

16 March 2017

610.14692-L02-v1.0 Response to Submission 20170316.docx

Skyline Properties  
PO Box 114  
ENFIELD NSW 2126

**Attention: Shivesh Singh**

Dear Shivesh

## **Response to Submissions Resources Recovery Facility Mortdale, NSW**

### **1 Introduction**

Further to receipt of comments from the Department of Planning and Environment, Environment Protection Authority and Georges River Council (formerly Hurstville City Council) in relation to the redevelopment of the Resource Recovery Facility at Mortdale, NSW, the proposal has now been significantly modified.

As a result of the modifications to the proposed redevelopment, the associated Noise and Vibration Impact Assessment has been updated and is attached as **Appendix A**.

Based on the updated noise and vibration report for the facility, the following responses have been prepared to address the comments from the respective Government Agencies.

### **2 Responses to Comments**

#### **2.1 Georges River Council**

##### **2.1.1 Comments**

2. *During after-hours operation (10pm - 6am), processing on site is limited however the following noise generating activities are required:*
  - a. *Vehicle movements to and from the site; Of greatest concern are the heavily laden semi-trailer/truck and dog combinations that will require braking at the Hearne Street/Boundary Road intersection (directly adjacent to residential receivers), idling while giving way and then accelerating from this stopped/idling position. Further noise issues are also likely when these heavily laden vehicles are required to accelerate up the hill along Boundary Road to the Forest Road intersection. "Noise and Vibration Impact Assessment" Table 3 identifies the corner of Boundary Road and Treloar avenue to have a maximum Truck pass-by dBA of 60 - 70 however no estimated maximum dBA is provided for the likely braking, stopping, idling and acceleration out of the Hearn Street/Boundary Road intersection, nor is the gradual up-grade acceleration of semi-trailers/truck and dog vehicles considered on Boundary Road on the approach to Forest Road. These vehicle movements are the most likely to result in negative impacts on adjacent residential receivers and must be addressed in the supporting information.*

However it is likely that these vehicle movements will generate noise that is greater than the assumed truck pass-by (i.e. movements that are presumably already under acceleration) reading of 60-70dBA. This is highly likely to affect health and wellbeing in accordance with Section 4.1.1 of "Noise and Vibration Impact Assessment" as "68 trucks are estimated to transport waste from the Mortdale site to other waste processing facilities per day" ("Response to Submissions Letter - Traffic Vehicle Movements" prepared by The Transport Planning Partnership; p19) with these movements scheduled to occur during "the later afternoon, night time and early morning." "Response to Submissions Letter - Traffic Vehicle Movements" prepared by The Transport Planning Partnership; p19). Even using a conservative linear estimate between the later afternoon (4pm) and the early morning (6am) this would result in up to 5 vehicle movements per hour at the Hearne St/Boundary Rd intersection. Chapter 4.4.4 of The "Noise and Vibration Impact Assessment" prepared by SLR Consulting Australia Pty Ltd (p11) states that "one or two noise events per night, with maximum noise levels of 65-70 dBA, are not likely to affect health and wellbeing significantly." From this it is then assumed that up to 5 such disturbances per hour during the night is likely to significantly impact on the health and wellbeing of residential receivers adjacent to the Hearne Street/Boundary Road intersection.

In summary insufficient assessment of the noise impact and noise frequency has been provided, especially at the Hearne Street and Boundary Road intersection and on the steeper up-grade on Boundary Road approaching Forest Road. On the information provided it is likely that the night-time movements of vehicles (especially heavily laden semi-trailers/truck and dog combinations) will impact significantly on residential receivers adjacent to this intersection and on Boundary Road. As such Council strongly objects to the night time (10pm - 6am) operation of the proposal.

## Response

As a result of the modifications to the original proposal, the hours of operation are now 6:00 am to 10:00 pm Monday to Saturday only (ie no 24 hour operation with an annual processing limit of 220,000 tonnes per annum [no longer 300,000 tonnes]).

Heavy vehicles accessing the site would travel via Boundary Road and Hearne Street. Heavy vehicles would be restricted from travelling along Barry Avenue.

The existing traffic flows on Boundary Road are presented in **Table 1**, along with the Project-generated traffic flows. For the purposes of this noise impact assessment, the weekly average traffic flows for morning shoulder (6am to 7am) and daytime (7:00 am to 10:00 pm) are shown, together with the relative percentage increase associated with the Project traffic.

**Table 1 Weekly Average Traffic Flow on Boundary Road<sup>1,6</sup>**

Road	Period	Existing <sup>2,3</sup>			Project-generated (Proposed) <sup>1,7</sup>			Cumulative			Increase due to Project		
		LV	HV	Total	LV	HV	Total	LV	HV	Total	LV	HV	Total
Boundary Road	Daytime <sup>4</sup>	14075	921	14996	12	354	366	14087	1275	15362	0%	38%	2.4%
	Morning Shoulder <sup>5</sup>	660	71	731	12	10	22	672	81	753	1.8%	14%	3%

Note 1: Traffic flows are for two way traffic movements. To determine the number of vehicles accessing the Project Site divide Project-generated (Proposed) flow by 2.

Note 2: Existing traffic flows based on information presented in The Transport Planning Partnership Pty Ltd letter Response to Submissions Letter - Traffic/Vehicle Movements dated 18 November 2016 (TTPP Letter).

Note 3: Existing traffic flow is based on the traffic count survey conducted on 19 September 2016 presented in TTPP Letter.

Note 4: Average 7 day traffic flow for daytime period (7:00 am to 10:00 pm) from the traffic count survey conducted on 19 September 2016 presented in TTPP Letter. Divide by 15 to get average hourly daytime period traffic flow.

Note 5: Average 7 day traffic flow for morning shoulder period (6am to 7am) from the traffic count survey conducted on 19 September 2016 presented in TTPP Letter.

Note 6: LV - number of light vehicles. HV - Number of heavy vehicles.

Note 7: Proposed project generated traffic from TTPP based on the revised traffic data calculated on 220,000 tonnes per annum and no night-time movements..

The relevant criteria for residents on Boundary Road are the LAeq(15hour) and LAeq(9hour) criteria in Table 5 of the revised Noise and Vibration Impact Assessment in **Appendix A**.

The maximum 38% and 2.4% increase in heavy vehicle and total traffic flows, respectively, due to the Project related vehicles on Boundary Road would result in less than a 2 dBA increase in the existing traffic noise levels. Specifically, the traffic noise levels would increase by 0.7 dBA and 0.4 dBA during the daytime and morning shoulder periods, respectively. As discussed in Section 4.2 of the revised Noise and Vibration Impact Assessment in **Appendix A** the noise increase of up to 2 dB represents a minor impact that is considered barely perceptible to the average person (in accordance with the EPA's Road Noise Policy). Further, the EPA's Road Noise Policy goes on to say, where existing residences and other sensitive land uses are potentially affected by additional traffic on existing roads due to land use developments, any increase in the total traffic noise level should be limited to 2 dB above the corresponding 'no build option'.

Accordingly, no Project related traffic noise impacts are anticipated at residential receivers adjacent to the surrounding road network, including Boundary Road and Barry Avenue.

In relation to the statement on page 11 of the Noise and Vibration Impact Assessment (see **Appendix A**), that "One or two noise events per night, with maximum internal noise levels of 65-70 dBA, are not likely to affect health and wellbeing significantly", it should be noted that these are internal noise levels. Reference to the following page (page 12) of the Report indicates that the allowable corresponding external noise levels would be 10 dB and 25 dB higher with windows open and windows closed, respectively. This equates to external noise levels of 75-80 dBA (windows open) and 90-95 dBA (windows closed). Accordingly, no potential sleep disturbance impacts are likely from the project related truck movements on the public road network.

It is also noted that, in undertaking the traffic noise assessment, the truck and light vehicle sound power levels for both the LAeq and LMax noise emissions under normal and high noise levels events (ie braking and accelerating, including body noise) have been used in the noise modelling to determine the traffic noise assessment against the LAeq (LAeq(15hour) and LAeq(9hour)) and LMax (sleep disturbance) criteria.

### 2.1.2 Comment

- b. MRV's will enter the site and undertake the tipping of waste. The "Noise and Vibration Impact Assessment" recommends that "the loading and unloading of heavy materials are addressed within the OEMP with protocols to ensure that such products are handled through the use of appropriate plant to minimise vibration" (page 16). It does not appear that the OEMP has identified what this "appropriate plant" may be, however it is assumed that an excavator would be used to decrease the distance from which concrete blocks/bricks would be dropped on to the tipping floor.

The abovementioned operation is identified as resulting in the following LMax dBA per item:

Round trip truck entry dump and exit - 111 dBA

Volvo ECR145C Excavator - 110dBA

"Noise and Vibration Impact Assessment" prepared by SLR Consulting Australia Pty Ltd, Table 6.

The cumulative impact of this noise on-site has not been identified in the "Noise and Vibration Impact Assessment." Council strongly objects to any additional noise on-site between 10am and 6pm that would impact (or potentially impact) on the sleeping patterns of nearby residential receivers.

In summary, it would appear that the site is of insufficient size to accommodate both site operation/vehicle queueing and vehicle movements at the capacity proposed. The supporting information also provides insufficient assessment of the impacts of vehicle noise and cumulative night-time (10pm - 6am) processing required on site and from the information provided it would appear that the proposal will have a significant impact on the health and amenity of nearby residences especially on Boundary Road. On this basis Council does not support the current proposal.

### Response

All appropriate equipment has been assessed and is noted in Table 6 of the attached updated Noise and Vibration Impact Assessment report. Most notably Leibherr excavators which are fitted with a grab attachment (allowing placement of material).

Further, as a result of the modifications to the original proposal, the hours of operation are now 6:00 am to 10:00 pm Monday to Saturday only.

In relation to cumulative noise impacts, despite being near an industrial area, the ambient noise environment measured at the logger location used for setting the noise assessment criteria was not controlled by industrial noise sources (but rather distant traffic noise and neighbourhood noise) and therefore the amenity criteria are the recommended amenity criteria for residences in an urban area (ie the "ANL" or Acceptable Noise Level). For each assessment period, the lower (ie the more stringent) of the amenity or intrusive criteria are adopted. These are shown in bold text in Table 4 of the revised Noise and Vibration Impact Assessment in **Appendix A**.

Further, in relation to potential cumulative noise impacts from activities being undertaken on the project site, the noise assessment has been undertaken on the basis of all proposed site activities being undertaken concurrently. Accordingly, the noise impacts presented in the Noise and Vibration Impact Assessment in **Appendix A** are based on all processing plant, mobile plant, trucks idling, manoeuvring and dumping waste onsite occurring at the same time.

The recommendation of having protocols to ensure that the loading and unloading of heavy materials are handled through the use of appropriate plant to minimise vibration (and noise) emissions still stands.

