

# Land Adjacent to The Load of Hay Villier Street, Uxbridge

Noise Impact Assessment Report  
Report 21907.NIA.02 Rev.B

Villier Street Developments  
73 Cornhill  
London EC3V 3QQ

| Report 21907.NIA.02 Rev.B                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                  |                                                 |                                                 |
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| C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                  | F                                               |                                                 |
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Environmental Noise Time Histories

Glossary of Acoustics Terminology

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## SUMMARY

KP Acoustics Ltd has been commissioned by Villier Street Developments 73 Cornhill London EC3V 3QQ to assess the suitability of the land adjacent to The Load of Hay, Villier Street, Uxbridge UB8 2PU for a residential development in accordance with the provisions of the National Planning Policy Framework and the Noise Policy Statement for England (NPSE).

This report assesses the noise impact from the garden of the public house to the proposed development site and recommends mitigation measures as necessary to inform a revised planning application.

An environmental noise survey has been undertaken on site in order to establish the current ambient and background noise levels, as shown in Table 3.1. These measured noise levels have been used to provide an assessment of impact due to patron noise from the nearby pub outdoor beer garden on the proposed residential development.

Noise from the existing external plant units associated with the adjacent pub has also been assessed in accordance with BS4142:2014 'Methods for rating and assessing industrial and commercial sound' guidance. Noise from existing plant was predicted to have a "low impact" in accordance with BS4142:2014 at the new proposed dwellings.

The predicted impact of patron noise has been assessed at nearest openable windows of the proposed residential receiver against London Boroughs of: Hillingdon, Hounslow, and Richmond Upon Thames Development Control for Noise Generating and Noise Sensitive Development April 2016 guidance criteria, as is shown in Tables 6.2 to 6.4. This methodology was not carried out for windows closest to the pub beer garden not required for ventilation, as the glazing specification would provide a significant reduction to the noise at the façade.

Additionally, sound reduction calculations have been undertaken based on typical glazing and trickle vent specifications at the closest windows within the nearest bedroom to determine the compliance against the internal noise requirements of London Boroughs of: Hillingdon, Hounslow, and Richmond Upon Thames Development Control for Noise Generating and Noise Sensitive Development April 2016. The results of these calculations are shown in Table 6.6.

So that windows to the nearest bedroom overlooking the pub beer garden are not required to be openable for the purposes of ventilation or overheating, we recommend that ventilation is provided by acoustically rated trickle vents (see section 8). Purge ventilation may be achievable by an openable rooflight. Potential overheating within this bedroom may also be mitigated by the openable rooflight within the bedroom.

No further mitigation measures should be required in order to protect the proposed habitable spaces from external noise intrusion.

## 1.0 INTRODUCTION

KP Acoustics Ltd has been commissioned by Villier Street Developments 73 Cornhill London EC3V 3QQ, to assess the suitability of the land adjacent to The Load of Hay, at 33 Villier Street, Uxbridge, UB8 2PU, for a residential development in accordance with the provisions of the National Planning Policy Framework and the Noise Policy Statement for England (NPSE).

This report presents the results of an environmental survey and the assessment of noise impact of the nearby pub outdoor seating area at the proposed residential development.

## 2.0 SITE SURVEYS

### 2.1 Site Description

The site is bounded by The Load of Hay outdoor seating area to the North, The Load of Hay pub to the West, existing residential dwellings to the East, and Villier Street to the South. Entrance to the site is located on Villier Street. At the time of the survey, the background noise climate was dominated by road traffic noise from surrounding roads.

### 2.2 Environmental Noise Survey Procedure

A noise survey was undertaken on the proposed site as shown in Figure 2.1. The locations were chosen in order to collect data representative of the typical levels expected on the site due to all nearby sources.

Continuous automated monitoring was undertaken for the duration of the survey between 12.11hrs 01/10/2021 and 11.41hrs on 04/10/2021.

Weather conditions were generally dry with light winds and therefore suitable for the measurement of environmental noise. The measurement procedure complied with ISO 1996-2:2017 Acoustics '*Description, measurement and assessment of environmental noise - Part 2: Determination of environmental noise levels*'.

### 2.3 Measurement Positions

The measurement positions are as described within Table 2.1 and shown within Figure 2.1.

| Icon                                                                              | Descriptor                   | Location Description                                                                                                                                                                                                                                                                                       |
|-----------------------------------------------------------------------------------|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | Noise Measurement Position 1 | The microphone was installed on a pole approximately 2.5m off the ground floor level of the south façade overlooking Villiers street, as shown in Figure 2.1.                                                                                                                                              |
|  | Noise Measurement Position 2 | <p>The microphone was installed on a pole approximately 2.5m off the ground floor level of the north of the proposed site overlooking the pub beer garden, as shown in Figure 2.1.</p> <p>The measurement position was partially shielded from the main road by a caravan parked on the proposed site.</p> |

**Table 2.1 Measurement positions and descriptions**



**Figure 2.1 Site measurement position (Image Source: Google Maps)**

## 2.4 Equipment

The equipment calibration was verified before and after use and no abnormalities were observed. The equipment used is described within Table 2.2.

| Measurement instrumentation            |                                             | Serial no. | Date       | Cert no.           |
|----------------------------------------|---------------------------------------------|------------|------------|--------------------|
| Noise Kit 9                            | Svantek Type 958A Class 1 Sound Level Meter | 45578      | 15/07/2020 | 14012950           |
|                                        | Free-field microphone PCB 377B02            | 169770     |            |                    |
|                                        | Preamp PCB 426E01                           | 128280     |            |                    |
|                                        | Svantek External windshield                 | -          | -          | -                  |
| Noise Kit 11                           | Svantek Type 971 Sound Level Meter          | 74376      | 16/10/2020 | Factory Calibrated |
|                                        | Aco Pacific 7052E Free-field microphone     | 56751      |            |                    |
|                                        | Preamp Svantek SV18                         | 41606      |            |                    |
|                                        | Svantek External windshield                 | -          | -          | -                  |
| Larson Davis CAL200 Class 1 Calibrator |                                             | 17148      | 27/04/2021 | 05223/1            |

**Table 2.2 Measurement instrumentation**

### 3.0 RESULTS

#### 3.1 Noise Survey

The  $L_{Aeq}$ : 5min,  $L_{Amax}$ : 5min,  $L_{A10}$ : 5min and  $L_{A90}$ : 5min acoustic parameters were measured throughout the duration of the survey. Measured levels are shown as a time histories

in Figures 21907.TH1/2. Measured noise levels are shown in Table 3.1.

