

Measurement Details for Open Air Entertainment Activity Noise from Music Concert conducted in WKCD in October 2011

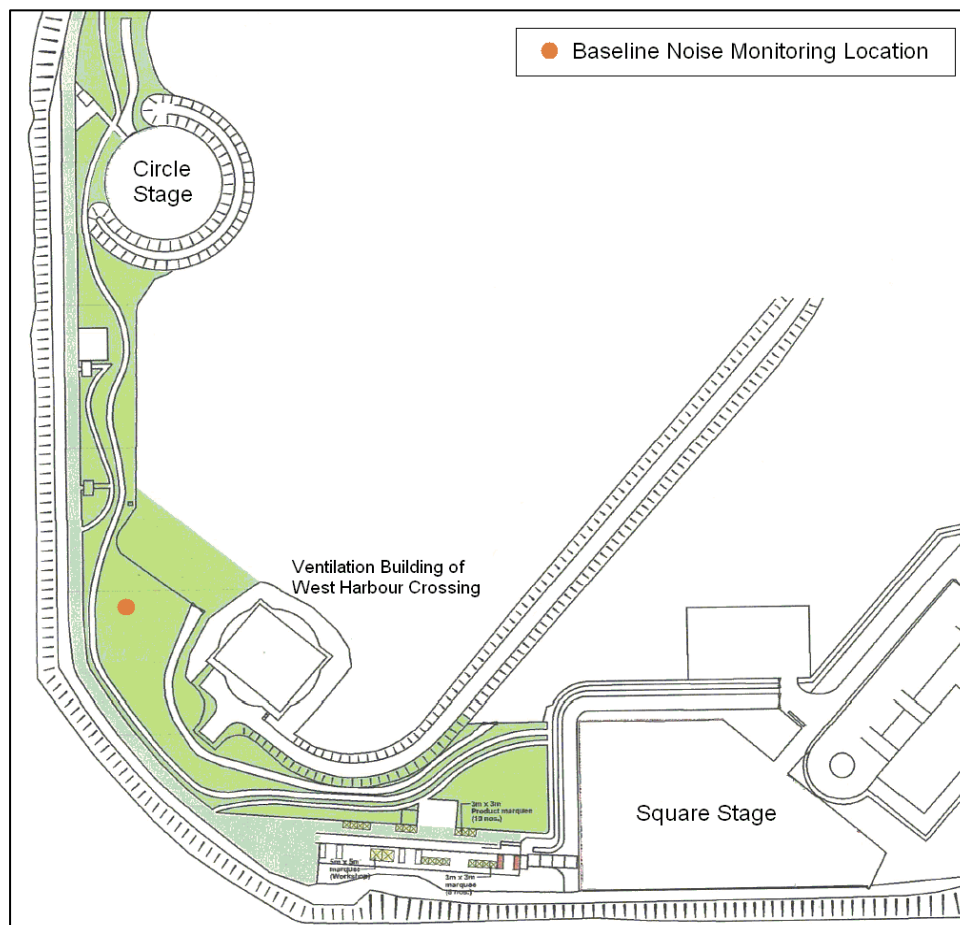
Noise Monitoring Programme

Some programmes of the Hong Kong International Jazz Festival 2011 were held within the proposed site of WKCD on the 1st and 2nd October 2011, the noise monitoring was initially proposed on these days to capture the background noise of the area and the noise from the event during the daytime and evening time. However, the monitoring on 2nd October was cancelled due to typhoon signal no. 1 was issued on that day. The monitoring period was from 11:00am to 7:30pm on 1st October 2011. Several measurements at different locations were undertaken within the monitoring period.

