ACOUSTIC DESIGN TECHNOLOGY
Noise and Vibration Consultants

ADT 3579

23 October 2023

Barnsley MBC
Finance and Property Directorate
Commercial Services Payments Team
PO BOX 522
BARNSLEY
S70 9AU

WORSBROUGH LIBRARY

ENVIRONMENTAL NOISE IMPACT ASSESSMENT

ACOUSTIC CONSULTANCY REPORT ADT 3579/ENIA

Revision	Date	Issued By	Checked by	Revision Notes
-	23 October 2023	Leo Oikawa	Chris Middleton	first issue

ACOUSTIC DESIGN TECHNOLOGY LIMITED
CROSSLAND GRANGE, GREENWAYS, CHESTERFIELD, DERBYSHIRE S40 3HF
Telephone: 01246 554841 Facsimile: 01246 550141 Website: www.acousticdesign.co.uk E-mail: mail@acousticdesign.co.uk
Company Registered in England No. 4528227
V.A.T. Registration No. 593 7456 92

TABLE OF CONTENTS

1.0 SUMMARY 3

2.0 BASIS OF ASSESSMENT 4

2.1 Site Location 4

2.2 Proposed Development 4

2.3 Assessment Criteria 4

2.4 Nearest Noise Sensitive Properties 5

2.5 Strategy for Noise Impact Assessment 5

3.0 ENVIRONMENTAL NOISE SURVEY 5

3.1 Purpose 5

3.2 Scope of Survey 5

3.3 Instrumentation 6

3.4 Procedure 6

3.5 Results 6

3.6 Weather Conditions 6

3.7 Description of Existing Acoustic Environment 7

4.0 NOISE IMPACT ASSESSMENT 7

4.1 Introduction 7

4.2 Specific Sound Level 7

4.2.1 Computer Model 7

4.2.2 Source Sound Levels 8

4.3 Predicted Sound Levels 8

4.4 Background Sound Level 8

4.5 Rating Level 9

4.5.1 Tonality 9

4.5.2 Impulsivity 9

4.5.3 Other Sound Characteristics 9

4.5.4 Intermittency 9

4.6 Initial Assessment of Impact 10

4.7 Context 10

4.7.1 The Absolute Level of Sound 10

4.7.2 The Character and Level of the Specific and Residual Sound 11

4.7.3 The Sensitivity of the Receptor 11

4.8 Conclusion 11

1.0 SUMMARY

Planning permission is being sought for the installation of three external condenser units, wall mounted at low level by the existing bin store 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.

The predicted cumulative BS 4142 rating level from the proposed installation is equal to the typical background level during the proposed hours of operation. 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

Worsbrough Library is located on a junction formed by Berrydale and Queensway in Worsbrough.

The surrounding area is predominantly residential with a few commercial properties, typically with flats on the upper floors and retail spaces on the ground floor. These commercial properties including takeaway shops and corner shops are located to the south east of the site on the other side of Queensway.

The neighbouring properties to the north and east are residential. 35 Berrydale is located to the north, with windows of the house facing towards the proposed plant.

The closest major roads are the M1 just under 2 km away to the west, and the A61 1.7 km to the north. A local primary school, the Mill Academy is located 137 metres to the north.

2.2 Proposed Development

The proposal is to install three external condenser units, wall mounted at low level behind the relocated bin store 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.

2.4 Nearest Noise Sensitive Properties

The nearest noise sensitive property is 35 Berrydale, which is approximately 5 metres away from the proposed plant, to the north.

Other dwellings are located further from the site and in some cases screened by the intervening buildings. A satisfactory noise impact at this location 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 during the typical period of proposed plant operation.

3.2 Scope of Survey

An attended environmental noise survey was undertaken between 10:30 hours and 12:30 hours on Wednesday 13 September 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

A single measurement position was selected at the boundary with 35 Berrydale as indicated on the attached site plan 3579/SP1.

The microphone was mounted on a tripod approximately 1.2 metres above the ground and at least 1.5 metres from any other acoustically reflective surface.

The noise levels were logged continuously for the duration of the survey period, using the 01dB Fusion 1 sound level meter set to store the octave band and A-weighted 100ms short-term L_{eq} levels 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 1 hour period, and these have been detailed in the attached table 3579/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 dry and still, with the occasional light breeze of generally less than 5 m/s throughout the survey period.

