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Architectural & Environmental Acousticians

Noise & Vibration Engineers

CASS ALLEN PROOF OF EVIDENCE

LAND AT 52 HARRIS LANE, SHENLEY

GRIGGS HOMES

RP01-23178-R0

CASS ALLEN PROOF OF EVIDENCE

PROJECT:	LAND AT 52 HARRIS LANE, SHENLEY
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1. EXECUTIVE SUMMARY

1.1 An assessment of the acoustic environment at Land Adjacent and to the Rear of 52 Harris Lane, Shenley has been carried out with regard to its suitability for the proposed residential development.

1.2 Noise monitoring has been carried out at the site from 1st to 16th March 2023 to measure background noise levels and capture commercial noise emissions from the adjacent Gristwood and Toms premises.

1.3 The results of the measurements were used in conjunction with source level data provided in the Rule 6 Party's statement of case for the mechanical plant used to create a 3D noise model of the Application Site and surrounding area.

1.4 The noise model was then used to predict the propagation of commercial noise across the Application Site in external amenity areas and at all facades of the proposed dwellings.

1.5 A comparison of the measured background noise levels to the commercial noise level (with appropriate corrections applied for the nature of the commercial noise) in line with the methodology given in the relevant British Standard (BS4142 (CDF.1)) indicates no more than adverse impact depending on context on at least one façade of all dwellings. This equates to up to Observed Adverse Effect as per NPSE (CDF.4) and NPPG guidance and as such should be mitigated to a minimum but not avoided in planning terms. BS4142 (CDF.1) is a starting point in the present case, but it does not – on its express terms – apply to internal noise levels from existing commercial noise sources.

1.6 The same British Standard (BS4142 (CDF.1)) also requires consideration of the context in which the assessment is being carried out, in particular regarding the provision of mitigation measures to reduce the potential impact of the noise on residents' amenities and indicates it is appropriate to consider the achievability of the noise levels stated in BS8233 (CDF.2).

1.7 In this case the following measures have been considered and have been or will be implemented in the final site design:

- The most recent illustrative site layout has been designed such that all dwellings have at least one façade on which habitable rooms can be situated and suitable daytime internal noise levels still achieved even if windows were to be opened. The illustrative internal layout plans demonstrate that every habitable room required to be available for daytime use will have at least one window/door (if dual-aspect) opening to the designed quiet façade of the building.
- The ventilation and thermal design of the building will be such that residents will not have to rely on open windows during the relatively short periods - limited to weekday mornings - in which potentially significant commercial noise generating operations take place in order to achieve thermal comfort. Such solutions (MVHR) are now very common throughout the UK, both to address noise, but they also bring environmental benefits too in terms of controlling heat loss and enhancing the building's energy efficiency.
- Acoustically upgraded glazing will be provided where necessary to achieve suitable commercial internal noise levels within habitable rooms on all relevant facades. Such

suitable internal noise levels are readily achievable with widely available glazing solutions.

- All dwellings will have access to either public or private external amenity areas in which commercial noise levels are predicted to be significantly below the guideline values in the relevant British Standard (BS8233 (CDF.2)). For example the northernmost houses will all have south facing gardens which will benefit from screening from the commercial noise by the associated dwelling itself. In addition, noise levels in much of the public open space in the heart of the Appeal Scheme are projected to be around the background level (LA90) and well below levels regarded as desirable upper limits in BS8233 (CDF.2).

1.8 The above measures are in line with and result in compliance with applicable national planning policy regarding noise as well as other relevant British Standards and guidance.

1.9 Further "context" considerations which are relevant when moving from a BS4142 (CDF.1) starting point to a considered conclusion include:

- Assessing the times of the day or week when the relevant noise occurs. It is important to note that there is no relevant noise during the night time period, nor at weekends, nor in the early mornings of weekdays, nor during weekday afternoons. Extended noise monitoring confirmed that the relevant noise presently only occurs for some parts of the period 8:30am-noon on weekdays, though a majority of the days recorded relatively limited commercial noise even during this period. It can be concluded that the relevant noise only occurs "some of the time" (a phrase relevant to assessment against the Noise Exposure Hierarchy within the NPPG), and this is at what is generally regarded as the least sensitive part of the day and week.
- The proximity of existing residential receptors on Mimms Lane (two barn conversions) where noise levels are on some residential facades at (or slightly higher) than the northernmost dwellings on the Appeal Site. In circumstances where there is no evidence of unreasonable noise impact at the existing receptors, and the Appeal Scheme can (as the Council appreciated at application stage) be designed with noise mitigation inherent in all aspects of its design, I do not consider a valid noise objection can be raised against the Appeal Scheme.

1.10 Any intensification of operations on the Gristwood and Toms site should also be considered in the context of the existing properties on Mimms Lane noting that any intensification will also affect those properties equally or worse than those on the Application Site.

1.11 On the basis of the above, it is considered that, with the proposed mitigation measures in place, suitable internal and external amenity can readily be provided for future occupants of the site and the site is suitable for the proposed residential development.

2. WITNESS DETAILS

2.1 This report is authored by Samuel Bryant, a Director of Cass Allen Associates Ltd. I hold a Master of Physics degree with Honours from Cardiff University and am a Chartered Engineer (CEng) with the Engineering Council through the UK Institute of Acoustics (IOA). I am also a corporate member of the IOA (MIOA). I have been a practicing Acoustics Consultant for 11 years and have presented expert evidence in relation to noise matters at various planning committees, inquiries and hearings. I have also carried out a large number of planning application stage acoustical assessments.

2.2 Cass Allen is a specialist Acoustics Consultancy that was formed in 2000. One of the specialisms of the firm is in the acoustic design and planning of new residential developments exposed to a wide variety of noise sources including existing commercial premises as well as transportation noise. Collectively, the firm has carried out assessments of a large number of proposed new residential developments near to existing commercial/ industrial uses to ensure that the amenities of the future occupants are not adversely impacted.

2.3 All members of Cass Allen's technical staff are appropriately trained and qualified and are supported by appropriate instrumentation and computer modelling facilities.

2.4 The evidence prepared and provided for this appeal in this Proof of Evidence is true and is given in accordance with the guidance of professional institution and I confirm that the opinions expressed are my true and professional opinions.

3. INSTRUCTION

3.1 Cass Allen has been instructed by the Griggs Homes to advise on noise matters relating to the proposed development at the Application Site known as Land Adjacent and to the Rear of 52 Harris Lane, Shenley (hereafter referred to as the "Land at 52 Harris Lane" or "the Application Site"). The application is being made by Griggs Homes ("the Appellant").

3.2 In particular, advice was sought on general suitability of the Application Site for residential development with regard to the potential impact of noise emissions from the adjacent Gristwood and Toms commercial site and mitigation measures to reduce that impact to a level suitable for residential use.

4. INTRODUCTION

Layout of Proof

4.1 This document is set out as follows:

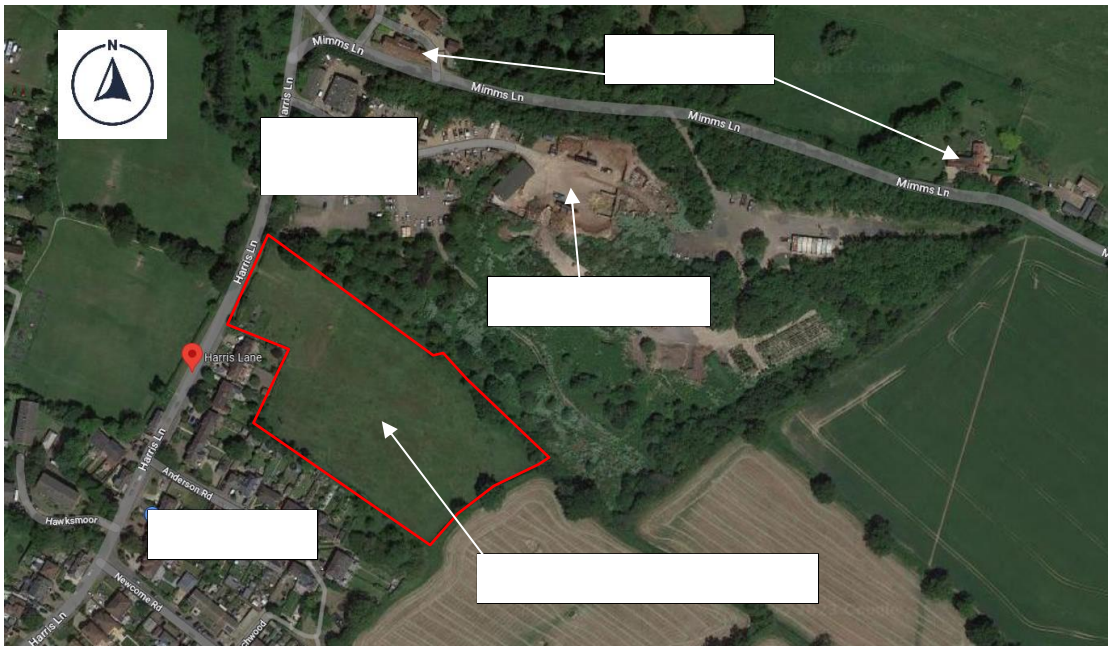
- Section 4 sets out the standards and planning guidance considered in the preparation of this Proof and used to formulate appropriate noise impact criteria.
- Section 5 provides the assessment of the potential noise impact and effectiveness of proposed mitigation.
- Section 6 addresses the potential for intensification of commercial activities.
- Section 7 sets out a summary of, and conclusions, to this Proof.

Site Description

4.2 The Application Site is bounded to the west by Harris Lane, to the south by residential properties, and to the north by the Gristwood and Toms site. Further residential properties are located approximately 500m to the east. The Maple Cross Nature Reserve is located to the south of the Application Site.

4.3 An annotated aerial photo of the Application Site and surrounding area is shown in Figure 1 below.

Figure 1 Site Location (Image Source: Google Earth)



4.4 Significant noise generating activities at the Gristwood and Toms site can be summarised as the processing, screening and chipping of trees felled off-site and brought back to the commercial premises. From discussions with the site operators it is understood that these activities only potentially occur for a relatively short period in the day (0830-1200) Monday to Friday with no such activities during the night time period or weekends.

5. PLANNING GUIDANCE AND PROPOSED CRITERIA

5.1 Relevant policy and technical guidance which have been applied in the assessment of the potential noise impact of the commercial operations can be summarised as follows:

- MHCLG (2021) National Planning Policy Framework
- NPSE (2010) Noise Policy Statement for England
- MHCLG (2019) Noise Planning Practice Guidance (CDF.4)
- Hertsmere Borough Council: Local Plan Site Allocations and Development Management Policies Plan
- British Standard BS4142: 2014+A1: 2019 – Methods for rating and assessing industrial and commercial sound (CDF.1)
- British Standard BS8233: 2014 – Guidance on sound insulation and noise reduction for buildings (CDF.2)

Key points with respect to the above guidance are discussed in turn below.

National Planning Policy Framework (NPPF)

5.2 The NPPF sets out the Government's planning policies for England and outlines how these are expected to be applied. It is designed to make the planning system less complex and more accessible, to protect the environment and to promote sustainable growth.

5.3 The NPPF consolidates all policy statements, circulars and guidance documents into a single, simpler framework and replaces planning guidance documents (such as PPG 24 Planning and Noise), which are cancelled by the NPPF.

5.4 Outline guidance for the assessment of noise affecting new developments is given in the National Planning Policy Framework (NPPF). Relevant sections in this case are highlighted below

> *174. Planning policies and decisions should contribute to and enhance the natural and local environment by … preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of …noise pollution.*
>
> *185. 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.*

187. Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.

Noise Policy Statement for England (NPSE)

5.5 The NPSE (CDF.4) provides the framework for noise management decisions to be made that ensure noise levels do not place an unacceptable burden on society.

5.6 The NPSE (CDF.4) acknowledges in Paragraph 2.9 that "noise management is a complex issue and at times requires complex solutions" and that currently "there are no European or national noise limits which have to be met".

5.7 Whilst avoiding setting down physical, measurable limits to determine acceptable levels of sound in different circumstances, the NPSE (CDF.4) provides decision makers with a number of principles and three key phases which can be applied to the acceptability or otherwise of noise impacts. The three policy aims of the NPSE (CDF.4) are that development should:

- 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.

5.8 To summarise the first two aims of the NPSE (CDF.4): it is not unacceptable for people to experience noise impacts from new development, provided that the noise impacts do not result in significant adverse effects on health and quality of life. With respect to the third aim of the NPSE (CDF.4): where possible, health and quality of life improvements should be made through the effective management and control of noise.

5.9 Three key phrases in the NPSE (CDF.4), which have been taken up in the NPPF and the corresponding Planning Practice Guidance on noise are:

- NOEL – No Observed Effect Level
    - This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.
- LOAEL – Lowest Observed Adverse Effect Level
    - This is the level above which adverse effects on health and quality of life can be detected.
- SOAEL – Significant Observed Adverse Effect Level
    - This is the level above which significant adverse effects on health and quality of life occur.

5.10 To achieve the intentions of the NPSE (CDF.4), it is therefore necessary to consider what the SOAEL, LOAEL, and NOEL should be in relation to noise emissions from the appeal site.

Noise Planning Practice Guidance (NPPG)

5.11 The NPPG repeats the policy stance in both the NPPF and NPSE (CDF.4) that where there is an observed effect level, but where the level has not reached a significant adverse effect, the advice is to mitigate and reduce the noise to a minimum.

