The Equestrian Company

Noise Compliance Plan for the Olympic Equestrian Event

Noise Compliance Plan

Final

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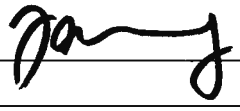
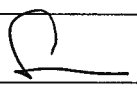
		Signature			
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Contents

1 Introduction

The varied Environmental Permit (VEP) for the Main Arena of the 2008 Olympic Equestrian Event was issued on 13 May 2008 to cover the extended operation period of the Olympic Event and Paralympic Event. Clause 4.1 of the amended EP requires the Public Address System (PAS) to be tested for compliance before the Olympic Event. A noise compliance plan to determine the "near field" control sound level and action plan for noise compliance during the event period need to be submitted 4 weeks prior to the "Testing and Commissioning" period for the PAS.

This Noise Compliance Plan is prepared in accordance with the above requirement in the amended EP.

1.1 Major Activities in the Main Arena

Based on the rehearsal schedule provided by the Equestrian Company, scenarios that may involve the use of public address system (PAS) have been identified as follows:-

- Entertainment
- Competitions with judge announcements
- Victory Ceremony

The volume of the above events should be tested and monitored to ensure the compliance of NCO.

2 Sound Measurement Methodology

2.1 Measurement Locations

Sound levels will be measured simultaneously at 3 locations as shown in Table 2.1. Plan 1 shows the locations of the five measurement points.

Table 2.1: Noise measurement locations

	ID	Location
Far-field	NM1	HKJC Staff Quarters
	NM3	Ravana Garden
Near-field	NM5	South-eastern spectator seating (exact location to be determined on site)

2.2 Sound Measurement Schedule

Sound measurement will be conducted on 24th and 25th of July and 3rd of August 2008. Should supplementary measurement data be required, additional sound measurement will be conducted on 27th of July. Table 2.2 below shows the detailed schedule of the sound measurement. The rehearsal schedule is subject to refinement and may be updated.

Table 2.2: Detailed sound measurement schedule

Date	Time	Activity
24 July	0900-1300	Sound test for live performance – marching band
	1400-1800	Sound test for live performance – marching band
	1900-2000	Sound test on visual content through audio channel
	2000-2100	Sound test on background music with announcers (scenario: jumping / dressage / victory ceremony)
25 July	1400-1600	Sound test for live entertainment with music playback
	1600-1700	Sound test on visual content through audio channel
	1800-2100	Running through of the Victory Ceremony with announcer
	1930-2030	Sound test for live performance – Police Band
*27 July**	*0900-1300*	*Sound test for live performance – Chinese dance*
	1900-2300	*Sound test for live performance – Mascot dance*
3 August	Full dress rehearsal simulating Day 10 schedule	

Note: * - Sound measurement will be conducted only when supplementary data is required.

2.3 Procedures of Measurement

For sound tests on **entertainment, competitions with announcement** and **victory ceremony**, the following measurement procedures will be followed:-

1. Before turning on the PA system, background noise will be measured in terms of L_{Aeq} (5 min) at the 3 locations. 6 sets of 5 minutes measurement will be taken.
2. The setting and aiming direction of the loudspeakers should be the same as that for the Olympic Event.
3. The EqCo or his contractor will broadcast the soundtrack prepared by themselves through the PA system. The Soundtrack shall contain contents similar to those used for Olympic Event of a typical duration.
4. Sound levels at the 3 measurement locations will be recorded continuously in terms of L_{Aeq} during the PA broadcast. Depending on the typical cycle duration of the test events, the noise levels in L_{Aeq} (30min) would be determined.
5. Sound level measurements will be taken at near-field (NM5) and far-field (NM1 and NM3) monitoring points during the PA system broadcast. The volume setting will be adjusted up/down from the intended sound level at the seating areas to a sound level at which the far-field measurement points are reaching but not exceeding the planning criteria (i.e. ANL-5).
6. The broadcasting content shall be the same as far as possible for each volume level. Background noise measurement will be taken during the interim period (after the morning session and before the evening session) in terms of L_{Aeq} (5 min) at the 3 locations. 6 sets of 5 minutes measurement will be taken.
7. After completion of PA system sound level measurements, background noise will be again measured in terms of L_{Aeq} (5 min) at the 3 locations. 6 sets of 5 minutes measurement will be taken. The average background noise level before and after PA system sound level measurements will serve for the ambient correction to establish the corrected noise levels at the measurement locations, as appropriate.
8. All PA broadcasting and testing should stop before 23:00 to avoid disturbance to the surrounding environment.
9. The background noise level after 23:00 will be measured in terms of L_{Aeq}(5 min) at the 3 locations. 6 sets of 5 minutes measurement will be taken.

