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NOISE IMPACT ASSESSMENT REPORT - KITCHEN EXTRACTION SYSTEM

4, NEW COLLEGE PARADE, FINCHLEY ROAD, KILBURN, LONDON NW3 5EP

FOR

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1. EXECUTIVE SUMMARY

The Client is to seek planning approval for the replacement of the kitchen extraction system servicing the premises at 4, New College Parade, Finchley Rd, Kilburn, London NW3 5EP.

Due to the current Covid19 pandemic it was not practical to carry out a noise survey so historic data from a previous application at the site (Planning Reference: 2019/0230/P) has been used. External noise levels at the site have been determined that are representative of the nearest noise sensitive properties, which have been identified as the second-floor windows on the rear façade of 1-8 Harben Parade.

The historic data is considered reasonable given the location of the measurement positions 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 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 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 intends to install a replacement kitchen extraction system at the rear of 4, New College Parade, Finchley Rd, Kilburn, London NW3 5EP, 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 and Local Authority policy, and
- To undertake an assessment to demonstrate compliance with the Local Authority noise requirements.

3. SITE DESCRIPTION

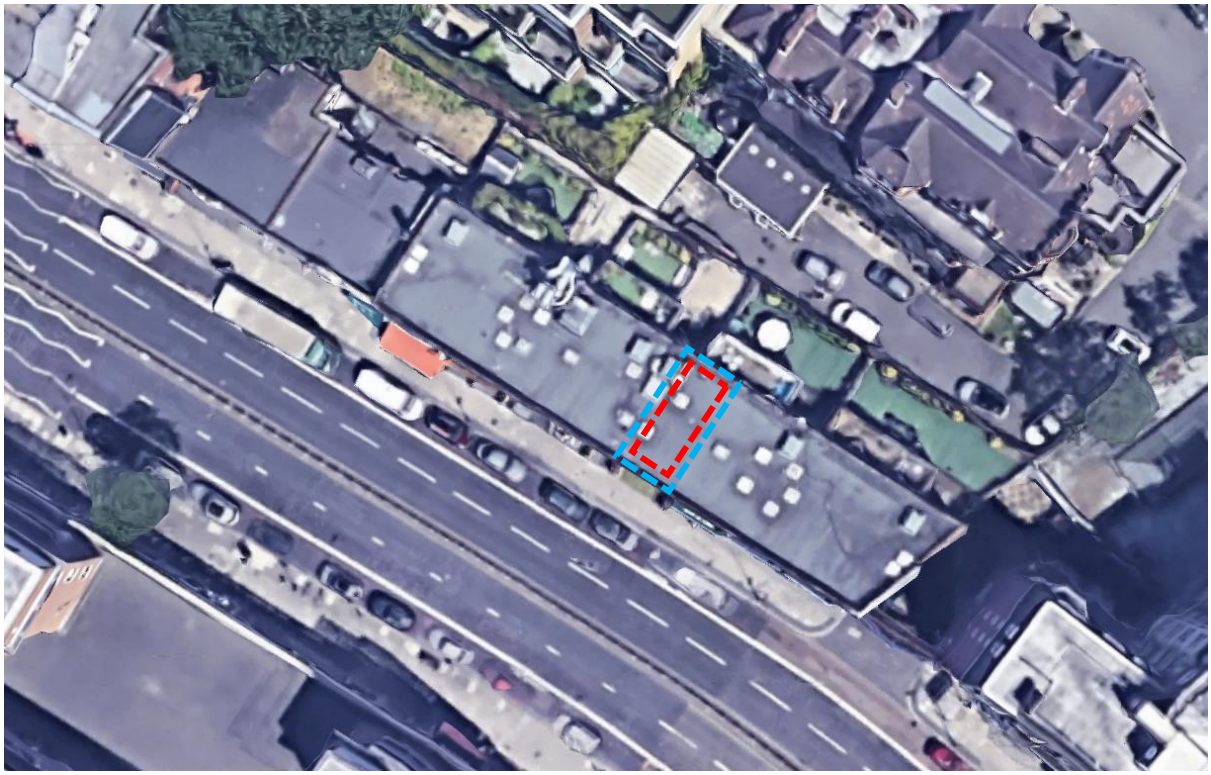
Planning permission is being sought for the replacement of a kitchen extraction system at 4, New College Parade, Finchley Rd, Kilburn, London NW3 5EP (hereafter referred to as 'the site'). The property is a traditionally built three-storey terraced building in the London Borough of Camden. It is located 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 second-floor windows located on the rear façade of 1-8 Harben Parade at approximate distances of 3m from the exhaust fan and duct terminus and 4m from the intake fan and duct terminus .

