Hong Kong Disneyland

Fireworks Dress Rehearsal Air and Noise Monitoring Results

EXECUTIVE SUMMARY

INTRODUCTION

1. This Executive Summary presents the results of the one-night testing of 24-hour RSP and noise for the fireworks dress rehearsal for the period between 4th and 8th August 2005. The monitoring was conducted in response to the request from Environmental Protection Department (EPD) following the Advisory Council on the Environment (ACE) consultation meeting on 11th July 2005.

BACKGROUND

2. In accordance with the requirements stated in Section 3.1 of the Environmental Permit (FEP-01/059/2000 and EP-01/059/2000/A), the results of the trial fireworks displays and associated air quality and noise monitoring data were submitted to ACE for consultation on 11th July 2005.

3. Following the consultation meeting on 11th July 2005, the ACE has commented that the monitoring data for the trial fireworks display were generally valid (EPD's letter dated 23 July 05 (re: ( ) in Ax(8) to EP2/N9/O/65)). However, in their views there were some gaps in the monitoring data, in particular, the Respirable Suspended Particulates (RSP) and noise levels. To address ACE's concerns, the Environmental Protection Department (EPD) required that an enhancement to the monitoring programme be made prior to the commencement of the operation of the park.

4. In response to the request from the EPD on 23rd July 2005, a subset of the operational monitoring has been brought forward for monitoring one-night of the fireworks dress rehearsal for the period between 4th and 8th August 2005. In addition, to help guide the creative process of the fireworks display, noise monitoring was also conducted on 3rd August 2005. A method statement for the one-night testing was submitted to the EPD on 27 July 2005 and was agreed by the EPD on 29 July 2005. The methodology as presented in the agreed method statement was adopted. The data presented is for the agreed locations for the Maximum Night. The Maximum Night, namely 8th August 2005, is the night in which the highest noise levels were recorded at the agreed locations during the three nights of monitoring for air and noise.

5. In view of the time constraints to gather one-night of a complete set of monitoring data for consultation with ACE prior to the commencement of the operation of the park, a redundant High Volume Sampler (HVS) was setup at each of the agreed monitoring locations and 24-hour RSP sampling were undertaken during the rest of the fireworks dress rehearsal period between 4th and 7th August 2005. Also, additional noise monitoring locations and monitoring days were conducted to ensure one-night of complete set of monitoring data are gathered. The results of the additional RSP and noise monitoring are presented in *Attachment A* and *B*, respectively. For clarification, we note that there were no fireworks shows on the 5th and 6th August 2005.

