

2016-2017

Annual Environmental Management Report



Lot 3 DP 218194

Widemere Road

Wetherill Park

DA 21-1-2002i

MOD 126-8-2005-i

Boral Recycling Pty Ltd

Widemere Recycling

2016-2017

**Submission of Annual Environmental
Management Report (AEMR)**

AEMR Prepared By

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In respect of:

DA-21-1-2002-I & MOD-126-8-2005-i

Operating Period: **21st February 2016 – 20th February 207**

Operator Name: Boral Recycling Pty Ltd

Facility Address: Lot 3 DP 218194
38 Widemere Road
Wetherill Park NSW

Postal Address: PO Box 42
South Wentworthville NSW 2145

Facilities Operations: Construction Materials Recycling Facility

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1. Introduction

Project Description

The Boral Widemere Recycling project is located along Widemere Road, Wetherill Park. The project operates a construction materials recycling facility and produces a range of products including recycled road bases, aggregates and sands.

On 25th November 2002, Planning NSW granted development consent to the Construction and Demolition Materials Recycling Facility DA-21-1-2002-I. This was subsequently constructed and Boral Recycling (NSW) Pty Ltd commenced its recycling operations on the 7th July 2003.

On the 17th November 2005 the sites development consent was modified (MOD-126-8-2005-I) to increase the capacity of the facility, alter operating hours and gain approval to install a blending plant by the NSW Department of Planning. The blending plant was installed in early 2008.

On the 25th November 2016, a new development consent (SSD 6525) was issued by the NSW Department of Planning and Environment. This consent increased the capacity of the facility to receive or process up to 1,000,000 tonnes of waste.

Purpose/Scope

This report has been prepared to address Annual Environmental Management Report (AEMR) requirements as per Schedule 2, condition 7.4 and 7.5 of Development Consent DA-21-1-2002-1 & MOD-126-8-2005-I. It is noted that development consent DA-21-1-2002-1 & MOD-126-8-2005-I, have been superseded by development consent SSD 6525. This will be the last AEMR prepared in association with DA-21-1-2002-1 & MOD-126-8-2005-I. This report accounts for the period between 21st of February 2016 and 20th February 2017.

This report does not detail performance against SSD 6525.

2. Performance against Operation Management Plan

To evaluate the facilities operations during the reporting period, the Operations Environmental Management Plan (OEMP) has been reviewed against environmental monitoring results and processes performed on site.

2.1 Materials Management

All materials are checked and their origin verified prior to receipt on site as per the following checks;

- Communicating the Boral recycling inspection and receipts protocol to demolishers and contractors prior to entering site.
- Undertaking independent checks on material origin prior to receipt on site. This includes ensuring compliance in relation to material separation and handling.
- Verification of source materials by obtaining appropriate clearance certificates (e.g. site clearance audits, asbestos clearance) where required.
- Monitoring and tracking of materials received on site by
 - Truck registration; Company name; Driver signature; Material origin and Load weight
- Visual inspection of loads (weighbridge & receipts area)
- Rejecting and recording unsatisfactory loads

A separate procedure for the receipt and screening of waste for recycling has been prepared for the site. The current version is within the sites OEMP

2.2 Dust Control

Fugitive dust control on site has been an area of emphasis since the commencement of operations. Sources of dust include the crushing facility, stockpiles, vehicular movement on unsealed roads and product transfer.

Existing Dust Controls

A number of existing controls are in place throughout the facility. The current dust controls used on site include:

- Watering all roads within the facility with a water cart. Water cart is equipped with a cannon which provides reach up stockpiles and power to wash and scrub hard surfaces.
- Use of water sprays and sprinklers on stockpiles, receipts area, sales area, and on fixed plant.

- Ceasing or reducing dust generating activities when potential for dust to leave the site e.g. high winds.
- Wheel washing facilities (x 2), equipped with cattle grids, at raw materials exit (bottom wheel wash) and product sales exit (top wheel wash).
- Sealed internal roads from wheel wash to exit
- Primary feed bin sprays installed and operated manually.
- Increase of sealed internal roads and repairing damaged roads (this is an ongoing process with the site undertaking works when a load of over ordered or out of RMS specification hot mix asphalt is delivered to site).
- Operational cameras installed around the site with video monitoring within the operations managers office
- Impact crusher has been enclosed with a vacuum in place transferring dust to a waste bin.
- Water Tank at receivals area to provide giving an independent water source to ensure adequate supply & coverage at all times.
- New recycled water tanks installed on site to assist with site water management capacity and dust suppression.
- The regular use of a street sweeper on the site and also along sections of Reconciliation Drive

Photos of controls in place are available on the subsequent pages of this document.

Future Proposals

Further controls are proposed to continue dust management control. These include the following:

- Sealing the southern haul road with asphalt/concrete to reduce fugitive emissions.
- Planting of extra trees around the site to assist in preventing wind-blown dust from leaving site.
- As part of the sites continual improvement program the site will monitor the current control methods and where necessary update and modify existing controls.



Photo 1- water cart for internal roads & stockpile suppression



Photo 3- Bottom Wheel Wash



Photo 2- Water cart is equipped with a water cannon



Photo 4- Top Wheel Wash



Photo 5- New sprinkler on plant



Photo 7- Water Tank for Receivals Area



Photo 6- Water Sprinkler in Receivals Area



Photo 8- Water Sprays on plant



Photo 9 - New sprinklers set up on western side of sales yard



Photo 11 – New Water Tanks

2.3 Stormwater Management

The sedimentation basins installed in the south eastern corner of the site are designed to capture dry and wet weather flows. Markers have been installed to ensure that the capacities of the basins are maintained for a 90th percentile 5-day rainfall event.

Four (4) discharges have occurred over the reporting period (Storm water detention basins are maintained to contain a 90th percentile rain event over 5 days). Water captured in the detention basins is reused on site for dust suppression or for use in the blending plant. As required, this captured water is treated with flocculent and acid before reuse on site. The overflow pond is always maintained at levels acceptable for discharge.

Recent Improvements

- Sediment basins were dredged in February 2017 to ensure capacity maintained.
- Meteorological station installed to ensure accurate data capture for the facility.
- Additional recycled water storage tanks installed on site to assist with water management capacity
- Flow meters installed throughout site to accurately track recycled water use.



Photo 12 – Meteorological Station

2.4 Noise Controls

Best practice techniques are used to minimise unnecessary noise on site. Site and equipment noise monitoring was conducted by Richard Heggies and Associates (RHA) in November 2004 as part of a compliance and modelling program for a Section 96 application and accompanying Statement of Environmental Effects to vary operating hours and processing volumes.

The results of the original compliance monitoring conducted in September 2003 are contained within the Operational Noise Management Plan prepared by RHA dated 28th January 2004.

As per condition 4.2A the site was to undertake a program to confirm the noise emission performance of the facility within 90 days of the commencement of extended operating hours. This monitoring was undertaken on 8 March 2006 by Heggies Australia.

Further noise modelling was undertaken and measured by EMM from 2nd to 15th May 2014 as part of the 2015 consent modification for increased capacity of the facility. Based on the modelling results, the noise emissions from the proposed modification would satisfy the PSNLs at all assessment locations. Refer to **Appendix 2** for the noise modelling assessment.

2.5 Visual Controls

The OEMP covers the maintenance of bund walls, tree plantings and minimising visual dust. All of these have been managed over the last year.

The facility does not allow any stockpiles on site to get above 20m not only because of visual impacts, but due to safety concerns.

The site continues to assess visibility from Reconciliation Rd, assess feasibility to plant extra trees and introduce more species of the Sydney Coastal River Flat Forest variety in around the surrounds of the site.

Due to the changes to the prospect reservoir bike track and development of Reconciliation Drive past the Recycling site entrance a small section of the site has become visible to passersby. The site previously planted a screen of trees to assist in maintaining a visual amenity. Weed control and regular plantings will be ongoing to ensure that this tree screen remains effective.

Future Proposals

- *The site will continue to investigate other ongoing future planting and ongoing weed control.*

2.6 Traffic

The OEMP covers internal traffic management and the loading and unloading of materials restricted to property boundary. This is managed well with a traffic management plan which has separate internal routes for deliveries and sales. Additionally there is a Transport Code of Conduct for which identifies routes used by vehicles entering and exiting the site, as well as expected driver behavior.

A copy of the Code of Conduct can be found in **Appendix 5**.

2.7 Site Security

All fencing around the site is maintained to restrict unauthorised access to the site as per the OEMP. A security contractor performs random patrols on the property and the facilities include back to base monitoring.

The site has also in operation surveillance cameras around the processing plant, picking huts, weighbridge, carparks and site stockpiling areas.

2.8 Refuelling

Refueling of machinery and vehicles used on site is carried out as per OEMP. Absorbent materials are available to soak up minor spills. The site contains a 12,500L bunded diesel tank with bowser, and a 9,500L double skinned above ground diesel tank. The 12,500L diesel tank and associated bunding is connected to Eclipse Oil/Water Separator which is service by Eclipse six monthly. Integrity of the 9,500L double skinned tank is inspected regularly.

There were no major incidents relating to the diesel tank or refueling area during the reporting period.

Recent Improvements

- *Roof installed over above ground diesel tank and bund.*
- *Rollover bund installed at diesel tank.*
- *Workshop entrance bunding installed.*



Photo 13 - Diesel Tank with roof and rollover bund



Photo 14- Workshop entrance bunding

2.9 Waste Disposal and Sewage Management

Solid waste management includes; non-recyclable raw materials, recyclable steel reinforcing materials, domestic garbage and spill material (if a spill was to occur). All these materials are disposed of to licensed waste facilities. Less than 0.5% by weight of all material received are disposed of at landfill.

The sewage management on site is controlled by a Econocycle unit which is inspected and maintained routinely by a qualified contractor. Treated water from the system is used as non-potable water around the site to irrigate tree and shrub plantings. Refer to Appendix 1 for service records.

2.10 Monitoring Requirements

2.10.1 Noise

Noise levels were measured by Heggies Australia in March 2006 to confirm the operations comply with the limits listed in **Table 1** below.

Table 1: Noise limits on site operations as per DA.

Receiver Location	Noise Limit	Munro Street, Greystanes	Southern Greystanes Estate Residential Lands
Morning Shoulder 6am – 7am Mon-Sat	LAeq (15min)	38	42
	LAeq (morning shoulder)	NA	40
	LA1 (1 minute)	52	54
Day 7am – 6pm M-F 8am-6pm Sat	LAeq (15min)	40	41
	LA eq (day)	NA	41
Evening 6pm-10pm	LAeq (15min)	44	44
	LAeq (evening)	40	40
Night 10pm-6am Mon-Sat 10pm-8am Sun & Pub Hol.	LAeq (15min)	35	40
	LAeq(night)	NA	40
	LA1(1 minute)	52	54

Table 1: Noise limits on site operations as per DA

Additional Noise modeling was conducted by EMM from 2nd to 15th May 2014 to confirm the operations comply with the limits (and as part of the 2015 consent modification). Refer to **Appendix 2**.

Further, noise monitoring will be undertaken during 2017 as part of the development of the Noise Management Plan.

2.10.2 Surface Water Quality

During the reporting period there were four (4) controlled discharges of water off site. Storm water is harvested and re-used for dust suppression and/or used in the blending plant. When required, waters in the detention basin are acid dosed and flocked prior to any controlled discharge.

All discharges to Prospect Creek were recorded in the EPA annual return submitted to the EPA. Further detail is provided in section 5.3 of this report.

During the reporting period, post the four controlled discharge events, approval to undertake controlled discharges under EPL 11815 was temporarily removed by the EPA in order to undertake further investigations into the sites

detention water quality. In turn, Boral agreed to the inclusion of the following Pollution Reduction Programs on their EPL which are due by the end of April 2017.

- Surface Water Characterisation Assessment (as per EPL 11815 PRP U1.2-U1.4).
- Surface Water Monitoring and Mitigation Plan (as per EPL 11815 PRP U1.5 – U1.9).

2.10.4 Complaints Register

An environmental complaints template is available on site, however all hazards or incidents are recorded into Boral's Safety Incident Management System (SIMS) reporting system, steps in handling complaints are discussed in Section 4. See **Appendix 4** for Complaints Register Template. One (1) complaint was received during this reporting period and is addressed in Section 4

2.11 Other Management Plans

The OEMP as per the DA consent conditions is to include a Noise Management Plan, Waste Screening Management Protocol, Dust Management Plan, Water Management Plan and a Landscape Management Plan. This is due for review every three years, with the last review completed in April 2016.

2.11.1 Noise Management Plan

The Operational Noise Management Plan for the site was prepared by Richard Heggies & Associates in January 2004. The Plan included operator attended and unattended noise monitoring to ensure compliance with conditions of consent.

The Plan covers Development Consent Conditions, Operational Noise Emission Criteria, Plant and Equipment, Hours of Operation, Operational Noise Mitigation Measures, Community Information and Complaints Handling, Noise Compliance Monitoring procedures, and Contingency Measures and Reactive Management Strategy.

2.11.2 Procedure for the Receiving and Screening of Waste for Recycling

This procedure outlines in detail, more than the section in OEMP, the procedure for the receiving and screening of waste for recycling. The procedure includes: Actions and Responsibilities, Screening Procedures, Procedures for handling suspected/confirmed asbestos products, Training and Document review.

Recent changes to State Government Legislation now require recyclers of waste (which affects this site) to test products produced for a range of substances and materials. The site is complying with this requirement. Refer to **Appendix 6** 'General Exemption – The recovered aggregate order 2014'.

2.11.3 Storm water Management Plan

The main water management issues associated with the activities carried out on site are:

- Sediment from stockpiles and open areas being transported from the site in uncontrolled storm water; and
- pH increase in storm water following percolation through concrete stockpiles.

The site is well protected by the storm water detention basins and these are managed as per the sites OEMP.

During the reporting period, post the four controlled discharge events, approval to undertake controlled discharges under EPL 11815 was temporarily removed by the EPA in order to undertake further investigations into the sites detention water quality. In turn, Boral agreed to the inclusion of the following Pollution Reduction Programs on their EPL which are due by the end of April 2017.

- Surface Water Characterisation Assessment (as per EPL 11815 PRP U1.2-U1.4).
- Surface Water Monitoring and Mitigation Plan (as per EPL 11815 PRP U1.5 – U1.9).

2.11.4 Landscape Management Plan

The main landscape management issues associated with the site are:

- Removal from the site of all noxious weeds as listed under the NSW Noxious Weeds Act 1993;
- Protection of existing vegetation at the southern end of the site;
- Timely re-establishment of landscaping as areas are completed; and
- Ongoing maintenance of landscaped areas.

Contractors have continued weed removal and bush regeneration.

3. Compliance with Conditions of Consent

Table 2 summarises all the conditions of consent, indicates compliance (if relevant) and provides comments if required. Where applicable, the conditions were considered for the reporting period of this AEMR.

Table 2: Compliance with Conditions of Consent. Boral Recycling Pty Ltd – Construction and Demolition Materials Recycling Facility, Widemere Road, Wetherill Park. DA - 21-1-2002-I & MOD-126-8-2005-i

Condition No.	Condition Summary	Complied with Y/N	Comments
1. General			
Obligation to Minimise Harm to the Environment.			
1.1	Implement all practical measures to minimise harm to the environment from construction and operation of site.	Y	On-going implementation of water management, dust management, noise management, hydrocarbon management practices.
Scope of Development			
1.2	Carryout development in accordance with documents outlined in DA-21-1-2002-I	Y	Operations carried out generally in accordance with the documents listed.
1.3	Processing capacity of the recycling facility shall be limited to 750 000tpa, comprising of no more than 600 000tpa of permitted waste.* *Development Consent SSD 6525 became active 26/11/16 and supersedes this condition.	Y	Production tonnes: <ul style="list-style-type: none"> Under DA-21-1-2002-I March 2016 to November 2016 = 507,372t Under SSD 6525 December 2016 to February 2017 = 128,756t
Provision of Documents			
1.4	Documents to be supplied to director general in electronic format e.g. pdf.	Y	Copy of AEMR is submitted in pdf format.
Statutory Requirements			
1.5	Ensure all necessary licences and permits and approvals obtained and kept up to date.	Y	Site keeps up to date copies of Licences, DC's and Permits in EPL folder & also soft copy in EPP evidence folder.
Compliance			
1.6	..ensure employees, contractors and sub-contractors aware of and comply with conditions of consent	Y	Site Inductions - Relevant elements of Development consent referenced in site inductions i.e Hours of Operations, production limits, Noise restrictions etc. It also states the environmental responsibilities of employees, contractors & visitors. SWMS, SOP's, Toolbox - Relevant elements of DC referenced i.e Water Management procedures, dust suppression etc.

Condition No.	Condition Summary	Complied with Y/N	Comments
			Site SOC is posted on the weighbridge noticeboard for further information.
1.7	Boral recycling are responsible for environmental impacts resulting from actions of all persons on site.	Y	Noted. Environmental impacts managed by site through Environmental Management System (EMS), Operational Environmental Management Plan (OEMP), Site Inductions, Enviromental Planning, Preferred suppliers, Incident reporting (Workers, Contractors & Visitors)
1.8	Prior to construction...	NA	Now operational
1.9	Prior to commencement of operation of recycling facility, certify in writing that all appropriate consents have been complied with.	NA	No longer applicable.
1.10	Director-General may require update on compliance with all or any part of consents	NA	Noted
1.11	Applicant shall meet requirements of D-G in respect of the implementation of any measure necessary to ensure compliance with the conditions of this consent.	Y	Noted
Dispute Resolution			
1.12	In event of a dispute between applicant and Council or a public utility in relation to requirements under this consent can be referred to by either party to the D-G.	NA	Noted. None to Date
2. Construction Certification			
2.1	Notification of construction and occupation prior to commencement of works a-e.	NA	No longer applicable
2.2	Information to be supplied to Principle Certifying Authority to determine compliance with Building Code of Australia.	NA	No longer applicable
3. Environmental Performance			
Noise Impacts			
3.1	Construction Activities 7am-6pm M-F 7am-4pm Sat	Y	Construction completed in 2003.
3.2	Operation Activities (plant) 6am-10pm M-F 6am-4pm Sat	Y	Hours of operation measured by QRS (Plant start & finish times). Site has in place a tracking register for hours of operations to ensure compliance.

