# BATTERY STORAGE FACILITY, BREDBURY

**Noise Impact Assessment**

Prepared for: Pivoted Power LLP **(an EDF Renewables company)**

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# BASIS OF REPORT

# CONTENTS

# DOCUMENT REFERENCES

## TABLES



## FIGURES



## APPENDICES

# 1.0 Introduction

Pivoted Power LLP has appointed SLR Consulting Ltd. (SLR) to undertake a noise impact assessment relating to a consented Battery Storage Facility (BSF), on Land under the ownership of National Grid at Bredbury.

The development was granted planning consent on 27 February 2023.

This Report presents the results of an updated assessment to account for a proposed change in the approved layout for the Site.

This Report presents the results of a baseline background sound survey, at locations representative of the nearest noise-sensitive receptors to the proposed development. Operational sound levels associated with the proposed changes to the permitted development, have been predicted at the nearest noise-sensitive receptors using the calculation methodologies in ISO 9613-2:1996 *Acoustics – Attenuation of Sound during Propagation Outdoors– Part 2: General Method of Calculation*, using the proprietary sound modelling software CadnaA®.

An assessment has been undertaken in accordance with British Standard 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound*.

Whilst reasonable effort has been made to ensure that this report is easy to understand, it is technical in nature; to assist the reader, a glossary of terminology is included in Appendix 01.

# 2.0 Site Description

## 2.1 Existing Site Conditions

The Site is located on Land under the ownership of National Grid at Bredbury.

Figure 2-1 shows the approximate location of the proposed BSF.

The Site is bordered:

- To the North by open vegetation, with residential use along Stockport Road West and Annable Road beyond.
- To the East by National Grid Infrastructure.
- To the South by National Grid Infrastructure, with The Mill and Pear Industrial Estate beyond.
- To the West by National Grid Infrastructure, with Stockport Road West beyond.

**Figure 2-1**
**Site Location**

## 2.2 Development

The approved BSF would import excess electricity from the local networks when demand is low, and supply is high; exporting stored electricity back to the grid when required in periods of high demand and/or low supply. This provides a solution to the growing need for flexibility, and helps to address concerns regarding grid reliability, prompted by the increased reliance on intermittent generation connected to the UK's electricity system.

This Report presents the results of a revised Noise Impact Assessment as the following changes are proposed to the approved development:

- A reduction in the number of inverters from 19 to 14
- A reduction in the number of transformers from 10 to 7.
- A change in the layout of the plant items.

# 3.0 Scope and Guidance

## 3.1 British Standard 4142:2014+A1:2019

British Standard 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound* is used to assess the potential adverse impact of sound, of an industrial and/or commercial nature, at nearby noise-sensitive receptor locations within the context of the existing sound environment.

Where the specific sound contains tonality, impulsivity and/or other sound characteristics, penalties should be applied depending on the perceptibility. For tonality, a correction of either 0, 2, 4 or 6dB should be added and for impulsivity, a correction of either 0, 3, 6 or 9dB should be added. If the sound contains specific sound features which are neither tonal nor impulsive, a penalty of 3dB should be added.

In addition, if the sound contains identifiable operational and non-operational periods, that are readily distinguishable against the existing sound environment, a further penalty of 3dB may be applied.

The assessment of impact contained in BS4142:2014+A1:2019 is undertaken by comparing the sound rating level, i.e. the specific sound level of the source plus any penalties, to the measured representative background sound level immediately outside the noise-sensitive receptor location. Consideration is then given to the context of the existing sound environment at the noise-sensitive receptor location to assess the potential impact.

Once an initial estimate of the impact is determined, by subtracting the measured background sound level from the rating sound level, BS4142:2014+A1:2019 states that the following should be considered:

- typically, the greater the difference, the greater the magnitude of the impact;
- a difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context;
- a difference of around +5dB is likely to be an indication of an adverse impact, depending on the context; and
- the lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. It is an indication that the specific sound source has a low impact, depending on the context.

BS4142:2014+A1:2019 notes that:

*"Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact."*

BS4142:2014+A1:2019 outlines guidance for the consideration of the context of the potential impact including consideration of the existing residual sound levels, location and/or absolute sound levels.

To account for the acoustic character of proposed sound sources, BS4142:2014+A1:2019 provides the following with respect to the application of penalties to account for *"the subjective prominence of the character of the specific sound at the noise-sensitive locations and the extent to which such acoustically distinguishing characteristics will attract attention".*

- **Tonality** – *"For sound ranging from not tonal to predominantly tonal the Joint Nordic Method gives a correction of between 0dB and +6dB for tonality. Subjectively, this can be converted to a penalty of 2dB for a tone which is just perceptible at the noise receptor, 4dB where it is clearly perceptible and 6dB where it is highly perceptible;*
- **Impulsivity** – *A correction of up to +9dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can*

*be converted to a penalty of 3dB for impulsivity which is just perceptible at the noise receptor, 6dB where it is clearly perceptible, and 9dB where it is highly perceptible;*

- **Intermittency** – *When the specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time. If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3dB can be applied; and*
- **Other Sound Characteristics** – *Where the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3dB can be applied."*

Finally, BS4142:2014+A1:2019 outlines guidance for the consideration of the context of the potential impact, including consideration of the existing residual sound levels, location and/or absolute sound levels.

## 3.2 ISO 9613-2:1996

The levels of sound generated by the operation of the proposed development have been predicted in accordance with the prediction framework within ISO 9613-2:1996 *Acoustics – Attenuation of Sound during Propagation Outdoors– Part 2: General Method of Calculation*. This method of calculation takes into account the distance between the sound sources and the closest receptors, and the amount of attenuation due to atmospheric absorption. The methodology also assumes downwind propagation, i.e. a wind direction that assists the propagation of sound from the source to the receiver.

# 4.0 Baseline Sound Survey

For the planning application a baseline noise survey was completed in 2020 and 2021. The results of this survey are replicated below.

