noise.co.uk Ltd
T+44(0)2476 545 397
F+44(0)2476 545 010
The Haybarn
Newnham Grounds
Kings Newnham Lane
Bretford
Warwickshire
CV23 0JU

Environmental Noise Assessment

Prepared: 27th August 2021

Report No	21696-1
Client	Ducorp Capital Ltd
Site	814 Uxbridge Road Hayes UB4 0RS

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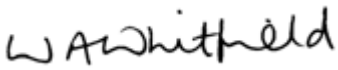
1. Quality Management

Report Number	21696 - 1
Issue	Issue 1
Prepared	27th August 2021
Prepared By	 Jonathan Seiffert BSc, AMIOA
Authorised By	 Bill Whitfield PhD, MSc, MIOA

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3. Executive Summary

3.1.1. An environmental noise assessment has been carried out for a proposed residential development at 814 Uxbridge Road, Hayes, UB4 0RS ("Proposed Development").

3.2. Measurement, Assessment and Evaluation

3.2.1. The survey was carried out to BS7445-1:2003,[1] BS7445-2:1991[2] and BS4142:2014[3] which are covered under our UKAS Accreditation.

3.2.2. The interpretation of the data and the specification of suitable mitigation or treatment are outside the scope of our UKAS accreditation but is covered in our 17025 Quality Management System and reporting procedure.

3.3. Scope

3.3.1. This report covers all aspects of the noise survey, including:

- the identification of acoustic design criteria;
- the identification of specific sound sources;
- an objective sound pressure level survey of the existing site;
- the design of any mitigation to meet the required internal noise criteria.

3.4. Mitigation

3.4.1. Facade sound insulation has been specified in order to mitigate and minimise the sound from the industrial/commercial sources.

3.4.2. The facade sound insulation required to meet the guideline values from BS8233:2014 are summarised in Table 1. The glazing performance has been specified in terms of the road traffic corrected weighted sound reduction index, $R_w + C_{tr}$, and the ventilator performance has been specified in terms of the road traffic corrected element normalised level difference $D_{ne,w} + C_{tr}$.

Living rooms (Daytime)	Bedrooms (Night-time)
Specification 1	
31dB $R_w + C_{tr}$ /37dB $D_{ne,w} + C_{tr}$	29dB $R_w + C_{tr}$ /35dB $D_{ne,w} + C_{tr}$
Specification 2	
34dB $R_w + C_{tr}$ /40dB $D_{ne,w} + C_{tr}$	35dB $R_w + C_{tr}$ /41dB $D_{ne,w} + C_{tr}$

Table 1 – Required facade sound insulation (Glazing/Ventilator)

[1] BS7445-1:2003 "Description and measurement of environmental noise – Part 1: Description of quantities and procedures"
[2] BS7445-2:1991 "Description and measurement of environmental noise – Part 2: Guide to the acquisition of data pertinent to land use"
[3] BS4142:2014 "Methods for rating and assessing industrial and commercial sound"

4. Contents

5. Background

5.1. Noise Policy Statement for England

5.1.1. The Noise Policy Statement for England (NPSE), published in March 2010, states the long-term vision of Government noise policy is to *"promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development".*

5.1.2. This long-term vision is supported by the following aims; through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

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

5.1.3. The intention is that the NPSE should apply to all types of noise apart from noise in the workplace (occupational noise).

5.2. National Planning Policy Framework

5.2.1. The National Planning Policy Framework (NPPF) was published on the 27th of March 2012 and was most recently updated on the 20th July 2021; it sets out the Government's planning policies for England and how these are expected to be applied. The framework states that the planning system should contribute to and enhance the natural and local environment by:

> *"preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability".*

5.2.2. The NPPF requires that new developments be appropriate to their locations such that the effects of pollution on health have been taken into account. Planning policies and decisions should aim to:

1. avoid noise giving rise to significant adverse impacts on health and the quality of life;
2. mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development; and,
3. identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value.

