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16 ENGLANDS LANE,
LONDON

NOISE IMPACT ASSESSMENT

Report **17245-NIA-01 RevA**

Prepared on 07 January 2022

Issued For:

Curvus Limited

Contents

List of Attachments

1.0 INTRODUCTION

Clement Acoustics Ltd has been commissioned by Curvus Limited to investigate and assess the suitability of the basement and ground floor unit at 16 Englands Lane, London NW3 4TG for development as a retail premises for wine and related paraphernalia, with an ancillary bar and seating areas.

This report presents the results of a background noise survey followed by an assessment of the anticipated noise emission levels and outlines any necessary mitigation measures.

2.0 PROJECT DESCRIPTION

Proposals are to redevelop the existing commercial unit across basement and ground floors, to house a wine and paraphernalia retail unit, with ancillary bar and seating areas for the consumption of alcoholic drinks, and snacks.

It is anticipated the main element of noise will be from customers in the seating areas, with a low level of background music. As all snacks will be cold, there is no requirement for kitchen plant. There are also no external seating areas proposed.

The proposed opening hours of the bar, when seating areas will be available for customers, are as follows:

- Sunday, and Monday to Thursday: 17:00 - 22:00,
- Friday to Saturday: 17:00 - 23:00,

Proposed activities within the bar will be assessed according to the above hours.

Based on proposed seating layouts, it is anticipated that as a worst case, there could be approximately 11 customers seated in the main retail area at the front of the ground floor, 8 customers in a seating area at the rear of the ground floor, and 26 customers seated within the basement seating area.

The site is in a mixed-use area, located in a row of ground and basement level commercial units, largely with residential flats above. Residential buildings are located across Englands Lane.

Noise sensitive receivers have been identified as the residential apartments at first floor level, directly above the proposed use.

3.0 ENVIRONMENTAL NOISE SURVEY

3.1 Procedure

In order to assess existing background noise levels in the area, an environmental noise survey was undertaken at the two positions marked on indicative site plan 17245-SP1. Surveys were conducted to assess background noise levels during a typical Friday night, when proposed opening hours are a worst case.

The surroundings and position used for each monitoring location are described in Table 3.1.

Position No.	Description
1	The microphone was mounted on a bracket protruding from the front façade, above ground floor level. The microphone was positioned 1 m in front of the wall. [1]
2	The microphone was mounted above a lightwell at the rear of the building. The microphone was positioned 1 m from reflective surfaces. [1]

Table 3.1: Description of unattended monitoring locations

Note [1]: The position was not considered to be free-field according to guidance found in BS 4142: 2014, and a correction for reflections has therefore been applied. Based on the presence of the reflective surface and the nature of surrounding noise sources, a correction for reflections of 3 dB has been applied, in line with the recommendations of the standard.

Continuous automated monitoring was undertaken for the duration of the survey between 11:30 on Friday 17 December 2021 and 11:55 on Saturday 18 December 2021.

The measurement procedure generally complied with BS 7445: 1991: '*Description and measurement of environmental noise, Part 2- Acquisition of data pertinent to land use*'.

3.2 Weather Conditions

At the time of set-up and collection of the monitoring equipment, the weather conditions were generally dry with light winds. It is understood that the weather conditions during the unattended survey remained as such.

It is considered that the weather conditions did not significantly adversely affect the measurements and are therefore considered suitable for the measurement of environmental noise.

3.3 Equipment

The equipment calibration was verified, by means of a field verification check, before and after use and no abnormalities were observed.

The equipment used was as follows.

- 1 No. Svantek Type 958A Class 1 Sound Level Meter
- 1 No. 01dB Black Solo Class 1 Sound Level Meter
- Rion Type NC-74 Class 1 Calibrator

4.0 RESULTS

4.1 Environmental Noise Survey

The $L_{Aeq:\ 5min}$, $L_{Amax:\ 5min}$, $L_{A10:\ 5min}$ and $L_{A90:\ 5min}$ acoustic parameters were measured and are shown as time histories in Figures 17245-TH1 & TH2.

