environmental impact. The proposed development may progress without further impact assessment.

12. Heritage

An Aboriginal and non-Aboriginal cultural heritage assessment has been performed as part of the EIS to document existing conditions, potential impacts and proposed mitigation measures to ensure that the development does not impact on any relics or places of heritage significance.

12.1. Legislative requirements

12.1.1. Environmental Protection and Biodiversity Conservation Act 1999

The *Environmental Protection and Biodiversity Act* 1999 (EPBC Act) is the national Act protecting the natural and cultural environment. The EPBC Act is administered by the Department of Environment and Energy (DEE). The EPBC Act establishes two heritage lists for the management of the natural and cultural environment:

- The National Heritage List (NHL) contains items listed on the NHL that have been assessed to be of outstanding significance and define "critical moments in our development as a nation".3
- The Commonwealth Heritage List (CHL) contains items listed on the CHL that are natural and cultural heritage places that are on Commonwealth land, in Commonwealth waters or are owned or managed by the Commonwealth. A place or item on the CHL has been assessed as possessing "significant" heritage value.4

12.1.2. NSW Heritage Act 1977

Heritage in NSW is principally protected by the *Heritage Act* 1977 (Heritage Act) (as amended) which was passed for the purpose of conserving items of environmental heritage of NSW. Environmental heritage is broadly defined under Section 4 of the Heritage Act as consisting of the following items: "those places, buildings, works, relics, moveable objects, and precincts, of State or Local heritage significance". The Act is administered by the NSW Heritage Council, under delegation by the Heritage Division, Office of Environment and Heritage. The Heritage Act is designed to protect both known heritage items (such as standing structures) and items that may not be immediately obvious (such as potential archaeological remains or 'relics'). Different parts of the Heritage Act deal with different situations and types of heritage and the Act provides a number of mechanisms by which items and places of heritage significance may be protected.

12.1.3. Oberon Local Environment Plan 2013

The *Oberon Local Environment Plan* 2013 contains schedules of heritage items that have been identified within the local government area. As the project is being undertaken under Part 4 of the EP&A Act, the Council is responsible for approving controlled work via the development application system.

12.2. Methodology

12.2.1. Aboriginal heritage

A desktop review of potential aboriginal heritage issues was conducted for the site. A basic search was conducted for the site and the surrounding area for up to 200m using the NSW Aboriginal Heritage Information Management System (AHIMS) online database[30]. The database was accessed on 17 September 2018.

12.2.2. Non-aboriginal heritage

The NSW Planning Portal and the NSW Sharing and Enabling Environmental Data (SEED) was used to assess the site against:

- Heritage provisions in the Oberon LEP 2013;
- State Heritage Register;
- Commonwealth Heritage Register;
- National Heritage Register; and
- World Heritage.

In addition, a search for any items of significant heritage in the Oberon local government area was conducted using the State Heritage Register.

The list of heritage items in Schedule 5 of the *Oberon Local Environment Plan* 2013 was reviewed, as well as the map of heritage items.

12.3. Existing environment

12.3.1. Aboriginal heritage

No aboriginal sites were found on or near the proposed development site. There were no items of aboriginal significance listed in the AHIMS database within 200m of the site. Figure 2.1 shows the search results from the basic AHIMS search.

As there were no items of interest found, an extensive search was not conducted for the site.

[30] Office of Environment and Heritage (2016). Aboriginal Heritage Information Management System (AHIMS). Internet: http://www.environment.nsw.gov.au/licences/WhatInformationCanYouObtainFromAHIMS.htm

Figure 12.1. Results of AHIMS search for aboriginal sites – accessed 17/09/2018.

A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

12.3.2. Non-aboriginal heritage

No items of non-aboriginal heritage were found on or near the site.

There are only two items of significance in the Oberon local government area;

1. Malachi Gilmore Memorial Hall, at 124 Oberon St (SHR01680)
2. Oberon Railway Station group, Tarana-Oberon railway (SHR01215).

Neither heritage items are near the proposed development site.

Figure 13.2 shows the results from searching the various Commonwealth and State heritage databases, which is that there were no heritage items on or near the site. Figure 13.2 shows the heritage items identified in the Oberon LEP 2013. There are a number of "General" heritage items in the Oberon town. However, no items are near the proposed development site.

Figure 12.2. Results of SEED search for heritage items - accessed 17/09/2018. Development area outlined in purple.

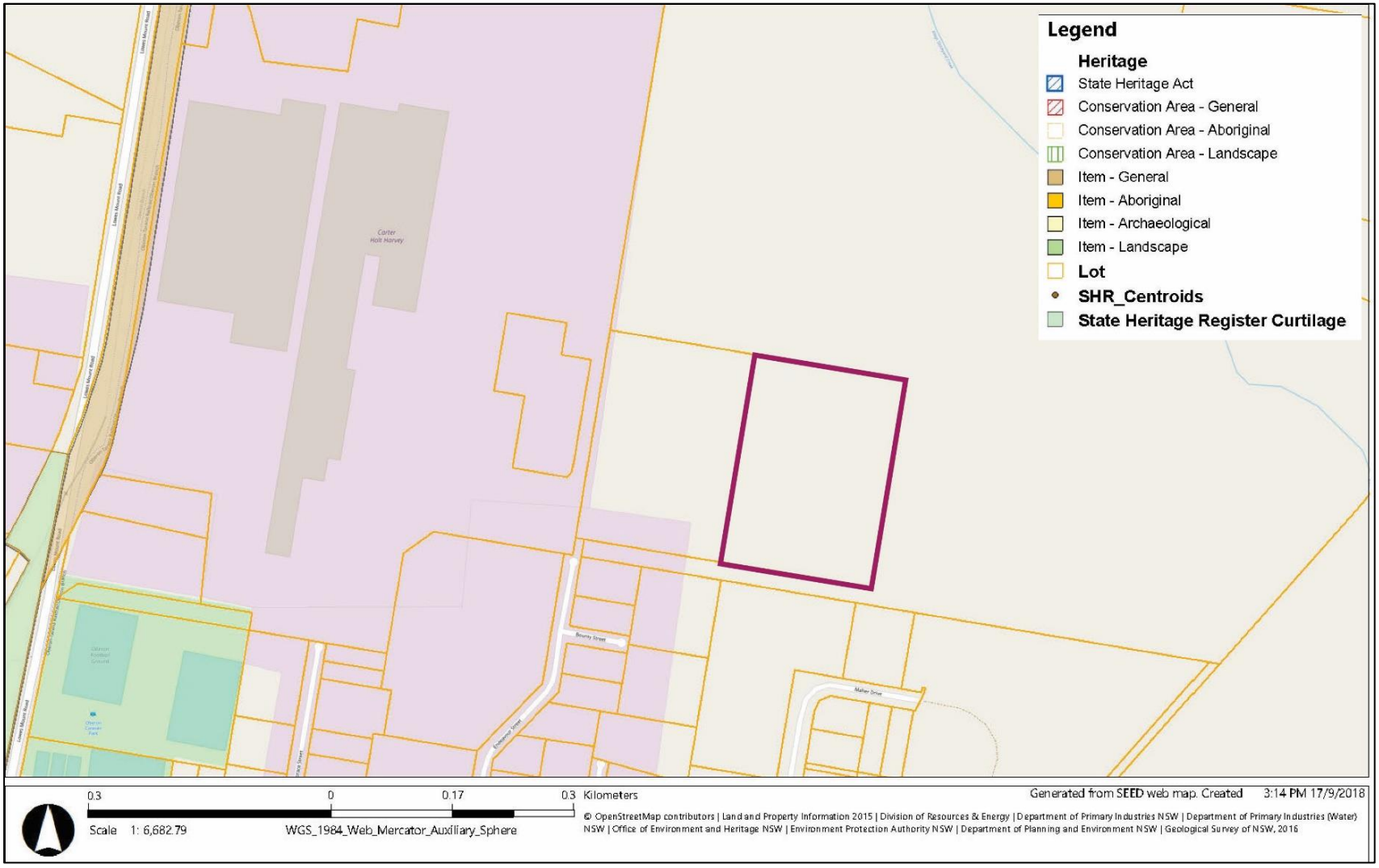


Figure 12.3. Oberon LEP 2013 – Heritage map.

12.4. Impact assessment

The proposed development will have no impact on any identified heritage sites or items.

12.5. Mitigation measures

Although no known heritage sites exist on or near the site, it is possible that the development may cause items of interest to be discovered. Therefore, the following procedures will be implemented during the construction phase of the project:

- If any suspected archaeological remains are discovered during the development, all activity must stop and an archaeologist consulted; and
- If any suspected human remains are discovered during the development, all activity must stop and the find reported to the NSW Police and the Coroner.

12.6. Conclusion

A desktop review and database search found that there were no heritage or aboriginal items of significance at the site or within 500m of the site. The proposed development will have no impact on any identified heritage sites or items within the area.

13. Visual Impact

Borg Manufacturing Pty Ltd undertook the visual impact assessment (VIA) for the proposed development. A copy of the Visual Impact Assessment report is provided at Appendix N – Visual Impact Assessment Report.

13.1. Methodology

The purpose of the VIA is to provide a qualitative and quantitative assessment of the visibility and potential visual impacts of the proposal. The VIA will support the Environmental Impact Statement (EIS) under Part 4 & Section 89(c) of the Environmental Planning and Assessment Act 1979 (EP&A Act) for development application to be submitted to Oberon Council. The report has been developed with regard to the local statutory planning as per the Local Environment Plan.

Survey work was undertaken during February 2019 using key viewpoints and locations with potential views towards the site. The report details the results of the fieldwork, documents the assessment of the landscape character and visual setting, and assesses potential visual impacts associated with the proposal.

The report also provides an overview of the proposed landscape treatments, which may be considered to assist in the mitigation of any potential visual impacts. This information is provided to aid understanding the likely impacts and how they may be managed to ensure that the positive character of the immediate area and surrounding visual landscape are not overly modified or diminished.

The assessment was undertaken in stages as noted below:

- Objective assessment of the relative aesthetic value of the landscape, defined as visual quality and expressed as high, medium or low. This assessment generally relates to variety, uniqueness, prominence and naturalness of the landform, vegetation and water forms within each character type.
- Determination of the landscape sensitivity and its ability to absorb different types of development based on physical and environmental character.
- An assessment of viewer sensitivity to change. This includes how different groups of people view the landscape (for example, a resident as opposed to a tourist), and how many people are viewing and from how far.
- The undertaking of a viewpoint analysis to identify areas likely to be affected by development of the site and a photographic survey using a digital camera and a handheld GPS unit to record position and altitude.
- An assessment of visual impacts and the preparation of recommendations for impact mitigation. Suggestions are made for suitable development patterns that would maintain the areas visual quality.

For the purposes of this Visual Impact Assessment:

- View Points are key locations, which most clearly convey the visual effects of the Project, and the viewer groups potentially affected. View Points are determined based on a combination of Viewing Zones and View sheds.

Based on the topography and land uses of the locality, we took the approach of identifying viewpoints by reviewing the surrounding area by sector based on compass points and likely viewing zones. The desktop review and site visit indicated that due to topography and vegetation the site could not be viewed from a public place in the district area to the north, northwest, west, south or south west, nor could it be viewed in the immediate vicinity from the

north-west or west, as the view is blocked by the Borg Panels. Figure 4 shows the locations of the photographs taken during the site visit.

Given the limited visibility of the proposed site, eight (8) View Points were identified in order to investigate the potential impacts of the proposed development on the visual landscape character. The majority of these viewpoints were taken from publicly accessible roads surrounding the site. The viewpoints, which have been included, represent the areas from where the development would appear most prominent, either based on the degree of exposure or the number of people likely to be affected.

The viewpoints as identified on Figure 13.1:

1. Rutters Ridge Road - 1.8km from site - North
2. Clover Lane - 1.2km from site - North
3. Cole Crescent - 1km from site - South east
4. 151 Hazelgrove Road - 1.1km from site - North east
5. 54 Hazelgrove Road - 1km from site - East
6. 59 Maher Drive - 230m from site - South east
7. Albion Road - 600m from site - South east
8. Mt. Lowes Road- 900m from site - North-west

Photos and assessment of each viewpoint can be seen below.

Figure 13.1. Viewpoint Assessment Locations. Source: SixMaps.

13.2. Existing environment

The site is located at 26 Endeavour St, Oberon, within the Oberon Council local government area. The Oberon LGA is located adjacent to the Blue Mountains of New South Wales on the Great Dividing Range, nearly 200 km west of Sydney.

The site is located to the North of the Oberon community and residential development. A number of existing commercial and industrial premises exist between the site and the Oberon residential area, including a recycling facility operated by Australian Native Landscapes. The site is currently vacant and unused.

The site consists of approximately 5 hectares, comprising roughly half of Lot 34, DP 1228591, a small part of Lot 33 DP 1228591 and an additional small area of land between that lot and Maher Drive being Lot 18 DP1249431.

The site is reasonably level, with a gentle slope from the southwest to the northeast, and a total change in levels of approximately 2m. Minimal earthworks (cut and fill) are expected to be required, apart from the proposed earth mounds. A large mound is currently on the site, which is old burden from the adjoining panel site. This mound will be reduced, repositioned and extended to run the whole length of the perimeter to reduce visual impact. The entranceway to the site, between Maher Drive and Lot 34, DP 1228591 slopes downwards approximately 3m from south to north.

There is a band of vegetation existing in the centre of the site, mainly consisting of large pine trees. The majority of this vegetation will be retained and incorporated into the design.

13.2.1. Landscape Context

The subject site is located on the northern outskirts of Oberon, part of the towns industrial estate. Historically, the primary local industries have been farming, forestry and wood products. Originally known as Bullock Flat by early pioneers, Oberon began to attract permanent settlers in the 1820s who used the land for grazing. From the 1930s onwards, native hardwood timbers were harvested from the local area; replanting with pine has sustained the timber industry in the locality. The surrounding area is generally characterised by grassy rolling hills interspersed with State Forest including Blenheim, Essington, Hampton and Lowes Mount. Most of the roads in the district are flanked with trees on both sides.

Oberon's industrial area is located in the north of the town, along Albion Street and the streets leading off it to the north, including Endeavour Street, Hawken Street and Horace Street (Figure 13.2). The subject site is located at the northern extent of the industrial area, off Hawken Street/Maher Drive. Another large landscape supplies site, Australian Natural Landscape Products, is located to the south-west of the proposed site at 7 Endeavour Street. Other uses in the area include warehousing, wholesale, retail, engineering and transport, many of which are related to the timber industry. The industrial area is characterised by very large warehouse type buildings, generally Colorbond in subdued shades of cream, beige and green, reflecting the surrounding landscape, interspersed with a few brighter reds and blues.

Figure 13.2. Aerial photo showing Oberon Industrial area. Source: SixMaps.

The town of Oberon is generally characterised by single storey detached houses of varying age on quarter acre blocks. The main street is primarily single storey; many of the shops have high parapets, which help to block views of the Oberon Timber Complex and industrial area.

The proposed site is visible from the south-east, east, north-east and north. Views to the site are not possible from the south of site, south-west and west of the site given the existing topography, vegetation and the existing Borgs Panel Site next door. The approximate viewable area is shown below in Figure 13.3.

Figure 13.3. Approximate view cones. Source: SixMaps.

The land to the north and east of proposal is rural, with dwellings scattered throughout the landscape. The topography is undulating, with the development site only visible on the down slopes of Hazelgrove Road closer to the Albion Street end. The site is not visible beyond the Town View Road turnoff, given the topography and vegetation. To the north, the site is visible from parts of Rutters Ridge Road, however it is heavily obscured due to the topography and vegetation.

The site is also visible to the south-east when viewed from Albion Street, and higher vantage points including Cole Crescent. The viewing area to the south-east is limited due to topography.

The existing landscape and views to the site are dominated by the adjoining Borgs Panel site that is visible from a large distance. The scale and extent of the operations at the Borgs site dominates all views from the east, north-east and south east of the site. The proposed development is minor to non-existent when compared to the adjoining site, and is consistent with the scale of the other industrial development within the immediate vicinity.

13.3. Impact assessment

13.3.1. View Point Analysis

This section presents the view point analysis for the proposed development, including photographs of the site from eight different locations surrounding the site.

Figure 13.4. Viewpoint 1- Rutters Ridge Road.

Table 13.1. Viewpoint 1 assessment – Rutters Ridge Road.

Viewpoint 1 Summary of Viewpoint		Viewpoint Description	Potential Visual Impact
Location	Road frontage of 30 Rutters Ridge Road	The photograph was taken from the front road frontage of 30 Rutters Ridge Road with a view towards the site. Rutters Ridge Road is a small rural residential subdivision with most dwellings using vegetation as a screen. Given there is no visibility of the site, this viewpoint has been rated as low.	From this position, views to the site are not possible. Desktop analysis of surrounding dwelling sites shows that views would be obscured by vegetation and topography from this area. The resulting visual impact from the development is assessed as low from this viewpoint.
Coordinates	Lat-33:40:38.49:S Lo-149:51:48.31:E		
Elevation	1100m		
Viewing Direction	South East		
Distance to site	1.8km		
Land Use	Rural-Rural residential		
Visual Effect	Not visible-low		
Visual Impact	Not visible-low		

Figure 13.5. Viewpoint 2 - Clover Lane.

Table 13.2. Viewpoint 2 assessment – Clover Lane.

Viewpoint 2 Summary of Viewpoint		Viewpoint Description	Potential Visual Impact
Location	Corner of Mt. Lowes Road & Clover Lane	The photograph was taken from the corner of Mt. Lowes Road and Clover Lane with a view towards the site. Clover Lane is a small rural residential subdivision with most dwellings using vegetation as a screen. Given there is no visibility of the site, this viewpoint has been rated as low.	From this position, views to the site are not possible. Desktop analysis of surrounding dwelling sites shows that views would be obscured by vegetation and topography from this area. The resulting visual impact from the development is assessed as low from this viewpoint.
Coordinates	Lat-33:41:1.72:S Lo-149:51:30.4:E		
Elevation	1100m		
Viewing Direction	South East		
Distance to site	1.2km		
Land Use	Rural-Rural residential		
Visual Effect	Not visible-low		
Visual Impact	Not visible-low		

Figure 13.6. Viewpoint 3 - Cole Crescent.

Table 13.3. Viewpoint 3 assessment – Cole Crescent.

Viewpoint 3 Summary of Viewpoint		Viewpoint Description	Potential Visual Impact
Location	End of Cole Crescent, above Albion Street	The photograph was taken from Private land at the end of Cole Crescent. The site is elevated and sits above Albion Street. The amount of views from this site and amount of viewers is limited. The site is clearly visible from this vantage point; however, proposed landscaping and earth mound will mitigate potential impacts.	Views from this point are dominated by the Borgs Panel site, which immediately adjoins the site. The proposed scale of the development is low and the visual impact can will be mitigated through landscape screening and the earth mound. The proposed landscaping will allow the development to blend with the existing industrial development adjoining and the impact is expected to be low
Coordinates	Lat-33:42:04.99:S Lo-149:52:25.66:E		
Elevation	1097m		
Viewing Direction	North West		
Distance to site	1km		
Land Use	Residential		
Visual Effect	Moderate		
Visual Impact	High- rated as high visual sensitivity with moderate visual effect		

Figure 13.7. Viewpoint 4 - 151 Hazelgrove Road.

