



Noise Assessment Condition 14

Former Neath Working Men's Club

July 2023

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1. Introduction

- 1.1 Phlorum Limited has been commissioned by Castell Group to undertake a Noise Assessment at the Former Neath Working Men's Club to enable the discharge of Condition 14, which requires a noise assessment against the internal noise guidance provided by BS8233:2014.
- 1.2 The noise has been established by predicting the effects against national guidelines on noise. Where necessary, mitigation measures have been recommended so that a noise climate suitable for the proposed development can be achieved.
- 1.3 Whilst reasonable efforts have been made to produce a report that is easy to understand, it is technical in nature. To assist the reader, an introduction to noise, and an explanation of the terminology used in this report are contained in Appendix A.

2. Site & Development Description

Site Location

- 2.1 The site was previously occupied by Neath Working Men's and Social Club (NWMC), a large building with access from High Street. Site boundaries are defined by the High Street to the north, Wind Steet to the south, a car park to the east and commercial buildings to the west. It is proposed that the NWMC is to be demolished to construct 35 affordable social homes on the outskirts of Neath town centre.
- 2.2 The noise at the site is dominated by road traffic on the surrounding road network. Other noise sources include a services yard at the rear of the Iceland store with mechanical services plant and pedestrians.
- 2.3 The proposed site plan is shown in Figure 1 along with the noise measurement locations.

3. Guidance

Noise Condition 14

- 3.1 The approval of full planning permission from Neath Port Talbot County Council (NPTBC) for application P2022/0692 included Condition 14 relating to operational noise:

"14. No construction works shall commence on site until a detailed scheme shall be submitted and approved by the local planning authority demonstrating that the layout and the sound insulation performance of the residential units achieves the relevant values detailed in Table 4 of British Standard BS8233:2014. The development shall be constructed in full accordance with the approved details and each residential unit shall not be occupied until all elements of the approved scheme are implemented as such thereafter."

Reason: In the interests of the amenity of the adjoining properties and to accord with Policy BE1 of the Neath Port Talbot Local Development Plan."

BS8233:2014

- 3.2 As discussed above, Condition 14 requires the noise levels that are detailed in Table 4 of British Standard BS8233:2014 to be achieved at the development.
- 3.3 The scope of British Standard (BS) 8233: 2014 Guidance on sound insulation and noise reduction for buildings is the provision of recommendations for the control of noise in and around buildings. It suggests appropriate criteria and limits for different situations, which are primarily intended to guide the design of new or refurbished buildings undergoing a change of use rather than to assess the effect of changes in the external noise climate.
- 3.4 Table 4 of BS8233: 2014 suggests suitable internal noise levels within different types of buildings, including residential dwellings, as shown in Table 3.2 below.

Table 3.2: BS8233 Recommended Internal Noise Levels, dB

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35dB LAeq,16hour	-
Dining	Dining room/area	40dB LAeq,16hour	-
Sleeping (daytime resting)	Bedroom	35dB LAeq,16hour	30dB LAeq,8hour

- 3.5 BS8233 contains the following relevant guidance in footnotes to the above information:

"[...] 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 LA_{max,F}, 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."

- 3.6 Although Note 4 above refers to setting a guideline value for maximum noise levels, BS8233: 2014 does not provide any guidance on a suitable criterion.
- 3.7 Placing the BS8233: 2014 guidance into the context required by the NPPF and the NPSE, it is considered that where the internal noise levels meet the guideline values set out in Table 3.2, there is considered to be no observed effect.
- 3.8 Since BS8233: 2014 allows for a 5dB relaxation in the guideline values in Table 3.2 (Note 7 above), it is considered that internal noise levels up to 5dB above the guideline values in Table 3.2 may still be acceptable.

World Health Organisation

- 3.9 The World Health Organisation (WHO) Guidelines for Community Noise (1999) also sets out guidance on suitable internal and external noise levels in and around residential properties. The guidance on internal and external noise levels is the same as set out in BS8233: 2014 in terms of LA_{eq} values, but the WHO guidelines also provide guidance on night-time maximum noise levels, stating:

"For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB LA_{Fmax} more than 10-15 times per night."

- 3.10 The WHO guidelines suggest the possibility of sleep disturbance if continuous noise in bedrooms exceeds 30dB LA_{eq,8hrs} during the night-time. The WHO published their Night Noise Guidelines for Europe in 2009. This document sets an external 'night noise guideline' (NNG) of 40dB.