## 2.2 Environment Protection Authority

### 2.2.1 Comments

#### **BARRY AVENUE**

*In relation to Barry Avenue, the EPA notes that predicted noise levels from the additional traffic generated by the proposal are acceptable along the simulated route. However, this route assumes that trucks do not access the facility via Barry Avenue.*

*One item which DPE may wish to consider is the inclusion of a condition on any approval that requires the Proponent to include, if possible and enforceable, clauses in any contracts with truck drivers requiring them not to use Barry Avenue. Alternatively, Council may be able to place weight restrictions on Barry Avenue. This would lessen noise from truck traffic for those residents on Barry Avenue.*

*The EPA notes that, while the Proponent has included a commitment to "encourage all vehicle access to the site via Boundary Road and Hearne Street" in their Statement of Commitments, Barry Avenue is a public road that any road registered vehicle is entitled to use.*

*If there is no enforceable method to restrict trucks associated with the proposal from accessing the facility via Barry Avenue, the EPA then strongly recommends DPE consider requiring the Proponent via conditions of approval to provide an assessment of traffic noise impacts on this route.*

### Response

Comments noted. Currently, there is no intention to use Barry Avenue, accordingly a traffic noise assessment of trucks accessing Barry Avenue is not included in the Noise and Vibration Impact Assessment.

### 2.2.2 Comments

#### **NOISE**

##### *Construction noise limits*

*Construction of the project is proposed to occur within standard hours, and not exceed the noise management levels at residences. This level of impact can be managed, on any project approval given, by requiring construction of the project to only occur within standard hours:*

**LG.8** *Construction work associated with the project must be undertaken:*

- a) between 7:00 am and 6:00 pm, Mondays to Fridays;*
- b) between 8:00 am and 1:00 pm on Saturdays; and*
- c) at no time on Sundays or public holidays.*

**LG.9** Construction work associated with the project may be undertaken outside the hours specified in condition L6.8 if it is:

- a) construction that causes LAeq(1smin) noise levels that are:
  - i. no more than 5 dB above Rating Background Level at any residence in accordance with the Interim Construction Noise Guideline (DECC, 2009); and
  - ii. no more than the Noise Management Levels specified in Table 3 of the Interim Construction Noise Guideline (DECC, 2009) at other noise sensitive land uses; or
- b) for the delivery of materials required by the police or other authorities for safety reasons; or
- c) required in an emergency to avoid the loss of lives, property and/or to prevent environmental harm; or
- d) approved through the process outlined in condition L6.10.

**LG.10** The hours of construction specified under condition L6.8 may be varied with the prior written approval of the Secretary. Any request to alter the hours of construction shall be:

- a) considered on a case-by-case or activity-specific basis;
- b) accompanied by details of the nature and justification for activities to be conducted during the varied construction hours;
- c) accompanied by written evidence to the Secretary that appropriate consultation with potentially affected noise sensitive receivers and notification of relevant Council(s) and other relevant agencies has been and will be undertaken;
- d) all reasonable and feasible noise mitigation measures have been put in place; and,
- e) accompanied by a noise impact assessment consistent with the requirements of the Interim Construction Noise Guideline (DECCW, 2009).

#### **Operating hours**

- Waste processing activities may only occur between 6am and 10pm Monday to Saturday, with no waste processing permitted on Sundays or Public Holidays.
- Truck movements are permitted 24 hours per day Monday to Saturday, with no truck movements on Sundays or Public Holidays.
- No activities are permitted at the Premises on Sundays and Public Holidays.

#### **Response**

SLR confirms that the construction noise limits proposed by the EPA for the development appear reasonable. In relation to construction noise, Section 5.4 of the Noise and Vibration Impact Assessment in **Appendix A** states that:

*"The proposed project site is approximately 200 m from nearest residential receptors. To represent the temporary impacts from the transient construction works, the range in predicted noise levels represents potential noise levels for works undertaken at the nearest work locations from the receivers.*

*Where construction works are predicted to exceed the noise management level (NML), the investigation and implementation of feasible and reasonable construction noise management and mitigation measures would be required.*

*Predicted noise levels do not trigger the 51 dBA LAeq(15minute) NML for residential premises at the nearest residential receivers and land uses. Notwithstanding, any noise mitigation measures implemented to control noise at adjacent residences will have a reciprocal benefit to reducing noise levels at commercial premises."*

In conclusion, the proposed modifications to the annual throughput, the hours of operation and refraining from using Barry Avenue have significantly benefited the SSD application in terms of noise and vibration.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Mark Blake', written in a cursive style.

MARK BLAKE  
Principal

Checked/ Authorised by: DG
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## **Appendix A**

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NOISE AND VIBRATION IMPACT ASSESSMENT  
REPORT 610.14692-R9 DATED 16 MARCH 2017

Resource Recovery Facility - Mortdale  
20 Hearne Street, Mortdale  
Noise and Vibration Impact Assessment  
State Significant Application

Report Number 610.14692-R9

16 March 2017

Mortdale Recycling Pty Ltd  
PO Box 7  
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Version: Revision 13



# Resource Recovery Facility - Mortdale

## 20 Hearne Street, Mortdale

### Noise and Vibration Impact Assessment

### State Significant Application

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This report has been prepared by SLR Consulting Australia Pty Ltd with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with the Client. Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of Mortdale Recycling Pty Ltd. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

#### DOCUMENT CONTROL

Reference	Status	Date	Prepared	Checked	Authorised
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610.14692-R9	Revision 11	6 March 2017	Mark Blake	Dick Godson	Mark Blake
610.14692-R9	Revision 10	5 December 2016	Mark Blake	Mark Blake	Mark Blake
610.14692-R9	Revision 9	21 November 2016	Mark Blake	Mark Blake	Mark Blake
610.14692-R9	Revision 8	18 November 2016	Mark Blake	Mark Blake	Mark Blake
610.14692-R9	Revision 7	10 November 2016	Mark Blake	Mark Blake	Mark Blake
610.14692-R9	Revision 6	28 June 2016	Monica Saralertsophon	Mark Blake	Mark Blake
610.14692-R9	Revision 5	17 June 2016	Monica Saralertsophon	Mark Blake	Mark Blake
610.14692-R9	Revision 4	31 May 2016	Zul Khasmuri	Mark Blake	Mark Blake
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## 1 INTRODUCTION

The site at 20 Hearne Street Mortdale is an existing waste storage and processing facility that accepts waste materials from domestic, municipal, commercial industrial and construction and demolition sources for the purpose of resource recovery.

The site is owned by Mortdale Recycling Pty Ltd and occupied by Hearne Street Pty Ltd. Currently the site accepts material from the above sources, which is delivered to site in skip and hook bins and in bulk in trucks.

The proponent wishes to increase the facility operating capacity from 30,000 tonnes per annum (tpa) to 220,000 tpa.

SLR Consulting Australia Pty Ltd (SLR) has been engaged by APP Corporation Pty Ltd (APP) on behalf of Mortdale Recycling Pty Ltd to prepare a Noise and Vibration Impact Assessment (NVIA) to accompany the EIS to be submitted to the Department of Planning and Environment for the proposed upgrades that include an increase in the processing capacity and building amendments. This NVIA also seeks to address relevant considerations contained in the State Significant Development (SSD 7421) Secretary's Environmental Assessment Requirements (SEARs) dated 16 December 2015.

This report presents the study methodology, assessment criteria, assessment of noise and vibration emissions and noise control recommendations in relation to the following specific areas of acoustic significance:

- Noise and vibration emission from vehicle movements on the premises
- Noise emission from vehicle movements on the surrounding roads
- Noise and vibration emission from operational processes on the premises
- Noise and vibration emission from the construction phases on surrounding receivers

A glossary of acoustic terminology used throughout this report is included as **Appendix A**.

## 2 PROJECT DESCRIPTION AND SURROUNDING ENVIRONMENT

### 2.1 Project Description

The facility currently operates under development approval issued by Hurstville City Council on 15 November 1990 (DA 250/90) and NSW Environment Protection Authority (EPA) Environment Protection Licence (EPL 20622) with anniversary date 5 January.

Approval is being sought to increase the processing capacity of the existing waste or resource management facility from 30,000 tonnes per annum to permit up to 220,000 tonnes per annum. The facility will continue to process general solid waste (non-putrescible), as described in with the Waste Classification Guidelines, 2014, prepared by the NSW EPA.

Approval is also sought for the following works on site:

- Demolition of existing structures and earthwork as detailed on the proposed demolition plan including:
  - The 1343 m<sup>2</sup> metal clad shed;
  - The truck wash bay;
  - The office and amenities building;
  - The concrete ramp;
  - Concrete pavement in poor condition;

- Removal of the existing weigh bridge; and
- Removal of existing landscaping and several trees across the site.
- Construction of new shed and awning with a combined area of 2,534 m<sup>2</sup> and a ridge height of 14 m from the existing ground level. The shed and awning will house all processing operations including:
  - A processing area containing the following equipment:
    - Volvo ECR145C Excavator;
    - Volvo EC140C Excavator with Magnet;
    - Volvo L110F Wheel Loader;
    - ASC Model 120 Diesel Industrial Sweeper;
    - Fuel Fix 30KL Self Bunded Tank;
    - Liebherr LH22M Hydraulic Excavator;
    - Komatsu 3.5 tonne Forklift Model: FD35AT-17; and
    - In line screening and processing plant incorporating finger screen, magnet, picking station, de-stoner and associated conveyors.
  - Loading, unloading and manoeuvring areas capable of accommodating up to a 15 m articulated vehicle; and
  - Six (6) Material Storage Bays.
- Installation of two new 12 m weighbridges;
- Provision of dedicated bin storage areas along the southwestern property boundary;
- Installation of a refuelling point and diesel fuel storage (28,000 litres) along the southwestern property boundary;
- Construction of an ancillary office building and staff amenities;
- Construction of concrete ramps and associated retaining walls;
- Reinstatement of landscaped areas; and
- Installation of pollution control equipment to mitigate stormwater and dust impacts.

The proposal will seek to utilise existing road infrastructure, other utility installations and will maintain the current site access arrangements and stormwater discharge point. Processing and handling of waste will be undertaken in a manner consistent with the current arrangements.

A Site Plan of the proposed Ground Floor of the facility is presented in **Appendix C**.

The proposed hours of operation of the facility are 6:00 am to 10:00 pm Monday to Saturday only, with no 24 hour operations.

