Oakridge Environmental Services Limited

Noise ImpactAssessment

Change of use of Agricultural Buildings to Joinery Workshop

PARSONAGE GREEN FARM
COCKFIELD

PREPARED BY

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MIOA DATE 3rd

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Reference:

OES23-007WILK

TECHNICAL REPORT

PARSONAGE GREEN FARM
COCKFIELD

Noise Impact Assessment

Document Control Sheet

Report prepared for:	Mr P Beales, Parsonage Green Farm
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A	2nd August 2023	Mick Cheong MSc MIOA	Chris Cornish BSc MCIEH

Revision History

Rev	Details

1 INTRODUCTION

1.1 Background

We have been appointed by Mr P Beales to carry out a noise assessment to inform the planning application for the partial change of use of an agricultural building at Parsonage Green Farm, Cockfield, to light industrial use (Class E) the remainder will stay as agricultural usage.

Class E(g) is defined as uses which can be carried out in a residential area without detriment to its amenity:

E(g)(i) Offices to carry out any operational or administrative functions,

E(g)(ii) Research and development of products or processes

E(g)(iii) Industrial processes

The proposed light industrial use is for a bespoke kitchen and cabinet maker currently operating in a converted agricultural building at Frogs Hall Road, Lavenham. We understand that the proposed site will be used in the same manner as the current site in Lavenham.

1.2 Structure of this report

The structure of this report is as follows:

- Section2 describes the relevant noise criteria;
- Section 3 describes the details of the proposed operations;
- Section 4 sets out our methodology, and summarises the results of our background sound measurements;
- Section 5 sets out our methodology, and summarises the results of our specific sound measurements;
- Section 6 sets out the results of our calculations of operational noise;
- Section 7 contains our assessment of the noise impact of the operation;
- Section 8 contains our summary and recommendations;
- An explanation of the technical terms used in this report is given in Appendix A
- Details of equipment, personnel and calibration are set out in Appendix B
- Appendix C contains a graphical noise model of our calculations.

2 NOISE CRITERIA

2.1 National Planning Policy Framework

states:

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

The NPPF does not set out numerical criteria for noise affecting proposed development sites. For an explanation of significant adverse impacts on health and quality of life, the NPPF refers to the Noise Policy Statement for England (NPSE).

2.1 Noise Policy Statement for England

The Noise Policy Statement for England (NPSE) published in March 2010 sets out the Government's policy on noise and introduced the concepts from toxicology currently being applied to noise impacts by the World Health Organisation. These are:

- NOEL – No Observed Effect Level: This is the level below which no effect can be detected.
- LOAEL – Lowest Observed Adverse Effect Level: This the level above which adverse effects on health and quality of life can be detected.
- SOAEL – Significant Observed Adverse Effect Level: This is the level above which significant adverse effects on health and quality of life occur.

The first aim of the NPSE is to avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.

The second aim of the NPSE is to mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development. This second aim refers to the situation where the impact lies somewhere between LOAEL and SOAEL. It requires that all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life. This does not mean that such adverse effects cannot occur.

Section 2.22 of the NPSE states:

> *"It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available."*

The European Environment Agency technical report *"Good practice guide on noise exposure and potential health effects"* published in October 2010, presents results of research (current at the time of publication) about the health effects of noise. **Table 1** shows the threshold levels at which adverse effects have been shown to occur. These can be used to assess special situations where the uncertainty in relation to the endpoints in terms of health and wellbeing is large (e.g. noise sources for which exposure-response relationships have not been established).

Effect	**Dimension**	**Acoustic indicator [1]**	**Threshold [2]**	**Time domain**
Annoyance disturbance	Psychosocial, quality of life	L_{den}	42	Chronic
Self-reported sleep disturbance	Quality of life, somatic health	L_{night}	42	Chronic
Learning, memory	Performance	L_{eq}	50	Acute, chronic
Stress hormones	Stress Indicator	L_{max} L_{eq}	N/A	Acute, chronic
Sleep (polysomnographic)	Arousal, motility, sleep quality	$L_{max, indoors}$	32	Acute chronic
Reported awakening	Sleep	$SEL_{indoors}$	53	Acute
Reported health	Wellbeing clinical health	L_{den}	50	Chronic
Hypertension	Physiology somatic health	L_{den}	50	Chronic
Ischaemic heart diseases	Clinical health	L_{den}	60	Chronic

Table 1 – Effects of noise on health and wellbeing with sufficient evidence

Section 5 of the Good Practice Guide refers to the WHO Night Noise Guidelines for Europe and concludes that an $L_{night,outdoor}$ of 30 dB is considered as NOEL (No observed effect level) and an $L_{night,outdoor}$ of 40 dB as LOAEL (lowest observed adverse effect level).

[1] L_{den} and L_{night} are defined as outside exposure levels. L_{max} may be either internal or external as indicated.

[2] Level above which effects start to occur or start to rise above background.

2.2 BS 8233:2014 Guidance on sound insulation and noise reduction for buildings

The guidelines recommend that daytime noise levels in external amenity areas should not exceed 50 dB $L_{Aeq,16hours}$. However, this is more appropriate for "impersonal noise" such as continuous road traffic. Noise which is attributable to a particular source, or which has a tonal or intermittent characteristic may cause annoyance at lower levels than these and in such cases an assessment linked to background noise levels may be more appropriate.

2.3 British Standard BS 4142:2014+A1:2019

British Standard BS 4142:2014 "Method for rating and assessing industrial and commercial sound" is a tool widely used by local authorities to determine whether a new industrial noise source is likely to give rise to complaint from people living in the vicinity.

The standard is complicated, but basically it sets out a method of assessing the impact of measured or calculated noise, based on the difference between the "rating level" of the noise and the "background noise level" (L_{A90}) that would otherwise exist in the absence of the noise. The "rating level" is derived by adding any correction that is necessary, due to certain characteristics of the noise to the "specific noise level".

The "specific noise level" is the equivalent continuous A-weighted sound pressure level (L_{Aeq}) of the noise, at the assessment position, over a time period specified in the standard. The assessment position must be outside the dwelling or other noise sensitive building affected by the noise and the measurements must be representative of the specific noise and the background noise level.

Where the noise has a tonal element e.g. whine, hiss, screech, hum etc., or contains distinct impulses such as bangs, clicks, clatters, or thumps etc, the standard recommends that, an adjustment of between 2 to 9dB is added to the "specific noise level" to give a "rating level".

The standard provides an assessment by subtracting the background noise level from the rating level:

- A rating level 10dB or more above background is likely to be an indication of a significant adverse impact.
- A rating level 5dB above background is likely to be an indication of an adverse impact.

The standard requires that the significance of the sound depends both upon the margin by which the rating level exceeds the background sound level and the context in which the sound occurs.

2.4 Conditions imposed by the Local Authority

Joanna Hart, Senior Environmental Protection Officer at Babergh & Mid-Suffolk District Councils, has requested a noise assessment to accompany the application. Stipulating:

> *"No mechanical plant shall be externally installed at the site (including Air Source Heat Pumps, air handling plant or other noisy plant) until such time as a full acoustic assessment relating to the background noise and predicted plant noise from the site shall be undertaken. This assessment shall be carried out by a competent person. The assessment shall have been made in accordance with the current version of British Standard 4142 and confirmation of the findings of the assessment and any recommendations shall have been*

submitted to and approved by the Local Planning Authority prior to the installation of any such equipment.

Reason: to minimise detriment to nearby residential amenity."

3 DETAILS OF THE PROPOSED OPERATION

3.1 Site description and nearest noise sensitive premises

The proposed site is a group of 6 conjoined agricultural buildings 35m South of Parsonage Green Farm farmhouse on the outskirts of the village of Cockfield.

The next nearest noise sensitive premises is The Old Rectory, located within extensive grounds which share a boundary with Parsonage Green Farm. However, this boundary is separated from the dwelling known as The Old Rectory by approximately 70m of woodland and a horseshoe shaped 20m wide pond before the boundary of one of the extensive gardens. We have read the submitted Technical Note commissioned by the owners of The Old Rectory and whilst we agree with much of what it contains, we do not agree that the noise assessment point should be at the boundary with Parsonage Green Farm. This is because the whilst the approximately 10,000m^2 woodland is "amenity land" nuisance is defined as *"an inconvenience materially interfering with the ordinary comfort, physically, of human existence, not merely according to elegant or dainty modes of living, but according to plain and sober and simple notions amongst English people." [Walter v Selfe (1851)]* Thus, it is entirely reasonable for the residents of The Old Rectory to want to sit on their lawn next to their pond and enjoy the peace and tranquillity of their rural home. It is not reasonable to expect to be able to sit at the edge of a 70m wide strip of woodland next to a farmyard with permitted and unrestricted agricultural use, including machinery and deliveries by heavy vehciles and expect the same tranquillity.

Figure 1 - Site location and nearest receptors ©GoogleEarth

Figure 1 shows the location of the site and the nearest noise sensitive receptors. The closest is the Parsonage Green Farm farmhouse whose façade is approximately 35m north of the nearest proposed workshop building, although this is associated with the site, we have provided an assessment based upon a point at the farmhouse garden boundary, shown with a blue star in Figure 1. The next nearest receptor is The Old Rectory and we have provided an assessment at a point at the edge of the garden shown with a blue star in Figure 1. We have also provided an assessment for the woodland boundary with the site at a point shown with a red star in Figure 1.

The proposed site layout is shown in Figure 2. Four of the buildings will be retained for agricultural use, mainly for the storage and repair of farm machinery, although there is

a building on the boundary used for firewood storage which will also provide some useful attenuation for The Old Rectory.

Figure 3 to Figure 10 show the existing buildings and their proposed uses. Figure 11 and Figure 12 show the current use of the proposed finishing workshop as a woodworking workshop with a number of woodworking machines and dust extraction systems. We understand that this has been in use for a number of years without complaint.

