hepworth acoustics

WATTS DYKE, LLAY (PHASE 2)
PROPOSED RESIDENTIAL DEVELOPMENT

NOISE IMPACT ASSESSMENT

On behalf of:

SG Estates

Report No: P24-297-R01v3
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PROPOSED RESIDENTIAL DEVELOPMENT

NOISE IMPACT ASSESSMENT

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1.0 INTRODUCTION

1.1 Hepworth Acoustics Ltd was commissioned by SG Estates to carry out a road traffic noise assessment in connection with a proposed planning application for Phase 2 of the proposed Watts Dyke residential development in Llay. Phase 1 of the development is to the west beyond the Royal British Legion and is currently under construction.

1.2 The Phase 2 land, which is currently an open area of grass, is located to the east of Llay New Road (B5425), a busy single carriageway road with a 30 mph speed limit.

1.3 To the north is Watts Dyke, a quiet residential street with dwellings to the other side. To the south is an area of woodland and to the west is the British Legion premises and associated car parking. There is no outdoor seating area at the British Legion.

1.4 The location of the development site is shown in Figure 1, and the proposed development layout is shown in Figure 2.

1.5 The proposals are for the construction of nine dwellings as part of this phase. The proposed layout of the site is such that the dwellings front onto Llay New Road with rear gardens and parking facing towards the British Legion.

1.6 The noise assessment has included:

i. An inspection of the site and surrounding area;

ii. Measurement of road traffic noise levels from Llay New Road on the development site;

iii. Assessment of the potential noise impact on the development; and

iv. Recommendation of appropriate noise mitigation measures.

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 ROAD TRAFFIC NOISE SURVEY

2.1 Road traffic noise measurements were carried out at a location close to Llay New Road. The noise measurement location is summarised below and indicated in Figure 1.

- Location 1: 5 metres from Llay New Road

2.2 The noise measurements were taken between approximately 12:00 on Monday 12th August and 12:00 on Tuesday 13th August 2024.

2.3 The noise surveys were carried out using a NTi Audio XL2 'Class 1' integrating sound level meter (s/n: A2A-20228-E0), complying with BS EN 60804:2001 and independently calibrated within the preceding 24 months.

2.4 Field acoustic calibration of the sound level meter was carried out before and after the noise measurements using an acoustic calibrator that had been independently calibrated within the preceding 12 months. No significant variation in the calibrated noise levels was noted.

2.5 The noise survey measurements were taken in consecutive 2-minute periods. The noise measurements have been carried out in general compliance with BS 7445: 2003. The noise measurements were taken in 'free-field' conditions and at a microphone height of approximately 1.5 metres above the ground.

2.6 Octave band frequency analysis was also carried out to assist with the design of sound insulation measures.

2.7 Due to ongoing site construction activity as part of road forming, some of our daytime noise measurements were unduly affected by this noise and thus unsuitable for use in this assessment.

2.8 Therefore, daytime noise levels have been evaluated in accordance with the 'shortened measurement method' described in the Department of Transport document *'Calculation of Road Traffic Noise' (CRTN)*, 1988. The memorandum was prepared to enable entitlement under the *Noise Insulation Regulations* 1975 to be determined, but as is stated in the document, the guidance is equally appropriate to the calculation of traffic noise for land use planning purposes.

2.9 The CRTN shortened measurement method involves taking noise measurements (in L_{A10}) over representative time periods within any three consecutive hours between 10:00 and 17:00. By using the $L_{A10,3hr}$, as the arithmetic mean of the measured L_{A10} values, the $L_{A10,18hr}$ value can then be calculated. The correction to obtain the $L_{A10,18hr}$ value from the $L_{A10,3hr}$ level is -1 dB.

2.10 For the purposes of the assessment the time period of between 14:00-17:00 have been selected as representative of the noise climate in the absence of construction noise.

2.11 The $L_{A10,18hr}$ value has then been converted into the equivalent $L_{Aeq,16hr}$ value by applying a correction of -2 dB, as set out in paragraph 6.2.2 of BS 8233.

2.12 The measured night-time (23:00-07:00) L_{Aeq} values have been logarithmically averaged to obtain the actual $L_{Aeq,8hr}$ value.

2.13 The full results of the traffic noise survey are shown in Appendix II. A summary of the results is provided in Table 1 below.

