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NOISE IMPACT ASSESSMENT REPORT

SILVER BULLET SPA, HAZEL MEWS, LONDON N22 6DT



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1. EXECUTIVE SUMMARY

Sound Licensing has been instructed to undertake an acoustic assessment of the property Silver Bullet Spa, Hazel Mews, London N22 6DT (hereafter called 'the spa') in response to a request from the property owner. The request is to support a planning application (HGY/2016/0892) with an acoustic assessment submitted to the Local Authority, the London Borough of Haringey. The proposal is operate a small boutique venue close to residential premises.

A visual investigation of the property was conducted wherever possible and practicable. A noise survey was conducted outside the spa at a nearby residential premise which is deemed to be representative of typical noise levels for residential premises adjacent to the hotel.

The results of the noise survey were considered reasonable, considering the location of the measurement positions and the noise source.

A robust, worst-case assessment of the external noise levels associated with the proposed hotel activities has been undertaken with respect to the nearest sensitive receptors.

Recommendations to upgrade the existing hotel mitigation have been provided based on the visual investigation of the premise.

The predicted noise impact due to the operation of the spa results in compliance with all BS8233:2014 daytime internal noise criteria and only a minor exceedance of the night-time criteria, remedial measures have been recommended which would ensure full compliance. Implementation of these measures would all result in the following rating under BS4142:2014 "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."

2. INTRODUCTION

The site of the Silver Bullet Spa is a small plot of land to the rear of existing residential premises. The hotel comprises of a small vintage airstream caravan with a small outside area and outbuilding. Residential premises surround the property on the north east, south and west with a mixed commercial/residential to the east.

A planning application requesting "Use of the land for the siting of an American Airstream Trailer to be used for C1 (boutique hotel accommodation) purposes with ancillary structures and spa" has been submitted to the Local Authority. In line with hotel/spa use the application is seeking 24 hour use.

The purposes of this report are:

- To detail the findings of the visual investigation of the building
- To detail the existing ambient noise levels at 1 metre from the façade of residential properties adjacent to the hotel
- To identify and detail noise sources audible at the residential properties due to the spa's typical activity in operation
- To calculate and assess the noise source levels of the operation of the spa/hotel at the nearest noise sensitive receptor.
- To detail a set of recommendations to improve the existing noise mitigation measures already installed

3. SITE DESCRIPTION

The Airstream Trailer has already been installed on site together with a small wooden outbuilding to be used for massage treatments and a covered external area (see appendix B) for guest use. The activities that are proposed in addition to the hotel are the use of the external area for relaxation, use of the Jacuzzi and for socialising.

The trailer occupies a compact triangular plot of land which once would most probably have formed part of one of the residential gardens. The closest noise sensitive property with limited direct line of site to part of the external area is located directly adjacent to the North east (First floor flat, 102 Alexandra Road, 12 metres approximately), also to the North east are a number of first floor residential with only partial or no line of sight. To the east on the High Road are further residential properties with no line of sight due to the substantial 3 metre fence.

The proposal is to operate a small scale boutique spa/hotel 7 days a week, the proposal does not include any inherently noisy activities.

However, to ensure that typical noise levels from the proposed operation of the external area considered fully the following activities have been assessed:

- Conversation/raised voices
- Background music
- The use of the Jacuzzi/hot tub

This report will demonstrate that typical and potentially noisy activities will not impact upon nearby noise sensitive receptors such and that noise will not be a matter for refusal in the planning decision. Figure 3 shows the site highlighted in red and the surroundings land use.

Figure 3 - Site Location and the Surrounding Land Use



3.1 Other External Noise Sources

At the time of the site visit several other noise sources were noted including a number of air handling/compressor units and a commercail kitchen extraction system. None of these sources appeared to be in operation during the monitoring period.

