

NOISE CONSTRAINTS & OPPORTUNITIES ASSESSMENT

Proposed Residential Development
Land off Leicester Road, Earl Shilton

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QUALITY ASSURANCE & REPORT INFORMATION

Report Version	R1	R2	R3	R4
Prepared by	Martyn Parker MIOA	Martyn Parker MIOA	Martyn Parker MIOA	
Position	Principal Consultant	Principal Consultant	Principal Consultant	
Reviewed by	John Goodwin MIOA	John Goodwin MIOA	John Goodwin MIOA	
Position	Director	Director	Director	
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Professional Consult Limited is registered in England (11635570). Registered Office: 534 Edenfield Road, Rochdale, Lancashire OL12 7QJ

Professional Consult Limited

hello@professionalconsult.co.uk
www.professionalconsult.co.uk



EXECUTIVE SUMMARY

With regards to road traffic noise, noise modelling software CadnaA has been used to predict noise levels across the Site. The guidance presented in ProPG has been used to assess the risk category at the Site for both daytime and night-time periods with the overall risk category being identified as 'Medium' for the majority of the Site which indicates that as long as good acoustic design is integrated into developing a masterplan, the site is likely to be acceptable from a noise perspective.

Indeed, this Assessment has shown that subject to good acoustic design being integrated into the scheme, then acceptable external and internal noise levels generated by road traffic movements will prevail in noise-sensitive areas of the proposed residential dwellings. The predicted noise levels in garden areas can accord with the guidance presented in BS8233:2014 through the use of good acoustic design or installation of barriers for any dwelling located close to Leicester Road. Furthermore, predicted internal noise levels within habitable rooms can meet the noise criteria levels presented in BS8233:2014 through use of upgraded glazing and alternative ventilation.

During the noise survey there was no audible sound from Laylo Building & Landscaping and the commercial building to the north. As such, there are no mitigation requirements for the existing commercial uses.

The future noise climate at the Development can be controlled through appropriate noise mitigation measures to meet acceptable noise levels in both internal and external amenity areas which will accord with the 'No Observed Adverse Effect Level' as detailed in the PPG and as such noise should not be deemed to be a determining factor in the granting of planning permission for this Site.

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1 INTRODUCTION

1.1 Appointment

- 1.1.1 Professional Consult Limited was instructed by Manor Oak Homes to prepare a Noise Constraints and Opportunities Assessment ('the Assessment') in support of a proposed residential development ('the Development') on a parcel of land to the east of Leicester Road in Earl Shilton, Leicestershire to be referred to hereafter as 'the Site'.

1.2 Purpose of Assessment

- 1.2.1 Hinckley & Bosworth Borough Council have provided pre-application planning advice for the Development with the following being stated for noise:

'The Council's Pollution officer stated that any application should consider the noise impact of the adjacent road and any surrounding business uses, and the potential for land contamination to have occurred due to the past use of the site. In light of the above, it is likely that Construction Environment Management Plan will be secured via planning condition for any submitted any planning application.'

- 1.2.2 Accordingly, this Assessment has been completed with due regard to the National Planning Policy Framework and its associated National Planning Policy Guidance in addition to appropriate British Standards and guidance documents relevant to the assessment of noise impacts.

- 1.2.3 All acronyms used within this report are defined in the Glossary presented in Appendix 2.

1.3 The Development

- 1.3.1 The Development will comprise of 35 residential dwellings with associated infrastructure.

1.4 The Site, Locality & Soundscape

- 1.4.1 The Site comprises of open land and is bound by Leicester Road to the west, a minor road to the north, a commercial entity to the east and existing residential dwellings to the south.

- 1.4.2 The soundscape across the Site comprised predominantly of road traffic noise from vehicles using Leicester Road and bird song.

1.5 Limitations

- 1.5.1 The limitations of this report are presented in Appendix 1.

1.6 Confidentiality

- 1.6.1 Professional Consult has prepared this report solely for the use of the Client. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from Professional Consult; a charge may be levied against such approval.

2 POLICY & GUIDANCE

2.1 National Planning Policy Framework & National Planning Practice Guidance

- 2.1.1 The Government updated the National Planning Policy Framework (NPPF) on 20th December 2023 and its associated National Planning Practice Guidance (NPPG) on 20th November 2023. Together, the NPPF and NPPG set out what the Government expects of local authorities. The overall aim is to ensure the planning system allows land to be used for new homes and jobs, while protecting valuable natural and historic environments.
- 2.1.2 The NPPG adds further context to the NPPF and it is intended that the two documents should be read together.
- 2.1.3 Noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. When preparing local or neighbourhood plans, or taking decisions about new development, there may also be opportunities to consider improvements to the acoustic environment.
- 2.1.4 Local planning authorities' plan-making and decision making should 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.
- 2.1.5 In line with the Explanatory Note of the Noise Policy Statement for England, this would include identifying whether the overall effect of the noise exposure (including the impact during the construction phase wherever applicable) is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation.
- 2.1.6 The Observed Effect Levels are as follows:
- Significant observed adverse effect level: This is the level of noise exposure above which significant adverse effects on health and quality of life occur;
 - Lowest observed adverse effect level: this is the level of noise exposure above which adverse effects on health and quality of life can be detected; and
 - No observed effect level: this is the level of noise exposure below which no effect at all on health or quality of life can be detected.
- 2.1.7 Table 1 summarises the noise exposure hierarchy, based on the likely average response.

Table 1. Noise Exposure Hierarchy

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

2.1.8 The subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation.

2.1.9 These factors include:

- The source and absolute level of the noise together with the time of day it occurs. Some types and level of noise will cause a greater adverse effect at night than if they occurred during the day - this is because people tend to be more sensitive to noise at night as they are trying to sleep. The adverse effect can also be greater simply because there is less background noise at night;
- For non-continuous sources of noise, the number of noise events, and the frequency and pattern of occurrence of the noise;
- the spectral content of the noise and the general character of the noise. The local topology and topography should also be taken into account along with the existing and, where appropriate, the planned character of the area.

2.1.10 More specific factors to consider when relevant:

- where applicable, the cumulative impacts of more than one source should be taken into account along with the extent to which the source of noise is intermittent and of limited duration;

- Consideration should also be given to whether adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time. In both cases a suitable alternative means of ventilation is likely to be necessary. Further information on ventilation can be found in the Building Regulations; and
- 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.