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

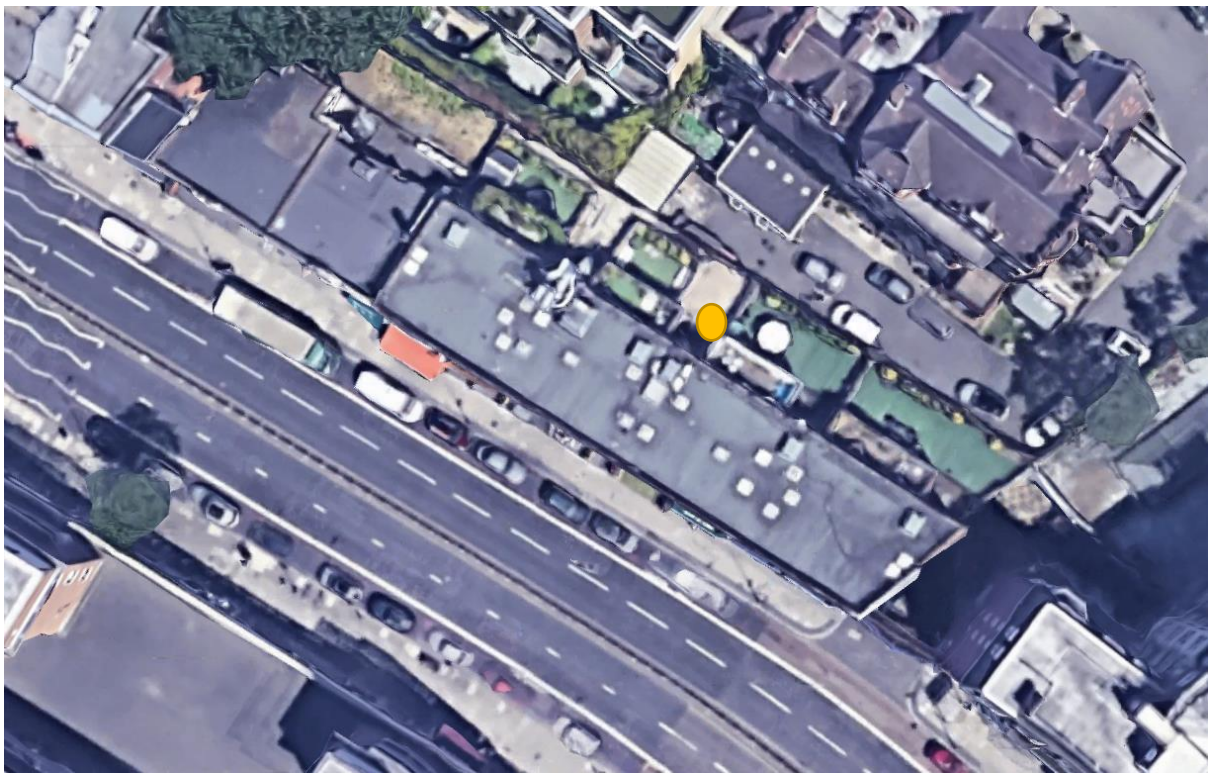
4. DETERMINATION OF NOISE CLIMATE

It was not possible to carry out a noise survey at the premises due to current Government restrictions on movement and the fact that any measurements made at this time could not be considered to be representative of the normal situation as a result of the controls imposed due to the Covid19 pandemic.

The Association of Noise Consultants [ANC] and the Institute of Acoustics [IOA] have provided guidance outlining alternative methods of characterising baseline noise conditions including the use of relevant historical data and noise mapping data.

A recent noise survey at the site was carried out by Acoustic Consultants Ltd (Planning Reference: 2019/0230/P) for the installation of the original extraction system at the site, has been identified as providing data relevant to this proposal. The data was identified from the London Borough of Camden Council planning records as being the most recent noise data available. The measurement position used during the previous survey is relevant to this site and is indicated in Figure 4.1 below in **orange** on Figure 4.1 below.

