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# Rebecca Road, Pershore

Lioncourt Homes Limited and Touch  
Developments Ltd

Noise Assessment  
July 2024





## Document Control

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Job No.	24-0274	
Project Name	Rebecca Road, Pershore	
Document Title	Noise Assessment	
Status	ISSUED	
Client	Lioncourt Homes Limited and Touch Developments Ltd	
	Name	Date
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## Record of Revisions

Revision	Date	Details	Made By

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# 1 Introduction

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## General

- 1.1 Rappor Consultants Limited was instructed by Lioncourt Homes Limited and Touch Developments Ltd to undertake a noise impact assessment for a proposed residential development of upto 115 dwellings on land to the north of Rebecca Road, Pershore ('the Site'). Outline permission is sought for the erection of up to 115 dwellings with all matters reserved with the exception of access, including open space, landscaping, drainage and associated works.
- 1.2 This report sets out the results of a baseline noise survey undertaken at the Site. The results have been assessed to determine the suitability of the Site for the proposed development.
- 1.3 A glossary of acoustic terminology is provided in **Appendix A – Acoustic Terminology**.



## 2 Site Description and Application

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### Site Location

- 2.1 The Site is located north of Rebecca Road on the western edge of Pershore and lies within the administrative area of Wychavon District Council (WDC). The Site currently comprises agricultural land. The Site is bound to the north by the B4084 Worcester Road with Allesborough Cottage and agricultural land beyond. To the east and south of the Site are residential dwellings and Rebecca Road. Further agricultural land forms the western boundary of the Site.
- 2.2 The planning proposals are in outline at this stage however an illustrative masterplan is in **Figure 2.1**.



Figure 2.1 Proposed Illustrative Masterplan





## 3 Consultation & Guidance

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### Consultation

- 3.1 Prior to undertaking the noise assessment, Rappor consulted with Worcestershire Regulatory Services (WRS), WDC's appointed environmental health consultants, to confirm the assessment methodology.
- 3.2 It was agreed that monitoring would be undertaken over a 24-hour period at the northern and southern boundary of the Site.
- 3.3 The results of the survey would be assessed in accordance with the guidance presented in ProPG and BS8233.
- 3.4 Details of applicable guidance to the assessment are set out below.

### National Planning Policy Framework (2023)

- 3.5 The National Planning Policy Framework (NPPF) sets out the government's planning policies for England and how these are expected to be applied. It states that 'The purpose of the planning system is to contribute to the achievement of sustainable development' and in relation to the natural environment it states at Paragraph 180:

*"Planning policies and decisions should contribute to and enhance the natural and local environment by:*

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

- 3.6 Paragraph 191 goes on to state:

*"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:*

*a) mitigate and reduce to a minimum potential adverse impact resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;*



*b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason...”.*

3.7 Finally, Paragraph 194 states:

*“The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities.”*

3.8 Where considering adverse impacts, the NPPF makes reference to the Noise Policy Statement for England (NPSE).

### **Noise Policy Statement for England (NPSE)**

3.9 The aim of the NPSE states:

*“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.”*

3.10 With reference to Significant Observed Adverse Effect Level (SOAEL), the document notes that:

*“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.”*





## Planning Practice Guidance (PPG) – Noise

3.11 The latest version of the PPG – Noise was published in July 2019 and provides advice on how planning can manage potential noise impacts in new developments.

3.12 It states:

*“Plan-making and decision making need to take account of the acoustic environment and in doing so consider:*

- *whether or not a significant adverse effect is occurring or likely to occur;*
- *whether or not an adverse effect is occurring or likely to occur; and*
- *whether or not a good standard of amenity can be achieved.”*

3.13 **Table 3.1** presents the noise exposure hierarchy based on the average response of those affected.