4. Noise Survey

Noise

- 4.1 A noise survey was undertaken to establish typical sound levels at the site. The measurements were taken over a 24-hour period starting at 14:15 hours on Monday the 3rd of July 2023 to provide the day and night-time noise levels at the site.
- 4.2 The survey methods and results are set out below.

Sound Survey Method

- 4.3 The equipment used during the survey is summarised in Appendix B. The sound level meter was field calibrated immediately before and after the measurements using the listed acoustic calibrator. No significant calibration drifts were found to have occurred.
- 4.4 The sound level meter had been laboratory-calibrated to a traceable standard within the two years preceding the survey. The acoustic calibrator had been laboratory-calibrated to a traceable standard within the year preceding the survey.
- 4.5 Noise measurements were carried out at two 24-hour locations and one short-term daytime location. The measurement locations are described as follows:
-  Position 1 - The microphone was located 1m from the front façade of the existing WMC building. The mic was at 1st floor level approx. 4.5m above the ground overlooking a taxi rank and the main road (B4434).
 -  Position 2 - The microphone was located 1m from the rear façade of the existing WMC building. The mic was at 1st floor level approx. 4.5m above the ground and overlooked the rear Iceland services yard.
 -  Position 3 - The microphone was located 1m from the side façade of the existing WMC building. The mic was at ground floor level, 1.8m above the ground overlooking Wind Street.

Sound Survey Results

- 4.6 The weather during the survey was suitable for noise measurement, it being predominantly dry with wind speeds of less than 5m/s.
- 4.7 The dominant sound source was from road traffic on the surrounding road network. Other significant noise sources included activities at the Iceland Yard (lorry movements and mechanical services plant) and pedestrians.

- 4.8 The sound survey results are summarised in Table 4.1, aggregated across the daytime and night-time periods. Full survey results are set out graphically in Appendix C.

Table 4.1 Summary of Measured Façade Noise Levels, dB

Measurement Location	Date	Period	Duration, T	L _{Aeq,T}	L _{AFmax}	L _{A10,T}	L _{A90,T}
1 (front)	3 rd and 4 th July 2023	Day	16 hours	61.2	71.9	63.0	54.3
		Night	8 hours	52.4	64.2	49.5	38.7
2 (rear)		Day	16 hours	60.5	71.1	60.4	55.4
		Night	8 hours	57.9	62.9	59.3	54.5
Note: ⁽¹⁾ – The L _{A90,T} , L _{Amax} and L _{A10,T} and values are the arithmetic means of the L _{A90,T} , L _{Amax} and L _{A10,T} measurements for each period.							

- 4.9 The following facade noise levels have been used in the noise assessment:
- 🌿 Daytime Noise Level – Position 1 L_{Aeq,16 hr} 61 dB, Position 2 L_{Aeq,16 hr} 61 dB.
 - 🌿 Night-time noise level – Position 1 L_{Aeq,8 hr} 52 dB, Position 2 L_{Aeq,8 hr} 58 dB.
 - 🌿 10th highest maximum noise level at night – Position 1 L_{Amax,f} 67 dB, Position 2 L_{Amax,f} 61 dB, (derived from the measured night-time noise levels shown in Appendix C).

Short Term Measurements

- 4.10 Additional short-term noise measurements were taken on the side elevation of the WMC overlooking Wind Street. Attended daytime noise levels were taken as it was considered that the noise kit could not be left on this elevation unattended for 24 hours due, to equipment security concerns.
- 4.11 The measured daytime façade noise level at position 3 are shown in Table 4.2.

Table 4.2 Measured Daytime Façade Noise Levels, dB

Measurement Location	Date	Period	L _{Aeq,T}	L _{AFmax}	L _{A10,T}	L _{A90,T}
3 (side)	3 rd and 4 th July 2023	1315-1330	60.9	77.0	63.7	53.8
		1330-1345	61.2	76.8	64.3	53.2
		1345-1400	61.2	73.4	63.8	54.2

- 4.12 The source noise levels from the mechanical service plant, located in the rear services yard of the neighbouring Iceland store, provided a steady noise level of L_{Aeq,T} 75.6 dB at a distance of 3m from the plant.

