SHARPS REDMORE

ACOUSTIC CONSULTANTS · Established 1990

# Report

**Environmental Noise Assessment – Discharge Planning Condition 4 of Planning Consent UTT/23/1569/FUL**

Pond Mead, High Street, Widdington, Saffron Walden

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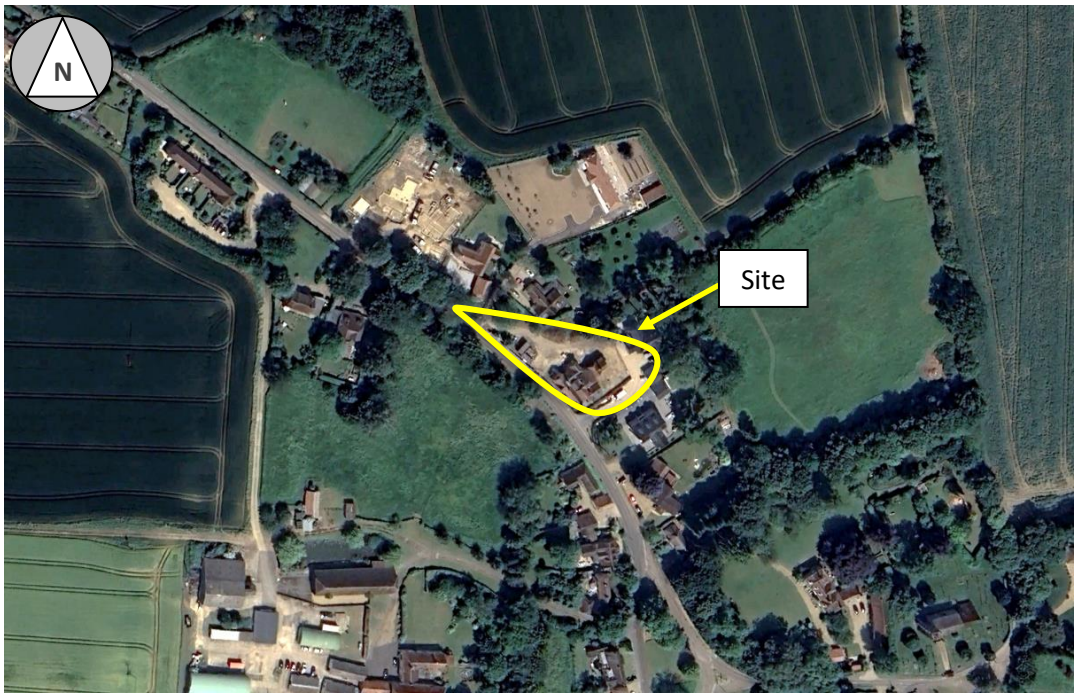
# Appendices

## 1.0 Introduction

1.1 Sharps Redmore (SR) has been instructed to undertake an acoustic assessment for the consented subdivision of an existing house to create 2no. houses. The objective of this assessment is to demonstrate how the sound insulation of the building will comply with the requirements of Condition 4 of the planning permission UTT/23/1569/FUL, full details are in Section 2.0. The site location is shown in Figure 1.1 below.

**FIGURE 1.1: Site Location (approximate outline) – Pond Mead, High Street, Widdington**




1.2 The site is located to the north of the village Widdington, Saffron Walden along High Street. Currently, the site is a large vacant single dwelling which will be split to create two dwellings with a total of seven bedrooms. The site was granted planning permission in October 2023.

1.3 When referencing throughout the report, the front façade of the building refers to the road facing/west façade and the rear is the façade at the back of the site/east direction.

1.4 A guide to the acoustic terminology used in the report is included in Appendix B.

## 2.0 Assessment Methodology and Criteria

### Local Policy

2.1 The site falls within the administrative area of Uttlesford District Council (UDC) which has granted planning permission on 17 October 2023 for the development (application no.: UTT/23/1569/FUL) with a number of conditions. Condition 4 relates to acoustics and is reproduced below:

*"4 Prior to commencement of the development hereby approved, a detailed noise protection scheme (NPS), informed by an assessment of the current noise environment, shall be submitted to and approved in writing by the Local Planning Authority.*

