hepworth acoustics

LAND TO THE WEST OF MARWICK CLOSE, BOLNEY ROAD, ANSTY

NOISE ASSESSMENT

On behalf of: Devine Homes PLC

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Report No: P23-312-R01 October 2023

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1.0 INTRODUCTION

- 1.1 Hepworth Acoustics Ltd was commissioned to carry out a noise assessment of land to the West of Marwick Close, which is a draft residential allocation (site reference DPH25) in Mid Sussex District Council's emerging local plan. The site location is shown in Figure 1.
- 1.2 The site currently consists of around 1.5 hectares of pastoral land, with the proposed allocation being for up to 45 residential dwellings. A potential layout is shown in Figure 2.
- 1.3 The proposal is for habitable rooms to be naturally ventilated using frame-mounted trickle ventilators above windows. Domestic extract fans will be provided for bathrooms and kitchens as necessary. The development may include domestic heat pumps; this is to be confirmed at the next stage.
- 1.4 The purpose of this assessment is to determine the noise environment at the site, and to confirm whether noise mitigation measures will be required to secure suitable acoustic conditions for the potential residents of the new dwellings, and to control noise impact. This assessment has included the following:
 - A site inspection;
 - A survey of the prevailing environmental noise levels at the site;
 - Discussion of relevant acoustic design criteria;
 - Recommendations for suitable noise control measures.
 - Noise limits for new mechanical plant (if any).
- 1.5 The site is bounded by Bolney Road (A272) to the northeast, with residences beyond. To the northwest are the residences on Marwick Close. To the east and south is open agricultural land.
- 1.6 This assessment is based on drawing number 22129/SK03 prepared by OSP Architecture, dated October 2022.
- 1.7 The recommendations in this report have been provided with respect to acoustics only. Compliance with all other aspects of the development's performance (e.g. structural, drainage, fire, ventilation, overheating etc.) must be checked by other professionals suitably qualified in their fields. This report

has been prepared with respect to planning requirements only and does not include an assessment of Building Regulations requirements.

1.8 The various noise 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 ACOUSTIC CRITERIA

Planning Policies

- 2.1 The Local Authority, Mid Sussex District Council, includes general guidance on noise impact in policy DPN7: Noise Impacts of the Mid Sussex District Plan 2021 2039 (Consultation Draft). This recommends, "New development needs to be managed to protect the natural environment and people's health and quality of life from unacceptable levels of noise."
- 2.2 Mid Sussex District Council has no specific acoustic criteria for new residential developments, but recommends following the guidance in British Standard 8233.
- 2.3 The 2023 National Planning Policy Framework (NPPF) provides some general guidance to local authorities on taking noise into account in planning policies and decisions. This includes guidance that local authorities should '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 mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development and avoid noise giving rise to significant adverse impacts on health and the quality of life.'
- 2.4 However, there is as yet no specific guidance on numerical acoustic assessment/design criteria for proposed new housing developments provided in the NPPF, accompanying Technical Guidance document, National Planning Practice Guidance 'Noise', nor the *Noise Policy Statement for England* (NPSE) 2010.

ProPG: Planning & Noise

- 2.5 ProPG: Planning & Noise '*Professional Practice Guidance on Planning & Noise*' 2017 provides "guidance on a recommended approach to the management of noise within the planning system in England", predominantly for proposed new residential developments on land that is exposed to transportation noise.
- 2.6 It is noted that the guidance has no legal status. It does not constitute an official government code of practice and does not provide an authoritative interpretation of the law or government policy.

- 2.7 The ProPG recommends a staged approach to assessment. Stage 1 is an initial site noise risk assessment, indicating whether the proposed site is considered to pose a negligible, low, medium or high risk from a noise perspective.
- 2.8 At low noise levels, the more likely the site is to be acceptable from a noise perspective provided that a good acoustic design process is followed and an ADS (Acoustic Design Statement) confirms how the adverse impacts of noise will be mitigated and minimised in the finished development.
- 2.9 As noise levels increase, the site is likely to be less suitable from a noise perspective and any subsequent application may be refused unless a good acoustic design process is followed and an ADS confirms how the adverse impacts of noise will be mitigated and minimised, and which clearly demonstrate that a significant adverse noise impact will be avoided in the finished development.
- 2.10 High noise levels indicate that there is an increased risk that development may be refused on noise grounds. This risk may be reduced by following a good acoustic design process that is demonstrated in a detailed ADS.
- 2.11 Stage 2 of the recommended approach in ProPG is a full assessment to consider good acoustic design. The guidelines of ProPG in terms of suitable acoustic design criteria are broadly consistent with (and essentially adopted from) the guidance of BS 8233, and the sound insulation recommendations made later in this report have been designed to achieve the BS 8233 guidelines, as described below.

