

**NOISE IMPACT ASSESSMENT  
FOR AMJ DEMOLITION AND EXCAVATION  
55 MARTIN ROAD, BADGERYS CREEK NSW 2555**

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## EXECUTIVE SUMMARY

This document presents a noise impact assessment conducted by Benbow Environmental for the approved resource recovery facility located at 55 Martin Road, Badgerys Creek pursuant to DA263-2018-A. The amount of waste to be processed is estimated to be approximately 95,000 tonnes per year.

The proposal is for enlarging the shed to encompass the external 'finished product' bins and moving it from the northern boundary to the southern boundary, every other operating parameter as previously approved remains the same (eg trucks, hours of operation, staff numbers, tonnages, hardstand pavement area, stormwater, boundary noise fencing etc). The 'finished product' bunkers that were previously located externally are now entirely within the larger building, which is a superior environmental outcome in terms of noise (ie not having the loaders operating outside the shed).

The nearest receivers and the noise generating activities have been identified. Noise criteria for the project have been formed, with assessment of the approved site activities conducted against the NSW Noise Policy for Industry (EPA, 2017), NSW Interim Construction Noise Guideline (DECC, 2009) and the NSW Road Noise Policy (DECCW, 2011). Modelling of the activities was conducted using the noise modelling software SoundPlan 7.3.

This noise impact assessment finds that predicted noise levels will be below the criteria set out in accordance with the NSW Noise Policy for Industry, at all receivers and time periods. Recommendations for noise controls are given in section 7.3, including sound power levels for the front end loader, fencing, equipment and automated roller doors usage.

The generation of additional road traffic associated with the site's activities has been assessed and it was predicted to comply with the guidelines set out in the NSW Road Noise Policy.

Construction activities are recommended to be limited to standard hours in accordance with the Interim Construction Noise Guideline.

The site is located near the Western Sydney Airport in a zone where the ANEF is between 30 and 35. The approved development is not a noise sensitive development and would be best classed as "other industrial" under AS2021:2015; acceptable in all ANEF zones. Furthermore the approved development meets the objectives of clause 7.18 of the Liverpool LEP.

This report concludes that following the carrying out of the recommendations in this report, the approved site activities will have an acceptable noise impact on the surrounding receivers.

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# 1. INTRODUCTION

Benbow Environmental has been engaged to undertake a Noise Impact Assessment (NIA) for the approved resource recovery facility at 55 Martin Road, Badgerys Creek NSW 2555 pursuant to DA263-2018-A. The DA has been attached as Attachment 1. This NIA is an update to the one completed in 2019 (ref: 191238\_NIA\_Rev3) to reflect a proposed s.4.55(2) modification application to increase the shed size from that previously approved by DA-263-2018-A. Note that nothing else changes from the previous Consent.

The proposal is for enlarging the shed to encompass the external 'finished product' bins and moving it from the northern boundary to the southern boundary, every other operating parameter as previously approved remains the same (e.g. trucks, hours of operation, staff numbers, tonnages, hardstand pavement area, stormwater, boundary noise fencing etc). The 'finished product' bunkers that were previously located externally are now entirely within the larger building, which is a superior environmental outcome in terms of noise (i.e. not having the loaders operating outside the shed).

The site is located within an ENT – Enterprise in Badgerys Creek, within Liverpool City Council. The nearest residential receptors are located approximately adjacent to the northern boundary of the site.

Operations at the site would consist of trucks unloading Construction and Demolition (C&D) waste, including soil (VENM/ENM) and green waste (only garden waste). The amount of waste to be processed is estimated to be approximately 95,000 tonnes per year.

Noise emissions from the site were predicted by using noise modelling software, SoundPlan (V7.3).

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

- NSW Environment Protection Authority (EPA), Noise Policy for Industry 2017;
- Department of Environment, Climate Change and Water (DECCW) NSW, Road Noise Policy (RNP) 2011; and
- Department of Environment and Climate Change (DECC) NSW, Interim Construction Noise Guideline (ICNG) 2009.

## 1.1 SCOPE OF WORKS

This noise impact assessment has been limited to the following scope of works:

- Site inspection and review of the approved site operations;
- Long term unattended noise monitoring and short term attended noise monitoring in accordance with relevant guidelines;
- Establish project specific noise levels;
- Determine all potential noise sources associated with the existing and approved development;
- Collect required noise sources data;
- Predict potential noise impacts at the nearest potentially affected receptors to the site;
- Assess potential noise impacts against relevant legislation and guidelines;
- Recommend general ameliorative measures/control solutions (where required); and



- Compile this report with concise statements of potential noise impact.

To aid in the review of this report, supporting documentation has been referenced within this report. A glossary of terminology is included in Attachment 2.



## **2. APPROVED DEVELOPMENT**

### **2.1 OVERVIEW OF OPERATIONS**

The proponent is seeking to establish a resource recovery facility at 55 Martin Road, Lot 4 DP 611519. The following is to be constructed on the site:

- Unloading and processing shed;
- Material storage bays;
- Weighbridge and wheel wash; and
- Car park and landscaped area.

Trucks will enter the site from Martin Road, and unload materials in the unloading and processing shed. Materials are handled and sorted, concrete will be crushed and green waste will be shredded inside the shed. Sorted concrete, bricks, untreated timber and shredded green garden waste are stockpiled on site.

Recovered materials would be stored in the internal storage bays for re-selling, either directly from site to trade clients or to a landscape supply outlet offsite. Any processed waste that is not suitable for resource recovery will be collected by a licensed waste contractor for final disposal to landfill.

The majority of stationary noise sources, including the screen and crusher are located inside the building. Truck movements per day include 10 x 15 tonne truck trips and 6 x 32 tonne truck trips, or a maximum of 2 truck trips per hour. This totals 16 truck movements per day.

### **2.2 HOURS OF OPERATIONS**

The resource recovery facility is approved to operate from Monday to Friday 7am to 6pm and Saturday from 7am to 5pm. The site is not approved to operate on Sundays or Public Holidays.

### **2.3 DESCRIPTION OF THE DEVELOPMENT**

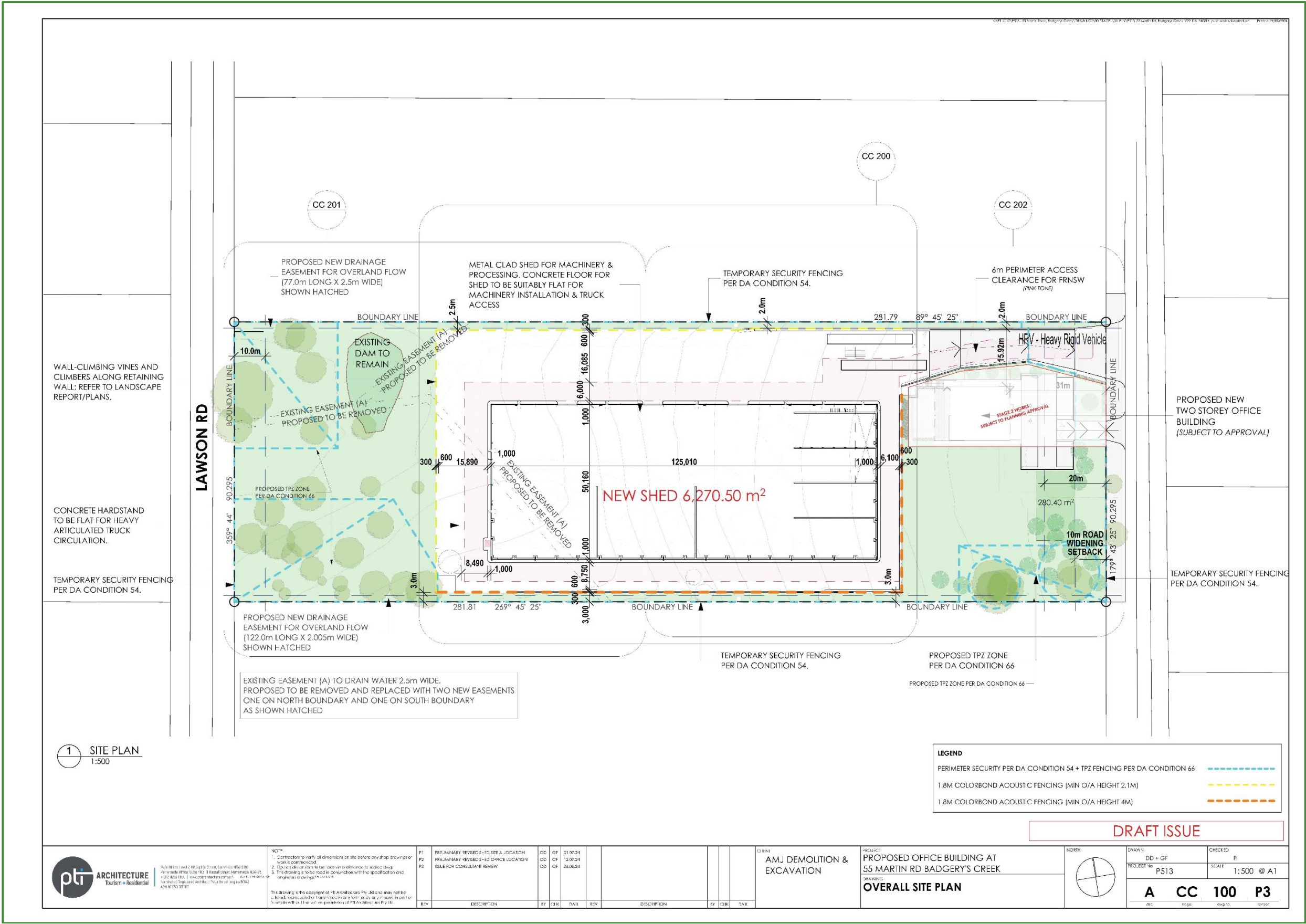
#### **2.3.1 Site Description**

The site is located at 55 Martin Road, Badgerys Creek. The block is rectangular shaped and approximately 2.5 hectares in size. A brick building is located on the eastern end of the property. The land and surrounds is zoned ENT – Enterprise under Chapter 4 Western Sydney Aerotropolis of State Environmental Planning Policy (Precincts – Western Parkland City) 2021.

A site layout plan of the 55 Martin Road property is shown in Figure 2-1.



Figure 2-1: Site Layout





### 2.3.2 Process Description

The processes involved in the sorting operations are as follows:

- Trucks drive to the site with waste materials from construction and demolition sites, entering the property from western access point off Martin Road.
- Trucks arrive on site at a rate of 16 per day (16 truck movements entering the site and 16 truck movements exiting the site).
- Trucks drive into the unloading and processing shed.
- Green waste, concrete and timber are separated from the waste stream.
- Concrete is crushed and screened.
- Sorted materials are loaded to the materials stockpile area by excavator. Materials are sorted into bricks, concrete, timber, glass, metal, as well as garden waste and soil (VENM/ENM).
- Products are either exported from site by truck or sold on location.



### 3. NEAREST SENSITIVE RECEPTORS

Table 3-1 identifies the nearest sensitive receptors that have the potential to be affected by the development. The aerial photographs of the sensitive residential and non-residential receivers are shown in Figure 3-1. These receptors were selected based on their proximity and directional bearing from the subject site.

Table 3-1: Residential and Non-Residential Receivers

| Receptor ID | Address                              | Lot & DP         | Approx. Distance and Direction from Approved Development | Type of Receptor |
|-------------|--------------------------------------|------------------|----------------------------------------------------------|------------------|
| R1          | 1990 Elizabeth Drive, Badgerys Creek | Lot 10 DP 860338 | 370 m N                                                  | Residential      |
| R2          | 1970 Elizabeth Drive, Badgerys Creek | Lot 11 DP 860338 | 370 m N                                                  | Residential      |
| R3          | 30 Martin Road, Badgerys Creek       | Lot 8 DP 226448  | 150 m NE                                                 | Residential      |
| R4          | 40 Martin Road, Badgerys Creek       | Lot 7 DP 226448  | 110 m NE                                                 | Residential      |
| R5          | 50 Martin Road, Badgerys Creek       | Lot 6 DP 226448  | 50 m E                                                   | Residential      |
| R6          | 60 Martin Road, Badgerys Creek       | Lot 5 DP 226448  | 170 m E                                                  | Residential      |
| R7          | 70 Martin Road, Badgerys Creek       | Lot 4 DP 226448  | 130 m SE                                                 | Residential      |
| R8          | 80 Martin Road, Badgerys Creek       | Lot 2 DP 530595  | 220 m SE                                                 | Residential      |
| R9          | 90 Martin Road, Badgerys Creek       | Lot 2 DP 226448  | 210 m SE                                                 | Residential      |
| R10         | 75 Martin Road, Badgerys Creek       | Lot 34 DP 3050   | 290 m S                                                  | Residential      |
| R11         | 65 Martin Road, Badgerys Creek       | Lot 36 DP 3050   | Adjacent S                                               | Residential      |
| R12         | 83-87 Lawson Road, Badgerys Creek    | Lot 6 DP 3050    | 70 m SW                                                  | Residential      |
| R13         | 75 Lawson Road, Badgerys Creek       | Lot 5 DP 3050    | 70 m W                                                   | Residential      |
| R14         | 65 Lawson Road, Badgerys Creek       | Lot 1 DP 104049  | 200 m W                                                  | Residential      |
| R15         | 55 Lawson Road, Badgerys Creek       | Lot 1 DP 1084967 | 110 m NW                                                 | Residential      |
| R16         | 45 Lawson Road, Badgerys Creek       | Lot 14 DP 531743 | 170 m NW                                                 | Residential      |
| R17         | 35 Lawson Road, Badgerys Creek       | Lot 13 DP 531743 | 200 m NW                                                 | Residential      |
| R18         | 25 Martin Road, Badgerys Creek       | Lot 1 DP 611519  | 150 m N                                                  | Industrial       |
| R19         | 10 Martin Road, Badgerys Creek       | Lot 10 DP 226448 | 270 m NE                                                 | Industrial       |
| R20         | 105 Lawson Road, Badgerys Creek      | Lot 8 DP 3050    | 220 m SW                                                 | Industrial       |



Figure 3-1: Residential and Non-Residential Receptors



## 4. EXISTING ACOUSTIC ENVIRONMENT

The level of background and ambient noise is assessed separately for the daytime, evening and night time assessment periods. The NSW EPA Noise Policy for Industry defines these periods as follows:

- **Day** is defined as 7.00am to 6.00pm, Monday to Saturday and 8.00am to 6.00pm Sundays and Public Holidays;
- **Evening** is defined as 6.00pm to 10.00pm, Monday to Sunday and Public Holidays; and
- **Night** is defined as 10.00pm to 7.00am, Monday to Saturday and 10.00pm to 8.00am Sundays and Public Holidays.

Unattended long-term noise monitoring was undertaken from 29<sup>th</sup> September 2017 to 10<sup>th</sup> October 2017 at two (2) residential locations. The background noise levels have remained the same from 2017 – 2024 as there have been no new noise sources introduced into the area and it remains rural in characterisation. Therefore, the logging completed in 2017 will be used in this assessment.

### 4.1 NOISE MONITORING EQUIPMENT AND METHODOLOGY

The background noise level measurements were carried out using a Svantek SVAN 957 Precision Sound Level Meter (attended noise monitoring) and two (2) Acoustic Research Laboratories statistical Environmental Noise Loggers, type EL-215 (unattended noise monitoring). The instrument sets complied with AS IEC 61672.1–2004 and were calibrated by a NATA accredited laboratory within two years of the measurement period. Calibration certificates have been included in Attachment 3.

Measurements of background and ambient noise levels were carried out in accordance with the Australian Standard AS 1055–1997 *Acoustics – Description and measurements of environmental noise* – Part 1 and Part 2 and the Noise Policy for Industry (EPA, 2017).

To ensure accuracy and reliability in the results, field reference checks were applied both before and after the measurement period with an acoustic calibrator. There were no excessive variances observed in the reference signal between the pre-measurement and post-measurement calibration. The instruments were set on A-weighted Fast response and noise levels were measured over 15-minute statistical intervals. QA/QC procedures applied for the measurement and analysis of noise levels have been presented in Attachment 4. The microphones were fitted with windsocks and were positioned between 1.2 and 1.5 metres above ground level.

In assessing the background noise levels, any data affected by adverse weather conditions has been discarded according to the requirements of the Noise Policy for Industry. The weather data was sourced from the Bureau of Meteorology Automatic Weather Station (AWS) located at Badgerys Creek (ID 067108).

Details of the instrumentation and setting utilised are provided in Table 4-1.

Table 4-1: Instrumentation and Setup Details

| Type of Monitoring   | Equipment                                                                | Serial Number | Setup Details                                                                                                                                                                                                                    |
|----------------------|--------------------------------------------------------------------------|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Long-term Unattended | ARL-215                                                                  | 194441        | A-weighted Fast Response<br>15-minute integration period                                                                                                                                                                         |
| Long-term Unattended | ARL-215                                                                  | 194552        | A-weighted Fast Response<br>15-minute integration period                                                                                                                                                                         |
| Short-term Attended  | Svantek SVAN957<br>Type 1 Integrating<br>Sound and<br>Vibration analyser | 15336         | Three channels:<br>A-weighted Fast Response<br>C-weighted Fast Response<br>A-weighted Impulse Response<br>15-minute integration period<br>1/3 octave band recorded every<br>100 ms<br>Logger file Recorded at steps of<br>100 ms |

## 4.2 MEASUREMENT LOCATIONS

The environmental noise loggers were utilised to measure the existing ambient and background noise levels. Unattended long-term noise monitoring was undertaken from 29<sup>th</sup> September 2017 to 10<sup>th</sup> October 2017 at two (2) residential locations. The monitoring locations were selected, to represent the closest receivers off Martin Road. The background noise levels have remained the same from 2017 – 2024 as there have been no new noise sources introduced into the area and it remains rural in characterisation. Therefore, the logging completed in 2017 will be used in this assessment.

Attended noise monitoring was undertaken on 29<sup>th</sup> September 2017.

The noise logger locations are shown in Figure 4-1 and listed in Table 4-2. Noise logger charts are presented in Attachment 5.

Table 4-2: Noise Monitoring Locations

| Monitoring Location | Methodology                                   | Address                           |
|---------------------|-----------------------------------------------|-----------------------------------|
| A                   | Attended monitoring and unattended monitoring | 55 Martin Road, Badgerys Creek    |
| B                   | Attended monitoring and unattended monitoring | 83-87 Lawson Road, Badgerys Creek |



Figure 4-1: Logger Locations



Table 4-3 identifies the receptor locations that have been associated with the two (2) noise logger locations and will therefore utilise the noise criteria derived from the measurement data obtained from the respective noise logger.

Table 4-3: Associated Residential Receptors

| Logger | Associated Residential Receptor Locations |
|--------|-------------------------------------------|
| A      | R1-R11                                    |
| B      | R12-R17                                   |

## 4.3 MEASURED NOISE LEVELS

### 4.3.1 Long-Term Unattended Noise Monitoring Results

The data was analysed to determine a single assessment background level (ABL) for each day, evening and night time period, in accordance with the Noise Policy for Industry. That is, the ABL is established by determining the lowest tenth-percentile level of the  $L_{A90}$  noise data over each period of interest. The background noise level or rating background level (RBL) representing the day, evening and night assessment periods is based on the median of individual ABL's determined over the entire monitoring period. The results of the long-term unattended noise monitoring are displayed in Table 4-4.

Existing road noise levels are presented in Table 4-5.

Table 4-4: Unattended Noise Monitoring Results, dB(A)

| Monitoring Location and associated receptors | Assessment Background Level<br>ABL ( $L_{90}$ ) |         |       | Equivalent Ambient Noise Level<br>$L_{eq}$ |         |       |
|----------------------------------------------|-------------------------------------------------|---------|-------|--------------------------------------------|---------|-------|
|                                              | Day                                             | Evening | Night | Day                                        | Evening | Night |
| Logger A                                     | 37                                              | 33      | 29    | 50                                         | 46      | 47    |
| Logger B                                     | 37                                              | 35      | 30    | 51                                         | 49      | 48    |

Table 4-5: Road Traffic Noise Data at Locations A and B

| Date     | Existing Road Traffic Noise – dB(A) |                   |                          |                   |
|----------|-------------------------------------|-------------------|--------------------------|-------------------|
|          | Daytime (7am to 10pm)               |                   | Night-time (10pm to 7am) |                   |
|          | $L_{eq}$ (15 hour)                  | $L_{eq}$ (1 hour) | $L_{eq}$ (9 hour)        | $L_{eq}$ (1 hour) |
| Logger A | 51                                  | 52                | 45                       | 48                |
| Logger B | 51                                  | 52                | 45                       | 49                |

### 4.3.2 Short Term Operator Attended Noise Monitoring Results

Given that the results of the unattended noise monitoring are affected by all ambient noise sources such as local fauna, road traffic and industrial sources, it is not possible to determine with precision the contribution of each component based on unattended monitoring alone. Therefore, the attended noise monitoring allows for a more detailed understanding of the existing ambient noise characteristics and a more meaningful final analysis to be undertaken. The results of the short-term attended noise monitoring are displayed in Table 4-6.

The attended measurements showed that the background noise levels consisted of traffic from Elizabeth Drive, birds and trees rustling in the wind. Ambient noise levels were dominated by vehicles on Martin Road and Lawson Road, aeroplanes and surrounding industrial noise.

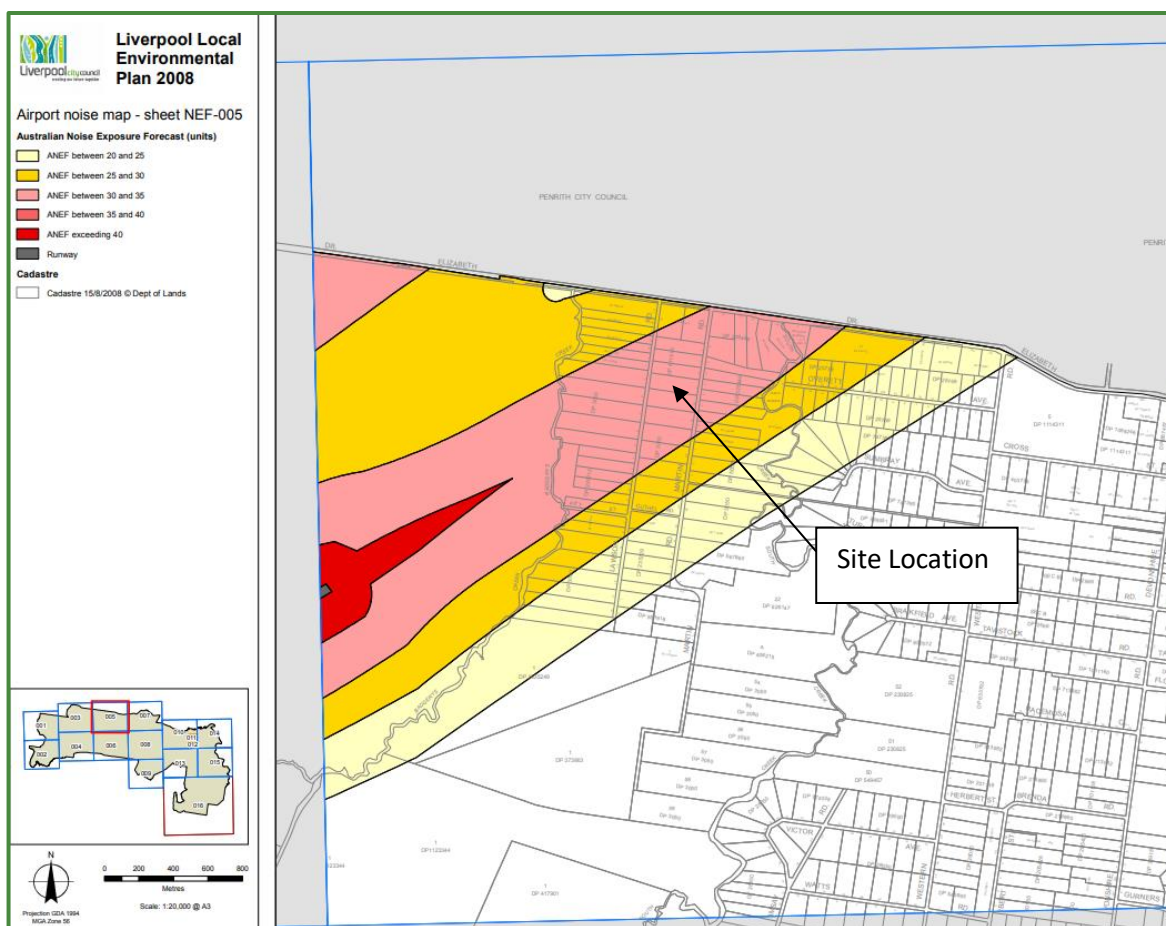
Table 4-6: Operator Attended Noise Measurements, dB(A)

| Location & Date/Time                                               | L <sub>Aeq</sub> | L <sub>A90</sub> | L <sub>A10</sub> | L <sub>A1</sub> | Comments                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------------------------------------------------------|------------------|------------------|------------------|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Location A<br>Friday<br>29/09/2017<br>12:55pm<br>Daytime<br>Period | 61               | 38               | 59               | 81              | Cars Martin Road < 74 dB(A)<br>Trucks Martin Road < 83 dB(A)<br>Background traffic Elizabeth Drive < 35 dB(A)<br><b>Distant fan &lt; 30 dB(A)</b><br>Birds in trees < 45 dB(A)<br>Wind in trees < 35 dB(A)<br>Dog barking < 44 dB(A)<br>Aeroplane < 58 dB(A)<br><b>Tractor &lt; 40 dB(A), 90 seconds</b><br><b>Distant excavator &lt; 30 dB(A), 30 seconds</b><br><b>Estimated L<sub>Aeq</sub> noise level from industrial sources = 31 dB(A)</b> |
| Location B<br>Friday<br>29/09/2017<br>12:28pm<br>Daytime<br>Period | 53               | 38               | 54               | 65              | Cars Lawson Road < 68 dB(A)<br>Trucks Lawson Road < 75 dB(A)<br>Background traffic Elizabeth Drive < 32 dB(A)<br><b>Truck revving &lt; 35 dB(A), 10 seconds</b><br>Birds < 55 dB(A)<br>Light wind in trees < 40 dB(A)<br>Aeroplane < 56 dB(A)<br><b>Industrial scraping/banging &lt; 40 dB(A), 2 minutes</b><br><b>Estimated L<sub>Aeq</sub> noise level from industrial sources = 31 dB(A)</b>                                                   |

## 4.4 WESTERN SYDNEY AIRPORT NOISE

The subject site lies under the flight path for the approved Western Sydney Airport. The site location is shown on the Australian Noise Exposure Forecast (ANEF) map below.

Figure 4-2: Western Sydney Airport ANEF Map



As can be seen in the image above the ANEF for the site is between 30 and 35.

## 5. METEOROLOGICAL CONDITIONS

Wind and temperature inversions may affect the noise impact at the receptors. Therefore noise enhancing weather conditions should be assessed when wind and temperature inversions are considered to be a feature of the area.

A representative meteorological data file was obtained from the Bureau of Meteorology (BOM) for the Badgerys Creek Automatic Weather Station (AWS ID 067108). At the time of preparing this report, the last full year of data available is 2016, and was therefore considered appropriate. Meteorological data for 2016 was compared with long term averages for minimum temperature, maximum temperature, and wind run and found to be consistent. Wind roses representing the annual frequency of wind speed and direction were also compared for the seven most recent meteorological years and found to be reasonably consistent (Attachment 6).

### 5.1 WIND EFFECTS

Wind is considered to be a feature where source-to-receiver wind speeds (at 10 m height) of 3 m/s or below occur for 30% or more of the time in any assessment period in any season.

#### 5.1.1 Wind Rose Plots

Wind rose plots show the direction that the wind is coming from, with triangles known as “petals”. The petals of the plots in the figures summarise wind direction data into 8 compass directions i.e. north, north-east, east, south-east, etc. The length of the triangles, or “petals”, indicates the frequency that the wind blows from that direction. Longer petals for a given direction indicate a higher frequency of wind from that direction. Each petal is divided into segments, with each segment representing one of the six wind speed classes.

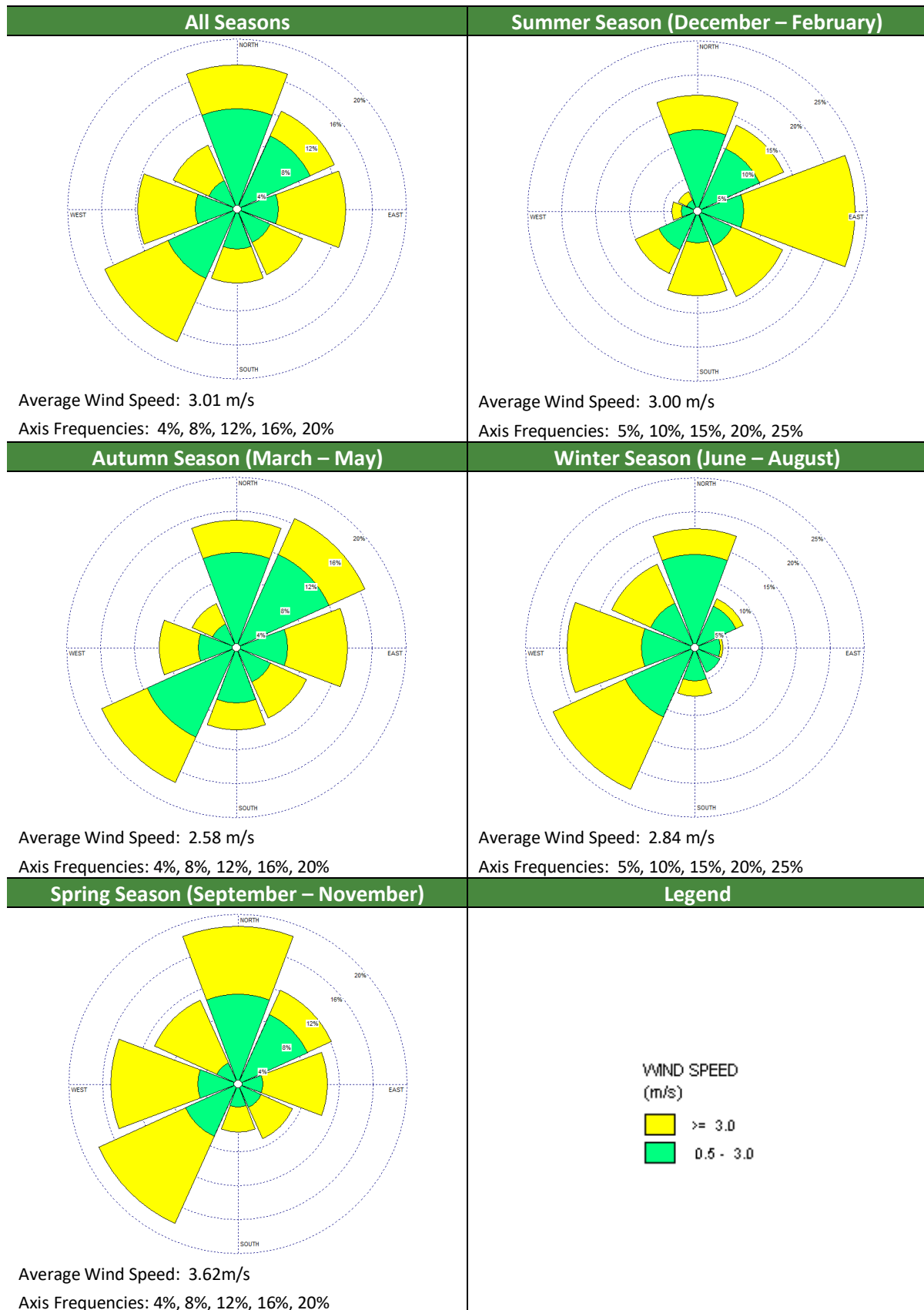
Thus, the segments of a petal show what proportion of wind for a given direction falls into each class. The proportion of time for which wind speed is less than 0.5 m/s, when speed is negligible, is referred to as calm hours or “calms”. Calms are not shown on a wind rose as they have no direction, but the proportion of time consisting of the period under consideration is noted under each wind rose.

The concentric circles in each wind rose are the axis, which denote frequencies. In comparing the plots it should be noted that the axis varies between wind roses, although all wind roses are similar in size. The frequencies denoted on the axes are indicated beneath each wind rose.

#### 5.1.2 Local Wind Trends

Seasonal wind rose plots for this site utilising Badgerys Creek AWS data have been included in Figure 5-1.

Figure 5-1: Wind Rose Plots – BOM Badgerys Creek AWS ID 067108 2016 – Day time





Based on the information presented from the weather data, source-to receiver wind speeds of 3 m/s or below are present for less than 30% of the time therefore wind effects have not been included in the assessment.

## 5.2 TEMPERATURE INVERSIONS

Operations are to take place during the day period, Monday to Friday 7am to 6pm and Saturday from 7am to 5pm. As the night period is not being utilised, temperature inversions are therefore not considered any further.

### 5.2.1 Weather Conditions Considered in the Assessment

The following conditions will be considered in this noise impact assessment considered:

- Condition A: Neutral Weather Conditions.

Details of the considered meteorological conditions have been displayed in Table 5-1.

Table 5-1: Meteorological Conditions Assessed in Noise Propagation Modelling

| Condition | Classification | Ambient Temp. | Ambient Humidity | Wind Speed | Wind Direction (blowing from) | Temperature Inversion | Affected Receiver | Applicability |
|-----------|----------------|---------------|------------------|------------|-------------------------------|-----------------------|-------------------|---------------|
| A         | Neutral        | 10 °C         | 70%              | -          | -                             | No                    | All               | All periods   |

## 6. CURRENT LEGISLATION AND GUIDELINES

### 6.1 NSW EPA NOISE POLICY FOR INDUSTRY

The NSW Noise Policy for Industry was developed by the NSW EPA primarily for the assessment of noise emissions from industrial sites regulated by the NSW EPA.

The policy sets out two components that are used to assess potential site-related noise impacts. The intrusiveness noise level aims at controlling intrusive noise impacts in the short-term for residences. The amenity noise level aims at maintaining a suitable amenity for particular land uses including residences in the long-term. The more stringent of the intrusiveness or amenity level becomes the project noise trigger levels for the project.

#### 6.1.1 Project Intrusiveness Noise Level

The project intrusiveness noise level is determined as follows:

$$L_{Aeq, 15\text{-minute}} = \text{rating background noise level} + 5 \text{ dB}$$

Where the  $L_{Aeq, (15\text{minute})}$  is the predicted or measured  $L_{Aeq}$  from noise generated within the project site over a fifteen minute interval at the receptor.

This is to be assessed at the most affected point on or within the residential property boundary or if that is more than 30 m from the residence, at the most affected point within 30 m of the residential dwelling.

#### 6.1.2 Amenity Noise Level

To limit continuing increases in noise levels, the maximum ambient noise level within an area from industrial noise sources should not normally exceed the acceptable noise levels specified in Table 2.2 of the NSW Noise Policy for Industry 2017. The relevant recommended noise levels applicable are reproduced in Table 6-1.

