SOL ACOUSTICS

Unit 11, Brunel Court, Gadbrook Park, CW9 7LP
01565 632535
info@solacoustics.co.uk
www.solacoustics.co.uk

Manchester One

Environmental and Intrusive Noise Report

P2554-RP-3-JLS P01

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Name of Organisation Sol Acoustics Limited

Company Registration Number 4218702

Summary

Sol has been commissioned by Bruntwood SciTech to undertake an acoustic design assessment of the proposed extension works at Manchester One on Portland Street in Manchester.

The purpose of this report is to asses the scheme in terms of environmental and intrusive noise and to determine an appropriate acoustic performance specification for the building envelope, as based on the pre-existing environmental noise climate on site as surveyed in October 2025, together with the outputs from the SOL 3D noise model, intrusive noise requirements of the British Council for Offices ("BCO"), BS 8233:2014 and currently available architectural design drawings.

This report demonstrated that indoor ambient noise limits can be achieved within all noise sensitive spaces across the proposed development with windows closed, and acoustic design guidance concerning the required building envelope and external glazing specifications has been provided. Where replacement windows of the existing tower are open, as per the existing natural ventilation strategy, internal noise levels are likely to exceed the target noise levels. however this as per the existing condition of the tower and existing conditions are not expected to worsen as a result of the replacement glazing.

Additionally, appropriate commercial, entertainment, and M&E plant daytime and night-time environmental noise limits have been set herein, all as based on the measured, pre-existing environmental noise levels at surrounding noise sensitive receptors.

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1 Introduction

1.1.1 Sol has been commissioned by Bruntwood SciTech to undertake an acoustic design assessment of the proposed extension works at Manchester One on Portland Street in Manchester.

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1.1.3 This report demonstrated that indoor ambient noise limits can be achieved within all noise sensitive spaces across the proposed development with windows closed, and acoustic design guidance concerning the required building envelope and external glazing specifications has been provided. Where replacement windows of the existing tower are open, as per the existing natural ventilation strategy, internal noise levels are likely to exceed the target noise levels, however this as per the existing condition of the tower and existing conditions are not expected to worsen as a result of the replacement glazing.

1.1.4 Additionally, appropriate commercial, entertainment, and M&E plant daytime and night-time environmental noise limits have been set herein, all as based on the measured, pre-existing environmental noise levels at surrounding noise sensitive receptors.

2 Proposed Development

2.1 Overview

2.1.1 The project proposals comprise the erection of a new 4No storey plus rooftop terrace and plant enclosure extension of the existing 21No storey office tower at Manchester One on Portland Street in Manchester. The proposed extension will comprise flexible use commercial unit at ground floor, entrance/circulation, BoH office rooms and ancillary WC, changing, and shower facilities at ground floor, serviced CAT B office space at first floor, CAT A office space at second and third floors, and internal and external wellbeing space and rooftop terrace at fourth floor.

2.1.2 The proposed extension is located on the northwest corner of the existing tower and the existing office suites to the east of the proposed development zone, it is furthermore proposed to replace the existing glazing systems throughout the tower.

2.2 Site Surroundings

2.2.1 The development site is located on Portland Street, Manchester, and lies within the remit of Manchester City Council.

2.2.2 The existing site comprises a 21No storeys of office space. The site is located amidst a number of commercial premises; it is bounded by Portland Street to the northwest, Sackville Street to the southwest, Chorlton Street to the northeast, and the Manchester Coach Station and NCP Manchester Chorlton Street MSCP to the southeast.

2.2.3 The nearest noise sensitive receptors are the commercial/office windows of 44-50 Portland Street to the northwest, residential windows of 36 Charlotte Street to the northwest, and the hotel windows of the Clayton Hotel to the southwest. An overview of the site and the surroundings is presented in Figure 1.

