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PROPOSED RESIDENTIAL DEVELOPMENT

LAND AT WOODGATE NURSERIES, LIDSEY ROAD, WOODGATE

NOISE AND VIBRATION ASSESSMENT

Technical Report: R10444-1 Rev 1

Date: 23rd July 2024

For: Hanbury Properties
17 Northgate
Chichester
West Sussex
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24 Acoustics Document Control Sheet

Project Title: Land at Woodgate Nurseries, Lidsey Road, Woodgate –
Noise and Vibration Assessment

Report Ref: R10444-1 Rev 1

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Document Status and Approval Schedule

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1.0 INTRODUCTION

- 1.1 24 Acoustics Ltd has been instructed by Hanbury Properties to undertake a noise and vibration assessment at land at Woodgate Nurseries, Lidsey Road, Woodgate, in connection with a proposed residential development.
- 1.2 Noise arising from road traffic on Lidsey Road to the east and from the railway to the north are the primary sources of ambient noise on the site. Vibration from the railway and noise associated with the nearby Prince of Wales Public House also require consideration. Accordingly, this noise and vibration impact assessment has included:
- Environmental noise and vibration monitoring;
 - Consideration of the noise arising from nearby sources affecting the site;
 - Assessment of internal noise levels within the proposed dwellings;
 - Assessment of external noise levels within garden areas;
 - Assessment of vibration from the railway.
- 1.3 Lidsey Landfill is located to the west of the proposed residential site. The Landfill site is no longer accepting waste and is now in a state of restoration and aftercare. Noise from generator plant at Lidsey landfill is subject to an existing planning condition (reference AL/88/06, condition 6). As the generator plant is over 600m from the closest proposed dwellings, at this distance there would be no breach of the landfill site's noise-related planning conditions as a result of the new development. Noise from Lidsey Landfill has therefore not been considered further in this assessment.
- 1.4 This report presents the results of the assessment, following site visits and ambient noise and vibration surveys undertaken in November 2023.
- 1.5 An explanation of acoustical terms used in this report is provided in Appendix A. All sound pressure levels in this report are given in dB re: 20 μ Pa.

2.0 SITE DESCRIPTION

2.1 The site is currently a former plant nursery, horticultural nurseries and adjacent agricultural land. The site is bounded by Lidsey Road (A29) to the east and the adjacent Thakeham Homes scheme (residential development) which is currently under construction. To the north is the railway line, to the south are derelict nurseries and to the west is further agricultural land. The Prince of Wales Public House is located adjacent to the north-eastern corner of the site. The consented site at Land West of Lidsey Road (A29) is located further to the south.

2.2 A site location plan is provided in Figure 1.

2.3 It is proposed to submit an outline application to redevelop the site for up to 130 dwellings, as described below.

"Outline planning application with all matters reserved except access for residential development of the site with up to 130 dwellings (Use Class C3), informal and formal public open space, landscaping, drainage, and other associated works."

2.4 The illustrative masterplan layout is shown in Figure 2.

2.5 While at this stage the proposals are in outline, the illustrative masterplan has evolved based upon a thorough review, understanding and consideration of noise impacts from existing noise sources. This is currently demonstrated by the deployment of large landscape and open space buffers, particularly adjacent to the Prince of Wales Public House to the north-east. In this area of the site, the indicative scheme is separated from the public house (via its current car park) and Lidsey Road, with a buffer space to new residential receptors. Similarly, a buffer zone has also been created between the northern site boundary with the railway line and the new residential receptors.

3.0 ASSESSMENT CRITERIA

National Planning Policy Framework and Noise Policy Statement for England

3.1 The National Planning Policy Framework (NPPF) [Reference 1], states in relation to noise that planning policies and decisions should aim to:

- Mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;
- Identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

3.2 The NPPF also refers to the Noise Policy Statement for England (NPSE) [Reference 2] which is intended to apply to all forms of noise, including environmental noise, neighbour noise and neighbourhood noise. The NPSE sets out the Government's long-term vision to 'promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development' which is supported by the following aims.

- Avoid significant adverse impacts on health and quality of life;
- Mitigate and minimise adverse impacts on health and quality of life.

3.3 The NPSE defines the concept of a 'significant observed adverse effect level' (SOAEL) as 'the level above which significant adverse effects on health and quality of life occur'. The following guidance is provided within the NPSE:

"It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available."

