Noise Residential Survey

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	Stanley Moss Lane
	Stockton Brook
	Staffordshire
	ST9 9LH
Date:	11/03/2020

Version	1	2	3
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Date	11/03/2020	--	--
Project Number	4242PR	--	--

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Contents

EXECUTIVE SUMMARY **4**

1. INTRODUCTION **5**
1.1 Overview 5
1.2 Scope & Objectives 5
1.3 Legislation, Policy and Guidance 5

2. SITE DESCRIPTION & BACKGROUND INFORMATION **6**
2.1 Site & Surroundings 6
2.2 Background 6

3. ENVIRONMENTAL NOISE SURVEY **7**
3.1 Measurement Methodology 7
3.2 Measurement Equipment 7
3.3 Weather Summary 7
3.4 Results 8
3.5 Subjective impression & Context 9

4. NOISE ASSESSMENT **9**
4.1 ProPG Stage 1 Initial Noise Risk Assessment 9
4.2 BS8233:2014 Noise Assessment 9

APPENDIX A – ACOUSTIC TERMINOLOGY **14**

APPENDIX B – LEGISLATION, POLICY AND GUIDANCE **17**

APPENDIX C - LOCATION PLAN **21**

APPENDIX D – SITE PLANS **22**

APPENDIX E – ENVIRONMENTAL SOUND SURVEY **23**

Tables

Table 1.0 – Measurement Equipment 7
Table 2.0 - Meteorological Data 8
Table 3.0 – Sound Survey Summary Results 8
Table 4.0 – Highest Octave Band Leq,15min during day & night 8
Table 5.0 – Maximum Sound Level Summary Results 9
Table 6.0 – Noise Risk Category for Site 9
Table 7.0 – BS8233 Internal Noise Level Analysis 10
Table 8.0 – Octave Band Internal Noise Level Analysis – Day time 10
Table 9.0 – Octave Band Internal Noise Level Analysis – Night time 10
Table 10.0 – Façade SRI 11
Table 11.0 – Roof SRI 11
Table 12.0 – Glazing SRI 12
Table 13.0 – Ventilation Specification 12
Table 14.0 – ProPG Stage 1 Initial Risk Assessment Criteria 19
Table 15.0 - BS8233 criteria for internal noise levels in dwellings 20

Figures

Figure 1. Measurement Position and Proposed Development 6

Executive summary

An environmental noise survey has been undertaken at the proposed residential development at Coltslow Farm, Stanley Moss Lane, Stockton Brook, Staffordshire, ST9 9LH to assess the suitability of the site. The measured ambient sound levels have allowed a BS8233:2014 and ProPG noise assessment to be carried out.

The ProPG assessment shows that the Proposed Development falls into NRC 1 'Low Risk´ during day and night time. Therefore, the area is suitable to locate the proposed development.

Outline mitigation measures have been recommended in the report, including glazing and ventilation. These recommendations should be sufficient to achieve the internal and external noise levels for the proposed development according to BS8233:2014 noise criteria. An overview of all recommendations can be seen below:

Recommendation and Mitigation Measure Overview
- All glazing of the development requires a minimum sound reduction of 22 dB $R_w + C_{tr}$ and 31 dB Rw. - All glazing also requires the octave sound reduction outlined in Table 8.0 & 9.0 - All ventilation should achieve a minimum sound reduction of 31dB $D_{n,e,w}$ when open. - Suitable glazing and ventilation has been specified in the body of the report

The findings of this report will require written approval from the Local Authority prior to work commencing.

1. Introduction

1.1 Overview

NOVA Acoustics Ltd has been commissioned to prepare a noise assessment for a residential development ('the Proposed Development') at Coltslow Farm, Stanley Moss Lane, Stockton Brook, Staffordshire, ST9 9LH ('the Site').

The Applicant has submitted a full planning application SMD/2018/0381 ('the Application') to the Staffordshire Moorlands District Council.

Accordingly, the following technical noise assessment has been produced to accompany the Application to the Staffordshire Moorlands District Council.

This report details the procedure to ensure the suitability of the proposed residential development.

This noise assessment is necessarily technical in nature; therefore, a glossary of terms is included in Appendix A to assist the reader.

1.2 Scope & Objectives

- Ambient sound monitoring survey to evaluate the prevailing sound levels incident on the Site.
- Detailed sound modelling, acoustic calculation and analysis in accordance with ISO9613 – 1 prediction methodology to predict sound levels incident on the Site.
- A detailed assessment of the suitability of the Site, in accordance with relevant standards in respect of sound from the surrounding noise sources.
- Recommendation of mitigation measures, where necessary, to comply with the requirements of the National Planning Practice Guidance in England and Wales, BS8233:2014, ProPG, World Health Organisation Guidelines and other relevant standards.

1.3 Legislation, Policy and Guidance

This report is to be primarily based on the following legislation, policy and guidance.

