

BS4142:2014 (revised 2019) Noise Assessment Thai bar Restaurant

Report Ref: 417PORTALBOT
Client: Mr Mark Courtney
Site Location: 3 Victoria Road
Port Talbot
SA12 6QJ

Date of Issue: 8th May 2025 revised to include silencer 30th July 2025
Date of Assessment: Thursday 24th April 2025

Assessor: Donald Angir MIOA Dip(IoA) BA(Hons) www.noisesurveyltd.co.uk who has over 9 years of experience conducting noise at work, BS8233:2014 and BS4142:2014 environmental noise assessments.



Picture 1: 3 Victoria Road is a mixed use residential area

Summary

The ambient noise level was not measured because the Systemair MUB 042 500EV multibox fan have not been installed. The specific noise of 30dBA was obtained by manual calculation. The specific noise is based on sound power level of LwA 83dB spread through a silencer, square sheet metal ducting. The noise spreads by line and freefield propagation over a single reflective plane over a distance of 3m to the nearest receptor at Victoria Road.

The day time background level is LAF90_(10 hours) 41dB was obtained onsite measurement on the roof of 3 Victoria Road.

The **day time rating is 11dB below the background level an indication of a low impact**, in the context of the noise environment.

Uncertainty is assessed at ± 4 dB because of rain during the measurements.

Objective:

The Client has proposed to renovate the ground floor retail unit, previously used as a salon, into a Bar and restaurant with seating and hot food takeaway serving Thai food. The unit is known as 3 Victoria Road. The bar restaurant will be on the ground floor only. The kitchen, on the ground floor, will have a cooker canopy with an extractor fan. The fan will be connected to a silencer along a square sheet metal duct that will run internally, inside the building, through the attic room and terminate above the roof.

A single Systemair MUB 042 500EV multibox fan will be connected to the canopy in the kitchen. A bathroom extra fan will be fitted to the customer toilets located on the ground floor. The bathroom extra fan noise is not assessed as part of this report.

The first and third floors of the building will be left as present. They are currently used as office and storage space.

Noise will be generated from the MUB 042 500 EV multibox fan attached to the kitchen canopy. This odour extractor fan will be ducted and the duct will terminate at the roof of the building.

The ducted extra fan will be operational during the opening hours of the bar restaurant. This will be in the day time only. The fan will not be operational during the night. The fan will not operate continuously but in a stop start fashion as determined by the need for odour extraction in the kitchen. The purpose of this assessment is to quantify the residual, background and specific noise levels at the nearest noise sensitive receptors. In addition, the report will provide a rating level and assess the likelihood of adverse impact using the BS4142:2014 revised (2019).



Picture 2: The ducting will terminate on the roof.



Picture 3: There are residential noise sensitive receptors at Jubilee House 11 Victoria Road/ Addison Rd

Source under Assessment

Sources of external noise include;

- SystemAir MUB 042 500EV Multibox fan ducted from the kitchen terminating on the roof of the building. The stated sound power of the fan is L_{WA} 83dB.

The extractor fan is the source of noise under assessment in this report. The unit is assessed for day time use only between 07:00 – 23:00.



Picture 4: Nearest receptor is at 5 Victoria Road and is known as Beautylicious . Jubilee House contains flats that will also be exposed to the mechanical noise. Both receptors are marked with a green border in the picture.

The duct termination point is at the roof of the bar restaurant. This is next to the nearest noise sensitive receptor at 5 Victoria Road. This receptor shares a partition wall with the bar restaurant and is next door.

The Nearest Receptor Point

The nearest noise sensitive receptor is the residential house adjacent to the proposed bar restaurant. The receptor is 5 Victoria Road and is known as beautylicious. Addison Road runs between Jubilee House and the proposed bar restaurant. Jubilee House will also be impacted by noise from the roof top extractor fan noise. Jubilee House is on the corner of Victoria Road and Addison Road.

