DRAGONFLY

CONSULTING

Northminster Land Ltd

Land South of Riccal Drive, Helmsley

Noise Impact Assessment

DC4324-NR1v2

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Report Version Issue Log

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This report has been prepared by Dragonfly Consulting with all reasonable skill, care and diligence, and taking account of the manpower and resources devoted to it by agreement with the client.

Dragonfly Consulting disclaims any responsibility to the client and others in respect of any matters outside the agreed scope of the work.

Limitations to this Report

This report entails a physical investigation of the site with a sufficient number of sample measurements to provide quantitative information concerning the type and degree of noise affecting the site. The objectives of the investigation have been limited to establishing sources of noise material to carrying out an appropriate assessment.

The number and duration of noise measurements have been chosen to give reasonably representative information on the environment within the agreed time, and the locations of measurements have been restricted to the areas unoccupied by building(s) that are easily accessible without undue risk to our staff.

As with any sampling, the number of sampling points and the methods of sampling and testing cannot preclude the existence of “hotspots” where noise levels may be significantly higher than those actually measured due to previously unknown or unrecognised noise emitters. Furthermore, noise sources may be intermittent or fluctuate in intensity and consequently may not be present or may not be present in full intensity for some or all of the survey duration.

CONTENTS

List of Appendices

1.0 INTRODUCTION

1.1 Details of Instruction

Northminster Land Ltd has appointed Dragonfly Consulting to carry out an noise impact assessment in relation to an outline planning application for the proposed mixed-use development at Land South of Riccal Drive, Helmsley.

The noise assessment has been conducted with reference to the National Planning Policy Framework and the appropriate British Standards, recognised guidance and reference documents relevant to this site.

This report describes a noise survey of the site and the subsequent analysis to determine the noise environment of the proposed development. It then compares the results with the adopted criteria and, where applicable, recommendations are made with respect to the design of the development.

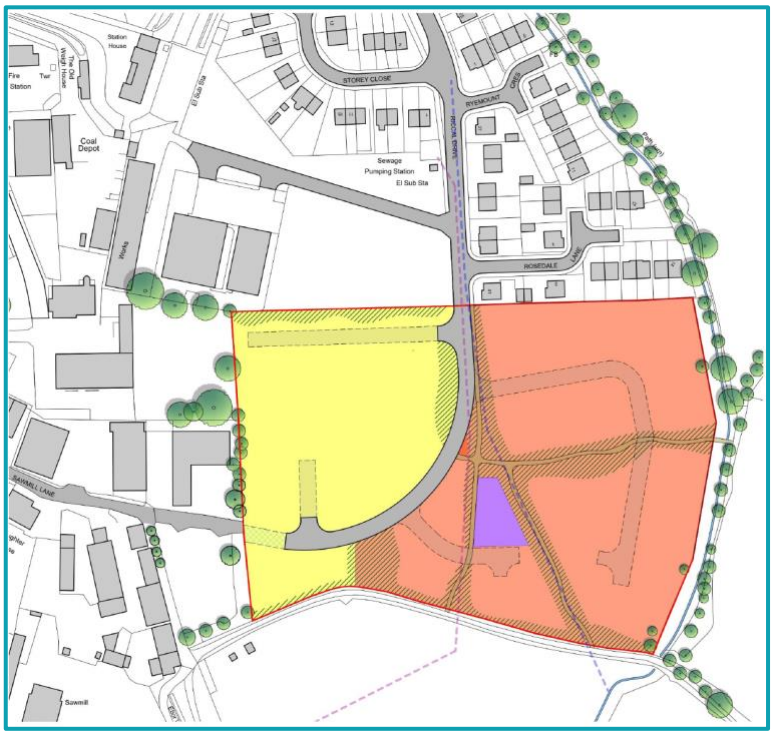
To support this document a glossary of technical terminology is included in Appendix A.

1.2 Site Conditions

The development site is situated on pasture land to the south of Riccal Drive in Helmsley, with its surroundings defined by a new residential development to the north along Riccal Drive, arable farmland to the east and south, and commercial premises to the west.

It is proposed that the site will be developed for both employment and residential purposes. Figure 1.1 below shows the proposed general arrangement of the site. The orange section defines the residential use and the yellow defines the area proposed for employment use.

Figure 1.1
Proposed Site Location



2.0 GUIDANCE

2.1 National Policy

2.1.1 National Planning Policy Framework

The National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and how these are expected to be applied. At the heart of the NPPF is a presumption in favour of sustainable development. It requires Local Plans to be consistent with the principles and policies set out in the NPPF with the objective of contributing to the achievement of sustainable development.

The NPPF states that the planning system has three overarching objectives in achieving sustainable development including a requirement to *"contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy."*

Paragraph 174 of the NPPF states:

"Planning policies and decisions should contribute to and enhance the natural and local environment by:

…

e) 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."

Additionally, Paragraph 185 of the NPPF 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…"

2.1.2 Noise Policy Statement for England

The 'Noise Policy Statement for England' (NPSE) sets out the following vision for ongoing noise policy:

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

This vision should be achieved through the following Noise Policy 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; and*
- *where possible, contribute to the improvement of health and quality of life."*

To achieve this vision, the Noise Policy Statement sets 3 noise levels to be defined by the assessor:

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.

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur.

The Noise Policy Statement considers that noise levels above the SOAEL would be seen to have, by definition, significant adverse effects and would be considered unacceptable. Where the assessed noise levels fall between the LOAEL and the SOAEL noise levels, the Policy Statement requires that:

"…all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development… This does not mean that such adverse effects cannot occur."

Where noise levels are below the LOAEL, it is considered there will be no adverse effect. Once noise levels are below the NOEL, there will be no observable change.

2.1.3 Planning Practice Guidance for Noise (NPPG)

With reference to the NPPF and NPSE above, further guidance is given within the Noise Exposure Hierarchy Table forming part of the Planning Practice Guidance for Noise:

Table 2.1
Noise Exposure Hierarchy Table – Planning Practice Guidance for Noise

Response	Examples of outcomes	Increasing effect level	Action
No Observed Effect Level			
Not present	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

With respect to addressing potential conflict between new residential development and existing businesses in the immediate area, the NPPG states the following:

"Development proposed in the vicinity of existing businesses, community facilities or other activities may need to put suitable mitigation measures in place to avoid those activities having a significant adverse effect on residents or users of the proposed scheme.

In these circumstances the applicant (or 'agent of change') will need to clearly identify the effects of existing businesses that may cause a nuisance (including noise, but also dust, odours, vibration and other sources of pollution) and the likelihood that they could have a significant adverse effect on new residents/users. In doing so, the agent of change will need to take into account not only the current

activities that may cause a nuisance, but also those activities that businesses or other facilities are permitted to carry out, even if they are not occurring at the time of the application being made.

The agent of change will also need to define clearly the mitigation being proposed to address any potential significant adverse effects that are identified. Adopting this approach may not prevent all complaints from the new residents/users about noise or other effects, but can help to achieve a satisfactory living or working environment, and help to mitigate the risk of a statutory nuisance being found if the new development is used as designed (for example, keeping windows closed and using alternative ventilation systems when the noise or other effects are occurring).”

2.2 Local Planning Policy

2.2.1 Local Plan

The NPPF guides that Local Authorities should maintain a ‘Local Plan’. In creating their plan, the NPPF guides that local planning policies should “*avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development*”.

The Ryedale Local Plan Strategy 2013 sets out a number of Core Policies with respect to development within the local area. Policy SP20 relates to residential amenity as follows:

“*New development will not have a material adverse impact on the amenity of present or future occupants, the users or occupants of neighbouring land and buildings or the wider community by virtue of its design, use, location and proximity to neighbouring land uses. Impacts on amenity can include, for example, noise, dust, odour, light flicker, loss of privacy or natural daylight or be an overbearing presence.*

Developers will be expected to apply the highest standards outlined in the World Health Organisation, British Standards and wider international and national standards relating to noise”.

However, it is noted that there is no guidance on the quantitative assessment of noise reflected within the Local Plan.

It is the understanding of Dragonfly Consulting that Ryedale District Council (RDC) have no published qualitative or quantitative guidance or policy relating to noise other than that detailed above.

