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Applegarth Farm
Grayshott

Noise Impact Assessment Report

23 December 2020

For

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Applegarth Farm

Headley Road

Grayshott

Hindhead

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Contents

SUMMARY

A redevelopment is proposed at Applegarth Farm on Headley Road in Grayshott, Hindhead, which will involve new items of building services plant, as well as additional vehicle movements.

A noise survey has been undertaken by **auricl** to determine background and ambient noise levels that are representative of the nearest noise sensitive properties.

Based on the results of the survey, plant noise limits have been proposed, compliance with which would result in no more than a **low noise impact** at the nearest noise sensitive properties, in accordance with BS 4142: 2014.

In addition, an assessment of the noise impact of future vehicle movements has been undertaken, which predicted a **negligible** noise impact, in accordance with IEMA guidance.

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1.0 Introduction

A redevelopment is proposed at Applegarth Farm on Headley Road in Grayshott, Hindhead, which will involve new items of building services plant, as well as additional vehicle movements.

auricl has been instructed to carry out a background noise survey and an assessment of potential noise impact resulting from the proposals at nearby residential properties during the proposed operating periods.

This report presents the methodology and results of a noise survey to determine background and ambient noise levels that are representative of the nearest noise sensitive receptors, and subsequent assessments to predict the noise impact of various external sources at the site.

2.0 Description of Site and Proposals

The site is located to the northeast of Headley Road between Grayshott and Headley and is occupied by a farm shop and its grounds. The site is bounded by farmland to the north and woodland containing Headley Road to the west, with a newly completed residential development encompassing the east of the site. A health spa is located adjacent on the south-western side of Headley Road which bounds the south-western site border.

Figure 2.1 shows the approximate existing site extent in **red**.

Figure 2.1 Existing Site Extent and Surroundings

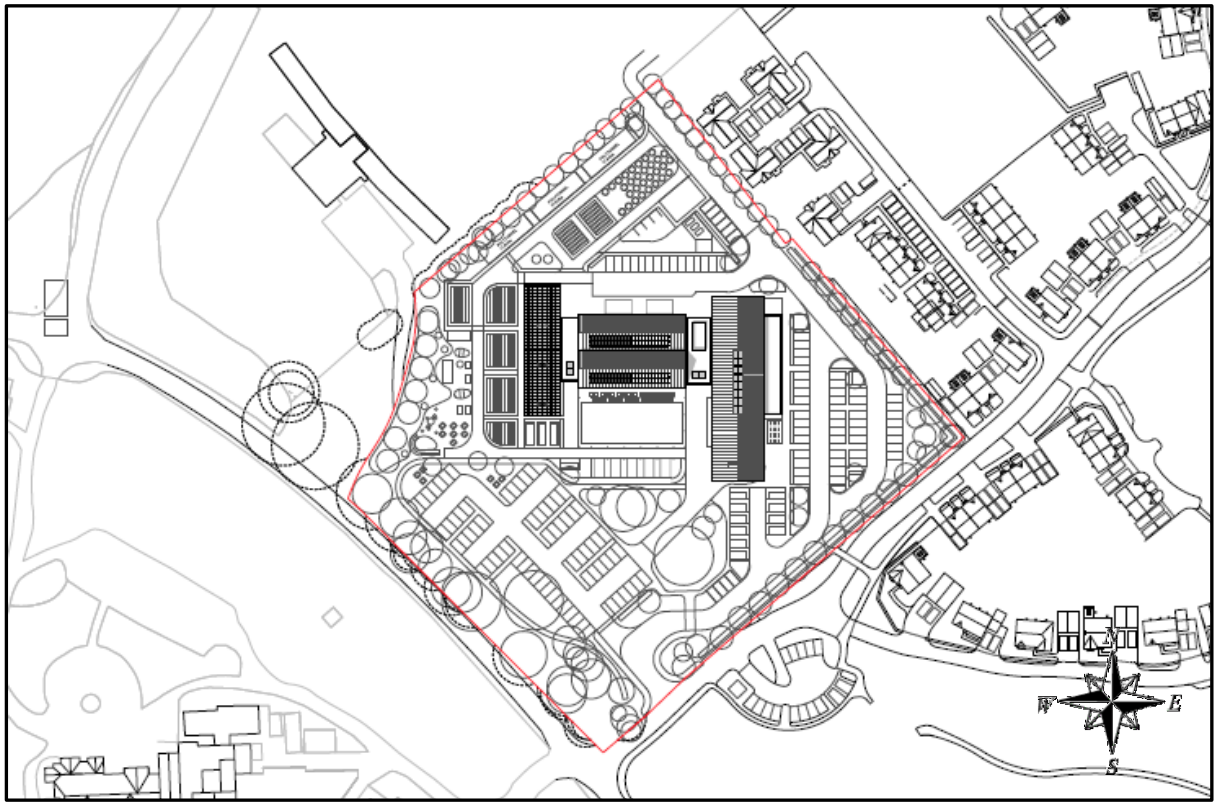
It is proposed to demolish all of the existing buildings at the site and build a new restaurant with areas for retail, cookery and growing schools, and various external amenities such as market stalls