Methodology

A single class 1 laboratory calibrated Casella Cel 490 sound level meter was field calibrated and used to take background and residual noise measurements. Noise measurements were obtained on the roof of 3 Victoria Road next to the nearest noise sensitive receptor at 5 Victoria Road.

The residual and background noise measurements started at 13:30PM on Thursday 24th and continued until 13:30 on Friday 25th of April 2025. Measurements were conducted when the proposed bar restaurant was not yet operational and when there was no mechanical, entertainment or patron noise from the proposed bar restaurant.

L_{Aeq} and L_{AF90} noise levels were measured to provide the residual and background noise levels. Measurements were calculated in hourly intervals.

During the measurement period, various background noise sources, unrelated to the proposed bar restaurant were observed, including road traffic noise.

The ambient and specific noise was not measured because the proposed extractor fan had not yet been installed at the time of this assessment. The specific noise has been obtained from a data sheet containing the noise levels of the fan and the specific noise has been deduced by use of spreading formula.

Façade Correction

Façade measurements occur when the sound level meter is outside but in front of a large reflective surface at a distance of less than 3.5m away from the reflective surface. The sound level meter was positioned 3.5m from a façade wall. A façade correction is not required and has not been applied. The measurement results are comparable to free field conditions.

17:14	54	47	75
18:14	55	47	77
19:14	56	46	80
20:14	53	44	77
21:14	61	41	99
22:14	50	40	67
23:14	47	37	75
00:00	46	36	65
01:00	43	36	70
02:00	43	35	81
03:00	40	35	63
04:00	45	37	69
05:00	52	42	72
06:00	53	44	70
07:00	53	47	73
08:00	54	47	73
09:00	55	47	77
10:00	54	48	75
11:00	58	48	79
12:00	54	48	75

Table 1: Residual and background measurements at measurement location

L_{Aeq} (10 hours) 56 dB

L_{AF90} (10 hours) 41 dB

The meter calibrated successfully at the start and at the end of the measurements with a 0.1 dB drift.

Ambient Noise Measurements

The ambient noise level at the nearest noise sensitive receptor was not obtained because the extractor fans have not been installed at the time of this report.

Noise Level for the Extractor Fan

Freq. Hz	63	125	250	500	1K	2K	4K	8K
L _{wA} dB	48	67	69	75	79	78	74	66

Table 2. Sound power spectrum of the SystemAir MUB 042 500 EV Multibox fan. The data source is the SystemAir website <https://shop.systemair.com>. The specification was downloaded on 07/03/2025. The combined broadband sound power is L_{wA} 83dB

Manual Sound Power Calculation and Propagation

The data sheet supplied by the Client for the Systemair MUB 042 500EV Multibox fan

Freq. Hz	63	125	250	500	1K	2K	4K	8K
LwA dB	48	67	69	75	79	78	74	66

Table 3: LwA 83dB for the Systemair multibox fan

The noise travels from the kitchen to the roof inside a circular unlined sheet metal duct of diameter less than 900 mm.

Freq. Hz	63	125	250	500	1K	2K	4K	8K
Insertion loss dB	6	11	17	26	28	30	26	23

4: Silencer model R02 4-1200 Silencer insertion loss.

A single silencer will be inserted as part of the ducting. All silencers will be inside the building and be separated by a minimum of 1m from each other. The Client has confirmed the figures used for the silencer and regenerated noise. Additionally;

- All silencers will be located inside the building
- The duct will extend a minimum of 1m inside the building after the silencer
- A minimum of 1 square duct elbow will be used between the outlet and the last silencer
- Ducting will be square sheet metal (not circular)
- The duct diameter will be less than 450 mm