For sound test on other rehearsal activities when adjustment of the master volume is not feasible, the sound level of the activities will be monitored throughout the rehearsal for record purpose.

2.4 Equipment

Details of the integrating sound level meters are shown in Table 2.3 below.

Table 2.3: Noise monitoring equipment

Manufacturer	Equipment	Precision Grade	Qty
Bruel and Kjaer	Electronic Calibrator Type 4230	IEC 942 Type 1	1
Bruel and Kjaer	Foam Windshield Type UA0237	IEC 804 Type 1	3
Rion	Precision Integrating Sound Level Meter Type NA-27.	IEC 651 Type 1	2
Bruel and Kjaer	Precision Integrating Sound Level Meter Type 2238	IEC 651 Type 1	3
Kestrel Vane Anemometer	LCD wind speed indicator	--	1

All sound level meters comply with the standards of IEC 651 (Fast, Slow, Impulse RMS detector tests) and IEC 804 (Leq functions).

2.5 Measurement QA Procedures

All field measurements will be conducted according to the following procedures:

- The sound level meter and battery will be checked to ensure that they are in proper condition.
- The sound level meter will be set on a tripod at 1.2m above floor and at 1m from the exterior of the building façade, if applicable. The actual position may be subject to adjustment based on site-condition.
- Before conducting the measurement, the sound level meter will be calibrated by an acoustical calibrator.
- The measurement parameter will be set to A-weighted sound pressure level. The time weighting will be set in fast response.
- The wind speed will be checked during noise monitoring to ensure the steady wind speed does not exceed 5m/s, or wind with gusts does not exceed 10m/s.
- Any abnormal conditions that generated intrusive noise during the measurement will be recorded on the field record sheet.
- After each measurement, the equivalent continuous sound pressure level (Leq), L10 and L90 will be recorded on the field record sheet.
- The sound level meter will be re-calibrated by the acoustical calibrator to confirm that there is no significant drift of reading.

3 Interpretation of Measurement Data and Action Plan

3.1 Data Analysis

Measurement data collected during the testing period will be analyzed to determine the upper volume limit for the master control of the PAS. The sound level of the PAS at each measurement point will be corrected against the background noise levels using standard acoustic principle.

Based on the results of PAS sound measurement, a reference near-field noise level to meet the nighttime criterion of 50dB(A) at the NSR can be deduced. The corresponding volume of the PAS master control at this configuration will be marked and set as the control limit for actual events.

3.2 Action Plan

Noise levels at the NSRs will be closely monitored when there is competition event in the Main Arena during the Olympic and Paralympic Period in accordance with the Environmental Permit (condition 4.1) and EM&A Manual's requirements. The noise limit levels for operational noise as defined in the Environmental Impact Assessment (EIA) Report and the Environmental Monitoring and Audit (EM&A) Manual are summarised in Table 3.1 below.

Table 3.1: Limit levels for operational noise

Location Reference	Area	Time Period	Limit Level in EM&A Manual (dB(A))
NM1	Chun Cheung Court, HKJC Staff Quarter	Day & evening	59
		Night	50
NM2	Racecourse Villa	Day & evening	55
		Night	50
NM3	Ravana Garden	Day & evening	57
		Night	50

Note: Day – 0700~1900; Evening – 1900~2300; Night – 2300~0700.

