

**Residential Development of Up to 8 Units
Land at Northfield Cottages, Eastergate
Noise Assessment
November 2021**

**RESIDENTIAL DEVELOPMENT OF UP TO 8 UNITS
LAND AT NORTHFIELD COTTAGES, EASTERGATE**

NOISE ASSESSMENT

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1.0 INTRODUCTION

- 1.1 Reside Developments Ltd commissioned Hepworth Acoustics Ltd to carry out a noise assessment relating to a proposed planning application for a residential development of up to 8 units on Land at Northfield Cottages, West of Fontwell Avenue in Eastergate.
- 1.2 The noise survey work, assessment, recommendations and report have been carried out and prepared by Hepworth Acoustics Ltd.
- 1.3 This noise assessment report relates to a proposed residential development of up to eight dwellings, adjacent to an approved residential development on land to the West of Fontwell Avenue.
- 1.4 The location of the site within the context of the surrounding area is shown in Figure 1, the approved residential development is located to the north of the proposed new development of up to 8 units.
- 1.5 This assessment has been based on the results and findings of the original noise assessment prepared by Hepworth Acoustics Ltd, ref: 'P20-188-R01' dated April 2020, along with supplementary noise survey measurements.
- 1.6 The site is bound by the A29 Fontwell Avenue to the East, an existing residential property to the south, other existing paddocks to the west, and the approved residential development to the north.
- 1.7 The proposed layout of the development is shown in Figure 2.
- 1.8 This noise assessment has included:
- Adoption of appropriate acoustic design criteria;
 - An inspection of the site and surrounding area;
 - A review of the data and findings from the original noise assessment for the approved residential development to the north;
 - Supplementary Daytime noise survey measurements;
 - An assessment of the potential noise impact on the proposed development extension; and,
 - Recommendations for suitable noise mitigation measures.
- 1.9 The various noise indices referred to in this report are described in Appendix I. All noise levels mentioned in the text have been rounded to the nearest decibel, as fractions of decibels are imperceptible.

2.0 ACOUSTIC DESIGN GUIDANCE

NPPF

- 2.1 The National Planning Policy Framework (NPPF) 2021 states in paragraph 174 that *“Planning policies and decisions should contribute to and enhance the natural and local environment by: ... e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of ... noise pollution ...”*.
- 2.2 Paragraph 187 states that: *“Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or ‘agent of change’) should be required to provide suitable mitigation before the development has been completed.”*
- 2.3 However, there is as yet no specific guidance on numerical acoustic assessment/design criteria for proposed new housing developments provided in the NPPF, accompanying Technical Guidance National Planning Practice Guidance ‘Noise’, nor the NPSE.

ProPG: Planning & Noise

- 2.4 ProPG: Planning & Noise ‘Professional Practice Guidance on Planning & Noise’ 2017 provides *“guidance on a recommended approach to the management of noise within the planning system in England”*, predominantly for proposed new residential developments on land that is exposed to transportation noise.
- 2.5 The ProPG recommends a staged approach to assessment. Stage 1 is an initial site noise risk assessment, indicating whether the proposed site is considered to pose a negligible, low, medium or high risk from a noise perspective.
- 2.6 At low noise levels, the more likely the site is to be acceptable from a noise perspective provided that a good acoustic design process is followed and an ADS (Acoustic Design Statement) confirms how the adverse impacts of noise will be mitigated and minimised in the finished development.

- 2.7 As noise levels increase, the site is likely to be less suitable from a noise perspective and any subsequent application may be refused unless a good acoustic design process is followed and an ADS confirms how the adverse impacts of noise will be mitigated and minimised, and which clearly demonstrate that a significant adverse noise impact will be avoided in the finished development.
- 2.8 High noise levels indicate that there is an increased risk that development may be refused on noise grounds. This risk may be reduced by following a good acoustic design process that is demonstrated in a detailed ADS.
- 2.9 Stage 2 of the recommended approach in ProPG is a full assessment to consider good acoustic design. The guidelines of ProPG in terms of suitable acoustic design criteria are broadly consistent with the guidance of BS 8233, and the sound insulation recommendations made later in this report have been designed to achieve the BS 8233 guidelines, as described below.
- 2.10 The scope of ProPG is restricted to sites that are exposed predominantly to noise from transportation sources. However, the recommended approach is also stated as being suitable where some industrial or commercial noise contributes to the acoustic environment provided that it is “*not dominant*”.