Table 6-1: Amenity noise levels.

| Receiver    | Noise Amenity Area | Time of Day | $L_{Aeq}$ dB(A)                 |
|-------------|--------------------|-------------|---------------------------------|
|             |                    |             | Recommended amenity noise level |
| Residential | Rural              | Day         | 50                              |
|             |                    | Evening     | 45                              |
|             |                    | Night       | 40                              |
| Industrial  | All                | When in use | 70                              |

Source: Table 2.2 NSW Noise Policy for Industry



**The project amenity noise level for industrial developments = recommended amenity noise level minus 5 dB(A)**

*The following exceptions to the above method to derive the project amenity noise levels apply:*

- 1. In areas with high traffic noise levels*
- 2. In approved developments in major industrial clusters*
- 3. Where the resultant project amenity noise level is 10 dB or more lower than the existing industrial noise level. In this case the project amenity noise levels can be set at 10 dB below existing industrial noise levels if it can be demonstrated that existing industrial noise levels are unlikely to reduce over time.*
- 4. Where cumulative industrial noise is not a necessary consideration because no other industries are present in the area, or likely to be introduced into the area in the future. In such cases the relevant amenity noise level is assigned as the project amenity noise level for development.*

This development is not considered to be captured by the above exceptions.

### **6.1.3 Sleep Disturbance Criteria**

In accordance with the NSW EPA Noise Policy for Industry, the potential for sleep disturbance from maximum noise level events from premises during the night-time period needs to be considered. Sleep disturbance is considered to be both awakenings and disturbance to sleep stages.

Where the subject development/premises night-time noise levels at a residential location exceed:

- **L<sub>Aeq, 15-minute</sub> 40 dB(A) or the prevailing RBL plus 5 dB, whichever is the greater, and/or**
- **L<sub>AFmax</sub> 52 dB(A) or the prevailing RBL plus 15 dB, whichever is the greater,**

A detailed maximum noise level assessment should be undertaken.

The development is not approved to operate during the night period, and therefore a sleep disturbance assessment is not considered warranted.

### **6.1.4 Project Noise Trigger Levels**

The project noise trigger levels for the site have been established in accordance with the principles and methodologies of the NSW Noise Policy for Industry (EPA, 2017).

Table 6-2 below presents the rating background level, project intrusive noise level, recommended amenity noise level, and project amenity noise level. The project noise trigger level is the lowest value of intrusiveness or project amenity noise level after conversion to L<sub>Aeq 15-minute</sub>, dB(A) equivalent level.

Different time periods apply for the noise criteria as the intrusive criterion considers a 15-minute assessment period while the amenity criterion requires assessment over the total length of time that a site is operational within each day, evening or night period. In order to ensure compliance under all circumstances, a 15-minute period assessment has been considered for all receptors.



Table 6-2: Project Noise Trigger Levels (PNTL) for Operational Activities, dB(A)

| Receiver | Type of Receptor    | Time of day | Rating background noise level | Project intrusiveness noise level ( $L_{eq(15-minute)}$ ) | Recommended amenity noise level $L_{Aeq \text{ period}}$ | Project amenity noise level $L_{Aeq \text{ 15-minute}}^2$ | PNTL $L_{Aeq \text{ 15-minute}}$ |
|----------|---------------------|-------------|-------------------------------|-----------------------------------------------------------|----------------------------------------------------------|-----------------------------------------------------------|----------------------------------|
| R1-R11   | Residential - Rural | Day         | 37                            | <b>42</b>                                                 | 50                                                       | 48                                                        | <b>42</b>                        |
|          |                     | Evening     | 33                            | <b>38</b>                                                 | 45                                                       | 43                                                        | <b>38</b>                        |
|          |                     | Night       | 30                            | <b>35<sup>1</sup></b>                                     | 40                                                       | 38                                                        | <b>35</b>                        |
| R12-R17  | Residential - Rural | Day         | 37                            | <b>42</b>                                                 | 50                                                       | 48                                                        | <b>42</b>                        |
|          |                     | Evening     | 35                            | <b>40</b>                                                 | 45                                                       | 43                                                        | <b>40</b>                        |
|          |                     | Night       | 30                            | <b>35</b>                                                 | 40                                                       | 38                                                        | <b>35</b>                        |
| R18-R20  | Industrial          | When in use | -                             | -                                                         | 70                                                       | 68                                                        | <b>68</b>                        |

Notes:

1) This value is based on the minimum assumed rating background level of 30 dB(A) for night time.

2) These levels have been converted to  $L_{Aeq \text{ 15-minute}}$  using the following:  $L_{Aeq \text{ 15-minute}} = L_{Aeq \text{ period}} + 3 \text{ dB}$  (NSW Noise Policy for Industry Section 2.2).

## 6.2 NSW EPA ROAD NOISE POLICY

The NSW Road Noise Policy (RNP) has been adopted to establish the noise criteria for the potential noise impact associated with additional traffic generated by the development. The RNP was developed by the NSW EPA primarily to identify the strategies that address the issue of road traffic noise from:

- Existing roads;
- New road projects;
- Road redevelopment projects; and
- New traffic-generating developments.

### 6.2.1 Vehicle Route

Trucks and light vehicles are approved to access the site from Martin Road. Martin Road is accessed from the sub-arterial road, Elizabeth Drive. The approved transport routes are shown in Figure 6-1. The potentially most impacted residents to the approved route are located along Martin Road, between Elizabeth Drive and the subject site.

Figure 6-1: Approved Transport Route



## 6.2.2 Road Category

Based on the RNP road classification description, Martin Road would be classified as a 'local road'.

## 6.2.3 Noise Assessment Criteria

Section 2.3 of the RNP outlines the criteria for assessing road traffic noise. The relevant section of Table 3 of the RNP is shown in Table 6-3.

Table 6-3: Road Traffic Noise Assessment Criteria for Residential Land Uses, dB(A)

| Road Category | Type of Project/Land Use                                                                                         | Assessment Criteria, dB(A)          |                                     |
|---------------|------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|
|               |                                                                                                                  | Day (7am-10pm)                      | Night (10pm-7am)                    |
| Local roads   | 6. Existing residences affected by additional traffic on existing local roads generated by land use developments | $L_{Aeq}$ (1 hour) 55 dB (external) | $L_{Aeq}$ (1 hour) 50 dB (external) |

\* measured at 1 m from a building façade.

## 6.2.4 Relative Increase Criteria

In addition to the assessment criteria outlined above, any increase in the total traffic noise level at a location due to a approved project or traffic-generating development must be considered. Residences experiencing increases in total traffic noise levels above the relative criteria should also be considered for mitigation as described in Section 3.4 of the RNP. For road projects where the main subject road is a local road, the relative increase criterion does not apply.

As Martin Road is a local road, the relative increase criterion will not be further considered.

## 6.2.5 Assessment Locations for Existing Land Uses

Table 6-4: Assessment Locations for Existing Land Uses

| Assessment Type                                   | Assessment Location                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| External noise levels at residences               | <p>The noise level should be assessed at 1 metre from the façade and at a height of 1.5 metres from the floor.</p> <p>Separate noise criteria should be set and assessment carried out for each façade of a residence, except in straightforward situations where the residential façade most affected by road traffic noise can be readily identified.</p> <p>The residential noise level criterion includes an allowance for noise reflected from the façade ('façade correction'). Therefore, when taking a measurement in the free field where reflection during measurement is unlikely (as, for instance, when measuring open land before a residence is built), an appropriate correction – generally 2.5 dB – should be added to the measured value. The 'façade correction' should not be added to measurements taken 1 metre from the façade of an existing building. Free measurements should be taken at least 15 metres from any wall, building or other reflecting pavement surface on the opposite side of the roadway, and at least 3.5 metres from any wall, building or other pavement surface, behind or at the sides of the measurement point which would reflect the sound.</p> |
| Noise levels at multi-level residential buildings | <p>The external points of reference for measurement are the two floors of the building that are most exposed to traffic noise.</p> <p>On other floors, the internal noise level should be at least 10 dB less than the relevant external noise level on the basis of openable windows being opened sufficiently to provide adequate ventilation. (Refer to the Building Code of Australia (Australian Building Codes Board 2010) for additional information.)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Internal noise levels                             | <p>Internal noise levels refer to the noise level at the centre of the habitable room that is most exposed to the traffic noise with openable windows being opened sufficiently to provide adequate ventilation. (Refer to the Building Code of Australia (Australian Building Codes Board 2010) for additional information.)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Open space – passive or active use                | <p>The noise level is to be assessed at the time(s) and location(s) regularly attended by people using the space. In this regard, 'regular' attendance at a location means at least once a week.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

### 6.2.6 Road Traffic Project Specific Noise Levels

Based on the traffic noise data obtained through the long term road traffic noise measurement, the current existing road traffic noise levels exceed the assessment criteria.

The selected project specific noise levels associated with road traffic noise are presented in Table 6-5.

Where existing traffic noise levels are above the noise assessment criteria, any increase in the total traffic noise level should be limited to 2 dB above that of the corresponding 'no build option'.

Table 6-5: Project Specific Noise Levels Associated with Road Traffic, dB(A)

| Receptor along                  | Period | Existing Road Traffic Noise $L_{eq}$ | Assessment Criteria $L_{eq}$ | PSNL Cumulative Road Traffic Noise Level $L_{eq}$ |
|---------------------------------|--------|--------------------------------------|------------------------------|---------------------------------------------------|
| R4, Martin Road<br>(Local Road) | Day    | 48                                   | 55                           | <b>55</b>                                         |
|                                 | Night  | 44                                   | 50                           | <b>50</b>                                         |

## 6.3 CONSTRUCTION NOISE AND VIBRATION CRITERIA

Criteria for construction and demolition noise has been obtained from the NSW Interim Construction Noise Guideline (DECC, 2009). Guidance for construction vibration has been taken from British Standard BS7385-Part 2: 1993 'Evaluation and measurement for vibration in buildings' and other standards.

### 6.3.1 NSW Interim Construction Noise Guideline

#### Residential Criteria

Table 2 of the Interim Construction Noise Guideline (DECC, 2009), sets out construction noise management levels for noise at residences and how they are to be applied. The management noise levels are reproduced in Table 6-6 below. Restrictions to the hours of construction may apply to activities that generate noise at residences above the 'highly noise affected' noise management level.



Table 6-6: Management Levels at Residences Using Quantitative Assessment

| Time of Day                                                                                                                                       | Management Level<br>$L_{Aeq(15\text{-minute})}$ | How to Apply                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Recommended standard hours:</b><br><br>Monday to Friday<br>7am – 6pm<br><br>Saturday<br>8am – 1pm<br><br>No work on Sundays or Public Holidays | Noise Affected<br>RBL + 10 dB                   | <p>The noise affected level represents the point above which there may be some community reaction to noise.</p> <ul style="list-style-type: none"> <li>Where the predicted or measured <math>L_{Aeq(15\text{-minute})}</math> is greater than the noise affected level, the proponent should apply all feasible and reasonable work practises to meet the noise affected level.</li> <li>The proponent should also inform all potentially affected 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<br>75 dB(A)               | <p>The highly noise affected level represents the point above which there may be strong community reaction to noise.</p> <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, or mid-morning or mid-afternoon for works near residents.</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> |
| <b>Outside recommended standard hours</b>                                                                                                         | Noise Affected<br>RBL + 5 dB                    | <ul style="list-style-type: none"> <li>A strong justification would typically be required for works outside the recommended standard hours.</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 see section 7.2.2 (RNP)</li> </ul>                                                                                                                                                                                                               |

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



## **Other Land Uses**

Table 6-7 sets out management levels for construction noise at other land uses applicable to the surrounding area.

Table 6-7: Management Levels at Other Land Uses

| Land use            | Management Level $L_{Aeq(15-minute)}$<br>(applies when properties are being used) |
|---------------------|-----------------------------------------------------------------------------------|
| Industrial Premises | External Noise Level 75 dB(A)                                                     |

There are no other sensitive land uses in the area surrounding the approved resource recovery facility.

The noise criterion for construction noise is presented in Table 6-8.

Table 6-8: Construction Noise Criterion dB(A)

| Receiver | Land Use    | Period         | RBL<br>$L_{A90}$ | Management Level<br>$L_{Aeq(15-minute)}$ |
|----------|-------------|----------------|------------------|------------------------------------------|
| R1-R11   | Residential | Standard Hours | 37               | 47                                       |
| R12-R17  | Residential | Standard Hours | 37               | 47                                       |
| R18-R20  | Industrial  | Standard Hours | -                | 75                                       |

### **6.3.2 Vibration Criteria**

A approved list of operational equipment listed in Table 7-1 and construction equipment listed in Table 9-2 does not include significant sources of vibration, and is not expected to cause cosmetic damage to surrounding structures or cause human response to nearby receivers. Vibration impacts during the construction and operational activities have therefore not been further considered.

## **6.4 WESTERN SYDNEY AIRPORT LEGISLATION**

The Australian Noise Exposure Forecast (ANEF) describes the cumulative aircraft noise for an 'average annual day'. Below shows the acceptability for different uses in relation to the ANEF zone in accordance with AS2021:2015 Acoustics – Aircraft noise intrusion – Building siting and construction.



Table 6-9: AS2021:2015 – Building Site Acceptability base on ANEF zone

| Building Type                       | ANEF zone of site            |                          |                      |
|-------------------------------------|------------------------------|--------------------------|----------------------|
|                                     | Acceptable                   | Conditionally Acceptable | Unacceptable         |
| House, home unit, flat caravan park | Less than 20 ANEF            | 20 to 25 ANEF            | Greater than 25 ANEF |
| Hotel, motel, hostel                | Less than 25 ANEF            | 25 to 30 ANEF            | Greater than 30 ANEF |
| School, university                  | Less than 20 ANEF            | 20 to 25 ANEF            | Greater than 25 ANEF |
| Hospital, nursing home              | Less than 20 ANEF            | 20 to 25 ANEF            | Greater than 25 ANEF |
| Public building                     | Less than 20 ANEF            | 20 to 30 ANEF            | Greater than 30 ANEF |
| Commercial building                 | Less than 25 ANEF            | 25 to 35 ANEF            | Greater than 35 ANEF |
| Light industrial                    | Less than 30 ANEF            | 30 to 40 ANEF            | Greater than 40 ANEF |
| Other industrial                    | Acceptable in all ANEF zones |                          |                      |

The approved development would be best classed as “other industrial” Acceptable in all ANEF zones. The site is located in a zone where the ANEF is between 30 and 35.

#### 6.4.1 LEP Clause 7.18

The Liverpool Local Environment Plan 2008 clause 7.18 states:

*7.18 Development in areas subject to potential airport noise*

*(1) The objectives of this clause are to ensure that development in the vicinity of Bankstown Airport and the Western Sydney International (Nancy-Bird Walton) Airport—*

*(a) has regard to the use or potential future use of each site as an airport, and*

*(b) does not hinder or have any other adverse impact on the development or operation of the airports on those sites.*

*(1A) This clause does not apply to development on land to which [State Environmental Planning Policy \(Precincts—Western Parkland City\) 2021](#), Chapter 4 applies.*

*(2) Development consent is required for the erection of a building on land where the ANEF exceeds 20 if it is erected for residential purposes or for any other purpose involving regular human occupation.*

*(3) The following development is prohibited unless it meets the requirements of AS 2021–2015, Acoustics—Aircraft noise intrusion—Building siting and construction with respect to interior noise levels—*

*(a) residential accommodation on land where the ANEF exceeds 20,*

*(b) business premises, entertainment facilities, office premises, public administration buildings, retail premises and tourist and visitor accommodation on land where the ANEF exceeds 25.*

*(4) The following development is prohibited—*

*(a) educational establishments, hospitals and places of public worship on land where the ANEF exceeds 20,*

*(b) dwellings on land where the ANEF exceeds 25 (other than development consisting of the alteration, extension or replacement of an existing dwelling house where the development is consistent with the objectives of this clause),*



*(c) business premises, entertainment facilities, office premises, public administration buildings, retail premises and tourist and visitor accommodation on land where the ANEF exceeds 30.*

*(5) In this clause—*

*ANEF means Australian Noise Exposure Forecast as shown on the Airport Noise Map.*

The approved development is considered to meet the objectives of the above clause. The development is a waste resource recovery facility and is not considered captured by the uses stated in the clauses above.

## 7. OPERATIONAL NOISE IMPACT ASSESSMENT

### 7.1 MODELLING METHODOLOGY

#### 7.1.1 Noise Model

Noise propagation modelling was carried out using the ISO9613 algorithm within SoundPLAN v7.3. This model has been extensively utilised by Benbow Environmental for assessing noise emissions for existing and approved developments, and is recognised by regulatory authorities throughout Australia. The model allows for the prediction of noise from a site at the specified receptor, by calculating the contribution of each noise source. Other model inputs included the noise sources, topographical features of the subject area and receiver locations.

The modelling scenarios have been carried out using the  $L_{Aeq, 15\text{-minutes}}$  descriptor. Using the descriptor, noise emission levels were predicted at the nearest potentially affected sensitive receptors to determine the noise impact against the relevant noise criteria in accordance with the NSW EPA Noise Policy for Industry.

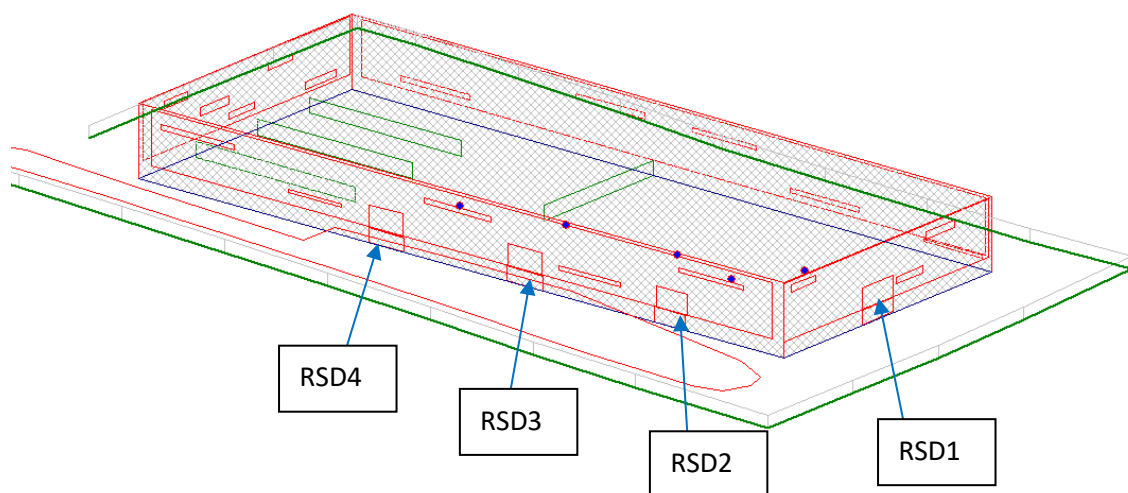
#### 7.1.2 Assumptions Made for Noise Modelling

It should be noted that the relevant assessment period for operational noise emissions has been considered to be 15-minutes. Therefore, noise source durations detailed in the following assumptions should be considered per 15-minute period in view of potential noise impacts under worst-case scenarios. Each assessment-specific assumption has been detailed below:

- Off-site topographical information was obtained from Google Earth.
- On-site topography has been obtained from the site survey plans provided by the client.
- The unloading and processing shed has been modelled as an industrial building with internal point sources. The building dimensions are as shown on the survey plans. The majority of the industrial building walls and roof have been considered to be constructed of 1 mm colorbond sheet steel ( $R_w = 25$  dB) with the bottom 2.5 m of the walls concrete ( $R_w = 55$  dB). The floor has been modelled as concrete.
- Acoustic louvres have been included in the model ( $R_w = 21$  dB).
- For scenario 1, the roller shutter doors have been modelled in the closed position for the entire 15-minute scenario. Pedestrian doors have been modelled open for 30 seconds per 15-minute scenario.
- For scenario 2, all roller shutter doors have been modelled in the closed position for the entire 15-minute scenario, except for door number 3 (the middle roller door). Roller door 3 has been modelled in the open position for 3 minutes, and closed for 12 minutes, simulating a truck or front end loader entering or exiting the shed.
- For scenario 3, the roller shutter doors have been modelled in the open position for the entire 15-minute scenario.

- A 2.1 m colorbond fence is modelled surrounding the hardstand area of the site.
- All receptors were modelled at 1.5 m above ground level.
- All ground areas have been modelled considering different ground factors ranging from 0 to 1 (hard to soft ground). The subject site and immediate surrounding industrial area have been modelled with a ground absorption factor of 1.0 (soft).
- One (1) truck has been modelled entering the site as a worst case scenario over a 15-minute period. An on-site speed of 20 km/hr has been considered.
- Internal noise sources associated with the site activities (i.e. generator, excavator, triple deck screen, concrete crusher) have been modelled as point sources and will be operational for 100% of the operational hours of the site, when utilised in a scenario.

Figure 7-1: 3D Model Perspective



An outline of the noise sources and operational noise modelling scenarios has been provided below.

### 7.1.3 Noise Sources

A-weighted octave band centre frequency sound power levels are presented in in Table 7-1 below. The sound power levels for the relevant noise sources have been calculated from measurements of sound pressure levels undertaken by an acoustic engineer from Benbow Environmental at similar sites and sourced from Benbow Environmental's extensive noise source database.



Table 7-1: A-weighted Sound Power Levels Associated with Operational Activities, dB(A)

| Noise Source       | Overall    | Octave Band Centre Frequency (Hz) |     |     |     |     |     |     |     |
|--------------------|------------|-----------------------------------|-----|-----|-----|-----|-----|-----|-----|
|                    |            | 63                                | 125 | 250 | 500 | 1k  | 2k  | 4k  | 8k  |
| 25T Excavator      | <b>101</b> | 80                                | 83  | 89  | 95  | 94  | 93  | 90  | 83  |
| Front End Loader   | <b>97</b>  | 80                                | 84  | 87  | 91  | 90  | 89  | 88  | 78  |
| Triple Deck Screen | <b>100</b> | 73                                | 87  | 82  | 92  | 98  | 91  | 88  | 86  |
| Concrete Crusher   | <b>113</b> | 80                                | 90  | 97  | 103 | 106 | 107 | 107 | 105 |
| Truck Maneuvering  | <b>102</b> | 73                                | 81  | 86  | 101 | 92  | 90  | 85  | 85  |
| Generator          | <b>97</b>  | 64                                | 74  | 81  | 87  | 90  | 91  | 91  | 89  |

#### 7.1.4 Noise Modelling Scenarios

Three operational scenarios were considered in the noise model. The first noise generating scenario considered a situation where all noise sources on site were operating over the 15-minute assessment period, and the roller doors to the building were closed. The second scenario considered the roller doors to the building to be closed, except for the middle roller door which is open for 3 minutes of the 15-minute period. Scenario 2 enables a truck or front end loader to enter or exit the building. The third scenario considered the roller doors to the building to be open for transfer of materials to the stockpile area via front end loader, but with the crusher and excavator not running. It is understood from the client that the crusher will only operate for a little under half of the operational hours.

In all three scenarios, pedestrian doors are open for 30 seconds per 15-minute scenario, to allow occasional foot traffic in and out of the building. The equipment list is detailed in Table 7-2, with equipment location diagrams for scenarios 1-3 in Figure 7-2 to Figure 7-4.



Table 7-2: Modelled Noise Scenarios for Approved Operations

| Scenario                                                                                                                                                  | Time of the day                                             | Noise Sources for Worst 15-minute Period                                                                                                                                                                                                                                                    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Scenario 1. All operations (all roller doors closed and all sources)                                                                                      | Monday – Friday<br>7am to 6pm<br><br>Saturday<br>7am to 5pm | Indoor Noise Sources <ul style="list-style-type: none"> <li>• Generator</li> <li>• Excavator</li> <li>• Triple decker screen</li> <li>• Concrete crusher</li> <li>• Front end loader</li> </ul> Outdoor Noise sources <ul style="list-style-type: none"> <li>• Truck manoeuvring</li> </ul> |
| Scenario 2. Selected operations (all roller doors closed except for the middle roller door, open for 3 minutes out of a 15-minute period and all sources) | Monday – Friday<br>7am to 6pm<br><br>Saturday<br>7am to 5pm | Indoor Noise Sources <ul style="list-style-type: none"> <li>• Generator</li> <li>• Excavator</li> <li>• Triple decker screen</li> <li>• Concrete crusher</li> <li>• Front end loader</li> </ul> Outdoor Noise sources <ul style="list-style-type: none"> <li>• Truck manoeuvring</li> </ul> |
| Scenario 3. Selected operations (all roller doors open and no crusher)                                                                                    | Monday – Friday<br>7am to 6pm<br><br>Saturday<br>7am to 5pm | Indoor Noise Sources <ul style="list-style-type: none"> <li>• Generator</li> <li>• Triple decker screen</li> <li>• Front end loader</li> <li>• Excavator</li> </ul> Outdoor Noise sources <ul style="list-style-type: none"> <li>• Truck manoeuvring</li> </ul>                             |

Figure 7-2: Scenario 1 – Roller Doors Closed – Operational noise sources

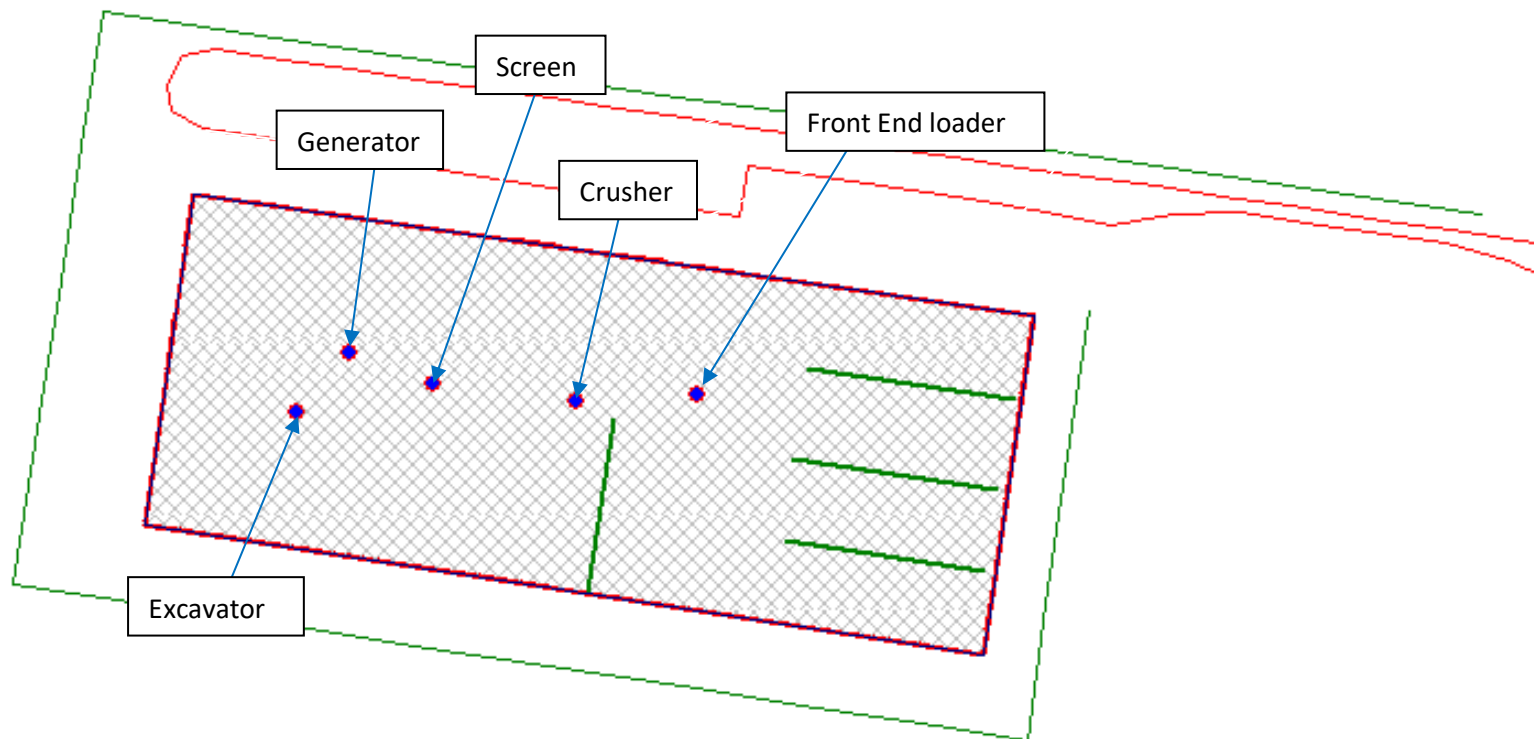


Figure 7-3: Scenario 2 – Roller Doors Mainly Closed – Operational noise sources

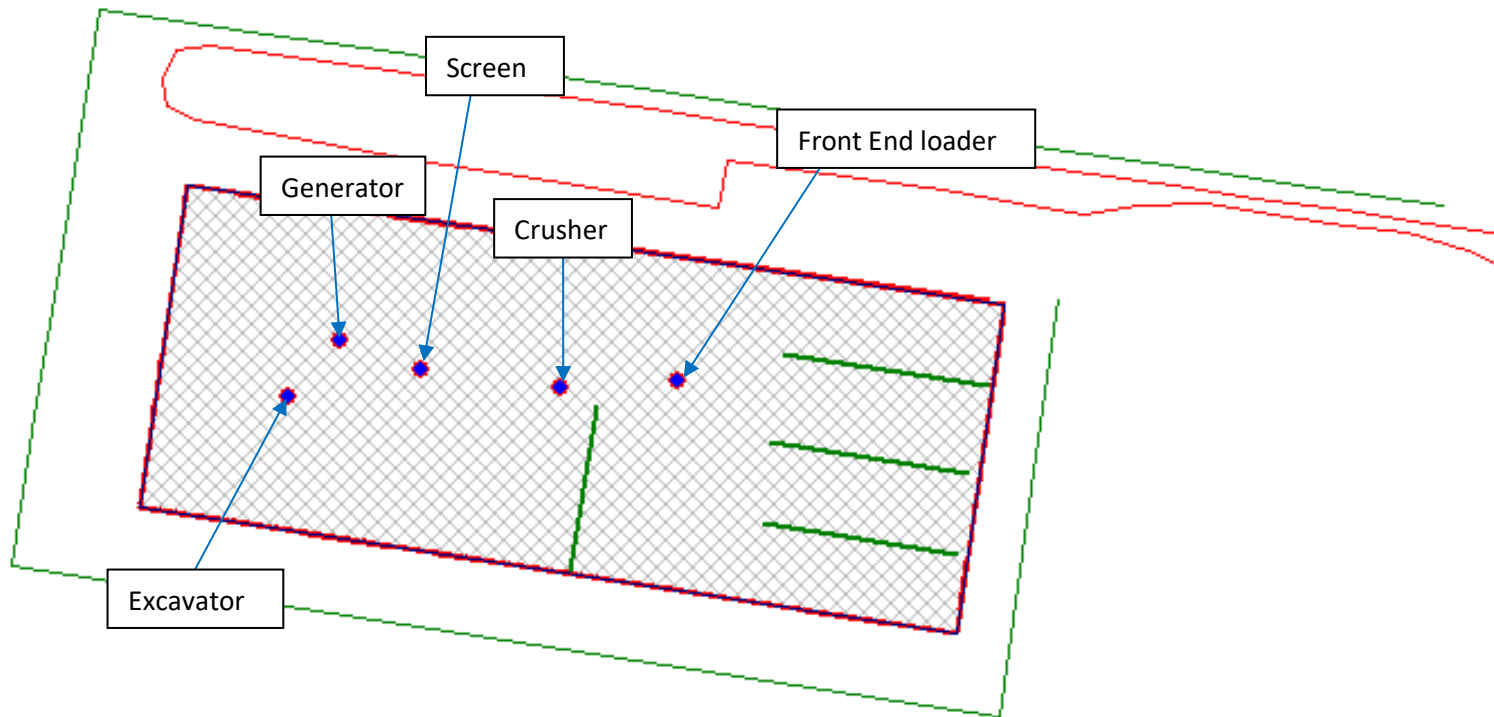
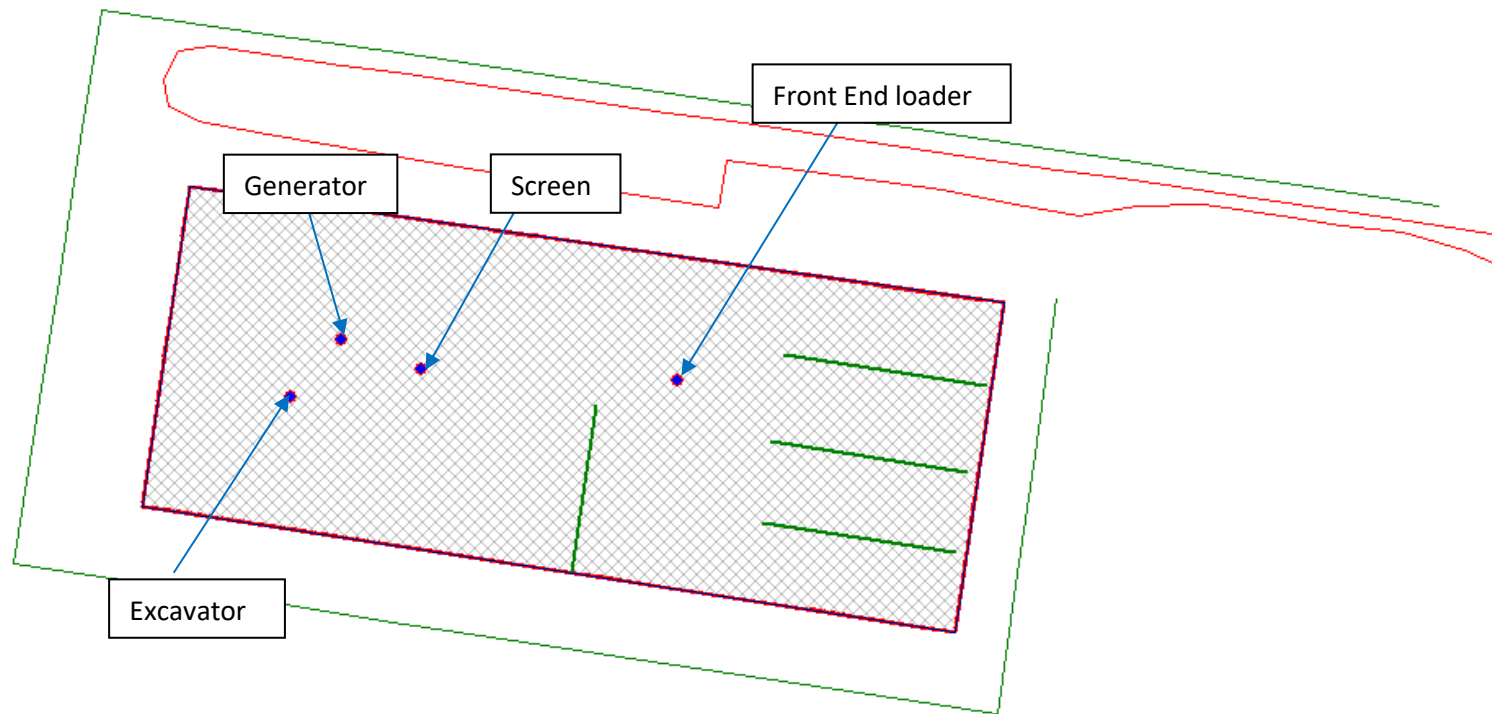


Figure 7-4: Scenario 3 – Roller Doors Open – Operational noise sources



## 7.2 OPERATIONAL PREDICTED NOISE LEVELS

Results of the predictive noise modelling of the operational activities are shown in Table 7-3.