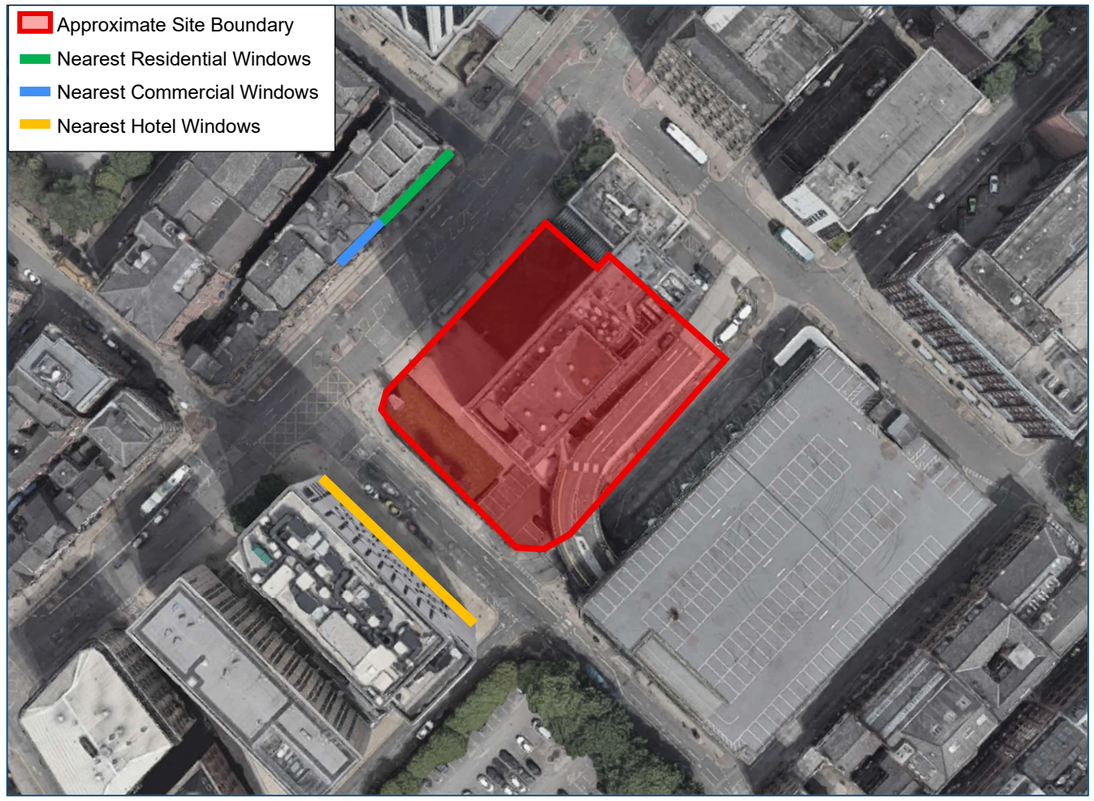


Figure 1: Proposed development site and surroundings (Google Maps, 2026)

3 Acoustic Design Criteria

3.1 Overview

3.1.1 To provide a building that is suitable for typical office use the following guidance documents have been considered:

- British Standard 8233:2014 *'Guidance on sound insulation and noise reduction for buildings'*
- British Council for Offices (BCO) *'Guide to Specification 2019'*
- British Council for Offices (BCO) *'Guide to Fit-out 2025'*

3.2 BS 8233:2014

3.2.1 BS 8233:2014 sets out acoustic performance standards recommended to be achieved in a variety of different building types. It is considered applicable to both new-build and refurbishment developments. Specifically, it provides design targets for the following acoustic considerations in office buildings:

- Indoor ambient noise levels
- Airborne sound insulation between internal spaces.

3.3 BCO Guide to Specification 2019

3.3.1 BCO Guide to Specification 2019 provides recommended performance standards for commercial office buildings up to "Cat A" fit-out. It provides design targets for the following areas that are considered relevant to the proposed development:

- External noise intrusion
- Sound insulation between internal spaces
- Flanking performance

3.4 BCO Guide to Fit-out 2025

3.4.1 BCO guide to Fit-out 2025 provides recommended performance standards for the fit-out of commercial office buildings. It provides design targets and guidance for the following areas:

- Internal ambient noise levels
- Sound insulation between internal spaces
- Building services plant noise

3.5 Employer's Requirements

3.5.1 It is understood that there are no specific alternative design requirements and Sol have not been made aware of any employer or end suer aspirations above or beyond the standards set out above. Where these are required, enhancement above the performances set out in this report may be required.

4 Baseline Environmental Noise Survey

4.1 Noise Survey Details

4.1.1 An environmental noise survey was conducted by Sol between Thursday 16th October 2025 and Tuesday 21st October 2025. The survey was undertaken in line with the requirements of BS 7445 '*Description and measurement of environmental noise*' Parts 1-3.

The survey consisted of two long-term unattended measurement positions as described in Table 1 below and shown in Figure 2.

Measurement position	Description
Measurement position 1 ("MP1")	Mast-mounted microphone positioned protruding c.1m from the front façade of the building at 15th floor level, overlooking Portland Street and Sackville Street. The microphone was sited in "facade" conditions.
Measurement position 2 ("MP2")	Mast-mounted microphone positioned protruding c.1m from the rear façade of the building at 15th floor level, overlooking NCP Manchester Chorlton Street Car Park. The microphone was sited in "facade" conditions.

Table 1: Summary of measurement positions

4.1.2 Type 1 Precision Grade sound measuring instrumentation was exclusively used and microphone windshields were fitted at all times. Full details of all the instrumentation used and corresponding traceable calibration records are retained on file by Sol and is available for inspection if required.

4.1.3 Periods of prolonged rainfall were observed to have occurred between approximately 12:00 on Sunday 19th October and approximately 08:00 on Tuesday 21st October, as such these periods have been excluded from further assessment. The prevailing weather conditions from the start of the survey (approx. 10:30 on Thursday 16th October) until approximately 12:00 on Sunday 19th October were suitable for the purposes of environmental noise measurements during the noise survey.

4.1.4 Notwithstanding the weather conditions, the microphone systems were entirely weatherproofed and fitted with all-weather environmental windshields, each with a bird spike.

4.2 Noise Survey Results Summary

4.2.1 Table 2 provides a basic summary of the free-field A-weighted broadband environmental noise levels measured during the survey at MP1 and MP2.

Measurement Location	Measured Noise Level (dB, $L_{Aeq,T}$, Range $L_{A1,1hr}$, and Range L_{A90})			
	Daytime			Nighttime
	$L_{Aeq,8hr}$ (09:00 – 17:00)	$L_{A1,1hr}$ (09:00 – 17:00)	$L_{A90,15min}$ (07:00 – 23:00)	$L_{A90,15min}$ (23:00 – 07:00)
MP1	63	65 - 76	52 - 61	50 - 59
MP2	56 - 58	59 - 66	51 - 59	48 - 59

Table 2: Summary of typical measured noise levels

4.2.2 Table 3 summarises the corresponding free-field time-averaged ($L_{Aeq,T}$) office hours (09:00 – 17:00) period ambient noise levels used for the assessment, in linear octave band frequency terms:

Measurement Location	Measurement Period	A-weighted Broadband noise level (dB $L_{Aeq,T}$)	Unweighted sound pressure level (dB, $L_{eq,T}$) at Octave band centre Frequency (Hz)							
			63	125	250	500	1k	2k	4k	8k
MP1	Office Hours (09:00 – 17:00)	63	65	61	58	59	58	55	55	47
MP2	Office Hours (09:00 – 17:00)	58	62	58	55	54	54	51	47	37

Table 3: Summary of time-averaged environmental noise levels, in octave band terms

4.2.3 Figure 2 outlines the location of each measurement position. Appendix A provides further information and a full summary of the measurement data.