- National Planning Policy Framework (2019)
- Noise Policy Statement for England
- ProPG: Planning & Noise
- BS8233:2014`Guidance on sound insulation and noise reduction for buildings'
- BS EN 12354-4 Building Acoustics

2. Site Description & Background Information

2.1 Site & Surroundings

The proposed development is located at Coltslow Farm, Stanley Moss Lane, Stockton Brook, Staffordshire, ST9 9LH. To the south is "Stanley Moss Lane" and "Stanley Moss Road" with low traffic flow throughout the day and night time period. To the East of the proposed development is "Corinthian Store Ltd" approx. 50m, which operates Monday to Friday from 08:00 to 14:00. The rest of the surrounding area is primarily farmland.

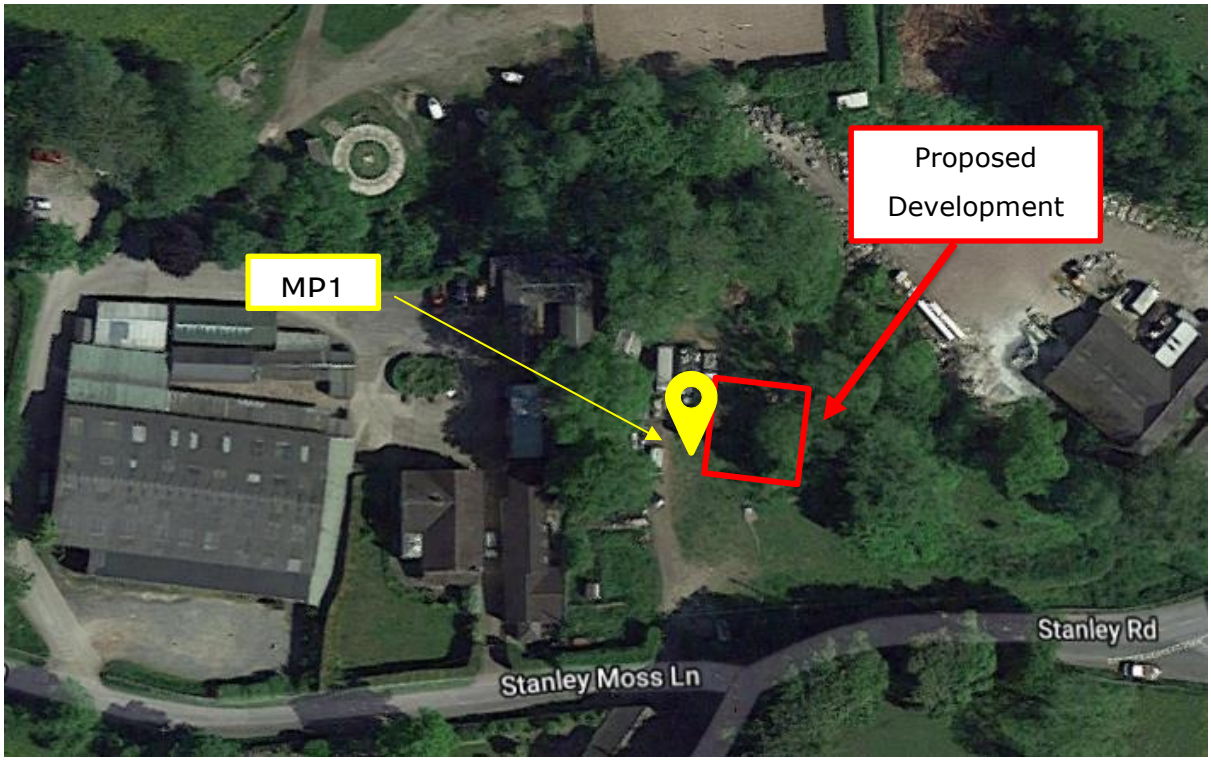


Figure 1.0- Site and Surroundings

2.2 Background

The site is currently empty land with some buildings. It is proposed that the existing buildings and site be cleared and a detached dwelling be erected on the site. given eh proximity of other residential dwellings in the area it is assumed that provided good acoustic design is implemented the amenity of all future residents can be fully protected.

3. Environmental Noise Survey

In order to characterise the sound profile of the area of the proposed development, a long term 24 hour environmental sound survey was carried out from the 19th February 2020 to 20th February 2020.

3.1 Measurement Methodology

For the long-term sound monitoring, the sound level meter was placed on the land of the proposed development at ground floor level. The microphone was approximately 1.5m from the ground with no other reflective surfaces in close proximity. The monitoring position was chosen in order to collect representative sound levels of the area daytime and night time periods. The measurement position can be found in Figure 1.0.

3.2 Measurement Equipment

Piece of Equipment	Serial No	Calibration Deviation
CESVA SC420 Class 1 Sound level meter	T246458	≤0.5
CESVA CB006 Class 1 Calibrator	901927	

Table 1.0 – Measurement Equipment

All equipment used during the survey was field calibrated at the start and end of the measurement period with a negligible deviation of ≤0.5 dB. All sound level meters are calibrated every 24 months and all calibrators are calibrated every 12 months, by a third-party calibration laboratory. All microphones were fitted with a protective windshield for the entire measurements period. Calibration certificates can be provided upon request.