Response	Example of outcomes	Increase effect level	Action
No Observed Effect Level			
Not present	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level (NOAEL)			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level (LOAEL)			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level (SOAEL)			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

**Table 3.1 Noise exposure hierarchy table**



## ProPG: Planning & Noise

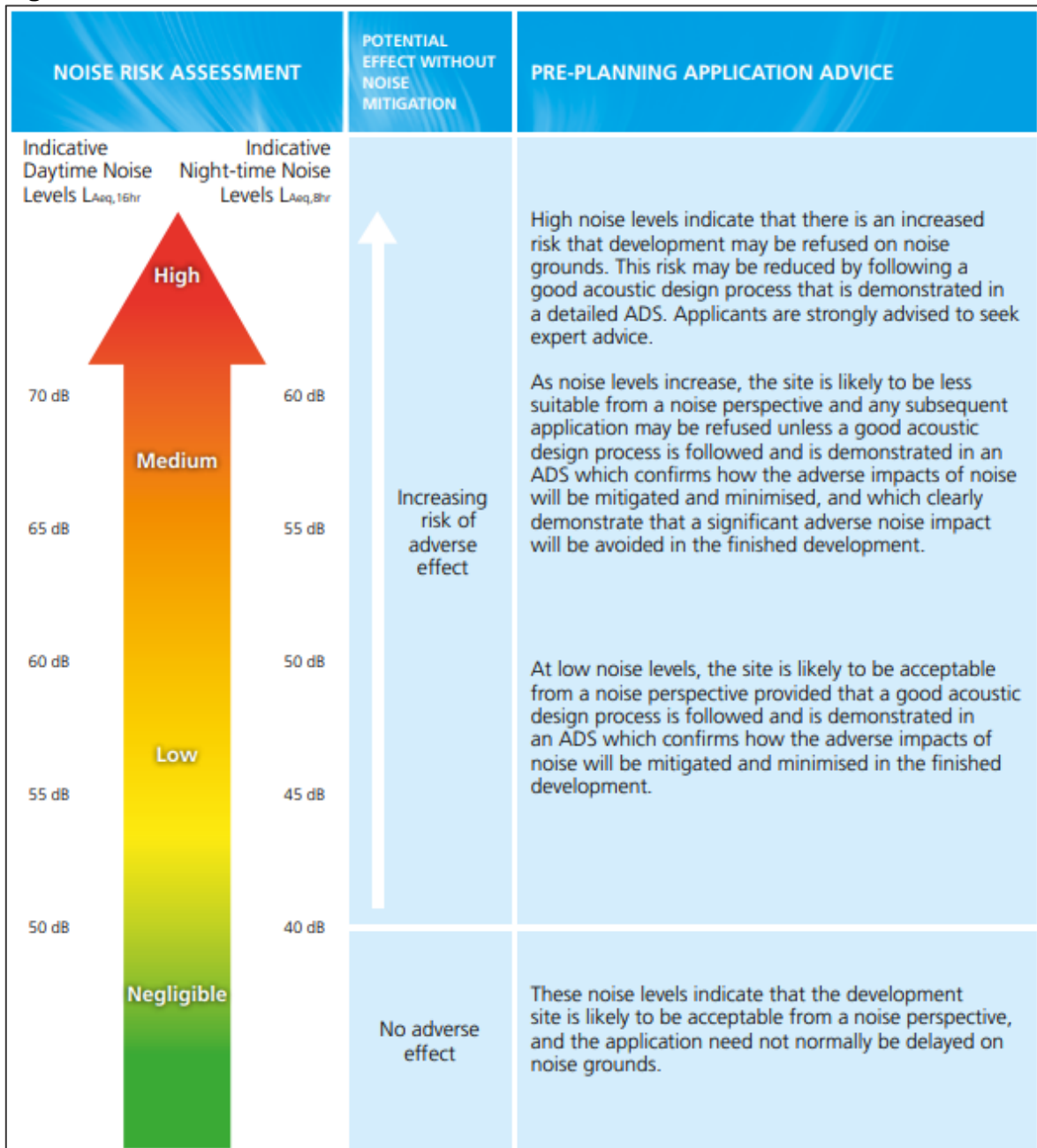
- 3.14 ProPG was prepared by a working group consisting of representatives of the Association of Noise Consultants (ANC), the Institute of Acoustics (IOA) and the Chartered Institute of Environmental Health (CIEH) and was published in June 2017. It was produced “*to provide practitioners with guidance on the management of noise within the planning system in England*”, though it does not constitute an official government code of practice and neither replaces nor provides an authoritative interpretation of the law or government policy.
- 3.15 ProPG bases much of its guidance on the numerical targets within BS 8233:2014 and the interpretation of NPPF and NPSE guidelines, providing new and extended recommendations where these standards are considered to fall short.

