



JOB No.: TCS00864/16

**CEDD SERVICE CONTRACT NO. NTE/07/2016
ENVIRONMENTAL TEAM FOR DEVELOPMENT OF
ANDERSON ROAD QUARRY SITE – SITE FORMATION
AND ASSOCIATED INFRASTRUCTURE WORKS**

BASELINE MONITORING REPORT

PREPARED FOR
**CIVIL ENGINEERING AND DEVELOPMENT
DEPARTMENT**

Quality Index

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1	18 April 2017	First Submission
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Your reference:

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Date: 5 May 2017

Attention: Mr Stephen T S Li

BY POST

Dear Sirs

Agreement No.: NTE 08/2016
Independent Environmental Checker for Development of Anderson Road Quarry Site
– Site Formation and Associated Infrastructure Works
Baseline Monitoring Report

We refer to emails of 18 April 2017 and 5 May 2017 from Action-United Environmental Services and Consulting attaching the Baseline Monitoring Report for the captioned project.

We have no further comment and hereby verify the Baseline Monitoring Report.

Should you have any queries, please do not hesitate to contact the undersigned or our Mr Nic Lam at 2618 2836.

Yours faithfully
ANewR CONSULTING LIMITED

Adi Lee
Independent Environmental Checker

LYMA/LHHN/CYYH/csym

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EXECUTIVE SUMMARY

- ES.01 Action-United Environmental Services & Consulting (AUES) has been awarded the Civil Engineering and Development Department (CEDD) Service Contract No. NTE/07/2016 Environmental Team for Development of Anderson Road Quarry Site – Site Formation and Associated Infrastructure Works (hereinafter called “the Service Contract”) on 15 December 2016. The commencement date of the Service Contract is from December 2016 and the Contract Period is 70 months.
- ES.02 According to the Approved EM&A Manual, air quality and noise monitoring are required to be monitored during the construction phase of the Project. As part of the EM&A program, baseline monitoring is required to determine the ambient environmental conditions. Baseline monitoring including air quality and noise were conducted on **17th January 2017 to 30th January 2017, 16th February 2017 to 2nd March 2017 and 26th March 2017 to 8th April 2017** at all designated monitoring locations before construction work commencement.
- ES.03 This report summarizes the key findings and presents the process and rationale behind determining a set of Action and Limit Levels (A/L Levels) of air quality and construction noise based on the baseline data. These A/L Levels will serve as the yardsticks for assessing the acceptability of the environmental impact during construction phase of the Project Works impact monitoring. They are statistical in nature and derived according to the criteria set out in Approved EM&A Manual.
- ES.04 Results of the derived Action and Limit Levels for the air quality and noise are given in **Tables ES-1** and **ES-2** as follows.

Table ES-1 Action and Limit Levels of Air Quality Monitoring

Monitoring Station	Action Level ($\mu\text{g}/\text{m}^3$)		Limit Level ($\mu\text{g}/\text{m}^3$)	
	1-hour TSP	24-hour TSP	1-hour TSP	24-hour TSP
AMS-1	313	154	500	260
AMS-2	319	165	500	260
AMS-3	319	165	500	260
AMS-4	315	165	500	260
AMS-5	299	166	500	260
AMS-6	303	168	500	260
AMS-7	307	156	500	260

Table ES-2 Action and Limit Levels of Construction Noise Monitoring

Monitoring Location	Action Level	Limit Level in dB(A)
	Time Period: 0700-1900 hours on normal weekdays	
NMS-1	When one or more documented complaints are received	75 dB(A) ^{Note 1} /
NMS-2		70 dB(A) ^{Note 2} / 65 dB(A) ^{Note 2}
NMS-3		75 dB(A)
NMS-4*		75 dB(A)

Note 1: Locations NMS-1 and NMS-2 are planned school as NSRs which are still under construction/ not yet constructed; hence the Limit Levels of 75dB(A) is adopted for NMS-1 and NMS-2 until the school is occupied and in operation.

Note 2: Noise Limit Levels for school is 70dB(A) and should be reduced to 65dB(A) during examination period.

Note: If works are to be carried out during restricted hours, the conditions stipulated in the construction noise permit issued by the Noise Control Authority have to be followed.

Remark: () Additional noise monitoring location is recommended by RE and agreed by IEC*

- ES.05 In cases where exceedance of these criteria occurs, actions should be carried out in accordance with the Event Action Plan as showed in the Approved EM&A Manual.

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1.0 INTRODUCTION

BACKGROUND

- 1.01 AUES has been awarded the CEDD Service Contract No. NTE/07/2016 Development of Anderson Road Quarry Site – Site Formation and Associated Infrastructure Works (hereinafter called “the Service Contract”) on 15 December 2016. The commencement date of the Service Contract is in December 2016 and the Contract Period is 70 months.
- 1.02 The Services under the Service Contract is to provide environmental monitoring and audit (EM&A) services for the Works Contracts pursuant to the requirement of Environmental Team (ET) under the EM&A manual to ensure that the environmental performance of the Works Contracts comply with the requirement specified in the EM&A Manual and EIA Report of Development of Anderson Road Quarry and other relevant statutory requirements.
- 1.03 Development of Anderson Road Quarry is to provide land and the associated infrastructures for the proposed land used at the existing Anderson Road Quarry Site at the North-eastern of East Kowloon according to the final Recommended Outline Development Plan (hereinafter named as the Project Works).
- 1.04 The scope of work of Contracts 1, 2 and 3 comprises as below:-

Contract 1 - Site Formation and Infrastructural Works at main site (SF&I) (Contract No. NE/2016/01)

- (i) Formation of about 40 hectares (ha) of land platforms at the ARQ site and the associated geotechnical works;
- (ii) Road works including construction of approximately 3-kilometer long vehicular roads, footpaths, cycle tracks, an approximately 130-meter long underpass at the southern end and a public transport terminus at the northern end at the ARQ site;
- (iii) Provision of and improvement to water supply, drainage and sewerage systems as well as landscaping works; and
- (iv) Construction of proposed subway structures and lift tower structures of pedestrian connectivity facilities.

Contract 2 - Pedestrian Connectivity Facilities Works Phase 1 (Contract No. NE/2016/05)

- (i) Construction of the following pedestrian connectivity facilities with covered elevated walkways, covered at grade walkways, escalators, lift towers with associated staircase and lifts:-
 - (a) Linking Hiu Kwong street with Hiu Ming Street (E1)
 - (b) Linking the proposed “Footbridge Link at Sau Ming Road” with Hiu Ming Street (E2, C1 and E3)
 - (c) Linking the proposed bus-to-bus interchange at Tseung Kwan O Tunnel Toll Plaza with Lin Tak Road (E12)
- (ii) Construction of bus-to-bus interchange (BBJ) at Tseung Kwan O Tunnel Toll Plaza; and
- (iii) Associated landscape works.

Contract 3 - Road Improvement Works and Pedestrian Connectivity Facilities Works Phase 1A

- (i) Site formation and road works in the following sections:-
 - (a) at junction of Clear Water Bay Road (CWBR) and On Sau Road constructed under the Development at Anderson Road (DAR) project including the provision of U-turn facility and noise mitigation measures (RIW1);
 - (b) at New Clear Water Bay Road (NCWBR) near Shun Lee Tsuen Road including the road widening works at NCWBR, modification of existing subway structure and provision of noise mitigation measures (RIW2); and
 - (c) at the junction of Lin Tak Road and Sau Mau Ping Road, construction of flyover above Tseung Kwan O Road, provision of loading and unloading bays along Lin Tak Road and noise mitigation measures (RIW3).
- (ii) construction of the following pedestrian connectivity facilities with covered elevated walkways, escalators and lift towers with associated staircases and lifts:-
 - (a) linking Anderson Road Quarry site with the DAR Site (except the works covered

- under Contract 1) (System A and System B);
 - (b) linking Hiu Ming Street with Hiu Yuk Path (E8); and
 - (c) linking the proposed bus-bus interchange at Tseung Kwan O Tunnel Toll Plaza with Sau Mau Ping Road (E11).
 - (iii) Associated landscape works.
- 1.05 Action-United Environmental Services & Consulting (hereinafter referred as “AUES”) has been commissioned as an Environmental Team (hereinafter referred as “the ET”) to implement the relevant EM&A program in accordance with the approved EM&A Manual, as well as the associated duties.
- 1.06 As part of the EM&A program, baseline monitoring is required to determine the ambient environmental conditions. Baseline monitoring including air quality and noise were conducted on *17th January 2017 to 30th January 2017, 16th February 2017 to 2nd March 2017 and 26th March 2017 to 8th April 2017* at all designated monitoring locations before construction work commencement.
- 1.07 This Baseline Monitoring Report presents the details of the baseline study including project background, monitoring methodology, monitoring results, summary of findings, and Action/Limit (A/L) Levels established for subsequent use in the Project construction phase EM&A program.

REPORT STRUCTURE

- 1.08 This Baseline Monitoring Report summarizes the key findings and presents the process and rationale behind determining a set of Action and Limit Levels (A/L Levels) of air quality, construction noise and water quality based on the baseline data. These A/L Levels will serve as the yardsticks for assessing the acceptability of the environmental impact during construction phase of the Project Works impact monitoring. The Baseline Monitoring Report is structured into the following sections:-
- Section 1** Introduction
 - Section 2** Summaries of Baseline Monitoring Requirement.
 - Section 3** Baseline Monitoring Methodology
 - Section 4** Baseline Monitoring Results
 - Section 5** Conclusion and Recommendation

2.0 SUMMARY OF BASELINE MONITORING REQUIREMENT

GENERAL

- 2.01 The Environmental Monitoring and Audit requirements are set out in the Approved EM&A manual. Environmental issues such as air quality and construction noise were identified as the key issues during the construction phase of the Project.
- 2.02 This report presents the results obtained during the baseline monitoring program of air and noise on *17th January 2017 to 30th January 2017, 16th February 2017 to 2nd March 2017 and 26th March 2017 to 8th April 2017*. A summary of the baseline EM&A requirements for air and noise monitoring are presented in the sub-sections below.

MONITORING PARAMETERS

- 2.03 The baseline monitoring programme covers the following environmental aspects:
- Air Quality; and
 - Construction noise
- 2.04 A summary of baseline monitoring parameters is presented in *Table 2-1*:

Table 2-1 Summary of Baseline Monitoring Parameters

Environmental Issue	Parameters
Air Quality	<ul style="list-style-type: none"> • 1-hour TSP by Real-Time Portable Dust Meter; and • 24-hour TSP by High Volume Air Sampler.
Construction Noise	<ul style="list-style-type: none"> • 3 sets of Leq (30min) at daily basis in covering the morning and afternoon sessions

MONITORING LOCATIONS

Air Quality

- 2.05 According to the EM&A Manual Section 4.6, seven (7) most representative and affected air sensitive receivers (ASR) were selected as air monitoring stations (AQM). The air quality monitoring locations are listed in *Table 2-2* and illustrated in *Appendix B*.

Table 2-2 Air Quality Monitoring Location

ID	ASR ID in EIA	Location in the EM&A Manual	Identified Location during Site Visit
AMS-1	ACYC-01	Chi Yum Ching She	Ground of Chi Yum Ching facing the project site
AMS-2	DARB-13	Block 8, Site B ^{Note 1}	Ground of Block 8, Site B facing On Sau Road
AMS-3	DARC-16	Planned Clinic and Community Centre, Site C2 ^{Note 1}	Ground of Planned Clinic and Community Centre facing Anderson Road
AMS-4	DARC-26	Planned School, Site C2 ^{Note 2}	Ground of Planned School facing Anderson Road
AMS-5	DARE-06	Block 5, DAR Site E	Main roof of Oi Tat House of On Tat Estate facing the project site
AMS-6	DARE-17	Block 9, Site E	Main roof of Hau Tat House of On Tat Estate facing the project site
AMS-7	AMYT-04	Ma Yau Tong Village	Balcony at 2 nd floor of Village House Anderson Road No. 1 facing the project site

Note 1: The NSR is under construction and not yet in operation.

Note 2: The NSR is not yet constructed.

- 2.06 In our recent site visit at the subject site, it was noted that some planned ASRs identified in the EM&A Manual are still under construction/ has not yet constructed and there were no suitable location to set up the high volume sampler to carry out the baseline 24-hour TSP monitoring.

Therefore, a proposal changes for the baseline monitoring programme was submitted and agreed by EPD before the baseline monitoring.

2.07 In our baseline monitoring proposal, baseline 1-hour TSP monitoring will be conducted at all AQM location AMS-1 to AMS-7. However, baseline 24-hour TSP monitoring will be conducted at existing ASR AMS-1, AMS-5, AMS-6 and AMS-7 only with our justifications present below:

- (a) AQM Locations AMS-2, AMS-3 & AMS-4 are planned ASRs which are still under construction/ has not yet constructed. During recent site visit, there were no suitable locations for setting up the HVS and electricity supply at these AQM locations.
- (b) Alternative locations were considered in accordance with EM&A Manual Section 4.7.3. However, there were no suitable location found and our justifications are provided in below:
 - (i) Alternative locations Sau Mau Ping Estate and Shun Tin Estate were located at downhill of the subject site which separated by the active construction site (i.e., AMS-2, AMS-3 & AMS-4) and Sau Mau Ping Road. In view of the level deviation, the baseline data obtained in these alternative locations could not represent the baseline condition of the designated location AMS-2, AMS-3 & AMS-4. Moreover, when the planned ASR AMS-2, AMS-3 & AMS-4 activate sooner or later, impact monitoring should be carried out at these designated locations instead of the alternative locations.
 - (ii) Alternative location such as site boundary of the site subject was considered, however, there were no provisions of power supply to sustain the HVS continuously after consultation with the Contractor.
- (c) According to EM&A Manual Section 4.7.4, as an exceptional cases, it is proposed to adopt the Action Level established at AMS-5 to AMS-2, AMS-3 & AMS-4 for impact monitoring as AMS-5 with our justification below.
 - (i) AMS-5 is the closest ASR to AMS-2, AMS-3 & AMS-4 under same direction of prevailing wind.
 - (ii) In view of the baseline 1-hour TSP data, the measured results at AMS-5 were lower than those collected at AMS-2, AMS-3 & AMS-4. As a conservation approach, adopting Action Level at AMS-5 for Location AMS-2, AMS-3 & AMS-4 is more stringent for the project.
 - (iii) The Action level for AMS-2, AMS-3 & AMS-4 will be subject to review in accordance with EM&A Manual Section 4.7.5

Construction Noise

2.08 According to the EM&A Manual Section 5.5, three (3) most representative and affected noise sensitive receivers (NSR) were selected as monitoring stations. As recommended by the RE and agreed by IEC, one (1) additional noise monitoring location is proposed to add in Oi Tat House of On Tat Estate (hereafter “NMS-4”) to oversee the possible noise impact pose to the resident in On Tat Estate, which is an existing NSR close to the major works activities. The details of noise monitoring location are listed in **Table 2-3** and illustrated in **Appendix B**.

Table 2-3 Construction Noise Monitoring Location

ID	NSR ID in EIA	Location
NMS-1	Site C2 – School 05 ^{Note 1}	Ground of planned school at DAR facing the project site
NMS-2	Site E – School ^{Note 1}	Ground area between the planned school and Him Tat House facing the project site
NMS-3	Site C2 – R102 ^{Note 1}	Ground of Ancillary Facilities Building facing the project site
NMS-4*	Oi Tat House	1m from the exterior of ground floor façade of Oi Tat House of On Tat Estate facing the project site

Note 1: The NSR is under construction and not yet in operation.

Remark: () Additional noise monitoring location is recommended by RE and agreed by IEC*

MONITORING FREQUENCY AND PERIOD

- 2.09 The baseline monitoring will be conducted immediately prior to commencement of the construction work under the Project. No construction activities are allowed to be undertaken during the baseline monitoring period.

Air Quality

- Frequency:
 - Daily for 24-hour TSP
 - Three times a day for 1-hour TSP
- Duration: 14 consecutive days

Airborne Noise

- Frequency: Continuous noise measurement
- 3 times of Leq30min in daily basis covering the morning and afternoon sessions, including L10 and L90 for reference
- Duration: Two weeks

MONITORING EQUIPMENT

Air Quality Monitoring

- 2.10 The 24-hour and 1-hour TSP levels shall be measured by following the standard high volume sampling method as set out in the *Title 40 of the Code of Federal Regulations, Chapter 1 (Part 50), Appendix B*. If the ET proposes to use a direct reading dust meter to measure 1-hour TSP levels, it shall submit sufficient information to the IEC to prove that the instrument is capable of achieving a comparable results to the HVS. The instrument should be calibrated regularly, and the 1-hour sampling shall be determined on yearly basis by the HVS to check the validity and accuracy of the results measured by direct reading method. The filter paper of 24-hour TSP measurement shall be determined by HOKLAS accredited laboratory.

Noise Monitoring

- 2.11 Sound level meter in compliance with the International Electrotechnical Commission Publications 651: 1979 (Type 1) and 804: 1985 (Type 1) specifications shall be used for carrying out the noise monitoring. The sound level meter shall be checked using an acoustic calibrator. The wind speed shall be checked with a portable wind speed meter capable of measuring the wind speed in ms^{-1} .

DERIVATION OF ACTION/LIMIT (A/L) LEVELS

- 2.12 The baseline results form the basis for determining the environmental acceptance criteria for the impact monitoring. A summary of derivation of Action/Limit (A/L) Levels for air quality, construction noise and water quality are shown in **Table 2-4** and **2-5** respectively.

Table 2-4 Derivation of Action and Limit Levels for Air Quality

Parameter	Action Level	Limit Level
24-hour TSP	For baseline level $\leq 200 \mu\text{g}/\text{m}^3$: Action level = $(\text{Baseline} \times 1.3 + \text{Limit level})/2$	260 $\mu\text{g}/\text{m}^3$
	For baseline level $> 200 \mu\text{g}/\text{m}^3$: Action level = Limit level	
1-hour TSP	For baseline level $\leq 384 \mu\text{g}/\text{m}^3$: Action level = $(\text{Baseline} \times 1.3 + \text{Limit level})/2$	500 $\mu\text{g}/\text{m}^3$
	For baseline level $> 384 \mu\text{g}/\text{m}^3$: Action level = Limit level	

Table 2-5 Derivation of Action and Limit Levels for Construction Noise

Time Period	Action Level in dB(A)	Limit Level in dB(A)
0700-1900 hours on normal weekdays	When one documented complaint is received	75* dB(A)

Note: (*) Reduces to 70 dB(A) for schools and 65 dB(A) during the school examination periods.

3.0 BASELINE MONITORING METHODOLOGY

GENERAL

- 3.01 The baseline monitoring of air and noise were conducted from *17th January 2017* to *30th January 2017*, *16th February 2017* to *2nd March 2017* and *26th March 2017* to *8th April 2017*. During the baseline monitoring period, no construction activities were carried out under the Project.

LOCATION OF BASELINE MONITORING

- 3.02 For baseline monitoring, 1-hour TSP for air quality and noise monitoring were undertaken at the designated monitoring stations from *17th January 2017* to *30th January 2017*; 24-hour TSP for air quality was conducted from *16th February 2017* to *2nd March 2017* and *26th March 2017* to *8th April 2017*. The detailed information of monitoring stations to be referred to *Tables 2-2 & 2-3* and the monitoring locations is shown in *Appendix B* in this report.

MONITORING EQUIPMENT OF BASELINE MONITORING

Air Quality

- 3.03 Equipment for baseline air quality monitoring is listed in *Table 3-1*.

Table 3-1 Air Quality Monitoring Equipment

Equipment		Model
<i>24-hour TSP</i>	High Volume Air Sampler	TISCH High Volume Air Sampler, HVS Model TE-5170
	Calibration Kit	TISCH Model TE-5025A
<i>1- hour TSP</i>	Portable Dust Meter	Laser Dust Monitor TSI AM510 / Sibata LD-3B Laser Dust Monitor

Noise

- 3.04 Noise equipment as perform for baseline monitoring is listed in *Table 3-2*.

Table 3-2 Construction Noise Monitoring Equipment

Equipment	Model
Integrating Sound Level Meter	B&K Type 2238 or Rion NL-31 or Rion NL-52
Calibrator	B&K Type 4231 or Rion NC-74
Portable Wind Speed Indicator	Anemometer AZ Instrument 8908

MONITORING PROCEDURE

- 3.05 The procedures to conduct air quality and noise monitoring are summarized in following sub-sections.

Air Quality

1-hour TSP

- 3.06 Operation of the 1-hour TSP meter will follow manufacturer's Operation and Service Manual.
- 3.07 The 1-hour TSP monitor, brand named "Model AM510 SidePak™ Personal Aerosol Monitor/ Sibata LD-3B Laser Dust monitor Particle Mass Profiler & Counter" is a portable, battery-operated laser photometer. The 1-hour TSP meter provides a real time 1-hour TSP measurement based on 90° light scattering. The 1-hour TSP monitor consists of the following:
- A pump to draw sample aerosol through the optic chamber where TSP is measured;
 - A sheath air system to isolate the aerosol in the chamber to keep the optics clean for maximum reliability; and
 - A built-in data logger compatible with Windows based program to facilitate data collection, analysis and reporting.
- 3.08 The 1-hour TSP meter to be used will be within the valid period, calibrated by the manufacturer prior to purchasing. Zero response of the instrument will be checked before and after each monitoring event.

