

PROPOSED RESIDENTIAL DEVELOPMENT
ON LAND AT WHEATHILL HOUSE, NAYLORS ROAD, LIVERPOOL

NOISE IMPACT ASSESSMENT

On behalf of:
Clive Henderson

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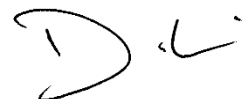
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1.0 INTRODUCTION

- 1.1 Hepworth Acoustics Ltd was commissioned by MSA Architects on behalf of Clive Henderson to carry out a noise impact assessment in connection with a proposed planning application for residential development on land at Wheathill House, Naylor's Road, Liverpool.
- 1.2 The location of the proposed residential development is on a former equestrian training centre and livery yard approximately 130 metres to the north of Naylor's Lane. The site is surrounded by farmland to the east, north and west with the M62 Motorway approximately 220 metres to the north. To the south is Lakeside School which is currently under construction.
- 1.3 It is proposed to develop the site for residential use consisting of four detached dwellings. Vehicular access to the development will be via the existing track off Naylor's Lane. The assessment has been based on the layout shown on drawing 1944 PL 011 rev B as provided by MSA Architects dated July 2023. The proposed layout of the development is shown in Figure 2.
- 1.4 Following pre application advice, Environmental Health at Knowsley Council have requested a noise impact assessment to consider the potential impact from the M62 to the north and multi-use games area (MUGA) located within the school development to the south. The noise assessment has included:
- ☐ An inspection of the site and surrounding area;
 - ☐ Measurement of road traffic noise levels on the site over a 24-hour period;
 - ☐ Assessment of the potential impact of road traffic noise on the development land;
 - ☐ Assessment of likely noise impact from the MUGA at the school;
 - ☐ Recommendation of appropriate noise mitigation measures.
- 1.5 The various noise units and indices referred to in this report are described in Appendix I. All noise levels mentioned in the text have been rounded to the nearest decibel, as fractions of decibels are imperceptible.

2.0 GUIDANCE AND ACOUSTIC DESIGN CRITERIA

NPPF:2021

- 2.1 Paragraph 185 of the National Planning Policy Framework (NPPF) 2021 states that planning policies and decisions should *“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;”*

NPSE:2010

- 2.2 The Noise Policy Statement for England (NPSE) 2010, which is referred to the in NPPF, includes three aims:
- i. Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.
 - ii. Mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.
 - iii. Where possible, contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.

Local Policy

- 2.3 Knowsley Local Plan Core Strategy January 2016 has two policies which relate to noise. CS19 Design Quality and Accessibility in New Development states:

“The design of new development should avoid unacceptable impacts which affect the amenity and living conditions of occupiers of buildings. Such effects can include generation of noise...”

- 2.4 Policy ENV2 Noise and Vibration states:

“Where a development would be likely to... be sensitive to an existing noise source, the Council will require that a noise assessment report be submitted as part of the planning application. The proposals will also need to incorporate any necessary measures to reduce noise or disturbance to acceptable levels. Where developments are permitted, conditions may be attached to the planning permission to ensure effective noise insulation or other required mitigation measures are carried out.”

BS 8233:2014

- 2.5 No specific guidance is given in the NPPF on acoustic design criteria, therefore, the guidance discussed below has been used for acoustic design purposes.
- 2.6 Guidance on acceptable noise levels in habitable rooms and private gardens is set out in British Standard 8233: 2014, ‘Guidance on sound insulation and noise reduction for buildings’. BS 8233 recommends that it is desirable that noise from external sources does not exceed the guidelines values that are shown in Table 1 inside habitable rooms for daytime (07:00 – 23:00 hours) and night-time (23:00 – 07:00 hours) periods.