BS 8233

2.12 British Standard 8233: 2014 Guidance on sound insulation and noise reduction for buildings, which carries the full weight of an adopted British Standard, recommends guidance on design criteria for acceptable noise levels within residential accommodation. BS 8233 guidelines for the daytime (07:00 – 23:00) and night-time (23:00 – 07:00) periods are summarised in Table 1.

		Internal Noise Levels			
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 LAeq,16hr	-		
Sleeping (daytime resting)	Bedroom	35 dB LAeq,16hr	30 dB LAeq,8hr		

Table 1: BS 8233 recommended acoustic design criteria

- 2.13 BS 8233 also states that, "where development is considered necessary or desirable ... the internal target levels [i.e. those in Table 1] may be relaxed by up to 5 dB and reasonable internal conditions still achieved".
- 2.14 BS 8233 clarifies that the above guidance relates only to noise without specific character (e.g. such as that which has a distinguishable, discrete and continuous tone, is irregular enough to attract attention, or has strong low-frequency content) and that where such characteristics are present, lower noise limits might be appropriate.
- 2.15 BS 8233 states that if there is a reliance on closed windows to meet the guide values, "there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level". Further, it is stated that assessments should be based on a room with "adequate ventilation provided (e.g. trickle ventilators should be open)".
- 2.16 BS 8233 also recognises that regular individual noise events at night can cause sleep disturbance. Peaks of noise from individual events are usually described in terms of L_{Amax} values and these can be highly variable and unpredictable. ProPG: Planning & Noise '*Professional Practice Guidance on Planning & Noise*' 2017 states that "*in most circumstances in noise-sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45dB L_{Amax,F} more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability and regularity of noise events*".
- 2.17 Regarding outdoor living areas, BS 8233 states that "it is desirable that the external noise level does not exceed 50dB L_{Aeq,T}, with an upper guideline value of 55dB L_{Aeq}, which would be acceptable in noisier environments. However, it is recognised that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas such as city centres or urban areas adjoining the strategic transport network, compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, developments should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited".
- 2.18 For external plant, we understand that Mid Sussex District Council does not apply specific noise criteria, but recommends assessing noise impact using the guidance in BS 4142. The latest version is BS 4142:

2014 + A1: 2019 '*Methods for rating and assessing industrial and commercial sound*'. This provides methods for rating and assessing sound of an industrial and/or commercial nature. The standard will be referred to as BS 4142 for the rest of this report for brevity.

- 2.19 BS 4142 requires the 'rating' noise level for the operation to be compared with the background (L_{A90}) noise level in the absence of the operational noise being assessed.
- 2.20 The 'rating' level is derived based on the 'specific' L_{Aeq} noise level attributable to the operation with an 'acoustic feature' penalty added for any noise sources which give rise to tonal, impulsive, intermittent, or other characteristics readily distinctive against the residual acoustic environment.
- 2.21 An initial estimate of the impact of the operation is determined by subtracting the background level from the rating level. BS 4142 states that:
 - Typically, the greater this difference, the greater the magnitude of the impact
 - A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context
 - A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context
- 2.22 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 does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

3.0 ENVIRONMENTAL NOISE SURVEY

- 3.1 A survey of prevailing environmental noise levels was carried out at the site from Saturday 2nd September to Wednesday 6th September 2023. The three measurement locations are indicated in Figure 1, chosen to represent the noise environment across the site.
- 3.2 Continuous noise monitoring was undertaken at Locations 1 to 3 for the following periods:
 - Location 1: 17:30 on Saturday 2nd September to 17:30 on Monday 4th September 2023
 - Location 2: 17:45 on Monday 4th September to 17:45 on Tuesday 5th September 2023
 - Location 3: 18:00 on Tuesday 5th September to 18:00 on Wednesday 6th September 2023
- 3.3 The daytime $L_{Aeq,16hr}$ and night-time $L_{Aeq,8hr}$ noise exposure values have been determined from the logarithmic average of all measured $L_{Aeq,15min}$ noise measurement samples over each of those periods.
- 3.4 The overall night-time *L*_{Amax,f} noise level has been determined for assessment purposes as the measured *L*_{Amax,15mins} noise level exceeded no more than 5 times over each full night-time period. This accounts for possible occasions that multiple events exceed the given level during an individual 15-minute sample period.
- 3.5 The results of the noise survey are detailed in Appendix II and summarised in Table 2:

Location	Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)		
Location	dB L _{Aeq,16hr}	dB <i>L</i> _{Aeq,8hr}	dB <i>L</i> _{Amax,f}	
1	55	48	68	
2	52	45	66	
3	49	41	59	

Table 2: Overall Noise Levels

3.6 The dominant noise source at the site was road traffic on Bolney Road. No commercial or industrial noise sources were audible. We are not aware of any developments planned for the local area that are likely to cause a significant increase in traffic levels at the site.

