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NOISE IMPACT ASSESSMENT REPORT - KITCHEN EXTRACTION SYSTEM

262 KILBURN HIGH ROAD, LONDON NW6 2BY

FOR

MR Z BUTT



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1. EXECUTIVE SUMMARY

Following the service of a planning enforcement notice in relation to the Kitchen Extraction System servicing the premises at 262 Kilburn High Road, London NW6 2BY. Sound Licensing Ltd have been commissioned to carry out a noise impact assessment of the existing kitchen extraction system.

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 has been identified as the third-floor residential premises above the site at 262 Kilburn High Road, London NW6 2BY.

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 Camden Borough Council's policy.



2. INTRODUCTION

The client has installed a kitchen extraction system at 262 Kilburn High Road, London NW6 2BY, 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

The premises are located on the ground floor of a three-storey traditionally built property with an attic conversion located on a busy street. It is located in a mixed area comprising predominantly of commercial units at ground floor level with residential accommodation on the floors above. The premises are located in the London Borough of Camden.

The nearest sensitive residential receptor was noted to be the third-floor residential premises above the restaurant at a distance of approximately 2.5 metres from the discharge point of the flue.

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

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 07:00 hours on the 16th September and 23:00 hours on the 19th September 2022. 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 (LAeq, LA90 and LAmax 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



4.1 Noise Survey Results

The survey was carried out between 07:00 hours on Friday 16th September 2022 and 23:00 hours on Saturday 17th September 2022. A summary of the measured ambient and typical background noise at a comparable measurement position during day-time hours are shown in Table 4.1 below:

Table 4.1 Measured ambient and typical background sound pressure levels

Date / Period (hours)	Average Sound Pressure Level, dB L _{Aeq,15min}	Typical Background Sound Pressure Level, dB L _{A90,15min}
16/09/2022 – 17/09/2022 (07:00 and 23:00)	53.3	49.5

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 Camden Borough Council. Camden Planning Guidance, Amenity January 2021 states:

"6.27 Developments proposing plant, ventilation, air extraction or conditioning equipment and flues will need to provide the system's technical specifications to the Council accompanying any acoustic report. 'BS4142 Method for rating Industrial and Commercial Sound' contains guidance and standards which should also be considered within the acoustic report."

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 5.1.

Table 5.1 Maximum noise emission design target at residential premises

Date / Period (hours)	Typical Background Sound Pressure Level, dB L _{A90,15min}	Rating noise level at the nearest residential facade, dB L _{Aeq,T}
16/09/2022 – 17/09/2022 (07:00 and 23:00)	50	40

5.2 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."



6. KITCHEN EXTRACTION SYSTEM AND ASSOCIATED NOISE LEVELS

The following item of plant has been installed internally at the premises.

	posed kitelieli E		
External Plant Item	Make	Model	Reference Noise Level* L _{w(A)}
Kitchen Extract Fan Motor	Helios	Gigabox 500/4	Outlet 80dB

Table 6.0	Proposed Kitchen Extraction Fan Motor
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*Reference sound power levels. Manufacturer's specifications are provided in Appendix B.

The outlet ducting is 500mm standard circular duct work. The duct terminus is fitted with a high velocity cowl. The extraction fan motor is located internally and therefore only noise from the terminus has been considered.

In reference to section 6 of this report, no penalty addition has been applied for intermittency as the system will be remain on when the business is open. No penalties for other significant characteristics, or for impulsiveness as it is considered that these characteristics will not be perceptible sufficient to attract attention at the noise receptors.

6.1 Directivity

A directivity correction should be applied as the 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 6.1 below.

Table 6.1	Directivity Attenuation
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125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
0	4	6	7	14	17	19

6.2 Silencers

The extraction system is fitted with one (1 No.) RSD 500/600 and one (1 No.) RSD 500/900 Helios silencers on the atmosphere side of the fan. The silencers provide the attenuation shown in Table 6.2. All silencers should be Melinex lined.

Table 6.2	Silencer Attenuation												
125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz							
10	13	23	27	22	22	15							



7. NOISE IMPACT ASSESSMENT

This section presents calculations to predict the noise impact of the kitchen extraction system, located at the site, at the nearest noise sensitive property.

7.1 Operational Hours and Background Noise Levels

The kitchen extraction system operates during the opening hours of the business. The opening hours are:

Monday to Sunday - 11:00 to 23:00 hours

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 receptor was noted to be the third-floor residential premises above the premises at a distance of approximately 2.5 metres from the discharge point of the flue.

7.3 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 kitchen extraction 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 system operating at the facade of the residential property are given below. Full calculations are provided in Appendix C.

The rating noise level at the 3rd floor window, with the mechanical plant operating, is predicted to be **38dB** L_{Aeq,T} which is **12dB(A) below** the typical background noise level (50dB L_{A90, 15min}).

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.

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. The fan should be installed with flexible connections to adjacent structures.



