

Kowloon Southern Link – KDB300 and KDB400 Tunnels, Jordan Road to Nam Cheong Station Overrun

Baseline Monitoring Report

July 2007

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Certified by Environmental Team Leader
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Executive Summary

KCRC has awarded the Kowloon Southern Link Contracts KDB300 & KDB400 Tunnels, Jordan Road to Nam Cheong Station Overrun (hereafter referred to as the “Project”) to China State Construction Engineering Corporate (CSCE). CSCE has appointed Hyder Consulting Limited (HCL) as the Environmental Team (ET) to undertake the Environmental Monitoring and Audit (EM&A) works in accordance with the contract specific EM&A Manual.

In accordance with the contract specific EM&A Manual, a total of three designated air quality monitoring locations (AM4a, AM5 and AM6) and four designated noise monitoring locations (NM4, NM4a, NM5 and NM6). Due to the site constraints for setting up the monitoring equipment, AM4a and NM4a are the alternative locations of AM4 and NM4 for the air quality monitoring and continuous noise monitoring respectively.

The contract specific baseline monitoring could not be undertaken by the ET before the commencement of the construction works of the Project because the access to the designated monitoring locations was not confirmed at that stage. The baseline monitoring data from KCRC project-wide baseline monitoring which was conducted by Ove Arup & Partners Hong Kong Ltd. (OAP) from June to August 2005 has been adopted for the preparation of this contract specific baseline monitoring report.

The baseline environmental monitoring for the Project was conducted between 25 June and 9 August 2005 at these locations except AM6 and NM6. Baseline environmental monitoring for AM6 and NM6 was conducted during Sundays and public holidays from 25 March 2007 to 27 May 2007 upon the completion of construction works of Olympian City Phase III (Harbour Green). Air quality was recorded in terms of 1-hr and 24-hr Total Suspended Particulates (TSP), and noise was measured in terms of L_{eq} dB(A) with L_{10} and L_{90} measurements as reference. The weather conditions during the baseline monitoring period was mainly sunny and fine, with occasional rainfall events.

The 1-hr TSP was ranged from 41.0 to 253.9 $\mu\text{g}/\text{m}^3$, with the lowest level of 1-hr TSP recorded on 7 April 2007 at AM6 (Harbour Green) and with the highest level of 1-hr TSP recorded on 8 August 2005 at AM4a (Man Cheong Street Refuse Collection Point). The 24-hr TSP levels were ranged from 17.8 to 157.2 $\mu\text{g}/\text{m}^3$ with the lowest level of 24-hr TSP recorded on 1 July at AM5 and the highest level of 24-hr TSP recorded on 13 May 2007 at AM6.

Baseline noise monitoring was conducted during daytime (0700 to 1900 hours), evening time (1900 to 2300 hours) and night time (2300 to 0700 hours). The highest noise level was recorded at NM6 (Harbour Green) and the lowest noise level was recorded at NM5 during the period of 2300 to 0700 hours. The measured noise levels on weekdays were presented separately from public holidays & Sundays, except for NM6, for easy reference.

The proposed Action/Limit (A/L) Levels for air quality monitoring for each monitoring location were derived from the baseline monitoring data and these will be adopted for impact monitoring during the construction stage of the Project.

The proposed Action/Limit levels for noise monitoring are based on the EIA predicted noise levels and are made reference to Appendix D2 of EM&A Guidelines for Development Projects in Hong Kong.

1 Introduction

A 3.8km new underground railway line (thereafter called “Kowloon Southern Link” or KSL) would be constructed to connect the KCRC East Tsim Sha Tsui (TST) Station to the West Rail (WR) Nam Cheong (NAC) Station, with its alignment running under Salisbury Road, Canton Road and the West Kowloon Reclamation area. It is expected that the KSL would improve the accessibility to and lessen the traffic congestions at TST and West Kowloon districts. The civil construction works for the KSL are split into three design-and-build contracts namely KDB200, KDB300 and KDB400.

The Kowloon Southern Link (KSL) project is a Category ‘A’ Designated Project (DP) under Schedule 2 and Part 1 of the Environmental Impact Assessment Ordinance (EIAO). Pursuant to the EIAO, the KCRC applied for an Environmental Permit (EP) with the submission of the Environmental Impact Assessment (EIA) report “Kowloon Southern Link, January 2005” (Register No. AEIAR-083/2005). Along with the EIA report submission, KCRC also prepared the Environmental Monitoring and Audit Manual (the Project-wide EM&A Manual) which outlines the recommended EM&A requirements and programme for the entire alignment of KSL.

The Environmental Permit (EP) to construct and operate the KSL has issued to KCRC and Further Environmental Permits (FEPs) have been issued to China State Construction Engineering Corporation (CSCE) who has been awarded the construction contracts KDB300 and KDB400.

CSCE has appointed Hyder Consulting Limited (HCL) as the Contractor’s Environmental Team (ET) for these two contracts during the construction period. The construction contracts KDB300 and KDB400 commenced in August 2005 and the total construction period is approximately 40 months.

2 The Purposes of the Report

An environmental baseline monitoring for air quality (1-hr and 24-hr TSP) and noise was undertaken in accordance with the contract specific Environmental Monitoring & Audit (EM&A) Manual. The purpose of this report is to summarise the findings of this baseline monitoring and to establish the compliance levels for the subsequent environmental impact monitoring during construction stage. Other than this introductory section, the report will provide information on monitoring methodology, monitoring results, derivation of Action and Limit (A/L) Levels, and conclusions.

The contract specific baseline monitoring could not be undertaken by the ET before the commencement of the construction works of the Project because the access to the designated monitoring locations was not confirmed at that stage. The baseline monitoring data from KCRC project-wide baseline monitoring which was conducted by Ove Arup & Partners Hong Kong Ltd. (OAP) from June to August 2005 has been adopted for the preparation of this contract specific baseline monitoring report.

3 Baseline Monitoring Methodology

According to the requirements given in the approved KSL EIA Report and contract specific EM&A Manual, 24-hour and 1-hour TSP and construction noise should be monitored at 3 locations. The baseline monitoring lasted for a duration of at least 14 days at all of the 3 monitoring locations.

The baseline environmental monitoring for the Project was conducted between 25 June and 9 August 2005 at these locations except AM6 and NM6 since Olympian City Phase III (Harbour Green) was under construction. Baseline environmental monitoring at AM6 and NM6 was carried out after the completion of construction works of Harbour Green in March 2007. Due to the existing KSL construction works, baseline monitoring for AM6 and NM6 was conducted on Sundays and public holidays only from 25 March 2007 to 27 May 2007 when there was no construction works in the vicinity of the monitoring station in order to ensure the baseline monitoring were not affected by any construction activities.

3.1 Air Quality

3.1.1 Methodology, Monitoring Parameter and Equipment

Baseline monitoring was conducted for both 1-hr and 24-hr TSP using a direct reading meter (MIE Data-RAM Portable Real Time Aerosol Monitor) and a high volume sampler (HVS) according to Title 40 of the Code of Federal Regulations, USA, Chapter 1 (Part 50) Appendix B respectively. The methodology for air quality monitoring followed that described in the EM&A Manual. Table 3-1 shows the equipment list for baseline air quality monitoring.

Equipment	Manufacturer & Model No.	Measurement Parameter	Qty.
High Volume Sampler	TE-5170	24-hour TSP	2
High Volume Sampler	GBM2000H1		1
HVS Calibration Kit	GMW-2535		2
Photometric Aerosol Monitor	MIE <i>persona</i> /DataRAM	1-hour TSP	2
Hand Held Barometer	Cole-Parmer EB833	Pa, Temperature	1

Note:

- Both 1-hr TSP and 24-TSP monitoring at AM6 were carried out using HVS.

Table 3-1 Equipment List for Baseline Air Quality Monitoring

1-hour TSP Monitoring

The procedure for 1-hour TSP monitoring at AM4a and AM5 is described as follows:

- The MIE monitor was switched on by pressing the ON/OFF button. The NEXT button was pressed to select Run or Ready mode.
- The NEXT button was pressed subsequently to check the following settings:
 - i Data logging function: on
 - ii Log period: 5 minutes
 - iii Tag number: storage
 - iv Analogue output: 0-4.000mg/m³
 - v Calibration factor: 1.0
 - vi Averaging time: 10s
 - vii Battery charge: ≥50%
 - viii Remaining memory: ≥10%
- The monitoring was started by pressing ENTER. The real-time concentration would display “CONC” and the time-averaged concentration would display “TWA”.
- The monitoring was stopped by pressing EXIT and ENTER buttons.
- The date and start time, weather, site condition and the downloaded monitoring results were recorded on the specified field record sheet.

24-hour TSP Monitoring

The 24-hour baseline air quality monitoring at AM4a, AM5 and AM6 and the 1-hour baseline air quality monitoring at AM6 was measured with the HVS complying with the following specifications:

- 0.6-1.7 m³/min (20-60SCFM);
- Equipped with a timing/control device with +/- 5 minutes/1 hour accuracy for 1-hour/24 hours operation;
- Installed with elapsed time meter with +/- 2 minutes accuracy for 1-hour/24 hours operation;
- Capable of providing a minimum exposed area of 406 cm² (63in²);
- Flow control accuracy: +/- 2.5% deviation over sampling period;
- Equipped with a shelter to protect the filter and sampler;
- Incorporated with an electronic mass flow rate controller or other equivalent devices;
- Equipped with a flow recorder for continuous monitoring;
- Provided with a peaked roof inlet;
- Incorporated with a manometer;
- Able to hold and seal the filter paper to the sampler housing at horizontal position;
- Easy to change the filter; and
- Capable of operating continuously for a 1-hour/24-hour period.

The relevant data including temperature, pressure, weather conditions, elapsed-time meter reading for the start and stop of the sampler, identification and weight of the filter paper, and other special phenomena observed and work progress of the concerned site were recorded. The HVSs were equipped with an electronic mass

flow controller and calibrated against a traceable standard at regular intervals. All equipment, calibration kit and filter papers were clearly labelled.

A HOKLAS accredited laboratory with constant temperature and humidity control, and equipped with necessary measuring and conditioning instruments, to handle the 24-hr TSP samples, was employed for sample analysis, and equipment calibration and maintenance. Filter papers of size 8"x10" were labelled before sampling. They were inspected clean with no pin holes and conditioned in a humidity controlled chamber for over 24-hr and be pre-weighed before use for the sampling.

After 24-hr sampling, the filter papers loaded with dust were kept in a clean and tightly sealed plastic bag, and then returned to the laboratory for reconditioning in the humidity controlled chamber followed by accurate weighing by an electronic balance with a readout down to 0.1 mg. All the collected samples shall be kept in a good condition for 6 months before disposal.

3.1.2 Maintenance and Calibration

The HVS and accessories were frequently checked and inspected in accordance with the manufacturer's operation and maintenance manual to ensure normal operation. The maintenance included checking of the supporting screen and gasket, and routine replacement of carbon brushes for the blower motor. Power supply was checked every time prior to sampling to ensure proper operation. All HVS are calibrated at 2-month intervals using GMW-2535 calibration kit, which is re-calibrated by the manufacturer annually. The calibration certificates for both HVS and calibration kit are included in Appendix 1.

The MIE monitor and accessories were frequently checked and inspected in accordance with the manufacturer's operation and maintenance manual to ensure normal operation. The maintenance includes checking of batteries, zero and sensitive adjustment and filter replacement. The MIE monitor is returned to the manufacturer for calibration bi-annually. The calibration certificates of the MIE monitor are included in Appendix 1.

3.1.3 Monitoring Locations

Three monitoring locations for air quality monitoring were identified in the contract specific EM&A Manual as summarised in Table 3-2 and shown in Figures 3-1.

3.1.4 Monitoring Period and Frequency

Monitoring periods at the respective locations are summarised in Table 3-2. Baseline air quality monitoring for 24-hour TSP and 1-hour TSP (3 times per day) were undertaken for 14 consecutive days prior to commencement of construction works except for AM6. As the construction of Harbour Green was not completed prior to the commencement of KSL construction works, baseline air quality monitoring was carried out at AM6 during Sundays and public holidays from 25



March 2007 to 27 May 2007 upon the completion of construction works of Harbour Green. There was no construction works of the Project in the vicinity of AM6 during the baseline monitoring.

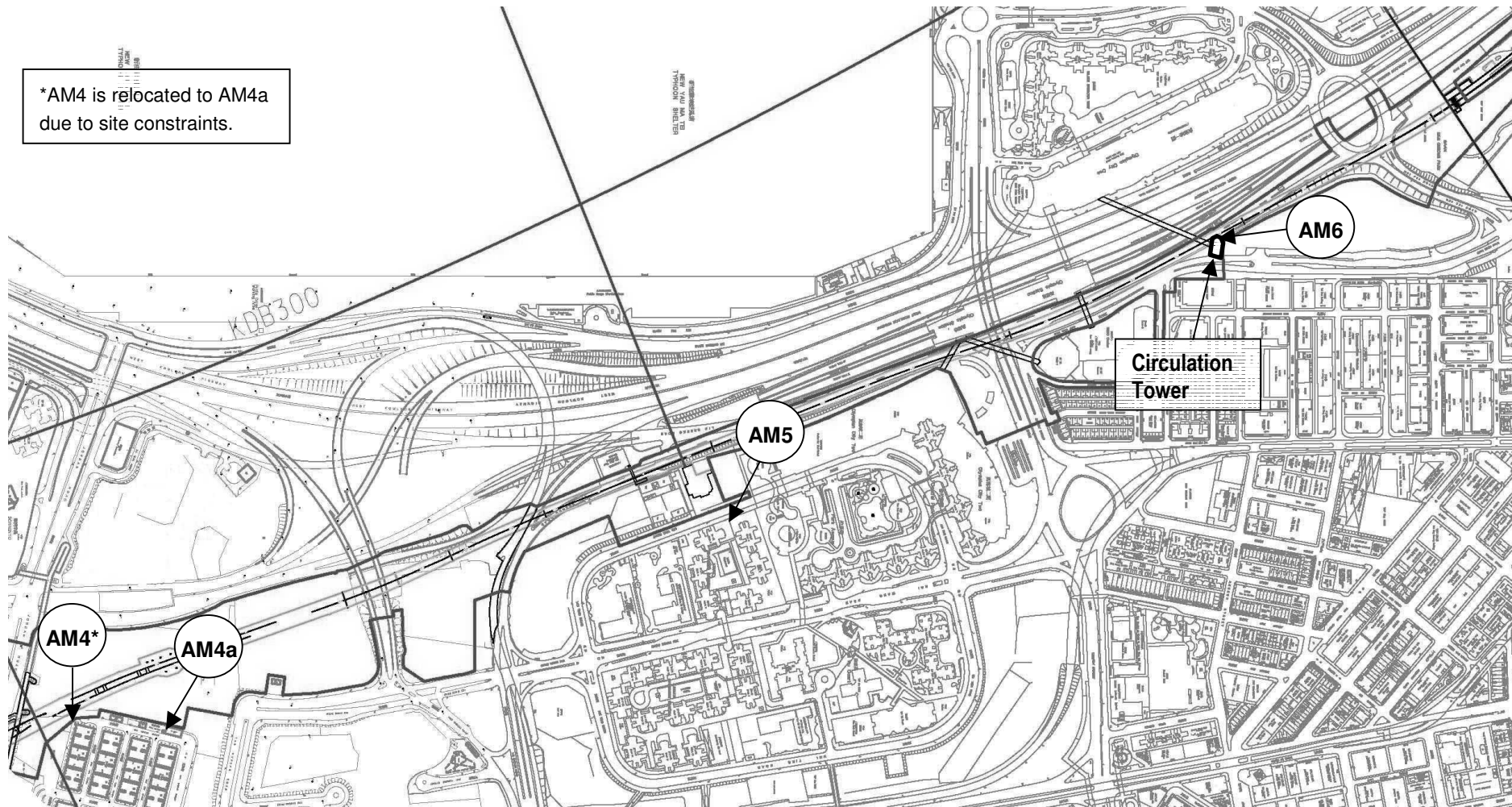


Figure 3-1 Baseline Air Quality Monitoring Station

Monitoring Station ID	Name of Premises	Site Description	Monitoring Period	Serial No. of Equipment Deployed
AM4a	Man Cheong Street Refuse Collection Point	Rooftop (above 2/F)	24/07/05 to 06/08/05	HVS 0718 MIE 4239
AM5	Charming Garden	Podium outside Block 6 facing Hoi Ting Road	25/06/05 to 08/07/05	HVS 0717 MIE 3809
AM6	Olympian City Phase III (Harbour Green)	Rooftop of Circulation Tower	Sundays and public holidays from 25/3/07 to 27/5/07	HVS 1059

Table 3-2 Baseline Air Quality Monitoring Locations

3.2 Noise

3.2.1 Methodology, Monitoring Parameters and Equipment

Baseline noise level was measured by sound level meters in terms of A-weighted equivalent continuous sound pressure level (L_{eq}) according to the Technical Memorandum on Noise from Construction Work other than Percussive Piling (GW-TM). L_{10} and L_{90} were recorded as supplementary information for data auditing. The sound level meters and calibrators comply with the International Electrotechnical Commission (IEC) Publication 651:1979 (Type 1) specification in accordance with GW-TM. The calibration certificates for the noise monitoring equipment are given in Appendix 1. Table 3-3 summarises the equipment list for baseline noise monitoring.

Equipment	Manufacturer & Model No.	Precision Grade	Qty.
Integrated sound level meter	Brüel & Kjær 2231	IEC 651 Type 1 IEC 804 Type 1	1
Integrated sound level meter	Brüel & Kjær 2238		2
Integrated sound level meter	Brüel & Kjær 2236		1
+Windshield	Brüel & Kjær UA0237		2
Acoustical calibrator	Brüel & Kjær 4231	IEC 942 Type 1	2
LCD wind speed indicator	Kestrel Vane Anemometer	--	2

Table 3-3 Equipment List for Baseline Noise Monitoring

Noise measurements were not conducted in the presence of fog, rain, wind with a steady speed exceeding 5m/s or wind with gusts exceeding 10m/s. The wind speed was checked with a portable meter capable of measurement in m/s. The monitoring

station was normally set at a point 1m from the exterior of the sensitive receivers building facade and at 1.2m above the ground.

3.2.2 Monitoring Locations

Four monitoring locations including the alternative location of NM4 for continuous noise monitoring were identified in the contract specific EM&A Manual for noise monitoring as summarised in Table 3-4 and shown in Figure 3-2.

As there is no parapet on the roof of NM4, the safety of the monitoring staff and the anchoring of equipment to avoid wind blown are major concerns. There is also constraint to obtain site access for monitoring works. Thus, no baseline noise monitoring could be carried out at NM4. However, baseline noise monitoring was carried out at NM4a which is the alternative location of NM4 for continuous noise monitoring.

3.2.3 Monitoring Period and Frequency

Monitoring periods at the respective locations are summarised in Table 3-4. Continuous baseline noise monitoring of L_{Aeq} , L_{A10} and L_{A90} have been carried out daily for a period of at least two weeks over a sample period of 5 minutes between 0700 and 1900 and between 1900 and 0700.

As the construction of Harbour Green was not completed prior to the commencement of KSL construction works, baseline noise monitoring was carried out at AM6 during Sundays and public holidays from 25 March 2007 to 27 May 2007 upon the completion of construction works of Harbour Green. There was no construction works of the Project in the vicinity of NM6 during the baseline monitoring.



