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HOLME VALLEY COMMUNITY LAND TRUST LIMITED

PROPOSED 'CHIPPINGS' RESIDENTIAL DEVELOPMENT ON LAND OFF CHAPELGATE, SCHOLES

PLANNING STAGE NOISE IMPACT ASSESSMENT

A0160-REP01

12 March 2022

Document History

Document Reference	Author	Document Reference
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CONTENTS

1. INTRODUCTION

1.1. This report presents details of a noise impact assessment carried out in order to support a planning application for a residential development, referred to as 'Chippings', comprising 10 new-build houses on land off Chapelgate , Scholes, Kirklees.

1.2. The following steps have been taken in preparing the assessment and identifying any requirements for noise mitigation to protect the residents:

- Visit the application site in order to inspect the land and surroundings and to carry out a noise survey that determines existing noise levels during daytime and night-time periods;
- Use the noise survey results to determine noise levels impacting upon all of the proposed dwellings and their gardens;
- Assess the noise risk of the proposed development in accordance with ProPG guidance;
- Predict levels of noise ingress to habitable rooms within the proposed houses;
- If predicted noise levels in private gardens or internal noise levels within the proposed dwellings are found exceed the adopted design limits, develop recommendations for a targeted noise mitigation scheme.

1.3. A glossary of the acoustic terminology referred to in this report is presented in Appendix A.

2. SITE AND SURROUNDINGS

2.1. The application site is located to the south east of the village of Scholes near Holmfirth. A single vehicle garage located near the north west corner of the site in the only structure on the land.

2.2. The site is located within a residential area and is bounded to the north by Chapelgate and to the east by Dean Bridge Lane, both of which are local roads exhibiting low traffic flows with intermittent vehicle movements. The site is bounded to the west by a playing field and a dwelling, 67 Chapelgate. The playing field is located approximately 4m above the level of the site and is occasionally used for football matches and other casual sporting activities. The site is bounded to the south by a wooded area and agricultural land. Dwellings lie on the opposite side of Chapelgate and Dean Bridge Road.

2.3. The location of the application site is indicated in Figure 1.

Figure 1 Site Location and Boundary

3. DESCRIPTION OF PROPOSED DEVELOPMENT

3.1. The proposed development will include the construction of 10 new-build houses with associated car parking and landscaping.

3.2. The houses will be of traditional masonry construction.

3.3. Ventilation for the houses will be provided by mechanical ventilation with heat recovery systems (MVHR) in line with the Passivhaus standard. This approach avoids the requirement for trickle/background ventilators in the external envelopes of habitable rooms and is therefore viewed as optimal acoustically.

3.4. The proposed site layout is shown in Figure 2.

Figure 2 Layout of Proposed Development

4. PLANNING GUIDANCE

National Planning Policy Framework

4.1. National Planning Policy is guided by the National Planning Policy Framework (NPPF) which was introduced in 2012 and recently updated (2021). The document sets out the Government's overall planning policies and advises how these are expected to be complied with.

4.2. Paragraph 174 of the NPPF states that the planning system should contribute to and enhance the natural and local environment by '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.'

4.3. Paragraph 185 of the NPPF goes on to recommend that 'planning policies and decisions should also aim to 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:

- 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.'

The terms 'significant adverse impact' and 'other adverse impacts' are defined in the explanatory notes of the Noise Policy Statement for England (NPSE) which states:

There are two established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organisation. They are:

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 Adverse Effect Level
This is the level above which adverse effects on health and quality of life can be detected.

4.4. Extension of these concepts leads to the concept of a significant observed adverse effect level.

SOAEL – Significant Observed Adverse Effect Level
This is the level above which significant adverse effects on health and quality of life occur.

4.5. Specific noise limits for LOAEL and SOAEL have yet to be defined, however, guidance from other acoustic standards may be employed to determine suitable levels within the overall principal of the National Planning Policy Framework.

National Planning Policy Guidance

4.6. National Planning Practice is guided by the National Planning Policy Framework. With regard to Noise the Framework states the following:

Local planning authorities' plan-making and decision taking should take account of the acoustic environment and in doing so consider:

- whether or not a significant adverse effect is occurring or likely to occur;
- whether or not an adverse effect is occurring or likely to occur; and
- whether or not a good standard of amenity can be achieved.

4.7. In line with the Explanatory Note of the Noise Policy Statement for England, this would include identifying whether the overall effect of the noise exposure (including the impact during the construction phase wherever applicable) is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation.

4.8. Table 1 overleaf summarises the likely average responses to noise based upon the levels of exposure as advised by the government's Planning Practice Guidance.