- 3.7 The weather conditions throughout the noise survey were mild, dry, and overcast. Wind was from the west and south-west, with wind speeds below 5 m/s. These were considered suitable conditions for the survey.
- The noise monitoring was undertaken using a NTi XL2 Class 1 Sound Analyser (serial no. A2A-20294-E0) fitted with a windshield. The microphone was mounted on a tripod, around 1.5 metres above local ground level at each location.
- 3.9 Calibration checks were carried out on the sound level meters before and after the survey periods using a Brüel & Kjær Type 4231 sound calibrator (serial no. 2412667). No variation in the calibration levels was observed.

4.0 NOISE ASSESSMENT AND MITIGATION MEASURES

- 4.1 The principal method of noise mitigation to control external intrusive noise levels inside the buildings will be appropriately specified glazing and ventilation systems.
- 4.2 The specification of the external building fabric is not known at this stage. The fabric should be specified to provide a sufficient level of sound insulation to maintain the overall performance of the façade. This will be readily achievable using a variety of standard building materials and constructions, though the detailed proposals should be checked by an acoustic consultant at the detailed design stage to ensure that the internal noise criteria will be met.
- 4.3 The following double-glazing and ventilation scheme is recommended as being capable of achieving the stated internal acoustic criteria:
 - Glazing Type 1 To all habitable rooms, double glazing providing the minimum Sound Reduction Indices (SRIs) set out in Table 3, typically achievable using a system of standard thermal double glazing (i.e. 4 mm glass/12 mm cavity/4 mm glass). Ventilation should be provided by way of standard (non-acoustic) ventilators.

Table 3: Minimum Glazing SRIs – Glazing Type 1

	Octave Band Centre Frequency (Hz)						
	125 250 500 1k 2k 4k						
dB SRI	21	20	23	31	32	33	

- 4.4 For all non-habitable rooms (e.g. bathrooms, corridors, kitchens, etc.), no specific acoustic criteria apply so the glazing and ventilation systems for these rooms have no particular acoustic performance requirements.
- 4.5 The above performance criteria apply to the façade glazing system as a whole, including frames and seals. Care must be taken to ensure seals to external doors and windows are air-tight so the overall façade sound insulation performance is not compromised.

Residential Outdoor Amenity Areas

4.6 The proposed outdoor amenity areas for use by residents are predicted to be exposed to daytime noise levels below the recommended upper limit of 55 dB *L*_{Aeq}. Based on this, no specific noise mitigation measures are required for these areas.

Mechanical Plant Noise Control

4.7 If any mechanical plant is proposed for the development, we recommend that this is specified not to exceed a noise rating level of 39 dB *L*_{Ar} during the daytime and 29 dB *L*_{Ar} at night-time at the nearest residences when assessed according to BS 4142, based on not exceeding the existing background noise levels. This is likely to be readily achievable using standard noise control methods with conventional plant.

5.0 SUMMARY AND CONCLUSIONS

- 5.1 Hepworth Acoustics has undertaken a noise assessment for the proposed Residential Allocation (Site reference DPH25) at land to the west of Marwick Close, Bolney Road, Ansty, West Sussex.
- 5.2 A noise survey has been undertaken at the site and daytime and night-time noise levels have been determined.
- 5.3 Recommendations of appropriate noise mitigation measures have been made in order to achieve the stated internal acoustic criteria.
- 5.4 Noise limits have been set for any mechanical plant associated with the development.
- 5.5 Noise in outdoor amenity areas is predicted to be within suitable limits.
- 5.6 This report has demonstrated that the site is suitable for residential use, and by following the recommendations in this report, we conclude that future residents of the proposed dwellings can be adequately protected from noise.



Figure 1 – Existing Site



Figure 2 – Potential Layout

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.

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.

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.

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.