In order to protect the amenity of nearby noise sensitive receivers, minimum existing background noise levels were calculated for the proposed bar operating hours as detailed in Section 2.0.

Minimum measured background levels for these periods are shown in Table 4.1.

Time Period	Minimum background noise level $L_{90:\ 5min}$ Position 1 [Front Façade]	Minimum background noise level $L_{90:\ 5min}$ Position 2 [Rear Façade]
Proposed Operating Hours (17:00 - 23:00)	42 dB(A)	31 dB(A)

Table 4.1: Minimum background noise levels

5.0 NOISE EMISSIONS CRITERIA

5.1 Breakout of Noise

For typical assessments on similar projects where the noise source includes a form of music, the requirements for breakout of noise were established as follows:

> "*The scheme shall provide that the LAeq of noise breakout does not exceed the representative background noise level LA90 (without entertainment noise), and the LAeq of noise breakout will be at least 3dB below the background noise level LA90 (without entertainment noise) in octaves between 63 and 125Hz when measured at the nearest noise sensitive premises. The approved scheme shall be retained thereafter*."

In order to provide a robust assessment, the predicted level of noise breakout will be compared with the minimum background noise shown in Table 4.1, and the corresponding spectral levels in the 63Hz and 125 Hz frequency bands.

5.2 Noise Transmission Through Separating Floor

The receivers immediately above the proposed use are existing residential uses on the first floor of the same building.

It is noted that proposed operating hours of the bar preclude night-time activities, with closing times no later than 23:00.

BS 8233:2014: '*Guidance on sound insulation and noise reduction for buildings*' describes recommended acceptable internal noise levels for residential spaces during daytime and night-time hours. These levels are shown in Table 5.1.

Activity	Location	Design range $L_{eq,T}$ Daytime (07:00-23:00)	Night-time (23:00-07:00)
Resting	Living Room	35 dB(A)	-
Dining	Dining Room/Area	40 dB(A)	-
Sleeping	Bedroom	35 dB(A)	30 dB(A)

Table 5.1: BS8233 recommended internal ambient noise levels

In order to ensure the above daytime levels are not exceeded, as well as ensuring spectral levels are suitably controlled, the proposed noise limit for internal spaces is a noise rating level of NR25

6.0 NOISE IMPACT ASSESSMENT – INTERNAL NOISE

6.1 Proposed Activities

As the building is not currently in use as proposed, manual measurements were taken of similar sized venue, with patrons present and music played back at a level considered to be a 'background' level.

Further measurements were taken at a bar with customers present, and music at a level considered to be a 'background' level.

The measured noise levels are as shown in Table 6.1.

	Sound Pressure Level (dB) in each Frequency Band, at source								
Source	**63Hz**	**125Hz**	**250Hz**	**500Hz**	**1kHz**	**2kHz**	**4kHz**	**8kHz**	**dB(A)**
Busy Bar, Music at Background Level	70	73	76	81	78	74	68	56	82

Table 6.1: Measured Music Noise Levels

These levels will be used to calculate the noise breakout to nearby noise sensitive receivers.

For all calculated levels shown below, full formulae used and spectral calculations are shown in Appendix B.

6.2 Noise Breakout Assessment – External Noise Breakout to Receiver 1

Windows to rooms used for residential purposes have been identified at the location shown in attached site plan 17245-SP1. The closest identified residential windows to the front façade are located approximately 2 m from the glazed façade of the proposed venue, identified as Receiver 1 on 17245-SP1.

The front facade to the venue is formed of existing glazed windows and a glazed entrance door. It is noted that the main seating areas are protected from the entrance door by the main retail area.

Calculations have therefore been undertaken assuming the glazed façade as the main noise breakout path through the front facade. This is considered representative, provided a noise management plan is followed, as detailed in Section 7.0.

Based on a visual inspection of the existing glazing, the anticipated sound reduction is a level of R_w 35 dB.

With music played back at the above levels, predicted noise emissions levels at nearest residential windows would be as shown in Table 6.2.

Levels have been calculated using the previously measured background music levels, the predicted sound reduction of the façade, and the formula shown in Appendix B1.

