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NOISE IMPACT ASSESSMENT REPORT – MECHANICAL PLANT

235 CAMDEN HIGH STREET, CAMDEN NW1 7BU

FOR

MANTOUSH LTD

ISSUE STATUS: FINAL
DATE OF ISSUE: 21/01/2022
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1. EXECUTIVE SUMMARY

The Client intends to seek planning approval for a change of use to a restaurant (Eb usage) as a result of which it is proposed to install mechanical plant (Kitchen Extraction System, 3 No. Air Conditioning Units, Air Exchange Unit and Condensing Unit) to service the premises at 235 Camden High Street, Camden NW1 7BU.

Sound Licensing has undertaken an environmental noise survey at the site in order to determine prevailing background noise levels that are representative of the nearest noise sensitive properties, which have been identified as the first-floor residential premises at Early Mews, NW1.

The results of the noise survey are considered reasonable given the location of the measurement position and the existing noise sources in the local vicinity.

Noise calculations of the mechanical plant have been undertaken using all available details and plans provided by the client and obtaining manufacturers' specifications wherever possible. The data and information form the basis of the assessment.

Noise break-out limits for the mechanical plant have been proposed based on the methodologies of British Standard (BS) 4142:2014+A1:2019 and in accordance to Local Authority policy. A robust, worst-case assessment of the noise levels associated to the proposed mechanical plant has been undertaken.

In accordance with BS 4142:2014+A1:2019 guidance, the predicted noise impact due to the operation of the mechanical plant **"*is an indication of the specific sound source having a low impact*"**. The predicted noise level of the mechanical plant at the nearest noise sensitive properties is considered to comply with the London Borough of Camden Council's policy.

2. INTRODUCTION

The client is proposing to install new mechanical plant at the rear of 235 Camden High Street, Camden NW1 7BU, the noise from which could have the potential to affect existing noise sensitive properties nearby.

The purposes of this report are:

- To determine prevailing environmental noise levels affecting surrounding properties due to nearby noise sources (e.g. road traffic, aircraft etc);
- Based on the above, to present noise emission limits in accordance with the requirements of BS 4142:2014+A1:2019 and Local Authority policy, and
- To undertake an assessment to demonstrate compliance with the Local Authority noise requirements.

3. SITE DESCRIPTION

Planning permission is being sought for the change of use to restaurant (Eb Usage) at 235 Camden High Street, Camden NW1 7BU (hereafter referred to as 'the site'). The property is a traditionally built part three-storey part single-storey terraced building in the London Borough of Camden. It is located in a mixed area comprising predominantly of commercial units at ground floor level with residential accommodation on the floors above.

The nearest sensitive residential receptors were noted to be the first-floor windows located on the rear façade of Early Mews at approximate distances of:

Receptor	Distance from Mechanical Plant (m)				
	Extraction Terminus	Extraction Motor	Condensing Unit	Air Exchange Unit	Air Conditioning Units (3 No.)
1st Floor Early Mews	8	8	9	8	8

The nearest sensitive receptors are identified in figure 3.1. If the noise impact assessment details that there is an indication of the specific sound source having a low impact at these premises then it can be safely assumed it will be met at other properties of equal distance and/or those further away.

Figure 3.1 shows the site highlighted in **blue** with the nearest noise sensitive premises highlighted in **red**.

Figure 3.1 Site Location and Surrounding Land Use

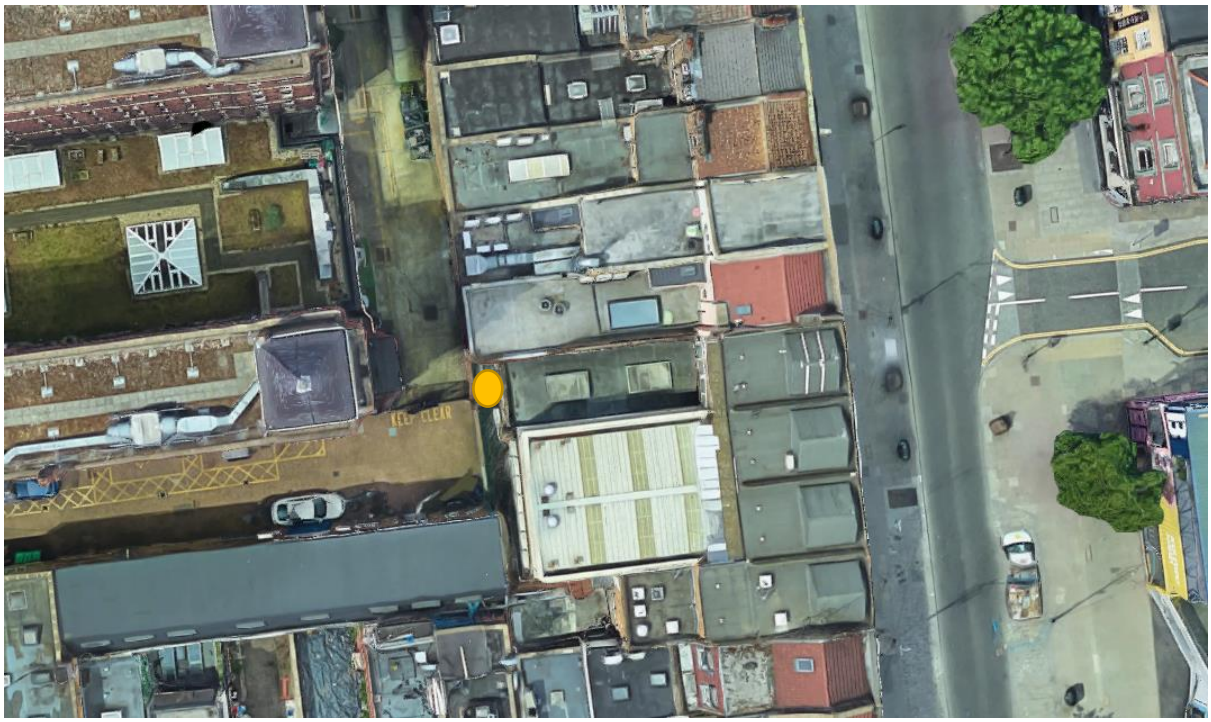
Source: Google Maps

4. ENVIRONMENTAL NOISE SURVEY METHODOLOGY

An unmanned environmental noise survey was undertaken at a single measurement location at first floor level to the rear of the site. The survey was undertaken between 11:30 hours on the 7th January and 11:00 hours on the 10th January 2021. A survey at this time covers the most sensitive period of time in which the mechanical plant system may be operational.

Ambient, background and maximum noise levels (L_{Aeq}, L_{A90} and L_{Amax} respectively) were measured throughout the noise survey in continuous 15-minute periods. The approximate measurement position is indicated in **orange** on Figure 4.1 below.

Figure 4.1 Site Plan Showing Approximate Location of Measurement Position



Source: Google Maps

The sound level meter microphone was positioned on a tripod at a height of 1.5 metres, 1 metre from the side façade of the building at first floor level. The position is not considered to be in free-field and therefore a 3dB façade correction will be applied. The monitoring position is considered representative of background noise levels at the nearest identified noise sensitive properties. The monitoring position was chosen for equipment security reasons also.

The equipment used for the noise survey is summarised in Table 4.1.

Table 4.1 Description of Equipment used for Noise Survey

Equipment	Description	Quantity	Serial Number
Larson Davis Sound Expert LxT	Type 1 automated logging sound level meter	1	0004720
Larson Davis 377B02	½" microphone	1	159605
Larson Davis	Pre-amplifier	1	042612
Larson Davis CAL200	Class 1 Calibrator	1	11706

The noise survey and measurements were conducted in accordance with BS7445-1:2003 '*Description and measurement of environmental noise. Guide to quantities and procedures'*.

Weather conditions throughout the entire noise survey period were noted to be cold (approx. 0-10° Celsius), mostly sunny (0 to 50% cloud cover approximately) with a light wind (<5m/s). These weather conditions were checked against and confirmed by the use of the Met Office mobile application available on smart phone technology. These conditions were maintained throughout the majority of the survey period and are considered reasonable for undertaking environmental noise measurements.

The noise monitoring equipment was field calibrated before and after the noise survey period. No significant drift was recorded (±0.3 dB). Equipment calibration certificates can be provided upon request.

5. NOISE SURVEY RESULTS AND OBSERVATIONS

5.1 Results

A summary of the measured ambient and background noise levels during the proposed opening hours are shown in Table 5.1.1 below (full monitoring data can be found in Appendix C).

Table 5.1.1 Measured Ambient and Typical Background Sound Pressure Levels

Date / Period (hours)	Ambient Sound Pressure Level, dB $L_{Aeq,T}$	Typical Background Sound Pressure Level, dB $L_{A90,T}$
07/01/2022(11:30 to 03:00)	**53-60***	**53***
08/01/2022(11:00 to 03:00)	**54-61***	**57***
09/01/2022(11:00 to 22:30)	**54-59***	**57***

*Façade correction -3dB. Day Time 1-hour measurements and Night Time 15-minute measurements

The typical background noise level at the measurement position during the survey, at the time in which the plant could be operational during the proposed opening hours, is **57dB** $L_{A90,T}$.

The condensing unit will operate outside of the proposed opening hours of the business; therefore, the noise impact of the condensing unit has been assessed against the existing noise levels outside of the proposed opening hours.

A summary of the measured ambient and background noise levels during the proposed operational hours outside of the opening hours are shown in Table 5.1.2 below (full monitoring data can be found in Appendix C).

Table 5.1.2 Measured Ambient and Typical Background Sound Pressure Levels

Date / Period (hours)	Ambient Sound Pressure Level, dB $L_{Aeq,T}$	Typical Background Sound Pressure Level, dB $L_{A90,T}$
08/01/2022(03:00 to 11:00)	**53-58***	**55***
09/01/2022(03:00 to 11:00)	**54-58***	**55***
09/01/2022 – 10/01/2022 (22:30 to 10:30)	**54-63***	**53***

*Façade correction -3dB. Day Time 1-hour measurements and Night Time 15-minute measurements

The typical background noise level at the measurement position during the survey, at the time in which the plant could be operational outside of the proposed opening hours, is **55dB** $L_{A90,T}$.

5.2 Observations

Given that the noise survey was unmanned, noise sources could not be identified. However, at the beginning and end of the survey background noise was dominated by noise from existing mechanical plant. After analysis of the data no significant abnormal noise source(s) were identifiable. It is considered that the measured noise levels are reasonable given the location of the measurement position.

6. EXTERNAL NOISE EMISSION LIMITS

6.1 Local Authority Requirements

The site lies within the jurisdiction of the Local Authority, Camden Borough Council. The following requirements for commercial plant have previously been requested by the Local Authority:

"Where appropriate and within the scope of the document it is expected that British Standard 4142:2014 'Methods for rating and assessing industrial and commercial sound' (BS 4142) will be used. For such cases a 'Rating Level' of 10 dB below background (15dB if tonal components are present) should be considered as the design criterion."

For the purposes of this report, an assessment has been undertaken in line with BS 4142:2014+A1:2019. A design criterion of achieving a minimum 10dB(A) below the typical background noise level has been adopted in line with the Local Authorities policy. Taking the noise monitoring data in Section 5 and Local Authority requirements above, the following design target has been adopted for mechanical plant as provided in Table 6.1.1 and Table 6.1.2.

Table 6.1.1 Maximum Noise Emission Design Target at Residential Premises (Opening Hours)

Date / Period (hours)	Typical Background Sound Pressure Level, dB $L_{A90,T}$	Rating Noise Level at 1m From Nearest Residential Facade, dB $L_{Aeq,T}$
07/01/2022(11:30 to 03:00)	**53***	**47**
08/01/2022(11:00 to 03:00)	**57***	
09/01/2022(11:00 to 10:30)	**57***	

* Façade correction -3dB. Day Time 1-hour measurements and Night Time 15-minute measurements

Table 6.1.2 Maximum Noise Emission Design Target at Residential Premises (Non-Opening Hours)

Date / Period (hours)	Typical Background Sound Pressure Level, dB $L_{A90,T}$	Rating Noise Level at 1m From Nearest Residential Facade, dB $L_{Aeq,T}$
08/01/2022(03:00 to 11:00)	**55***	**45**
09/01/2022(03:00 to 11:00)	**55***	
09/01/2022 – 10/01/2022 (22:30 to 10:30)	**53***	

* Façade correction -3dB. Day Time 1-hour measurements and Night Time 15-minute measurements

6.2 BS 4142:2014+A1:2019

BS 4142:2014+A1:2019 "Methods for rating and assessing industrial and commercial sound" presents a method for assessing the significance and possible adverse impact due to an industrial noise source, based on a comparison of the source noise levels and the background noise levels, both of which are measured or predicted at a noise sensitive receiver e.g. a residential property.