Perception	Examples of Outcomes	Increasing Effect Levels	Action
Not not ceab e	No ffect	No Observed ffect	No spec fic measures requ red
Not ceab e and not ntrus ve	No se can be heard but does not cause any change n behav our or att tude. Can s ght y affect the acoust c character of the area but not such that there s a perce ved change n the qua ty of fe.	No Obse ved Adverse ffect	No spec fic measures requ red
		owest Observed Adverse ffect eve	
Not ceab e and ntrus ve	No se can be heard and causes sma changes n behav our and/or att tude e.g. turn ng up vo ume of te ev s on; speak ng more oud y; c os ng w ndows for some of the t me because of the no se. Potent a for non awaken ng s eep d sturbance. Affects the acoust c character of the area such that there s a perce ved change n the qua ty of fe.	Observed Adverse ffect	M t gate and reduce to a m n mum
		S gn ficant Observed Adverse ffect eve	
Not ceab e and d srupt ve	The no se causes a mater a change n behav our and/or att tude e.g. hav ng to keep w ndows c osed most of the t me avo d ng ce ta n act v t es dur ng per ods of ntrus on. Potent a for s eep d sturbance resu t ng n d fficu ty n gett ng to s eep premature awaken ng and d fficu ty n gett ng back to s eep. Qua ty of fe d m n shed due to change n acoust c character of the area.	S gn ficant Observed Adverse ffect	Avo d
Not ceab e and ve y d srupt ve	xtens ve and regu ar changes n behav our and/or an nab ty to m t gate effect of no se ead ng to psycho og ca stress or phys o og ca effects e.g. regu ar s eep depr vat on/awaken ng; oss of appet te s gn ficant med ca y definab e harm e.g. aud tory and non aud tory	Unacceptab e Adverse ffect	Prevent

Table 1 Noise Exposure Hierarchy Based on Average Likely Response

5. ACOUSTICS STANDARDS AND GUIDANCE

ProPG: Planning and Noise - Professional Practice Guidance

5.1. ProPG was introduced in 2017 with the aim of delivering sustainable development and promoting good health and well-being through the effective management of noise which may impact on new residential developments. The guidance aims to complement the national planning policy and encourages the use of good acoustic design at the earliest phase of the planning process. It builds upon the recommendations of various other guidance documents including NPPF, NPSE, BS8233 and World Health Organisation guidelines.

5.2. The guidance is applicable to new residential developments which would be exposed predominantly to noise from existing transport sources. The ProPG advocates a risk based approach to noise using a two-stage process:

- Stage 1 – an initial noise risk assessment of the proposed development site; and
- Stage 2 – a systematic consideration of four key elements: –
  - Element 1 – demonstrating a 'Good Acoustic Design Process';
  - Element 2 – observing internal 'Noise Level Guidelines';
  - Element 3 – undertaking an 'External Amenity Area Noise Assessment'; and
  - Element 4 – consideration of 'Other Relevant Issues'.

5.3. The ProPG approach is underpinned by the preparation and delivery of an 'Acoustic Design Statement' (ADS), whereby the higher the risk for noise at the site, the more detailed the ADS. The ADS should address the following issues:

- Present the initial site noise risk assessment, including the pre-development acoustic conditions prior to development;
- Describe the external noise levels that occur across the site both before and after any necessary mitigation measures have been incorporated. The external noise assessment with mitigation measures in place should use an informed judgement of typical worst-case conditions;
- Demonstrate how good acoustic design is integrated into the overall design and how the proposed acoustic design responds to specific circumstances of the site;

- Confirm how the internal noise level guidelines will be achieved, including full details of the design measures and building envelope specifications;
- A detailed assessment of the potential impact on occupants should be undertaken where individual noise events are expected to exceed 45 dB $L_{AF\ ax}$ more than 10 times a night inside bedrooms;
- Priority should be given to enable the use of openable windows where practical across the development. Where this is not practical to achieve the internal noise level guidelines with windows open, then full details of the proposed ventilation and thermal comfort arrangements must be provided;
- Present the findings of the external amenity area noise assessment;
- Present the findings of the assessment of other relevant issues;
- Confirm for a low risk site how adverse impacts of noise will be mitigated and minimised;
- Confirm for a medium or high noise risk site how adverse impacts of noise will be mitigated and minimised and clearly demonstrate that a significant adverse noise impact has been avoided.

5.4. ProPG target noise levels are based on existing guidance from BS8233 and WHO (see below). Table 2 below outlines the guidance noise levels for different room types during day and night periods.