2.2.2 Consultation with Local Authority

The Environmental Health Officer at North Yorkshire Council (NYC) responded to the consultation initiated by the NYC planning officer concerning noise matters at this site via email as follows:

“*As previously discussed with you all new housing developments will have to comply with our local plan policy SP20 which in respect of noise requires the ‘highest standards of the World Health Organisation, British Standards…etc’ interpreted successfully for continuous anonymous noise on appeal decision to be*

- *30dBA inside night-time with no more that 10-15 L_{Amax} events above 45dB at night,*
- *an external amenity value of no more than 50dBA daytime,*
- *35dBA daytime inside,*

all to be provide with windows open and without reliance on mechanical ventilation to demonstrate sufficient ventilation (ever more important now with reference to overheating requirements within building regulations).

Industrial and/or commercial noise should be assessed (based on BS4142;20140 separately to determine if

a) existing levels are too high for residential development,

b) the contribution from new commercial/industrial use will result in increase in background levels for existing or new residential occupiers, and

c) whether the presence of new residential would jeopardise the viability of existing industrial/commercial uses by reason of proximity and the likelihood of complaints (agent of change)

An assessment of the contribution to the proposed noise climate shall be made for the road system, and traffic noise.

An initial noise risk assessment would undoubtedly reveal the need for further noise investigation and an acoustic design statement (as promoted in ProPG) which will describe from an acoustic viewpoint that design, orientation, access and layout have been optimised from an acoustic standpoint".

2.2.3 Review of Consultation with Local Authority

The pre-application informal guidance received from NYC indicates that the requirements of Policy SP20 must be met assuming that for residential dwellings "*windows open and without reliance on mechanical ventilation to demonstrate sufficient ventilation*.

It is noted that within the guidance referenced by Policy SP20, the noise levels identified as providing acceptable (highest) levels of amenity within residential dwellings, are identified simply as acceptable noise levels within dwellings. The mitigation used to achieve those values dose not contribute to the assessment of the 'quality' of the level of amenity achieved.

The use of British Standard (BS) 8233:2014 and the guidance set out in ProPG: *Planning and Noise* is universally accepted within the acoustics industry as representing best practice in consideration of noise impacts as they may apply to residential dwellings, with reference also made to the assessment methodologies set out in BS 4142:2014+A1:2019 where the noise sources to be assessed include significant and dominant commercial and industrial noise sources.

In this regard, the informal guidance provided by North Yorkshire Council as to the highest standards of amenity to be achieved is entirely consistent with recognised good practice.

However, the request that this highest standard of amenity be achieved assuming that windows to habitable rooms are assumed to be open is a significant departure from that universally accepted guidance, both nationally and in regard to other areas in North Yorkshire outside the former Ryedale District area.

With regards to the BS 8233:2014, Paragraph 5.2.1 recognises that context is an important consideration in determining the need for and extent of any noise control measures in a new scheme.

Whilst this can relate to uses that may only operate at certain times of the day, or change their operations, it also recognises that buildings might not necessarily be occupied when the outside environment is noisy (which is a point which that should be applied to the use of a first-floor bedroom during the daytime). Furthermore, Paragraph 7.7.2 and Table 4 of the standard also set out the target internal noise levels to be achieved within dwellings, and there are a few important points to make about this guidance which include:

- The BS 8233:2014 accepts that these are guidelines and desirable values to be achieved and are not an absolute requirement above which a scheme should be classed as unacceptable.
- It recognises, at NOTE 5 of Table 4, that the use of closed windows can be an appropriate method of achieving target levels provided appropriate means of ventilation is provided.
- It accepts, at NOTE 7 of Table 4, that a relaxation of up to 5dB of the levels will still achieve reasonable internal conditions for occupiers, where it is desirable or necessary to have a development come forward.

It is further noted that the ProPG (Note 5 Figure 2) identifies that the same standard of amenity can be achieved with windows open, or windows closed, providing sufficient consideration is made of overheating risk and sufficient alternative means of ventilation provided to offset ventilation not being provided via open windows.

Significant regard must also be paid to the Planning Practice Guidance (PPG). The guidance presented in the PPG identifies a number of factors to be considered when determining whether noise could be a concern and highlights that the absolute level of the noise, together with the times of day that it occurs, as being one specific example. In this context, Paragraph 007 makes it clear that Local Planning Authorities (LPA's) should avoid applying specific noise standards rigidly to allow for specific circumstances to be taken into account in decision making. Furthermore, Paragraph 011 states that noise impacts can be partially offset if residents have access to a relatively quiet façade (containing windows to habitable rooms) as part of their dwelling. Finally, the PPG also explains that types and level of noise will have a greater impact at night, particularly when people are more likely to be trying to sleep, which is a key consideration in respect of this scheme.

Considering the weight of national guidance on the topic, and in particular the status of that guidance with the PPG and ProPG that are both endorsed by the Secretary of State as best practice for consideration of noise impacts in the planning context, it must be concluded that the informal guidance on the interpretation of Policy SP20 is in conflict with national policy and guidance.

The informal guidance also suggests that of the lack of conformity of Policy SP20 with national policy and guidance is one that is universal and supported by appeal decisions. However, a review of planning applications which have been approved by the former Ryedale District Council, in the period the current Local Plan has been in force, indicates that this interpretation of Policy SP20 is not one that is universally applied.

The following recent planning approvals, all of which were approved by planning committee or under delegated powers have been identified as being sites where Policy SP20 has been interpreted and applied to residential developments using a mix of windows open and windows closed strategies:

1. 12 No. dwellings on land east of Outgang Lane, Pickering (Ref: 19/00796/MFUL)
2. 87 dwellings at The Showfield, pasture Lane, Malton (Ref: 18/00305/REM)

3. 56 dwellings on land at Rainbow Lane, Malton (Ref: 17/01509/MREM)
4. 260 dwellings at Westfields, Kirbymoorside (Ref: 17/01449/MREM)
5. 4 dwellings at Commercial Street, Norton (Ref: 22/01368/FUL)
6. 336 dwellings on land off Crossgate Lane, Pickering (Ref: 14/00976/MREM)

On the schemes identified in 1-5 above, specific noise impact assessments were submitted to support the planning applications. In all of the noise assessments submitted, it was identified that noise levels could not be achieved in at least some habitable rooms without consideration of the sound insulation provided by the building façade with windows closed. This was clearly set out to the Local Authority and in each instance the application was approved and the approval notes that the scheme is in compliance with Policy SP20 of Local Plan.

It is noted that with respect to the most recent approval at Commercial Street, Norton, Condition 5 states as follows:

"*Prior to the commencement of the above ground works associated with the development hereby approved, a comprehensive Noise Mitigation and Ventilation Scheme, to include full details and specifications of the proposed Mechanical Ventilation Heat Recovery (MVHR) system and with any associated external plant/machinery to be installed, together with full glazing specifications for all windows (including roof lights) shall be submitted to and approved in writing by the Local Planning Authority to secure appropriate noise mitigation and ventilation within the 4no. 1 bedroom apartments hereby approved*

The scheme shall detail the means to achieve resistance to both, airborne and impact sound with a view to achieving noise levels in all habitable rooms as recommended with BS8233:2014 Guidance on sound insulation and noise reduction for buildings. The scheme shall provide details of noise levels that are to be achieved in all habitable rooms.

Thereafter the development shall be undertaken in accordance with the approved scheme and thereafter maintained.

Reason: To ensure a satisfactory level of residential amenity to satisfy the requirements of Policies SP16 and SP20 of the Ryedale Plan - Local Plan Strategy.

Informative: Mechanical ventilation may not be required on every window serving the new development (i.e. the stairwell window.)

Informative: To ensure good air quality from nearby traffic pollution it is recommended that air intake is from the 'cleanest' façade of the development or shall include suitable means of means of filtration.

Informative: The scheme shall be designed to meet current building regulations with respect to the provision of background ventilation and purge ventilation."

The condition specifically requires the implementation of a mechanical ventilation scheme to ensure that windows do not need to be opened for ventilation such that windows can be considered as closed for noise control purposes. The noted reason for the Condition is that it is required to ensure compliance with Policy SP20.