5. Noise Assessment & Mitigation

- 5.1 The measured noise levels have been considered against the guidance in BS5228:2014 as required by Condition 14. Consideration has been given to the specification of building materials to control internal noise levels, so that they achieve the following criteria:
- 🌿 Bedrooms - 30dB $L_{Aeq,8hr}$ (23:00 to 07:00 hours)
 - 🌿 Living rooms - 35dB $L_{Aeq,16hr}$ (07:00 to 23:00 hours)
 - 🌿 All habitable rooms - 45dB L_{Amax} (not to be exceeded more than ten times per night).
- 5.2 The calculated sound reduction performance requirements apply to the whole external building fabric. However, since windows are typically the weakest link in the external building fabric, in terms of acoustic performance, the values below will particularly apply to the windows.
- 5.3 All noise measurements were taken at the façade of the existing building and the sound reduction performances required of the external building fabric are shown in Table 5.1, below.

Table 5.1: Required Sound Reduction Performances, dB

Location	Period	Target Noise Level	Facade Noise Level	Required Sound Reduction Performance
Position 1	Day	35dB $L_{Aeq,16hrs}$	61	26
	Night	30dB $L_{Aeq,8hrs}$	52	22
	Night	45dB L_{AFmax}	67	22
Position 2	Day	35dB $L_{Aeq,16hrs}$	61	26
	Night	30dB $L_{Aeq,8hrs}$	58	28
	Night	45dB L_{AFmax}	61	16
Position 3	Day	35dB $L_{Aeq,16hrs}$	61	26

- 5.4 Windows do not reduce noise equally across the entire frequency spectrum, so the frequency content of the sound will influence the overall sound reduction performance of a given window, and by extension, the resulting noise levels within the property.
- 5.5 However, many glazing manufacturers test their products under laboratory conditions using a typical road traffic noise frequency spectrum source. The resultant measured noise attenuation, in dB, gives a very useful guide to in-situ sound reduction performance of the window for situations where road traffic noise dominates, known as the R_{TRA} .

- 5.6 It can be seen from Table 5.1 that a sound reduction performance of up to R_{TRA} 28 dB and R_w 22 dB (for maximum noise levels) would be required to achieve all of the criteria at the Working Men's Club. Acoustic double glazing such as 10mm(6-16mm)/4mm construction provides 30 dB R_{TRA} and 35 dB R_w and provides the required acoustic performance to meet the internal noise targets in BS8233:2014.
- 5.7 It is noted that the sound reduction performances stated as achievable by the identified glazing units are based on laboratory tests. In practice, the actual on-site performance may be lower, depending on the quality of the fitting. The sound reduction performances in Table 5.1 should be interpreted as in-situ sound reduction performances.
- 5.8 Glazing units other than those suggested may be suitable and it is the responsibility of the glazing manufacturer to recommend and provide appropriate systems. The above analysis demonstrates that a design solution is feasible at the site for the purposes of a planning application. Further detailed calculations may be necessary to inform glazing procurement decisions.
- 5.9 Internal noise levels should be considered in the context of room ventilation and overheating requirements. As the sound reduction performance requirements are greater than 10dB, the windows will need to be closed to achieve the internal noise criteria. However, the windows should be openable so that the choice of opening or closing windows is with the occupants. Therefore, an alternative form of ventilation and/or cooling will be required so that occupants can retain access to fresh air and retain thermal comfort without compromising their noise climate. The ventilation and/or cooling system chosen should be designed so that it does not compromise the sound insulation performance of the building fabric.
- 5.10 The selected ventilation option must meet the acoustic specification of $D_{n,e,w} + C_{tr}$ 38 dB on the elevation overlooking the Iceland Services Yard and $D_{n,e,w} + C_{tr}$ 36 dB on all other elevations. This acoustic performance can be achieved by ventilation options such as Mechanical Ventilation & Heat Recovery (MVHR) or acoustic trickle vents such as Titon TA5225 (V75) + TA5204 (C50) 2500EA which provides $D_{n,e,w} + C_{tr}$ 40 dB in the open position and $D_{n,e,w} + C_{tr}$ 50 dB with the vent closed.

6. Conclusion

- 6.1 Phlorum Limited has been commissioned by Castell Group to undertake a Noise Assessment at the former Neath Working Men's Club to enable the discharge of Condition 14.
- 6.2 The noise assessment indicates that, with appropriate noise mitigation measures at the proposed residential dwellings, the internal noise targets provided by Condition 14 will be achieved.
- 6.3 On the basis of this noise assessment, it is considered that Condition 14 can be discharged.