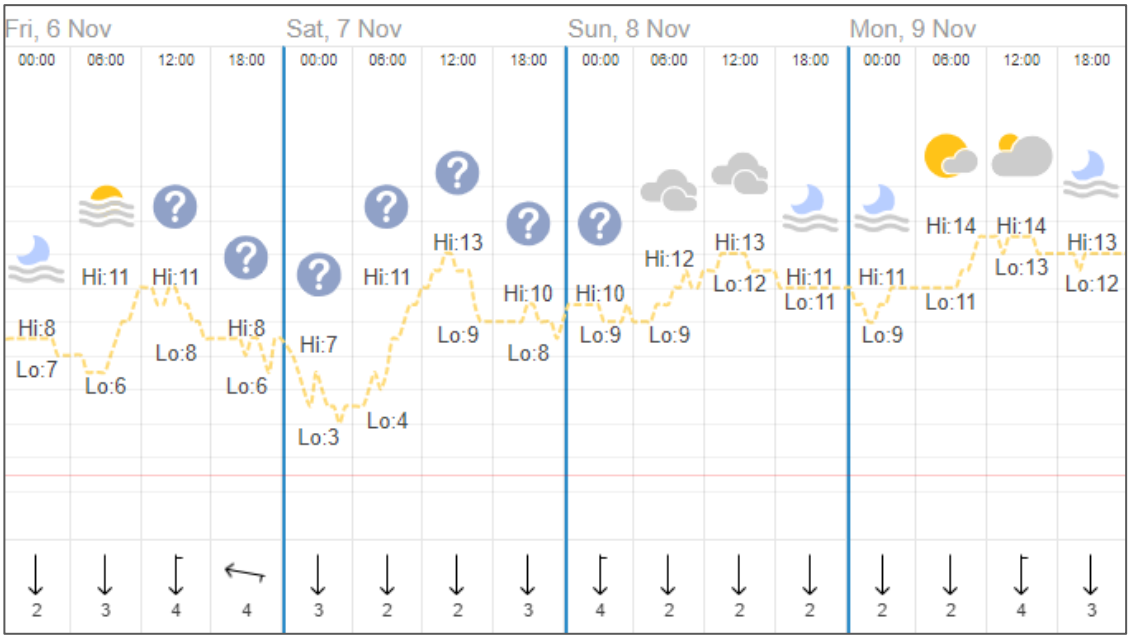
## 4.1 Survey Date

To determine baseline sound levels in the vicinity of the proposed development, an initial noise survey was undertaken between Friday 6th November and Monday 9th November 2020. Due to technical issues with some of the equipment used during that survey, a second survey was completed between Thursday 25th February and 1st March 2021.

## 4.2 Weather Conditions

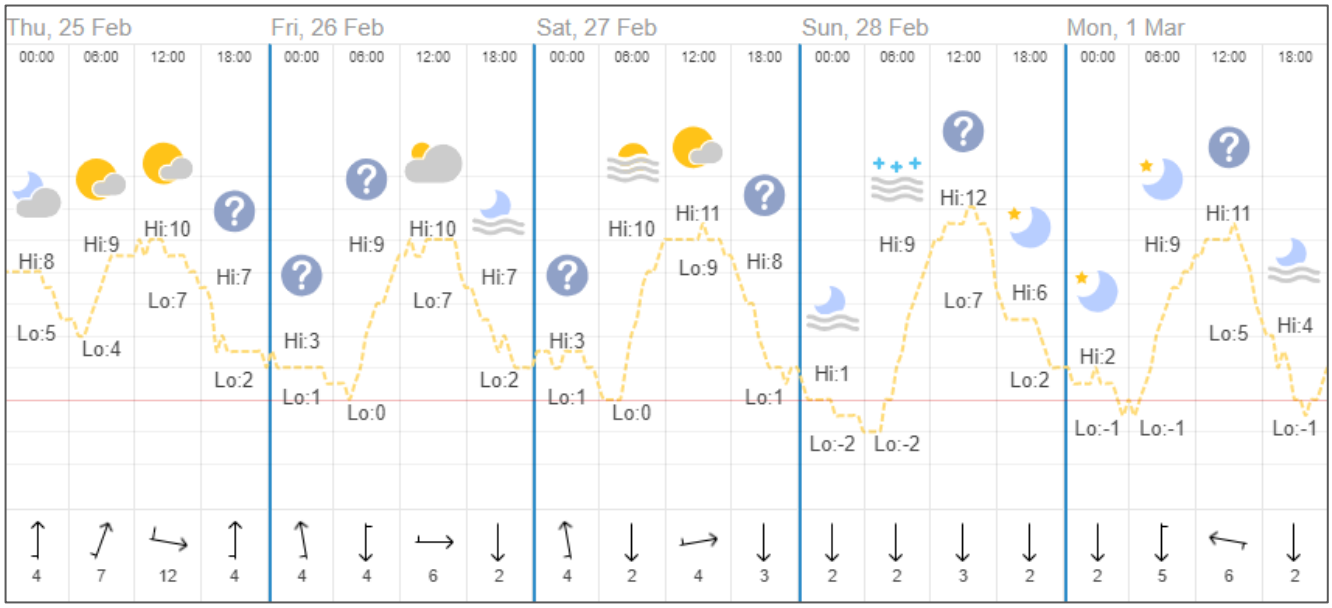
During the survey weather conditions were generally suitable for noise monitoring with calm and dry weather conditions. The general weather conditions can be seen in Figures 4-1[1] and 4-2 (wind speeds shown are mph).

**Figure 4-1**
**Weather Conditions – Survey 1**




[1] https://www.timeanddate.com/weather/@2654814/historic

**Figure 4-2**
**Weather Conditions – Survey 2**




## 4.3 Equipment

The noise survey equipment used during the survey is detailed in Table 4-1. All measurement instrumentation was calibrated before and after the measurements. No significant drift was observed. The calibration chain is traceable via the United Kingdom Accreditation Service (UKAS) to National Standards held at the National Physical Laboratory.

**Table 4-1**
**Survey Equipment**

| Location | Equipment | Serial Number |
|---|---|---|
| Locations 1 and 3 | Norsonic 140 Type 1 Sound Level Meter | 1403012 |
| | Norsonic 1251 Acoustic Calibrator | 31872 |
| Locations 2 and 3 | Rion NL-52 Type 1 Sound Level Meter | 00331823 |
| | Rion NC-74 Acoustic Calibrator | 34336013 |

## 4.4 Survey Locations

Sound levels were measured by at two locations, representative of the nearest Residential Receptors to the site, as follows:

- Location 1: Stockport Road. In the assessment this data is used for the following receptors:
  - No.4 Annable Road, No.573 Stockport Road, and No. 533 Stockport Road.
- Location 2: Annable Road. In the assessment this data is used for the following receptors:
  - No.32 Annable Road.

- Location 3: Southern boundary near to the Mill.

The original unattended survey was completed between Friday 6th and Monday 9th November 2020. However, due to technical issues with the meter at Location 1, the measurement at this position was repeated between Thursday 25th February and Monday 1st March 2021.

Additional attended measurements were also taken at Location 3, in a position to the south of the Site considered representative of the commercial premise abutting the southern boundary of the National Grid Site.

The survey locations are shown in Figure 4-3.

**Figure 4-3**
**Survey and Sensitive Receptor Locations**


At the survey locations the microphone was placed 1.5m above the local ground level and in free-field conditions, i.e. at least 3.5m from the nearest vertical, reflecting surface. The following noise level indices were recorded:

- $L_{Aeq,T}$: The A-weighted equivalent continuous noise level over the measurement period.
- $L_{A90}$: The A-weighted noise level exceeded for 90% of the measurement period. This parameter is often used to describe background noise.
- $L_{A10}$: The A-weighted noise level exceeded for 10% of the measurement period. This parameter is often used to describe road traffic noise.
- $L_{Amax}$: The maximum A-weighted noise level during the measurement period.

## 4.5 Baseline Sound Level Results

### 4.5.1 Location 2 Annable Road Results

A summary of the survey results from Location 2, is shown in Table 4-2. The full survey results are available upon request.