Given the above, it is concluded that providing best practice is followed by following good acoustic design principles, with particular reference to those measures as set out by the ProPG: *Planning and Noise*. Policy SP20, as interpreted North Yorkshire Council (NYC) and its predecessor Ryedale District Council (RDC), does not require that amenity standards be achieved in all instances with windows open. The indication within the pre-application guidance as supplied for this site appears to be a personal opinion as to how Policy SP20 should be applied rather than an NYC policy position and one that does not reflect national best practice or NYC policy.

Therefore, this assessment defers to the guidance detailed in the NPPF, PPG, ProPG and the Noise Policy Statement for England for guidance on assessment of acceptable impact in terms of noise. In addition to this, the assessment considers site suitability for residential development with reference to a number of British Standards, and in particular with reference to the nationally accepted guidance documents detailed above.

2.3 British Standards and Guidance Documents

2.4 ProPG: Planning and Noise

The document 'ProPG: Planning & Noise – *Professional Practice Guidance on Planning & Noise*' provides advice for Local Planning Authorities, developers and their respective advisors and compliments government planning, noise policy and guidance. The document seeks 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 around new residential developments;
- Outline what should be taken into account in deciding planning applications for new noise sensitive developments;
- Improve understanding of how to determine the extent of potential noise impact and effect;
- Assist in the delivery of sustainable development.

Following the guidance in Paragraph 17 of the NPPF, planning should always seek to secure high quality design and a good standard of amenity for all existing and future occupants of land and buildings. ProPG describes an acoustic design process which seeks to deliver the best acoustic outcome for the site.

2.4.1 Good Acoustic Design Objectives

With reference to the guidance set out within the ProPG, the following design objectives have been set out for this site:

7. Full consideration of the acoustic environment from the earliest possible stage of the development process.
8. An integrated approach should be taken to achieve optimal acoustic conditions, both internally (inside noise sensitive parts of the building) and externally (in spaces to be used for amenity purposes.

9. The basis of good acoustic design should avoid 'unreasonable' acoustic conditions and prevent 'unacceptable' acoustic conditions as defined by the ProPG. Necessary design compromises should ideally not adversely affect living conditions and the quality of life of inhabitants.

10. Using fixed unopenable glazing for sound insulation purposes is generally unsatisfactory and should be avoided.

11. Solely relying on sound insulation of the building envelope to achieve acceptable acoustic conditions in new residential development, when other methods could reduce the need for this approach, is not regarded as good acoustic design.

12. Evidence should be provided that good acoustic design processes have been followed.

The ProPG empowers the assessing acoustician to assess the acceptability of any noise impact and to establish the need for acoustic mitigation measures by considering the guidance detailed in British Standard (BS) 8233:2014 whilst also giving consideration to the context of the site, along with other non-acoustic factors that may affect the need to bring forward a site that is not acoustically ideal.

However, in determining what acoustic conditions would be 'unreasonable' and 'unacceptable' the ProPG also sets out the following guidance:

"The more often internal L_{Aeq} levels start to exceed the internal L_{Aeq} target levels by more than 5dB, the more that most people are likely to regard them as "unreasonable". Where such exceedances are predicted, applicants should be required to show how the relevant number of rooms affected has been kept to a minimum. Once internal L_{Aeq} levels exceed the target levels by more than 10 dB, they are highly likely to be regarded as "unacceptable" by most people, particularly if such levels occur more than occasionally. Every effort should be made to avoid relevant rooms experiencing "unacceptable" noise levels at all and where such levels are likely to occur frequently, the development should be prevented in its proposed form."

2.4.2 Approved Document F1 – Means of Ventilation

Whilst not directly related to the acoustic performance and the noise impact assessment covered within this report, Table 1.7 of Approved Document F1 provides the following guidance with respect to minimum passive ventilator space installed within the external façade of spaces:

Table 2.2
Minimum Passive Ventilator Space within External Facades

Room	Minimum equivalent area of background ventilators for dwellings with multiple floors	Minimum equivalent area of background ventilators for single-storey dwellings
Habitable rooms	8000mm^2	10,000mm^2
Kitchen	8000mm^2	10,000mm^2
Utility room	No minimum	No minimum
Bathroom	4000mm^2	4000mm^2
Sanitary accommodation	No minimum	No minimum

2.4.3 ANC Green Book: Environmental Noise Measurement Guide

The ANC Green Book provides practical guidance around the measurement and analysis of environmental sound. Areas which are covered include the preparation, execution and reporting of site survey work. It also outlines a number of industry standard practices for the determination of L_{Amax} as a design case.

2.4.4 British Standard (BS) 7445:2003 Parts 1 and 2 – Description and Measurement of Environmental Noise

The assessment of noise impact for this development has been undertaken by measuring external noise levels in accordance with the guidance detailed in BS 7445-1:2003 *Description and Measurement of Environmental Noise – Part 1: Guide to Quantities and Procedures*.

This document defines the basic quantities to be used for the description of noise in community environments and describes basic procedures for the determination of these quantities.

The methods and procedures described in this British Standard are intended to be applicable to sounds from all sources, individually and in combination, which contribute to the total noise at a site. This British Standard does not specify limit environmental noise.

2.4.5 BS 8233:2014 – Guidance on Sound Insulation and Noise Reduction in Buildings

BS 8233:2014 provides a methodology to calculate the noise levels entering a building through façades and façade elements. It also provides details of appropriate measures for sound insulation between dwellings and recommended internal noise levels which are provided for a variety of situations.

2.4.6 BS 4142:2014+A1:2019 - Method for rating and assessing industrial and commercial sound

BS 4142 describes methods for rating and assessing sound of an industrial and/or commercial nature. The methods use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident.

2.4.7 ISO 9613 Attenuation of Sound during Propagation Outdoors

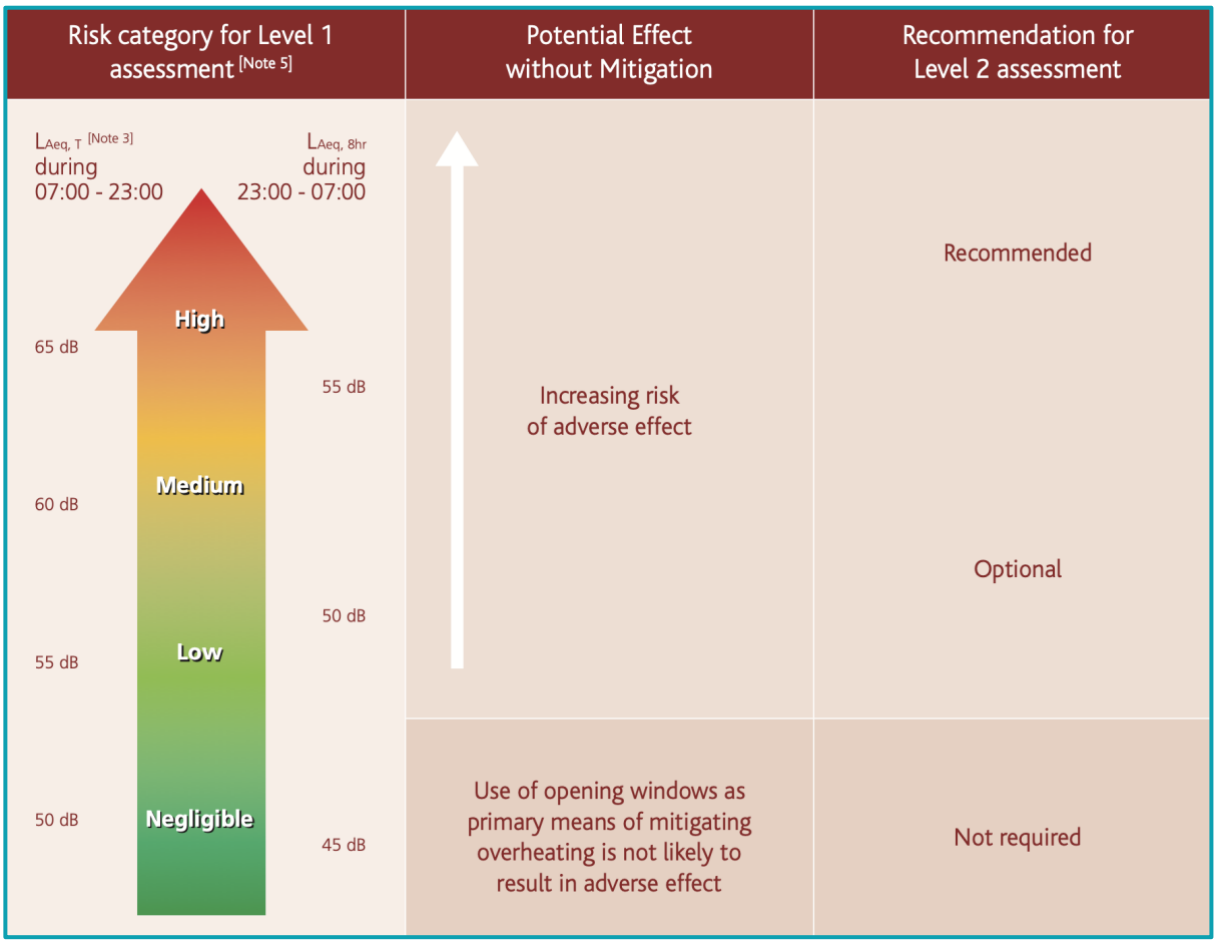
IS0 9613 presents a calculation methodology for the determination of the attenuation of sound outdoors. The methodology enables the prediction the levels of environmental noise at a distance from a variety of sources.