- $L_{Aeq,T}$ This is the A-weighted 'equivalent continuous noise level' which is an average of the total sound energy measured over a specified time period, T. 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_{Amax,f} This is the maximum A-weighted noise level that was recorded during a sample period, measured using the 'fast' setting on the SLM.
- $L_{A90,T}$ This is the A-weighted noise level exceeded for 90% of the time period, T. $L_{A90,T}$ is used as a measure of background noise.

Appendix II: Noise Survey Results

Location 1

Equipment:	NTi XL2 Class 1 Sound Analyser (serial no. A2A-20294-E0) with tripod and
	windshield
Weather:	Dry, wind speed below 5 m/s

All levels in dB re 20 μ Pa.

Date	Start Time	Duration (h:mm:ss)	L _{Amax,f}	L Aeq,T	L _{A90,T}
02/09/2023	17:30:00	0:15:00	67	56	44
02/09/2023	17:45:00	0:15:00	67	57	45
02/09/2023	18:00:00	0:15:00	72	57	44
02/09/2023	18:15:00	0:15:00	68	56	42
02/09/2023	18:30:00	0:15:00	80	57	42
02/09/2023	18:45:00	0:15:00	71	56	45
02/09/2023	19:00:00	0:15:00	68	55	40
02/09/2023	19:15:00	0:15:00	67	55	40
02/09/2023	19:30:00	0:15:00	67	54	39
02/09/2023	19:45:00	0:15:00	65	54	40
02/09/2023	20:00:00	0:15:00	66	53	37
02/09/2023	20:15:00	0:15:00	69	53	34
02/09/2023	20:30:00	0:15:00	71	54	38
02/09/2023	20:45:00	0:15:00	66	52	36
02/09/2023	21:00:00	0:15:00	65	53	36
02/09/2023	21:15:00	0:15:00	66	53	35
02/09/2023	21:30:00	0:15:00	66	53	36
02/09/2023	21:45:00	0:15:00	63	53	34
02/09/2023	22:00:00	0:15:00	65	52	33
02/09/2023	22:15:00	0:15:00	65	51	30
02/09/2023	22:30:00	0:15:00	65	52	33
02/09/2023	22:45:00	0:15:00	68	51	29
02/09/2023	23:00:00	0:15:00	65	49	29
02/09/2023	23:15:00	0:15:00	65	50	27
02/09/2023	23:30:00	0:15:00	69	49	27
02/09/2023	23:45:00	0:15:00	66	47	27
03/09/2023	00:00:00	0:15:00	65	48	26
03/09/2023	00:15:00	0:15:00	63	46	25
03/09/2023	00:30:00	0:15:00	74	51	22
03/09/2023	00:45:00	0:15:00	64	48	23
03/09/2023	01:00:00	0:15:00	67	46	20
03/09/2023	01:15:00	0:15:00	66	45	20
03/09/2023	01:30:00	0:15:00	64	39	20
03/09/2023	01:45:00	0:15:00	66	44	22

03/09/2023	02:00:00	0:15:00	62	44	22
03/09/2023	02:15:00	0:15:00	63	44	21
03/09/2023	02:30:00	0:15:00	65	46	22
03/09/2023	02:45:00	0:15:00	65	44	23
03/09/2023	03:00:00	0:15:00	63	45	22
03/09/2023	03:15:00	0:15:00	62	41	21
03/09/2023	03:30:00	0:15:00	68	46	22
03/09/2023	03:45:00	0:15:00	67	47	22
03/09/2023	04:00:00	0:15:00	62	46	23
03/09/2023	04:15:00	0:15:00	65	48	29
03/09/2023	04:30:00	0:15:00	66	52	33
03/09/2023	04:45:00	0:15:00	65	49	31
03/09/2023	05:00:00	0:15:00	72	52	32
03/09/2023	05:15:00	0:15:00	67	54	35
03/09/2023	05:30:00	0:15:00	67	54	34
03/09/2023	05:45:00	0:15:00	69	54	37
03/09/2023	06:00:00	0:15:00	66	55	39
03/09/2023	06:15:00	0:15:00	65	54	38
03/09/2023	06:30:00	0:15:00	66	55	39
03/09/2023	06:45:00	0:15:00	65	56	43
03/09/2023	07:00:00	0:15:00	69	55	36
03/09/2023	07:15:00	0:15:00	71	57	46
03/09/2023	07:30:00	0:15:00	80	59	44
03/09/2023	07:45:00	0:15:00	65	58	47
03/09/2023	08:00:00	0:15:00	65	58	49
03/09/2023	08:15:00	0:15:00	74	58	48
03/09/2023	08:30:00	0:15:00	70	58	49
03/09/2023	08:45:00	0:15:00	79	59	47
03/09/2023	09:00:00	0:15:00	69	57	44
03/09/2023	09:15:00	0:15:00	75	59	49
03/09/2023	09:30:00	0:15:00	68	58	50
03/09/2023	09:45:00	0:15:00	78	59	48
03/09/2023	10:00:00	0:15:00	79	60	51
03/09/2023	10:15:00	0:15:00	67	59	51
03/09/2023	10:30:00	0:15:00	66	58	48
03/09/2023	10:45:00	0:15:00	71	58	49
03/09/2023	11:00:00	0:15:00	71	59	49
03/09/2023	11:15:00	0:15:00	71	59	52
03/09/2023	11:30:00	0:15:00	70	59	52
03/09/2023	11:45:00	0:15:00	68	59	50
03/09/2023	12:00:00	0:15:00	67	58	48
03/09/2023	12:15:00	0:15:00	68	57	47
03/09/2023	12:30:00	0:15:00	77	58	47
03/09/2023	12:45:00	0:15:00	71	58	49
03/09/2023	13:00:00	0:15:00	81	60	48