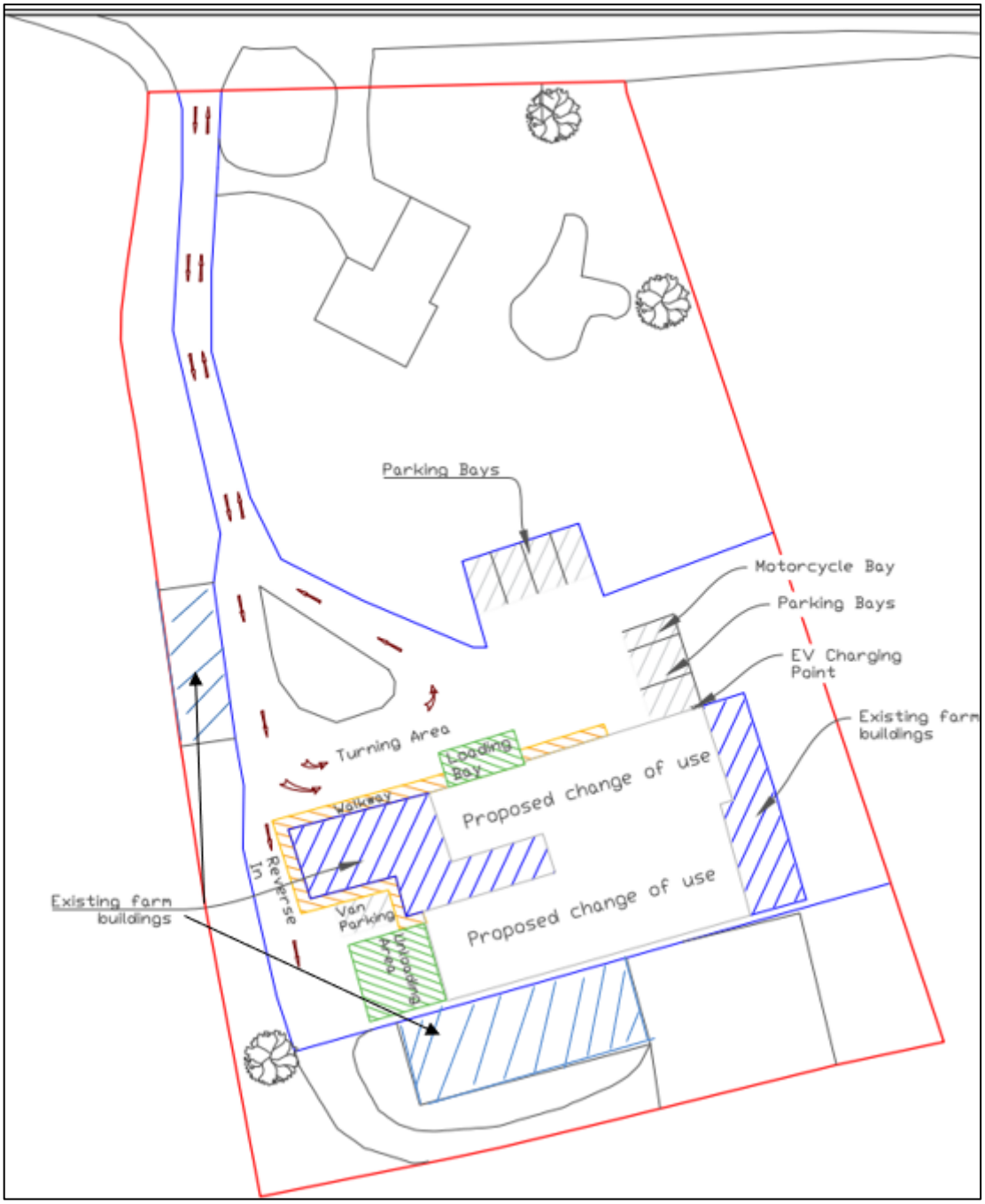


Figure 2 – Site Layout

Figure 3 – View of existing buildings and proposed uses

Figure 4 – View of existing buildings and proposed uses

Figure 5 – View of existing buildings and proposed uses

Figure 6 – View of existing buildings and proposed uses

Figure 7 – View of existing buildings and proposed uses

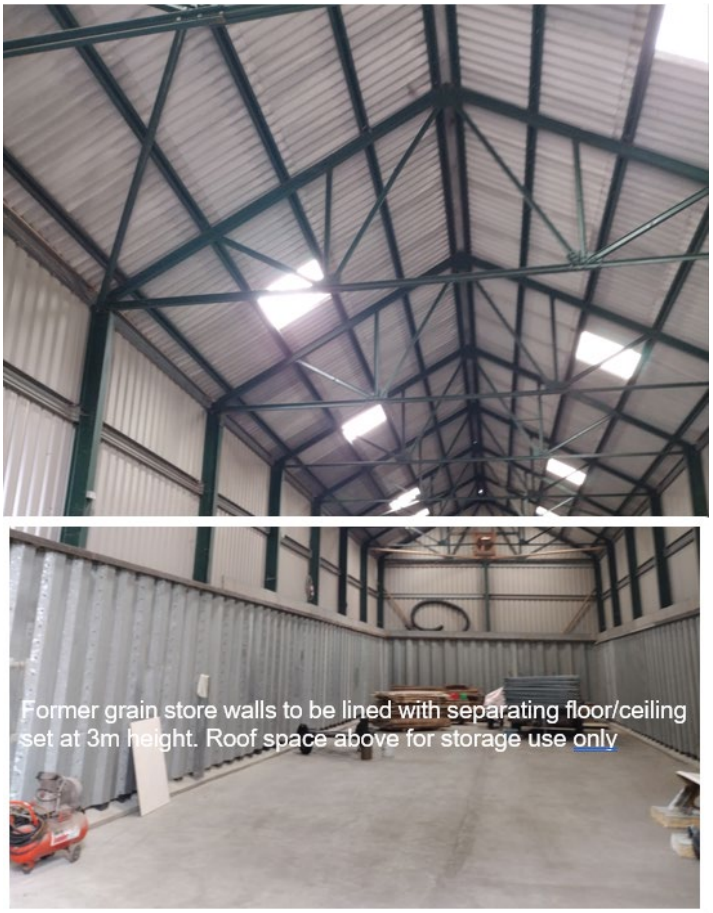


Figure 8 – Interior of former grain store

Figure 9– View of buildings remaining as agricultural use.

Figure 10– View of agricultural building and farmhouse

Figure 11- Proposed finishing workshop current use

Figure 12 – Proposed finishing workshop current use

3.2 Proposed noise control measures

The buildings will be refurbished with some changes made to walls and roofs.

3.2.1 Grain Store

The steel-clad grain store will contain the main workshop with a band saw, cross cutter, over/under planer, panel saw and overhead router along with workbenches. The workshop will have a ceiling height of 3m and this will be formed within the grain store by the installation of a timber deck. 9mm OSB will be laid on 200x47mm C24 joists to form a light storage space above the workshop. 190mm thick mineral wool laid between the joists and 2 layers of 15mm thick dense plasterboard (staggered joints) will be fixed to underside of the joists to form the ceiling.

The walls will have an independent wall lining consisting of 47x150mm C24 studs set at least 20mm from the steel wall with 140mm thick mineral wool laid between the studs. One layer of 18mm OSB fixed to the studs with a final covering of 15mm thick dense plasterboard.

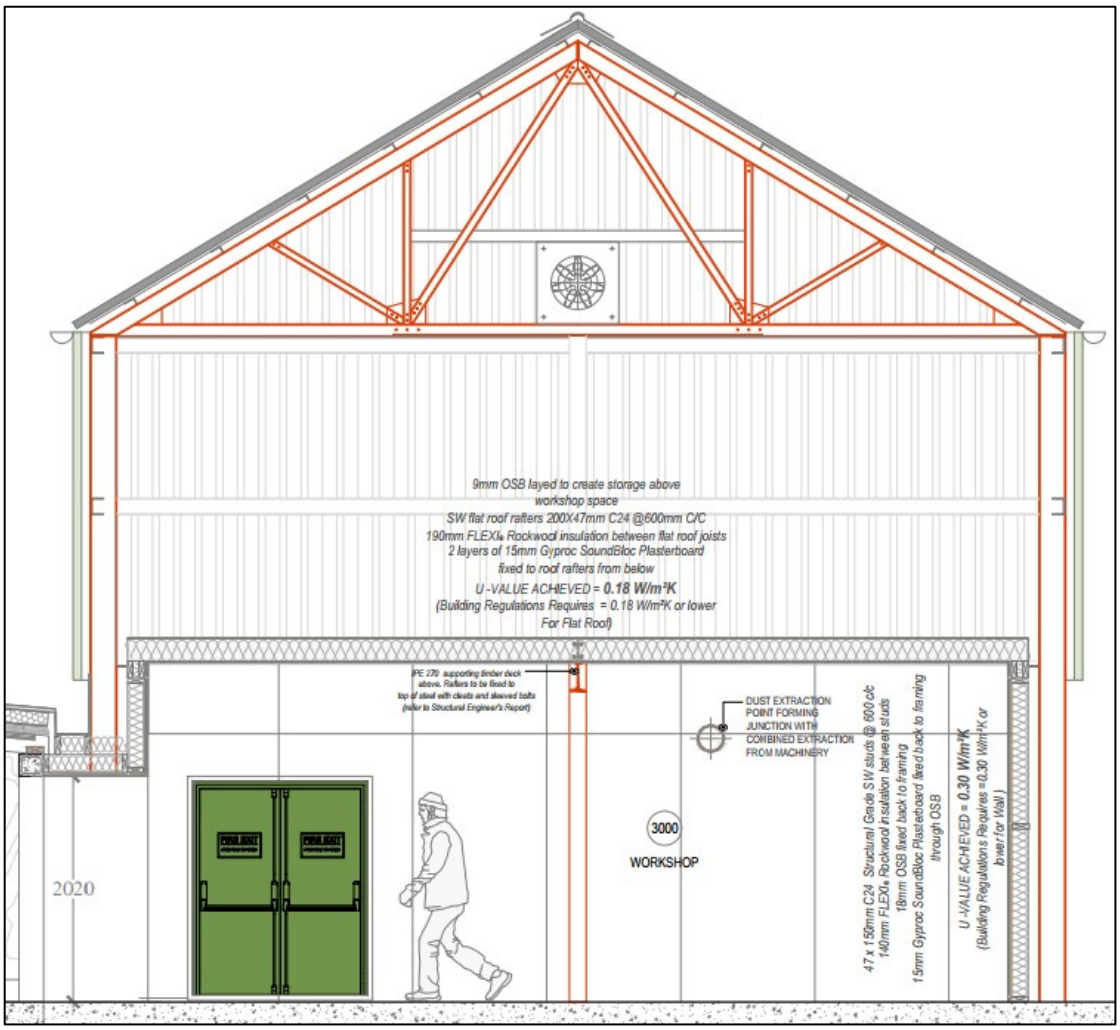


Figure 13 -Main workshop section

In addition to these noise control measures, there will be a lobby in front of the main doors that face The Old Rectory boundary. This lobby will be used for timber storage

and a separating wall using the same specification as the internal wall liner with additional 18mm OSB sheathing on the side facing the storage lobby .

Dust extraction will be located at the rear of the main workshop in the lean-to area furthest away from the boundary with The Old Rectory an benefiting from the buildings barrier affect.