**Table 4-2**
**Annable Road - Summary of Measured Sound Levels, free-field, dB**

| Date | Period | $L_{Aeq,T}$ | Median $L_{A90}$ | Median $L_{A10}$ | $L_{Amax}$ |
|---|---|---|---|---|---|
| Friday 6th November 2020 | Daytime (14.45 – 23.00) | 60.8 | 40.3 | 42.7 | 100.9 |
| | Night-Time | 41.8 | 36.9 | 37.5 | 75.8 |
| Saturday 7th November 2020 | Daytime | 59.9 | 40.6 | 43.4 | 104.0 |
| | Night-Time | 43.3 | 36.9 | 38.1 | 71.6 |
| Sunday 8th November 2020 | Daytime | 48.8 | 39.2 | 41.4 | 77.7 |
| | Night-Time | 41.0 | 36.4 | 37.7 | 62.2 |
| Monday 9th November 2020 | Daytime (7.00 – 11:30) | 50.6 | 42.8 | 44.7 | 75.5 |

The following baseline background sound levels were used in the BS4142:2014+A1:2019 planning noise assessment for the sensitive receptors on Annable Road:

- Daytime: 39.2 dB $L_{A90}$.
- Night-Time: 36.4 dB $L_{A90}$ .

### 4.5.2 Location 1 Stockport Road Results

A summary of the survey results from Location 1 is shown in Table 4-3. The full survey results are available upon request.

**Table 4-3**
**Location 1 Stockport Road - Summary of Measured Sound Levels, free-field, dB**

| Date | Period | $L_{Aeq,T}$ | Median $L_{A90}$ | Median $L_{A10}$ | $L_{Amax}$ |
|---|---|---|---|---|---|
| Thursday 25th February 2021 | Daytime (14:30 – 23:00) | 56.0 | 50.9 | 54.0 | 83.4 |
| | Night-Time | 53.5 | 47.0 | 51.4 | 83.0 |
| Friday 26th February 2021 | Daytime | 58.6 | 52.4 | 58.4 | 97.0 |
| | Night-Time | 50.9 | 46.1 | 51.7 | 76.9 |
| Saturday 27th February 2021 | Daytime | 54.9 | 48.9 | 56.8 | 84.7 |
| | Night-Time | 51.5 | 41.4 | 48.9 | 78.9 |
| Sunday 28th February 2021 | Daytime | 56.6 | 46.9 | 55.4 | 92.3 |
| | Night-Time | 51.7 | 44.9 | 48.6 | 78.6 |
| Monday 1st March 2021 | Daytime (07:00 – 11:00) | 58.7 | 51.6 | 60.9 | 81.3 |
| | Night-Time | - | - | - | - |

The following baseline background sound levels will be used in the BS4142:2014+A1:2019 planning noise assessment for the sensitive receptors on Stockport Road:

- Daytime: 46.9 dB $L_{A90}$.
- Night-Time: 41.4 dB $L_{A90}$.

### 4.5.3 Location 3 Southern Boundary Results

The attended survey results from Location 3 are shown in Table 4-4.

**Table 4-4**
**Southern Boundary - Measured Sound Levels, free-field, dB**

| Date | Start Time | $L_{Aeq,T}$ | Median $L_{A90}$ | Median $L_{A10}$ | $L_{Amax}$ |
|---|---|---|---|---|---|
| Thursday 25th February 2021 | 15:00 | 57.8 | 55.8 | 58.5 | 72.8 |
| | 15:15 | 56.9 | 55.8 | 57.8 | 66.3 |
| | 15:30 | 58.4 | 55.9 | 59.6 | 75.1 |
| | 15:45 | 57.7 | 55.9 | 58.4 | 69.9 |
| | 16:00 | 57.7 | 55.8 | 58.3 | 72.4 |
| | 16:15 | 57.3 | 55.9 | 58.4 | 67.4 |
| | 16:30 | 57.6 | 55.7 | 58.8 | 69.7 |
| | 16:45 | 57.8 | 55.7 | 58.1 | 71.9 |
| Monday 1st March 2021 | 14:15 | 46.2 | 42.2 | 47.7 | 68.6 |
| | 14:30 | 46.9 | 42.3 | 47.6 | 67.0 |
| | 14:45 | 50.8 | 43.4 | 52.2 | 67.7 |
| | 15:00 | 48.5 | 43.6 | 50.3 | 70.8 |
| | 15:15 | 48.3 | 43.1 | 51.0 | 65.5 |
| | 15:30 | 48.5 | 43.1 | 48.2 | 65.0 |
| | 15:45 | 45.5 | 43.0 | 46.5 | 64.6 |
| | 16:00 | 48.0 | 43.4 | 50.5 | 70.1 |

# 5.0 2023 Baseline Sound Survey

For this application to amend the conditions and layout an updated noise survey has been completed.

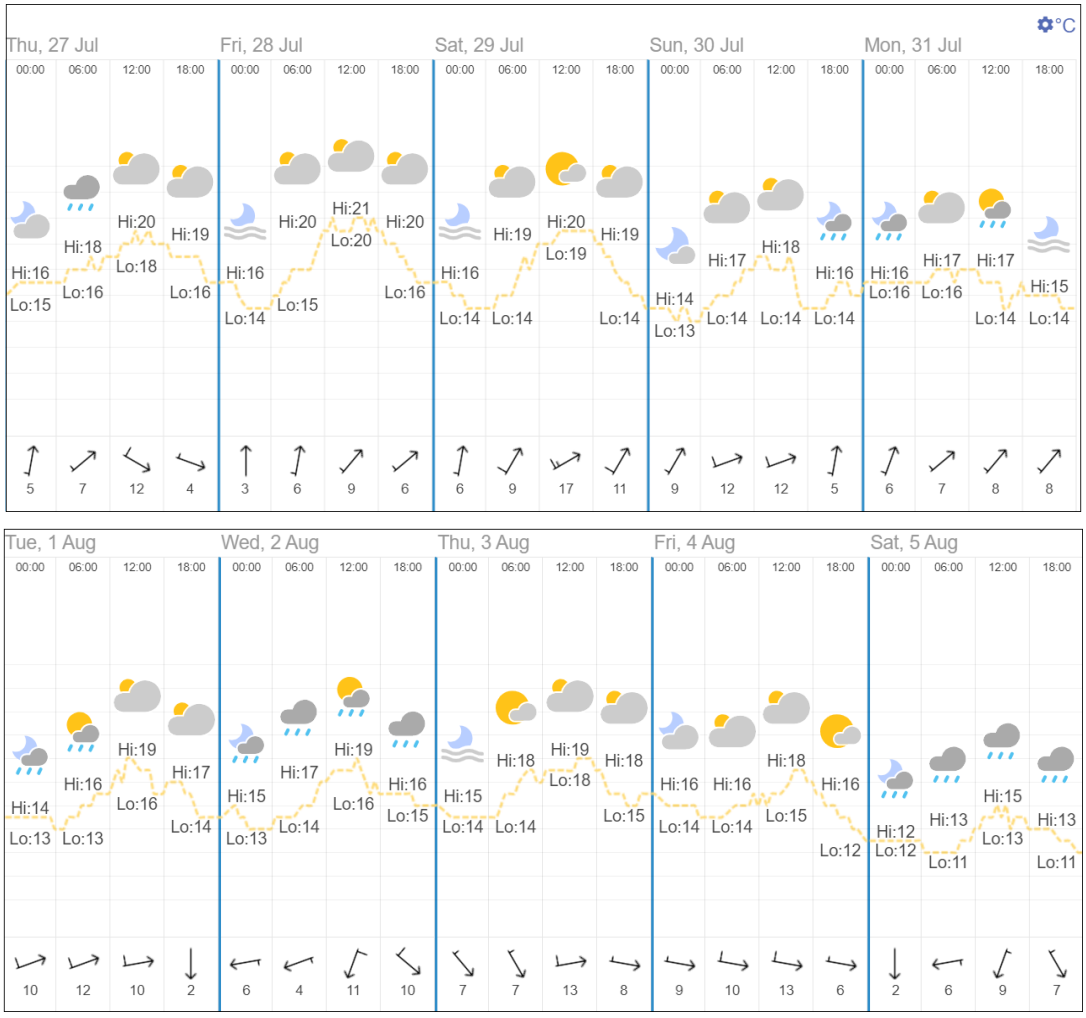
## 5.1 Survey Date

To determine baseline sound levels in the vicinity of the proposed development, the noise survey was undertaken between Friday 28th July and Wednesday 2nd August 2022.

