Carn Thomas, Isles of Scilly

Noise impact assessment of air source heat pumps

for

Kirkham Board Ltd.

ACT Acoustics

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Document information

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Executive Summary

Kirkham Board Ltd. has commissioned ACT Acoustics to provide a noise impact assessment of proposed air source heat pumps at Carn Thomas, Isles of Scilly.

This report has been produced to support the planning application for the scheme and details the results of the environmental noise survey undertaken at the site and a noise impact assessment.

We have made our assessment in accordance with BS 4142:2014+A1. To do this, we have:

- undertaken a survey of the background noise levels at the site;
- created a noise model to estimate the noise level from plant;
- used the results of the noise model to calculate the rating noise level at the nearest noise-sensitive location; and
- compared the rating noise to the background noise to determine the likelihood of adverse impact due to the introduction of new plant.

The results of our assessment show that the difference between the rating noise level and the background noise level is expected to be between -9 and 0 dB. The likelihood of adverse impact is therefore *negligible*.

Based on the above, we see no reason to refuse planning permission on noise grounds.

1 Introduction

1.1 Site address

Carn Thomas, Isles of Scilly

1.2 Proposed development

The proposed development comprises proposed dwellings, with 27 air source heat pumps:

Figure 1: The proposed site layout

The air source heat pumps and other infrastructure are shown above according to the following key:

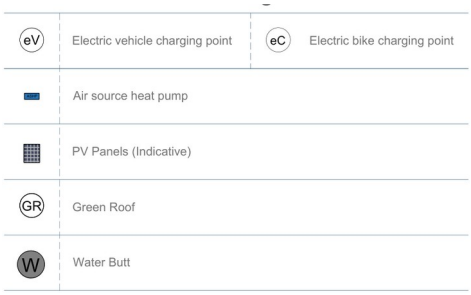

Figure 2: Key to infrastructure elements on the drawing

1.3 Hours of operation

We understand that the proposed hours of operation of the air source heat pumps will be 24-hours per day. However, it is important to understand that they will not be operating to their full capacity (an therefore maximum noise) during this time.

1.4 Approach to the assessment

We have carried out our assessment in accordance with the requirements BS 4142:2014+A1. To do this, we have:

- undertaken a survey of the background noise levels at the site;
- created a noise model to estimate the noise level from plant;
- used the results of the noise model to calculate the rating noise level at the nearest noise-sensitive location; and
- compared the rating noise to the background noise to determine the likelihood of adverse impact due to the introduction of new plant.

1.5 Scope and limitations

The scope of this report is limited to the assessment of air source heat pump noise only. Please ensure that you have read and understood the disclaimer at the end of this report.

2 Standards

This section provides a summary of the assessment methods and standards referred to in this report.

2.1 National Planning Policy Framework

The National Planning Policy Framework (NPPF) was updated in December 2023. The framework replaces the previous NPPF (September 2023) and the Planning Policy Guidance 24 (Planning and Noise). Paragraph 180 of NPPF states:

> Planning policies and decisions should contribute to and enhance the natural and local environment by:
>
> 1. protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);
>
> 2. recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services - including the economic and other benefits of the best and most versatile agricultural land,
>
> 3. maintaining the character of the undeveloped coast, while improving public access to it where appropriate;
>
> 4. minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;
>
> 5. preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and
>
> 6. remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.

Further, Paragraph 191 states:

> 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:
>
> 1. 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;
>
> 2. 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
>
> 3. limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.

The NPPF does not provide any guidance on how noise should be assessed, nor does it provide any criteria with which the adverse effects of noise can be quantified.

2.2 Noise Policy Statement for England

The Noise Policy Statement for England (NPSE) is referred to in the NPPF. Published in March 2010, the NPSE aims to provide clarity regarding current policies and practices as well as enabling noise decisions to be made within the wider context, at the most appropriate level, in a cost effective manner and in a timely fashion. It applies to all forms of noise including environmental noise, neighbour and neighbourhood noise.

