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NOISE IMPACT ASSESSMENT FOR PROPOSED DEVELOPMENT: The Huddersfield Hotel, 41 Kirkgate, Huddersfield, West Yorkshire HD1 1QT

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1.00 INTRODUCTION

1.1

Acoustic Solutions has been commissioned by Hotel Snooze Limited to undertake a noise impact assessment for a proposed development at The Huddersfield Hotel, 41 Kirkgate, Huddersfield.

1.2

The objectives for the noise impact assessment were as follows:

- Establish the evening and night time ambient and background sound levels at the application site and its surrounding environs;
- Establish the specific sound level, within the property's proposed first and second storey dwelling rooms, associated with identified noise sources;
- If appropriate, provide recommendations with respect to management and/or structural controls to mitigate and control the potential noise impact upon future occupiers of the proposed development.

1.3

This report details the methodology and results of the assessment. It has been prepared to accompany an application for planning permission that is to be submitted to Kirklees Council for the proposed development of the application site.

1.4

This report has been prepared for the sole purpose described above and no extended duty of care to any third party is implied or offered.

Third parties referring to the report should consult Hotel Snooze Limited and Acoustic Solutions as to the extent to which the findings may be appropriate for their use.

1.05

A glossary of acoustic terms used in the main body of the text is contained in Appendix 1.

2.0 SITE SETTING AND PROPOSED DEVELOPMENT

2.1

The application site is the existing Huddersfield Hotel, 41 Kirkgate, Huddersfield (Appendix 2). The planning application (reference 2020/93807) is for the change of use from vacant hotel to form 9x residential apartments on the premises' first and second storeys. The premises is located in Huddersfield city centre. It faces north onto Beast Market, south onto Kirkgate, east onto Southgate, (A62) and west onto Lord Street.

Beast Market is a narrow cul-de-sac located north of the development site. On it are two licenced premises, The Boy and Barrel Public House and The Black Dog Bar Night Club; both currently closed due to the current Covid-19 emergency. It is understood that the Black Dog Bar has permanently closed. This being the case, noise from these sources will not be considered in this report's noise impact predictions.

Southgate is a busy dual carriageway located to the east of the development site. It is an arterial highway, running north-south which makes up the eastern section of Huddersfield's ring road.

Kirkgate is a busy city centre commercial street/bus route located to the south of the development site. The busy San Vito Restaurant (currently operating as a take-away) is located at 43 Kirkgate, directly beneath the proposed first storey residential dwellings.

Lord Street is a busy city centre commercial street/bus route located to the west of the development site. On the eastern side of Lord Street is the Haolaiwu Karaoke Bar (currently closed).

3.00 NOISE IMPACT ASSESSMENT CRITERIA

3.1

In terms of noise impact assessment criteria, Paragraph 170e of the National Planning Policy Framework (NPPF) 2018 states that planning policies and decisions should contribute to and enhance the natural local environment by '*preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability.'*

3.2

Planning Practice Guidance specifically dealing with noise was uploaded to the Government's Planning Portal in March 2014 as an accompaniment to the National Planning Policy Framework. This guidance is summarised herein.

3.3

The guidance states that noise needs to be considered when new developments may create additional noise. Whilst noise can override other planning concerns, neither the Noise Policy Statement for England nor the National Planning Policy Framework (which reflects the Noise Policy Statement for England) expects noise to be considered in isolation, separately from the economic, social and other environmental dimensions of proposed development.

3.4

In order to determine noise impact, local planning authorities' plan-making and decision taking should take account of the acoustic environment and in doing so consider:

- Whether or not a significant adverse effect is occurring or likely to occur;
- Whether or not an adverse effect is occurring or likely to occur, and;
- Whether or not a good standard of amenity can be achieved.

3.5

In line with the Explanatory Note of the Noise Policy Statement for England, this would include identifying whether the overall effect of the noise exposure is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation.

3.6

In terms of Observed Effect Levels:

- No Observed Adverse Effect Level (NOAEL) – This is the level of noise exposure below which no effect at all on health or quality of life can be detected;

- Lowest Observed Adverse Effect Level (LOAEL) – This is the level of noise exposure above which adverse effects on health and quality of life can be detected, and;

- Significant Observed Adverse Effect Level (SOAEL) – This is the level of noise exposure above which significant adverse effects on health and quality of life occur.

3.7

At the lowest extreme, when noise is not noticeable, there is by definition no effect. As the noise exposure increases, it will cross the 'no observed' effect level as it becomes noticeable. However, the noise has no adverse effect so long as the exposure is such that it does not cause any change in behaviour or attitude. The noise can slightly affect the acoustic character of an area but not to the extent there is a perceived change in quality of life. If the noise exposure is at this level no specific measures are required to manage the acoustic environment.

