

SPRATT+HAMER



Noise Impact Report

Project details

Client	JSM Company Group Limited
Client Address	18 – 26 Fleet Street Liverpool L1 4AN
Site Address	9-11 Regent Street Wrexham LL11 1SG
Survey Dates	First Visit: 03 – 06/02/23 Second Visit: 24 – 27/08/2024
Reference	20664

Quality Assurance

Prepared by	Alejo Garcigoy MSc MIOA
Reviewed by	Ben Bielicki BSc (Hons) MIOA
Authorised by	Ben Bielicki BSc (Hons) MIOA
Issue date	28/11/2024

Revision History

Version	Date	Editor	Notes
V1	06/03/2023	Pawel Tatar	First issue
V2	11/09/2024	Alejo Garcigoy	Additional monitoring position and subsequent recommendations. Formatting
V3	28/11/2024	Alejo Garcigoy	Updates in accordance with LPA commentary



Contents

1	Introduction.....	5
1.1	An Environmental Noise Assessment.....	5
2	Assumptions, Limitations & Uncertainty.....	6
3	Planning Policies, Guidance and Criteria.....	7
3.1	Planning Policy Wales.....	7
3.2	Criteria.....	9
3.2.1	Communications & Local Planning Authority Criteria.....	9
3.2.2	BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings.....	10
3.2.3	WHO Guidelines for Community Noise	11
3.3	Criteria Summary	11
4	Site Description.....	12
4.1	Subjective Observations	12
4.2	Weather.....	12
5	Noise Measurement Procedure.....	14
5.1	Survey Date.....	14
5.2	Personnel Present.....	14
5.3	Survey Equipment Used	14
5.4	Calibration.....	14
5.5	External Ambient Sound Measurements.....	14
5.5.1	Monitoring Position 1	15
5.5.2	Monitoring Position 2	15
5.5.3	Monitoring Position 3	15
5.5.4	Monitoring Position 4 (2 nd Visit).....	15
5.6	Location Plan of Measurement Positions.....	16
6	Results and Analysis	17
6.1	External Ambient Sound Measurement Analysis in Accordance with BS 8233:2014.....	17
6.1.1	Discussion.....	18
6.2	Nighttime L_{AFmax} Analysis.....	19
6.2.1	Nighttime L_{AFmax} Selection.....	19
6.2.2	Nighttime L_{AFmax} at Monitoring Position 1.....	19
6.2.3	Nighttime L_{AFmax} at Monitoring Position 2.....	19



SPRATT+HAMER

6.2.4	Nighttime L_{AFmax} at Monitoring Position 3.....	20
6.2.5	Nighttime L_{AFmax} at Monitoring Position 4 (2 nd Visit).....	20
7	Recommendations	21
7.1	Glazing & Ventilation Specification 1 – Front Façade	21
7.2	Glazing & Ventilation Specification 2 – Rear Façade.....	21
7.2.1	External Wall Specification.....	22
7.3	Glazing & Ventilation Specification 3 – West Façade	22
7.4	Glazing & Ventilation Specification 4 – Atrium Façade	22
7.5	Habitable Room Ceilings in Roof Space	23
7.6	Specification Guide.....	23
7.7	Notes on Ventilation.....	24
8	Calculation Methodology.....	26
8.1	Building Elements	26
8.2	Example of Estimated Performance.....	27
9	Conclusion.....	28
10	References	29
10.1	Drawing References	29
	Appendix.....	30
	Measurement Results.....	34
	Proposed Site Plans.....	57



1 Introduction

JSM Company Group Limited has instructed Spratt and Hamer Limited to undertake an environmental noise survey in order to assess the impact from the nearby road, night clubs, commercial units, as well as other general noise within the local environment which may have an impact on future residents of the proposed development.

The proposed development site is an existing three-storey building that currently comprises ground floor retail and commercial space. It is proposed to convert the entire first and second floors into 20no. 1-bedroom and 2-bedroom residential apartments, while maintaining ground floor commercial units.

Version 2 of the report outlines further comparison and sound level analysis and sets the recommendations in line with the additional measurement undertaken at the new Monitoring Position 4 with the Rocking Chair entertainment venue fully operational. Version 3 addresses recent commentary facilitated by the LPA.

This report is prepared solely for JSM Company Group Limited. Spratt and Hamer Limited accepts no responsibility for its use by any third party.

This document has been prepared using the various documents listed within the appendices of this report, together with drawings, technical information and additional verbal representations made by third parties. We have not audited nor independently verified the content or accuracy of any of the documents and information provided to us in the preparation of this report.

If additional information comes to light subsequent to the production of this report, we reserve the right to revise our opinions and the conclusions reached within this report.

1.1 An Environmental Noise Assessment

Spratt and Hamer Limited carried out a first environmental noise survey at the above site with noise levels measured externally over 24-hour periods, consisting of 16-hour days (07:00 – 23:00) and eight-hour nights (23:00 – 07:00). The measurements were carried out during weekdays and over a weekend (11:30 Friday – 11:30 Monday).

A second environmental survey has been undertaken with noise levels measured externally over a 72-hour period, consisting of 16-hour days (07:00 – 23:00) and eight-hour nights (23:00 – 07:00). The measurements were carried out during weekdays and over a weekend (Saturday to Tuesday) from 24/08/2024 to 27/08/2024.

This report will state the measured noise levels and will refer to guidance relevant to the nature of this survey whilst considering Local Planning Authority guidance and conditions.



2 Assumptions, Limitations & Uncertainty

- a. All suggested specifications require a good level of workmanship and for materials to be installed as the manufacture intends. Any poor workmanship may lead to weaknesses in the sound attenuation provided by the building elements.
- b. It is assumed that the sound pressure levels measured on site during the environmental noise survey are typical of the site.
- c. It is assumed that the technical data provided by glazing and ventilation manufacturers is up to date and correct.
- d. It is assumed that drawings and information supplied by JSM Company Group Limited are up to date and correct.
- e. It should also be noted that building elements modelled in INSUL are only an approximation of the proposed specifications due to the limitation of materials available within the software. These models are shown in the appendix.
- f. All building elements modelled in INSUL Acoustic Prediction Software have had a 3 dB correction applied to account for a margin of error within the software.
- g. It is assumed that single-glazed front façade windows are 6mm thick.



3 Planning Policies, Guidance and Criteria

The planning policies and criteria listed below are taken from associated relevant guidance documents, all of which should be considered for the internal and external noise levels.

3.1 Planning Policy Wales

The Planning Policy Wales Edition 12/ February 2024 (PPW) sets out the land use planning policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes (TANs), Welsh Government Circulars, and policy clarification letters, which together with PPW provide the national planning policy framework for Wales. PPW, the TANs¹, MTANs² and policy clarification letters comprise national planning policy.

The primary objective of PPW is 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, as required by the Planning (Wales) Act 2015, the Well-being of Future Generations (Wales) Act 2015 and other key legislation and resultant duties such as the Socio-economic Duty. A well-functioning planning system is fundamental for sustainable development and achieving sustainable places.

PPW promotes action at all levels of the planning process which is conducive to maximising its contribution to the well-being of Wales and its communities. It encourages a wider, sustainable and problem solving outlook which focuses on integrating and addressing multiple issues rather than on an approach which is fragmented, un-coordinated and deals with issues in isolation. It provides an opportunity to remove any actual or perceived problems in current approaches and stimulate and support innovative and creative ideas as well as high standards of evidence and assessment to underpin the preparation of development plans and strategies and individual proposals. Monitoring and learning from development outcomes so as to drive sustainable improvements in planning practice is also important.

Technical Advice Note 11 of the previous edition 11/ February 2021 of PPW: Noise provides a way of assessing noise exposure inside new residential dwellings by separating it into distinctive categories. When planning applications are considered, local planning authorities should determine into which of the categories the proposed site falls. Noise categories are expressed in Table 2 overleaf.



Noise Exposure Categories for New Dwellings

A	Noise need not be considered as a determining factor in granting planning permission, although the noise level at the high end of the category should not be regarded as desirable.
B	Noise Should be taken into account when determining planning applications and, where appropriate, conditions imposed to ensure an adequate level of protection.
C	Planning permission should not normally be granted. Where it is considered that permission should be given, for example, because there are no alternative quieter sites available, conditions should be imposed to ensure a commensurate level of protection against noise.
D	Planning permission should normally be refused.

Noise Source		Noise Exposure Category			
		A	B	C	D
		$L_{Aeq,T}$ (dB)	$L_{Aeq,T}$ (dB)	$L_{Aeq,T}$ (dB)	$L_{Aeq,T}$ (dB)
Road Traffic	07:00 – 23:00	<55	55 – 63	63 – 72	>72
	23:00 – 07:00	<45	45 – 57	57 – 66	>66
Rail Traffic	07:00 – 23:00	<55	55 – 66	66 – 74	>74
	23:00 – 07:00	<45	45 – 59	59 – 66	>66
Air Traffic	07:00 – 23:00	<57	57 – 66	66 – 72	>72
	23:00 – 07:00	<48	48 – 57	57 – 66	>66
Mixed Sources	07:00 – 23:00	<55	55 – 63	63 – 72	>72
	23:00 – 07:00	<45	45 – 57	57 – 66	>66

Table 1: Noise Exposure Categories in Accordance with Technical Advice Note 11: Noise

In addition, para 6.7.5 of PPW Edition 12 states that:

“(…) it will be important to consider the relationship of proposed development to existing development and its surrounding area and its potential to exacerbate or create poor air quality or inappropriate soundscapes. The agent of change principle says that a business or person responsible for introducing a change is responsible for managing that change. In practice, for example, this means a developer would have to ensure that solutions to address air quality or noise from nearby pre-existing infrastructure, businesses or venues can be found and implemented as part of ensuring development is acceptable.”



3.2 Criteria

3.2.1 Communications & Local Planning Authority Criteria

Environmental Health Office (EHO) from Wrexham County Borough Council has commented about noise.

"The EHO has advised that the development site is in an area that can be affected by noise from the night-time economy, and you are therefore required to carry out a noise survey in order to determine noise levels for both day (07:00 – 23:00 hours) and night (23:00 – 07:00 hours) having regard to relevant Planning Guidance (Wales). The report of the noise survey findings shall include:

- a) Noise levels arising from day/night-time activities in the vicinity of the proposed development site and the impact upon the proposed accommodation, and*
- b) A detailed scheme of noise insulation and / or attenuation measures so designed to safeguard the amenity of the future occupants of the proposed accommodation hereby approved."*

The Conservation Officer commented about front façade windows.

"9 to 11 Regent Street is within Wrexham Town Centre Conservation Area. Regent Street is part of one of the key shopping streets in the conservation which includes several buildings of character. This is reflected in the elevation which faces Regent Street, especially in the upper floors.

Windows to the Regent Street elevation are timber sliding sashes. It is important that these are retained. Please confirm if there are any proposals to undertake work on these windows, for example to 'upgrade' from single to double glazing? Changing to double glazing will only be appropriate if it can be demonstrated that the windows are currently in poor condition, and that the thicker glazing unit can be accommodated without significant change to the thickness of frames and glazing bars. The method of opening should remain as sliding. Provided that assurance can be given on proposals for the windows to the Regent Street elevation of the building, I have no objections to the application."

Following the submission of V1 of this report; in April 2024 the client made Spratt and Hamer aware of further comments that have been provided by the Local Authority, as outlined below.

"The noise report submitted did reference noise from external factors such as the public and identify the potential for noise from nearby entertainment premises in the objectives. Measurements particularly those taken at Position 3 over Friday – Monday should have monitored any noise from the live music venue situated to the rear of the proposed apartments. Noise Levels measured were correctly compared to TAN11 in relation to mixed noise sources and mitigation in the form of glazing insulation specified.

However, this objection raises the concern that entertainment music noise breakout from the neighbouring business may be a factor to consider in determining the acceptable use of this property for residential purposes. No other residential accommodation is located close to the music venue. The venue has a premises licence to 4am in the morning over the weekends. There are no licence conditions attached to the Premises Licence that controls noise levels with reference to neighbouring residential premises. Any adverse impact on the residents, generating complaints and the likelihood of enforcement action against the existing business, must be avoided.

Low frequency (bass) noise produced by such venues has high energy and is exceptionally hard to mitigate, however such low frequency noise does not especially impact the standard measurement (dB(A) scales, and therefore use of TAN 11 alone will not preclude the potential for adverse or justified complaints in the future.



We seek confirmation of the nature of the music noise that was occurring during the monitoring period in the report submitted. There is no specific reference to any music noise being witnessed, however there is some indication that this monitoring was remote, and no technician may have been on site during the monitoring period overnight on the weekends.

If this cannot be explained and assessed, through revision of the existing report further monitoring specifically aimed to determine the extent that music / entertainment noise will impact the proposed residential properties requires completing. The objector has asked for liaison with the music venue so that realistic and typical noise levels from the venue can be assessed.

Significant impact of low frequency music on residential premises from the venue that currently holds a 4am licence may result in this department not being able to support the application as mitigation may not be economically achievable.”

Furthermore, following the submission of V2 of this report; additional comments have been put forward by the Local Authority, as outlined below.

“There is a clear rise in sound levels starting at 23:00 on 24/08 with a notable drop in the recorded sound levels at 00:50 on 25/08 (chart at the top of page 54). (...)

Further details are needed to explain this and in particular the levels recorded in the 63Hz octave – the bar chart on the same page identifies a 63 Hz sound level of over 70dB. We would like to see the un-weighted 1:1 octave results for the music event period (23:00 to 00:50 – 24/08/24 to 25/08/24) for the MP4 monitoring position and a similar period four positions 1 to 3 in the period 03/02/23 to 06/02/23 (if there was a Saturday music event). We would also be looking to see the calculated transmission loss’ for MP3 and 4 using Optiphon 12.8mm / 20mm / 16.8mm double glazing and mechanical acoustic wall continuous/purge ventilators (for the bedrooms).”

3.2.2 BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings

The British Standard BS 8233:2014, Guidance on Sound Insulation and noise reduction for buildings, provides appropriate internal levels of noise within dwellings, flats and rooms in residential use when unoccupied.

Section 7.2.2 ‘Internal ambient noise levels in dwellings’ of BS 8233: 2014 states that ‘In general, for steady external noise sources, it is desirable that the internal ambient noise level does not exceed the guideline values in Table 4’.

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living Room	35 dB $L_{Aeq,16hour}$	–
Dining	Dining room/area	40 dB $L_{Aeq,16hour}$	–
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

Table 2: Table 4 of BS 8233:2014 Indoor ambient levels for dwellings

Note 7 of section 7.7.2 states ‘Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed up to 5 dB and reasonable internal conditions still achieved’.

In addition, Note 4 of section 7.7.2 states, ‘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 $L_{Amax,F}$, depending on the character and number of events per night. Sporadic noise events could require separate values”.



In the absence of a specific performance criterion within BS 8233 for short-term noise maxima, reference can be made to guidance published by the WHO. In particular, the WHO publication 'Guidelines for Community Noise' (1999), from which the guidance given in BS 8233: 2014 is itself derived, states that 'for a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB L_{AFmax} more than ten to fifteen times per night'.

The WHO publication 'Guidelines for Community Noise' (1999) has since been updated in 2018; however, it is widely accepted by Local Authorities that L_{AFmax} 45 dB is the target level for short-term noise maxima between 23:00–07:00.

3.2.3 WHO Guidelines for Community Noise

In 1999, the WHO (World Health Organisation) published Guidelines for Community Noise, stating the following internal noise levels are applicable within dwellings.

Specific Requirement	Critical Health Effect (s)	L_{Aeq} (dB)	Time base (hours)*	L_{AFmax} (dB)
Outdoor living area	Serious annoyance, daytime and evening	55	16	–
	Moderate annoyance, daytime evening	50	16	–
Dwelling, indoors	Speech intelligibility and moderate annoyance, daytime and evening	35	16	–
Inside bedrooms	Sleep disturbance, night-time	30	8	45
Outside bedrooms	Sleep disturbance, window open (outdoor values)	45	8	60

Table 3: A Summary of the Guidance Noise Levels

3.3 Criteria Summary

In order to meet the requirements of Wrexham County Borough Council, in line with their latest commentary and the 'agent of change' principle, the assessment and recommendations will be made in reference to BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings and WHO Guidelines for Community Noise.

In order to account for sources of various nature, in particular entertainment noise emanating from the neighbouring venue The Rocking Chair, the assessment will consider a more onerous approach by using the highest measured 1-hour $L_{Aeq,t}$ ambient noise level, as well as the inclusion of the 63Hz octave band within the calculation at those proposed residential apartments exposed to entertainment noise.



4 Site Description

The proposed development at 9-11 Regent Street is an existing three-storey building situated in the city centre of Wrexham, approximately 220m east of Wrexham Central train station.

The front façade of the building faces north onto Hope Street, which is a pedestrianised area with multiple commercial units including cafés and shops.

The west façade faces Hill Street which is considered to be a busy street. There are commercial units as well as Hill Street Social bar and Grove Park Theatre to the west. Due to the front façade being in a conservation area, windows to the Regent Street are to be retained. The east boundary of the site directly adjoins the neighbouring building.

The south façade faces a building which consists of several units. Lot 11, The Priory and Rock Suite café, as well as a music venue i.e. The Rocking Chair.

Due to the central location of the site, it is likely to be impacted by night time activity, especially during weekends. There are multiple bars and public houses located within the central area of Wrexham. Multiple mechanical plant can be found within the area from various commercial premises. The street at the rear of the building is typically accessed by bin lorries in early mornings.

It is important to note that during the time of the survey, an event i.e. DJ set took place at the Rocking Chair which commenced at 22:00 and finished approximately at 02:00. The music included hip hop and funk being played through the venue's large PA system, with particular high content of the low frequencies, characteristic of this type of music. The event poster can be found in the appendix.

4.1 Subjective Observations

During site attendance, subjectively the main source of noise was road traffic on Hill Street, on Hope Street primarily pedestrians were audible. At the rear façade facing Brynyffynnon some bin lorries were observed. Mechanical plant units were observed in the area; however, they were inaudible on the day.

4.2 Weather

First Visit 03-06/02/2023	Daytime Average	Night time Average
Temperature	6°C	4°C
Wind Speed	4.3m/s	3.3m/s
Wind Direction	E	E
Precipitation	Light for 2 hours	None
Damp road/ wet ground	None	None
Fog/snow/ice	None	None

Table 4: First Visit Weather Conditions.

Weather data taken from www.windy.com.



Second Visit 24-27/08/2024	Saturday	Sunday	Monday	Tuesday
Temperature (°C)	12.8 – 19.9	9.6 – 18.1	13.0 – 20.4	14.3 – 19.0
Wind Speed (m/s)	0.1 – 6.5 (mean 1.6)	0.0 – 6.2 (mean 2.3)	0.0 – 4.8	0.0 – 5.9 (mean 2.1)
Wind Direction	WSW	SW	SW	SSW
Precipitation (mm/h)	0.0	0.0	0.0	0.0 – 1.8
Damp road/ wet ground	No	No	No	Yes
Fog/snow/ice	None	None	None	None

Table 5: Second Visit Weather Conditions

Second visit’s weather data taken from www.metoffice.gov.uk from the Erbistock weather station, located at approximately 2.1km south of the proposed development.



5 Noise Measurement Procedure

5.1 Survey Date

First Visit: 03 – 06/02/23
Second Visit: 24 – 27/08/2024

5.2 Personnel Present

First Visit: Pawel Tatar BSc AMIOA
Second Visit: Jonny Spratt BSc (Hons)

5.3 Survey Equipment Used

Manufacturer	Model	Serial No.	Description
Rion	NA-28	00211583	Integrating Sound Level Meter and Real Time Analyser
Rion	NL-52	01032413	Integrating Sound Level Meter and Real Time Analyser
Rion	NL-52	00976149	Integrating Sound Level Meter and Real Time Analyser
Rion	NC-74	35125832	Acoustic Calibrator
Rion	NC-74	34678495	Acoustic Calibrator
Rion	NL-52	01054205	Integrating Sound Level Meter and Real Time Analyser
Pulsar	Model 105	59964	Acoustic Calibrator

Table 5: Survey Equipment Used

5.4 Calibration

The sound level meters were calibrated with the field calibrator to a level of 94.0 dB @ 1 kHz prior to and on completion of the survey. No significant drift in calibration was observed. The meters used during the survey are precision grade Class 1.
Calibration certificates are available on request.

5.5 External Ambient Sound Measurements

The measurement locations chosen during the survey were deemed suitable for the determination of the noise levels able to impact upon the façades of the proposed development.
The sound level meters were set to measure broadband L_{Aeq} , L_{A90} , L_{A10} , and L_{AFmax} in 5-minute periods, as well as A-weighted 1:1 octave spectrum analysis over a 72-hour weekend period.



5.5.1 Monitoring Position 1

A microphone was placed 3m above the ground floor surface at first-floor level 1m from the west façade overlooking Hill Street/Regent Street. The sound level meter was set to record WAV file audio recordings for all maximum sound level events above 75 dBA.

