

## **Appendix 7**

### *Noise Impact Assessment*



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Glenfield Waste Site  
Materials Recycling Facility  
Noise Impact Assessment

Report Number 630.10711-R2

5 January 2015

Environmental Property Services  
9 Yacaaba Street  
Nelson Bay NSW 2315

Version: Revision 0

# Glenfield Waste Site

## Materials Recycling Facility

### Noise Impact Assessment

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#### DOCUMENT CONTROL

Reference	Status	Date	Prepared	Checked	Authorised
630.10711-R2	Revision 0	5 January 2015	Katie Teyhan	Martin Davenport	Katie Teyhan

## Executive Summary

SLR Consulting Australia Pty Ltd (SLR) has been commissioned by Environmental Property Services (EPS) on behalf of Glenfield Waste Disposals Pty Ltd to undertake a Noise Impact Assessment (NIA) relating to the proposed Materials Recycling Facility at the Glenfield Waste Site (GWS) located at Cambridge Avenue, Glenfield NSW.

The aim of this assessment was to assess the potential noise and vibration impacts associated with the proposed development on surrounding sensitive receptors.

The noise assessment has been prepared with reference to the Environmental Assessment Requirements issued for the Project on 19 December 2013 by the Director-General of the NSW Department of Planning and Infrastructure (DP&I). The NIA was also prepared with reference to Australian Standard AS 1055:1997 *Description and Measurement of Environmental Noise Parts 1, 2 and 3* and in general accordance with the Environment Protection Authority's (EPA) NSW Industrial Noise Policy (INP) (EPA, 2000), the associated Application Notes (EPA, last updated July 2012), Interim Construction Noise Guideline (ICNG) (DECC, 2009) and the NSW Road Noise Policy (RNP) (DECCW, 2011).

Operational noise emissions from the GWS site are predicted to meet the project specific noise criteria at all the nearest potentially affected residential locations with the mitigation measures implemented as described in **Section 9.1**. Recommended noise mitigation, management and monitoring measures have been summarised in **Section 14**.

Construction noise impacts are also predicted to be below the relevant noise goals. Notwithstanding this, recommendations have been provided with the aim of minimising construction noise impacts at nearby noise sensitive receivers.

Road traffic noise impact associated with the Project is expected to be minimal given the relatively small increase in proposed traffic volumes and the number of other significant traffic-generating developments in the vicinity of the Project site.

## Table of Contents

1	INTRODUCTION	6
2	STATUTORY REQUIREMENTS	6
3	PROJECT DESCRIPTION	7
3.1	Overview	7
3.2	Site Development	7
3.3	Site Operation and Layout	7
3.4	Project Particulars	11
4	SENSITIVE RECEIVERS	11
5	NOISE IMPACT ASSESSMENT PROCEDURES	13
5.1	Operational Noise Impact Assessment – Industrial Noise Policy	13
5.2	Assessing Sleep Disturbance	15
5.3	Construction Noise Assessment	16
5.4	Road Traffic Noise Assessment	17
6	EXISTING ACOUSTICAL ENVIRONMENT	17
6.1	Methodology	17
6.2	Unattended Noise Monitoring Results	17
6.3	Operator-Attended Noise Monitoring Results	18
7	EFFECTS OF METEOROLOGY ON NOISE LEVELS	19
7.1	Wind	19
7.2	Temperature Inversions	20
8	PROJECT SPECIFIC NOISE CRITERIA	20
8.1	Operational Noise Criteria	20
8.2	Construction Noise Goals	21
8.3	Sleep Disturbance Noise Goals	21
8.4	Road Traffic Noise Criteria	22
9	OPERATIONAL NOISE IMPACT ASSESSMENT	23
9.1	Noise Modelling Assumptions	23
9.2	Predicted Operational Noise Levels	24
10	CUMMULATIVE NOISE ASSESSMENT	25
11	CONSTRUCTION NOISE ASSESSMENT	26
12	SLEEP DISTURBANCE ASSESSMENT	27

## Table of Contents

13	ROAD TRAFFIC NOISE ASSESSMENT	28
14	NOISE MANAGEMENT AND MONITORING	29
15	CONCLUSION	29

### TABLES

Table 1	Environmental Assessment Requirements - Noise	6
Table 2	Materials Produced	8
Table 3	Amenity Criteria Recommended LAeq Noise Levels from Industrial Noise Sources	14
Table 4	Modification to Acceptable Noise Level (ANL)* to Account for Existing Levels of Industrial Noise	15
Table 5	ICNG: Noise at residences using quantitative method	16
Table 6	Noise Monitoring Details	17
Table 7	Summary of Existing Ambient Noise Levels – Glenfield	18
Table 8	Operator-attended Noise Survey Results – Glenfield	19
Table 9	Seasonal Frequency of Occurrence of Wind Speed Intervals - Daytime	19
Table 10	Seasonal Frequency of Occurrence of Wind Speed Intervals - Evening	20
Table 11	Seasonal Frequency of Occurrence of Wind Speed Intervals - Night	20
Table 12	Project Specific Noise Criteria	21
Table 13	Project Specific Noise Goals - Construction	21
Table 14	Sleep Disturbance Noise Goals	22
Table 15	Road Traffic Noise Assessment Criteria for Residential Land Uses	22
Table 16	Meteorological Parameters Considered for Noise Predictions	23
Table 17	Operational Scenario Considered in Noise Model	24
Table 18	Predicted Intrusive Noise Levels – GWS Materials Recycling Facility	25
Table 19	Assumed Construction Plant and Equipment	26
Table 20	Construction Noise Predictions	26
Table 21	Maximum Noise Events	27
Table 22	Maximum Noise Predictions	28

### FIGURES

Figure 1	Site Layout Plan	9
Figure 2	Nearest Sensitive Receivers	12

### APPENDICES

Appendix A	Statistical Ambient Noise Levels
Appendix B	Equipment Sound Power Levels

## 1 INTRODUCTION

SLR Consulting Australia Pty Ltd (SLR) has been commissioned by Environmental Property Services (EPS) on behalf of Glenfield Waste Disposals Pty Ltd to undertake a Noise Impact Assessment (NIA) relating to the proposed Materials Recycling Facility at the Glenfield Waste Site (GWS) located at Cambridge Avenue, Glenfield NSW.

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## 2 STATUTORY REQUIREMENTS

The Director-General of the NSW Department of Planning and Infrastructure (DP&I) issued Environmental Assessment Requirements for the Project on 19 December 2013. The Director-General's Requirements (DGRs) relevant to noise are provided in **Table 1** together with the relevant section of the NIA indicating where the requirements have been addressed.

**Table 1 Environmental Assessment Requirements - Noise**

Environmental Assessment Requirement	Relevant NIA Section
The EIS must address the following specific matters: <b>Noise</b> – including:	
Construction, operation and traffic noise; and	Whole NIA
Details of all proposed mitigation, management and monitoring measures.	Section 14

### **3 PROJECT DESCRIPTION**

#### **3.1 Overview**

Glenfield Waste Disposals Pty Ltd is proposing to develop a materials recycling facility within the southern portion of the GWS. The facility will have a capacity to process recycling of 450,000 tonnes per annum of non-putrescible waste for reuse in secondary markets. The proposal will be located across approximately 5ha in four (4) differentiated but contiguous areas and positioned to avoid existing landfill cells. Site entry and egress for transport of material will utilise existing site access locations along Cambridge Avenue and Railway Parade respectively.

#### **3.2 Site Development**

A number of site upgrades and provision of additional facilities will be required to assist the development proposal. These works include:

- Clearing and grading of the site to provide a level working area for the storage of materials and operation of machinery.
- Installation of stormwater management systems.
- Upgrade of existing water retention & distribution systems for on-site dust management.
- Provision of other utility services (electricity, communications, etc.) as required.
- Installation of operational fixtures including site office.
- Construction of internal one-way road and parking area.
- Sealing of part of an existing internal road.
- Construction of material storage bays.
- Landscaping, fencing and signage.

#### **3.3 Site Operation and Layout**

##### **Materials Received**

The materials recycling facility intends to recycle and process waste produced by the Construction and Demolition (C&D), and Commercial and Industrial (C&I) sectors to produce goods for resale to the construction markets. Strict quality controls will be used to ensure the quality of the incoming materials, and this in turn will underpin the quality of the final saleable product.

##### **Quality control management:**

- Ensures the quality of incoming materials.
- Avoids raw material stockpile cross contamination.
- Allows tracking of the materials source and progress through the facility.

Based on the experience of existing operations at the GWS, the quantity of waste generated by the proposed facility that cannot be reused or recycled is considered to be minimal. This is because all impurities removed in the crushing process (for example, wood and scrap metal) will be sorted and re-distributed to the appropriate recycling section of the facility. Anticipated waste classifications which are to be accepted and processed on site are:

- C&I waste (typically paper/cardboard, plasterboard, ceramics, natural and manufactured timbers, metal, green waste, plastics (hard and soft) and glass).

- C&D waste (asphalt, concrete, brick, crushed concrete, concrete plant washout, concrete waste from batching plants).
- Foundry sand.
- Virgin Excavated Natural Material (VENM) including sandstone.
- Excavated Natural Material (ENM).

In line with the current process adopted at GWS, the Recycling Facility will not accept hazardous materials such as asbestos and chemical waste. Additionally, all personnel will be required to undertake asbestos awareness training as part of the site induction process and ongoing training program.

### Materials Produced

Products expected to be produced on site and sold back into the construction markets are provided in **Table 2** together with their applications.

**Table 2 Materials Produced**

Material/Product Type	Applications
Recycled Aggregates	Landscaping, filter material, concrete products, pipes manufacture, asphalt products, road applications, backfill, concrete blocks, and drainage materials.
Recycled Pipe Bedding	For the application of and not limited to bedding sand and fill under concrete slabs.
VENM/ENM	Engineered and non-engineered fill applications such as subgrade replacement, reinforced earth wall fill, pavement applications.
Recycled General Fill	Filter material, select fill, re-enforced earth wall select fill, fill for structural applications.
Road base	Engineered and non-engineered applications. which applies to and is not limited to local roads, highways, hardstand and car parks.
Timber Mulch	Landscaping, chicken bedding for agriculture purposes, council use.
Green Waste	Erosion control, composting.

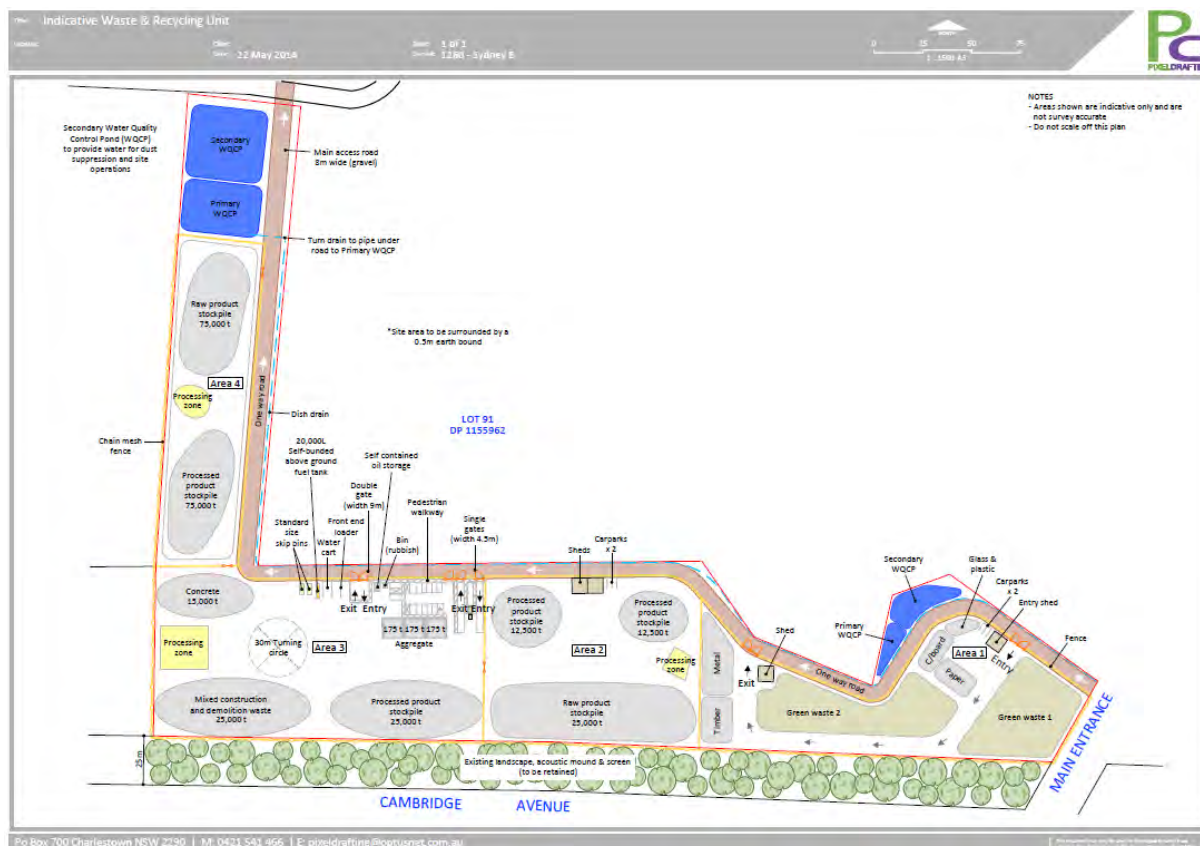
### Capacity

In total, the facility is expected to process a maximum volume in the order of 450,000 tonnes of material per annum, distributed across the four (4) areas.

### Facility Layout

A copy of the Site Layout Plan is provided in **Figure 1**.

**Figure 1 Site Layout Plan**



The materials recycling facility is divided into four (4) separated areas, with each area receiving and processing different waste streams. The materials recycling facility will be accessed via a one-way internal road, with a left-hand turn prior to the existing GWS front gates. This will ensure all traffic movements for the materials recycling facility avoid entering the landfill facility, and will provide separate access arrangements for area covered by separate EPA licences. All material will be received through controlled access points in Area 1 and Area 3. Area 2 and 4 will be used for stockpiling, storage and processing of material received through Area 3. Access to these areas will be via gated entries within Area 3, with no unsupervised direct access for customers from the main one-way road.

**Area 1:** This area will receive and separate all green waste and, commercial and industrial waste. The area is designed with a one-way internal road with gated entry and exit points. Material received in Area 1 will be visually inspected upon arrival and charged based on vehicle tare rates. This area will be operated by approximately 2-3 full-time employees. Materials will be divided and stored in separate stockpiles.

**Area 3:** This area will receive and process all construction and demolition waste streams, foundry sand, and VENM and ENM material. There are two access points to Area 3, including a weighbridge and double width gates to allow materials received and purchased to be definitively calculated and charged.