3.8

As the exposure increases further, it crosses the lowest observed adverse effect level boundary above which the noise starts to cause small changes in behaviour and attitude, for example, having to turn up the volume on the television or needing to speak more loudly to be heard. The noise therefore starts to have an adverse effect and consideration needs to be given to mitigating and minimising those effects (taking account of the economic and social benefits being derived from the activity causing the noise).

3.9

Increasing noise exposure will at some point cause the significant observed adverse effect level boundary to be crossed. Above this level the noise causes a material change in behaviour such as keeping windows closed for most of the time or avoiding certain activities during periods when the noise is present. If the exposure is above this level the planning process should be used to avoid this effect occurring, by use of appropriate mitigation such as
by altering the design and layout. Such decisions must be made taking account of the economic and social benefit of the activity causing the noise, but it is undesirable for such exposure to be caused.

3.10

At the highest extreme, noise exposure would cause extensive and sustained changes in behaviour without an ability to mitigate the effect of noise. The impacts on health and quality of life are such that regardless of the benefits of the activity causing the noise, this situation should be prevented from occurring.

3.11

The following table summarises noise exposure hierarchy, based on likely average response.

Table 3.1 Guideline "Absolute" Sound Level[1]

Absolute Sound Level	**Absolute Level:**	**≤40Db**	**41 - 45dB**	**46 - 50dB**	**51 - 55dB**	**56 - 60dB**	**≥60dB**
	Daytime Effect:[2]	**NOAEL**	**NOAEL**	**NOAEL**	**LOAEL**	**SOAEL**	**SOAEL+**
	Evening Effect:[3]	**NOAEL**	**NOAEL**	**LOAEL**	**SOAEL**	**SOAEL**	**SOAEL+**
	Night-time Effect:[4]	**NOAEL**	**LOAEL**	**SOAEL**	**SOAEL**	**SOAEL**	**SOAEL+**
	Effect / Impact Description:	No observed effect on health or quality of life.	Sleep disturbance in bedrooms with window open.	Speech intelligibility within living areas with windows open resulting in moderate annoyance. Greater potential for sleep disturbance and adverse health impact.	Increased potential for sleep disturbance, including significant adverse health effects. Gardens and amenity spaces affected.	Significant adverse health effects likely to all habitable rooms. Occupants unable to open windows due to noise ingress and unable to enjoy garden / amenity areas.	High risk of significant adverse health impact. Unable to use garden and amenity space or have windows open for ventilation.
Mitigation Considerations:		**A1** Use design, layout and landscaping (DLL) to create and preserve areas of amenity and tranquillity to enhance the noise environment.	**A2** Protect bedroom facades from noise through DLL. Provide minimum double-glazing with trickle vents to bedrooms.	**A3** Protect habitable room facades from noise through DLL with greater protection for bedrooms. Provide higher spec double-glazing with trickle-vents to all habitable rooms.	**A4** Bedroom facades to be protected through DLL to bring below LOAEL. Provide higher spec double-glazing with trickle vents to all habitable rooms. Protection of gardens and amenity space through DLL and acoustic fencing.	**A5** Bespoke assessment of noise mitigation needs, including consideration of alternative to open window ventilation provision to protect internal noise environment and protection of garden / amenity areas through DLL to bring below LOAEL.	**A6** Bespoke assessment of noise impact and mitigation, including DLL, protection of building envelope and provision of alternative amenity space.
Planning Consideration:		No objection	No objection subject to Approved Plans and/or conditions to include satisfactory window specification to bedrooms with facades exposed to LOAEL noise.	No objection subject to Approved Plans and/or conditions to include satisfactory window specification to all habitable rooms with facades exposed to LOAEL noise.	Details of noise mitigation to be supplied as part of planning approval process. Conditions required to implement control measures within the noise report. Refusal if noise report is inadequate.	Details of noise mitigation to be supplied as part of planning approval process. Conditions required to implement control measures within the noise report. Refusal if noise report is inadequate.	Presumption against planning permission being granted, unless detailed noise impact assessment and approved mitigation measures implemented through conditions. Post completion verification of mitigation measures required.

[1] Free-field, outdoor noise level expressed as dB LAeq(T), where T is the reference time period for the relevant Day, Evening or Night-time period.
[2] Day is from 07:00 to 19:00 and the reference time period (T) is 8 hours.
[3] Evening is from 19:00 to 23:00 and the reference time period (T) is 4 hours.
[4] Night is from 23:00 to 07:00 and the reference time period (T) is 8 hours.

3.12

The subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation. These factors include:

- The source and absolute level of the noise together with the time of day it occurs;

- For non-continuous sources of noise, the number of noise events, and the frequency and pattern of occurrence of the noise;

- The spectral content of the noise (i.e. whether or not the noise contains particular high or low frequency content) and the general character of the noise (i.e. whether or not the noise contains particular tonal characteristics or other particular features);

- The local acoustic character of the area.

