



Acoustic Associates

P E T E R B O R O U G H

**Environmental noise assessment associated with a proposed
commercial storage building and residential dwelling on land to
the rear of Springway, Stockwell Gate, Whaplode, PE12 6UE**

CLIENT: G R Merchant Ltd
Bank House
Broad Street
Spalding
Lincolnshire
PE11 1TB

REPORTED BY: Stephen Marshall MIOA

REPORT No.: SEM/J3795/18589

DATE: May 2024

ACOUSTIC ASSOCIATES (PETERBOROUGH)

Office 23 Eventus Business Centre, Sunderland Road, Northfields Industrial Estate,
Market Deeping, Peterborough, PE6 8FD.

Tel: 01733 896 346

e-mail: info@aapb.co.uk Website: www.aapb.co.uk

CONTENTS	Page No.
1 OBJECTIVES	3
2 CONCLUSIONS	3
3 RECOMMENDATIONS	4
4 BACKGROUND.....	4
5 POLICY, GUIDANCE AND STANDARDS	7
6 NOISE ASSESSMENT.....	16
7 DISCUSSIONS.....	22
REFERENCES	23
Appendix 1 – Glossary of terms	24
Appendix 2 – Noise instrumentation.....	26
Appendix 3 – Results of long-term noise monitoring at Location A	27
Appendix 4 – Results of short-term noise specific noise monitoring.....	28
Appendix 5 – Predicted Specific Noise Contours With Storage Yard In Use (1.5m Height)	29

1 OBJECTIVES

- 1.1** To carry out an environmental *noise impact assessment associated with a proposed commercial storage building and residential dwelling on land to the rear of Springway, Stockwell Gate, Whaplode, PE12 6UE, in accordance with British Standard (BS) 4142 (Reference 5) and other relevant standards and guidance.
- 1.2** To recommend solutions to any problems identified by the assessment.

2 CONCLUSIONS

- 2.1** Based on the unattended daytime noise monitoring on site between Thursday 21st March – Tuesday 26th March 2024:
- The typical background sound level during the daytime period is estimated as $L_{A90,1\text{hour}}$ 41 dB(A), which was the modal value ($L_{A90,15\text{mins}}$) measured on site during the daytime periods (07:00 – 23:00 hours).
- 2.2** Using computer noise model predictions and based on specific noise levels measured during the site visit, noise emissions from the use of the storage yard and building are assessed as having:
- A “low” impact when assessed at reception points within the outdoor amenity areas (1.5m above the ground) of the nearest existing and proposed residential receptors during a ‘worst case’ daytime BS 4142 1-hour reference period, whereby a transportation vehicle enters the storage area via the access road off Stockwell Gate, loads an item of plant (e.g: mini excavator) onto a trailer, attaches the trailer to the transportation vehicle and then exits site via the access road onto Stockwell Gate.
- 2.3** When taking into account context whereby the predicted noise levels represent a worst-case noise scenario (for the majority of most daytime periods no activity will be taking place within the storage yard), this is regarded to be an acceptable noise situation. It should also be noted that acceptable internal and external noise levels in accordance with the WHO Guidelines (Reference 8) and BS 8233 (Reference 9) are shown to be achievable at the nearest residential receptors and at the proposed new residential dwelling (even under circumstances where windows are partially open). With the above in mind and provided the recommendations within this report are implemented, then this is deemed to be an acceptable noise situation.
- 2.4** When assessing the suitability of the site for the proposed new residential dwelling it is concluded that using terminology from the ProPG, noise levels across the site are likely to be indicative of a “*Negligible risk*” during both the daytime and night-time periods. A stage 2 assessment in accordance with ProPG is therefore not required and it can be concluded that an acceptable noise situation should occur for future residential of the proposed residential premises.

*** See Appendix 1 for a Glossary of Terms**

3 RECOMMENDATIONS

3.1 Proposed Storage Yard and Building:

In order to minimise the impact of noise emissions from the proposed storage yard / building:

- The use of the storage yard and any activity within the storage building should be restricted to daytime use only (between 07:00 – 23:00 hours).
- The 2.4m high closed boarded fencing (or equivalent) that has already been installed around the storage yard should be retained for the lifespan of the site.

