



St Gabriel's Student Accommodation, Manchester

Planning Condition 29a

9668.9

5th March 2025

Revision A



St Gabriel's Student Accommodation, Manchester

Planning condition 29a

9668.9

Revision	Description	Issued by	Date
A	First issue	NC	5 th March 2025

This report has been prepared for the sole benefit, use and information of the client for the purposes set out in the report or instructions commissioning it. The liability of Apex Acoustics Limited in respect of the information contained in the report will not extend to any third party. All concepts, data and proposals are copyright © 2025. Issued in commercial confidence.

Prepared for

McLaren Construction

Prepared by



Joseph Tony MIOA

Checked by



Nick Conlan BEng MIOA

Apex Acoustics Limited Reg. in England no. 05656507
Design Works, William Street, Gateshead, NE10 0JP

T 0191 620 0750
E info@apexacoustics.co.uk
W www.apexacoustics.co.uk

1 Contents

1	Contents	2
2	Introduction.....	3
3	Assessment criteria.....	4
4	Existing acoustic environment	4
5	Plant noise limits and plant location	5
6	Noise sources.....	6
7	Assessment results– Residential receptors (NSR 1).....	8
8	Conclusion	11
9	References.....	11
Appendix A	Noise exposure hierarchy.....	12
Appendix B	Background sound levels.....	13
Appendix C	Professional qualifications and competence	14

2 Introduction

- 2.1 A development of four blocks of student accommodation has been proposed at Oxford Place, Manchester, M14 5RP. The two buildings – St Gabriel's & Chapel Hall and Woodthorpe Hall will be retained and refurbished, and the remaining two buildings demolished for new build; the site location is shown in Figure 1 with the site layout provided by the client shown in Figure 2.
- 2.2 Apex Acoustics has been commissioned to provide a plant noise impact assessment to discharge Condition 29a of planning application reference 135278/FO/2022 relating to the proposed plant associated with the development.
- 2.3 This report presents a BS4142 assessment of the proposed plant at the nearest noise sensitive receptor (NSR) to discharge the planning condition and assessment of noise impact from the emergency generator.
- 2.4 The NSRs are identified as the residential properties on Hathersage Road to the north and the student accommodation on Oxford Place to the south of the proposed site as shown in Figure 1.
- 2.5 The proposed plant would be installed to the north of the site as shown in Figure 2. Therefore, the residential properties to the north are considered the worst affected noise sensitive receptor (NSR1), the student accommodation situated to the south and further away from the proposed plant would be exposed to a lower noise impact.



Figure 1: Proposed site boundary outlined in red and identified NSRs outlined in yellow

