

A.K.S Air Conditioning Limited

The Sharp Project, Thorpe Road

Proposed ASHP – Acoustic Assessment



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Peninsular Acoustics

Liverpool: Office 14 Clock Tower Building, Clock Tower Park, Liverpool, England, L10 1LD

Birmingham: Studio 214, Scott House, Custard Factory, Gibb Street, Birmingham, B9 4AA

London: 16 Upper Woburn PI, London, WC1H 0AF

Website: www.peninsularacoustics.co.uk

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1. Introduction

Peninsular Acoustics Ltd has been commissioned by A.K.S Air Conditioning Limited (hereafter referred to as 'the Client') to undertake an acoustic assessment for the installation of 2no. new condensing units at The Sharp Project, Thorpe Road, Manchester M40 5JB (hereafter referred to as 'the Site').

1.1. Scope of Works

In order to determine the potential impact, the following scope of works has been undertaken:

- Nearby Noise Sensitive Receptors (NSRs) have been identified using satellite images, client information and site observations;
- Baseline environmental sound levels have been established through an attended environmental sound survey, capturing sample measurement during both daytime and night-time periods;
- Sound levels at the nearest NSR have been predicted using technical specifications of the proposed plant; and
- An assessment in accordance with BS 4142¹ has been undertaken with suitable mitigation measures suggested where required.

This report is necessarily technical in nature and therefore, to assist the reader, an acoustics glossary is provided in Appendix A.

1.2. Pre-Commencement Condition

This assessment supports planning application 143112/FO/2025 which relates to the installation of air conditioning units and related pipework.

Condition 1 of the planning approval is reproduced below:

External plant/equipment/servicing

a) Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme 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. Prior to commencement of the use hereby approved the scheme shall be submitted to and approved in writing by the City Council as local planning authority in order to secure a reduction in the level of noise emanating from the site. The scheme shall be implemented in full before the use commences or as otherwise agreed in writing by the City Council as local planning authority.

¹ BS 4142:2014 +A1:2019 'Methods for rating and assessing industrial and commercial sound.'

2. Sound Surveys

2.1. Methodology and Equipment

A survey of the existing background sound levels was undertaken in front of the nearest residential receptors to the Site at the location SM1 shown in Figure 2.1. This location was considered representative of the background sound levels at the nearest residential receptor, No. 19 Limerston Drive (NSR1).

Daytime background sound level measurements (L_{A90}) were conducted between 13:30 and 14:30 on Friday 18th July 2025, with night-time measurements taken between 00:30 and 01:00 earlier that same day.

Sound levels were measured using a Class 1 Sound Level Meter (SLM) housed in environmental protection apparatus. The SLM was field calibrated before and after the survey using a Class 1 calibrator, with no significant drift in calibration levels recorded ($> \pm 0.5\text{dB}$).

Figure 2.1 Site plan



2.2. Survey Observations

2.2.1. Meteorological Conditions

During the survey, weather conditions were monitored which showed steady state wind speeds of less than 5 m/s. Additionally, there was no precipitation during the full length of the survey meaning all results are suitable for assessment purposes.

2.3. Site Survey Notes

Site notes indicate, for both daytime and night-time site visits, the dominant noise source at NSR1 is road traffic noise from Oldham Road.

2.4. Results

Table 2.1 and Table 2.2 present the results of the daytime and night-time background measurements.

Table 2.1: Daytime sample measurements

Measurement Start Time	Background $L_{A90,15min}$
18/07/2025 13:30:00	51
18/07/2025 13:45:00	50
18/07/2025 14:00:00	50
18/07/2025 14:15:00	51

Table 2.2: Night-time sample measurements

Measurement Start Time	Background $L_{A90,15min}$
18/07/2025 00:30:00	44
18/07/2025 00:45:00	44