3.2 Proposed Residential Dwelling:

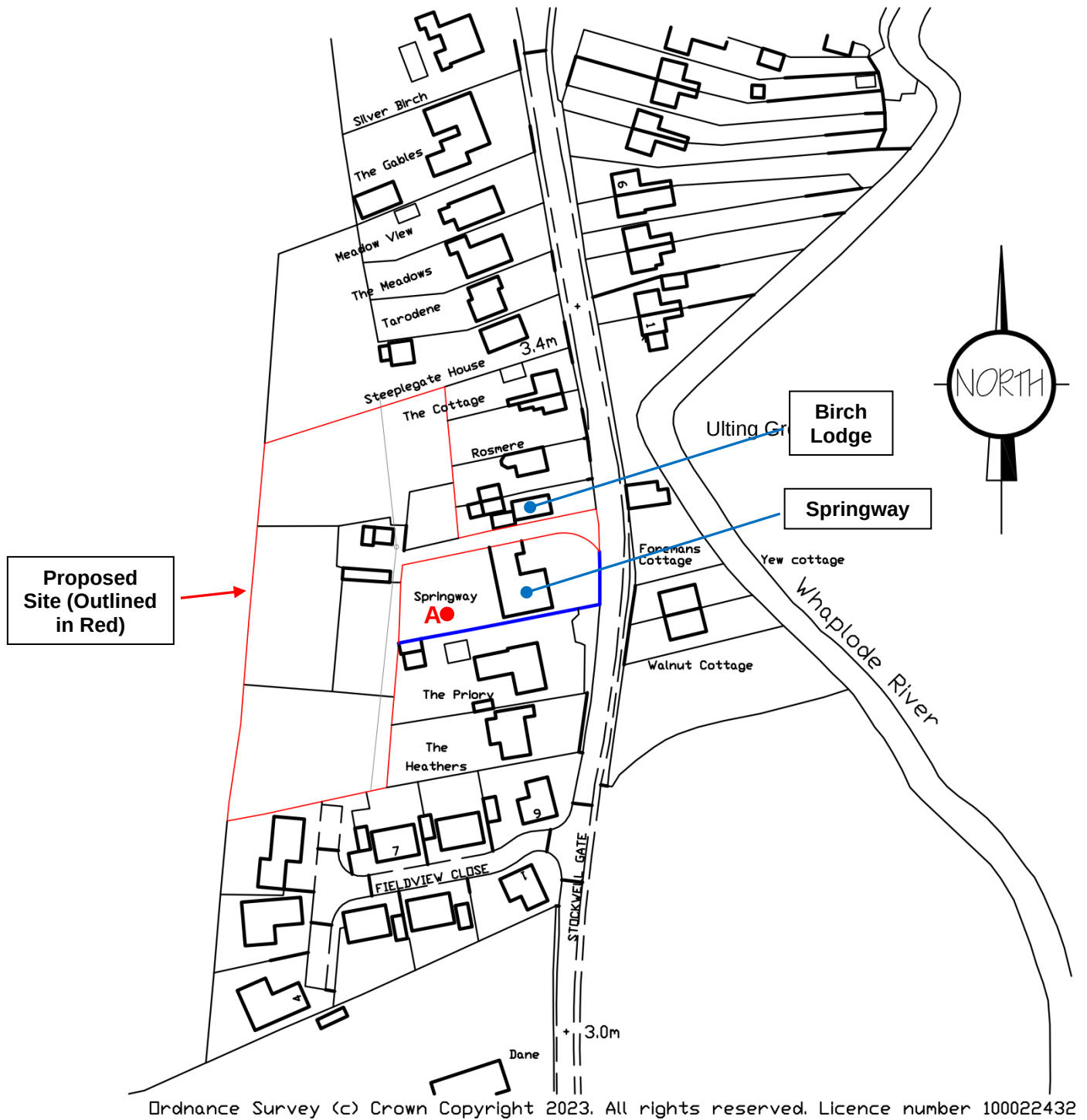
- Any form of standard double glazing and any form of standard trickle vents fitted with compression seals should result in acceptable internal noise levels being achieved within the living rooms and bedrooms of the proposed residential dwelling.
- Internal noise levels within the proposed living rooms and bedrooms of the proposed dwelling are likely to be acceptable even under circumstances where future residents have windows partially open. It is therefore recommended that from an acoustic perspective any of the ventilation systems detailed within Document F of the Building Regulations (Reference 10) can be used (any of Types 1 – 4).

4 BACKGROUND

4.1 Planning permission is being sought for a proposed development on land to the rear of Springway, Stockwell Gate, Whaplode PE12 6UE. The proposed development features a proposed storage yard and storage building on the northern section of the site and a proposed residential dwelling on the southern section of the site. Both the storage yard and the proposed residential dwelling will be accessed via an access road that has already been installed between the existing residential dwellings at “Springway” and “Birch Lodge”

The proposed site boundary, the location of the nearest existing residential receptors and the background noise monitoring location are shown in Drawing 4.1.

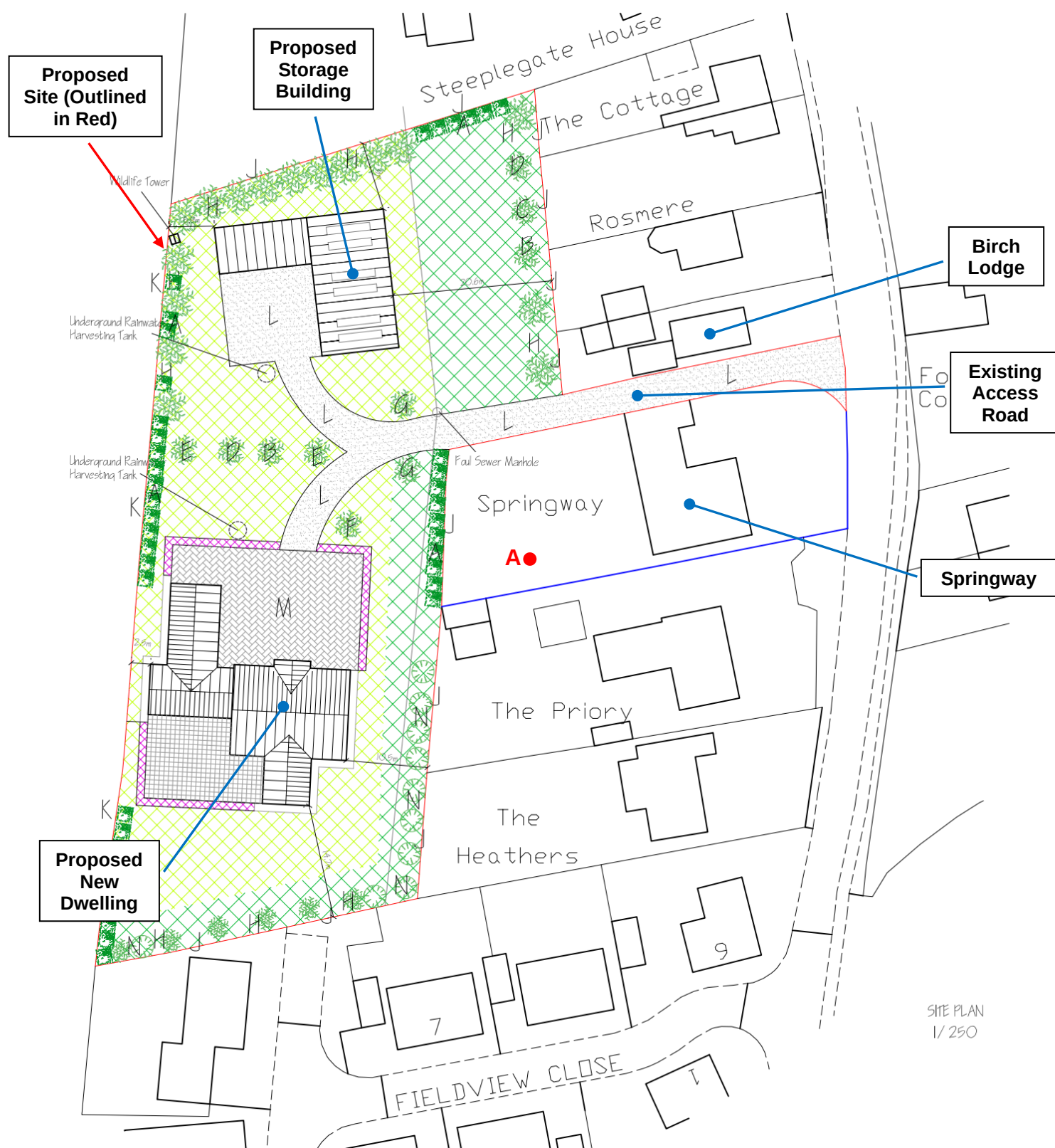
The location of the proposed storage yard, storage building and the proposed new residential dwelling are as shown in Drawing 4.2.