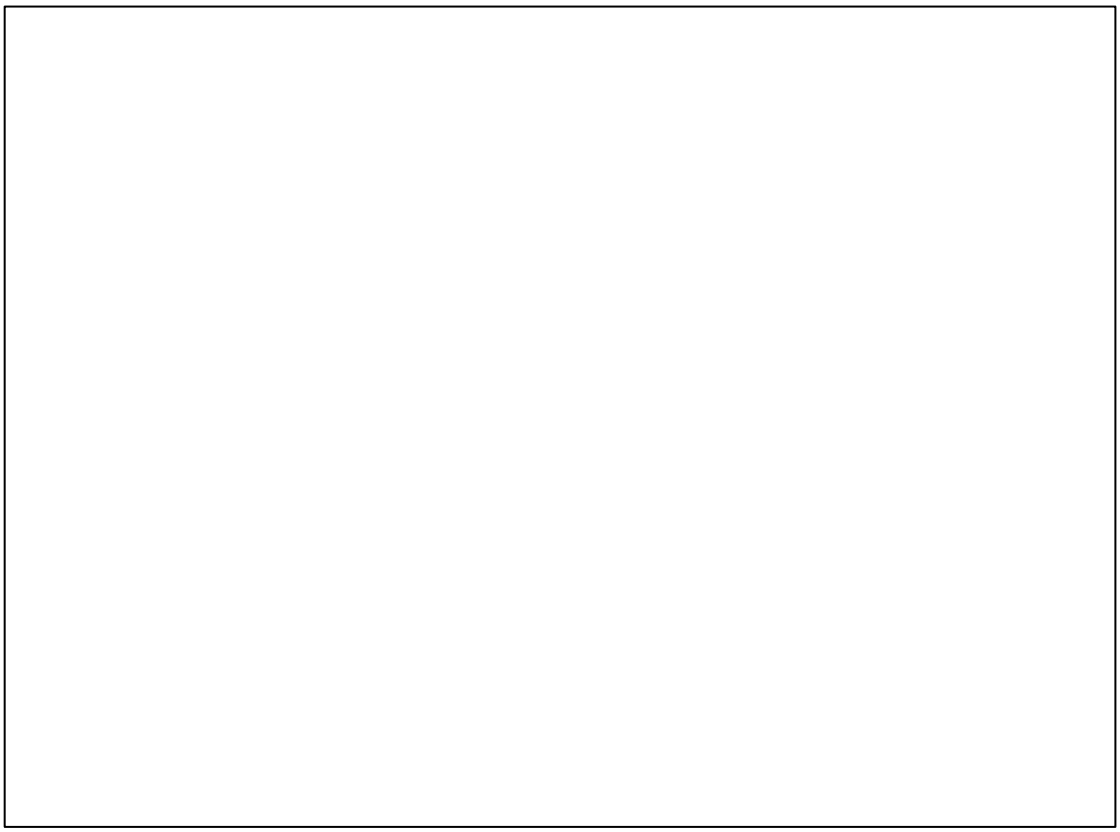


Figure 14- Main workshop plan view showing stock room lobby

Figure 15 – Dust extraction unit

3.2.2 Finishing Workshop and Showroom

The existing asbestos roof covering will be replaced with Eternit 6 fibre cement corrugated sheeting. 44x200mm C24 rafters fixed to the purlins with 200mm mineral wool laid between the rafters. Hardrock Multi-Fix 50mm fixed to the underside of the rafters with 2 layers of 15mm thick dense plasterboard forming the ceiling.

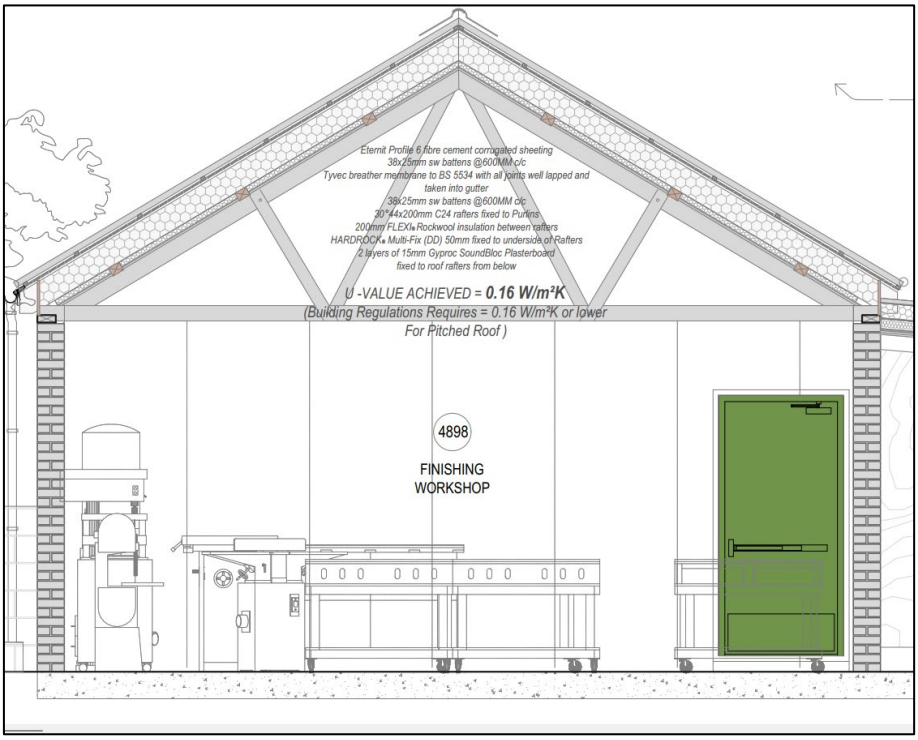


Figure 16 - Finishing workshop Section

3.2.3 Kiln & lathe room, office area and paint shop

The flat roof between the finishing workshop and the main workshop consists of Tata Trisomet composite roof panels with 80mm thick mineral wool fitted loose in the cavity. 2 layers of 15mm thick dense plasterboard fixed to resilient bars on the underside of the purlins.