Condition No.	Condition Summary	Complied with Y/N	Comments
	No operation Sunday or Public Holidays		Maintenance Planning & Rosters in place. Site induction includes hours of operations.
3.3	Ancillary Operations e.g. sales, Receivals, maintenance 6am Monday to Midnight Friday (inclusive) 6am-4pm Sat No activity on Sunday or Public Holidays	Y	Hours of operation measured by QRS (Plant start & finish times). Site has in place a tracking register for hours of operations to ensure compliance. Maintenance Planning & Rosters in place. Site induction includes ancillary hours of operations.
3.4	Maintain recycling facility to ensure compliance with noise limits in Table 1.	Y	The site meets project specific noise criteria levels (PSNLs) set in the 2005 D.C modification (Table 14 Noise Impact Assessment, July 2005). Noise impact assessment conducted in April 2015 suggested that the noise emissions from the proposed modification would satisfy the PSNLs at all assessment locations.
3.5	Noise measurements at nearest affected residents.	Y	Noise monitoring conducted at: -Munro Street, Greystanes -Southern Greystanes Estate -Residential Lands
3.6	Alternative noise assessment method	NA	Noted
Air Quality Impacts – Dust Emissions			
3.7	...design, construct, operate and maintain recycling facility in a manner that minimises dust emissions from the site	Y	Dust suppression (plant sprays, water cart, stockpile sprinklers, wheel wash). Weekly environmental checklist completed. Bund walls & vegetation screens in place to prevent dust emissions leaving site. Plant (Fixed & Mobile) & activities cease if potential for dust to leave site.
3.8	During construction and operation implement dust minimisation methods...	NA	
3.9	Vehicles entering or leaving the site carrying a load are to be covered if practical.	Y	Site signage for tarping requirements, weighbridge operators monitor compliance. Truck tarping requirements are included in site induction.
3.10	Undertake air monitoring at locations determined in consultation with EPA.	Y	The site conducts continuous ambient air monitoring at EPL Point # 1 (Site 2) & also another non-licenced monitor at site 3. Dust monitors are collected monthly and sent to Boral Material Technical Services (BMTS) lab for analysis.
Water Quality Impacts			
3.11	...Section 120 of POEO Act (Pollution of waters) to be complied with, except as per EPA Lic.	Y	Discharges of waters during the year were compliant with discharge criteria.

Condition No.	Condition Summary	Complied with Y/N	Comments
3.12	Maintain facility to provide maximum allowable discharge limits to water as listed in Table 2.	Y	Discharges of waters during the year were compliant with discharge criteria. Further, the site accepted an applicable Pollution Reduction Program from the EPA to investigate and address the areas of concern. A surface water characterisation assessment begun during this reporting period.
3.13	...Turbidity and TSS to waters only permitted when rainfall exceeds a total of 45mm in 5 consecutive days.	Y	Discharges of waters during the year were compliant with discharge criteria.
3.14	Discharge limit 100 000 L/day.	Y	Flow rate monitored and limit adhered to. Water management procedure in place, depth indicator pole installed, 'Environmental Checklist' completed daily etc.
3.15	Water monitoring to be undertaken during discharge.	Y	Monitoring completed as required. Cessation of discharges since November 2016 issued through PRP by EPA.
Erosion and Sediment Control			
3.16	Soil and vegetation disturbed stored in a manner that cannot be washed off site.	Y	No vegetation or soil removed from site
3.17	All vehicles exiting the site, having had access to unpaved areas, shall depart via a wheel wash facility.	Y	All vehicles exiting site pass through one of the 2 wheelwash stations. Demonstrated in Traffic Management Plan. Signage around the site directs trucks to the wheelwash.
3.18	Erosion controls during construction duration.	Y	Site has catch drains, berms/windrows, sedimentation ponds & revegetation works in place. Sediment is removed from the detention ponds.
Site Drainage and Stormwater			
3.19	Direct all water to the sites detention basins.	Y	All stormwater runoff flows to the first stormwater detention basin and second stormwater basin. Features in place to ensure this include; barriers/bunds along the western boundary, bund wall & drains along southern end (flows into pipes then to the top dam), front entry- any run off flows through a grated drain to top dam.
3.20	Maintain detention basins to 45mm storm.	Y	Depth gauge in place to provide visual compliance. Water is pumped from lower basin & used for dust suppression to assist in meeting the 45mm requirement. Daily dam inspection checklist in place daily. Additional recycled water tanks are in place to assist with capacity. Detention basins were desilted in February 2017.
3.21	Only water from secondary detention basin is permitted to be	Y	Water pumped from secondary stormwater detention basin for use onsite

Condition No.	Condition Summary	Complied with Y/N	Comments
	applied to land and stockpiles on site. Spray from its application must not drift beyond boundary.		(sprinklers & water cart). It is first pumped to a poly tank (direct use for water cart) and then pumped around site for dust suppression (sprinklers & fixed plant sprays). Perimeter Tree linings, Bund walls, Limited sprinkler capacities prevent drift beyond the boundary of the area
3.22	Free board marker to be maintained in sediment basins for 45 mm rain event.	Y	Visible marker installed in sediment retention basin # 1 & # 2.
Traffic and Transport Impacts			
3.23	Provision for at least 15 car spaces on site.	Y	>15 car spaces
3.24	Disabled, visitor and service vehicle parking must clearly be sign posted.	Y	Signage in place.
3.25	Vehicles associated with recycling facility may not stand or park on any public road or footpath adjacent to site.	Y	Signage in place on road to stop parking.
Access and Internal Road works			
3.26	...can not prevent construction and operation of future N-S Spine road and bus transit way.	Y	Noted
3.27	..maintain site access road to enable future connection of site access road to N-S spine road.	Y	Noted
3.28	Road verges at intersection of site access road and existing quarry access road to be cleared and profiled for driver safety.	Y	Noted. No obstructions.
3.29	Should access be significantly changed due to N-S spine road, Boral required to undertake clearing etc as with 3.28	N\A	
3.30	Vehicles entering and exiting site shall only use the traffic routes specified in EIS.	Y	Traffic routes are in line with EIS requirements. The site Traffic Code Of Conduct references traffic routes. Access now from Reconciliation Rd (Left & Right turn).
3.31	Traffic route specific in 3.30 can be varied with prior written approval of the D-G.	N\A	Noted
3.31A	Prepare and implement a Transport Code of Conduct before commencement of extended hours of operation.	Y	See Appendix 5 .
Waste Management			

Condition No.	Condition Summary	Complied with Y/N	Comments
Impacts			
3.32	No waste etc. can be received on site except permitted by a licence under the POEO Act 1997.	Y	As per EPL condition L4.1. Inspection & Receivals protocol in place. Initial screening at the weighbridge viewing stand as well as registers obtained of source, organisation & vehicle. Secondary inspection at receivals once material tipped. Material reloaded to truck if rejected. Rejected load procedure & register in place for non-permitted wastes. Waste sorting with bins containing contamination (i.e. wood & plastic) removed during the processing of materials. <0.5% required to go to licenced landfill. OEMP manages compliance
3.33	Only permitted waste can be received on site: inert waste, restricted waste only 20% of stockpiles on site (VENM, timber, metal, plastic, glass, paper and cardboard, tree cuttings and tree trunks) when mixed with inert waste.	Y	EPA Licence requirements (permitted waste)- As per EPL condition L4.1 Inspection & Receivals protocol in place. Rejected load procedure & register in place for non-permitted wastes.
3.34	All unloading and loading of materials to be carried out wholly within the site.	Y	All loading and unloading of material occurred wholly within the site. Unloading occurs at receivals identified in the drawing SEK250-C-002 Rev A. Traffic Management Plan also displays this information.
3.35	All waste received on site including timber, metal, glass, plastic, paper and cardboard shall be recycled.	Y	Materials brought to site are recycled as the nature of the business. Bi-products from processing the C&D waste are either recycled or sent to land fill depending on the waste. Steel & Copper are sent to licenced recycling facilities. Timber & plastic is sent to licenced landfills. All wastes exported from site are tracked through the EPA's WARRP reporting system.
3.36	Biocycle unit to be inspected 3 monthly, details of maintenance work to be documented and included in AEMR.	Y	Serviced by qualified contractor on a routine basis. Service records provided in AEMR.
Hazards and Risk Impacts Bunding and Spill Management			
3.37	Store and handle diesel in accordance with AS, min 110% capacity, EPA guidelines.	Y	Diesel Tank # 1 - Above ground bunded diesel tank. Can contain >110% of the diesel tank, & contains appropriate signage. Further, a roof was installed over above ground diesel tank and bund; a rollover bund installed at diesel tank and the workshop is now bunded.

Condition No.	Condition Summary	Complied with Y/N	Comments
Soil Management			
3.38	Prior to commencement of construction, written evidence that site has been remediated.	NA	No longer applicable
Flora and Fauna			
3.39	Vegetation stand located at Southern end of site to be retained. Details of protection and maintenance shall be implemented in the Landscape Management Plan. (Vegetation forms part of the Sydney Coastal River Flat Forest listed in schedule 3 of the Threatened Species Conservation Act 1995).	Y	1.5m - 2m high bund wall at southern end of site. Bund wall in place to protect vegetation.
3.40	Noxious weeds to be removed from site. Details of weed management to be included in Landscape Management Plan.	Y	Contractor identifies & treats noxious weeds on site as per Landscape Management Plan. Skyline Contractors have been engaged and have been on site twice in 2016 (quarterly contract).
3.41	Landscaping along eastern boundary once transit way completed	Y	Native Tree Species planted along eastern fence line adjacent to Transitway. Casuarinas mostly cover the eastern boundary (between the dams & road). Casuarinas form part of the Sydney Coastal River Flat Forest.
Visual Amenity Impacts			
3.42	External lighting associated with site to comply with AS 4282.	Y	All lighting does is not directed in any manner to cause nuisance to surround properties or roadways. There have been no complaints in regard to light spoil. Lights are installed by licenced electricians EAM Work Orders, Light Monitoring Inspections & maintenance.
3.43	Stockpiles of permitted waste and recycled product not to exceed 20m above ground level.	Y	Aerial flyovers indicate that stockpile heights are at a maximum of 18m compared to the RL's. Stockpile heights are tracked through GPS measurements
Heritage Impacts			
3.44	Indigenous relics uncovered during construction.....	NA	Construction completed
3.45	Non-indigenous relics uncovered during construction.....	NA	Construction Completed
4. Environmental Monitoring and Auditing			
General Monitoring Requirements			
4.1	Results of monitoring to be in legible form, hold for 4 years,	Y	Monthly Dust & Water samples are sent to BMTS lab (NATA accredited) on

Condition No.	Condition Summary	Complied with Y/N	Comments
	produced in legible form to authorised officer, keeping details on date, time, point and who sampled.		monthly basis & also as required following water discharge events. Lab sends out report in a legible format. 4+ years of results are available.
Noise Monitoring			
4.2	Noise assessment to be undertaken to ensure compliance with consent limits.	Y	Noise monitoring was conducted by Heggies Australia in July 2005.
4.2A	Within 90 days of commencement of extended hours a noise assessment.....	Y	Heggies Australia noise report dated 11 April 2006
4.3	Remediation measures required should limits be exceeded in noise assessment under 4.2 & 4.2A.	NA	
Air Quality Monitoring			
4.4	Dust deposition monitoring to EPA AM-19.	Y	Dust monitoring conducted at Point 1 to AM-19 (sampling method) as per EPL M2.2 Point # 1. Dust bottles are collected monthly and send to BTMS for testing & analysis. Method of sampling is to AS 3580.10.1-2003- Methods for sampling and analysis of ambient air method 10.1- Determination of particulate matter, Deposited matter- Gravimetric method.
Water Quality Monitoring			
4.5	As per EPA requirements	Y	Discharge water sampling procedure in place and Water samples are collected in accordance with EPL.
4.6	Water samples to be collected every 4 hours and limits as per EPA licence.	Y	Water Quality monitoring is undertaken at EPL Point 2, during discharge and also monthly. Samples sent to BTMS for analysis. Site records water discharge volumes utilising flow meter.
Auditing			
4.7	Independent auditor approved by D-G to audit site within 3 years of commencement and as directed by the D-G. Report to be sent to D-G, Council and EPA within one month of completion....	Y	Operations commenced on 7 July 2003 & Maunsell / Aecom were confirmed as independent auditors by DoP on 5 July 2006. The audit was performed on 26 September 2006 and the final report was sent to the DG on 29 November 2006.
5. Community Information and Involvement			
5.1	Subject to confidentiality, all documents required under this	Y	Noted. No request to date.

Condition No.	Condition Summary	Complied with Y/N	Comments
	consent are to be available for public inspection upon request.		
Complaints Procedure			
5.2	Following required for community complaints; telephone no, postal address, email address	Y	Signage is displayed at front entry with details of phone number, postal address and website. Complaints number is also available at: http://www.boral.com.au/Article/nsw_poela_environmental_reporting.asp
5.3	Complaints register to be held. To be made available to D-G or EPA upon request.	Y	Complaints are also kept in an on site register in EMS Folder. Complaints are entered into SIMS. Register available for DG & EPA upon request Reported in annual returns.
6. Environmental Management			
Construction Environmental Management Plan (CEMP)			
6.1	CEMP to be prepared to be followed during construction.	NA	Construction completed.
6.2	Erosion and Sedimentation Plan	NA	
Operation Environmental Management Plan (OEMP)			
6.3	OEMP to detail enviro mgt framework and include management plans listed under 6.4. OEMP to be submitted for approval one month prior to commencement of operation. Upon approval from D-G, copies to be supplied to EPA and Council ASAP.	Y	OEMP in place and reviewed in April 2016.
6.4	Management Plans to be included in OEMP: a) Noise Management Plan, b) waste screening management protocol, c) Dust Management Plan, D) Water Management Plan, e) landscape mgt plan	Y	OEMP addresses all elements required. OEMP's contain a Noise Management Plan, Water Maangement Plan & Landscape Management Plan. Dust Management is addressed throughout the OEMP. The Waste Screening Management Protocol is addressed separately to the OEMP due to legislative requirements.
6.5	Every 3 years OEMP to be formally reviewed	Y	OEMP reviewed April 2016. Due 2019.
7. Environmental Reporting			

Condition No.	Condition Summary	Complied with Y/N	Comments
Incident Reporting			
7.1	Notify D-G and EPA of any incident with actual or potential significant off-site impacts ASAP.	Y	Noted.
7.2	All requirements of D-G to address incident as related to this consent. As well as any EPA requirements	Y	Noted.
Annual Performance Reporting			
7.3	Submit an annual return to EPA.	Y	As per EPA Licence requirements.
7.4	Annual Environmental Management Report to be completed yearly.	Y	
7.5	Annual Environmental Management Report to be submitted to D-G, Council and EPA annually throughout life of operation with EPA annual returns.	Y	1 st Submitted September 2004. Now submitted annually as required. It is noted that this report will be the last to be submitted under DA 21-1-2002-I.
7.6	DG may require applicant to address certain matters to environmental performance in response to the AEMR...	Y	Noted

4. Complaints Management

The purpose of the complaints register is to:

- Ensure that complaints/concerns received regarding the facility are documented; and
- An appropriate response to complaints is initiated (this may include changing management practices/monitoring procedures or adopting new practices/monitoring procedures).

Complaints must be reported to the Production Supervisor within 24 hours of receipt. The Production Supervisor will log the complaint on the electronic complaints register (SIMS) and retain a copy on site.

The person reporting the complaint should where possible provide the Manager with the following information:

- Date of the complaint;
- Name of the person making the complaint;
- Telephone number of the person making the complaint;
- Reason for the complaint; and
- Actions taken in response to the complaint.

Upon being informed of a complaint the Manager must determine:

- Whether any further response actions are required; and
- Whether changes to site management procedures/monitoring programs are required.

4.1 *Complaints Summary & Resolutions*

There was one community complaint received during the reporting period. The complaint was received from a member of the public alleging that a piece of concrete originating from Widemere Recycling had damaged the rim & tyre of their vehicle on Reconciliation Drive, Pemulway. The material was approximately 400 m north of the Widemere site. The origin of the material was unable to be verified, and the complainant was advised to contact their insurer. Furthermore, Drivers associated with the Widemere Recycling facility were advised to check loads and drawbars before leaving site. This complaint was recorded in the Boral Safety Incident Management System (SIMS).

5. Environmental Monitoring Results

March 2016 – February 2017

5.1 Noise

Noise monitoring was conducted by Heggies Australia in March 2006 as per condition 4.2A. The site operations complied with the limits at all times. Further noise modelling was conducted by EMM in May 2014 further demonstrating compliance. Refer to **Appendix 2**.

5.2 Dust

Gravimetric gauges have been placed in the following locations;

- (2) At the south west corner of the site (EPL license point).
- (3) At the south east corner of the site, adjacent the sedimentation basins.

Dust monitoring is undertaken in accordance with the requirements of Table 3 below, section 4.4 of the development consent.

Table 3. Dust Deposition Parameter Monitoring

Pollutant/Parameter	Discharge Point	Method	Frequency
Particulate Matter (deposited matter)	g/m ² /month	AM-1, AM-19	Continuous

NSW EPA Approved Method 19 – AS 3580.10.1 Methods of sampling and analysis of ambient air; Determination of particulate Deposited Matter – Gravimetric Method.

The analysis was performed by Boral Materials Technical Services which is a NATA Accredited Laboratory (No: 9968).

The annual average, (g/m²/month) for ash at the current sites are listed in the Table below.