Receiver	Operating Hours Criterion	Noise Level at Receiver (due to amplified music)
Receiver 1	42 dB(A)	34 dB(A)

Table 6.2: Noise levels and criteria at Residential Receiver

As shown in Table 6.2 and Appendix B1, transmission of noise to the nearest sensitive windows due to the effects of the events and activities would meet the set criteria, based on predictions. Criteria are also met spectrally as shown in Appendix B1.

6.3 Noise Breakout Assessment – External Noise Breakout to Receiver 2

The closest identified residential windows to the rear façade are located approximately 3.5 m above the rooflight to basement areas, identified as Receiver 2 on 17245-SP1.

The rear façade is formed of masonry, with windows into the counter area and small ground floor seating area. There is also a rooflight to the basement seating area at ground floor flat roof level . It is noted that there are no entrance doors in the rear facade.

Calculations have therefore been undertaken assuming the basement rooflight as the main noise breakout path through the rear facade. This is considered representative, provided a noise management plan is followed with regards to external windows, as detailed in Section 7.0.

Based on a visual inspection of the existing glazing, the anticipated sound reduction is a level of R_w 35 dB.

With music played back at the above levels, predicted noise emissions levels at nearest residential windows would be as shown in Table 6.3.

Levels have been calculated using the previously measured background music levels, the predicted sound reduction of the façade, and the formula shown in Appendix B2.

Receiver	Operating Hours Criterion	Noise Level at Receiver (due to amplified music)
Receiver 2	31 dB(A)	29 dB(A)

Table 6.3: Noise levels and criteria at Residential Receiver

As shown in Table 6.3 and Appendix B2, transmission of noise to the nearest sensitive windows due to the effects of the events and activities would meet the set criteria, based on predictions. Criteria are also met spectrally as shown in Appendix B2.

6.4 Noise Transmission Through Floor

During an onsite visit, it was observed that a shared laundry room at first floor is located above the rear seating area on the ground floor. To provide a robust assessment, it is assumed that rooms above other ground floor areas could be private bedrooms.

Sound insulation measurements were undertaken between the ground floor seating room and the laundry room above. This was the only area where access to the first floor was possible.

High volume "white" noise was generated from two loudspeakers in the source room (ground floor seating room), positioned in order to obtain a diffuse sound field. A spatial average of the resulting one-third octave band noise levels between 100 Hz and 3150 Hz was obtained by using a moving microphone technique over a minimum period of 15 seconds at each of two positions.

The same measurement procedure was followed in the receiver room (first floor laundry room).

The results of the tests were rated in accordance with BS EN ISO 717-1: 1997 "*Rating of sound insulation in buildings and of building elements. Part 1 - Airborne sound insulation*".

The measured sound insulation performance of the separating floor is as shown in Table 6.4.

	Measured Sound Reduction in Each Frequency Band							
Construction	**63Hz**	**125Hz**	**250Hz**	**500Hz**	**1kHz**	**2kHz**	**4kHz**	**8kHz**
Existing Separating Floor to Laundry Room	20	27	36	42	43	49	55	60

Table 6.4: Predicted sound reduction of existing separating floor

Based on the measured sound insulation performance and discussions onsite, the construction is understood to be based on an existing timber joist floor, as follows:

- Existing floor finish on floorboards
- Timber joists (assumed minimum 200 mm)
    - 100 mm nominal mineral wool in void
- 2 layers of nominal plasterboard

As access to the private flats was not possible, it has not been possible to confirm the corresponding construction between the front of the ground floor unit and the flats above.

It is noted that the front of the ground floor area will be used primarily as a retail unit, and noise levels would therefore be particularly low. The main seating areas will be at the rear of the ground floor, below the non-sensitive laundry room, and at basement level, which is protected by significant buffer zones.

The existing constructions may therefore be capable of reducing noise to an acceptable level within residential dwellings.

We would recommend that prior to occupation of the commercial unit, a commissioning exercise is undertaken to investigate the transfer of noise between noise generating commercial areas and private flats above. Access into the private flats would be required in order to carry this out.

It is expected that based on the proposed zoning of the site, the existing constructions may be adequate to suitably protect residential amenity.

