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Factory International

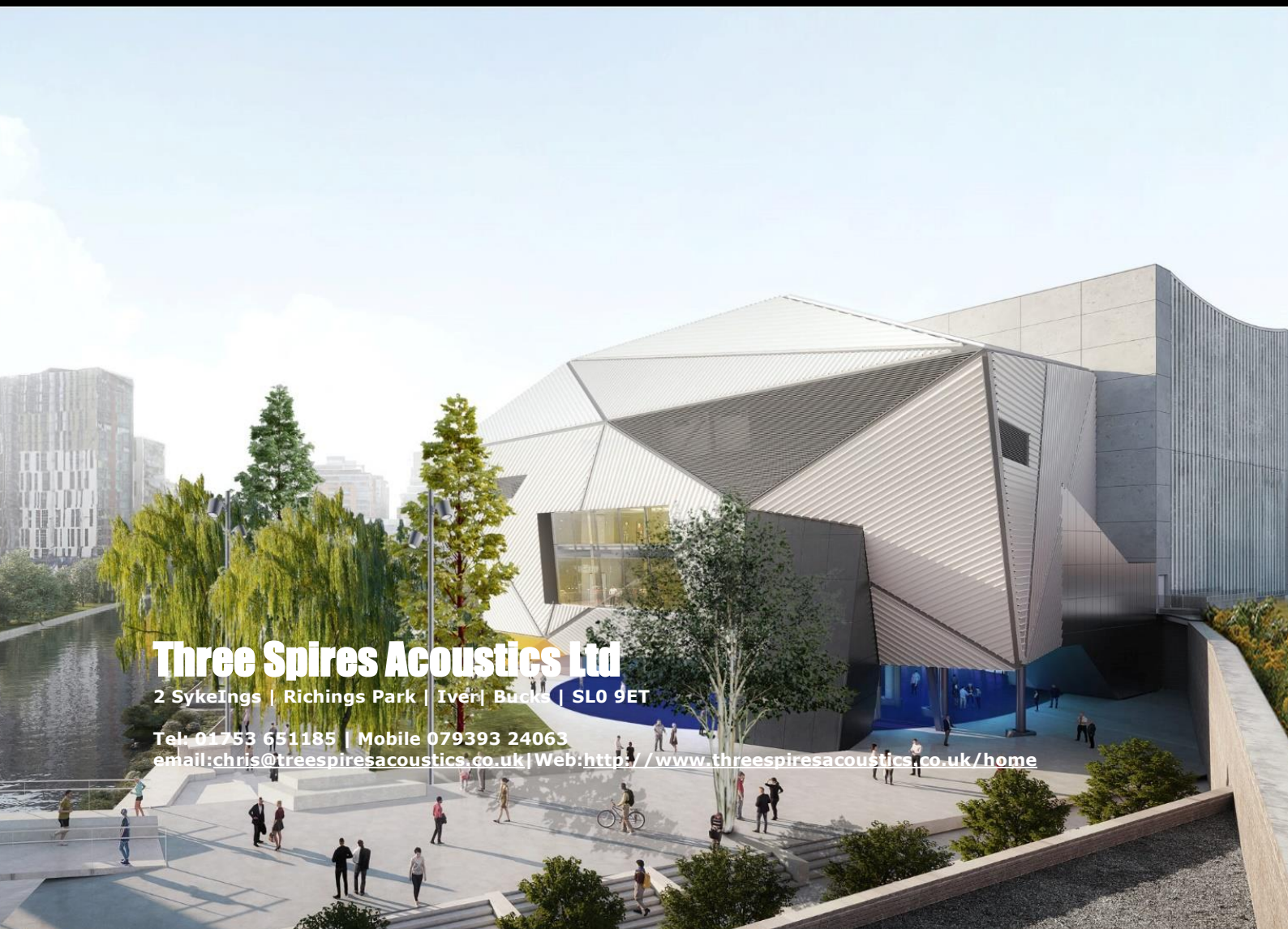
Water Street

Manchester

M3 4JQ

External Events Noise Management Plan

For: Factory International



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FACTORY INTERNATIONAL

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1. Introduction

- 1.1.1 Three Spires Acoustics Ltd (TSA) have been commissioned by Factory International Ltd (FI) to produce a Noise Management Plan for external events held at Factory International, which is a new event space located on Water Street, Manchester, M3 4JQ.
- 1.1.2 This document has been requested by the client in order to discharge planning consent Condition 13 attached to permission 130034/JO/2021 regarding the use of venue for entertainment purposes.
- 1.1.3 We have updated the Noise Mgt Plan to take account of comments made by MCC Environmental Health Department.

1.2 Factory International – Venue Information

- 1.2.1 Factory International is a multi-use space, designed by Ellen van Loon of the Office for Metropolitan Architecture in the Netherlands. The venue has been designed so it can adapt to host any kind of set-up, from theatre shows and intricate exhibitions, to huge multimedia performances and warehouse-scale gigs. The venue is due to fully open in Autumn 2023 and will hold a series of small external events in June and July 2023 which form part of the Manchester International Festival (MIF), which is a biennial international arts festival, with a specific focus on original new work, held in the Manchester and run by Factory International.
- 1.2.2 A photograph of Factory International is presented at Figure 1 below and a Google Maps Aerial photograph detailed at Figure 2. Plans of the events spaces are detailed at Appendix A.