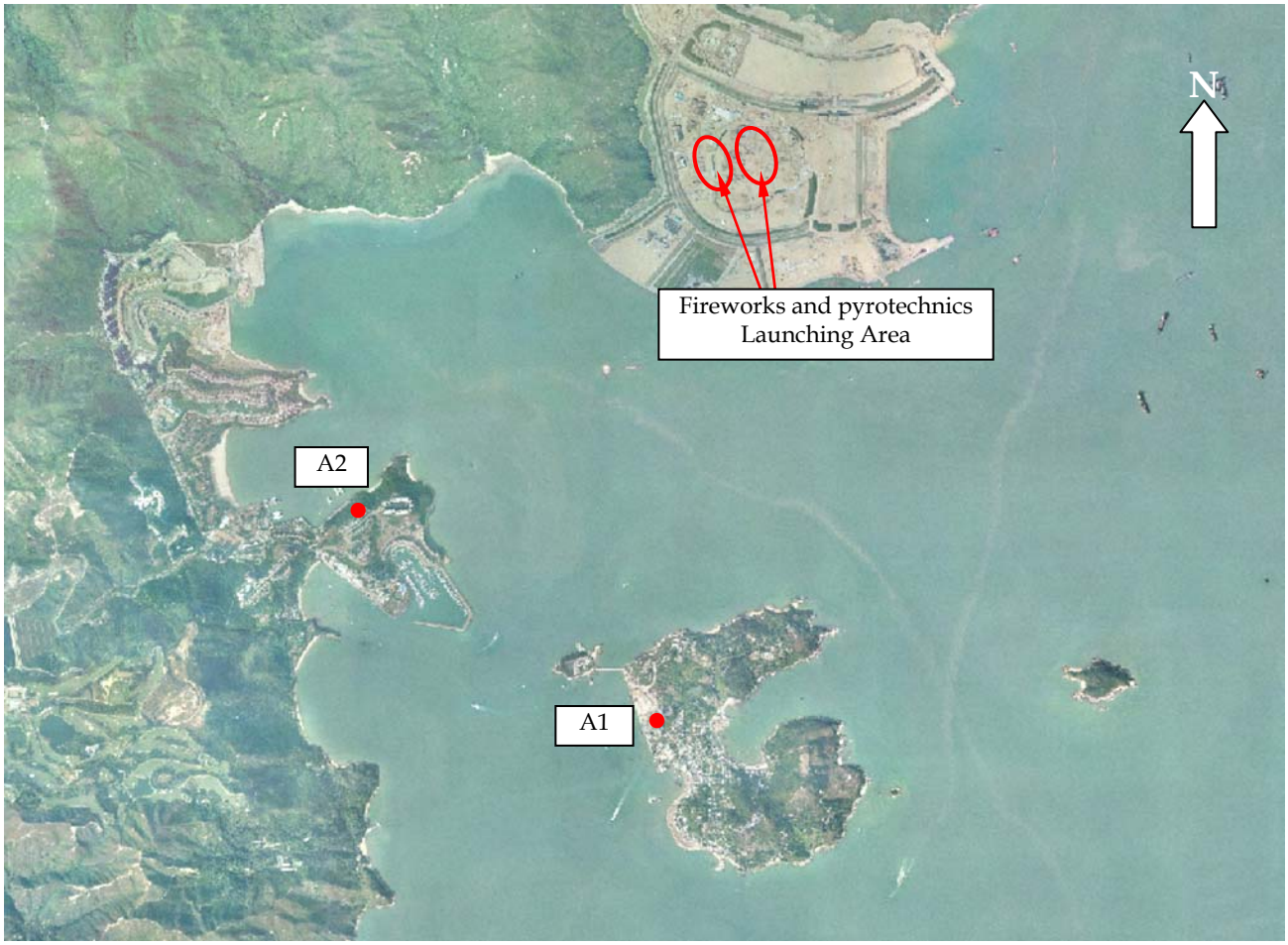
24-hour RSP MONITORING

6. 24-hour RSP concentrations were measured during the fireworks dress rehearsal. Levels were measured at two representative Air Sensitive Receivers nearest to the Theme Park. The sampling locations are shown in *Figure 1*.

Table 1 Sampling Locations

Sampling Location		Description
AIR1	Rooftop of Peng Lai Court in Peng Chau	A 5 to 6 storey high building, located approximately 2.8km from the main launch area
AIR2	Rooftop of Crestmont Villa Management Office in Discovery Bay	A single storey high building, located approximately 2.7km from the main launch area

Figure 1 Air Quality Sampling Locations



7. The highest measured RSP concentrations measured on the Maximum Night, 8th August 2005, was 26 µg m^{-3} and is well below the statutory RSP criterion of 180µgm^{-3}.

8. In view of the time constraints to gather one-night of a complete set of monitoring data for consultation with ACE, additional RSP sampling was also conducted on 4th and 7th August 2005. The measured RSP concentrations on both days were low and well below the statutory RSP criterion of 180 µgm^{-3}(see *Attachment A*).

9. The monitoring results validate the EIA prediction that the fireworks program will not cause a significant air quality impact to the ASRs.

NOISE MONITORING

10. Noise monitoring was conducted for one-night during the fireworks dress rehearsal period between 4th and 8th August 2005. For the creative process, the noise monitoring The noise

monitoring was conducted at representative noise monitoring locations within Peng Chau and Discovery Bay, which are the nearest Noise Sensitive Receivers to the theme park. The monitoring locations are listed in *Table 2* and are shown in *Figure 2*.

Table 2 Sampling Locations

Monitoring Location		Description
NOISE1	Tai Lei, Peng Chau	Located approximately 2.7 km from the main launch area. Façade measurement location was set at 1.2 m above the ground level.
NOISE2	Rooftop of Cherish Court, Discovery Bay	Located approximately 2.4 km from the main launch area. Façade measurement location was set at rooftop of Cherish Court approximately 53 m above the ground level.

11. Façade noise measurements were carried out at the two agreed monitoring locations using sound level meters and calibrators in compliance with the IEC 651: 1979 and 804:1985 (Type 1) specifications. The microphone was positioned at 1m from a façade, which has a direct line of sight to the theme park perimeter. Noise monitoring was conducted with reference to the calibration and measurement procedures as stated in the *Technical Memorandum for the Assessment of Noise from Places other than Domestic Premises, Public Places or Construction Sites*.