- 3.4 The National Planning Practice Guidance (NPPG) [Reference 3] is written to support the NPPF with more specific planning guidance. The NPPG reflects the NPSE and states that noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. The NPPG states that noise can over-ride other planning concerns but should not be considered in isolation from the other economic, social and environmental dimensions of the proposed development.
- 3.5 The NPPG expands upon the concept of SOAEL (together with Lowest Observable Adverse Effect Level, LOAEL and No Observed Effect Level, NOEL) as introduced in the NPSE and provides a table of noise exposure hierarchy for use in noise impact assessments in the planning system.
- 3.6 The NPPF, NPSE and NPPG documents do not refer to specific noise criteria. For residential developments 24 Acoustics considers that the spirit of the requirements of the NPPF and NPSE will be complied with if criteria and guidance from British Standard 8233: 2014 are adopted.

BS 8233: 2014

- 3.7 BS 8233:2014 [Reference 4] provides design guidance for dwelling houses, flats and rooms in residential use and recommends that internal noise levels in dwellings do not exceed 35 dB $L_{Aeq,16 \text{ hour}}$ in living rooms and bedrooms during the day, 40 dB $L_{Aeq, 16 \text{ hour}}$ in dining rooms during the day and 30 dB $L_{Aeq, 8 \text{ hour}}$ in bedrooms at night.
- 3.8 The standard states that the above limits apply to steady external noise sources without specific character, and also states the following:

"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."

- 3.9 BS 8233 also notes that "Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or L_{Amax,f_r} depending on the character and number of events per night."

- 3.10 The World Health Organisation (WHO) [Reference 5] provides guidance on desirable internal noise levels to minimise the risk of sleep disturbance. The WHO guidelines suggest internal noise levels not exceeding 30 dB $L_{Aeq,8hr}$ or regularly exceeding 45 dB $L_{Amax,f}$ for 'a good night's sleep'.

Professional Practice Guidance on Planning & Noise (ProPG)

- 3.11 The Professional Practice Guidance on Planning and Noise (ProPG) [Reference 6] was published jointly by the Association of Noise Consultants, Institute of Acoustics and Chartered Institute of Environmental Health in May 2017. The guidance relates to the consideration of existing sources of transportation noise upon proposed new residential developments.
- 3.12 It is important to note that the guidance in ProPG does not constitute an official government code of practice and neither replaces nor provides an authoritative interpretation of the law or government policy. It is provided for guidance only and has no formal place within planning legislation.

Entertainment Noise

- 3.13 The Institute of Acoustics' document Good Practice Guide on the Control of Noise from Pubs and Clubs considers the audibility of noise and refers to the Code of Practice on Environmental Noise Control at Concerts.
- 3.14 The code considers suitable music noise levels for up to 30 events per year. The Prince of Wales Public House licence allows for predominantly daytime live and amplified music with a limited number of permitted events later than 23:00 hours. The pub advertises music events approximately once per month and resulting noise levels would be expected to vary. The type of event and equipment used will greatly affect levels of break-out noise.
- 3.15 The following assessment therefore considers the licensing restrictions in light of the proximity of existing residential properties. Consideration is given to predicted music noise levels and the resulting noise levels at the proposed residential properties.

BS 6472-1: 2008 Guide to Evaluation of Human Exposure to Vibration in Buildings

- 3.16 The assessment of human response to vibration within buildings is currently guided by BS 6472-1 (Reference 7). The relevant criteria are summarised below.

- 3.17 Where vibration occurs as a series of events, as in the case of train pass-bys, BS 6472 indicates that Vibration Dose Values (VDVs) should be used. Human response to vibration in buildings is assessed in terms of VDVs defined over daytime and night-time periods.
- 3.18 The human body is most sensitive to vibration in the vertical direction (head to foot). The standard defines values of VDV which are likely to cause varying degrees of adverse comment and these are summarised in Table 1.

