HARLEQUIN FOOTBALL CLUB LTD
CONCERT PLANNING JUNE 2017

NOISE MANAGEMENT PLAN

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VANGUARDIA

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1. INTRODUCTION

1.1. Vanguardia Consulting has been commissioned by Harlequin Football Club Ltd to provide a noise management plan as part of a time limited planning application for a single music concert to be held on Saturday 3rd June 2017.

1.2. The purpose of this document is to provide an assessment of the noise impact at nearby noise sensitive properties and to describe the sound management and monitoring scheme that will be put in place to minimise music noise levels at nearby residential properties. The practical measures that should be adopted to achieve compliance with the licence conditions applied to the event are described in Section 5.

1.3. It is intended that this document is considered a 'live' document which may evolve accordingly as a result of on-going liaison between Harlequin Football Club, The London Borough of Richmond Upon Thames and local residents.

1.4. A glossary of acoustic terms is shown in Appendix A.

CONSULTANTS EXPERIENCE

1.5. Vanguardia Consulting is an independent acoustic consultancy specialising in the field of sound, noise and acoustics related to entertainment venues. The team of consultants have many years' experience dealing with some of the largest and most innovative sound and acoustic projects in the UK, including Wembley Stadium, the Millennium Dome, The Millennium Stadium, Wembley Arena and Earls Court.

1.6. The consultants have successfully provided sound management advice, including noise control, at over 1000 concerts during the past 25 years. These concerts have ranged from relatively small scale events at green field sites to major events staged at national stadia providing entertainment for tens of thousands of people.

1.7. The company director also sat on the UK Noise Council Working Party which prepared the Code of Practice on Environmental Noise Control at Concerts (1995). They have also managed Government research projects related to sound and noise aspects of the entertainment business.

1.8. As well as the provision of sound and acoustic design/management for entertainment venues, the company deals with the whole range of acoustic, noise and vibration issues and our staff have presented expert testimony at planning and licensing hearings, magistrates and high courts, Judicial Reviews and House of Commons and House of Lords Select Committees.

2. LICENCE CONDITIONS/ ENTERTAINMENT NOISE CRITERIA

NOISE COUNCIL'S CODE OF PRACTICE ON ENVIRONMENTAL NOISE CONTROL AT CONCERTS (1995)

2.1. The established guidance for noise from outdoor music events is contained in the Noise Council's Code of Practice on Environmental Noise Control at Concerts (1995). The recommended noise limits contained within the Code of Practice for events held between the hours of 09:00 and 23:00 hours are summarised in Table 1 below.

Table 1 Recommended Noise Limits

Concert days per calendar year, per venue	Venue Category	Guideline
1 to 3	Urban Stadia or Arenas	The MNL should not exceed 75 dB(A) over a 15 minute period
1 to 3	Other Urban and Rural Venues	The MNL should not exceed 65 dB(A) over a 15 minute period
4 to 12	All Venues	The MNL should not exceed the background noise level by more than 15 dB(A) over a 15 minute period

2.2. The Code of Practice states that 'for venues where just one event has been held on one day in any one year, it has been found possible to adopt a higher limit value without causing an unacceptable level of disturbance'.

2.3. It is understood that there is to be only one event day at the venue in 2017 where music is the primary source of entertainment.

2.4. Therefore, taking the guidance from table 1 above, the suggested criteria is that the Music Noise Level (MNL) would be 75dB $L_{Aeq,15min}$ measured at the facade of the nearest residential property.

2.5. Noise predictions are shown in the following section of this report.

3. PREDICTED NOISE LEVELS

3.1. Noise predictions have been carried out using IMMI noise modelling software to predict the noise impact at the following noise sensitive locations:

- Langhorn Drive
- Kendrey Gardens
- Gladstone Way
- Craneford Way

3.2. Noise predictions have been carried out at a height of 1.5m based on the information supplied by Harlequins with the stage at the north end of the pitch, orientated towards the south.

3.3. The following assumptions have been made in predicting noise levels at the nearest noise sensitive locations:

- Noise predictions have been made based on the intended coverage of the sound system and data from similar previous events to achieve a music noise level for music performances of 95dB(A) at the mixing desk position, 30m from the sound source.
- The sound system had been modelled as a 'line array' system which is the most common type of system used for most concert events. The horizontal dispersion data is taken from an L-Acoustics K1 line array sound system at a trim height of 10m.
- Ground attenuation effects as per ISO 9613.
- Moderate downwind propagation as per ISO 9613.