Table 4: Boral Recycling Dust Deposition Results

Monitoring Points Test Method AM 19	Mar 2011 – End Feb 2012 Av (g/m ² /mth)	Mar 2012 – End Feb 2013 Av (g/m ² /mth)	Mar 2013 – End Feb 2014 Av (g/m ² /mth)	Mar 2014 – End Feb 2015 Av (g/m ² /mth)	Mar 2015 – End Feb 2016 Av (g/m ² /mth)	Mar 2016 – End Feb 2017 Av (g/m ² /mth)
	Ash	Ash	Ash	Ash	Ash	Ash
2. SW Corner**	3.64	2.70	4.03	4.79	3.90	5.25
3. SE Corner near Sediment Basins	4.27	3.38	4.76	4.09	5.41	5.23

** EPL 11815 Licensed monitoring point

In interpreting the results it is necessary to refer to the NSW EPA Approved Methods and Guidance – For the Modelling and Assessment of Air Pollutants in NSW. The impact assessment for dust is listed with the maximum annual average of deposited dust being $4\text{g/m}^2/\text{mth}$ for insoluble solids.

Section 10 of the Gravimetric Method standard indicates that the accuracy of the method is $\pm 20\%$ on monthly average for insoluble solids.

Throughout the reporting period, on a number of occasions the gauges have recorded insoluble solids above the goal of $4\text{g/m}^2/\text{month}$. These gauges are located on the operating site and are on occasions influenced by very localised dust generating activities. To that extent, the recorded fallout rates are not necessarily representative of off-site dust levels or even widespread dust levels on the site.

Due to the physical nature of construction and demolition materials it is generally accepted that the ash level (sample heated to 850 degrees for 30 minutes as per the standard), be used as a measure to reduce other sources of organic deposited matter. These organic sources usually include insects, bird droppings, pollen, grass seed etc. Ash in the standard is defined as 'the mass of that portion of the insoluble matter remaining after combustion.

The twelve months of dust data since the previous AEMR indicates an increase of the ash level at dust gauge #2 (EPL location) whilst there was a slight decrease to site # 3.



Figure 1: Boral Recycling Widemere – Dust Deposition Monitoring Locations March 2016 – February 2017.

5.3 Surface Water

Four (4) controlled discharges of waters occurred during the year and were compliant with discharge criteria. The results can be found in Table 5 below:

Table 5: Boral Recycling Water Discharge Results

Date	pH	Turbidity (NTU)	Oil and Grease (mg/L)	Total Suspended Solids (mg/L)	Volume Discharged (kL)
6/06/2016	7.7	20.0	0.8	21.0	97
7/06/2016	7.0	27.0	1	24.0	99
8/06/2016	6.9	7.1	0.7	11.0	99
9/06/2016	7.1	5.7	0.7	14.0	99
Average	7.2	15.0	0.8	17.5	-

These results were referred to the Environment Protection Authority for the reporting period.

6. Comparison of Impacts and Performance against EIS Predictions

Table 6: Boral Recycling Dust Deposition Results

Impact	EIS Prediction	Performance 2015-2016
Air Quality	Annual Average within site 3-4 g/m ² /month	Mean result for site 2 and site 3 were 5.25 g/m ² /mth Ash, 5.23 g/m ² /mth. In comparison with the previous reporting figures, this indicates an increase on site 2 and slight improvement on site 3. Both results and are both above the EIS prediction. During this reporting period fixed water sprinklers on the western side of the sales area and extra sprays on the fixed plant were installed to improve dust control.
Noise	See Table 1 of this report.	Refer to Appendix 2
Water Quality	Stormwater Discharge Quality TSS <50mg/L pH 6.5-8.5 Oil and Grease <5mg/L	All discharges met these criteria.
Traffic and Transport	Based on 600 000tpa and 300 days operation. *Light Vehicle 2-way total: 40 *Trucks 2-way total: 578	Light vehicle movements average 12 movements per day. Truck movements average 419 movements per day Truck movement tracking register implemented.
Flora and Fauna	No runoff flowing into southern stand of Swamp She-oak Forest.	All onsite water is diverted into the stormwater detention basins to the SW of the site.
Visual Impact	Visibility of the site is limited, stockpiles maybe up to 20m high. The existing vegetation along southern boundary provides an effective visual screen	T-way vegetation, natural growth in Prospect Creek and trees within Boral land screens the operation. Earth bund is erected along the SE boundary. Changes to the cycle-way and opening of Reconciliation Road will make areas visible. Planting screening trees is ongoing.
Resource Consumption	Water Supply: Anticipated that stormwater reuse will provide the site water demand for wet and medium years. *During drought years, anticipated off-site water requirements to be only 500m ³ or 14 days site water usage.	Throughout this reporting period recycled water tanks were installed on site (200 kL total volume) to assist with first flush capacity and for re-use through dust suppression. Flow meters have been installed to track recycled water use. Town water is used on occasion.
Waste Management	Impurities from crushing process taken to recycling centres where possible.	Domestic garbage, plastics etc. to landfill. Less than 0.5% taken to landfill. Reinforcing materials (metals) and paper are recycled.
Potential Hazards	Above ground diesel storage tank to be bunded to AS1940-1993 requirements.	Bund can contain >110% of volume. Further, during this reporting period a roof over the tank & bund was installed; a rollover bund was installed around the fill point; and the

Impact	EIS Prediction	Performance 2015-2016
		workshop is now bunded.
Social and Economic	Benefits community, consistent with NSW Government aims to reduce amount of C&D waste going into landfill.	Yes. Large volume of C&D waste received and recycled over the last 12 months.

7. Details When Performance Goals Not Achieved

Air Quality – During the reporting period the annual average for ash at the deposited dust monitoring sites were above the EIS prediction for onsite annual average air quality (3-4 g/m²/month). It is noted that these gauges are located on the operating site and are on occasions influenced by very localised dust generating activities. To that extent, the recorded fallout rates are not necessarily representative of off-site dust levels or even widespread dust levels on the site. Throughout the reporting period a number of dust control improvements were made including the installation of additional water sprays for both the stockpiling area and fixed plant. A further improvement to be implemented in the next reporting period includes the sealing of the southern haul road to assist with fugitive dusts.

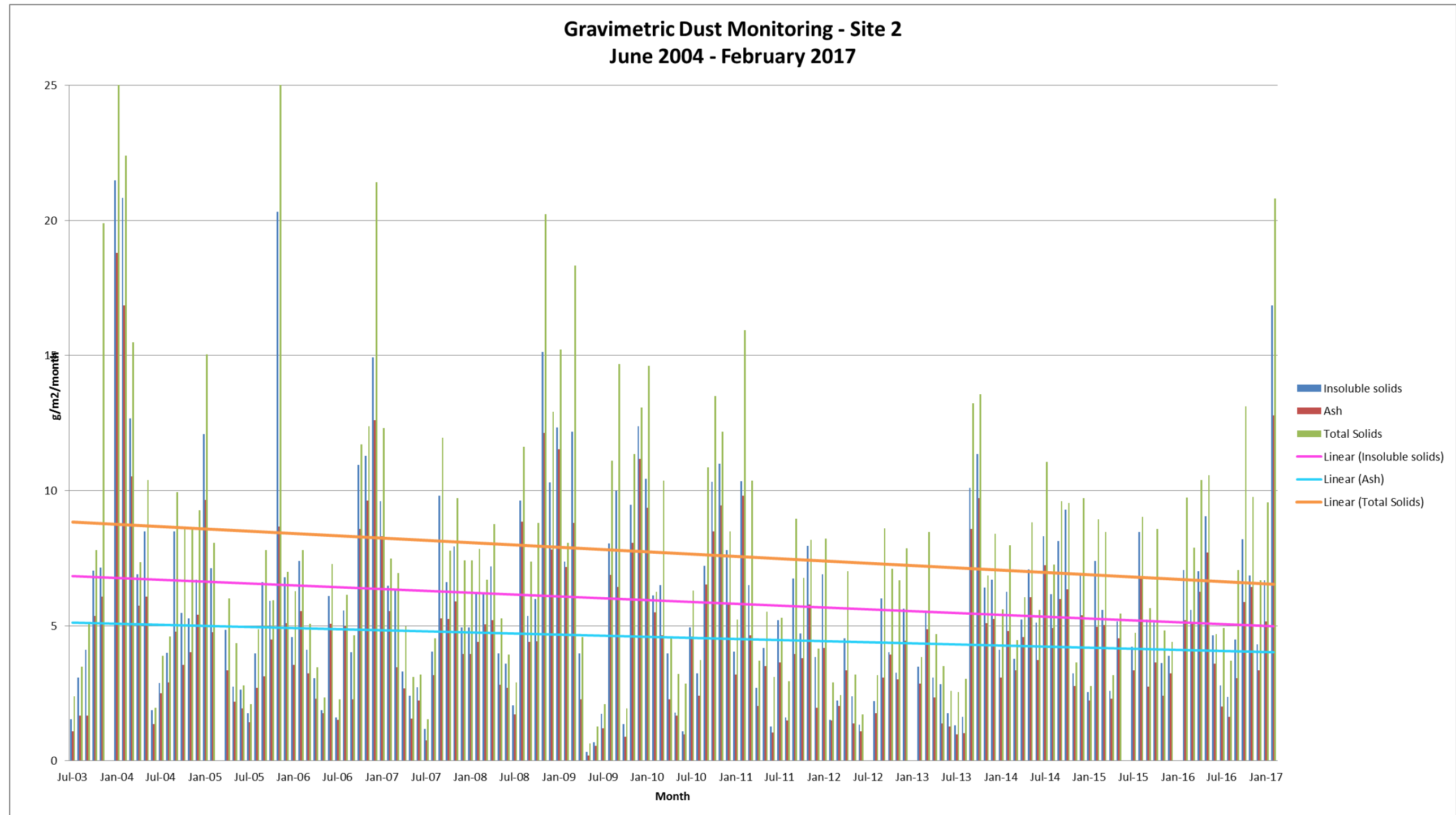
8. Monitoring Data trends

The only monitoring data trends available for the life of the project are those for gravimetric dust deposition at monitoring Site 2.

Figure 2 provides a graphical representation of Site 2 gravimetric dust monitoring results for the life of the project. It is evident that the monitoring results were elevated during the 1st year of operation and monthly spikes are not uncommon during the summer months. Higher levels during summer are not unusual for any operation considering the potential offsite impacts.

Figure 2 also illustrates that the trends, for all parameters measured, have decreased over the life of the project. This decrease is a result of improvements to the facility's processing, handling and dust management.

Figure 2



9. Environmental Management Targets and Strategies for the Following 12 Months

9.1 *Dust Minimisation*

The site has all the necessary equipment to minimise dust to the best of its ability. Control is managed day to day by way of sprays on crushing equipment, sprinklers around the plant, water cart and water cannons within the stockpiles and haul roads, and vehicle wheel wash facilities. Further improvements to the fixed sprinkler network, and also changes to the traffic flows will reduce the quantity of water required for dust suppression, and improve overall performance.

Future Proposals

- Seal the southern haul road to assist with fugitive dusts (pending new development consent).
- Planting of extra trees around the site to assist in preventing wind-blown dust from leaving site.

9.2 *Water Management*

The water detention basins will be managed to maximise freeboard capacity in preparation for storm events. Water will continue to be treated and used where possible for dust suppression around site.

Future Proposals

- Complete Surface Water Characterisation Assessment (as per EPL 11815 PRP U1.2-U1.4).
- Surface Water Monitoring and Mitigation Plan (as per EPL 11815 PRP U1.5 – U1.9).

Appendix 1 : Econocycle Service Records



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 POSTAL: P.O Box 3032 Wallacia 2745
 sepserve@bigpond.net.au



1300 1 ECONO
 (1300 132 666)

AERATED SEPTIC SYSTEM SERVICE ADVICE

CUSTOMER COPY

Contract No. & Council: 7663
Name: Jeff Hill Plumbing
Address: Boral Recycling, Reconciliation Drive Wetherille Park
Brand:
Identification:
Customer Email: iw.hill@hotmail.com.au

General Inspection	Free chlorine (mg/L):	0.0
	Water meter reading (L):	
Septic Tank	Check sludge depth:	Med
	Check scum depth:	Med
	Is desludge required?:	No
	Are septic junctions in place?:	Yes
	Excessive kitchen fats?:	No
	Garbage in septic section?:	No
Aeration Tank	Blower - Check pressure:	Good
	Blower - Check noise:	Low
	Blower Filter:	Clean
	Pump - Check flow:	Good
	Circulating Pump Operating:	
	Inspect connections & fittings:	Good
	Inspect water flow through unit:	Good
	Check &/or adjust air controls:	Yes
	Check &/or adjust sludge & scum return:	Yes
	U.V. Lamp:	
	Inspect bio-mass/filter media:	Good
	Inspect clarifier clarity:	Fair
	Inspect retention chamber clarity:	Fair
	10 mins. Settlement test 500ml:	Fair
	Replenish chlorine No. of tablets:	12
	Check chlorinator:	Yes
	Do tablets contain cyanurate?:	Yes
Irrigation	Inspect sprinklers operational:	No
	Inspect irrigation area for ponding:	Yes
	Clean Irrigation filter:	

Technician's Name: Curtis Day
Notes (if any):

Date: 2/08/2016

Appendix 2 : EMM Noise Monitoring Assessment

Widemere Recycling Facility

Final

Report J13127RP1 | Prepared for Boral Resources (NSW) Pty Ltd | 24 April 2015

Approved by **Najah Ishac**

Position Director

Signature



Date 27 April 2015

This report has been prepared in accordance with the brief provided by the client and has relied upon the information collected at the time and under the conditions specified in the report. All findings, conclusions or recommendations contained in the report are based on the aforementioned circumstances. The report is for the use of the client and no responsibility will be taken for its use by other parties. The client may, at its discretion, use the report to inform regulators and the public.

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Document Control

V1	18 December 2014	O. Muller	N. Ishac
V2	27 April 2015	N. Ishac	D. Weston



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Executive summary

ES1 Introduction

Boral Recycling Pty Limited (Boral) operates the Widemere Recycling facility (the facility) at Wetherill Park. The facility accepts construction and demolition waste where it separates, crushes and blends it with quarry material to form construction materials. Boral is seeking to modify operations at the facility, including increasing the maximum processing rate from 750,000 tonnes per annum (tpa) to 1,000,000 tpa (the proposal).

The assessment considered the following noise related aspects of the proposed modification:

- operational noise;
- sleep disturbance;
- construction noise;
- road traffic noise; and
- cumulative noise.

The assessment has been undertaken in accordance with the following policies and guidelines:

- NSW Environment Protection Authority (EPA) 2000, NSW Industrial Noise Policy (INP);
- NSW EPA 2011, NSW Road Noise Policy (RNP); and
- NSW Department of Environment and Climate Change (DECC) 2009 Interim Construction Noise (ICNG).

ES2 Operational noise

Noise modelling results presented in this assessment demonstrate that operational noise emissions from the proposed modifications will comply with the relevant criteria at all assessment locations.

The maximum noise levels are expected to satisfy the relevant sleep disturbance criteria at all assessment locations.

ES3 Construction noise

Noise from simultaneous construction and operation will comply with the relevant project specific noise levels (PSNLs) at all assessment locations.

ES4 Cumulative noise

The cumulative noise assessment identified that existing cumulative industrial noise would increase by up to 1 dB(A) at the worst affected receiver locations during the day period at residential assessment locations. Cumulative noise levels including the proposed facility will remain below relevant criteria at industrial and recreational assessment locations.

The proposed facility will increase existing cumulative noise at industrial and recreational receptors, however levels remain below the respective cumulative criteria.

ES5 Road traffic noise

Road traffic noise generated as a result of the proposed modification is expected to satisfy relevant criteria for privately owned assessment locations.

ES6 Conclusion

This assessment demonstrated noise from the proposed changes to the Widemere Recycling facility would satisfy all relevant guidelines.

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1 Introduction

EMGA Mitchell McLennan Pty Limited (EMM) has been commissioned by Boral Recycling Pty Limited (Boral) to complete a noise assessment to accompany an environmental impact statement (EIS) and development application under the State Significant Development provisions within Division 4.1 of Part 4 of the *Environmental Planning & Assessment Act 1979* (EP&A Act) for operational changes to the Widemere Recycling facility ('the facility').

The facility accepts construction and demolition waste where it separates, crushes and blends it with quarry material to form construction materials. Boral is seeking to modify operations at the facility, including increasing the maximum processing rate from 750,000 tonnes per annum (tpa) to 1,000,000 tpa (the proposal). The proposal also includes a minor internal road realignment, import of additional waste materials that are not currently listed on the facility's Environment Protection Licence (EPL), and minor changes to the operating hours of the facility.