## 5.2 Weather Conditions

During the survey weather conditions were generally suitable for noise monitoring with calm and dry weather conditions. The general weather conditions can be seen in Figures 5-1[2] (wind speeds shown are mph).There were high windspeeds on the Saturday and periods of rain Sunday night into Monday morning. Where the weather conditions were considered to have elevated the measured noise levels, the data was removed from the dataset.

**Figure 5-1**
**Weather Conditions – 2023 Survey**




[2] https://www.timeanddate.com/weather/@2654814/historic

## 5.3 Equipment

The noise survey equipment used during the survey is detailed in Table 5-1. All measurement instrumentation was calibrated before and after the measurements. No significant drift was observed. The calibration chain is traceable via the United Kingdom Accreditation Service (UKAS) to National Standards held at the National Physical Laboratory.

**Table 5-1**
**Survey Equipment**

| Location | Equipment | Serial Number |
|---|---|---|
| Locations 1 | Cirrus CR:171B Class 1 Sound Level Meter | G079816 |
| | Cirrus CR:515 Acoustic Calibrator | 81268 |
| Locations 2 | Cirrus CR:171B Class 1 Sound Level Meter | G080288 |
| | Cirrus CR:515 Acoustic Calibrator | 83349 |

## 5.4 Survey Locations

Sound levels were measured by at two locations, representative of the nearest Residential Receptors to the site, as follows:

- Location 1: Stockport Road. In the assessment this data is used for the following receptors:
  - No.4 Annable Road, No.573 Stockport Road, and No. 533 Stockport Road.
- Location 2: Annable Road. In the assessment this data is used for the following receptors:
  - No.32 Annable Road.

The survey locations are shown in Figure 5-3. Photographs taken during the survey of the survey locations are available in Appendix 2.

**Figure 5-2**
**Survey and Sensitive Receptor Locations**


At the survey locations the microphone was placed 1.5m above the local ground level and in free-field conditions, i.e. at least 3.5m from the nearest vertical, reflecting surface. The following noise level indices were recorded:

- $L_{Aeq,T}$: The A-weighted equivalent continuous noise level over the measurement period.
- $L_{A90}$: The A-weighted noise level exceeded for 90% of the measurement period. This parameter is often used to describe background noise.
- $L_{A10}$: The A-weighted noise level exceeded for 10% of the measurement period. This parameter is often used to describe road traffic noise.
- $L_{Amax}$: The maximum A-weighted noise level during the measurement period.

## 5.5 Baseline Sound Level Results

### 5.5.1 Location 2 Annable Road Results

A summary of the survey results from Location 1 and are shown in Table 5-2 and 5-3. The full survey results are available upon request.

**Table 5-2**
**Location 1 Stockport Road - Summary of Measured Sound Levels, free-field, dB**

| Date | Period | $L_{Aeq,T}$ | $L_{Amax}$ | Median $L_{A90}$ | Median $L_{A10}$ |
|---|---|---|---|---|---|
| Friday 28th July 2023 | Daytime (10:00 – 23:00) | 56.3 | 88.8 | 58.3 | 48.9 |
| | Night-Time | 54.0 | 81.3 | 52.0 | 42.3 |
| Saturday 29th July 2023 | Daytime | 56.0 | 80.1 | 56.8 | 48.8 |
| | Night-Time | 54.6 | 79.0 | 52.8 | 43.1 |
| Sunday 30th July 2023 | Daytime | 57.5 | 84.1 | 59.7 | 50.9 |
| | Night-Time | 57.8 | 76.6 | 55.8 | 50.1 |
| Monday 31st July 2023 | Daytime | 56.8 | 81.3 | 57.6 | 50.8 |
| | Night-Time | 55.3 | 79.0 | 55.8 | 44.9 |
| Tuesday 1st August 2023 | Daytime | 56.6 | 82.7 | 57.8 | 49.2 |
| | Night-Time | 47.6 | 74.9 | 45.4 | 39.3 |
| Wednesday 2nd August 2023 | Daytime (07:00 – 16:30) | 56.0 | 89.3 | 54.6 | 47.8 |
| | Night-Time | - | - | - | - |

**Table 5-5-3**
**Annable Road - Summary of Measured Sound Levels, free-field, dB**

| Date | Period | $L_{Aeq,T}$ | $L_{Amax}$ | Median $L_{A90}$ | Median $L_{A10}$ |
|---|---|---|---|---|---|
| Friday 28th July 2023 | Daytime (10:15 – 23.00) | 54.3 | 76.1 | 56.3 | 48.2 |
| | Night-Time | 52.1 | 76.6 | 49.8 | 43.9 |
| Saturday 29th July 2023 | Daytime | 54.6 | 77.9 | 55.8 | 48.3 |
| | Night-Time | 52.9 | 74.6 | 51.2 | 44.8 |
| Sunday 30th July 2023 | Daytime | 56.1 | 78.4 | 58.3 | 51.0 |
| | Night-Time | - | - | - | - |

The decision to use median values for LA90 in the assessment is based on their robustness against extreme outliers. The median is less influenced by sporadic, extreme noise events, ensuring a more stable representation of the central tendency in the dataset. This choice is crucial in environmental noise assessments, where occasional spikes in noise may not accurately reflect the overall acoustic environment. The median LA90 values derived from the histograms offer a concise and reliable measure for evaluating prevalent noise conditions during the specified measurement periods. Histograms can be found in Appendix 3, these provide a clear distribution of captured LA90 noise levels throughout the survey.

Based on the data presented, the measured noise levels in 2023 are elevated compared to the measured nose levels in 2021. However, to present a robust assessment the 2021 levels will be used.

# 6.0 Noise Model

## 6.1 Noise Model Assumptions

The sound predictions in this assessment have been undertaken using a proprietary software-based noise model, CadnaA, which implements the full range of UK noise-based calculation methods. The calculation algorithms set out in ISO 9613-2:1996 *Acoustics – Attenuation of sound during propagation outdoors – Part 2 General method of calculation* have been used and the model assumes:

- a ground absorption map of 0.75;
- contour Data to include OS terrain data;
- a 4m high acoustic fence around the western boundary of the Site and a 3m high boundary around the northern boundary (as shown on Figures 6-1 and 6-2); and
- a reflection factor of 2.

The physical development on site would consist of:

- 84 containerised energy blocks (battery units) with associated cooling systems on concrete foundations;
- 14 inverters; and
- 7 transformer units.