Location	Activity	Daytime (07:00-23:00)	Night-time (23:00-07:00)
Living Rooms	Resting	35dB $L_{Aeq,16hour}$	
Bedrooms	Sleeping (daytime resting)	35dB $L_{Aeq,16hour}$	30dB $L_{Aeq,8hour}$ 45dB $L_{A\ max}$
Dining Rooms	Dining	40dB $L_{Aeq,16hour}$	

Table 2 ProPG Guideline Indoor Ambient Noise Levels for Dwellings

5.5. The footnotes to this table within ProPG suggest that internal noise level limits can be relaxed by up to 5 dB where development is considered necessary or desirable, and still represent "reasonable" internal conditions. They also suggest that in such cases, external levels which exceed WHO guidance target levels (see WHO section below) may still be acceptable provided that reasonable internal noise levels are achieved. Although, where the acoustic environment of external amenity areas is intrinsic to the overall design, "noise levels should ideally not be above the range 50 to 55 dB $L_{Aeq,\ 6}$ ". The wording of ProPG (and BS 8233:2014) is clear that exceedance of guideline noise levels in external areas should not prohibit the development of desirable developments in any event.

BS8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings

5.6. This standard provides recommended guideline values for internal noise levels within dwellings which are similar in scope to guideline values contained within the World Health Organisation (WHO) document, Guidelines for Community Noise (1999). The guideline average noise levels recommended by BS8233 are the same as those shown in Table 2.

5.7. BS8233:2014 adopts guideline external noise values provided in WHO for external amenity areas such as gardens and patios. The standard states that it is "desirable" that the external noise does not exceed 50 dB $L_{Aeq,T}$ with an upper guideline value of 55 dB $L_{Aeq,T}$ whilst recognising that development in higher noise areas such as urban areas or those close to the transport network may require a compromise between elevated noise levels and other factors that determine if development in such areas is warranted. In such circumstances, the development should be designed to achieve the lowest practicable noise levels in external amenity areas.

World Health Organisation (WHO) Guidelines on Community Noise 1999

5.8. The WHO Guidelines 1999 recommends that to avoid sleep disturbance, indoor night-time guideline noise values of 30 dB L_{Aeq} for continuous noise and 45 dB $L_{AF\ ax}$ for individual noise events should be applicable. It is to be noted that the WHO Night Noise Guidelines for Europe 2009 makes reference to research that indicates sleep disturbance from noise events at indoor levels as low as 42 dB $L_{AF\ ax}$. The number of individual noise events should also be taken into account and the WHO guidelines suggest that indoor noise levels from such events should not exceed approximately 45 dB $L_{AF\ ax}$ more than 10 – 15 times per night.

5.9. The WHO document recommends that steady, continuous noise levels should not exceed 55 dB L_{Aeq} on balconies, terraces and outdoor living areas. It goes on to state that to protect the majority of individuals from moderate annoyance, external noise levels should not exceed 50 dB L_{Aeq}.

6. ENVIRONMENTAL NOISE SURVEY

Survey Method

6.1. Attended noise measurements at the application site were carried out by Auditive during daytime and night-time periods on Monday 7 March 2022.

6.2. The measurements were taken at the following positions:

Position 1	North east corner of site, approximately 4m from the junction of Chapelgate and Dean Bridge Lane
Position 2	East site boundary, approximately 12m from Dean Bridge Lane