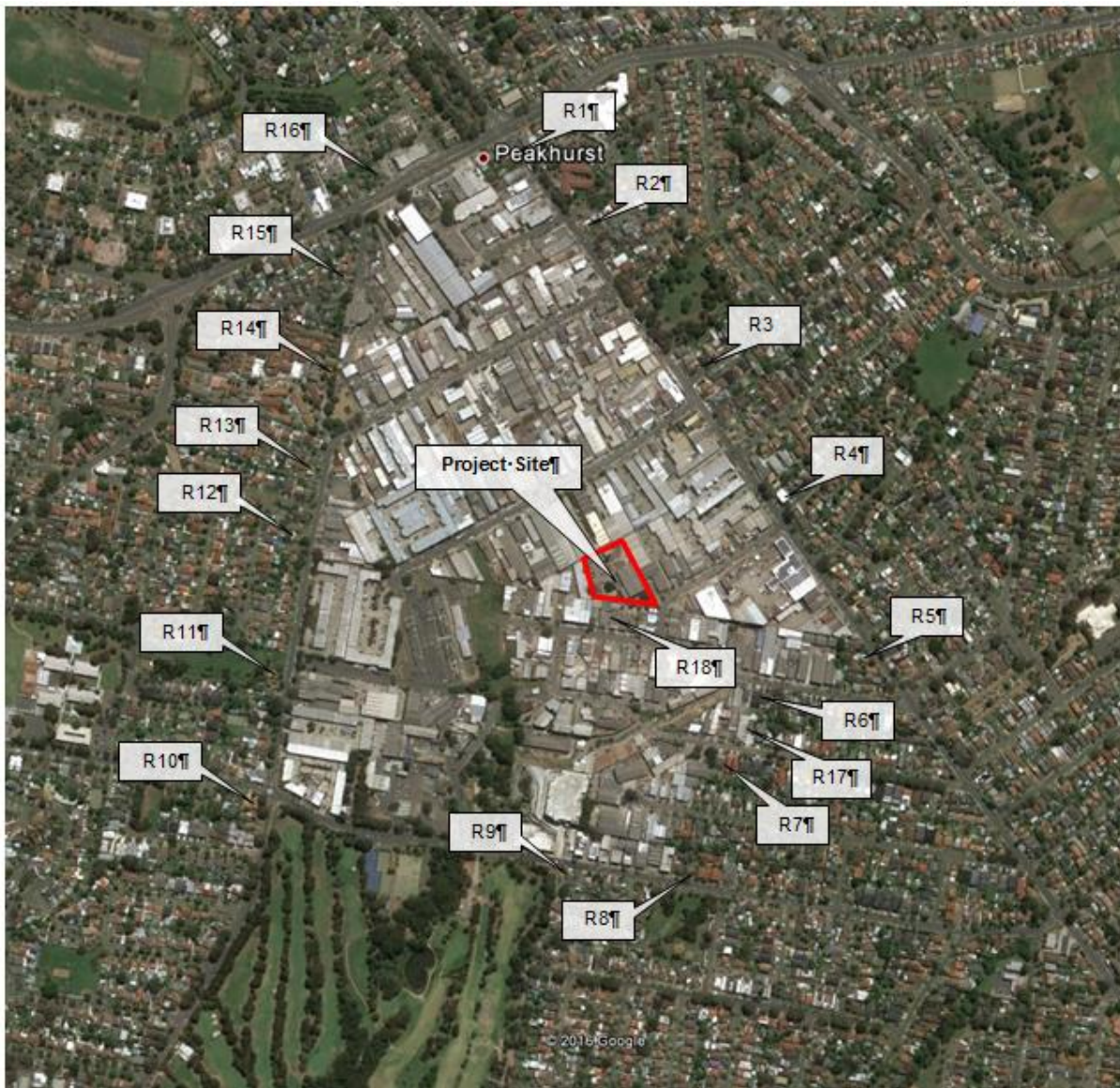
## 2.2 Surrounding Environment

The surroundings are characterised by a mix of industrial developments including factories, automotive servicing, parts, panel beaters and painters, printing facilities, hardware and general supplies, manufacturing and warehousing. The industrial nature of the surrounding developments means they would not be considered as sensitive in the way that an office, school or hospital would be, hence this report focusses on potential impacts at the nearest residential receivers. Notwithstanding, the noise emissions from the operation of the facility to the nearest commercial (eg childcare centre) and Industrial receivers are included in this assessment.

The nearest residential receivers are located 200 m to the southeast along Barry Avenue and 250 m to the east, on the opposite side of Boundary Road. Sixteen (16) discrete receptor locations were used in this study to assess the potential noise impacts of the site operations at sensitive receptor locations identified in the area surrounding the Project Site and were selected based on their close proximity to the Project Site. The nearest identified childcare centre (New Era Early Education, 38 Anderson Road) is located approximately 223 m to the south east of site and represented by Receiver 17. The nearest industrial receivers immediately to the south boundary of site (36-48 Barry Avenue and 22 Hearne Street) are represented by the Receiver 18.

These locations are presented in **Figure 1** and **Table 1**.

**Figure 1 Project Setting and Assessment Locations**



*Image courtesy of Google Earth - Photographed approximately 29 November 2014.*

The noise environment is dominated by neighbourhood noise (dogs, birds, etc), distant road traffic noise, and infrequent industrial noise (eg angle grinders, ratchet guns, etc).

**Table 1 Sensitive Receiver Locations Used in this Assessment**

Receiver	Address	Receiver Type
R1	147 Boundary Road	Residential
R2	164 Boundary Road	Residential
R3	128 Boundary Road	Residential
R4	106 Boundary Road	Residential
R5	55 Boundary Road	Residential
R6	27 Barry Avenue	Residential
R7	41 Anderson Avenue	Residential
R8	64 Roberts Avenue	Residential
R9	45 Roberts Avenue	Residential
R10	72 Lorraine Street	Residential
R11	46 Lorraine Street	Residential
R12	18 Lorraine Street	Residential
R13	27 Hannons Street	Residential
R14	12 Turpentine Avenue	Residential
R15	6 Pritchard Place	Residential
R16	824 Forest Road	Residential
R17	38 Anderson Road	Childcare Centre
R18	48 Barry Avenue	Industrial

### 3 BACKGROUND NOISE ENVIRONMENT

#### 3.1 Unattended Noise Monitoring

In order to characterise the existing acoustical environment at the nearest sensitive receivers, unattended noise monitoring was conducted at Receiver R6 between Wednesday 11 February and Wednesday 18 February 2015 at the location shown in **Figure 1**.

Instrumentation for the survey comprised of one ARL EL-316 environmental noise logger (serial number 16-207-047) fitted with a microphone windshield. Calibration of the logger was checked prior to and following measurements. Drift in calibration did not exceed  $\pm 0.5$  dBA. All equipment carried appropriate and current NATA (or manufacturer) calibration certificates.

Charts presenting summaries of the measured daily noise data are attached in **Appendix B**. The charts present each 24 hour period by incorporating the LA<sub>max</sub>, LA<sub>eq</sub> and LA<sub>90</sub> noise levels for the corresponding 15 minute periods.

The measured data has been filtered to remove periods affected during adverse weather conditions following consultation of weather reports recorded at the Bureau of Meteorology (BOM) Sydney Airport weather station. The filtered data is shown in **Appendix B**.

It was observed that several evening periods have been excluded from the monitoring data due to wind speeds over 5 m/s. To determine the effect of this on the parameters shown in **Table 3**, the data was reprocessed without any weather filtering. An insignificant 0.3 dB change was observed and it is therefore concluded that weather conditions during monitoring were suitable and data is considered acceptable.

### 3.1.1 INP Rating Background Level

The data obtained from the noise logging was processed in accordance with the procedures contained in the NSW *"Industrial Noise Policy"* (INP, January 2000) to establish Rating Background Level (RBL, background noise level) at the nearest sensitive receivers. The results of this analysis are presented in **Table 2**.

**Table 2 Measured Ambient Noise Levels Corresponding to INP Assessment Time Periods**

Daytime <sup>1</sup>		Evening <sup>1</sup>		Night-time <sup>1</sup>	
RBL <sup>2</sup>	LAeq <sup>3</sup>	RBL	LAeq	RBL	LAeq
42	57	38	55	34	54

Note 1: For Monday to Saturday, Daytime 7:00 am - 6:00 pm; Evening 6:00 pm - 10:00 pm;  
Night-time 10:00 pm - 7:00 am.  
On Sundays and Public Holidays, Daytime 8:00 am - 6:00 pm; Evening 6:00 pm - 10:00 pm;  
Night-time 10:00 pm - 8:00 am.

Note 2: The RBL noise level is representative of the "average minimum background sound level" (in the absence of the source under consideration), or simply the background level.

Note 3: The LAeq is essentially the "average sound level". It is defined as the steady sound level that contains the same amount of acoustical energy as a given time-varying sound.

### 3.2 Attended Noise Monitoring

In order to identify noise sources contributing to the ambient noise environment at the nearest sensitive receivers, operator attended noise measurements were conducted at Receivers R4 and R6 presented in **Figure 1**.

Instrumentation for the survey comprised a Larson Davis 831 sound level meter (serial number 0001028) fitted with a microphone windshield. Calibration of the sound level meter was checked prior to and following measurements. Drift in calibration did not exceed  $\pm 0.5$  dBA. All equipment carried appropriate and current NATA (or manufacturer) calibration certificates.

Measurements were conducted in accordance with AS 1055.1-1997: *"Acoustics - Description and measurement of environmental noise – General procedures"*.

The result of the operator attended noise survey is presented in **Table 3**, together with a description of the contributed noise levels at the time of the measurement. The number of vehicle pass bys was also noted during measurements.



**Table 3 Attended Noise Survey Results**

Receiver Location	Date / Start Time	Primary Noise Descriptor			Typical Maximum Levels dBA and Vehicle Counts
		LAeq	LA1	LA90	
R6 - Barry Avenue	11/2/2015 12:12 pm 15 Minute Measurement	56	68	43	Aircraft: 60-64 Urban/Industrial hum: 42-45 Insects/cicadas: 40-42 Birds: 51-53 Car passby: 55-65 Truck passby: 60-70 Compressor: 55-57  Cars count: 13 Trucks count: 2
R4 - Corner of Boundary Road and Treloar Avenue	11/2/2015 12:32 pm 15 Minute Measurement	69	79	57	Car passbys: 60-66 Truck passbys: 70-80 Cicadas: 68-71 Breaks in traffic: 52-55  Cars count: 207 Trucks count: 31

## 4 NOISE CRITERIA

### 4.1 Onsite Operational Noise - NSW Industrial Noise Policy

Responsibility for the control of noise emissions in New South Wales is vested in Local Government and the NSW EPA.

The EPA oversees the INP which provides a framework and process for deriving noise criteria. The INP criteria for industrial noise sources have two components:

- Controlling the intrusive noise impacts for residents and other sensitive receivers in the short term; and
- Maintaining noise level amenity for particular land uses for residents and sensitive receivers in other land uses.

#### 4.1.1 Intrusiveness Criterion

For assessing intrusiveness, the background noise generally needs to be measured. The intrusiveness criterion essentially means that the equivalent continuous noise level (LAeq) of the source should not be more than 5 dBA above the measured Rated Background Level (RBL), over any 15 minute period.

#### 4.1.2 Amenity Criterion

The amenity criterion is based on land use and associated activities (and their sensitivity to noise emission). The cumulative effect of noise from industrial sources needs to be considered in assessing the impact. The criteria relate only to other industrial-type noise sources and do not include road, rail or community noise. The existing noise level from industry is measured. If it approaches the criterion value, then noise levels from new industrial-type noise sources, (including air-conditioning mechanical plant) need to be designed so that the cumulative effect does not produce total noise levels that would significantly exceed the criterion.

#### 4.1.3 Amenity Area Classification

The INP, for the purposes of determining the appropriate noise amenity criteria, characterises an “Urban” noise environment as an acoustical environment that:

- Is dominated by “urban hum” or industrial source noise.
- Has through traffic with characteristically heavy and continuous traffic flows during peak periods.
- Is near commercial districts or industrial districts.
- Has any combination of the above.

Where “urban hum” means the aggregate sound of many unidentifiable, mostly traffic-related sound sources.

For the purposes of this assessment, the area surrounding the nearest sensitive receivers falls under the “Urban” area classification.