3. BS 4142 Assessment

3.1. Proposed Plant

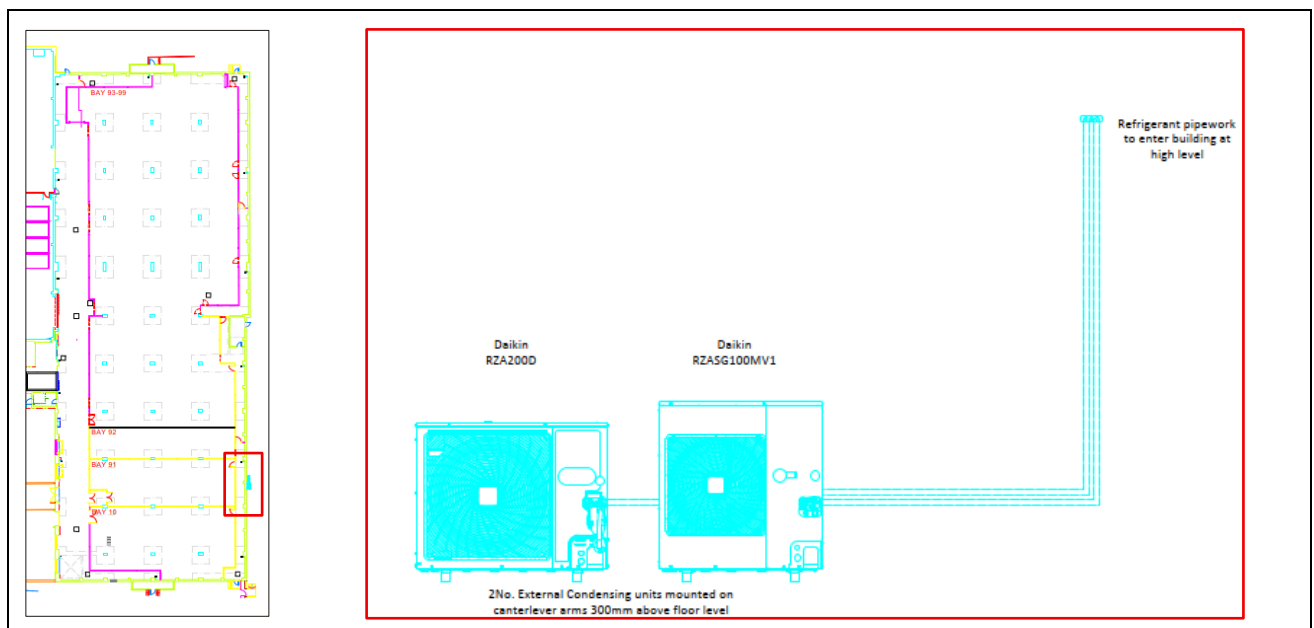
The plant has been selected as:

- 1x Daikin RZA200D with manufacturers data indicating a sound power level of L_w 76 dB(A); and
- 1x Daikin RZASG100M with manufacturers data indicating a sound power level of L_w 70 dB(A)

The outdoor units are to be located at ground level on the west side of the Site, mounted to the external walls and circa 170 metres from NSR1.

The approximate location of the units are shown below and in Figure 2.1.

Figure 3.1 Site layout highlighting condensing unit locations



3.2. Specific Sound Level

The predicted noise levels at NSR1, based on the plant being installed as per the architectural drawings, have been calculated using the noise data in Section 3.1.

Due to the distance to receiver (circa 170m), it is highly unlikely any distinctive acoustic features from the plant will be audible at the residential receptors and as such no feature corrections have been applied.

The predicted sound pressure levels at NSR1 are presented below in Table 3.1.

Detailed calculations for the predicted noise levels are presented in Appendix B.

Table 3.1 Specific sound level at receptor

Step	Instruction	RZA200D	RZASG100M	Comments
1	Determine the A-Weighted SWL	76 dBA	70 dBA	From manufacturer's technical specification
2	Determine the directivity	Q = 4	Q = 4	Ground mounted against a wall.
3	Measure the distance from the plant to NSR1	170m	170m	As per architectural drawings and Google maps
4	Distance reduction correction	- 45 dB	- 45 dB	Based upon Q=4 from Note 4 of MSC 020
5	Barrier reduction correction	0	0	No barriers assumed
6	Calculate the A-Weighted SPL	26 dB	20 dB	Step 1 – Step 4 – Step 5

3.3. Initial Numerical Impact Assessment

An assessment in accordance with BS 4142 for each unit is presented in Table 3.2 and Table 3.3.

