Units 13 - 15 Sherrington Way, Basingstoke
Leverton Helm –Chilled Solutions Project

Noise Impact Assessment

31 January 2024

Client: Leverton Helm Limited
Units 13 –15 Sherrington Way
Lister Road Industrial Estate
Basingstoke
Hampshire
RG22 4DQ

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Document Control

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Role	Name	Signature	Date
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For Information

Please Note

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Contents

1.0 INTRODUCTION

1.1 Quantum Acoustics Limited has been instructed by Leverton Helm Limited to prepare this Noise Impact Assessment which accompanies a planning application for new chiller plant to be installed at Leverton Helm's existing factory at Units 13-15, Sherrington Way, Basingstoke.

1.2 This report presents the results of an environmental noise survey undertaken in the environs of the site to determine existing ambient noise levels.

1.3 These noise levels have been used to determine noise emission criteria for proposed mechanical services and process plant supporting the use of the chiller plant equipment.

1.4 Compliance with these noise limits has then been assessed, based on available manufacturer's data for the proposed plant.

1.5 This report is structured as follows:

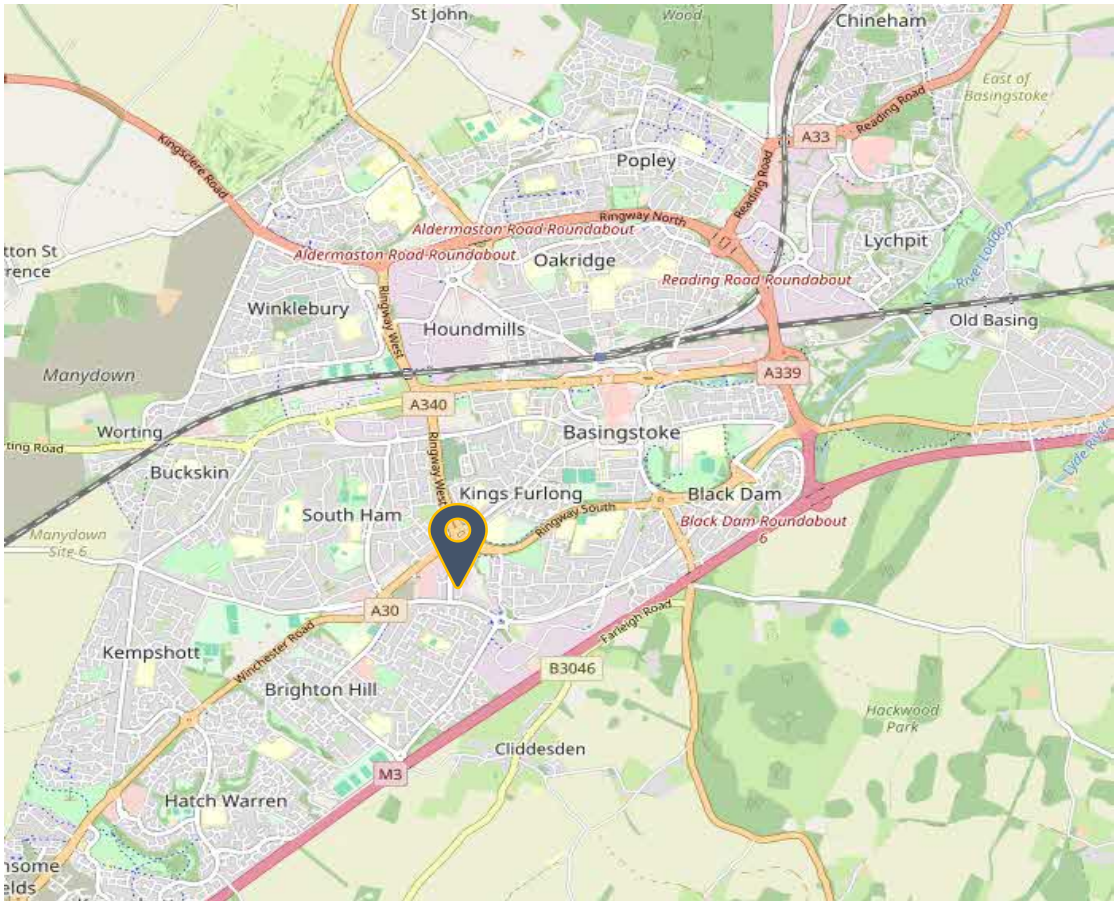
- Section 2 outlines the location of site and proximity of existing noise sensitive receptors;
- Section 3 describes the proposed development (including specifications for the proposed plant);
- Section 4 discusses relevant national and local planning policy and industry standard design guidance used as a basis for assessment;
- Section 5 presents the results of noise monitoring;
- Section 6 assesses noise emissions;
- Conclusions are set out in Section 7.

1.6 A glossary of acoustic terminology is provided at Appendix A to assist with the technical terms and acoustic nomenclature used in this report.

2.0 SITE DESCRIPTION

2.1 The site is located in the south of Basingstoke in an established industrial area (Lister Road Industrial Estate), as shown in Figure 2.1 below:

Figure 2.1: Site Location (OpenStreetMap, 2023)



2.2 The site is accessed from Sherrington Way, off Lister Road which runs alongside the proposed chiller locations with trees and hedgerow separating.