During operations, noise levels are predicted to comply with the Noise Policy for Industry criteria at all receivers during all scenarios.

It is therefore concluded that the approved site activities will not have a detrimental impact on the neighbouring receivers, if the noise control measures in section 7.3 are carried out.

Table 7-3: Noise Modelling Results Associated with Operational Activities,  $L_{eq}$ , dB(A)

| Receiver | Criteria: PNTL ( $L_{eq,15\text{-minute}}$ dB(A)) – Day | Predicted: Scenario 1 ( $L_{eq}$ , dB(A)) | Predicted: Scenario 2 ( $L_{eq}$ , dB(A)) | Predicted: Scenario 3 ( $L_{eq}$ , dB(A)) |
|----------|---------------------------------------------------------|-------------------------------------------|-------------------------------------------|-------------------------------------------|
| R1       | 42                                                      | 31 ✓                                      | 33 ✓                                      | 33 ✓                                      |
| R2       | 42                                                      | 31 ✓                                      | 32 ✓                                      | 32 ✓                                      |
| R3       | 42                                                      | 36 ✓                                      | 38 ✓                                      | 37 ✓                                      |
| R4       | 42                                                      | 38 ✓                                      | 39 ✓                                      | 38 ✓                                      |
| R5       | 42                                                      | 31 ✓                                      | 31 ✓                                      | 30 ✓                                      |
| R6       | 42                                                      | 33 ✓                                      | 33 ✓                                      | 29 ✓                                      |
| R7       | 42                                                      | 36 ✓                                      | 36 ✓                                      | 31 ✓                                      |
| R8       | 42                                                      | 32 ✓                                      | 32 ✓                                      | 27 ✓                                      |
| R9       | 42                                                      | 34 ✓                                      | 34 ✓                                      | 29 ✓                                      |
| R10      | 42                                                      | 32 ✓                                      | 32 ✓                                      | 26 ✓                                      |
| R11      | 42                                                      | 42 ✓                                      | 42 ✓                                      | 36 ✓                                      |
| R12      | 42                                                      | 38 ✓                                      | 38 ✓                                      | 39 ✓                                      |
| R13      | 42                                                      | 37 ✓                                      | 37 ✓                                      | 40 ✓                                      |
| R14      | 42                                                      | 33 ✓                                      | 34 ✓                                      | 36 ✓                                      |
| R15      | 42                                                      | 38 ✓                                      | 40 ✓                                      | 41 ✓                                      |
| R16      | 42                                                      | 37 ✓                                      | 38 ✓                                      | 40 ✓                                      |
| R17      | 42                                                      | 35 ✓                                      | 37 ✓                                      | 38 ✓                                      |
| R18      | 68                                                      | 38 ✓                                      | 40 ✓                                      | 41 ✓                                      |
| R19      | 68                                                      | 33 ✓                                      | 34 ✓                                      | 34 ✓                                      |
| R20      | 68                                                      | 33 ✓                                      | 33 ✓                                      | 32 ✓                                      |

### 7.3 NOISE CONTROL MEASURES

In order to achieve the predicted compliance levels at the nearest receptors, the following control measures are recommended to be implemented.

- A 2.1 m Colorbond fence is recommended to be constructed surrounding the hardstand area of the site.
- Trucks are not to use the access path on the south side of the building for standard operations. South side path is to be signposted as emergency vehicle access only.
- Pedestrian doors are to be self-closing, so the doors automatically close once a pedestrian is no longer using the door.
- Equipment is restricted to indoor operations only.
- When the crusher is operating indoors, one roller shutter door is recommended to be open for only 3 minutes out of a 15-minute scenario (scenario 2). To enable this to practically occur, for example, for the arrival of a truck, it is recommended that automated roller shutter doors be installed to assist in the opening and closing of doors as fast as possible.
- The roller shutter doors should be selected based on their acoustic performance with regards to minimising breakout noise and minimising noise generated from opening and closing operations.
- Should the roller doors need to be opened for extended periods, the crusher is to cease operations.
- It is recommended mobile equipment regularly used onsite such as the excavator and front end loader be fitted with reversing lights or a white noise reversing alarm.

It is also recommended the following additional management practices be implemented:

- Prohibition of extended periods of on-site revving/idling;
- Minimisation of the use of truck exhaust brakes on site;
- Enforcement of low on-site speed limits;
- On-site vehicles to be maintained in accordance with a preventative maintenance program to ensure optimum performance and early detection of wearing or noisy components;
- Ensure condition of roadway surface is maintained (by responsible party) to ensure deterioration of internal access road surface does not lead to increased noise sources; and
- Vehicles awaiting loading, unloading or servicing shall be parked on site with their engines turned off.

Figure 7-5: Colorbond Fence Locations



## 8. ROAD TRAFFIC NOISE IMPACT ASSESSMENT

A description of the calculation methodology and the noise predictions associated with road traffic has been provided below.

The approved route for the heavy and light vehicles was presented in Figure 6-1. Trucks and light vehicles are approved to access the site from Martin Road.

Calculation of road traffic noise contribution has been undertaken using a moving point source within SoundPLAN v7.3.

It is understood that a maximum of 16 truck movements are approved per day between 7am and 5pm. 16 truck movements are assumed in each direction during the day period, with a maximum of three in any one hour period. A maximum of 10 light vehicle movements are expected in a one-hour period. No truck movements are approved during the night period. Vehicles are assumed to travel at the posted speed of 80 km/h.

The  $L_{Aeq, 1 \text{ hour}}$  noise descriptor has been calculated at the most affected residential receptor (R4) located along Martin Road and Lawson Road. The predicted noise levels are displayed in Table 8-1. The highest noise levels would be predicted at these location, therefore they are the only results displayed.

Table 8-1: Predicted Levels for Road Traffic Noise

| Receptor                           | Noise Criteria                   |                                    | Existing Traffic                 |                                    | Site Contribution                |                                    | Cumulative Road Traffic Noise    |                                    |
|------------------------------------|----------------------------------|------------------------------------|----------------------------------|------------------------------------|----------------------------------|------------------------------------|----------------------------------|------------------------------------|
|                                    | Day<br>$L_{Aeq, 1 \text{ hour}}$ | Night<br>$L_{Aeq, 1 \text{ hour}}$ | Day<br>$L_{Aeq, 1 \text{ hour}}$ | Night<br>$L_{Aeq, 1 \text{ hour}}$ | Day<br>$L_{Aeq, 1 \text{ hour}}$ | Night<br>$L_{Aeq, 1 \text{ hour}}$ | Day<br>$L_{Aeq, 1 \text{ hour}}$ | Night<br>$L_{Aeq, 1 \text{ hour}}$ |
| R4, 40 Martin Road, Badgerys Creek | 55                               | 50                                 | 48                               | 44                                 | 41 ✓                             | N/A ✓                              | 50 ✓                             | 44 ✓                               |

For residential dwellings that front onto Martin Road, the predicted noise levels associated with the vehicle movements from the site would be below the daytime criteria of  $L_{Aeq, 1 \text{ hour}}$  55 dB for local roads. From Table 8-1, the predicted cumulative daytime  $L_{Aeq, 1 \text{ hour}}$  road traffic noise are below the noise criteria, as established from the NSW Road Noise Policy (RNP).

Step 3 of Section 3.4.1 of the RNP identifies possible reasonable and feasible control measures when exceedances of either of the outlined criteria occur. As no exceedances are predicted, the approved vehicle movements comply with the RNP, and no additional mitigation strategies are recommended.



## 9. CONSTRUCTION NOISE IMPACT ASSESSMENT

### 9.1 CONSTRUCTION ACTIVITIES

Construction activities are approved to include the following:

- Site establishment;
- The building of the unloading and processing shed;
- The installation of a wheel wash and weighbridge;
- The setup of five storage bays; and
- Construction of the car park and landscaped area

The current residential dwelling is approved to be kept; therefore no demolition works are approved.

### 9.2 MODELLED NOISE GENERATING SCENARIOS

Considering the construction activities outlined in section 9.1, the three construction stages listed in Table 9-1 are modelled for civil works, concreting works and structure works. The noise generating stages consider a worst case scenario in which all equipment is running for 100% of the time over the 15-minute assessment period.

The equipment list for the stages is detailed in Table 9-1, with an equipment location diagrams in Figure 9-1 to Figure 9-3. Equipment is primarily located in the area of the approved unloading and processing shed, as the majority of the construction works will take place at this location.

All works are approved to be undertaken during standard construction hours, that is

- Monday to Friday, 7am to 6pm;
- Saturday 8am to 1pm ; and
- No work on Sundays or public holidays.

Table 9-1: Modelled Noise Stages for Approved Construction Works

| Scenario                               | Time of the day | Noise Sources for Worst 15-minute Period                                                                                |
|----------------------------------------|-----------------|-------------------------------------------------------------------------------------------------------------------------|
| Stage 1. Civil Works                   | Standard hours  | <ul style="list-style-type: none"> <li>• Dozer</li> <li>• Backhoe</li> <li>• Truck</li> <li>• Hand tools</li> </ul>     |
| Stage 2. Concreting construction works | Standard hours  | <ul style="list-style-type: none"> <li>• Concrete mixer truck</li> <li>• Concrete pump</li> <li>• Hand tools</li> </ul> |
| Stage 3. Structure construction works  | Standard hours  | <ul style="list-style-type: none"> <li>• Truck</li> <li>• Crane</li> <li>• Hand Tools</li> </ul>                        |

Figure 9-1: Construction Stage 1 – Civil Works

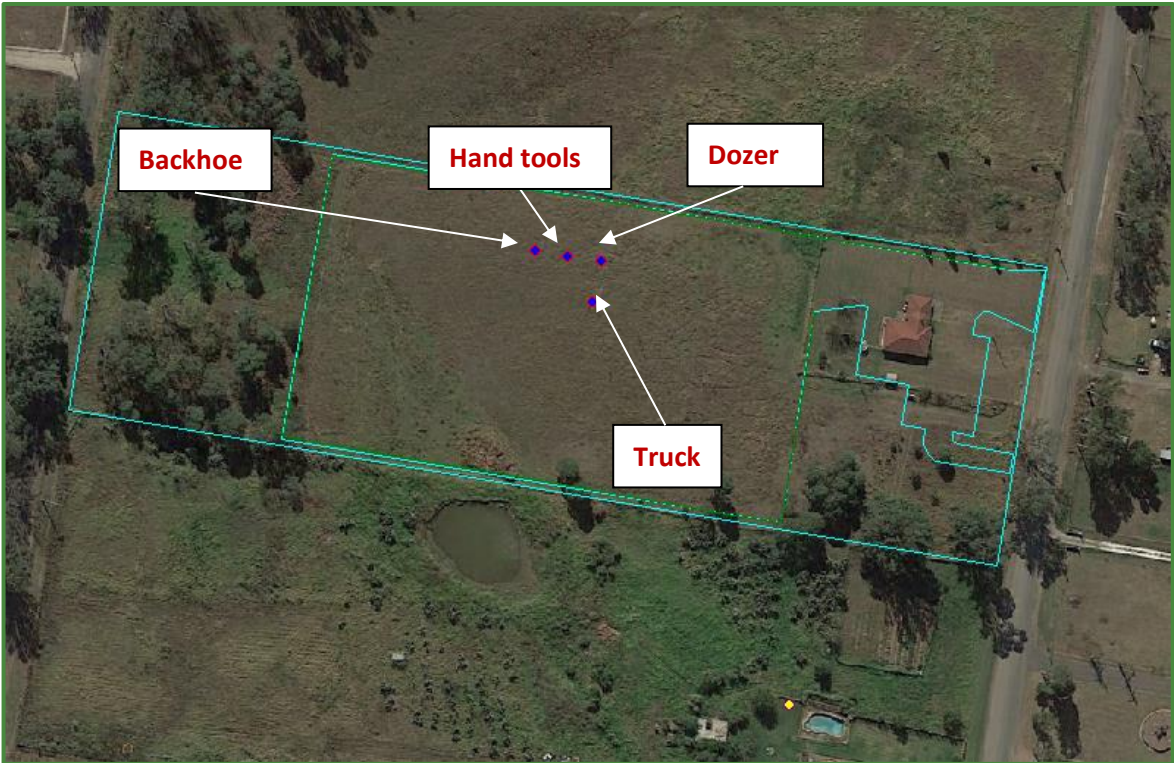


Figure 9-2: Construction Stage 2 – Concreting Construction Works

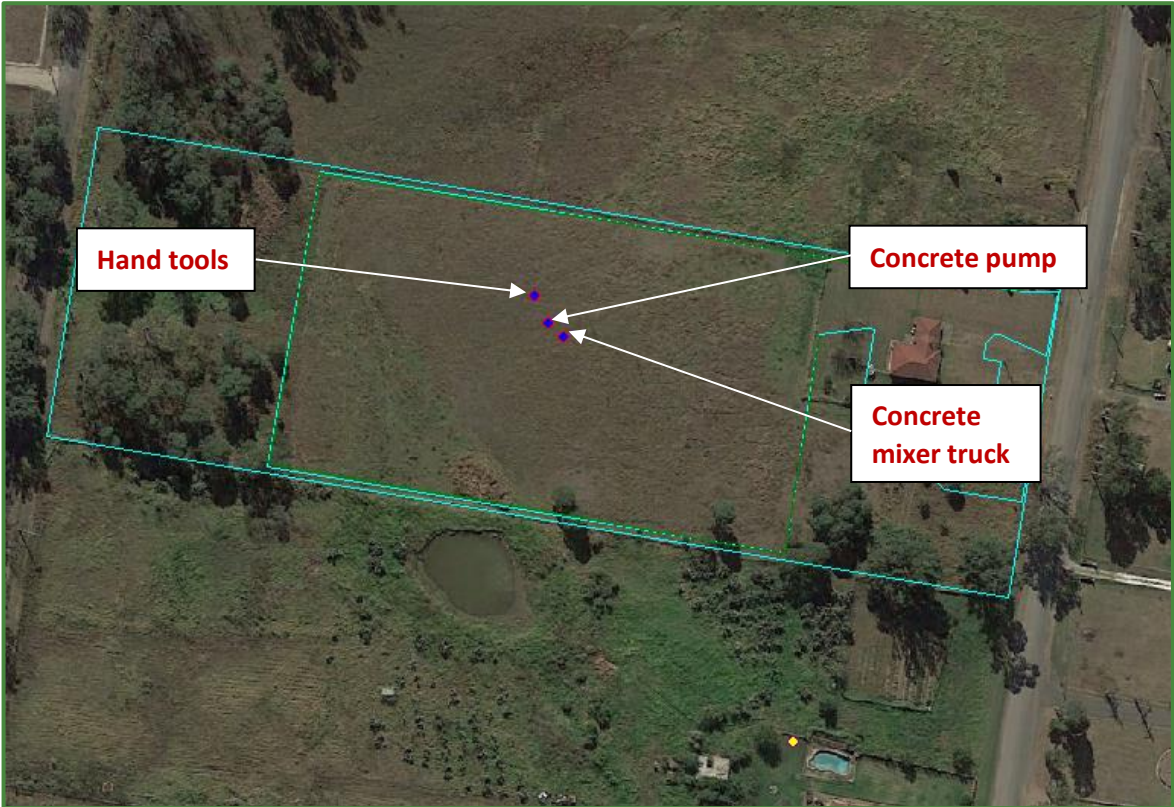


Figure 9-3: Construction Stage 3 – Structure Construction Works



## 9.3 MODELLING METHODOLOGY

### 9.3.1 Noise Model

Noise propagation modelling for the construction activities was carried out using the ISO 9613 algorithm within SoundPLAN v7.3. The construction stages were modelled using the  $L_{Aeq, 15\text{-minutes}}$  descriptor.

Assumptions made in the noise modelling of the construction noise stages are as follows:

- The relevant assessment period for operational noise emissions has been considered to be 15-minutes. Construction stages assume all equipment is running 100% of the time during the 15-minute assessment period, to provide a worst case scenario;
- Topographical information for off-site areas was obtained from Google Earth;
- Topographical information for on-site areas was obtained from the site survey;
- The model included the 2.1 m colorbond fence surrounding the hardstand area of the site.
- All receptors were modelled at 1.5 m above ground level;
- The surrounding ground areas have been modelled with a ground absorption coefficient of 1.0 (soft); and

- All noise sources associated with the construction works have been modelled as point sources.

### 9.3.2 Noise Sources

A-weighted octave band centre frequency sound power levels are presented shown in Table 9-2 below. The sound power levels for the relevant noise sources have been calculated from measurements of sound pressure levels undertaken by an acoustic engineer from Benbow Environmental at similar sites and sourced from Benbow Environmental's noise source database, as well as taken from AS 2436-2010 and the UK Department for Environmental Food and Rural Affairs (DEFRA) database, *Update of noise database for prediction of noise on construction and open sites*.

Table 9-2: A-weighted Sound Power Levels Associated with Construction Activities, dB(A)

| Noise Source        | Overall    | Octave Band Centre Frequency (Hz) |     |     |     |     |     |    |    |
|---------------------|------------|-----------------------------------|-----|-----|-----|-----|-----|----|----|
|                     |            | 63                                | 125 | 250 | 500 | 1k  | 2k  | 4k | 8k |
| Truck               | <b>102</b> | 73                                | 81  | 86  | 101 | 92  | 90  | 85 | 85 |
| Dozer               | <b>110</b> | 101                               | 105 | 103 | 103 | 100 | 97  | 91 | 83 |
| Backhoe             | <b>104</b> | 102                               | 94  | 92  | 92  | 91  | 88  | 87 | 78 |
| Hand tools          | <b>100</b> | 71                                | 81  | 91  | 96  | 94  | 90  | 87 | 81 |
| Concrete truck      | <b>108</b> | 85                                | 86  | 85  | 94  | 98  | 107 | 89 | 82 |
| Concrete pump truck | <b>105</b> | 77                                | 92  | 97  | 99  | 100 | 95  | 95 | 89 |
| Crane               | <b>110</b> | 94                                | 99  | 103 | 104 | 104 | 102 | 94 | 84 |

## 9.4 CONSTRUCTION PREDICTED NOISE LEVELS

Results of the predictive noise modelling of the construction activities are shown in Table 9-3. For stage 1, compliance is predicted at all receivers except for a 1 dB exceedance predicted at R11. For stage 2, compliance is predicted to be achieved at all receivers except for R4, R11-R13 and R15. A maximum exceedance of a 3 dB is predicted at R12 and R13 in stage 2. For stage 3, compliance is predicted to be achieved at all receivers except R11-R13 and R15-R16. A maximum exceedance of 6 dB is predicted in stage 3.

Compliance with the construction noise criteria is therefore predicted to be achieved at the vast majority of receivers across the three stages during standard construction hours.

Construction activities are therefore approved to take place during standard **construction** hours only as follows:

Monday to Friday: 7am to 5pm (with no hammering or saw-cutting to occur before 7.30am)

Saturday: 8am to 1pm (with no hammering or saw-cutting to occur before 8.30am)  
Sunday and Public Holidays: No works permitted

The predicted exceedances are minor in nature, and well below the 75 dB(A) “highly affected” noise criteria in the Interim Construction Noise Guideline. The following noise mitigation measures are therefore recommended:

- Construction works are recommended to take place during standard construction hours; and
- The Colorbond fence is recommended to be installed on site prior to the remainder of the construction works taking place.

Table 9-3: Noise Modelling Results Associated with Construction Activities for  $L_{eq}$ , dB(A)

| Receiver | Criteria: PSNL ( $L_{eq,15\text{-minute}}$ dB(A)) | Predicted Levels: Stage (Standard Hours) ( $L_{eq}$ , dB(A)) |      |      |
|----------|---------------------------------------------------|--------------------------------------------------------------|------|------|
|          | Standard Hours                                    | 1                                                            | 2    | 3    |
| R1       | 47                                                | 39 ✓                                                         | 43 ✓ | 43 ✓ |
| R2       | 47                                                | 38 ✓                                                         | 40 ✓ | 42 ✓ |
| R3       | 47                                                | 44 ✓                                                         | 46 ✓ | 47 ✓ |
| R4       | 47                                                | 46 ✓                                                         | 49 ✗ | 47 ✓ |
| R5       | 47                                                | 40 ✓                                                         | 41 ✓ | 42 ✓ |
| R6       | 47                                                | 42 ✓                                                         | 43 ✓ | 45 ✓ |
| R7       | 47                                                | 44 ✓                                                         | 46 ✓ | 47 ✓ |
| R8       | 47                                                | 41 ✓                                                         | 43 ✓ | 43 ✓ |
| R9       | 47                                                | 42 ✓                                                         | 44 ✓ | 45 ✓ |
| R10      | 47                                                | 40 ✓                                                         | 42 ✓ | 44 ✓ |
| R11      | 47                                                | 48 ✗                                                         | 49 ✗ | 52 ✗ |
| R12      | 47                                                | 47 ✓                                                         | 50 ✗ | 52 ✗ |
| R13      | 47                                                | 47 ✓                                                         | 50 ✗ | 53 ✗ |
| R14      | 47                                                | 41 ✓                                                         | 43 ✓ | 45 ✓ |
| R15      | 47                                                | 46 ✓                                                         | 49 ✗ | 50 ✗ |
| R16      | 47                                                | 44 ✓                                                         | 47 ✓ | 49 ✗ |
| R17      | 47                                                | 43 ✓                                                         | 45 ✓ | 47 ✓ |
| R18      | 75                                                | 47 ✓                                                         | 50 ✓ | 52 ✓ |
| R19      | 75                                                | 40 ✓                                                         | 42 ✓ | 46 ✓ |
| R20      | 75                                                | 41 ✓                                                         | 43 ✓ | 45 ✓ |

✓Complies ✗ Non-compliance



## 10. VIBRATION IMPACT ASSESSMENT

In the NSW TfNSW Construction Noise Strategy document and Assessing Vibration – A Technical Guideline, construction equipment that may cause vibration impacts includes hydraulic hammers, vibratory pile drivers, pile boring, jackhammers, wacker packers, concrete vibrators and pavement breakers, amongst other equipment. It is understood that none of this equipment, or any equipment likely to cause significant vibration, is proposed as part of the works.

Furthermore, vibration monitoring at a similar facility demonstrated that vibration levels were well below the human comfort preferred value criteria of 0.8 m/s<sup>1.75</sup> as per the DEC's Assessing Vibration – A Technical Guideline (2006). Therefore, no further assessment is considered warranted.



## **11. WESTERN SYDNEY AIRPORT ASSESSMENT**

As shown in Figure 4-2, the site is located in a zone where the ANEF is between 30 and 35. The approved development is not a noise sensitive development and would be best classed as “other industrial” under AS2021:2015; acceptable in all ANEF zones. Furthermore, the approved development meets the objectives of clause 7.18 of the Liverpool LEP.

## 12. STATEMENT OF POTENTIAL NOISE IMPACT

A noise impact assessment was undertaken to assess the potential noise emissions from the approved resource recovery facility at 55 Martin Road, Badgerys Creek, pursuant to DA263-2018-A. The site is approved to process up to 95,000 tonnes per annum.

The noise impact assessment was undertaken in accordance with the following guidelines:

- NSW Environment Protection Authority Noise Policy for Industry 2017;
- Department of Environment, Climate Change and Water NSW Road Noise Policy 2011; and
- Department of Environment, Climate Change and Water NSW Interim Construction Noise Guideline 2009.

The nearest receivers and noise criteria were identified. The site operations were modelled using the predictive noise software, Sound Plan V7.3.

The activities approved by the proponent were found to be within the framework of the NSW Noise Policy for Industry. The noise generating scenarios are predicted to comply with the project specific noise levels at all receivers. Recommendations for noise controls are given in section 7.3, including sound power levels for the front end loader, truck pathing, equipment and automated roller doors usage.

Compliance with the guidelines set out in the NSW Road Noise Policy was predicted at all considered receptors.

Construction activities are recommended to be limited to standard hours in accordance with the Interim Construction Noise Guideline.

Operational vibration impacts on the similar industrial facilities have been assessed and shown to be well below the relevant Assessing Vibration – A Technical Guideline (DEC, 2006) criteria.

The site is located near the Western Sydney Airport in a zone where the ANEF is between 30 and 35. The approved development is not a noise sensitive development and would be best classed as “other industrial” under AS2021; acceptable in all ANEF zones. Furthermore, the approved development meets the objectives of clause 7.18 of the Liverpool LEP.

This concludes the report.



Emma Hansma  
Senior Engineer



R T Benbow  
Principal Consultant



## 13. LIMITATIONS

Our services for this project are carried out in accordance with our current professional standards for site assessment investigations. No guarantees are either expressed or implied.

This report has been prepared solely for the use of AMJ Demolition and Excavation, as per our agreement for providing environmental services. Only AMJ Demolition and Excavation is entitled to rely upon the findings in the report within the scope of work described in this report. Otherwise, no responsibility is accepted for the use of any part of the report by another in any other context or for any other purpose.

Although all due care has been taken in the preparation of this study, no warranty is given, nor liability accepted (except that otherwise required by law) in relation to any of the information contained within this document. We accept no responsibility for the accuracy of any data or information provided to us by AMJ Demolition and Excavation for the purposes of preparing this report.

Any opinions and judgements expressed herein, which are based on our understanding and interpretation of current regulatory standards, should not be construed as legal advice.

## **ATTACHMENTS**



CLARON CONSULTING PTY LTD  
PO BOX 542  
LINDFIELD NSW 2070

Dear Sir/Madam,

**55 MARTIN ROAD, BADGERYS CREEK NSW 2555, (LOT 4 DP 611519),  
SECTION 4.55(2) MODIFICATION TO DEVELOPMENT CONSENT DA-263/2018**

I am pleased to advise that on 12 June 2020, the Sydney Western City Planning Panel has approved your Section 4.55(2) Application seeking to amend Development Consent DA-263/2018 which granted approval *to establish a resource recovery facility for 95,000 tonnes per annum of construction and demolition waste including the installation of a weighbridge, hardstand, retaining walls and erection of a rural shed.*

The modification seeks *alterations to the site layout, including an enlarged slab, altered internal vehicle movements, and noise barriers; an increase in building height and footprint and the addition of an awning; the replacement of the existing dwelling with a purpose built single storey office building; the relocation of the car park and the provision of an additional vehicle access; changes to the drainage and easements across the site.*

The modification is approved under Section 4.55(2) of the *Environmental Planning and Assessment Act 1979*.

Development Consent DA-263/2018 is amended as follows (***amendments to conditions are underlined and italicised***):

**A. Condition 1 of Development Consent No. DA-263/2018 is amended to read as follows:**

**Approved Plans**

1. Development the subject of this determination notice must be carried out strictly in accordance with the following plans/reports marked, except where modified by the undermentioned conditions.

| <b>Plan Name</b>                                        | <b>Plan Number</b> | <b>Rev</b> | <b>Date</b>       | <b>Prepared By</b>      |
|---------------------------------------------------------|--------------------|------------|-------------------|-------------------------|
| <u>Location Plan</u>                                    | <u>P513-DA-01</u>  | <u>D</u>   | <u>23/09/2019</u> | <u>PTI Architecture</u> |
| <u>Site Plan</u>                                        | <u>P513-DA-03</u>  | <u>J</u>   | <u>23/09/2019</u> | <u>PTI Architecture</u> |
| <u>Detailed Shed Plan</u>                               | <u>P513-DA-04</u>  | <u>E</u>   | <u>23/09/2019</u> | <u>PTI Architecture</u> |
| <u>Detailed Site Plan (Part A)</u>                      | <u>P513-DA-05</u>  | <u>N</u>   | <u>23/09/2019</u> | <u>PTI Architecture</u> |
| <u>Detailed Site Plan (Part B)</u>                      | <u>P513-DA-06</u>  | <u>J</u>   | <u>23/09/2019</u> | <u>PTI Architecture</u> |
| <u>Shed Amenities Floor Plans</u>                       | <u>P513-DA-07</u>  | <u>B</u>   | <u>23/09/2019</u> | <u>PTI Architecture</u> |
| <u>Processing Shed Elevations</u>                       | <u>P513-DA-08</u>  | <u>E</u>   | <u>23/09/2019</u> | <u>PTI Architecture</u> |
| <u>Section thru Processing Shed</u>                     | <u>P513-DA-09</u>  | <u>C</u>   | <u>23/09/2019</u> | <u>PTI Architecture</u> |
| <u>Section thru Stockpile Bunker</u>                    | <u>P513-DA-10</u>  | <u>G</u>   | <u>23/09/2019</u> | <u>PTI Architecture</u> |
| <u>New Office Building Ground Floor Plan</u>            | <u>P513-DA-11</u>  | <u>C</u>   | <u>23/09/2019</u> | <u>PTI Architecture</u> |
| <u>New Office Building Elevations East &amp; West</u>   | <u>P513-DA-12</u>  | <u>C</u>   | <u>23/09/2019</u> | <u>PTI Architecture</u> |
| <u>New Office Building Elevations North &amp; South</u> | <u>P513-DA-13</u>  | <u>C</u>   | <u>23/09/2019</u> | <u>PTI Architecture</u> |
| <u>Truck Entry Driveway Ramp Sections</u>               | <u>P513-DA-14</u>  | <u>B</u>   | <u>23/09/2019</u> | <u>PTI Architecture</u> |
| <u>Staff Carpark Driveway Ramp Sections</u>             | <u>P513-DA-15</u>  | <u>B</u>   | <u>23/09/2019</u> | <u>PTI Architecture</u> |
| <u>Fence Elevations for Acoustic</u>                    | <u>P513-DA-16</u>  | <u>B</u>   | <u>23/09/2019</u> | <u>PTI Architecture</u> |
| <u>Fence Elevations for Acoustic</u>                    | <u>P513-DA-17</u>  | <u>B</u>   | <u>23/09/2019</u> | <u>PTI Architecture</u> |
| <u>Visual Impact Assessment – Location Plan</u>         | <u>P513-DA-18</u>  | <u>C</u>   | <u>23/09/2019</u> | <u>PTI Architecture</u> |
| <u>Visual Impact Assessment – View 1</u>                | <u>P513-DA-19</u>  | <u>C</u>   | <u>23/09/2019</u> | <u>PTI Architecture</u> |
| <u>Visual Impact Assessment – View 2</u>                | <u>P513-DA-20</u>  | <u>C</u>   | <u>23/09/2019</u> | <u>PTI Architecture</u> |
| <u>Visual Impact Assessment – View 3</u>                | <u>P513-DA-21</u>  | <u>C</u>   | <u>23/09/2019</u> | <u>PTI Architecture</u> |
| <u>Visual Impact Assessment – View 4</u>                | <u>P513-DA-22</u>  | <u>C</u>   | <u>23/09/2019</u> | <u>PTI Architecture</u> |

|                                          |                   |          |                   |                             |
|------------------------------------------|-------------------|----------|-------------------|-----------------------------|
| <u>Visual Impact Assessment – View 5</u> | <u>P513-DA-23</u> | <u>C</u> | <u>23/09/2019</u> | <u>PTI Architecture</u>     |
| <u>Visual Impact Assessment – View 6</u> | <u>P513-DA-24</u> | <u>C</u> | <u>23/09/2019</u> | <u>PTI Architecture</u>     |
| <u>Sediment Control Plan</u>             | <u>D1-17-040</u>  | <u>C</u> | <u>11/09/2019</u> | <u>TOP Consulting Group</u> |
| <u>Stormwater Pit Collection</u>         | <u>D2-17-040</u>  | <u>B</u> | <u>06/09/2019</u> | <u>TOP Consulting Group</u> |
| <u>Stormwater Plan</u>                   | <u>D3-17-040</u>  | <u>B</u> | <u>06/09/2019</u> | <u>TOP Consulting Group</u> |
| <u>Roof Stormwater Plan</u>              | <u>D4-17-040</u>  | <u>B</u> | <u>06/09/2019</u> | <u>TOP Consulting Group</u> |
| <u>Leachate Collection Plan</u>          | <u>D5-17-040</u>  | <u>B</u> | <u>06/09/2019</u> | <u>TOP Consulting Group</u> |
| <u>Concrete Layout Plan</u>              | <u>S1-17-040</u>  | <u>B</u> | <u>06/09/2019</u> | <u>TOP Consulting Group</u> |

| <b>Report Name</b>                                                                                                       | <b>Date</b>       | <b>Reference</b>    | <b>Prepared By</b>               |
|--------------------------------------------------------------------------------------------------------------------------|-------------------|---------------------|----------------------------------|
| Environmental Impact Statement, including Appendices (and revisions):                                                    | 22/03/2018        | 1771127-EIS-Rev2    | Benbow Environmental             |
| 2. Geotechnical Investigation, Preliminary Acid Sulfate Soils Assessment, Salinity Assessment, and Wastewater Assessment | December 2018     | 17/3905 A           | STS Geo-Environmental            |
| 3. Stormwater Management Plan and Report                                                                                 | 17/01/2019        | 2017/01             | Ultramark                        |
| 4. Traffic Impact Assessment Report                                                                                      | February 2018     | 17149r              | Transport & Urban Planning       |
| 5. Waste Management Plan                                                                                                 | February 2018     | 171127-WMP-Rev1     | Benbow Environmental             |
| 6. Air Quality Impact Assessment                                                                                         | February 2018     | 171127-AQIA-Rev3    | Benbow Environmental             |
| 7. Community Consultation Leaflet                                                                                        | February 2018     | -                   | Benbow Environmental             |
| 9. Flora & Fauna Survey and Impact Assessment                                                                            | March 2018        | 55 Martin Road      | Ecological Consultants Australia |
| 10. Arboriculture Impact Assessment Report                                                                               | 13/03/2018        | Revision B          | Glenyss Laws                     |
| 11. Preliminary Site Investigation                                                                                       | January 2018      | 18/0089             | STS Geo-Environmental            |
| 13. Landscaping Plan                                                                                                     | December 2018     | 55 Martin Road      | Ecological Consultants Australia |
| <u>Addendum to the Environmental impact Statement, including Appendices:</u>                                             | <u>24/09/2019</u> | <u>18580 Rev. 1</u> | <u>Benbow Environmental</u>      |

|                                                            |                       |                        |                                         |
|------------------------------------------------------------|-----------------------|------------------------|-----------------------------------------|
| <u>D. Architectural Plans and Visual Impact Assessment</u> | <u>(see above)</u>    |                        |                                         |
| <u>E. Landscaping Plan Updates</u>                         | <u>September 2019</u> | <u>55 Martin Road</u>  | <u>Ecological Consultants Australia</u> |
| <u>F. Civil and Stormwater Plans</u>                       | <u>(see above)</u>    |                        |                                         |
| <u>G. Traffic Impact Letter</u>                            | <u>29/08/2019</u>     | <u>19115L1</u>         | <u>Transport &amp; Urban Planning</u>   |
| <u>H. Noise Impact Assessment</u>                          | <u>September 2019</u> | <u>191238-NIA-Rev3</u> | <u>Benbow Environmental</u>             |
| <u>I. Air Quality Statement Letter</u>                     | <u>13/09/2019</u>     | <u>EH/snb</u>          | <u>Benbow Environmental</u>             |
| <u>J. Revised Stormwater Management Letter</u>             | <u>24/09/2019</u>     | <u>2017-01</u>         | <u>Ultramark</u>                        |
| Construction Noise and Vibration Management Plan           | December 2018         | 171127-02-CNVMP-Rev3   | Benbow Environmental                    |
| Response to Submissions                                    | 18/07/2018            | 55 Martin Road         | Claron Consulting                       |
| Response to Matters Raised                                 | 06/12/2018            | 55 Martin Road         | Claron Consulting                       |

- B. Condition 2 of Development Consent No. DA-263/2018 is amended to read as follows:**

**General Terms of Approval**

2. All the General Terms of Approval issued by NSW Environmental Protection Authority (EPA) shall be complied with prior, during, and at the completion of construction, as required in accordance with the General Terms of Approval dated 2 December 2019. A copy of the General Terms of Approval is attached to this decision notice.