LOCATION PLAN
1/1250

Drawing 4.1 – Proposed Site Location

● = Monitoring Location A



Drawing 4.2 - Site Layout - Location Of Proposed Storage Building and Proposed New Dwelling

● = Monitoring Location A

4.2 Acoustic Associates (Peterborough) were instructed by the applicant to carry out an environmental noise assessment to assess the noise impact associated with the proposed development.

5 POLICY, GUIDANCE AND STANDARDS

5.1 National Planning Policy Framework (NPPF – Reference 1)

5.1.1 The NPPF states that planning policies and decisions should prevent

¹ “...new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of noise pollution”

5.1.2 It states further:-

²“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 ³adverse impacts 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.

5.2 Noise Policy Statement for England (NPSE – Reference 2) and National Planning Policy Guidance (NPPG – Reference 3)

The NPSE has stated that the impact of noise be classified according to an “effect level” (shown in column 3 below). The NPPG has clarified what this effect level below means in terms of its perception by people at receptors and what action should be taken (columns 1 and 4 in Table 1 below).

¹ Para 180 – item e)

² Para 191

³ It refers to the Noise Policy Statement for England in order to explain what it means by “adverse impact” (see section 5.2).

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
Lowest Observed Adverse Effect Level			
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
Significant Observed Adverse Effect Level			
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 Adverse 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

Table 1 – NPPG noise exposure hierarchy

5.3 ProPG: Professional Practice Guidance on Planning & Noise (Reference 4)

This document was produced by noise professionals to offer them guidance on noise management within the planning system in England. It recommends a 2-stage approach to managing for noise:

5.3.1 ProPG: Stage 1 – Initial Site Noise Risk Assessment

5.3.1.1 The aim of this stage is to provide an indication of the likely risk of adverse effects due to noise from developing a site. Using measurement and/or prediction, indicative future noise levels on a site are estimated.

5.3.1.2 The following excerpt shows the potential effect associated with likely site noise levels for daytime and night-time.

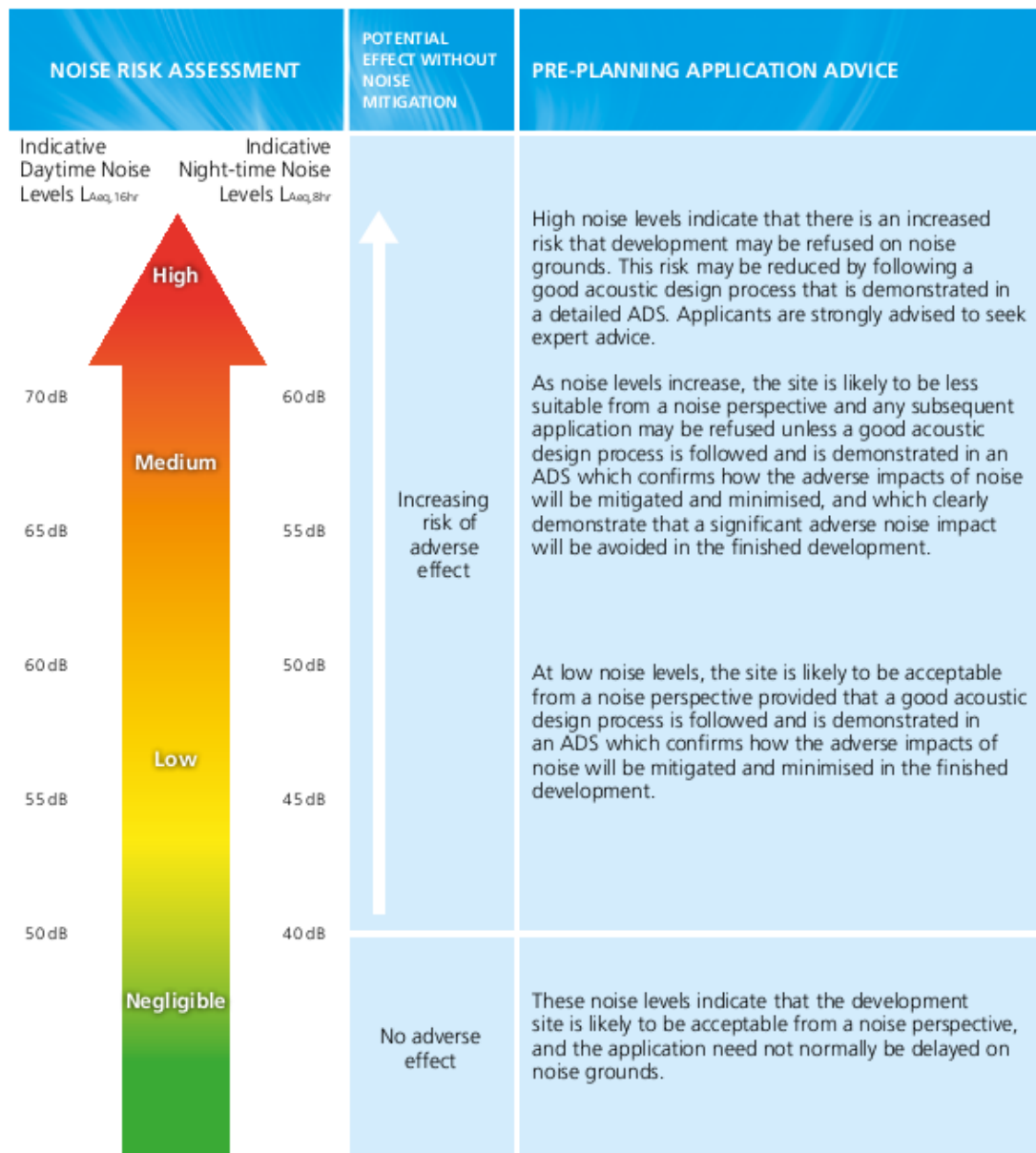


Figure 1 Notes:

- Indicative noise levels should be assessed without inclusion of the acoustic effect of any scheme specific noise mitigation measures.
- 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".
- $L_{Aeq,16hr}$ is for daytime 0700 – 2300, $L_{Aeq,8hr}$ is for night-time 2300 – 0700.
- 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.

