



風移聲學及環境顧問

Aeolian View Consultants

Acoustics & Environmental Engineering

**Repositioning and Long Term
Operation Plan of Ocean Park :
Noise Mitigation Audit Report (NMAR)
for the Special Event at the Summit
(Phase 2 : Operation hour 09:00-01:00)**

**“Countdown for Coloratura 2022”
(Temporary Outdoor Attraction Facilities)**

December 2022 (Rev. 0)

**Report Prepared for
Ocean Park Corporation**

(C:\...\22P039\22Rep-039b (R0))

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Prepared by

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MSc, AMIOA, MHKIOA

1.0 Introduction

This report, an updated Noise Mitigation Audit Report (NMAR) for the captioned Countdown event, is one of the noise related documents to be prepared for subsequent review / approval by the Environmental Protection Department (EPD) as covered under the Environmental Permit (EP) (EP-249/2006/D) for the Repositioning and Long Term Operation Plan of Ocean Park.

Sequentially the other associated report, Noise Mitigation Audit Plan (NMAP), as submitted earlier to the EPD, has addressed in details the EP background, the associated submission requirements (Condition 2.30 of the EP) as well as the coverage area for this NMAR preparation. Upon the NMAP submission, the NMAR is to be preceded by the completion of a field noise measurement exercise (mock-up test) for the identified noise sources under the captioned Countdown event. The NMAR is then to incorporate all such measurement results and the noise compliance verification for the EPD’s approval and hence serves as part of the noise regulation scheme for the proper execution of the Countdown event.

2.0 Noise Measurement (Mock-up Test)

2.1 Noise Sources

The field noise measurement exercise covers, as noise sources for the mock-up test, a number of floor mounted loudspeakers to be assembled at 3 separate attraction spots within the Summit area as shown in Figure 2. Details of the loudspeaker arrangement are as follows.

Table 1 Loudspeaker Noise Sources

Noise Source			No. of Loudspeakers at Attraction Spot :		
	Loudspeaker Model *	Dimensions, mm (H x W x D)	Main Stage	Stage A	Stage B
1	Main Speaker - Kudo®	356 x 876 x 689	6	-	6
2	Main Speaker - Nexo PS15-R2	675 x 434 x 368	-	2	-
3	Subwoofer - Kudo SB28	-	6	2	4
Total :			12	4	10
Notes : * To be floor mounted & with onsite volume control for background music playing					

2.2 Commissioning Noise Limits

The commissioning noise limits for the loudspeaker sources from the Countdown event have been determined by considering the cumulative noise impact from the loudspeaker sources as well as those existing noise sources (Normal Operation) at the Summit which will be in concurrent operation with them during the Countdown event. Quantification of the cumulative noise impact shall be with respect to the noise criteria at the most critical Noise Sensitive Receivers (NSRs) : ‘BC1 (Broadview Court)’ and ‘MV (Manly Villa)’ as shown in Figure 1. A list detailing the noise sources and noise mitigation measures at the Summit during the Countdown event as well as the noise criteria at ‘BC1 (Broadview Court)’ are tabulated in Table 2 for easy reference. Details of the commissioning noise limit derivation, taking into consideration all these noise sources (Table 2) for both the loudspeaker sources and those for Normal Operation, are given in Appendix I.

Table 2 Noise Sources & Noise Mitigation Measures during the Countdown Event

Plant ID	Plant	Location	Operation during Countdown Event			Noise Mitigation Measures
			30 and 31/12/2022, 1/1/2023	31/12/2022 to 1/1/2023		
			09:00-20:00	20:00-23:00	23:00-01:00	
SF01	Split-type A/C unit	Funicular Building	√	-	-	-
SF02	Split-type A/C unit	South Pole Spectacular	√	√	√	-
SF03	Split-type A/C unit	Tuxedos Restaurant	√	-	-	-
SF04	Split-type A/C unit	North Pole Encounter	√	√	√	-
SF05	AC plant	South Pole Spectacular	√	√	√	-
SF06	AC plant group	Tuxedos Restaurant	√	-	-	-
SF07	AC plant	North Pole Encounter	√	√	√	-
SF08	AC plant	Rainforest	√	√	√	-
SF09	Chiller	North Pole Encounter	√	√	√	-
SF10	Pump	North Pole Encounter	√	√	√	-
SF11	Ventilation fan	Funicular Building	√	-	-	-
SF12	PA system	Rainforest	√	√	√	-
SF13	PA system	Thrill Mountain	√	√	√	-
SF14	PA system	Polar Adventure	√	√	√	-
-	All fixed plants in Marine World & Adventure Land	Marine World & Adventure Land	√	-	-	-
N-R14	Arctic Blast	Polar Adventure	√	√	√	-
N-R17	Hair Raiser	Thrill Mountain	√	√	-	Closed (23:00 - 01:00)
N-R13	Rev Booster	Thrill Mountain	√	√	√	-
N-R12	Whirly Bird	Thrill Mountain	√	√	√	-
N-R11	The Flash	Thrill Mountain	√	√	-	Closed (23:00 - 01:00)
N-R15	Bumper Blasters	Thrill Mountain	√	√	√	-
N-R16	The Rapids	Rainforest	√	√	√	-
SF15	Machine plant	Cable Car Station	√	-	-	-
Special Event - Countdown for Coloratura 2022		The Summit	-	√	√	Computerized volume control at the manned spot location
Fixed Plant Noise Assessment Criteria at NSR : BC1 (Broadview Court)			57 dB(A)		54 dB(A)	-

2.3 Noise Measurement Methodology

Noise measurement methodology as detailed in the related NMAP and tabulated below shall be adopted for the mock-up test. The noise emission levels from the loudspeaker sources as well as the background noise levels are to be captured at the 2 identified measurement positions (Positions R1 and R2) within the Summit area as shown in Figure 4. Correction for the background noise levels (if necessary) shall be determined for subsequent noise compliance status determination with the identified Commissioning Noise Limits. Repeated measurements shall be conducted with loudspeaker volume adjustment in case non-compliance is identified.