3.4. The following table 2 shows the predicted noise levels at the model receptor points at the facade of the nearest noise sensitive properties. In addition to this data noise contours have been plotted to assess the noise impact at all nearby community receptors. The noise contour plots are provided in Appendix B:

Table 2 Predicted Noise Levels at Nearest Noise Sensitive Properties

Location	Predicted LAeq,T (dB)
Stage Mixer	95
Langhorn Drive 1	61
Langhorn Drive 2	63
Langhorn Drive 3	64
Kendrey Gardens	64
Galdstone Way	65
Craneford Way	58

Galdstone Way 2	75

LIMITATIONS OF NOISE MODEL

3.5. Whilst the noise prediction model provides a relatively accurate indication of the noise impact at noise sensitive properties, it can in no way guarantee the actual operational noise levels of an event as meteorological conditions such as temperature inversions and wind direction may have a significant (up to 15dB) effect on noise levels at noise sensitive properties during an event, the effects of which cannot be readily predicted.

4. NOISE ASSESSMENT

4.1. The guidance from the Code of Practice advises that for urban stadia or arenas used for 1-3 events per calendar year, the music noise level (MNL) should not exceed 75dB(A) over a fifteen-minute period at the nearest noise sensitive premises for events finishing no later than 2300hrs.

4.2. The noise predictions indicate that the recommended noise limit would be achieved at all locations.

4.3. Through effective noise management, sound system design and mitigation measures, the music noise level (MNL) will not exceed 75dB(A) over a fifteen-minute period at the nearest noise sensitive premises as recommended in the guidance contained in the Noise Council's Code of Practice on Environmental Noise Control at Concerts (1995). The noise management protocol is provided in the following section.

5. NOISE MANAGEMENT PLAN

5.1. Careful consideration will be given to implementing and exercising a noise management programme during sound checks and event to control entertainment noise from the venue.

5.2. The sound management programme fundamentally follows the procedures that have been successfully adopted at outdoor concerts and festivals over the past 20 years throughout the UK and are detailed below:

SOUND SYSTEM

5.3. The sound system will be a 'line array' which is known to provide improved sound coverage and reduced over-spill into neighbouring residential dwellings (under neutral meteorological conditions). It is recommended that the sound system should provide as narrow horizontal dispersion as possible to maximise the containment of sound and minimise overspill from the intended coverage area.

5.4. The sound system should be set up in a configuration which is as distributed as possible, with the use of delay speakers providing sound coverage to smaller areas. The advantage of this type of setup effectively means that sound systems do not need to operate at such high levels to provide even sound coverage to the intended areas.

5.5. Careful and detailed alignment of the system will be ensured to optimise the coverage throughout the audience areas and balance this against the off-site environmental noise impact.

5.6. Vanguardia will review the sound system and other noise sources and work with the event promoter and the council to minimise noise disturbance.

5.7. The appointed sound system supplier will be informed of the requirements of noise control and the type and location/orientation of their system. Their contract of hire will also specify that the overall control of sound levels will be set by the venue management and/or their appointed agent (acoustic consultants).

5.8. Vanguardia have liaised with the sound engineer and provided a model to assist with the sound system design for the event and ensure that the sound coverage is contained within the stadium as much as possible.

PRE EVENT INFORMATION

5.9. Vanguardia will set up a direct means of communication with all parties.

5.10. An appropriate form of communication will be made with relevant parties at least 2 weeks prior to the event, informing them of the details of the event and including the start and finish times of both the event and any sound-checks. This should also include a dedicated telephone number for noise complaints.

5.11. A telephone complaints line should be made available for the duration of the event. Should any noise complaints be received, a consultant or venue representative will investigate the complaint and if noise levels are above those agreed, immediate action would be taken to reduce the levels at the noise source. A complaints log should be maintained throughout the event, detailing addresses of complaints, times and actions. The Environmental Health Department will be advised of the likely times of rehearsals and sound-checks, although this is unlikely to be known until very near the production set up for the event. The timings for production set up will also be agreed.

5.12. The management communication protocol will be agreed and reviewed to ensure effective and responsive communication channels are established and maintained between all relevant parties throughout the duration of the event.

5.13. Vanguardia will liaise with the council and comply with their complaints procedures.

5.14. Harlequins Football Club will comply with any reasonable instructions given by the licensing authority.

SOUND MANAGEMENT PROCEDURES

Sound Propagation Tests

5.15. Prior to the event, the production team should carry out short sound checks and as part of this process, a venue representative or consultant will undertake sound propagation tests to correlate the music noise levels at the mixing desk with those observed at the most sensitive sound control positions. The results of these tests will be used to 'fine tune' the sound system in order to maximise the containment of music and set an appropriate sound limit at the mixer position.