allotments and a multi-use events space. The proposals will require various items of external plant to serve the new buildings, however the plant selections are yet to be finalised.

The growing school in the northern corner of the site will provide storage for the use of one B-series tractor with associated trailer, and one all-terrain vehicle (ATV). The service entrance for services and deliveries will be located adjacent to this, as well as 15 spaces for staff parking. Customer parking is proposed in the eastern corner and along the south-western boundary of the site.

Figure 2.2 shows the approximate proposed site extent outlined in **red.**

Figure 2.2 Proposed Site Extent and Surroundings



3.0 Acoustic Criteria

3.1 Building Services Plant Noise

BS 4142: 2014 presents a method for assessing the level of impact due to a commercial or industrial noise source, based on a comparison of the source noise level and the background noise level, both of which are measured or predicted at a noise sensitive receiver e.g. a residential property. The standard is generally used for assessing industrial noise, such as industrial activities, deliveries and fixed machinery/plant.

The specific noise level due to the source is determined, with corrections applied if the source is tonal or intermittent, or contains any other distinctive audible characteristics. The rating level is then compared to the background noise level and the level of impact can be estimated, depending on context, in accordance with the following advice:

- A difference of around +10 dB or more is likely to be an indication of a significant adverse noise impact

- A difference of around +5 dB is likely to be an indication of an adverse noise impact
- Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low noise impact

Daytime and evening activities (07:00 – 23:00 hours) are considered over a reference period of 1 hour; night-time activities (23:00 – 07:00 hours) are considered over a reference period of 15 minutes, in accordance with the BS 4142: 2014 methodology.

3.2 Vehicle Movements

Noise due to vehicle movements will be assessed at the nearest receptors, based on the predicted vehicle quantities and relevant periods.

The noise impact will be assessed against the criteria shown in Table 3.1, which are based on the IEMA document "*Guidelines for Environmental Noise Impact Assessment*" (November 2014).

Table 3.1 Vehicle Movement Noise Impact Assessment Criteria

Noise Level Change (dB, $L_{Aeq, T}$)	Noise Impact
< 3	Negligible
3 – 5	Moderate
5 – 10	Substantial
> 10	Very Substantial

Daytime and evening activities (07:00 – 23:00) will be considered over a reference period of 1 hour, as is common.

4.0 Noise Survey Methodology

An unmanned environmental noise survey was undertaken at a position considered representative of the nearest noise sensitive (residential) properties to the site over a 4-day period from Friday 4 December 2020 to Tuesday 8 December 2020. This measurement period was selected to assess background noise levels over typical daytime and night-time periods when the proposed use is expected to be operational.

The equipment used for the noise survey is described in Table 4.1.