Noise Monitoring Location

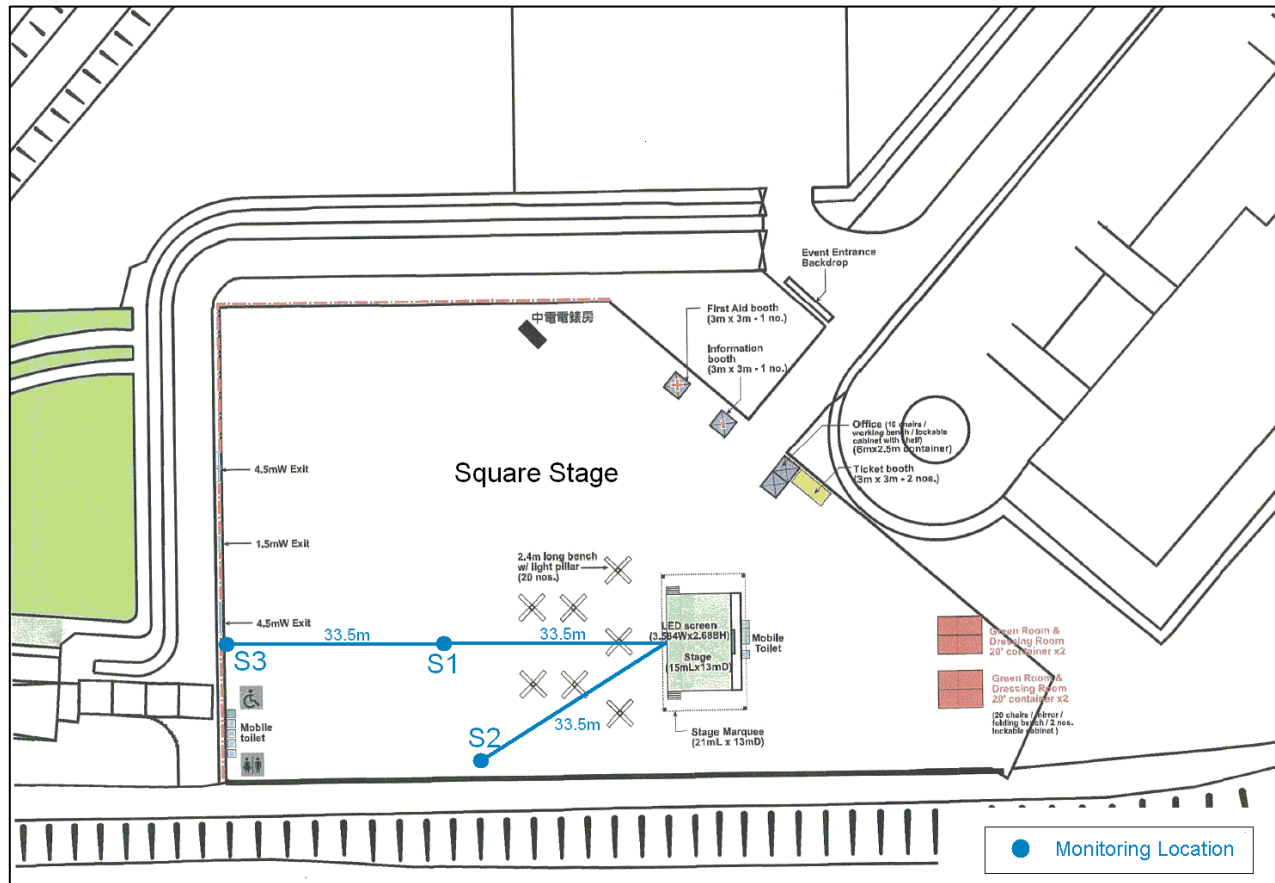
A single 15 minutes measurement for background noise of the area was conducted on the grassland about midway between the two main performance stages namely Square Stage and Circle Stage. This location was chosen due to the long distance from the two performance stages, which aimed to minimize the noise impact of testing from the stages during the monitoring. The monitoring location for background noise is shown in **Figure 1** below.

