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3584 - POOL COTTAGE, NEWPORT

Façade Assessment

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Façade Assessment

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CONTENTS

1.0 INTRODUCTION

The purpose of this document is to outline the standards and regulations applicable to the proposed development at Poole Cottage in Newport development and perform a façade assessment to ensure internal noise levels meet the required internal noise level criteria. Proposals include the conversion and extension to an existing unused day centre into 4 No. assisted living flats at Poole Cottage, Magor Road, Newport.

This report provides details of the environmental noise survey undertaken and the resultant predicted noise levels, assessment levels and specifications to meet the criteria.

The following aspects of acoustics design are therefore addressed within this report.

1.1 Noise Ingress

Achieving appropriate indoor ambient noise levels within residential dwellings is an important consideration as noise can have a significant impact on the health and quality of life of individuals and communities where noise exposure can lead to a range of adverse effects including sleep disturbance, annoyance and health effects.

BS8233 is typically called upon during planning process, providing indoor ambient noise requirements within dwellings. However, this document does not provide a direct correlation between internal noise and ventilation rates. Within urban environments due to noise from transport infrastructure it is not possible to meet the requirements of BS8233 with windows open whilst complying with the overheating criteria within CIBSE TM59. In 2022 the government introduced Approved Document O (Wales) to address overheating in residential buildings.

This report therefore outlines the various internal noise requirements for the various ventilation rates which are discussed in the following section and provides façade specifications such to achieve these criteria.

2.0 PERFORMANCE DOCUMENTS

2.1 Performance Specification

The following documents have been considered in the assessment of environmental noise.

Assessment	Document	Summary
Planning Policy & Guidance	Planning Policy Wales (PPW) Edition 12 February 2024	Provides guidance to ensure that the planning system contributes towards the delivery of sustainable development and improves the social, economic, environmental and cultural well-being of Wales
Indoor Ambient Noise	BS8233:2014	Provides Internal noise requirements for living rooms and bedrooms during the background ventilation condition
	WHO Guidelines for Community Noise	Provides maximum internal noise criteria to prevent sleep disturbance
	Approved Document O (Wales)	Provides internal noise criteria during overheating during the night time
	Approved Document O (England)	

Table 2.1: Performance Standards

2.2 Planning Policy

2.2.1 EHO comments

It is understood that the Environmental Health Officer has provided the following commentary in written correspondence. RE: 25/0325 dated 15/09/2025.

*"A scheme shall be submitted to and approved in writing by the Local Planning Authority to provide that all habitable rooms exposed to external road traffic noise in excess of 55 dBA Leq 16 hour [free field] during the day [07.00 to 23.00 hours] or 45 dBA Leq 8 hour [free field] at night [23.00 to 07.00 hours] shall be subject to sound insulation measures to ensure that **all** such rooms achieve an internal noise level of 35 dBA Leq 16 hour during the day and 30 dBA Leq 8 hour at night.*

The submitted scheme shall ensure that habitable rooms subject to sound insulation measures shall be able to be effectively ventilated without opening windows.

No dwelling shall be occupied until the approved sound insulation, additional ventilation measures including purge ventilation and façade window mitigation have been installed to that property in accordance with the approved details. The approved measures shall be retained thereafter in perpetuity."

***Reason**: To ensure that the amenities of future occupiers are protected*

2.3 Indoor Ambient Noise Criteria

2.3.1 Ventilation Modes

The table below provides a summary of different ventilation 'conditions or modes' for bedroom and living spaces which have been adopted for this scheme. Note that there is a difference in definition between 'Purge' and 'Overheating' ventilation scenarios.

Ventilation Condition	Description
Whole Dwelling / Background	Continuous low level flow rates to provide fresh air and remove smells.
Overheating	Potentially long periods of increased ventilation during the summer to maintain occupant thermal comfort. The nighttime acoustic design criteria for external noise ingress for bedrooms can be relaxed if naturally ventilated.
Purge	Short periods of high flow rate ventilation to remove smoke or smells (e.g. from cooking or decorating). The acoustic impact of purge ventilation does not need to be considered as it will only occur over a short period of time.

Table 2.2: Ventilation Types

2.3.2 BS8233

BS8233:2014 - Guidance on sound insulation and noise reduction for buildings provides guidance on internal noise levels within dwellings which is typically called upon in planning. BS8233 states that to achieve "ideal" sleeping and living conditions, the following targets should be met.

