50 GATEHILL ROAD, NORTHWOOD HA6 3QP

BS4142 PLANT NOISE ASSESSMENT

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Mr & Mrs Kotecha

Aran Acoustics Ltd
20-22 Wenlock Road,
London N1 7GU

t: 0845 544 2695
e: info@aranacoustics.com
w: www.aranacoustics.com

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Aran Acoustics Ltd
20-22 Wenlock Road,
London N1 7GU

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e: info@aranacoustics.com
w: www.aranacoustics.com

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Company Registration No. 08480500 | Registered Offices: 20-22 Wenlock Road, London N1 7GU, United Kingdom

ARAN ACOUSTICS

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1.0 INTRODUCTION

Aran Acoustics have been appointed to carry out a noise impact assessment for the proposed installation of condenser units at 50 Gatehill Road, Northwood.

A noise survey and assessment has been requested to ensure that noise levels from the proposed plant does not cause undue disturbance to nearby noise sensitive locations.

The purpose of this assessment is to determine the existing noise levels at the nearest noise sensitive location and establish the maximum permissible noise levels from the plant.

Such to establish suitable plant noise levels an assessment has been carried out to BS 4142: 2014 '*Method for rating and assessing industrial and commercial sound*'. This assessment has been benchmarked against an environmental noise survey carried out on 21 August 2023.

This report therefore describes the noise survey and its results. Figure 4.1 contains a graphical representation of the noise measurements taken on site. Section 5.0 provides the maximum permissible noise levels for the proposed plant. Section 6.0 provides an assessment of plant noise levels based on the proposed location.

2.0 SITE DESCRIPTION

The site is located at 50 Gatehill Road in the London Borough of Hillingdon. The site contains an existing 2-storey residential dwelling. Proposals include the installation of an air conditioning system within the property and associated air condenser units located at ground floor level on the side elevation of the building as shown on the site plans within Appendix A.

No air intake or extract vents are associated with the system therefore the main concern is noise from the external condenser units.

The nearest noise sensitive receptors to the proposed location of the condenser units are the rear windows of the adjacent residential dwelling on Gatehill Road.

A subjective assessment on site determined that the predominant noise sources in the area to impact nearby noise sensitive receptors is background noise from road traffic on surrounding roads.

Figure 2.1 below shows a location map and aerial photo of the site and surrounding area.

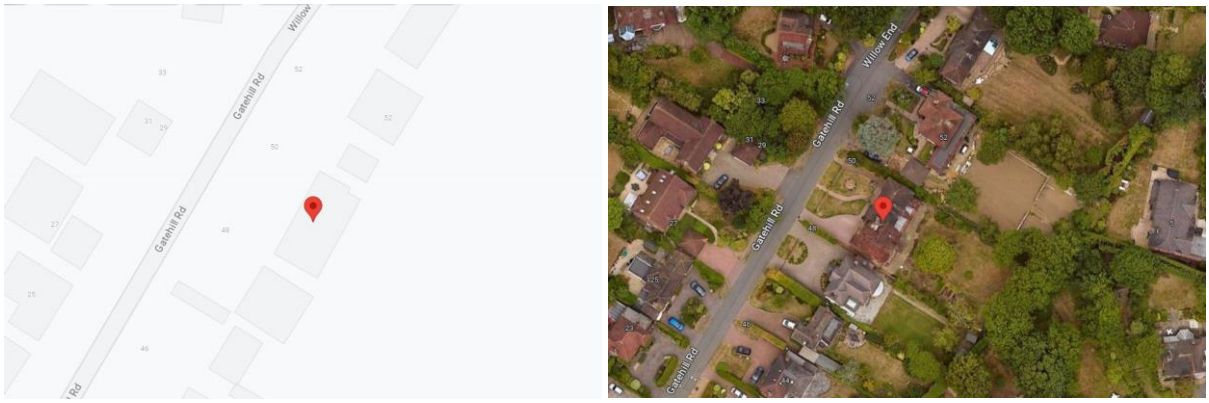


Table 2.1 – Location map and aerial photo of the site*

**Imagery courtesy of Google Maps*

3.0 ENVIRONMENTAL NOISE SURVEY

An environmental noise survey was carried out at the site between Monday 21 and Tuesday 22 August 2023. The survey incorporated both day and night time measurements.

A single noise monitor was placed on temporary scaffolding at first floor level to the rear of the property. The microphone was located next to the rear windows of the adjacent residential dwelling. Noise levels measured at the microphone location are considered representative of the existing environmental noise levels to impact nearby noise sensitive receptors.

Temporary construction works were in operation during the day time period (08:00 – 16:40 hours) however were not seen to significantly impact the measured background noise levels.

A site plan showing the microphone location is provided in Appendix A. Site photos of the microphone position are provided in Appendix B.

3.1 Measurement Equipment

The following measurement equipment was used, which complies with the performance specifications for a Class 1 device in accordance with BS EN 61672-1, BS EN 61260 and BS EN 60942.

Name	Serial Number	Last Calibrated	Calibration Due
Norsonic Precision Sound Analyser Type 140	1404425	Feb 2022	Feb 2024
Norsonic Type 1209 Pre-amplifier	13231	Feb 2022	Feb 2024
Norsonic Type 1225 Microphone	128783	Feb 2022	Feb 2024
Norsonic Type 1251 Calibrator	32994	Mar 2023	Mar 2024

Table 3.1 – Measurement equipment used on site

The meter was calibrated before and after testing - no deviations were found. The meter was set to measure consecutive 'A' weighted 15-minute samples.