**Area 2 and 4:** These areas will service Area 3 and be used to process and stockpile both processed and raw product. Area 2 contains additional equipment storage areas and additional carparking.

## Operational Process

The operations carried out on site will primarily comprise:

1. Receipt of waste materials:
  - It is anticipated that majority of the material received by the Materials Recycling Facility will be source separated, however there is a margin of capacity to sort mixed loads.
  - All material entering the facility will be visually inspected upon arrival.
  - Material received in Area 1 will be charged based on Vehicle Tare Weight, and materials received in Area 3 will be charged as per the weighbridge.
2. C&I materials are separated into different waste streams and stockpiled in relevant areas on site. Mechanical or manual sorting and processing is then undertaken.
  - Green waste and timber is stockpiled for mulching and sale.
  - Paper/cardboard and plastics are separated for baling and recycling.
  - Timber, metals and glass are separated for recycling.
3. C&D materials will be processed using the following methods depending on the type of treatment required:
  - Breakdown/pre-processing - material that is delivered to the site in large sections (over 600mm) is first broken down into manageable sizes using a pulveriser attached to a 40 tonne excavator.
  - Initial processing (pulverising) to remove reinforced steel, this is done using standard type excavator. The steel, once removed is separated and stored until taken off-site for recycling;
  - The pulverised material is then crushed using mobile plant.
  - The crushed material will then be blended into finished product and stockpiled for sale. This function will be carried out using a front-end wheel loader.
  - The finished product will be loaded and weighing will be via a weighbridge or weighed for dispatch using machinery buckets with weighing capabilities that connect via Wi-Fi back to the administration office for purchase invoicing.

A water cart equipped with spray nozzles will be kept onsite permanently to be used systematically and/or in periods of high wind for dust management.

## Plant and Equipment

The following mobile machinery are proposed to be utilised on site (and stored on site when not in use) to carry out the processing of materials:

- 4 x Front End Loaders (Cat 972 or similar);
- 1 x Wheel Loader (Cat 950 or similar);
- 2 x 45t Excavator with Bucket (Hitachi or similar);
- 1 x Excavator with Pulveriser (Hitachi or similar);
- 1 x 8 t Excavator Plant Housekeeping
- 1 x 7,000lt Water Cart (Cat 769 for dust suppression)
- 1 x Jaw Crusher (Powercrusher PC6 Mobile Jaw Crusher);
- 1 x Cone Crusher (Powercrusher PC21 Mobile Cone Crusher);
- 1 x Screen (Powercrusher HCS5515 Mobile Screen); and
- 1 x Shredder.

The machinery will be stored within designated and secured zones in Area 1 and Area 3.

### 3.4 Project Particulars

#### Access

Traffic access to the facility will utilise the existing main southern entry of the GWS which enters from Cambridge Avenue. Trucks will be entering via Cambridge Avenue to an inspection point and then proceed to a receival area. A one-way internal road will be constructed which will guide traffic along the perimeter of the facility before re-joining the existing GWS internal road network to facilitate site traffic egress at Railway Parade.

An existing internal road of approximately 550 metres is proposed to be sealed to reduce acoustic and dust emissions, control sediment and allow trucks to safely reach speeds of 40 km/hr prior to leaving the site. The length of the exit roadway and a speed of approximately 40 km/hr is required to safely allow debris caught in wheel axles to dislodge while still within the confines of the GWS site.

#### Hours of Operation and Staffing

The GWS site is currently approved to operate from 6.30 am to 4.30 pm with no restrictions recorded for days of operation. Consistent with current hours the recycling facility is proposed to operate between the hours of 6.30 am to 4.30 pm Monday to Friday and 8.00 am to 4.00 pm on Saturdays. Access until 6.00 pm Monday to Friday will be required for maintenance. Occasional out-of-hours access will be required to cater for night road works and similar operations. It is expected that any such out-of-hours work will be infrequent and unobtrusive. The facility will operate within the approved hours nominated by the regulating authority. The operating hours will be clearly displayed at the entry to the site. The proposed recycling facility is anticipated to employ 20 staff during the operational stage of the development. In addition, during the construction period, approximately five (5) full time equivalent jobs will be created.

#### Traffic

Information regarding traffic associated with the Project has been obtained with reference to *Glenfield Waste Services State Significant Development Traffic Impact Assessment* (GWS TIA) dated October 2014 prepared by Anton Reisch Consulting Pty Ltd. Key points from the GWS TIA that are relevant to the noise impact assessment are summarised as follows:

- The GWS site currently generates approximately 250 vehicle trips per day; 38% light vehicles, 62% heavy vehicles. The peak hourly flow of 34 vehicle trips currently occurs between 11.00 am and 12.00 pm. The current hourly profile of traffic generation is not expected to change for the Project.
- Traffic survey data shows that approximately 50% of existing daily vehicle trips are from/to the west and 50% from/to the east. This is expected to remain the same for the Project.
- The total predicted future traffic generation of the site is expected to be approximately 600 vehicle trips per day with approximately the same proportion of light and heavy vehicles; an increase of approximately 350 vehicle trips per day compared to existing traffic volumes.

## 4 SENSITIVE RECEIVERS

The nearest sensitive residential receivers to the Site are located in the Glenfield residential area to the south of Cambridge Avenue and to the west of the Site in the Glenfield Road residential development. The locations of the sensitive receivers along with background noise monitoring locations are illustrated in **Figure 2**.

Receptors most potentially affected by an increase in road traffic noise are located on Glenfield Road; the nearest being approximately 8 m from the road.

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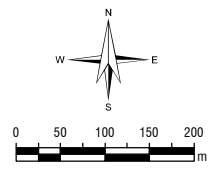
- Glenfield Waste Services Site Boundary
- Recycling Facility Subject Allotments
- Noise Monitoring Locations



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Environmental Planning Services

**Noise Assessment**

**Nearest Sensitive Receivers  
Proposed Recycling Facility  
Glenfield NSW**

FIGURE 2

## 5 NOISE IMPACT ASSESSMENT PROCEDURES

### 5.1 Operational Noise Impact Assessment – Industrial Noise Policy

Responsibility for the control of noise emission in New South Wales (NSW) is vested in Local Government and the Environment Protection Authority (EPA). The INP was released in January 2000 and provides a framework and process for deriving noise criteria for consents and licences that will enable the relevant authority to regulate premises that are scheduled under the Protection of the Environment Operations Act, 1997.

The specific policy objectives are:

- To establish noise criteria that would protect the community from excessive intrusive noise and preserve amenity for specific land uses.
- To use the criteria as the basis for deriving project specific noise levels.
- To promote uniform methods to estimate and measure noise impacts, including a procedure for evaluating meteorological effects.
- To outline a range of mitigation measures that could be used to minimise noise impacts.
- To provide a formal process to guide the determination of feasible and reasonable noise limits for consents or licences that reconcile noise impacts with the economic, social and environmental considerations of industrial development.
- To carry out functions relating to the prevention, minimisation and control of noise from premises scheduled under the Act.

The policy sets two separate noise criteria to meet environmental noise objectives; one to account for intrusive noise and the other to protect the amenity of particular land uses.

#### Assessing Intrusiveness

For assessing intrusiveness, the background noise level must be measured. The intrusiveness criterion essentially means that the equivalent continuous noise level ( $L_{Aeq}$ ) of the source should not be more than five decibels above the measured background level ( $L_{A90}$ ).

#### Assessing Amenity

The amenity assessment is based on noise criteria specific to land use and associated activities (**Table 3**). The criteria relate only to industrial-type noise 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 industries need to be designed so that the cumulative effect does not produce noise levels that would significantly exceed the criterion (**Table 4**).

**Table 3 Amenity Criteria Recommended LAeq Noise Levels from Industrial Noise Sources**

Type of Receiver	Indicative Noise Amenity Area	Time of Day	Recommended LAeq(Period) Noise Level (dBA)	
			Acceptable	Recommended Maximum
Residence	Rural	Day	50	55
		Evening	45	50
		Night	40	45
	Suburban	Day	55	60
		Evening	45	50
		Night	40	45
	Urban	Day	60	65
		Evening	50	55
		Night	45	50
	Urban/Industrial Interface (for existing situations only)	Day	65	70
		Evening	55	60
		Night	50	55
School classrooms - internal	All	Noisiest 1 hour period when in use	35	40
Hospital wards - internal	All	Noisiest 1 hour period	35	40
		- external	50	55
Place of worship - internal	All	When in use	40	45
Area specifically reserved for passive recreation (eg National Park)	All	When in use	50	55
Active recreation area (eg school playground, golf course)	All	When in use	55	60
Commercial premises	All	When in use	65	70
Industrial premises	All	When in use	70	75

Note: Monday - Saturday: Daytime 7.00 am to 6.00 pm; Evening 6.00 pm to 10.00 pm; Night-time 10.00 pm to 7.00 am.  
 Sundays, Public Holidays: Daytime 8.00 am - 6.00 pm; Evening 6.00 pm - 10.00 pm; Night-time 10.00 pm - 8.00 am.  
 The LAeq index corresponds to the level of noise equivalent to the energy average of noise levels occurring over a measurement period.

**Table 4 Modification to Acceptable Noise Level (ANL)\* to Account for Existing Levels of Industrial Noise**

Total Existing LAeq Noise Level from Industrial Noise Sources	Maximum LAeq Noise Level for Noise from New Sources Alone, dBA
≥ Acceptable noise level plus 2 dBA	If existing noise level is <i>likely to decrease</i> in future acceptable noise level minus 10 dBA If existing noise level is <i>unlikely to decrease</i> in future existing noise level minus 10 dBA
Acceptable noise level plus 1 dBA	Acceptable noise level minus 8 dBA
Acceptable noise level	Acceptable noise level minus 8 dBA
Acceptable noise level minus 1 dBA	Acceptable noise level minus 6 dBA
Acceptable noise level minus 2 dBA	Acceptable noise level minus 4 dBA
Acceptable noise level minus 3 dBA	Acceptable noise level minus 3 dBA
Acceptable noise level minus 4 dBA	Acceptable noise level minus 2 dBA
Acceptable noise level minus 5 dBA	Acceptable noise level minus 2 dBA
Acceptable noise level minus 6 dBA	Acceptable noise level minus 1 dBA
< Acceptable noise level minus 6 dBA	Acceptable noise level

\* ANL = recommended acceptable LAeq noise level for the specific receiver, area and time of day from **Table 3**

Residences surrounding the development have been classified for the purposes of this noise assessment as 'suburban'. The 'suburban' classification is not determined in relation to the zoning of these residences but is an acoustical classification. The ambient noise at these locations is influenced by highway traffic noise and (to a lesser extent) noise from existing industrial facilities.

## 5.2 Assessing Sleep Disturbance

The potential for sleep disturbance has been assessed using the guidance provided in the INP Application Notes.

The INP Application Notes (last updated 12 July 2012) recognises that the current LA1(1minute) sleep disturbance criteria of 15 dBA above the prevailing LA90(15minute) level is not ideal. The assessment of potential sleep disturbance is complex and poorly understood and the EPA believes that there is insufficient information to determine a suitable alternative criteria.

In the interim, the INP guideline suggests that the LA1(1minute) level of 15 dBA above the RBL is a suitable screening criteria for sleep disturbance for the night-time period.

Guidance regarding potential for sleep disturbance is also provided in the NSW Road Noise Policy (RNP). The RNP calls upon a number of studies that have been conducted into the effect of maximum noise levels on sleep. The RNP acknowledges that, at the current level of understanding, it is not possible to establish absolute noise level criteria that would correlate to an acceptable level of sleep disturbance. However, the RNP provides the following conclusions from the research on sleep disturbance:

- Maximum internal noise levels below 50 - 55 dBA are unlikely to awaken people from sleep.
- 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.

### 5.3 Construction Noise Assessment

The EPA released the Interim Construction Noise Guideline (DECCW, 2009) (ICNG) in July 2009. This policy sets out noise management levels for residential and other noise-sensitive receivers and how they are to be applied. The policy suggests restriction to the hours of construction that apply to activities that generate noise at residences above the 'highly affected' noise management level. A summary of the noise management levels is contained in **Table 5**.

**Table 5 ICNG: Noise at residences using quantitative method**

Time of Day	Management Level LAeq(15minute)* (dBA)	How to Apply
Recommended standard hours Monday to Friday 7am to 6pm Saturday 8am to 1pm No work Sundays or public holidays	Noise Affected RBL** + 10 dB	The noise affected level represents the point above which <b>there may be some community reaction to noise</b> . <ul style="list-style-type: none"> <li>Where the predicted or measured LAeq(15minute) is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level.</li> <li>The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.</li> </ul>
	Highly noise affected 75 dBA	The highly noise affected level represents the point above which <b>there may be strong community reaction to noise</b> . <ul style="list-style-type: none"> <li>Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account:               <ol style="list-style-type: none"> <li>Times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences.</li> <li>If the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.</li> </ol> </li> </ul>
Outside recommended standard hours	Noise Affected RBL** + 5 dB	<ul style="list-style-type: none"> <li><b>A strong justification would typically be required for works outside the recommended standard hours.</b></li> <li>The proponent should apply all feasible and reasonable work practices to meet the noise affected level.</li> <li>Where all feasible and reasonable practices have been applied and noise is more than 5 dB(A) above the noise affected level, the proponent should negotiate with the community.</li> <li>For guidance on negotiating agreements refer to section 7.2.2 of the ICNG.</li> </ul>

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

\*\*RBL: Rating Background Level, as defined in the NSW Industrial Noise Policy (EPA, 2000).

## 5.4 Road Traffic Noise Assessment

The RNP presents guidelines for the assessment of road traffic noise. The policy document provides road traffic noise criteria for proposed road, residential and industrial developments, as well as criteria for other sensitive land uses. Further details of project specific road traffic noise goals are provided in **Section 8.4**

## 6 EXISTING ACOUSTICAL ENVIRONMENT

### 6.1 Methodology

A site inspection was conducted on Thursday 1 May 2014 to gain an appreciation of the subject site and to commence the noise monitoring program. Both short-term operator-attended and long-term unattended noise monitoring surveys were conducted. Two (2) environmental noise loggers were positioned at locations representing the nearest sensitive receivers to the site as shown in **Figure 2**. Details of the loggers and their locations are provided in **Table 6**.

**Table 6 Noise Monitoring Details**

Location Reference	Location	Noise Logger Type / Serial No.	Monitoring Period
NM1	8 Goodenough Street, Glenfield	ARL Type EL316 / 16-207-042	Thursday 1 May 2014 to Wednesday 14 May 2014, inclusive
NM2	3 Albion Crescent, Glenfield	ARL Ngara / 878049	Friday 16 May 2014 to Friday 23 May 2014 inclusive

Operator-attended noise surveys were conducted during logger deployment for a period of 15 minutes at the logger locations.