Figure 1. Factory International

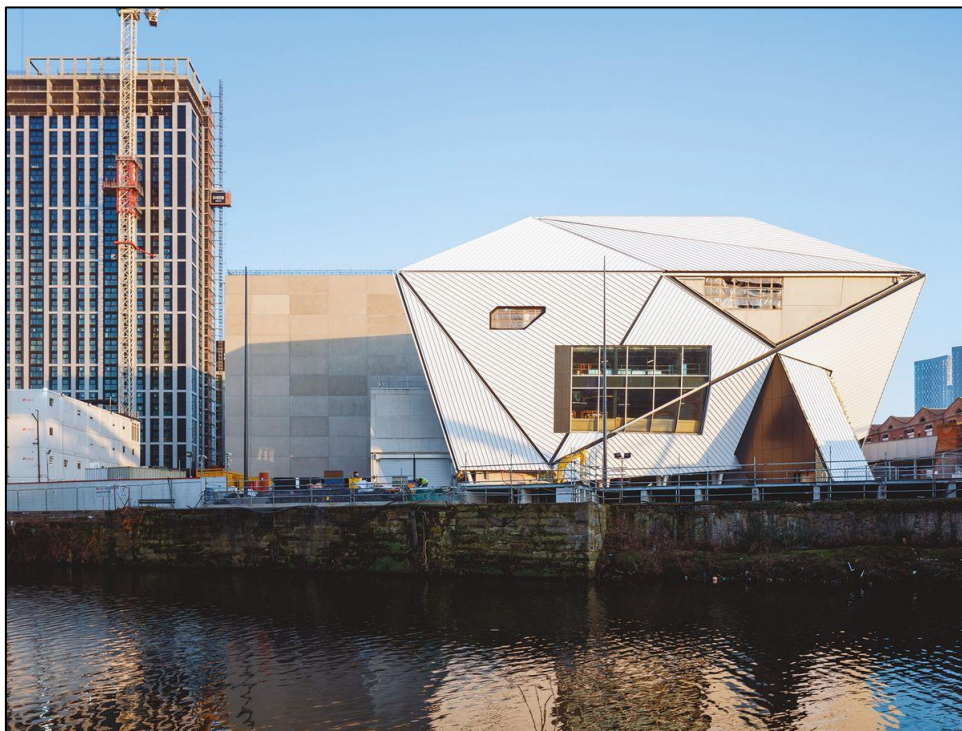


Figure 2. Google Maps Aerial Photograph of Site



1.3 Operating Hours

- 1.3.1 The venue will operate as a multi-use art, cultural, music and events venue. From June 2023, the intention is that standard venue operating hours when open to the public will be Tuesday to Sunday, 10:00 to 23:00. Specific event activity may dictate operating longer hours than this and some exceptions will be made to open on Bank Holiday Mondays.
- 1.3.2 The premises licence permits 24-hour operation for regulated entertainment and the provision of late-night refreshment. Alcohol sales are permitted on the premises between 08:00 and 04:00 (20 hours of operation).

The premises licence granted by MCC Licensing Authority, which is the primary regulator for events held at FI, includes the following time restrictions for outdoor events. Condition 48 states:

- 1.3.3 *(48) There shall be no external licensable activities between 00:00 and 07:00 daily save for on 12 weekends per year when licensable activities shall be permitted beyond 00:00, until 02:00 externally. Weekend days shall be defined as the early hours of Friday, Saturday, Sunday and Monday. The premises shall only use three days on any weekend that this condition is used. Three of these weekends shall be during the Manchester International Festival.*

- 1.3.4 We have been informed that there are currently very few events booked within the external space before the MIF in 2025.

1.4 Acoustic Environment

- 1.4.1 The area around the site is that of an urban city location with major road and rail networks close to existing commercial and residential properties. The closest residential properties are a block of residential flats on Stanley Street across the river Irwell to the southwest of the site and residential properties to the east of the site on Lower Byron Street. There are also new residential flats being constructed which will be close to the venue.
- 1.4.2 The acoustic environment is dominated by transportation noise from road and rail vehicles using these arterial routes. DEFRA has published strategic noise map data that provide a snapshot of the estimated noise from major road and rail sources across England in 2017. The data was developed as part of implementing the Environmental Noise Directive. The noise contour map for the area around the site is presented in Figures 3 and 4 below and includes the modelled LAeq,16hour (day) and LAeq,8hour (night) noise contours for the major road.
- 1.4.3 The map indicates that the closest residential areas to the north and south of the site, are likely to experience noise exposure from daytime road traffic noise between 55dB to 65dB LAeq,16hour and night-time noise exposure from road traffic noise between 50dB to 55dB LAeq,8hour.

Figure 3. DEFRA Road Traffic Noise Contour Map LAeq,16hour (07:00-23:00)

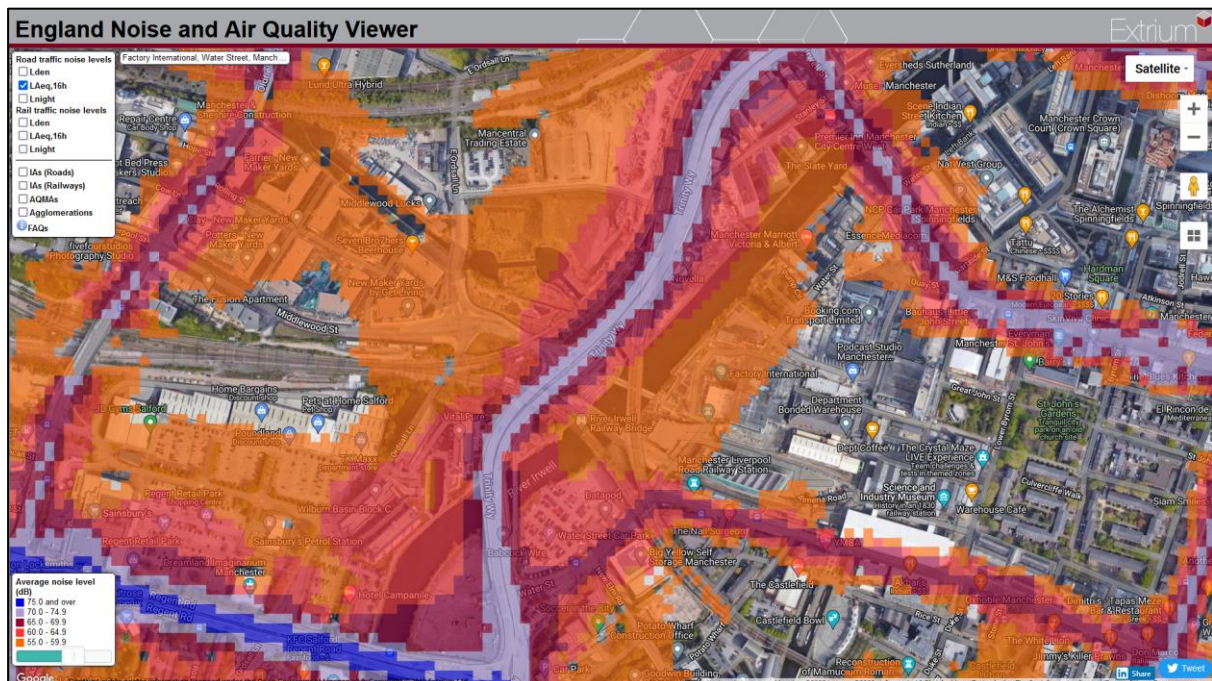
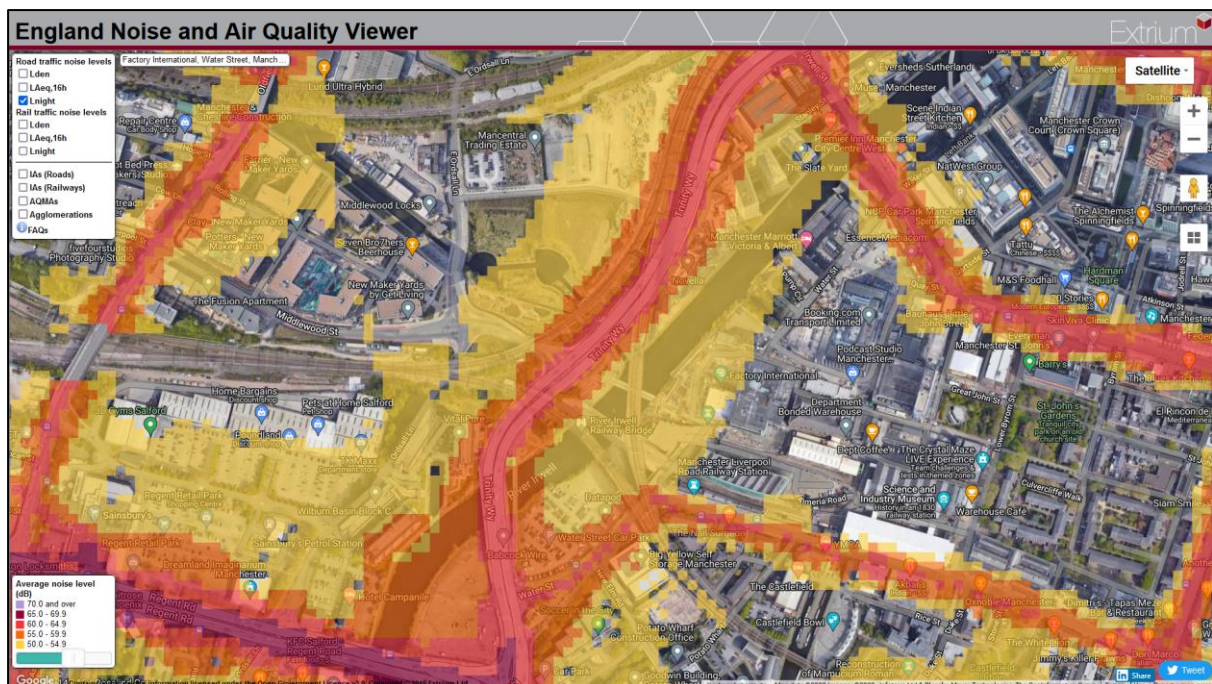