5.5.2 Monitoring Position 2

A microphone was placed on a roof outside front window, 1.5m above the canopy surface and 1m away from the front façade, overlooking Hope Street. The sound level meter was set to record WAV file audio recordings for all maximum sound level events above 70dBA.

5.5.3 Monitoring Position 3

A microphone was placed 3m above the ground floor surface at first-floor level 1m from the rear façade overlooking Brynyffynnon.

5.5.4 Monitoring Position 4 (2nd Visit)

A microphone was placed protruding through the window at second floor level 1m away from the façade directly overlooking the Rocking Chair entertainment venue. The sound level meter was set to record WAV file audio recordings for all maximum sound level events above 70dBA. The meter was set to measure the complete survey duration.



5.6 Location Plan of Measurement Positions

The location plan below shows the proposed development and location positions of the meters.

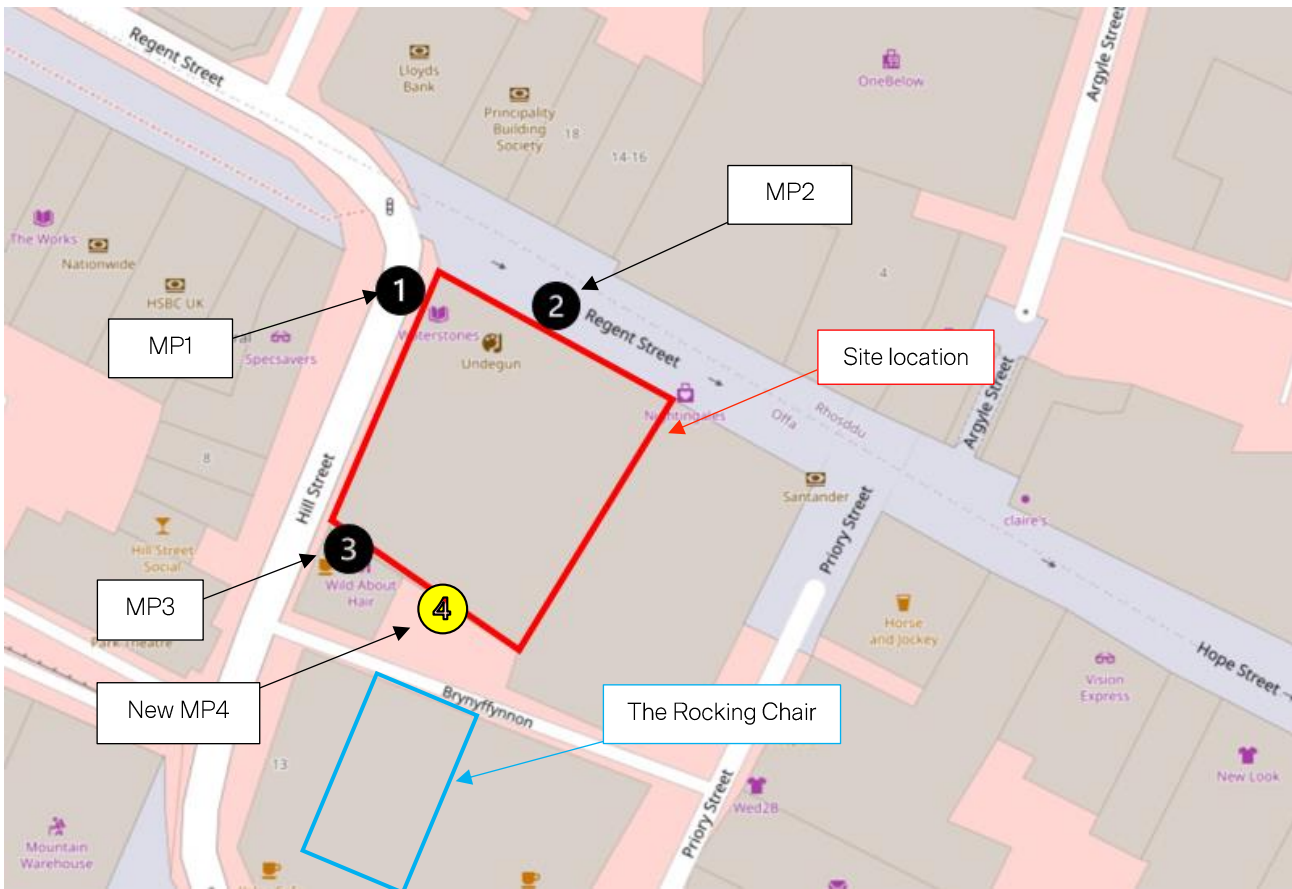


Figure 1: Indicative Site Map. Image Taken from www.openstreetview.org



6 Results and Analysis

6.1 External Ambient Sound Measurement Analysis in Accordance with BS 8233:2014

The following table presents the measured results from all monitoring positions during the first visit.

Monitoring position	Day	Time Period	Time Base T (hours)	$L_{Aeq,T}$ (dB)	L_{AFmax} (dB)	L_{A90} (dB)	L_{A10} (dB)
1	Friday	Daytime	16	66.6	-	56.8	68.0
		Night time	8	63.7	62.4 – 104.5	51.7	63.2
	Saturday	Daytime	16	66.6	-	57.4	67.9
		Night time	8	62.9	64.8 – 94.1	52.9	64.8
	Sunday	Daytime	16	65.5	-	54.5	66.7
		Night time	8	57.4	50.4 – 83.3	49.7	58.1
2	Friday	Daytime	16	61.2	-	52.6	60.6
		Night time	8	58.2	54.7 – 92.2	47.0	55.9
	Saturday	Daytime	16	59.4	-	53.0	60.6
		Night time	8	59.5	56.3 – 91.6	48.3	58.1
	Sunday	Daytime	16	65.1	-	50.1	58.8
		Night time	8	51.0	46.8 – 81.0	45.8	51.0
3	Friday	Daytime	16	62.4	-	52.8	64.2
		Night time	8	58.2	56.8 – 93.0	43.4	55.9
	Saturday	Daytime	16	61.7	-	52.1	63.4
		Night time	8	56.6	53.0 – 92.2	44.7	57.3
	Sunday	Daytime	16	61.4	-	47.6	61.5
		Night time	8	51.7	42.1 – 83.2	42.1	49.8

Table 6: Measurement Results

Data charts can be found in the appendix.

The following table presents the measured results from Monitoring Position 4, undertaken during the second visit. For this monitoring position, the noise profile of the area includes entertainment noise emanating from the Rocking Chair. As such, in order to provide a robust approach, results show the measured ambient sound levels in 1-hour intervals during both day and nighttime periods.



SPRATT+HAMER

Monitoring position	Day	Time Period	Time Base T	$L_{Aeq,T}$ (dB)	Highest $L_{Aeq,1hour}$ (dB)	L_{AFmax} (dB)
4	Saturday	Daytime	13hr	59.8	62.8	–
		Night-time	8hr	57.1	62.1	56.3 – 86.6
	Sunday	Daytime	16hr	54.0	56.2	–
		Night-time	8hr	50.5	54.0	49.7 – 79.4
	Monday	Daytime	16hr	54.1	57.4	–
		Night-time	8hr	52.3	58.3	47.5 – 93.5
	Tuesday	Daytime	4hr	54.5	55.5	–

Table 7: Second Visit MP4 Measurement Results

As can be seen, the highest $L_{Aeq,t}$ occurred on the Saturday, whilst a special event i.e. DJ session was taking place within the Rocking Chair. The session started at 22:00 and finished at around 02:00, this period being where the measured ambient noise levels are the highest. Data charts are shown in the appendix.

6.1.1 Discussion

Analysis has established that the highest $L_{Aeq,1hour}$ during the day time occurred at 13:00 and was in its majority influenced by patron activity in the vicinity. The highest $L_{Aeq,1hour}$ during the nighttime occurred from 23:00 whilst a hip-hop DJ (DJ Format) session was taking place. Further analysis has shown that the low frequency content is significantly high, typical of a hip-hop music playback. The following table outlines the noise emissions in octave frequency bands for this period.

Day	Time	Time Base T	$L_{Aeq,T}$ (dB)	Octave Centre Frequencies (Hz)						
				63	125	250	500	1k	2k	4k
Saturday	23:00	1hr	62.1	80.2	73.3	62.8	57.2	52.6	48.3	46.6

Table 8: Octave Band $L_{Aeq,1hr}$ Noise Emissions

The following table outlines the highest noise emissions in octave frequency bands during the nighttime up to 04:00 (venue's closure time as licensed) at Monitoring Position 3, also situated along the same façade in close proximity to the venue.

MP	Day	Time	Highest $L_{Aeq,1hr}$ (dB)	Octave Centre Frequencies (Hz)						
				63	125	250	500	1k	2k	4k
3	Sunday	00:00	59.6	68.7	60.0	55.8	56.8	55.7	51.3	44.5

Table 9: Octave Band $L_{Aeq,1hr}$ Noise Emissions

As can be seen, the levels measured at MP4 are 2 dB higher than those measured at MP3 and significantly higher at the lower frequencies 63 – 250Hz. As such, in consultant's opinion, in order to provide a robust approach, both highest $L_{Aeq,1hour}$ of 62.8 and 62.1 during the day and nighttime, respectively, measured at MP4, will be used in the assessment in order to provide the recommendations at this façade.



6.2 Nighttime L_{AFmax} Analysis

The L_{AFmax} measured during the nighttime (23:00–07:00) has been analysed. WHO Community Noise Guidelines states “For a good night sleep it is believed that indoor sound pressure should not exceed approximately 45 dB L_{AFmax} more than 10 – 15 times per night (Vallet & Vernet 1991).

6.2.1 Nighttime L_{AFmax} Selection

All max levels were considered. It was found that multiple max events were related to nighttime activities during the weekend time, on Friday and Saturday nights. Table shown in Section 8.3 shows an amount of max level exceedances during nighttime every night based on the collected data and calculations.

6.2.2 Nighttime L_{AFmax} at Monitoring Position 1

The maximum measured L_{AFmax} is 104.5 dB, which occurred at 02:00 on Friday night. The next highest L_{AFmax} is 94.1 dB, which occurred at 23:15 on Saturday. L_{AFmax} 100.0 dB is exceeded only once and L_{AFmax} 90.0 dB is exceeded six times during the nighttime periods throughout the weekend.

The WAV file recordings and frequency spectrum data indicate that on Friday the L_{AFmax} 104.5 dB as well as 90.0 dB events were from modified exhaust vehicles accelerating, 88.8 dB which occurred at 06:20 is also due to a vehicle acceleration. The L_{AFmax} 85.4 dB event was from an HGV/road sweeper.

On Saturday the L_{AFmax} 94.1 dB event was related to people shouting, and the 91.6 dB event was from a metallic object being dropped on the floor. Both events are likely to be related to nighttime activities. The L_{AFmax} 90.6 dB was from modified exhaust vehicle acceleration.

The L_{AFmax} 94.1 dB event which occurred at 23:15 on Saturday night will be used for the assessment at this monitoring position as this is considered representative of other L_{AFmax} events during the weekend nighttime period.

6.2.3 Nighttime L_{AFmax} at Monitoring Position 2

The maximum measured L_{AFmax} is 92.2 dB, which occurred at 02:00 on Friday night which is the same max event as measured at monitoring position 1. The next highest L_{AFmax} is 91.6 dB, which occurred at 00:35 on Saturday night. L_{AFmax} 90.0 dB is exceeded only twice and L_{AFmax} 85.0 dB is exceeded eight times throughout the weekend nighttime periods.

The WAV file recordings and frequency spectrum data indicate that on Friday the L_{AFmax} 92.2 dB event was from modified exhaust vehicle accelerating, the 86.2 dB event was also from a vehicle. The L_{AFmax} 85.3 dB event was from an HGV/road sweeper.

On Saturday the L_{AFmax} 91.6 dB event was from modified exhaust vehicle accelerating and the 86.6 dB event was also from a vehicle.

The L_{AFmax} 85.3 dB event which occurred at 05:50 on Friday night will be used for the assessment at this monitoring position as this is considered representative of other L_{AFmax} events during the nighttime period.

Various max events related to the nighttime economy, such as people shouting, were recorded at this monitoring position. The events however were lower than the L_{AFmax} level chosen for the assessment.



6.2.4 Nighttime L_{AFmax} at Monitoring Position 3

The maximum measured L_{AFmax} is 93.0 dB, which occurred at 04:50 on Friday night. The next highest L_{AFmax} is 92.2 dB, which occurred at 00:30 on Saturday night. L_{AFmax} 90.0 dB is exceeded only twice and L_{AFmax} 85.0 dB is exceeded seven times during the nighttime periods.

The frequency spectrum data suggests that the L_{AFmax} 87.7 dB event which occurred on Saturday night was from HGV pass. This event will be used for the assessment as it is considered representative of other max events during the nighttime.

6.2.5 Nighttime L_{AFmax} at Monitoring Position 4 (2nd Visit)

The maximum measured L_{AFmax} is 93.5 dB, which occurred at 05:50 on Tuesday morning. The next highest L_{AFmax} is 86.6 dB, which occurred at 01:30 on Saturday night, which was caused by a sports car revving. Subsequent events were also caused by car passings. As such, this event will be used for the assessment as it is considered representative as well as represent a robust scenario.

It is worth to mention that no L_{Amax} events coming from the Rocking Chair or any patron activity associated with the venue were between the highest maximum events, which were mostly caused by passing cars in the vicinity.



7 Recommendations

The estimated internal noise levels attributed by the external noise sources have been assessed over an average of $L_{Aeq,T}$ from the daytime and night time survey periods and L_{AFmax} values from the night time.

For Monitoring Position 4 (2nd visit), in order to provide a more robust approach for those residential apartments at the rear façade, the estimated internal noise levels for both day and nighttime periods have been assessed using:

- The highest 1-hour interval $L_{Aeq,T}$ and octave band sound levels for both day and nighttime.
- The L_{AFmax} maximum value analysis from the nighttime.

With the following considerations:

- The most onerous glazing and ventilation specification between MP3 and MP4 will be applied universally to the whole rear façade.
- Due to the front façade being in a conservation area, windows to the Regent Street are to be retained. As such, a secondary window specification is recommended.

7.1 Glazing & Ventilation Specification 1 – Front Façade

The glazing specification in all habitable rooms on the front façade should consist of at least 4mm glass (existing) / 100mm void / 6mm glass secondary window unit; in well-sealed frames.

The ventilation specification should consist of a quality mechanical system or a passive acoustic vent as shown in the table below.

Room	Glazing	Ventilation
Bedrooms	Existing single-glazed sash window / 100mm void / 6mm glass	Greenwood MA3051 wall acoustic vent or Active MV ventilation
Living rooms		

Table 10: Specification 1

Existing windows must be made good and to ensure the frames are well sealed and tightly fitted with no cracks or gaps. The reveals of the secondary glazing should be well sealed and preferably lined with an absorbent material.

7.2 Glazing & Ventilation Specification 2 – Rear Façade

The glazing and ventilation specification in bedrooms & living rooms is outlined in the table below. Two glazing options will be set out, a triple-glazing unit comprising a typical double-glazed unit with a secondary window and a double Pilkington Optiphon unit. Both options will require replacing any existing window sets.



Room	Glazing	Ventilation
Bedrooms	Option 1 – Double Glazing + Secondary window 6mm glass / 16mm air / 4mm glass / 150mm air / 6mm glass Option 2 – Double glazing 12.8mm Optiphon / 20mm argon / 16.8mm Optiphon	Greenwood MA3051 wall acoustic vent or mechanical ventilation
Living rooms	8mm glass / 16mm air / 4mm glass	Greenwood Vent 5000EA + 2 Acoustic Set or mechanical ventilation

Table 11: Specification 2

Additionally, upgrades i.e. independent acoustic wall lining to the external wall in bedrooms will be required in order to achieve the internal noise level criteria, as shown in the following section.

7.2.1 External Wall Specification

The external wall specification in bedrooms is shown in the table below.

Room	External Wall Construction	Upgrade
Bedrooms	Existing 300mm solid brickwork	- External wall. - 15mm cavity. - 75x50mm timber batten filled with 50mm mineral wool insulation of 45kg/m³. - 2 no. layers of 15mm sound/fire rated plasterboard.
Living rooms		None

Table 12: External Wall Upgrade for Specification 2

7.3 Glazing & Ventilation Specification 3 – West Façade

The glazing and ventilation specification in bedrooms & living rooms should consist of double-glazed unit in well-sealed frames and a quality mechanical system or a passive acoustic vent as shown in the table below.

Room	Glazing	Ventilation
Bedrooms	10mm glass / 16mm argon / 8.8mm Optiphon	Greenwood MA3051 wall acoustic vent or mechanical ventilation
Living rooms	8mm glass / 16mm air / 4mm glass	Greenwood Vent 5000EA + 2 Acoustic Set or mechanical

Table 13: Specification 3

7.4 Glazing & Ventilation Specification 4 – Atrium Façade

The glazing and ventilation specification in bedrooms & living rooms should consist of double glazed unit in well-sealed frames and a quality mechanical system or a passive acoustic vent as shown in the table below.



Room	Glazing	Ventilation
Bedrooms	8mm glass / 16mm air / 4mm glass	Greenwood Vent 5000EA + 2 Acoustic Set or mechanical
Living rooms		

Table 14: Specification 4

7.5 Habitable Room Ceilings in Roof Space

All ceilings/roof in bedrooms and living rooms on the top floor are assumed to be constructed of a min. 100mm concrete structure. This construction should be capable of meeting the minimum required sound reduction.

7.6 Specification Guide



Below is a visual aid to identify the location of the glazing specifications as described above for all floors.

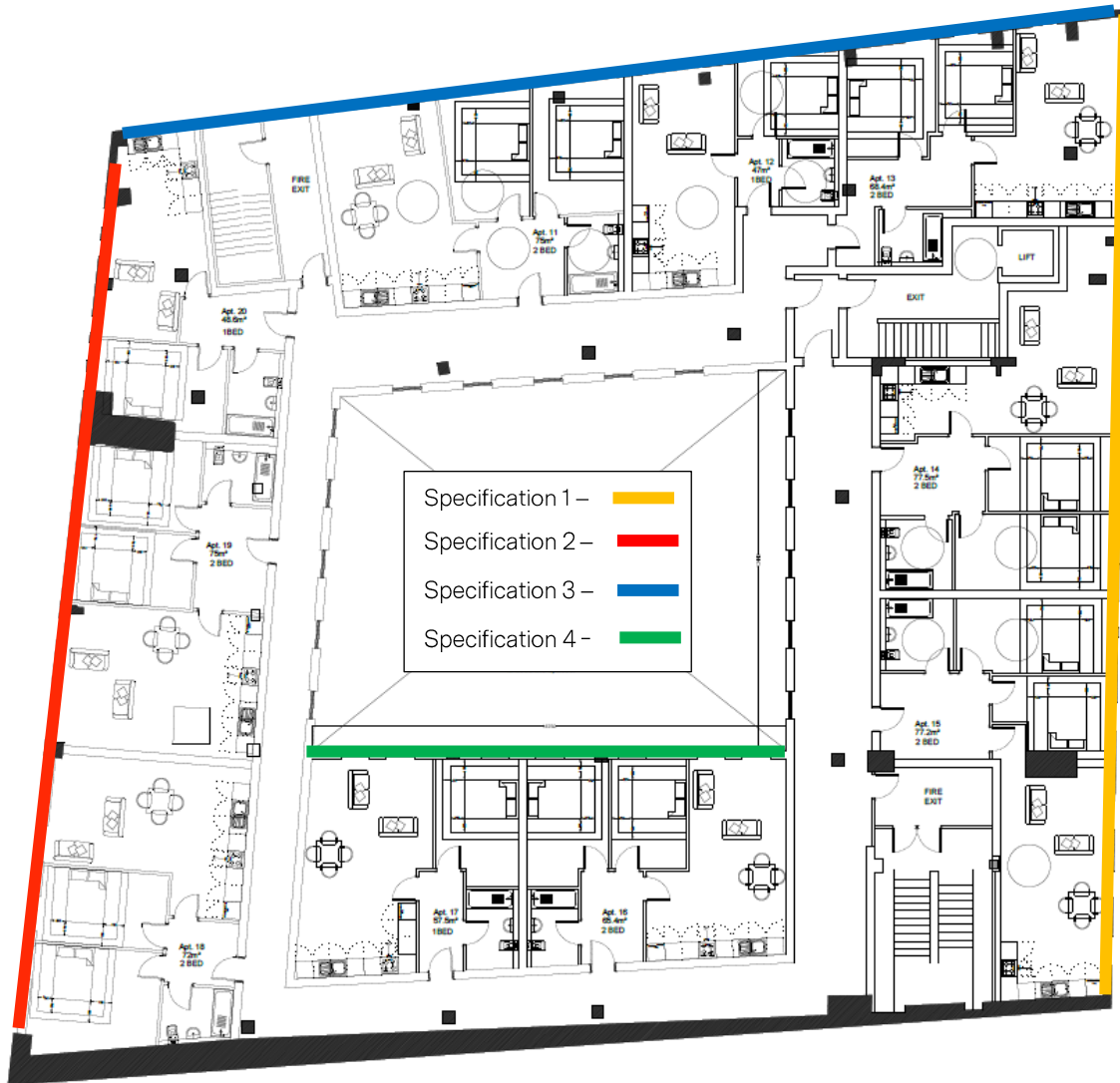


Figure 2: Specification Guide

7.7 Notes on Ventilation

NOTE 5 in section 7.7.2 of BS 8233:2014 states “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.”

