



ACOUSTIC DESIGN TECHNOLOGY
Noise and Vibration Consultants

ADT 3568

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HARBOUR VETERINARY GROUP, WATERLOOVILLE, PORTSMOUTH

ENVIRONMENTAL NOISE IMPACT ASSESSMENT

ACOUSTIC CONSULTANCY REPORT ADT 3568/ENIA

Revision	Date	Issued By	Checked by	Revision Notes
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1.0 **SUMMARY**

Planning permission is being sought for the installation of a single condenser unit at low level mounted on the south-west side wall as shown on the planning application drawings.

Acoustic Design Technology Limited have undertaken an environmental noise survey to determine the existing ambient noise levels in the vicinity over a sample of the proposed (day time) operating period.

The predicted cumulative BS 4142 rating level from the proposed installations is below the typical background level during the proposed hours of operations. According to BS 4142:2014+A1:2019, this is "*... an indication of the specific sound source having a low impact, depending on the context*".

The assessment of the local context indicates that there is no need to adjust the initial assessment of impact. The environmental noise impact of the proposed plant would therefore be low.

2.0 BASIS OF ASSESSMENT

2.1 Site Location

Harbour Veterinary Group Waterlooville is located on Stakes Hill Road in Portsmouth, near the junction with Broadlands Avenue.

The area is mostly residential with Waterlooville town centre approximately 280 metres to the north. The neighbouring properties are all residential, with houses on Stakes Hill Road on both sides, and more houses to the rear off Broadlands Avenue and Hopfield Close.

There is an existing solid timber fence of approximately 1.8 metres height around all three sides of the rear car park. This provides some degree of acoustic screening to the ground floor windows of the houses, but not the upper floor windows.

The closest main roads are Hulbert Road approximately 400 metres to the north and the A3(M) approximately 1.15 km to the east.

2.2 Proposed Development

Planning permission is being sought for a single condenser unit at low level mounted on the south-west side wall as shown on the planning application drawings.

2.3 Assessment Criteria

The primary guidance on the control of noise emissions from new external plant is to be found in BS 4142:2014+A1:2019. The survey details and assessment method have been discussed with Mark Moss, environmental health officer at Havant Borough Council.

2.4 Nearest Noise Sensitive Properties

The noise sensitive properties in the surrounding area have been grouped into two noise sensitive areas (NSA), as described below and as indicated on the attached site plan 3568/SP1.

NSA	Location	Direction	Approximate distance from proposed plant (metres)
1	Houses on Hopfield Close	south-east	11
2	Houses on Broadlands Avenue	north-west	20

The above NSA represent the closest noise sensitive properties, with others (such as the adjoining houses, screened from the plant) located further from the site and in some cases screened by the intervening buildings. A satisfactory noise impact at the defined NSA should therefore ensure a satisfactory noise impact at other noise sensitive areas.

2.5 Strategy for Noise Impact Assessment

Based on the information in Sections 2.1 to 2.4 above, the strategy for the noise impact assessment has been broken down into the following stages:

- i. undertake an environmental noise survey to obtain baseline noise data, as described in Section 3.0 below
- ii. assess the impact of noise emissions from the proposed mechanical plant as described in Section 4.0 below

3.0 ENVIRONMENTAL NOISE SURVEY

3.1 Purpose

The purpose of the survey was to obtain representative background noise levels over a sample of the proposed hours of plant operation.

3.2 Scope of Survey

An attended environmental noise survey was undertaken between 12:50 hours and 14:50 hours on Monday 21 August 2023.

3.3 Instrumentation

The instrumentation used, and the field calibration values before and after the survey are detailed in Appendix A of this report.

3.4 Procedure

Two measurement positions were selected as described below and indicated on the attached site plan 3568/SP1:

- i. at the south-west end of the car park
- ii. on the grass patch at the north end of the site, 5 metres from the kerb of Stakes Hill Road

Position 1 was chosen to obtain representative background level for both noise sensitive properties NSA 1 and NSA 2. Position 2 was used for reference, and in the event that future plant is located at the front.

At both positions the microphone was mounted on a tripod approximately 1.2 metres above the ground and least 3.5 metres from any other acoustically reflective surface.

Measurements were taken hourly at each position using the 01dB Fusion 1 sound level meter set to store the octave band and A-weighted 100ms short-term L_{eq} levels over a 15 minute sample of each hour for subsequent post processing.

3.5 Results

The logged data has been post processed to determine $L_{Aeq,T}$, $L_{A90,T}$ and L_{Amax} levels for each 15 minute period, and these are listed in the attached table 3568/T1.