The day and time of the sound propagation test and / or rehearsals will be agreed with the Council's Environmental Health Department.

Sound Monitoring Within the Venue

5.16. The music sound levels at the mixing desk position will be continually monitored in terms of 15 minute and 1 minute L_{Aeq} values. The noise limit will be set in 15-minute intervals but the 1-minute values provide immediate information to ensure the limit is not exceeded. The sound engineers will be informed of the position of the music sound levels and immediate instructions will be issued to them if it appears that the

limit may be exceeded at any point. If off site levels begin to approach the noise limits, noise reductions will be immediately requested at the mixing desk.

5.17. As part of the managerial process, the sound engineers of any individual artistes appearing at the event will be informed prior to arriving at the mixer of the need to adhere to the sound limits and instructions issued to them in relation to sound control.

Sound Monitoring Outside of the Venue

5.18. Noise measurements outside of the site will be taken at locations agreed with the Council's Environmental Health Officers during the event. In addition, noise measurements will be taken in response to any complaints that may be received by a competent member of event or venue management or appointed consultant. Action necessary to ensure the noise limit is not exceeded will be relayed to the mixer positions and immediate instructions issued to the sound engineers to resolve any potential problems.

CUMULATIVE EFFECTS

5.19. Harlequin Football Club have written confirmation from the RFU Twickenham that there are to be no events at Twickenham Stadium on Saturday 3rd June 2017.

TELEPHONE COMPLAINTS LINE

5.20. A telephone complaints line will be confirmed prior to the event.

SUMMARY REPORTING

5.21. All noise monitoring results will be provided in a summary report and provided to the Local Authority within 14 days of the event.

5.22. Any changes or updates to this noise management plan will be submitted and agreed with the Local Authority.

6. APPENDIX A

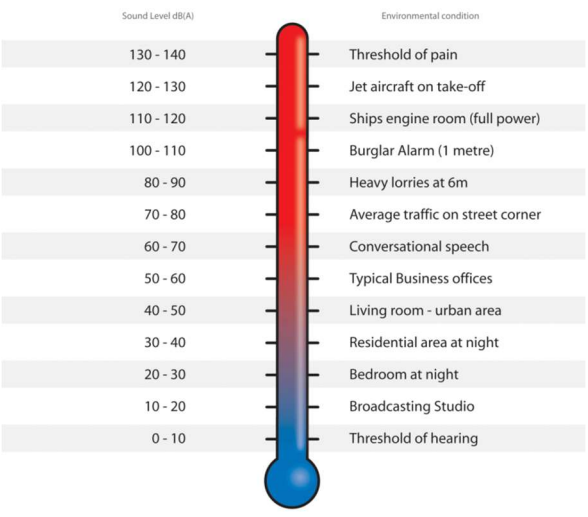
GLOSSARY OF TERMS

6.1. Noise is defined as unwanted sound. The range of audible sound is from 0dB to 140dB, which is taken to be the threshold of pain. The sound pressure detected by the human ear covers an extremely wide range. The decibel (dB) is used to condense this range into a manageable scale by taking the logarithm of the ratio of the sound pressure and a reference sound pressure.

6.2. The frequency response of the ear is usually taken to be about 18Hz (number of oscillations per second) to 18,000Hz. The ear does not respond equally to different frequencies at the same level. It is more sensitive in the mid-frequency range than at the lower and higher frequencies, and because of this, the low and high frequency component of a sound are reduced in importance by applying a weighting (filtering) circuit to the noise measuring instrument. The weighting which is most used and which correlates best with the subjective response to noise is the dB(A) weighting. This is an internationally accepted standard for noise measurements.

6.3. The ear can just distinguish a difference in loudness between two noise sources when there is a 3dB(A) difference between them. Also when two sound sources of the same noise level are combined the resultant level is 3dB(A) higher than the single source. When two sounds differ by 10dB(A) one is said to be twice as loud as the other.

6.4. The subjective response to a noise is dependent not only upon the sound pressure level and its frequency, but also its intermittency. Various indices have been developed to try and correlate annoyances with the noise level and its fluctuations. The parameter used for this measure is Equivalent Continuous Sound Pressure Level (L_{Aeq}). The A-weighted sound pressure level of a steady sound that has, over a given period, the same energy as the fluctuating sound under investigation. It is in effect the energy average level over the specified measurement period (T) and is the most widely used indicator for environmental noise. A few examples of noise of various levels are given right:



7. APPENDIX B

NOISE CONTOUR PLOT

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