Monitoring Station	Name of Premises	Site Description	Monitoring Period	Serial No. of Equipment Deployed
NM4	Man King Building	Ground Floor	NA	NA
NM4a	Man Cheong Street Refuse Collection Point	Rooftop (above 2/F)	23/07/05 to 9/08/05 ¹	1709184
NM5	Charming Garden	Podium outside Block 6 facing Hoi Ting Road	02/07/05 to 21/07/05 ²	2320707
NM6	Olympic City Phase III (Harbour Green)	Rooftop of Circulation Tower	Sundays and public holidays from 25/3/07 to 27/5/07	2285726, 1785701

Notes:

1. No noise monitoring was undertaken at NM4a on 23 July 2005 (1700 to 2400 hours), 24 July 2005 (0000 to 1100 hours), 27 July 2005 (1200 to 2400 hours) and 28 July 2005 (0000 to 1300 hours) due to failure of power supply. Moreover, there was no data provided for NM4a on 8 August 2005 (1900 to 0700 hours of the next day).
2. No noise monitoring was undertaken at NM5 on 4 July 2005 (1900 to 2300 hours), 5 July 2005, 6 July 2005 (0000 to 1900 hours) and 11 July 2005 (0700-1900 and 1900-2300) due to failure of power supply. Moreover, there was no data provided for NM5 on 20 July 2005 (1900 to 2300 hours and 2300 to 0700 hours of the next day)

Table 3-4 Baseline Noise Monitoring Locations

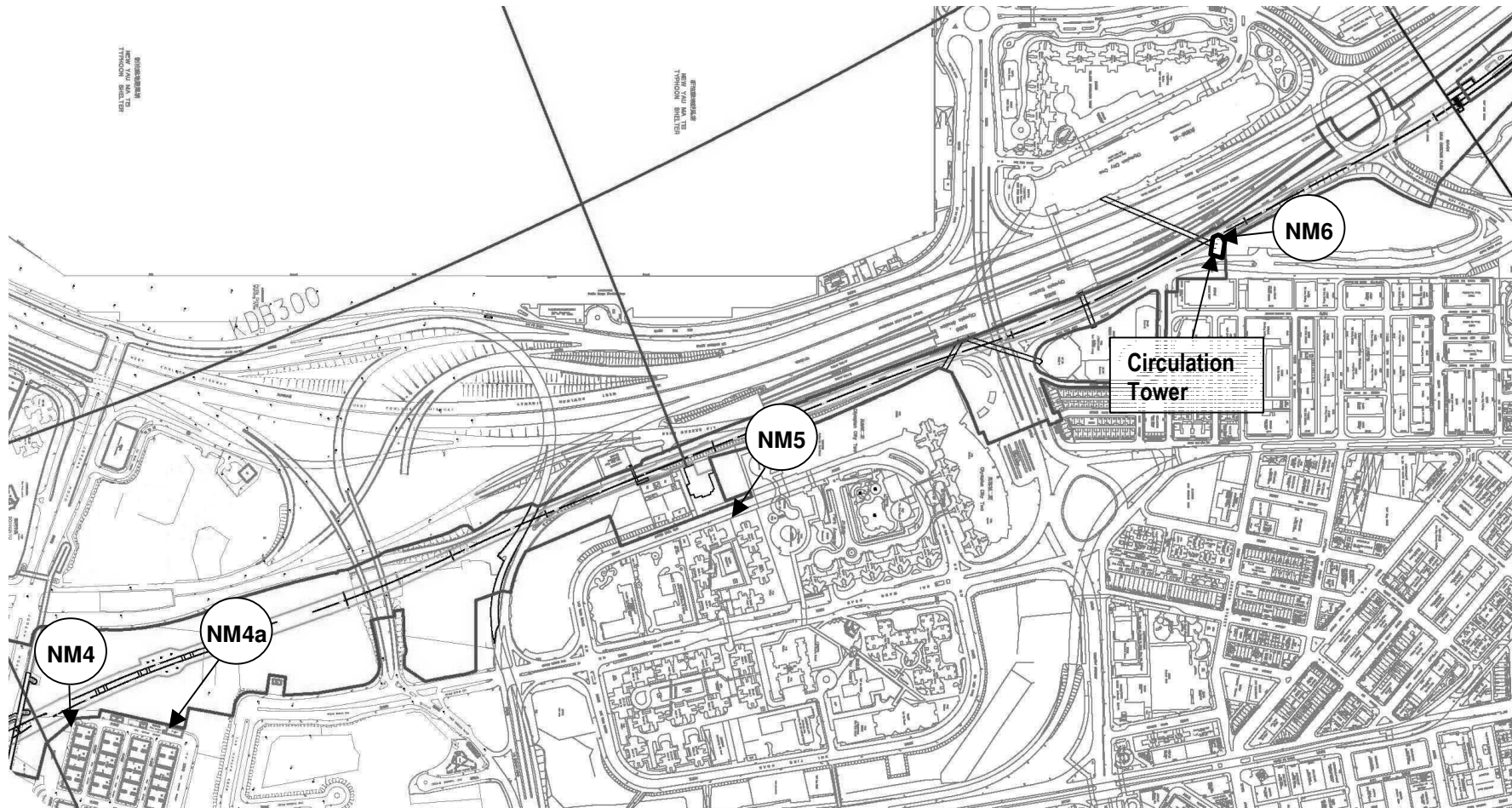


Figure 3-2 Baseline Noise Monitoring Station

4 Baseline Monitoring Results

4.1 Air Quality

4.1.1 Weather Conditions and Other Factors

Air quality monitoring was conducted between 25 June and 6 August 2005 for AM4a and AM5 and from 25 March 2007 to 27 May 2007 for AM6. The weather was mainly sunny and fine with occasional rainfall events during the baseline monitoring period. Major dust sources were observed to originate mainly from traffic activities.

4.1.2 Summary Results

The air quality monitoring results of 1-hour and 24-hour TSP are summarised in Table 4-5 and detailed in Appendix 2. Graphical presentations of the monitoring results are also provided in Appendix 2.

Baseline air quality monitoring was conducted at three locations. The 1-hr TSP was ranged from 41.0 to 253.9 $\mu\text{g}/\text{m}^3$, with the lowest level of 1-hr TSP recorded on 7 April 2007 at AM6 and the highest level of 1-hr TSP recorded on 8 August 2005 at AM4a. The 24-hr TSP levels were ranged from 17.8 to 157.2 $\mu\text{g}/\text{m}^3$ with the lowest levels of 24-hr TSP was recorded on 1 July 2005 at AM5 and the highest levels of 24-hr TSP was recorded on 13 May 2007 at AM6.

Monitoring Station ID	Average ($\mu\text{g}/\text{m}^3$)		Minimum ($\mu\text{g}/\text{m}^3$)		Maximum ($\mu\text{g}/\text{m}^3$)	
	1-hr TSP	24-hr TSP	1-hr TSP	24-hr TSP	1-hr TSP	24-hr TSP
AM4a	157.5	45.9	94.6	34.6	253.9	64.8
AM5	158.5	29.2	79.1	17.8	231.2	66.2
AM6*	83.5	85.2	41.0	43.9	170.4	157.2

Note:

* Baseline monitoring was carried out during Sundays and public holidays.

Table 4-5 Baseline Air Quality Monitoring Results

4.2 Noise

4.2.1 Weather Conditions and Other Factors

Noise monitoring was conducted between 2 July and 9 August 2005 for NM4a and NM5 and from 25 March 2007 to 27 May 2007 for NM6. The weather was mainly sunny and fine with occasional rainfall events during the baseline monitoring period.

4.2.2 Summary Results

Baseline noise monitoring results are summarised in Table 4-6 for the different monitoring periods, and details are attached in Appendix 3. Graphical presentations of the monitoring results are also provided in Appendix 3.

Monitoring Station ID	Non-Restricted hours dB(A) (0700 – 1900) ¹			Restricted hours dB(A) (1900 - 2300 on normal weekdays and 0700 – 2300 on public holidays) ²			Restricted hours dB(A) (2300 – 0700) ³		
	L _{eq} (30min)	L ₁₀ (30min)	L ₉₀ (30min)	L _{eq} (15min)	L ₁₀ (15min)	L ₉₀ (15min)	L _{eq} (15min)	L ₁₀ (15min)	L ₉₀ (15min)
NM4a	64.4	66.9	60.2	61.1	62.9	57.9	58.0	59.5	55.2
NM5	65.4	67.7	61.0	64.4	66.7	59.8	61.0	62.9	56.6
NM6	70.8	72.8	67.0	69.7.	71.9	66.0	68.3	71.0	64.4

Notes:

1. Baseline monitoring data of NM 6 were measured for the period from 0700 to 1900 hours during Sundays and public holidays.
2. Baseline monitoring data of NM 6 were measured for the period from 1900 to 2300 hours during Sundays and public holidays.
3. Baseline monitoring data of NM 6 were measured for the period from 2300 hours during Sundays and public holidays to 0700 hours of the next day.

Table 4-6 Baseline Noise Monitoring Results

5 Action and Limit Levels

5.1 Air Quality

The baseline monitoring results form the basis for derivation of the Action and Limit Levels for air quality impact monitoring. Table 5-7 shows the criteria to be adopted and Table 5-8 shows the derived Action and Limit Levels for the Project. If the air quality criteria are exceeded, the Event and Action Plan summarised in Table 5-9 should be triggered immediately.

Parameters	Action Level	Limit Level
24-hour TSP level in $\mu\text{g}/\text{m}^3$	-- For baseline level $\leq 200 \mu\text{g}/\text{m}^3$, Action Level = (baseline level * 1.3 + Limit level)/2; -- For baseline level $> 200 \mu\text{g}/\text{m}^3$, Action level = Limit level	HKAQO of 260 $\mu\text{g}/\text{m}^3$
1-hour TSP level in $\mu\text{g}/\text{m}^3$	-- For baseline $\leq 384 \mu\text{g m}^{-3}$, Action Level = (baseline level * 1.3 + Limit level)/2 -- For baseline $\leq 384 \mu\text{g m}^{-3}$, Action Level = Limit level	EIAO Statutory Limit of 500 $\mu\text{g}/\text{m}^3$

Table 5-7 Proposed Action and Limit Levels for Air Quality Monitoring

Monitoring Station ID	1-hour TSP Level in $\mu\text{g}/\text{m}^3$		24-hour TSP Level in $\mu\text{g}/\text{m}^3$	
	Action	Limit	Action	Limit
AM4a	352.4	500	159.8	260
AM5	353.0		149.0	
AM6	304.3		185.3	

Note:

Average Baseline Level of AM4a: 1-hour – 157.5 $\mu\text{g}/\text{m}^3$; 24-hour – 45.9 $\mu\text{g}/\text{m}^3$

Average Baseline Level of AM5: 1-hour – 158.5 $\mu\text{g}/\text{m}^3$; 24-hour – 29.2 $\mu\text{g}/\text{m}^3$

Average Baseline Level of AM6: 1-hour – 83.5 $\mu\text{g}/\text{m}^3$; 24-hour – 85.2 $\mu\text{g}/\text{m}^3$

Table 5-8 Action and Limit Levels for Air Quality

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
ACTION LEVEL				
Exceedance for one sample	<ul style="list-style-type: none"> Identify source, investigate the causes of exceedance and propose remedial measures; Inform IEC and ER; Repeat measurement to confirm finding; Increase monitoring frequency to daily. 	<ul style="list-style-type: none"> Check monitoring data submitted by ET; Check Contractor's working method. 	<ul style="list-style-type: none"> Notify Contractor. 	<ul style="list-style-type: none"> Rectify any unacceptable practice; Amend working methods if appropriate.
Exceedance for two or more consecutive samples	<ul style="list-style-type: none"> Identify source; Inform IEC and ER; Advise ER on the effectiveness of the proposed remedial measures; Repeat measurements to confirm findings; Increase monitoring frequency to daily; Discuss with IEC and Contractor on remedial actions required; If exceedance continues, arrange meeting with IEC and ER; If exceedance stops, cease additional monitoring. 	<ul style="list-style-type: none"> Check monitoring data submitted by ET; Check Contractor's working method; Discuss with ET and Contractor on possible remedial measures; Advise the ET on the effectiveness of the proposed remedial measures; Supervise Implementation of remedial measures. 	<ul style="list-style-type: none"> Confirm receipt of notification of exceedance in writing; Notify Contractor; Ensure remedial measures properly implemented. 	<ul style="list-style-type: none"> Submit proposals for remedial to ER within 3 working days of notification; Implement the agreed proposals; Amend proposal if appropriate.
LIMIT LEVEL				
Exceedance for one sample	<ul style="list-style-type: none"> Identify source, investigate the causes of exceedance and propose remedial measures; Inform IEC, ER, Contractor and EPD; Repeat measurement to confirm finding; Increase monitoring frequency to daily; Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results. 	<ul style="list-style-type: none"> Check monitoring data submitted by ET; Check Contractor's working method; Discuss with ET and Contractor on possible remedial measures; Advise ER on the effectiveness of the proposed remedial measures; Supervise implementation of remedial measures. 	<ul style="list-style-type: none"> Confirm receipt of notification of exceedance in writing; Notify Contractor; Ensure remedial measures properly implemented. 	<ul style="list-style-type: none"> Take immediate action to avoid further exceedance; Submit proposals for remedial actions to IEC within 3 working days of notification; Implement the agreed proposals; Amend proposal if appropriate.
Exceedance for two or more consecutive samples	<ul style="list-style-type: none"> Notify IEC, ER, Contractor and EPD; Identify source; Repeat measurement to confirm findings; Increase monitoring 	<ul style="list-style-type: none"> Discuss amongst ER, ET, and Contractor on the potential remedial actions; Review Contractor's remedial actions 	<ul style="list-style-type: none"> Confirm receipt of notification of exceedance in writing; Notify Contractor; In consultation with the IEC, agree with the 	<ul style="list-style-type: none"> Take immediate action to avoid further exceedance; Submit proposals for remedial actions to IEC within 3 working

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
	frequency to daily; • Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; • Arrange meeting with IEC and ER to discuss the remedial actions to be taken; • Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results; • If exceedance stops, cease additional monitoring.	whenever necessary to assure their effectiveness and advise ER accordingly; • Supervise the implementation of remedial measures.	Contractor on the remedial measures to be implemented; • Ensure remedial measures properly implemented; • If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated.	days of notification; • Implement the agreed proposals; • Resubmit proposals if problem still not under control; • Stop the relevant portion of works as determined by ER until the exceedance is abated.

Table 5-9 Proposed Event/ Action Plan for Air Quality Monitoring

5.2 Noise

The Action Level for noise is based on documented complaints received and Limit Level is the level at a specified limit. The Action and Limit Levels for construction noise are defined in Table 5-10. If non-compliance of the criteria occurs, action should be taken immediately in accordance with the Event/Action Plan as shown in Table 5-11.

Time Period	Action	Limit
0700-1900 hrs on normal weekdays	When one documented complaint is received	75 / 77* dB(A)
0700-2300 hrs on holidays; and 1900-2300 hrs on all other days		70 dB(A)
2300-0700 hrs of next day		55 dB(A)

Notes:

Area Sensitive Ratings of NM4, NM4a and NM5 are "C".

* For NM4 in the fourth, eleventh, twelfth, nineteenth months of the construction programme since there will be residual impact of 1 to 2 dB(A) at Man King Building as predicted in the EIA report.

Table 5-10 Action and Limit Levels for Noise Monitoring

Event	Action			
	ET Leader	IEC	ER	Contractor
Action Level	<ul style="list-style-type: none"> Notify IEC and the Contractor. Carry out investigation. Report the results of investigation to IEC and the Contractor. Discuss with the Contractor and formulate remedial measures. Increase monitoring frequency to check mitigation measures. 	<ul style="list-style-type: none"> Review with analysed results submitted by ET. Review the proposed remedial measures by the Contractor and advise ER accordingly. Supervise the implement of remedial measures. 	<ul style="list-style-type: none"> Confirm receipt of notification of exceedance in writing. Notify the Contractor. Require the Contractor to propose remedial measures for the analysed noise problem. Ensure remedial measures are properly implemented. 	<ul style="list-style-type: none"> Submit noise mitigation proposals to IEC. Implement noise mitigation proposals.
Limit Level	<ul style="list-style-type: none"> Identify the source. Notify IEC, ER, EPD and the Contractor. Repeat measurement to confirm findings. Increase monitoring frequency. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented. Inform IEC, ER, and EPD the causes & actions taken for the exceedances. Assess effectiveness of the Contractor's remedial actions and keep IEC, EPD and ER, informed of the results. If exceedance stops, cease additional monitoring 	<ul style="list-style-type: none"> Discuss amongst ER, the ET Leader and the Contractor on the potential remedial actions. Review the Contractor's remedial actions whenever necessary to assure their effectiveness and advise ER, accordingly. Supervise the implementation of remedial measures. 	<ul style="list-style-type: none"> Confirm receipt of notification of exceedance in writing. Notify the Contractor. Require the Contractor to propose remedial measures for the analysed noise problem. Ensure remedial measures are properly implemented. If exceedance continues, consider what activity of the work is responsible and instruct the Contractor to stop that activity of work until the exceedance is abated. 	<ul style="list-style-type: none"> Take immediate action to avoid further exceedance. Submit proposals for remedial actions to IEC within 3 working days of notification. Implement the agreed proposals. Resubmit proposals if problem still not under control. Stop the relevant activity of works as determined by ER, until the exceedance is abated.

Table 5-11 Event and Action Plan for Noise Monitoring

6 Comments and Conclusions

Baseline monitoring was carried out between the period of 25 June and 9 August 2005 for AM4a, NM4a, AM5 and NM5 and from 25 March 2007 to 27 May 2007 for AM6 and NM6 encompassing 3 air quality and 3 noise monitoring locations. The weather during the baseline monitoring period was generally sunny and fine, with occasional rainfall events.

Action/Limit Levels for air quality monitoring for each location have been derived from the baseline monitoring results and these will be adopted for impact environmental monitoring. The proposed Action/Limit levels for noise monitoring are based on the EIA predicted noise levels and are made reference to Appendix D2 of EM&A Guidelines for Development Projects in Hong Kong.