All acoustic instrumentation employed throughout the monitoring programme has been designed to comply with the requirements of AS IEC 61672.1-2004 *Electroacoustics - Sound level meters - Specifications* and carries current NATA or manufacturer calibration certificates. Instrument calibration was checked before and after each measurement survey, with the variation in calibrated levels not exceeding  $\pm 0.5$  dBA.

### 6.2 Unattended Noise Monitoring Results

Each noise logger was set to record statistical indices over 15-minute intervals including L<sub>Amax</sub>, L<sub>A1</sub>, L<sub>A10</sub>, L<sub>A90</sub> and L<sub>Aeq</sub> noise levels.

Weather data for the survey period was obtained from the nearest Bureau of Meteorology (BoM) weather station located at Bankstown Airport, approximately 9 km north-east of the monitoring location. Unattended noise data corresponding with periods of rainfall and/or wind speeds in excess of 5 m/s (approximately 18km/h) were discarded in accordance with INP data exclusion methodology.

Results of the unattended noise monitoring program are provided in graphical format in **Appendix A**. A summary of noise levels measured during the unattended noise monitoring program is provided in **Table 7**.

**Table 7 Summary of Existing Ambient Noise Levels – Glenfield**

Location	Period	Background LA90 Noise Level	Measured LAeq(Period)	Estimated Existing Industrial Contribution LAeq
		Rating Background Level		
NM1 8 Goodenough Street, Glenfield	Morning Shoulder	48 dBA	55 dBA	37 dBA (GWS)
	Day	42 dBA	51 dBA	37 dBA (GWS)
	Evening	42 dBA	49 dBA	Non discernible < 39 dBA
	Night	36 dBA	48 dBA	Non discernible < 34 dBA
NM2 3 Albion Crescent Glenfield	Morning Shoulder	47 dBA	51 dBA	Non discernible
	Day	39 dBA	52 dBA	Non discernible < 49 dBA
	Evening	45 dBA	51 dBA	Non discernible < 39 dBA
	Night	35 dBA	48 dBA	Non discernible < 34 dBA

Note: Daytime 7.00 am to 6.00 pm; Evening 6.00 pm to 10.00 pm; Night-time 10.00 pm to 7.00 am  
 On Sundays and Public Holidays, Daytime 8.00 am to 6.00 pm; Evening 6.00 pm to 10.00 pm; Night-time  
 10.00 pm to 8.00 am  
 The LA90 represents the level exceeded for 90% of the interval period and is referred to as the average minimum or  
 background noise level  
 LAeq - The equivalent continuous noise level is defined as the level of noise equivalent to the energy average of  
 noise levels occurring over a measurement period  
 All noise levels reported here are free-field measurements, meaning that no noise reflections occurred from  
 building façades at the noise monitoring location.

### 6.3 Operator-Attended Noise Monitoring Results

The purpose of the operator-attended noise survey was to determine the character and duration of various noise sources to the total ambient noise level. The results of the operator-attended noise survey are provided in **Table 8**.

**Table 8 Operator-attended Noise Survey Results – Glenfield**

Location	Date/ Start time/ Weather	Primary Noise Descriptor (dBA re 20 µPa)					Description of Noise Emission, Typical Maximum Levels, LAmax (dBA)
		LAmax	LA1	LA10	LAeq	LA90	
NM1 8 Goodenough Street Glenfield	1/05/2014 12:10 pm Wind: 0.5 E Temp: 20°C	65	58	50	47	40	Plane 50 to 62 Resident 48 to 53 Traffic 40 to 46 Local traffic 51 to 65 Birds 47 to 52 Train horn 41 GWS site 32 to 62 GWS contribution LAeq(15minute) - 37
NM2 3 Albion Crescent Glenfield	1/05/2014 12:49 pm Wind: 0.5 E Temp: 20°C	57	52	46	43	38	Plane 42 to 51 Train 47 to 50 Train horn 49 to 56 Insects 41 Dog 54 GWS site not audible

Operator-attended noise survey results indicate that the main contributors to the ambient noise environment in the vicinity of the GWS site are road and rail traffic at both noise monitoring locations with current operations at the GWS site also contributing at Goodenough Street.

## 7 EFFECTS OF METEOROLOGY ON NOISE LEVELS

### 7.1 Wind

Wind has the potential to increase noise levels at a receiver when it is light and stable and blows from the direction of the source of the noise. As the strength of the wind increases the noise produced by the wind will obscure noise from most industrial and transport sources.

Wind effects need to be considered when wind is a feature of the area under consideration. Where wind blows from the source to the receiver at speeds up to 3 m/s for more than 30% of the time in any season, then wind is considered to be a feature of the area and noise level predictions must be made under these conditions.

Weather data was obtained, for a period of 12 months (April 2013 to April 2014), from the BoM weather station located at Bankstown Airport, approximately 9 km north-east of the subject site. This data was analysed to determine the frequency of occurrence of winds up to speeds of 3 m/s for day, evening and night in each season.

A summary of the most frequently occurring winds for each period is contained within **Table 9**, **Table 10** and **Table 11**.

**Table 9 Seasonal Frequency of Occurrence of Wind Speed Intervals - Daytime**

Period	Calm	Wind Direction	0.5 to 2 m/s	2 to 3 m/s	0.5 to 3 m/s
Summer	2.2%	NNW±45°	3.7%	3.9%	7.6%
Autumn	5.3%	WNW±45°	11.2%	5.5%	16.7%
Winter	5.3%	WNW±45°	12.0%	6.6%	18.5%
Spring	1.9%	WNW±45°	6.2%	5.5%	11.7%

**Table 10 Seasonal Frequency of Occurrence of Wind Speed Intervals - Evening**

Period	Calm	Wind Direction	0.5 to 2 m/s	2 to 3 m/s	0.5 to 3 m/s
Summer	1.5%	NE±45°	5.8%	4.9%	10.7%
Autumn	20.3%	NNE±45°	10.1%	3.8%	13.9%
Winter	30.0%	W±45°	10.5%	5.0%	15.5%
Spring	8.3%	NE±45°	8.9%	4.1%	13.0%

**Table 11 Seasonal Frequency of Occurrence of Wind Speed Intervals - Night**

Period	Calm	Wind Direction	0.5 to 2 m/s	2 to 3 m/s	0.5 to 3 m/s
Summer	30.4%	NE±45°	11.3%	4.0%	15.2%
Autumn	39.8%	WSW±45°	16.7%	5.3%	22.1%
Winter	34.4%	WNW±45°	16.5%	4.2%	20.7%
Spring	39.3%	SW±45°	10.4%	4.6%	15.0%

Seasonal wind records indicate that prevailing winds from the western sector are not a feature of the area since the frequency of occurrence of winds up to 3 m/s is below the 30% threshold for all seasons. Hence, prevailing winds have not been considered as part of this noise assessment.

## 7.2 Temperature Inversions

Temperature inversions, when they occur, have the ability to increase noise levels by focusing sound waves. Temperature inversions generally occur during the night-time and early morning periods during the winter months. For a temperature inversion to be a significant characteristic of the area it needs to occur for approximately 30% of the total night-time during winter, or about two nights per week.

Meteorological data regarding the occurrence of temperature inversions was not available for the area. Therefore, it has been assumed that temperature inversions are a feature of the area and have been considered as part of this noise assessment. The default INP value of 3°C/100 m has been adopted for this assessment and applies to the morning shoulder period only.

## 8 PROJECT SPECIFIC NOISE CRITERIA

### 8.1 Operational Noise Criteria

The operational noise criteria contained in **Table 12** have been determined based on measured noise levels provided in **Table 7** and with reference to the INP.

It is noted that the GWS contributed to the noise levels recorded at monitoring location NM1. The GWS operated between 6.30 am and 4.00 pm each weekday during the noise monitoring period. The influence of the GWS on the overall background noise level recorded at NM1 is deemed to be minimal as evidenced by the fact that the background noise level during the evening period (in the absence of noise from GWS) is identical to that during the daytime period.

**Table 12 Project Specific Noise Criteria**

Location	Period	Measured Background Noise Level (LA90)	Adopted RBL LA90	Intrusiveness Criteria LAeq(15min)	Amenity Criteria LAeq(Period)	Project Specific Noise Criteria LAeq(15min)
Residents on Goodenough Street, Ferguson Street and Canterbury Road, Glenfield <sup>1</sup>	Morning Shoulder <sup>3</sup>	48	39 <sup>5</sup>	44	47	<b>44</b>
	Day <sup>4</sup>	42	42	47	55	<b>47</b>
Residents on Slessor Road, Glory Road and Minstrel Street <sup>2</sup>	Morning Shoulder <sup>3</sup>	47	37 <sup>5</sup>	42	47	<b>42</b>
	Day <sup>4</sup>	39	39	44	55	<b>44</b>

1. Based on ambient noise monitoring results obtained from NM1 (8 Goodenough Street, Glenfield).
2. Based on ambient noise monitoring results obtained from NM2 (3 Albion Crescent, Glenfield).
3. Morning shoulder 6.30 am – 7.00 am, Monday to Friday
4. Daytime 7.00 am to 6.00 pm, on Sundays and Public Holidays, Daytime 8.00 am to 6.00 pm.
5. The adopted RBL for the morning shoulder periods has been taken to be the midpoint of the RBL measured for day and night periods. This is due to the small sample size of the measured LA90 data during this period.

## 8.2 Construction Noise Goals

The project specific noise goals for construction activity associated with the Project have been established with reference to the ICNG outlined in **Section 5.3** of this report and results of the ambient noise survey presented in **Section 6**.

The resulting construction noise goals for the Project are presented in **Table 13**.

**Table 13 Project Specific Noise Goals - Construction**

Location	Time of Day	Noise Goal (LAeq,15minute)	
		Noise Affected	Highly Noise Affected
Residents on Goodenough Street, Ferguson Street and Canterbury Road, Glenfield <sup>1</sup>	Recommended standard hours <sup>3</sup>	52	75
Residents on Slessor Road, Glory Road and Minstrel Street <sup>2</sup>	Recommended standard hours <sup>3</sup>	49	75

1. Based on ambient noise monitoring results obtained from NM1 (8 Goodenough Street, Glenfield).
2. Based on ambient noise monitoring results obtained from NM2 (3 Albion Crescent, Glenfield).
3. Monday to Friday 7am to 6pm, Saturday 8am to 1pm, no work Sundays or public holidays.
4. Note that a strong justification would typically be required for work outside the recommended standard hours.

## 8.3 Sleep Disturbance Noise Goals

The relevant sleep disturbance noise goals for the Project are provided in **Table 14**. To provide a conservative approach to the assessment of potential for sleep disturbance the minimum measured LA90 during the proposed morning shoulder operating period has been utilised for the purpose of establishing the relevant sleep disturbance noise goal.

**Table 14 Sleep Disturbance Noise Goals**

Location	Period	Measured Background Noise Level (LA90)	Adopted RBL LA90	Sleep Disturbance Noise Goal (LA1 (1minute))
Residents on Goodenough Street and Ferguson Street, Glenfield <sup>1</sup>	Morning Shoulder <sup>3</sup>	48	39 <sup>4</sup>	54 dBA
Residents on Canterbury Road, Slessor Road, Glory Road and Minstrel Street <sup>2</sup>	Morning Shoulder <sup>3</sup>	47	37 <sup>4</sup>	52 dBA

1. Based on ambient noise monitoring results obtained from NM1 (8 Goodenough Street, Glenfield).
2. Based on ambient noise monitoring results obtained from NM2 (3 Albion Crescent, Glenfield).
3. Morning shoulder 6.30 am – 7.00 am, Monday to Friday.
4. The adopted RBL for the morning shoulder period has been taken to be the midpoint of the RBL measured for day and night periods. This is due to the small sample size of the measured LA90 data during this period.

Guidance regarding potential for sleep disturbance is also provided in the NSW Road Noise Policy (RNP). The RNP calls upon a number of studies that have been conducted into the effect of maximum noise levels on sleep. The RNP acknowledges that, at the current level of understanding, it is not possible to establish absolute noise level criteria that would correlate to an acceptable level of sleep disturbance. However, the RNP provides the following conclusions from the research on sleep disturbance:

- Maximum internal noise levels below 50 dBA to 55 dBA are unlikely to awaken people from sleep
- One (1) or two (2) noise events per night, with maximum internal noise levels of 65 dBA to 70 dBA, are not likely to affect health and wellbeing significantly.

It is generally accepted that internal noise levels in a dwelling, with the windows open, are 10 dB lower than external noise levels. Based on a worst case minimum attenuation, with windows open, of 10 dB, the first conclusion above suggests that short term external noises of 60 dBA to 65 dBA are unlikely to cause awakening reactions. The second conclusion suggests that one or two noise events per night with maximum external noise levels of 75 dBA to 80 dBA are not likely to affect health and wellbeing significantly.

#### 8.4 Road Traffic Noise Criteria

Operation of the Facility has the potential to increase road traffic noise received at residents adjacent to Glenfield Road. **Table 15** presents the most relevant road traffic noise criteria for the Project with reference to the RNP.

**Table 15 Road Traffic Noise Assessment Criteria for Residential Land Uses**

Road Category	Type of Project/Land Use	Assessment Criteria	
		Day (7am to 10pm)	Night (10pm to 7am)
Freeway/arterial/sub-arterial roads –Glenfield Road	Existing residences affected by additional traffic on existing freeways/arterial/sub-arterial roads generated by land-use developments.	LAeq(15hour) 60 dBA (external)	LAeq(9hour) 55 dBA (external)

In addition to the assessment criteria provided in **Table 15**, any increase in the total traffic noise level at a location due to a proposed project or traffic-generating development must be considered. Residences experiencing increases in total traffic noise level of more than 12 dBA (compared to existing road traffic noise levels for the relevant “no build” option) should also be considered for mitigation.

## 9 OPERATIONAL NOISE IMPACT ASSESSMENT

### 9.1 Noise Modelling Assumptions

A computer model was used to predict noise emissions from the operation of the Project. The operational noise modelling was undertaken using the Concawe algorithms within SoundPLAN v7.3 software, developed by Braunstein and Berndt GmbH in Germany. A three-dimensional digital terrain map providing relevant topographic information was used in the modelling process. The model used this map, together with noise source data, ground cover, shielding by barriers and/or adjacent buildings and atmospheric information to predict noise levels at the nearest potentially affected receivers.

Topographic contours and operational information were supplied by EPS for the purpose of modelling noise. Prediction of noise emission levels was carried out under calm and prevailing atmospheric conditions. Atmospheric parameters under which noise predictions were made are given in **Table 16**.

