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PROPOSED LOG CABINS, QUARRY WALK PARK, COPPICE LANE, CHEADLE

NOISE ASSESSMENT

On behalf of:

Quarry Walk Park Ltd

Report No: P17-370-R01v1
July 2018

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NOISE ASSESSMENT

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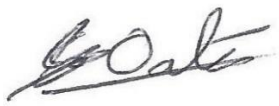
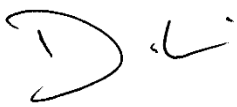
Report prepared by: Samuel Oates BSc AMIOA - Graduate Consultant	

Report checked by: Donald Quinn BSc FIOA - Managing Director	

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1.0 INTRODUCTION

1.1 Hepworth Acoustics Ltd was commissioned by Quarry Walk Park Ltd to carry out a noise assessment in connection with a planning application for new log cabins at Quarry Walk Park, Coppice Lane, Cheadle.

1.2 The proposals are for erection of 17 new log cabins on the site, where touring pitches have previously been located. There are currently 32 existing log cabins at the Quarry Walk Park site.

1.3 The proposals also include two new water treatment pumps that are to be positioned alongside the four existing water treatment pumps as indicated in Figure 2.

1.4 The nearest existing dwelling not associated with the site is to the south of the site on Lockers Bank, with the other nearest dwellings to the east on Sandy Lane and to the west as shown in Figure 1.

1.5 Further to discussions with Mr Denis Colgan, Environmental Health Officer at Staffordshire Moorlands District Council & High Peak Borough Council, our report has included an assessment of the potential noise impact from the proposed new water treatment pumps and comments on the sound insulation of the proposed log cabins within the context of the noise climate in the area.

1.6 The noise assessment has included:

- An inspection of the site and surrounding area;
- Measurement of noise levels from the existing water treatment pumps;
- Measurement of the existing ambient noise levels;
- Assessment of the potential noise impact from the proposed new water treatment pumps on the nearest sensitive dwellings; and,
- Comment on the sound insulation of the proposed log cabins.

1.7 The various noise units and indices referred to in this report are described in Appendix I. All noise levels mentioned in the text have been rounded to the nearest decibel, as fractions of decibels are imperceptible.

2.0 GUIDANCE AND CRITERIA

BS 4142:2014

2.1 British Standard 4142: 2014, 'Methods for rating and assessing industrial and commercial sound' is appropriate guidance for assessing the potential noise impact from industrial and commercial noise sources.

2.1 BS 4142:2014 requires a 'rating' level ($L_{Ar, Tr}$) calculated from the operation of the noise source to be compared with the background sound level (L_{A90}) which is measured in the absence of the noise source, evaluated over a 1-hour period for daytime operations and 15-minute period for night-time operations.

2.2 The rating level ($L_{Ar, Tr}$) is based on the 'specific' sound level ($L_{Aeq, Tr}$) attributed to the operating noise source, with 'character corrections' added for sound sources where 'certain acoustic features can increase the significance of impact'.

2.3 The character correction applied to the specific sound level in order to obtain the rating level can take into account tonality, intermittency, impulsivity and characteristics otherwise distinctive against the prevailing noise climate in the area.

2.4 An estimate of the potential noise impact from the operating noise source is determined by comparing the difference between the background level and the rating level.

2.5 Regarding the outcome of the initial estimate, BS 4142:2014 states that:

- Typically, the greater this difference, the greater the magnitude of impact;
- A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context;
- A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context; and,
- The lower the rating level is relative to the measured background level, the less likely it is that the operation will have an adverse impact or a significant adverse impact. Where the rating level is does not exceed the background sound level, this is an indication of the specific sound source having low impact, depending on the context.

2.6 BS 4142:2014 states that all pertinent factors should be taken into account where the initial estimate needs to be modified due to context, including:

- The absolute level of sound.
- The character and level of the residual sound compared to the character of the specific sound; and,
- The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will actually incorporate design measures that ensure good internal and/or outdoor acoustic conditions such as acoustic screening.