Place and Time	Vibration Dose Value, m/s 1.75		
	Low Probability of Adverse Comment	Adverse Comment Possible	Adverse Comment Probable
Residential 16-hour day (07:00 to 23:00)	0.2 to 0.4	0.4 to 0.8	0.8 to 1.6
Residential 8-hour night (23:00 to 07:00)	0.1 to 0.2	0.2 to 0.4	0.4 to 0.8

Table 1: Vibration Dose Values and Subjective Response

Local Authority Policy

- 3.19 The Arun Local Plan 2011-2031 was adopted in July 2018 [Reference 8]. Policy QE SP1 (Quality of the Environment) refers to noise exposure categories (NECs) for new residential developments affected by noise from transportation or mixed sources. Policy QE DM1 (Noise Pollution) also comments on noise from industrial and commercial sources.
- 3.20 The Sussex Planning Noise Advice Document 2021 [Reference 9] states, that for noise sensitive developments, measures are provided to achieve internal noise levels specified in BS 8233 and WHO Guidance and careful consideration should be given to proposals near to existing commercial sources (including entertainment premises). The document also refers to the threshold Vibration Dose Values (VDVs) from BS 6472-1 for the assessment of vibration from sources such as a railway line.

Summary of Noise and Vibration Criteria

- 3.21 The impact of noise upon the site has been assessed using the following methodology:

- BS 8233: 2014 and the WHO Guidelines for recommended internal noise levels, inside the properties from road and rail traffic noise. An upper internal daytime level of 35 dB $L_{Aeq, 16 \text{ hour}}$ for bedrooms and living rooms should apply; and a night-time level for bedrooms of 30 dB $L_{Aeq, 8 \text{ hour}}$ should apply. Similarly, a maximum night-time internal level of 45 dB $L_{Amax, fast}$ should apply in bedrooms for regular events.
- Assessment of predicted music noise levels from the public house against existing ambient noise levels during relevant periods (19:00 to 23:00 hours) as well as consideration to internal music noise levels within the proposed dwellings.
- BS 6472-1 for the assessment of rail vibration affecting proposed dwellings. It is considered that vibration should not exceed the 'low probability of adverse comment' range.

3.22 The above criteria are considered to be in line with Arun District Council's Local Plan, Policies QE SP1 & QE DM1 and The Sussex Planning Noise Advice Document.

4.0 ENVIRONMENTAL NOISE AND VIBRATION MEASUREMENTS

4.1 Environmental noise and vibration surveys were undertaken on site between 21st and 27th November 2023. The following instrumentation was used during the surveys:

- | | |
|--|-------------|
| • 1 x Rion Type 1 sound level meter: | Type NL-52; |
| • 2 x Svantek precision sound and vibration level meter; | Type 958; |
| • 2 x Dynatron tri-axial accelerometer | Type 323A; |
| • Brüel and Kjær Class 1 acoustic calibrator: | Type 4231. |

4.2 The equipment was set-up in the following locations as shown in Figure 1:

- Location 1 (Noise) – North-eastern corner of site, close to Lidsey Road and the Prince of Wales public house
- Location 2 (Noise and Vibration) – Approximately 6m from the northern site boundary with the railway line
- Location 3 (Noise and Vibration) – South of Location 3, approximately 24m from the northern site boundary

- 4.3 The sound level meters were configured to monitor in 1 minute sample periods and were set up to measure and store overall A-weighted and linear octave band statistical parameters including the L_{eq} , L_{90} , and $L_{max,f}$ sound pressure levels. Noise measurements were made in accordance with BS 7445: 1991 'Description and measurement of environmental noise Part 2 - Acquisition of data pertinent to land use' [Reference 10]. The equipment was located in free-field conditions at a height of approximately 1.5 m above local grade level and an environmental wind shield was fitted.
- 4.4 The vibration measurements were undertaken in terms of the Vibration Dose Value, as defined in BS 6472, in $m/s^{1.75}$ in three axes of motion (defined as X (longitudinal), Y (lateral) and Z (vertical), all relative to the surroundings). The accelerometers were levelled and mounted directly on the ground via a mounting plate. The accelerometer was well coupled with the ground in free field conditions.
- 4.5 Calibration of all instrumentation was checked before and on completion of the measurements and no drift was found. The calibration of all 24 Acoustics' equipment is traceable to National Standards.
- 4.6 The weather during the survey was mainly fine and dry with wind speeds generally lower than 5 m/s.

Noise Measurement Results

- 4.7 The results of the long-term noise measurements at Location 1 (north-east corner of site) are presented graphically in Appendix B and are summarised in Table 2 below.