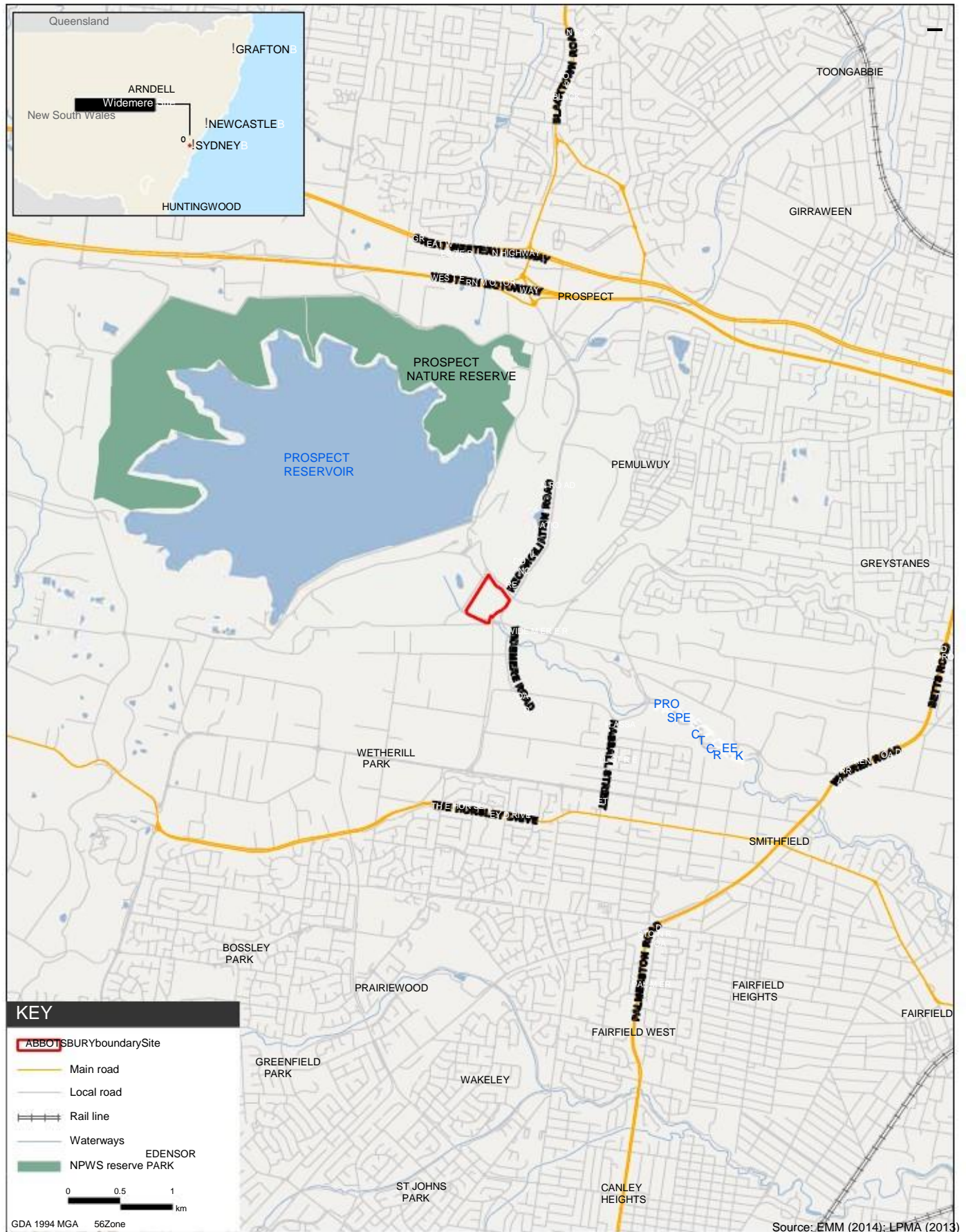
The facility is located off Widemere Road, Wetherill Park within the Fairfield local government area (LGA), close to its boundary with the Holroyd LGA. It is located between the employment lands developed in Boral's Greystanes Estate and the Wetherill Park industrial area, one of Sydney's largest industrial precincts (see Figure 1.1).

To the north of the facility is the former Sydney Water Supply Canal and Boral's closed Prospect Quarry which is now used for commercial/light industrial purposes. Prospect Reservoir and its associated buffer area are to the west of the site. To the east of the facility is a large stormwater detention basin and the closest residential receptors are situated approximately 1 km to the east.

This noise assessment has been prepared in accordance with the following policies and guidelines:

- NSW Environment Protection Authority (EPA) 2000, NSW Industrial Noise Policy (INP);
- NSW Department of Environment and Climate Change (DECC) 2009 Interim Construction Noise Guideline (ICNG); and
- NSW EPA 2011, NSW Road Noise Policy (RNP).

A number of technical terms are required for the discussion of noise and vibration. These are explained in Appendix A.



2 Project description

2.1 Background

Approved operations at the facility include the receipt of permitted waste which is sorted, processed and blended on site to produce a range of recycled aggregate and road base products. The facility currently has approval to process 750,000 tpa of material, comprising no more than 600,000 tonnes of permitted waste with the balance being made up of blending material.

Boral is seeking a new development consent for the facility, which includes continuation of operations approved under the current development consent (as modified) for the facility, with the following modifications:

- x increase in the maximum processing capacity to 1,000,000 tpa;
- x addition of new waste streams to the permitted wastes received by the facility;
- x minor changes to the site layout, including realigning the internal haul road (refer to Figure 2.1); and
- x change in the operating hours of the facility.

2.2 Site layout

The facility occupies an area of approximately 9.8 hectares (ha), and comprises the following general areas (see Figure 2.1):

- x receivals area which includes a weighbridge, spot checking platform, and administration buildings;
- x incoming materials stockpile area where incoming vehicles unload waste material;
- x processing plant;
- x processed materials stockpiles including imported quarry product; and
- x water management area (including retention basins).

Minor changes to the general layout of plant and equipment are proposed to accommodate the realignment of the southern haul road. However the overall site layout will remain generally consistent with current operations.

2.3 Deliveries, workforce and operating hours

The proposed increase in processing capacity will increase the number of vehicles travelling to and from the facility to 306 trucks (612 truck movements) per day.

Additionally, up to three full time equivalent employees will be generated by the proposal, with a total of 33 full time equivalent personnel.

Changes to the hours of operation proposed include maintenance activities from 6 am to 6 pm on Sundays and public holidays. Maintenance activities comprise a set of tasks performed post inspection of the plant to repair mobile and fixed plant problems occurring directly from processing of the raw feed. In addition, Boral is seeking approval to operate on up to 12 Sundays per year (one Sunday per month on average).

The hours of operation (receival of waste, product dispatch and processing activities) would be as follows:

- x Monday to Saturday 6 am to midnight; and
- x Sunday 6 am to 6 pm.

The current and proposed hours of operation are in Table 2.1.

Table 2.1 **Current and proposed hours of operation**

Current operations	Proposed operations
6 am 10 pm, Monday to Friday	6 am midnight, Monday to Saturday
6 am 4 pm, Saturday	6 am 6 pm on one Sunday per month, on average
No operations on Sundays or public holidays	Maintenance activities 6 am 6 pm on Sundays and public holidays

2.4 Potential noise impacts

The aspects of the proposed changes with the potential to generate additional noise impacts are:

- x the increase in processing capacity;
- x construction of the internal haul road; and
- x changes to the operating hours of the facility.

3 Existing environment

3.1 Ambient noise environment

The facility is located within an existing industrial area that contains a number of noise generating industries and land uses. The closest existing residential receptors are located approximately 1 km to the east of the facility.

To characterise the ambient noise environment, noise monitoring was undertaken at assessment locations surrounding the facility, representative of nearby sensitive receptors. Table 3.1 and Figure 3.1 present the assessment locations.

Table 3.1 Sensitive receptor locations

Assessment location ID	Address / description	Receptor type	Distance to facility (m)
R1	71 Munro St Greystanes	Residential	1,000
R2	146 Daruga Ave Nelsons Ridge ¹	Residential	1,320
R3	Industrial area Greystanes	Industrial	1,150
R4	Industrial area Davis Road	Industrial	220
R5	Southern Employment Lands	Industrial / commercial	300
R6	Hyland Road Youth Centre	Active recreation	590
R7	Gipps Road sporting complex	Active recreation	1,090
R9	Hyland Road Park	Active recreation	790
R10	Greystanes Estate future high density residential ²	Future residential	670

Notes: 1. Location identified as a future residence (HLA 2005).

2. Indicative location based on EAR MP 06_0181 (NSW Government 2007).

Location R10 to the north east of the facility represents the approximate location of potential future residential development, which is zoned for high density residential land use. This is detailed in the NSW Government's *Environmental Assessment Report (EAR) Major Project Assessment – Greystanes Southern Employment Lands (SEL)* (MP06_0181) (July 2007).

3.1.1 Unattended noise monitoring

EMM conducted unattended noise monitoring from 2 to 15 May 2014 at two monitoring locations, L1 (near R1) and L2 (near R2) (see Figure 4.1), to quantify the existing background noise. Measurements were conducted in general accordance with the procedures described in Australian Standard (AS) 1055 1997, Acoustics Description and Measurement of Environmental Noise and the INP (EPA 2000).

The noise logging was completed using two Acoustic Research Laboratories (ARL) environmental loggers EI 215 (S/N 194449 and 16 207 005), and a Svantek 957 sound analyser (S/N 14572). The instruments were calibrated in field with no drift in calibration noted.

In accordance with the INP (EPA 2000) and AS 1055 1997, periods of rainfall and/or wind speed in excess of 5 m/s at the microphone were excluded from the analysis. Meteorological data was sourced from Bureau of Meteorology (BoM) Automatic Weather Station (AWS) 067119 at Horsley Park Equestrian Centre.

The results of unattended monitoring are provided in Table 3.2, with corresponding charts provided in Appendix B. The morning shoulder (6 am to 7 am) background levels (referred to as rating background levels, or RBLs) were determined using the midpoint between day and night RBLs for the monitoring period in accordance with the INP.

Table 3.2 Unattended noise measurement summary

Location	Period ¹	Rating background level $L_{eq}(15 \text{ min})$ (RBL) dB(A)	Measured existing ambient $L_{eq,period}$ noise level dB(A)
L1 (R1) ² Greystanes	Day	43	52
	Evening	42	49
	Night	39	47
	Morning shoulder	41 ³	51
L2 (R2) Pemulwuy	Day	37	47
	Evening	37	44
	Night	35	44
	Morning shoulder	36 ³	

Notes:

1. Day: 7 am to 6 pm Monday to Saturday; 8 am to 6 pm Sundays and public holidays; evening: 6 pm to 10 pm; night is the remaining periods. Morning shoulder is the period 6 am to 7 am for the purposes of this assessment.
2. Measurement ceased after 10 May 2014 due to battery failure. However, in accordance with the INP, at least seven days of suitable data was collected.
3. Morning shoulder (6 am to 7 am) rating background levels (RBLs) calculated as midpoint between day and night time RBLs in accordance with the INP.

Unattended monitoring was also conducted at a third location (L3) representative of the future residential location (R10), however data collected during the day and evening periods was found to be affected by noise from existing operations at the facility. Data collected during the night period was validated against that of L1 to the east of the facility and this data was found to be representative of the background noise environment in the vicinity of assessment location R10. As a result, background data from L1 was used to determine criteria at this location.

The measured (2014) data was compared against historic background data reported by Heggies as part of a previous assessment for the facility in 2005 (HLA Envirosciences 2005). Background noise levels in the vicinity of the facility were found to be generally unchanged and relatively consistent with this assessment at L1 (Greystanes).

3.1.2 Attended noise monitoring

EMM reviewed the historic data from the 2005 assessment (HLA Envirosciences 2005). Historic data included 15 minute measurements collected on 25 September 2003 at Munroe Street (assessment location L1) and the Southern Greystanes Estate (R10). The review identified that the subject facility is generally inaudible at the assessment locations.

The attended monitoring surveys for this assessment identified that the noise environment is influenced by distant traffic, insects and birds, and is typical of a suburban environment, with noise from nearby unrelated industrial operations also audible.

Table 3.3 **Attended noise measurement summary**

Location	Date	Start time	Leq	L90	Lmax	Comments
Munroe St Greystanes (L1)(R1)	25/9/03	11:35	54	51	61	Traffic noise, dogs, construction and jackhammer noise, noise from Youth Centre.
Southern Greystanes Estate (R10)	25/9/03	13:15	47	43	67	Excavator tracking from construction activities, birds.

Source: Heggies (2005) for HLA Envirosciences (2005).

A comparison of historical data against data collected by EMM (2014) indicates that the acoustic environment in the vicinity of the facility remains consistent with historical observations, with levels more elevated in the vicinity of the future residential assessment location (R10) as a result of recent commercial and industrial development within the Greystanes Estate Southern Employment Lands.

3.2 Prevailing meteorological conditions

The INP provides procedures for identifying and combining prevailing meteorological conditions at a site (referred to as a 'feature' of the area) and assessing the noise levels against the relevant criteria. The INP defines a feature wind (3 m/s or lower speed) condition to be one that occurs for 30% of the time or more for a given season, period (day, evening, night) and direction.

During wind and temperature gradient conditions (eg temperature inversions), noise levels at receivers may increase or decrease compared with noise during calm conditions. This change is due to refraction caused by the varying speed of sound with increasing height above ground. The noise level received increases when the wind blows from source to receivers or under temperature inversion conditions. Conversely, the noise level decreases when the wind blows from receivers to source or under temperature lapse conditions.

3.2.1 Modelled meteorological conditions

For the purpose of this assessment, a simple (or 'maximum impact') approach has been adopted in accordance with section 5 of the INP. This approach assumes that source to receptor winds are a feature for the subject area, where the source to receptor wind would occur for more than 30% of the time in any period in any season.

The INP default inversion parameter has been adopted (F class inversion).

The INP states that a default wind drainage value should be applied where sources are at a higher altitude than the receptors with no intervening topography. Due to the presence of intervening topography to the east between the facility and potentially affected residences, and the reduced elevations to the south and south west, it is considered that any drainage winds would be channelled south and south west, away from sensitive receptors. Therefore, drainage winds have not been adopted in this assessment.

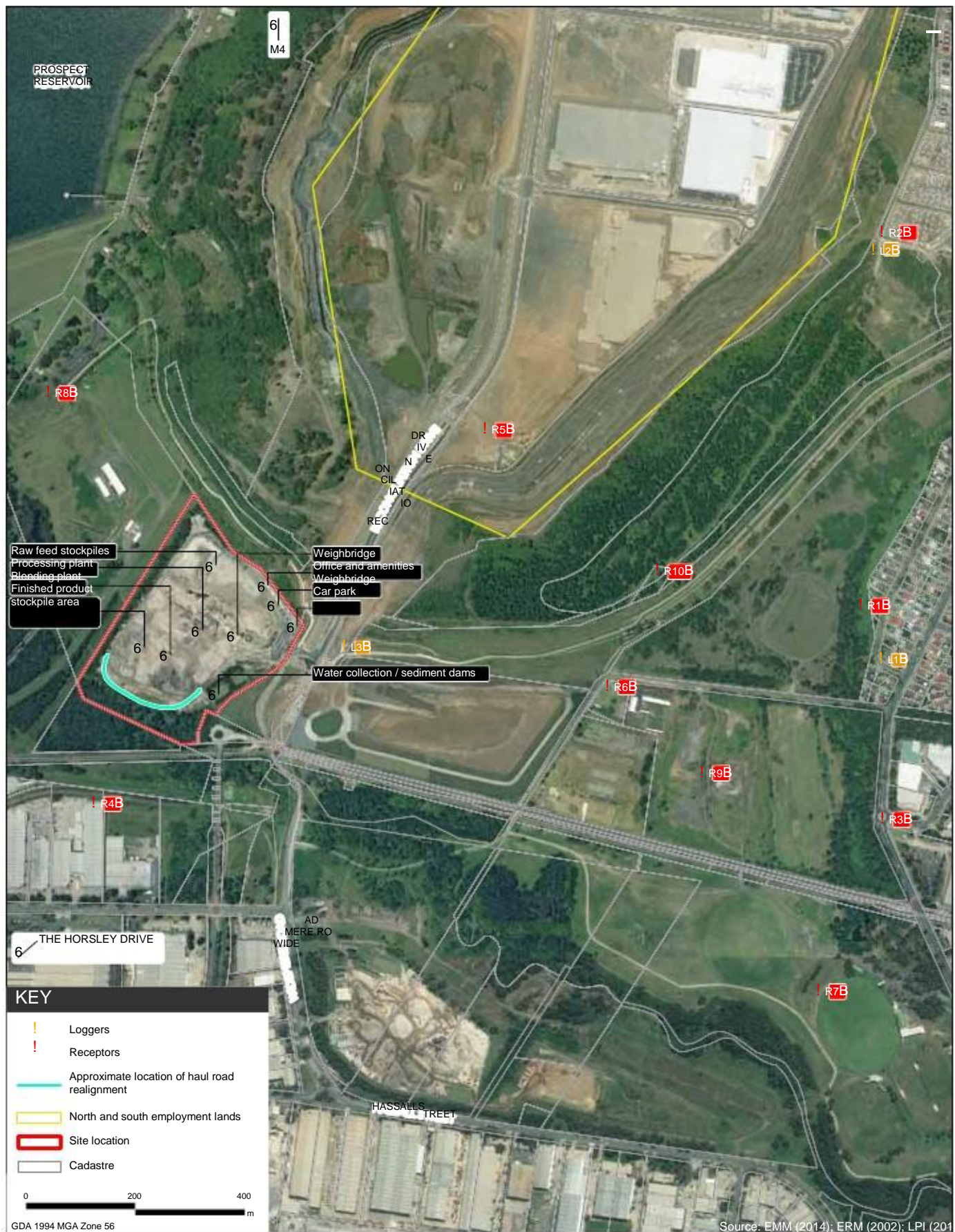
The meteorological conditions adopted in the modelling for this assessment are presented in Table 3.4.

Table 3.4 **Modelled meteorological conditions**

Period	Calm	Maximum impact winds (3 m/s source to receptor)	Inversion (F class) ¹
Day	3	3	n/a
Evening	3	3	n/a
Night	3	3	3
Morning shoulder	3	3	3

Notes: 1. Inversion conditions only applicable to night time and morning shoulder periods.

The noise predictions adopting the meteorological conditions presented in Table 3.4 reflect the maximum worst case levels from the facility. The predicted noise levels should therefore be considered conservative.



Assessment locations and noise monitoring locations

Noise Impact Assessment

Figure 3.1

4 Noise criteria

4.1 Operational noise

Industrial sites in NSW are regulated by the Department of Planning and Environment (DP&E) and the NSW EPA and usually have a licence and/or approval conditions stipulating noise limits. These limits are operational noise criteria applied at sensitive receptors derived in accordance with the INP methodology or are noise levels that can be achieved at a specific site following the application of all reasonable and feasible noise mitigation. Noise from current operations at the facility is regulated by the facility's environment protection licence (EPL), which specifies operational noise limits.

The INP (EPA 2000) has been adopted for this assessment. With respect to the criteria, the policy states:

'They are not mandatory, and an application for a noise producing development is not determined purely on the basis of compliance or otherwise with the noise criteria. Numerous other factors need to be taken into account in the determination. These factors include economic consequences, other environmental effects and the social worth of the development.'

Assessment criteria depend on the existing amenity of areas potentially affected by a proposed development. Assessment criteria for sensitive receptors near industry are based on the following objectives:

- x protection of the community from excessive intrusive noise; and
- x preservation of amenity for specific land uses.