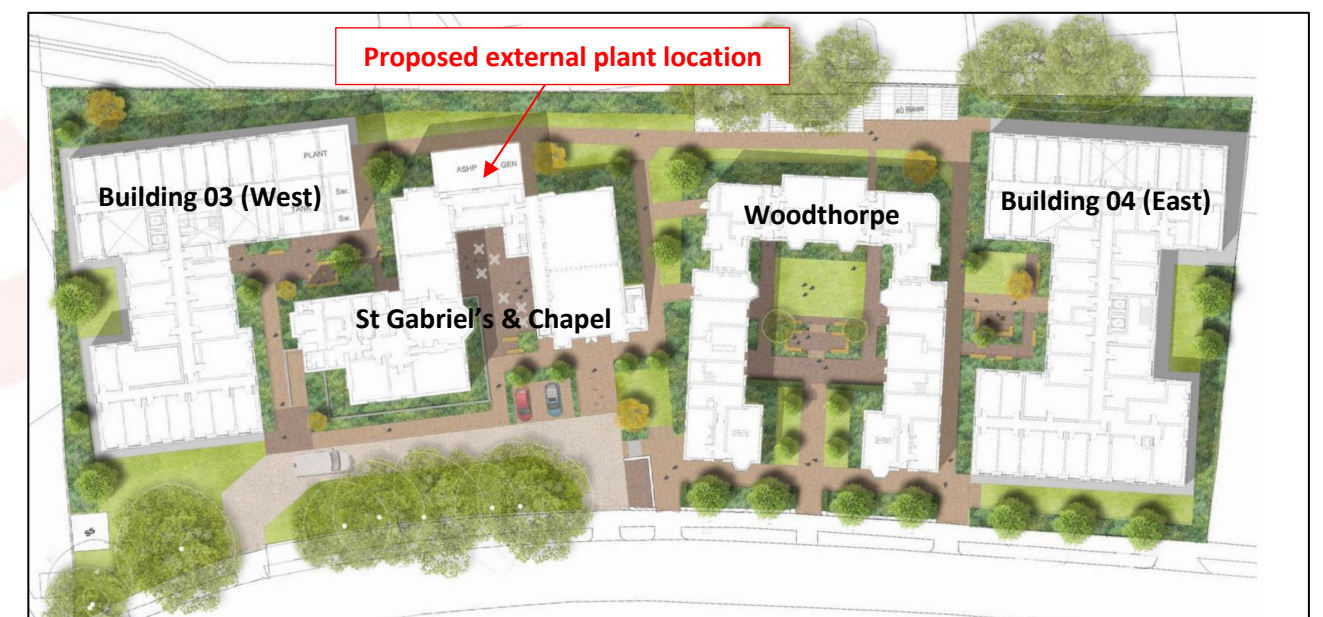


Figure 2: Site layout (provided by the client)

3 Assessment criteria

3.1 Planning Condition 29a

- 3.2 Planning Condition 29a associated with the original Application ref. 135278/FO/2022 for this development is shown below:

29a. Any externally mounted ancillary plant, equipment and servicing to be installed shall be selected and / or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5 dB (LAeq) below the typical background (LA90) level at the nearest noise sensitive location. Prior to its installation, the scheme, including any necessary mitigation, shall be submitted to and approved in writing by the City Council Local Planning Authority in order to secure a reduction in the level of noise emanating from the site.

- 3.3 This condition requires that the rating level associated with the externally mounted plant should be 5 dB below the background noise level L_{A90} at the nearest NSR during the day and night.

3.4 Emergency Plant – Back-up Generator

- 3.5 Further to conversation with Lisa Jones, Environmental Protection Officer at Manchester City Council, it is understood that “With regard to emergency plant such as back up generators the limit is no more than 10dB above background at the nearest noise sensitive properties and we would need to see, and agree, a schedule for testing the equipment.”

- 3.6 Other than in an emergency situation, the generator is expected to be tested during the daytime hours only. On this basis, the noise emitted from the emergency generator should not exceed 10 dB above the background noise level L_{A90} at the nearest NSR during the daytime.

3.7 BS4142:2014

- 3.8 The assessment of noise of a commercial/ industrial nature is commonly based on BS 4142:2014, Reference 1, which includes sound from fixed installations that comprise mechanical and electrical plant and equipment.

- 3.9 The terminology used in BS 4142 to describe the various levels of potential adverse impact with respect to the PPG-N noise hierarchy are summarised Appendix A.

4 Existing acoustic environment

- 4.1 The existing acoustic environment was measured for a 24-hour period from around 13:00 hours on the 2nd March 2022.

- 4.2 The measurement positions are shown in Figure 3.



Figure 3: Measurement positions

- 4.3 The microphone was located 3.5 metres above ground level and away from other reflecting surfaces such that the measurements are considered free-field.
- 4.4 Data was recorded in single-octave band frequencies at one-second intervals throughout the 24-hour measurement period.
- 4.5 The most significant noise sources were traffic noise from the surrounding road networks.
- 4.6 The equipment used is listed in Table 1.