The noise specification for the data is shown in Table 5-1. It is understood that plant would be procured on this basis.

**Table 6-1**
**Noise Specification of Plant Included in the Assessment, dB**

| Name | dB(A) |
|---|---|
| Transformer | 68.5 $L_w$ |
| Inverter | 87 $L_w$ |
| Battery Cube Chiller | 65.3 $L_p$ at 1.5m |

For the Cube Chillers, the sound power levels have been validated in a model with hard reflective ground and the Cube System included as a building structure with the following dimensions:

- Height: 2.46m.
- Width: 3m.

The Transformers and Inverters will be modelled as point sources at a height of 1.5m.

# 7.0 Predicted Sound Levels

The predicted sound level of the proposed BSF at the nearest residential receptor locations is shown in Table 6-1 below.

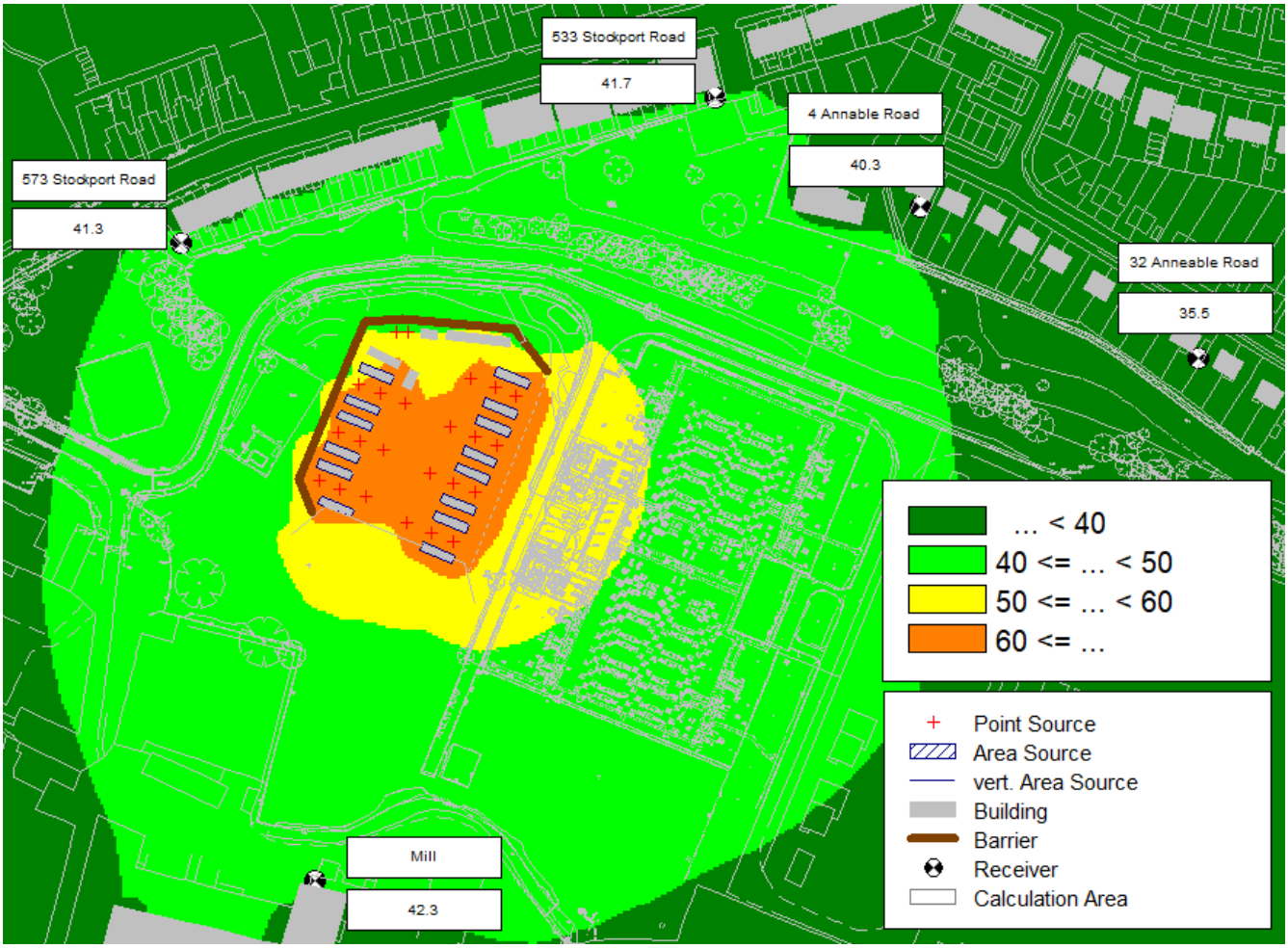
Daytime sound levels have been predicted at 1.5m above local ground level, which is the approximate height of a ground floor window. Night-time sound levels have been predicted at 4.0m above local ground level, which is the approximate height of a first-floor window.