3.13

In addition, further useful contextual guidance is provided in:

- British Standard 8233:2014 ‘Guidance on Sound Insulation and Noise Reduction for Buildings’ (BS 8233);

- World Health Organisation (WHO) Guidelines for Community Noise (1999)

3.14

British Standard 8233:2014 'Guidance on Sound Insulation and Noise Reduction for Buildings' sets indoor ambient noise levels from residential dwellings (see table below).

Table 3.2 – Indoor Ambient Noise Levels in Dwellings (BS 8233): 2014

Activity	Location	Good Indoor Ambient Noise Levels	
Resting	Living Room	35 dB $L_{Aeq\ (0700–2300)}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq\ (0700–2300)}$	30 dB $L_{Aeq\ (2300–0700)}$

3.15

With regard to sound attenuation through the building envelope, the 'weak points' in the building façade are generally considered to be the windows. The worked example (G.1) at Annex G of BS 8233 suggests that a partially opened window would provide sound attenuation of approximately 15 dB R_w. The Standard also suggests that *"..standard insulating glass units have an insulation value of approximately 30 dB R_w"* when closed.

3.16

With respect to noise affecting external areas, i.e. gardens, BS 8233 states that *".. it is desirable that the steady noise level does not exceed 50 dB L_{Aeq}, and 55 dB L_{Aeq} should be regarded as the upper limit".*

3.17

The World Health Organisation's Guidelines for Community Noise (1999) sets indoor ambient noise levels from residential dwellings (see table below).

Table 3.3 – Indoor Ambient Noise Levels in Dwellings (WHO 1999)

Activity	Location	Good Indoor Ambient Noise Levels	
Resting	Living Room	35 dB $L_{Aeq\ (0700–2300)}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq\ (0700–2300)}$	30 dB $L_{Aeq\ (2300–0700)}$

4.0 BASELINE NOISE SURVEY

4.1

In order to establish the evening/night time background noise levels at the application site and its surrounding environs, a baseline noise survey was undertaken on 15 & 16 December 2020 between 07:00 and 23:00 hours (daytime/evening) and 23:00-07:00 hours (night time).

4.2

For the purpose of the assessment, four noise monitoring positions, MP1, MP2, MP3 and MP4 were adopted in free field environments at over 1.5 metres above ground and over 3 metres from any vertical reflective surface (see Appendix 2):

- MP1. Lord Street, outside the Haolaiwu Karaoke Bar. (Appendix 2);
- MP2 Beast Market, outside Boy and Barrel Public House.
- MP3 Southgate, on the Southgate/Beast Market junction
- MP4 Kirkgate, outside the entrance of the Huddersfield Hotel.

4.3

A series of hourly 15-minute noise measurements were undertaken using a Type 1 integrating sound level meter (Appendix 3). The measurement system calibration was verified immediately before the commencement of the measurement sessions and again at the end. Weather conditions throughout the survey were dry but overcast with a maximum north-westerly wind speed of 4 metres per second: appropriate for monitoring. Measurements consisted of A–weighted parameters: L_{Aeq}, L_{A90} and L_{Amax}.

4.4 MP1. Lord Street

The principle existing noise source in the vicinity of MP1 was road traffic (including cars and buses) travelling along Lord Street and Kirkgate. This was the dominant noise source throughout the daytime, evening and night time, up to midnight. Secondary sources included pedestrians talking. Tables 4.1-4.3 contain a summary of daytime, evening and night time noise measurement

data. For the purposes of this report, the average L_{Aeq} values measured will be used, thus to provide an accurate illustration of the noise environment. The highest recorded L_{Amax} values will be used for the impact assessment. Distance between principle noise source and nearest first storey dwelling's window, 10 metres.

Table 4.1 – MP1: Baseline Noise Measurement Data, Daytime

Start Time	Measured Noise Level, dB, $L_{Aeq, 15\ min}$	Measured Noise Level, dB, $L_{A90, 15\ min}$	Measured Noise Level, dB $L_{Amax, 15\ min}$
07:00	53.9	43.7	74.5
08:00	60.4	49	77.9
09:00	64.1	51.5	79
10:00	65	53.4	81.3
11:00	63.7	54	78.7
12:00	66.1	57.3	79.4
13:00	64.3	56.4	82.5
14:00	64	57	79.5
15:00	66.3	56.6	72.9
16:00	66	55.2	80
17:00	64.7	54.6	78.8
18:00	61.9	50.1	79.4