Figures & Appendices



Job No. 12326A

Figure No. 1

Appendix A: Introduction to Noise and Glossary of Terminology

Appendix A: Introduction to Noise and Glossary of Terminology

Noise is defined as unwanted sound. The human ear is able to respond to sound in the frequency range 18Hz (deep bass) to 18,000Hz (high treble) and over the audible range of 0dB (the threshold of perception) to 140dB (the onset of pain). The ear does not respond equally to different frequencies of the same magnitude, but is more responsive to mid-frequencies than to lower or higher frequencies. To quantify noise in a manner that approximates the response of the human ear, a weighting (filtering) mechanism is used. This reduces the importance of lower and higher frequencies, approximating the response of the human ear.

Furthermore, the perception of noise may be determined by a number of other factors, which may not necessarily be acoustic. Noise can be perceived to be louder or more noticeable if the source of the noise is observed; e.g. roads, trains, factories, building sites etc. In general, the impact of noise depends upon its level, the margin by which it exceeds the background level, its character and its variation over a given period of time. In some cases, the time of day and other acoustic features such as tonality may be important, as may the disposition of the affected individual. Any assessment of noise should give due consideration to all of these factors when assessing the significance of a noise source. Various noise indices have been derived to describe the fluctuation of noise levels that vary over time. Usually, these noise indices relate to specific types of noise, and as such different noise indices are used to describe road traffic noise, background noise, construction noise, etc.

The weighting mechanism that best corresponds to the response of the human ear is the 'A'-weighting scale. This is widely used for environmental noise measurement and the levels are denoted as dB(A) or L_{Aeq} , L_{A10} , etc, according to the parameter being measured.

Noise is measured on the decibel scale, which is logarithmic rather than linear. As a result of this, a 3dB increase in sound level represents a doubling of the sound energy present. Judgement of sound is subjective, but as a general guide a 10dB(A) increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3dB(A) is generally regarded as the minimum difference needed to perceive a change. Table A.1 sets out examples of noise levels typically experienced during everyday activities. Table A.2 sets out an explanation of the terminology used in this report.

Table A.1: Typical Sound Levels Found in the Environment

Sound Level	Location
0 to 10dB(A)	Threshold of hearing
10 to 20dB(A)	Broadcasting studio
20 to 30dB(A)	Quiet bedroom at night
30 to 40dB(A)	Living room during the day
40 to 50dB(A)	Typical office
50 to 60dB(A)	Inside a car
60 to 70dB(A)	Typical high street

Sound Level	Location
70 to 90dB(A)	Inside a factory or noisy pub
100 to 110dB(A)	Burglar Alarm at 1m
110 to 130dB(A)	Pneumatic drill at 1m away
140dB(A)	Threshold of Pain

Table A.2: Terminology Relating to Noise

Term	Description
Sound Pressure	Sound, or sound pressure, is a fluctuation in air pressure over the static ambient pressure.
Sound Pressure Level (Sound Level)	The sound level is the sound pressure relative to a standard reference pressure of $20\mu\text{Pa}$ (20×10^{-6} Pascals) on a decibel scale.
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s_1 and s_2 is given by $20 \log_{10} (s_1/s_2)$. The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is $20\mu\text{Pa}$.
A-weighting, dB(A)	The unit of sound level, weighted according to the A-scale, which takes into account the increased sensitivity of the human ear at some frequencies.
Noise Level Indices	Noise levels usually fluctuate over time, so it is often necessary to consider an average or statistical noise level. This can be done in several ways, so a number of different noise indices have been defined, according to how the averaging or statistics are carried out.
$L_{\text{Aeq},T}$	A noise level index called the equivalent continuous noise level over the time period T . This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
$L_{\text{max},T}$	A noise level index defined as the maximum noise level during the period T . L_{max} is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
$L_{90,T}$ or Background Noise Level	A noise level index. The noise level exceeded for 90% of the time over the period T . L_{90} can be considered to be the "average minimum" noise level and is often used to describe the background noise.
$L_{10,T}$	A noise level index. The noise level exceeded for 10% of the time over the period T . L_{10} can be considered to be the "average maximum" noise level. Generally used to describe road traffic noise.
Free-field	Far from the presence of sound reflecting objects (except the ground), usually taken to mean at least 3.5 metres
Façade	At a distance of 1 metre in front of a large sound reflecting object such as a building façade.

Term	Description
Fast Time Weighting	An averaging time used in sound level meters. Defined in BS EN 61672.