24-hour TSP

- 3.09 The equipment used for 24-hour TSP measurement is the High Volume Sampler (hereinafter the “HVS”) brand named TISCH, Model TE-5170 TSP High Volume Air Sampler, which complied with *EPA Code of Federal Regulation, Appendix B to Part 50*. The HVS consists of the following:
- An anodized aluminum shelter;
 - A 8”x10” stainless steel filter holder;
 - A blower motor assembly;
 - A continuous flow/pressure recorder;
 - A motor speed-voltage control/elapsed time indicator;
 - A 6-day mechanical timer, and
 - A power supply of 220v/50 Hz
- 3.10 For HVS for 24-hour TSP monitoring, the HVS is mounted in a metallic cage with a top for protection and also it is sat on the existing ground or the roof of building. The flow rate of the HVS between 0.6m³/min and 1.7m³/min will be properly set in accordance with the manufacturer’s instruction to within the range recommended in *EPA Code of Federal Regulation, Appendix B to Part 50*. Glass Fiber Filter 8" x 10" of TE-653 will be used for 24-Hour TSP monitoring and would be supplied by laboratory. The general procedures of sampling are described as below:-
- A horizontal platform with appropriate support to secure the samples against gusty wind should be provided;
 - No two samplers should be placed less than 2 meters apart;
 - The distance between the sampler and an obstacle, such as building, must be at least twice the height that the obstacle protrudes above the sample;
 - A minimum of 2 meters of separation from any supporting structure, measured horizontally is required;
 - Before placing any filter media at the HVS, the power supply will be checked to ensure the sampler work properly;
 - The filter paper will be set to align on the screen of HVS to ensure that the gasket formed an air tight seal on the outer edges of the filter. Then filter holder frame will be tightened to the filter hold with swing bolts. The holding pressure should be sufficient to avoid air leakage at the edge.
 - The mechanical timer will be set for a sampling period of 24 hours (00:00 mid-night to 00:00 mid-night next day). Information will be recorded on the field data sheet, which would be included the sampling data, starting time, the weather condition at current and the filter paper ID with the initial weight;
 - After sampling, the filter paper will be collected and transfer from the filter holder of the HVS to a sealed envelope and sent to a local HOKLAS accredited laboratory for quantifying.
- 3.11 All the sampled 24-hour TSP filters will be kept in normal air conditioned room conditions, i.e. 70% HR (Relative Humidity) and 25°C, for six months prior to disposal.
- 3.12 The HVS used for 24-hour TSP monitoring will be calibrated before the commencement for sampling, and after in two months interval for 1 point checking of maintenance and six months interval for five points calibrate in accordance with the manufacturer’s instruction using the NIST-certified standard calibrator (Tisch Calibration Kit Model TE-5025A) to establish a relationship between the follow recorder meter reading in cfm (cubic feet per minute) and the standard flow rate, Qstd, in m³/min. Motor brushes of HVS will be regularly replaced of about five hundred hours per time.

Construction Noise

- 3.13 As referred to in the Technical Memorandum (TM) issued under the NCO, sound level meters in compliance with the International Electrotechnical Commission Publications 651: 1979 (Type 1) and 804:1985 (Type 1) specifications shall be used for carrying out the noise monitoring. Immediately prior to and following each noise measurement the accuracy of the sound level

meter shall be checked using an acoustic calibrator generating a known sound pressure level at a known frequency. Measurements may be accepted as valid only if the calibration levels from before and after the noise measurement agree to within 1.0 dB.

- 3.14 All noise measurements will be performed with the meter set to FAST response and on the A-weighted equivalent continuous sound pressure level (Leq). $Leq_{(30 \text{ min})}$ in six consecutive $Leq_{(5 \text{ min})}$ measurements will be used as the monitoring parameter for the time period between 07:00-19:00 hours on weekdays throughout the construction period.
- 3.15 The sound level meter will be mounted on a tripod at a height of 1.2 m and placed at the assessment point and oriented such that the microphone is pointed to the site with the microphone facing perpendicular to the line of sight. The windshield will be fitted for all measurements. Where a measurement is to be carried out at a building, the assessment point would normally be at a position 1 m from the exterior of the building façade. Where a measurement is to be made for noise being received at a place other than a building, the assessment point would be at a position 1.2 m above the ground in a free-field situation, i.e. at least 3.5 m away from reflective surfaces such as adjacent buildings or walls.
- 3.16 Immediately prior to and following each noise measurement the accuracy of the sound level meter will be checked using an acoustic calibrator generating a known sound pressure level at a known frequency. Measurements will be accepted as valid only if the calibration level from before and after the noise measurement agrees to within 1.0 dB.
- 3.17 Noise measurements will not be made in fog, rain, wind with a steady speed exceeding 5m/s or wind with gusts exceeding 10m/s. The wind speed will be checked with a portable wind speed meter capable of measuring the wind speed in m/s.

Meteorological Information

- 3.18 The meteorological information including wind direction, wind speed, humidity, rainfall, air pressure and temperature etc. during baseline monitoring is extracted from the closest Hong Kong Observatory Station. To obtain the most appropriate meteorological information where available, the data of temperature is extracted from the Kwun Tong Observatory Station; the data of wind speed and wind direction are extracted from Kai Tak Observatory Station and the data of humidity is extracted from King's Park Station.

DATA MANAGEMENT AND DATA QA/QC CONTROL

- 3.19 The baseline monitoring data were handled by the ET's in-house data recording and management system.
- 3.20 The monitoring data recorded in the equipment were downloaded directly from the equipment at each monitoring day or after completion of baseline measurement. The downloaded monitoring data were input into a computerized database properly maintained by the ET. The laboratory results were input directly into the computerized database and checked by personnel other than those who input the data.
- 3.21 For monitoring parameters that require laboratory analysis, the local laboratory shall follow the QA/QC requirements as set out under the HOKLAS scheme for the relevant laboratory tests.

4.0 BASELINE MONITORING RESULTS

GENERAL

- 4.01 The baseline monitoring schedules are presented in *Appendix D* and the monitoring results are detailed in the following sub-sections.

RESULTS OF AIR QUALITY MONITORING

- 4.02 Baseline 1-hour TSP and 24-hour TSP monitoring were carried out from *17th to 30th January 2017* and *16th February 2017 to 2nd March 2017* and *26th March 2017 to 8th April 2017*. The results for 1-hour and 24-hour TSP are summarized in *Tables 4-1 to 4-7*. The 24-hour TSP data are shown in *Appendix E*.

Table 4-1 Summary of 24-hour and 1-hour TSP Monitoring Results – AMS-1

24-hour TSP ($\mu\text{g}/\text{m}^3$)		1-hour TSP ($\mu\text{g}/\text{m}^3$)				
Date	Meas. Result	Date	Start Time	1 st Meas.	2 nd Meas.	3 rd Meas.
16-Feb-17	35	17-Jan-17	13:13	50	53	60
17-Feb-17	24	18-Jan-17	13:09	52	42	46
18-Feb-17	50	19-Jan-17	13:03	83	88	86
19-Feb-17	41	20-Jan-17	9:16	86	83	85
20-Feb-17	37	21-Jan-17	9:27	88	89	99
21-Feb-17	19	22-Jan-17	16:01	62	59	58
22-Feb-17	37	23-Jan-17	10:34	86	90	96
23-Feb-17	33	24-Jan-17	14:00	136	139	146
24-Feb-17	18	25-Jan-17	13:39	117	101	112
25-Feb-17	13	26-Jan-17	9:24	93	91	90
26-Feb-17	21	27-Jan-17	7:31	61	59	62
27-Feb-17	52	28-Jan-17	9:01	68	72	64
28-Feb-17	59	29-Jan-17	9:00	180	229	198
1-Mar-17	83	30-Jan-17	9:21	191	158	191
Average (Range)	37 (13 – 83)	Average (Range)		98 (42 – 229)		

Table 4-2 Summary of 1-hour TSP Monitoring Results – AMS-2

1-hour TSP ($\mu\text{g}/\text{m}^3$)				
Date	Start Time	1 st Meas.	2 nd Meas.	3 rd Meas.
17-Jan-17	12:50	56	59	64
18-Jan-17	12:34	72	71	68
19-Jan-17	13:35	117	127	113
20-Jan-17	9:42	89	94	92
21-Jan-17	13:29	138	143	123
22-Jan-17	14:45	100	106	118
23-Jan-17	10:06	167	175	165
24-Jan-17	9:40	130	127	140
25-Jan-17	13:08	127	133	108
26-Jan-17	10:01	100	95	102
27-Jan-17	7:57	65	65	68
28-Jan-17	9:18	58	66	56
29-Jan-17	9:20	102	113	97
30-Jan-17	9:47	160	155	139
Average (Range)	106 (56 – 175)			

Table 4-3 Summary of 1-hour TSP Monitoring Results – AMS-3

1-hour TSP ($\mu\text{g}/\text{m}^3$)				
Date	Start Time	1 st Meas.	2 nd Meas.	3 rd Meas.
17-Jan-17	9:45	54	57	62
18-Jan-17	9:29	73	65	66
19-Jan-17	9:07	99	112	125
20-Jan-17	13:11	84	87	82
21-Jan-17	9:42	140	141	134
22-Jan-17	12:34	96	75	83
23-Jan-17	14:17	158	154	123
24-Jan-17	9:31	122	125	135
25-Jan-17	9:30	119	123	115
26-Jan-17	12:55	108	108	112
27-Jan-17	10:13	67	68	71
28-Jan-17	12:45	80	77	83
29-Jan-17	9:24	150	156	127
30-Jan-17	13:14	148	137	135
Average (Range)	106 (54 – 158)			

Table 4-4 Summary of 1-hour TSP Monitoring Results – AMS-4

1-hour TSP ($\mu\text{g}/\text{m}^3$)				
Date	Start Time	1 st Meas.	2 nd Meas.	3 rd Meas.
17-Jan-17	9:44	52	57	64
18-Jan-17	9:34	73	48	49
19-Jan-17	9:10	108	118	130
20-Jan-17	13:24	102	95	99
21-Jan-17	9:47	164	118	120
22-Jan-17	12:37	65	55	62
23-Jan-17	14:28	96	87	72
24-Jan-17	13:16	132	144	141
25-Jan-17	9:52	121	128	123
26-Jan-17	13:32	111	116	119
27-Jan-17	10:46	65	64	66
28-Jan-17	12:52	85	78	82
29-Jan-17	9:28	113	113	101
30-Jan-17	13:11	167	155	132
Average (Range)	100 (48 – 167)			

Table 4-5 Summary of 24-hour and 1-hour TSP Monitoring Results – AMS-5

24-hour TSP ($\mu\text{g}/\text{m}^3$)		1-hour TSP ($\mu\text{g}/\text{m}^3$)				
Date	Meas. Result	Date	Start Time	1 st Meas.	2 nd Meas.	3 rd Meas.
26-Mar-17	30	17-Jan-17	10:26	61	56	55
27-Mar-17	94	18-Jan-17	9:27	70	67	69
28-Mar-17	90	19-Jan-17	9:52	112	111	101
29-Mar-17	76	20-Jan-17	13:11	45	80	83
30-Mar-17	69	21-Jan-17	9:37	71	80	82
31-Mar-17	19	22-Jan-17	7:34	54	57	62
1-Apr-17	48	23-Jan-17	13:02	98	100	135
2-Apr-17	71	24-Jan-17	9:16	69	70	73
3-Apr-17	61	25-Jan-17	9:22	77	79	73
4-Apr-17	58	26-Jan-17	9:22	82	90	98
5-Apr-17	56	27-Jan-17	9:33	76	78	80
6-Apr-17	46	28-Jan-17	9:40	66	61	68
7-Apr-17	33	29-Jan-17	10:01	68	83	76
8-Apr-17	33	30-Jan-17	7:59	43	43	46
Average (Range)	56 (19 – 94)	Average (Range)		75 (43 – 135)		

Table 4-6 Summary of 24-hour and 1-hour TSP Monitoring Results – AMS-6

24-hour TSP ($\mu\text{g}/\text{m}^3$)		1-hour TSP ($\mu\text{g}/\text{m}^3$)				
Date	Meas. Result	Date	Start Time	1 st Meas.	2 nd Meas.	3 rd Meas.
26-Mar-17	34	17-Jan-17	10:10	103	103	121
27-Mar-17	88	18-Jan-17	9:37	67	71	70
28-Mar-17	91	19-Jan-17	9:49	110	118	111
29-Mar-17	83	20-Jan-17	9:29	37	36	45
30-Mar-17	70	21-Jan-17	9:38	77	81	82
31-Mar-17	20	22-Jan-17	7:21	56	57	60
1-Apr-17	50	23-Jan-17	9:52	161	205	230
2-Apr-17	75	24-Jan-17	9:21	73	71	70
3-Apr-17	66	25-Jan-17	9:25	72	76	80
4-Apr-17	62	26-Jan-17	9:35	76	89	100
5-Apr-17	59	27-Jan-17	9:32	79	78	80
6-Apr-17	47	28-Jan-17	10:09	54	50	57
7-Apr-17	45	29-Jan-17	9:41	66	74	79
8-Apr-17	32	30-Jan-17	7:47	45	42	44
Average (Range)	59 (20 – 91)	Average (Range)		82 (36 – 230)		

Table 4-7 Summary of 24-hour and 1-hour TSP Monitoring Results – AMS-7

24-hour TSP ($\mu\text{g}/\text{m}^3$)		1-hour TSP ($\mu\text{g}/\text{m}^3$)				
Date	Meas. Result	Date	Start Time	1 st Meas.	2 nd Meas.	3 rd Meas.
16-Feb-17	32	17-Jan-17	13:55	100	129	126
17-Feb-17	20	18-Jan-17	13:02	70	67	73
18-Feb-17	56	19-Jan-17	13:29	108	125	110
19-Feb-17*	Power failure	20-Jan-17	9:07	43	40	48
20-Feb-17	40	21-Jan-17	13:07	77	79	80
21-Feb-17	25	22-Jan-17	11:04	61	61	64
22-Feb-17	38	23-Jan-17	9:36	160	197	218
23-Feb-17	30	24-Jan-17	13:07	79	80	82
24-Feb-17	17	25-Jan-17	13:02	77	79	80
25-Feb-17	22	26-Jan-17	13:04	72	80	81
26-Feb-17	16	27-Jan-17	13:00	83	85	86
27-Feb-17	56	28-Jan-17	13:22	72	70	74
28-Feb-17	57	29-Jan-17	9:13	89	120	105
1-Mar-17	81	30-Jan-17	10:21	54	51	53
2-Mar-17	72					
Average (Range)	40 (16 – 81)	Average (Range)		88 (40 – 218)		

Remarks: (*) Power failure of HVS.

- 4.03 Due to power failure for 24-hour TSP monitoring on 19th February 2017 at AMS-7, an extra day of 24-hour TSP monitoring has conducted at AMS-7 accordingly.

Action/Limit Levels

- 4.04 Following the criteria shown in **Table 2-3** of this report, the proposed Action and Limit Levels for 24-hour and 1-hour TSP are listed in **Table 4-8**.

Table 4-8 Action and Limit Levels for Air Quality Monitoring

Monitoring Station	Action Level ($\mu\text{g}/\text{m}^3$)		Limit Level ($\mu\text{g}/\text{m}^3$)	
	1-hour TSP	24-hour TSP	1-hour TSP	24-hour TSP
AMS-1	313	154	500	260
AMS-2	319	165	500	260
AMS-3	319	165	500	260
AMS-4	315	165	500	260
AMS-5	299	166	500	260
AMS-6	303	168	500	260
AMS-7	307	156	500	260

Note: 1-hour & 24-hour TSP Action Level = (Average Baseline Result \times 1.3 + Limit level)/2

RESULTS OF NOISE MONITORING

- 4.05 The baseline continuous noise monitoring was undertaken from 17th to 30th January 2017. The measurement data are shown in **Appendix E** and summarized in **Table 4-9, 4-10, 4-11 & 4-12**.

Table 4-9 Summaries of Noise Monitoring Results – NMS-1

Time Period	NMS-1 (dB(A))		
	Mean (*)	Max(*)	Min(*)
Normal Daytime 0700-1900 – L_{eq} (30mins)	69	74	63
Restricted Hours 0700-1900 holiday – L_{eq} (30mins)	65	67	61

Remark: (*) The sound meter was set in a free field situation and façade correction of +3 dB(A) has been

added according to acoustical principles and EPD guidelines.

Table 4-10 Summaries of Noise Monitoring Results – NMS-2

Time Period	NMS-2 (dB(A))		
	Mean(*)	Max(*)	Min(*)
Normal Daytime 0700-1900 – L_{eq} (30mins)	66	73	53
Restricted Hours 0700-1900 holiday – L_{eq} (30mins)	53	57	49

Remark: (*) The sound meter was set in a free field situation and façade correction of +3 dB(A) has been added according to acoustical principles and EPD guidelines.

Table 4-11 Summaries of Noise Monitoring Results – NMS-3

Time Period	NMS-3 (dB(A))		
	Mean(*)	Max(*)	Min(*)
Normal Daytime 0700-1900 – L_{eq} (30mins)	70	73	64
Restricted Hours 0700-1900 holiday – L_{eq} (30mins)	65	69	60

Remark: (*) The sound meter was set in a free field situation and façade correction of +3 dB(A) has been added according to acoustical principles and EPD guidelines.

Table 4-12 Summaries of Noise Monitoring Results – NMS-4

Time Period	NMS-4 (dB(A))		
	Mean	Max	Min
Normal Daytime 0700-1900 – L_{eq} (30mins)	61	64	53
Restricted Hours 0700-1900 holiday – L_{eq} (30mins)	54	57	51

Action/ Limit Levels for Noise

4.06 The Proposed Action/Limit levels at each monitoring station is illustrated in **Table 4-14**.

Table 4-13 Action / Limit Levels of Construction Noise Monitoring

Monitoring Location	Action Level	Limit Level in dB(A)
	Time Period: 0700-1900 hours on normal weekdays	
NMS-1	When one or more documented complaints are received	75 dB(A) ^{Note 1} /
NMS-2		70 dB(A) ^{Note 2} / 65 dB(A) ^{Note 2}
NMS-3		75 dB(A)
NMS-4*		75 dB(A)

Note 1: Locations NMS-1 and NMS-2 are planned school as NSRs which are still under construction/ not yet constructed; hence the Limit Levels of 75dB(A) is adopted for NMS-1 and NMS-2 until the school is occupied and in operation.

Note 2: Noise Limit Levels for school is 70dB(A) and should be reduced to 65dB(A) during examination period.

Note: If works are to be carried out during restricted hours, the conditions stipulated in the Construction Noise Permit issued by the Noise Control Authority have to be followed.

Remark: (*) Additional noise monitoring location is recommended by RE and agreed by IEC

DISCUSSION AND RECOMMENDATIONS

Air Quality

Possible Influence of Seasonal Changes

4.07 The baseline monitoring was conducted from **17th January 2017** to **30th January 2017** and **16th February 2017** to **2nd March 2017** during typical Hong Kong dry seasons. The baseline data so

collected therefore represent the baseline air quality of the dry season immediately prior to commencement of the Project. They may not reflect the air quality conditions of wet seasons in Hong Kong, which are normally significantly different.

- 4.08 It is therefore recommended that the interpretation of the air quality monitoring data should take into account the influence of the seasonal changes, and the baseline conditions should be regularly reviewed, in particular during seasonal changes.

Possible Influence of Other Construction Projects

- 4.09 The baseline 1-hour TSP and Noise monitoring were conducted from **17th January 2017** to **30th January 2017**. Other on-going construction projects adjacent to the monitoring locations may have influence on the baseline and impact monitoring programme, especially to the impact noise monitoring at NMS-1 and NMS-3.

5.0 CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

- 5.01 The baseline monitoring program was carried out during the period from *17th January 2017 to 30th January 2017, 16th February 2017 to 2nd March 2017 and 26th March 2017 to 8th April 2017* at the designated monitoring locations by the ET according to the Approved EM&A Manual. During the baseline monitoring, there were no construction activities undertaken under this Project.
- 5.02 Based on the baseline monitoring results, the recommended environmental performance criteria for air quality, construction noise and water quality are summarized as follows:

Recommended Action & Limit Levels of Air Quality				
Monitoring Station	Action Level ($\mu\text{g}/\text{m}^3$)		Limit Level ($\mu\text{g}/\text{m}^3$)	
	1-hour TSP	24-hour TSP	1-hour TSP	24-hour TSP
AMS-1	313	154	500	260
AMS-2	319	165	500	260
AMS-3	319	165	500	260
AMS-4	315	165	500	260
AMS-5	299	166	500	260
AMS-6	303	168	500	260
AMS-7	307	156	500	260

Recommended Action & Limit Levels of Construction Noise		
Monitoring Location	Action Level	Limit Level in dB(A)
	Time Period: 0700-1900 hours on normal weekdays	
NMS-1	When one or more documented complaints are received	75 dB(A) ^{Note 1} /
NMS-2		70 dB(A) ^{Note 2} / 65 dB(A) ^{Note 2}
NMS-3		75 dB(A)
NMS-4*		75 dB(A)

Note 1: Locations NMS-1 and NMS-2 are planned school as NSRs which are still under construction/ not yet constructed; hence the Limit Levels of 75dB(A) is adopted for NMS-1 and NMS-2 until the school is occupied and in operation.

Note 2: Noise Limit Levels for school is 70dB(A) and should be reduced to 65dB(A) during examination period.