Table 1: Calculated Road Traffic Noise Exposure Levels (dB)

Location	Daytime $L_{Aeq,16hr}$	Night-time $L_{Aeq,8hr}$
1. Llay New Road	62	59

2.14 Corresponding corrected for distance peaks of noise at Location 1 during the night were in the range 36 – 90 dB L_{Amax} due to passing vehicles, with the 15th highest measured night-time $L_{Amax,2min}$ being 79 dB.

3.0 BRITISH LEGION NOISE SURVEY

3.1 An 'attended' noise survey has been carried out at a location on the site representative of dwellings that will be closest to and potentially most exposed to any noise from Llay Royal British Legion. The measurement location is shown in Figure 1 as Location 2.

3.2 The layout of the Llay Royal British Legion is such that the lounge room faces towards the Phase 2 dwellings, there are windows to the lounge and a fire door which appears to be kept closed. There is also a function room which are used for scheduled events and is also hired day and evening events such as birthday celebrations the function room is located on the opposite side of the building away from Phase 2.

3.3 The car park for the British Legion is located to the rear of Plots 57, 58 & 59 although there is parking for the dwellings in-between and thus a standoff between the two of around 10m. The entrance to the British Legion building is to the front and appears to be lobbied such that noise breakout from the function room does not occur.

3.4 The opening hours of the Llay Royal British Legion are as follows:

- Monday – Thursday 17:00-23:00
- Friday 15:00-00:00
- Saturday 12:00-00:00
- Sunday 12:00-23:00

3.5 The noise measurements were taken between approximately 22:00-00:00 on Saturday 31st August 2024. The measurements were carried out using a NTi Audio XL2 'Class 1' integrating sound level meter (s/n: A2A-20228-E0) which has been independently calibrated within the preceding 12 months. Field acoustic calibration of the sound level meter was carried out before and after the noise measurements using an acoustic calibrator that had itself been independently calibrated within the preceding 12 months. No variation in the calibrated noise level occurred.

3.6 The noise measurements have been carried out in general compliance with BS 7445: 2003, in 'free-field' conditions and at a microphone height of approximately 1.4 m above the ground. Octave band frequency analysis was also carried out to assist with the design of outline sound insulation measures.

3.7 The noise climate of the area is dominated by road traffic on Llay New Road. However, no audible noise from the British Legion was detected, even during brief lulls in traffic. It should be noted that the fire

door to the lounge was kept closed at all times and no noise was audible from the function room. There was a number of car movements during the survey and noise from the vehicles included doors slamming.

3.8 The noise levels measured at the survey location were between 51-59 $L_{Aeq,15min}$, although as previously mentioned this way primarily due to road traffic.

3.9 The implications of the survey results and our outline recommendations are set out in the following sections.

4.0 ASSESMENT

4.1 The results of the traffic noise survey have been assessed in accordance with the guidance in '*Technical Advice Note (Wales) 11 – Noise', 1997 (TAN 11)* and *CL-01-15* updates. TAN 11 sets out Noise Exposure Categories (NECs) for proposed residential development land that is exposed to different types of noise, and their suitability for residential use.

4.2 The NECs for land exposed to road traffic noise are shown in Table 2.

	Noise Exposure Category			
	A	B	C	D
Daytime (07:00-23:00)	<55	55-63	63-72	>72
Night-time (23:00-07:00)	<45*	45-57*	57-66	>66

[* sites where noise events regularly exceed 82 dB L_{Amax} several times in any hour at night should be treated as being in Category C]

Category A - Noise need not be considered as a determining factor in granting planning permission.

Category B - Noise should be taken into account and steps taken to ensure an adequate level of protection against noise.

Category C - Planning permission should not normally be granted. Where development is permitted, steps should be taken to ensure a commensurate level of protection against noise.

Category D - Planning permission should normally be refused.

4.3 The results of the traffic noise measurements demonstrate the site falls into Category B of TAN 11 in the daytime and Category C during the night.

4.4 In our experience most local planning authorities will permit development of land in Category C as long as appropriate noise mitigation measures are implemented that safeguard residential amenity, such measures typically include provision of upgraded glazing, acoustic ventilation and acoustic fencing.