Where any shortfalls are found, possible improvement works could include the following:

- Suspended ceiling below existing to improve the sound insulation performance of the floor
    - Typically lightweight metal frame on acoustic hangers, lined with dense plasterboard
- Linings to the separating wall between the ground floor commercial space and residential stairwell
    - Typically independent metal stud system lined with dense plasterboard

We would recommend certain steps to avoid transmission of structure-borne noise (See Section 7.0).

7.0 PROPOSED NOISE MANAGEMENT PLAN

7.1 Noise Management

In order to ensure the calculated noise emission levels are not exceeded, we would recommend following certain steps when operating the bar, as detailed below:

- We would recommend ensuring noise levels do not exceed the predicted internal noise levels as follows[1]:

Source	Low Frequency Limits		Overall Limit
	63Hz	125Hz	
Amplified Music Internally	70 dB	73 dB	82 dB(A)

- During evening hours, it should be ensured that entrance doors and windows are kept closed when not in use.
- There must be no audible activities after 23:00.
- All loudspeakers should be isolated from the building structure. For fixed speakers, this should be achieved using neoprene fixings for all speaker mountings. For free standing speakers, these should be sited on a suitable isolating material.
- Patrons should also be reminded of the nature of surrounding premises and behaviour inside and outside the premises should be monitored accordingly.
- No deliveries or waste collection should be undertaken outside daytime hours.
- Behaviour of patrons should be monitored to ensure there is no unnecessary or excessive noise.

[1] It must be noted that these noise limits are a prediction only, based on the expected performance of the external façade and separating floor, and acoustic formulae. A final commissioning exercise should be undertaken to determine the appropriate limits in practice, which could be lower.

8.0 CONCLUSION

A noise survey has been undertaken at 16 Englands Lane, London NW3 4TG. The results of the survey, combined with a noise breakout assessment, have enabled the assessment of noise propagation of proposed activities within indoor spaces to surrounding receivers.

Calculations have been based on noise breakout through facades to the closest identified residential receivers.

Calculations have shown that proposed bar activities within the venue would meet the set noise criteria during proposed operational hours, provided a noise management plan is adhered to.

Additional commissioning exercise are recommended in order to ensure the separating elements between commercial and residential spaces are suitable, prior to occupation.