Table 4.1 Description of Equipment used for Noise Survey

Item	Make & Model	Serial Number
Type 1 automated logging sound level meter	01dB Fusion	12032
Type 1 ½" external microphone	GRAS 40CE	330829
Calibrator	01 dB CAL31	87267

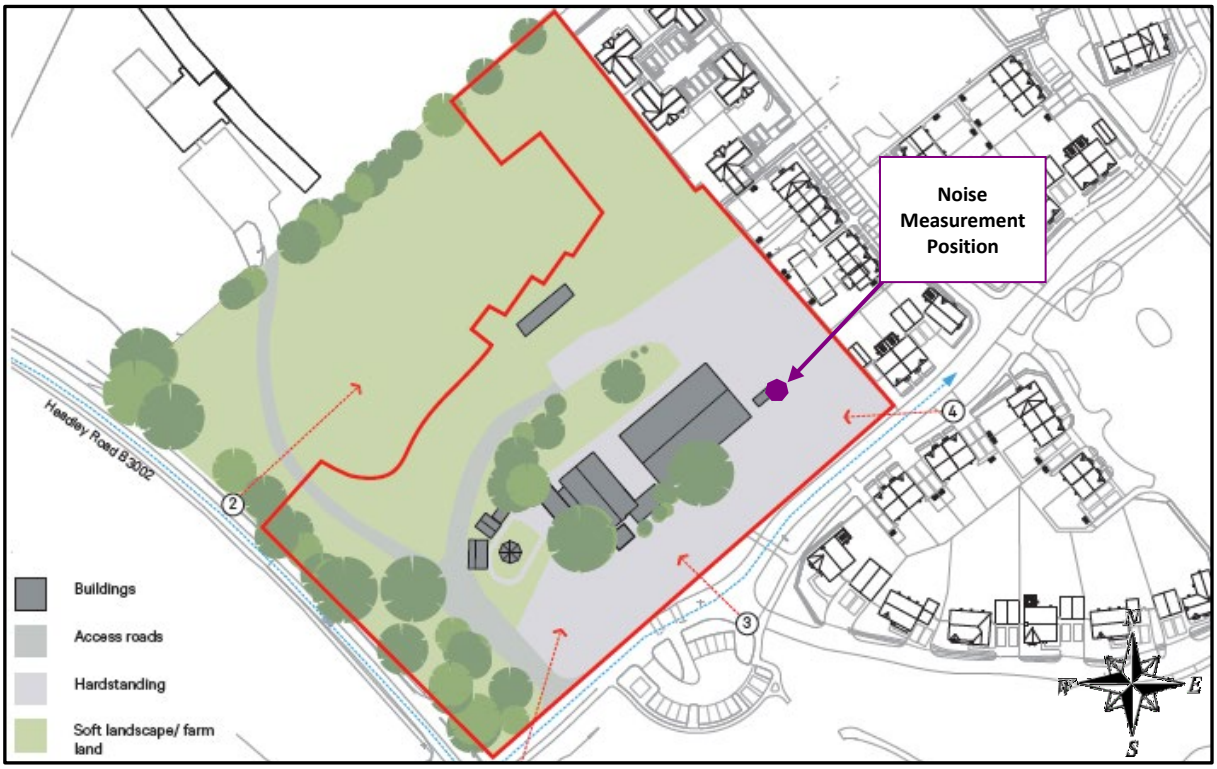
L_{Amax}, L_{Aeq} and L_{A90} sound pressure levels were measured throughout the noise survey over contiguous 125-millisecond intervals.

The noise monitoring equipment was calibrated before and after the noise survey period. No significant change was found. Laboratory equipment calibration certificates can be provided upon request.

The measurement position was located with the microphone elevated on a pole attached to the corner of a shipping container in the eastern corner of the site, approximately 3.5m above ground level, in free-field. The measurement position was selected as the most secure and accessible location representative of the background noise levels at the nearest noise sensitive properties along the north-eastern and south-eastern borders of the site.

The approximate location of the measurement position is indicated in **purple** on Figure 4.1.

Figure 4.1 Site Plan Indicating Approximate Location of Measurement Position



Due to the nature of the noise survey, i.e. unmanned, we are unable to comment on the weather conditions throughout the entire noise survey period. However, at the beginning and end of the survey period, there was noted to be no rainfall, an overcast sky and only light wind. These conditions are understood to be representative of the majority of the survey period and are considered appropriate for undertaking environmental noise measurements. Weather conditions are not considered to have had any significant effect on the measured noise levels.