Equipment	Model	Serial no.
Sound Level Meter	NTi XL2	A2A-11084-E0
Calibrator	Larson Davis CAL 200	10665
Sound Level Meter	NTi XL2	A2A-11062-E0
Calibrator	Larson Davis CAL 200	13403

Table 1: Equipment used

- 4.7 Both meter and calibrator have current calibration certificates traceable to national standards. The sound level meter has been calibrated within the last two years and calibrator has been calibrated within the last year in accordance with the guidance of BS 4142; calibration certificates are available on request.
- 4.8 The equipment was field-calibrated before and after the measurements with no significant drift in sensitivity noted.
- 4.9 **Ambient sound level, L_a**
- 4.10 The ambient sound environment included noise sources such as traffic noise from the surrounding road networks.
- 4.11 Ambient sound levels considered representative of the daytime and night-time at both positions with the tenth highest maximum levels are shown in Table 2.
- 4.12 **Background sound level**
- 4.13 The background sound level, $L_{A90, T}$, is derived from the $L_{Aeq, T}$, with results shown in Appendix B.
- 4.14 The background sound levels considered representative of the assessment periods are shown in Table 2.

Position	Assessment period	L_{Aeq} (dB)	L_{AFmax} (dB)	L_{A90} (dB)
1 - Front (Facing Oxford Place)	Daytime (07:00 – 23:00 hrs)	61	-	52
	Night time (23:00 – 07:00 hrs)	56	71	50
2 - Rear (Shielded from Oxford Place)	Daytime (07:00 – 23:00 hrs)	54	-	51
	Night time (23:00 – 07:00 hrs)	51	57	49

Table 2: Ambient, 15th highest maximum and background sound levels considered representative of the assessment periods

5 Plant noise limits and plant location

- 5.1 **Plant noise emission limits**
- 5.2 The following plant noise emission limits have been determined in accordance with BS 4142 and the planning Condition 29a.
- 5.3 The noise emission limits presented on Table 3 below are based on the background sound levels considered representative of the assessment periods at Position 2 (to the north of the proposed site).

Location	Plant Item	Period	Rated noise impact, $L_{Ar,Tr}$	Comments
Outside of noise sensitive residential facades on Hathersage Road (worst affected NSR1)	Fixed Mechanical Plant	Daytime (07:00 – 23:00)	≤ 46 dB	BS 4142 rating level of 5 dB below the background sound level
		Night-time (23:00 – 07:00)	≤ 44 dB	
	Emergency Generator	Daytime (07:00 – 23:00)	≤ 61 dB	BS 4142 rating level of 10 dB above the background sound level

Table 3: Noise limits for fixed mechanical plant and emergency generator

- 5.4 **Plant location**
- 5.5 The external plant is proposed to be installed to the north of St Gabriel’s & Chapel Hall as shown in Figure 4 below.