To ensure these objectives are met, the EPA provides two separate criteria: intrusiveness criteria and amenity criteria. A fundamental difference between the intrusiveness and the amenity criteria is the period they relate to:

- x intrusiveness criteria — apply over 15 minutes in any period; and
- x amenity criteria — apply to the entire assessment period (day, evening or night).

The facility will operate during all assessment periods, with limited operations during night time periods.

4.1.1 Intrusiveness

The intrusiveness criteria require that $L_{eq(15 \text{ min})}$ noise levels from a newly introduced source during the day, evening and/or night do not exceed the RBL by more than 5 dB. This is expressed as:

$$L_{eq(15 \text{ min})} \leq \text{RBL} + 5$$

Where $L_{eq(15 \text{ min})}$ is the L_{eq} noise level from the source (ie site), measured over a 15 minute period. Where the noise contains annoying characteristics (eg tonal, low frequency etc), adjustments as per the INP apply to the level of noise produced by the source.

Table 4.1 presents the base intrusive criteria for the site. The derivation of morning shoulder RBLs is presented in Section 3.1.1.

Table 4.1 Base intrusive criteria

Location ²	Period ¹	RBL, dB(A)	Intrusive criteria dB(A), Leq(15 min)
R1, R10 (L1)	Day	43	48
	Evening	42	47
	Night	39	44
	Morning shoulder	41	46
R2 (L2)	Day	37	42
	Evening	37	42
	Night	35	40
	Morning shoulder	36	41

Note:

1. Day: 7 am to 6 pm Monday to Saturday; 8 am to 6 pm Sundays and public holidays; evening: 6 pm to 10 pm; morning shoulder: 6 am to 7 am; night is the remaining periods.
2. Receptors R3 to R9 have not been included as part of the intrusive assessment. Non residential receptors are assessed using amenity criteria which are discussed in the following section.

4.1.2 Amenity

Amenity assessments are based on noise criteria specific to the land use. The criteria relate only to industrial noise and exclude offsite road or rail noise.

Residential receptors potentially affected by the facility are classified by the suburban amenity category (EPA 2000). The base corresponding amenity criteria, or acceptable noise levels (ANLs), for all assessment locations are given in Table 4.2.

Table 4.2 Base amenity criteria

Receptor	Indicative area	Time period	Recommended noise level dB(A), Leq,period	
			Acceptable	Maximum
Residential	Suburban	Day	55	60
		Evening	45	50
		Night	40	45
Active recreation	All	When in use	55	60
Industrial	All	When in use	70	75

Source: INP (EPA 2000).

Where measured existing industrial noise approaches base amenity criteria, it needs to be demonstrated that noise from new industries will not significantly contribute to existing ambient industrial noise. This is achieved by the application of modifications to the ANLs from Table 4.2. These modifications from Table 2.2 of the INP are presented in Table 4.3 and are applicable to the project.

Table 4.3 **Modification to acceptable noise level (ANL) to account for existing levels of industrial noise**

Total existing L_{eq} noise level from industrial sources, dB(A)	Maximum L_{eq} noise level for noise from new sources alone, dB(A)
Acceptable noise level plus 2	<i>If existing noise level is likely to decrease in future:</i> acceptable noise level minus 10 <i>If existing noise level is unlikely to decrease in future:</i> existing level minus 10
Acceptable noise level plus 1	Acceptable noise level minus 8
Acceptable noise level	Acceptable noise level minus 8
Acceptable noise level minus 1	Acceptable noise level minus 6
Acceptable noise level minus 2	Acceptable noise level minus 4
Acceptable noise level minus 3	Acceptable noise level minus 3
Acceptable noise level minus 4	Acceptable noise level minus 2
Acceptable noise level minus 5	Acceptable noise level minus 2
Acceptable noise level minus 6	Acceptable noise level minus 1
< Acceptable noise level minus 6	Acceptable noise level

Notes: 1. ANL = recommended acceptable L_{eq} noise level for the specific receiver, area and time of day from Table 4.2.

4.1.3 Project specific noise levels

In accordance with the INP application notes, where operations occur for only a part of an assessment period, PSNLs are determined for that operational period only. Specifically, the INP application notes state that 'existing industrial noise should be used in conjunction with the appropriate ANL to establish the applicable amenity criteria'. Table 4.4 presents a summary of proposed site operations over a typical 24 hour period.

Table 4.4 **Summary of proposed site operations**

Period	Operations	Deliveries	Product processing (loader only)
Day	3	3	3
Evening	3	3	3
Night		3	3 ¹
Morning shoulder	3	3	3

Notes: 1. Product processing during night time period occurs from 10 pm to midnight only, with deliveries occurring throughout the entire night period.

In this instance, the facility will comprise of full operations and all plant operating during the day, evening and morning shoulder (6 am to 7 am) periods. Deliveries will occur until midnight, with product processing (loader only) from 10 pm to midnight (night). Therefore, these operations have been assessed against the night assessment period.

To account for full operations for the morning shoulder period, analysis of the existing hourly industrial contribution has been determined for the morning shoulder period and used as a basis for establishing the morning shoulder amenity criteria in accordance with the INP application notes.

The project specific noise level (PSNL) is the stricter of the calculated intrusive or amenity criteria. The PSNLs for all periods are highlighted in Table 4.5. The existing level of industrial noise at residential assessment locations was estimated from unattended logger data, and it was generally assumed average total L_{eq} noise captured by the logger was attributable to industrial sources. The residential assessment locations are located in close proximity to industrial estates and this method provides a conservative assessment of existing industrial noise levels. Existing industrial noise contributions at most recreational areas (east of the site) were conservatively assumed to be the same level as at R10 (ie 52 dB(A)). The exception is R8 which is located west of the site and further removed from industrial sites. For this and other non residential assessment locations, existing industrial noise contributions is estimated at less than 6 dB below ANLs. To that end, it is noted that industrial land uses are not sensitive receptors to noise.

It is also important to note that the subject site, being an existing operation, should not be unreasonably penalised compared to other existing industrial sites by virtue of the adjusted amenity criteria (which requires the existing operations to be excluded). It is more equitable in such situations to demonstrate the ANL can be achieved with all industrial sites, and where it cannot be met, define the subject site's contribution as a percentage of total (other) industrial noise to understand its significance in the area. Furthermore, chapter 10 of the INP addresses 'applying the policy to existing industrial premises'.

Table 4.5 Project specific noise levels

Location	Period ¹	RBL, dB(A)	Intrusive criteria dB(A), $L_{eq}(15 \text{ min})$ (RBL+5)	Estimated existing industrial noise contribution dB(A), $L_{eq,period}$	Site specific amenity criteria dB(A), $L_{eq,period}$
R1. 71 Munro St Greystanes	Day	43	48	52	52 ₂
	Evening	42	47	49	39 ₂
	Night	39	44	47	37 ₂
	Morning shoulder	41	46	51 ³	41 ²
R2. 146 Daruga Ave Nelsons Ridge	Day	37	42	47	55
	Evening	37	42	44	39 ₂
	Night	35	40	42	32 ₂
	Morning shoulder	36	41	47 ₃	37 ₂
R3. Industrial area Greystanes	When in use	N/A	N/A	<64	70
R4. Industrial area Davis Road	When in use	N/A	N/A	<64	70
R5. Southern Employment Lands	When in use	N/A	N/A	<64	70
R6. Hyland Road Youth Centre	When in use	N/A	N/A	52	52
R7. Gipps Road sporting complex	When in use	N/A	N/A	52	52

Table 4.5 Project specific noise levels

Location	Period ¹	RBL, dB(A)	Intrusive criteria dB(A), Leq(15 min) (RBL+5)	Estimated existing industrial noise contribution dB(A), Leq,period	Site specific amenity criteria dB(A), Leq,period
R8. Lower Prospect Canal Reserve	When in use	N/A	N/A	<49	55
R9. Hyland Road Park	When in use	N/A	N/A	52	52
R10. Proposed high density residential	Day	43	48	52	52 ²
	Evening	42	47	49	39 ₂
	Night	39	44	47	37 ₂
	Morning shoulder	41	46	51 ₃	41 ₂

Note: 1. Day: 7 am to 6 pm Monday to Saturday; 8 am to 6 pm Sundays and public holidays; evening: 6 pm to 10 pm; night is the remaining periods. Morning shoulder is the period 6 am to 7 am for the purposes of this assessment.
2. Modification for existing industrial noise applied in accordance with section 2.2 of INP (EPA 2000) presented in Table 4.2.
3. Industrial contribution for morning shoulder period is log average of 32 and 40 lots of 15 min samples of logger 1 and logger 2 respectively.

4.2 Sleep disturbance criteria

The facility will operate during the night time and morning shoulder periods from 10 pm to 7 am and therefore requires an assessment of sleep disturbance in accordance with the INP (EPA 2000).

The operational criteria described in Section 4.1, which consider the average noise emission of a source over 15 minutes, are appropriate for assessing noise from steady state sources, such as engine noise from mobile plant and other pit equipment. However impact noise from sources such as a front end loader (FEL) loading trucks is intermittent (rather than continuous) in nature and, as such, needs to be assessed using the L₁ or L_{max} noise metrics.

Intermittent noise has the potential to disturb the sleep of nearby residents. The EPA provides guidance on assessing sleep disturbance for industrial sites. The EPA nominates that a screening criteria of background noise level (L₉₀) plus 15 dB shall apply to maximum noise level events from the site. The maximum noise events are to be calculated at one metre from the bedroom facade at the nearest residential properties. Where noise levels have been calculated above the screening criteria, additional analysis should be undertaken, referencing guidance on maximum noise levels and sleep disturbance listed in the RNP (EPA 2011).

The RNP states:

- x maximum internal noise levels below 50 to 55 dB(A) are unlikely to wake sleeping occupants; and
- x one or two noise events per night, with maximum internal noise levels of 65 70 dB(A), are not likely to significantly affect the health and wellbeing of occupants.

It is commonly accepted by acoustic practitioners and regulatory bodies that a partially open window will reduce external noise levels by 10 dB(A). Therefore, external noise levels in the order of 60 65 dB(A) calculated at the facade of a residence are unlikely to cause sleep disturbance affects at worst case (ie with windows open). Similarly, the World Health Organisation (WHO 1999) suggest that levels below 45 dB(A) inside homes are unlikely to wake sleeping occupants.

If noise levels over the screening criteria were identified, more detailed analysis is required. This would consider factors such as the frequency and time of the events (between 10 pm and 7 am).

Table 4.6 provides the sleep disturbance criteria for residential receptors. In accordance with the RNP, sleep disturbance has been assessed in terms of night time period RBLs. The descriptors L_{max} and L_1 may be considered interchangeably which is accepted by EPA.

Table 4.6 Sleep disturbance criteria – residential receptors (night period)

Receptor	Night period RBL (dB(A))	Sleep disturbance criteria dB(A), L_{max}
		Night period (10 pm to 7 am)
R1, R10	39	54
R2	35	50

4.3 Construction noise criteria

Construction activities will be limited to the realignment of the southern internal road. Activities will be completed over a period of approximately five working days. Construction activities will occur concurrently with operational activities and will therefore be assessed against operational noise criteria as per contemporary assessment methodology.

For reference purposes, the ICNG (DECCW 2009) provides the following definition of standard construction hours for activities where the noise is audible at residential premises:

- × Monday to Friday 7 am 6 pm;
- × Saturday 8 am 1 pm; and
- × No construction work is to take place on Sundays or public holidays.

Based on information provided by Boral, the construction activities will be completed Monday to Friday from 6 am to 6 pm. The corresponding criteria for out of hours construction activities (for the period 6 am to 7 am) would be identical to the operational criteria for this period.

4.4 Cumulative noise criteria

To limit continuing increases in industrial noise within a particular area, ambient industrial noise should not exceed the levels specified in Table 2.1 of the INP. There are multiple existing industrial sources surrounding the facility, including the Greystanes Estate SEL to the north and various commercial and industrial land uses to the south. The noise contribution of these sources has been estimated from the unattended monitoring data (refer to Section 3.1.1).

The relevant cumulative noise criteria are reproduced in Table 4.7.

Table 4.7 Cumulative noise criteria

Receptor	Indicative area	Time period ¹	Recommended noise level dB(A), <i>Leq,period</i>	
			Acceptable	Maximum
Residential	Suburban	Day	55	60
		Evening	45	50
		Night	40	45
Active recreation	All	When in use	55	60
Industrial	All	When in use	70	75

Source: INP (EPA 2000).

Note: 1. Day: 7 am to 6 pm Monday to Saturday; 8 am to 6 pm Sundays and public holidays; evening: 6 pm to 10 pm; night is the remaining periods.

4.5 Road noise criteria

The principle guidance for assessing the impact of road traffic noise on receptors is the RNP (EPA 2011). Road trucks will be used to transport material to and from the site via Widemere Road (southbound) and Reconciliation Road (northbound). No residential dwellings are located adjacent to the northbound route. The nearest potentially affected residences located along the southbound route are situated in Hassall Street and Gipps Road.

Hassall Street and Gipps Road are classified as arterial and sub arterial roads in accordance with the RNP. Table 4.8 presents the road noise assessment criteria reproduced from Table 3 of the RNP.

Table 4.8 Road traffic noise assessment criteria for residential land uses

Road category	Type of project/development	Assessment criteria, dB(A)	
		Day (7 am to 10 pm)	Night (10 pm to 7 am)
Freeway/arterial/sub arterial roads	Existing residences affected by additional traffic on existing freeway/arterial/sub arterial roads generated by land use developments.	Leq(15 hr) 60 (external)	Leq(9 hr) 55 (external)

Source: RNP (EPA 2011).

Additionally, the RNP (EPA 2011) states that where existing road traffic noise criteria are already exceeded, any additional increase in total traffic noise level should be limited to 2 dB.

In addition to meeting the assessment criteria, any significant increase in total traffic noise at receptors must be considered. Receptors experiencing increases in total traffic noise levels above those presented in Table 4.9 should be considered for mitigation.

Table 4.9 Relative increase criteria for residential land uses

Road category	Type of project/development	Total traffic noise level increase, dB(A)	
		Day (7 am to 10 pm)	Night (10 pm to 7 am)
Freeway/arterial/sub arterial roads and transitways	New road corridor/redevelopment of existing road/land use development with the potential to generate additional traffic on existing road.	Existing traffic	Existing traffic
		Leq(15 hr)+12 dB (external)	Leq(9 hr)+ 12 dB (external)

4.6 Vibration criteria

No significant vibration generating equipment items have been identified from the proposal. Also, buffer distances would mitigate potential ground vibration generated by plant and equipment. To that end, existing sensitive receivers (eg residences) are located over 1 km to the east of the site (ie Munro Street Greystanes), with possible future residences of Nelsons Ridge approximately 700 m from site. Plant and equipment at the site will not generate ground vibration levels perceptible at such distances. For example, crushing and screening plant include isolation mounts to reduce vibration transmitted to surrounding structures and to the ground. Other large plant include front end loaders, excavators and road trucks which are not major sources of vibration that could be perceptible off site.

Notwithstanding, the following vibration criteria are provided for reference.

4.6.1 Human comfort – Assessing vibration a technical guideline

Environmental Noise Management – Assessing Vibration: a technical guideline (DEC 2006) is based on guidelines contained in *BS 6472 – 2008, Evaluation of human exposure to vibration in buildings (1 80Hz)*.

The guideline presents preferred and maximum vibration values for use in assessing human responses to vibration and provides recommendations for measurement and evaluation techniques. At vibration values below the preferred values, there is a low probability of adverse comment or disturbance to building occupants. Where all feasible and reasonable mitigation measures have been applied and vibration values are still beyond the maximum value, it is recommended the operator negotiate directly with the affected community.

The guideline defines three vibration types and provides direction for assessing and evaluating the applicable criteria. Table 2.1 of the guideline provides examples of the three vibration types and has been reproduced in Table 4.10.

Table 4.10 Examples of types of vibration (from Table 2.1 of the guideline)

Continuous Vibration	Impulsive Vibration	Intermittent Vibration
Machinery, steady road traffic, continuous construction activity (such as tunnel boring machinery).	Infrequent: Activities that create up to 3 distinct vibration events in an assessment period, e.g. occasional dropping of heavy equipment, occasional loading and unloading. Blasting is assessed using ANZECC (1990).	Trains, intermittent nearby construction activity, passing heavy vehicles, forging machines, impact pile driving, jack hammers. Where the number of vibration events in an assessment period is three or fewer these would be assessed against impulsive vibration criteria.

i Continuous vibration

Appendix C of the guideline outlines acceptable criteria for human exposure to continuous vibration (1 80Hz). The criteria are dependent on both the time of activity (usually daytime or night time) and the occupied place being assessed. Table 4.11 reproduces the preferred and maximum criteria relating to measured peak velocity.

Table 4.11 Criteria for exposure to continuous vibration

Place	Time	Peak velocity (mm/s)	
		Preferred	Maximum
Critical working Areas (e.g. hospital operating theatres, precision laboratories)	Day or night time	0.14	0.28
Residences	Daytime	0.28	0.56
	Night time	0.20	0.40
Offices	Day or night time	0.56	1.1
Workshops	Day or night time	1.1	2.2

Notes: 1. RMS velocity (mm/s) and vibration velocity value (dB re 10 mm/s).⁹
2. Values given for most critical frequency >8 Hz assuming sinusoidal motion.

ii Intermittent vibration

Intermittent vibration (as defined in *Section 2.1* of the guideline) is assessed using the vibration dose concept which relates to vibration magnitude and exposure time.

Intermittent vibration is representative of activities such as impact hammering, rolling or general excavation work (such as an excavator tracking).

Section 2.4 of the Guideline provides acceptable values for intermittent vibration in terms of vibration dose values (VDV) which requires the measurement of the overall weighted rms (root mean square) acceleration levels over the frequency range 1 Hz to 80 Hz. To calculate VDV the following formula (refer Section 2.4.1 of the guideline) is used:

$$VDV = \left(\frac{a_{T,40}^{0.25}}{10^{1/4}} \int_0^T a(t) dt \right)^3$$

Where VDV is the vibration dose value in m/s^{1.75}, $a(t)$ is the frequency weighted rms of acceleration in m/s² and T is the total period of the day (in seconds) during which vibration may occur.