5.2.3. Existing businesses near to proposed development 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.

5.3. National Planning Practice Guidance

5.3.1. The National Planning Practice Guidance (PPG) is a web-based resource, launched by the Department for Communities and Local Government (DCLG) which was published on the 29th November 2016 and is regularly updated to reflect the changes made to the NPPF and make it more accessible.[4]

[4] http://planningguidance.communities.gov.uk/

5.3.2. There are a number of factors that determine whether a noise could be a concern to a receptor. These include: the absolute level of the noise and when it occurs, whether it is existing or new to the area, temporal characteristics, spectral content and the acoustic absorption in the area.

Perception	Examples of outcomes	Effect level	Action
Not noticeable	No effect	No observed effect	No specific measures required
Noticeable 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 (NOAEL)	No specific measures required
Lowest Observed Adverse Effect Level (LOAEL)			
Noticeable 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 (SOAEL)			
Noticeable 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
Noticeable and very intrusive	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, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

Table 2 – Noise exposure hierarchy

5.3.3. It is emphasised in the PPG that the planning process should be used to mitigate and minimise the impact of noise. This could include: engineering the noise sources to be quiet, minimising the impact of noise through layout, using conditions/obligations to restrict activities, mitigating the impact in places where noise is likely to be experienced (e.g. using facade sound insulation).

PPG and Agent of Change

5.3.4. Where residential development is proposed close to existing commercial premises. Suitable mitigation measures may need to be put in place to avoid those activities having a significant adverse effect on future residents.

5.3.5. Where this is the case, the developer (or 'agent of change') would need to identify commercial premises that could cause a noise nuisance. This should include potential future noise sources that may not be present at the time a planning application is made. The agent of change will also need to mitigate and minimise noise to avoid potential significant adverse effects.

> "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)."
>
> **NPPG 009 Reference ID: 30-009-20190722 - Revision date: 22nd July 2019**

5.3.6. What constitutes noise, as opposed to sound, is subjective and there is not a simple relationship between the level of a sound and the impact on those affected but could be dependent on:

- the source and absolute level of the noise;
- the time of day it occurs;
- how a new noise source and/or receiver relates to the existing sound environment; and,
- the time and frequency characteristics of the noise

5.3.7. It is emphasised in the PPG that the planning process should be used to mitigate and minimise the impact of noise. This could include:

- engineering the noise sources to be quiet;
- minimising the impact of noise through layout;
- using conditions/obligations to restrict activities; and,
- mitigating the impact in places where noise is likely to be experienced (e.g. using facade sound insulation).

> "More specific factors to consider when relevant include:"
> "whether any adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time (and the effect this may have on living conditions). In both cases a suitable alternative means of ventilation is likely to be necessary. Further information on ventilation can be found in the Building Regulations."
> **Paragraph: 006 Reference ID: 30-006-20190722 Revision date: 22nd July 2019**

5.3.8. Care should be taken when considering mitigation to ensure the envisaged measures do not make for an unsatisfactory development.

5.3.9. It is possible that noise effects may be counteracted by providing: quiet facades containing habitable rooms, quiet private gardens or balconies, or quiet public amenity space within 5-minute walking distance.

6. Introduction

6.1.1. An environmental noise assessment has been carried out for a proposed residential development at 814 Uxbridge Road, Hayes, UB4 0RS. It is understood that the proposed residential dwellings are planned to be constructed above existing residential and commercial premises.

6.2. Proposed Development

6.2.1. An image showing the proposed location and layout of the Proposed Development is given in Figure 1 with the new section of the building marked up in red.

