

APPROVED ADULT GAMING CENTRE AT 22-23 NEW ROAD, GRAVESEND, KENT DA11 0AA

CONDITION 5 NOISE ASSESSMENT

**On behalf of:
Luxury Leisure**

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1.0 INTRODUCTION

1.1 Hepworth Acoustics Ltd has been commissioned by Luxury Leisure to carry out a noise assessment in connection with an approved Adult Gaming Centre (AGC) in the existing ground floor unit at 22 – 23 New Road, Gravesend, Kent DA11 0AA.

1.2 The ground floor unit at 22 – 23 New Road is currently vacant, formerly in use as a New Look clothing store. We understand that the applicant has had planning permission granted by Gravesham Borough Council, application reference 20220456, to convert the ground floor unit into an AGC with 24-hour operation. Permission includes Condition 5 relevant to acoustics, as follows:

“5. Prior to first operation, a noise impact assessment shall be carried out and submitted to the Local Planning Authority for approval demonstrating that the noise levels produced by the gaming machines and any customer noise shall not cause a nuisance to any residents above the gaming centre. The assessment must be made in accordance with the Professional Practice Guidance on Planning & Noise and the WHO Guidelines for Community Noise.”

1.3 The AGC, operating under the Admiral brand, will include slot machines and other electronic gaming machines. The gaming area will be at the front of the building, adjacent to New Road. The rear of the premises will be used for WCs, storage, and staff facilities.

1.4 The first floor of the same building is currently unoccupied. This was previously used as a Dental Surgery. We have assumed for assessment purposes that this may potentially be converted to residential use in future, to consider a worst-case scenario where there are residences directly above the ground floor trading area.

1.5 The site is bounded to the south by New Road, a pedestrianised shopping street. To the north is an access road and car parking, with St George’s Shopping Centre beyond. Either side of the site are retail premises, with residences above. The site location is shown in Figure 1.

1.6 This assessment has included the following:

- A site inspection;
- A survey of the prevailing environmental noise levels at the site;
- Sound insulation prediction between the ground and first floors;
- Measurement of indoor activity noise at a similar Admiral to use as reference noise levels.

- Assessment of noise impact on residents.

- 1.7 All recommendations in this report are given for acoustics reasons only. Compliance with other requirements (e.g. fire, structural, thermal, etc.) must be checked by others.
- 1.8 The various noise units and indices referred to in this report are described in Appendix I. All noise levels mentioned in the text have been rounded to the nearest decibel, as fractions of decibels are imperceptible.

2.0 ACOUSTIC DESIGN CRITERIA

World Health Organisation Guidelines for Community Noise

- 2.1 Condition 5 of the planning permission refers to the World Health Organisation Guidelines for Community Noise (1999). This includes the following guidance:

Annoyance to community noise varies with the type of activity producing the noise. Speech communication, relaxation, listening to the radio and TV are all examples of noise-producing activities. During the daytime, few people are seriously annoyed by activities with L_{Aeq} level below 55 dB; or moderately annoyed with L_{Aeq} levels below 50 dB. Sound pressure levels during the evening and night should be 5 – 10 dB lower than during the day.

ProPG: Planning & Noise

- 2.1 Condition 5 of the planning permission refers to ProPG: Planning & Noise ‘Professional Practice Guidance on Planning & Noise’ 2019. This provides “guidance on a recommended approach to the management of noise within the planning system in England”, predominantly for proposed new residential developments on land that is exposed to transportation noise.
- 2.2 The ProPG recommends a staged approach to assessment. Stage 1 is an initial site noise risk assessment, indicating whether the proposed development is considered to pose a negligible, low, medium or high risk from a noise perspective.
- 2.3 Stage 2 of the recommended approach in ProPG is a full assessment to consider good acoustic design. The guidelines of ProPG in terms of suitable acoustic design criteria are broadly consistent with the guidance of British Standard 8233: 2014 *Guidance on sound insulation and noise reduction for buildings*, and the sound insulation recommendations made later in this report have been designed to achieve these guidelines, as described below.