3.3 Weather Summary

As the environmental noise survey was carried out over a long un-manned period no localized records of weather conditions were taken. However, during the setup and collection of the monitoring equipment, the weather conditions have been documented in the following table. All measurements have been compared with met office weather data of the area, specifically, the closest weather station is at Weather-Above (Cheddleton) 15Km distance away. When reviewing the time history of the noise measurements, any scenarios that were considered potentially to be affected by the local weather conditions have been omitted. The analysis of the noise data includes statistical and percentile analysis and review of minimum and maximum values, which aids in the preclusion of any periods of undesirable weather conditions. The weather conditions were deemed suitable for the measurement of environmental noise in accordance with BS7445 Description and Measurement of Environmental Noise. The table below presents the average temperature, wind speed and rainfall range for each 24-hour period during the entire measurement.

Weather conditions 19/02/2020 – 20/02/2020 - Weather-Above (Cheddleton)				
Time period	**Air temp (^{0}C)**	**Rainfall mm/h**	**Prevailing Wind Direction**	**Wind Speed (m/s)**
Monitor Set-up 19/02/2020 12:00– 23:59	2.1 – 8.2	0.0 - 3.0	SSE	0.0 – 3.1
Monitor Collection 20/02/2020 00:00 – 13:00	1.8 – 8.5	0.0 - 1.4	SW	0.0 – 3.1

Table 2.0 - Meteorological Data

3.4 Results

3.4.1 Summary Results

The following table shows a summary of the sound survey results; L_{Aeq}, L_{Amax}, L_{A90} and the L_{A10} for the measurement period.

Measurement Position MP1				
Measurement Time Period ('t')	**$L_{Aeq,t}$**	**$L_{Amax,t}$**	**$L_{A90,t}$**	**$L_{A10,t}$**
Day 1 - 19/02/20 - 13:00 - 23:00	52.0	85.0	49.0	53.0
Night 1 – 20/02/20 – 23:00 – 07:00	49.0	77.0	46.0	53.0
Day 2 - 20/02/20 - 07:00 – 12:45	56.0	82.0	52.0	57.0
Highest hour Day	57.0	82.0	51.0	61.0
Highest hour Night	52.0	77.0	46.0	57.0

Table 3.0 – Sound Survey Summary Results

The following table shows a summary of the highest 1-hour octave band sound levels measure during the day and night periods.

Measurement Position MP1							
Frequency Analysis	**Z-weighted Octave Band Sound Pressure Level, Hz (dB)**						
	63	**125**	**250**	**500**	**1K**	**2K**	**4K**
Highest $L_{eq,15min}$ during the day	63.0	60.0	58.0	54.0	52.0	49.0	48.0
Highest $L_{eq,15min}$ during the night	59.0	55.0	52.0	48.0	45.0	43.0	48.0

Table 4.0 – Highest Octave Band Leq,15min during day & night

The following table shows a summary of the maximum sound level results during the measurement period.

Measurement Position MP1			
Measurement Period ('t')	**$L_{AFMax,15min}$**	**Statistically most Repeated $L_{AFMax,15min}$**	**No. of exceedances of 76 dB $L_{AFMax,15min}$**
Night 1 – 20/02/20 – 23:00 – 07:00	77.0	75.0	3

Table 5.0 – Maximum Sound Level Summary Results

3.5 Subjective impression & Context

During the site visit, it was noted that the surrounding acoustic environment was low. There was som sporadic noise from car pass bys to the south of the site however these were considered low in level, in general, the surrounding area was deemed ideal for development. during the visit, there was also no audible noise coming from the neighbouring sites. The above impression is further corroborated by the results presented above.

4. Noise Assessment

4.1 ProPG Stage 1 Initial Noise Risk Assessment

Considering the noise levels measured across the entire measurement period, the development site falls into Noise Risk Category (NRC) 1. As shown in the following table.

Noise Risk Category	Potential Effect if unmitigated	Pre-Planning Application Guidance
1 - Low $L_{Aeq, 16hour}$ < 50 - 60dB $L_{Aeq, 8hour}$ < 40 - 50dB	Adverse effect on health and quality of life	At low noise levels, the site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and the minimized in the finished development.

Table 6.0 – Noise Risk Category for Site

The site falls into NRC 1 "Low Risk" during day time and night time. Therefore, it is deemed suitable to place a residential development at the site.

4.2 BS8233:2014 Noise Assessment

4.2.1 Internal Noise Level Assessment

The following section analyses the ambient sound levels incident on the development compared with the internal noise level criteria presented within BS8233:2014.