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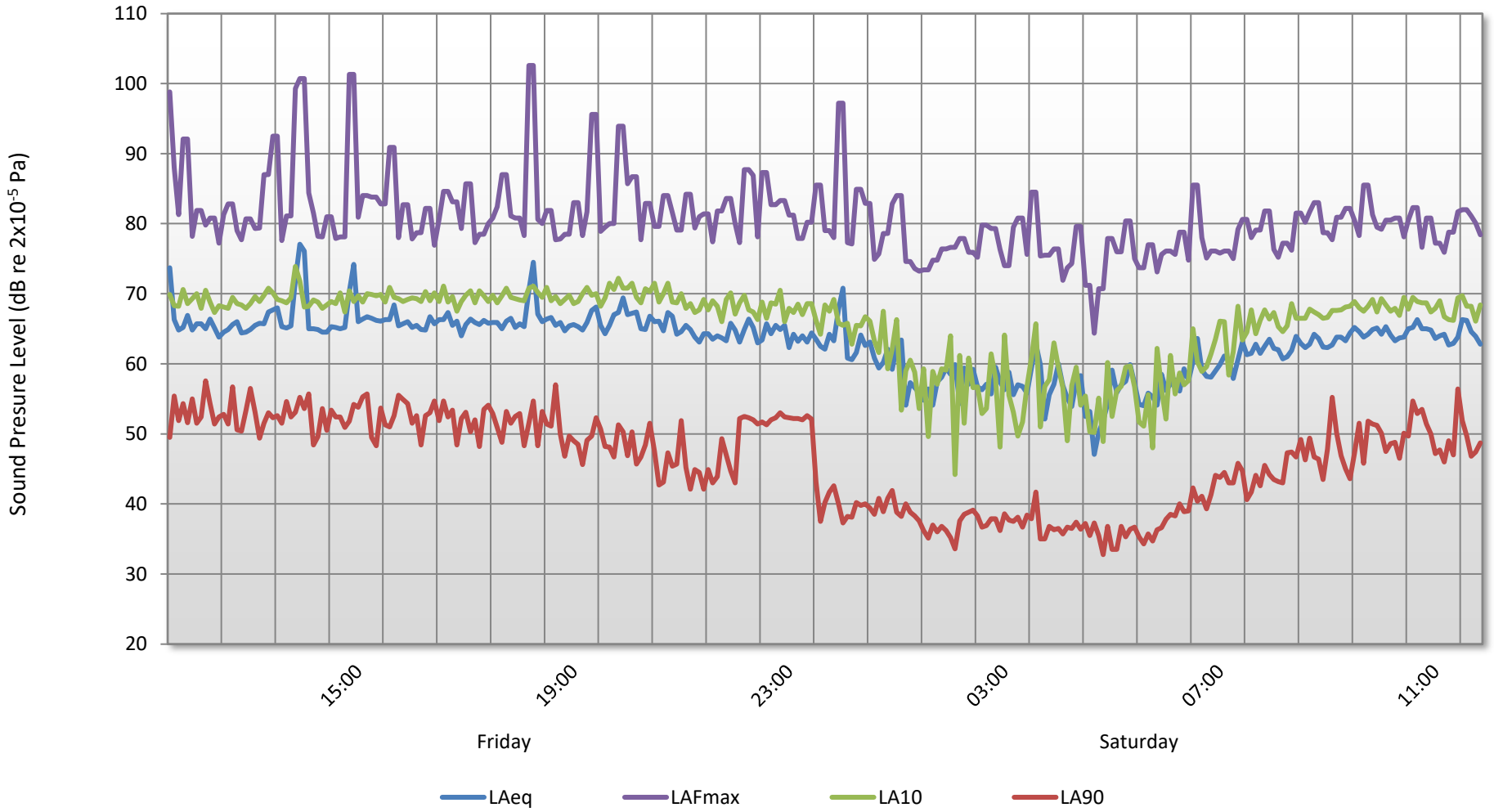
17245-SP1 Indicative site plan indicating noise monitoring position and nearest noise sensitive receiver **Date:** 7 January 2022