Appendix 1

Calibration Certificates

Annex 2 High Volume Air Sampler Calibration Worksheet

Project Title: KSL KDB300 & KDB400 Tunels, Jordan Road to Nam Cheong Station Overrun
Monitoring Location: Circulation Tower of Olympian City Phase 3(AM6)
Calibration Date: 01-Apr-07
Calibration Due Date: 01-Jun-07
Time: 08:55

Sampler Model:	GBM2000H1
Serial No.:	1059
Calibrator Orifice no.:	517N
Slope (m):	2.01069
Intercept (b):	-0.00482
Correction coeff. (r)	0.9999

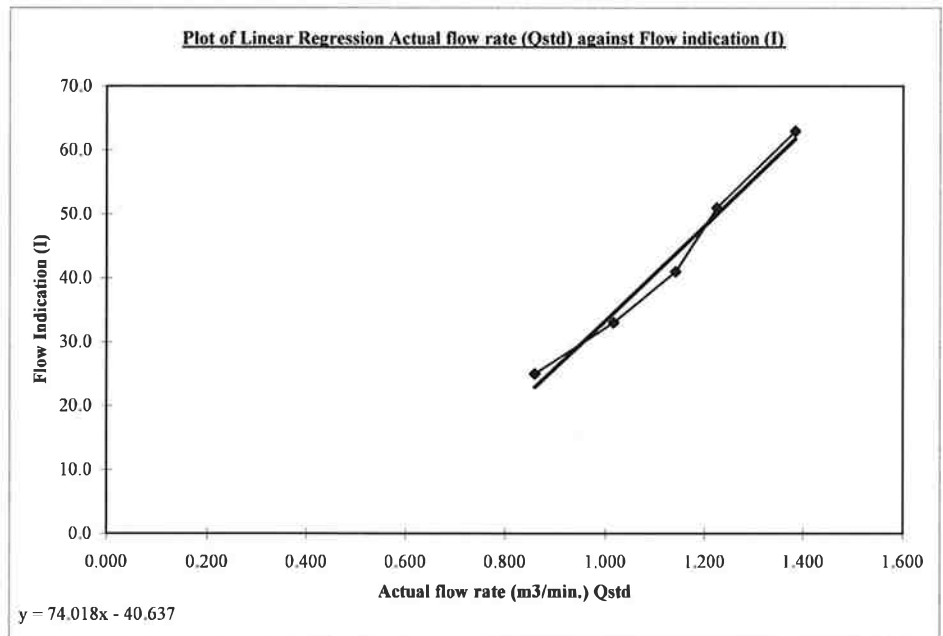
$$\text{Flow (corrected)} = \sqrt{H \times \frac{Pa}{Pstd} \times \frac{Tstd}{Ta}}$$

Standard pressure (mmHg) Pstd:	763.3
Standard temp. (K) Tstd:	297.18
Calibration pressure (mmHg) Pa:	756.9
Calibration temp. (K) Ta:	298.9

$$Qstd = \frac{1}{m} \times \left(\sqrt{H \times \frac{Pa}{Pstd} \times \frac{Tstd}{Ta}} - b \right)$$

Sample no.	Pressure Drop (H), inch	Flow (corrected), m ³ /min	Actual flow rate (Qstd), m ³ /min	Flow indication (I), arbitrary
1	7.8	2.777	1.383	63.0
2	6.1	2.456	1.224	51.0
3	5.3	2.289	1.141	41.0
4	4.2	2.038	1.016	33.0
5	3.0	1.722	0.859	25.0


Correlation Coefficient : 0.9903



Remark
 Qstd Range 1.1 - 1.7
 1HPa = 0.750062 mmHg

Calibrated by: Hui Chun Ming
 ()

Date: 2 - Apr - 07

Checked by: Tang Hiu Yeung
 ()

Date: 3 - Apr - 07



TISCH ENVIRONMENTAL, INC.
 145 SOUTH MIAMI AVE.
 VILLAGE OF CLEVELAND, OH 45002
 513.467.9000
 877.263.7610 TOLL FREE
 513.467.9009 FAX
 WWW.TISCH-ENV.COM

AIR POLLUTION MONITORING EQUIPMENT

ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - Feb 10, 2005 Rootsmeter S/N 9833620 Ta (K) - 292
 Operator Tisch Orifice I.D. - 1378 Pa (mm) - 754.38

PLATE OR Run #	VOLUME START (m3)	VOLUME STOP (m3)	DIFF VOLUME (m3)	DIFF TIME (min)	METER DIFF Hg (mm)	ORFICE DIFF H2O (in.)
1	NA	NA	1.00	1.4010	3.2	2.00
2	NA	NA	1.00	0.9870	6.3	4.00
3	NA	NA	1.00	0.8840	7.8	5.00
4	NA	NA	1.00	0.8420	8.7	5.50
5	NA	NA	1.00	0.6960	12.5	8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)	Va	(x axis) Qa	(y axis)
1.0087	0.7200	1.4234	0.9957	0.7107	0.8799
1.0045	1.0178	2.0130	0.9917	1.0047	1.2443
1.0024	1.1340	2.2506	0.9896	1.1194	1.3912
1.0013	1.1892	2.3604	0.9884	1.1739	1.4591
0.9961	1.4313	2.8468	0.9834	1.4129	1.7597
Qstd slope (m) = 2.00216			Qa slope (m) = 1.25372		
intercept (b) = -0.02053			intercept (b) = -0.01269		
coefficient (r) = 0.99997			coefficient (r) = 0.99997		

y axis = $\text{SQRT}[\text{H2O}(\text{Pa}/760) (298/\text{Ta})]$

y axis = $\text{SQRT}[\text{H2O}(\text{Ta}/\text{Pa})]$

CALCULATIONS

$V_{std} = \text{Diff. Vol} [(\text{Pa} - \text{Diff. Hg}) / 760] (298 / \text{Ta})$
 $Q_{std} = V_{std} / \text{Time}$

$V_a = \text{Diff Vol} [(\text{Pa} - \text{Diff Hg}) / \text{Pa}]$
 $Q_a = V_a / \text{Time}$

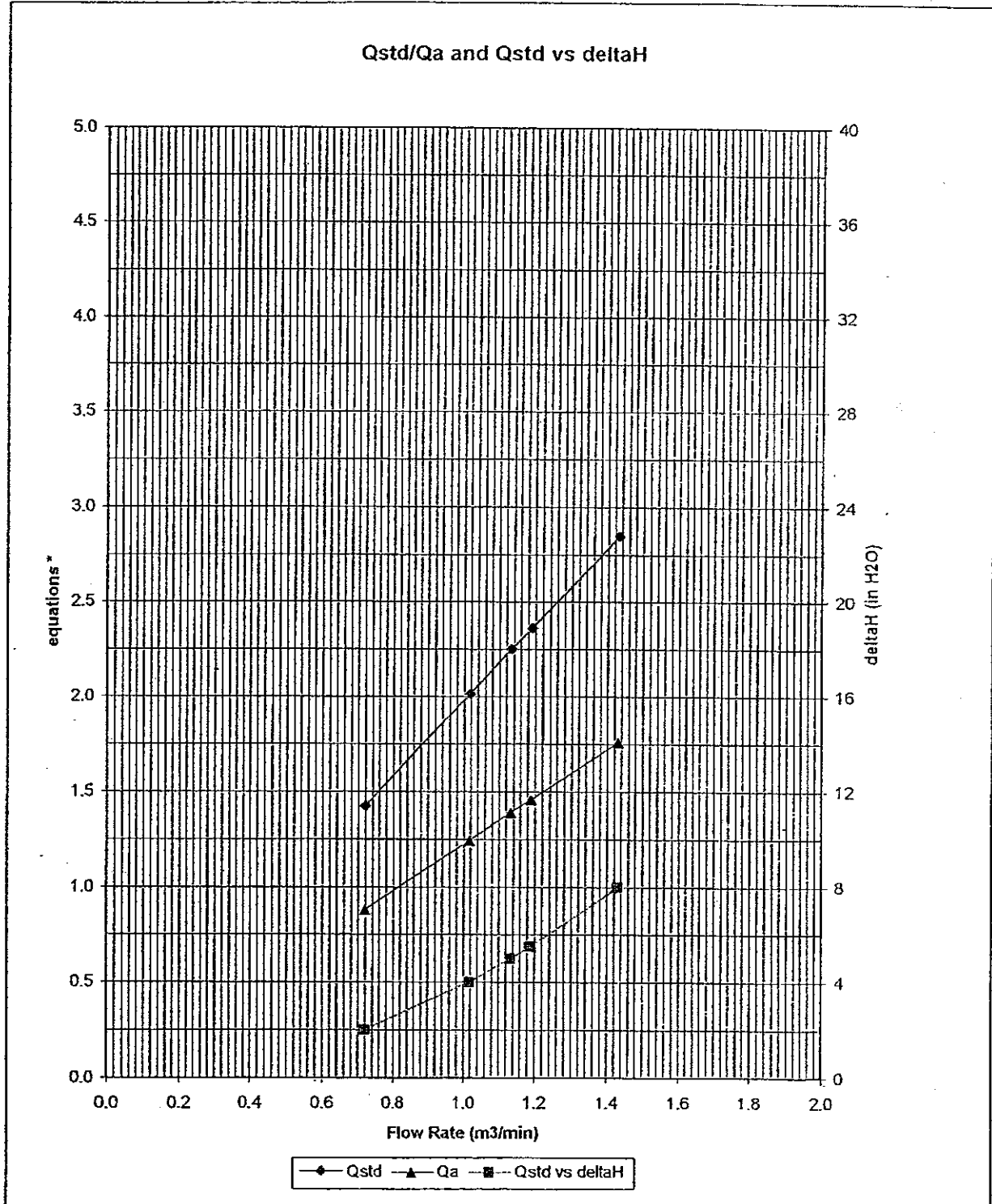
For subsequent flow rate calculations:

$Q_{std} = 1/m \{ [\text{SQRT}(\text{H2O}(\text{Pa}/760) (298/\text{Ta}))] - b \}$
 $Q_a = 1/m \{ [\text{SQRT} \text{H2O}(\text{Ta}/\text{Pa})] - b \}$



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AIR POLLUTION MONITORING EQUIPMENT



* y-axis equations:

Qstd series:
$$\sqrt{\Delta H \left(\frac{P_a}{P_{std}} \right) \left(\frac{T_{std}}{T_a} \right)}$$

Qa series:
$$\sqrt{(\Delta H (T_a / P_a))}$$

1378



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AIR POLLUTION MONITORING EQUIPMENT

ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - Apr 26, 2006 Roots-meter S/N 9833620 Ta (K) - 294
 Operator Tisch Orifice I.D. - 517N Pa (mm) - 750.57

PLATE OR Run #	VOLUME START (m3)	VOLUME STOP (m3)	DIFF VOLUME (m3)	DIFF TIME (min)	METER DIFF Hg (mm)	ORIFICE DIFF H2O (in.)
1	NA	NA	1.00	1.4140	3.2	2.00
2	NA	NA	1.00	0.9910	6.3	4.00
3	NA	NA	1.00	0.8890	7.8	5.00
4	NA	NA	1.00	0.8480	8.7	5.50
5	NA	NA	1.00	0.6980	12.5	8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)	Va	(x axis) Qa	(y axis)
0.9967	0.7049	1.4149	0.9957	0.7042	0.8851
0.9926	1.0016	2.0010	0.9916	1.0006	1.2517
0.9905	1.1142	2.2372	0.9895	1.1131	1.3995
0.9894	1.1667	2.3464	0.9884	1.1656	1.4678
0.9843	1.4102	2.8299	0.9833	1.4087	1.7702
Qstd slope (m) = 2.01069			Qa slope (m) = 1.25906		
intercept (b) = -0.00482			intercept (b) = -0.00301		
coefficient (r) = 0.99990			coefficient (r) = 0.99990		
y axis = $\sqrt{H_2O(Pa/760)(298/Ta)}$			y axis = $\sqrt{H_2O(Ta/Pa)}$		

CALCULATIONS

$$Vstd = \text{Diff. Vol} [(Pa - \text{Diff. Hg}) / 760] (298 / Ta)$$

$$Qstd = Vstd / \text{Time}$$

$$Va = \text{Diff Vol} [(Pa - \text{Diff Hg}) / Pa]$$

$$Qa = Va / \text{Time}$$

For subsequent flow rate calculations:

$$Qstd = 1/m \{ [\sqrt{H_2O(Pa/760)(298/Ta)}] - b \}$$

$$Qa = 1/m \{ [\sqrt{H_2O(Ta/Pa)}] - b \}$$

CERTIFICATE OF CALIBRATION

Certificate No. : 2KS040905-5

Page 1 of 2

Calibration of :

Description :	Sound Level Meter	,	Microphone
Manufacture :	Brüel & Kjær		
Type No. :	2238	,	4188
Serial No. :	2320707	,	2179479

Client : Ove Arup & Partners Hong Kong Ltd.
Level 5, Festival Walk,
80 Tat Chee Avenue,
Kowloon Tong, Kowloon,
Hong Kong.

Calibration Conditions :

Air Temperature :	23.1	°C
Air Pressure :	101.4	kPa
Relative Humidity :	58	%

Test Specifications :

The Sound Level Meter has been calibrated in accordance with the requirements as specified in IEC 60651 and IEC 60804 type 1, and vendor specific procedures.

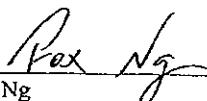
The measurements has been performed with the assistance of:
Brüel & Kjær's Sound Level Meter Calibration System B&K 9600 CAL2238A, Ver.25.10.1999
The standard(s) and instrument(s) used in the calibration are traceable to international standard and are calibrated on a schedule which is adjusted to maintain the required accuracy level.

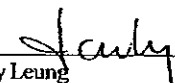
Test Result :

A list of the performed (sub) tests is stated on page 2 of this certificate. Actual Measurement are documented on worksheet.

Date of Calibration : 09 September, 2004
Calibrated By :

Certificate issued : 10 September, 2004
Approved signatory :


Fox Ng


Jacky Leung

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CERTIFICATE OF CALIBRATION

Certificate No. : 2KS040905-5

Page 2 of 2

Results :

List of performed (sub) test with test status:

"OK" Means the result of the (sub)test is Inside the tolerances stated in the test specifications.

" - " Means the result of the (sub)test is Outside these tolerances.

Test :	Subtest :	Status :
Noise	A	OK
Noise	C	OK
Noise	Lin	OK
Frequency Weighting	A	OK
Frequency Weighting	C	OK
Frequency Weighting	Lin	OK
Level Range Control	1000 Hz	OK
Linearity Range	SPL 10dB 4000 Hz	OK
Linearity Range	SPL 1dB 1000 Hz	OK
Linearity Range	Leq	OK
Linearity Range	SEL	OK
RMS Detector	CF 3	OK
RMS Detector	CF 5	OK
RMS Detector	CF 10	OK
RMS Detector	Symmetry	OK
Time Weighting	Difference Indication	OK
Time Weighting	Single Burst FAST	OK
Time Weighting	Single Burst SLOW	OK
Time Weighting	Single Burst IMPULSE	OK
Time Weighting	Repetitive Burst	OK
Time Weighting	Peak	OK
Time Averaging		OK
Pulse Range		OK
Overload	SPL	OK
Overload	SEL	OK
Acoustic Response	A	OK
Acoustic Response	Lin	OK

Calibration Equipment :

Brüel & Kjær's Sound Level Meter Calibration System B&K 9600 CAL2238A, Ver.25.10.1999

Description :	Make & Model :	Serial No. :	Last Cal. Date :	Traceable to:
Digital Multi-meter	Datron I281	27361	08 Oct, 2003	HKSCS (HOKLAS)
Sine/Noise Generator	B&K 1049	1314978	Test	B&K Conformance
Test Waveform Generator	B&K 5918	1482949	Test	B&K Conformance
Acoustical Calibrator	B&K 4226	1551627	22 Jun, 2004	NPL via B&K (UKAS)

Calibrated By: *Rox Ng*
Date : 09 September, 2004

Checked By: *Sealy*
Date : 10 September, 2004

CERTIFICATE OF CALIBRATION

Certificate No. : 2KS040905-2

Page 1 of 2

Calibration of :

Description	: Sound Level Meter	,	Microphone
Manufacture	: Brüel & Kjær		
Type No.	: 2231	,	4188
Serial No.	: 1709184	,	2179476

Client : Ove Arup & Partners Hong Kong Ltd.
Level 5, Festival Walk,
80 Tat Chee Avenue,
Kowloon Tong, Kowloon,
Hong Kong.

Calibration Conditions :

Air Temperature	: 23.2 °C
Air Pressure	: 101.2 kPa
Relative Humidity	: 59 %

Test Specifications :

The Sound Level Meter has been calibrated in accordance with the requirements as specified in IEC 60651 and IEC 60804 type 1, and vendor specific procedures.

The measurements has been performed with the assistance of :
Brüel & Kjær's Sound Level Meter Calibration System B&K 9600 C2231_10, Ver.03.11.1995
The standard(s) and instrument(s) used in the calibration are traceable to international standard and are calibrated on a schedule which is adjusted to maintain the required accuracy level.

Test Result :

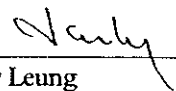
A list of the performed (sub) tests is stated on page 2 of this certificate. Actual Measurement are documented on worksheet.

Date of Calibration: 10 September, 2004

Certificate issued: 10 September, 2004

Calibrated By :

Approved Signatory :


Fox Ng
Jacky Leung

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CERTIFICATE OF CALIBRATION

Certificate No. : 2KS040905-2

Page 2 of 2

Results :

List of performed (sub) test with test status:

“OK” Means the result of the (sub)test is Inside the tolerances stated in the test specifications.

“ - ” Means the result of the (sub)test is Outside these tolerances.

Test :	Subtest :	Status :
Noise	A	OK
Noise	C	OK
Noise	Lin	OK
Noise	Lin Lim	OK
Frequency Weighting	A	OK
Frequency Weighting	C	OK
Frequency Weighting	Lin	OK
Frequency Weighting	Lin Lim	OK
Frequency Weighting	Random	OK
Level Range Control	4000 Hz	OK
Linearity Range	SPL 10dB 1000 Hz	OK
Linearity Range	SPL 1dB 4000 Hz	OK
Linearity Range	Leq	OK
Linearity Range	SEL	OK
RMS Detector	CF 3	OK
RMS Detector	CF 5	OK
RMS Detector	CF 10	OK
RMS Detector	Symmetry	OK
Time Weighting	Difference Indication	OK
Time Weighting	Single Burst FAST	OK
Time Weighting	Single Burst SLOW	OK
Time Weighting	Single Burst IMPULSE	OK
Time Weighting	Repetitive Burst	OK
Time Weighting	Peak	OK
Time Averaging	Leq-SEL	OK
Pulse Range	SEL-Leq	OK
Overload	SPL	OK
Overload	SEL	OK
Internal Reference		OK
Acoustic Response	A	OK
Acoustic Response	Lin	OK

Calibration Equipment :

Brüel & Kjær's Sound Level Meter Calibration System B&K 9600 C2231_10, Ver.03.11.1995

Description :	Make & Model :	Serial No. :	Last Cal. Date :	Traceable To
Digital Multi-meter	Datron 1281	27361	08 Oct 2003	HKSL(HOKLAS)
Sine/Noise Generator	B&K 1049	1314978	Test	B&K Conformance
Test Waveform Generator	B&K 5918	1482949	Test	B&K Conformance
Acoustical Calibrator	B&K 4226	1551627	22 Jun, 2004	NPL via B&K (UKAS)

Calibrated By : *Rox Ng*
Date : 10 September, 2004

Checked By : *Henry*
Date : 10 September, 2004

Hyder Consulting Limited
47/F, Hopewell Centre
183 Queen's Road East, Wanchai
Hong Kong,
China

Customer Reference:**Service Request:**
1-92873601**Date:**
2007-01-18

We hereby declare that
-2238--- Integrating Sound Level Meter Serial Number: 2285726
has been tested and passed all test.

The instrument has been tested according to published specifications at the date of the test.
All tests have been performed using calibrated equipment, traceable to National or International Standards
or by ratio measurements.

Certificate issued
2006-11-28



Service Manager
For and on behalf of
Spectris China Limited
(Brüel & Kjær S&V Business Unit)

Recommended date for next check: 2007-11

Brüel & Kjær assuring that all calibration data is retained on file and is available for inspection upon request.

Note:

Please note: Although this certificate states that your instrument complied with all specifications at the time of the test, this is not a calibration certificate.