Table 3 Noise Measurement Details & Noise Mitigation Measures

Noise Measurement				Commissioning Noise Limit in SPL, dBA) **		Noise Mitigation Measures in Place	
Noise Source *		Measurement Position	Source Measurement	Background Noise Measurement	R1		R2
					23:00-01:00		20:00-23:00
Main Stage	12 speakers	R1 and R2 (Free field position)	3 trials of measurements at each position, sampled with 'Fast response' time weighting setting & in terms of Leq (5 min) in dB(A)	1 measurement at each position, sampled with 'Fast response' time weighting setting & in terms of Leq (1 min) in dB(A)	81	70	Computerized volume control at the manned spot location
Stage A	4 speakers						
Stage B	10 speakers						
Notes : 1. SPL = Sound Pressure Level 2. * Input from simulated sound track [e.g. background music or pink noise] 3. ** Taken as the more stringent limit within the periods (20:00-23:00 or 23:00-01:00) as in Appendix I							

2.4 Measurement Details

Date & Time : 20/12/2022 (Tue) ; 19:45 to 20:15
Measurement locations : Positions R1 and R2 (near the 3 attraction spots) at the Summit
Weather condition : Fine & cool
Prevailing wind speed : < 5.0 m/s
Conducted by : Mr. K.W. Cheng (MHKIOA)

2.5 Instrumentation

The noise measurement has been undertaken using 2 precision integrating sound level meters and 1 sound level calibrator. The sound level meters conform to the Class 1 accuracy requirements under the International Electrotechnical Commission standards IEC 61672-1 (2002) and IEC 61260 (1995). Both the meters and the calibrator have been calibrated by a recognized laboratory in accordance with relevant IEC laboratory calibration requirements and with calibration certificates valid within 1 year from the calibration dates. Appendix II gives the calibration certificates of the instrumentation. The following gives a complete description of the measurement equipment.

Table 4 Noise Measurement Equipment

Measurement Equipment	Brand Name & Model No.	Serial No.	Calibration Expiry
Precision integrating sound level meter	NTi-XL2-TA	A2A-08670-E0	13/06/2023
Precision integrating sound level meter	Svantek Svan 959	11238	09/02/2023
Sound level calibrator	Svantek SV 30A	7441	09/02/2023

Field calibration check of the meters using the calibrator shall be undertaken before and after the measurement exercise.

3.0 Results & Findings

3.1 Calibration Results

Both sound level meters : 94.0 dB (Pre-measurement) 94.0 dB (Post-measurement)
No change in the calibration levels occurs and hence the instrumentation accuracy is acceptable.

3.2 Measurement Results

Results of the mock-up noise measurement exercise and the noise compliance status are tabulated in Table 5 below. Field noise measurement photos are given in Appendix III. Note that all the loudspeakers at each attraction spot during the test have been tuned to levels at the confronting area close to the event sound levels for the park-goers. **All the corrected SPLs at Positions R1 and R2 during the test are shown to be within the Commissioning Noise Limits.**

Table 5 Mock-up Noise Measurement Results

Noise Measurement Results								Commissioning Noise Limit in SPL, dBA) **	Compliance Status (Corrected SPL ≤ SPL Limit)
Noise Source *	Measurement Position (Free field)	Measured SPL in L_{eq} (5 min), dB(A)			Averaged SPL, dB(A)	Measured BGL in L_{eq} (1 min), dB(A)	Corrected SPL, dB(A)		
		Trial 1	Trial 2	Trial 3					
Main Stage (12 speakers)	R1	66.7	66.2	66.2	66.4	47.6	66	81	Complied
Stage A (4 speakers) Stage B (10 speakers)	R2	53.9	54.0	53.9	53.9	47.0	53	70	Complied

Notes : 1. BGL = Background Noise Level ; SPL = Sound Pressure Level
 2. * Input from simulated sound track [Pink noise]
 3. Corrected SPL = $10 \log (10^{(Averaged\ SPL/10)} - 10^{(Measured\ BGL/10)})$

4.0 Noise Audit

Apart from the mock-up test and the noise compliance verification with the commissioning noise limits above, noise from the Countdown event shall also comply with the inaudibility requirement at the neighbouring NSRs after 23:00 hour as stipulated under the EPD’s guidelines [1]. The organizer of the Countdown event will deploy noise competent manpower at the most critical NSR ‘BC1’ (Broadview Court) to verify the inaudibility compliance status of the musical noise during the countdown event beyond 23:00 hour. In case audible musical noise is perceived and persists, immediate feedback to the audio crew at the attraction spots shall be exercised to lower the source volume / stop the source for inaudibility confirmation.

5.0 Conclusion

This NMAR details the field noise measurement exercise (mock-up test) above which is to serve as a demonstration of the anticipated performance of the noise mitigation measures for the loudspeaker noise sources during the Countdown event.

The test covers 2 measurement positions in the vicinity of the 3 attraction spots at the Summit for the Countdown event. Onsite computerized volume control of the loudspeakers at each attraction spot has been exercised during the test and as the means of noise mitigation measures for the event. Results of the test indicate that all the noise samples at the 2 measurement positions are in compliance with the Commissioning Noise Limits. Accordingly this demonstrates that the design and performance of the noise mitigation measures to be implemented during the event comply with the commissioning requirements as determined in the NMAP.

6.0 References

1. Noise Control Guidelines for Music, Singing & Instrument Performing Activities, Environmental Protection Department, April 2021.