British Standard 8233

- 2.4 Gravesham Borough Council has no specific noise limits for residences, but encourages the use of British Standard 8233: 2014 *Guidance on sound insulation and noise reduction for buildings*, where appropriate. This is referred to as BS 8233 hereon.
- 2.5 BS 8233 recommends guidance on design criteria for acceptable noise levels within residential accommodation. BS 8233 guidelines for the daytime (07:00 – 23:00) and night-time (23:00 – 07:00) periods are summarised in Table 1.

Table 1: BS 8233 recommended acoustic design criteria

Activity	Location	Internal Noise Levels	
		Daytime 07:00 – 23:00	Night-time 23:00 – 07:00
Resting	Living room	35 dB $L_{Aeq,16hr}$	-
Dining	Dining room / area	40 dB $L_{Aeq,16hr}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hr}$	30 dB $L_{Aeq,8hr}$

- 2.6 BS 8233 clarifies that the above guidance relates only to noise without ‘specific character’ (e.g. such as that which has a distinguishable, discrete and continuous tone, is irregular enough to attract attention, or has strong low-frequency content) and that where such characteristics are present, lower noise limits might be appropriate.
- 2.7 The type of noise associated with the proposed gaming machines has ‘specific character’. To account for this, we recommend that any noise intrusion from the ground floor trading area to any nearby residences should be controlled to be within NR 20 for living rooms during the daytime, and NR 15 for bedrooms at night. These are equivalent to no more than around 28 dB L_{Aeq} and 23 dB L_{Aeq} , respectively, and are therefore well within the BS 8233 design limits stated in Table 1.
- 2.8 BS 8233 also recognises that regular individual noise events at night can cause sleep disturbance. Peaks of noise from individual events are usually described in terms of L_{Amax} values and these can be highly variable and unpredictable. Research described in WHO *Community Noise Guidelines* states, “for a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB L_{Amax} more than 10-15 times per night”. That threshold is therefore 22 dB(A) above the night-time L_{Aeq} criterion value as stated above.

3.0 NOISE SURVEYS

Environmental Noise

- 3.1 Environmental noise measurements were carried out at the site to determine the prevailing ambient noise levels of the area. Noise was measured at Location 1 on the pavement in front of the building, and at Location 2 on the first-floor walkway outside the nearest residence to the rear. The locations are marked on Figure 1.
- 3.2 The noise measurements were taken on Monday 31st March 2025 between 01:00 and 03:00 to represent typical night-time conditions and between 13.00 and 15.00 the same day to represent typical daytime conditions. Measurements were taken simultaneously at Locations 1 and 2. Measurements were taken in sequential 15-minute samples at both locations.
- 3.3 The measurement microphones at Locations 1 and 2 were mounted on tripods. At both locations, the measurement microphones were around 1.5 metres above local ground level.
- 3.4 The weather conditions throughout the noise survey were mild, dry, and overcast, with wind speeds below 5 m/s. Wind was from the southwest. These were considered suitable conditions for the survey.
- 3.5 The results of the noise survey are detailed in Appendix II. The measured noise levels are summarised in Table 2. The L_{Aeq} and L_{A90} values in Table 2 are the logarithmic and arithmetic average respectively of the samples at each location for the relevant time period.

Table 2: Environmental noise levels summary (dBA)

Location	Time	Noise level		
		$L_{Amax,f}$	$L_{Aeq,T}$	$L_{A90,T}$
1	Daytime	72 – 81	58	53
	Night-time	60 – 75	52	46
2	Daytime	65 – 76	50	45
	Night-time	55 – 70	43	39

- 3.6 The dominant noise sources at Location 1 were distant road traffic noise and noise from passing pedestrians. The dominant noise sources at Location 2 were distant road traffic and mechanical plant associated with nearby commercial premises. Aircraft noise was occasionally audible at both locations.