Table 13.4. Viewpoint 4 assessment – 151 Hazelgrove Road.

Viewpoint 4 Summary of Viewpoint		Viewpoint Description	Potential Visual Impact
Location	151 Hazelgrove Road, Oberon	The photograph was taken from a gap in the vegetation on Hazelgrove Road; The site is only visible for a very short period if driving. The surrounding dwellings have vegetation screening potential views of the site. The site is clearly visible from this vantage point; however, proposed landscaping and earth mound will mitigate potential impacts.	Views from this point are dominated by the Borgs Panel site, which immediately adjoins the site. The proposed scale of the development is low and the visual impact can will be mitigated through landscape screening and the earth mound. The proposed landscaping will allow the development to blend with the existing industrial development adjoining and the impact is expected to be low.
Coordinates	Lat-33:41:16.81:S Lo-149:52:31.39:E		
Elevation	1112m		
Viewing Direction	South West		
Distance to site	1.1km		
Land Use	Rural/ Rural Residential		
Visual Effect	Moderate		
Visual Impact	Moderate- rated as high visual sensitivity with low visual effect		

Figure 13.8. Viewpoint 5 - 54 Hazelgrove Road.

Table 13.5. Viewpoint 5 assessment – 54 Hazelgrove Road.

Viewpoint 5 Summary of Viewpoint		Viewpoint Description	Potential Visual Impact
Location	54 Hazelgrove Road, Oberon	The photograph was taken from a gap in the vegetation on Hazelgrove Road, opposite the Oberon Abattoir; The site is only visible for a very short period if driving. The site is clearly visible from this vantage point; however, proposed landscaping and earth mound will mitigate potential impacts.	Views from this point are dominated by the Borgs Panel site, which immediately adjoins the site. The proposed scale of the development is low and the visual impact can will be mitigated through landscape screening and the earth mound. The proposed landscaping will allow the development to blend with the existing industrial development adjoining and the impact is expected to be low.
Coordinates	Lat-33:41:47.00:S Lo-149:52:31.39:E		
Elevation	1076m		
Viewing Direction	West		
Distance to site	1km		
Land Use	Rural/ Rural Residential		
Visual Effect	Moderate		
Visual Impact	Moderate- rated as high visual sensitivity with low visual effect		

Figure 13.9. Viewpoint 6 - Maher Drive.

Table 13.6. Viewpoint 6 assessment - Maher Drive.

Viewpoint 6 Summary of Viewpoint		Viewpoint Description	Potential Visual Impact
Location	Vacant land at end of Maher Drive	The photograph was taken from a vacant lot at the end of Maher Drive, currently being used for storage of gravel and soil. The land is zoned industrial. The photo shows the existing extent of the earth mound that will be continued around the site, mitigating any potential impacts.	The potential visual impact from this site is high, given the close proximity to the site, however, given the land is industrial the impact is low. The operation of the site will not be visible due to the proposed landscaping and earth mound. Further development of Maher Drive will also decrease potential impacts from site located further south, including Albion Street and Cole Crescent.
Coordinates	Lat-33:41:48.42:S Lo-149:52:02.11:E		
Elevation	1085m		
Viewing Direction	West		
Distance to site	230m		
Land Use	Industrial		
Visual Effect	High		
Visual Impact	Low-industrial land use		

Figure 13.10. Viewpoint 7 – Albion Street.

Table 13.7. Viewpoint 7 assessment – Albion Street.

Viewpoint 7 Summary of Viewpoint		Viewpoint Description	Potential Visual Impact
Location	Albion Street	This photo is taken from one of the main roads heading into Oberon. A number of dwellings are located opposite this viewpoint. Given setbacks and existing vegetation, the proposal would have a minimal impact on these dwellings. A bike/pedestrian path traverses the opposite side of the road, which would increase viewership numbers from this area. The vegetation in the middle ground of this photo will reduce impact once maturity is reached.	The potential visual impact from this site is moderate. The operation of the site will not be visible due to the proposed landscaping and earth mound. Further development of Maher Drive will also decrease potential impacts, along with maturity of vegetation on other sites adjoining. The potential impact is comparable to other industrial development in the near vicinity.
Coordinates	Lat-33:42:01.85:S Lo-149:52:12.39:E		
Elevation	1089m		
Viewing Direction	North		
Distance to site	600m		
Land Use	Main Road/Residential		
Visual Effect	Moderate		
Visual Impact	Moderate		

Figure 13.11. Viewpoint 8 - Mt. Lowes Road.

Table 13.8. Viewpoint 8 assessment – Mt. Lowes Road.

Viewpoint 8 Summary of Viewpoint		Viewpoint Description	Potential Visual Impact
Location	Mt. Lowes Road just north of Borg Panels site	The photograph was taken Mt. Lowes Road just north of the Borg Panels site. Mt Lowes Road is a minor road. Given there is no visibility of the site, this viewpoint has been rated as low.	From this position, views to the site are not possible. Desktop analysis of surrounding dwelling sites shows that views would be obscured by vegetation and topography from this area. The resulting visual impact from the development is assessed as low from this viewpoint.
Coordinates	Lat-33:41:13.85:S Lo-149:51:28.44:E		
Elevation	1097m		
Viewing Direction	South East		
Distance to site	900m		
Land Use	Rural-Rural residential		
Visual Effect	Not visible-low		
Visual Impact	Not visible-low		

13.3.1.1.Overview of View Point Analysis

For each viewpoint, the potential visual impact was analysed using a combination of topographic maps and on site analysis.

The visual sensitivity and visual effect of each viewpoint have been assessed which, when combined, result in an overall visual impact for the viewpoint.

Of the eight (8) viewpoints assessed as part of this VIA, the proposal would be visible from five (5) viewpoints. Of the five (5) viewpoints from which the proposal would be visible, three (3) of these have been assessed as having a moderate visual impact with one (1) having a high visual Impact and one (1) a low visual impact.

The incorporated mitigation measures outlined in Section 6.0 of this report seek to avoid, reduce and where possible remedy adverse visual effects arising from the proposed development.

Table 13.6. Viewpoint assessment.

View Point	Visual Sensitivity	Visual Effect	Potential Visual Impact
V1	Not visible	Not visible	No impact
V2	Not visible	Not visible	No impact
V3	High	Moderate	High
V4	High	Low	Moderate
V5	High	Low	Moderate
V6	Low	Moderate	Low
V7	Moderate	Moderate	Moderate
V8	Not visible	Not visible	No impact

13.3.2. Visual Impact Assessment

The existing character of the surrounding lands to the north and northeast is rural and rural residential. As can be seen from the presented Viewpoints the visibility of the site is restricted by vegetation and topography. The majority of dwellings within these areas have existing vegetation screens that restrict views to the site. It is evident that the vegetation screens are used to minimise impacts of the dominating factor within the landscape being the Borgs Panel site, which is visible from distance for a greater range then the proposed landscape facility. The sensitivity of this landscape has been assessed as moderate to high, as the amenity of the location, with established vegetation and rolling hills, somewhat picturesque and valued.

The impact of the development on the northern and north-eastern area is expected to be limited, given the minor nature of the development. The only building on-site will be a site office, which will sit behind the proposed earth mounds, and is unlikely to be visible from outside of the site. Proposed goods bunkers will be managed so that stockpiles will sit below the height of the bunker wall or earth mound. The proposed vegetation screening will enable the site to sit comfortably within the rural landscape, with a number of other pine screens evident within the landscape.

To the south and southeast, the character is urban with industrial and residential development. Minimal impact is expected from the adjoining properties immediately to the south given that it is an industrial estate, with no sensitive receivers. The development will be similar in size and scale of an existing landscape supplies site located at 7 Endeavour Street, Oberon. The existing industrial area also assists in screening the development from central part of Oberon.

The residential area identified by viewpoint 3, to the south west of the site, will be impacted by the development, with an assessment showing a high visual impact. The limited dwellings located in this area will experience a change in character of their views to the north, characterised by a larger/extended earth mound and elevated vegetation screen. It is unlikely that the site building or plant will be visible from this location. Overall the impact is expected to be minimal given the view is currently dominated by the Borgs Panel site, with the scale of the proposed development consistent with other existing industrial development viewable from the location, with the proposed mound and vegetation also minimising any visual contrast.

The proposal is likely to be viewed as a continuation of the existing industrial development in a large-scale industrial zone and as the site is already disturbed, it is our determination that the visual impacts from public domain areas are acceptable. The mitigation measures outlined in Section 13.4 will also minimise any visual impact of the development on the wider region.

The proposal is consistent with the design guidelines outlined in the Oberon Development Control Plan. The proposed landscaping incorporated in to the design allows the site to sit comfortably within the context of the area and not impact on the visual amenity of the Oberon area.

13.4. Mitigation measures

The mitigation measures can mitigate any visual impact of the proposed development whilst enhancing the visual character of the surrounding environment.

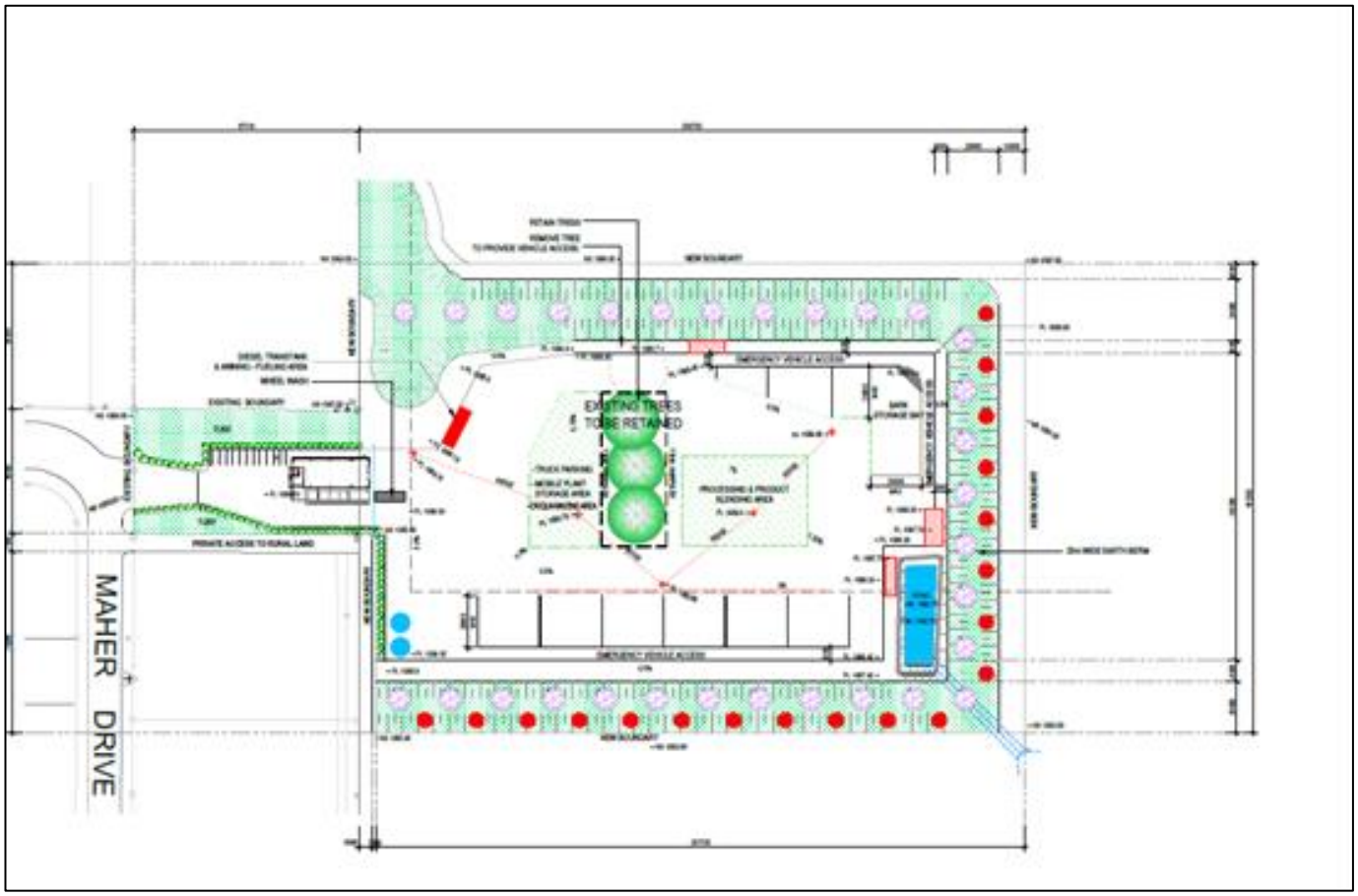
Methods incorporated into the concept design for mitigating the potential visual impact include:

- The built form of the proposed buildings (site office and workshop) are of a minor scale to the surrounding industrial buildings, and is unlikely to be visible external to the site.
- Building materials selected will reduce colour contrast and blend any new and existing structures, as far as

possible, into the surrounding landscape.

- Retention of existing trees within the Site to assist in fragmenting views of the proposed development.
- Extension of existing earth mound around the perimeter of the site will limit views and screen material bunkers and plant machinery.
- Vegetation screening incorporating species that integrate with existing landscape character. The proposed landscaping can be seen below in Figure 13.12.

Figure 13.12. Proposed landscaping plan incorporating screening around the perimeter.



13.5. Conclusion

The existing landscape character is a mix of industrial development, rural properties and bushland ridgelines and corridors. The scale of the built form in the proposal is small compared to existing industrial developments adjoining, mainly the Borgs Panel site, which dominates views from the surrounding area.

The recommended design principles outlined in the VIA seek to avoid, reduce and where possible, remedy adverse effects on the environment arising from the proposed development. The proposed mitigation measures will reduce any visual impacts of the development.

14. Contaminated Site Assessment

Envirowest Consulting Pty Ltd was commissioned by Borg Plantations Pty Ltd to undertake a contamination investigation, in accordance with the contaminated land management planning guidelines, from the Contaminated Land Management Act 1997 and the State Environmental Policy No. 55 (SEPP 55), of part Lot 34 DP1228591 Endeavour Street, Oberon NSW. The objective was to identify past potentially contaminating activities, identify potential contamination types, discuss the site condition, provide a preliminary assessment of site contamination and assess the need for further investigation or suitability for industrial land-use.

This section provides a brief summary of the methodology and findings of the contamination investigation. A copy of the full Contamination Investigation report is provided at Appendix M.

14.1. Legislative requirements

Under State Environmental Planning Policy, No 55: Remediation of Land (SEPP 55), applicants for consent must carry out a preliminary site investigation for any development consent sought on land previously used for activities that may cause contamination. Agricultural activities are included as a use that may cause contamination.

14.2. Methodology

A Contaminated Site Assessment was conducted in accordance with NSW EPA guidelines[31].

A desktop study and a review of the available history were undertaken of the site. The following sources of information were drawn on to conduct the site history and desktop analysis.

- Site inspection 20 September 2018 by Envirowest Consulting Pty Ltd
- NSW EPA records of public notices under the CLM Act 1997
- Soil and geological maps
- Historical aerial photographs
- Oberon LEP 2013
- Oberon 1:25000 Topographic map[32]

A walkover and site inspection for evidence of contamination from past activities was conducted on 20 September 2018. Soil samples were collected and analysed for metals, persistent pesticides, hydrocarbons and asbestos. Sampling was conducted in accordance with EPA guidelines[33].

Based on historical activities and site inspection the soil samples were tested for the following contaminants of concern:

- Heavy metals (arsenic, cadmium, chromium, copper, nickel, lead, zinc and mercury)
- Organochlorine and organophosphate pesticides (OCP and OPP)

[31] EPA (2017) Contaminated Sites: Guidelines for the NSW Site Auditors Scheme (Environmental Protection Authority, NSW.)
[32] Central Mapping Authority of NSW (1988) *Oberon 8731-4-S 1:25000 Topographic map 1st edition*. (Department of lands)
[33] Environment Protection Authority (1995) *Contaminated sites: Sampling Design Guidelines* (NSW Environment Protection Authority, Chatswood)

- Total recoverable hydrocarbons (TRH C6-C40)
- Benzene, toluene, ethylbenzene, xylenes, naphthalene (BTEXN)
- Polycyclic aromatic hydrocarbons (PAH)
- Asbestos

A judgmental sampling pattern was adopted to assess the probable location of contamination across the site. Twenty-two discrete soil samples were collected from the investigation area. One sample of fibrous sheeting was collected from a stockpile for analysis of asbestos.

14.3. Existing environment

14.3.1. Historical land uses

1929 – 2016	Agricultural grazing land
2016 – present	Storage of equipment and machinery

14.3.2. Surface cover

Surface cover on the site consisted of pasture grasses including rye grass and phalaris in the eastern section of the site. The western section of the site was predominately bare from vehicle movements and storage of machinery and equipment. Several large pine trees were located in the eastern section. The south western section had undergone earthworks including site cut to level the site.

14.3.3. Topography

The site is on a mid-slope with a gentle inclination ranging from 0 to 2%. Elevation ranges between 1,085 and 1095 metres above sea level.

14.3.4. Soils and geology

The site is within the Oberon Soil Landscape (Kovac et al. 1990)[34]. The dominant soils within the landscape are red earths on mid to upper slopes and yellow podzolic soils and yellow earths on mid to lower slopes.

Geology comprises Rockley volcanics and Triangle Group with parent rock comprising andesite, tuff, grey slate, quartz and feldspathic greywacke. Parent material includes in situ and alluvial-colluvial materials derived from the above parent rock (Kovac et al. 1990).

14.3.5. Surface water

Surface water on the majority of the site flows east into a dam located off-site. The dam is expected to empty into Kings Stockyard Creek located approximately 300m west.

14.3.6. Groundwater

No bores are located within the investigation area. One bore is located within the lot boundary, outside the investigation area. Five bores are located within 500m of the site. The bores are licensed for test bores and water

[34] Kovac M, Murphy BW and Lawrie, JW (1990) *Soil Landscapes of the Bathurst 1:250,000 Sheet* (Soil Conservation Service of NSW, Sydney)

bearing zones were from 0.3m in shale and basalt. Standing water levels were recorded at depths of greater than 0.3m.

Table 14.1. Summary of standing water levels in nearby water bores.

No.	Date drilled	Location	SWL (m)	Use	Status
GW801240	1994	E 170m	2.75	Monitoring bore	Cancelled
GW800792	1995	W 180m	0.84	Test bore	Cancelled
GW801095	1999	NW 190m	0.30	Test bore	Cancelled
GW800701	1998	W 210m	1.50	Test bore	Cancelled
GW800793	1995	N 430m	1.00	Test bore	Cancelled

14.3.7. Soil sample results

No staining or odour was observed across the surface of the site.