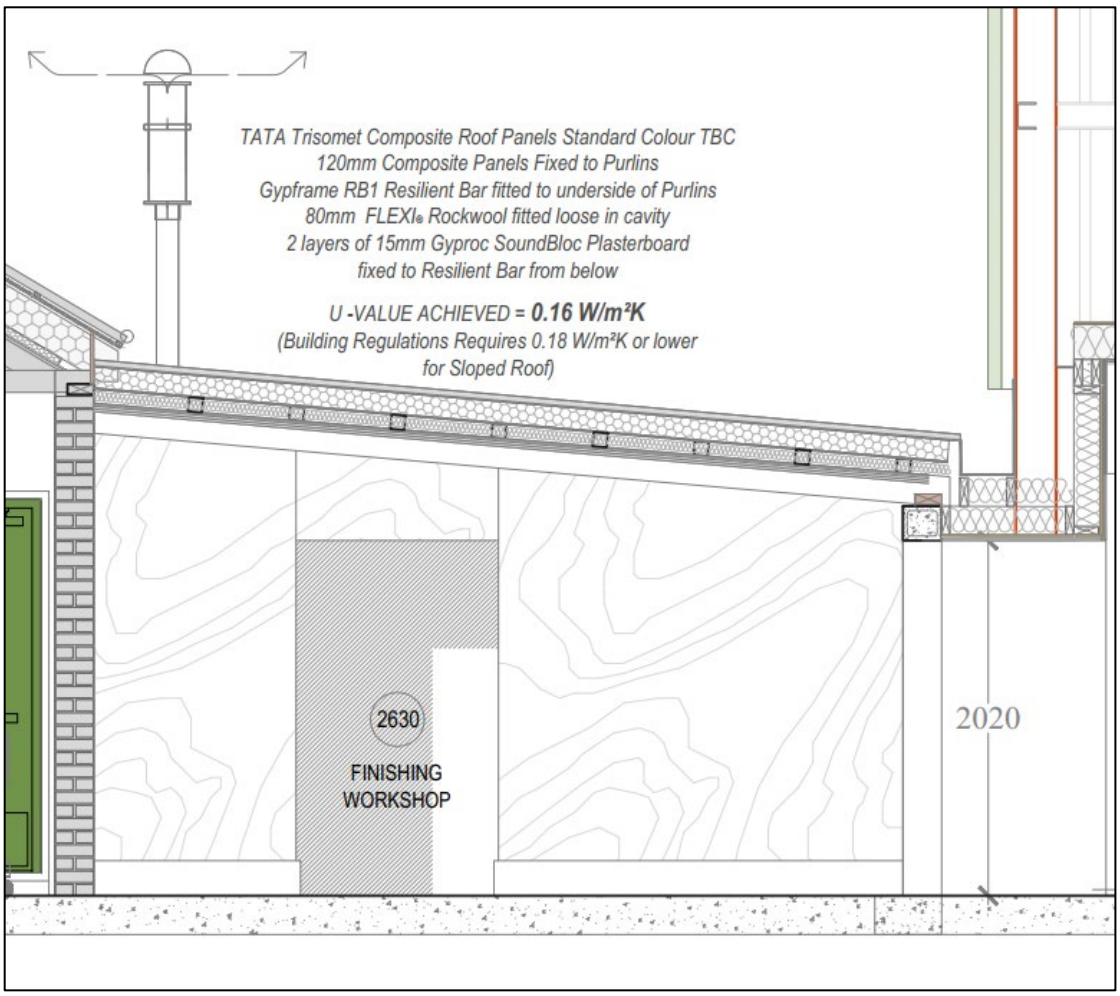


Figure 17 – Flat roof section

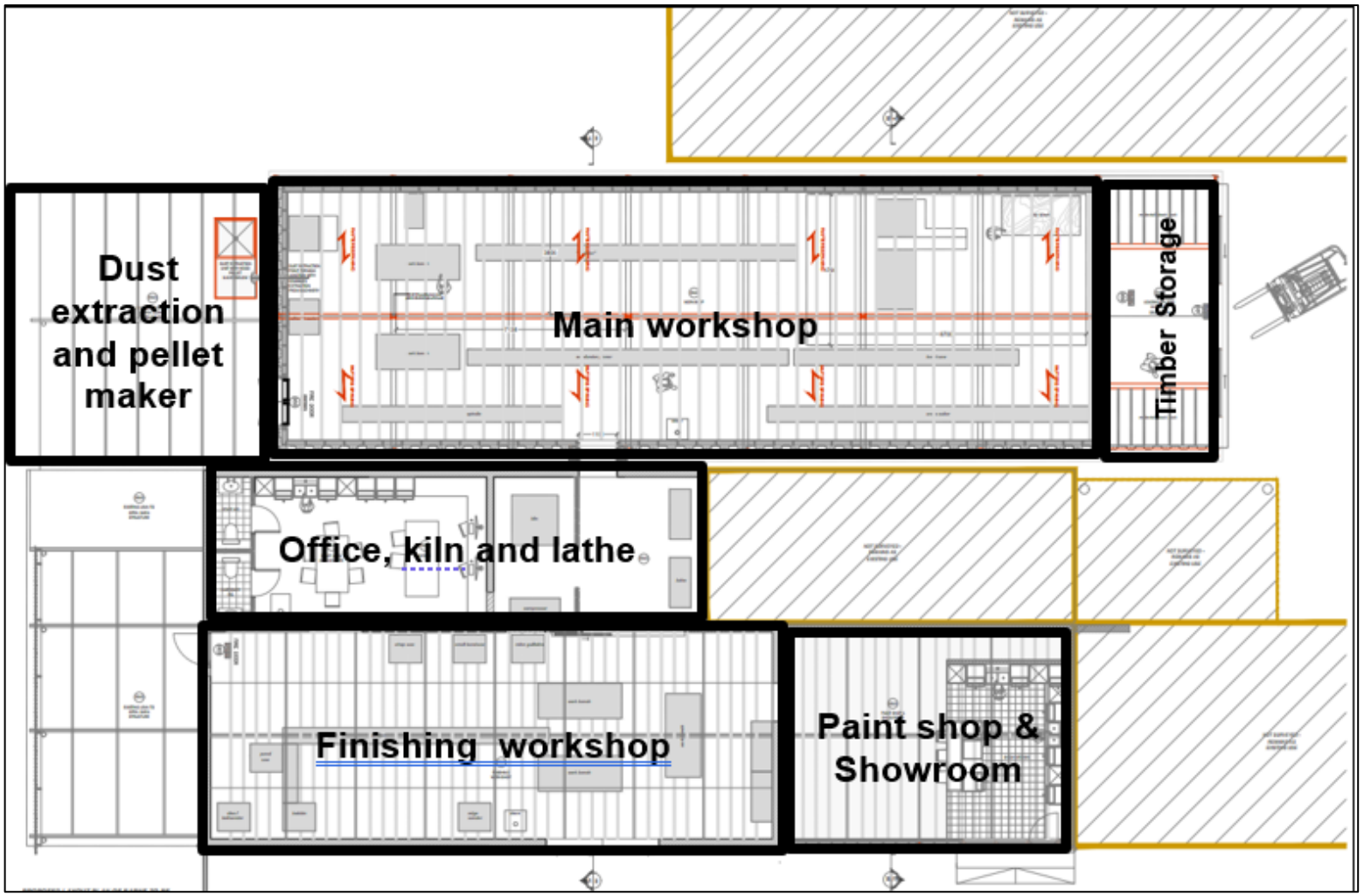


Figure 18 – Plan view

3.2.4 Boundary with The Old Rectory woodland

Due to the location of the delivery area, we recommend the installation of a 2m high barrier as indicated in Figure 19. The barrier should have no holes or gaps and have a minimum surface density of 10kgm^2. For example, a close boarded timber fence.

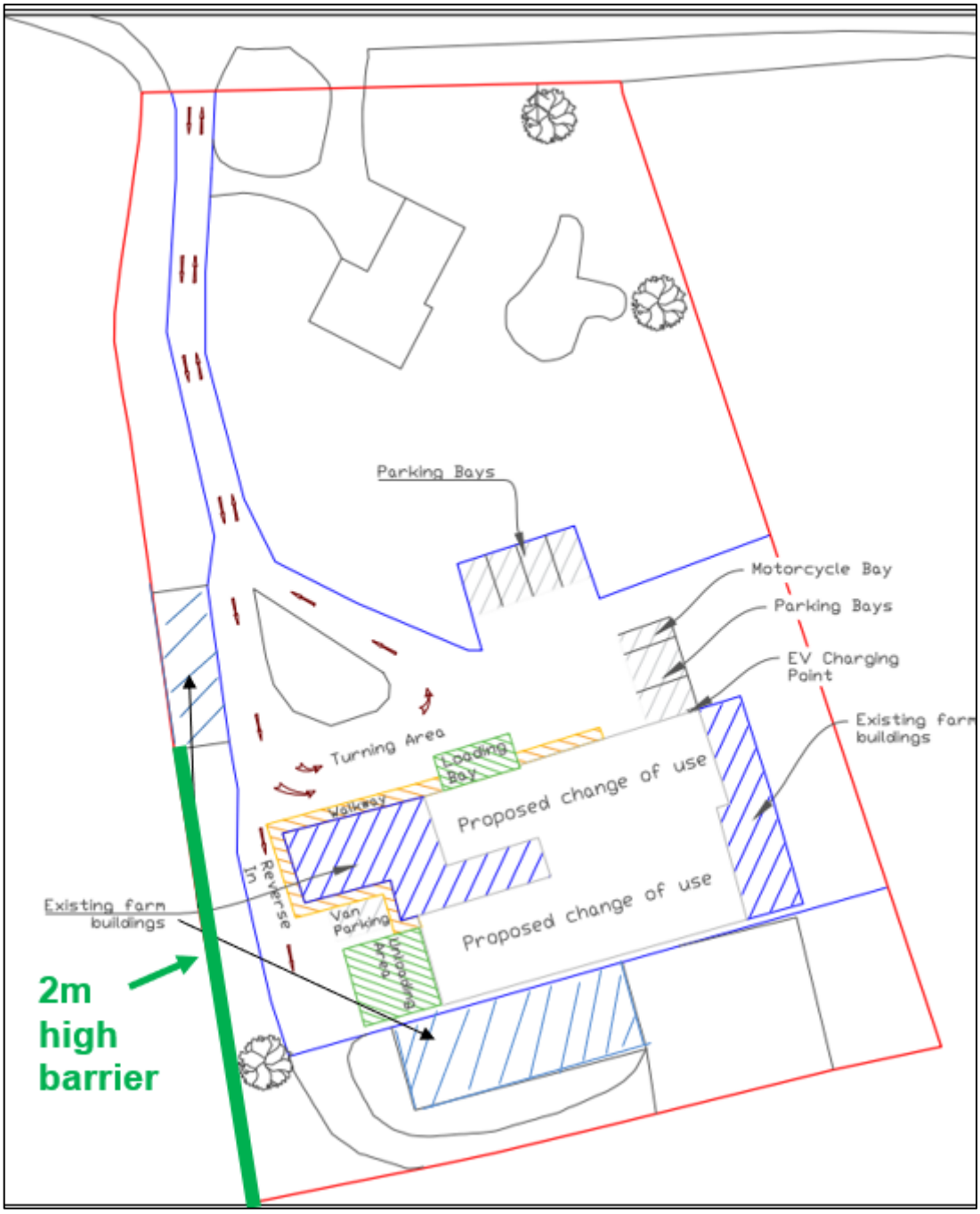


Figure 19 – Location of proposed barrier

3.3 Hours of operation

We understand that the normal operating hours of the site would be 07:00hrs to 18:00hrs Monday to Friday and 07:00hrs to 14:00hrs on Saturday. No working on Sunday or Bank Holidays.

3.4 Noise sources on site

Noise sources will be the use of woodworking machines, dust extraction and deliveries/despatches. We have undertaken on-site measurements at the existing workshop in Lavenham. We understand that as a custom joinery operation rather than a mass manufacturer with delivery of materials no more than twice a week and despatches less than once a week.

4 BACKGROUND SOUND SURVEY

4.1 Methodology

We undertook a noise survey by installing an unattended sound level meter at the location shown in Figure 20. The microphone was mounted on a tripod at a height of 1.5m in free-field conditions. Weather conditions were suitable for taking sound level measurements i.e dry with light winds. The equipment was left in place from Friday 30th June 2023 to Wednesday 5th July 2023. Details of the survey, personnel and equipment are listed in Appendix B of this report.

Figure 20 – Background sound measurement position (GoogleEarth©)

4.2 Results

BS 4142:2014 states that the representative background sound levels can be obtained from a series of either sequential or disaggregated measurements of not less than 15 minutes and that the level ought to not automatically assume to be either the minimum or modal value.

Figure 21 shows the statistical distribution of the hourly background sound levels during operational hours. These range from 33 to 56 dB $L_{AF90,1hr}$ although 56 dB was an outlier with the majority of the values between 36 and 39 dB. The graph tends towards a normal distribution and in this case we consider the modal value of 38dB $L_{AF90,1hr}$ to be the representative background sound level for the purposes of the

BS4142:2014 assessment at the Parsonage Green Farmhouse. These levels are very similar to those measured at The Old Rectory by Sharps Redmore in their technical note and so we consider 38dB $L_{AF90,1hr}$ to be the representative background noise level for the purposes of the BS4142:2014 assessment at The Old Rectory.

Figure 21 - Statistical distribution of background sound levels (operational hours)

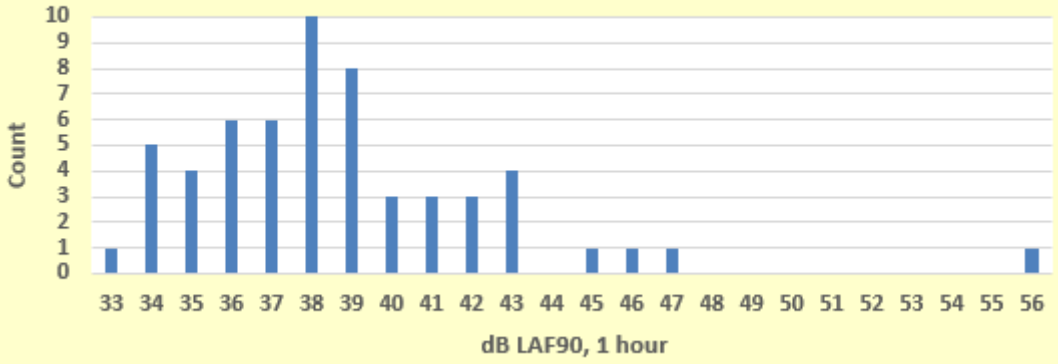


Figure 22 shows the statistical distribution of the hourly background sound levels during the evening – 18:00hrs to 23:00hrs. These range from 27 to 50 dB $L_{AF90,1hr}$ although the majority of the values were between 35 and 38 dB. The graph tends towards a normal distribution and in this case we consider the modal value of 37dB $L_{AF90,1hr}$ to be the representative background sound level for the purposes of the BS4142:2014 assessment at the Parsonage Green Farmhouse and The Old Rectory.