Table 3.2 BS 4142 INIA – RZA200D

Assessment Step	Results	
	Daytime	Night-time
Specific Sound Level [A]	26 dB $L_{Aeq, T}$	26 dB $L_{Aeq, T}$
Acoustic Corrections [B]	+0 dB	+0 dB
Rating Level [A+B = C]	26 dB $L_{Ar, Tr}$	26 dB $L_{Ar, Tr}$
Background Sound Level [D]	50 dB $L_{A90, 15mins}$	44 dB $L_{A90, 15mins}$
Excess over Background [E = C-D]	-24 dB	-18 dB
Initial Estimate of Impact	Low Impact	Low Impact

Table 3.3 BS 4142 INIA – RZASG100M

Assessment Step	Results	
	Daytime	Night-time
Specific Sound Level [A]	20 dB $L_{Aeq, T}$	20 dB $L_{Aeq, T}$
Acoustic Corrections [B]	+0 dB	+0 dB
Rating Level [A+B = C]	20 dB $L_{Ar, Tr}$	20 dB $L_{Ar, Tr}$
Background Sound Level [D]	50 dB $L_{A90, 15mins}$	44 dB $L_{A90, 15mins}$
Excess over Background [E = C-D]	-30 dB	-24 dB
Initial Estimate of Impact	Low Impact	Low Impact

3.3.1. Discussion of Results

The INIA assessments indicates that each proposed plant unit, when operating individually, results in a low impact at NSR1 during both daytime and night-time periods. When assessed together, the combined sound level at the receptor is calculated as 27 dBA (from 26 dBA and 20 dBA), which also represents a low impact. This level is at least 17 dB below the L_{A90} night-time sound level, thereby meeting the requirement of achieving 5 dB below background as specified in the planning condition.

4. Conclusions

Peninsular Acoustics Ltd. has been commissioned by A.K.S Conditioning Limited to conduct an acoustic assessment for the proposed installation of two air conditioning units (models RZA200D and RZASG100M) at a commercial unit at The Sharp Project, Thorpe Road, Manchester M40 5JB.

A baseline environmental sound survey was conducted to establish prevailing background sound levels at the nearest residential receptor.

Manufacturer-provided sound power levels for the proposed units were used to predict operational sound levels at the NSRs. The assessment demonstrates that the predicted sound levels from each unit, both individually and in combination, are significantly below the prevailing background levels during both daytime and night-time periods. The combined sound level achieves at least 17 dB below background, achieving a low impact in accordance with BS 4142 and satisfying the planning condition.

It is therefore concluded that, based on the assessed plant models and their proposed locations, the installation is suitable without the need for mitigation and will not result in adverse noise impacts on the nearest noise-sensitive properties.

Limitations applicable to this report are contained in Appendix C.

Appendix A

Technical Terminology

Noise	Typically defined as unwanted, unpleasant or disturbing sound
Frequency (Hz)	The number of oscillations in acoustic pressure per second. It represents the 'tone' of the sound. Often determined in octave bands
Equivalent continuous sound pressure level ($L_{eq, T}$)	The average of the total sound energy over a specified time period (T). L_{eq} represents the equivalent sound level that a fluctuating source would have compared to a steady source with the same total sound energy over a specific time period. Commonly used as a descriptor of human perception of sound over time.
'A' weighting	Frequency-dependent weighting based on the response of the human auditory system which has been found to correlate well with the subjective response to sound. Denoted by the use of the letter 'A'. For example, dBA denotes an 'A' weighted sound level in decibels, or L_{Amax} denotes an 'A' weighted maximum sound pressure level.
Internal Ambient Noise Level (IANL)	The noise level within a room or enclosed space. Usually determined as an equivalent continuous sound pressure level over a specific time period ($L_{Aeq, T}$, dB)
$L_{night, outside}$	The incident external A-weighted long-term average sound level as defined in ISO 1996-2: 1987, determined over all the night periods of a year, in which the night is eight hours between 23:00 and 07:00.
Façade level	The sound pressure level measured close to a building façade that includes contribution from both the incident sound and the sound reflected from the façade. Normally taken to be 3dB higher than the equivalent free-field level, when located at 1 metre from a façade.
Free-field level	A measured sound pressure level that is independent of any contributions due to reflections from nearby surfaces and is therefore representative of the direct path only.
R / R_w	The laboratory tested airborne sound insulation of a building element
Sound insulation	The capacity of a structure to prevent sound from reaching a receiving location. Sound energy is not necessarily absorbed; impedance mismatch, or reflection back toward the source, is often the principal mechanism
Sound Power Level (SWL)	Sound Power Level is the logarithm of the ratio of a given sound power to the reference sound power. Such power level in decibels is ten times the logarithm to the base ten of the ratio. Note : unless otherwise specified, the reference sound power is 1 pW.
Sound Pressure Level (SPL)	Sound Pressure Level is the logarithm of the ratio of a given sound pressure to the reference sound pressure in decibels is 20 times the logarithm to the base ten of the ratio.