Figure 1. Stage 1– Initial Site Noise Risk Assessment

5.3.1.3 It must be noted that the initial assessment of noise risk is not the basis for the eventual recommendation of approval. Its aim is to give an early assessment of site suitability for residential development and the extent of the acoustic issues to be faced. The higher the risk the more important it is that good acoustic design is followed for the development.

5.3.2 ProPG: Stage 2 – Full Assessment

There are 4 stages to a full assessment and these are briefly described below.

5.3.2.1 Element 1 - Good Acoustic Design Process

Provide an integrated solution whereby development avoids “unreasonable” and prevents “unacceptable” acoustic conditions. In particular the following should be considered: -

- Check the feasibility of relocating or reducing noise levels from relevant sources.
- Consider options for planning the site or building layout.
- Consider the orientation of proposed building(s).
- Select construction types and methods for meeting building performance requirements.
- Examine the effects of noise control measures on ventilation, fire regulation, health and safety, cost, CDM (construction, design and management) etc.
- Assess the viability of alternative solutions.
- Assess external amenity area noise.

5.3.2.2 Element 2 – Internal noise level Guidelines

Seek to achieve recommended noise levels inside noise sensitive rooms in new residential development. The following excerpt from the document shows the recommended internal noise levels that should ideally be achieved.

Activity	Location	Noise criteria	
		07:00 to 23:00	23:00 to 07:00
Resting	Living room	35 dB $L_{Aeq,16hour}$	-
Dining	Dining room / area	40 dB $L_{Aeq,16hour}$	-
Sleeping	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$ 45 dB $L_{Amax,F}$

Table 2 – ProPG Internal Noise Level Guidelines

Note 1: Figure 2 - Note 4 in ProPG states that in most circumstances the maximum noise level $L_{Amax,F}$ should not exceed 10 times per night.

Note 2: Section 2.3.3 of ProPG states the following with respect to the reduction of noise due to the building envelope *“the acoustic performance of the building envelope will be reduced in the event windows are opened for ventilation or cooling purposes, typically reducing the insulation to no more than 10 to 15 dB(A)”*.

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.

5.3.2.3 Element 3 – External Amenity Area Noise Assessment

The acoustic environment of external amenity areas that are an intrinsic part of the overall design assessment should always be assessed and noise levels should ideally not be above the range 50-55 dB $L_{Aeq,16\text{hours}}$. However the following follow-up advice should be noted

“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.”

5.3.2.4 Element 4 – Assessment of Other Relevant Issues

At this stage the following should be addressed:

- 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
- acoustic design v wider planning objectives

5.4 Acoustics, Ventilation and Overheating Guidance (AVOG – Reference 11)

Acoustics design considerations for dwellings may impact on the ventilation and thermal comfort of the inhabitants e.g., closing windows to prevent noise ingress may mean that alternative means are needed to provide fresh air to inhabitants and to prevent overheating. The AVOG design guide details good practice to achieve satisfactory thermal and acoustic comfort for residents. It currently addresses noise from transport sources.

In summary an assessment for a dwelling will consist of the following:

- 5.4.1** Based on the estimates of noise levels at the façades, advise on glazing specifications to achieve suitable internal noise levels;
- 5.4.2** Advise the design team on the options for a ventilation strategy team (System 1,2,3 or 4 from Document F of the Building Regulations);

5.4.3 Assess the effects of the ventilation strategy chosen and advise accordingly to prevent noise ingress. This advice could be on measures allowing natural (windows vents or open windows) or other methods such as mechanical ventilation. The following table from AVOG is useful in guiding a design choice for ventilation for outline planning permissions.

Table B-3 Summary of potential noise issues associated with ventilation strategies described in ADF

ADF System	External noise ingress considerations	Mechanical system noise considerations	Approximate guideline free-field external noise limits. ^[Note 1]
1 or 2	Noise ingress is likely to be defined by the performance of the background ventilators (trickle vents), windows and other façade elements. Note that use of System 1, relying on the use of open trickle vents without opening windows may give rise to poor indoor air quality in airtight dwellings outside the winter period.	For System 1, intermittent kitchen and bathroom fans should have suitable noise levels to meet the guidelines in Table 3-4. System 2 has no mechanical components.	With standard double glazing and two trickle vents: • $\sim L_{Aeq,16h}$ 56 dB day • $\sim L_{Aeq,8h}$ 51 dB night • L_{AFmax} not normally exceeding ~ 67 dB more than 10x per night With high performing acoustic glazing and two 'acoustic' trickle vents: • $\sim L_{Aeq,16h}$ 66 dB day • $\sim L_{Aeq,8h}$ 61 dB night • L_{AFmax} not normally exceeding ~ 80 dB more than 10x per night
3	Noise ingress is likely to be defined by the performance of the background ventilators (trickle vents), windows and other façade elements. ADF advises that: <i>"controllable background ventilators having a minimum equivalent area of 2,500 mm² should be fitted in each room, except wet rooms..."</i>	This could be a centralised or decentralised MEV system. Guideline levels are shown in Table 3-4. For a centralised system, the location of the fan is important for structure-borne and airborne noise. System noise may affect living rooms and bedrooms as well as the rooms in which the extract inlets are located i.e. wet rooms. For a decentralised system, there are individual fans extracting from each bathroom, toilet, kitchen and utility room. The noise effects on adjacent living rooms and bedrooms should be considered. ^[Note 2]	With standard double glazing and trickle vent: • $\sim L_{Aeq,16h}$ 58 dB day • $\sim L_{Aeq,8h}$ 53 dB night • L_{AFmax} not normally exceeding ~ 69 dB more than 10x per night With high performing acoustic glazing and an 'acoustic' trickle vent: • $\sim L_{Aeq,16h}$ 68 dB day • $\sim L_{Aeq,8h}$ 63 dB night • L_{AFmax} not normally exceeding ~ 83 dB more than 10x per night
4	No trickle vents required. Consider noise ingress through other facade elements.	MVHR is a centralised system ducted to supply outlets in living rooms and bedrooms as well as to extracts in wet rooms. Guideline levels are shown in Table 3-4. The unit location is important for structure-borne and airborne noise. Consider ducted noise, particularly to bedrooms. Consider also cross-talk sound transmission via ducts. ^[Note 2]	With standard double glazing and no trickle vent: • $\sim L_{Aeq,16h}$ 62 dB day • $\sim L_{Aeq,8h}$ 57 dB night • L_{AFmax} not normally exceeding ~ 76 dB more than 10x per night With high performing acoustic glazing: • $\sim L_{Aeq,16h}$ 73 dB day • $\sim L_{Aeq,8h}$ 68 dB night • L_{AFmax} not normally exceeding ~ 90 dB more than 10x per night N.B. With secondary glazing higher sound insulation may be achieved.

