

# NOISE IMPACT ASSESSMENT

REPORT REFERENCE: **NCSL 1250A**

VARSITY CONSULTING LTD.

CASTLETON COMMUNITY CENTRE, ROCHDALE.

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**Issue 1**

|                                                                                               |    |
|-----------------------------------------------------------------------------------------------|----|
| 1 INTRODUCTION .....                                                                          | 3  |
| 2 COMPETENCE .....                                                                            | 4  |
| 3 SUMMARY OF TERMS, DESCRIPTORS & QUANTITIES .....                                            | 5  |
| 4 APPLICABLE LITERATURE .....                                                                 | 6  |
| 4.1 National Planning Policy Framework .....                                                  | 6  |
| 4.2 Noise Policy Statement for England (NPSE) .....                                           | 7  |
| 4.3 Planning Practice Guidance .....                                                          | 7  |
| 4.4 BS4142:2014+A1:2019 Methods for Rating and Assessing Industrial and Commercial Sound .... | 10 |
| 4.5 BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings .....         | 11 |
| 4.6 World Health Organisation – Guidelines for Community Noise 1999 .....                     | 12 |
| 4.7 IOA Briefing Note – Heat Pumps – November 2022 .....                                      | 12 |
| 5 LOCATION .....                                                                              | 14 |
| 5.1 Site Location .....                                                                       | 14 |
| 5.2 Noise Sensitive Receptor Location .....                                                   | 14 |
| 5.3 Measurement Locations .....                                                               | 14 |
| 5.4 Local Area Map .....                                                                      | 15 |
| 5.5 Subjective Appraisal of the Existing Acoustic Environment .....                           | 15 |
| 6 PROPOSED NOISE SOURCES .....                                                                | 16 |
| 7 EQUIPMENT & MEASUREMENT CONDITIONS .....                                                    | 17 |
| 7.1 Equipment Details .....                                                                   | 17 |
| 7.2 Ground Conditions .....                                                                   | 17 |
| 7.3 Weather Conditions .....                                                                  | 17 |
| 8 ACOUSTIC MEASUREMENTS & DEFINED SOUND LEVELS .....                                          | 19 |
| 8.1 Background Sound Levels .....                                                             | 19 |

|                                                              |    |
|--------------------------------------------------------------|----|
| 8.2 Ambient Sound Level .....                                | 21 |
| 8.3 Specific Sound Level .....                               | 22 |
| 8.4 Rating Level.....                                        | 22 |
| 8.5 Defined Sound Level Summary .....                        | 24 |
| 9 NOISE IMPACT ASSESSMENT .....                              | 25 |
| 9.1 Context Assessment.....                                  | 26 |
| 9.1.1 Absolute Level of Sound .....                          | 26 |
| 9.1.2 Character and Level of Residual & Specific Sound ..... | 27 |
| 9.1.3 Sensitivity of Receptor .....                          | 27 |
| 9.2 BS4142 Assessment Summary .....                          | 28 |
| 10 CONCLUSIONS & RECOMMENDATIONS.....                        | 29 |
| 11 UNCERTAINTY .....                                         | 31 |
| APPENDIX A: JAKOUSTIC ABSORPTIVE FENCING.....                | 32 |
| APPENDIX B: ACOUSTIC SURVEY DATA .....                       | 33 |
| APPENDIX C: NOISE MODEL RESULTS .....                        | 36 |

## 1 INTRODUCTION

Noise Control Solutions Limited (NCSL) have been commissioned by Varsity Consulting Ltd to undertake a noise impact assessment for the proposed installation of 2no. air source heat pumps (Ideal EcoMod 50kw) at Castleton Community Centre, Rochdale. This assessment is required in order to accompany the relevant planning application which is to be considered by Rochdale Borough Council. The scope of this application is the installation of 2no. air source heat pumps.

The potential sources of noise are considered by NCSL to be;

1. 2no. Ideal EcoMod 50kw air source heat pumps.

In order to assess the noise impact at the nearest noise sensitive receptors, an environmental noise impact assessment has been conducted, details of which are shown within this report.

Report prepared by  Andrew Todd BA(HONS) MSc MIOA CEng

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## 2 COMPETENCE

This report has been prepared by Mr Andrew Todd, a corporate member of the Institute of Acoustics, a holder of a MSc in Acoustics and a Chartered Engineer registered with the United Kingdom Engineering Council. Andrew has over 15 years of experience as an acoustic consultant/engineer working in various aspects of acoustics.

### 3 SUMMARY OF TERMS, DESCRIPTORS & QUANTITIES

Within this report, several acoustic descriptors and quantities are referred to. Due to their specialised nature, the following summary is provided.

**DECIBELS (dB):** Ten times the logarithm (base 10) of the ratio between a measured quantity and a reference quantity. For sound pressure levels defined within this report, the reference quantity is 20 Micropascals ( $\mu\text{Pa}$ ).

**A-WEIGHTING:** The filtering of acoustic signals in order to provide a closer approximation to the human hearing response. Measurements with this weighting applied are denoted with “(A)”, for example, “dB(A)”.

**N<sup>TH</sup> PERCENTILE NOISE LEVEL ( $L_{AN,T}$ ):** The A-weighted sound pressure level, in decibels, exceeded for N% of the measurement duration (T). This metric is generally used to assess background noise levels ( $L_{A90}$ ) as it allows for the removal of non-constant noise sources, for example, passing vehicles. The subscript ‘T’ defines the measurement duration.

**EQUIVALENT CONTINUOUS NOISE LEVEL ( $L_{AEQ,T}$ ):** The logarithmically averaged sound pressure level, in decibels, over the measurement duration (T) with A-weighting applied. The subscript ‘T’ defines the measurement duration.

**FAST TIME WEIGHTING:** The integration time constant of the measurement. Fast time weighting, denoted by the subscript ‘F’, integrates sound pressure levels over 0.125 seconds.

**MAX LEVEL ( $L_{AF\ MAX}$ ):** The maximum reported RMS sound pressure level during a measurement period. The level is A-weighted and is calculated with a Fast time weighting.

**DAY-TIME AND NIGHT-TIME PERIODS:** Following guidance contained within BS4142, the day-time period is defined as 07:00 to 23:00 and the night-time period is defined as 23:00 to 07:00.

**NOISE SENSITIVE RECEPTOR (NSR):** A premises or area which is sensitive to noise disturbance. This is generally an existing, or future residential premises close to a proposed development.

**SOUND POWER LEVEL ( $L_W$ ):** The sound energy radiated per unit time by a sound source, measured in Watts (W) on a decibel scale with a reference value of  $10^{-12}\text{ W}$ .

## 4 APPLICABLE LITERATURE

### 4.1 NATIONAL PLANNING POLICY FRAMEWORK

The National Planning Policy Framework (NPPF), updated in 2021, outlines the Government's planning policies for England and how they are expected to be applied. In respect of noise, the document states that:

*Planning policies and decisions should also ensure that new development is appropriate for its location, taking into account the effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so, they should:*

- *Mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life.*
- *Identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.*

Additionally, the policy states that:

- *Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.*
- *Planning conditions should be kept to a minimum and only imposed where they are necessary, relevant to planning and to the development to be permitted, enforceable, precise and reasonable in all other respects. Agreeing conditions early is beneficial to all parties involved in the process and can speed up decision-making. Conditions that are required to be discharged before development commences should be avoided, unless there is a clear justification*

## 4.2 NOISE POLICY STATEMENT FOR ENGLAND (NPSE)

Published in March 2010 by DEFRA, this document defines the Government's policy on noise. It incorporates the long-term vision of promoting good health and quality of life through the effective management of noise in the context of Government policy on sustainable development. The long-term vision of the NPSE is supported by the following aims:

- *Avoid significant adverse impacts on health and quality of life.*
- *Mitigate and minimise adverse impacts of health and quality of life.*
- *Where possible, contribute to the improvement of health and quality of life.*

This document also defines three categories relating to noise impact:

- **NOEL – NO OBSERVED EFFECT LEVEL.** This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.
- **LOAEL – LOWEST OBSERVED EFFECT LEVEL.** This is the level above which adverse effects on health and quality of life can be detected.
- **SOAEL – SIGNIFICANT OBSERVED ADVERSE EFFECT LEVEL.** This is the level above which significant adverse effects on health and quality of life occur.