6.3. The measurement positions are indicated in Figure 3. Both positions were subject to free-field conditions.

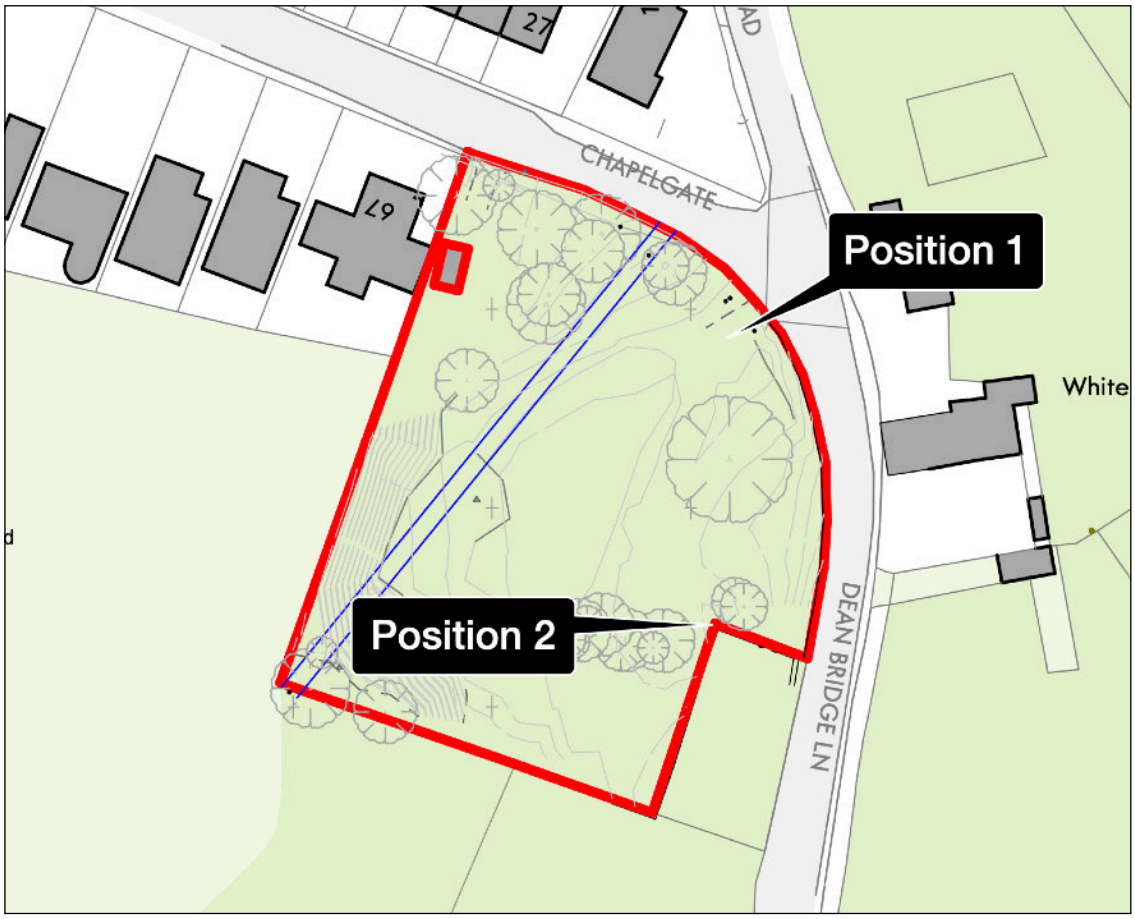


Figure 3 Noise Measurement Positions

[1] Free field measurements are those taken in the absence of reflections from nearby buildings and other vertical surfaces.

6.4. All significant sources of noise affecting the measurement positions were noted by the survey engineer and audio recordings were made simultaneously during all measurements facilitating the identification specific noise sources during post processing of the results.

6.5. Noise measurements were undertaken in general accordance with the guidance presented in British Standard 7445:2003 *Description and measurement of environmental noise*.

6.6. Calibration checks were carried out immediately before and after the survey periods using an acoustic calibrator; no drift in the instrumentation's sensitivity was detected.

6.7. The survey results are presented in terms of the following acoustic parameters:

L_{Aeq} is the equivalent continuous sound level. It is a type of average and is used to describe a fluctuating noise in terms of a single noise level over the measurement period. It is typically used as a descriptor for ambient noise.

$L_{AF\ ax}$ is the instantaneous maximum noise level measured during the survey period.

L_{AF90} is the sound level that is exceeded for 90% of the survey period. It is typically used as a descriptor for background noise.

The "A" suffix denotes the fact that the sound levels have been "A-weighted" in order to account for the non-linear sensitivity of human hearing at different frequencies. All sound levels in this report are expressed in terms of decibels (dB) relative to $2x10^{-5}$ Pa.

6.8. Full noise survey details and results are presented in Appendix B.

Survey Results

6.9. The noise survey results are summarised in Table 3.

	Measured Daytime Noise Levels		Measured Night-time Noise Levels		
Measurement Location	Ambient Sound Level dB, L_{Aeq}	Typical Background Sound Level dB, L_{A90}	Ambient Sound Level dB, L_{Aeq}	Range of Maxima dB, $L_{A\ max}$	Typical Background Sound Level dB, L_{A90}
Position 1	48	34	39	39 67	30
Position 2	47	38	39	40 54	35

Table 3 Summary of noise survey results (free-field)

6.10. The dominant source of noise in the area during daytime is road traffic. Others sources of noise affecting the daytime measurements included intermittent sawing/cutting noise and dogs barking, both from the direction of Hepworth, a village located in the valley to the east.