Figure 4.1 Site Plan Showing Approximate Location of Measurement Position

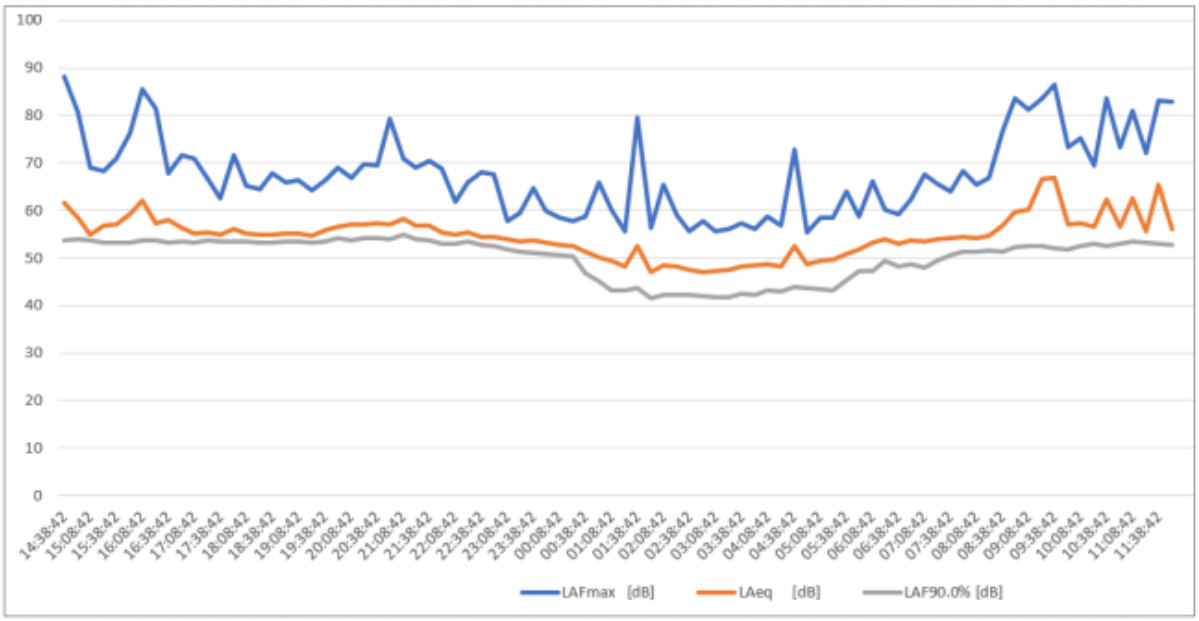


Source: Google Maps

4.1 Noise Survey Results

The original survey was carried out between 14:40 on the 2nd October 2018 and 12:05 on the 3rd October 2018. The results of the survey are represented graphically in Figure 4.2 below.

Figure 4.2 Measured 15-minute A-Weighted Maximum, Ambient & Background Noise Levels



The levels have been corrected for façade effect

A summary of the measured ambient and lowest background noise at the measurement position during day-time hours are shown in Table 4.1 below:

Table 4.1 Measured Typical Ambient and Background Sound Pressure Levels

Date / Period (hours)	Ambient Sound Pressure Level, dB $L_{Aeq,T*}$	Typical Background Sound Pressure Level, dB $L_{A90,T*}$
02/11/2019 - 03/11/2019 (11:00 to 23:00)	**54-67**	**52**
02/11/2019 – 03/11/2019 (23:00 to 00:30)	**52-54**	**50**

*Daytime measurements – 1 Hour / Night-time Measurements – 15min

The typical background noise level at the measurement position during the survey, at the time in which the plant could be operational, is **50dB $L_{A90,15min}$**.

5. EXTERNAL NOISE EMISSION LIMITS

5.1 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. A design criterion of achieving a minimum 10dB(A) below the 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 5.1.

Table 5.1 Maximum Noise Emission Design Target at Residential Premises

Date / Period (Hours)	Typical Background Sound Pressure Level, dB $L_{A90,T*}$	Rating noise level at nearest residential facade, dB $L_{Aeq,T*}$
02/11/2019 - 03/11/2019 (11:00 to 23:00)	**52**	**42**
02/11/2019 – 03/11/2019 (23:00 to 00:30)	**50**	**40**

*Daytime measurements – 1 Hour / Night-time Measurements – 15min

In line with Local Authority requirements, it is proposed that the mechanical plant be designed so that noise emissions do not exceed **40dB $L_{Aeq,T}$** when assessed at the façade of the nearest noise sensitive location.

5.2 BS 4142:2014

BS 4142:2014 "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."

6. PROPOSED KITCHEN EXTRACTION SYSTEM AND ASSOCIATED NOISE LEVELS

The following items of plant will be installed on the roof of the premises.

Table 6.0 Proposed Kitchen Extraction and Intake Fan Motors

External Plant Item	Make	Model	Reference Noise Level* $L_{w(A)}$
Kitchen Extract Fan Motor	Helios	Gigabox GBD 710-4	Outlet 88dB Breakout 71dB
Kitchen Intake Fan Motor	Systemair	MUB 062 560D4	Inlet 87dB Breakout 75dB

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

The ducting will be 1200mm x 300mm standard rectangular duct work for the extraction system and 900mm x 300mm standard rectangular duct work for the intake system. The fan motors will be located externally and therefore breakout noise from the motors and noise from the duct termini have been considered.

In reference to section 6 of this report, no penalty addition has been applied for intermittency as the system will remain on whilst the premises are open. 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.

6.1 Silencers

The extraction system will be fitted with an Acoustica CP03 C Series CA-0800-2D silencer and an Acoustica CP03 C Series CA-0800-1D on the atmosphere side of the fan. The silencers provide the attenuation shown in Table 6.1.1 and 6.1.2. All silencers should be Melinex lined.