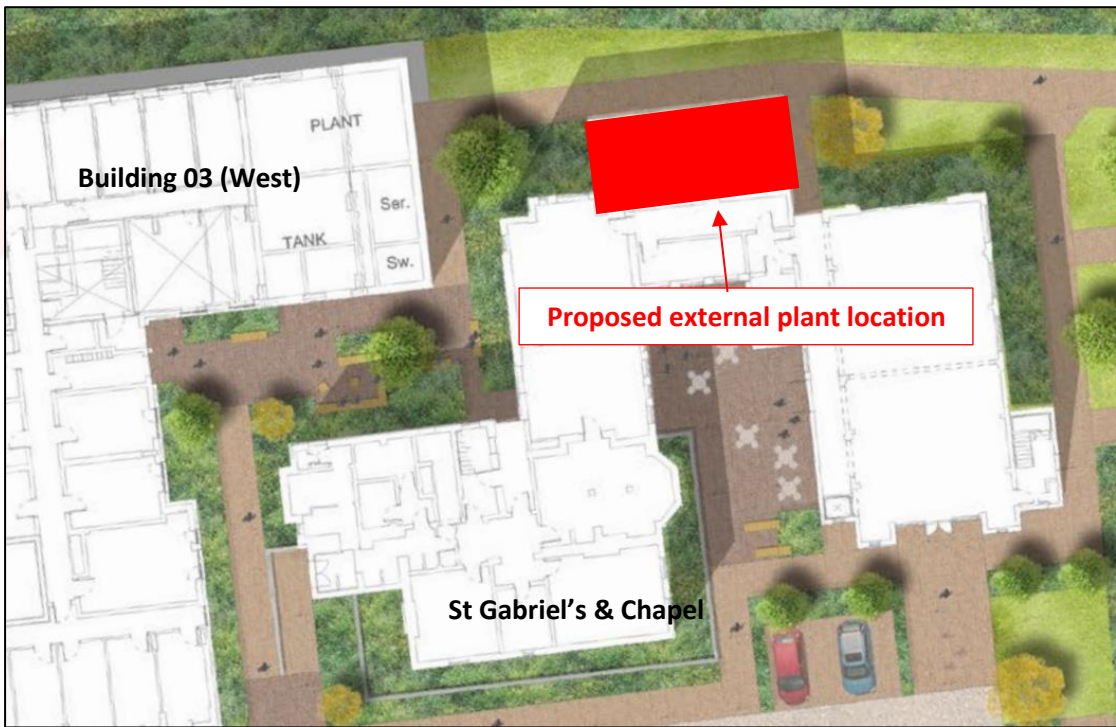


Figure 4: Proposed external plant location

6 Noise sources

6.1 Proposed plant and associated noise levels

6.2 The mechanical plant is assessed based on plant details supplied by the mechanical engineers.

6.3 The location of the all the units have been taken from the mechanical engineers' drawing as shown below.

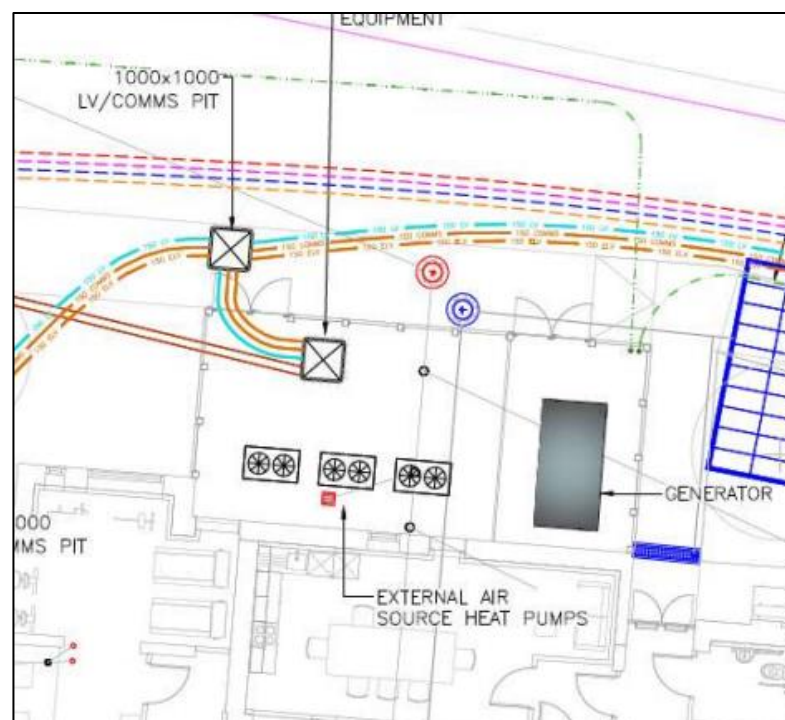


Figure 5: Proposed unit location (provided by the mechanical engineer)

6.4 The proposed plant is understood to comprise of that summarised in Table 4.

Plant	Manufacturer	Model	No. proposed
Air Source Heat Pump (ASHP)	Mitsubishi Electric	Q-Ton	3
Emergency generator	Vital Power	VPC88-UKS	1