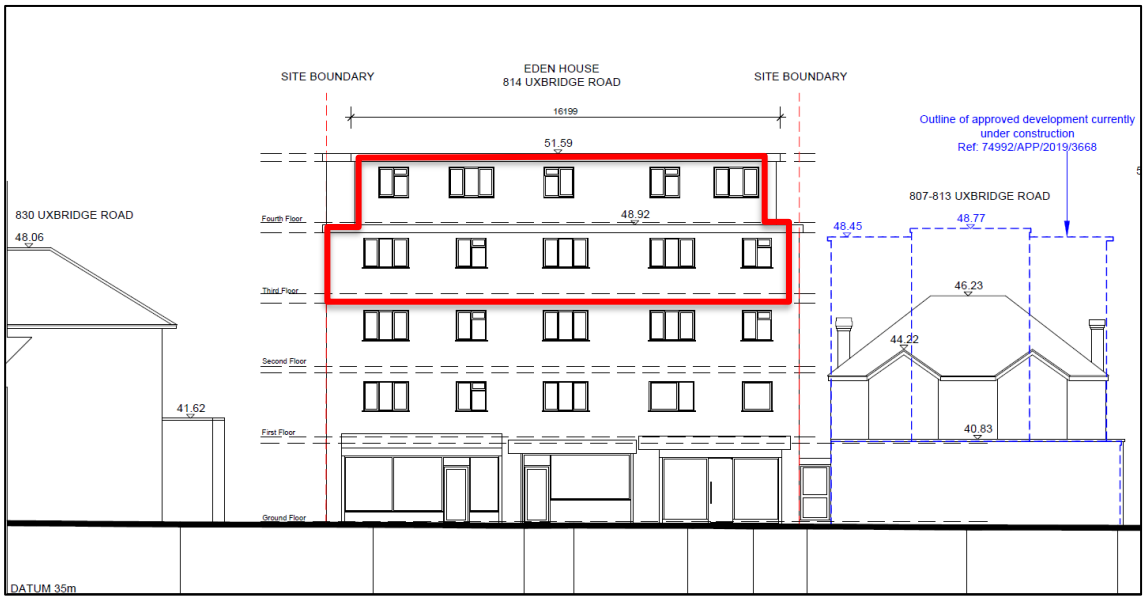


Figure 1 - Plans showing the layout of the Proposed Development

6.3. Noise Climate

6.3.1. The general noise climate in the area was dominated by road traffic noise from Uxbridge Road with a contribution from existing commercial premises in the area.

6.4. Specific Sound Sources

6.4.1. During the survey visits it was noted that there were a number of commercial premises around the proposed development. However, there was no audible noise from any of the commercial premises at the time of the survey. Furthermore, there are existing residential receivers closer to the commercial premises than the proposed development.

7. Assessment Criteria

7.1. BS4142:2014

7.1.1. BS4142 provides methods for rating and assessing ***specific sound sources*** of an industrial and/or commercial nature, which includes: industrial and manufacturing processes, fixed services plant, sound generated by the loading/unloading of goods and sound from mobile plant/vehicles associated with industrial/commercial premises (e.g. fork-lift trucks). The ***assessment location*** is outside a residential receptor.

7.1.2. The standard is specifically precluded from being used to assess the likely impact inside a building or from the assessment of various sound sources for which other (more relevant) guidance exists, including: music/entertainment noise, noise from people and construction noise.

7.1.3. The foundation of the assessment is to establish the following quantities, either by measurement or prediction:

- ***Ambient sound***: The overall sound at the assessment location
- ***Residual sound***: The ambient sound without the specific sound source operating
- ***Specific sound:*** The ambient sound with the specific sound source operating, corrected for residual sound
- ***Background sound***: Residual sound present for 90% of the time

7.1.4. How these quantities relate to the sound that would be measured during a survey has been illustrated in Figure 2.

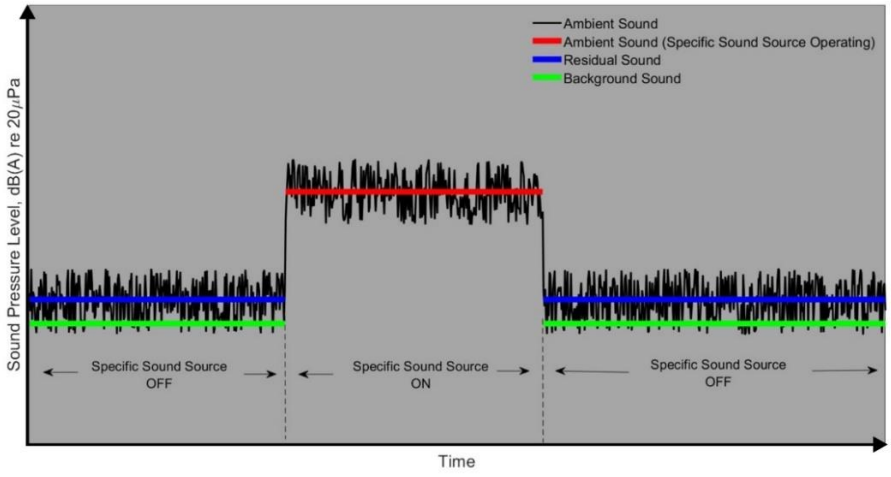


Figure 2 – Diagrammatic illustration of the definitions of ambient, residual, specific and background sound

