



ACOUSTIC DESIGN TECHNOLOGY
Noise and Vibration Consultants

ADT 2784

17 June 2019

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PLOT 5 ANGEL MEADOWS
ENVIRONMENTAL NOISE IMPACT ASSESSMENT
ACOUSTIC CONSULTANCY REPORT ADT 2784/ENIA

Revision	Date	Issued By	Checked by	Revision Notes
-	17 June 2019	Luke Delaney	Chris Middleton	first issue

1.0 SUMMARY

Planning permission has been granted for the development of a residential apartment block, as shown on the planning application drawings.

As an environmental noise survey has been carried out by WSP at a location relating to the development, these figures will be used in support of the planning condition discharge. Furthermore, a computer model will be used to assess the impact of the proposed plant on noise sensitive areas.

Maximum rating levels as defined in BS 4142:2014 have been proposed for the new fixed plant installations, designed for compliance with the Manchester city council noise and planning guidance.

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

2.0 BASIS OF ASSESSMENT

2.1 Site Location

The site is located north of Manchester city centre on Old Mount Street, approximately 100m to the east of the A664 Angel Street. The surrounding area is comprised primarily of commercial developments interspersed with private residential developments located to the south and the east. Railway lines run parallel to the site, approximately 125 metres away to the north.

2.2 Assessment Criteria

Planning permission 116366/FO/2017 has been issued. Condition 19 relates to noise and reads as follows:

19 (a) prior to the first occupation of a phase, details of any externally mounted ancillary plant, equipment and servicing shall be submitted for approval.

(b) The approved scheme shall be implemented and prior to the first occupation of a phase and post construction survey (including appropriate mitigation measures and timescales for implementation if necessary) shall be submitted for approval in writing by the City Council, as Local Planning Authority. The measures agreed thereafter retained and maintained in situ.

As the condition contains no specific noise criteria, the guidance in the Manchester City Council 'Planning & Noise: Technical Guidance' (2015) has been used. Section 3.6.1.5.1 states that:

‘The development should be designed so as to achieve a rating level of 5dB (L_{Aeq}) below the typical background (L_{A90}) level at the nearest noise sensitive location’.

2.3 Nearest Noise Sensitive Properties

The noise sensitive properties in the surrounding area have been grouped into four *noise sensitive areas* (NSA), as described below and as indicated on the attached site plan 2784/SP1.

NSA	Location	Direction	Approximate distance from proposed building (metres)
1	Apartment block on Naples Street	South-west	12
2	Apartment blocks on Simpson Street	South-east	40
3	Apartments on Ludgate Hill	South-East	26
4	New apartments on Angel Meadows	North-west	51

The above NSAs represent the closest noise sensitive properties, with others 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.

2.4 Strategy for Noise Impact Assessment

Based on the information in Sections 2.1 to 2.3 above, the environmental noise impact of the proposed plant has been assessed as described in Section 3.0 below.

3.0 NOISE IMPACT ASSESSMENT

3.1 Introduction

The City Council require that noise emissions from the new plant installations be controlled following the guidance of BS 4142:2014.

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 B for an explanation of the technical terms defined in the Standard.

3.2 Specific Sound Level

3.2.1 Computer Model

As the analysis is relatively complex, a computer model of the proposed installation has been constructed using Datakustik Cadna/A 2018 to predict how the sound will radiate from the flat roof area to the identified NSA.

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 1.5 metres at NSA1 and NSA4, and 20 metres at NSA2 and NSA3 - the approximate heights of the windows most affected by plant noise.

3.2.2 Source Sound Levels

Manufacturers' noise data for the proposed plant is set out in the attached plant noise schedule 2784/PNS, with the associated atmospheric silencers set out in the attached schedule 2784/SSA.

3.3 Predicted Sound Levels

The scheduled plant noise levels and silencer insertion losses have been input into the Cadna/A computer model, and the predicted noise levels at NSA1 to NSA4 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	
NSA1	30	31	30	22	18	17	15	6	26
NSA2	27	34	31	27	23	18	11	-1	29
NSA3	25	31	32	26	20	15	12	18	28
NSA4	15	17	8	-1	-9	-17	-24	-32	4

3.4 Background Sound Level

The plant will operate 24 hours a day. Background noise survey data is available in the separately issued WSP report 70020194-07, with typical background levels at the location marked on the attached site plan 2784/SP1 of 52 dB $L_{A90, 1\text{hour}}$ and 44 dB $L_{A90,15\text{mins}}$ for the daytime and night-time periods respectively.

3.5 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.