#### 4.1.4 Sleep Disturbance

Intermittent noise, in particular those occurring over short durations, due to activities such as impacts or hydraulic brake releases are not directly addressed by the INP. A definitive noise level above which sleep disturbance is likely to occur has not been determined and research in the area is ongoing.

As a screening assessment, in order to minimise the risk of sleep disturbance resulting from these sources, the *INP Application Notes* recommend that the LA1(60second) noise level outside a bedroom window should not exceed the prevailing background LA90 noise level by more than 15 dBA during the 10:00 pm to 7:00 am night-time period.

Additionally, summary of research included in the EPA “*Road Noise Policy*” (RNP, March 2011) concludes that:

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

Corresponding external criteria of LA<sub>max</sub> 60-65 dBA and 75-80 dBA respectively result, if a 10 dBA loss through open windows is adopted (as suggested in the policy).

The wide discrepancy in sleep disturbance screening criteria (refer **Table 4**) reflects the uncertainty regarding definitive noise levels whereby sleep disturbance may occur. Nonetheless, this assessment considers the INP and RNP sleep disturbance screening criteria, as well as the frequency of exposure to the intermittent noise.

#### 4.1.5 Project Specific Noise Criteria

Having defined the area type, the processed results of the unattended noise monitoring have been used to determine project specific noise criteria. The intrusive and amenity criteria for nearby residential premises and industrial boundaries are presented in **Table 4**. These criteria are nominated for the purpose of assessing potential noise impacts from the proposed development.

Despite being near an industrial area, the ambient noise environment measured at the logger location is not controlled by industrial noise sources (but rather distant traffic noise and neighbourhood noise) and therefore the amenity criteria are the recommended amenity criteria for residences in an urban area (ie the “ANL” or Acceptable Noise Level). For each assessment period, the lower (ie the more stringent) of the amenity or intrusive criteria are adopted. These are shown in bold text in **Table 4**.

It is understood that the project site will commence processing operations at 6 am Monday to Saturday, therefore it would be overly stringent to expect such operation to be assessed against the night-time criteria. In accordance with Section 3.3 of the INP, a morning shoulder period has been included as part of the assessment, the hours of which are detailed in **Table 4**.

For the purpose of this assessment, it is conservatively assumed that all buildings have openable windows. The internal noise levels are then assumed to be 10 dB lower than external noise levels when windows are open, and up to 25 dB lower than external noise levels with windows closed.

**Table 4 Operational Noise Criteria for at Nearest Residential Receivers**

Receiver	Time of Day	ANL <sup>1</sup> LAeq(period)	Measured RBL <sup>2</sup> LA90(15minute)	Measured LAeq(period) Noise Level)	Criteria for New Sources		
					Intrusive LAeq(15minute)	Amenity <sup>3</sup> LAeq(period)	Sleep Disturbance LAmax Screening Criteria
Residential I	Morning Shoulder <sup>5</sup> Period (6am-7am)		39	55	<b>44</b>	45	INP 54 RNP 60-65 <sup>4</sup> and 75-80 <sup>5</sup>
	Day	60	42	57	<b>47</b>	57	-
	Evening	50	38	55	<b>43</b>	45	-
	Night	45	34	54	<b>39</b>	44	INP 49 RNP 60-65 <sup>4</sup> and 75-80 <sup>5</sup>
Childcare centre	When in use	Peak hour LAeq(1hour, internal) <sup>7</sup> 40	-	-		LAeq(1hour, external) <sup>7</sup> <b>65</b>	-
Industrial	When in use	Acceptable 70 Maximum 75	-	-	-	<b>70-75</b>	-

Note 1: ANL = "Acceptable Noise Level" for residences in Suburban areas, and acceptable and maximum noise level for industrial receivers in accordance with INP.

Note 2: RBL = "Rating Background Level".

Note 3: Assuming existing noise levels are unlikely to decrease in the future.

Note 4: Unlikely to awaken people.

Note 5: One or two noise events per night are not likely to affect health and wellbeing significantly.

Note 6: Shoulder period defined as per Section 3.3 of the INP ie 6.00 am to 7.00 am.

Note 7: The internal criterion for school classrooms has been adopted for the childcare centre. The internal ANL has been set to LAeq(1hour,internal) 40 dBA as determined that the premises is currently affected by noise from existing industrial noise sources. Accordingly, it is appropriate to adopt an **external** LAeq noise criterion of 65 dBA based on the assumption that windows would be closed.

## 4.2 Offsite Vehicle Noise - NSW Road Noise Policy

The NSW Road Noise Policy (RNP) was released by the (now) EPA to replace the "Environmental Criteria for Road Traffic Noise" (ECRTN) from 1 July 2011. The key provisions of the new policy are an emphasis on the use of land use planning, better road design and vehicle noise emission control to avoid or minimise road traffic noise impacts. The assessment criteria for residences potentially affected by additional traffic generated by land use developments on local roads are summarised in **Table 5**.

**Table 5 NSW RNP Road Traffic Noise Assessment Criteria for Residences**

Road category	Type of project/land use	Assessment criteria <sup>1</sup>	
		Day (7:00 am to 10:00 pm)	Night (10:00 pm to 7:00 am)
Freeway/arterial/sub-arterial roads	Existing residences affected by <b>additional traffic</b> on existing freeways/arterial/sub-arterial roads generated by land use developments	LAeq(15hour) 60 dBA	LAeq(9hour) 55 dBA
Local Roads	Existing residences affected by <b>additional traffic</b> on existing local roads generated by land use developments	LAeq(1hour) 55 dBA	LAeq(1hour) 50 dBA

Note 1: The criteria are for assessment against façade-corrected noise levels when measured at 1 m in front of a building facade.

In relation to the noise criteria in **Table 5**, the RNP notes that an increase of up to 2 dB represents a minor impact that is considered barely perceptible to the average person. Where existing residences and other sensitive land uses are potentially affected by additional traffic on existing roads due to land use developments, any increase in the total traffic noise level should be limited to 2 dB above the corresponding 'no build option'.

#### 4.3 Vibration - Human Comfort

The EPA's *Assessing Vibration: a technical guideline* provides guideline values for continuous, transient and intermittent events that are based on a Vibration Dose Value (VDV) rather than a continuous vibration level. The VDV is dependent upon the level and duration of the short-term vibration event, as well as the number of events occurring during the daytime or night-time period.

The recommended VDV's for vibration of an intermittent nature (eg construction works where more than three distinct vibration events occur) are presented in **Figure 2**.

**Figure 2 Acceptable Vibration Dose Values for Intermittent Vibration ( $\text{m/s}^{1.75}$ ) (EPA *Assessing Vibration: a technical guideline*)**

Location	Daytime <sup>1</sup>		Night-time <sup>1</sup>	
	Preferred value	Maximum value	Preferred value	Maximum value
Critical areas <sup>2</sup>	0.10	0.20	0.10	0.20
Residences	0.20	0.40	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

1 Daytime is 7.00 am to 10.00 pm and night-time is 10.00 pm to 7.00 am.

2 Examples include hospital operating theatres and precision laboratories where sensitive operations are occurring. These criteria are only indicative, and there may be a need to assess intermittent values against the continuous or impulsive criteria for critical areas.

Source: BS 6472-1992

## 5 NOISE ASSESSMENT

### 5.1 Noise Model

In order to predict noise levels associated with the Project at noise sensitive receivers, a SoundPLAN computer model was developed for the facility. SoundPLAN is a software package which enables compilation of a sophisticated computer model comprising a digitised ground map (containing ground contours and significant structures, where appropriate), the location and acoustic power levels of significant noise sources, and the location of sensitive receptors.

#### 5.1.1 Operational Noise Standard

The Conservation of Clean Air and Water Europe (CONCAWE) prediction methodology was utilised within SoundPLAN. This prediction method was specially designed for large industrial facilities and incorporates the influence of wind and the stability of the atmosphere on the propagation of noise.

#### 5.1.2 Modelling Inputs

The computer model generates noise emission levels taking into account such factors as the source sound power levels, distance attenuation, ground absorption, air absorption and shielding attenuation, as well as meteorological conditions.

The proposed project site land and surrounds is essentially flat and has been modelled as such. All ground was modelled as "hard ground" that mostly reflects noise. Significant man-made structures such as the industrial sheds on site were incorporated into the noise model.

#### 5.1.3 Plant and Equipment Sound Power Levels

From previous studies of noise emissions from similar facilities as well as site specific measurements, the major noise sources associated with the facility are shown in **Table 6**, together with their relevant maximum LAeq sound power levels (calculated from measured sound pressure levels).

**Table 6 Plant and Equipment Noise Levels**

Noise Source or Activity	Sound Power Level, dBA (per item)				
	LAeq	LAmix	Morning Shoulder 6am -7am	Daytime 7am-6pm	Evening 6pm-10pm
Loaded Finger and Finlay Screen	112 <sup>1</sup>	123 <sup>1</sup>	Yes	Yes	Yes
Volvo ECR145C Excavator	103	110	Yes	Yes	Yes
Volvo EC140C Excavator	103	110	No	Yes	No
Volvo L110F Wheel Loader	108	115	No	Yes	No
Liebherr LH22M Excavator	99	102	No	Yes	No
Komatsu 3.5 tonne Forklift	101	106	No	Yes	No
Trucks idling	100	103	Yes	Yes	No
Round trip truck entry, dump and exit	108	111	Yes	Yes	Yes

Note 1: The Finger and Finlay Screen will be wholly located within the shed.

#### 5.1.4 Operational Scenarios

The facility operates on the following trading hours:

- Monday to Friday - Site opens at 5:30am and trucks leave site from 6:00am. Processing plant commences at 6:00am and is finished by 10:00pm. Heavy vehicle access is to occur during the hours of 6:00 am to 10:00 pm Monday to Saturday.. Heavy vehicles will access the facility via Boundary Road and Hearne Street and avoid using Barry Avenue during night-time period. It has been predicted that the bulk of heavy vehicle movements are to occur between 11.30am to 12.30pm.
- Saturdays - As per Monday to Friday.
- Sundays and Public Holidays - No trade.

The operational scenarios incorporated into the noise model to reflect the above operations are discussed in **Table 7**.

**Table 7 Operational Scenarios over a 24 Hour Period**

INP Assessment Time Period	Operational Characteristics
Morning Shoulder Period (6:00 am to 7:00 am)	Processing and sorting of waste only <ul style="list-style-type: none"> <li>Finger Screen operational</li> <li>Waste processing vehicles<sup>1</sup> fully operational</li> <li>Trucks dropping off / picking up waste</li> </ul>
Daytime (7:00 am to 6:00 pm)	Busiest operational period <ul style="list-style-type: none"> <li>Finger Screen operational</li> <li>Waste processing vehicles<sup>1</sup> fully operational</li> <li>Trucks dropping off / picking up waste</li> <li>Up to four trucks waiting in hardstand area</li> </ul>
Evening (6:00 pm to 10:00 pm)	<ul style="list-style-type: none"> <li>Finger Screen operational</li> <li>Trucks entering site, loading and unloading within the site area</li> </ul>

Note 1: Skidsteer, front end loaders, excavators + grabber attachment.