Figure 4. DEFRA Road Traffic Noise Contour Map LAeq,8hour (23:00-07:00)



1.5 Background Noise Survey

- 1.5.1 A background noise survey was undertaken at MP1 on top of the platform next to the residential block, which is currently under construction, identified at Figure 5 page 12. Measurements were undertaken from 18:00 on Monday 19th June to 16:50 on Friday 23rd June 2023. A photograph of the equipment is presented at Appendix C.
- 1.5.2 Construction work was undertaken during daytime working hours and stopped at 18:00 each day, therefore measurements from 18:00 to 02:00 have been used to set baseline limits. It is considered measurements at this position will be similar to the blocks of flats on the other side of the river on Stanley Way and will be applied for the baseline at these properties as well.
- 1.5.3 The sound level meter was set to record all broadband and statistical A weighted metrics including L90 and Leq as well as and centre frequency octave band measurements. Measurements were simultaneously made of 1 minute and 15minute time intervals. Measurements were obtained using the following instrumentation complying with the Type 1 specification of IEC 60651, IEC 61260 and IEC 61672;
 - Brüel and Kjaer 2250 Integrated SLM Serial Nos 2827259
 - Brüel and Kjaer 4231 Field Calibrator 3001533
- 1.5.4 The equipment was calibrated using a B&K 4231 field calibrator both before and after the survey and no significant drift was observed. Full calibration certificates are available upon request. Measurements were supplemented with timed audio recordings to enable post measurement analysis and any evening/night periods that have contained any audio

indication of construction noise discounted. Therefore, we do not consider that further monitoring is required at this stage.

- 1.5.5 Further details are presented in Appendix A. Weather conditions were monitored using Met office data and were generally conducive for monitoring purposes.
- 1.5.6 The modal sound level and range of sound level metrics required by MCC technical guidance are detailed in Table 1 below. Measurements align with the DEFRA strategic noise mapping contours and the background noise survey undertaken by Arup and detailed in The Factory Stage 2 Acoustic Design Report, ref, R01_SJS, 8 April dated 2016 and both indicate that the general acoustic environment is acoustically vibrant and dominated by transportation noise sources.

Table 1. MP1 Background Measurement

Time	LAeq	LCeq	LAF90	LZF90 63HZ	LZF90 125HZ	LZF90 250HZ	LZF90 500HZ	LZF90 1KHZ	LZF90 2KHZ	LZF90 4KHZ
18:00- 23:00	56 (54-63)	63 (59-69)	50 (47-60)	49 (47-61)	48 (45-56)	49 (44-58)	47 (42-57)	47 (44-54)	41 (37-50)	29 (25-43)
23:00- 02:00	53 (48-63)	59 (54-64)	45 (38-48)	44 (42-49)	43 (40-48)	42 (38-46)	41 (35-43)	42 (34-45)	36 (28-39)	22 (19-26)

2. Local Authority Requirements & Guidance

2.1 Planning Conditions

- 2.1.1 Planning consent 130034/JO/2021 was granted by MCC, condition 13 is reproduced below.

Condition 13 If the ground floor commercial units are to be used as A3 or A4 use classes (Café/Restaurant, or Pub/Drinking establishment):

a noise study and scheme of acoustic treatment is to be submitted and approved in writing by the city council as local planning authority.

the units must be acoustically insulated and treated to limit the breakout of noise, in accordance with the noise study and scheme.

the scheme must be implemented in full prior to use and should consider the impact of the noise in relation to other noise sensitive locations including the office space above; and

the scheme should be designed so that low frequency sound emission within any dwelling does not exceed 47dBLeq in the 63Hz octave frequency band and 41dBLeq in the 125Hz band.