2.4.8 Acoustics Ventilation and Overheating Residential Design Guide (AVO)

The Association of Noise Consultants (ANC) and the Institute of Acoustics (IOA) have published a document which provides guidance on making an assessment of overheating risk associated with a specific acoustic strategy. The guidance offers a two-level approach to address issues of overheating with respect to internal noise levels.

A level 1 AVO assessment identifies the potential risk of overheating based on the existing external noise levels at a proposed development site, whilst relying on an open window scenario to provide sufficient ventilation. The results of the level 1 assessment (Recommended, Optional or Not Required) will determine if a level 2 AVO assessment is required/recommended. Table 3-2 within the document provides guidance for a level 1 site risk assessment relating to overheating conditions. This is shown in Figure 2.1 below.

Figure 2.1
Guidance for a Level 1 AVO Risk Assessment



3.0 INITIAL SITE NOISE RISK ASSESSMENT

It is noted that this risk assessment has been completed after submission of an application, but it has been completed to provide an initial appraisal of noise risks on the site to inform the necessity for any further Noise Impact Assessment and to inform site design and layout.

The noise risk assessment should provide an indication of the likely risk of adverse effects from noise were no subsequent mitigation to be included as part of the development proposal. It should indicate whether the proposed site is considered a:

- Negligible Risk;
- Low Risk;
- Medium Risk; or
- High Risk.

The risk assessment should not include the impact of any new additional mitigation measures that may subsequently be included in development proposals for the site and proposed as part of the subsequent planning application. Put simply, the risk assessment should **include** the acoustic effect of any existing site features that will remain (e.g. retained buildings, changes in ground level) and **exclude** the acoustic effect of any site features that will not remain (e.g. buildings to be demolished and barrier to be removed).

The noise risk assessment may be based on measurement or prediction (or a combination) as appropriate and should aim to describe levels over a 'typical worst-case' 24-hour day either now or in the foreseeable future.

Figure 1 of the document, reproduced in Figure 3.1 overleaf, summarises the site noise risk assessment whilst giving indicative noise level figures. These figures are intended to provide a sense of the noise challenge at a potential residential development site and should be interpreted flexibly having regard to the locality, the project and the wider context.

Figure 3.1
Stage 1 – Initial Site Noise Risk Assessment

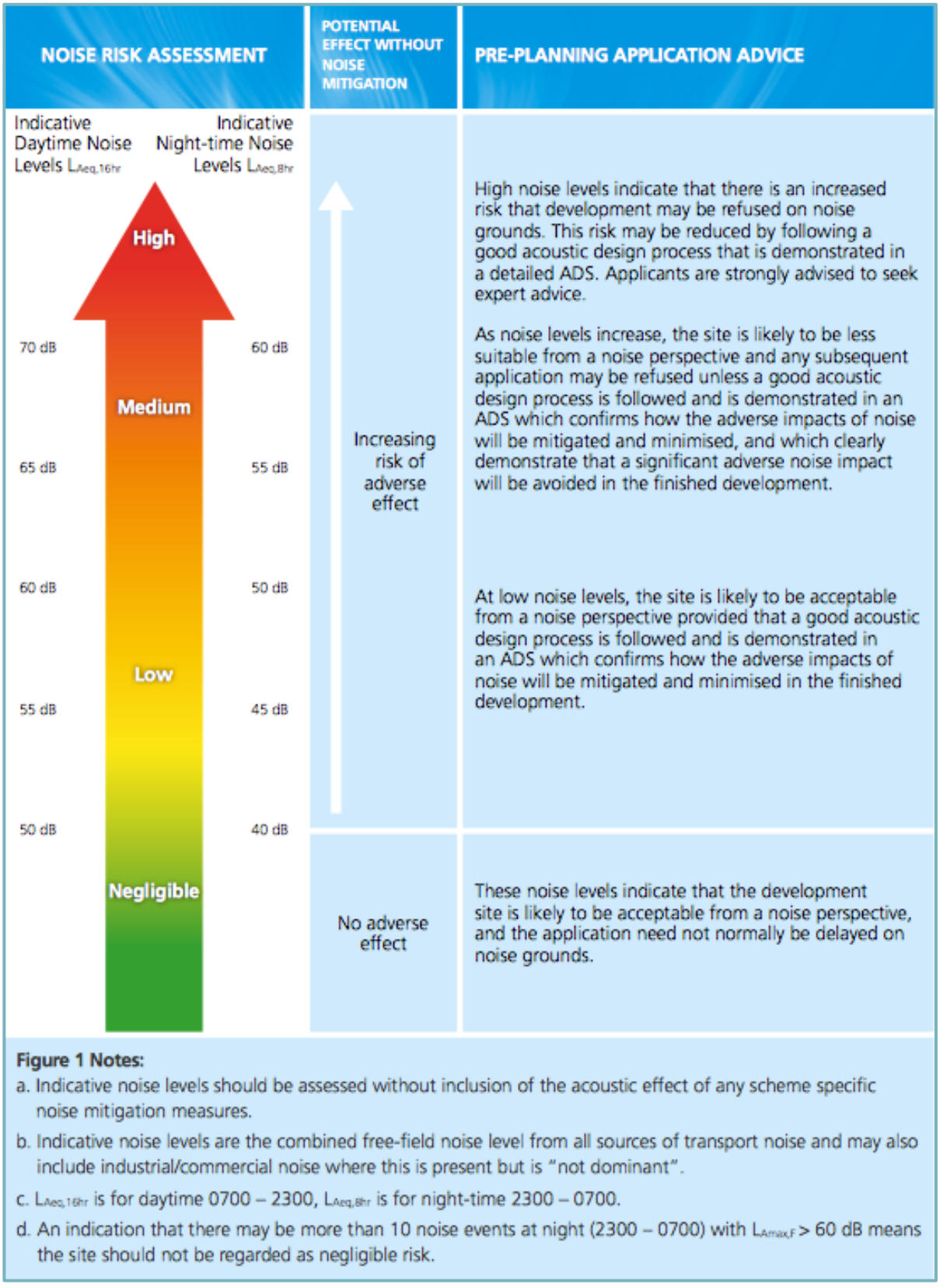


Figure 1 Notes:

a. Indicative noise levels should be assessed without inclusion of the acoustic effect of any scheme specific noise mitigation measures.

b. 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".

c. $L_{Aeq,16hr}$ is for daytime 0700 – 2300, $L_{Aeq,8hr}$ is for night-time 2300 – 0700.

d. An indication that there may be more than 10 noise events at night (2300 – 0700) with L_{AmaxF} > 60 dB means the site should not be regarded as negligible risk.

3.1 Summary of Baseline Evidence – Desk Study

Table 3.1
Sources Checklist

Sources	Yes	No
Site Visit		✓
Information from Client	✓	
Ordnance Survey Map	✓	
Aerial photography	✓	
Other (specify)	LiDAR DTM	

Using aerial photography, it is considered that the main noise source likely to impact upon the proposed site will be noise from road traffic along the A170 to the north of the development site, along with local road traffic. In addition, noise generated by operations at the commercial premises off Station Road and Sawmill Lane should be considered in determining the noise impact on the site.

The nearest residential properties are considered to be immediately adjacent to the entrance to the site off Riccal Drive.