Note: If works are to be carried out during restricted hours, the conditions stipulated in the construction noise permit issued by the Noise Control Authority have to be followed.

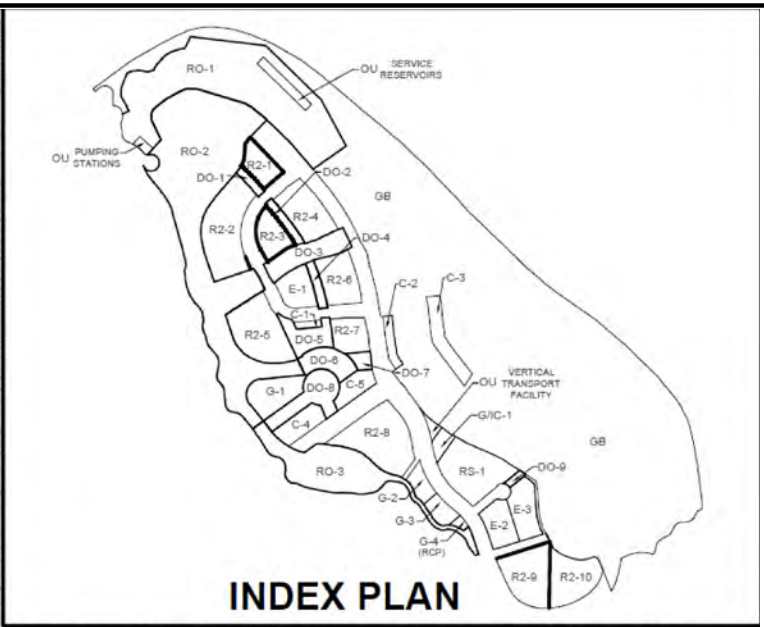
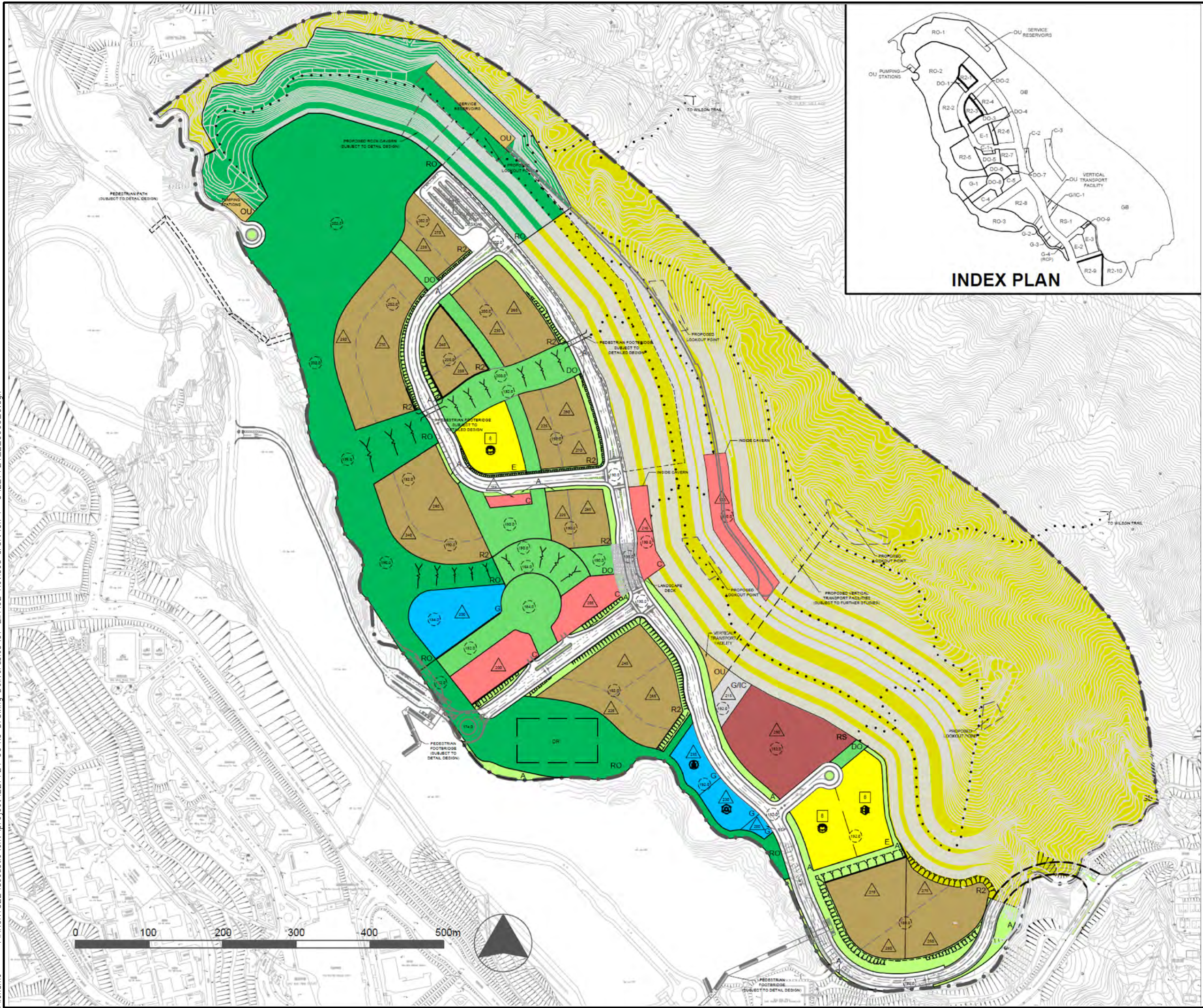
Remark: () Additional noise monitoring location is recommended by RE and agreed by IEC*

RECOMMENDATIONS

- 5.03 The baseline monitoring of air quality and noise were conducted during typical dry season (November to April next years) in Hong Kong. It is important to note that influence of seasonal changes should be taken into account when interpreting monitoring data obtained during wet season (May to October). Review of the baseline conditions may need to be conducted regularly, in particular during seasonal changes. If the changes in baseline conditions are evident, the environmental performance criteria should be re-established by agreement of the ER and submitted for EPD endorsement.

Appendix A

Project Site Layout Plan



- LEGEND
- POLICE STATION
 - DIVISIONAL FIRE STATION
 - SECONDARY SCHOOL
 - PRIMARY SCHOOL
 - PUBLIC TRANSPORT TERMINUS
 - PLANNING BOUNDARY
 - UNDERPASS
 - PROPOSED PEDESTRIAN TRAIL
 - PEDESTRIAN PRECINCT
 - DRAINAGE RESERVE
 - MAXIMUM BUILDING HEIGHT (in m above PD)
 - MAXIMUM BUILDING HEIGHT (in storeys)
 - PROPOSED LEVEL (in m above PD)
 - PROPOSED SLOPE
 - REFUSE COLLECTION POINT
 - FOOTBRIDGE
 - COMMERCIAL
 - SPECIAL RESIDENTIAL
 - RESIDENTIAL ZONE-2
 - GOVERNMENT
 - GOVERNMENT/ INSTITUTION OR COMMUNITY
 - EDUCATION
 - REGIONAL OPEN SPACE
 - DISTRICT OPEN SPACE
 - AMENITY
 - OTHER SPECIFIED USES
 - GREEN BELT
 - ROADS, JUNCTIONS, ETC.
 - AREA WITH POTENTIAL FOR ROCK CAVERN DEVELOPMENT

C	THIRD ISSUE	GL	03/14
B	SECOND ISSUE	GL	01/14
A	FIRST ISSUE	GL	10/13
Rev	Description	By	Date

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Contract No. and Title

Agreement No. CE 18/2012(CE)

**Development of
Anderson Road Quarry -
Investigation**

Drawing title

**Recommended Outline
Development Plan**

Drawing no.	227724/E/0003	Rev.	C
Drawn	GL	Date	03/14
Checked	TC	Approved	ST
Scale	AS SHOWN	Status	PRELIMINARY

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Appendix B

Monitoring Locations

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HVS in AMS-1 for 24-Hour TSP




AMS-2



AMS-3

- Legend
- Study Area
 - 500m Assessment Area
 - Dust Monitoring Locations

B	SECOND ISSUE	GL	03/14
A	FIRST ISSUE	GL	10/13
Rev	Description	By	Date
Consultant			
ARUP			
Contract No. and Title			
Agreement No. CE 18/2012(CE)			
Development of Anderson Road Quarry - Investigation			
Drawing title			
Locations of Construction Dust Monitoring (Sheet 1 of 3)			
Drawing no.		Rev.	
227724/E/1045		B	
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GL	03/14	TC	ST
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- Legend
- Study Area
 - 500m Assessment Area
 - Dust Monitoring Locations



HVS in AMS-5 for 24-Hour TSP



HVS in AMS-6 for 24-Hour TSP



B	SECOND ISSUE	GL	03/14
A	FIRST ISSUE	GL	10/13
Rev	Description	By	Date
Consultant			
ARUP			
Contract No. and Title			
Agreement No. CE 18/2012(CE)			
Development of Anderson Road Quarry - Investigation			
Drawing title			
Locations of Construction Dust Monitoring (Sheet 2 of 3)			
Drawing no.		Rev.	
227724/E/1046		B	
Drawn	Date	Checked	Approved
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Scale	1:5000 (M3)	Status	PRELIMINARY

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Filename : G:\env\project\227724-50\13 Drawing Deliverables\08 EIM\A02 Revised draft\227724-E-047-B - Locations of Construction Dust Monitoring (Sheet 3 of 3).dgn

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- Legend
- Study Area
 - 500m Assessment Area
 - Dust Monitoring Locations



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A FIRST ISSUE		GL	10/13
Rev	Description	By	Date
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Development of Anderson Road Quarry - Investigation			
Drawing title			
Locations of Construction Dust Monitoring (Sheet 3 of 3)			
Drawing no.		Rev.	
227724/E/1047		B	
Drawn	Date	Checked	Approved
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Legend

- Study Area
- Construction Noise Monitoring Location
- Construction and Operational Road Traffic Noise Monitoring Location

Building layout is assumed for assessment purpose

Building layout is assumed for assessment purpose

NMS-3
(Site C2 - R102)

NMS-1
(Site C2 + School 05)

Proposed NMS-4 (On Tat House)

Building layout is assumed for assessment purpose

NMS-2
(Site E - School)

C	THIRD ISSUE	GL	05/14
B	SECOND ISSUE	GL	03/14
A	FIRST ISSUE	GL	10/13
Rev	Description	By	Date

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Contract No. and Title

Agreement No. CE 18/2012(CE)

Development of
Anderson Road Quarry -
Investigation

Drawing title

Locations of Noise
Monitoring

Drawing no.	227724/E/2400	Rev.	C
Drawn	Date	Checked	Approved
GL	05/14	TC	ST
Scale	1:50000 MA3	Status	PRELIMINARY

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Appendix C

**Calibration Certificates of Equipment
and
the Accreditation Laboratory Certificate**

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Chi Yum Ching She
Location ID : AMS1

Date of Calibration: 16-Feb-17
Next Calibration Date: 16-Apr-17
Technician: Chan Hong Sung

CONDITIONS

Sea Level Pressure (hPa)	1021.6	Corrected Pressure (mm Hg)	766.2
Temperature (°C)	18.7	Temperature (K)	292

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.00757
Model->	5025A	Qstd Intercept ->	-0.01628
Serial # ->	1612		

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.10	6.10	12.2	1.774	54	55.39	Slope = 34.9092 Intercept = -5.9629 Corr. coeff. = 0.9991
13	4.80	4.80	9.6	1.574	48	49.24	
10	3.70	3.70	7.4	1.383	42	43.08	
7	2.40	2.40	4.8	1.116	32	32.82	
5	1.50	1.50	3.0	0.884	24	24.62	

Calculations :

$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$
 $IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K

Pstd = actual pressure during calibration (mm Hg

For subsequent calculation of sampler flow:

$1/m((I) [\text{Sqrt}(298/Tav)(Pav/760)]-b)$

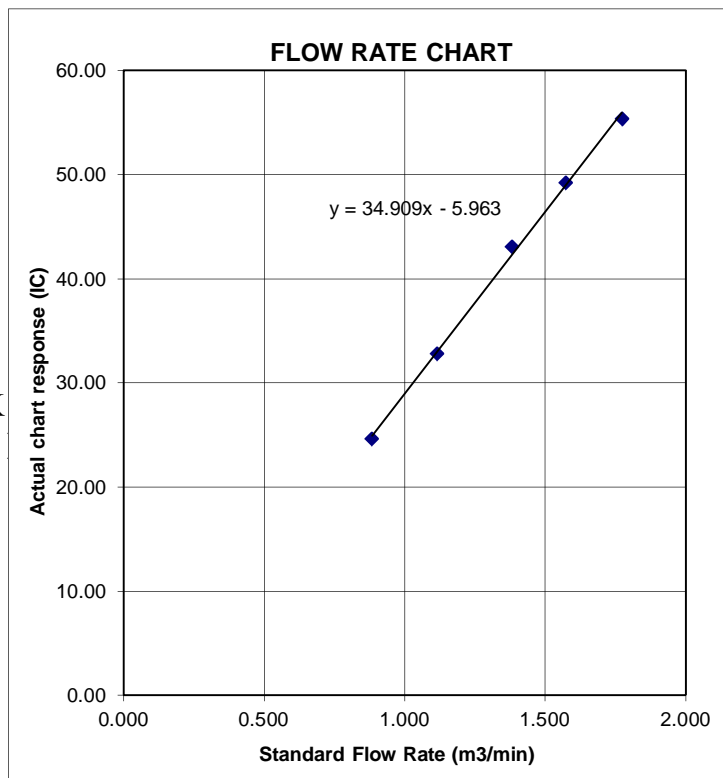
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Oi Tat House	Date of Calibration: 25-Mar-17
Location ID : AMS5	Next Calibration Date: 25-May-17
	Technician: Chan Hong Sung

CONDITIONS

Sea Level Pressure (hPa)	1017.2	Corrected Pressure (mm Hg)	762.9
Temperature (°C)	20.2	Temperature (K)	293

CALIBRATION ORIFICE

Make-> TISCH	Qstd Slope -> 2.11965
Model-> 5025A	Qstd Intercept -> -0.02696
Serial # -> 1941	

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.25	6.25	12.5	1.698	53	53.97	Slope = 33.1466 Intercept = -3.5611 Corr. coeff. = 0.9945
13	5.00	5.00	10.0	1.520	45	45.82	
10	3.90	3.90	7.8	1.344	40	40.73	
7	2.45	2.45	4.9	1.068	30	30.55	
5	1.50	1.50	3.0	0.838	25	25.46	

Calculations :

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K

Pstd = actual pressure during calibration (mm Hg

For subsequent calculation of sampler flow:

$$1/m((I) [\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

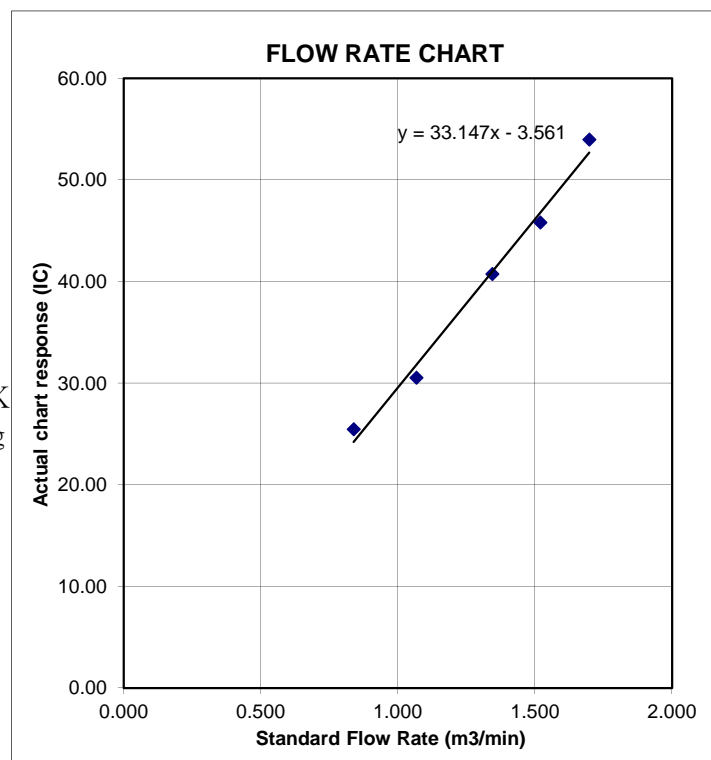
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Hau Tat House

Location ID : AMS6

Date of Calibration: 25-Mar-17

Next Calibration Date: 25-May-17

Technician: Chan Hong Sung

CONDITIONS

Sea Level Pressure (hPa)

1017.2

Temperature (°C)

20.2

Corrected Pressure (mm Hg)

762.9

Temperature (K)

293

CALIBRATION ORIFICE

Make-> TISCH

Model-> 5025A

Serial # -> 1941

Qstd Slope ->

2.11965

Qstd Intercept ->

-0.02696

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.10	6.10	12.2	1.677	55	56.01	Slope = 30.9886
13	4.90	4.90	9.8	1.504	48	48.88	Intercept = 3.2893
10	3.80	3.80	7.6	1.326	43	43.79	Corr. coeff. = 0.9941
7	2.40	2.40	4.8	1.057	37	37.68	
5	1.50	1.50	3.0	0.838	28	28.51	

Calculations :

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K

Pstd = actual pressure during calibration (mm Hg

For subsequent calculation of sampler flow:

$$1/m((I) [\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

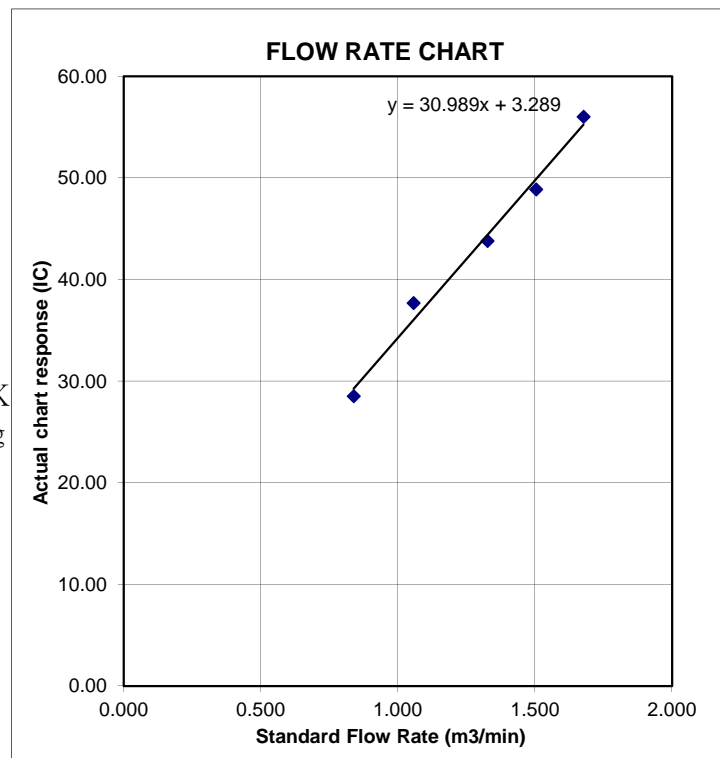
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Ma Yau Tong Village

Date of Calibration: 16-Feb-17

Location ID : AMS7

Next Calibration Date: 16-Apr-17

Technician: Chan Hong Sung

CONDITIONS

Sea Level Pressure (hPa)

1021.6

Corrected Pressure (mm Hg)

766.2

Temperature (°C)

18.7

Temperature (K)

292

CALIBRATION ORIFICE

Make-> TISCH

Qstd Slope ->

2.00757

Model-> 5025A

Qstd Intercept ->

-0.01628

Serial # -> 1612

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.80	5.80	11.6	1.730	52	53.34	Slope = 35.3658 Intercept = -8.8133 Corr. coeff. = 0.9965
13	4.60	4.60	9.2	1.541	44	45.13	
10	3.60	3.60	7.2	1.365	38	38.98	
7	2.30	2.30	4.6	1.092	28	28.72	
5	1.50	1.50	3.0	0.884	23	23.59	

Calculations :

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K

Pstd = actual pressure during calibration (mm Hg

For subsequent calculation of sampler flow:

$$1/m((I) [\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

m = sampler slope

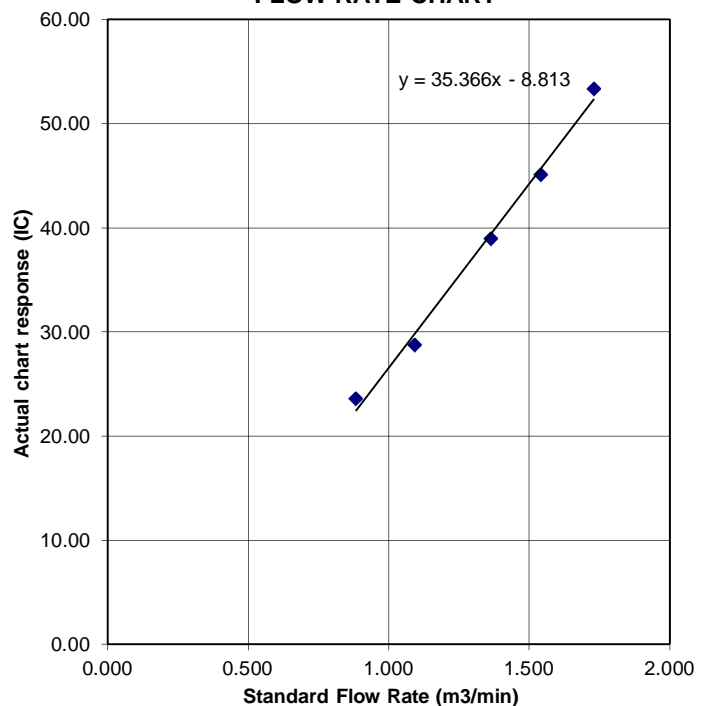
b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

FLOW RATE CHART



ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - Feb 28, 2017 Rootmeter S/N 0438320 Ta (K) - 294
Operator Tisch Orifice I.D. - 1941 Pa (mm) - 750.57

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	1.4600	3.2	2.00
2	NA	NA	1.00	1.0410	6.4	4.00
3	NA	NA	1.00	0.9280	7.9	5.00
4	NA	NA	1.00	0.8840	8.7	5.50
5	NA	NA	1.00	0.7290	12.7	8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)	Va	(x axis) Qa	(y axis)
0.9967	0.6827	1.4149	0.9957	0.6820	0.8851
0.9925	0.9534	2.0010	0.9915	0.9524	1.2517
0.9904	1.0672	2.2372	0.9894	1.0661	1.3995
0.9894	1.1192	2.3464	0.9884	1.1181	1.4678
0.9840	1.3499	2.8299	0.9830	1.3485	1.7702
Qstd slope (m) = 2.11965			Qa slope (m) = 1.32729		
intercept (b) = -0.02696			intercept (b) = -0.01686		
coefficient (r) = 0.99991			coefficient (r) = 0.99991		
y axis = SQRT[H2O(Pa/760)(298/Ta)]			y axis = SQRT[H2O(Ta/Pa)]		

CALCULATIONS

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

$$Qstd = Vstd/Time$$

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

$$Qa = Va/Time$$

For subsequent flow rate calculations:

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

$$Qa = 1/m\{[\text{SQRT}(H2O(Ta/Pa))]-b\}$$



ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

SUB-CONTRACTING REPORT

CONTACT	: MR BEN TAM	WORK ORDER	: HK1618640
CLIENT	: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING		
ADDRESS	: RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, Kwai Chung, N.T. HONG KONG	SUB-BATCH	: 1
		DATE RECEIVED	: 2-APR-2016
		DATE OF ISSUE	: 12-MAY-2016
PROJECT	: ----	NO. OF SAMPLES	: 1
		CLIENT ORDER	: ----

General Comments

- Sample(s) were received in an ambient condition.
- Sample(s) analysed and reported on an as received basis.
- Calibration was subcontracted to and analysed by Action United Enviro Services.