4.2.4 A statistical analysis (histograms) of the Background Sound Level measured at both positions is presented in Appendix B. From the statistical analysis it is considered that the representative free-field Background Sound Level measured at MP1 was 56dB $L_{A90,15min}$ during the daytime and 51dB $L_{A90,15min}$ during the night-time. For MP2, the Background Sound Level was 53dB $L_{A90,15min}$ during the daytime and 49dB $L_{A90,15min}$ during the night-time.

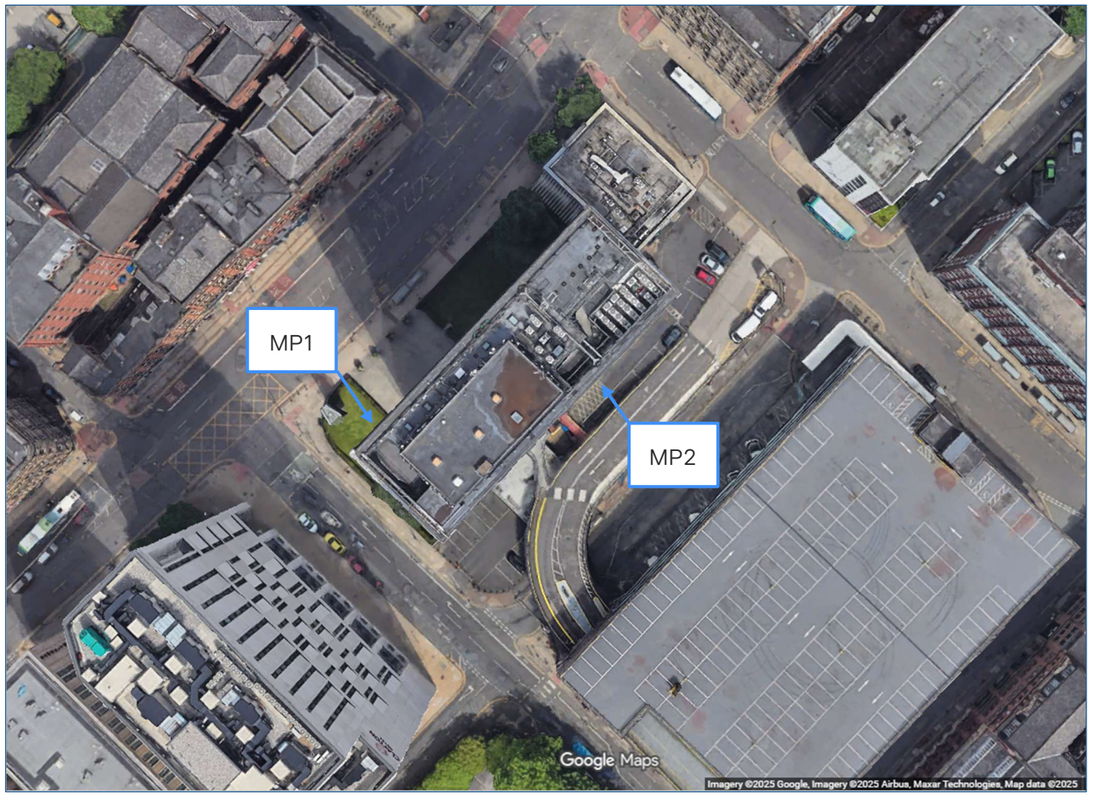


Figure 2: Location of measurement positions

5 Internal Ambient Noise Levels

5.1 Guidance

BS 8233:2014

5.1.1 British Standard BS 8233:2014 'Guidance on sound insulation and noise reduction in buildings' provides guidance for indoor ambient noise levels in unoccupied shared spaces, as a combination of external noise ingress and buildings services noise. Table 4 summarises the relevant design ranges presented in BS 8233:2014:

Space	Design Range dB $L_{Aeq,T}$
Executive Office	35 – 40
Staff/meeting room, training room	35 - 45
Open-plan Office	45 - 50
Department store	50 - 55
Concourse, corridor, circulation space	45 - 55

Table 4: BS 8233:2014 internal ambient noise level design ranges

5.1.2 Section 7.7.6 of BS 8233:2014 also states that specific guidance for offices is available from the British Council for Offices.

BCO *'Guide to Fit-out 2025'*

5.1.3 BCO *'Guide to Fit-out 2025'* gives recommendations for noise limits for external noise intrusion within typical office areas. The relevant recommendations given in this document are presented in Table 5 below:

Space	Guideline NR Levels	Guideline Short-term Noise Level
Open plan offices	NR40($L_{eq,T}$)	55dB($L_{A01,1hour}$)
Standard offices/meeting rooms[1]	NR38($L_{eq,T}$)	53dB($L_{A01,1hour}$)
Executive office/Boardroom	NR30($L_{eq,T}$)	45dB($L_{A01,1hour}$)
Circulation/Lobbies	NR40($L_{eq,T}$)	-

Note 1: Also applies to CAT A speculative offices (BCO BTS 2019)

Table 5: BCO Guide to Fit-out internal ambient noise level guidance

BCO *'Guide to Specification 2019'*

5.1.4 BCO *'Guide to Specification 2019'* recommends that noise intrusion levels should not normally exceed more than 55dB $L_{A1,1hr}$ in open plan or 50dB $L_{A1,1hr}$ in cellular offices/meeting rooms and that rain noise should be controlled so that it does not exceed 60dB $L_{Aeq,T}$ in office spaces during heavy rainfall.

5.1.5 In the case of naturally ventilated buildings, it may be appropriate to accept higher external noise intrusion levels in maximum ventilation mode provide occupants have the choice to open or close windows or ventilation openings. It is stated that a relaxation of 5dB may be considered acceptable during occasional periods.