5.12 The NPPG provides more descriptive detail for the definitions of NOEL, LOAEL and SOAEL than the NPSE (CDF.4). A summary of the advice given in Table 4 is reproduced as Table 1 below.

Table 1 Noise Exposure Hierarchy Based on Average Response of Those Affected

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not present	No effect	No Observed Effect	No specific measures required
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived 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 and/or attitude, 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 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 and/or attitude, 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 and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite,	Unacceptable Adverse Effect	Prevent

Perception	Examples of Outcomes	Increasing Effect Level	Action
	significant, medically definable harm, e.g. auditory and non-auditory		

5.13 It should be noted that for noise below the SOAEL it is expected that occupants may wish to close their windows to control noise ingress however this is not a situation to be avoided (as noise over the SOAEL would be described to be) rather this is a permissible scenario provided mitigation to reduce this eventuality to a minimum has been provided. Therefore designing developments such that closed windows provide a significant part of the noise mitigation strategy is acceptable provided suitable alternative ventilation is provided.

5.14 The above is supported by Paragraph 009 of the NPPG which provides an endorsement of closed windows and alternative ventilation in the context of reducing the risk of conflict between new development and existing businesses. Key parts are reproduced below for reference:

> *The agent of change will also need to define clearly the mitigation being proposed to address and 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* (Cass Allen emphasis*) when the noise or other effects are occurring).*

Hertsmere Borough Council: Site Allocations and Development Management Policies Plan

5.15 Regarding Noise and Vibration, the Hertsmere Borough Council: Site Allocations and Development Management Policies Plan provides the following information:

> *4.66 Noise can cause stress to people and have a significant effect on the quality of the environment. Nuisance is regulated by Hertsmere's Environmental Health Department. However, the planning system can play a role in protecting new noise-sensitive development from existing sources of noise, as well as ensuring new development does not impact adversely on existing sensitive receptors. In Hertsmere, residential development pressures have led to some developments being located close to sources of noise such as railways. With adequate mitigation measures, development need not result in an unacceptable environment to future occupiers of the site.*

5.16 The document expands on the above regarding situations where development is proposed next to existing noise sources (as is the case in this instance):

> *4.67 Where development is proposed next to an existing noise source, an assessment of the noise exposure will need to be undertaken by a competent person and submitted as part of the development proposal. An assessment in accordance with BS 4142:1997 should be submitted with the development proposal. For residential developments close to sources of transport noise, the four Noise Exposure Categories (NECs) and corresponding noise levels in Appendix A will aid the assessment of proposals. Regard must also be given to BS 8233:1999 - Sound Insulation and Noise Reduction for Buildings.*

5.17 Regarding the above, it should be noted that the four NECs are taken from Planning Policy Guidance 24: Planning and Noise. This document was withdrawn from use in March 2012 and superseded by NPPF, NPSE (CDF.4) and NPPG guidance. The NECs are therefore not considered further.

5.18 It should also be noted that both BS8233 (CDF.2) and BS4142 (CDF.1) were updated in 2014. The 2014 updates supersede the versions referenced above and are the versions used in this assessment and agreed in the Statement of Common Ground to be the relevant documents.

5.19 Of particular relevance to the Application Site is the statement that, along with an assessment in accordance with BS4142 (CDF.1), "regard must also be given to BS8233 (CDF.2)" for development next to an existing noise source.

5.20 The document then goes on to set out Policy SADM20 – Environmental Pollution and Development which states:

> *Development should not result in any adverse impact to public health or wellbeing, or significantly add to contamination or pollution, taking into account the situation following any mitigation and remediation measures. Development proposals will be judged against the principles below and any future Contaminated Land, Air Quality or Noise and Vibration SPD.*
>
> *…*
>
> *Noise and vibration*
>
> *(i) New residential development should not be exposed to existing significant sources of noise pollution, unless it can be shown that mitigation measures would be successful in reducing noise impacts to an acceptable level.*
>
> *(ii) Development which would create increases in background noise levels should be sited away from noise-sensitive development as far as possible: in addition, noise mitigation measures should be taken to ensure there is no increase in background noise levels beyond the site boundary.*
>
> *(iii) The Council will use the more detailed criteria and guidance in Appendix A to interpret these principles*

5.21 Of relevance to the Application Site is Clause (i) above which clearly allows for development to be exposed to "significant sources of noise pollution" provided suitable mitigation measures are available to reduce the noise impacts to an acceptable level.

BS4142: 2014+A1: 2019 – Methods for rating and assessing industrial and commercial sound (BS4142)

5.22 BS4142 (CDF.1) is of relevance to the assessment of the impact of noise from external industrial and/or commercial noise sources on nearby sensitive receptors in the manner described below.

1. Measure the existing background noise levels (LA90,T dB) at the locations of nearby noise sensitive receptors during the quietest periods when the noise source(s) under investigation will operate;

2. Predict or measure the noise emissions (LAeq,T dB) from the noise source(s) under investigation at the location(s) of the nearby sensitive receptors, including corrections for any distinguishable acoustic features (e.g. tones, whines, screeches, hisses etc);

3. Subtract the measured background noise levels (item 1 above) with the measured or predicted rating noise levels (item 2 above) at each sensitive receptor. BS4142 (CDF.1) states that:

a) Typically, the greater this difference, the greater the magnitude of the impact.

b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.

c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.

d) The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

NOTE Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact.

5.23 The above guidance is widely adopted for the purposes of assessing proposed or new commercial noise impact on existing noise sensitive receptors and is accepted to be the starting point for assessments of commercial noise on proposed noise sensitive receptors.

5.24 Paragraph 1.2 of BS4142 (CDF.1) discusses the scope of the document and states the following:

This standard is applicable to the determination of the following levels at outdoor locations:

a) rating levels for sources of sound of an industrial and/or commercial nature; and

b) ambient, background and residual sound levels,

for the purposes of:

1) investigating complaints;

2) assessing sound from existing, proposed, new, modified or additional source(s) of sound of an industrial and/or commercial nature; and

3) assessing sound at proposed new dwellings or premises used for residential purposes.

5.25 Section 1 goes on to clarify further the scope of the document as follows (by way of footnote A1 to the word “existing” in paragraph 1.2(2) above):

*The methodology set out in Clauses **7**, **8**, and **9** of this standard is not intended to be used to assess the extent of the impact at indoor locations. Internal sound levels can be taken into account as outlined in Clause **11.***

The standard is not intended to be applied to the assessment of indoor sound levels.

5.26 The above introduces the importance to the consideration of internal noise levels and by extension the applicability of other standards in addition to BS4142 (CDF.1) in their assessment.

5.27 Regarding new noise-sensitive receptors BS4142 (CDF.1) states the following:

> ***8.5 Introduction of a new noise-sensitive receptor***
>
> *Measure the background sound at the intended location of any new noise-sensitive receptor(s) in the absence of any specific sound.*
>
> *NOTE Where a new noise-sensitive receptor is introduced and there is extant industrial and/or commercial sound, it should be recognized that the industrial and/or commercial sound forms a component of the acoustic environment. In such circumstances other guidance and criteria in addition to or alternative to this standard can also inform the appropriateness of both introducing a new noise-sensitive receptor and the extent of required noise mitigation.*

5.28 Regarding which standards "in addition to or alternative to" BS4142 (CDF.1) are applicable, a number of assessment examples are provided in the appendices of BS4142 (CDF.1) which refer to internal noise levels (A6, A8). In both instances the British Standard referred to as applicable is BS8233 (CDF.2).

Context

5.29 As detailed above, Clause 11 of BS4142 (CDF.1) indicates that when comparing the rating noise levels to the background noise levels it is important to consider the "context" in which the assessment is being carried out.

5.30 Regarding context, BS4142 (CDF.1) goes on to state the following:

> *Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration, including the following.*
>
> *1) The absolute level of sound. For a given difference between the rating level and the background sound level, the magnitude of the overall impact might be greater for an acoustic environment where the residual sound level is high than for an acoustic environment where the residual sound level is low.*
>
> *Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night.*
>
> *Where residual sound levels are very high, the residual sound might itself result in adverse impacts or significant adverse impacts, and the margin by which the rating level exceeds the background might simply be an indication of the extent to which the specific sound source is likely to make those impacts worse.*
>
> *2) The character and level of the residual sound compared to the character and level of the specific sound. Consider whether it would be beneficial to compare the frequency spectrum and temporal variation of the specific sound with that of the ambient or residual sound to assess the degree to which the specific sound source is likely to be*

distinguishable and will represent an incongruous sound by comparison to the acoustic environment that would occur in the absence of the specific sound. Any sound parameters, sampling periods and averaging time periods used to undertake character comparisons should reflect the way in which sound of an industrial and/ or commercial nature is likely to be perceived and how people react to it.

…

3) The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions, such as:

i) facade insulation treatment;

ii) ventilation and/or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation; and

iii) acoustic screening.

5.31 In Clause (3) above BS4142 (CDF.1) allows for inbuilt mitigation into a scheme to reduce the commercial noise impact to an appropriate level. It is important to note that Items i and ii of Clause 3 both refer to methods of mitigation which would directly impact internal noise levels. Internal noise levels due to commercial sources are clearly recognised by BS4142 (CDF.1) as an important consideration regarding the appropriateness of a proposed development exposed to existing commercial noise.

5.32 Application of other standards to assess internal noise levels and the associated mitigation requirements, in particular BS8233 (CDF.2), is therefore not only in line with BS4142 (CDF.1) but also in line with Hertsmere Borough Council policy as well as the NPPF, NPSE (CDF.4) and NPPG guidance.

5.33 In addition to mitigation and the absolute commercial noise levels, other considerations are applicable when considering the "context" of a commercial noise, especially for the assessment of impacts of commercial noise outdoors. BS4142 (CDF.1) expressly does not apply to the assessment of commercial noise impact in indoor areas. In terms of context considerations include (but are not limited to):

- The presence of other existing noise sensitive receptors exposed to the same commercial noise.
- The time of day that the commercial activities take place.
- The number of days per week/ month/ year that the commercial activities take place.
- The duration within a given day that the commercial activities take place.
- The awareness of any new residents of the commercial premises and likely noise emissions. On this aspect, I see no reason why a prospective new resident would not identify the location of the commercial business immediately north of the site from elementary due diligence (including a Google Maps search of the surrounding area, or a short journey along Harris Lane).

5.34 The above considerations should be taken into account when deciding on the suitability of any new residential development in areas containing commercial noise.

Character Correction

5.35 BS4142 (CDF.1) also states that a correction should be applied to account for the specific character of the noise. It is agreed between the appellant and the Rule 6 party that these corrections should take into account the nature of the noise at the position of the receptor (not at the source). The evidence presented in the Shenley Parish Council Statement of Case considers a correction of +3dB to be "in accordance with the requirements of the standard". This is agreed and is discussed further below.

BS4142 Summary

5.36 When assessing the appropriateness of a development in which new noise sensitive receptors exposed to existing commercial noise, it is not appropriate or in line with BS4142 (CDF.1) guidance to simply assess the likelihood of adverse impact and draw conclusions from that assessment. Context must be taken into account and application of other relevant standards (in particular BS8233 (CDF.2)) is appropriate. In this case the potential impact of commercial noise is being mitigated through mitigation measures which will be provided for the wider site (e.g. noise barrier, overall layout and orientation of buildings etc.) as well as for individual dwellings (e.g. orientation of habitable rooms and gardens, provision of alternative ventilation etc.).

BS8233: 2014 – Guidance on sound insulation and noise reduction for buildings (BS8233)

5.37 BS8233 (CDF.2) provides guidance on appropriate internal and external noise levels for residential (and other) developments. Appropriate design criteria for acceptable noise levels in acoustically sensitive areas of new developments are summarised in Table 2 below.

Table 2 BS8233:2014 Internal Noise Criteria

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35 dB LAeq,16hour	-
Dining	Dining room/area	40 dB LAeq,16hour	-
Sleeping (daytime resting)	Bedroom	35 dB LAeq,16hour	30 dB LAeq,8hour

5.38 BS8233 (CDF.2) expands on the above with the following guidance:

> *This subclause applies to external noise as it affects the internal acoustic environment from sources without a specific character, previously termed "anonymous noise". Occupants are usually more tolerant of noise without a specific character than, for example, that from neighbours which can trigger complex emotional reactions. For simplicity, only noise without character is considered in Table 4. For dwellings, the main considerations are:*
>
> *a) for bedrooms, the acoustic effect on sleep; and*
>
> *b) for other rooms, the acoustic effect on resting, listening and communicating.*
>
> *NOTE Noise has a specific character if it contains features such as a distinguishable, discrete and continuous tone, is irregular enough to attract attention, or has strong low-frequency content, in which case lower noise limits might be appropriate.*

5.39 In this case, as the noise source in question is of a commercial nature, it has the potential to have "a specific character" and as a result "lower noise limits might be appropriate". BS8233 (CDF.2) does not say how much lower the noise limits should be however a typical approach is to consider the character of the commercial noise and its potential to disturb. For example, noise with significant impulsive, intermittent, and tonal content would typically be subject to lower internal noise limits relative to the levels presented in Table 1 above than noise with only a minor intermittency but no impulsivity or tonality. While the commercial noise with which this case is concerned is not "anonymous" noise, it is the case that BS4142 (CDF.1) directs the reader to BS8233 (CDF.2) (as does the Local Plan and national noise guidance). With due allowances for the nature of the noise (as considered within this proof), the limits in BS8233 (CDF.2) are appropriate targets, as is generally accepted industry practice. Adjusted BS8233 (CDF.2) limits are readily achievable at the Appeal Site, for both internal and external spaces, as explained below.

