ARCHO CONSULTING
ACOUSTICS | DESIGN | SYNERGY

REPORT

Merkur Slots – 537 Stockport Road, Manchester

Noise Assessment

Client: MERKUR Slots UK Limited

Reference: PR2001_192_FINAL

Date: 06/09/2024

ARCHO CONSULTING
ACOUSTICS | DESIGN | SYNERGY

Table of Contents

1 Introduction 3

1.1 Background 3

1.2 Site Context 3

1.3 Analysis of Onsite Observations in Relation to Internal Noise Impacts 4

1.4 Legislation 4

2 Assessment Criteria 5

3 Assessment of Potential Noise Impacts – External 6

3.1 Background 6

3.2 Onsite Observations 6

3.3 Operational Noise Levels within Merkur Slots 67 Deansgate, Manchester 6

3.4 Assessment of a 24-Hour Merkur Slots 7

3.5 Noise Impact Assessment – External 8

3.6 Analysis of Results 11

4 Unpredictable Noise Events, Recommended Control Measures and OMP 12

5 Conclusion 13

ARCHO CONSULTING
ACOUSTICS | DESIGN | SYNERGY

Executive Summary

- **Merkur Slots will be occupying a new venue at 537 Stockport Road, Manchester. The venue will be operational 24-hours a day.**

- **A site survey and inspection has been undertaken at 537 Stockport Road, Manchester of the existing condition. The first-floor level is used an ancillary space and the closest residential units to the site appear to be located on the opposite side of the road approximately 36 metres away which are the closest noise sensitive receptors.**

- **Merkur Slots currently operate another venue in Manchester at 67 Deansgate and therefore, to provide a prudent assessment, operational measurements from this site have been used to undertake the assessment of potential impacts for the new venue on Stockport Road. Additionally, a late-night patron survey was undertaken at the Deansgate venue to determine the behaviour of patrons and provide context for the assessment of potential noise impacts.**

- **Measurements of operational noise levels made in the existing Manchester venue and also 10 other operational venues across the country have been referenced to assess potential noise impacts. Operational noise data from the existing venues is presented in Appendix C. All of this information gathered at the venues was used to undertake the noise assessment for external impacts (i.e. noise from outside to the closest residential window). Since there is no adjoining noise sensitive receptor, internal impacts (i.e. through the separating floor) have been scoped out of the assessment.**

- **External Noise Impact Assessment – an assessment of potential external noise impacts from 24-hour operation to the closest residential units was undertaken. A series of case studies of patron behaviour have been undertaken for six different Merkur sites (other than the Manchester venue) with 24-hour consent to assess if noise impacts could occur. Three of the sites had a residential unit directly above. The studies concluded that patrons are nearly always alone or in a pair, very quiet and do not behave in a way that would cause disturbance to others. The assessment demonstrated that the external building façade can attenuate operational noise levels sufficiently so that Noise Rating (NR) 20 will be achieved in the closest noise sensitive receptor and max levels at the window are below the BS8233 criteria.**

- **Surveys at many existing Merkur venues across the UK have been undertaken during the night-time and it was observed that patrons were nearly always arriving and leaving on foot and never congregated outside or near the venue. Patrons arriving by car is an extremely rare event (only 1 instance of 50+ surveys) and as such no noise impacts from vehicles has ever been recorded. These observations have been factored into the assessment for context.**

- **A worst-case scenario assessment of noise from patrons standing outside the venue was undertaken and demonstrates that noise impacts are not anticipated.**

- **Based on the outcome of the assessment, noise impacts are not anticipated and the site is considered suitable for 24-hour operation. An operational management plan for managing unpredictable noise events have been developed and presented within this report.**

1 Introduction

1.1 Background

Archo Consulting Ltd have been appointed to undertake an assessment of sound insulation performance and potential noise impacts from patron activity for a new Merkur Slots site at 537 Stockport Road, Manchester. Planning permission is being sought for 24-hour operation and as such the assessment has been undertaken in accordance with the appropriate Noise Rating (NR) criteria and night-time internal noise criteria thresholds in accordance with BS8233:2014.

An onsite inspection has been undertaken of the existing condition of the separating ceiling and walls to identify the current configuration. The resulting sound insulation performance has been calculated using INSUL Sound Insulation Prediction Software to prove compliance. Merkur Slots currently operate another venue in Manchester at 67 Deansgate and therefore, to provide a prudent assessment, operational measurements from this site have been used to undertake the assessment of potential impacts for the new venue on Stockport Road. Additionally, a late-night patron survey was undertaken at the Deansgate venue to determine the behaviour of patrons and provide context for the assessment of potential noise impacts.

1.2 Site Context

The site is located at ground-floor level facing out onto Stockport Road. Merkur will be taking the ground floor for trading and the first-floor for ancillary purposes. Neighbouring commercial units exist on each side of the site. The closest residential premises to the site described as a noise sensitive receptor (NSR1) appear to be a first-floor unit on the opposite site of Stockport Road approximately 36-metres away. The location of NSR1 in relation to the site is indicated in **Figure 1** below:

Figure 1: Location of Site and Closest NSR



Predictions of the sound insulation performance are provided to ensure noise impacts do not occur. Measurements of operational noise levels from the existing site at 67 Deansgate have been used to assess noise breakout.

1.3 Analysis of Onsite Observations in Relation to Internal Noise Impacts

As per the inspection and noted context of the site, no noise sensitive receptors adjoin to the site but rather it is surrounded on all sides by commercial premises and storage. Commercial premises are not considered noise sensitive and, based on the site inspection, the building envelope will more than sufficiently attenuate any noise generated.

Therefore, potential impacts from internal noise transmission have been scoped out of this assessment and will not be considered further.

1.4 Legislation

Noise impacts to adjacent residential premises have been calculated and assessed in accordance with the following standards:

- *British Standard (BS) 8233:2014 – Guidance on Sound Insulation and Noise Reduction for Buildings* (herein after referred to as BS 8233:2014).

Full details of all legislation, guidance and standards referenced for noise assessments are presented in **Appendix A**.