The specific noise level due to the source is determined, with a series of corrections for tonality, impulsivity, intermittency or other unusual characteristic. The rating level is then compared to the background noise level and the significance of the new noise source likelihood of any adverse impact is determined in accordance with the following advice:

"The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occur. A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context. A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context. 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."

7. PROPOSED MECHANICAL PLANT AND ASSOCIATED NOISE LEVELS

It is proposed to install the following items of plant at the rear of the premises.

Table 7.0 Proposed Mechanical Plant

External Plant Item	Quantity	Make	Model	Reference Noise Level*
Kitchen Extract Fan Motor	1	Helios	GigaBox 500/4	Outlet 83dB $L_{W(A)}$ Breakout 67dB $L_{W(A)}$
Condensing Unit	1	Fridge Splits	114X711000	29dB @ 10m $L_{p(A)}$
Air Exchange Unit	1	Mitsubishi	LGH200RVX-E	40dB @ 1.5m $L_{p(A)}$
Air Conditioning Unit	3	Mitsubishi	SUZ-M60VAR2	51dB @ 1m $L_{p(A)}$

*Reference sound levels. Manufacturer's specifications are provided in Appendix B.

The kitchen extract ducting will be 500mm standard rectangular duct work. The extraction fan motor will be located externally and therefore breakout noise from the motor and noise from the duct terminus have been considered.

In reference to section 6 of this report, a penalty addition (+3dB) has been applied for intermittency as the plant will be switched on & off as and when required. Penalty additions have not been applied for tonality as manufacturers' data shows no significant characteristics, or for impulsiveness as it is considered that these characteristics will not be perceptible sufficient to attract attention at the noise receptors. Penalty additions have not been applied for any other sound characteristics as mechanical plant of this type generally do not demonstrate such features.

7.1 Silencer

The kitchen extraction system will be fitted with an R02-2-600 Acoustica silencer on the atmosphere side of the fan. The silencer provides the attenuation shown in Table 7.1. All silencers should be Melinex lined.

Table 7.1 Silencer Attenuation

125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
12	20	31	39	40	38	27

7.2 Directivity

A directivity correction should be applied as the kitchen extract fan duct aperture is to terminate approximately 90˚ to the nearest residential windows. A duct opening of 500mm has been used. The levels of attenuation (dB) at each octave frequency band (Hz) is provided in table 7.2 below.

Table 7.2 Directivity Attenuation

125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
0	4	6	7	14	17	19

7.3 Building Screening

Due to the positioning of two of the air conditioning units, there will be significant building screening, due to the rear yard wall, from the nearest residential properties so there will be no direct line of sight, therefore attenuation due to barrier loss has also been considered (calculations are provided in Appendix D).

8. NOISE IMPACT ASSESSMENT

This section presents calculations to predict the noise impact of the proposed mechanical plant, located at the site, at the nearest noise sensitive properties.

8.1 Proposed Operational Hours and Background Noise Levels

The kitchen extraction system, air exchange unit and air conditioning unit will operate as required during the opening hours of the proposed business. The opening hours are from 11:00 - 01:00 hours Monday to Thursday, 11:00 - 00:00 hours Friday and Saturday and 11:00 – 10:30 on Sunday.

The typical background noise level during the proposed opening hours at the measurement position during the survey is **57dB** $L_{A90,T}$. The design range is **47dB** $L_{Aeq,T}$ at 1m from the façade of the nearest residential premises.

The condensing unit will operate as required 24 hours-a-day, 7 days-a-week.

The typical background noise level outside of the proposed opening hours at the measurement position during the survey is **55dB** $L_{A90,T}$. The design range is **45dB** $L_{Aeq,T}$ at 1m from the façade of the nearest residential premises.

8.2 Nearest Noise Sensitive Properties

The nearest sensitive residential receptors were noted to be the first-floor windows located on the rear façade of Early Mews at approximate distances of:

Receptor	Distance from Mechanical Plant (m)				
	Extraction Terminus	Extraction Motor	Condensing Unit	Air Exchange Unit	Air Conditioning Units (3 No.)
1st Floor Early Mews	8	8	9	8	8

8.3 Description of Calculation Process

In accordance with the methodologies of BS 4142:2014+A1:2019, calculations have been undertaken to predict noise levels in which the mechanical plant could be operational at its maximum level. Given the distances between the noise sources and the noise sensitive receptors, point source calculations have been used.

8.4 Noise Level Predictions

Calculations to predict the noise of the mechanical plant operating at the facade of the residential property is given below. Full calculations are provided in Appendix D.

The rating noise level at 1m from the nearest residential façade during the opening hours, with the mechanical plant operating, is predicted to be **47dB $L_{Aeq,T}$** which is **10dB(A) below** the typical background noise level (57dB $L_{A90,T}$).

In accordance with BS 4142:2014+A1:2019 guidance, noise from the mechanical plant ***"is an indication of the specific sound source having a low impact"***. *The lower the rating level is relative to the measured background level, the less likely it is that the specific sound source will have an adverse impact.*

The rating noise level at 1m from the nearest residential façade not during the opening hours, with the mechanical plant operating, is predicted to be **34dB $L_{Aeq,T}$** which is **21dB(A) below** the typical background noise level (55dB $L_{A90,T}$).

In accordance with BS 4142:2014+A1:2019 guidance, noise from the mechanical plant ***"is an indication of the specific sound source having a low impact"***. *The lower the rating level is relative to the measured background level, the less likely it is that the specific sound source will have an adverse impact.*

8.5 Vibration

In addition to the control of airborne noise transfer, it is important to consider the transfer of noise as vibration to adjacent properties as well as any sensitive areas of the same building. Vibration from the system is not expected, however, as a precaution plant should wherever possible be installed on suitable type isolators.

Uncertainty

The levels of uncertainty in the data and calculations are considered to be low given the robust exercise undertaken in noise monitoring and the confidence in the data statistical analysis. Manufacturers' data for the plant is highly likely to be robust. Detailed calculations and resultant noise levels at the residential location are considered to be confidently predicted.

9. CONCLUSION

Sound Licensing has undertaken an environmental noise survey at the site in order to determine prevailing background noise levels that are representative of the nearest noise sensitive properties. The operation of the mechanical plant, in accordance with BS 4142:2014+A1:2019 guidance, indicates to creating a low impact. All worst-case scenarios have been applied to the assessment. The predicted cumulative operating noise level of the mechanical plant is demonstrated to comply with the London Borough of Camden Council's policy.

APPENDIX A – Acoustic Terminology

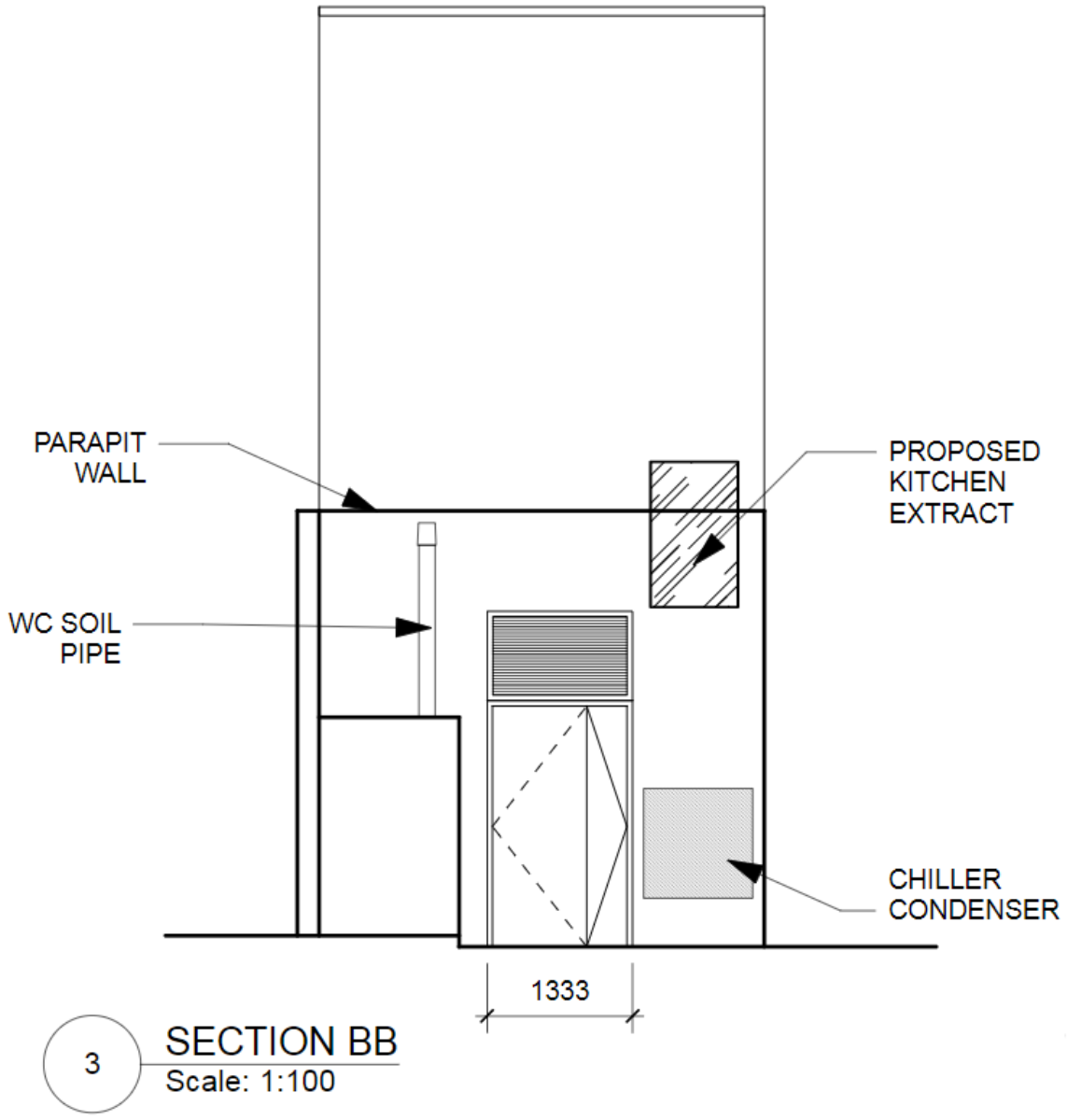
Parameter	Description
Acoustic environment	Sound from all sound sources as modified by the environment
Ambient sound	Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far
Ambient sound level, La = LAeq,T	Equivalent continuous A-weighted sound pressure level of the totally encompassing sound in a given situation at a given time, usually from many sources near and far, at the assessment location over a given time interval, T
Background sound level, LA90,T	A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting F and quoted to the nearest whole number of decibels
Decibel (dB)	A logarithmic scale representing the sound pressure or power level relative to the threshold of hearing ($20x10^{-6}$ Pascals).
Equivalent continuous A-weighted sound pressure level, LAeq,T	Value of the A-weighted sound pressure level in decibels of continuous steady sound that, within a specified time interval, T = t2 – t1, has the same mean-squared sound pressure as a sound that varies with time
Measurement time interval, Tm	Total time over which measurements are taken
Rating level, LAr,Tr	Specific sound level plus any adjustment for the characteristic features of the sound
Reference time interval, Tr	Specified interval over which the specific sound level is determined
Residual sound	Ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound
Residual sound level, Lr = LAeq,T	Equivalent continuous A-weighted sound pressure level of the residual sound at the assessment location over a given time interval, T
Specific sound level, Ls = LAeq,Tr	Equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, Tr
Specific sound source	Sound source being assessed

References:

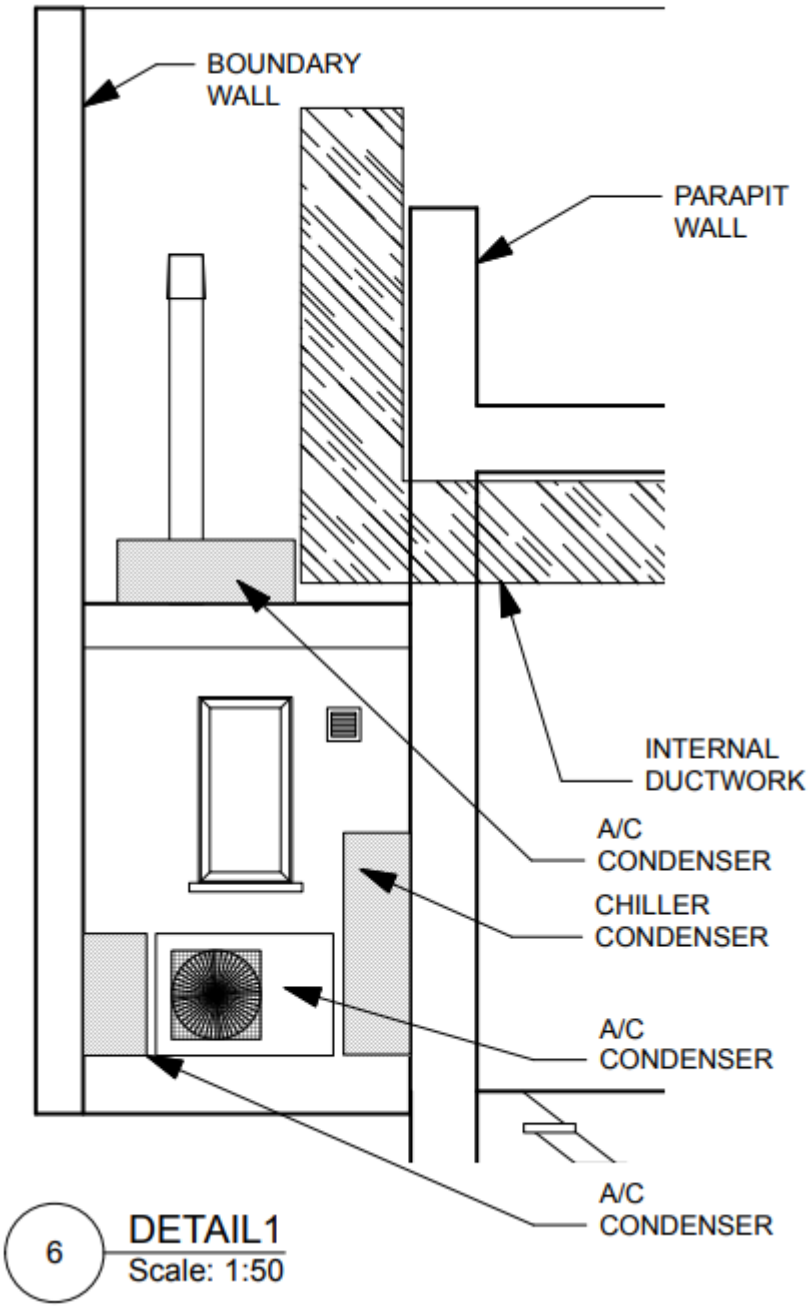
BS 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'
Camden Local Plan 2017

APPENDIX B – Data Sheets and Figures

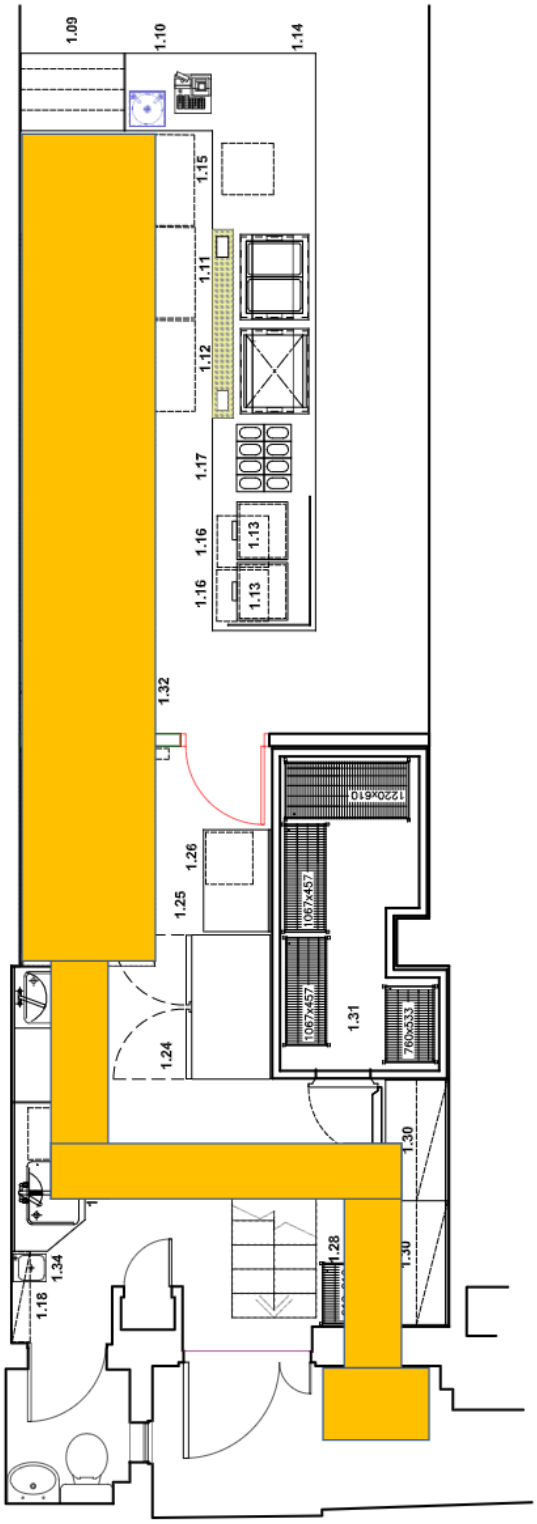
Proposed Rear Elevation



Proposed Side Elevation and Air Conditioning Unit Locations



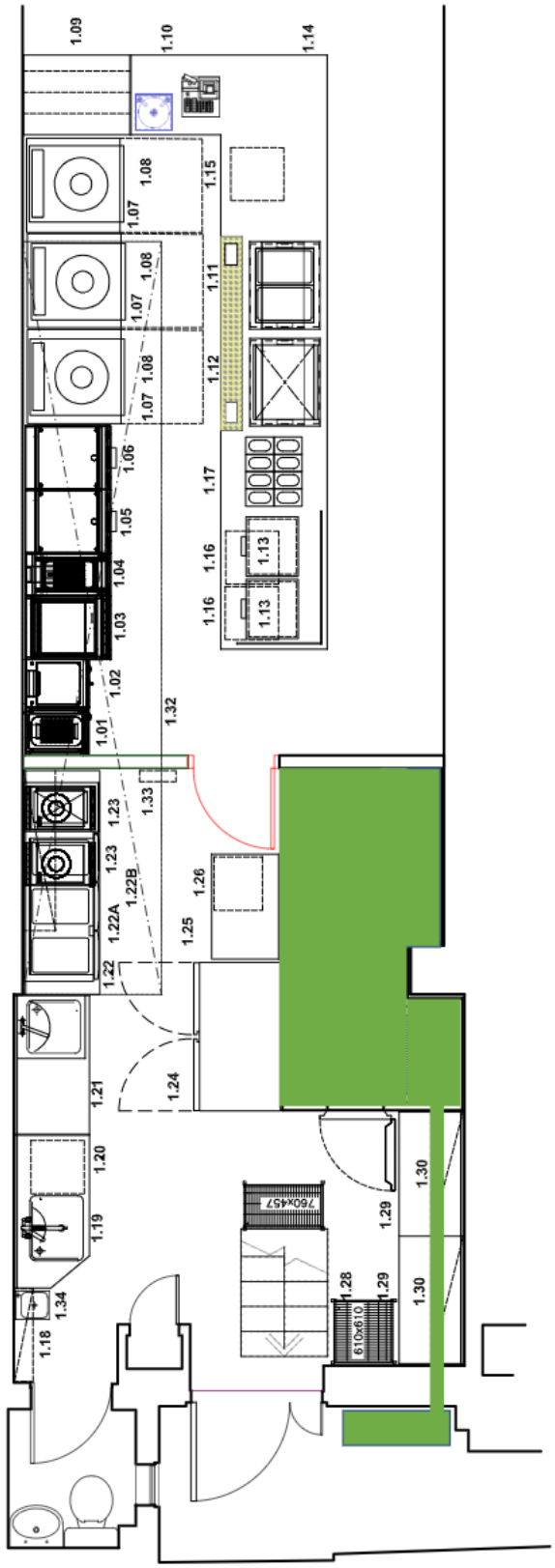
Kitchen Extraction System Plans



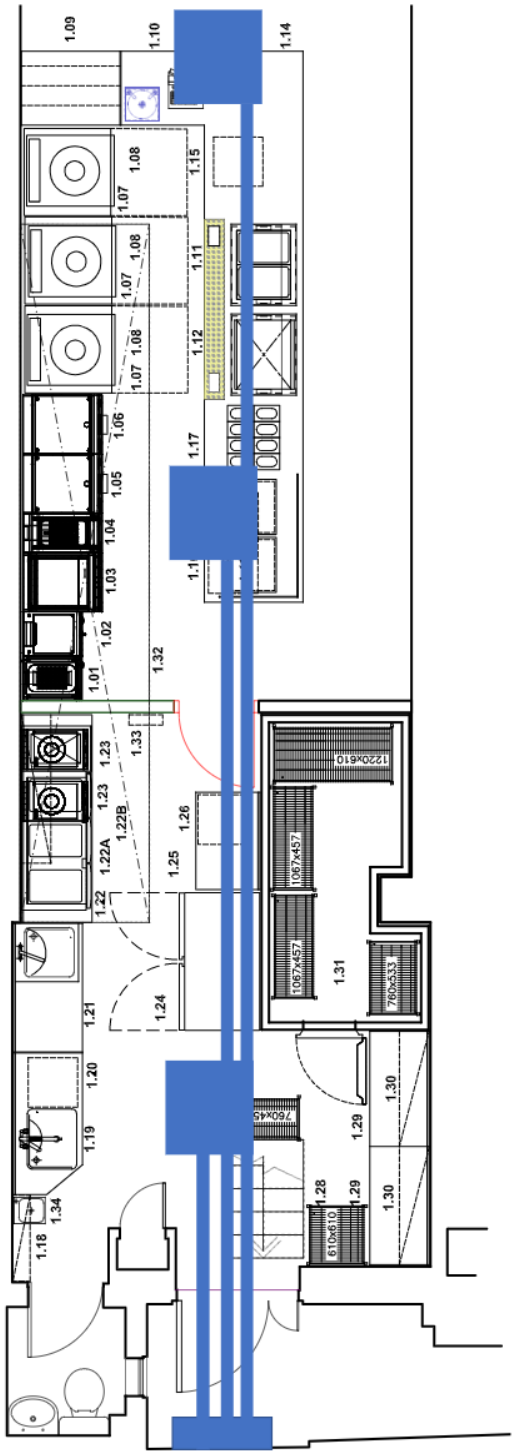
EXTRACT

Hood and extract system. Main Fan to be external at high enough level to allow escape route to be maintained. Say 2.5m.