5.40 Regarding noise levels within gardens, BS8233 (CDF.2) states that it is desirable that noise levels in external amenity areas of residential developments do not exceed 50 dB LAeq and that 55 dB LAeq,T should be regarded as an upper guideline value. The document does however go on to note that this will not be achievable in all circumstances and where this is the case the lowest practicable noise levels should be achieved in these areas.

5.41 Guidance regarding design targets for suitable internal and garden noise levels due to commercial noise has been received from the Hertsmere Borough Council Environmental Health Officer as follows:

- The design should achieve 10dB below the levels in BS8233 (CDF.2) for habitable rooms with an open window
- Noise levels in external amenity areas should be significantly below the upper guideline level in BS8233 (CDF.2).

5.42 The above Council guidance has been taken into account in the assessment.

5.43 BS8233 (CDF.2):2014 also states that where development is considered necessary or desirable, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.

Summary of Acoustic Criteria

5.44 The following design targets and criteria have been adopted in line with the above guidance:

- All dwellings should have at least one façade where the commercial noise would be categorised in accordance with BS4142 (CDF.1) as "low impact, depending on context" or "adverse impact, depending on context".
- Internal noise levels due to commercial should be significantly lower than the BS8233 (CDF.2) guideline levels presented in Table 1 above.
- All dwellings should have access to either private or shared external amenity areas (or both) where commercial noise levels are significantly below the upper guideline level in BS8233 (CDF.2).

5.45 Achieving the above design targets is consistent with a noise impact which would be categorised as No Observed Adverse Effect or Observed Adverse Effect as per NPSE (CDF.4)/ NPPG guidance. The outcome of which is a situation which should be mitigated and reduced to a minimum but not one to be avoided and therefore planning permission withheld on noise grounds.

6. ASSESSMENT OF COMMERCIAL NOISE IMPACT

Site Noise Survey

6.1 A noise survey was carried out at the Application Site between 1st and 16th March 2023 to assess existing noise levels in the area. The full methodology and results of the noise survey are provided in Appendix 1.

6.2 The aims of the measurements were to quantify commercial noise associated with Gristwood and Toms at the Application Site boundary, identify times and duration of significant commercial activity and establish typical background noise levels in the area.

6.3 The noise logging equipment was deployed on the Application Site boundary closest to the area in which the significant noise generating activities at the Gristwood and Toms are known to take place. Activities in this area are the processing, screening and chipping of wood.

6.4 From analysis of the measured data it was found that commercial noise levels varied significantly from day to day with brief periods (45 – 60 mins) of increased commercial activity on 4 of the 11 monitored weekdays (Monday to Friday). It is important to note that, as these periods were relatively short they were found to represent only c.3% of the overall daytime measurements. Further, on the other 7 monitored weekdays (3 of which mornings were attended on site by employees of the Appellants who reported relevant activities to me), commercial activity took place including use of the chipper and measured noise levels were significantly below the increased commercial activity levels.

6.5 Abnormally high noise levels were recorded between 0200 and 1800 on Monday 13th March. This period is clearly outside of the Gristwood and Toms operating hours and the levels recorded were not in line with noise levels recorded on any other day. Weather records for the area indicate very high wind speeds during the period identified with gusts up to c.25 m/s. Wind conditions of this nature prevailed across the south-east on this day, and disrupted schedules at major airports. This data has therefore been excluded from the analysis on the basis of adverse weather affecting the measurements.

6.6 From discussions with the site operator (and also as stated in the Rule 6 Party's Statement of Case) it is understood that processing, screening and chipping operations only occur for a small proportion of the week, between 0830 to 1200 Monday to Friday inclusive. These times are understood to be based on commercial need as well as Gristwood and Toms operators wishing to be considerate neighbours of the existing nearby residents. Analysis of the logged data confirms that significant noise generating activities are indeed limited to these times.

Commercial Noise Levels

6.7 Due to the variation in commercial noise levels it is appropriate to evaluate the measured data to establish average noise levels for both a reasonable worst-case 1 hour commercial period as well as a typical 16 hour daytime (0700-2300) weekday average (as per BS8233 (CDF.2) guidance). The results of this are as follows:

- 1 hour commercial period – 55 dB LAeq,1hr

  In order to take into account the nature and variation of the commercial noise, this figure was calculated as a 1 hour logarithmic average based on a combination of the level

recorded during the brief period of increased commercial activity (60 dB LAeq,T) and the lower commercial activity noise directly either site of that period (51 dB LAeq,T). In this case, although the increased commercial activity only accounted for c.3% of the daytime measurements a figure of 25% of the assessed hour in which increased activity takes place in order to represent a reasonable worst case hour.

This methodology is in line with BS4142 (CDF.1) guidance which states:

> ***7.3.12*** *If the specific sound fluctuates at random, select the measurement time interval, Tm, to give a reliable estimate of the equivalent continuous A-weighted sound pressure level over the reference time interval, Tr, measure the equivalent continuous A-weighted sound pressure level, LAeq,Tm, take this value to be La, correct for the influence of residual sound according to equation (2), and assign the result to the specific sound level.*
>
> ***7.3.15*** *If the specific sound is intermittent or cyclic, and the reference time interval is over a representative time, and the on time is equal to or greater than the reference time interval, select the measurement time interval, Tm, to obtain a representative value for the equivalent continuous A-weighted sound pressure level LAeq,Tm, and take this value to be La. Correct for the influence of residual sound according to equation (2), and assign the result to the specific sound level.*

It should be noted that the noise level presented above is also in line with that found in the 24 Acoustics analysis of the commercial operations and is therefore considered representative and appropriate for use.

- Typical 16 hour weekday daytime (0700-2300) – 51 dB LAeq,16hrs

  This is based on BS8233 (CDF.2) guidance regarding suitable daytime assessment periods and was calculated as a logarithmic average of all measured weekday data and therefore comprehensively takes into account both the periods of higher commercial activity as well as the more common lower commercial noise levels.

6.8 These values have been used to inform the assessment below where relevant and appropriate.

Background Noise Levels

6.9 In the absence of commercial activity, background noise levels (LA90) across the Application Site are dictated by distant road traffic noise and natural noises (tree rustle etc.).

6.10 Analysis of the logged background noise levels in the 60 minutes preceding and subsequent to 0830 and 1200 respectively is considered to be representative of the background noise levels during the period in which the potentially significant noise generating activities take place. Based on this analysis of the 11 logged weekdays, the representative background noise level was found to be 42 dB LA90. This figure is therefore used to inform this assessment where relevant.

Noise Modelling

6.11 A 3D noise model of the Application Site, proposed layout, surrounding area and Gristwood and Toms site was constructed using CadnaA 2023 noise modelling software. The model also contained detailed topographical data for the entire modelled area.

6.12 The spectral sound power levels as measured by 24 Acoustics and presented in the Rule 6 Party's Statement of Case for the following plant items were input into the model:

- Chipper- Jenz Hem 561
- Chainsaw- Stihl MS5001
- Screen- Komptech Crimbus 5000E
- Screen- Hurstmann Twister
- Volvo Wheeled Loader HO61

6.13 The above plant items were input as point sources located in the positions observed during a walk-around of the Gristwood and Toms site by the appellant and Cass Allen. These positions also match aerial imagery of the site found on Google Maps and are therefore considered representative of typical operations at the site.

6.14 The point source sound levels in the model were then calibrated to match the measured 1 hour commercial period and typical 16 hour daytime average.

Assessment

6.15 Based on the reasonable worst case 1 hour commercial period, noise levels at all facades of the Application Site as well as at existing residences were calculated. The modelling results are presented in Figures 2, 3, 4 and 5 below.

6.16 The figures presented include a +3 dB character correction as per BS4142 (CDF.1) guidance and which was also applied by 24 Acoustics in their analysis. It is agreed between the Rule 6 Party and the Appellant that any correction must be applied to account for the character of the noise once it is at the receptor position (i.e. not at source). In this case, as the commercial noise is present during the daytime only, the most relevant rooms are living rooms across the site and bedrooms being used for daytime resting. As all dwellings will be provided with south facing living rooms and at least one south facing bedroom (which may be used if daytime resting is required for whatever reason) then there is significant screening provided by the dwellings themselves which in turn will significantly reduce both the level and perceptible character of the noise when compared to the background noise environment. It is therefore agreed with 24 Acoustics that a +3dB correction is applicable and is considered to take into account that the commercial noise may be "readily distinctive against the residual acoustic environment" as per Section 9.2 of BS4142 (CDF.1).

6.17 In interpreting the data presented below, it is important to note that all buildings on the northern edge of the Application Site will be designed such that no habitable rooms have north-facing windows/doors only. This is discussed further below.

Figure 2 – 1 Hour Commercial Noise Levels Including Character Correction – Existing Dwellings on Mimms Lane & Associated Floor Plans

Figure 3 – 1 Hour Commercial Noise Levels Including Character Correction – Ground Floor

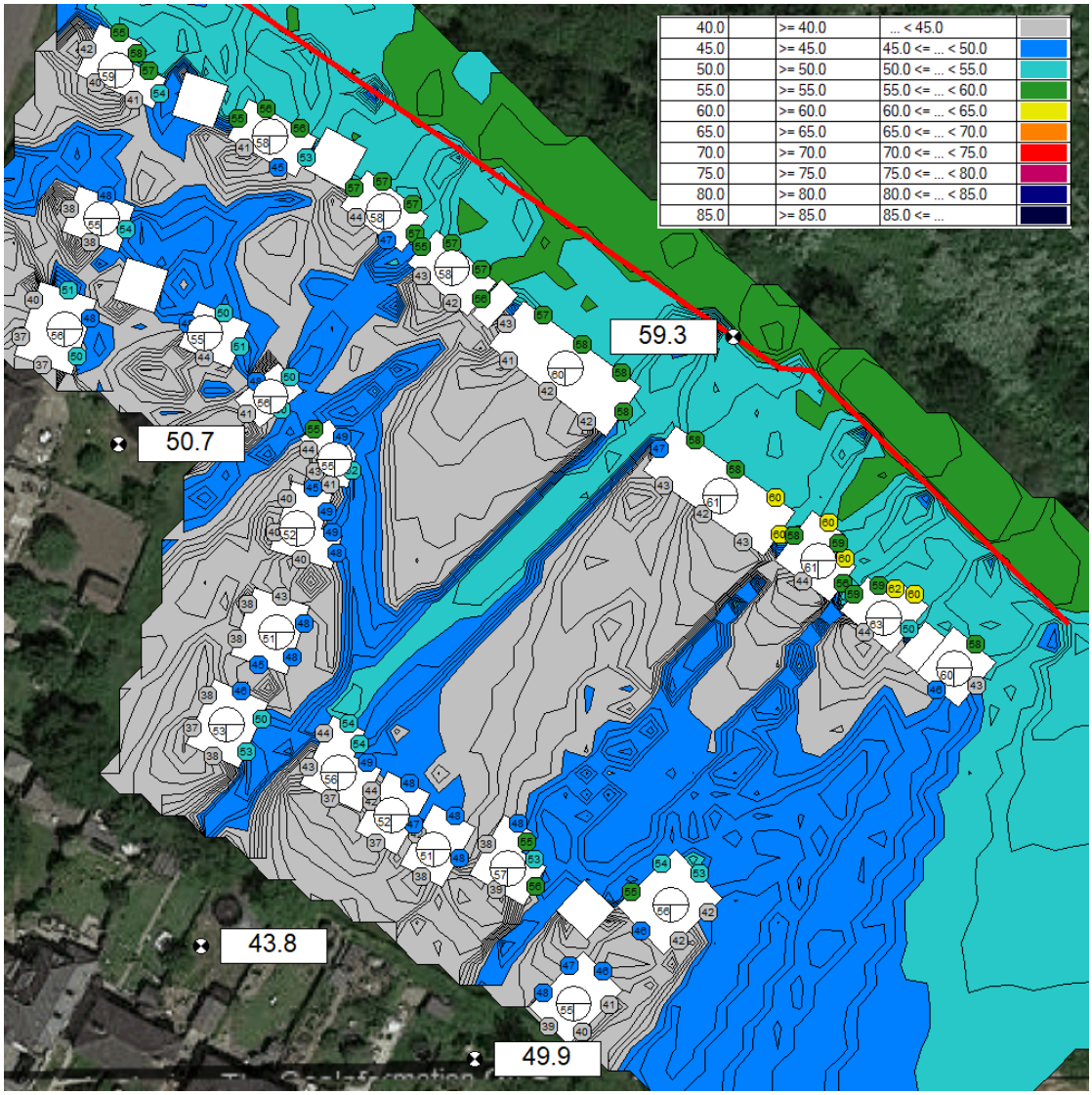


Figure 4 – 1 Hour Commercial Noise Levels Including Character Correction – First Floor