Signatories

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories

Position

Richard Fung

General Manager

This is the Final Report and supersedes any preliminary report with this batch number.
Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

ALS Technichem (HK) Pty Ltd
Part of the ALS Laboratory Group

1/F, Chung Shun Knitting Centre 1 - 3 Wing Yip Street Kwai Chung N.T. Hong Kong
Tel. +852 2610 1044 Fax. +852 2610 2021 www.alsglobal.com

WORK ORDER : HK1618640
SUB-BATCH : 1
CLIENT : ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING
PROJECT : ----



ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK1618640-001	S/N: 456660	AIR	02-APR-2016	S/N: 456660

Equipment Verification Report (TSP)

Equipment Calibrated:

Type: Laser Dust monitor
Manufacturer: Sibata LD-3B
Serial No. 456660
Equipment Ref: EQ117
Job Order HK1618640

Standard Equipment:

Standard Equipment: Higher Volume Sampler
Location & Location ID: AUES office (calibration room)
Equipment Ref: HVS 018
Last Calibration Date: 22 Mar 2016

Equipment Verification Results:

Calibration Date: 3 April 2016

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m ³ (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr00min	10:15 ~ 12:15	23.0	1014.6	0.056	3022	25.2
2hr00min	12:20 ~ 14:20	23.0	1014.6	0.032	1588	13.2
2hr00min	14:25 ~ 16:25	23.0	1014.6	0.039	1726	14.4

Sensitivity Adjustment Scale Setting (Before Calibration) 606 (CPM)

Sensitivity Adjustment Scale Setting (After Calibration) 606 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022

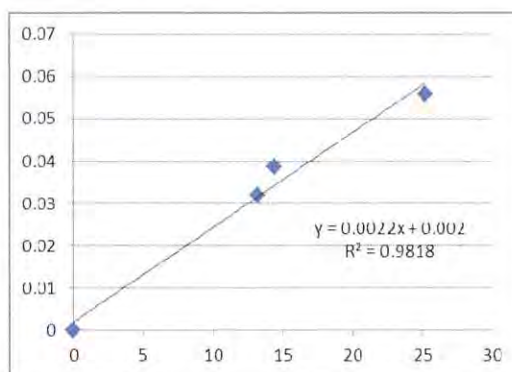
Correlation Coefficient (R) 0.9909


Date of Issue 6 April 2016

Remarks:

1. **Strong** Correlation ($R > 0.8$)
2. Factor 0.0022 should be apply for TSP monitoring

*If $R < 0.5$, repair or re-verification is required for the equipment



Operator : Donald Kwok Signature :  Date : 6 April 2016

QC Reviewer : Ben Tam Signature :  Date : 6 April 2016

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Gold King Industrial Building, Kwai Chung
 Location ID : Calibration Room

Date of Calibration: 22-Mar-16
 Next Calibration Date: 22-Jun-16

CONDITIONS

Sea Level Pressure (hPa)	1013.4	Corrected Pressure (mm Hg)	760.05
Temperature (°C)	16.6	Temperature (K)	290

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.10265
Model->	5025A	Qstd Intercept ->	-0.00335
Calibration Date->	24-Mar-15	Expiry Date->	24-Mar-16

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	4.2	4.2	8.4	1.400	57	57.82	Slope = 31.6915 Intercept = 13.9178 Corr. coeff. = 0.9946
13	3.2	3.2	6.4	1.222	52	52.75	
10	2.4	2.4	4.8	1.059	47	47.68	
8	1.6	1.6	3.2	0.865	42	42.61	
5	1.1	1.1	2.2	0.717	35	35.51	

Calculations :

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K

Pstd = actual pressure during calibration (mm Hg

For subsequent calculation of sampler flow:

$$1/m((I) [\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

m = sampler slope

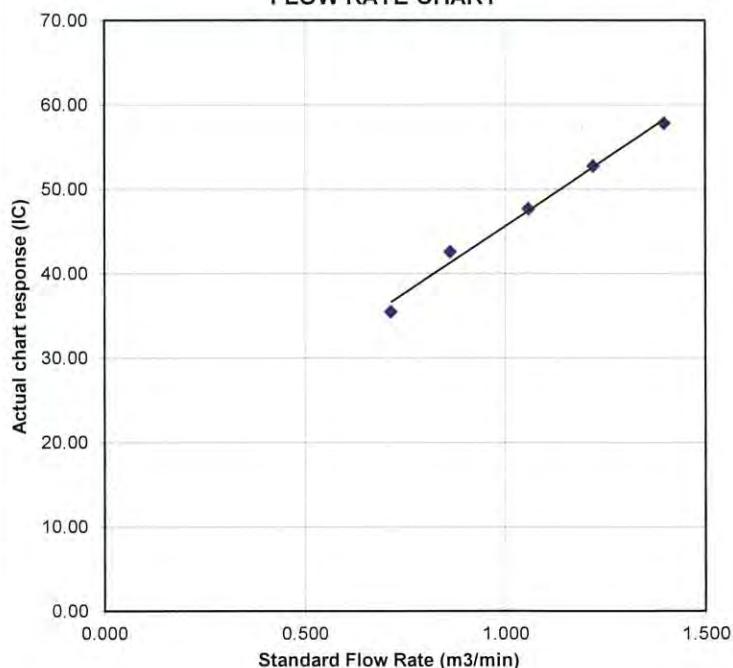
b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

FLOW RATE CHART





ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

SUB-CONTRACTING REPORT

CONTACT	: MR BEN TAM	WORK ORDER	: HK1618636
CLIENT	: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING		
ADDRESS	: RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T. HONG KONG	SUB-BATCH	: 1
		DATE RECEIVED	: 2-APR-2016
		DATE OF ISSUE	: 12-MAY-2016
PROJECT	: ----	NO. OF SAMPLES	: 1
		CLIENT ORDER	: ----

General Comments

- Sample(s) were received in an ambient condition.
- Sample(s) analysed and reported on an as received basis.
- Calibration was subcontracted to and analysed by Action United Enviro Services.

Signatories

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories

Position

Richard Fung  General Manager

This is the Final Report and supersedes any preliminary report with this batch number.
Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

ALS Technichem (HK) Pty Ltd
Part of the ALS Laboratory Group

11/F. Chung Shun Knitting Centre 1 - 3 Wing Yip Street Kwai Chung N.T. Hong Kong
Tel. +852 2610 1044 Fax. +852 2610 2021 www.alsglobal.com

WORK ORDER : HK1618636
SUB-BATCH : 1
CLIENT : ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING
PROJECT : ----



ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK1618636-001	S/N: 456659	AIR	02-APR-2016	S/N: 456659

Equipment Verification Report (TSP)

Equipment Calibrated:

Type: Laser Dust monitor
Manufacturer: Sibata LD-3B
Serial No. 456659
Equipment Ref: EQ116
Job Order HK1618636

Standard Equipment:

Standard Equipment: Higher Volume Sampler
Location & Location ID: AUES office (calibration room)
Equipment Ref: HVS 018
Last Calibration Date: 22 Mar 2016

Equipment Verification Results:

Calibration Date: 3 April 2016

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m ³ (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr00min	10:15 ~ 12:15	23.0	1014.6	0.056	3055	25.5
2hr00min	12:20 ~ 14:20	23.0	1014.6	0.032	1607	13.4
2hr00min	14:25 ~ 16:25	23.0	1014.6	0.039	1749	14.6

Sensitivity Adjustment Scale Setting (Before Calibration) 736 (CPM)

Sensitivity Adjustment Scale Setting (After Calibration) 735 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022

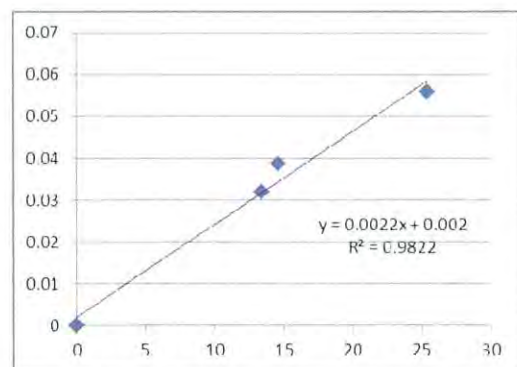
Correlation Coefficient (R) 0.9911


Date of Issue 6 April 2016

Remarks:

1. **Strong** Correlation ($R > 0.8$)
2. Factor 0.0022 should be apply for TSP monitoring

*If $R < 0.5$, repair or re-verification is required for the equipment



Operator: Donald Kwok Signature:  Date: 6 April 2016

QC Reviewer: Ben Tam Signature:  Date: 6 April 2016

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Gold King Industrial Building, Kwai Chung
 Location ID : Calibration Room

Date of Calibration: 22-Mar-16
 Next Calibration Date: 22-Jun-16

CONDITIONS

Sea Level Pressure (hPa) 1013.4
 Temperature (°C) 16.6

Corrected Pressure (mm Hg) 760.05
 Temperature (K) 290

CALIBRATION ORIFICE

Make-> TISCH
 Model-> 5025A
 Calibration Date-> 24-Mar-15

Qstd Slope -> 2.10265
 Qstd Intercept -> -0.00335
 Expiry Date-> 24-Mar-16

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	4.2	4.2	8.4	1.400	57	57.82	Slope = 31.6915
13	3.2	3.2	6.4	1.222	52	52.75	Intercept = 13.9178
10	2.4	2.4	4.8	1.059	47	47.68	Corr. coeff. = 0.9946
8	1.6	1.6	3.2	0.865	42	42.61	
5	1.1	1.1	2.2	0.717	35	35.51	

Calculations :

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K

Pstd = actual pressure during calibration (mm Hg

For subsequent calculation of sampler flow:

$$1/m((I) [\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

m = sampler slope

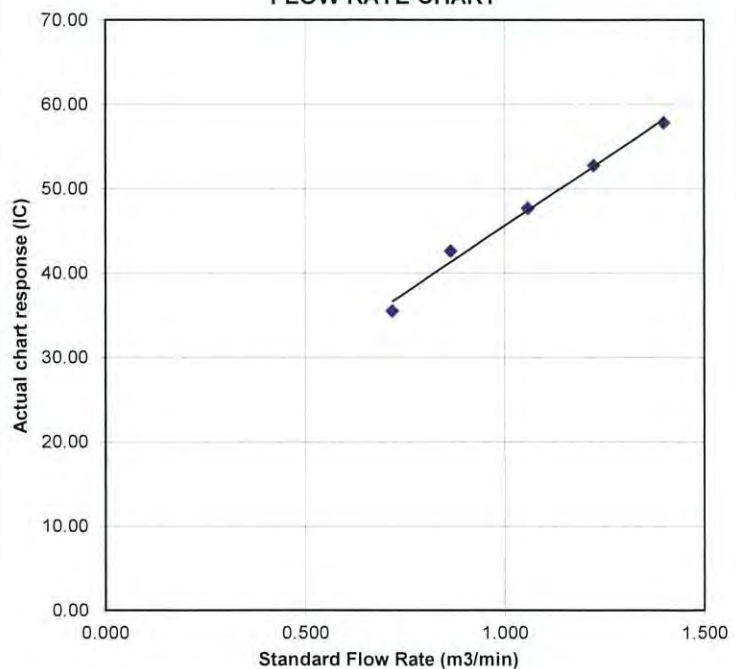
b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

FLOW RATE CHART





ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

SUB-CONTRACTING REPORT

CONTACT	: MR BEN TAM	WORK ORDER	: HK1618634
CLIENT	: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING		
ADDRESS	: RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T. HONG KONG	SUB-BATCH	: 1
		DATE RECEIVED	: 2-APR-2016
		DATE OF ISSUE	: 12-MAY-2016
PROJECT	: ----	NO. OF SAMPLES	: 1
		CLIENT ORDER	: ----

General Comments

- Sample(s) were received in an ambient condition.
- Sample(s) analysed and reported on an as received basis.
- Calibration was subcontracted to and analysed by Action United Enviro Services.

Signatories

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories

Position

Richard Fung

General Manager

This is the Final Report and supersedes any preliminary report with this batch number.
Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

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Part of the ALS Laboratory Group

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Tel. +852 2610 1044 Fax. +852 2610 2021 www.alsglobal.com

WORK ORDER : HK1618634
SUB-BATCH : 1
CLIENT : ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING
PROJECT : ----



ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK1618634-001	S/N: 456658	AIR	02-APR-2016	S/N: 456658

Equipment Verification Report (TSP)

Equipment Calibrated:

Type: Laser Dust monitor
Manufacturer: Sibata LD-3B
Serial No. 456658
Equipment Ref: EQ115
Job Order HK1618634

Standard Equipment:

Standard Equipment: Higher Volume Sampler
Location & Location ID: AUES office (calibration room)
Equipment Ref: HVS 018
Last Calibration Date: 22 Mar 2016

Equipment Verification Results:

Calibration Date: 3 April 2016

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m ³ (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr00min	10:15 ~ 12:15	23.0	1014.6	0.056	3014	25.1
2hr00min	12:20 ~ 14:20	23.0	1014.6	0.032	1599	13.3
2hr00min	14:25 ~ 16:25	23.0	1014.6	0.039	1743	14.5

Sensitivity Adjustment Scale Setting (Before Calibration) 700 (CPM)

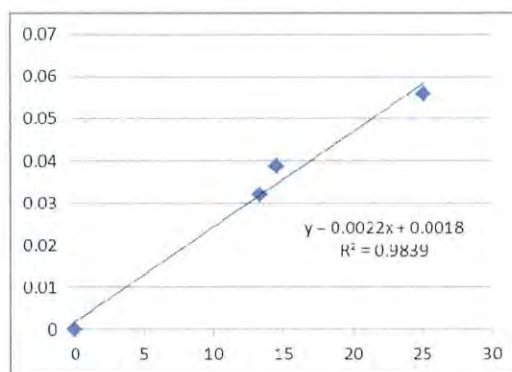
Sensitivity Adjustment Scale Setting (After Calibration) 703 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022

Correlation Coefficient (R) 0.9919

Date of Issue 6 April 2016



Remarks:

1. **Strong** Correlation ($R > 0.8$)
2. Factor 0.0022 should be apply for TSP monitoring

*If $R < 0.5$, repair or re-verification is required for the equipment

Operator : Donald Kwok Signature :  Date : 6 April 2016

QC Reviewer : Ben Tam Signature :  Date : 6 April 2016

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Gold King Industrial Building, Kwai Chung	Date of Calibration: 22-Mar-16
Location ID :	Calibration Room	Next Calibration Date: 22-Jun-16

CONDITIONS

Sea Level Pressure (hPa)	1013.4	Corrected Pressure (mm Hg)	760.05
Temperature (°C)	16.6	Temperature (K)	290

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.10265
Model->	5025A	Qstd Intercept ->	-0.00335
Calibration Date->	24-Mar-15	Expiry Date->	24-Mar-16

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	4.2	4.2	8.4	1.400	57	57.82	Slope = 31.6915 Intercept = 13.9178 Corr. coeff. = 0.9946
13	3.2	3.2	6.4	1.222	52	52.75	
10	2.4	2.4	4.8	1.059	47	47.68	
8	1.6	1.6	3.2	0.865	42	42.61	
5	1.1	1.1	2.2	0.717	35	35.51	

Calculations :

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K

Pstd = actual pressure during calibration (mm Hg

For subsequent calculation of sampler flow:

$$1/m((I)[\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

m = sampler slope

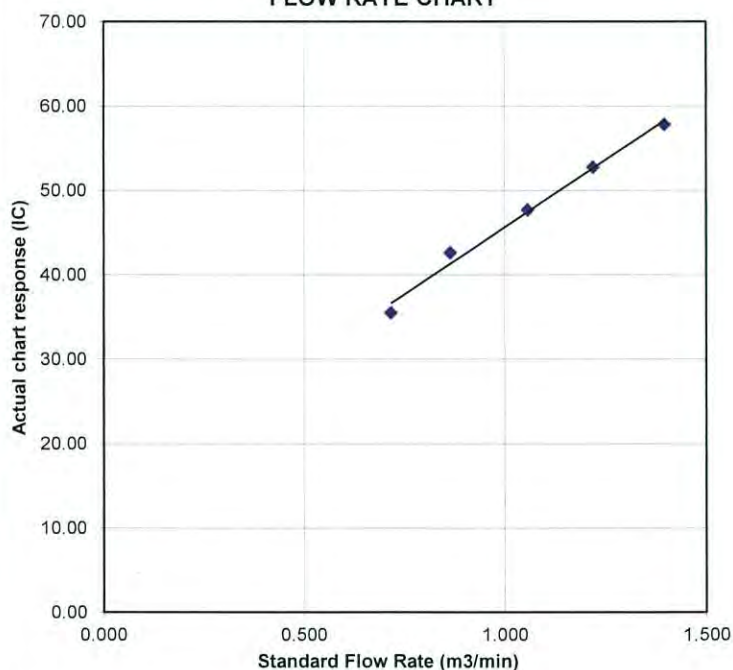
b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

FLOW RATE CHART





ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

SUB-CONTRACTING REPORT

CONTACT	: MR BEN TAM	WORK ORDER	: HK1618632
CLIENT	: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING		
ADDRESS	: RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T. HONG KONG	SUB-BATCH	: 1
		DATE RECEIVED	: 2-APR-2016
		DATE OF ISSUE	: 12-MAY-2016
PROJECT	: ----	NO. OF SAMPLES	: 1
		CLIENT ORDER	: ----

General Comments

- Sample(s) were received in an ambient condition.
- Sample(s) analysed and reported on an as received basis.
- Calibration was subcontracted to and analysed by Action United Enviro Services.