It should be noted that it’s the responsibility of JSM Company Group Limited to ensure that the ventilation strategy is sufficient to meet the requirements of Building Regulations Part F

It is our understanding that all dwellings may be ventilated either with passive vents or mechanically ventilated. Where mechanical ventilation is utilised, the system is to be designed by a suitably qualified engineer or M&E consultant. The system shall be designed so the sound levels from any external plant or inlet/outlets do not exceed the background noise level at any noise receptor, i.e., outside a neighbouring window. This may require further assessment once the type and location of system has been specified.



The glazing and ventilation suggestions have been calculated assuming the windows are tightly closed. However, it must be noted that windows are suggested to be openable to provide rapid or purge ventilation or means of escape.



8 Calculation Methodology

Calculations for the BS 8233:2014 assessment have been based on the rigorous calculation method of BS 8233:2014 and BS EN 12354-3.

In order to calculate the glazing recommendations, the measurements at all positions have had a façade correction of 3 dB applied in order to adjust the measurement so that it is comparable to a free-field sound pressure level.

The calculations are based on one vent per room. If more ventilation is required, then further calculations will need be carried out. Part F (Ventilation) expert advice must be sought

All room dimensions used in calculations are based on drawings provided by the architect. See appendix – Site plans.

The calculations assume the external walls to be solid brickwork. Some building elements have been modelled in INSUL Acoustic Prediction Software with a 3 dB correction applied to account for a margin of error within the software.

The calculations assume each living room has a reverberation time of 0.5 and each bedroom of 0.4 seconds.

The predictions also have been calculated assuming all windows are tightly closed.

8.1 Building Elements

The following table shows the expected performance of the glazing and ventilation. The selected units or products described have been used as a guide to form part of the specification. Other similar units or products can be used provided they can achieve the given minimum acoustic performance.

Element	Description	$R_w/D_{n,e,w}$ (C, C_{tr}) (dB)	Octave Centre Frequencies (Hz) SRI / $D_{n,e}$ (dB)					
			125	250	500	1k	2k	4k
Glazing	4mm / 100mm / 6mm secondary glazing	46 (-2;-7)	27	33	46	57	52	50
	6mm / 16mm / 4mm / 150mm / 6mm double glazing + secondary window	46 (-1;-4)	31	37	43	48	45	58
	12.8mm / 20mm / 16.8mm Pilkington Optiphon	51 (-1;-4)	35	45	49	50	54	65
	10mm / 16mm / 8.8mm Pilkington Optiphon	44 (-2;-6)	28	31	42	45	50	58
	8mm / 16mm / 4mm double glazing	33 (-1;-4)	22	21	28	38	40	47
Ventilation	Greenwood MA3051 Acoustic Wall Ventilator	55 (-1;-3)	47	46	49	56	66	69
	Greenwood EA5000.AC2 Acoustic Passive Vent	42 (-2;-4)	40	38	32	47	54	48



Table 15: Table showing suggested Glazing & Ventilation

8.2 Example of Estimated Performance

The following table compares the estimated performance values with the measured values at the most exposed habitable rooms for each façade, thus representing a worst-case scenario.

Location	Room	Time period	Measured Level		Estimated Internal	
			$L_{Aeq,T}$ (dB)	L_{AFmax} (dB)	$L_{Aeq,T}$ (dB)	L_{AFmax} (dB)
Front Façade	Bedroom	Daytime (07:00 – 23:00)	64.2	–	25.2	–
		Nighttime (23:00 – 07:00)	60.8	91.1	21.1	41.6
	Living room	Daytime (07:00 – 23:00)	64.2	–	22.7	–
Rear Façade $L_{Aeq,1hour}$	Bedroom w/ double glazing & secondary window + wall lining	Daytime (07:00 – 23:00)	59.8	–	16.2	–
		Nighttime (23:00 – 07:00)	59.1	83.6	29.9	38.7
	Bedroom w/ Optiphon + wall lining	Daytime (07:00 – 23:00)	59.8	–	15.7	–
		Nighttime (23:00 – 07:00)	59.1	83.6	29.9	37.7
	Living room	Daytime (07:00 – 23:00)	59.8	–	27.1	–
West Façade	Bedroom	Daytime (07:00 – 23:00)	62.1	–	16.6	–
		Nighttime (23:00 – 07:00)	56.5	82.3	16.4	43.2
	Living room	Daytime (07:00 – 23:00)	62.1	–	22.9	–

Table 16: Estimated performance



9 Conclusion

When installing the glazing and ventilation detail as well as any other relevant external wall upgrades as discussed in the recommendations section, the recommended internal noise levels described in BS 8233:2014 can be achieved in all habitable rooms.

The report has considered the commercial character and noise profile of the area, including entertainment noise, especially at the rear façade overlooking the Rocking Chair, considering all elements of the building fabric, including external wall, glazing and roof following a stricter methodology.



10 References

Planning Policy Wales Edition 11: February 2021

Planning Policy Wales Edition 12: February 2024

BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings

World Health Organisation Guidelines for Community Noise

BS 7445-1:2003 Description and measurement of environmental noise – Part 1: Guide to quantities and procedures

BS EN 12758:2011 Glass in building – Glazing and airborne sound insulation

[openstreetmap.org](https://www.openstreetmap.org)

INSUL 9.0 Sound Insulation Prediction Software

10.1 Drawing References

520-P-02 First Floor

520-P-03 Second Floor

520-P-04 Elevations



Appendix

Figure 1: Photograph showing Monitoring Position 1



Figure 2: Photograph showing Monitoring Position 2



Figure 3: Photograph showing Monitoring Position 3



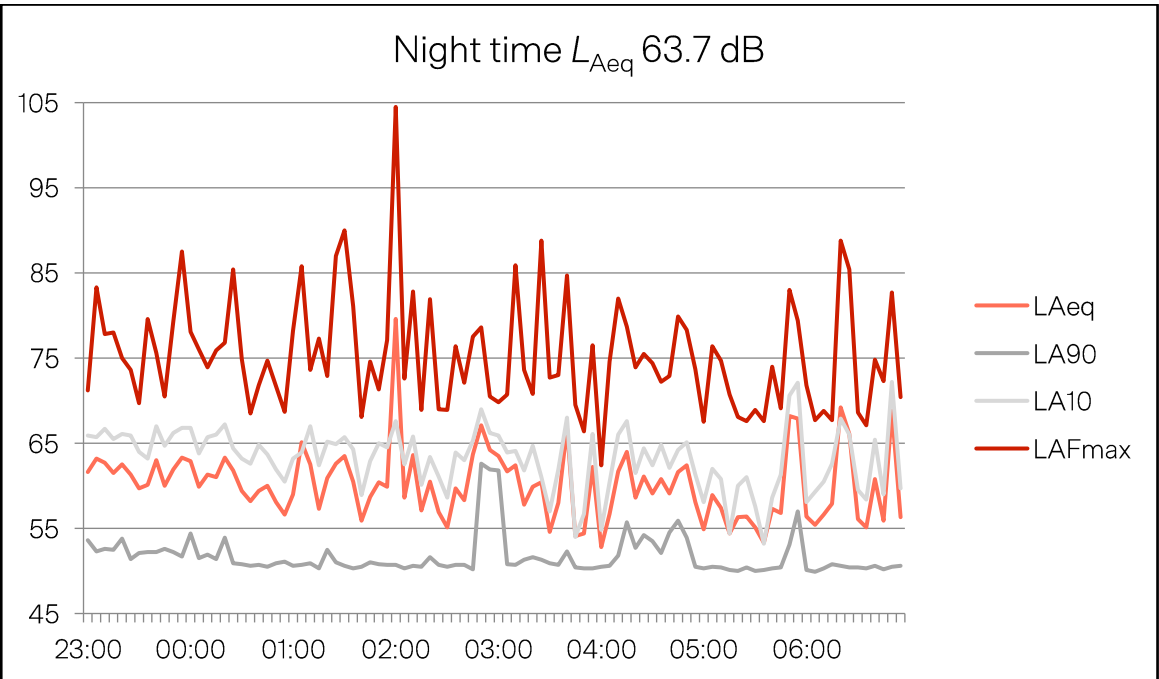
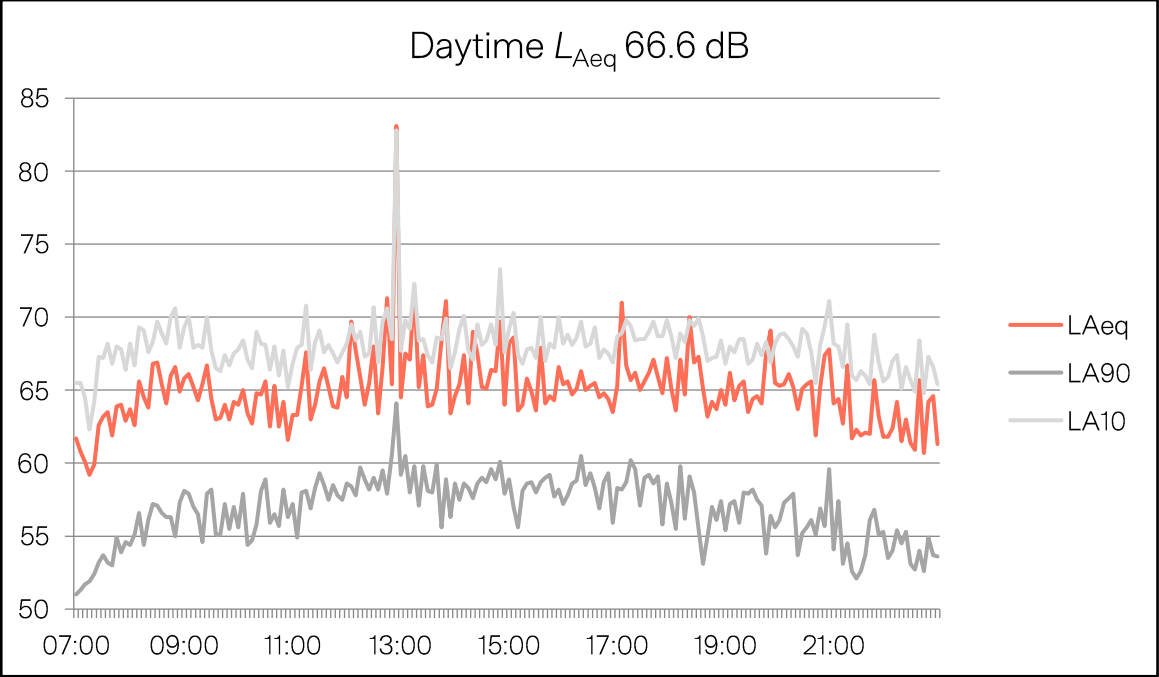
Figure 4: Photograph showing Monitoring Position 4 (2nd Visit)



Measurement Results

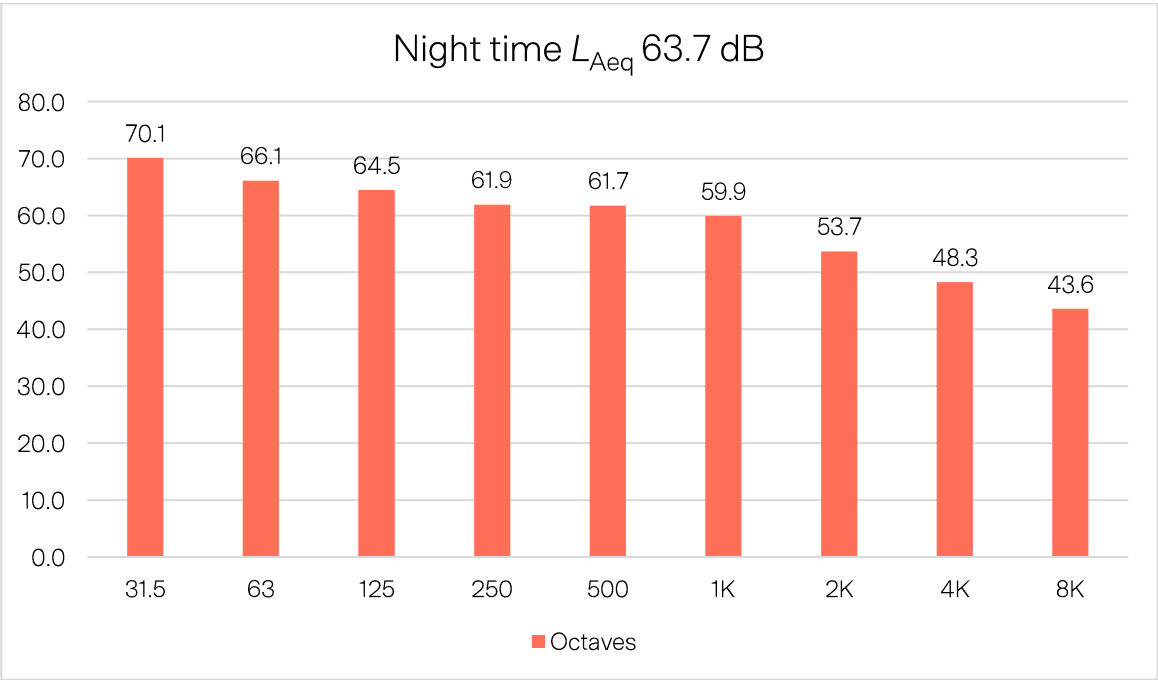
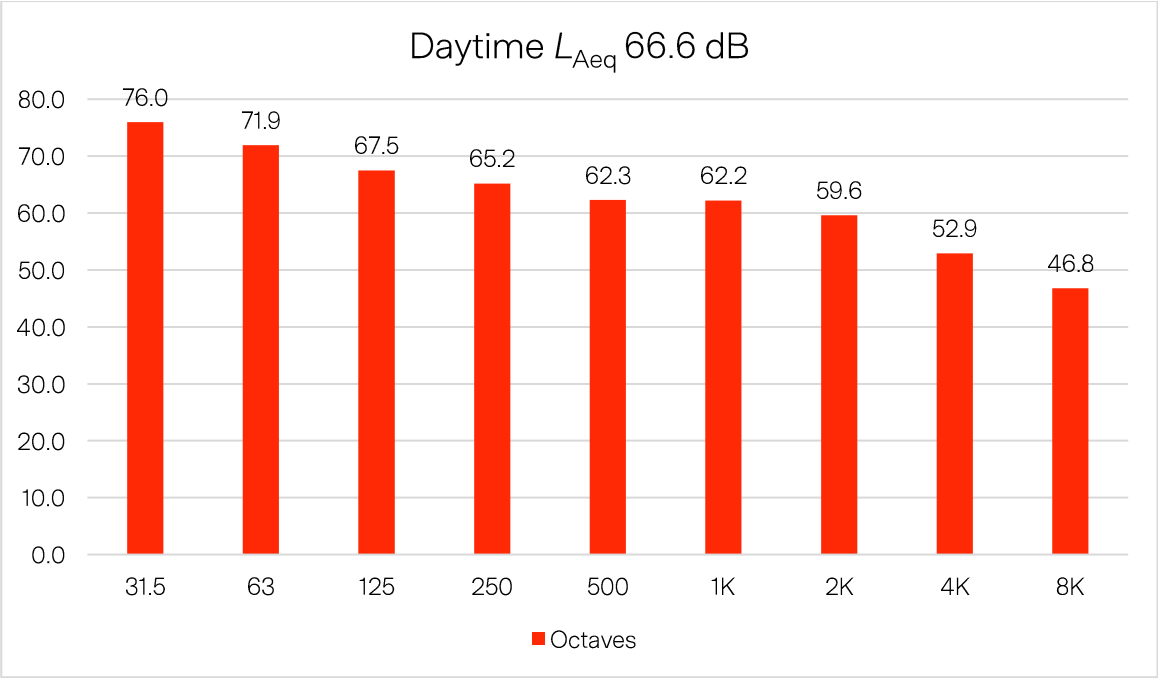
Monitoring Position 1