Table 4.2 – MP1: Baseline Noise Measurement Data, Evening

Start Time	Measured Noise Level, dB, $L_{Aeq, 15\ min}$	Measured Noise Level, dB, $L_{A90, 15\ min}$	Measured Noise Level, dB $L_{Amax, 15\ min}$
19:00	60.7	49.9	77.8
20:00	58.5	48	78
21:00	58	49.3	79.3
22:00	56.4	47	77

Table 4.3 – MP1: Baseline Noise Measurement Data, Night-Time

Start Time	Measured Noise Level, dB, $L_{Aeq, 15\ min}$	Measured Noise Level, dB, $L_{A90, 15\ min}$	Measured Noise Level, dB $L_{Amax, 15\ min}$
23:00	52.1	45.5	78.9
00:00	53	46	68.5
01:00	51.4	44.6	70
02:00	50.6	45.3	66.9
03:00	47.6	45.2	68
04:00	48.3	44.4	70.2
05:00	47	43.1	69.3
06:00	46.8	42.9	65

4.5 MP2 Beast Market

The principle existing noise source in the vicinity of MP2 was road traffic (including cars and buses) travelling along Lord Street and Southgate. This was the dominant noise source throughout the daytime, evening and night time. Secondary sources included pedestrians talking. Although San Vito was seen to be open during the evening, its air extraction flue and condenser units were not audible. Therefore, these are not considered to constitute a potential noise issue to the future occupants of the proposed dwellings. Tables 4.4-4.6 contain a summary of daytime, evening and night time noise measurement data. Distance between principle noise source and nearest first storey dwelling's window, 10 metres.

Table 4.4 – MP2: Baseline Noise Measurement Data, Daytime

Start Time	Measured Noise Level, dB, $L_{Aeq, 15\ min}$	Measured Noise Level, dB, $L_{A90, 15\ min}$	Measured Noise Level, dB $L_{Amax, 15\ min}$
07:00	51	42.2	73
08:00	57.5	49	78.8
09:00	59.4	50.1	75
10:00	64	49.9	74.9
11:00	64.2	51	75.1
12:00	66.3	50.5	77
13:00	65.1	53.2	75.6
14:00	62.9	55	75
15:00	62.5	56.4	76.1
16:00	64	55.1	75.8
17:00	62.3	52.4	74.5
18:00	61.3	51.7	75.3

Table 4.5 – MP2: Baseline Noise Measurement Data, Evening

Start Time	Measured Noise Level, dB, $L_{Aeq, 15\ min}$	Measured Noise Level, dB, $L_{A90, 15\ min}$	Measured Noise Level, dB $L_{Amax, 15\ min}$
19:00	58	51.5	73
20:00	55.7	50	76.3
21:00	56	48.2	75.9
22:00	55.2	47.5	76.5

Table 4.6 – MP2: Baseline Noise Measurement Data, Night-Time

Start Time	Measured Noise Level, dB, $L_{Aeq, 15\ min}$	Measured Noise Level, dB, $L_{A90, 15\ min}$	Measured Noise Level, dB $L_{Amax, 15\ min}$
23:00	49.6	46	75
00:00	52.5	44.6	65.3
01:00	48.8	44	66.6
02:00	49	44.4	61.8
03:00	49.3	44.1	63.8
04:00	45.1	42.9	69.7
05:00	44.4	43.1	67
06:00	44.1	41	64.6

4.6 MP3 Southgate

The principle existing noise source in the vicinity of MP3 was road traffic (including cars, buses and HGVs) travelling along Southgate. This was the dominant noise source throughout the daytime, evening and night time. Any secondary sources were masked by the loud road traffic noise. Tables 4.7-4.9 contain a summary of daytime, evening and night time noise measurement data. Distance between principle noise source and nearest first storey dwelling's window is 10 metres. This applies to 1x dwelling. The remainder of the east-facing dwellings are located 20 metres away from the principle noise source.

Table 4.7 – MP3: Baseline Noise Measurement Data, Daytime

Start Time	Measured Noise Level, dB, $L_{Aeq, 15\ min}$	Measured Noise Level, dB, $L_{A90, 15\ min}$	Measured Noise Level, dB $L_{Amax, 15\ min}$
07:00	71.4	56.4	91.6
08:00	73.6	59	93.1
09:00	75	58.5	93.7
10:00	76.6	59.3	92.1
11:00	76	60.1	94.3
12:00	75	59.6	92.8
13:00	74.6	59	94.4
14:00	75.5	59.3	95
15:00	74.9	58.7	92
16:00	75.8	59.4	93.3
17:00	77	60.2	96.1
18:00	72	58.4	93

Table 4.8 – MP3: Baseline Noise Measurement Data, Evening

Start Time	Measured Noise Level, dB, $L_{Aeq, 15\ min}$	Measured Noise Level, dB, $L_{A90, 15\ min}$	Measured Noise Level, dB $L_{Amax, 15\ min}$
19:00	70.4	57	94.1
20:00	69.5	57.2	92.2
21:00	70.3	56.8	94
22:00	70.4	57.3	92.9