7.1.5. Once the specific sound level has been determined, this must be corrected for the presence of acoustic features that are audible at the assessment location to determine the ***rating level***:

Rating Level = Specific Sound Level + Character Corrections

7.1.6. Normally it is possible to carry out a subjective assessment of characteristics, based on the following correction guidelines:

- Tonality: +2dB for a 'just perceptible' tone, +4dB for 'clearly perceptible', and rising to +6dB for 'highly perceptible' tones.
- Impulsivity (rapidity of change and overall chance in level): +3 dB for 'just perceptible' impulsivity, +6dB for 'clearly perceptible', rising to +9 dB for 'highly perceptible' impulsivity.
- Intermittency: if the on/off-time of the specific sound is readily distinctive at the noise- sensitive receivers, +3dB.

7.1.7. It should be noted that. where one feature is clearly perceived as dominant, it may be appropriate to apply a single correction. Where multiple features are likely to affect perception and response, each should be added arithmetically.

7.1.8. An estimate of the magnitude of the impact is evaluated by subtracting the measured background sound level at the assessment location from the rating level

Assessment Level = Rating Level – Background Sound Level

7.1.9. Typically, the greater the difference between the background and rating level, the greater the magnitude of impact, although BS 4142 emphasises that this is highly context-specific. As an initial estimate, BS4142 states that:

- A difference (between the background and rating level) of around +10 dB or more is likely to be indicative of significant adverse impact, depending on context
- A difference (between the background and rating level) of around +5 dB or more is likely to be indicative of adverse impact, depending on context
- Where the rating level does not exceed the background level, this is an indication that the specific sound will have a low impact, depending on context

7.1.10. Where the initial estimate of the impact needs to be modified due to the context, other factor should be considered, including: absolute sound levels, the character and level of the residual sound and the sensitivity of the receiver, which includes the effect of building façade sound insulation.

7.2. Guideline Internal Sound Levels

7.2.1. BS8233:2014 draws on the results of research and experience to provide information on the design of buildings that have internal acoustic environments appropriate to their function. The standard provides guideline internal values for dwellings for steady external noise sources. These have been summarised in Table 3.

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

Table 3 – BS8233:2014 guideline values for internal ambient noise levels from steady external noise sources

7.2.2. The guideline values are issued by the World Health Organisation (WHO) and assume normal diurnal fluctuations in external noise. They are expected to be achieved based on normal annual data and not in all circumstances. For example, it is normal to exclude occasional events such as fireworks night or New Year's Eve.

7.2.3. For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50dB $L_{Aeq,T}$ with an upper guideline value of 55dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognised that these guideline values are not achievable in all circumstances where development might be desirable. In such cases, the lowest practicable levels should be achieved in external amenity areas but the development should not be prohibited.

7.3. Ventilation and Overheating Requirements

7.3.1. This section addresses ventilation issues that may conflict with the acoustic design of the building. They are provided for reference purposes only as this report is addressing the acoustic parameters of the development and building design only.

7.3.2. BS8233:2014 states that, if relying on closed windows to achieve the guideline values, there needs to be an appropriate alternative ventilation scheme that does not compromise the facade sound insulation or the resulting noise level. However, rooms should have adequate ventilation, i.e. trickle ventilators should be assumed to be open for any assessment.

7.3.3. Ventilation requirements for dwellings are covered under Building Regulations Approved Document F[5] ("ADF"). It describes the purpose of ventilation as for the removal of stale air from inside a building and replacement with fresh air from outside.