5.4.4 Assess the risk of overheating based on input from thermal modelling in a 2-stage assessment. Stage 1 determines whether open windows will suffice to mitigate against overheating. If so, there is no further assessment required for overheating as open windows will suffice.

Table 3-2 Guidance for Level 1 site risk assessment of noise from transport noise sources ^[Note 1] relating to overheating condition

Risk category for Level 1 assessment ^[Note 5]	Potential Effect without Mitigation	Recommendation for Level 2 assessment
^[Note 2] $L_{Aeq,T}$ during 07:00 - 23:00 $L_{Aeq,8hr}$ during 23:00 - 07:00 65 dB High 60 dB Medium 55 dB Low 50 dB Negligible 45 dB	Increasing risk of adverse effect	Recommended Optional
	Use of opening windows as primary means of mitigating overheating is not likely to result in adverse effect	Not required

Note 1 The noise levels suggested assume a steady road traffic noise source but may be adapted for other types of transport. All levels are external free-field noise levels.

Note 2 The values presented in this table should not be regarded as fixed thresholds and reference can also be made to relevant dose-response relationships, ^[15, 17].

Note 3 A decision must be made regarding the appropriate averaging period to use. The averaging period should reflect the nature of the noise source, the occupancy profile and times at which overheating might be likely to occur. Further guidance can be found within the 2014 IEMA Guidelines ^[21].

Note 4 Refer also to references ^[1, 17, 18, 22] for further guidance regarding individual noise events. Where 78dB LAFmax is normally exceeded during the night-time period (23:00-07:00), a Level 2 assessment is recommended.

Note 5 The risk of an adverse effect occurring will also depend on how frequently and for what duration the overheating condition occurs. Refer to Figure 3-2.

Note 6 To evaluate the risk category for a dwelling, all three aspects of external noise exposure (i.e. daytime, night-time and individual noise events) should be evaluated. The highest risk category for any of the three aspects applies.

5.4.5 If a Stage 2 assessment is required, then, with input from the design team, advise on measures to achieve acceptable noise levels while preventing overheating could be offered.

5.5 British Standard BS 4142:2014 (Reference 5)

5.5.1 BS 4142 is a standard which describes a method for assessing whether the 'specific noise' from an industrial source is likely to give rise to complaints from residents of the adjacent dwellings. The 'specific noise' levels are determined outside dwellings. The specific noise level is determined for reference time periods of 1-hour for the daytime (7am to 11pm) and 15 minutes for the night time. Tonal or impulsive characteristics of a noise are likely to increase the scope for complaints and this is taken into account by adding a value to the specific noise source level to obtain the 'rating level'. The value may be between 0 and 15 dB depending on objective and

subjective measures detailed in the standard. The following table detail the values added for the subjective method.

Characteristics of noise	Noise at receptor	Value to add to specific noise level for rating level
Noise has tonal characteristics	Just perceptible	+2 dB
	Clearly perceptible	+4 dB
	Highly perceptible	+6 dB
Noise has impulsive characteristics	Just perceptible	+3 dB
	Clearly perceptible	+6 dB
	Highly perceptible	+9 dB
Other - characteristics that are neither tonal nor impulsive but are readily distinctive against the residual acoustic environment,	-	+ 3 dB
Intermittency	If intermittency is readily distinctive in the residual acoustic environment	+3 dB

Table 3 – BS 4142 – Corrections to noise to calculate rating level – subjective method

5.5.2 BS 4142 requires that the rating level of a noise is compared with the existing background noise ($L_{A90,T}$). Guidance given in the standard states the following regarding the difference between the rating Level and the background noise.

- A difference of 0 dB is indicative of a “*minor impact*”;
- A difference of +5 dB is indicative of an “*adverse impact*”;
- A difference of +10 dB is indicative of a “*significant adverse impact*”.

5.6 World Health Organisation (WHO) Guidance (Reference 8).

5.6.1 The WHO has published guidelines for community noise, as shown in Table 4. This WHO document gives guidance for the levels of noise both inside and outside of dwellings.

Specific Environment	Critical Health Effect(s)	L _{Aeq} (dB)	Time Base (hours)	L _{Amax, fast} (dB)
Outdoor living area	Serious annoyance, daytime and evening	55	16	-
	Moderate annoyance, daytime and evening	50	16	-
Dwelling, indoors	Speech intelligibility and moderate annoyance, daytime and evening	35	16	-
Inside bedrooms	Sleep disturbance, night-time	30	8	45
Outside bedrooms	Sleep disturbance, window open (outdoor values)	45	8	60

Note: The 'daytime' and 'night-time' periods are generally referred to as 0700 to 2300 and 2300 to 0700 hours respectively.

Table 4 - World Health Organisation Noise Guidance Levels

5.7 British Standard BS 8233:2014 (Reference 9)

5.7.1 BS 8233 also gives guidance on indoor ambient noise levels, as shown in Table 5.

Activity	Location	Noise criteria	
		07:00 to 23:00	23:00 to 07:00
Resting	Living room	35 dB L _{Aeq,16hour}	-
Dining	Dining room/area	40 dB L _{Aeq,16hour}	-
Sleeping	Bedroom	35 dB L _{Aeq,16hour}	30 dB L _{Aeq,8hour}

Table 5 - BS 8233: 2014 guidance indoor ambient noise levels for dwellings.

5.7.2 With respect to external noise in amenity areas, BS 8233 states the following:

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 L_{Aeq,T}, with an upper guideline value of 55 dB L_{Aeq,T} which would be acceptable in noisier environments.

5.8 Criteria for this assessment

ProPG Stage 1 guidance has been used to carry out an initial noise risk assessment for the proposed residential dwelling and ProPG, BS 8233 and WHO Guidance are used to assess noise inside dwellings and within outdoor amenity areas. The potential industrial / commercial impact of noise emissions from the proposed storage yard and storage building is assessed

using BS 4142. The overall noise impact with mitigation measures in place is classified according to criteria given in the NPSE and NPPG.