Table 1: BS 8233:2014 recommended acoustic design criteria (dB $L_{Aeq,T}$)

Activity	Location	Daytime 07:00 – 23:00 hours	Night-time 23:00 – 07:00 hours
Resting	Living room	35	-
Dining	Dining room/area	40	-
Sleeping (daytime resting)	Bedroom	35	30

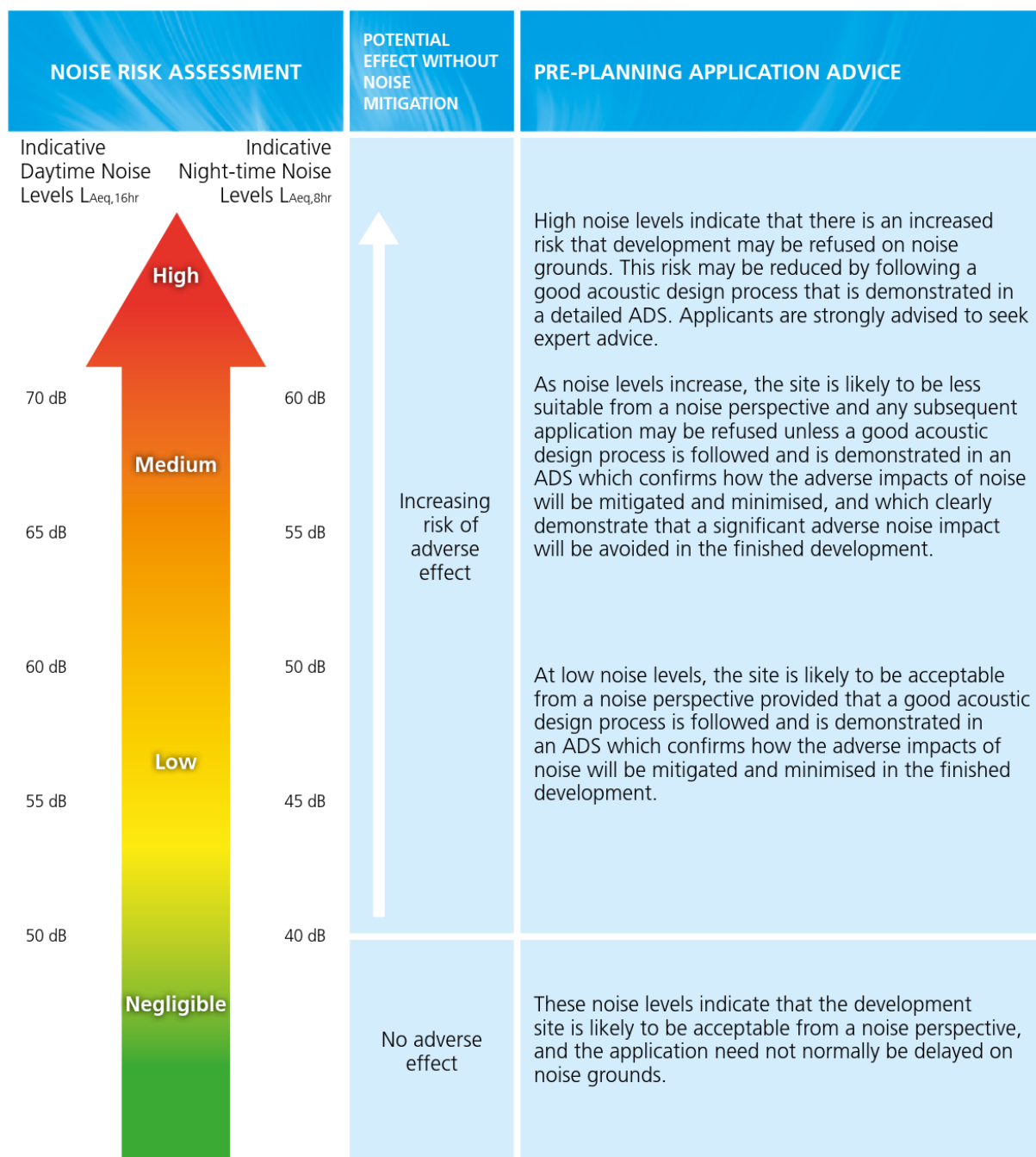
- 2.7 BS 8233 also recognises that regular individual noise events at night can cause sleep disturbance. Peaks of noise from individual events are usually described in terms of L_{AFmax} values and these can be highly variable and unpredictable.
- 2.8 For private outdoor amenity spaces of the new houses (e.g. rear gardens) BS8233 states that ‘it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,16hr}$ with an upper guideline value of 55 dB $L_{Aeq,16hr}$ which would be acceptable in noisier environments’. In our experience, most local planning authorities have traditionally adopted, or accepted, the 55 dB(A) guideline value for rear gardens of proposed new residential developments near busy roads. However, the standard also recognises that these guideline values are not achievable in all circumstances where development might be desirable and in such cases, for sites near to the ‘strategic transport network’ higher noise levels than 55 dB $L_{Aeq,16hr}$ in gardens may be acceptable.