*The NPS shall be designed, specified and constructed so that the sound insulation performance of the structures and the layout of the development hereby approved are such that the indoor ambient noise levels do not exceed the values detailed in Table 4 of British Standard 8233:2014 and that the individual noise events do not exceed 45 dB $L_{A,max,F}$ more than 10 times a night.*

*Where opening windows will lead to an internal noise level increase of 5 dBA or greater above British Standard 8233:2014 recommended internal levels, the scheme shall include provision of alternative mechanical ventilation with minimum performance equivalent to a mechanical heat recovery (MVHR) system with cool air bypass as an alternative means of cooling and ventilation. Noise from the system should not result in British Standard 8233:2014 internal levels being exceeded.*

*Thereafter, the approved NPS shall be fully implemented prior to occupation of the dwellings hereby approved and shall be retained as such at all times unless otherwise agreed in writing by the local planning authority.*

*REASON: To safeguard residential amenities, in accordance with the adopted Uttlesford Local Plan Policies GEN2, ENV10, ENV11, and the National Planning Policy Framework (2023)."*

### Design Guidance

2.2 The current nationally recommended internal noise levels for dwellings are given in BS 8233:2014 (BS:8233) 'Guidance on Sound Insulation & Noise Reduction for Buildings'. BS 8233 recommends the following internal noise standards:

**TABLE 2.1: Guideline noise values**

| BS 8233:2014 Table 4 – Indoor ambient noise levels for dwellings | | | |
|---|---|---|---|
| Activity | Location | 0700 to 2300 | 2300 to 0700 |
| Resting | Living room | 35 dB $L_{Aeq,16hour}$ | - |
| Dining | Dining room/area | 40 dB $L_{Aeq,16hour}$ | - |
| Sleeping (daytime resting) | Bedroom | 35 dB $L_{Aeq,16hour}$ | 30 dB $L_{Aeq,8hour}$ |

2.3 The previous version (1999) of BS 8233 contained two guidelines for internal criteria; good and reasonable. The difference between the good and reasonable criteria was 5 dB. Whilst the 5 dB relaxation in noise criteria is not specifically referred to in the table above, Note 7 advises that "where development is considered necessary or despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved" this is consistent with the criteria contained within the planning condition.

2.4 There is no longer a $L_{AMAX}$ standard for bedrooms In BS 8233. However, footnote 4 to Table 4 states that "Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$ depending on the character and number of events per night. Sporadic noise events could require separate values." In this case, it is proposed that the previous BS 8233 internal standard (also referenced in World Health Organisation Guidelines for Community Noise) is applied. This is 45 dB $L_{AMAX}$, inside bedrooms occurring no more than 10 – 15 times per night.

2.5 Regard is also given to the guidance document for Building Regulation Approved Document O which relates to over-heating. The advice in the document is that for moderate risk locations (anywhere outside greater London) that where external maximum levels are higher than 64 dB $L_{Amax}$ more than 10 times a night then an assessment should be carried out to demonstrate compliance. It can therefore be assumed that if maximum levels are below the threshold that windows can be open to reduce the impact of overheating.

## 3.0 Noise Survey Details

3.1 A noise survey was undertaken at site between 16:00 hours on Tuesday 7th and 07:00 hours on Wednesday 8th November 2023 at two locations representing the front façade and the rear façade of the building. One sound level meter was installed in line with the front façade at approximately 1.4m above local ground level (Location A) and a second sound level meter was installed in line with the rear façade at approx. 2m above local ground level (Location B). The meters were set to measure existing ambient noise levels over 15-minute periods. The measurement locations are shown in Figure 3.1 below.

**FIGURE 3.1: Measurement locations**


3.2 Noise levels were recorded using two Rion NL52 Class 1 sound level meters which were calibrated before and after the surveys with no drift in accuracy found in either meter. Due to current site activity, noise levels were taken from 16:00 hours onwards. Weather conditions throughout the noise survey were mostly suitable for taking noise measurements being dry and calm wind conditions being predominately from a south-west direction (<5m/s). Noise measurements during the morning period, after 07:00 hours, on Wednesday 8th were taken in rainy conditions and have therefore been discounted from this assessment. Noise levels were dominated by road traffic.

3.3 Table 3.1 below presents a summary of the noise levels obtained including calculated noise levels for the middle of the site with a clear view of the road. Graphical results of the survey periods are contained within Appendix A. Full results are available on request.