Signatories

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories

Position

Richard Fung

General Manager

This is the Final Report and supersedes any preliminary report with this batch number.
Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

ALS Technichem (HK) Pty Ltd
Part of the ALS Laboratory Group

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Tel. +852 2610 1044 Fax. +852 2610 2021 www.alsglobal.com

WORK ORDER : HK1618632
SUB-BATCH : 1
CLIENT : ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING
PROJECT : ----



ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK1618632-001	S/N: 3Y6502	AIR	02-APR-2016	S/N: 3Y6502

Equipment Verification Report (TSP)

Equipment Calibrated:

Type: Laser Dust monitor
Manufacturer: Sibata LD-3B
Serial No. 3Y6502
Equipment Ref: EQ113
Job Order HK1618632

Standard Equipment:

Standard Equipment: Higher Volume Sampler
Location & Location ID: AUES office (calibration room)
Equipment Ref: HVS 018
Last Calibration Date: 22 Mar 2016

Equipment Verification Results:

Calibration Date: 3 April 2016

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m ³ (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr00min	10:15 ~ 12:15	23.0	1014.6	0.056	3102	25.9
2hr00min	12:20 ~ 14:20	23.0	1014.6	0.032	1699	14.2
2hr00min	14:25 ~ 16:25	23.0	1014.6	0.039	1844	15.4

Sensitivity Adjustment Scale Setting (Before Calibration) 579 (CPM)

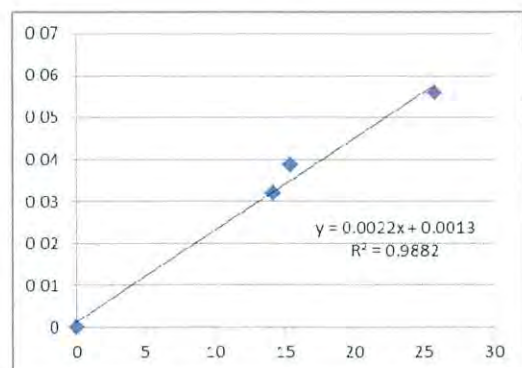
Sensitivity Adjustment Scale Setting (After Calibration) 577 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022

Correlation Coefficient (R) 0.9941


Date of Issue 6 April 2016



Remarks:

1. **Strong** Correlation ($R > 0.8$)
2. Factor 0.0022 should be apply for TSP monitoring

*If $R < 0.5$, repair or re-verification is required for the equipment

Operator : Donald Kwok Signature :  Date : 6 April 2016

QC Reviewer : Ben Tam Signature :  Date : 6 April 2016

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Gold King Industrial Building, Kwai Chung
 Location ID : Calibration Room

Date of Calibration: 22-Mar-16
 Next Calibration Date: 22-Jun-16

CONDITIONS

Sea Level Pressure (hPa) 1013.4
 Temperature (°C) 16.6

Corrected Pressure (mm Hg) 760.05
 Temperature (K) 290

CALIBRATION ORIFICE

Make-> TISCH
 Model-> 5025A
 Calibration Date-> 24-Mar-15

Qstd Slope -> 2.10265
 Qstd Intercept -> -0.00335
 Expiry Date-> 24-Mar-16

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	4.2	4.2	8.4	1.400	57	57.82	Slope = 31.6915 Intercept = 13.9178 Corr. coeff. = 0.9946
13	3.2	3.2	6.4	1.222	52	52.75	
10	2.4	2.4	4.8	1.059	47	47.68	
8	1.6	1.6	3.2	0.865	42	42.61	
5	1.1	1.1	2.2	0.717	35	35.51	

Calculations :

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K

Pstd = actual pressure during calibration (mm Hg

For subsequent calculation of sampler flow:

$$1/m((I) [\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

m = sampler slope

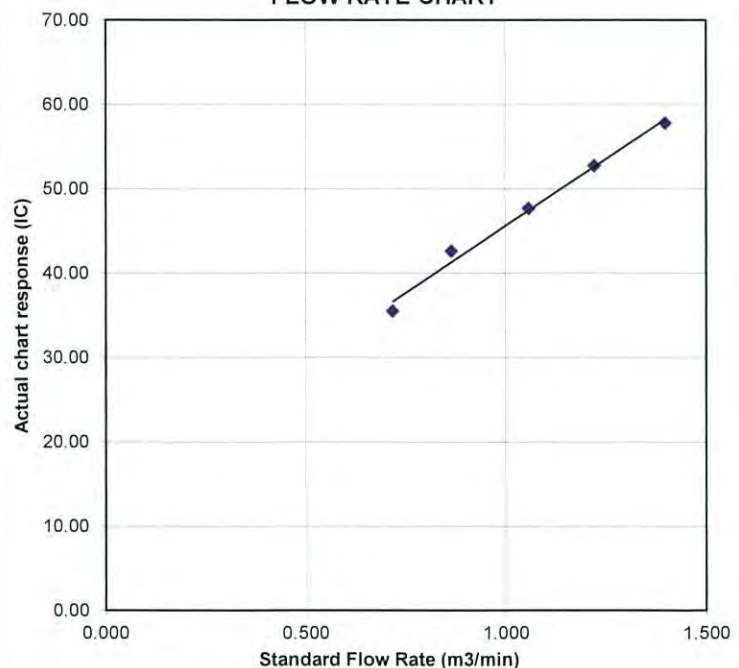
b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

FLOW RATE CHART





SUB-CONTRACTING REPORT

CONTACT	: MR BEN TAM	WORK ORDER	: HK1703460
CLIENT	: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING		
ADDRESS	: RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T. HONG KONG	SUB-BATCH	: 1
		DATE RECEIVED	: 19-JAN-2017
		DATE OF ISSUE	: 23-JAN-2017
PROJECT	: ----	NO. OF SAMPLES	: 1
		CLIENT ORDER	: ----

General Comments

- Sample(s) were received in ambient condition.
- Sample(s) analysed and reported on an as received basis.
- Calibration was subcontracted to and analysed by Action United Enviro Services.

Signatories

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Signatories

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Richard Fung

General Manager

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WORK ORDER : HK1703460
SUB-BATCH : 1
CLIENT : ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING
PROJECT : ----



ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK1703460-001	S/N: 366410	AIR	19-JAN-2017	S/N: 366410

Equipment Verification Report (TSP)

Equipment Calibrated:

Type: Laser Dust monitor
Manufacturer: Sibata LD-3B
Serial No. 366410
Equipment Ref: EQ110
Job Order HK1703460

Standard Equipment:

Standard Equipment: Higher Volume Sampler
Location & Location ID: AUES office (calibration room)
Equipment Ref: HVS 018
Last Calibration Date: 25 November 2016

Equipment Verification Results:

Testing Date: 9 January 2017

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m ³ (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
3hr14min	09:10 ~ 12:24	20.6	1016.3	0.145	12401	64.0
1hr57min	12:30 ~ 14:27	20.6	1016.3	0.069	3266	27.9
1hr58min	14:35 ~ 16:33	20.6	1016.3	0.091	4878	41.1

Sensitivity Adjustment Scale Setting (Before Calibration) 677 (CPM)

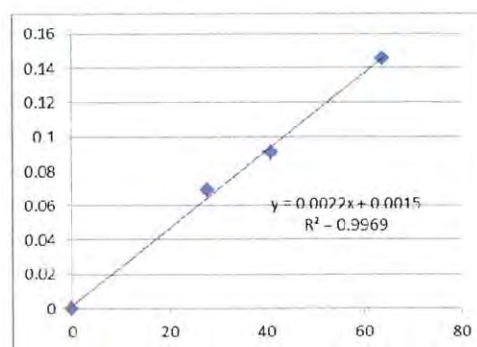
Sensitivity Adjustment Scale Setting (After Calibration) 675 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022

Correlation Coefficient 0.9984

Date of Issue 11 January 2017



Remarks:

1. **Strong** Correlation ($R > 0.8$)
 2. Factor 0.0022 should be apply for TSP monitoring
- *If $R < 0.5$, repair or re-verification is required for the equipment

Operator : Martin Li Signature :  Date : 11 January 2017

QC Reviewer : Ben Tam Signature :  Date : 11 January 2017

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Gold King Industrial Building, Kwai Chung
 Location ID : Calibration Room

Date of Calibration: 25-Nov-16
 Next Calibration Date: 25-Feb-17

CONDITIONS

Sea Level Pressure (hPa) 1016.4
 Temperature (°C) 20.0

Corrected Pressure (mm Hg) 762.3
 Temperature (K) 293

CALIBRATION ORIFICE

Make-> TISCH
 Model-> 5025A
 Calibration Date-> 14-Mar-16

Qstd Slope -> 2.00411
 Qstd Intercept -> -0.03059
 Expiry Date-> 14-Mar-17

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.1	6.1	12.2	1.776	56	56.56	Slope = 35.6871
13	4.7	4.7	9.4	1.560	49	49.49	Intercept = -6.1123
10	3.6	3.6	7.2	1.368	43	43.43	Corr. coeff. = 0.9967
8	2.3	2.3	4.6	1.096	34	34.34	
5	1.4	1.4	2.8	0.859	23	23.23	

Calculations :

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

$$1/m((I) [\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

m = sampler slope

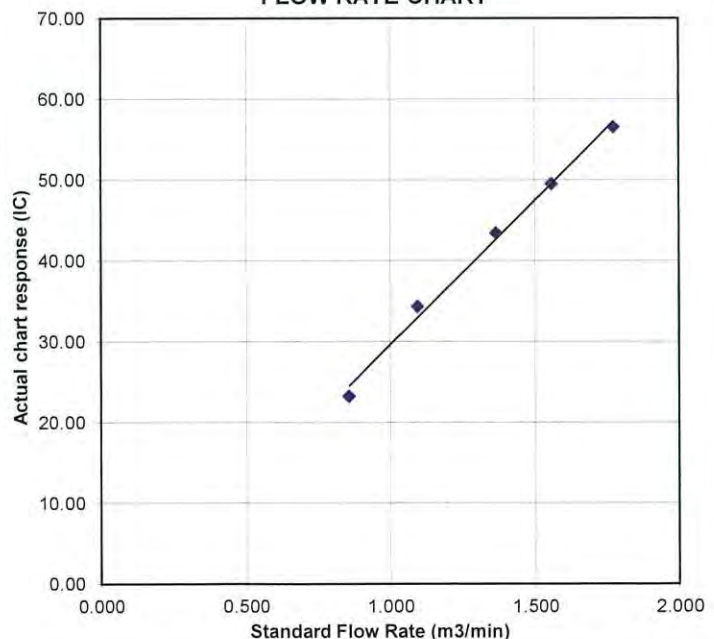
b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

FLOW RATE CHART





ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

SUB-CONTRACTING REPORT

CONTACT	: MR BEN TAM	WORK ORDER	: HK1703455
CLIENT	: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING		
ADDRESS	: RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T. HONG KONG	SUB-BATCH	: 1
		DATE RECEIVED	: 19-JAN-2017
		DATE OF ISSUE	: 23-JAN-2017
PROJECT	: ----	NO. OF SAMPLES	: 1
		CLIENT ORDER	: ----

General Comments

- Sample(s) were received in ambient condition.
- Sample(s) analysed and reported on an as received basis.
- Calibration was subcontracted to and analysed by Action United Enviro Services.

Signatories

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Signatories

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General Manager

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WORK ORDER : HK1703455
SUB-BATCH : 1
CLIENT : ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING
PROJECT : ----



ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK1703455-001	S/N: 366409	AIR	19-JAN-2017	S/N: 366409

Equipment Verification Report (TSP)

Equipment Calibrated:

Type: Laser Dust monitor
Manufacturer: Sibata LD-3B
Serial No. 366409
Equipment Ref: EQ109
Job Order HK1703455

Standard Equipment:

Standard Equipment: Higher Volume Sampler
Location & Location ID: AUES office (calibration room)
Equipment Ref: HVS 018
Last Calibration Date: 25 November 2016

Equipment Verification Results:

Testing Date: 9 January 2017

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m ³ (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
3hr14min	09:10 ~ 12:24	20.6	1016.3	0.145	12487	64.4
1hr57min	12:30 ~ 14:27	20.6	1016.3	0.069	3433	29.3
1hr58min	14:35 ~ 16:33	20.6	1016.3	0.091	4815	40.5

Sensitivity Adjustment Scale Setting (Before Calibration) 523 (CPM)

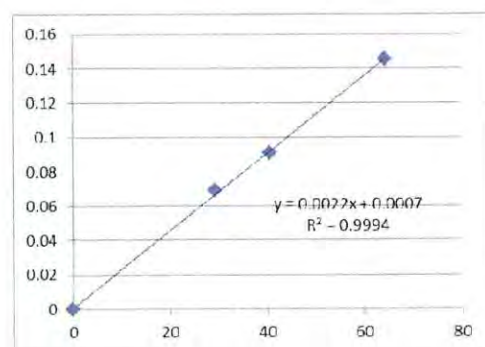
Sensitivity Adjustment Scale Setting (After Calibration) 525 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022

Correlation Coefficient 0.9997

Date of Issue 11 January 2017



Remarks:

- Strong** Correlation ($R > 0.8$)
- Factor 0.0022 should be apply for TSP monitoring

*If $R < 0.5$, repair or re-verification is required for the equipment

Operator : Martin Li Signature : [Signature] Date : 11 January 2017

QC Reviewer : Ben Tam Signature : [Signature] Date : 11 January 2017

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Gold King Industrial Building, Kwai Chung Date of Calibration: 25-Nov-16
 Location ID : Calibration Room Next Calibration Date: 25-Feb-17

CONDITIONS

Sea Level Pressure (hPa)	1016.4	Corrected Pressure (mm Hg)	762.3
Temperature (°C)	20.0	Temperature (K)	293

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.00411
Model->	5025A	Qstd Intercept ->	-0.03059
Calibration Date->	14-Mar-16	Expiry Date->	14-Mar-17

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.1	6.1	12.2	1.776	56	56.56	Slope = 35.6871 Intercept = -6.1123 Corr. coeff. = 0.9967
13	4.7	4.7	9.4	1.560	49	49.49	
10	3.6	3.6	7.2	1.368	43	43.43	
8	2.3	2.3	4.6	1.096	34	34.34	
5	1.4	1.4	2.8	0.859	23	23.23	

Calculations :

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

$$1/m((I) [\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

m = sampler slope

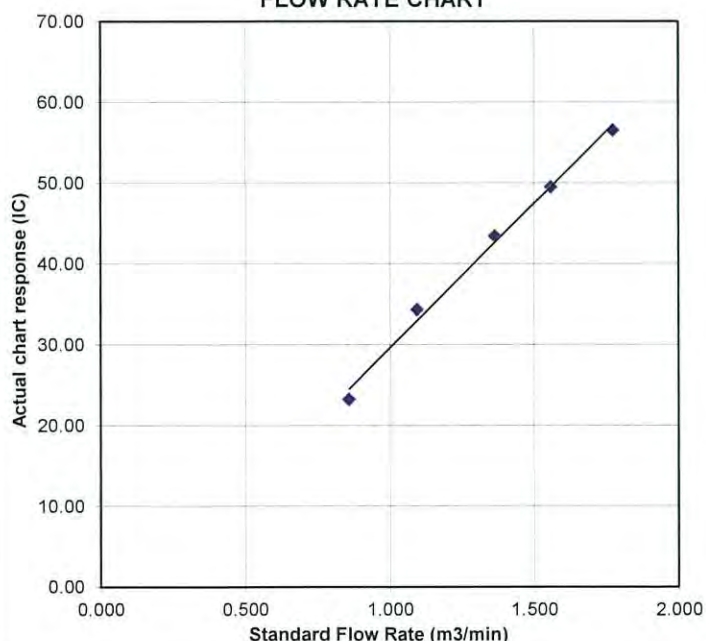
b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

FLOW RATE CHART





ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

SUB-CONTRACTING REPORT

CONTACT	: MR BEN TAM	WORK ORDER	: HK1618617
CLIENT	: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING		
ADDRESS	: RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T. HONG KONG	SUB-BATCH	: 1
		DATE RECEIVED	: 2-APR-2016
		DATE OF ISSUE	: 12-MAY-2016
PROJECT	: ----	NO. OF SAMPLES	: 1
		CLIENT ORDER	: ----

General Comments

- Sample(s) were received in an ambient condition.
- Sample(s) analysed and reported on an as received basis.
- Calibration was subcontracted to and analysed by Action United Enviro Services.

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WORK ORDER : HK1618617
SUB-BATCH : 1
CLIENT : ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING
PROJECT : ----



ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK1618617-001	S/N: 366418	AIR	02-APR-2016	S/N: 366418

Equipment Verification Report (TSP)

Equipment Calibrated:

Type: Laser Dust monitor
Manufacturer: Sibata LD-3B
Serial No. 366418
Equipment Ref: EQ108
Job Order HK1618617

Standard Equipment:

Standard Equipment: Higher Volume Sampler
Location & Location ID: AUES office (calibration room)
Equipment Ref: HVS 018
Last Calibration Date: 22 Mar 2016

Equipment Verification Results:

Calibration Date: 3 April 2016

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m ³ (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr00min	10:15 ~ 12:15	23.0	1014.6	0.056	3126	26.1
2hr00min	12:20 ~ 14:20	23.0	1014.6	0.032	1688	14.1
2hr00min	14:25 ~ 16:25	23.0	1014.6	0.039	1707	14.2

Sensitivity Adjustment Scale Setting (Before Calibration) 677 (CPM)

Sensitivity Adjustment Scale Setting (After Calibration) 679 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022

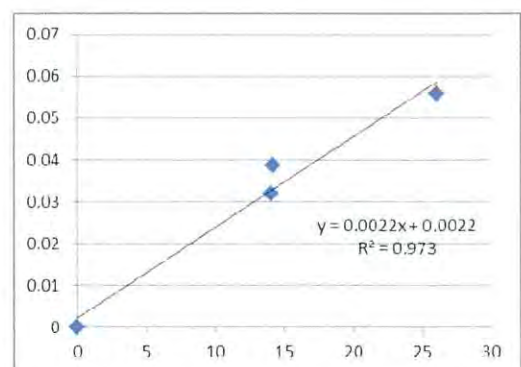
Correlation Coefficient (R) 0.9864

Date of Issue 6 April 2016

Remarks:

1. **Strong** Correlation ($R > 0.8$)
2. Factor 0.0022 should be apply for TSP monitoring

*If $R < 0.5$, repair or re-verification is required for the equipment



Operator: Donald Kwok Signature:  Date: 6 April 2016

QC Reviewer: Ben Tam Signature:  Date: 6 April 2016

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Gold King Industrial Building, Kwai Chung
 Location ID : Calibration Room

Date of Calibration: 22-Mar-16
 Next Calibration Date: 22-Jun-16

CONDITIONS

Sea Level Pressure (hPa)
 Temperature (°C)

1013.4
 16.6

Corrected Pressure (mm Hg)
 Temperature (K)

760.05
 290

CALIBRATION ORIFICE

Make-> TISCH
 Model-> 5025A
 Calibration Date-> 24-Mar-15

Qstd Slope -> 2.10265
 Qstd Intercept -> -0.00335
 Expiry Date-> 24-Mar-16

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	4.2	4.2	8.4	1.400	57	57.82	Slope = 31.6915 Intercept = 13.9178 Corr. coeff. = 0.9946
13	3.2	3.2	6.4	1.222	52	52.75	
10	2.4	2.4	4.8	1.059	47	47.68	
8	1.6	1.6	3.2	0.865	42	42.61	
5	1.1	1.1	2.2	0.717	35	35.51	

Calculations :

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K

Pstd = actual pressure during calibration (mm Hg

For subsequent calculation of sampler flow:

$$1/m((I) [\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

m = sampler slope

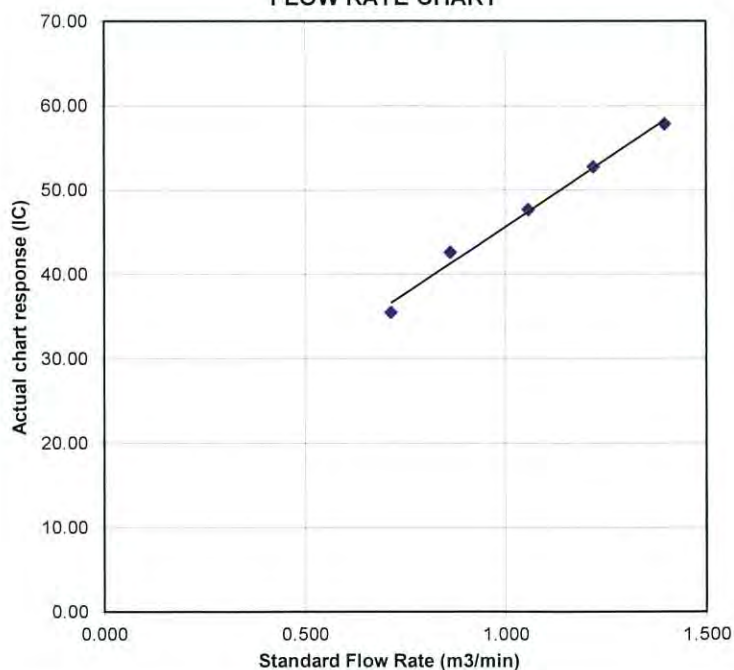
b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

FLOW RATE CHART





ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

SUB-CONTRACTING REPORT

CONTACT	: MR BEN TAM	WORK ORDER	: HK1618618
CLIENT	: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING		
ADDRESS	: RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T. HONG KONG	SUB-BATCH	: 1
		DATE RECEIVED	: 2-APR-2016
		DATE OF ISSUE	: 12-MAY-2016
PROJECT	: ----	NO. OF SAMPLES	: 1
		CLIENT ORDER	: ----

General Comments

- Sample(s) were received in an ambient condition.
- Sample(s) analysed and reported on an as received basis.
- Calibration was subcontracted to and analysed by Action United Enviro Services.