5.1.6 BCO also states that:

> *'... Acoustic privacy, whether in an open plan or cellular situation requires moderate background sound to mask unwanted noise. Modern energy efficient air-conditioning systems, such as chilled beams or variable speed fan coil units (FCU's), and office IT equipment can be very quiet. As a result offices are often too quiet to achieve reasonable acoustic privacy. Where building services noise levels in office areas are likely to be significantly below criteria mentioned previously, provision should exist to install an electronic sound masking system'.*

5.2 Assessment Criteria

5.2.1 Based on the guidance in the previous section, the following design criteria are recommended to be met as a result of a combination of external noise intrusion and building services noise:

Space	NR Level Upper Limit	Target Ambient Noise Level	Maximum Short-term Noise Level
Cellular offices/meeting rooms	NR35($L_{eq,T}$)	35 – 45dB($L_{eq,T}$)	50dB($L_{A01,1hour}$)
Executive offices/Boardrooms	NR30($L_{eq,T}$)	35 – 40dB($L_{eq,T}$)	45dB($L_{A01,1hour}$)
Speculative Offices	NR38($L_{eq,T}$)	35 – 45dB($L_{eq,T}$)	55dB($L_{A01,1hour}$)
Open plan offices	NR40($L_{eq,T}$)	45 – 50dB($L_{eq,T}$)	55dB($L_{A01,1hour}$)
F&B Retail	NR40($L_{eq,T}$)	45 – 50dB($L_{eq,T}$)	-
Reception	NR40($L_{eq,T}$)	45 – 50dB($L_{eq,T}$)	-
Circulation/Toilets	NR45($L_{eq,T}$)	50 - 55dB($L_{eq,T}$)	-
Wellbeing/Sauna	NR35($L_{eq,T}$)	35 – 45dB($L_{eq,T}$)	-
Studio/Lounge	NR45($L_{eq,T}$)	50 - 55dB($L_{eq,T}$)	-

Table 6: Internal ambient noise level criteria

6 External Nosie Intrusion Assessment

6.1 Predicted Development Environmental Noise Levels

6.1.1 In order to predict the likely resultant environmental noise levels across the façades of the proposed development, a 3D computer based environmental noise model has been created using the proprietary DataKustik "CadnaA" Noise Mapping software. The following assumptions have been made in the generation of the noise model:

- The acoustic model was set up to apply the noise prediction methodology set out in ISO 9610-2: *'Acoustics – Attenuation of Sound propagation outdoors – Part 2: General Method of Calculation'*
- The model was set up to include up to third order reflected noise from solid structure
- Ground absorption was set to G=0 to represent hard ground;
- The existing land topography has been taken into consideration in the assessment. Thid part topographical information has been obtained from the Department for Environment, Food, and Rural Affairs (DEFRA) via https://environment.data.gov.uk/DefraDataDownload/?Mode=survey
- Acoustic screening and reflections afforded by nearby buildings and solid structures.

6.1.2 Based on the above, the office hours (09:00 – 17:00) free-field noise levels have been predicted actoss all proposed and existing facades of the development as shown in Appenidx B. A 3D example of the predicted office hours (09:00 – 17:00) ambient noise map is shown in Figure 3.



Figure 3: Example of 3D noise map

6.2 Building Envelope

6.2.1 The project proposals are to replace the opening light windows throughout the existing tower with the existing pre-cast concrete panels retained and to install a new pre-cast panel façade system and fixed light windows to the proposed extension.

6.2.2 Based on the predicted noise levels incident on the new and existing facades of the proposed development and the noise levels measured on site, an assessment of the required sound insulation of the façade elements has been undertaken.

6.2.3 The assessment is based on achieving suitable internal noise levels in BCO and BS8233 with windows closed. When the windows of the existing tower are open, which forms part of the retained ventilation strategy throughout the tower, internal noise levels may exceed the design targets.

External Walls

6.2.4 The existing external walls of the tower are understood to comprise a minimum 50mm thick pre-cast concrete panels with 150mm internal blockwork linings.

6.2.5 In order to improve the thermal performance of the existing façade and reduce the overall thickness it is proposed to replace the internal 150mm blockwork lining with a fully insulated Gypframe lining system with internal plasterboard lining.

6.2.6 The exact build-up of the external walls of the proposed extension are yet to be determined but shall comprise pre-cast concrete panels with insulated SFS and internal plasterboard linings.

6.2.7 These configurations are expected to comfortably surpass the minimum sound insulation performance requirements for the scheme.

6.2.8 Detailed construction proposals shall be submitted to Sol for review as the design progresses through RIBA Stage 4.

Acoustic Specification for Glazing & Curtain Walling

6.2.9 It is understood that a minimum 8.8(lam) / 16mm / 6mm Paniclear glazing configuration is proposed to all replacement and new glazed areas due to thermal and energy requirements. The currently proposed glazing system is stated to have a specified airborne sound insulation performance of 33dB R_w + C_{tr}. This specification of airborne sound insulation performance is suitable to meet the internal noise targets identified in Table 6 and therefore is adopted as the minimum acoustic specification throughout the development.

6.2.10 Details of the final glazing specifications as they are developed through detailed design must be submitted to Sol for approval. These details shall include confirmation that all glazing and glazed doors, inclusive of framing systems, deals, and hardware achieve the minimum acoustic specification of 33dB R_w + C_{tr}, as corroborated by independent acoustic laboratory test data measured in accordance with BS EN ISO 10140-2:2010 for identical constructions.

7 Noise Egress

7.1 Guidance

BS 4142:2014+A1:2019

7.1.1 BS 4142:2014+A1:2019: *'Method for rating and assessing industrial and commercial sound'* ("BS 4142")is intended to be used to assess noise of an industrial nature, which includes sound from fixed installations comprising mechanical and electrical plant and equipment.