## 4.3 PLANNING PRACTICE GUIDANCE

Further detail is provided within the Planning Practice Guidance (PPG) regarding how the effect levels, set out within NPSE, can be recognised and the associated concern arising from each.

*At the lowest extreme, when noise is not perceived to be present, there is by definition no effect. As the noise exposure increases, it will cross the 'no observed effect' level. However, the noise has no adverse effect so long as the exposure does not cause any change in behavior, attitude or other physiological responses of those affected by it. The noise may slightly affect the acoustic character of an area but not to the extent*

there is a change in quality of life. If the noise exposure is at this level no specific measures are required to manage the acoustic environment.

As the exposure increases further, it crosses the 'lowest observed adverse effect' level boundary above which the noise starts to cause small changes in behavior and attitude, for example, having to turn up the volume on the television or needing to speak more loudly to be heard. The noise therefore starts to have an adverse effect and consideration needs to be given to mitigating and minimising those effects (taking account of the economic and social benefits being derived from the activity causing the noise).

Increasing noise exposure will at some point cause the 'significant observed adverse effect' level boundary to be crossed. Above this level the noise causes a material change in behavior such as keeping windows closed for most of the time or avoiding certain activities during periods when the noise is present. If the exposure is predicted to be above this level the planning process should be used to avoid this effect occurring, for example through the choice of sites at the plan-making stage, or by use of appropriate mitigation such as by altering the design and layout. While such decisions must be made taking account of the economic and social benefit of the activity causing or affected by the noise, it is undesirable for such exposure to be caused.

At the highest extreme, noise exposure would cause extensive and sustained adverse changes in behavior and / or health without an ability to mitigate the effect of the noise. The impacts on health and quality of life are such that regardless of the benefits of the activity causing the noise, this situation should be avoided.

Table 1 summarises the noise exposure hierarchy.

| Response                 |           | Example of Outcomes | Increasing Effect Level | Action                     |
|--------------------------|-----------|---------------------|-------------------------|----------------------------|
| No Observed Effect Level |           |                     |                         |                            |
| Not Noticeable           | No Effect |                     | No Observed Effect      | No                         |
|                          |           |                     |                         | Specific Measures Required |

| Response                                         | Example of Outcomes                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Increasing Effect Level           | Action                         |
|--------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|--------------------------------|
| <b>No Observed Adverse Effect Level</b>          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                   |                                |
| <b>Present &amp; Not Intrusive</b>               | Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life                                                                                                                                                                                                                                                                    | No Observed Adverse Effect        | No Specific Measures Required  |
| <b>Lowest Observed Adverse Effect Level</b>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                   |                                |
| <b>Present &amp; Intrusive</b>                   | Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.                                          | Observed Adverse Effect           | Mitigate & Reduce to a Minimum |
| <b>Significant Observed Adverse Effect Level</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                   |                                |
| <b>Present &amp; Disruptive</b>                  | The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area. | Significant Observed Effect Level | Avoid                          |
| <b>Present &amp; Very Disruptive</b>             | Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.                                                                                                                                                                                       | Unacceptable Adverse Effect       | Prevent                        |

TABLE 1 – NOISE EXPOSURE HIERARCHY

## 4.4 BS4142:2014+A1:2019 METHODS FOR RATING AND ASSESSING INDUSTRIAL AND COMMERCIAL SOUND

British Standard 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound (BS4142) sets out a methodology to determine the potential impact of proposed industrial and commercial sound sources upon nearby dwellings or premises used for residential purposes. Furthermore, BS4142 is appropriate to consider the impact of existing sources of industrial and commercial sound on proposed receptors.

The methodology prescribes the measurement of the existing acoustic environment at noise sensitive receptor locations, termed the 'background sound level'.

A measurement or calculation of the noise generated by the proposed noise source at the receptor location is also required and is termed the 'specific sound level'. This value is then adjusted to reflect any acoustic characteristics which may increase audibility or annoyance to define the 'rating level'.

Once these values have been attained, an analysis can be conducted in order to assess the estimated noise impact that will occur with the introduction of the proposed source into the existing environment.

- In instances where the rating level exceeds background noise level by +10dB, this is an indication of a significant adverse impact, depending upon the context.
- In instances where the rating level exceeds background noise level by +5dB, this is an indication of an adverse impact, depending upon the context.
- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will cause an adverse noise impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

The assessment of a noise impact at a receptor should consider the context in which the sound occurs. BS4142 states that the following factors be included in the context assessment;

- The absolute level of sound
- The character and level of residual sound

- The sensitivity of the receptor.

## 4.5 BS8233:2014 GUIDANCE ON SOUND INSULATION AND NOISE REDUCTION FOR BUILDINGS

BS8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings (BS 8233) provides guidance on internal noise levels within dwellings allowing for sufficient resting and sleeping conditions, as shown in Table 2. However, it is also noted that these values may be relaxed by 5dB where a development is considered necessary or desirable with reasonable internal conditions still achieved.

| Activity | Location    | 07:00 to 23:00        | 23:00 to 07:00                          |
|----------|-------------|-----------------------|-----------------------------------------|
| Resting  | Living room | 35dB $L_{Aeq,16hour}$ | N/A                                     |
| Dining   | Dining room | 40dB $L_{Aeq,16hour}$ | N/A                                     |
| Sleeping | Bedroom     | 35dB $L_{Aeq,16hour}$ | 30dB $L_{Aeq,8hour}$<br>45dB $L_{Amax}$ |

TABLE 2 - BS8233:2014: RECOMMENDATIONS FOR INDOOR NOISE LEVELS

BS8233 also provides guidance as to acceptable external noise levels, as shown in Table 3.

| Activity   | Location               | Desirable Noise Level | Upper Guideline Level |
|------------|------------------------|-----------------------|-----------------------|
| Relaxation | External Amenity Space | 50dB $L_{Aeq,T}$      | 55dB $L_{Aeq,T}$      |

TABLE 3 - BS8233:2014: RECOMMENDATIONS FOR EXTERNAL NOISE LEVELS

BS8233, however, does recognise that these external guideline values are not achievable in all circumstances where development may be desirable. The standard also provides guidance on estimated noise reduction levels of commonly used building materials and constructions.

## 4.6 WORLD HEALTH ORGANISATION – GUIDELINES FOR COMMUNITY NOISE 1999.

The World Health Organisation (WHO) provides guidance on maximum recommended noise levels in outdoor living areas. The noise guideline levels are shown in Table 4.

| Specific Environment | Critical Health Effect                           | dB<br>L <sub>Aeq</sub> | Time<br>(hr) | dB<br>L <sub>AMax</sub> |
|----------------------|--------------------------------------------------|------------------------|--------------|-------------------------|
| Outdoor living area  | Serious annoyance daytime and evening.           | 55                     | 16           | NA                      |
|                      | Moderate annoyance daytime and evening.          | 50                     | 16           | NA                      |
| Outside bedroom      | Sleep disturbance, window open (outdoor values). | 45                     | 8            | 60                      |

TABLE 4 - WHO RECOMMENDATIONS FOR OUTDOOR NOISE LEVELS

## 4.7 IOA BRIEFING NOTE – HEAT PUMPS – NOVEMBER 2022

The Institute of Acoustic (IOA) recently published their guidance on the noise impact of heat pumps in a 2022 briefing note. This guidance recommends a maximum rating level (when calculated in accordance with BS4142) at residential receptors of 35dB(A), with an upper guideline level of 40dB(A).

The document also recommends that where the manufacturer of the proposed heat pump cannot provide detailed acoustic output data, a BS4142 correction factor of +6dB for tonality should be applied.

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*Where the equipment emits sound that contains a prominent tone during its operation or during reverse cycle operation or has a noticeable intermittency then features corrections should be applied, in accordance with the method set out in BS4142:2014+A1:2019, using information provided by the manufacturer. If the manufacturer cannot provide this information, or it is not sufficient to be able to determine the correction, it is recommended that a feature correction of 6dB is added to the calculated sound pressure level in order to obtain the rating level. This adjustment assumes the maximum tonal penalty that is found in BS 4142:2014+A1:2019.*

## 5 LOCATION

### 5.1 SITE LOCATION

The development in question is located at Castleton Community Centre, Rochdale, (reference 'D1'). This is a community centre and library with an associated car parking area. The area surrounding the site is comprised of residential dwellings. Additionally, there is a relatively busy public highway (Manchester Road) to the East of the proposed development site.