These limits are the sum of mechanical services and noise breaking in through the façade. Additional guidance is provided within BS 8233:2014 which states that internal noise levels which are 5dB greater than these "ideal" limits, will still result in "reasonable" internal conditions.

Activity	Location	Day (07:00-23:00)	Night (23:00-07:00)
Resting	Living Room	35 dB $L_{Aeq,\ 16\ Hour}$	-
Dining	Dining Room	40 dB $L_{Aeq,\ 16\ Hour}$	-
Sleeping	Bedroom	35 dB $L_{Aeq,\ 16\ Hour}$	30 dB $L_{Aeq,\ 8\ Hour}$

Table 2.3: BS 8233 Internal Noise Limits

Note 5 within BS8233 advises that 'If relying on closed windows to meet the guide values, there needs to be appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level. If applicable, any room should have adequate ventilation (e.g. trickle ventilators should be open) during assessment.' It is therefore considered that these internal noise targets are to be achieved with windows closed and a means of background ventilation enabled, typically through trickle ventilators or whole house ventilation systems.

BS 8233:2014 provides no definitive methodology for assessment of L_{Amax} levels. The WHO Community Noise Guidelines 1998 states that in order to avoid sleep disturbance within bedrooms during the night, the internal sound pressure level should not exceed 45 dB L_{Amax}. It is widely accepted that noise events should not exceed 45 dB L_{Amax} more than 10-15 times during the night-time period (23:00 – 07:00).

2.3.3 Approved Document O

2.3.3.1 Wales

This document provides guidance for mitigating overheating in residential accommodation. However, Approved Document O (Wales) does not specify internal noise thresholds under these conditions.

MACH has therefore considered the guidance provided within Approved Document O (England), which provides indicative increased internal noise limits within dwellings during overheating to those outlined within BS8233, with the aim being to promote natural ventilation, while maintaining suitable internal noise requirements. This approach has been used previously in similar assessments and is regarded as a robust assessment methodology.

2.3.3.2 England

Approved Document O was released on December 15th 2021, and outlines a set of performance criteria for mitigating overheating in residential accommodation. In addition to overheating criteria, the document also outlines a requirement for internal noise levels.

Guidance is provided to minimise the risk of occupants closing windows (and thus overheating) by ensuring that noise levels are below a certain threshold during night-time periods. Approved Document O therefore addresses internal noise levels within bedrooms at night time only. These internal noise criteria, based upon a natural ventilation scheme are outlined in the Table 2.4 below.

Note: If the overheating ventilation scheme is to be via mechanical cooling, the internal noise criteria within BS8233:2014 is the default design criteria.

Location	Time	Maximum Internal Noise Level
Bedroom	23:00 – 07:00	40 dB $L_{Aeq,\ 8\ Hour}$ 55 dB L_{AfMax} *
* Not to be exceeded more than 10 times a night		

Table 2.4: Approved Document O acoustic criteria

3.0 DESIGN CRITERIA

This section provides a summary of the acoustic performance criteria which have been adopted for the Pool Cottage.

3.1 Proposed Ventilation Strategy

MACH is not aware of the proposed ventilation strategy at the time of writing this report.

3.2 Summary of Indoor Ambient Noise Level Requirements

The table below provides a summary of the indoor ambient noise level requirements for residential dwellings. The table includes criteria for the various ventilation mode types of spaces. Please also note that there is a difference in definition between 'Purge' and 'Overheating' ventilation scenarios as described in Table 2.2.

Ventilation Condition	Day Time Criteria	Night time Criteria
Whole Dwelling / Background	Living Rooms – 35dB $L_{Aeq,16hr}$ Bedrooms – 35dB $L_{Aeq,16hr}$	Bedrooms – 30dB $L_{Aeq,8hr}$ Bedrooms – 45dB L_{Afmax}
Overheating	None	Bedrooms – 40dB $L_{Aeq,8hr}$ Bedrooms – 55dB L_{Afmax}*
Purge	None	None
* Not to be exceeded more than 10 times a night		

Table 3.1: Summary of indoor ambient noise criteria

4.0 NOISE CLIMATE

To establish the existing environmental noise levels on site, a noise survey was conducted between 11:30 on the 14/10/2025 and 13:00 on the 15/10/2025. For more information on the methodology of this survey, site information and survey data, see APPENDIX A - Environmental Noise Survey.