BS 8233: 2014

2.1 Design guidance on acceptable noise levels in habitable rooms of new dwellings is set out in British Standard 8233: 2014, 'Guidance on sound insulation and noise reduction for buildings'. The criteria for inside habitable rooms are summarised in Table 1.

Table 1: BS 8233:2014 Recommended Acoustic Design Criteria

Activity	Location	Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)
Resting	Living room	35 dB $L_{Aeq, 16hr}$	-
Dining	Dining room/area	40 dB $L_{Aeq, 16hr}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq, 16hr}$	30 dB $L_{Aeq, 8hr}$

2.1 For this development, we therefore recommend the following noise criteria be adopted with windows closed and trickle ventilation provided:

- Daytime noise below 35 dB L_{Aeq} inside living rooms and bedrooms, below 40 dB L_{Aeq} in dining rooms and below 55 dB L_{Aeq} in gardens; and
- Night-time noise levels not exceeding 30 dB L_{Aeq} and generally not exceeding 45 dB L_{Amax} in bedrooms.

3.0 NOISE SURVEYS

3.1 A noise survey has been carried out to establish the existing noise climate in the area and determine the noise levels of the existing water treatment pumps.

Ambient Noise Survey

3.2 Automated noise measurements were taken between 15:11 on Thursday 12th and 14:41 on Friday 13th of July 2018 at a location representative of the nearest dwellings in the area. The measurement location is indicated in Figure 1.

3.3 Acoustic calibration checks were carried out before and after the measurements, with no deviation in calibration levels observed. The measurements were taken in consecutive 15-minute periods.

3.4 Full results of the noise survey are included in Appendix II, along with details of the equipment used and weather conditions during the survey. Table 2 below shows a summary of the measured noise levels.

Table 2: Summary of measured noise levels (dB)

Noise Level	Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)
$L_{Aeq, 15mins}$	31 – 47	29 – 47
$L_{A90, 15mins}$	30 – 35	28 – 34

3.5 Noise levels in the area are generally low, with contributions from distant road traffic noise and wildlife noise.

3.6 The overall measured daytime noise level is 40 dB $L_{Aeq, 16hr}$ and the overall measured night-time level is 37 dB $L_{Aeq, 8hr}$. These are low levels of noise. Corresponding peaks of noise at night were typically below 60 dB $L_{Amax, 15min}$.

Plant Noise Measurements

3.7 An inspection of the existing water treatment pumps was undertaken on Tuesday 10th July 2018.

3.8 Source noise measurements of the equipment operating was carried out using a Brüel & Kjær 2250 'Class 1' sound level meter (S/N: 301176). Calibration checks were carried out both before and after the measurement periods with no variance in levels noted.

3.9 The measurements were taken at 3 metres from the equipment during periods where two pumps were operating and with the pumps off, providing ambient and residual noise levels respectively.

3.10 The noise from the dust extraction plant was of a steady nature which meant that it could be measured over short durations.

3.11 The 'specific' noise level of the water treatment pumps was obtained by calculation (logarithmic subtraction of the ambient and residual noise levels). The resulting specific noise level for two pumps operating simultaneously is 56 dB $L_{Aeq,T}$ at 3 metres.

4.0 NOISE ASSESSMENT

BS 4142 Assessment of Proposed New Water Treatment Pumps

4.1 The nearest dwellings to the proposed new water treatment pumps that are not associated with the site are on Lockers Bank, Sandy Lane and to the west of the site, approximately 235m, 320m and 715m from the proposed pumps respectively.

4.2 The potential noise impact has also been assessed at the nearest existing log cabin to the proposed new pumps which is located approximately 85m away.

4.3 The specific sound levels used in the initial BS 4142 assessment can be seen in Table 3, these levels are derived from the front and side source noise levels of the two proposed pumps discussed above only accounting for nominal distance attenuation.

4.4 We understand that the equipment will operate 24 hours per day on a demand basis. Therefore, the assessment of potential noise impact associated with the equipment has been carried out for the night-time period when the background sound level will be at its lowest and potential noise impact at its highest.