Reference Noise Levels

- 3.7 Noise measurements were taken inside an existing operational Admiral premises at 513 Green Lanes, Haringey, London N4 1AN from 20.00 to 21.00 on Wednesday 19th February 2025. This time was selected following consultation with staff to be representative of a typical busy period. The results are shown in Appendix II and summarised in Table 3.

Table 3: Typical Admiral internal trading noise levels (dB)

Description	Octave Band Centre Frequency (Hz)								A
	63	125	250	500	1k	2k	4k	8k	
L_{eq}	62	64	66	62	61	59	57	49	67
Typical $L_{max,f}$	86	85	82	80	79	74	73	69	84

- 3.8 Therefore, the trading noise is characterised by fairly modest average noise levels interspersed with occasional periods of more elevated peaks of noise.

Sound Level Meter Details

- 3.9 Noise measurements at Location 1, and inside Admiral Haringey, were carried out using a Brüel & Kjær Type 2250 sound level meter (serial no. 3011626).
- 3.10 Noise measurements at Location 2 were carried out using a NTi XL2-TA 'Class 1' sound level meter (serial no. A2A-20294-E0).
- 3.11 Both meters were fitted with windshields. Both meters have independent laboratory calibration certification valid for the date of all measurements.
- 3.12 The calibration levels of the meters were checked before and after the surveys with a Brüel & Kjær Type 4231 sound calibrator (serial no. 2412667). No significant calibration deviation was observed.

4.0 ASSESSMENT

Noise Break Out

- 4.1 We understand that the existing glazed frontage and glass entry door for the ground floor will be retained. We would expect this to provide an overall sound reduction comfortably in excess of 20 dB R_w .
- 4.2 Based on the reference trading noise levels shown in Table 3, and by taking typical values for the sound reduction indices (SRIs) equating to 20 dB R_w for a cautious assessment, as well as the area of the façade, the noise break-out levels at 10 metres have been calculated, as shown in Table 4.

Table 4: Predicted Noise Break-Out at 10 metres from Frontage

	Octave Band Centre Frequency (Hz)								A
	63	125	250	500	1k	2k	4k	8k	
Trading Noise L_{eq}	62	64	66	62	61	59	57	49	66
Trading Noise L_{max}	86	85	82	80	79	74	73	69	84
Frontage SRI	12	15	20	25	25	23	20	20	
Noise Break-Out L_{eq}	30	29	26	17	16	16	17	9	24
Noise Break-Out L_{max}	54	50	42	35	34	31	33	29	42

- 4.3 To note, 10 metres is representative of the most-affected residential window at the nearest neighbouring residence.
- 4.4 Break-out noise reflecting or refracting back to the first floor windows at 22-23 New Road is not expected to be significant.
- 4.5 The predicted worst-case noise break-out levels are considerably lower than the corresponding baseline noise levels at Location 1, as set out in Table 2. They are also well within the limits described in WHO Guidelines for Community Noise, as referred to in Condition 5. Therefore, no adverse impacts due to break out of noise through the premises frontage are anticipated. The trading noise levels within any nearby residences will be well within the limits stated in Section 2.
- 4.6 The rear of the venue comprises an access corridor and staff area. There is then a solid brick façade with a metal security door on the rear elevation. Due to the sound attenuation offered by this arrangement, no appreciable noise break-out via the rear is anticipated.

Internal Sound Insulation

4.7 We understand that the separating construction between the first floor and the ground floor trading area below is as follows:

- Existing floor finish on timber floorboards in the first-floor residence.
- Existing timber joists. We recommend that the voids between these are filled with 100 mm thick mineral wool (density 20 – 40 kg/m³).
- Existing fire lining. Where it is not already, we recommend this lining is upgraded to 2 x 15 mm thick Fireline board.
- 300 mm deep services void.
- Existing suspended ceiling, currently broken in places, which is to be replaced with a new decorative suspended ceiling on a metal grid with sound absorptive acoustic tiles.