Table 4: Proposed plant

6.5 Manufacturer supplied data are shown in Table 5.

Plant	Data type	dB(A)	Single-octave band centre frequency (Hz)							
			Linear noise levels (dB)							
			63	125	250	500	1k	2k	4k	8k
ASHP (Standard mode)	L _w ¹	70	-	60	60	65	66	64	62	52
ASHP (Silent mode)	L _w ²	64	-	54	54	59	60	58	56	46
Emergency Generator	L _p ³	71	-							

Table 5: Manufacturer's noise levels

¹ Octave band sound power levels taken from BRE test report for Q-Ton provided by the manufacturer, Reference 2

² It is understood that the ASHP unit running in silent mode will be 6 dB quieter than the unit running in standard mode as advised by the manufacturer and has been confirmed by the mechanical engineer.

³ Sound pressure level measured at 7m, based on manufacturers data sheet.

6.6 Operation times

6.7 All plant is assumed to operate continuously during the daytime 1-hour and night-time 15-minute assessment periods.

6.8 It is understood that the ASHP units will run in standard mode during the daytime and silent mode during the night-time period (2300 – 0700), it is understood that this has been confirmed by the mechanical engineers as being representative of typical operation.

6.9 Other than in an emergency situation, the generator is expected to be tested during the daytime hours only.

6.10 It is recommended that the testing of emergency generator is only be carried out for up to one hour in a calendar month and only during the more noise tolerant daytime period of 09:00-17:00 hours Monday to Friday and not on weekends or public holidays.

6.11 Noise transmission and propagation

6.12 Noise transmission and propagation from the air source heat pumps (ASHPs) is modelled to the NSRs based on the noise source data detailed, using proprietary software, CadnaA, Reference 3.

6.13 This models noise propagation outdoors according to ISO 9613, Reference 4.

The model parameters and assumptions are summarised in Table 6.

Parameter	Source	Details
Model dimensions	Google Earth	British Transverse Mercator coordinates
Site location and layout	Architects’ drawings	Architects’ drawings
Topography –within site	Site observations and Google Street view	Modelled with no changes in topography
Topography –Outside of site	Site observations and Google Street view	Modelled with no changes in topography
Building heights – proposed buildings	Drawings	Architects’ drawings
Building heights – outside of site	Site observations and Google Street view	Site observations and Google Street view
Receptor positions	Site observations and Google Street view	Site observations and Google Street view
Building and barrier absorption coefficient	ISO 9613-2	0.21 to represent a reflection loss of 1 dB
G, Ground factor	ISO 9613-2	Hard ground, G = 0; Porous ground, G = 1 (locally on model)
Max. order of reflections	Apex Acoustics	Three

Table 6: Modelling parameters and assumptions

7 Assessment results– Residential receptors (NSR 1)

7.1 ASHP units



Figure 6: Sound contours at 4 m, showing the calculated specific sound level during the daytime, L_{Aeq 1 hr} based on current proposals



Figure 7: Sound contours at 4 m, showing the calculated specific sound level during the night-time, $L_{Aeq, 15 min}$ based on current proposals

7.2 A BS4142 assessment of ASHP noise affecting the NSR1 is provided in Table 7, below.

Parameter	Daytime assessment	Night-time assessment	Commentary
Background sound level	51 dB $L_{A90,15min}$	49 dB $L_{A90,15min}$	Considered representative of the assessment period based on statistical analysis detailed in Appendix B.
Plant noise limit	46 dB $L_{A90,15min}$	44 dB $L_{A90,15min}$	BS 4142 rating level of 5 dB below the background sound level.
Specific sound level L_s , due to all sources for the required assessment interval	41 dB $L_{Aeq,1hr}$	35 dB $L_{Aeq,15min}$	The calculated specific sound level across the site due to all sources during the assessment period is shown in Figure 6 and Figure 7.
Acoustic feature correction	+ 0 dB	+ 0 dB	A subjective assessment to determine acoustic features is undertaken, and the following penalties are considered applicable: • Tonality – 0 dB; • Impulsivity – 0 dB; • Intermittency – 0 dB; • Other – 0 dB; The specific sound level of any one source at the receptors is no more than 44 dB (5 dB below the background sound level) and it is therefore considered unlikely that the combined sound level would contain acoustic features which are readily distinctive against the residual acoustic environment. No rating penalty is therefore considered to be applicable and the rating level is equal to the specific sound level.
Rating level, $L_{Ar,Tr}$	41 dB	35 dB	
Uncertainty of assessment	N/A	N/A	Background data was obtained over a 2-day period, accounting for the changing acoustic environment. Uncertainty in the calculated impact has been reduced by the use of a calculation method in accordance with ISO 9613-2.
Excess of $L_{Ar,Tr}$ over background sound level	-10 dB	-14 dB	The calculated rating level is at least 5 dB below the background sound level and therefore complies with the planning Condition 29a.

