

BS8233:2014 Noise Assessment Report

Report Ref: 8086NEATH
Client: Memo Cafe
Site Location: 1st Floor
Memo Cafe
50 Wind Street
Neath SA11 3EN

Date of Issue: 23rd January 2025

Date of Assessment: Friday 17th – Saturday 18th of January 2025

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Picture 1: Measurements obtained through the first floor window.

Executive Summary

Measurements at the proposed location show the day time noise level is LAeq(16 hours) 57dB. The night time level is LAeq(16 hours) 46dB and LAFmax is 80dB at night.

In relation to BS8233:2014 and WHO (2009) these levels are too high and have to be actively reduced in order to ensure that internal noise levels do meet the guidelines. However reduction of the external noise to acceptable levels internally is achievable. This can be done by using windows, doors and ventilation that has the $R_{w}(C;Ctr)$ specified herein for the respective rooms.

The WHO (2009) recommendation for L_{AFmax} of 60dB and an $L_{Aeq}(8\text{ hour})$ of 45dB outside bedrooms may not be achievable. However the development should not be prohibited if the planners deem the development as desirable in the circumstances as acknowledged in BS8233:2014.

Application of the sound reduction recommendations in this report will meet the standards for internal noise levels required by the national planning policy framework guidelines, based on the noise levels used in this report. If users of the property keep external windows and doors closed, they will be at a low risk of adverse noise impact.

It should be noted that the development relies on windows being closed to achieve internal noise level guidelines. As a result acoustic ventilation must be provided that does not require windows to be open. Acoustic ventilation in bedrooms, dining rooms and living rooms must achieve the minimum sound reduction stated for that room in this report. Sound reduction requirements have been set higher to account for uncertainty due to day to day variations in environmental noise levels.

Uncertainty in the measurement is ± 4 dB

Objective:

The Client has proposed a conversion of the first and second floor of the building known as 50 Wind Street into a residential apartment. The ground floor is to remain as a retail unit. The proposed residence will be sensitive to nearby environmental noise sources.

The site presently has a ground floor retail unit trading as Memos Café. The first and second floors are used as storage but may have been offices in the past.

The purposes of this noise assessment is to determine the level of environmental noise likely to impact the proposed residential building and the type and level of sound reduction needed from external windows, doors and ventilation that is required to satisfy the guidelines in BS8233:2014 and WHO(2009).

Source under Assessment

The proposed development is in the town center on the corner of Wind Street and Church Place. The building is at the main retail trading area of the town and is exposed to environmental noise sources.

Sources of noise impacting the proposed noise sensitive dwelling include;

- Pedestrian noise from passers by
- Road Traffic Noise
- Noise from other retailers
- Mechanical noise from extractor fans nearby
- Retail customers from the ground floor



Picture 2: The building is on wind st a pedestrian thoroughfare



Picture 3: Measurements were obtained for a continuous 24 hour period (day and night).

Methodology

Measurements were taken through the window on the first floor above the ground floor café. The window used opens onto the main pedestrian walk way. Measurements were conducted on a Friday through to Saturday to include additional noise from weekend shoppers, restaurant, pub and bar patrons.

A single Casella Cel 490 class 1 sound level meter was calibrated and used to take measurements. Before, during and after the measurements the weather was recorded as suitable for taking measurements. The meters were calibrated before and after the measurements successfully.

Environmental noise measurements were obtained from 16:00 Friday 17th till 16:00 Saturday 18th January 2025. Other measurements include an airborne sound insulation measurement to measure the sound insulation of the ceiling and floor.

The café has a mechanical extractor fan ducted internally through an enclosed room known as a plant room. An internal measurement of the noise next to the plant room on the first floor was also obtained.

Railway noise was not observed but if present will have been included and measured as part of the environmental noise. Trains were not audible at any time during the measurement period.

Road traffic noise was observed as cars, on occasion drove past the Café. Road traffic noise was also spread from nearby busy roads including Old Market Street and Wind Street. Road traffic noise was measured as part of the general noise environment.

The measurement data has not been edited, deleted or amended and has been presented in its entirety.

Façade Correction

Façade measurements occur when the meter is in front of a large reflective surface at a distance of less than 3.5m away from the reflective surface. In order to convert measurements to free field equivalents, a façade correction is required. This is done by

Date and Time of Measurements

Measuring Equipment & Calibration

The sound level meters used is a Casella Cel-490 a class 1 meter laboratory calibrated traceable to UKAS standards. At the beginning and at the end of measurements the meter was calibrated with an acoustic calibrator before and after the measurements with negligible deviation ($\leq 0.4\text{dB}$). The meter calibrated successfully before and after measurements.