03/09/2023	13:15:00	0:15:00	72	58	49
03/09/2023	13:30:00	0:15:00	75	57	47
03/09/2023	13:45:00	0:15:00	70	57	46
03/09/2023	14:00:00	0:15:00	66	56	46
03/09/2023	14:15:00	0:15:00	66	57	46
03/09/2023	14:30:00	0:15:00	77	58	48
03/09/2023	14:45:00	0:15:00	64	57	47
03/09/2023	15:00:00	0:15:00	73	58	51
03/09/2023	15:15:00	0:15:00	72	58	49
03/09/2023	15:30:00	0:15:00	67	57	47
03/09/2023	15:45:00	0:15:00	68	58	47
03/09/2023	16:00:00	0:15:00	69	57	44
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03/09/2023	19:30:00	0:15:00	66	53	37
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03/09/2023	20:00:00	0:15:00	64	52	33
03/09/2023	20:15:00	0:15:00	65	52	35
03/09/2023	20:30:00	0:15:00	63	50	30
03/09/2023	20:45:00	0:15:00	77	54	34
03/09/2023	21:00:00	0:15:00	62	51	35
03/09/2023	21:15:00	0:15:00	71	51	31
03/09/2023	21:30:00	0:15:00	63	47	29
03/09/2023	21:45:00	0:15:00	62	47	27
03/09/2023	22:00:00	0:15:00	63	47	28
03/09/2023	22:15:00	0:15:00	66	46	30
03/09/2023	22:30:00	0:15:00	61	46	29
03/09/2023	22:45:00	0:15:00	62	45	30
04/09/2023	07:00:00	0:15:00	61	54	48
04/09/2023	07:15:00	0:15:00	67	54	47
04/09/2023	07:30:00	0:15:00	79	55	46
04/09/2023	07:45:00	0:15:00	67	54	45
04/09/2023	08:00:00	0:15:00	69	54	44
04/09/2023	08:15:00	0:15:00	68	54	46

04/09/2023	08:30:00	0:15:00	63	53	43
04/09/2023	08:45:00	0:15:00	67	54	42
04/09/2023	09:00:00	0:15:00	69	54	46
04/09/2023	09:15:00	0:15:00	76	55	43
04/09/2023	09:30:00	0:15:00	65	55	44
04/09/2023	09:45:00	0:15:00	63	53	44
04/09/2023	10:00:00	0:15:00	65	53	42
04/09/2023	10:15:00	0:15:00	66	53	40
04/09/2023	10:30:00	0:15:00	67	53	41
04/09/2023	10:45:00	0:15:00	77	55	44
04/09/2023	11:00:00	0:15:00	63	53	42
04/09/2023	11:15:00	0:15:00	87	56	45
04/09/2023	11:30:00	0:15:00	65	54	44
04/09/2023	11:45:00	0:15:00	73	53	41
04/09/2023	12:00:00	0:15:00	70	53	43
04/09/2023	12:15:00	0:15:00	66	52	40
04/09/2023	12:30:00	0:15:00	68	54	45
04/09/2023	12:45:00	0:15:00	68	53	45
04/09/2023	13:00:00	0:15:00	65	55	47
04/09/2023	13:15:00	0:15:00	68	54	45
04/09/2023	13:30:00	0:15:00	66	54	45
04/09/2023	13:45:00	0:15:00	83	57	46
04/09/2023	14:00:00	0:15:00	70	54	44
04/09/2023	14:15:00	0:15:00	65	54	44
04/09/2023	14:30:00	0:15:00	65	54	44
04/09/2023	14:45:00	0:15:00	64	54	47
04/09/2023	15:00:00	0:15:00	69	55	45
04/09/2023	15:15:00	0:15:00	76	56	46
04/09/2023	15:30:00	0:15:00	63	54	46
04/09/2023	15:45:00	0:15:00	67	54	48
04/09/2023	16:00:00	0:15:00	62	54	44
04/09/2023	16:15:00	0:15:00	68	54	44
04/09/2023	16:30:00	0:15:00	63	54	46
04/09/2023	16:45:00	0:15:00	66	54	46
04/09/2023	17:00:00	0:15:00	71	54	42
04/09/2023	17:15:00	0:15:00	69	53	40