In the order for the facility to be able to operate in compliance with the project specific noise criteria the following noise mitigation and management measures have been including in this assessment:

- The building layout and orientation is such that building openings will not direct noise towards sensitive receivers.
- 175 mm concrete reinforced tilt panel construction of processing shed wall on eastern, southern and western facades.
- Heavy vehicles access the facility via Boundary Road and Hearne Street and avoid using Barry Avenue.

## 5.2 Predicted Operational Noise Levels

A summary of the predicted operational noise levels is shown in **Table 8**. The predicted noise levels are based on relevant noise sources presented in **Table 7** and include modifications to the finger screen shed discussed in **Section 5.3.3**.

**Table 8 Predicted Operational Noise Levels (dBA)**

Receiver	Morning Shoulder 6am – 7am	Day 7am – 6pm	Evening 6pm – 10pm	Sleep Disturbance Morning Shoulder 6am – 7am
	LAeq	LAeq	LAeq	LAmx
R1	30	37	34	36
R2	32	41	38	38
R3	38	47	41	44
R4	39	46	42	45

Receiver	Morning Shoulder	Day	Evening	Sleep Disturbance
	6am – 7am	7am – 6pm	6pm – 10pm	Morning Shoulder 6am – 7am
	LAeq	LAeq	LAeq	LAmx
R5	36	43	40	41
R6	41	47	43	47
R7	39	46	42	45
R8	37	44	40	43
R9	33	40	38	39
R10	27	34	31	33
R11	40	46	41	46
R12	34	41	38	40
R13	32	39	36	38
R14	30	37	34	36
R15	28	35	31	34
R16	24	31	28	30
R17	41	47	42	N/A
R18	59	65	53	N/A

From the predicted noise levels shown in **Table 8**, the facility operations would comply with project specific noise criteria presented in **Table 4**.

### 5.3 Operational Vibration

Precise details of the mechanical plant selection are unknown at this stage, as this will take place during the detailed design stage of the project.

The external vibration emissions and location of vibration generating plant and activities should be controlled so that the operation does not adversely impact upon neighbouring receivers and occupants within the proposed development. The criteria for vibration emissions from mechanical plant and equipment are nominated in **Section 4.3**. Detailed assessment and verification of vibration emissions would be carried out prior to construction in accordance with the SKALA Detailed Design Vibration Emission Considerations presented in **Appendix D**.

Notwithstanding the proposed Project Site layout has been reviewed and vibration control recommendations are presented below. Further, vibration measurements of the proposed plant were measured at another site and the findings are included in this assessment.

#### 5.3.1 Truck unloading

All loading and unloading of truck activities are to be carried out within the processing shed or under the awning. Heavy products, i.e. concrete waste are accepted within the facility and may pose a concern to adjacent tenants regarding vibratory impacts if dropped from a height onto paved areas. It is recommended that the loading and unloading of heavy materials are addressed within the Operational Environmental Management Plan (OEMP) with protocols to ensure that such products are handled through the use of appropriate plant to minimise vibration.

### 5.3.2 Speed Humps

It has been noted that within the Project Site, the three (3) existing speed humps near the entry towards the weighbridge on the southern boundary are to be removed. Speed humps would cause undue vibration and additional noise associated with metal to metal contact. Speed humps will therefore be removed and replaced with posted speed limit signs along the driveway and entry of the development.

### 5.3.3 Finger Screen

The Finger Screen located within the enclosed shed has been identified as the primary potential source of vibratory concern. It should be noted that the Finger Screen will impose static and dynamic loads during operation and operate at frequencies between 6 Hz and 13 Hz. It is therefore essential that the finger screen isolation and foundation of the slab are designed by a structural dynamics engineer to account for the dynamic and static loads as per the SKALA Detailed Design Vibration Emission Considerations presented in **Appendix D**.

SLR undertook a broad spectrum (1 Hz to 20 kHz) noise and vibration survey of finger and finlay screen currently in operation at a similar facility in Auburn, which is the same design proposed to be installed at the Mortdale facility. The survey found the screen to be operating in the dominant third octave band of 6.3 Hz with overall rms (root mean square) vibration levels of 0.09 mm/s (velocity) and 0.01 m/s<sup>2</sup> (acceleration) measured at 5 m. The corresponding vibration dose being 0.17 m/s<sup>1.75</sup>, which is significantly lower than the preferred vibration dose value of 0.8 m/s<sup>1.75</sup> for workshops associated with the neighbouring properties.

Consequently, there will be no vibration impact to the surrounding industrial developments from the Project operation, particularly from the trucks and finger screen.

## 5.4 Construction Noise

The proposed project site is approximately 200 m from nearest residential receptors. To represent the temporary impacts from the transient construction works, the range in predicted noise levels represents potential noise levels for works undertaken at the nearest work locations from the receivers.

Where construction works are predicted to exceed the noise management level (NML), the investigation and implementation of feasible and reasonable construction noise management and mitigation measures would be required.

Predicted noise level from the cumulative operation of the proposed construction equipment shown in **Table 9** does not trigger the 51 dBA LAeq(15minute) NML for residential premises at the nearest residential receivers and land uses. Notwithstanding, any noise mitigation measures implemented to control noise at adjacent residences will have a reciprocal benefit to reducing noise levels at commercial premises.



**Table 9 Proposed Construction Equipment**

Activity	Plant/Equipment Item	Number of items per 15 minute
Construction	Elevated Working Platform	1
	Hand Tools	1
	Grinder	1
	Circular Saw	1
	Truck (10 tonne)	1
	Dozer	1
	Bobcat	1
	Excavator (20 tonne)	1
	Front End Loader (FEL) 962	2
	Tipper Truck	4
	Franna Crane	2
	Concrete Truck / Agitator	1
	Water Tanker (8000 litre)	2

## 5.5 Off-site Heavy Vehicle Noise Emission

Heavy vehicles accessing the site would travel via Boundary Road and Hearne Street. Heavy vehicles would be restricted from travelling along Barry Avenue.

The existing traffic flows on Boundary Road are presented in **Table 10**, along with the Project-generated traffic flows. For the purposes of this noise impact assessment, the weekly average traffic flows for morning shoulder (6am to 7am) and daytime (7:00 am to 10:00 pm) are shown, together with the relative percentage increase associated with the Project traffic.

**Table 10 Weekly Average Traffic Flow on Boundary Road<sup>1,6</sup>**

Road	Period	Existing <sup>2,3</sup>			Project-generated (Proposed) <sup>1,2</sup>			Cumulative			Increase due to Project		
		LV	HV	Total	LV	HV	Total	LV	HV	Total	LV	HV	Total
Boundary Road	Daytime <sup>4</sup>	14,075	921	14,996	12	354	366	14087	1275	15362	0%	38%	2.4%
	Morning Shoulder <sup>5</sup>	660	71	731	12	10	22	672	81	753	1.8%	14%	3%

Note 1: Traffic flows are for two way traffic movements. To determine the number of vehicles accessing the Project Site divide Project-generated (Proposed) flow by 2.

Note 2: Existing traffic flows based on information presented in The Transport Planning Partnership Pty Ltd letter *Response to Submissions Letter - Traffic/Vehicle Movements* dated 18 November 2016 (TTPP Letter).

Note 3: Existing traffic flow is based on the traffic count survey conducted on 19 September 2016 presented in TTPP Letter.

Note 4: Average 7 day traffic flow for daytime period (7am to 10pm) from the traffic count survey conducted on 19 September 2016 presented in TTPP Letter. Divide by 15 to get average hourly daytime period traffic flow.

Note 5: Average 7 day traffic flow for morning shoulder period (6am to 7am) from the traffic count survey conducted on 19 September 2016 presented in TTPP Letter.

Note 6: LV – number of light vehicles. HV – Number of heavy vehicles.

Note 7: Proposed project generated traffic from TTPP based on the revised traffic data calculated on 220,000 tonnes per annum and no night-time movements.

The relevant criteria for residents on Boundary Road are the LAeq(15hour) and LAeq(9hour) criteria in **Table 5**.

The maximum 38% and 2.4% increase in heavy vehicle and total traffic flows, respectively, due to the Project related vehicles on Boundary Road would result in less than a 2 dBA increase in the existing traffic noise levels. Specifically, the traffic noise levels would increase by 0.7 dBA and 0.4 dBA during the daytime and morning shoulder periods, respectively. As discussed in **Section 4.2** the noise increase of up to 2 dB represents a minor impact that is considered barely perceptible to the average person. Where existing residences and other sensitive land uses are potentially affected by additional traffic on existing roads due to land use developments, any increase in the total traffic noise level should be limited to 2 dB above the corresponding 'no build option'.

Accordingly, no Project related traffic noise impacts are anticipated at residential receivers adjacent to the surrounding road network, including Boundary Road and Barry Avenue.

## **5.6 On-site Vehicle Heavy Vehicle Noise Emission**

Noise emissions from truck activities within the Project Site have been included in the onsite operational noise assessment presented in **Section 5.2**.

## **6 SUMMARY OF MITIGATION MEASURES**

In the order for the facility to be able to operate in compliance with the project specific noise criteria the following noise mitigation and management measures were including in this assessment:

- The proposed building layout is such that the location of openings to the building will not direct noise generated from plant towards sensitive receivers.
- 175 mm concrete reinforced tilt panel construction of processing shed wall on eastern, southern and western facades.
- Heavy vehicles access the facility via Boundary Road and Hearne Street and avoid using Barry Avenue.

## **7 RECOMMENDATIONS**

As discussed in **Section 5**, the facility will be able to operate in compliance with the project specific noise criteria based on the following recommendations:

- Heavy vehicles shall access the facility via Boundary Road and Hearne Street and shall avoid using Barry Avenue.
- Construction works are to be restricted to 7:00 am to 6:00 pm Monday to Friday and 8:00 am to 1:00 pm Saturdays.
- Speed humps are to be removed and replaced with posted speed limit signs.

## **8 CONCLUSION**

SLR Consulting Australia Pty Ltd has conducted an assessment of the noise and vibration impacts associated with the proposed upgrade to the existing waste transfer facility at 20 Hearne Street, Mortdale. This assessment has been carried out in accordance with NSW regulatory requirements and will form part of the State Significant Development (SSD 7421) application to the NSW Department of Planning and Environment in support of the development. Once the SSD approval has been granted, an application will be made to the Environment Protection Authority to vary the Environment Protection Licence (EPL 20622) to reflect the changes to the approved project.

The scope of the assessment involved a survey of the existing noise environment, derivation and establishment of project specific noise and vibration criteria, a noise and vibration impact assessment relative to appropriate criteria, and, where required, recommendations for noise and vibration control measures.

The assessment has demonstrated that the site will be able to operate at a rate of 220,000 tonnes per annum in an acoustically compliant manner with the operational procedures recommended in **Section 6** and **Section 7**.

## ACOUSTIC TERMINOLOGY

### 1 Sound Level or Noise Level

The terms “sound” and “noise” are almost interchangeable, except that in common usage “noise” is often used to refer to unwanted sound.

Sound (or noise) consists of minute fluctuations in atmospheric pressure capable of evoking the sense of hearing. The human ear responds to changes in sound pressure over a very wide range. The loudest sound pressure to which the human ear responds is ten million times greater than the softest. The decibel (abbreviated as dB) scale reduces this ratio to a more manageable size by the use of logarithms.