### 5.2 NOISE SENSITIVE RECEPTOR LOCATION

Two noise sensitive receptors have been identified in reference to this noise impact assessment, these are detailed in Table 5.

| NSR Reference | NSR Address                            | Distance to Development |
|---------------|----------------------------------------|-------------------------|
| NSR1          | Residential premises on Knoll Street   | ~50m                    |
| NSR2          | Residential premises on Keswick Street | ~50m                    |

TABLE 5 - NOISE SENSITIVE RECEPTOR DETAILS

### 5.3 MEASUREMENT LOCATIONS

Background and ambient sound level measurements detailed within this report were taken using an outdoor microphone positioned at the boundary of the Castleton Community Centre car park, at a distance greater than 3.5m from any vertical reflective surfaces. The microphone was located at a height of 2.0m from the ground.

| Location Reference | Location Description               | Measured Values                   |
|--------------------|------------------------------------|-----------------------------------|
| ML1                | Community centre car park boundary | Background & ambient sound levels |

TABLE 6 - MEASUREMENT LOCATIONS

## 5.4 LOCAL AREA MAP

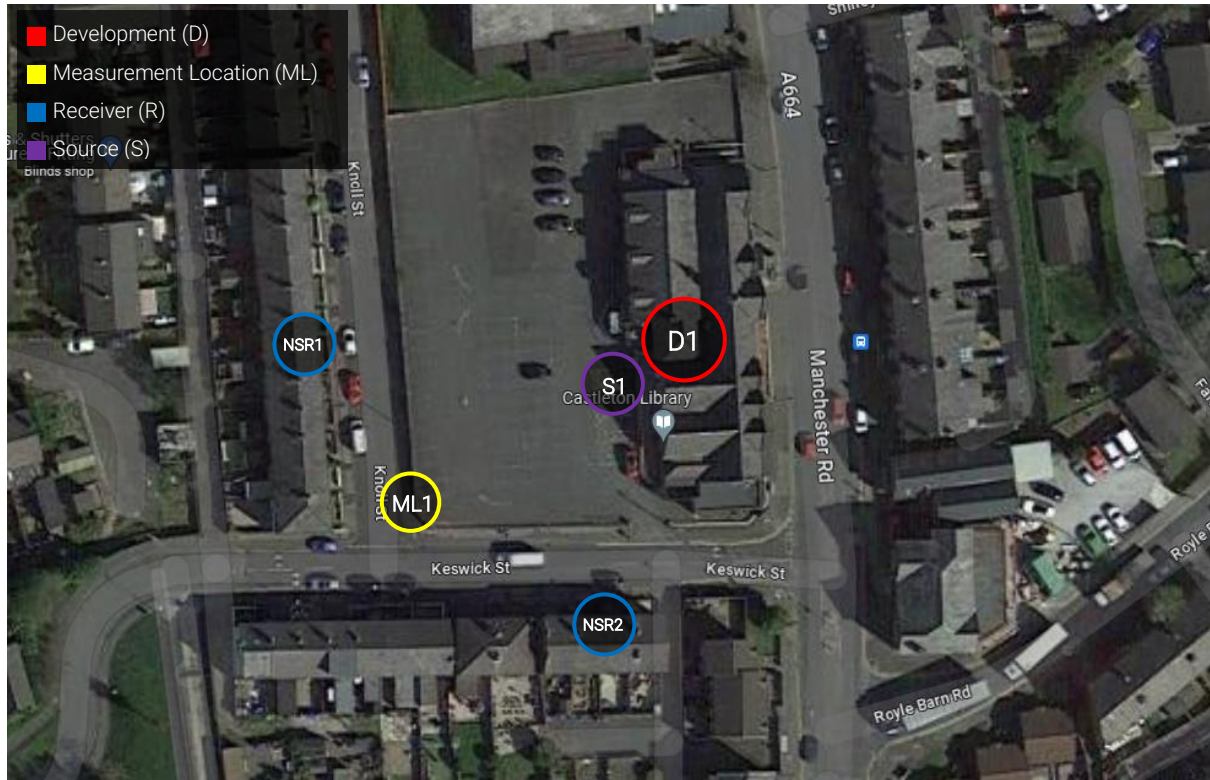


FIGURE 1 - LOCAL AREA MAP

## 5.5 SUBJECTIVE APPRAISAL OF THE EXISTING ACOUSTIC ENVIRONMENT

During a site visit on 15th November 2023 a subjective assessment of the existing acoustic environment was conducted by NCSL. At the noise sensitive receptor locations, the residual sound is made up of noise from local vehicle traffic, pedestrians and residents.

## 6 PROPOSED NOISE SOURCES

The proposed development (reference 'D1') comprises installation of 2no. air source heat pumps (reference 'S1').

The main operational times for the 2no. air source heat pumps (Ideal EcoMod 50kw) will be 24hr operation.

The proposed noise source will run continuously, however the load placed upon the pumps is expected to vary. In order to provide a robust noise assessment, the manufacturers stated sound power levels relating to full-load operation have been used within all calculations. These octave band sound power levels are shown below in Table 7.

| Frequency          | 63Hz | 125Hz | 250Hz | 500Hz | 1kHz | 2kHz | 4kHz |
|--------------------|------|-------|-------|-------|------|------|------|
| Full Load $L_{WA}$ | 59.2 | 66.3  | 69.6  | 73.7  | 76.8 | 78.5 | 69.6 |

TABLE 7 – ECOMOD 50KW SOUND POWER SPECTRUM

It is understood that the proposed sources will be located within a 3m high timber enclosure, incorporating Jacksons Fencing Jakoustic Absorptive Acoustic Fencing, further details are shown in Appendix A. It is assumed that the enclosure will have an open top section to provide adequate ventilation. This enclosure is expected to fully obscure the line of sight between S1 and NSRs and it must be ensured that the enclosure exhibits no gaps.

## 7 EQUIPMENT & MEASUREMENT CONDITIONS

### 7.1 EQUIPMENT DETAILS

All measurements detailed within this report relating to the assessment of noise levels to BS4142 were made using a Class 1 NTi Audio XL2 sound level meter (serial number A2A-15792-E0). Field calibration of the meter was conducted using a Class 1 Bruel & Kjaer Type 4230 94dB acoustic calibrator (serial number 1275784). Pre and post measurement sensitivity checks were conducted and showed no significant deviation to the nominal sound level meter sensitivity of 41.3mV/Pa or reference signal levels. Details of these tests are documented in Table 8.

| Test Reference       | dB Level | Sensitivity | Comments                |
|----------------------|----------|-------------|-------------------------|
| Pre-test calibration | 93.9dB   | 41.3 mV/Pa  | NA                      |
| Post-test check      | 93.9dB   | 41.3 mV/Pa  | No significant variance |

TABLE 8 - FIELD CALIBRATION DETAILS (S/N A2A-15792-E0)

All equipment is calibrated in accordance with IEC 61672-3, IEC 61260 and BS EN 60942:2003 where applicable. Calibration certificates are available upon request.

### 7.2 GROUND CONDITIONS

Ground conditions between S1 and NSRs consist of a finished tarmac car park and pedestrian walkways. The ground was dry throughout the survey period.

### 7.3 WEATHER CONDITIONS

Weather conditions during survey measurements were overcast but dry. A maximum wind speed of 3.1 ms<sup>-1</sup> was recorded.

| Parameter           | Survey Start         | Survey End           |
|---------------------|----------------------|----------------------|
| Barometric Pressure | 1015 mbar            | 1013 mbar            |
| Temperature         | 8° Celsius           | 8° Celsius           |
| Wind Velocity       | 3.1 ms <sup>-1</sup> | 1.3 ms <sup>-1</sup> |
| Cloud Cover         | 100%                 | 100%                 |

TABLE 9 - ENVIRONMENTAL CONDITIONS

## 8 ACOUSTIC MEASUREMENTS & DEFINED SOUND LEVELS

### 8.1 BACKGROUND SOUND LEVELS

The background sound level characterises the existing acoustic environment at a specific location without the influence of the noise source under assessment.

Measurements have been taken in order to define the existing background sound level at the noise sensitive receptor locations (NSRs). A 24-hour acoustic survey has been undertaken. The survey commenced at 1200hrs 15th November 2023 and was completed at 1200hrs 16th November 2023.

These measurements were taken at ML1.