BS 8233

- 2.11 British Standard 8233:2014 Guidance on sound insulation and noise reduction for buildings, which carries the full weight of an adopted British Standard recommends guidance on design criteria for acceptable noise levels within residential accommodation. BS 8233 guidelines for the daytime (07:00-23:00) and night-time (23:00-07:00) periods are summarised in Table 1.

Table 1 : BS 8233 Recommended Acoustic Design Criteria

Activity	Location	Internal Noise Levels	
		Daytime (07:00-23:00)	Night-time (23:00-07:00)
Resting	Living room	35 dB $L_{Aeq,16h}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16h}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16h}$	30 dB $L_{Aeq,8h}$

- 2.12 BS 8233 also states that, “*where development is considered necessary or desirable ... the internal target levels [i.e. those in Table 1] may be relaxed by up to 5dB and reasonable internal conditions still achieved*”.

- 2.13 BS 8233 clarifies that the above guidance relates only to noise without specific character (e.g. such as that which has a distinguishable, discrete and continuous tone, is irregular enough to attract attention, or has strong low-frequency content) and that where such characteristics are present, lower noise limits might be appropriate.
- 2.14 Further, BS 8233 states that if there is a reliance on closed windows to meet the guide values, *“there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level”*. Further, it is stated that assessments should be based on a room with *“adequate ventilation provided (e.g. trickle ventilators should be open)”*.
- 2.15 BS 8233 also recognises that regular individual noise events at night can cause sleep disturbance. Peaks of noise from individual events are usually described in terms of L_{Amax} values and these can be highly variable and unpredictable. ProPG states that *“in most circumstances in noise-sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45dB $L_{Amax,F}$ more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability and regularity of noise events”*.
- 2.16 Regarding outdoor living areas, BS 8233 states that *“it is desirable that the external noise level does not exceed 50dB $L_{Aeq,T}$, with an upper guideline value of 55dB L_{Aeq} , which would be acceptable in noisier environments. However, it is recognised 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, 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, developments should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited”*.

3.0 NOISE SURVEY DATA

Supplementary Noise Survey Measurements

- 3.1 The proposed development site was visited on Thursday 8 July 2021 to inspect the land and surrounding area and carry out supplementary attended noise survey measurements.
- 3.2 The supplementary measurements were carried out at the position of the closest proposed elevation to Fontwell Avenue, Location X as shown in Figure 3.
- 3.3 The noise measurements were taken in 'free-field' conditions and at a microphone height of approximately 1.4m above the ground. Calibration checks were carried out both before and after the noise survey with no variation in calibration level.
- 3.4 Weather conditions during the noise survey were suitable for sound level measurements, being dry with low winds, full details of the weather conditions and the noise survey equipment can be seen in Appendix II.
- 3.5 At the time of the noise survey the majority of the COVID-19 pandemic restrictions affecting public behaviour and movements were no longer in place and the road traffic in the area is considered to be representative of normal conditions. Therefore, there is not considered to have been any COVID-19 related effect on the noise survey results.
- 3.6 Full results of the noise survey are provided in Appendix II and a summary showing the range of the measured noise levels is shown in Table 2 below.

Table 2: Summary of Supplementary Daytime Noise Survey Results (dB)

<i>L_{Aeq,T}</i>	<i>L_{Aeq,T}</i>
46-48	59-61

- 3.7 The only significant contribution to the noise on the proposed development extension is road traffic noise from Fontwell Avenue.

Existing Noise Survey Data

- 3.8 The existing noise survey data which served as the basis the noise assessment which accompanied the planning application for the approved residential development to the north, was taken during a noise survey in April 2020.

- 3.9 Whilst more stringent COVID-19 related restrictions were in place during this period, the noise assessment also took into account traffic count data during the noise survey and adjusted it for projected 2025 traffic flow data to provide a robust approach.
- 3.10 The results of the supplementary noise survey show good agreement with the April 2020 noise survey data, and therefore the projected 2025 road traffic noise levels provide a robust basis for the assessment of noise impact upon the most exposed dwellings which form part of the proposed development extension.
- 3.11 On this basis, the predicted 2025 road traffic noise levels at the most exposed elevations, accounting for anticipated growth are set out in Table 3.