3.5.1 Tonality

Using commonly accepted definitions of tonality, the predicted specific sound levels are not tonal at the assessment locations.

3.5.2 Impulsivity

Building services plant of the type proposed will not operate in an impulsive manner, and so the noise emissions should not be impulsive in character. Therefore, no correction is required.

3.5.3 Other Sound Characteristics

There are no additional sound characteristics which would require a correction to the specific noise rating level.

3.5.4 Intermittency

The proposed plant is scheduled to run continuously, and so the noise emissions will not be intermittent. Therefore, no correction is required.

The respective rating levels are therefore as follows:

Location	Rating Level $L_{Ar, 15 \text{ mins}}$ dB
NSA1	26
NSA2	29
NSA3	28
NSA4	4

3.6 Initial Assessment of Impact

The attached sample calculation 2784/C1 provides the initial estimate of impact for the worst affected NSA2, following the methodology of BS 4142:2014.

The predicted rating level is 15 dB lower than the typical background level, which fulfils the planning requirement to achieve a rating level at least 5 dB below the background level.

3.7 Conclusion

This assessment has demonstrated that when assessed following the methodology of BS 4142:2014, the rating levels are at least 5 dB below the background level, as required by planning condition 19, applying the guidance in the 'Planning & Noise : Technical Guidance'.

FOR ACOUSTIC DESIGN TECHNOLOGY



Notes

Description

Noise sensitive areas and survey measurement position

Project

Plot 5, Angel Meadows

Date

17 June 2019

Drawing No.

2784/SP1



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APPENDIX A

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 B
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

BS 4142 : 2014 ASSESSMENT

Results		Commentary
[Predicted / measured] sound level	$L_{Aeq,T} = 29 \text{ dB}$	
Residual sound level	-	not applicable
Background sound level	$L_{A90,15\text{mins}} = 44 \text{ dB}$	from survey results
Assessment made during the nighttime, so the reference time interval is 15 minutes		
Specific sound level	$L_{Aeq,T} = 29 \text{ dB}$	noise emissions from plant assumed to be continuous
Acoustic feature correction		none
Rating level	$L_{Ar, 15 \text{ mins}} = 29 \text{ dB}$	
Background sound level	$L_{A90,15\text{mins}} = 44 \text{ dB}$	from survey results
Excess of rating over background sound level	$(29 - 44 \text{ dB} = -15\text{dB})$	
Assessment indicates likelihood of low impact depending on the context		

CALCULATION 2784/C1

PLOT 5 ANGEL MEADOWS

PLANT NOISE SCHEDULE ADT 2784/PNS

PRELIMINARY ISSUE



ACOUSTIC DESIGN TECHNOLOGY
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17 June 2019

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
HRU 01	Mitsubishi LGH-80RVX-E-1	Cycle Store venting to west elevation	0.255 : n/a	L _w	55	56	50	45	42	36	29	23
EC03	MXZ-5E102VA-E3	Roof	-	L _p @ 1m	56	62	58	54	50	45	39	30
EC04	MXZ-5E102VA-E3	Roof	-	L _p @ 1m	56	62	58	54	50	45	39	30
EC05	MXZ-5E102VA-E3	Roof	-	L _p @ 1m	56	62	58	54	50	45	39	30
EC06	MXZ-5E102VA-E3	Roof	-	L _p @ 1m	56	62	58	54	50	45	39	30
EF01	Vent Axia ACM 250	Left Refuse Store, venting to south elevation	0.38 : n/a	L _w (A-weighted)	-	39	64	68	71	70	66	55
EF02	Vent Axia ACM 250	Right Refuse Store, venting to south elevation	0.36 : n/a	L _w (A-weighted)	-	39	64	68	71	70	66	55

PLOT 5 ANGEL MEADOWS

ATMOSPHERIC SILENCER SCHEDULE ADT 2784/SSA

PRELIMINARY ISSUE



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Ref	Plant Description	Length (mm)	Width (mm)	Height (mm)	No. Off	Vol (m ³ /s)	Max. (Pa)	Insertion Loss (dB) at Centre Frequency (Hz)							
								63	125	250	500	1k	2k	4k	8k
ATT01	EF01 exhaust	400	400	470	1			2	4	5	10	15	13	10	7
ATT03	EF02 exhaust	400	400	470	1			3	6	9	16	24	24	19	11
ATT05	HRU01 exhaust	250 dia.		615	1			1	2	5	12	27	17	13	13
ATT06	HRU01 fresh air intake	250 dia.		615	1			1	2	5	12	27	17	13	13

Note:- silencer details from Caice Acoustics schedule