3.2 Weather Conditions

The weather was overcast and remained dry for the duration of the survey. Wind speed remained below 5 m/s. The temperature was approximately 14 - 26 ^{o}C.

The weather conditions were seen as suitable for environmental noise surveying in accordance with BS 7445-1:2003 '*Description and measurement of environmental noise*'.

4.0 SURVEY RESULTS

The noise levels measured during the survey period are shown in Figure 4.1 below. The full set of acoustic data measured on site is provided in Appendix C.

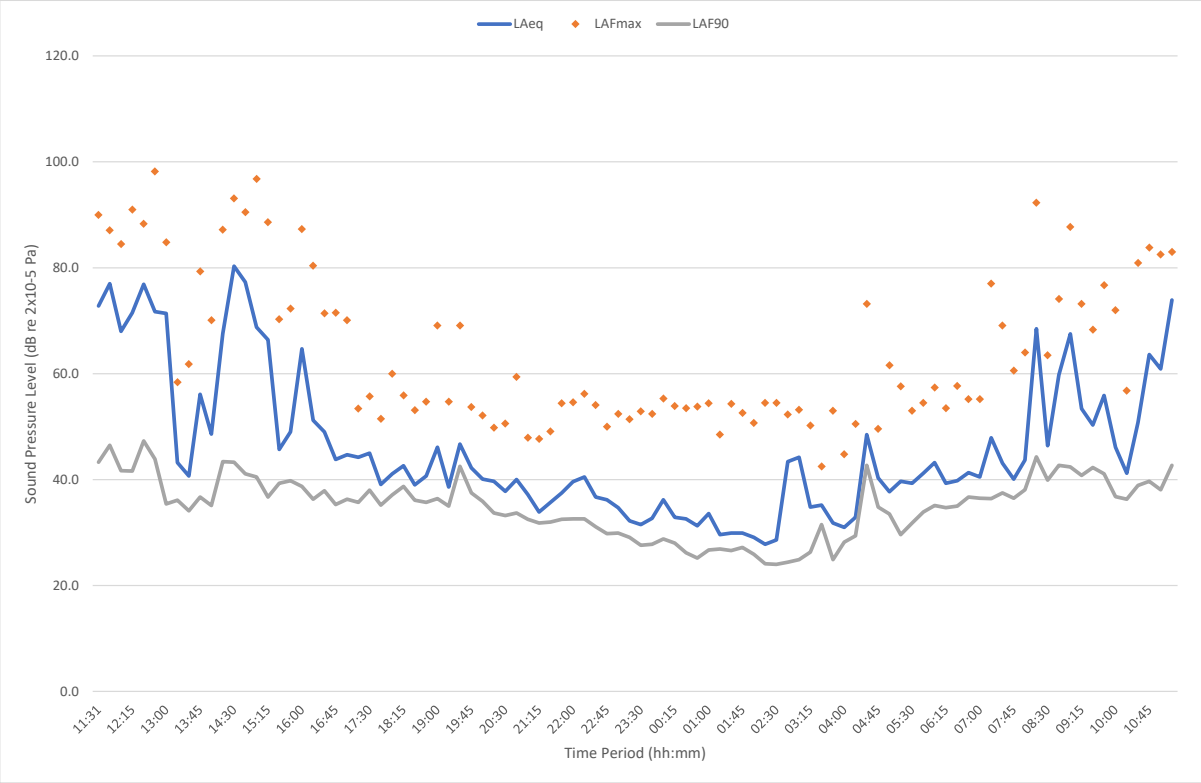


Figure 4.1 – Measured noise levels

The following table provides a summary of the noise levels measured on site at the fixed microphone position during the survey period including the equivalent continuous A-weighted sound pressure level; $L_{Aeq,T}$ and representative background noise level; $L_{A90,T}$.

Time Period	Average Noise Level L_{Aeq}, dB	Representative Background L_{A90}, dB
Day (07:00 – 23:00 hours)	68	30
Night (23:00 – 07:00 hours)	39	24

Table 4.1 - Summary of measured noise levels

5.0 ASSESSMENT CRITERIA

Section 4.0 above provides a summary of measured noise levels on site. The following section provides a summary of guidance documentation relevant to this development.

5.1 British Standard 4142

BS 4142:2014 describes a method of determining the level of noise of an industrial nature, together with the procedures for assessing whether the noise in question is likely to give rise to complaints from persons living in the vicinity. As such, an assessment to BS 4142 is typically called for within planning conditions.

The likelihood of complaints in response to a specific noise depends on various factors. BS 4142 assesses the likelihood of complaints by considering the margin by which the noise in question exceeds the background noise level. BS 4142 states that:

a) Typically, the greater this difference, the greater the magnitude of the impact.
b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
d) The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

This standard also allows for an appropriate correction for the acoustic features present in the noise using a number of methods. A correction should be applied if one or more of the following features (see the list below), are present within the noise sources in question.

- The noise is of a tonal nature, i.e. it contains a distinguishable, discreet, continuous note such as whine, hiss, screech, hum;
- The noise is impulsive, i.e. it contains distinct impulses such as bangs, clicks, clatters, or thumps;
- The noise contains other characteristics that are neither tonal nor impulsive but is irregular enough to attract attention.

BS4142 states that 'where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration including the following':

- The absolute level of sound. Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night.
- The character and level of the residual sound compared to the character and level of the specific sound.

It can be concluded from BS4142 guidance document that noise levels from plant and equipment associated with the development should not generally exceed the background noise level when measured at the nearest noise sensitive location. This is a positive indication of low noise impact.