Table 3: Predicted 2025 Road Traffic Noise Levels at Location X (dB)

Daytime (07:00-23:00)	Night-time (23:00-07:00)	
<i>L_{Aeq,16h}</i>	<i>L_{Aeq,8h}</i>	<i>L_{Amax}</i>
67	60	78

- 3.12 As can be seen from comparison of the levels in Table 2 and Table 3, the projected 2025 road traffic noise levels are higher, but this is due to a worst case projected increase in traffic flow rates.

4.0 ASSESSMENT & NOISE MITIGATION MEASURES

- 4.1 Considering the predicted 2025 road traffic noise in Table 3, this falls into the 'medium' risk category for both the daytime and night-time periods, as set out in the Stage 1 guidance of ProPG.
- 4.2 Accordingly, some mitigation measures will be necessary for proposed plots adjacent to the A29, to ensure good acoustic design and a suitable acoustic environment for future occupants.
- 4.3 To achieve internal noise levels consistent with the relevant BS 8233 / ProPG guidelines, and based on the overall daytime and night-time noise levels set out in Table 3, a scheme of glazing and ventilation has been determined for plots closest to the A29 boundary of the site. The areas to which each of the following mitigation schemes apply, for habitable rooms only, are identified in Figure 4.
- 4.4 The highest specification applies in worst-case areas, closest to the A29 and with a direct line-of-site across that road. For habitable rooms in these areas Mitigation Scheme 1 (below) applies.

Mitigation Scheme 1: Acoustic glazing system providing the minimum Sound Reduction Indices (R) set out in Table 4, typically achievable using a system comprising one 10mm standard pane and one 8mm thick standard pane on a minimum 12mm air cavity (i.e. 10-12-8). Ventilation to be provided via acoustically attenuated trickle ventilators rated at not less than 42 dB $D_{n,e,w}$.

Table 4 : Mitigation Scheme 1 - Sound Reduction Indices (dB R)

Sound Reduction Index (R) at Octave Band Centre Frequency (Hz)					
125	250	500	1k	2k	4k
29	27	35	37	36	45

- 4.5 A secondary scheme, Mitigation Scheme 2 (below), applies for habitable rooms close to the A29, yet set a little further back and/or where the line-of-sight to the carriageway is restricted, either due to partial screening provided by adjacent plots, or due to the orientation of the façade.

Mitigation Scheme 2: Acoustic glazing system providing the minimum Sound Reduction Indices (R) set out in Table 5, typically achievable using a system comprising one 10mm thick standard pane and one 4mm thick standard pane on a minimum 12mm air cavity (i.e. 10-12-4). Ventilation to be provided via acoustically attenuated trickle ventilators rated at not less than 42 dB $D_{n,e,w}$.

Table 5 : Mitigation Scheme 2 - Sound Reduction Indices (dB R)

Sound Reduction Index (R) at Octave Band Centre Frequency (Hz)					
125	250	500	1k	2k	4k
25	22	33	40	43	44

- 4.6 Further to above, to adequately protect garden areas of proposed plots closest to the A29, purpose-built acoustic barriers are recommended. In many areas, where gardens are not fully exposed to the A29 (i.e. some protection will be provided by the development building), then 1.8m high barriers will be adequate. The lateral extents of recommended acoustic barriers, are identified in Figure 4.
- 4.7 Any acoustic barriers should be of overall mass not less than 10 kg.m^{-2} and nominal thickness not less than 20 mm (e.g. proprietary acoustic fencing, solid masonry wall). The construction should be imperforate with no holes or gaps and should be sealed at the base.

5.0 SUMMARY & CONCLUSIONS

- 5.1 Reside Developments Ltd commissioned Hepworth Acoustics Ltd to carry out a noise assessment relating to a proposed planning application for a residential development of up to 8 units on Land at Northfield Cottages, West of Fontwell Avenue in Eastergate.
- 5.2 Suitable acoustic design criteria have been adopted for the proposed new dwellings based on BS 8233 design criteria.
- 5.3 An inspection of the proposed development land along with a supplementary noise survey have been carried out to determine the existing character and level of noise in the area.
- 5.4 The existing noise survey data for the land directly to the north has been reviewed, which shows good agreement with the supplementary noise data.
- 5.5 The potential noise impact upon the proposed development extension has been assessed and recommendations for appropriate noise mitigation measures have been provided.