4.1 Site Description

The site is located at Poole Cottage in Newport and is situated in a rural area, between the M4 motorway and Magor Road (B4245).

4.2 Site Map

The site in relation to its surroundings and nearest noise sensitive receivers is presented in Figure 4.1.

Figure 4.1 - Proposed Development (Red) and Nearest Noise Sensitive Receivers (Blue)

4.3 Noise Survey Measurement Locations

To ascertain the current sound insulation acoustic performance of the existing façade at the day centre, an internal microphone (F1) was set up within the existing kitchen.

Figure 4.2 - Internal Measurement Location

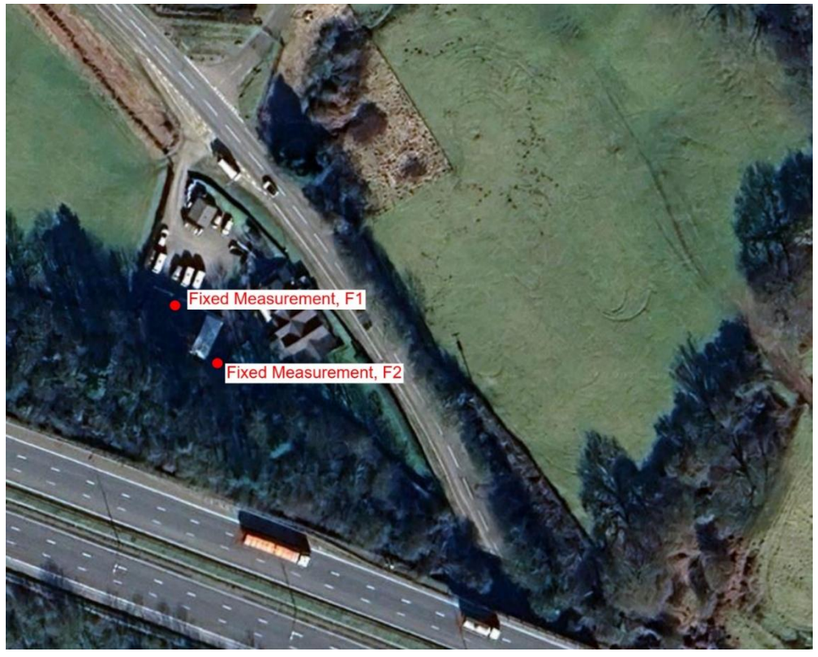

Figure 4.3 - All Measurement Locations

4.4 Summary of Noise Survey Results

The tables below present the noise parameters recorded at the fixed microphone position for the ambient (L_{Aeq}) and maximum (L_{Amax}) noise levels. The L_{Aeq} figures presented are the average noise levels during the stated times across the days of the survey, excluding non-representative noise. The L_{Amax} figures presented are the 10th highest measured between 23:00-07:00.

Date	Location	Period, T	$L_{Aeq,T}$ (dB)	L_{Amax} (dB)
14/10/2025 - 15/10/2025	Fixed Position 1	Day (07:00 – 23:00)	30	-
		Night (23:00 – 07:00)	27	42
14/10/2025 - 15/10/2025	Fixed Position 2	Day (07:00 – 23:00)	60	-
		Night (23:00 – 07:00)	56	65

Table 4.1 Summary of $L_{Aeq,T}$ and L_{Amax}

5.0 FAÇADE ASSESSMENT

This section provides details of the various façade assessments for the ventilation conditions outlined within Table 2.2 previously.

5.1 Background Ventilation

This section provides details of the façade assessment during the background ventilation condition such to comply with the BS8233, internal noise criteria during background ventilation as defined within Approved Document F.

Background ventilation conditions are normally achieved through either trickle ventilators in the façade or provided by a whole house ventilation system, as long as one of these methods are employed, the noise level criteria set out within BS8233:2014 are to be achieve while windows are closed.

5.1.1 Existing Façade for Conversion

The internal measured noise levels are compared against internal noise guidance criteria set out in Section 3.2.