Please refer to Appendix B for explanation of the noise units and the A-weighting term used in this report.

3.6 Weather Conditions

Throughout the survey, the weather conditions were sunny and dry, with the occasional light breeze of generally less than 5 m/s throughout the survey period.

3.7 Description of Existing Acoustic Environment

For the duration of the survey the background sound levels were controlled by the distant traffic noise. At the rear, the noise levels during the second reading were elevated due to noise from people using power tools in their gardens.

4.0 NOISE IMPACT ASSESSMENT

4.1 Introduction

As already mentioned in Section 2.3 above, the proposal is to assess noise emissions from the new plant installations using the guidance of BS 4142.

The standard provides a methodology for assessing the likely impact of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident. The assessment involves comparing the *rating* level of the sound source with the typical *background* levels for the period of interest. The standard concludes that if the rating level does not exceed the background levels, the noise impact should be low, depending on the context.

Please refer to Appendix C for an explanation of the technical terms defined in the Standard.

4.2 Specific Sound Level

4.2.1 Computer Model

As the analysis is relatively complex, a computer model of the proposed installation has been constructed using Datakustik Cadna/A 2023 to predict how the sound will radiate from the plant to the identified noise sensitive area.

Within the model all buildings and barriers have been assumed to be acoustically reflective, with ground absorption taken into account as appropriate. The receiver height has been assumed to be 2.5 metres at NSA 1 and 1.5 metres for NSA 2 as the approximate height of the closest windows.

4.2.2 Source Sound Levels

The single condenser unit will be placed at the south-west elevation of the veterinary at low ground level. The manufacturer's noise data for the plant is provided in the attached plant noise schedule ADT 3568/PNS. Only A-weighted noise data is available from the manufacturer, Panasonic.

4.3 Predicted Sound Levels

The scheduled plant noise levels have been input into the Cadna/A computer model, and the predicted noise levels at NSA 1 and NSA 2 are as follows:-

Location	L _{Aeq,T} dB
NSA 1 – House on Hopfield Close	23
NSA 2 – House on Broadlands Avenue	20

4.4 Background Sound Level

The plant will operate during the surgery opening hours. Reference to the survey results shows that the background level during the survey period was 33 dB L_{A90,15mins} at position 1 (representing NSA 1 and NSA 2) and 42 dB L_{A90} at position 2.

4.5 Rating Level

To convert the specific sound level into a rating level, corrections have to be applied for impulsivity, intermittency, tonality and other sound characteristics where such features are present.

4.5.1 Tonality

As the manufacturer does not provide octave band noise data for the proposed plant, it is not possible to make a technical assessment of tonality, and as a worst case assumption it is assumed that the plant could be clearly tonal at the assessment location (+ 4 dB).

4.5.2 Impulsivity

The noise emissions from the air conditioning units should not be impulsive in character, so no correction is required.

4.5.3 Other Sound Characteristics

There are no additional sound characteristics which would warrant the addition of an extra correction.

4.5.4 Intermittency

As the plant operation is dependent on internal conditions, periods of operation may be intermittent. As such, a correction of +3 dB has been applied.

Applying the corrections for tonality and intermittency to the specific sound levels results in predicted rating levels as follow:

Noise Sensitive Area	Rating Level, dB $L_{Ar, 1 \text{ hour}}$
NSA 1 – House on Hopfield Close	30
NSA 2 – House on Broadlands Avenue	27

4.6 Initial Assessment of Impact

A comparison of the rating levels in Section 4.5 above with the background sound levels in Section 4.4 above reveals that the rating levels are between 3 and 6 dB below the representative background level.

The standard concludes that this is "*... an indication of the specific sound source having a low impact, depending on the context*".

4.7 Context

As described in Section 2.4 above, BS 4142 notes that the impact may need to be modified to take account of factors including the absolute level of sound, the character and level of the residual sound compared with that of the specific sound, and the sensitivity of the receptor.

4.7.1 The Absolute Level of Sound

The worst case specific sound level of 23 dB $L_{Aeq, 1 \text{ hour}}$ is very low in this context, where existing $L_{Aeq, 1 \text{ hour}}$ were between 41 and 47 dB. It is therefore not necessary to adjust the impact for the absolute levels of sound.

4.7.2 The Character and Level of the Specific and Residual Sound

The character of the noise from the plant is different to that of the residual sound of traffic, although as the specific sound level is well below the background level, the potentially distinctive character should not be noticeable.