6.0 TARGET PLANT NOISE LEVELS

It is understood that the proposed air condenser units will operate over a 24-hour period and mainly in periods of warmer weather. Planning conditions typically require a design target of 10 dB below the existing background noise levels. This is seen as a design target where noise impact would be 'low' in accordance with BS 4142 and complaints from nearby noise sensitive receptors deemed unlikely.

Following analysis of manufacturers sound level data, it is considered that the proposed plant produces a broadband noise with no tonal features. The units are also inverter driven, meaning that it will gradually increase or decrease operating capacity depending on the level of duty required. This gives a positive indication that the noise produced is not immediate or distinguishable therefore no acoustic feature correction need be applied.

Based on the lowest background noise level during the proposed operating periods and the suggested design targets including any tolerance or correction factors, the following table shows the maximum permissible noise level from the extract fan when measured at the window of nearby noise sensitive receptors.

Time Period	Lowest Background, L_{A90}	Tolerance Factor	Correction Factor	Max Noise Level at Residential
Day (07:00 – 23:00 hours)	30 dBA	-10 dB	-0 dB	**20 dBA**
Night (23:00 – 07:00 hours)	24 dBA	-10 dB	-0 dB	**14 dBA**

Table 6.1 - Plant Noise Level Target

It is seen from Table 6.1 above that to comply with design targets noise levels from the unit of plant must not exceed a rating level of 20 dBA during the day time period and 14 dBA at night when measured at 1m from the nearest noise sensitive receptor.

The night time target is considered a very low rating level and BS4142: 2014 states that 'where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night'.

7.0 PLANT NOISE LEVEL ASSESSMENT

Proposals are to install 2 no. Daikin 5MXM90N air condenser units at ground floor level next to the side elevation of the property as indicated on the site plans in Appendix A. Each condenser unit are to be housed in an Environlite acoustic enclosure.

The nearest noise sensitive receptors to the location of the condenser units are the first floor windows of the residential dwelling directly adjacent on Gatehill Road at an approximate distance of 13.5m. At distance, the units of plant are considered a point source and noise levels will decay at a rate of 6dB per doubling of distance.

Due to the 2m boundary fencing and adjacent garage roof there is no direct line of sight between the windows of the adjacent dwelling and proposed condenser units therefore barrier attenuation has been included in our calculations. It is further noted that the side entrance is fully enclosed to the front with no direct line to the street and houses opposite.

Barrier attenuation can be added to distance attenuation to determine the overall sound reduction enroute to the receptor location. Calculations show that noise levels for the condenser units in operation at the nearest noise sensitive window would be 7 dBA with the acoustic enclosure which meets the design targets set out in Table 6.1 above.

Due to the low rating level at night time it is also important to consider the absolute level. It is generally accepted that a partially open window provides 10 – 15 dB attenuation. Given a rating level of 7 dBA at night the internal noise level from the condenser unit would be approximately 0 dBA, i.e. inaudible. This is a positive indication of low noise impact in accordance with BS 4142 therefore no further mitigation is proposed.

Plant noise calculation sheets are provided in Appendix D. Manufacturers noise level data sheets are provided in Appendix E.

7.1 Vibration

Note that attention should be given to the installation of mechanical plant to ensure there is no transmission of excessive tactile and audible frequency vibration to adjacent areas, due to the operation of equipment and/or its connection to pipe work, duct work or conduits. Suitable anti-vibration mounts and flexible connectors will be used where necessary.