Figure 1 Location of Background Noise Monitoring



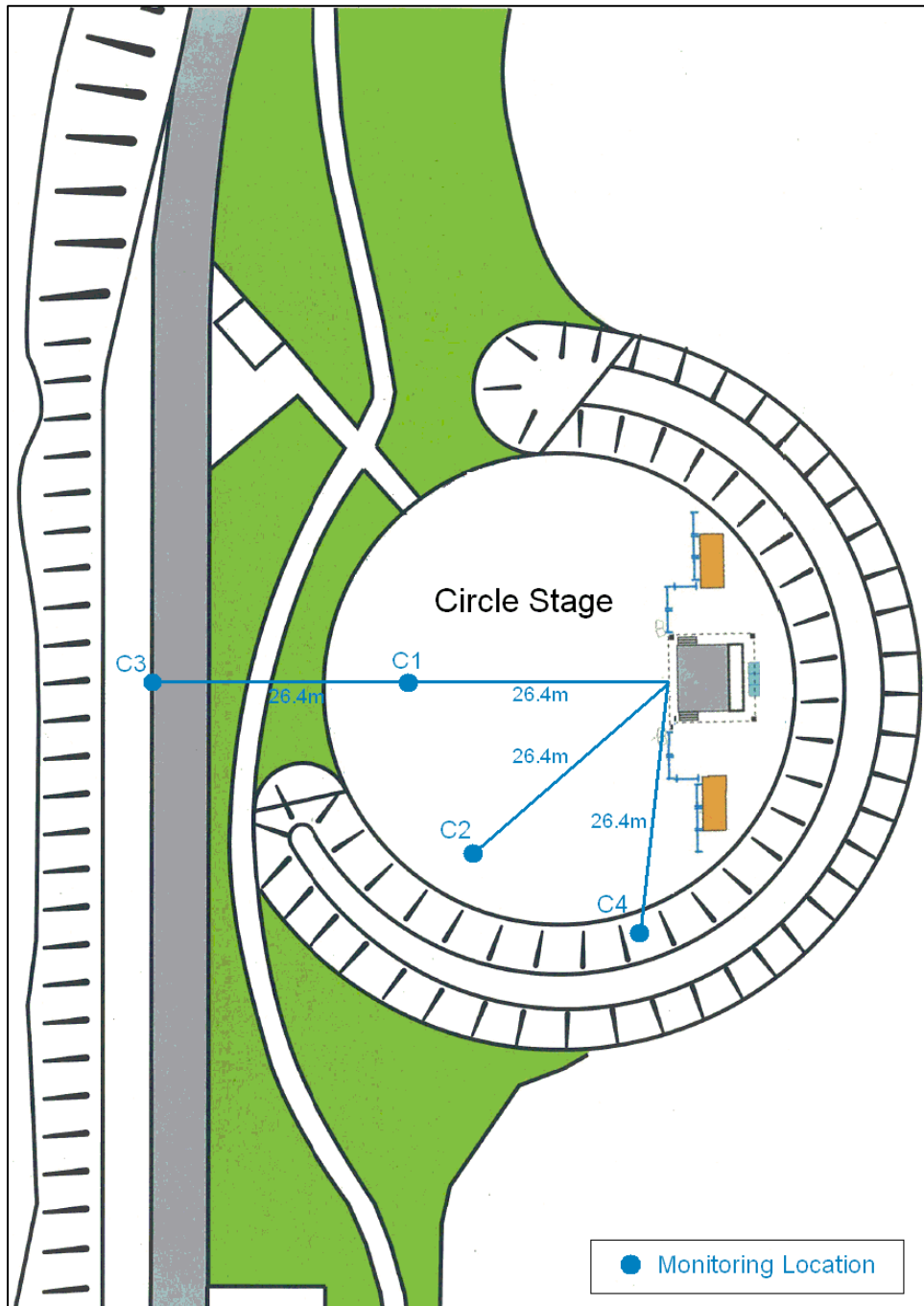
For the Square Stage, three locations namely S1, S2 and S3 were selected for the noise monitoring of the amplified sound from the stage. Distances from the stage to S1 and S2 were approximately 33.5m. Distance from the stage to S3 was approximately 67m which was double distance between the stage and S1. Monitoring results at S1 and S3 were used for understanding the noise impact levels at different distances to the stage. Monitoring results at S1 and S2 were used for understanding the noise impact levels at different locations with equidistance to the stage. **Figure 2** shows the selected noise monitoring locations at Square Stage and their relative distance from the stage.