Signatories

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WORK ORDER : HK1618618
SUB-BATCH : 1
CLIENT : ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING
PROJECT : ----



ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK1618618-001	S/N: 3Y6501	AIR	02-APR-2016	S/N: 3Y6501

Equipment Verification Report (TSP)

Equipment Calibrated:

Type: Laser Dust monitor
Manufacturer: Sibata LD-3B
Serial No. 3Y6501
Equipment Ref: EQ111
Job Order HK1618618

Standard Equipment:

Standard Equipment: Higher Volume Sampler
Location & Location ID: AUES office (calibration room)
Equipment Ref: HVS 018
Last Calibration Date: 22 Mar 2016

Equipment Verification Results:

Calibration Date: 3 April 2016

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m ³ (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr00min	10:15 ~ 12:15	23.0	1014.6	0.056	3014	25.1
2hr00min	12:20 ~ 14:20	23.0	1014.6	0.032	1557	13.0
2hr00min	14:25 ~ 16:25	23.0	1014.6	0.039	1722	14.4

Sensitivity Adjustment Scale Setting (Before Calibration) 657 (CPM)

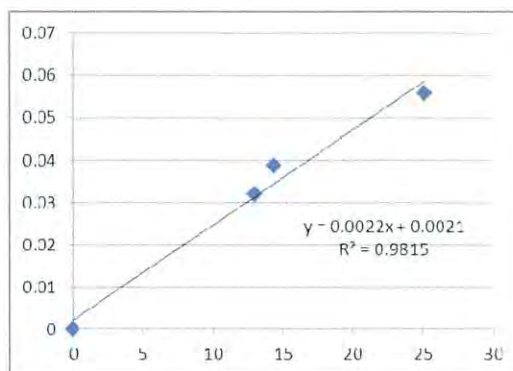
Sensitivity Adjustment Scale Setting (After Calibration) 657 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022

Correlation Coefficient (R) 0.9907

Date of Issue 6 April 2016



Remarks:

1. **Strong** Correlation ($R > 0.8$)
2. Factor 0.0022 should be apply for TSP monitoring

*If $R < 0.5$, repair or re-verification is required for the equipment

Operator : Donald Kwok Signature :  Date : 6 April 2016

QC Reviewer : Ben Tam Signature :  Date : 6 April 2016

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Gold King Industrial Building, Kwai Chung
 Location ID : Calibration Room

Date of Calibration: 22-Mar-16
 Next Calibration Date: 22-Jun-16

CONDITIONS

Sea Level Pressure (hPa) 1013.4
 Temperature (°C) 16.6

Corrected Pressure (mm Hg) 760.05
 Temperature (K) 290

CALIBRATION ORIFICE

Make-> TISCH
 Model-> 5025A
 Calibration Date-> 24-Mar-15

Qstd Slope -> 2.10265
 Qstd Intercept -> -0.00335
 Expiry Date-> 24-Mar-16

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	4.2	4.2	8.4	1.400	57	57.82	Slope = 31.6915 Intercept = 13.9178 Corr. coeff. = 0.9946
13	3.2	3.2	6.4	1.222	52	52.75	
10	2.4	2.4	4.8	1.059	47	47.68	
8	1.6	1.6	3.2	0.865	42	42.61	
5	1.1	1.1	2.2	0.717	35	35.51	

Calculations :

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K

Pstd = actual pressure during calibration (mm Hg

For subsequent calculation of sampler flow:

$$1/m((I) [\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

m = sampler slope

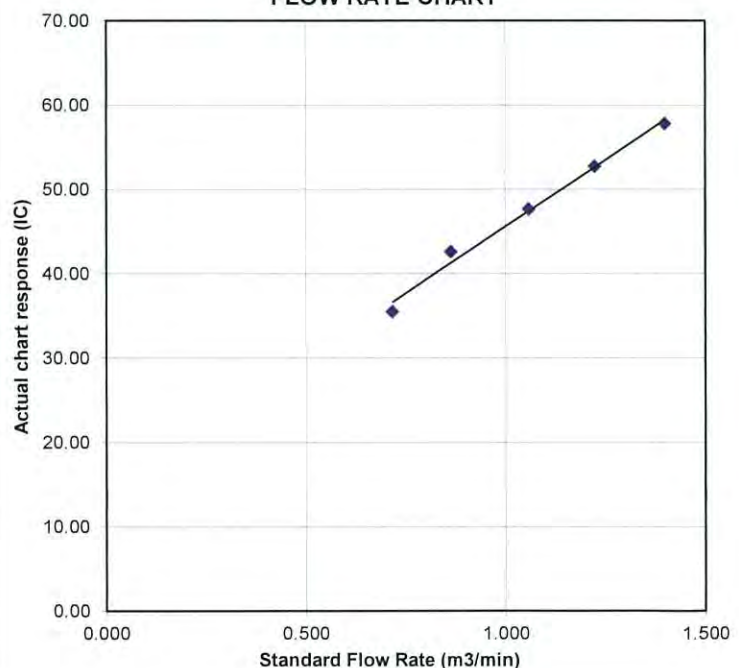
b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

FLOW RATE CHART



Certificate of Calibration

校正證書

Certificate No. : C162440
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC16-0843)

Date of Receipt / 收件日期 : 5 May 2016

Description / 儀器名稱 : Sound Level Meter (EQ011)
Manufacturer / 製造商 : Rion
Model No. / 型號 : NL-52
Serial No. / 編號 : 01121362
Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

Temperature / 溫度 : $(23 \pm 2)^{\circ}\text{C}$
Line Voltage / 電壓 : ---

Relative Humidity / 相對濕度 : $(55 \pm 20)\%$

TEST SPECIFICATIONS / 測試規範

Calibration check

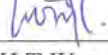
DATE OF TEST / 測試日期 : 10 May 2016

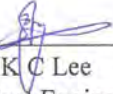
TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.
The results do not exceed manufacturer's specification.
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA

Tested By : 
測試 : H T Wong
Technical Officer

Certified By : 
核證 : K C Lee
Project Engineer

Date of Issue : 11 May 2016
簽發日期

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

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Certificate of Calibration

校正證書

Certificate No. : C162440
證書編號

- The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours, and switched on to warm up for over 10 minutes before the commencement of the test.
- Self-calibration was performed before the test.
- The results presented are the mean of 3 measurements at each calibration point.
- Test equipment :

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C160077
CL281	Multifunction Acoustic Calibrator	PA160023

- Test procedure : MA101N.

- Results :

6.1 Sound Pressure Level

6.1.1 Reference Sound Pressure Level

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 130	L _A	A	Fast	94.00	1	93.3	± 1.1

6.1.2 Linearity

UUT Setting				Applied Value		UUT Reading (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
30 - 130	L _A	A	Fast	94.00	1	93.3 (Ref.)
				104.00		103.3
				114.00		113.3

IEC 61672 Class 1 Spec. : ± 0.6 dB per 10 dB step and ± 1.1 dB for overall different.

6.2 Time Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 130	L _A	A	Fast	94.00	1	93.3	Ref.
			Slow			93.3	± 0.3

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

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Certificate of Calibration

校正證書

Certificate No. : C162440

證書編號

6.3 Frequency Weighting

6.3.1 A-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 130	L _A	A	Fast	94.00	63 Hz	67.0	-26.2 ± 1.5
					125 Hz	77.1	-16.1 ± 1.5
					250 Hz	84.6	-8.6 ± 1.4
					500 Hz	90.1	-3.2 ± 1.4
					1 kHz	93.3	Ref.
					2 kHz	94.5	+1.2 ± 1.6
					4 kHz	94.3	+1.0 ± 1.6
					8 kHz	92.3	-1.1 (+2.1 ; -3.1)
					12.5 kHz	88.9	-4.3 (+3.0 ; -6.0)

6.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 130	L _C	C	Fast	94.00	63 Hz	92.5	-0.8 ± 1.5
					125 Hz	93.1	-0.2 ± 1.5
					250 Hz	93.3	0.0 ± 1.4
					500 Hz	93.3	0.0 ± 1.4
					1 kHz	93.3	Ref.
					2 kHz	93.1	-0.2 ± 1.6
					4 kHz	92.5	-0.8 ± 1.6
					8 kHz	90.4	-3.0 (+2.1 ; -3.1)
					12.5 kHz	86.9	-6.2 (+3.0 ; -6.0)

Remarks : - UUT Microphone Model No. : UC-59 & S/N : 07549

- Mfr's Spec. : IEC 61672 Class 1

- Uncertainties of Applied Value :

94 dB	63 Hz - 125 Hz	: ± 0.35 dB
	250 Hz - 500 Hz	: ± 0.30 dB
	1 kHz	: ± 0.20 dB
	2 kHz - 4 kHz	: ± 0.35 dB
	8 kHz	: ± 0.45 dB
	12.5 kHz	: ± 0.70 dB
104 dB	1 kHz	: ± 0.10 dB (Ref. 94 dB)
114 dB	1 kHz	: ± 0.10 dB (Ref. 94 dB)

- The uncertainties are for a confidence probability of not less than 95 %.

Note :

The values given in this 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 environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited 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 the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

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Certificate of Calibration

校正證書

Certificate No. : C163603
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC16-0843)

Date of Receipt / 收件日期 : 22 June 2016

Description / 儀器名稱 : Integrating Sound Level Meter (EQ008)
Manufacturer / 製造商 : Brüel & Kjær
Model No. / 型號 : 2238
Serial No. / 編號 : 2285690
Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

Temperature / 溫度 : $(23 \pm 2)^{\circ}\text{C}$
Line Voltage / 電壓 : ---

Relative Humidity / 相對濕度 : $(55 \pm 20)\%$

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 4 July 2016


TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.
The results do not exceed manufacturer's specification.
The results are detailed in the subsequent page(s).


The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA

Tested By
測試


H T Wong
Technical Officer

Certified By
核證


K C Lee
Project Engineer

Date of Issue
簽發日期

5 July 2016

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗室所書面批准。

Certificate of Calibration

校正證書

Certificate No. : C163603
證書編號

- The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours, and switched on to warm up for over 10 minutes before the commencement of the test.
- Self-calibration using laboratory acoustic calibrator was performed before the test from 6.1.1.2 to 6.4.
- The results presented are the mean of 3 measurements at each calibration point.
- Test equipment :

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C160077
CL281	Multifunction Acoustic Calibrator	PA160023

- Test procedure : MA101N.

- Results :

6.1 Sound Pressure Level

6.1.1 Reference Sound Pressure Level

6.1.1.1 Before Self-calibration

UUT Setting				Applied Value		UUT Reading
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	(dB)
50 - 130	L_{AFP}	A	F	94.00	1	94.5

6.1.1.2 After Self-calibration

UUT Setting				Applied Value		UUT Reading	IEC 60651 Type 1 Spec.
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	(dB)	(dB)
50 - 130	L_{AFP}	A	F	94.00	1	94.0	± 0.7

6.1.2 Linearity

UUT Setting				Applied Value		UUT Reading
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	(dB)
50 - 130	L_{AFP}	A	F	94.00	1	94.0 (Ref.)
				104.00		104.0
				114.00		114.0

IEC 60651 Type 1 Spec. : ± 0.4 dB per 10 dB step and ± 0.7 dB for overall different.

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

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Certificate of Calibration

校正證書

Certificate No. : C163603
證書編號

6.2 Time Weighting

6.2.1 Continuous Signal

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
50 - 130	L _{AFP}	A	F	94.00	1	94.0	Ref.
	L _{ASP}		S			94.0	± 0.1
	L _{AIP}		I			94.0	± 0.1

6.2.2 Tone Burst Signal (2 kHz)

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Burst Duration		
30 - 110	L _{AFP}	A	F	106.0	Continuous	106.0	Ref.
	L _{AFMax}				200 ms	105.0	-1.0 ± 1.0
	L _{ASP}	S	Continuous		106.0	Ref.	
	L _{ASMax}		500 ms		102.0	-4.1 ± 1.0	

6.3 Frequency Weighting

6.3.1 A-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
50 - 130	L _{AFP}	A	F	94.00	31.5 Hz	54.7	-39.4 ± 1.5
					63 Hz	67.8	-26.2 ± 1.5
					125 Hz	77.8	-16.1 ± 1.0
					250 Hz	85.3	-8.6 ± 1.0
					500 Hz	90.7	-3.2 ± 1.0
					1 kHz	94.0	Ref.
					2 kHz	95.2	+1.2 ± 1.0
					4 kHz	95.0	+1.0 ± 1.0
					8 kHz	92.9	-1.1 (+1.5 ; -3.0)
					12.5 kHz	89.8	-4.3 (+3.0 ; -6.0)

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

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Certificate of Calibration

校正證書

Certificate No. : C163603
證書編號

6.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
50 - 130	L _{CFP}	C	F	94.00	31.5 Hz	91.0	-3.0 ± 1.5
					63 Hz	93.2	-0.8 ± 1.5
					125 Hz	93.8	-0.2 ± 1.0
					250 Hz	93.9	0.0 ± 1.0
					500 Hz	93.9	0.0 ± 1.0
					1 kHz	93.9	Ref.
					2 kHz	93.8	-0.2 ± 1.0
					4 kHz	93.1	-0.8 ± 1.0
					8 kHz	90.9	-3.0 (+1.5 ; -3.0)
					12.5 kHz	87.8	-6.2 (+3.0 ; -6.0)

6.4 Time Averaging

UUT Setting				Applied Value					UUT Reading (dB)	IEC 60804 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Integrating Time	Frequency (kHz)	Burst Duration (ms)	Burst Duty Factor	Burst Level (dB)	Equivalent Level (dB)		
30 - 110	L _{Aeq}	A	10 sec.	4	1	1/10	110.0	100	99.9	± 0.5
						1/10 ²		90	89.8	± 0.5
			60 sec.			1/10 ³		80	79.8	± 1.0
			5 min.			1/10 ⁴		70	69.8	± 1.0

Remarks : - UUT Microphone Model No. : 4188 & S/N : 2812706

- Mfr's Spec. : IEC 60651 Type 1 & IEC 60804 Type 1

- Uncertainties of Applied Value :

94 dB	31.5 Hz - 125 Hz	: ± 0.35 dB
	250 Hz - 500 Hz	: ± 0.30 dB
	1 kHz	: ± 0.20 dB
	2 kHz - 4 kHz	: ± 0.35 dB
	8 kHz	: ± 0.45 dB
	12.5 kHz	: ± 0.70 dB
104 dB	1 kHz	: ± 0.10 dB (Ref. 94 dB)
114 dB	1 kHz	: ± 0.10 dB (Ref. 94 dB)
Burst equivalent level		: ± 0.2 dB (Ref. 110 dB continuous sound level)

- The uncertainties are for a confidence probability of not less than 95 %.

Note :

The values given in this 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 environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

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Certificate of Calibration

校正證書

Certificate No. : C162177

證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC16-0843)

Date of Receipt / 收件日期 : 14 April 2016

Description / 儀器名稱 : Integrating Sound Level Meter (EQ006)

Manufacturer / 製造商 : Brüel & Kjær

Model No. / 型號 : 2238

Serial No. / 編號 : 2285762

Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

Temperature / 溫度 : $(23 \pm 2)^{\circ}\text{C}$

Relative Humidity / 相對濕度 : $(55 \pm 20)\%$

Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 25 April 2016

TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.


The results do not exceed manufacturer's specification.

The results are detailed in the subsequent page(s).

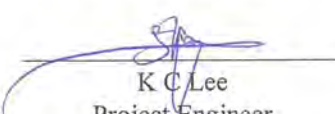
The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Fluke Everett Service Center, USA
- Rohde & Schwarz Laboratory, Germany

Tested By
測試


H T Wong
Technical Officer

Certified By
核證


K C Lee
Project Engineer

Date of Issue
簽發日期

27 April 2016

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

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Sun Creation Engineering Limited - Calibration & Testing Laboratory

c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

輝創工程有限公司 - 校正及檢測實驗室

c/o 香港新界屯門興安里一號青山灣機樓四樓

Tel/電話: 2927 2606

Fax/傳真: 2744 8986

E-mail/電郵: callab@suncreation.com

Website/網址: www.suncreation.com

Certificate of Calibration

校正證書

Certificate No. : C162177

證書編號

- The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours, and switched on to warm up for over 10 minutes before the commencement of the test.
- Self-calibration using laboratory acoustic calibrator was performed before the test from 6.1.1.2 to 6.4.
- The results presented are the mean of 3 measurements at each calibration point.
- Test equipment :

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C160077
CL281	Multifunction Acoustic Calibrator	PA160023

- Test procedure : MA101N.

- Results :

- Sound Pressure Level

- Reference Sound Pressure Level

- Before Self-calibration

UUT Setting				Applied Value		UUT Reading (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
50 - 130	L _{AFP}	A	F	94.00	1	94.2

- After Self-calibration

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
50 - 130	L _{AFP}	A	F	94.00	1	94.0	± 0.7

- Linearity

UUT Setting				Applied Value		UUT Reading (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
50 - 130	L _{AFP}	A	F	94.00	1	94.0 (Ref.)
				104.00		104.0
				114.00		113.9

IEC 60651 Type 1 Spec. : ± 0.4 dB per 10 dB step and ± 0.7 dB for overall different.

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗室書面批准。

Sun Creation Engineering Limited – Calibration & Testing Laboratory

c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

輝創工程有限公司 – 校正及檢測實驗室

c/o 香港新界屯門興安里一號青山灣機樓四樓

Tel/電話: 2927 2606

Fax/傳真: 2744 8986

E-mail/電郵: callab@suncreation.com

Website/網址: www.suncreation.com

Certificate of Calibration

校正證書

Certificate No. : C162177

證書編號

6.2 Time Weighting

6.2.1 Continuous Signal

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
50 - 130	L _{AFP}	A	F	94.00	1	94.0	Ref.
	L _{ASP}		S			94.0	± 0.1
	L _{AIP}		I			94.1	± 0.1

6.2.2 Tone Burst Signal (2 kHz)

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Burst Duration		
30 - 110	L _{AFP}	A	F	106.0	Continuous	106.0	Ref.
	L _{AFMax}				200 ms	105.0	-1.0 ± 1.0
	L _{ASP}	S	Continuous		106.0	Ref.	
	L _{ASMax}		500 ms		102.0	-4.1 ± 1.0	

6.3 Frequency Weighting

6.3.1 A-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
50 - 130	L _{AFP}	A	F	94.00	31.5 Hz	55.1	-39.4 ± 1.5
					63 Hz	67.9	-26.2 ± 1.5
					125 Hz	77.9	-16.1 ± 1.0
					250 Hz	85.3	-8.6 ± 1.0
					500 Hz	90.7	-3.2 ± 1.0
					1 kHz	94.0	Ref.
					2 kHz	95.2	+1.2 ± 1.0
					4 kHz	95.0	+1.0 ± 1.0
					8 kHz	91.0	-1.1 (+1.5 ; -3.0)
					12.5 kHz	89.8	-4.3 (+3.0 ; -6.0)

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

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Sun Creation Engineering Limited – Calibration & Testing Laboratory

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輝創工程有限公司 – 校正及檢測實驗室

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Website/網址: www.suncreation.com

Certificate of Calibration

校正證書

Certificate No. : C162177
證書編號

6.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
50 - 130	L _{CFP}	C	F	94.00	31.5 Hz	91.5	-3.0 ± 1.5
					63 Hz	93.4	-0.8 ± 1.5
					125 Hz	93.9	-0.2 ± 1.0
					250 Hz	94.1	0.0 ± 1.0
					500 Hz	94.1	0.0 ± 1.0
					1 kHz	94.1	Ref.
					2 kHz	93.9	-0.2 ± 1.0
					4 kHz	93.2	-0.8 ± 1.0
					8 kHz	92.9	-3.0 (+1.5 ; -3.0)
					12.5 kHz	87.9	-6.2 (+3.0 ; -6.0)

6.4 Time Averaging

UUT Setting				Applied Value					UUT Reading (dB)	IEC 60804 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Integrating Time	Frequency (kHz)	Burst Duration (ms)	Burst Duty Factor	Burst Level (dB)	Equivalent Level (dB)		
30 - 110	L _{Aeq}	A	10 sec.	4	1	1/10	110.0	100	100.0	± 0.5
						1/10 ²		90	89.9	± 0.5
			60 sec.			1/10 ³		80	79.2	± 1.0
			5 min.			1/10 ⁴		70	69.2	± 1.0

Remarks : - UUT Microphone Model No. : 4188 & S/N : 2812705

- Mfr's Spec. : IEC 60651 Type 1 & IEC 60804 Type 1

- Uncertainties of Applied Value : 94 dB : 31.5 Hz - 125 Hz : ± 0.35 dB
250 Hz - 500 Hz : ± 0.30 dB
1 kHz : ± 0.20 dB
2 kHz - 4 kHz : ± 0.35 dB
8 kHz : ± 0.45 dB
12.5 kHz : ± 0.70 dB
104 dB : 1 kHz : ± 0.10 dB (Ref. 94 dB)
114 dB : 1 kHz : ± 0.10 dB (Ref. 94 dB)
Burst equivalent level : ± 0.2 dB (Ref. 110 dB continuous sound level)

- The uncertainties are for a confidence probability of not less than 95 %.

Note :

The values given in this 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 environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

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輝創工程有限公司

Sun Creation Engineering Limited

Calibration and Testing Laboratory

Certificate of Calibration

校正證書

Certificate No. : C161796

證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC16-0662)

Date of Receipt / 收件日期 : 22 March 2016

Description / 儀器名稱 : Sound Level Meter (EQ015)

Manufacturer / 製造商 : Rion

Model No. / 型號 : NL-52

Serial No. / 編號 : 00142581

Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

Temperature / 溫度 : $(23 \pm 2)^{\circ}\text{C}$

Relative Humidity / 相對濕度 : $(55 \pm 20)\%$

Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 6 April 2016

TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.

The results do not exceed manufacturer's specification.