Asbestos was not detected in any soil sample. One sample of fibrous sheeting was collected from a stockpile of rubble. No asbestos was identified in the sample.

The levels of all metals, pesticides, PCB and hydrocarbons analysed in soil samples collected across the investigation area (Tables 4 and 5 in the report at Appendix P) were below the industrial/commercial land-use thresholds (NEPC 1999)[35].

14.4. Impact assessment

Surface cover on the site was predominately bare from vehicular movement and storage of machinery and equipment across the site. The eastern portion of the site comprised pasture grasses with pine trees. The south western section of the site had undergone earthworks including site cut to level the site.

A review of historical aerials indicated minimal changes on-site from 1964 to 2016 with the site being used for grazing of stock. The western portion of the site has been used for storage of machinery and equipment since 2016 and the eastern portion has remained vacant pasture. The machinery and equipment included steel, poly pipe and stockpiles of rubble including brick, timber and chipboard.

A large stockpile was located on the site comprising topsoil and organic material from adjacent sites. The material is reportedly being removed off the site prior to the proposed industrial land-use.

Vegetated stockpiles from an unknown source are located north of the pine trees. The material was sampled and the levels of all analytes were below the adopted thresholds for industrial/commercial land-use (NEPC 1999)[36].

There is no evidence of underground storage tanks, mines, sheep dips or mixing sheds on the site from the review of site history or site walkover.

[35] NEPC (1999 revised 2013) *National Environment Protection (Assessment of Site Contamination) Measure 1999* (National Environment Protection Council Service Corporation, Adelaide)
[36] NEPC (1999 revised 2013) *National Environment Protection (Assessment of Site Contamination) Measure 1999* (National Environment Protection Council Service Corporation, Adelaide)

No staining or odour was observed across the surface of the site.

Asbestos was not detected in any soil sample. One sample of fibrous sheeting was collected from a stockpile of rubble. No asbestos was identified in the sample.

The levels of all metals, pesticides, PCB and hydrocarbons analysed in soil samples collected across the investigation area were below the industrial/commercial land-use thresholds (NEPC 1999).

14.5. Mitigation measures

The report recommends removal of stockpiled topsoil material and machinery and equipment including brick and chipboard stockpiles to make the site suitable for industrial land-use.

14.6. Conclusion

The site has an agricultural land-use history of stock grazing with recent storage of equipment and machinery in the western section of the proposed lot boundaries. The south western section of the site had undergone earthworks including site cut to level the site.

There is no evidence of underground storage tanks, mines, sheep dips or mixing sheds on the site from the review of site history or site walkover.

No staining or odour was observed across the surface of the site.

Asbestos was not detected in any soil sample. One sample of fibrous sheeting was collected from a stockpile of rubble. No asbestos was identified in the sample.

A large stockpile was located on the site comprising topsoil and organic material from adjacent sites. The material is reportedly being removed off the site prior to the proposed industrial land-use. The topsoil stockpile was not assessed.

Stockpiles from an unknown source are located north of the pine trees. The material is suitable to remain on-site for proposed industrial land-use.

The soil sampling program did not detect elevated levels of the analysed metals, pesticides, hydrocarbons, polycyclic biphenyls or asbestos. The levels of all substances evaluated were below the adopted thresholds for industrial land-use.

The site is suitable for proposed industrial land-use following removal of stockpiled topsoil material and machinery and equipment.

Removal of stockpiled topsoil material and machinery and equipment including brick and chipboard stockpiles is required prior to development.

15. Bushfire Risk

Bushfire Planning and Design was engaged to undertake a bushfire risk assessment for the proposed development. A copy of the Bushfire Risk Assessment report is provided at Appendix H – Fire Risk Assessment.

15.1. Methodology

The methodology for the bushfire hazard assessment follows the method described in the Appendix 3 of Rural Fire Service publication 'Planning for Bushfire Protection'. These steps are as follows;

- Determine the vegetation formation types and sub-formations around the building using Appendix 2 of PBP, 2006.
    i. Identify all the vegetation types within 140 metres of the site using Keith(2004);
    ii. Classify the vegetation formations as set out in Appendix 2; and (iii) Convert Keith to Specht.

Note: AS3959-2009 as referenced in the BCA-2010 uses AUSLIG (1990) vegetation classifications while PBP uses Keith.

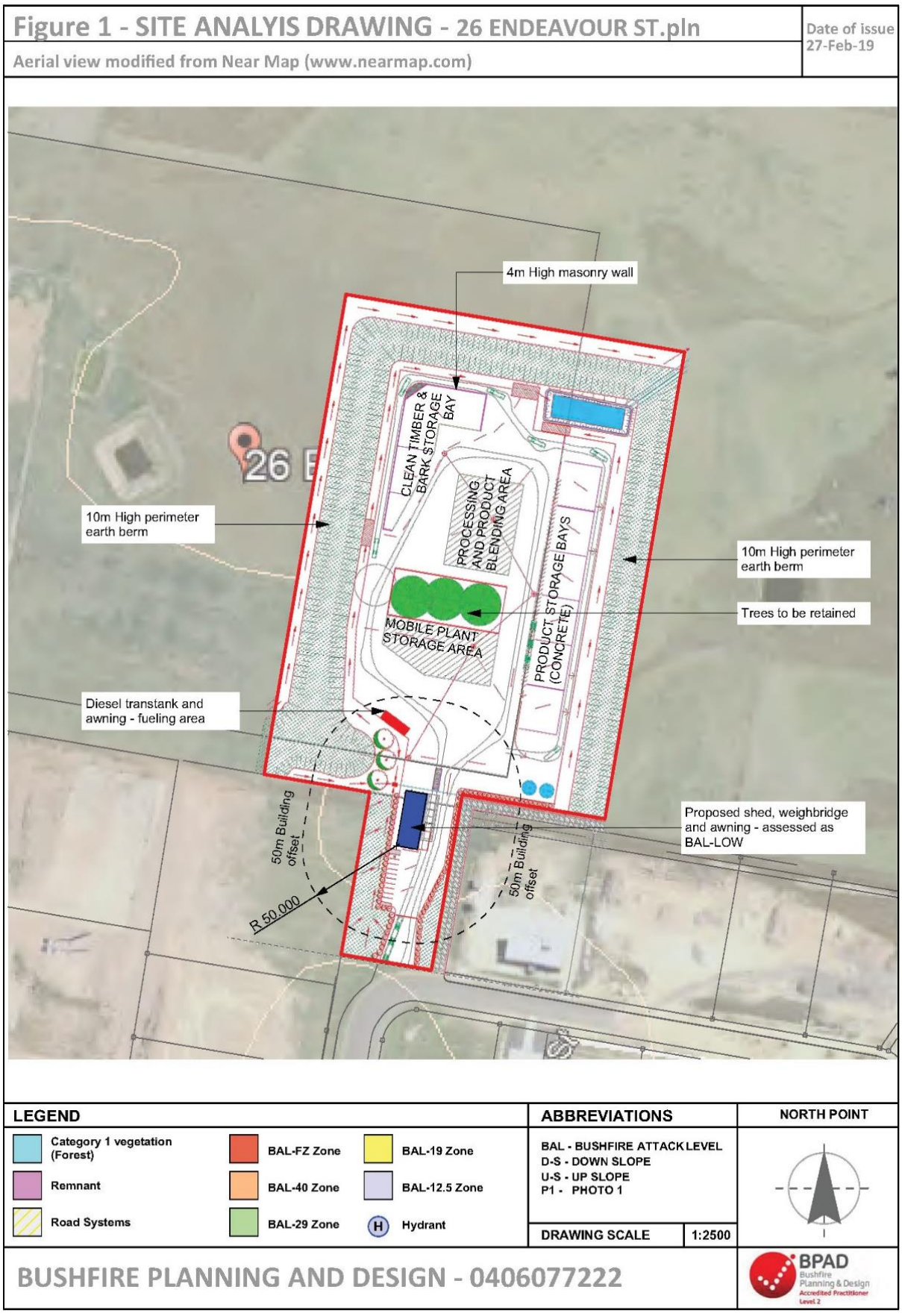
- Determine the distance between each vegetation formation identified (from the edge of the foliage cover) and the building.
- Determine the effective slope of the ground for each vegetation group.
- Determine the relevant FDI for the council area in which the development is to take place.
- Match the relevant FDI, appropriate vegetation, distance and effective slope classes to determine the bush fire attack levels using method 1 of AS3959-2009.
- Where a more detailed analysis is required, method 2 of AS3959-2009 will be employed.

15.2. Existing environment

The land is not identified as being bushfire affected. Grassland is located to the north, east and west of the site. Although the land is not mapped as bushfire affected, grassland if un- managed can facilitate the passage of bushfire under certain weather conditions.

All grassland within 50m of the proposed building is proposed to be managed. As there is no bushfire prone land within 100m of the proposed building (shed, awning and weighbridge) and no un-managed grassland within 50m, there is insufficient threat to warrant any specific construction standards with regards to the construction of a building in a bushfire prone area.

Figure 15.1. Site analysis.



15.3. Impact assessment

Table 15.1. BAL assessment (to be read in conjunction with Figure 15.1).

LGA = Oberon Council	Forest Fire Danger Index = FDI 100	
	NORTH, EAST AND WEST	SOUTH
Effective slope	N/A	N/A
Site Slope	N/A	N/A
Vegetation classification	Grassland	Managed Land
Separation from vegetation	> 50m	> 100m
Assessed BAL-Rating	BAL-LOW	BAL-LOW
Required level of construction	BAL-LOW	BAL-LOW
Assessment methodology	Method 1	Method 1

The proposed development is located on land that is not mapped as being bushfire affected. With regard to the development of bushfire prone land, the development is not legislatively required to address bushfire risk.

It was found that the development complies with the aims and objectives of Planning for Bushfire Protection (2006) in relation access, water and services, emergency planning and landscaping/vegetation management. The development is not required to comply with the National Construction Code (2016) with regards to bushfire protection. The general fire safety provisions are deemed to be acceptable.

The proposed development will be utilised for processing and stockpiling timber. The proposed storage bays are separated from potential grass fire by a swale, a perimeter emergency vehicular access road and a 10m high earth berm. The proposed earth berms are to be planted with grass and the grass on the earth berms are to be managed as short cropped < 100mm high. The proposed vegetation management will keep all grass in the vicinity of the proposed stock pile are in minimal fuel condition and will therefore mitigate the potential for grass fire to encroach onto the site. A 30m managed zone, consisting of a swale, a perimeter emergency vehicular access road and a 10m high earth berm is provided between the proposed storage areas and surrounding grassland to the north, east and west. This will mitigate the risk of accidental fire occurring within the subject site, spreading onto adjoining grassland.

15.4. Mitigation measures

15.4.1. Asset protection zones

The asset protection zones (APZ) requirements have been derived from the methodology of Appendix 2 of Planning for Bushfire Protection 2006. Asset protection zones and in particular the Inner Asset Protection Zones are critical for providing defendable space and reducing flame length and rate of spread (PBP 2006). APZs are designed to provide sufficient open space for emergency workers to operate and for occupants to egress the site safely. They are divided into Inner and Outer Asset Protection Zones (IPAs and OPAs) and are required to be maintained for the life of the development. The IPA provides for defendable space and a reduction of radiant heat levels at the building

line and the OPA provides for the reduction of the rate of spread and filtering of embers. The required Asset Protection Zones are identified in Table 15.2 below.

Table 15.2. Asset Protection Zones.

	SOUTH EAST	ALL OTHER DIRECTIONS
REQUIRED APZ	17m (Forest U-S)	Maintain as IPA
ACHIEVED APZ	> 19m	Maintain as IPA

There is sufficient space within the site to provide an asset protection zone (APZ). A 50m grassland APZ is required to achieve a construction rating of BAL-LOW (AS3959 2009). All adjacent grass, including grass planting on the proposed perimeter earth berms can be managed. All grass within 50m of the proposed industrial shed is to be managed as short cropped grass < 100mm high.

The proposed storage bays are separated from potential grass fire by a swale, a perimeter emergency vehicular access road and a 10m high earth berm. The proposed earth berms are to be planted with grass and the grass on the earth berms are to be managed as short cropped < 100mm high. The proposed vegetation management will keep all grass in the vicinity of the proposed stock piles are in minimal fuel condition and will therefore mitigate the potential for grass fire to encroach onto the site. A 30m managed zone, consisting of a swale, a perimeter emergency vehicular access road and a 10m high earth berm is provided between the proposed storage areas and surrounding grassland to the north, east and west. This will mitigate the risk of accidental fire occurring within the subject site, spreading onto adjoining grassland.

The following points are to be adhered to for providing APZs.

- The IPA is to have a tree canopy cover less than 15%.
- The OPA is to have a tree canopy cover less than 30%.
- No trees are to be located within 2m of the building roof line.
- Garden beds with flammable shrubs are to be located a minimum 10m from the building.
- Tree limbs within 2m of the ground are to be removed.
- Removal of ground fuels should be removed each year prior to the bushfire season (October- March).

There is a cluster of trees retained in the middle of the site, but it is not envisaged these as contributing to bushfire risk. The understory should be managed to remove dead foliage and organic debris and this will be sufficient to mitigate combustibility from embers that could be generated from nearby grassland in the event of a bushfire.

15.4.2. Building construction and utilities

The following measures will be implemented to ensure the building and utilities at the site will not increase the bushfire risk at the site.

- All above-ground water and gas service pipes and fittings external to the office/workshop building will be metal.
- Gas bottles will be installed and maintained in accordance with AS1596.
- All fixed gas cylinders are to be kept clear of all flammable materials to a distance of 10m and shielded on the hazard side of the installation.

- Release valves are directed away from the building and at least 2m away from any combustible material, so that they do not act as a catalyst to combustion. Connections to and from gas cylinders are to be metal.
- Polymer sheathed flexible gas supply lines to gas meters adjacent to buildings are not to be used.
- Electrical transmission lines will be underground.

15.4.3. Landscaping and property maintenance

The following measures will be implemented to ensure the landscaping and vegetation at the site will not increase the bushfire risk at the site.

- Apply the principles for APZ and vegetation management as described in the Bushfire Risk Assessment report (Appendix K).
- Maintain short cropped grass less than 100mm adjacent to the house.
- Keep areas under fences, fence posts and gates and trees raked and cleared of fuel.
- Utilising non-combustible fencing and retaining walls.

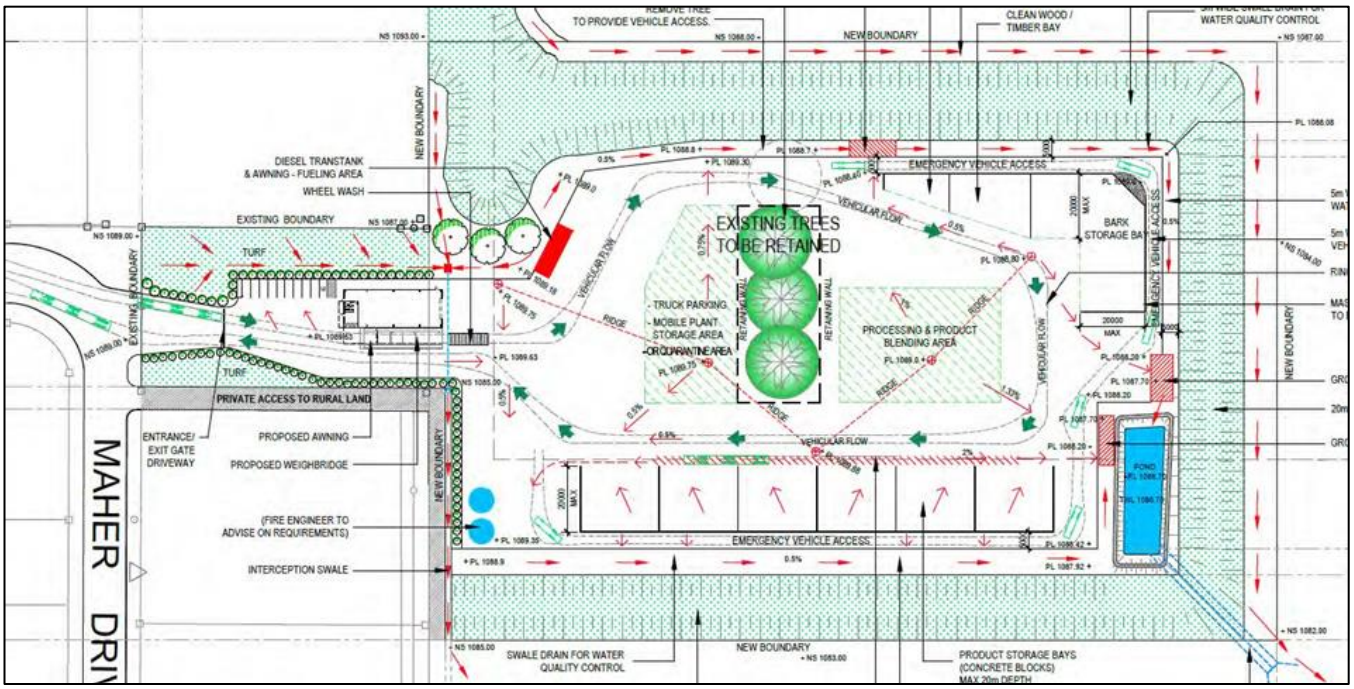
Prior to the bushfire season which runs from October to March the site should be maintained utilising the following guidelines from Appendix 5 PBP (2006).

- Remove organic material from the roof and gutters and valleys.
- Check tiles and roof lines for broken tiles or dislodged roofing materials.
- Ensure painted surfaces are in good condition with decaying timbers being given particular attention to prevent the lodging of embers within gaps.
- Doors are fitted with draught seals and well maintained.
- Mats are of non-combustible material or in areas of low potential exposure.
- Screens on windows and doors are in good condition without breaks or holes in fly screen material and frames are well fitting into sills and window frames.
- Where applicable, check pumps and water supplies are available and in working order.
- Where applicable, drenching or spray systems are tested before the fire season.
- Hoses and hose reels are not perished and fittings are tight and in good order.
- Woodpiles, garden sheds and other combustible materials are located away from the house.

15.4.4. Fire and emergency services access

A minimum 6m wide clear access route is provided around the proposed storage bays, processing area and temporary stockpiling area (see site plan extract below - Figure 15.2). This will allow the NSWFB unobstructed access to all areas of the proposed development.

Figure 15.2. Site plan showing unobstructed access to all areas of the development.



The emergency vehicle access has been designed in accordance with the NSW Fire Brigades' guidelines on access for emergency vehicles, including;

- A minimum inner radius of 6.3m and outer radius of 11.3m for general appliance access.
- A minimum inner radius of 7.3m and outer radius of 14.6m for aerial appliance access.
- There should be no dead end roads.
- A minimum 3.2m width is to be provided at perimeter security points (eg. at boom gates).
- Kerbs to be a maximum 250mm high.
- All access routes are to provide a minimum vertical clearance of 4.5m.
- The preferred maximum gradient is 1:8 or less.