4.5 Therefore, we conclude that, subject to an adequate scheme of noise mitigation measures to provide a commensurate level of noise protection, the site can be developed for residential use. We consider that it will be reasonably straightforward to provide adequate noise protection at this site. Appropriate acoustic design goals are discussed in Section 4.0 and our outline recommendations for noise mitigation are set out in Section 5.0.

5.0 ACOUSTIC DESIGN CRITERIA

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

5.1 Guidance on acceptable noise levels in habitable rooms and private gardens is set out in British Standard 8233: 2014, *'Guidance on sound insulation and noise reduction for buildings'*, which carries the full weight of an adopted British Standard. BS 8233 recommends that it is desirable that noise from external sources does not exceed the guidelines values that are shown in Table 3 inside habitable rooms for daytime (07:00 – 23:00) and night-time (23:00 – 07:00) periods.

Table 3: BS 8233:2014 Recommended Acoustic Design Criteria (dB $L_{Aeq,T}$)

Activity	Location	Daytime 07:00 – 23:00	Night-time 23:00 – 07:00
Resting	Living room	35	-
Dining	Dining room/area	40	-
Sleeping (daytime resting)	Bedroom	35	30

5.2 BS 8233 also recognises that regular individual noise events at night can cause sleep disturbance, thigh no specific criterion is stated. Peaks of noise from individual events are usually described in terms of L_{Amax} values and these can be highly variable and unpredictable such that for design purposes it is usual to take into account the findings of research described in WHO *Community Noise Guidelines* that states 'for a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB L_{Amax} more than 10-15 times per night'.

5.3 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; and
- Night-time noise levels not exceeding 30 dB L_{Aeq} and generally not exceeding 45 dB L_{Amax} in bedrooms.

5.4 For outdoor amenity spaces such as private gardens and patios, BS8233 states that 'it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$ with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments'. However, the new standard also recognises that these guideline values are not achievable in all circumstances where development might be desirable and, in such cases, for sites near to the 'strategic transport network' higher noise levels in gardens may be acceptable. Nevertheless, at this stage, we have adopted an acoustic design criterion of up to 55 dB $L_{Aeq(16\ hours)}$ for private rear gardens of the new dwellings for this proposed residential development.

5.5 Meeting the above adopted noise criteria will provide a good standard of protection of residential amenity for future residents of the proposed development.

5.6 Our outline noise mitigation recommendations to meet the adopted noise criteria are described in Section 5.0.

6.0 RECOMMENDED NOISE MITIGATION MEASURES

6.1 Windows of standard well-sealed thermal double glazing (4mm glass – 4mm glass) have a typical sound reduction performance of 25 dB $R_w + C_{tr}$. Therefore, where external noise levels exceed values of 60 dB $L_{Aeq,16hr}$ during the daytime and/or 55 dB $L_{Aeq,8hr}$ and/or 70 dB L_{Amax} at night, higher specification glazing will be necessary.

Glazing

6.2 Taking into account the noise survey results, for bedrooms of elevations most exposed to traffic noise (marked in blue on Figure 2) we recommend double glazed windows having a minimum sound insulation performance of 35 dB $R_w + C_{tr}$. Typically, this would be achieved with a double glazing specification of:

- 8 mm Solaglas 'Stadip Silence' laminated glass – nominal (12-20 mm) cavity – 8.8 mm glass.

6.3 For living rooms of these dwellings, we recommend double glazed windows having a minimum sound insulation performance of 29 dB $R_w + C_{tr}$. Typically, this would be achieved with a double-glazing specification of:

- 6 mm glass - nominal (8-20 mm) cavity – 4 mm glass.

Ventilation

6.4 Also, for habitable ground floor rooms and bedrooms for which sound insulated windows have been recommended above as well as the bedrooms to the rear that face towards the British Legion, we recommend that specialist acoustic vents are fitted instead of standard window frame slot vents. Various types of acoustic vents are commercially available.

6.5 However, in terms of acoustic performance, we would recommend types such as the Greenwood EAR42W 3-part system, comprising humidity sensitive indoor unit, acoustic sleeve, and outdoor acoustic canopy or wall mounted Ryton AAC125HP units, both of which have a good acoustic performance rating of over 40 dB $D_{n,e,w}$.