7.3.4. ADF prescribes three types of ventilation provision:

1. **Whole dwelling ventilation** – running continuously (includes background ventilation)
2. **Extract ventilation** – removing vapour/pollutants from a space e.g. from bathrooms and kitchens
3. **Purge ventilation** – manually controlled rapid ventilation

7.3.5. Where a means of ventilation is required as an alternative to open windows, there are four broad categories of ventilation system that each meet the requirements of ADF:

System 1 – Background ventilators and intermittent extract fans
System 2 – Passive stack ventilation
System 3 – Continuous mechanical extract ventilation (MEV)
System 4 – Continuous mechanical supply and extract with heat recovery (MVHR)

Systems 1-3 require penetrations in the facade to allow air to flow into and out of the building. In order to control the noise break-in from external noise sources, it should be checked that the penetration offers sufficient resistance to the passage of sound. The sound insulation of these, typically small, penetrations is often specified in terms of the element normalised sound pressure level difference, $D_{ne,w}$, which is often corrected for the spectrum shape of road traffic using the C_{tr} correction term.

7.3.6. Ventilation provisions, including open windows, will not necessarily meet cooling needs. Building Regulations Approved Document L2a[6] ("ADL2a") requires that overheating be mitigated by controlling the solar gains by means of building orientation, shading and the g-value of the glazing. It recommends that the developer assess the overheating risk using CIBSE TM 37.[7]

7.4. Local Planning Authority Criteria

7.4.1. The local planning authority has provided specific noise-related planning requirements for the Proposed Development. The noise-related requirements have been reproduced in Figure 3.

(h) impacts of noise from any commercial premises on the intended occupiers of the new dwellinghouses;
(i) impacts of the introduction of, or an increase in, a residential use of premises in the area on the carrying on of any trade, business or other use of land in the area;

Figure 3 – Noise related planning requirements provided by the local planning authority

[5] Approved Document F: Means of Ventilation (2010 Edition)
[6] Approved Document L2a : Conservation of Fuel and Power (2013 Edition)
[7] CIBSE Guide TM 37 "Design for Improved Solar Shading Control"

8. Survey

8.1. Measurement Locations

8.1.1. Fixed position monitoring took place at three positions to account for the likely dominant noise sources. The monitoring equipment was located 1.5m from the ground and at least 3m from the next nearest reflecting surface. The monitoring position is shown in Figure 4.

Figure 4 - Noise monitoring locations on site.

8.1.2. The measurement instrumentation used during the survey is detailed in the appendix. The acoustic equipment was calibrated to comply with Section 4.2 of BS7445-1:2003[8] before and after the surveys. The calibration details are also detailed in the appendix.

8.2. Meteorology

8.2.1. During the survey the weather information was noted. This is summarised in Table 4.

	9th August 2021	10th August 2021
Roads (Wet/Dry)	Dry	Dry
Wind Speed (ms^{-1})/Direction	4 / SW	4 / W

Table 4 - Meteorological data noted during the survey

[8] BS7445-1:2003 "Description and measurement of environmental noise – Part 1: Guide to quantities and procedures"

8.3. Measurement and Timescale

8.3.1. Unattended monitoring was carried out between 9th August 2021 and 10th August 2021. The measurements that have been made are summarised in Table 5.

Monitoring position	Date	Type	Quantity
1	09/08/2021 – 10/08/2021	Unattended	$L_{Aeq,5min}$
2	09/08/2021 – 10/08/2021	Unattended	$L_{A90,15min}$
3	09/08/2021 – 10/08/2021	Unattended	$L_{Aeq,5min}$

Table 5 – Measurements made at the site of the Proposed Development

8.3.2. Sound pressure measurements were subsequently averaged into hourly, daytime and night-time periods. The acoustic measurements and their interpretation have been in accordance with BS 7445: Parts 1, and 2[9]. All sound pressure levels are in dB (re 20μPa).

8.4. Results Summary

Average Sound Pressure Levels

8.4.1. The fixed position external measurement results are summarised in Table 6.

Measurement location	Daytime dB, $L_{Aeq,16hr}$	Night-time dB, $L_{Aeq,8hr}$
1	66.0	59.0
3	68.3	64.3

Table 6 - Summary of the external sound pressure levels measured

Background Sound Levels

8.4.2. Figure 5 shows the results of the data analysis in terms of the frequency of occurrence of each data value during the daytime and the night-time.