2.2 Professional Practice Guidance on Planning & Noise 2017

2.2.1 Professional Practice Guidance (ProPG) on Planning and Noise has been produced to provide practitioners with guidance on a recommended approach to the management of noise within the planning system in England. The guidance encourages better acoustic design for new residential development and aims to protect people from the harmful effects of noise. It aims to complement Government planning and noise policy and guidance. In particular, it strives to:

- Advocate full consideration of the acoustic environment from the earliest possible stage of the development control process;
- Encourage the process of good acoustic design in and around new residential developments;
- Outline what should be taken into account in deciding planning applications for new noise-sensitive developments;
- Improve understanding of how to determine the extent of potential noise impact and effect; and
- Assist the delivery of sustainable development.

2.2.2 ProPG advocates a systematic, proportionate, risk based, 2-stage, approach. The approach encourages early consideration of noise issues, facilitates straightforward accelerated decision making for lower risk sites, and assists proper consideration of noise issues where the acoustic environment is challenging. The two sequential stages of the overall approach are:

- Stage 1 – an initial noise risk assessment of the proposed development site

It is important that the assessment of noise risk at a proposed residential development site is not the basis for the eventual recommendation to the decision maker. The recommended approach is intended to give an early indication of the likely initial suitability of the site for new residential development from a noise perspective and the extent of the acoustic issues that would be faced.

- Stage 2 – a systematic consideration of four key elements:

Element 1 – demonstrating a “Good Acoustic Design Process”

It is imperative that acoustic design is considered at an early stage of the development control process. A good acoustic design process takes a multi-faceted and integrated approach to achieve optimal acoustic conditions, both internally and externally. Good acoustic design should avoid “unreasonable” acoustic conditions and prevent “unacceptable” acoustic conditions.

Element 2 – observing internal “Noise Level Guidelines”

Table 2. ProPG Internal Noise Level Guidelines (additions to BS8233:2014 show in bold)

Activity	Location	07:00 – 23:00 Hours	23:00 – 07:00 Hours
Resting	Living room	35dB LAeq,16hr	-
Dining	Dining room/area	40dB LAeq,16hr	-
Sleeping (daytime resting)	Bedroom	35dB LAeq,16hr	30dB LAeq,8hr 45dB LAmax, fast⁴

NOTE 1 The Table provides recommended internal L_{Aeq} target levels for overall noise in the design of a building. These are the sum total of structure-borne and airborne noise sources. Ground-borne noise is assessed separately and is not included as part of these targets, as human response to ground-borne noise varies with many factors such as level, character, timing, occupant expectation and sensitivity.

*NOTE 2 The **internal L_{Aeq} target** levels shown in the Table are based on the existing guidelines issued by the WHO and assume normal diurnal fluctuations in external noise. In cases where local conditions do not follow a typical diurnal pattern, for example on a Road serving a port with high levels of traffic at certain times of the night, an appropriate alternative period, e.g. 1 hour, may be used, but the level should be selected to ensure consistency with the **internal L_{Aeq} target** levels recommended in the Table.*

*NOTE 3 These **internal L_{Aeq} target** levels are based on annual average data and do not have to be achieved in all circumstances. For example, it is normal to exclude occasional events, such as fireworks night or New Year’s Eve.*

*NOTE 4 Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax, F}$, 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 $L_{Amax, F}$ 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.***

*NOTE 5 **Designing the site layout and the dwellings so that the internal target levels can be achieved with open windows in as many properties as possible demonstrates good acoustic design. Where it is not possible to meet internal target levels with windows open, internal noise levels can be assessed with windows closed, however any façade openings used to provide whole dwelling ventilation (e.g. trickle ventilators) should be assessed in the “open” position and, in this scenario, the internal L_{Aeq} target levels should not normally be exceeded, subject to the further advice in Note 7.***

NOTE 6 Attention is drawn to the requirements of the Building Regulations.

*NOTE 7 Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal L_{Aeq} target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved. **The more often internal L_{Aeq} levels start to exceed the internal L_{Aeq} target levels by more than 5 dB, the more that most people are likely to regard them as “unreasonable”. Where such exceedances are predicted, applicants should be required to show how the relevant number of rooms affected has been kept to a minimum. Once internal L_{Aeq} levels exceed the target levels by more than 10 dB, they are highly likely to be regarded as “unacceptable” by most people, particularly if such levels occur more than occasionally. Every effort should be made to avoid relevant rooms experiencing “unacceptable” noise levels at all and where such levels are likely to occur frequently, the development should be prevented in its proposed form.***

Element 3 – undertaking an “External Amenity Area Noise Assessment”

Advice in BS8233:2014 provides the following:

“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. The acoustic environment of external amenity areas that are an intrinsic part of the overall design should always be assessed and 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.”

Where, despite following a good acoustic design process, significant adverse noise impacts remain on any private external amenity space then that impact may be partially off-set if the residents are provided, through the design of the development or the planning process, with access to:

- a relatively quiet façade or a relatively quiet externally ventilated as part of their dwelling; and/or
- a relatively quiet alternative or additional external amenity space for sole use by a household; 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 that is nearby.

Element 4 – consideration of “Other Relevant Issues”

- compliance with relevant national and local policy;
- magnitude and extent of compliance with ProPG;
- likely occupants of the development;
- acoustic design v unintended adverse consequences; and
- acoustic design v wider planning objectives.

2.2.3 Following the above stages, including the initial site risk assessment and full assessment, a recommendation to the decision maker is determined as follows:

- Grant without noise conditions; or
- Grant with noise conditions; or
- Avoid (significant adverse effects); or
- Prevent (unacceptable adverse effects).

2.3 BS8233:2014 ‘Guidance on sound insulation and noise reduction for buildings’

Noise Criteria Limits

2.3.1 The scope of this standard is the provision of recommendations for the control of noise in and around buildings. It suggests appropriate criteria and limits for different situations, which are primarily intended to guide the design of new buildings or refurbished buildings undergoing a change of use, rather than to assess the effect of changes in the external noise climate.

2.3.2 The standard suggests suitable internal noise levels within different types of buildings, including dwellings, as shown in Table 3.

Table 3. BS8233:2014 Internal Target Noise Levels

Criterion	Typical Situation	Design $L_{Aeq,T}$ (dB)
Suitable resting / sleeping conditions	Living Room	35

	Bedroom*	30
*For a Reasonable standard in bedrooms at night, individual noise evens (measured with fast time weighting) should not exceed 45dB L _{max}		

2.3.3 BS8233 goes on to recommend noise levels for gardens as follows:

“It is desirable that the external noise level does not exceed 50dB L_{Aeq,T}, with an upper guideline value of 55dB L_{Aeq,T} which would be acceptable in noisier environments. However, it is also recognised that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors might be warranted”.

2.3.4 BS8233 goes on to say:

“In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces but should not be prohibited”.