Spectris China Limited
(Brüel & Kjær S&V)

B&K S&V Offices in China:

B&K S&V Technical Centres in China:

Website:

Beijing . Chengdu . Guangzhou . Hong Kong . Shanghai . Shenyang . Xian

Guangzhou . Wuhan

www.bksv.com

ABN-AMRO BANK N.V.
38/F Cheung Kong Center
2 Queen's Road Central
Central, Hong Kong

Account No.: 65 56 566 (HKD/USD/EURO)
Swift Code: ABNAHKHH



Calibration Certificate

Certificate No. **70311**

Page 1 of 4 Pages

Customer : Hyder Consulting Limited

Address : Room 3801., Hopewell Centre, 183 Queen's Road East, Wan Chai, Hong Kong

Order No. : Q70049

Date of receipt : 17-Jan-07

Item Tested

Description : Digital Sound Level Meter

Manufacturer : B&K

Model : Type 2236

Serial No. : 1785701

Test Conditions

Date of Test : 19-Jan-07

Supply Voltage : --

Ambient Temperature : (23 ± 3)°C

Relative Humidity : (50 ± 25) %

Test Specifications

Calibration check.

Calibration procedure : Z01.

Test Results

All results were within the IEC 651 Type 1, IEC 804 Type 1 & IEC 1260 Class 1 specification.

The results are shown in the attached page(s).

Test equipment used:

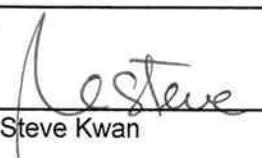
<u>Equipment No.</u>	<u>Description</u>	<u>Cert. No.</u>	<u>Due Date</u>	<u>Traceable to</u>
S017	Function Generator	C051022	21-Mar-07	SCL-HKSAR
S024	Sound Level Calibrator	62691	22-Apr-07	NIM-PRC & SCL-HKSAR

The values given in this Calibration Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include 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 measurement. Hong Kong Calibration Ltd. shall not be liable for any loss or damage resulting from the use of the equipment.

The test equipment used for calibration are traceable to International System of Units (SI).

The test results apply to the above Unit-Under-Test only

Calibrated by : 
P.F. Wong

Approved by : 
Steve Kwan

Date: 19-Jan-07

This Certificate is issued by:

Hong Kong Calibration Ltd.

Unit 8B, 24/F., Well Fung Industrial Centre, No. 58-76, Ta Chuen Ping Street, Kwai Chung, NT, Hong Kong.

Tel: 2425 8801 Fax: 2425 8646

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Level 5 Festival Walk
80 Tat Chee Avenue
Kowloon Tong, Kowloon
HONG KONG

AAc Certificate No. 2004002

Fax: +852 2268 3950

Tel: +852 2268 3216


CERTIFICATE OF CONFORMITY

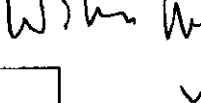
<u>Description of Test Instrument</u>	<u>Type No</u>	<u>Serial No</u>
Bruel & Kjaer Acoustic Calibrator	4231	2314016

Date of Test: 16 July 2004

Carried out by: Steven Wong

Approved by: William Ng

Signature: 

Signature: 

Ambient Conditions During Test	
Atmospheric Pressure:	1KPa
Air Temperature:	28°C
Relative Humidity:	58%

This document is to certify that the above Test Instrumentation did conform to the manufacturer's original specification on the date of the test. Any adjustments that were required to bring the instrumentation back into specification are duly noted in this document. The tests were carried out using the reference calibrator described below.

<u>Description of Reference Calibrator</u>	<u>Type No</u>	<u>Serial No</u>
Brüel & Kjær Multi Frequency Calibrator	4226	1531372
Brüel & Kjær Coupler	UA0915	1531372

Certificate of Calibration Serial No.	12701
By Brüel & Kjær (UK) Ltd Calibration Date:	20 April 2004
NAMAS Accredited Calibration Laboratory No.	0174

The reference calibrator, Type 4226, has traceable calibration back to National Measurement Standards. As such it is used as Arup Acoustics own 'Primary Standard' and is used only for controlled laboratory calibration tests on all sound measuring equipment owned by Arup Acoustics.

Footnote:

Arup Acoustics is not a registered NAMAS accredited calibration laboratory. This certificate is for internal use only (unless otherwise authorised) and is part of Arup Acoustics development and commitment to QC and QA procedures.

AAc IN-HOUSE SPECIFICATION TEST RESULTS
(for Brüel & Kjær 4231 Acoustic Calibrator)

4231 Serial No: 2314016
Date of Test: 16 July 2004

Calibrated By: SW
Checked By: WN

Atmospheric Pressure: 774.75 kPa approx
* Air Temperature: 21 °C approx (room temperature)
** Relative Humidity: 58 % approx

* and ** measured using Nagretti and Zambria Whirling Hygrometer or Radio Spares Temperature and Humidity Meter.

SOUND PRESSURE LEVEL TEST – Part 1

4226 Primary Standard	1 st set of free field readings		<u>93</u> : <u>8</u> dB
* 4231 Under Test	1 st set of free field readings		<u>93</u> : <u>8</u> dB
* (before any required level adjustment made)			
Calibration Error of 4231	Within specification	YES/ NO	<u> </u> : <u> </u> dB
	Outside specification	YES /NO	<u> </u> : <u> </u> dB

NOTE: Each set of readings comprises three individual readings, which are arithmetically averaged together

SOUND PRESSURE LEVEL TEST – Part 2

4226 Primary Standard	2 nd set of free field readings	<u>93</u> : <u>8</u> dB
⊙ 4231 Under Test	2 nd set of free field readings	<u>93</u> : <u>8</u> dB
⊙ (after corrective adjustment made)		

SPECIFICATION TOLERANCE FOR THE 4231 SOUND LEVEL CALIBRATOR IS
±0.3dB AT 23°C AND +0.5dB between 0 - 50°C

HARMONIC DISTORTION TEST

Maximum permitted harmonic distortion is 1% (53.8dB) of the SPL produced by the 4230 at 1kHz.

Measured Harmonic Distortion: 20.9 dB
0.04 %

CALIBRATION ACCURACY

THE ACCURACY OF THE AAc IN-HOUSE CALIBRATION
SET UP FOR 4231 CALIBRATORS IS BETTER THAN:
+0.43dB 95% CONFIDENCE LEVEL
+0.3dB 80% CONFIDENCE LEVEL



CERTIFICATE OF CALIBRATION

Certificate No. : 2KS050708-1

Page 1 of 2

Calibration of :

Description : Acoustical Calibrator
Manufacture : Brüel & Kjær
Type No. : 4231
Serial No. : 2314016

Client :

ARUP Acoustic Consultant
Level 5 Festival Walk
80 Tat Chee Avenue
Kowloon Tong
Kowloon

Calibration Conditions :

Air Temperature : 23 °C
Air Pressure : 100.9 kPa
Relative Humidity : 56 %

Test Specifications :

The Acoustical Calibrator has been calibrated in accordance with the documented procedures and using standard(s) and instrument(s) which are recommended by Brüel & Kjær, or equivalent. The standard(s) and instrument(s) used in the calibration are traceable to international standard and are calibrated on a schedule which is adjusted to maintain the required accuracy level.

Test Result :

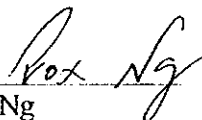
A list of the performed (sub) tests is stated on page 2 of this certificate. Actual Measurement are documented on worksheet.

Date of Calibration : 27 July, 2005

Certificate issued : 28 July, 2005

Calibrated By :

Approved signatory :


Fox Ng


Jacky Leung

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CERTIFICATE OF CALIBRATION

Certificate No. : 2KS050708-1

Page 2 of 2

Results :

List of performed (sub) test with test status:


“OK” Means the result of the (sub)test is Inside the tolerances stated in the test specifications.

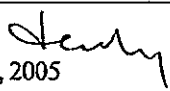
“ - ” Means the result of the (sub)test is Outside these tolerances.

Test :	Subtest :	Status :
SPL	94 dB SPL	OK
	114 dB SPL	OK
Frequency		OK
2nd Harmonic		OK

Calibration Equipment :

<i>Description :</i>	<i>Make & Model :</i>	<i>Serial No. :</i>	<i>Last Cal. Date :</i>	<i>Traceable to:</i>
Digital Multi-meter	Datron 1281	27361	28 Sep., 2004	HKSCS(HOKLAS)
Frequency Counter	Philips PM6671	SM 6043	23 Sep., 2004	HKSCS(HOKLAS)
Acoustical Calibrator	B&K 4226	1843103	11 Jul., 2005	NPL via B&K (DANAK)

Calibrated By : 
Date : 27 July, 2005

Checked By : 
Date : 28 July, 2005



Calibration Certificate

Certificate No. **70180**

Page 1 of 2 Pages

Customer : Hyder Consulting Limited

Address : Room 3801., Hopewell Centre, 183 Queen's Road East, Wan Chai, Hong Kong

Order No. : Q70049

Date of receipt : 11-Jan-07

Item Tested

Description : Sound Level Calibrator

Manufacturer : B&K

Model : Type 4231

Serial No. : 1770806

Test Conditions

Date of Test : 12-Jan-07

Supply Voltage : --

Ambient Temperature : (23 ± 3)°C

Relative Humidity : (50 ± 25) %

Test Specifications

Calibration check.

Calibration procedure : F21, Z02.

Test Results

All results were within the IEC 942 Class 1 specification.

The results are shown in the attached page(s).


Test equipment used:

<u>Equipment No.</u>	<u>Description</u>	<u>Cert. No.</u>	<u>Due Date</u>	<u>Traceable to</u>
S014	Spectrum Analyzer	62914	7-Jul-07	NIM-PRC & SCL-HKSAR
S024	Sound Level Calibrator	62691	22-Apr-07	NIM-PRC & SCL-HKSAR
S041	Universal Counter	63839	22-Aug-07	SCL-HKSAR

The values given in this Calibration Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include 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 measurement. Hong Kong Calibration Ltd. shall not be liable for any loss or damage resulting from the use of the equipment.

The test equipment used for calibration are traceable to International System of Units (SI).

The test results apply to the above Unit-Under-Test only

Calibrated by : 
P.F. Wong

Approved by : 
Steve Kwan

Date: 12-Jan-07

MASTER # D320 LAST CALIBRATED 10/1/04

THERMO ELECTRON
27 FORGE PARKWAY
FRANKLIN MA 02038
TOLL-FREE: 866-282-0430
TEL: 508-553-6949
FAX: 508-541-8366
WWW.THERMO.COM

PDR-1000 CALIBRATION CERTIFICATE

This calibration is traceable to the National Institute of Standards and Testing

SERIAL NUMBER:	<u>3809</u>
CALIBRATION RATIO:	<u>1.009</u>
AVG. PDR-1000 CONCENTRATION:	<u>2.91 mg/m3</u>
CALIBRATION MASTER AVG. CONCENTRATION:	<u>2.45 mg/m3</u>
DR BACKGROUND CONCENTRATION:	<u>.448 mg/m3</u>
TEMPERATURE:	<u>78F</u>
HUMIDITY:	<u>22%</u>
TECHNICIAN <u>K. Lachapelle</u>	DATE: <u>10/6/04</u>

MASTER # D325 LAST CALIBRATED 12/17/04

THERMO ELECTRON
27 FORGE PARKWAY
FRANKLIN MA 02038
TOLL-FREE: 866-282-0430
TEL: 508-553-6949
FAX: 508-541-8366
WWW.THERMO.COM

PDR-1000 CALIBRATION

CERTIFICATE

This calibration is traceable to the National
Institute of Standards and Testing

SERIAL NUMBER:	<u>4239</u>
CALIBRATION RATIO:	<u>0.9900</u>
AVG. PDR-1000 CONCENTRATION:	2.53 <u>mg/m³</u>
CALIBRATION MASTER AVG. CONCENTRATION:	2.24 <u>mg/m³</u>
DR BACKGROUND CONCENTRATION:	.280 <u>mg/m³</u>
TEMPERATURE:	<u>71.7F</u>
HUMIDITY:	<u>21%</u>
TECHNICIAN: <u>DON MCELMAN</u>	DATE: <u>2/03/05</u>

Appendix 2

Baseline Air Quality Monitoring Results

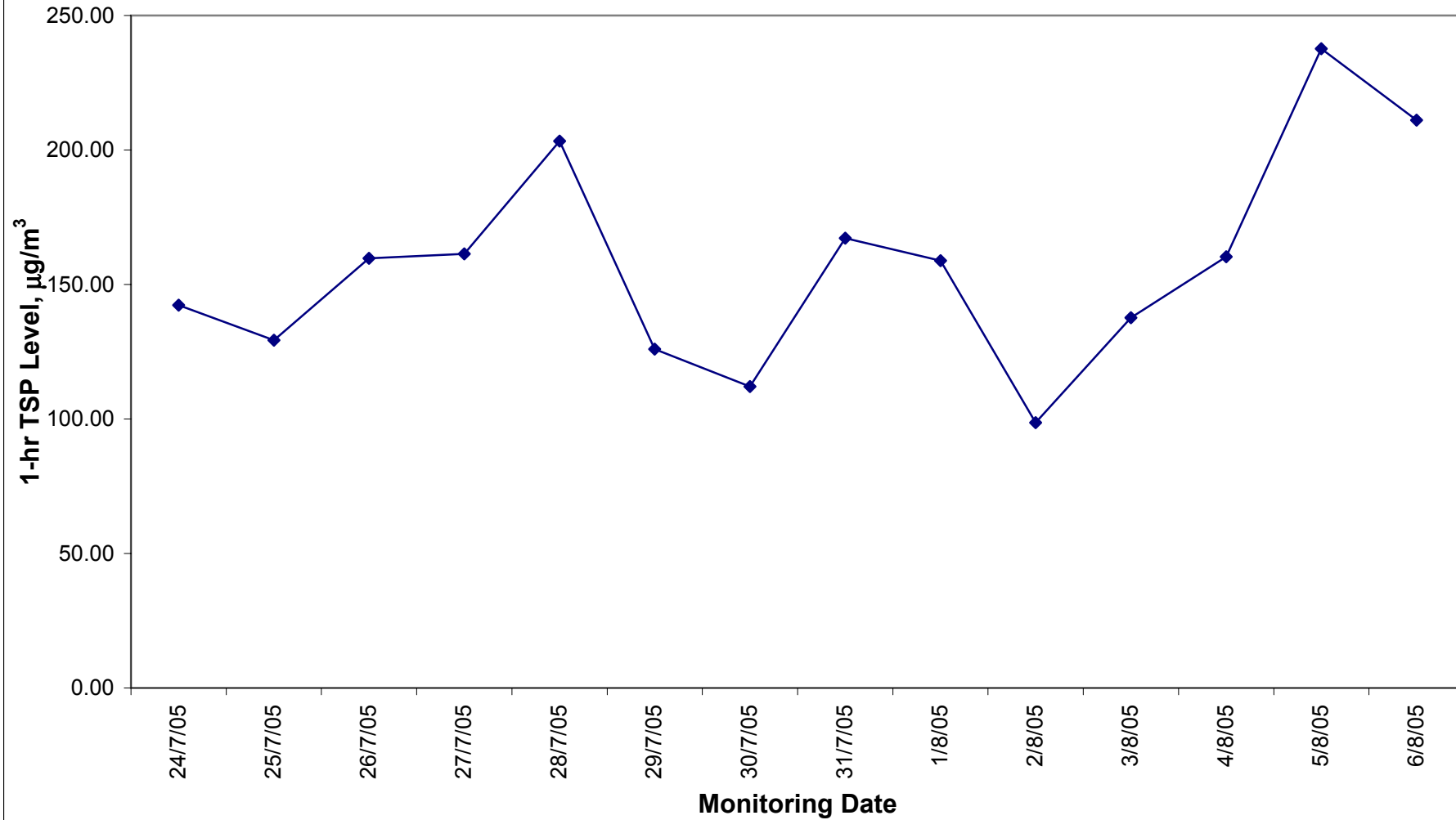
**KDB300&KDB400 Tunnels, Jordan Road to Nam Cheong Station Overrun
Appendix 2 Baseline Air Quality Monitoring Results for AM4a**

Location	Monitoring Date	Weather Conditions	Starting Time	1-hr TSP ($\mu\text{g}/\text{m}^3$)	Average 1-hr TSP ($\mu\text{g}/\text{m}^3$)	24-hr TSP ($\mu\text{g}/\text{m}^3$)
Man Cheong Street Refuse Collection Point (AM4a)	24-Jul-05	Sunny	13:00	157.65	142.32	64.80
			14:00	142.53		
			15:00	126.79		
	25-Jul-05	Sunny	11:00	123.65	129.29	48.10
			13:00	128.92		
			14:00	135.29		
	26-Jul-05	Sunny	14:22	149.92	159.77	61.40
			15:22	163.71		
			16:22	165.69		
	27-Jul-05	Fine	8:59	161.58	161.36	37.50
			9:59	160.58		
			10:59	161.91		
	28-Jul-05	Fine	9:00	209.02	203.34	38.90
			10:00	203.06		
			11:00	197.93		
	29-Jul-05	Cloudy	9:52	123.29	126.01	34.60
			10:52	126.96		
			13:02	127.78		
	30-Jul-05	Rainy	9:00	124.01	112.09	36.80
			10:00	117.65		
			11:00	94.60		
	31-Jul-05	Cloudy	9:01	172.02	167.21	37.70
			10:01	178.57		
			11:01	151.03		
	1-Aug-05	Fine	9:00	159.04	158.81	43.30
			10:00	158.79		
			11:00	158.61		
	2-Aug-05	Sunny	8:55	103.19	98.61	45.70
			9:55	96.65		
			10:55	95.98		
3-Aug-05	Fine	10:41	138.61	137.60	44.30	
		13:01	136.11			
		14:01	138.09			
4-Aug-05	Sunny	9:00	164.35	160.35	45.70	
		10:00	157.47			
		11:00	159.22			
5-Aug-05	Sunny	9:03	217.54	237.62	55.30	
		10:03	241.44			
		11:03	253.88			
6-Aug-05	Sunny	9:01	215.16	211.10	47.90	
		10:01	197.62			
		11:01	220.50			