**TABLE 3.1: Summary of typical noise levels – 7th to 8th November 2023 (free field)**

| Location/façade | Daytime dB $L_{Aeq,16hr}$ | Night-time dB $L_{Aeq,8hr}$ | Night-time dB $L_{AfMax}$ |
|---|---|---|---|
| Front (A) | 53 | 47 | 64 |
| Middle | 51 | 46 | 60 |
| Rear (B) | 48 | 44 | 55 |

3.4 Figure 3.2 below presents a plan indicating where the front, middle and rear façades refer to.

**FIGURE 3.2: Plan of the site showing front, middle and rear locations**

## 4.0 Noise Assessment

### Noise Levels Through an Open Window

4.1 Part of Condition 4 states that where opening windows will lead to an internal noise level increase of 5 dBA or greater above BS 8233 recommended internal levels, the scheme shall include provision of alternative mechanical ventilation. An open window provides around a 10-15 dB reduction in external noise levels. Table 4.1 below presents a summary of noise levels through an open window using 13 dB reduction through an open window.

**TALE 4.1: Noise levels through an open window**

| Location / Façade | Noise level-13 dB | | BS 8233+5 dB Criteria | | Criteria Met? | |
|---|---|---|---|---|---|---|
| | Day dB $L_{eq}$ | Night dB $L_{eq}$ | Daytime* | Night-time | Daytime | Night-time |
| Front | 40 (53-13) | 34 (47-13) | 35 + 5 = 40 | 30 + 5 = 35 | Yes | Yes |
| Middle | 38 (51-13) | 33 (46-13) | | | Yes | Yes |
| Rear | 35 (48-13) | 31 (44-13) | | | Yes | Yes |

*Based on BS 8233 daytime resting noise level.

4.2 In relation to maximum noise levels, $L_{Afmax}$, typical maximum noise levels did not exceed 64 dB, this is within the recommended criteria in the ANC guide on AD-O. Therefore, taking into account both $L_{AeqT}$ and $L_{Afmax}$ levels suitable internal noise levels can be achieved, in accordance with planning Condition 4, with windows open and therefore does not require a scheme of alternative ventilation.

### Building Façade Elements

4.3 The octave band levels in Table 4.2 are associated with the typical external dBA noise levels presented in Table 3.1 and have been used as part of the building envelope assessment for the two houses.

**TABLE 4.2: Octave Band Linear Frequency Spectra**

| Location / Façade | Parameter | Octave Band Centre Frequency Hz | | | | | | | | dBA |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 63 | 125 | 250 | 500 | 1k | 2k | 4k | 8k | |
| Front | Day dB $L_{eq}$ | 58 | 50 | 50 | 50 | 50 | 44 | 34 | 23 | 53 |
| | Night dB $L_{eq}$ | 53 | 44 | 42 | 44 | 45 | 37 | 26 | 21 | 47 |
| | Night typical dB $L_{fmax}$ | 74 | 66 | 64 | 60 | 61 | 54 | 49 | 38 | 64 |
| Middle | Day dB $L_{eq}$ | 59 | 51 | 49 | 49 | 48 | 40 | 30 | 24 | 51 |
| | Night dB $L_{eq}$ | 53 | 48 | 45 | 44 | 42 | 32 | 30 | 27 | 46 |
| | Night typical dB $L_{fmax}$ | 59 | 54 | 57 | 54 | 57 | 54 | 43 | 34 | 60 |
| Rear | Day dB $L_{eq}$ | 52 | 46 | 44 | 45 | 46 | 36 | 28 | 24 | 48 |
| | Night dB $L_{eq}$ | 46 | 41 | 40 | 42 | 42 | 31 | 26 | 22 | 44 |
| | Night typical dB $L_{fmax}$ | 59 | 52 | 48 | 49 | 53 | 45 | 35 | 32 | 55 |

4.4 Having reviewed the plan drawings provided in terms of room sizes and based on the window sizes shown on the elevations, noise break-in calculations have been undertaken in accordance with the method outlined in BS 8233 and the sound insulation required of the external wall, roof window and trickle ventilation have been reviewed. It has been assumed that the rooms have a height of 2.5m.