6 NOISE ASSESSMENT

6.1 Background Noise Monitoring

Long-term unattended noise monitoring equipment was set up at Monitoring Location A (see Drawings 4.1 and 4.2), within the outdoor amenity area of the “Springway” residential property within free field conditions at a height of approximately 1.5m above the ground. Noise was continuously monitored throughout the period from 10:23 hours on Thursday 21st March 2024 to 09:08 hours on Tuesday 26th March 2024. Weather conditions throughout the monitoring period were mostly dry, temperature ranged between approximately 2°C to 12°C, with wind speeds below 5m/s at all times (with the possible exception of the night of 23rd – 24th March where wind speeds were forecast to potentially exceed this value). Appendix 2 gives details of the noise instrumentation used. The long-term noise monitoring results from Location A are shown in graphical form in Appendix 3.

6.2 Estimation of Daytime Background Noise Levels

The full results of the unattended monitoring at Monitoring Location A are shown in graphical form in Appendix 3. The results show the noise levels logged at 15-minute intervals in terms of average noise ($L_{Aeq,15minutes}$), maximum noise ($L_{Amax,15minutes}$) and background noise levels ($L_{A90,15minutes}$).

The background noise levels ($L_{A90,15minutes}$) at Location A varied throughout the daytime periods with levels between 33 – 47 dB(A) recorded during the survey.

Based on detailed analysis of the measured data, the modal background noise level ($L_{A90,15minutes}$) occurred at 41 dB(A). Based on the above a typical $L_{A90,1hour}$ value of **41 dB(A)** has been assumed for the daytime BS 4142 Assessment.

6.3 Specific Noise Levels

During the site visit on 21st March 2024, specific noise monitoring was undertaken whilst the applicant undertook simulations of tasks that will typically take place within the storage yard.

The following measurements were taken:

- Sound pressure level measurements at a distance of 5m from a loaded transportation vehicle (loaded with a mini-excavator on a trailer) entering the site via the existing access road

- Sound pressure level measurements at a distance of 5m from a loaded transportation vehicle (loaded with a mini-excavator on a trailer) exiting the site via the existing access road
- Sound pressure level measurements at a distance of 5m covering the full process of a mini-excavator being loaded onto a trailer and attached to a transportation vehicle, ready to be transported off site.
- Sound pressure level measurements at a distance of 5m covering the full process of a mini-excavator being unloaded from a trailer and moved into its storage location on site.

The results of these specific noise level measurements have been documented in Appendix 4. These measured noise levels were then used to calibrate the computer noise model for the site.

6.4 Predictive Noise Model

A computer noise model of the site (see Drawing 6.1) was generated using proprietary iNoise software (Reference 6) which calculates noise emissions using ISO 9613-2 (Reference 7). The computer noise model was used to assess daytime noise emissions associated with the use of the proposed new storage yard / building. The following noise sources have been input into the computer noise model and it has been assumed that all these noise generating events could take place during a single 1- hour BS 4142 daytime assessment period:

- A loaded transportation vehicle has been assumed to enter site. This activity has been modelled with a sound power level (L_{WA}) of 91.2 dB(A). Based on the specific noise measurements undertaken (see Appendix 4) it has been assumed that this activity will take 1 minute and therefore a time correction of -17.8dB has been applied as an 'on time' correction to simulate the transportation vehicle entering the site for 1 minute during any one hour assessment period.
- A loaded transportation vehicle has been assumed to exit the site. This activity has been modelled with a sound power level (L_{WA}) of 91.2 dB(A). Based on the specific noise measurements undertaken (see Appendix 4) it has been assumed that this activity will take 1 minute and therefore a time correction of -17.8dB has been applied as an 'on time' correction to simulate the transportation vehicle exiting the site for 1 minute during any one hour assessment period.
- In addition to the vehicle movements on and off the site, a loaded transportation vehicle has been assumed to either be loaded or unloaded during the same one-hour assessment period. This activity has been modelled as an area noise source with a sound power level (L_{WA}) of 91.1 dB(A). Based on the specific noise measurements undertaken (see Appendix 4) it has been assumed that this activity will take up to 5 minutes and therefore a time correction of -10.8dB has been applied as an 'on time' correction to simulate the loading / unloading activities being undertaken for 5 minutes during any one hour assessment period.

The computer noise model has been used to predict daytime specific noise emissions at Assessment Locations 1 - 3 (see Drawing 6.1) within the outdoor amenity areas of the nearest existing and proposed residential receptors, approximately 3.5m from the rear façades of the dwellings.



Drawing 6.1 – Computer Noise Model Showing Location Of Noise Sources and Assessment Locations

6.5 Predicted Specific Noise Levels

Specific noise levels associated with the use of the storage yard / storage building have been predicted at Assessment Locations 1 - 3, based on the assumptions detailed in Section 6.4 and are documented in Table 6. The daytime noise levels have been predicted at ground floor height (1.5m above the ground). Predictive noise contours at a height of 1.5m above the ground are shown in Appendix 5.

Assessment Location (see Drawing 6.1)	Predicted Specific Noise Level - Daytime Period When The Storage Yard Is In Use ($L_{Aeq,1hour}$) dB(A)
Assessment Location 1 – Outdoor amenity area of “Springway” – 3.5m from the rear building façade	34
Assessment Location 2 – Outdoor amenity area of “Birch Lodge” – 3.5m from the rear building façade	38
Assessment Location 3 – Outdoor amenity area of proposed new dwelling – 3.5m from the rear building façade	16

Table 6 – Predicted Specific Daytime Noise Levels

6.6 British Standard (BS) 4142 Assessment

The following table detail the BS 4142 assessment at Assessment Location 2 (worst affected receptor) during the daytime period. The assessment relating to the use of the proposed storage yard / building is shown in Table 7.