- 2.1.2 Noise breakout from the main venue has been addressed by Level Acoustics & Vibration in their report Acoustic study noise emissions, reference LA.190505.R02 dated 15/12/2021. It is understood that further in-situ testing will be undertaken before the venue opens in September 2023, to demonstrate compliance with MCC technical requirements and to set internal monitoring system limits.
- 2.1.3 Although condition 13 does not specifically relate to external events and does not expressly require compliance with MCC guidance, Manchester City Council have requested that FI provide a Noise Management Plan to detail how amplified entertainment noise will be controlled to ensure it achieves policy requirements and have provided guidance on outdoor concerts and events which is summarised below.

2.2 MCC Technical Guidance -Guidance on noise control for open air concerts and events August 2022

- 2.2.1 Noise guidelines are detailed at Section 3 of the above document and reference the Code of Practice on Environmental Noise Control at Concerts 1995. This document is being revised by the Chartered Institute of Environmental Health and is due to be released in 2024. Chris Hurst of Three Spires sits on the working group and although it cannot be referred to directly before it is published, the new guidance has taken a more flexible approach to the previous version, to reflect the changes in licensing legislation and the experience of the industry since the first code was published in 1995.

2.3 Code of Practice on Environmental Noise Control at Concerts 1995

- 2.3.1 The Code of Practice first published in 1995, addresses environmental noise control at concerts and similar large music events involving high powered amplification when held in sporting stadia, arenas, open air sites and within lightweight buildings. The introduction to the CoP states:
- 2.3.2 Large music events involving high powered amplification are held in sporting stadia, arenas, open air sites and within lightweight buildings. These events give pleasure to hundreds and in some cases thousands of people. However, the music from these events can cause disturbance to those living in the vicinity. The purpose of this code is to give guidance on how such disturbance or annoyance can be minimised.
- 2.3.3 This is an important factor as the CoP predates the introduction of the Licensing Act 2003 where the relevant objective to noise, is the promotion of the prevention of public nuisance. It has therefore been argued that the threshold described in the CoP of “minimising disturbance or annoyance” is at a lower threshold than that the Licensing Act 2003 requires.
- 2.3.4 Various guidelines and criteria are described. For events held between 0900 and 2300 the Music Noise Level (MNL) when assessed at the prediction stage or measured during sound checks or concerts should not exceed the levels detailed in Table 2 below.

Table 2. Guideline Music Noise Limits

Concert days per Year	Venue Category	Guideline
1 To 3	Urban Stadia & Arenas	The MNL should not exceed 75dB(A) over a 15minute period.
1 To 3	Other Urban & Rural Venues	The MNL should not exceed 65dB(A) over a 15minute period.
4 To 12	All Venues	The MNL should not exceed the background noise level by more than 15dB(A) over a 15 min period

2.3.5 For more than 12 events per year Note 4 to Table 1 in the above CoP states;

For indoor venues used for up to about 30 events per calendar year an MNL not exceeding the background noise by more than 5 dB(A) over a fifteen-minute period is recommended for events finishing no later than 23.00 hours.

2.3.6 Section 3.2 of the guide states

For events continuing or held between the hours 23:00 and 09:00 the music noise should not be audible within noise-sensitive premises with windows open in a typical manner for ventilation.

2.4 Low Frequency Noise Criteria

2.4.1 The above 1995 CoP does not specify limits for low frequencies although there is a footnote with some helpful guidance. Whilst this is only a footnote, there have been an increasing number of councils who have adopted these low frequency limits.

2.4.2 The conclusions of the research behind the footnote state that:

- I. At open air venues, the increase over background 'A' weighted criterion works well at minimizing complaints near to a venue.
- II. The 'A' weighted criterion can underestimate annoyance at greater distances from the venue (in excess of 2km) as the mid to high frequency energy is quickly attenuated with respect to low frequency and the expectation of people living some distance from the event being that the concert should be inaudible.
- III. Sound pressure levels in excess of 80dB in the 63Hz or the 125 Hz octave bands recorded in excess of 2km from the concert, are likely to give rise to complaints of low frequency noise. Levels below 70dB are likely to be acceptable.

- 2.4.3 However, the effect of imposing a 70 dB limit in 63Hz and 125Hz bands within 1 Km of an outdoor open-air venue is that it is often unachievable without substantially undermining the viability of the music event, and if adopted would prevent many concerts from taking place. Therefore, in practice, it has been found to be effective for multiple events to set a maximum external low frequency level in order to control some of the more excessive effects of certain types of music with specific “sub-bass” emphasis at higher low frequency levels; by setting LCeq,T limits at representative sensitive receptors in a range up to 90dB(C) or similar levels within individual octave or third octave bands

3. Proposed Entertainment & Music Noise Limits

- 3.1.1 The proposed music noise limits are detailed in Table 3 below.