Location 2

Equipment:	NTi XL2 Class 1 Sound Analyser (serial no. A2A-20294-E0) with tripod and
	windshield
Weather:	Dry, wind speed below 5 m/s

All levels in dB re 20 μ Pa.

Date	Start Time	Duration (h:mm:ss)	L Amax,f	L Aeq,T	L A90,T
04/09/2023	17:45:00	0:15:00	71	53	41
04/09/2023	18:00:00	0:15:00	63	52	42
04/09/2023	18:15:00	0:15:00	64	51	39
04/09/2023	18:30:00	0:15:00	75	53	39
04/09/2023	18:45:00	0:15:00	79	55	37
04/09/2023	19:00:00	0:15:00	64	51	38
04/09/2023	19:15:00	0:15:00	63	50	37
04/09/2023	19:30:00	0:15:00	67	50	36
04/09/2023	19:45:00	0:15:00	86	60	34
04/09/2023	20:00:00	0:15:00	61	48	33
04/09/2023	20:15:00	0:15:00	67	48	34
04/09/2023	20:30:00	0:15:00	61	47	32
04/09/2023	20:45:00	0:15:00	64	49	34
04/09/2023	21:00:00	0:15:00	63	48	34
04/09/2023	21:15:00	0:15:00	62	47	30
04/09/2023	21:30:00	0:15:00	64	46	29
04/09/2023	21:45:00	0:15:00	67	47	32
04/09/2023	22:00:00	0:15:00	65	46	32
04/09/2023	22:15:00	0:15:00	62	45	30
04/09/2023	22:30:00	0:15:00	64	45	30
04/09/2023	22:45:00	0:15:00	62	44	26
04/09/2023	23:00:00	0:15:00	66	44	26
04/09/2023	23:15:00	0:15:00	60	40	25
04/09/2023	23:30:00	0:15:00	57	40	25
04/09/2023	23:45:00	0:15:00	61	41	25
05/09/2023	00:00:00	0:15:00	62	40	25
05/09/2023	00:15:00	0:15:00	61	41	26
05/09/2023	00:30:00	0:15:00	60	40	24
05/09/2023	00:45:00	0:15:00	57	38	26
05/09/2023	01:00:00	0:15:00	45	31	24
05/09/2023	01:15:00	0:15:00	65	43	23
05/09/2023	01:30:00	0:15:00	60	39	23
05/09/2023	01:45:00	0:15:00	62	40	23
05/09/2023	02:00:00	0:15:00	59	40	24
05/09/2023	02:15:00	0:15:00	60	42	24