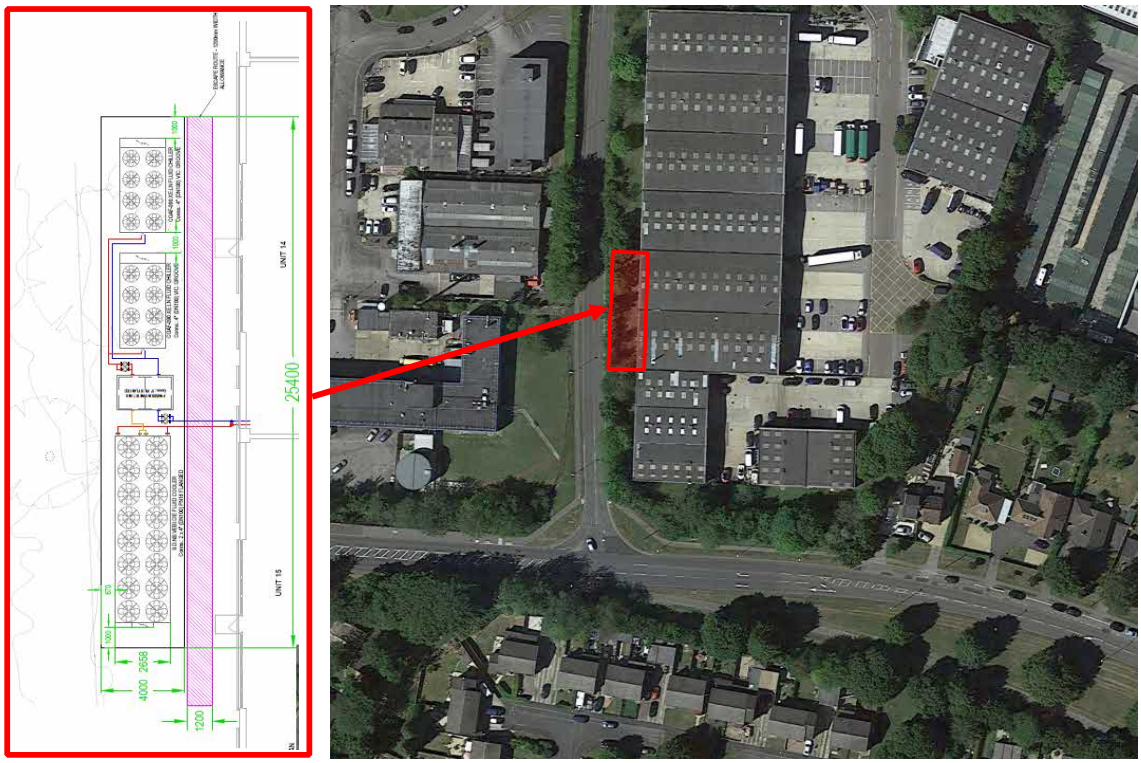
2.3 The site adjoins other industrial/commercial units directly to the northern and southern sides. Beyond the western boundary is Lister Road with industrial/commercial units on the opposing side of road.

2.4 Nearby noise sensitive receptors are dwellings to the south east on The Harrow Way and dwellings to south in Coates Close.

3.0 PROPOSED DEVELOPMENT

3.1 The proposed development involves the installation of new chiller plant adjacent to the western elevation of existing industrial units. The plant consist of two fluid chillers and a single large fluid cooler. The proposed arrangement of the site and proposed location of the plant is shown in Figure 3.1 below:

Figure 3.1: General Arrangement of Site and Disposition of Proposed Plant



3.2 Manufacturer noise data for the two noise generating systems is shown below. Detailed specifications can be found in Appendix B.

Table 3.1: Plant Manufacturer Noise Data

System	Sound Pressure Level at 10m, dB(A)
Chiller	58
Free Air Cooler	63 ±2

4.0 PLANNING POLICY CONTEXT AND DESIGN GUIDANCE

National Planning Policy Framework (2023)

4.1 The overarching aim of the planning regime is to ensure the compatibility of land uses. With regard to noise, the National Planning Policy Framework sets out two primary policies which seek to ensure that new noise sensitive development is adequately protected from noise; that that the impact of noise from new noise generating land uses on existing residential uses is minimised and that existing commercial/industrial uses and community facilities do not have unreasonable restrictions imposed on them by new noise sensitive development (the 'agent of change' principle).

4.2 Paragraph 191 of the NPPF requires:

> *Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely 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:*
>
> *a) 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;*
>
> *b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and*
>
> *c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.*

4.3 Paragraph 193 of the NPPF draw specific attention to the need to ensure that new development is compatible with existing businesses and community facilities and introduces and "agent of change" principle:

> "*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."

4.4 With regard to '*adverse*' impacts and '*significant adverse*' impacts, the NPPF directs the reader to the advice contained in DEFRA's "*Noise Policy Statement for England*" (NPSE).

Noise Policy Statement for England

4.5 With regard to 'adverse' impacts and 'significant adverse' impacts, the NPPF directs the reader to the advice contained in DEFRA's "*Noise Policy Statement for England*" (NPSE). This Policy Statement introduces the concept of a "*Significant Observed Adverse Effect Level*" (SOAEL), "*Lowest Observed Adverse Effect Level*" (LOAEL) and "No Observed Effect Level" (NOEL). These are concepts aligned with toxicology outcomes derived from guidance given by the World Health Organisation.

- NOEL –No Observed Effect Level
  This is the level below which no effect can be detected and below which there is no detectable effect on health and quality of life due to noise.

- LOAEL –Lowest Observable Adverse 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.

Planning Practice Guidance

4.6 The application of national planning is amplified in the government's "National Planning Practice Guidance" (NPPG). This seeks to help clarify understanding the perception of noise effects, outcomes and actions that should be taken to align decision making with the NPPF. In line with the NPPF concept of basing decision making on the identification of "significant" or "other" impacts on health and quality of life, the NPPG aligns its guidance with the NPSE.

4.7 Table 4.1 overleaf summarises this guidance.

Table 4.1: Noise Exposure Hierarchy

Response	Examples of Outcomes	Increasing Effect Level	Action
No Observed Effect Level (NOEL)			
Not present	No effect	No Observed Effect	No specific measures required
Present and not intrusive	Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level (LOAEL)			
Present and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, 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.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level (SOAEL)			
Present and disruptive	The noise causes a material change in behaviour and/or attitude, 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 Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable hard, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

Local Planning Policy

4.8 Basingstoke and Deane Borough Council's development plan for determining planning applications includes the "*Basingstoke and Deane Local Plan (2011 to 2029)*" (adopted May 2016) and its adopted Local Plan Policies Map. The principle local planning policy relevant to noise is Policy EM12: pollution. This states:

> "*Development will be permitted provided that it does not result in pollution[33] which is detrimental to quality of life, or poses unacceptable risks to health or the natural environment. Development that would result in unavoidable pollution will only be permitted where measures to adequately mitigate these polluting effects can be implemented. Development which is sensitive[35] to pollution will only be permitted where:*
>
> a) *There would be no detrimental impact on quality of life as a result of existing, historic, or nearby land uses and activities; and*
>
> b) *It would not lead to unacceptable risks to human health or the natural environment, as a result of existing, historic, or nearby land uses and activities; or*
>
> c) *Adequate remedial or mitigation measures are proposed and can be implemented."*

4.9 Supporting the implementation of the above policy are guidance notes produced by BDBC's Environmental Protection Team: *"Guidance note for Developers and Consultants: Noise Assessment and Reports for Planning Applications*" (2023). Section 9 of the guidance deals with industrial and commercial noise sources. The introductory paragraph to this section states that "British Standard BS 4142 is the governing guidance where noise of an industrial or commercial nature is under consideration" and refers the reader to the latest version of this standard at the time of publication of the guidance (BS 4142: 2014 + A1: 2019).