| Time Period                                   | Noise Measurement Position 1                |                                                      | Noise Measurement Position 2                |                                                      |
|-----------------------------------------------|---------------------------------------------|------------------------------------------------------|---------------------------------------------|------------------------------------------------------|
|                                               | Measured Ambient Noise level – $L_{Aeq}$ dB | Representative background noise level - $L_{A90}$ dB | Measured Ambient Noise level – $L_{Aeq}$ dB | Representative background noise level - $L_{A90}$ dB |
| Daytime $L_{Aeq,16hour}$ (07.00 – 23.00hrs)   | 51                                          | 47                                                   | 50                                          | 44                                                   |
| Evening $L_{Aeq,4hour}$ (19.00 – 23.00hrs)    | 50                                          | 44                                                   | 47                                          | 42                                                   |
| Night-time $L_{Aeq,8hour}$ (23.00 – 07.00hrs) | 47                                          | 48                                                   | 42                                          | 42                                                   |

**Table 3.1 Site average noise levels for daytime and night time**

It is understood<sup>1</sup> that the beer garden is in use between (12.00 – 23.00), and that patrons are asked to start vacating the area at 10.30pm. The average ambient noise level during the evening period has been included in Table 3.1 to assess against the anticipated period of typical use. As the pub beer garden would not be in use during the night-time period, the night-time averaged ambient noise level is not relevant to this assessment and has been provided for context only.

As stated in Table 2.1, measurement position 2 was partially shielded from the main road by a caravan, and therefore noise levels measured at this position are anticipated to be representative of the levels taking into account shielding from the proposed dwellings.

## **4.0 NOISE ASSESSMENT GUIDANCE**

### **4.1 Noise Policy Statement For England 2019**

The National Planning Policy Framework (NPPF) has superseded and replaces Planning Policy Guidance Note 24 (PPG24), which previously covered issues relating to noise and planning in England. Paragraph 174 of the NPPF states that planning policies and decisions should aim to:

- preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans

In addition, Paragraph 185 of the NPPF states that *'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':*

- 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

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<sup>1</sup> Email from Rachel White, Boyer Planning to Oliver Packman KP Acoustics, 03.02.2021

The Noise Policy Statement for England (NPSE) was developed by DEFRA and published in March 2010 with the aim to ‘Promote good health and good quality of life through the effective management of noise within the context of Government policy on sustainable development.’

Noise Policy Statement England (NPSE) noise policy aims are as follows:

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

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

The Noise Policy Statement England (NPSE) outlines observed effect levels relating to the above, as follows:

- 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.

As stated in The Noise Policy Statement England (NPSE), it is not currently possible to have a single objective based measure that defines SOAEL that is applicable to all sources of noise in all situations. Specific noise levels are not stated within the guidance for this reason, and allow flexibility in the policy until further guidance is available.

## 4.2 BS8233:2014

BS8233:2014 'Sound insulation and noise reduction for buildings' describes recommended internal noise levels for residential spaces. These levels are shown in Table 4.1.

| Activity                   | Location         | 07:00 to 23:00 | 23:00 to 07:00 |
|----------------------------|------------------|----------------|----------------|
| Resting                    | Living Rooms     | 35 dB(A)       | -              |
| Dining                     | Dining Room/area | 40 dB(A)       | -              |
| Sleeping (daytime resting) | Bedrooms         | 35 dB(A)       | 30 dB(A)       |

**Table 4.1 BS8233 recommended internal background noise levels**

It should be noted that the recommended internal noise levels outlined above are not applicable under "purge ventilation" conditions as defined by Approved Document F of the Building Regulations, as this should only occur occasionally (E.G. to remove odour from painting or burnt food). However, the levels above should be achieved whilst providing sufficient background ventilation, either via passive or mechanical methods.

The external building fabric would need to be carefully designed to achieve these recommended internal levels.

In addition to guidance on internal levels, BS8233:2014 also states the following with regards to noise within external amenity spaces:

*'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 50 dB LAeq,T, with an upper guideline value of 55 dB LAeq,T, which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.'*

As outlined above, the resulting noise levels in external amenity areas should not be a reason for refusal, providing that the noise levels are designed to be as low as practically possible within external amenity areas.

#### 4.3 London Boroughs of: Hillingdon, Hounslow, and Richmond Upon Thames Development Control for Noise Generating and Noise Sensitive Development April 2016

Section 7.0 of London Boroughs of: Hillingdon, Hounslow, and Richmond Upon Thames Development Control for Noise Generating and Noise Sensitive Development April 2016 gives guidance relating to the assessment of noise from places of entertainment, e.g. Pubs clubs and Bars. It states the following in relation to assessment standards:

*“Table 3 [Table 4.2 below] below details the entertainment noise standards that will be applied in situations where entertainment noise exposure is likely to arise as a result of new development in the Boroughs. These noise standards will normally be applied to any proposals that may generate new noise from entertainment sources within a mixed-use area and for noise sensitive development that is proposed in a mixed-use area containing entertainment establishments.*

*Proposed developments will be assessed on a case by case basis and the design criteria may be modified depending on the nature of the business, frequency, time, duration and number of entertainment events and sensitivity of the area. It is expected that any likelihood of structure borne sound (and vibration) transmission problems will be separately assessed and that effective control measures will be included in proposals. Developers are encouraged to enter into pre-application discussions with the LPA to discuss these issues at an early stage.”*

| Location | Time period                | Criteria                                                                                                             |
|----------|----------------------------|----------------------------------------------------------------------------------------------------------------------|
| External | Daytime (09:00 – 23.00)    | $L_{Aeq,5min} EN \text{ minus } L_{Aeq,5min} \text{ or } L_{A90,5min} \text{ WEN} = 0 \text{ to } +5 \text{ dBA}$    |
|          |                            | $L_{Ceq,5min} EN \text{ minus } L_{Ceq,5min} \text{ or } L_{C90,5min} \text{ WEN} = 0 \text{ to } +5 \text{ dBC.}$   |
|          | Night-Time (23:00 – 09.00) | $L_{Aeq,5min} EN \text{ minus } L_{Aeq,5min} \text{ or } L_{A90,5min} \text{ WEN} = -5 \text{ to } +3 \text{ dBA.}$  |
|          |                            | $L_{Ceq,5min} EN \text{ minus } L_{Ceq,5min} \text{ or } L_{C90,5min} \text{ WEN} = -10 \text{ to } +3 \text{ dBC.}$ |
| Internal | Daytime (09:00 – 23.00)    | $EN = \text{Noise Rating NR25-35 } L_{eq,5mins}$                                                                     |
|          |                            | $L_{Ceq,5min} EN \text{ minus } L_{Ceq,5min} \text{ or } L_{C90,5min} \text{ WEN} = -10 \text{ to } +5 \text{ dBC.}$ |
|          | Night-Time (23:00 – 09.00) | $EN = \text{Noise Rating NR15-25 } L_{eq,5mins}$                                                                     |
|          |                            | $L_{Ceq,5min} EN \text{ minus } L_{Ceq,5min} \text{ or } L_{C90,5min} \text{ WEN} = -10 \text{ to } 0 \text{ dBC.}$  |