4.5 The airborne sound insulation performance of wall and window elements are given in terms of $R_w$ for laboratory requirements (measured in accordance with BS EN ISO 10140-2 2021 and rated in accordance with BS EN ISO 717-1 2020 or national equivalent).

4.6 The airborne sound insulation performance of ventilation elements are given in terms of $D_{ne,w}$ for laboratory requirements (measured in accordance with BS EN ISO 10140-2 2021 and rated in accordance with BS EN ISO 717-1 2020 or national equivalent).

4.7 Selected products shall provide evidence of compliance with these standards.

**External Wall**

4.8 SR have been informed that the existing external wall and what is proposed to be retained consists of a timber frame with render externally and plaster internally. For the purpose of the assessment it has been assumed that the non-glazed elements of the façade system for will meet the minimum sound insulation requirements detailed in Table 4.3.

**TABLE 4.3 – Non-glazed wall specification to all habitable rooms**

| Façade / Room | Octave band centre frequency Hz – R dB | | | | | | |
|---|---|---|---|---|---|---|---|
| | 63 | 125 | 250 | 500 | 1k | 2k | 4k |
| All | 13 | 23 | 39 | 46 | 42 | 55 | 57 |

**Roof**

4.9 The roof is a pitched roof with clay tiles. The sound reduction, R, of the roof should meet the performance provided ahead in Table 4.4 to be capable of achieving the internal ambient noise level criteria and has been used within calculations.

**TABLE 4.4 – Roof**

| Octave band centre frequency Hz – R dB | | | | | | |
|---|---|---|---|---|---|---|
| 63 | 125 | 250 | 500 | 1k | 2k | 4k |
| 15 | 32 | 42 | 49 | 54 | 50 | 56 |

**Glazing Elements**

4.10 The window and glazed door system must be considered as the glazing element, seals and frame combined. For all habitable rooms (living rooms, snugs, living / kitchen open plan and bedrooms) the chosen glazing systems must achieve the minimum sound reduction indices as detailed in Table 4.5.

**TABLE 4.5 – Glazing system specifications for all habitable rooms**

| Façade / Room | Octave band centre frequency Hz – R dB | | | | | | | $R_w$ dB | Example of typical construction (mm) |
|---|---|---|---|---|---|---|---|---|---|
| | 63 | 125 | 250 | 500 | 1k | 2k | 4k | | |
| All | 18 | 23 | 20 | 24 | 35 | 41 | 36 | 30 | Standard thermal double glazing 4-10-4 |

4.11 The above sound insulation requirements are the overall performances for the window and glazed door systems (including frame, seal and glass).

**Acoustic Performance of Façade Ventilation**

4.12 The ventilation strategy is not currently known to SR, so we have assumed that trickle ventilation through a window is likely to be used. Habitable rooms will require ventilators such which will meet the performance in Table 4.6 below. The assessment assumes a free, or open, area of two ventilators no greater than 8mm$^2$. Changes to this area will affect the acoustic performance requirement of the ventilator.

**TABLE 4.6 – Acoustic performance of ventilation units for all habitable rooms**

| Façade / Room | Octave Band Centre Frequency Hz | | | | | | | $D_{ne,w}$ dB |
|---|---|---|---|---|---|---|---|---|
| | 63 | 125 | 250 | 500 | 1k | 2k | 4k | |
| Bedrooms | 23 | 26 | 24 | 30 | 36 | 42 | 46 | 34 |
| All other habitable rooms that aren't bedrooms | 24 | 27 | 24 | 25 | 32 | 37 | 36 | 31 |

4.13 Considering the mitigation measures available, suitable internal noise levels within the dwellings can be achieved and noise from road traffic noise will not cause an adverse impact in line with the policy aims of the NPPF.

**Overheating**

4.14 As stated in paragraphs 4.1 to 4.2 with windows open, predicted noise levels in the habitable rooms shall not exceed the local authority's criteria of BS 8233 + 5 dB. Therefore, opening windows as a way to mitigate overheating shall not subject the occupiers to any unreasonable noise levels.