7.1.2 The procedure contained in BS 4142 for assessing environmental noise impact is to compare the measured or predicted noise level from the source in question, the "Specific Sound Level" immediately outside the noise sensitive premises, with the corresponding representative "Background Sound Level".

7.1.3 Where the noise contains attention attracting characteristics such as tonal, impulsive and/or intermittent elements, it may be appropriate to apply a correction to the Specific Sound Level to obtain the "Rating Level".

7.1.4 BS 4142 states that the significance of sound arising from an industrial and/or commercial nature depends upon both the margin by which the Rating Level of the specific sound source exceeds the Background Sound Level, and also the context in which the sound occurs:

a) Typically, the greater this difference, the greater the magnitude of the impact.

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

c) A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.

d) The lower the Rating Level is relative to the measured Background Sound Level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the Rating 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.

7.1.5 For the daytime, the assessment is carried out over a one-hour period, and over a 15-minute period at night. The daytime and night time periods are defined as occurring between 07:00 hours to 23:00 hours, and 23:00 hours to 07:00 hours, respectively.

Local Authority

7.1.6 Manchester City Council;s *'Planning and Noise Technical Guidance'* published in October 2022 states that with regards to noise from commercial developments and proposed fixed building services plant respectively:

'...The development should be designed so as to achieve a rating level of 5dB (L_{Aeq}) below the typical background (L_{A90}) level at the nearest noise sensitive location..."

"...Entertainment noise ($L_{aeq,5min}$) should be controlled to 5dB below the typical background noise level (L_{A90}) in each octave band at the nearest noise sensitive location.

'... 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 (L_{Aeq}) below the typical background (L_{A90}) level at the nearest noise sensitive location...'

7.2 Criteria

7.2.1 In line with the guidance and the requirements of, the above operational noise from internal activities associated with the proposed development should not exceed the limits set out in Table 7 below when measured at the nearest noise sensitive window.

Zone	Maximum Permissible Rating Level Limit 1m from nearest noise-sensitive façade dB $L_{Aeq,T}$	
	Daytime (07:00 – 23:00 hrs)	Nighttime (23:00 – 07:00 hrs)
Portland Street	51	46
All other	48	44

Table 7: Operational noise breakout limits

7.2.2 In line with the guidance and the requirements of the above, any entertainment noise resulting from the use of externally mounted loudspeakers associated with the proposed development should not exceed the limits set out in Table 8 below when measured at the nearest noise sensitive window.

Time	Entertainment Noise Limit, dB, $L_{eq,5min}$ at 1 metre from the Nearest Noise Sensitive Windows in each Octave Band (Hz)							
	63	125	250	500	1000	2000	4000	8000
Daytime (07:00 – 23:00)	59	56	53	54	52	47	39	26
Night-time (23:00 – 07:00)	52	50	48	49	45	40	33	19

Table 8: Entertainment noise limits

7.2.3 In line with the guidance and the requirements above, the total, aggregate environmental noise from all M&E plant, when operating simultaneously, should be limited to a Rating Level at least 5dB below the typical pre-existing background noise level (L_{A90}) at the nearest neighbouring noise sensitive premises:

7.2.4 Where M&E plant items are proposed to be installed on the roof of the proposed extension it may be difficult to sufficiently attenuate plant noise such that the above criteria are achieved at the closest windows of the development itself; however given the plant will be associated with the development the sensitivity of these windows can be considered reduced.

7.2.5 It is therefore proposed to adopt a 5dB relaxation of MCC's standard plant noise criteria when assessed at the development's own windows. Such a relaxation would yield a design target of Rating Level not exceeding background, which, when assessed in accordance with BS41412:2014, would be an indication of a low impact.

7.2.6 Table 9 summarises the proposed maximum permissible Rating Level limits to be achieved by the proposed M&E plant associated with the development at the nearest noise sensitive premises and the developments own windows:

Zone	Maximum Permissible Rating Level Limit 1m from nearest noise-sensitive façade dB $L_{Aeq,T}$	
	Daytime (07:00 – 23:00 hrs)	Nighttime (23:00 – 07:00 hrs)
44-50 Portland Street	51	46
36 Charlotte Street	51	46
Clayton Hotel	51	46
Manchester One Front Elevation	56	51
Manchester One Rear Elevation	53	49
All other	48	44

Table 9: Plant noise limits

7.2.7 The above noise level limits are specific as Rating Levels and as such it will be necessary to consider the acoustic character associated with any of the proposed M&E plant associated with the scheme when predicting the noise impact expected.

7.2.8 Any proposed plant should, in the first instance, be designed to avoid have any significant tonal, impulsive, of intermittent acoustic characteristics. However, where such features are expected to be present, this must be taken into consideration and suitable correction must be applied.

7.2.9 These noise limits are subject to the approval of Manchester City Council.

7.3 Wellbeing Facilities

7.3.1 The development proposals include a small area of internal and external wellbeing facilities at fourth floor level. These facilities comprise an indoor sauna and small yoga studio/lounge with associated showers/changing area, and an external yoga studio, ice baths, and shared customer roof terrace. The proposed wellbeing facilities are illustrated in Figure 4 below.