4.8 We also recommend the following measures:

- Any new Fireline boards should be staggered, and sealed at the perimeter with suitable non-hardening sealant to ensure an air-tight seal.
- There must be no penetrations, gaps, or openings in the fire lining.
- The fire lining should cover the entirety of the soffit above the trading area.

4.9 With the above recommendations, if built correctly and to a good standard of workmanship, the separating floor/ceiling is predicted to achieve the sound insulation performance shown in Table 5. This has been predicted using Insul version 8 sound insulation prediction software, and is consistent with our experience of testing similar constructions.

Table 5: Floor sound insulation performance prediction

Description	Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
Sound reduction performance (dB)	23	34	41	50	52	53	54	55

4.10 Based on the reference trading noise levels shown in Table 3 and the sound insulation prediction shown in Table 5, the trading noise intrusion to the first-floor flat is predicted to be within the recommended noise intrusion limits stated in Section 2. Therefore, it is concluded that no further sound enhancement measures are required for the separating floor/ceiling element, beyond those recommended above. The calculation is shown in Table 6:

Table 6: Trading noise intrusion (dB)

Description	Sound Pressure Levels (dB L_{eq})							
	Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
Ground floor trading noise	62	64	66	62	61	59	57	49
Sound insulation performance	23	34	41	50	52	53	54	55
1 st floor trading noise intrusion	39	30	25	12	9	6	3	-6
NR15	47	35	26	19	15	12	9	7
Comparison (Trading noise – NR 15)	-8	-5	-1	-7	-6	-6	-6	-13

- 4.11 On the same basis, the $L_{max,f}$ trading noise intrusion to the flat above is also predicted to be within the limit proposed in Section 2.
- 4.12 As general good practice, we recommend that the ceiling in the ground floor space is kept in good condition in future, repairing any gaps or holes that may appear, to ensure the sound insulation performance is maintained.
- 4.13 We do not anticipate there to be potential for noise disturbance to or from the adjacent retail premises through the party walls.

Outdoor Customer Noise

- 4.14 This section is to consider the potential noise impact at night from customers arriving at or leaving from the premises. Based on our experience of monitoring other existing Admiral AGCs, customers mostly arrive and leave alone or in pairs, and do not make significant noise. We expect similar to occur at this location. Based on expected occupancy levels at the venue, around two to three customers are likely to arrive or leave in a 15-minute period at peak times – the occupancy numbers for other similar-sized Admiral premises in London from 20:00 to 02:00 from Thursday to Saturday are shown in Appendix III for reference.
- 4.15 If customers have a conversation when leaving, typical speech noise levels are around 65 dB(A) @ 1 metre. Taking into consideration the distance to the nearest habitable-room window at the front, this will reduce to 49 dB(A). This is 2 dB(A) below the lowest measured night-time $L_{Aeq,15mins}$ level at the front of the building. It is within the limits described in WHO Guidelines for Community Noise, as referred to in Condition 5. It would also not be distinguishable from other conversing passers-by. Based on this, noise impact from customers arriving at or leaving from the premises is predicted to be low.

5.0 CONCLUSIONS

- 5.1 A noise assessment of the approved new Admiral premises at 22 – 23 New Road, Gravesend has been carried out with regards to the requirements of Condition 5 of the planning permission.
- 5.2 This assessment has involved carrying out a baseline noise monitoring survey to establish the existing noise climate outside the building.
- 5.3 Suitable residential noise limits have been set based on relevant standards and guideline documents.
- 5.4 A prediction of the acoustic separation between the ground floor space and the first-floor above has been carried out.
- 5.5 Noise measurements have been made in an existing Admiral premises to provide reference internal noise levels for the expected gaming activities at the development.
- 5.6 Based on the reference noise levels, the predicted acoustic separation, and our recommended internal residential noise limits, no enhancements to the airborne sound insulation performance of the demising construction separating the ground floor and the level above are necessary.
- 5.7 Breakout of trading noise through the front and rear elevations has been assessed and found to be within suitable limits.
- 5.8 The likely noise impact of customers arriving and leaving the premises at night has also been discussed. This impact is predicted to be low.
- 5.9 We conclude that the noise impact of the proposed development will not result in any discernible loss of amenity to local residents. On this basis, we recommend that Condition 5 may be discharged.