- C. Condition 20 of Development Consent No. DA-263/2018 is amended to read as follows:**

**Recommendations of Acoustic Report**

20. The recommendations provided within the Noise Impact Assessment for AMJ Demolition and Excavation 55 Martin Road, Badgerys Creek (Report no. 191238-NIA-Rev3) prepared by Benbow Environmental dated September 2019 and the Construction Noise and Vibration Management Plan 55 Martin Road Badgerys Creek (Report no. 171127-02-CNVMP-Rev3) prepared by Benbow Environmental dated December 2018 are to be complied with. This includes, but is not limited to:

- A 2.1m colourbond fence to be constructed surrounding the perimeter of the site.
- The front end loader is to have a sound power level of 97 dB (A) or lower.
- Pedestrian doors are to be self-closing
- Crusher/s, generator/s, screen/s and excavator/s are restricted to indoors only.

- When either crusher or excavator is operating, one roller shutter door is to be open for only 3 minutes out of a 15minute scenario.
- Automated roller shutter doors be installed
- Roller shutters selected should be for their acoustic performance with regards to minimising breakout noise and minimising noise generated from opening and closing operations
- Mobile equipment regularly used onsite such as excavators and front end loaders are to be fitted with reversing lights or a white noise reversing alarm

**D. Condition 24 of Development Consent No. DA-263/2018 is amended to read as follows:**

**On-Site Detention**

24. On-Site Detention shall be provided generally in accordance with the concept plan/s lodged for development approval, prepared by T.O.P Consulting Group Pty Ltd, reference number 17-040, revision B, dated 06/09/2019.

The proposed development and stormwater drainage system shall be designed to ensure that stormwater runoff from upstream properties is conveyed through the site without adverse impact on the development or adjoining properties.

Engineering plans and supporting calculations for the on-site detention system are to be prepared by a suitably qualified person and shall accompany the application for a Construction Certificate.

Prior to the issue of a Construction Certificate the Certifying Authority shall ensure that the on-site detention system has been designed in accordance with Liverpool City Council's Design Guidelines and Liverpool City Council's On-Site Stormwater Detention policy and Technical Specification.

**E. Condition 102 of Development Consent No. DA-263/2018 is amended to read as follows:**

**Site to be concreted**

102. All areas to be trafficable by vehicles (being the area annotated with 'Concrete Driveway & Manoeuvring Area' and 'driveway', and the car spaces depicted on the plans prepared by 'PTI Architecture', Sheets DA 05 Revision N and DA 06 Revision J, dated 23/09/2019), are to be concreted to an appropriate engineering specification prior to the issuing of an Occupation Certificate.

**F. Condition 110 of Development Consent No. DA-263/2018 is amended to read as follows:**

**EPA General terms of Approval**

110. The facility shall operate in accordance with the General Terms of Approval (Notice No. 1589160) issued by the NSW EPA. This includes, but is not limited to:

- Noise limits of 42 dB(A) (LAeq, 15minute) during the day at 40 & 65 Martin Road, 75 & 55 Lawson Road.
- Noise Monitoring Report within 60 days of the commencement of operation
- Use of water sprinklers and/or mist sprays in the enclosed building and outside undercover storage area so that no visible dust leaves the premises
- Development of an Air Quality Management Plan.

**G. Attachment 2 of Development Consent No. DA-263/2018 is amended to include the updated General Terms of Approval from the NSW Environmental Protection Authority (EPA) dated 02/12/2019.**

All other conditions of Development Consent No. DA-263/2018 remain unchanged.

**ADVISORY NOTES:**

*(a) Section 4.55 of the Environmental Planning and Assessment Act, 1979 gives you the right to request the Council to review this determination within six months of the date of determination.*

*(b) Section 8.7 & 8.10 of the Environmental Planning and Assessment Act, 1979 gives you the right to appeal to the NSW Land and Environment Court within six (6) months after:*

*(a) the date on which the applicant received notice, given in accordance with the regulations, of the determination of that application or, if an application for review under section 96AB has been decided, the date on which the applicant received notice, in accordance with the regulations, of the decision, or*

*(b) the date on which the applicant's application is taken to have been determined in accordance with regulations made under section 8.5 (3), 4.55 (6) or 4.55AA (3).*

*(c) The Section 4.55 Modification Application does not extend the timeframe of the development consent initially granted by Council.*

*(d) Modification of the development consent in accordance with Section 4.55 of the Environmental Planning and Assessment Act, 1979 shall not be construed as the granting of development consent, but reference to a development consent, is a reference to a development consent so modified.*

*(e) Modification of the development consent does not remove the need to obtain any other statutory consent necessary under the Act.*

If you have any questions please contact Adam Flynn on the number at the top of this letter.

Yours faithfully



**Lina Kakish  
Manager  
DEVELOPMENT ASSESSMENT**

## **For Information – Revised conditions of approval in full**

### **ATTACHMENT 1: Conditions of Approval**

#### **CONDITIONS:**

The following conditions have been imposed to achieve the objectives of the relevant planning instruments and policies:

#### **A. THE DEVELOPMENT**

##### **Approved Plans (amended under DA-263/2019/A)**

1. Development the subject of this determination notice must be carried out strictly in accordance with the following plans/reports marked, except where modified by the undermentioned conditions.

| <b>Plan Name</b>                             | <b>Plan Number</b> | <b>Rev</b> | <b>Date</b> | <b>Prepared By</b> |
|----------------------------------------------|--------------------|------------|-------------|--------------------|
| Location Plan                                | P513-DA-01         | D          | 23/09/2019  | PTI Architecture   |
| Site Plan                                    | P513-DA-03         | J          | 23/09/2019  | PTI Architecture   |
| Detailed Shed Plan                           | P513-DA-04         | E          | 23/09/2019  | PTI Architecture   |
| Detailed Site Plan (Part A)                  | P513-DA-05         | N          | 23/09/2019  | PTI Architecture   |
| Detailed Site Plan (Part B)                  | P513-DA-06         | J          | 23/09/2019  | PTI Architecture   |
| Shed Amenities Floor Plans                   | P513-DA-07         | B          | 23/09/2019  | PTI Architecture   |
| Processing Shed Elevations                   | P513-DA-08         | E          | 23/09/2019  | PTI Architecture   |
| Section thru Processing Shed                 | P513-DA-09         | C          | 23/09/2019  | PTI Architecture   |
| Section thru Stockpile Bunker                | P513-DA-10         | G          | 23/09/2019  | PTI Architecture   |
| New Office Building Ground Floor Plan        | P513-DA-11         | C          | 23/09/2019  | PTI Architecture   |
| New Office Building Elevations East & West   | P513-DA-12         | C          | 23/09/2019  | PTI Architecture   |
| New Office Building Elevations North & South | P513-DA-13         | C          | 23/09/2019  | PTI Architecture   |
| Truck Entry Driveway Ramp Sections           | P513-DA-14         | B          | 23/09/2019  | PTI Architecture   |
| Staff Carpark Driveway Ramp Sections         | P513-DA-15         | B          | 23/09/2019  | PTI Architecture   |

|                                          |            |   |            |                      |
|------------------------------------------|------------|---|------------|----------------------|
| Fence Elevations for Acoustic            | P513-DA-16 | B | 23/09/2019 | PTI Architecture     |
| Fence Elevations for Acoustic            | P513-DA-17 | B | 23/09/2019 | PTI Architecture     |
| Visual Impact Assessment – Location Plan | P513-DA-18 | C | 23/09/2019 | PTI Architecture     |
| Visual Impact Assessment – View 1        | P513-DA-19 | C | 23/09/2019 | PTI Architecture     |
| Visual Impact Assessment – View 2        | P513-DA-20 | C | 23/09/2019 | PTI Architecture     |
| Visual Impact Assessment – View 3        | P513-DA-21 | C | 23/09/2019 | PTI Architecture     |
| Visual Impact Assessment – View 4        | P513-DA-22 | C | 23/09/2019 | PTI Architecture     |
| Visual Impact Assessment – View 5        | P513-DA-23 | C | 23/09/2019 | PTI Architecture     |
| Visual Impact Assessment – View 6        | P513-DA-24 | C | 23/09/2019 | PTI Architecture     |
| Sediment Control Plan                    | D1-17-040  | C | 11/09/2019 | TOP Consulting Group |
| Stormwater Pit Collection                | D2-17-040  | B | 06/09/2019 | TOP Consulting Group |
| Stormwater Plan                          | D3-17-040  | B | 06/09/2019 | TOP Consulting Group |
| Roof Stormwater Plan                     | D4-17-040  | B | 06/09/2019 | TOP Consulting Group |
| Leachate Collection Plan                 | D5-17-040  | B | 06/09/2019 | TOP Consulting Group |
| Concrete Layout Plan                     | S1-17-040  | B | 06/09/2019 | TOP Consulting Group |

| <b>Report Name</b>                                                                                                       | <b>Date</b>   | <b>Reference</b> | <b>Prepared By</b>         |
|--------------------------------------------------------------------------------------------------------------------------|---------------|------------------|----------------------------|
| Environmental Impact Statement, including Appendices (and revisions):                                                    | 22/03/2018    | 1771127-EIS-Rev2 | Benbow Environmental       |
| 2. Geotechnical Investigation, Preliminary Acid Sulfate Soils Assessment, Salinity Assessment, and Wastewater Assessment | December 2018 | 17/3905 A        | STS Geo-Environmental      |
| 3. Stormwater Management Plan and Report                                                                                 | 17/01/2019    | 2017/01          | Ultramark                  |
| 4. Traffic Impact Assessment Report                                                                                      | February 2018 | 17149r           | Transport & Urban Planning |

|                                                                       |                |                      |                                  |
|-----------------------------------------------------------------------|----------------|----------------------|----------------------------------|
| 5. Waste Management Plan                                              | February 2018  | 171127-WMP-Rev1      | Benbow Environmental             |
| 6. Air Quality Impact Assessment                                      | February 2018  | 171127-AQIA-Rev3     | Benbow Environmental             |
| 7. Community Consultation Leaflet                                     | February 2018  | -                    | Benbow Environmental             |
| 9. Flora & Fauna Survey and Impact Assessment                         | March 2018     | 55 Martin Road       | Ecological Consultants Australia |
| 10. Arboriculture Impact Assessment Report                            | 13/03/2018     | Revision B           | Glenyss Laws                     |
| 11. Preliminary Site Investigation                                    | January 2018   | 18/0089              | STS Geo-Environmental            |
| 13. Landscaping Plan                                                  | December 2018  | 55 Martin Road       | Ecological Consultants Australia |
| Addendum to the Environmental impact Statement, including Appendices: | 24/09/2019     | 18580 Rev. 1         | Benbow Environmental             |
| D. Architectural Plans and Visual Impact Assessment                   | (see above)    |                      |                                  |
| E. Landscaping Plan Updates                                           | September 2019 | 55 Martin Road       | Ecological Consultants Australia |
| F. Civil and Stormwater Plans                                         | (see above)    |                      |                                  |
| G. Traffic Impact Letter                                              | 29/08/2019     | 19115L1              | Transport & Urban Planning       |
| H. Noise Impact Assessment                                            | September 2019 | 191238-NIA-Rev3      | Benbow Environmental             |
| I. Air Quality Statement Letter                                       | 13/09/2019     | EH/snb               | Benbow Environmental             |
| J. Revised Stormwater Management Letter                               | 24/09/2019     | 2017-01              | Ultramark                        |
| Construction Noise and Vibration Management Plan                      | December 2018  | 171127-02-CNVMP-Rev3 | Benbow Environmental             |
| Response to Submissions                                               | 18/07/2018     | 55 Martin Road       | Claron Consulting                |
| Response to Matters Raised                                            | 06/12/2018     | 55 Martin Road       | Claron Consulting                |

### **General Terms of Approval (amended under DA-263/2019/A)**

2. All the General Terms of Approval issued by NSW Environmental Protection Authority (EPA) shall be complied with prior, during, and at the completion of construction, as required in accordance with the General Terms of Approval dated 2 December 2019. A copy of the General Terms of Approval is attached to this decision notice.

### **RMS Conditions**

3. The swept path of the longest vehicle (including garbage trucks, building maintenance vehicles and removalists) entering and exiting the subject site, as well as manoeuvrability through the site, shall be in accordance with AUSTROADS. In this regard, a plan shall be submitted to Council for approval, which shows that the proposed development complies with this requirement.
4. The layout of the proposed car parking areas associated with the subject development (including, driveways, grades, turn paths, sight distance requirements in relation to landscaping and/or fencing, aisle widths, aisle lengths, and parking bay dimensions) should be in accordance with AS 2890.1- 2004, AS2890.6-2009 and AS 2890.2 – 2002 for heavy vehicle usage. Parking Restrictions may be required to maintain the required sight distances at the driveway.
5. All vehicles are to enter and exit the site in a forward direction.
6. All vehicles are to be wholly contained within the site before being required to stop.

### **Works at no cost to Council**

7. All roadworks, drainage works and dedications, required to effect the consented development shall be undertaken at no cost to Liverpool City Council.

## **B. PRIOR TO ISSUE OF A CONSTRUCTION CERTIFICATE**

**The following conditions are to be complied with or addressed prior to issue of a Construction Certificate by the Principal Certifying Authority:**

### **Comply with EP&A Act**

8. The requirements and provisions of the *Environmental Planning & Assessment Act 1979* and *Environmental Planning & Assessment Regulation 2000*, must be fully complied with at all times.

Failure to comply with these legislative requirements is an offence and may result in the commencement of legal proceedings, issuing of 'on-the-spot' penalty infringements or service of a notice and order by Council.

### **Prescribed condition**

9. In accordance with Section 4.17(11) of the *Environmental Planning & Assessment Act 1979* and clause 98 of the *Environmental Planning & Assessment Regulation 2000*, it is a prescribed condition that all building work must be carried out in accordance with the applicable Performance Requirements of the *National Construction Code*. Compliance with the Performance Requirements can only be achieved by:

- a) Complying with the Deemed to Satisfy Provisions, or
- b) Formulating an Alternative Solution, which complies with the Performance Requirements or is shown to be at least equivalent to the Deemed to Satisfy Provision, or a combination of (a) and (b).

### **Provision of Services**

10. An application to obtain a Section 73 Compliance Certificate under the Sydney Water Act 1994, must be lodged with Sydney Water. To facilitate this, an application must be made through an authorised Water Servicing Coordinator. Please refer to the “building and developing” section of Sydney Water’s web site at [www.sydneywater.com.au](http://www.sydneywater.com.au), or telephone 13 20 92.

Following receipt of the application, a ‘Notice of Requirements’ will detail water and sewer extensions to be built and charges to be paid. Please make early contact with the Coordinator, since building of water/sewer extensions can be time consuming and may impact on other services and building, driveway or landscape design. A copy of the ‘Notice of Requirements’ must be submitted to the PCA.

11. Written clearance from Endeavour Energy, stating that electrical services have been made available to the development or that arrangements have been entered into for the provision of services to the development must be submitted to the PCA.
12. Prior to the issue of a Construction Certificate, the Principal Certifying Authority shall be satisfied that telecommunications infrastructure may be installed to service the premises which complies with the following:
  - The requirements of the Telecommunications Act 1997:
    - For a fibre ready facility, the NBN Co’s standard specifications current at the time of installation; and
    - For a line that is to connect a lot to telecommunications infrastructure external to the premises, the line shall be located underground.

Unless otherwise stipulated by telecommunications legislation at the time of construction, the development must be provided with all necessary pits and pipes, and conduits to accommodate the future connection of optic fibre technology telecommunications.

13. Written approval must be gained from Transgrid stating they have reviewed the proposed engineering design plans and that they consent to the issue of a CC by the PCA.

### **Fee Payments**

14. Unless otherwise prescribed by this consent, all relevant fees or charges must be paid. Where Council does not collect these payments, copies of receipts must be provided. For the calculation of payments such as Long Service Levy, the payment must be based on the value specified with the Development Application/Construction Certificate.

The following fees are applicable and payable:

- a) Damage Inspection Fee – relevant where the cost of building work is \$20,000 or more, or a swimming pool is to be excavated by machinery,
- b) Fee associated with Application for Permit to Carry Out Work Within a Road, Park and Drainage Reserve, and
- c) Long Service Levy payment is applicable on building work having a value of \$25,000 or more, at the rate of 0.35% of the cost of the works. The required Long Service Levy payment, under the *Building and Construction Industry Long Service Payments Act 1986*, is to be forwarded to the Long Service Levy Corporation or the Council, prior to the issuing of a Construction Certificate, in accordance with Section 6.8 of the *Environmental Planning & Assessment Act 1979*.

These fees are reviewed annually and will be calculated accordingly.

- 15. All fees associated with a road opening permit required for the connection, extension or amplification of any services within Council's road reserve must be paid to Council and receipts provided to the PCA. A separate form must be submitted in conjunction with payment of the fees. The fees include the standard road opening permit fee and any restoration fees that may be required as a result of the works.

#### **Substation**

- 16. Should an Electrical Substation be required and should this be located outside the building envelope, the location and any associated fire separation walls must comply with Integral Energy Substation Design Instruction Document No SDI 104 (Current Version).

#### **Access**

- 17. Access must be provided to the building for people with a disability in accordance with the relevant requirements of the Building Code of Australia, Disability (Access to Premises – Buildings) Standard 2010 and Australian Standard – AS1428.1 (2009), Design for Access and Mobility – General requirements for new building work, to the satisfaction of the Certifying Authority.

#### **Cladding**

- 18. Prior to issue of a construction certificate the certifier must be satisfied that all proposed attachments, cladding material and systems forming part of external walls comply with the NCC BCA and relevant Australian Standards. The certifier must be able to demonstrate compliance with evidence of suitability as per clause A2.2 of the BCA for all products/systems proposed.

#### **On-Site Sewerage Management System**

- 19. An application for Approval to Install an On-site Sewage Management System pursuant to Section 68 of the *Local Government Act* is to be submitted to Council for consideration and approval. The application is to be accompanied by a Waste Water Report prepared by a suitably qualified consultant, specifications of the proposed system and NSW Health accreditation details of proposed system.

## **Recommendations of Acoustic Report (amended under DA-263/2019/A)**

20. The recommendations provided within the Noise Impact Assessment for AMJ Demolition and Excavation 55 Martin Road, Badgerys Creek (Report no. 191238-NIA-Rev3) prepared by Benbow Environmental dated September 2019 and the Construction Noise and Vibration Management Plan 55 Martin Road Badgerys Creek (Report no. 171127-02\_CNVMP\_Rev3) prepared by Benbow Environmental dated December 2018 are to be complied with. This includes, but is not limited to:
- A 2.1m colourbond fence to be constructed surrounding the perimeter of the site.
  - The front end loader is to have a sound power level of 97 dB (A) or lower.
  - Pedestrian doors are to be self-closing
  - Crusher/s, generator/s, screen/s and excavator/s are restricted to indoors only.
  - When either crusher or excavator is operating, one roller shutter door is to be open for only 3 minutes out of a 15minute scenario.
  - Automated roller shutter doors be installed
  - Roller shutters selected should be for their acoustic performance with regards to minimising breakout noise and minimising noise generated from opening and closing operations
  - Mobile equipment regularly used onsite such as excavators and front end loaders are to be fitted with reversing lights or a white noise reversing alarm

## **Special Infrastructure Contribution**

21. The applicant is to make a special infrastructure contribution in accordance with any determination made by the Minister administering the *Environmental Planning and Assessment Act 1979* under Section 7.23 of that Act and is in force on the date of this consent, and must obtain a certificate to that effect from the Department of Planning (Growth Centres Commission) before a Construction Certificate is issued in relation to any part of the development to which this consent relates.

## **S138 Roads Act – Minor Works in the public road**

22. Prior to the issue of a Construction Certificate a S138 Roads Act application/s, including payment of fees shall be lodged with Liverpool City Council, as the Roads Authority for any works required in a public road. These works may include but are not limited to:
- Vehicular crossings (including kerb reinstatement of redundant vehicular crossings)
  - Road opening for utilities and stormwater (including stormwater connection to Council infrastructure)
  - Road occupancy or road closures

All works shall be carried out in accordance with the Roads Act approval, the development consent including the stamped approved plans, and Liverpool City Council's specifications.

Note: Approvals may also be required from the Roads and Maritime Service (RMS) for classified roads.

### **S138 Roads Act – Stormwater drainage works**

23. Prior to the issue of a Construction Certificate, the Principal Certifying Authority and/ or Certifying Authority shall ensure that an application under Section 68 of the *Local Government Act*, including the payment of application and inspection fees, has been lodged with, and approved by Liverpool City Council for easement relocation.

Engineering plans are to be prepared in accordance with the development consent, Liverpool City Council's Design Guidelines and Construction Specification for Civil Works and best engineering practice.

### **On-Site Detention (amended under DA-263/2019/A)**

24. On-Site Detention shall be provided generally in accordance with the concept plan/s lodged for development approval, prepared by T.O.P Consulting Group Pty Ltd, reference number 17-040, revision B, dated 06/09/2019.

The proposed development and stormwater drainage system shall be designed to ensure that stormwater runoff from upstream properties is conveyed through the site without adverse impact on the development or adjoining properties.

Engineering plans and supporting calculations for the on-site detention system are to be prepared by a suitably qualified person and shall accompany the application for a Construction Certificate.

Prior to the issue of a Construction Certificate the Certifying Authority shall ensure that the on-site detention system has been designed in accordance with Liverpool City Council's Design Guidelines and Liverpool City Council's On-Site Stormwater Detention policy and Technical Specification.

25. Subject to a detailed hydraulic assessment; detail onsite detention must be provided in accordance with Council's Onsite Detention (OSD) Policy and Construction Specification and to Council's satisfaction. Details are to be included with any application for a Construction Certificate. The proposed development and stormwater drainage system shall be designed to ensure that stormwater runoff from upstream properties is conveyed through the site without adverse impact on the development or adjoining properties.

### **Water Quality**

26. Prior to the issue of a Construction Certificate the Certifying Authority shall ensure that details of a stormwater pre-treatment system have been provided on the stormwater plans and that the design meets pollutant retention criteria in accordance Council's Development Control Plan.

The Construction Certificate must be supported by:

- Specification & installation details of the stormwater pre-treatment system
- The approval of an operation and maintenance manual/ schedule for the stormwater pre-treatment system

A copy of the approved operation and maintenance manual/ schedule shall be submitted to Liverpool City Council with notification of the Construction Certificate issue.

### **Water Pollution Control Measures**

27. Detailed specifications, floor and section plans for the proposal shall be submitted to the Principal Certifying Authority for review and approval prior to the issue of a Construction Certificate. The plans to be submitted with the application for the Construction Certificate shall make provision for the following:
  - Trafficable bunds shall be installed at the entry and exits of the batching house building, storage facilities and wash bays to contain all substances and prevent ingress of stormwater, and
  - The location of spill kits, stormwater pits and stormwater drainage infrastructure.

### **Traffic Management Plan**

28. A traffic management plan is to be submitted to Liverpool City Council's Traffic Committee for approval. Works within the road reserve shall not commence until the traffic management plan has been approved.

The traffic management plan is to be prepared by an accredited designer and submitted to and stamp approved by Council via a standard Section 138 Roads Act Permit application available at Council's customer service counter. The stamped approved Roads Act Permit is to be obtained by the PCA. A copy of the stamped approved Roads Act Permit and traffic management plan is to be available on the works site for inspection at any time by an authorised Council officer.

### **Traffic**

29. Detail design drawings of access driveways, parking facilities and any required road improvements will have to be submitted to Traffic and Transport Section for review and endorse. The designs which will also include swept path analysis will have to be in accordance with Council's and Austroads design guidelines and should take into account heavy vehicles. Line marking and signage to be incorporated with the road design for the development.
30. Prior to the issue of a Construction Certificate the Certifying Authority shall ensure that vehicular access, circulation, manoeuvring, pedestrian and parking areas associated with the subject development are in accordance with AS 2890.1, AS2890.2, AS2890.6 and Liverpool City Council's Development Control Plan.
31. The developer shall provide an appropriate level of lighting to the vehicular entry and exit location.
32. The access driveway along Martin Road must be designed to cater for heavy rigid vehicles in accordance with AS 2890.2 – 2002.

## **Construction Environmental Management Plan**

33. Prior to issue of a construction certificate, a Construction Environmental Management Plan (CEMP) for the development must be provided to the Principal Certifying Authority for approval. The environmental site management measures must remain in place and be maintained throughout the period of the development. The CEMP must address all environmental aspects of the development's construction phases, and include, where relevant, but not be limited to, the following:
- a) Asbestos Management Plan;
  - b) Project Contact Information;
  - c) Site Security Details;
  - d) Timing and Sequencing Information;
  - e) Site Soil and Water Management Plan;
  - f) Noise and Vibration Control Plan;
  - g) Dust Control Plan;
  - h) Air Monitoring;
  - i) Odour Control Plan;
  - j) Health and Safety Plan;
  - k) Waste Management Plan;
  - l) Incident management Contingency; and
  - m) Unexpected Finds Protocol.

The CEMP must be kept on site for the duration of the works and must be made available to Council Officers upon request.

## **Retaining walls on Boundaries**

34. All retaining walls shall be of masonry construction and must be wholly within the property boundary, including footings and agricultural drainage lines. Construction of retaining walls or associated drainage works along common boundaries shall not compromise the structural integrity of any existing structures.

Where a retaining wall exceeds 600mm in height, the wall shall be designed by a practicing structural engineer and a construction certificate must be obtained prior to commencement of works on the retaining wall.

## **No loading on easements**

35. Prior to the issue of a Construction Certificate the Certifying Authority shall ensure that the foundations of proposed structures adjoining the drainage and/ or services easement have been designed clear of the zone of influence.

## **Dilapidation report**

36. Prior to the Commencement of Works a dilapidation report of all infrastructure fronting the development in Martin Road and Lawson Road is to be submitted to Liverpool City Council. The report is to include, but not limited to, the road pavement, kerb and gutter, footpath, services and street trees and is to extend 100m either side of the development.

## **C. PRIOR TO WORKS COMMENCING**

**The following conditions are to be complied with or addressed prior to works commencing on the subject site/s:**

### **Construction Certificates**

37. Building work shall not commence prior to the issue of a Construction Certificate. Building work as defined under Section 4 of the EP&A Act means any physical activity involved in the erection of a building and includes but is not limited to, the placement of any site shed/s or builders facilities, site grading, retaining walls, excavation, cutting trenches, installing formwork and steel reinforcement or, placing of plumbing lines.
38. Prior to the commencement of any building works, the following requirements must be complied with:
  - a) Construction Certificate must be obtained from the Council or an Accredited Certifier, in accordance with the provisions of the *Environmental Planning & Assessment Act 1979*,
  - b) Where a Construction Certificate is obtained from an Accredited Certifier, the applicant shall advise Council of the name, address and contact number of the Accredited Certifier, in accordance with Section 4.19, 6.6, 6.7, 6.12, 6.13, 6.14 of the Act,
  - c) A copy of the Construction Certificate, the approved development consent plans and consent conditions must be kept on the site at all times and be made available to the Council officers and all building contractors for assessment,
  - d) A Principal Certifying Authority (PCA) must be appointed to carry out the necessary building inspections and to issue an occupation certificate, and
  - e) The PCA must advise Council of the intended date to commence work which is the subject of this consent by completing a notice of commencement of building works or subdivision works form, available from Council's Customer Service Centre. A minimum period of two (2) working days' notice must be given.

### **Notification/Principal Certifying Authority**

39. The PCA must advise Council of the intended date to commence work which is the subject of this consent by completing a notice of commencement of building works or subdivision works form, available from Council's Customer Service Centre. A minimum period of two (2) working days' notice must be given.
40. Written notice of intention shall be given to the owner of the adjoining allotments of land, outlining the particulars of the proposed work, which involves:
  - (a) Any excavation, below the base of the footings of a building on an adjoining allotment of land.
  - (b) The notice shall be given seven (7) days prior to the commencement of work.

### **Notification**

41. The certifying authority must advise Council, in writing of:
- (a) The name and contractor licence number of the licensee who has contracted to do or intends to do the work, or
  - (b) The name and permit of the owner-builder who intends to do the work.

If these arrangements are changed, or if a contract is entered into for the work to be done by a different licensee, Council must be immediately informed.

### **Notification of Service Providers**

42. The approved development must be approved through the 'Sydney Water Tap in' service to determine whether the development will affect any Sydney Water wastewater and water mains, stormwater drains and/or easements, and if any requirements need to be met. A receipt must be provided to Council.

Please refer to the website [www.sydneywater.com.au](http://www.sydneywater.com.au) for more information.

### **Dial Before You Dig**

43. Underground assets may exist in the area that is subject to your application. In the interest of health and safety and in order to protect damage to third party assets please contact Dial before you dig at [www.1100.com.au](http://www.1100.com.au) or telephone 1100 before excavating or erecting structures (This is the law in NSW). If alterations are required to the configuration, size, form or design of the development upon contact the Dial before You Dig service, an amendment to the development consent (or a new development application) may be necessary. Individuals owe asset owners a duty of care that must be observed when working in the vicinity of plant or assets. It is the individual's responsibility to anticipate and request the nominal location of plant or assets on the relevant property via contacting the Dial before you dig service in advance of any construction or planning activities.

### **Sediment & Erosion Control**

44. Prior to commencement of works sediment and erosion control measures shall be installed in accordance with the approved Construction Certificate and to ensure compliance with the *Protection of the Environment Operations Act 1997* and Landcom's publication "*Managing Urban Stormwater – Soils and Construction (2004)*" – also known as "The Blue Book".

The erosion and sediment control measures shall remain in place and be maintained until all disturbed areas have been rehabilitated and stabilised.

## **D. DURING CONSTRUCTION**

The following conditions are to be complied with or addressed during construction:

## **Building work**

45. The building works must be inspected by the Principal Certifying Authority, in accordance with Sections 6.5 (3) of the *Environmental Planning & Assessment Act 1979* and Clause 162A of the *Environmental Planning & Assessment Regulation 2000*, to monitor compliance with the relevant standards of construction, Council's development consent and the construction certificate.
46. The *Principal Certifying Authority* (PCA) must specify the relevant stages of construction to be inspected and a satisfactory inspection must be carried out, to the satisfaction of the PCA, prior to proceeding to the subsequent stages of construction or finalisation of the works.
47. The building and external walls are not to proceed past ground floor/reinforcing steel level until such time as the PCA has been supplied with an identification survey report prepared by a registered surveyor certifying that the floor levels and external wall locations to be constructed, comply with the approved plans, finished floor levels and setbacks to boundary/boundaries. The slab shall not be poured, nor works continue, until the PCA has advised the builder/developer that the floor level and external wall setback details shown on the submitted survey are satisfactory.

In the event that Council is not the PCA, a copy of the survey shall be provided to Council within three (3) working days.

48. On placement of the concrete, works again shall not continue until the PCA has issued a certificate stating that the condition of the approval has been complied with and that the slab has been poured at the approved levels.

## **Signage**

49. A sign must be erected in a prominent position on the premises on which work is to be carried out. The sign is to be maintained during work, and removed at the completion of work. The sign must state:
  - a) the name, address and telephone number of the principal certifying authority for the work,
  - b) the name of the principal contractor (if any) for any building work and a telephone number on which that person may be contacted outside working hours, and
  - c) unauthorised entry to the premises is prohibited.

## **Excavation**

50. In the event the development involves an excavation that extends below the level of the base of the footings of a building, structure or work (including any structure or work within a road or rail corridor) on adjoining land, the person having the benefit of the development consent must, at the person's own expense:
  - a) protect and support the adjoining premises from possible damage from the excavation,

- b) where necessary, underpin the adjoining premises to prevent any such damage, and
- c) a and b above does not apply if the person having the benefit of the development consent owns the adjoining land or the owner of the adjoining land has given consent in writing to that condition not applying.
- d) retaining walls or other approved methods necessary to prevent the movement of excavated or filled ground, together with associated subsoil drainage and surface stormwater drainage measures, shall be designed strictly in accordance with the manufacturers details or by a practising structural engineer.

### **Toilet facilities**

51. Toilet facilities must be available or provided at the work site and must be maintained until the works are completed at a ratio of one toilet plus one additional toilet for every 20 persons employed at the site. Each toilet must:
- a) be a standard flushing toilet connected to a public sewer, or
  - b) have an on-site effluent disposal system approved under the *Local Government Act 1993*, or
  - c) be a temporary chemical closet approved under the *Local Government Act 1993*.

### **Craning and Hoardings**

52. Lifting or craning materials over a public footway or roadway is not permitted unless a "B" class construction hoarding has been installed in compliance with work cover authority requirements.
53. If the work is likely to cause pedestrian or vehicular traffic in a public area to be obstructed or rendered inconvenient; or if craning of materials is to occur across a public or road reserve area, a separate Road Occupancy Certificate and/or Hoarding approval must be obtained from Liverpool City Council prior to undertaking the works.

### **Security Fence**

54. A temporary security fence to WorkCover Authority requirements is to be provided to the property during the course of construction.

Note. Fencing is not to be located on Council's reserve area.

### **Refuse Disposal**

55. Adequate refuse disposal methods and builders storage facilities shall be installed on the site. Builders' wastes, materials or sheds are not to be placed on any property other than that which this approval relates to.

### **Aboriginal Cultural Heritage – Staff and Contractors**

56. All relevant on-site staff and contractors should be made aware of their statutory obligations for heritage under NSW National Parks and Wildlife Act 1974 and the NSW Heritage Act 1977. They are to be informed of what the potential heritage on the site will be and its significance. The site supervisor is to maintain a record of who has completed the heritage induction and this is to be provided to Council prior to Issue of Occupation Certificate.

### **Aboriginal Cultural Heritage – Unexpected Finds**

57. As required by the *National Parks and Wildlife Service Act 1974* and the *Heritage Act 1977*, in the event that Aboriginal cultural heritage or historical cultural fabric or deposits are encountered/discovered where they are not expected, works must cease immediately and Council and the Heritage Division of the Office of Environment and Heritage (OEH) must be notified of the discovery.

In the event that archaeological resources are encountered, further archaeological work may be required before works can re-commence, including the statutory requirement under the Heritage Act 1977 to obtain the necessary approvals/permits from the Heritage Division of the OEH.

Note: The National Parks and Wildlife Service Act 1974 and the Heritage Act 1977 impose substantial penalty infringements and / or imprisonment for the unauthorised destruction of archaeological resources, regardless of whether or not such archaeological resources are known to exist on the site.

### **Skeletal Remains**

58. In the event that skeletal remains are uncovered, work must cease immediately in that area and the area secured. NSW Police must be contacted and no further action taken until written advice has been provided by the NSW Police. If the remains are determined to be of Aboriginal origin, the Office of Environment and Heritage must be notified by ringing the Enviroline 131 555 and a management plan prior to works re-commencing must be developed in consultation with relevant Aboriginal stakeholders.