2.3.5 With regards to external noise within balcony areas, BS8233: 2014 provides the following advice:

“Other locations, such as balconies, roof gardens and terraces, are also important in residential buildings where normal external amenity space might be limited or not available, i.e. in flats, apartment blocks, etc. In these locations, specification of noise limits is not necessarily appropriate. Small balconies may be included for uses such as drying washing or growing pot plants, and noise limits should not be necessary for these uses. However, the general guidance on noise in amenity space is still appropriate for larger balconies, roof gardens and terraces, which might be intended to be used for relaxation. In high-noise areas, consideration should be given to protecting these areas by screening or building design to achieve the lowest practicable levels”

Ventilation Requirements

2.3.6 Where a partially open window cannot be relied upon to provide an adequate level of facade sound insulation performance, it is necessary to consider alternative ventilation for habitable rooms. Section 8.4.5.4 within BS8233 states:

“The Building Regulations’ supporting documents on ventilation [48, 49, 50] recommend that habitable rooms in dwellings have background ventilation. Where openable windows cannot be relied upon for this ventilation, trickle ventilators can be used and sound attenuating types are available. However, windows may remain openable for rapid or purge ventilation, or at the occupant’s choice.

Alternatively, acoustic ventilation units (see 7.7.2 below) are available for insertion in external walls. These can provide sound reduction comparable with double glazed windows. However, ducted systems with intakes on the quiet side of the building might be required in very noisy situations, or where appearance rules out through-the-wall fans.”

Section 7.7.2 states:

“NOTE 5 If relying 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.”

BS4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'

2.3.7 This standard describes methods for rating and assessing sound of an industrial 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 processes or premises, such as that from forklift trucks, or that from train or ship movements on or around an industrial or commercial Site.

2.3.8 The procedure detailed in the standard compares the measured or predicted noise level 'the specific noise level' from any of the above detailed noise sources with the background sound level at a residential dwelling. The measured background sound level at a receptor should be reliable and should not necessarily ascertain a lowest measured background sound level, but rather to quantify what is 'typical.'

2.3.9 The specific noise level also acknowledges the following reference time intervals depending upon whether the noise source operates during daytime or night-time periods:

- Daytime (07:00 - 23:00): 1 hour; and
- Night-time (23:00 - 07:00): 15 minutes.

2.3.10 There are a number of 'penalties' which can be attributed to the specific sound level, either subjectively or objectively, depending upon the 'acoustic features' of the sound level under investigation as follows. These penalties vary in their weighting depending upon the severity of the acoustic feature, as follows (with regards to the subject method):

Tonality

- +2dB: where the tonality is just perceptible;
- +4dB: where the tonality is clearly perceptible; and
- +6dB: where the tonality is highly perceptible.

Impulsivity

- +3dB: where the impulsivity is just perceptible;
- +6dB: where the impulsivity is clearly perceptible; and
- +9dB: where the impulsivity is highly perceptible.

Intermittency

- +3dB: where the intermittency is readily distinctive against the acoustic environment.

- 2.3.11 Where the assessment is carried out using the objective method, the tonality penalty is either 0dB or 6dB and the impulsivity penalty can range from 0dB up to 9dB in increments of 1dB, depending on the level of impulsivity identified.
- 2.3.12 In addition to the above acoustic features, there is a penalty for 'other sound characteristics' of +3dB where a sound exhibits characteristics that are neither tonal nor impulsive, though is readily distinctive against the acoustic environment.
- 2.3.13 BS4142 goes on to state that the rating level is equal to the specific sound level if there are no such features present or expected to be present.
- 2.3.14 Assessment of the rating level relative to the background noise level can yield the following commentary:
- Typically, the greater this difference (between the rating level and the background sound level), the greater the magnitude of impact;
 - A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context;
 - A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context; and
 - The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact.
- 2.3.15 Whilst the amended 2019 Standard does make various references to it not being intended to assess noise impacts at indoor locations, section 1.1 does state 'The methods described in this British Standard use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident'. Example 6 in the Standard states 'In addition to the rating/background sound level comparison shown in Table A.6, the primary concern is the potential for disturbance of residents who could be sleeping with open bedroom windows. Other guidance, such as BS 8233, might also be applicable in this instance'.
- 2.3.16 With the above in mind, and for a clear need to ensure that any potential commercial or industrial noise impacts at the building façade do not give rise to internal noise level which causes sleep disturbance in bedrooms, this Assessment will ensure that the predicted rating level (specific sound level including any character corrections) does not exceed 30dB in bedrooms.

2.4 Local Authority Guidance and Criteria – Hinckley & Bosworth Borough Council's Environmental Health Department

- 2.4.1 Consultation was provided to Hinckley & Bosworth Borough Council on 4th March 2024, which stated:

'We have been appointed by a client to undertake a Noise Impact Assessment in support of the proposed residential development on land East of Leicester Road, Earl Shilton.

It is understood that pre-application advice has been received, stating that a Noise Impact Assessment is required for road traffic noise and the surrounding commercial uses.

Professional Consult will complete the following noise surveys:

- **Road Traffic Noise:** A road traffic noise survey will be completed for Leicester Road in line with the guidance presented in Calculation of Road Traffic Noise;

- *Commercial Source Survey:* A noise survey will be completed for any noise associated with the commercial units to the east and north; and
- *Background Sound Survey:* A background sound survey will be completed on Site in an area representative of the proposed dwellings.

Professional Consult will complete the following assessment:

- *Road Traffic Noise:* An assessment of noise from vehicles using Hethersett Road and New Road will be completed in line with the noise criteria presented in BS8233:2014 'Sound Insulation & Noise Reduction for Buildings'; and
- *Commercial Noise:* An assessment of any audible commercial noise associated with the commercial units will be assessed in line with the criteria presented in BS4142:2014+A1:2019.

If you have any comments, then please do advise at your earliest convenience.'

2.4.2 A response was received on the 12th March, stating that the above methodology is acceptable for the Site.

3 NOISE SURVEYS

3.1 Road Traffic Noise

3.1.1 Professional Consult has completed noise measurements as follows:

- **Noise Measurement Position 1:** Located at 7.5m from the nearside kerbstone of Leicester Road between 11:50 – 14:50 on 11th March 2024 in free-field conditions. Noise sources at the measurement position comprised of road traffic movements along Leicester Road.