To ensure a robust analysis the following considerations have been taken:

- The loudest $L_{Aeq,1hour}$ during the day time and night time from MP1.
- The highest statistically most repeated $L_{Amax,15min}$ noise level measured during the night time exceeded less than 10 times
- The highest $L_{eq,1hour}$ octave band noise levels during the day and night from MP1.

The following table analyses the required composite SRI required of the dwelling to achieve appropriate internal noise levels.

Measurement position	Location	Time Period	Façade Noise Level	BS8233 Criteria	Min. SRI Required (dB)
MP1	Bedroom / Living Room	Day time	57.0	35 dB $L_{Aeq,16hour}$	22.0 R_w + C_{tr}
	Bedroom	Night time	52.0	30 dB $L_{Aeq,8hour}$	22.0 R_w + C_{tr}
	Bedroom	Night time	76.0	45 dB $L_{Amax,8hour}$	31.0 R_w

Table 7.0 – BS8233 Internal Noise Level Analysis

The following table analyses the required composite octave band SRI required of the dwelling to achieve appropriate internal noise levels during the night time period.

Frequency Analysis	Z-weighted Octave Band Sound Pressure Level, Hz (dB)						
	63	125	250	500	1K	2K	4K
Highest $L_{eq,15min}$ during the day	63.0	60.0	58.0	54.0	52.0	49.0	48.0
NR30 Curve (dB)	59.2	48.1	39.9	34.0	30.0	26.9	24.7
Required Octave Band SRI (R_w)	4.0	12.0	18.0	20.0	22.0	22.0	24.0

Table 8.0 – Octave Band Internal Noise Level Analysis – Day time

The following table analyses the required composite octave band SRI required of the dwelling to achieve appropriate internal noise levels during the night time period.

Frequency Analysis	Z-weighted Octave Band Sound Pressure Level, Hz (dB)						
	63	125	250	500	1K	2K	4K
Highest $L_{eq,15min}$ during the night	59.0	55.0	52.0	48.0	45.0	43.0	48.0
NR25 Curve (dB)	55.2	43.7	35.2	29.2	25.0	21.9	19.5
Required Octave Band SRI (R_w)	4.0	12.0	17.0	19.0	20.0	22.0	29.0

Table 9.0 – Octave Band Internal Noise Level Analysis – Night time

4.2.2 External Noise Level Assessment

As can be seen by the measured noise levels at the site the expect noise levels within the garden areas would range from 52 dB to 56 dB. $L_{Aeq,16hour}$. The external garden noise criteria is 50 – 55 dB $L_{Aeq,16hour}$. As can be seen, there is potential for the criteria to be exceeded by 1 dB however this level of exceedance is deemed negligible. Furthermore when considering thee shielding that the proposed building will provide from the road to the south once constructed it is expected the criteria will be achieved and thus no further mitigation is required.

4.2.3 Recommendations & Mitigation

Building Envelope

The noise levels within the proposed dwellings will be dictated by the configuration, materials and elements of the façade. The non-glazed elements of the facade will contribute significantly to the reduction of ambient noise levels in combination with a superior quality appropriate acoustic glazing specification.

a) Facades

The prediction of the performance of the facade is based upon an assumed construction of 100mm brick, 75mm butterfly tie with fibreglass insulation (min. density of 10 kg/m^3), 100mm blockwork (min. density of 1400 kg/m^3) finished with 10mm standard plasterboard. The expected performance as predicted within INSUL software is shown in the following table.

Frequency (Hz)	63	125	250	500	1k	2k	4k	R_w
Façade SRI	40.0	46.0	43.0	47.0	57.0	67.0	78.0	48.0

Table 10.0 – Façade SRI

Any other configuration of external walls that would achieve at least these insulation figures will be suitable for the development.

b) Roofs

If the dwelling has rooms within the roof space the roof system will require additional sound insulation to achieve appropriate internal noise levels. If the roof, is being utilized as a voided loft space with thermal insulation the following detailing is not required. The ceilings in the roof space should consist of 100mm 45kg/m^3 sab insulation fitted tightly between the 200mm roof joists and 2no. 15mm SoundBloc plasterboard fixed to resilient bars to achieve a uniform sound reduction. The expected performance as predicted within INSUL software is shown in Table 11.0.

Frequency (Hz)	63	125	250	500	1K	2K	4K	Rw
Roof SRI	33	45	52	57	60	57	61	58

Table 11.0 – Roof SRI

Any other configuration of roof that would achieve at least these insulation figures will be suitable for the development.

c) Glazing

Windows can be considered the weakest point of a façade in terms of noise reduction from external noise. To provide a robust assessment the composite SRI required for the entire building envelope will be used to provide the glazing specification.

Glazed elements installed in all the living rooms and bedrooms require a minimum sound reduction index value as shown in Table 7.0. The glazing units shown in the following table would provide a suitable sound reduction, any other window capable of providing this attenuation will be suitable. The performance is specified for the whole window unit, including frame and other design features.