Table 7: BS 4142 assessment results with proposed ASHP units

7.3 Emergency generator

- 7.4 The NSR1 to the north, are the most affected location in terms of noise exposure from emergency generator. These NSRs are approximately 20 m to the north of the proposed ground floor generator plant area. Corrections have been made for distance, as appropriate.
- 7.5 On the basis of the above, the predicted, cumulative specific noise level at the NSR 1 is $61\text{dBL}_{\text{Aeq,T}}$. The predicted noise level is no more than 10 dB above the background noise level during the daytime and hence will meet the Local Authority's requirement for emergency plant.

8 Conclusion

- 8.1 Based upon manufacturer's noise data, and background noise levels measured by Apex Acoustics, a BS4142 assessment of operational plant noise levels have been undertaken at the nearest sensitive properties.
- 8.2 The results of the assessment show that the cumulative plant noise emissions level is at least 5 dB lower than the existing background noise level during the daytime and night-time, and the requirements of Condition 29a of planning permission 135278/FO/2022 can therefore be discharged.
- 8.3 Based on the proposed emergency generator, it is calculated that the noise emission from emergency generator at the worst-affected NSR is no more than 10 dB above the background level during the daytime.

9 References

- 1 BS 4142 2014: A1+2019, Method for rating and assessing industrial and commercial sound.
- 2 BRE test report, DHW Testing of MHI Q-Ton to EN 16147 (tapping cycle XXL), Prepared for Mitsubishi Heavy Industries Air Conditioning Europe Ltd, report no. P103440-1000 Issue 5, 20 June 2016.
- 3 CadnaA environmental noise modelling software, Datakustik GmbH.
- 4 ISO 9613: Acoustics - Attenuation of sound during propagation outdoors.

Appendix A Noise exposure hierarchy

Planning Practice Guidance - Noise				Significant adverse effect Adverse effect Low Impact + 10 dB + 5 dB 0 dB An initial estimate of the impact of the specific sound may be obtained by subtracting the measured background sound level from the rating level. Typically, the greater this difference, the greater the magnitude of impact
Noise	Example of outcomes	Increasing effect level	Action	
Present and very distributive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent	
Present and distributive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid	
Significant Observed Adverse Effect Level (SOAEL)				
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum	
Lowest Observed Adverse Effect Level (LOAEL)				
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No specific measures required	
No Observed Adverse Effect Level (NOAEL)				
Not present	No effect	No Observed Effect	No specific measures required	
No Observed Effect Level (NOEL)				

Table 8: PPG-N Noise Exposure Hierarchy and BS 4142 initial estimate of impact

Appendix B Background sound levels

B.1 Analysis to determine the typical background sound level representative of the daytime and night-time period at Positions 1 and 2 has been undertaken following the guidance of BS 4142, with results shown in Figure 8 - Figure 11.