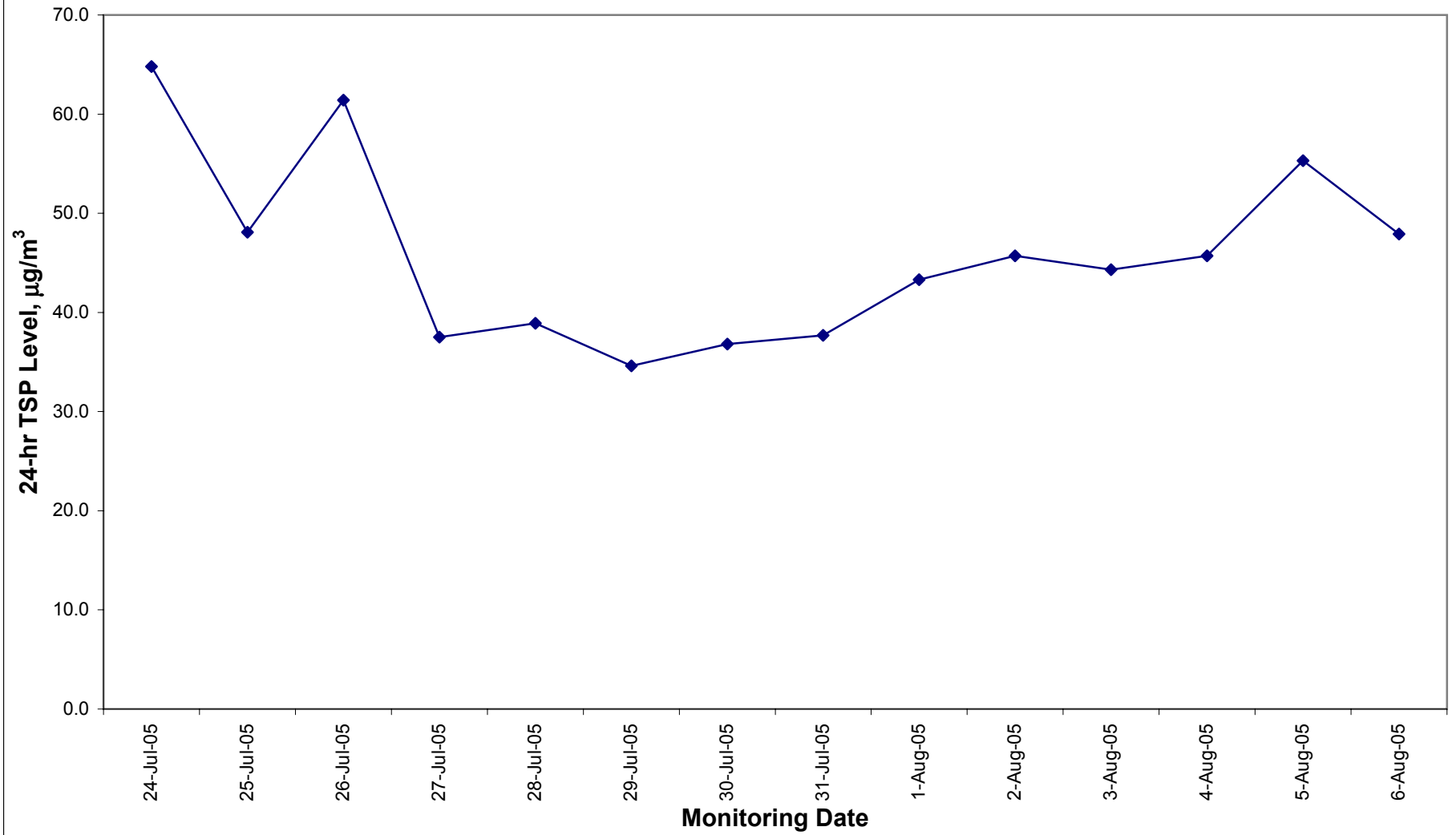
Details of 24-Hour Total Suspended Particulates (TSP) Level Monitoring at Man Cheong Street Refuse Collection Point (AM4a) from 24 July to 6 August 2005

Filter No.	Month	Date	Receptor No.	Weather condition	Site condition	Filter Weight (g)		TSP weight (g)	Flow Rate (m ³ /min)		Average Flow Rate (m3/min)	Elapse Time		Sampling Time (mins.)	Total vol. (m3)	24-hour TSP Level (µg/m3)	Remarks
						Initial	Final		Initial	Final		Start	Finish				
A03828	Jul-05	24-Jul-05	AM4a	Sunny	normal operation	2.8547	2.9444	0.0897	1.0104	0.9114	0.9609	2791.96	2815.96	1440.00	1383.70	64.8	
A03832	Jul-05	25-Jul-05	AM4a	Sunny	normal operation	2.8493	2.9357	0.0864	1.1963	1.2979	1.2471	2815.96	2839.96	1440.00	1795.82	48.1	
A03848	Jul-05	26-Jul-05	AM4a	Sunny	normal operation	2.8674	2.9482	0.0808	0.9168	0.9114	0.9141	2839.96	2863.95	1439.40	1315.76	61.4	
A03851	Jul-05	27-Jul-05	AM4a	Fine	normal operation	2.8694	2.9571	0.0877	1.5762	1.6775	1.6269	2863.95	2887.89	1436.40	2336.81	37.5	
A03863	Jul-05	28-Jul-05	AM4a	Fine	normal operation	2.8700	2.9400	0.0700	1.2490	1.2574	1.2532	2887.89	2911.82	1435.80	1799.34	38.9	
A03868	Jul-05	29-Jul-05	AM4a	Cloudy	normal operation	2.8975	2.9626	0.0651	1.3052	1.3065	1.3059	2911.82	2935.81	1439.40	1879.64	34.6	
A03873	Jul-05	30-Jul-05	AM4a	Rainy	normal operation	2.8817	2.9409	0.0592	1.1151	1.1187	1.1169	2935.81	2959.81	1440.00	1608.34	36.8	
A03876	Jul-05	31-Jul-05	AM4a	Cloudy	normal operation	2.8735	2.9133	0.0398	0.7352	0.7324	0.7338	2959.81	2983.78	1438.20	1055.35	37.7	
A03879	Jul-05	1-Aug-05	AM4a	Fine	normal operation	2.8806	2.9496	0.0690	1.1152	1.1056	1.1104	2983.78	3007.71	1435.80	1594.31	43.3	
A03897	Jul-05	2-Aug-05	AM4a	Sunny	normal operation	2.8762	2.9550	0.0788	1.2008	1.1970	1.1989	3007.71	3031.70	1439.40	1725.70	45.7	
A03900	Jul-05	3-Aug-05	AM4a	Fine	normal operation	2.8774	2.9417	0.0643	1.0070	1.0098	1.0084	3031.70	3055.68	1438.80	1450.89	44.3	
A03910	Jul-05	4-Aug-05	AM4a	Sunny	normal operation	2.9420	2.9833	0.0413	0.6292	0.6261	0.6277	3055.68	3079.68	1440.00	903.82	45.7	
A03924	Jul-05	5-Aug-05	AM4a	Sunny	normal operation	2.9572	3.0071	0.0499	0.6261	0.6261	0.6261	3079.68	3103.68	1440.00	901.58	55.3	
A03925	Jul-05	6-Aug-05	AM4a	Sunny	normal operation	2.9610	3.0500	0.0890	1.2907	1.2873	1.2890	3103.68	3127.68	1440.00	1856.16	47.9	

Baseline Air Quality Monitoring Results (1-hr TSP) for Man Cheong Street Refuse Collection Point (AM4a) from 24 July 05 to 6 August 05



Baseline Air Quality Monitoring Results (24-hr TSP) for Man Cheong Street Refuse Collection Point (AM4a) from 24 July 05 to 6 August 05



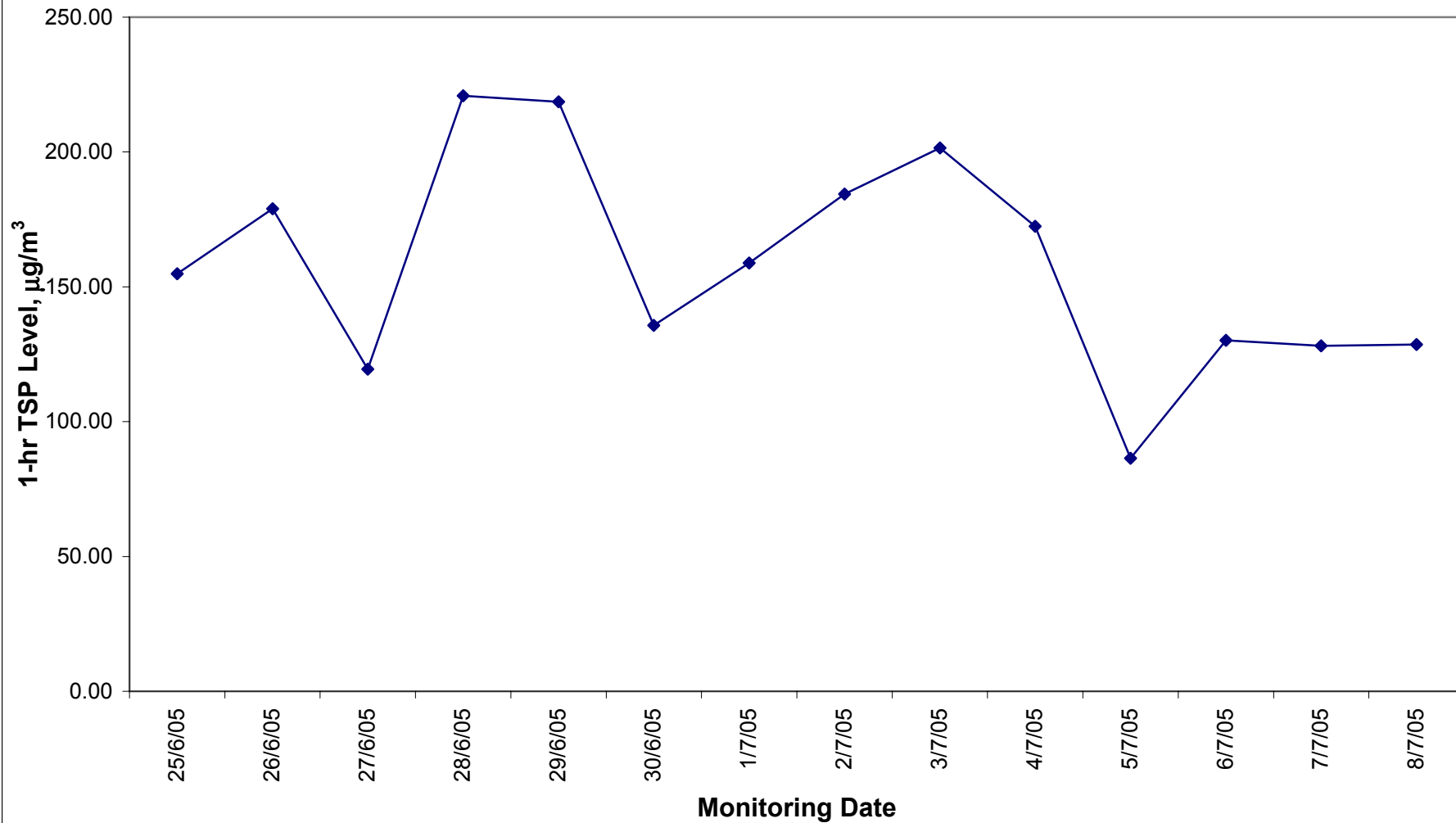
**KDB300&KDB400 Tunnels, Jordan Road to Nam Cheong Station Overrun
Appendix 2 Baseline Air Quality Monitoring Results for AM5**

Location	Monitoring Date	Weather Conditions	Starting Time	1-hr TSP ($\mu\text{g}/\text{m}^3$)	Average 1-hr TSP ($\mu\text{g}/\text{m}^3$)	24-hr TSP ($\mu\text{g}/\text{m}^3$)
Charming Garden (AM5)	25-Jun-05	Cloudy	8:33	163.06	154.83	40.00
			9:33	153.26		
			10:33	148.18		
	26-Jun-05	Cloudy	8:19	189.62	178.97	19.00
			9:19	180.74		
			10:19	166.55		
	27-Jun-05	Fine	8:34	130.79	119.44	28.00
			9:34	104.06		
			10:34	123.47		
	28-Jun-05	Fine	15:26	218.78	220.80	20.10
			16:26	212.31		
			17:26	231.32		
	29-Jun-05	Fine	9:00	220.21	218.60	29.00
			10:00	222.81		
			11:00	212.78		
	30-Jun-05	Fine	9:12	130.48	135.71	18.10
			10:12	136.64		
			11:12	139.99		
	1-Jul-05	Fine	14:11	157.83	158.78	17.80
			15:11	159.13		
			16:11	159.39		
	2-Jul-05	Sunny	8:55	188.86	184.41	26.20
			9:55	186.41		
			10:55	177.96		
	3-Jul-05	Sunny	14:10	204.69	201.49	22.90
			15:10	199.34		
			16:10	200.44		
	4-Jul-05	Sunny	14:32	172.17	172.48	27.90
			15:32	171.59		
			16:32	173.68		
	5-Jul-05	Sunny	14:17	84.52	86.41	39.50
			15:17	79.07		
			16:17	95.64		
	6-Jul-05	Cloudy	13:41	128.60	130.17	66.20
			14:41	122.92		
			15:41	138.99		
	7-Jul-05	Cloudy	14:34	140.85	128.11	30.90
			15:34	104.62		
			16:34	138.86		
	8-Jul-05	Fine	13:49	130.48	128.63	23.20
			14:49	127.95		
			15:49	127.45		

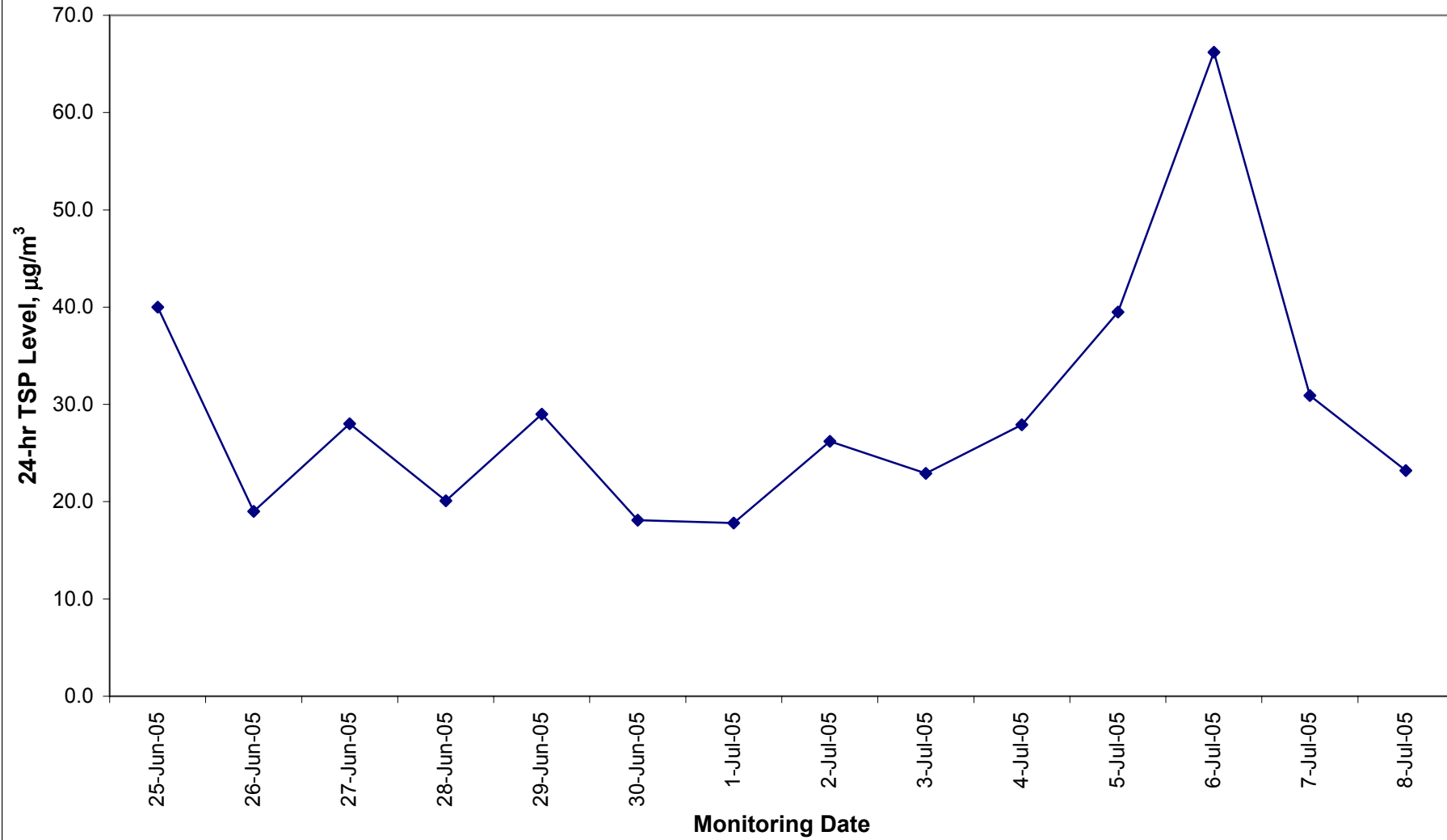
Details of 24-Hour Total Suspended Particulates (TSP) Level Monitoring at Charming Garden (AM5) from 25 June to 8 July 2005

Filter No.	Month	Date	Receptor No.	Weather condition	Site condition	Filter Weight (g)		TSP weight (g)	Flow Rate (m ³ /min)		Average Flow Rate (m3/min)	Elapse Time		Sampling Time (mins.)	Total vol. (m3)	24-hour TSP Level (µg/m3)	Remarks
						Initial	Final		Initial	Final		Start	Finish				
A03643	Jun-05	25-Jun-05	AM5	Cloudy	normal operation	2.7869	2.8408	0.0539	0.7279	1.1450	0.9365	2088.55	2112.55	1440.00	1348.49	40.0	
A03648	Jun-05	26-Jun-05	AM5	Cloudy	normal operation	2.7990	2.8359	0.0369	1.3539	1.3502	1.3521	2112.55	2136.55	1440.00	1946.95	19.0	
A03652	Jun-05	27-Jun-05	AM5	Fine	normal operation	2.8058	2.8442	0.0384	0.9334	0.9682	0.9508	2136.55	2160.55	1440.00	1369.15	28.0	
A03667	Jun-05	28-Jun-05	AM5	Fine	normal operation	2.8114	2.8470	0.0356	1.2113	1.2470	1.2292	2160.55	2184.55	1440.00	1769.98	20.1	
A03670	Jun-05	29-Jun-05	AM5	Fine	normal operation	2.7992	2.8412	0.0420	1.0037	1.0100	1.0069	2184.55	2208.55	1440.00	1449.86	29.0	
A03683	Jun-05	30-Jun-05	AM5	Fine	normal operation	2.8605	2.8993	0.0388	1.4863	1.4990	1.4927	2208.55	2232.55	1440.00	2149.42	18.1	
A03686	Jul-05	1-Jul-05	AM5	Fine	normal operation	2.8247	2.8629	0.0382	1.4863	1.4990	1.4927	2232.55	2256.55	1440.00	2149.42	17.8	
A03670	Jul-05	2-Jul-05	AM5	Sunny	normal operation	2.8758	2.9190	0.0432	1.1478	1.1446	1.1462	2424.30	2448.30	1440.00	1650.53	26.2	
A03694	Jul-05	3-Jul-05	AM5	Sunny	normal operation	2.8553	2.8936	0.0383	1.1478	1.1794	1.1636	2280.55	2304.55	1440.00	1675.58	22.9	
A03697	Jul-05	4-Jul-05	AM5	Sunny	normal operation	2.8692	2.9204	0.0512	1.2849	1.2828	1.2839	2304.55	2328.40	1431.00	1837.19	27.9	
A03722	Jul-05	5-Jul-05	AM5	Sunny	normal operation	2.9303	3.0013	0.0710	1.2132	1.2818	1.2475	2328.40	2352.40	1440.00	1796.40	39.5	
A03726	Jul-05	6-Jul-05	AM5	Cloudy	normal operation	2.9226	3.0348	0.1122	1.1428	1.2123	1.1776	2352.40	2376.39	1439.40	1694.97	66.2	
A03742	Jul-05	7-Jul-05	AM5	Cloudy	normal operation	2.9022	2.9774	0.0752	1.6989	1.6989	1.6989	2376.39	2400.30	1434.60	2437.24	30.9	
A03745	Jul-05	8-Jul-05	AM5	Fine	normal operation	2.8789	2.9288	0.0499	1.4960	1.4943	1.4952	2400.30	2424.30	1440.00	2153.02	23.2	