Location	Glazing Configuration	Attenuation (dB)
Bedrooms and Living Rooms	*Double Glazing* 6mm Glass – 16mm Air Cavity – 4mm Glass	28.0 $R_w + C_{tr}$ 32.0 R_w

Table 12.0 – Glazing SRI

The glazing system above will protect the amenity of the occupants of the dwellings against the extraneous noise. The glazing specifications have been taken from the BS6262 – 2 and Pilkington's Optiphon range however any glazing providing the same attenuation can be used.

d) Ventilation

BS8233 States;

"If relying on closed windows to meet the guide values, there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level."

and

"The Building Regulations' supporting documents on ventilation [48, 49, 50] recommend that habitable rooms in dwellings have background ventilation. Where openable windows cannot be relied upon for this ventilation, trickle ventilators can be used and sound attenuating types are available. However, windows may remain openable for rapid or purge ventilation, or at the occupant's choice. Alternatively, acoustic ventilation units are available for insertion in external walls. These can provide sound reduction comparable with double glazed windows. However, ducted systems with intakes on the quiet side of the building might be required in very noisy situations, or where appearance rules out through-the-wall fans."

It is recommended that an alternative ventilation system is installed to fully protect the amenity of future inhabitants. As stated in BS8233:2014 section 5.4.4, having complete enclosure of the noise source or receiver is the most effective barrier of sound. An alternative ventilation strategy allows for maximum sound insulation from the noise source whilst still maintaining a sufficient level of ventilation. It is recommended that the alternative ventilation should provide the same resistance to sound as the glazed elements. The following table provides ventilation system that meet sthe above recommendations.

Model	Attenuation (dB)
Titon Xtra Sound Attenuator - Standard vent + standard SF canopy	32dB Open / 48dB Closed $D_{n,e,w}$

Table 13.0 – Ventilation Specification

If the above ventilation systems are not deemed suitable for the development then a mechanical heat-recovery ventilation (MHRV) system should be employed. It should be noted that if a MHRV

system is used, the self-generating noise from the system will need to conform to the internal noise levels outlined in BS8233:2014.

Appendix A – Acoustic Terminology

Sound Pressure	Sound, or sound pressure, is a fluctuation in air pressure over the static ambient pressure.
Sound Pressure Level (Sound Level)	The sound level is the sound pressure relative to a standard reference pressure of 20μPa (20x10-6 Pascals) on a decibel scale.
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s1 and s2 is given by 20 log10 (s1 / s2). The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is 20μPa.
A-weighting, dB(A)	The unit of sound level, weighted according to the A-scale, which takes into account the increased sensitivity of the human ear at some frequencies.
Noise Level Indices	Noise levels usually fluctuate over time, so it is often necessary to consider an average or statistical noise level. This can be done in several ways, so a number of different noise indices have been defined, according to how the averaging or statistics are carried out.
$L_{eq,T}$	A noise level index called the equivalent continuous noise level over the time period T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
$L_{max,T}$	A noise level index defined as the maximum noise level during the period T. Lmax is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall Leq noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
$L_{90,T}$	A noise level index. The noise level exceeded for 90% of the time over the period T. L90 can be considered to be the "average minimum" noise level and is often used to describe the background noise.
$L_{10,T}$	A noise level index. The noise level exceeded for 10% of the time over the period T. L10 can be considered to be the "average maximum" noise level. Generally used to describe road traffic noise.
Free-Field	Far from the presence of sound reflecting objects (except the ground), usually taken to mean at least 3.5m
Facade	At a distance of 1m in front of a large sound reflecting object such as a building façade.
Fast Time Weighting	An averaging time used in sound level meters. Defined in BS 5969.

In order to assist the understanding of acoustic terminology and the relative change in noise, the following background information is provided. The human ear can detect a very wide range of pressure fluctuations, which are perceived as sound. In order to express these fluctuations in a manageable way, a logarithmic scale called the decibel, or dB scale is used. The decibel scale typically ranges from 0 dB (the threshold of hearing) to over 120 dB. An indication of the range of sound levels commonly found in the environment is given in the following table.

Sound Level	Location
0dB(A)	Threshold of hearing
20 to 30dB(A)	Quiet bedroom at night
30 to 40dB(A)	Living room during the day
40 to 50dB(A)	Typical office
50 to 60dB(A)	Inside a car
60 to 70dB(A)	Typical high street
70 to 90dB(A)	Inside factory
100 to 110dB(A)	Burglar alarm at 1m away
110 to 130dB(A)	Jet aircraft on take off
140dB(A)	Threshold of Pain

The ear is less sensitive to some frequencies than to others. The A-weighting scale is used to approximate the frequency response of the ear. Levels weighted using this scale are commonly identified by the notation dB(A).

In accordance with logarithmic addition, combining two sources with equal noise levels would result in an increase of 3 dB(A) in the noise level from a single source. A change of 3 dB(A) is generally regarded as the smallest change in broadband continuous noise which the human ear can detect (although in certain controlled circumstances a change of 1 dB(A) is just perceptible). Therefore, a 2 dB(A) increase would not be normally be perceptible. A 10 dB(A) increase in noise represents a subjective doubling of loudness.