Figure 1 – Site Location



Appendix I: Noise Units & Indices

Sound and the decibel

A sound wave is a small fluctuation of atmospheric pressure. The human ear responds to these variations in pressure, producing the sensation of hearing. The ear can detect a very wide range of pressure variations. In order to cope with this wide range of pressure variations, a logarithmic scale is used to convert the values into manageable numbers. Although it might seem unusual to use a logarithmic scale to measure a physical phenomenon, it has been found that human hearing also responds to sound in an approximately logarithmic fashion. The dB (decibel) is the logarithmic unit used to describe sound (or noise) levels. The usual range of sound pressure levels is from 0 dB (threshold of hearing) to 120 dB (threshold of pain).

Due to the logarithmic nature of decibels, when two noises of the same level are combined together, the total noise level is (under normal circumstances) 3 dB(A) higher than each of the individual noise levels e.g. 60 dB(A) plus 60 dB(A) = 63 dB(A). In terms of perceived 'loudness', a 3 dB(A) variation in noise level is a relatively small (but nevertheless just noticeable) change. An increase in noise level of 10 dB(A) generally corresponds to a doubling of perceived loudness. Likewise, a reduction in noise level of 10 dB(A) generally corresponds to a halving of perceived loudness.

The ear is not equally sensitive to sound at all frequencies. It is less sensitive to sound at low and very high frequencies, compared with the frequencies in between. Therefore, when measuring a sound made up of different frequencies, it is often useful to 'weight' each frequency appropriately, so that the measurement correlates better with what a person would actually hear. This is usually achieved by using an electronic filter called the 'A' weighting, which is built into sound level meters. Noise levels measured using the 'A' weighting are denoted dB(A) or dBA.

Frequency and Hertz (Hz)

As well as the loudness of a sound, the frequency content of a sound is also very important. Frequency is a measure of the rate of fluctuation of a sound wave. The unit used is cycles per second, or hertz (Hz). Sometimes large frequency values are written as kiloHertz (kHz), where 1 kHz = 1000 Hz.

Young people with normal hearing can hear frequencies in the range 20 Hz to 20 kHz. However, the upper frequency limit gradually reduces as a person gets older.

Glossary of Terms

- $L_{Aeq,T}$ This is the A-weighted 'equivalent continuous noise level' which is an average of the total sound energy measured over a specified time period, T. In other words, $L_{Aeq,T}$ is the level of a continuous noise which has the same total (A-weighted) energy as the real fluctuating noise, measured over the same time period, T. It is increasingly being used as the preferred parameter for all forms of environmental noise.
- $L_{Amax,f}$ This is the maximum A-weighted noise level that was recorded during a sample duration, with the sound level meter on the 'fast' setting.
- $L_{A90,T}$ This is the A-weighted noise level exceeded for 90% of the time period, T. $L_{A90,T}$ is used as a measure of background noise.

Appendix II: Noise Survey Results

Location 1

Equipment: Brüel & Kjær 2250 'Class 1' Sound Analyser (serial no. 3011626) with tripod and windshield
 Weather: Dry, wind speed below 5 m/s

All levels in dB re 20 µPa.