4.5 The representative background sound level has been obtained from the mode of the measured L_{A90} values rounded to the nearest decibel and was found to be 30 dB $L_{A90,\ 15mins}$.

4.6 Due to the steady nature of the noise from the proposed pumps and the distance to the nearest dwellings, no special character corrections have been applied in order to obtain a rating level (i.e. tonality, intermittency etc.) as any potential characteristics would not be audible at the nearest sensitive receptors.

4.7 The resulting plant noise levels outside these dwellings have been calculated, with appropriate allowances for distance attenuation only, and are shown in Table 3.

Table 3: Initial BS 4142 Assessment of water treatment pumps at nearest dwellings (dB)

Description	Sandy Lane	Western Dwelling	Lockers Bank	Existing Log Cabin site
Calculated Specific Sound Level outside Dwelling	15	8	18	27
Acoustic feature correction	0	0	0	0
Rating Level of Sound at Dwelling	15	8	18	27
Representative Background Sound Level	30	30	30	30
Difference	-15	-22	-12	-3
Likely Noise Impact	Low	Low	Low	Low

4.8 The rated sound levels from the proposed new water treatment pumps as detailed in Table 3, are between 3 and 22 dB below the representative background sound level outside the nearest dwellings. The initial assessment therefore indicates a low impact. In our view, there is no reason to modify the conclusion of the initial assessment and we therefore conclude that there will be no unacceptable noise impact associated with the proposed water treatment pumps.

Proposed Log Cabins

4.9 We understand that the construction of the proposed new cabins is similar to some of the other log cabins on the site.

4.10 The building envelope construction of the existing cabins is understood to be timber stud frames with timber cladding and plasterboard internal wall lining; metal clad roof with plasterboard ceiling; and standard thermal double glazing with standard trickle ventilation. Therefore, it is considered that the sound insulation performance of the windows will dictate the likely resulting internal noise levels. Standard thermal double glazing can be considered to provide approximately 25 dB $R_w + C_{tr}$.

4.11 Taking into account the sound insulation performance of the standard thermal double glazing, the existing measured external ambient noise levels of 40 dB $L_{Aeq,\ 16hr}$ in the daytime and 37 dB $L_{Aeq,\ 8hr}$ during night-time, the corresponding internal noise levels would therefore be well below 20 dB L_{Aeq} and therefore well within the BS 8233: 2014 acoustic design criteria set out in Table 1.