5.0 Noise Survey Results

Appendix B presents a time history graph showing the L_{Amax}, L_{Aeq} and L_{A90} sound pressure levels at the measurement position throughout the noise survey, presented at 15-minute intervals.

Typical measured $L_{A90, T}$ background noise levels are shown in Table 5.1 for daytime and night-time periods.

Table 5.1 Measured Background Noise Levels

Measured $L_{A90,T}$ Background Level (dB) during Operating Period	
Daytime (07:00 – 23:00 hours)	Night-time (23:00 – 07:00 hours)
43	23

The typical existing ambient noise level measured during the proposed operating hours (07:00 – 19:00 hours) is 49 dB $L_{Aeq\ (1\ hour)}$.

We would consider the levels measured to be reasonable, taking into account the location of the measurement position and the dominant nearby noise sources.

Due to the nature of the noise survey, i.e. unmanned, we are unable to comment on the exact noise climate throughout the entire noise survey period. However, at the beginning and end of the survey period, the daytime noise climate at the measurement position was noted to be mainly affected by road traffic using Headley Road, with occasional road traffic on the new residential development to the east.

6.0 Noise Impact Assessment – Building Servces Plant

6.1 External Noise Limits

In accordance with the BS 4142: 2014 assessment methodology, the design of external plant items should ensure that the rating level of plant does not exceed the typical background noise level, when measured 1 metre from the nearest noise sensitive window.

Based on the above and the results of the noise survey, Table 6.1 presents the proposed plant noise limits to be achieved at the nearest noise sensitive properties during daytime and night-time periods.

Table 6.1 External Plant Noise Limits

External L_{Aeq} Plant Noise Limit during Plant Operating Period (dB)	
Daytime (07:00 – 23:00 hours)	Night-time (23:00 – 07:00 hours)
43	23

The noise limits are to be achieved at a distance of 1m external to the nearest noise sensitive property and apply to the total cumulative noise level with all relevant plant operating simultaneously. Achievement of this will result in no more than a **low noise impact** at the nearest noise sensitive properties.

6.2 Control of Plant Noise Emissions

At this stage in the design process, it is considered that the building services plant design is sufficiently flexible to ensure that suitably quiet plant can be procured and where necessary, mitigation options can be included to ensure the noise limits are not exceeded.

The building services design is at an early stage, but noise mitigation measures that will be incorporated are as follows:

- Sensible location of air intake and air discharge louvres, so as to maximise distance and screening from noise sensitive façades
- Use of appropriate atmospheric duct-mounted attenuators on any fans and air handling units, with attenuators located close to external louvres so as to attenuate noise from any plantrooms breaking into the duct
- Use of acoustic louvres, if necessary
- Consideration of air velocities, to avoid air-regenerated noise at external louvres
- Selection of low-noise plant, including night set-back modes
- Appropriate casings on external fans and air handling units, so as to limit noise break-out
- Suitably-specified vibration isolators fitted to all plant items and associated ductwork/pipework, to control vibration transmission through the building structure

7.0 Noise Impact Assessment – Vehicle Movements

We have undertaken calculations to assess the noise impact of various vehicle movements at the nearest noise sensitive properties east of the site, based on the following vehicle movement scenarios:

- Staff vehicle arrival (15 cars) and staff vehicle departure (15 cars)
- Deliveries/Waste collection – HGV arrival (assumed no more than 3 on any given day, possibility for 2 within the same hour)
- Deliveries/Waste collection – HGV departure (assumed no more than 3 on any given day, possibility for 2 within the same hour)
- Tractor movements along the northeast boundary (assumed 5 per hour as a worst case)
- ATV movements along the northeast boundary (assumed 5 per hour as a worst case)
- Customer vehicles arriving throughout the day (135 customer parking spaces total, assumed up to 50 arrivals per hour as a worst case)
- Customer vehicles departing throughout the day (135 customer parking spaces total, assumed up to 50 departures per hour as a worst case)

auricl has previously measured coach and car movement noise levels as follows:

- Car arrival, manoeuvre and park — 70 dB L_{AE} at 5m
- Car depart — 67 dB L_{AE} at 5m
- HGV arrival (including reverse beeper) — 79 dB L_{AE} at 5m
- HGV departure (including reverse beeper) — 72 dB L_{AE} at 5m

Note: L_{AE} = Sound Exposure Level of complete event = $L_{Aeq\ (1\ sec)}$

Manufacturer's literature for the Kubota B-Series Tractor states a noise level of 86 dBA at the operator's position. The specific ATV selection is currently unknown. We have therefore assumed as a worst case that it could operate with noise levels up to 86 dBA at 1m.

Based on the above, we have undertaken calculations to compare the measured existing baseline ambient noise levels with predicted future ambient noise levels during typical operating hours (07:00 – 19:00 hours). Our calculations have included a minimal screening correction of -5 dB due to intervening buildings/structures and the site boundary fence.

Our vehicle noise calculations for the specified vehicle movement scenarios are presented in Tables 7.1 to 7.8.

Table 7.1 Staff Cars – Arrival, Manoeuvre and Park

Element	Level (L_{pA} dB)
Source Sound Exposure Level L_{AE}	70
Time Correction	-36
Quantity Correction	+12
Distance Attenuation	-16
Screening Attenuation	-5
Predicted $L_{Aeq\ (1\ hour)}$ Contribution due to Future Cars (dB)	**25.6**
Existing Measured Lowest Ambient $L_{Aeq\ (1\ hour)}$ Noise Level (dB)	49
Predicted Total $L_{Aeq\ (1\ hour)}$ (dB)	49
Predicted Difference in $L_{Aeq\ (1\ hour)}$	**0**

Table 7.2 Staff Cars – Departure

Element	Level (L_{pA} dB)
Source Sound Exposure Level L_{AE}	67
Time Correction	-36
Quantity Correction	+12
Distance Attenuation	-16
Screening Attenuation	-5
Predicted $L_{Aeq\ (1\ hour)}$ Contribution due to Future Cars (dB)	**22.6**
Existing Measured Ambient $L_{Aeq\ (1\ hour)}$ Noise Level (dB)	49
Predicted Total $L_{Aeq\ (1\ hour)}$ (dB)	49
Predicted Difference in $L_{Aeq\ (1\ hour)}$	**0**

Table 7.3 HGV Arrivals and Departures

Element	Level (L_{pA} dB)	
	Arrival	Departure
Source Sound Exposure Level L_{AE}	79	72
Time Correction	-36	-36
Quantity Correction	+3	+3
Distance Attenuation	-17	-17
Screening Attenuation	-5	-5
Predicted Future $L_{Aeq\ (1\ hour)}$ Contribution (dB)	24.5	17.5
Total Predicted Future $L_{Aeq\ (1\ hour)}$ Contribution (dB)	**25.3**	
Existing Measured Ambient $L_{Aeq\ (1\ hour)}$ Noise Level (dB)	49	
Predicted Cumulative Total $L_{Aeq\ (1\ hour)}$ (dB)	49	
Predicted Difference in $L_{Aeq\ (1\ hour)}$	**0**	

Table 7.4 South-West Car Park – Arrivals and Departures

Element	Level (L_{pA} dB)	
	Arrival, Manoeuvre & Park	Departure
Source Sound Exposure Level L_{AE}	70	67
Time Correction	-36	-36
Quantity Correction	+15	+15
Distance Attenuation	-24	-24
Screening Attenuation	-5	-5
Predicted Future $L_{Aeq\ (1\ hour)}$ Contribution (dB)	20.2	17.2
Total Predicted Future $L_{Aeq\ (1\ hour)}$ Contribution (dB)	**22.0**	
Existing Measured Ambient $L_{Aeq\ (1\ hour)}$ Noise Level (dB)	49	
Predicted Cumulative Total $L_{Aeq\ (1\ hour)}$ (dB)	49	
Predicted Difference in $L_{Aeq\ (1\ hour)}$	**0**	