Do not scale from this figure

Key:



Illustrative Site Boundary



reside.

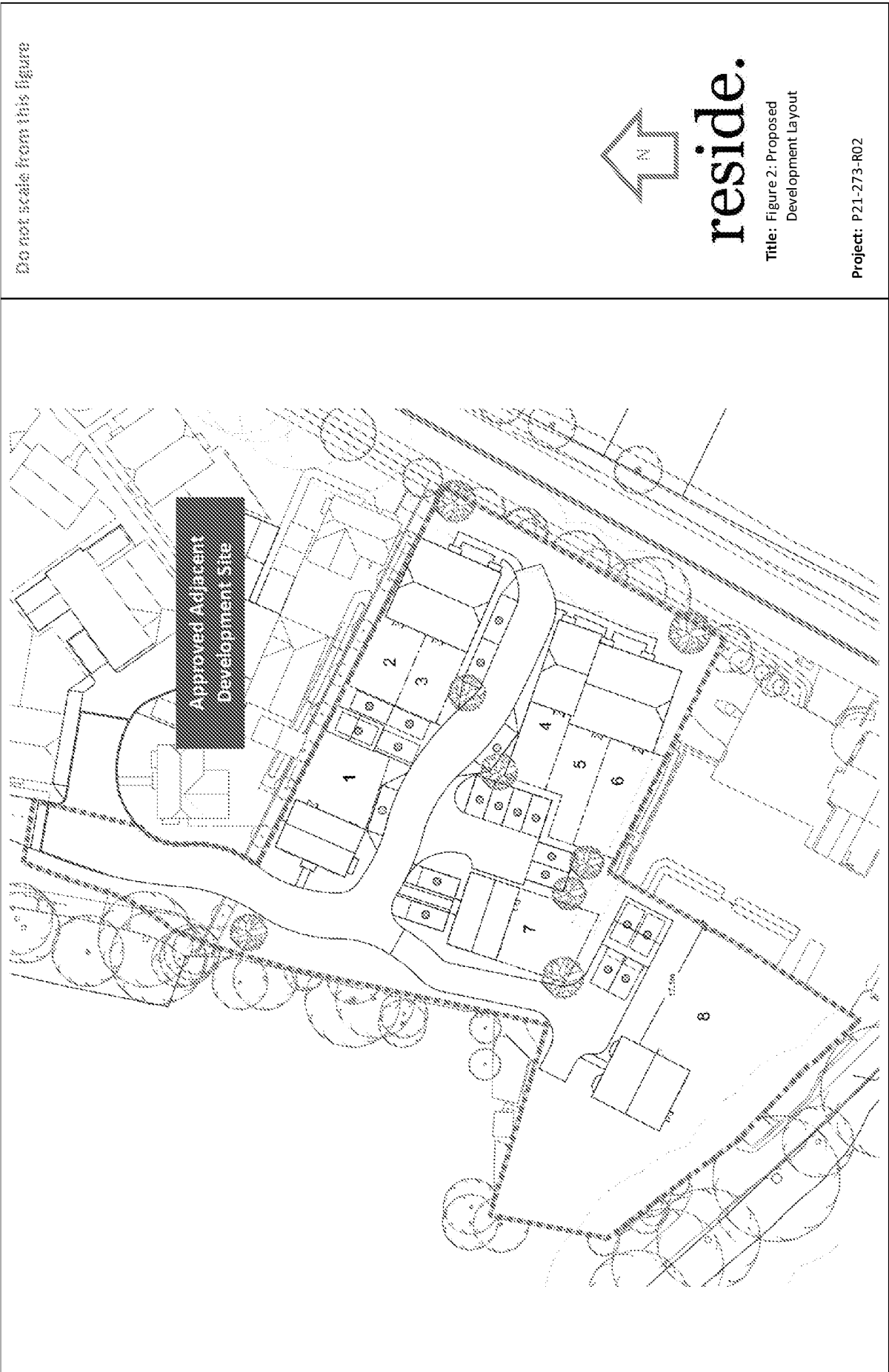
Title: Figure 1: Aerial View of
Development Location