4. CONSTRUCTION OF SITE

The Airstream Trailer is believed to have been constructed in the 1960's. The Trailer is currently in the process of being refurbished with a number of internal alterations however the original aluminium shell and insulation will be retained. Due to the size and construction, noise from inside the trailer has not been included in this assessment as any noise emanating from the trailer will be below those in the external area.

The front entrance to the site consists of a 3 metre substantial wooden fence with the rest of the site being fully enclosed by more 2 metre fencing. The outside relaxation area consists of a 3 sided wooden structure with a lightweight poly/Perspex roof. The open side of the relaxation area is orientated away from the nearest noise sensitive properties

A Jacuzzi/hot tub has been installed inside the covered external area along with two small speakers for background music.

5. NOISE EMISSION LIMITS

Due to time constraints it was not possible to have discussions with the Local Authority Environmental Health Officer to establish noise emission limits.

This report therefore has adopted use of British Standard 8233:2014, 'Guidance on sound insulation and noise reduction for buildings'. This standard can be considered the most appropriate guidance with respect to demonstrating how the proposal may impact on nearby residential premises.

In addition a general comparison with BS4142:2014 has been carried out to assess the impact of the proposed activities on the existing background noise levels.

5.1 BS8233:2014 – Guidance on Sound Insulation & Noise Reduction for Buildings

This guidance provides information on internal acoustic environments appropriate to their functions and also common building elements for sound insulation of external noise. It is noted that this standard does not provide guidance on external noise from speech. However, the standard provides acoustic targets for various classes of residential living spaces which shall be referenced within this report for the purposes of providing an impact assessment.

BS8233:2014 - Table 4 Indoor ambient noise levels for dwellings

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

5.2 BS 4142:2014

BS 4142:2014 "Methods for rating and assessing industrial and commercial sound" presents a method for assessing the significance and possible adverse impact due to an industrial noise source, based on a comparison of the source noise levels and the background noise levels, both of which are measured or predicted at a noise sensitive receiver e.g. a residential property. Although primarily used for assessing noise emissions of an industrial or commercial nature, British Standard 4142:2014 can be seen as a good guide for assessing the suitability of noise emissions to residential receivers where background noise levels have been measured.

"The significance of sound of 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 the context in which the sound occur. A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context. A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context. 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."

6. NOISE SURVEY METHODOLOGY

A manned noise survey was undertaken on 17/04/2016 between 21:00 and 23:50. The noise survey measured background noise levels and a representative music level on the site. The noise survey was carried out on a Sunday at a time that is envisaged as being the latest the external area would be used. This would represent a worst case assessment of the noise impact from the external area of the site when typical activities are taking place.

In order to predict internal noise levels inside the nearest residential premise (both line of sight and partial line of sight) calculations have been completed taking into account distance, screening and open window attenuation.

Measurements were undertaken at Flat 3, 108 Alexandra Road, on the rear balcony (to the north west of the site) approximately 2m from reflecting facades. Measurements undertaken at Flat 3, 108 Alexandra Road were completed by mounting the sound level meter 1.5 metres above ground on a tripod. Measurements were recorded in 15 minute periods with set parameters of L_{Amax}, L_{Aeq} and L_{A90}. The noise survey and measurements were conducted, wherever possible, in accordance with BS7445-1:2003 '*Description and measurement of environmental noise. Guide to quantities and procedures*'. The equipment used for the noise survey is summarised in Table 6.1.

Table 6.1 Description of Equipment used for Noise Survey

Equipment	Description	Quantity	Serial Number
Pulsar Model 30	Type 1 sound level meter	1	T232239
Pulsar 100B	Class 1 Calibrator	1	65615

The noise monitoring equipment used was calibrated before and after the noise survey period. No significant drift was found. Equipment calibration certificates can be provided upon request.

Figure 6.1 Location of noise monitoring position



7. NOISE SURVEY RESULTS AND OBSERVATIONS

7.1 Results

A summary of the noise levels measured at the monitoring position during the survey is provided in the below table. All measured and calculated noise levels have been rounded to one decimal point for the purposes of this report. The measurement position was not considered to be in total free field and therefore a **-2dB** correction has been applied.