4.12 We therefore conclude that acceptable acoustic conditions will be achieved inside the new log cabins.

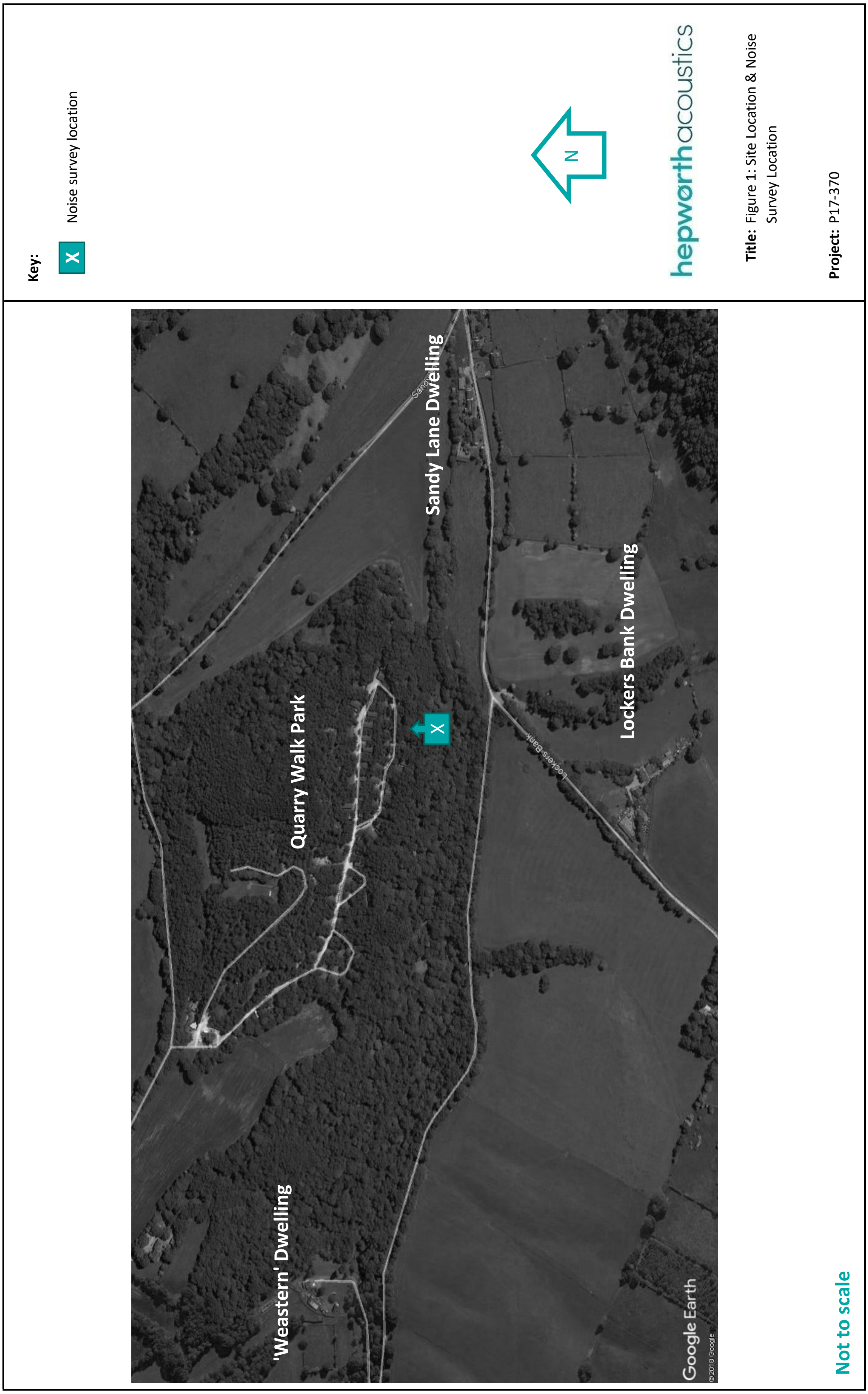
5.0 SUMMARY AND CONCLUSION

5.1 Hepworth Acoustics Ltd was commissioned by Quarry Walk Park Ltd to carry out a noise assessment in connection with a planning application for erection of 17 log cabins at Quarry Walk Park, Coppice Lane, Cheadle.

5.2 A series of noise measurements were carried out to determine the source noise levels associated with new water treatment pumps proposed as part of the development and to establish the existing ambient and background noise climate of the area.

5.3 An assessment of the potential noise impact from the proposed new water treatment pumps on the nearest sensitive dwellings has been carried out in line with BS 4142:2014, the outcome of which indicates a low impact - the pump noise levels being well below the existing background noise levels.

5.4 Taking into account the proposed building envelope construction for the new log cabins, we have also considered the likely resulting internal noise levels. The ambient noise climate of the area is sufficiently low that resulting noise levels within habitable rooms will be well within the appropriate design criteria set out in relevant guidance.