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+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 kitchen extraction system is demonstrated to comply with Camden Borough 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-	Value of the A-weighted sound pressure level in decibels of
weighted sound pressure level,	continuous steady sound that, within a specified time
LAeq,T	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'

Aran Acoustics (Report Ref: RPT.160613.0 June 2016) – 258 Kilburn High Road, London NW6 2BY



APPENDIX B – Data Sheets and Figures

Helios Gigabox 500/4 Data Sheet

GigaBox centrifugal fan 500 mm ø



Models GB.. T120 Models GB.. Arbitrary installation position and flexible assembly by five possible discharge directions. Centrifuga discharge -centrifugal on both sides free discharge





Special features of type GB.. T120

- Designed for moving dirty, hu-mid 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 deli-very. Drill hole for rain drainage (accessories) for outdoor instal-lation is prepared.
- Assembly of types GB.. T120 Installation must be carried out with condensation discharge showing downward. Flexible assembly by three possible cen-trifugal 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 possi-ble discharge directions via the discharge adapter. For wall mounting the wall bracket (accessories) has to be used. Out-door installation is possible using outdoor cover hood and external weather louvers (accessories).



Specification of both types Casing

Self-supporting frame construc-tion from aluminium hollow profiles. Double-walled side panels from galvanised sheet steel, lined with 20 mm thick temp-erature insulting and fiameretardant 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 ourved aluminium centrifugal impelier highly efficient and di-rect 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 44 or 54. With ball bearings and radio suppres-sed as standard.

Electrical connection

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

Туре	iet. No.	Air flow volume (FID)	R.P.M.	Sound press. level case breakout	Motor power (nominal)	Cur full load	rent speed controlled	Wiring diagram	Maximur tempe full load	m air flow erature controlled	Nominal weight (net)	5 step with motor prote	translo ect. un 1	mer contre witho motor pro	iller ut act. unit	Full moti unit u therma	or protection using the al contacts
		V/m ² /h	min ⁻¹	dB(A) at 4 m	kW	A	A	Nr.	+°C	+°C	kg	Type Re	d. No.	Type P	ef. No.	Туре	Ref. No.
1 Phase motor, 2	30 V /	1 ph. / 50 H	z, capacito	motor, prote	ction to IP 5	54											
GBW 500/6	5519	5760	880	35	0.52	2.30	2.60	864	45	45	47	MWS 3	1948	TSW 3.0	1496	MW ¹⁾	1579
GBW 500/4	5517	8400	1350	45	1.38	6.40	8.20	865	65	55	61	MWS 10	1945	-	-	-	-
2 speed motor, 3	Phase	motor, 400	V/3 ph./	50 Hz, Y/ -w	riring, prote	ction to IP 54	1										
GBD 500/4/4	5518	8000/8850	1075/1340	45	0.97/1.45	1.60/2.80	2.90	867	50	50	57	RDS 7	1578	TSD 5.5	1503	M4 ²⁾	1571
1 Phase motor, 2	30 V /	1 ph. / 50 H	z, capacitor	r motor, prote	ction to IP 5	54											
GBW 500/4 T120	5776	8345	1340	45	1.40	6.1	7.0	301	120	100	75	MWS 10	1946	-	-	MW ¹⁾	1579
2 speed motor, 3	Phase	motor, 400	V/3 ph./	50 Hz, Y/ -w	iring, prote	ction to IP 54											
GBD 500/4/4 T12	0 5777	7320/8350	1070/1365	45	1.07/1.50	1.80/3.00	3.0	947	120	110	75	RDS 4	1316	TSD 3.0	1502	M4 ²⁾	1571
I) incl. operation sw	101	2) (*	rol, operation	and 2 speed	switch												



Helios Gigabox 500/4 Acoustic Data





Flanged circular attenuator RSD

Helios Silencers Data Sheet



Specification – Installation Casing made of galvanised steel, acoustically lined with high quality mineral wool covered with doth to prevent erosion. Dimensions and tapped flange holes of all sizes fit fan's nominal diameter (R 20). Tapped holes in accordance to DIN 24155, Pt. 2.

Insertion loss

To increase the attentuation, several attenuators can be installed in-line. Pressure drop

The resistance of the RSD attenuators is very low. When designing the system consider twice the pressure drop of rigid ducting. RSD