Figure 2 Selected Noise Monitoring Locations at Square Stage



For the Circle Stage, 4 locations named C1, C2, C3 and C4 were selected for the noise monitoring of the amplified sound from the stage. Distance from the stage to C1, C2 and C4 were approximately 26.4m. Distance from the stage to C3 was approximately 52.8m which was double distance between the stage and C1. Monitoring results at C1 and C3 were used for understanding the noise impact levels at different distances to the stage. Monitoring results at C1, C2 and C4 were used for understanding the noise impact levels at different locations with equidistance to the stage. **Figure 3** shows the selected noise monitoring locations at Circle Stage and their relative distance from the stage.

Figure 3 Selected Noise Monitoring Locations at Circle Stage



Noise Monitoring Result

The results for background noise monitoring and both the noise monitoring at the Square Stage and the Circle Stage are presented in **Table 1** to **Table 3**.

According to the monitoring data in **Table 2** and **Table 3**, the highest $L_{eq(5min)}$ at Square Stage and Circle Stage are 87.7dB(A) at S1 (approximately 34m from the Stage) and 89.0 dB(A) at C1 (approximately 26m from the Stage) respectively. Based on the measured L_{eq} , the sound power level from both noise sources at Square Stage and Circle Stage are calculated using the below equation.

Calculated Sound Power Level (dB(A)) = highest measured L_{eq} (5 mins) + DC – FC

Where:

DC = $20\log(\text{distance between source and measurement point})+8$

FC = Facade Correction = 0 as the measurements were free field measurement

The sound power level at Square Stage is calculated as 126.2 dB(A) which was higher compare to that of 125.4 dB(A) for Circle Stage. Therefore, the calculated sound power level at Square Stage has been adopted in the open air activity noise assessment for worst case scenario.

Table 1: Background Noise Monitoring for Jazz Festival Concert

Monitoring Location	Grassland midway between two stages
Date of Monitoring	01-Oct-11
Measurement Start Time	11:24
Measurement End Time	11:38
Measurement Time Length (min)	15
Weather Condition	Cloudy
Noise Meter Model	Rion NL-18
Measurement Results, dB(A)	15min
Leq	55.6
Lmax	71.7
Lmin	47.8
L10	57.9
L90	50.5
Dominant Noise Sources during Monitoring	People walking and cycling around
Remarks	Free Field Measurement

Table 2: Noise Monitoring for Jazz Festival Concert (Square Stage)