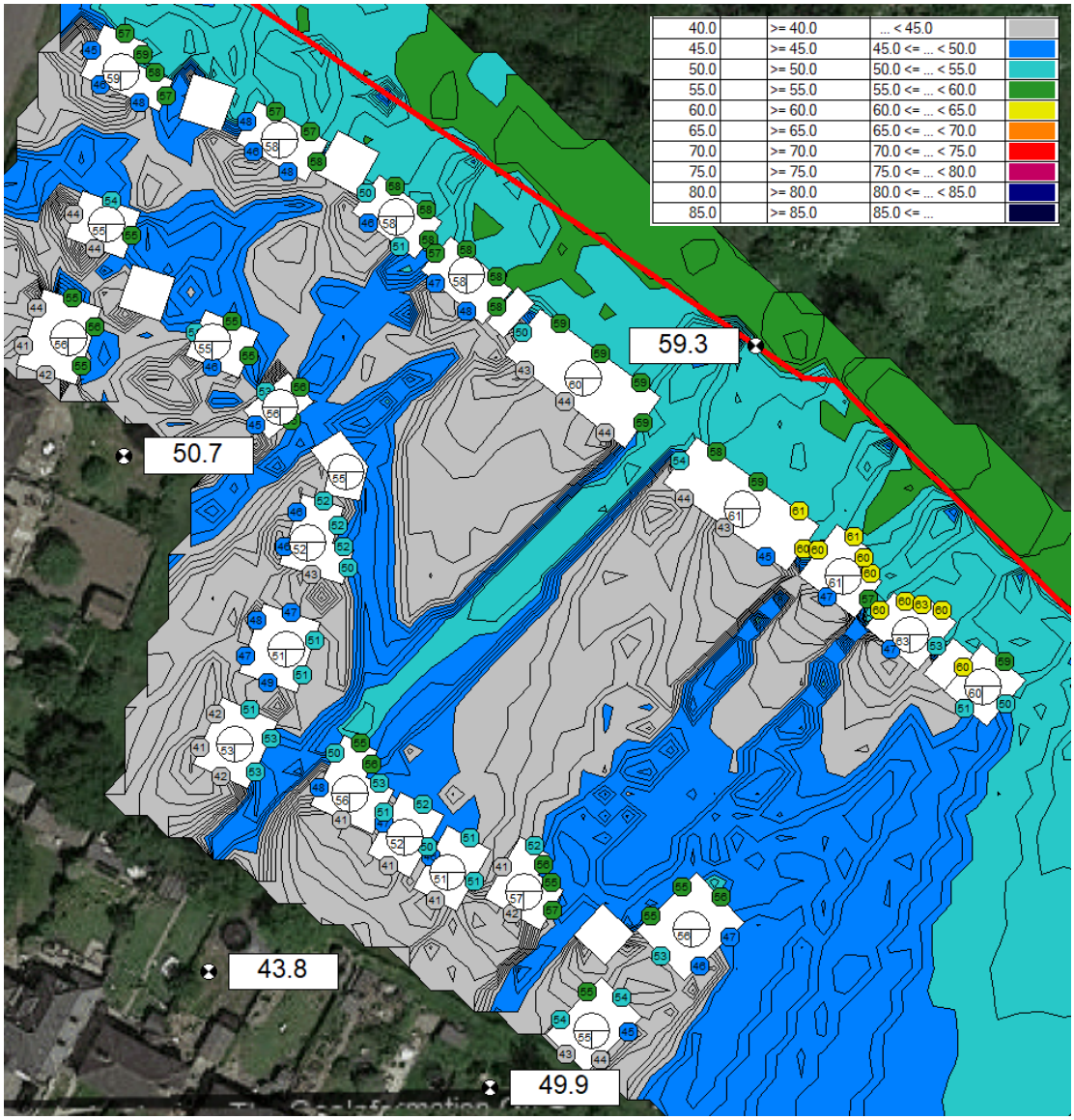
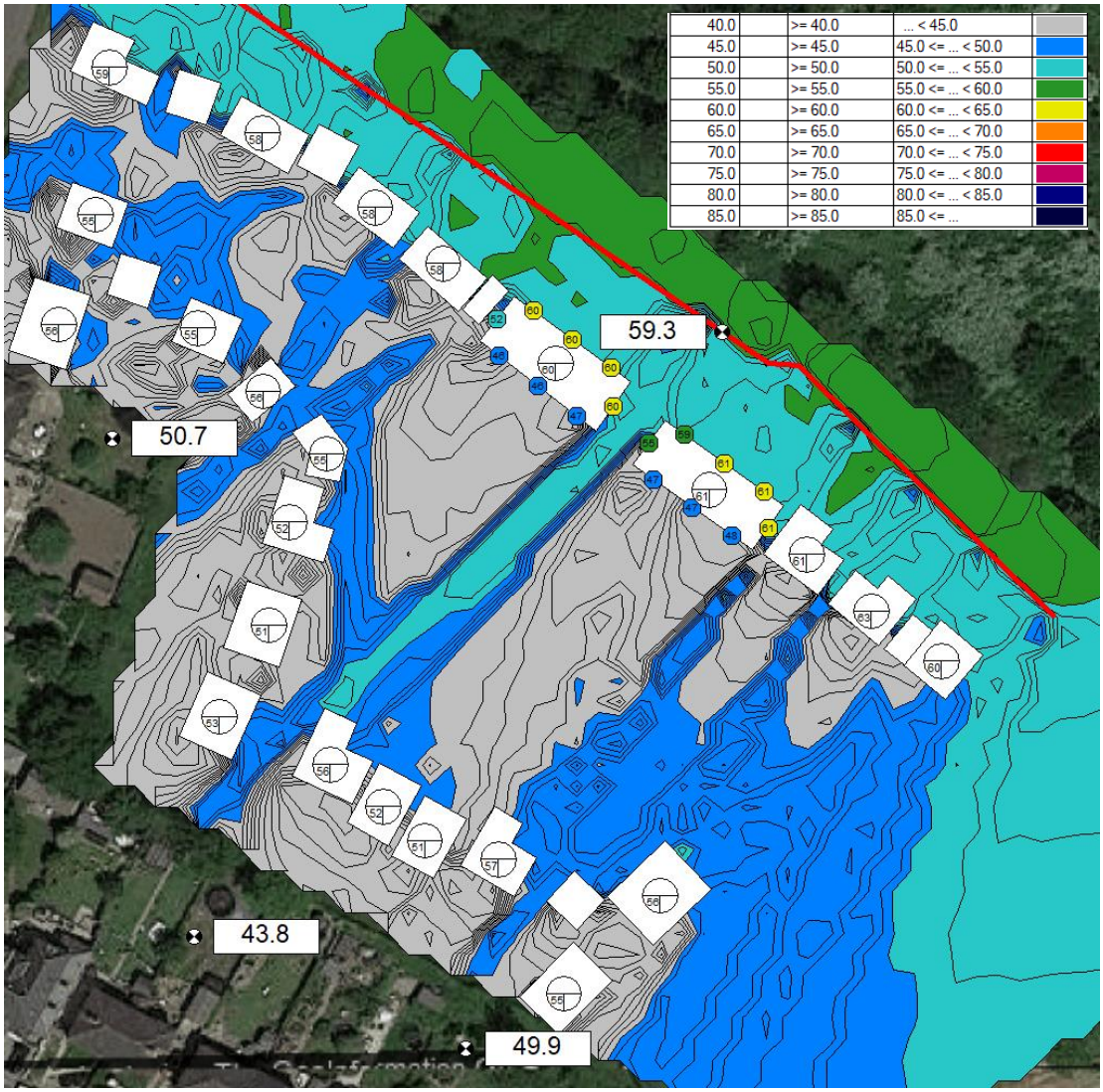


Figure 5 – 1 Hour Commercial Noise Levels Including Character Correction – Second Floor



6.18 It can be seen that based on the above figures that all proposed dwellings have at least one façade on all floors where commercial noise levels would be classified according to BS4142 (CDF.1) as "low impact, depending on context" or " indication of adverse impact, depending on context" (i.e. not "significant adverse impact, depending on context"). This is in line with up to an Observed Adverse Effect Level as detailed in the NPPG and such a categorisation is not to be avoided but rather mitigated and reduced to a minimum.

6.19 It can also be seen from the above that commercial noise levels incident on the existing Mimms Lane properties are similar to (if not higher than) commercial noise levels incident on the proposed dwellings on the Application Site.

6.20 As discussed above, BS4142 (CDF.1) clearly states that it is not appropriate to draw conclusions regarding the potential impact of commercial noise solely based on a comparison of commercial and background noise levels as context is a key consideration that must be taken into account, and in any event BS4142 (CDF.1) has no application in the current case to internal noise levels. This is discussed below.

Context

6.21 As discussed above, the context relating to the nature of the commercial noise and surrounding environment is relevant in any assessment in line with BS4142 (CDF.1). In this instance there are a number of contextual considerations are relevant. These are considered below.

Commercial Activity Timings

6.22 From discussions with the site operators and as presented in the Rule 6 Party's Statement of Case the potentially significant on-site noise generating activities (processing, screening and chipping) only occur during a relatively short period of the day (0830-1200) and only on weekdays. As such there is no significant noise generating activity during the evenings, night-time and weekends which are recognised to be the periods typically used for sleep and relaxation and typically considered most noise sensitive.

6.23 These stated timings were confirmed from analysis of the long-term survey where no significant processing, screening and chipping activity was observed outside those times. Furthermore, the long-term survey results found that of those periods the commercial activity noise was at a relatively low level with a small number of brief events with elevated noise levels each lasting no more than 1 hour. The total duration of these events represented approximately 3% of all measured daytime periods.

6.24 It is widely recognised by both BS4142 (CDF.1) and BS8233 (CDF.2) as well as national planning policy that the potential impact of noise at night (2300-0700) is higher than during the day. The operations at Gristwood and Toms do not occur at night and indeed vehicle movements are controlled by condition[1] to not occur before 0700.

6.25 This is positive as the commercial operations only occur during the least sensitive part of the day and of those daytime activities the significant commercial operations only occur for a short part of the day. The potential for adverse impact in accordance with BS4142 (CDF.1) is therefore lessened with consideration to this context.

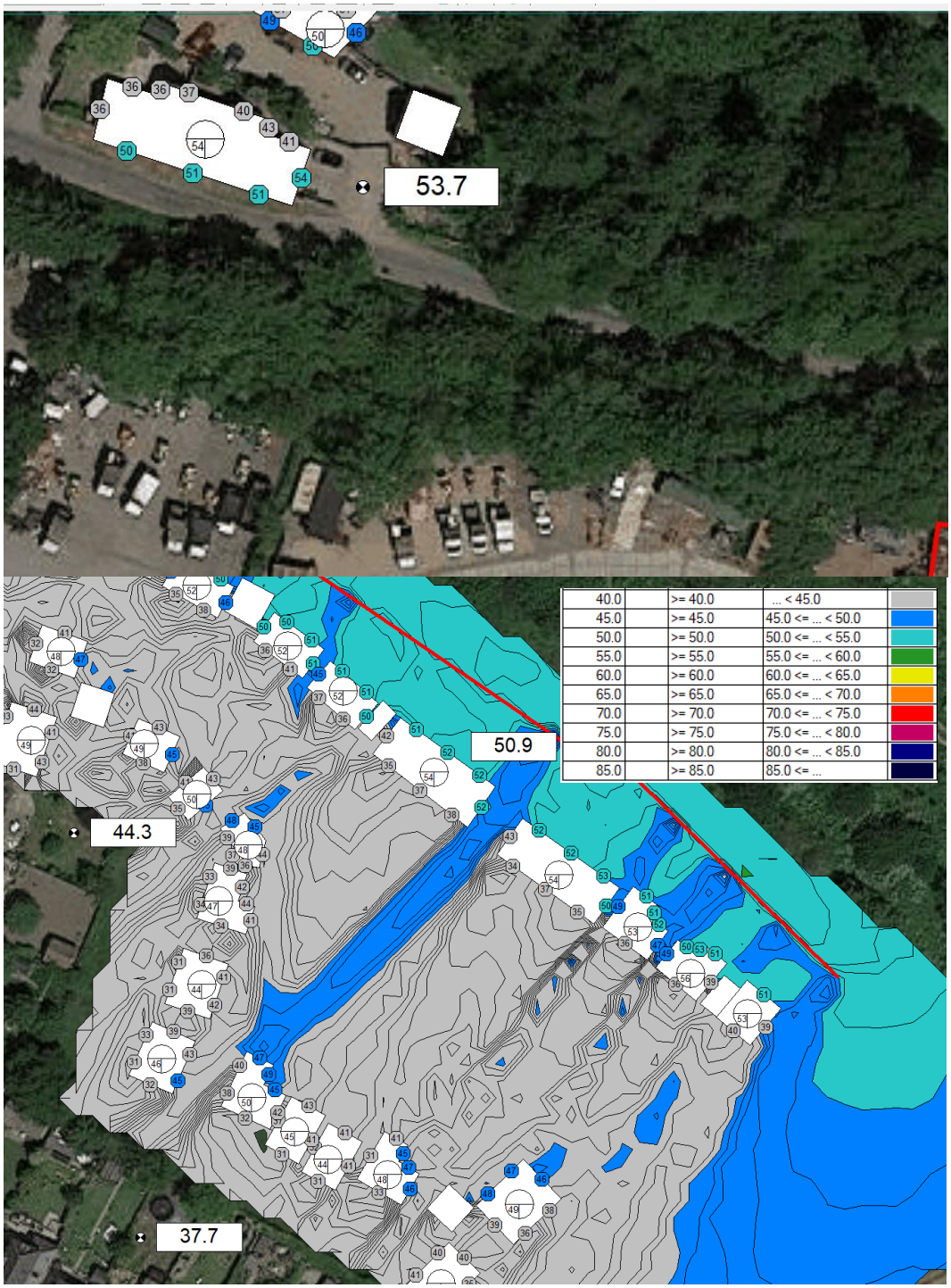
Existing Residential Premises on Mimms Lane

6.26 There are a number of existing properties in the vicinity of the Gristwood and Toms site, most notably the barn conversion on Mimms Lane (identified in Figure 1 above). It is understood that residential development of these properties occurred after commencement of operations on the Gristwood and Toms site and therefore the decision as to the appropriateness of this redevelopment would have taken the commercial noise into account.