### **Hours of Construction Work and Deliveries**

59. Construction work/civil work/demolition work, including the delivery of materials, is only permitted on the site between the hours of 7:00am to 6:00pm Monday to Friday and 8:00am to 1:00pm Saturday. No work will be permitted on Sundays or Public Holidays, unless otherwise approved by Council.

### **Sediment**

60. The development, including construction, shall not result in any increase in sediment deposition into any water body, wetland, bushland or environmentally significant land.

### **Removal of dangerous/hazardous waste**

61. All dangerous and/or hazardous material shall be removed by a suitably qualified and experienced contractor licensed by SafeWork NSW. The removal of such material shall be carried out in accordance with the requirements of SafeWork NSW and the material shall be transported and disposed of in accordance with NSW Environment Protection Authority requirements

### **Car Parking Areas**

62. Car parking spaces and driveways must be constructed of a minimum of two coat finish seal or better. The spaces must be clear of obstructions and columns, permanently line marked and provided with adequate manoeuvring facilities. The design of these spaces must comply with Council's DCP 2008, and Australian Standard 2890.1 Parking Facilities – Off Street Car Parking.

All car parking areas to be appropriately line marked and sign posted in accordance with the approved plans. All customer/visitor/staff parking areas are to be clearly signposted limiting car parking for customers/visitors/staff only. The applicant is to cover the costs of installation and maintenance of the signage.

The on-site parking spaces shown in the approved plans must be identified in accordance with A.S.2890.1 Parking Facilities – Off-Street Car Parking.

### **Traffic Management**

63. All works within the road reserve are to be at the applicant cost and all signage is to be in accordance with the RTA's Traffic Control at Worksites Manual and the RTA's Interim Guide to Signs and Markings.
64. If a Works Zone is required, an application is to be made to Council's Traffic & Transport Section for approval. The application form can be found at <https://www.liverpool.nsw.gov.au/council/Fees-Forms-Policies-and-Enforcement/forms>
65. Applications must be made to Council's Traffic & Transport Section for temporary road closures. Applications prepared by a suitably qualified person, are to specify the date and times of proposed closures, traffic control plans, insurances and any other relevant information. This activity may require a seven (7) days advance notice to be installed near the site and/or advertisement in local newspapers and websites to Council's satisfaction.

### **Vegetation**

66. All existing trees and areas of native vegetation not identified for removal on approved plans of the proposed development shall be protected from damage during site works. This protection shall consist of 1800mm high protective fencing, securely installed beneath the outer canopy of any tree to be retained. Trees may be fenced off in clusters where it is not practical to fence off individual trees. There shall be no storing materials, washing machinery or changes to existing soil levels within the fenced areas.
67. Any works or activities shall adhere to the recommendations outlined in the approved Flora and Fauna Report prepared for the site.

68. No known environmental or noxious weeds or known invasive plant species shall be included in the landscaping/revegetation.
69. Mulch generated from exotic trees or other weed species cleared shall not be used on site. It shall be removed from the site and disposed of appropriately and in accordance with legislative requirements.

### ***Landscaping Works***

70. Planting is to be carried out generally in accordance with the Council approved landscaping proposal with reference to planting locations/ planting densities and general landscaping site management. Species chosen for planting shall be consistent with naturally occurring species of the surrounding area ie Cumberland Plain Bushland species. All landscaping work is to be overseen by a suitably qualified expert holding appropriate qualifications in bush regenerations and horticulture.

### **Imported Fill**

71. Filling material must be limited to the following:
  - a) Virgin excavated natural material (VENM)
  - b) Excavated natural material (ENM) certified as such in accordance with *Protection of the Environment Operations (Waste) Regulation 2014*; and/or
  - c) Material subject to a Waste Exemption under Clause 91 and 92 *Protection of the Environment Operations (Waste) Regulation 2014* and recognised by the NSW Environment Protection Authority as being “fit for purpose” with respect to the development subject of this application.

Certificates proving that the material imported is ENM or VENM must be provided to the Principal Certifying Authority prior to filling. Certificates are to be provided to Council officers if and when requested.

Fill imported on to the site must be compatible with the existing soil characteristic for site drainage purposes.

72. Records of the following must be submitted to the principal certifying authority monthly and at the completion of earth works:
  - (a) The course (including the address and owner of the source site), nature and quantity of all incoming loads including the date, the name of the carrier, and the vehicle registration;
  - (b) The results of a preliminary contamination assessment carried out on any fill material used in the development.
  - (c) The results of any chemical testing of fill material.

### **Unidentified contamination**

73. Any new information which comes to light during remediation, demolition or construction works which has the potential to alter previous conclusions about site contamination and remediation must be immediately notified to Council and the Principal Certifying Authority in writing.

A Section 4.55 Application under the EP&A Act shall be made for any proposed works outside the scope of the approved development consent.

### **Air Quality**

74. Dust screens shall be erected and maintained in good repair around the perimeter of the subject land during land clearing, demolition, and construction works.
75. Where operations involve excavation, filling or grading of land, or removal of vegetation, including ground cover, dust is to be suppressed by regular watering until such time as the soil is stabilised to prevent airborne dust transport. Where wind velocity exceeds five knots the PCA may direct that such work is not to proceed.
76. All vehicles involved in the delivery, demolition or construction process departing from the property shall have their loads fully covered before entering the public roadway.

### **Water quality**

77. All topsoil, sand, aggregate, spoil or any other material shall be stored clear of any drainage line, easement, water body, stormwater drain, footpath, kerb or road surface and there shall be measures in place in accordance with the approved erosion and sediment control plan.

### **Pollution Control**

78. Building operations such as brick cutting, mixing mortar and the washing of tools, paint brushes, form-work, concrete trucks and the like shall not be performed on the public footway or any other locations which may lead to water pollution.
79. The loading and unloading of all vehicles associated with the development must be undertaken within the property boundary of the premises subject to this consent.

Measures must be implemented to prevent tracking of sediment by vehicles onto roads.

Vehicle loads must be covered when entering and exiting the site with material.

### **Erosion and sediment control**

80. All disturbed areas shall be progressively stabilised and/or revegetated so that no areas remain exposed to potential erosion damage for a period of greater than 14 days.

81. Erosion and sediment control measures shall remain in place and be maintained until all disturbed areas have been rehabilitated and stabilised.
82. Sediment and erosion control measures are to be adequately maintained during the works until the establishment of grass.
83. Vehicular access to the site shall be controlled through the installation of wash down bays or shaker ramps to prevent tracking of sediment or dirt onto adjoining roadways. Where any sediment is deposited on adjoining roadways is shall be removed by means other than washing. All material is to be removed as soon as possible and the collected material is to be disposed of in a manner which will prevent its mobilisation.

#### **Construction noise and management plan**

84. The recommendations provided in the Construction Noise and Vibration Management Plan 55 Martin Road Badgerys Creek (Report no. 171127-02\_CNVMP\_Rev3) prepared by Benbow Environmental dated December 2018 are to be implemented and complied with throughout the construction phase.

### **E. PRIOR TO ISSUE OF OCCUPATION CERTIFICATE**

**The following conditions are to be complied with or addressed prior to issue of either an Interim or Final Occupation Certificate by the Principal Certifying Authority:**

#### **Certificates**

85. The premises must not be utilised until an Occupation Certificate is issued by the Principal Certifier. A single and complete Fire Safety Certificate certifying the operation of all of the fire safety measures within the building must be submitted to Council with the Occupation Certificate.
86. Details of *critical* stage inspections carried out by the principal certifying authority together with any other certification relied upon must be provided to Council with the occupation certificate.
87. A Section 73 Compliance Certificate under the *Sydney Water Act 1994* must be obtained for submission to the PCA prior to issue of Occupation Certificate
88. Prior to issuing an occupation certificate the principal certifier must be satisfied that suitable evidence has been provided to demonstrate that the external wall cladding material and system is consistent with the consent documentation, NCC and relevant Australian Standards.

#### **Environmental Protection Licence**

89. An Occupation Certificate shall not be issued for any part of the development until an Environment Protection Licence (EPL) is issued by the NSW Environment Protection Authority and a copy of the EPL has been provided to Council.

## **Landscaping**

90. Upon completion of the approved landscape works associated with the development and prior to the issue of any OC, an Implementation Report is to be submitted to the PCA attesting to the satisfactory completion of the landscape works in accordance with the approved landscape plan. The report is to be prepared by a suitably qualified person.

## **Recommendations of Acoustic Report**

91. A Compliance Certificate or other documentation deemed suitable demonstrating compliance with the following is to be submitted to the Principal Certifying Authority:
  - a) The building has been constructed to meet the relevant noise criteria's in accordance with the approved acoustic report; and
  - b) All recommendations within the approved acoustic report have been adopted.

## **Noise Management**

92. A Noise Management Plan and complaints handling procedure shall be prepared for the industry in consultation with a suitably qualified and experienced acoustic consultant. The Noise Management Plan is to incorporate the additional management practices as per the approved Noise Impact Assessment and Construction Noise and Vibration Management Plan, which include but are not limited to:
  - Prohibition of extended periods of revving/idling
  - Minimisation of the use of truck exhaust brakes onsite
  - Low onsite speed limits
  - Preventative maintenance program for onsite vehicles
  - Vehicles waiting to be loaded and unloaded shall be parked onsite with their engines off
  - Regularly train workers and contractors to use equipment in ways that minimise noise
  - Avoid the use of radios, stereos and speakers
  - Use of quieter equipment
  - Monitor vehicle movements to ensure recommended practices are being implemented
  - Appropriate complaints procedure
  - The front end loader is to have a sound power level of 97 dB (A) or lower.
  - Pedestrian doors are to be self-closing
  - Crusher/s, generator/s, screen/s and excavator/s are restricted to indoors only.
  - When either crusher or excavator is operating, one roller shutter door is to be open for only 3 minutes out of a 15minute scenario.
  - Automated roller shutter doors be installed
  - Roller shutters selected should be for their acoustic performance with regards to minimising breakout noise and minimising noise generated from opening and closing operations
  - Mobile equipment regularly used onsite such as excavators and front end loaders are to be fitted with reversing lights or a white noise reversing alarm

### **On-Site Sewerage Management System**

93. Prior to the issue of any OC an Approval to operate for the On-Site Sewerage Management System is to be issued by Council in accordance with Section 68 of the Local Government Act.

### **Liverpool City Council clearance – Roads Act/ Local Government Act**

94. Prior to the issue of an Occupation Certificate, the Principal Certifying Authority shall ensure that all works associated with a S138 Roads Act approval or S68 Local Government Act approval have been inspected and signed off by Liverpool City Council.

### **Works as executed – General**

95. Prior to the issue of an Occupation Certificate, works-as-executed drawings and compliance documentation shall be submitted to the Principal Certifying Authority in accordance with Liverpool City Council's Design Guidelines and Construction Specification for Civil Works.

An original set of works-as-executed drawings and copies of compliance documentation shall also be submitted to Liverpool City Council with notification of the issue of the Occupation Certificate where Council is not the Principal Certifying Authority.

### **Stormwater Compliance**

96. Prior to the issue of an Occupation Certificate the Principal Certifying Authority shall ensure that the:

- a) On-site detention system/s
- b) Stormwater pre-treatment system/s
- c) Overland flowpath works
  - Have been satisfactorily completed in accordance with the approved Construction Certificate and the requirements of this consent.
  - Have met the design intent with regard to any construction variations to the approved design.
  - Any remedial works required to been undertaken have been satisfactorily completed.

Details of the approved and constructed system/s shall be provided as part of the Works-As-Executed drawings.

### **Restriction as to User and Positive Covenant**

97. Prior to the issue of an Occupation Certificate a restriction as to user and positive covenant relating to the following shall be registered on the title of the property:

- a) On-site detention system/s
- b) Stormwater pre-treatment system/s
- c) Overland flowpath works

The restriction as to user and positive covenant shall be in Liverpool City Council's standard wording as detailed in Liverpool City Council's Design and Construction Guidelines and Construction Specification for Civil Works.

#### **Rectification of Damage**

98. Prior to the issue of an Occupation Certificate any damage to Council infrastructure not identified in the dilapidation report, as a result of the development shall be rectified at no cost to Liverpool City Council.

Any rectification works within Martin Road and Lawson Road will require a Roads Act application. The application is to be submitted and approved by Liverpool City Council prior to such works commencing.

#### **Dilapidation Report**

99. Any rectification works required by Council regarding the condition of Council infrastructure shall be undertaken, at full cost to the developer.

#### **Directional signage**

100. Prior to the issue of an Occupation Certificate, directional signage and linemarking shall be installed indicating directional movements and the location of customer parking to the satisfaction of the Principal Certifying Authority.

#### **Bonds**

101. A maintenance bond in the form of a bank Guarantee or cash bond (\$TBA), shall be lodged with Council prior to the issue of an Occupation Certificate. The bond shall cover maintenance and any damage to roads, drainage lines, public reserves or other council property or works required as a result of work not in accordance with Council's standards, and /or development consent conditions. The bond will be held by Council for a minimum period of 12 months from the date of Council acceptance of final works.

#### **Site to be concreted**

102. All areas to be trafficable by vehicles (being the area annotated with 'Concrete Driveway & Manoeuvring Area' and 'driveway', and the car spaces depicted on the plans prepared by 'PTI Architecture', Sheets DA 05 Revision N and DA 06 Revision J, dated 23/09/2019), are to be concreted to an appropriate engineering specification prior to the issuing of an Occupation Certificate.

## **G. CONDITIONS RELATING TO USE**

**The following conditions relate to the ongoing use of the premises:**

## **Occupational Health & Safety**

103. Within 3 months of the commencement of the activity, an Occupational Noise and Hygiene Assessment shall be completed and submitted for approval. This assessment shall be prepared in accordance with the *Work Health and Safety Act (2011)*, the *Work Health and Safety Regulation (2017)*, and *AS/NZS 1269.1:2005 (Occupational noise management—Measurement and assessment of noise emission and exposure)*, and should include an assessment of, but not limited to, the following:
- Inhalable Dust
  - Respirable Dust
  - Silica
  - Asbestos
104. The proposed operation of the resource recovery facility shall thereafter be conducted in accordance with the approved Occupational, Noise, Health, Air Quality and Hygiene Assessments.

## **Waste**

105. All waste soils and material(s), liquid and solid, to be removed from the site, excluding materials that can be recycled or reused in accordance with a Resource Recovery Order and/or exemption, must be analysed and classified by an appropriately qualified and certified consultant, in accordance with the *Protection of the Environment Operations (Waste) Regulation 2014* and related guidelines, in particular the *NSW EPA Waste Classification Guidelines*, prior to off-site disposal.

All Waste material(s) must be disposed of at an appropriately licensed waste facility for the specific waste. Receipts for the disposal of the waste must be submitted to the Principal Certifying Authority within 30 days of the waste being disposed of.

All waste must be transported by a contractor licenced to transport the specific waste, and in vehicles capable of carting the waste without spillage, and meeting relevant requirements and standards. All loads must be covered prior to vehicles leaving the site.

## **Car Parking/Loading**

106. A total of 13 off street car parking spaces must be provided in accordance with Council's relevant development control plan. 2 of the spaces must be designed and signposted/marked for the specific use of persons with a disability.
107. All parking areas shown on the approved plans must be used solely for this purpose.
108. The operator of the development must not permit the reversing of vehicles onto or away from the road reserve, with the exception of garbage and recycling collection vehicles. All vehicles must be driven forward onto and away from the development and adequate space must be provided and maintained on the land to permit all vehicles to turn in accordance with AS 2890.1 Parking Facilities – Off Street Car Parking.

### **Environment Protection License**

109. The use of the premises shall operate in accordance with the Environment Protection License issued by the NSW EPA.

### **EPA General terms of Approval (amended under DA-263/2019/A)**

110. The facility shall operate in accordance with the General Terms of Approval (Notice No. 1589160) issued by the NSW EPA. This includes, but is not limited to:
- Noise limits of 42 dB(A) (LAeq, 15minute) during the day at 40 & 65 Martin Road, 75 & 55 Lawson Road.
  - Noise Monitoring Report within 60 days of the commencement of operation
  - Use of water sprinklers and/or mist sprays in the enclosed building and outside undercover storage area so that no visible dust leaves the premises
  - Development of an Air Quality Management Plan.

### **Acoustic Report**

111. Within 60 days of commencement of the approved operation, an acoustic report is to be prepared by an appropriately qualified acoustic engineer independent of Benbow Environmental, including a test of the acoustic performance of the facility, with an assessment of all the equipment used in the yard and the processing equipment with the door of the building open. The approved use is to be suspended after that 60 day period until written confirmation by the acoustic engineer is provided to the Council confirming that the development complies with all relevant acoustic conditions.

### **Bunding**

112. All work and storage areas where spillage may occur shall be banded. The capacity of the banded area shall be calculated as being equal to 110% of the largest storage or process vessel/container in the area or 10% of the total volume of vessels/containers accommodated in the area, whichever is the greater.

All banded areas shall be graded to a blind sump or sewer to facilitate collection and disposal of wastewater in accordance with Sydney Water's requirements. All banded areas shall be suitably treated to prevent ingress of stormwater.

### **Air Quality**

113. All activities and operations shall not give rise to air pollution (including odour), offensive noise or pollution of land and/or water as defined under the *Protection of the Environment Operations Act 1997*.

### **Lighting**

114. Illumination of the site is to be arranged in accordance with the requirements and specifications of Australian Standard 4282:1997 so as not to impact upon the amenity of the occupants of adjoining and nearby premises.

### **Noise – Silent Alarm System**

115. Any alarm installed on the site is to be “silent back to base” type.

### **Offensive Noise – Acoustic Report**

116. The proposed use of the premises and/or machinery equipment must not create offensive noise so as to interfere with the amenity of the neighbouring properties. Should an offensive noise complaint be received and verified by Council an acoustic assessment is to be undertaken (by an appropriately qualified consultant, and an acoustic report is to be submitted to Liverpool City Council for review. Any noise attenuation recommendations approved by Council must be implemented. The assessment is to obtain relevant background readings for the approved Noise Impact Assessment.

### **Hours of Operation**

117. The hours of operation of the premises are limited to:
- Processing and delivery activities, as well as the movement, loading and unloading of trucks, and cleaning activities using mechanical equipment that is audible from any residential boundary:
    - o Monday to Friday 7:00am to 6:00pm
    - o Saturdays 8:00am to 1:00pm
    - o At no time on Sundays or Public Holidays
  - Administrative activities
    - o Monday to Friday 7:00am to 6:00pm
    - o Saturdays 8:00am to 5:00pm
    - o At no time on Sundays or Public Holidays

### **Storage of flammable and combustible liquids**

118. Flammable and combustible liquids shall be stored in accordance with AS 1940:2017– The Storage and Handling of Flammable and Combustible Liquids.

### **Landscaping**

119. Landscaping shall be maintained in accordance with the approved plan, in a healthy state and in perpetuity by the existing or future owners and occupiers of the development.

If any of the vegetation comprising the landscaping dies or is removed, it is to be replaced with vegetation of the same species, and similar maturity as the vegetation which has died or was removed.

An annual report shall be submitted to Council, for the 3 years following issue of the OC, certifying that the landscaping works have been satisfactorily maintained.

### **Industrial Use**

120. The premises must not be used for the display or sale of goods to the public (i.e., a shop).

## H. ADVISORY

- a) If you are dissatisfied with this notice of determination or the conditions contained within this notice of determination, Sections 8.2, 8.3, 8.4 and 8.5 of the Environmental Planning and Assessment Act 1979 gives you the right to request a review of the determination within six months after the date on which the application is taken to have been determined.
- b) If you are dissatisfied with this decision, Sections 8.7 and 8.10 of the Environmental Planning and Assessment Act 1979 gives you the right to appeal to the Land and Environment Court within six months after the date on which the application is taken to have been determined.
- c) In accordance with Section 4.53 of the Environmental Planning and Assessment Act 1979, unless otherwise stated by a condition of this consent, this consent will lapse unless the development is commenced within five (5) years of the date of this notice.
- d) The approval of this application does not imply or infer compliance with the Disability Discrimination Act and that the developer should investigate their liability under the Act.
- e) "DIAL BEFORE YOU DIG" DIAL 1100

Underground assets may exist in the area that is subject to your application. In the interest of health and safety and in order to protect damage to third party assets please contact Dial before you dig at [www.1100.com.au](http://www.1100.com.au) or telephone 1100 before excavating or erecting structures (This is the law in NSW). If alterations are required to the configuration, size, form or design of the development upon contact the Dial before You Dig service, an amendment to the development consent (or a new development application) may be necessary. Individuals owe asset owners a duty of care that must be observed when working in the vicinity of plant or assets. It is the individual's responsibility to anticipate and request the nominal location of plant or assets on the relevant property via contacting the Dial before you dig service in advance of any construction or planning activities.

- f) TELECOMMUNICATIONS ACT 1997 (COMMONWEALTH)

Telstra (and its authorised contractors) are the only companies that are permitted to conduct works on Telstra's network and assets. Any person interfering with a facility or installation owned by Telstra is committing an offence under the Criminal Code Act 1995 (Cth) and is liable for prosecution.

Furthermore, damage to Telstra's infrastructure may result in interruption to the provision of essential services and significant costs. If you are aware of any works or proposed works which may affect or impact on Telstra's assets in any way, you are required to contact: Telstra's Network Integrity Team on Phone Number 1800 810 443.

- g) The obligation to comply with the Category 1 fire safety provisions may require building work to be carried out even though none is proposed or required by other conditions of this consent.

- h) The Liverpool City Council Local Government area soils and ground water may be subject to varying levels of Salinity. Whilst Council may require applicants to obtain Salinity reports relating to some developments, no assessment may be made by Council in that regard. Soil and ground water salinity levels can change over time due to varying factors. It is recommended that all applicants make their own independent inquiries as to appropriate protection against the current and future potential affect of Salinity to ensure the ongoing structural integrity of any work undertaken. Liverpool City Council will not accept any liability for damage occurring to any construction of any type affected by soil and or ground water Salinity.
- i) The cost of any necessary adjustments to utility mains and services shall be borne by the applicant.
- j) Care shall be taken by the applicant and the applicant's agents to prevent any damage to adjoining properties. The applicant or the applicant's agents may be liable to pay compensation to any adjoining owner if, due to construction works, damage is caused to such an adjoining property.

# ATTACHMENT 2: NSW EPA General Terms of Approval

Protection of the Environment Operations Act 1997

## General Terms of Approval - Issued



Notice No: 1589160

### ATTACHMENT A - GENERAL TERMS OF APPROVAL

1. Except as expressly provided by these general terms of approval, works and activities must be carried out in accordance with the proposal contained in:

- the development application DA-263/2018 submitted to Liverpool City Council, and subsequent approved modifications;
- the environmental impact statement titled "Environmental Impact Statement, Resource Recovery Facility, 55 Martin Road, Badgerys Creek" dated 22 March 2018 and prepared by Benbow Environmental, and as amended by, the document titled, "Addendum to the Environmental Impact Statement for a proposed Amendment to a Development Consent" dated 24 September 2019 and prepared by Claron Consulting Pty Ltd;
- all additional documents supplied to the EPA in relation to the development, including the letter dated 18 July 2018 prepared by Claron Consulting Pty Ltd and the letter dated 17 January 2019 prepared by Ultramark Pty Ltd; and
- all additional documents supplied to the EPA in relation to the modification application (DA-263/2018/a).

#### Waste

2. The amount of waste received at the Premises cannot exceed 95,000 tonnes in any 12 month period.

3. The types of waste permitted to be received at the premises include:

| Code | Waste                             | Description                                                                                    | Activity                           | Other Limits                                                                                                                      |
|------|-----------------------------------|------------------------------------------------------------------------------------------------|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| NA   | Building & demolition waste       | As defined in the Protection of the Environment Operations Act (as in force from time to time) | Resource recovery<br>Waste storage |                                                                                                                                   |
| NA   | Virgin excavated natural material | As defined in the Protection of the Environment Operations Act (as in force from time to time) | Resource recovery<br>Waste storage |                                                                                                                                   |
| NA   | Garden waste                      | As defined in the Protection of the Environment Operations Act (as in force from time to time) | Resource recovery<br>Waste storage | No more than 2,000 tonnes may be received in any 12 month period.<br><br>No more than 30 tonnes permitted onsite at any one time. |

## General Terms of Approval - Issued



Notice No: 1589160

4. All waste handling, loading, unloading and processing must be undertaken inside a fully enclosed building.
5. All waste storage must occur in designated bays that are covered with a permanent awning. *Note: The Air Quality Impact Assessment dated February 2018 states, "A Colorbond skillion roof to cover the five (5) stockpile bins" will be installed.*
6. Putrescible waste must not be received or processed at the Premises.

### Air quality

7. Water sprinklers and/or misting sprays in the enclosed building must be utilised at all times when plant is operational.
8. Water sprinklers and/or misting sprays must be installed in the outside undercover storage area and operated to prevent dust generation and wind erosion of stored material.
9. Crushing and screening must not be undertaken when any doors, including the roller doors, are open with the exception of one roller door permitted to be open for 3 minutes out of a 15 minute period to permit ingress or egress of a truck.
10. The crushing machine must be operated with a sprinkler system.
11. All roads and carparking areas at the Premises must be sealed with concrete or asphalt.
12. All operating, storage, unloading and loading areas must be sealed with concrete or asphalt.
13. All operations and activities occurring at the premises must be carried out in a manner that prevents and minimises the emission of air pollutants from the Premises.
14. The premises must be maintained in a manner that prevents and minimises the emission of air pollutants.
15. The licensee must ensure no visible dust leaves the Premises.
16. The licensee must ensure that no material including sediment is tracked from the Premises.
17. Air Quality Management Plan: The proponent must develop and implement an air quality management plan prior to the commencement of project operations. The air quality management plan must include both proactive and reactive management measures. As a minimum, the air quality management plan must include the following parts:
  - Key performance indicator(s);
  - Monitoring method(s);
  - Location, frequency and duration of monitoring;
  - Record keeping;
  - Response mechanisms; and
  - Compliance reporting.

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## General Terms of Approval - Issued



Notice No: 1589160

Management measures must include:

- a protocol for managing unsuitable material, including contaminated material, setting out the method for storage, the maximum amount stored at any one time, the maximum time for storage, and the measures to ensure these limits are met; and
- a protocol for ensuring odour emissions from green waste stored on-site is minimised including limits on the amount stored, the length of time material is stored, and the means for meeting these limits.

### Water

18. Stormwater and leachate management at the Premises should be undertaken in accordance with the "Stormwater Water Management Plan & Report" dated 17 January 2019 and prepared by Ultramark Pty Ltd, and as amended by the letter from Ultramark Pty Ltd dated 24 September 2019 (Job No: 2017-01).

19. Leachate (whether treated or untreated) at the Premises may not be used for dust suppression without written permission from the NSW EPA.

### Hours of operation

20. Construction works must only be undertaken:

- a. between the hours of 7:00am and 6:00pm Monday to Friday;
- b. between the hours of 8:00am and 1:00pm on Saturdays; and
- c. at no time on Sundays or public holidays.

21. Operational activities at the Premises may only be carried out between the following hours:

- a. 7:00am to 6:00pm Monday to Friday;
- b. between the hours of 7:00am and 5:00pm on Saturdays; and
- c. At no time on Sundays or public holidays.

### Noise

22. All the noise control measures set out in section 7.3 of the report titled, "Noise Impact Assessment for AMJ Demolition and Excavation, 55 Martin Road, Badgerys Creek" dated 2 September 2019 prepared by Benbow Environmental must be implemented at the facility.

23. All doors, including the roller doors, must be closed while the crushing/sorting/screening plant is operating and trucks are being loaded and unloaded, with the exception of one roller door permitted to be open for 3 minutes out of a 15 minute period to permit ingress or egress of a truck.

24. The following conditions related to noise as set out below must be complied with.

L6.1 Noise generated at the premises must not exceed the noise limits in the Table below.

**TABLE 1 - NOISE LIMITS IN dB(A)**

| Location | Lot and DP number | NOISE LIMITS dB(A) |
|----------|-------------------|--------------------|
|          |                   | Day                |

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## General Terms of Approval - Issued



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|                                |                  | L <sub>Aeq</sub> (15 minute) |
|--------------------------------|------------------|------------------------------|
| 40 Martin Road, Badgerys Creek | Lot 7 DP 226448  | 42                           |
| 65 Martin Road, Badgerys Creek | Lot 36 DP 3050   | 42                           |
| 75 Lawson Road, Badgerys Creek | Lot 5 DP 3050    | 42                           |
| 55 Lawson Road, Badgerys Creek | Lot 1 DP 1084967 | 42                           |

L6.2 For the purposes of condition L6.1:

- Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sunday and Public Holidays.

L6.3 The noise limits set out in condition L6.1 apply under all meteorological conditions except for the following:

- Wind speeds greater than 0.5 metres/second at 10 metres above ground level.

L6.4 For the purposes of condition L6.3:

- Data recorded by a Bureau of Meteorology meteorological station at Badgerys Creek must be used to determine meteorological conditions.

L6.5 To determine compliance:

- with the L<sub>eq</sub>(15 minute) noise limits in condition L6.1, the noise measurement equipment must be located:
  - approximately on the property boundary, where any dwelling is situated 30 metres or less from the property boundary closest to the premises; or
  - within 30 metres of a dwelling façade, but not closer than 3m, where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable
  - within approximately 50 metres of the boundary of a National Park or a Nature Reserve.
- with the noise limits in condition L6.1, the noise measurement equipment must be located:
  - at the most affected point at a location where there is no dwelling at the location; or
  - at the most affected point within an area at a location prescribed by condition L6.5(a).

L6.6 A non-compliance of condition L6.1 will still occur where noise generated from the premises in excess of the appropriate limit is measured:

- at a location other than an area prescribed by conditions L6.5(a) and L6.5(b); and/or
- at a point other than the most affected point at a location.

## General Terms of Approval - Issued

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Notice No: 1589160

- L6.7 For the purposes of determining the noise generated at the premises the modification factors in Fact Sheet C of the Noise Policy for Industry must be applied, as appropriate, to the noise levels measured by the noise monitoring equipment.

### **M8 Requirement to Monitor Noise**

**M8.1** Compliance with Condition L6.1 must be assessed by attended noise monitoring in accordance with condition L6.5:

- a) at each one of the locations listed in Condition L6.1;
- b) occur at the time of commencement of typical processing activity;
- c) occur during the day as defined in the Noise Policy for Industry for a minimum of:
  - 30 minutes of duration in the day period for typical processing activity.

### **Reporting Conditions**

#### **R4 Noise Monitoring Report**

A noise compliance assessment report must be submitted to the EPA within 60 days of the commencement of operation. The assessment must be prepared by a suitably qualified and experienced acoustical consultant and include:

- a) an assessment of compliance with noise limits presented in Condition L6.1; and
- b) an outline of any management actions taken within the monitoring period to address any exceedances of the limits contained in Condition L6.1.

### **Additions to Definition of Terms of the licence**

- Noise Policy for Industry - the document entitled "Noise Policy for Industry" published by the Environment Protection Authority in October 2017."
- Noise – 'sound pressure levels' for the purposes of conditions L6.1 to L6.7.



## **Glossary of Noise Terminology**

### **'A' FREQUENCY WEIGHTING**

The 'A' frequency weighting roughly approximates to the Fletcher-Munson 40 phon equal loudness contour. The human loudness perception at various frequencies and sound pressure levels is equated to the level of 40 dB at 1 kHz. The human ear is less sensitive to low frequency sound and very high frequency sound than midrange frequency sound (i.e. 500 Hz to 6 kHz). Humans are most sensitive to midrange frequency sounds, such as a child's scream. Sound level meters have inbuilt frequency weighting networks that very roughly approximates the human loudness response at low sound levels. It should be noted that the human loudness response is not the same as the human annoyance response to sound. Here low frequency sounds can be more annoying than midrange frequency sounds even at very low loudness levels. The 'A' weighting is the most commonly used frequency weighting for occupational and environmental noise assessments. However, for environmental noise assessments, adjustments for the character of the sound will often be required.

### **AMBIENT NOISE**

The ambient noise level at a particular location is the overall environmental noise level caused by all noise sources in the area, both near and far, including all forms of traffic, industry, lawnmowers, wind in foliage, insects, animals, etc. Usually assessed as an energy average over a set time period 'T' ( $L_{Aeq,T}$ ).

### **AUDIBLE**

Audible refers to a sound that can be heard. There are a range of audibility grades, varying from "barely audible", "just audible" to "clearly audible" and "prominent".

### **BACKGROUND NOISE LEVEL**

Total silence does not exist in the natural or built-environments, only varying degrees of noise. The Background Noise Level is the minimum repeatable level of noise measured in the absence of the noise under investigation and any other short-term noises such as those caused by all forms of traffic, industry, lawnmowers, wind in foliage, insects, animals, etc.. It is quantified by the noise level that is exceeded for 90 % of the measurement period 'T' ( $L_{A90,T}$ ). Background Noise Levels are often determined for the day, evening and night time periods where relevant. This is done by statistically analysing the range of time period (typically 15-minute) measurements over multiple days (often 7 days). For a 15-minute measurement period the Background Noise Level is set at the quietest level that occurs at 1.5 minutes.

### **'C' FREQUENCY WEIGHTING**

The 'C' frequency weighting approximates the 100 phon equal loudness contour. The human ear frequency response is more linear at high sound levels and the 100 phon equal loudness contour attempts to represent this at various frequencies at sound levels of approximately 100 dB.

## **DECIBEL**

The decibel (dB) is a logarithmic scale that allows a wide range of values to be compressed into a more comprehensible range, typically 0 dB to 120 dB. The decibel is ten times the logarithm of the ratio of any two quantities that relate to the flow of energy (i.e. power). When used in acoustics it is the ratio of square of the sound pressure level to a reference sound pressure level, the ratio of the sound power level to a reference sound power level, or the ratio of the sound intensity level to a reference sound intensity level. See also Sound Pressure Level and Sound Power Level. Noise levels in decibels cannot be added arithmetically since they are logarithmic numbers. If one machine is generating a noise level of 50 dB, and another similar machine is placed beside it, the level will increase to 53 dB (from  $10 \log_{10} (10^{(50/10)} + 10^{(50/10)})$ ) and not 100 dB. In theory, ten similar machines placed side by side will increase the sound level by 10 dB, and one hundred machines increase the sound level by 20 dB. The human ear has a vast sound-sensitivity range of over a thousand billion to one so the logarithmic decibel scale is useful for acoustical assessments.

**dBA – See ‘A’ frequency weighting**

**dB(C) – See ‘C’ frequency weighting**

## **EQUIVALENT CONTINUOUS SOUND LEVEL, $L_{Aeq}$**

Many sounds, such as road traffic noise or construction noise, vary repeatedly in level over a period of time. More sophisticated sound level meters have an integrating/averaging electronic device inbuilt, which will display the energy time-average (equivalent continuous sound level -  $L_{Aeq}$ ) of the ‘A’ frequency weighted sound pressure level. Because the decibel scale is a logarithmic ratio, the higher noise levels have far more sound energy, and therefore the  $L_{Aeq}$  level tends to indicate an average which is strongly influenced by short term, high level noise events. Many studies show that human reaction to level-varying sounds tends to relate closer to the  $L_{Aeq}$  noise level than any other descriptor.