### Initial Site Noise Risk Assessment

- 3.16 ProPG recommends that an initial site noise risk assessment to identify likely adverse effects from noise without accounting for any mitigation measures that may subsequently be included in development proposals. **Figure 3.1** is taken from ProPG which shows the increasing risk of adverse effect based on daytime noise levels ( $L_{Aeq,16hr}$ ) and night-time noise levels ( $L_{Aeq,8hr}$ ) without noise mitigation.



**Figure 3.1 Initial Site Risk Assessment**



**Figure 1 Notes:**

- a. Indicative noise levels should be assessed without inclusion of the acoustic effect of any scheme specific noise mitigation measures.
- b. Indicative noise levels are the combined free-field noise level from all sources of transport noise and may also include industrial/commercial noise where this is present but is "not dominant".
- c.  $L_{Aeq,16hr}$  is for daytime 0700 – 2300,  $L_{Aeq,8hr}$  is for night-time 2300 – 0700.
- d. An indication that there may be more than 10 noise events at night (2300 – 0700) with  $L_{Amax,F} > 60$  dB means the site should not be regarded as negligible risk.



### Internal Ambient Noise Levels

3.17 ProPG provides internal ambient noise level targets based upon BS 8233:2014, with the addition of maximum noise events. ProPG suggests that the development layout should be designed such that internal noise level targets can be achieved with open windows in as many areas as possible, on the basis that residents will value the ability to open windows at will. However, an assessment can be made with closed windows and open ventilators (i.e. trickle vents) which provide “whole dwelling ventilation” (as defined by Building Regulations Approved Document F).

3.18 The recommended indoor noise levels for dwellings are presented in **Table 3.2**.

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35 dB $L_{Aeq, 16hr}$	-
Dining	Dining room/area	40 dB $L_{Aeq, 16hr}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq, 16hr}$	30 dB $L_{Aeq, 8hr}$ 45 dB $L_{Amax, F}^*$
<p>* 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 <math>L_{Amax, F}</math>, depending on the character and number of events per night. Sporadic noise events could require separate values. 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 <math>L_{Amax, F}</math> 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.</p>			

**Table 3.2 Indoor noise levels for dwellings**

### External Amenity Noise Levels

3.19 ProPG provides guidance for external amenity noise levels based upon BS 8233:2014 and PPG-N guidelines. In summary it recommends the following as part of an external amenity area noise assessment:

- If external amenity spaces are an intrinsic part of the overall design, the acoustic environment of those spaces should be considered so that they can be enjoyed as intended. Noise levels should ideally not be above the range 50 – 55 dB  $L_{Aeq, 16hr}$ .
- These guideline values may not be achievable in all circumstances where development might be desirable. In such a situation, development should be designed to achieve the lowest practicable noise levels in these external amenity spaces.