## 5.0 Conclusions

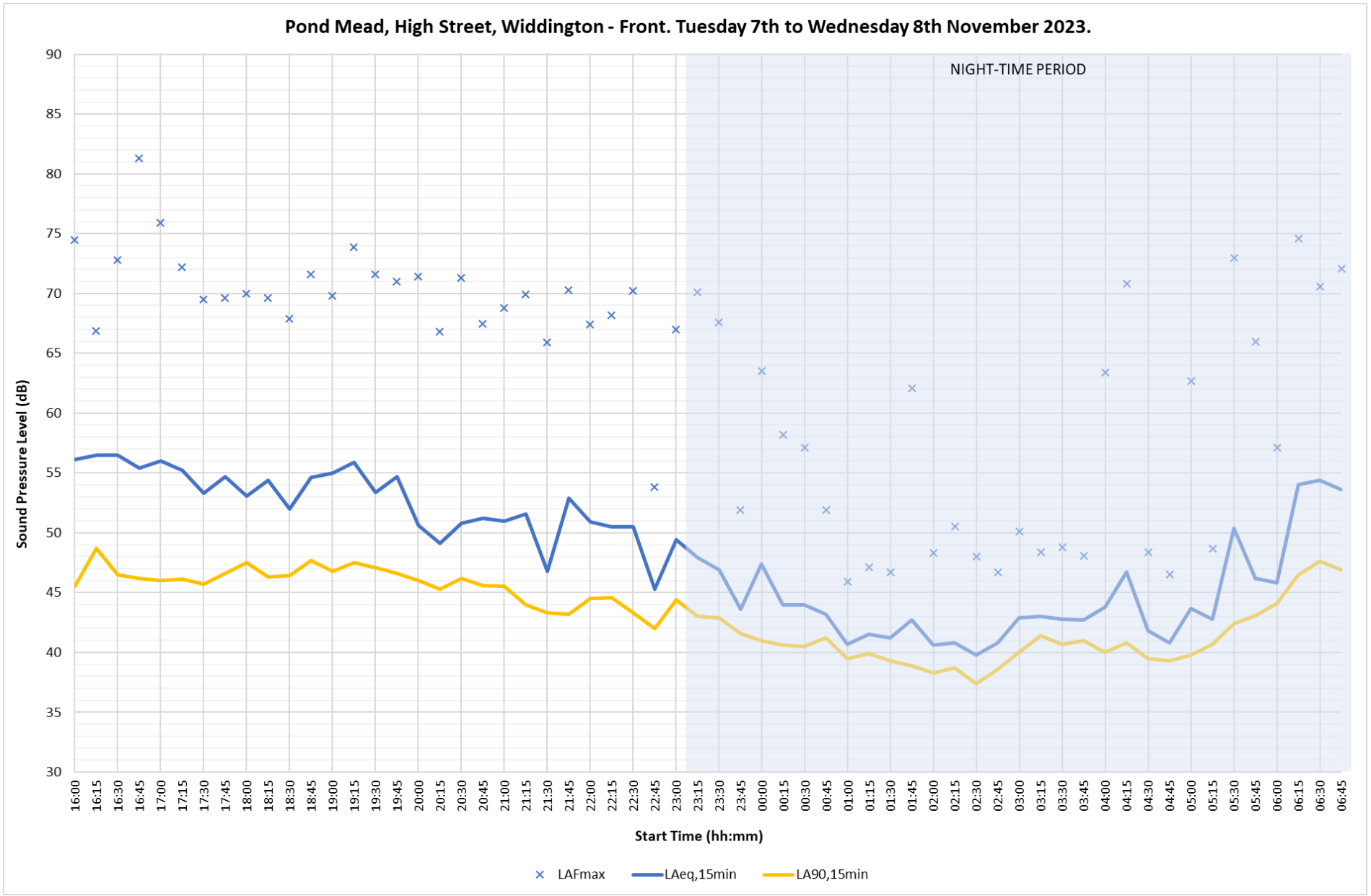
5.1 Sharps Redmore has undertaken an acoustic assessment with the aim of discharging Condition 4, of application UTT/23/1569/FUL, for the permitted subdivision of an existing house to create 2no. houses at Pond Mead, High Street, Widdington, Saffron Walden.

5.2 An environmental noise survey has been undertaken to measure existing daytime and night time ambient noise levels on both the front and rear façades.

5.3 A performance specification has been given for the external wall, roof, window and ventilation systems necessary to achieve the internal noise criteria as stated in Condition 4. Consideration has also been given to the openable windows element of the condition, which has shown that the site shall meet the criteria set. It is therefore considered that Condition 4 can be discharged.