2 Assessment Criteria

The following guidance has been used to undertake the assessment for external noise impacts to the closest noise sensitive receptors. Full details of all guidance are presented in **Appendix A** and a description of acoustic terminology is presented in **Appendix B**.

NR Curves

The closest noise sensitive receptor NSR1 to the site is the residential unit located approximately 36-metres away. Residential units will typically experience very low internal noise levels, mostly from conversations and entertainment. In determining what NR criteria should be the limit to sufficiently protect the occupants, it was deemed prudent that a threshold of NR20 should be applied as this criterion will be sufficiently low to protect the amenity of residents. This criterion has been used for previous assessments of the same nature and provided adequate protection. The NR20 criterion applies to internal noise impacts (noise transmitting through the separating floor) and external noise impacts (noise from outside entering via a partially open window).

BS8233:2014

BS8233:2014 criteria for recommended internal noise levels (night-time) has also been referenced in order to provide a prudent assessment. BS8233:2014 specifies that, in order for the above thresholds to apply, the noise source in question must have "no specific character" i.e. no tones, strong low frequency component etc. Based on the measurements made within the active site, it was determined that noise levels were low and without specific character (predominantly people talking and low-level sounds from machines). The site will be operational 24-hours a day and the night-time (23:00 to 07:00) internal noise criteria represents the most stringent criterion. Therefore, **the threshold of 30 dB $L_{Aeq,8hour}$** representing the BS8233:2014 night-time criteria has also been referenced for this assessment.

NANR116: 'Open / Closed Window Research

The Building Performance Centre – School of the Built Environment at Napier University published a research paper in April 2007 entitled *NANR116: 'Open/Closed Window Research' Sound Insulation Through Ventilated Domestic Windows* which detailed the measured sound attenuation which can be achieved by partially open windows with different opening areas. The attenuation values presented in **Appendix A** were used to assess potential noise impacts as this represents a prudent and worst-case scenario.

3 Assessment of Potential Noise Impacts – External

3.1 Background

As per **Section 1.3**, no adjoining noise sensitive receptors exist and therefore internal noise impacts have been scoped out of the assessment. The following section deals with potential *external* noise impacts exclusively.

In order to assess the current site conditions, an inspection and assessment was undertaken on the 23rd July 2024. The assessment focused predominantly on the ceiling area, walls and shop front which will separate the premises from the adjacent spaces. Detailed site notes and accompanying photographs were taken to inform the assessment.

In order to assess potential noise impacts from patrons, a series of six case studies of patron behaviour during the night-time at existing Merkur sites with 24-hour consent has been presented to demonstrate the passive and quiet nature of patrons of AGC's across the UK. An assessment of potential noise impacts to the closest noise sensitive receptor (NSR) from noise breakout and also from people smoking on the street has also been performed.

3.2 Onsite Observations

It was noted onsite that a suspended grid ceiling was present which incorporated mineral fibre ceiling tiles. The separating floor consisted of cast concrete, the thickness of which could not be determined but is assumed to be a minimum of 101mm as this is the minimum structural requirements for concrete floors.

The separating walls were noted to be composed of brick. The entrance consisted of a single-leaf glass door mounted in glazed frontal façade.

The key findings of the onsite investigation in relation to the sound insulation performance are listed below. Photos from the site are presented in **Appendix C**:

- ***Entrance Door***: It is recommended that acoustic perimeter seals are installed around the frame of the door and at the bottom to prevent unnecessary sound transmission to the outside. It is recommended that the door also incorporate an automatic closer system.

- ***Separating Floor***: Although no noise sensitive receptors exist directly above it is recommend that all M&E penetrations are fully sealed up using non-hardening sealant which prevents potential sound flanking paths. As per the site notes detailed in **Appendix C**, all holes and voids in the separating floor should be filled in a patched over.

3.3 Operational Noise Levels within Merkur Slots 67 Deansgate, Manchester

Measurements of internal operational noise levels within 67 Deansgate, Manchester have been made in order to provide a prudent and robust method to assess potential noise breakout from the new site. Measurements were made in various locations to obtain a representative spatial average. All details of the measurements and data are presented

in **Appendix C**. For reference, internal source measurements made at other Merkur venues across the UK have also been presented in **Appendix C** to demonstrate how all venues have very similar operational noise levels.

It was noted during the site visit in which source noise levels were measured that the venue was very typical of others across the country with no discernible difference in operational sound or patron behaviour / frequency. The following contextual factors were noted with relation to noise which are typical for all Merkur venues:

- No sound was audible outside of the premises to the front or rear during peak operation;
- Internal noise levels were not high with normal conversations clearly audible and perceptible at normal speech level;
- Max levels were infrequent and short in duration;
- Patrons observed entering and leaving the premises during peak operation were always alone or in a pair with no loud conversation or behaviour that might cause disturbance; and,
- Patrons enter and leave quickly without loitering.

Additionally, a late-night assessment of patron behaviour before the venue closed was undertaken between 00:00 and 01:00 to determine if any noise impacts were occurring as patrons arrived and exited the venue. During the survey period 2 patrons left the venue at different times, one talking quietly on a phone and one vaping. No sound from the patrons was perceptible against the ambient sound scape on Stockport Road which was very loud. Patrons of nearby pubs were audible and vehicles passing one Stockport Road formed the predominant noise sources. No sound from the operational venue was perceptible.

3.4 Assessment of a 24-Hour Merkur Slots

In order to determine what potential noise impacts could arise from patrons during the early hours of the morning, a series of surveys have been undertaken at existing operational Merkur Sites (separate from the Deansgate venue) which have 24-hour consent. The surveys aimed to determine the typical behaviour of patrons during the most noise sensitive period of the night (after midnight) and identify if noise impacts could occur. The first three assessments were conducted during covid times and a further three have been conducted post-covid when restrictions have been fully lifted. **Table 2** below presents the outcome of the assessments in relation to noise.