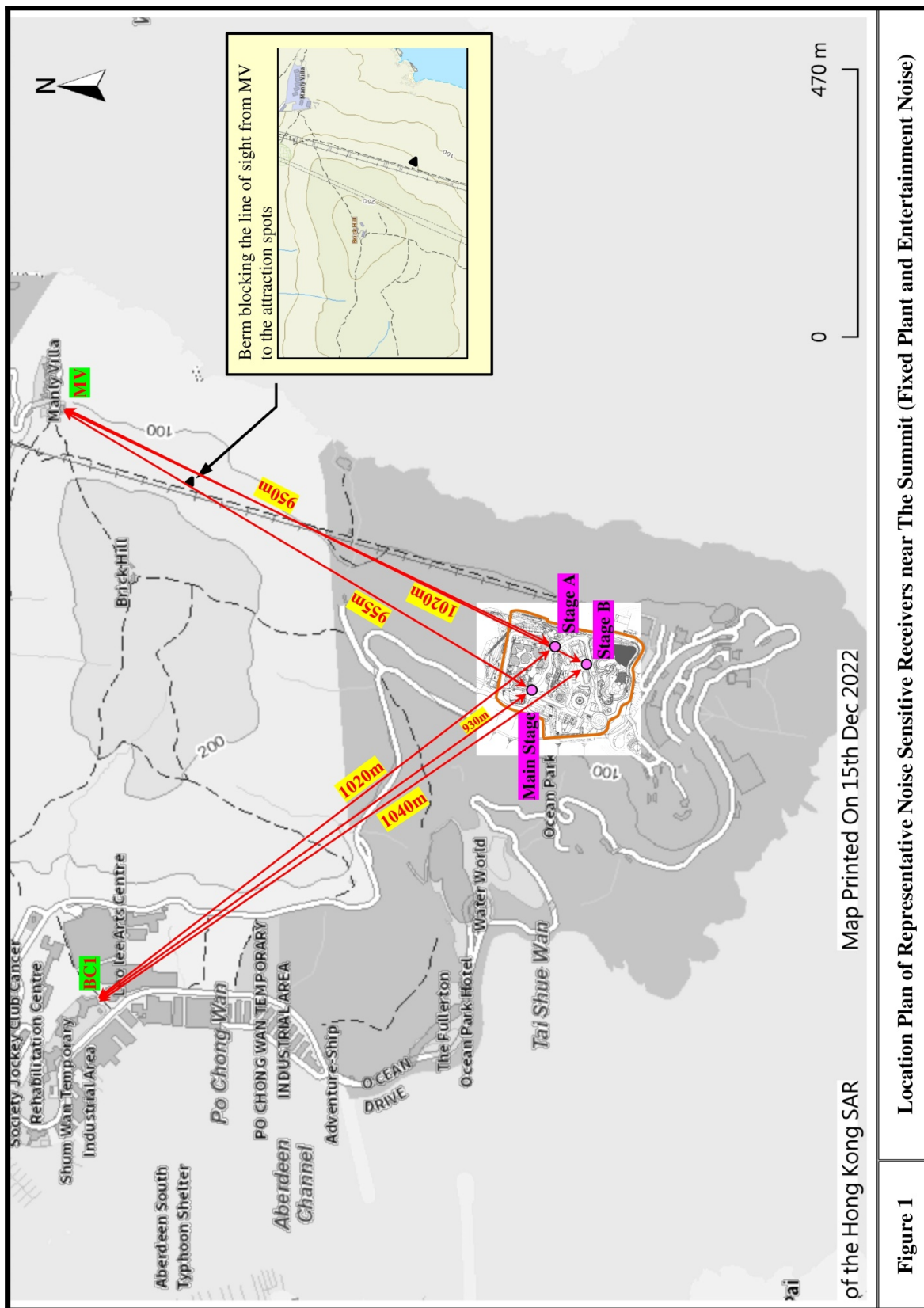
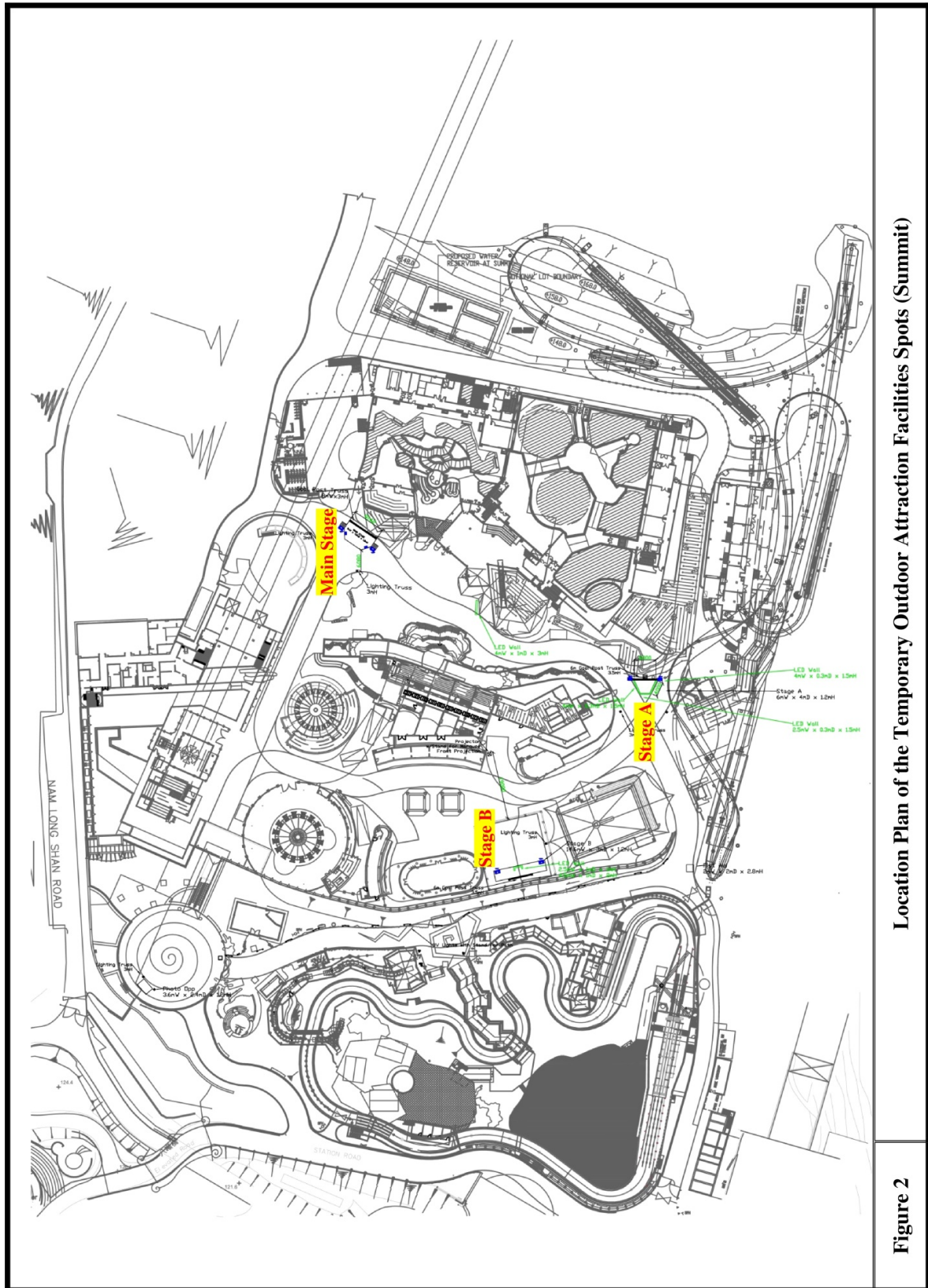