Friday/Monday

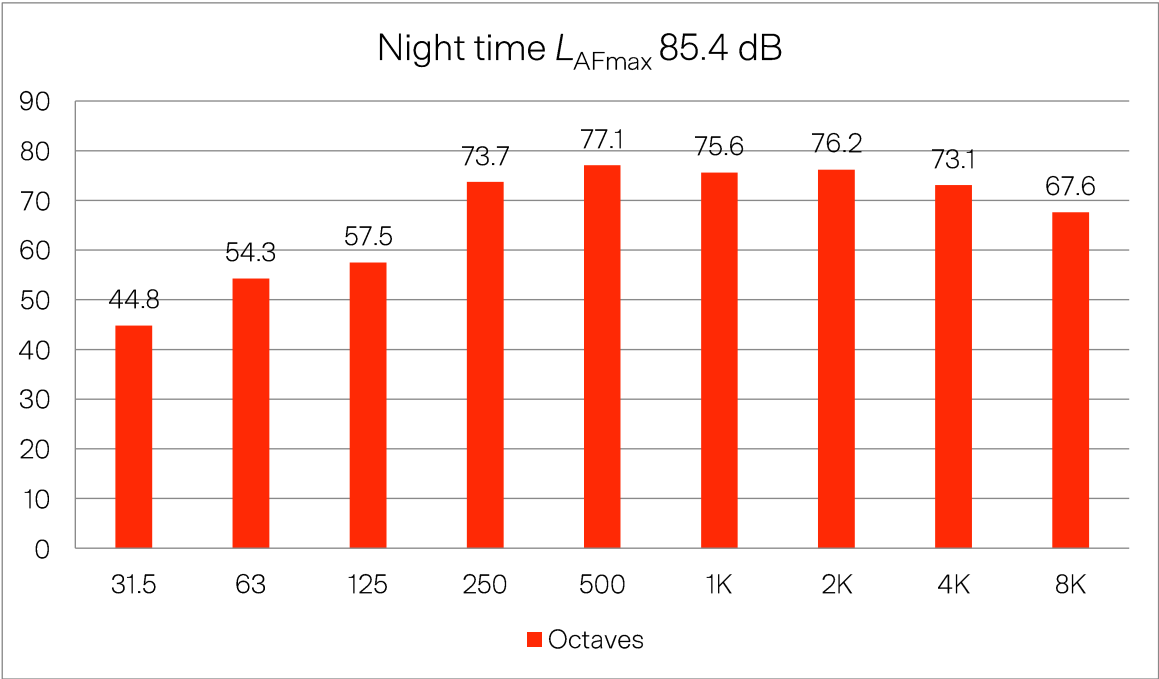


SPRATT+HAMER

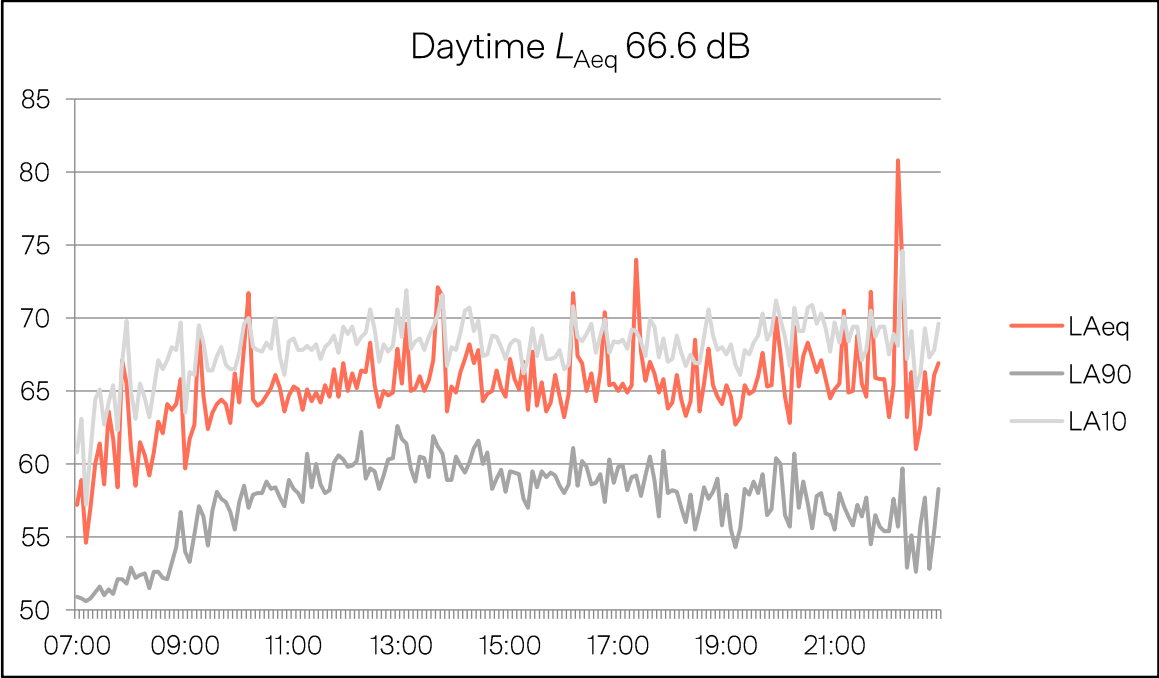
Un-weighted 1:1 Octave Results

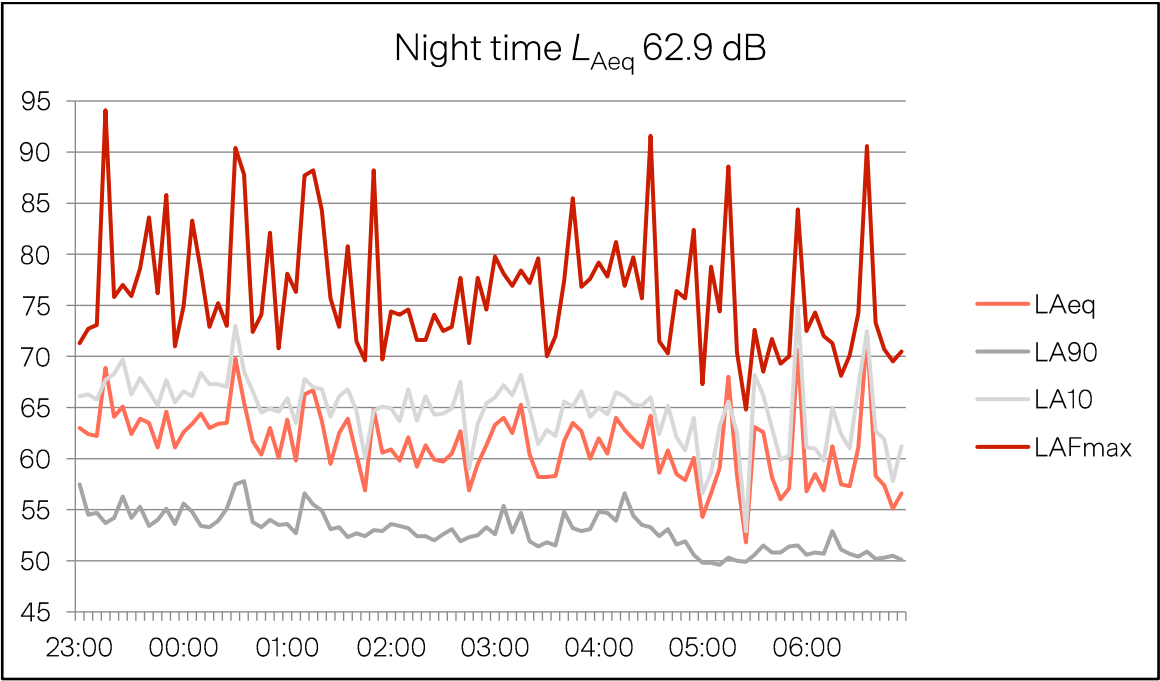


SPRATT+HAMER

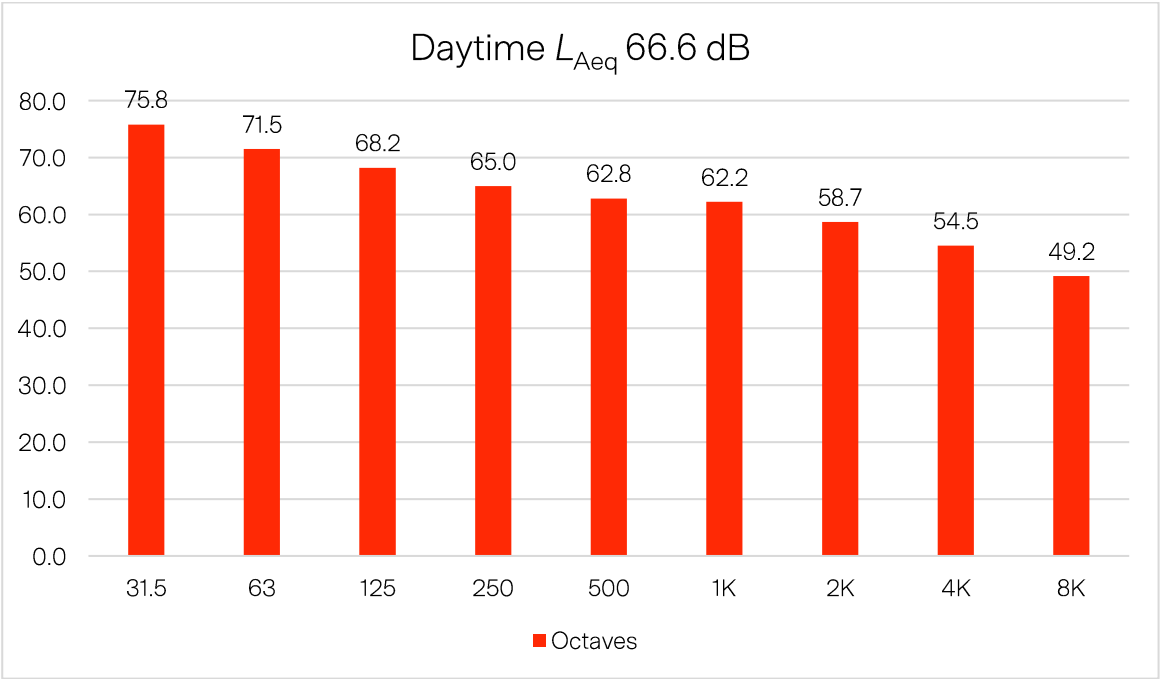


Saturday

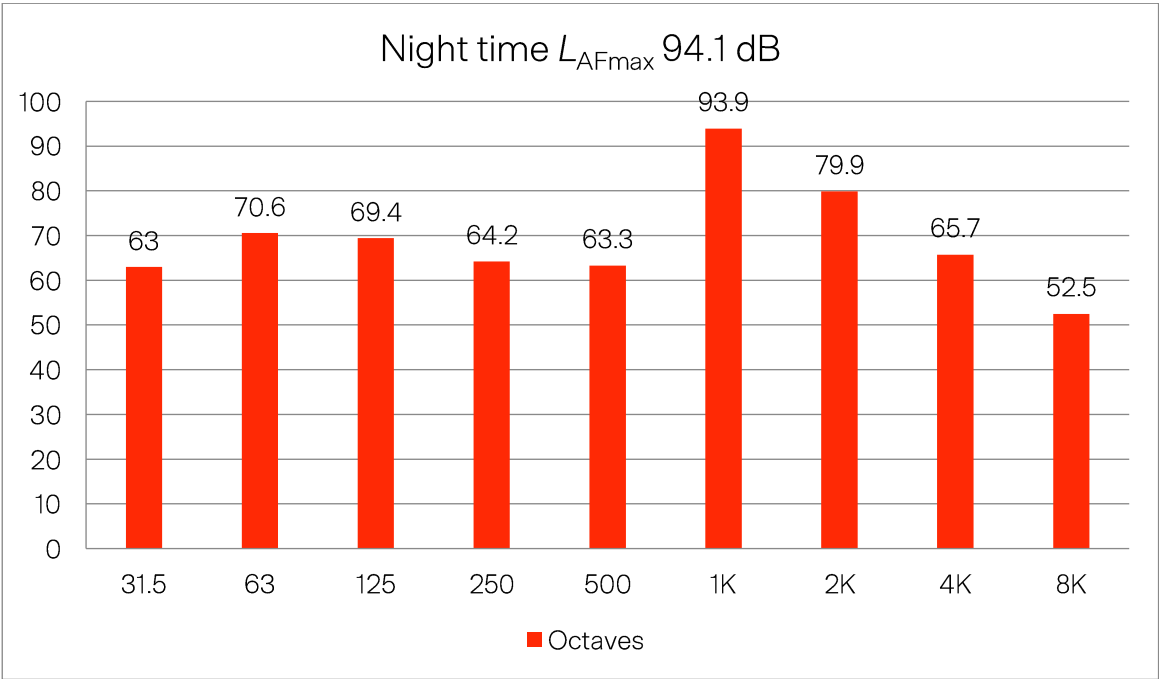
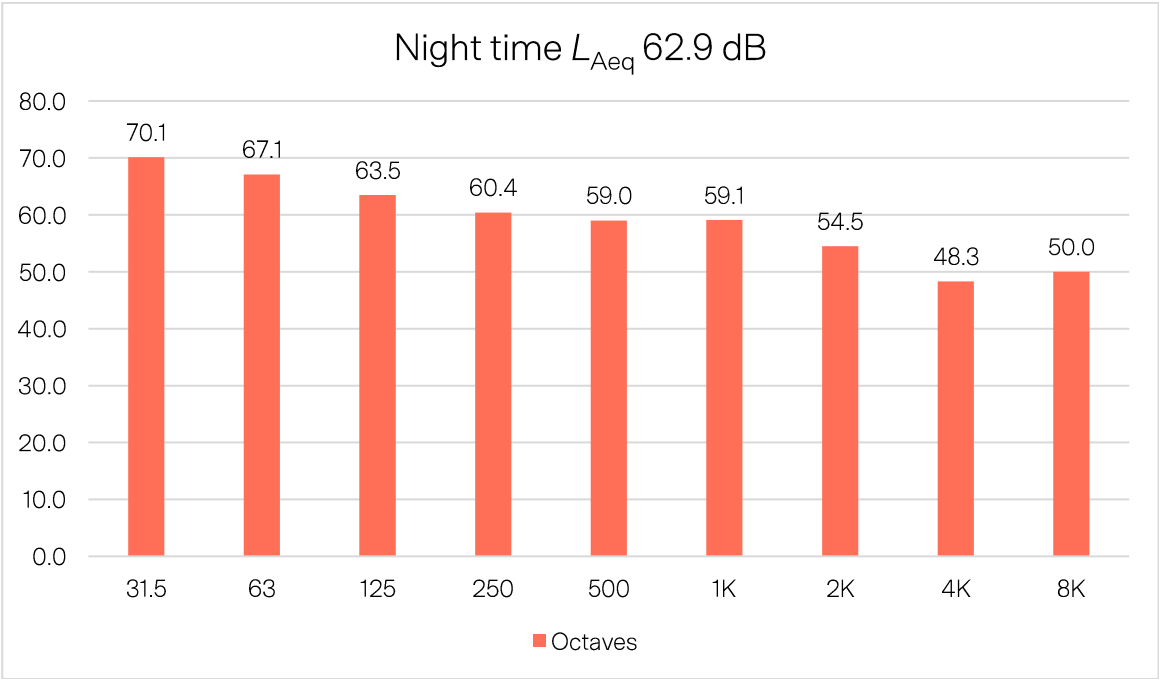




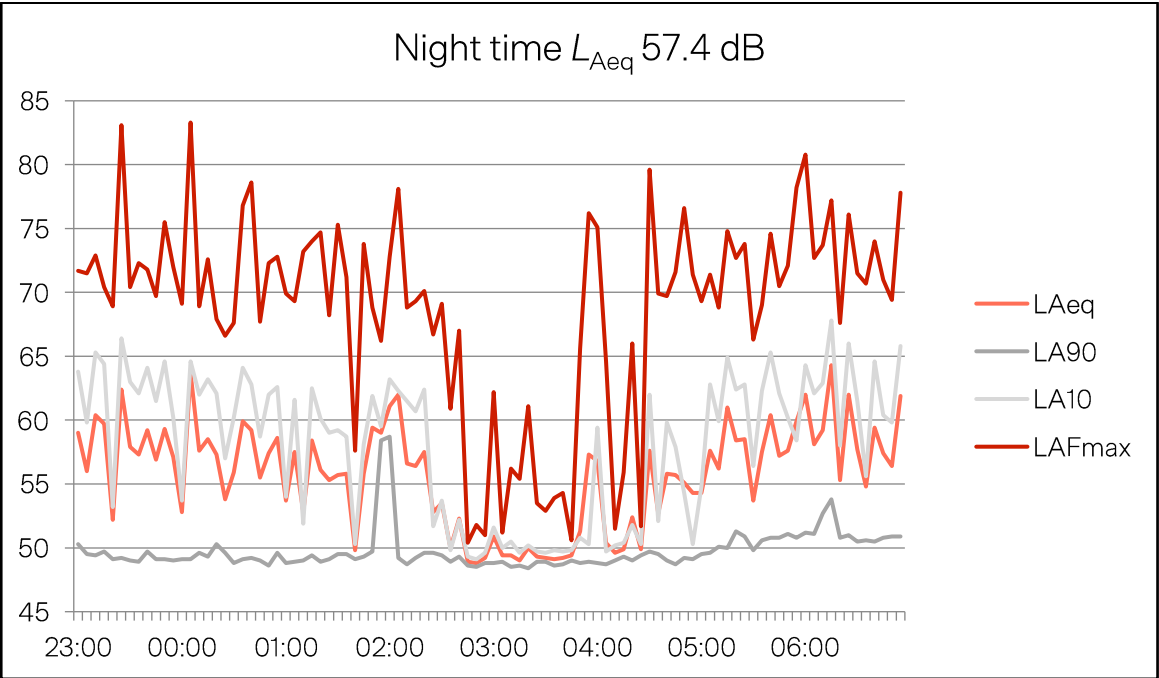
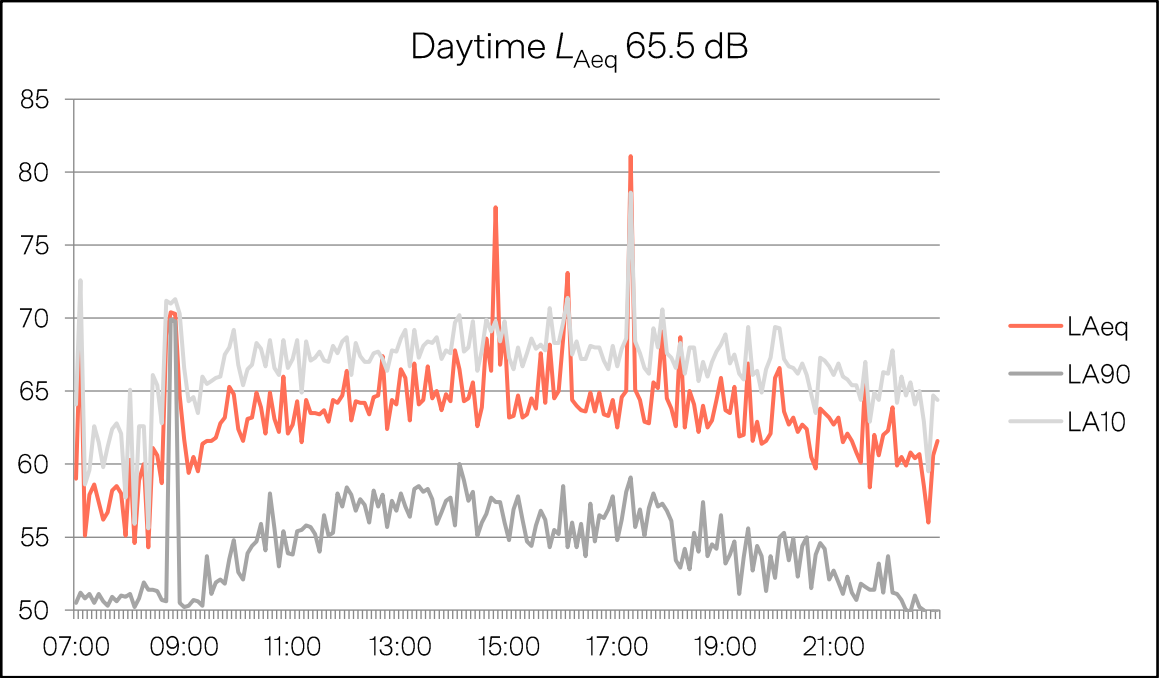
Un-weighted 1:1 Octave Results



SPRATT+HAMER

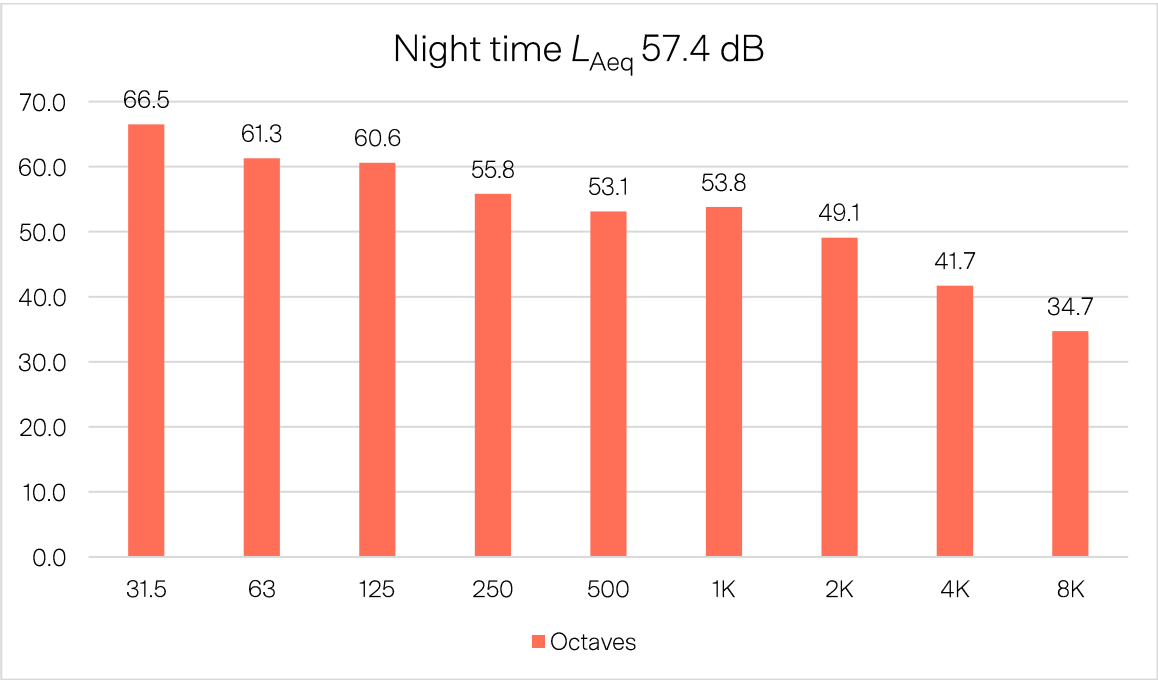
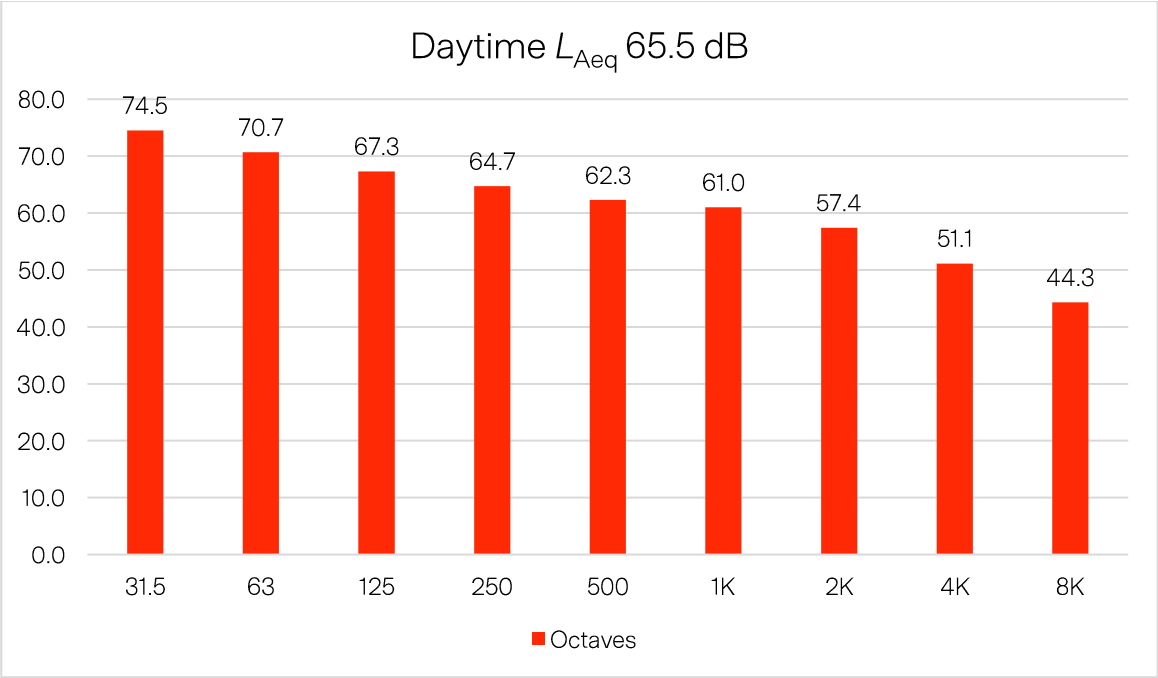