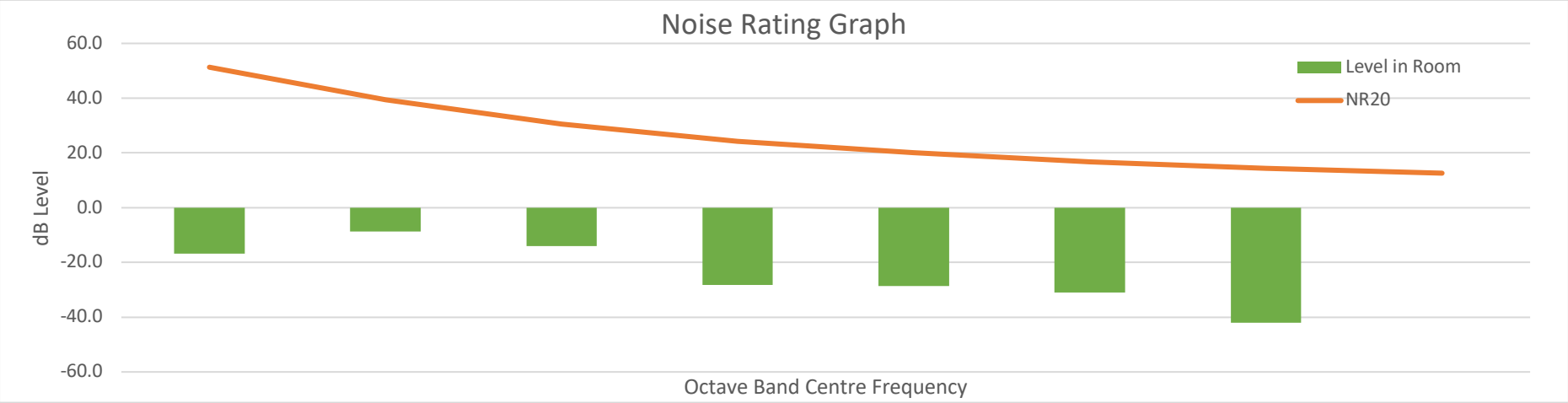
Table 2: Patron Survey Assessment Results

Venue	Date & Time of Visit	Town or District Centre	Residential Directly Above (Y/N)	No. Customers In	No. Customers out	Analysis of Observation (Patron behaviour)
302-304 Hessle Road, Hull – 11th September 2020	11th September 2020 01:45-02:45	District Centre	No	10	4	Patrons generated little sound from brief conversation. Barely discernible against noise from the road.
48-50 Camberwell Church Street, Camberwell, London – 15th July 2021	15th July 2021 01:00-02:00	District Centre	Yes	2	4	On three occasions patrons came outside for a cigarette. On one occasion patrons talked at low level briefly.
45 West Street, Boston – 29th July 2021	29th July 2021 00:00-01:00	Town Centre	No	2	0	No sound was generated by patrons. One patron came outside to smoke but made no sound.
22 The Market, Wrythe Lane, Carshalton, SM5 1AG	16th March 2023 01:00-02:30	District Centre	Yes	1	1	Staff came out at 02.29 but made no noise and one patron is heard talking briefly. No other sound.
122 Kingsland High Street, Hackney, London, E8 2NS	15th March 2023 01:00-02:30	Town Centre	Yes	2	2	No sound from any of the patrons. Only sound is from cars on the road.
222-223 High Street, Dudley, DY1 1PD	22nd March 2023 01:00-02:00	Town Centre	No	5	3	Two instances occurred were patrons came out to smoke but no sound was generated. No other patron noise.

3.5 Noise Impact Assessment – External

All calculations, methodology and technical details are presented in **Appendix D**. With reference to **Section 2** it was deemed appropriate that the limit of **NR20** can be applied for the closest residential receptor NSR1. The noise rating curve within NSR1 was calculated using the attenuation values presented in NANR116 and reproduced in **Appendix A**. The sound insulation performance of the glazed shop front was calculated using INSUL Sound Insulation Prediction Software and is presented in **Appendix D**. The octave band noise level incident at the window of NSR1 was calculated over a 36-metre distance and the NR curve inside the room predicted. **Figure 2** below presents the calculated NR curve plotted against the NR20 curve:

Figure 2: Predicted NR curve against NR20



It can be observed from **Figure 2** above that the calculated NR curve within NSR1 will be well below both the **NR20** curve values and the night-time threshold of 30 dB stipulated within BS8233:2014.

Assessment of Max Levels

Previous versions of BS8233:2014 stated that noise levels should not regularly exceed 45dB within bedrooms during the night-time. BS8233:2014 states that a partially open window can achieve a reduction of -15 dB and combining this with the internal threshold of 45 dB provides a façade limit of 60 dB.

To provide a prudent and worst-case approach, an assessment of potential noise impacts from measured L_{Amax} levels has been undertaken for the scenario when the entrance door is briefly open for customers to enter and leave. The highest measured L_{Amax} levels presented in **Appendix C** were used and, assuming the partially open door achieves the same attenuation values as a partially open window, the predicted L_{Amax} level at NSR1 (36-metres away) was calculated. **Table 3** below presents the results of the assessment:

Table 3: Predicted L_{Amax} Level Incident at Closest Residential Window

Element	63	125	250	500	1000	2000	4000	Single Figure L_{Aeq}, dB
Level at Window	21.4	23.8	20.2	15.2	19.4	14.3	3.1	**28.0**

It can be seen in **Table 3** above that, assuming an absolute and unlikely worst-case scenario, predicted max levels at the closest residential window are below the criteria stipulated by BS8233. It should be noted that machines generating the max levels are never located near the door but further inside the venues and therefore, max levels emanating from the periodically open door will realistically be much lower.

Based on the results of the noise breakout assessment and the worst-case assessment of max levels it can be concluded that noise impacts to NSR1 are considered highly unlikely to occur.

Assessment of Patron Noise – Smoking

Based on the site observations undertaken at different active Merkur sites with 24-hour consent detailed in **Section 4.3** it was observed that, at each of the sites, patrons were very quiet when entering and leaving the site and were typically alone or in a pair. It should be noted that the sites in Camberwell, Carshalton & Hackney had a residential unit directly above, the occupants of which have never complained about the AGC. When patrons who chose to smoke were observed coming out of the venue they generated little to no sound which was imperceptible against the ambient noise level of the area.