	(Square Stage Set 1)											
Data Set	Set 1a						Set 1b					
Monitoring Location	Centre (S1)			Side Fencing (S2)			Centre (S1)			Rear Fencing (S3)		
Date of Monitoring	01-Oct-11			01-Oct-11			01-Oct-11			01-Oct-11		
Measurement Start Time	15:56	16:01	16:06	15:56	16:01	16:06	16:20	16:25	16:30	16:20	16:25	16:30
Measurement End Time	16:00	16:05	16:10	16:00	16:05	16:10	16:24	16:29	16:34	16:24	16:29	16:34
Measurement Time Length (min)	5	5	5	5	5	5	5	5	5	5	5	5
Weather Condition	Cloudy			Cloudy			Cloudy			Cloudy		
Noise Meter Model	Rion NL-18			Rion NL-31			Rion NL-18			Rion NL-31		
Measurement Results, dB(A)	1 st 5min	2 nd 5min	3 rd 5min	1 st 5min	2 nd 5min	3 rd 5min	1 st 5min	2 nd 5min	3 rd 5min	1 st 5min	2 nd 5min	3 rd 5min
Leq	84.1	81.9	87.7	81.8	81.1	83.3	79.2	81.9	83.4	78.5	80.5	82.8
Lmax	96.0	93.5	98.4	90.4	95.9	92.6	90.0	91.7	96.6	89.1	88.5	97.1
Lmin	61.5	68.6	61.8	62.8	61.4	62.8	59.7	62.4	56.4	61.0	62.5	58.3
L10	87.7	85.5	92.2	85.4	84.4	87.4	83.1	85.4	86.6	82.3	83.5	85.8
L90	72.9	68.7	68.7	72.4	69.3	69.0	66.0	73.8	73.2	66.7	73.7	70.7
Dominant Noise Sources during Monitoring	Music performance on the stage, Audience						Music performance on the stage, Audience			Music from the stage, Audience, Activities outside fencing		
Remarks	Free Field Measurement						Free Field Measurement					

Note: **Bold** figure denotes the highest measured Leq (5 mins)

	(Square Stage Set 2)											
Data Set	Set 2a						Set 2b					
Monitoring Location	Centre (S1)			Side Fencing (S2)			Centre (S1)			Rear Fencing (S3)		
Date of Monitoring	01-Oct-11			01-Oct-11			01-Oct-11			01-Oct-11		
Measurement Start Time	18:27	18:32	18:37	18:27	18:32	18:37	18:51	18:56	19:01	18:51	18:56	19:01
Measurement End Time	18:31	18:36	18:41	18:31	18:36	18:41	18:55	19:00	19:05	18:55	19:00	19:05
Measurement Time Length (min)	5	5	5	5	5	5	5	5	5	5	5	5
Weather Condition	Cloudy			Cloudy			Cloudy			Cloudy		
Noise Meter Model	Rion NL-18			Rion NL-31			Rion NL-18			Rion NL-31		
Measurement Results, dB(A)	1 st 5min	2 nd 5min	3 rd 5min	1 st 5min	2 nd 5min	3 rd 5min	1 st 5min	2 nd 5min	3 rd 5min	1 st 5min	2 nd 5min	3 rd 5min
Leq	84.7	83.3	82.5	80.6	79.5	78.9	83.2	82.8	85.4	81.1	80.4	82.6
Lmax	98.2	93.7	96.9	92.9	92.2	91.8	95.1	103.9	99.2	91.8	103.0	97.8
Lmin	62.6	59.5	61.5	61.3	61.1	61.4	64.1	59.7	59.7	63.5	62.0	62.5
L10	88.2	87.2	86.1	84.1	83.2	82.3	86.8	87.2	89.3	84.9	84.7	86.2
L90	71.9	63.7	68.5	69.2	63.9	67.4	72.5	64.4	71.8	70.4	64.9	71.2
Dominant Noise Sources during Monitoring	Music performance on the stage, Audience						Music performance on the stage, Audience			Music from the stage, Audience, Activities outside fencing		
Remarks	Free Field Measurement						Free Field Measurement					

Table 3: Noise Monitoring for Jazz Festival Concert (Circle Stage)