**Table 16 Meteorological Parameters Considered for Noise Predictions**

	Temperature	Humidity	Wind Speed	Wind Direction (degrees from north)	Temperature Inversion
Calm (Day)	20°C	70%	n/a	n/a	n/a
Inversion (Morning Shoulder only)	10°C	90%	n/a	n/a	3°C/100m

Sound power levels of acoustically significant plant and equipment proposed for use on the subject site have been obtained from a SLR database of similar equipment. Detailed sound power level data is provided in **Appendix B**.

Other assumptions incorporated in the noise model include the following:

- No significant levelling will occur at the subject site; existing ground level has been assumed in the noise model.
- All acoustically significant plant and equipment operate simultaneously.
- A 4m stockpile for processed product is maintained in Area 3.

Initial noise modelling results indicated that predicted noise emission levels would exceed the relevant project specific noise criteria during each period considered. Consideration was given to the operational scenario during the morning shoulder period and additional noise mitigation measures to be implemented at the site.

Preliminary noise modelling indicated that adverse noise impacts would be likely during the morning-shoulder period in the presence of a temperature inversion even during restricted operations. Synthetic weather data generated for the purpose of the Air Quality Impact Assessment was analysed to gain an understanding of the frequency of occurrence of temperature inversions during this time. It was found that F-class temperature inversions were likely to occur from 6.30 am to 7.00 am during the months from May to August, inclusive. It has been assumed that the GWS Site would not operate during the morning shoulder in these months.

In addition, the following mitigation measures have been assumed in the noise model for the purpose of reducing noise emissions below the relevant criteria during all proposed operational periods:

- The existing 1.8 m fence on the bund to the south of the subject site.
- Localised noise barriers approximately 2.5 m high adjacent to the processing plant in Areas 2 and 3 and the shredder in Area 1. These have been oriented to provide shielding to the south and the west.
- 1.8 m acoustic barrier on top of the existing bund that is located south of the subject site between the main entry to the project area and the gully.

The operational scenario modelled during each period together with assumed sound power level information is summarised in **Table 17**. A tick (✓) indicates that the equipment is in operation during the relevant period. A cross (×) indicates that the equipment is not in operation during the relevant period. Where there is a number in brackets following a tick, this represents the number of pieces of the equipment that has been considered in the noise model during the relevant period. The typical operational scenario has been confirmed by EPS. Plant and equipment locations assumed in the noise model for the typical operational scenario are also indicated in **Table 17**.

**Table 17 Operational Scenario Considered in Noise Model**

Plant and Equipment / Area of Operation (refer to Figure 1)	Sound Power Level	Morning Shoulder	Day
Front End Loaders (Cat 972 or similar)	107 dBA	✓ (3)	✓ (4)
Wheel Loader (Cat 950 or similar)	107 dBA	✓	✓
45t Excavator with Bucket (Hitachi or similar)	107 dBA	×	✓ (2)
Excavator with Pulveriser (Hitachi or similar);	108 dBA	×	✓
8 t Excavator Plant Housekeeping	98 dBA	×	✓
7,000lt Water Cart (Cat 769 for dust suppression)	100 dBA	✓	✓
Jaw Crusher (Powercrusher PC6 Mobile Jaw Crusher)	112 dBA	×	✓
Cone Crusher (Powercrusher PC21 Mobile Cone Crusher)	109 dBA	×	✓
Screen (Powercrusher HCS5515 Mobile Screen)	109 dBA	×	✓
Shredder	110 dBA	×	✓
Product despatch/delivery trucks (33t Road Trucks)	99 dBA	✓ (4)	✓ (4)

## 9.2 Predicted Operational Noise Levels

Noise emission levels were predicted from the proposed development for the typical operational scenarios described in **Table 17**.

Noise from all sources that contribute to the total noise from the site at each receiver have been examined to identify characteristics that may cause greater annoyance (for example tonality, impulsiveness etc). These characteristics were not identified in any of the sources considered.

Intrusive noise levels predicted at the nearest potentially affected residential locations are provided in **Table 18**.

**Table 18 Predicted Intrusive Noise Levels – GWS Materials Recycling Facility**

Location <sup>1</sup>	Period	Predicted Noise Level, LAeq(15minute)	Project Specific Intrusive Noise Criteria LAeq(15minute)
Slessor Road, Casula	Morning Shoulder	36	42 dBA
	Day	41	44 dBA
Glory Road (north), Glenfield	Morning Shoulder	38	42 dBA
	Day	41	44 dBA
Glory Road (south), Glenfield	Morning Shoulder	37	42 dBA
	Day	40	44 dBA
Minstrel Street, Glenfield	Morning Shoulder	36	42 dBA
	Day	39	44 dBA
Canterbury Road, Glenfield	Morning Shoulder	37	42 dBA
	Day	40	44 dBA
Fergusson Street (west), Glenfield	Morning Shoulder	37	44 dBA
	Day	40	47 dBA
Fergusson Street (central), Glenfield	Morning Shoulder	40	44 dBA
	Day	43	47 dBA
Fergusson Street (east), Glenfield	Morning Shoulder	43	44 dBA
	Day	47	47 dBA
Goodenough Street (west), Glenfield	Morning Shoulder	44	44 dBA
	Day	47	47 dBA
Goodenough Street (central), Glenfield	Morning Shoulder	43	44 dBA
	Day	47	47 dBA
Goodenough Street (east), Glenfield	Morning Shoulder	44	44 dBA
	Day	47	47 dBA

Noise emissions from the GWS site are predicted to meet the project specific noise criteria at all the nearest potentially affected residential locations with the mitigation measures implemented as described in **Section 9.1**.

## 10 CUMMULATIVE NOISE ASSESSMENT

Potential cumulative noise impacts from existing and successive developments are embraced by the INP procedures by ensuring that the appropriate noise emission criteria are established with a view to maintaining acceptable noise amenity levels for residences. Therefore, the cumulative impact of the Project with existing industrial noise sources in the surrounding area has been assessed in the determination of the amenity criteria at each receiver location.

It is noted that existing industrial noise was not found to be a significant contributor to ambient noise levels at any of the monitoring locations (refer to **Section 6** of this report) and therefore, further assessment of cumulative industrial noise is not required.

## 11 CONSTRUCTION NOISE ASSESSMENT

Information was provided to SLR by EPS regarding the proposed equipment for construction activity associated with the Project. The most significant impacts are expected to occur during bulk earthworks across the site. It has been assumed that all construction activity associated with the Project would be conducted during recommended standard construction hours.

**Table 19** provides the likely equipment associated with the assumed acoustically worst-case construction activity together with the associated sound power levels.

**Table 19 Assumed Construction Plant and Equipment**

Plant and Equipment	Sound Power Level (dBA)
Front End Loader	107 dBA
45t Excavator with Bucket	107 dBA
33t Product Truck	99 dBA
Transit Mixer (unloading)	111 dBA
Crane	104 dBA
Generator	99 dBA
Grader	111 dBA

Noise predictions at the nearest potentially affected residences are provided in **Table 20** for proposed construction activity associated with the Project.

**Table 20 Construction Noise Predictions**

Location	Time of Day	Predicted Construction Noise Level, LAeq(15minute)	Noise Goal (LAeq,15minute) dBA	
			Noise Affected	Highly Noise Affected
Slessor Road, Casula	Recommended standard hours	38	52	75
Glory Road (north), Glenfield		41	52	75
Glory Road (south), Glenfield		40	52	75
Minstrel Street, Glenfield		39	52	75
Canterbury Road, Glenfield		41	54	75
Fergusson Street (west), Glenfield		41	54	75
Fergusson Street (central), Glenfield		44	54	75
Fergusson Street (east), Glenfield		48	54	75
Goodenough Street (west), Glenfield		47	54	75
Goodenough Street (central), Glenfield		47	54	75
Goodenough Street (east), Glenfield		50	54	75

Results of construction noise modelling indicate that the noise affected management level is predicted to be achieved at all noise sensitive locations.

Notwithstanding the above, the following recommendations are made with the aim of minimising construction noise impacts at nearby noise sensitive receivers:

- An important aspect of the mitigation of noise impacts during all construction phases will be adherence to the standard daytime construction hours.
- Noisy plant operating simultaneously to be avoided wherever possible.
- Maintenance work on all construction plant will be carried out away from noise sensitive areas and confined to standard daytime construction hours, where practicable.
- Site noisy equipment behind structures that act as barriers or at the greatest distance from the noise-sensitive area or orient the equipment so that noise emissions are directed away from any sensitive areas.
- Keep equipment well maintained.
- Employ “quiet” practices when operating equipment (eg positioning and unloading of trucks in appropriate areas).

With regard to potentially offensive noise events associated with construction activities AS 2436-1981 “*Guide to noise control on construction, maintenance and demolition sites*” provides the following:

*If noisy operations must be carried out, then a responsible person should maintain liaison between the neighbouring community and the contractor. This person should inform the public at what time to expect noisy operations and also inform the contractor of any special needs of the public.*

Consultation and co-operation between the contractor and his neighbours and the removal of uncertainty and rumour can help to reduce the adverse reaction to noise.

## 12 SLEEP DISTURBANCE ASSESSMENT

In assessing sleep disturbance, typical L<sub>Am</sub> noise levels of acoustically significant plant and equipment to be used at the subject site were used as input to the computer model and are presented in **Table 21**. Predictions were made at the nearest residential areas under calm weather conditions during the morning shoulder period (6.30 am – 7.00 am). Noise events considered include material being loaded into an empty truck and a front end loader bucket scraping concrete or impacting on truck bodies etc. The use of the L<sub>Am</sub> noise level provides a worst-case prediction since the LA1(1minute) noise level of a noise event is likely to be less than the L<sub>Am</sub>.

**Table 21 Maximum Noise Events**

Source	L <sub>Am</sub>
Loading empty truck	113 dBA
Front end loader bucket impact/scrape	120 dBA

Predicted maximum noise levels during the morning shoulder period are provided in **Table 22**.

**Table 22 Maximum Noise Predictions**

Location	Time of Day	Predicted Maximum Noise Level LAmax, dBA	Sleep Disturbance Noise Goal LA1(1minute), dBA
Slessor Road, Casula		46	52
Glory Road (north), Glenfield		47	52
Glory Road (south), Glenfield		45	52
Minstrel Street, Glenfield		45	52
Canterbury Road, Glenfield		46	54
Fergusson Street (west), Glenfield	Morning Shoulder	46	54
Fergusson Street (central), Glenfield		50	54
Fergusson Street (east), Glenfield		52	54
Goodenough Street (west), Glenfield		53	54
Goodenough Street (central), Glenfield		52	54
Goodenough Street (east), Glenfield		50	54

Results of maximum noise predictions indicate that the sleep disturbance noise goal will be achieved.

### 13 ROAD TRAFFIC NOISE ASSESSMENT

Information regarding traffic associated with the Project has been obtained with reference to *Glenfield Waste Services State Significant Development Traffic Impact Assessment (GWS TIA)* dated October 2014 prepared by Anton Reisch Consulting Pty Ltd.

The total predicted future traffic generation is expected to be approximately 600 vehicle trips per day; 38% light vehicles and 62% heavy vehicles. This is an increase of approximately 350 vehicle trips per day compared to existing traffic volumes. It is expected that vehicle trips associated with the GWS site will be evenly split between the east and west.

It is noted that the nearest residences potentially affected by an increase in road traffic noise associated with the Project are located approximately 8 m from Glenfield Road.

Based on the preceding, it is likely that the Project will increase daily traffic volumes by approximately 175 on Glenfield Road; approximately 109 heavy vehicles and 66 light vehicles. Further, it is likely that the Project could generate a maximum hourly increase of approximately 33 heavy vehicles on Glenfield Road. Annual average daily traffic (AADT) was not available for Glenfield Road at the time of reporting, however, based on the assumption that predicted AM/PM peak volumes are approximately 10% of daily volumes then Glenfield Road is expected to currently experience in the order of 14,000 vehicle trips per day. Total traffic predicted to be generated by the GWS site represents less than 2% of the estimated existing daily traffic on Glenfield Road. The corresponding increase in road traffic noise would not be noticeable by most people.

Furthermore, the GWS TIA describes a number of other significant developments occurring and/or planned in and around Glenfield that will have a significantly greater impact on the road traffic network; Glenfield Road Urban Release Area, Campbelltown Road Upgrade, Glenfield Link Road and The Moorebank Avenue Intermodal.

## 14 NOISE MANAGEMENT AND MONITORING

The following mitigation measures have been assumed in the noise model for the purpose of reducing noise emissions below the relevant criteria during all proposed operational periods:

- The existing 1.8 m fence on the bund to the south of the subject site.
- A 4m stockpile for processed product is maintained in Area 3.
- Localised noise barriers approximately 2.5 m high adjacent to the processing plant in Areas 2 and 3 and the shredder in Area 1. These have been oriented to provide shielding to the south and the west.
- 1.8 m acoustic barrier on top of the existing bund that is located south of the subject site between the main entry to the project area and the gully.

[For discussion] GWS will prepare an Operational Noise Management Plan (ONMP) prior to commencement of operations at the subject site. The ONMP will consider the following:

- Relevant noise goals for the subject site.
- A program to monitor and report on noise emission levels from the site and the effectiveness of noise mitigation measures.
- A protocol for managing and reporting any noise complaints.

## 15 CONCLUSION

SLR has undertaken a NIA relating to the proposed Materials Recycling Facility at the Glenfield Waste Site (GWS) located at Cambridge Avenue, Glenfield NSW.

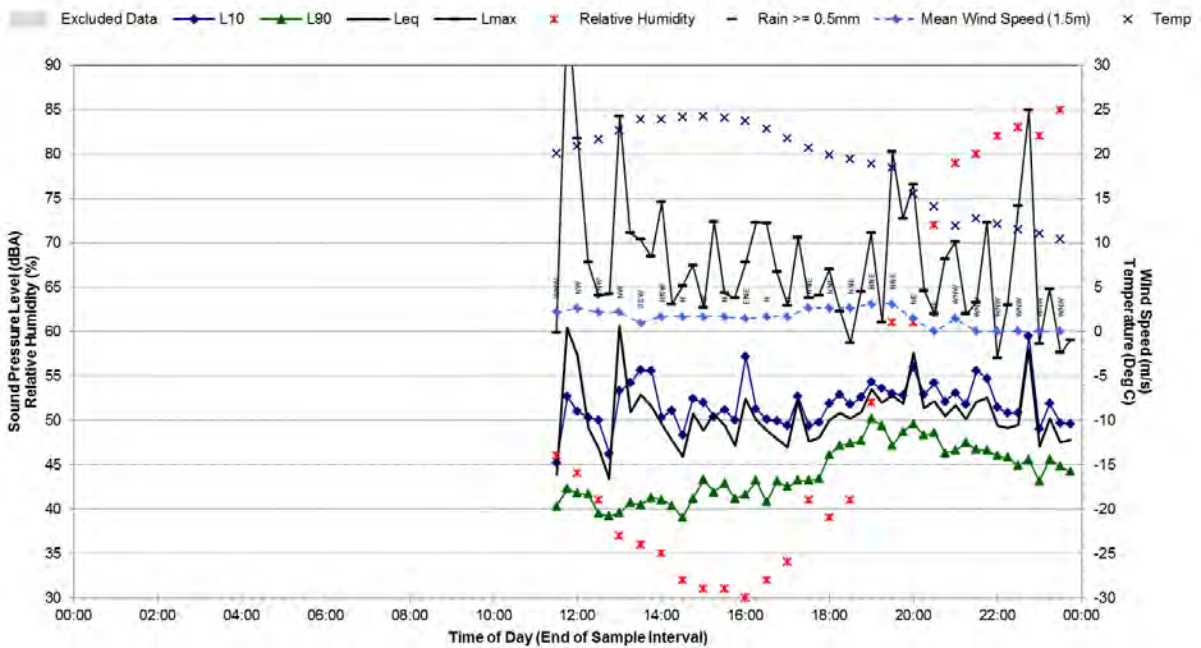
The aim of this assessment was to assess the potential noise and vibration impacts associated with the proposed development on surrounding sensitive receptors.