Freq. Hz	63	125	250	500	1K	2K	4K	8K	Total
LwA dB of one System Air Fant	48	67	69	75	79	78	74	66	83
First Silencer insertion loss	-11	-16	-31	-45	-50	-47	-43	-33	
LwA after silencer	37	51	38	30	29	31	31	33	
Silencer regenerated noise (outlet)	41	39	34	29	29	30	22	17	
Combined LwA of Silencer and Self regen noise	42	51	39	33	32	31	32	33	52
Square Unlined sheet metal duct attenuation dBm ⁻¹ (per meter of length) (CIBSE:2002)	1	0.7	0.3	0.2	0.2	0.2	0.2	0.2	
Distance sheet metal attenuation over 1m ducting	1	0.7	0.3	0.2	0.2	0.2	0.2	0.2	
Attenuation from 1 Square elbow without turning vanes (CIBSE:2002)	0	1	5	8	4	3	3	3	
Total Attenuation elbow + distance	1	2	5	8	4	3	3	3	
LwA at outlet	41	49	34	25	28	28	29	30	50

Table 4: The sound power of the extractor fan at the duct termination is LwA 41dB.

The distance between the duct end and the nearest receptor is approximately 3m. The noise travels 3m over a single reflective plane. The duct has a diameter of 450mm. The predicted noise level at the receptor at 5 Victoria Road is;

Distance 0 – 0.5m near field no attenuation from propagation. Noise level at this point is $50 - 8 = 42\text{dBA}$.

Distance 0.5 – 1m line source propagation over a single reflective plane – 3dB. Noise level at this point is $= 42 - 3 = 39\text{dBA}$.

Distance 1 – 2m free field propagation continued on a single reflective plane already accounted for -6dB. Noise level at this point is $39 - 6 = 33\text{dBA}$.

Distance 2 – 3m free field propagation over a single reflective plane already accounted for -3dB ($\frac{1}{2} \times 6$, it was half of the doubling distance). Noise level at this point is $33 - 3 = 30\text{dBA}$.

The specific noise is 30dBA at the nearest receptor. The background noise level is LAF90 (10 hours) is 41dB. This is below the background level.

Specific Noise

The specific noise used for the BS4142:2014 (2019 update) is LAeq(60min) 30dB. This is calculated using line source and freefield propagation formula.

Mode of Operation

The specific noise is based on sound power level of LwA 83dB propagated through a silencer, square sheet metal ducting and line and freefield propagation over a single reflective plane.

Noise Character

One third octave data is not available and has not been measured. The data is not available to determine the level differences between adjacent one third octave bands to enable the identification of tonality.

The level differences between adjacent one third octave bands that identify a tone are;

- 15dB in the low frequency one third octave bands (25Hz – 125Hz);
- 8dB in the middle frequency one third octave bands (160Hz – 400Hz);
- 5dB in the high frequency one third octave bands (500Hz to 10,000Hz)

The data is not available for this objective determination of tonality.

Noise Characteristics (subjective assessment method)

Irregular: The fan has a stop start nature but this is below the background level

Impulsive: None detected

Tonal: None detected

A combined subjective character correction of 0dB has been added to the day time rating level.

BS4142:2014 Assessment Day Time

Results		Relevant Clause BS4142:2014	Commentary
Measured ambient sound level	$L_{Aeq(60min)}$ N/A	7.3.1	Fan not yet installed
Residual Sound Level	$L_{Aeq(10\text{ hours})}$ 56 dB	7.3.3	onsite measurement at ML1
Background sound level	$L_{AF90(10\text{ hour})}$ 41dB	8.3	Measured on site
day time, reference time interval is 60 min.		7.2	
Specific sound level (ambient noise – residual noise)	30dBA	7.3.3	Specific noise based on propagation formula
Acoustic feature correction	0dB	9.2	Noise character is not distinguishable at the receptor
Rating Level (specific level plus correction for noise characteristics)	30dB	9.2	
Excess of rating over	30- 41 = -11dBA	11	

background level			
This is an indication of a low impact, depending on the context		11	
Uncertainty of the assessment	Uncertainty is estimated at ± 4 dB		

Table 5: BS4142 noise rating level calculation for day time specific noise.