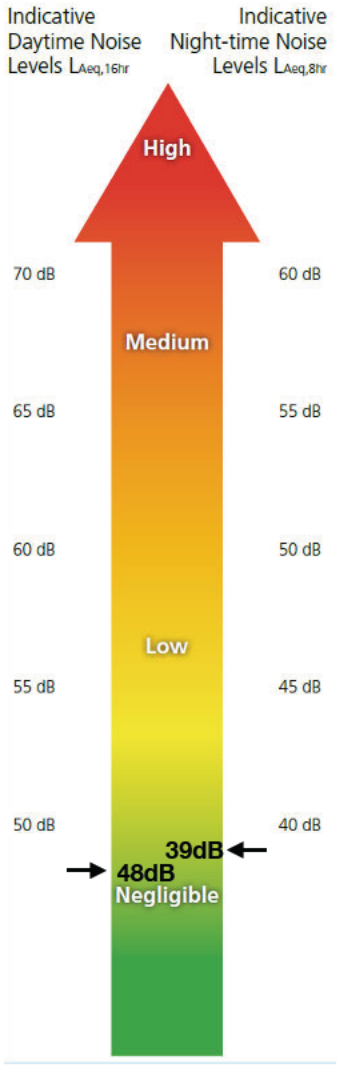
6.11. At night the noise environment was dominated by faint traffic noise from distant roads and breeze in trees and bushes near the microphone positions. Only one vehicle, a motorcycle, passed the application site during the night-time noise survey period producing an instantaneous maximum noise level of 67dB $L_{A\ ax}$ at Position 1. Maximum noise levels during all other measurement intervals at night fell within the range of 39dB $L_{A\ ax}$ to 58dB $L_{A\ ax}$. It is therefore concluded that maximum noise levels impacting upon the proposed dwellings at night are unlikely to regularly exceed 58dB $L_{A\ ax}$.

6.12. Background noise levels (L_{A90}) measured at Position 2 were marginally higher than those measured at Position 1 as the microphone was more exposed to a steady easterly breeze that rustled nearby foliage.

6.13. The levels of noise measured at Positions 1 and 2 have been assessed against the ProPG noise risk levels to determine the potential effect of noise on the proposed development without mitigation measures. Noise levels impacting upon the proposed dwellings will be marginally lower (by 1dB to 3dB) than the levels measured during the surveys as the houses will lie further from the local roads than the positions at which the levels were measured.

6.14. As can be seen in Table 4, the average noise levels measured during the noise surveys indicate that noise will have no adverse effect on the proposed dwellings during daytime and night-time periods confirming that mitigation is not required to achieve the internal design noise limits shown in Table 2. As partially open windows typically provide a sound reduction of approximately 13dB it is anticipated that the internal design noise limits will be met during daytime and night-time periods when windows are open or closed.

6.15. The noise levels measured at the application site also confirm that average daytime noise levels within the private gardens will lie below the BS8233/WHO recommended limit of 50dB L_{Aeq} before taking account of any additional acoustic screening that will be provided by garden fencing or other boundary structures.

Noise Risk Assessment	Potential Effect Without Mitigation	Pre-Planning Application Advice
	**Increasing risk of adverse effect**	gh no se eve s nd cate that there s an ncreased r sk that deve opment may be refused on no se grounds. Th s r sk may be reduced by fo ow ng a good acoust c des gn process that s demonstrated n a deta ed ADS. App cants are strong y adv sed to seek expert adv ce.
		As no se eve s ncrease the s te s ke y to be ess su tab e from a no se perspect ve and any subsequent app cat on may be refused un ess a good acoust c des gn process s fo owed and s demonstrated n an ADS wh ch confirms how the adverse mpacts of no se w be m t gated and m n m sed and wh ch c ear y demonstrate that a s gn ficant adverse no se mpact w be avo ded n the fin shed deve opment.
		At ow no se eve s the s te s ke y to be acceptab e from a no se perspect ve prov ded that a good acoust c des gn process s fo owed and s demonstrated n an ADS wh ch confirms how the adverse mpacts of no se w be m t gated and m n m sed n the fin shed deve opment.
	No adverse effect	These no se eve s nd cate that the deve opment s te s ke y to be acceptab e from a no se perspect ve and the app cat on need not norma y be de ayed on no se grounds.
Typical Night-time L_{AFmax} (dB)	**> 60dB ?**	**L_{AFmax} Level Comment**
58	**No**	An nd cat on that that there may be more than 10 no se events at n ght t me w th L_{AFmax} > 60 dB means the s te shou d not be regarded as neg g b e r sk.