However, to provide a prudent and worst-case scenario approach to assessing potential noise impacts, an assessment of potential noise from patrons who choose to smoke talking loudly outside the front of the site has been undertaken. The methodology for the assessment of potential noise impacts from patrons outside it presented in **Appendix D**. During the initial site visit to a Merkur Slots venue in Hull (pre-covid) two patrons were recorded talking moderately to loudly outside the venue for a duration of around 1 minute. This level was measured to be 69.4 dBA which is representative of a louder conversation. Using this measured level an assessment was undertaken of potential noise impacts at the closest residential window NSR1. To assess a worst-case scenario, it was assumed that 3 patrons were outside and all talking at the same time and same level i.e. 69.4 dBA. Using the information detailed in **Appendix D**, an assessment was undertaken of potential noise impacts to NSR1 at night-time. **Table 4** below presents the results of the assessment:

Table 4: Predicted Noise Levels

Source Noise Level of Each Patron (dBA)	No. of Patrons Talking	Distance (Metres)	Predicted Level at NSR1	Comment
69.4	3	36	38	Below 60 dBA threshold

3.6 Analysis of Results

Operational Noise

The predicted noise levels at the closest noise sensitive receptor NSR1 are below NR20 and BS8233:2014 criteria for internal habitable rooms during the night-time. It should be noted that this assessment represents a worst-case scenario and in practise noise levels will likely be lower. The worst-case scenario assessment of max levels when the front door is open demonstrates that predicted noise levels at NSR1 are below BS8233 criteria. It can be concluded that, given the measured internal operational noise levels and noted construction of the site, noise impacts at NSR1 are considered highly unlikely to occur.

Patrons Noise

Section 3.4 demonstrates that patrons of these venues showed no tendency towards shouting or other behaviour that might cause disturbance when outside, entering or leaving the venue. Therefore, noise impacts from patrons are considered highly unlikely to occur.

Notwithstanding, the OMP for this site presented in **Appendix E** should be followed.

Patrons Smoking

It can be observed from **Table 4** above that predicted worst-case scenario levels at NSR1 are below the external criteria of 60 dBA for the night-time.

Given that these events were observed at different Merkur sites across the country to occur infrequently (if at all) and combined with the worst-case predicted level being lower than this threshold it can be concluded that noise impacts from patrons who choose to smoke outside the venue are considered very unlikely to occur.

4 Unpredictable Noise Events, Recommended Control Measures and OMP

Observations at Other Merkur Sites

Based on observations at other active Merkur sites with 24-hour consent and the similar procedures that have been implemented, random noise events are considered unlikely to occur and the chance of such an event occurring from other people in the area unrelated to the site is equal.

It was observed at other Merkur sites and noted from conversations with the management that the venues normally have a strong circle of regulars who are known to the staff. This means they are unlikely to disobey house rules or go against staff requests.

Operational Management Plan - Control Measures

Notwithstanding, **Appendix E** presents the operational management plan which will be implemented to control, among other things, potential noise incidents. The main points are summarized below:

- Background music only will be played in the premises and there will not be any tannoy systems.
- The main entrance doors will not be fixed or propped open at any time whilst the premises is trading and there are customers in the venue.
- Customers wishing to smoke will be asked to do so as quickly as possible and in a responsible and quiet manner.
- Individuals who are deemed to be under the influence of excessive alcohol shall not be allowed to enter the premises.
- A notice will be placed that is visible from the exterior of the premises stating that drinking of alcohol directly outside the premises is forbidden and that those who do so will be banned from the premises.
- Customers will be reminded to respect neighbours when they leave.
- Customers found to be loitering near the building will be politely asked by staff to move on.
- Staff, on request, will provide relevant information to customers who require a taxi or directions to the nearest station or bus stop.

5 Conclusion

Internal Noise

A site inspection and assessment has been undertaken at 537 Stockport Road, Manchester.

The inspection has identified the current configuration and site photos and notes are presented in **Appendix C** of this report. The site inspection revealed that no noise sensitive receptors adjoined directly to the site and instead it was surrounded by commercial premises and storage.

Based on the configuration of the separating elements, the measured operational noise levels and the lack of noise sensitive receptors adjoining to the premises, internal noise impacts were scoped out of the assessment. The resulting measurements made in the existing venue at 67 Deansgate also indicate that noise levels generated by the venue are minimal and therefore noise impacts are strongly not anticipated. The site is considered suitable for 24-hour operation.

External Noise

An late-night assessment of patron behaviour and potential noise impacts was undertaken at the existing Merkur Slots at 67 Deansgate, Manchester. The results indicated that patron movements were infrequent and no sound was perceptible from patrons or the venue against the ambient sound scape of Stockport Road which was generally busy during this time.

A series of case studies of patron behaviour have been undertaken for six different Merkur sites with 24-hour consent to assess if noise impacts could occur. Three of the sites had a residential unit directly above. The studies concluded that patrons are nearly always alone or in a pair, very quiet and do not behave in a way that would cause disturbance to others. An assessment of potential noise breakout to the closest residential premises NSR1 located 36 metres away was undertaken using source noise measurements made within an existing site during peak operation and is presented. The assessment showed that the front façade will attenuate noise levels sufficiently to comply with the criteria of NR20 and BS8233:2014 criteria for internal habitable rooms at NSR1. An assessment of max levels has demonstrated that under a worst-case and unlikely scenario, when the door is periodically open, predicted levels at NSR1 are below the criteria prescribed in BS8233.

An assessment of potential noise impacts from patrons smoking outside has been undertaken. The study concluded that predicted worst-case noise levels are significantly below the external 60 dBA threshold during the night-time stipulated in WHO and referenced within BS8233. The OMP presented in **Appendix E** will be followed which has proven highly effective in other venues for control of noise. The assessment concludes that external noise impacts are considered highly unlikely to occur and, based on the outcome of the assessment, the site is suitable for 24-hour operation.

Unpredictable Noise Events

Based on the site assessments of patron behaviour at six sites during the most noise sensitive period of the night detailed in **Section 3.4,** it is considered highly unlikely that noise impacts will occur due to patrons leaving and entering the site. Patrons are typically regulars from the local area and are unlikely to be inclined to disobey the rules or staff members.