The background sound level has been measured as a 90<sup>th</sup> percentile sound pressure level ( $L_{A90,T}$ ) logged at 15-minute measurement intervals. Following the methodology described in BS4142, the statistical mode of the day-time measurement values has been taken as the day-time background sound level between 1200hrs 15th November 2023 and 1200hrs 16th November 2023.

As no single modal value exists for the night-time measurement values, the linear mean value has been taken as the night-time background sound level between 1200hrs 15th November 2023 and 1200hrs 16th November 2023.

The results of this acoustic survey are shown in Figures 2 & 3 and the results are summarised in Table 10.

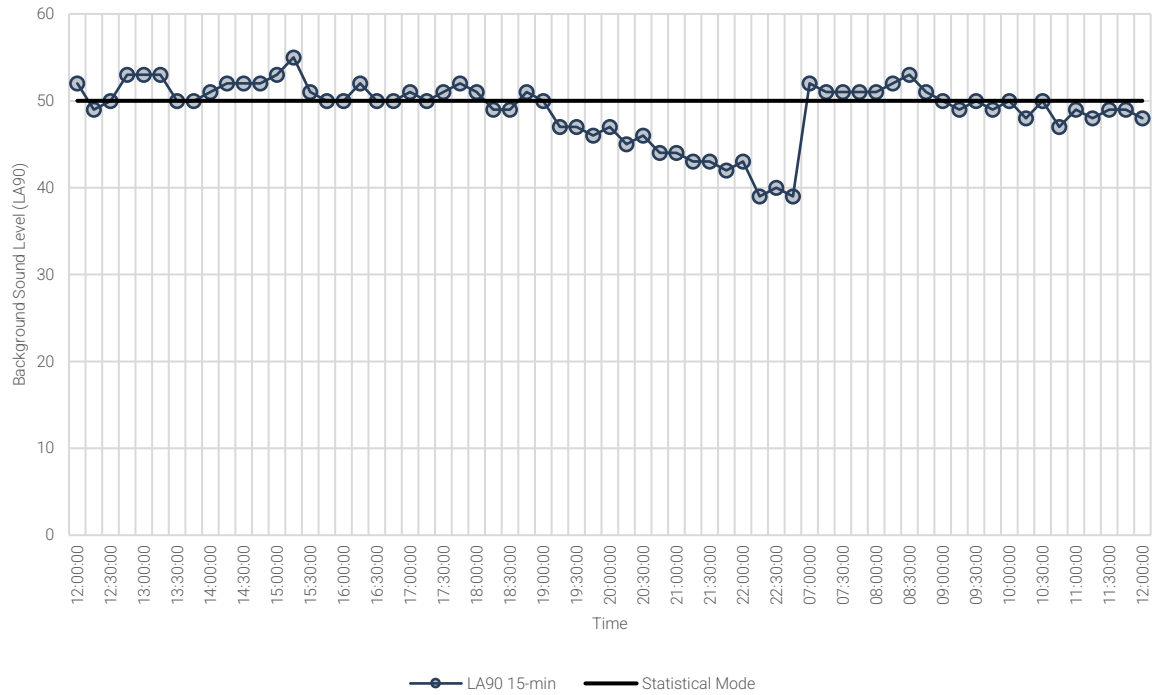


FIGURE 2 – DAY-TIME BACKGROUND SOUND LEVEL VALUES ( $LA_{90,15MIN}$ )

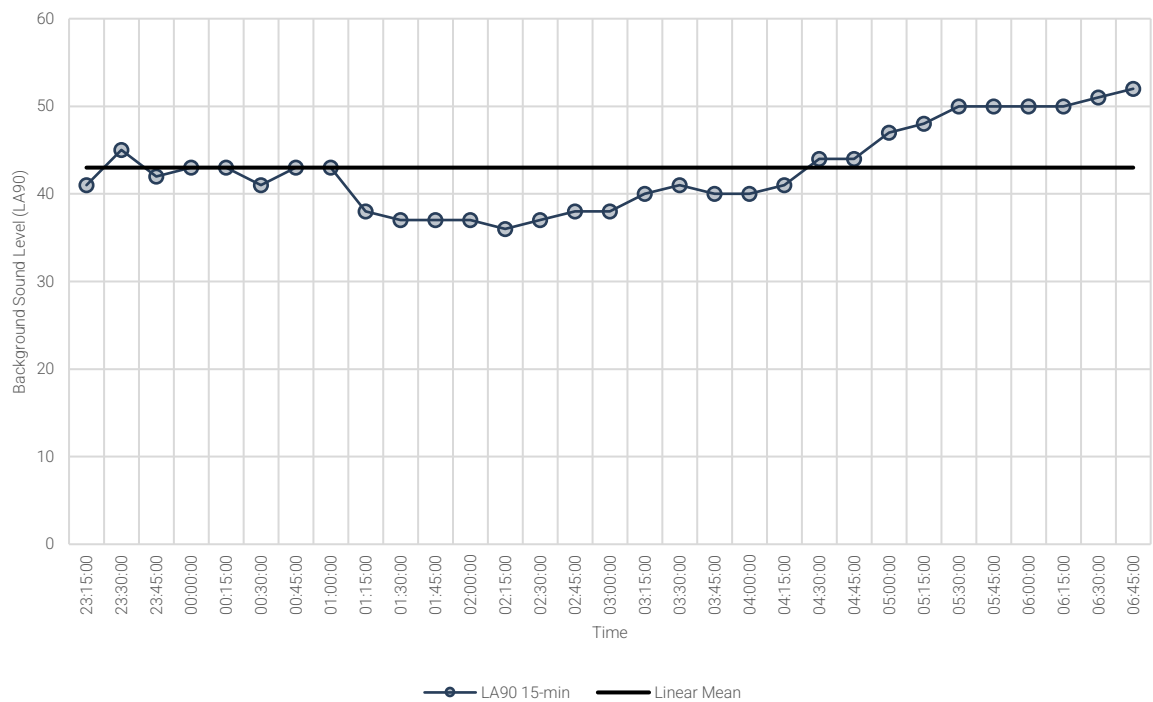


FIGURE 3 - NIGHT-TIME BACKGROUND SOUND LEVEL VALUES ( $LA_{90,15MIN}$ )

| Time Period | Measurement Location | Representative Receptor | Measurement Date & Time    | Background Sound Level (dB $L_{A90,T}$ ) |
|-------------|----------------------|-------------------------|----------------------------|------------------------------------------|
| Day-Time    | ML1                  | NSR1 & NSR2             | 1200hrs 15th November 2023 | 50dB(A)                                  |
| Night-Time  | ML1                  | NSR1 & NSR2             | 1200hrs 15th November 2023 | 43dB(A)                                  |

TABLE 10 - BACKGROUND SOUND LEVEL

These background sound levels are considered to be representative of the background sound level at NSRs and have been used within this report.

Further details are shown in Appendix B.

## 8.2 AMBIENT SOUND LEVEL

The ambient sound level defines the total sound pressure level in a specific location at a specific time, generally composed of acoustic radiation from several sources. Measurements of ambient sound level take the form of an A-weighted equivalent continuous sound pressure level ( $L_{Aeq,T}$ ). This metric logarithmically averages the observed sound level over the measurement period.

In the case of this noise assessment, the ambient sound level has been measured, allowing the quantification of the sound level generated as a result of noise from all existing sources contributing to the acoustic environment at NSRs.

These measurements were taken at ML1.

The ambient sound level has been measured as an equivalent continuous A-weighted sound pressure level ( $L_{Aeq,T}$ ) logged at 15-minute intervals. These discrete logged values have been logarithmically averaged over a measurement time interval of 16-hours during the day-time period and 8-hours during the night-time period.

In this case, the day-time ambient sound level has been measured to be 59dB(A)dB  $L_{Aeq,16-hrs}$ . This level is considered to be representative of the day-time ambient sound level at NSRs and has been used within this report.

The night-time ambient sound level has been measured to be 50dB(A)dB  $L_{Aeq,8-hrs}$ . This level is considered to be representative of the night-time ambient sound level at NSRs and has been used within this report.

## 8.3 SPECIFIC SOUND LEVEL

The specific sound level is the calculated noise level generated at a NSRs due exclusively to the noise source under investigation. In this case, the specific sound level has been calculated using a computer noise model, generated within the sound propagation simulation software SoundPLAN Essentials 5.1. This computer noise model incorporates the manufacturers sound power level rating of the proposed sources as shown in Table 7.