Figure 2 Noise Monitoring Locations

12. A $L_{Aeq,\ 15\ minute}$ noise measurement was made starting from the start of the firework display. Ambient noise levels of at least 15 minutes were also measured prior to and immediately after the 15 minutes firework measurement period for establishing the average background noise level. The

noise measurement was conducted in accordance with the agreed monitoring methodology and any significant extraneous influences on the measured noise levels were taken into account in accordance with standard acoustical principles and practices. The monitoring results are summarised in *Table 3*.

Table 3 Monitoring Results – 8th August 2005 ($L_{eq, 15\ min}$ dB(A))

	Tai Lei, Peng Chau	**Cherish Court, Discovery Bay**
Corrected Fireworks Noise Levels	**48.8**	**53.0**
Noise Criterion ($L_{eq, 15min}$)	**55**	**55**

13. The measured results indicated that the corrected fireworks noise levels at all monitoring locations complied with the stipulated noise criterion of $L_{eq, 15\ min}$ 55 dB(A). No significant extraneous noise sources were recorded during the measurement period at the monitoring locations.

14. In view of the time constraints to gather one-night of a complete set of monitoring data for consultation with ACE, additional noise monitoring was also conducted at three additional monitoring locations on 4th and 7th August 2005. In addition, to help guide the creative process of the fireworks display, noise monitoring was also conducted on 3rd August 2005. The measured noise levels show compliance with the stipulated noise criterion of $L_{eq, 15\ min}$ 55 dB(A) at all locations at all nights (see *Attachment B*).

ATTACHMENT A: 24-HOUR RSP MONITORING RESULTS

In view of the time constraints to gather one-night of a complete set of monitoring data for consultation with ACE, additional 24-hour RSP monitoring were also conducted during the fireworks dress rehearsal on 4th and 7th August 2005. The measurement results are summarized in *Table A.1*.

Table A.1 Summary of Measured 24-hour RSP Monitoring Results in Peng Chau and Discovery Bay

Sampling Location		**24-hour RSP Results (μg m^{-3})**		
		4th Aug	**7th Aug**	**8th Aug**
Peng Chau	Sample 1	32	24	26 (1)
	Sample 2	33	22	26
Discovery Bay	Sample 3	28	18	20
	Sample 4	32	18	21 (1)
AQO Criterion			**180**	

(1) The shaded results represent the results for the Maximum Night for the agreed monitoring locations.

Furthermore, by comparing with the EPD's monitoring data at Tap Mun, Tung Chung and Central/Western (see *Table A.2*), the additional RSP concentrations measured on 4th and 7th August were comparable to 24-hour RSP concentrations measured within Hong Kong.

Table A.2 Summary of 24-hour RSP Concentrations Measured at EPD Air Quality Monitoring Stations

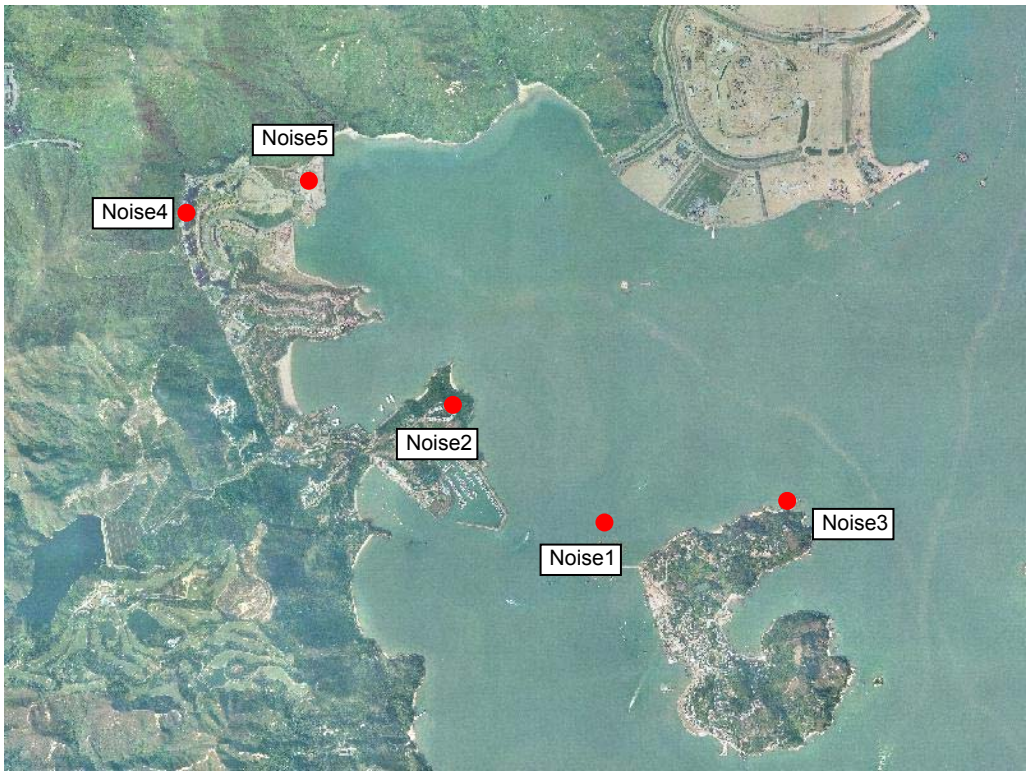
EPD AQMS	**Background 24-hour RSP Results (μg m^{-3})** (a)	
	4th Aug	**7th Aug**
Tap Mun	31	26
Tung Chung	33	18
Central/Western	28	16