8.0 SUMMARY AND CONCLUSION

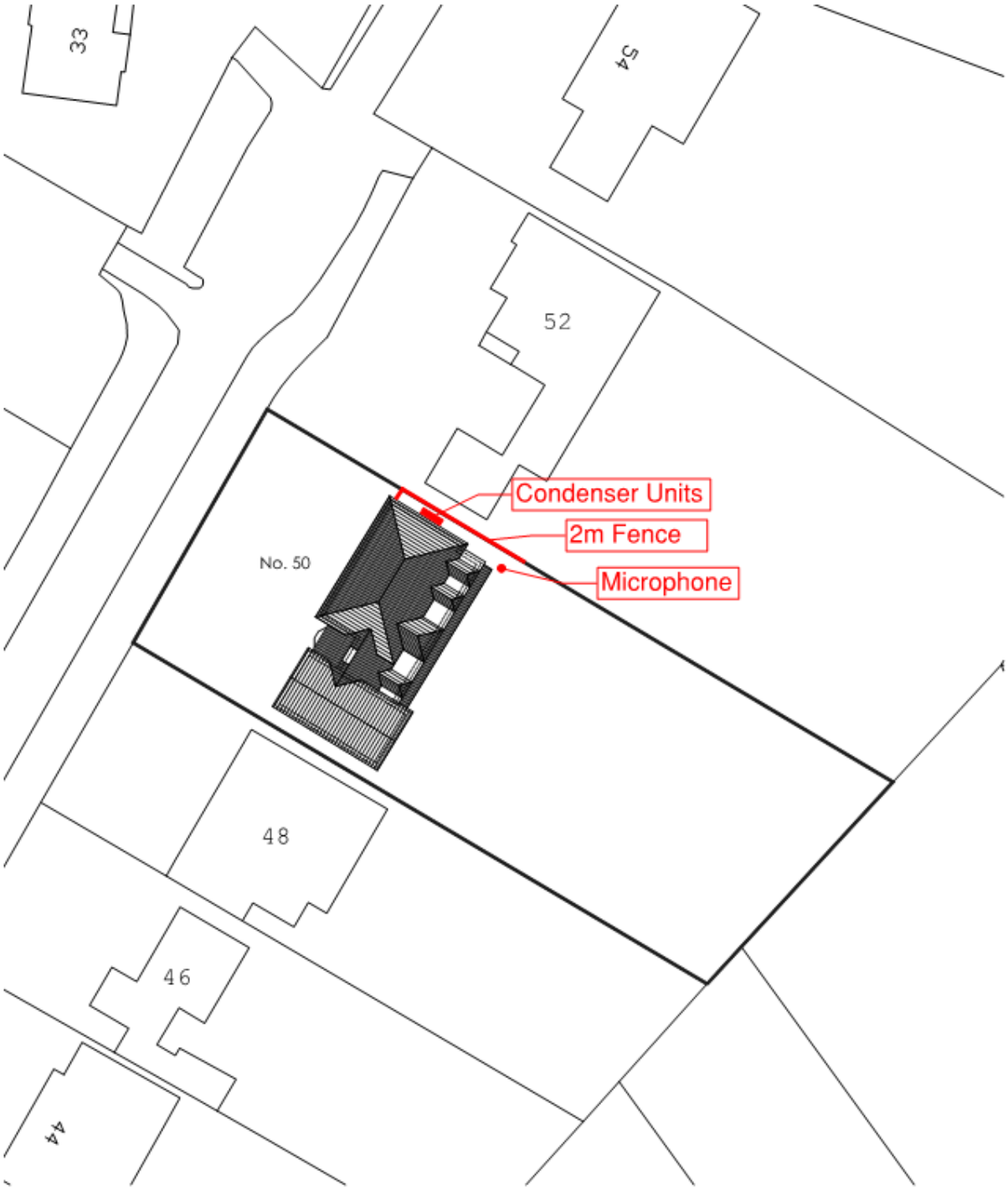
A noise survey was carried out at the proposed location of air condenser units to be installed at 50 Gatehill Road, Northwood on 21 August 2023.

From this survey the minimum representative background noise level at the nearby sensitive receptors was found to be 30 dB L_{A90} during the daytime period and 24 dB L_{A90} at night.

Using guidance in BS 4142 and based on typical planning conditions, noise levels from the condenser units should not generally exceed -10 dB below the background noise level at the window of the nearby noise sensitive receptors.

Based on manufacturer's noise level data for the condenser units along with the proposed acoustic enclosure, calculations show that plant noise levels at nearby noise sensitive receptors would be at worst case 7 dBA. This does not exceed the maximum permissible noise level targets at any noise sensitive receptor which is a positive indication of low noise impact in accordance with BS 4142 where complaints are deemed unlikely.