## **‘F’ (FAST) TIME WEIGHTING**

Sound level meter design-goal time constant which is 0.125 seconds.

## **FREE FIELD**

In acoustics a free field is a measurement area not subject to significant reflection of acoustical energy. A free field measurement is typically not closer than 3.5 metres to any large flat object (other than the ground) such as a fence or wall or inside an anechoic chamber.

## **FREQUENCY**

The number of oscillations or cycles of a wave motion per unit time, the SI unit is the hertz (Hz). 1 Hz is equivalent to one cycle per second. 1000 Hz is 1 kHz.

## **IMPULSE NOISE**

An impulse noise is typified by a sudden rise time and a rapid sound decay, such as a hammer blow, rifle shot or balloon burst.

**MAXIMUM NOISE LEVEL,  $L_{AFmax}$** 

The root-mean-square (rms) maximum sound pressure level measured with sound level meter using the 'A' frequency weighting and the 'F' (Fast) time weighting. Often used for noise assessments other than aircraft.

**NOISE**

Noise is unwanted, harmful or inharmonious (discordant) sound. Sound is wave motion within matter, be it gaseous, liquid or solid. Noise usually includes vibration as well as sound.

**NOISE REDUCTION COEFFICIENT – See: "Sound Absorption Coefficient"****OFFENSIVE NOISE**

Reference: Dictionary of the NSW Protection of the Environment Operations Act (1997).

"Offensive Noise means noise:

(a) that, by reason of its level, nature, character or quality, or the time at which it is made, or any other circumstances:

(i) is harmful to (or likely to be harmful to) a person who is outside the premise from which it is emitted, or

(ii) interferes unreasonably with (or is likely to interfere unreasonably with) the comfort or repose of a person who is outside the premises from which it is emitted, or

(b) that is of a level, nature, character or quality prescribed by the regulations or that is made at a time, or in other circumstances prescribed by the regulations."

**SOUND ABSORPTION COEFFICIENT,  $\alpha$** 

Sound is absorbed in porous materials by the viscous conversion of sound energy to a small amount of heat energy as the sound waves pass through it. Sound is similarly absorbed by the flexural bending of internally damped panels. The fraction of incident energy that is absorbed is termed the Sound Absorption Coefficient,  $\alpha$ . An absorption coefficient of 0.9 indicates that 90 % of the incident sound energy is absorbed. The average  $\alpha$  from 250 to 2 kHz is termed the Noise Reduction Coefficient (NRC).

**SOUND ATTENUATION**

A reduction of sound due to distance, enclosure or some other device. If an enclosure is placed around a machine, or an attenuator (muffler or silencer) is fitted to a duct, the noise emission is reduced or attenuated. An enclosure that attenuates the noise level by 20 dB reduces the sound energy by one hundred times.

**SOUND PRESSURE**

The rms sound pressure measured in pascals (Pa). A pascal is a unit equivalent to a newton per square metre ( $N/m^2$ ).

## **SOUND PRESSURE LEVEL, $L_p$**

The level of sound measured on a sound level meter and expressed in decibels (dB). Where  $L_p = 10 \log_{10} (P_a/P_o)^2$  dB (or  $20 \log_{10} (P_a/P_o)$  dB) where  $P_a$  is the rms sound pressure in Pascal and  $P_o$  is a reference sound pressure conventionally chosen is  $20 \mu\text{Pa}$  ( $20 \times 10^{-6}$  Pa) for airborne sound.  $L_p$  varies with distance from a noise source.

## **SOUND POWER**

The rms sound power measured in watts (W). The watt is a unit defined as one joule per second. A measures the rate of energy flow, conversion or transfer.

## **SOUND POWER LEVEL, $L_w$**

The sound power level of a noise source is the inherent noise of the device. Therefore sound power level does not vary with distance from the noise source or with a different acoustic environment.  $L_w = L_p + 10 \log_{10} 'a'$  dB, re: 1pW, ( $10^{-12}$  watts) where 'a' is the measurement noise-emission area ( $\text{m}^2$ ) in a free field.

## **STATISTICAL NOISE LEVELS, $L_n$ .**

Noise which varies in level over a specific period of time 'T' (standard measurement times are 15-minute periods) may be quantified in terms of various statistical descriptors for example:-

- The noise level, in decibels, exceeded for 1 % of the measurement time period, when 'A' frequency weighted and 'F' time weighted is reference to as  $L_{AF1}$ , T. This may be used for describing short-term noise levels such as could cause sleep arousal during the night.
- The noise level, in decibels, exceeded for 10 % of the measurement time period, when 'A' frequency weighted and 'F' time weighted is reference to as  $L_{AF10}$ , T. In most countries the  $L_{AF10}$ , T is measured over periods of 15-minutes, and is used to describe the average maximum noise level.
- The noise level, in decibels, exceeded for 90 % of the measurement time period, when 'A' frequency weighted and 'F' time weighted is reference to as  $L_{AF90}$ , T. In most countries the  $L_{AF90}$ , T is measured over periods of 15-minutes, and is used to describe the average minimum or background noise level.

## **STEADY NOISE**

Noise, which varies in level by 6 dB or less, over the period of interest with the time-weighting set to "Fast", is considered to be "steady". (Refer AS 1055.1—1997).

## **WEIGHTED SOUND REDUCTION INDEX, $R_w$**

This is a single number rating of the airborne sound insulation of a wall, partition or ceiling. The sound reduction is normally measured over a frequency range of 100 Hz to 3.150 kHz and averaged in accordance with ISO standard weighting curves (Refer AS/NZS ISO 717-1:2004). Internal partition wall  $R_w + C$  ratings are frequency weighted to simulate insulation from human voice noise. The  $R_w + C$  is similar in value to the STC rating value. External walls, doors and windows may be  $R_w + C_{tr}$  rated to simulate insulation from road traffic noise. The spectrum adaptation term  $C_{tr}$  adjustment factor takes account of low frequency noise. The weighted sound reduction index is normally similar or slightly lower number than the STC rating value.

## **'Z' FREQUENCY WEIGHTING**

The 'Z' (Zero) frequency weighting is 0 dB within the nominal 1/3 octave band frequency range centred on 10 Hz to 20 kHz. This is within the tolerance limits given in AS IEC 61672.1—2004: *'Electroacoustics – Sound level meters – Specifications'*.





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Research  
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www.acousticresearch.com.au

**Sound Level Meter**  
AS 1259.1:1990 - AS 1259.2:1990  
**Calibration Certificate**

Calibration Number C16368

**Client Details** Benbow Environmental  
13 Daking Street  
North Paramatta NSW 2151

**Equipment Tested/ Model Number :** ARL EL-215  
**Instrument Serial Number :** 194441  
**Microphone Serial Number :** N/A  
**Pre-amplifier Serial Number :** N/A

**Atmospheric Conditions**

**Ambient Temperature :** 21.9°C  
**Relative Humidity :** 34.2%  
**Barometric Pressure :** 100kPa

**Calibration Technician :** Dennis Kim  
**Calibration Date :** 13/07/2016

**Secondary Check:** Riley Cooper  
**Report Issue Date :** 14/07/2016

**Approved Signatory :**

Juan Aguero

| Clause and Characteristic Tested        | Result | Clause and Characteristic Tested              | Result |
|-----------------------------------------|--------|-----------------------------------------------|--------|
| 10.2.2: Absolute sensitivity            | Pass   | 10.3.4: Inherent system noise level           | Pass   |
| 10.2.3: Frequency weighting             | Pass   | 10.4.2: Time weighting characteristic F and S | Pass   |
| 10.3.2: Overload indications            | Pass   | 10.4.3: Time weighting characteristic I       | Pass   |
| 10.3.3: Accuracy of level range control | Pass   | 10.4.5: R.M.S performance                     | Pass   |
| 8.9: Detector-indicator linearity       | Pass   | 9.3.2: Time averaging                         | Pass   |
| 8.10: Differential level linearity      | Pass   | 9.3.5: Overload indication                    | Pass   |

**Least Uncertainties of Measurement -**

**Acoustic Tests**

31.5 Hz to 8kHz:  $\pm 0.120\text{dB}$   
12.5kHz:  $\pm 0.165\text{dB}$   
16kHz:  $\pm 0.245\text{dB}$

**Electrical Tests**

31.5 Hz to 20 kHz:  $\pm 0.098\text{dB}$

**Environmental Conditions**

Temperature:  $\pm 0.3^\circ\text{C}$   
Relative Humidity:  $\pm 4.1\%$   
Barometric Pressure:  $\pm 0.1\text{kPa}$

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.

The sound level meter under test has been shown to conform to the type 2 requirements for periodic testing as described in AS 1259.1:1990 and AS 1259.2:1990 for the tests stated above.



This calibration certificate is to be read in conjunction with the calibration test report.

Acoustic Research Labs Pty Ltd is NATA Accredited Laboratory Number 14172.  
Accredited for compliance with ISO/IEC 17025.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/National standards.



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**Sound Level Meter**  
AS 1259.1:1990 - AS 1259.2:1990  
**Calibration Certificate**

Calibration Number C17333

Client Details Benbow Environmental  
13 Daking Street  
North Parramatta NSW 2151

Equipment Tested/ Model Number : ARL EL-215  
Instrument Serial Number : 194552  
Microphone Serial Number :  
Pre-amplifier Serial Number :

**Atmospheric Conditions**

Ambient Temperature : 22.8°C  
Relative Humidity : 35.5%  
Barometric Pressure : 101.15kPa

Calibration Technician : Lucky Jaiswal Secondary Check: Riley Cooper  
Calibration Date : 12/07/2017 Report Issue Date : 12/07/2017

Approved Signatory :

Ken Williams

| Clause and Characteristic Tested        | Result | Clause and Characteristic Tested              | Result |
|-----------------------------------------|--------|-----------------------------------------------|--------|
| 10.2.2: Absolute sensitivity            | Pass   | 10.3.4: Inherent system noise level           | Pass   |
| 10.2.3: Frequency weighting             | Pass   | 10.4.2: Time weighting characteristic F and S | Pass   |
| 10.3.2: Overload indications            | Pass   | 10.4.3: Time weighting characteristic I       | Pass   |
| 10.3.3: Accuracy of level range control | Pass   | 10.4.5: R.M.S performance                     | Pass   |
| 8.9: Detector-indicator linearity       | Pass   | 9.3.2: Time averaging                         | Pass   |
| 8.10: Differential level linearity      | Pass   | 9.3.5: Overload indication                    | Pass   |

**Least Uncertainties of Measurement -**

| Acoustic Tests    |         | Environmental Conditions |          |
|-------------------|---------|--------------------------|----------|
| 31.5 Hz to 8kHz   | ±0.16dB | Temperature              | ±0.05°C  |
| 12.5kHz           | ±0.2dB  | Relative Humidity        | ±0.46%   |
| 16kHz             | ±0.29dB | Barometric Pressure      | ±0.017Pa |
| Electrical Tests  |         |                          |          |
| 31.5 Hz to 20 kHz | ±0.12dB |                          |          |

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.

The sound level meter under test has been shown to conform to the type 2 requirements for periodic testing as described in AS 1259.1:1990 and AS 1259.2:1990 for the tests stated above.



This calibration certificate is to be read in conjunction with the calibration test report.

Acoustic Research Labs Pty Ltd is NATA Accredited Laboratory Number 14172.  
Accredited for compliance with ISO/IEC 17025.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/National standards.

NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.

# CERTIFICATE OF CALIBRATION

CERTIFICATE No: 20949

EQUIPMENT TESTED: Sound Level Calibrator

Manufacturer: Rion  
Type No: NC-73 Serial No: 10186522  
Owner: Benbow Environmental  
13 Daking Street  
North Parramatta NSW 2151

Tests Performed: Measured output pressure level was found to be:

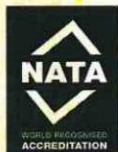
| Parameter                     | Pre-Adj | Adj<br>Y/N | Output: (db<br>re 20 $\mu$ Pa) | Frequency:<br>(Hz) | THD&N (%)   |
|-------------------------------|---------|------------|--------------------------------|--------------------|-------------|
| Level 1:                      | NA      | N          | 94.03                          | 991.4              | 2.00        |
| Level 2:                      | NA      | N          | NA                             | NA                 | NA          |
| Uncertainty:                  |         |            | $\pm 0.11$ dB                  | $\pm 0.05$ Hz      | $\pm 0.2$ % |
| Uncertainty (at 95% c.i.) k=2 |         |            |                                |                    |             |

CONDITION OF TEST:

Ambient Pressure: 996 hPa  $\pm 1.5$  hPa Relative Humidity: 42%  $\pm 5\%$   
Temperature: 22  $^{\circ}$ C  $\pm 2^{\circ}$  C  
Date of Calibration: 05/07/2017 Issue Date: 06/07/2017  
Acu-Vib Test Procedure: AVP02 (Calibrators)  
Test Method: AS IEC 60942 - 2004

CHECKED BY: ..... AUTHORISED SIGNATURE: .....  
*Jack Ridd*

Accredited for compliance with ISO/IEC 17025  
The results of the tests, calibration and/or measurements included in this document are traceable to  
Australian/national standards.



Accredited Lab: 9262  
Acoustic and Vibration  
Measurements



HEAD OFFICE  
Unit 14, 22 Hudson Ave. Castle Hill NSW 2154  
Tel: (02) 96808133 Fax: (02) 96808233  
Mobile: 0413 809806  
Web site: www.acu-vib.com.au

# CERTIFICATE OF CALIBRATION

CERTIFICATE No.: **SLM 21111 & FILT 4097**

**Equipment Description:** Sound & Vibration Analyser

**Manufacturer:** Svantek  
**Model No:** Svan-957      **Serial No:** 15336  
**Microphone Type:** 7052E      **Serial No:** 47869  
**Filter Type:** 1/3 Octave      **Serial No:** 15336

**Comments:** • All tests passed for class 1.  
(See over for details)

**Owner:** Benbow Environmental  
13 Daking Street  
North Parramatta 2151

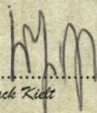
**Ambient Pressure:** 1004 hPa  $\pm 1.5$  hPa

**Temperature:** 21 °C  $\pm 2^\circ$  C      **Relative Humidity:** 36%  $\pm 5\%$

**Date of Calibration:** 25/07/2017      **Issue Date:** 26/07/2017

**Acu-Vib Test Procedure:** AVP10 (SLM) & AVP06 (Filters)

**CHECKED BY:** 

**AUTHORISED SIGNATURE:** 

*Jack Kidd*

Accredited for compliance with ISO/IEC 17025  
The results of the tests, calibration and/or measurements included in this document are traceable to  
Australian/national standards.



Accredited Lab. No. 9262  
Acoustic and Vibration  
Measurements



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web site: [www.acu-vib.com.au](http://www.acu-vib.com.au)

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AVCERT10 Rev. 1.2 03.02.15



### **Calibration of Sound Level Meters**

A sound level meter requires regular calibration to ensure its measurement performance remains within specification. Benbow Environmental sound level meters are calibrated by a National Association of Testing Authority (NATA) registered laboratory or a laboratory approved by the NSW Environment Protection Authority (EPA) every two years and after each major repair, in accordance with AS IEC 61672.1–2004 Electroacoustics – Sound level meters - Specifications.

The calibration of the sound level meter was checked immediately before and after each series of measurements using an acoustic calibrator. The acoustic calibrator provides a known sound pressure level, which the meter indicates when the calibrator is activated while positioned on the meter microphone.

The sound level meters also incorporate an internal calibrator for use in setting up. This provides a check of the electrical calibration of the meter, but does not check the performance of the microphone. Acoustical calibration checks the entire instrument including the microphone. Calibration certificates for the instrument sets used have been included as Attachment 2.

### **Care and Maintenance of Sound Level Meters**

Noise measuring equipment contains delicate components and therefore must be handled accordingly. The equipment is manufactured to comply with international and national standards and is checked periodically for compliance. The technical specifications for sound level meters used in Australia are defined in Australian Standard AS IEC 61672.1–2004 Electroacoustics – Sound level meters - Specifications.

The sound level meters and associated accessories are protected during storage, measurement and transportation against dirt, corrosion, rapid changes of temperature, humidity, rain, wind, vibration, electric and magnetic fields. Microphone cables and adaptors are always connected and disconnected with the power turned off. Batteries are removed (with the instrument turned off) if the instrument is not to be used for some time.

### **Investigation Procedures**

All investigative procedures were conducted in accordance with AS 1055.1—1997 *Acoustics – “Description and Measurement of Environmental Noise (Part 1: General Procedures)”*.

The following information was recorded and kept for reference purposes:

- type of instrumentation used and measurement procedure conducted;
- description of the time aspect of the measurements, ie. measurement time intervals; and
- positions of measurements and the time and date were noted.

As per AS 1055.1—1997, all measurements were carried out at least 3.5 m from any reflecting structure other than the ground. The preferred measurement height of 1.2 m above the ground was utilised. A sketch of the area was made identifying positions of measurement and the approximate location of the noise source and distances in meters (approx.).

## **UNATTENDED NOISE MONITORING**

### ***NOISE MONITORING EQUIPMENT***

ARL noise logger type NGARA and EL-215 were used to conduct the long-term unattended noise monitoring. This equipment complies with Australian Standard AS IEC 61672.1–2004 *Electroacoustics – Sound level meters – Specifications* and are designated as a Type 2 instrument suitable for field use.

The measured data is processed statistically and stored in memory every 15-minutes. The equipment was calibrated prior and subsequent to the measurement period using a Rion NC-73 sound level calibrator. There were no significant variances observed in the reference signal between the pre-measurement and post-measurement calibrations. Instrument calibration certificates have also been included in Attachment 2.

### ***METEOROLOGICAL CONSIDERATION DURING MONITORING***

For the long-term attended monitoring, meteorological data for the relevant period were provided by the Bureau of Meteorology, which was considered representative of the site for throughout the monitoring period.

Measurements affected by wind or rain over certain limits were excluded from the final analyses of the recorded data in accordance with the EPA's Noise Policy for Industry. The wind data were modified to take into account the difference of height between the AWS (Automatic Weather Station) used by the Bureau of Meteorology (10m above ground level), and the microphone (1.5 m above ground level). The correction factor applied to the data was calculated according to the Australian Standard AS 1170.2 2011 .

### ***DESCRIPTORS & FILTERS USED FOR MONITORING***

Noise levels are commonly measured using A-weighted filters and are usually described as dB(A). The "A-weighting" refers to standardised amplitude versus frequency curve used to "weight" sound measurements to represent the response of the human ear. The human ear is less sensitive to low frequency sound than it is to high frequency sound. Overall A-weighted measurements quantify sound with a single number to represent how people subjectively hear different frequencies at different levels.

Noise environments can be described using various descriptors depending on characteristics of noise or purpose of assessments. For this survey the  $L_{A90}$ ,  $L_{Aeq}$  and  $L_{Amax}$  levels were used to analyse the monitoring results. The statistical descriptors  $L_{A90}$  measures the noise level exceeded for 90% of the sample measurement time, and is used to describe the "Background noise". Background noise is the underlying level of noise present in the ambient noise, excluding extraneous noise or the noise source under investigation. The  $L_{Aeq}$  level is the equivalent continuous noise level or the level averaged on an equal energy basis which is used to describe the "Ambient Noise". The  $L_{Amax}$  noise levels are maximum sound pressure levels measured over the sampling period and this parameter is commonly used when assessing noise impact.

Measurement sample periods were fifteen minutes. The Noise -vs- Time daily noise logger charts representing measured noise levels at the noise monitoring locations are presented in Attachment 4.

## **ATTENDED NOISE MONITORING**

### *NOISE MONITORING EQUIPMENT*

The attended short-term noise monitoring was carried out using a SVANTEK SVAN957 Class 1 Precision Sound Level Meters. The instrument was calibrated by a NATA accredited laboratory within two years of the measurement period. The instrument sets comply with AS IEC 61672.1-2004 and was set on A-weighted, fast response.

The microphone was positioned at 1.2 to 1.5 metres above ground level and was fitted with windsocks. The instrument was calibrated using a Rion NC-73 sound level calibrator prior and subsequent to the measurement period to ensure the reliability and accuracy of the instrument sets. There were no significant variances observed in the reference signal between the pre-measurement and post-measurement calibrations. Instrument calibration certificates have also been included in Attachment 2.

### *WEATHER CONDITIONS*

It was clear, fine without significant breeze.

### *METHODOLOGY*

The attended noise measurements were carried out generally in accordance with Australian Standard AS 1055—1997 - "*Acoustics – Description and Measurement of Environmental Noise*".



Logger A – Unattended Noise Monitoring Results, dB(A)

| Location A                 |                        |           |           |                 |           |           |
|----------------------------|------------------------|-----------|-----------|-----------------|-----------|-----------|
| Date                       | ABL (L <sub>90</sub> ) |           |           | L <sub>eq</sub> |           |           |
|                            | Day                    | Evening   | Night     | Day             | Evening   | Night     |
| 29/09/2017                 | -                      | 36        | 33        | -               | 45        | 45        |
| 30/09/2017                 | -                      | 33        | -         | -               | 46        | -         |
| 1/10/2017                  | 33                     | 33        | 30        | 46              | 43        | 43        |
| 2/10/2017                  | -                      | 35        | 29        | -               | 47        | 42        |
| 3/10/2017                  | 38                     | 32        | 29        | 52              | 45        | 48        |
| 4/10/2017                  | 38                     | 34        | 30        | 52              | 46        | 49        |
| 5/10/2017                  | 38                     | 34        | 29        | 52              | 46        | 50        |
| 6/10/2017                  | -                      | 33        | 29        | -               | 48        | 47        |
| 7/10/2017                  | 35                     | 32        | 28        | 49              | 43        | 46        |
| 8/10/2017                  | 36                     | 32        | 28        | 47              | 44        | 42        |
| 9/10/2017                  | -                      | 35        | 29        | -               | 45        | 48        |
| 10/10/2017                 | -                      | -         | -         | -               | -         | -         |
| <b>Median (RBL)</b>        | <b>37</b>              | <b>33</b> | <b>29</b> | <b>*</b>        | <b>*</b>  | <b>*</b>  |
| <b>Logarithmic Average</b> | <b>*</b>               | <b>*</b>  | <b>*</b>  | <b>50</b>       | <b>46</b> | <b>47</b> |

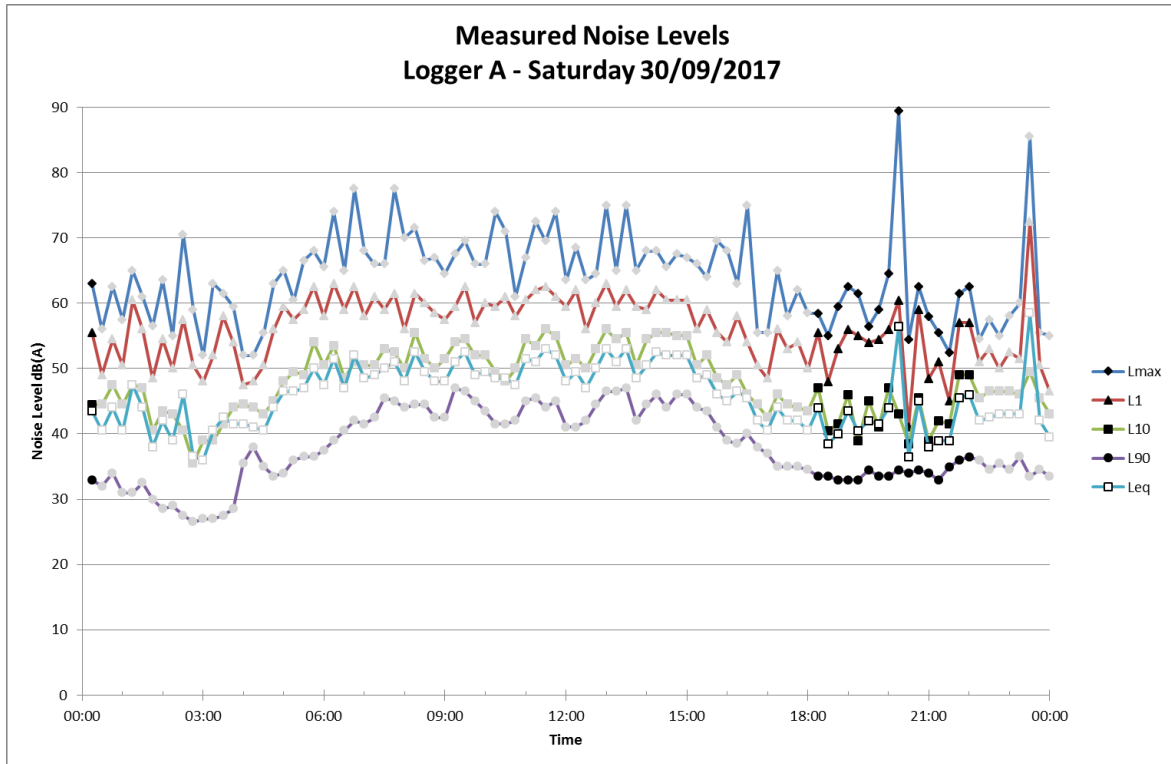
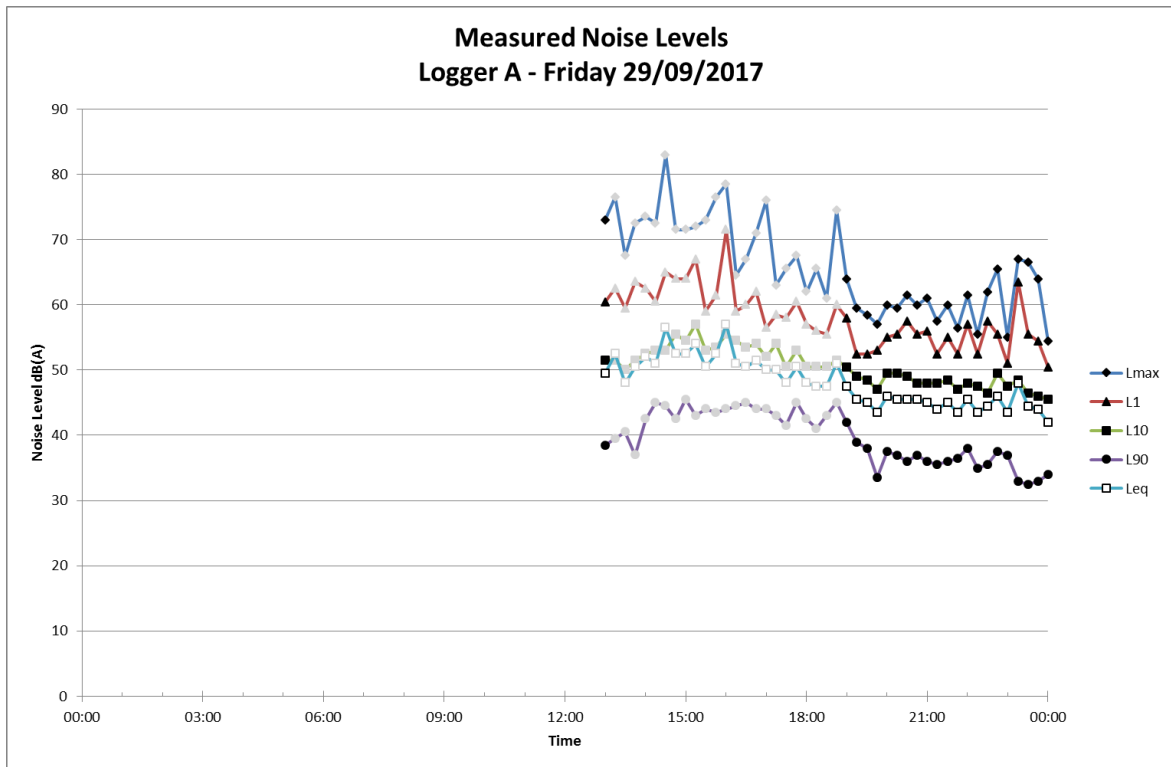
**Note:** - indicates values that has not been considered due to adverse weather conditions

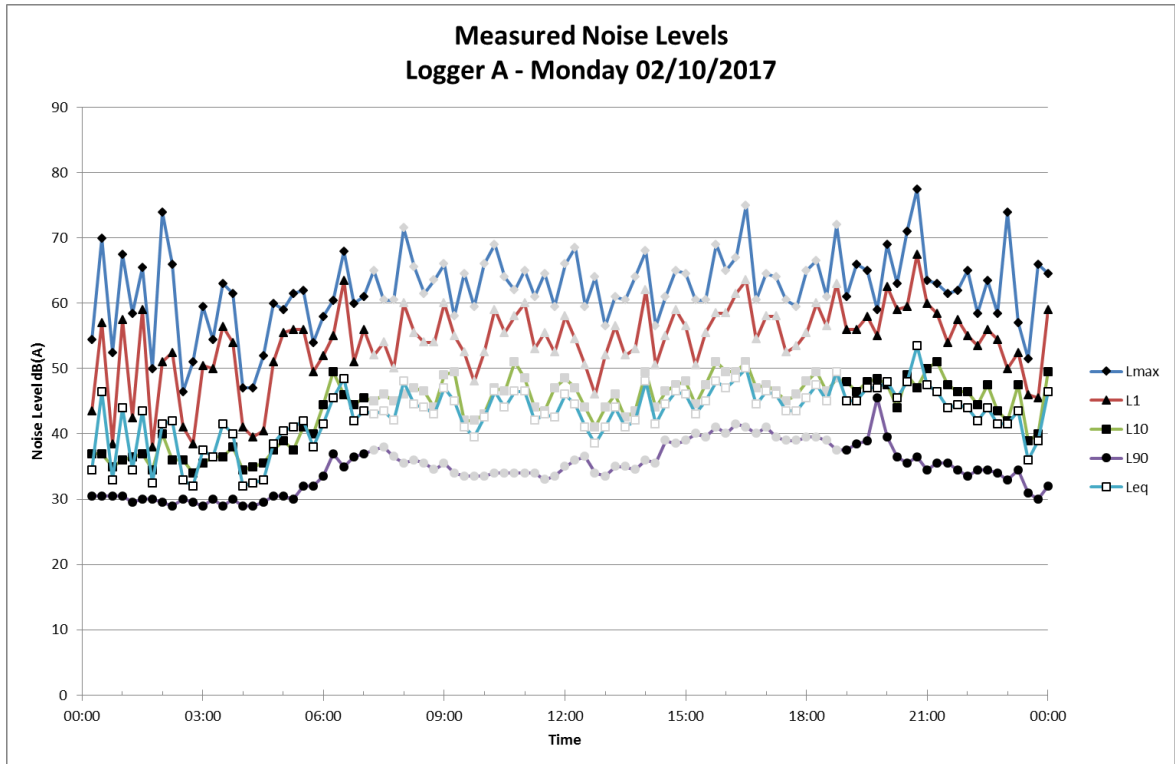
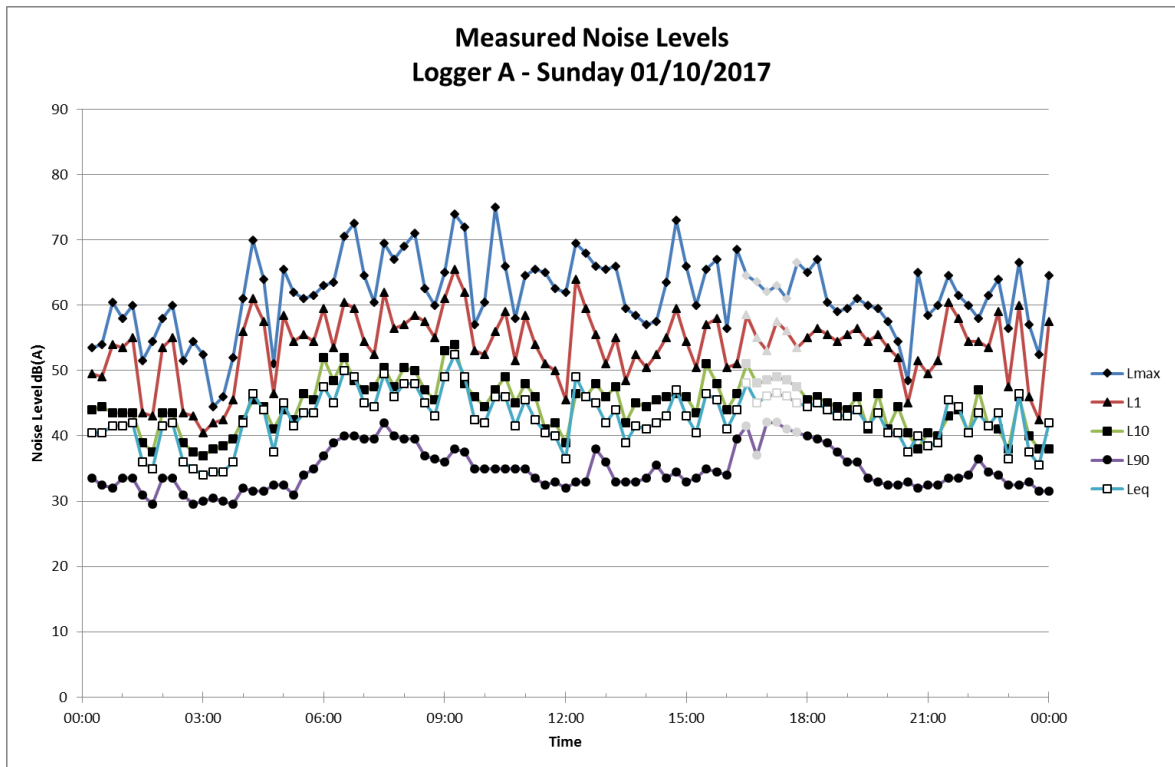
\* Indicates values that are not relevant to that noise descriptor