4.10 For "new" noise sources, the guidance states:

> "*While a noise source which is assessed to be at, or marginally above the existing background noise level is unlikely to lead direct adverse impacts (unless background sound levels are already high); where various mechanical plant and equipment is introduced over time, ambient and background noise levels are likely to progressively creep upwards. As such, to minimise this, as a starting point, noise from new mechanical sources should preferably be below, but certainly no greater than the existing background level at the most sensitive period when the plant will be operated*

(e.g. evenings, nights and weekends). If this cannot be achieved, then a view will be taken on the context and character of the noise as discussed in section 11 of BS 4142."

4.11 In addition to noise related policy, it is also material to note that the site sits within the Viables Business Park, which is an allocated strategic employment area, as identified on the Local Plan. As such, Policies EP1 and EP2 of the Local Plan (which seek to protect and promote the use of strategic employment land) are also material.

Design Guidance - BS 4142: 2014 + A1: 2019

4.12 As noted above, BDBC's guidance for noise assessments makes specific reference to BS 4142:2014 + A1: 2019: *"Methods for Rating and Assessing Commercial and Industrial Sound".* This standard provides a rating and assessment methodology for assessing the potential adverse impact of commercial and commercial noise sources on neighbouring dwellings and is referenced in documents supporting the Government's planning practice guidance on noise.

4.13 The assessment procedure initially compares the 'Rating Level' of the source with the 'Background Noise Level' when the source is not present.

4.14 The 'Rating Level' (L_{Ar}) referred to is the specific noise level of the noise source under investigation (in terms of the L_{Aeq} noise index), to which corrections are applied if the noise has certain audible characteristics. The table below summarises the corrections to be applied based on a subjective assessment of noise source characteristics.

BS4142 Character Corrections

Character Correction				
Feature / Perception	Tonality	Impulsivity	Intermittency	Other Acoustic Characteristics
Just perceptible	+2dB	+3dB	+3dB When the specific sound has identifiable on/off conditions that are readily distinctive	+3dB
Clearly perceptible	+4dB	+6dB		
Highly perceptible	+6dB	+9dB		

4.15 The 'Background Noise Level' (L_{A90}) represents the noise level that is exceeded for 90% of the stated measurement period. For assessment purposes, the background noise level needs to be determined without the noise source under investigation operating.

4.16 The time of operation needs to be taken into account. During the day (normally taken to be 07.00 to 23.00 hours) a one-hour measurement period is considered appropriate. During the night (normally taken to be 23.00 –07.00 hours) a 15-minute time period is normally used.

4.17 The following guidance is then offered based on the outcome of this initial assessment:

- *A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.*
- *A difference of around +5 dB is likely to be an indication of an adverse impact, depending on 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 have an adverse impact or a significant adverse 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*

4.18 Aligning the above guidance with national planning policy objectives suggest that:

- An *assessment* level 10 dB(A) above the background level might be considered to be a "*Significant Observed Adverse Effect Level*" (SOAEL).
- An *assessment* level that does not exceed the background level might be considered to be a "*Lowest Observed Adverse Effect Level*" (LOAEL).

4.19 Notwithstanding the above, BS 4142 importantly notes that any initial estimate of a noise impact should be modified to account for its "context". Such considerations include:

- The absolute level of the sound - the magnitude of the overall impact might be greater for an acoustic environment where the residual sound level is high than for an acoustic environment where the residual sound level is low. 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 *character* and level of the residual sound compared to the character and level of the specific sound.
- 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.

5.0 EXISTING NOISE ENVIRONMENT

5.1 In order to establish existing ambient noise levels characterising the environs of the site, an environmental noise survey was undertaken over a notional three-day period between 16th and 18th January 2024.

