



Azymuth Acoustics UK

Professional Acoustic Services

Noise Verification Report Ref: AA0422.1

Unagi Dark Kitchen

Manchester,
M3 1HJ

On behalf of

AWMC Restaurants Ltd

48 Greenwood Street
Altrincham, Cheshire
WA14 1RZ



Azymuth Acoustics UK
Viridor House
No.3 Bolholt Terrace
Bury/Gtr Manchester
BL8 1PP

Tel: +44 (0)161-762 1055
Fax: +44 (0)161-761 1094

Matthew@acousticsuk.com
www.acousticsuk.com

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Reference: AA0422.1	Signature:	Signature:	Date:
Produced by:		Dominic McCann BEng (Hons), MIOA, Director	26 th October 2022
Checked by:		Ollie Platts BSc	26 th October 2022
Approved by:		Matthew Gibson BEng (Hons) CEng CEnv Directc	26 th October 2022

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Contents

1.0	Introduction	4
2.0	Previous Noise Assessment Report	5
2.1	Scope of Previous Noise Assessment.....	5
2.2	Results of Baseline Noise Survey in Previous Noise Assessment	5
3.0	Plant Noise (Verification) Measurements.....	5
3.1	Noise Measurement Procedures	5
3.2	Results of Noise Verification Measurements	6
4.0	SoundPlan Noise Model.....	7
5.0	BS4142 and BS8233 Assessment	8
6.0	Summary / Conclusions	10
	Appendix A – Kitchen Extract Fan Data sheets	11

1.0 Introduction

This report sets out the results of noise verification measurements in the vicinity of the Unagi Kitchen and aims to address some of the concerns brought to us by local planning authority (Manchester city council).

Azymuth Acoustics had previously carried out a noise assessment for the Unagi Kitchen at the design stage of the project. Hence, the noise verification presented here updates this earlier noise assessment based on operational noise levels measured on 18th October 2022.

The comments from Local Authority relating to noise were:

Noise from Plant / Kitchen extraction: If the kitchen extraction system is now known, we will need an actual assessment based on BS4142:2014 as outlined in the condition requirements (Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (LAeq) below the typical background (LA90) level at the nearest noise sensitive location).

It is not sufficient to state that both extract and supply fans are new technology, they are very quiet and kitchen extract is not anticipated to significantly impact on the nearest office receptors on Park Place. We need an actual assessment to demonstrate compliance with the condition. The nearby commercial premises need to be considered as receptors and the occupiers could be sensitive to the new noise source so the limit at the commercial receptors does need including and complying with. The Purpose of the condition is also to minimise the impact of the development and to prevent a general increase in pre-existing background noise levels around the site.

Azymuth Acoustics visited the site now that the kitchen is operational (on 18th October 2022) and we have adjusted the standard kitchen extract noise spectrum to reflect the measured values from the site visit.

NSE2 external areas / outside seating condition: I am happy for the actual hours to be included here. I will accept that the assessment has been based on 48 customers using the outside area but confirmation will still be required with regard to how many people talking at once (assessment should be based on 50% of people taking at once)

Azymuth Acoustics can confirm that our previous noise assessment assumed of 48 people with only 50% usage(talking) at all times. Hence, the previous assessment of patron noise levels remain valid and representative of the operating conditions at Unagi Kitchen.



2.0 Previous Noise Assessment Report

2.1 Scope of Previous Noise Assessment

In the previous original environmental noise assessment report (Azymuth Acoustics ref: AA0402revA dated 29th April 2022) was intended to provide information relating to potential noise levels affecting the site, in order to support the detailed planning application for the kitchen. In particular, the previous report set out the following details:

- The results of a baseline noise survey undertaken in the vicinity of the proposed development
- Reasonable assessment criteria for the analysis of survey results
- Noise limits on plant equipment to reduce likelihood of adverse impact upon the nearest residential receptor
- Discussion of patron noise at the proposed development

2.2 Results of Baseline Noise Survey in Previous Noise Assessment

The following table summarises the results of the baseline noise measurements undertaken at the proposed site in terms of the average daytime (07:00 to 23:00 hours) and night-time (23:00 to 07:00 hours) statistical noise levels.