APPENDIX A – SITE PLANS



SITE PLAN AS PROPOSED

0 5 10 15 20 25m

SCALE 1:500

APPENDIX B – SITE PHOTOS

APPENDIX C – NOISE DATA

Date	Time	LAeq	LAFmax	LAF90	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1.0 kHz	2.0 kHz	4.0 kHz	8.0 kHz
21/08/2023	11:31	72.8	90.0	43.3	57	58.8	56.6	63.5	64.7	68.4	66.2	62.9	63.0
21/08/2023	11:45	77.0	87.1	46.5	59.2	61.6	55.6	67.1	68.8	70.9	71.3	68.6	68.2
21/08/2023	12:00	68.0	84.5	41.7	58.3	61.3	54.7	53.1	57.9	60.9	63.5	60.2	56.8
21/08/2023	12:15	71.5	91.0	41.6	64.7	63.1	59.0	62.5	64.1	67.0	65.3	61.6	60.6
21/08/2023	12:30	76.9	88.3	47.3	60.2	63.0	57.4	67.0	71.0	71.4	71.3	66.6	65.4
21/08/2023	12:45	71.7	98.2	43.9	58.8	60.2	55.7	62.0	65.0	65.6	66.5	62.3	60.0
21/08/2023	13:00	71.4	84.8	35.4	56.4	50.7	49.4	56.7	64.4	63.4	67.7	61.9	57.2
21/08/2023	13:15	43.2	58.4	36.1	50.2	49.0	48.6	44.1	42.1	35.9	31.5	32.0	27.3
21/08/2023	13:30	40.7	61.8	34.1	52.5	46.3	44.5	42.5	37.7	35.2	30.5	28.0	23.6
21/08/2023	13:45	56.1	79.3	36.7	55	55.8	52.2	53.9	51.8	48.8	48.6	48.9	44.5
21/08/2023	14:00	48.6	70.1	35.1	52.1	52.4	50.5	46.1	48.8	42.7	36.6	32.8	26.8
21/08/2023	14:15	67.6	87.2	43.4	59.4	61.6	58.3	57.5	61.8	61.5	60.3	59.9	59.2
21/08/2023	14:30	80.3	93.1	43.3	58.6	61.9	61.2	64.6	68.0	69.8	75.1	74.4	73.0
21/08/2023	14:45	77.3	90.5	41.1	55.7	61.4	60.8	64.9	72.9	69.6	72.0	69.1	65.2
21/08/2023	15:00	68.8	96.8	40.5	56.3	57.8	59.6	63.8	64.8	63.9	62.2	57.9	54.9
21/08/2023	15:15	66.4	88.6	36.7	50.4	46.5	50.3	58.1	68.0	60.0	51.1	46.5	40.1
21/08/2023	15:30	45.7	70.3	39.3	54.8	55.5	52.6	43.5	40.6	36.9	36.8	40.3	31.6
21/08/2023	15:45	49.0	72.3	39.8	58.6	57.4	52.6	51.0	47.4	42.7	38.1	35.0	29.9
21/08/2023	16:00	64.7	87.3	38.7	58.8	57.4	51.8	60.0	66.1	57.2	53.3	46.5	38.1
21/08/2023	16:15	51.2	80.4	36.3	53.7	53.2	52.6	52.5	50.2	45.3	39.4	35.8	37.2
21/08/2023	16:30	49.0	71.4	37.9	57.2	54.6	53.1	48.3	45.5	42.9	39.8	40.6	34.4
21/08/2023	16:45	43.8	71.5	35.3	51.4	49.2	45.2	41.6	39.9	36.4	36.8	36.5	27.0
21/08/2023	17:00	44.7	70.1	36.3	53.5	48.1	44.4	40.2	37.3	37.7	40.9	32.4	27.4
21/08/2023	17:15	44.2	53.4	35.7	48.7	46.0	42.6	38.6	35.8	33.7	36.3	39.2	36.5
21/08/2023	17:30	45.0	55.7	38.0	51.5	46.4	46.5	38.7	35.8	34.7	37.2	40.0	37.1
21/08/2023	17:45	39.1	51.5	35.2	51.3	49.0	46.1	41.6	37.0	32.8	27.2	25.2	21.9
21/08/2023	18:00	41.1	60.0	37.1	51	45.8	41.7	39.2	36.3	34.7	33.6	32.7	30.2
21/08/2023	18:15	42.6	55.9	38.7	51.4	46.0	44.1	44.6	40.0	35.6	32.9	31.8	31.0
21/08/2023	18:30	39.0	53.1	36.1	47.8	45.2	41.2	38.6	35.7	33.5	29.1	26.5	31.2
21/08/2023	18:45	40.7	54.7	35.7	49	48.1	45.7	43.0	38.7	34.4	30.3	25.2	23.9
21/08/2023	19:00	46.1	69.1	36.4	54.4	50.4	50.9	52.3	43.4	36.6	29.6	26.8	24.2
21/08/2023	19:15	38.6	54.7	35.0	46.7	45.0	42.6	40.1	36.4	33.0	28.1	25.7	25.8
21/08/2023	19:30	46.7	69.1	42.5	44.2	43.6	40.1	39.4	37.6	38.1	37.5	39.7	42.9
21/08/2023	19:45	42.2	53.7	37.5	47.1	49.0	46.3	42.3	38.8	36.2	33.0	30.4	32.1
21/08/2023	20:00	40.1	52.1	35.9	46.5	45.2	42.6	39.3	37.0	32.5	27.4	33.2	31.3
21/08/2023	20:15	39.7	49.8	33.7	46	47.1	46.3	41.3	36.1	32.4	25.6	31.5	29.3
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21/08/2023	21:30	35.7	49.1	32.0	45.7	43.9	42.0	38.9	33.2	30.4	21.8	16.4	13.3
21/08/2023	21:45	37.5	54.4	32.5	48.4	48.6	46.8	40.8	33.9	30.9	23.3	20.4	15.9