Sport England 'Artificial Grass Pitch (AGP) Acoustics – Planning Implications'

- 2.1 The Sport England Design Guidance Note provides guidance on the acoustics related planning implications of AGPs. The Guidance Note refers to both NPPF and NPSE documents but also draws attention to the fact that there is “no specific noise criteria for an AGP” or sports pitch. The guidance refers to World Health Organisation (WHO) 1999 ‘Guidelines for Community Noise’ and from this derives an appropriate daytime noise level outside a dwelling of 50 dB $L_{Aeq,1hr}$. Similarly, 50 dB is also recommended to avoid moderate annoyance in outdoor living spaces/external amenity areas. The assessment period has been reduced from 16 hours to 1 hour reflecting a “*typical time period for a community sports session*” and a robust assessment. These noise levels are also in line with the criteria set out in BS8233.

ProPG

- 2.2 There is also guidance in ‘ProPG: Planning & Noise – New Residential Development’ (2017), although this guidance does not constitute official government guidance and has no legal standing. The ProPG describes a staged approach to the assessment of noise impact on proposed new residential development sites. Stage 1 is an initial site noise risk assessment, indicating whether the proposed site is considered to pose a negligible, low, medium or high risk from a noise perspective.
- 2.3 The ProPG initial site noise risk assessment criteria are shown in Chart 1.

Chart 1: ProPG Stage 1: Initial Site Noise Risk Assessment Criteria**Figure 1 Notes:**

- Indicative noise levels should be assessed without inclusion of the acoustic effect of any scheme specific noise mitigation measures.
- Indicative noise levels are the combined free-field noise level from all sources of transport noise and may also include industrial/commercial noise where this is present but is "not dominant".
- $L_{Aeq,16hr}$ is for daytime 0700 – 2300, $L_{Aeq,8hr}$ is for night-time 2300 – 0700.
- An indication that there may be more than 10 noise events at night (2300 – 0700) with $L_{Amax,F} > 60$ dB means the site should not be regarded as negligible risk.

- 2.4 Chart 1 sets out indicative noise levels that define the element of risk of noise impact on proposed residential development land, ranging from 'Negligible' to 'High'.
- 2.5 The guidance states that these noise levels *"should be interpreted flexibly having regard to the locality, the project and the wider context"*.
- 2.6 The ProPG criteria apply to residential development land that is exposed to transportation noise or mixed transportation noise and industrial/commercial noise where the latter is not the dominant noise source.
- 2.7 Stage 2 of the ProPG approach is a more detailed assessment in the form of an Acoustic Design Statement (ADS). However, the acoustic design criteria that are specified in ProPG, and which forms the basis of the ADS, are essentially the same as those recommended in BS8233, as summarised previously in Table 1 of this report.
- 2.8 Similarly to BS 8233, ProPG recognises that regular individual noise events at night can cause sleep disturbance. The ProPG guidance suggests that for design purposes, wherever practicable, peaks of noise inside bedrooms from external sources should not exceed 45 dB L_{AFmax} more than 10 times per night'.

Acoustic Design Criteria

- 2.9 For this development we therefore recommend the following noise criteria be adopted in respect of road traffic noise with windows closed and trickle ventilation provided:
- ☐ Daytime noise below 35 dB $L_{Aeq,16hr}$ inside living rooms and bedrooms, 40 dB $L_{Aeq,16hr}$ inside dining rooms; and
 - ☐ Night-time noise levels not exceeding 30 dB $L_{Aeq,8hr}$ and generally not exceeding 45 dB L_{AFmax} in bedrooms (i.e. no more than 10 times per night).
- 2.10 For this development, we have adopted a criterion of 55 dB $L_{Aeq,16hr}$ for gardens as far as is practicable.