Period	L _{AFMax}	L _{Aeq}	L _{A10}	L _{A50}	L _{A90}
Day (07:00 - 23:00)	68.4	55.9	58.7	52.6	47.5
Night (23:00-7:00)	62.7	52.1	54.8	48.7	43.8

Table 1 - Summary results from the baseline noise surveys carried out by AAUK in March/April 2022

3.0 Plant Noise (Verification) Measurements

3.1 Noise Measurement Procedures

A site visit was carried out by Azymuth Acoustics on 18th October 2022 for the purpose of recording the noise levels at possible representative locations around the Unagi kitchen and extract system in particular. The noise measurements were taken to establish an accurate representation of the kitchen extract fan noise levels present at site.

The instrumentation used for the noise survey consisted of a SvanTek 977 type 1 precision sound level meter. The equipment was calibrated before and after the noise measurements. The sound level meter measured at A-weighted (fast response) noise levels as well as octave bands noise levels for all measurement records.

A total of 4 noise measurements positions were and the graphic below shows the measurement positions where measurement microphone was located. Table 2 below summarises the measured noise levels for each position measured.

The noise measurements at each position a minimum of 6mins was recorded and the survey covered the period from 13:17 to 13:50hrs. A BS 4142 assessment was then carried following the results gained from our measurements and Soundplan using predicted and recorded noise levels to assist the process.



Figure 1 - Noise measurement positions for commissioning noise measurements 18/10/22

3.2 Results of Noise Verification Measurements

The following table summarises the results of the noise measurements carried out positions A) to D) in the vicinity of the Unagi Kitchen on 18th October 2022.

	Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1000	2000	4000	8000	
A) Facing Kitchen Shutter Closed	56.0	53.3	54.9	50.8	48.6	41.6	35.8	30.9	53.1
A) Facing Kitchen Shutter Open	56.7	53.0	54.5	51.4	49.2	42.8	37.7	33.0	53.6
B) 5m from kitchen flue on tripod	56.5	56.1	59.3	57.8	56.0	48.7	42.9	38.1	59.7
B) 5m from kitchen flue held lifted to ~3m height	56.6	58.1	63.8	59	56.8	50.1	43.8	37.1	61.4
C) 20m on tripod	56.2	49.8	55.7	51.2	49.6	41.5	34.9	27.0	53.6
D) Park Place outside of dbf associates	64.5	50.8	50.1	49.2	49.1	44.0	37.0	28.0	52.7

Table 2- Summary of measured noise levels around the Unagi Kitchen

These noise measurements have been used to calculate the Sound Power Level for the Kitchen Extract system. The following table sets out the sound power level for the kitchen extract that was calculated by Azymuth Acoustics to be used as an accurate sound power spectrum for the kitchen extract fan which was previously assumed from a generic kitchen extract fan.

The sound from the Unagi extract system is continuous and based on the octave band noise levels and a subjective assessment of the character of the sound it would best be described as non-tonal and non-intermittent in nature. Therefore, it is not deemed appropriate to add penalties in BS4142.

	Octave Band Centre Frequency (Hz)								LwA
	63	125	250	500	1000	2000	4000	8000	
Calculated Kitchen Extract Sound Power Level	81.6	82.3	85.5	84.0	81.8	74.9	68.8	62.1	85.8

Table 3 - Octave band sound power level for the Unagi Kitchen extract system

This octave band sound power spectrum has been fed into the updated SoundPlan model described below.

4.0 SoundPlan Noise Model

A SoundPlan noise model was developed for the initial planning stage noise assessment and this computer-based noise model has been updated to take account of the commissioning noise measurements set out above. All other noise model information remains valid from the previous assessment.

The Graphic below shows the output from the SoundPlan model in terms of the sound propagation across the Unagi site and the overall dBA levels at (single point) receiver locations placed where AAUK actually carried out the noise measurements (i.e., allowing the noise model to be “calibrated” against the noise measurements carried out on site).