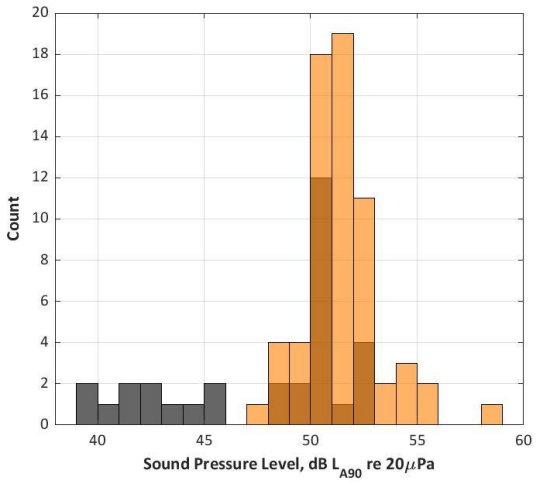


Figure 5 – Distribution of background sound levels during the daytime (07:00-23:00) and night-time (23:00-07:00)

8.4.3. As can be seen in Figure 5 the background sound levels ranged between 47dB $L_{A90,15min}$ and 58dB $L_{A90,15min}$ during the daytime period and that the background sound levels ranged between 39dB $L_{A90,15min}$ and 52dB $L_{A90,15min}$ during the night-time period.

8.4.4. The typical background sound level has been taken to be 52dB $L_{A90,15min}$ during the daytime and 50dB $L_{A90,15min}$ for the night-time.

[9] BS7445-2:1991 "Description and measurement of environmental noise – Part 2: Guide to the acquisition of data pertinent to land use"

Specific Sound Levels

8.4.5. During the survey it was noted that there were commercial premises on the ground floor of the existing building and adjacent to the development (An Afghan Restaurant). There are existing residential receivers nearer to the commercial premises than the proposed development. The noise from existing specific sound sources will affect the existing receivers on the proposed development which are closer than the proposed dwellings on the extension to the building. Any specific noise emissions will therefore be controlled by the nearest receiver position. Therefore, for the purposes of this assessment, mitigation has been specified to allow the proposed residential dwellings on the upper floors to achieve the internal guideline values from BS8233:2014. It is noted that the determining factor in the noise mitigation is the dominant road traffic noise affecting the property from the main Uxbridge Road for which we have 24 hour sound pressure level data at two locations that represent the direct line of sight noise impact on the proposed development. This is true for both day and night time periods.

9. Mitigation

9.1. Methodology

9.1.1. Based on the measured and predicted free-field sound pressure levels at the worst affected facades, the simple calculation method from BS8233:2014 has been used to determine the necessary sound reduction to meet the guideline values. Standard forms of construction are assumed such that the glazing is likely to be the lowest performing facade element.

9.2. Required Mitigation

9.2.1. The single figure glazing and ventilator performance requirements in order to achieve the internal design criteria are summarised in Table 7. The glazing performance has been specified in terms of the road traffic corrected weighted sound reduction index, $R_w + C_{tr}$, and the ventilator performance has been specified in terms of the road traffic corrected element normalised level difference $D_{ne,w} + C_{tr}$.

Living rooms (Daytime)	Bedrooms (Night-time)
Specification 1	
31dB $R_w + C_{tr}$ /37dB $D_{ne,w} + C_{tr}$	29dB $R_w + C_{tr}$ /35dB $D_{ne,w} + C_{tr}$
Specification 2	
34dB $R_w + C_{tr}$ /40dB $D_{ne,w} + C_{tr}$	35dB $R_w + C_{tr}$ /41dB $D_{ne,w} + C_{tr}$

Table 7 – Required facade sound insulation (Glazing/Ventilator)

9.3. Glazing and Ventilator Specifications

9.3.1. The glazing and ventilator performance has been specified based on the performance data provided by Saint-Gobain and Greenwood Airvac. These are suggested configurations and any other glazing and vent combination can be used provided it achieves the minimum performance levels given in Table 7. The recommended glazing specification is given in Table 8.