16 Englands Lane

Position 1

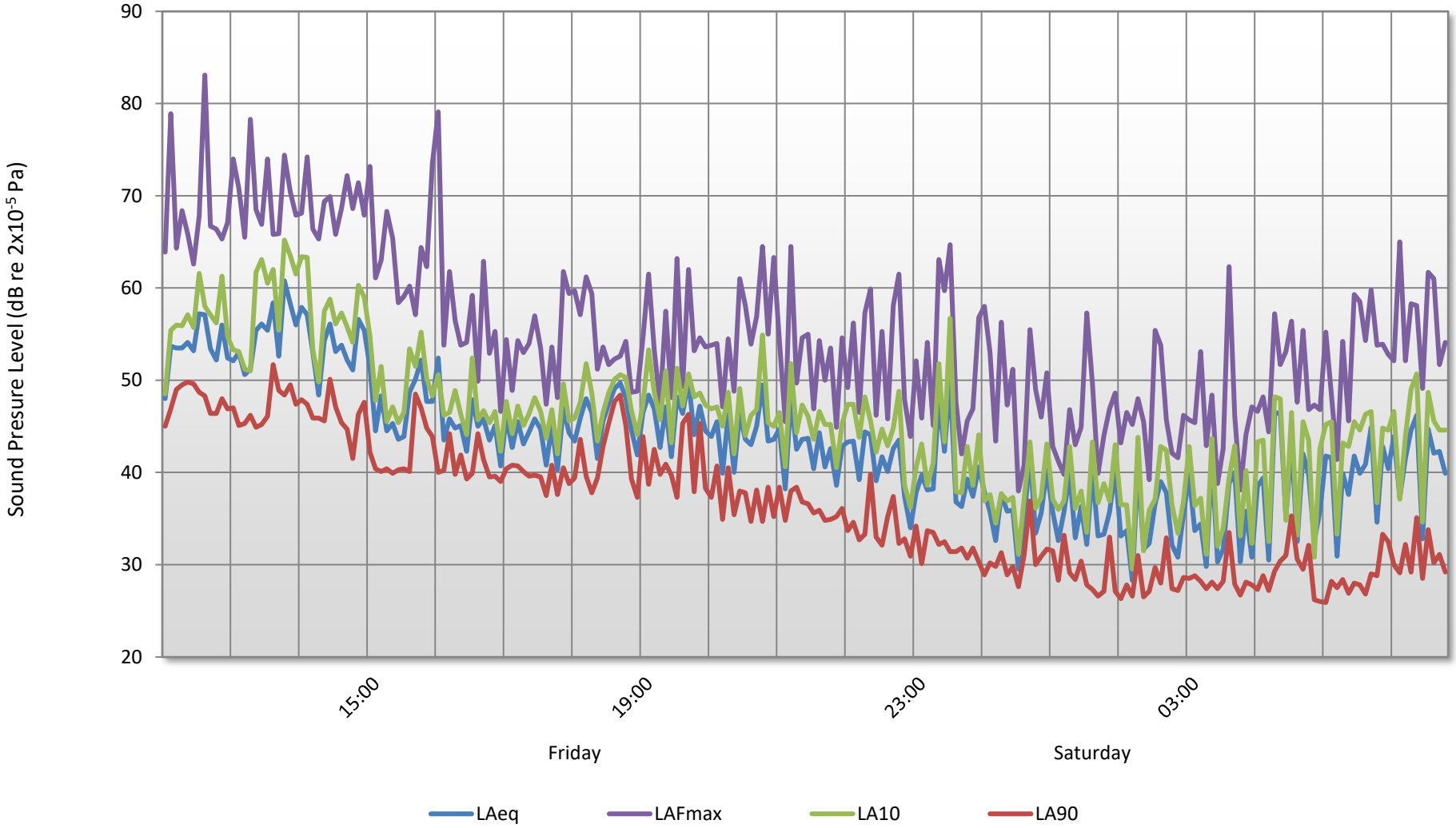
Environmental Noise Time History
17 December 2021 to 18 December 2021



16 Englands Lane

Position 2

Environmental Noise Time History
17 December 2021 to 18 December 2021



APPENDIX A

GLOSSARY OF ACOUSTIC TERMINOLOGY

dB(A)

The human ear is less sensitive to low (below 125Hz) and high (above 16kHz) frequency sounds. A sound level meter duplicates the ear's variable sensitivity to sound of different frequencies. This is achieved by building a filter into the instrument with a similar frequency response to that of the ear. This is called an A-weighting filter. Measurements of sound made with this filter are called A-weighted sound level measurements and the unit is dB(A).

L_{eq}

The sound from noise sources often fluctuates widely during a given period of time. An average value can be measured, the equivalent sound pressure level L_{eq}. The L_{eq} is the equivalent sound level which would deliver the same sound energy as the actual fluctuating sound measured in the same time period.

L_{10}

This is the level exceeded for not more than 10% of the time. This parameter is often used as a "not to exceed" criterion for noise

L_{90}

This is the level exceeded for not more than 90% of the time. This parameter is often used as a descriptor of "background noise" for environmental impact studies.

L_{max}

This is the maximum sound pressure level that has been measured over a period.

Octave Bands

In order to completely determine the composition of a sound it is necessary to determine the sound level at each frequency individually. Usually, values are stated in octave bands. The audible frequency region is divided into 10 such octave bands whose centre frequencies are defined in accordance with international standards.

Addition of noise from several sources

Noise from different sound sources combines to produce a sound level higher than that from any individual source. Two equally intense sound sources operating together produce a sound level which is 3dB higher than one alone and 10 sources produce a 10 dB higher sound level.

Attenuation by distance

Sound which propagates from a point source in free air attenuates by 6dB for each doubling of distance from the noise source. Sound energy from line sources (e.g. stream of cars) drops off by 3 dB for each doubling of distance.