Table 4.9 – MP3: Baseline Noise Measurement Data, Night-Time

Start Time	Measured Noise Level, dB, $L_{Aeq, 15\ min}$	Measured Noise Level, dB, $L_{A90, 15\ min}$	Measured Noise Level, dB $L_{Amax, 15\ min}$
23:00	69.5	56.4	91
00:00	70	57	93.2
01:00	68.6	55.7	89.8
02:00	65.7	56	89
03:00	66	54.5	91.6
04:00	66.1	55	88.8
05:00	65.7	53.8	89.5
06:00	67.9	54.2	90

4.7 MP4. Kirkgate

The principle existing noise source in the vicinity of MP4 was road traffic (including cars and buses) travelling along Lord Street and Kirkgate and Lord Street. This was the dominant noise source throughout the daytime, evening and night time, up to midnight. Secondary sources included pedestrians talking. Tables 4.10-4.12 contain a summary of daytime, evening and night time noise measurement data. Distance between principle noise source and nearest first storey dwelling's window, 10 metres.

Table 4.10 – MP4: Baseline Noise Measurement Data, Daytime

Start Time	Measured Noise Level, dB, $L_{Aeq, 15 min}$	Measured Noise Level, dB, $L_{A90, 15 min}$	Measured Noise Level, dB $L_{Amax, 15 min}$
07:00	49.5	44	71
08:00	63	51.5	77
09:00	63.7	53.3	79.5
10:00	62.5	55.7	78.3
11:00	65.5	57.1	81
12:00	66.1	56	80.2
13:00	65	58.2	79.7
14:00	62.8	55.6	77.8
15:00	66.9	56.9	80
16:00	68.4	59	81.4
17:00	65	57.8	78
18:00	64	50.8	77.2

Table 4.11 – MP4: Baseline Noise Measurement Data, Evening

Start Time	Measured Noise Level, dB, $L_{Aeq, 15 min}$	Measured Noise Level, dB, $L_{A90, 15 min}$	Measured Noise Level, dB $L_{Amax, 15 min}$
19:00	65.5	49.5	78
20:00	62.4	51.1	77.2
21:00	60.7	49	77.9
22:00	58.5	49.5	80

Table 4.12 – MP4: Baseline Noise Measurement Data, Night-Time

Start Time	Measured Noise Level, dB, $L_{Aeq, 15 min}$	Measured Noise Level, dB, $L_{A90, 15 min}$	Measured Noise Level, dB $L_{Amax, 15 min}$
23:00	55	47	77
00:00	56.2	47.6	76.6
01:00	54.2	45.2	75.2
02:00	53.7	45	73.1
03:00	52.3	45.1	72.5
04:00	50.4	44.5	71.1
05:00	50	45	72
06:00	49.3	44.4	69.7

Tables 4.13, 4.14 and 4.15 summarise measured daytime, evening and night time ambient noise levels at all measurements positions. Table 4.14 summaries predicted values outside first floor windows at northern, southern, eastern and western facades, assuming a distance attenuation of 10 metres, 23 dB. Table 4.15 summaries predicted values outside first floor windows at the eastern facade, assuming a distance attenuation of 20 metres, 29 dB. The distance attenuation value is calculated using the following equation:

$$SPL_2 = SPL_1 - 20\log r - 3$$

Table 4.13 – Baseline Noise Measurement Data: Average Values

Time	MP1, dB $L_{Aeq,\ 15\ min}$	MP2, dB $L_{Aeq,\ 15\ min}$	MP3, dB $L_{Aeq,\ 15\ min}$	MP4, dB $L_{Aeq,\ 15\ min}$
Day	63	62	75	64
Day/Evening	62	60	74	63
Evening	58	56	70	62
Night	50	48	67	53

Table 4.14 - Baseline Noise Measurement Data: Average Values, corrected for 10m distance attenuation, 23 dB

Time	MP1, dB $L_{Aeq,\ 15\ min}$	MP2, dB $L_{Aeq,\ 15\ min}$	MP3, dB $L_{Aeq,\ 15\ min}$	MP4, dB $L_{Aeq,\ 15\ min}$
Day	39	37	52	39
Day/Evening	62	60	52	40
Evening	58	56	52	42
Night	50	48	47	36

Table 4.15 – MP3, Baseline Noise Measurement Data: Average Values, corrected for 20m distance attenuation, 29 dB

Time	MP3, dB $L_{Aeq,\ 15\ min}$
Day	46
Day/Evening	46
Evening	46
Night	41

5.0 IDENTIFIED NOISE SOURCES

The assessment has identified three noise noises or potential noise sources:

- Ambient external noise from road traffic;
- Ambient external noise, from amplified music associated with licenced premises;
- Ambient external noise from licenced premises' external customers;

5.1 Ambient External Noise from Road Traffic

Daytime , evening and night time road traffic noise has been discussed in Paragraphs 4.1 to 4.7 in

5.2 Amplified Music

Although most ambient noise sources have been accounted for in the baseline assessment, noise from licenced premises was absent. At MP1 there is one licenced premises, the Haolaiwu Bar. At MP2 there is one bar, the Boy and Barrel public house.