Notes:

a) nd cat ve no se eve s shou d be assessed w thout the nc us on of the acoust c effect of any scheme spec fic no se m t gat on measures.

b) nd cat ve no se eve s are the comb ned free fie d no se eve from a sources of transpo t no se and may a so nc ude ndustr a / commerc a no se where th s s present but s not dom nant.

Table 4 ProPG Noise Risk Level Assessment

7. NOISE MITIGATION SCHEME

7.1. The noise survey results have confirmed that the proposed development is subject to a negligible noise risk when assessed using ProPG guidance. Internal noise levels within habitable rooms will lie below BS8233 recommended design limits with windows open or closed. Average daytime noise levels in private gardens will lie below the recommended BS8233/WHO limit of 50dB L_{Aeq} without taking account of any additional screening provided by garden fences or other boundary structures.

7.2. No additional noise mitigation is therefore required to protect the development. Windows to all habitable rooms may comprise standard double or triple glazing units that typically provide a sound reduction of at least 30dB R_w.

8. ACOUSTIC DESIGN STATEMENT

8.1. Table 5 contains an Acoustic Design Statement summarising the issues considered in determining the noise risk of the site and the noise mitigation requirements.

Typical Issues for Low / Medium / High Risk Sites	Statement
Relevant noise sources identified	The assessment has taken into consideration all significant noise sources observed during daytime and night time monitoring periods. Traffic noise is dominant although low in terms of its absolute level.
Multiple source contributions carefully quantified	Contributions from individual sources have been ex amined using the survey data.
Assess extent of noise risk for unmitigated site (current and foreseeable future, 15 years ahead)	Unmitigated site will be subject to a negligible risk of noise intrusion. Future increase in traffic flows expected to increase average noise levels by no more than 1dB to 2dB.
Alternative site layouts considered	Not considered necessary.
Opportunities to mitigate the noise sources within the site	Not required.
Opportunities to mitigate the noise source outside owned land; Physical mitigation; Operational manage ment	Unable to mitigate existing off site noise sources in the area.
Maximise separation	Not applicable.
Noise barriers screening opportunities	Not required.
Site layout protecting residential units	Proposed layout is suitable without mitigation.
Design external amenity spaces (e.g. balconies) to re duce noise entering sensitive rooms	Daytime noise levels in private gardens will be acceptable without mitigation.
Access to quiet open space on or off site	Private gardens.
Orientation of noise sensitive rooms away from the source of noise exposure i.e. quiet facades	Not required.
Consideration of alternative acoustic options	Not required.
Window location & size on affected facades	Not applicable.
Innovative facade and window designs e.g. plenum windows	Not required.
Facade insulation design	Masonry or lightweight facade elements will provide ac ceptable attenuation.
Ventilation natural, from quiet facade	Proposed MVHR system is optimal for acoustic protection.
Complete Acoustic Design Process throughout	Yes

Table 5 Acoustic Design Statement

9. CONCLUSIONS

9.1. The noise environment at the application site has been surveyed and found to be controlled by low levels of road traffic noise from local roads during daytime and from distant roads at night.

9.2. BS8233 internal design noise limits will be met when windows are open or closed.

9.3. Average noise levels in private gardens during daytime will lie below the BS8233/WHO recommended limit of 50dB L_{Aeq}.

9.4. No additional noise mitigation measures are considered necessary in order to protect residents against the low levels of noise that will impact upon the development.

9.5. A noise risk assessment carried out in accordance with ProPG guidance has confirmed that noise levels affecting the proposed dwellings will have no adverse effect. ProPG guidance indicates that the site is likely to be acceptable from a noise perspective, and that the application should not be delayed on noise grounds.

Appendix A - Glossary of Acoustic Terms

Decibel, dB

This is the unit to measure sound. The human ear has an approximately logarithmic response to acoustic pressure over a very large dynamic range (typically 20 micro-Pascals to 100 Pascals). We therefore use a logarithmic scale to describe sound pressure level, intensities and sound power levels. The logarithms used are to base 10; hence, an increase of 10 dB in sound pressure level is equivalent to an increase by a factor of 10 in acoustic pressure in Pascals. Subjectively, this corresponds to a doubling in the perceived loudness of sound.

Octave and Third Octave Bands

The human ear is sensitive to sound over a range of approximately 20 Hz to 10 kHz, and is generally more sensitive to medium and high frequencies than to low frequencies. In order to define the frequency content of a noise, the spectrum is divided into frequency bands, and the sound pressure level is measured in each band. The most commonly used frequency bands are octave bands, in which the mid frequency of each band is twice that of the band below it. For finer analysis, each octave band may be split into three one-third octave bands o in some cases, fine frequency bands.