Date	Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)	
	$L_{Aeq, 16\text{ hr}}$	$L_{Aeq, 8\text{ hr}}$	Typical $L_{Amax,f}$
Tuesday 21/11/2023	61 *	53	69
Wednesday 22/11/2023	60	53	69
Thursday 23/11/2023	60	53	70
Friday 24/11/2023	60	52	70
Saturday 25/11/2023	58	51	69
Sunday 26/11/2023	58	52	68
Monday 27/11/2023	61 *		
Design Level	60	52	69

Table 2: Location 1 (north-east corner of site) - Ambient Noise Survey Results
*partial sample

- 4.8 The results of the long-term noise measurements at Location 2 (facing railway line) are presented graphically in Appendix B and are summarised in Table 3.

Date	Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)	
	$L_{Aeq, 16\text{ hr}}$	$L_{Aeq, 8\text{ hr}}$	Typical $L_{Amax, f}$
Tuesday 21/11/2023	57 *	55	80
Wednesday 22/11/2023	57	55	79
Thursday 23/11/2023	57	56	81
Friday 24/11/2023	58	54	80
Saturday 25/11/2023	57	52	78
Sunday 26/11/2023	56	53	79
Monday 27/11/2023	57 *	-	-
Design Level	57	54	79

Table 3: Location 2 (facing railway line) Ambient Noise Survey Results

*partial sample

- 4.9 24 Acoustics determines the typical L_{Amax} to be the 10th highest L_{Amax} level over the measurement period.
- 4.10 Noise from road traffic on Lidsey Road was the primary source of ambient noise at Location 1. Noise levels at this location were also affected by generator plant on the construction site to the south during weekday daytime hours and relevant periods have been omitted from the analysis.
- 4.11 Noise from passing trains determined the measured noise levels at Location 2. Analysis of train timetable data confirms that there were some freight train movements as well as regular passenger trains, during daytime and night-time periods.
- 4.12 Short-term noise levels at Location 3 during the daytime were in the order of 54 dB $L_{Aeq, T}$ with maximum events from train pass-bys in the order of 71 to 78 dB $L_{Amax, f}$.
- 4.13 It was noted that the nursery site to the south of the proposed site is now derelict and no other significant noise sources were observed.
- 4.14 Should the derelict nursery site come back to use again in the future, the main sources of noise would be the delivery area, access road and car park. From the site layout of the existing nurseries, the access road and car park are located to the south-east of the site, at a significant distance from the proposed properties. Noise from the nurseries, should they come back into use again, is therefore not expected to have an adverse impact on the proposed development.

Vibration Measurement Results

- 4.15 The results of the long-term vibration measurements at Location 2 are summarised in Table 4 below, in terms of the daytime and night-time VDV_s in the most-affected (vertical) axis.

Date	Vibration Dose Values (m/s ^{1.75})	
	Day (07:00 – 23:00)	Night (23:00 – 07:00)
Tuesday 21/11/2023	0.09 *	0.04
Wednesday 22/11/2023	0.05	0.04
Thursday 23/11/2023	0.05	0.04
Friday 24/11/2023	0.05	0.04
Saturday 25/11/2023	0.05	0.04
Sunday 26/11/2023	0.05	0.04
Monday 27/11/2023	0.04 *	-
Design Level	0.09	0.04

Table 4: Location 2 Vibration Survey Results (vertical axis)

*partial sample

- 4.16 Short-term measured vibration levels at location 3 were in the order of 0.01 m/s^{1.75} VDV.
- 4.17 During the site visits, vibration from train pass-bys was not perceptible within the site.