MP1

The report assumes that the Haolaiwu Bar is approximately. 20m from the nearest window of the proposed residential dwellings. It is understood that the bar plays host to private karaoke parties which take place in individual rooms. This being the case it will be assumed that noise from these parties must encounter 2x closed doors before breaking out onto the street. There are no external windows. It will also be assumed that the door of individual karaoke rooms will have a R_w value of 45 dB so to prevent sound from room leaking into one another. In the absence of noise measurements, the following assumptions will also be made:

- Amplified Music SPL: 100 dB @ 3m from source;
- No significant ‘bass’ or low frequency element;
- Noise reduction, R_w of internal karaoke room door: 45 dB;
- Noise reduction, R_w of external door: 35 dB.
  (Hayne, Mee, Rumble, 2005)

MP2

The report assumes that the Boy and Barrel is approximately. 20m from the nearest window of the proposed residential dwellings. It is understood that background music is played within the premises. It is also understood that the premises benefits from a double-door lobbied entrance. This being the case it will be assumed that noise from these parties must encounter 2x closed doors before breaking out onto the street. It will also be assumed each door will have a R_w value of 35 dB. It is also assumed that the premise’s windows will also have a 35 dB R_w value. In the absence of noise measurements, the following noise assumptions will also be made:

- Amplified Music SPL: 85 dB @ 3m from source;
- No significant ‘bass’ or low frequency element;
- Noise reduction, R_w , of external window: 35 dB;
  (Hayne, Mee, Rumble, 2005)

Table 5.1 Predicted Amplified Music, MP1 & MP2

Location	SPL outside Licenced Premises, dB
MP1	20
MP2	20

6.0 DISCUSSION

6.1 Ambient External Noise

6.1.1 Noise Policy Statement for England

Table 6.1 summaries the Observed Effect Levels for predicted daytime, evening and night time external SPLs at The Huddersfield Hotel, 41 Kirkgate.

Table 6.1: Predicted External Evening and Night Time Observed Effect Levels arising from Noise from ambient external noise at a distance of 10 metres from the principle sources of noise

Location	Pedicted Daytime Observed Effect Level, dB	Predicted Evening Observed Effect Level, dB	Predicted Night Time Observed Effect Level, dB
MP1	NOAEL	NOAEL	SOAEL
MP2	NOAEL	NOAEL	NOAEL
MP3	LOAEL	SOAEL	SOAEL
MP4	NOAEL	NOAEL	NOAEL

Table 6.2: MP3. Predicted External Evening and Night Time Observed Effect Levels arising from Noise from ambient external noise at a distance of 20 metres from the principle sources of noise

Location	Pedicted Daytime Observed Effect Level, dB	Predicted Evening Observed Effect Level, dB	Predicted Night Time Observed Effect Level, dB
MP3	NOAEL	LOAEL	LOAEL

6.1.2 World Health Organisation: 1999 and BS8233: 2014

Assuming a -15 dB attenuation provided by a slightly open window, daytime, evening and night time internal sound pressure levels arising from combined ambient external noise and predicted external noise from amplified music and bar/club patrons (evening and night time at MP1 & MP2) can be predicted within each noise the noise sensitive dwellings.

These values can then be compared against maximum noise criteria, as set out in the World Health Organisation's 'Guidelines for Community Noise (1999) and BS8233: 2014. Tables 6.3, to 6.6 summarise the predicted internal noise levels.

Table 6.3: Predicted Internal Daytime Sound Pressure Levels at The Huddersfield Hotel, 41 Kirkgate at a distance of 10 metres from the principle sources of noise

Location	External SPL, dB	Open Window Attenuation, dB	Predicted Internal SPL, dB	WHO & BS8233 Daytime Criterion, 35 dB, met?
MP1	39	15	24	Yes
MP2	40	15	25	Yes
MP3	52	15	37	No
MP4	39	15	24	Yes

Table 6.4: Predicted Internal Evening Sound Pressure Levels at The Huddersfield Hotel, 41 Kirkgate at a distance of 10 metres from the principle sources of noise

Location	External SPL, dB	Open Window Attenuation, dB	Predicted Internal SPL, dB	WHO & BS8233 Evening Criterion, 35 dB, met?
MP1	40	15	25	Yes
MP2	39	15	24	Yes
MP3	52	15	37	No
MP4	42	15	27	Yes