Figure 22 – Statistical distribution of background sound levels 18:00hrs to 23:00hrs

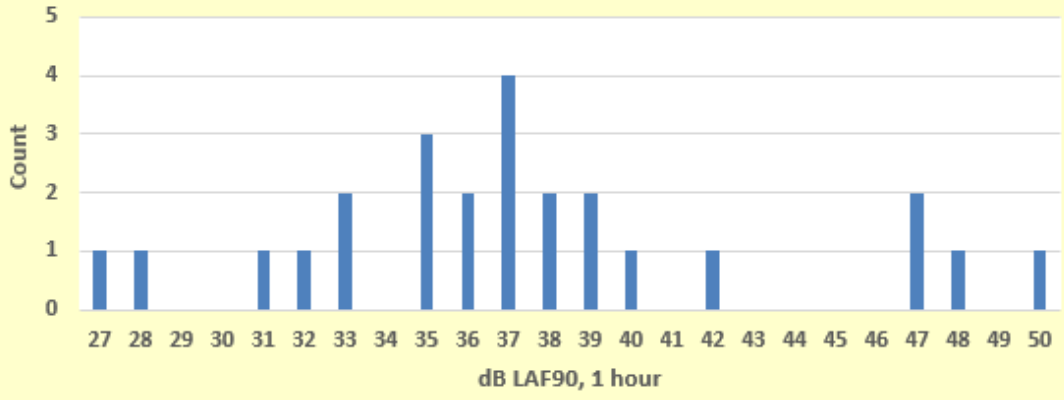


Figure 23 shows the statistical distribution of the hourly background sound levels during the night – 23:00hrs to 07:00hrs. These range from 20 to 50 dB $L_{AF90,1hr}$ although the majority of the values were between 23 and 30 dB. In this case, as the night time levels fall quite significantly in the middle of the night as is typical of rural areas, we consider 24dB $L_{AF90,1hr}$ to be the representative background sound level for the

purposes of the BS4142:2014 assessment at the Parsonage Green Farmhouse and The Old Rectory.

Figure 23 – Statistical distribution of background sound levels 23:00hrs to 07:00hrs

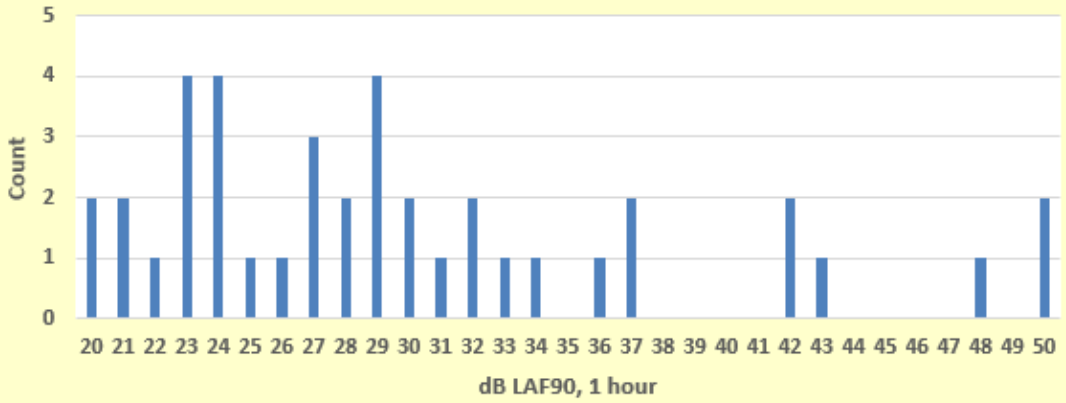
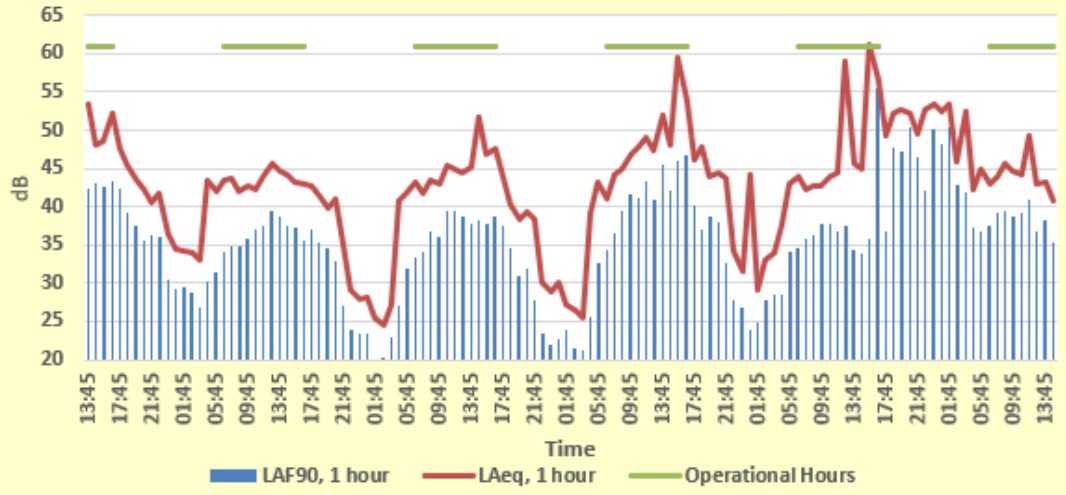


Figure 24 – Level v Time history background sound survey Parsonage Green Farm



4.2.1 Summary of background sound levels

Table 2 shows the representative background sound levels used in the assessment.

Time period	Background sound level
Operational Hours 07:00hrs to 18:00hrs	38 dB $L_{AF90,\ 1\ hour}$
Evening 18:00hrs to 23:00hrs	37 dB $L_{AF90,\ 1\ hour}$
Night 23:00hrs to 07:00hrs	24 dB $L_{AF90,\ 15\ minutes}$

Table 2 – Representative background sound levels

5 SPECIFIC SOUND SURVEY

5.1 Methodology

We undertook a noise survey by installing an unattended sound level meter at the location shown in Figure 25. The microphone was mounted on a tripod at a height of 2.4m in free-field conditions This height was chosen as it was in a location opposite the main barn doors to the workshop (12m), secure and away from any risk of accidental damage. Weather conditions were suitable for taking sound level measurements i.e dry with light winds. The equipment was left in place from Wednesday 12th July 2023 to 08:00hrs on Friday 14th July 2023 before high winds and rain were forecast. The sound level meter had a continuous audio recording facility which allowed us to post process the results and identify any noise attributable to the operation, such as woodworking machinery and vehicle movements.

In addition to the unattended measurement, we took a series of measurements around the site on Wednesday 12th July 2023 of various activities.

Details of the survey, personnel and equipment are listed in Appendix B of this report.

Figure 25 - Specific sound level unattended measurement position Google Earth©

Figure 26 -- Specific sound level unattended measurement position

5.2 Description of noise sources

5.2.1 Main workshop

The main workshop is located in a large barn with a variety of sanders, saws and routers (see Figure 28 to Figure 31Figure 32).

The reverberant level within the shop was 70.2 dB $L_{Aeq,8\ minutes}$ with the larger and loudest machines running. Due to the nature of the work and the spacing between the machines and workbenches, all the machines running at the same time and on a continuous basis is not possible and the use of the machines is sporadic. Thus, the noise level within the shop fluctuates between short bursts of loud wood cutting machines with longer periods where the shop radio is the loudest source of noise. It should be noted that the reverberant level within the shop will be lower to that experienced at the operators' ear and this report is an environmental noise assessment not a noise at work assessment. Figure 27 shows the 1/3 octave band measured noise levels.

Figure 27 – Main workshop reverberant level

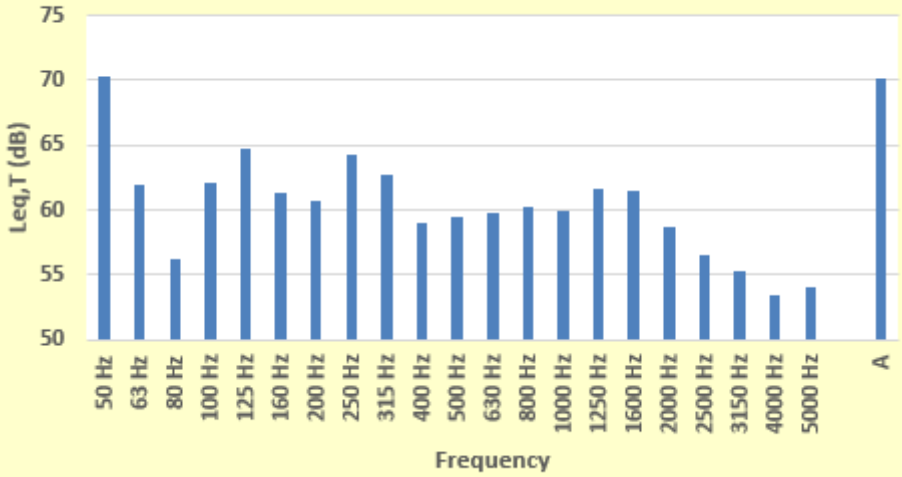


Figure 28 - Main workshop

Figure 29 - Main workshop

Figure 30 - Main workshop

Figure 31 - Main workshop

Figure 32 - Small workshop in loft above main workshop

5.2.2 External dust extraction unit

The dust extraction unit is located on the northern façade (see Figure 34) and was not audible at the front of the building, a measurement was made 1m from the doors to this unit. The noise was broadband and steady at 64.4 dB L_{AeqT}. Figure 33 shows the 1/3 octave band measured noise levels.

Figure 33 – 1m from external duct extraction unit

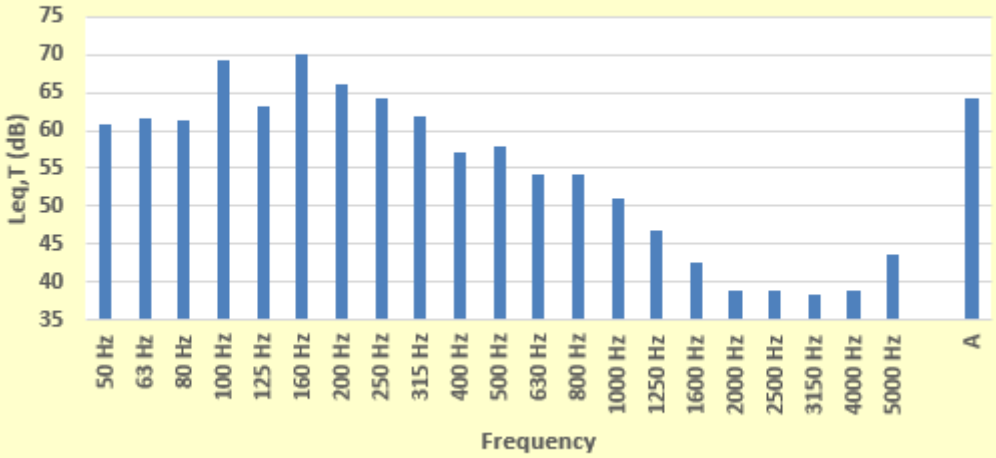


Figure 34 - Dust extraction units at rear of main workshop

5.2.3 Machine shop

The machine shop is located in a separate building located 30m to the West of the main workshop as shown in Figure 25. This shop is used to undertake the initial cutting and shaping of component parts for kitchen cabinets and other custom joinery. (See Figure 36 to Figure 38). We understand that due to the bespoke nature of the business, this shop is not used every day or even for long periods of time during the days that it is used.