The NPSE sets out the long-term vision of the Government's noise policy. This is supported 'through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- avoid significant adverse effects on health and quality of life;
- mitigate and minimise adverse impacts on health and quality of life; and
- where possible, contribute to the improvement of health and quality of life.'

The NPSE introduces the concept of 'effect levels' to relate the impact of noise to the stated policy aims.

- *No observed effect level (NOEL)* — This is the level below which no effect can be detected. Below this level, there is no detectable effect on health and quality of life due to noise.
- *Lowest observed adverse effect level (LOAEL)* — This is the level at which adverse effects on health and quality of life can be detected.
- *Significant observed adverse effect level (SOAEL)* — This is the level at which significant adverse health effects start to occur.

Where there is potential for noise impact, the NPSE states:

> The second aim of the NPSE refers to the situation where the impact lies somewhere between LOAEL and SOAEL. It requires that all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development [detailed in paragraph 1.8]. This does not mean that such adverse impacts cannot occur.

The NPSE does not provide any assessment criteria for the various effect levels, and each case needs to be considered on its own merits. The NPSE emphasises that Local Planning Authorities are required to take a balanced approach in considering the benefits of a development. Paragraph 2.18 of the NPSE states:

> There is a need to integrate consideration of the economic and social benefits of the activity or policy under examination with proper consideration of the adverse environmental effects, including the impact of noise on health and quality of life. This should avoid noise being treated in isolation in any particular situation, i.e. not focusing solely on the noise impact without taking into account other related factors.

The planning need is outside the scope of this report. Planning issues other than noise should be addressed by others.

2.3 Planning Practice Guidance: Noise

The UK Government has published advice on how planning can manage potential noise impacts in new development. It states:

> Noise needs to be considered when development may create additional noise, or would be sensitive to the prevailing acoustic environment (including any anticipated changes to that environment from activities that are permitted but not yet commenced). When preparing plans, or taking decisions about new development, there may also be opportunities to make improvements to the acoustic environment. Good acoustic design needs to be considered early in the planning process to ensure that the most appropriate and cost-effective solutions are identified from the outset.

The guidance goes on to state:

> 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 behaviour, 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 behaviour 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 behaviour 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 behaviour 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.

The Government provides the following noise exposure hierarchy to help planners to make objective decisions regarding responses to noise:

Response	Examples of outcomes	Increasing effect level	Action
No Observed Effect Level			
Not present	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Present and not intrusive	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
Lowest Observed Adverse Effect Level			
Present and intrusive	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 and reduce to a minimum
Significant Observed Adverse Effect Level			
Present and disruptive	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 Adverse Effect	Avoid
Present and very disruptive	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

Figure 3: Noise exposure hierarchy

The table does not provide quantitative levels for the above effects. However, where noise is audible it is not necessarily intrusive. The impact is based primarily on the level of noise.

2.4 Noise — BS 4142:2014+A1

The impact of noise from from industrial and commercial activities is typically determined using BS 4142:2014+A1 (herein referred to as *BS 4142*). A summary of the requirements for assessment in accordance with BS 4142 is given below.

BS 4142 provides a method of assessment of industrial and commercial noise sources in mixed residential and industrial areas. The method assesses the noise by calculating the *noise rating level* (L_{ArTr}) and comparing this to the prevailing background noise level (L_{A90}).

The background noise level is the level which is exceeded for 90% of the time *in the absence of the noise being assessed*. The reason for measuring the background noise is that low background noise levels can make the noise being assessed more audible (and therefore increasing the impact), whereas high background noise levels can mask the sound. Since background noise levels typically vary throughout the day, they are usually measured by a noise survey lasting more than 24 hours.

The noise rating level is the noise level from the source in question plus any penalties (see below). The rating level is compared to the background noise level to determine its likely impact on noise-sensitive locations.