Measurement Locations

5.2 Manned and unmanned noise measurements were made at the locations shown in Figure 5.1 below

Figure 5.1: Noise Monitoring Locations

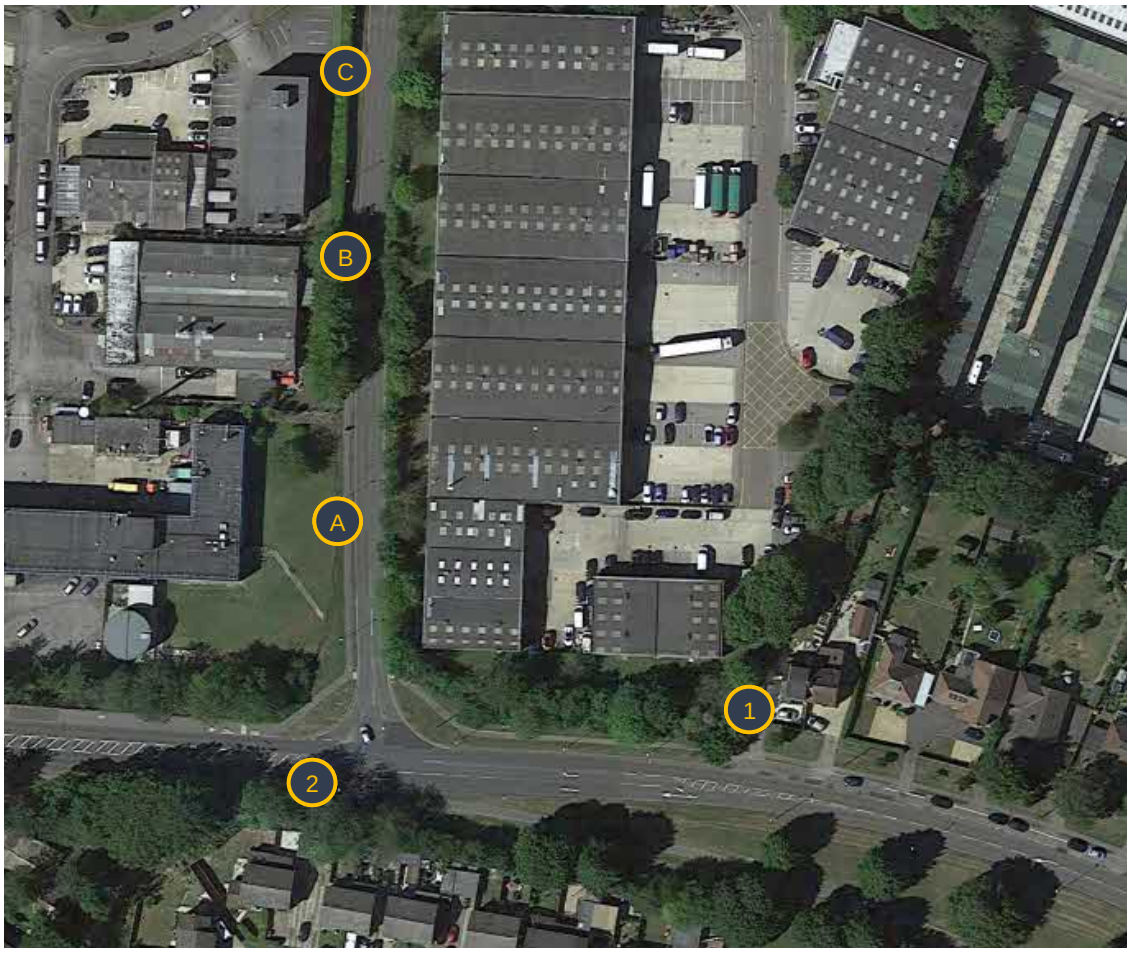


Table 5.1: Measurement Positions

Position	Description
Position 1	Unmanned at north side of The Harrow Way, mounted to fence at boundary to the closest residential property
Position 2	Unmanned south side of The Harrow Way, mounter to roadside lamppost behind residential properties to the south

Position A	Manned measurement at the southern end of Lister Road near junction with The Harrow Way
Position B	Manned measurement behind industrial unit on Lennox Road
Position C	Manned measurement at northern end of Lister Road near roundabout

Equipment

5.3 Details of the equipment used for the survey are summarised below.

Table 5.2: Measurement Instrumentation

Location	Manufacturer	Type	Serial Number
1	Convergence Instruments	NSRT_mk4	AFvUL9WS8X8XgBNgQ4rZFD
2	Convergence Instruments	NSRT_mk4	AlNWpV0S09eXIhFCT8hZND
A, B & C	Svantek	971A	127617
All	Rion	NC74	34651766

5.4 Calibration certificates for the equipment are available upon request.

5.5 Calibration checks on each instrument were carried out prior to and on completion of the survey, with no significant calibration drift observed.

Measurement Procedure

5.6 The sound level analysers at both locations were configured to continuously log “fast” A-weighted sound pressure levels. The data has been post-processed using Convergence Instruments “NSTR-AutoCalc” software to determine 15-minute $L_{A90,15min}$, $L_{Aeq,15min}$ and $L_{Amax,fast}$ noise metrics.

Results

5.7 The results of the survey work are presented in Graphs 1 and 2 overleaf.

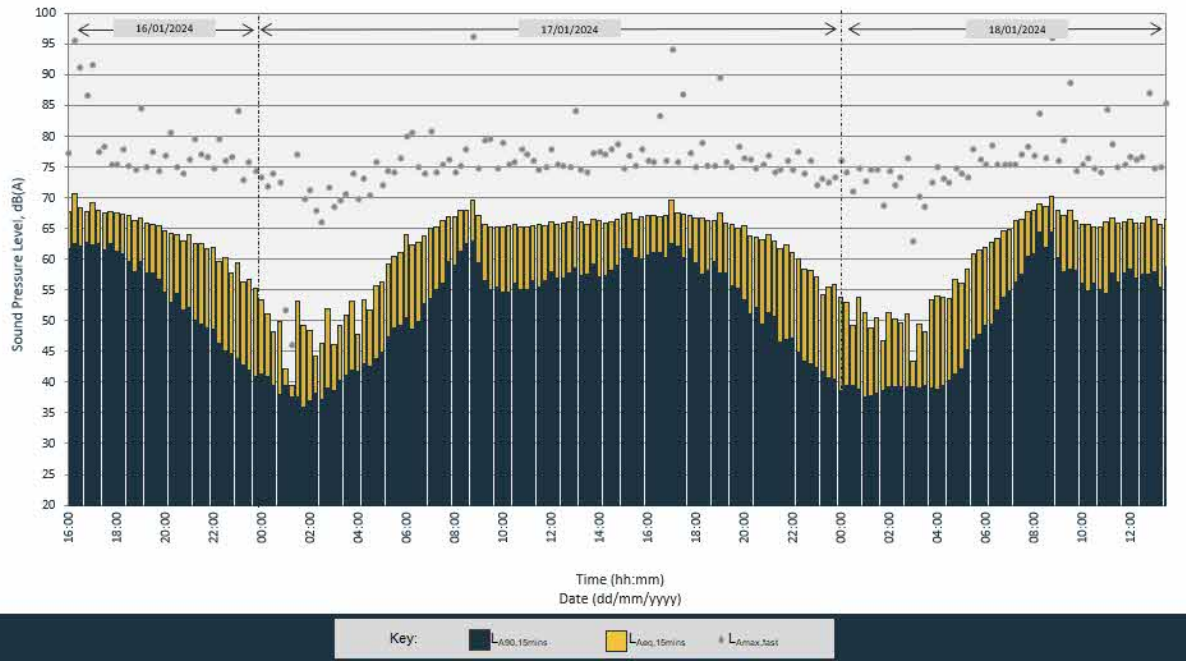
5.8 Higher resolution copies of the graphs are also attached at Appendix C.