21/08/2023	22:00	39.6	54.6	32.6	47.3	48.9	46.7	42.3	37.9	33.8	23.8	20.1	16.2
21/08/2023	22:15	40.5	56.2	32.6	50.1	50.2	48.6	44.4	38.8	32.6	23.8	20.9	17.5
21/08/2023	22:30	36.7	54.1	31.1	46.2	46.6	45.0	39.8	33.2	30.0	21.7	16.9	15.2
21/08/2023	22:45	36.2	50.0	29.8	47.7	47.4	46.2	39.8	33.5	28.9	19.9	14.1	12.2
21/08/2023	23:00	34.7	52.4	29.9	44.5	43.9	41.6	37.4	31.9	29.0	20.8	16.8	14.1
21/08/2023	23:15	32.2	51.4	29.1	42.5	40.8	37.3	32.6	28.6	28.4	19.3	13.0	11.8
21/08/2023	23:30	31.5	52.9	27.6	42.6	41.5	38.1	32.2	26.9	27.4	17.9	11.8	12.0
21/08/2023	23:45	32.7	52.4	27.8	39.9	40.1	37.0	33.5	29.3	28.8	19.5	12.7	11.9
22/08/2023	00:00	36.2	55.3	28.8	40.7	41.5	39.5	41.1	34.4	28.9	20.1	13.3	12.5
22/08/2023	00:15	32.9	53.9	28.0	39.7	39.6	35.6	32.4	29.5	29.6	20.5	13.8	12.3
22/08/2023	00:30	32.6	53.5	26.2	38.6	39.7	39.3	35.8	29.2	26.8	17.9	11.7	11.8
22/08/2023	00:45	31.3	53.8	25.2	38.2	39.4	34.9	31.4	27.1	27.2	17.3	11.7	11.7
22/08/2023	01:00	33.6	54.4	26.7	41.4	39.8	39.6	37.4	29.9	24.5	20.2	19.1	16.5
22/08/2023	01:15	29.6	48.5	26.9	42	38.1	34.9	31.6	25.5	23.1	19.6	19.0	16.1
22/08/2023	01:30	29.9	54.3	26.6	40.1	37.3	33.4	28.6	25.0	23.5	19.9	19.1	16.4
22/08/2023	01:45	29.9	52.6	27.2	41.8	37.7	32.1	27.9	25.3	24.2	20.5	19.4	16.6
22/08/2023	02:00	29.1	50.7	25.9	41	37.4	32.9	29.3	24.5	22.7	20.1	18.9	15.4
22/08/2023	02:15	27.8	54.5	24.1	38.8	37.2	34.1	27.5	22.4	20.7	15.4	13.8	12.6
22/08/2023	02:30	28.6	54.5	24.0	39.6	37.5	31.3	27.4	23.9	22.9	19.2	18.2	16.0
22/08/2023	02:45	43.4	52.3	24.4	38.3	36.7	32.7	26.8	23.3	27.8	34.7	39.7	37.5
22/08/2023	03:00	44.2	53.2	24.9	39.6	37.7	33.2	27.7	24.2	28.8	36.3	40.4	37.6
22/08/2023	03:15	34.8	50.2	26.3	39.6	40.9	38.8	38.8	24.4	22.3	24.1	26.7	29.3
22/08/2023	03:30	35.2	42.5	31.5	39.6	37.0	32.5	27.7	23.9	25.6	27.3	29.2	30.6
22/08/2023	03:45	31.8	53.0	24.9	38.5	37.7	33.8	28.5	22.8	21.6	19.6	21.1	29.8
22/08/2023	04:00	31.0	44.8	28.2	41.8	39.3	34.5	31.1	25.2	24.0	22.7	22.7	22.2
22/08/2023	04:15	32.9	50.5	29.4	42.4	40.0	35.8	31.0	26.3	25.2	24.6	25.4	26.5
22/08/2023	04:30	48.5	73.2	42.7	41.6	39.4	36.0	34.0	36.3	38.0	38.1	41.1	46.1
22/08/2023	04:45	40.3	49.6	34.8	42	41.4	37.2	33.4	34.3	34.8	33.1	30.3	32.9
22/08/2023	05:00	37.7	61.6	33.5	38.3	42.8	38.6	33.5	29.5	27.9	27.9	32.0	32.0
22/08/2023	05:15	39.7	57.6	29.6	39.6	39.9	37.1	33.3	28.9	27.6	26.2	36.7	32.4
22/08/2023	05:30	39.3	53.0	31.8	41.8	41.8	39.3	35.6	29.2	27.5	24.7	36.6	30.1
22/08/2023	05:45	41.2	54.5	33.9	46.8	44.2	42.3	39.7	37.2	33.4	27.6	35.9	32.6
22/08/2023	06:00	43.2	57.4	35.1	45.8	46.0	45.1	43.8	42.3	38.3	27.7	29.5	27.9
22/08/2023	06:15	39.3	53.5	34.7	45.1	45.7	43.4	39.2	38.1	32.2	25.9	30.5	27.9
22/08/2023	06:30	39.8	57.7	35.0	44.8	46.0	44.0	40.5	37.3	32.8	27.5	32.2	26.9
22/08/2023	06:45	41.3	55.2	36.7	47.1	48.6	46.4	43.7	38.7	33.6	27.7	33.0	26.9
22/08/2023	07:00	40.5	55.2	36.5	46.7	47.0	44.4	41.2	37.6	33.5	27.1	32.9	30.5
22/08/2023	07:15	47.9	77.0	36.4	48	47.8	45.3	43.9	43.2	41.4	40.4	41.6	34.7
22/08/2023	07:30	43.1	69.1	37.5	53.6	50.2	47.6	43.6	39.6	36.5	32.5	35.6	30.3
22/08/2023	07:45	40.1	60.6	36.5	48	46.8	44.2	40.5	38.6	33.6	30.1	27.7	27.9
22/08/2023	08:00	43.7	64.0	38.1	49.7	50.3	47.5	43.0	39.7	36.8	34.0	36.7	32.5
22/08/2023	08:15	68.5	92.3	44.3	51	49.0	50.2	48.2	50.6	57.5	65.3	60.3	58.3
22/08/2023	08:30	46.4	63.5	39.9	49.5	48.6	48.4	46.5	43.5	40.1	37.8	37.1	30.6
22/08/2023	08:45	59.8	74.1	42.7	54.2	59.5	57.2	51.9	58.3	54.6	51.1	48.8	40.9
22/08/2023	09:00	67.5	87.7	42.4	57.7	57.9	55.8	56.9	59.5	55.9	59.3	64.3	55.4
22/08/2023	09:15	53.4	73.2	40.8	57.8	58.1	55.2	55.4	51.9	46.8	43.2	41.1	33.6

22/08/2023	09:30	50.3	68.3	42.3	50.5	51.0	54.7	48.1	46.9	43.9	42.4	41.3	34.7
22/08/2023	09:45	55.9	76.7	41.1	55.2	54.5	55.6	56.3	54.2	50.4	46.0	43.8	36.2
22/08/2023	10:00	46.1	72.0	36.8	55	53.4	49.1	45.8	44.6	40.3	36.4	33.9	30.1
22/08/2023	10:15	41.2	56.8	36.3	50.8	46.1	41.0	37.6	36.4	34.3	31.4	35.0	33.4
22/08/2023	10:30	50.8	80.9	38.9	58.6	54.9	49.6	48.2	50.3	46.2	38.2	36.8	34.9
22/08/2023	10:45	63.6	83.8	39.7	60	57.4	54.3	58.2	58.0	55.1	54.3	59.6	50.1
22/08/2023	11:00	60.9	82.5	38.1	57.1	54.6	54.2	52.2	50.8	51.5	57.8	51.3	43.6
22/08/2023	11:15	73.9	83.0	42.7	59.8	56.0	55.7	59.9	62.7	65.0	70.5	65.2	58.2