3.1.2 Table 4 summarises the measured road traffic noise levels at the microphone location.

Table 4. Summary of Measured Road Traffic Noise Levels

Table 4: Summary of Measured Road Traffic Noise Levels				
Noise Measurement Position	Period	Measured Sound Pressure Level (dB)		
		L _{Aeq,1hr}	L _{A10,1hr}	L _{Amax,fast}
1	11/03/2024 11:50	64.7	69.2	82.5
	11/03/2024 12:50	64.6	69.3	
	11/03/2024 13:50	65.4	69.4	
*10 th highest L _{Amax,fast}				

3.2 Commercial Noise Survey – Laylo Building & Landscaping

3.2.1 Professional Consult has completed noise measurements as follows:

- **Noise Measurement Position 2:** Located on the eastern boundary with the yard area with Laylo Building & Landscaping. Measurements were undertaken between 11:15 Friday 1st March and 15:30 Monday 4th March 2024. The soundscape on the Site is comprised of vehicle noise from vehicles using Leicester Road, birdsong early in the morning and occasional aircraft overflights. The sound level meter used the audio feature to enable measurement analysis of the measured noise levels.

3.2.2 No audible sound from Laylo Building & Landscaping was recorded during the survey. The loudest spikes during the survey were due to bird song close to the microphone. As such, Laylo Building & Landscaping has not been considered in the assessment as no movements were noted during the survey. It was also noted that there is a barrier along the yard areas with the site and the building associated with the yard area is facing away from our Site. There is also an existing residential property located immediately to the south of the yard area, therefore it is expected that sound from the yard is not significant.

3.2.3 Table 5 presents the measured commercial noise levels:

Table 5. Summary of Measured Background Sound Levels

Date	Period	Measured Background Sound Level, L _{A90,15mins} (dB)		Ambient Sound Level, L _{Aeq,15mins} (dB)	
		Range	Typical (Mode Average)	Range	Typical (Logarithmic Average)
Friday 1 st March 2024	Daytime (11:15 – 23:00)	38 – 46	44	40.6 – 57.9	50.2

	Night-time (23:00 – 07:00)	29 – 40	31	32.2 – 57.7	47.3
Saturday 2 nd March 2024	Daytime (07:00 – 23:00)	33 – 43	41	36.9 – 61.8	50.2
	Night-time (23:00 – 07:00)	25 – 39	27	31.3 – 55.9	44.3
Sunday 3 rd March 2024	Daytime (07:00 – 23:00)	29 – 41	38	39.6 – 55.8	48.2
	Night-time (23:00 – 07:00)	27 – 48	27	30.1 – 58.2	47.7
Monday 4 th March 2024	Daytime (07:00 – 15:30)	37 – 49	39	41.8 – 54.4	49.1

3.2.4 It was also noted during the survey that there was no activity associated with the commercial buildings to the north and they appeared to be derelict. Additionally, Professional Consult have found a planning application for a proposed residential development and church meeting hall on the parcel of land to the north where the commercial buildings are located.

3.3 Noise Survey Equipment

3.3.1 The following equipment was used for the noise surveys.

Table 6. Noise Measurement Equipment

Measurement Position	Equipment Description	Manufacturer & Type No	Serial No.	Calibration Due Date
NMP1	Sound Level Meter	01dB Fusion	12038	14 March 2025
	Pre-amplifier	01dB PRE22	2113007	
	Microphone	GRAS 40CE	330801	
	Calibrator	01dB CAL-31	87280	02 July 2024
NMP2	Sound Level Meter	01dB Fusion	12586	29 June 2024
	Pre-amplifier	01dB PRE22	2004163	
	Microphone	GRAS 40CD	367351	
	Calibrator	01dB CAL-31	92222	01 July 2024

3.3.2 The sound level meters were field calibrated prior to and following the noise surveys and there was no drift beyond the allowable limit of 1dB.

3.3.3 Table 7 indicates a summary of the measured weather conditions.

Table 7. Range of Measured Wind Speeds

Period	Range of Measured Wind Speeds (m/s)	Rainfall Recorded?
All periods	0 – 2.9	Rainfall was noted during Friday 1 st Mach and Sunday 3 rd March

4 NOISE IMPACT ASSESSMENT

4.1 Road Traffic

4.1.1 For the purposes of this assessment, the daytime and night-time average ($L_{Aeq,T}$) noise levels have been calculated based on the shortened measurement procedure detailed in CRTN. The respective daytime and night-time noise levels have been derived using the following calculations:

- Calculation of the $L_{A10,18hr}$ noise level by using the following formula:

$$L_{10,18hr} = L_{10,3hr} - 1dB$$

- Calculation of the $L_{Aeq,16hr}$ noise level by using the following formula:

$$L_{eq,16hr} = L_{10,18hr} - 2dB$$

- Calculation of the night-time $L_{Aeq,8hr}$ noise level by using the following formula:

$$L_{night} (L_{eq,8hr}) = (0.90 \times L_{10,18hr}) - 3.77dB$$

4.1.2 Table 8 calculates the daytime and night-time noise levels for Leicester Road.

Table 8. Calculation of Road Traffic Noise Levels

Measurement Position	Period	Calculated $L_{Aeq,t}$ (dB)	10 th Highest Measured $L_{Amax,fast}$ (dB)	Distance from Centre of Road (m)
NMP1	Daytime (07:00 – 23:00)	66.3	-	10
	Night-time (23:00 – 07:00)	57.7	82.5	

4.1.3 For the purposes of this Assessment, Professional Consult has used noise modelling software CadnaA to determine the impact of noise from Leicester Road at the proposed residential dwellings. A noise model has therefore been constructed in order to calculate façade noise levels and external noise levels in amenity areas.

4.1.4 The following inputs have been included in the model:

- Proposed Scheme Layout;
- Site elevations have been taken as existing using 1m contours;
- Existing buildings or features that provide shielding from the road have been included in the model;
- Noise Measurement Position 1 has been used in order to calibrate the noise model;
- A floor height of 2.5m has been assumed for all proposed dwellings which is a standard separation distance between ground and first floors in a typical dwelling;
- A reflection order of 2 has been used in all calculations;
- All dwellings have been taken to be 7.5m to apex (2-storey); and

- Noise levels generated using ISO 9613-1 and ISO 9613-2 “Acoustics – Attenuation of sound during propagation outdoors” as incorporated into CadnaA software.

4.1.1 Figures 1 & 2 in Appendix 4 detail the daytime and night-time grid noise maps respectively for the Site. The majority of the Site has a daytime noise level of 64dB $L_{Aeq,16hr}$ or below and for the night-time period, 57.0dB $L_{Aeq,8hr}$ or below.