Table 3. Outdoor Events Music Noise Guideline Limits

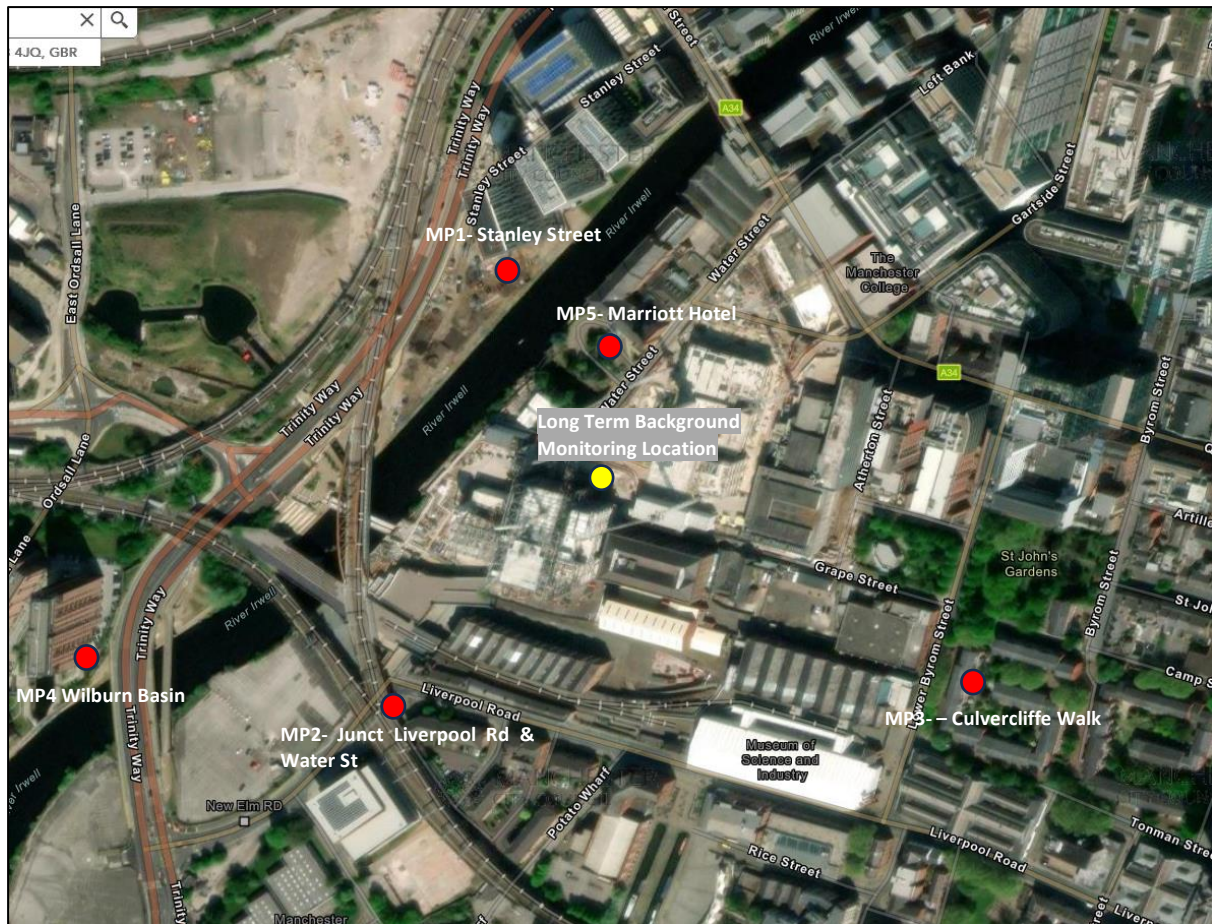
Time	LAeq	LCeq	LZeq 63HZ	LZeq 125HZ
Up to 15 Events 12:00-23:00	65	80	NA	NA
Up to 15 Events 23:00-02:00	50	65	60	55
More than 15 Events 12:00-23:00	55	70	NA	NA
More than 15 events 23:00-02:00	45	65	57	51

3.2 Rationale For Guidelines Levels.

- 3.2.1 For outdoor events a more flexible approach than those detailed within the MCC Guidance on noise control for open air concerts is considered appropriate when the context of the acoustic environment is taken into consideration. For up to 15 events a daytime guideline level of 15dB(A) above the prevailing background level of LA90,T with a 15-20dB(C) differential is considered appropriate given the acoustic context of the environment and generally aligns with the Code of Practice Environmental Noise Control at Concerts referenced by MCC guidance. For the few events which will operate between 11pm and 2am a guideline level which achieves the MCC inaudibility criteria within the 63Hz and 125Hz single octave bands is considered appropriate allowing for 10dB attenuation for a partially open window and also taking account of the existing ambient Leq,T levels which are typically above the MCC guideline levels in the 63Hz and 125Hz single octave bands.
- 3.2.2 For more than 15 events per year a daytime guideline level of 5dB(A) above the prevailing background level of LA90,T with a 15-20dB(C) differential is considered appropriate. For the few events which will operate between 11pm and 2am a guideline level which achieves the MCC inaudibility criteria within the 63Hz and 125Hz single octave bands is considered appropriate allowing for 10dB attenuation for a partially open window.

- 3.2.3 The modal ambient level 23.00-02.00 at permanent monitoring location was 53dB(A), this is likely to be higher at the MP1 Stanley Street and MP2 Junction Liverpool and Water St locations as closer to transportation noise in a busy city centre environment. Therefore, ambient noise is already above the proposed limit level and will offer a degree of masking noise and therefore proposed guideline levels are considered appropriate within the context of the site. Also new build (MP1 and Water Street Flats) will have planning sound insulation glazing and ventilation requirements for compliance with MCC Planning and Noise Technical guidelines and therefore should have included background ventilation with windows closed i.e mechanical ventilation or attenuated vents. As the proposed music noise guideline levels in the NMP are below the existing ambient noise levels it could be argued that assessment should be undertaken with a windows closed situation for all new build properties.
- 3.2.4 Noise monitoring locations are presented at Figure 5 below. We have changed MP3 location and included MP5 the Marriott Hotel in response to the MCC comments. However, monitoring at 91 Liverpool Street and Left Bank is considered unnecessary as there are several building block barriers between the location and the site, spot checks for patron noise on egress will be undertaken at these locations. Monitoring at higher level apartments is not possible as there is not access to these apartments by FI. Monitoring at the Marriott Hotel will be included, however should not be restricted to the same noise limit requirements as there are no permanent residential occupiers and hotel standards for internal noise are typically relaxed compared to permanent residential accommodation.
- 3.2.5 The most sensitive noise receptors are considered to be.
- MP1 Stanley Street
 - MP2- Junction Liverpool Rd & Water St
 - Future Residential flats on Water Street
- 3.2.6 It is considered that compliance with proposed noise level limits at these locations will be, by definition, compliant at more distant receptors.

Figure 5. Noise Monitoring Locations



3.3 Venue Testing - Outdoor Performance Space

- 3.3.1 A venue sound test was undertaken on the 18/06/2023 and further testing in conjunction with MCC Officers was carried out on 28/06/2023. The external performance space was set up within the under croft of the building and high levels of amplified music were played within the space and simultaneous measurements undertaken, at the closest residential receptors to determine the correlation between source and receiver. Ambient measurements were undertaken prior to testing to establish if the prevailing acoustic conditions would contribute to the measurements of music noise.
- 3.3.2 The results of the assessment have been used to provide guideline FOH limiting music criteria (LAeq & LCeq) to ensure that music noise is controlled to meet objective requirements.
- 3.3.3 FOH limit levels will be applied through the MIF events and will be refined as more experienced is gained from using the events space, the introduction of mitigation measures detailed below and the response from the local community.
- 3.3.4 An updated plan of the external event space including stage location and orientation is presented at Appendix B.

Table 4. Front of House (FOH) Guideline Levels

Situation	FOH LAeq	FOH LCeq
Up to 15 Events 12:00-23:00	95	110
Up to 15 Events 23:00-02:00	89	100
More than 15 Events 12:00-23:00	92	108
More than 15 events 23:00-02:00	89	100

4. Sound Control Procedures

4.1 Outdoor Performances

- 4.1.1 Following the propagation testing and the setting of guideline limits levels by TSA and FI management, 2Nos B&K 2250 external noise monitoring stations will be left for the duration of the MIF performances. One will be located on top of the platform opposite the apartment block under construction and the other within the external area of the event space and will provide further assessment data and audio recordings for post measurement assessment.