Date	Location	Period, T	Criteria	Measured Internal Level	Difference
14/10/2025 - 15/10/2025	Fixed Measurement F1	Day (07:00 – 23:00)	35 dB $L_{Aeq,16hr}$	30 dB $L_{Aeq,16hr}$	-5
		Night (23:00 – 07:00)	30 dB $L_{Aeq,8hr}$	27 dB $L_{Aeq,8hr}$	-3
			45 dB L_{Afmax}	42 dB L_{Afmax}	-3

Table 5-1 Measured Internal Noise Levels - Front Façade

The table shows that the measured internal noise levels are below the criteria targets and therefore considered to be suitably low.

5.1.2 New Build Façade for Extension

5.1.2.1 Dominant Noise Period During Background Ventilation

By comparing the predicted facade noise levels for each of the different acoustic criteria, $L_{Aeq,Daytime}$, $L_{Aeq,\ Nighttime}$, and $L_{Afmax,Nighttime}$, we have been able to determine which acoustic criteria will require the highest acoustic reduction across the façade. Therefore, the criteria which requires the greatest level of reduction, will be the most onerous criteria. Demonstrating the design meets the most onerous criteria will ensure that all other criteria are achieved. The most onerous criteria are identified below.

Time Period	Predicted Sound Pressure Level, dB(A)	Target	Outside to inside level difference
$L_{Aeq,16hr}$ (Day time)	60	35	25
$L_{Aeq,8hr}$ (Night time)	56	30	26
L_{Afmax} (Night time)	65	45	20

Table 5.2: Façade Noise Levels

Based on the above noise levels and the select design criteria outlined in Section 3.2, it is observed that a façade reduction of 26 dB is required for the most onerous scenario.

The table below presents the octave band sound pressure level on the façade for the identified most onerous assessment time period, parameter and location, with regard to background ventilation scenario.

Time Period	Sound Pressure Level, dB (Octave Band Centre Frequency, Hz)						
	125	250	500	1000	2000	4000	dB(A)
$L_{Aeq,8hr}$ (Night time)	53	50	51	54	47	35	56

Table 5.3: Spectral Façade Noise Levels

5.1.2.2 Façade Specification

The table below provides the minimum sound reduction indices to meet the BS8233 internal noise level requirements. Note that the values presented are representative of the entire window, including frames and other components. The acoustic performance of the selected systems should be verified via a laboratory test certificate. Additionally, the specified sound reduction indices must be achieved including any trickle vents element, if they are part of the proposed design for background ventilation conditions.

MACH has not provided specific build-ups for the façade or roof, such that there can be flexibility in the design of the new build aspects of the scheme.

Façade Element	Minimum Required Sound Reduction Indices						
	125	250	500	1000	2000	4000	Weighted – dB
Window	19	20	27	37	39	40	32 R_w
Solid Façade & Roof	24	34	40	45	49	49	43 R_w

Table 5.4: Minimum Façade Reduction Indices Required for Residential Façades

5.1.2.3 M&E Noise Contribution

To comply with the noise level criteria in BS 8233:2014, the M&E noise contribution must not exceed NR17 in habitable spaces.

5.1.2.4 Louvre noise break-in

If any louvres are proposed to be included in the façade design, they should meet the solid façade specifications to ensure they do not compromise the overall façade performance.

5.2 Part O - Overheating Ventilation

This section provides details of the façade assessment during the overheating ventilation condition Assessing this ventilation scenario is not typically required at planning. However, it is required such to comply with the internal noise criteria during overheating ventilation as stated within Approved Document O – Building Regulations.

It is important to note that this assessment addresses internal noise levels only within bedrooms during night-time, assuming the overheating ventilation strategy is based on a natural or hybrid ventilation scheme.

Note: If the overheating ventilation scheme is to be solely via a mechanical cooling with windows closed, the internal noise criteria within BS8233:2014 is the default design criteria. Please refer to the façade specification in the previous section.

5.2.1 Ventilation Strategies Acoustic Performance

The acoustic performance of open windows and other natural ventilation options can vary significantly, reasonable estimates of the acoustic performance of different mitigation strategies of the ventilation method are presented below.

Ventilation Strategy	Room	Outside to Inside Level Difference
Openable windows	Bedroom	13
Restricted / Acoustically enhanced windows[1]	Bedroom	20
Mechanical ventilation, windows closed	Bedroom	20+

Table 5.5: Ventilation Strategies Depending on Façade Attenuation Required

[1]Note: restricted or enhanced openable windows or vent opening, as a ventilation option would require further detailed design which looks holistically across the site, this would need to consider the building massing, type and direction of window opening direction or other attenuated type openings and information from a detailed dynamic thermal model will also be required to provide minimum open area requirements for the ventilation strategy.