4.1.2 Table 9 completes the risk assessment.

Table 9. Risk Categorisation – Majority of Site

Period	Highest Calculated Noise Level at Site Boundary (dB)	Risk Category	Overall Risk Category
Daytime	64.0	Medium Risk	Medium Risk
Night-time	57.0	Medium Risk	
	82.5 *	10th highest $L_{Amax,fast}$ is over 60dB so 'Negligible Risk' is not permitted	

4.1.3 Table 9 indicates that the Site has a risk categorisation no greater than ‘medium’.

Medium Risk

‘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 which confirms how the adverse impacts of noise will be mitigated and minimised, and which clearly demonstrates that a significant adverse noise impact will be avoided in the finished development.’

4.1.4 Analysis of the grid noise map for the night-time and daytime period indicates that much of the central area of the Site falls into the low / medium category.

Full Site Noise Risk Assessment for Transportation Noise

Good Acoustic Design Process

4.1.5 Good acoustic design should avoid “unreasonable” acoustic conditions and prevent “unacceptable” acoustic conditions. Good acoustic design is not just compliance with recommended internal and external noise exposure standards. Good acoustic design should provide an integrated solution whereby the optimum acoustic outcome is achieved without design compromises that will adversely affect living conditions and the quality of life of the inhabitants or other sustainable design objectives and requirements.

4.1.6 Given the potential for plots to fall within the medium risk category, good acoustic design is essential in these areas. Specifically, the following will need to be considered when designing the Site and plot layouts:

- Where possible, plots closest to the boundary with Leicester Road are to be orientated such that any garden areas are protected by the building envelope and buildings should wrap around the sides to protect the gardens. Where this is not possible barriers can be used to protect the garden areas; and

- Wherever possible, windows for habitable rooms should face away from the roads so that opening of windows does not necessarily result in an exceedance of the internal noise criteria. This is particularly important for any bedroom windows facing Leicester Road.

Internal Noise Level Assessment

- 4.1.7 Due to the Site being at outline stage, detailed assessments are not possible. Accordingly, the indicative site layout has been used to determine the requirements for a building located closest to the road which would be the worst-case scenario. See Figures 1 & 2 of Appendix 4 for the grid noise maps which includes for the indicative layout.
- 4.1.8 Table 10 considers internal noise levels using standard thermal double glazing and a partially open window if a dwelling were to be built on the Site boundary with the Leicester Road. BS8233:2014 suggests that a glazing unit with configuration 6mm glass/12mm air space/6mm glass affords sound insulation performance in the order of 33dB, however this is for a pink noise spectrum. The same unit, weighted for road the '+C_{tr}' correction, has a sound insulation performance value of approximately 30dB and so this value has been used to calculate internal noise levels. It also goes on to recommend that a partially open window provides approximately 15dB attenuation.
- 4.1.9 For the maximum noise level, the measured level of 82.5dB L_{Amax} at 10m has been distance corrected to 17m based on a calculation of 6dB per doubling of distance.

Table 10. Calculation of Internal Noise Level with Standard Thermal Glazing & Open Window

Location	Room / Period	Windows Closed / Open	Noise Level at Closest Proposed Residential Area (dB)	Attenuation Afforded (dB)	Calculated Internal Noise Level (dB)	Internal Noise Criteria Level (dB)	Difference +/- (dB)
Western Boundary with Leicester Road	Living Room (Daytime)	Closed	64.0 L _{Aeq} 16hr	30	34	35	-1
	Bedroom (Night-time)		57.0 L _{Aeq} 8hr	30	27	30	-3
			77.9 L _{AF,max}	33	44.9	45	-0.1
	Living Room (Daytime)	Open	64.0 L _{Aeq} 16hr	15	49	35	+14
	Bedroom (Night-time)		57.0 L _{Aeq} 8hr	15	42	30	+12
			77.9 L _{AF,max}	15	62.9	45	+17.9

- 4.1.10 Table 10 indicates that based on a worst-case assessment for the eastern most dwelling, standard thermal double glazing is adequate in controlling the external noise levels to achieve the internal noise criteria limits detailed in BS8233:2014 and ProPG. Additionally, with a partially open window, there will be exceedances of the internal noise criteria and so alternative ventilation will be required.
- 4.1.11 At the detailed stage when the precise location of dwellings is known, it is recommended that noise modelling software is used to accurately determine which facades of dwellings require alternative ventilation and which do not.

External Amenity Area Noise Level Assessment

- 4.1.12 Figure 1 in Appendix 5 details the daytime grid noise maps for the Site with the indicative layout. The majority of the Site has a daytime noise level of 60dB $L_{Aeq,16hr}$ or below. It is expected that any garden areas that are not screened by the dwelling will require an acoustic barrier in order to achieve noise levels which accord with the guidance presented in BS8233:2014. This is particularly important for the western boundary.
- 4.1.13 Based on the current indicative layout it is recommended that a number of barriers be included as part of the development along the western area. In order to achieve the criteria 55dB criteria the barriers would need to range from 1.8m to 2.3m closer to the road. Figure 1 of appendix 6 shows the location of the barriers.
- 4.1.14 At the detailed stage when the precise location of dwellings is known, it is recommended that noise modelling software is used in order to accurately determine which dwellings will require acoustic fences and associated heights.

Other Relevant Issues

- 4.1.15 ProPG primarily seeks to encourage a good acoustic design process for new residential development. It is recognised that it may not always be possible to achieve the internal noise level guidelines in all rooms within noise sensitive developments. Where it is not possible to achieve the recommended standards in every respect, regard should be had to the number of dwellings and number of habitable rooms in each of the dwellings where the recommended standard cannot be achieved. Similarly, regard should be had to the extent to which the guidance on the external amenity area noise assessment has been followed, including whether access to quiet or relatively quiet external amenity areas is considered necessary, and the extent of any adverse impacts on external amenity areas that are an intrinsic part of the overall design.

4.2 Proposed Church Meeting Hall

- 4.2.1 During the survey it was noted that the commercial Site to the north is vacant. Through searching on the Hinckley & Bosworth Borough Council (HBBC) planning portal it was noted that there is a current application for 6 residential dwellings and Church Meeting Hall (Reference 24/00035/HYB).
- 4.2.2 During the application concerns were raised from the Environmental Health Officer at HBBC regarding amplified music from the Church Hall. It was confirmed by the applicant that the meeting hall does not use amplified music or voice amplification. As such, no mitigation measures were required for the proposed residential element of the scheme.
- 4.2.3 It should also be noted that our development has included a 35m standoff distance from the Church Hall as part of the indicative masterplan, which is approximately double the distance from the Church Hall as the proposal residential use for the scheme to the north. Therefore, as there was considered to be no adverse impact for the proposed residential dwellings to the north it is considered acceptable that there will be no impact at our development.