4.2 Sound Monitoring Control

- 4.2.1 The music sound levels at the mixing desk position of the external performance stage will be continually monitored using B&K 2245 and Noisy concert and venue noise monitoring system . The sound engineer will have a traffic light display system on a tablet next to the sound meter so they can ensure that performances do not exceed the guideline limit designated after the propagation testing. Pre and post 23.00 limits will be set and the system is designed so that limits can change automatically at predetermined times. (see inset for FOH engineer display system).

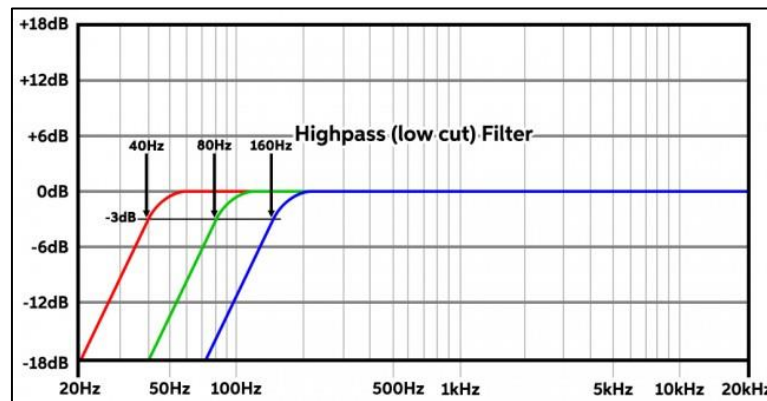


- 4.2.2 For future events FI will monitor levels at FOH either using Noisy monitoring or a equivalent system . External spot checks will be undertaken by FI staff at external locations detailed at Figure 5.

4.3 High Pass Filter

- 4.3.1 A high-pass filter is an EQ curve that is used to remove low-frequency sounds from an audio signal. It is called a high-pass filter because it allows high-frequency signals to pass through, while attenuating (reducing the amplitude of) lower-frequency signals. Figure 6 below illustrates how the high pass filter works.
- 4.3.2 It is recommended that a high-pass filter is applied to all frequencies below 100Hz for events which operate after 23.00 in order to reduce low frequency sound breakout from the event space affecting residential receptors in the vicinity of the site.

Figure 6. High Pass Filter



4.4 Community Engagement

- 4.4.1 Should complaints of music noise arise during the event, the details will be logged by the onsite Production Management Team and passed onto a member of the FI team who will undertake a spot check (where practicable) to check against guideline criteria. Where an intervention will be necessary to ensure MNL's are compliant, instruction will be relayed to the relevant sound engineer. Details of community comment /complaint information are provided below.
- Website page which includes some information about all events planned at the venue not just the confirmed ones: <https://factoryinternational.org/aviva-studios/visit/neighbours/>
 - Dedicated inbox for local residents to email us with enquiries neighbours@factoryinternational.org
 - Phone number provided to contact the venue directly with any issues – this is a landline or re-directed to the Duty Front of House Manager on events: 0161 843 8900
- 4.4.2 FI will also be establishing a Neighbours Forum who will meet regularly any discuss any issues that local residents are facing. FI also 2Nos Festival Advocates currently engaging with members of the local community, at least one will be retained to be a St. John's Neighbourhood Organiser and they will be able to speak to local residents regularly and seek

feedback from operational teams on any issues residents face with the venue (not just noise related issues)

4.5 Patron Noise

4.5.1 Patron noise during ingress and egress can, if not managed effectively, cause noise disturbance to the surrounding community. Factory International are experienced at logistical crowd management and the following measures are a brief overview of some of the measures that will be undertaken to limit impact from patron noise. Further details will be provided within the event management plan.

- Routing to avoid ingress/egress past residential areas where practicable.
- Marshalling of audience to ensures quick ingress and egress.
- Signage to inform audience of behavioural requirements.
- Training of marshals to encourage good behaviour in audience.

5. Conclusions

- 5.1.1 Three Spires Acoustics Ltd have updated the Noise Management Plan for external events held at Factory International, Water Street, Manchester, M3 4JQ, following comments to the first iteration from MCC Environmental Health department. The venue is due to fully open in Autumn 2023 and will hold a series of small external events in June and July 2023 which form part of the Manchester International Festival.
- 5.1.2 Appropriate amplified music criteria have been established applying a pyramid approach and including guidelines for pre and post 11pm events and have been broadly based on Manchester City Council and national guidance on control of noise from concerts.
- 5.1.3 A background noise survey has been undertaken to establish prevailing noise levels at a representative noise sensitive receptor location. Propagation testing has been undertaken to establish front of house limiting criteria which will achieve guideline criteria for pre and post 11pm situations.
- 5.1.4 Sound equipment and front of house concert noise monitoring system has been installed for the duration of the MIF events and will be used by sound engineers to control music noise levels in order to achieve objective offsite limits. Future events will be monitored by FI staff.
- 5.1.5 It is therefore considered that this report demonstrates that, subject to compliance with the FOH guideline limiting levels, noise from external events should comply with planning requirements and promote the Licensing Act 2003 objective of the prevention of public nuisance.