Operational noise emissions from the GWS site are predicted to meet the project specific noise criteria at all the nearest potentially affected residential locations with the mitigation measures implemented as described in **Section 9.1**. Recommended noise mitigation, management and monitoring measures have been summarised in **Section 14**.

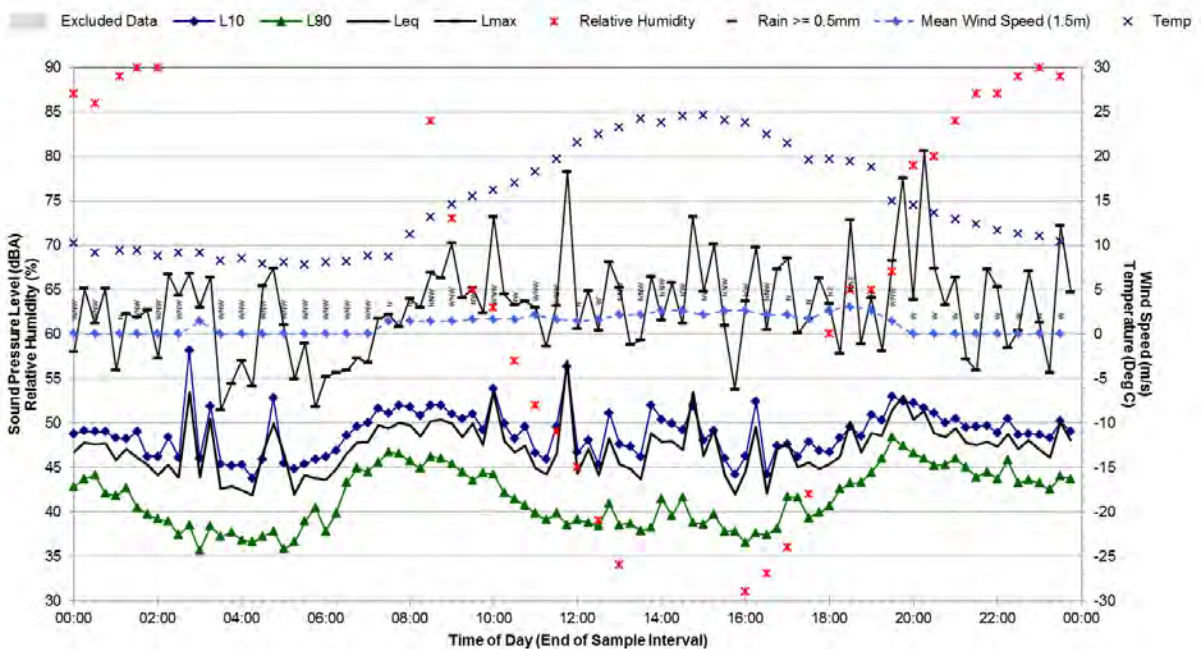
Construction noise impacts are also predicted to be below the relevant noise goals. Notwithstanding this, recommendations have been provided with the aim of minimising construction noise impacts at nearby noise sensitive receivers.

Road traffic noise impact associated with the Project is expected to be minimal given the relatively small increase in proposed traffic volumes and the number of other significant traffic-generating developments in the vicinity of the Project site.

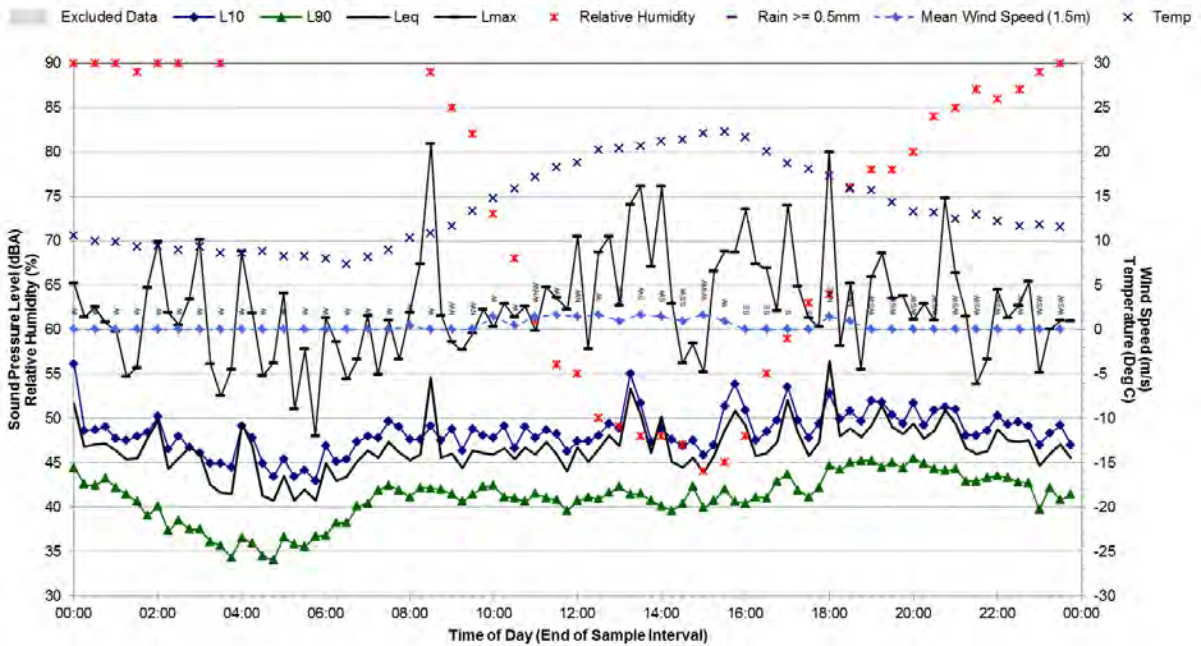
### Statistical Ambient Noise Levels 3 Albion Cres, Glenfield - Friday, 16 May 2014



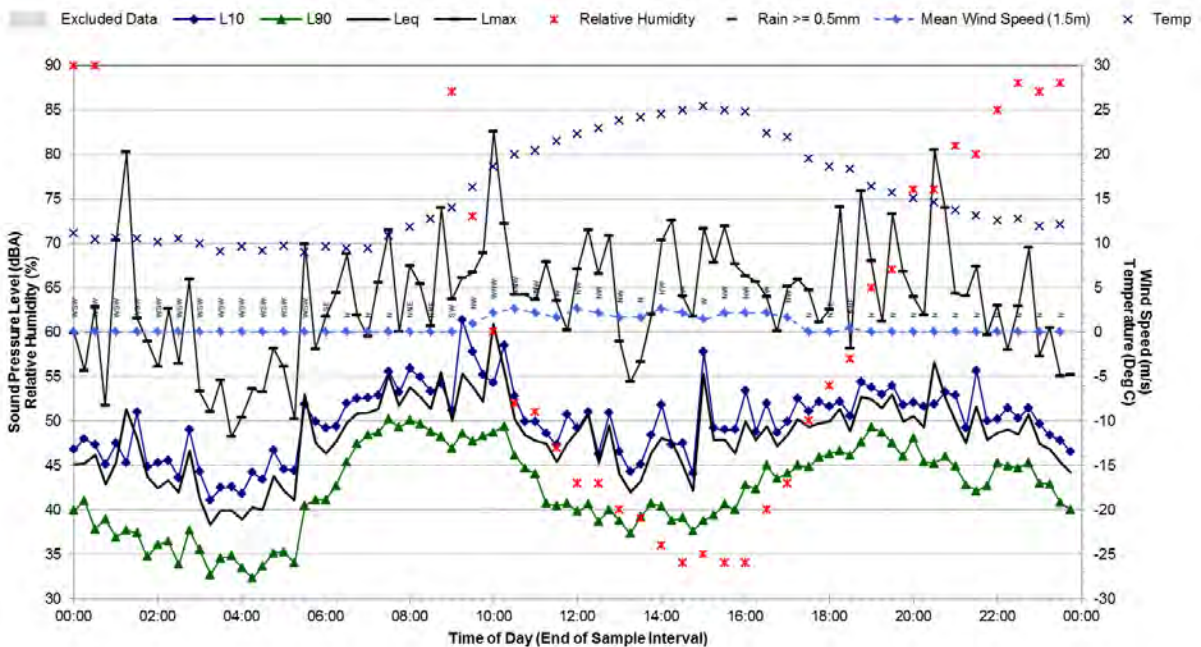
### Statistical Ambient Noise Levels 3 Albion Cres, Glenfield - Saturday, 17 May 2014



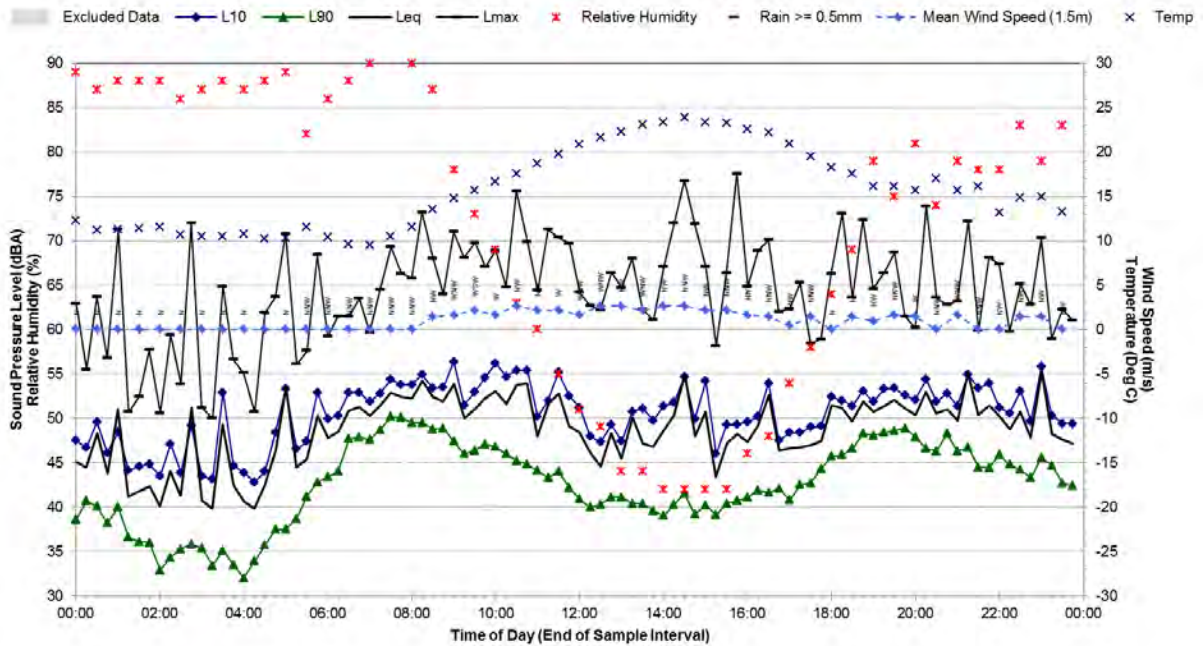
### Statistical Ambient Noise Levels 3 Albion Cres, Glenfield - Sunday, 18 May 2014



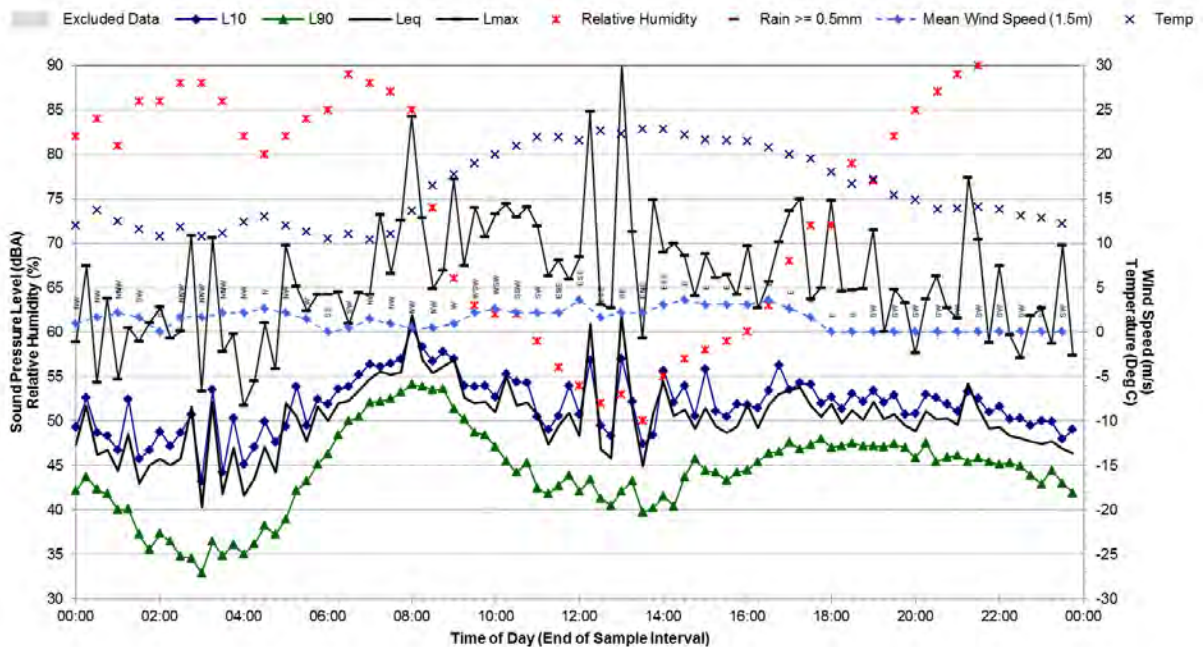
### Statistical Ambient Noise Levels 3 Albion Cres, Glenfield - Monday, 19 May 2014