The output from this computer noise model results in a cumulative specific sound level of 36dB(A) at NSR1.

The output from this computer noise model results in a cumulative specific sound level of 37dB(A) at NSR2.

## 8.4 RATING LEVEL

The rating level is calculated as the specific sound level plus any correction required for the characteristic features of the sound.

BS4142 states that: "for sound ranging from not tonal to prominently tonal the Joint Nordic Method gives a correction of between 0 dB and +6 dB for tonality. Subjectively, this can be converted to a penalty of 2 dB for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible, and 6 dB where it is highly perceptible.

A correction of up to +9 dB 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 3 dB for impulsivity which is just perceptible at the noise receptor, 6 dB where it is clearly perceptible, and 9 dB where it is highly perceptible."

As per the guidance provided within the Institute of Acoustics Briefing Note – Heat Pumps – November 2022 (see Section 4.7), as no one-third octave data is contained within the manufacturer’s acoustic specification, a correction of +6dB has been applied for potential tonal characteristics.

Following this guidance, a penalty of +6dB has been applied for tonal characteristics and 0dB has been applied for impulsive characteristics.

The calculated cumulative rating level of the 2no. heat pumps is shown in Table 11.

| Representative Receptor | Specific Sound Level (dB(A)) | Tonal Penalty (dB) | Impulse Penalty (dB) | Rating Level (dB) |
|-------------------------|------------------------------|--------------------|----------------------|-------------------|
| NSR1                    | 36dB(A)                      | +6dB               | 0dB                  | 42dB(A)           |
| NSR2                    | 37dB(A)                      | +6dB               | 0dB                  | 43dB(A)           |

TABLE 11 - RATING LEVEL SUMMARY

## 8.5 DEFINED SOUND LEVEL SUMMARY

The defined sound levels are summarised in Table 12.

| Time Period | Source Reference | NSR  | Rating Level (dB) | Background Sound Level (dB, L <sub>A90</sub> ) | Difference |
|-------------|------------------|------|-------------------|------------------------------------------------|------------|
| Day-Time    | S1               | NSR1 | 42dB(A)           | 50dB(A)                                        | -8dB       |
| Night-Time  | S1               | NSR1 | 42dB(A)           | 43dB(A)                                        | -1dB       |
| Day-Time    | S1               | NSR2 | 43dB(A)           | 50dB(A)                                        | -7dB       |
| Night-Time  | S1               | NSR2 | 43dB(A)           | 43dB(A)                                        | 0dB        |

TABLE 12 - DEFINED SOUND LEVEL SUMMARY

## 9 NOISE IMPACT ASSESSMENT

BS4142:2014 provides the following guidance on the expected impact to the local environment based upon rating levels:

- In instances where the rating level exceeds background noise level by +10dB, this is an indication of a significant adverse impact, depending upon the context.
- In instances where the rating level exceeds background noise level by +5dB, this is an indication of an adverse impact, depending upon the context.
- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will cause an adverse noise impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

The assessment of a noise impact at a receptor should consider the context in which the sound occurs. BS4142:2014 states that the following factors be included in the context assessment.

- The absolute level of sound.
- The character and level of residual sound.
- The sensitivity of the receptor.

At NSR1, the delta between rating level and background sound level is calculated at -8dB during the day-time period and -1dB during the night-time period.

At NSR2, the delta between rating level and background sound level is calculated at -7dB during the day-time period and 0dB during the night-time period.

Based upon the guidance from BS4142:2014, noise from the 2no. air source heat pumps (Ideal EcoMod 50kw) is expected to produce no adverse effect at NSRs, depending upon context.

## 9.1 CONTEXT ASSESSMENT

BS4142:2014 states:

*"The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound sources exceeds the background sound level and the context in which the sound occurs".*

*The first requirement of this statement has been determined within the noise impact assessment section above. To determine the context in which the industrial sound will reside, three factors must be considered, these are.*

- *The absolute level of sound.*
- *The character and level of the residual sound compared to the character and level of the specific sound; and,*
- *The sensitivity of the receptor.*

### 9.1.1 ABSOLUTE LEVEL OF SOUND

To determine the first context test in BS4142 it is necessary to determine whether the residual and background sound levels are high or low. Section 11 of BS4142 states:

*"Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night.*

*Where residual sound levels are very high, the residual sound might itself result in adverse impacts or significant adverse impacts, and the margin by which the rating level exceeds the background might simply be an indication of the extent to which the specific sound source is likely to make those impacts worse."*

The worst-case rating level is calculated at 43dB(A), and the night-time (worst-case) background sound level is measured at 43dB(A)  $L_{A90}$ . These noise levels are moderate. However, as the rating level does not exceed the background sound level, this context test is unlikely to alter the findings of this assessment.

### 9.1.2 CHARACTER AND LEVEL OF RESIDUAL & SPECIFIC SOUND

The sound from the 2no. air source heat pumps (Ideal EcoMod 50kw) is expected to comprise broadband airflow noise. There is also potential for the noise emissions to be tonal, however this has been accounted for within the rating level calculation.

As the proposed noise source will likely introduce new acoustic characteristics into the existing soundscape, this is an indication that the potential noise impact may be greater than the results of Table 12 would suggest. However, as the rating level is below or equal to the background sound level, it is not expected that this context test would alter the findings of this assessment.

### 9.1.3 SENSITIVITY OF RECEPTOR

With regard to pertinent factors to be taken into consideration in the context assessment, Section 11 of BS4142 states:

*"The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions, such as:*

- i) facade insulation treatment.*
- ii) ventilation and/or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation; and*
- iii) acoustic screening."*

NSR1 & NSR2 are believed to be old housing stock and, from observations taken during site visits, do not appear to have any acoustically attenuated ventilation installed. Therefore, the dwellings will likely rely on open windows for ventilation. This could potentially increase the impact of noise from S1 at NSRs.

However, due to the estimated rating level at NSRs front façades, it is expected that even with windows open for ventilation, the internal noise level will be below the recommended indoor noise levels as defined within BS8233. This is based upon a 13dB attenuation provided by an open window, as defined within the recent AVO guidelines (January 2020).

This is a positive indication of a low noise impact from S1 at NSRs.

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## 9.2 BS4142 ASSESSMENT SUMMARY

A BS4142 assessment has been undertaken to assess the potential noise impact from the proposed development at receptors.

The assessment indicates that the noise associated with the 2no. air source heat pump (Ideal EcoMod 50kw) is likely to have a **low impact** at noise sensitive receptors.

We would therefore suggest that the application is recommended for approval.

## 10 CONCLUSIONS & RECOMMENDATIONS

Noise Control Solutions Limited (NCSL) have been commissioned by Varsity Consulting Ltd to undertake a noise impact assessment for the proposed installation of 2no. air source heat pumps (Ideal EcoMod 50kw) at Castleton Community Centre, Rochdale. The assessment is required in order to accompany the relevant planning application which is to be considered by Rochdale Borough Council. The scope of this application is the installation of 2no. air source heat pumps.

The potential sources of noise are considered by NCSL to be;

1. 2no. Ideal EcoMod 50kw air source heat pumps.

It is understood that the proposed sources will be located within a 3m high timber enclosure, incorporating Jacksons Fencing Jakoustic Absorptive Acoustic Fencing, with an open top section to provide adequate ventilation. This enclosure is expected to fully obscure the line of sight between S1 and NSRs and exhibit no gaps.

The noise impact assessment includes data from a background sound level survey which was conducted between 1200hrs 15th November 2023 and 1200hrs 16th November 2023. The results of this background sound level survey result in a day-time statistical modal value of 50dB(A)  $L_{A90}$  and a night-time linear mean value of 43dB(A)  $L_{A90}$ .

The specific sound level of the proposed noise sources at NSRs has been calculated with the use of a computer noise model, generated within the sound propagation simulation software SoundPLAN Essentials 5.1. This model has been informed by the manufacturers declared sound power level output.

As per the guidance provided within the IOA Briefing Note – Heat Pumps – November 2022 (see section 4.7) a correction of +6dB has been applied for tonal characteristics, as sufficient data is not provided by the manufacturer in order to make an informed calculation of tonality.

This results in a rating level of 42dB(A) at NSR1 and 43dB(A) at NSR2.

As the background sound level in the area is relatively high (above the 40dB(A) recommendation provided within the IOA Briefing Note), it is assumed that BS4142 is likely to be the most appropriate standard to assess the noise impact from the proposed sources at receptors.