6.27 As discussed above, these were included in the 3D model detailed above and commercial noise levels calculated at their facades. It was found that these properties are exposed to similar (indeed potentially higher) commercial noise levels than dwellings on the Application Site. The results of the modelling are presented in Figure 6 below:

[1] HBC Planning Ref. TP/97/0008 – Condition 13 "Except in emergencies no vehicle engines shall be switched on anywhere within the land edged red on the amended plan earlier in the day than 7.00am on Mondays to Fridays or earlier in the day than 8.00am on Saturdays and Sundays"

Figure 6 – Typical 16 Hour Average Commercial Noise Levels



6.28 As the residential development on Mimms Lane was permitted it follows that the potential impact on residents' amenity due to Gristwood and Toms operations was deemed acceptable. By extension the potential impact should also be acceptable on the Application Site where noise mitigation measures can and will be designed in from the outset.

Mitigation

6.29 As discussed in detail above, it is in line with BS4142 (CDF.1) and other relevant standards and guidance to consider mitigation in the assessment of the potential impact of commercial noise. In this instance the following in-built mitigation is being provided at the Application Site:

- A 2.4m imperforate barrier will be erected along the northern site boundary of suitable length to cover the curtilage of all northernmost proposed dwellings at the Application Site
- The northernmost proposed dwellings will be designed such that no habitable rooms will only have north-facing windows/doors.
- The dwellings will, where necessary be provided with acoustically upgraded glazing to achieve significantly below BS8233 (CDF.2) levels. This approach is in line with both BS8233 (CDF.2) guidance (in line with guidance "lower noise limits might be appropriate") as well as the example provided in BS4142 (CDF.1) A6 where 25 dB of internal commercial noise is deemed acceptable.
- Whole-house mechanical ventilation (Mechanical Ventilation with Heat Recovery - MVHR) will be provided.
- South facing front gardens with seating areas will be provided to northernmost properties which will be significantly screened from commercial noise by the associated dwelling. Furthermore a central communal amenity area will be provided which also benefits from screening by the northernmost dwellings.

6.30 The 3D noise model was used to establish typical 16 hour average commercial noise levels across the site and included the above mitigation where appropriate. The results of the modelling are presented below:

Figure 7 – Typical 16 Hour Average Commercial Noise Levels – Ground Floor

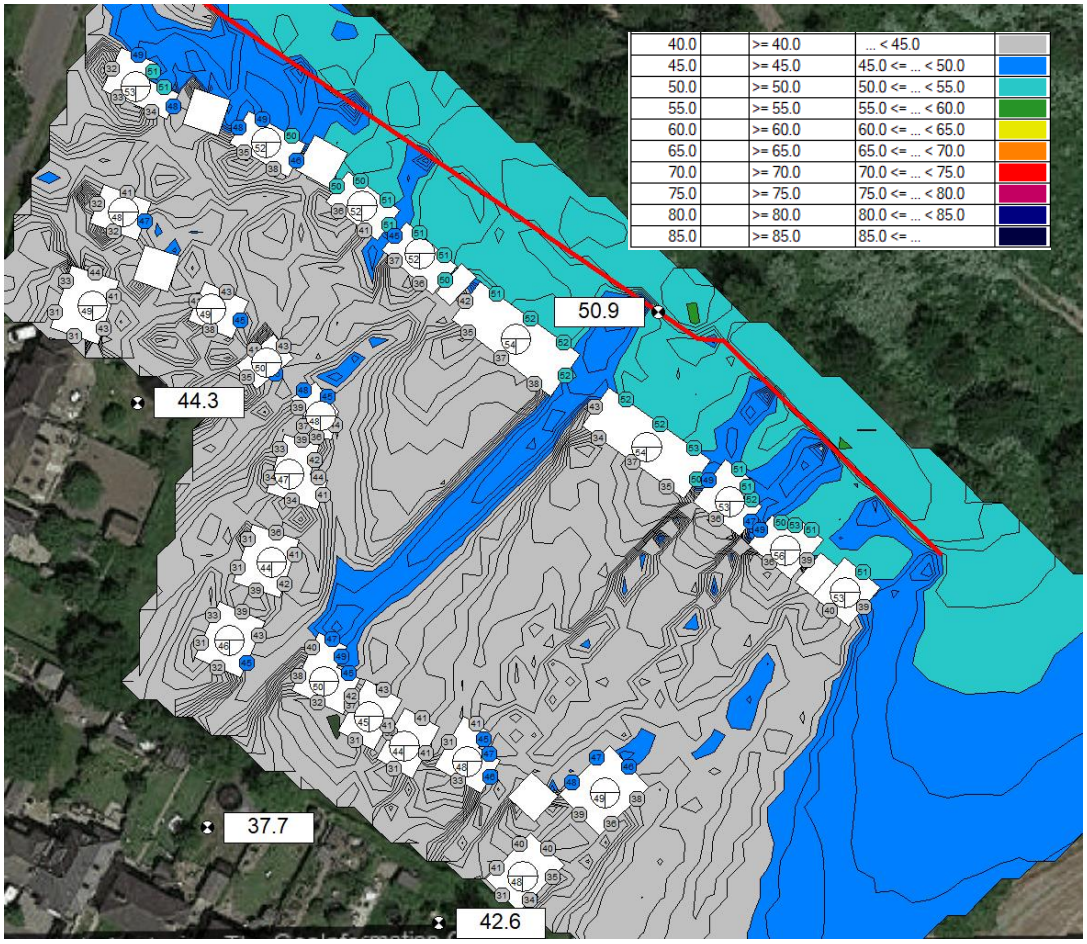


Figure 8 – Typical 16 Hour Average Commercial Noise Levels – First Floor

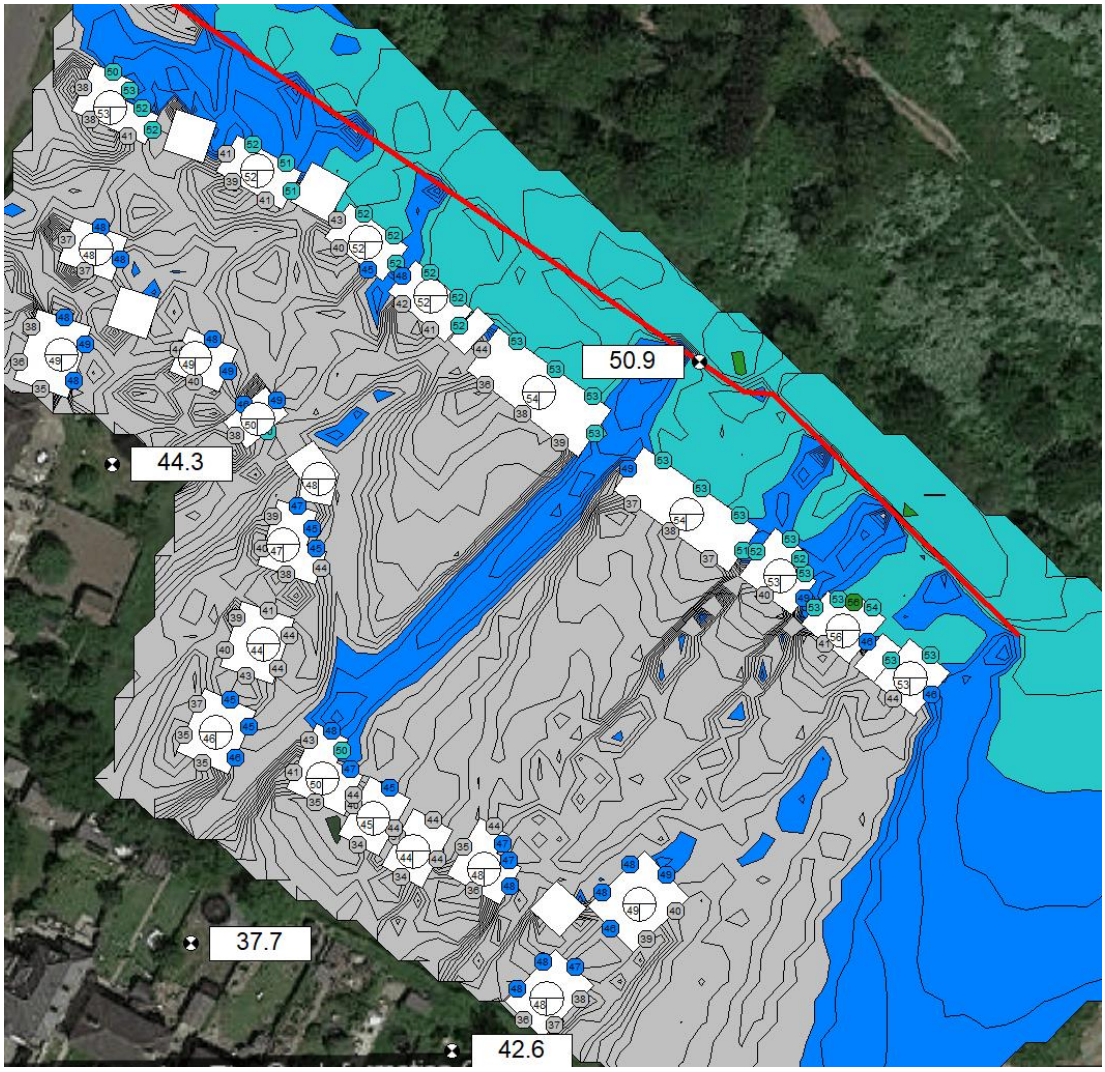
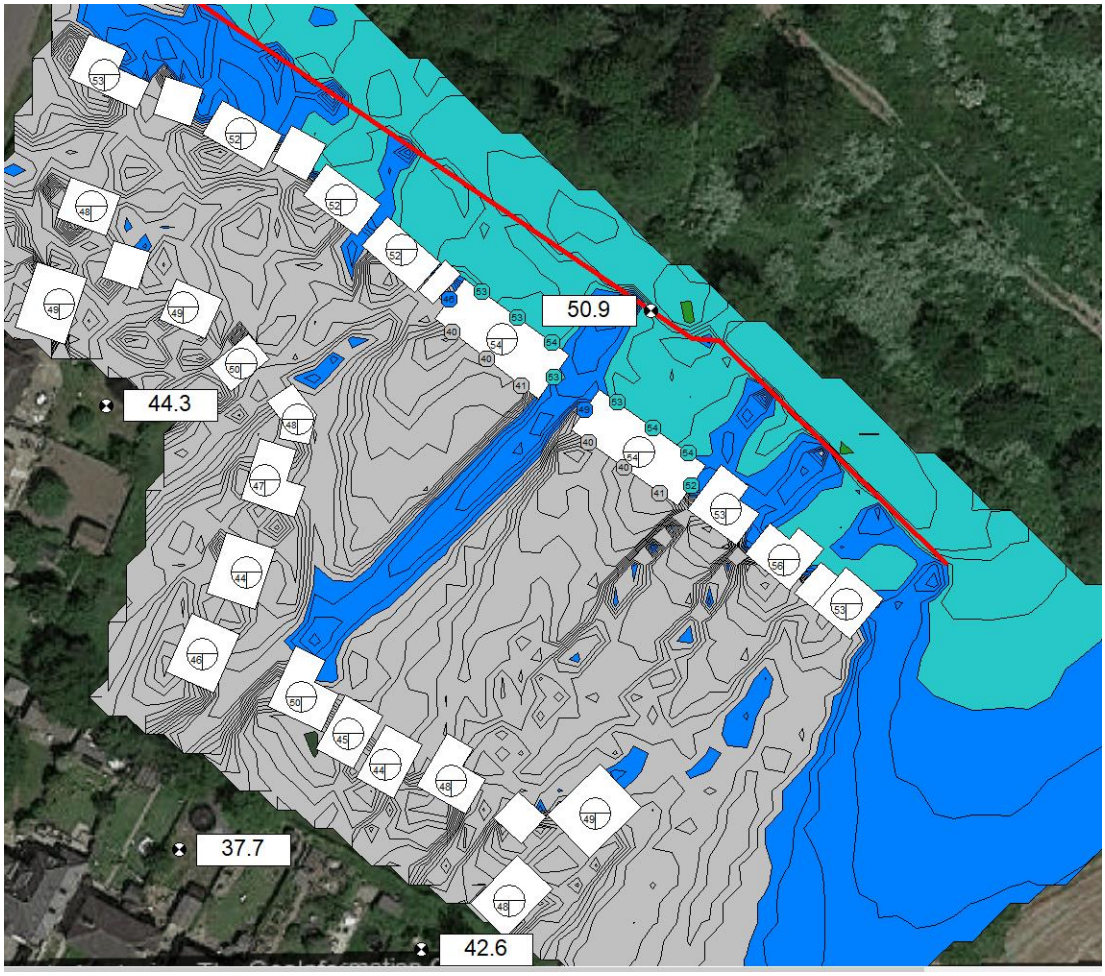


Figure 9 – Typical 16 Hour Average Commercial Noise Levels – Second Floor



6.31 It can be seen from the above that all dwellings will have at least one façade where external commercial noise levels outside living rooms do not exceed 40 dB LAeq,16hr with the exception of two small areas on the upper floors of the apartment buildings where there is a marginal 1 dB increase over that level which will not be noticeable to occupants[2]. BS8233 (CDF.2) states that the sound insulation provided by a partially open window is c.15 dB and applying this figure to the modelled noise levels results in an internal commercial noise level of around 25 dB LAeq,16hr. This is both in line with the HBC EHO request of noise levels 10 dB below BS8233 (CDF.2) design targets for internal noise levels in occupied rooms as well as in line with general BS8233 (CDF.2) guidance that lower noise limits might be appropriate where noise has a particular character. It is therefore considered that, even during periods of commercial activity, living room windows may comfortably be opened and suitable internal noise environments achieved.