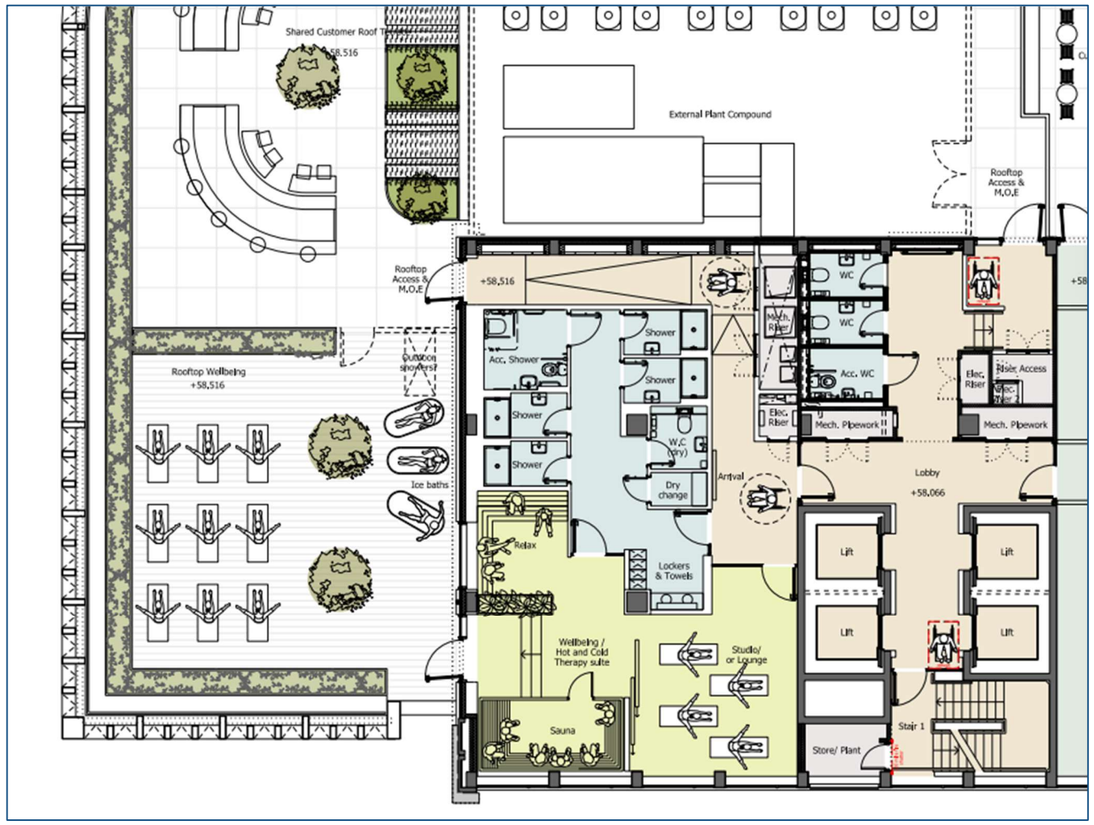


Figure 4: Plan showing proposed wellbeing facilities at fourth floor level (c/o Bridge Architects)

7.3.2 The proposed usage of these areas are considered to be very low intensity and are therefore not anticipated to generate any significant noise output. Therefore, no specific assessment of internal noise breakout/egress has been undertaken.

7.3.3 It is proposed that externally amplified music systems may be used to provide background music within the external rooftop terrace and wellbeing areas. Where externally amplified music is proposed the systems shall be designed such that the limits set out in Table 8.

7.4 Flexible Commercial Unit

The development proposals include a flexible commercial unit at ground floor as illustrated in Figure 5 below.



Figure 5: Plan showing proposed ground floor flexible commercial unit (c/o Bridge Architects)

7.4.1 Currently it is intended to introduce an F&B operator, and as such the assessment herein has been carried out on this basis.

7.4.2 Based on the minimum glazing performance of 33dB R_w+C_{tr} calculations indicate that internal noise levels within the flexible commercial unit could exceed 80dBA before the noise rating limits at the nearest off-site noise sensitive receptors or the upper floors of the proposed extension are exceeded.

7.4.3 Given the context of the intended F&B usage, within an office building, and open to the main reception area it is expected that operational noise levels of any F&B tenant in practice will be well below 80dBA within the flexible commercial unit and therefore noise breakout should be suitably controlled by the proposed glazing system.

7.4.4 Any internal or external amplified music system installed by the tenant must be designed such that the entertainment noise limits set out in Table 8 are not exceeded.

8 Conclusion

8.1.1 Sol has been commissioned by Bruntwood SciTech to undertake an acoustic design assessment of the proposed extension works at Manchester One on Portland Street in Manchester.

8.1.2 The purpose of this report is to assess the scheme in terms of environmental and intrusive noise and to determine an appropriate acoustic performance specification for the building envelope, as based on the pre-existing environmental noise climate on site as surveyed in October 2025, together with the outputs from the SOL 3D noise model, intrusive noise requirements of the British Council for Offices ("BCO"), BS 8233:2014 and currently available architectural design drawings.

8.1.3 This report demonstrated that indoor ambient noise limits can be achieved within all noise sensitive spaces across the proposed development with windows closed, and acoustic design guidance concerning the required building envelope and external glazing specifications has been provided. Where replacement windows of the existing tower are open, as per the existing natural ventilation strategy, internal noise levels are likely to exceed the target noise levels, , however this as per the existing condition of the tower and existing conditions are not expected to worsen as a result of the replacement glazing..

8.1.4 Additionally, appropriate commercial, entertainment and M&E plant daytime and night-time environmental noise limits have been set herein, all as based on the measured, pre-existing environmental noise levels at surrounding noise sensitive receptors.