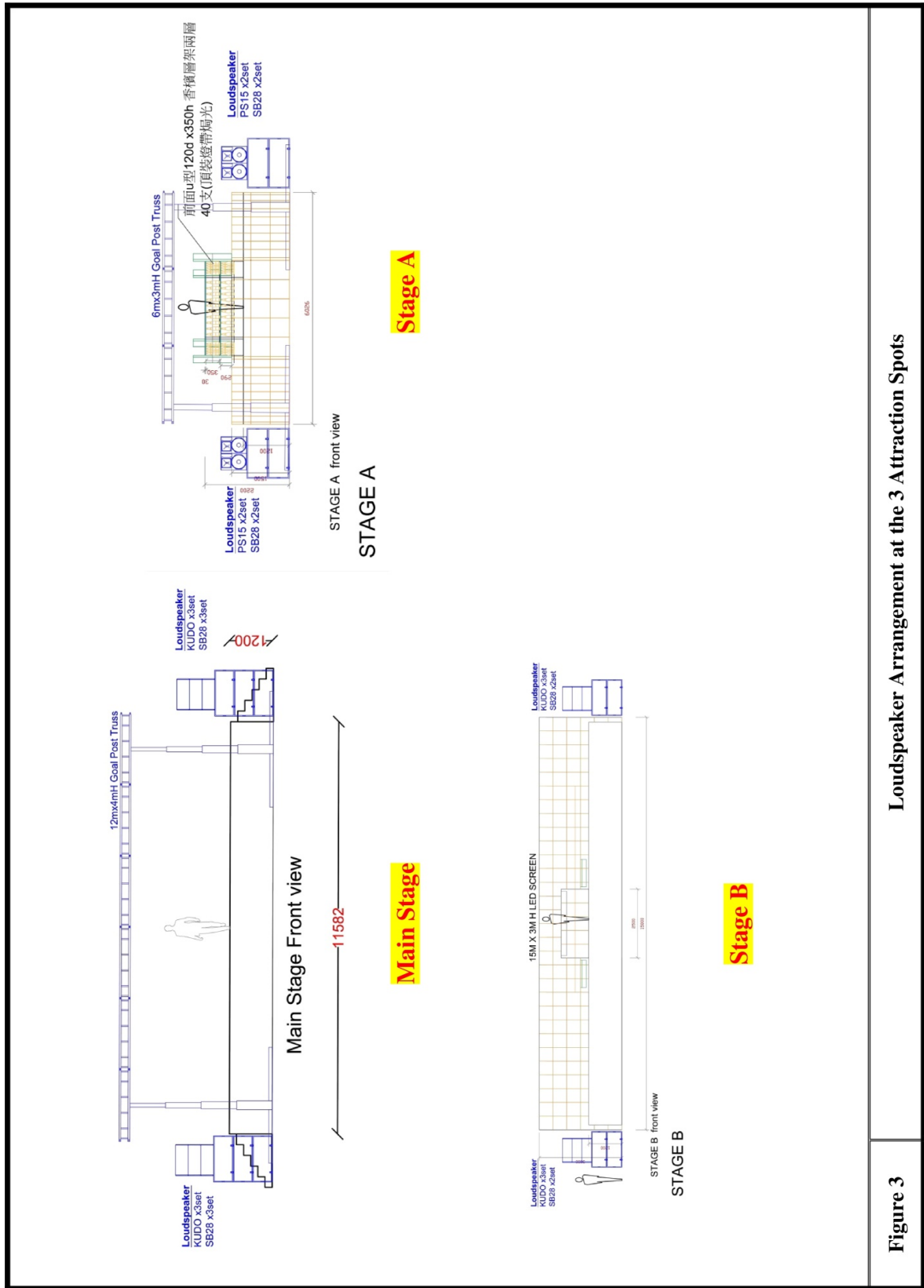