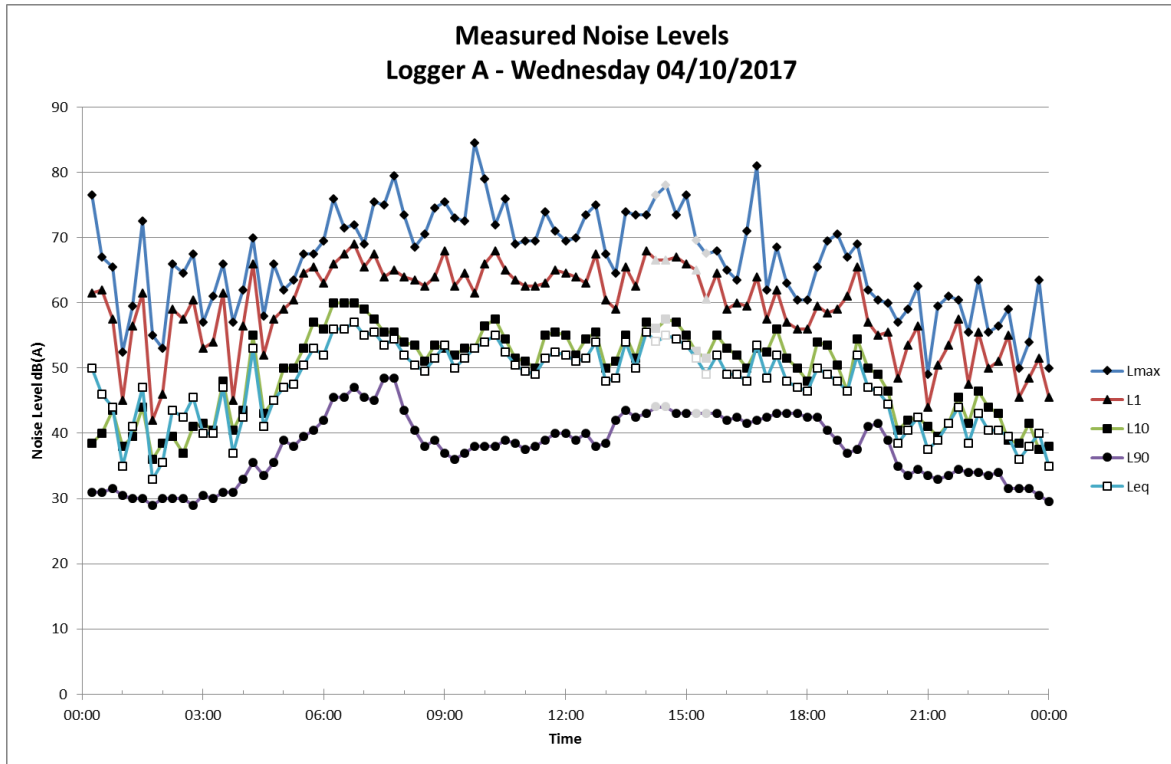
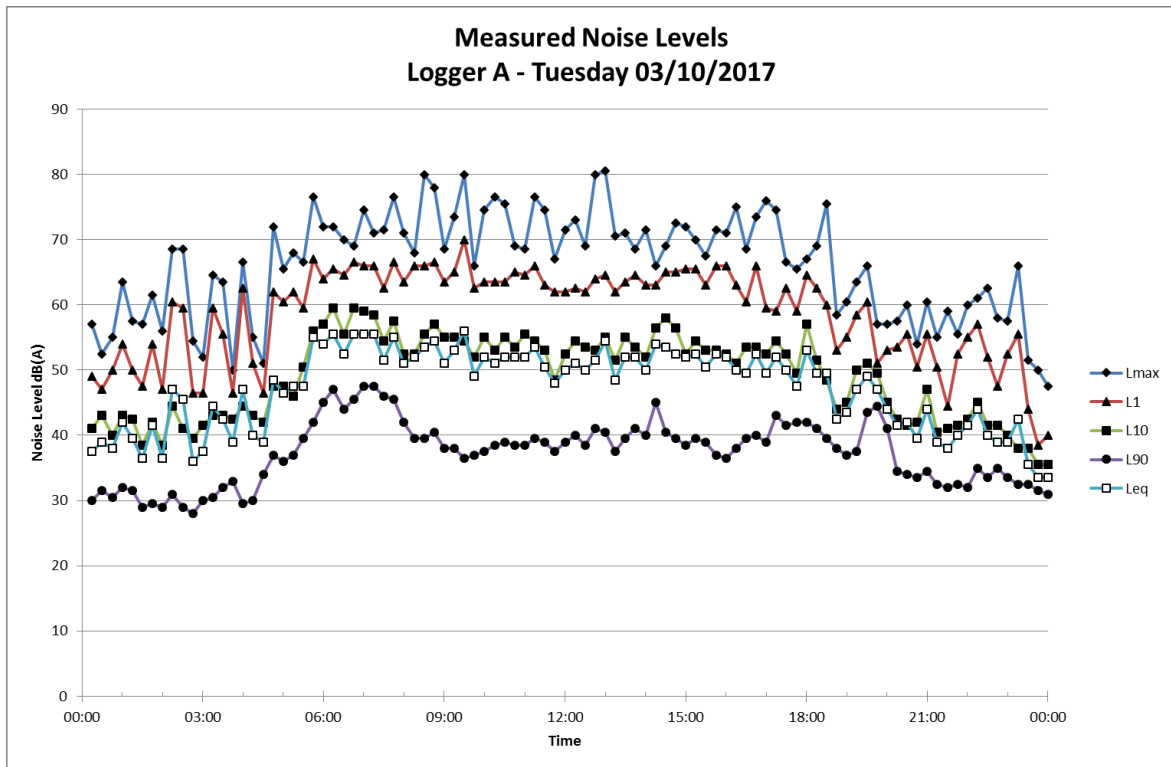
Road Traffic Noise Data at Location Logger A

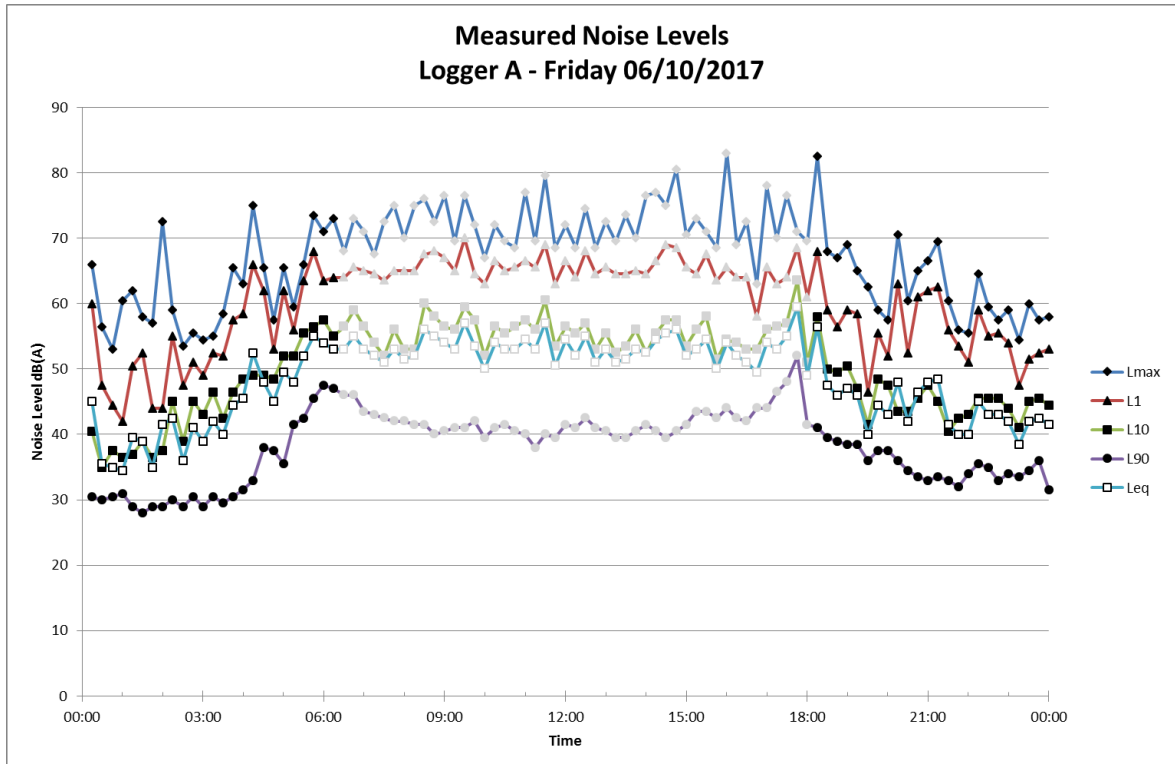
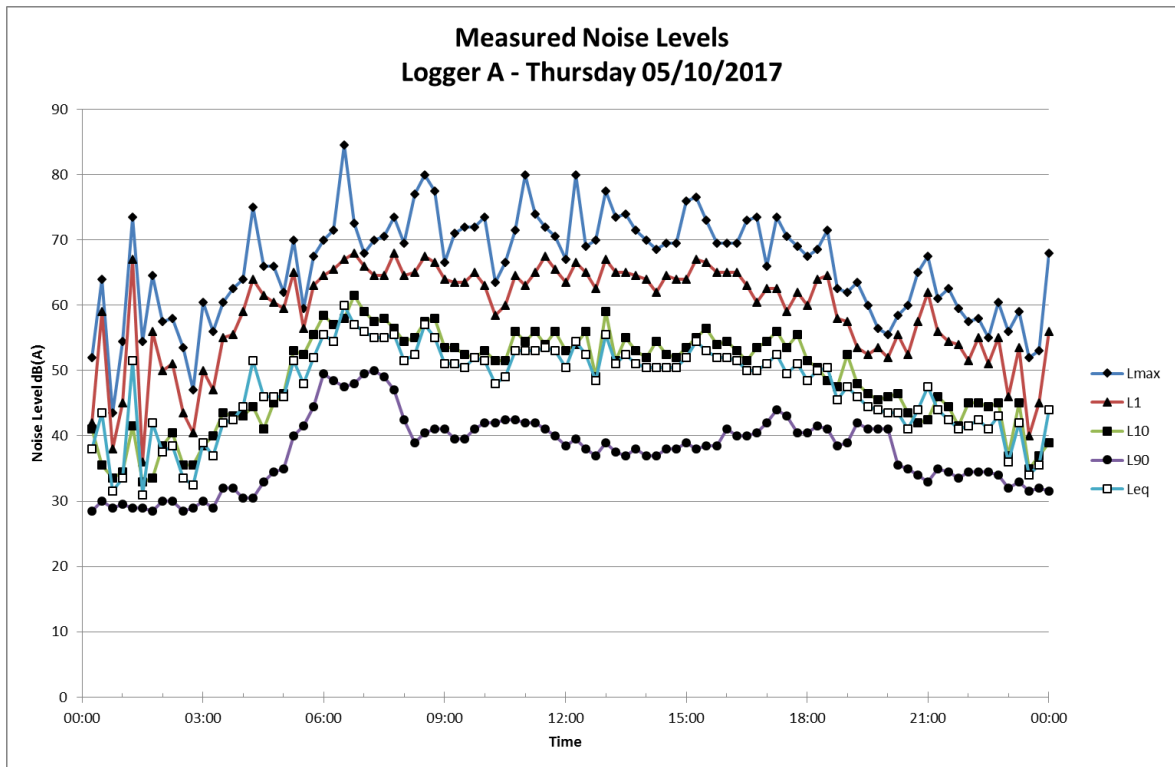
| Date                                              | Existing Road Traffic Noise Location A – dB(A) |                          |                          |                          |
|---------------------------------------------------|------------------------------------------------|--------------------------|--------------------------|--------------------------|
|                                                   | Daytime (7am to 10pm)                          |                          | Night-time (10pm to 7am) |                          |
|                                                   | L <sub>eq</sub> (15 hour)                      | L <sub>eq</sub> (1 hour) | L <sub>eq</sub> (9 hour) | L <sub>eq</sub> (1 hour) |
| 29/09/2017                                        | -                                              | -                        | -                        | -                        |
| 30/09/2017                                        | -                                              | -                        | -                        | -                        |
| 1/10/2017                                         | 46                                             | 47                       | 41                       | 43                       |
| 2/10/2017                                         | -                                              | -                        | 41                       | 42                       |
| 3/10/2017                                         | 53                                             | 53                       | 45                       | 49                       |
| 4/10/2017                                         | 52                                             | 53                       | 47                       | 50                       |
| 5/10/2017                                         | 53                                             | 54                       | 47                       | 51                       |
| 6/10/2017                                         | -                                              | -                        | 45                       | 48                       |
| 7/10/2017                                         | 50                                             | 51                       | 44                       | 47                       |
| 8/10/2017                                         | 47                                             | 47                       | 40                       | 42                       |
| 9/10/2017                                         | -                                              | -                        | 45                       | 48                       |
| 10/10/2017                                        | -                                              | -                        | -                        | -                        |
| <b>Logarithmic Average</b>                        | <b>51</b>                                      | <b>52</b>                | <b>45</b>                | <b>48</b>                |
| <b>Road Traffic Noise Levels at the Residence</b> | <b>47</b>                                      | <b>48</b>                | <b>41</b>                | <b>44</b>                |

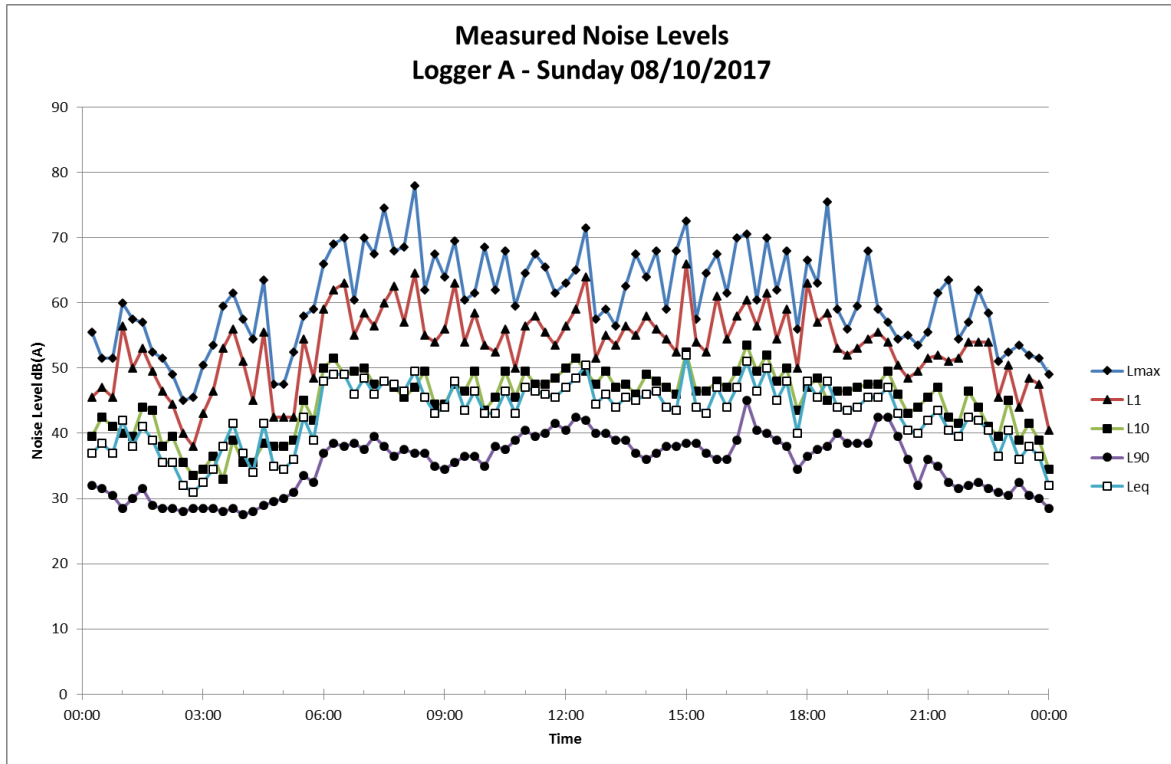
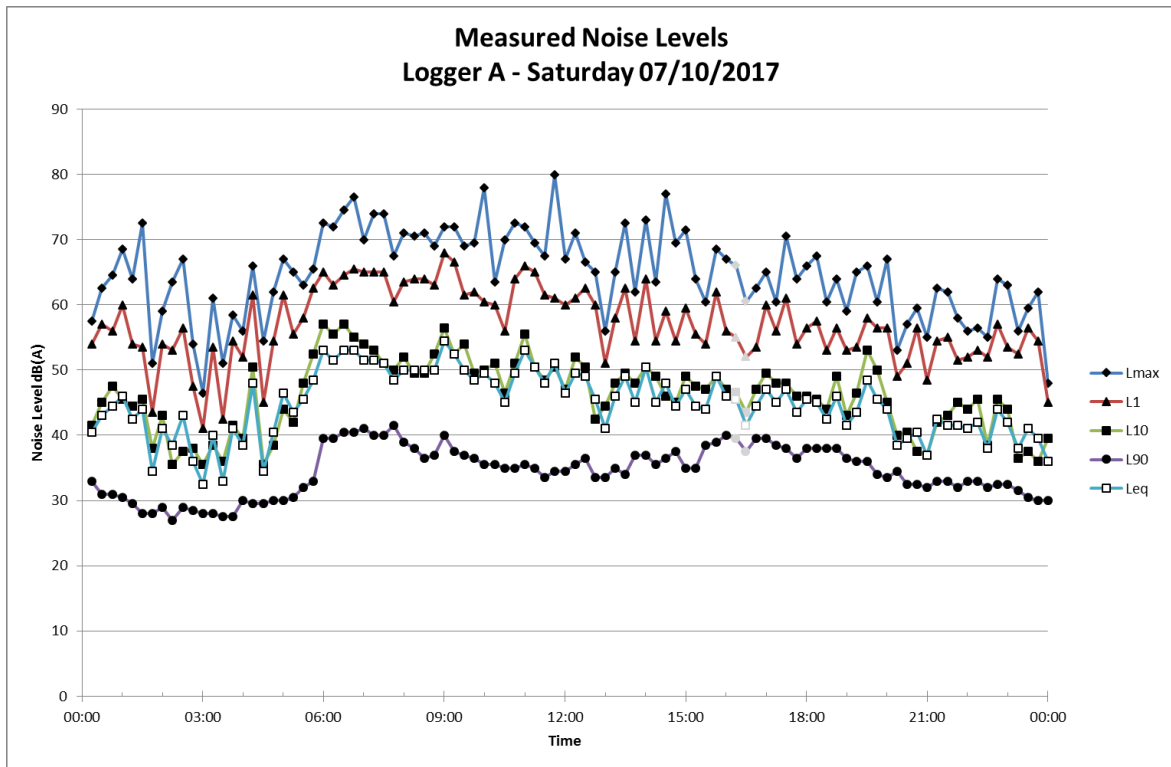
– Data excluded because adverse weather conditions were present.

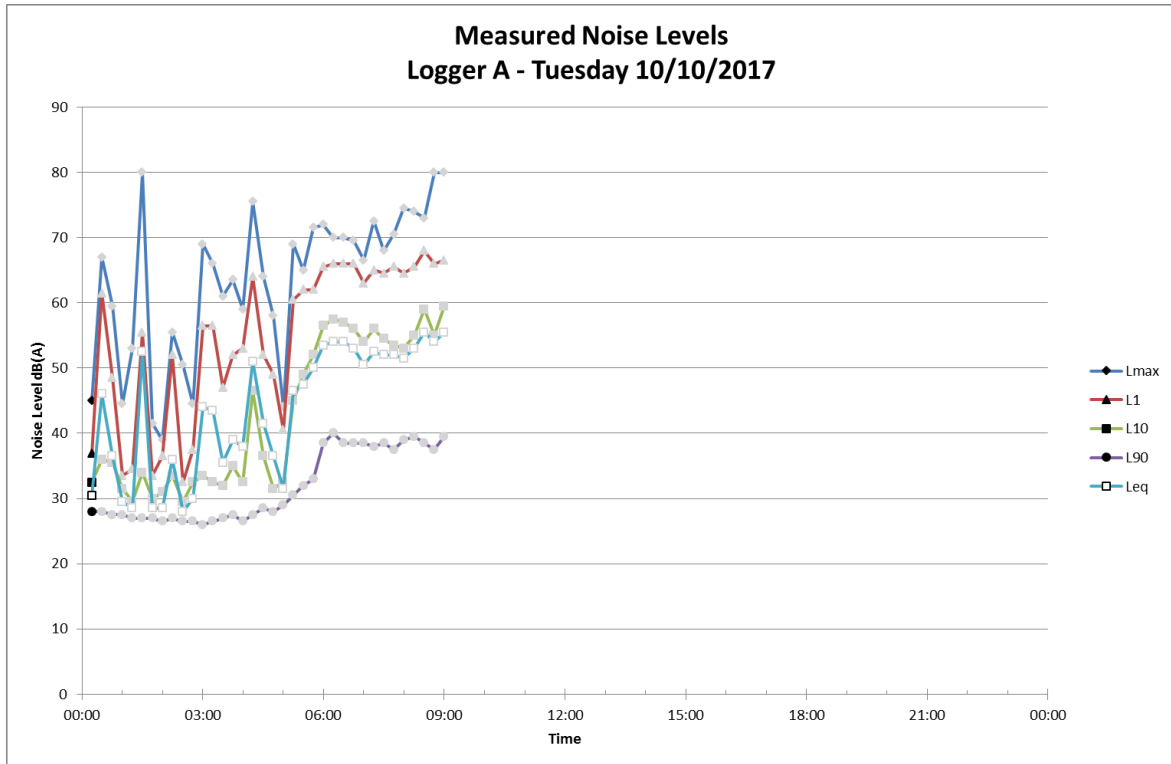
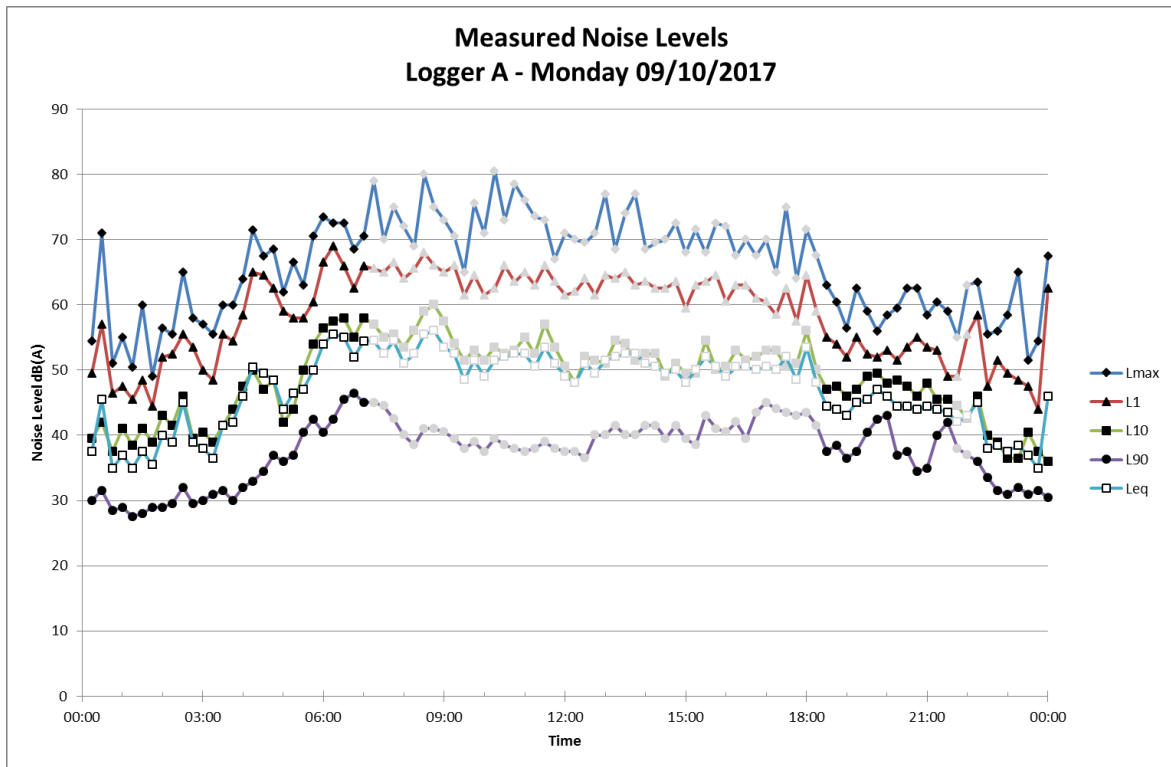












Logger B – Unattended Noise Monitoring Results, dB(A)

| Location B                 |                        |           |           |                 |           |           |
|----------------------------|------------------------|-----------|-----------|-----------------|-----------|-----------|
| Date                       | ABL (L <sub>90</sub> ) |           |           | L <sub>eq</sub> |           |           |
|                            | Day                    | Evening   | Night     | Day             | Evening   | Night     |
| 29/09/2017                 | -                      | 35        | 33        | -               | 50        | 44        |
| 30/09/2017                 | -                      | 33        | -         | -               | 45        | -         |
| 1/10/2017                  | 34                     | 33        | 32        | 48              | 48        | 43        |
| 2/10/2017                  | -                      | 37        | 30        | -               | 52        | 51        |
| 3/10/2017                  | 37                     | 36        | 31        | 51              | 49        | 49        |
| 4/10/2017                  | 38                     | 35        | 31        | 51              | 50        | 53        |
| 5/10/2017                  | 38                     | 36        | 30        | 52              | 49        | 47        |
| 6/10/2017                  | -                      | 35        | 30        | -               | 48        | 44        |
| 7/10/2017                  | 35                     | 32        | 29        | 51              | 49        | 45        |
| 8/10/2017                  | 36                     | 33        | 30        | 50              | 48        | 43        |
| 9/10/2017                  | -                      | 37        | 30        | -               | 47        | 45        |
| 10/10/2017                 | -                      | -         | -         | -               | -         | -         |
| <b>Median (RBL)</b>        | <b>37</b>              | <b>35</b> | <b>30</b> | <b>*</b>        | <b>*</b>  | <b>*</b>  |
| <b>Logarithmic Average</b> | <b>*</b>               | <b>*</b>  | <b>*</b>  | <b>51</b>       | <b>49</b> | <b>48</b> |

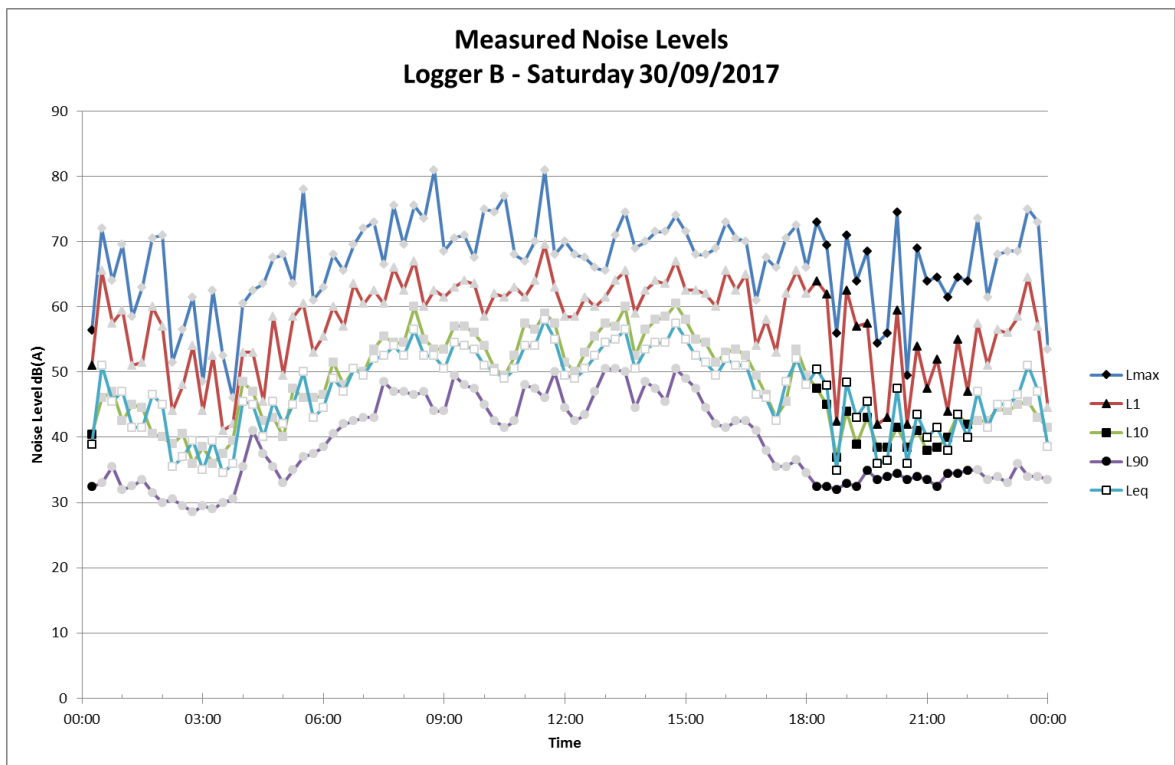
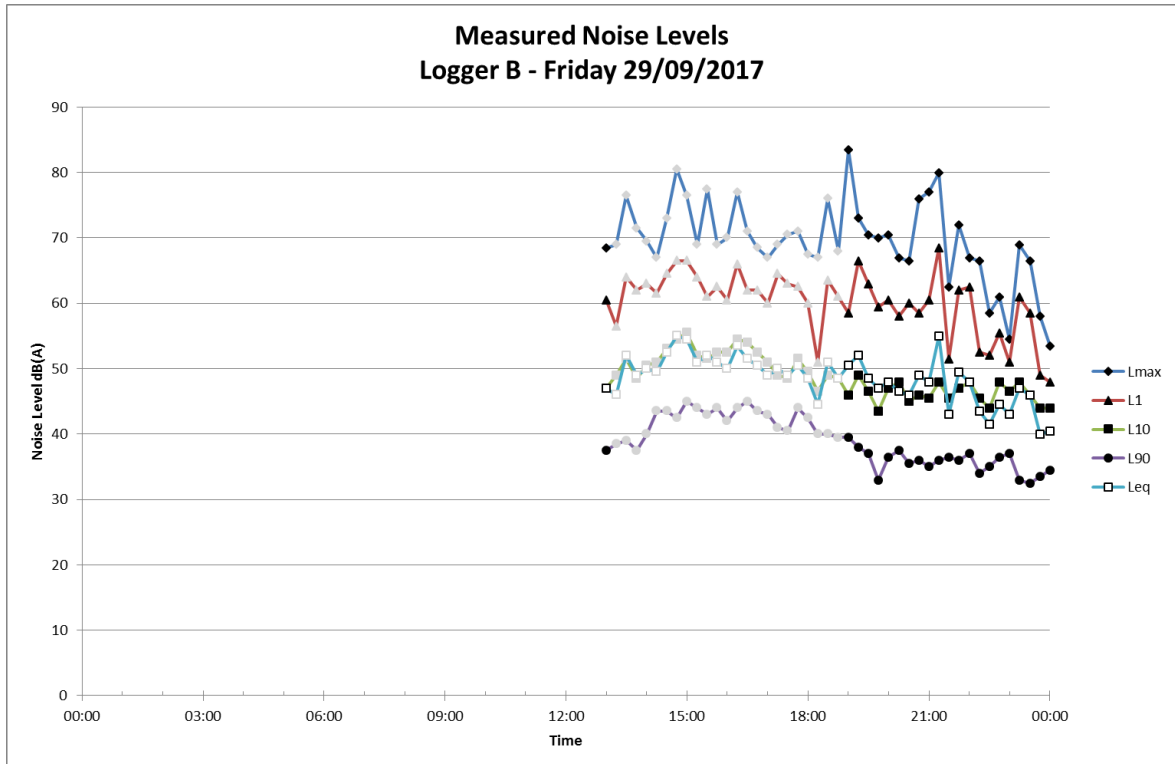
**Note:** - indicates values that has not been considered due to adverse weather conditions

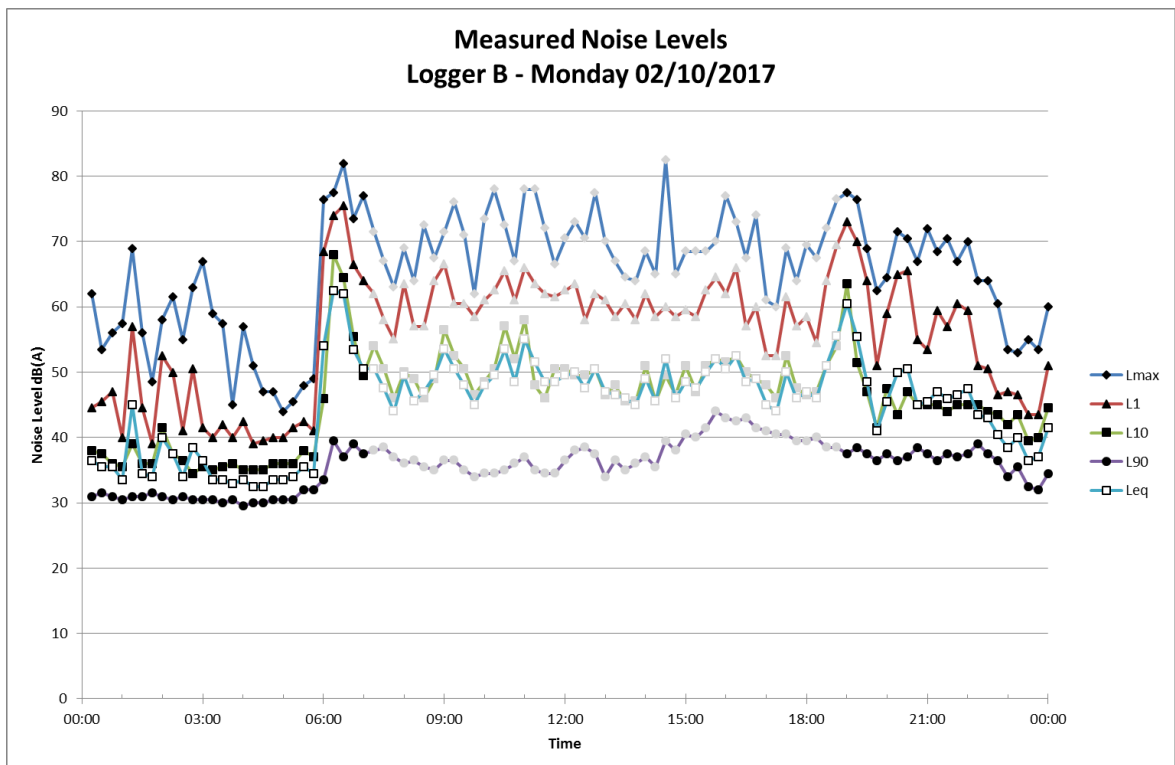
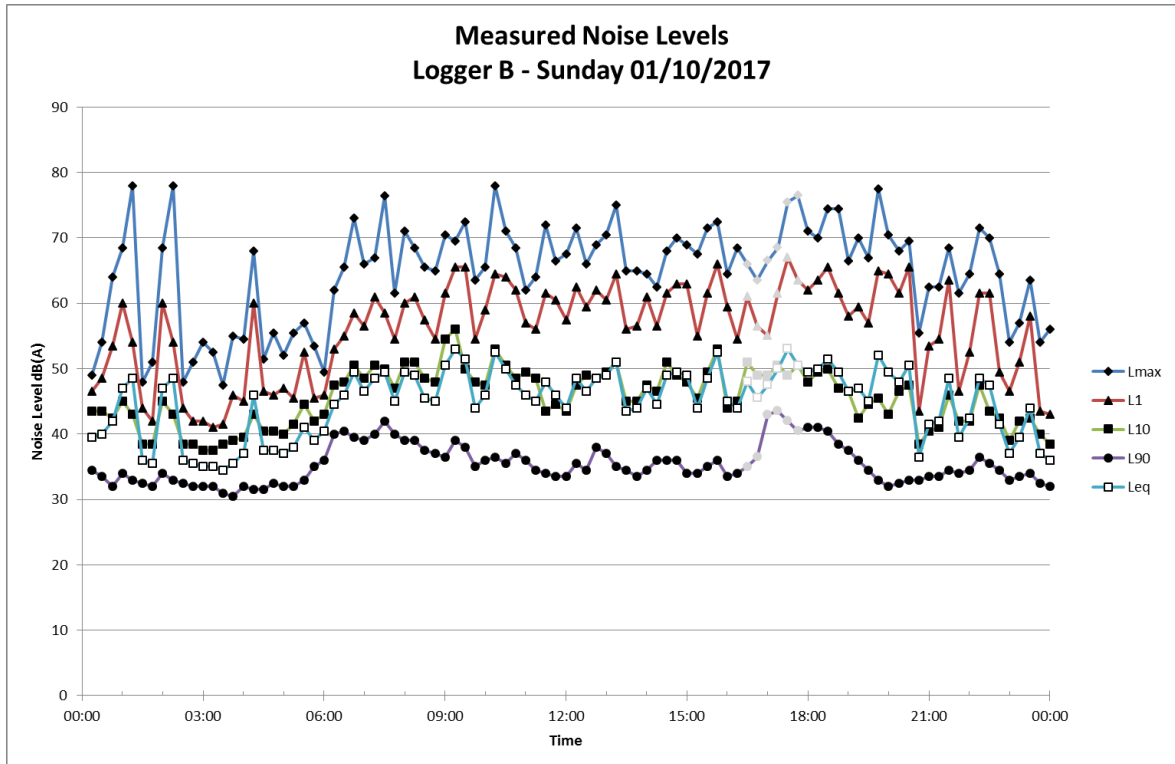
\* Indicates values that are not relevant to that noise descriptor