**Table 7-1**
**Predicted Specific Sound Levels of Proposed BSF, free-field dB**

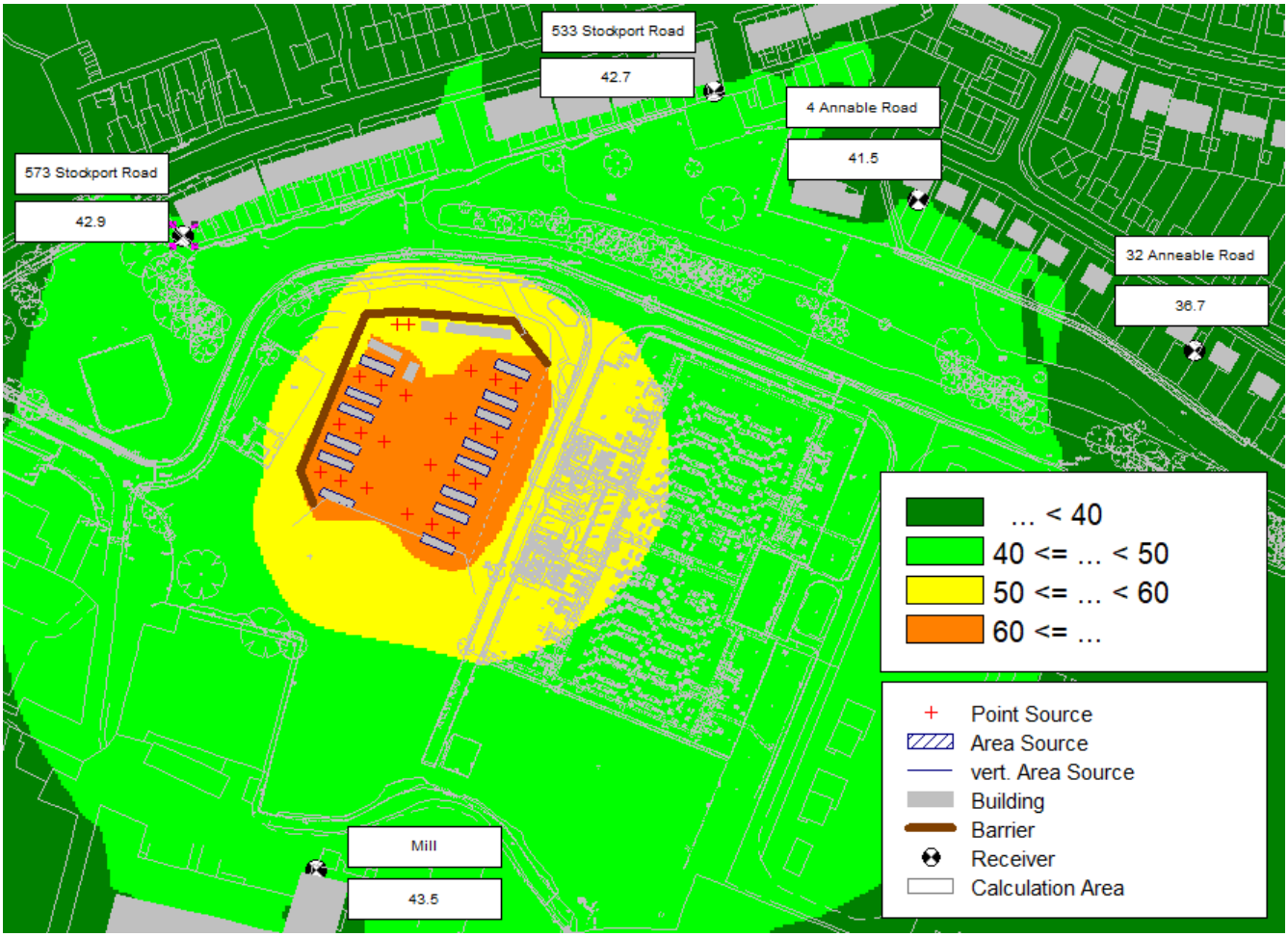
| Location | Period | Predicted Specific Sound Level, $L_{Aeq,T}$ |
|---|---|---|
| 573 Stockport Road | Daytime | 41.3 |
| | Night-Time | 42.9 |
| 533 Stockport Road | Daytime | 41.7 |
| | Night-Time | 42.7 |
| 4 Annable Road | Daytime | 40.3 |
| | Night-Time | 41.5 |
| 32 Annable Road | Daytime | 35.5 |
| | Night-Time | 36.7 |

A graphical image of the predicted specific sound level during the daytime can be seen in Figure 6-1, whilst a graphical image of the predicted specific sound level during the night-time can be seen in Figure 6-2.

**Figure 7-1**
**Daytime $L_{Aeq,T}$ Specific Sound Level – dB(A)**



## Figure 7-2
## Night-Time $L_{Aeq,T}$ Specific Sound Level – dB(A)



# 8.0 BS4142:2014+A1:2019 Assessment

## 8.1 Sound Characteristics

The character of each noise source, and the sound correction that will be applied in the BS4142:2014+A1:2019 assessment, is detailed below:

- Tonality: SLR has not been able to undertake the BS4142:2014+A1:2019 *Objective method for assessing the audibility of tones in sound: one third octave method*. However, it is understood that the equipment would be broadband in nature, and tonal noise would be designed out of the Scheme. Therefore, no tonal correction is required.
- Impulsivity: It is not anticipated that the operation would produce any impulsive noise.
- Other sound characteristics: When operating, the proposals may be distinctive against the residual soundscape. Therefore, a precautionary 3dB(A) correction will be applied.
- Intermittency: Over the BS4142:2014+A1:2019 reference period of 1-hour in the daytime (07:00 – 23:00) and 15-minutes at night-time (23:00 – 07:00), it is anticipated that the noise sources would be constant; therefore, no intermittency correction is required.

Based on the above, a 3dB acoustic character correction has been applied to the predicted specific sound level, to derive the corresponding rating levels.

## 8.2 Assessment Results

The correction described in Section 7-1 above has been added to the predicted sound levels shown in Table 6-1 to derive the rating levels at each of the receptors.

The rating levels have then been compared to the derived background sound levels, detailed in Section 4 of this report.

The results of the BS4142:2014+A1:2019 assessment, are shown in Table 7-1. It must be noted that the rating levels and the representative background sound levels have been rounded to the nearest decibel.

**Table 8-1**
**BS4142 Assessment, dB**

| Receptor | Assessment | Predicted Specific Sound Level, $L_{Aeq,T}$ | Predicted Rating Level, $L_{Ar,T}$ | Derived Background Sound Level $L_{A90}$ | Difference |
|---|---|---|---|---|---|
| 573 Stockport Road | Daytime | 41 | 44 | 47 | -3 |
| | Night-Time | 43 | 46 | 41 | +5 |
| 533 Stockport Road | Daytime | 42 | 45 | 47 | -2 |
| | Night-Time | 43 | 46 | 41 | +5 |
| 4 Annable Road | Daytime | 41 | 44 | 47 | -3 |
| | Night-Time | 42 | 45 | 41 | +4 |
| 32 Annable Road | Daytime | 36 | 39 | 39 | 0 |
| | Night-Time | 37 | 40 | 36 | +4 |

During the daytime, Table 7-1 shows that the rating level would be between 4 dB below and equal to the background sound level at the receptors.

Therefore, in accordance with BS4142:2014+A1:2019, the development would have a **low impact** during the daytime.

During the night-time, the rating level of the proposals would be between 4 and 5 dB above the background sound level at the receptors.

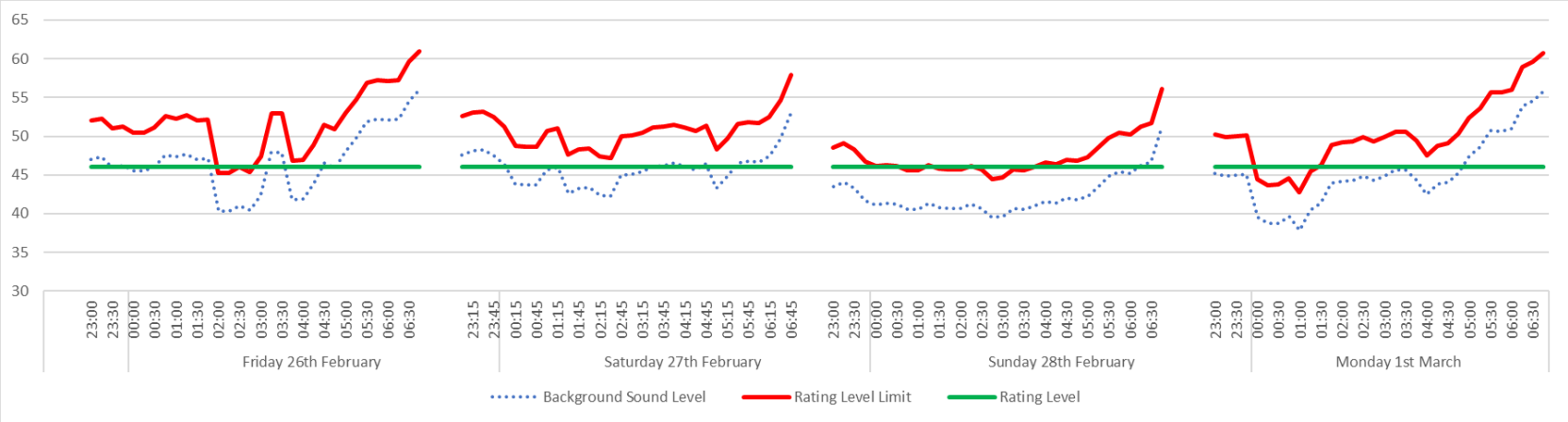
However, the proposed development will be located adjacent to National Grid Infrastructure with existing noise emitting plant, which would likely be similar in character. Furthermore, the background sound is made up of distant road traffic, which will also be similar in sound. In accordance with BS4142:2014+A1:2019, when considering the context, it is expected that the proposed development would have a **low impact** during the night-time.