Figure 1 Location Plan of Representative Noise Sensitive Receivers near The Summit (Fixed Plant and Entertainment Noise)



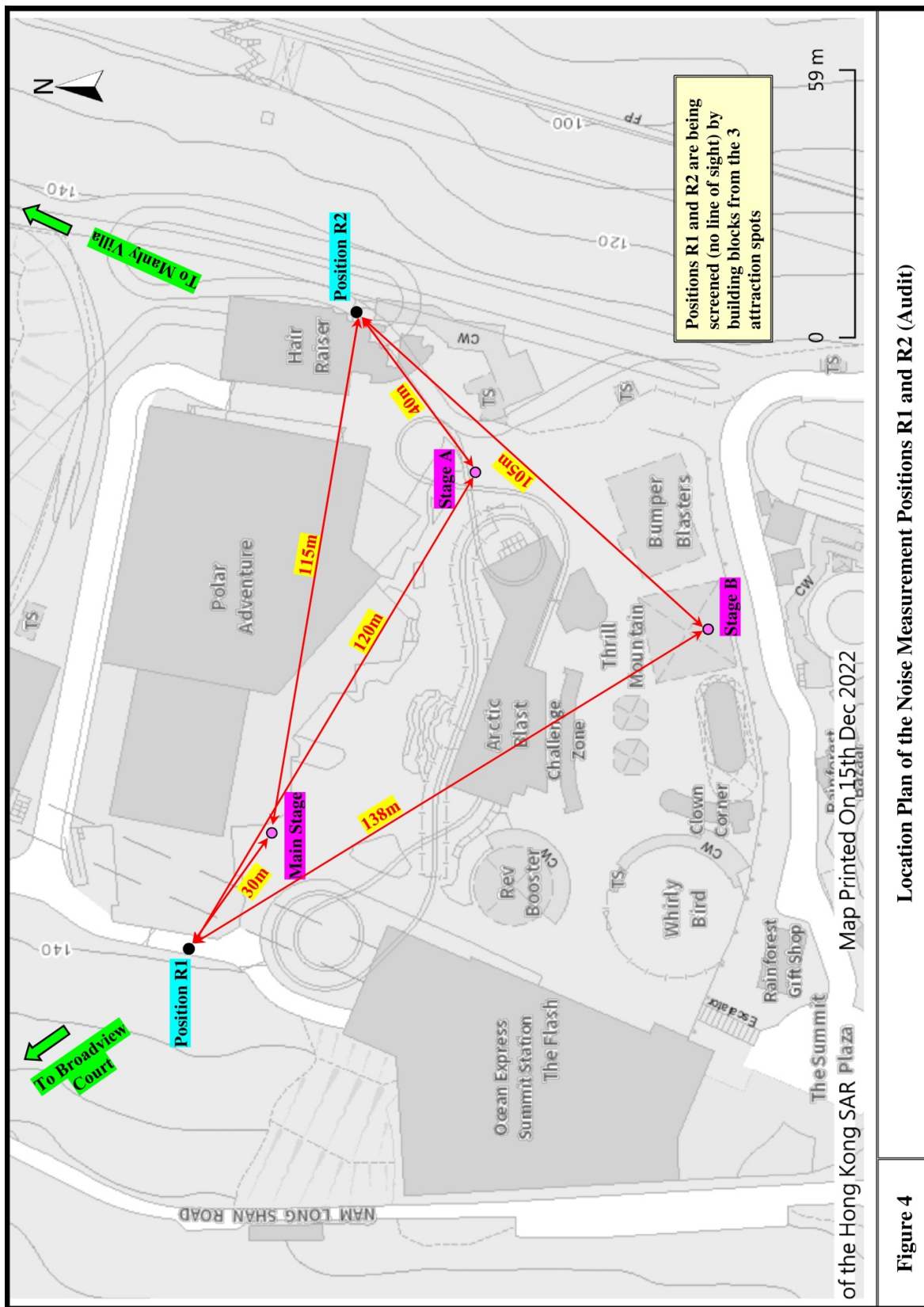
Location Plan of the Temporary Outdoor Attraction Facilities Spots (Summit)

Figure 2



Loudspeaker Arrangement at the 3 Attraction Spots

Figure 3



Location Plan of the Noise Measurement Positions R1 and R2 (Audit)

Figure 4

Appendix I

Derivation of Commissioning Noise Limits for Loudspeaker Sources

20:00-23:00

Noise Sensitive Receiver (NSR)	NSR			Propagation	Ocean Park (Summit)					
	Fixed Plant Noise Assessment Criteria *	Total Predicted SPL (Normal Operation Source)	Allowable Net SPL (at NSR)	Distance (NSR to Attraction Spot)	Attraction Spot	Maximum Allowable SWL (at attraction spot)	Distance (Attraction Spot to Position R1 or R2)	Audit Position **	Commissioning Noise Limit	
	SPL _(NSR)	SPL _(Total)	SPL _(Net)	D		SWL _(Spot)	d	R1 or R2	R1	R2
	dB(A)	dB(A)	dB(A)	m	dB(A)	m	dB(A)	dB(A)		
BC1 (Broadview Court)	57	54	54.3	930	Main Stage	127	30	81	82	-
				1020	Stage A	128	120	70		
				1040	Stage B	128	138	69		
MV (Manly Villa)	54	54	44 ***	955	Main Stage	117	115	60	-	70
				950	Stage A	117	40	69		
				1020	Stage B	117	105	61		

Notes :

- SPL = Sound Pressure Level ; SWL = Sound Power Level
- * Extracted from Table 3.1e, Environmental Review Report (ERR) in May 2014
- ** under free field condition
- $SPL_{(Net)} = 10\log[10^{SPL_{(NSR)/10} - 10^{SPL_{(Total)/10}}$
 $SWL_{(Spot)} = SPL_{(Net)} - 3$ (Façade Reflection) - $10\log(3)$ (contribution at 1 attraction spot) + 10 (Barrier effect #) + $20\log(D) + 11$
 $SPL_{(i)} = SPL_{(Spot)} - 5$ (Barrier effect ▼) - $20\log(d) - 11$
[Where # No direct line of sight from NSR to Attraction Spots ; ▼ No direct line of sight from Position R1 or R2 to Attraction Spots (See Figures 1 and 4)]
- *** As $SPL_{(NSR)} = SPL_{(Total)} = 54$ dB(A), $SPL_{(Net)}$ is deliberately taken to be 44 dB(A) for the subsequent commissioning limit derivation
[Numerically 10 dB(A) below $SPL_{(NSR)}$ implies negligible contribution to $SPL_{(NSR)}$]

23:00-01:00

Noise Sensitive Receiver (NSR)	NSR			Propagation	Ocean Park (Summit)					
	Fixed Plant Noise Assessment Criteria *	Total Predicted SPL (Normal Operation Source)	Allowable Net SPL (at NSR)	Distance (NSR to Attraction Spot)	Attraction Spot	Maximum Allowable SWL (at attraction spot)	Distance (Attraction Spot to Position R1 or R2)	Audit Position **	Commissioning Noise Limit	
	SPL _(NSR)	SPL _(Total)	SPL _(Net)	D		SWL _(Spot)	d	R1 or R2	R1	R2
	dB(A)	dB(A)	dB(A)	m	dB(A)	m	dB(A)	dB(A)		
BC1 (Broadview Court)	54	47	53.0	930	Main Stage	126	30	80	81	-
				1020	Stage A	126	120	68		
				1040	Stage B	127	138	68		
MV (Manly Villa)	50	26	50.0	955	Main Stage	123	115	66	-	76
				950	Stage A	123	40	75		
				1020	Stage B	123	105	67		

Notes :