Table 3.2
Constraints Sites Checklist

Noise Source	Present	Comments
Road traffic	✓	Road traffic noise from the A70 to the north
Overhead aircraft		It is not considered that the site sits under a regular flight path
Train pass-by and train horns		None locally
Commercial premises	✓	A mix of light industrial and commercial premises off Station Road and Sawmill Lane to the west.
Fixed plant		None noted in the immediate vicinity of the site
School		There are no schools in the immediate vicinity of the site.
Farm activities		There are no farms in the immediate vicinity of the site.
Emergency sirens		The site is not in proximity to any emergency service depots

3.2 Risk Assessment

3.2.1 Probability

Noise impact of development on existing sensitive receptors – Medium

The development has the potential to introduce noise from commercial activities within the employment element of the site. This may result in a noise impact on the existing residential properties on Riccal Drive, although any noise impact is likely to be higher for the proposed residential portion of the site.

Noise levels impacting on the site – Medium

The noise survey identified road traffic from the A170 to be the dominant noise source due to the high volume of vehicles. Noise impacts from existing commercial activities near to the site will require consideration but are unlikely to present a risk to the viability of the development.

3.3 Potential Impact

Noise impact of development on existing sensitive receptors – Low to medium

Based on current information, noise levels during construction may impact on existing receptors and therefore impact upon project management, cost or programme.

However, it should be noted such noise levels would be impermanent in nature and would likely be appropriately dealt with through a suitable Construction Management Plan (CMP).

Therefore, the magnitude of impact is considered to be low.

Noise levels generated by the commercial portion of the development may impact on existing receptors and therefore impact upon the design or project cost.

Based on the noise risk assessment matrix detailed in Figure 1 of the ProPG, taking account of the measured noise levels and the context of the site, it is considered that this site is subject to noise that generates a medium risk of an adverse effect.

Noise levels impacting on the site – Low to medium

The ambient daytime noise levels for the adjacent site on Riccal Drive were circa 44dB during the day and 39dB(A) at night.

Based on the noise risk assessment matrix detailed in Figure 1 of the ProPG, taking account of the measured noise levels and the context of the site, it is considered that this site is subject to noise that generates a low to medium to high risk of an adverse effect.

It is not expected that noise will be a barrier to the development of a site considered as low to medium risk.

3.4 Recommended Further Action

Based on the results of the risk assessment, a full noise impact assessment is recommended for this site.

As the proposed application is outline only, no guidance on viability of a detailed proposed site layout can be provided based on the outcomes of the noise risk assessment. This would be dealt with at the reserved matters stage of the planning application.

4.0 NOISE IMPACT ASSESSMENT METHODOLGY

4.1 Potential Sources of Environmental Noise

The following sources of noise are considered in the context this site:

Table 4.1
Assessment Methodology

Assessment Type	Relevant Assessment Methodology
Amenity on Potential Occupants	BS 8233:2014
Commercial and Industrial Noise	BS 4142:2014+A1:2019

4.2 Selection of Noise Criteria

With reference to the guidance detailed in Section 2, the following criteria have been selected to determine the threshold of effect levels in the context of the National Planning Policy Framework and Noise Policy Statement for England.

Table 4.2
Assessment Criteria: BS 8233:2014

Effect Level	Criteria	Justification
Lowest Observed Adverse Effect Level (LOAEL)	Internal Noise Levels at adjacent sensitive receptor locations below 35 dB $L_{Aeq, 16hr}$ / 30 dB $L_{Aeq, 8hr}$ / 45 dB L_{AfMax}	Noise Levels within BS 8233:2014 target criteria.
Significant Observed Adverse Effect Level (SOAEL)	Internal Noise Levels at adjacent sensitive receptor locations exceed 40 dB $L_{Aeq, 16hr}$ / 35 dB $L_{Aeq, 8hr}$ / 50 dB L_{AfMax}	None – Planning guidance requires that impacts must be reduced below the SOAEL though mitigation, with adverse impacts above the Lowest Observable Adverse Impact Level (LOAEL) but below the SOAEL being mitigated as far as is reasonable.

Table 4.3
Assessment Criteria: BS 4142:2014+A1:2019

Effect Level	Criteria	Justification
Lowest Observed Adverse Effect Level (LOAEL)	Free-field external noise levels at adjacent sensitive receptor locations within +5 dB of representative background noise level	Noise levels + 5 dB above background are considered an indication of where adverse noise impacts may occur in the context of BS 4142. Noise levels below this level are an indication that it is less likely that the specific sound source will have an adverse impact
Significant Observed Adverse Effect Level (SOAEL)	Free-field external noise levels at receptor above +10 dB of representative background noise level	None – Planning guidance requires that impacts must be reduced below the SOAEL though mitigation, with adverse impacts above the Lowest Observable Adverse Impact Level (LOAEL) but below the SOAEL being mitigated as far as is reasonable.

5.0 ENVIRONMENTAL NOISE SURVEY

External daytime and night-time measurements were undertaken from the 24th to the 26th of July 2023. The noise measurements established typical ambient and background noise levels at the site.

5.1 Survey Methodology

The equipment used during the survey is detailed in Appendix B. The sound level meters were calibrated before and after the measurements and no significant calibration drifts were found to have occurred (>0.2dB). All of the noise monitoring equipment had been calibrated to a traceable standard within the twenty-four months preceding the survey. Calibration certificates are available on request.

Three measurement locations were surveyed in order to establish the typical ambient and background noise levels at the proposed development site. The measurement locations are hereby referred to in this report as follows:

- 'Location 1' – sound level meter positioned approximately 1.5m from the ground in the northeast corner of the development site (Grid Ref: 462097, 483466);
- 'Location 2' – sound level meter positioned approximately 1.5m from the ground in the northwest corner of the site adjacent to the industrial/commercial units to the west (Grid Ref: 461885, 483460);
- 'Location 3' – sound level meter positioned approximately 1.5m from the ground along the southern boundary with the site at the edge of the proposed residential area (Grid Ref: 461940, 483340).

The measurement locations are shown in Appendix C.

5.2 Survey Results

The weather during the unattended survey was suitable for the noise measurements, it being dry with low wind speeds. A short period of rainfall was excluded from the survey data as this coincided with equipment set up.

In addition, the following periods have been excluded from the data for Location 2. During both excluded periods the measurement was directly affected by birdsong, in close proximity to the measurement location, confirmed by review of the audio data:

- 25/07/23 – 0500hr-0530hr
- 25/07/23 – 0600hr-0630hr
- 26/07/23 – 0500hr-0545hr
- 26/07/23 – 0615 hr-0700hr

Summaries of the measured noise levels, following the exclusion of the above detailed periods, are given in Tables 5.1 overleaf. Full survey results are available on request.

Table 5.1
Summary of Measured Noise Levels – 24/07/23 to 26/07/23 – dB

Location	Date	Period	Time (h)	$L_{Aeq, T}$	L_{A10}	L_{A90}	L_{AFMax}
1	24/07/23	Daytime	1130h-2300h	42.1	41.5	33.7	77.3
	24/07/23-25/07/23	Night-time	2300h-0700h	36.2	33.5	25.4	64.9
	25/07/23	Daytime	0700h-2300h	44.7	42.3	33.3	76.9
	25/07/23-26/07/23	Night-time	2300h-0700h	36.1	36.2	27.9	49.2
	26/07/23	Daytime	0700h-1430h	45.9	46.2	38.6	80.9
2	24/07/23	Daytime	1130h-2300h	44.6	44.4	36.1	68.9
	24/07/23-25/07/23	Night-time	2300h-0700h	34.3	35.1	27.7	80.2
	25/07/23	Daytime	0700h-2300h	45.6	43.5	34.5	80.0
	25/07/23-26/07/23	Night-time	2300h-0700h	34.5	36.8	29.7	69.0
	26/07/23	Daytime	0700h-1430h	47.7	47.6	39.3	79.9
3	24/07/23	Daytime	1130h-2300h	42.1	42.0	35.0	67.7
	24/07/23-25/07/23	Night-time	2300h-0700h	34.1	32.2	24.4	68.2
	25/07/23	Daytime	0700h-2300h	44.1	41.9	33.7	75.9
	25/07/23-26/07/23	Night-time	2300h-0700h	33.6	33.9	25.8	58.0
	26/07/23	Daytime	0700h-1345h	43.9	43.7	36.5	75.3

5.3 Observations and Comments

During the attended portions of the survey, the acoustic environment at all Locations consisted of road traffic noise from the A170 with a low amount of commercial noise from the industrial estate to the west.