# APPENDIX A

# NOISE SURVEY GRAPHS


Pond Mead, High Street, Widdington - Front. Tuesday 7th to Wednesday 8th November 2023.
NIGHT-TIME PERIOD
Sound Pressure Level (dB)
90
85
80
75
70
65
60
55
50
45
40
35
30
16:00
16:15
16:30
16:45
17:00
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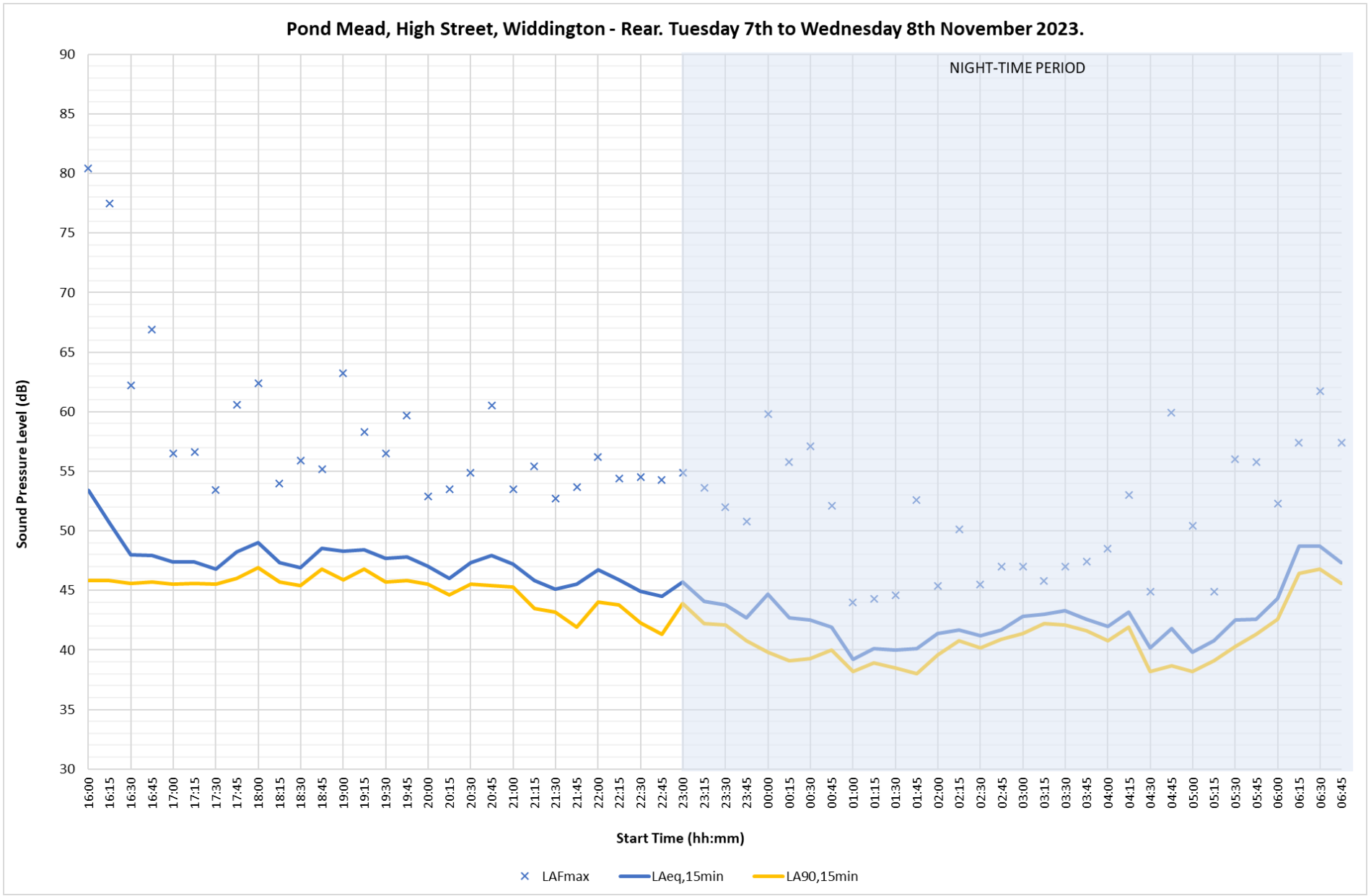
06:30
06:45
Start Time (hh:mm)
LAFmax
LAeq,15min
LA90,15min