APPENDIX A
Glossary of Acoustic Terms

Term	Abbreviation	Description
Decibel	dB	A scale for comparing the ratios of two quantities, including sound pressure and sound power.
A-weighting	dB(A)	The unit of sound level, weighted according to the A-scale, which takes into account the change in sensitivity of the human ear at varying frequencies.
Sound Pressure Level	L_{pA}	A measure of the sound pressure at a particular location. Typically expressed in dB(A) referenced to $2x10^{-5}$ Pascals.
Equivalent Continuous Sound Level	$L_{Aeq,T}$	The steady level of sound over a prescribed period of time which would contain the same total sound energy as the actual fluctuating noise under consideration in the same period of time.
Statistical Sound Levels	L_{A10} and L_{A90}	The level of noise exceeded for a percentage of the time period being sampled, namely 10% or 90% respectively.
Background Sound Level	$L_{A90,T}$	The A-weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90% of the time period being sampled.
Maximum Sound Level	L_{Amax}	The maximum sound or noise level determined with instrumentation set to either a fast time weighting, L_{AFmax}, or a slow time weighting, L_{Asmax}, as occurring during the time period being sampled.
Sound Power Level	L_{wA}	A measure of the total sound energy radiated from a source. Like sound pressure levels, this is also expressed in dB(A) terms, but it is referenced to 1×10^{-12} W.
Broadband		Sound sampled over a wide range of frequencies.
Narrow band		Sound sampled over a specific, restricted frequency range. Used to ascertain the amplitude and significant of individual, audible tones, and to assist in identifying particular sources of noise within a complex, multi-source soundscape environment.
Ambient Sound	$L_{eq,T}$	Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources, both near and far.
Specific Sound Level	$L_{eq,T}$	The Equivalent Continuous A-Weighted Sound Level at an assessment position produced by a specific sound over a given reference time interval, *Tr*
Rating Level	$L_{Ar,Tr}$	The Specific Sound Level plus any adjustment for the acoustic characteristic features of the noise (e.g. intermittency, tones etc.).
Residual Noise	$L_{Aeq,T}$	The ambient sound remaining at given position in a given situation, when the specific sound source is suppressed to such an extent that it no longer contributes to the ambient sound.
Sound Reduction Index	*SRI*	The reduction in sound energy when transmitted through a panel or similar planar element, typically used in relation to single octave or one-third octave frequency band values.
Weighted Sound Reduction Index	R_w	The Sound Reduction Index expressed as a single figure, as expressed against a reference curve.
Dynamic Insertion Loss	*DIL*	Reduction in acoustic energy resulting from the insertion of a noise control element (e.g. an attenuator, acoustic enclosure etc.).
Free Field		Noise measuring location that is free from the presence of sound reflecting objects (except the ground), usually taken to mean being at least 3.5 metres distance from reflective surface(s) or greater.

APPENDIX B
Noise Survey Details and Summary Results

LOCATION

Manchester One, Portland Street, Manchester

DATES AND TIMES

11:00 hours on the 16 October 2025 to 08:00 hours on the 21 October 2025

WEATHER CONDITIONS

Periods of prolonged rainfall were observed to have occurred between approximately 12:00 on Sunday 21 October and approximately 08:00 on Tuesday 23 October, as such these periods have been excluded from further assessment. The prevailing weather conditions from the start of the survey (approx. 10:30 on Thursday 16 October) until approximately 12:00 on Sunday 21 October were suitable for the purposes of environmental noise measurements during the noise survey.

PERSONNEL

Joe Sinker – Sol Acoustics Ltd

INSTRUMENTATION

01dB Cube Sound Level Meter (serial no. 14027)

01dB Pre22 Microphone Preamplifier (serial no.2105097)

Gras 40CD Microphone Capsule (serial no. 428400)

01dB Cube Sound Level Meter (serial no. 14452)

01dB Pre22 Microphone Preamplifier (serial no.2343088)

Gras 40CD Microphone Capsule (serial no. 470955)

01dB CAL21 Sound Calibrator (serial no. 34675320)

METHODOLOGY

Before and after the measurements the noise monitoring equipment was calibrated to an accuracy of ±0.4dB using the Sound Calibrator. The calibrator produces a sound pressure level of 94 dB re $2x10^{-5}$ Pa @ 1kHz.

MEASUREMENT RESULTS

Graphs B1 – B2 summarise the broadband A-weighted results obtained during the survey.