**Table 4.2 Entertainment noise standards – “Development Control for Noise Generating and Noise Sensitive Development April 2016”**

*“EN is the representative measured or calculated Entertainment Noise level (A & C-Weighted  $L_{eq,5-mins}$ ) measured or predicted at 1 metre from the facade of noise-sensitive premises.*

*(Advisory A: For assessment purposes, the EN is the whole integer value of the measurement closest to the 75th percentile of all the 5-minute measurements made in the last hour of the operation of the premises at its highest entertainment noise levels, i.e. it does not include any “cool-down period” when MNLs might be reduced below normal operational levels.)*

*WEN is the representative ambient or background noise level (situation dependent) without the Entertainment Noise taking place assessed 1 metre from the facade of the noise sensitive premises.*

*(Advisory B: for assessment purposes WEN is the whole integer modal average, i.e. the most commonly occurring value of the twelve WEN 5-minute measurements during the last hour of the operation of the premises without entertainment noise occurring.*

*For existing premises where it is impracticable to stop the entertainment noise for the last hour of operation, the measurement period shall be twelve WEN 5-minute periods totalling an hour after entertainment noise at the premises has ceased, excluding any measurements that contain noise from patrons or other sources associated with dispersal from the premises under assessment.)*

*(Advisory C: Internal measurements should be undertaken at a representative position, e.g. bedhead or chair position and where necessary be the same for both the EN and WEN assessments. The height of the measuring microphone should be between 1.2 to 1.5 m above the floor and 1 m away from any sound reflecting surfaces.)”*

#### 4.4 Patron Noise Emissions Criterion

It is understood that the beer garden is in use between (12.00 – 23.00), and that patrons are asked to start vacating at 10.30pm. Therefore, internal and external noise criteria have been set at the nearest residential dwelling based on the guidance given in “London Boroughs of: Hillingdon, Hounslow, and Richmond Upon Thames Development Control for Noise Generating and Noise Sensitive Development April 2016” as shown in Tables 4.3 and 4.4.

| Time period             | Modal Measured $L_{eq}$<br>(22:00 – 23.00) | Entertainment Noise Criterion<br>at Nearest Residential<br>Receiver |
|-------------------------|--------------------------------------------|---------------------------------------------------------------------|
| Evening (22:00 – 23.00) | 45 dB(A)                                   | 50 dB(A)                                                            |

**Table 4.3 Proposed external noise emissions criterion**

| Level | Octave Frequency Band (Hz) |     |     |     |    |    |    | Approximate Overall Level dB(A) |
|-------|----------------------------|-----|-----|-----|----|----|----|---------------------------------|
|       | 63                         | 125 | 250 | 500 | 1k | 2k | 4k |                                 |
| NR25  | 55                         | 44  | 35  | 29  | 25 | 22 | 20 | 31                              |

**Table 4.4 Proposed internal noise emissions criterion**

#### 4.5 BS4142: 2014 'Methods for rating and assessing industrial and commercial sound'

British Standard BS4142:2014 'Methods for rating and assessing industrial and commercial sound' describes a method for rating and assessing sound of an industrial and/or commercial nature, which includes:

- Sound from industrial and manufacturing processes
- Sound from fixed installations which comprise mechanical and electrical plant and equipment
- Sound from the loading and unloading of goods and materials at industrial and/or commercial premises, and
- Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes.

This Standard compares the Rating Level due to the noise source/s under assessment for a one-hour period during the daytime (07:00 – 23:00 hours) and a fifteen-minute period during the night-time (23:00 – 07:00 hours) with the existing background noise level in terms of an  $L_{A90}$  when the noise source is not operating.

It should be noted that the Rating Level is the Specific Sound Level in question ( $L_{Aeq, Tr}$ ), including any relevant acoustic feature corrections, as follows:

- **Tonality** – 'For sound ranging from not tonal to prominently tonal the Joint Nordic Method gives a correction of between 0dB and +6dB for tonality. Subjectively, this can be converted to a penalty of 2dB for a tone which is just perceptible at the noise receptor, 4dB where it is clearly perceptible, and 6dB where it is highly perceptible'
- **Impulsivity** – 'A correction of up to +9dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of 3dB for impulsivity which is just perceptible at the noise receptor, 6dB where it is clearly perceptible, and 9dB where it is highly perceptible'

- **Intermittency** – *‘If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3dB can be applied’*
- **Other sound characteristics** – *‘Where the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3dB can be applied’*

Once the Rating Level has been obtained, the representative background sound level is subtracted from the Rating Level to obtain an initial estimate of the impact, as follows:

- Typically, the greater this difference, the greater the magnitude of the impact
- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context
- A difference of around +5 dB could be an indication of an adverse impact, depending on the context
- The lower the rating level is relative to the measured background sound level, the less likely it is that there will be an adverse impact or significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound having a low impact, depending on the context

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

The initial estimate of the impact may then be modified by taking consideration of the context in which the sound occurs.

#### **4.6 Proposed Plant Noise Criteria**

London Boroughs of: Hillingdon, Hounslow, and Richmond Upon Thames Development Control for Noise Generating and Noise Sensitive Development April 2016 guidance gives noise criteria for new industrial developments, given in Table 4.5 below.

| Time period                                                                                             | Entertainment Noise Criterion at Nearest Residential Receiver                                 |
|---------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| Rating Level (L <sub>A</sub> r,Tr) is at least 5 dB(A) below the Background Level L <sub>A</sub> 90     | Normally acceptable                                                                           |
| Rating level (L <sub>A</sub> r,Tr) is no more than 5 dB(A) above the Background Level L <sub>A</sub> 90 | Acceptable only if there are overriding economic or social reasons for development to proceed |
| Rating level (L <sub>A</sub> r,Tr) is more than 5 dB(A) above the Background Level L <sub>A</sub> 90    | Normally unacceptable                                                                         |

**Table 4.5 New Industrial and Commercial Development - External Noise Standards**

As the pub plant is only used during the daytime noise period, the criterion has been set as shown in Table 4.6 in order to comply with the above requirements.

| Time period                | Noise Criterion at Nearest Residential Receiver |
|----------------------------|-------------------------------------------------|
| Daytime (07:00 – 23.00hrs) | 39 dB(A)                                        |

**Table 4.6 Proposed plant noise emissions criterion**

## 5.0 PROJECT PROPOSALS AND SITE LAYOUT

### 5.1 Proposed Site

Plans of the proposed site are shown in Figure 5.1 along with the location of the existing pub outdoor seating area.