Graph 1

Project: Leverton Helm, 13-15 Sherrington Way

Measurement Location: Position 1 - The Harrow Way North

Survey Date: 16 to 18 January 2024

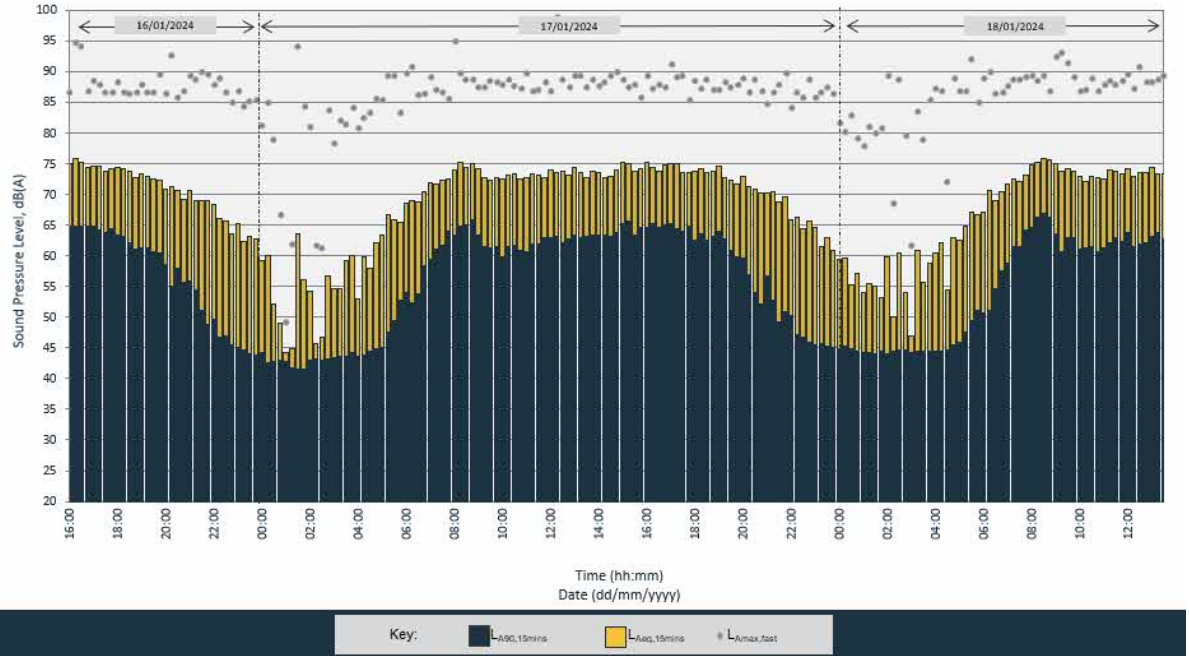


Graph 2

Project: Leverton Helm, 13-15 Sherrington Way

Measurement Location: Position 2 - The Harrow Way South

Survey Date: 16 to 18 January 2024



Observations

5.9 During site attendances it was noted that noise levels at both unmanned measurement positions, dominant noise was from traffic noise off The Harrow Way. Noise levels at manned measurement positions were also influenced by occasional traffic movements on Lister Road with some contribution from existing plant in the locality.

Weather Conditions

5.10 Whilst weather conditions during the survey were not actively measured, weather conditions at the time of equipment installation and removal were find and dry, with light winds. Publicly available historic weather data for the survey periods indicates the following typical conditions:

- 16 January 2024
  Temperature range: -5 –6ºC
  Pressure range: 983 –997 hPa
  Humidity range: 52 –84%
  Average wind speed: 0.4km/h
  Average wind direction: SSW
  Precipitation: 0mm

- 17 January 2024
  Temperature range: -2 –3ºC
  Pressure range: 973 –983 hPa
  Humidity range: 70 –79%
  Average wind speed: 1.6km/h
  Average wind direction: NE
  Precipitation: 0mm

- 18 January 2024
  Temperature range: -5 –4ºC
  Pressure range: 981 –1002 hPa
  Humidity range: 62 –78%
  Average wind speed: 0.4km/h
  Average wind direction: ENE
  Precipitation: 0mm

Statistical Analysis of Background Noise Levels

5.11 As noted earlier, BS 4142 requires industrial/commercial noise to be assessed against background noise levels ($L_{A90,T}$) that are representative of the proposed hours of operation of the proposed plant/process. It is understood that the proposed plant will operate during normal daytime working hours only. For the purpose of this report, this is assumed to be a period from 07.00 –19.00 hours. Statistical analyses of the measurement datasets are shown in Figures 5.2 and 5.3 below.

Figure 5.2: Daytime Background Noise Levels: Position 1 (The Harrow Way)

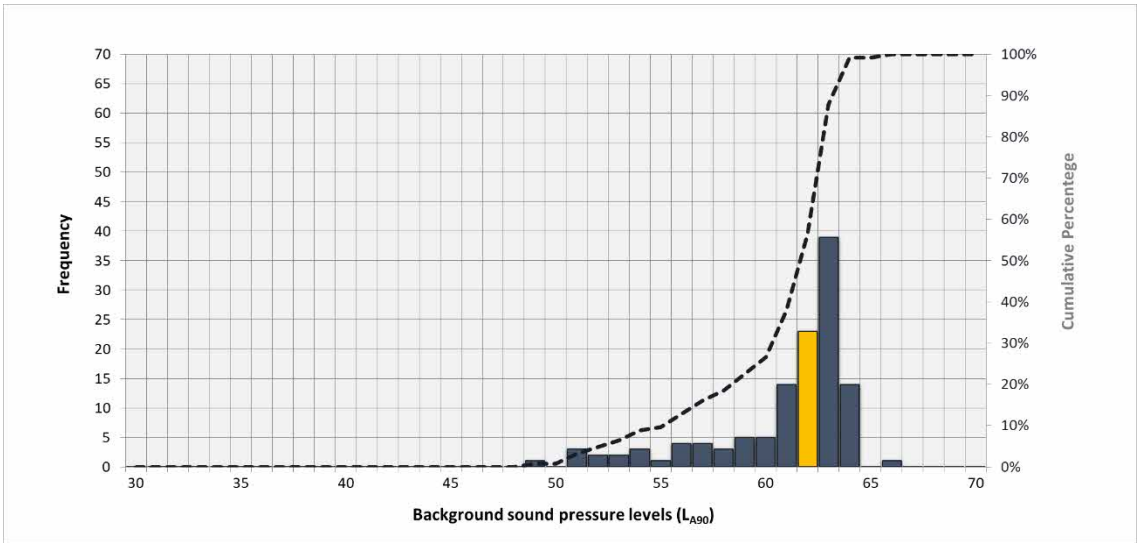
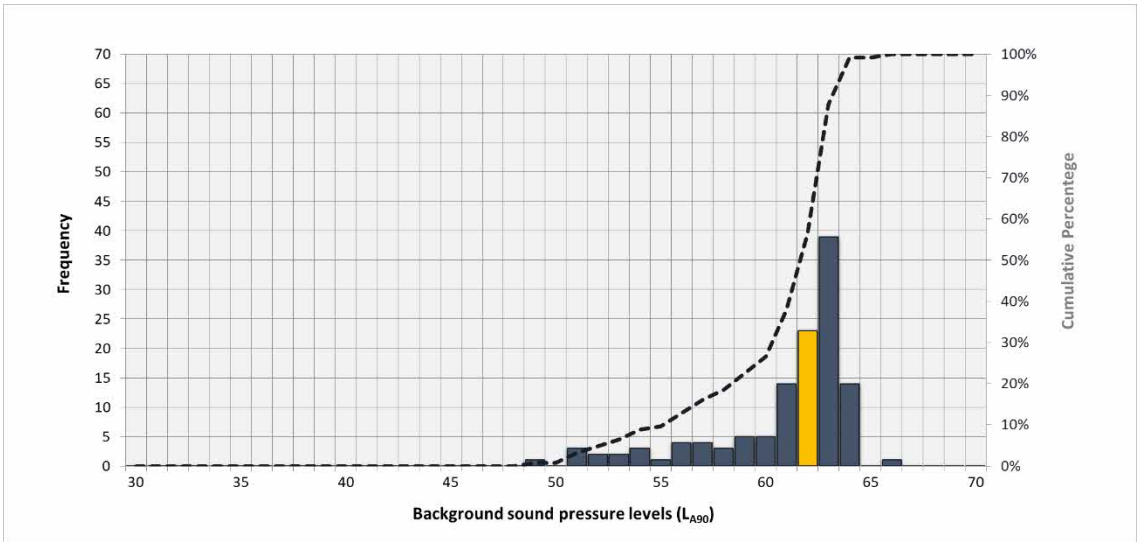