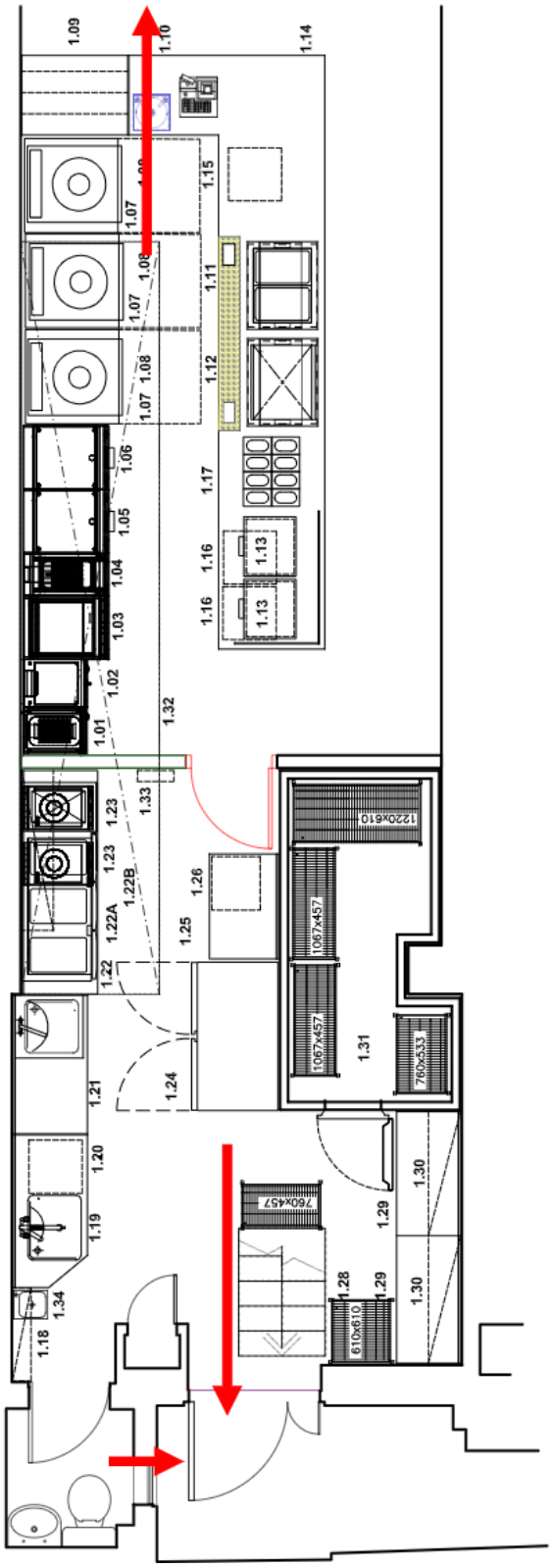
Proposed Chiller Plan



Proposed Air Conditioning Location



Proposed Air Exchange/Ventilation Plan



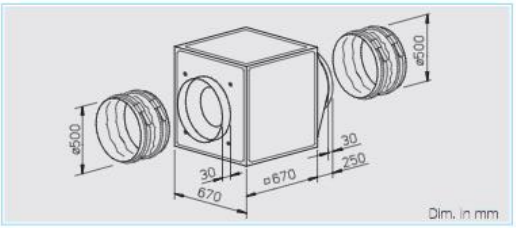
Helios Gigabox 500/4 Data Sheet

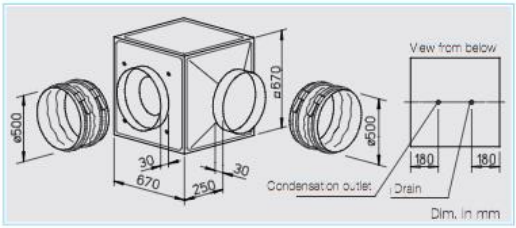
500 mm ø GigaBox centrifugal fan

Helios

GB
Arbitrary installation position and flexible assembly by five possible discharge directions.

GB T120
Designed for moving dirty, humid and hot air up to max. 120° C.
Motor located outside the air flow.





■ **Special features of types GB T120**
- Designed for moving dirty, humid and hot air volumes up to max. 120° C.
- Motor located outside of air flow.
- Temperature insulated partition panel between motor and impeller, lined with 20 mm thick, flame-retardant mineral wool.
- Easily accessible motor and impeller unit, removable without disassembling the system components.
- Inspection cover with handle, simply remove for cleaning and maintenance.
- Condensate collector with condensate spigot included in delivery. Drill hole for rain drainage (accessories) for outdoor installation is prepared.

□ **Assembly GB T120**
Installation must be carried out with condensation discharge showing downward. Flexible assembly by three possible centrifugal discharge directions via the discharge adapter.
Outdoor installation is possible using outdoor cover hood and external weather louvers (accessories).

■ **Feature**

□ **Assembly of types GB**
Arbitrary installation position and flexible assembly by five possible discharge directions via the discharge adapter.
For wall mounting the wall bracket (accessories) have to be used. Outdoor installation is possible using outdoor cover hood and external weather louvers (accessories).

■ **Specification of both types**

□ **Casing**
Self-supporting frame construction from aluminium hollow profiles. Double-walled side panels from galvanised sheet steel, lined with 20 mm thick temperature insulating and flame-retardant mineral wool. Intake cone for ideal inflow as well as spigot and flexible sleeve (for the respective max. permissible air flow temperature) for duct connection. With discharge adapter (from square to circular) on the pressure side for low-loss discharge and flexible sleeve to reduce vibration transmission. Simple positioning by standard crane hooks.

□ **Impeller**
Smooth running backward curved aluminium centrifugal impeller highly efficient and direct driven. Energy efficient with a low noise development. Dynamically balanced together with the motor to DIN ISO 1940 Pt.1 – class 6.3.

□ **Motor**
Maintenance-free external rotor motor or IEC-standard motor protected to IP 54. With ball bearings and interference-free as standard.

□ **Electrical connection**
Standard terminal box (IP 54) fitted on the motor; with GB T120 fitted on the motor support plate.

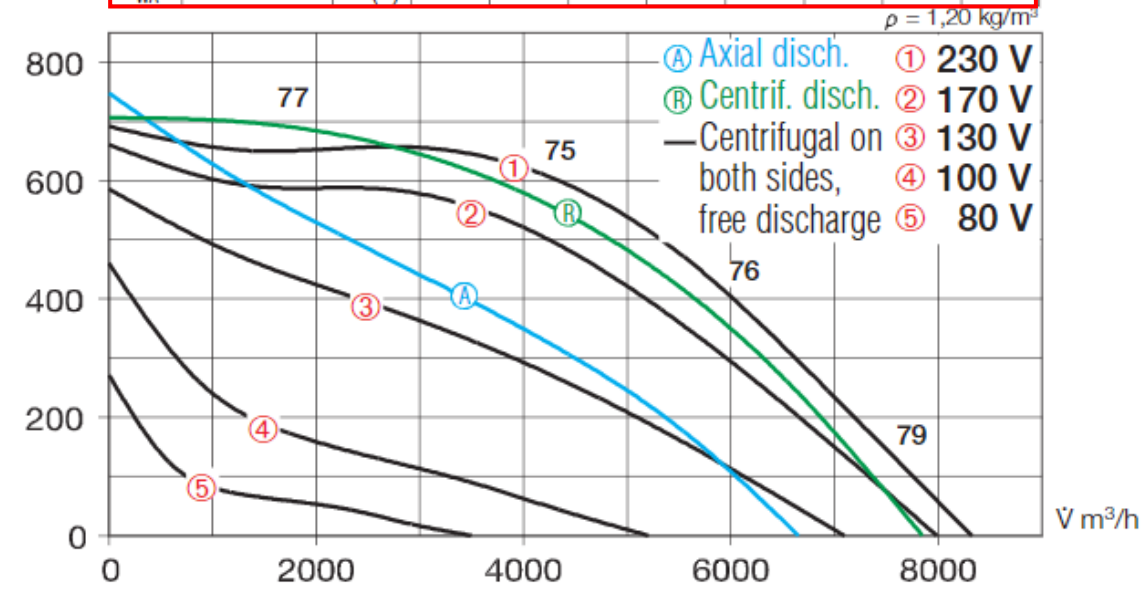
Type	Ref. no.	Air flow volume (FiD)	R.P.M.	Sound press. case breakout	Motor power (nominal)	Current full load	Current speed controlled	Wiring diagram	Maximum air flow temperature Full load	Maximum air flow temperature controlled	Weight (net)	5 step transformer controller with mot. protect. unit	Ref. no.	5 step transformer controller without mot. protect. unit	Ref. no.	Full motor protection unit using the thermal contacts	Ref. no.
		V m³/h	min⁻¹	dB(A) in 4 m	kW	A	A	No.	+°C	+°C	kg	Type		Type		Type	
1 Phase motor, 230 V / 1 ph. / 50 Hz, capacitor motor, protection to IP 54																	
GBW 500/4	5517	8321	1401	47	1.50	6.70	9.60	865	65	55	61	**MWS 10**	1946	**TSW 10**	1498	**MW** [1]	1579
2 speed motor, 3 Phase motor, 400 V / 3 ph. / 50 Hz, Y/△ wiring, protection to IP 54																	
GBD 500/4/4	5518	8000/9200	1075/1340	45	0.97/1.45	1.60/2.80	2.90	867	50	50	57	**RDS 7**	1578	**TSD 5,5**	1503	**MD**	5849
1 Phase motor, 230 V / 1 ph. / 50 Hz, capacitor motor, protection to IP 54																	
GBW 500/4 T120	5776	8345	1340	45	1.40	6.1	7.0	301	120	100	75	**MWS 10**	1946	—		—	
2 speed motor, 3 Phase motor, 400 V / 3 ph. / 50 Hz, Y/△ wiring, protection to IP 54																	
GBD 500/4/4 T120	5777	7320/8350	1120/1370	45	0.95/1.30	1.60/2.50	2.5	947	120	110	75	**RDS 4**	1316	**TSD 3,0**	1502	**MD**	5849

1) incl. operation switch

Helios Gigabox 500/4 Acoustic Data

GBW 500/4

Frequency		Hz	Total	125	250	500	1k	2k	4k	8k
L_{WA}	Case breakout	dB(A)	67	64	63	53	52	50	46	40
L_{WA}	Intake	dB(A)	79	63	72	72	74	72	66	59
L_{WA}	Exhaust	dB(A)	83	72	75	76	78	75	71	67

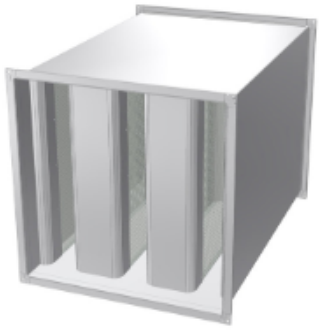


Acoustica R02-2-600 Data Sheet

R02
Rectangular Silencers

R02 - 2 - Attenuator

Available in seven standard lengths R02 2 Rectangular Duct Mounted Silencers have excellent attenuation properties, achieved with sound absorbing infill splitters, retained in the attenuator casing by a perforated liner. The resistance to airflow is a function of the face velocity and length. It is not recommended to select the R02 2 Silencers with a face velocity above 2.5 metres per second without asking advice regarding re-generated self noise. We can advise on the selections and can perform system analysis to ensure the correct unit is specified.



- High performance rectangular duct silencer
- Seven standard lengths
- Many connection options
- Cross section dimensions in 1mm increments
- System pressure within ducted systems to 1500 Pa
- Special lengths on request

Insertion Loss (dB) - Centre Band Frequency

Product Code	Length (mm)	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
R02 - 2 - 600	600	7	12	20	31	39	40	38	27
R02 - 2 - 900	900	9	16	25	42	50	50	50	41
R02 - 2 - 1200	1200	11	20	20	50	50	50	50	48
R02 - 2 - 1500	1500	13	24	25	50	50	50	50	50
R02 - 2 - 1800	1800	15	30	20	50	50	50	50	50
R02 - 2 - 2100	2100	16	33	25	50	50	50	50	50
R02 - 2 - 2400	2400	7	38	20	50	50	50	50	50

Insertion loss data is derived from continual testing to BS4718 and other standards in independent UKAS certified laboratories, which includes where appropriate, re-generated orself noise testing in both forward and reverse flow conditions. If you request system analysis from our technicians all predictions will be assessed using the relevant certified insertion loss data together with relevant dynamic corrections.