Gardens

6.1 The rear gardens on the proposed Phase 2 development will be screened adequately from traffic noise by the houses themselves. However, as the daytime traffic noise exposure level was found to be up to 62 dB $L_{Aeq,16hr}$ in order to achieve traffic noise levels within 55 dB L_{Aeq} in all gardens, we recommend that a 2.0 metre high proprietary acoustic fence is installed for the sides of gardens for the two plots indicated in yellow on Figure 2.

6.2 In addition, as a pragmatic approach and in order to minimise potential noise impact from the British Legion, we recommend that the acoustic barrier is extended across the rear gardens of all plots is incorporated into the proposed development, as shown in Figure 2.

6.3 The acoustic barrier must be imperforate (i.e. have no holes or gaps) and achieve a surface mass of at least 10 kg/m^2. This could typically be formed of proprietary acoustic timber fencing of minimum 20mm thickness or solid brick wall.

6.4 Suppliers of proprietary acoustic fences include Jacksons Fencing (jacksons-fencing.co.uk), Guardian Fencing (guardianfencing.com) and Ransfords (ransfords.co.uk).

7.0 SUMMARY

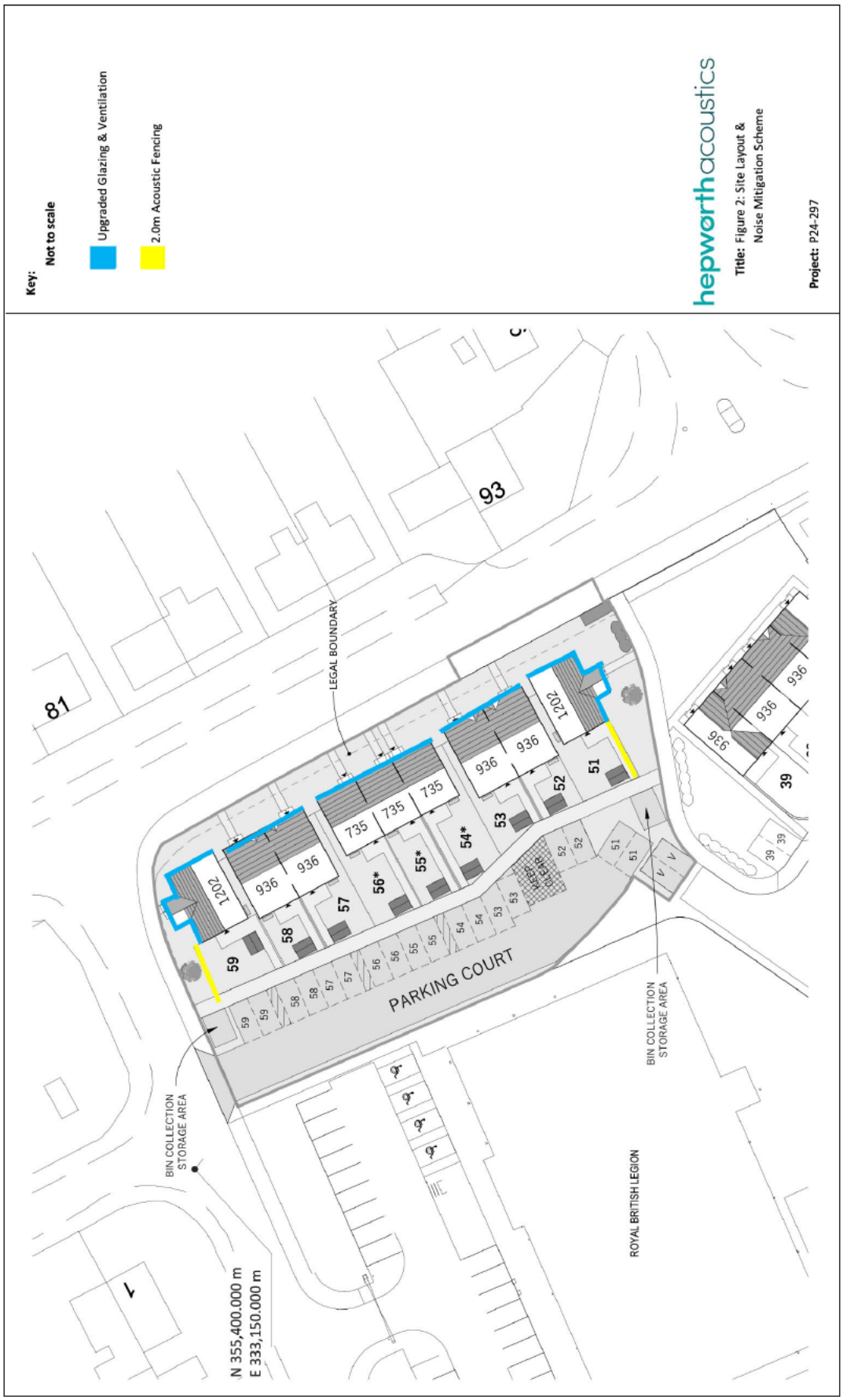
7.1 The impact of noise has been assessed for a proposed residential development on the Watts Dyke Phase 2 development in Llay.