At Stockport Road the difference between the rating level and the background sound level used in the assessment is +5dB(A). However, this is only the case on typically the quietest night of the week on Sunday.

Figure 7-1 shows a comparison of the background sound level, rating level, and rating level limit. For the majority of the night time period, the night-time rating level **(green line)** of the proposed BSF is calculated to be generally below the rating level limit **(red line)** which has been set at 5dB(A) above the measured background sound level **(dashed blue line).**

It is the opinion of SLR, that the identified difference between the rating level and the night-time background sound level at No. 573 Stockport Road, is not significant and it is expected that the proposals would not lead to an adverse noise impact.

**Figure 8-1**
**Comparison of Rating Level Against the Rating Level Limit**



# 9.0 Commercial Receptors

The BS4142:2014+A1:2019 assessment has demonstrated that the proposals would typically have a low noise impact at the residential receptor locations. However, BS4142 states within its Scope that it is only used to assess the sound at residential dwellings.

To assess the impact on nearby commercial receptors, including The Mill , SLR typically completes an assessment against Noise Rating curves developed by the International Organization for Standardization (ISO). However, this type of assessment requires octave band noise data, which is not available at this stage.

Therefore, SLR has compared the predicted specific sound level at The Mill, with the measured ambient noise levels at Location 3 on the southern boundary of the Site, adjacent to The Mill. This comparison has only been made for the daytime period only, as The Mill is not expected to be occupied at night.

Table 8-1 compares the specific noise level of the Site, against the lowest measured ambient noise level at Location 3 (see Table 4-4), in order to present a worst-case scenario.

**Table 9-1**
**Mill Noise Assessment**

| Receptor | Predicted Specific Sound Level, $L_{Aeq,T}$ | Lowest Baseline Ambient Sound Level, $L_{Ar,T}$ | Cumulative Sound Level $L_{Aeq,T}$ | Difference Between Cumulative and Lowest Baseline Ambient, $L_{Aeq,T}$ |
|---|---|---|---|---|
| The Mill | 42.3 | 45.5 | 47.2 | +1.7 |

Table 8-1 shows that at worst, ambient noise levels at The Mill would increase by up to 1.7dB. However, for a change in noise level to be considered perceptible, a change of 3dB or more is typically required. Therefore, the impact of the development would be negligible at The Mill.

# 10.0 Conclusion

Pivoted Power LLP has appointed SLR to undertake a noise impact assessment relating to the approved Battery Storage Facility (BSF) on Land under the ownership of National Grid at Bredbury, Stockport.

The development was granted planning consent on 27 February 2023.. This Report presents the results of an updated assessment to account for a proposed change in the layout of the Site.

A baseline background sound survey has been undertaken at locations representative of the nearest noise-sensitive receptors. Operational sound levels associated with the proposed development have been predicted at the receptors, using sound modelling software. Operational sound levels for the proposed BSF, have been based on manufacturer data provided to SLR by Pivoted Power LLP.

An assessment has been made with reference to British Standard 4142:2014+A1:2019.

During the daytime, the assessment shows that the rating level would be below or equal to the background sound level at the receptors. Therefore, in accordance with BS4142:2014+A1:2019, the proposed development would have a **low impact** during the daytime.

During the night-time, the rating level of the proposals would be between 4 and 5dB above the background sound level at the receptors.

However, the proposed development will be located adjacent to National Grid Infrastructure with existing noise emitting plant, which would likely be similar in character. Furthermore, the background sound is made up of distant road traffic, which will also be similar in sound. In accordance with BS4142:2014+A1:2019, when considering the context, it is expected that the proposed development would have a **low impact** during the night time.

At The Mill a business premises, ambient noise levels would increase by up to 1.7dB at worst. However, for a change in noise level to be considered perceptible, a change of 3dB or more is typically required. Therefore, the impact of the development would be negligible at The Mill.

# APPENDIX 01

## Glossary of Terminology

# Glossary of Terminology

In order to assist the understanding of acoustic terminology and the relative change in noise, the following background information is provided.

The human ear can detect a very wide range of pressure fluctuations, which are perceived as sound. In order to express these fluctuations in a manageable way, a logarithmic scale called the decibel, or dB scale is used. The decibel scale typically ranges from 0dB (the threshold of hearing) to over 120dB. An indication of the range of sound levels commonly found in the environment is given in the following table.

**Table 01-1:**
**Sound Levels Commonly Found in the Environment**

| Sound Level | Location |
|---|---|
| 0dB(A) | Threshold of hearing |
| 20 to 30dB(A) | Quiet bedroom at night |
| 30 to 40dB(A) | Living room during the day |
| 40 to 50dB(A) | Typical office |
| 50 to 60dB(A) | Inside a car |
| 60 to 70dB(A) | Typical high street |
| 70 to 90dB(A) | Inside factory |
| 100 to 110dB(A) | Burglar alarm at 1m away |
| 110 to 130dB(A) | Jet aircraft on take off |
| 140dB(A) | Threshold of Pain |

## Acoustic Terminology

dB (decibel) — The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure ($2x10^{-5}$Pa).

dB(A) — A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.

$L_{Aeq}$ — $L_{Aeq}$ is defined as the notional steady sound level which, over a stated period of time, would contain the same amount of acoustical energy as the A - weighted fluctuating sound measured over that period.

$L_{10}$ & $L_{90}$ — If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The $L_n$ indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence $L_{10}$ is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, $L_{90}$ is the 'average minimum level' and is often used to describe the background noise. It is common practice to use the $L_{10}$ index to describe traffic noise.

| | |
|---|---|
| $L_{Amax}$ | $L_{Amax}$ is the maximum A - weighted sound pressure level recorded over the period stated. $L_{Amax}$ is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall $L_{eq}$ noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response. |