The reverberant level within the shop was 79.2 dB $L_{Aeq,8\ minutes}$ with the machines running. Due to the nature of the work and the spacing between the machines, all the machines running at the same time and on a continuous basis is not possible and the use of the machines is sporadic. Thus, the noise level within the shop fluctuates between short bursts of loud wood cutting machines with longer periods with little noise as machines are set up or wood prepared for the next cut. Figure 35 shows the 1/3 octave band measured noise levels.

Figure 35– Machine shop reverberant level

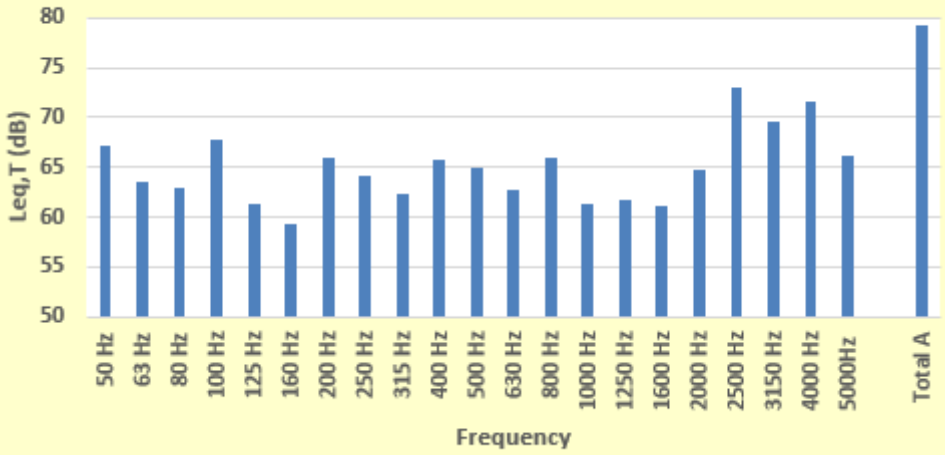


Figure 36 - Machine shop

Figure 37 - Machine shop

Figure 38 - Machine shop

5.2.4 Unattended measurement results

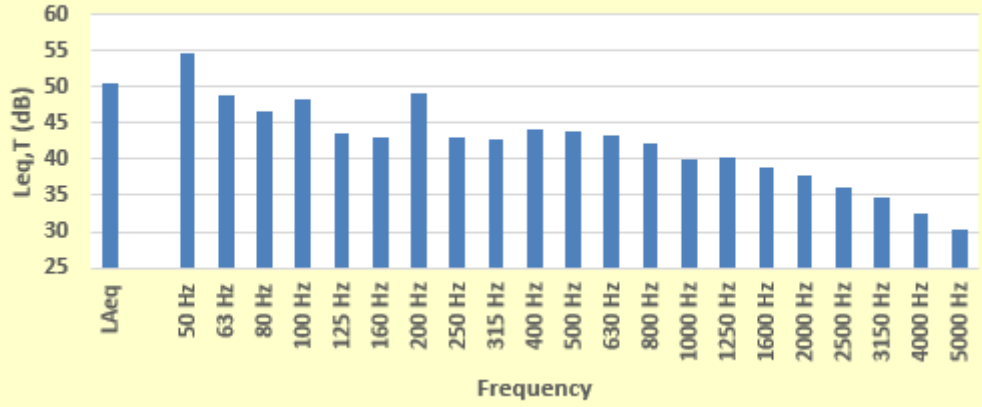
By listening to the audio trace and isolating those sounds that were identifiable as related to the main workshop we have obtained the following activity levels.

Woodworking machines

We identified 31 events spread over the 2-day period where the characteristic sound of woodcutting was heard at the microphone located 12m from the barn door of the main workshops. Most events were of less than a minute duration with the total duration of all such events over 2 days was 31 minutes.

The measured level at 12m from the main workshop door was 50.6 dB $L_{Aeq,31\ minutes}$. Figure 39 shows the 1/3 octave band measured noise levels.

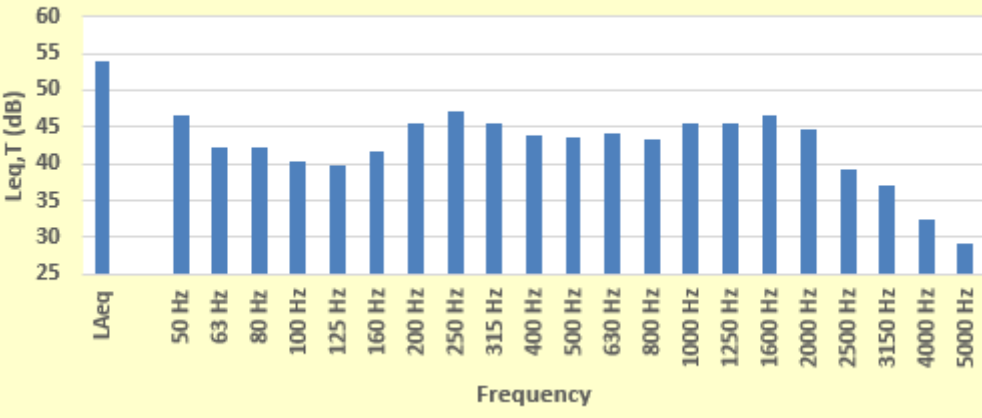
Figure 39 – Woodworking machine noise 12m from main shop



Hammering

There were just 5 occasions on the 12th July 2023 between 11:39hrs and 11:58hrs when impact noise was heard. The impact noise was identifiable as a hammer or mallet, possible used when assembling components. The total duration of these events was 1 minute 35 seconds. The measured level at 12m from the main workshop door was 54.1 dB $L_{Aeq,T}$. Figure 40 shows the 1/3 octave band measured noise levels.

Figure 40 – Hammering noise 12m from main shop

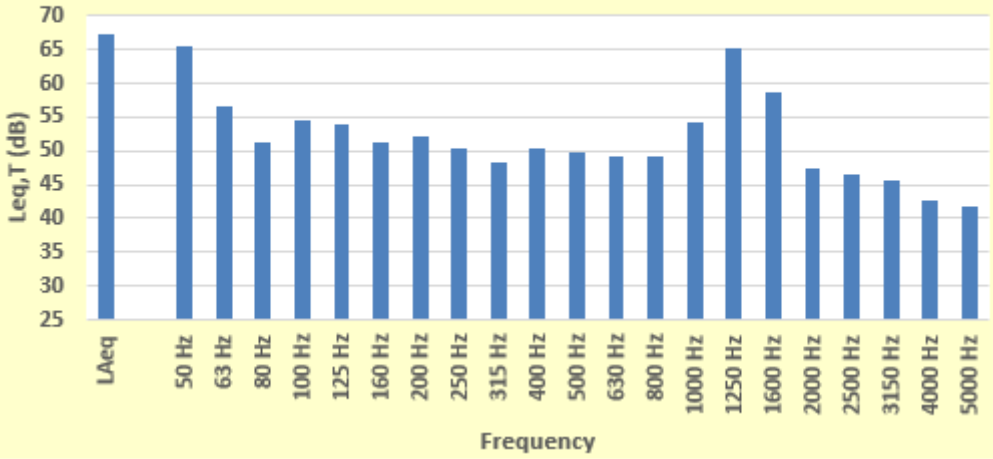


Delivery/dispatch

We identified 3 events, 1 on the 12th and 2 on the 13th where the sound of diesel vehicles manoeuvring close to the measurement position were heard. Noise included engine noise, reversing alarms and some impact noise. However, the event of the 12th was of only 56 seconds duration and its possible that this event was related to another business located on the site. The total duration of the first event was 23 minutes and the second 29 minutes.

The measured level at an assumed distance of 6m from the measurement position was 67.3 dB $L_{Aeq,53\ minutes}$. Figure 41 shows the 1/3 octave band measured noise levels.

Figure 41 – Delivery/despatch to main workshop



Background Sound Levels

Figure 42 shows the statistical distribution of the 15 minute background sound levels during operational hours. These range from 34 to 47dB $L_{AF90,15\ minutes}$ although 44 and 47dB were outliers with the majority of the values between 35 and 41dB with 38dB $L_{AF90,15\ minutes}$ occurring more frequently. The background sound level during operational hours at the Lavenham Joinery site is remarkably similar to that at the Parsonage Green Farm Site and indicates that the operation of the joinery has little effect upon the background sound levels.

Figure 42- Statistical distribution of background sound levels (operational hours)

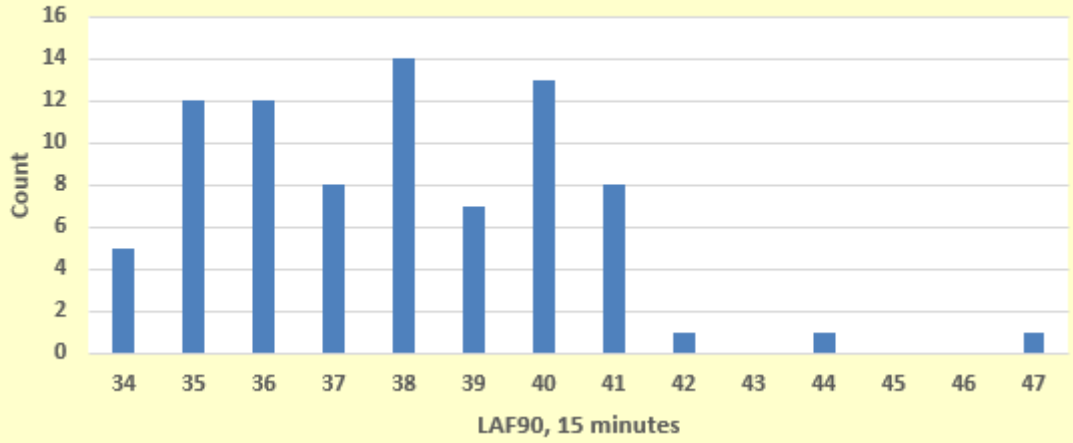


Figure 43 shows the statistical distribution of the 15 minute background sound levels during the evening – 18:00hrs to 23:00hrs. These range from 20 to 36 dB $L_{AF90,15\ minutes}$ although the majority of the values were between 29 and 35 dB. The graph tends skew right and in this case we consider the value of 31dB $L_{AF90,15\ minutes}$ to be the representative background sound level which is 6dB lower than that at the Parsonage Green Farmhouse and The Old Rectory.