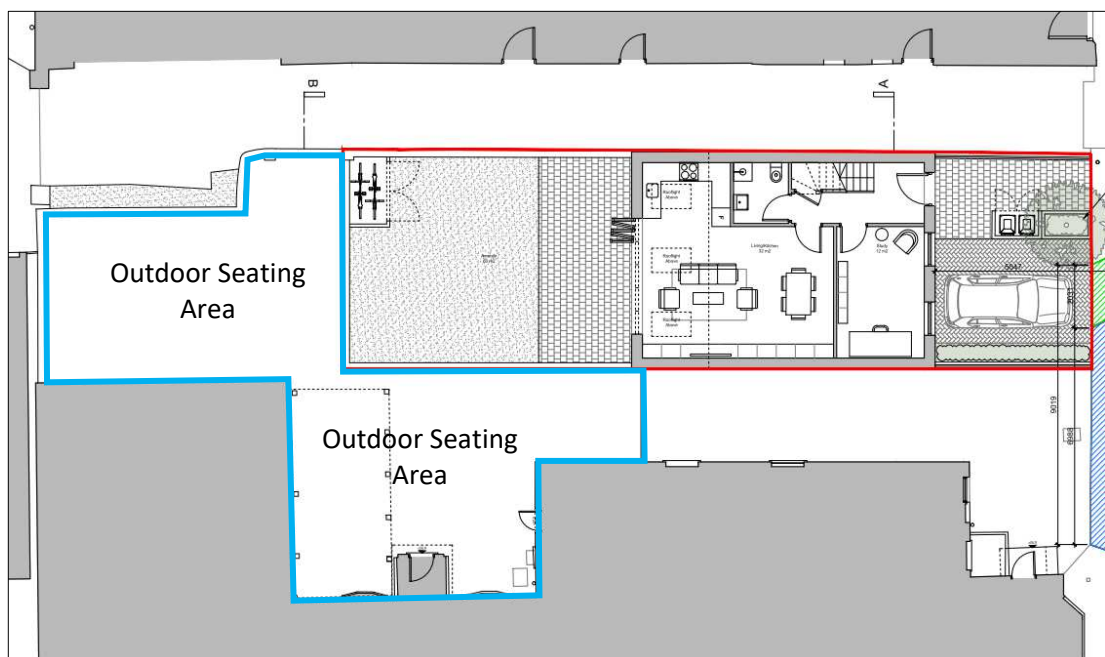


**Figure 5.1 Site Layout, Ground Floor**

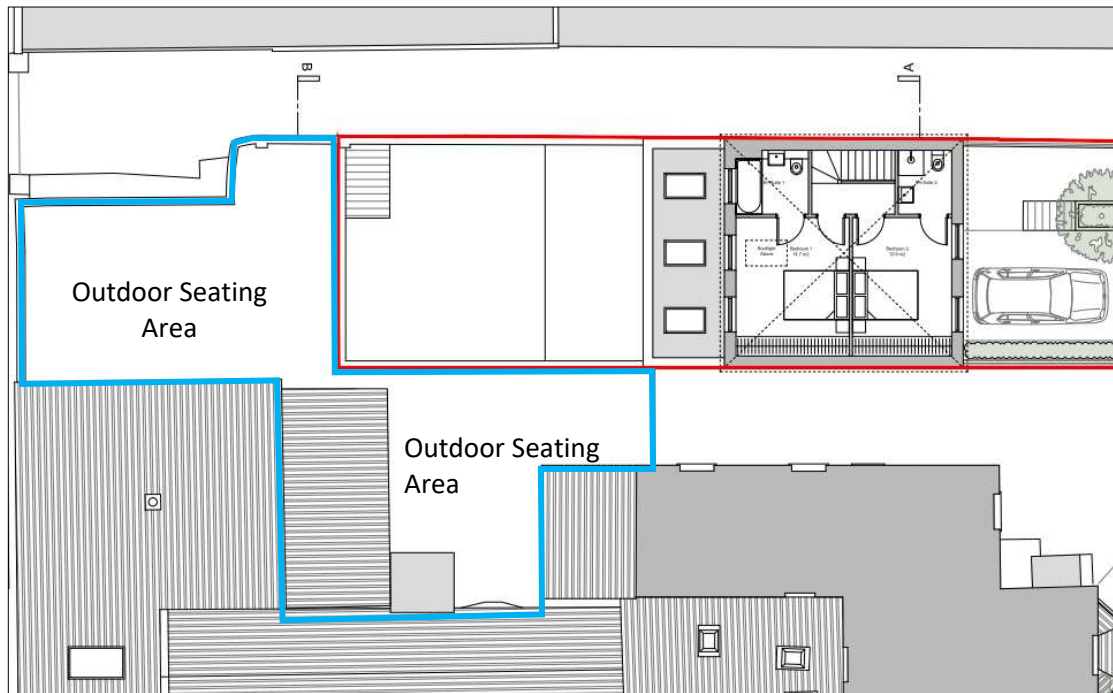


**Figure 5.2 Site Layout, First Floor**

A 2.0m brick wall is proposed at the boundary of the proposed residential property and the pub seating area.

## 6.0 PATRON NOISE ASSESSMENT

### 6.1 Entertainment Noise Assessment to Openable Windows

At the time of this assessment, The Load of Hay pub was closed indefinitely. Therefore, the impact of noise at the proposed residential development due to patrons within the pub beer garden has been assessed using predicted noise levels.