Appendix A: Background Monitoring Results

Start time	Duration	LAeq	LCeq	LAF90	LZF90 63Hz	LZF90 125Hz	LZF90 250Hz	LZF90 500Hz	LZF90 1kHz	LZF90 2kHz	LZF90 4kHz
20/06/2023 18:00	0:15:00	57	63	53	52	49	49	49	49	44	33
20/06/2023 18:15	0:15:00	58	63	52	53	50	49	47	49	43	33
20/06/2023 18:30	0:15:00	57	64	52	52	49	49	47	49	42	32
20/06/2023 18:45	0:15:00	57	63	52	52	49	49	47	50	43	33
20/06/2023 19:00	0:15:00	60	63	52	51	49	49	47	49	43	32
20/06/2023 19:15	0:15:00	58	63	53	51	49	49	47	50	44	33
20/06/2023 19:30	0:15:00	56	64	52	52	48	48	47	49	42	32
20/06/2023 19:45	0:15:00	58	65	52	52	49	48	47	49	43	32
20/06/2023 20:00	0:15:00	57	65	52	53	50	50	48	49	43	32
20/06/2023 20:15	0:15:00	56	63	50	50	48	47	45	48	41	29
20/06/2023 20:30	0:15:00	57	62	50	50	47	47	45	47	41	30
20/06/2023 20:45	0:15:00	59	62	50	50	48	47	46	47	41	30
20/06/2023 21:00	0:15:00	55	60	50	50	47	47	45	47	41	29
20/06/2023 21:15	0:15:00	55	59	49	49	46	46	44	47	40	29
20/06/2023 21:30	0:15:00	55	60	48	48	45	45	43	46	39	28
20/06/2023 21:45	0:15:00	55	59	48	48	45	45	43	45	39	28
20/06/2023 22:00	0:15:00	54	59	47	47	45	44	42	44	38	28
20/06/2023 22:15	0:15:00	55	59	48	48	46	45	43	45	39	28
20/06/2023 22:30	0:15:00	56	61	47	48	46	45	43	44	38	26
20/06/2023 22:45	0:14:00	56	61	49	49	47	46	44	47	40	28
21/06/2023 18:00	0:15:00	63	69	60	54	56	58	57	54	50	43
21/06/2023 18:15	0:15:00	63	69	57	55	52	53	53	53	48	41
21/06/2023 18:30	0:15:00	60	67	58	61	56	54	53	54	50	43
21/06/2023 18:45	0:15:00	57	63	52	53	50	50	48	49	43	32
21/06/2023 19:00	0:15:00	57	62	52	51	49	48	47	49	42	32
21/06/2023 19:15	0:15:00	56	61	50	50	48	47	45	47	41	30
21/06/2023 19:30	0:15:00	56	60	50	49	47	47	45	47	41	30
21/06/2023 19:45	0:15:00	56	61	50	50	48	47	45	47	41	30
21/06/2023 20:00	0:15:00	56	62	50	52	49	48	46	47	41	30
21/06/2023 20:15	0:15:00	56	61	51	50	48	48	46	47	41	31
21/06/2023 20:30	0:15:00	59	65	49	49	48	47	44	46	40	29
21/06/2023 20:45	0:15:00	55	60	49	49	47	46	44	46	40	29
21/06/2023 21:00	0:15:00	55	60	48	48	46	45	44	45	39	29
21/06/2023 21:15	0:15:00	55	59	48	49	47	45	43	45	39	29
21/06/2023 21:30	0:15:00	55	59	48	48	46	45	43	45	39	28
21/06/2023 21:45	0:15:00	55	61	48	49	47	46	43	45	39	29
21/06/2023 22:00	0:15:00	55	60	48	49	47	45	43	46	39	29
21/06/2023 22:15	0:15:00	58	61	49	50	48	46	44	47	40	29
21/06/2023 22:30	0:15:00	54	60	49	49	48	46	44	46	39	26
21/06/2023 22:45	0:15:00	54	59	47	49	48	46	43	44	37	25
22/06/2023 18:00	0:15:00	55	63	51	53	50	49	48	47	41	32
22/06/2023 18:15	0:15:00	55	63	51	53	50	49	47	47	41	32
22/06/2023 18:30	0:15:00	55	65	51	53	50	49	47	47	42	32
22/06/2023 18:45	0:15:00	55	63	51	52	49	48	46	48	41	31
22/06/2023 19:00	0:15:00	56	63	51	52	49	49	47	47	41	30
22/06/2023 19:15	0:15:00	56	63	52	52	49	49	47	49	42	30
22/06/2023 19:30	0:15:00	56	61	51	51	48	48	46	48	41	29
22/06/2023 19:45	0:15:00	56	61	51	51	48	48	46	48	41	30
22/06/2023 20:00	0:15:00	56	62	50	50	48	48	45	47	40	29
22/06/2023 20:15	0:15:00	56	62	51	51	48	48	46	48	42	30
22/06/2023 20:30	0:15:00	56	61	50	49	47	46	45	47	41	29
22/06/2023 20:45	0:15:00	56	61	49	50	47	47	45	46	40	28
22/06/2023 21:00	0:15:00	56	63	50	51	48	47	46	47	41	30
22/06/2023 21:15	0:15:00	55	60	49	49	46	46	44	46	40	28
22/06/2023 21:30	0:15:00	55	61	49	49	47	46	44	47	40	29
22/06/2023 21:45	0:15:00	55	60	49	49	47	46	44	46	39	28
22/06/2023 22:00	0:15:00	54	59	47	48	46	44	42	44	38	27
22/06/2023 22:15	0:15:00	54	59	47	48	46	44	43	44	38	26
22/06/2023 22:30	0:15:00	56	63	47	48	47	45	43	44	38	25
22/06/2023 22:45	0:15:00	56	63	47	48	46	45	42	44	38	25
	Max	63	69	60	61	56	58	57	54	50	43
	Min	54	59	47	47	45	44	42	44	37	25
	Mode	56	63	50	49	48	49	47	47	41	29