**1-hour Baseline Air Quality Monitoring Results (1-hr TSP) for Charming Garden (AM5)
from 25 June 05 to 8 July 05**



**24-hour Baseline Air Quality Monitoring Results (24-hr TSP) for Charming Garden (AM5)
from 25 June 05 to 8 July 05**



KSL KDB300 & KDB400 Tunnels, Jordan Road to Nam Cheong Station Overrun
Appendix 2 Baseline Air Quality Monitoring Results for AM6

Location	Monitoring Date	Weather Conditions	Starting Time	1-hr TSP ($\mu\text{g}/\text{m}^3$)	Average 1-hr TSP ($\mu\text{g}/\text{m}^3$)	24-hr TSP ($\mu\text{g}/\text{m}^3$)
Olympian City phase III	25-Mar-07	Fine	09:00	123.10	136.2	101.7
		Fine	10:00	137.57		
		Fine	11:00	148.00		
	01-Apr-07	Sunny	09:00	41.95	43.4	71.6
		Sunny	10:00	51.10		
		Sunny	11:00	37.11		
	05-Apr-07	Cloudy	09:10	94.86	67.2	65.5
		Cloudy	10:10	49.25		
		Cloudy	11:10	57.45		
	06-Apr-07	Fine	11:25	71.53	74.6	53.0
		Fine	12:25	52.33		
		Fine	13:25	99.87		
	07-Apr-07	Cloudy	13:15	64.03	41.0	43.9
		Cloudy	14:15	21.75		
		Cloudy	15:15	37.28		
	08-Apr-07	Cloudy	15:25	56.76	49.3	65.6
		Cloudy	16:21	30.55		
		Cloudy	17:22	60.52		
	09-Apr-07	Fine	17:00	38.17	42.8	123.0
		Fine	18:00	43.15		
		Fine	19:00	46.98		
	15-Apr-07	Fine	09:08	45.74	41.7	66.3
		Fine	10:08	48.63		
		Fine	11:07	30.82		
	22-Apr-07	Sunny	09:15	114.21	90.1	65.5
		Sunny	10:15	86.29		
		Sunny	11:15	69.70		
29-Apr-07	Cloudy	09:40	19.80	65.4	101.5	
	Cloudy	10:40	104.43			
	Cloudy	11:40	71.97			
01-May-07	Sunny	09:00	145.84	157.7	134.2	
	Sunny	10:00	172.70			
	Sunny	11:00	154.56			
13-May-07	Sunny	09:00	221.15	170.4	157.2	
	Sunny	10:00	170.36			
	Sunny	11:00	119.58			
24-May-07	Sunny	09:15	196.57	138.4	71.5	
	Sunny	10:15	84.10			
	Sunny	11:15	134.58			
27-May-07	Sunny	09:00	46.83	50.7	71.7	
	Sunny	10:00	58.54			
	Sunny	11:00	46.83			

* No monitoring could be carried out on 6 May and 20 May due to power failure

KSL KDB300 & KDB400 Tunnels, Jordan Road to Nam Cheong Station Overrun

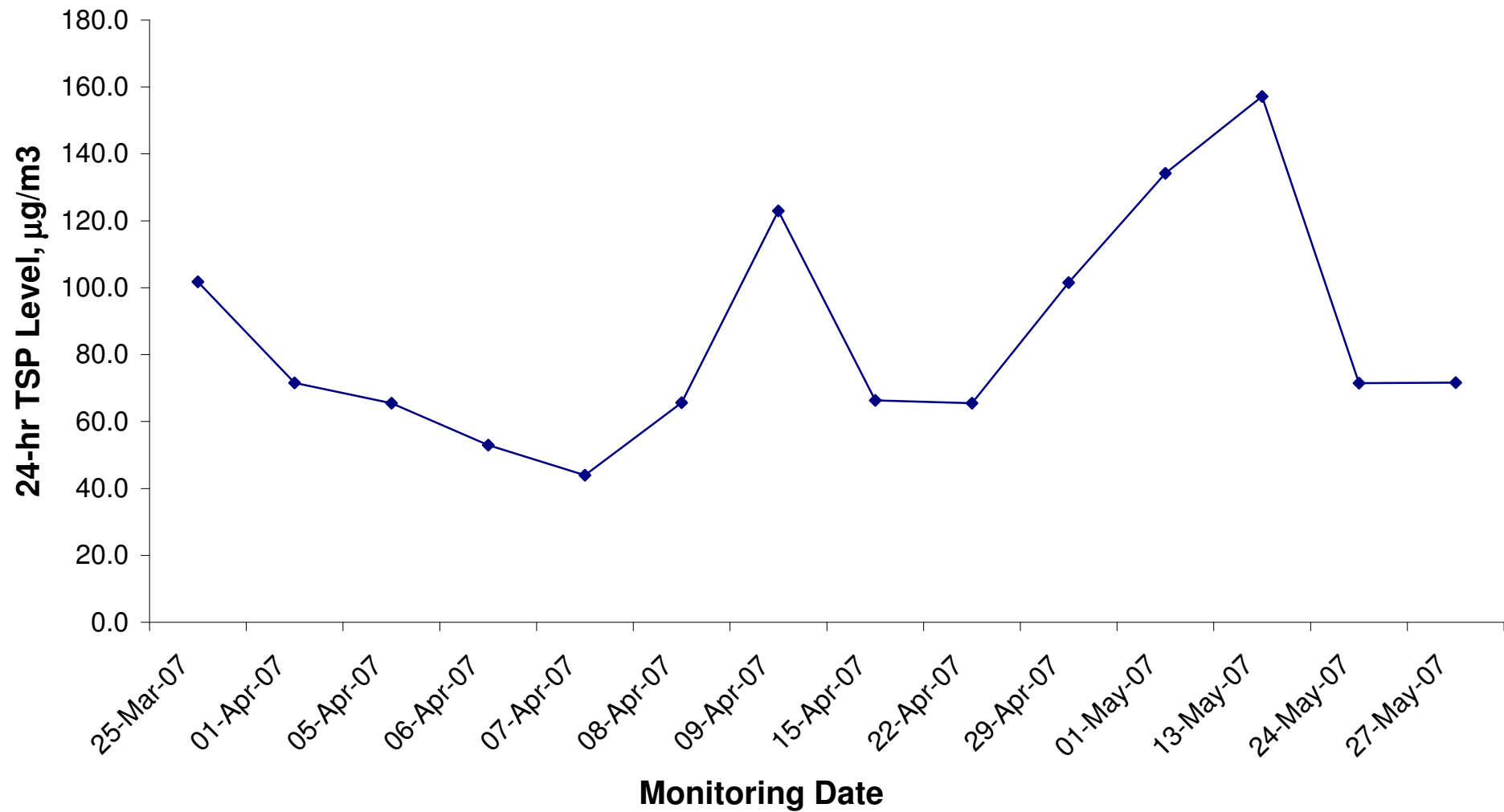
Air Quality Baseline Monitoring Results for AM6 (1-Hour TSP)

Location	Monitoring Date	Weather Conditions	Temp (oC)	Timer-I	Timer-F	Time (mins)	Flow-I (CFM)	Flow-F (CFM)	Flow-I (m³/min)	Flow-F (m³/min)	Flow-avg (m³/min)	Volume (m³)	Weight-I (g)	Weight-F (g)	Weight-diff. (g)	1-hr TSP (µg/m³)	Average 1-Hr TSP (µg/m³)
Olympian City phase III	25-Mar-07	Fine	27	383811	383913	61.2	36	36	1.04	1.04	1.04	63.37	2.8319	2.8397	0.0078	123.1	136.2
		Fine	27	383913	384015	61.2	42	42	1.12	1.12	1.12	68.33	2.8472	2.8566	0.0094	137.6	
		Fine	27	384015	384118	61.8	50	50	1.22	1.22	1.22	75.68	2.8618	2.8730	0.0112	148.0	
	01-Apr-07	Sunny	26	386547	386643	57.6	39	39	1.08	1.08	1.08	61.97	2.8746	2.8772	0.0026	42.0	43.4
		Sunny	26	386643	386740	58.2	39	39	1.08	1.08	1.08	62.62	2.8647	2.8679	0.0032	51.1	
		Sunny	26	386740	386836	57.6	39	39	1.08	1.08	1.08	61.97	2.8733	2.8756	0.0023	37.1	
	05-Apr-07	Cloudy	17	389227	389323	57.6	42	42	1.12	1.12	1.12	64.31	2.8282	2.8343	0.0061	94.9	67.2
		Cloudy	17	389323	389420	58.2	42	42	1.12	1.12	1.12	64.98	2.8364	2.8396	0.0032	49.2	
		Cloudy	17	389420	389515	57.0	43	43	1.13	1.13	1.13	64.41	2.8595	2.8632	0.0037	57.4	
	06-Apr-07	Fine	19	391830	391926	57.6	42	42	1.12	1.12	1.12	64.31	2.8378	2.8424	0.0046	71.5	74.6
		Fine	19	391926	392023	58.2	42	42	1.12	1.12	1.12	64.98	2.8800	2.8834	0.0034	52.3	
		Fine	19	392023	392119	57.6	43	43	1.13	1.13	1.13	65.09	2.8427	2.8492	0.0065	99.9	
	07-Apr-07	Cloudy	18	394396	394494	58.8	38	38	1.06	1.06	1.06	62.47	2.842	2.846	0.0040	64.0	41.0
		Cloudy	18	394494	394595	60.6	38	38	1.06	1.06	1.06	64.38	2.8529	2.8543	0.0014	21.7	
		Cloudy	18	394595	394690	57.0	36	36	1.04	1.04	1.04	59.02	2.8821	2.8843	0.0022	37.3	
	08-Apr-07	Cloudy	21	397028	397123	57.0	28	28	0.93	0.93	0.93	52.86	2.8509	2.8539	0.0030	56.8	49.3
		Cloudy	21	397123	397223	60.0	28	28	0.93	0.93	0.93	55.64	2.8755	2.8772	0.0017	30.6	
		Cloudy	21	397223	397321	58.8	28	28	0.93	0.93	0.93	54.53	2.8892	2.8925	0.0033	60.5	
	09-Apr-07	Fine	17	399559	399653	56.4	35	35	1.02	1.02	1.02	57.63	2.8646	2.8668	0.0022	38.2	42.8
		Fine	17	399653	399750	58.2	36	36	1.04	1.04	1.04	60.26	2.8621	2.8647	0.0026	43.1	
		Fine	17	399750	399845	57.0	34	34	1.01	1.01	1.01	57.48	2.8631	2.8658	0.0027	47.0	
	15-Apr-07	Fine	23	402033	402130	58.2	40	40	1.09	1.09	1.09	63.40	2.8664	2.8693	0.0029	45.7	41.7
		Fine	23	402130	402226	57.6	36	36	1.04	1.04	1.04	59.64	2.8571	2.8600	0.0029	48.6	
		Fine	23	402226	402320	56.4	36	36	1.04	1.04	1.04	58.40	2.8881	2.8899	0.0018	30.8	
	22-Apr-07	Sunny	28	405030	405126	57.6	37	37	1.05	1.05	1.05	60.42	2.8667	2.8736	0.0069	114.2	90.1
		Sunny	28	405126	405223	58.2	36	36	1.04	1.04	1.04	60.26	2.8732	2.8784	0.0052	86.3	
		Sunny	28	405223	405320	58.2	36	36	1.04	1.04	1.04	60.26	2.8584	2.8626	0.0042	69.7	
	29-Apr-07	Cloudy	22	407701	407798	58.2	30	30	0.95	0.95	0.95	55.54	2.881	2.8821	0.0011	19.8	65.4
		Cloudy	22	407798	407895	58.2	30	30	0.95	0.95	0.95	55.54	2.8917	2.8975	0.0058	104.4	
		Cloudy	22	407895	407991	57.6	29	29	0.94	0.94	0.94	54.19	2.8679	2.8718	0.0039	72.0	
	01-May-07	Sunny	28	410177	410275	58.8	41	40	1.10	1.09	1.10	64.46	2.8707	2.8801	0.0094	145.8	157.7
		Sunny	28	410275	410373	58.8	41	41	1.10	1.10	1.10	64.85	2.8785	2.8897	0.0112	172.7	
		Sunny	28	410373	410470	58.2	40	40	1.09	1.09	1.09	63.40	2.8621	2.8719	0.0098	154.6	
	13-May-07	Sunny	28	412939	413036	58.2	37	37	1.05	1.05	1.05	61.05	2.8620	2.8755	0.0135	221.1	170.4
		Sunny	28	413036	413133	58.2	37	37	1.05	1.05	1.05	61.05	2.8629	2.8933	0.0104	170.4	
		Sunny	28	413133	413230	58.2	37	37	1.05	1.05	1.05	61.05	2.8725	2.8798	0.0073	119.6	
	24-May-07	Sunny	31	415701	415798	58.2	37	37	1.05	1.05	1.05	61.05	2.8149	2.8269	0.0120	196.6	138.4
		Sunny	31	415798	415895	58.2	38	38	1.06	1.06	1.06	61.83	2.8624	2.8676	0.0052	84.1	
		Sunny	31	415895	415993	58.8	37	37	1.05	1.05	1.05	61.67	2.8674	2.8757	0.0083	134.6	
	27-May-07	Sunny	32	418425	418520	57.0	37	37	1.05	1.05	1.05	59.79	2.8308	2.8336	0.0028	46.8	50.7
		Sunny	32	418520	418615	57.0	37	37	1.05	1.05	1.05	59.79	2.8288	2.8323	0.0035	58.5	
		Sunny	32	418615	418710	57.0	37	37	1.05	1.05	1.05	59.79	2.8655	2.8683	0.0028	46.8	

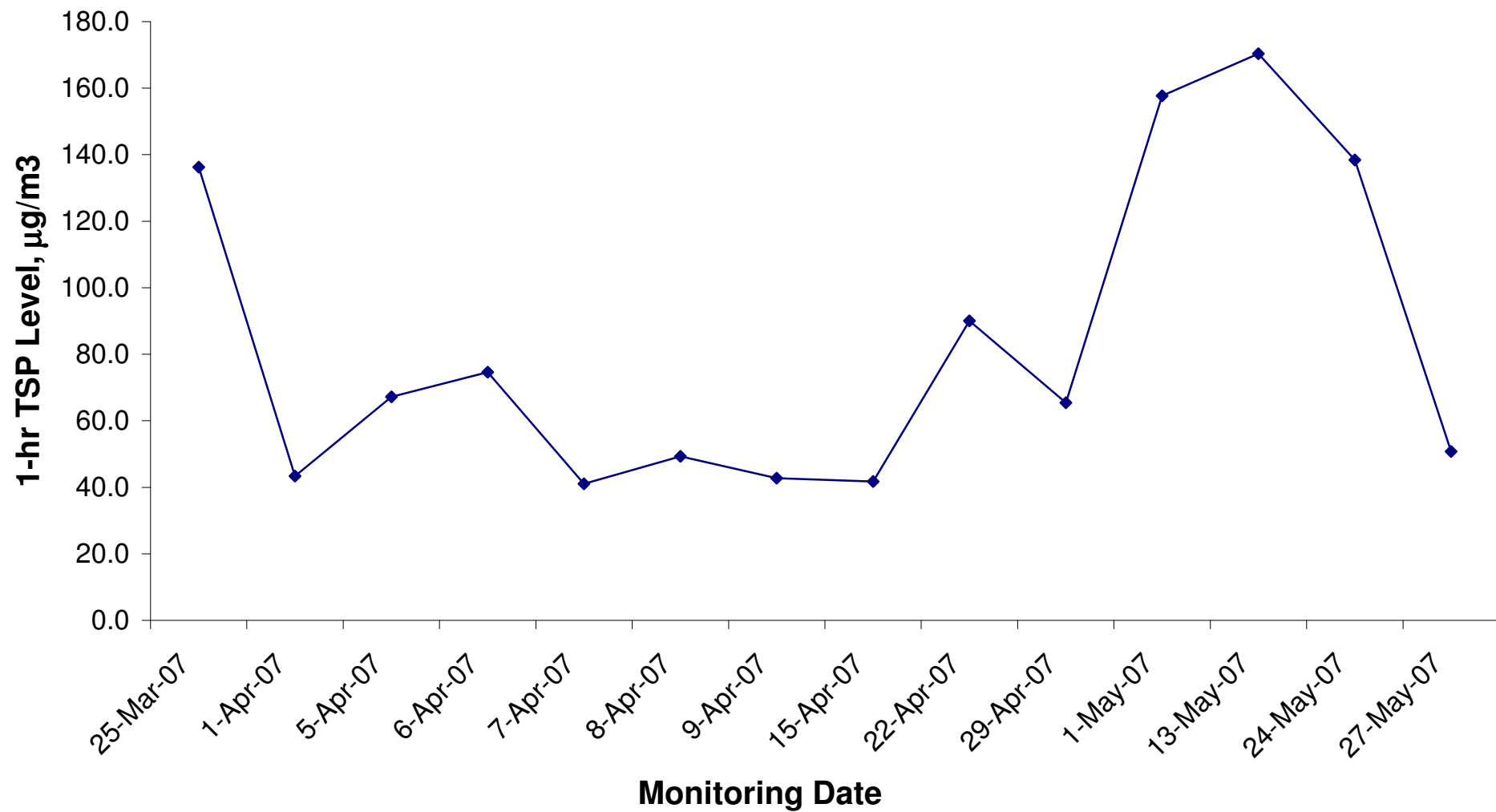
Details of 24-Hour Total Suspended Particulates (TSP) Level Monitoring at Olympian City Phase III (AM6) from 25 March 2007 to 27 May 2007

Filter No.	Month	Date	Receptor No.	Weather condition	Site condition	Filter Weight (g)		TSP weight (g)	Flow Rate (m ³ /min)		Average Flow Rate (m3/min)	Elapse Time		Sampling Time (mins.)	Total vol. (m3)	24-hour TSP Level (µg/m3)	Remarks
						Initial	Final		Initial	Final		Start	Finish				
KP01	Mar-07	25-Mar-07	AM6	Fine	normal operation	2.8622	3.0224	0.1602	1.0894	1.0759	1.0827	384118	386542	1454.4	1574.63	101.7	
KQ52	Apr-07	01-Apr-07	AM6	Sunny	normal operation	2.8379	2.9484	0.1105	1.0759	1.0759	1.0759	386836	389227	1434.6	1543.51	71.6	
KR54	Apr-07	05-Apr-07	AM6	Cloudy	normal operation	2.8520	2.9535	0.1015	1.1164	1.1164	1.1164	389515	391830	1389.0	1550.74	65.5	
KR58	Apr-07	06-Apr-07	AM6	Fine	normal operation	2.8192	2.9010	0.0818	1.1300	1.1300	1.1300	392119	394396	1366.2	1543.74	53.0	
KR81	Apr-07	07-Apr-07	AM6	Cloudy	normal operation	2.8736	2.9374	0.0638	1.0354	1.0354	1.0354	394690	397028	1402.8	1452.44	43.9	
KR70	Apr-07	08-Apr-07	AM6	Cloudy	normal operation	2.8717	2.9534	0.0817	0.9273	0.9273	0.9273	397321	399559	1342.8	1245.18	65.6	
KR77	Apr-07	09-Apr-07	AM6	Fine	normal operation	2.8859	3.0618	0.1759	1.0894	1.0894	1.0894	399845	402033	1312.8	1430.20	123.0	
KS10	Apr-07	15-Apr-07	AM6	Fine	normal operation	2.8645	2.9774	0.1129	1.0354	1.0354	1.0354	402320	405061	1644.6	1702.79	66.3	
KS40	Apr-07	22-Apr-07	AM6	Sunny	normal operation	2.8644	2.9629	0.0985	1.0489	1.0489	1.0489	405320	407710	1434.0	1504.11	65.5	
KT23	Apr-07	29-Apr-07	AM6	Cloudy	normal operation	2.8689	2.9942	0.1253	0.9408	0.9408	0.9408	407991	410177	1311.6	1233.97	101.5	
KT22	May-07	01-May-07	AM6	Sunny	normal operation	2.8892	3.1056	0.2164	1.0894	1.0894	1.0894	410470	412937	1480.2	1612.57	134.2	
KT66	May-07	13-May-07	AM6	Sunny	normal operation	2.8858	3.1341	0.2483	1.0759	1.0624	1.0692	413230	415693	1477.8	1580.00	157.2	
KV93	May-07	24-May-07	AM6	Sunny	normal operation	2.8679	2.9788	0.1109	1.0624	1.0624	1.0624	415993	418427	1460.4	1551.53	71.5	
KY33	May-07	27-May-07	AM6	Sunny	normal operation	2.885	2.9988	0.1138	1.0624	1.0489	1.0556	418710	421217	1504.2	1587.91	71.7	