6.32 Regarding the acoustically upgraded double glazing, in this case a glazing sound insulation performance of c.30 dB Rw + Ctr would generally result in internal noise levels within worst case habitable rooms of 25 dB LAeq. The specification of the glazing will be finalised at the detailed design stage once site layouts, internal layouts and building fabric constructions have been decided. This acoustic performance is readily achieved with commercially available products and equates to a small acoustic upgrade over the minimum performance expected of standard double glazing. This internal noise level is again in line with both Council and BS8233 (CDF.2) targets.

[2] A change of 1 dB is only perceptible under controlled conditions whereas a change of 3 dB(A) is the minimum perceptible under normal conditions.

6.33 The MVHR system will be specified alongside the thermal design of the building envelope to ensure that, at least during the period 0830 to 1200, it will be possible for residents to keep all windows closed and still achieve suitable thermal comfort. Opening windows will therefore be at the occupants choice and should the noise be disturbing they have the option to use the closed window as mitigation. Furthermore MVHR negates the need for ventilators leading directly into habitable rooms which are typically a noise ingress weak-point if not suitably considered, a mechanical ventilation system therefore simplifies and improves the sound insulation design of the buildings.

6.34 Relying on temporarily closed windows is a nationally recognised mitigation strategy which has been employed on countless recent developments. It is also in line with NPSE (CDF.4)/ NPPG guidance regarding Observed Adverse Effect levels which allows for windows to be closed "some of the time" and this situation is not to be avoided provided suitable mitigation has been provided in terms of ventilation and façade acoustic performance. This is also in-line with the discussed Paragraph 009 of NPPG which clearly allows for closed windows and alternative ventilation as mitigation for commercial noise. By way of an example closed windows and mechanical ventilation was accepted by the Inspector reviewing the residential development at Land at Crewe Road, Crewe, Cheshire, CW2 5AD (Appeal Ref: APP/R0660/A/12/2170820) as a suitable mitigation strategy to control commercial noise incident.

6.35 The results of the modelling indicate that, with the proposed layout and noise barrier in place, all houses across the Application Site will be provided with private and communal external amenity areas in which typical commercial noise levels are calculated to be below 45 dB LAeq,16hr. This is significantly below both the upper guideline level and desirable level presented in BS8233 (CDF.2) and therefore takes the nature of the commercial noise into account as well as achieving the HBC design target for external amenity areas.

6.36 It should also be noted that even if a shorter commercial time period or a very worst-case commercial noise level were to be assessed (i.e. without consideration of the overall variation in the commercial noise levels) then the mitigation described above would still be anticipated to achieve suitable internal and external noise environments with simple and appropriate upgrades to the acoustic specification of the glazing.

6.37 The following planning condition is proposed for inclusion if the Application Site should be granted permission and is considered suitably robust to both protect the future occupants as well as the ongoing operations at Gristwood and Toms:

> *No development shall commence until a scheme for the protection of the development, both with regard to external and internal areas, from external noise has been submitted to, and approved in writing by, the local planning authority. The scheme shall include:*
>
> *a) plans, drawings and a description of the site;*
>
> *b) an assessment of the existing noise levels relevant to the site; and,*
>
> *c) an explanation of the principles adopted in the devising of mitigation measures, including appropriate site design and layout.*

6.38 In summary of the above it is considered that, with the proposed mitigation measures in place, suitable internal and external amenity can readily be provided for future occupants of the site.

7. POTENTIAL COMMERCIAL INTENSIFICATION

7.1 It is acknowledged that Gristwood and Toms do not currently have any limits on the use of on-site plant and machinery. It is therefore possible that they may wish to either increase the time or intensity of the processing, screening and chipping operations beyond the currently accepted hours.

7.2 Of note in this instance is, as discussed above, existing properties on Mimms Lane are potentially exposed to the same or potentially higher commercial noise levels than dwellings on the Application Site. As such any intensification will likely affect residents on Mimms Lane equally or worse than those on the Application Site. Furthermore due to the nature of the Mimms Lane properties (i.e. non-new build) they are unlikely to benefit from the same level of in-built façade and overheating mitigation and there is no reasonable scope to add a significant noise barrier on the Mimms Lane boundary in order to offset any intensification.

7.3 Considering the above, the appropriateness and impact of any intensification of the commercial activities will need to be considered in the context of the potential impact on Mimms Lane residents as well as the Application Site. If the impact of such intensification is deemed acceptable on Mimms Lane residents then it follows that it will also be acceptable on residents of the Application Site.

8. CONCLUSIONS

8.1 In summary, I set out below the reasons why I believe the proposed residential development is suitable for the site and surrounding noise sources:

- An assessment in line with BS4142 (CDF.1) indicates no more than adverse impact depending on at least one façade of all dwellings which also contains most relevant occupied rooms considering the day-time only nature of the noise (i.e. living rooms). This equates to up to Observed Adverse Effect as per NPSE (CDF.4) and NPPG guidance and as such should be mitigated to a minimum but not avoided in planning terms.
- The site layout has been designed such that all dwellings have at least one façade on which a living room can be situated and suitable daytime internal noise levels still achieved even if windows were to be opened.
- In any event, the ventilation and thermal design of the building will be such that residents will not have to rely on open windows during the period in which potentially significant commercial noise generating operations take place in order to achieve thermal comfort.
- Suitable commercial internal noise levels within habitable rooms can be achieved on all relevant facades with marginally acoustically upgraded glazing where necessary.
- All dwellings will have access to either public or private external amenity areas in which commercial noise levels are predicted to be significantly below the guideline values in the relevant British Standard.
- Any intensification of operations on the Gristwood and Toms site should be considered in the context of the existing properties on Mimms Lane noting that any intensification will also affect those properties equally or worse than those on the Application Site.

8.2 On the basis of the above, I consider that, with the proposed mitigation measures in place, suitable internal and external amenity can readily be provided for future occupants of the site and the site is suitable for the proposed development.

Appendix 1 Site Noise Survey

Survey Summary:

The survey comprised long-term unattended noise monitoring at the site. Noise levels at the site were generally dictated by natural noise, road traffic on Harris Lane and commercial noise from Gristwood and Toms.

Survey Period:

01/03/2023 to 16/03/2023

Survey Objectives:

- To identify noise and vibration sources that contribute to ambient noise levels at the site;
- To measure noise at the site over a suitable number of days.

Equipment Used:

Type	Manufacturer	Model	Serial Number
Sound level meter[1]	01dB		
Calibrator			

Note 1: All sound level meters were calibrated before and after measurement periods and no significant drift in calibration was found to have occurred. The results of the measurements are therefore considered to be representative.

Weather Conditions:

The observed weather conditions were acceptable for acoustic measurement throughout the attended survey periods (low-medium wind speeds and no rain). Weather records for the area confirmed that weather conditions were also generally acceptable for acoustic measurement during the unattended monitoring. Any periods of unattended monitoring that may have been adversely affected by weather conditions have been excluded from the data analysis.

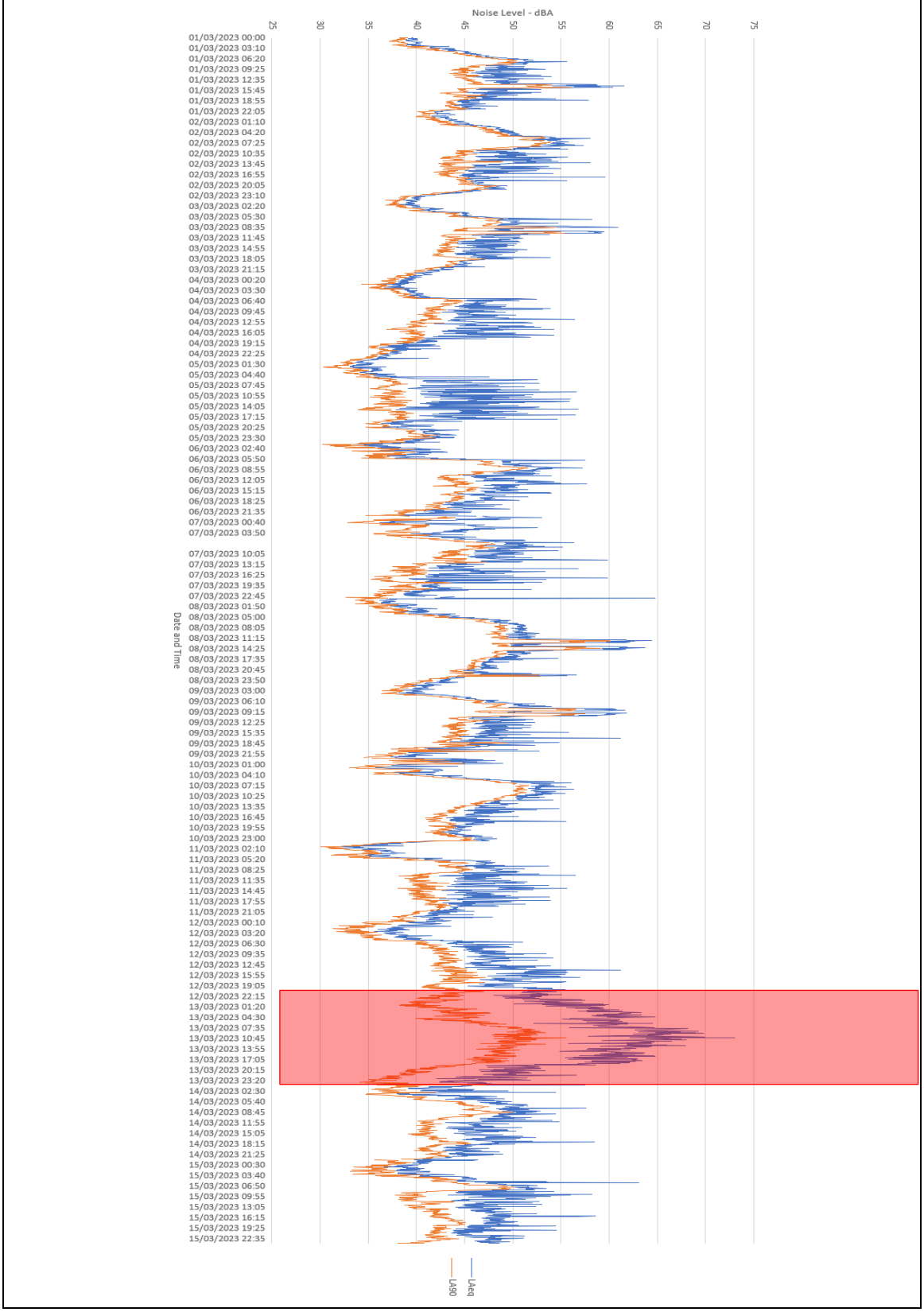
Measurement Position:

Position (refer plan below)	Description
L1	Unattended noise logging position. 2m above ground level. Free-field. Direct line of sight to commercial activity.

Site Plan showing Measurement Positions:

Unattended Noise Monitoring Results:

Meas. Period	Position	Red highlighted area excluded from analysis due to adverse weather conditions
01/03/2023 to 16/03/2023	L1	



Appendix 2 3D Modelling Printouts

Figure 2 – 1 Hour Commercial Noise Levels Including Character Correction – Existing Dwellings on Mimms Lane & Associated Floor Plans

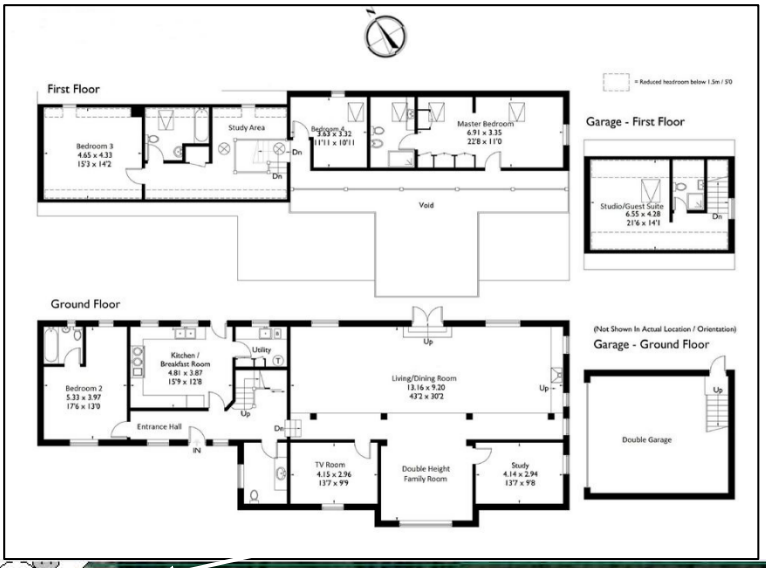


Figure 3 – 1 Hour Commercial Noise Levels Including Character Correction – Ground Floor