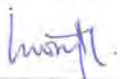
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA

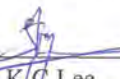
Tested By

測試


H T Wong
Technical Officer

Certified By

核證


K/C Lee
Project Engineer

Date of Issue

簽發日期

7 April 2016

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

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Page 1 of 3

Certificate of Calibration

校正證書

Certificate No. : C161796
證書編號

- The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours, and switched on to warm up for over 10 minutes before the commencement of the test.
- Self-calibration was performed before the test.
- The results presented are the mean of 3 measurements at each calibration point.
- Test equipment :

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C160077
CL281	Multifunction Acoustic Calibrator	PA160023

- Test procedure : MA101N.

- Results :

6.1 Sound Pressure Level

6.1.1 Reference Sound Pressure Level

UUT Setting				Applied Value		UUT	IEC 61672
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	Reading (dB)	Class 1 Spec. (dB)
30 - 130	L _A	A	Fast	94.00	1	94.4	± 1.1

6.1.2 Linearity

UUT Setting				Applied Value		UUT
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	Reading (dB)
30 - 130	L _A	A	Fast	94.00	1	94.4 (Ref.)
				104.00		104.4
				114.00		114.4

IEC 61672 Class 1 Spec. : ± 0.6 dB per 10 dB step and ± 1.1 dB for overall different.

6.2 Time Weighting

UUT Setting				Applied Value		UUT	IEC 61672
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	Reading (dB)	Class 1 Spec. (dB)
30 - 130	L _A	A	Fast	94.00	1	94.4	Ref.
			Slow			94.4	± 0.3

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Certificate of Calibration

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Certificate No. : C161796
證書編號

6.3 Frequency Weighting

6.3.1 A-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 130	L _A	A	Fast	94.00	63 Hz	68.1	-26.2 ± 1.5
					125 Hz	78.2	-16.1 ± 1.5
					250 Hz	85.7	-8.6 ± 1.4
					500 Hz	91.1	-3.2 ± 1.4
					1 kHz	94.4	Ref.
					2 kHz	95.6	+1.2 ± 1.6
					4 kHz	95.4	+1.0 ± 1.6
					8 kHz	93.3	-1.1 (+2.1 ; -3.1)
					12.5 kHz	89.9	-4.3 (+3.0 ; -6.0)

6.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 130	L _C	C	Fast	94.00	63 Hz	93.5	-0.8 ± 1.5
					125 Hz	94.2	-0.2 ± 1.5
					250 Hz	94.3	0.0 ± 1.4
					500 Hz	94.4	0.0 ± 1.4
					1 kHz	94.4	Ref.
					2 kHz	94.2	-0.2 ± 1.6
					4 kHz	93.6	-0.8 ± 1.6
					8 kHz	91.4	-3.0 (+2.1 ; -3.1)
					12.5 kHz	88.0	-6.2 (+3.0 ; -6.0)

Remarks : - UUT Microphone Model No. : UC-59 & S/N : 06015

- Mfr's Spec. : IEC 61672 Class 1

- Uncertainties of Applied Value :

94 dB : 63 Hz - 125 Hz	: ± 0.35 dB
250 Hz - 500 Hz	: ± 0.30 dB
1 kHz	: ± 0.20 dB
2 kHz - 4 kHz	: ± 0.35 dB
8 kHz	: ± 0.45 dB
12.5 kHz	: ± 0.70 dB
104 dB : 1 kHz	: ± 0.10 dB (Ref. 94 dB)
114 dB : 1 kHz	: ± 0.10 dB (Ref. 94 dB)

- The uncertainties are for a confidence probability of not less than 95 %.

Note :

The values given in this 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 environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

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Certificate of Calibration 校正證書

Certificate No. : C163602
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC16-0843)

Date of Receipt / 收件日期 : 23 June 2016

Description / 儀器名稱 : Sound Level Meter (EQ013)
Manufacturer / 製造商 : Rion
Model No. / 型號 : NL-52
Serial No. / 編號 : 00921191
Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

Temperature / 溫度 : $(23 \pm 2)^{\circ}\text{C}$
Line Voltage / 電壓 : ---

Relative Humidity / 相對濕度 : $(55 \pm 20)\%$

TEST SPECIFICATIONS / 測試規範

Calibration

DATE OF TEST / 測試日期 : 4 July 2016


TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.
The results do not exceed manufacturer's specification. (after adjustment)
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA

Tested By : 
測試 : H T Wong
Technical Officer

Certified By : 
核證 : K/C Lee
Project Engineer

Date of Issue : 5 July 2016
簽發日期

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

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Certificate of Calibration

校正證書

Certificate No. : C163602
證書編號

- The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours, and switched on to warm up for over 10 minutes before the commencement of the test.
- Self-calibration using the internal standard (After Adjustment) was performed before the test 6.1.1.2 to 6.3.2.
- The results presented are the mean of 3 measurements at each calibration point.

4. Test equipment :

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C160077
CL281	Multifunction Acoustic Calibrator	PA160023

5. Test procedure : MA101N.

6. Results :

6.1 Sound Pressure Level

6.1.1 Reference Sound Pressure Level

6.1.1.1 Before Adjustment

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 130	L _A	A	Fast	94.00	1	* 95.6	± 1.1

* Out of IEC 61672 Class 1 Spec.

6.1.1.2 After Adjustment

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 130	L _A	A	Fast	94.00	1	94.0	± 1.1

6.1.2 Linearity

UUT Setting				Applied Value		UUT Reading (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
30 - 130	L _A	A	Fast	94.00	1	94.0 (Ref.)
				104.00		104.0
				114.00		114.0

IEC 61672 Class 1 Spec. : ± 0.6 dB per 10 dB step and ± 1.1 dB for overall different.

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

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Certificate of Calibration

校正證書

Certificate No. : C163602
證書編號

6.2 Time Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 130	L _A	A	Fast	94.00	1	94.0	Ref.
			Slow			94.0	± 0.3

6.3 Frequency Weighting

6.3.1 A-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 130	L _A	A	Fast	94.00	63 Hz	67.7	-26.2 ± 1.5
					125 Hz	77.8	-16.1 ± 1.5
					250 Hz	85.3	-8.6 ± 1.4
					500 Hz	90.7	-3.2 ± 1.4
					1 kHz	94.0	Ref.
					2 kHz	95.2	+1.2 ± 1.6
					4 kHz	95.0	+1.0 ± 1.6
					8 kHz	93.0	-1.1 (+2.1 ; -3.1)
					12.5 kHz	89.6	-4.3 (+3.0 ; -6.0)

6.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 130	L _C	C	Fast	94.00	63 Hz	93.1	-0.8 ± 1.5
					125 Hz	93.8	-0.2 ± 1.5
					250 Hz	94.0	0.0 ± 1.4
					500 Hz	94.0	0.0 ± 1.4
					1 kHz	94.0	Ref.
					2 kHz	93.8	-0.2 ± 1.6
					4 kHz	93.2	-0.8 ± 1.6
					8 kHz	91.1	-3.0 (+2.1 ; -3.1)
					12.5 kHz	87.6	-6.2 (+3.0 ; -6.0)

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

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Certificate of Calibration 校正證書

Certificate No. : C163602

證書編號

Remarks : - UUT Microphone Model No. : UC-59 & S/N : 10042

- Mfr's Spec. : IEC 61672 Class 1

- Uncertainties of Applied Value :

94 dB	63 Hz - 125 Hz	: ± 0.35 dB
	250 Hz - 500 Hz	: ± 0.30 dB
	1 kHz	: ± 0.20 dB
	2 kHz - 4 kHz	: ± 0.35 dB
	8 kHz	: ± 0.45 dB
	12.5 kHz	: ± 0.70 dB
104 dB	1 kHz	: ± 0.10 dB (Ref. 94 dB)
114 dB	1 kHz	: ± 0.10 dB (Ref. 94 dB)

- The uncertainties are for a confidence probability of not less than 95 %.

Note :

The values given in this 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 environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited 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 the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

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E-mail/電郵: callab@suncreation.com

Website/網址: www.suncreation.com

Certificate of Calibration

校正證書

Certificate No. : C164099
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC16-0843)

Date of Receipt / 收件日期 : 15 July 2016

Description / 儀器名稱 : Sound Calibrator
Manufacturer / 製造商 : Rion
Model No. / 型號 : NC-74
Serial No. / 編號 : 34657231
Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

Temperature / 溫度 : $(23 \pm 2)^{\circ}\text{C}$
Line Voltage / 電壓 : ---

Relative Humidity / 相對濕度 : $(55 \pm 20)\%$

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 27 July 2016

TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.
The results do not exceed manufacturer's specification.
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA

Tested By : 
測試 : H T Wong
Technical Officer

Certified By : 
核證 : K C Lee
Project Engineer

Date of Issue : 28 July 2016
簽發日期

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

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Certificate of Calibration

校正證書

Certificate No. : C164099
證書編號

- The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours before the commencement of the test.
- The results presented are the mean of 3 measurements at each calibration point.
- Test equipment :

Equipment ID	Description	Certificate No.
CL130	Universal Counter	C163709
CL281	Multifunction Acoustic Calibrator	PA160023
TST150A	Measuring Amplifier	C161175

- Test procedure : MA100N.

- Results :

5.1 Sound Level Accuracy

UUT Nominal Value	Measured Value (dB)	Mfr's Spec. (dB)	Uncertainty of Measured Value (dB)
94 dB, 1 kHz	94.1	± 0.3	± 0.2

5.2 Frequency Accuracy

UUT Nominal Value (kHz)	Measured Value (kHz)	Mfr's Spec.	Uncertainty of Measured Value (Hz)
1	1.001	1 kHz $\pm 1\%$	± 1

Remark : The uncertainties are for a confidence probability of not less than 95 %.

Note :

The values given in this 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 environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

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Certificate of Calibration 校正證書

Certificate No. : C164098
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC16-0843)

Date of Receipt / 收件日期 : 15 July 2016

Description / 儀器名稱 : Sound Level Calibrator (EQ085)
Manufacturer / 製造商 : Rion
Model No. / 型號 : NC-73
Serial No. / 編號 : 10655561
Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

Temperature / 溫度 : $(23 \pm 2)^{\circ}\text{C}$
Line Voltage / 電壓 : ---

Relative Humidity / 相對濕度 : $(55 \pm 20)\%$

TEST SPECIFICATIONS / 測試規範

Calibration

DATE OF TEST / 測試日期 : 27 July 2016

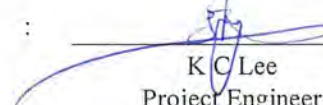
TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.
The results do not exceed manufacturer's specification & user's specified acceptance criteria. (after adjustment)
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA

Tested By : 
測試 : H T Wong
Technical Officer

Certified By : 
核證 : K C Lee
Project Engineer

Date of Issue : 28 July 2016
簽發日期

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

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Certificate of Calibration

校正證書

Certificate No. : C164098
證書編號

- The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours before the commencement of the test.
- The results presented are the mean of 3 measurements at each calibration point.
- Test equipment :

Equipment ID	Description	Certificate No.
CL130	Universal Counter	C163709
CL281	Multifunction Acoustic Calibrator	PA160023
TST150A	Measuring Amplifier	C161175

- Test procedure : MA100N.

- Results :

5.1 Sound Level Accuracy

5.1.1 Before Adjustment

UUT Nominal Value	Measured Value (dB)	Mfr's Spec. (dB)	Uncertainty of Measured Value (dB)
94 dB, 1 kHz	* 93.4	± 0.5	± 0.2

* Out of Mfr's Spec.

5.1.2 After Adjustment

UUT Nominal Value	Measured Value (dB)	Mfr's Spec. (dB)	Uncertainty of Measured Value (dB)
94 dB, 1 kHz	94.0	± 0.5	± 0.2

5.2 Frequency Accuracy

5.2.1 Before Adjustment

UUT Nominal Value (kHz)	Measured Value (kHz)	User's Spec.	Uncertainty of Measured Value (Hz)
1	0.955	1 kHz ± 6 %	± 1

5.2.2 After Adjustment

UUT Nominal Value (kHz)	Measured Value (kHz)	User's Spec.	Uncertainty of Measured Value (Hz)
1	0.954	1 kHz ± 6 %	± 1

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

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Sun Creation Engineering Limited – Calibration & Testing Laboratory
c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

輝創工程有限公司 – 校正及檢測實驗室
c/o 香港新界屯門興安里一號青山灣機樓四樓

Tel/電話: 2927 2606 Fax/傳真: 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com



輝創工程有限公司
Sun Creation Engineering Limited
Calibration and Testing Laboratory

Certificate of Calibration 校正證書

Certificate No. : C164098
證書編號

Remark : The uncertainties are for a confidence probability of not less than 95 %.

Note :

The values given in this 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 environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited 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 the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗所書面批准。

Sun Creation Engineering Limited – Calibration & Testing Laboratory

c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

輝創工程有限公司 – 校正及檢測實驗室

c/o 香港新界屯門興安里一號青山灣機樓四樓

Tel/電話: 2927 2606 Fax/傳真: 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com

Certificate of Calibration

校正證書

Certificate No. : C162438
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC16-0843)

Date of Receipt / 收件日期 : 5 May 2016

Description / 儀器名稱 : Acoustical Calibrator (EQ081)
Manufacturer / 製造商 : Brüel & Kjær
Model No. / 型號 : 4231
Serial No. / 編號 : 2326408
Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

Temperature / 溫度 : $(23 \pm 2)^{\circ}\text{C}$
Line Voltage / 電壓 : ---

Relative Humidity / 相對濕度 : $(55 \pm 20)\%$

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 10 May 2016


TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.
The results do not exceed manufacturer's specification.
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA

Tested By
測試


H T Wong
Technical Officer

Certified By
核證


K C Lee
Project Engineer

Date of Issue
簽發日期

11 May 2016

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

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Certificate of Calibration

校正證書

Certificate No. : C162438
證書編號

- The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours before the commencement of the test.
- The results presented are the mean of 3 measurements at each calibration point.
- Test equipment :

Equipment ID	Description	Certificate No.
CL130	Universal Counter	C153519
CL281	Multifunction Acoustic Calibrator	PA160023
TST150A	Measuring Amplifier	C161175

- Test procedure : MA100N.

- Results :

5.1 Sound Level Accuracy

UUT Nominal Value	Measured Value (dB)	Mfr's Spec. (dB)	Uncertainty of Measured Value (dB)
94 dB, 1 kHz	94.0	± 0.2	± 0.2
114 dB, 1 kHz	114.0		

5.2 Frequency Accuracy

UUT Nominal Value (kHz)	Measured Value (kHz)	Mfr's Spec.	Uncertainty of Measured Value (Hz)
1	1.000 0	1 kHz ± 0.1 %	± 0.1

Remark : The uncertainties are for a confidence probability of not less than 95 %.

Note :

The values given in this 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 environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited 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 the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

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Sun Creation Engineering Limited – Calibration & Testing Laboratory
c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
輝創工程有限公司 – 校正及檢測實驗室

c/o 香港新界屯門興安里一號青山灣機樓四樓

Tel/電話: 2927 2606 Fax/傳真: 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com

Certificate of Calibration

校正證書

Certificate No. : C162125

證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC16-0843)

Date of Receipt / 收件日期 : 14 April 2016

Description / 儀器名稱 : Acoustical Calibrator (EQ082)

Manufacturer / 製造商 : Brüel & Kjær

Model No. / 型號 : 4231

Serial No. / 編號 : 2713428

Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

Temperature / 溫度 : $(23 \pm 2)^{\circ}\text{C}$

Relative Humidity / 相對濕度 : $(55 \pm 20)\%$

Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 22 April 2016

TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.


The results do not exceed manufacturer's specification.

The results are detailed in the subsequent page(s).

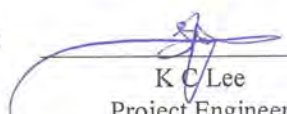
The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA

Tested By
測試


H T Wong
Technical Officer

Certified By
核證


K C Lee
Project Engineer

Date of Issue
簽發日期

25 April 2016

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

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Sun Creation Engineering Limited - Calibration & Testing Laboratory

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Tel/電話: 2927 2606 Fax/傳真: 2744 8986

E-mail/電郵: callab@suncreation.com

Website/網址: www.suncreation.com

Certificate of Calibration

校正證書

Certificate No. : C162125
證書編號

- The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours before the commencement of the test.
- The results presented are the mean of 3 measurements at each calibration point.
- Test equipment :

Equipment ID	Description	Certificate No.
CL130	Universal Counter	C153519
CL281	Multifunction Acoustic Calibrator	PA160023
TST150A	Measuring Amplifier	C161175

- Test procedure : MA100N.

- Results :

5.1 Sound Level Accuracy

UUT Nominal Value	Measured Value (dB)	Mfr's Spec. (dB)	Uncertainty of Measured Value (dB)
94 dB, 1 kHz	94.0	± 0.2	± 0.2
114 dB, 1 kHz	114.1		

5.2 Frequency Accuracy

UUT Nominal Value (kHz)	Measured Value (kHz)	Mfr's Spec. (Hz)	Uncertainty of Measured Value (Hz)
1	1.000 0	1 kHz ± 0.1 %	± 0.1

Remark : The uncertainties are for a confidence probability of not less than 95 %.

Note :

The values given in this 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 environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

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Appendix D

Baseline Monitoring Schedule

Baseline 1-hour TSP (Air) and Noise Monitoring Schedule

Scheduled Monitoring Day		Air Quality 1-hour TSP	Noise
17-Jan-17	Tuesday	AMS-(1, 2, 3, 4, 5, 6 & 7)	NMS-1, NMS-2, NMS-3 & NMS-4
18-Jan-17	Wednesday	AMS-(1, 2, 3, 4, 5, 6 & 7)	NMS-1, NMS-2, NMS-3 & NMS-4
19-Jan-17	Thursday	AMS-(1, 2, 3, 4, 5, 6 & 7)	NMS-1, NMS-2, NMS-3 & NMS-4
20-Jan-17	Friday	AMS-(1, 2, 3, 4, 5, 6 & 7)	NMS-1, NMS-2, NMS-3 & NMS-4
21-Jan-17	Saturday	AMS-(1, 2, 3, 4, 5, 6 & 7)	NMS-1, NMS-2, NMS-3 & NMS-4
22-Jan-17	Sunday	AMS-(1, 2, 3, 4, 5, 6 & 7)	NMS-1, NMS-2, NMS-3 & NMS-4
23-Jan-17	Monday	AMS-(1, 2, 3, 4, 5, 6 & 7)	NMS-1, NMS-2, NMS-3 & NMS-4
24-Jan-17	Tuesday	AMS-(1, 2, 3, 4, 5, 6 & 7)	NMS-1, NMS-2, NMS-3 & NMS-4
25-Jan-17	Wednesday	AMS-(1, 2, 3, 4, 5, 6 & 7)	NMS-1, NMS-2, NMS-3 & NMS-4
26-Jan-17	Thursday	AMS-(1, 2, 3, 4, 5, 6 & 7)	NMS-1, NMS-2, NMS-3 & NMS-4
27-Jan-17	Friday	AMS-(1, 2, 3, 4, 5, 6 & 7)	NMS-1, NMS-2, NMS-3 & NMS-4
28-Jan-17	Saturday	AMS-(1, 2, 3, 4, 5, 6 & 7)	NMS-1, NMS-2, NMS-3 & NMS-4
29-Jan-17	Sunday	AMS-(1, 2, 3, 4, 5, 6 & 7)	NMS-1, NMS-2, NMS-3 & NMS-4
30-Jan-17	Monday	AMS-(1, 2, 3, 4, 5, 6 & 7)	NMS-1, NMS-2, NMS-3 & NMS-4

Baseline 24-hour TSP (Air) Monitoring Schedule

Scheduled Monitoring Day		Air Quality 24-hour TSP
16-Feb-17	Thu	AMS-1 & AMS-7
17-Feb-17	Fri	AMS-1 & AMS-7
18-Feb-17	Sat	AMS-1 & AMS-7
19-Feb-17	Sun	AMS-1 & AMS-7*
20-Feb-17	Mon	AMS-1 & AMS-7
21-Feb-17	Tue	AMS-1 & AMS-7
22-Feb-17	Wed	AMS-1 & AMS-7
23-Feb-17	Thu	AMS-1 & AMS-7
24-Feb-17	Fri	AMS-1 & AMS-7
25-Feb-17	Sat	AMS-1 & AMS-7
26-Feb-17	Sun	AMS-1 & AMS-7
27-Feb-17	Mon	AMS-1 & AMS-7
28-Feb-17	Tue	AMS-1 & AMS-7
1-Mar-17	Wed	AMS-1 & AMS-7
2-Mar-17	Thu	AMS-7

Remark: (*) Power failure occurred at AMS-7

Scheduled Monitoring Day		Air Quality 24-hour TSP
26-Mar-17	Sun	✓ (AMS-5 & AMS-6)
27-Mar-17	Mon	✓ (AMS-5 & AMS-6)
28-Mar-17	Tue	✓ (AMS-5 & AMS-6)
29-Mar-17	Wed	✓ (AMS-5 & AMS-6)
30-Mar-17	Thu	✓ (AMS-5 & AMS-6)
31-Mar-17	Fri	✓ (AMS-5 & AMS-6)
1-Apr-17	Sat	✓ (AMS-5 & AMS-6)
2-Apr-17	Sun	✓ (AMS-5 & AMS-6)
3-Apr-17	Mon	✓ (AMS-5 & AMS-6)
4-Apr-17	Tue	✓ (AMS-5 & AMS-6)
5-Apr-17	Wed	✓ (AMS-5 & AMS-6)
6-Apr-17	Thu	✓ (AMS-5 & AMS-6)
7-Apr-17	Fri	✓ (AMS-5 & AMS-6)
8-Apr-17	Sat	✓ (AMS-5 & AMS-6)