Table 7.1 Summary of noise monitoring results

Noise Monitoring 17/04/2016 (Background, no noise source)

Time	$L_{AEq\ 15mins}$	L_{Amax}	$L_{A90\ 15mins}$
21:25	49.5	81.4	42.6
21:40	48.7	67.9	42.7
22:17	48.3	69.3	43.8
22:33	47.5	64.6	42.0
22:48	46.5	63.0	42.4
23:03	45.3	56.2	42.2
23:18	45.7	64.8	41.8
23:34	45.4	61.3	41.9

As can be seen from Table 7.1, the 15 minute L_{Aeq} noise level ranged between 45 and 50dB L_{Aeq} . The 15 minute L_{A90} noise level ranged between 42dB and 44dB and the maximum A-weighted sound pressure level recorded was 81dB.

Background Music

In order to assess the audibility and noise impact of background music (allowing for normal conversation) on the site, representative music was played and measured in the centre of the external area at the following reference level:

Time	$L_{Aeq\ 5mins}$	L_{Amax}	$L_{A90\ 5\ mins}$
20:59	63.7	85.8	58.4

With the music being played at the reference level a measurement was taken at the residential monitoring position and the following levels were recorded:

Time	$L_{Aeq\ 10mins}$	L_{Amax}	$L_{A90\ 10\ mins}$
21:12	48.4	62.8	43.8

7.2 Observations

External ambient noise levels were affected mainly by vehicles on local road network, relatively significant overhead aircraft noise and occasional noise from the local rail network. Subjective observations of the background music source in operation at the monitoring location detail that the music was considered to be inaudible and had no impact on the external area of the residential premise.

Weather conditions throughout both noise survey periods were noted to be mild (approx. 5 degrees Celsius), dry, overcast/clearing skies (approx. 60% cloud cover) and a very light wind (<5metres p/second). These weather conditions were checked against and confirmed by the use of the Met Office mobile application available on smart phone technology. These conditions were maintained throughout the whole survey period and are considered reasonable for undertaking environmental noise measurements. No abnormal noise sources were noted to occur during the survey which affected the data.

8. RESIDENTIAL INTERNAL NOISE CALCULATIONS

A number of calculations below have been completed to predict internal noise levels in the two given residential properties under assessment:

- First Floor Flat, 102 Alexandra Road (Direct line of sight)
- Flat 3, 108 Alexandra Road (Partial line of sight)

The assessment includes:

- Conversation/raised voices
- Background music
- The use of the Jacuzzi/hot tub

8.1 Conversation / Raised Voices

Calculations have been completed to predict the specific noise level inside the given residential properties. The following noise reference levels have been used:

Table 8.1

Metres	Normal	Raised
0.9	60 dB(A)	66 dB(A)
11	39 dB(A)	45 dB(A)

*Formula = $L_{PA1} = L_{PA2} - 20 \text{ Log } (d_1/d_2)$

First Floor Flat, 102 Alexandra Road (Direct line of sight)

The predicted maximum internal noise level allowing for 15dB attenuation for an open window as specified in of BS8233:2014 would be **30dB(A).**

Flat 3, 108 Alexandra Road (Partial line of sight)

The predicted maximum internal noise level allowing for 15dB attenuation for an open window as specified in of BS8233:2014 and a **5dB** screening correction would be **25dB(A).**

8.2 Background Music

Calculations have been completed to predict the specific noise level inside the given residential properties. The following noise reference levels have been used:

Table 8.2

Metres	Music Level
1	64
11	43

*Formula = $L_{PA1} = L_{PA2} - 20 \text{ Log } (d_1/d_2)$

First Floor Flat, 102 Alexandra Road (Direct line of sight)

The predicted maximum internal noise level allowing for 15dB attenuation for an open window as specified in BS8233:2014 would be **28dB(A).**