Table 6.5: Predicted Internal Night Time Sound Pressure Levels at The Huddersfield Hotel, 41 Kirkgate at a distance of 10 metres from the principle sources of noise

Location	External SPL, dB	Open Window Attenuation, dB	Predicted Internal SPL, dB	WHO & BS8233 Evening Criterion, 30 dB, met?
MP1	33	15	18	Yes
MP2	31	15	16	Yes
MP3	47	15	32	No
MP4	36	15	21	Yes

Table 6.6: MP3. Predicted Internal Day, Evening &Night Time Sound Pressure Levels at The Huddersfield Hotel, 41 Kirkgate at a distance of 20 metres from the principle sources of noise

Time	External SPL, dB	Open Window Attenuation, dB	Predicted Internal SPL, dB	WHO & BS8233 Evening Criterion, 30 dB, met?
Day	46	15	31	Yes
Evening	46	15	31	Yes
Night	41	15	26	Yes

7.0 RECOMMENDATIONS

7.1 MP1, MP2, MP3 & MP4

All habitable rooms should have glazing that meets a sound insulation value of 32 dB, $R_{w + Ctr}$ (window closed) for this approximate specification.

7.2 Ventilation

MP1

Open-window ventilation will result in internal sound levels that will exceed maximum recommend night time noise levels; however, it is felt that night time noise is only likely to be problematic between 23:00 and 00:00 hours. This being the case no recommendations are made for closed window, mechanical ventilation.

MP2

Open window ventilation.

MP3

For the east facing dwellings located 20 metres from the principle noise source, Southgate, open window ventilation.

For the east facing dwelling located 10 metres from the principle noise source, Southgate, open-window ventilation will result in internal sound levels that will exceed maximum recommend daytime, evening and night time noise levels. This being the case closed-window mechanical ventilation should be available. The glazing must incorporate sufficient ventilation so to prevent overheating. ProPG calls for glazing with ‘good ventilation’. In terms of temperature, this report interprets this as ventilation sufficient to provide a range of between 15-210C. It is thought that this can only be provided by means of mechanical ventilation. Given the windows’ east-facing aspect, the risk of overheating should be prevented by means of controllable mechanical ventilation, with a control range extending from background/trickle through to purge, see Appendix 5 for ventilation details.

Where mechanical ventilation is required, it is recommended that ventilation be provided by 1x Solace Decentralised Mechanical Ventilation Unit (dMEV), or similar, per room (Titon, 2019).

Table 5.1.b of Approved Document F, 'Approved means of ventilation' (2010) prescribes a whole dwelling ventilation rate of 13 l/s per bedroom. The dMEV meets this criteria. Additionally, its sound rating at 13 l/s is 23 dB @ 3 metres. Assuming an existing daytime/evening internal sound level of 35 dB, an additional 23 dB would result in a imperceptible increase in the internal sound level.

MP4

Open window ventilation.

Appendix 1
Glossary of Acoustic Terms

Sound Pressure Level (L_p)

The basic unit of sound measurement is the sound pressure level. As the pressures to which the human ear responds can range from 20 µPa to 200 Pa, a linear measurement of sound levels would involve many orders of magnitude. Consequently, the pressures are converted to a logarithmic scale and expressed in decibels (dB) as follows:

$L_p = 20 \log_{10}(p/p_0)$

Where L_p = sound pressure level in dB; p = rms sound pressure in Pa; and p0 = reference sound pressure (20 µPa).

A-weighting Network

A frequency filtering system in a sound level meter, which approximates under defined conditions the frequency response of the human ear. The A-weighted sound pressure level, expressed in dB(A), has been shown to correlate well with subjective response to noise.

Equivalent continuous A-weighted sound pressure level, $L_{Aeq,\,T}$

The A-weighted 'equivalent continuous noise level' which is an average of the total sound energy measured over a specified period of time. In other words, L_{Aeq} is the level if a continuous noise which has the same total (A-weighted) energy as the real fluctuating noise, measured over the same time period. L_{Aeq} is increasing being used as the preferred parameter for all forms of environmental noise.

$L_{A90,\,T}$

The A-weighted sound pressure level of the residual noise in decibels exceeded 90% of a given time interval, T. L_{A90} is typically taken as representative of background noise.

$L_{A\ max}$

The maximum A-weighted noise level recorded during the measurement period.

Hz

The unit of frequency. The number of cycles (in the context of acoustics, the number of complete sound waves generated) per second.