The acceptable VDV for intermittent vibration are reproduced in Table 4.12.

Table 4.12 Acceptable vibration dose values for intermittent vibration

Location	Daytime		Night time	
	Preferred value, m/s ^{1.75}	Maximum value, m/s ^{1.75}	Preferred value, m/s ^{1.75}	Maximum value, m/s ^{1.75}
Critical Areas	0.10	0.20	0.10	0.20
Residences	0.20	0.4	0.13	0.26
Offices, schools, educational institutions and places of worship	0.40	0.80	0.40	0.80
Workshops	0.80	1.60	0.80	1.60

Notes: 1. Daytime is 7 am to 10 pm and night time is 10 pm to 7 am.

2. These criteria are indicative only, and there may be a need to assess intermittent values against continuous or impulsive criteria for critical areas.

There is a low probability of adverse comment or disturbance to building occupants at vibration values below the preferred values. Adverse comment or complaints may be expected if vibration values approach the maximum values. The Guideline states that activities should be designed to meet the preferred values where an area is not already exposed to vibration.

4.6.2 Structural vibration criteria – DIN4150

For structural vibration, measurements should be assessed at the foundation of a building structure. In the absence of a relevant Australian Standard, the German Standard *DIN 4150 Part 3: 1999* provides the strictest guideline levels of vibration velocity for evaluating the effects of vibration in structures. The limits presented in this standard are generally recognised to be conservative.

The DIN 4150 values (maximum levels measured in any direction at the foundation, or maximum levels measured in (x) or (y) horizontal directions, in the plane of the uppermost floor), are summarised in Table 4.13 and shown graphically in Figure 4.1 in the case of foundation levels. For residential and commercial type structures, the standard recommends safe limits as low as 5 mm/s and 20 mm/s respectively. These limits increase with frequency values above 10 Hz. The operational frequency of construction plant typically ranges between 10 Hz to 30 Hz, and hence according to DIN4150, the safe vibration criteria range for dwellings is 5 to 15 mm/s. For reinforced commercial type buildings the limit is as low as 20 mm/s, while for heritage or sensitive structures the lower limit is 3 mm/s.

Table 4.13 **Structural damage guideline values of vibration velocity – DIN4150**

Line*	Type of Structure	Vibration velocity in mm/s			
		At foundation at a frequency of			Plane of floor of uppermost storey
		1Hz to 10Hz	10Hz to 50 Hz	50Hz to 100Hz	All frequencies
1	Buildings used for commercial purposes, industrial buildings and buildings of similar design.	20	20 to 40	40 to 50	40
2	Dwellings and buildings of similar design and/or use.	5	5 to 15	15 to 20	15
3	Structures that because of their particular sensitivity to vibration do not correspond to those listed in Lines 1 or 2 and have intrinsic value (e.g. buildings that are under a preservation order).	3	3 to 8	8 to 10	8

Notes: 1. "Line*" refers to curves in Figure 1 of DIN4150.
 2. For frequencies above 100Hz the higher values in the 50Hz to 100Hz column should be used.

These levels are safe limits, for which damage due to vibration effects is unlikely to occur. Damage is defined in DIN 4150 to include even minor non structural effects such as superficial cracking in cement render, the enlargement of cracks already present, and the separation of partitions or intermediate walls from load bearing walls.

Should such damage be observed without vibration levels exceeding the "safe limits" then it is likely to be attributable to other causes. DIN 4150 also states that when vibration levels higher than the "safe limits" are present, it does not necessarily follow that damage will occur.

As indicated by the criteria in Figure 4.1, high frequency vibration has less potential to cause damage than lower frequencies. Furthermore, the point source nature of vibration from plant causes the vibratory disturbances to arrive at different parts of nearby large structures in an out of phase manner, thereby reducing its potential to excite in phase motion of the low order modes of vibration in such structures.

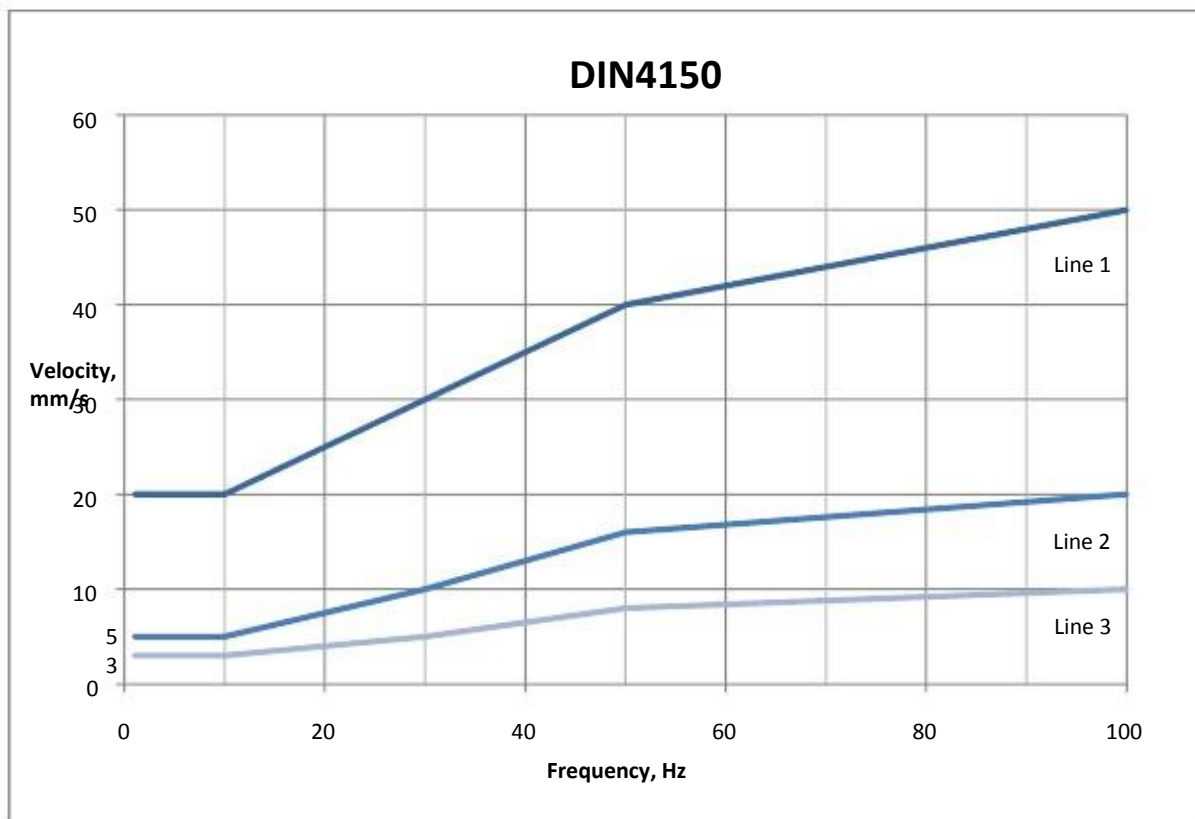


Figure 4.1 DIN4150 Structural vibration safe limits for buildings

5 Noise modelling methodology and parameters

5.1 Introduction

This section presents the methods and base parameters used to model noise emissions from the facility, including the effect of worst case meteorological conditions.

Noise modelling was based on three dimensional digitised ground contours of the surrounding topography, the internal site layout, buildings and stockpile areas at the facility. The equipment was placed at representative locations and heights, representing realistic operating scenarios for the facility based on data provided by Boral.

Noise predictions were carried out using Br el and Kjær Predictor Version 8.14 noise prediction software. 'Predictor' calculates total noise levels at receivers from the concurrent operation of multiple noise sources. The model considers factors such as:

- x the lateral and vertical location of plant;
- x source to receiver distances;
- x ground effects;
- x atmospheric absorption;
- x topography of the facility and surrounding area; and
- x applicable meteorological conditions.

5.2 Operational noise

The site plans used to determine plant location and operating parameters (such as equipment utilisation) were supplied by Boral. These represent indicative delivery and despatch operations at the facility. The noise model was configured to predict the total L_{eq} noise levels from the facility's operations. Noise emissions from all sources that contribute to the total noise level from the proposed facility operations were assessed. The noise model incorporates bunds and stockpiles as included in site plans provided by Boral.

The model has assumed simultaneous operation of all plant and equipment. In practice, such operating scenarios would only occur on occasion, therefore the noise predictions are considered to be conservative.

The modelling was completed for daytime, evening, night and morning shoulder periods for maximum impact meteorological scenarios presented in Table 3.4.

5.2.1 Noise sources

Table 5.1 summarises the operational noise sources and associated indicative sound power levels for the facility. Appendix C provides indicative plant make and model details, and total single octave sound power levels obtained from EMM's database of measurements. To that end, each source's spectra was reviewed against the INP's tonal test and shown to pass. Similarly, the INP's low frequency test (applied at source) shows most sources pass, with the exception of the blending plant. However, this source has comparatively significantly lower emission levels than other sources (eg crushers and screens). The total spectra of all plant together passes both the tonal and low frequency INP tests and hence no penalty is applicable.

Figure 3.1 shows the location of modelled plant and equipment. Corrections have been applied to the 980H loader to account for partial utilisation during the night time period (10 pm to midnight).

Table 5.1 Indicative operations plant and equipment sound power levels

Item	Number	Lw, Leq(15 min), dB(A)	Operational period			
			Day	Evening	Night	Morning shoulder
980H Loader	1	108	3	3	3	3
980H Loader	2	108	3	3		3
972 Loader	1	110	3			3
Telehandler	1	106	3	3		3
Powerscreen	1	111	3			3
Excavator 227	1	105	3	3		3
Excavator 226	1	105	3	3		3
Freightliner	1	115	3			3
Jaw crusher	1	116	3	3		3
Impact crusher	1	112	3	3		3
Primary screen	1	115	3	3		3
Secondary screen	1	111	3	3		3
Screen 3	1	107	3	3		3
Blending plant (Stab Plant)	1	105	3			3
Trucks (empty)	(refer to Table 5.2)	105	3	3	3	3
Trucks (full)	(refer to Table 5.2)	95	3	3	3	3

Notes: 1. Traffic movements on site are classified as operational sources.

A summary of truck movements to and from the facility is presented in Table 5.2, based on the traffic impact assessment undertaken for the proposal by EMM. Additionally, it is anticipated that approximately 25 trucks will be onsite in any one hour during the day period (6 am to 6 pm), with three trucks present during any hour during the evening and night period (6 pm to 6 am).

Table 5.2 Future facility traffic movements – typical (average) day

Activity	Truck movements	Percentage (%)
Imports	364 (182 trucks)	59
Exports	248 (124 trucks)	41
Total	612 (306 trucks)	100

Note: Traffic movements on site are classified as operational sources.

5.3 Sleep disturbance assessment

People asleep in their homes may be disturbed by intermittent on site noises, such as reversing alarms or heavy vehicles. Typical noise levels from the loudest of these events are presented in Table 5.3. Levels were obtained from measurements undertaken by EMM on similar projects.

Table 5.3 Maximum noise from intermittent sources

Noise source	Measured L _{max} noise level, dB(A)
Road truck trailer impact	120
Reverse alarm	105–115 (with maximum modifying factor adjustment)

Table 5.3 indicates that the highest maximum noise levels received would likely result from road truck trailer impacts. The maximum (at source) sound power level of these is typically 120 dB(A) L_{max}. Maximum noise levels at each residential assessment location were calculated assuming worst case meteorological conditions (ie 3 m/s source to receptor winds). Where sleep disturbance noise levels are below relevant criteria for worst case conditions, levels would comply for all other meteorological conditions. The assessment is representative of the night period of 10 pm to 7 am.

Predicted L_{max} noise levels were based on the worst case plant locations during operations. Predictions were based on a single event, rather than the simultaneous operation of a number of plant items, due to of the low probability of more than one maximum noise event occurring concurrently.

5.4 Construction noise assessment

The construction fleet modelled for this assessment is presented in Table 5.4. This fleet was provided by Boral, with sound power levels obtained from EMM's database of measurements. Construction plant was modelled in conjunction with the operational noise fleet to reflect simultaneous construction and operational noise.

The construction assessment was completed adopting maximum impact meteorological conditions (ie 3 m/s source to receptor winds). Where construction noise levels are below relevant criteria for these conditions, levels would comply for all other meteorological conditions. This assessment was completed for daytime and morning shoulder periods (6 am to 6 pm).

Table 5.4 **Indicative construction plant and equipment sound power levels**

Item	Number	Lw, Leq(15 min), dB(A)
Grader	1	104
Front end loader	1	116
Bobcat	1	100
Asphalt paver	1	119
Roller	1	114

5.5 Cumulative noise assessment

The cumulative assessment was completed in accordance with the INP, and considered the $L_{eq}(\text{period})$ noise levels from existing industrial noise sources and the modelled worst case impacts from the facility.

Cumulative impacts were assessed based on estimated existing industrial noise levels (refer to Section 3.1.1) and the worst case model predictions for each assessment location. The impacts were assessed with reference to relevant amenity criteria in the INP (see Table 4.7).

6 Noise impact assessment results

6.1 Operational noise modelling results

The predicted noise levels for the facility for day, evening, night and morning shoulder operations for the modelled meteorological conditions are presented in Table 6.1. Predicted $L_{eq}(15 \text{ min})$ noise levels have been assessed against the PSNLs (refer to Table 4.5). Predictions assessed against $L_{eq,period}$ criteria should be considered conservative as the criteria apply over the entire assessment period as opposed to the modelled 15 minute period.

It should be noted that only the maximum prevailing wind is presented for any period. Where predicted noise levels are below relevant criteria for these conditions, levels would comply for all other meteorological conditions.

The modelling results show that noise emissions are predicted to be below the PSNLs at all assessment locations for all periods.

Figures 6.1 presents the overall maximum impact noise contours for maximum winds to the residential assessment locations during the daytime period.

Table 6.1 Predicted facility operational noise levels $L_{eq}(15 \text{ min})$, dB(A)

Assessment location	Period ¹	Calm ²	Maximum impact winds (3 m/s) ³	Inversion ^{4,5}	PSNL
R1 (L1)	Day	37	39	n/a	48 $L_{eq}(15 \text{ min})$
	Evening	35	38	n/a	39 $L_{eq,period}$
	Night	<30	<30	<30	37 $L_{eq,period}$
	Morning shoulder	37	39	39	41 $L_{eq,period}$
R2 (L2)	Day	32	35	n/a	42 $L_{eq}(15 \text{ min})$
	Evening	31	34	n/a	39 $L_{eq,period}$
	Night	<30	<30	<30	32 $L_{eq,period}$
	Morning shoulder	32	35	35	37 $L_{eq,period}$
R3	Day	37	40	n/a	70 $L_{eq,period}$
	Evening	35	38	n/a	70 $L_{eq,period}$
	Night	<30	<30	<30	70 $L_{eq,period}$
	Morning shoulder	37	40	40	70 $L_{eq,period}$
R4	Day	51	54	n/a	70 $L_{eq,period}$
	Evening	49	51	n/a	70 $L_{eq,period}$
	Night	<30	31	31	70 $L_{eq,period}$
	Morning shoulder	51	54	54	70 $L_{eq,period}$
R5	Day	42	45	n/a	70 $L_{eq,period}$
	Evening	40	43	n/a	70 $L_{eq,period}$
	Night	<30	<30	<30	70 $L_{eq,period}$
	Morning shoulder	42	45	45	70 $L_{eq,period}$

Table 6.1 Predicted facility operational noise levels $L_{eq}(15 \text{ min})$, dB(A)

Assessment location	Period ¹	Calm ²	Maximum impact winds (3 m/s) ³	Inversion ^{4,5}	PSNL
R6	Day	42	45	n/a	52 $L_{eq,period}$
	Evening	41	44	n/a	52 $L_{eq,period}$
	Night	<30	<30	<30	52 $L_{eq,period}$
	Morning shoulder	42	45	45	52 $L_{eq,period}$
R7	Day	37	40	n/a	52 $L_{eq,period}$
	Evening	35	38	n/a	52 $L_{eq,period}$
	Night	<30	<30	<30	52 $L_{eq,period}$
	Morning shoulder	37	40	40	52 $L_{eq,period}$
R8	Day	48	51	n/a	55 $L_{eq,period}$
	Evening	47	50	n/a	55 $L_{eq,period}$
	Night	<30	31	<30	55 $L_{eq,period}$
	Morning shoulder	48	51	51	55 $L_{eq,period}$
R9	Day	40	43	n/a	52 $L_{eq,period}$
	Evening	38	41	n/a	52 $L_{eq,period}$
	Night	<30	<30	31	52 $L_{eq,period}$
	Morning shoulder	40	43	43	52 $L_{eq,period}$
R10 (L1)	Day	36	39	n/a	48 $L_{eq}(15 \text{ min})$
	Evening	34	37	n/a	39 $L_{eq,period}$
	Night	<30	<30	<30	37 $L_{eq,period}$
	Morning shoulder	36	39	39	41 $L_{eq,period}$

Notes:

1. Day: 7 am to 6 pm Monday to Saturday; 8 am to 6 pm Sundays and public holidays; evening: 6 pm to 10 pm; morning shoulder: 6 am to 7 am; night is the remaining periods.
2. Calm: no winds or temperature gradient (refer to section 3.2.1).
3. Max prevailing wind: maximum prevailing winds noise level predicted at each assessment location.
4. Inversion: F class inversion.
5. Inversion conditions occur during night and morning shoulder periods only.

6.2 Sleep disturbance assessment

The predicted L_{max} noise levels associated with the facility at the nearest residential assessment locations are presented in Table 6.2 for maximum impact meteorological conditions. Predictions have been made for the night time (10 pm to 6 am) period in accordance with the INP (EPA 2000).