Fridge Splits 114X711000 Data Sheet

Model number	FS145M1C
Indoor model number	EVS201ED
Refrigerant (ID)	R449A
Airflow (ID)	565 m3/h
Air Throw (ID)	4 M
Power Supply (ID)	220 - 240v / 1ph / 50Hz V/ph/Hz
Evaporator Dimensions - L x W x H (ID)	611 x 435 x 170 mm
Weight (ID)	10.7 kg
Outdoor Model Type	OP-MSYM014MPW05G
Outdoor Model Number	114X711000
Refrigerant (OD)	R449A
Sound Pressure 10m (OD)	29 dBA
Power Supply (OD)	220 - 240v / 1ph / 50Hz V/ph/Hz
Outdoor Dimensions - L x W x H (OD)	910 x 364 x 530 mm
Weight (OD)	52 kg
Suction pipe size	1/2"
Liquid pipe size	1/4"

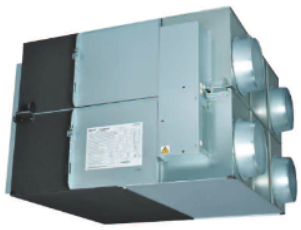
Mitsubishi LGH200RVX-E Data Sheet

Ventilation

Product Information

LGH-RVX-E
Commercial Lossnay

Making a World of Difference



COMMERCIAL MODELS		LGH15RVX-E	LGH25RVX-E	LGH35RVX-E	LGH50RVX-E	LGH65RVX-E	LGH80RVX-E	LGH100RVX-E	LGH150RVX-E	LGH200RVX-E
ELECTRICAL POWER SUPPLY		220-240V, 50Hz	220-240V, 50Hz	220-240V, 50Hz	220-240V, 50Hz	220-240V, 50Hz	220-240V, 50Hz	220-240V, 50Hz	220-240V, 50Hz	220-240V, 50Hz
RUNNING CURRENT (A)	SP1	0.10	0.10	0.12	0.13	0.15	0.15	0.17	0.29	0.33
	SP2	0.15	0.16	0.26	0.26	0.39	0.36	0.50	0.70	0.88
	SP3	0.24	0.28	0.54	0.59	0.90	0.83	1.20	1.75	2.20
	SP4	0.40	0.48	0.98	1.15	1.65	1.82	2.50	3.71	4.88
INPUT POWER (W)	SP1	7	8	11	12	15	18	21	38	42
	SP2	14	16	31	32	49	60	75	123	153
	SP3	28	33	70	78	131	151	200	311	400
	SP4	49	62	140	165	252	335	420	670	850
AIRFLOW (m^3/h)*2	SP1	38	63	88	125	163	200	250	375	500
	SP2	75	125	175	250	325	400	500	750	1000
	SP3	113	188	263	375	488	600	750	1125	1500
	SP4	150	250	350	500	650	800	1000	1500	2000
AIRFLOW (l/s)*2	SP1	10	17	24	35	45	56	69	104	139
	SP2	21	35	49	69	90	111	139	208	278
	SP3	31	52	73	104	135	167	208	313	417
	SP4	42	69	97	139	181	222	278	417	556
SPECIFIC FAN POWER (W/(l/s))	SP1	0.70	0.47	0.46	0.34	0.33	0.32	0.30	0.37	0.30
	SP2	0.67	0.46	0.63	0.46	0.54	0.54	0.54	0.59	0.55
	SP3	0.90	0.63	0.96	0.75	0.97	0.90	0.96	0.99	0.96
	SP4	1.17	0.90	1.44	1.19	1.39	1.51	1.51	1.61	1.53
EXTERNAL STATIC PRESSURE (Pa)	SP1	6	5	10	8	8	10	11	11	10
	SP2	24	21	40	30	30	38	43	44	38
	SP3	54	48	90	68	68	85	96	98	84
	SP4	95	85	160	120	120	150	170	175	150
SOUND PRESSURE LEVEL (dBA)	SP1	17	17	17	18	18	18	18	18	18
	SP2	19	20	20	19	22	23	23	24	28
	SP3	24	22	28	28	29	30	31	32	36
	SP4	28	27	32	34	34.5	34.5	37	39	40
TEMPERATURE EXCHANGE EFFICIENCY (%)	SP1	84	86	88.5	87	86	85	89.5	85	89.5
	SP2	83	82	86	83.5	84	84	86.5	84	86.5
	SP3	81	80	82.5	81	81	82.5	83	82.5	83
	SP4	80	79	80	78	77	79	80	80	80
ENTHALPY EXCHANGE EFFICIENCY (%) Heating	SP1	79	83	83.5	82.5	82	81	87	81	87
	SP2	78	76	78.5	75	76	78	78	78	78
	SP3	75.5	72	74	71	71	73.5	74	73.5	74
	SP4	73	69.5	71.5	69	68.5	71	72.5	72	72.5
Cooling	SP1	79	83	82	82	81	81	85.5	81	85.5
	SP2	78	74.5	78	72.5	74	78	77	78	77
	SP3	74.5	70	73	68	69.5	72.5	73	72.5	73
	SP4	71	68	71	66.5	66	70	71	70.5	71
WEIGHT (kg)		20	23	30	33	38	48	54	98	110
DIMENSIONS (mm) Width x Depth x Height		780 x 610 x 289	780 x 735 x 289	888 x 874 x 331	888 x 1016 x 331	908 x 954 x 404	1144 x 1004 x 404	1144 x 1231 x 404	1144 x 1004 x 808	1144 x 1231 x 808
DUCT SIZE (mm)		100	150	150	200	200	250	250	(SA,RA) 250 (OA,EA) 270 x 700	(SA,RA)250 (OA,EA) 270 x 700
STANDARD FILTER*1		EU-G3	EU-G3	EU-G3	EU-G3	EU-G3	EU-G3	EU-G3	EU-G3	EU-G3
FUSE RATING (BS88) – HRC (A)		6	6	6	6	6	6	6	10	10

Notes: Running Current, Input Power and Recovery Efficiency are based on the above airflow rate, power supply 240V, 50Hz. Sound Pressure Level measured at 1.5m under the centre of panel.
*1: EU-F7 filter available as optional parts. *2: Airflow tested to Japan industrial standard JIS B 8628. SP1, SP2, SP3 & SP4 relate to the fan speeds of the Lossnay RVX units i.e. fanspeed 1, 2, 3 & 4.

Mitsubishi SUZ-M60VAR2 Data Sheet

Air Conditioning | **Product Information**

SLZ-M R32
600x600 4-Way Blow Ceiling Cassette System
Standard Inverter Heat Pump (Single Phase)

R32





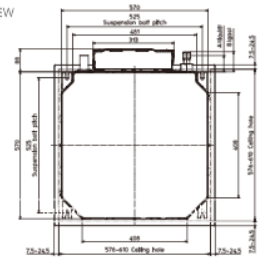
SLZ-M INDOOR UNITS		SLZ-M15FA	SLZ-M25FA	SLZ-M35FA	SLZ-M50FA	SLZ-M60FA
CAPACITY (kW)	Heating (nominal)	1.7 (0.9-3.1)	3.2 (1.3-4.2)	4.0 (1.0-5.0)	5.0 (1.3-5.5)	6.4 (1.6-7.3)
	Cooling (nominal)	1.5 (0.9-2.4)	2.5 (1.4-3.2)	3.5 (0.7-3.9)	4.6 (1.0-5.2)	5.7 (1.5-6.3)
	Heating (UK)	-	2.72 (1.11-3.57)	3.40 (0.85-4.25)	4.25 (1.11-4.68)	5.44 (1.36-6.21)
	Cooling (UK)	-	2.30 (1.29-2.94)	3.22 (0.54-3.59)	4.42 (0.92-4.79)	5.25 (1.38-5.80)
SHF (nominal)		-	0.78	0.72	0.68	0.68
COP / EER (nominal)		-	3.81 / 3.80	3.71 / 3.20	3.20 / 3.40	3.00 / 3.40
SCOP (ηsh) / SEER (ηsc) (BS EN14825)		-	4.30 / 6.30	4.30 / 6.70	4.20 / 6.30	4.10 / 6.20
ErP ENERGY EFFICIENCY CLASS	Heating/Cooling	-	A+ / A++	A+ / A++	A+ / A++	A+ / A++
AIRFLOW (l/s)	Lo-Mi-Hi	100-108-117	108-125-142	108-133-158	117-150-192	125-192-217
PIPE SIZE mm (in)	Gas	9.52 (3/8")	9.52 (3/8")	9.52 (3/8")	12.7 (1/2")	15.88 (5/8")
	Liquid	6.35 (1/4")	6.35 (1/4")	6.35 (1/4")	6.35 (1/4")	6.35 (1/4")
SOUND PRESSURE LEVEL (dBA)	Lo-Mi-Hi	24-26-28	24-26-28	25-28-31	25-30-34	27-34-39
SOUND POWER LEVEL (dBA)		45	45	48	51	56
DIMENSIONS (mm)	Width x Depth x Height	570 (650) x 570 (650) x 245 (10)	570 (650) x 570 (650) x 245 (10)	570 (650) x 570 (650) x 245 (10)	570 (650) x 570 (650) x 245 (10)	570 (650) x 570 (650) x 245 (10)
WEIGHT (kg)	Unit / Grille	15 / 3	15 / 3	15 / 3	15 / 3	15 / 3
ELECTRICAL SUPPLY		Fed by Outdoor Unit	Fed by Outdoor Unit	Fed by Outdoor Unit	Fed by Outdoor Unit	Fed by Outdoor Unit
FUSE RATING (BS88) - HRC (A)		6	6	6	6	6
INTERCONNECTING CABLE No. CORES		4	4	4	4	4
GRILLE REFERENCE		SLP-2FA	SLP-2FA	SLP-2FA	SLP-2FA	SLP-2FA
WIRED REMOTE CONTROLLER REFERENCE		PAR-40MAA	PAR-40MAA	PAR-40MAA	PAR-40MAA	PAR-40MAA

Note: SLZ-M15FA only available with R32 MXZ Multi-Split outdoor units.

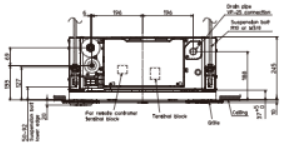
SUZ-M OUTDOOR UNITS		N/A Multi-Split only	SUZ-M25VAR2	SUZ-M35VAR2	SUZ-M50VAR2	SUZ-M60VAR2
SOUND PRESSURE LEVEL (dBA)	Heating/Cooling	-	45 / 46	48 / 48	48 / 49	49 / 51
SOUND POWER LEVEL (dBA)	Cooling	-	59	59	64	66
WEIGHT (kg)		-	30	35	41	54
DIMENSIONS (mm)	Width x Depth x Height	-	800 x 285 x 550	800 x 285 x 550	800 x 285 x 714	840 x 330 x 880
ELECTRICAL SUPPLY		-	220-240v, 50Hz	220-240v, 50Hz	220-240v, 50Hz	220-240v, 50Hz
PHASE		-	Single	Single	Single	Single
SYSTEM POWER INPUT (kW)	Heating/Cooling (nominal)	-	0.88 / 0.85	1.07 / 1.09	1.56 / 1.35	2.13 / 1.67
	Heating/Cooling (UK)	-	0.75 / 0.56	0.91 / 0.94	1.33 / 1.16	1.81 / 1.44
STARTING CURRENT (A)		-	3.7	5.0	8.0	9.3
SYSTEM RUNNING CURRENT (A)	Heating/Cooling (MAX)	-	3.7 / 3.0 (6.8)	5.0 / 4.1 (8.5)	8.0 / 7.1 (13.5)	9.3 / 8.4 (14.9)
FUSE RATING (BS88) - HRC (A)		-	10	10	20	20
MAINS CABLE No. CORES		-	3	3	3	3
MAX PIPE LENGTH (m)		-	20	20	30	30
MAX HEIGHT DIFFERENCE (m)		-	12	12	30	30
CHARGE REFRIGERANT (kg) / CO_2 EQUIVALENT (t) - R32 (GWP 675)		-	0.65 / 0.44	0.90 / 0.61	1.20 / 0.81	1.25 / 0.84
MAX ADDITIONAL REFRIGERANT (kg) / CO_2 EQUIVALENT (t) - R32 (GWP 675)		-	0.91 / 0.61	1.16 / 0.78	1.66 / 1.12	1.71 / 1.15