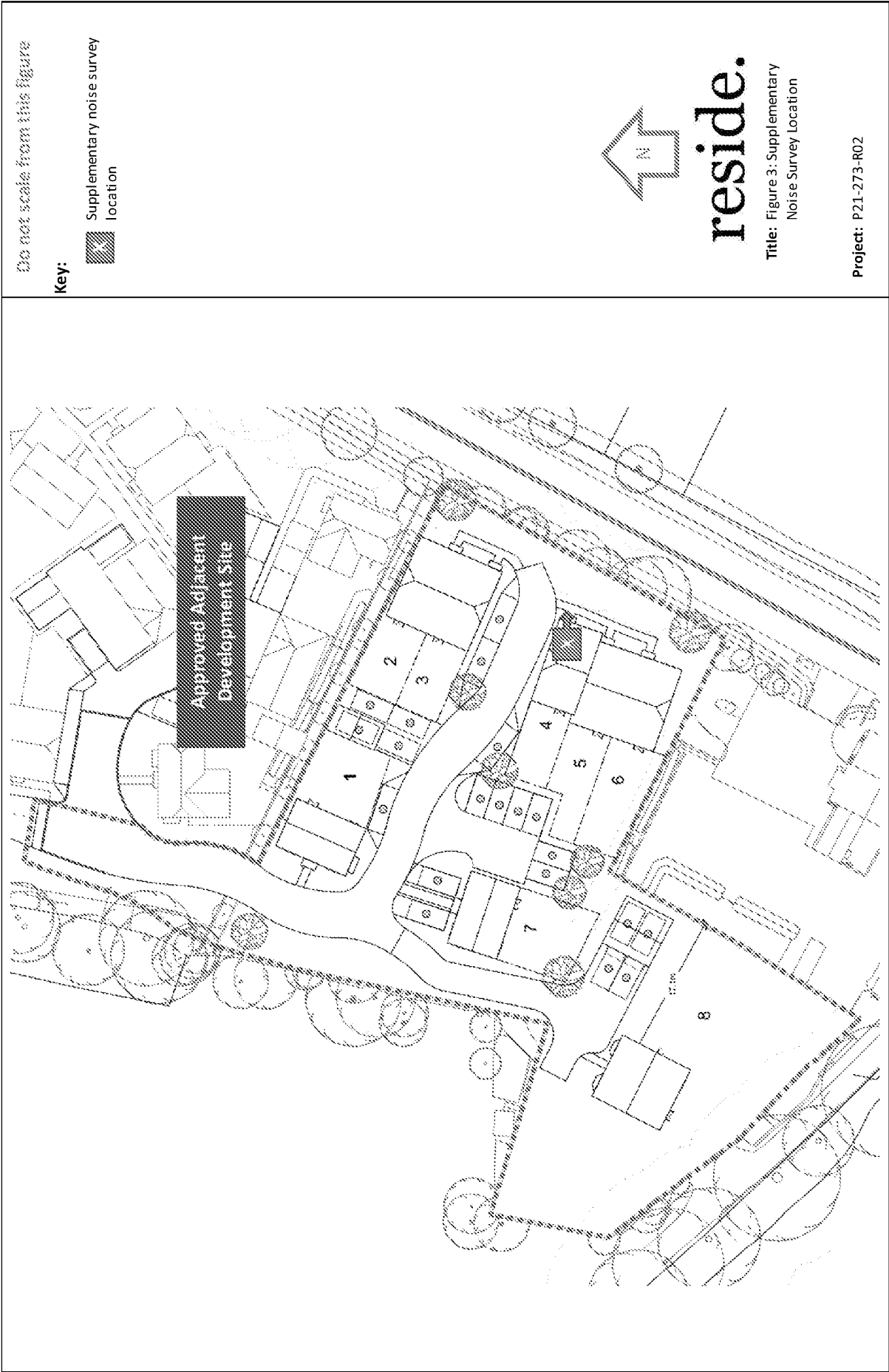
Project: P21-273-R02

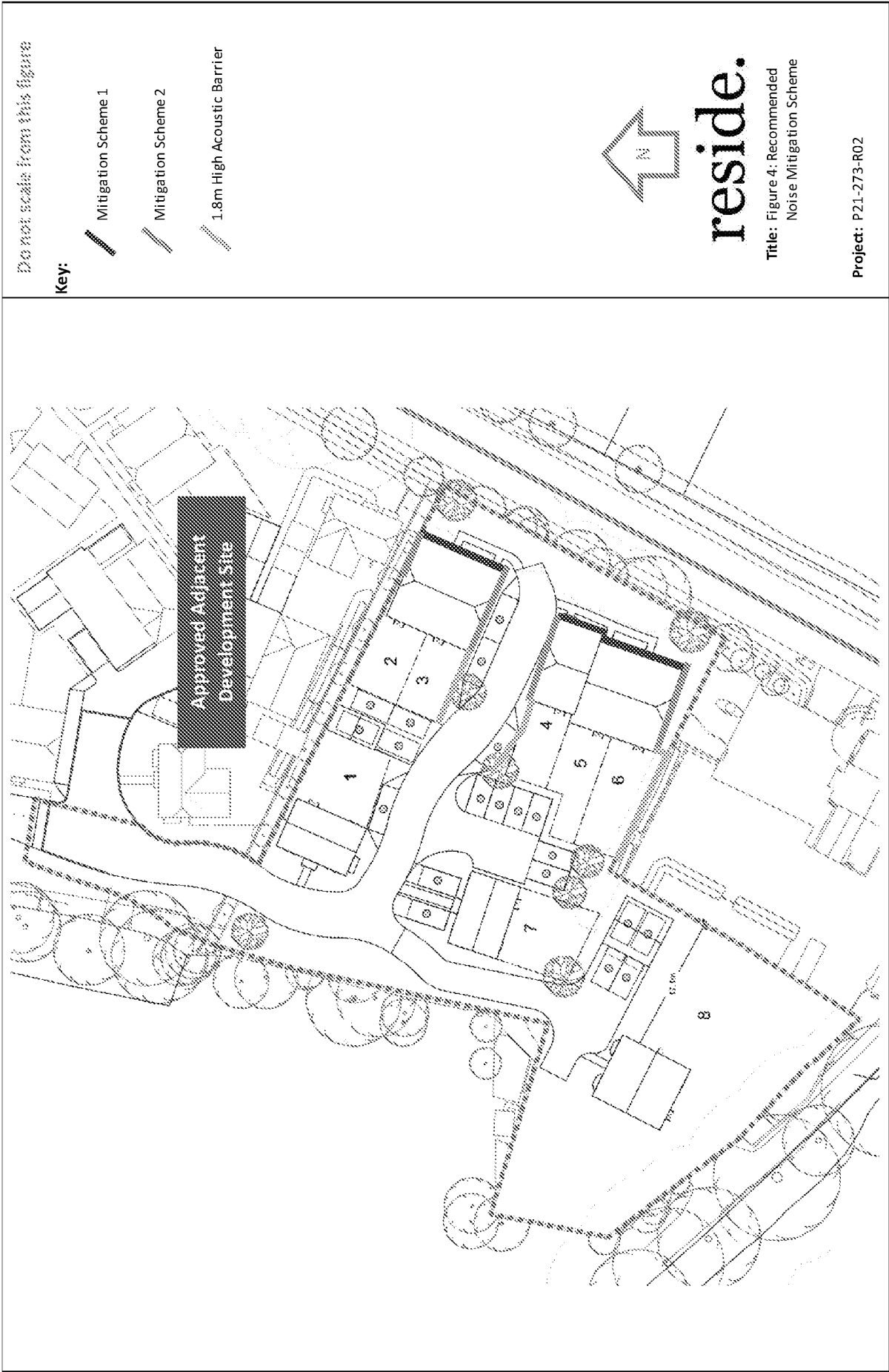


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Appendix I: Noise Units & Indices

Sound and the decibel

A sound wave is a small fluctuation of atmospheric pressure. The human ear responds to these variations in pressure, producing the sensation of hearing. The ear can detect a very wide range of pressure variations. In order to cope with this wide range of pressure variations, a logarithmic scale is used to convert the pressure values into manageable numbers. Although it might seem unusual to use a logarithmic scale to measure a physical phenomenon, it has been found that the human response to sound most closely follows a logarithmic relationship. The dB (decibel) is the logarithmic unit used to describe sound (or noise) levels. The usual range of sound pressure levels is from 0 dB (at the threshold of hearing) to 120 dB (at the threshold of pain).