Typically, the greater the difference between the specific sound level and the background level, the greater the magnitude of the impact. The lower the fan noise level is relative to the measured background sound level, the less likely it is that the external condenser noise will have an adverse impact or a significant adverse impact. Where the fan noise 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 (source: BS4142:2014).

A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context, (source: BS4142:2014).

A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context, (source: BS4142:2014).

The day time difference between the rating level and the background level is 11dB below the background level. This is an indication of a low impact, depending on the context

Context of the Noise Environment

The Absolute Level of Sound. The specific noise of LAeq (60min) 30dBA is below the prevailing environmental residual noise level of LAeq(10 hours) 56dB during the day. This shows that the absolute level of noise from the Systemair multibox fan will not add to the residual noise environment.

The specific noise is below the day time background level of $LAF90_{(10 \text{ hour})}$ 41dB.

The character and level of the residual sound compared with the character and Level of the specific sound. The noise environment is characteristic of an urban mixed use area. The character of the residual noise is predominantly irregular due to the presence of road traffic noise. Irregular noise is a feature of a densely populated and busy urban area.

The sensitivity of the receptor. All receptors have glazing, however it is not known the state of repair of the seals around the glazing. Poor seals around windows could mean that the external noise enters the building at higher levels. Further it is not known whether the receptors have suitable acoustic ventilation to allow the provision of air into the dwellings without having to open windows. Glazing in good repair and acoustic ventilation would mitigate against higher levels of specific noise but this is not known in this case.

In the context of the noise environment, a rating level of 11dB below the day time background level of $LAF90_{(10 \text{ hours})}$ 41dB is **an indication of a low impact, in the context of the noise environment.**

Uncertainty

The noise levels were obtained by direct onsite measurements. The sound level meter was fitted with a wind shield and maintained on a tripod during the measurement period. Once readings were started, the sound level meter was free from human interference. The measurements have not been edited, paused or deleted. The noise measurements have been presented in their entirety. This has been done to minimize uncertainty in the readings.

The measurement was conducted for a duration sufficient to provide a representation of the background and residual noise levels.

Uncertainty arises from variations in day to day noise levels. Background levels will vary depending on the level of noise from nearby commercial buildings, road traffic and pedestrian noise. This attracts an uncertainty factor of ± 4 dB.

Reliance has been placed on a single 10 hour measurement of the noise level. It is expected that the background noise levels will show variation day to day. However the measurement duration has been limited in consideration of budget and the nature of the noise source. To reflect the potential variations, a factor of ± 1 dB has been added to the uncertainty calculation to account for these uncertainties affecting the noise impact from the Systemair multibox fan.

Laboratory calibration uncertainty of the sound level meter ± 1 dB

$$u = \sqrt{a^2 + b^2 + c^2 \dots etc}$$

U = ± 4 dB

Authorised

Signed:

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BIBLIOGRAPHY

British Standards Institution (2014) BS EN 4142:2014 **Methods for Rating and Assessing Industrial and Commercial Sound**. London. BSI (revised 2019)

APPENDIX A

Measuring Equipment

- Casella 63X serial number 4181566 Class 1 Sound level meter calibrated 17 March 2025 by Campbell Associates Ltd to UKAS standards Cert No.U50390
- Casella Cel-110/1 Class 1 Acoustic calibrator calibrated 17th March 2025 by Campbell Associates cert no. U50388 meter serial 138252
- Anemometer and thermostat

The equipment was calibrated before the first and after the last measurement and no significant variations were observed. The equipment was working normally.

Weather Conditions

At the start of the noise measurements at 13:30PM on Thursday 24th April 2025; Wind speeds 3m/s, no precipitation. Cloud cover was 100%. There was no fog, it was clear and temperature was 17 degrees celcius.

At the end of the noise measurements at 13:30 on Friday 25th of April 2025; Wind speeds was 3m/s with no precipitation, cloud cover was 90%. There was no fog, it was clear and temperature was 18 degrees celcius.

All measurements were conducted during suitable weather conditions.