A noise impact on a community is deemed to occur when a new noise is introduced that is out of character with the area, or when a significant increase above the pre-existing ambient noise level occurs.

For levels of noise that vary with time, it is necessary to employ a statistical index that allows for this variation. These statistical indices are expressed as the sound level that is exceeded for a percentage of the time period of interest. In the UK, traffic noise is measured as the L_{A10}, the noise level exceeded for 10% of the measurement period. The L_{A90} is the level exceeded for 90% of the

time and has been adopted to represent the background noise level in the absence of discrete events. An alternative way of assessing the time varying noise levels is to use the equivalent continuous sound level, L_{Aeq}.

This is a notional steady level that would, over a given period of time, deliver the same sound energy as the actual fluctuating sound. To put these quantities into context, where a receiver is predominantly affected by continuous flows of road traffic, a doubling or halving of the flows would result in a just perceptible change of 3 dB, while an increase of more than 25%, or a decrease of more than 20%, in traffic flows represent changes of 1 dB in traffic noise levels (assuming no alteration in the mix of traffic or flow speeds).

Note that the time constant and the period of the noise measurement should be specified. For example, BS4142:2014 specifies background noise measurement periods of 1 hour during the day and 15 minutes during the night. The noise levels are commonly symbolised as $L_{A90,1hour}$ dB and $L_{A90,15mins}$ dB. The noise measurement should be recorded using a 'FAST' time response equivalent to 0.125ms.

Appendix B – Legislation, Policy and Guidance

This report is to be primarily based on the following legislation, policy and guidance.

National Planning Policy Framework (2019)

Government policy on noise is set out in the National Planning Policy Framework (NPPF), published in 2019. This replaced all earlier guidance on noise and places an emphasis on sustainability. In section 15, Conserving and enhancing the natural and local environment, paragraph 170e, it states:

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;

Paragraph 180 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:

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.*

Noise Policy Statement for England

Paragraph 180 of the NPPF also refers to advice on adverse effects of noise given in the Noise Policy Statement for England (NPSE). This document sets out a policy vision to:

Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.

To achieve this vision the Statement identifies the following three aims:

Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

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

In achieving these aims the document introduces significance criteria as follows:

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur. It is stated that "significant adverse effects on health and quality of life should be avoided while also considering the guiding principles of sustainable development".

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected. It is stated that the second aim above lies somewhere between LOAEL and SOAEL and requires that: "all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also considering the guiding principles of sustainable development. This does not mean that such adverse effects cannot occur."

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. This can be related to the third aim above, which seeks: "where possible, positively to improve health and quality of life through the pro-active management of noise while also considering the guiding principles of sustainable development, recognising that there will be opportunities for such measures to be taken and that they will deliver potential benefits to society. The protection of quiet places and quiet times as well as the enhancement of the acoustic environment will assist with delivering this aim."

The NPSE recognises that it is not possible to have a single objective noise-based measure that is mandatory and applicable to all sources of noise in all situations and provides no guidance as to how these criteria should be interpreted. It is clear, however, that there is no requirement to achieve noise levels where there are no observable adverse impacts but that reasonable and practicable steps to reduce adverse noise impacts should be taken in the context of sustainable development and ensure a balance between noise sensitive and the need for noise generating developments.

Any scheme of noise mitigation outlined in this report will, therefore, aim to abide by the above principles of the NPPF and NPSE whilst recognizing the constraints of the site.

ProPG: Planning & Noise

The Professional Practice Guidance on Planning and Noise (ProPG) has been produced to provide practitioners with guidance on the management of noise within the planning system in England.

Noise can have a significant effect on the environment and on the quality of life enjoyed by individuals and communities. For these reasons, noise is a material consideration in the planning process and a key aspect of sustainable development. Noise must therefore be considered and given serious attention when new developments might create additional noise and when new developments would be sensitive to the prevailing acoustic conditions.

It aims to:

- Advocate full consideration of the acoustic environment from the earliest possible stage of the development control process;
- Encourage the process of good acoustic design in and around new residential developments;

- Outline what should be taken into account in deciding planning applications for new noise-sensitive developments.
- Promote appropriate noise exposure standards; and
- Assist the delivery of sustainable development.

This document describes an acoustic design process which is multi-faceted and that seeks to deliver the best acoustic outcome for a particular site. The advice and procedures contained in the ProPG are restricted to the consideration of new residential development that will be exposed predominantly to airborne noise from existing transport sources. New housing is the most common type of new residential development, however the ProPG can also be applied to other types of residential developments such as residential institutions, care homes etc.