The symbols SPL, L or LP are commonly used to represent Sound Pressure Level. The symbol LA represents A-weighted Sound Pressure Level. The standard reference unit for Sound Pressure Levels expressed in decibels is 2E-5 Pa.

### 2 “A” Weighted Sound Pressure Level

The overall level of a sound is usually expressed in terms of dBA, which is measured using a sound level meter with an “A-weighting” filter. This is an electronic filter having a frequency response corresponding approximately to that of human hearing.

People’s hearing is most sensitive to sounds at mid frequencies (500 Hz to 4000 Hz), and less sensitive at lower and higher frequencies. Thus, the level of a sound in dBA is a good measure of the loudness of that sound. Different sources having the same dBA level generally sound about equally loud.

A change of 1 dBA or 2 dBA in the level of a sound is difficult for most people to detect, whilst a 3 dBA to 5 dBA change corresponds to a small but noticeable change in loudness. A 10 dBA change corresponds to an approximate doubling or halving in loudness. The table below lists examples of typical noise levels

Sound Pressure Level (dBA)	Typical Source	Subjective Evaluation
130	Threshold of pain	Intolerable
120 110	Heavy rock concert Grinding on steel	Extremely noisy
100 90	Loud car horn at 3 m Construction site with pneumatic hammering	Very noisy
80 70	Kerbside of busy street Loud radio or television	Loud
60 50	Department store General Office	Moderate to quiet
40 30	Inside private office Inside bedroom	Quiet to very quiet
20	Unoccupied recording studio	Almost silent

Other weightings (eg B, C and D) are less commonly used than A weighting. Sound Levels measured without any weighting are referred to as “linear”, and the units are expressed as dB(lin) or dB.

### 3 Sound Power Level

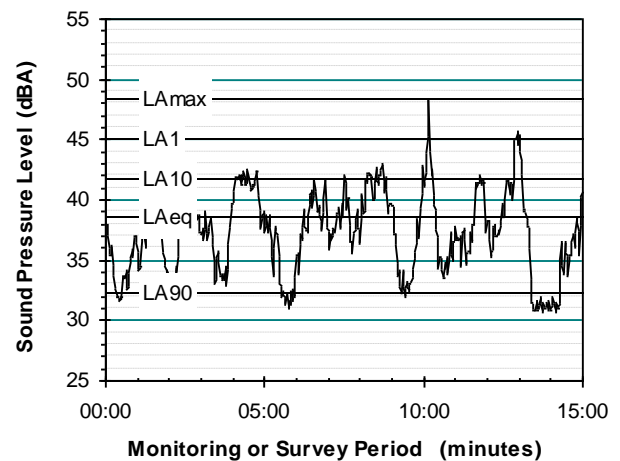
The Sound Power of a source is the rate at which it emits acoustic energy. As with Sound Pressure Levels, Sound Power Levels are expressed in decibel units (dB or dBA), but may be identified by the symbols SWL or LW, or by the reference unit 1E-12 W.

The relationship between Sound Power and Sound Pressure may be likened to an electric radiator, which is characterised by a power rating, but has an effect on the surrounding environment that can be measured in terms of a different parameter, temperature.

### 4 Statistical Noise Levels

Sounds that vary in level over time, such as road traffic noise and most community noise, are commonly described in terms of the statistical exceedance levels LAN, where LAN is the A-weighted sound pressure level exceeded for N% of a given measurement period. For example, the LA1 is the noise level exceeded for 1% of the time, LA10 the noise exceeded for 10% of the time, and so on.

The following figure presents a hypothetical 15 minute noise survey, illustrating the statistical indices.



Of particular relevance, are:

- LA1 The noise level exceeded for 1% of the 15 minute interval.
- LA10 The noise level exceeded for 10% of the 15 minute interval. This is commonly referred to as the average maximum noise level.
- LA90 The noise level exceeded for 90% of the sample period. This noise level is described as the average minimum background sound level (in the absence of the source under consideration), or simply the background level.
- LAeq Is the A-weighted equivalent continuous noise level (basically the average noise level). It is defined as the steady sound level that contains the same amount of acoustical energy as the corresponding time-varying sound.

When dealing with numerous days of statistical noise data, it is sometimes necessary to define the typical noise levels at a given monitoring location for a particular time of day. A standardised method is available for determining these representative levels.

This method produces a level representing the “repeatable minimum” LA90 noise level over the daytime and night-time measurement periods, as required by the DECCW. In addition the method produces mean or “average” levels representative of the other descriptors (LAeq, LA10 etc).

## ACOUSTIC TERMINOLOGY

### 5 Tonality

Tonal noise contains one or more prominent tones (ie distinct frequency components), and is normally regarded as more offensive than "broad band" noise.

### 6 Impulsiveness

An impulsive noise is characterised by one or more short sharp peaks in the time domain, such as occurs during hammering.

### 7 Frequency Analysis

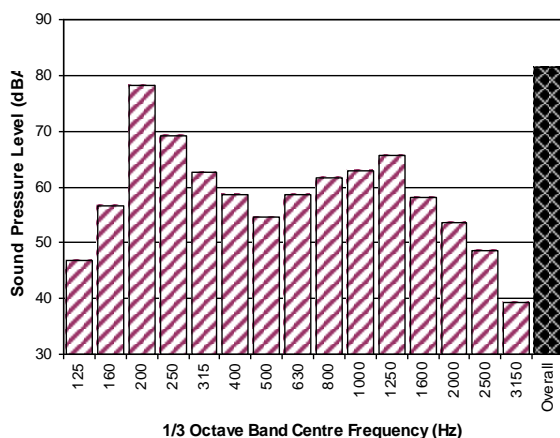
Frequency analysis is the process used to examine the tones (or frequency components) which make up the overall noise or vibration signal. This analysis was traditionally carried out using analogue electronic filters, but is now normally carried out using Fast Fourier Transform (FFT) analysers.

The units for frequency are Hertz (Hz), which represent the number of cycles per second.

Frequency analysis can be in:

- Octave bands (where the centre frequency and width of each band is double the previous band)
- 1/3 octave bands (3 bands in each octave band)
- Narrow band (where the spectrum is divided into 400 or more bands of equal width)

The following figure shows a 1/3 octave band frequency analysis where the noise is dominated by the 200 Hz band. Note that the indicated level of each individual band is less than the overall level, which is the logarithmic sum of the bands.



### 8 Vibration

Vibration may be defined as cyclic or transient motion. This motion can be measured in terms of its displacement, velocity or acceleration. Most assessments of human response to vibration or the risk of damage to buildings use measurements of vibration velocity. These may be expressed in terms of "peak" velocity or "rms" velocity.

The former is the maximum instantaneous velocity, without any averaging, and is sometimes referred to as "peak particle velocity", or PPV. The latter incorporate "root mean squared" averaging over some defined time period.

Vibration measurements may be carried out in a single axis or alternatively as triaxial measurements. Where triaxial measurements are used, the axes are commonly designated vertical, longitudinal (aligned toward the source) and transverse.

The common units for velocity are millimetres per second (mm/s). As with noise, decibel units can also be used, in which case the reference level should always be stated. A vibration level  $V$ , expressed in mm/s can be converted to decibels by the formula  $20 \log (V/V_0)$ , where  $V_0$  is the reference level (1E-6 mm/s). Care is required in this regard, as other reference levels are used by some organisations.

### 9 Human Perception of Vibration

People are able to "feel" vibration at levels lower than those required to cause even superficial damage to the most susceptible classes of building (even though they may not be disturbed by the motion). An individual's perception of motion or response to vibration depends very strongly on previous experience and expectations, and on other connotations associated with the perceived source of the vibration. For example, the vibration that a person responds to as "normal" in a car, bus or train is considerably higher than what is perceived as "normal" in a shop, office or dwelling.

### 10 Overpressure

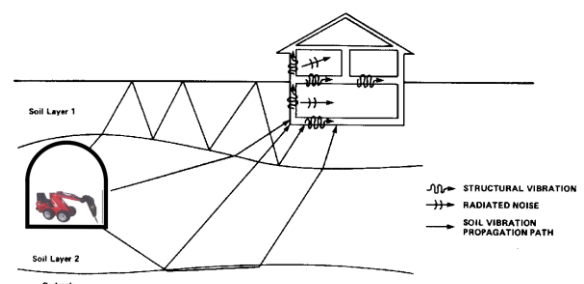
The term "over-pressure" is used to describe the air pressure pulse emitted during blasting or similar events. The peak level of an event is normally measured using a microphone in the same manner as linear noise (ie unweighted), at frequencies both in and below the audible range.

### 11 Regenerated Noise

Noise that propagates through a structure as vibration and is radiated by vibrating wall and floor surfaces is termed "regenerated noise", "structure borne noise", or sometimes "ground-borne noise". Regenerated noise originates as vibration and propagates between the source and receiver through the ground and/or building structural elements, rather than through the air.

Typical sources of regenerated noise include tunnelling works, underground railways, excavation plant (eg rockbreakers), and building services plant (eg fans, compressors and generators).

The following figure presents the various paths by which vibration and regenerated noise may be transmitted between a source and receiver for construction activities occurring within a tunnel.

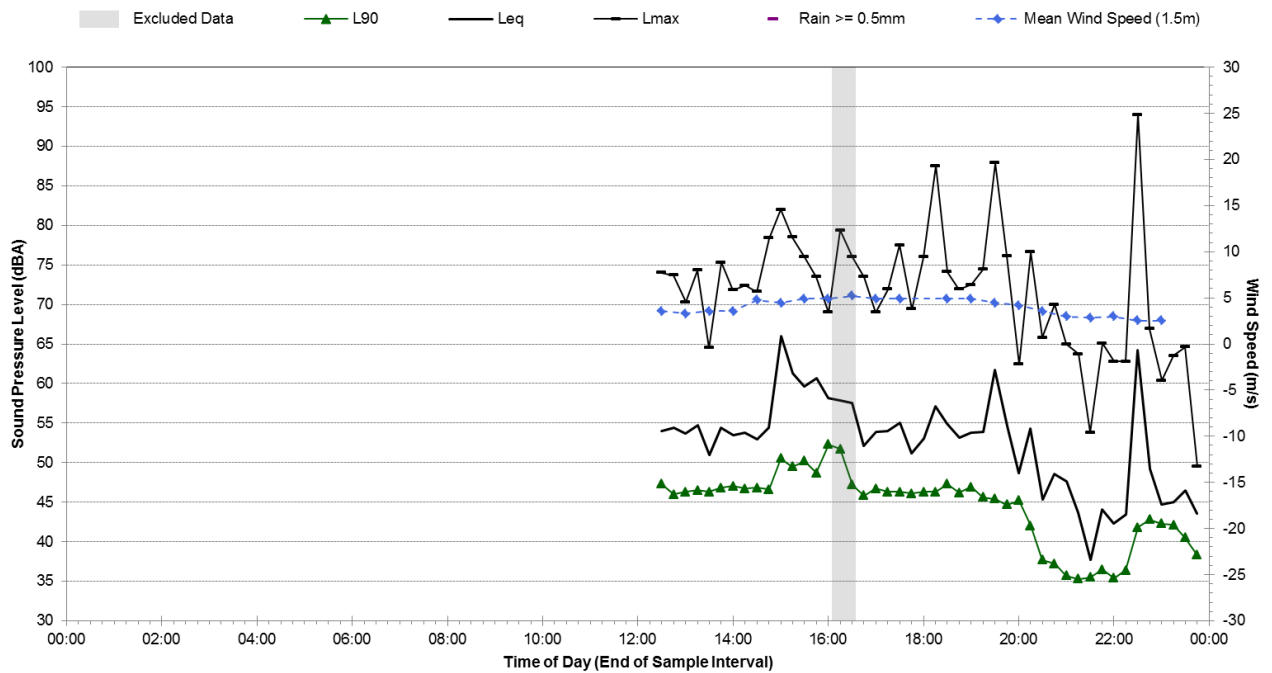


The term "regenerated noise" is also used to describe other types of noise that are emitted from the primary source as a different form of energy. One example would be a fan with a silencer, where the fan is the energy source and primary noise source. The silencer may effectively reduce the fan noise, but some additional noise may be created by the aerodynamic effect of the silencer in the airstream. This "secondary" noise may be referred to as regenerated noise.