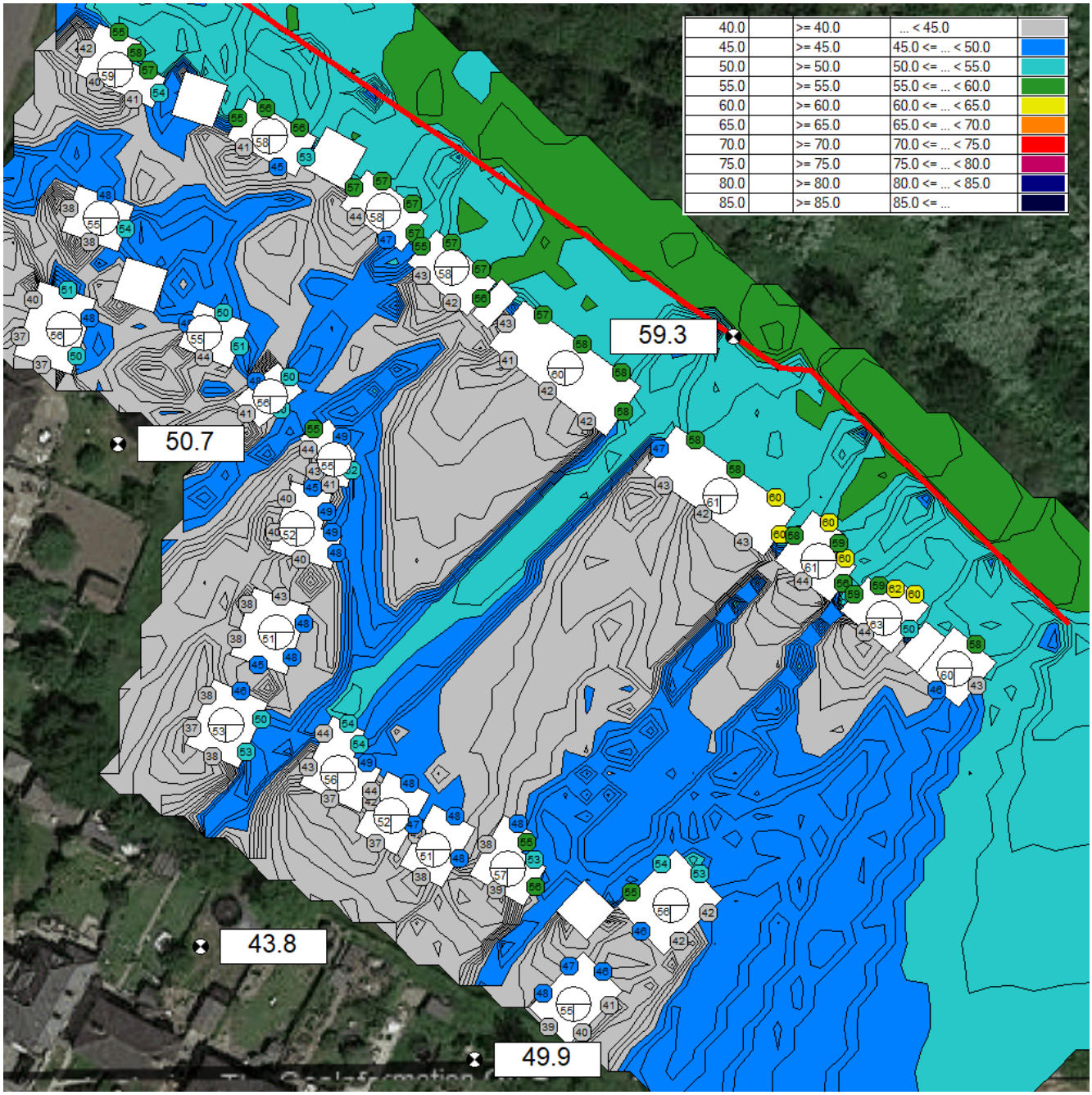


Figure 4 – 1 Hour Commercial Noise Levels Including Character Correction – First Floor

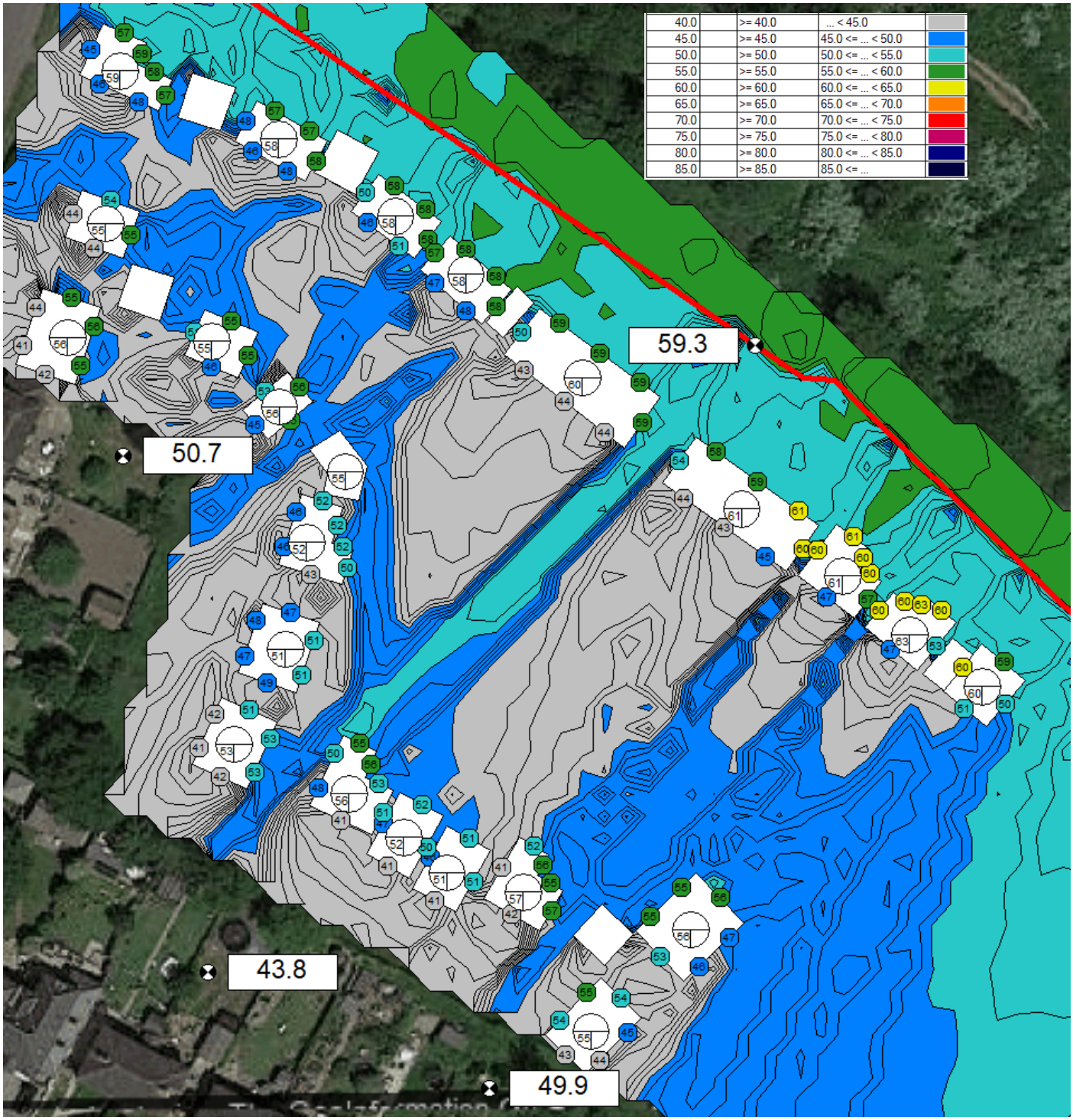


Figure 5 – 1 Hour Commercial Noise Levels Including Character Correction – Second Floor