The assessment concludes that noise impacts from patrons are considered very unlikely to occur and the OMP presented in **Appendix E** will be implemented to ensure control.

Appendix A – Legislation

Legislative Framework and Planning Policy

National Legislation Environmental Protection Act 1990

Section 79 of the Act defines statutory nuisance with regard to noise and determines that local planning authorities have a duty to detect such nuisances in their area.

The Act also defines the concept of "Best Practicable Means" (BPM):

> *" 'practicable' means reasonably practicable having regard among other things to local conditions and circumstances, to the current state of technical knowledge and to the financial implications;*
> *the means to be employed include the design, installation, maintenance and manner and periods of operation of plant and machinery, and the design, construction and maintenance of buildings and structures;*
>
> *the test is to apply only so far as compatible with any duty imposed by law; and*
> *the test is to apply only so far as compatible with safety and safe working conditions, and with the exigencies of any emergency or unforeseeable circumstances."*

Section 80 of the Act provides local planning authorities with powers to serve an abatement notice requiring the abatement of a nuisance or requiring works to be executed to prevent their occurrence.

The Control of Pollution Act 1974

Section 60 of the Act provides powers to Local Authority Officers to serve an abatement notice in respect of noise nuisance from construction works.

Section 61 provides a method by which a contractor can apply for 'prior consent' for construction activities before commencement of works. The 'prior consent' is agreed between the Local Authority and the contractor and may contain a range of agreed working conditions, noise limits and control measures designed to minimise or prevent the occurrence of noise nuisance from construction activities. Application for a 'prior consent' is a commonly used control measure in respect of potential noise impacts from major construction works.

National Policy Guidance
National Planning Policy Framework 2023

The National Planning Policy Framework (NPPF) was introduced in March 2012 replacing the former Planning Policy Guidance 24: Planning and Noise. It was revised in July 2018, in February 2019, in July 2021 and most recently in September 2023. This document now forms the basis of the Government's planning policies for England and how these should be applied.

Paragraph 174 e) of the National Planning Policy Framework (NPPF) states that planning policies and decisions should contribute to and enhance the natural and 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...."*

Furthermore, Paragraph 185 of the NPPF states:

> *"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:*

1. *a) Mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life:*
2. *b) Identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and,*
3. *c) Limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation."*

The NPPF also refers to the Noise Policy Statement for England (NPSE) (Defra, 2010).

Noise Policy Statement for England

The Noise Policy Statement for England (NPSE) document was published by Defra in 2010 and paragraph 1.7 states three policy aims:

> *"Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:*
> *avoid significant adverse impacts on health and quality of life;*
> *mitigate and minimise adverse impacts on health and quality of life; and, where possible, contribute to the improvement of health and quality of life."*

The first two points require that significant adverse impact should not occur and that, where a noise level falls between a level which represents the lowest observable adverse effect and a level which represents a significant observed adverse effect:

> *"...all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life whilst also taking into consideration the guiding principles of sustainable development. This does not mean that such effects cannot occur."* (Paragraph 2.24, NPSE, March 2010).

Section 2.20 of the NPSE introduces key phrases including "Significant adverse" and "adverse" and two established concepts from toxicology that are being applied to noise impacts:

> *"NOEL – No Observed Effect Level*
> *This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.*
> *LOAEL – Lowest Observed Adverse Effect Level*
> *This is the level above which adverse effects on health and quality of life can be detected".*

Paragraph 2.21 of the NPSE extends the concepts described above and leads to a significant observed adverse effect level – SOAEL, which is defined as the level above which significant effects on health and quality of life occur. The NPSE states:

> "*it is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations*". (Paragraph 2.22, NPSE, March 2010).

Furthermore paragraph 2.22 of the NPSE acknowledges that:

> "*further research is required to increase understanding of what may constitute a significant adverse effect on health and quality of life from noise*".

National Planning Practice Guidance for Noise

The National Planning Practice Guidance for Noise (NPPG Noise, December 2014), issued under the NPPF, states that noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. When preparing local or neighbourhood plans, or taking decisions about new development, there may also be opportunities to consider improvements to the acoustic environment.

Guidance

The following guidance has been used for the purpose of the noise and vibration assessment:

British Standard (BS) 7445: Parts 1 and 2 - Description and measurement of environmental noise
This Standard provides details of the instrumentation and measurement techniques to be used when assessing environmental noise, and defines the basic noise quantity as the continuous A-weighted sound pressure level (LAeq). Part 2 of BS 7445 replicates ISO standard 1996-2.

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

BS8233:2014 criteria for recommended internal noise levels (night-time) has also been referenced in order to provide a prudent assessment.

Guidance on suitable internal noise levels is provided in BS 8233:2014 (Section 7.7.2, Table 4) derived from the guidance provided by the WHO. These details recommended internal noise levels to ensure that adequate noise reduction occurs to reduce direct and flanking transmission across facade elements. Recommended internal noise levels are reproduced in **Table 5** below:

Table 5: Recommended Internal Noise Levels – BS 8233:2014

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

BS8233:2014 specifies that, in order for the above thresholds to apply, the noise source in question must have "no specific character" i.e. no tones, strong low frequency component etc. Based on the measurements made within an active Merkur Slots sites it was determined that noise levels were low and without specific character (predominantly people talking and low-level sounds from machines). The site will be operational 24-hours a day. It can be observed from **Table 5** above that the night-time (23:00 to 07:00) internal noise criteria is more stringent. Therefore, the threshold of 30 dB LAeq,8hour presented in **Table 5** above representing the BS8233:2014 night-time criteria has also been referenced for this assessment.

NANR116: 'Open / Closed Window Research

The Building Performance Centre – School of the Built Environment at Napier University published a research paper in April 2007 entitled NANR116: 'Open/Closed Window Research' Sound Insulation Through Ventilated Domestic Windows which detailed the measured sound attenuation which can be achieved by partially open windows with different opening areas. Different types of window were tested and the window which is common in residential buildings and achieved the lowest performance in the tests is the side swing reversable (denoted Type B in the paper). It was determined that with an opening of 200,000 mm2 (representative of a large opening) a sound reduction value of Dn,e,W (C;Ctr) 16 (-1; -2) was achieved. **Table 6** below reproduces the octave band attenuation values for this type of window.