Noise Levels

Date	Time	LAFmx dB	LAeq dB	LCpk dB	LAF10.0 dB	LAF90.0 dB
17/01/2025	16:04:31	91	58	118	58	49
17/01/2025	17:04:31	90	58	103	60	49
17/01/2025	18:04:31	78	56	110	59	47
17/01/2025	19:04:31	74	53	105	56	42
17/01/2025	20:04:31	73	53	101	56	44
17/01/2025	21:04:31	77	52	94	54	40
17/01/2025	22:04:31	86	54	96	53	37
17/01/2025	23:04:31	82	49	95	49	35
18/01/2025	00:04:31	73	46	91	48	32
18/01/2025	01:04:31	82	52	99	48	32
18/01/2025	02:04:31	63	40	84	38	31
18/01/2025	03:04:31	63	38	77	40	31
18/01/2025	04:04:31	64	38	83	37	31
18/01/2025	05:04:31	70	46	84	50	33
18/01/2025	06:04:31	85	51	97	53	41
18/01/2025	07:04:31	88	66	109	61	45
18/01/2025	08:04:31	81	54	96	57	45
18/01/2025	09:04:31	93	56	117	58	48
18/01/2025	10:04:31	77	59	96	62	52
18/01/2025	11:04:31	78	60	92	63	54
18/01/2025	12:04:31	85	62	94	65	55
18/01/2025	13:04:31	83	59	94	62	52
18/01/2025	14:04:31	83	58	95	60	52
18/01/2025	15:04:31	81	57	99	60	50

Table 1: Measurement data. Data highlighted in gray represent the night time. The day time LAeq(16 hour) 59dB. The night time noise level is LAeq(8 hour) 48dB. LAFmax reached 82dB in the night time, (a façade correction of -2dB has not been applied).

BS4142:2014 (2019) Methods for Rating and Assessing Industrial and Commercial Sound.

Mechanical or industrial noise was not observed during the onsite measurements.

ML1 Noise Levels at first floor of 50 Wind Street Memo's Café

Day and night levels with façade correction of -2dB

Day L_{Aeq} (16 hour) = 57 dB

Night L_{Aeq} (8 hour) = 46 dB

The night time LAF_{max} is 80dB.

(see measurement data in the Appendix).

The noise levels exceed the BS8233:2014 guidelines and require mitigation.

BS8233:2014 Criteria

Table 1 below is taken from BS8233:2014. It shows the guide lines for internal ambient noise levels. The guidelines in BS8233:2014 are also advised by WHO (2009)

Activity	Location	Day (07:00 – 23:00)	Night (23:00 – 07:00)
Resting	Living Room	35dB L_{Aeq} (16 hour)	-
Dining	Dining Room / Area	40dB L_{Aeq} (16 hour)	-
Sleeping (day time resting)	Bedroom	35dB L_{Aeq} (16 hour)	30dB L_{Aeq} (8 hour)

Table 1: BS8233:2014 noise level for internal habitable rooms.

In addition the WHO (2009) has guidance for outdoor living areas such as gardens for day time noise of 50 – 55dB L_{Aeq} (16 hour). It has a L_{AFmax} of 45dB inside bedrooms and a L_{AFmax} of 60dB outside bedrooms, (see table 2 below).

Specific Environment	L_{Aeq} dB	Time base (hours)	L_{AFmax} dB
Outdoor living area (day)	55	16	
Outdoor living area (evening)	50	16	
Inside bedrooms (sleeping)	30	8	45

Outside bedrooms	45	8	60
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Table 2: WHO (2009) guidelines

Recommendations for Acoustic Glazing and Ventilation

- Living rooms** should have windows, external doors, external walling and ventilation with a sound reduction of $R_{w(c;ctr)}$ 26dB. The sound reduction is set to account for some uncertainty ± 4 dB (see uncertainty section below).

Living Rooms				
Opening Type	Type	Required $D_{n,e,w(ctr)}$ dB	Required $R_w + C_{tr}$ dB	Product Description
Glazing	Double glazing glazing		26	Glazing arrangement 6mm glass, 6 – 16mm cavity, 6mm glass $R_w + C_{tr} = 27$ dB
Ventilation	Acoustic window ventilation	26		Greenwoods model 500 EAW,AC1 $D_{n,e,W} + C_{tr} = 37$ dB
External doors	N/A		N/A	An external door does not open into a living room

Table 3: Living room sound insulation for glazing, acoustic ventilation, doors and walling

Dining rooms should have windows, external doors, external walling and ventilation with a sound reduction of $R_{w(c;ctr)}$ 21B. The sound reduction is set to account for some uncertainty ± 4 dB (see uncertainty section below).