15.5. Conclusion

The proposed development is located on land that is not mapped as being bushfire affected. With regard to the development of bushfire prone land, the development is not legislatively required to address bushfire risk. Regardless of the above statement, our Client has engaged us to provide an assessment to address bushfire risk for the proposed development.

It was found that the development complies with the aims and objectives of Planning for Bushfire Protection (2006) in relation access, water and services, emergency planning and landscaping/vegetation management. The development is not required to comply with the National Construction Code (2016) with regards to bushfire protection. The general fire safety provisions are deemed to be acceptable.

Based on the above and from a bushfire hazard perspective, the proposed development is suitable for the subject site.

16. Chemicals and Fuels

16.1. Legislative requirements

The following guidelines and legislation influence the management of chemicals in NSW:

- *Protection of the Environment Operations Act* 1997 (POEO Act 1997)

Regulates chemical pollution and wastes, establishes management and licensing requirements along with offence provisions to deliver environmental outcomes.

- Chemical Control Orders

Made under the *Environmentally Hazardous Chemicals Act* 1985 when chemicals or chemical wastes pose serious threats to the environment and there are particular challenges in their management. Out of the five chemical control orders in place in NSW, the applicable CCO for the facility is the Scheduled Chemical Wastes Chemical Control Order 2004. Scheduled chemical wastes are wastes containing chemicals defined by the schedule attached to the order and special care is required minimise their impacts on the environment. The CCO establishes requirements for the management and control of the wastes that contain scheduled chemicals at a combined concentration above 2 mg/kg. It covers certain activities such as generating, processing, storing, distributing, conveying and disposing of scheduled chemical wastes.

- *Waste Avoidance and Resource Recovery Act* 2001

This Act underpins the NSW Government's Waste Avoidance and Resource Recovery Strategy 2014 – 2021, setting targets for recycling and reduction of litter in six key result areas.

- NSW Environment Protection Authority (2014). Waste Classification Guidelines: Part 1, Classifying waste.
- NSW Department of Planning (2011). Hazardous and Offensive Development Application Guidelines - Applying SEPP 33.

16.2. Baseline conditions

16.2.1. Chemical use, handling and storage

A small range of fuels, oils, fluids and gases will be stored in a current dedicated fuel storage area in the north-west corner of the site and in a chemical storage area within the maintenance shed at the entrance to the site.

Diesel fuel will be stored in a self-bunded tank, similar to the one depicted in Figure 16.1 below. The fuel tank will rest on bunded hardstand. The bund will be designed to meet *Australian Standard AS 1940B1993: The Storage and Handling of Flammable and Combustible Liquids*.

The fuel tank will sit above an underground pump-out tank, with an oily water separator for capture and containment of spills. It will be fully self-contained, and is designed to minimise spills to the surrounding environment.

The fuel storage area will be covered with an awning or roof to reduce the risk of fuel contaminating stormwater.

Figure 16.1. Self-bunded fuel storage tank with safe storage limit of 55,600L.

A small range of oils and solvents will be stored on self-bunded pallets in a ventilated area of the maintenance shed. The storage area within the maintenance shed will be signed with the appropriate dangerous goods signage per the requirements of the Australian Dangerous Goods Code.

Chemicals to be stored on site are given in Table 16.1.

Table 16.1. List of chemicals stored on-site during operational phase.

Liquid chemicals	Estimated quantities to be stored on-site
Diesel	55,600 L
Engine coolant	20 L
Hydraulic oil	200 L
Engine oil	200 L
Gear oil	200 L
Transmission oil	20 L
Degreaser	200 L
Brake fluid	<10 L
Grease drum cartridges	< 10 L
Gas (LPG) – gas cylinders	<500 kg

No fuels, oils, lubricants and chemicals will be stored on-site during the demolition and construction phases of the project. Once the construction phase is completed, chemicals as per Table 16.1 will be safely stored in a dedicated

chemical storage area within the maintenance shed in accordance with the *Code of Practice for Managing the Risks of Hazardous Chemicals in the Workplace*[37]and the *Australian Dangerous Goods Code*[38].

A Pollution Incident Response Management Plan, outlining procedures and practices in the event of an incident or chemical spill on the site, is provided at Appendix O.

16.3. Impact assessment

16.3.1. Chemicals use and Code of Practice

The chemicals on-site are fuels – diesel and LPG, oils - grease and degreasers. Risk of harm to environment is due to leaks, spills and fire during the construction and operation phases of the facility.

Commercial and industrial users of hazardous chemicals such as petrochemicals, flammable oils and fluids have a duty of care to manage the risks associated with hazardous chemicals in the workplace. This includes ensuring the safe use, handling and storage of chemicals, as well as specific duties under the model Work Health and Safety Regulations and the *Code of Practice for Managing the Risks of Hazardous Chemicals in the Workplace*.

A substance is deemed to be a hazardous substance if it meets the classification criteria specified in the *Approved Criteria for Classifying Hazardous Substances (NOHSC:1008, 2004]*[39].

16.3.2. Chemicals use – demolition and construction phase

To avoid the impacts of chemicals on the environment during the demolition phase, all fuels, oils, lubricants and chemicals will be moved off-site during the demolition and construction phases of the project. All areas where chemicals have been stored will be cleaned to remove any chemical residues that could become mobile once the demolition phase of the project commences.

All areas where chemicals have been stored will be removed by a licenced contractor and transported off-site for lawful storage, recycling or disposal consistent with the *Australian Dangerous Goods Code*[40]. Once the construction phase is completed, chemicals as per Table 14.1 will be safely stored in the new mechanical workshop according to *Code of Practice for Managing the Risks of Hazardous Chemicals in the Workplace*[41].

16.3.3. Risk to Environmentally Sensitive Areas

The nearest waterway is Kings Stockyard Creek, located at a distance of about 290 metres from the subject site in the north-east direction. The land to the north and east of the site is zoned RU1 – Primary Production, but is largely undeveloped grassland. Therefore, the more sensitive areas are in the north-east direction from the site.

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[37] Safe Work Australia (2012). Model Code of Practice - Managing Risks of Hazardous Chemicals in the Workplace. http://www.safeworkaustralia.gov.au/sites/swa/about/publications/pages/managing-risks-of-hazardous-chemicals-in-the-workplace

[38] National Transport Commission (2016). The Australian Dangerous Goods Code- v7.4. Internet publication: http://www.ntc.gov.au/heavy-vehicles/safety/australian-dangerous-goods-code/

[39] Available at: http://www.safeworkaustralia.gov.au/sites/swa/about/publications/pages/ns2004criteriaforclassifyinghazardous

[40] National Transport Commission (2016). The Australian Dangerous Goods Code- v7.4. Internet publication: http://www.ntc.gov.au/heavy-vehicles/safety/australian-dangerous-goods-code/

[41] Safe Work Australia (2012). Model Code of Practice - Managing Risks of Hazardous Chemicals in the Workplace. http://www.safeworkaustralia.gov.au/sites/swa/about/publications/pages/managing-risks-of-hazardous-chemicals-in-the-workplace

A stormwater collection drain runs around the edge of the site and drains towards the OSD in the north-east corner of the site. Therefore, any serious spill that isn't contained in the immediate vicinity should be contained by the OSD.

A small chemical spill that is appropriately contained and cleaned up as per the existing Pollution Incident Response Management Plan (Appendix L) would pose a very low risk to the surrounding land and to Kings Stockyard Creek.

In the event of a fire, the OSD can be block off to act as a fire water retention basin. This will capture the fire water from the site, which can be pumped out for disposal at an appropriate facility at a later time.

16.4. Mitigation measures

16.4.1. Chemical use risk mitigation

The risk of chemical contamination occurring on site is mainly due to spills and leaks. To reduce these risks, mitigation measures have been proposed to reduce risk to 'As low as reasonably practicable'. These are defined in Table 16.2.

Table 16.2. Risk, likelihood and mitigation measures proposed during the demolition and construction phases of the project.

Risk	Likelihood	Impact	Mitigation
Demolition and Construction Phase			
Spills & Leaks	High	Low risk	No chemical storage on site during demolition and construction works. Maintain spills management response kit onsite – immediate clean-up of spill as per Pollution Incident Response Management Plan (Appendix L)
Fire Hazard	Low	Medium risk	Fire safety measures as per Fire Safety Procedures (to be developed)
Operational Phase			
Spills	High	Medium risk - Potential to cause contamination to land and waters	Maintain spills management response kit onsite – immediate clean-up of spill as per Pollution Incident Response Management Plan (Appendix L)
Leaks from vehicles onsite	Medium	Low risk	Maintain spills management response kit onsite – immediate clean-up of spill as per Pollution Incident Response Management Plan (Appendix L)
Leaks and spills from fuel tank	Medium	Low risk	Fuel will be stored in a self-bunding tank sitting within a bunded area, over a pump out tank with an oil water separator. The fuel storage area will be covered, to prevent stormwater contamination. A spill kit will be kept next to the fuel storage area.
Fire risk	Medium	High Risk	Fire safety measures as per Fire Safety Procedures (to be developed). Fire water will be captured in the OSD, and pumped out for appropriate disposal as soon as possible after the fire event.

Impacts from spills will be remediated by using a spill response management system as addressed in Chapter 15 and the Pollution Incident Response Management Plan as per Appendix L.

Risk from fire is identified as a hazard, but the quantities are below threshold and can be easily managed with a fire suppressant. A fire hydrant will be installed near the site entrance. A fire hose reel with high pressure water sprayer to control medium fires will be installed on the site.

An emergency access entrance to the site will be included in the south-west corner of the site. This will provide access to the site in the event that the main entrance (in the south-east corner of the site) is blocked.

Once the construction phase is completed, chemicals will be stored in a dedicated chemical storage shed using the following approaches:

- Clear signage on outside of the shed;
- Adequate ventilation;
- Drums and containers stored on self-bunding pallets for containment of leaks and spills;
- Spill kit and fire extinguisher stored next to the chemical storage area; and
- Incorporate spill prevention and control mechanisms in process controls.

16.4.2. Other Reporting requirements

If there is an incident involving a chemical spill, a chemical pollution event or a possible misuse of a chemical or pesticide, there is a 24-hour Environment line (131 555) that can be contacted to report the incident. This procedure is defined in the Pollution Incident Response Management Plan (Appendix L).

The health, safety and welfare of people at workplaces where chemicals are used and stored are regulated by WorkCover NSW, through Worksafe *Australia Model Code of Practice-Managing Risks of Hazardous Chemicals in the Workplace* under the *Work Health and Safety Act* 2011. There is an additional requirement for people conducting business or undertaking use of chemicals in their workplace to help manage health and safety risks associated with hazardous chemicals.

16.5. Conclusion

The use and storage of chemicals on-site will be minimal. The main risk will be spills during filling vehicles from the diesel storage tank. Fuel will be stored in a self-bunding tank sitting within a bunded area, over a pump out tank with an oil water separator. The fuel storage area will be covered, to prevent stormwater contamination. A spill kit will be kept next to the fuel storage area. Spill kits will be kept nearby to minimise the damage from any spills.

17. Preliminary hazard analysis and environmental risk assessment

A Preliminary Hazard Analysis and Environmental Risk Assessment has been performed to identify key potential impacts of the development, as well as potentially offensive or hazardous issues that need to be considered as part of the Development Application process.

The assessment has been performed according to AS/NZS ISO 31000: 2009 *Risk Management – Principles and Guidelines* and the Preliminary Hazardous Analysis has been informed by the *Hazardous and Offensive Development Application Guidelines - Applying SEPP 33*[42]. We have also considered the following guidelines published by the NSW Department of Planning in 2011:

- Hazardous Industry Planning Advisory Paper No 2 - Fire Safety Study Guidelines[43]
- Hazardous Industry Planning Advisory Paper No 3 - Risk Assessment[44]
- Hazardous Industry Planning Advisory Paper No 4 - Risk Criteria for Land Use Safety Planning[45]
- Hazardous Industry Planning Advisory Paper No 6 - Hazard Analysis[46].

17.1. Scope

The assessment has been performed to identify the risks posed to people, property and the environment, and to identify potential hazardous and offensive issues that need to be addressed as part of the development to ensure compliance with SEPP 33. The assessment also considers off-site risks to people, property and the environment (in the presence of controls) arising from atypical and abnormal hazardous events and conditions (i.e. equipment failure, operator error and external events). The hazard treatment measures that have been proposed assist in producing a 'low' level of risk in accordance with the risk acceptance criteria.

17.2. Methodology

The methodology used to inform preliminary hazard analysis and environmental risk assessment has included the following steps:

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[42] NSW Department of Planning (2011). Hazardous and Offensive Development Application Guidelines - Applying SEPP 33. Published by the NSW Department of Planning. Internet publication: http://www.planning.nsw.gov.au/en/Policy-and-Legislation/~/media/3609822D91344221BA542D764921CFC6.ashx

[43] NSW Department of Planning (2011). Hazardous Industry Planning Advisory Paper No 2 - Fire Safety Study Guidelines. Published by the NSW Department of Planning. Internet publication: http://www.planning.nsw.gov.au/Policy-and-Legislation/~/media/CCC734E980C4427DB95D319DF073C41A.ashx

[44] NSW Department of Planning (2011). Hazardous and Offensive Development Application Guidelines- Risk Criteria for Land Use Safety Planning. Published by NSW Department of Planning. Internet publication: http://www.planning.nsw.gov.au/Policy-and-Legislation/~/media/0D39F08E7889409BBA1FA88D5FB859FD.ashx

[45] NSW Department of Planning (2011). Hazardous Industry Planning Advisory Paper No 4 - Risk Criteria for Land Use Safety Planning. Published by the NSW Department of Planning. Internet publication: http://www.planning.nsw.gov.au/Policy-and-Legislation/~/media/0D39F08E7889409BBA1FA88D5FB859FD.ashx

[46] NSW Department of Planning (2011). Hazardous Industry Planning Advisory Paper No 6 - Hazard Analysis. Published by NSW Department of Planning. Internet publication: http://www.planning.nsw.gov.au/Policy-and-Legislation/~/media/3ACC37BE3EFE4BAAB3EBA5872AFBA8BD.ashx

- Identify and screen the hazards associated with the proposed development;
- Examine the maximum reasonable consequence of identified events;
- Qualitatively estimate the likelihood of events;
- Proposed risk treatment measures;
- Qualitatively assess risks to the environment, member of the public and their property arising from atypical and abnormal events and compare these to applicable qualitative criteria;
- Recommend further risk treatment measures if considered warranted; and
- Qualitatively determine the residual risk assuming the implementation of the risk treatment measures.

It is important to note that this preliminary hazard analysis and environmental risk assessment has been undertaken at an early stage of the proposed development to help inform key issues to be considered in the EIS. All hazards need to be identified, and an assessment of the resultant risk levels on a cumulative basis is also undertaken as part of the study.

17.3. Risk management

The environmental risk assessment has been informed by AS/NZ 31000: 2009 *Risk Management Principles and Guidelines* and *Hazardous Industry Planning Advisory Paper No 3 - Risk Assessment* (NSW Department of Planning, 2011). The risk management process has been informed by the following elements:

- Establish the context;
- Identify the risks;
- Analyse the risks;
- Evaluate the risks; and
- Treat risks.

17.4. Risk criteria

The following principles have been adopted to identify and assess risk in this study. This has been informed by the *Hazardous Industry Planning Advisory Paper No. 4 – Risk Criteria for Land Use Safety Planning*[47].

- The avoidance of all avoidable risks;
- The risk from a major hazard should be reduced wherever practicable, even where the likelihood of exposure is low;
- The effects of significant events should, wherever possible be contained within the site boundary; and
- Where the risk from an existing installation is already high, further development should not pose any incremental risk.

[47] NSW Department of Planning, 2011, *Hazardous Industry Planning Advisory Paper No. 4*, internet publication: http://www.planning.nsw.gov.au/~/media/Files/DPE/Other/hazardous-industry-planning-advisory-paper-no-4-risk-criteria-for-land-use-safety-planning-2011-01.ashx

17.5. Qualitative measurement of consequence, likelihood and risk

To undertake a qualitative risk assessment, it is useful to describe the levels of consequence of a particular event, and the likelihood or probability of such an event occurring. Risk assessment criteria have been developed in AS/NZS ISO 31000: 2009 which allows the risk assessor to develop risk criteria during the establishment of the context.

In according with AS/NZS ISO 31000: 2009, the following tables have been reviewed as part of establishing the context of the proposed development. These tables were considered to be consistent with the specific objectives of the preliminary hazard analysis and environmental risk assessment.

Table 17.1. Qualitative measures of probability.

Event	Likelihood	Description
A	Almost certain	Happens often
B	Likely	Could easily happen
C	Possible	Could happen and has occurred elsewhere
D	Unlikely	Hasn't happened yet but could
E	Rare	Conceivable, but only in extreme circumstances

Table 17.2. Qualitative measures of maximum reasonable consequence.

Event	People	Environment	Asset / Production
1	Multiple fatalities	Extreme environmental harm (e.g. widespread catastrophic impact on environmental values of an area)	More than $1B loss or production delay
2	Permanent total disabilities, single fatality	Major environmental harm (e.g. widespread substantial impact on environmental values of an area)	$100M to $1B or production delay
3	Minor injury or health effects (e.g. major lost workday case / permanent disability)	Serious environmental harm (e.g. widespread and considerable impact on environmental values of an area)	$5M - $100M loss or production delay
4	Minor injury or health effects (e.g. restricted work or minor lost workday case)	Material environmental harm (e.g. localised and considerable impact on environmental values of an area)	$250K to $5M loss or production delay
5	Slight injury or health effects (e.g. first aid / minor medical treatment needed)	Minimum environmental harm (e.g. minor impact on environmental values of an area)	Less than $250K or production delay

Combining the probability and consequence tables, Table 17.3 provides a qualitative risk analysis matrix to assess risk levels.

Table 17.3. Qualitative risk analysis matrix used in this preliminary hazard analysis and environmental risk assessment.

Consequence	Probability[1]				
	A	B	C	D	E
1	1 (H)	2 (H)	4 (H)	7 (M)	11 (M)
2	3 (H)	5 (H)	8 (M)	12 (M)	16 (L)
3	6 (H)	9 (M)	13 (M)	17 (L)	20 (L)
4	10 (M)	14 (M)	18 (L)	21 (L)	23 (L)
5	15 (M)	19 (L)	22 (L)	24 (L)	25 (L)

[1] Legend – L: low; M: Moderate; H: high; Risk numbering: 1 – highest; 25 – lowest risk. Colour coding: Green: tolerable risk; orange: ALARP – as low as reasonably practicable; red: intolerable risk.