The findings of this assessment demonstrate that the proposed 2no. air source heat pumps (Ideal EcoMod 50kw) are unlikely to cause any adverse acoustic effect at NSRs based upon a worst-case difference between background sound level and rating level of -7dB during the day-time period and 0dB during the night-time period, when calculated in accordance with BS4142.

Based upon the findings of this assessment, it is the recommendation of NCSL that the planning application is approved regarding noise impact.

Any recommendations contained within this report should be approved by the relevant authority before any work commences.

## 11 UNCERTAINTY

All measurements within this report have been taken under repeatable conditions and therefore any uncertainty in the result will be low.

To reduce measurement uncertainty, the following steps have been taken.

- The background noise measurements were undertaken during dry weather and with wind speeds of less than 5m/s.
- The results of each measurement period were reported to the nearest 0.1dB.
- Noise measurements were made using one Class 1, integrating sound level meter.

All noise impact assessments and similar acoustic assessments inherently rely upon estimations and assumptions. This report should therefore be considered within this context.

## APPENDIX A: JAKOUSTIC ABSORPTIVE FENCING

# AIRO

## Test Certificate

### SOUND ABSORPTION ABSORPTIVE TIMBER NOISE BARRIER

#### MEASUREMENTS

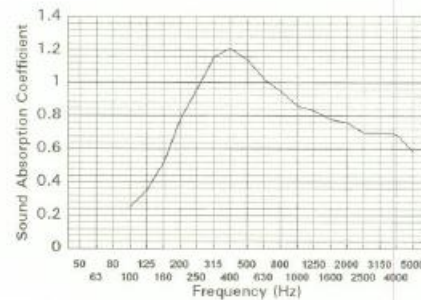
Sound Absorption Coefficient ( $\alpha_s$ ) measurements were conducted at the AIRO Acoustics Laboratory in accordance with BS EN 1793-1:1998 and EN ISO 354:2003, using a purpose built reverberation chamber. AIRO is a UKAS accredited testing laboratory No. 0483. The test was performed on 16 January 2007 for Jacksons Fencing Ltd.

#### DESCRIPTION

The specimen of area 4110 mm wide x 3050 mm high (12.54 m<sup>2</sup>) was installed in accordance with the requirements of BS EN 1793-1:1998 and included a split post arrangement positioned to give panel widths of 2055 mm each side of the post centre-line. The barrier comprised a series of 35 x 145 mm t&g boards with a face height of 125 mm which were laid horizontally. These were laid with alternative boards spanning the full width and cut boards joining at the post. The split posts comprised 35 x 125 mm timbers which were screwed together through the boards. Horizontal battens, 45 x 54 mm, were screwed to the boards at 650 mm centres with 50 mm Rockwool RW3 inserted between, faced with a black woven plastic mesh stapled in place and overfixed by vertical half-round battens at 350 mm centres. All the timber used was pre-treated with preservative, and for test purposes the barrier was laid over the floor of the test chamber with the absorbent face uppermost. The estimated mass of the specimen (excluding post and battens) is 28 kg/m<sup>2</sup>.

#### RESULTS

| Frequency<br>Hz | $\alpha_s$ | Frequency<br>Hz | $\alpha_s$ |
|-----------------|------------|-----------------|------------|
| 100             | 0.25       | 800             | 0.95       |
| 125             | 0.35       | 1000            | 0.86       |
| 160             | 0.52       | 1250            | 0.83       |
| 200             | 0.78       | 1600            | 0.78       |
| 250             | 0.96       | 2000            | 0.76       |
| 315             | 1.16       | 2500            | 0.70       |
| 400             | 1.21       | 3150            | 0.70       |
| 500             | 1.14       | 4000            | 0.69       |
| 630             | 1.02       | 5000            | 0.58       |



Rating according to BS EN 1793-1:1998

$DL_{\alpha} = 9$  dB

Category = A3

This Test Certificate summarises Report No. L/3041/B dated 31 January 2007

*A J Jones*

A J Jones BSc PhD CSci CPhys MInstP FIOA  
Managing Director

*M Sawyer*

M Sawyer MIOA  
Laboratory Supervisor

### ACOUSTICAL INVESTIGATION & RESEARCH ORGANISATION LTD

Duxons Turn  
Maylands Avenue  
Hemel Hempstead  
Hertfordshire  
HP2 4SB  
Telephone: 01442 247146