To calculate the noise rating level, the noise source (technically referred to as the *specific noise level*, L_s) is either measured in the field or calculated.

If the specific noise level is measured in the field, it will also include the residual noise (L_r) of the surrounding landscape. The total of the residual noise and the specific noise is the ambient noise level L_a.

In order to calculate the specific noise level, we must take measurements when the specific noise is both *on* and *off*. The specific noise level is then calculated from:

$$L_s = 10 \times \log_{10}\left(10^{\frac{L_a}{10}} - 10^{\frac{L_r}{10}}\right)$$

The noise rating level is:

$$L_{\mathrm{ArTr}} = L_s + P$$

Where P is the sum of the noise penalties.

2.4.1 Acoustic feature corrections

In calculating the noise rating level (L_{ArTr}), BS 4142 requires that penalties are applied based on the character of the noise being assessed. Penalties are applied for any tonal, impulsive or intermittent sounds.

2.4.2 Tonality

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.

2.4.3 Impulsivity

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.

2.4.4 Intermittency

When the specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time. This can necessitate measuring the specific sound over a number of shorter sampling periods that are in combination less than the reference time interval in total, and then calculating the specific sound level for the reference time interval allowing for time when the specific sound is not present. If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.

2.4.5 Uncertainty

BS4142 states that the predictions of the noise rating level take account of uncertainty in both the calculations and the measurements undertaken. These uncertainties depend on a number of factors, including:

a) the complexity of the sound source and the level of variability in sound emission from the source;
b) the complexity and level of variability of the residual acoustic environment;
c) the level of residual sound in the presence of the specific sound at the measurement location;
d) the location(s) selected for taking the measurements;
e) the distance between the sources of sound and the measurement location and intervening ground conditions;
f) the number of measurements taken;
g) the measurement time intervals;
h) the range of times when the measurements were taken;
i) the range of suitable weather conditions during which measurements were taken;
j) the measurement method and variability between different practitioners and the way the method is applied;

k) the level of rounding of each measurement recorded; and
l) the instrumentation used.

The reporting of the uncertainty should include an estimate of uncertainty for each of the points above.

Assessment of the impacts

Once the noise rating level is calculated, the likely impact is assessed. BS 4142 section 11 gives the following guidance on assessing the impacts from noise:

a) Typically, the greater this difference [between the rating noise level and the background noise level], the greater the magnitude of the impact.
b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
d) 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.

Typically, parity with the prevailing background sound is recommended, but for low background noise levels (such as during the night), BS 4142 provides the following additional guidance:

> For a given difference between the rating level and the background sound level, 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 the background sound levels and rating level are low absolute levels might be as or more relevant than the margin by which the rating level exceeds the background sound level, this is especially true at night.

In situations where the background noise level is low, the *absolute* noise level from fixed plant may be more important than how much louder than the background noise level it is. In these cases, we can additionally assess the noise levels using the guidelines in BS 8233.

The BS 8233 guidance recommends that for a good night's sleep the sound pressure level from all sources should not exceed 30 dBA $L_{Aeq,8hr}$ in bedrooms at night. Since the noise reduction through a partially open window has been shown to be between 10 dB and 15 dB*, the external sound levels in the vicinity of the receptors (assuming windows are partially open for ventilation) should not exceed 45 dB $L_{Aeq,8hr}$.

* As described in NANR116 Open / Closed Window Research published by Napier University in 2007

2.5 BS 4142 and planning

The relationship between the BS 4142 assessment method and the noise exposure levels given in the PPG-N is not clear. Whilst there is clearly some relationship between the *significance of the impact* detailed in BS 4142 and the *exposure effect levels* PPG-N, they cannot be interchangeable.

BS 4142 asks that the context of the noise in question be considered in determining the likely impact. It is therefore difficult to ascribe the numerical value obtained from BS 4142 and apply it to specific impact level (LOAEL and SOAEL *etc*).

Factors that need to be considered include:

- 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.