Subjective impression of noise

Sound intensity is not perceived directly at the ear; rather it is transferred by the complex hearing mechanism to the brain where acoustic sensations can be interpreted as loudness. This makes hearing perception highly individualised. Sensitivity to noise also depends on frequency content, time of occurrence, duration of sound and psychological factors such as emotion and expectations. The following table is a reasonable guide to help explain increases or decreases in sound levels for many acoustic scenarios.

Change in sound level (dB)	Change in perceived loudness
1	Imperceptible
3	Just barely perceptible
6	Clearly noticeable
10	About twice as loud
20	About 4 times as loud

Barriers

Outdoor barriers can be used to reduce environmental noises, such as traffic noise. The effectiveness of barriers is dependent on factors such as its distance from the noise source and the receiver, its height and its construction.

Reverberation control

When sound falls on the surfaces of a room, part of its energy is absorbed and part is reflected back into the room. The amount of reflected sound defines the reverberation of a room, a characteristic that is critical for spaces of different uses as it can affect the quality of audio signals such as speech or music. Excess reverberation in a room can be controlled by the effective use of sound-absorbing treatment on the surfaces, such as fibrous ceiling boards, curtains and carpets.

APPENDIX B

17245

16 Englands Lane, London

Appendix B1: Breakout of Noise Through Front Façade

Acoustic Calculation used for Indoor to Outdoor Transmission:

$$SPL_{outdoor} = SPL_{indoor} - SRI_{composite} + 10\log_{10} S + 10\log\left(\frac{Q}{4\pi r^2}\right) - 6dB$$

Receiver: Receiver 1
Source: Background Music Levels

	Frequency, Hz								
	63	125	250	500	1k	2k	4k	8k	dB(A)
Internal Sound Pressure Level									
Predicted Source Noise Level Within Ground Floor	70	73	76	81	78	74	68	56	82
Sound Reduction of predicted Rw 35 dB glazed facade, dB (SRI)	-24	-26	-27	-34	-35	-36	-44	-44	
Correction for total area of building facade (S = 21m^2)	13	13	13	13	13	13	13	13	
Correction for directivity (Q) and distance (r) (Q=2, r = 2m)	-14	-14	-14	-14	-14	-14	-14	-14	
Non reverberant correction	-6	-6	-6	-6	-6	-6	-6	-6	
Correction for directivity to vertical receiver	-8	-7	-7	-7	-7	-7	-7	-7	
Sound pressure level at receiver due to music play back	**31**	**33**	**35**	**33**	**29**	**24**	**10**	**-2**	**34**
Measured Background Noise Levels	**44**	**40**	**-**	**-**	**-**	**-**	**-**	**-**	**42**

Appendix B2: Breakout of Noise Through Rear Façade

Acoustic Calculation used for Indoor to Outdoor Transmission:

$$SPL_{outdoor} = SPL_{indoor} - SRI_{composite} + 10\log_{10} S + 10\log\left(\frac{Q}{4\pi r^2}\right) - 6dB$$

Receiver: Receiver 2
Source: Background Music Levels

	Frequency, Hz								
	63	125	250	500	1k	2k	4k	8k	dB(A)
Internal Sound Pressure Level									
Predicted Source Noise Level Within Basement	70	73	76	81	78	74	68	56	82
Sound Reduction of predicted Rw 35 dB glazed rooflight, dB (SRI)	-24	-26	-27	-34	-35	-36	-44	-44	
Correction for total area of rooflight (S = 11m^2)	10	10	10	10	10	10	10	10	
Correction for directivity (Q) and distance (r) (Q=4, r = 3.5m)	-16	-16	-16	-16	-16	-16	-16	-16	
Non reverberant correction	-6	-6	-6	-6	-6	-6	-6	-6	
Correction for directivity to vertical receiver	-8	-7	-7	-7	-7	-7	-7	-7	
Sound pressure level at receiver due to music play back	**26**	**28**	**30**	**28**	**24**	**19**	**5**	**-7**	**29**
Measured Background Noise Levels	**46**	**36**	**-**	**-**	**-**	**-**	**-**	**-**	**31**