Factory International – External Events Noise Management Plan

Start time	Duration	LAeq	LCeq	LAF90	LZF90 63Hz	LZF90 125Hz	LZF90 250Hz	LZF90 500Hz	LZF90 1kHz	LZF90 2kHz	LZF90 4kHz
19/06/2023 23:00	0:15:00	53	58	46	47	44	44	42	44	37	25
19/06/2023 23:15	0:15:00	54	59	46	46	43	43	41	43	37	25
19/06/2023 23:30	0:15:00	52	57	43	45	42	41	39	40	34	22
19/06/2023 23:45	0:15:00	55	62	46	46	43	43	41	43	37	24
20/06/2023 00:00	0:15:00	52	59	43	44	42	42	39	40	34	22
20/06/2023 00:15	0:15:00	51	56	42	44	42	41	38	39	33	22
20/06/2023 00:30	0:15:00	53	57	40	44	42	40	37	36	31	23
20/06/2023 00:45	0:15:00	51	58	41	44	42	40	37	38	32	21
20/06/2023 01:00	0:15:00	50	55	39	44	41	39	36	36	30	20
20/06/2023 01:15	0:15:00	50	57	40	43	42	40	37	36	31	20
20/06/2023 01:30	0:15:00	48	54	39	42	41	39	36	36	30	20
20/06/2023 01:45	0:15:00	48	54	38	42	40	39	35	34	28	19
20/06/2023 23:00	0:15:00	54	58	48	48	46	45	43	45	39	26
20/06/2023 23:15	0:15:00	53	59	47	49	46	45	42	44	38	25
20/06/2023 23:30	0:15:00	52	58	45	47	45	43	41	42	36	24
20/06/2023 23:45	0:15:00	63	64	45	48	45	44	40	42	36	24
21/06/2023 00:00	0:15:00	55	59	45	47	45	43	40	42	36	24
21/06/2023 00:15	0:15:00	53	58	43	47	44	42	39	39	33	22
21/06/2023 00:30	0:15:00	53	57	42	46	44	42	38	38	32	21
21/06/2023 00:45	0:15:00	52	57	42	45	43	41	38	38	32	23
21/06/2023 01:00	0:15:00	51	56	43	46	44	42	38	40	34	24
21/06/2023 01:15	0:15:00	50	58	43	46	43	42	39	40	34	23
21/06/2023 01:30	0:15:00	50	56	41	44	43	40	37	37	32	23
21/06/2023 01:45	0:15:00	49	56	42	47	45	42	38	38	32	22
21/06/2023 23:00	0:15:00	60	62	48	49	47	46	43	45	39	26
21/06/2023 23:15	0:15:00	55	61	46	48	47	45	41	43	36	23
21/06/2023 23:30	0:15:00	54	58	46	48	48	45	42	43	37	24
21/06/2023 23:45	0:15:00	54	59	46	48	47	45	41	43	36	24
22/06/2023 00:00	0:15:00	52	58	45	48	46	44	41	42	35	22
22/06/2023 00:15	0:15:00	54	59	45	47	46	44	41	42	36	23
22/06/2023 00:30	0:15:00	52	59	43	47	45	42	40	40	34	22
22/06/2023 00:45	0:15:00	55	63	42	45	44	41	38	39	33	21
22/06/2023 01:00	0:15:00	49	55	39	43	43	39	36	35	29	20
22/06/2023 01:15	0:15:00	51	56	40	44	43	39	36	37	31	20
22/06/2023 01:30	0:15:00	49	55	39	44	43	39	36	35	29	19
22/06/2023 01:45	0:15:00	48	55	39	44	43	38	36	36	30	19
22/06/2023 23:00	0:15:00	55	59	48	48	45	44	43	45	38	25
22/06/2023 23:15	0:15:00	54	59	47	48	45	44	43	45	38	25
22/06/2023 23:30	0:15:00	53	57	45	46	44	42	40	42	35	23
22/06/2023 23:45	0:15:00	53	59	45	46	44	43	41	43	36	24
23/06/2023 00:00	0:15:00	53	60	44	46	44	42	40	41	35	22
23/06/2023 00:15	0:15:00	55	59	45	45	43	42	40	42	35	23
23/06/2023 00:30	0:15:00	52	62	43	46	44	41	39	40	33	22
23/06/2023 00:45	0:15:00	53	58	44	45	43	42	40	42	35	22
23/06/2023 01:00	0:15:00	52	58	42	45	43	40	37	38	32	21
23/06/2023 01:15	0:15:00	51	56	44	45	43	41	39	41	34	23
23/06/2023 01:30	0:15:00	50	55	41	43	42	40	37	37	31	21
23/06/2023 01:45	0:15:00	51	57	41	44	43	40	37	38	32	21
	Max	63	64	48	49	48	46	43	45	39	26
	Min	48	54	38	42	40	38	35	34	28	19
	Mode	53	59	45	44	43	42	41	42	32	22
										36	

Appendix C: Background Monitoring Equipment



Appendix B: Glossary of Terms

‘A’ weighting (dB(A)): A frequency dependent correction which weights sound to correlate with the sensitivity of the human ear to sounds of different frequencies.

Ambient Noise: A measure of the typical noise (excluding any unusual events) present at a site, or in a room. This is usually described in terms of $L_{Aeq,T}$.

Audible: Sound that can be heard or is perceptible by the human ear.

Background Noise: A measure of the underlying noise (excluding any unusual events) which is present at a site before a new noise source is introduced. This is usually described in terms of the LA_{90} level: the sound pressure level exceeded for 90% of the time.

Decibel (dB): A unit used for many acoustic quantities to indicate the level of sound with respect to a reference level.

External Amenity Space: An outdoor area near to a residential building which is designed and intended primarily for leisure and recreational use by the occupants of the dwelling. This will include gardens, patios, balconies, roof gardens and terraces.

Hertz: The tonal quality of a sound is described and measured in terms of the frequency content and is commonly expressed as octave or third octave bands, the latter being the division of the octave bands into three for finer analysis, across the frequency spectrum. The smaller the octave band or third octave band centre frequency number defined in terms of Hz, the lower the sound. For example 63 Hz is lower than 500 Hz and is perceived as a deeper sound. The attenuation due to air absorption and natural barriers increases with frequency i.e. low frequencies are always the most difficult to control

Inaudible: Sound that cannot be heard or is imperceptible to the human ear.

$LA_{90,T}$: Sound pressure level exceeded for 90% of the measurement period “T” or ‘background level’.

$L_{Aeq,T}$: Equivalent continuous sound pressure level measured over the time period “T”

L_{Amax} : The maximum RMS A weighted sound pressure level

Music Noise Level (MNL): The L_{eq} of music noise measured at a particular location.

Noise: Unwanted sound.

Noise assessment: A basic evaluation of an acoustic environment by a suitably qualified person to assist in the determination of a planning application..

Noise impact: the noise level of the source under consideration, and/or any change in noise levels due to the scheme, and/or the relationship between the noise level of the source under consideration and a descriptor of the existing noise climate; at a receptor or group of receptors.

Noise effect: the consequence of the noise impact e.g. annoyance, sleep disturbance, speech interference, disruption of learning/teaching, health consequences, fauna displacement etc. Noise

impact and noise effect are related to each other and the noise effect is related to the magnitude of the noise impact as well as other factors e.g. sensitivity of the receptor, duration of the noise, how frequently it occurs, the time of day or night it occurs, whether the noise is temporary, reversible or permanent etc.

Noise level (Lp): the logarithmic measure of the RMS sound pressure of a sound relative to a reference value that represents the threshold of hearing. It is measured in decibels (dB) e.g. $L_p = 20 \lg(p/p_0)$ dB re 20 μ Pa for air.

Noise sensitive premises / developments: Principally comprising residential premises, hospitals, schools and hotels. Other premises and sites may be deemed to be noise sensitive depending upon circumstances.

Typical sound pressure levels