Pond Mead, High Street, Widdington - Rear. Tuesday 7th to Wednesday 8th November 2023.
NIGHT-TIME PERIOD
Sound Pressure Level (dB)
90
85
80
75
70
65
60
55
50
45
40
35
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16:00
16:15
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04:30
04:45
05:00
05:15
05:30
05:45
06:00
06:15
06:30
06:45
Start Time (hh:mm)
LAFmax
LAeq,15min
LA90,15min

# APPENDIX B

# ACOUSTIC TERMS

## Acoustic Terminology

1 Noise, defined as unwanted sound, is measured in units of decibels, dB. The range of audible sounds is from 0 dB to 140 dB. Two equal sources of sound, if added together will result in an increase in level of 3 dB, i.e. 50 dB + 50 dB = 53 dB. Increases in continuous sound are perceived in the following manner:

1 dB increase - barely perceptible.

3 dB increase - just noticeable.

10 dB increase - perceived as twice as loud.

2 Frequency (or pitch) of sound is measured in units of Hertz. 1 Hertz (Hz) = 1 cycle/second. The range of frequencies audible to the human ear is around 20Hz to 18000Hz (or 18kHz). The capability of a person to hear higher frequencies will reduce with age. The ear is more sensitive to medium frequency than high or low frequencies.

3 To take account of the varying sensitivity of people to different frequencies a weighting scale has been universally adopted called "A-weighting". The measuring equipment has the ability automatically to weight (or filter) a sound to this A scale so that the sound level it measures best correlates to the subjective response of a person. The unit of measurement thus becomes dBA (decibel, A-weighted).

4 The second important characteristic of sound is amplitude or level. Two units are used to express level, a) sound power level - $L_w$ and b) sound pressure level - $L_p$. Sound power level is an inherent property of a source whilst sound pressure level is dependent on surroundings/distance/directivity, etc. The sound level that is measured on a meter is the sound pressure level, $L_p$.

5 External sound levels are rarely steady but rise or fall in response to the activity in the area - cars, voices, planes, birdsong, etc. A person's subjective response to different noises has been found to vary dependent on the type and temporal distribution of a particular type of noise. A set of statistical indices have been developed for the subjective response to these different noise sources.

6 The main noise indices in use in the UK are:

$L_{A90}$: The sound level (in dBA) exceeded for 90% of the time. This level gives an indication of the sound level during the quieter periods of time in any given sample. It is used to describe the "background sound level" of an area.

$L_{Aeq}$: The equivalent continuous sound level in dBA. This unit may be described as "the notional steady noise level that would provide, over a period, the same energy as the intermittent noise". In other words, the energy average level. This unit is now used to measure a wide variety of different types of noise of an industrial or commercial nature, as well as aircraft and trains.

$L_{A10}$: The sound level (in dBA) exceeded for 10% of the time. This level gives an indication of the sound level during the noisier periods of time in any given sample. It has been used over many years to measure and assess road traffic noise.

$L_{AMAX}$: The maximum level of sound measured in any given period. This unit is used to measure and assess transient noises, i.e. gun shots, individual vehicles, etc.

7 The sound energy of a transient event may be described by a term SEL - Sound Exposure Level. This is the $L_{Aeq}$ level normalised to one second. That is the constant level in dBA which lasting for one second has the same amount of acoustic energy as a given A weighted noise event lasting for a period of time. The use of this unit allows the prediction of the $L_{Aeq}$ level over any period and for any number of events using the equation;

$$L_{AeqT} = SEL + 10 \log n - 10 \log T \text{ dB}.$$

Where

n = Number of events in time period T.

T = Total sample period in seconds.

8 In the open, known as free field, sound attenuates at a rate of 6 dB per each doubling of distance. This is known as geometric spreading or sometimes referred to as the Inverse Square Law. As noise is measured on a Logarithmic scale, this attenuation in distance = 20 Log (ratio of distances), e.g. for a noise level of 60 dB at ten metres, the corresponding level at 160 metres is:

$$60 - 20 \text{ Log } {}^{160}/_{10} = 60 - 24 = 36 \text{ dB}.$$