SLZ-M15/25/35/50/60FA DIMENSIONS

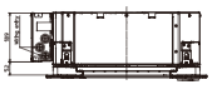
UPPER VIEW



SIDE VIEW



FRONT VIEW



MITSUBISHI ELECTRIC
Changes for the Better

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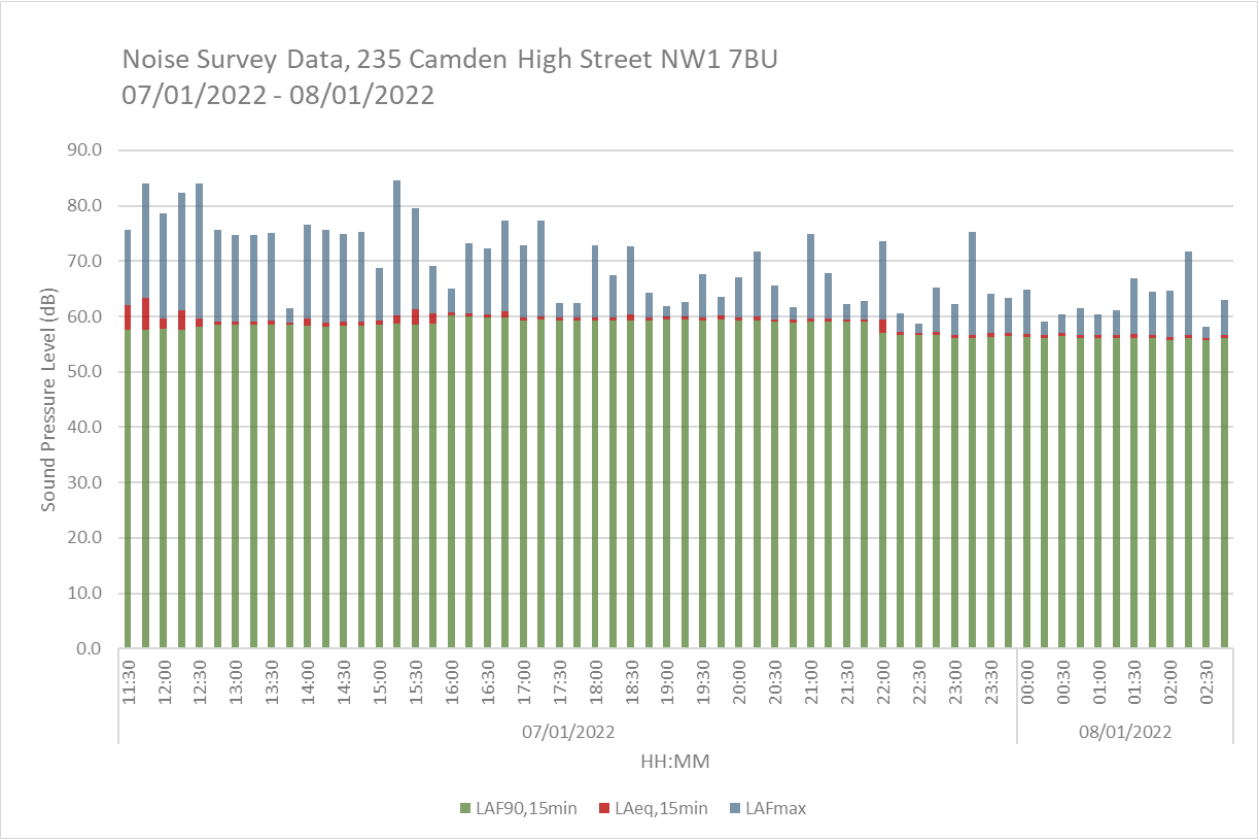
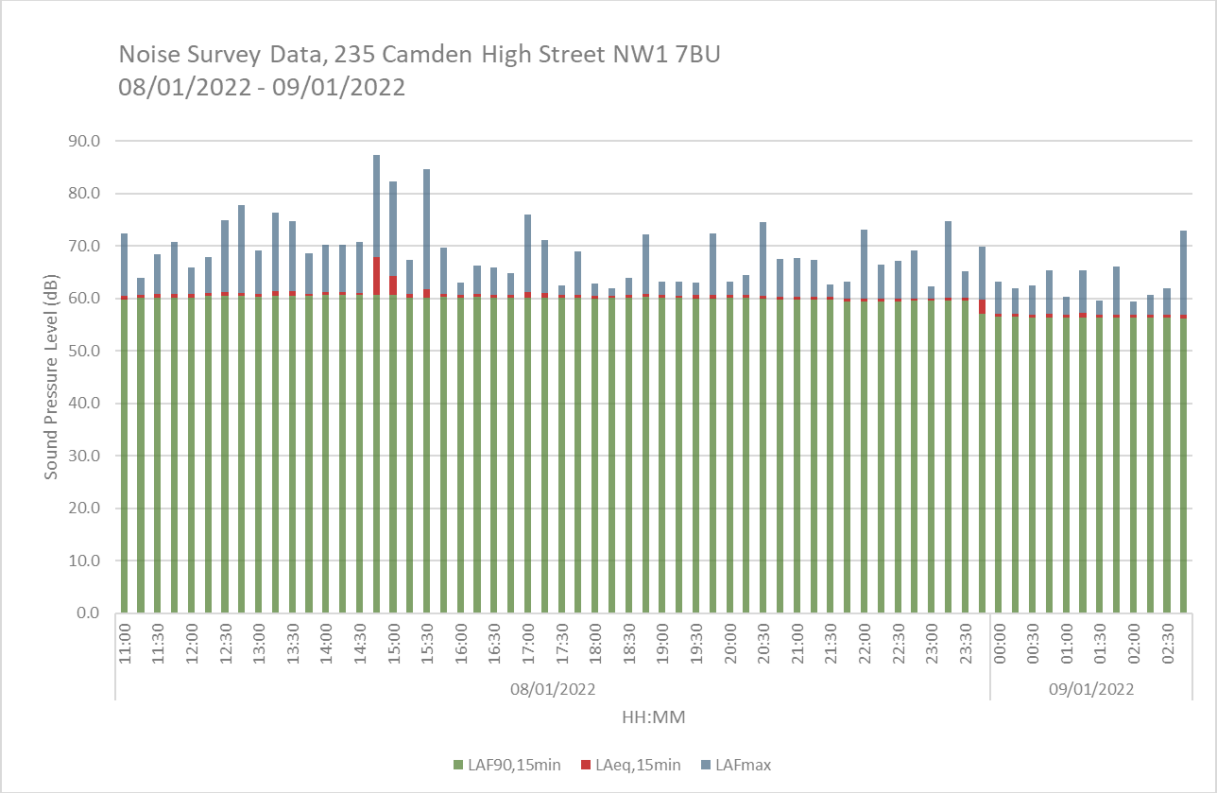
APPENDIX C – Noise monitoring Data

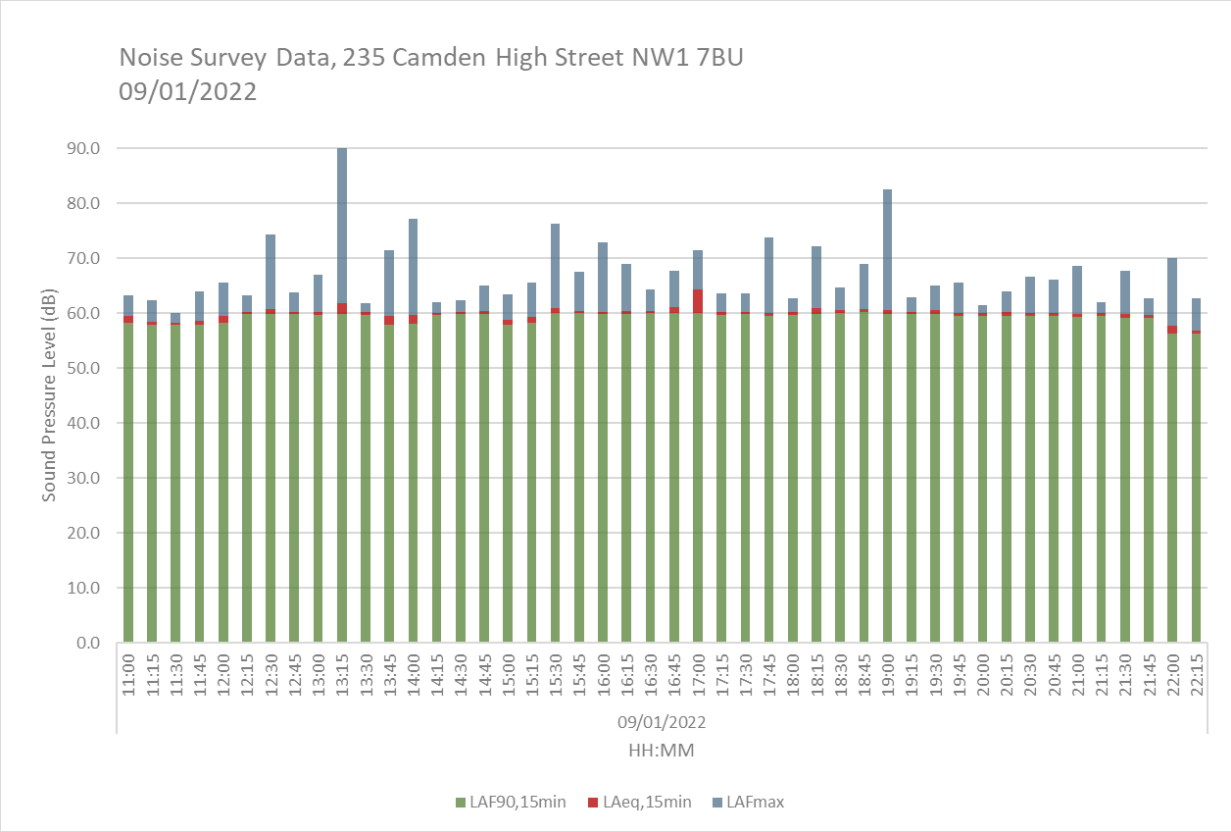
During Opening Hours



Date	Time	$L_{Aeq,15min}$	L_{AFmax}	$L_{AF90,15min}$	$L_{Aeq,1hour}$	$L_{AF90,1hour}$	Date	Time	$L_{Aeq,15min}$	L_{AFmax}	$L_{AF90,15min}$	$L_{Aeq,1hour}$	$L_{AF90,1hour}$
07/01/2022	11:30	62.1	75.7	57.5	62.7	57.6	07/01/2022	20:00	59.9	67.0	59.3	59.7	59.1
	11:45	63.3	84.0	57.6				20:15	60.1	71.7	59.2		
	12:00	59.5	78.6	57.7	59.9	58.0		20:30	59.4	65.6	59.0		
	12:15	61.1	82.4	57.6				20:45	59.4	61.7	58.9		
	12:30	59.7	83.9	58.2				21:00	59.7	74.9	59.0	59.6	59.1
	12:45	59.1	75.5	58.5				21:15	59.6	67.8	59.1		
	13:00	59.1	74.6	58.6	59.1	58.6		21:30	59.5	62.2	59.0		
	13:15	59.1	74.7	58.6				21:45	59.5	62.8	59.1		
	13:30	59.2	75.1	58.6				22:00	59.5	73.5	57.1	57.9	56.7
	13:45	59.0	61.6	58.5				22:15	57.1	60.5	56.6		
	14:00	59.6	76.6	58.3	59.1	58.3		22:30	57.1	58.6	56.6		
	14:15	58.8	75.7	58.2				22:45	57.2	65.1	56.6		
	14:30	59.0	74.8	58.4				23:00	56.7	62.2	56.1		
	14:45	59.0	75.3	58.4				23:15	56.6	75.3	56.0		
	15:00	59.3	68.7	58.6	60.4	58.7		23:30	57.0	64.2	56.3		
	15:15	60.2	84.5	58.7				23:45	56.9	63.4	56.4		
	15:30	61.3	79.5	58.6			08/01/2022	00:00	56.9	64.8	56.2		
	15:45	60.5	69.0	58.7				00:15	56.6	59.1	56.0		
	16:00	60.7	65.1	60.2	60.7	60.0		00:30	57.0	60.4	56.5		
	16:15	60.6	73.2	60.0				00:45	56.6	61.6	56.1		
	16:30	60.4	72.3	59.9				01:00	56.6	60.4	56.1		
	16:45	61.0	77.2	59.8				01:15	56.6	61.1	56.0		
	17:00	59.9	72.8	59.3	59.9	59.3		01:30	56.9	66.8	56.1		
	17:15	60.0	77.2	59.4				01:45	56.6	64.4	56.0		
	17:30	59.7	62.5	59.3				02:00	56.3	64.6	55.8		
	17:45	59.9	62.3	59.3				02:15	56.7	71.7	56.1		
	18:00	59.8	72.8	59.2	60.0	59.3		02:30	56.2	58.2	55.7		
	18:15	59.8	67.5	59.3				02:45	56.6	62.9	56.0		
	18:30	60.4	72.7	59.2									
	18:45	59.9	64.3	59.3									
	19:00	59.9	61.9	59.4	60.0	59.4							
	19:15	60.0	62.6	59.5									
	19:30	59.8	67.7	59.3									
	19:45	60.2	63.6	59.5									