Baseline Air Quality Monitoring Results (24-hr TSP) at Olympian City Phase III (AM6) from 25 Mar 07 to 27 May 07



Baseline Air Quality Monitoring Results (1-hr TSP) at Olympian City Phase III (AM6) from 25 Mar 07 to 27 May 07



Appendix 3

Baseline Noise Monitoring Results

KSL KDB300 & KDB400 Tunnels, Jordan Road to Nam Cheong Station Overrun

Appendix 3 Baseline Noise Monitoring Results at Man Cheong Street Refuse Collection Point (NM4a)

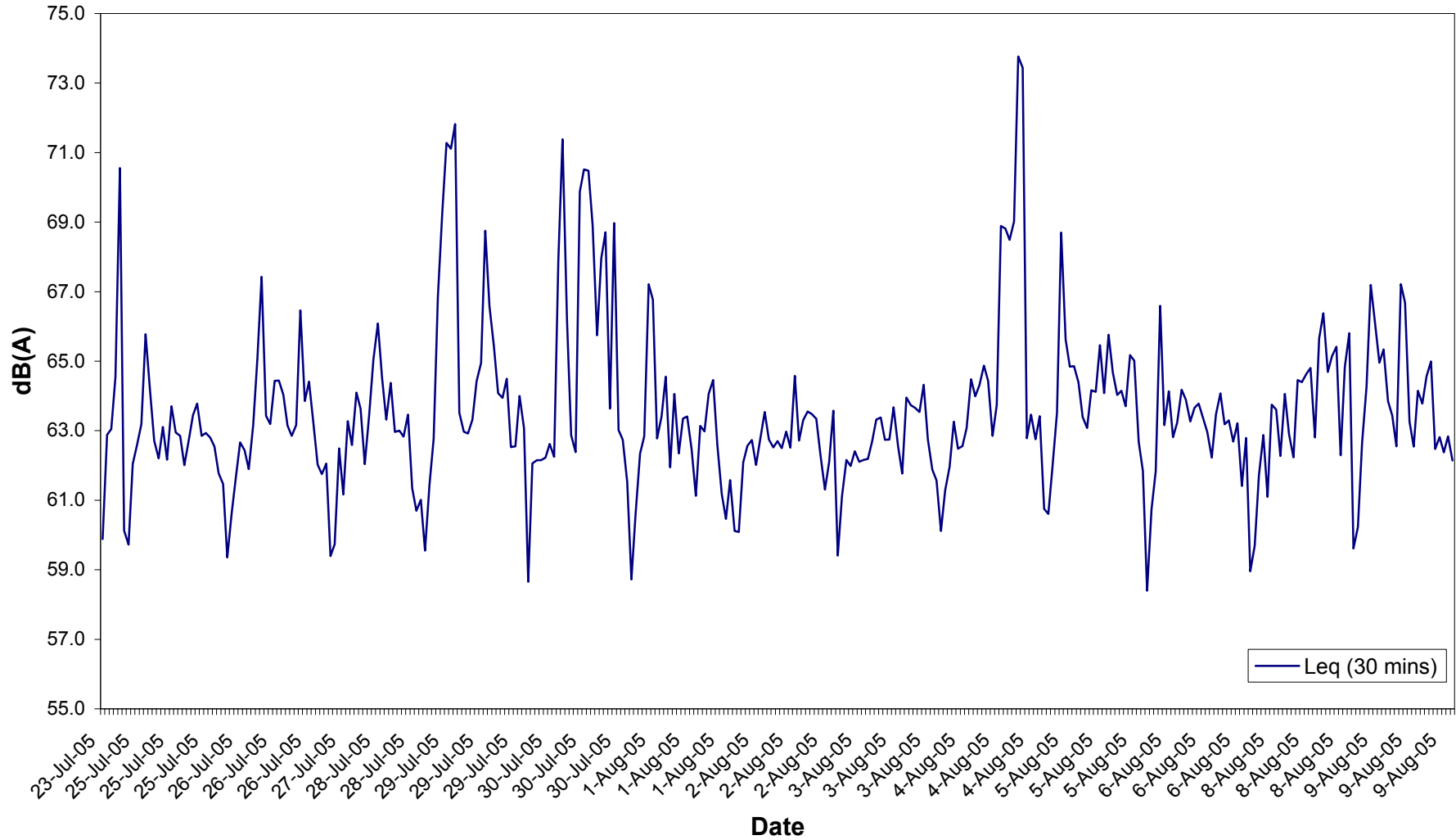
Date	Non-restricted Hours (0700-1900)			Restricted Hours (1900-2300 on normal weekdays and 0700-2300 on Public Holidays)			Restricted Hours (2300-0700)			Weather Conditions	Wind Direction
	Noise Level, dB(A)			Noise Level, dB(A)			Noise Level, dB(A)				
	L _{eq} (30min)	L ₁₀ (30min)	L ₉₀ (30min)	L _{eq} (15min)	L ₁₀ (15min)	L ₉₀ (15min)	L _{eq} (15min)	L ₁₀ (15min)	L ₉₀ (15min)		
23-Jul-05	65.8	66.8	61.9	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	Fine	NE
24-Jul-05	N/A	N/A	N/A	59.5	60.9	56.7	57.3	58.5	55.4	Sunny	NE
25-Jul-05	62.8	64.8	59.7	60.7	62.1	57.5	57.2	58.5	54.9	Sunny	N
26-Jul-05	63.6	65.6	59.8	60.9	63.0	57.4	57.8	59.0	55.6	Sunny	SW
27-Jul-05	62.3	64.7	58.4	n.a.	n.a.	n.a.	56.5	57.6	53.8	Fine	E
28-Jul-05	63.5	65.5	59.5	59.5	61.4	56.8	58.5	60.0	56.1	Fine	E
29-Jul-05	66.4	69.4	60.3	62.5	64.2	59.1	57.6	59.1	54.9	Cloudy	E
30-Jul-05	66.7	69.1	61.2	60.0	61.9	56.9	58.0	59.9	54.9	Rainy	SE
31-Jul-05	N/A	N/A	N/A	63.8	66.8	58.1	59.9	62.7	55.3	Cloudy	SE
1-Aug-05	63.3	65.5	59.4	60.8	62.4	57.9	59.4	62.0	55.2	Fine	SE
2-Aug-05	62.7	64.5	59.9	60.5	61.8	58.1	58.6	57.7	54.0	Sunny	SW
3-Aug-05	62.7	64.5	59.8	61.4	62.6	59.1	56.8	58.1	54.4	Fine	SW
4-Aug-05	66.8	71.2	60.4	61.8	63.6	58.7	57.6	58.9	55.1	Sunny	SW
5-Aug-05	64.4	66.4	60.8	61.2	62.5	58.3	57.7	58.8	54.7	Sunny	W
6-Aug-05	63.2	65.5	59.9	60.3	61.6	57.6	57.7	59.1	55.5	Sunny	SW
7-Aug-05	N/A	N/A	N/A	60.1	61.7	57.4	57.1	58.4	54.7	Cloudy	SW
8-Aug-05	63.9	66.3	59.7	n.a.	n.a.	n.a.	58.5	59.5	57.1	Cloudy	E
9-Aug-05	64.2	66.3	60.3	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	Cloudy	E
Average Noise Level	64.4	66.9	60.2	61.1	62.9	57.9	58.0	59.5	55.2		
Noise level with Façade correction	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
Days of data used	15	15	15	14	14	14	16	16	16		

Remarks:

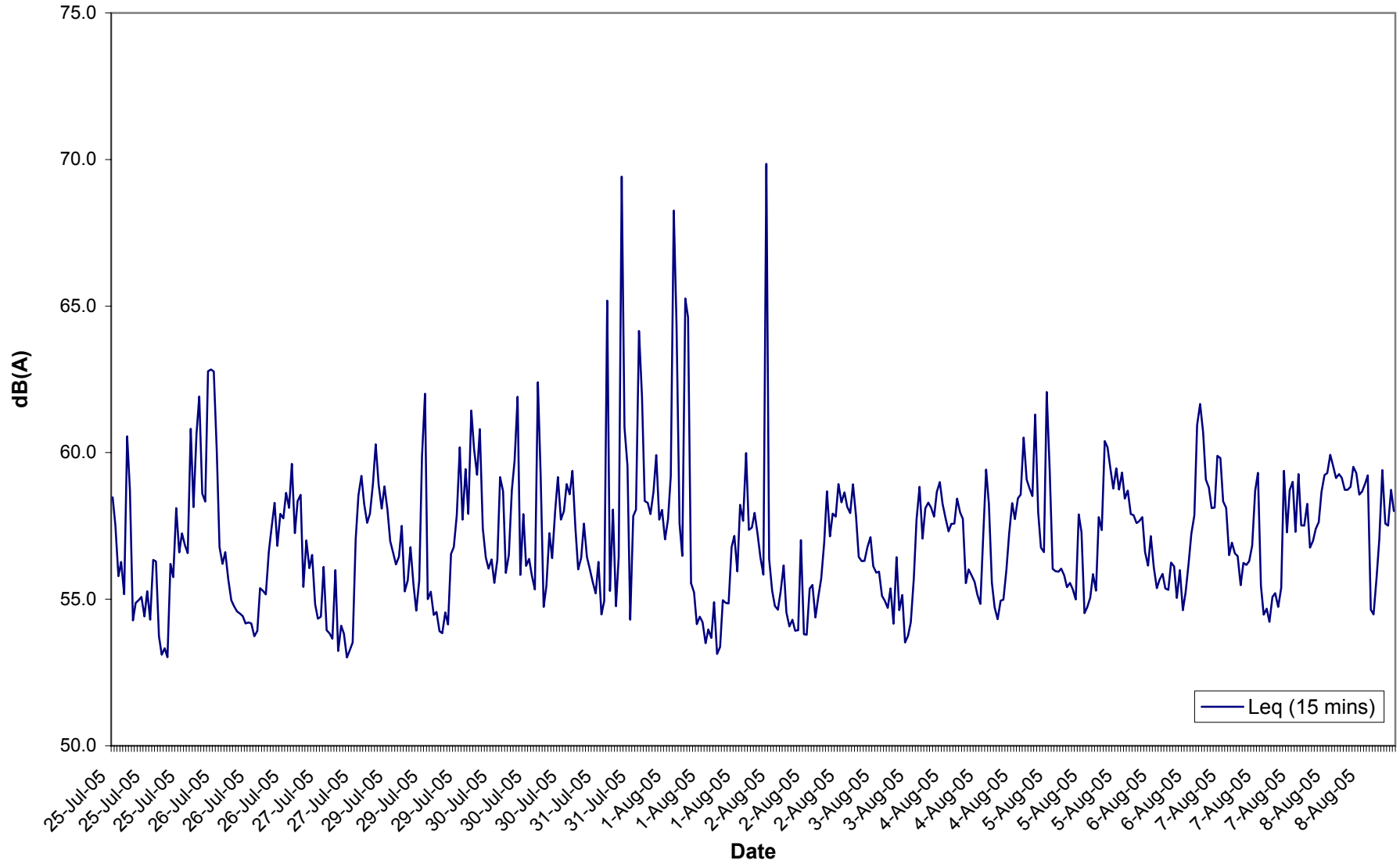
Shaded area indicates Sunday or public holiday

n.a. - No data available / No sufficient data

**Chart 1 - Baseline Noise Monitoring at Man Cheong Street Refuse Collection Point (NM4a)
during 07:00-19:00 on Normal Weekdays (24 July 2005 - 9 August 2005)**



**Chart 3 - Baseline Noise Monitoring at Man Cheong Street Refuse Collection Point (NM4a)
during 23:00-07:00 (24 July 2005 - 9 August 2005)**



KSL KDB300 & KDB400 Tunnels, Jordan Road to Nam Cheong Station Overrun

Appendix 3 Baseline Noise Monitoring Results at Charming Garden (NM5)

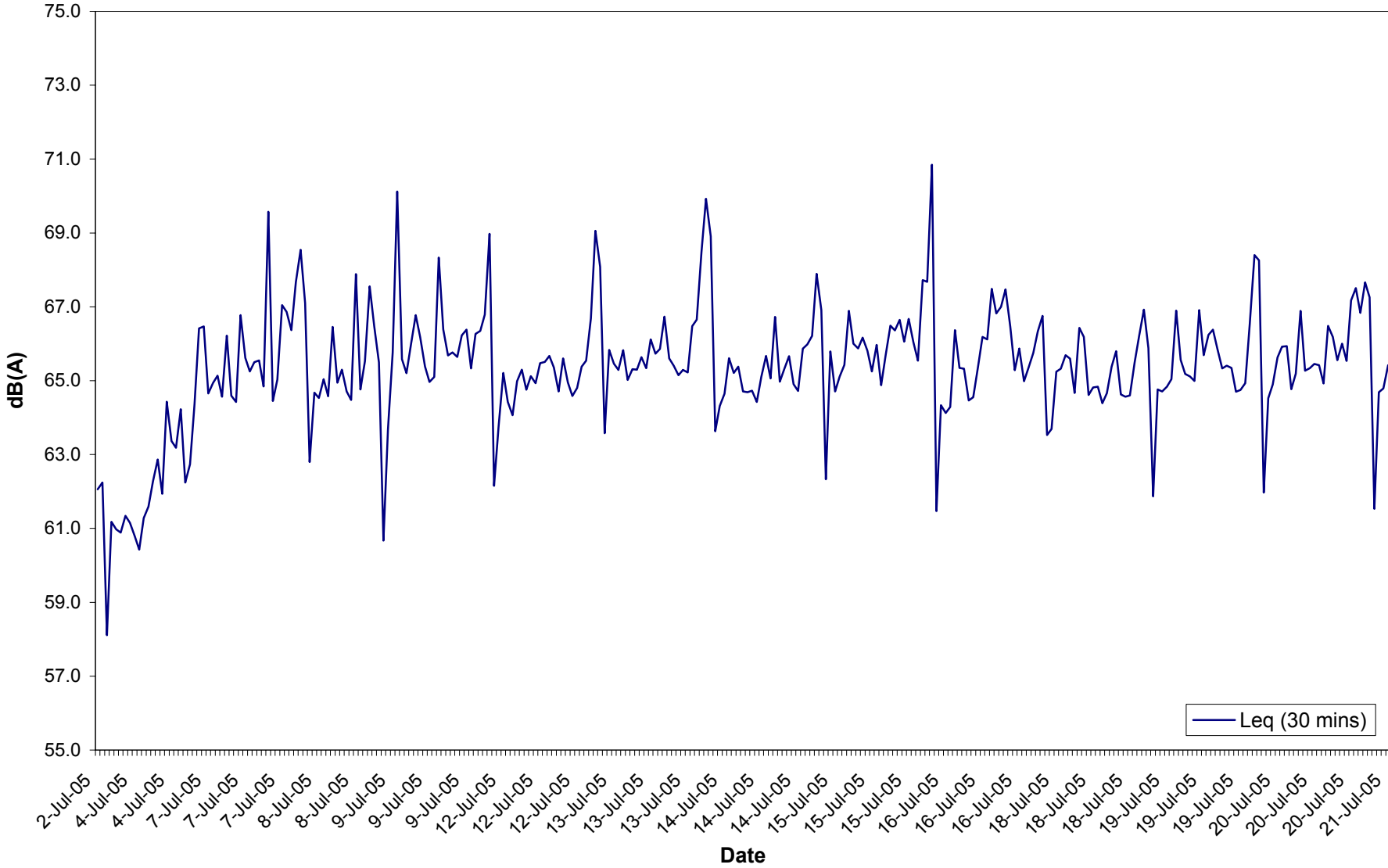
Date	Non-restricted Hours (0700-1900)			Restricted Hours (1900-2300 on normal weekdays and 0700-2300 on Public Holidays)			Restricted Hours (2300-0700)			Weather Conditions	Wind Direction
	Noise Level, dB(A)			Noise Level, dB(A)			Noise Level, dB(A)				
	L _{eq} (30min)	L ₁₀ (30min)	L ₉₀ (30min)	L _{eq} (15min)	L ₁₀ (15min)	L ₉₀ (15min)	L _{eq} (15min)	L ₁₀ (15min)	L ₉₀ (15min)		
2-Jul-05	62.2	64.5	57.7	59.9	62.2	55.8	58.0	60.6	53.9	Sunny	SE
3-Jul-05	N/A	N/A	N/A	60.4	62.5	56.0	55.5	57.9	51.3	Sunny	SE
4-Jul-05	62.2	64.7	57.5	n.a.	n.a.	n.a.	54.0	55.8	51.1	Sunny	S
5-Jul-05	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	Sunny	SW
6-Jul-05	n.a.	n.a.	n.a.	63.5	66.2	59.6	61.5	64.4	57.1	Cloudy	W
7-Jul-05	66.2	68.7	61.5	63.5	65.7	59.5	59.0	61.0	55.6	Cloudy	N
8-Jul-05	65.5	67.6	60.8	63.6	65.8	59.2	60.4	62.1	56.5	Fine	SW
9-Jul-05	66.3	68.7	61.8	64.7	67.3	59.4	60.0	62.2	55.8	Rainy	S
10-Jul-05	N/A	N/A	N/A	64.9	66.4	59.6	63.2	65.6	56.2	Cloudy	S
11-Jul-05	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	65.1	67.3	61.1	Cloudy	S
12-Jul-05	65.5	67.8	61.1	66.1	68.6	60.5	60.2	61.6	56.2	Sunny	SW
13-Jul-05	66.2	68.7	61.6	64.6	67.0	60.8	60.0	61.8	56.4	Fine	SW
14-Jul-05	65.4	67.8	61.2	64.8	67.4	60.2	60.1	62.1	56.5	Sunny	SW
15-Jul-05	66.4	68.7	61.3	64.9	67.5	59.7	59.7	61.3	56.4	Sunny	SE
16-Jul-05	65.7	67.8	61.8	65.6	68.0	60.5	60.2	62.4	56.6	Cloudy	NE
17-Jul-05	N/A	N/A	N/A	64.7	66.9	60.4	60.0	62.1	56.5	Sunny	W
18-Jul-05	65.3	67.4	61.4	65.0	67.3	61.1	60.7	62.2	57.0	Sunny	W
19-Jul-05	65.8	68.1	61.7	65.2	67.5	60.9	65.1	65.3	58.7	Rainy	W
20-Jul-05	65.9	68.1	61.7	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	Rainy	W
21-Jul-05	64.3	66.6	60.4	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	Cloudy	W
Average Noise Level	65.4	67.7	61.0	64.4	66.7	59.8	61.0	62.9	56.6		
Noise level with Façade correction	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
Days of data used	14	14	14	15	15	15	17	17	17		