3.7 Description of Existing Acoustic Environment

The noise climate was primarily controlled by traffic noise on the A61 and the distant traffic noise from the M1. During the quieter periods occasional bird songs and children's voices could be heard from the Mill Academy.

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 nearest noise sensitive property.

Within the model all buildings and barriers have been assumed to be acoustically reflective, with ground absorption taken into account as appropriate. Ground and first floor windows at the nearest dwelling have been assessed.

4.2.2 Source Sound Levels

Three condenser units will be placed outside behind the relocated bin store located by the west elevation, acoustically screened from the house by the retaining wall. The manufacturers' noise data and plant locations are described on the attached plant noise schedule ADT 3579/PNS, with the locations shown in more detail on the planning application drawings.

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 the nearest dwellings are as follows:-

Location	Predicted $L_{eq,T}$ (dB) at octave band centre frequency (Hz)								$L_{Aeq,T}$ dB
	63	125	250	500	1k	2k	4k	8k	
35 Berrydale	39	37	34	28	23	17	8	1	30

4.4 Background Sound Level

The plant will operate during the library opening hours. Reference to the survey results show that the lowest background level at measurement position 1, representative of the nearest residential was 33 dB $L_{A90,1\ hour}$.

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

Using commonly accepted definitions of tonality, the predicted specific sound level at 35 Berrydale is not tonal. Therefore, a tonal correction has not been applied.

4.5.2 Impulsivity

The noise emissions from the air conditioning unit 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 +3dB has been applied.

Applying the correction for tonality and intermittency to the specific sound levels results in a predicted rating level of 33 dB $L_{Ar,\ 1\ hour}$ at 35 Berrydale.

4.6 Initial Assessment of Impact

The predicted rating level is equal to the background level at the assessment location. According to BS 4142, where the rating level does not exceed the background sound level, the initial assessment of impact would be 'low' impact, depending on the context.

4.7 Context

4.7.1 The Absolute Level of Sound

The background sound levels and rating levels as discussed in Sections 4.4 and Section 4.5 found above are low for a suburban area during the day, and therefore the absolute levels might be as, or more, relevant than the degree by which the rating level exceeds the background level.

A specific sound level of 30 dB $L_{Aeq,\ 1\ hour}$ outside the dwellings would translate to levels of 15 to 20 dB $L_{Aeq,\ 1\ hour}$ inside the dwellings with windows open. This compares with BS 8233 criterion for dwellings of 35 dB $L_{Aeq,\ 16\ hour}$ during the day. That criterion is designed primarily for anonymous noise source such as traffic rather than plant noise, although the significant margin of compliance should compensate for that.

On that basis the absolute sound levels reduces the initial assessment of impact in this case.

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 the specific sound level is 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 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 receptor.