Figure 5.3: Daytime Background Noise Levels: Position 2 (Coates Close)



5.12 Based on the above, the following typical background noise levels have been determined for during the operational hours of the proposed plant.

Table 5.2: Typical Background Noise Levels

Location	Typical Daytime (07,00 –23.00) Background Sound Level, $L_{A90,T}$ dB	Typical Night-time (23.00 –07.00) Background Sound Level, $L_{A90,T}$ dB
Position 1	58	40
Position 2	53	44

6.0 NOISE IMPACT ASSESSMENT

Noise Sensitive Receptors

6.1 As noted in Section 2, the closest residential receptors to the site are:

- Receptor 1: Residential properties along The Harrow Way to the southeast of the site; and
- Receptor 2: Residential properties in Coates Close to the south of the site.

Assessment

6.2 Noise levels to both receptors have been calculated based on the noise data set out in section 3, in general accordance with ISO 9613-2: 1996 *"Acoustics. Attenuation of Sound During Propagation Outdoors – General Method of Calculation".*

6.3 Predicted noise levels are presented and assessed in lien with BS 4142 in Table 6.1 and Table 6.2 below (for daytime plant operations).

Table 6.1: Assessment of Plant Noise Emissions from Receptor 1: The Harrow Way

Parameter	Chiller 1	Chiller 2	Free Air Cooler
Source SPL, dB(A) at 10m	58	58	63
Distance, m	100	100	100
Distance Loss, dB	-20	-20	-20
Barrier Attenuation, dB	-23	-23	-23
Calculated Lp, dB(A)	15	15	20
Total Combined Noise Level, dB	22		
Background $L_{A90,T}$, dB	58		
Difference, dB(A)	-36		
Compliant?	✓	✓	✓

Table 6.2: Assessment of Plant Noise Emissions from Receptor 2: Coates Close

Parameter	Chiller 1	Chiller 2	Free Air Cooler
Source SPL, dB(A) at 10m	58	58	63
Distance, m	90	95	85
Distance Loss, dB	-19	-20	-19
Barrier Attenuation, dB	0	0	0
Calculated Lp, dB(A)	39	38	44
Total Combined Noise Level, dB	46		
Background $L_{A90,T}$, dB	53		
Difference, dB(A)	-7		
Compliant?	✓	✓	✓

6.4 As noted previously in Section 4, the guidance provided by BDBC's Environmental Protection Team for new industrial sources of noise is that such should *"…preferably be below, but certainly no greater than the existing background level at the most sensitive period when the plant will be operated*".

6.5 It is assumed that the plant will only be operated during daytime hours 0700-1900.

6.6 In light of the above, it is concluded that noise emissions from the proposed plant installations are acceptable for daytime operation. It is further concluded that the proposed development complies fully with noise related national and local planning policy guidance.

7.0 CONCLUSIONS

7.1 An environmental noise survey has been undertaken to determine existing ambient noise levels characterising the site and neighbouring noise sensitive receptors.

7.2 A statistical analysis of the measurement data has been undertaken to determine representative daytime (07.00 to 19.00 hours) background noise levels.

7.3 Based on manufacturer's noise data for proposed plant, calculations have been undertaken to determine operational noise levels at the nearest neighbouring noise sensitive receptors.

7.4 The calculation results have been assessed in line with BS 4142.

7.5 The assessment concludes that for daytime operation, calculated noise levels are comfortably below the representative daytime background sound level, indicating there should be no adverse impact associated with the proposed operation of plant.

7.6 Based on the above assessments it is concluded that the proposed plant installations comply with guidance issued by BDBC's Environmental Protection Team for new industrial development.

7.7 It is also concluded that the proposed plant installations comply with local and national panning policies related to noise.

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APPENDIX A

Glossary of Acoustic Terminology

General

Vibrations in the air, water or other media cause pressure variations in the surrounding air. These pressure changes are perceived by the human ear as "sound".

Measurement Units

Given the huge range of pressure fluctuations detectable or tolerated by the human ear, sound is quantified on a logarithmic scale with values expressed in "decibels". Values are based on a reference sound pressure level of 20µPa, thus a sound pressure of 20µPa would equate to 0dB and a pressure of 200Pa would equate to 140dB.

Frequency

The number of cycles or vibrations per second, measured in Hertz (Hz). Higher frequencies are perceived as higher-pitched. Noise audible to the human ear typically covers a frequency range of 20Hz to 20,000Hz.