Living rooms (Daytime)	Bedrooms (Night-time)
Specification 1	
Saint Gobain 4(6)6	Saint Gobain 4(12)6
Specification 2	
Saint Gobain 6(12)10	Saint Gobain 10(20)6

Table 8 - Our recommended glazing configurations

9.3.2. Should penetrations be required for ventilation purposes our recommended ventilator configurations, calculated to work in conjunction with the above glazing specifications, are summarised in Table 9. The specification provides an equivalent area of at least 5000mm^2. It should be checked by a suitably qualified person that this ventilator specification meets the requirements of Approved Document F.[10]

Living rooms (Daytime)	Bedrooms (Night-time)
Specification 1	
Greenwood 5000EAW.AC1	Greenwood 5000EAW.AC1
Specification 2	
Greenwood MA3051 (x2)	Greenwood MA3051 (x2)

Table 9 - Our recommended ventilator configurations.

9.3.3. Given the assumptions in this method the information in this section should be treated as general guidance only. The acoustic performance of third-party products cannot be guaranteed by noise.co.uk.

9.3.4. It should be noted that, in order to meet the internal ambient noise criteria in these areas, the windows will need to remain closed.

9.4. Element 3: External Amenity Area Noise Assessment

9.4.1. The client has confirmed that there are no external amenity areas associated with this development.

[10] Approved Document F: Means of Ventilation (2010 Edition)

10. Conclusions

10.1.1. An environmental noise assessment has been carried out at the site of a proposed residential development at 814 Uxbridge Road, Hayes, UB4 0RS to determine typical ambient sound levels. The sound pressure levels have been used to calculate the required facade sound insulation to meet the guideline internal levels from BS8233:2014 based on the dominant noise source which is the road traffic on Uxbridge Road. This also ensures the noise mitigation proposed addresses and noise egress from any of the specific commercial sources that are currently located on the lower ground floor of the development building or adjacent to the development (The Afghan Restaurant). The occupants will therefore be suitably protected from all noise sources affecting the residential facades.

10.1.2. Table 7 in section 9 gives the required facade sound reduction by any glazing and ventilator combination to be compliant with the internal guideline values for bedrooms and living rooms.

10.1.3. We strongly recommend that this report be passed to the local planning authority for approval prior to any works being carried out.

11. Appendix

APPENDIX A: Summary Information

Required ISO Test Report Information (cross referenced where required)			
		Measurements carried out to:	Analysed to:
A	Standards	BS 7445-1: 2003 BS 7445-2: 1991 BS4142:2014	BS 8233:2014 BS4142:2014
B	Organisation performed the measurements	noise.co.uk Ltd, The Haybarn, Newnham Grounds, Kings Newnham Lane, Bretford, Coventry, CV23 0JU.	
C	Name of Client	Ducorp Capital Ltd	
D	Full site address	814 Uxbridge Road Hayes UB4 0RS	
E	Date of surveys	Survey Date: 9th August 2021 – 10th August 2021	
F	Description & identification of Proposed Development	It is proposed to develop the site for residential use.	
G	Brief Description of details of Procedure & equipment	See Section 5 of this report.	