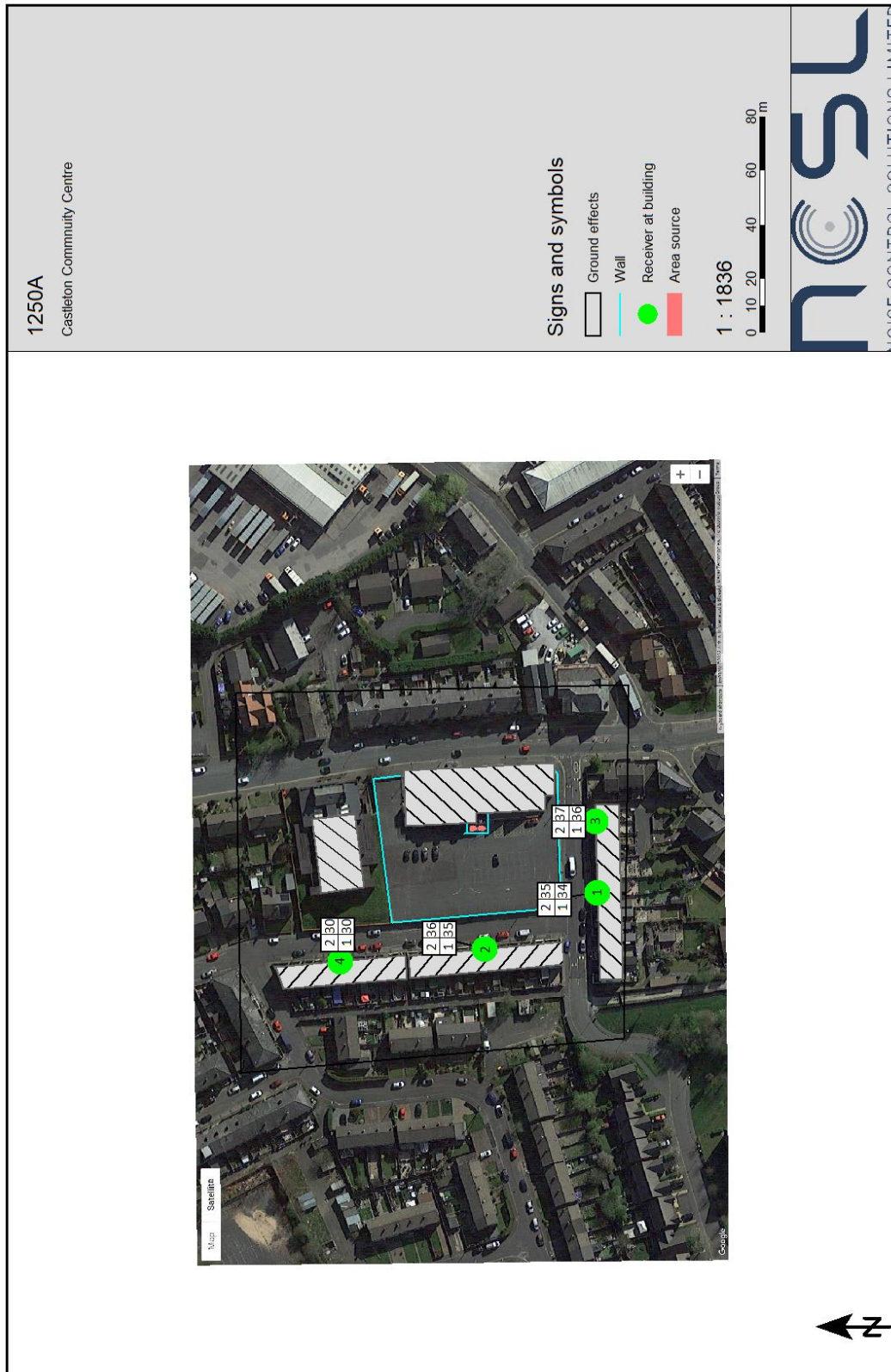
## APPENDIX B: ACOUSTIC SURVEY DATA

| Time     | LAeq | LAF90.0% | LAF10.0% | LAFmax | LAFmin | LZeq | LCeq |
|----------|------|----------|----------|--------|--------|------|------|
| 12:00:00 | 58.8 | 51.6     | 61.1     | 80.8   | 48.4   | 89.2 | 75.6 |
| 12:15:00 | 56.4 | 49.4     | 58.9     | 71.4   | 46.8   | 88.5 | 74.7 |
| 12:30:00 | 56.3 | 49.5     | 58.9     | 69.9   | 46.5   | 87.4 | 73.8 |
| 12:45:00 | 59   | 52.6     | 61.3     | 76.5   | 50.7   | 87.4 | 74.5 |
| 13:00:00 | 60.9 | 52.6     | 63.9     | 77.4   | 50.2   | 89.6 | 76.7 |
| 13:15:00 | 59.1 | 52.8     | 62.4     | 74.9   | 51.3   | 89.8 | 76.9 |
| 13:30:00 | 59.2 | 50.2     | 63.3     | 70.6   | 47.1   | 89.3 | 75.7 |
| 13:45:00 | 59   | 50.4     | 61.9     | 74     | 47.9   | 90   | 76.7 |
| 14:00:00 | 59.7 | 51.2     | 63.8     | 70.4   | 48.2   | 88.1 | 74.8 |
| 14:15:00 | 60.9 | 51.6     | 64       | 76.8   | 48.6   | 86.5 | 73.3 |
| 14:30:00 | 60.6 | 51.5     | 64.1     | 73.1   | 47     | 83.7 | 71.2 |
| 14:45:00 | 60.7 | 52.1     | 64.2     | 73     | 48.8   | 87   | 74   |
| 15:00:00 | 61   | 52.8     | 64.8     | 73.1   | 48.7   | 86.9 | 74   |
| 15:15:00 | 65.2 | 55       | 66.8     | 90     | 52.6   | 83.2 | 72.7 |
| 15:30:00 | 61.7 | 51.2     | 65.9     | 73.7   | 47.6   | 81.6 | 71.1 |
| 15:45:00 | 60.6 | 50.3     | 64.7     | 75.3   | 48.1   | 82.3 | 70.7 |
| 16:00:00 | 60.9 | 50.4     | 64.8     | 73.7   | 47.1   | 81.6 | 69.6 |
| 16:15:00 | 60.6 | 51.6     | 64.6     | 73.8   | 47.3   | 79.8 | 70.4 |
| 16:30:00 | 60   | 49.6     | 64.1     | 72.5   | 46.2   | 77.7 | 68.4 |
| 16:45:00 | 59.1 | 49.6     | 63.1     | 68.9   | 46.3   | 75.1 | 67.4 |
| 17:00:00 | 60.4 | 50.7     | 64.4     | 71.9   | 47.2   | 73.8 | 68.6 |
| 17:15:00 | 61.1 | 49.9     | 63.9     | 79.7   | 46.4   | 74   | 69.5 |
| 17:30:00 | 61.1 | 51.3     | 64.6     | 78.2   | 48.1   | 77.8 | 69.4 |
| 17:45:00 | 60.1 | 51.7     | 63.4     | 78.4   | 47.4   | 78   | 70.3 |
| 18:00:00 | 59.3 | 51       | 63.2     | 70.8   | 46     | 77.4 | 69.3 |
| 18:15:00 | 58.7 | 49.4     | 62.6     | 71.4   | 46.2   | 81   | 69.6 |
| 18:30:00 | 58.6 | 49.1     | 62.1     | 72.6   | 45.6   | 75.6 | 69.8 |
| 18:45:00 | 60.2 | 51.4     | 64.1     | 70.1   | 46     | 74   | 69.5 |
| 19:00:00 | 60.6 | 50.1     | 63.8     | 78.3   | 46.3   | 73.8 | 70.1 |
| 19:15:00 | 58   | 47.2     | 61.7     | 73.4   | 43     | 71.4 | 65.9 |
| 19:30:00 | 58.7 | 46.7     | 62.5     | 73.9   | 42.6   | 74.1 | 68.2 |
| 19:45:00 | 57.8 | 46       | 61.6     | 72.2   | 42.5   | 69.6 | 65.2 |
| 20:00:00 | 57.5 | 47.1     | 61.1     | 75.2   | 43.4   | 71.1 | 65.9 |
| 20:15:00 | 57   | 45.1     | 60.7     | 71.1   | 41.8   | 71.6 | 64.8 |
| 20:30:00 | 56.3 | 45.6     | 60.5     | 69.6   | 42.9   | 75.1 | 65.3 |
| 20:45:00 | 54.8 | 43.7     | 58.5     | 69.5   | 41.2   | 73.9 | 63.7 |
| 21:00:00 | 55.9 | 44.2     | 59.7     | 70.4   | 39.8   | 70.7 | 64.7 |
| 21:15:00 | 56.1 | 42.6     | 60.3     | 75.2   | 39.8   | 74.6 | 66.3 |
| 21:30:00 | 54.6 | 42.5     | 58.1     | 76.3   | 40.2   | 70.4 | 63.2 |
| 21:45:00 | 50.2 | 41.7     | 52.4     | 69.3   | 39.5   | 66.8 | 58.5 |

|          |      |      |      |      |      |      |      |
|----------|------|------|------|------|------|------|------|
| 22:00:00 | 55.4 | 43   | 58.7 | 72.5 | 39.5 | 66.1 | 63   |
| 22:15:00 | 51.1 | 39.4 | 55   | 64.2 | 37.8 | 63.5 | 61.4 |
| 22:30:00 | 51.3 | 39.8 | 54   | 68.3 | 37.4 | 61.5 | 59.4 |
| 22:45:00 | 51.2 | 38.7 | 54.4 | 69.5 | 36.8 | 62.3 | 60.6 |
| 23:00:00 | 49.6 | 38.4 | 52.2 | 81.1 | 36.7 | 61.4 | 59.1 |
| 23:15:00 | 52.5 | 41.1 | 54.9 | 73.3 | 38   | 62.7 | 61.2 |
| 23:30:00 | 50.4 | 44.5 | 52.6 | 67.9 | 42.5 | 60.8 | 57.8 |
| 23:45:00 | 48.7 | 41.5 | 50.6 | 65.9 | 39.5 | 60.8 | 57.3 |
| 00:00:00 | 47.6 | 43   | 49   | 64.4 | 41   | 60.9 | 54.8 |
| 00:15:00 | 50.6 | 42.7 | 51.7 | 73.3 | 39.6 | 62.2 | 57.2 |
| 00:30:00 | 47.9 | 41.4 | 48.1 | 68.5 | 39.7 | 58.8 | 55.1 |
| 00:45:00 | 47.1 | 43.2 | 47.3 | 63.5 | 40.9 | 58   | 54.6 |
| 01:00:00 | 46.1 | 43.1 | 47.1 | 63.5 | 39.8 | 56.7 | 53.3 |
| 01:15:00 | 44.1 | 38.4 | 44.8 | 66.2 | 36.7 | 55   | 50.4 |
| 01:30:00 | 43.4 | 37.4 | 44.8 | 61.9 | 35.9 | 54.8 | 52.4 |
| 01:45:00 | 45.6 | 36.9 | 46.3 | 63.8 | 35.8 | 55.7 | 52.9 |
| 02:00:00 | 46   | 37.1 | 46.1 | 65.7 | 35.7 | 55.5 | 53.5 |
| 02:15:00 | 45.3 | 36.4 | 44.3 | 65   | 35.2 | 56.2 | 53.7 |
| 02:30:00 | 41.5 | 37.2 | 43.7 | 54.2 | 35.7 | 54.7 | 50.6 |
| 02:45:00 | 46.8 | 38   | 48.1 | 68.1 | 36.1 | 58.9 | 57   |
| 03:00:00 | 43.9 | 37.7 | 47.2 | 58.3 | 36.3 | 57.6 | 55.6 |
| 03:15:00 | 43.5 | 39.7 | 45   | 58.3 | 37.9 | 53.7 | 51.1 |
| 03:30:00 | 48.1 | 40.5 | 49.8 | 65.4 | 38.8 | 60.9 | 58.3 |
| 03:45:00 | 43.5 | 40   | 44.9 | 54.8 | 38.3 | 56.9 | 52.8 |
| 04:00:00 | 44.1 | 39.8 | 45.7 | 59.5 | 37.4 | 59.1 | 52.6 |
| 04:15:00 | 44   | 40.8 | 45.4 | 57.2 | 39.1 | 65.9 | 54.9 |
| 04:30:00 | 46.1 | 43.5 | 47.3 | 63   | 40.2 | 56.8 | 53.9 |
| 04:45:00 | 49.4 | 44.3 | 51.3 | 65.8 | 41.5 | 60.8 | 57.6 |
| 05:00:00 | 50   | 46.9 | 51.2 | 65.8 | 45.1 | 62.5 | 59   |
| 05:15:00 | 51.7 | 47.9 | 53.2 | 68   | 45.7 | 61.8 | 59.2 |
| 05:30:00 | 53.6 | 49.5 | 54.1 | 75   | 46.2 | 62.2 | 59.9 |
| 05:45:00 | 54   | 49.8 | 57.1 | 68   | 47.6 | 62.5 | 60.6 |
| 06:00:00 | 53   | 49.6 | 54.5 | 74.1 | 47.8 | 63.4 | 61.1 |
| 06:15:00 | 54.5 | 50   | 56.9 | 69.8 | 47.5 | 63.6 | 61.7 |
| 06:30:00 | 55.4 | 50.9 | 58.4 | 67.6 | 49   | 65.4 | 63.4 |
| 06:45:00 | 55.4 | 51.9 | 57.3 | 68.1 | 49.4 | 64.4 | 62.4 |
| 07:00:00 | 56   | 51.5 | 59   | 65.6 | 49.9 | 65.9 | 63.9 |
| 07:15:00 | 57.5 | 51.4 | 60.2 | 72   | 49.5 | 66.8 | 65   |
| 07:30:00 | 58   | 51.4 | 62.1 | 73.6 | 48.4 | 68   | 66.1 |
| 07:45:00 | 59.2 | 51   | 63.1 | 73.4 | 48.8 | 70   | 68.6 |
| 08:00:00 | 58.7 | 51.2 | 62.3 | 79.7 | 48.2 | 68.6 | 66.8 |
| 08:15:00 | 59   | 52.2 | 62.5 | 69.1 | 49.2 | 69.2 | 67.2 |
| 08:30:00 | 60.9 | 53.2 | 64   | 82.3 | 48.3 | 71.3 | 69.3 |
| 08:45:00 | 60   | 51.1 | 62.9 | 81.1 | 47.5 | 68.8 | 66.9 |
| 09:00:00 | 57.8 | 50.4 | 61.3 | 75.3 | 48.2 | 68.4 | 66.4 |