Table 6.1.1 Acoustica CP03 C Series CA-0800-2D Attenuation

125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
6	10	21	23	17	12	10

Table 6.1.2 Acoustica CP03 C Series CA-0800-1D Attenuation

125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
5	9	16	14	10	8	8

The air intake system will be fitted with an Acoustica CP03 C Series CAP-0630-1D on the atmosphere side of the fan. The silencer provides the attenuation shown in Table 6.1.3.

Table 6.1.3 Acoustica CP03 C Series CAP-0630-1D Attenuation

63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
4	7	13	21	21	14	13	12

6.2 Directivity

A directivity correction should be applied as the extract and intake fan duct apertures are to terminate approximately 120˚ to the nearest residential windows. A duct opening of 600mm has been used. The levels of attenuation (dB) at each octave frequency band (Hz) is provided in table 6.2 below.

Table 6.2 Directivity Attenuation

63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
0	2	6	12	17	20	22	22

6.3 Extraction Fan Jacket

The extraction fan motor will be fitted with a Helios acoustic jacket. The jacket provides the attenuation shown in Table 6.3.

Table 6.3 Jacket Attenuation

125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
18	24	32	34	39	42	44

6.4 Building Screening

Due to the positioning of the kitchen extract system, there will be significant building screening, due to the roof line, 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 C).

7. NOISE IMPACT ASSESSMENT

This section presents calculations to predict the noise impact of the proposed kitchen extraction and kitchen intake systems, located at the site, at the nearest noise sensitive properties.

7.1 Proposed Operational Hours and Background Noise Levels

The kitchen extraction system will operate during the opening hours of the proposed business. The opening hours are from 11:00 - 00:00 hours Saturday to Wednesday and 11:00 - 00:30 hours Thursday and Friday.

The typical background noise level at the measurement position during the survey is **50dB $L_{A90,15min}$**. The design range is **40dB $L_{Aeq,T}$** at the façade of the nearest residential premises.

7.2 Nearest Noise Sensitive Properties

The nearest sensitive residential receptors were noted to be the second-floor windows located on the rear façade of 1-8 Harben Parade at approximate distances of 3m from the exhaust fan and duct terminus and 4m from the intake fan and duct terminus .

7.3 Description of Calculation Process

In accordance with the methodologies of BS 4142:2014, calculations have been undertaken to predict noise levels in which the kitchen extraction and kitchen intake system 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.

7.4 Noise Level Predictions

Calculations to predict the noise of the kitchen extraction and kitchen intake systems operating at the facade of the residential property are given below. Full calculations are provided in Appendix C.

The rating noise level at the nearest residential receptor, with the mechanical plant operating, is predicted to be **40dB $L_{Aeq,T}$** which is **10dB(A) below** the typical background noise level (50dB $L_{A90,\ 15min}$).

In accordance with BS 4142:2014 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.*

7.5 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/medium due to the use of historic noise data 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.

8. 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 kitchen extraction system, in accordance with BS 4142:2014 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 kitchen extraction system is demonstrated to comply with the London Borough of Camden Council's policy.

APPENDIX A – Acoustic Terminology

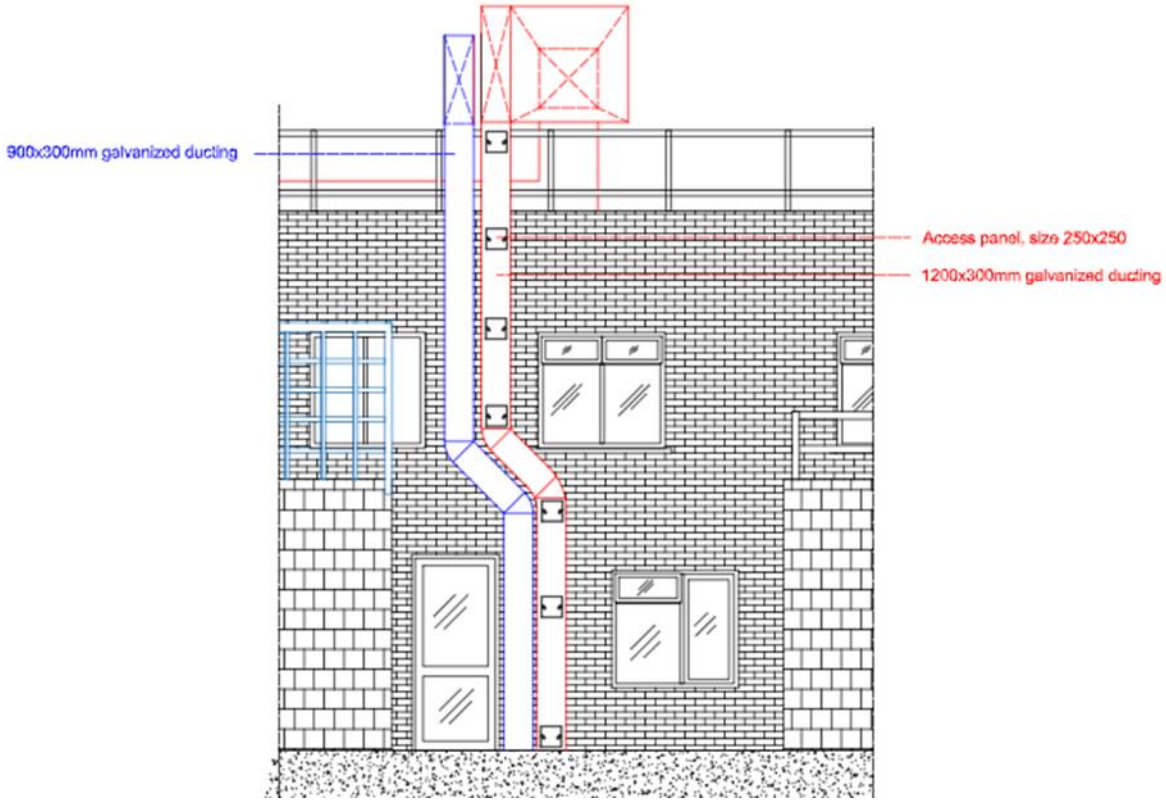
Parameter	Description
Acoustic environment	Sound from all sound sources as modified by the environment
Ambient sound	Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far
Ambient sound level, La = LAeq,T	Equivalent continuous A-weighted 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:

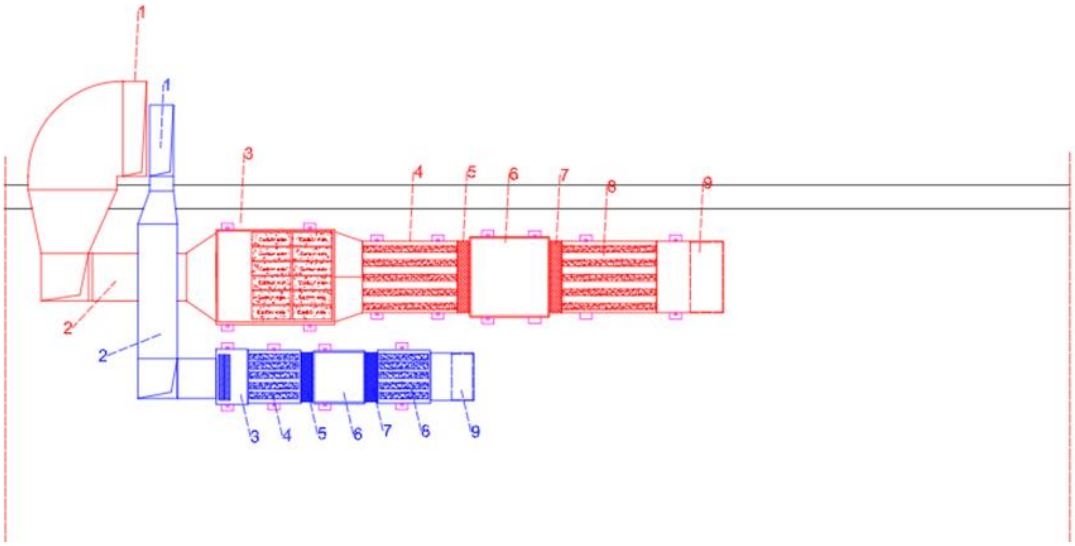
BS 4142:2014 'Methods for rating and assessing industrial and commercial sound'
Acoustic Consultants LTD. 2018, 'Proposed Kitchen Plant, 4 New College Parade, Finchley Road'

APPENDIX B – Figures and Data Sheets

Proposed Rear Elevation



Proposed Roof Plan



1- 1200x900mm Galvanized Ducting
2- 600x600mm Galvanized Ducting
3- 12x Activated Carbon side
4- 1200mm Length, 800x800 rectangular silencer
5- Anti-vibration connection
6-GBD710-4 3Phase extraction fan
7- Anti-vibration connection
8- 1200mm Length, 800x800 rectangular silencer
9- Discharging point as velocity 7.5m/s

1-900x300mm galvanized ducting
2-500x500mm galvanized ducting
3-F6 Air clean filter
4-670x670x670 Silencer
5- Anti vibration connection
6-System air MUB 062 560 D4 IE3 Supply fan
Power Supply 400V, 3PH. 50HZ. 4.28 A
7-Anti vibration connection
8-670x670x670 Silencer
9- Flue inlet as velocity 8.5m/s

Intake Fan Motor - Systemair MUB 062 560D4 Data Sheet

systemair

MUB 062 560D4 Multibox

Centrifugal box fan, insulated, flexible outlet
Item Number: 37352
Variant: 400V 3~ 50Hz - 90° air flow

High efficient motor
Speed-controllable via frequency converter
Integral cold conductor (PTC)
Low sound level
Flexible airflow direction due to removable panels
Installation in any mounting position
Easy to maintain and reliable