5 MITIGATION

5.1 Road Traffic

5.1.1 The previous section has indicated that the majority of the Site falls into the low / medium risk category for the daytime and night-time periods. For the daytime period, the majority of the Site falls below 64dB and 57dB for the night-time. Nevertheless, good acoustic design should avoid “unreasonable” acoustic conditions and prevent “unacceptable” acoustic conditions. Good acoustic design is not just compliance with recommended internal and external noise exposure standards. Good acoustic design should provide an integrated solution whereby the optimum acoustic outcome is achieved, without design compromises that will adversely affect living conditions and the quality of life of the inhabitants or other sustainable design objectives and requirements.

5.1.2 Given the potential for plots to fall within the medium risk category, good acoustic design is essential in these areas. Specifically, the following will need to be considered when designing the Site and plot layouts:

- Where possible, plots closest to the roads will need to be orientated such that any garden areas are protected by the building envelope and buildings should wrap around the sides to protect the gardens;
- It is recommended that barriers are positioned along the garden areas on the western boundary; and
- Wherever possible, windows for habitable rooms should face away from the road so that opening windows does not necessarily result in an exceedance of the internal noise criteria. However, where this is not possible, internal noise levels can be controlled by way of alternative ventilation.

5.1.3 With regards to internal noise levels within dwellings from road traffic noise, the previous section has shown that for both the daytime and night-time average noise levels standard thermal double glazing will be adequate in controlling external noise levels.

5.1.4 Additionally, with a partially open window, the internal noise levels for the habitable rooms of the closest dwellings to the road will exceed the noise criteria level. Accordingly, it is necessary to consider an alternative ventilation scheme which does not require the opening of windows to provide fresh air flow and background ventilation. Adequate background ventilation can be achieved by using a window-frame mounted acoustic trickle ventilator as follows:

- Greenwoods EAQ42W (affords up to 42dB $D_{n,e,w} + C_{tr}$).

5.2 Commercial Noise

5.2.1 The survey was undertaken over a 4-day period has shown that there is no audible sound from Laylo Building & Landscaping and the commercial building to the north. As such, there are not mitigation requirements for the existing commercial uses.

6 CONCLUSION

- 6.1.1 Professional Consult Limited was instructed by Manor Oak Homes to prepare a Noise Constraints and Opportunities Assessment in support of a proposed residential development on a parcel of land to the east of Leicester Road in Earl Shilton, Leicestershire.
- 6.1.2 The Site comprises of open land and is bound by Leicester Road to the west, a minor road to the north, a commercial entity to the east and existing residential dwellings to the south.
- 6.1.3 The soundscape across the Site comprised predominantly of road traffic noise from vehicles using Leicester Road and bird song.
- 6.1.4 It is understood that proposals include for the development of 36 residential dwellings and associated works.
- 6.1.5 Hinckley & Bosworth Borough Council have provided pre-application planning advice for the Development with the following being stated for noise:

'The Council's Pollution officer stated that any application should consider the noise impact of the adjacent road and any surrounding business uses, and the potential for land contamination to have occurred due to the past use of the site. In light of the above, it is likely that Construction Environment Management Plan will be secured via planning condition for any submitted any planning application.'

- 6.1.6 Accordingly, this Assessment has been completed with due regard to the National Planning Policy Framework and its associated National Planning Policy Guidance in addition to appropriate British Standards and guidance documents relevant to the assessment of noise impacts.
- 6.1.7 During the noise survey there was no audible sound from Laylo Building & Landscaping and the commercial building to the north. As such, there are not mitigation requirements for the existing commercial uses.
- 6.1.8 With regards to road traffic noise, noise modelling software CadnaA has been used to predict noise levels across the Site. The guidance presented in ProPG has been used to assess the risk category at the Site for both daytime and night-time periods with the overall risk category being identified as 'Medium' for the majority of the Site which indicates that as long as good acoustic design is integrated into developing a masterplan, the site is likely to be acceptable from a noise perspective.
- 6.1.9 Indeed, this Assessment has shown that subject to good acoustic design being integrated into the scheme, then acceptable external and internal noise levels generated by road traffic movements will prevail in noise-sensitive areas of the proposed residential dwellings. The predicted noise levels in garden areas can accord with the guidance presented in BS8233:2014 through the use of good acoustic design or installation of barriers for any dwelling located close to Leicester Road. Furthermore, predicted internal noise levels within habitable rooms can meet the noise criteria levels presented in BS8233:2014 through use of upgraded glazing and alternative ventilation.
- 6.1.10 The future noise climate at the Development can be controlled through appropriate noise mitigation measures to meet acceptable noise levels in both internal and external amenity areas which will accord with the 'No Observed Adverse Effect Level' as detailed in the PPG and as such noise should not be deemed to be a determining factor in the granting of planning permission for this Site.

APPENDIX 1: LIMITATIONS

This report and its findings should be considered in relation to the terms of reference and objectives agreed between Professional Consult Limited and the Client.

The executive summary, conclusions and recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon without considering the context of the report in full.

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APPENDIX 2: GLOSSARY OF ACOUSTIC TERMINOLOGY

Noise is defined as unwanted sound. Human ears are able to respond to sound in the frequency range 20 Hz (deep bass) to 20,000 Hz (high treble) and over the audible range of 0 dB (the threshold of perception) to 140 dB (the threshold of pain). The ear does not respond equally to different frequencies of the same magnitude, but is more responsive to mid-frequencies than to lower or higher frequencies. To quantify noise in a manner that approximates the response of the human ear, a weighting mechanism is used. This reduces the importance of lower and higher frequencies, in a similar manner to the human ear.

Furthermore, the perception of noise may be determined by a number of other factors, which may not necessarily be acoustic. In general, the impact of noise depends upon its level, the margin by which it exceeds the background level, its character and its variation over a given period of time. In some cases, the time of day and other acoustic features such as tonality or impulsiveness may be important, as may the disposition of the affected individual. Any assessment of noise should give due consideration to all of these factors when assessing the significance of a noise source.

The most widely used weighting mechanism that best corresponds to the response of the human ear is the ‘A’-weighting scale. This is widely used for environmental noise measurement, and the levels are denoted as dB(A) or L_{Aeq} , L_{A90} etc., according to the parameter being measured.

The decibel scale is logarithmic rather than linear, and hence a 3 dB increase in sound level represents a doubling of the sound energy present. Judgement of sound is subjective, but as a general guide a 10 dB(A) increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3 dB(A) is generally regarded as the minimum difference needed to perceive a change under normal listening conditions.

An indication of the range of sound levels commonly found in the environment is given in the following table.