Risk acceptance criteria for the proposed development have been formulated following consideration of the *Hazardous Industry Planning Advisory Paper No 4 - Risk Criteria for Land Use Safety Planning* (NSW Department of Planning and Environment, 2011d) and AS/NZS ISO 31000 2009 – *Risk Management Principles and Guidelines.*

In assessing the tolerability of risk from potentially hazardous development, both qualitative and quantitative aspects need to be considered. Relevant general principles considered in this study as documented in the *Hazardous Industry Planning Advisory Paper No. 4 – Risk Criteria for Land Use Safety Planning*[48].:

- The avoidance of all avoidable risks;
- The risk from a major hazard should be reduced wherever practicable, even where the likelihood of exposure is low;
- The effects of significant events should, wherever possible be contained within the site boundary; and
- Where the risk from an existing installation is already high, further development should not pose any incremental risk.

17.6. Site description

The facility is to be developed on premises at 26 Endeavour Rd, Oberon, NSW. The site is also identified at Lot 34 / DP1228591 in industrial land located in the Oberon Council local government area.

A full site description is given in Section 2.2.

17.7. Process

A detailed overview of current and proposed operations is given in Section 2.3.1.

17.8. Hazardous materials stored on-site

The NSW Department of Planning (2011) in the SEPP 33 sets out a process for screening potentially hazardous materials that are stored on site as part of a proposed development.

Potential risk typically of holding certain types of hazardous materials on site depends on:

[48] NSW Department of Planning, 2011, *Hazardous Industry Planning Advisory Paper No. 4*, internet publication: http://www.planning.nsw.gov.au/~/media/Files/DPE/Other/hazardous-industry-planning-advisory-paper-no-4-risk-criteria-for-land-use-safety-planning-2011-01.ashx

- The properties of the substance(s) being handled or stored;
- The conditions of storage or use;
- The quantity involved;
- The location with respect to the site boundary; and
- The surrounding land use.

Risk screening needs to be undertaken as part of the SEPP 33 guidelines based on an estimate of the consequences of fire, explosion or toxic release from material(s) being handled. It takes into account information from the proponent on the properties of the materials, quantity, type of storage or use, and location. A risk screening analysis for the proposed development is given in Table 15.4 below.

17.8.1. Wood – pine bark residuals, pallets, sawdust

Wood is not classified as dangerous goods according to the Dangerous Goods Code. However, it can combust if exposed to an ignition source. Saw dust, in particular, is combustible. Up to 8,000 tonnes of wood waste and wood chip products will be stored in the processing facility at any one point in time.

The materials are stored in a dry state, with water used as a dust suppressant. Strict procedures will be in place at the premises to avoid any hot work during operations and smoking is strictly prohibited in all parts of the site.

17.8.2. Diesel

Diesel with a flashpoint < 60 °C is classified as a Dangerous Good Class 3 Packaging Group 3 (flammable liquids). Diesel fuel will be stored in a dedicated fuel storage area for the purpose of fuelling of diesel-fuelled plant on-site. In the event of a spill, diesel is damaging to soils and aquatic ecosystems and fires can occur if it is ignited (flash point 61 to 150°C).

The risks associated with this proposed development include diesel storage and use. The use of diesel will be in accordance with the requirements of AS 1940: 2017 - *The storage and handling of flammable and combustible liquids*[49]. The diesel stored in the fuel storage area will be appropriately bunded to ensure any spills are contained.

A self-bunded diesel fuel tank with a maximum volume of 65,000L for the storage of diesel fuel will be installed to service the mobile plant and wood shredder/s. The proposed tank is an AdBlue™ Logitank Blue LTBL 60 (or equivalent). The container has a safe fill level of 55,600L as recommended by the manufacturer. The self-bunded container has dimensions of 12,192 mm length, 2,438 mm wide and 2,896 mm high.

The proposed location of the tank is shown in site layout at Appendix E – Site plans. The tank will be located in the north-west corner of the site, at least 15m from the north and western boundaries.

The site is expected to use approximately up to 25,000 L of diesel fuel per fortnight to service the on-site equipment. Refilling of the tank once a fortnight, depending on need, in a single semi-trailer (delivering maximum of 30,000L for each load).

Across an entire year, the tank will be refilled a total of 26 times with a total annual volume of diesel expected to be up to 0.65ML.

[49] AS 1940: 2017 - *The storage and handling of flammable and combustible liquids*. Published by SAI Global. Internet publication: https://infostore.saiglobal.com/en-au/Standards/AS-1940-2017-99377_SAIG_AS_AS_208935/

The proposed development may be potentially hazardous if the number of generated traffic movements (for significant quantities of hazardous materials entering or leaving the site) is above the annual or weekly cumulative vehicle movements shown in Table 2 of Department of Planning (2011) *Hazardous and Offensive Development Application Guidelines - Applying SEPP 33*. These thresholds for potentially hazardous development are >60 (diesel) deliveries per week or >1,000 (diesel) deliveries per annum. As the proposed delivery schedule is only once per fortnight, the use of the proposed AdBlue™ Logitank Blue LTBL 60 (or equivalent) self-bunded fuel tank is not considered potentially hazardous development.

An assessment of the proposed portable AdBlue™ Logitank Blue LTBL 60 (or equivalent) has been performed under SEPP33 with specific reference to Department of Planning (2011) *Hazardous and Offensive Development Application Guidelines - Applying SEPP 33*. Risk screening was performed according to Section 7 of these guidelines (specifically under Table 1, Table 3 and Figure 9 of the guidelines). Under these guidelines, development considered as 'potentially hazardous' needs to be more fully assessed through a Preliminary Hazardous Assessment to determine whether the development poses an unacceptable risk to neighbouring land uses and may not be appropriate development.

Given the proposed 65,000 L (≈65 tonne) above ground diesel storage tank is located 15m from the northern boundary, and that the neighbouring land use closest to the proposed tank location is not sensitive and zoned IN1 General Industrial (and is vacant land), the proposed development and tank installation falls outside 'potentially hazardous development' as per the SEPP33 Guidelines (this occurs when the tank is positioned <10m to a boundary). As a consequence, a Preliminary Hazard Assessment is not required.

17.8.3. Gas (LPG) – Forklift gas

Liquefied petroleum gas (LPG) used as a fuel in forklifts on site is classified as a Class 2.1 flammable gas under the *Australian Dangerous Goods Code*. Limited volumes of LPG may be stored outside of the mechanical workshop for the purposes of fuelling forklift units.

The risks associated with the storage of small volumes of LPG will be minimised in a dedicated space outside the mechanical workshop in an approved rack with safety chains consistent with the Material Safety Data Sheet[50].

[50] ELGAS (2016). Material safety data sheet for storage of LPG gas cylinders. Internet publication: http://www.elgas.com.au/storage-handling-lpg-gas-bottles-cylinders

Table 17.4. Risk screening analysis of potentially hazardous materials held on site as part of the development.

Material / potential pollutant	Storage location	Dangerous Goods Class[1]	Packing Group[2]	Maximum quantity on site	Screening method[3]	Threshold[4]	Notes
Wood – pine bark residuals, wood pallets, saw dust, chipped wood product	Stockpiled in concrete bunkers	n/a	n/a	8,000 tonnes	n/a	n/a	Not classified as a dangerous good
Diesel	65,000L self-bunded storage container in fuel storage area	3	III	65,000 L	Figure 9	10m to a boundary	Below threshold based on quantity stored and location of storage (>10m from lot boundary)
Gas (LPG) – Forklift gas	Storage area	2.1	n/a	<50 kg	Table 3	10,000 kg	Below threshold

[1] Class 2.1 Dangerous Goods are classified as 'flammable gases'. [3] Screening method is the methodology used to assess dangerous goods in the NSW Department of Planning (2011) *Hazardous and Offensive Development Application Guidelines - Applying SEPP 33*. [4] Where dangerous goods are stored on-site which exceed the nominated thresholds as per Department of Planning (2011) *Hazardous and Offensive Development Application Guidelines - Applying SEPP 33*, the proposed development is considered to be hazardous and requires detailed assessment under SEPP 33.

17.9. Further hazard identification, scenarios, consequence, likelihood analysis and risk assessment

To help understand further hazards possible as part of the proposed development, a series of potential worst case scenarios have been assessed to determine possible consequences, likelihood and risk. The NSW Department of Planning's (2011) *Hazardous Industry Planning Advisory Paper No 6 - Hazard Analysis* has been used to assist in guiding this analysis.

As per the above guidelines, a qualitative assessment of the impacts of the largest possible event on people, plant and the environment ,has been conducted. The worst-case scenarios reflect any foreseeable factors that could exacerbate the severity of an accident, including abnormal process conditions, out of hours manning levels, and the potential for control measures to be disabled or rendered inoperable by the accident.

The worst case scenarios we have assessed include the following:

- Vehicle collision on entry to the site, resulting in fire and possible death;
- Leaks / spills on vehicle entry to the site, with potential impacts on stormwater and fire risk;
- Vehicle theft and malicious damage, leading to equipment failure and injury to person(s);
- Leaks / spills in processing Facility, with potential impacts on stormwater and fire risk;
- Vehicle theft and malicious damage in processing Facility, leading to equipment failure and injury to person(s);
- Vehicle collision between delivery vehicles with other on-site vehicles through driver error, or pedestrian, resulting in possible fire or death near the product storage shed;
- Leak / spill from vehicle collision with potential impacts on stormwater and fire risk;
- Fire caused by ignition source (e.g. cigarette);
- Leakage of fuel and oil containers in workshop, potentially igniting and/or moving into stormwater, through human error or malicious act;
- Vehicle or material within workshop stolen, and leads to equipment failure and possible safety risk to staff; and
- Fire caused by ignition source (e.g. cigarette, hot work such as welding) and flammable materials in workshop (e.g. fuels, oils) catch fire due to spark from cigarette or hot work.

Prevention and treatment measures to reduce the likelihood and resulting consequences from these worst-case scenarios are mapped out in Table 17.5. Hazard identification, scenario, consequence, prevention/treatment measures and risk rating table. below. Note that a risk rating category has been prepared to understand the significance of these risks – on the environment and human health. Note that the risk ratings estimated as part of the qualitative analysis are specified after implementation of the risk prevention, treatment and detection measures.

As a result of this analysis, it is suggested that the worst-case scenarios modelled with risk prevention, treatment and detection measures are all low risks.

17.10. Conclusion

The proposed development is not considered a potentially hazardous development as per Figure 11 of SEPP33, so no further Preliminary Hazard Analysis or Multi-Level Risk Assessment has been performed.

Table 17.5. Hazard identification, scenario, consequence, prevention/treatment measures and risk rating table.

Facility / event	Cause / comment	Possible scenarios, results & consequences	Prevention, Treatment Measures and Detection Protection Required	Likelihood	Consequence	Risk rating and category (after treatment measures)[1]
Vehicle collision	Possible collision of delivery vehicles with other on-site vehicles through driver error, or pedestrian, resulting in possible fire or death	Fire possible outside of processing Facility, potentially spreading to processing Facility with flammable liquids. Possible impacts on stormwater from discharge of fire water. Death or injury to personnel	• Ensure vehicle speed limits and regular driver education • Firefighting equipment • Emergency management / response plan • Pollution incident response management plan / Environmental management plan • Traffic management plan • Work health and safety plan • Hazardous material management plan • Operator and driver training • Spill response equipment and training • Contact emergency services (NSW Fire Service)	Unlikely (D)	3	17 (Low risk)
Leak / spill	Vehicle collision / damage causes spill / leak of hazardous material	Collision causes leakage of vehicle fuel or oil onto handstand and possible stormwater impacts and a fire risk	• Ensure vehicle speed limits and regular driver education • Firefighting equipment • Emergency management / response plan • Pollution incident response	Possible (C)	5	22 (Low risk)

Facility / event	Cause / comment	Possible scenarios, results & consequences	Prevention, Treatment Measures and Detection Protection Required	Likelihood	Consequence	Risk rating and category (after treatment measures)[1]
			management plan / Environmental management plan • Traffic management plan • Work health and safety plan • Hazardous material management plan • Operator and driver training • Spill response equipment and training • Emergency response • Communications • Spill containment and sweeping of hardstand • Contact emergency services (NSW Fire Service)			
Vehicle theft / malicious damage	Vehicle or material within truck stolen	Components of a truck are stolen and leads to equipment failure and possible safety risk to staff	• Ensure staff compliance with site security measures • Emergency management / response plan • Traffic management plan • Work health and safety plan • Contact emergency services (Police) • Site security / limited access	Possible (C)	5	22 (Low risk)

Facility / event	Cause / comment	Possible scenarios, results & consequences	Prevention, Treatment Measures and Detection Protection Required	Likelihood	Consequence	Risk rating and category (after treatment measures)[1]
Excess noise and vibration from truck movements on site	Increase truck vehicle movements results in excess noise and vibration impacts on neighbours	Increased truck movements results in excess noise and vibration nuisance impacts on neighbours	• Ensure vehicle speed limits and regular driver education • Traffic management plan	Possible (C)	5	22 (Low risk)
Excess dust and fire	Fire caused by excess dust and build-up of electrostatic electricity or spark and fire	Excess build-up of dust during crushing operations, and spark through electrostatic electricity or spark through electrical failure	• Ensure staff compliance with hot work procedures • Regular machinery maintenance and safety inspections • Dust minimisation practices • Firefighting equipment • Emergency management / response plan • Pollution incident response management plan / Environmental management plan • Traffic management plan • Work health and safety plan • Hazardous material management plan • Operator and driver training • Spill response equipment and training • Contact emergency services (NSW Fire Service)	Possible (C)	4	18 (Low risk)

Facility / event	Cause / comment	Possible scenarios, results & consequences	Prevention, Treatment Measures and Detection Protection Required	Likelihood	Consequence	Risk rating and category (after treatment measures)[1]
Equipment breakdown and excess stockpiling	Excess stock increases stored in Facility increases risk of vehicle collision or fire	Collision of vehicles due to constrained operational area, possible fire as a result	• Cease receipt of glass on the site and divert trucks to other facilities • Firefighting equipment • Emergency management / response plan • Pollution incident response management plan / Environmental management plan • Traffic management plan • Work health and safety plan • Hazardous material management plan • Operator and driver training • Spill response equipment and training • Contact emergency services (NSW Fire Service)	Unlikely (D)	5	24 (Low risk)
Fire	Fire caused by ignition source (e.g. cigarette)	Combustible liquid is ignited through contact with an ignition source (e.g. cigarette)	• Ensure strict non-smoking policy is enforced at all times • Firefighting equipment • Emergency management / response plan • Pollution incident response management plan / Environmental	Possible (C)	4	18 (Low risk)

Facility / event	Cause / comment	Possible scenarios, results & consequences	Prevention, Treatment Measures and Detection Protection Required	Likelihood	Consequence	Risk rating and category (after treatment measures)[1]
			management plan • Traffic management plan • Work health and safety plan • Hazardous material management plan • Operator and driver training • Spill response equipment and training • Contact emergency services (NSW Fire Service)			
Storage of fuels and hydrocarbons	Leakage of fuel	Spill of fuel, and potentially ignite and/or move into stormwater, through human error or malicious act	• Ensure fuels stored in fully bunded container. • Staff training on safe storage of fuel. • Emergency management / response plan • Pollution incident response management plan / Environmental management plan • Traffic management plan • Work health and safety plan • Hazardous material management plan • Spill response equipment and	Possible (C)	4	18 (Low risk)

Facility / event	Cause / comment	Possible scenarios, results & consequences	Prevention, Treatment Measures and Detection Protection Required	Likelihood	Consequence	Risk rating and category (after treatment measures)[1]
			training • Emergency response • Communications • Spill containment and sweeping of hardstand • Contact emergency services (NSW Fire Service)			
Fire	Fire caused by ignition source (e.g. cigarette, hot work such as welding)	Flammable materials in workshop (e.g. solvents, oils) catch fire due to spark from cigarette or hot work)	• Ensure strict non-smoking policy is enforced at all times • Follow correct procedures for full containment of any hot work • Staff training on correct storage and handling of flammable liquids • Firefighting equipment • Emergency management / response plan • Pollution incident response management plan / Environmental management plan • Traffic management plan • Work health and safety plan • Hazardous material management plan • Operator and driver training	Possible (C)	4	18 (Low risk)

Facility / event	Cause / comment	Possible scenarios, results & consequences	Prevention, Treatment Measures and Detection Protection Required	Likelihood	Consequence	Risk rating and category (after treatment measures)[1]
			• Spill response equipment and training • Contact emergency services (NSW Fire Service)			

Risk rankings: 1, highest risk; 25, lowest risk. Colour coding: Green: tolerable risk; orange: ALARP – as low as reasonably practicable; red: intolerable risk.

18. Compilation of mitigation measures

18.1. Introduction

A wide range of mitigation measures to prevent or minimise environmental impacts which may be generated by the proposal have been detailed throughout this EIS. This Section of the report is a compilation of the recommended mitigation measures. Implementation of these measures would be considered necessary to minimise impacts and maximise positive outcomes on the physical, social and economic environments of the local area and wider region.

18.2. Objective

The objective of this Section of the EIS is to outline how the recommended environmental protection measures will be implemented and managed in an integrated manner to demonstrate that the proposal is capable of complying with statutory obligations under EPA licenses or approvals. This includes the environmental management and cleaner production principles which will be followed when planning, designing, establishing and operating the proposal.

18.3. Cleaner Production Principles

Cleaner production is a practical method for protecting human and environmental health. This is achieved through the continuous application of an integrated, preventive environmental strategy towards processes, products and services. Cleaner production increases the overall efficiency of products and services and reduce damage and risks for humans and the environment. A proactive approach to the reduction in the risk and consequence of potential environmental impacts at the source results is a decreased reliance on reactive environmental mitigation measures.

The cleaner production techniques that are applicable to the ongoing operations of the project include:

- Selecting and using the most appropriate technology and materials to reduce the quantity of resources used and to minimise the amount of waste generated;
- Improved operation and maintenance practices to reduce the quantity of resources used and to minimise the amount of waste generated;
- Employing processes that are efficient in their consumption of energy, materials and natural resources and reduce greenhouse gas emissions;
- Selecting energy efficient plant and equipment for use in the facility;
- Reuse of captured stormwater as the primary source of water for the site;
- Safely disposing of any residual wastes and process residues;
- Promoting the safe use, handling, recycling and disposal of waste products through an understanding of their life cycle.

Where cleaner production principles can no more remove environmental risk or consequence, mitigation strategies must be considered to ensure the remaining potential environmental harm is reduced to the lowest risk level possible.

18.4. Mitigation Strategies

Without appropriate environmental management measures being incorporated in the design of the Project and the contractual arrangements associated with the proposed works, there will be the potential for adverse impacts on the

environment. Effective implementation is necessary to ensure the Project has minimal impact on the physical, social and economic environments of the local area and wider region.

Table 18.1 summarises the mitigation measures identified in this EIS to ameliorate impacts and safeguard the environment so that the desired environmental outcomes are achieved for the various components of the project for design, construction and operation.