Due to the logarithmic nature of decibels, when two sounds of the same level are combined together, the total sound level is (under normal circumstances) 3 dB higher than each of the individual sound levels e.g. 60 dB plus 60 dB = 63 dB. In terms of perceived 'loudness', a 3 dB(A) variation in sound level is a relatively small (but nevertheless just noticeable) change. An increase in sound level of 10 dB(A) generally corresponds to a doubling of perceived loudness. Likewise, a reduction in sound level of 10 dB(A) generally corresponds to a halving of perceived loudness.

The ear is not equally sensitive to sound at all frequencies. It is less sensitive to sound at low and very high frequencies, compared with the frequencies in between. Therefore, when measuring a sound made up of different frequencies, it is often useful to 'weight' the frequency spectrum appropriately, so that the measurement correlates better with what a person would actually hear. This is usually achieved by using a mathematical filter called the 'A' weighting, which is built into sound level meters. Sound levels measured using the 'A' weighting are denoted dB(A) or dBA.

Frequency and Hertz (Hz)

As well as the loudness of a sound, the frequency content of a sound is also very important. Frequency is a measure of the rate of fluctuation of a sound wave. The unit used is cycles per second, or Hertz (Hz). Sometimes large frequency values are written as kiloHertz (kHz), where 1 kHz = 1000 Hz.

Young people with normal hearing can hear frequencies in the range 20 Hz to 20 kHz. However, the upper frequency limit gradually reduces as a person gets older.

Glossary of Relevant Sound & Vibration Terms

When a noise level is constant and does not fluctuate, it can be described adequately by measuring the dB(A) level. However, when the noise level varies with time, the measured dB(A) level will vary as well. In this case, it is therefore not possible to represent the noise with a simple dB(A) value. In order to describe noise where the level is continuously varying, a number of other indices can be used. The various indices used in this report, along with other relevant terms are described below.

$L_{Aeq,T}$ This is the A-weighted 'Equivalent Continuous Sound Level' which is an average of the total sound pressure measured over a specified time period. In other words, $L_{Aeq,T}$ is the level of a steady sound which has the same total (A-weighted) sound pressure as the real fluctuating noise, measured over the same time period. It is increasingly being used as the preferred parameter for most forms of environmental noise.

L_{Amax} This is the 'Maximum A-weighted Sound Level' that was measured during the monitoring period. L_{Amax} used in this report refers throughout to L_{Amax} measured using the fast time weighting of the sound level meter, $L_{Amax,f}$.

$L_{A10,T}$ This is the A-weighted noise level exceeded for 10% of the time period. $L_{A10,T}$ is usually used as a measure of traffic noise.

$L_{A90,T}$ This is the A-weighted sound level exceeded for 90% of a measurement time period. $L_{A90,T}$ is used as a measure of background sound level.

$D_{n,e,w}$ This the 'Weighted Element Normalised Level Difference', which is a single figure value quantifying the sound insulation performance of a building element, such as an air vent.

R This is the 'Sound Reduction Index' as measured in a laboratory, which is a measure of the sound insulation properties of a building element (e.g. a wall) in a stated frequency band.

Appendix II: Noise Survey Results

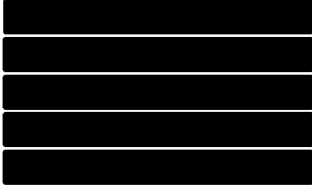
Date	Thursday 8 July 2021
Equipment	Rion NA-28 'Class 1' sound analyser (S/N: 00960036) Rion NC-74 'Class 1' sound calibrator (S/N: 00430648) Kestrel 2500 portable weather meter (S/N: 2556870) Tripod
Weather	Thursday Daytime: Dry, ~19°C with low winds <4 m.s ⁻¹ and low cloud coverage

Results of Attended Supplementary Noise Measurements

Time		Measured Noise Levels (dB)				Comments
Start	End	L_{Amax}	$L_{A10,T}$	$L_{Aeq,T}$	$L_{A90,T}$	
13:00	13:15	72.8	64.5	60.8	48.1	Road traffic noise. Some bird noise.
13:15	13:30	67.5	63.2	58.9	45.8	Road traffic noise. Some bird noise. Some distant lawn mower noise.
13:30	13:45	76.9	63.9	60.4	46.0	Road traffic noise. Some bird noise.

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