Figure 43 - Statistical distribution of background sound levels (18:00hrs to 23:00hrs)

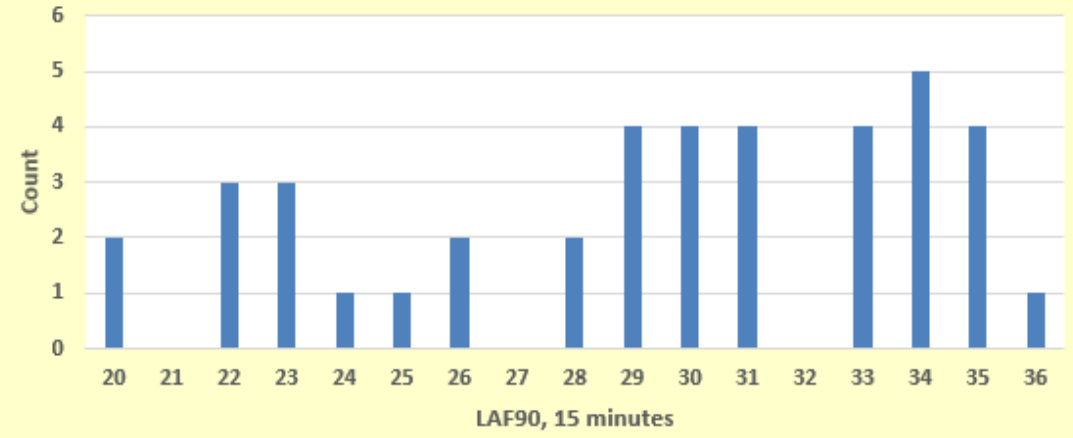
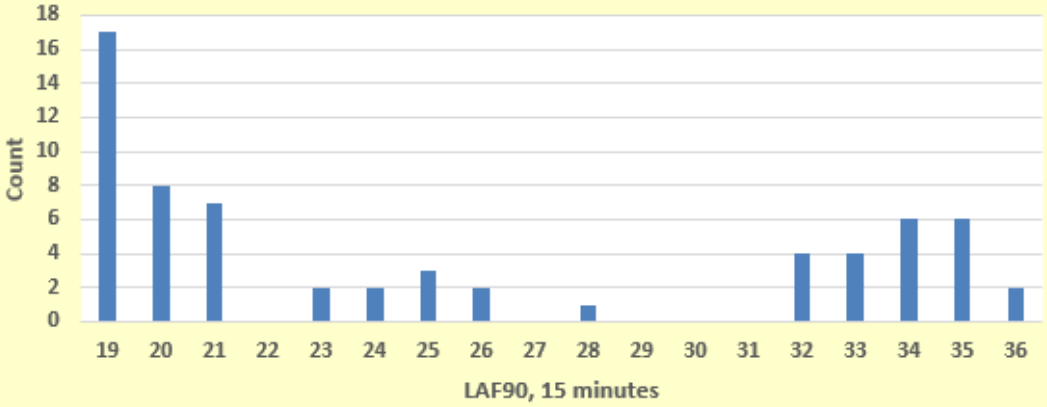


Figure 44 shows the statistical distribution of the 15-minute background noise levels during the night – 23:00hrs to 07:00hrs. These range from 19 to 36 dB $L_{AF90,15\ minutes}$. The graph is skewed left and in this case, as the night time levels fall quite significantly in the middle of the night as is typical of rural areas, we consider 24dB $L_{AF90,15\ minutes}$ to be the representative background noise level which is the same value for the purposes of the BS4142:2014 assessment at the Parsonage Green Farmhouse and The Old Rectory.

Figure 44- Statistical distribution of background sound levels (23:00hrs to 07:00hrs)



6 CALCULATED SPECIFIC SOUND LEVELS

6.1 Assumptions, limitations and accuracy

The proposed light industrial use is for a bespoke kitchen and cabinet maker currently operating in a converted agricultural building at Frogs Hall Road, Lavenham. We understand that the proposed site will be used in the same manner as the current site in Lavenham. The unattended survey at the existing site set out in Section 5 above shows that very little noise can be attributed to the activities on site with 33 minutes of workshop noise and 53 minutes of delivery/despatch noise audible over the 2-day period of the survey.

However, there have been concerns raised regarding an increase in production and although we understand from our client that this is not the case, we have made some worst-case assumptions in order to provide a robust assessment.

We have assumed a constant noise level over the full 1-hour assessment period within both the main workshop and the finishing workshop using the highest reverberant level measured within the current machine shop.

We have assumed that noise from deliveries will take place over 45 minutes of the 1-hour assessment period and 20 minutes out of the 1-hour period for despatches. This is because for much of the time the engine will be switched off during the loading of finished articles where fragile finishes have to be protected and items secured to prevent damage.

However, we have used the unlikely scenario that a delivery and a despatch will take place within the same hour whilst both workshops are working with machinery operating at the highest level consistently for the one-hour assessment period and the external dust collection is operating during the whole period.

As the site will only operate during the daytime, we have assumed that the primary concern will be the protection of amenity in residential gardens. We have therefore assumed a standard receiver height of 1.5 metres above ground level.

Element	Octave Band SRI (dB)						
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**
Main workshop ceiling	17.7	31.1	44.0	52.1	59.7	58.0	62.3
Main workshop walls	31.0	43.0	55.0	65.0	73.0	75.0	75.0
Main workshop lobby interior wall	16.7	37.9	47.2	52.9	58.3	59.2	55.8
Finishing workshop roof	31.0	43.0	55.0	65.0	73.0	75.0	75.0
Finishing workshop walls	34.0	41.0	45.0	48.0	56.0	65.0	69.0
Hardwood doors 66mm thick	22.0	24.0	26.0	33.0	38.0	41.0	46.0

Table 3- Sound insulation values used in calculation.

Typically, we would expect the accuracy of this type of assessment to be in the order of +/- 3dB(A), primarily due to uncertainties about the precise noise emissions from the site, conservative estimates of the sound insulation performance of the building envelopes and the calculation methodology – ISO 9613-2. Because of these uncertainties, however, we have tended to use worst case assumptions as discussed above.

6.2 Calculated noise levels

The calculated noise levels are shown in Table 4. This includes all the sources operating during the 1 hour assessment period.

Receptor	Specific noise level dB $L_{Aeq,1\ hour}$
Garden boundary of Parsonage Green Farmhouse	43
Garden boundary of The Old Rectory	29
Woodland 5m from boundary with site	42

Table 4- calculated specific sound levels.

7 BS4142:2014+A1:2019 ASSESSMENT

As the noise from the site has some tonal (a small amount of reversing alarms was heard and thus a 2 dB penalty for a tone which is just perceptible at the receptor could be applied) and intermittent but not readily distinctive against the residual acoustic environment (the background sound levels at the current site are equal to the background sound levels at the proposed site), we have applied a +5dB penalty to the specific sound level.

Receptor	Specific noise level	Rating Level	Background Sound Level	Rating over Background	Initial risk assessment	Assessment considering context
Garden boundary of Parsonage Green Farmhouse	43 dB $L_{Aeq,1\ hour}$	48 dB L_{Ar}	38 dB $L_{AF90,\ 1hour}$	+10 dB	Significant Adverse impact	Low impact
Garden boundary of The Old Rectory	29 dB $L_{Aeq,1\ hour}$	34 dB L_{Ar}	38 dB $L_{AF90,\ 1hour}$	-4 dB	Low impact	Low impact
Woodland 5m from boundary with site	42 dB $L_{Aeq,1\ hour}$	47 dB L_{Ar}	38 dB $L_{AF90,\ 1hour}$	+9 dB	Adverse impact	Low impact

Table 5 – Assessment

The initial assessment indicates that noise from the site will have a significant adverse impact on Parsonage Green Farmhouse, an adverse impact on the nearest section of the woodland to the site boundary and a low impact upon The Old Rectory.

However, the standard states:

"Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration, including the following:

1) *The absolute level of sound. For a given difference between the rating level and the background sound level, the magnitude of the overall impact might be greater for an acoustic environment where the residual sound level is high than for an acoustic environment where the residual sound level is low. Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night. Where residual sound levels are very high, the residual sound might itself result in adverse impacts or significant adverse impacts, and the margin by which the rating level exceeds the background might simply be an indication of the extent to which the specific sound source is likely to make those impacts worse.*
2) *The character and level of the residual sound compared to the character and level of the specific sound. Consider whether it would be beneficial to compare the frequency spectrum and temporal variation of the specific sound with that of the ambient or residual sound, to assess the degree to which the specific sound source is likely to be distinguishable and will*

represent an incongruous sound by comparison to the acoustic environment that would occur in the absence of the specific sound. Any sound parameters, sampling periods and averaging time periods used to undertake character comparisons should reflect the way in which sound of an industrial and/or commercial nature is likely to be perceived and how people react to it. NOTE 3 Consideration ought to be given to evidence on human response to sound and, in particular, industrial and/or commercial sound where it is available. "

In this case a rural environment with farm vehicles operating in the surrounding fields (the grain store forming the main workshop would have had frequent visits from both tractor/trailer units and HGV's) and the current use of the retained agricultural buildings for farm machinery maintenance, the noise will not be as incongruous as the +5dB penalty may suggest.

1) Parsonage Green Farmhouse is currently associated with the site and could be considered as a non-sensitive receptor. The Senior Environmental Protection Officer has noted this and asked for a condition that the dwelling will not be separated from the site. Also, the Rating Level of 48dB LAr is below the 50dB $L_{Aeq,16hours}$ that BS 8233:2014 recommends for external amenity areas and given that the Rating Level is based upon the unlikely event that a delivery and a despatch will take place within the same hour whilst both workshops are working with machinery operating at the highest level consistently for the one-hour assessment period, actual noise levels are more likely than not to be significantly lower.
2) The assessment point in the woodland 5m from the site boundary can also be considered a non-sensitive receptor for the reasons set out in Section 3.1 of this report. Also, the Rating Level of 47dB LAr is below the 50dB $L_{Aeq,16hours}$ that BS 8233:2014 recommends for external amenity areas and given that the Rating Level is based upon the unlikely event that a delivery and a despatch will take place within the same hour whilst both workshops are working with machinery operating at the highest level consistently for the one-hour assessment period, actual noise levels are more likely than not to be significantly lower.

8 SUMMARY AND RECOMMENDATIONS

Our assessment indicates that, in a worst-case calculation, noise levels from the proposed use of the site will have a low impact upon the nearest non-associated noise sensitive receptor known as The Old Rectory.

The associated dwelling at Parsonage Green Farm has also been assessed as “low impact”. However, if this dwelling were to be separated from the site, noise control measures such as the installation of a noise barrier at the boundary of the garden and the site would reduce noise levels further.

With the installation of the recommended noise barrier described in Section 3.2.4 of this report, the woodland amenity area on the western boundary of the site will have levels well below the 50dB $L_{Aeq,16hours}$ that BS 8233:2014 recommends for external amenity areas.

Noise from the only external plant we are aware of – the dust extraction system located on the eastern end of the building under a lean-to roof has little influence on the received noise levels at the receptors. This is due to the shielding provided by the buildings and any additional plant should be located on this side of the building, preferably under the lean-to roof where walls or louvres can be installed if required. Any openings for ventilation on facades closer to the noise sensitive receptors should have either acoustic louvres or lined cowls.

The representative background sound levels are shown in Table 6 below, and if noise from any plant installed in the future does not exceed those background sound levels any adverse effects should be avoided.