Representative data of a single person talking has been taken from ANSI 3.5-1997 '*Methods for Calculation of the Speech Intelligibility Index*'. A correction has been added in order to consider the typical number of people within the amenity area.

| Source                                       | Sound Power Level (dB) in each Frequency Band |       |       |       |      |      |      |      |
|----------------------------------------------|-----------------------------------------------|-------|-------|-------|------|------|------|------|
|                                              | 63Hz                                          | 125Hz | 250Hz | 500Hz | 1kHz | 2kHz | 4kHz | 8kHz |
| Level of a raised voice as per ANSI 3.5-1997 | 48                                            | 59    | 70    | 75    | 72   | 64   | 57   | 48   |

**Table 6.1 Sound power Level of a single raised voice**

The total sound power level of the group of people has been determined from the following formula taken from *Prediction of Noise from Small to Medium Sized Crowds M.J.Hayne et al*

*Proceedings of ACOUSTICS 2011, November 2011*, which approximates the sound power level of a group based on a series of measurements of crowds:

$$L_{wAeq} = 15\log(N) + 64\text{dB(A)}$$

where  $N$  is the number in the group

In this case 30 people have been assumed in the beer garden, and the total sound power level predicted is given in Table 6.2

| Noise Source            | Sound Power Level (dB) in each Frequency Band |       |       |      |      |      |
|-------------------------|-----------------------------------------------|-------|-------|------|------|------|
|                         | 125Hz                                         | 250Hz | 500Hz | 1kHz | 2kHz | 4kHz |
| Beer garden (30 people) | 76                                            | 77    | 83    | 80   | 75   | 67   |

**Table 6.2 Sound power Level of a group of 30 persons**

An external noise assessment was carried out to the nearest windows serving habitable spaces within the proposed dwelling, that are potentially required to be opened for ventilation /overheating purposes. These were the ground floor living space, the rooflight of the 1<sup>st</sup> floor bedroom closest to the beer garden, and the windows of the bedroom furthest from the beer garden.

An assessment of external noise due to the pub beer garden was not carried out to the closest 1<sup>st</sup> floor bedroom windows, as these are not required to be opened by the occupier for any ventilation/overheating purpose, and the glazing specification would provide a significant reduction to the noise at the façade. Assessment of noise within this closest 1<sup>st</sup> floor bedroom was carried out against the internal noise criteria given in Table 4.4.

A SoundPlan 8.1 3D noise model was created to predict the noise level incident at the proposed dwelling. The total sound power level for all 30 people talking was spread around the total area of the beer garden, as shown in Appendix C.

Tables 6.3 to 6.4 show the results of the predicted noise level at the ground floor living room, and first floor bedroom openable rooflight of the proposed residential development.

| Results                                                             |                          | Comments                                           |
|---------------------------------------------------------------------|--------------------------|----------------------------------------------------|
| EN – Patron Noise Level Predicted at Ground Floor of Residences (A) | $L_{Aeq}$ 51dB           | Calculated source level, minus corrections         |
| WEN - Measured Ambient Level without Event Noise (B)                | $L_{Aeq, 5-min}$ 45dB(A) | Modal Averaged Measured $L_{eq}$<br>(22:00 –23.00) |
| Change in ambient noise level (B – A)                               | +6dB                     | Meets SDP guidance as per Table 4.2                |

**Table 6.3 External Noise assessment, Ground Floor Living room**

| Results                                                            |                          | Comments                                           |
|--------------------------------------------------------------------|--------------------------|----------------------------------------------------|
| EN – Patron Noise Level Predicted at First Floor of Residences (A) | $L_{Aeq}$ 50dB           | Calculated source level, minus corrections         |
| WEN - Measured Ambient Level without Event Noise (B)               | $L_{Aeq, 5-min}$ 45dB(A) | Modal Averaged Measured $L_{eq}$<br>(22:00 –23.00) |
| Change in ambient noise level (B – A)                              | +5dB                     | Meets SDP guidance as per Table 4.2                |

**Table 6.4 External Noise assessment, First Floor Bedroom to North Rooflight**

As shown in Tables 6.3 & 6.4, patron noise within the adjacent outdoor beer garden would be expected to meet the requirements of London Boroughs of: Hillingdon, Hounslow, and Richmond Upon Thames Development Control for Noise Generating and Noise Sensitive Development, with an exceedance of only 1dB above the criteria of +5dB, which can be considered negligible.

## 6.2 Internal Noise Assessment to Closest Bedroom

Further calculations have been undertaken to assess whether the noise from the pub outdoor beer garden would be expected to meet the proposed internal noise criteria given in Table 4.4 at the closest bedrooms with the windows closed.

Sound reduction performance calculations have been undertaken to determine the predicted internal noise level due to patron noise in the adjacent pub beer garden. These have been carried out using glazing specification with an overall Sound Reduction Index of 34dB  $R_w$  (i.e. 6mm pane / 12mm cavity / 8mm pane) and 35dB  $D_{n,e,w}$  trickle vents.

Bedroom dimensions used in calculations are as follows:

4.0m x 3.5m x 2.5m with 2.0m<sup>2</sup> Glazing

A predicted patron noise level of 58dB(A) (considering only distance attenuation of 6 meters) has been determined externally at 1m from the receiving first floor bedroom windows.

Table 6.4 shows the predicted noise internal noise level within the nearest 1<sup>st</sup> floor bedroom window.

|                                                             | Octave band centre frequency Noise Level, dB |       |       |       |      |      |      | Overall dB(A)    |
|-------------------------------------------------------------|----------------------------------------------|-------|-------|-------|------|------|------|------------------|
|                                                             | 63Hz                                         | 125Hz | 250Hz | 500Hz | 1kHz | 2kHz | 4kHz |                  |
| Predicted Patron Noise (1m from Bedroom Façade)             | 44*                                          | 44    | 46    | 53    | 51   | 46   | 38   | 55               |
| Calculated noise level within 1 <sup>st</sup> Floor Bedroom | 21                                           | 19    | 21    | 24    | 11   | 16   | 5    | 21               |
| NR25 Criteria                                               | 55                                           | 44    | 35    | 29    | 25   | 22   | 20   | 31 (Approximate) |
| Exceedance of NR25                                          | 0                                            | 0     | 0     | 0     | 0    | 0    | 0    | -                |

**Table 6.5 Internal Noise assessment, to First Floor Bedroom north windows \* noise level for 63Hz have been extrapolated from other octave band results.**

As shown in Table 6.5, patron noise within the nearest bedroom due to the adjacent outdoor beer garden would be expected to meet the internal noise criteria of London Boroughs of: Hillingdon, Hounslow, and Richmond Upon Thames Development Control for Noise Generating and Noise Sensitive Development.

As shown Table 6.5, predicted internal levels would also be expected to meet the recommendations of BS8233 within the nearest bedroom.