The document a Stage 1 Initial Site Risk Assessment, as follows:

Noise Risk Category	Potential Effect if unmitigated	Pre-Planning Application Guidance
0 – Negligible $L_{Aeq, 16hour}$ < 50dB $L_{Aeq, 8hour}$ < 40dB	No adverse effect	These noise levels indicate that the development site is likely to be acceptable from a noise perspective, and the application need not normally be delayed on noise grounds.
1 - Low $L_{Aeq, 16hour}$ < 50 - 60dB $L_{Aeq, 8hour}$ < 40 - 50dB	Adverse effect on health and quality of life	At low noise levels, the site is likely to be acceptable from a noise perspective provided that a good acoustic design process in followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and the minimized in the finished development.
2 - Medium $L_{Aeq, 16hour}$ < 60 - 70dB $L_{Aeq, 8hour}$ < 50 – 60dB	Significant adverse effect on health and quality of life	As noise levels increase, the site is likely to be less suitable from a noise perspective and any subsequent application may be refused unless good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimize, and which clearly demonstrated that a significant adverse noise impact will be avoided I the finished development.
3 - High $L_{Aeq, 16hour}$ > 70dB $L_{Aeq, 8hour}$ > 60dB	Unacceptable adverse effect on health and quality of life	High noise levels indicate that there is an increased risk that development may be refused on noise grounds. The risk may be reduced by following a good acoustic design process that is demonstrated in a detailed ADS. Applicants are strongly advised to seek expert advice.

Table 14.0 – ProPG Stage 1 Initial Risk Assessment Criteria

BS8233:2014`Guidance on sound insulation and noise reduction for buildings'

The British Standard BS 8233: 2014, Guidance on Sound insulation and noise reduction for buildings provides additional guidance on noise levels from sources without specific character in the built environment, based on the recommendations of the World Health Organization; specifically, WHO Guidelines on Community Noise, 1999. The criteria desirable levels of steady state, "anonymous" noise in unoccupied spaces within dwellings, from sources such as road traffic, mechanical services and other continuously running plant, are tabulated below:

Activity	Location	07:00 – 23:00	23:00 – 07:00
Resting	Living Room	35 dB $L_{Aeq,16hour}$	--
Dining	Dining Room/Area	40 dB $L_{Aeq,16hour}$	--
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

Table 15.0 - BS8233 criteria for internal noise levels in dwellings

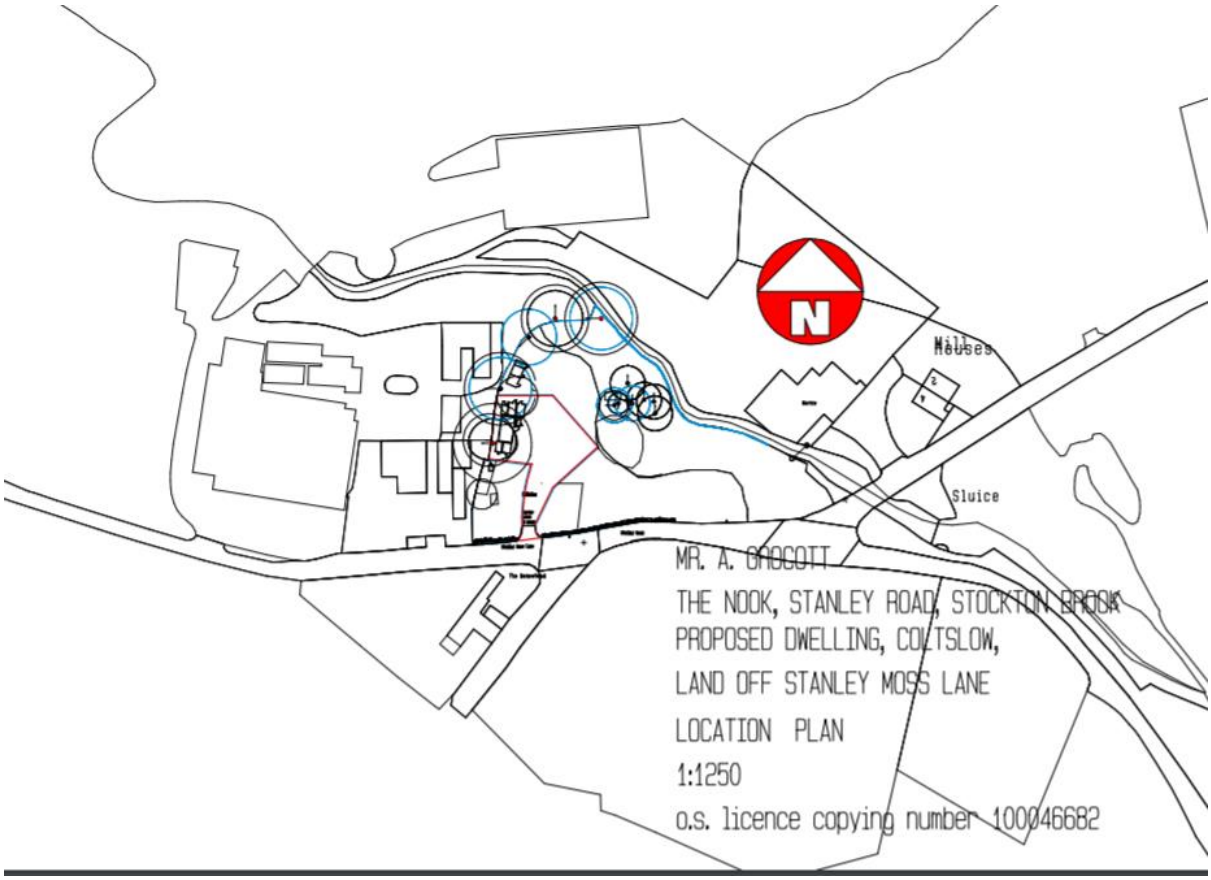
It is noted, however that where development is considered necessary or desirable, despite external noise level above WHO guidelines, the above target levels may be relaxed by up to 5 dB.