Data Set	(Circle Stage Set 1)															
	Set 1a						Set 1b						Set 1c			
Monitoring Location	Centre (C1)			Next to the Control Panel (C2)			Centre (C1)			Coastal walkway (C3)			Centre (C1)	RHS of the stage (C4)		
Date of Monitoring	01-Oct-11			01-Oct-11			01-Oct-11			01-Oct-11			01-Oct-11		01-Oct-11	
Measurement Start Time	14:23	14:28	14:33	14:23	14:28	14:33	14:49	14:54	14:59	14:49	14:54	14:59	15:14	N/A	15:14	N/A
Measurement End Time	14:28	14:32	14:37	14:28	14:32	14:37	14:53	14:58	15:03	14:53	14:58	15:03	15:18		15:18	
Measurement Time Length (min)	5	5	5	5	5	5	5	5	5	5	5	5	5		5	
Weather Condition	Cloudy			Cloudy			Cloudy			Cloudy			Cloudy		Cloudy	
Noise Meter Model	Rion NL-18			Rion NL-31			Rion NL-18			Rion NL-31			Rion NL-18		Rion NL-31	
Measurement Results, dB(A)	1 st 5min	2 nd 5min	3 rd 5min	1 st 5min	2 nd 5min	3 rd 5min	1 st 5min	2 nd 5min	3 rd 5min	1 st 5min	2 nd 5min	3 rd 5min	1 st 5min	N/A	1 st 5min	N/A
Leq	83.8	86.8	86.2	77.7	81.6	79.7	86.6	86.3	86.7	81.9	82.0	84.5	84.2		76.2	
Lmax	98.3	102.5	100.8	90.5	93.1	92.4	100.8	102.7	100.3	95.0	96.4	97.3	98.2		91.7	
Lmin	52.8	53.7	52.4	54.6	56.6	54.8	54.9	56.1	57.4	58.4	59.0	58.8	55.5		57.3	
L10	88.2	90.6	90.0	82.5	85.2	83.4	90.6	89.1	90.0	85.6	85.6	87.6	87.3		79.1	
L90	59.8	65.3	68.1	60.9	64.7	65.6	65.7	69.9	77.2	63.9	67.2	77.7	71.1		66.6	
Dominant Noise Sources during Monitoring	Music performance on the stage, Audience						Music performance on the stage, Audience			Music from the stage, Audience, People walking and cycling			Music performance on the stage, Audience			
Remarks	Free Field Measurement						Free Field Measurement						Free Field Measurement			

	(Circle Stage Set 2)											
Data Set	Set 2a						Set 2b					
Monitoring Location	Centre (C1)			Next to the Control Panel (C2)			Centre (C1)			Coastal walkway (C3)		
Date of Monitoring	01-Oct-11			01-Oct-11			01-Oct-11			01-Oct-11		
Measurement Start Time	17:19	17:24	17:29	17:19	17:24	17:29	17:43	17:48	17:53	17:43	17:48	17:53
Measurement End Time	17:23	17:28	17:33	17:23	17:28	17:33	17:47	17:52	17:57	17:47	17:52	17:57
Measurement Time Length (min)	5	5	5	5	5	5	5	5	5	5	5	5
Weather Condition	Cloudy			Cloudy			Cloudy			Cloudy		
Noise Meter Model	Rion NL-18			Rion NL-31			Rion NL-18			Rion NL-31		
Measurement Results, dB(A)	1 st 5min	2 nd 5min	3 rd 5min	1 st 5min	2 nd 5min	3 rd 5min	1 st 5min	2 nd 5min	3 rd 5min	1 st 5min	2 nd 5min	3 rd 5min
Leq	84.7	89.0	84.8	82.7	85.9	82.8	83.9	83.4	83.5	81.1	81.0	81.7
Lmax	95.0	99.2	97.4	90.7	95.1	94.5	94.9	93.7	94.8	90.7	93.5	94.6
Lmin	57.2	72.1	57.0	58.5	70.8	59.8	59.5	59.0	57.2	57.4	58.5	58.2
L10	88.3	92.4	88.3	86.2	88.5	86.1	87.3	87.1	86.8	84.5	84.2	85.0
L90	70.9	82.5	74.8	70.8	81.0	75.0	74.8	75.5	73.1	72.2	73.2	69.2
Dominant Noise Sources during Monitoring	Music performance on the stage, Audience						Music performance on the stage, Audience			Music from the stage, Audience, People walking and cycling		
Remarks	Free Field Measurement						Free Field Measurement					

Note: **Bold** figure denotes the highest measured Leq (5 mins)