Note:
(a) Mean of 24 hourly RSP data obtained from EPD website (www.epd.gov.hk)

The results indicated that the measured 24-hour RSP concentrations were low and well below the AQO criterion of 180 μgm^{-3}.

Three additional monitoring locations were identified for the noise monitoring for the fireworks dress rehearsal display, namely Peng Chau Radio Transmission Station (NOISE3), Rooftop of Greenwood Court, Discovery Bay (NOISE4) and Renovated Building at Sam Pak Wan, Discovery Bay (NOISE5). The monitoring locations are shown in *Figure B1*.

Figure B1 ***Noise Monitoring Locations***



1.1 *NOISE MONITORING*

The monitoring results conducted indicated that the firework noise levels at all monitoring locations at all nights complied with the stipulated noise criterion of $L_{eq, 15\ min}$ 55 dB(A). In addition, the monitoring results confirmed that Cherish Court is a representative NSR within Discovery Bay for the purpose of firework noise monitoring.

Table B1 Monitoring Results ($L_{eq, 15\ min}$ dB(A))

	Tai Lei, Peng Chau				Cherish Court, DB				Peng Chau Radio Transmission Station				Greenwood Court, DB				Building at Sam Pak Wan, DB			
	3 Aug	**4 Aug**	**7 Aug**	**8 Aug**	**3 Aug**	**4 Aug**	**7 Aug**	**8 Aug**	**3 Aug**	**4 Aug**	**7 Aug**	**8 Aug**	**3 Aug**	**4 Aug**	**7 Aug**	**8 Aug**	**3 Aug**	**4 Aug**	**7 Aug**	**8 Aug**
Ambient measurement before	46.8	51.7	42.8	47.9 (2)	51.7	52.8	53.7	54.0 (2)	52.0	51.7	52.2	51.9	53.9	53.3	55.2	53.3	43.6	43.0	52.2	46.9
Ambient measurement after	45.7	51.2	44.2	49.6 (2)	53.0	52.9	52.7	55.1 (2)	52.6	51.2	52.1	52.6	52.6	53.8	52.2	53.0	44.2	42.6	49.1	50.5
Averaged Background Noise Levels	46.3	51.5	43.6	48.8 (2)	52.4	52.9	53.2	54.6 (2)	52.3	51.5	52.2	52.3	53.3	53.6	54.0	53.2	43.9	42.8	50.9	49.1
$L_{eq, 15min}$ measurement during the fireworks displays	46.3	52.2	46.6	51.8 (2)	55.7	54.4	54.5	56.9 (2)	53.4	52.2	53.7	53.8	51.0	52.6	54.7	53.8	45.2	44.4	53.0	50.2
Corrected Fireworks Noise Levels	**<46.3** (1)	**43.9**	**43.7**	**48.8** (2)	**52.9**	**49.2**	**48.7**	**53.0** (2)	**47.0**	**43.9**	**48.3**	**48.7**	**<51.0** (1)	**<52.6** (1)	**46.7**	**44.8**	**39.3**	**39.4**	**48.8**	**43.6**
Noise Criterion ($L_{eq, 15min}$)	**55**	**55**	**55**	**55**	**55**	**55**	**55**	**55**	**55**	**55**	**55**	**55**	**55**	**55**	**55**	**55**	**55**	**55**	**55**	**55**

Note:

(1) The noise levels during the fireworks displays are equal to or lower than the averaged background noise levels. Hence, the actual corrected fireworks noise levels cannot be calculated.

(2) The shaded results represent the results for the Maximum Night for the agreed monitoring locations.