Table 18.1. Summary of mitigation strategies.

Issue	Desired Outcome	Mitigation Strategy
Waste	Minimise the amount of waste generated and sent to landfill from site – construction phase	• Construction Method Statements (CMS) will include practices to minimise waste generation and to maximise recycling and reuse of materials including oils, greases, lubricants, timber, glass, and metal. • Segregated waste disposal containers for the collection and recycling/disposal of all waste streams generated during the construction and operation phases will be provided onsite. Waste disposal containers will have clear signage and instructions for use to avoid cross-contamination. No rubbish shall be disposed of on site. • Existing stockpiles on the site will be tested prior to removal. • MSW will be collected in a MGB and removed weekly by a licensed waste removal contractor, and disposed at a licensed landfill.

Issue	Desired Outcome	Mitigation Strategy
	Minimise the amount of waste generated and sent to landfill from site – operation phase	• Waste management and minimisation will form part of the induction program (which includes environmental due diligence training). • Specific locations for waste management (e.g. sorting area locations, recycling bin locations, material stockpile locations) will be established on site and signposted appropriately. • Waste management areas will be adequately managed to prevent sediment runoff and dust generation. • Packaging minimisation and reuse initiatives will be implemented as part of procurement protocols. • Waste will be disposed to an appropriate licensed facility. A Waste Management Register of all waste collected for disposal and / recycling, including amounts, data and time and details and location of disposal will be maintained at all times. • All waste being transported off site must be covered. The transportation must be appropriately licensed to carry that material. • Storage of all hazardous substances and dangerous goods will be in accordance with SDS requirements in a bunded area. Solid and hazardous wastes will be contained and separated from inert waste. • Any hazardous waste (e.g. asbestos) will be managed and handled by an appropriately licensed contractor and transported for disposal to a licensed facility approved site. • Any material contaminated by spills i.e. fuel, oil, lubricants etc., including empty fuel, oil and chemical containers, will be stored in a sealed secure container within a bunded area and will be transported to a waste disposal site approved by the NSW EPA to accept such material. • Incompatible wastes will not be mixed. • Storage areas would be located away from waterways and the stormwater system. • Biodegradable products will be used wherever practicable. • Regular collection of wastes will ensure air emissions are at a satisfactory level. • Conduct regular litter patrols to ensure litter is effectively controlled on site.
	Stockpiles are well-managed	• The total amount of waste stored on site will be kept within the authorised limit on the Environment Protection Licence. • Stockpiles of waste materials in the designated waste storage area will be limited to 3m. Height guidance will be provided by the 3m height of the concrete block bays. Stockpiles of organic material such as timber and mulch will be limited to a maximum of 3m in height in the processing and blending areas. Height Poles to the exact length (3m) will provide on-site guidance for stockpile management. Stockpiles of all processed products and landscaping supplies will be limited to 3m. Height guidance will be provided by the 3m height of the concrete block bays.

Issue	Desired Outcome	Mitigation Strategy
Air Quality	Maintain good air quality	• Activities to be assessed during adverse weather conditions and modified as required (e.g. cease activity where reasonable levels of visible dust cannot be maintained). • Engines of on-site vehicles and plant to be switched off when not in use. • Vehicles and plant are to be fitted with pollution reduction devices where practicable. • Vehicles are to be maintained and serviced according to manufacturer's specifications. • Visual monitoring of construction activities is to be undertaken to identify dust generation.
	Reduce impacts of hauling material / vehicle movements	• Any hardstand on-site to be swept/cleaned regularly as required etc. • Construction vehicle traffic is to be restricted to designated routes. • Construction speed limits are to be enforced. • Vehicle loads are to be covered when travelling off-site.
	Reduce impacts of material handling	Drop heights from loading and handling equipment are to be reduced as much as practical.
	Reduce impacts of exposed areas / stockpiles	• The extent of exposed surfaces and stockpiles is to be kept to a minimum. • Exposed areas and stockpiles are either to be covered or are to be dampened with water as far as is practicable if dust emissions are visible.
Noise and Vibration	Control noise during construction phase	• Noise planning as part of the project pre-planning. • During construction, restrict construction activity to the period 7.00am to 6.00pm Monday to Friday and 8.00am to 1.00pm Saturday, with no work on Sundays or public holidays. • Site inductions and toolbox meetings to all employees and subcontractors must include information about the need to minimise noise impacts to surrounding areas. Contractors should familiarise themselves with methods of controlling noisy machines and alternative construction procedures. • Mechanical plant should be silenced using best available control technology. Noise suppression devices should be maintained to manufacturer's specifications. • All equipment used on the site shall have exhaust systems that have been recommended by the manufacturer as having the lowest associated noise for that machine. • Machines which are used intermittently such as rollers or other earthmoving machinery should either be shut down in the intervening periods between works or throttled down to a minimum. • Site access is designed such that delivery vehicles, and other heavy vehicles moving through the site can do so with minimum need to reverse.
	Minimise noise during operational phase.	• Acoustic noise barriers will be construction around the site. A 10m earth bund will be constructed along the western, northern, eastern and part of the southern boundaries. A 2.5m fence will be constructed along the south-eastern boundary. • Restrict operational activity to the period 7.00am to 6.00pm Monday to Friday and 8.00am to 1.00pm Saturday, with no work on Sundays or public holidays.

Issue	Desired Outcome	Mitigation Strategy
Soil erosion	Contain soil erosion and run-off during construction	A pit will be dug in the north-west corner of the site and used to capture any run-off and sediment during the construction phase of the project.
	Contain soil erosion and run-off during operation	• The site will be compacted, with the majority of the site impervious. • Landscaping and tree plantings will limit soil erosion from the earth mounds surrounding the site. • All stormwater will be captured by the stormwater system and drained towards the stormwater pond. All sediment will be captured and contained on-site. • Overflow from the stormwater pond will be released to the grassed area to the north via leaky weirs.
Water	Water quality of water leaving the site is acceptable and does not adversely impact the surrounding environment.	• Stormwater will be captured by the series of drainage channels and pipes. • All stormwater will be treated, using a combination of gross pollutant traps, swales, and a pond. • The pond and swales will contain plants known to reduce nutrient load in run-off.
	Water conservation	• Water captured in the stormwater pond will be used on-site for dust suppression. • Water will be treated via a filter system prior to re-use, for health and safety reasons.
	Containment of firefighting water	In the event of a fire, the stormwater capture system is capable of capturing and containing up to four hours of firewater. The pond will maintain a freeboard of at least 330mm, which will allow the capture of 330,000L water, if necessary. Firewater could be pumped from the pond for disposal off-site, if necessary.
Traffic and Transport	Reduce impacts of traffic to and from the site	No significant decrease in the performance of the local traffic network is anticipated as a result of the proposed development. There should be no warrant for any intersection upgrades, as a result of traffic generated, should this development be approved.
	Control on-site traffic management	Heavy vehicle movements within the site will be one-way clockwise to minimize conflicts and to ensure the safe and efficient operation of the site.
	Ensure adequate car parking	The development provides nine parking spaces near the site frontage (including one accessible parking space)
Biodiversity	Project Location	The location of the proposed development has been positioned within historically cleared land in order to avoid and minimise the potential resulting impacts on biodiversity values within the Subject Site.
	Project Design	The proposed activity has been designed to avoid and minimise impacts on native vegetation and habitat where possible within the Survey Area. Where this is not possible, mitigation measures have been designed and recommended to reduce impact.

Issue	Desired Outcome	Mitigation Strategy
	Assigning a Project Ecologist	Prior to construction, the proponent should commission the services of a qualified and experienced Ecologist Consultant. The Ecologist will be commissioned to: • Assist the proponent in identifying and assigning an appropriate skilled Bushland Restoration Professional to implement vegetation restoration; • Help the proponent undertake any threatened species habitat augmentation or translocation; • Undertake any required targeted searches for threatened flora prior to vegetation clearing; • Undertake an extensive pre-clearing survey; delineating habitat-bearing trees and shrubs to be retained/removed; and • Supervise the clearance of trees and shrubs (native and exotic) in order to capture, treat and/or relocate any displaced fauna.
	Reduce impacts of clearing of vegetation/ fauna habitat	The following conditions must be adhered to: • Before any vegetation is damaged or removed, a qualified Ecologist with flora identification experience should be assigned to undertake a pre-clearing survey to delineate areas permitted to be cleared, from areas that must be retained. Bunting or strong flagging tape should be used. • Prior to vegetation being damaged or removed, a qualified Ecologist with fauna identification experience should determine the presence of any suitable habitat for roosting microbats, nesting birds or other fauna in the area of the Survey Area due to be cleared. • A qualified Project Ecologist with experience in handling wildlife should be present on the Project Site during all vegetation clearing in order to supervise clearing and capture and relocate any displaced, healthy animals, or care for / rehabilitate any injured or orphaned animals.
	Relocation of woody debris	Where possible; all woody debris (fallen trees and logs), within the Survey Area is to be retained. Woody debris within the activity footprint should be relocated, as directed by the Project Ecologist.
	Avoid clearing of hollow-bearing Trees	Any hollow-bearing trees (including dead trees) should be retained where possible. If such habitat features are to be removed, an Ecologist should be present to supervise felling.
	Replacement of hollows	• Wherever possible the proponent should install nestboxes on trees to enhance fauna habitat, particularly habitat for microbats. • No hollow-bearing trees will be removed, as a result of the proposal. • In the event that any hollow-bearing trees require removal; hollows are to be replaced nest boxes (with similar sized entry holes to the hollows lost) to the compensatory ratio of 1:2 (two replacements for each one lost), or as agreed by the Project Ecologist.
	Reduce impacts of erosion and Sedimentation	Appropriate erosion and sediment control must be erected and maintained at all times during construction. As minimum such measures should comply with the relevant industry guidelines such as 'the Blue Book' (Landcom 2004).
	Reduce impacts of storage and Stockpiling (Soil and Materials)	Allocate all storage, stockpile and laydown sites away from any native vegetation that is planned to be retained. Avoid importing any soil from outside the site as this can introduce weeds and pathogens to the site.

Issue	Desired Outcome	Mitigation Strategy
	Tree Replacement and Revegetation	The proponent continues to actively manage the broader Subject Property including the removal of weeds and plantings of locally-indigenous trees.
	Weed suppression and eradication	The proponent will continue to actively manage weed infestations throughout the Subject Site and broader Subject Property. Since herbaceous weeds and woody weeds exist within the Subject Area, priority must be given to manage and eliminate all weeds in order to prevent weeds from spreading into neighbouring areas. This will be undertaken using a combination of hand removal, cut/scrape and painting, brush cutting and spot spraying as required.
	Reduce impacts of sewerage	• All stormwater accumulation and sewerage produced on site will be managed in an appropriate system as advised by a stormwater/wastewater engineer. • Sewerage produced on site to a certified sewerage system will eliminate any adverse effects to the local ecology.
Heritage	Protection of heritage items not yet discovered	• If any suspected archaeological remains are discovered during the development, all activity must stop and an archaeologist consulted; and • If any suspected human remains are discovered during the development, all activity must stop and the find reported to the NSW Police and the Coroner.
Visual Impact	Reduce the visual impact of the development from the surrounding areas.	• The built form of the proposed buildings (site office and workshop) are of a minor scale to the surrounding industrial buildings, and is unlikely to be visible external to the site. • Building materials selected will reduce colour contrast and blend any new and existing structures, as far as possible, into the surrounding landscape. • Retention of existing trees within the Site to assist in fragmenting views of the proposed development. • Extension of existing earth mound around the perimeter of the site will limit views and screen material bunkers and plant machinery. • Vegetation screening incorporating species that integrate with existing landscape character.
Contaminated sites	Minimise potential for soil contamination or groundwater at the site.	Remove stockpiled topsoil material and machinery and equipment including brick and chipboard stockpiles to make the site suitable for industrial land-use.
Bushfire risk assessment	Maintain a 50m asset protection zone around the office / workshop building.	All grass within 50m of the proposed industrial shed is to be managed as short cropped grass < 100mm high.

Issue	Desired Outcome	Mitigation Strategy
	Maintain inner and outer protection areas within the site.	The following points are to be adhered to for providing APZs. • The IPA is to have a tree canopy cover less than 15%. • The OPA is to have a tree canopy cover less than 30%. • No trees are to be located within 2m of the building roof line. • Garden beds with flammable shrubs are to be located a minimum 10m from the building. • Tree limbs within 2m of the ground are to be removed. • Removal of ground fuels should be removed each year prior to the bushfire season (October- March).
	Reduce fire risk to the building on site.	• All above-ground water and gas service pipes and fittings external to the office/workshop building will be metal. • Gas bottles will be installed and maintained in accordance with AS1596. • All fixed gas cylinders are to be kept clear of all flammable materials to a distance of 10m and shielded on the hazard side of the installation. • Release valves are directed away from the building and at least 2m away from any combustible material, so that they do not act as a catalyst to combustion. Connections to and from gas cylinders are to be metal. • Polymer sheathed flexible gas supply lines to gas meters adjacent to buildings are not to be used. • Electrical transmission lines will be underground.
	Reduce risk of on-site fires spreading to surrounding grassland	The proposed storage bays are separated from potential grass fire by a swale, a perimeter emergency vehicular access road and a 10m high earth berm. The proposed earth berms are to be planted with grass and the grass on the earth berms are to be managed as short cropped < 100mm high. The proposed vegetation management will keep all grass in the vicinity of the proposed stock piles are in minimal fuel condition and will therefore mitigate the potential for grass fire to encroach onto the site. A 30m managed zone, consisting of a swale, a perimeter emergency vehicular access road and a 10m high earth berm is provided between the proposed storage areas and surrounding grassland to the north, east and west.
	Provide adequate access for emergency vehicles to the site	A minimum 6m wide clear access route is provided around the proposed storage bays, processing area and temporary stockpiling area.
Chemicals and fuels	Minimise impact of spills and leaks	• No chemical storage on site during demolition and construction works. • Maintain spills management response kit onsite – immediate clean-up of spill as per Pollution Incident Response Management Plan. • Fuel will be stored in a self-bunding tank sitting within a bunded area, over a pump out tank with an oil water separator. The fuel storage area will be covered, to prevent stormwater contamination. A spill kit will be kept next to the fuel storage area.

Issue	Desired Outcome	Mitigation Strategy
	Reduce impacts in event of fire	• Fire safety measures as per Fire Safety Procedures (to be developed). • Fire water will be captured in the OSD, and pumped out for appropriate disposal as soon as possible after the fire event.

18.5. Environmental Management System

Adopting an Environmental Management System (EMS) and a monitoring program, for both the construction and operational phases, is an important component of the proposal to demonstrate KSSS's commitment to implementing the measures outlined in this EIS.

To ensure an integrated approach, the EMS will include Environmental Management Plans (EMPs), specifically created to address the management and mitigation of the following environmental issues, as compiled in the table above. These sub plans include:

- Waste;
- Water;
- Soils and contamination;
- Air quality;
- Traffic;
- Noise and vibration;
- Flora and fauna;
- Fire safety;
- Historic and Aboriginal heritage;
- Visual impact; and
- Work health and safety.

The key objectives of the EMPs will be to ensure:

- Works are carried out in accordance with relevant environmental statutory requirements and relevant non-statutory policy, as detailed throughout this EIS;
- Works are carried out in accordance with the goals and requirements presented in this EIS;
- Works are carried out in such a way as to minimise the likelihood of environmental degradation;
- Works are carried out in such a way as to manage the impact of the works on neighbouring properties;
- All employees engaged in the works comply with the terms and conditions of the EMPs;
- Clear procedures for management of environmental impacts, including corrective actions;
- Continual improvement of environmental management; and
- Responsibilities and reporting requirements to ensure compliance with the EMP.

The EMPs will be prepared following assessment and approval of the Project, and will serve as working documents to be used throughout the detailed design, construction and operational stages. They will be integrated into KSSS's existing management systems, procedures and plans for its activities within the facility, to ensure consistency in approach.

Each EMP developed for the site will contain, but not be limited to, the following information:

- Goals and objectives;
- Licenses, permits, approvals and statutory requirements;
- Lists of required actions, timing and responsibilities (including relevant environmental authorities);
- Operational procedures for preventing environmental impacts;
- Reporting requirements and procedures;
- Corrective and preventative action procedures;
- Procedures and forms for documentation and reporting of issues;
- Standard specifications for incorporating environmental safeguards;
- Environmental awareness and environmental management training and education requirements
- Guidelines for emergencies;
- Surveillance, review and auditing procedures for modification of the EMPs;
- Complaint procedures;
- Maintenance and monitoring programs; and
- Quality assurance procedures

Adherence to the EMPs will enable environmental safeguards and mitigation measures to be effectively implemented and sustainable work practices adopted for the entire Project. This also demonstrates the KSSS's commitment to preventing environmental pollution, minimising the impact of the proposal on the environment and complying with all relevant legislation.

18.6. Environmental Monitoring and Reporting

Environmental monitoring will be a fundamental component of the Operational EMPs for the proposal. Monitoring programs will be developed and presented in EMPs, in accordance with the conditions of approval and Licence requirements.

However, specific environmental monitoring recommended for the project have been defined in the environmental investigations done for the EIS. This monitoring is recommended for implementation, in addition to any specific environmental monitoring required as a condition of the SSD planning approval or EPA Licence for the site. Proposed environmental monitoring is given in Table 17.2.

Table 17.2. Environmental monitoring as recommended through technical investigations done in the EIS.

Environmental issue	Monitoring	Purpose	Proposed limit conditions
Waste	Weighbridge records for all incoming waste materials and outgoing products and waste exported by the site under an appropriate EPA *Resource Recovery Order*	For monthly reporting to the EPA for compliance with proposed Authorised Amount and annual processing limits	Maximum 2,900 tonnes of waste or product held on site at any one point in time Annual processing limit of 99,000 tonnes per year
Water	Periodic water quality sampling in stormwater detention dam	Assess quality of water stored on site and effectiveness of stormwater quality controls on site	Water quality parameters and frequency of testing as recommended by the EPA

Environmental issue	Monitoring	Purpose	Proposed limit conditions
	Water quality grab samples during overflow events	Assess quality of water discharged from site in peak storm events	Water quality parameters as recommended by the EPA
	Groundwater quality testing through upstream and downstream bores	To monitor groundwater quality.	Water quality parameters as recommended by the EPA
Air quality	Campaign fence line monitoring (north / south / east and wet boundaries), including a meteorological station on site	To confirm the effectiveness of dust control measures on the site, and to validate predictions in the air quality impact assessment	Periodic monitoring of dust deposition, PM_{10} and $PM_{2.5}$ at a frequency as required by the EPA
Noise and vibration	Periodic noise and vibration validation monitoring at closest residential receivers along Acacia Rd (No's 10, 12, 16 and 32)	Confirm the effectiveness of noise and vibration controls and management practices on the site during construction and operation	As per predicted worst-case noise levels ($LA_{eq,\ 15m}$) in Table 8.12 and Table 8.13.