Table 6: Measured Attenuation for Partially Open Window

Window	Attenuation at Octave Band Centre Frequencies							Dn,e,W (C;Ctr)
	63	125	250	500	1k	2k	4k	
Side Swing Reversable (B)	20.8	13.3	12.9	18.1	12.0	18.3	20.5	16 (-1; -2)

The attenuation values presented in **Table 6** above were used to assess potential noise impacts as this represents a prudent and worst-case scenario.

Noise Rating (NR) Curves

Noise rating curves provide a method of measuring, specifying and controlling noise levels within buildings. They consist of single figure values corresponding to individual mid-frequency octave bands. The overall single figure NR value is determined by examining which curve the highest of the individual NR values for the frequency bands falls onto. **Table 7** reproduced from 'The Little Red Book of Acoustics: A Practical Guide (Second Edition)', (published by Blue Tree Acoustics) below provides examples of typical noise levels within different buildings and spaces.

Table 7: Typical Noise Levels for Different Spaces

Location	NR Value at Octave Band Centre Frequencies							dB(A)
	63	125	250	500	1k	2k	4k	
Quiet Restaurant	60	60	60	65	65	55	50	67
Busy Restaurant	60	70	75	75	75	75	70	80
Busy Pub/Bar	80	85	85	85	85	80	70	88
Music Bar/Nightclub	110	110	100	100	95	90	85	101
Classroom	55	55	55	60	60	60	55	65

Table 8 below presents typical NR curves for different spaces:

Table 8: NR Curves for Different Spaces

Noise Rating (NR) Curve	Application
NR 25	Concert halls, broadcasting and recording studios, churches
NR 30	Private dwellings, hospitals, theatres, cinemas, conference rooms
NR 35	Libraries, museums, court rooms, schools, hospitals operating theatres and wards, flats, hotels, executive offices
NR 40	Halls, corridors, cloakrooms, restaurants, night clubs, offices, shops
NR 45	Department stores, supermarkets, canteens, general offices
NR 50	Typing pools, offices with business machines
NR 60	Light engineering works
NR 70	Foundries, heavy engineering works

In determining what NR criteria should be the limit to sufficiently protect the occupants, it was deemed prudent that a threshold of NR20 should be applied as this criterion will be sufficiently low to protect the amenity of residents. This criterion has been used for previous assessments of the same nature and provided adequate protection.

Table 9 below presents the values associated with the NR20 curve:

Table 9: NR20 Octave-band Values

Noise Rating	Octave Band Mid-Frequency Levels (dB)							
	63	125	250	500	1000	2000	4000	8000
NR20	51.3	39.4	30.6	24.3	20	16.8	14.4	12.6

World Health Organisation (WHO) (1999) Guidelines for community noise

These guidelines present health-based noise limits intended to protect the population from exposure to excess noise. They present guideline limit values at which the likelihood of particular effects, such as sleep disturbance or annoyance, may increase. The guideline values are 50 or 55dB LAeq during the day, related to annoyance, and 45 dB LAeq or 60dB LAmax at night, related to sleep disturbance.

British Standard (BS) 4142:2014 – Method for rating and assessing industrial and commercial sound

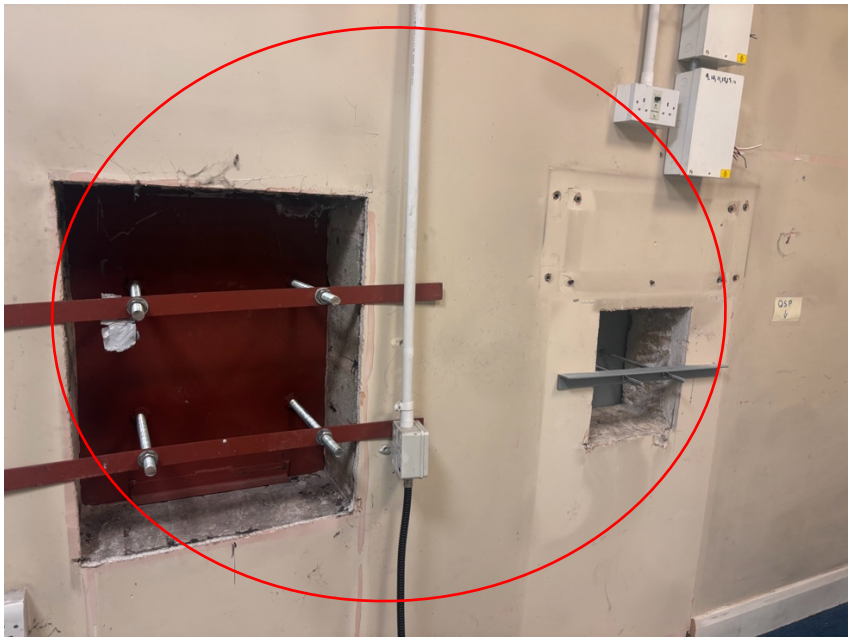
BS 4142 describes methods for rating and assessing sound of an industrial and/or commercial nature. The methods use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident.