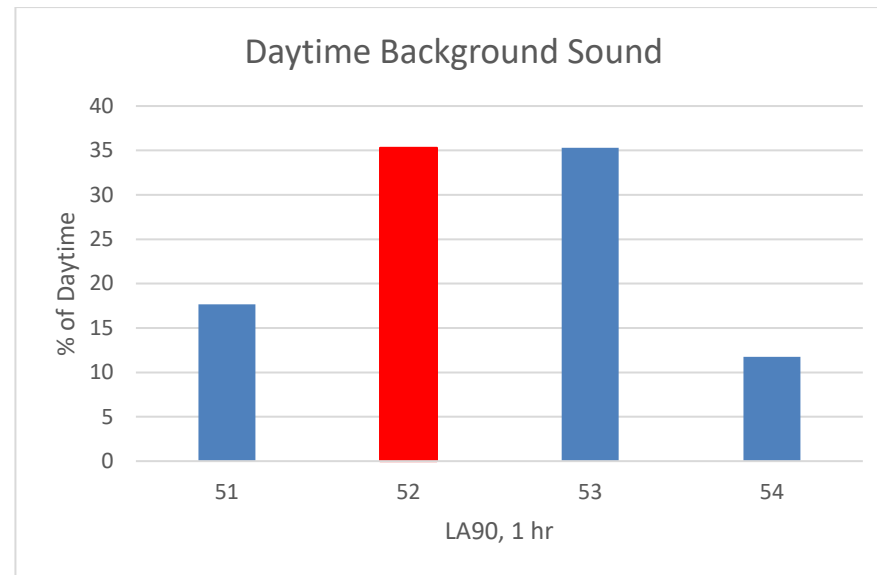


Figure 8: Analysis of daytime background levels, LA90, 1hr at Position 1 (facing Oxford Place)

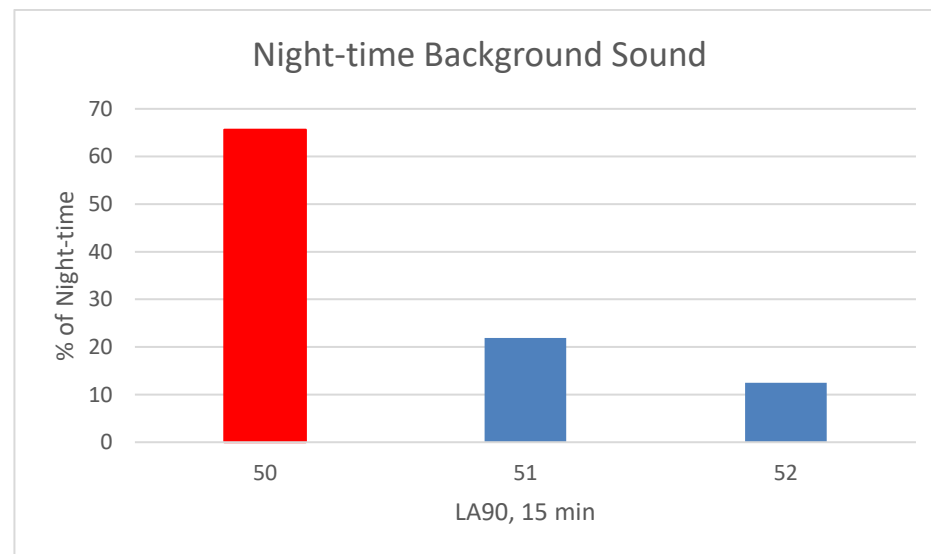


Figure 9: Analysis of night-time background levels, LA90, 15min at Position 1 (facing Oxford Place)