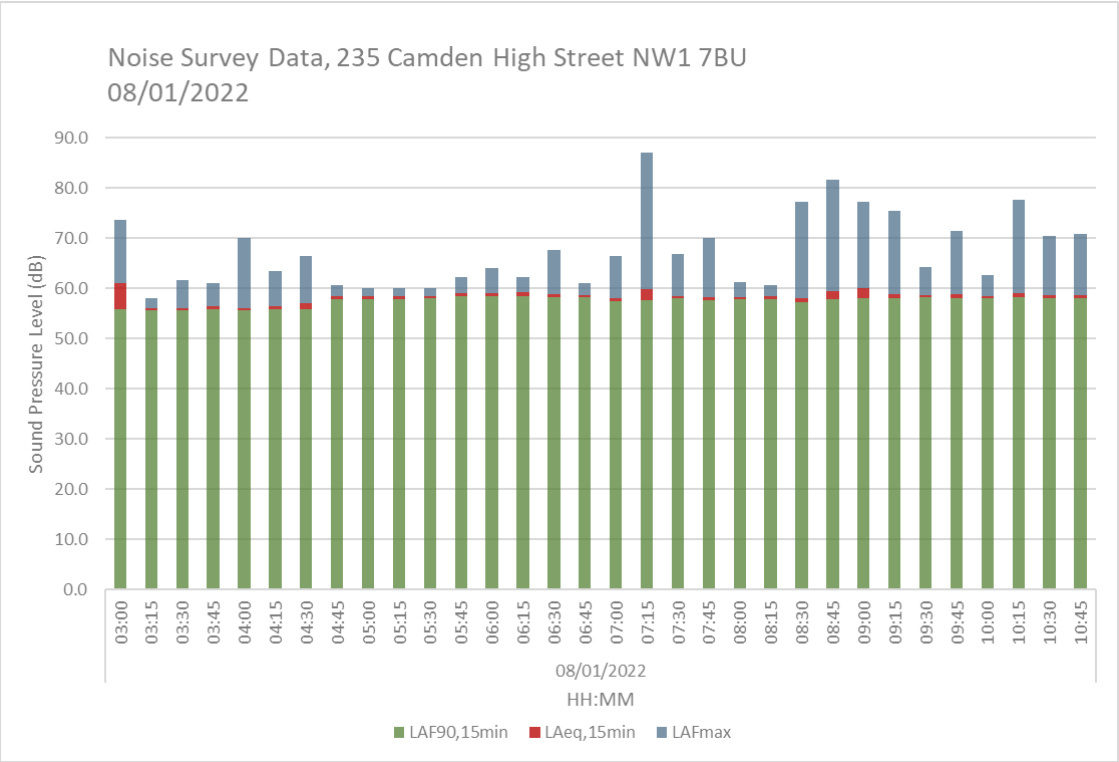


Date	Time	$L_{Aeq,15min}$	L_{AFmax}	$L_{AF90,15min}$	$L_{Aeq,1hour}$	$L_{AF90,1hour}$	Date	Time	$L_{Aeq,15min}$	L_{AFmax}	$L_{AF90,15min}$	$L_{Aeq,1hour}$	$L_{AF90,1hour}$
08/01/2022	11:00	60.5	72.4	59.8	60.7	60.1	08/01/2022	19:00	60.7	63.2	60.2	60.6	60.1
	11:15	60.7	63.8	60.2				19:15	60.5	63.2	60.1		
	11:30	60.8	68.4	60.2				19:30	60.6	63.0	59.9		
	11:45	60.7	70.7	60.2				19:45	60.7	72.4	60.0		
	12:00	60.8	65.9	60.2	61.0	60.4		20:00	60.6	63.2	60.1	60.5	60.0
	12:15	61.0	67.9	60.4				20:15	60.7	64.4	60.2		
	12:30	61.2	74.9	60.5				20:30	60.5	74.5	59.9		
	12:45	61.0	77.7	60.4				20:45	60.3	67.5	59.7		
	13:00	60.9	69.1	60.3	61.1	60.4		21:00	60.2	67.8	59.7	60.1	59.6
	13:15	61.4	76.4	60.5				21:15	60.2	67.3	59.7		
	13:30	61.3	74.8	60.4				21:30	60.2	62.7	59.7		
	13:45	60.8	68.6	60.4				21:45	59.8	63.1	59.3		
	14:00	61.1	70.2	60.6	64.0	60.6		22:00	59.9	73.1	59.4	59.9	59.4
	14:15	61.2	70.2	60.6				22:15	60.0	66.4	59.4		
	14:30	61.1	70.8	60.6				22:30	59.9	67.1	59.4		
	14:45	67.9	87.4	60.6				22:45	60.0	69.2	59.5		
	15:00	64.2	82.4	60.6	62.1	60.3		23:00	60.0	62.3	59.5		
	15:15	60.7	67.4	60.2				23:15	60.2	74.8	59.6		
	15:30	61.7	84.6	60.1				23:30	60.1	65.1	59.6		
	15:45	60.9	69.7	60.3				23:45	59.7	69.8	57.0		
	16:00	60.6	63.1	60.2	60.7	60.2	09/01/2022	00:00	57.0	63.1	56.5		
	16:15	60.8	66.2	60.3				00:15	57.0	61.8	56.5		
	16:30	60.7	65.8	60.1				00:30	56.9	62.4	56.4		
	16:45	60.6	64.8	60.2				00:45	57.0	65.3	56.4		
	17:00	61.3	76.0	60.1	60.9	60.2		01:00	56.9	60.2	56.4		
	17:15	61.0	71.1	60.2				01:15	57.1	65.4	56.4		
	17:30	60.6	62.4	60.2				01:30	56.9	59.6	56.4		
	17:45	60.7	68.9	60.2				01:45	56.9	66.0	56.4		
	18:00	60.5	62.9	60.0	60.6	60.2		02:00	56.8	59.4	56.3		
	18:15	60.5	61.9	60.1				02:15	56.8	60.7	56.3		
	18:30	60.6	63.8	60.2				02:30	56.8	61.9	56.3		
	18:45	60.8	72.1	60.3				02:45	56.8	72.9	56.2		

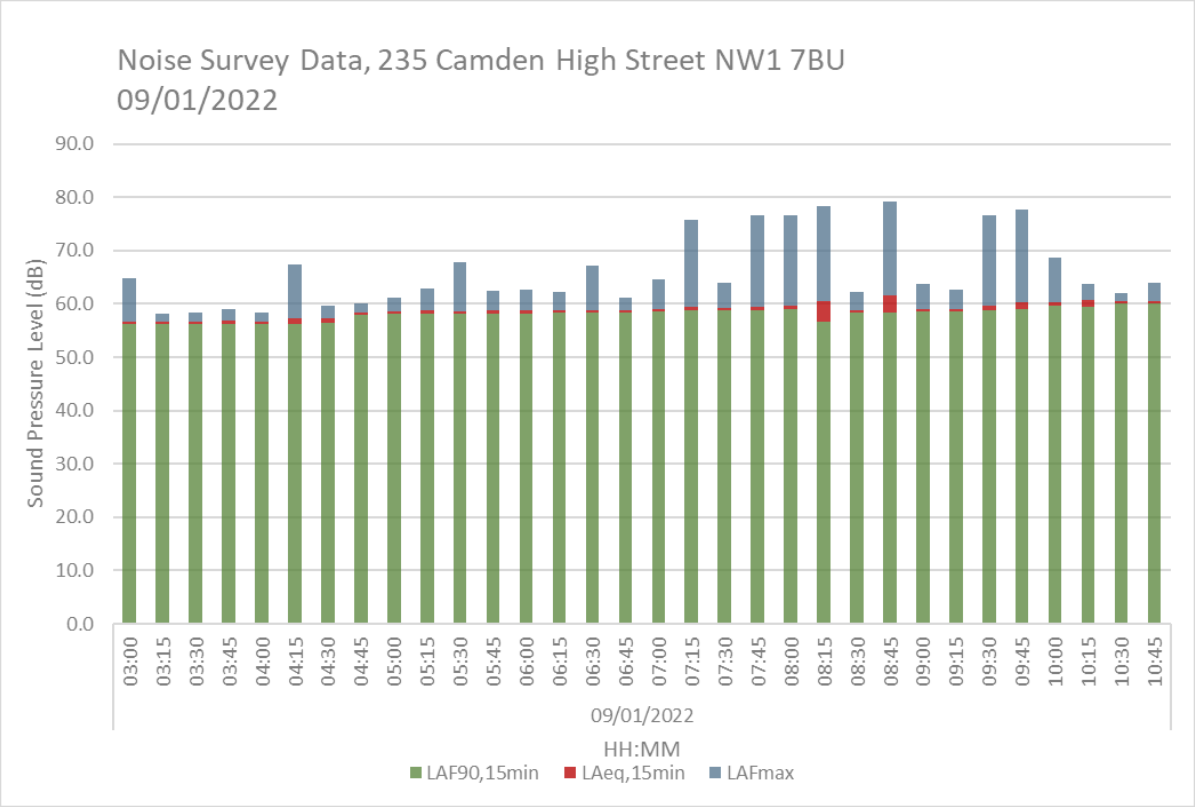


Date	Time	$L_{Aeq,15min}$	L_{AFmax}	$L_{AF90,15min}$	$L_{Aeq,1hour}$	$L_{AF90,1hour}$	Date	Time	$L_{Aeq,15min}$	L_{AFmax}	$L_{AF90,15min}$	$L_{Aeq,1hour}$	$L_{AF90,1hour}$
09/01/2022	11:00	59.6	63.3	58.2	58.8	58.0	09/01/2022	17:00	64.3	71.5	60.1	61.6	59.8
	11:15	58.4	62.4	57.9				17:15	60.2	63.6	59.7		
	11:30	58.3	60.0	57.9				17:30	60.3	63.6	59.8		
	11:45	58.6	64.0	58.0				17:45	60.1	73.8	59.6		
	12:00	59.6	65.7	58.2	60.3	59.5		18:00	60.2	62.7	59.7	60.7	60.0
	12:15	60.3	63.2	59.8				18:15	61.0	72.1	59.8		
	12:30	60.8	74.4	59.9				18:30	60.6	64.6	60.1		
	12:45	60.3	63.9	59.9				18:45	60.9	68.9	60.2		
	13:00	60.3	67.0	59.7	60.5	59.4		19:00	60.6	82.6	59.8	60.4	59.8
	13:15	61.8	92.2	59.8				19:15	60.3	63.0	59.8		
	13:30	60.2	61.9	59.7				19:30	60.6	65.1	59.8		
	13:45	59.6	71.4	58.0				19:45	60.0	65.6	59.6		
	14:00	59.8	77.1	58.1	60.2	59.4		20:00	60.0	61.4	59.6	60.1	59.6
	14:15	60.1	62.0	59.7				20:15	60.2	63.9	59.6		
	14:30	60.3	62.5	59.8				20:30	60.1	66.7	59.6		
	14:45	60.4	65.0	59.9				20:45	60.0	66.2	59.5		
	15:00	58.7	63.4	58.0	59.9	59.2		21:00	59.9	68.7	59.4	59.9	59.3
	15:15	59.3	65.5	58.2				21:15	60.0	62.0	59.5		
	15:30	60.9	76.4	60.0				21:30	60.0	67.7	59.2		
	15:45	60.5	67.6	60.0				21:45	59.7	62.7	59.2		
	16:00	60.3	72.9	59.8	60.6	60.0		22:00	57.8	70.1	56.3	57.3	56.3
	16:15	60.4	69.0	59.9				22:15	56.8	62.8	56.3		
	16:30	60.5	64.3	60.0									
	16:45	61.1	67.7	60.1									