3.0 ROAD TRAFFIC NOISE SURVEY

- 3.1 Automated noise measurements were carried out at one location on the site indicated in Figure 1. The purpose of the survey was to measure road traffic noise from the M62 Motorway approximately 220 metres to the north of the site and also determine the existing ambient noise level.
- 3.2 Noise measurements were carried out in consecutive 5-minute periods between approximately 09:00 on Wednesday 9 until 09:00 on Thursday 10 August 2023.
- 3.3 The noise measurements were taken in 'free-field' conditions and at a microphone height of approximately 1.4m above the ground. Calibration checks were carried out both before and after the measurement periods with no variance in levels noted. Frequency analysis was carried out. Audio was also recorded during the unattended monitoring period in order to assist in identifying significant sources of noise making up the noise climate. The weather conditions during the noise survey (details of which are given in Appendix II) were suitable for the purposes of the survey and subsequent assessment. The daytime & night-time noise levels are presented in Table 2, and the full results along with details of the equipment used, and the weather conditions during the survey, are shown in Appendix II.

Table 2: Summary of road traffic noise exposure values (dB)

Location	Daytime	Night-time	
	$L_{Aeq,16hr}$	10 th highest $L_{Amax,F}$	$L_{Aeq,8hr}$
220 metres from M62	57	62	53

- 3.4 Noise levels measured were due to road traffic on M62 Motorway. Other sources of noise were birdsong and occasional distant aircraft.
- 3.5 The implications of the noise exposure values are set out in Section 4.0 and have been used to determine the type and extent of any noise mitigation measures necessary to achieve the adopted noise design criteria.