Key:
X Noise survey location
N
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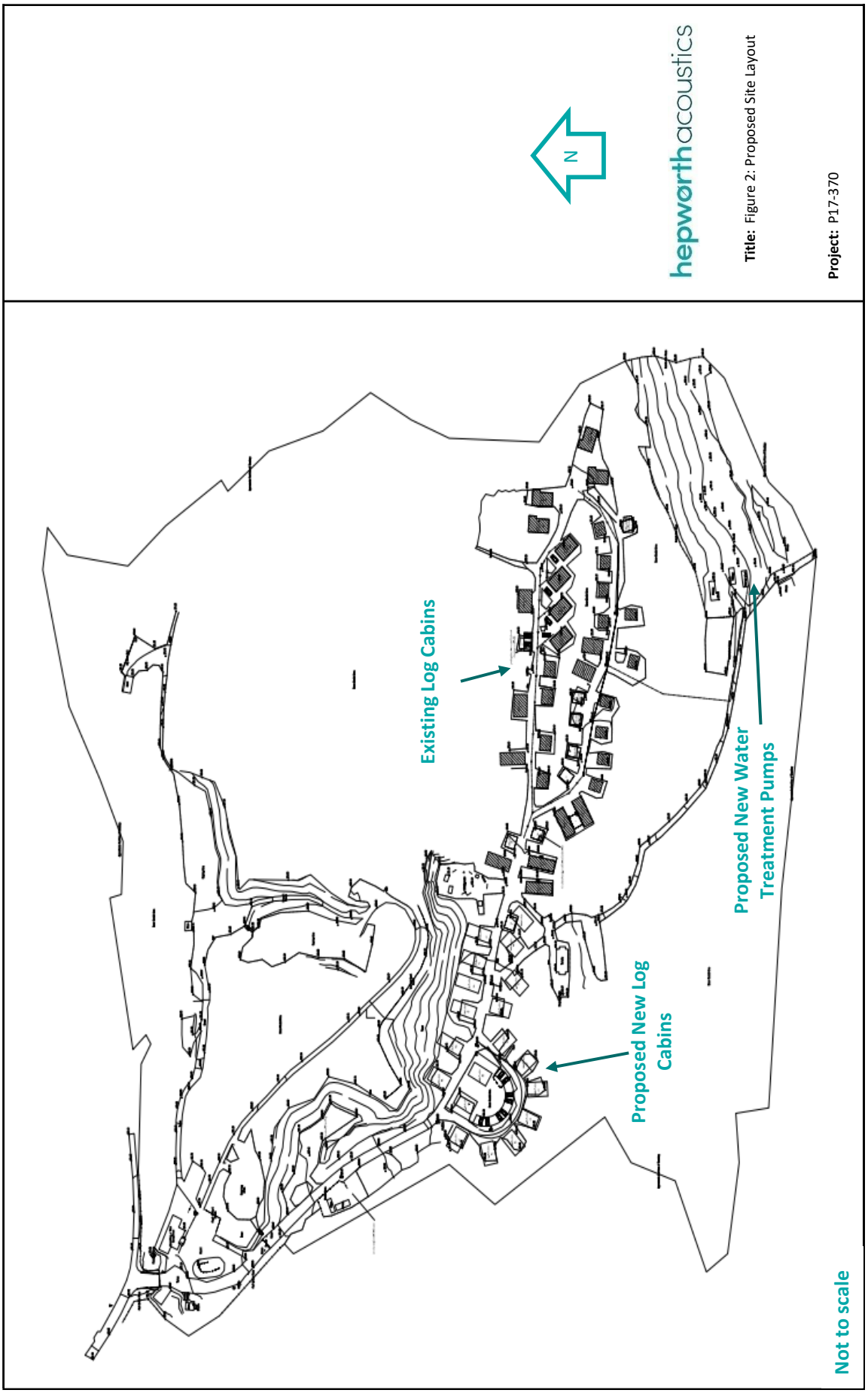
Title: Figure 1: Site Location & Noise Survey Location
Project: P17-370
Sandy Lane Dwelling
Lockers Bank Dwelling
Quarry Walk Park
'Weastern' Dwelling
Google Earth
Not to scale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Title: Figure 2: Proposed Site Layout
Project: P17-370
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Existing Log Cabins
Proposed New Water Treatment Pumps
Proposed New Log Cabins
Not to scale

Appendix I: Noise Units & Indices

Sound and the decibel

A sound wave is a small fluctuation of atmospheric pressure. The human ear responds to these variations in pressure, producing the sensation of hearing. The ear can detect a very wide range of pressure variations. In order to cope with this wide range of pressure variations, a logarithmic scale is used to convert the values into manageable numbers. Although it might seem unusual to use a logarithmic scale to measure a physical phenomenon, it has been found that human hearing also responds to sound in an approximately logarithmic fashion. The dB (decibel) is the logarithmic unit used to describe sound (or noise) levels. The usual range of sound pressure levels is from 0 dB (threshold of hearing) to 120dB (threshold of pain).