5.2.2 Outline Façade Noise Limits

The table below helps identify when the external noise level associated with this development are too high for an open window strategy to be used for the overheating strategy. This is determined by simply adding the outline potential acoustic performance of the ventilation method, to the internal noise level criteria. Please note these criteria are only applicable for the night-time period.

Ventilation Strategy	Outside to Inside Level Difference (dB)	Internal Noise Criteria		Façade Noise Level Limit		Measured Façade Noise Level	
		$L_{Aeq,8hr}$ (dB)	L_{Afmax} (dB)	$L_{Aeq,8hr}$ (dB)	L_{Afmax} (dB)	$L_{Aeq,8hr}$ (dB)	L_{Afmax} (dB)
Openable windows	13	40	55	53	68	56	65
Restricted / Acoustically enhanced windows	20	40	55	60	75	56	65
Mechanical ventilation, windows closed	20+	40	55	n/a	n/a	56	65

Table 5.6: Façade Noise Level Limit for Exposure Category

The table above identifies that an open window strategy to address overheating is not possible since the external noise level are too high. Therefore, a mechanical ventilation strategy with windows closed is likely to be required such to comply with Part O Building Regulations.

Alternatively, our assessment has shown that the external noise levels are not significantly high that mechanical ventilation is the only option. It may be possible to introduce elements of natural ventilation into the overheating strategy. This may reduce the size of mechanical unit required, how often the unit may need to be operated which would reduce running costs and reduce CO_2 or, may even mitigate the need for mechanical cooling all together. This level of design is outside the scope of this document but is a design service we can provide at request.

6.0 CONCLUSION

In summary the following points set out the conclusions of this report;

Noise Survey

- A noise survey has been conducted at the proposed site to establish the existing noise climate. These noise levels are presented in Section 4.0 of this report and the details of the noise survey itself are included in APPENDIX A -

Design Criteria

- MACH has proposed a set of design criteria, which is considered appropriate for planning support, which has been provided in Section 3.0
- Two assessments have been considered;
    - Internal noise levels during the background ventilation condition
    - Internal noise levels during the night time during overheating condition, if naturally ventilated. This is a requirement of Part O Building Regulations.

Façade Assessment

Assessment – Background Ventilation

Existing Façade for Conversion

- The measured internal noise levels are below the criteria targets and therefore considered to be suitably low.

New Build Façade for Extension

- The background ventilation assessment in section 5.1.2 outlines minimum sound reduction indices required for the façade elements such to comply with the established internal noise criteria.

Assessment – Overheating Ventilation

- Such to comply with Part O of the Building Regulations, the feasibility assessment of different ventilation strategies during an overheating scenario, indicates that an open window strategy is not possible since the external noise level are too high. Therefore, a mechanical ventilation strategy with windows closed is likely to be required such to comply with Part O Building Regulations.
- However, our assessment has shown that the external noise levels are not significantly high that mechanical ventilation is the only option. It may be possible to introduce elements of natural ventilation into the overheating strategy. This level of design is outside the scope of this document but is a design service we can provide at request.

APPENDIX A - ENVIRONMENTAL NOISE SURVEY

To establish the existing environmental noise levels on site, a noise survey was conducted between 11:30 on the 14/10/2025 and 13:00 on the 15/10/2025.

This site assessment was undertaken by Aidan Preston of MACH Group.

A.1 Site Description

The site is located at Poole Cottage in Newport and is situated in a rural area, between the M4 motorway and Magor Road (B4245).

A.1.1 Subjective Noise Climate (On-site)

Noise Type	Noise Characteristics	Sources
Dominant	A primary contributor of noise levels on the site.	Road noise from the M4
Other Noise Contributions	Contributors to the remainder of the noise climate on site.	Road noise from B4245 Birdsong Wind rustling the trees

Table A.1.1 Subjective Summary of the Noise Sources

A.1.2 Non-Representative Noise Sources

During the survey, no noise events occurred which would be deemed as atypical of the site location.

A.2 All Measurement Locations

To help with the understanding of the site and measurement locations all the measurement positions are presented on the map below. Photos of the locations in situ are in the following sections.