Time period	Background sound level
Operational Hours 07:00hrs to 18:00hrs	38 dB $L_{AF90, 1\ hour}$
Evening 18:00hrs to 23:00hrs	37 dB $L_{AF90, 1\ hour}$
Night 23:00hrs to 07:00hrs	24 dB $L_{AF90, 15\ minutes}$

Table 6 - Background Sound Levels

We consider that the proposed development with the noise mitigation measures described in 3.2 of this report should not have an unacceptable impact to local amenity when assessed with regard to BS4142:2014+A1:2019.

APPENDIX A - TECHNICAL TERMS AND UNITS USED IN THIS REPORT

Decibel (dB) - This is the unit used to measure sound level. The range of human hearing from the quietest detectable sound to the threshold of pain is very large. If a normal linear scale of measurement were used, it would have to range from 20 µPa to 200,000,000 µPa. Using such large figures would be unmanageable and for this reason sound pressure levels are expressed on a logarithmic scale, which corresponds to the almost logarithmic response of the ear and which compresses the range to a manageable 0dB to140dB.

Sound Pressure Level (Lp or SPL) - This is a function of the source and its surroundings and is a measure in decibels of the total instantaneous sound pressure at a point in space. The SPL can vary both in time and in frequency. Different measurement parameters are therefore required to describe the time variation and frequency content of a given sound. These are described below.

Frequency - This refers to the number of complete pressure fluctuations or cycles that occur in one second. Frequency is measured in Hertz (Hz). The rumble of thunder has a low frequency, while a whistle has a high frequency. The sensitivity of the ear varies over the frequency range and is most sensitive between 1KHz and 5KHz.

Octave and One-Third Octave Bands - The human ear is sensitive to sound over a frequency range of approximately 20 Hz to 20,000 Hz and is more sensitive to medium and high frequencies than to low frequencies. To define the frequency content of a sound, the spectrum is divided into frequency bands, the most common of which are octave bands. Each band is referred to by its centre frequency, and the centre frequency of each band is twice that of the band below it. Where it is necessary for a more detailed analysis octave bands may be divided into one-third octave bands.

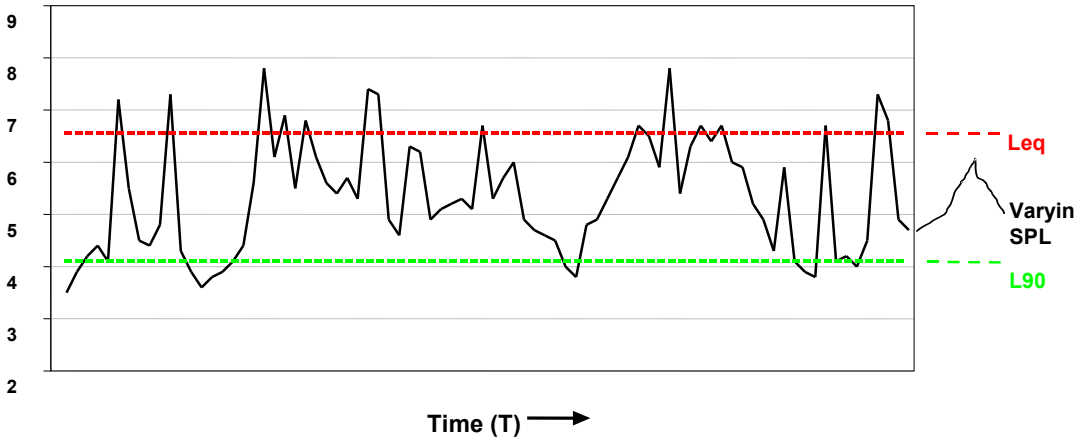
'**A' Weighting** - The sensitivity of the human ear varies with frequency, some frequencies sound louder than others. The 'A'-weighting curve represents the non-linear frequency response of the human ear and is incorporated in an electronic filter used in sound level meters. Measurements using an 'A'-weighting filter makes the meter more sensitive to the middle range of frequencies, which approximates to the response of the ear and the subjective loudness of the sound. Sound level measurements using 'A'-weighting will include the subscript A, e.g. dB(A).

Statistical Analysis - These figures are normally expressed as LN, where L is the sound pressure level in dB and N is the percentage of the measurement period. The LN figure represents the sound level that is exceeded for that percentage of the measurement period. L90 is commonly used to give an indication of the background level or the lowest level during the measurement period. L10 may be used to measure road traffic noise. See Figure A1.

LAmax - The highest A weighted sound pressure level recorded during the measurement period. The time constant used (Fast or Slow) should be stated. See Figure A1.

Leq,T - The equivalent continuous sound level is used to measure sound that varies with time. The Leq,T is the notional equivalent steady sound level, which contains the same acoustic energy as the actual varying sound level over the period of measurement. Because the averaging process used is logarithmic, the Leq,T level tends to be dominated by the higher sound levels measured. See Figure A1 overleaf.

Figure A1 - Time Varying Sound and Equivalent Continuous Sound Level (Leq,T)



APPENDIX B - MEASURING EQUIPMENT AND CALIBRATION

Job reference and title: Parsonage Green Farm, Cockfield NIA

Measurement locations: As per Figure 20 and Figure 25

Measurement date(s): Friday 30th June 2023 to Wednesday 5th July 2023
Wednesday 12th July 2023 to Friday 14th July 2023

Measuring equipment used:

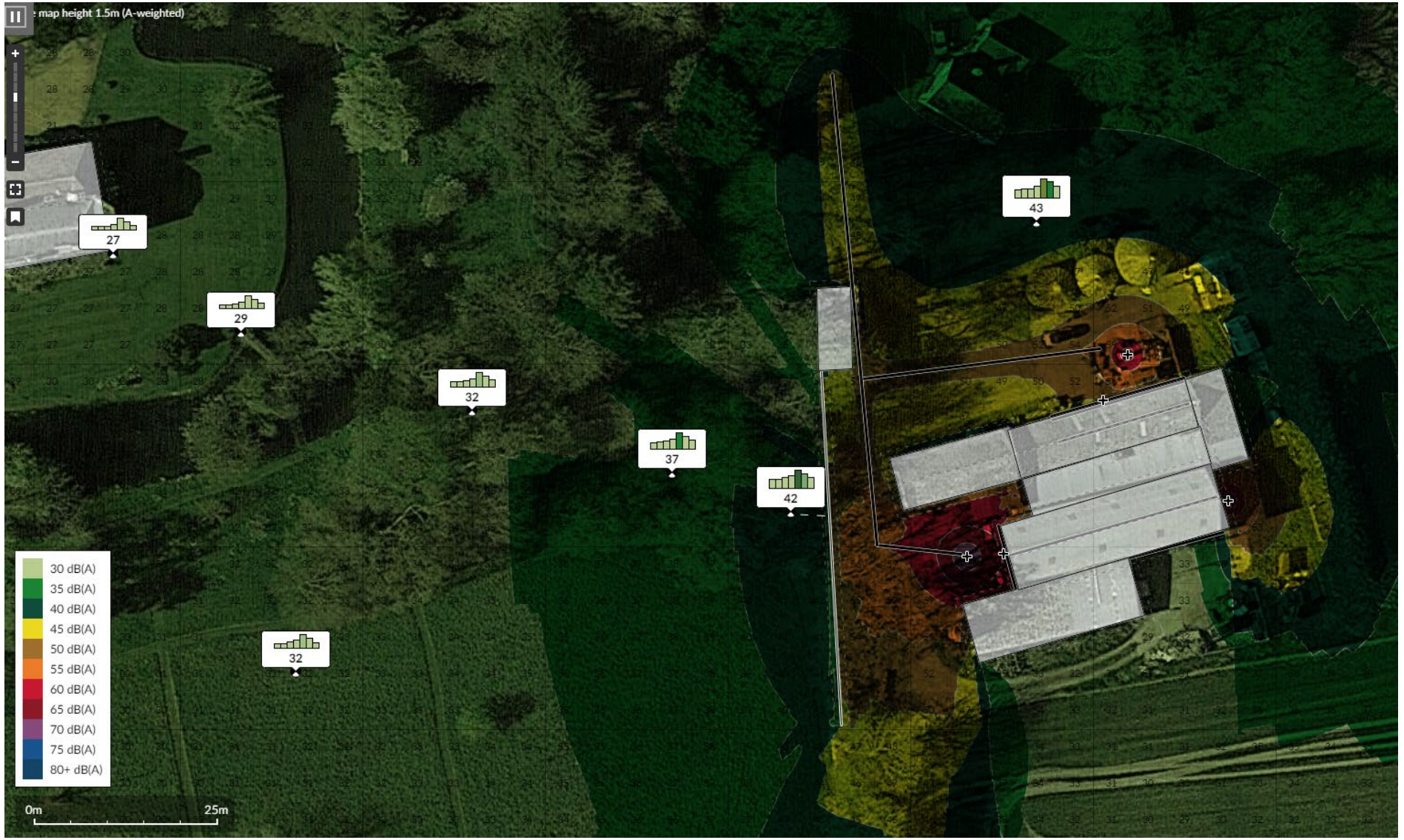
Equipment description / serial number	**Type number**	**Manufacturer**	**Date of calibration expiration**	**Calibration certificate number**
Precision sound level meter serial no. 127614	SV971A	Svantek	04/05/2025	Factory
Microphone serial no. 85902	7152	ACO PACIFIC	04/05/2025	Factory
Microphone pre-amplifier serial no. 130496	SV18A	Svantek	04/05/2025	Factory
Microphone calibrator serial no 074050.	GA611	Castle	02/05/2025	Factory
Outdoor Microphone protection kit	MW402	Castle		
Calibration level:	94.0 dB	@ 1kHz		
Precision sound level meter serial no. 121068	SV971A	Svantek	04/08/2024	Factory
Microphone serial no. 83649	7152	ACO PACIFIC	04/08/2024	Factory
Microphone pre-amplifier serial no. 122179	SV18A	Svantek	04/08/2024	Factory
Microphone calibrator serial no 125775.	SV33B	Svantek	13/09/2024	Factory
Calibration level:	113.9 dB	@ 1 kHz		
Both microphones were field calibrated before and after each measurement session, and neither showed any significant calibration drift.				

Person in charge of measurements: Background – Chris Cornish MCIEH
Specific - Michael Cheong MIOA

Measurement parameters Third Octave band and A-weighted $L_{F\,90,T}$ and $L_{eq,\,T}$

Weather conditions Dry with moderate wind.

APPENDIX C – NOISE MAP


map height 1.5m (A-weighted)
27
29
32
37
42
43
32
30 dB(A)
35 dB(A)
40 dB(A)
45 dB(A)
50 dB(A)
55 dB(A)
60 dB(A)
65 dB(A)
70 dB(A)
75 dB(A)
80+ dB(A)
0m
25m