Flat 3, 108 Alexandra Road (Partial line of sight)

The predicted maximum internal noise level allowing for 15dB attenuation for an open window as specified in BS8233:2014 and a **5dB** screening correction would be **23dB(A).**

8.3 Jacuzzi/Hot tub Operation

A jacuzzi/hot tub has been installed in the covered enclosure located in the external area and the intention is that this will be used by guests. At the time of the site visit the unit was not operational and noise data was requested from the manufacture/distributor Balboa Water which was not available. The Jacuzzi pump has been installed below the decking with additional sound insulation to reduce the noise level.

A search for noise data has revealed that there is little information available with regard to noise levels, therefore in order to represent a worst case scenario a noise level of 70dB(A) has been adopted.

Table 8.3

Metres	Jacuzzi/Hot Tub Noise Level
1	70
11	39

*Formula = $L_{PA1} = L_{PA2} - 20 \text{ Log } (d_1/d_2)$

First Floor Flat, 102 Alexandra Road (Direct line of sight)

The predicted maximum internal noise level allowing for 15dB attenuation for an open window as specified in BS8233:2014 would be **24dB(A).**

Flat 3, 108 Alexandra Road (Partial line of sight)

The predicted maximum internal noise level allowing for 15dB attenuation for an open window as specified in BS8233:2014 and a **5dB** screening correction would be **19dB(A).**

9.0 DISCUSSION

9.1 Noise Survey Results compared to BS 8233:2014

British Standard (BS) 8233:2014 'Guidance on sound insulation and reduction for buildings' provides references and guideline values for desirable indoor ambient noise levels for dwellings. A comparison of the measured noise data against the British Standard provides the difference between the predicted noise levels and desired internal levels. An assumption has to be applied in this comparison due to the fact there are differing time periods in which the noise levels apply (i.e., the BS8233 guideline is over 16hours L_{Aeq}, noise measurements are 15minute L_{Aeq} periods). The assumption is that predicted internal noise, if measured over 16hours as per the British Standard, would achieve the same noise level as that achieved in the 15 minute period.

Given the envisaged proposed operating times of the external area of the spa/hotel, it is appropriate to compare predicted noise levels with reasonable resting conditions in nearby residential premises. This time period is within 07:00-00:00 hours therefore noise break out from the hotel will be assessed against achieving the internal noise levels inside residential premises' bedrooms, as per BS8233:2014. The proposed operational hours are considered to be reasonable and the comparison of predicted noise levels to residential levels within bedrooms will ensure that worst case scenario is used.

Resultant Noise Level - First Floor Flat, 102 Alexandra Rd

In order to calculate the total internal noise level decibel addition was used to combine the conversation level (45dB), Background music (43dB) and the Jacuzzi level (39dB), giving a total noise level of 48dB(A) at 1m from the façade and after a correction of 15dB(A) for an open window results in an internal level of **33dB(A)**.

Resultant Noise Level – Flat 3, 108 Alexandra Rd

In order to calculate the total internal noise level decibel addition was used to combine the conversation level (45dB), Background music (43dB) and the Jacuzzi level (39dB) and applying a partial screening correction of 5dB(A)gives a total noise level of 43dB(A) at 1m from the façade and after a correction of 15dB(A) for an open window results in an internal level of **28dB(A)**.

The above data shows maximum predicted noise levels comply fully with the daytime BS8233:2014 guidance criteria and only a minor exceedance of the night-time internal levels within the First Floor Flat at 102 Alexandra Road.

9.2 Noise Survey Results compared to BS 4142:2014

British Standard (BS) 4142:2014 "Methods for rating and assessing industrial and commercial sound" presents a method for assessing the significance and possible adverse impact due to an industrial noise source, based on a comparison of the source noise levels and the background noise levels, both of which are measured or predicted at a noise sensitive receiver e.g. a residential property.