**DAILY NOISE MONITORING GRAPHS**

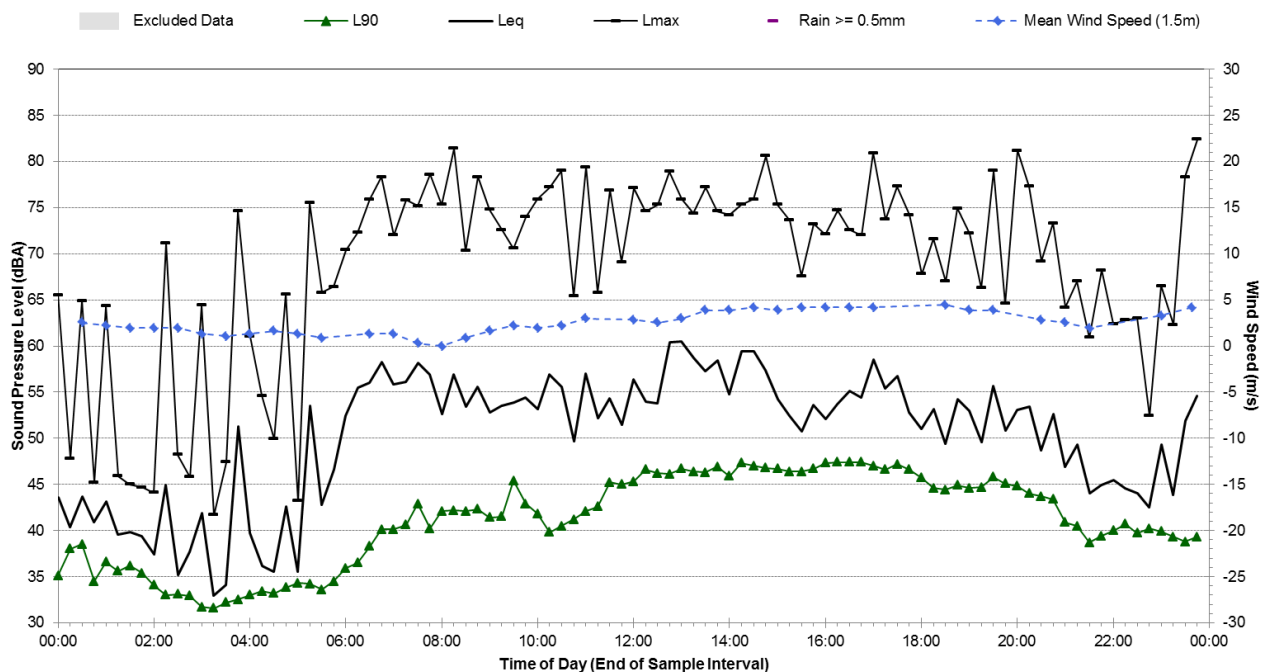
**Statistical Ambient Noise Levels**

**Mortdale Waste Transfer Facility - Wednesday, 11 February 2015**



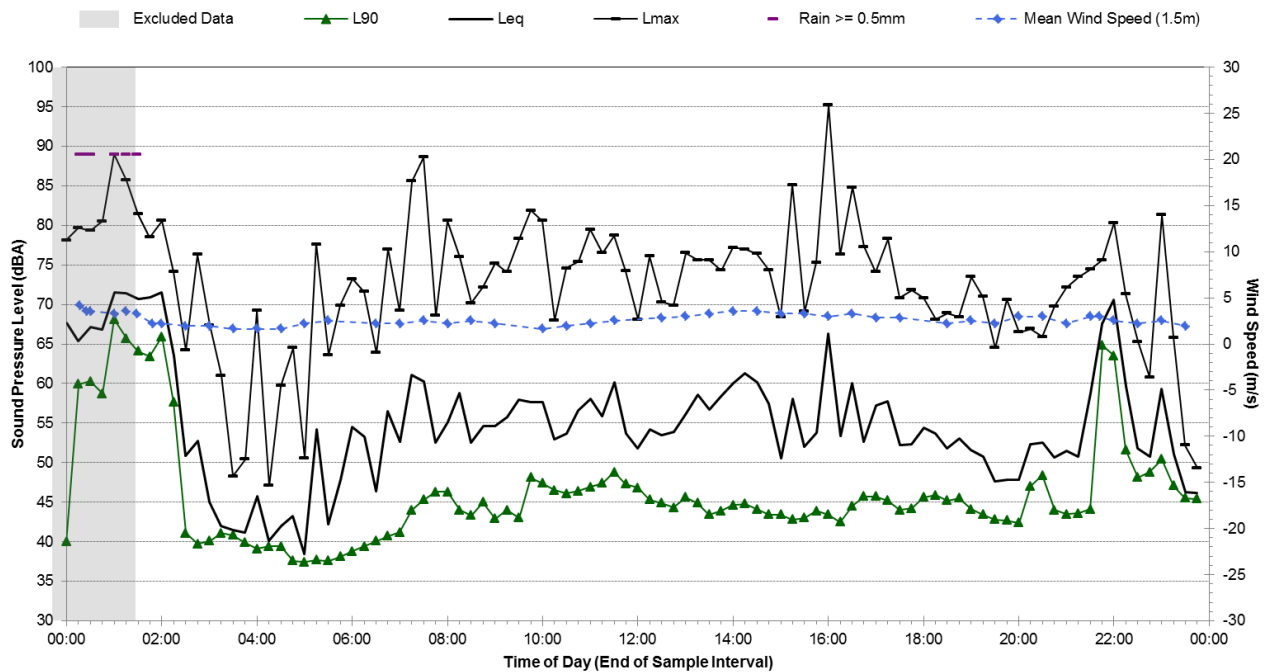
**Statistical Ambient Noise Levels**

**Mortdale Waste Transfer Facility - Thursday, 12 February 2015**

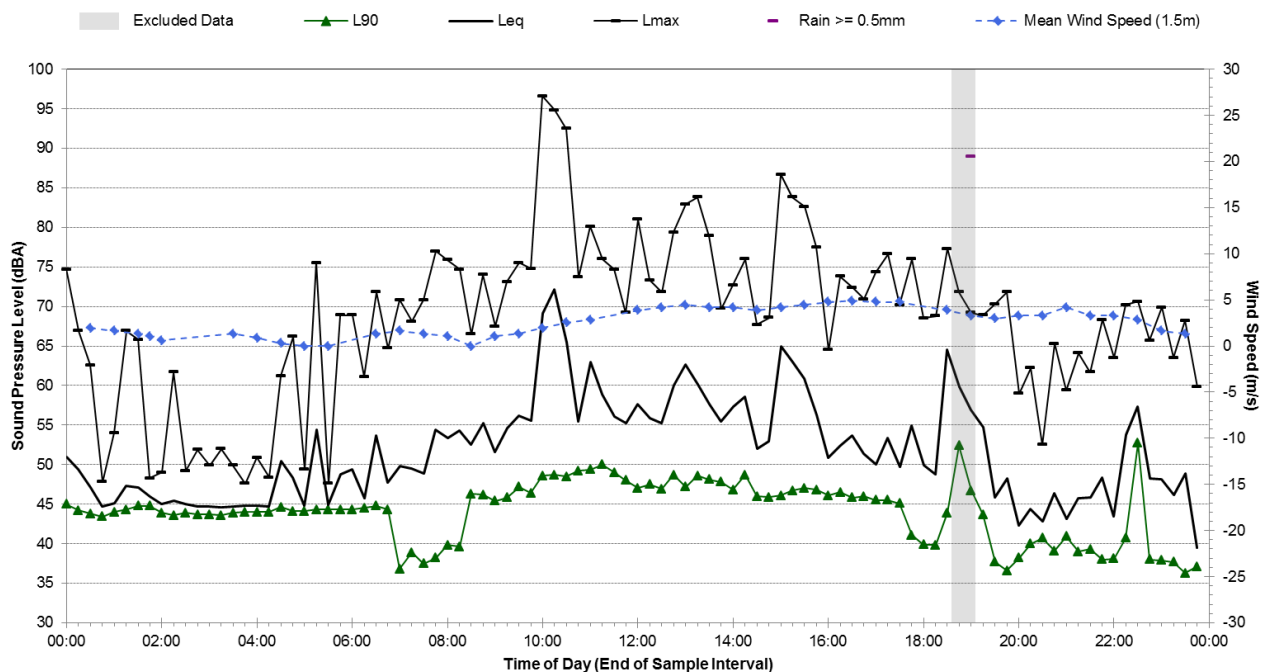


**DAILY NOISE MONITORING GRAPHS**

**Statistical Ambient Noise Levels**  
**Mortdale Waste Transfer Facility - Friday, 13 February 2015**



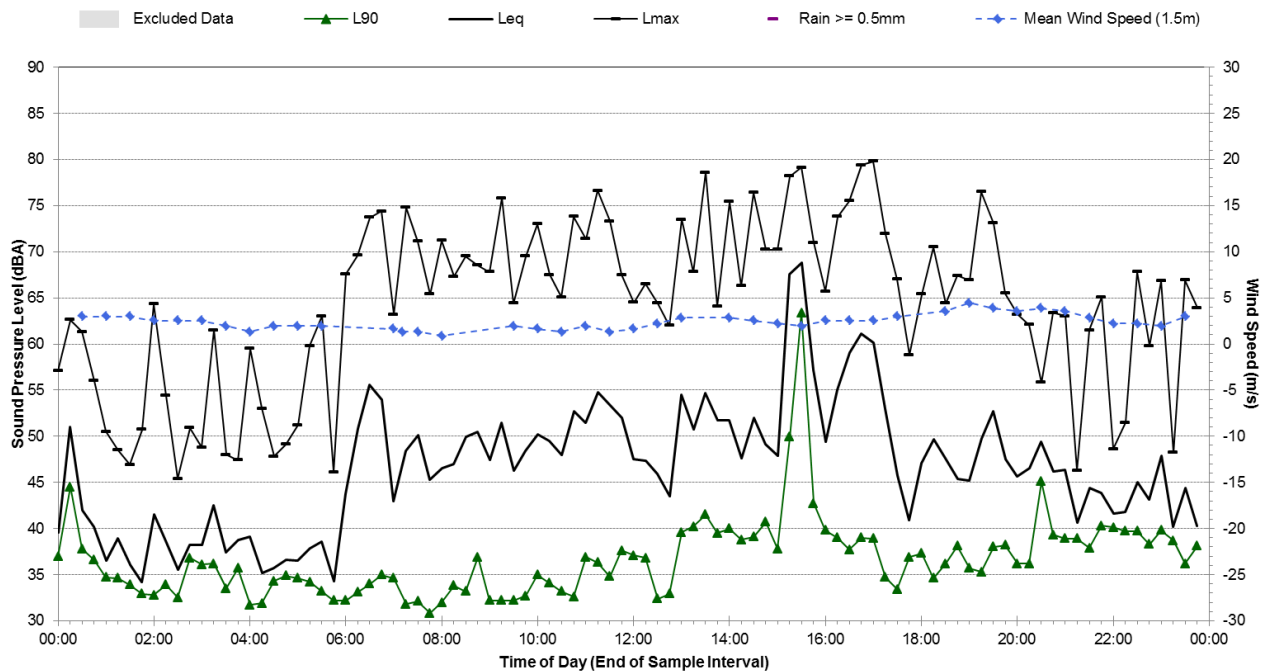
**Statistical Ambient Noise Levels**  
**Mortdale Waste Transfer Facility - Saturday, 14 February 2015**