The assessment also needs to consider 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:

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

3 Baseline survey

3.1 Measurement methodology

BS 7445 (Description and measurement of environmental noise: Guide to quantities and procedures) provides guidance on the quantification of environmental noise. It provides the framework within which environmental noise should be quantified.

It comprises three parts:

- Part 1 (2003): provides a guide to quantities and procedures;
- Part 2 (1991): provides a guide to the acquisition of data pertinent to land use.
- Part 3 (1991): provides a guide to the application of noise limits.

BS 7445 also refers to BS EN 61672, which details the required equipment necessary for proper measurement.

To facilitate the comparison of results (measurements of noise from different sources), it may be necessary to carry out measurements under selected meteorological conditions which are reproducible and correspond to quite stable sound propagation conditions [Part 2, paragraph 5.4.3.3].

These conditions include:

- Wind speed not exceeding 5 m/s (measured at a height of 3 to 11 m above the ground);
- No strong temperature inversions near the ground; and
- No heavy precipitation.

All measurements were taken in accordance with the above guidance.

3.2 Survey location and time

The noise survey was undertaken at the site between 27 September 2022 and 3 October 2024 at the location shown below.

Figure 4: Location of the survey

Full details of the survey are given in our previous report dated 7 October 2022.

3.3 Summary survey results

A summary of the survey results is shown in the table below:

Period	Ambient noise level (L_{Aeq})	Background noise level (L_{A90})
Day (0700-1900)	54	35
Evening (1900-2300)	47	30
Night (2300-0700)	38	26

We use the above values as the basis for our assessment.

4 Noise model

4.1 Noise modelling assumptions

We created a noise model of the proposed development using iNoise 2024. The model was used to estimate the noise level from all air source heat pumps (assumed to the running simultaneously).

The settings used in the model were:

- Calculation methodology: ISO 9613-2
- Ground factor: 0.5 (mixed ground, worst case assumption as the majority of the intervening ground is hard)
- D_{max} set in accordance with ISO 9613 (D_{max1} = 20.0, D_{max2} = 25)
- Temperature (Kelvin): 293.15
- Pressure (kPa): 101.33
- Air humidity (%): 60

We used the noise model to calculate the noise level across the study area.

4.2 Noise sources

The location of the noise sources being assessed are shown below:

Figure 5: Location of the air source heat pumps

Table 1: Air source heat pump noise assumptions

Item no.	Plant	Sound power level (LWA dB)	Quantity
1.	Air source heat pumps	100%	27

4.3 Usage assumptions (worst case assumed for noise model)

The usage patterns of the air source heat pump are likely to change during the day, evening and nighttime periods. However, tor the purposes of the noise model, we make the following assumptions. We assume that these assumptions quantify the noise output in the worst-case:

Period	Time	% usage
Day	0700-1900	100%
Evening	1900-2300	100%
Night	2300-0700	100%

4.4 NSL locations

The NSL locations assessed in the model are shown below:

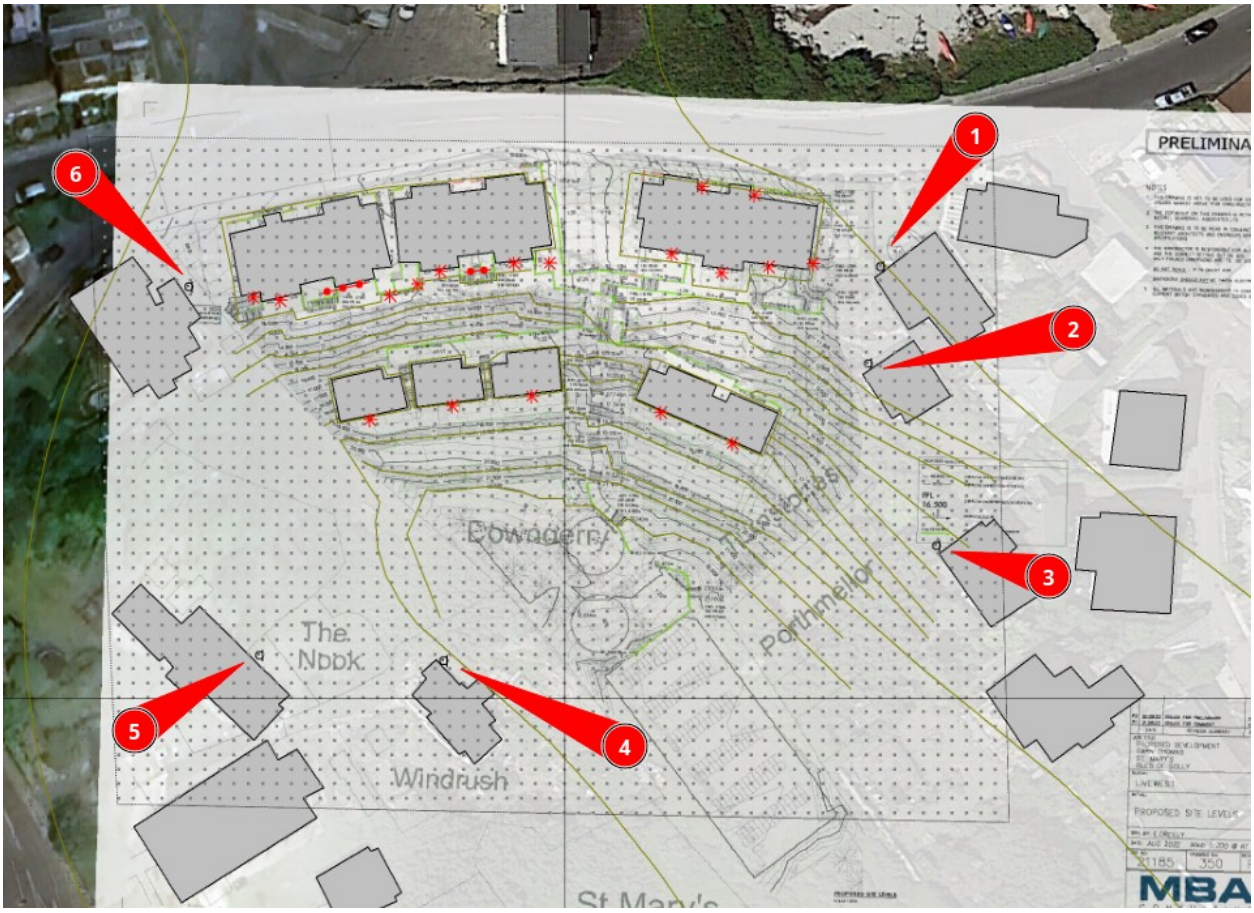

Figure 6: NSL locations assessed in the model

4.5 Noise contours

Noise contours showing the distribution of sound are shown below:

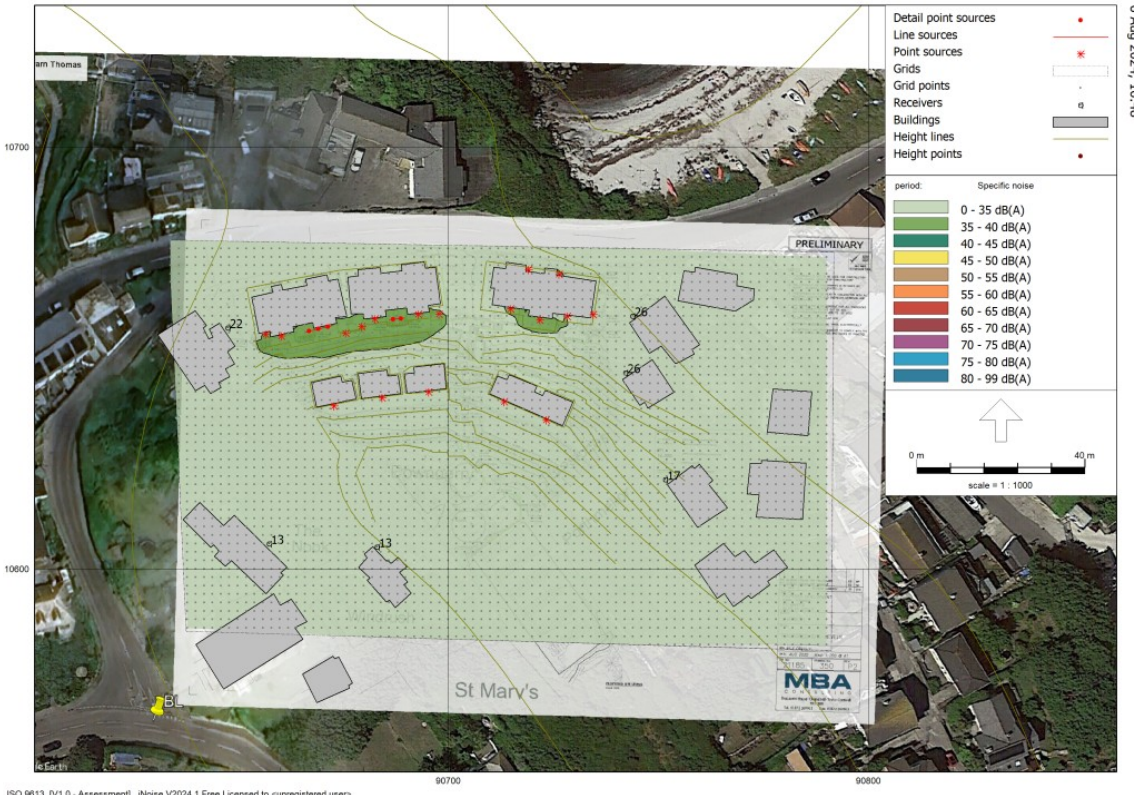

Figure 7: Noise contours showing the worst-case output of the air source heat pumps

4.6 Table of results

The estimated noise levels at the NSLs are:

Table 2: Predicted noise levels at each noise sensitive location

Name	**Specific noise level at each of the NSLs (L_s)**
NSL1	26
NSL2	26
NSL3	17
NSL4	13
NSL5	13
NSL6	22

The most exposed NSLs are 1 and 2. We use these as the basis for the BS 4142 assessment.

5 BS 4142:2014+A1 assessment

5.1 Acoustic feature corrections

For the purposes of this assessment, we have applied the following acoustic feature corrections:

Feature correction type	Value (dB)	Reasoning
Tonality	0	We do not expect an audible tonal element from new air source heat pumps.
Impulsivity	0	The sound from ASHPs does not include any impulsive elements.
Intermittency	0	At the noise levels expect, the intermittency of operation is very unlikely to be noticeable.
Total	**0**	

5.2 Assessment

We provide an assessment at each of the noise sensitive locations below:

Element	Day	Evening	Night	Comments
Specific noise level (Ls)	26	26	26	Noise level as calculated by the noise model, averaged over 1 hour and 15 mins for the day and night periods respectively.
Acoustic feature corrections (dB)	0	0	0	The total acoustic feature corrections given in section 5.1.
Rating noise level (L_{ArTr})	26	26	26	The rating noise level in accordance with BS 4142:2014+A1
Background noise (L_{A90})	35	30	26	The prevailing background noise level for locale.
Difference	-9	-4	0	The difference between the rating noise level and the background noise.

Based on the above, the difference between the rating noise level and the background noise level is expected to be between -9 and 0 dB. The likelihood of adverse impact is therefore *negligible*.