A-Weighting

Normal hearing covers the frequency range from about 20Hz to 20KHz but sensitivity is greatest between about 500Hz and 8KHz. The "A-Weighting" is an electronic filters network incorporated in sound level meters which approximately corresponds to the frequency response of the ear. The unit of measurement of A-weighted sound level is dBA.

$L_{Aeq,T}$

The equivalent continuous A-weighted sound pressure level. It is a value of the A-weighted sound pressure level in decibels (dB) of a continuous, steady sound, that within a specified time interval, T, has the same mean squared sound pressure as the sound under consideration that varies with time.

L_{Amax}

The maximum instantaneous A-weighted sound pressure level occurring during the measurement period. $L_{A\ ax}$ is often referred to when examining noise intrusion to dwellings and sleep disturbance. Acoustic design noise limits for bedrooms are often specified in terms of a permissible $L_{A\ ax}$ value.

L_{Amin}

The minimum A-weighted sound pressure level occurring during the measurement period.

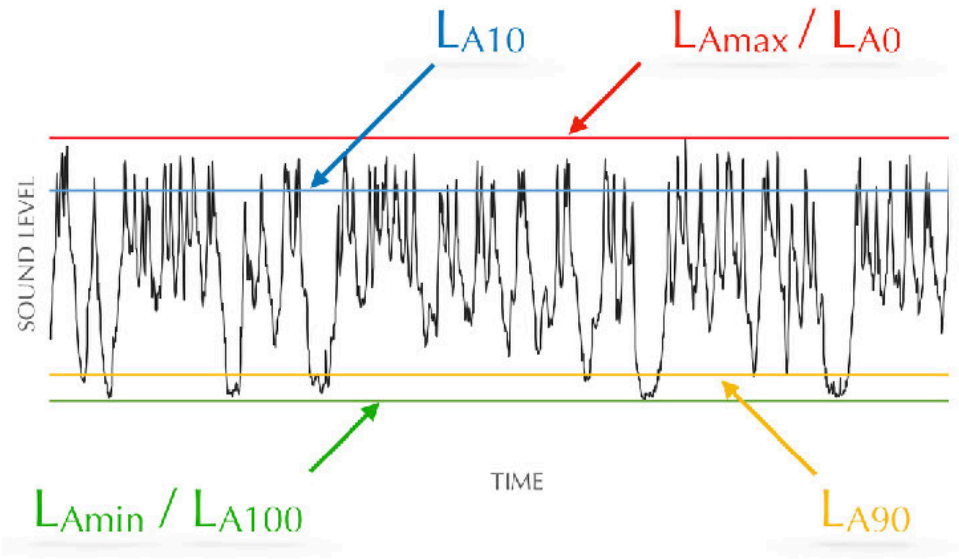
Statistical Level: L_{90}

The sound pressure level exceeded for 90% of the measurement time. Indicative of the general background noise level in the absence of any higher level short duration events that occur during the period.

Statistical Level: L_{10}

This is the sound pressure level exceeded for 10% of the measurement time. It is widely used to measure traffic noise. For a given measurement period, the L_{0} level is by definition greater than or equal to the L_{90} level.

The relationship between the parameters described above is indicated in the attached figure.



Sound Insulation

The use of structures and materials designed to reduce the transmission of sound from one room or area of a building to another, from the exterior to the interior of a building or between the exterior and interior of a building.

Appendix B - Noise Survey Details and Results

Survey Location

Land off Chapelgate
Scholes
Kirklees
West Yorkshire

Survey Dates

7 March 2022

Weather Conditions During Survey

Daytime: Light easterly breeze (<2/ms), dry, 50% RH, overcast, 9ºC
Night-time: Light easterly breeze (<2/ms), dry, 56% RH, 4ºC

Instrumentation

Equipment Description	Type Number	Manufacturer	Serial Number	Date of Last Laboratory Calibration/Verification
Sound Level Analyser	XL2 TA	NTi Audio	A2A 11085 E0	26 and 27 August 2020
Pre amp/Microphone	M2230	NTi Audio	6647/A15224	26 and 27 August 2020
Calibrator	CAL200	NTi Audio	12583	15 September 2021
Handheld Weather Station	Kestrel 3000	Kestrel	2673082	
Tripod				

Table B1 - Results of Daytime Noise Survey - 7 March 2022 (free-field)