The standard also recommends that for traditional external amenity areas, such as gardens, it is desirable that external noise levels do not exceed 50 dB $L_{Aeq,T}$, and that 55 dB $L_{Aeq,T}$ would be acceptable in noisier environments. However, it is recognised that these values may not be achievable in all areas where development is desirable and in such locations, development should be designed to achieve the lowest practicable levels.

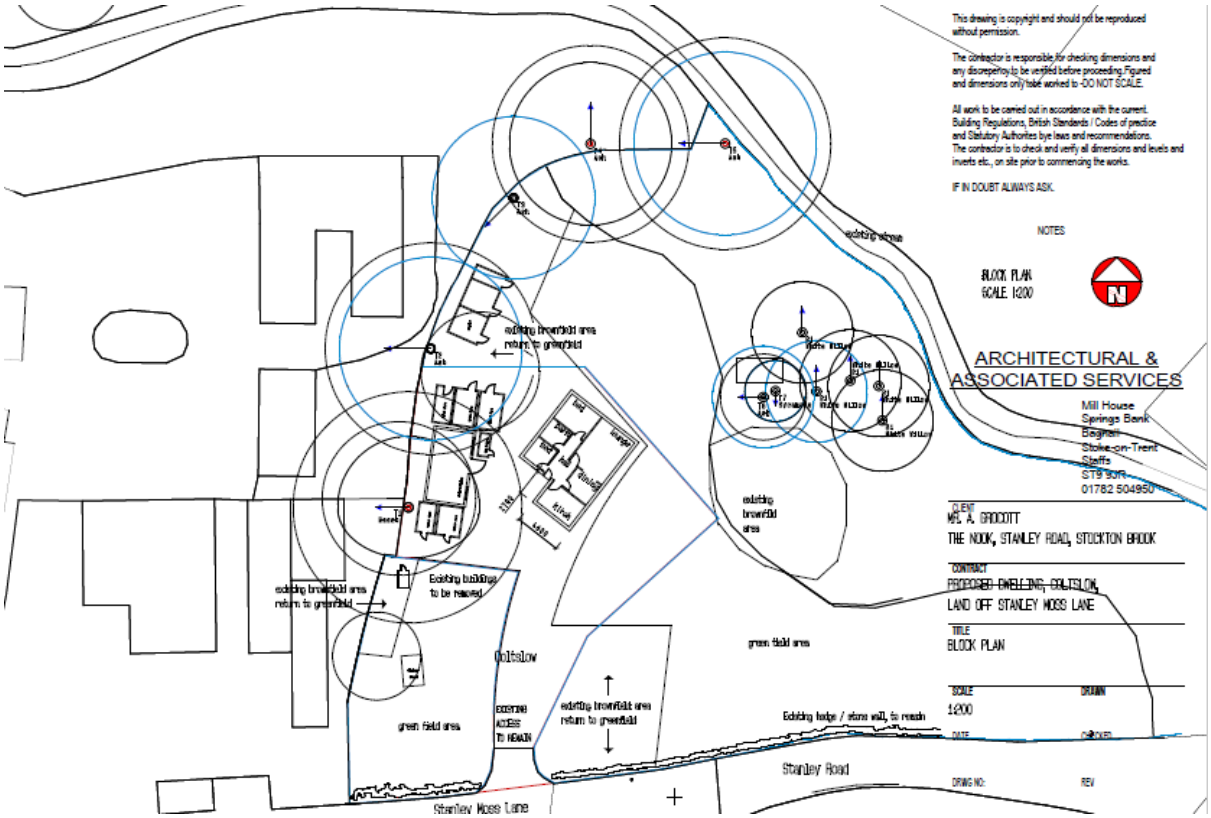
General recommendations for mitigation to enable these targets to be achieved are provided, including the use of bunds and barriers to reduce external noise and space planning and sound insulation for the control of internal noise levels.

For this assessment, the above criteria are considered to be the LOAEL as defined in the NPSE above

Appendix C - Location Plan



Appendix D – Site Plans



Appendix E – Environmental Sound Survey