Due to the logarithmic nature of decibels, when two noises of the same level are combined together, the total noise level is (under normal circumstances) 3 dB(A) higher than each of the individual noise levels e.g. 60 dB(A) plus 60 dB(A) = 63 dB(A). In terms of perceived 'loudness', a 3 dB(A) variation in noise level is a relatively small (but nevertheless just noticeable) change. An increase in noise level of 10 dB(A) generally corresponds to a doubling of perceived loudness. Likewise, a reduction in noise level of 10 dB(A) generally corresponds to a halving of perceived loudness.

The ear is not equally sensitive to sound at all frequencies. It is less sensitive to sound at low and very high frequencies, compared with the frequencies in between. Therefore, when measuring a sound made up of different frequencies, it is often useful to 'weight' each frequency appropriately, so that the measurement correlates better with what a person would actually hear. This is usually achieved by using an electronic filter called the 'A' weighting, which is built into sound level meters. Noise levels measured using the 'A' weighting are denoted dB(A) or dBA.

Frequency and Hertz (Hz)

As well as the loudness of a sound, the frequency content of a sound is also very important. Frequency is a measure of the rate of fluctuation of a sound wave. The unit used is cycles per second, or hertz (Hz). Sometimes large frequency values are written as kiloHertz (kHz), where 1 kHz = 1000 Hz.

Young people with normal hearing can hear frequencies in the range 20 Hz to 20 kHz. However, the upper frequency limit gradually reduces as a person gets older.

Glossary of Terms

When a noise level is constant and does not fluctuate, it can be described adequately by measuring the dB(A) level. However, when the noise level varies with time, the measured dB(A) level will vary as well. In this case it is therefore not possible to represent the noise climate with a simple dB(A) value. In order to describe noise where the level is continuously varying, a number of other indices can be used. The indices used in this report are described below.

C_{tr} This is an A-weighted urban traffic noise spectrum, which can be added to $D_{nT,w}$ or R_w in some standards to take into account different source spectra such as low frequency sound.

R This is the 'Sound Reduction Index' as measured in a laboratory, and is a measure of the sound insulation properties of an building element in a stated frequency band.

R_w This is the 'Weighted Sound Reduction Index' (L_w), and is a single figure quantity of R, the laboratory measured Sound Reduction Index.

L_{Aeq} This is the A–weighted 'equivalent continuous noise level' which is an average of the total sound energy measured over a specified time period. In other words, LAeq is the level of a continuous noise which has the same total (A–weighted) energy as the real fluctuating noise, measured over the same time period. It is increasingly being used as the preferred parameter for all forms of environmental noise.