40 0





Nor	ype ninal-ø	Rel.No.	Basic	000	Dimens	ions in mm B	Hole ø	Nominal weight kg	125	250	500	1000 1000	2000	4000	8000	attenuation
RSD	280/ 400	8740	1	400	322	454	8 xM 8	10	4	5	8	14	9	8	6	8
RSD	280/ 800	8741	2	800	322	454	8 xM 8	18	7	9	16	28	18	17	14	14
RSD	280/1200	8742	3	1200	322	454	8 xM 8	25	9	12	23	37	23	20	16	18
RSD	315/ 400	8743	1	400	356	504	8 xM 8	11	3	3	7	13	8	7	5	5
RSD	315/ 800	8744	2	800	356	504	8 x M 8	19	6	8	14	26	16	12	9	12
RSD	315/1200	8745	3	1200	356	504	8 x M 8	28	9	12	21	36	18	17	14	18
RSD	355/ 400	8746	1	400	395	564	8 M x 8	13	3	4	7	11	7	6	4	6
RSD	355/ 800	8747	2	800	395	564	8 xM 8	23	6	7	13	22	14	12	8	11
RSD	355/1200	8748	3	1200	395	564	8 xM 8	33	8	11	17	29	18	15	10	17
RSD	400/ 400	8749	1	400	438	564	12 xM 8	12	3	4	6	9	7	5	3	6
RSD	400/ 800	8750	2	800	438	564	12 xM 8	21	6	6	12	18	13	12	8	9
RSD	400/1200	8751	3	1200	438	564	12 x M 8	30	7	10	14	22	18	13	9	15
RSD	450/ 400	8752	1	400	487	634	12 x M 8	17	4	5	8	10	8	7	5	8
RSD	450/ 800	8753	2	800	487	634	12 xM 8	27	6	7	13	18	13	12	9	11
RSD	450/1200	8754	3	1200	487	634	12 x M 8	38	8	10	18	23	17	14	10	15
RSD	500/ 600	8755	1	600	541	714	12 x M 8	27	4	5	9	11	9	9	6	8
RSD	500/ 900	8756	2	900	541	714	12 x M 8	36	6	8	14	16	13	13	9	12
RSD	500/1200	8757	3	1200	541	714	12 x M 8	45	8	11	22	24	17	16	12	17
RSD	560/ 600	8758	1	600	605	804	8 x M 10	32	3	5	9	9	8	8	6	8
RSD	560/1200	8759	2	1200	605	804	8 x M 10	52	6	10	19	19	16	13	10	15
RSD	630/ 600	8760	1	600	674	900	8 x M 10	44	3	5	8	8	8	7	5	8
RSD	630/1200	8761	2	1200	674	900	8 x M 10	68	5	10	16	15	15	11	8	15
RSD	710/ 600	8762	1	600	751	1000	8 x M 10	51	3	5	7	7	7	6	4	8
RSD	710/1200	8763	2	1200	751	1000	8 x M 10	80	5	10	14	13	13	10	7	15
RSD	800/ 600	8764	1	600	837	1100	12 x M 10	57	2	5	7	6	6	5	4	8
RSD	800/1200	8765	2	1200	837	1100	12 x M 10	88	5	9	13	11	11	9	6	14
RSD	900/ 900	8766	1	900	934	1220	12 x M 10	82	2	4	10	9	6	5	4	6
RSD	900/1800	8767	2	1800	934	1220	12 x M 10	135	4	9	21	17	13	9	8	14
RSD	1000/ 900	8768	1	900	1043	1350	12 x M 10	96	2	4	8	7	5	4	3	6
RSD	1000/1800	8769	2	1800	1043	1350	12 x M 10	157	4	7	16	14	10	7	6	11
RSD	1120/ 900	8770	1	900	1174	1350	12 x M 10	81	2	3	7	6	4	3	3	5
RSD	1120/1800	8771	2	1800	1174	1350	12 x M 10	136	3	6	14	11	8	6	5	9
RSD	1250/ 900	8772	1	900	1311	1460	12 x M 10	86	1	2	5	4	3	2	2	3
RSD	1250/1800	8773	2	1800	1311	1460	12 x M 10	146	2	4	11	9	7	5	4	6



APPENDIX C – Calculations

Attenuati	on per double distance re	equired =		6	dB			Metres	
(6	(6dB for LpA recommended)				Er	nter Distance	9 =	2.5	
				F	requency H	lz			
		125	250	500	1000	2000	4000	8000	Total
		77.1	81.6	77.2	74	71.8	68	61.1	84.72
	Total LW	77.1	81.6	77.2	74.0	71.8	68.0	61.1	84.72
	'A' Weight	16.1	8.6	3.2	0	-1.2	-1	1.1	
	LWA (Power)	61.0	73.0	74.0	74.0	73.0	69.0	60.0	80.01
	LPA at New Dist'	45.07	57.07	58.07	58.07	57.07	53.07	44.07	64.08
	SILENCERS	10	13	23	27	22	22	15	
	DUCT BENDS (1)	2	3	3	3	3	3	3	
	DUCT LENGTH, 10m	1	1	1	1	1	1	1	
	DIRECTIVITY 90°	0	4	6	7	14	17	19	
	LPA After Insert	32.07	36.07	25.07	20.07	17.07	10.07	6.07	37.88

Fan Motor Outlet Sound Pressure Level @ Nearest Sensitive Receptor = 38dB LAr,T