Dining Room				
Opening Type	Type	Required $D_{n,e,w(ctr)}$ dB	Required $R_w + C_{tr}$ dB	Description
Glazing	double glazing		21	Glazing arrangement 4mm glass, 6 – 16mm cavity, 4mm glass $R_w + C_{tr} = 25$ dB
Ventilation	Acoustic wall ventilation	21		Greenwoods model 500 EAW,AC1 $D_{n,e,W} + C_{tr} = 37$ dB
External doors	N/A		N/A	An external door does not open into a Dining Room

Table 3A: Dining room sound insulation for glazing, acoustic ventilation, doors and walling

Bedrooms, should have windows, external doors, external walling and ventilation with a sound reduction sufficiently high to reduce LAFmax (night) from 80dB to 45dB internally as recommended by WHO (2009). The required sound reduction is $R_{w} + C_{tr}$ 39dB.

Bed Rooms				
Opening Type	Type	Required $D_{n,e,w(ctr)}$ dB	Required $R_w + C_{tr}$ dB	Description
Glazing	Single glazing		39	Glazing to be 10 mm glass/ 20 mm argon filled cavity/ 8.8 mm Pilkington Optiphon™ glass $R_w + C_{tr}$ 40dB
Ventilation	Acoustic wall ventilation	39		Greenwoods model 2500 EAW,AC1 $D_{n,e,W} + C_{tr} = 40$ dB
External doors	N/A		N/A	No external doors from a bedroom

Table 3: Bed room sound insulation for glazing, acoustic ventilation, doors and walling

The required sound reduction has been set higher to account for an uncertainty due to day a to day variations of +/-4dB.

It should be noted that the development relies on windows being closed to achieve internal noise level guidelines. As a result acoustic ventilation must be provided that does not require windows to be open. Acoustic ventilation in bedrooms, dining rooms and living rooms must achieve the minimum sound reduction stated for that room.

WHO (2009) has an external LAFmx night of 60dB outside bedrooms. This is not achievable because LAFmx night is 80dB.

A data sheet from Pilkington glass has been attached showing glazing that achieves the sound reductions index as recommended in this report. A data sheet for the Greenwoods acoustic wall vent is also included.

Pilkington provides glazing. Huet provides acoustic doors that achieve the required $R_{w(c;ctr)}$ Greenwoods acoustic ventilation provides ventilation that would be suitable. Data sheets have been attached as part of this report to assist the Client in achieving the required sound insulation. The client does not have to source these products from the suppliers mentioned in this report. The suppliers mentioned herein are for example purposes only.

No special acoustic measures are required for hallways, bathrooms and kitchens unless they form part of a Dining room, Living room or bedroom.

The day time noise levels are outside the L_{Aeq} (16 hour) 50 – 55dB for outside living space.

Achieving the sound reduction as stated in this report will meet the standards for day and night time levels in the specified rooms. This is based on noise levels on the day of the noise measurements.

Context of the Noise Environment

WHO (2009) provides guidance of night time L_{Aeq} (8 hour) of 45dB outside bedrooms. Adverse health effects arise from sleep disturbance when the window to the bedroom is left open. This means that persons sleeping with the window open are likely to have disturbed sleep if outside noise levels are greater than night time L_{Aeq} (8 hour) 45dB. For this reason the WHO (2009) guidelines recommend noise levels outside bedrooms to be L_{Aeq} (8 hour) 45dB or lower. This requirement may not be achievable in the presence of road traffic noise and entertainment noise.

Should L_{Aeq} (8 hour) 45 dB outside bedrooms not be achievable BS8233:2014 (see below) provides for the approval of development if the planners deem the development as desirable.

LAFmx 45dB Inside Bedrooms

The SRI of the windows, external doors and ventilation has been calculated to reduce internal LAFmx to below 45dB and to also achieve the day time L_{Aeq} (16hour) of 35dB and the night time L_{Aeq} (8hour) of 30dB.

National Planning Policy Framework (NPPF)

The national policy framework states at paragraph 109 new and existing developments should be prevented;

“from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability..”

At paragraph 123 the NPPF states;

“Planning policies and decisions should aim to avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development..”

The proposed development is within an elevated noise environment where LAFmax reached 80dB during the night at the proposed development location. The area has a daytime level of L_{Aeq} (16 hour) 57dB and a night time L_{Aeq} (8 hour) of 46dB.

Achieving the weighted sound reduction index for windows, doors and ventilation as specified in this report will satisfy the main standards for internal habitable rooms and should fulfill the requirements of the national planning policy framework.

It should be noted that users of the proposed dwellings are at risk of adverse noise impact when external doors and windows are left open.

BS8233:2014 accepts that external noise level guidelines may not be attainable but in certain circumstances development is acceptable, see section 7.7.2 and 7.7.3.2 of BS8233:2014 reproduced below.