APPENDIX D – PLANT NOISE CALCULATION SHEETS

	QTY	63 Hz	125 Hz	250 Hz	500 Hz	1.0 kHz	2.0 kHz	4.0 kHz	dBA
Daikin 5MXM90N (Lp)	1.0	56.5	56.0	55.0	51.0	46.0	41.0	34.0	**52**
Multiple Unit Correction	2.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Acoustic Enclosure	0	-11.0	-13.0	-19.0	-28.0	-34.0	-36.0	-36.0	
Distance Atttenuation	13.5	-22.6	-22.6	-22.6	-22.6	-22.6	-22.6	-22.6	
Barrier Attenuation	1	-7.5	-9.1	-11.2	-13.7	-16.5	-19.3	-22.3	
Reflection Q	4	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
SPL at Receiver		24.4	20.3	11.2	-4.3	-18.0	-27.9	-37.8	**7**

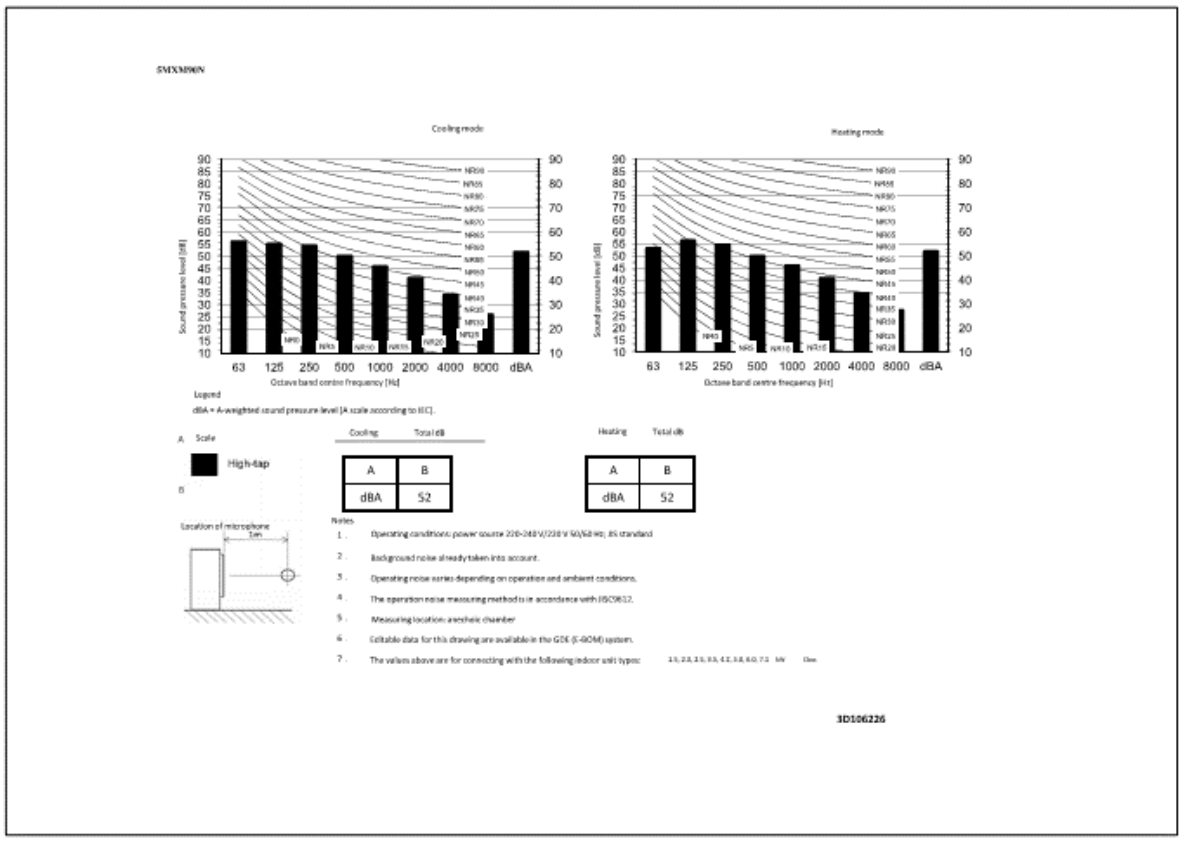
APPENDIX E – NOISE DATA SHEETS

2 Specifications

2-1 Technical Specifications					5MXM90N
Casing	Colour				Ivory white
Dimensions	Unit	Height		mm	734
		Width		mm	958
		Depth		mm	340
	Packed unit	Height		mm	820
		Width		mm	1,050
		Depth		mm	840
Weight	Unit			kg	68
	Packed unit			kg	72
Packing	Weight			kg	4
Heat exchanger	Length			mm	920 / 650
	Rows	Quantity			2 / 1
	Fin pitch			mm	1.4 / 1.8
	Passes	Quantity			32 / 12
	Tube type				ø8 Hi-XA
	Fin	Type			WHS8 FIN-HYDROPHILIC
		Treatment			Anti-corrosion treatment
Compressor	Model				2YC71DXD#C
	Type				Hermetically sealed swing compressor
	Output			W	2,400
Fan	Type				Propeller
	Air flow rate	Cooling	High	m^3/min	49.1
				cfm	1,734
			Nom.	m^3/min	49.1
				cfm	1,734
			Super low	m^3/min	24.1
				cfm	851
		Heating	High	m^3/min	50.4
				cfm	1,780
			Nom.	m^3/min	50.4
				cfm	1,780
			Super low	m^3/min	24.1
				cfm	851
Fan motor	Model				DB90B-37
	Output			W	128
	Speed	Cooling	High	rpm	800
			Nom.	rpm	800
			Low	rpm	420
			Super low	rpm	-
		Heating	High	rpm	820
			Nom.	rpm	820
			Low	rpm	420
			Super low	rpm	-
Sound power level	Cooling			dBA	64
	Heating			dBA	64
Sound pressure level	Cooling	Nom.		dBA	52
	Heating	Nom.		dBA	52
Operation range	Cooling	Ambient	Min.	°CDB	-10
			Max.	°CDB	46
	Heating	Ambient	Min.	°CWB	-15
			Max.	°CWB	18
Refrigerant	Type				R-32
	Charge			kg	2.40
				TCO_2eq	1.6
	GWP				675