A-Weighting

The human ear is typically more sensitive to sound in towards the middle of the audible range and less sensitive to lower and higher and frequencies. In order to take account of these differences, a frequency weighting is often applied to the sound measurement which adjusts the measurement value to reflect the way the human ear will perceive the sound. The use of "A-weighting" therefore gives a measure of subjective "loudness". A-weighted sound levels are expressed in dB(A).

Comparison of Sound Levels

The subjective perception of sound is illustrated by reference to various relatable noise sources below:

Sound Pressure Level, dB(A)	Typical Noise Source
160	Space rocket taking off
140	Military jet taking off (at 30m)
100	Dancefloor of nightclub
90	Heavy goods vehicle driving past
80	Busy urban road
70	Vacuum cleaner
60	Busy office
55	Normal speech at 1m
40	Whispered conversation at 2m
30	Bedroom at night (BS 8233: 2014)
20	Remote country location
0	Threshold of hearing

Variation of Sound with Time

The magnitude of most sounds varies with time. Environmental noise is normally measured with a "fast" time weighting which best replicates the way sound fluctuations are perceived.

Acoustic Terminology

A number of noise metrics are routinely used to assist in characterising a noise environment. These include:

L_{90} is the noise levels that is exceeded for 90% of the measurement period. It reflects the quiet periods during that time and is often referred to as the "background noise level". It is often used as a basis for setting noise emission criteria. The A-weighted value over time period (T) is written as LA90,T.

Leq is the level of a notional continuous sound that would deliver the same sound energy as the actual fluctuating sound over the measurement period. This may be thought of as the "average" level during the measurement period. The A-weighted value over time period (T) is written as LA90,T.

L_{max} is the maximum noise level during the measurement period. For environmental noise purposes, L_{max} values are normally measured with a "fast" time response. The A-weighted value is then reported as $L_{Amax,fast}$ (or $L_{Amax,F}$)

Addition of Sound Levels

The use of a logarithmic scale does not allow the simple arithmetic addition of sound levels – they need to be added logarithmically. This means that two noise sources, each generating a sound level of 50dB(A) will generate a combined sound level of 53dB(A) – not 100dB(A),

Subjective Perception of Sound Level Changes

Subjectively, the human ear:

Cannot perceive a sound level change of less than 3dB(A);

Will perceive a sound level change of 4-5dB(A) as "noticeable";

Will perceive a sound level change of 10dB(A) as a doubling (or halving) of loudness

Sound Insulation

The sound insulation performance of building constructions can be described using a number of metrics:

R_w is the "weighted sound reduction index" and is an intrinsic measure of the sound reduction capabilities of a construction measured in an acoustics laboratory.

D_w is the "weighted sound level difference". This is a measured of the in-situ performance of a construction, as installed in a building.

$D_{nT,w} + C_{tr}$ is a weighted sound level difference to which further corrections (standardisation and the addition of "$+C_{tr}$" correction). This descriptor forms the basis of the airborne sound insulation performance requirements of Approved Document E of the Building Regulations 2010 (as amended).

$L'_{nT,w}$ is the standardised impact sound pressure level and forms the basis of the impact sound insulation performance requirements of Approved Document E of the Building Regulations 2010 (as amended).

Reverberation Time

This is the time taken for sound in a room to decay by 60dB. Reverberation times are lower in smaller rooms with lots of soft furnishings, and longer in large rooms with hard finishes.

Noise Rating Level

As an alternative to expressing a sound level in dB(A), noise from some sources (e.g. building services system) are quantified in terms of a Noise Rating (NR) level. This is achieved by comparing the frequency content of the sound against a series or curves defined in Annex A of BS 8233: 2014.

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APPENDIX B

Manufacturer's Noise Data

Chiller Plant Manufacturer Noise Data

Physical information		
Length	4,520	mm
Width	2,200	mm
Height	2,530	mm
A-weighted sound power	90	dBA
Sound pressure level (10m)	58	dBA
Unit shipping weight	2,626	kg
Operating weight	2,701	kg
Circuit 1 refrigerant charge	23	kg
Circuit 2 refrigerant charge	23	Kg

Free Air Cooler Plant Manufacturer Noise Data

Noise Specification		
Sound Pressure Level	LpA	63.2, measured at a distance of 10m
Sound Power Level	LwA	96
Calculated in Accordance With		BS EN:13487
Noise Tolerance	dB	+/- 2

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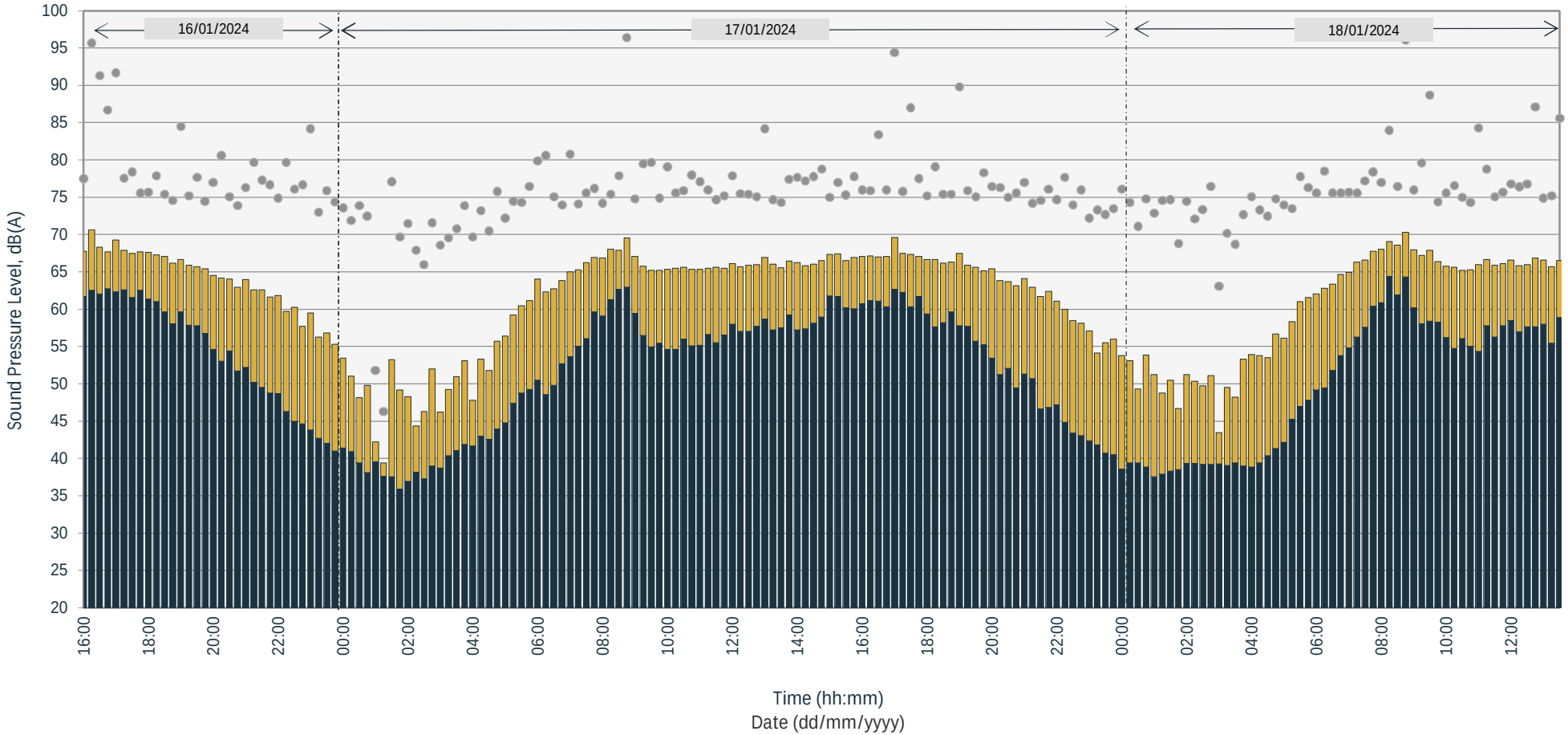
APPENDIX C