Remarks:

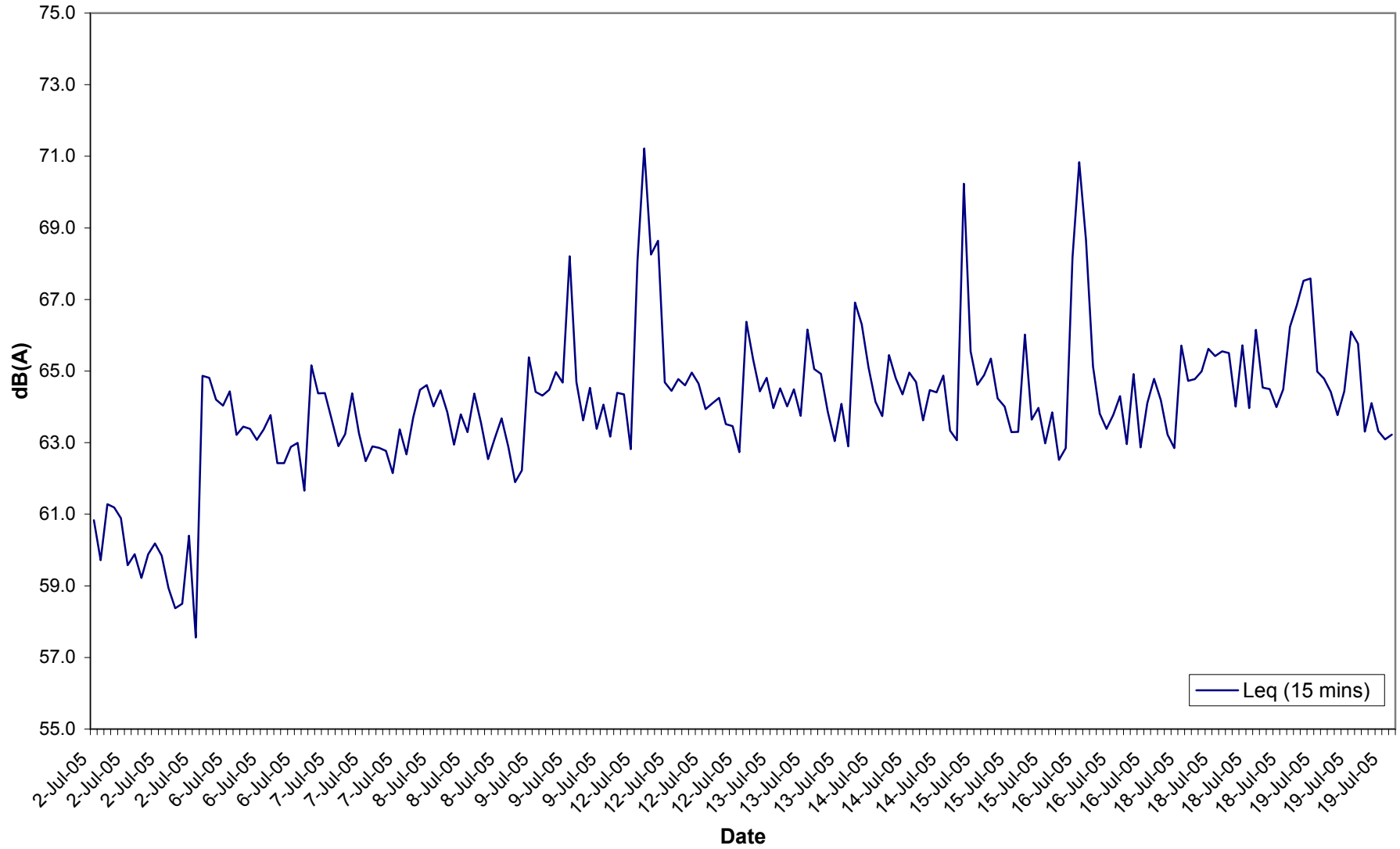
Shaded area indicates Sunday or public holiday

n.a. - No data available / No sufficient data

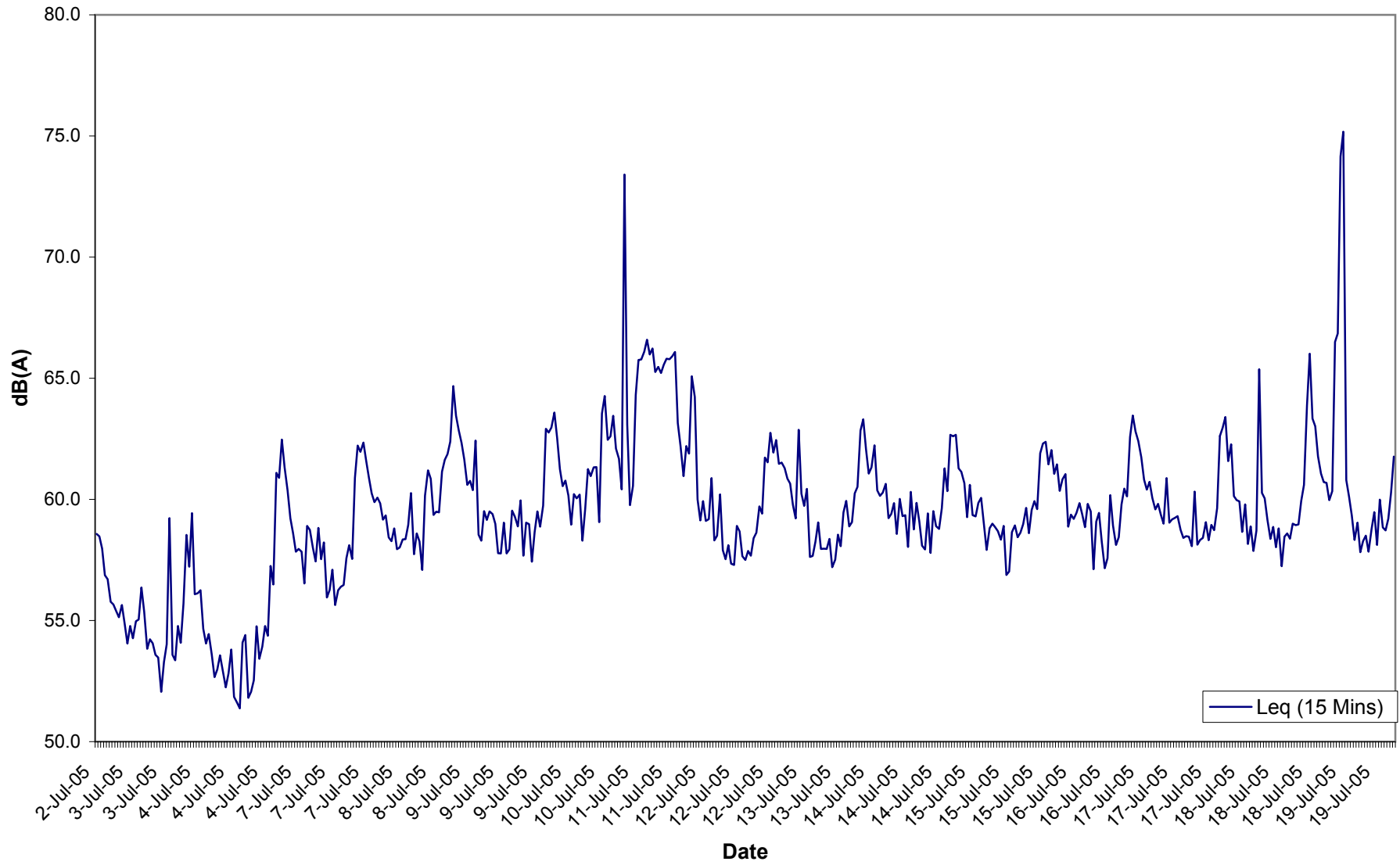
**Chart 1 - Baseline Noise Monitoring at Charming Garden (NM5)
during 07:00-19:00 on Normal Weekdays (2 July 2005 - 21 July 2005)**



**Chart 2 - Baseline Noise Monitoring at Charming Garden (NM5)
during 19:00-23:00 on Normal Weekdays (2 July 2005 - 21 July 2005)**



**Chart 3 - Baseline Noise Monitoring at Charming Garden (NM5)
during 23:00-7:00 (2 July 2005 - 21 July 2005)**



KSL KDB300 & KDB400 Tunnels, Jordan Road to Nam Cheong Station Overrun

Appendix 3 Baseline Noise Monitoring Results at Circulation Tower of Olympic City Phase III

Date	0700-1900 Hours			1900-2300 Hours			2300-0700 Hours			Weather Conditions	Wind Direction
	Noise Level, dB(A)			Noise Level, dB(A)			Noise Level, dB(A)				
	L _{eq} (30min)	L ₁₀ (30min)	L ₉₀ (30min)	L _{eq} (5min)	L ₁₀ (5min)	L ₉₀ (5min)	L _{eq} (5min)	L ₁₀ (5min)	L ₉₀ (5min)		
25-Mar-07	69.0	72.4	67.0	68.9	72.4	66.9	n.a	n.a	n.a	Drizzle	E
01-Apr-07	71.4	73.1	66.5	70.4	72.1	65.4	67.2	70.1	61.4	Fine	N
05-Apr-07	71.1	72.8	66.6	69.8	71.5	65.4	68.4	70.8	63.6	Fine	E
06-Apr-07	70.3	71.9	66.8	69.2	70.7	65.3	67.9	70.0	63.3	Fine*	E
07-Apr-07	71.6	73.2	67.6	69.1	70.6	65.4	66.1	68.3	61.7	Fine*	E
08-Apr-07	70.2	71.7	67.0	69.2	70.6	65.4	67.3	69.6	63.0	Fine*	E
09-Apr-07	72.8	74.1	68.7	69.2	70.8	65.5	66.1	68.4	61.7	Fine	E
15-Apr-07	69.6	73.3	66.6	69.6	73.3	66.8	69.7	72.7	66.8	Fine	N
22-Apr-07	70.3	72.1	65.7	n.a	n.a	n.a	n.a	n.a	n.a	Drizzle	N
29-Apr-07	70.7	72.4	66.7	69.4	71.1	65.2	67.0	69.3	61.8	Fine*	NE
01-May-07	70.9	72.6	67.0	69.6	71.3	65.6	67.8	70.3	63.5	Fine	N
06-May-07	70.8	72.6	66.9	69.4	71.6	65.2	66.0	68.2	61.3	Fine	N
13-May-07	71.4	73.1	66.5	70.4	72.1	65.4	69.0	71.8	63.9	Fine	N
24-May-07	69.9	73.5	66.6	70.0	73.5	66.7	70.7	74.3	67.6	Fine	N
27-May-07	71.0	73.1	68.1	71.1	73.3	68.1	71.2	73.1	68.4	Fine*	N
Average Noise Level	70.8	72.8	67.0	69.7	71.9	66.0	68.3	71.0	64.4		
Noise level with Façade correction	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
Days of data used	15	15	15	14	14	14	13	13	13		

Remarks:

n.a. - No data available due to inclement weather.

* - Fine with occasional rainy

Chart 1 - Baseline Noise Monitoring at Olympian City Phase III during 07:00-19:00 from 25 Mar 2007 to 27 May 2007

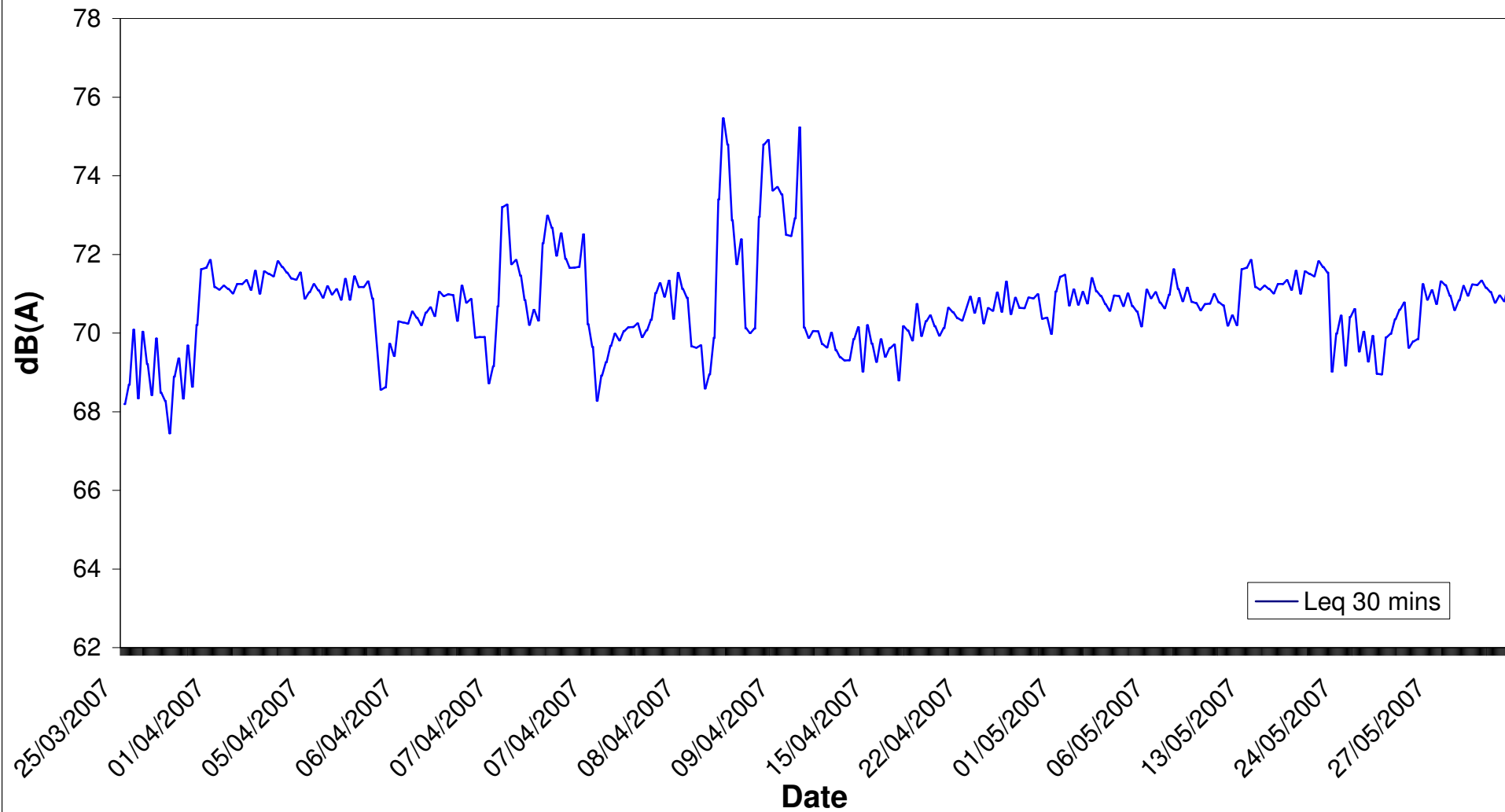


Chart 2 - Baseline Noise Monitoring at Olympian City Phase III during 19:00-23:00 from 25 Mar 2007 to 27 May 2007

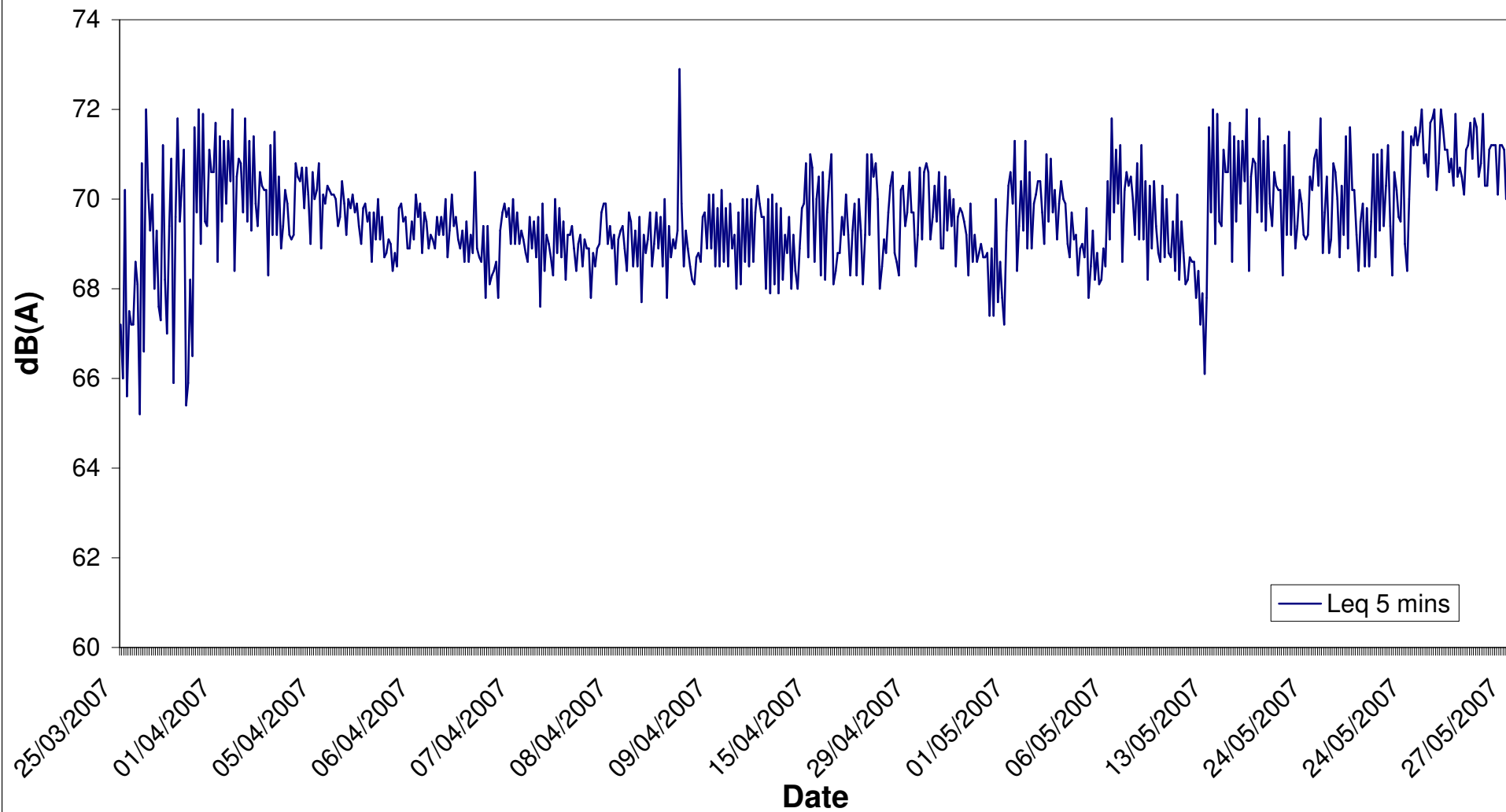


Chart 3 - Baseline Noise Monitoring at Olympian City Phase III during 23:00-07:00 from 25 Mar 2007 to 27 May 2007