4.7.3 The Sensitivity of the Receptor

The identified noise sensitive buildings do not appear to be any more or less sensitive than the typical residential buildings, and there is no evidence that they have any specific sound insulation measures. It is therefore not necessary to adjust the impact for the sensitivity of the receptors.

4.8 Conclusion

This assessment has demonstrated that when assessed following the methodology of BS 4142:2014, the initial estimate of impact of the proposed plant installations to the noise sensitive areas should be low, depending on the context.

Furthermore, consideration of the context has shown that this need not affect the initial estimate of impact.

The conclusion of this report is therefore that noise emission from the proposed plant installations would be 'low' when assessed in accordance with BS 4142.



FOR ACOUSTIC DESIGN TECHNOLOGY

Measurement
Position 1



Measurement
Position 2

Notes

Description

Site Plan showing noise monitoring locations and noise sensitive areas

Project

Harbour Veterinary Group, Waterlooville, Portsmouth

Survey Date

21 August 2023

Drawing No.

3568/SP1



ACOUSTIC DESIGN TECHNOLOGY
Noise and Vibration Consultants

SURVEY RESULTS (A WEIGHTED TIME HISTORY)

Position	Period	L _{Aeq, 15mins} dB	L _{Amax} dB	L _{A90} dB
1	12:50 – 13:05	41	60	33
	13:50 – 14:05	47	68	34
2	13:06 – 13:21	59	77	42
	14:08 – 14:23	60	72	44

Table 3568/T1

APPENDIX A

Instrumentation

Manufacturer	Type and / or Model	Serial Number	Last Laboratory Calibration	Calibrator Output (dB)	Free Field Correction (dB)	Initial Reading (dB)	Final Reading (dB)
01dB	Fusion 1 (SLM11)	1404515	April 2023		-0.30	113.7	113.72
01dB	Nor1251 Calibrator (Cal 5)	33453	March 2023	113.98			

APPENDIX B

Acoustic Terminology

The annoyance produced by noise is dependent upon many complex interrelated factors such as 'loudness', its frequency (or pitch) and any variations in its level. In order to have some objective measure of the annoyance, scales have been derived to allow for these subjective factors.

A-weighting The human ear is more susceptible to mid-frequency noise than the high and low frequencies. To take account of this when measuring noise, the A-weighting scale is used so that the measured noise corresponds roughly to the overall level of noise that is discerned by the average person. It is also possible to calculate the A-weighted noise level by applying certain corrections to an un-weighted spectrum.

When the noise being measured has variable amplitude, such as traffic noise, it is necessary to qualify the basic dB unit. This may be done using a statistical index L_n dB, where n is any value between 0 and 100, and is the percentage of the sample time for which the stated level is exceeded. In defining the use of the index, both the value of n and the length of the sample period must be stated.

L_{10} L_{10} , being the level exceeded for 10% of the time, has been shown to be a good indicator for traffic noise intrusion, and is used in assessing the effect of traffic noise on residential or commercial premises.

L_{90} L_{90} is the level exceeded for 90% of the time, and is used as a measure of background noise level, as it excludes the effects of occasional transient levels, such as individual passing cars or aircraft.

In addition to the statistical noise indices defined above, the following noise units are also used to define variable amplitude noise sources:

$L_{eq,T}$ $L_{eq,T}$ is defined as the notional steady sound pressure level which, over a stated period of time, would contain the same amount of acoustical energy as the actual fluctuating sound measured over the same period. In other words, it is a measure of the "average" noise level

L_{max} L_{max} is the maximum time-weighted sound pressure level recorded over the stated time period

APPENDIX C

Definitions from BS 4142 : 2014

reference time interval, T_r

specified interval over which the specific sound level is determined (1 h during the day, and 15 min during the night)

specific sound level, L_{Aeq,T_r}

equivalent continuous A-weighted sound pressure level produced by the specific source at the assessment position produced over a given reference time interval, T_r

rating level, L_{At,T_r}

specific sound level plus any adjustment for the characteristic features of the sound

background noise level, $L_{A90,T}$

see Appendix A

PLANT NOISE SCHEDULE ADT 3568/PNS

PRELIMINARY ISSUE

25 August 2023

Ref.	Plant Description	Location	Duty m ³ /s : Pa	Data L _w / L _p	Octave Band Centre Frequency - Hz							
					63	125	250	500	1k	2k	4k	8k
1	Panasonic CU-TZ25WKE	Wall mounted at low level at south-west side wall	-	L _p at 1m	48 dB(A)							