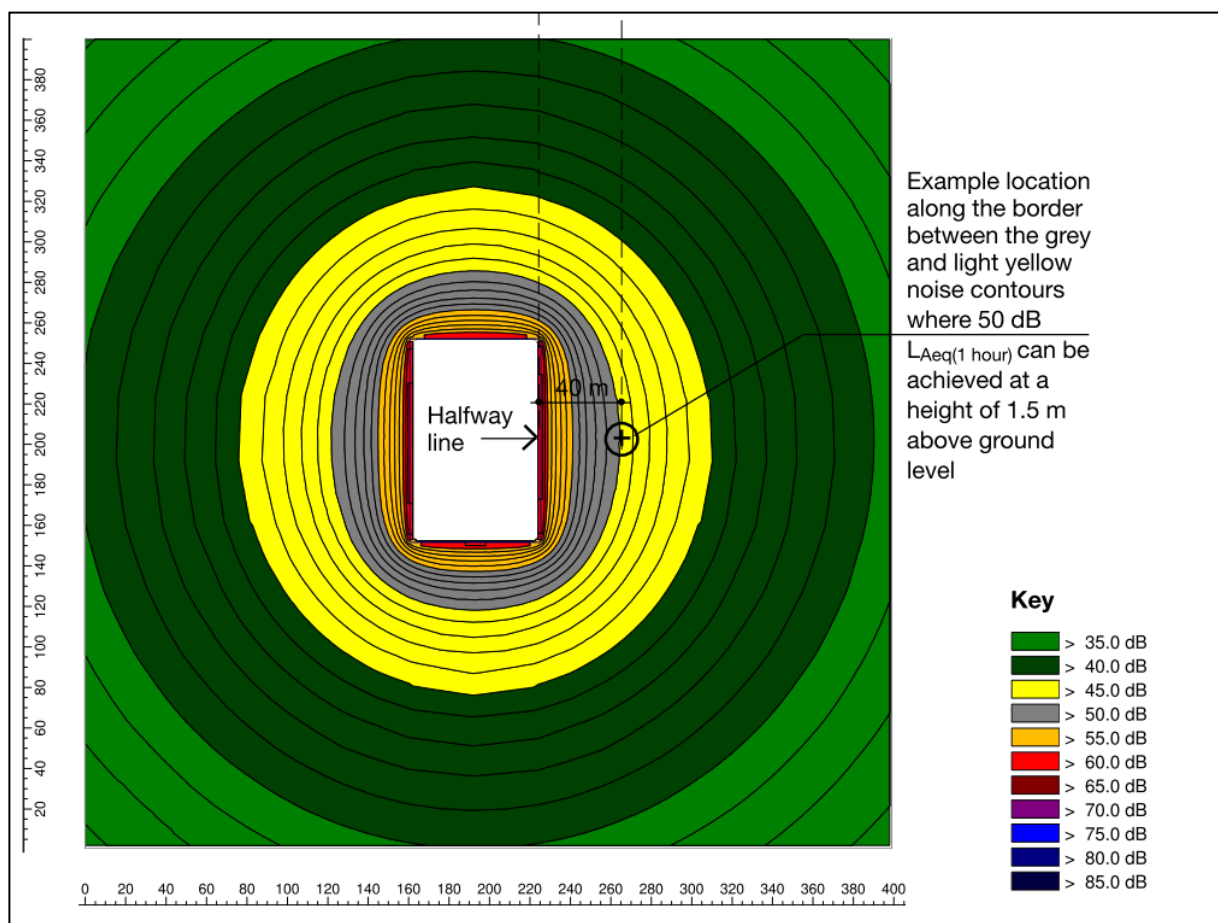
4.0 NOISE ASSESSMENT

Initial Road Traffic Noise Risk Assessment

- 4.1 The road traffic noise exposure levels across the site fall into the 'Low' risk category of ProPG in the daytime and the 'Low' to 'Medium' risk categories at night. It is considered that the site is suitable for residential development, provided that traffic noise levels for proposed dwellings are mitigated adequately.

Noise from the school MUGA

- 4.2 Likely noise levels from use of the MUGA situated within the Lakeside School development have been calculated at the nearest proposed dwellings based on noise levels set out in the Sport England Guidance.
- 4.3 The Sport England Design Guidance Note describes noise level measurements that were *"undertaken during nine sports sessions on three separate AGPs. The sessions included football, hockey and rugby and participation by men, women and children. The purpose was to determine a 'typical' noise level generated from a 'typical' AGP sports session. Noise level measurements were taken at a distance of 10 metres behind the mid-way points along goal lines and sidelines. They were found to be highest behind the sideline halfway line ... From the measurement data, a typical free-field noise level of 58dB $L_{Aeq,1hr}$ at a distance of 10m from the sideline halfway marking has been determined as representative for noise from an AGP"*.
- 4.4 The relevant noise map from the Sport England Design Guidance Note is presented below.



- 4.5 The AGP noise levels described are consistent with noise levels measured by Hepworth Acoustics at similar facilities.
- 4.6 The MUGA is located approximately 50 metres from the centre of the closest proposed gardens at plots 3 and 4. Therefore, using the reference source noise map above, the resulting noise levels outside the nearest proposed dwellings will be 49 dB $L_{Aeq,1hr}$. This is 8 dB below the existing ambient noise level of 57 dB $L_{Aeq,16hr}$ and within the adopted criteria.
- 4.7 Nevertheless, given the proximity of the MUGA to the proposed dwellings and the nature of the noise, an acoustic barrier is recommended to protect residential amenity and safeguard the future use of the pitch, which is detailed in the following section.

5.0 NOISE MITIGATION SCHEME

Gardens

- 5.1 The garden plots on the proposed development are to be located generally on the far side of the dwellings to the M62 and so will be acoustically screened by the houses themselves such that noise levels in the majority of the area of the gardens will be within the 55 dB $L_{Aeq,16hr}$ criterion. We would however recommend that the 2m barrier along the southern boundary is extended along the western boundary to provide screening to the garden of plot 4.
- 5.2 However, due to the considerable distance to the M62, it is possible that there will be some small areas of the gardens where noise levels could be marginally above the 55 dB criterion. BS8233 recognises that this guideline value may not be achievable in all circumstances.
- 5.3 In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces. It is generally accepted that a change or increase in noise level of 3 dBA is the minimum perceptible under normal circumstances. On the basis that road traffic noise levels on the undeveloped site are no more than 57 dB $L_{Aeq,16hour}$, with the acoustic barrier in place noise levels in garden plots will be adequately controlled.