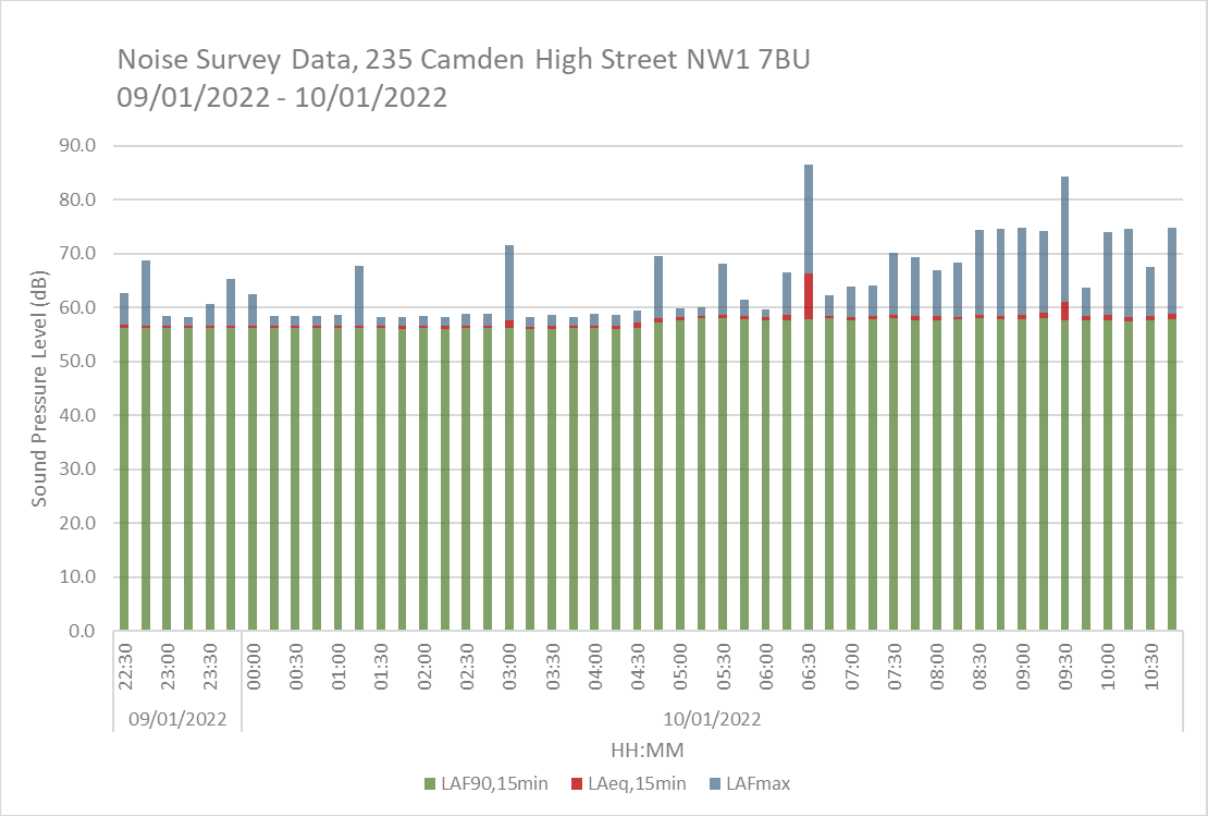
Outside of Opening Hours



Date	Time	$L_{Aeq,15min}$	L_{AFmax}	$L_{AF90,15min}$	$L_{Aeq,1hour}$	$L_{AF90,1hour}$
08/01/2022	03:00	61.1	73.8	55.9		
	03:15	56.1	58.0	55.6		
	03:30	56.2	61.6	55.6		
	03:45	56.5	61.1	55.9		
	04:00	56.2	70.1	55.6		
	04:15	56.4	63.4	55.8		
	04:30	57.0	66.6	55.9		
	04:45	58.5	60.7	57.8		
	05:00	58.5	60.0	57.9		
	05:15	58.4	60.0	57.9		
	05:30	58.5	60.0	58.0		
	05:45	59.1	62.3	58.5		
	06:00	59.0	64.1	58.5		
	06:15	59.2	62.4	58.4		
	06:30	58.8	67.8	58.3		
	06:45	58.6	61.0	58.2		
	07:00	58.2	66.5	57.5	58.7	57.7
	07:15	59.8	87.0	57.6		
	07:30	58.5	66.9	58.0		
	07:45	58.2	70.1	57.6		
	08:00	58.3	61.4	57.8	58.6	57.7
	08:15	58.4	60.7	57.9		
	08:30	58.0	77.4	57.3		
	08:45	59.5	81.8	57.9		
	09:00	60.0	77.3	58.1	59.1	58.2
	09:15	58.8	75.5	58.1		
	09:30	58.8	64.3	58.3		
	09:45	58.8	71.5	58.1		
	10:00	58.5	62.6	58.0	58.7	58.1
	10:15	59.0	77.8	58.2		
	10:30	58.6	70.4	58.1		
	10:45	58.8	70.9	58.0		



Date	Time	$L_{Aeq,15min}$	L_{AFmax}	$L_{AF90,15min}$	$L_{Aeq,1hour}$	$L_{AF90,1hour}$
09/01/2022	03:00	56.7	64.8	56.2		
	03:15	56.6	58.1	56.2		
	03:30	56.7	58.4	56.2		
	03:45	56.8	59.0	56.3		
	04:00	56.7	58.3	56.2		
	04:15	57.3	67.3	56.3		
	04:30	57.4	59.6	56.4		
	04:45	58.5	60.1	58.0		
	05:00	58.7	61.2	58.2		
	05:15	58.7	63.0	58.1		
	05:30	58.7	67.8	58.2		
	05:45	58.8	62.5	58.2		
	06:00	58.8	62.7	58.1		
	06:15	58.8	62.3	58.3		
	06:30	58.8	67.1	58.3		
	06:45	58.7	61.1	58.3		
	07:00	59.0	64.5	58.5		
	07:15	59.3	75.6	58.7	59.2	58.7
	07:30	59.2	63.9	58.7		
	07:45	59.5	76.7	58.7		
	08:00	59.6	76.6	59.0		
	08:15	60.6	78.4	56.7	60.2	58.2
	08:30	58.8	62.2	58.4		
	08:45	61.5	79.2	58.3		
	09:00	59.0	63.8	58.5		
	09:15	59.1	62.7	58.6	59.5	58.7
	09:30	59.7	76.5	58.7		
	09:45	60.2	77.6	59.1		
	10:00	60.4	68.6	59.6		
	10:15	60.7	63.6	59.5	60.5	59.8
	10:30	60.5	62.1	60.0		
	10:45	60.5	63.9	60.1		



Date	Time	$L_{Aeq,15min}$	L_{AFmax}	$L_{AF90,15min}$	$L_{Aeq,1hour}$	$L_{AF90,1hour}$
09/01/2022	22:30	56.8	62.7	56.3	56.7	56.2
	22:45	56.6	68.8	56.1		
	23:00	56.6	58.4	56.1		
	23:15	56.6	58.2	56.1		
	23:30	56.6	60.6	56.1		
	23:45	56.6	65.3	56.1		
10/01/2022	00:00	56.6	62.5	56.1		
	00:15	56.6	58.5	56.1		
	00:30	56.6	58.4	56.1		
	00:45	56.6	58.3	56.1		
	01:00	56.6	58.7	56.1		
	01:15	56.6	67.7	56.1		
	01:30	56.6	58.3	56.1		
	01:45	56.5	58.3	56.0		
	02:00	56.6	58.4	56.1		
	02:15	56.5	58.2	56.0		
	02:30	56.6	58.8	56.1		
	02:45	56.5	58.9	56.1		
	03:00	57.6	71.6	56.1		
	03:15	56.5	58.2	56.0		
	03:30	56.5	58.5	56.0		
	03:45	56.5	58.2	56.1		
	04:00	56.6	58.9	56.1		
	04:15	56.5	58.6	56.0		
	04:30	57.1	59.5	56.2		
	04:45	58.0	69.6	57.3		

Date	Time	$L_{Aeq,15min}$	L_{AFmax}	$L_{AF90,15min}$	$L_{Aeq,1hour}$	$L_{AF90,1hour}$
10/01/2022	05:00	58.2	59.9	57.7		
	05:15	58.5	60.0	58.1		
	05:30	58.5	68.0	58.0		
	05:45	58.5	61.4	57.9		
	06:00	58.1	59.6	57.7		
	06:15	58.6	66.5	57.7		
	06:30	66.4	86.6	57.9		
	06:45	58.5	62.2	58.0		
	07:00	58.2	63.8	57.7	58.4	57.8
	07:15	58.4	64.2	57.9		
	07:30	58.6	70.1	58.0		
	07:45	58.5	69.4	57.7		
	08:00	58.3	66.8	57.7	58.4	57.9
	08:15	58.2	68.4	57.8		
	08:30	58.6	74.3	58.0		
	08:45	58.5	74.7	57.9		
	09:00	58.7	74.9	57.8	59.4	57.8
	09:15	59.0	74.3	58.0		
	09:30	61.1	84.3	57.7		
	09:45	58.5	63.7	57.7		
	10:00	58.6	74.0	57.7	58.5	57.7
	10:15	58.3	74.5	57.5		
	10:30	58.4	67.6	57.6		
	10:45	58.8	74.7	57.9		

APPENDIX D – Calculations

During Opening Hours

Attenuation per double distance required = (6dB for LpA recommended)	6	dB			Metres	
		Enter Distance =			7	

	Frequency Hz							
	125	**250**	**500**	**1000**	**2000**	**4000**	**8000**	Total
	80.1	71.6	56.2	52	48.8	45	41.1	80.70
Total LW	80.1	71.6	56.2	52.0	48.8	45.0	41.1	80.70
'A' Weight	16.1	8.6	3.2	0	-1.2	-1	1.1	
LWA (Power)	64.0	63.0	53.0	52.0	50.0	46.0	40.0	67.00
LPA at New Dist'	39.16	38.16	28.16	27.16	25.16	21.16	15.16	42.16
LPA After Insert	**39.16**	**38.16**	**28.16**	**27.16**	**25.16**	**21.16**	**15.16**	**42.16**

Fan Motor Casing Breakout @ 7m = 42dB $L_{Aeq,T}$

Attenuation per double distance required = (6dB for LpA recommended)	6	dB			Metres	
		Enter Distance =			7	

	Frequency Hz							
	125	**250**	**500**	**1000**	**2000**	**4000**	**8000**	Total
	88.1	83.6	79.2	78	73.8	70	68.1	90.26
Total LW	88.1	83.6	79.2	78.0	73.8	70.0	68.1	90.26
'A' Weight	16.1	8.6	3.2	0	-1.2	-1	1.1	
LWA (Power)	72.0	75.0	76.0	78.0	75.0	71.0	67.0	83.00
LPA at New Dist'	47.16	50.16	51.16	53.16	50.16	46.16	42.16	58.16
SILENCER	12	20	31	39	40	38	27	
DIRECTIVITY 90°	0	4	6	7	14	17	19	
LPA After Insert	**35.16**	**26.16**	**14.16**	**7.16**	**-3.84**	**-8.84**	**-3.84**	**35.71**

Fan Motor Terminus @ 7m = 36dB $L_{Aeq,T}$

Level distance given a LPA @ a distance (Assumes point source and Hemispherical)

(Pressure Calculations)

LPA = **29** dB at distance of = **10** metre

dB level a **8** metres = **30.9** dB

Formula = $L_{PA1} = L_{PA2} - 20 \text{ Log } (d_1/d_2)$

Condensing Unit @ 8m = 31dB $L_{Aeq,T}$

Level distance given a LPA @ a distance (Assumes point source and Hemispherical)

(Pressure Calculations)

LPA = 40 dB at distance of = 1.5 metre

dB level a 7 metres = 26.6 dB

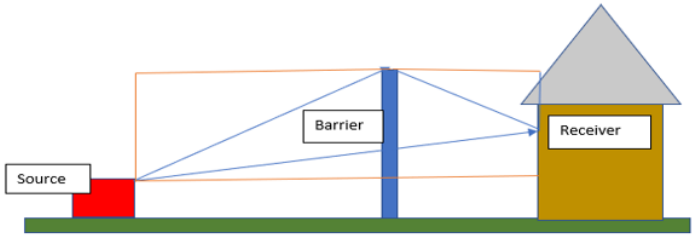
Formula = $L_{PA1} = L_{PA2} - 20 \text{ Log } (d_1/d_2)$

Air Exchange Unit @ 8m = 26dB $L_{Aeq,T}$

Applicable where barrier breaks line of sight between source and receiver

Example Illustration of Barrier Attenuation

		Metres
Source to Barrier		1.5
Receiver to Barrier		7.5
Source to Receiver		8



Path Difference	1

Frequency Hz	63	125	250	500	1000	2000	4000	8000
Barrier Correction	10.1	12.4	15.1	17.9	20.8	23.7	26.7	29.7

Building Screening Attenuation for Air Conditioning Units Below Rear Yard Wall = 18dB (500 Hz)

Level distance given a LPA @ a distance (Assumes point source and Hemispherical)

(Pressure Calculations)

LPA = 51 dB at distance of = 1 metre

dB level a 7 metres = 34.1 dB

Formula = $L_{PA1} = L_{PA2} - 20 \text{ Log } (d_1/d_2)$

Air Conditioning Unit Without Building Screening @ 8m = 34dB $L_{Aeq,T}$

Air Conditioning Units With Building Screening @ 8m – Building Screening (18dB) = 16dB $L_{Aeq,T}$

Adding dB

Levels to be added (Max. of eight)

Enter values	42	36	31	26	34	16	16	0

Total = **43.8** dB

Cumulative Sound Pressure Level @ Nearest Sensitive Receptor + Intermittency (3dB) = 47dB $L_{Aeq,T}$

Outside of Opening Hours

Level distance given a LPA @ a distance (Assumes point source and Hemispherical)

(Pressure Calculations)

LPA = **29** dB at distance of = **10** metre

dB level a **8** metres = **30.9** dB

Formula = $L_{PA1} = L_{PA2} - 20 \text{ Log } (d_1/d_2)$

Condensing Unit @ Nearest Sensitive Receptor + Intermittency (3dB) = 34dB $L_{Aeq,T}$