Sunday

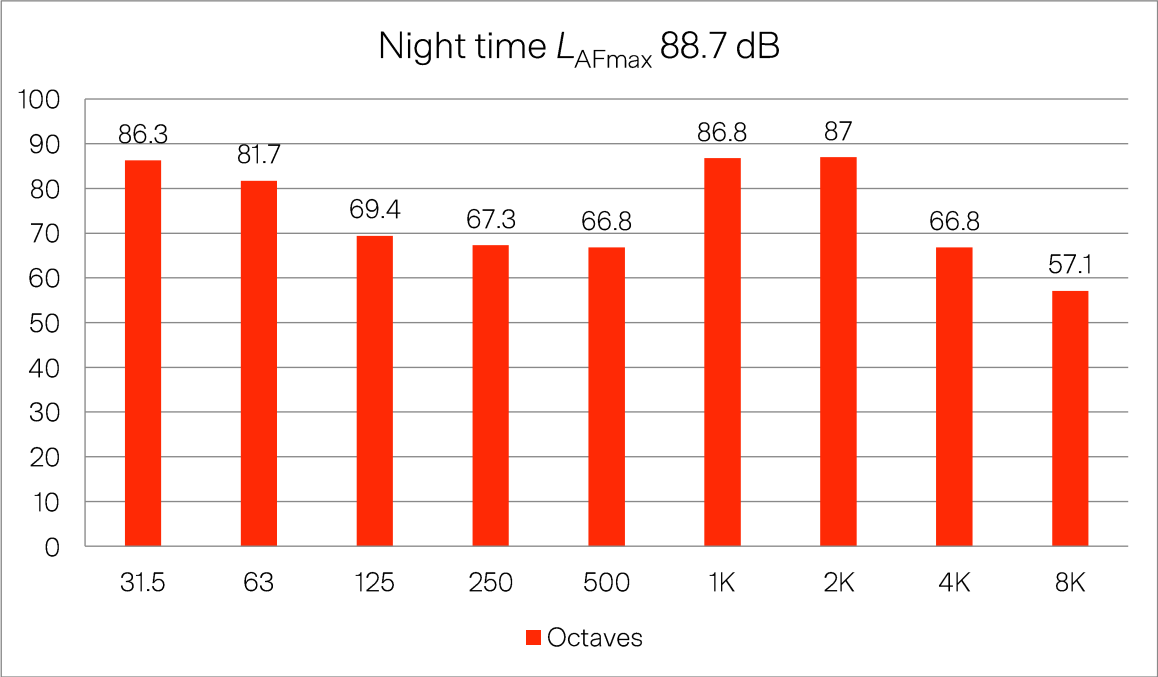


SPRATT+HAMER

Un-weighted 1:1 Octave Results

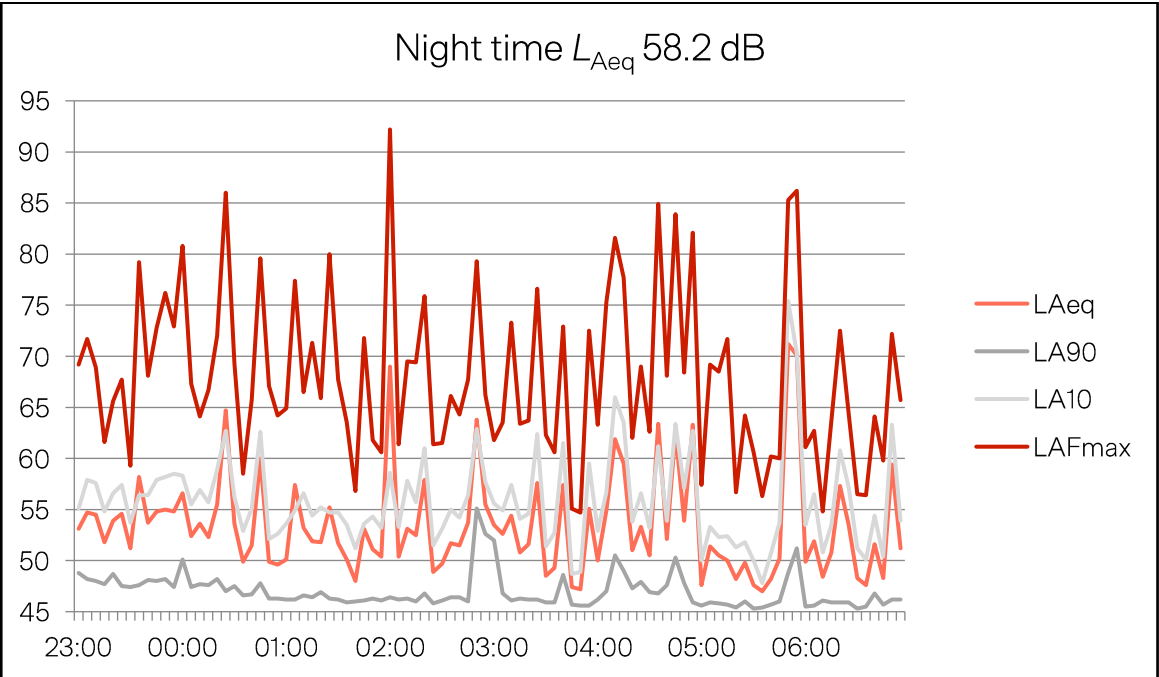
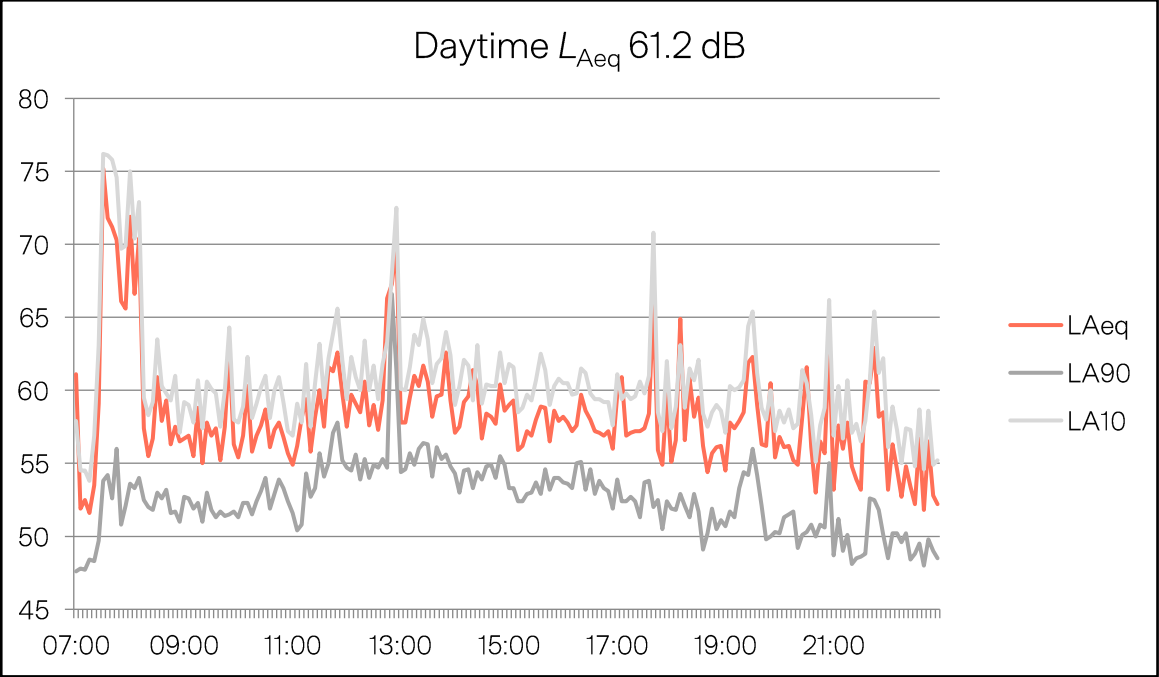


SPRATT+HAMER



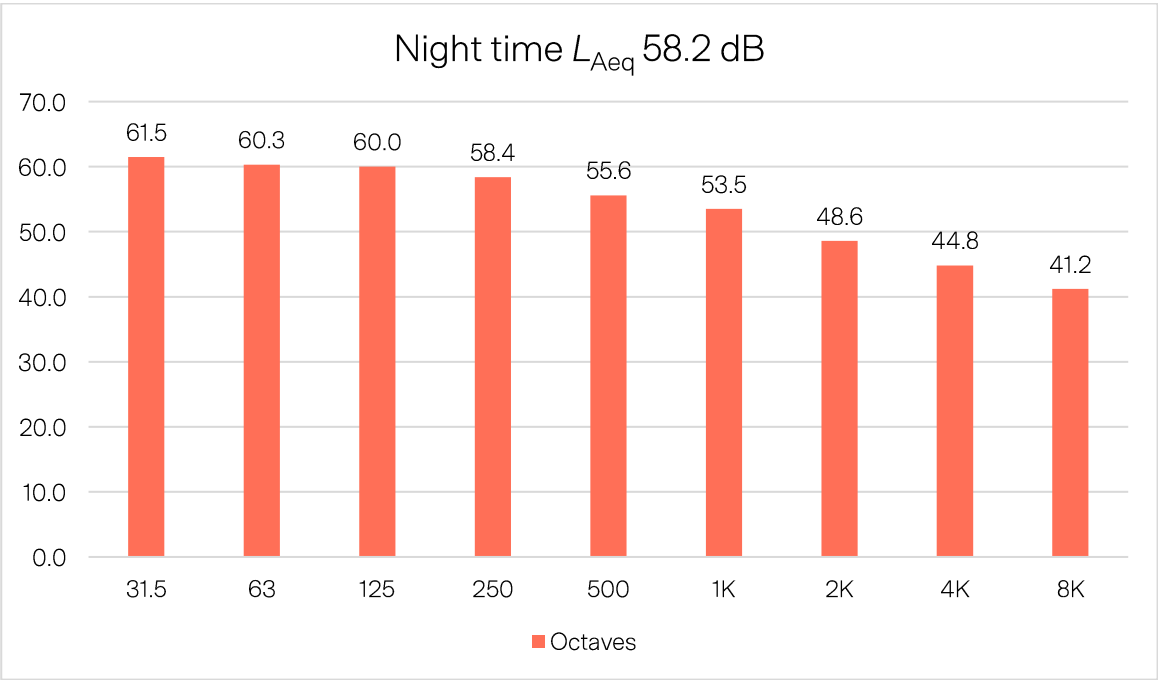
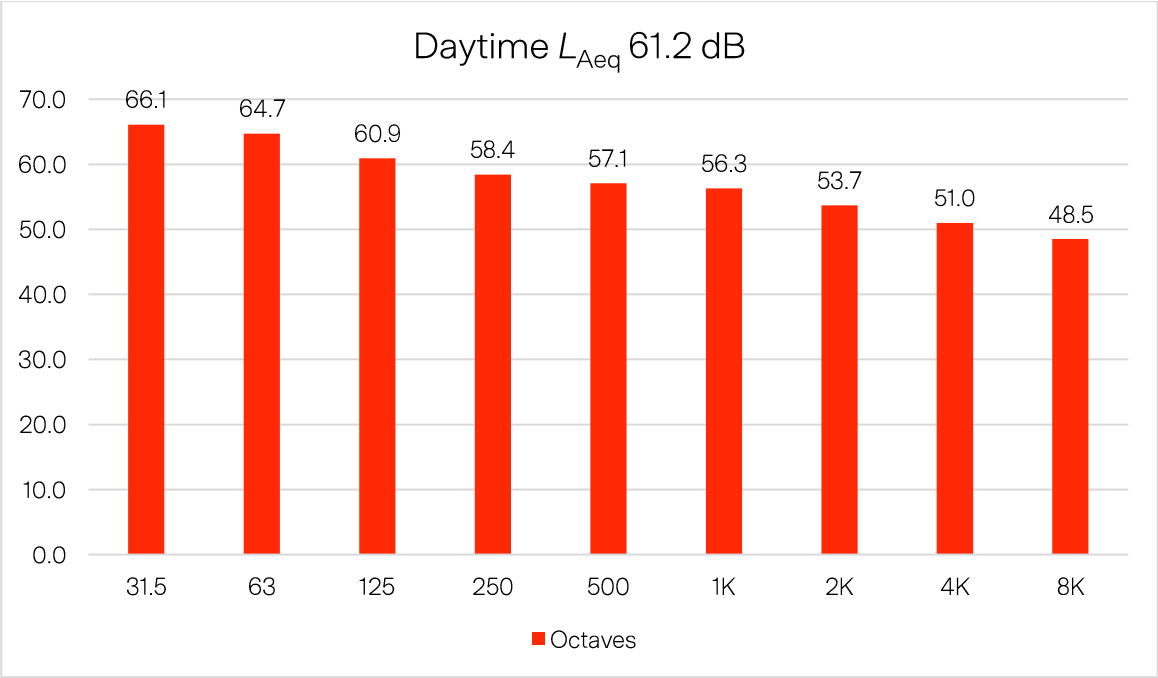
Monitoring Position 2