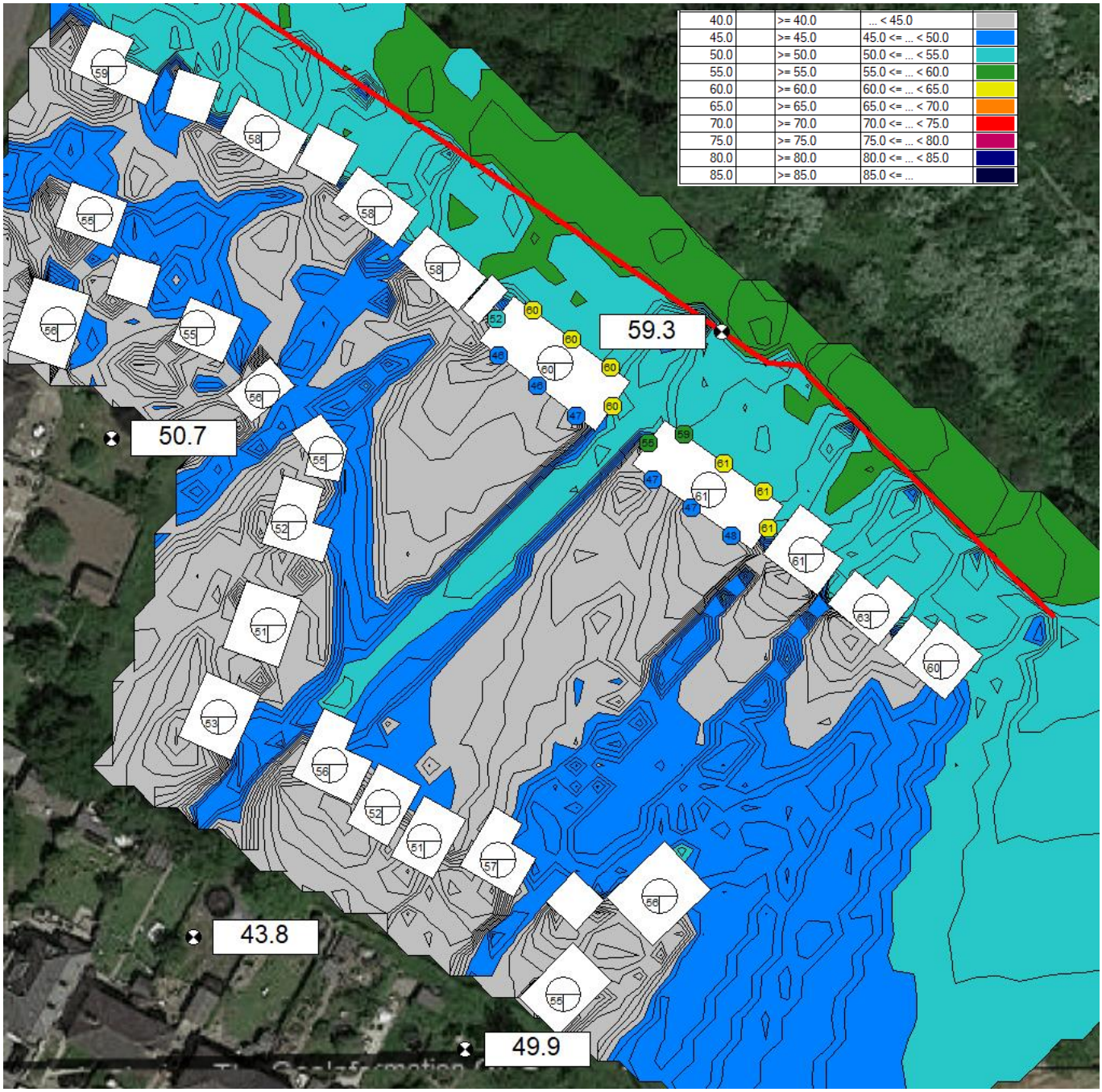


Figure 6 – Typical 16 Hour Average Commercial Noise Levels

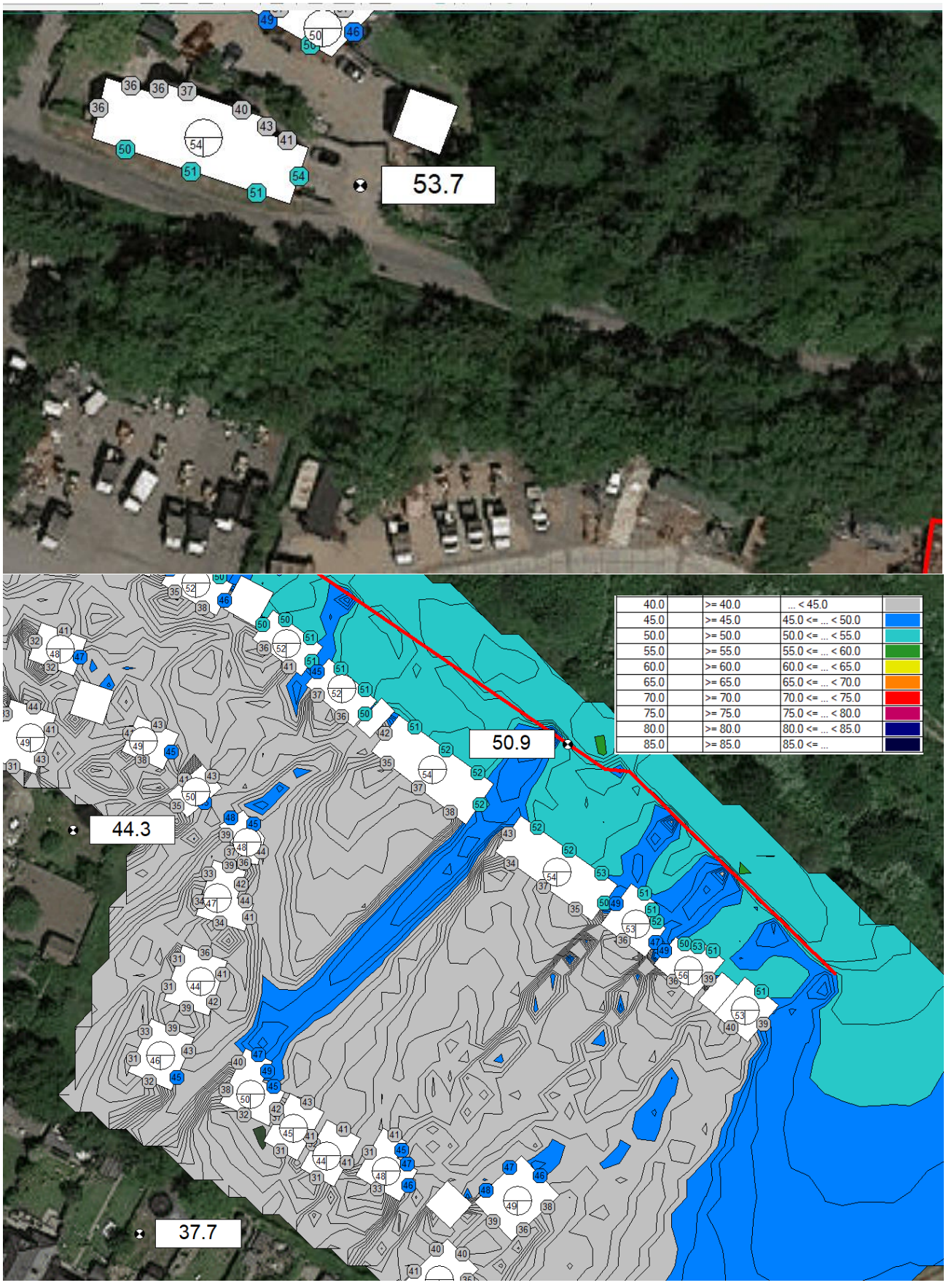


Figure 7 – Typical 16 Hour Average Commercial Noise Levels – Ground Floor

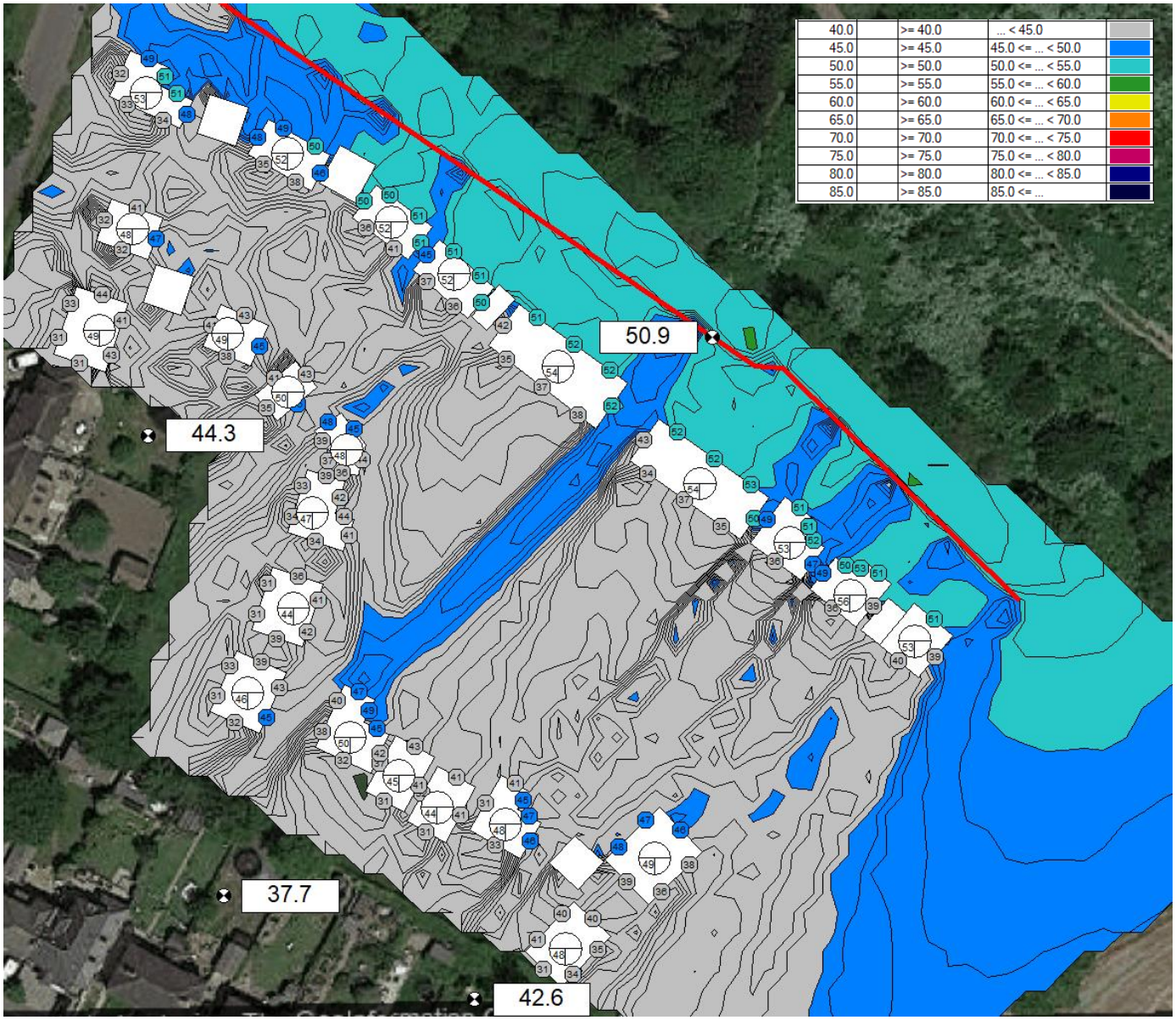


Figure 8 – Typical 16 Hour Average Commercial Noise Levels – First Floor

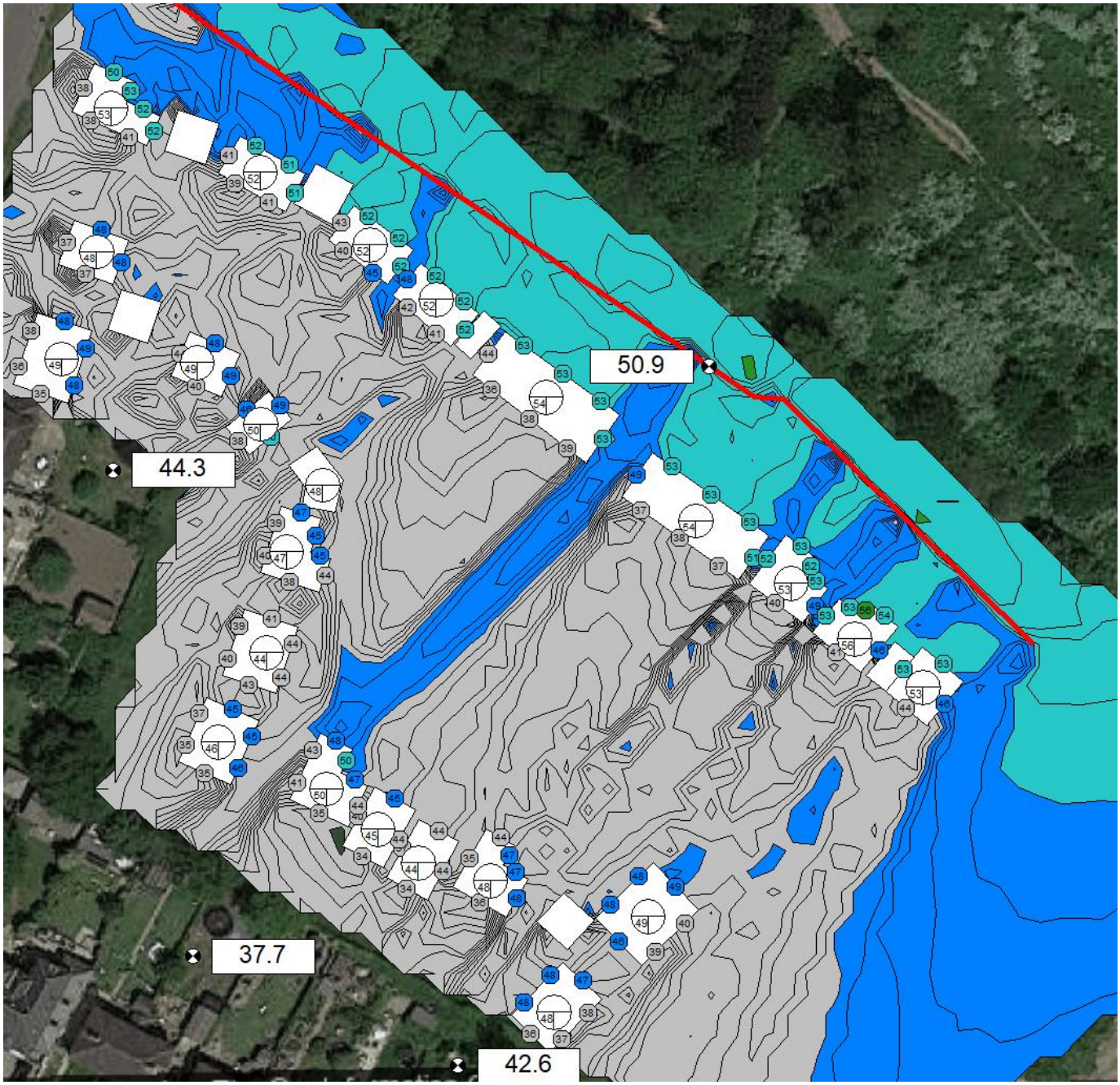
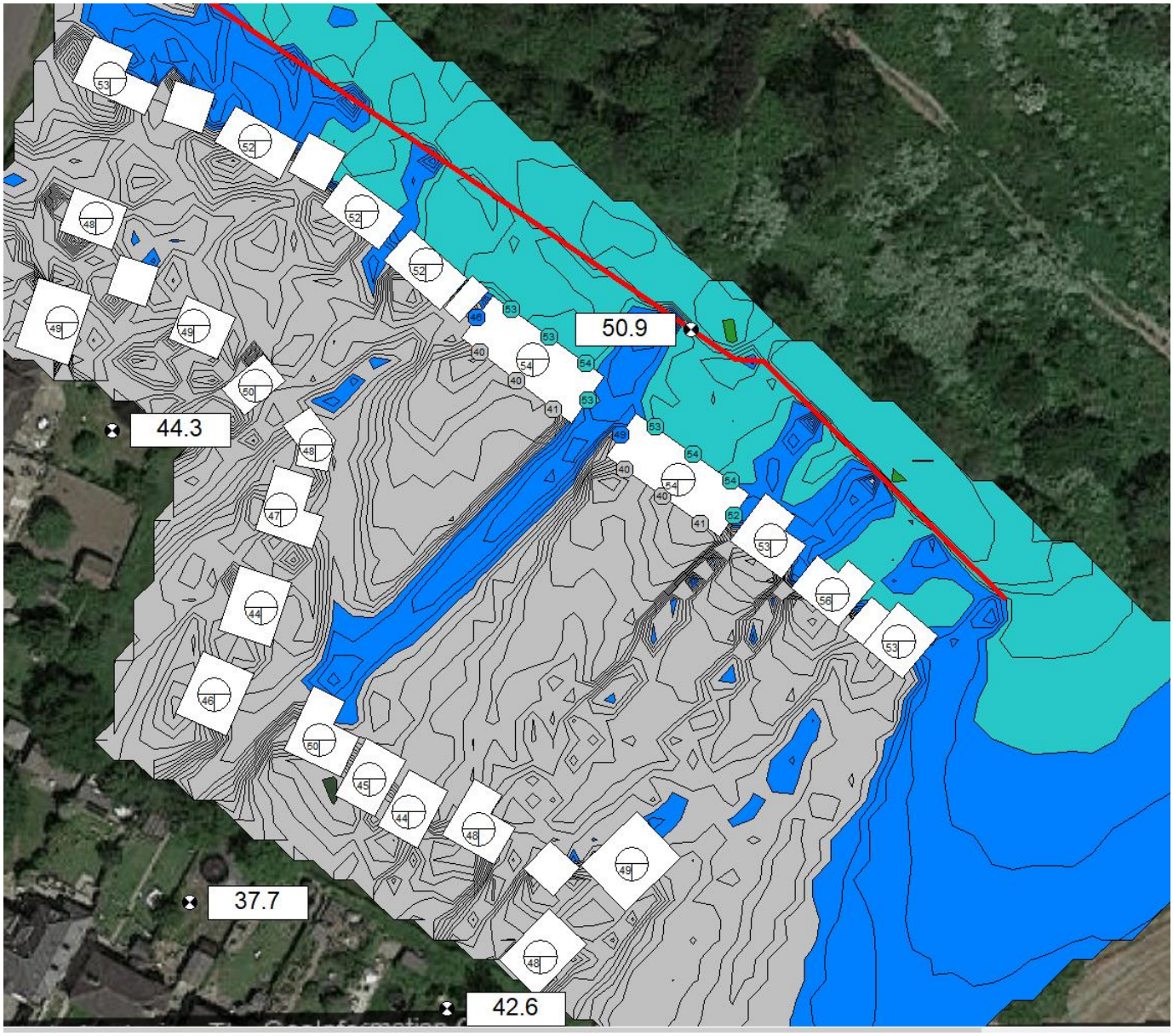


Figure 9 – Typical 16 Hour Average Commercial Noise Levels – Second Floor

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