For both the daytime and night-time assessments, it is considered that the levels measured are representative of the typical acoustic environments at the survey locations.

6.0 NOISE MODEL INPUT DATA

6.1 Data Sources

Modelling calculations for the noise impact of new traffic on the spine road have been undertaken based on the spatial settings and data sources identified in the Table below.

Table 6.1
Noise Model Input Data

Parameter	Scenario	Data Source	Assumptions
Site Plans	Existing	*OS Local Map Data*	Existing building heights modelled as 8.5m AGL (typical 2-storey building height)
	Proposed	*Site Strategy Diagrams Drawing No.: 419-(PL)02 Rev B (June 2022) mesh architects*	None
Ground Heights	All	Environment Agency Open Data LiDAR Digital Terrain Model (2.0m resolution)	None
Ground Absorption	Existing / Proposed	*n/a*	Mixed ground conditions on and off site (G=0.5), roads hard/ reflective (G=0)
Reflections	All	*n/a*	3rd order reflections have been accounted for within the noise model

With reference to the guidance within BS 8233:2014, the ProPG and the *'ANC Green Book: Environmental Noise Measurement Guide'* (ANC, 2019), the predicted internal levels have been assessed against the following criteria:

- $L_{Aeq,16h}$ (Daytime) – internal levels must not exceed 35dB $L_{Aeq,16h}$;
- $L_{Aeq,8h}$ (Night-time) – internal levels must not exceed 30dB $L_{Aeq,8h}$;
- L_{AFMax} (Typical) – the 95th percentile of all 1min night-time L_{Amax} noise levels must not exceed 45dB L_{AFMax}.

With regard to the determination of the L_{Amax} design case, the ANC Green Book Notes:

> *"Only in the most extreme situations would it be appropriate to adopt the highest measured L_{Amax} value... as a descriptor of an appropriate design case. In most situations, an average, typical or modal value, specific to the time period in question, needs to be selected or derived from the survey data. The frequency of occurrence of specific L_{Amax} events is critical in determining their typicality (hence the importance of sample period selection during scoping) ... Some common approaches to selecting the Design Case L_{Amax}, for instance, include ranking events during an assessment period and selecting the nth value (NB sample period is critical), taking a 10th percentile 'high average' level or simply selecting an appropriate looking value 'by eye'."*

As can be seen above, the approach adopted within the assessment is more onerous than recommended within the ANC Green Book. By adopting the 95th percentile as the design case it is considered that the assessment presents a reasonable worst-case approach.

6.1.1 Assessment of Proposed Spine Road

Noise emissions from the proposed spine road have been modelled using data within the transport statement provided by Bryan G Hall Consulting Civil & Transport Planning Engineers. Table 6.2 below shows the number of vehicles travelling along the spine road during a peak hour.

Table 6.2
Spine Road Vehicle Movements – Peak Hour Vehicle Movements

Parameter	Input
No. of vehicles to Residential Area	28
No. of vehicles to Industrial Units	37

6.2 Uncertainty

6.2.1 Survey

Given the duration of the survey and the use of the highest measured daytime and night-night noise levels to ascertain noise propagation across the site, it is considered that the limits of Class 1 sound level meters are the only limiting factor when considering survey uncertainty.

Standard equipment uncertainties have been considered by applying allowable tolerances minus the maximum allowable test laboratory uncertainties given in IEC 61672-1, as defined by Narang and Bell (*Narang, P. and Bell, T., 2008. New IEC standards and periodic testing of sound level meters. Proceedings of the Internoise, Shanghai, China, pp.26-29*).

The following table provides an overview of standard equipment uncertainties relevant to the SLM class utilised within the survey.

Table 6.3
Standard uncertainties using allowable tolerances minus test laboratory tolerances given in IEC 61672-1 (source: Narang and Bell, Table 14)

SLM Class	Frequency Weighting	Directional Response	Level Linearity	Toneburst Response	Calibrator (IEC 61672)	Supply Voltage	Combined Standard Uncertainty +/- dB
Class 1	0.5	0.5	0.4	0.25	0.125	0.05	0.9

6.2.2 Modelling

CadnaA noise modelling software has been utilised to ascertain how noise propagates throughout the proposed development in relation to traffic on the spine road. The software directly incorporates the ISO 9613 calculation procedure which has an uncertainty rating of +/- 3dB. Design Calculations

Where design calculations have been utilised to determine the required performance of the glazing and ventilation strategy for the scheme, the method outlined within Annex G of BS 8233 (which is based on the BS EN 12354-3 calculation methodology) has been followed. The expected precision of this calculation methodology is quoted as +/- 2dB.

6.2.3 Combined Uncertainty

Based on the information provided above, the combined Root Sum Squared (RSS) uncertainty for the assessment has been calculated as +/- 3.9dB.

7.0 COMMERCIAL NOISE IMPACT ASSESSMENT – PROPOSED COMMERCIAL

7.1 Commercial Noise Limits

Due to the nature of an outline assessment, there is no layout, building types, construction materials or end user details which can be used to formulate a meaningful prediction of noise emissions from the commercial uses. Therefore, to assess the impact of the proposed commercial/employment area a maximum limit has been set during both the daytime and night-time at the edge of the proposed residential area using the existing measured background levels at Location 3. The limits will be set at 5dB above the existing measured background levels in accordance with the assessment criteria identified in Section 4 above.

In accordance with the methodology detailed at Section 8 of BS 4142:2014+A1:2019, representative background noise levels have been determined through statistical analysis of all 15-minute samples and are expressed as integers (with 0.5 dB being rounded up).

The results of the statistical analysis of measured background noise levels at Location 3 are presented in a graphical format for both daytime and night-time, in Figures 7.1 and 7.2 below. The records highlighted in each figure denote the representative background levels used within this assessment.