Acoustic Barrier

- 5.4 We recommend an acoustic barrier of minimum 2 metres in height to the southern boundaries of the garden plots as shown in Figure 2.
- 5.5 Acoustic barriers must be imperforate (i.e. have no holes or gaps) and have a minimum 10 kg/m² surface mass and incorporate gravel boards to close the gap between the bottom of the fence and the ground if constructed using timber. Typically, the barriers could be formed of timber fencing of minimum 20mm thickness, solid brick walls or a combination of the two, any timber infill panels need to be well fitted with no gaps.
- 5.6 Suppliers of proprietary timber acoustic fences include GRAMM Barrier Systems Ltd (grammbarriers.com) Jacksons Fencing (jacksons-fencing.co.uk), Guardian Fencing (guardianfencing.com) and Ransfords (ransfords.co.uk).

Glazing

- 5.7 Road traffic noise levels from the distant M62 Motorway are low to moderate during the daytime and at night. Therefore, for all bedrooms and living rooms, on the development, we recommend standard double glazing of 4mm glass - nominal (10-16mm) cavity - 4mm glass (minimum acoustic rating 25 dB $R_w + C_{tr}$). Due care and attention must be taken to ensure that all glazing is well-fitted.

Ventilation

- 5.8 The adopted internal noise criteria will be achieved in all proposed living rooms and bedrooms on the development with windows closed. Nevertheless, in order to control maxima from passing road traffic it is recommended that acoustically treated trickle ventilation, instead of standard window frame slot vents is provided for all bedrooms on the development. We would recommend either:
- ☐ Aereco EHA2 Acoustic Trickle Ventilator with acoustic canopy and sleeve (44 dB $D_{n,e,w}$); or
 - ☐ Rytons AAC125HP Super Acoustic Controllable LookRyt AirCore Ventilator (43 dB $D_{n,e,w}$); or
 - ☐ Another ventilation system with a good acoustic performance (i.e. above 40 dB $D_{n,e,w}$).
- 5.9 Ventilation proposals will need to be agreed with the Local Authority at an early stage. Details regarding the ventilation performance, etc. should be confirmed by others.

External Walls

- 5.10 The exact construction of the external walls is not known at this stage however it is assumed that the sound insulation performance of the wall construction will not be less than 50 dB R_w .

Planning Condition

- 5.11 The need to ensure that an adequate scheme of noise mitigation is implemented can be formalised by an appropriately worded planning condition that requires a scheme of noise mitigation measures as described in this report to be implemented prior to occupation of relevant dwellings.

Conclusion

- 5.12 Subject to the recommendations for mitigation measures made above we conclude that potential noise impact from road traffic would not result in any unacceptable harm to residential amenity by reason of noise disturbance.

- 5.13 Furthermore, 'significant adverse impacts' would be avoided and 'adverse impacts' would be mitigated/minimised, bringing the development in line with the aims of the Noise Policy Statement for England (NPSE) 2010, also policies CS19 and ENV02 of the Knowsley Local Plan.

6.0 SUMMARY

- 6.1 Hepworth Acoustics has carried out an assessment of the potential noise impact on proposed residential development at Wheathill, Naylors Road, Liverpool.
- 6.2 The purpose of the assessment was to determine the potential noise impact from road traffic on the M62 Motorway to the north and MUGA which forms part of the Lakeside school to the south of the site.
- 6.3 The assessment has included a 24-hour road traffic noise survey at the site and adopting appropriate acoustic design criteria for the development.
- 6.4 We have concluded that some modest noise mitigation measures may be necessary for the bedrooms in dwellings most exposed to road traffic noise.
- 6.5 In order to protect residential amenity an acoustic barriers are proposed on the southern boundary with Lakeside school and along the western boundary of the garden of Plot 4.
- 6.6 The implementation of an adequate scheme of noise mitigation measures can be ensured by the use of an appropriately worded planning condition.