Measurement Position	Start Time	L_{Aeq}	L_{Amax}	L_{A90}	Sound Level (L_{eq} dB) @ Octave Band Centre Frequency (Hz)						
					63	125	250	500	1k	2k	4k
Position 1	11:30	47.8	68.0	34.2	56.4	48.4	43.7	42.8	43.3	40.7	37.4
	11:40	46.5	67.9	35.0	55.9	50.5	46.4	42.2	41.0	38.7	35.9
	12:00	42.7	62.3	34.4	50.5	45.1	40.3	38.6	38.6	34.7	31.7
	12:55	46.6	65.7	37.6	56.2	45.0	40.2	41.3	39.2	36.2	42.3
	13:05	51.8	76.1	36.8	58.2	51.9	48.6	46.4	46.3	45.7	42.8
	13:15	50.1	69.8	34.4	57.3	51.4	45.7	46.1	45.5	42.4	39.9
	13:25	41.7	58.7	36.3	49.8	44.3	43.1	37.6	37.3	33.0	27.8
	14:03	47.4	64.7	34.5	57.1	47.1	42.0	41.4	42.2	42.2	36.1
	14:13	44.7	64.2	34.7	55.8	49.4	43.7	40.3	40.2	37.0	31.8
	14:54	48.3	71.3	35.0	57.4	51.8	47.6	44.3	43.8	39.4	36.7
	15:04	46.4	62.6	34.2	54.2	51.2	45.4	41.5	41.7	38.5	33.7
Position 2	12:17	46.9	61.5	38.1	59.0	47.9	42.4	43.0	43.2	39.3	32.3
	12:27	46.7	63.6	39.3	58.8	47.0	40.8	42.1	42.2	38.3	37.7
	12:37	46.4	63.3	41.5	62.3	50.8	43.1	42.5	41.9	36.7	35.7
	13:40	46.3	60.9	41.5	50.6	41.8	39.4	42.4	39.9	37.0	40.6
	13:50	47.4	69.3	38.0	60.1	50.3	42.3	41.4	42.2	41.1	37.2
	14:28	45.5	62.2	37.3	54.9	49.7	46.4	41.4	41.0	36.9	31.7
	14:38	46.4	59.8	39.1	60.0	48.7	43.9	43.9	41.9	37.3	32.5

Table B2 - Results of Night-time Noise Survey - 7 March 2022 (free-field)

Measurement Position	Start Time	L_{Aeq}	L_{AMax}	L_{A90}	Sound Level (L_{eq} dB) @ Octave Band Centre Frequency (Hz)						
					63	125	250	500	1k	2k	4k
Position 1	22:55	36.6	56.3	33.1	47.1	38.4	36.4	34.5	31.3	26.5	24.1
	23:05	36.9	50.6	32.8	51.7	41.1	37.7	36.1	30.5	24.1	19.6
	23:15	41.2	57.5	33.9	58.8	46.9	40.6	38.7	35.6	30.4	26.3
	23:25	35.7	46.3	32.5	49.5	38.6	35.5	33.9	30.6	25.0	20.6
	00:15	37.6	49.7	34.3	52.7	40.8	37.0	35.6	32.2	26.9	22.9
	00:25	39.1	54.5	33.4	55.3	43.9	38.6	36.8	33.7	28.5	24.5
	00:35	39.8	52.7	34.0	51.4	42.6	39.3	37.8	34.7	29.7	25.8
	01:20	36.3	46.0	31.9	46.1	39.0	36.9	34.9	30.7	25.5	21.6
	01:30	32.3	39.1	30.6	40.9	33.3	31.7	30.6	27.6	22.1	17.5
	01:40	45.6	67.3	30.7	46.7	44.4	40.8	39.4	40.2	40.0	36.0
	01:50	32.2	44.3	30.4	41.9	33.3	31.4	30.2	27.8	21.9	17.7
	01:55	31.9	49.2	30.1	41.0	33.0	31.0	29.9	27.8	21.7	17.0
Position 2	23:43	39.4	52.0	36.6	55.9	43.5	38.3	37.1	34.0	29.6	24.3
	23:53	36.4	39.9	35.0	43.0	35.4	35.3	34.1	31.7	28.0	22.1
	00:03	38.0	48.2	34.8	51.8	39.8	37.2	35.9	32.7	28.9	23.6
	00:48	40.9	53.6	35.6	51.8	52.9	39.3	36.6	33.3	29.4	23.6
	00:58	38.3	49.5	35.3	52.1	46.5	37.3	35.9	32.6	29.0	23.6
	01:08	36.7	47.1	34.8	47.7	36.5	35.3	34.4	31.8	28.2	22.6
	02:03	39.0	40.7	38.3	43.2	38.6	38.4	37.4	34.3	29.9	23.7