Table A1: Measured external noise levels (dB)

Start	Duration (h:mm:ss)	$L_{Aeq,T}$	$L_{Amax,f}$	$L_{A90,T}$
31/03/2025 01:00	0:15:00	51	68	45
31/03/2025 01:15	0:15:00	52	67	45
31/03/2025 01:30	0:15:00	52	66	45
31/03/2025 01:45	0:15:00	54	75	47
31/03/2025 02:00	0:15:00	52	64	45
31/03/2025 02:15	0:15:00	53	66	46
31/03/2025 02:30	0:15:00	51	60	45
31/03/2025 02:45	0:15:00	53	62	46
31/03/2025 13:00	0:15:00	60	78	53
31/03/2025 13:15	0:15:00	58	76	52
31/03/2025 13:30	0:15:00	57	75	53
31/03/2025 13:45	0:15:00	58	78	52
31/03/2025 14:00	0:15:00	59	72	53
31/03/2025 14:15	0:15:00	57	78	52
31/03/2025 14:30	0:15:00	58	79	52
31/03/2025 14:45	0:15:00	60	81	54

Location 2

Equipment: NTi XL2-TA 'Class 1' sound level meter (serial no. A2A-20294-E0) with tripod and windshield

Weather: Dry, wind speed below 5 m/s

All levels in dB re 20 µPa.

Table A2: Measured external noise levels (dB)

Start	Duration (h:mm:ss)	$L_{Aeq,T}$	$L_{Amax,f}$	$L_{A90,T}$
31/03/2025 01:00	0:15:00	43	58	39
31/03/2025 01:15	0:15:00	43	60	38
31/03/2025 01:30	0:15:00	42	63	38
31/03/2025 01:45	0:15:00	44	70	39
31/03/2025 02:00	0:15:00	42	64	38
31/03/2025 02:15	0:15:00	42	55	38
31/03/2025 02:30	0:15:00	43	56	39
31/03/2025 02:45	0:15:00	44	62	40
31/03/2025 13:00	0:15:00	51	71	46
31/03/2025 13:15	0:15:00	49	69	45
31/03/2025 13:30	0:15:00	51	76	46
31/03/2025 13:45	0:15:00	50	70	45
31/03/2025 14:00	0:15:00	49	71	44
31/03/2025 14:15	0:15:00	48	65	44
31/03/2025 14:30	0:15:00	49	68	44
31/03/2025 14:45	0:15:00	51	72	46

Reference internal noise levels at existing Admiral venue, 513 Green Lanes, London

Equipment: Brüel & Kjær 2250 Type 1 Sound Analyser (serial no. 3011626) with tripod and windshield

Date: Wednesday 19th February 2025

All levels in dB re 20 µPa.

Table A3: Measured internal noise levels (dB)

Location	Time start	Time end	$L_{Amax,f}$	$L_{Aeq,5mins}$	$L_{A90,5mins}$
Gaming Area	20:00	20:05	65	81	61
	20:05	20:10	64	80	59
	20:10	20:15	68	90	62
	20:15	20:20	66	82	62
	20:20	20:25	65	78	61
	20:25	20:30	62	73	58
	20:30	20:35	66	91	61
	20:35	20:40	67	83	63
	20:40	20:45	69	78	61
	20:45	20:50	69	92	62
	20:50	20:55	65	83	62
	20:55	21:00	67	79	61

Appendix III: Headcount Data from other Admiral premises

Thursday	20:00	21:00	22:00	23:00	00:00	01:00	02:00
Wood Green	2	2	2	2	4	4	3
Hackney	9	8	7	6	4	3	4
Basildon	2	2	3	2	1	2	2
Streatham	4	3	4	4	4	4	4

Friday	20:00	21:00	22:00	23:00	00:00	01:00	02:00
Wood Green	2	5	3	7	5	6	3
Hackney	11	8	9	10	6	7	4
Basildon	4	4	3	3	3	3	3
Streatham	3	2	1	3	3	2	3

Saturday	20:00	21:00	22:00	23:00	00:00	01:00	02:00
Wood Green	8	6	6	3	2	2	6
Hackney	7	5	8	8	4	4	2
Basildon	4	4	3	2	3	2	2
Streatham	6	7	6	6	4	2	2