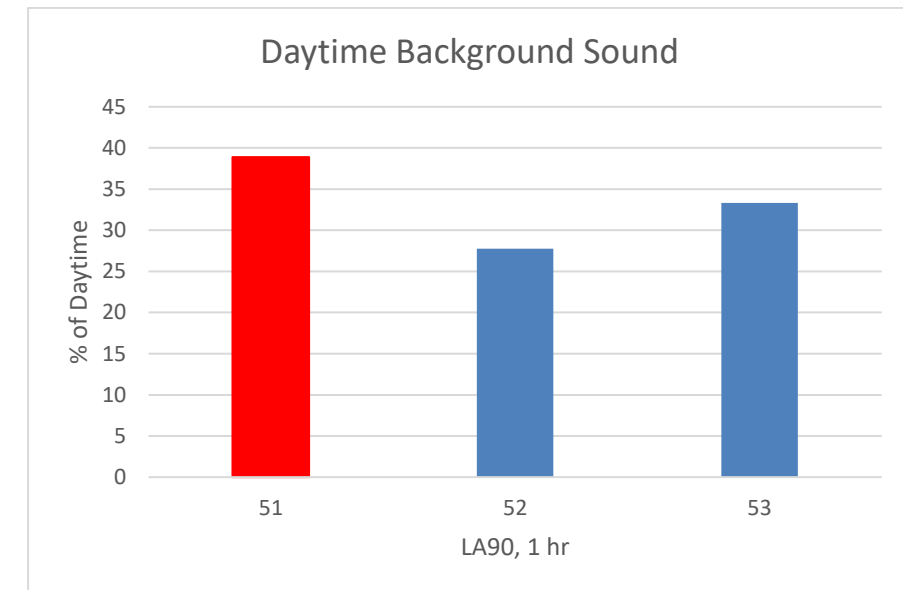


Figure 10: Analysis of daytime background levels, LA90, 1hr at Position 2 (shielded from Oxford Place)

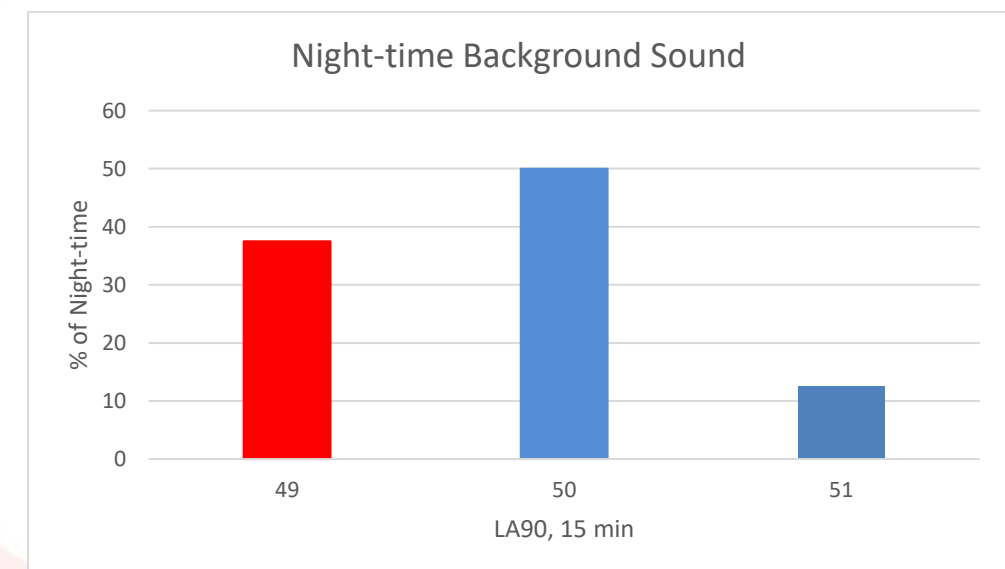


Figure 11: Analysis of night-time background levels, LA90, 15min at Position 2 (shielded from Oxford Place)

Appendix C Professional qualifications and competence

- C.1 All Apex Acoustics consultants work under the close supervision of a member who holds qualification in acoustics and is a member of the IOA.
- C.2 This can be verified by searching the Institute of Acoustics' list of Members, available here, with the surname of the consultant.
<http://www.ioa.org.uk/membership-check>
- C.3 Apex Acoustics is a member of the Association of Noise Consultants (ANC). The ANC is a trade organisation which seeks to raise the standards of acoustic consultancy and as such there are barriers to entry to ensure member's competency.
- C.4 This report has been checked by an appropriately qualified and experienced acoustic consultant.