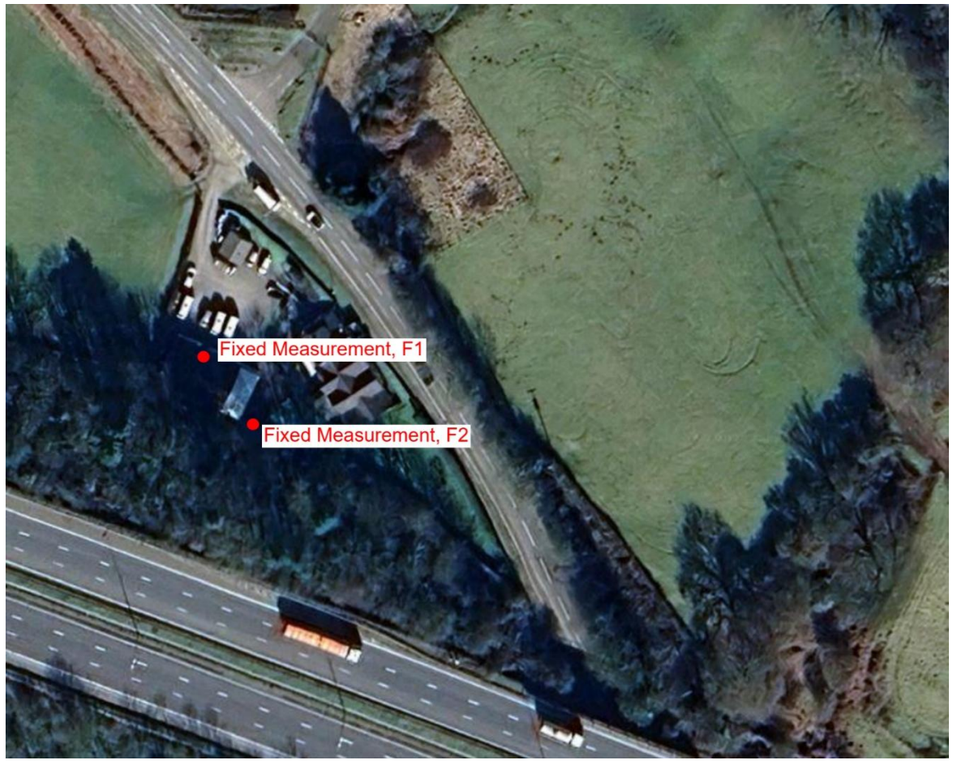

Figure A.2.1 All Measurement Locations on a Map

A.3 Fixed Measurement

A fixed microphone position was used to record noise levels between 11:30 on the 14/10/2025 and 13:30 on the 15/10/2025, where the fixed long-term meter was set to measure consecutive 'A' weighted 5-minute time samples.

To help with the understanding of the site and the measurement locations, the figures below present the location of the microphone position(s) in situ.

A.3.1 Fixed Measurement Location – F1

Figure A.3.2 Fixed measurement F1 location in situ

A.3.2 Fixed Measurement Location – F2

Figure A.3.3 Fixed measurement F2 location in situ

A.3.3 Fixed Measurement Results – F1

The following graph presents the noise levels recorded over the measurement period at the fixed location (F1).