Appendix B: Noise Equipment

Table B1: Noise monitoring equipment

Position	Equipment	Serial Number	Calibration Date
1	LD824 Sound Analyser	A1419	20/10/2022
	Mic	31817	
	Preamp	2732	
2	LD824 Sound Analyser	A1420	
	Mic	37023	
	Preamp	1812	
3	LD820 Sound Meter	1350	
	Mic	37024	
	Preamp	1568	
All positions	LD CAL200 Calibrator	3724	

Appendix C: Noise Measurement Results

Figure C1 – Façade Noise Levels at Position 1

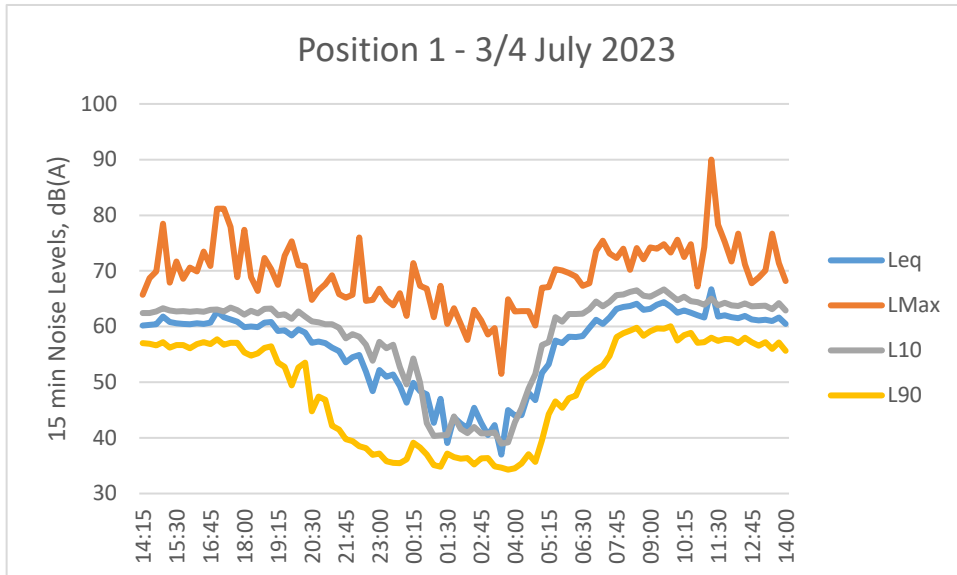
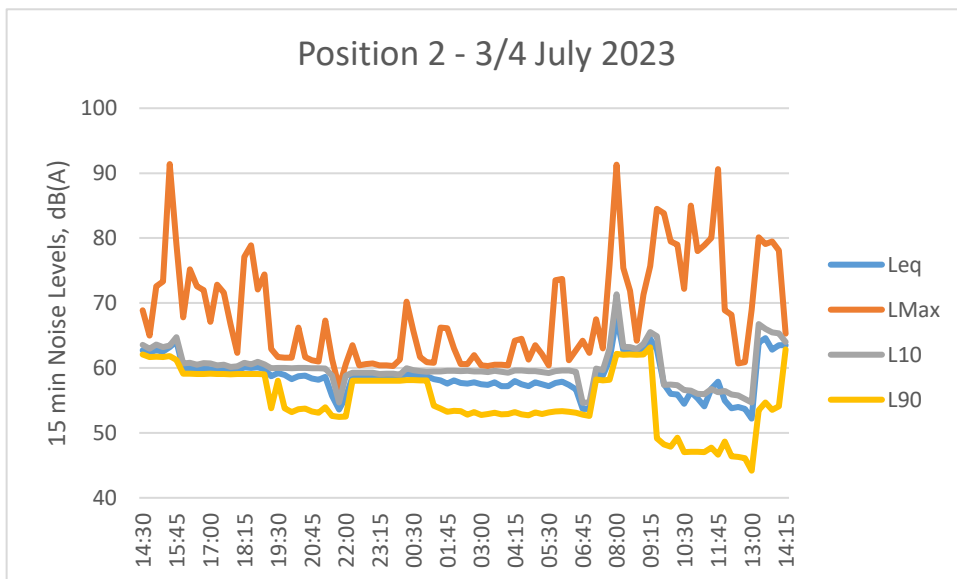


Figure C2 – Façade Noise Levels at Position 2





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