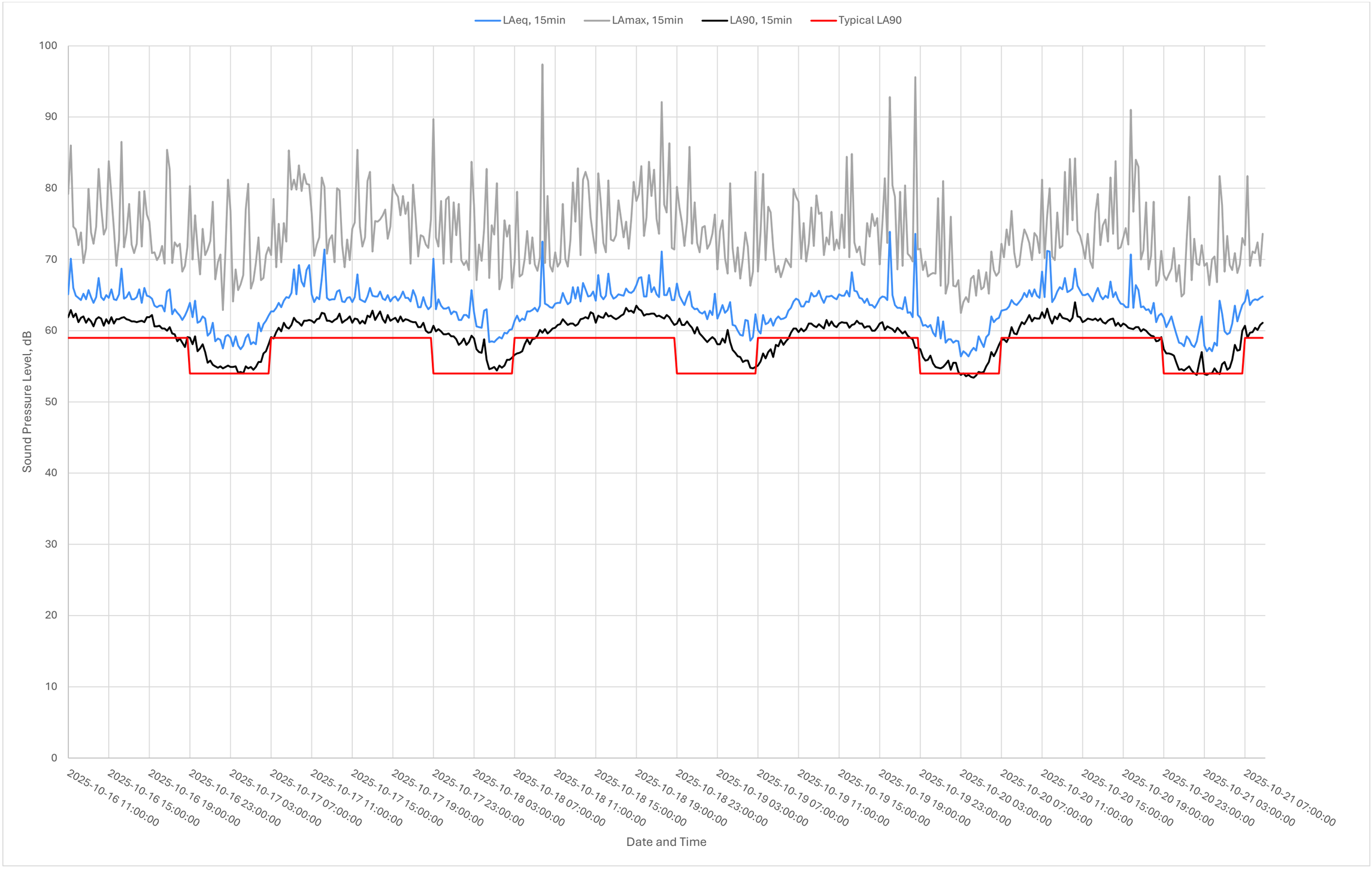


Figure 6: Summary of measured noise levels at MP1

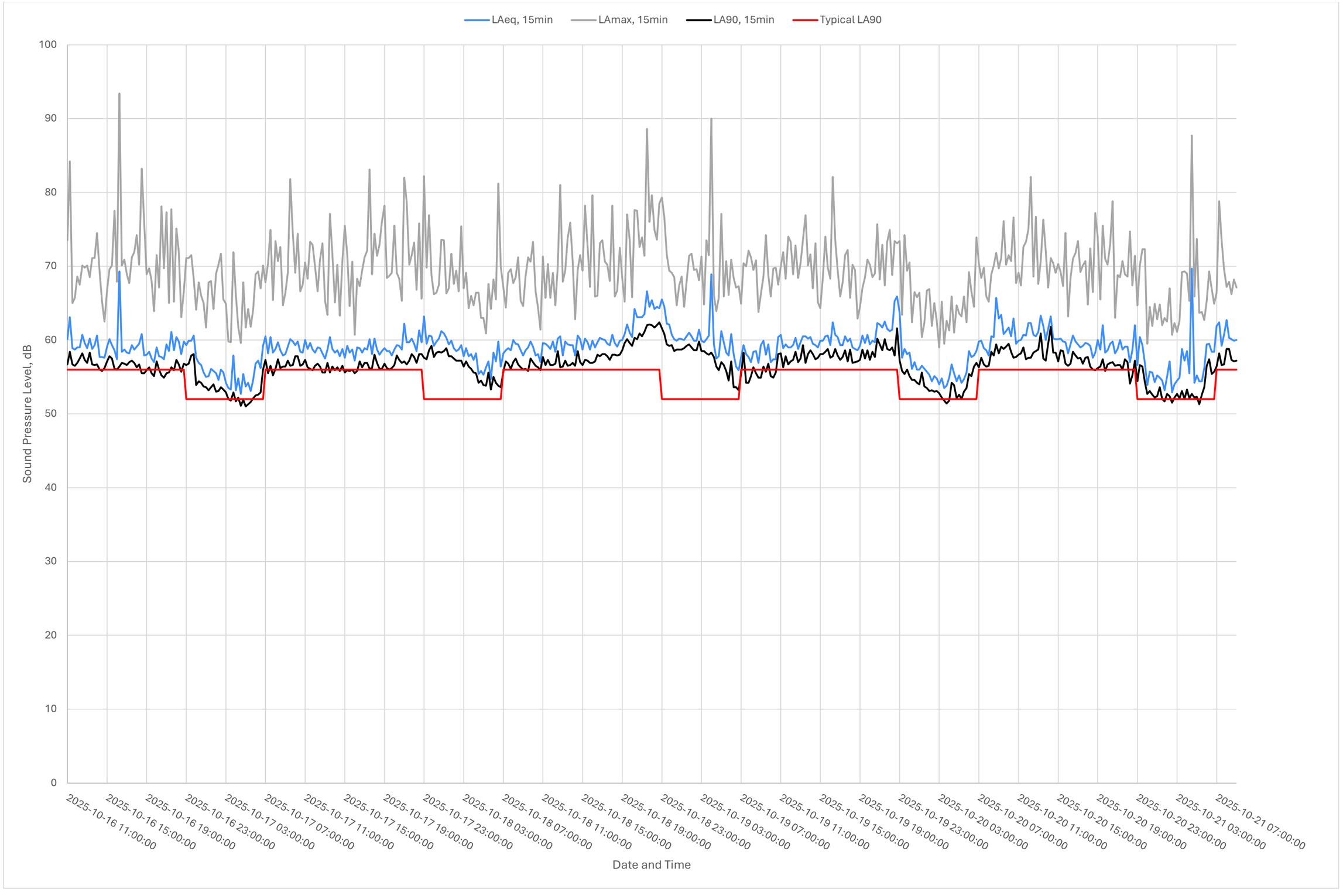


Figure 7: Summary of measured noise levels at MP2