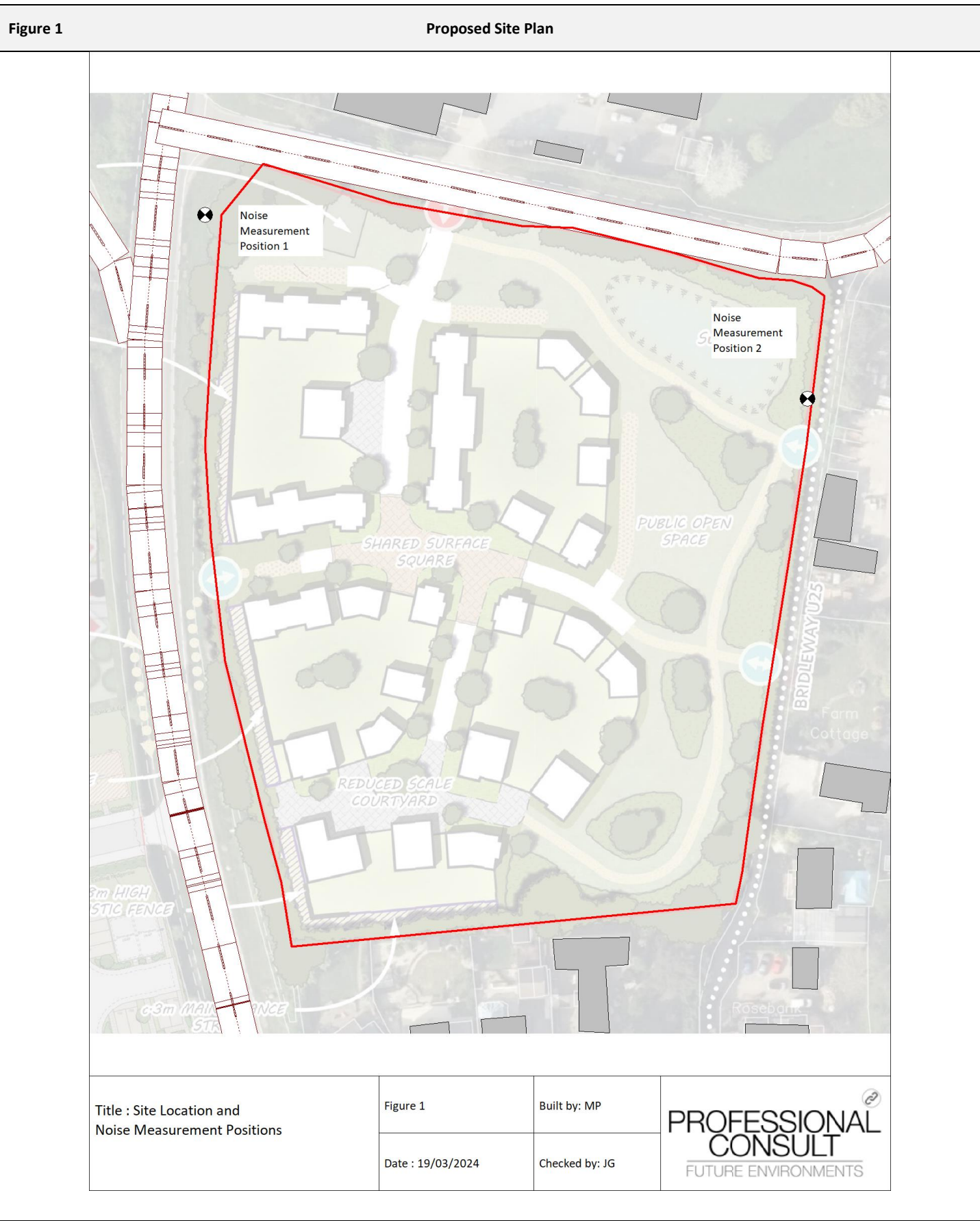
Table 1: Typical Sound Pressure Levels

Sound Pressure Level (dB)	Location/Example
0	Threshold of hearing
20 - 30	Quiet bedroom at night
30 - 40	Living room during the day
40 - 50	Typical office
50 - 60	Inside a car
60 - 70	Typical high street
70 - 90	Inside factory
100 - 110	Burglar alarm at 1m away
110 - 130	Jet aircraft on take off
140	Threshold of pain