|          |      |      |      |      |      |      |      |
|----------|------|------|------|------|------|------|------|
| 09:15:00 | 55.3 | 49.2 | 58.5 | 71.5 | 46.5 | 67.1 | 64.2 |
| 09:30:00 | 57.8 | 49.5 | 61.5 | 81.1 | 46.2 | 68.2 | 66.2 |
| 09:45:00 | 58.7 | 49.4 | 62   | 86.8 | 46.6 | 69   | 66.8 |
| 10:00:00 | 61.3 | 50.1 | 63.2 | 82.4 | 47   | 71   | 68.6 |
| 10:15:00 | 56.4 | 48.1 | 60   | 79   | 45.5 | 69.1 | 66   |
| 10:30:00 | 58.1 | 49.5 | 62   | 69.4 | 46.3 | 71.4 | 66.7 |
| 10:45:00 | 55.7 | 47.4 | 59.2 | 69.8 | 45   | 70.2 | 64.8 |
| 11:00:00 | 56.7 | 48.6 | 60.2 | 72   | 45.4 | 69.5 | 65.4 |
| 11:15:00 | 55.9 | 47.6 | 59.4 | 73.5 | 45.2 | 71.3 | 64.9 |
| 11:30:00 | 57.3 | 49   | 60.7 | 72   | 46   | 69.5 | 66.4 |
| 11:45:00 | 57.5 | 48.8 | 61.1 | 74   | 45.2 | 69.4 | 66.9 |
| 12:00:00 | 58   | 48.1 | 60.8 | 81.5 | 42.5 | 70.4 | 67.9 |

## APPENDIX C: NOISE MODEL RESULTS





## TERMS AND CONDITIONS OF BUSINESS

### 1. GENERAL

Work done or services undertaken are subject to the terms and conditions detailed below and all other conditions, warranties and representations, expressed or implied are hereby excluded.

### 2. PRICES

Prices are based on current costs, exchange rates, duty and freight and are subject to change without notice. The quoted price does not cover the cost of attending meetings, telephone calls or email exchanges. This is charged separately at a pro rata hourly rate of £75 per hour.

### 3. TIMING ESTIMATES

Timing estimates are made in good faith and date from receipt of a written order and full information to enable us to proceed. While NCSL makes every effort to fulfil them, such estimates are subject to unforeseen events and if not maintained, cannot give rise to any claim.

### 4. CANCELLATION AND RETURNS

Cancellation of orders for services, training or consultancy is only acceptable by prior agreement of NCSL and a charge will normally be made. NCSL reserve the right to cancel any work at any time.

### 5. CLAIMS

Claims for errors etc should be notified within 10 days of date of receipt.

### 6. PAYMENT TERMS

Full payment is required before any work is undertaken by NCSL. Failure to comply with the terms of payment may result in delayed delivery of services and a review of the Customer's credit account (if applicable). Should the customer become subject to an administration order, or becomes bankrupt or goes into liquidation, NCSL has a right to cancel any contract and discontinue any work.

### 7. RETENTION OF TITLE

All reports & data remain the property of NCSL. Under no circumstances will a customer's purchase order override our Retention of Title clause. In the case of software and data, the ownership remains with NCSL. Payment of invoices in full will entitle the customer to use reports or other services under licence until (a) a set expiry date is passed (b) they cease trading. In both instances, the licence shall then revert to NCSL. All measurement data and reports are the sole property of NCSL and shall not be reproduced or distributed without written consent from NCSL.

### 8. TEST REPORTS

NCSL shall not be liable for any subsequent loss or damage incurred by the client as a result of information supplied in a test report. Any specifications or targets supplied by NCSL are to be considered as guidance only. No guarantee is offered by NCSL that the meeting of any supplied targets or specifications will solve the relevant issue or prevent future issues.

### 9. RESPONSIBILITY

Every effort is made to ensure accuracy in description, drawings and other information in correspondence etc but no warranty is given in this respect and NCSL shall not be liable for any error therein. NCSL carries out all tests and/or advises only on the basis that the same are carried out, made or given without any responsibility whether for negligence or otherwise. NCSL and its servants or agents will not be liable for any damage or loss direct or indirect of whatsoever kind, whether or not the same results directly or indirectly from negligence on the part of NCSL or its servants or agents.

### 10. CONFIDENTIALITY

Unless specifically excluded in the terms of an individual contract between NCSL and its Customer, the following shall apply to all reports, advice, drawings, photographs, specifications or data:

- i. The above shall not be disclosed to third parties or used in litigation without the consent of NCSL.
- ii. Where NCSL has given consent to disclosure, the Customer shall draw the attention of the third party to these terms of business and the basis on which NCSL undertakes test, reporting and advising. The Customer shall indemnify NCSL for any failure to do so.
- iii. The above items are submitted to the Customer as confidential documents. Confidentiality shall continue to apply after completion of the business but shall cease to apply to information or knowledge which may come into the public domain.

### 11. CONSTRUCTION AND ARBITRATION

The laws of England shall govern all contracts and the parties submit to exclusive jurisdiction of the courts of England, unless otherwise agreed.

### 12. JOB SPECIFIC TERMS

NCSL will not be held responsible for any adverse impact arising from the introduction of proposed palliative measures. Furthermore, no guarantee is given regarding the effectiveness of any proposed palliative and/or mitigation measures. The client is responsible for any palliative measures, including, but not limited to, the sourcing of suppliers, the quality of installation, the cost of all materials / installation, maintenance and safety. All advice given should be taken as guidance only. It is the responsibility of the client to ensure the safe operation of any mitigation measures, including but not limited to, adequate fire safety and ventilation requirements. NCSL provide no guarantee that adherence to provided specifications will result in no further noise and/or vibration complaints and/or the elimination of noise and/or vibration issues. NCSL do not supply, procure, install or maintain any materials. We reserve the right to publicise the work conducted by NCSL, including, where appropriate, client logos etc. On occasion, work may be conducted by sub-contract partners.