Noise modelling demonstrates that L_{max} noise levels associated with the site would be below the relevant sleep disturbance criteria at all residential assessment locations for all meteorological conditions.

Table 6.2 Predicted L_{max} noise levels at residential assessment locations night, dB(A)

Assessment location	Calm ¹	Max prevailing wind ²	Inversion ³	L_{max} criteria
R1	35	38	38	54
R2	24	27	27	50
R10	33	36	36	54

Notes:

1. Calm: no winds or temperature gradient (refer to section 3.2.1).
2. Max prevailing wind: maximum prevailing winds noise level at each assessment location.
3. Inversion: F class inversion.



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Maximum impact winds to residential receptors

Noise Assessment
Figure 6.1

6.3 Construction noise assessment

Noise associated with the construction activities has been assessed against operational criteria (ie background + 5 dB(A)) since construction will coincide with operational activities. The noise model was configured to predict the total L_{eq} noise levels from all construction activities in conjunction with operational site noise. It is anticipated that construction will be limited to five days and only to realignment of the southern haul road.

Noise modelling demonstrates that construction noise levels associated with the facility would be below the relevant construction noise criteria at all residential assessment locations during worst case meteorological conditions.

Table 6.3 Predicted construction noise levels, dB(A)

Assessment location	Predicted noise levels		Criteria
	Calm ¹	Max prevailing wind ²	
R1	40	43	48
R2	37	40	42
R3	40	43	70
R4	56	58	70
R5	45	48	70
R6	45	48	55
R7	40	43	55
R8	51	53	55
R9	43	46	55
R10	42	44	48

Notes:

1. Calm: no winds or temperature gradient (refer to section 3.2.1).
2. Max prevailing wind: maximum prevailing winds noise level at each assessment location.
3. Operational criteria adopted as construction simultaneous with operational noise.

6.4 Cumulative noise assessment

Cumulative noise predictions have been completed based on modelled worst case noise levels from the facility in conjunction with estimated existing industrial noise (refer to section 3.1.1). The highest measurements for day, evening and night periods have been compared to worst case model predictions to provide a conservative estimate of cumulative noise levels.

The $L_{eq,period}$ level is derived by applying a correction factor of 3 dB(A) to modelled $L_{eq(15\ min)}$ intrusive noise levels; this is a commonly accepted approach by acoustic practitioners and is considered conservative in EMM's experience. This correction factor has been applied to day and evening period predictions only, while night time predictions have been modelled to account for operating durations discussed in Section 6.1. Table 6.4 presents the results of the cumulative noise assessment at residential assessment locations. It should be noted that the existing industrial noise contribution excludes the subject site.

Table 6.4 Predicted cumulative noise levels at residential assessment locations during worst case conditions $L_{eq}(\text{period})$, dB(A)

Assessment location	Period ¹	Measured existing industrial contribution dB(A)	Modelled worst case facility contribution dB(A)	Future total cumulative contribution dB(A)	Cumulative criteria, dB(A)
		$L_{eq,period}$	$L_{eq,period}$	$L_{eq,period}$	$L_{eq,period}$
R1 (L1)	Day	45	36	46	55
	Evening	45	35	45	45
	Night	42	<30	42	40
R2 (L2)	Day	41	32	42	55
	Evening	41	31	41	45
	Night	38	<30	38	40
R10 (L1)	Day	45	36	46	55
	Evening	45	34	45	45
	Night	42	<30	42	40

The cumulative noise result comparison identifies that the proposed facility's predicted noise contribution will have negligible impacts at residences. Levels are predicted to increase by up to 1 dB(A) from 'existing' (without site) cumulative industrial noise at assessment locations R1, R2 and R10 for day period only. It is noted that existing industrial noise levels exceed the night time cumulative noise residential criteria at R1 and R10, however these levels are unaffected by the facility's operations.

Table 6.5 presents the results of the cumulative noise assessment at non residential assessment locations. Criteria for these assessment locations apply when in use, and existing industrial contributions were estimated at either less than 6 dB below ANLs (R3 to R5 and R8) or 52 dB(A) based on R10 as discussed in Section 4.1.3. As for Table 6.4, estimated 'existing' industrial contribution excludes the current site operations.

Table 6.5 Predicted cumulative noise levels at non residential assessment locations during worst case conditions $L_{eq}(\text{period})$, dB(A)

Assessment location	Period ¹	Estimated existing industrial contribution dB(A)	Modelled worst case facility contribution dB(A)	Future total cumulative contribution dB(A)	Cumulative criteria, dB(A)
		$L_{eq,period}$	$L_{eq,period}$	$L_{eq,period}$	$L_{eq,period}$
R3	When in use	<64	37	<64	70
R4	When in use	<64	51	<64	70
R5	When in use	<64	42	<64	70
R6	When in use	52	42	52	55
R7	When in use	52	37	52	55
R8	When in use	<49	48	<52	55
R9	When in use	52	40	52	55

Cumulative noise levels at industrial and recreational assessment locations including the proposed facility will remain below the relevant criteria.

6.5 Road traffic noise

6.5.1 Operational road traffic noise

Traffic travelling to and from the facility travels northbound on Reconciliation Drive via the M4 Motorway, Prospect Highway and Great Western Highway, and southbound on Reconciliation Drive via Hassall Street and Gipps Road to the Horsley Drive and Cumberland Highway. It is noted there are no residential assessment locations along the northbound route. The nearest potentially affected residences are located on Hassall Street (south of Reconciliation Drive) along the southbound route.

The US Environment Protection Agency's method was used to predict the L_{eq} noise levels from traffic travelling along Hassall Street at adjacent residences. This method is an internationally accepted theoretical traffic noise prediction model and is ideal for calculating road traffic noise where relatively low traffic flows are encountered.

The assessment was completed based on data for operational traffic movements. Estimates of existing and future traffic noise levels were made using traffic volumes from the traffic impact assessment for the proposal (EMM 2014). Based on this report for movements south of Reconciliation Drive (in the direction of Hassall Road), the existing daily traffic volumes are in the order of 8,350 movements per day, which is consistent with the findings of a historical traffic assessment for the facility (*Construction Materials Recycling Facility EIS* (ERM 2002)). These volumes include the current site related traffic volumes. The traffic impact assessment noted that the split of facility related truck movements was in the order of 70% northbound and 30% southbound, with light vehicle movements in the order of 70% southbound and 30% northbound. A summary of site related truck volumes is presented in Table 6.6.

Table 6.6 Average daily truck volumes

Truck movements	Current operations			Proposed operations			Increase
	Imported waste	Exported product	Total	Imported waste	Exported product	Total	
Average trucks/day	124	110	234	182	124	306	72
Average movements/day	248	220	468	364	248	612	144

Traffic noise calculations are presented in Table 6.7 for the closest residences on Hassall Road, which are set back approximately 15 m from the road. For the purpose of this assessment traffic volumes distributions of 85% and 15% have been assumed over the day and night time assessment periods, which is industry accepted practice.

Table 6.7 Road traffic noise levels at residences on Hassall Road

Distance to nearest privately owned residences (m)	Calculated existing traffic noise	Calculated additional site traffic noise	Combined (existing + site) traffic noise	Assessment criteria	Difference (existing and combined)
		¹ Day Leq(15 hr), dB(A)			
15	69.0	50.0	69	60	<1.0
		Night Leq(9 hr), dB(A)			
15	63.0	50.0	63	55	<1.0

Notes: 1. Day period: 7 am to 10 pm, night period: 10 pm to 7 am as per the RNP (2011).
2. Distances were measured to the nearest identified residential dwellings via Google Earth.

The results in Table 6.7 demonstrate that road traffic noise increases associated with the proposal will be negligible (less than 1 dB). Existing traffic noise exceeds criteria at the nearest residences on Hassall Road. Given this, the RNP requires that future traffic noise levels satisfy the allowable increase criteria of not more than 2dB. This is achieved.

6.5.2 Construction road traffic noise

A review of construction road traffic noise has been completed for the asphalt laying which will occur over one day only. All other construction resources will be sourced onsite and will not generate offsite traffic movements.

A total of ten staff will be required for asphalt laying which will be negligible compared to existing traffic levels, therefore construction road traffic has not been considered further.

7 Conclusion

EMM has completed a noise assessment for the proposal, which comprises a production capacity increase at the facility.

Based on the modelling results, the noise emissions from the proposed modification would satisfy the PSNLs at all assessment locations.

Potential sleep disturbance impacts from operational maximum noise level events have been assessed and are expected to satisfy the relevant criteria at all assessment locations.

The cumulative noise assessment identified that the facility contributes to total industrial noise by up to 1 dB at the most affected residential assessment locations during the day period. It is noted that existing industrial noise levels exceed the night time cumulative noise criteria, however these levels are unaffected by the proposed facility operations. Cumulative noise levels including the proposed facility will remain below relevant criteria at industrial and recreational assessment locations.

The road traffic noise associated with the Widemere Recycling facility's operations is expected to comply with relevant RNP criteria. Construction road traffic noise impacts were considered to be negligible due to the short duration and relatively minimal requirement for external materials during the construction phase.

References

HLA August 2005, *Statement of Environmental Effects to support Modification Application, Boral Recycling, Widemere Road Wetherill Park NSW.*

ERM 2002, *Construction Materials Recycling Facility Environment Impact Statement.*

NSW Department of Environment and Climate Change (DECC) 2009 *Interim Construction Noise Guideline.*

NSW Environment Protection Authority (EPA) 2000, *NSW Industrial Noise Policy.*

NSW Environmental Protection Authority (EPA) 2011, *Road Noise Policy.*

NSW Government's Environmental Assessment Report (EAR) *Major Project Assessment – Greystanes Southern Employment Lands* (MP06_0181)(July 2007).

Appendix A

Glossary of acoustic terms

Table A.1 **Glossary of acoustic terms**

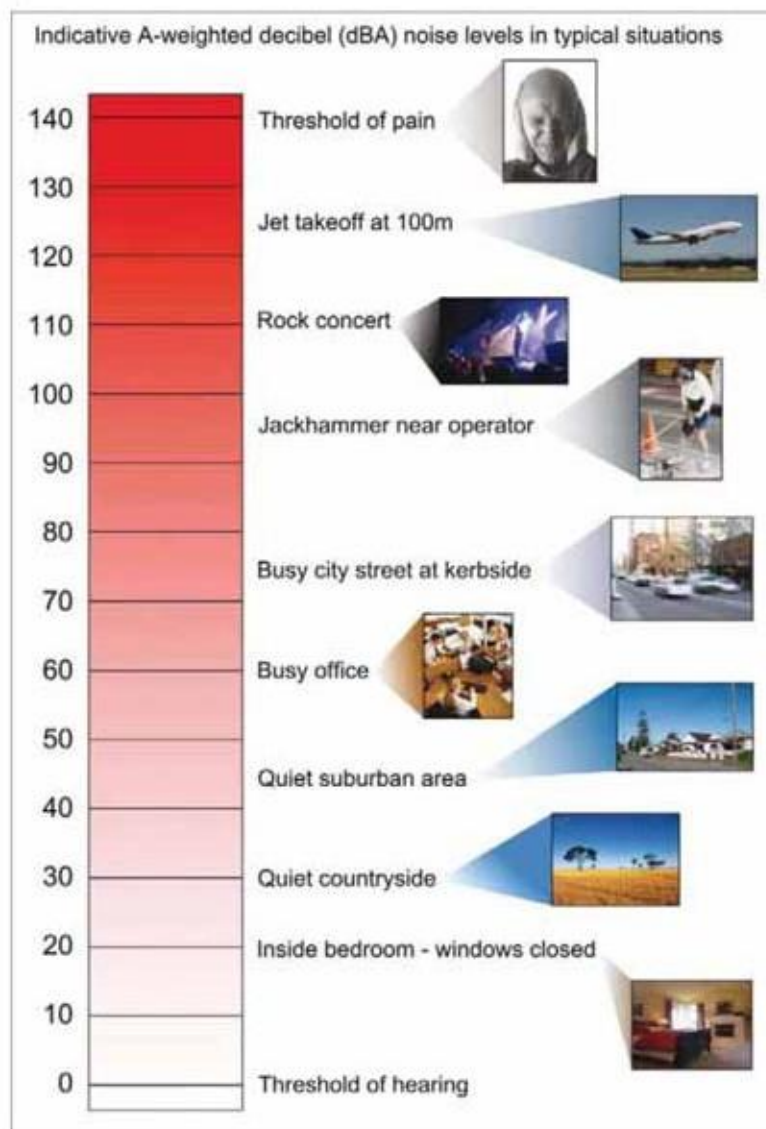
Term	Description
ABL	The assessment background level (ABL) is defined in the INP as a single figure background level for each assessment period (day, evening and night). It is the tenth percentile of the measured L_{90} statistical noise levels.
dB(A)	Noise is measured in units called decibels (dB). There are several scales for describing noise, the most common being the 'A weighted' scale. This attempts to closely approximate the frequency response of the human ear.
EP&A Act	<i>Environmental and Planning Assessment Act 1979 (NSW)</i>
ICNG	Interim Construction Noise Guideline.
INP	Industrial Noise Policy.
L_1	The noise level exceeded for 1% of the time.
L_{10}	The noise level which is exceeded 10% of the time. It is roughly equivalent to the average of maximum noise level.
L_{90}	The noise level that is exceeded 90% of the time. Commonly referred to as the background noise level.
L_{eq}	The energy average noise from a source. This is the equivalent continuous sound pressure level over a given period. The $L_{eq(15min)}$ descriptor refers to an L_{eq} noise level measured over a 15 minute period.
L_{max}	The maximum root mean squared sound pressure level received at the microphone during a measuring interval.
PSNL	The project specific noise levels (PSNL) are criteria for a particular industrial noise source or industry. The PSNL is the lower of either the intrusive criteria or amenity criteria.
RBL	The Rating Background Level (RBL) is an overall single value background level representing each assessment period over the whole monitoring period. The RBL is used to determine the intrusiveness criteria for noise assessment purposes and is the median of the ABL's.
RNP	Road Noise Policy
Sound power level (L_w)	A measure of the total power radiated by a source. The sound power of a source is a fundamental property of the source and is independent of the surrounding environment.

It is useful to have an appreciation of decibels, the unit of noise measurement. Table A.2 gives an indication as to what an average person perceives about changes in noise level.

Table A.2 **Perceived change in noise**

Change in sound level (dB)	Perceived change in noise
3	just perceptible
5	noticeable difference
10	twice (or half) as loud
15	large change
20	four times as loud (or quarter) as loud


Examples of common noise levels are provided in Figure A.1.





Source: RTA Environmental Noise Management Manual (RTA, 2001)


Figure A.1 Common noise levels

Appendix 3: Site Inspection Template

Site Inspection : Widemere Recycling				W\C :			
	M	T	W	T	F	Comments	
Weighbridge/Office area							
Work area clear and tidy							
Fire extinguishers and exits clear of obstructions							
Floor free of obstructions							
Are site security measures effective E.g. Fencing							
First aid kits available							
Receivals Area							
All Personal wearing correct PPE							
All personal trained in working on Foot programme							
First aid kits available							
All faces clear of overhang and no vertical faces							
Machines positioned in a safe area							
Are materials unloading procedures complied with ?							
Area clear of rubbish and debris							
Control Room							
Work area clear and tidy							
Fire extinguishers and exits clear of obstructions							
Floor free of obstructions							
First aid kits available							
Cameras working							

Site Inspection : Widemere Recycling				W\C :			
	M	T	W	T	F	Comments	
Plant							
All Guards in place in good condition and bolted on							
Area clear of rubbish and debris							
Weekly plant inspection done							
All Personal wearing correct PPE							
Water sprays are on							
Any work being carried out has a current SWMS							
Fire extinguishers properly mounted and signposted							
Walkways clear							
Are equipment noise control measures adequately maintained ?							
No excessive spillage							
Stockpile Yard							
Unbound Base							
DGB 20							
Pipe Bedding							
10mm Agg							
20mm Agg							
10mm Rec Agg							
20mm Rec Agg							
Roads clear of potholes/in good condition							
All faces clear of overhang and no vertical faces							
Are materials management procedures operating effectively ?							
Are Dust suppression measures operating effectively ?							
Are loading procedures complied with ?							
Signs maintained and visible							

Site Inspection : Widemere Recycling				W\C :			
	M	T	W	T	F	Comments	
Lab							
Work area clear and tidy							
Fire extinguishers and exits clear of obstructions							
Floor free of obstructions							
First aid kits available							
Stab Plant							
All Guards in place in good condition and bolted on							
Area clear of rubbish and debris							
Daily plant inspection done							
All Personal wearing correct PPE							
Fire extinguishers properly mounted and signposted							
Walkways clear							
No excessive spillage							
Workshop							
Work area clear and tidy							
Fire extinguishers and exits clear of obstructions							
Floor free of obstructions							
First aid kits available							
Last date of Oil Water Separator Service ?							
Any work being carried out has a current SWMS							
Are on site re-fuelling procedures undertaken in a safe manner ?							
Are all bund valves closed and integrity ok ?							
Are wastes being stored and disposed of appropriately ?							
All Personal wearing correct PPE							
Wheel Wash							
Sprays working							
Bin empty							
Electrical box closed							
Floc available							

Site Inspection : Widemere Recycling				W\C :			
	M	T	W	T	F	Comments	
Dam							
Water level							
Meter reading same as previous day							
Grass and trees ok							
Are soil erosion and water controls operating effectively ?							
1st Flush capacity is maintained in detention basin ?							
Last water sample date from detention basin (every 2 mnths)							
Area clear of rubbish and debris							
Check Stormwater Drains							
Inspection Summary							
Are there any additional environmental issues resulting from the inspection							

Immediate Actions	Planned Actions

Signed Dated :

Appendix 4: Complaints Summary Template



POLLUTION COMPLAINTS REGISTER: Widemere Recycling

- as per Section M4 of EPA license
- to be kept for at least 4 years.