### 6.3 External Noise Assessment to Garden

There is a proposed garden to the rear of the dwelling that backs onto the Beer Garden. A receiver was also located in the centre of the garden in the SoundPlan model, as shown in Appendix C. The resulting predicted noise level within the garden was 51dB(A).

This meets the BS8233:2014 upper guideline value of 55dBA, and is exceeds the desirable level by only 1dB, as outlined in Section 4.2, and therefore the noise levels within the external amenity space are considered suitable.

## 7.0 PLANT NOISE IMPACT ASSESSMENT

### 7.1 Existing Plant Installations

As the pub is not currently open, none of the plant was operational during the survey. The following plant was noted to be installed on site:

- 2 No. DWA KFR-61W/AXc Air Conditioning Unit on the roof at the rear of the pub.
- 1 No. KD PAP015M1 Cooler on the wall to the front of the pub.

The installation location for the plant units installed at the pub will be as shown in Figure 7.1 below.



**Figure 7.1 Existing plant unit installations shown in red (Image Source: Google Maps)**

The noise emission levels as provided by the manufacturer for the units are shown in Table 7.1.

| Unit                                  | Descriptor  | Octave Frequency Band (Hz)   |     |     |     |    |    |    |    | Overall (dBA) |
|---------------------------------------|-------------|------------------------------|-----|-----|-----|----|----|----|----|---------------|
|                                       |             | 63                           | 125 | 250 | 500 | 1k | 2k | 4k | 8k |               |
| DWA KFR-61W/AXc Air Conditioning Unit | SPL@1m (dB) | Not supplied by manufacturer |     |     |     |    |    |    |    | 56            |
| KD PAP015M1 cooler                    | SPL@1m (dB) | Not supplied by manufacturer |     |     |     |    |    |    |    | 47            |

**Table 7.1 Plant Units Noise Emission Levels as provided by the manufacturer**

## 7.2 Closest Noise Sensitive Receiver

The closest noise sensitive receiver to the proposed installation location has been identified as being the 1<sup>st</sup> floor rear bedroom window of the proposed dwelling, located approximately 14 metres from the units at the rear of the pub, and the 1<sup>st</sup> floor front bedroom window of the proposed dwelling, located approximately 10 metres from the units at the rear of the pub proposed plant installation location, as shown in 7.1.

## 7.3 Calculations

Taking all acoustic corrections into consideration, the noise level contribution expected at the closest residential window from the plant associated with the pub would be as shown in Table 7.2. Detailed calculations are shown in Appendix B.

A 2dB feature correction has been applied to account for possible tonality of the existing plant units.

| Receiver                                                | Criterion | Noise Level at 1m From the Closest Noise Sensitive Window |
|---------------------------------------------------------|-----------|-----------------------------------------------------------|
| 1 <sup>st</sup> Floor Bedrooms of the proposed dwelling | 39dB(A)   | 39dB(A)                                                   |

**Table 7.2 Predicted noise level and criterion at nearest noise sensitive location**

As shown in Appendix B and Table 7.2, transmission of noise to the nearest sensitive windows of the proposed dwellings due to the effects of the existing plant associated with the pub satisfies the proposed emissions criterion. This corresponds to a “Low Impact” with respect to BS4142:2014 guidance.

## 8.0 VENTILATION AND OVERHEATING

### 8.1 Ventilation Strategy

Based on the noise levels measured on site and the pub beer garden noise assessment, appropriate ventilation systems are outlined in Table 7.1 below in order to ensure the internal noise environment is not compromised.

| Ventilation System | Whole Dwelling Ventilation                                                                                                                                                                                           | Extract Ventilation       |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| ADF System 1       | <p>Northerly Bedroom - Trickle vents providing a minimum performance of 35dB <math>D_{n,e,w}</math></p> <p>Other Habitable spaces - Trickle vents providing a minimum performance of 30dB <math>D_{n,e,w}</math></p> | Intermittent extract fans |

**Table 8.1 Ventilation systems**

In all cases, purge ventilation would be provided by openable windows (or rooflight in the case of the northerly bedroom). The internal noise level requirement would not be applicable during purge conditions as this would only occur occasionally.

## 9.0 CONCLUSION

An environmental noise survey has been undertaken at 33 Villier Street, Uxbridge UB8 2PU allowing the assessment of levels of predicted patron noise likely to be experienced by the proposed development.

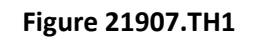
Predicted patron noise from the beer garden predicted internally and externally at the proposed dwellings meets the Entertainment noise standards given in “Development Control for Noise Generating and Noise Sensitive Development April 2016”.

Predicted noise levels allowed a typical glazing specification to be proposed which would provide internal noise levels for all residential environments of the development commensurate to the design range of BS8233.

Noise from the existing external plant units associated with the adjacent pub were assessed in accordance with BS4142:2014 ‘Methods for rating and assessing industrial and commercial sound’ guidance and predicted to have a “low impact” at the proposed dwellings.

No further mitigation measures should be required in order to protect the proposed residential units from external noise intrusion from the adjacent pub outdoor beer garden.