ARCHO CONSULTING
ACOUSTICS | DESIGN | SYNERGY

Appendix B – Description of Acoustic Terms

Term	Description
Noise sensitive receptors	People, property or designated sites for nature conservation that may be at risk from exposure to noise and vibration that could potentially arise as a result of the proposed development/project
Noise and Vibration study area	The area assessed for noise and vibration impacts during this assessment
Baseline scenario	Scenarios with the proposed development/project not in operation
Decibel (dB)	A unit of noise level derived from the logarithm of the ratio between the value of a quantity and a reference value. It is used to describe the level of many different quantities. For sound pressure level the reference quantity is 20 µPa, the threshold of normal hearing is 0dB, and 140dB is the threshold of pain. A change of 1dB is only perceptible under controlled conditions. Under normal conditions a change in noise level of 3dB(A) is the smallest perceptible change.
dB(A)	Decibels measured on a sound level meter incorporating a frequency weighting (A weighting) which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB(A) broadly agree with people's assessment of loudness. A change of 3 dB(A) is the minimum perceptible under normal conditions, and a change of 10 dB(A) corresponds roughly to halving or doubling the loudness of a sound. The background noise level in a living room may be about 30 dB(A); normal conversation about 60 dB(A) at 1 metre; heavy road traffic about 80 dB(A) at 10 metres; the level near a pneumatic drill about 100 dB(A).
LAeq,T	The equivalent continuous sound level – the sound level of a notionally steady sound having the same energy as a fluctuating sound over a specified measurement period (T). LAeq,T is used to describe many types of noise and can be measured directly with an integrating sound level meter.
LA10,T	The A weighted noise level exceeded for 10% of the specified measurement period (T). LA10 is the index generally adopted to assess traffic noise
LA90, T	The A weighted noise level exceeded for 90% of the specified measurement period (T). In BS 4142: 2014 it is used to define the 'background' noise level.
LAmax	The maximum A-weighted sound pressure level recorded during a measurement.
Rw	Single-number quantity which characterizes the airborne sound insulating properties of a material or building element over a range of frequencies.
Sound Reduction Index (SRI)	Laboratory measure of the sound insulating properties of a material or building element in a stated frequency band.

Appendix C – Site Photos and Measurements

Site Photo	Comment
	
Location: *Entrance Doors* It is recommended that acoustic perimeter seals are installed around the frame of the door and at the bottom to prevent unnecessary sound transmission to the outside. It is recommended that the door also incorporate an automatic EM closer system.	Location: *Walls* It is recommended that all holes and voids within the walls are fully sealed up and filled with mineral fibre insulation in order to prevent sound transmission to the outside.

Measured Noise Levels – Internal Operational Noise Levels at 67 Deansgate, Manchester

Measurements of internal noise levels within an operational Merkur site have been made at 67 Deansgate, Manchester in order to assess potential noise breakout. Measurements were made after 19:00 in various locations in the venue to obtain a representative spatial average sound reading and staff were asked to turn on some of the noisier machines in demo mode to measure a worst-case scenario of operational noise (i.e. greater number of patrons than normal). **Table 10** below presents the measured operational noise levels within the site.

Table 10: Source Level Noise Measurements within the Operational Site

Site	Measurement Position	L_{Aeq}	L_{Amax}	Octave Band Levels (dB)							
				63	125	250	500	1kHz	2kHz	4kHz	8kHz
Hull	MP1	55.2	70.7	53.1	56.8	55.0	49.9	47.4	49.5	44.6	44.4

Table 11 below presents the details of the equipment used at the time of the measurements:

Table 11: Instrumentation

Instrument	Serial No.	Calibration Due Date at Time of Survey
Norsonic 140 Class 1 Sound Level Meter	1406433	October 2025
Norsonic 1209 Preamplifier	21318	October 2025
Norsonic 1225 Microphone	226973	October 2025
Nor 1252 Acoustic Calibrator	31717	October 2024

For reference, **Table 12** below presents source level measurements made within 10 other active Merkur Slots to demonstrate how operational noise levels within Merkur Slots venues across the UK do not change in any significant way with location:

Table 12: Source Noise Level Measurements from Other Merkur Venues Across the UK

Merkur Slots Venue Address	L_{Aeq}	L_{Amax}	Octave Band Levels (dB)							
			63	125	250	500	1kHz	2kHz	4kHz	8kHz
4-4a Holmeside, Sunderland	60.8	73.6	51.1	46.8	59.2	59.2	47.6	38.7	37.6	27.5
48 King Street, South Shields	67.2	72.7	53.3	62.3	61.2	65.1	59.8	57.2	60.3	56.6
1076 Warwick Road, Acocks Green, Birmingham	65.8	74.7	56.1	64.2	67.7	62.3	59.6	58.0	54.0	50.6
62 East Street, Barking	60.0	79.4	52.0	60.4	60.7	57.5	53.0	52.3	49.3	44.4
37 High Street, Hornchurch	62.3	83.5	55.4	58.3	57.4	60.7	58.1	53.4	49.0	43.8
37-39 King Street, Southall	64.0	78.6	62.3	64.5	62.6	61.8	58.6	56.8	50.8	41.5
76 London Road, North End, Portsmouth	68.9	78.4	55.9	62.1	62.8	68.7	59.7	62.6	56.9	53.3
55 High Street, Aylesbury	57.8	71.9	52.0	49.8	49.5	51.4	56.9	45.4	39.3	33.8
159 Trongate, Glasgow	65.7	74.7	64.3	66.2	62.9	54.7	50.8	48.2	45.0	37.7
26A Upper Tooting Road, London	62.1	69.3	59.4	44.3	53.1	51.6	52.4	47.6	49.0	34.3

Appendix D – Technical Methodology, Calculations and Data

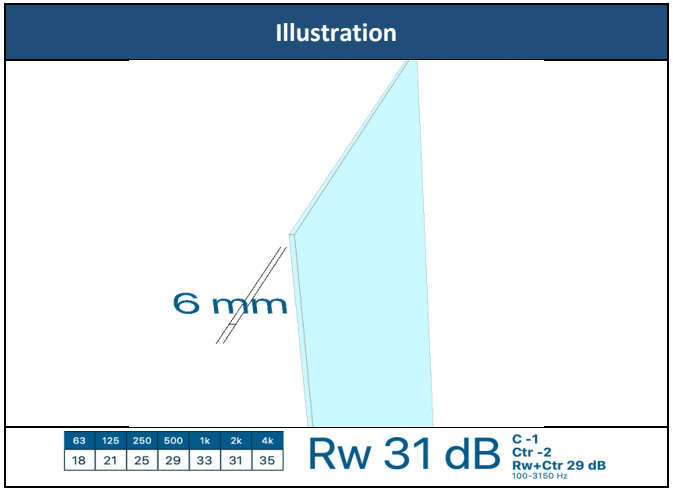
External Noise Impact Assessment methodology

With reference to **Section 2** it was deemed appropriate that the limit of **NR20** can be applied for the closest residential receptors. **Table 13** below presents the values associated with the NR20 curve:

Table 13: NR20 Octave-band Values

Noise Rating	Octave Band Mid-Frequency Levels (dB)							
	63	125	250	500	1000	2000	4000	8000
NR20	51.3	39.4	30.6	24.3	20	16.8	14.4	12.6

To provide a prudent and detailed approach to assessment the noise rating within the assumed closest residential unit was calculated using the attenuation values presented in NANR116. The sound insulation performance of the glazed shop front was calculated using the details provided below and is presented below:



The octave band noise level incident at the window was calculated over a 36-metre distance and the NR curve inside the room predicted. **Table 14** below presents the results of the assessment:

Table 14: Predicted NR level at Closest Receptor

Element	63	125	250	500	1k	2k	4k	Single Figure L_{Aeq}, dB
Predicted Noise Level at Window	4.0	4.6	-1.2	-10.2	-16.7	-12.7	-21.5	-
Attenuation of Partially Open Window	20.8	13.3	12.9	18.1	12.0	18.3	20.5	-
Calculated NR in Room	**-16.8**	**-8.7**	**-14.1**	**-28.3**	**-28.7**	**-31.0**	**-42.0**	**-7.0**

Assessment of Max Levels

Previous versions of BS8233:2014 stated that noise levels should not regularly exceed 45dB within bedrooms during the night-time. BS8233:2014 states that a partially open window can achieve a reduction of -15 dB and combining this with the internal threshold of 45 dB provides a façade limit of 60 dB.

To provide a prudent and worst-case approach, an assessment of potential noise impacts from measured L_{Amax} levels has been undertaken for the scenario when the entrance door is briefly open for customers to enter and leave. The highest measured L_{Amax} levels were used and, assuming the partially open door achieves the same attenuation values as a partially open window, the predicted L_{Amax} level at NSR1 (36 metres away) was calculated. **Table 15** below presents the results of the assessment:

Table 15: Predicted L_{Amax} Level Incident at Closest Residential Window

Element	63	125	250	500	1000	2000	4000	Single Figure L_{Aeq}, dB
Source Noise L_{Amax} Levels	73.3	68.2	64.3	64.5	62.6	63.8	54.7	77.4
Shop front Attenuation (door open)	20.8	13.3	12.9	18.1	12.0	18.3	20.5	-
Level Outside	52.5	54.9	51.4	46.4	50.6	45.5	34.2	-
Level at Window	**21.4**	**23.8**	**20.2**	**15.2**	**19.4**	**14.3**	**3.1**	**28.0**

It can be seen in **Table 15** above that, assuming an absolute and unlikely worst-case scenario, predicted max levels at the closest residential window are below the criteria stipulated by BS8233. It should be noted that machines generating the max levels are never located near the door but further inside the venues and therefore, max levels emanating from the periodically open door will realistically be much lower.

Assessment of Patron Noise – Smoking

During the initial site visit to a Merkur venue in Hull (pre-covid) two patrons were recorded talking moderate to loudly outside the venue for a duration of around 1 minute. This level was measured to be 69.4 dBA which is representative of loud conversation. Using this measured level an assessment was undertaken of potential noise impacts at the closest residential window. To assess a worst-case scenario, it was assumed that 3 patrons were outside using the shelter and all talking at the same time and same level i.e. 69.4 dBA. **Table 16** below presents measured octave band noise levels from the speech event:

Table 16: Measured Patron Speech Noise Event

Noise Event	Octave Band Mid-Frequency Levels (dB)								
	63	125	250	500	1k	2k	4k	8k	dB(A)
People Talking Loudly	80.6	79.3	69.2	67.0	62.5	58.2	50.8	44.1	69.4

The distance from the front of the unit where the patrons who choose to smoke will congregate to the closest noise sensitive window (NSR1) was determined to be 36-metres away. Previous versions of BS8233:2014 stated that noise levels should not regularly exceed 45dB within bedrooms during the night-time. BS8233:2014 states that a partially open window can achieve a reduction of -15 dB and combining this with the internal threshold of 45 dB provides a façade limit of 60 dB. Using the information detailed above, an assessment was undertaken of potential noise impacts to the closest residential window at night-time.

Appendix E – Merkur Slots Operational Management Plan

Merkur Slots UK Ltd is an experienced and responsible Adult Gaming Centre operator. As with all our premises, we will operate a 'good neighbour' policy and will ensure that all neighbours are respected. All staff will be provided with a copy of this Operational Management Plan. All members of the management team will have full training with regard to the management plan. Refresher training will be held with all management members every 6 months.
The Operational Management Plan in the first year will be reviewed on a 6 monthly basis in order to react to any changes in our initial trading pattern and then annually thereafter.

General
The premises shall install and maintain a comprehensive CCTV system. All entry and exit points will be covered enabling frontal identification of every person entering in a light condition including customer facing areas. The CCTV system shall continually record whilst the premises are open. All recordings shall be stored for a minimum period of 31 days with date and time stamping.

Subject to Data Protection guidance and legislation, the management of the premises will ensure that key staff are fully trained in the operation of the CCTV. We will only play background music in the premises and there will not be any tannoy systems.

The main entrance doors will not be fixed or propped open at any time whilst the premises is trading and there are customers in the venue.
Customers wishing to smoke will be asked to do so as quickly as possible and in a responsible and quiet manner.
Individuals who are deemed to be under the influence of excessive alcohol shall not be allowed to enter the premises.

We will place a notice visible from the exterior of the premises stating that drinking of alcohol directly outside the premises is forbidden and that those who do so will be banned from the premises.

Dispersal Policy
Our premises attract individuals and couples rather than large groups, and our customer base beyond midnight is predominantly the local entertainment workforce and shift workers who like to relax after their busy shifts. It is also unusual for our customers to loiter outside the premises. As such we do not have formal dispersal policies in place at our premises. However, the following steps will be taken:

- Customers will be reminded to respect our neighbours when they leave.
- Customers found to be loitering near the building will be politely asked by staff to move on.
- Staff, on request, will provide relevant information to customers who require a taxi or directions to the nearest station or bus stop.