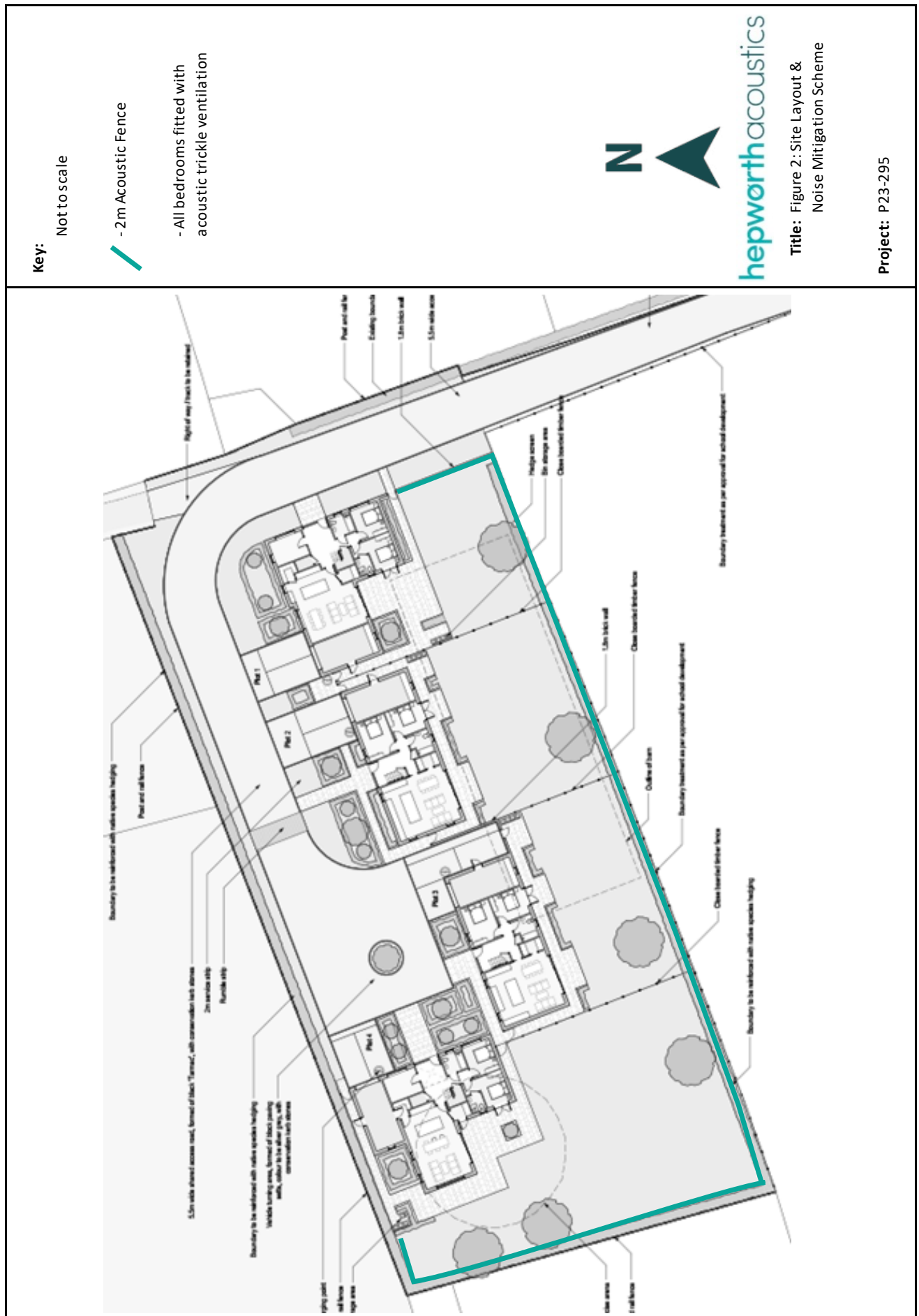
**Key:**

Not to scale

 - Approx Site Boundary - Noise Measurement Position

hepworthacoustics

Title: Figure 1: Site Location & Noise Measurement Position**Project:** P23-295



Appendix I: Noise Units & Indices

Sound and the decibel

A sound wave is a small fluctuation of atmospheric pressure. The human ear responds to these variations in pressure, producing the sensation of hearing. The ear can detect a very wide range of pressure variations. In order to cope with this wide range of pressure variations, a logarithmic scale is used to convert the values into manageable numbers. Although it might seem unusual to use a logarithmic scale to measure a physical phenomenon, it has been found that human hearing also responds to sound in an approximately logarithmic fashion. The dB (decibel) is the logarithmic unit used to describe sound (or noise) levels. The usual range of sound pressure levels is from 0 dB (threshold of hearing) to 120dB (threshold of pain).

Due to the logarithmic nature of decibels, when two noises of the same level are combined together, the total noise level is (under normal circumstances) 3 dB(A) higher than each of the individual noise levels e.g. 60 dB(A) plus 60 dB(A) = 63 dB(A). In terms of perceived 'loudness', a 3 dB(A) variation in noise level is a relatively small (but nevertheless just noticeable) change. An increase in noise level of 10 dB(A) generally corresponds to a doubling of perceived loudness. Likewise, a reduction in noise level of 10 dB(A) generally corresponds to a halving of perceived loudness.

The ear is not equally sensitive to sound at all frequencies. It is less sensitive to sound at low and very high frequencies, compared with the frequencies in between. Therefore, when measuring a sound made up of different frequencies, it is often useful to 'weight' each frequency appropriately, so that the measurement correlates better with what a person would actually hear. This is usually achieved by using an electronic filter called the 'A' weighting, which is built into sound level meters. Noise levels measured using the 'A' weighting are denoted dB(A) or dBA.

Frequency and Hertz (Hz)

As well as the loudness of a sound, the frequency content of a sound is also very important. Frequency is a measure of the rate of fluctuation of a sound wave. The unit used is cycles per second, or hertz (Hz). Sometimes large frequency values are written as kiloHertz (kHz), where 1 kHz = 1000 Hz.