Stage	Daytime – Assessment Location 2 (1.5m Height)	Comments
Specific sound level $L_{Aeq,T}$ dB(A)	38	Specific sound level associated with the use of the storage yard / building (see Table 6).
Penalty dB	+5	See Table 1. Noise emissions from the storage yard / building activities could potentially be tonal in character. Therefore a correction of +2dB for tonality that is 'just perceptible' has been applied. The activities could also potentially include impulsive noise therefore a +3dB correction has been added for impulsivity.
Rating sound level dB(A) $L_{AR,TR}$	43	Specific sound level + penalty
Assumed background sound level L_{A90} dB(A)	41	See section 6.2
Excess of "Rating" Level over background	+2 dB	See section 5.1.2
Initial BS 4142 Assessment	<i>Marginally above a "low" impact</i>	See section 5.1.2
Assessment when taking account of context	-	The predicted noise levels represent a worst-case noise scenario (for the majority of most daytime periods no activity will be taking place within the storage yard). It should also be noted that acceptable internal and external noise levels in accordance with the WHO Guidelines and BS 8233 are shown to be achievable at the nearest residential receptors and at the proposed new residential dwelling (even under circumstances where windows are partially open).
Uncertainty of the assessment	-	The background sound measurements were taken over a number of full daytime periods which is a reasonable sample length, limiting the impact of uncertainties.

Table 7 – Daytime BS 4142 Assessment at Assessment Location 2

It can be seen from the assessment above that the proposed activities on site are likely to have marginally above a low impact during periods when the site is in use. When taking into account context whereby the predicted noise levels represent a worst-case noise scenario (for the majority of the daytime period the storage yard will not be in use), this is regarded as an acceptable noise situation. It should also be noted that acceptable internal and external noise

levels in accordance with the WHO Guidelines and BS 8233 are shown to be achievable at the nearest existing residential receptor and the proposed new dwelling (even under circumstances where windows are partially open). With the above in mind and provided the recommendations within this report are implemented, then this is deemed to be an acceptable noise situation.

6.7 Assessment of Internal noise levels at the nearest residential receptor

The WHO Guidelines and BS 8233 offer guidance levels for acceptable noise levels inside living rooms and bedrooms during the daytime period of $L_{Aeq,16hour} < 35 \text{ dB(A)}$ (see criteria given in sections 5.6.1 and 5.7.1).

Internal levels are typically around 15 dB less than external façade levels with a partially open window. The predicted incident specific noise level at Assessment Location 2 (see Drawing 6.1), outside the worst affected residential façade (south-eastern façade) of the nearest residential receptor during the daytime period is approximately 38 dB(A) ($L_{Aeq,1hour}$) when the storage yard / building is in use. Predicted Internal specific noise levels within the nearest residential receptor with a partially open window would be approximately 23 dB(A) when the storage yard / building is in use, which achieves the criteria specified in the WHO and BS 8233 guidance. This is deemed to be an acceptable noise situation.

6.8 Assessment of outdoor amenity area noise levels

The WHO Guidelines offer guidance levels for acceptable daytime noise levels within outdoor amenity areas of $L_{Aeq,16hour} < 50 \text{ dB(A)}$ (see criteria given in sections 5.6.1). It can be seen in Appendix 5 that predicted noise levels within the outdoor amenity areas of the nearest residential receptor when the storage yard / building is in use are well below the WHO guidance criteria. This is deemed to be an acceptable noise situation.

6.9 ProPG Stage 1 – Initial noise risk assessment

Daytime and night-time noise monitoring was undertaken at Monitoring Location A within the outdoor amenity area of the existing residential property at “Springway” (see Drawings 4.1 and 4.2). For the purposes of undertaking a ProPG Stage 1 assessment for the proposed new dwelling the daytime and night-time levels measured at Monitoring Location A have been assumed to be representative of levels that the new dwelling will be exposed to. The monitoring at Monitoring Location A showed that daytime noise levels ($L_{Aeq,16hour}$) ranged from 43.0 – 48.5 dB(A), whilst night-time noise levels ($L_{Aeq,8hour}$) ranged from 40.1 – 41.3 dB(A). These levels are indicative of a “Negligible Risk” in accordance with the ProPG. A stage 2 assessment in accordance with ProPG is therefore not required and it can be concluded that an acceptable noise situation should occur for future residential of the proposed residential dwelling.

7 DISCUSSIONS

7.1 Uncertainties

- Background noise monitoring was undertaken over a number of full days and nights which is a reasonable sample length which reduces the uncertainties relating to the background noise levels assumed as part of the assessment.
- Specific noise emissions associated with activities within the storage yard / building have been measured and all typical noise generating activities reported by the applicant have been demonstrated.
- For the majority of each daytime assessment period the applicant has reported that the storage yard / building will not be in use. Therefore this needs to be accounted for when considering context and the fact that for the majority of the daytime period no noise generating activity will be undertaken on the proposed site.
- Computer predictions to ISO 9613-2 carry an uncertainty of +/- 3 dB.

REFERENCES

1. Ministry of Housing, Communities and Local Government. National Policy Planning Framework ;, 2021.
2. Noise Policy Statement for England; DEFRA, 2010.
3. DEFRA. National Policy Planning Guidance (revised 2019).
4. ProPG working group. ProPG: Planning & Noise: Professional Practice Guidance on Planning & Noise: New Residential Development;, 2017.
5. British Standard BS 4142:2014+A1:2019, Methods of rating and assessing industrial and commercial sound; BSI, 2014, amended 2019.
6. DGMR Software. iNoise V2024 Enterprise
7. ISO 9613-2 Acoustics of sound during propagation outdoors, Part 2: General method of calculation; ISO, 1996.
8. World Health Organisation Guidance, Guidelines for Community Noise; WHO, 1999.
9. British Standard BS 8233, Guidance on sound insulation and noise reduction for buildings; BSI, 2014.
10. Document F Ventilation Regulations; thenbs, 2010.