Table 7.5 East Car Park – Arrivals and Departures

Element	Level (L_{pA} dB)	
	Arrival, Manoeuvre & Park	Departure
Source Sound Exposure Level L_{AE}	70	67
Time Correction	-36	-36
Quantity Correction	+13	+13
Distance Attenuation	-14	-14
Screening Attenuation	-5	-5
Predicted Future $L_{Aeq\ (1\ hour)}$ Contribution (dB)	28.3	25.3
Total Predicted Future $L_{Aeq\ (1\ hour)}$ Contribution (dB)	**30.1**	
Existing Measured Ambient $L_{Aeq\ (1\ hour)}$ Noise Level (dB)	49	
Predicted Cumulative Total $L_{Aeq\ (1\ hour)}$ (dB)	49.1	
Predicted Difference in $L_{Aeq\ (1\ hour)}$	**+0.1**	

Table 7.6 Growing School – Car Arrivals and Departures

Element	Level (L_{pA} dB)	
	Arrival, Manoeuvre & Park	Departure
Source Sound Exposure Level L_{AE}	70	67
Time Correction	-36	-36
Quantity Correction	+8	+8
Distance Attenuation	-8	-8
Screening Attenuation	-5	-5
Predicted Future $L_{Aeq\ (1\ hour)}$ Contribution (dB)	29.6	26.6
Total Predicted Future $L_{Aeq\ (1\ hour)}$ Contribution (dB)	**31.4**	
Existing Measured Ambient $L_{Aeq\ (1\ hour)}$ Noise Level (dB)	49	
Predicted Cumulative Total $L_{Aeq\ (1\ hour)}$ (dB)	49.1	
Predicted Difference in $L_{Aeq\ (1\ hour)}$	**+0.1**	

Table 7.7 B-Series Tractor Movements

Element	Level (L_{pA} dB)
Operator Sound Pressure Level L_p at 1m	86
Time Correction	-11
Distance Attenuation	-22
Screening Attenuation	-5
Predicted $L_{Aeq\ (1\ hour)}$ Contribution due to Future Cars (dB)	**48.6**
Existing Measured Lowest Ambient $L_{Aeq\ (1\ hour)}$ Noise Level (dB)	49
Predicted Total $L_{Aeq\ (1\ hour)}$ Including Future Cars (dB)	51.8
Predicted Difference in $L_{Aeq\ (1\ hour)}$	**+2.8**

Table 7.8 ATV Movements

Element	Level (L_{pA} dB)
Sound Pressure Level L_p at 1m	86
Time Correction	-22
Distance Attenuation	-8
Screening Attenuation	-5
Predicted $L_{Aeq\ (1\ hour)}$ Contribution due to Future Cars (dB)	**48.6**
Existing Measured Lowest Ambient $L_{Aeq\ (1\ hour)}$ Noise Level (dB)	49
Predicted Total $L_{Aeq\ (1\ hour)}$ Including Future Cars (dB)	51.8
Predicted Difference in $L_{Aeq\ (1\ hour)}$	**+2.8**

By comparison of the future noise level differences with the noise impact criteria in Section 3.2, it can be seen that the predicted noise impact of the various vehicle movements is **negligible**.

Appendix A – Acoustic Terminology

Parameter	Description
Decibel (dB)	A logarithmic scale representing the sound pressure or power level relative to the threshold of hearing ($20x10^{-6}$ Pascals).
Sound Pressure Level (L_p)	The sound pressure level is the sound pressure fluctuation caused by vibrating objects relative to the threshold of hearing.
A-weighting (L_A or dBA)	The sound level in dB with a filter applied to increase certain frequencies and decrease others to correspond with the average human response to sound.
$L_{Aeq,T}$	The A-weighted equivalent continuous noise level over the time period T (typically T= 16 hours for daytime periods, T = 8 hours for night-time periods). This is the sound level that is equivalent to the average energy of noise recorded over a given period.
$L_{A90\ (15\ min)}$	The noise level exceeded for 90% of the time (also referred to as the background noise level), measured over a 15-minute period

Appendix B – Time History Graph