Friday/Monday

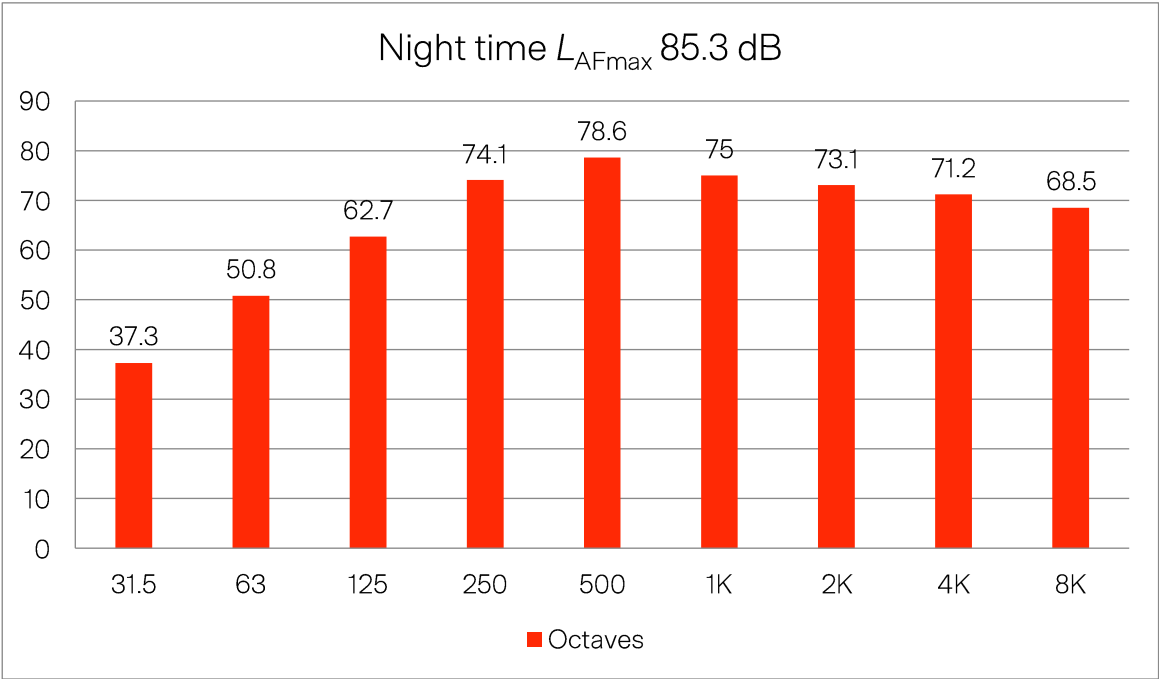


SPRATT+HAMER

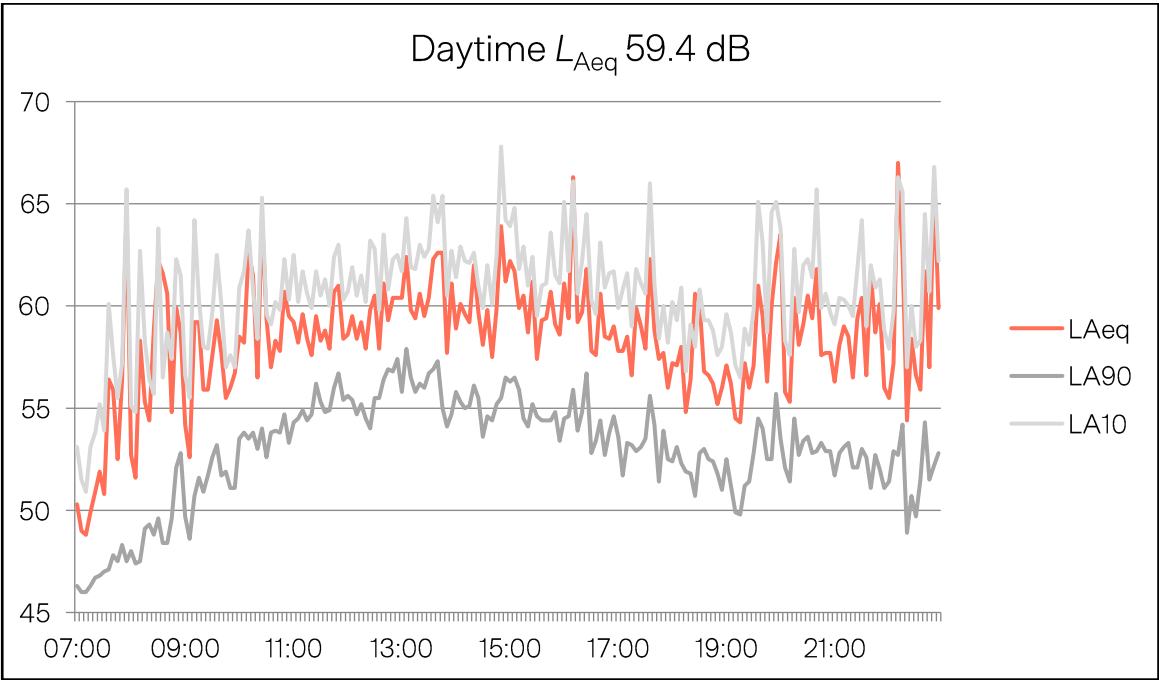
Un-weighted 1:1 Octave Results

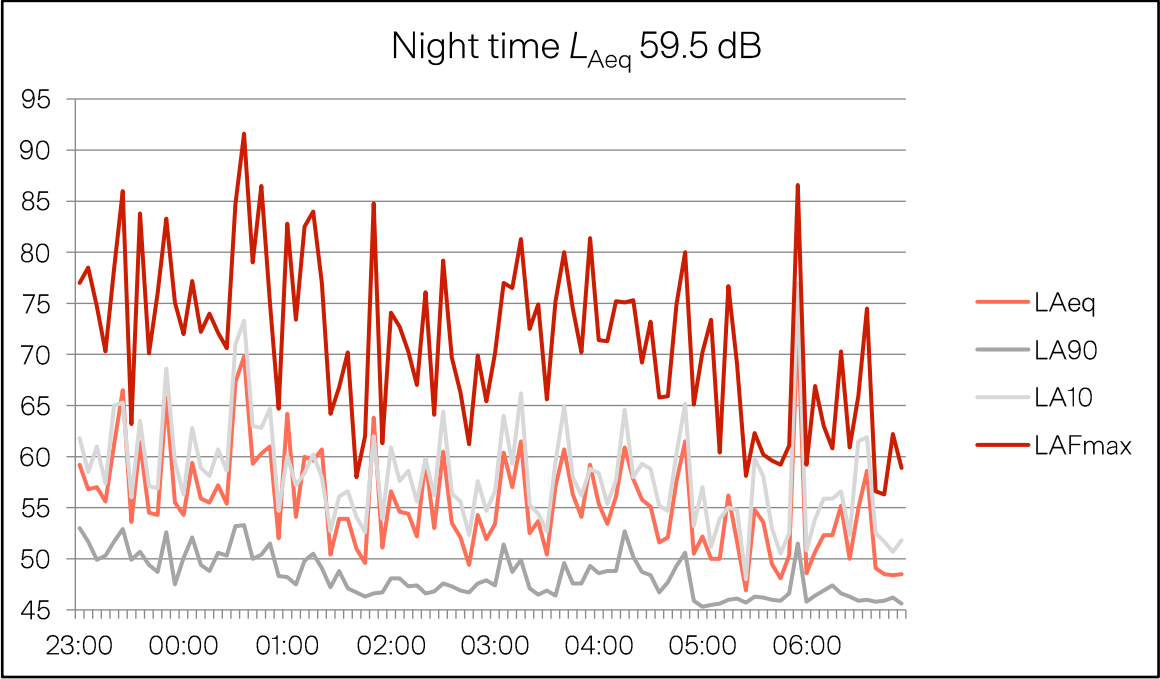


SPRATT+HAMER

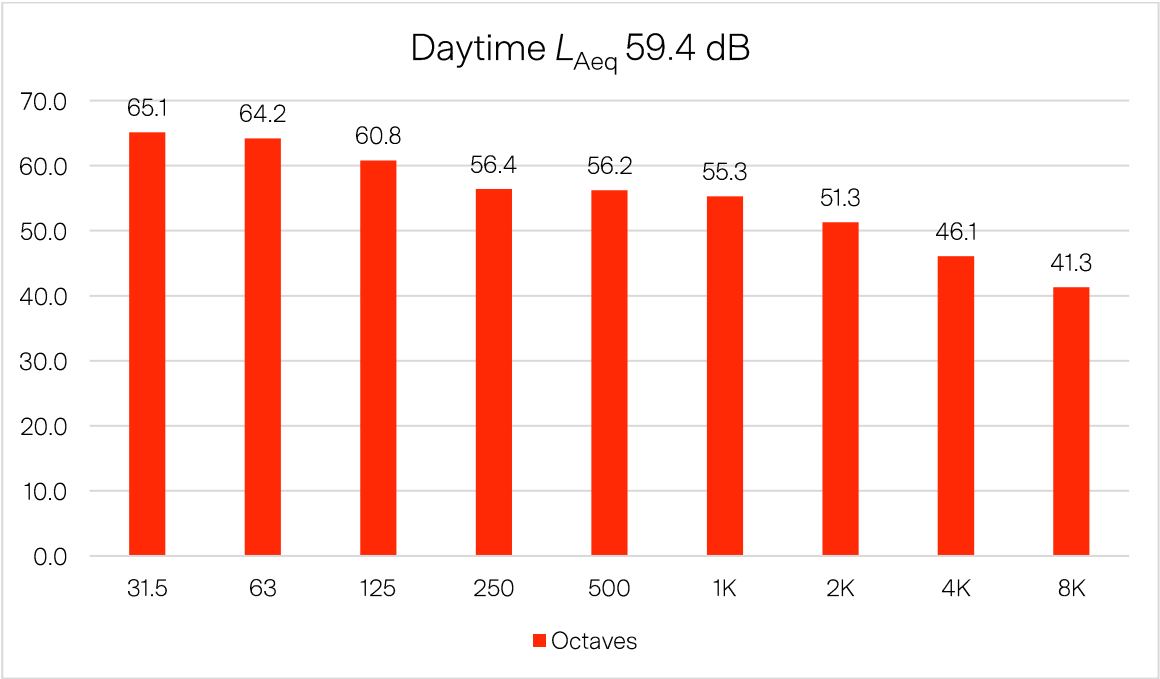


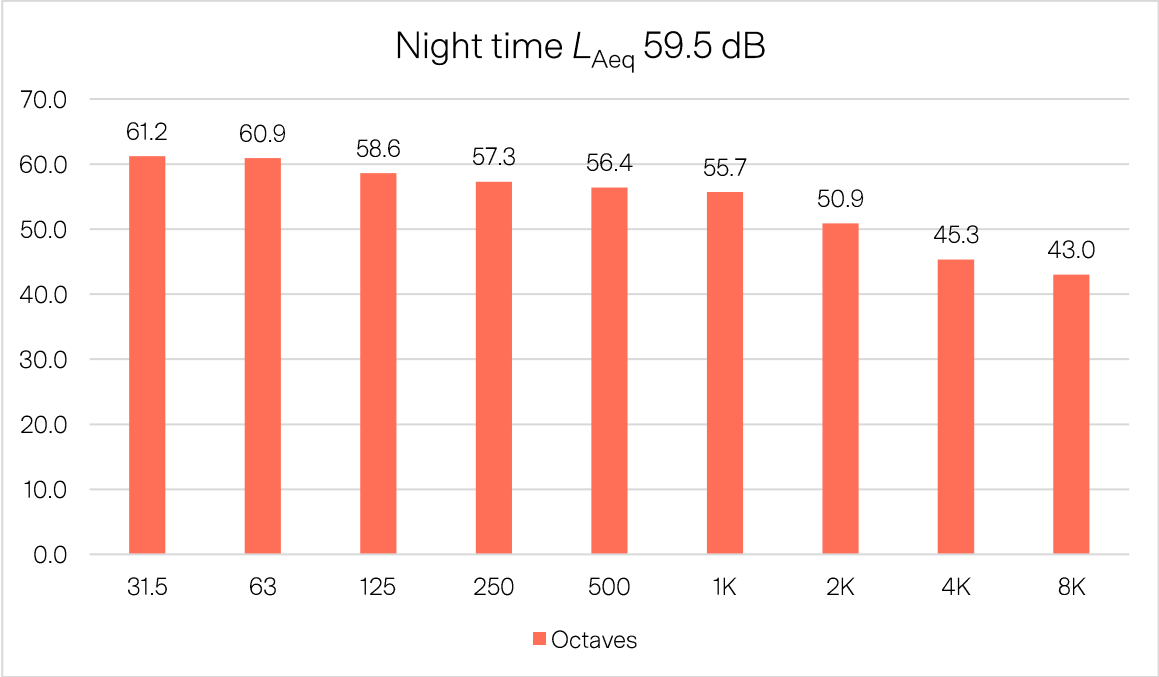
Saturday



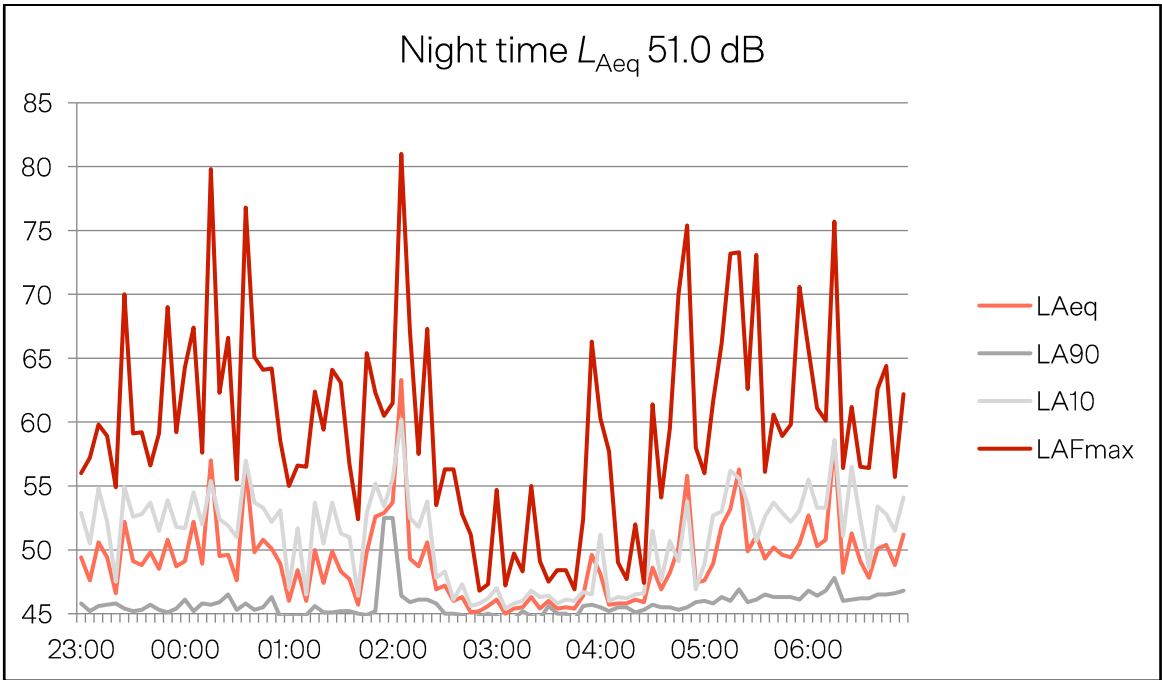
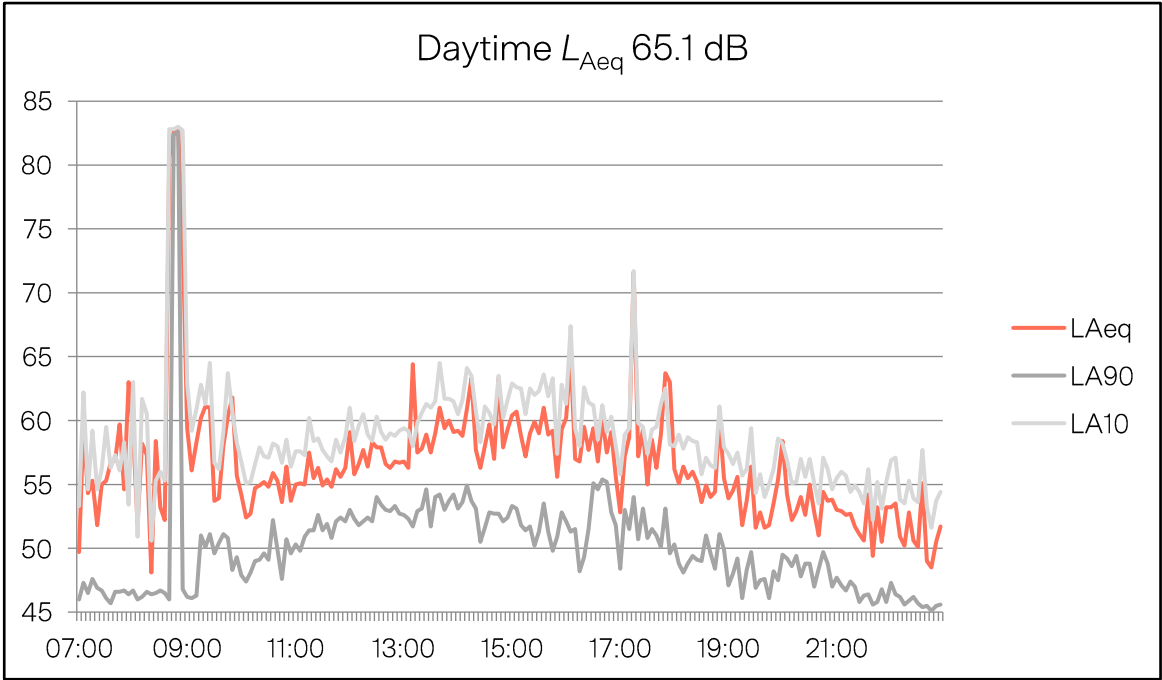


Un-weighted 1:1 Octave Results



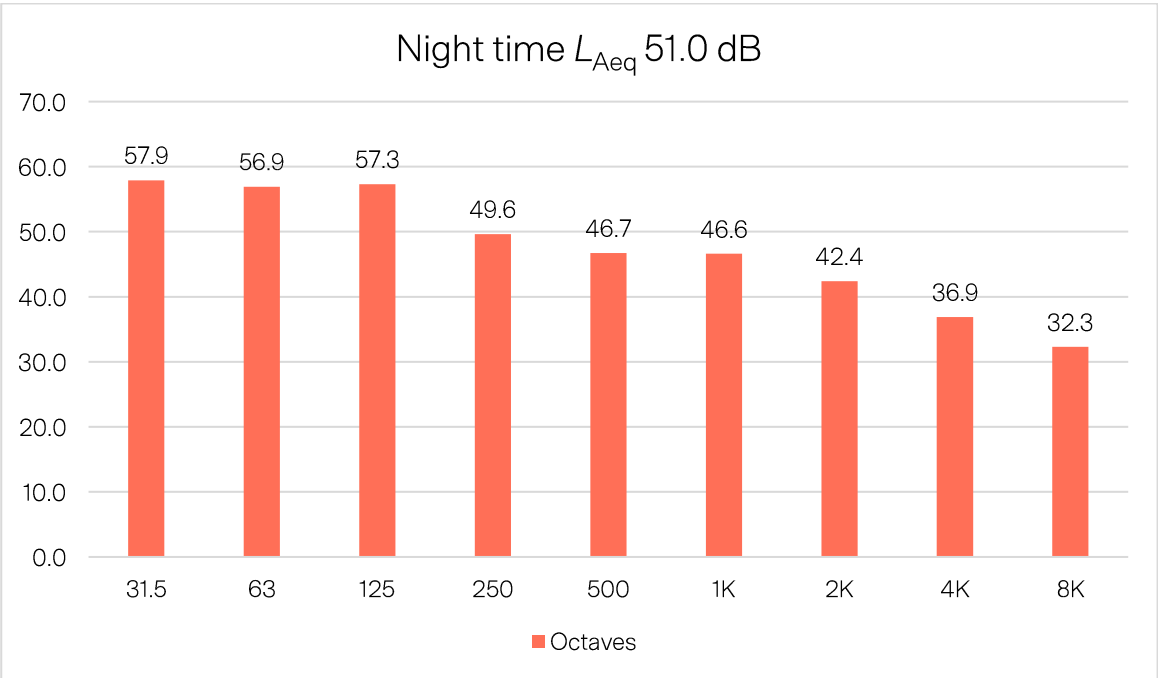
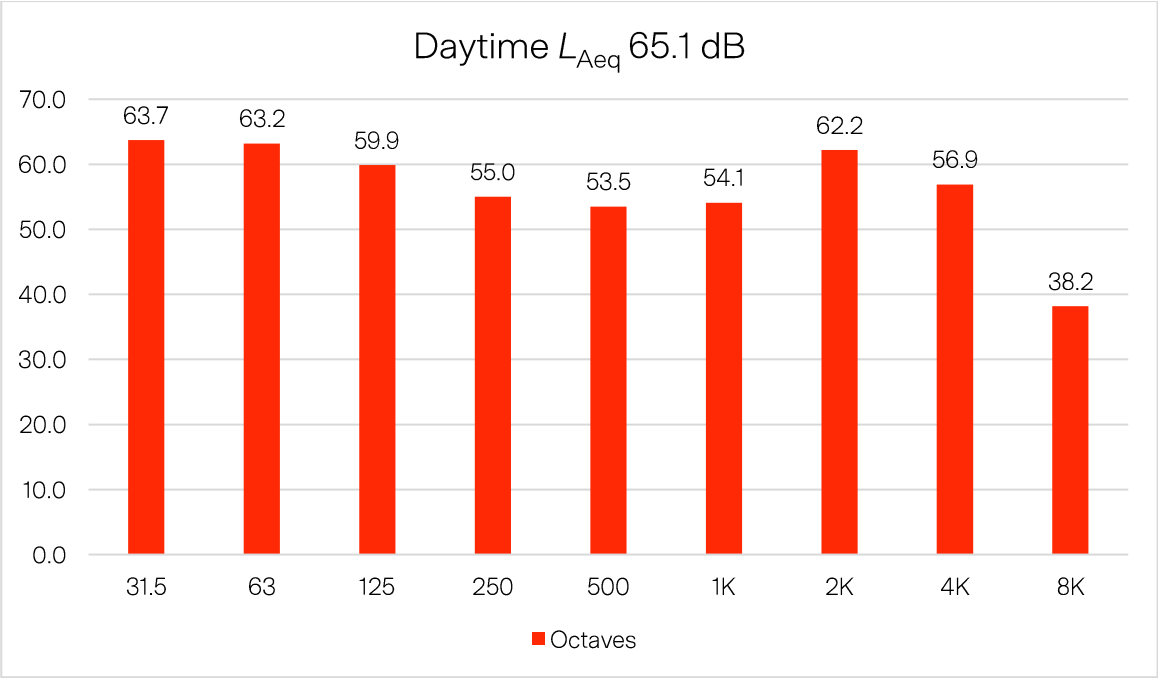


Sunday



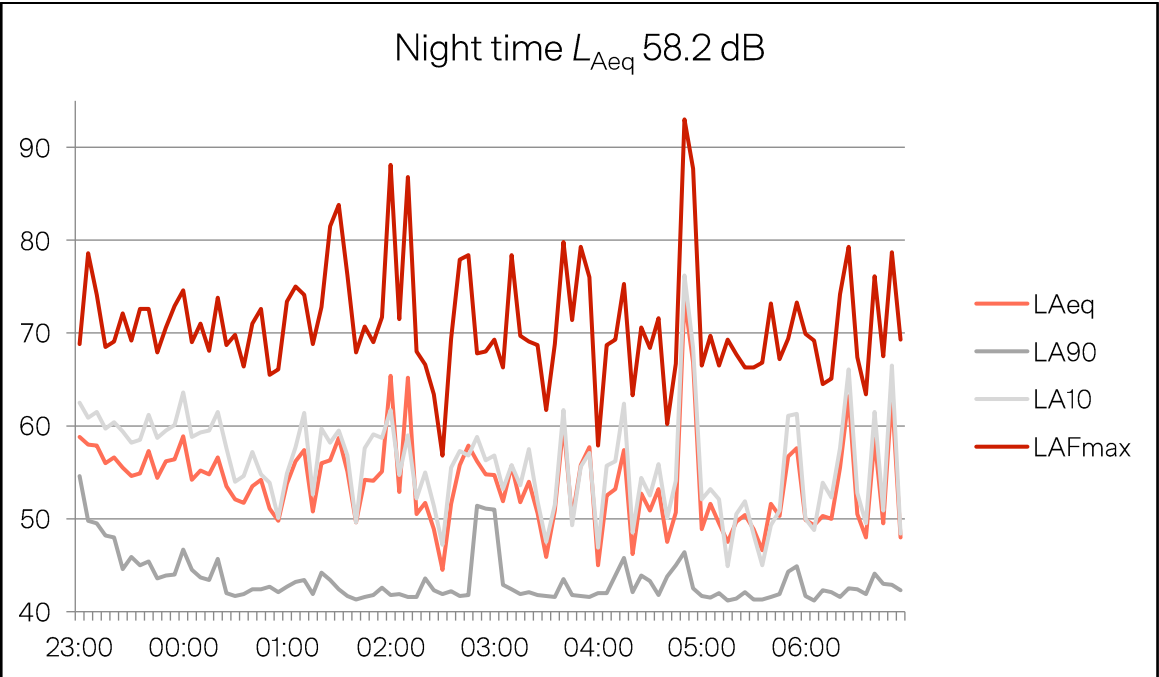
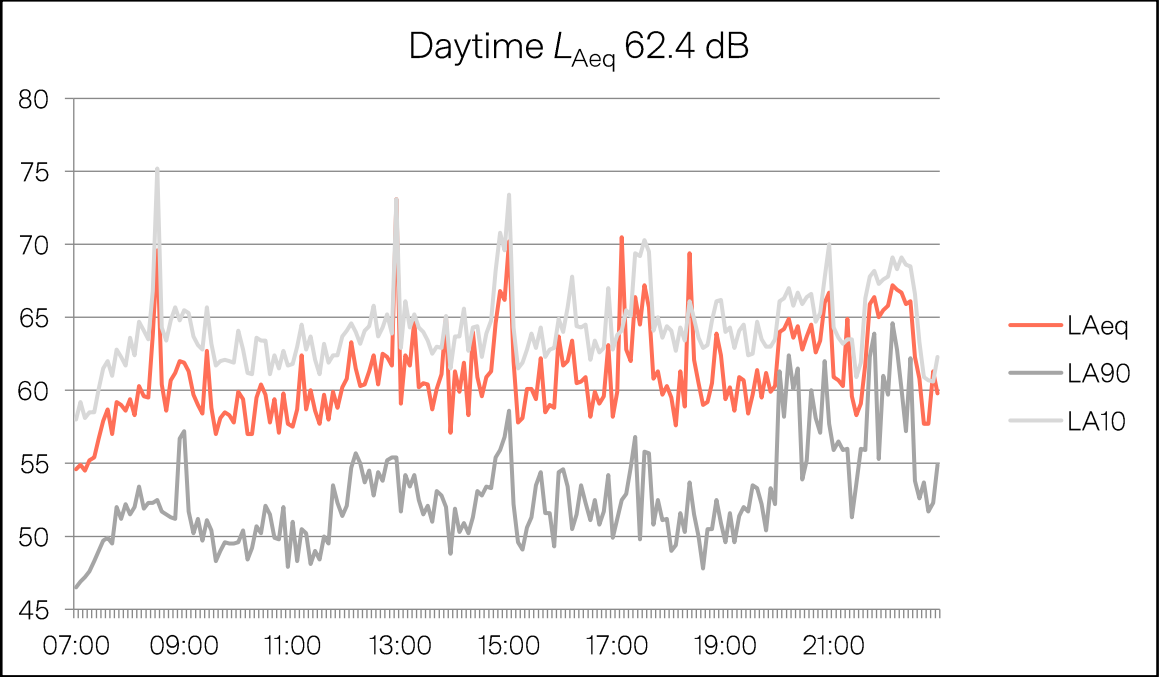
SPRATT+HAMER