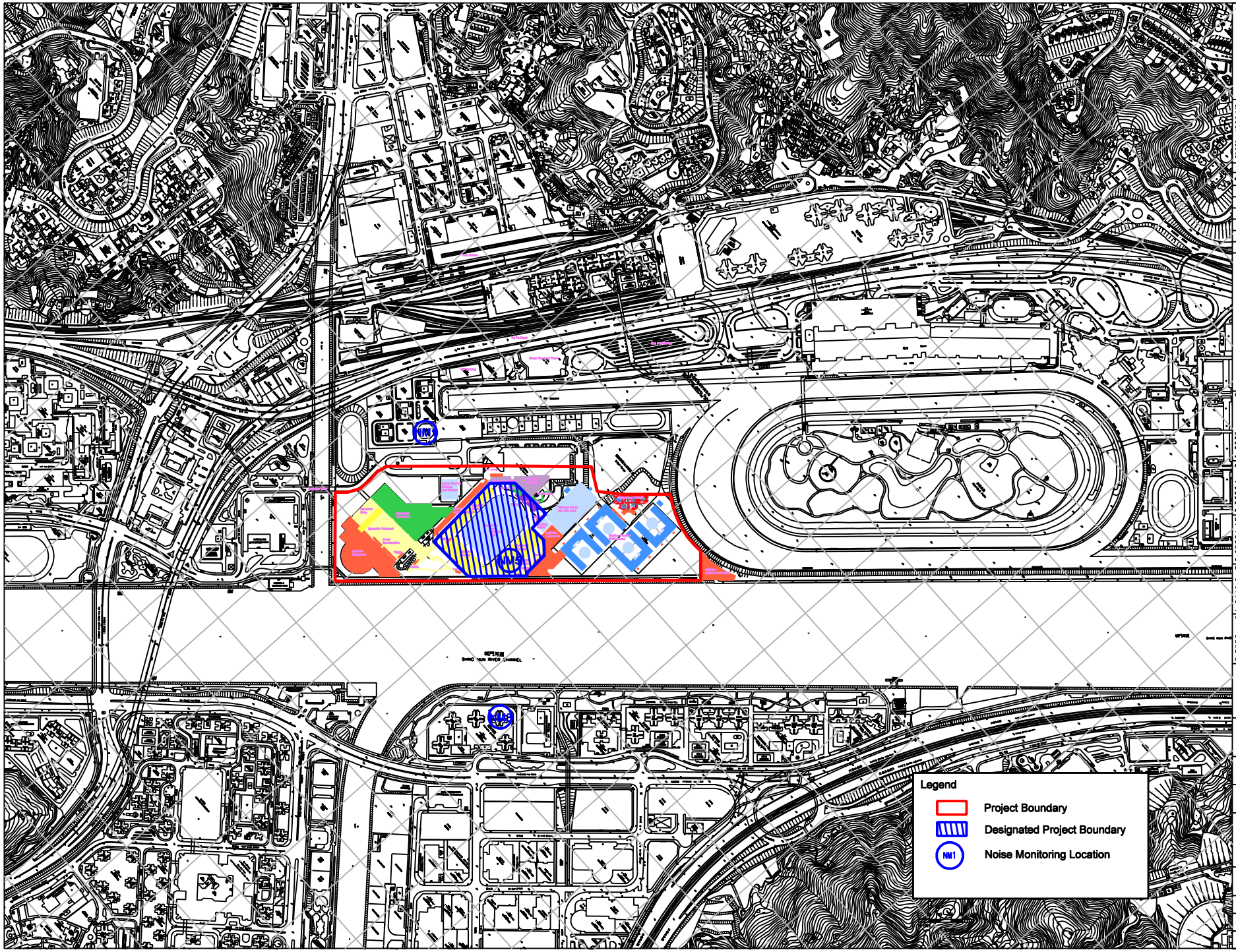
Should non-compliance of the criteria occur, actions in accordance with the Action Plan in Table 3.2 shall be carried out and persons in charge as given in Table 3.3 shall be notified.

Table 3.2: Event / Action Plan for operational noise

Event	Action		
	EMA(O)	IEC	Operator
Action Level	1. Notify the operator and IEC within 24 hours of identification of the exceedance. 2. Identify the noise source. 3. Report the results of investigation to IEC and the Operator 4. Discuss with the Operator and formulate remedial measures.	1. Review with analysed results submitted by EMA(O). 2. Review the proposed remedial measures by the Operator.	1. Take immediate action to avoid further exceedance 2. In consultation with IEC, develop proposals for remedial actions within three working days of notification 3. Amend proposals if required by the IEC 4. Implement remedial actions immediately upon agreement with IEC.
Limit Level	1. Identify the source. 2. Notify the IEC, EPD and Operator within 24 hours of identification of the exceedance 3. In combination with the Operator identify the exact reason for the exceedance 4. Repeat measurement to confirm findings 5. Assess the efficiency of the Operator's remedial actions and keep the Operator, EPD and IEC informed. 6. Report the results of investigation to the IEC, EPD and Operator.	1. Discuss with EMA(O) and the Operator on the potential remedial actions. 2. Review the Operator's remedial actions whenever necessary to assure their effectiveness.	1. Take immediate action to avoid further exceedance. 2. Advise IEC of remedial proposals within one working day of notification. 3. Amend proposals if required by the IEC. 4. Implement remedial actions immediately upon agreement with IEC. 5. Instruct EMA(O) to assess efficiency of remedial actions.

Table 3.3: Contact persons and numbers of relevant parties

Role	Organisation	Contact Person	Office Number	Mobile Number
EMA(O)	Ove Arup & Partners Ltd	Justin Kwan	2268 3882	9200 4274
IEC	Meinhardt Infrastructure and Environment Ltd	Fredrick Leong	2859 1739	9366 9313
Operator	Equestrian Company Ltd	H K Tang	2107 9998	6856 9998



香港賽馬會
The Hong Kong Jockey Club

Lead Architects
T.C & Co.

Consulting Engineers
ARUP

Documentation Architect
RLP

Landscape Architect
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Quantity Surveyors
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EQUESTRIAN VENUES

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Monitoring Locations

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