**KP**  **acoustics**



33 Villier Street Rear  
Environmental Noise Time History  
From 01 October 2021 To 04 October 2021

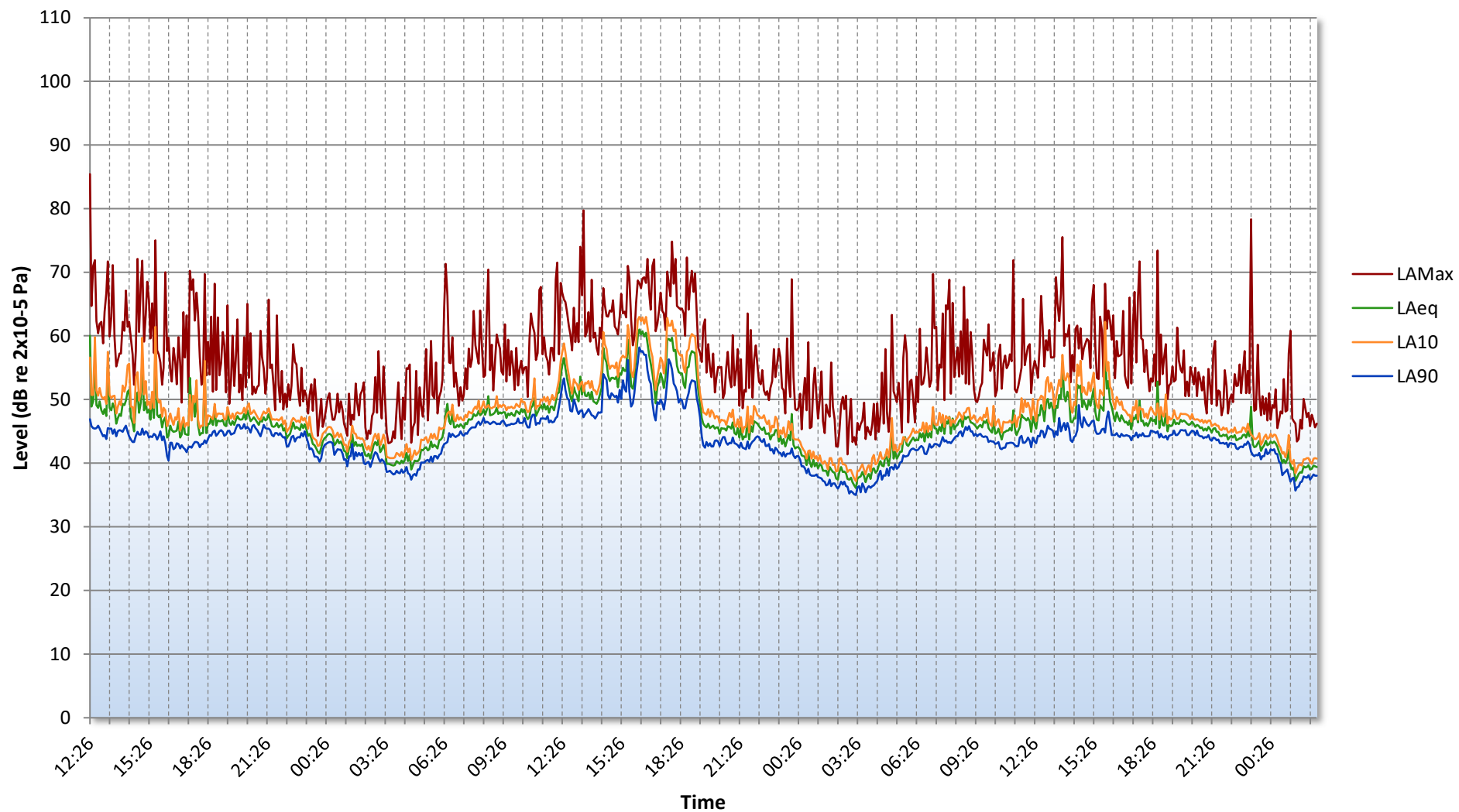


Figure 21907.TH2

## GENERAL ACOUSTIC TERMINOLOGY

### Decibel scale - dB

In practice, when sound intensity or sound pressure is measured, a logarithmic scale is used in which the unit is the 'decibel', dB. This is derived from the human auditory system, where the dynamic range of human hearing is so large, in the order of  $10^{13}$  units, that only a logarithmic scale is the sensible solution for displaying such a range.

### Decibel scale, 'A' weighted - dB(A)

The human ear is less sensitive at frequency extremes, below 125Hz and above 16Khz. A sound level meter models the ears variable sensitivity to sound at different frequencies. This is achieved by building a filter into the Sound Level Meter with a similar frequency response to that of the ear, an A-weighted filter where the unit is dB(A).

### $L_{eq}$

The sound from noise sources often fluctuates widely during a given period of time. An average value can be measured, the equivalent sound pressure level  $L_{eq}$ . The  $L_{eq}$  is the equivalent sound level which would deliver the same sound energy as the actual fluctuating sound measured in the same time period.

### $L_{10}$

This is the level exceeded for no more than 10% of the time. This parameter is often used as a "not to exceed" criterion for noise.

### $L_{90}$

This is the level exceeded for no more than 90% of the time. This parameter is often used as a descriptor of "background noise" for environmental impact studies.

### $L_{max}$

This is the maximum sound pressure level that has been measured over a period.

### Octave Bands

In order to completely determine the composition of a sound it is necessary to determine the sound level at each frequency individually. Usually, values are stated in octave bands. The audible frequency region is divided into 11 such octave bands whose centre frequencies are defined in accordance with international standards. These centre frequencies are: 16, 31.5, 63, 125, 250, 500, 1000, 2000, 4000, 8000 and 16000 Hertz.

Environmental noise terms are defined in BS7445, *Description and Measurement of Environmental Noise*.

## APPLIED ACOUSTIC TERMINOLOGY

### Addition of noise from several sources

Noise from different sound sources combines to produce a sound level higher than that from any individual source. Two equally intense sound sources operating together produce a sound level which is 3dB higher than a single source and 4 sources produce a 6dB higher sound level.

### Attenuation by distance

Sound which propagates from a point source in free air attenuates by 6dB for each doubling of distance from the noise source. Sound energy from line sources (e.g. stream of cars) drops off by 3dB for each doubling of distance.

### Subjective impression of noise

Hearing perception is highly individualised. Sensitivity to noise also depends on frequency content, time of occurrence, duration of sound and psychological factors such as emotion and expectations. The following table is a guide to explain increases or decreases in sound levels for many scenarios.

| Change in sound level (dB) | Change in perceived loudness |
|----------------------------|------------------------------|
| 1                          | Imperceptible                |
| 3                          | Just barely perceptible      |
| 6                          | Clearly noticeable           |
| 10                         | About twice as loud          |

### Transmission path(s)

The transmission path is the path the sound takes from the source to the receiver. Where multiple paths exist in parallel, the reduction in each path should be calculated and summed at the receiving point. Outdoor barriers can block transmission paths, for example traffic noise. The effectiveness of barriers is dependent on factors such as its distance from the noise source and the receiver, its height and construction.

### Ground-borne vibration

In addition to airborne noise levels caused by transportation, construction, and industrial sources there is also the generation of ground-borne vibration to consider. This can lead to structure-borne noise, perceptible vibration, or in rare cases, building damage.

### Sound insulation - Absorption within porous materials

Upon encountering a porous material, sound energy is absorbed. Porous materials which are intended to absorb sound are known as absorbents, and usually absorb 50 to 90% of the energy and are frequency dependent. Some are designed to absorb low frequencies, some for high frequencies and more exotic designs being able to absorb very wide ranges of frequencies. The energy is converted into both mechanical movement and heat within the material; both the stiffness and mass of panels affect the sound insulation performance.