5.0 CALCULATIONS AND ASSESSMENT

Assessment – Internal Noise Levels

- 5.1 As it is proposed to submit an outline planning application, the exact locations / orientations of dwellings, floor layouts and elevations are currently unknown and will be left to reserved matters. The application is supported however by an illustrative masterplan.
- 5.2 The following assessment has therefore been undertaken based on the illustrative masterplan by Davies Landscape Architects provided to 24 Acoustics in June 2024 and is shown in Figure 2. The assessment should be updated during the detailed design stages, once further details are available.
- 5.3 Using the measured noise levels at Locations 1 and 2, distance corrections have been applied in order to calculate the ambient noise levels from road and rail traffic sources at the façades of the proposed properties.
- 5.4 A preliminary analysis has been undertaken to determine indicative acoustic requirements for the external façade elements, based on the submitted illustrated masterplan as this is an outline application. Detailed floorplans and elevations will not be available until reserved matters, therefore preliminary calculations are based on typical room sizes, volumes and glazed areas. A room size of 3 m x 3 m x 2.3 m has been assumed for a typical bedroom, with a glazed window area of 3 m² and a masonry façade construction.
- 5.5 Based on the corrected noise levels, calculations have been undertaken to determine preliminary acoustic requirements for windows and ventilators, which will ensure that noise levels do not exceed the criteria set out in Section 3.
- 5.6 The calculations have assumed that external wall construction will comprise a cavity masonry construction or similar, which is expected to achieve a minimum sound insulation performance of 52 dB R_w.
- 5.7 The minimum acoustic requirements for the windows and ventilators, for all habitable rooms are summarised in Table 5 below.

Zone	Room	Window Type	Ventilation Type
Zone 1	Bedrooms & Living Rooms	Window Type A	Vent Type A
Zone 2	Bedrooms & Living Rooms	Window Type B	Vent Type B
Zone 3	Bedrooms & Living Rooms	Window Type B	Vent Type C

Table 5: Acoustic Window and Ventilation Requirements

5.8 The indicative acoustic performance requirements for the window types are stated below in Table 6.

Window	Minimum SRI (dB) per Octave Band Centre Frequency (Hz)					
	125	250	500	1k	2k	4k
Window Type A	25	25	33	44	44	49
Window Type B	24	20	25	35	38	35

Table 6: Indicative Window Performances

5.9 In making a comparison with the values in Table 4, it is important that the window figures used are the result of tests in accordance with ISO 10140, Part 2: 2010 and that the quoted minimum sound reduction specifications are met by the entire window system as a whole, including frames, seals, any insulated panels and not just the glass. The requirements also apply to any external glazed doors to habitable rooms.

5.10 For guidance the following window configurations, if installed properly, would be capable of achieving the required sound reduction performance:

- Window Type A: 6 mm glass: 12 mm cavity (minimum): 8.4 mm Stadip Silence glass (37 dB R_w)
- Window Type B: 4 mm glass: 12 mm cavity (minimum): 4 mm (31 dB R_w)

5.11 The indicative acoustic performance requirements for ventilation types are shown in Table 7.

Ventilation	Minimum $D_{n,e,w}$ (dB) per Octave Band Centre Frequency (Hz)					
	125	250	500	1k	2k	4k
Vent Type A	41	39	36	43	45	45
Vent Type B	38	38	34	32	42	49
Vent Type C	23	26	29	30	33	33

Table 7: Indicative Ventilator Performance

5.12 The ventilation acoustic specifications in Table 7 assume up to 2No. ventilators per habitable room and relate to the following overall minimum sound insulation performance ratings for guidance:

- Type A: 42 dB $D_{n,e,w}$, e.g. acoustically attenuated trickle ventilator or through-wall ventilator
- Type B: 36 dB $D_{n,e,w}$, e.g. acoustically attenuated trickle ventilator
- Type C: 31 dB $D_{n,e,w}$, e.g. standard trickle ventilator

5.13 In making a comparison with the above ventilator specifications, it is important that the figures used are the result of laboratory tests with the vent in the open position.

5.14 The ventilation systems should allow for adequate ventilation to meet background ventilation requirements as per Part F of the Building Regulations [Reference 11]. The specific ventilation requirements (e.g. equivalent free area etc.) should be confirmed by others.

5.15 The above indicative assessment demonstrates that the internal noise level criteria (outlined in Section 3) would be readily achievable, subject to the appropriate specification and design of the external façade elements. This assessment should be updated for the reserved matters, once further details are available.

Noise levels in External Amenity Areas

5.16 Private gardens will be provided for each property, as shown in Figure 2. Due to their orientation, the majority of rear gardens will be also screened from road and rail sources by the new buildings.

- 5.17 It is recommended that all gardens with line of sight to Lidsey Road and/or the railway line are enclosed with a minimum 1.8m high close-boarded timber fence, of minimum mass per unit area 10 kg/m².
- 5.18 Based on the measured noise levels and the screening provided by the new building and proposed solid fencing, noise levels in all gardens would be lower than 55 dB L_{Aeq,16 hour} and hence acceptable.