9 Sound data

9 - 1 Sound Pressure Spectrum



CUSTOMER:	SITE / LOCATION / REFERENCE

ORIGINAL EQUIPMENT MANUFACTURERS PUBLISHED DATA

MAKE, MODEL, DIMENSIONS, AIR FLOW & SOUND PRESSURE LEVEL @1.0M FREE FIELD

MAKE:	MODEL:	AIR IN	AIR OUT
Daikin	5MXM90N	Rear & 1 Side	Front

WIDTH (MM)	DEPTH (MM)	HEIGHT (MM)	AIRFLOW (M^3S^{-1})	Sound Pressure (dBA)	DISTANCE (M)
958	340	734	1.00	52	1

INNER CUBE DIMENSIONS		
1050	450	1135
WIDTH (MM)	DEPTH (MM)	HEIGHT (MM)
1.00	1.0	52
AIRFLOW (M^3S^{-1})	DISTANCE (M)	SPL dB(A)

ENCLOSURE DETAIL		
1650	1000	1200
WIDTH (MM)	DEPTH (MM)	HEIGHT (MM)
1.00	1.0	27-32
AIRFLOW (M^3S^{-1})	DISTANCE (M)	SPL dB(A)

INLET AIRWAYS		
1135	250	1
WIDTH (MM)	HEIGHT (MM)	NO.

DESIGN CRITERIA		
OK	OK	OK
UNIT SIZE	OUTLET	INLET

OUTLET AIRWAYS		
250	1135	1
WIDTH (MM)	HEIGHT (MM)	NO.

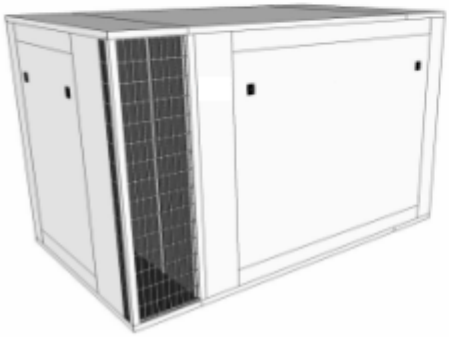
AIRFLOW INFORMATION		
15	3.5	3.5
PD (NM^{-3})	OUTLET (MS^{-1})	INLET (MS^{-1})

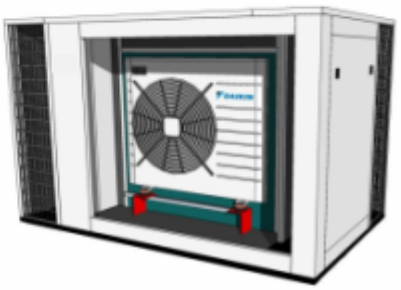
Select Inlet & Outlet Airway Sizes to Ensure Airflows are kept Below 6.0m/s

ENCLOSURE INFORMATION	WIDTH (MM)	DEPTH (MM)	HEIGHT (MM)
INLET AIRWAY	250		1135
OUTLET AIRWAY	250		1135
GENERAL EXTERNAL SIZE	1650	1000	1200
INDICATIVE SOUND LEVEL RANGE @ 1.0m (FREE FIELD)	27-32	SPL dB(A) SOUND PRESSURE	

NOTES CONCERNING ENCLOSURE DESIGN

Enclosure weight 85kg approx
Static Pressure <20 Pacsals
Estimated Airflow





SYSTEM ACOUSTICAL DATA

Noise Measurement Information:

Test: Acoustic Enclosure

Test Standard:

BS EN ISO 140-3 Acoustics - Measurement of Sound Insulation in Buildings and of Building Elements - Part 1: Airborne Sound Insulation

Sound Level Measuring Equipment:

Norsonic 830 RTA Precision Sound Analyser Type 1
CEL 284/2 Acoustic Calibrator Type 1
JBL Loudspeaker driven by CEL Loudspeaker driven by 830 White Noise Source

Transmission Loss Data:

Transmission Loss — ELV1.1.25AC Acoustic Enclosure							
Octave Frequency in Hertz (dB ref 2 x 10-5 Pascal's)							
63	125	250	500	1K	2K	4K	8K
11	13	19	28	34	36	36	37
Summary							
Transmission Loss Equates to an Overall Reduction of 26 dB(A)							

Support Information:

Monitoring was carried out using the BS3740 technique, insofar as measurements were taken in each quadrant and the results averaged. Internal Test Room: W 6m x D 16m x H 5m. Background noise in the semi-reverberant test room was such as not to interfere with the practical measurements

IMPORTANT NOTE: acoustic performance based on accuracy of equipment noise & ventilation data