- Even if external amenity spaces are not an intrinsic part of the overall design, consideration of the need to provide access to a quiet or relatively quiet external amenity space forms part of a good acoustic design process.
- Where, despite following a good acoustic design process, significant adverse noise impacts remain on any private external amenity space (e.g. garden or balcony) then the impact may be partially offset if the residents are provided, through the design of the development or the planning process, with access to:
  - a relatively quiet facade (containing openable windows to habitable rooms) or a relatively quiet externally ventilated space (i.e. an enclosed balcony) as part of their dwelling; and/or
  - relatively quiet alternative or additional external amenity space for sole use by a household, (e.g. a garden, roof garden or large open balcony in a different, protected, location); and/or
  - a relatively quiet, protected, nearby, external amenity space for sole use by a limited group of residents as part of the amenity of their dwellings; and/or
  - a relatively quiet, protected, publicly accessible, external amenity space (e.g. a public park or a local green space designated because of its tranquillity) that is nearby (e.g. within a 5 minutes walking distance). The local planning authority could link such provision to the definition and management of Quiet Areas under the Environmental Noise Regulations.

### **British Standard 8233:2014 Guidance on sound insulation and noise reduction for buildings**

3.20 BS8233 provides guidance for the control of noise in and around buildings. The scope of the document is applicable for new and refurbished buildings undergoing a change of use.

3.21 The recommendations from BS8233 for steady external noise sources are presented in **Table 3.2** above with the addition of maximum noise events from ProPG.

3.22 The guidance also provides criteria for external areas and states:

*“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.”*

## Approved Document O

- 3.23 Approved Document O Overheating came into effect on 15 June 2022 and requires reasonable provision to limit unwanted solar gains in summer and provide an adequate means to remove heat from the indoor environment.
- 3.24 In achieving the above, account must be taken of the safety of occupants and reasonable enjoyment of the residence.
- 3.25 In Section 3 of the document, it states:

*“In locations where external noise may be an issue (for example, where the local planning authority considered external noise to be an issue at the planning stage), the overheating mitigation strategy should take account of the likelihood that windows will be closed during sleeping hours (11pm to 7am).*

*Windows are likely to be closed during sleeping hours if noise within bedrooms exceeds the following limits.*

- a. 40dB  $L_{Aeq,T}$  averaged over 8 hours (between 11pm and 7am).*
- b. 55dB  $L_{AFmax}$  more than 10 times a night (between 11pm and 7am).”*

## 4 Noise Survey

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### Survey Details

- 4.1 A noise survey was undertaken between the 27<sup>th</sup> and 28<sup>th</sup> June 2024 to capture the prevailing noise climate on the Site.
- 4.2 Noise meters were installed at the northern and southern boundary of the Site as shown in **Figure 4.1** below.

**Figure 4.1 Noise Monitoring Location**



- 4.3 The meters were installed at a height of approximately 1.5m, in free-field conditions, i.e. at least 3.5m from a reflective surface.
- 4.4 Details of the monitoring equipment can be found in **Appendix B – Monitoring Equipment**. On-site calibration was undertaken before and after measurements with no significant drift observed.





## Weather Conditions

4.5 Weather conditions during the survey were dry with winds less than 5m/s and therefore suitable for environmental noise monitoring.

## Noise Climate

4.6 During the installation and collection of the noise meters, the noise climate was dominated by road traffic, mainly on the B4084 with a contribution from Rebecca Road. Other sources of note were natural sounds including birdsong.

## Monitoring Results

4.7 A summary of the measured noise levels is presented in **Table 4.1**.

Location	Date	Period	L <sub>Aeq, T</sub>	L <sub>A10, T</sub>	L <sub>A90, T</sub>	L <sub>Amax</sub>
NML1	27/06/2024	15:15 – 23:00	60.6	64.1	48.5	79.7
		23:00 – 07:00	53.3	50.3	32.9	76.1
	28/06/2024	07:00 – 15:15	62.0	65.5	50.2	88.4
NML2	27/06/2024	15:15 – 23:00	52.1	51.0	38.9	78.1
		23:00 – 07:00	42.3	37.3	30.7	69.7
	28/06/2024	07:00 – 15:00	53.6	55.6	40.8	74.0

**Table 4.1 Summary of Measured Noise Levels, dB**



## 5 Noise Assessment

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### Initial Risk Assessment

5.1 The results of the noise survey when compared to the initial risk assessment as presented in **Figure 3.1** indicate that the Site is a low risk in the south rising to between low and medium risk at the northern boundary.