Monitoring requirements will be focused on ensuring compliance with the relevant environmental sub-plans, for example:

- Visually monitoring dust generation from work zones to ensure that excessive dust is not being produced;
- Monitoring noise and vibration generation from work zones to ensure that excessive noise and vibration is not being produced; and
- Monitoring stockpiling heights.

Monitoring requirements will also be focused on ensuring current mitigation/management systems remain fit for purpose and are in good working order to ensure they will remain effective.

Operational monitoring may also result from investigative monitoring or regulatory compliance monitoring, such as conducting investigative noise monitoring in response to specific complaints.

Environmental performance reporting is a key decision support tool that provides management with the information to make meaningful and positive change. Reporting requirements will be details in the EMPs for the relevant implementation phases.

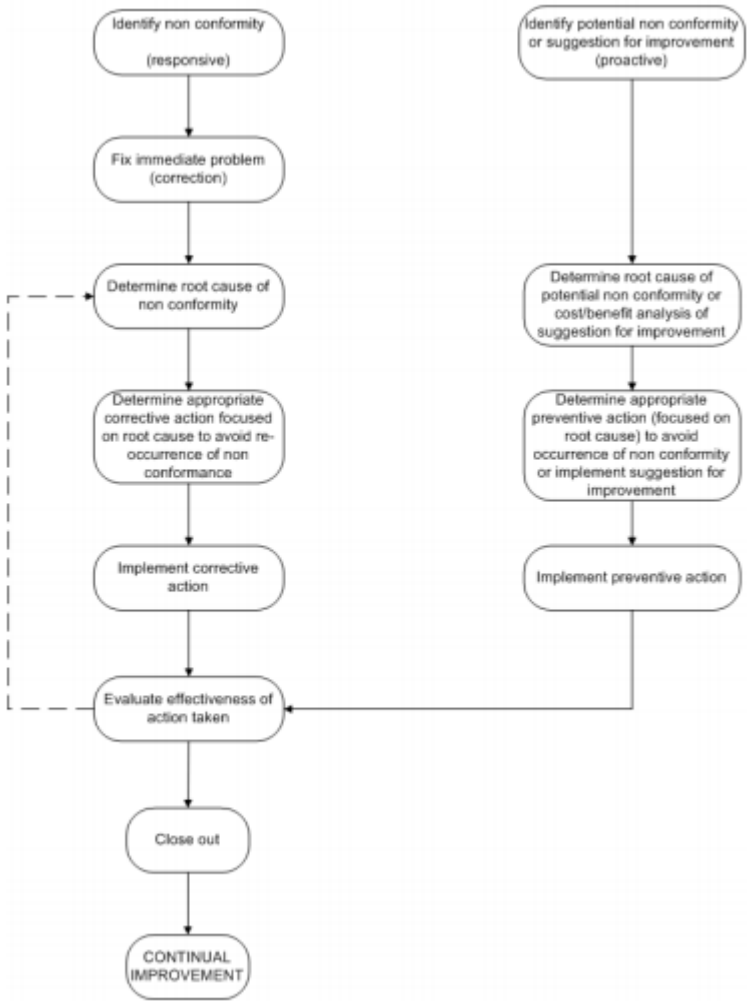
The identification of actual and potential non-conformities contributes to continual improvement of the environmental management system through corrective action and preventive action, respectively. If the reports identify any shortcomings in the way that the construction activities or the operations are being conducted, or in the performance of environmental control structures, the necessary changes will be made to the EMPs to reflect these changes. The NSW EPA will receive all relevant reports and prompt notification of any incidents or deviations in performance as well as updated EMPs as required.

18.7. Environmental Auditing and Continual Improvement

Environmental system audits will be conducted in accordance with a schedule nominated in the EMP. This will include a schedule of independent audits by accredited external auditors. Quantified and unquantified information contained in the EIS will be assessed to ensure that the construction and operational phases of the Project meet acceptable environmental standards. Audits will be based on available information and observations. Environmental audits will also assess the Project against any Conditions of Approval imposed by statutory

authorities. The register that is completed during compliance audits become a record of the evaluation of compliance. All detected non-compliances will be followed up with corrective actions as per the flow chart below.

Figure 18.1. Non-compliance corrective actions flow chart



Actual and potential non-conformities identified and suggestions for improvement are made by the following means:

- Internal audit;
- External audit;
- Site inspections;
- Feedback from external parties;
- Complaints from customers or other stakeholders;
- Suggestions for improvement from staff and contractors;
- Occurrence of environmental emergencies and accidents;
- Testing of emergency preparedness and response; and
- Management review.

The above flowchart illustrates the organisation's process for non-conformity, corrective action and preventive action, through:

- Identifying actual and potential environmental nonconformities;
- Recording suggestions for improvement;
- Taking appropriate action to correct non-conformities and mitigate environmental impacts;
- Taking corrective action to avoid recurrence of non- conformities; and
- Taking preventive action to avoid occurrence of non-conformity.

KSSS or their environmental representative will be responsible for maintaining a register of environmental nonconformity and suggestions for improvement to environmental management. Each record is associated with a corrective and/or preventive action. Corrective and preventive action will require a change environmental management documentation in a continual process for document control.

This process has the ultimate goal of driving continual improvement.

18.8. Conclusion

The objective of this Section of the EIS is to outline how the recommended environmental protection measures will be implemented and managed in an integrated manner to demonstrate that the proposal is capable of complying with statutory obligations under EPA licenses or approvals.

This Chapter described the mitigation measures to be implemented for potential impacts of the proposal that have been identified throughout this EIS. This Chapter provides an outline of the proposed environmental management measures, and additional strategies, including cleaner production principles, which will be followed when planning, designing, establishing and operating the proposal. These measures and processes will be incorporated into EMPs and monitoring programs to ensure a commitment to implementing the requirements of relevant legislation outlined in this EIS. Monitoring the efficacy of those measures will inform a process to drive continual improvement.

19. Cumulative Impact Assessment

19.1. Introduction

This cumulative impact assessment addresses the cumulative environmental impacts of the proposed waste wood processing facility at 26 Endeavour Street, Oberon, as well as to address the Secretary's Environmental Assessment Requirements (SEAR 1238).

The proposed development involves establishing a waste wood recycling facility (the Facility) at 26 Endeavour Street, Oberon (60 Hawken St, Oberon). The Facility will utilise state-of-art processing equipment to process up to 99,000 tonnes of bark and clean waste wood (e.g. pallets) per annum.

A cumulative impacts assessment is an environmental assessment that examines both the positive and negative environmental impacts of a proposal where there is a clustering of a land use type. A cumulative impact on the environment results from the incremental impact of human activities with consideration to the historic, current and foreseeable planned activities for a particular area. Cumulative impacts from a cluster of premises will vary between locations but typically cumulative impacts are a product of the location, the number and type of facilities present in the vicinity, the way they are managed, and the capacity of the local environment to accommodate these facilities.

The proposed development is not considered to make a significant contribution to cumulative impacts due to the mitigation measures that will be put in place to manage environmental impacts, which is in addition to the numerous long-term cumulative benefits of the proposed development, including a contribution to the attainment of waste management objectives including the aims and objectives of relevant legislation around the management of problem wastes, illegal dumping and waste to landfill targets.

19.2. Objective

This cumulative impacts assessment aims to achieve the following objectives:

- 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;
- Identified infrastructure requirements flowing from the proposal; and
- Assess the likely impacts from such additional infrastructure and measures reasonably available to the proponent to contain such requirements or mitigate their impacts.

19.3. Assessment of stress level of existing environment

The facility will be located at 26 Endeavour Street, Oberon, within an existing industrial estate. The site is close to Borg's timber panel manufacturing plant, as well as ANL's composting facility. The site itself is surrounded by light industrial businesses to the south, and un-used rural land to the north and west. The site immediately to the east is currently being developed for an industrial use.

The nearest residential area is approximately 500m to the south of the site, on the other side of a major thoroughfare.

The site and surrounding land uses were formerly rural/agricultural properties. There is very little native vegetation in the vicinity of the site.

There are no major sources of water, protected zones and/or Environmentally Sensitive Areas (ESAs) that can be directly affected by an incident at the facility. The subject site is located at significant distance to riparian areas or a nearby waterway. No sensitive riparian areas or waterways exist on the site. The site drains via overland flow towards the north-west of the site, following the gently sloping topography of the landscape.

The site and surrounding areas are already developed or degraded. The industrial activity in the area means that there is already significant noise levels and heavy traffic. The consultation process indicated that there were already some dust issues in the area.

19.4. Assessment of the long-term impact of the proposal

As identified within the respective Sections and technical studies, the proposals environmental impacts, such air, noise and water quality meet all relevant environmental legislation, policies and objectives. The following Sections provide a summary of the key long-term environmental impacts of the proposal.

19.4.1. Traffic

It is estimated that the facility will generate an additional 21 truck movements per day, most of which will be heavy vehicles (B-doubles).

The traffic impact assessment found that the roads leading to and from the site have a good LoS, and that the additional traffic would not change the LoS for the roads and intersections used.

The roads with access to the site (Hawken Street and Maher Rd) service a limited number of properties. The line of sight analysis shows that there is good visibility for heavy vehicles entering and leaving the site. The site access driveway is designed to provide easy turning for large vehicles, with vehicles entering and leaving the site in a forward direction.

19.4.2. Noise and vibration

A noise impact assessment, including monitoring of current noise levels and noise modelling, was conducted for the proposed development. The assessment found that the predicted noise emissions from the site to the surrounding environment are low. The proposed development satisfies the Project Noise Trigger Levels (PNTLs) of the NSW Noise Policy for Industry (NPI) of the NSW Environment Protection Authority during all the time periods, providing the following noise mitigation measures are included:

- 10m high earth bund surround the site
- 2.5m noise fence along the south-east boundary
- Restricting operational hours
- Using best practice noise suppression on equipment.

The results of the point calculations for the modelled neutral atmospheric and southerly wind scenarios are shown in Table 8.12 and Table 8.13. The receivers included in the tables are considered representative of the worst case received noise at each residential area in the vicinity.

Table 19.1. ENM Point Calculation Results (dB(A) L_{eq} (15 min)). Scenario 1 – Neutral.

Location	Scenario 1	Criterion
R1 – Fox Lane	24.2	40
R2 – Hazelgrove Rd	32.6	40
R3 – Albion Street	38.1	45
R4 – Cnr Ross Street & Cunynhame St	35.0	45

Table 19.2. ENM Point Calculation Results (dB(A) L_{eq} (15 min)). Scenario 2 – East South East Wind.

Location	Scenario 2	Criterion
R1 – Fox Lane	28.9	40
R2 – Hazelgrove Rd	33.0	40
R3 – Albion Street	37.4	45
R4 – Cnr Ross Street & Cunynhame St	36.2	45

The results of the point calculations show that, under the assessed atmospheric conditions, the predicted noise levels at all receivers will be in compliance with the relevant noise trigger levels.

The contours show that the worst case predicted noise at the Oberon High School is under the modelled neutral atmospheric conditions (Scenario 1). The worst case predicted noise is approximately 37 dB(A) Leq (15 min).

It is generally accepted that for a broad band noise sources (such as road traffic noise) the attenuation through the façade of a solid masonry building, with windows closed, is approximately 25 dB(A). With the windows open the loss into a room is approximately 10 dB(A) (source: Environmental Noise Management Manual).

As the noise from the Facility will be relatively broad band, it is of similar character to road traffic noise and the above assumptions are considered applicable to the current assessment. This would mean that the worst case received noise inside the rooms in the school which are closest, and most exposed to, the Facility would be approximately 27 dB(A) L_{eq} with windows open, which is in compliance with the adopted noise criterion. With windows closed the internal noise would be approximately 12 dB(A) L_{eq} which would be virtually inaudible in that situation.

At the Jenolan Holiday Park the worst case noise levels will be approximately 40 dB(A) L_{eq} (15 min) which is significantly below the applicable noise criterion for any permanent residents at the site.

The noise contours show that the predicted noise levels at nearby industrial receivers will be less than 70 dB(A) L_{eq} (15 min) which is in compliance with the applicable noise criterion for industrial receivers.

The development will have minimal impact on the noise levels in the area.

19.4.3. Air quality

Assessment of cumulative 24-hour average $PM_{2.5}$ and PM_{10} was conducted in accordance with the NSW EPA Level 1 and Level 2 contemporaneous assessment methods as outlined in the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales*[51] to examine the potential maximum total (cumulative) 24-hour average $PM_{2.5}$ and PM10 impacts for the Project.

[51] NSW EPA (2017) Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales, NSW EPA, January 2017

Table 7.8 provides a summary of the findings from the Level 2 assessment at representative receptor locations for both PM_{10} and $PM_{2.5}$. Detailed tables of the assessment results are provided in AQIA, provided at Appendix M.

The results indicate that the Project does not increase the number of days above the 24-hour average criterion at the assessed receptors.

Table 19.3. NSW EPA contemporaneous assessment - maximum number of additional days above 24-hour average criterion.

Receptor ID	$PM_{2.5}$	PM_{10}
R5	0	0
R20	0	0
R24	0	0
R28	0	0
R30	0	0

Time series plots of the predicted cumulative 24-hour average PM_{10} concentrations for R5 and R20 are presented in Figure 19.1 and Figure 19.2.

The orange bars in the figures represent the contribution from the Project, the blue bars represent the contribution from the modelled existing sources and the purple bars represent the background levels from Bathurst. It is clear from the figures that the Project has a relatively small influence at the receptor locations.

Figure 19.1. Time series plots of predicted cumulative 24-hour average PM_{10} concentrations for R5.

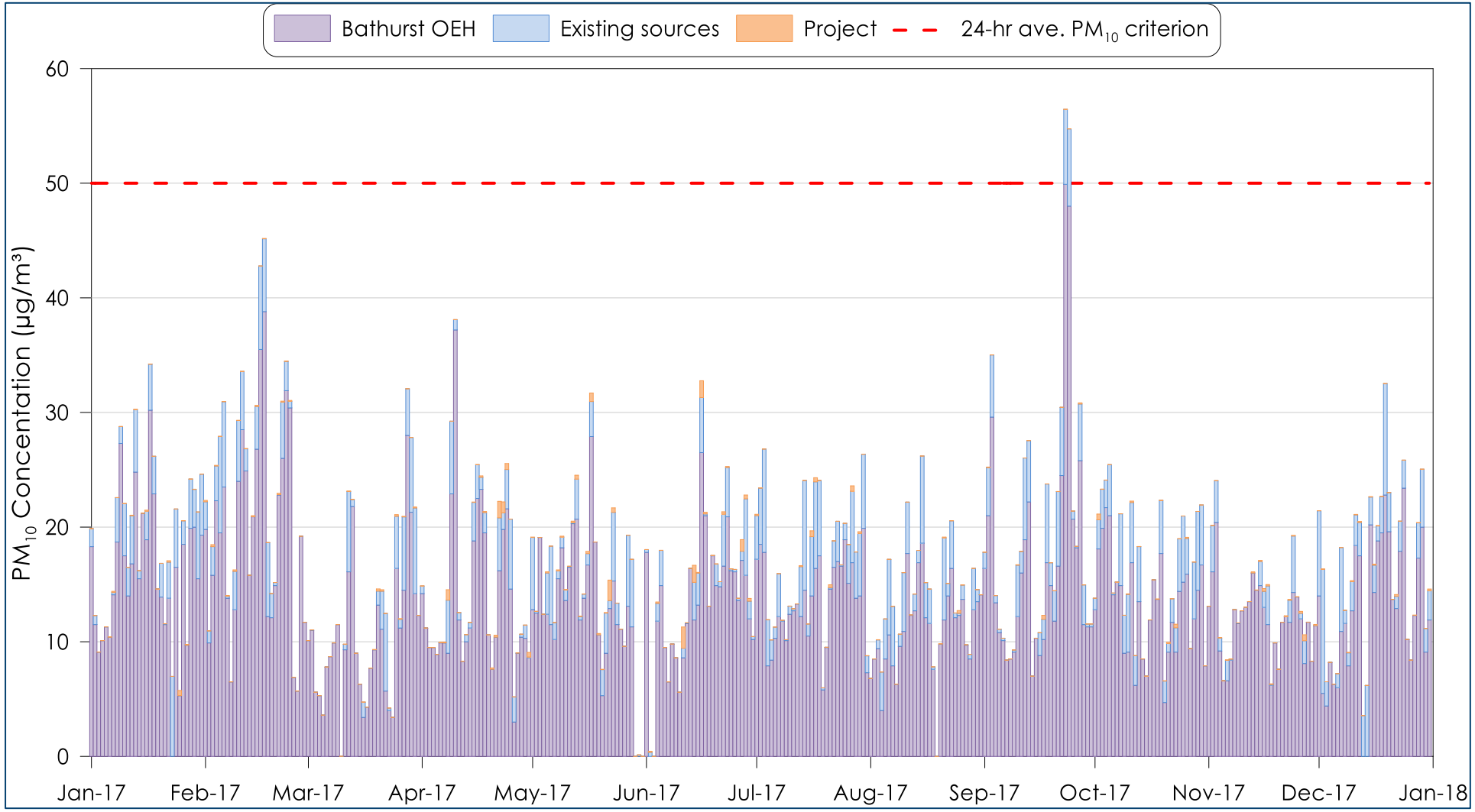
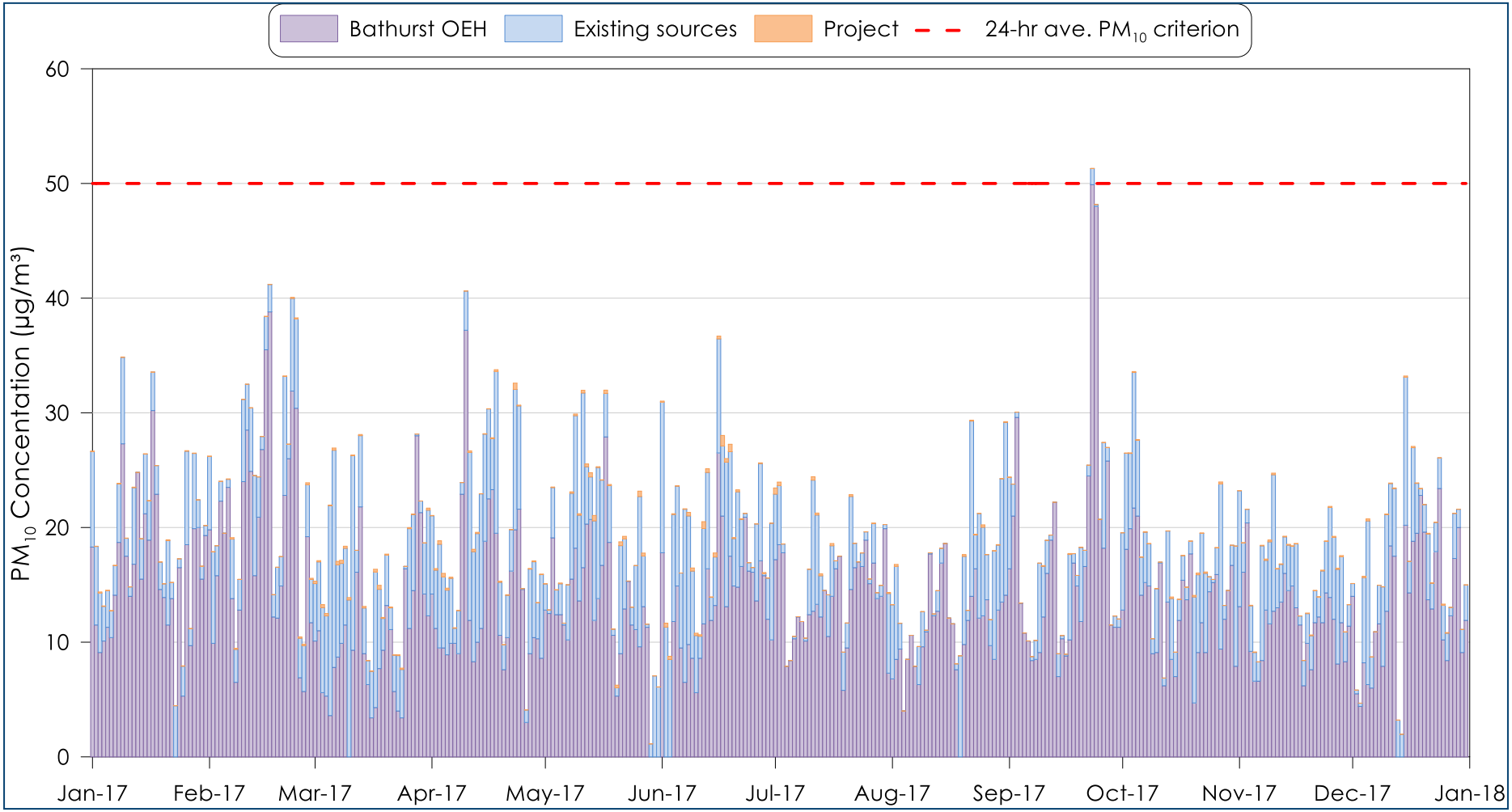


Figure 19.2. Time series plots of predicted cumulative 24-hour average PM_{10} concentrations for R20.