Figure 2 - Grid noise map output from the SoundPlan noise model

The sound levels at the single point receivers located at no.s 10-12 Park Place (office receptor) and no. 4 Park Place (residential receptor) are carried over into the BS4142 and BS8233 noise assessments set out below.



5.0 BS4142 and BS8233 Assessment

The following table updates the BS 4142 noise assessment for the residential receptors located at 4 Park Place (approx. 45m to the west of the Unagi site). This assessment relies on the baseline noise data from the night-time measurements as a worst case on the basis that the kitchen extract fan might be left on after opening hours for a short period during cleaning.

Location	Results	Values	Commentary
Residential 4 Park Place	Noise level @ 1m from the atmosphere connection	$L_{Aeq} = 75\text{dBA}$	A generic extract fan has been provided
	Residual Sound Level	$L_{Aeq,5mins} = 52.1$	Average taken from evening (up to 2300h) measurements
	Background Sound Level	$L_{A90, 5mins} = 43.8$	Average background sound level from evening (up to 2300h) measurements
	Estimated Sound Level @ 50 metres from source	$L_{Aeq} = 32\text{dB}$	Taken from the calculations based upon estimates
	Acoustic feature correction	+ 0 dB	The sound is purely speculative at present, and as such the required correction cannot be determined. It is assumed the sound will not be tonal nor impulsive
	Rating Level	$(32 + 0) = 32\text{ dB}$	As above
	Background Sound Level	$L_{A90, 5mins} = 44\text{dB}$	
	Excess of rating over background sound level	$(32 - 44)\text{ dB} = -12\text{dB}$	As per clause 11 of BS4142
	Assessment indicates no adverse impact		The excess of the rating level over the background sound level is showing a negative result. This indicates that there will be no adverse noise impact.

Table 4 - BS4142 noise assessment for the residential receptors at no. 4 Park Place



Azymuth Acoustics have added an assessment of the noise levels at the adjacent commercial premises (offices) at no. 2 Park Place. It should be note, however, as these are not residential receptors it would not be reasonable to apply BS414 (see clause 11 of BS4142) and the -5dB relative to background as a target for these office receptors.

Instead, the indoor ambient noise level guidance for an open plan office, as stated in BS 8233, is based a design range of 45-50dB L_{Aeq} as the recommended acceptable noise levels for an office. Assuming the approximate attenuation of 12dB provided by a partly open window, Azymuth would recommend a noise limit of 57 dBA ($57-12 = 45\text{dBA}$) at the nearest commercial receptor.

Location	Results	Values	Commentary
Office 10-12 Park Place	Noise level @ 1m from the atmosphere connection	$L_{Aeq} = 75\text{dBA}$	A generic extract fan has been provided
	Residual Sound Level	$L_{Aeq,5mins} = 55.9$	Average taken from day-time measurements
	Background Sound Level	$L_{A90, 5mins} = 47.5$	Average background sound level from day-time measurements
	Estimated Sound Level @ 50 metres from source	$L_{Aeq} = 44\text{dB}$	Taken from the calculations based upon estimates
	Acoustic feature correction	+ 0 dB	The sound is purely speculative at present, and as such the required correction cannot be determined. It is assumed the sound will not be tonal nor impulsive
	Rating Level	$(44 + 0) = 44 \text{ dB}$	As above
	Background Sound Level	$L_{A90, 5mins} = 48\text{dB}$	
	Excess of rating over background sound level	$(44 - 48) \text{ dB} = -4\text{dB}$	As per clause 11 of BS4142, NB BS4142 is not strictly applicable to an office receptor. BS 8233 indicates that a target of 48dBA externally to an office is a good standard.
	Assessment against a noise limit of 57dBA outside an office window	Calculated noise level of 44dBA is 13dB below the 57dBA target outside the office receptors.	57dBA outside an open office window is derived from BS8233 guidance (of
	Assessment indicates no adverse impact		The noise levels externally to the office are entirely satisfactory according to BS 8233 and BS 4142.

Table 5 - Noise Assessment for the nearest office receptors at no. 10-12 Park Place

6.0 Summary / Conclusions

Azymuth Acoustics have carried out a noise verification survey of the Unagi Kitchen. The results of the verification survey confirm that the noise level at 5m from kitchen extract system is 60dBA.