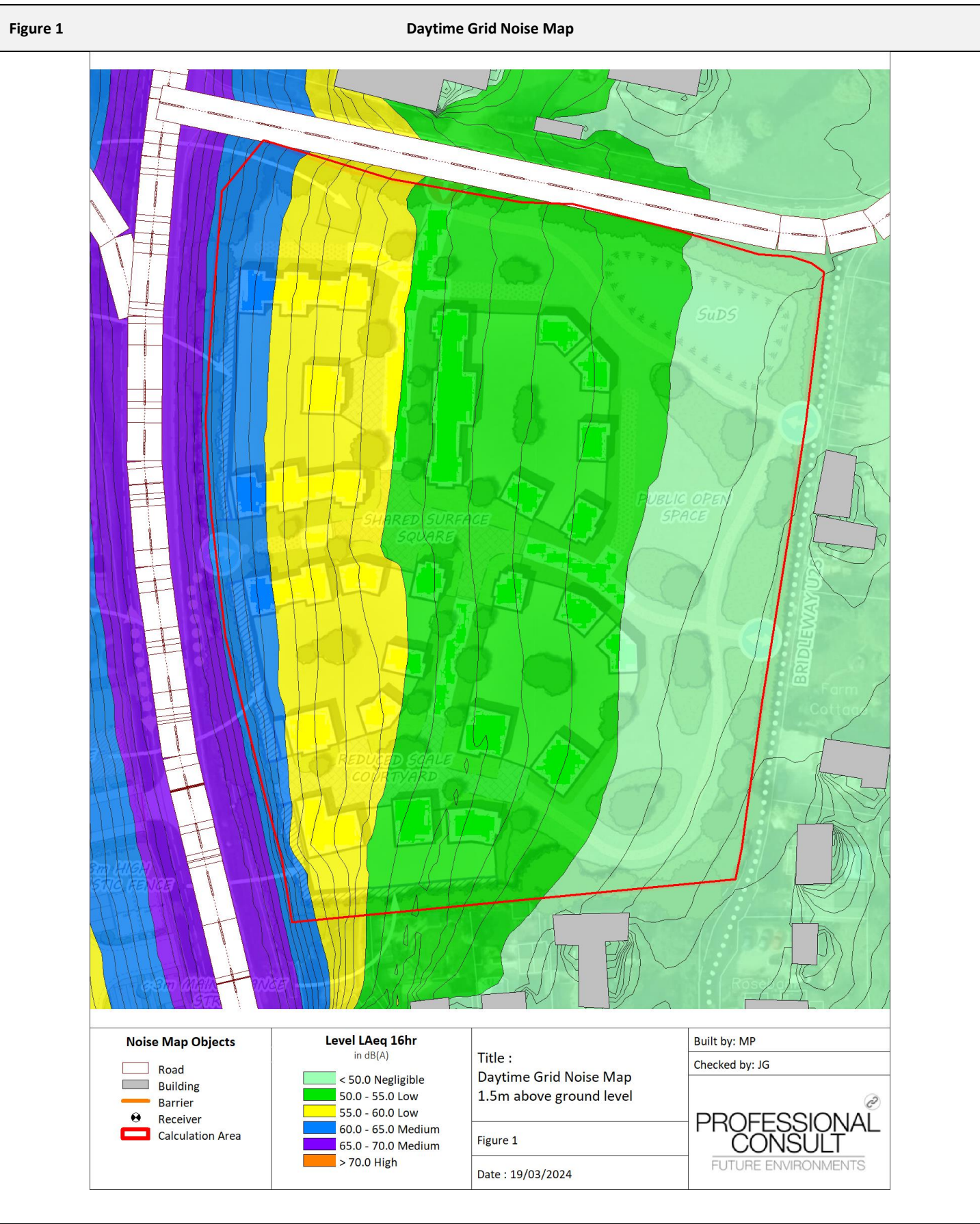
Table 2: Terminology

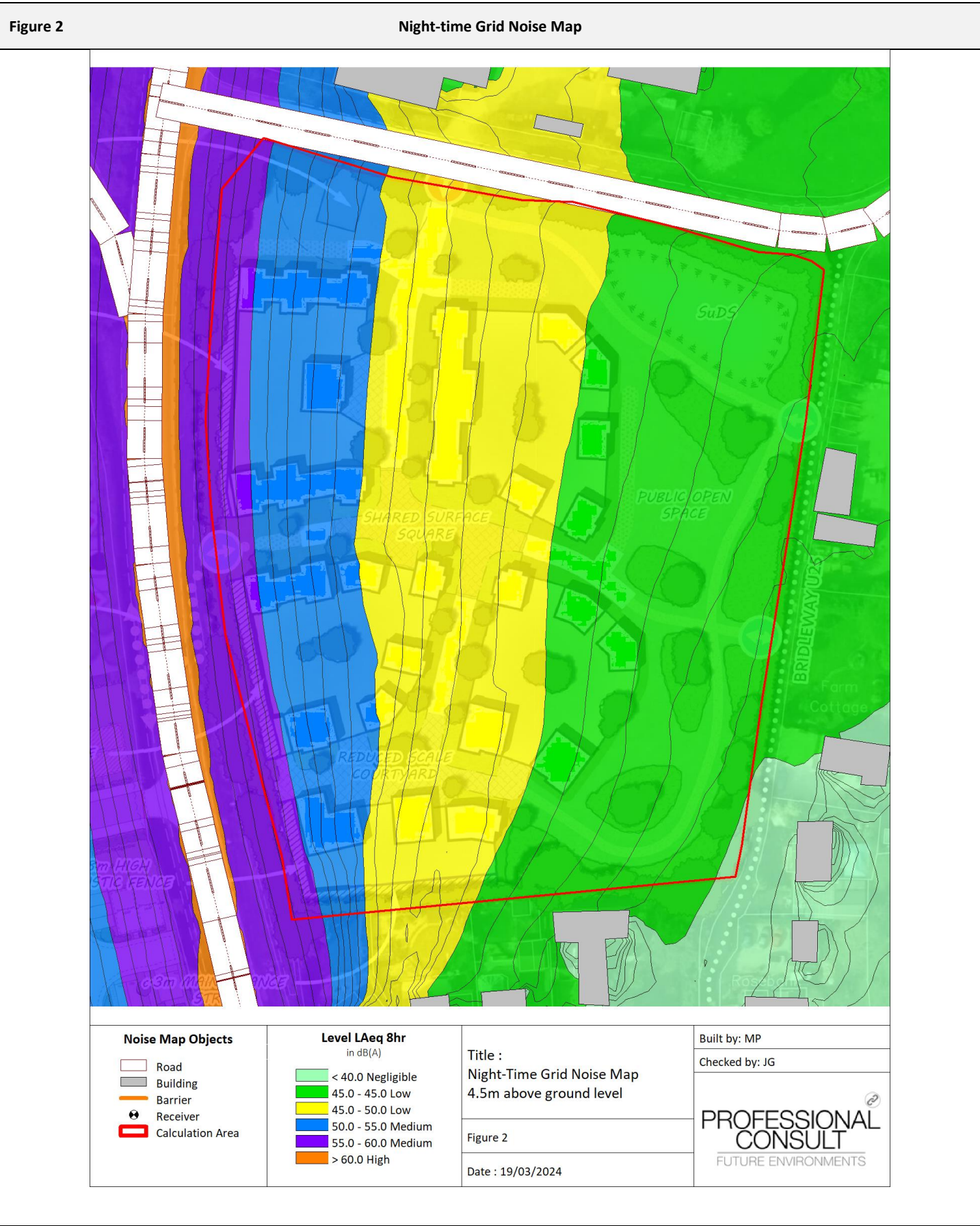
Descriptor	Explanation
dB (decibel)	The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure (2x10 ⁻⁵ Pa).
dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
L _{Aeq, T}	L _{Aeq} is defined as the notional steady sound level which, over a stated period of time (T), would contain the same amount of acoustical energy as the A - weighted fluctuating sound measured over that period.
L _{Amax}	L _{Amax} is the maximum A - weighted sound pressure level recorded over the period stated. L _{Amax} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall Leq noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
L ₁₀ & L ₉₀	If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The Ln indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L ₁₀ is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, L ₉₀ is the 'average minimum level' and is often used to describe the background noise. It is common practice to use the L ₁₀ index to describe traffic noise.
Free-field Level	2A sound field determined at a point away from reflective surfaces other than the ground with no significant contributions due to sound from other reflective surfaces. Generally as measured outside and away from buildings.
Fast	A time weighting used in the root mean square section of a sound level meter with a 125millisecond time constant.
Slow	A time weighting used in the root mean square section of a sound level meter with a 1000millisecond time constant.

APPENDIX 3: SITE LOCATION PLAN & NOISE MEASUREMENT POSITION



APPENDIX 4: BASELINE GRID NOISE MAPS





APPENDIX 5: GRID NOISE MAPS WITH INDICATIVE LAYOUT



APPENDIX 6: GRID NOISE MAPS WITH INDICATIVE LAYOUT AND BARRIERS