05/09/2023	02:30:00	0:15:00	62	39	25
05/09/2023	02:45:00	0:15:00	63	44	28
05/09/2023	03:00:00	0:15:00	59	39	27
05/09/2023	03:15:00	0:15:00	63	44	30
05/09/2023	03:30:00	0:15:00	64	46	28
05/09/2023	03:45:00	0:15:00	61	46	27
05/09/2023	04:00:00	0:15:00	64	47	29
05/09/2023	04:15:00	0:15:00	61	47	31
05/09/2023	04:30:00	0:15:00	69	52	34
05/09/2023	04:45:00	0:15:00	65	51	36
05/09/2023	05:00:00	0:15:00	64	51	37
05/09/2023	05:15:00	0:15:00	78	55	40
05/09/2023	05:30:00	0:15:00	75	55	42
05/09/2023	05:45:00	0:15:00	65	54	43
05/09/2023	06:00:00	0:15:00	65	55	47
05/09/2023	06:15:00	0:15:00	64	55	47
05/09/2023	06:30:00	0:15:00	67	55	48
05/09/2023	06:45:00	0:15:00	66	55	47
05/09/2023	07:00:00	0:15:00	66	55	47
05/09/2023	07:15:00	0:15:00	64	55	48
05/09/2023	07:30:00	0:15:00	65	55	48
05/09/2023	07:45:00	0:15:00	64	55	47
05/09/2023	08:00:00	0:15:00	68	54	43
05/09/2023	08:15:00	0:15:00	67	55	47
05/09/2023	08:30:00	0:15:00	65	54	45
05/09/2023	08:45:00	0:15:00	64	54	44
05/09/2023	09:00:00	0:15:00	63	54	44
05/09/2023	09:15:00	0:15:00	70	54	45
05/09/2023	09:30:00	0:15:00	67	54	43
05/09/2023	09:45:00	0:15:00	62	53	43
05/09/2023	10:00:00	0:15:00	66	52	40
05/09/2023	10:15:00	0:15:00	76	55	42
05/09/2023	10:30:00	0:15:00	62	53	42
05/09/2023	10:45:00	0:15:00	64	53	42
05/09/2023	11:00:00	0:15:00	63	53	41
05/09/2023	11:15:00	0:15:00	67	53	42
05/09/2023	11:30:00	0:15:00	70	55	45
05/09/2023	11:45:00	0:15:00	68	54	42
05/09/2023	12:00:00	0:15:00	63	53	43
05/09/2023	12:15:00	0:15:00	67	53	43
05/09/2023	12:30:00	0:15:00	61	52	43
05/09/2023	12:45:00	0:15:00	63	53	44
05/09/2023	13:00:00	0:15:00	63	53	42
05/09/2023	13:15:00	0:15:00	70	54	45
05/09/2023	13:30:00	0:15:00	63	54	44

05/09/2023	13:45:00	0:15:00	74	54	44
05/09/2023	14:00:00	0:15:00	70	54	45
05/09/2023	14:15:00	0:15:00	63	54	44
05/09/2023	14:30:00	0:15:00	63	53	45
05/09/2023	14:45:00	0:15:00	66	54	45
05/09/2023	15:00:00	0:15:00	65	54	46
05/09/2023	15:15:00	0:15:00	68	54	47
05/09/2023	15:30:00	0:15:00	64	54	45
05/09/2023	15:45:00	0:15:00	61	53	46
05/09/2023	16:00:00	0:15:00	62	53	42
05/09/2023	16:15:00	0:15:00	63	54	46
05/09/2023	16:30:00	0:15:00	63	54	46
05/09/2023	16:45:00	0:15:00	63	53	43
05/09/2023	17:00:00	0:15:00	69	53	43
05/09/2023	17:15:00	0:15:00	63	53	43
05/09/2023	17:30:00	0:15:00	61	53	43

Location 3

Equipment:	NTi XL2 Class 1 Sound Analyser (serial no. A2A-20294-E0) with tripod and
	windshield
Weather:	Dry, wind speed below 5 m/s

All levels in dB re 20 μ Pa.

Date	Start Time	Duration (h:mm:ss)	L Amax,f	L Aeq,T	L _{А90,Т}
05/09/2023	18:00:00	0:15:00	58	48	39
05/09/2023	18:15:00	0:15:00	56	47	35
05/09/2023	18:30:00	0:15:00	63	48	37
05/09/2023	18:45:00	0:15:00	56	47	35
05/09/2023	19:00:00	0:15:00	55	47	33
05/09/2023	19:15:00	0:15:00	77	49	31
05/09/2023	19:30:00	0:15:00	63	47	31
05/09/2023	19:45:00	0:15:00	60	47	32
05/09/2023	20:00:00	0:15:00	58	46	32
05/09/2023	20:15:00	0:15:00	55	45	30
05/09/2023	20:30:00	0:15:00	56	45	31
05/09/2023	20:45:00	0:15:00	59	45	31
05/09/2023	21:00:00	0:15:00	60	44	31
05/09/2023	21:15:00	0:15:00	59	43	28
05/09/2023	21:30:00	0:15:00	58	43	29
05/09/2023	21:45:00	0:15:00	57	44	31
05/09/2023	22:00:00	0:15:00	60	43	29
05/09/2023	22:15:00	0:15:00	54	38	26
05/09/2023	22:30:00	0:15:00	56	39	26
05/09/2023	22:45:00	0:15:00	55	38	25
05/09/2023	23:00:00	0:15:00	51	37	26
05/09/2023	23:15:00	0:15:00	56	37	24
05/09/2023	23:30:00	0:15:00	54	37	24
05/09/2023	23:45:00	0:15:00	53	39	24
06/09/2023	00:00:00	0:15:00	57	37	26
06/09/2023	00:15:00	0:15:00	51	33	25
06/09/2023	00:30:00	0:15:00	43	28	23
06/09/2023	00:45:00	0:15:00	52	36	24
06/09/2023	01:00:00	0:15:00	55	38	24
06/09/2023	01:15:00	0:15:00	56	35	24
06/09/2023	01:30:00	0:15:00	54	36	25
06/09/2023	01:45:00	0:15:00	53	36	24
06/09/2023	02:00:00	0:15:00	55	36	24
06/09/2023	02:15:00	0:15:00	51	34	25
06/09/2023	02:30:00	0:15:00	55	39	25