5.2 For medium risk, ProPG states:

*“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 is demonstrated in an ADS (acoustic design statement) which 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.”*

5.3 Based on the above, the results of the noise survey have been used to develop a noise model of the development to predict the noise levels at facades and outdoor amenity areas of the proposed plots.

### Noise Model

5.4 The intention of noise modelling/mapping for this assessment is to accurately determine the noise levels at each façade and each floor of the building(s) associated with the illustrative proposed development. This avoids relying on using the highest measured noise levels from the baseline noise survey as a worst case, avoiding a blanket, over-specified strategy being applied across the entire façade.

5.5 The noise predictions within this report have been undertaken using the proprietary software IMMI, a 3-D noise mapping package which implements a wide range of national and international standards, guidelines and calculation algorithms, including those set out in ISO 9613-2:1996.

5.6 The results of the noise survey have been used to calibrate a without development model. Once calibrated, the model is updated with the indicative layout based on the concept masterplan for the development and noise levels predicted across the Site.



5.7 The noise map model has assumed:

- downwind propagation, i.e. a wind direction that assists the propagation of sound from source to receptor;
- a maximum reflection factor of three where buildings and barriers are assumed to have a 'smooth' reflective façade, as a worst case;
- that noise sources do not have strong radiation patterns and therefore radiate equally in all directions;
- 1.8m high close boarded garden fencing with minimum surface density of 10kg/m<sup>2</sup>; and
- a grid height at 1.5m when plotting noise across external amenity areas such as gardens.

#### Internal Ambient Noise Levels

5.8 The ProPG suggests that a 'good' acoustic design process should explore other methods of mitigating noise which doesn't wholly rely on using the building envelope.

5.9 The proposed development maximises the distance between the dwellings and the road whilst also minimising the number of dwellings at the closest approach.

5.10 **Figure 5.1** and **Figure 5.2** present the predicted daytime (07:00 – 23:00) and night-time (23:00 – 07:00) noise levels across the Site.