Figure 7.1
Location 3 – Daytime Background (L_{A90}) Analysis

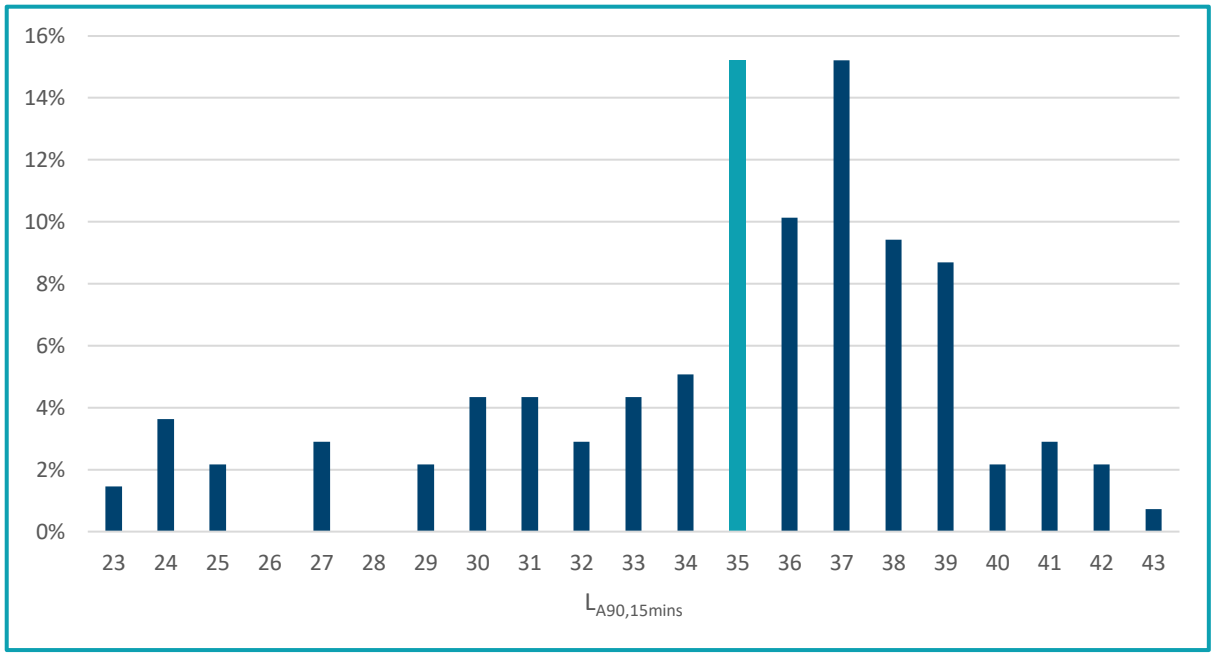
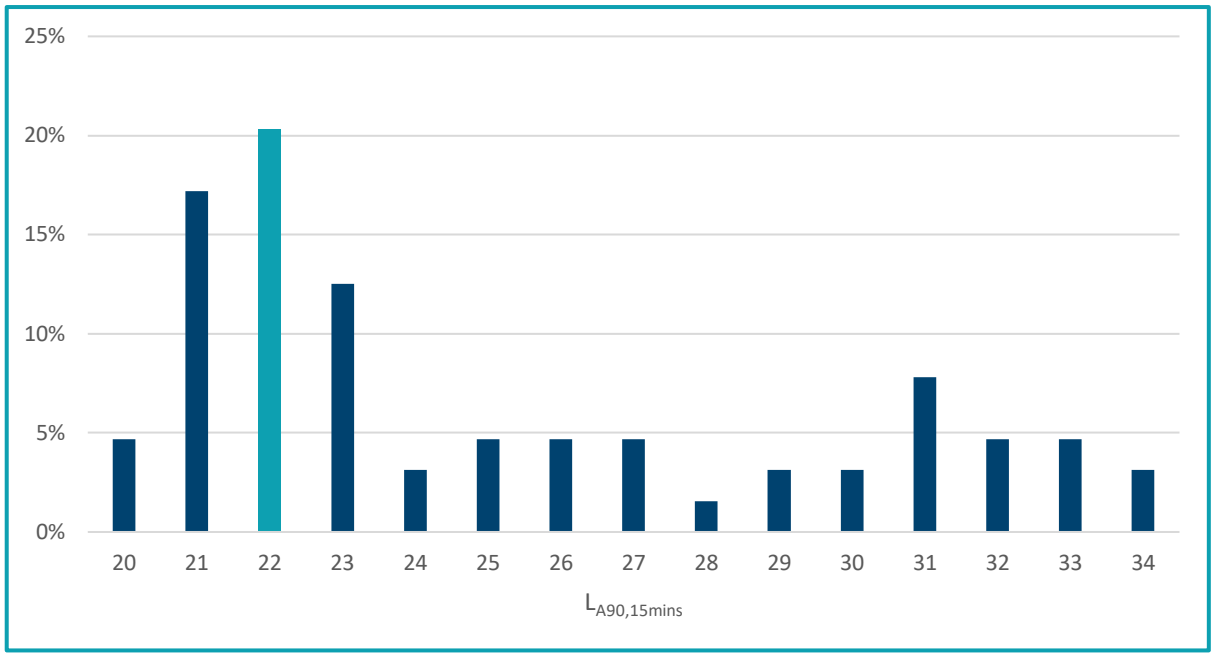


Figure 7.2
Location 3 – Night-time Background (L_{A90}) Analysis



Based upon the figures above, the limit on the maximum acceptable noise emissions from the commercial/employment area will be 40dBA $L_{Aeq, 1hr}$ during the daytime period (0700hr to 2300hr) and 27dBA $L_{Aeq, 15mins}$ during the night-time period (2300hr to 0700hr).

Compliance with this limit are to be achieved through the site layout, including through the use of appropriate noise mitigation in the form of boundary treatments where necessary, and through controls on the location of noise sources and hours of operation where appropriate.

Implementation of noise mitigation can be controlled through determination of the reserved matters and compliance with planning conditions where any noise controls are considered necessary and proportionate, in line with the requirements of the NPPG and NPPG.

Compliance with these noise limits would mean that the noise levels being produced by the proposed commercial area would be below the LOAEL for a future assessment.

8.0 RESIDENTIAL NOISE IMPACT ASSESSMENT

As the current application is at an outline stage, with no indicative site layout currently proposed, it is not possible to complete detailed noise intrusion predictions for residential dwellings. However, to provide confidence that the residential development is viable on this site in terms of noise impact, an assessment of noise impact on two example dwellings has been completed to demonstrate that satisfactory internal noise levels can be achieved, in line with the requirements of both local and national planning guidance.

Two example dwellings identified as Example Dwelling 1 (ED1) and Example Dwelling (ED2) have been assessed as being located at the following positions:

- ED1 – Survey Location 1 (Grid Ref: 462097, 483466)
- ED2 – Survey Location 2 (Grid Ref: 461885, 483460)

8.1 Predicted Internal Noise Levels – Open Windows

Internal noise ambient noise levels within all habitable rooms have been assessed with open windows. The account for the attenuation afforded by a partially open window, a nominal correction of 15dB has been applied in line with the guidance in NANR 116. The results of the assessment are presented in Table 8.1.

Table 8.1
Assessment of Noise Intrusion Levels – Open Windows (Natural Ventilation)

Ref	External Noise Level			Internal Noise Level		
	$L_{Aeq,16h}$	$L_{Aeq,8h}$	L_{AfMax}	$L_{Aeq,16h}$	$L_{Aeq,8h}$	L_{AfMax}
ED1	45.9	36.2	56.6	30.9	21.2	41.6
ED2	44.1	34.1	51.4	29.1	19.1	36.4

As shown in the table above, the attenuation afforded by a partially open window will be sufficient to meet BS 8233:2014 internal ambient noise level criteria and Dragonfly Consulting's recommended criteria for internal maximum levels for all facades. Therefore, the noise impact upon proposed residential dwellings from existing noise sources is predicted to be below the LOAEL.

8.2 Consideration of Existing Commercial Operations

When considering the impact of existing commercial operations, a comparison of the measured noise data at Location 2 (closest to the commercial properties) was made to that of Location 1 which was the furthest away from these operations.

This comparison showed little variation in noise levels between these locations was that the noise levels had a maximum of 1.9 dB difference night-time noise levels and 2.5dB during the night-time period. This provides a clear indication that the commercial activities are not dominant and do not have a significant bearing on noise levels across the site, with noise levels being controlled by traffic on the wider road network.

Furthermore, at these noise levels, assuming commercial noise was the dominant source, noise levels from commercial activities would be below 30dB(A) internally within properties during the day and below 20dB(A) at night. As commercial noise is not a dominant noise source across the site, it is not possible or appropriate to assess the noise levels measured at location to against the requirements of BS 4142:2014+A1:2019.

9.0 SPINE ROAD NOISE IMPACT ASSESSMENT

9.1 Assessment of Noise Impact from the Proposed Spine Road

At the request of North Yorkshire Council, ambient noise contributions from the proposed spine road have been assessed with windows open for four example NSRs along the eastern side of the spine road from north to south. This assessment is based on peak hour daytime vehicle movements.

To present a worst-case, a nominal reduction of 15dB has been applied to account for attenuation through a partially open window as detailed previously. The results of the assessment are presented in Table 9.1.

Table 9.1
BS 8233:2014 Assessment Levels at NSRs, (Daytime), dB

NSR	Floor	External Noise Levels $L_{Aeq,T}$	Internal Noise Levels $L_{Aeq,T}$	BS 8233:2014 Internal Target Criteria Daytime $L_{Aeq,T}$	Within BS 8233:2014 Criteria Y/N
1	GF	51.6	36.6	35	N
	FF	52.6	37.6		N
2	GF	51.2	36.2		N
	FF	52.2	37.2		N
3	GF	43.8	28.8		Y
	FF	44.9	29.9		Y
4	GF	45.9	30.9		Y
	FF	46.9	31.9		Y

As shown in Table 9.1 above, predicted noise contributions from the proposed spine road are above the BS 8233:2014 target internal noise criteria for the daytime (35 dB $L_{Aeq,T}$) for those properties that face directly on to the spine road. For those properties not directly facing the spine road it is expected that internal noise levels will be below 35 dB $L_{Aeq,T}$ regardless of layout.