# APPENDIX 2

## Photos

**Figure 02-01**
**Location 1**

**Figure 02-02**
**Location 1**

**Figure 02-03**
**Location 1**

**Figure 02-04**
**Location 1**

**Figure 02-05**
**Location 2**

**Figure 02-06**
**Location 2**

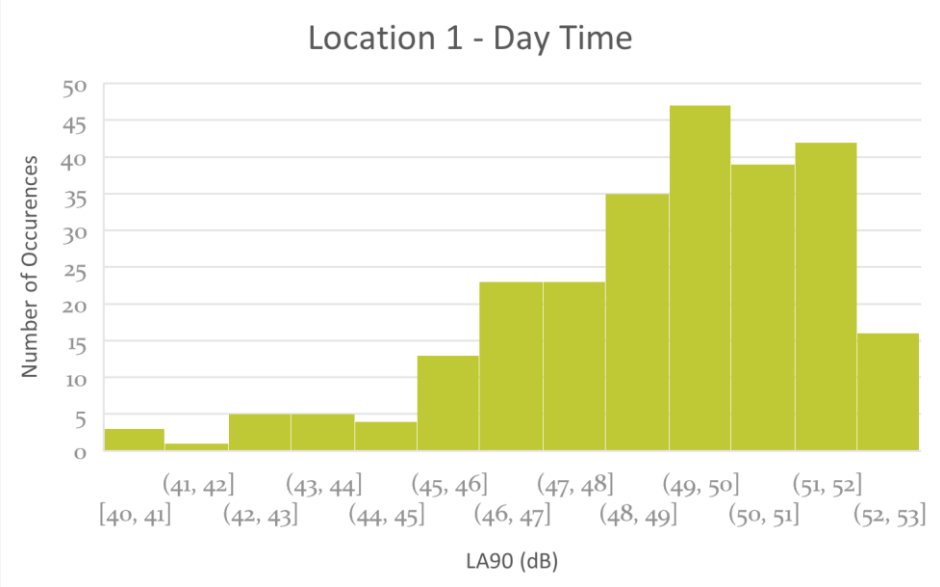
**Figure 02-07**
**Location 2**

**Figure 02-08**
**Location 2**

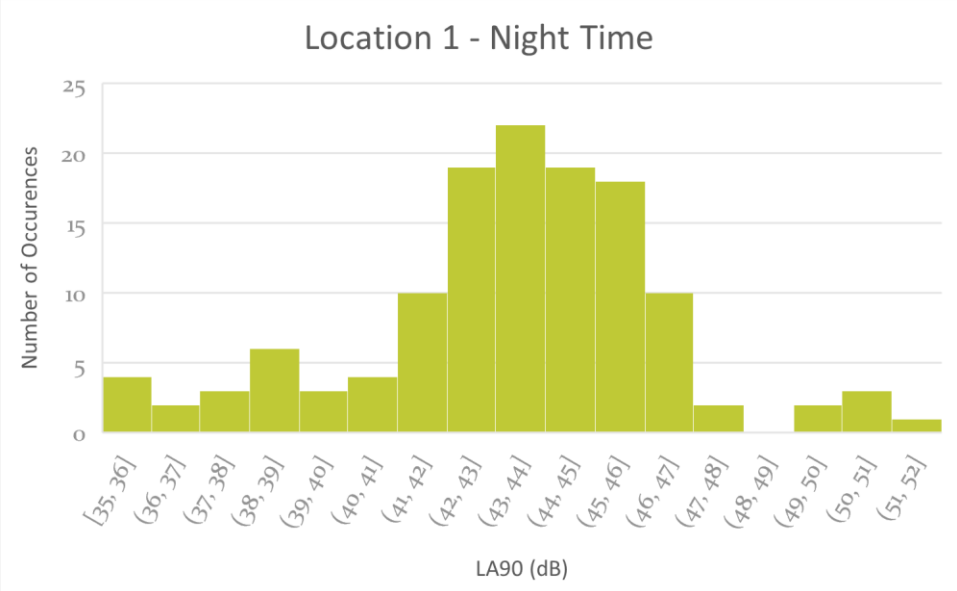
# APPENDIX 03

## Histograms

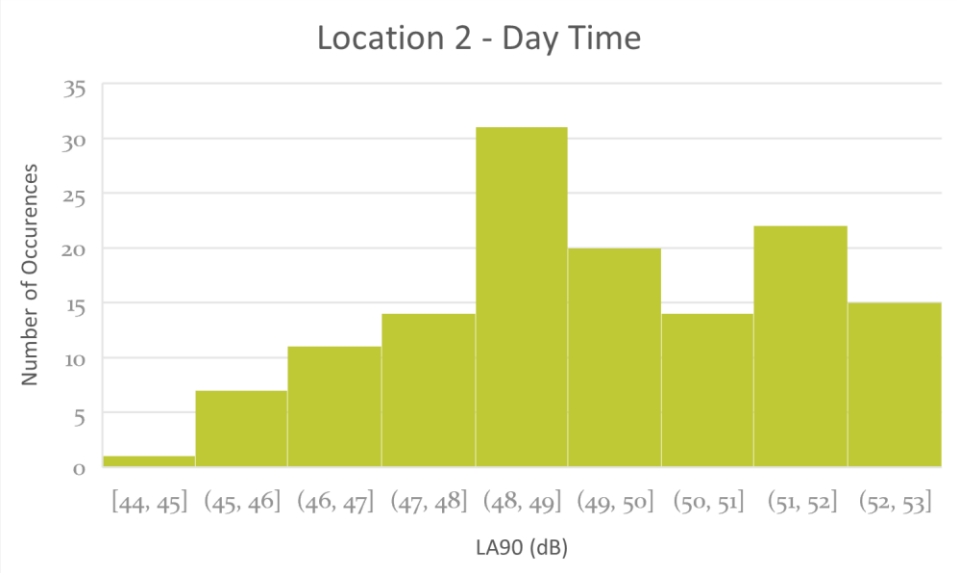
## Location 1 $L_{Aeq,T}$ Histogram dB(A)



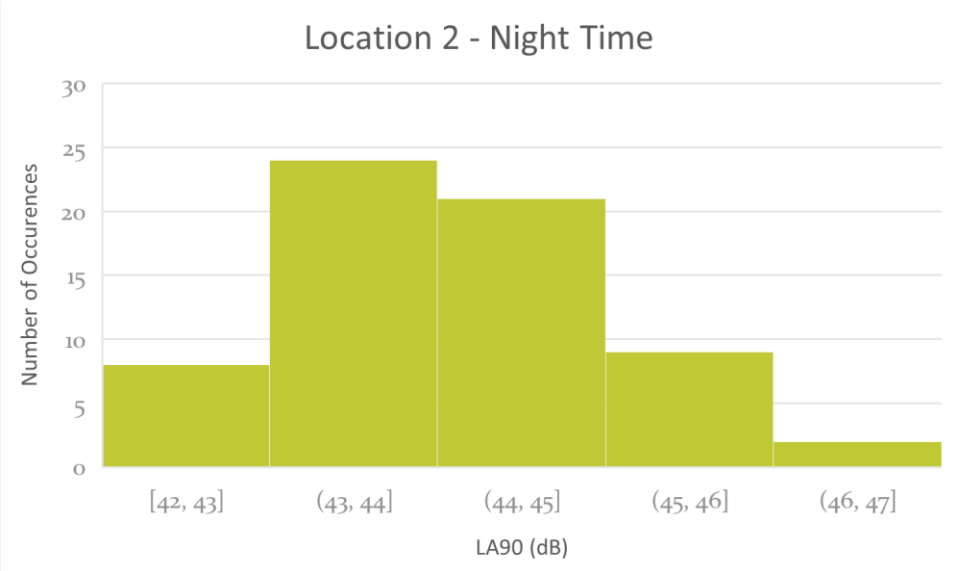

## Location 1 $L_{Aeq,T}$ Histogram dB(A)



**Location 2 $L_{Aeq,T}$ Histogram dB(A)**




**Location 2 $L_{Aeq,T}$ Histogram dB(A)**



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