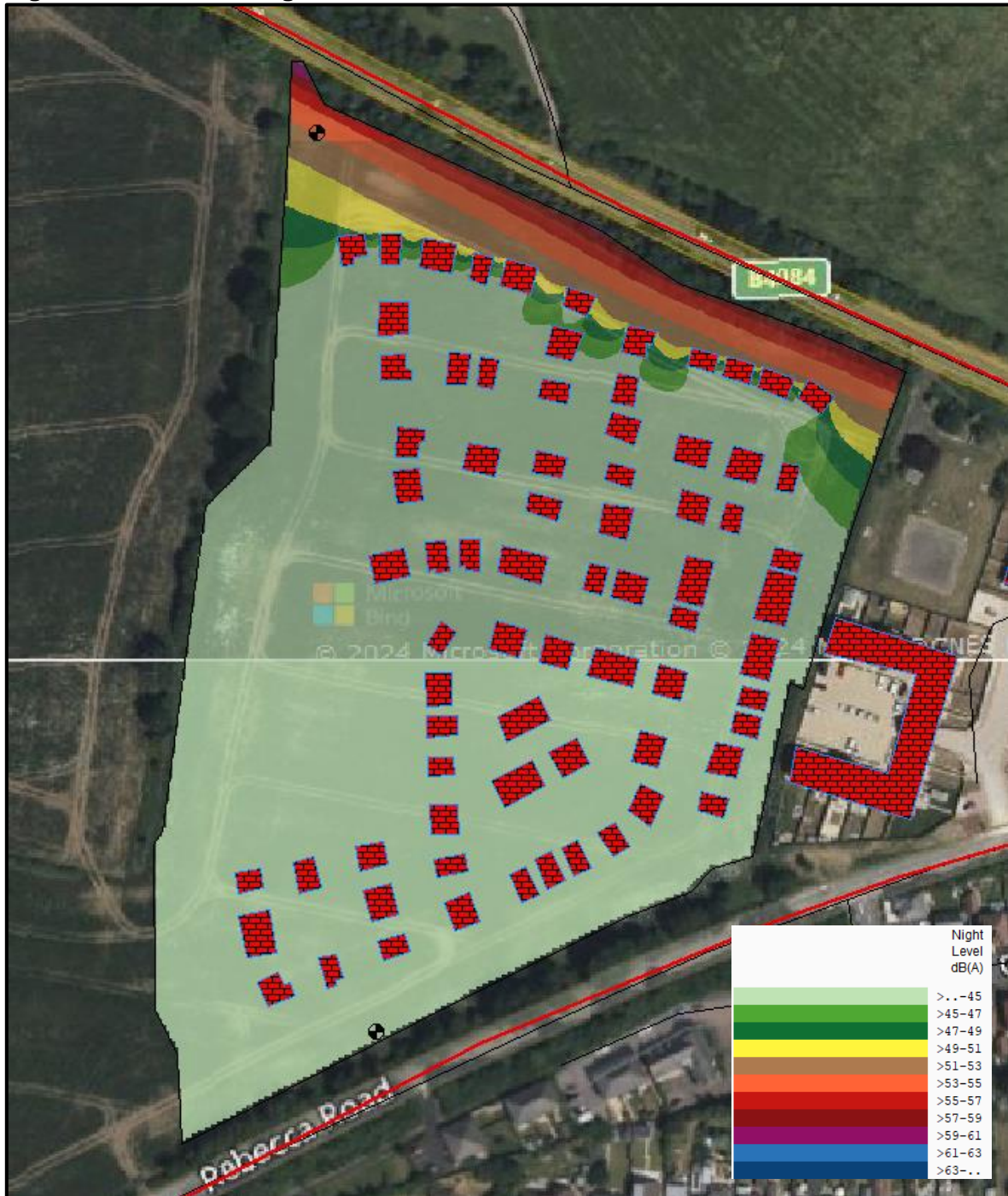


Figure 5.1 Predicted Daytime Noise Levels





Figure 5.2 Predicted Night-time Noise Levels



5.11 For internal noise levels, a partially open window typically provides up to 15dB sound reduction between outside and inside. As set out in BS8233, internal noise levels during the day should be less than 35dB  $L_{Aeq}$  and 30dB  $L_{Aeq}$  during the night. Therefore, a level at the façade of less than 50dB during the day or 45dB during the night would achieve acceptable internal noise levels with an open window.

5.12 The results presented in **Figures 5.1** and **5.2** indicate that by far the majority of the development is not affected by noise however, the northern facades of the properties



directly overlooking the B4084 would be subject to noise levels in excess of the guideline values during both the day and night-time periods.

- 5.13 For those plots subject to noise levels in excess of the guidance, a suitable glazing unit and alternative ventilation would be required to achieve acceptable internal noise levels.
- 5.14 Windows do not reduce noise equally across the entire frequency spectrum, so the frequency content of the sound will influence the overall sound reduction performance of a given window and by extension, the resulting noise levels within the receiving room.
- 5.15 However, many glazing manufacturers test their products under laboratory conditions using a typical road traffic noise frequency spectrum source. The resultant measured noise attenuation, in dB, gives a very useful guide to in-situ sound reduction performance of the window for situations where road traffic noise dominates. This performance index is known as the  $R_w + C_{tr}$  dB noise level.
- 5.16 A standard double glazed unit suitable for thermal insulation would achieve a sound reduction of approximately 26dB  $R_w + C_{tr}$ . Therefore, no enhanced performance glazing is required.
- 5.17 Where a closed window would be required for internal noise level limits to be achieved, alternative ventilation (to an open window), will be needed to comply with the requirements of the Building Regulations Approved Document F.
- 5.18 The acoustic performance of ventilators is often referred to as a  $D_{n,e,w}$  figure, which is the weighted element-normalized level difference that applies to small building elements with a surface area of less than 1m<sup>2</sup>.
- 5.19 On average, the  $D_{n,e,w}$  value is typically 6dB more than the  $R_w$  index. Therefore, a  $D_{n,e,w}$  of 32dB would be required. An example ventilator to achieve 32dB would be a Greenwood Slotvent 4000S. Alternative ventilators are available and can be determined during detailed design.
- 5.20 No further mitigation is considered necessary to achieve acceptable internal noise levels.