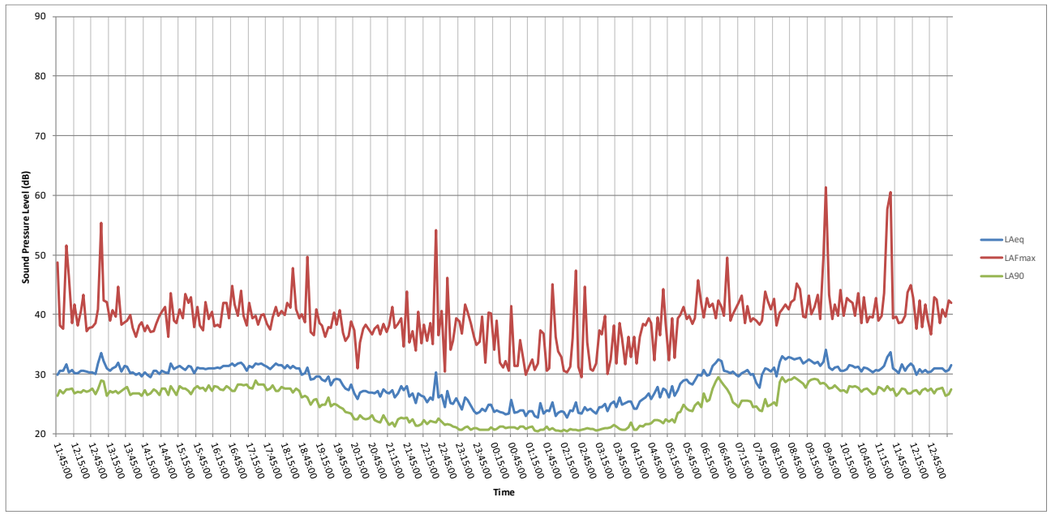

Figure A.3.4 Sound Pressure Level at fixed location, F1

A.3.4 Fixed Measurement Results – F2

The following graph presents the noise levels recorded over the measurement period at the fixed location (F2).

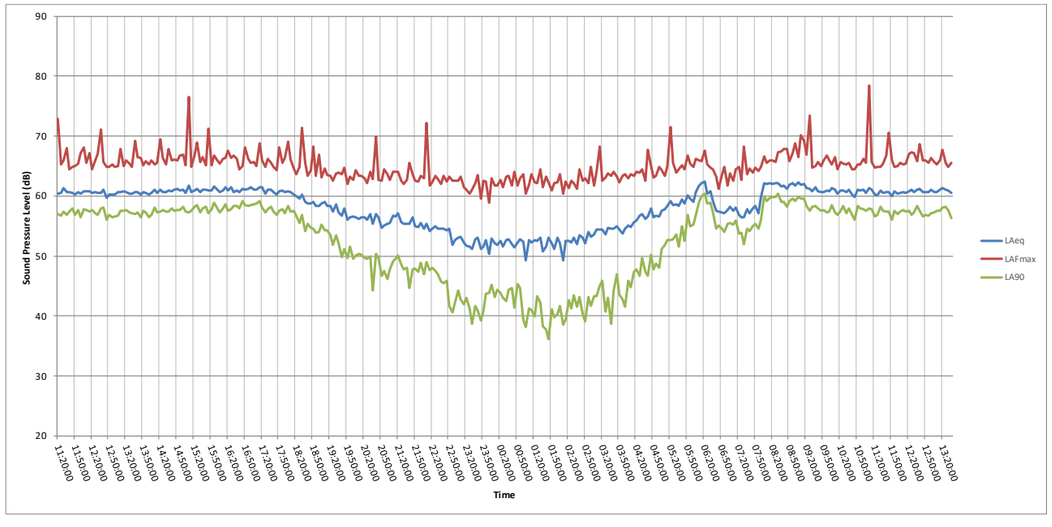

Figure A.3.5 Sound Pressure Level at fixed location, F2

A.4 Measurement Equipment

Item	Serial No.	Last Calibration	Certificate No.	Calibration Due
NTI Precision Sound Analyser XL2 TA	A2A-11002-E0	239096	25/04/2025	25/04/2027
NTI Pre-amplifier MA220	7183	239096	25/04/2025	25/04/2027
Cirrus Microphone Capsule MK:224	214341A	239096	25/04/2025	25/04/2027
Svantek Acoustic Calibrator SV31	32531	227845	28/11/2024	28/11/2025
NTI Precision Sound Analyser XL2 TA	A2A-18713-E0	237087	28/03/2025	28/03/2027
NTI Pre-amplifier MA220	9517	237087	28/03/2025	28/03/2027
NTI Microphone Capsule MC230A	A19763	237061	17/03/2025	17/03/2027
Svantek Acoustic Calibrator SV33A	64140	229003	13/12/2024	13/12/2025

Table A.4.2 Measurement Equipment

A.5 Meteorological Conditions

Data Taken from: https://www.timeanddate.com/weather/

Date	Time (hh:mm)	Temperature (High / Low) (°C)	Humidity (%)	Pressure (hPa)	Wind Speed (m/s)	Wind Direction	Conditions
14/10/2025	06:00	12/10	94	1030	4.2	ENE	Low clouds
	12:00	12/11	92	1030	4.4	NE	Low clouds
	18:00	11/10	94	1030	4.7	NE	Overcast
15/10/2025	00:00	10/9	88	1031	3.9	ENE	Overcast
	06:00	10/9	86	1030	3.9	ENE	Overcast
	12:00	10/9	90	1030	4.7	ENE	Low clouds

Table A.5.3 Meteorological Conditions