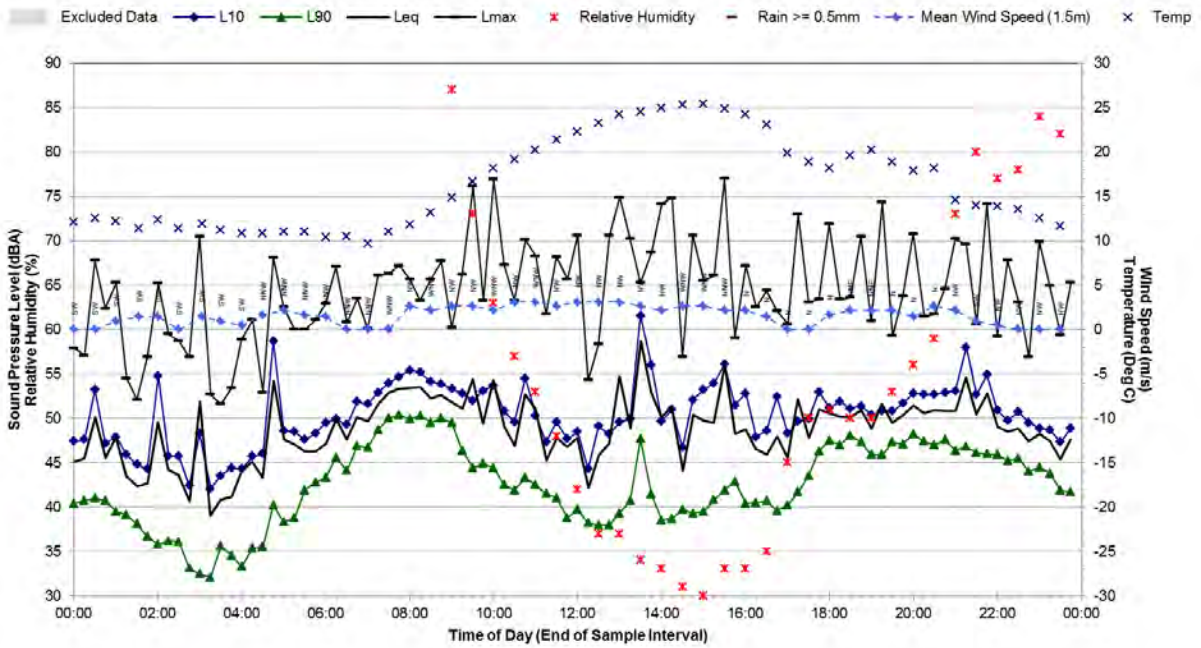
### Statistical Ambient Noise Levels 3 Albion Cres, Glenfield - Tuesday, 20 May 2014



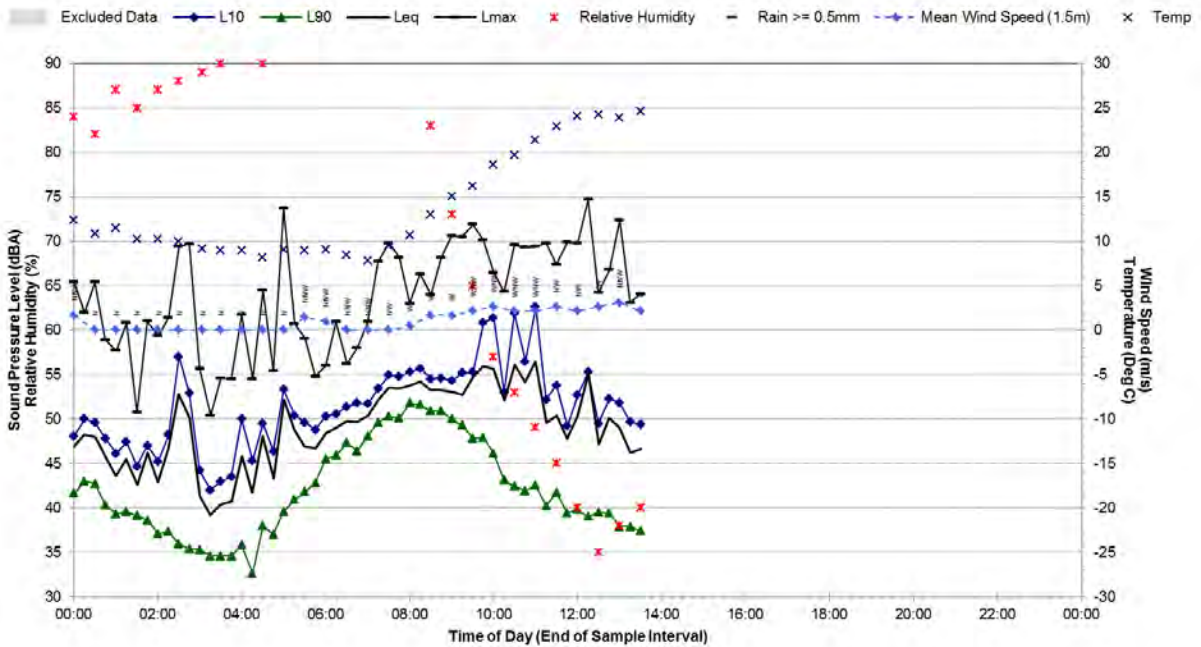
### Statistical Ambient Noise Levels 3 Albion Cres, Glenfield - Wednesday, 21 May 2014



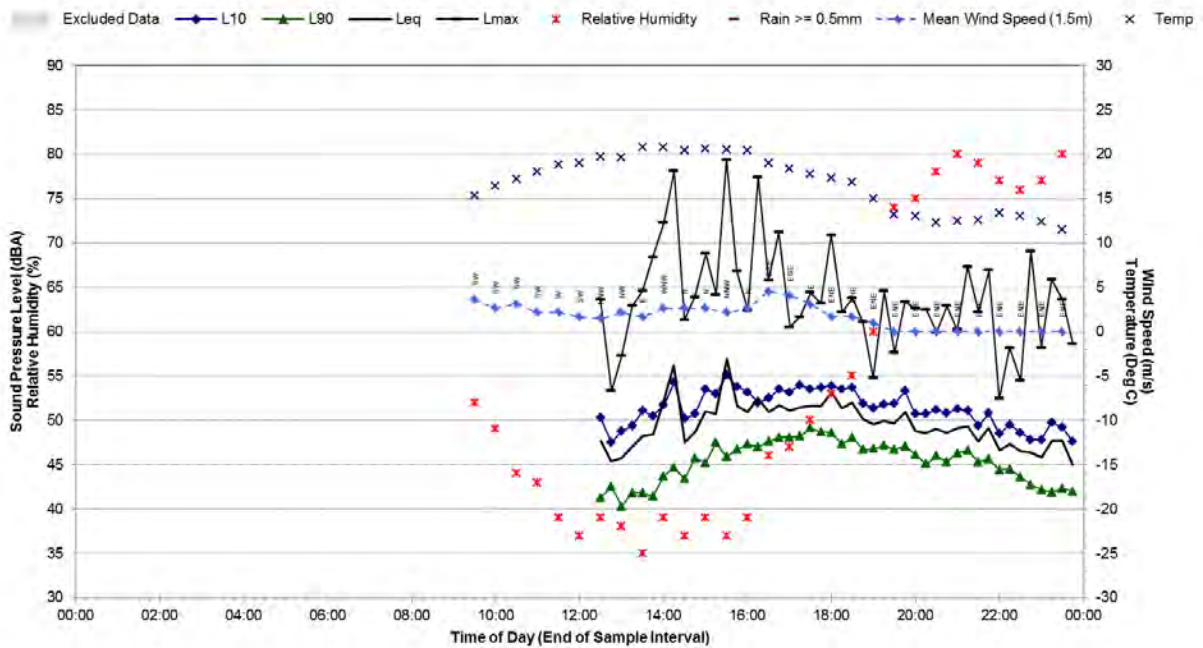
### Statistical Ambient Noise Levels 3 Albion Cres, Glenfield - Thursday, 22 May 2014



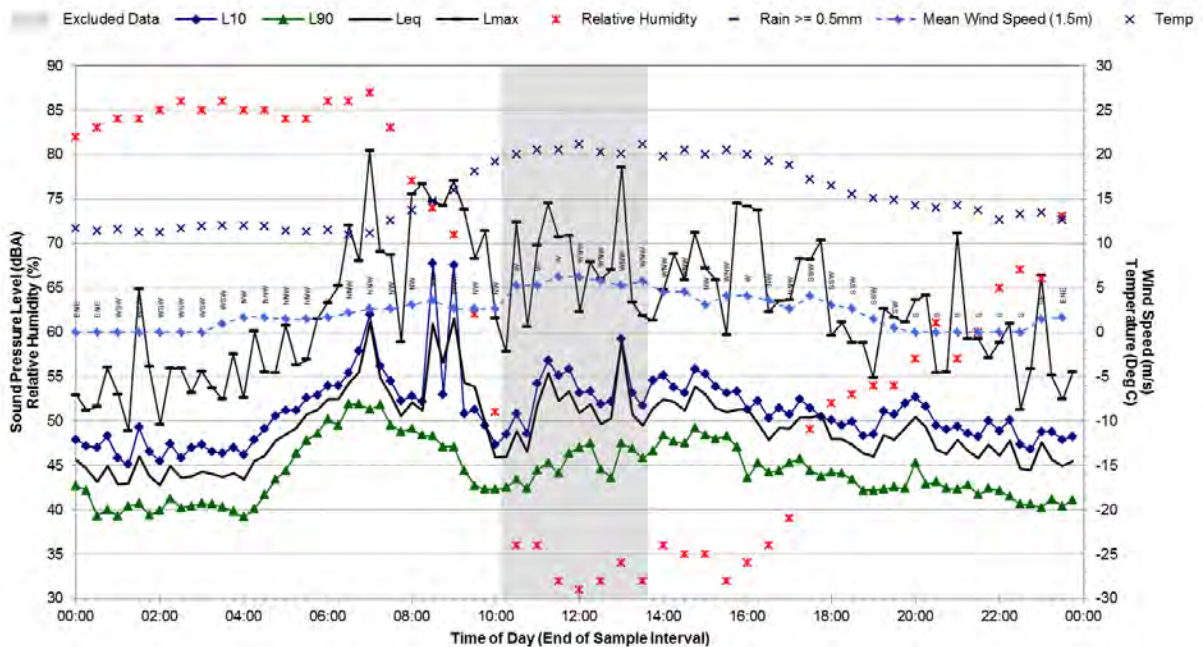
### Statistical Ambient Noise Levels 3 Albion Cres, Glenfield - Friday, 23 May 2014



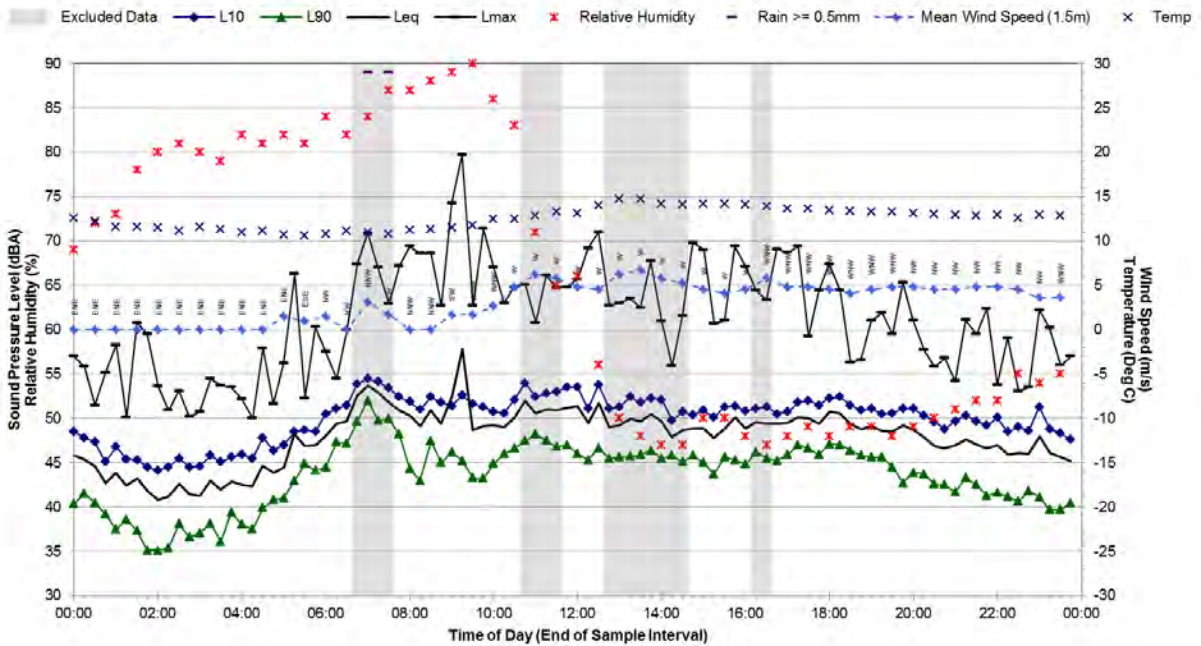
### Statistical Ambient Noise Levels 8 Goodenough Street, Glenfield - Thursday, 1 May 2014