The MUB fan are equipped with high efficient motors. The MUB fans have an impeller with backward curved blades, manufactured from aluminum. Speed control is only possible by using a frequency converter. Motor protection is done by cold conductors (PTC), which have to be connected to an external motor protection device. The casing consists of an aluminum frame with fiberglass reinforced plastic corners of PA6; highly shock-resistant. The double skin panels are manufactured from galvanized steel with 20 mm mineral wool insulation. To avoid condensation the profile is provided with a separate chamber to fix screws. The Multibox fans are delivered for straight through airflow but can easily be rebuilt due to removable panels. This allows flexible ventilation solutions. The MUB can also be used as extract- or supply air unit in air handling units. Installation in any mounting position is possible.
MUB with additional modules (filters, heaters etc.) are available as air handling units "K025, K042 or K062" on request!

Technical parameters

Norminal data		
Voltage (Nominal)	400	V
Frequency	50	Hz
Phase(s)	3~	
Input power	2,490	W
Input current	4.28	A
Impeller speed	1,456	r.p.m.
Air flow	max 3.2789	m³/s
Temperature of transported air	max 40	°C
Max temperature of transported air, when speed controlled	40	°C

Sound data		
Sound pressure level at 3m (20m² Sabin)	70	dB(A)

Protection/Classification		
Enclosure class, motor	IP55	
Insulation class	F	

Systemair MUB 062 560D4 Acoustic Data

Mid-frequency band, Hz										
560D4	**Hz**	**Tot**	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
LwA Inlet	dB(A)	78	65	67	71	73	72	69	64	57
LwA Outlet	dB(A)	80	67	69	73	75	74	71	66	59
LwA Surrounding	dB(A)	63	50	52	56	58	57	54	49	42
Measuring point: qv = 1,79 m3/s, Ps = 717 Pa										

Extraction Fan Motor - Helios Gigabox GBD 710/4 Data Sheet

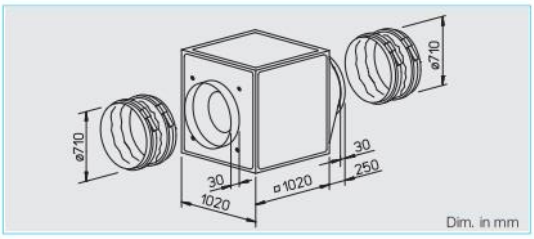
710 mm ø GigaBox centrifugal fan

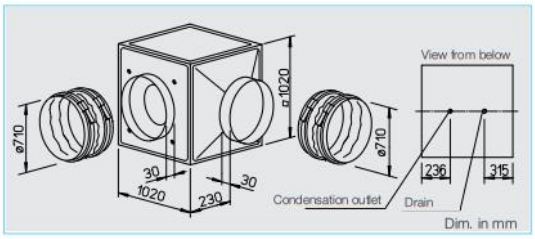
Helios

GB

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.

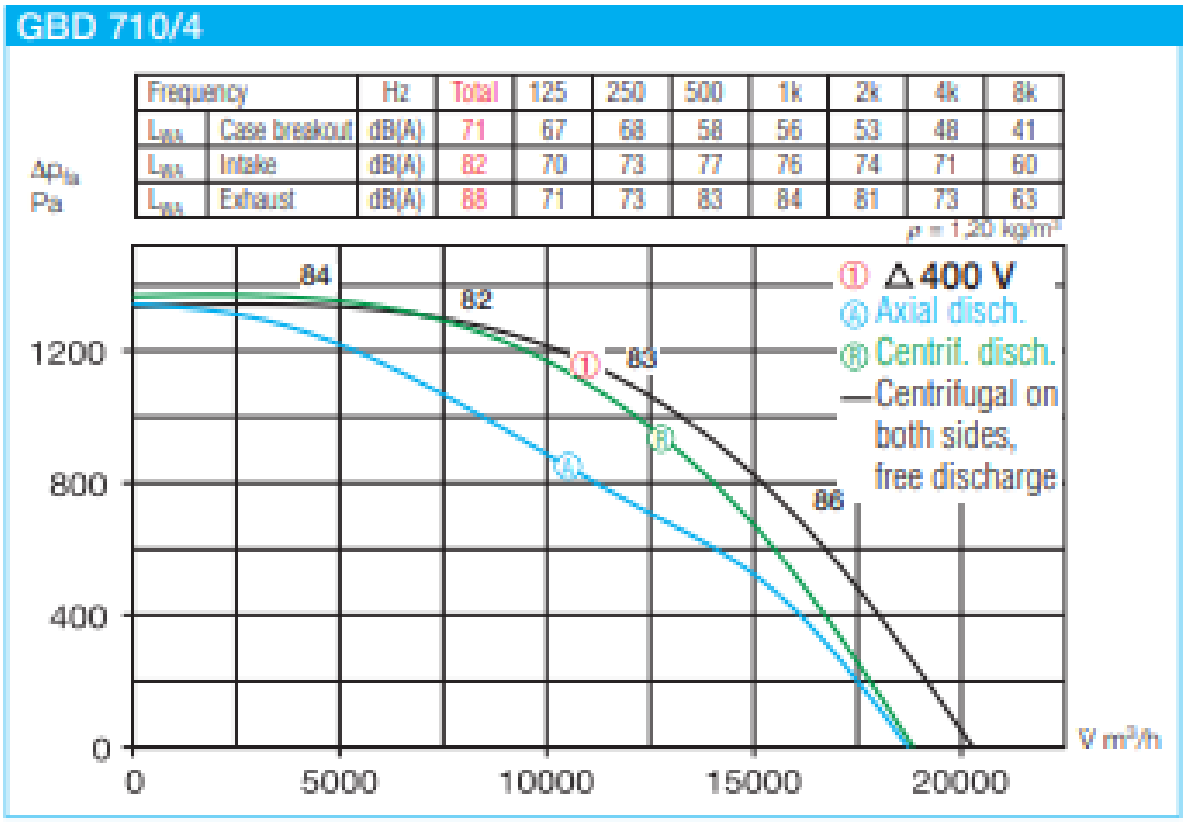
☐ **Impeller**
Smooth running backward curved aluminium centrifugal impeller highly efficient and direct driven. Energy efficient with a low noise development. Dynamically balanced together with the motor to DIN ISO 1940 Pt.1 – class 6.3.