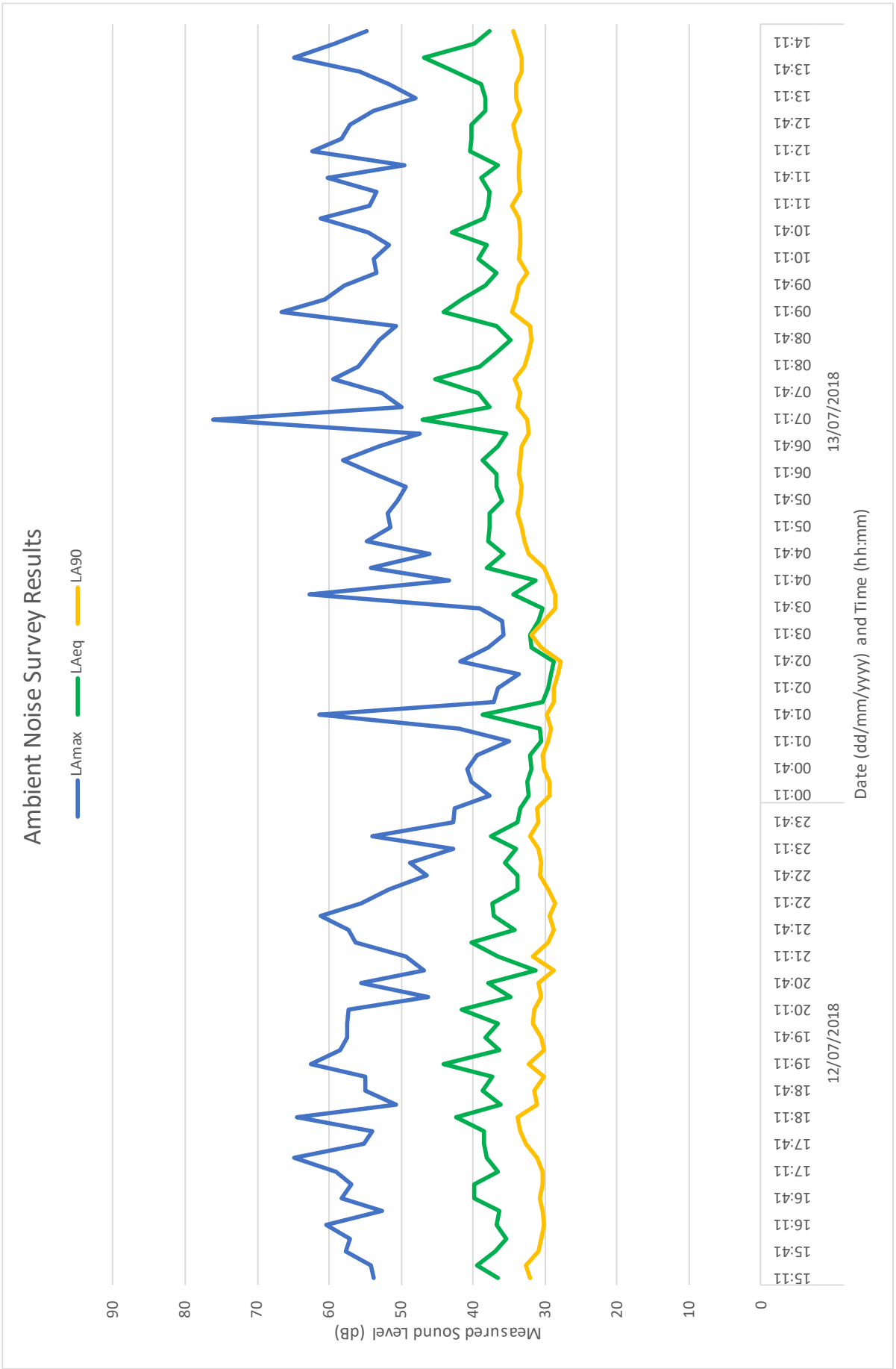
L_{Amax} This is the maximum A–weighted noise level that was recorded during the monitoring period.

L_{A90} This is the A–weighted noise level exceeded for 90% of the time period. L_{A90} is used as a measure of background noise.

Appendix II: Ambient Noise Survey Results

Date(s):	Thursday 12 to Friday 13 July 2018
Equipment:	Rion NL-31 'Class 1' sound level meter (S/N: 00242747) with calibrator and environmental kit
Weather:	Daytime: Mostly dry with some light drizzle in the evening, Warm ~17-23°C, low winds <2m/s with moderate cloud coverage Night-time: Mostly dry with some light showers, Warm ~15-17°C, low winds <1m/s with moderate cloud coverage

Please see results in graph overleaf.


Ambient Noise Survey Results
LAmax
LAeq
LA90
Measured Sound Level (dB)
0
10
20
30
40
50
60
70
80
90
12/07/2018
13/07/2018
Date (dd/mm/yyyy) and Time (hh:mm)
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