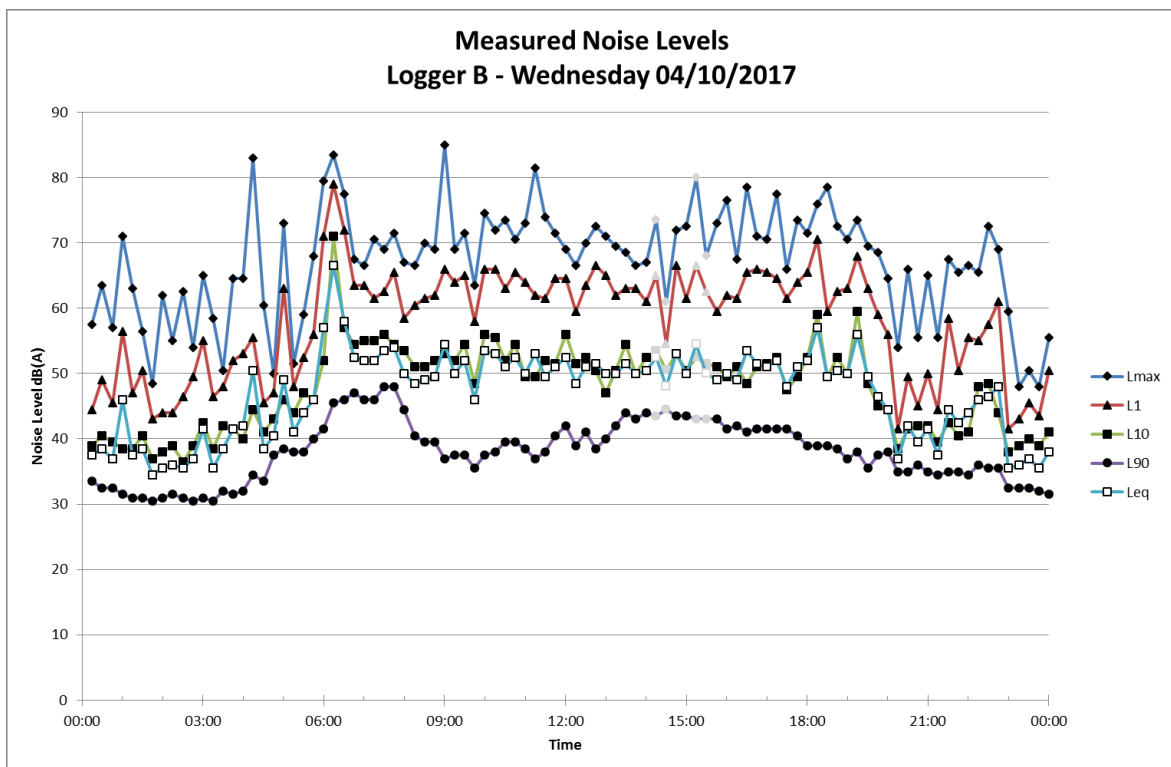
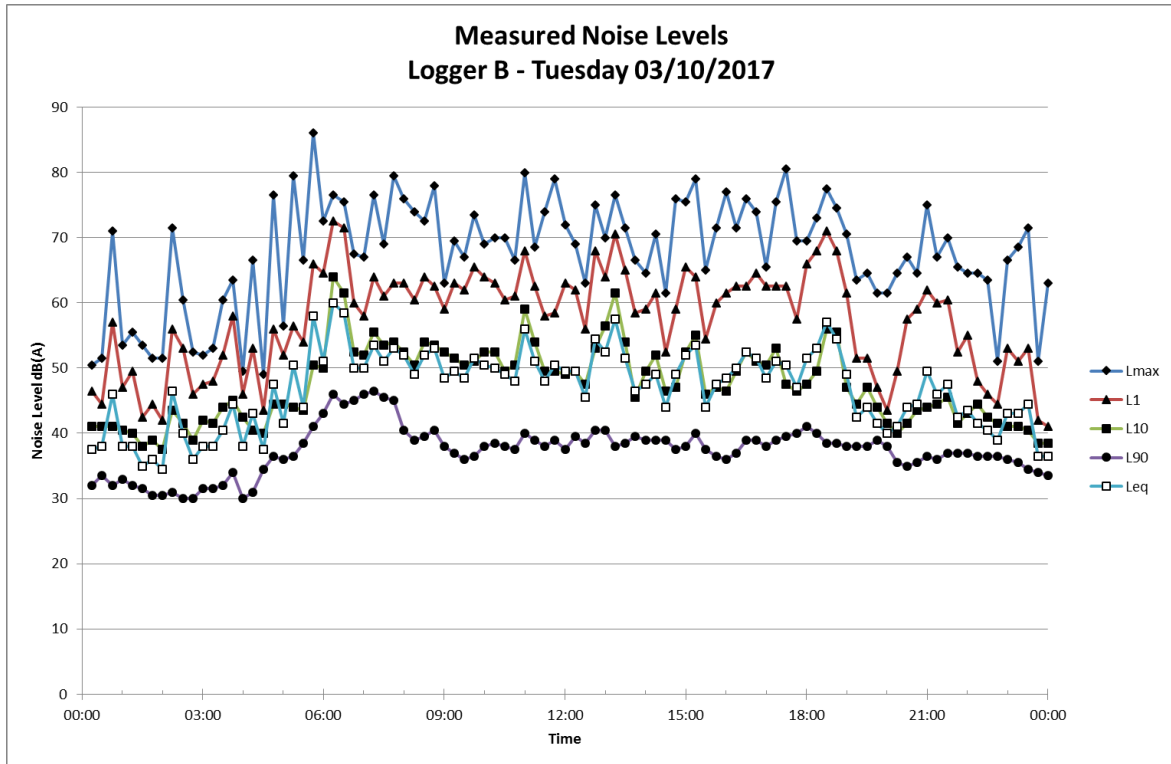
Road Traffic Noise Data at Location Logger B

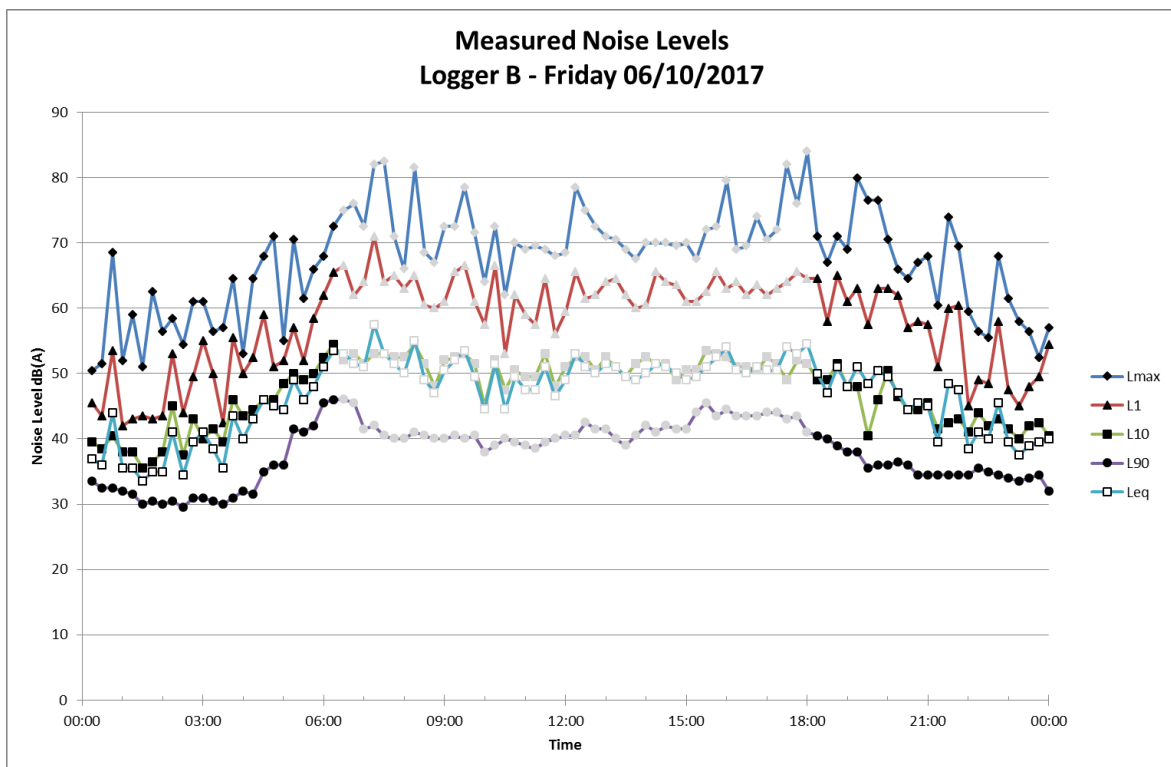
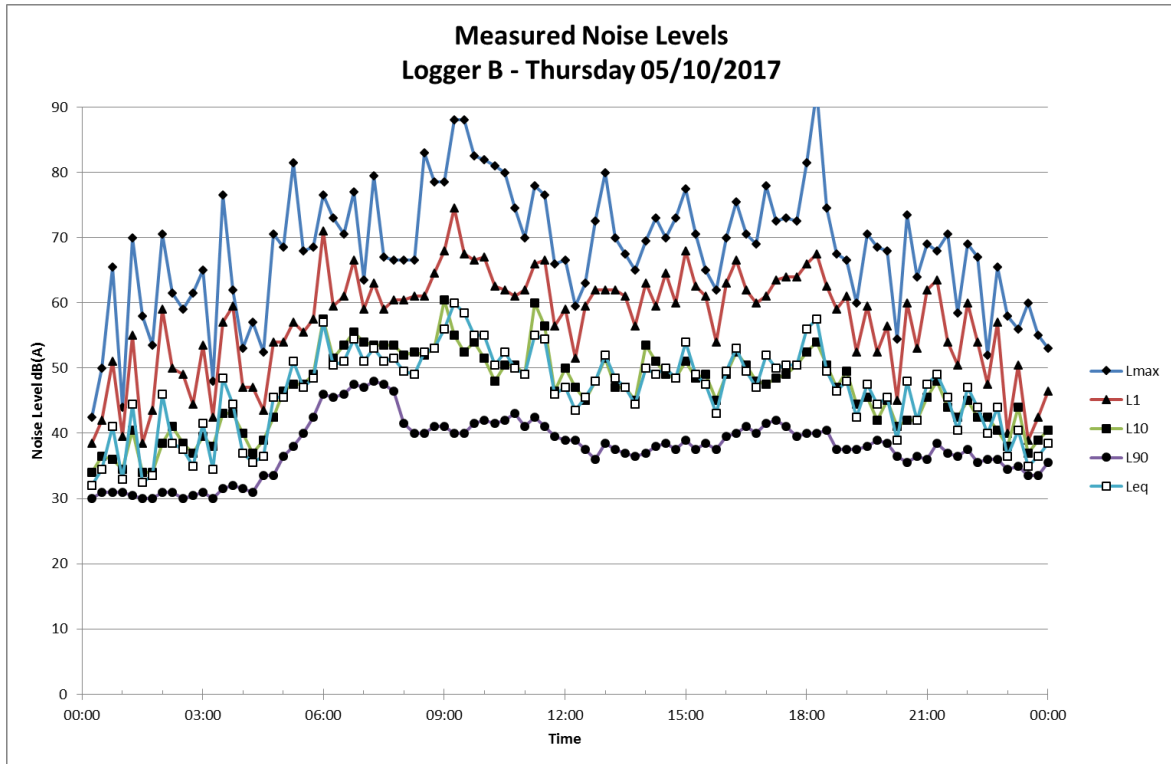
| Date                                              | Existing Road Traffic Noise Location B – dB(A) |                          |                          |                          |
|---------------------------------------------------|------------------------------------------------|--------------------------|--------------------------|--------------------------|
|                                                   | Daytime (7am to 10pm)                          |                          | Night-time (10pm to 7am) |                          |
|                                                   | L <sub>eq</sub> (15 hour)                      | L <sub>eq</sub> (1 hour) | L <sub>eq</sub> (9 hour) | L <sub>eq</sub> (1 hour) |
| 29/09/2017                                        | -                                              | -                        | -                        | -                        |
| 30/09/2017                                        | -                                              | -                        | -                        | -                        |
| 1/10/2017                                         | 49                                             | 49                       | 43                       | 44                       |
| 2/10/2017                                         | -                                              | -                        | 46                       | 51                       |
| 3/10/2017                                         | 51                                             | 52                       | 46                       | 50                       |
| 4/10/2017                                         | 52                                             | 52                       | 48                       | 53                       |
| 5/10/2017                                         | 53                                             | 54                       | 44                       | 48                       |
| 6/10/2017                                         | -                                              | -                        | 42                       | 45                       |
| 7/10/2017                                         | 52                                             | 53                       | 44                       | 45                       |
| 8/10/2017                                         | 50                                             | 50                       | 39                       | 43                       |
| 9/10/2017                                         | -                                              | -                        | 42                       | 45                       |
| 10/10/2017                                        | -                                              | -                        | -                        | -                        |
| <b>Logarithmic Average</b>                        | 51                                             | 52                       | 45                       | 49                       |
| <b>Road Traffic Noise Levels at the Residence</b> | 47                                             | 48                       | 41                       | 45                       |

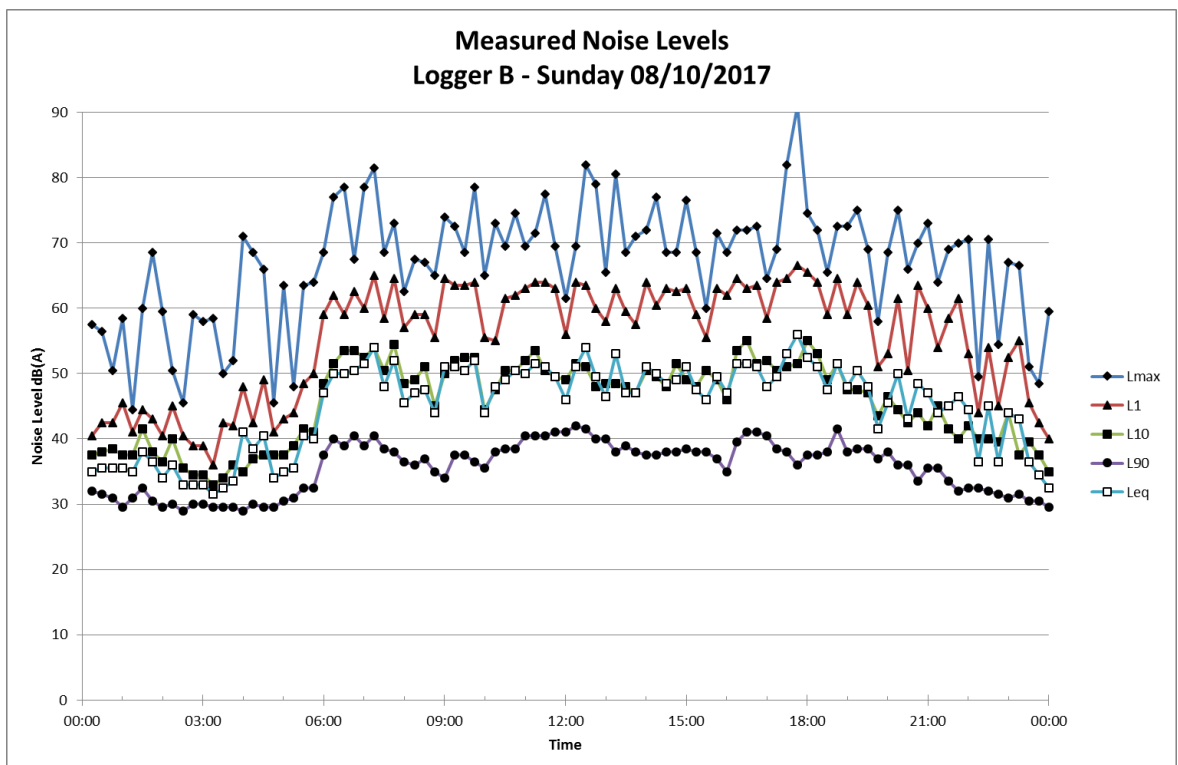
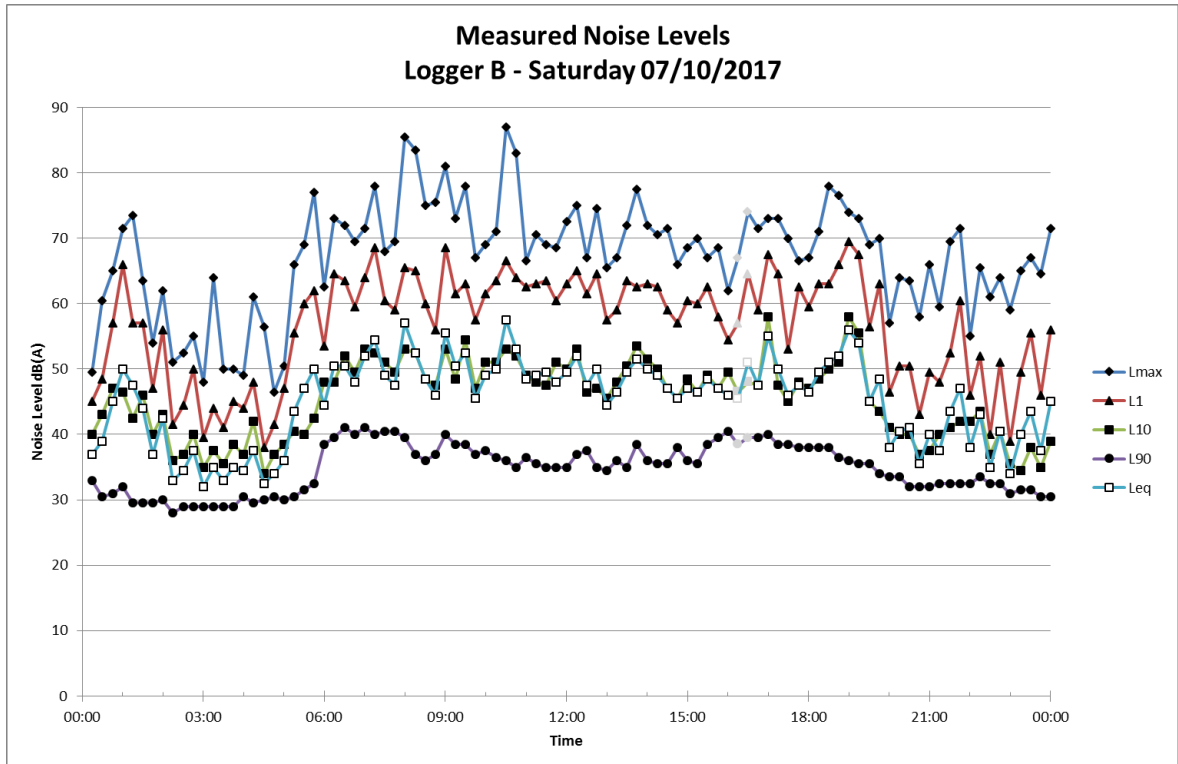
– Data excluded because adverse weather conditions were present.

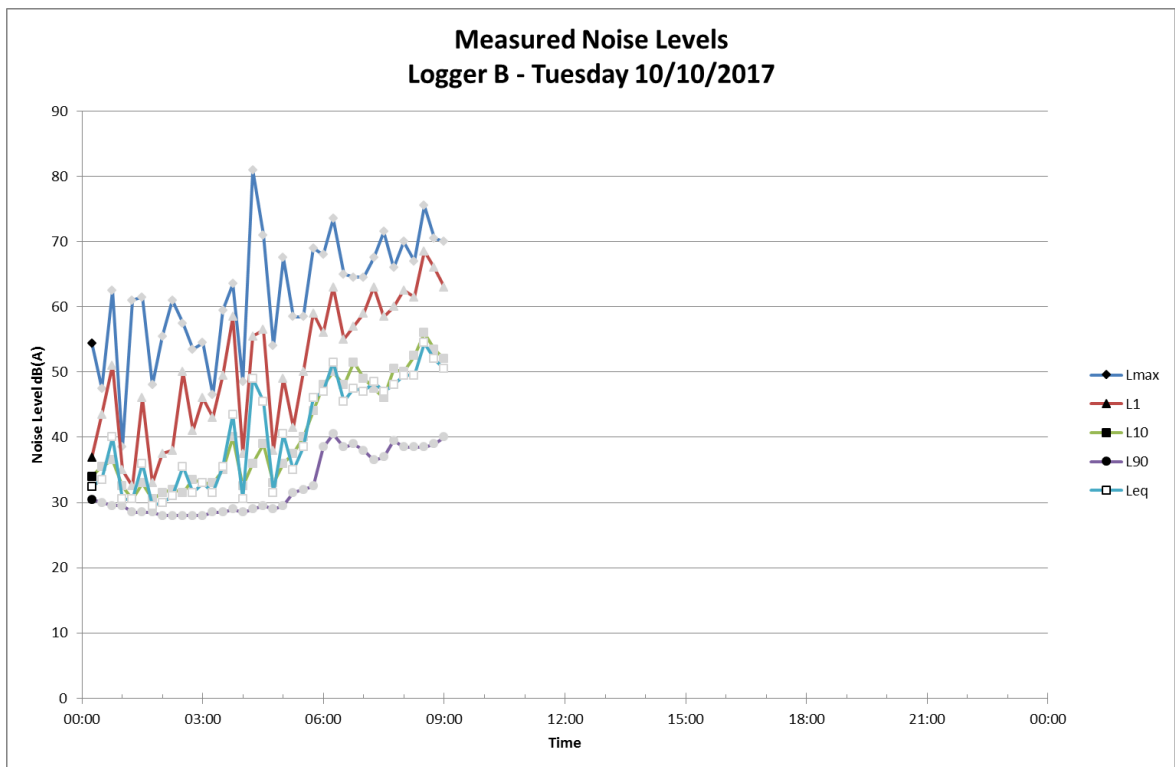
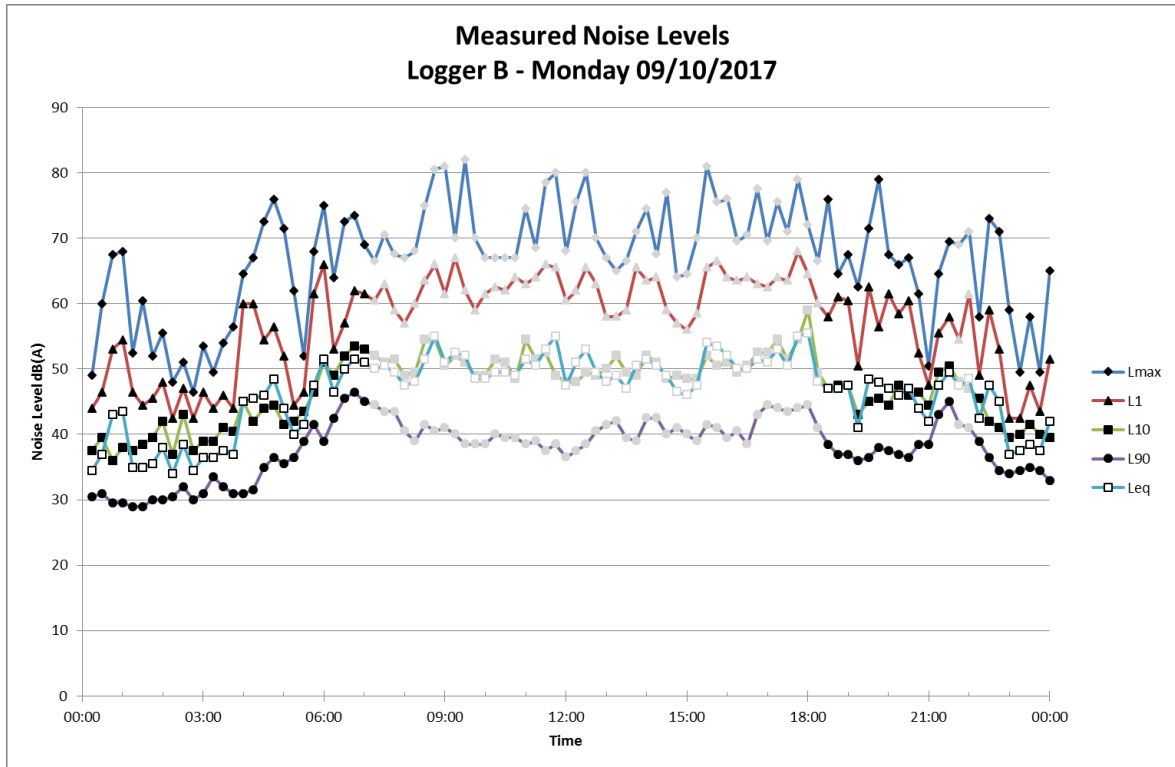








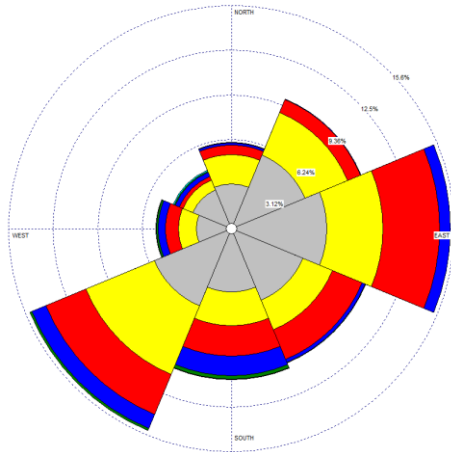




Attachment 6: Comparison of Annual Average Windroses From Badgerys Creek AWS  
Meteorological Data From 2012, 2014-2017

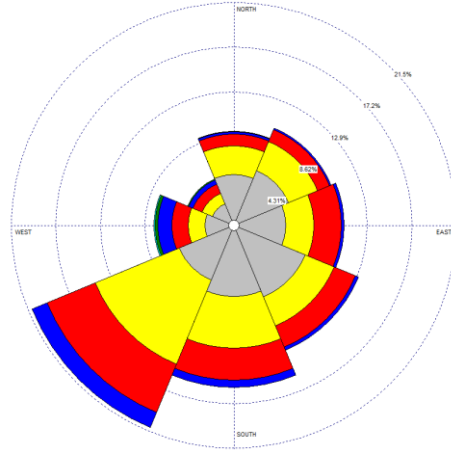
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2023



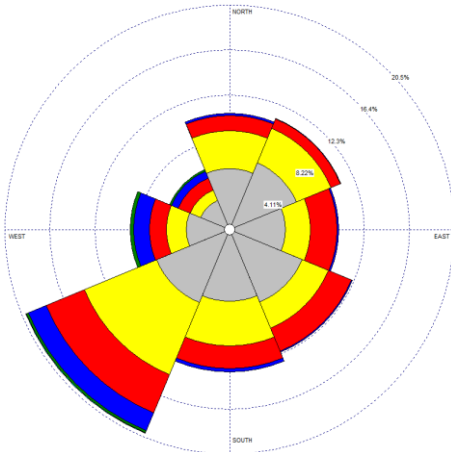
Average Wind Speed: 2.43 m/s  
Calms Frequency: 7.63%  
Axis Frequencies: : 3.12%, 6.24%, 9.36%, 12.5%, 15.6%

2022



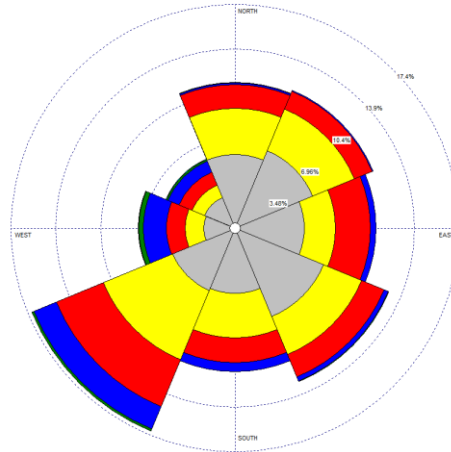
Average Wind Speed: 2.47 m/s  
Calms Frequency: 7.62%  
Axis Frequencies: 4.31%, 8.62%, 12.9%, 17.2%, 21.5%

2021



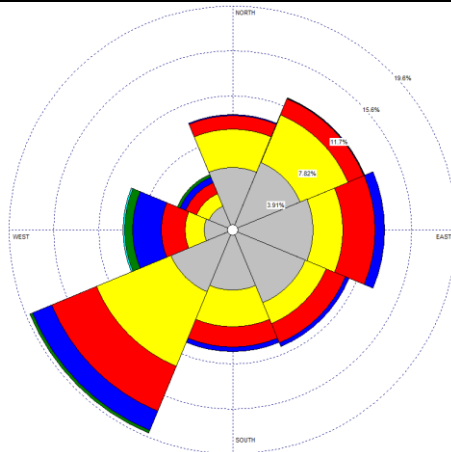
Average Wind Speed: 2.36 m/s  
Calms Frequency: 7.98%  
Axis Frequencies: 4.11%, 8.22%, 12.3%, 16.4%, 20.5%

2020



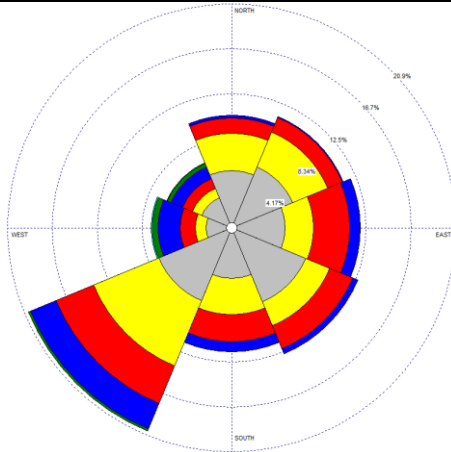
Average Wind Speed: 2.41 m/s  
Calms Frequency: 11.69%  
Axis Frequencies: 3.48%, 6.96%, 10.4%, 13.9%, 17.4%

2019



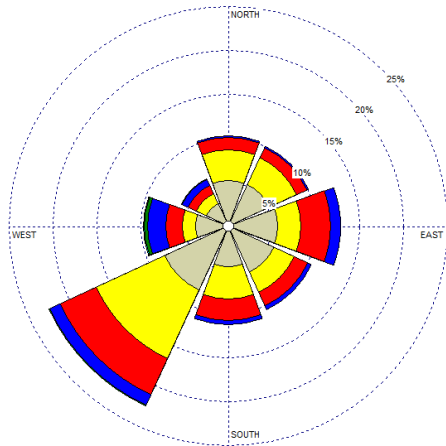
Average Wind Speed: 2.54 m/s  
Calms Frequency: 8.55%  
Axis Frequencies: 3.91%, 7.82%, 11.7%, 15.6%, 19.6%

2018



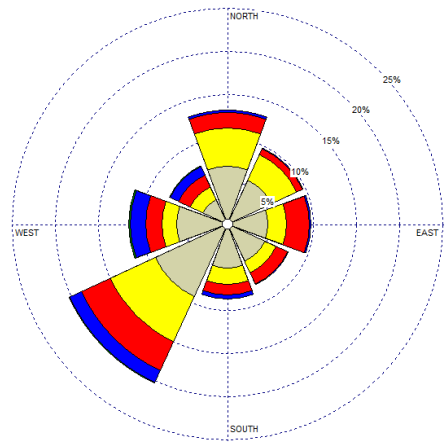
Average Wind Speed: 2.65 m/s  
Calms Frequency: 7.42%  
Axis Frequencies: 4.7%, 8.34%, 12.5%, 16.7%, 20.9%

2017



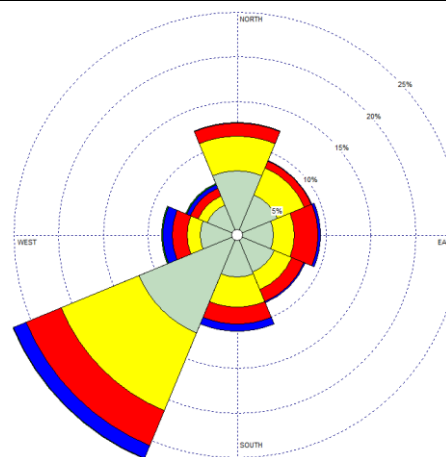
Average Wind Speed: 2.54 m/s  
Calms Frequency: 7.12%  
Axis Frequencies: : 5%, 10%, 15%, 20%, 25%

2016



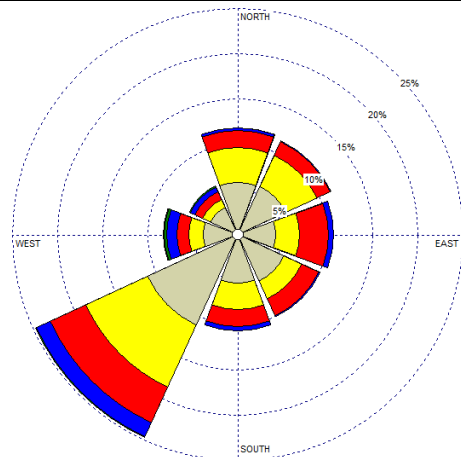
Average Wind Speed: 2.39 m/s  
Calms Frequency: 5.67%  
Axis Frequencies: 5%, 10%, 15%, 20%, 25%

2015



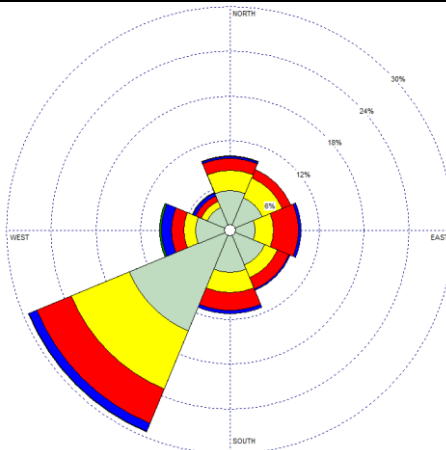
Average Wind Speed: 2.34 m/s  
Calms Frequency: 7.06%  
Axis Frequencies: 5%, 10%, 15%, 20%, 25%

2014



Average Wind Speed: 2.44 m/s  
Calms Frequency: 6.10%  
Axis Frequencies: : 5%, 10%, 15%, 20%, 25%

2012



Average Wind Speed: 2.34 m/s  
Calms Frequency: 7.55%  
Axis Frequencies: 6%, 12%, 18%, 24%, 30%

WIND SPEED  
(m/s)