4.8 Conclusion

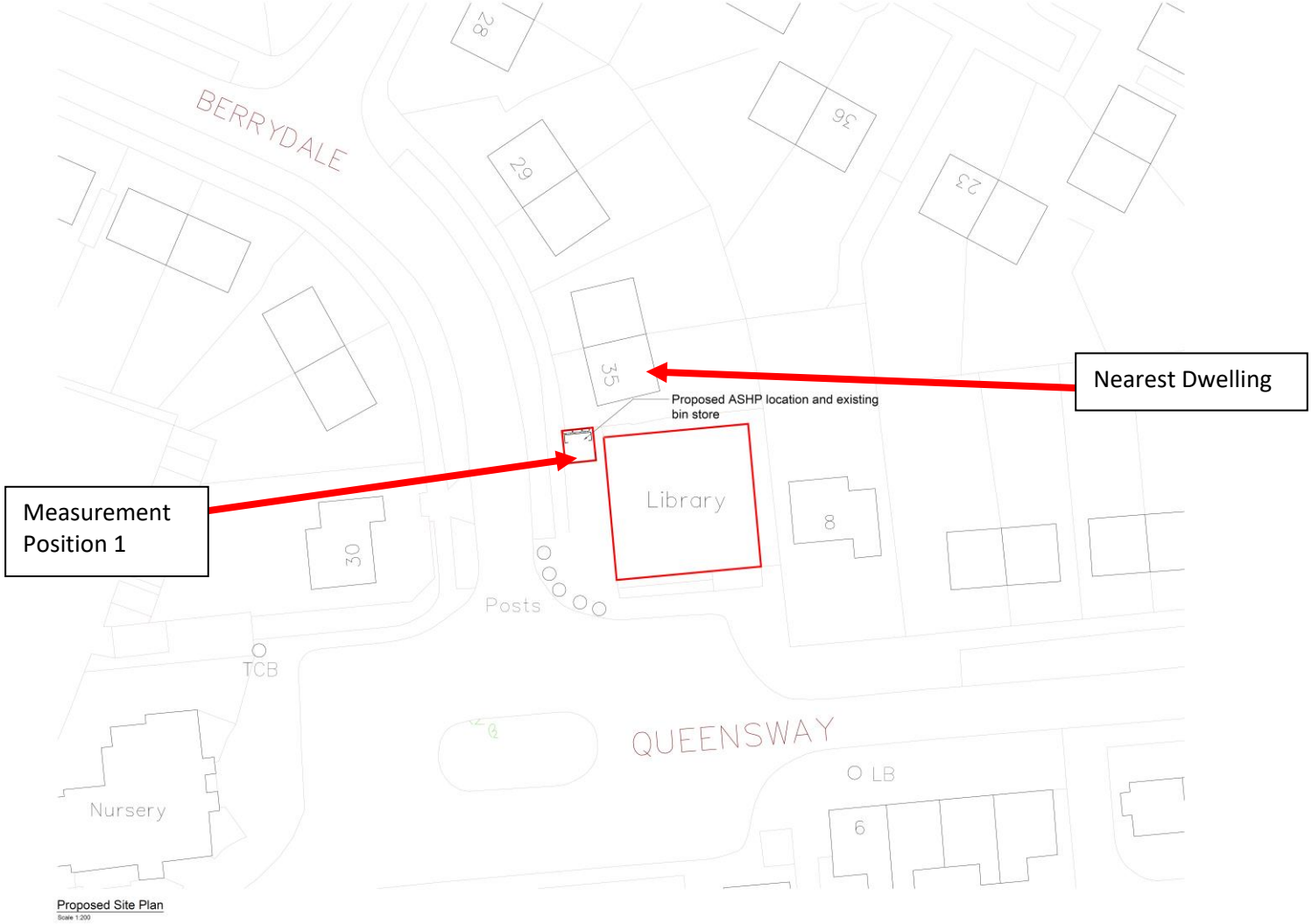
This assessment has demonstrated that when assessed following the methodology of BS 4142:2014, the initial estimate of impact at the nearest house should be low, depending on the context.

Furthermore, consideration of the context has shown that this strengthens the case of 'low' 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.

Leo Clikawa

FOR ACOUSTIC DESIGN TECHNOLOGY



Notes	**Description** Site plan showing noise monitoring location and the nearest dwelling	
	Project Worsbrough Library	
	Survey Date 13 September 2023	**Drawing No.** 3579/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	10:30 – 11:30	46	74	35
	11:30 – 12:30	48	80	33

Table 3579/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 Class 1 Sound Level Meter (SLM11)	15131	April 2023		-0.3	113.7	113.84
01dB	Fusion MCE3 Microphone	14038	April 2023				
Norsonic	Nor1251 Calibrator (Cal 5)	34220	March 2023	114.02			

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

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
C01-02	Mitsubishi PUZ-M100VKA2 (2 no.)	Behind the relocated bin store by the west elevation	-	L_p at 1m	54	54	53	49	46	41	36	29
C03	Mitsubishi SUZ-M50VAR2	Behind the relocated bin store by the west elevation	-	L_p at 1m	57	58	57	54	51	48	42	36

ACOUSTIC DESIGN TECHNOLOGY LIMITED
CROSSLAND GRANGE, GREENWAYS, CHESTERFIELD, DERBYSHIRE S40 3HF
Telephone: 01246 554841 Facsimile: 01246 550141 Website: www.acousticdesign.co.uk E-mail: mail@acousticdesign.co.uk
Company Registered in England No. 4528227
V.A.T. Registration No. 593 7456 92