Prince of Wales Public House

- 5.19 The Prince of Wales public house lies directly north-east of the site and comprises a car park to the west and external seating area to the north which is well screened from the proposed development.
- 5.20 Licencing information for the premises has been obtained from the online register and is summarised below:
- Live and amplified music between the hours of 19:00 to 23:00 hours Monday to Sunday and;
 - Usually solo or duo once or twice weekly. Xmas Eve, Xmas Day, Boxing Day, New Years Eve & Day, Good Friday, Easter Saturday, Sunday & Monday and all other bank holidays from 19:00 until 01:00.
 - Disco as alternative for live music. Xmas Eve, Xmas Day, Boxing Day, New Years Eve & Day, Good Friday, Easter Saturday, Sunday & Monday and all other bank holidays from 19:00 until 01:00
- 5.21 With reference to the Prince of Wales' social media sites and online adverts, live and amplified music events occur relatively infrequently (approximately once a month) and have previously comprised low key live music events.
- 5.22 No music events occurred during the on-site noise survey between 21st and 27th November 2023. To determine noise levels from potential entertainment sources from the Prince of Wales, incident at the proposed development, 24 Acoustics' library database for amplified music noise has been referenced and is shown in Table 8.

Minimum SRI (dB) per Octave Band Centre Frequency (Hz)									
Noise Source	63	125	250	500	1k	2k	4k	8k	dBA
Amplified Music	100	100	95	90	90	85	85	75	95

Table 8: Music Source Noise Data

5.23 Assuming the door to the pub's southern facade and all windows at the pub remain closed during events, the following music noise levels would be anticipated outside the closest habitable room windows of the proposed development:

- Overall external music noise levels in the region of 39 dB L_{Aeq} .
- Low frequency external music noise levels in the region of 44 dB $L_{eq, 63Hz}$ and 44 dB $L_{eq, 125 Hz}$.

5.24 The predicted overall external music noise levels outside the closest proposed dwelling are described alongside the ambient noise levels during the evening period (19:00 to 23:00 hours), corrected from measurement Location 1, in Table 9.

Predicted External Music Noise Level	Typical External Ambient Noise Level
39 dB $L_{Aeq, T}$	52 dB $L_{Aeq, T}$
44 dB $L_{eq, 63Hz}$	55 dB $L_{eq, 63Hz}$
44 dB $L_{eq, 125 Hz}$	51 dB $L_{eq, 125 Hz}$

Table 9: Assessment of External Noise Levels from Pub Music Events.

5.25 Music noise levels within the proposed properties would be significantly lower than the values in Table 9.

5.26 Based on social media sites and online adverts, music events at the Prince of Wales pub appear to be relatively infrequent, and low key. The proximity of existing residential properties on Lidsey Road to the pub (in the order of 20m), will also serve to protect the proposed residential properties from live/amplified music events. The risk of disturbance to future residents is therefore considered low.

Vibration Assessment

- 5.27 Measured vibration levels at Locations 2 and 3 were of low magnitude, with overall vibration dose values (VDV) are below the range for 'low probability of adverse comment' under BS 6472. This is commensurate with observations made on site that vibration caused by passing trains was not perceptible.
- 5.28 In practice, the vibration level inside the building will not be the same as that measured at the undeveloped site. This will depend upon the nature of the construction, the materials used and mass and stiffness of individual building elements. Because of this it is not possible to reliably predict the likely internal vibration levels from external measurements without using a detailed vibration model.
- 5.29 The proposed development layout as shown in Figure 2 has included a buffer zone of at least 12m between the northern site boundary (with the railway line) and proposed residential properties.
- 5.30 Given the measured vibration levels and the distance between proposed properties and the railway line, it is considered that there would be a low risk of adverse comment within the proposed dwellings due to vibration, which is acceptable.