☐ **Motor**
Maintenance-free external rotor motor or IEC-standard motor protected to IP 54/55. With ball bearings and interference-free as standard.

☐ **Electrical connection**
Standard terminal box (IP 54/55) 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) kg	5 step transformer controller with mot. protect. unit Type	Ref. no.	5 step transformer controller without mot. protect. unit Type	Ref. no.	Full motor protection unit using the thermal contacts Type	Ref. no.
		V. m³/h	min⁻¹	dB(A) in 4 m	kW	A	A	No.	+°C	+°C	kg						
3 Phase motor, 3~, 400 V, 50 Hz, Y/△ wiring, protection to IP 55																	
GBD 710/4	5529	20285	1465	51	5.97	10.20	—	499	70	—	170	—		—		**MD**	5849
2 speed motor, 3 Phase motor, 400 V / 3 ph. / 50 Hz, Y/△ wiring, protection to IP 54																	
GBD 710/6/6	5525	16500/19000	690/890	46	1.55/2.45	2.90/4.70	4.70	867	50	50	157	**RDS 7**	1578	**TSD 7,0**	1504	**MD**	5849
3 Phase motor, 3~, 400 V, 50 Hz, protection to IP 54																	
GBD 710/4 T120	5756	18200	1465	55	5,89	10.4	—	499	120	—	188	—		—		**MD**	5849

Helios Gigabox GBD 710/4 Acoustic Data



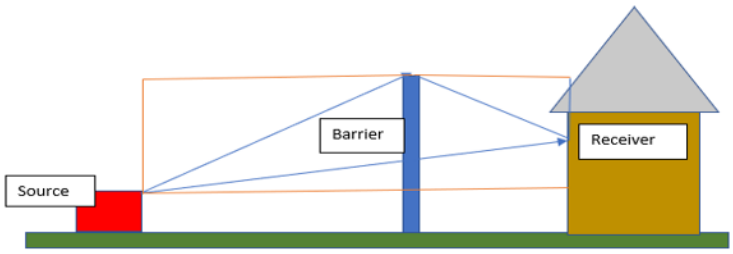
APPENDIX C – Calculations

Barrier Correction Exhaust Duct and Fan

Applicable where barrier breaks line of sight between source and receiver

	Metres
Source Height	3.7
Barrier Height	2.7
Receiver Height	1
Source to Barrier	0.6
Barrier to Receiver	0.5

Path Difference	0.02



Frequency Hz	125	250	500	1000	2000	4000	8000
Barrier Correction	5.2	5.6	6.4	7.5	9.2	11.3	13.8

Attenuation per double distance required = (6dB for LpA recommended)			6	dB			Metres	
				Enter Distance =			3	
	Frequency Hz							
	125	**250**	**500**	**1000**	**2000**	**4000**	**8000**	Total
	87.1	81.6	86.2	84	79.8	72	64.1	91.58
Total LW	87.1	81.6	86.2	84.0	79.8	72.0	64.1	91.58
'A' Weight	16.1	8.6	3.2	0	-1.2	-1	1.1	
LWA (Power)	71.0	73.0	83.0	84.0	81.0	73.0	63.0	88.00
LPA at New Dist'	53.49	55.49	65.49	66.49	63.49	55.49	45.49	70.49
BARRIER	5.2	5.6	6.4	7.5	9.2	11.3	13.8	
SILENCER	5	9	16	14	10	8	8	
SILENCER	6	10	21	23	17	12	10	
DIRECTIVITY 120°	2	6	12	17	20	22	22	
LPA After Insert	**35.26**	**24.85**	**10.13**	**4.97**	**7.30**	**2.16**	**-8.35**	**35.67**