Appendix B

External Plant Noise Emissions Calculations and Specifications

EXTERNAL PLANT NOISE EMISSIONS CALCULATION TO NSR1

RZA200D

		dB(A)
Sound Power Level		76
Directivity	4	6
No. of units	1	0
Distance loss to receiver	170 m	-45
Barrier		0
Lp at receptor		26

RZASG100M

		dB(A)
Sound Power Level		70
Directivity	4	6
No. of units	1	0
Distance loss to receiver	170 m	-45
Barrier		0
Lp at receptor		20

2 Specifications

2 - 1 Specifications

Technical Specifications					RZA200D		RZA250D	
Casing	Colour				Ivory white			
	Material				Painted galvanized steel plate			
Dimensions	Unit	Height	mm		870			
		Width	mm		1,100			
		Depth	mm		460			
	Packed unit	Height	mm		1,050			
		Width	mm		1,205			
		Depth	mm		569			
Weight	Unit	kg		117				
	Packed unit	kg		127				
Packing	Weight	kg		10				
Heat exchanger	Fin	Type		WF fin				
		Treatment		Anti-corrosion treatment (PE)				
Fan	Type				Propeller			
	Discharge direction				Horizontal			
	Quantity				1			
	Air flow	Cooling	Nom.	m ³ /min	101		119	
	rate	Heating	Nom.	m ³ /min	126		142	
Fan motor	Partial	m ³ /min		52 (l)				
	Quantity				1			
	Model				Brushless DC motor			
	Output	W			600			
	Drive				Direct drive			
Compressor	Quantity				1			
	Type				Hermetically sealed scroll compressor			
Operation range	Cooling	Ambient	Min.	°CDB	-20			
			Max.	°CDB	46			
	Heating	Ambient	Min.	°CWB	-20			
			Max.	°CWB	15			
	Sound power level	Cooling			dBA	73		76
Heating				dBA	76 (l)		79 (l)	
Sound pressure level	Cooling			dBA	53		57	
	Heating			dBA	60		63	



Sky Air Advance-series • RZASG-MV1

2 Specifications

2 - 1 Specifications

Technical Specifications				RZASG71MV1		RZASG100MV1		RZASG125MV1		RZASG140MV1		
Casing	Colour	Ivory white										
	Material	Painted galvanized steel plate										
Dimensions	Unit	Height	mm	770			990					
		Width	mm	900			940					
		Depth	mm			320						
	Packed unit	Height	mm	900			1,170					
		Width	mm	980			1,015					
Depth		mm	420			422						
Weight	Unit	kg	60			70				78		
	Packed unit	kg	64		78		79			87		
Packing	Weight	kg	4					9				
Heat exchanger	Fin	Type	WF fin									
		Treatment	Anti-corrosion treatment (PE)									
Fan	Type	Propeller										
		Horizontal										
	Discharge direction	Quantity	1									
		Air flow rate	Cooling	Nom.	m ³ /min	56		69		71		76
		Heating	Nom.	m ³ /min	50				82			
Fan motor	Quantity	Partial	m ³ /min			-				55 (l)		
		1										
		Brushless DC motor										
		Model	200									
Compressor	Type	Output	W									
		Drive	Direct drive									
		Quantity	1									
Operation range	Cooling	Ambient	Min.	-15								
				46								
				-15								
				15.5								
Sound power level	Cooling	Ambient	Min.	65								
				70								
				71								
				73 (l)								
Sound pressure level	Cooling	Nom.	dBA	46								
				53								
				47								
				57								

Appendix C

Report Limitations

This report has been prepared for the titled project or named part thereof and should not be used in whole or part and relied upon for any other project without the written authorisation of Peninsular Acoustics Limited. Peninsular Acoustics Limited accept no responsibility or liability for the consequences of this document if it is used for a purpose other than that for which it was commissioned. Persons wishing to use or rely upon this report for other purposes must seek written authority to do so from the owner of this report and/ or Peninsular Acoustics Limited and agree to indemnify Peninsular Acoustics Limited for any and all loss or damage resulting therefrom. Peninsular Acoustics Limited accepts no responsibility or liability for this document to any other party other than the person by whom it was commissioned.

The findings and opinions expressed are relevant to the dates of the site works and design drawings/specifications and should not be relied upon to represent conditions at substantially later dates. Opinions included therein are based on information gathered during the study and from our experience. If additional information becomes available which may affect our comments, conclusions or recommendations Peninsular Acoustics Limited reserve the right to review the information, reassess any new potential concerns and modify our opinions accordingly.



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