Appendix 1 – Glossary of terms

Sound Pressure	The variation of ambient pressure that is detected by the ear as sound.
Noise	Unwanted sound
decibel (dB)	Ten times the logarithm of the square of the ratio of the Sound Pressure to a reference pressure (20 micro-Pascal's).
Sound Pressure Level (L_p)	The decibel version of the Sound Pressure.
A-Weighting	A frequency weighting which simulates the response of the ear. An A-Weighted Sound Pressure Level is denoted by L _{pA} and has units of dB(A)
L_{Aeq,T}	The value of the A-weighted sound pressure level, in decibels [dB(A)], of a continuous steady sound that within a specified time interval (T), for example 16 hours, has the same mean-square sound pressure as a sound that varies with time. Therefore, the average over a 16 hour period would be denoted as L _{Aeq,16h}
L_{Amax,T}	The maximum A-Weighted sound pressure level that was encountered during the measurement period.
L_{A90,T}	The A-Weighted sound pressure level that is exceeded for 90% of the time (T). This is usually used a measure of background noise.
Free Field	Where noise can propagate freely without any reflections from buildings etc.
Octave Band	A band of frequencies the upper limit of which is twice the lower limit. They are known by their centre frequency, e.g., 63, 125, 250, 500, 1000, 2000
NPSE Criteria	
NOEL	No Observed Effect Level
LOAEL	Lowest Observed Adverse Effect Level
SOAEL	Significant Observed Adverse Effect Level

BS 4142 Terms

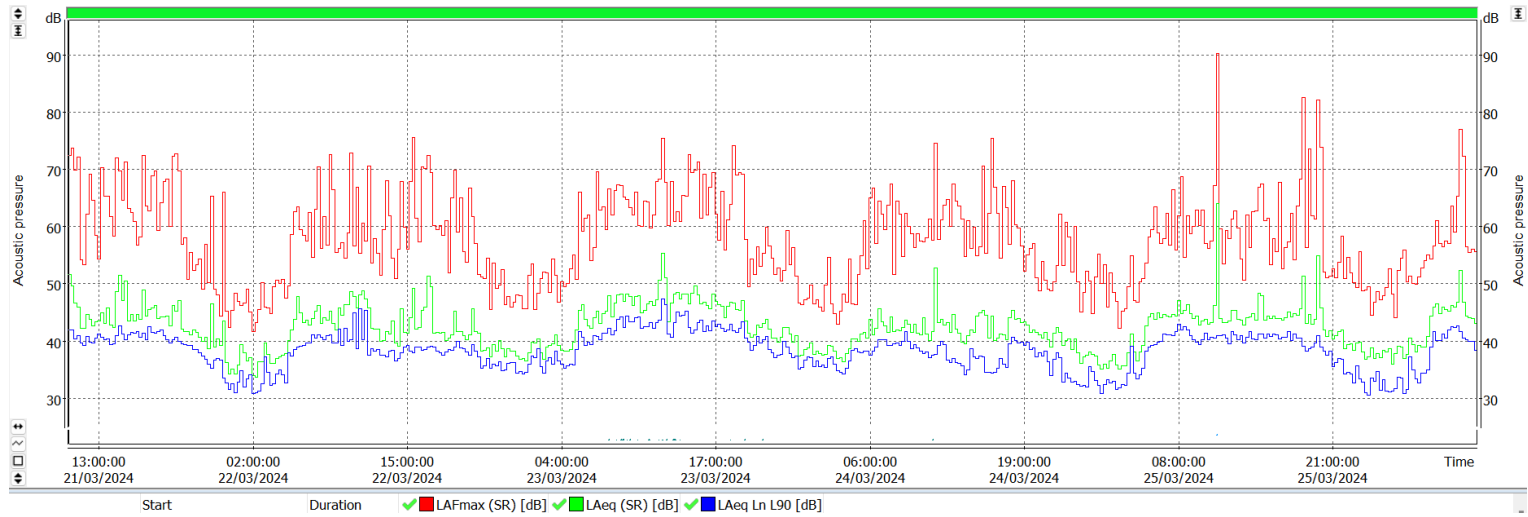
T_r	The reference time interval over which an equivalent continuous A-weighted sound pressure is determined. Day time = 1 hour Night-time = 15 minutes
T_m	The measurement time interval over which measurements are taken.
Ambient Noise	Total sound in a given situation at a given time.
Residual Noise	The ambient noise remaining at a given position in a given situation when the specific noise is suppressed to a degree such that it does not contribute to the ambient noise.
Specific Noise Level Rating Level L_{Ar,T_r}	The dB L_{Aeq,T_r} of the noise sources being assessed at a site. The specific noise level plus any correction for the character of the noise, known as the Rating Level.
Assessment Level	Difference between Rating Level ($L_{Ar,T}$) and Background Noise ($L_{A90,T}$)
Sound Power Level (L_{WA})	The noise level from the source in terms of sound power, in dB(A).

Appendix 2 – Noise instrumentation

Type	Manufacturer	Description	Serial Number	Last Calibration Date	Calibration Certificate No.
Svan 971	Svantek	Sound level meter	34935	23/06/2022	1129258
Svan 957	Svantek	Sound level meter	23893	12/09/2022	1132546
Svan 957	Svantek	Sound level meter	27517	22/02/2024	1158093
GA 607	Castle	Sound level calibrator	043186	22/02/2024	1158111

The calibration of the instrumentation was checked at the start and end of the tests and there was no significant drift.

Appendix 3 – Results of long-term noise monitoring at Location A



Appendix 4 – Results of short-term specific noise monitoring

Date	Monitoring Position	Time (Hours)	Ambient Noise Level (L _{Aeq,T}) dB(A)	Background Noise Level (L _{A90,T}) dB(A)	Maximum Noise Level (L _{Amax,T}) dB(A)	Comments
21 st March 2024	5m from noise source	10:31 – 10:36 (5 minutes)	68.5	47.8	80.3	Specific noise measurement associated with the full loading process which involved driving a mini excavator onto a trailer and attaching the trailer to the transportation vehicle ready to leave site
		10:39 (34 seconds)	69.2	60.7	82.6	Specific noise measurement associated with the loaded transportation vehicle pulling off the site via the access road
		10:39 – 10:42 (2 minutes and 53 seconds)	67.8	49	86	Specific noise measurement associated with the full unloading process which involved unloading a mini excavator from a trailer, driving the excavator into its storage position and storing the trailer
		10:44 – 10:47 (3 minutes and 46 seconds)	69.1	49.2	86.5	Specific noise measurement associated with the full loading process which involved driving a mini excavator onto a trailer and attaching the trailer to the transportation vehicle ready to leave site
		10:47 (41 seconds)	64.9	59.5	75.2	Specific noise measurement associated with the loaded transportation vehicle pulling off the site via the access road
		10:50 (53 seconds)	67.4	52.2	77.7	Specific noise measurement associated with the loaded transportation vehicle pulling onto the site via the access road
		10:50 – 10:53 (3 minutes and 21 seconds)	65.5	47.9	81.0	Specific noise measurement associated with the full unloading process which involved unloading a mini excavator from a trailer, driving the excavator into its storage position and storing the trailer

Appendix 5 – Predicted Specific Noise Contours With Storage Yard In Use (1.5m Height)