7.2 The assessment has included the measurement of road traffic noise levels on the site during representative periods of the daytime and at night as well as an attended noise survey to measure noise from the Royal British Legion on a Saturday evening and night.

7.3 We have recommended that an appropriate scheme of sound insulation is implemented for the new houses that will be most exposed to traffic noise in order to protect the amenity of the new residents. In addition, as a pragmatic approach to minimise potential noise impact from the British Legion we recommend the implementation of suitable noise mitigation measures to the rear elevation of gardens.

7.4 The implementation of an adequate scheme of noise mitigation measures as described in this report can be ensured by the use of an appropriately worded planning condition.


Key:
Not to scale
Noise Survey Location
1
2
North
hepworthacoustics
Title: Figure 1: Site Location & Noise Measurement Locations
Project: P24-294


Key:
Not to scale
Upgraded Glazing & Ventilation
2.0m Acoustic Fencing
hepworthacoustics
Title: Figure 2: Site Layout & Noise Mitigation Scheme
Project: P24-297
93
81
LEGAL BOUNDARY
PARKING COURT
BIN COLLECTION STORAGE AREA
BIN COLLECTION STORAGE AREA
ROYAL BRITISH LEGION
N 355,400.000 m
E 333,150.000 m
1202
936
735
39
51
52
53
54*
55*
56*
57
58
59

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 120 dB (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_w This is the 'Weighted Sound Reduction Index', and is a single figure quantity of R, the laboratory measured Sound Reduction Index.

$L_{Aeq,T}$ 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, $L_{Aeq,T}$ 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_{AFmax} This is the maximum A–weighted noise level that was recorded during the measurement period in terms of 'Fast' time weighting.

$L_{A10,T}$ This is the A–weighted noise level exceeded for 10% of the time period. $L_{A10,T}$ is usually used as a measure of traffic noise.