Therefore, further mitigation would be needed to ensure that predicted internal noise levels fall below the identified criteria. As this is an outline application, it is not the appropriate stage to stipulate in detail what noise mitigation would be required. However, in line with national and local planning guidance and national guidance detailed in ProPG: *Planning and Noise* and BS 8233:2014, the most appropriate mitigation strategy would be to optimise the house layouts to minimise the number of habitable rooms to the front façade of the property facing the spine road and to use in façade noise mitigation in the form of a glazing and ventilation strategy when designing the dwellings.

Mitigation measures could come in the form of either a simple glazing and ventilation system such as a 4/12/4 double glazing and 'hit and miss' trickle vents. It is unlikely that a barrier would be appropriate in this context as properties facing on to the spine road will need to be accessed from the spine road.

It is noted that, in line with the requirements of Policy SP20 of the Local Plan and Part O of the Building Regulations, consideration of additional ventilation for comfort cooling may be required for facades where closed windows are utilised for noise mitigation, therefore an assessment in line with the AVO guidance has been completed overleaf.

9.2 Acoustics Ventilation and Overheating (AVO) Assessment

The risk of overheating within the NSRs has been considered in line with the guidance set out in the Acoustics Ventilation and Overheating Residential Design Guide (AVO), published by the Association of Noise Consultants (ANC) in January 2020.

In accordance with Table 3-2 within the AVO document (Figure 2.1, above), a level 1 risk assessment has been carried out to establish the potential risk of overheating when compared to the existing external noise levels at the development location.

Part O of the Building Regulations indicates that residents are likely to close their windows due to noise (during sleeping hours only) if the noise levels exceed:

- 40dB(A) $L_{Aeq,8hr}$ (2300h to 0700h);
- 55dB(A) L_{AFmax} more than 10 times per night between 2300h to 0700h.

Considering the guidance from Part O and the guidance provided by the AVO Residential Design Guide, and the results of the noise measurements carried out during the daytime and night-time period have been compared to the information within Table 3-2 of the AVO and are displayed in Table 9.2.

Table 9.2
Level 1 AVO Risk Assessment of Overheating

Ref	Period	External Noise Level $L_{Aeq,16h}$ $L_{Aeq,8h}$	Requirement for Level 2 Assessment	Risk of Overheating
NSR 1	Daytime $L_{Aeq,16h}$	51.6	Not Required	Negligible
NSR 2	Daytime $L_{Aeq,16h}$	51.2	Not Required	Negligible
NSR 3	Daytime $L_{Aeq,16h}$	43.8	Not Required	Negligible
NSR 4	Daytime $L_{Aeq,16h}$	45.9	Not Required	Negligible

The Level 1 assessment indicates that a Level 2 assessment is not required and in line with the AVO guidance "*Use of opening windows as a primary means of mitigating overheating is not likely to result in adverse effect*"

Please note, consideration for the requirements of Part F of the Building Regulations has been given to support the assessment of acoustic suitability only. Part F compliance should be determined through consultation with a qualified ventilation specialist.

10.0 RECOMMENDATION TO DECISION MAKERS

The noise impact assessment demonstrates that existing ambient noise levels will result in acceptable noise levels within dwellings when considered against the identified criteria.

It is therefore considered that the calculated internal noise levels are below the LOAEL set for this project. The LOAEL is defined as:

LOAEL – Lowest Observed Adverse Effect Level – Internal noise levels achieve the requirements of the BS 8233:2014 standard assuming windows are closed, subject to consideration of comfort cooling ventilation requirements.

As such, these levels are considered to be acceptable and meet the requirements of the NPPF and the Noise Policy Statement for England, as well as national and local planning guidance.

The ProPG recommends that the acoustician make one of the following recommendations to a decision maker when considering the suitability in noise terms of a site for residential development. The recommendations are as follows:

1. Planning consent may be granted without any need for noise conditions;
2. Planning consent may be granted subject to the inclusion of suitable noise conditions;
3. Planning consent should be refused on noise grounds in order to avoid significant adverse effects (“avoid”); or
4. Planning consent should be refused on noise grounds in order to prevent unacceptable adverse effects (“prevent”).

Based on the assessment of noise risk, the subsequent detailed noise impact assessment and taking account of the recommended mitigation measures, it is the recommendation of Dragonfly Consulting that:

“planning consent be granted subject to the inclusion of suitable noise conditions.”

10.1 Assertion of Competence

This assessment has been completed by Bailey Hoare, Acoustic Consultant with responsibilities for completing acoustic reports on behalf of Dragonfly Consulting.

I hold the Institute of Acoustic Diploma in Acoustics and Noise Control, a Master of Science in Conservation Science, with Honours, and a Bachelor of Science in Environmental Science, with Honours, from the University of Exeter. I am an Associate Member of the Institute of Acoustics.

11.0 CONCLUSIONS

Northminster Land Ltd has appointed Dragonfly Consulting to carry out an outline noise impact assessment for the proposed mixed-use development at Land South of Riccal Drive, Helmsley.

The noise assessment has been conducted with reference to the National Planning Policy Framework and the appropriate British Standards, recognised guidance and reference documents relevant to this site.

This report describes a noise survey of the site and the subsequent analysis to determine the noise environment of the proposed development. It then compares the results with the adopted criteria and, where applicable, recommendations are made with respect to the design of the development.

11.1 Residential Noise Assessment

This assessment shows that following the incorporation of a glazing and ventilation strategy for properties along the spine road, and with an open window strategy for the remaining part of the residential development, internal noise levels within habitable rooms are predicted to be compliant with the requirements of BS 8233:2014 and Dragonfly Consulting's recommended criteria for internal maximum levels with the windows closed an alternative source of suitable ventilation provided.

11.2 Commercial Noise Assessment

This assessment shows that the limit on the maximum acceptable noise emissions from the commercial/employment area will be 40dBA $L_{Aeq, 1hr}$ during the daytime period (0700hr to 2300hr) and 27dBA $L_{Aeq, 15mins}$ during the night-time period (2300hr to 0700hr).

Compliance with this limit would be achieved by consideration of the site layout, including through the use of appropriate noise mitigation in the form of boundary treatments where necessary, and through controls on the location of noise sources and hours of operation where appropriate.

Compliance with these noise limits would mean that the noise levels being produced by the proposed commercial area would be below the LOAEL for a future assessment.

11.3 Overall Conclusion

All assessed noise impacts are considered to be acceptable and meet the requirements of the NPPF and the Noise Policy Statement for England as well as national and local planning guidance.

Based on the assessment of noise risk, the subsequent detailed noise impact assessment and taking account of the recommended mitigation measures, it is the recommendation of Dragonfly Consulting that:

"planning consent be granted subject to the inclusion of suitable noise conditions."

Appendix A – Glossary of Terminology

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 0dB (the threshold of hearing) to over 120dB. An indication of the range of sound levels commonly found in the environment is given in the following table.

Table A-1
Sound Levels Commonly Found in the Environment

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

Acoustic Terminology

dB (decibel) The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure ($2x10^{-5}$ Pa).

dB(A) A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.

L_{Aeq} This is defined as the notional steady sound level which, over a stated period of time, would contain the same amount of acoustical energy as the A-weighted fluctuating sound measured over that period.

L_{10} & L_{90} If a non-steady noise is to be described, it is necessary to know both its level and the degree of fluctuation. The L_n indices are used for this purpose, and the term refers to the level exceeded for n% of the time. L_{10} is the level exceeded for 10% of the time and is often used as a descriptor for road traffic noise. Similarly, L_{90} is the level exceeded for 90% of the time and is often used to describe the background level. It is common practice to use the L_{10} index to describe traffic noise.

L_{AMax} is the maximum A-weighted sound pressure level recorded over the period stated. L_{AMax} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment.

Appendix B – Monitoring Equipment

Table B-1
Noise Monitoring Equipment

Equipment	Serial Number
01dB Cube Sound Level Meter	10892
G.R.A.S 40CD Microphone	233511
01dB PRE22N Preamplifier	11071
01dB Cube Sound Level Meter	10889
G.R.A.S 40CD Microphone	231555
01dB PRE22N Preamplifier	1610358
01dB Fusion Sound Level Meter	11860
G.R.A.S 40CD Microphone	331802
01dB PRE22N Preamplifier	1707207
O1dB Cal31 Acoustic Calibrator	98862

Appendix C – Measurement Locations

Figure C-1
Measurement Location Plan

Measurement Locations