- SPL = Sound Pressure Level ; SWL = Sound Power Level
- * Extracted from Table 3.1e, Environmental Review Report (ERR) in May 2014
- ** under free field condition
- $SPL_{(Net)} = 10\log[10^{SPL_{(NSR)/10} - 10^{SPL_{(Total)/10}}$
 $SWL_{(Spot)} = SPL_{(Net)} - 3$ (Façade Reflection) - $10\log(3)$ (contribution at 1 attraction spot) + 10 (Barrier effect #) + $20\log(D) + 11$
 $SPL_{(i)} = SPL_{(Spot)} - 5$ (Barrier effect ▼) - $20\log(d) - 11$
[Where # No direct line of sight from NSR to Attraction Spots ; ▼ No direct line of sight from Position R1 or R2 to Attraction Spots (See Figures 1 and 4)]

Environmental Review Report (ERR) in May 2014

Table 3.1e Proposed Fixed Plant Noise Assessment Criteria during the Proposed Extended Opening Hours

NSR	Description	Noise Monitoring Location	Minimum Measured Noise Levels, during 09:00-10:00 hrs / 22:00-23:00 hrs, dB(A)	Fixed Plant Noise Assessment Criteria during 10:00 - 22:00 hrs ^(a) , dB(A)	Fixed Plant Noise Assessment Criteria, during 09:00-10:00 hrs / 22:00-23:00 hrs, dB(A), i.e. Minimum of [1] and [2]	Minimum Measured Noise Levels, during 23:00-01:00 hrs of the next day, dB(A)	Minimum Measured Noise Levels, during 08:00-02:00 hrs of the next day, dB(A)	IND-TM ANL-5, during 07:00-23:00 hrs/23:00-07:00 hrs of the next day, dB(A)	Fixed Plant Noise Assessment Criteria, during 23:00-01:00 hrs of the next day, dB(A), i.e. Minimum of [3] and [5]	Fixed Plant Noise Assessment Criteria, during 08:00-09:00/01:00-02:00 hrs of the next day, dB(A), i.e. Minimum of [4] and [5]
PTSI	Old Teaching Block (Police Training School)	NM1	66/62	60	60	61	66/63	60/50	50	60/50
SW2	Wong Chuk Hang San Wai	NM3	64/61	60	60	54	66/53	60/50	50	60/50
HA	The Hazelton									
CV2	Country Villa									
XC	Xanadu Court									
OR	Orchid Valley	NM5	56/55	55	55	50	55/45	60/50	50	55/45
HY	Hau Yau									
IV1	Island View	NM6	59/54	60	54	53	58/54	60/50	50	58/50
MV	Manly Villa	NM4	59/54	56	54	53	57/53	60/50	50	57/50
BC1	Broadview Court	NM8	57/57	62	57	54	53/52	65/55 ^(b)	54	53/52

Notes:

- (a) The noise criteria during 10:00 - 22:00 hrs are taken from Table 3.4 of the approved EIA Report.
(b) The Broadview Court is located within 100m from the industrial area.

Total Predicted SPL Estimation (Normal Operation Source)

BC1

Plant ID	Plant *	Location	Predicted SPL *, dB(A)	
			20:00-23:00	23:00-01:00
SF02	Split-type A/C unit	South Pole Spectacular	6	6
SF04	Split-type A/C unit	North Pole Encounter	15	15
SF05	AC plant	South Pole Spectacular	12	12
SF07	AC plant	North Pole Encounter	21	21
SF08	AC plant	Rainforest	22	22
SF09	Chiller	North Pole Encounter	26	26
SF10	Pump	North Pole Encounter	18	18
SF12	PA system	Rainforest	27	27
SF13	PA system	Thrill Mountain	34	34
SF14	PA system	Polar Adventure	33	33
N-R14	Arctic Blast	Polar Adventure	38	38
N-R17	Hair Raiser	Thrill Mountain	50	-
N-R13	Rev Booster	Thrill Mountain	46	46
N-R12	Whirly Bird	Thrill Mountain	34	34
N-R11	The Flash	Thrill Mountain	49	-
N-R15	Bumper Blasters	Thrill Mountain	22	22
N-R16	The Rapids	Rainforest	28	28
Total Predicted SPL at BC1 , $SPL_{(Total)} =$			54	47

Notes : * Extracted from Annex C10, Environmental Review Report (ERR)

Total Predicted SPL Estimation (Normal Operation Source)

MV

Plant ID	Plant *	Location	Predicted SPL *, dB(A)	
			20:00-23:00	23:00-01:00
-	All rides	Whiskers Harbour	47	-
LN-R7	Sea Life Carousel	Aqua City	46	-
WF01	PA system	Whiskers Harbour	45	-
WF02	PA system	Bird of Paradise	43	-
WF03	PA system	Amazing Asian Animals	39	-
WF04	PA system	Entry Plaza	35	-
WF05	PA system	Aqua City	47	-
WF06	Split-type A/C unit	Coral Building	33	-
WF07	Split-type A/C unit	East Retail at Entry Plaza	32	-
WF08	Split-type A/C unit	West Retail at Entry Plaza	30	-
WF09	Split-type A/C unit	The Grand Aquarium	31	-
WF10	Split-type A/C unit	The Hong Kong Jockey Club Sichuan Treasures	29	-
WF11	Split-type A/C unit	New Birds House	24	-
WF12	Split-type A/C unit	Amazing Bird Theatre	32	-
WF13	Split-type A/C unit	Old Hong Kong	26	-
WF14	Split-type A/C unit	Panda Café	29	-
WF15	Split-type A/C unit	Giant Panda Adventure and Panda Village	22	-
WF16	Split-type A/C unit	Annex Administration Building	22	-
WF17	Split-type A/C unit	Administration Building	34	-
WF18	Pump Cluster	The Hong Kong Jockey Club Sichuan Treasures	31	-
WF19	AC plant	West Retail at Entry Plaza	34	-
WF20	AC plant	East Retail at Entry Plaza	34	-
WF21	AC plant cluster	The Grand Aquarium	21	-
WF22	AC plant	The Hong Kong Jockey Club Sichuan Treasures	39	-
WF23	AC plant	Old Hong Kong	28	-
WF24	AC plant	Panda Café	38	-
WF25	AC plant cluster	Old Warehouse & CPU	16	-
WF26	Cooling tower	The Grand Aquarium	42	-
WF27	Compressor	West Retail at Entry Plaza	16	-
WF28	Chiller	The Grand Aquarium	40	-
WF29	Chiller	Giant Panda Adventure and Panda Village	26	-
WF30	Fan Room	West Retail at Entry Plaza	22	-
WF31	Ventilation fan	The Hong Kong Jockey Club Sichuan Treasures	33	-
WF32	Ventilation fan	West Retail at Entry Plaza	27	-
WF33	Ventilation fan	New Bird House	21	-
WF34	Ventilation fan	Amazing Bird Theatre	28	-
WF35	Ventilation fan	Panda Café	38	-
WF36	Machine plant	Ocean Express Station (Waterfront)	26	26
WF37	Machine Plant	Cable Car Station	31	-
LN-A11	Sky Fair Plaza Performance Venue	Aqua City	39	-
Total Predicted SPL at MV , $SPL_{(Total)} =$			54	26
Notes : * Extracted from Annex C10, Environmental Review Report (ERR)				