#### Approved Document O

- 5.21 The noise model developed for the noise assessment has been utilised to determine the facades for which an internal noise level in excess of 40dB  $L_{Aeq, 8hr}$  would occur with windows open.



5.22 For the purposes of the assessment, a level difference of 13dB from outside to inside has been assumed based on a façade opening of approximately 2% of the floor area.

5.23 **Figure 5.3** presents the results of the noise model with any façade within the red area subject to external noise levels in excess of 53dB  $L_{Aeq, 8hr}$  and therefore would result in an internal noise level in excess of 40dB  $L_{Aeq, 8hr}$  with an open window.

**Figure 5.3 Predicted Night-time Noise Levels**





5.24 A review of maximum noise events during the night-time period indicates that the closest proposed dwellings would not be subject to noise levels in excess of 68dB  $L_{Amax}$  more than 10 times per night, therefore achieving the requirement that internal maximum noise levels do not exceed 55dB  $L_{Amax}$  more than 10 times per night with an open window.

#### External Amenity Noise Levels

5.25 For outdoor amenity areas, as can be seen in **Figure 5.1**, all garden areas are subject to noise levels of less than 55dB  $L_{Aeq, 16hr}$ , with a significant number subject to noise levels less than 50 dB  $L_{Aeq, 16hr}$ .

5.26 This is likely to be further improved with the inclusion of garden boundary treatments and therefore no further mitigation is considered necessary. This is all noting that the layout at this stage is illustrative and the positioning of the dwellings to avoid noise ingress to rear gardens could further improve upon noise levels in amenity spaces.





## 6 Summary and Conclusions

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### Summary

- 6.1 Rappor Consultants Limited was instructed by Lioncourt Homes Limited and Touch Developments Ltd to undertake a noise impact assessment for a proposed residential development of upto 115 dwellings on land to the north of Rebecca Road, Pershore. Outline permission is sought for the erection of up to 115 dwellings with all matters reserved with the exception of access, including open space, landscaping, drainage and associated works.
- 6.2 The results of a noise survey have been assessed against guidance contained within ProPG and BS8233 to determine the suitability of the Site for the intended development.
- 6.3 By far the majority of the Site is not affected by noise however, the northern facades of the properties directly overlooking the B4084 would be subject to noise levels in excess of the guideline values during both the day and night-time periods. Through the use of standard double glazing and trickle vents, acceptable internal noise levels can be achieved.
- 6.4 For outdoor amenity areas, all of the plots are subject to noise levels which meet the guideline values presented in BS8233.

### Conclusions

- 6.5 Rappor concludes that based on the results of the noise assessment, noise is not considered a material constraint to the proposed development.



## Appendix A – Acoustic Terminology



## Glossary of Acoustic Terminology

Term	Description
Ambient Sound Level, $L_{Aeq, T}$	Equivalent continuous A-weighted sound pressure level of the totally encompassing sound in a given situation at a given time, usually from many sources near and far, at the assessment location over a given time interval, T
Background Sound Level, $L_{A90, T}$	A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting, F, and quoted to the nearest whole number of decibels
Specific Sound Level	Equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, $T_r$
Rating level, $L_{Ar, T_r}$	Specific sound level plus any adjustment for the characteristic features of the sound



## Appendix B – Monitoring Equipment



### Details of Monitoring Equipment

Location	Item Description	Serial Number
NML1	Svantek SV307A Class 1 Sound Level Meter	116137
NML2	Svantek SV307A Class 1 Sound Level Meter	116148
Both	Svantek SV36 Acoustic Calibrator	122250

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