Un-weighted 1:1 Octave Results



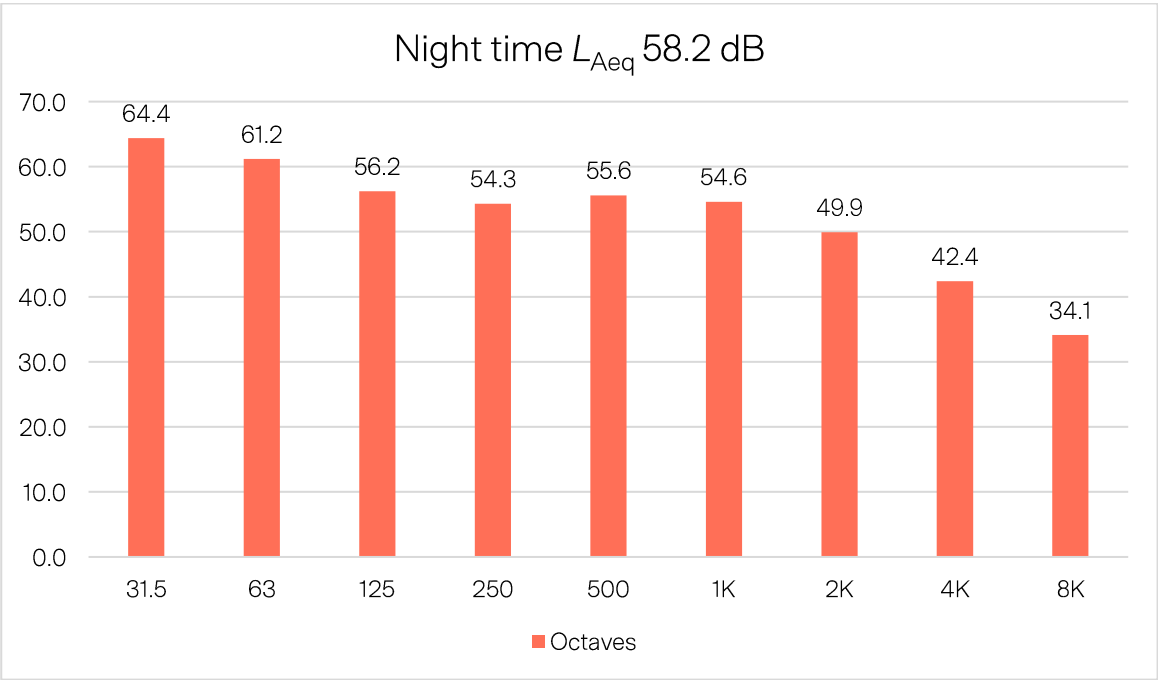
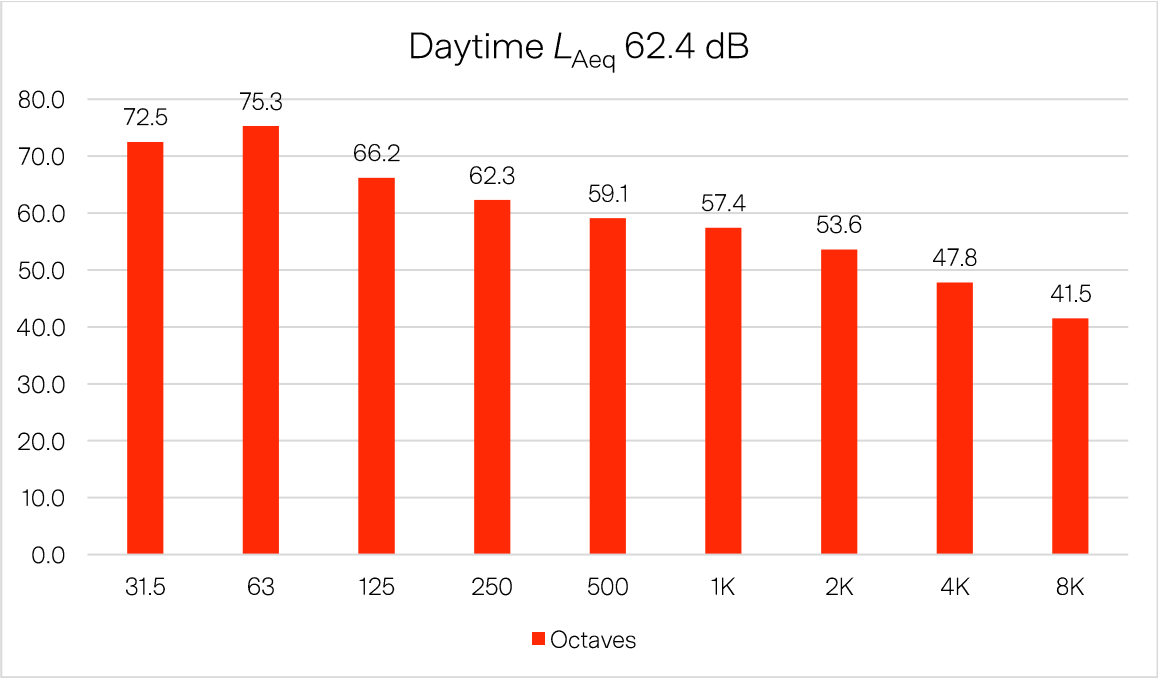
Monitoring Position 3

Friday/Monday

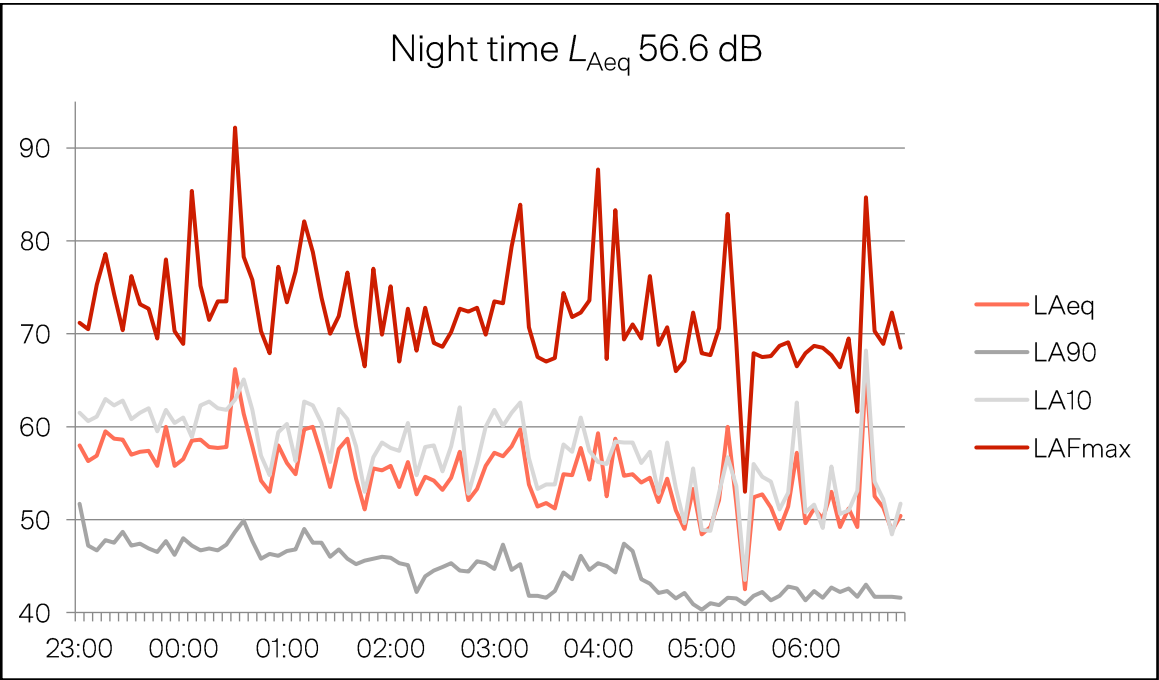
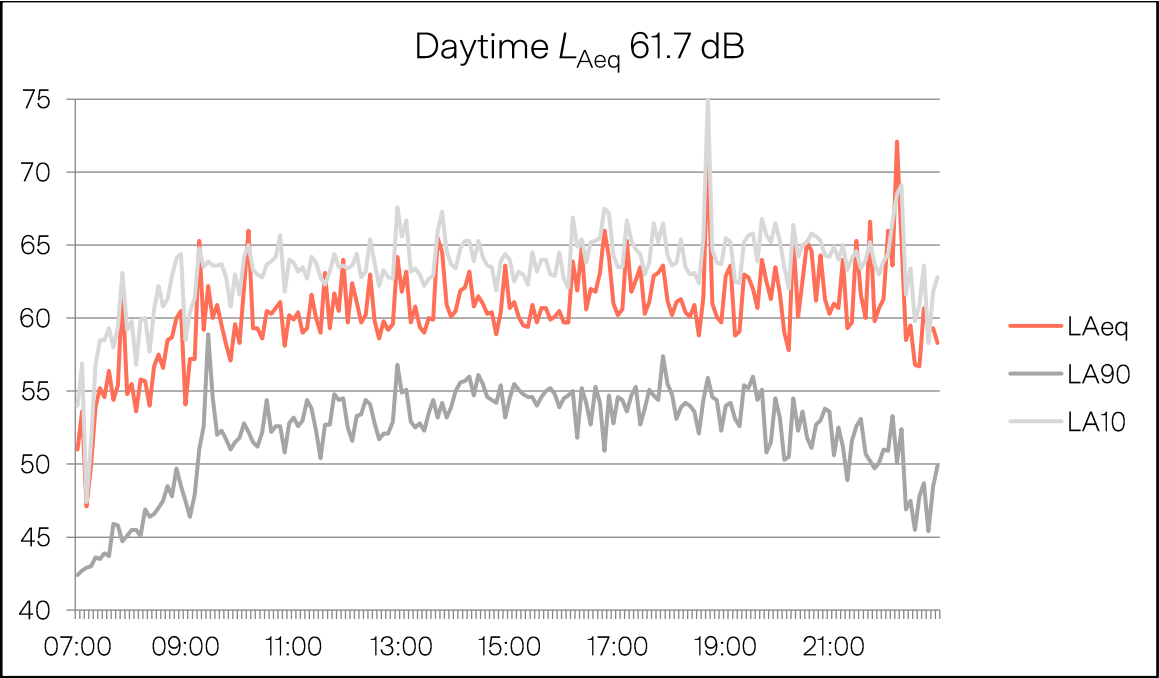


SPRATT+HAMER

Un-weighted 1:1 Octave Results

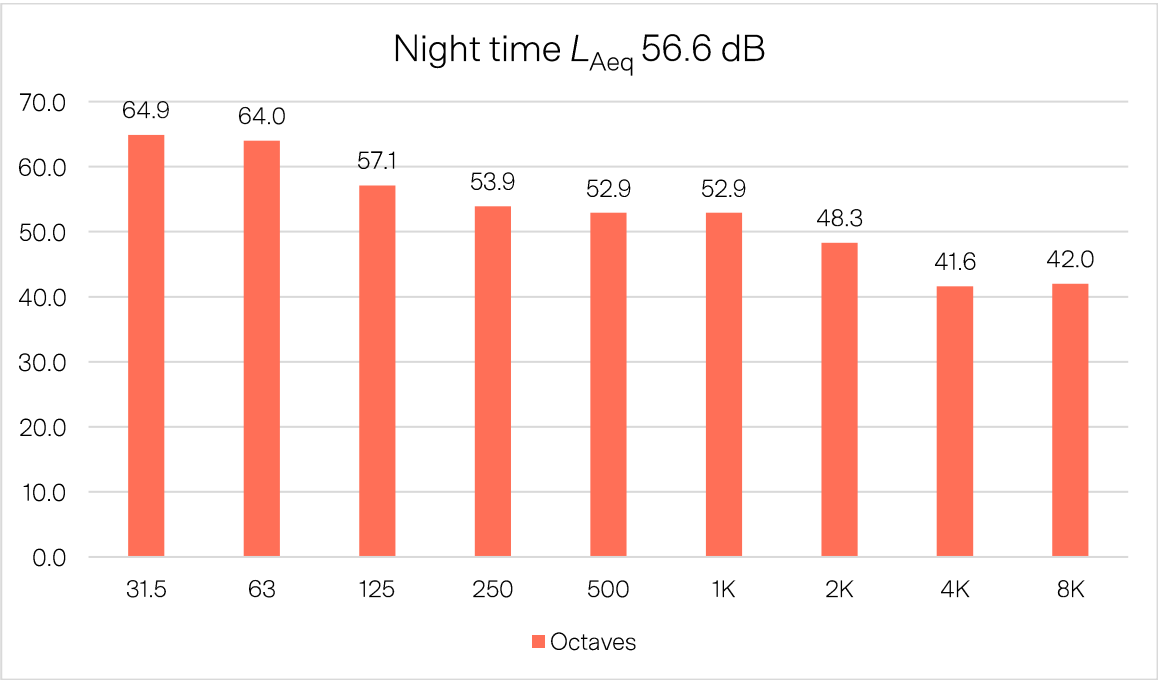
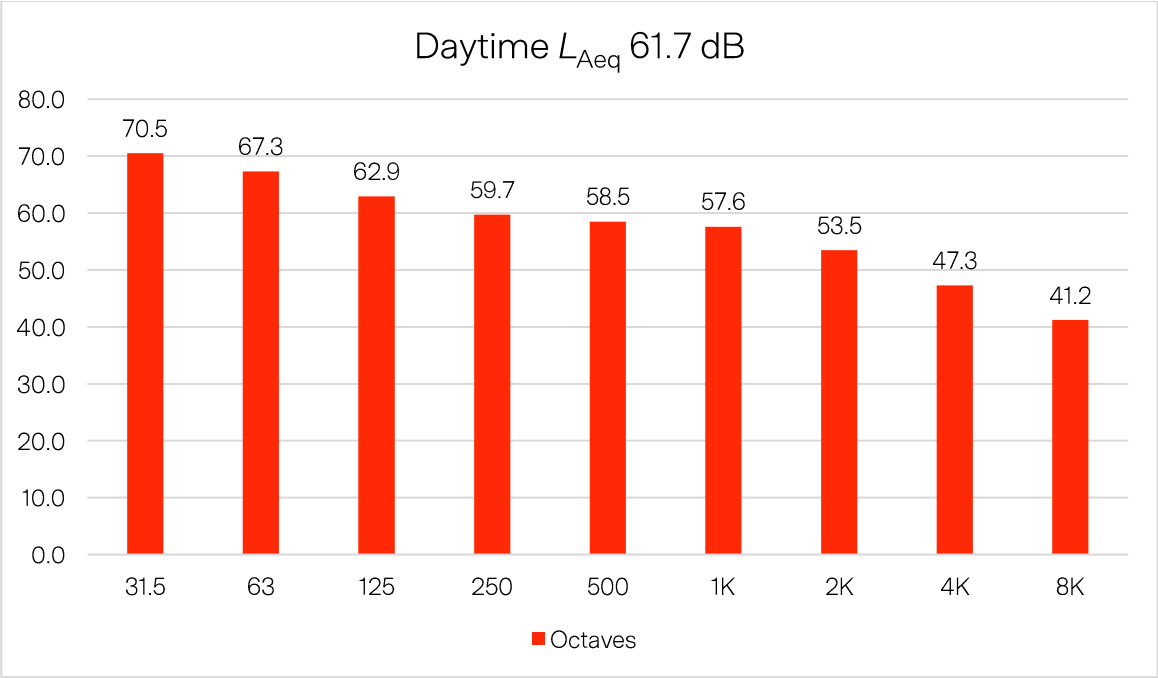


Saturday

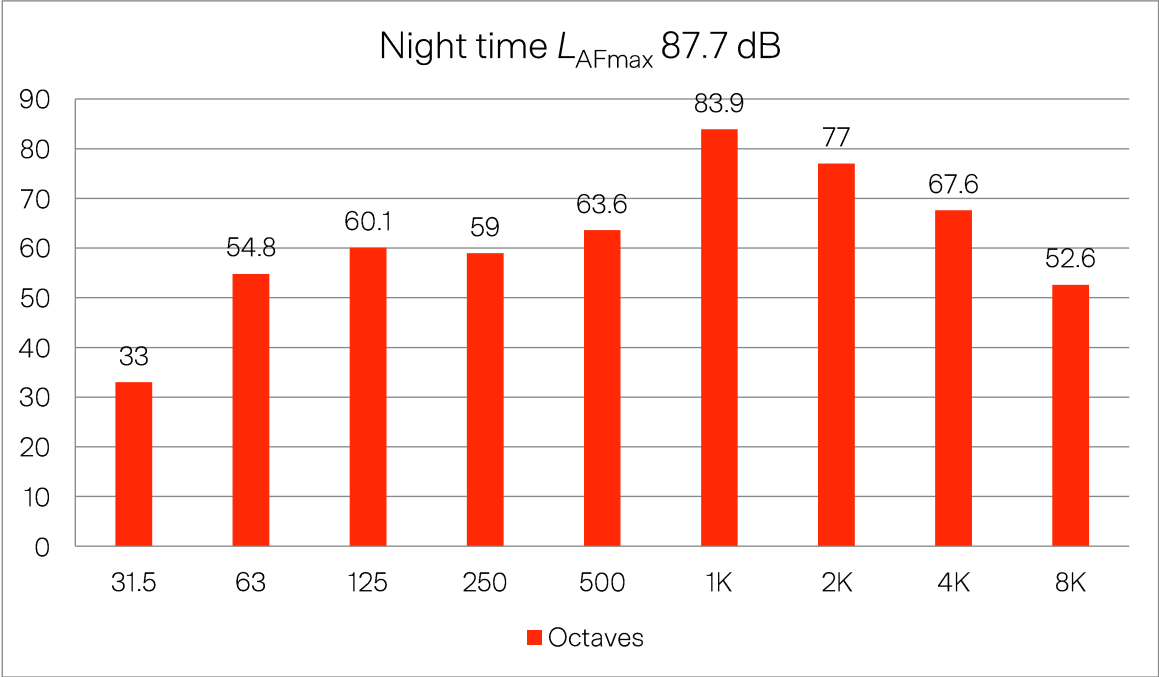


SPRATT+HAMER

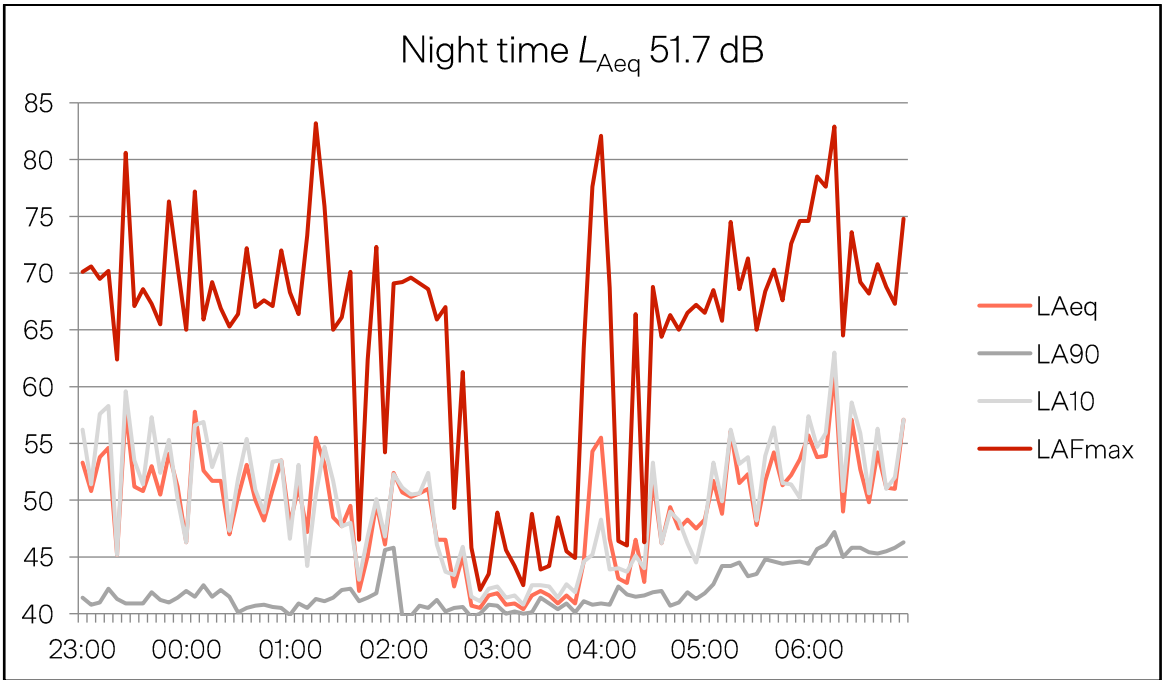
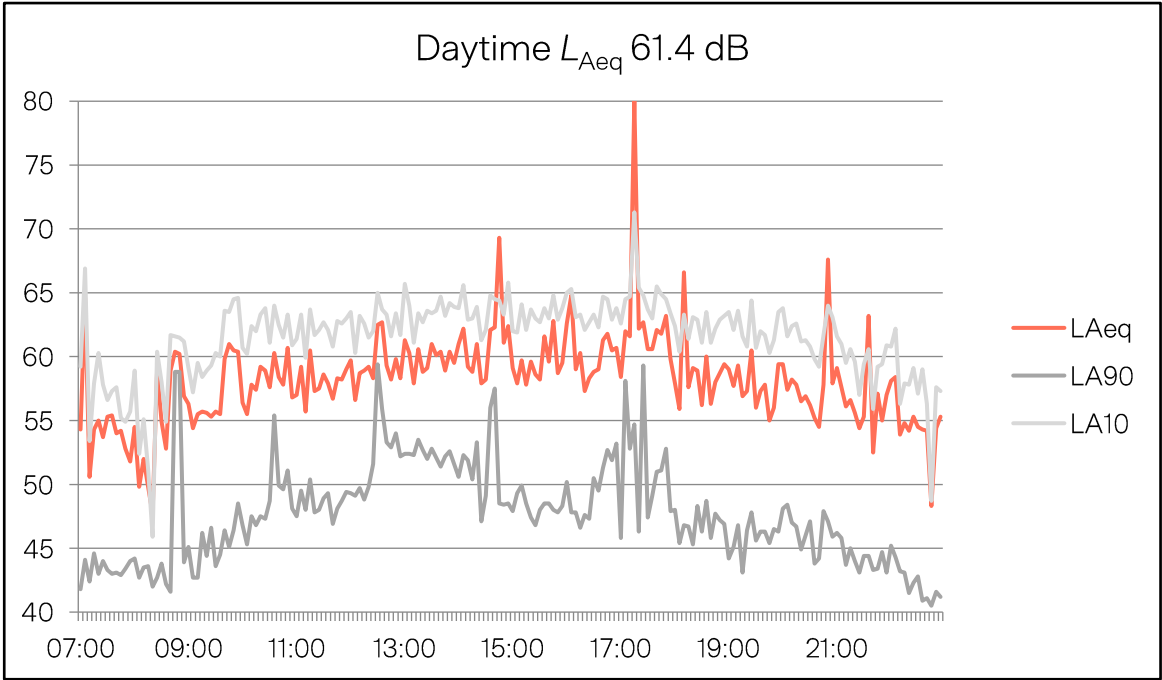
Un-weighted 1:1 Octave Results