Date & Time	Method of Complaint (phone, face-to-face)	Details of Complainant	Nature of Complaint	Action taken	Reason for no action (if applicable)

Appendix 5: Transport Code of Conduct

Date Documented	1st December 2006
Date Reviewed	2nd April 2016
Next Review Date	2nd April 2017
1. Purpose	
<p>The purpose of this Code is to ensure that all road truck operators accessing the Boral Recycling site at Widemere use the designated site access, public routes and comply with all the given conditions.</p>	
2. Scope	
<p>This Code applies to all road truck drivers accessing the Widemere site and off-site public roads.</p> <p>This Code has been documented to provide a formal set of rules to truck drivers accessing the Widemere site and off-site public roads. This procedure also outlines the Boral Recycling management responsibilities in taking corrective action should a road truck driver not follow the documented site access routes or breach conditions outlined in Section 5.</p> <p>Any problems for which no solutions are given in this procedure are to be forwarded to the Recycling Manager.</p>	

3. Definitions

Road Truck

Rigid or non-rigid road registered truck, used to carry processed quarry materials from the Widemere site.

Gunnels

The top surface of the sides of a road truck body that is used to carry quarry material.

4. Responsibilities

Recycling Manager responsibilities:

- To ensure that all relevant information is provided to road truck operators so that they are fully informed on their responsibilities under the procedures as documented below.
- Should a breach of procedures occur, ensure that the driver is identified.
- When identified, ensure that the following action is undertaken in the listed order:
 1. Following an initial breach, verbally inform the driver of the breach, remind the driver of his/ her responsibilities under this procedure and outline further action that will be undertaken should a further breach occur.
 2. Following a second breach, inform the driver's manager/ truck owner of the breach by way of a Boral letter.
 3. Following a third breach, inform the driver and the driver's manager/ truck owner in writing, that a truck operated by that driver will no longer be loaded at the Boral Recycling Widemere site.
- To ensure this work procedure is reviewed as required and must be reviewed after a period of 12 months has elapsed from the implementation date.

Supervisor (s) must:

- To assist in identifying any driver who has breached their responsibilities.
- Should a member of the public contact the site on the complaints phone number, ensure that all relevant information is recorded and passed on to the Recycling Manager.

Truck Operator(s) must:

- Must access the Widemere site using the designated routes (see attached map below):

Subject to compliance with the noise limits defined under this consent, operation activities associated with the construction materials recycling facility shall only be carried out between the following hours;

- a) 6:00am and 10:00pm Mon to Fri inclusive
- b) 6:00am to 4:00pm Saturdays
- c) No times on Sunday or Public Holidays

Notwithstanding condition 3.2 of this consent, but subject to compliance with noise limits defined under this consent, ancillary operation activities associated with the construction materials recycling facility may be carried out between the following hours;

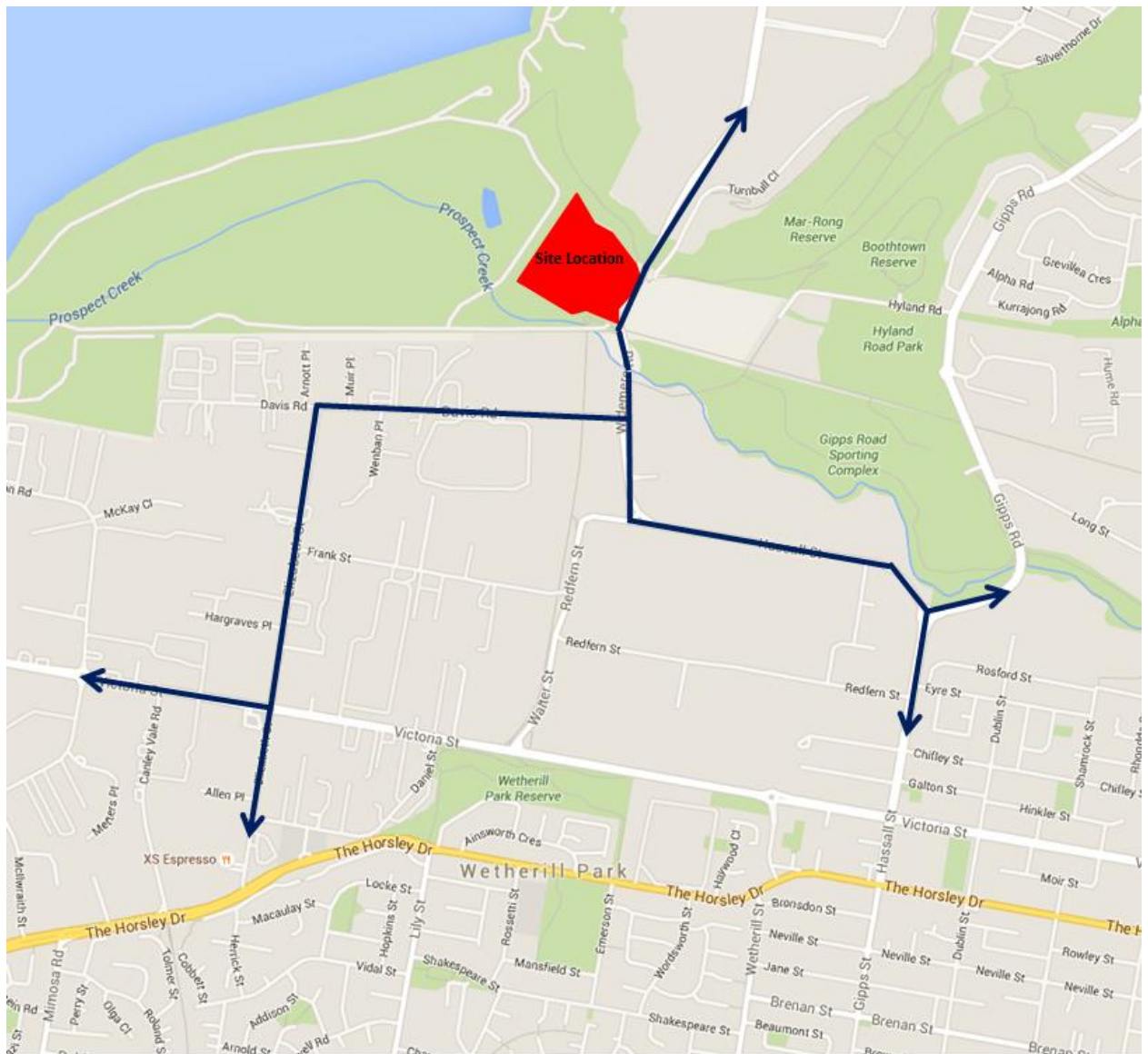
- a) 6:00am to midnight Friday inclusive
- b) between 6:00am and 4:00pm on Saturdays.
- c) at no time on Sunday or Public Holiday

- Must obey all traffic road rules including speed limits and traffic signals.
- Must ensure that gunnels on loaded trucks are swept before leaving the site and that all loads are covered.
- Must avoid unnecessary use of engine brakes in residential areas.
- Must avoid travelling in convoys.

5. Review / Evaluation

This procedure will be reviewed and evaluated within 12 months or earlier due to:

- Changes in the procedures
- Environmental monitoring indicating changed levels



Appendix 6: The recovered aggregate exemption 2014



Resource Recovery Order under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014

The recovered aggregate order 2014

Introduction

This order, issued by the Environment Protection Authority (EPA) under clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014 (Waste Regulation), imposes the requirements that must be met by suppliers of recovered aggregate to which 'the recovered aggregate exemption 2014' applies. The requirements in this order apply in relation to the supply of recovered aggregate for application to land as a road making material, or in building, landscaping or construction works.

1. Waste to which this order applies

- 1.1. This order applies to recovered aggregate. In this order, recovered aggregate means material comprising of concrete, brick, ceramics, natural rock and asphalt processed into an engineered material. This does not include refractory bricks or associated refractory materials, or asphalt that contains coal tar.

2. Persons to whom this order applies

- 2.1. The requirements in this order apply, as relevant, to any person who supplies recovered aggregate that has been generated, processed or recovered by the person.
- 2.2. This order does not apply to the supply of recovered aggregate to a consumer for land application at a premises for which the consumer holds a licence under the POEO Act that authorises the carrying out of the scheduled activities on the premises under clause 39 'waste disposal (application to land)' or clause 40 'waste disposal (thermal treatment)' of Schedule 1 of the POEO Act.

3. Duration

- 3.1. This order commences on 24 November 2014 and is valid until revoked by the EPA by notice published in the Government Gazette.

4. Processor requirements

The EPA imposes the following requirements on any processor who supplies recovered aggregate.

Sampling requirements

- 4.1. On or before supplying recovered aggregate, the processor must:
 - 4.1.1. Prepare a written sampling plan which includes a description of sample

preparation and storage procedures for the recovered aggregate.

- 4.1.2. Undertake sampling and testing of the recovered aggregate as required under clauses 4.2 and 4.3 below. The sampling must be carried out in accordance with the written sampling plan and Australian Standard 1141.3.1-2012 Methods for sampling and testing aggregates – Sampling – Aggregates (or equivalent).
- 4.2. Where the recovered aggregate is generated as part of a continuous process, the processor must undertake the following sampling:
 - 4.2.1. Characterisation of the recovered aggregate by collecting 20 composite samples of the waste and testing each sample for the chemicals and other attributes listed in Column 1 of Table 1. Each composite sample must be taken from a batch, truckload or stockpile that has not been previously sampled for the purposes of characterisation. Characterisation must be conducted for recovered aggregate generated and processed every year following the commencement of the continuous process; and
 - 4.2.2. Routine sampling of the recovered aggregate by collecting either 5 composite samples from every 4,000 tonnes (or part thereof) processed or 5 composite samples every 3 months (whichever is the lesser); and testing each sample for the chemicals and other attributes listed in Column 1 of Table 1 other than those listed as 'not required' in Column 3. Each composite sample must be taken from a batch, truckload or stockpile that has not been previously sampled for the purposes of routine sampling. However, if characterisation sampling occurs at the same frequency as routine sampling, any sample collected and tested for the purposes of characterisation under clause 4.2.1 may be treated as a sample collected and tested for the purposes of routine sampling under clause 4.2.2.
- 4.3. Where the recovered aggregate is not generated as part of a continuous process, the processor must undertake one-off sampling of a batch, truckload or stockpile of the recovered aggregate, by collecting 10 composite samples from every 4,000 tonnes (or part thereof) processed and testing each sample for the chemicals and other attributes listed in Column 1 of Table 1. The test results for each composite sample must be validated as compliant with the maximum average concentration or other value listed in Column 2 of Table 1 and the absolute maximum concentration or other value listed in Column 4 of Table 1 prior to the supply of the recovered aggregate.

Chemical and other material requirements

- 4.4. The processor must not supply recovered aggregate to any person if, in relation to any of the chemical and other attributes of the recovered aggregate:
 - 4.4.1. The concentration or other value of that attribute of any sample collected and tested as part of the characterisation, or the routine or one-off sampling, of the recovered aggregate exceeds the absolute maximum concentration or other value listed in Column 4 of Table 1, or
 - 4.4.2. The average concentration or other value of that attribute from the characterisation or one-off sampling of the recovered aggregate (based on the arithmetic mean) exceeds the maximum average concentration or other value listed in Column 2 of Table 1, or
 - 4.4.3. The average concentration or other value of that attribute from the routine sampling of the recovered aggregate (based on the arithmetic mean) exceeds the maximum average concentration or other value

listed in Column 3 of Table 1.

- 4.5. The absolute maximum concentration or other value of that attribute in any recovered aggregate supplied under this order must not exceed the absolute maximum concentration or other value listed in Column 4 of Table 1.

Table 1

Column 1	Column 2	Column 3	Column 4
Chemicals and other attributes	Maximum average concentration for characterisation (mg/kg 'dry weight' unless otherwise specified)	Maximum average concentration for routine testing (mg/kg 'dry weight' unless otherwise specified)	Absolute maximum concentration (mg/kg 'dry weight' unless otherwise specified)
1. Mercury	0.5	Not required	1
2. Cadmium	0.5	0.5	1.5
3. Lead	75	75	150
4. Arsenic	20	Not required	40
5. Chromium (total)	60	60	120
6. Copper	60	60	150
7. Nickel	40	Not required	80
8. Zinc	200	200	350
9. Electrical Conductivity	1.5 dS/m	1.5dS/m	3 dS/m
10. Metal	1%	1%	2%
11. Plaster	0.25%	0.25%	0.5%
12. Rubber, plastic, paper, cloth, paint, wood and other vegetable matter	0.2%	0.2%	0.3%

Test methods

- 4.6. The processor must ensure that any testing of samples required by this order is undertaken by analytical laboratories accredited by the National Association of Testing Authorities (NATA), or equivalent.
- 4.7. The processor must ensure that the chemicals and other attributes (listed in Column 1 of Table 1) in the recovered aggregate it supplies are tested in accordance with the test methods specified below or other equivalent analytical methods. Where an equivalent analytical method is used the detection limit must be equal to or less than that nominated for the given method below.
- 4.7.1. Test method for measuring the mercury concentration:
- 4.7.1.1. Analysis using USEPA SW-846 Method 7471B Mercury in solid or semisolid waste (manual cold vapour technique), or an equivalent analytical method with a detection limit < 20% of the stated maximum average concentration in Table 1, Column 2 (i.e. < 0.1 mg/kg dry weight).
- 4.7.1.2. Report as mg/kg dry weight.
- 4.7.2. Test methods for measuring chemicals 2 - 8:

- 4.7.2.1. Sample preparation by digesting using USEPA SW-846 Method 3051A Microwave assisted acid digestion of sediments, sludges, soils, and oils.
- 4.7.2.2. Analysis using USEPA SW-846 Method 6010C Inductively coupled plasma - atomic emission spectrometry, or an equivalent analytical method with a detection limit < 10% of stated maximum concentration in Table 1, Column 2 (i.e. 1 mg/kg dry weight for lead).
- 4.7.2.3. Report as mg/kg dry weight.
- 4.7.3. Test methods for measuring the electrical conductivity:
 - 4.7.3.1. Sample preparation by mixing 1 part recovered aggregate with 5 parts distilled water.
 - 4.7.3.2. Analysis using Method 104 (Electrical Conductivity) in Schedule B (3): Guideline on Laboratory Analysis of Potentially Contaminated Soils, National Environment Protection (Assessment of Site Contamination) Measure 1999 (or an equivalent analytical method).
 - 4.7.3.3. Report deciSiemens per metre (dS/m).
- 4.7.4. Test method for measuring the attributes 10 - 12:
 - 4.7.4.1. NSW Roads & Traffic Authority Test Method T276 Foreign Materials Content of Recycled Crushed Aggregate (or an equivalent method), for the materials listed in 10 - 12 of Column 1, Table 1.
 - 4.7.4.2. Report as %

Notification

- 4.8. On or before each transaction, the processor must provide the following to each person to whom the processor supplies the recovered aggregate:
 - a written statement of compliance certifying that all the requirements set out in this order have been met;
 - a copy of the recovered aggregate exemption, or a link to the EPA website where the recovered aggregate exemption can be found; and
 - a copy of the recovered aggregate order, or a link to the EPA website where the recovered aggregate order can be found.

Record keeping and reporting

- 4.9. The processor must keep a written record of the following for a period of six years:
 - the sampling plan required to be prepared under clause 4.1.1;
 - all characterisation, routine and/or one-off sampling results in relation to the recovered aggregate supplied;
 - the quantity of the recovered aggregate supplied; and
 - the name and address of each person to whom the processor supplied the recovered aggregate.
- 4.10. The processor must provide, on request, the most recent characterisation and sampling (whether routine or one-off or both) results for recovered aggregate supplied to any consumer of the recovered aggregate.
- 4.11. The processor must notify the EPA within seven days of becoming aware that it has not complied with any requirement in clause 4.1 to 4.7.

5. Definitions

In this order:

application or apply to land means applying to land by:

- spraying, spreading or depositing on the land; or
- ploughing, injecting or mixing into the land; or
- filling, raising, reclaiming or contouring the land.

composite sample means a sample that combines five discrete sub-samples of equal size into a single sample for the purpose of analysis.

consumer means a person who applies, or intends to apply, recovered aggregate to land.

continuous process means a process that produces recovered aggregate on an ongoing basis.

processor means a person who processes, mixes, blends, or otherwise incorporates recovered aggregate into a material in its final form for supply to a consumer.

transaction means:

- in the case of a one-off supply, the supply of a batch, truckload or stockpile of recovered aggregate that is not repeated.
- in the case where the supplier has an arrangement with the recipient for more than one supply of recovered aggregate the first supply of recovered aggregate as required under the arrangement.

Manager Waste Strategy and Innovation

Environment Protection Authority

(by delegation)

Notes

The EPA may amend or revoke this order at any time. It is the responsibility of each of the generator and processor to ensure it complies with all relevant requirements of the most current order. The current version of this order will be available on www.epa.nsw.gov.au

In gazetting or otherwise issuing this order, the EPA is not in any way endorsing the supply or use of this substance or guaranteeing that the substance will confer benefit.

The conditions set out in this order are designed to minimise the risk of potential harm to the environment, human health or agriculture, although neither this order nor the accompanying exemption guarantee that the environment, human health or agriculture will not be harmed.

Any person or entity which supplies recovered aggregate should assess whether the material is fit for the purpose the material is proposed to be used for, and whether this use may cause harm. The supplier may need to seek expert engineering or technical advice.

Regardless of any exemption or order provided by the EPA, the person who causes or permits the application of the substance to land must ensure that the action is lawful and consistent with any other legislative requirements including, if applicable, any development consent(s) for managing operations on the site(s).

The supply of recovered aggregate remains subject to other relevant environmental regulations in the POEO Act and Waste Regulation. For example, a person who pollutes land (s. 142A) or water (s. 120), or causes air pollution through the emission of odours (s. 126), or does not meet the special requirements for asbestos waste (Part 7 of the Waste Regulation), regardless of this order, is guilty of an offence and subject to prosecution.

This order does not alter the requirements of any other relevant legislation that must be met in supplying this material, including for example, the need to prepare a Safety Data Sheet. Failure to comply with the conditions of this order constitutes an offence under clause 93 of the Waste Regulation.