The AQIA assessed the potential air quality impacts associated with the operation of the Borg Plantations bark-timber processing and landscape supplies production facility.

Air dispersion modelling was used to predict the potential for off-site dust impacts in the surrounding area due to the operation the Project. The estimated emissions of dust applied in the modelling are likely to be conservative and would overestimate the actual impacts.

It is predicted that all the assessed air pollutants generated by construction and operation of the Project would comply with the applicable assessment criteria at the sensitive receptors and therefore would not lead to any unacceptable level of environmental harm or impact in the surrounding area.

Nevertheless, the site would apply appropriate dust 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 receivers in the surrounding environment.

19.4.4. Flora and fauna

The site is located in an area that was formerly rural agricultural land. Virtually no native vegetation remains at or near the site. The site is surrounded by industrial sites to the south and west, and grassland to the north and east.

The Biodiversity report determined that the vegetation assemblage within the Subject Site was representative of non- native vegetation. This does not constitute a Threatened Ecological Community (TEC). The proposed works will result in the removal of approximately 6.81 ha of non-native vegetation.

Direct (wholesale) vegetation clearing will occur for the construction of the plant and will occur in consultation with the Project Ecologist and Oberon City Council's Environmental Officer.

No threatened fauna were identified on the Subject Site during field survey, however, flowering and fruit- bearing trees that are proposed for management within the proposed Asset Protection Zone (APZ) have the potential to offer intermittent sheltering and foraging habitat for threatened fauna. Due to the poor condition and lack of suitable habitat within the Subject Property (and surrounding locality) it was determined that the removal of potential habitat is unlikely to significantly impact upon a viable population of any of potentially occurring threatened species.

Owing to the lack of any perceived significant effects upon threatened biodiversity from the proposed development, it is expected that the proposed development can be achieved within minimal environmental impact. The proposed development may progress without further impact assessment.

19.4.5. Soil

Surface cover on the site was predominately bare from vehicular movement and storage of machinery and equipment across the site. The eastern portion of the site comprised pasture grasses with pine trees. The south western section of the site had undergone earthworks including site cut to level the site.

A review of historical aerials indicated minimal changes on-site from 1964 to 2016 with the site being used for grazing of stock. The western portion of the site has been used for storage of machinery and equipment since 2016 and the eastern portion has remained vacant pasture. The machinery and equipment included steel, poly pipe and stockpiles of rubble including brick, timber and chipboard.

A large stockpile was located on the site comprising topsoil and organic material from adjacent sites. The material is reportedly being removed off the site prior to the proposed industrial land-use.

Vegetated stockpiles from an unknown source are located north of the pine trees. The material was sampled and the levels of all analytes were below the adopted thresholds for industrial/commercial land-use (NEPC 1999)[52].

There is no evidence of underground storage tanks, mines, sheep dips or mixing sheds on the site from the review of site history or site walkover.

No staining or odour was observed across the surface of the site.

Asbestos was not detected in any soil sample. One sample of fibrous sheeting was collected from a stockpile of rubble. No asbestos was identified in the sample.

The levels of all metals, pesticides, PCB and hydrocarbons analysed in soil samples collected across the investigation area were below the industrial/commercial land-use thresholds.

The site's operations will occur on impervious hardstand. The operations do not involve regular use of chemicals. This risk of soil contamination resulting from the development is low. The impact is expected to be minimal, and will not impact the surrounding area.

19.4.6. Water Quality

A Water Quality Impact Assessment and Water Quality Plan were prepared for the proposed development.

The proposed development, being best practice, will see concrete hardstand areas created to form a sealed, stable working environment that would protect local groundwater resources. However this sealed working platform would result in an increase in impervious area of approximately 2.64 hectares.

The proposed development includes an office building, sealed storage bays and sealed concrete hardstand areas constructed in trafficked areas and under product blending areas. Raw materials will also be stored on concrete hardstand prior to reprocessing. A detailed description of the proposed development is included in Chapter 2 of this report.

A preliminary grading indicates gentle slopes for the working platform of the proposed operation which would match existing land levels in the west and be approximately 2m to 5m depth above the existing levels on the eastern side of the development. The site generally slopes to the north east. There will be an earth mound for noise and visual mitigation placed around each side of the proposal – broken only in the south where the entry to the site is located.

Guidance for the development of this site is drawn from NSW EPA guidance documents for composting facilities. The site however won't be composting any food or green waste – it will largely be processing or reprocessing raw timber resources into blended landscape products.

In accordance with EPA guidance, groundwater will be protected by compacting site clay soils to stop downward movement of stormwater. The working part of the site will be sealed with a concrete pavement which will also have subsurface drainage so that any seepage water is directed into swales and into a treatment pond. Because the site is raised above existing levels there will be no interception of groundwater and consequently no expected impacts on groundwater. Groundwater, locally, is an important resource for Borgs and other licenced groundwater users.

Currently overland flows would be directed onto the site from the existing Borgs and ANL developments located to the west of Lot 34. These flow paths would be intercepted in a diversion swale which is proposed to run in a

[52] NEPC (1999 revised 2013) *National Environment Protection (Assessment of Site Contamination) Measure 1999* (National Environment Protection Council Service Corporation, Adelaide)

northerly direction along the western boundary of the site (in a 5m wide easement) and is then directed east along the northern boundary (in a proposed 10m wide easement) toward to King's Stockyard Creek.

Some minor run-on flows from the adjacent lots on Maher Drive will be conveyed under the site in a culvert and discharged on the eastern side of the site. At no point will clean run-on water from off the site mix with "dirty" Lot 34 site water.

Where runoff from this site joins Kings Stockyard Creek, 580m downstream of the site, it is a second order Strahler creek with two separate upstream reaches. It has a defined bed and bank and intermittent flow. Though it has not been considered in any water quality modelling of the site, the 580m overland flow path to the creek will provide additional substantial polishing of the flow and assimilation of any exported pollutants.

The existing creek is denuded of riparian vegetation, a highly modified ecosystem, though it is well sealed and stable with a mildly incised bed typical of most rural creeks. Local soils tend to be stable with steep batters possible, i.e. this is a low erosive environment typical of the soils on the Great Dividing Range.

Key sources of stormwater pollution will arise from:

- An increase in impervious areas
- Storage of raw materials and blended landscape products
- Handling and transport of shredded timber and bark including mulch created from recycled timber sources as well as new sources
- Vehicular traffic – truck movements each day

The key stormwater pollutants of concern will be:

- Total suspended Solids (TSS)
- Total Phosphorus (TP) – mostly particulate and correlated with TSS
- Total Nitrogen (TN) – mostly particulate but some dissolved N. Little ammonia produced as gross pollutants will keep captured solids in a dry state. Dissolved N would be in the nitrate and nitrite form. Organic N would be the dominant form of N.

The risk of other toxic pollutants entering the receiving waters will be minimised by best practice such as self-bunded fuel tanks with drip trays and covered refuelling area as well as the ability capture all fire-fighting water on-site within a proposed water quality pond.

Therefore, the key pollutants of concern and potential surface water impacts are from chronic, non-toxic pollutants. Nutrients (nitrogen and phosphorus) are often called nuisance plant growth stimulators, i.e. food/fertiliser for algae. In summary the proposed development would generate, if left unmitigated, non-toxic pollutants which can contribute nutrient loads in catchments leading to an increase in nuisance plant growth (algae). TSS could smother benthic organisms and lead to siltation of receiving waters.

In addition to compliance with EPA Guidelines for Composting Facilities, the proposed mitigation measures include:

Construction of 4 dry gross pollutant traps strategically placed. Dry sump gross pollutant traps (GPTs), in this context are preferable to wet sump GPTs as they avoid nitrification which converts particulate nitrogen into dissolved nitrogen in a wet environment. It is relatively hard to remove dissolved nitrogen and easy to remove particulate nitrogen.

Wherever possible stormwater is conveyed from the GPTs into grassed swales. The swales are good at removing particulates (TSS) including particulate bound nitrogen and phosphorus.

Where it is not possible to treat the stormwater in swales it is treated in a dry GPT first and then directed to a stormwater pond.

Creation of a stormwater treatment pond with a storage volume of 1.5 ML. The pond is to be edged with macrophytes with an open water body in the middle.

The new pond is located downstream of all treatment measures and is the final stage of treatment for most stormwater. 40% of the stormwater however is to be further treated (in a skid mounted state of the art, media filtration process, dosed with chlorine for safety and reused on site). Reuse of the water is maximised by irrigating all landscape mulches to keep them at optimum moisture content to suppress dust as well as irrigating the extensive pervious areas on the site – simply to dispose of as much polluted stormwater as practical on-site and equally without causing a problem by over irrigating. The irrigation will also help to keep the swales in good condition through dry periods.

The total demand for stormwater on the site was estimated to be 9 ML/year. The pond can supply about 77.5% of this demand or 7 ML/annum. This helps to reduce the mean annual volume of runoff (MARV) which will mitigate against the additional impervious area created by the development.

The development will increase the MARV from 6.67 ML/a predevelopment to 17.6 ML and the harvesting helps to mitigate the increased post development MARV by 45%. The post development MARV after harvesting is 9.64 ML.

Stormwater from the proposed pond will be pumped to a filtration system which will include UV and possibly chlorination. The chlorination will assist with reduction of tannins and disinfection.

Once water is discharged from the site onto adjoining rural land, a series of leaky weirs will see the flow spread out wide on the floodplain to remain shallow and to reduce velocities and further settle out any suspended solids and nutrients. Modelling the benefit of the floodplain treatment has not been undertaken.

Emergency spill prevention controls would include water tight penstocks which would prevent spilled material from leaving the site. Based on NSW Fire and Rescue Guidelines which require up to 4 hours of fire-fighting water to be stored it would be necessary to contain 330 m3 of fire-fighting water on site and sufficient freeboard shall be allowed for this purpose. In the 1,000m^2 proposed pond this equates to a depth of 330mm.

A MUSIC water balance and quality model for the site was constructed to assess the potential impacts of the proposed 5 hectare development and to help design appropriate mitigation measures.

Water quality objectives for the Macquarie Bogan Catchment, simply adopt default ANZECC trigger values for upland rivers. The trigger values are to be determined by analysing the median concentration at low flows. Because of the stormwater harvesting proposed, the site has no low flow discharge. In fact 45% of the time its raining, the site has no discharge. Therefore at low flows the median concentrations of TN and TP would be zero with the WQOs achieved. This is a somewhat misleading approach, as it implies that water quality leaving the site would have no detrimental effect. Therefore application of DGVs to an isolated urban development with stormwater harvesting is not appropriate.

In accordance with the ANZECC Guidelines assessment of the impact on the receiving water under the full range of flow conditions must be undertaken. Especially so for urban development where it is understood that very few storms can contribute most of the pollutant load (ANZECC, 2000).

Licence conditions for similar composting facilities, at Oberon and elsewhere, include an EPL limit of 50 mg/L for TSS.

Predicted maximum concentration values for TSS are predicted to be less than 31 mg/L while the 90th percentile TSS concentration would be in the order of 13 mg/L which for any industrial development would be considered an excellent outcome.

The proposed development is therefore likely to meet an EPL limit at the 100th percentile for TSS of 50 mg/L.

Total Suspended solids and Total Phosphorus loads are predicted to decline as a result of the proposal and if anything, this would be beneficial for receiving waters.

The proposal will see an increase in the level of TN discharged from the site with an additional 13 kg discharged from the site. The predevelopment level of 12kg/annum would therefore increase to about 25 kg/annum after development.

TN is not a toxicant and its effects, in this context, would be load based – i.e. on a reservoir or water storage but not on the flowing creeks or rivers in between. The proposed development is located 5 km upstream of the Fish River which has a catchment area of approximately 9,000 hectares. Using typical rural EMC values for TN, the TN load in the Fish River would be in the order of 21,960 kg/annum of TN. An addition of 12 to 13 kg which equates to about 0.05% of the annual load, would, with a high degree of certainty, have no detectable impact.

We conclude that the proposal would be highly unlikely to impact on ambient water quality in the Fish River or Macquarie Bogan catchments.

King's Stockyard Creek is a highly disturbed ecosystem. Flows in King's Stockyard Creek upstream of the proposed development would help dilute site discharge concentrations and reduce them.

Given the level of treatment proposed and the surrounding industrial context it is concluded that it is highly unlikely that the proposed development would result in a decline in the presence of aquatic organisms locally, i.e. cause pollution (defined as a change in ecological stressors) within Kings Stockyard Creek prior to its confluence with the Fish River.

The site is located at an elevation of 1100m above sea level in the headwaters of the Macquarie catchment. The proposed development will not have any floodplain or flooding impacts either upstream or downstream.

A site as large as this would require management of construction phase water quality within a dedicated sediment basin and preparation of soil and water management plan for the site is essential.

It is therefore recommended that the proposed permanent water quality pond be constructed prior to site stripping and used as a temporary sediment basin during construction and converted to a permanent water quality pond only once the site has been effectively sealed.

In conclusion the proposed stormwater treatment and harvesting and reuse scheme will see the impacts of the proposed development reduced to levels which will see it comply with an EPL licence limit for TSS of 50 mg/L. The proposal will see about 7ML/year of stormwater harvested and treated on-site and used for keeping the landscape products moist, for dust suppression and for irrigating up to 1.78 Ha of selected landscaped areas.

The proposal, if approved, with the proposed mitigation measures, would have minimal impact on the geomorphology of Kings Stockyard Creek, no discernible impact on aquatic health of King's Stockyard Creek and meet its likely EPL condition for TSS through best practice on site management of its stormwater. The proposal will not impact on ambient water quality within the Macquarie Bogan or Fish River catchments.

19.4.7. Fire

The stockpiling of flammable material, such as bark and waste wood, on the site has the potential to increase fire risk in the area. A Bushfire Risk Assessment was completed for the development.

The waste wood and shredded wood products will be stored in concrete bunkers, with a maximum stockpile height of 3m.

The access ring road inside the site, used for normal operations, provides access to the front the all stockpiles. In addition, an access road will be constructed around the outside of the operations, running along the back of the storage bunkers, to provide additional access to the stored flammable material, in the event of a fire.

The site will be surrounded on three sides by a 10m earth mound, which should further contain any fires on the site. A drainage area will be maintained along each of the boundaries, separating the earth mound from surrounding grassland.

A fire hydrant will be designed and installed as part of the development, for fighting any on-site fires. In addition, water from the stormwater capture pond can be used to assist in fighting fires.

Overall, the development presents a low fire risk to the surrounding environment.

19.4.8. Heritage

A desktop review of available data on heritage items in the area found none within 500m of the proposed development site. The development will have no impact on heritage values in the area.

19.4.9. Visual impact

A visual assessment was undertaken of the site and proposed development. The site is visible, at a distance, from a number of potentially sensitive uses.

The existing landscape character is a mix of industrial development, rural properties and bushland ridgelines and corridors. The scale of the built form in the proposal is small compared to existing industrial developments adjoining, mainly the Borgs Panel site, which dominates views from the surrounding area.

The recommended design principles outlined in the VIA seek to avoid, reduce and where possible, remedy adverse effects on the environment arising from the proposed development. The proposed mitigation measures will reduce any visual impacts of the development. These include:

- The built form of the proposed buildings (site office and workshop) are of a minor scale to the surrounding industrial buildings, and is unlikely to be visible external to the site.
- Building materials selected will reduce colour contrast and blend any new and existing structures, as far as possible, into the surrounding landscape.
- Retention of existing trees within the Site to assist in fragmenting views of the proposed development.
- Extension of existing earth mound around the perimeter of the site will limit views and screen material bunkers and plant machinery.
- Vegetation screening incorporating species that integrate with existing landscape character.

The proposed development will have minimal adverse impact on the visual ascetic of the area.

19.5. Infrastructure requirements flowing from the proposal

No additional infrastructure is required to support the development.

19.6. Conclusion

Overall, the cumulative impact of the proposed development is expected to be minimal. The potential for adverse impacts will be mitigated by a range of measures, as listed in Chapter 18.

Appendix A – Secretary's Environmental Assessment Requirements (SEAR 1238)

Appendix B – Site plans

Appendix C – Capital Investment Valuation

Appendix D – Consultation report and responses

Appendix E – Waste Management Plan

Appendix F – Traffic Impact Assessment

Appendix G – Noise Assessment

Appendix H – Fire Risk Assessment

Appendix I – Water Quality Impact Assessment

Appendix J – Air Quality Impact Assessment

Appendix K – Flora and Fauna Assessment

Appendix L – Pollution Incident Response Management Plan

Appendix M – Contamination Investigation Report

Appendix N – Visual Impact Assessment Report