SPRATT+HAMER

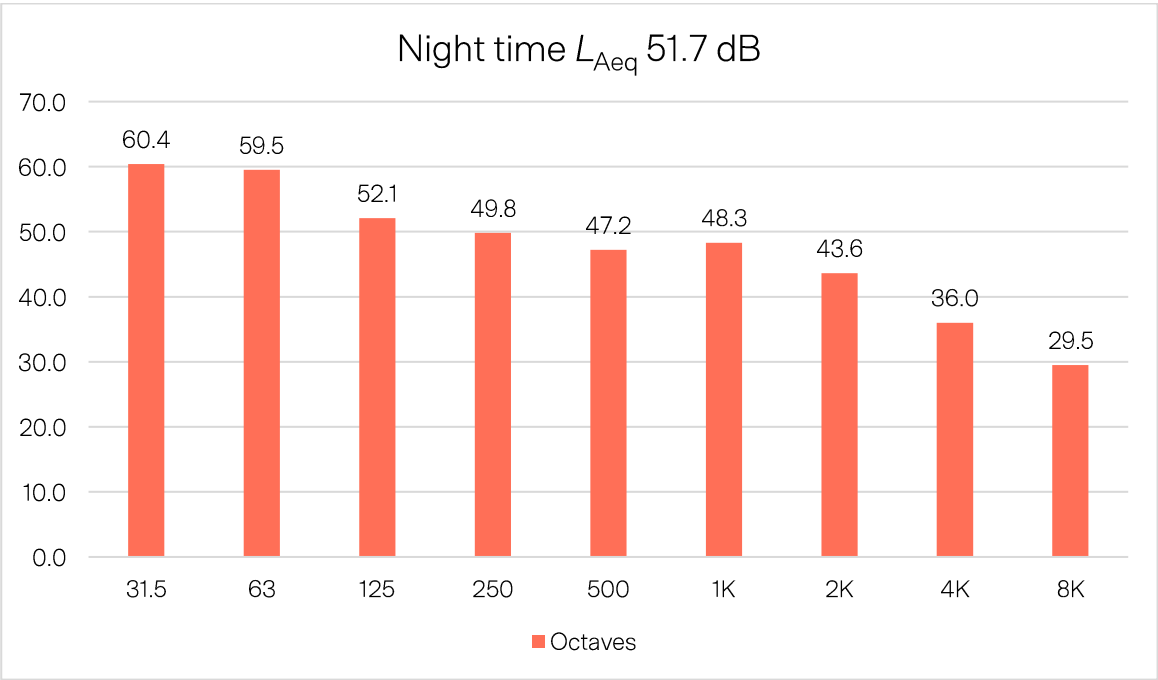
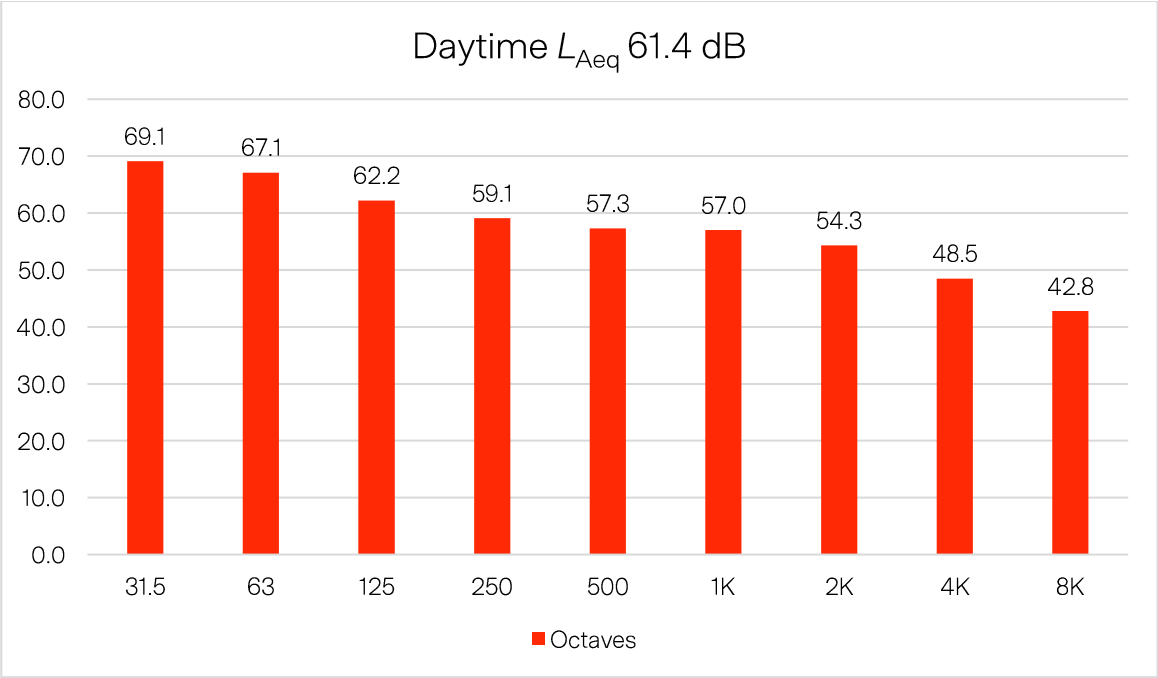


Sunday

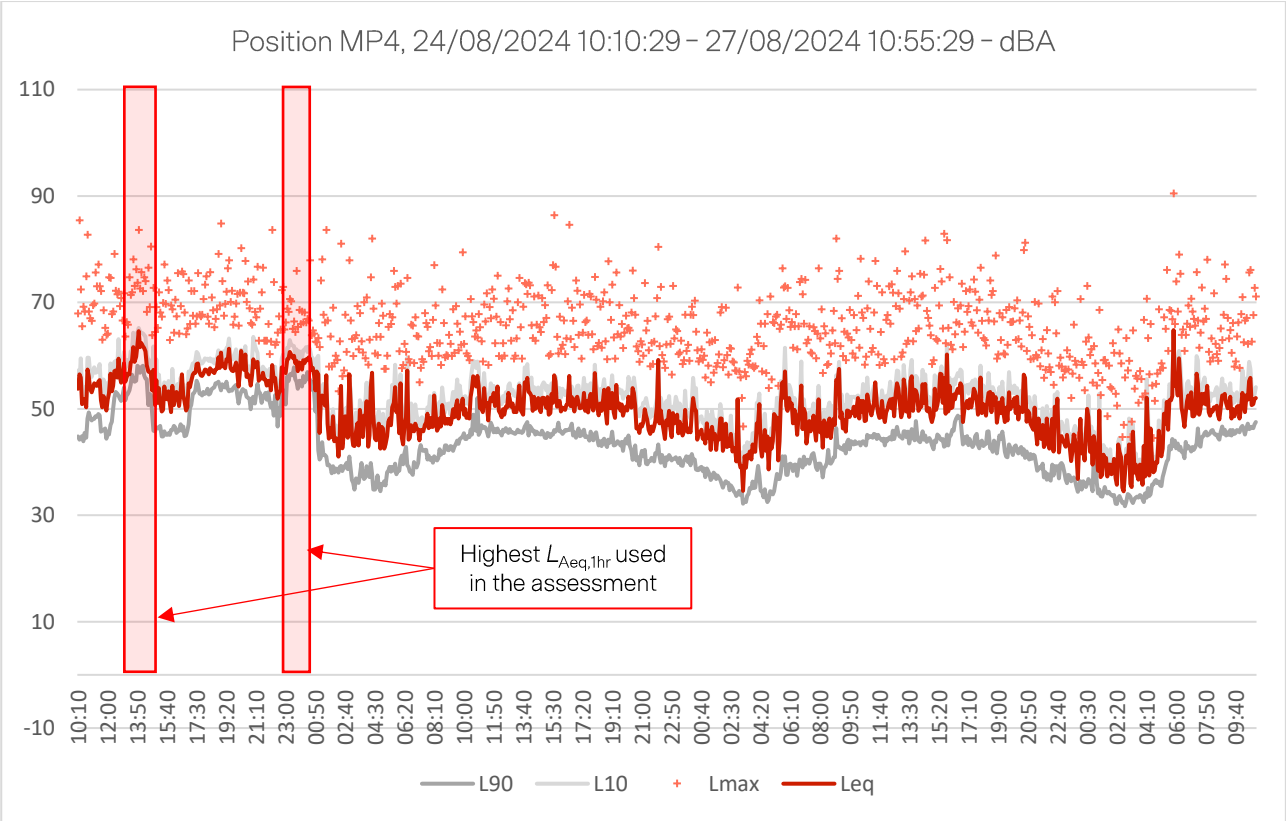


SPRATT+HAMER

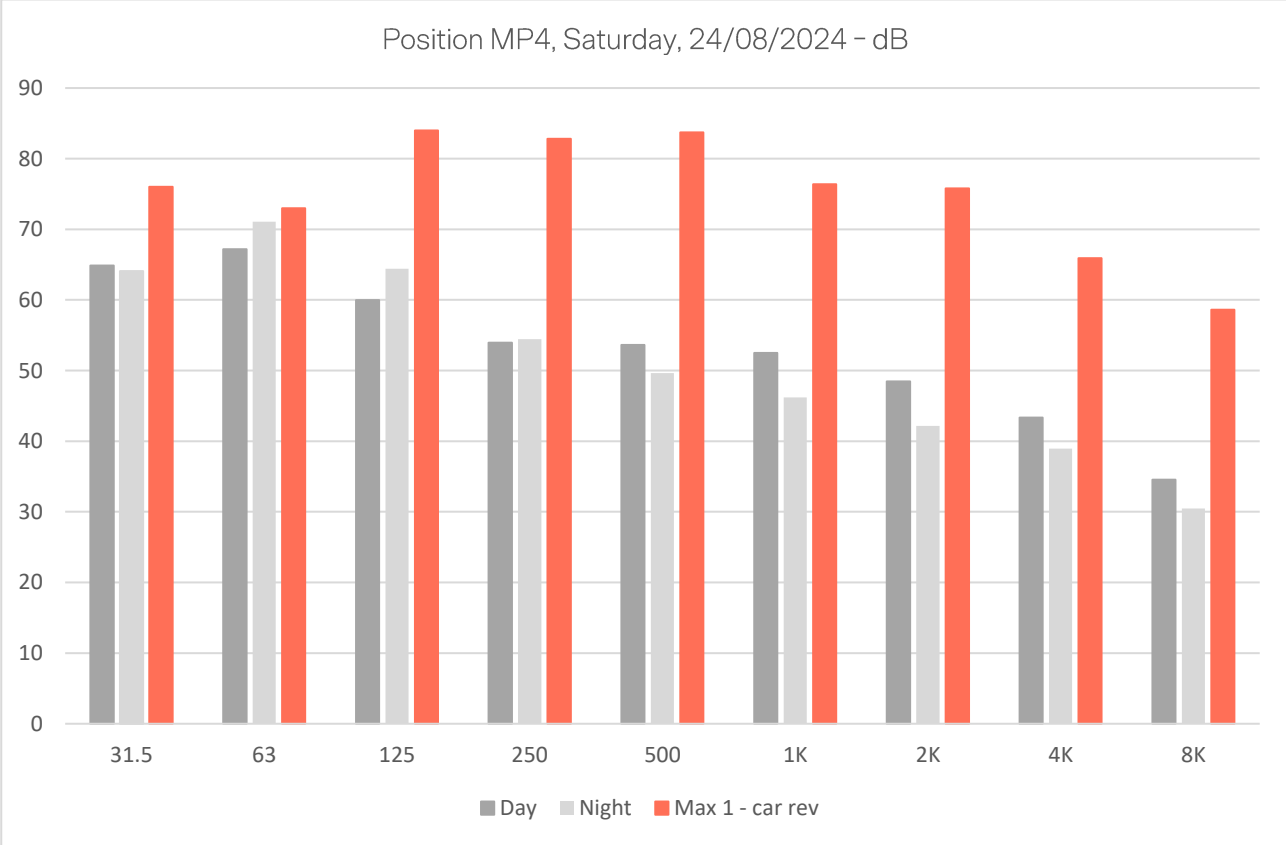
Un-weighted 1:1 Octave Results



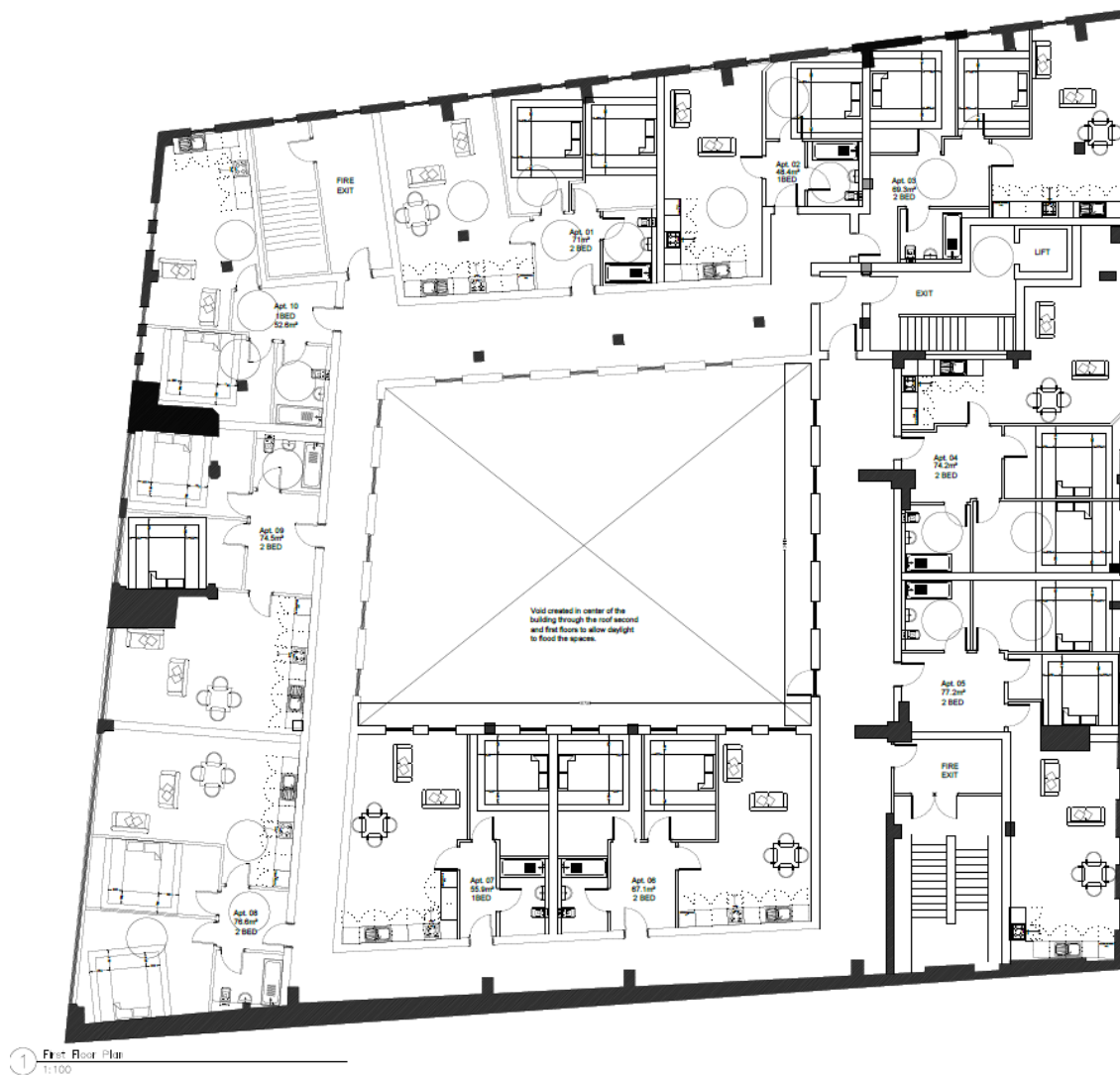
Monitoring Position 4



Un-weighted 1:1 Octave Results



Proposed Site Plans



This drawing is the copyright of WD Architects and may not be reproduced in any form without prior written consent. Issue of this drawing does not impart any real or implied copyright licence.

This drawing must be read in conjunction with all associated architect's, consultants', sub-contractors', specialist drawings and specifications.

Do not scale from this drawing.

Notes:

Amount of Apartments:

1 BEDS = 4
2 BEDS = 6

Drawn	Revised
REVISED	
STANDARD: 520-P-02	A
STANDARD: PLANNING	RN
SCALE: 1:100@A2	
DRAWING TITLE: First Floor Proposed	
PROJECT TITLE: 9-11 Regent Street Wrexham	
 WD Architects 145 Salford Street Wrexham, Wrexham, Wrexham 0191 332 0100 wrexham@wdarchitects.co.uk wrexham@wdarchitects.co.uk	

Page 58 of 62

SPRATT+HAMER

Event Posters



Glossary of Acoustical Terms

A-weighting

Noise levels are corrected to represent human response to sound.

L_{Aeq}

This is a continuous equivalent of time varying noise, or effectively the average measured (A weighted) noise level over a defined period of time.

$L_{Aeq,16hour}$

A 16 hour long measurement of the L_{Aeq} over the period between 07:00 and 23:00, also known as a daytime measurement.

$L_{Aeq,8hour}$

An 8 hour long measurement of the L_{Aeq} over the period between 23:00 and 07:00, also known as a night time measurement.

L_{AFmax}

The highest, or maximum A-weighted sound pressure level measured over a specified time period. The 'F' defines a time weighting in Fast.

L_{A90}

The A-weighted noise level or average level which is exceeded for 90 percent of the measured time period. Also known as a background level.

L_{A10}

The A-weighted noise level or average level which is exceeded for 10 percent of the measured time period.

1:1 & 1:3 octave spectrum analysis

A single measurement that is separated into frequency bands to allow for a more detailed analysis of the noise source in question.

R_w

The weighted sound reduction index of a partition or facade. A single number value based on the performance of a partition between two rooms across the frequency range 100Hz to 3150Hz. The level is adjusted for the effects of reverberation and background noise.



$D_{n,e,w}$

The weighted level difference of a partition or façade which takes into account a small element such as a grill or vent.

SEL (sound exposure level)

A measure of A-weighted sound energy used to describe a particular event, such as a train pass. It is the sound energy, which, if occurring over one second would contain the same energy as the event.

Free field sound pressure

Is where the radiation or spread of sound is completely unaffected by the presence of any reflecting surfaces or boundaries.

Low Frequency Noise

A term generally used for sound below a frequency of 100 to 150Hz.





SPRATT+HAMER

Online

sprattandhamer.co.uk

Email

info@sprattandhamer.co.uk

Birmingham

Lewis Building, Bull Street
Birmingham, B4 6AF
0121 828 3120

London

100 Borough High Street,
London, SE1 1LB
0203 286 2019

Liverpool

23 Roscoe Street, Liverpool
L1 2SX
0151 933 6186

Manchester

Peter House, Oxford Street
Manchester, M1 5AN
0161 521 9383