Kitchen Extraction Terminus Sound Pressure Level @ 3m = 36dB $L_{Aeq,T}$

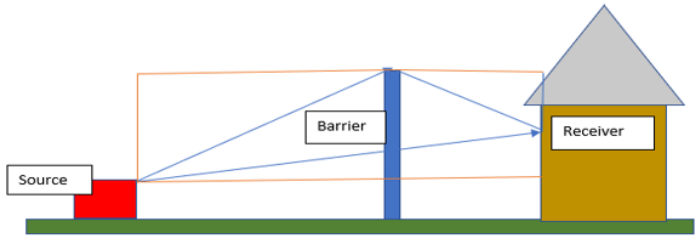
Attenuation per double distance required = (6dB for LpA recommended)			6	dB			Metres	
				Enter Distance =			3	
	Frequency Hz							
	125	**250**	**500**	**1000**	**2000**	**4000**	**8000**	Total
	87.1	74.6	61.2	56	51.8	47	42.1	87.35
Total LW	87.1	74.6	61.2	56.0	51.8	47.0	42.1	87.35
'A' Weight	16.1	8.6	3.2	0	-1.2	-1	1.1	
LWA (Power)	71.0	66.0	58.0	56.0	53.0	48.0	41.0	72.52
LPA at New Dist'	53.49	48.49	40.49	38.49	35.49	30.49	23.49	55.01
BARRIER	5	6	6	8	9	11	14	
JACKET	18	24	32	34	39	42	44	
LPA After Insert	**30.26**	**18.85**	**2.13**	**-3.03**	**-12.70**	**-22.84**	**-34.35**	**30.58**

Kitchen Extraction Fan Motor Casing Breakout Sound Pressure Level @ 3m = 31dB $L_{Aeq,T}$

Barrier Correction Intake Duct and Fan

Applicable where barrier breaks line of sight between source and receiver

	Metres
Source Height	3.7
Barrier Height	2.7
Receiver Height	1
Source to Barrier	1.9
Barrier to Receiver	0.5



Frequency Hz	63	125	250	500	1000	2000	4000	8000
Barrier Correction	7.2	8.7	10.8	13.2	15.9	18.7	21.6	24.6

Path Difference	0.31

Attenuation per double distance required = 6 dB Metres
(6dB for LpA recommended) Enter Distance = 4

	Frequency Hz								
	63	125	250	500	1000	2000	4000	8000	Total
	91.2	83.1	79.6	76.2	72	67.8	63	58.1	92.25
Total LW	91.2	83.1	79.6	76.2	72.0	67.8	63.0	58.1	92.25
'A' Weight	26.2	16.1	8.6	3.2	0	-1.2	-1	1.1	
LWA (Power)	65.0	67.0	71.0	73.0	72.0	69.0	64.0	57.0	78.29
LPA at New Dist'	45.00	47.00	51.00	53.00	52.00	49.00	44.00	37.00	58.29
BARRIER	7	9	11	13	16	19	22	25	
SILENCER	4	7	13	21	21	14	13	12	
DIRECTIVITY 120°	0	2	6	12	17	20	22	22	
LPA After Insert	**33.80**	**29.27**	**21.23**	**6.80**	**-1.88**	**-3.72**	**-12.64**	**-21.61**	**35.29**

Kitchen Intake Terminus Sound Pressure Level @ 4m = 35dB $L_{Aeq,T}$

Attenuation per double distance required = 6 dB Metres
(6dB for LpA recommended) Enter Distance = 4

	Frequency Hz								
	63	125	250	500	1000	2000	4000	8000	Total
	76.2	68.1	64.6	61.2	57	52.8	48	43.1	77.25
Total LW	76.2	68.1	64.6	61.2	57.0	52.8	48.0	43.1	77.25
'A' Weight	26.2	16.1	8.6	3.2	0	-1.2	-1	1.1	
LWA (Power)	50.0	52.0	56.0	58.0	57.0	54.0	49.0	42.0	63.29
LPA at New Dist'	30.00	32.00	36.00	38.00	37.00	34.00	29.00	22.00	43.29
BARRIER	7	9	11	13	16	19	22	25	
LPA After Insert	**22.80**	**23.27**	**25.23**	**24.80**	**21.12**	**15.28**	**7.36**	**-2.61**	**30.82**

Kitchen Intake Fan Motor Casing Breakout Sound Pressure Level @ 4m = 31dB $L_{Aeq,T}$

Adding dB

(Max. of eight)

Enter values	35.7	30.6	35.3	30.8	0	0	0

Total = **39.8 dB**

Cumulative Sound Pressure Level @ Nearest Residential Receptor = 40dB $L_{Aeq,T}$