Young people with normal hearing can hear frequencies in the range 20 Hz to 20 kHz. However, the upper frequency limit gradually reduces as a person gets older.

Glossary of Terms

When a noise level is constant and does not fluctuate, it can be described adequately by measuring the dB(A) level. However, when the noise level varies with time, the measured dB(A) level will vary as well. In this case it is therefore not possible to represent the noise climate with a simple dB(A) value. In order to describe noise where the level is continuously varying, a number of other indices can be used. The indices used in this report are described below.

- C_{tr} This is an A-weighted urban traffic noise spectrum, which can be added to $D_{nT,w}$ or R_w in some standards to take into account different source spectra such as low frequency sound.
- R This is the 'Sound Reduction Index' as measured in a laboratory, and is a measure of the sound insulation properties of an building element in a stated frequency band.
- R_w This is the 'Weighted Sound Reduction Index', and is a single figure quantity of R , the laboratory measured Sound Reduction Index.
- $D_{n,e,w}$ This is the weighted element normalized level difference as measured in a laboratory, and is a measure of the sound insulation properties of small building elements such as ventilators.
- $L_{Aeq,T}$ This is the A-weighted 'equivalent continuous noise level' which is an average of the total sound energy measured over a specified time period. In other words, $L_{Aeq,T}$ is the level of a continuous noise which has the same total (A-weighted) energy as the real fluctuating noise, measured over the same time period. It is increasingly being used as the preferred parameter for all forms of environmental noise.
- L_{AFmax} This is the maximum A-weighted noise level that was recorded during the measurement period in terms of 'Fast' time weighting.

Appendix II: Noise Survey Results

Date(s):	Wednesday/Thursday 9/10 August 2023
Equipment	NTi XL2 'Class 1' sound level meters (s/n: A2A-20361-E0) with associated calibrator and environmental outdoor monitoring kit
Weather	Dry, warm 16-20°C, clear skies and calm <2 m/s

All levels in dB(A)

Location : 220 metres from M62 Motorway