6.0 CONCLUSIONS

- 6.1 24 Acoustics Ltd has been instructed by Hanbury Properties to undertake a noise and vibration assessment for the proposed development at Land at Woodgate Nurseries, Woodgate.
- 6.2 The assessment has considered the noise impact upon proposed new residential properties from road traffic using Lidsey Road, the railway line and the nearby public house.
- 6.3 Measurements have been carried out at the site to determine existing noise and vibration levels during daytime & night-time periods.
- 6.4 Recommendations have been provided for acoustically rated glazing and ventilation to habitable rooms, to achieve suitable internal noise levels from rail and road sources in line with BS 8233, WHO Guidance and the Arun District Council Local Plan.
- 6.5 Calculations have been undertaken which show that daytime external noise levels within gardens will be lower than 55 $L_{Aeq,16\text{ hour}}$, which is acceptable.
- 6.6 Additionally, predicted noise levels from potential music events at the nearby Prince of Wales pub were found to present a low risk of disturbance at the proposed development.
- 6.7 Based on the measured vibration levels and the proposed site layout, it is considered that there would be a low risk of adverse comment within the proposed dwellings due to vibration, which is acceptable.
- 6.8 On the basis of the above, it is concluded that noise and vibration levels at the development will be acceptable for future occupiers of the scheme. Noise and vibration are therefore not a constraint on residential development and nor will residential development prejudice the ongoing operation of existing businesses. Consequently, the outline proposals are not in conflict with local or national planning policy on noise and vibration.

REFERENCES

1. Department for Levelling Up, Housing and Communities. The National Planning Policy Framework (NPPF), revised December 2023.
2. DEFRA. Noise Policy Statement for England, 2010.
3. Department of Communities and Local Government. Planning Practice Guidance, revised July 2019.
4. British Standards Institution. British Standard 8233: Guidance on sound insulation and noise reduction for buildings, 2014.
5. World Health Organisation. Guidelines for Community Noise, 2000.
6. ProPG Professional Practice Guidance on Planning and Noise (ProPG), ANC, IOA, CIEH, May 2017.
7. British Standards Institution. British Standard 6472 Part 1: Guide to Evaluation of Human Exposure to Vibration in Building, 2008.
8. Arun District Council, Adoption Arun Local Plan 2011-2031, July 2018.
9. Sussex Planning Noise Advise Document, 2021.
10. British Standards Institution. BS 7445: 'Description and measurement of environmental noise Part 2 - Acquisition of data pertinent to land use' 1991.
11. Building Regulations. Approved Document F - Ventilation, 2021.

FIGURES



- Zone 1 – [dotted line]
- Zone 2 – [dashed line]
- Zone 3 – All other façade areas



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APPENDIX A: ACOUSTIC TERMINOLOGY

Noise is defined as unwanted sound. The range of audible sound is from 0 to 140 dB. The frequency response of the ear is usually taken to be around 18 Hz (number of oscillations per second) to 18000 Hz. The ear does not respond equally to different frequencies at the same level. It is more sensitive in the mid-frequency range than the lower and higher frequencies and because of this, the low and high frequency components of a sound are reduced in importance by applying a weighting (filtering) circuit to the noise measuring instrument. The weighting which is most widely used and which correlates best with subjective response to noise is the dBA weighting. This is an internationally accepted standard for noise measurements.

For variable sources, such as traffic, a difference of 3 dBA is just distinguishable. In addition, a doubling of traffic flow will increase the overall noise by 3 dBA. The 'loudness' of a noise is a purely subjective parameter, but it is generally accepted that an increase/ decrease of 10 dBA corresponds to a doubling/ halving in perceived loudness.

External noise levels are rarely steady, but rise and fall according to activities within an area. In attempt to produce a figure that relates this variable noise level to subjective response, a number of noise indices have been developed. These include:

i) The L_{Amax} noise level

This is the maximum noise level recorded over the measurement period.

ii) The L_{Aeq} noise level

This is "equivalent continuous A-weighted sound pressure level, in decibels" and is defined in British Standard BS 7445 as the "value of the A-weighted sound pressure level of a continuous, steady sound that, within a specified time interval, T, has the same mean square sound pressure as a sound under consideration whose level varies with time".

It is a unit commonly used to describe construction noise and noise from industrial premises and is the most suitable unit for the description of other forms of environmental noise. In more straightforward terms, it is a measure of energy within the varying noise.

iii) The L_{A10} noise level

This is the noise level that is exceeded for 10% of the measurement period and gives an indication of the noisier levels. It is a unit that has been used over many years for the measurement and assessment of road traffic noise.

iv) The L_{A90} noise level

This is the noise level that is exceeded for 90% of the measurement period and gives an indication of the noise level during the quieter periods. It is often referred to as the background noise level and is used in the assessment of disturbance from industrial noise.

APPENDIX B: ENVIRONMENTAL NOISE SURVEY RESULTS