The resulting sound level at the nearest residential receptor is 32dBA and this is 12dB below the background noise level at 23hrs at this location, ie fully compliant with the local authority requirements.

The noise levels from the perspective of the nearest office receptor in the vicinity of the site is 44dBA and this is 13dB below a standard based on the guidance in BS8233. The sound level at this location is also 4dB below the daytime background sound level at this location. In overall terms the Unagi Kitchen does not adversely affect the noise levels at this location in terms of high-quality office occupation.

Appendix A – Kitchen Extract Fan Data sheets

PLATE MOUNTED AXIAL FLOW FANS COMPACT HCFCB / HCFT Series - PLASTIC IMPELLERS



Range of low profile plate mounted axial fans fitted with plastic impellers with fiberglass, single phase motor (HCFCB) or three phase motor (HCFT), IP65 (1), Class F insulation (2), equipped with thermal protection (3).

(1) Ø 800, 900 and 1000 models are IP55.

(2) Working temperatures from -40°C up to +70°C. Except models 4-710 suitable up to +55°C and models Ø 800 to 1000 suitable for usage in environments from -20°C to +40°C.

(3) Except models 800 to 1000.

Motors

Available, depending upon the model, with single or three phase motors in 2, 4 or 6 poles.

All motors are speed controllable by autotransformer except 2 pole and /4-630, 710, T/800, T/900 and T/1000.

Three phase models are speed controllable by inverter.

Electrical supplies:

Single phase 220-240V-50Hz.

(Capacitor located inside the wiring terminal box).

Three phase 220-240/380-415V-50Hz or 380-415V-50Hz.

(See characteristic chart).

Additional information

Standard air direction: form (A) configuration.

(Motor over Impeller).

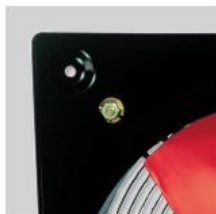
On request

Inlet finger proof guard for models Ø 800 to 1000.



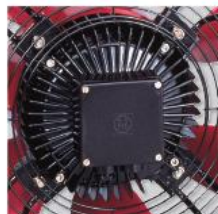
Compact design

Compact design created by the combination of the motor with the factory matched direct drive wrap around impeller hub.



Corrosion resistance

Mounting plate, motor support and finger proof guard protected by cataforesis primer and black polyester paint finish. Stainless steel screws.



Terminal box

Wiring terminal box with cable gland PG-11.



Impeller dynamically balanced

Impellers are dynamically balanced, according to ISO 1940 standard, giving vibration free operation.



Manufacturing variations

Multiple manufacturing variations, depending on the type of installation and use conditions.



Configuration for models Ø 800 to 1000

Special design of motor over impeller, which provides compactness and tightness IP55.





FläktGroup

MaXfan Compac



Air Movement



Introduction

The Woods MaXfan Compac is designed for kitchen canopy systems, offering high

- High performance & pressure – Single motor & impeller
- Full 1Ph inverter control – Programmed with simple installation
- Compact robust design - DW172 compliant



Product details

Product Code: AMFC

The Woods MaXfan Compac reinforces the high-quality products that Fläkt Woods has provided over the years. The MaXfan Compac fan has been specifically designed for kitchen canopy systems offering you; High Performance, Full Inverter Control, Easy Installation & Minimised maintenance with the single motor & impeller solution, Comparable noise levels, Compact robust lightweight design, DW172 Compliance and is available in stock for next day delivery in the UK. A Woods Air Movement product.

Fast Facts

- 315 630 mm diameter
- Volumes up to 4.9m/s
- Static Pressures up to 900 Pa (Non-stalling characteristic)
- Fans tested to ISO5801 and BS848
- High efficiency energy saving IE2 motor
- Low breakout noise levels
- Motor protection and terminal block IP55 (DW172 & Defra Compliant)
- Ambient temperatures up to 80°C (Dependant on size)
- Overheat protection as standard
- Compact robust light weight construction
- Galvanised casing for high corrosion resistance
- Full inverter control and flexibility

EXCELLENCE IN SOLUTIONS