Section 7.7.2 Internal Ambient Noise Levels for Dwellings of BS8233:2014 states

Note 4: Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or L_{AFMAX} depending on the character and number of events per night. Sporadic noise events could require separate values.

Note 5: If relying on closed windows to meet the guide values, there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level.

Note 7: Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.

Section 7.7.3.2 Design Criteria for External Noise of BS8233:2014 states

“For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50dB $L_{Aeq,T}$ with an upper guideline of 55dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited,” (BS8233:2014).

Internal Plant Room Noise Measurement

Odour from Memo's Café on the ground floor is extracted into ducting that is laid internally. A room that encloses the ducting is on the first floor and shares a partition with the proposed dwelling. The ducting comes from the extractor hood on the ground floor and passes through the first and second floor before terminating outside. The sound level meter was positioned 2.5m from the partition wall separating the plant room from the proposed flat. This measurement was inside the building. Measurements were inside the location of the proposed flat. The Café operates 07:00 – 16:00 Monday – Sunday. The café is closed at night.

Measurements started at 14:20 on Friday 17th January 2025.

Duration 14:20 – 15:20

L_{Aeq} (1 hour) 37dB

L_{AFmax} 62dB

LAF90 26dB

Duration 15:20 – 15:56

L_{Aeq}(36min) 35dB

LAF_{max} 62dB

LAF90 26dB

Due to the internal noise level reaching L_{Aeq}(1 hour) 37dB, a cavity stud wall is recommended between the plant room and the flat. The café extractor fan is operation during the day time only and it is not used after 16:00. To achieve L_{Aeq}(16 hour) in the bedroom for resting purposes, the sound from the plant room should be reduced by 2dB or more. This can be achieved using a 100mm cavity wall between the dwelling and the plant room. The cavity is to be left empty and a stud wall created using a double layer of Gyproc 12.5mm sound bloc plasterboard and finished with a skim of plaster and paint. The combination of 100mm cavity and a stud wall with dense plasterboard will achieve a sound reduction of 10dB or more.

Sound Transmission from Ground Floor Retail to First Floor Dwelling

An Airborne sound insulation measurement has been conducted and the report attached. The report shows that the present D_{nT,W} (C:Ctr) between the ground and first floor is 44dB. The required minimum in the Approved Document Part E Resistance to the Passage of Sound is D_{nT,W} (C:Ctr) 43dB for rooms for residential purpose formed by a material change of use. The present sound insulation between the ground and first floor meets the requirements for part E.

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 throughout the measurement period. Once readings were started, the sound level meter was free from human interference. This was done to minimize uncertainty in the readings.

In addition, the readings were taken during suitable weather conditions. Each measurement was conducted for a duration sufficient to provide a representation of $L_{Aeq,(8 \text{ hour})}$ for night time and $L_{Aeq,(16 \text{ hour})}$ for day time.

The calibration of the sound level meter at the beginning and end of the readings showed a maximum drift of 0.3 dB at the start and end of the reading. This is considered normal.

Laboratory calibration uncertainty of the sound level meter is ± 1 dB

The nature of the road traffic noise may vary from time to time depending on but not limited to the number of vehicles, type of vehicles and the speed at which they are travelling. An uncertainty factor of ± 4 dB has been added to account for variations that can occur day to day.

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

$$U = \sqrt{1 + 4^2}$$

$$U = \pm 4 \text{ dB}$$

Uncertainty in the measurement is ± 4 dB

Signed:

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BIBLIOGRAPHY

British Standards Institution (2014) BS EN 8233:2014 **Guidance on Sound Insulation and Noise Reduction for Buildings**. London. BSI

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

World Health Organization Europe (2009) **Night Noise Guidelines for Europe**. Copenhagen WHO

Department for Communities and Local Government (2012) **National Planning Policy Framework**. Crown London

Approved Document Part E Resistance to the Passage of Sound, Building Regulations 2010, HM Government

APPENDIX A

Measuring Equipment

- Casella 230643 Class 1 Sound level meter calibrated 06 February 2024 by Pennine Instrument Services Cert No.063196-1
- Casella Cel-110/1 Class 1 Acoustic calibrator calibrated 24 July 2023 by Pennine, Instrument Services cert no. 059962-1 meter serial 138252

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 16:00PM on Friday 17th January 2025; Wind speeds was 0m/s, no precipitation. Cloud cover was 90%. There was no fog, it was clear and temperature was 9 degrees celcius.

At the end of the noise measurements at 14:00 on Saturday 18th January 2025; Wind speeds was 0m/s with no precipitation, cloud cover was 100%. There was no fog, it was clear and temperature was 6 degrees celcius.

All measurements were conducted during suitable weather conditions.