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

Appendix II: Noise Survey Results

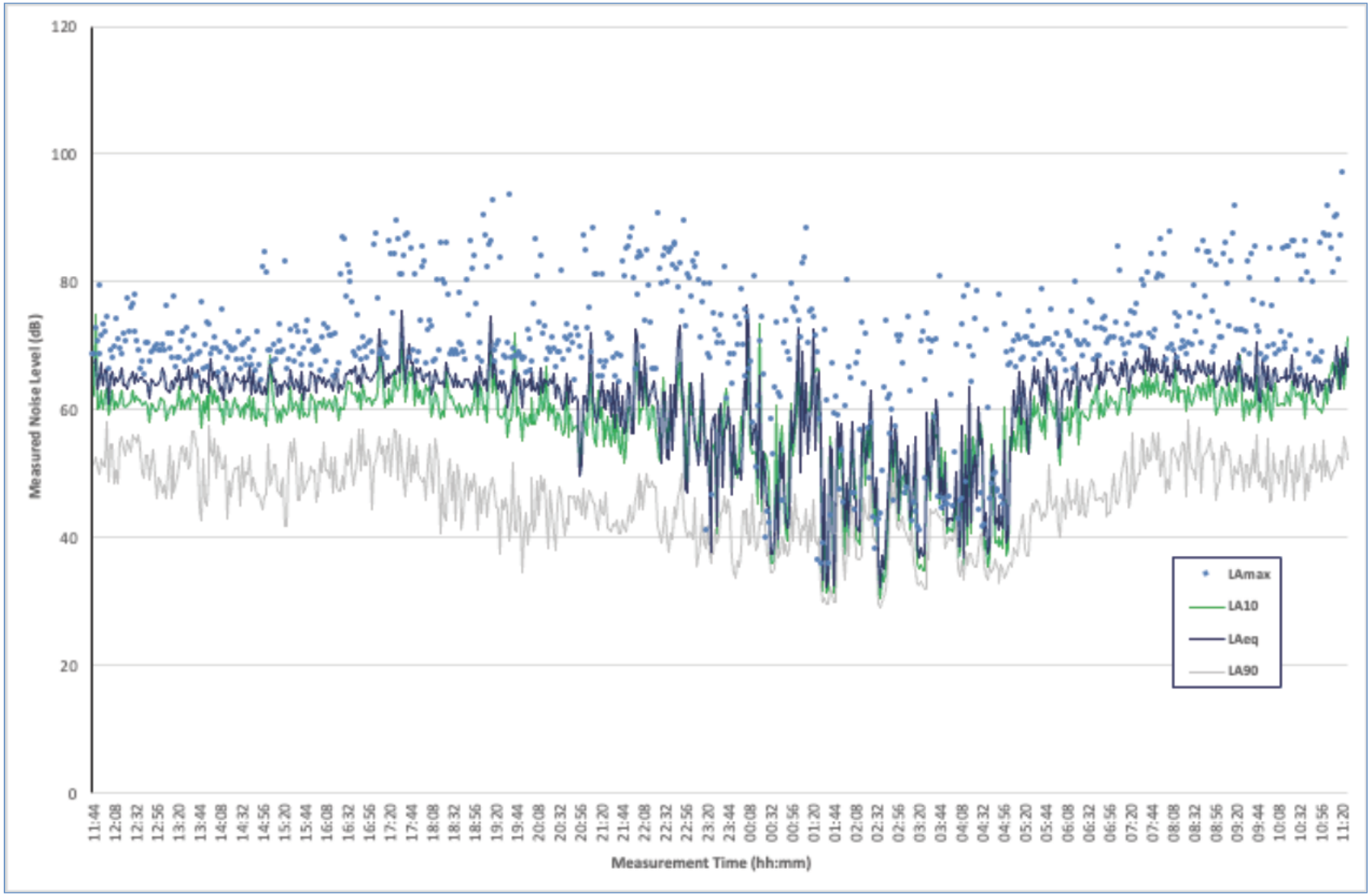
Date(s):	Monday 12th – Tuesday 13th August 2024 Saturday 30th August 2024
Equipment:	NTi XL2 'Class 1' sound level meter (s/n: A2A-20228-E0) with associated calibrator and environmental outdoor monitoring kit
Weather	Daytime – Dry, ~16-20°C, cloudy skies and calm <3 m/s Night-time – Dry, ~13-15°C, clear skies and calm <3 m/s

All levels in dB(A)

Location 2:

Time		Measured Noise Levels (dB)			Comments
Start	End	L_{Amax}	L_{Aeq}	L_{A90}	
22:00	22:15	79	59	48	Road traffic. Distant train. No audible noise from British Legion.
22:15	22:30	74	54	47	Road traffic. Distant train. No audible noise from British Legion.
22:30	22:45	75	56	41	Road traffic. Distant train. No audible noise from British Legion.
22:45	23:00	70	59	46	Road traffic. Distant train. No audible noise from British Legion.
23:00	23:15	77	55	42	Road traffic. Distant train. No audible noise from British Legion.
23:15	23:30	69	53	40	Road traffic. Distant train. No audible noise from British Legion.
23:30	23:45	70	51	40	Road traffic. Distant train. No audible noise from British Legion.

Location 1:


120
100
80
60
40
20
0
Measured Noise Level (dB)
11:44
12:08
12:32
12:56
13:20
13:44
14:08
14:32
14:56
15:20
15:44
16:08
16:32
16:56
17:20
17:44
18:08
18:32
18:56
19:20
19:44
20:08
20:32
20:56
21:20
21:44
22:08
22:32
22:56
23:20
23:44
00:08
00:32
00:56
01:20
01:44
02:08
02:32
02:56
03:20
03:44
04:08
04:32
04:56
05:20
05:44
06:08
06:32
06:56
07:20
07:44
08:08
08:32
08:56
09:20
09:44
10:08
10:32
10:56
11:20
Measurement Time (hh:mm)
LAmax
LA10
LAeq
LA90