The guidance states that

"*The significance of sound of 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 the context in which the sound occur. 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.*"

In line with the above guidance the external noise level at any property with no direct line of sight or partial line of sight would be below the existing background and at First Floor Flat, 102 Alexandra Road would exceed the background level by 5dB(A).

In order to ensure that all internal levels are within the BS8233 guidance it is recommended that the fence between the Spa/hotel site and 102 Alexandra Road is increased in height by approximately 50-70cm. This would result in a reduction of approximately 5dB(A) due to the screening effect. This would also ensure that all external noise levels would be equal to or below the existing background noise level.

The assessment within this report is a worst case example and provides information for the client with regard to suitable mitigation measures.

10. RECOMMENDATIONS TO REDUCE NOISE FROM SPA/HOTEL

Even though this report has demonstrated that the spa/hotel's external area is capable of being utilised with typical noise levels, the following recommendations should be considered.

Construction:

NOISE SOURCE	NOISE TRANSMISSION	RECOMMENDATIONS
External relaxation area (Jacuzzi)	Airborne, through lightweight poly roof	- Install mineral wool (minimum 50mm – density min 10 Kg/m^3) covered with weatherproof marine plywood. Ensure all gaps are sealed with flexible sealant.
External area	Direct line of sight to 102 Alexandra Road	Increase fence height by approx. 50-70cm

Premises Management:

- Include a clause in the hire agreement requiring guests to minimise noise.
- Notice posted within the external area asking guests to respect the neighbours and to keep noise levels down.

11 Conclusion

Sound Licensing has completed a visual investigation of the property and completed a noise survey in order to determine noise levels at the residential premises adjacent to the site. The construction of the Spa/hotel has been detailed. Noise sources have been identified and calculations undertaken to predict internal noise levels within adjacent residential premises & external façade levels. The predictions provide a maximum level, worst-case impact associated to the noise sources of the spa/hotel when typical activities are in operation. The predicted internal noise levels have been compared to British Standard 8233:2014 guidelines and with the recommendations within this report will comply in full with the guidance internal noise levels. This would also result in a rating under BS4142:2014 of "low impact".

Recommendations have been provided to further mitigate and minimise noise from the Spa/hotel as best practice. It should be noted that the recommendations, if followed and implemented, should reduce noise transmission from the Spa/hotel external areas and also further reduce any impact to nearby residential premises.

APPENDIX A – ACOUSTIC TERMINOLOGY

Parameter	Description
Decibel (dB)	A logarithmic scale representing the sound pressure or power level relative to the threshold of hearing ($20x10^{-6}$ Pascals).
Sound Pressure Level (L_p)	The sound pressure level is the sound pressure fluctuation caused by vibrating objects relative to the threshold of hearing.
A-weighting (L_A or dBA)	The sound level in dB with a filter applied to increase certain frequencies and decrease others to correspond with the average human response to sound.
LAeq,T	The A-weighted equivalent continuous noise level over the time period T (typically T= 16 hours for daytime periods, T = 8 hours for night time periods). This is the sound level that is equivalent to the average energy of noise recorded over a given period.
Ln,T	The noise level exceeded for n% of the time over a given period T. e.g., L90, the noise level exceeded for 90% of the time (background noise) level.
Lmax	The maximum noise level measured.

References:

BS8233:2014 – "'Guidance on sound insulation and reduction for buildings"

BS4142:2014 – "Methods for rating and assessing industrial and commercial sound"

<u>Note on Limitations</u>

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The findings and opinions expressed are relevant to the dates of the site work and should not be relied upon to represent conditions at substantially later dates. Opinions included therein are based on information gathered during the study and from our experience. If additional information becomes available which may affect our comments, conclusions or recommendations SLL reserve the right to review the information, reassess any new potential concerns and modify our opinions accordingly.

APPENDIX B – PICTURES

Site entrance



External Jacuzzi/hot tub area



View from the rear of Flat 3, 108 Alexandra Road



View to the rear of Alexandra Road