6 Appendix

6.1 Typical noise levels

The below table shows typical noise levels for reference:

Source	dBA SPL
Jet aircraft at a 50m distance	140
Threshold of pain	130
Threshold of discomfort	120
Chainsaw at a 1m distance	110
Disco, 1m from speaker	100
Diesel truck at a 10m distance	90
Kerbside of busy road at a 5m distance	80
Vacuum cleaner at a 1m distance	70
Conversational speech at a 1m distance	60
Average home	50
Quiet library	40
Quiet bedroom at night	30
Background in TV studio	20
Rustling leaves in the distance	10
Threshold of human hearing	0

6.2 Glossary

General acoustic terms

- **Sound**: The audible transmission of vibrations through air or water.
- **Noise**: Unwanted sound. Sound that causes disturbance.
- **Ground-borne Vibration**: Vibration transmitted through the ground. Has the potential cause disturbance, even damage at sufficient levels. Typically measured as Vibration Dose Values (VDVs).
- **Re-radiated Noise (or 'Ground-borne Noise')**: Ground-borne vibration can cause walls, floors and ceilings to radiate noise. This is often referred to as ground-borne noise. Mechanical plant may also generate noise by similar means.
- **Cross-talk**: Sound transmission between rooms via ventilation ducting.
- **Decibel (dB)**: The standard unit for defining sound pressure levels. The range of normal hearing is between 0 dB and 130 dB Where 130 dB is the upper threshold of pain. A change of 1dB in sound pressure levels is barely perceptible and 3dB is normally the minimum audible difference. A change of 5dB is clearly audible. A change of 10dB roughly corresponds to a halving or doubling of perceived loudness.
- **dBA (A-weighted decibel)**: A-weighted decibels use a frequency weighting to correspond to how the human ear hears sound.

Environmental noise terminology

- $\mathbf{L_{Aeq,T}}$ **(equivalent continuous noise level)**: The A-weighted equivalent average noise level (L_{Aeq}) is commonly used to describe the average noise level in a given environment over the measurement period.
- $\mathbf{L_{A10,T}}$: The A-weighted level of noise exceeded for 10% of the specified measurement period (T). It gives an indication of the upper limit of fluctuating noise and is commonly used in traffic noise measurements.
- $\mathbf{L_{A90,T}}$: The A-weighted level of noise exceeded for 90% of the specified period (T). It is commonly used to define background noise level; the underlying level in the absence of intermittent noise.
- $\mathbf{L_{Amax}}$ **(maximum noise level)**: The highest A-weighted noise level recorded during the measurement period. It is measured using the fast sound level meter response.
- **Hz (Hertz)**: Hz is the unit of frequency, equal to one pressure fluctuation cycle per second. Frequency is related to the pitch of a sound.
- **Free-field**: A sound measurement taking in the absence of any reflecting objects. Generally measured outside and away from buildings.
- **Façade-level**: A measurement taken in close proximity (e.g. 1 m) to a reflective surface other than ground, such as a building façade. This typically increases the measured level by around 3 dB.

- **NSL:** Noise-sensitive location. This is typically a dwelling, church, meditation space or other location likely to be significantly affected by noise.

BS 4142 terminology

- **BS4142:2014:** A British Standard that provides guidance on assessing the effect of noise from commercial operations on residential dwellings.
- **Ambient Noise (La as used in BS4142:2014):** The sound that comprises the total sound for a specific situation and time (e.g. distant road traffic plus wildlife plus an air conditioning unit or other commercial noise source).
- **Specific Noise (Ls as used in BS4142:2014):** The sound arising from the source being assessed (e.g. an air conditioning unit or other commercial noise source).
- **Residual Noise (as used in BS4142:2014):** The sound remaining when the specific sound is inaudible (e.g. distant road traffic plus wildlife)
- **Rated Noise LArTr (as used in BS4142:2014):** The specific noise level with penalties for characteristic features of the noise (i.e. tonality, intermittency or impulsivity)
- **Background Noise (as used in BS4142:2014):** The sound level that is exceeded for 90% of the time.
- **Ambient Noise (as used in BS4142:2014):** This is equivalent average noise level (dB LAeq) at a given location.

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