**DAILY NOISE MONITORING GRAPHS**

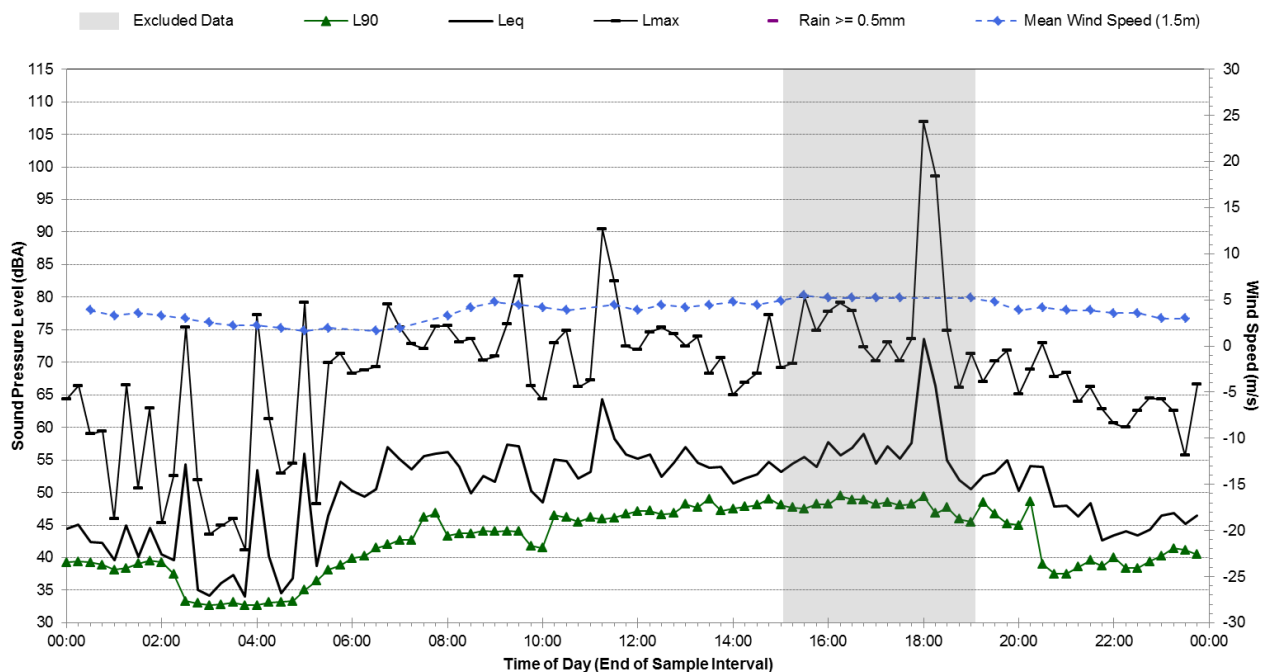
**Statistical Ambient Noise Levels**

**Mortdale Waste Transfer Facility - Sunday, 15 February 2015**



**Statistical Ambient Noise Levels**

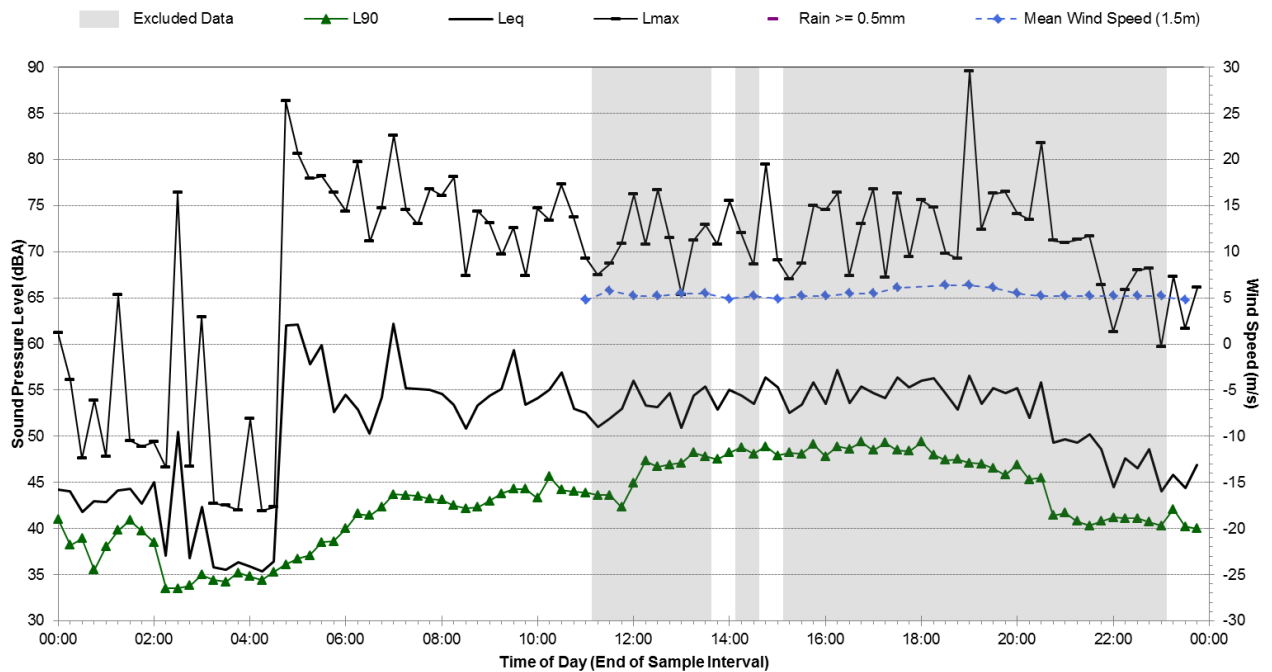
**Mortdale Waste Transfer Facility - Monday, 16 February 2015**



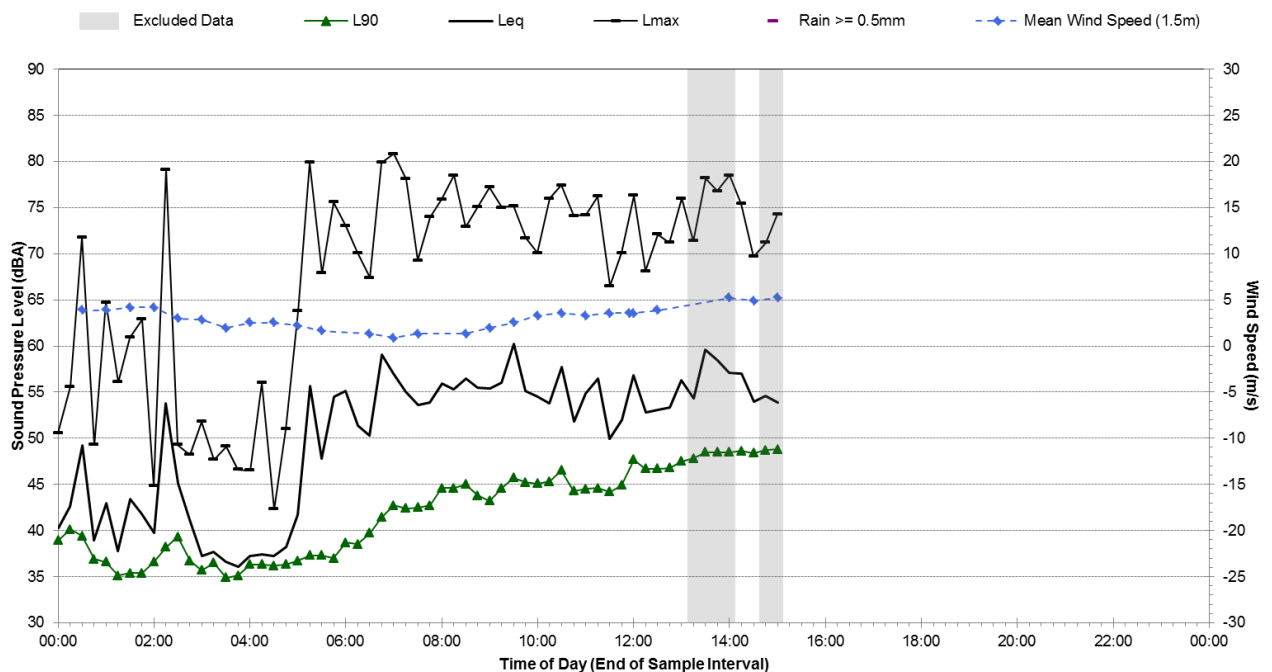


**DAILY NOISE MONITORING GRAPHS**

**Statistical Ambient Noise Levels**  
**Mortdale Waste Transfer Facility - Tuesday, 17 February 2015**



**Statistical Ambient Noise Levels**  
**Mortdale Waste Transfer Facility - Wednesday, 18 February 2015**





SKALA DETAILED DESIGN - VIBRATION EMISSION CONSIDERATIONS



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12<sup>th</sup> May 2016

Re: Mortdale C&D Plant for Bingo Industries.

To whom it may concern,

During the detailed design and planning of the Mortdale C&D recycling system, Skala select the most efficient and effective equipment available in the current market place. Particular attention and emphasis is placed on reduction and elimination of vibration transmission and reduction of noise emission's.

The machinery chosen has very few moving parts, is energy efficient and has an inherent design that isolates vibration transmission and noise transmission through the use of counterbalance motion, isolation, Isolation springs and design. In addition to this, the foundations for the machinery are totally isolated from the building and surrounding floor slabs thus taking all steps to stop vibration transmission. With all these measures in place external vibration & noise emissions will be controlled to ensure the operation will not adversely impact on neighbouring properties.

Yours sincerely

A handwritten signature in black ink, appearing to read "Brook Griffiths".

Brook Griffiths  
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