Appendix II

Calibration Certificates



ATSL 聲學測試服務有限公司
Acoustic Testing Services Limited

Unit E, 2/F., Century Industrial Centre, 33-35 Au Pui Wan Street, Fo Tan, Shatin, New Territories, Hong Kong
Tel: (852) 2690 9126 Fax: (852) 2690 9125 E-mail: info@ATSL.com.hk http://www.ATSL.com.hk

Certificate of Calibration

Certificate No. ATS22-008-CC003

Customer: **Aeolian View Consultants**
Flat 23E, 23/F., Block 1, Kingley Industrial Building,
35 Yip Kan Street, Wong Chuk Hang,
Hong Kong

Unit-under-test (UUT):

Description:	Sound Analyzer	, Microphone	, Pre-amplifier
Manufacturer:	NTi Audio		
Type No.:	XL2-TA	, MC230	, MA220
Serial No.:	A2A-08670-E0	, 9422	, 5045

Conditions during calibration:

Temperature:	26°C
Relative Humidity:	58%

Test Specifications: Calibration Check

Date of calibration: 13 June 2022

Calibration Results: All calibration points are within manufacturer's specification.

Certified by:  
Mr. Y. P. LEUNG / Technical Manager
MIOA, MHKIOA, MHKIQEP

Issue Date: 14 June 2022

Certificate No.: ATS22-008-CC003 Page 1 of 3



Unit E, 2/F., Century Industrial Centre, 33-35 Au Pui Wan Street, Fo Tan, Shatin, New Territories, Hong Kong
Tel: (852) 2690 9126 Fax: (852) 2690 9125 E-mail: info@ATSL.com.hk http://www.ATSL.com.hk

1. The instrument under test was allowed to stabilize in the laboratory for over 24 hours.

2. Calibration equipment

Description:	Acoustical Calibrator
Manufacturer:	Brüel & Kjær
Type No.:	4226
Serial No.:	2919264
Last Calibration Date:	20 August 2021
Certificate No.:	2HB21001798-0001

The calibration equipment used for calibration is traceable to National Standards via China Ceprei Laboratory Calibration & Testing Centre.

3. The Sound Analyzer has been calibrated in accordance with the requirements as specified in IEC 61672 Class 1, and vendor specific procedures.

4. The values given in this certification only related to the values measured at the time of the calibration and any uncertainties quoted will not allowance for the equipment long-term drift, variations with environmental changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the calibration. Acoustic Testing Services Limited shall not be liable for any loss or damage resulting from the use of the equipment.

Certificate No.: ATS22-008-CC003



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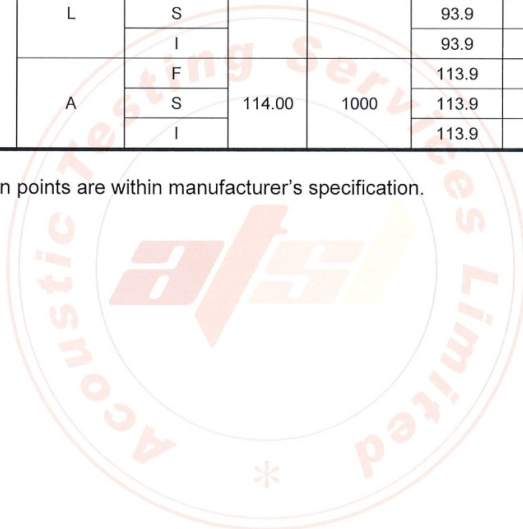


Unit E, 2/F., Century Industrial Centre, 33-35 Au Pui Wan Street, Fo Tan, Shatin, New Territories, Hong Kong
 Tel: (852) 2690 9126 Fax: (852) 2690 9125 E-mail: info@ATSL.com.hk http://www.ATSL.com.hk

5. Calibration Results

Setting of unit-under-test (UUT)				Applied value		UUT Reading, dB	IEC 61672-1 Class 1 Tolerance Limits, dB	Conclusion		
Range, dB	Parameter	Frequency Weighting	Response	Level, dB	Frequency, Hz					
20-120	SPL	A	F	94.00	1000	93.9	± 0.7	PASS		
			S			93.9	± 0.7	PASS		
			I			93.9	± 0.7	PASS		
		C	F			93.9	± 0.7	PASS		
			S			93.9	± 0.7	PASS		
			I			93.9	± 0.7	PASS		
		L	F			93.9	± 0.7	PASS		
			S			93.9	± 0.7	PASS		
			I			93.9	± 0.7	PASS		
		A	F			114.00	1000	113.9	± 0.7	PASS
			S					113.9	± 0.7	PASS
			I					113.9	± 0.7	PASS

All calibration points are within manufacturer's specification.



Certificate No.: AT522-008-CC003



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Certificate of Calibration

Certificate No. ATS22-008-CC001

Customer: **Aeolian View Consultants**
Flat 23E, 23/F., Block 1, Kingley Industrial Building,
35 Yip Kan Street, Wong Chuk Hang,
Hong Kong

Unit-under-test (UUT):

Description:	Sound Analyzer	,	Microphone	,	Pre-amplifier
Manufacturer:	Svantek	,	BSWA	,	Svantek
Type No.:	Svan-959	,	231	,	SV 12L
Serial No.:	11238	,	540602	,	73661


Conditions during calibration:

Temperature: 22°C
Relative Humidity: 58%

Test Specifications: Calibration Check

Date of calibration: 09 February 2022

Test Results: All calibration points are within manufacturer's specification.