Noise Survey Results

Graph 1

Project:	Leverton Helm, 13-15 Sherrington Way
Measurement Location:	Position 1 - The Harrow Way North
Survey Date:	16 to 18 January 2024



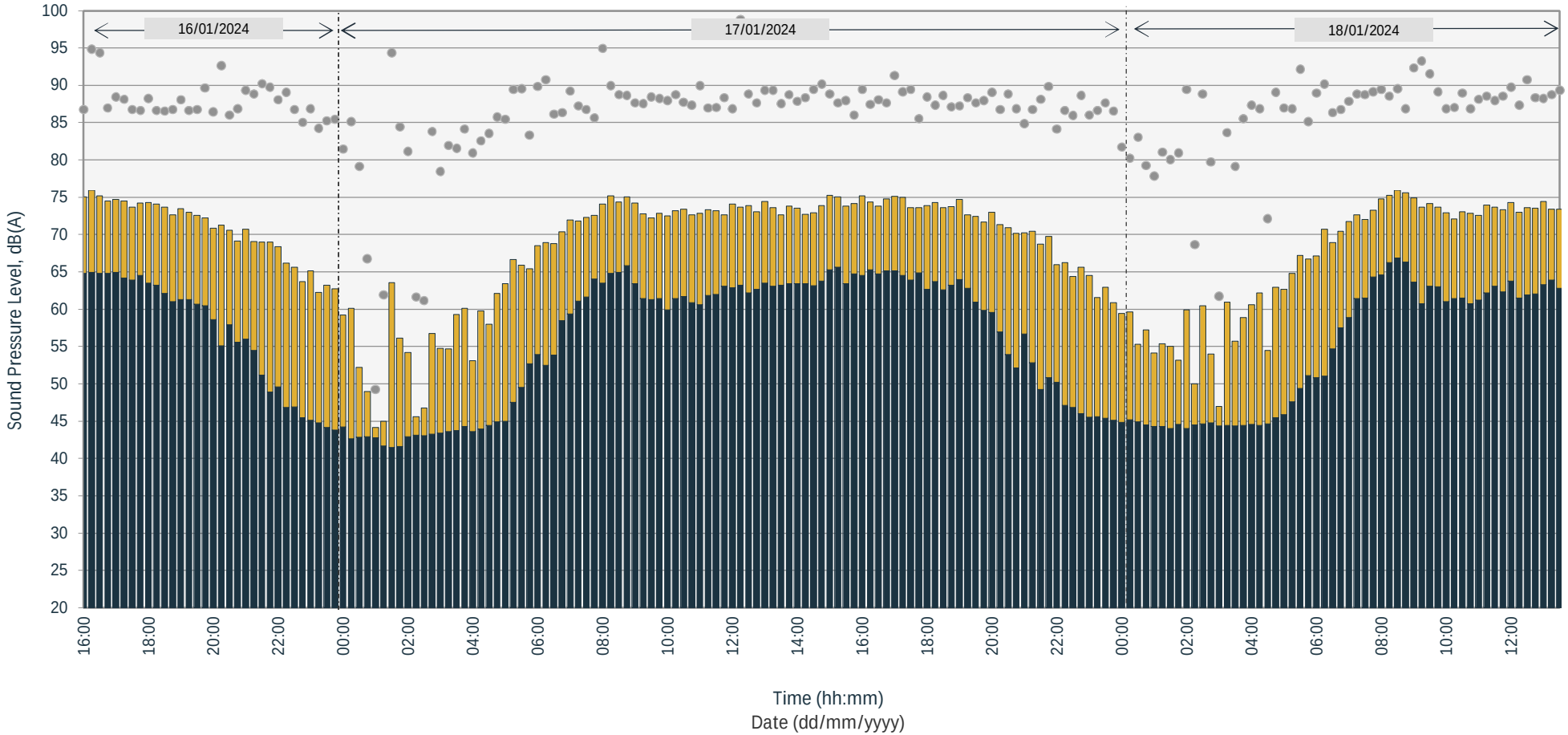
Key: $L_{A90,15mins}$ $L_{Aeq,15mins}$ $L_{Amax,fast}$

Graph 2

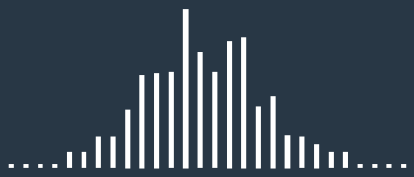
Project: Leverton Helm, 13-15 Sherrington Way

Measurement Location: Position 2 - The Harrow Way South

Survey Date: 16 to 18 January 2024



Key: $L_{A90,15mins}$ $L_{Aeq,15mins}$ $L_{Amax,fast}$



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