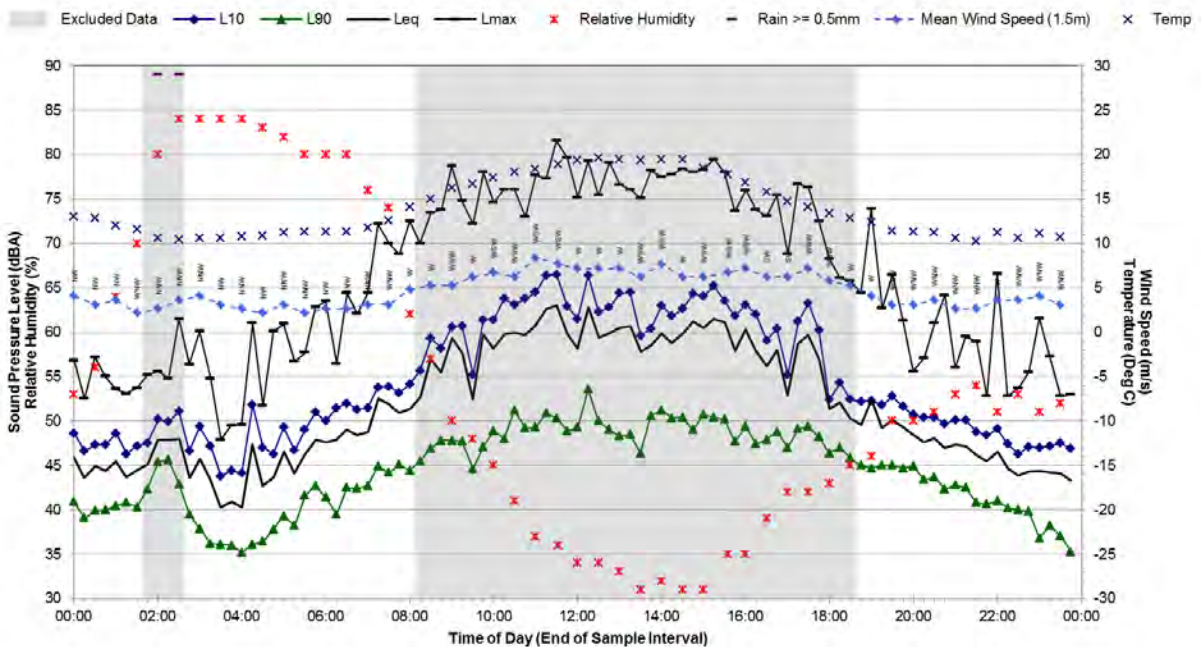
### Statistical Ambient Noise Levels 8 Goodenough Street, Glenfield - Friday, 2 May 2014



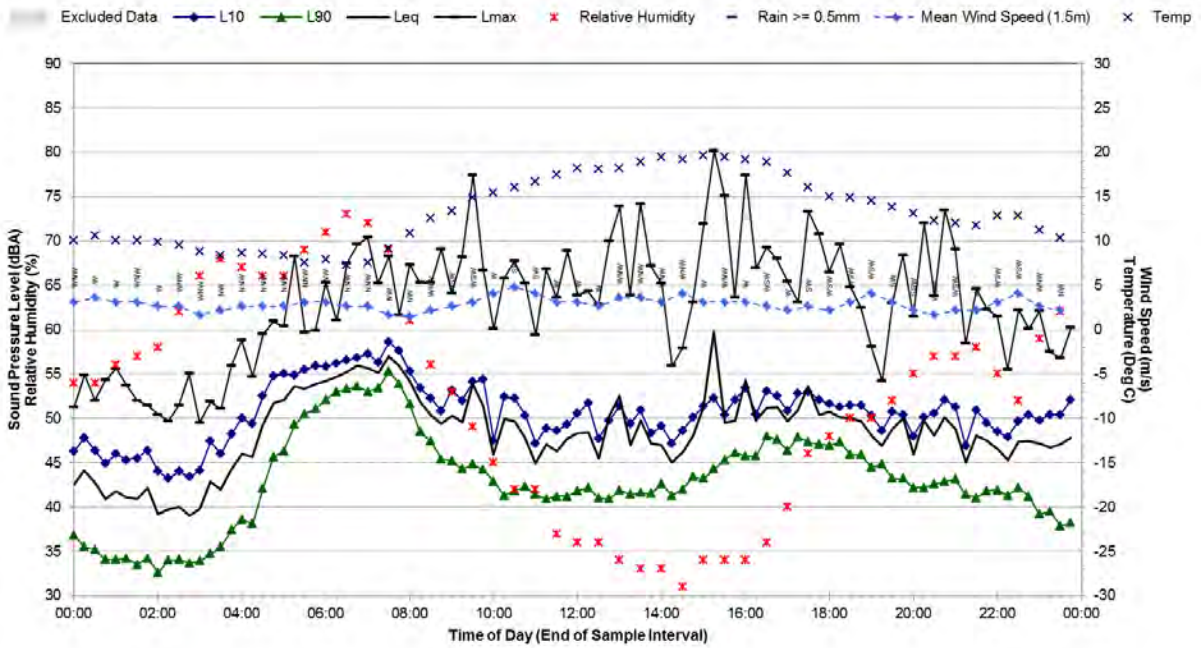
### Statistical Ambient Noise Levels 8 Goodenough Street, Glenfield - Saturday, 3 May 2014



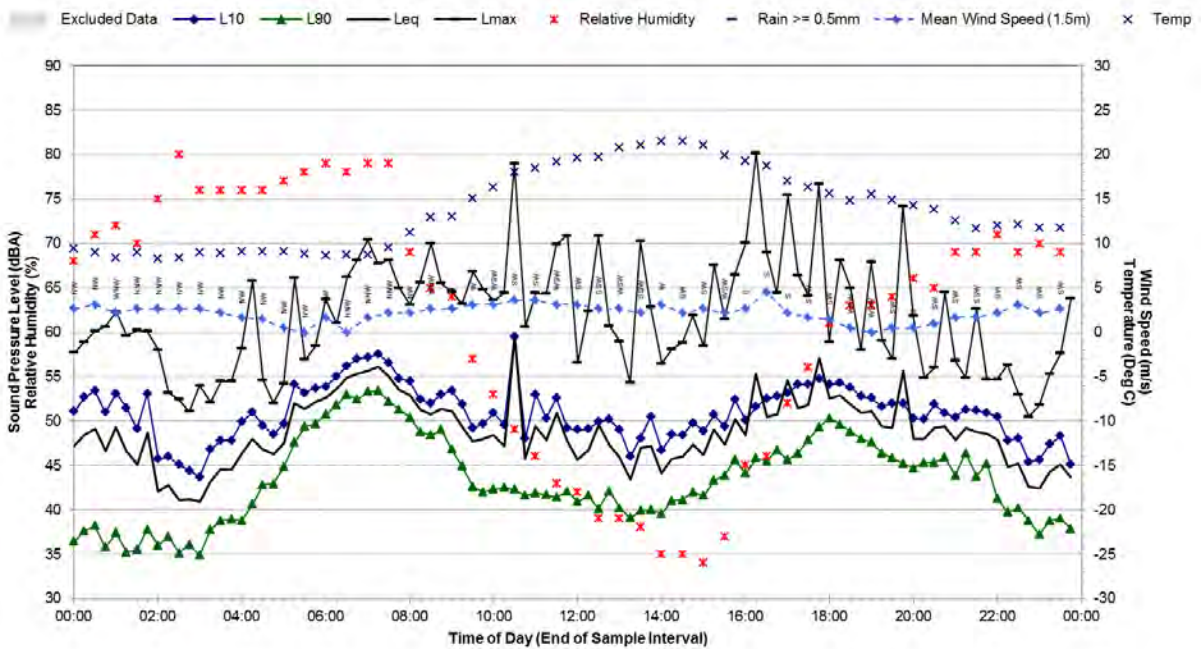
### Statistical Ambient Noise Levels 8 Goodenough Street, Glenfield - Sunday, 4 May 2014



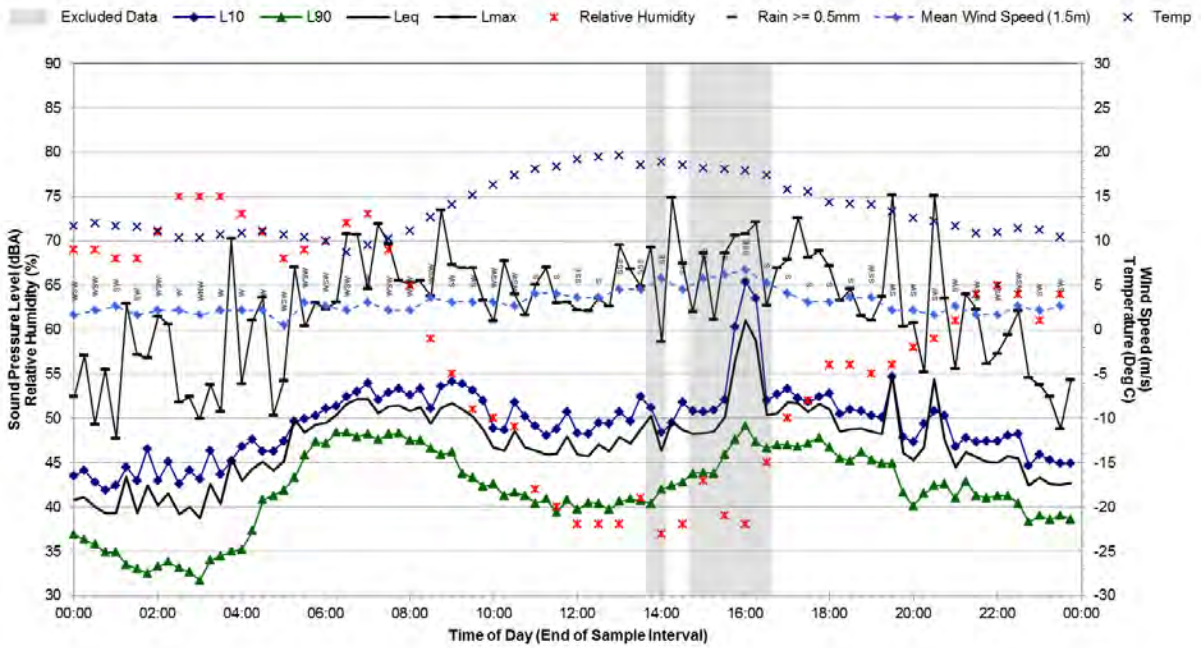
### Statistical Ambient Noise Levels 8 Goodenough Street, Glenfield - Monday, 5 May 2014



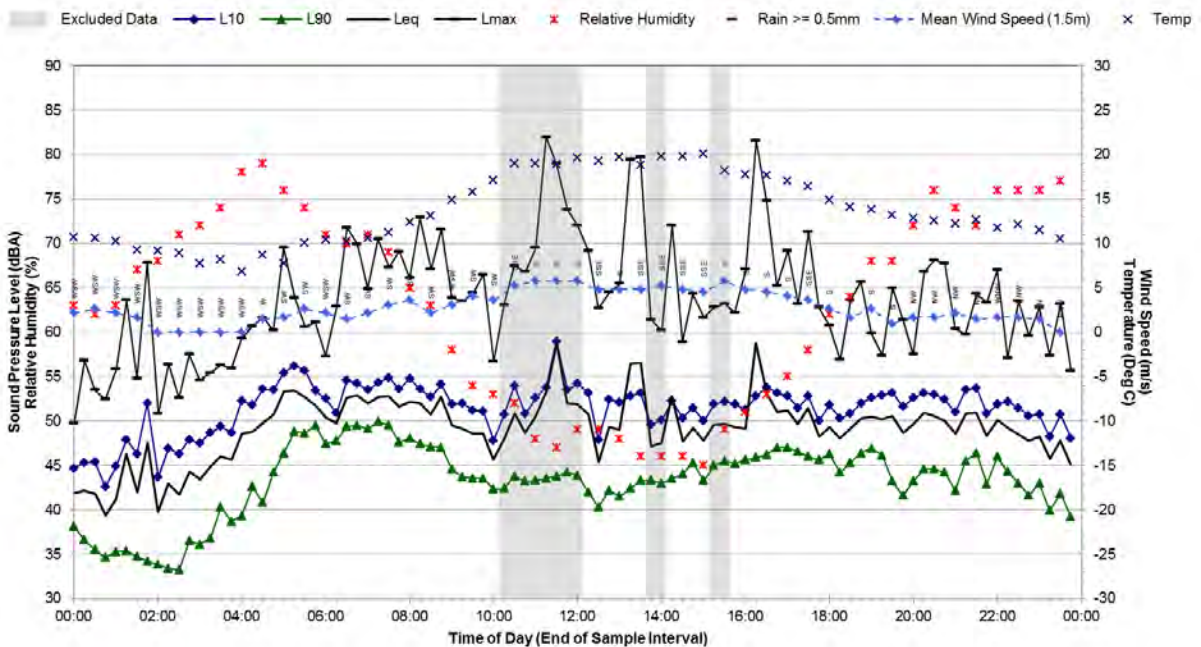
### Statistical Ambient Noise Levels 8 Goodenough Street, Glenfield - Tuesday, 6 May 2014



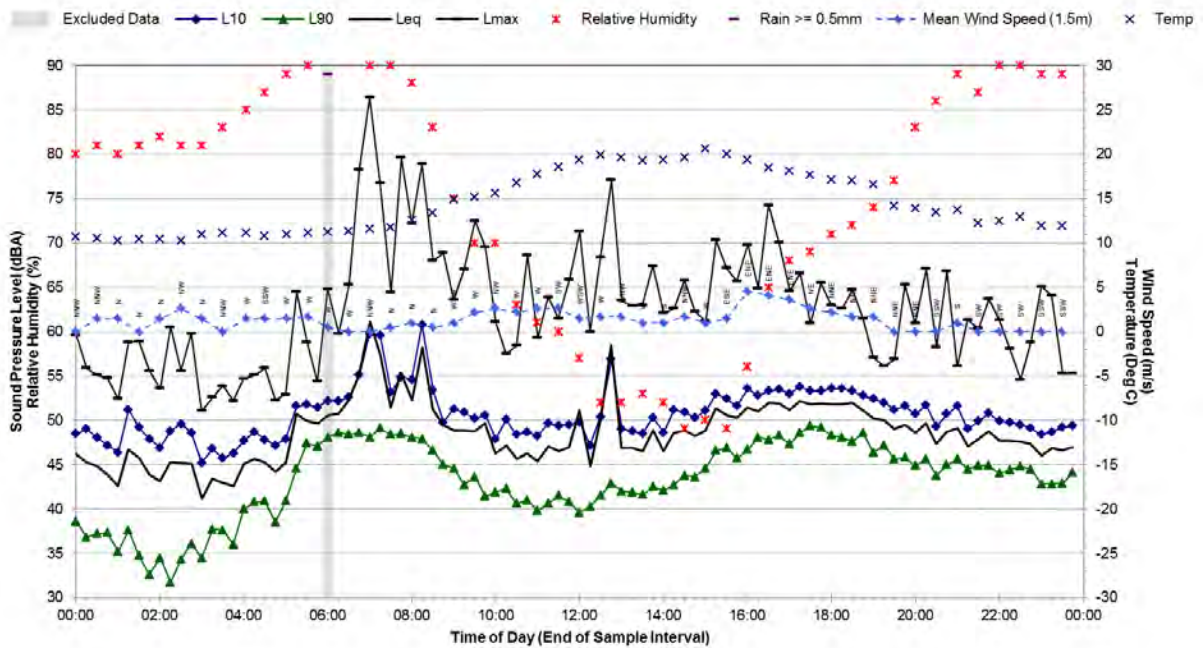
### Statistical Ambient Noise Levels 8 Goodenough Street, Glenfield - Wednesday, 7 May 2014