Appendix 2

Location Plan and Noise Monitoring Positions

MP1: West of The Huddersfield Hotel, Lord Street
MP2: North of The Huddersfield Hotel, Beast Market
MP3: East of The Huddersfield Hotel, Southgate
MP4: South of The Huddersfield Hotel, Kirkgate

Appendix 3

Equipment Used

Noise measurements were undertaken using a precision grade sound level meter:

Norsonic Nor145 Model integrating sound level meter.
Serial Number 14529307
Certificate Number U35939/U35940
Last Laboratory Calibrated 07/10/20

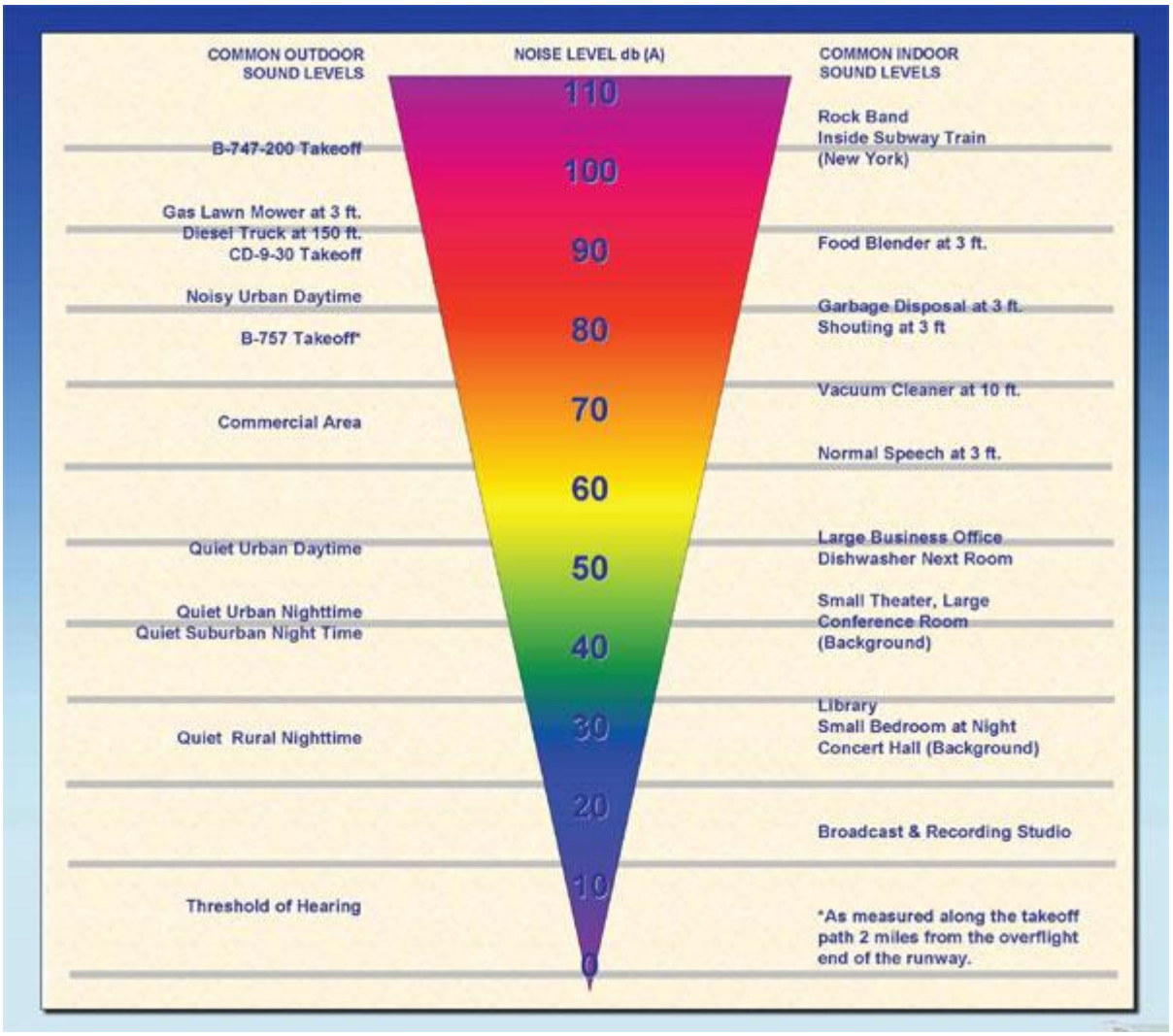
B & K 4230 Model calibrator
Serial Number 724157
Last Laboratory Calibrated 13/2/20

The Sound Level Meter was calibrated before and after both measurement periods, with no significant change in calibration. All calibrations took place at the measurement position.

The SLM met the requirements of BS EN 60651: 1994 and BS EN 60804: 2001 IEC 60804: 2000. It was capable of simultaneously measuring Leq and Ln values. Batteries for the SLM and calibrator were checked prior to all measurements.

Appendix 4

Sound Level Comparison Chart



Appendix 5
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