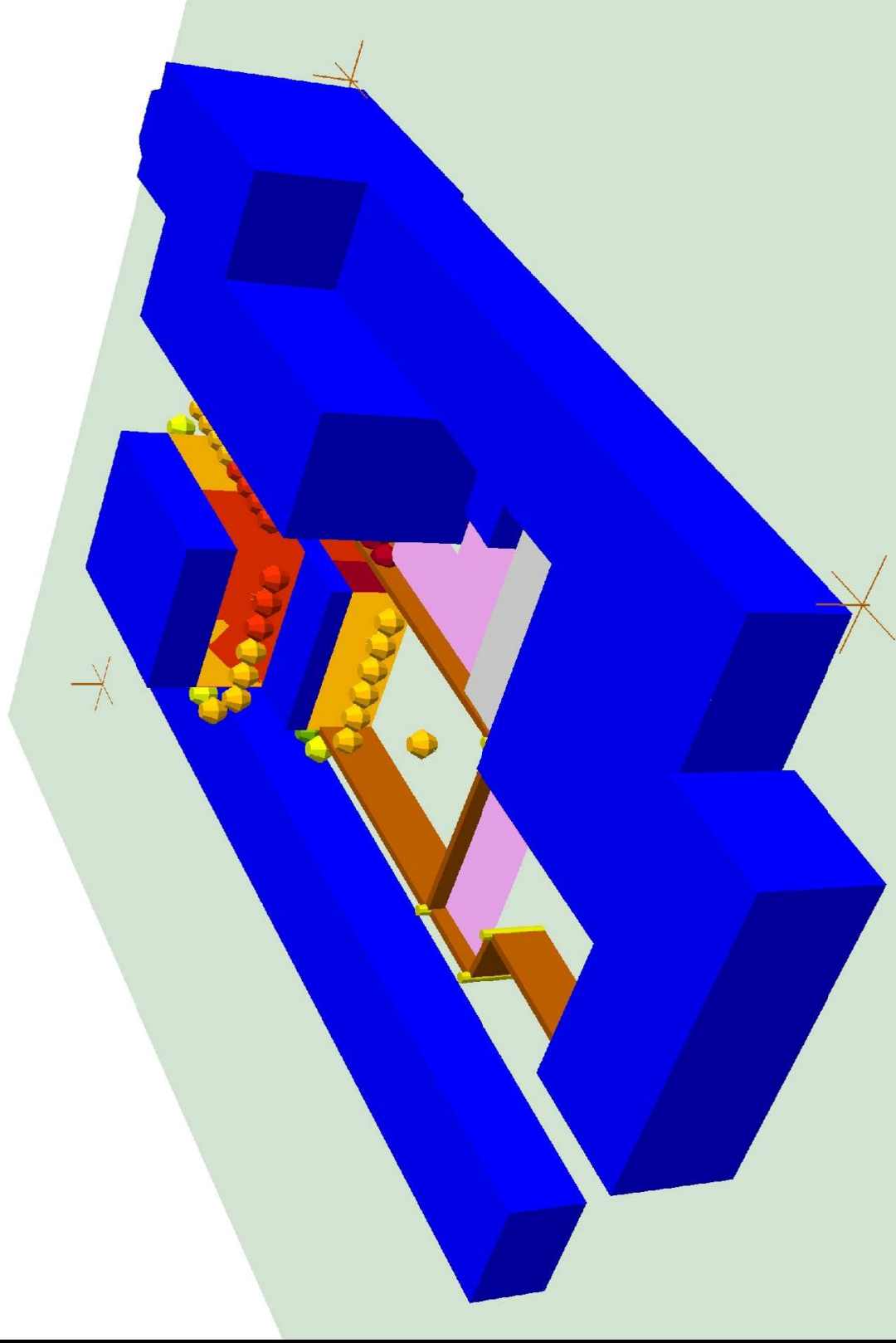
## APPENDIX B

### Land Adjacent to The Load of Hay

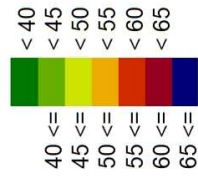
#### PLANT NOISE EMISSIONS CALCULATIONS

| Source: Existing Plant Units<br>Receiver: Proposed development 1st floor bedroom | Frequency, Hz                   |          |          |          |          |          |          |          | dB(A)     |
|----------------------------------------------------------------------------------|---------------------------------|----------|----------|----------|----------|----------|----------|----------|-----------|
|                                                                                  | 63                              | 125      | 250      | 500      | 1k       | 2k       | 4k       | 8k       |           |
| DWA KFR-61W/AXc (Sound Pressure Level @1m)                                       | Octave band performance unknown |          |          |          |          |          |          |          | 56        |
| Correction for number of units (2),dB                                            |                                 |          |          |          |          |          |          |          | 3         |
| Minimum attenuation provided by distance (14m), dB                               |                                 |          |          |          |          |          |          |          | -23       |
| DWA KFR-61W/AXc (Sound Pressure Level @Receiver)                                 |                                 |          |          |          |          |          |          |          | 36        |
| KD PAP015M1 (Sound Pressure Level @1m)                                           | Octave band performance unknown |          |          |          |          |          |          |          | 47        |
| Minimum attenuation provided by distance (10m), dB                               |                                 |          |          |          |          |          |          |          | -20       |
| Minimum attenuation required by proposed acoustic enclosure, dB                  |                                 |          |          |          |          |          |          |          | 27        |
| <b>Total Specific Level of all Plant Unit Installations at Receiver</b>          |                                 |          |          |          |          |          |          |          | 37        |
| <b>BS4142 Acoustic Feature Corrections</b>                                       |                                 |          |          |          |          |          |          |          |           |
| Tonality                                                                         |                                 |          |          |          |          |          |          |          | 2         |
| Impulsivity                                                                      |                                 |          |          |          |          |          |          |          | 0         |
| Intermittency                                                                    |                                 |          |          |          |          |          |          |          | 0         |
| <b>Total Rating Noise Level of all Plant Unit Installations at Receiver</b>      | <b>0</b>                        | <b>0</b> | <b>0</b> | <b>0</b> | <b>0</b> | <b>0</b> | <b>0</b> | <b>0</b> | <b>39</b> |

|                  |    |
|------------------|----|
| Design Criterion | 39 |
|------------------|----|



Noise levels day dB(A)



Signs and symbols

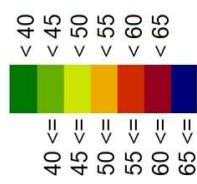


Date 20/01/2022

Length Scale 1:100



Noise levels day dB(A)



Signs and symbols

Main building

Area source

Date 20/01/2022

Length Scale 1:256