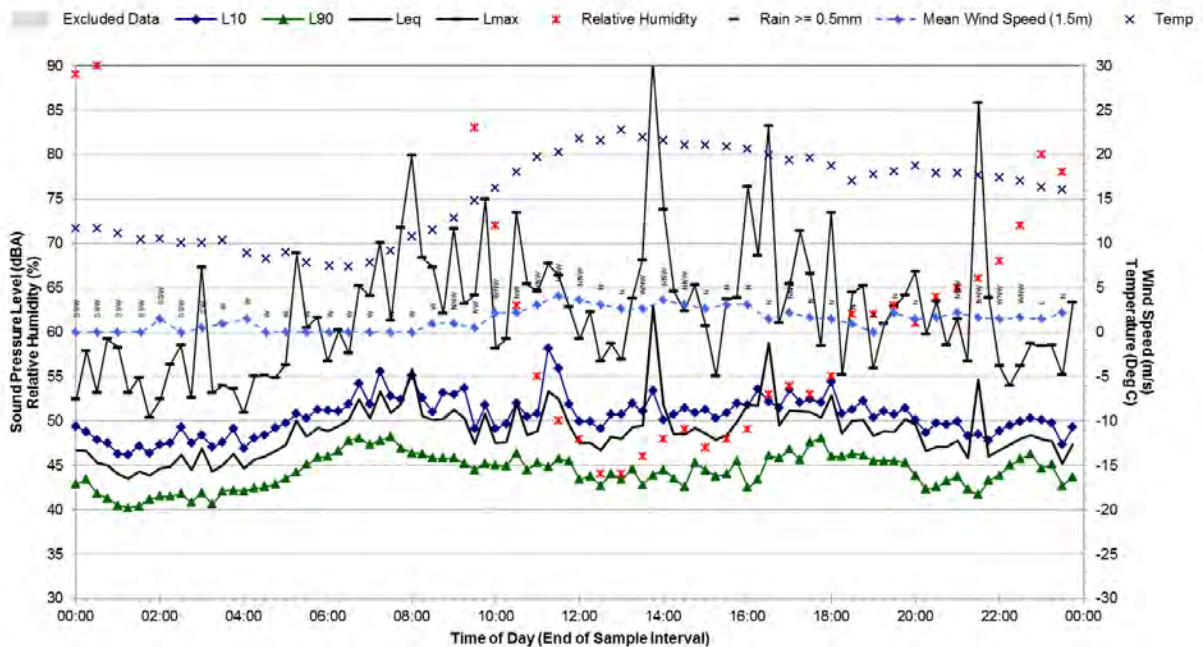
### Statistical Ambient Noise Levels 8 Goodenough Street, Glenfield - Thursday, 8 May 2014



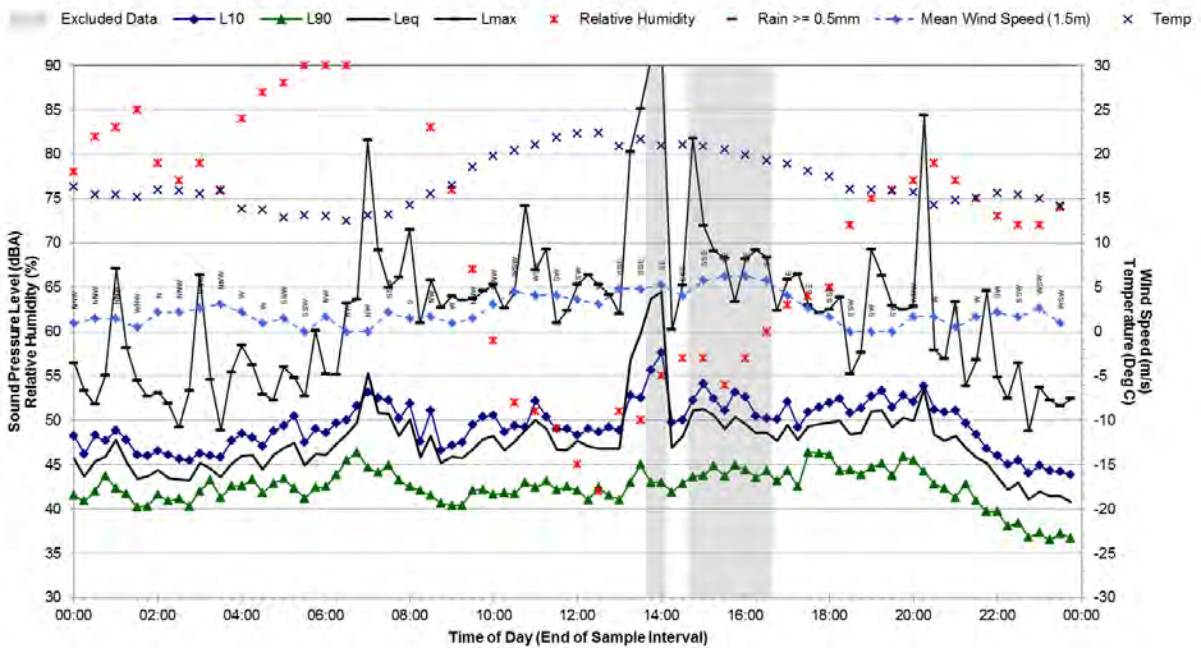
### Statistical Ambient Noise Levels 8 Goodenough Street, Glenfield - Friday, 9 May 2014



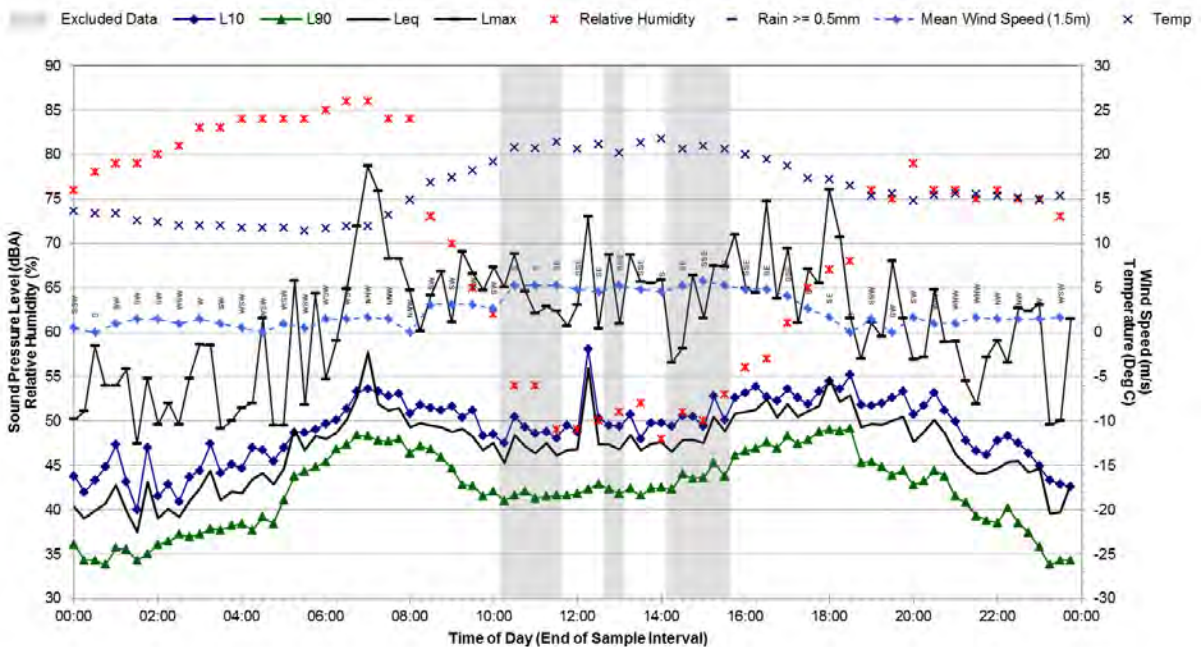
### Statistical Ambient Noise Levels 8 Goodenough Street, Glenfield - Saturday, 10 May 2014



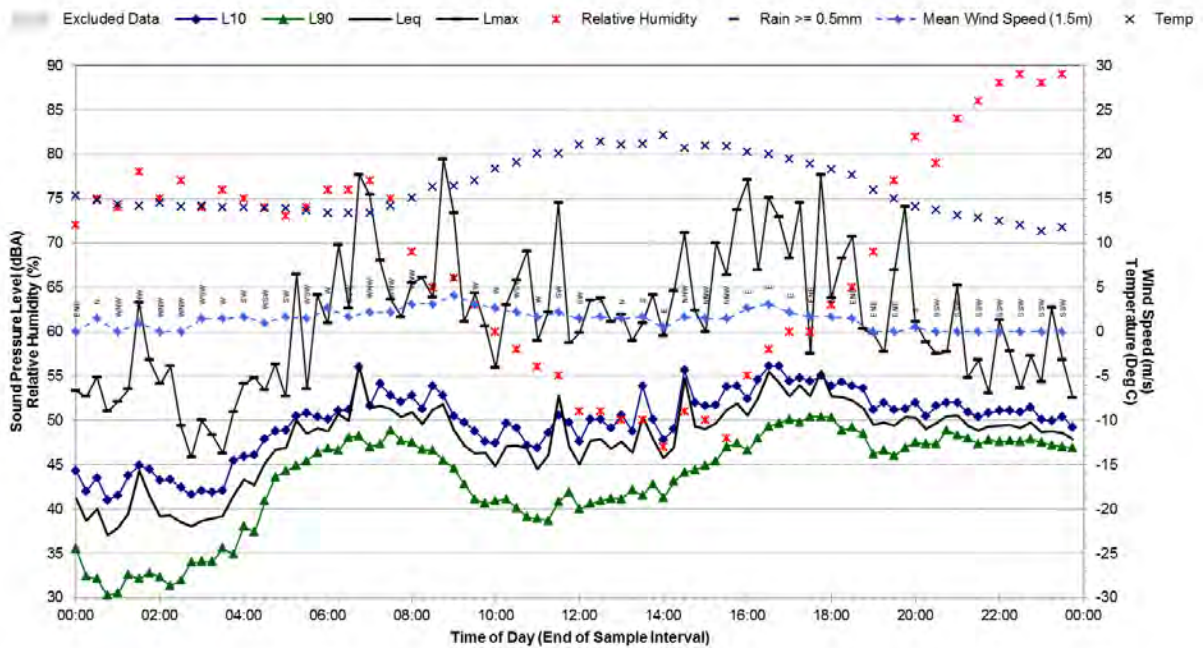
### Statistical Ambient Noise Levels 8 Goodenough Street, Glenfield - Sunday, 11 May 2014



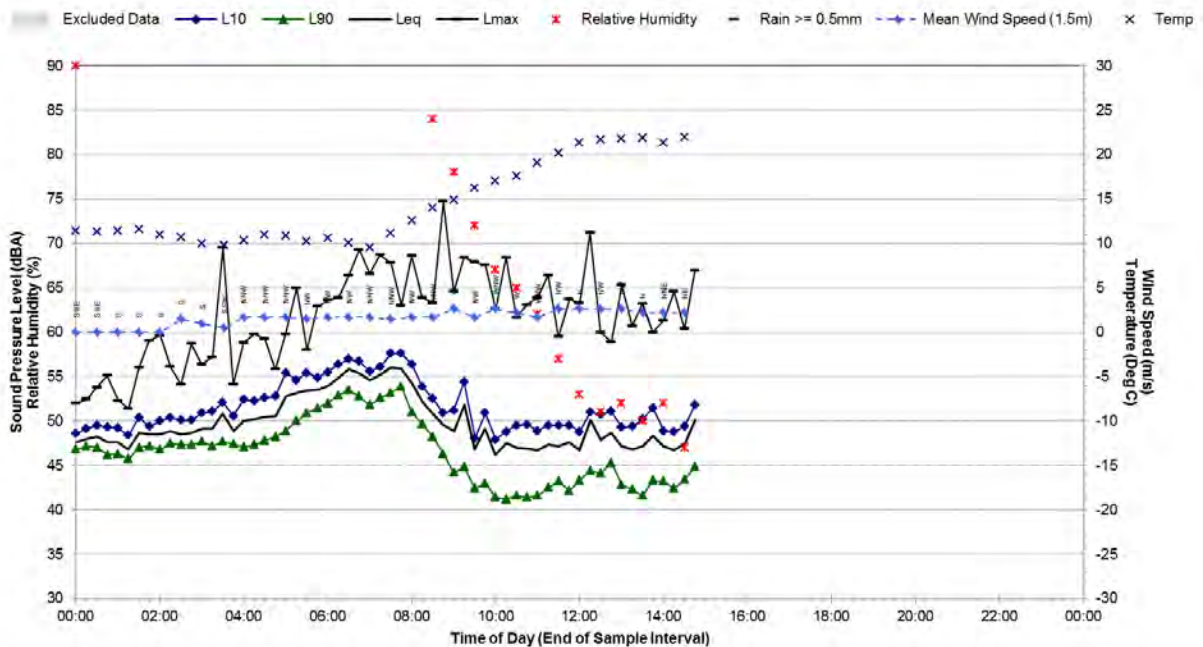
### Statistical Ambient Noise Levels 8 Goodenough Street, Glenfield - Monday, 12 May 2014



### Statistical Ambient Noise Levels 8 Goodenough Street, Glenfield - Tuesday, 13 May 2014



### Statistical Ambient Noise Levels 8 Goodenough Street, Glenfield - Wednesday, 14 May 2014



**Appendix B**

Report Number 630.10711-R2

Page 1 of 1

**Equipment Sound Power Levels**

Plant and Equipment	Total Sound Power Level	Octave Band									
		31Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	16kHz
Front End Loaders (Cat 972 or similar)	107 dBA	70	90	94	98	99	101	100	97	87	78
Wheel Loader (Cat 950 or similar)	107 dBA	70	90	94	98	99	101	100	97	87	78
45t Excavator with Bucket (Hitachi or similar)	107 dBA	63	77	90	96	102	101	100	97	90	81
Excavator with Pulveriser (Hitachi or similar);	108 dBA	73	87	88	93	100	102	104	99	92	83
8 t Excavator (Plant Housekeeping)	98 dBA	62	76	82	87	92	92	91	87	77	69
7,000lt Water Cart (Cat 769 for dust suppression)	100 dBA	63	77	84	84	92	94	94	91	85	78
Jaw Crusher (Powercrusher PC6 Mobile Jaw Crusher)	112 dBA	74	88	96	103	106	106	104	100	93	84
Cone Crusher (Powercrusher PC21 Mobile Cone Crusher)	109 dBA	81	95	98	98	106	103	100	95	86	77
Screen (Powercrusher HCS5515 Mobile Screen)	109 dBA	62	79	88	89	101	103	104	100	90	84
Shredder	110 dBA	66	86	94	98	103	105	104	100	93	87
Product despatch/delivery trucks (33t Road Trucks)	99 dBA	70	84	87	87	91	95	91	87	77	68