Certified by: 
Mr. Y. F. LEUNG
MIOA, MHKIOA, MHKIQEP



Issue Date: 09 February 2022

Certificate No.: ATS22-008-CC001

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1. The instrument under test was allowed to stabilize in the laboratory for over 24 hours.

2. Calibration equipment

Description: Acoustical Calibrator
Manufacturer: Brüel & Kjær
Type No.: 4231
Serial No.: 2478237
Last Calibration Date: 13 April 2021
Certificate No.: AV210055

The test equipment used for calibration is traceable to National Standards via Standards and Calibration Laboratory, the Government of the HKSAR.

3. The sensitivity of the microphone has been adjusted by the calibration function of the Sound Analyzer (calibrated as 94.0dB at 1000Hz) before the calibration. And the adjusted sensitivity was recorded.

Adjusted Microphone Sensitivity (mV/Pa)	32.32
-----------------------------------------	-------

4. The Sound Analyzer has been calibrated in accordance with the requirements as specified in IEC 61672 Class 1, and vendor specific procedures.

5. The values given in this certification only related to the values measured at the time of the calibration and any uncertainties quoted will not allowance for the equipment long-term drift, variations with environmental changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the calibration. Acoustic Testing Services Limited shall not be liable for any loss or damage resulting from the use of the equipment.



Certificate No.: AT22-008-CC001

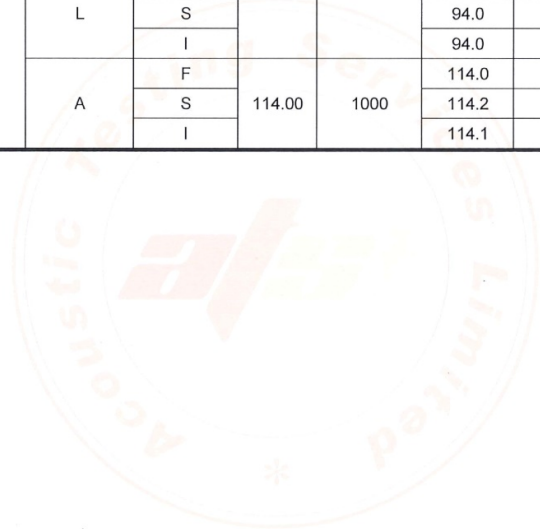
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6. Calibration Results

Setting of unit-under-test (UUT)				Applied value		UUT Reading, dB	IEC 61672-1 Class 1 Tolerance Limits, dB	Conclusion
Range, dB	Parameter	Frequency Weighting	Response	Level, dB	Frequency, Hz			
20-120	SPL	A	F	94.00	1000	94.0	± 0.7	PASS
			S			94.0	± 0.7	PASS
			I			94.0	± 0.7	PASS
		C	F			94.0	± 0.7	PASS
			S			94.0	± 0.7	PASS
			I			94.0	± 0.7	PASS
		L	F			94.0	± 0.7	PASS
			S			94.0	± 0.7	PASS
			I			94.0	± 0.7	PASS
		A	F	114.00	1000	114.0	± 0.7	PASS
			S			114.2	± 0.7	PASS
			I			114.1	± 0.7	PASS



Certificate No.: AT22-008-CC001

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Certificate of Calibration

Certificate No. ATS22-008-CC002

Customer: **Aeolian View Consultants**
Flat 23E, 23/F., Block 1, Kingley Industrial Building,
35 Yip Kan Street, Wong Chuk Hang,
Hong Kong

Unit-under-test (UUT):

Description: Acoustic Calibrator
Manufacturer: Svantek
Type No.: SV-30A
Serial No.: 7441

Conditions during calibration:

Temperature: 22°C
Relative Humidity: 58%

Test Specifications: Calibration Check

Date of calibration: 09 February 2022

Test Results: All calibration points are within manufacturer's specification.

Certified by: 
Mr. Y.T. LEUNG
MIOA, MHKIOA, MHKIQEP



Issue Date: 09 February 2022

Certificate No.: ATS22-008-CC002

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 Tel: (852) 2690 9126 Fax: (852) 2690 9125 E-mail: info@ATSL.com.hk http://www.ATSL.com.hk

1. The instrument under test was allowed to stabilize in the laboratory for over 24 hours.

2. Calibration equipment

Description:	Sound Analyzer	Reference Microphone
Manufacturer:	Brüel & Kjær	Brüel & Kjær
Type No.:	2270	4189
Serial No.:	3029788	3037051
Last Calibration Date:	24 August 2021	24 August 2021
Certificate No.:	AV210161	AV210161

The test equipment used for calibration is traceable to Standards and Calibration Laboratory, the Government of the HKSAR.

3. Calibration Results

Nominal value dB	Measured value dB	Expanded Measurement Uncertainty of Reference Microphone B&K 4189 at 1000 Hz dB
94.00	94.0	0.2
114.00	114.0	0.2



Certificate No.: AT22-008-CC002

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Appendix III

Mock-up Noise Measurement Photos



Photo A1 : Measurement Position R1

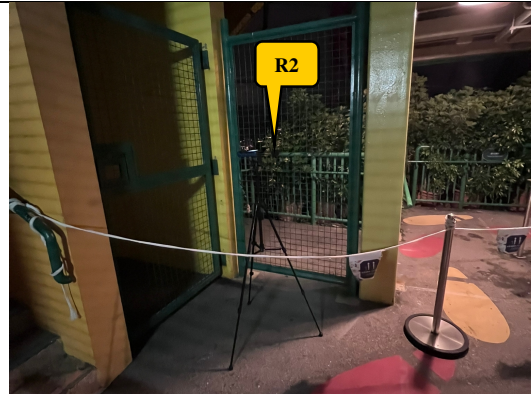


Photo A2 : Measurement Position R2



Photo A3 : Loudspeaker setup at Main Stage



Photo A4 : Loudspeaker setup at Stage A



Photo A5 : Loudspeaker setup at Stage B