06/09/2023	02:45:00	0:15:00	54	37	25
06/09/2023	03:00:00	0:15:00	54	38	26
06/09/2023	03:15:00	0:15:00	56	40	26
06/09/2023	03:30:00	0:15:00	57	42	28
06/09/2023	03:45:00	0:15:00	56	43	31
06/09/2023	04:00:00	0:15:00	55	43	31
06/09/2023	04:15:00	0:15:00	56	43	32
06/09/2023	04:30:00	0:15:00	65	48	34
06/09/2023	04:45:00	0:15:00	60	47	34
06/09/2023	05:00:00	0:15:00	58	48	36
06/09/2023	05:15:00	0:15:00	69	52	40
06/09/2023	05:30:00	0:15:00	58	50	41
06/09/2023	05:45:00	0:15:00	59	50	41
06/09/2023	06:00:00	0:15:00	58	52	47
06/09/2023	06:15:00	0:15:00	57	52	48
06/09/2023	06:30:00	0:15:00	60	52	46
06/09/2023	06:45:00	0:15:00	59	52	48
06/09/2023	07:00:00	0:15:00	60	52	48
06/09/2023	07:15:00	0:15:00	61	52	46
06/09/2023	07:30:00	0:15:00	59	52	47
06/09/2023	07:45:00	0:15:00	59	51	45
06/09/2023	08:00:00	0:15:00	59	51	44
06/09/2023	08:15:00	0:15:00	61	50	42
06/09/2023	08:30:00	0:15:00	63	50	40
06/09/2023	08:45:00	0:15:00	59	51	42
06/09/2023	09:00:00	0:15:00	62	51	43
06/09/2023	09:15:00	0:15:00	61	50	41
06/09/2023	09:30:00	0:15:00	61	50	41
06/09/2023	09:45:00	0:15:00	61	51	44
06/09/2023	10:00:00	0:15:00	60	50	41
06/09/2023	10:15:00	0:15:00	58	49	41
06/09/2023	10:30:00	0:15:00	71	52	41
06/09/2023	10:45:00	0:15:00	61	50	41
06/09/2023	11:00:00	0:15:00	58	50	42
06/09/2023	11:15:00	0:15:00	59	50	40
06/09/2023	11:30:00	0:15:00	64	51	41
06/09/2023	11:45:00	0:15:00	58	50	42
06/09/2023	12:00:00	0:15:00	64	50	40
06/09/2023	12:15:00	0:15:00	67	51	41
06/09/2023	12:30:00	0:15:00	61	50	40
06/09/2023	12:45:00	0:15:00	63	51	44
06/09/2023	13:00:00	0:15:00	65	51	42
06/09/2023	13:15:00	0:15:00	65	51	41
06/09/2023	13:30:00	0:15:00	58	50	44
06/09/2023	13:45:00	0:15:00	58	51	44

06/09/2023	14:00:00	0:15:00	61	51	45
06/09/2023	14:15:00	0:15:00	58	51	45
06/09/2023	14:30:00	0:15:00	61	51	43
06/09/2023	14:45:00	0:15:00	67	51	46
06/09/2023	15:00:00	0:15:00	59	51	46
06/09/2023	15:15:00	0:15:00	62	51	44
06/09/2023	15:30:00	0:15:00	61	51	46
06/09/2023	15:45:00	0:15:00	57	51	44
06/09/2023	16:00:00	0:15:00	65	52	47
06/09/2023	16:15:00	0:15:00	62	51	45
06/09/2023	16:30:00	0:15:00	58	51	44
06/09/2023	16:45:00	0:15:00	60	50	43
06/09/2023	17:00:00	0:15:00	56	50	41
06/09/2023	17:15:00	0:15:00	59	50	42
06/09/2023	17:30:00	0:15:00	63	49	39
06/09/2023	17:45:00	0:15:00	70	53	40