APPENDIX B: Technical Appendix

11.1.1. Measurements were made using the following equipment:

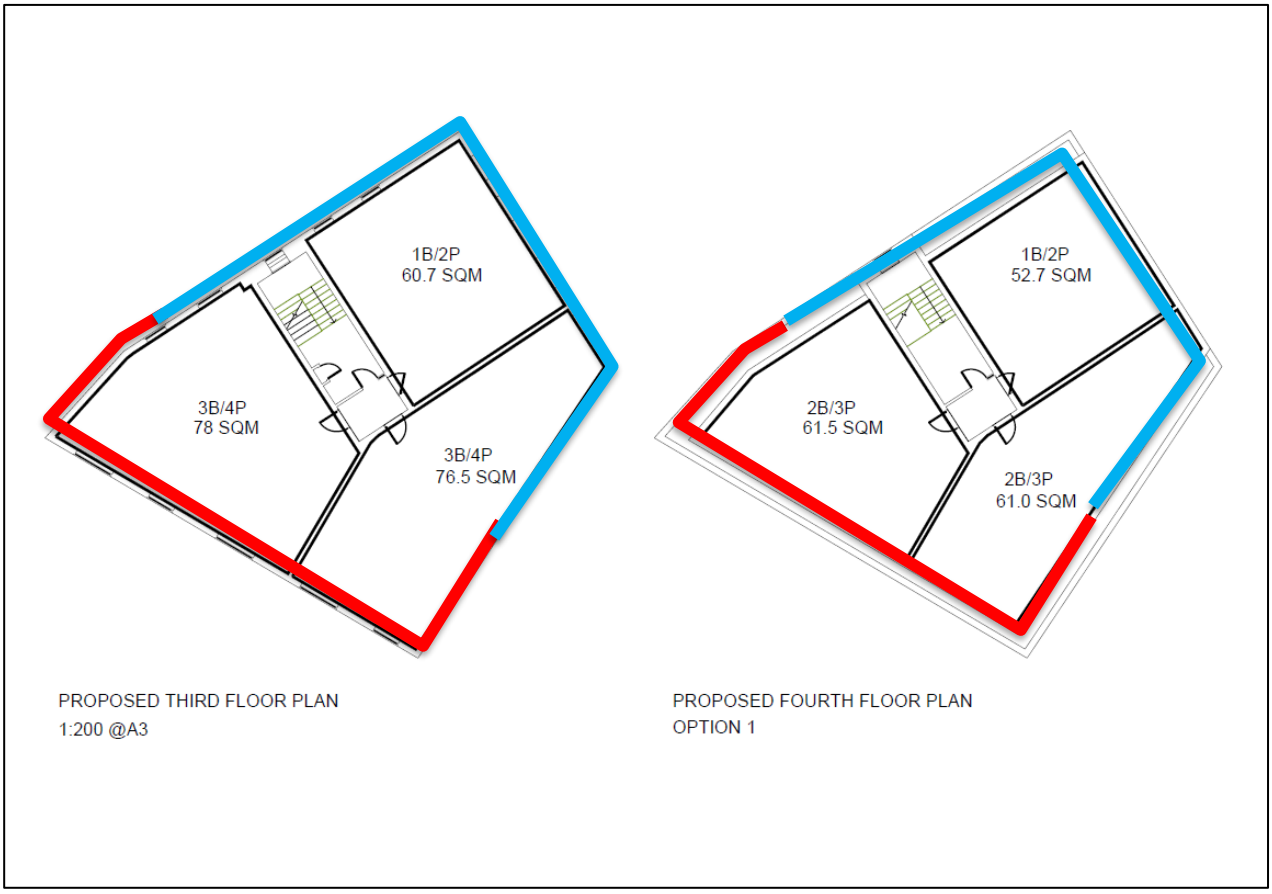
Monitoring Position	Sound Level Meter (Serial Number)	Calibrator (Serial Number)
1	SoftdB Piccolo 2 (PO221070105)	BSWA CA114 (590010)
2	SoftdB Piccolo 2 (PO221070104)	BSWA CA114 (590010)
3	SoftdB Piccolo 2 (PO221070106)	BSWA CA114 (590010)

11.1.2. The equipment has traceable calibration. The sound level meter was calibrated immediately prior to and immediately after the measurements were carried out.

Sound Level Meter	Before	After
SoftdB Piccolo 2 (PO221070105)	94.0 dB	94.0 dB
SoftdB Piccolo 2 (PO221070104)	94.0 dB	94.0 dB
SoftdB Piccolo 2 (PO221070106)	94.0 dB	94.0 dB

11.1.3. There was no adverse deviation.

APPENDIX C: Glazing Mark-Up Plan



Living rooms (Daytime)	Bedrooms (Night-time)
Specification 1	
31dB $R_w + C_{tr}$ /37dB $D_{ne,w} + C_{tr}$	29dB $R_w + C_{tr}$ /35dB $D_{ne,w} + C_{tr}$
Specification 2	
34dB $R_w + C_{tr}$ /40dB $D_{ne,w} + C_{tr}$	35dB $R_w + C_{tr}$ /41dB $D_{ne,w} + C_{tr}$