Public Holiday	
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Appendix E

**Database for 24-hour TSP Data
of Air Quality**

CEDD Service Contract No. NTE/07/2016
Environmental Team for Development of Anderson Road Quarry Site – Site
Formation and Associated Infrastructure Works
Baseline Monitoring Report

AUES

Baseline Monitoring Results for 24-hour TSP at Location AMS-1										Date of Calibration: 16-Feb-17				Slope = 34.9092	
										Next Calibration Date: 16-Apr-17				Intercept = -5.9629	
DATE	SAMPLE NUMBER	ELAPSED TIME		ACTUAL (min)	CHART READING			AVG TEMP (°C)	STANDARD			FILTER WEIGHT (g)		WEIGHT DUST COLLECTED (g)	DUST 24-hour TSP IN AIR (ug/m³)
		INITIAL	FINAL		MIN	MAX	AVG		AVG PRESS (hPa)	FLOW RATE (m³/min)	AIR VOLUME (std m³)	INITIAL	FINAL		
16-Feb-17	20569	17321.89	17346.00	1446.60	24	28	26.0	17.4	1017.1	0.93	1341	2.8045	2.8514	0.0469	35
17-Feb-17	20610	17346.00	17369.78	1426.80	26	29	27.5	20.4	1020.6	0.97	1381	2.7926	2.8264	0.0338	24
18-Feb-17	20623	17369.79	17393.31	1411.20	36	40	38.0	19.9	1021.2	1.27	1797	2.7886	2.8793	0.0907	50
19-Feb-17	20575	17393.31	17417.31	1440.00	38	38	38.0	16.3	1018.2	1.28	1841	2.8082	2.8845	0.0763	41
20-Feb-17	20607	17417.31	17441.09	1426.80	38	38	38.0	16.7	1018.3	1.28	1823	2.7802	2.8472	0.0670	37
21-Feb-17	20612	17441.09	17465.00	1434.60	36	38	37.0	16.8	1018.2	1.25	1791	2.8020	2.8359	0.0339	19
22-Feb-17	20636	17465.00	17489.27	1456.20	36	36	36.0	17	1018.1	1.22	1775	2.8146	2.8810	0.0664	37
23-Feb-17	20638	17489.27	17513.23	1437.60	36	36	36.0	17.9	1017.4	1.22	1749	2.8277	2.8857	0.0580	33
24-Feb-17	20602	17513.23	17537.33	1446.00	36	40	38.0	17.1	1018	1.28	1846	2.8028	2.8362	0.0334	18
25-Feb-17	20640	17537.33	17560.97	1418.40	36	36	36.0	12.2	1020.9	1.23	1743	2.8079	2.8312	0.0233	13
26-Feb-17	20646	17560.97	17585.00	1441.80	30	31	30.5	16.9	1018.2	1.06	1527	2.8392	2.8711	0.0319	21
27-Feb-17	20642	17585.00	17609.10	1446.00	36	37	36.5	16.8	1018.4	1.23	1784	2.8246	2.9180	0.0934	52
28-Feb-17	20644	17609.10	17633.10	1440.00	36	37	36.5	16.8	1018.4	1.23	1777	2.8208	2.9253	0.1045	59
1-Mar-17	20664	17633.10	17657.35	1455.00	36	37	36.5	17	1018.4	1.23	1795	2.8103	2.9585	0.1482	83

Baseline Monitoring Results for 24-hour TSP at Location AMS-5										Date of Calibration: 16-Feb-17				Slope = 33.1466	
										Next Calibration Date: 16-Apr-17				Intercept = -3.5611	
DATE	SAMPLE NUMBER	ELAPSED TIME		ACTUAL (min)	CHART READING			AVG TEMP (°C)	STANDARD			FILTER WEIGHT (g)		WEIGHT DUST COLLECTED (g)	DUST 24-hour TSP IN AIR (ug/m³)
		INITIAL	FINAL		MI N	MAX	AVG		AVG PRESS (hPa)	FLOW RATE (m³/min)	AIR VOLUME (std m³)	INITIAL	FINAL		
26-Mar-17	20784	3818.57	3842.35	1426.80	40	40	40.0	20.1	1014.8	1.33	1891	2.7841	2.8416	0.0575	30
27-Mar-17	20677	3842.35	3866.15	1428.00	30	41	35.5	20	1014.9	1.19	1697	2.8038	2.9627	0.1589	94
28-Mar-17	20680	3866.15	3889.80	1419.00	40	40	40.0	20.2	1014.9	1.32	1880	2.8027	2.9723	0.1696	90
29-Mar-17	20802	3889.80	3913.91	1446.60	38	40	39.0	20.3	1014.7	1.29	1872	2.7993	2.9420	0.1427	76
30-Mar-17	20679	3913.91	3937.92	1440.60	40	40	40.0	20.5	1014.6	1.32	1908	2.8073	2.9397	0.1324	69
31-Mar-17	20804	3937.92	3961.74	1429.20	40	40	40.0	20.6	1014.5	1.32	1892	2.8132	2.8484	0.0352	19
1-Apr-17	20809	3961.74	3985.74	1440.00	40	40	40.0	20.6	1014.4	1.32	1906	2.8211	2.9132	0.0921	48
2-Apr-17	20811	3985.74	4009.70	1437.60	40	40	40.0	20.7	1014.3	1.32	1903	2.8193	2.9541	0.1348	71
3-Apr-17	20813	4009.70	4033.70	1440.00	39	40	39.5	20.8	1014.2	1.31	1884	2.8218	2.9370	0.1152	61
4-Apr-17	20814	4033.70	4057.70	1440.00	39	41	40.0	20.8	1014.1	1.32	1905	2.8067	2.9168	0.1101	58
5-Apr-17	20816	4057.70	4081.70	1440.00	28	37	32.5	20.9	1013.9	1.10	1577	2.8249	2.9135	0.0886	56
6-Apr-17	20819	4081.70	4105.60	1434.00	39	40	39.5	21	1013.7	1.31	1875	2.8069	2.8927	0.0858	46
7-Apr-17	20822	4105.60	4129.60	1440.00	45	45	45.0	21.3	1013.5	1.47	2122	2.8034	2.8724	0.0690	33
8-Apr-17	20824	4129.60	4153.26	1419.60	42	42	42.0	21.5	1013.3	1.38	1962	2.8237	2.8888	0.0651	33

CEDD Service Contract No. NTE/07/2016
Environmental Team for Development of Anderson Road Quarry Site – Site
Formation and Associated Infrastructure Works
Baseline Monitoring Report

AUES

Baseline Monitoring Results for 24-hour TSP at Location AMS-6										Date of Calibration: 16-Feb-17				Slope = 30.9886	
										Next Calibration Date: 16-Apr-17				Intercept = -3.2893	
DATE	SAMPLE NUMBER	ELAPSED TIME		ACTUAL (min)	CHART READING			AVG TEMP (°C)	STANDARD			FILTER WEIGHT (g)		WEIGHT DUST COLLECTED (g)	DUST 24-hour TSP IN AIR (ug/m³)
		INITIAL	FINAL		MI N	MAX	AVG		AVG PRESS (hPa)	FLOW RATE (m³/min)	AIR VOLUME (std m³)	INITIAL	FINAL		
26-Mar-17	20782	8956.9	8980.74	1430.40	43	43	43.0	20.1	1014.8	1.29	1851	2.7959	2.8590	0.0631	34
27-Mar-17	20676	8980.74	9004.74	1440.00	44	44	44.0	20	1014.9	1.33	1911	2.7970	2.9651	0.1681	88
28-Mar-17	20800	9004.74	9028.64	1434.00	42	42	42.0	20.2	1014.9	1.26	1809	2.7966	2.9620	0.1654	91
29-Mar-17	20801	9028.64	9052.14	1410.00	42	42	42.0	20.3	1014.7	1.26	1778	2.8098	2.9570	0.1472	83
30-Mar-17	20678	9052.14	9076.14	1440.00	42	42	42.0	20.5	1014.6	1.26	1815	2.8211	2.9477	0.1266	70
31-Mar-17	20803	9076.14	9100.14	1440.00	38	38	38.0	20.6	1014.5	1.13	1627	2.8065	2.8391	0.0326	20
1-Apr-17	20808	9100.14	9124.71	1474.20	42	42	42.0	20.6	1014.4	1.26	1858	2.8313	2.9249	0.0936	50
2-Apr-17	20810	9124.71	9148.69	1438.80	42	42	42.0	20.7	1014.3	1.26	1813	2.8198	2.9552	0.1354	75
3-Apr-17	20812	9148.69	9172.64	1437.00	42	42	42.0	20.8	1014.2	1.26	1810	2.8190	2.9386	0.1196	66
4-Apr-17	20815	9172.64	9196.42	1426.80	41	42	41.5	20.8	1014.1	1.24	1774	2.8095	2.9195	0.1100	62
5-Apr-17	20817	9196.42	9220.40	1438.80	42	42	42.0	20.9	1013.9	1.26	1811	2.8102	2.9170	0.1068	59
6-Apr-17	20818	9220.40	9244.40	1440.00	42	42	42.0	21	1013.7	1.26	1812	2.8114	2.8966	0.0852	47
7-Apr-17	20821	9244.40	9268.49	1445.40	42	42	42.0	21.3	1013.5	1.26	1818	2.8118	2.8936	0.0818	45
8-Apr-17	20823	9268.49	9293.45	1497.60	42	42	42.0	21.5	1013.3	1.26	1883	2.8041	2.8647	0.0606	32

CEDD Service Contract No. NTE/07/2016
Environmental Team for Development of Anderson Road Quarry Site – Site
Formation and Associated Infrastructure Works
Baseline Monitoring Report

AUES

Baseline Monitoring Results for 24-hour TSP at Location AMS-7									Date of Calibration: 16-Feb-17			Slope = 35.3658		Intercept = -8.8133	
									Next Calibration Date: 16-Apr-17						
DATE	SAMPLE NUMBER	ELAPSED TIME		ACTUAL (min)	CHART READING			AVG TEMP (°C)	STANDARD			FILTER WEIGHT (g)		WEIGHT DUST COLLECTED (g)	DUST 24-hour TSP IN AIR (ug/m ³)
		INITIAL	FINAL		MIN	MAX	AVG		AVG PRESS (hPa)	FLOW RATE (m ³ /min)	AIR VOLUME (std m ³)	INITIAL	FINAL		
16-Feb-17	20568	4492.65	4516.34	1421.40	40	40	40.0	17.4	1017.1	1.40	1986	2.7999	2.8630	0.0631	32
17-Feb-17	20609	4516.34	4540.24	1434.00	41	41	41.0	20.4	1020.6	1.42	2039	2.8006	2.8421	0.0415	20
18-Feb-17	20624	4540.24	4563.98	1424.40	41	41	41.0	19.9	1021.2	1.42	2027	2.7969	2.9106	0.1137	56
19-Feb-17	#														
20-Feb-17	20674	4565.15	4589.04	1433.40	48	48	48.0	16.7	1018.3	1.63	2335	2.7877	2.8820	0.0943	40
21-Feb-17	20611	4589.04	4612.70	1419.60	35	35	35.0	16.8	1018.2	1.26	1782	2.7945	2.8399	0.0454	25
22-Feb-17	20635	4612.70	4636.69	1439.40	30	30	30.0	17	1018.1	1.11	1599	2.8105	2.8714	0.0609	38
23-Feb-17	20637	4636.69	4660.52	1429.80	40	40	40.0	17.9	1017.4	1.40	1996	2.8247	2.8847	0.0600	30
24-Feb-17	20608	4660.52	4684.50	1438.80	43	43	43.0	17.1	1018	1.48	2136	2.7908	2.8267	0.0359	17
25-Feb-17	20639	4684.50	4708.07	1414.20	36	36	36.0	12.2	1020.9	1.29	1829	2.8239	2.8636	0.0397	22
26-Feb-17	20645	4708.07	4732.07	1440.00	44	45	44.5	16.9	1018.2	1.53	2200	2.8394	2.8756	0.0362	16
27-Feb-17	20641	4732.07	4755.62	1413.00	41	41	41.0	16.8	1018.4	1.43	2017	2.8213	2.9335	0.1122	56
28-Feb-17	20643	4755.62	4779.62	1440.00	37	38	37.5	16.8	1018.4	1.33	1911	2.8385	2.9469	0.1084	57
1-Mar-17	20633	4779.62	4803.42	1428.00	37	38	37.5	17	1018.4	1.33	1895	2.8336	2.9880	0.1544	81
2-Mar-17	20665	4803.42	4827.31	1433.40	37	38	37.5	17.1	1018.2	1.33	1901	2.8345	2.9721	0.1376	72

Remark: (#) Power Failure

Appendix F

Database for Noise Measurement Data

NMS-1

Noise Measurement results at Location NMS1																					
Date	Start Time	1st Leq (5min)			2nd Leq (5min)			3rd Leq (5min)			4th Leq (5min)			5th Leq (5min)			6th Leq (5min)			Leq30min, dB(A)	Corrected Noise Level ^o , dB(A)
		Leq, dB(A)	L10, dB(A)	L90, dB(A)	Leq, dB(A)	L10, dB(A)	L90, dB(A)	Leq, dB(A)	L10, dB(A)	L90, dB(A)	Leq, dB(A)	L10, dB(A)	L90, dB(A)	Leq, dB(A)	L10, dB(A)	L90, dB(A)	Leq, dB(A)	L10, dB(A)	L90, dB(A)		
17-Jan-17	9:45	65.2	68.0	58.0	65.7	68.5	58.0	64.4	67.5	56.5	69.7	70.5	57.5	63.8	67.0	56.5	63.6	67.0	55.0	66.0	69.0
	10:16	65.7	68.3	58.4	66.0	68.7	58.3	64.5	67.8	56.7	63.4	67.4	56.6	64.0	68.3	56.6	64.4	67.3	56.9	64.8	67.8
	14:32	70.4	70.0	59.0	65.6	69.0	59.0	64.7	67.0	59.5	64.1	66.5	59.0	64.9	68.0	58.0	64.8	67.7	59.0	66.4	69.4
18-Jan-17	9:36	77.3	73.0	60.2	66.4	69.7	59.9	66.5	69.2	59.3	68.7	71.5	59.6	65.5	68.0	59.7	65.6	68.5	60.7	71.1	74.1
	11:15	66.7	70.7	62.0	65.7	69.1	59.4	65.8	68.9	60.0	67.4	69.3	58.6	64.1	66.7	60.2	65.5	68.0	59.9	66.0	69.0
	14:30	65.0	68.3	59.2	65.3	69.2	59.6	65.8	69.4	59.8	64.5	67.4	60.8	65.7	68.4	60.4	67.2	69.3	60.6	65.7	68.7
19-Jan-17	9:12	64.9	67.4	60.4	65.3	68.2	59.1	65.8	69.0	57.8	64.8	67.7	58.2	66.6	68.7	59.5	65.4	67.7	58.6	65.5	68.5
	10:20	66.1	68.4	59.8	65.5	68.1	60.2	67.7	70.7	61.2	65.9	68.8	59.1	66.6	70.4	60.2	66.5	68.0	59.3	66.4	69.4
	14:26	64.5	68.6	57.8	65.3	68.7	58.1	66.2	69.4	58.2	65.7	69.3	57.4	65.9	69.4	58.4	64.3	67.5	57.1	65.4	68.4
20-Jan-17	10:21	63.8	64.8	50.6	64.1	65.2	52.4	61.4	64.2	51.3	63.2	64.6	50.8	64.7	65.4	52.5	62.1	64.2	51.3	63.4	66.4
	11:00	65.2	66.4	53.1	64.2	67.3	52.1	63.7	64.9	51.0	65.2	67.1	50.1	64.2	65.0	51.6	61.2	63.7	50.1	64.1	67.1
	17:24	66.2	67.4	51.1	65.1	66.4	52.1	64.2	65.5	53.8	62.1	65.1	50.6	63.6	64.7	51.6	65.2	66.9	54.2	64.6	67.6
21-Jan-17	10:16	65.0	68.9	56.5	67.9	70.4	58.8	66.4	70.1	57.3	68.9	72.2	58.3	67.7	71.7	57.4	66.5	70.4	56.2	67.2	70.2
	10:46	67.8	70.2	57.1	66.5	69.9	56.4	67.7	70.0	57.5	67.4	70.4	57.7	68.5	71.0	58.4	66.0	69.0	56.7	67.4	70.4
	11:16	66.1	69.6	56.6	65.4	68.0	55.0	66.6	69.7	56.6	67.8	70.4	57.0	67.7	70.4	57.8	68.7	71.7	58.7	67.2	70.2
22-Jan-17	12:39	61.1	65.1	49.6	61.3	64.2	49.0	67.3	67.2	49.2	62.3	67.1	49.5	60.0	62.3	50.3	57.8	59.1	50.6	62.8	65.8
	17:36	64.5	64.4	48.8	60.5	64.9	47.9	60.9	63.7	49.4	60.4	61.6	49.3	63.6	66.6	49.2	64.2	68.1	49.5	62.7	65.7
	18:38	60.8	65.0	48.7	60.1	63.2	47.8	63.0	66.7	47.6	61.5	65.2	47.4	60.3	65.1	47.3	60.6	65.7	48.4	61.2	64.2
23-Jan-17	11:36	65.6	69.8	55.6	63.1	66.1	54.3	65.8	70.3	54.5	63.7	67.0	53.3	65.6	69.9	55.5	61.6	65.5	52.5	64.5	67.5
	14:29	65.8	69.0	59.7	67.1	69.8	60.5	64.8	68.0	59.9	66.1	68.4	59.3	65.1	68.8	59.5	65.0	68.7	58.3	65.7	68.7
	16:07	66.8	70.7	59.1	64.8	68.6	58.6	65.3	68.5	58.6	64.0	67.5	57.1	66.4	70.1	60.2	65.9	69.3	59.2	65.6	68.6
24-Jan-17	9:10	68.1	69.2	55.3	67.1	69.8	54.9	66.2	68.3	56.4	69.1	71.2	56.3	68.1	70.1	55.8	70.1	72.1	57.7	68.3	71.3
	15:21	70.1	72.1	56.4	68.9	70.1	54.1	71.4	74.6	57.1	69.2	71.6	56.1	68.3	69.2	55.4	71.6	73.1	57.8	70.1	73.1
	16:11	69.4	70.4	57.1	68.5	69.0	55.4	72.4	75.3	57.1	68.9	69.9	54.2	69.1	69.8	55.4	67.2	68.6	57.4	69.6	72.6
25-Jan-17	9:39	61.3	62.5	56.0	65.7	68.5	60.5	64.8	67.5	60.5	66.9	70.0	61.5	66.7	69.0	59.0	66.3	69.0	57.0	65.6	68.6
	10:09	65.4	67.5	59.0	65.5	68.5	59.5	67.0	69.5	61.5	69.7	69.5	62.5	66.2	69.0	57.0	62.3	65.0	56.5	66.6	69.6
	13:03	62.3	65.0	53.0	58.4	61.5	52.5	60.2	63.0	54.5	59.8	63.5	53.0	58.7	62.0	52.5	60.8	64.5	53.5	60.2	63.2
26-Jan-17	10:20	61.6	63.8	52.6	62.4	64.2	53.1	64.1	66.2	53.9	62.0	61.3	51.0	64.8	65.1	54.6	62.1	66.4	55.5	63.0	66.0
	10:51	62.9	64.1	55.2	61.0	63.1	56.2	65.3	66.2	55.8	63.1	65.4	54.1	64.2	66.1	55.8	66.2	68.9	54.1	64.1	67.1
	14:20	65.2	67.1	54.1	64.4	66.7	55.0	66.8	69.2	57.1	64.0	66.2	54.1	63.1	65.4	55.2	69.2	71.1	54.8	66.0	69.0
27-Jan-17	8:00	62.0	64.5	51.0	60.2	64.0	50.5	60.0	63.5	51.5	65.8	65.0	51.5	61.0	62.5	51.0	56.2	58.8	50.5	61.8	64.8
	8:31	59.1	63.5	50.5	62.3	64.0	50.5	58.6	60.5	51.0	60.1	64.2	51.5	62.0	64.1	50.9	59.6	61.4	51.2	60.5	63.5
	13:27	63.4	65.5	51.5	62.8	64.7	51.2	64.3	66.7	52.0	63.7	65.8	51.8	65.8	68.0	52.3	64.7	67.1	52.0	64.2	67.2
28-Jan-17	8:17	65.1	68.8	54.4	62.1	65.3	53.8	63.2	64.9	54.9	64.1	65.6	55.2	61.7	63.8	54.9	64.0	67.6	55.3	63.5	66.5
	11:12	61.2	63.4	55.7	63.1	64.9	54.2	60.1	62.4	55.9	62.4	64.7	54.8	61.6	63.5	55.4	63.7	65.8	56.2	62.2	65.2
	11:45	60.4	63.7	53.6	64.2	65.7	52.4	63.8	65.0	54.2	63.1	64.6	53.2	61.7	63.5	52.0	65.2	67.1	55.0	63.3	66.3
29-Jan-17	9:15	59.3	62.3	46.7	60.1	60.5	46.4	56.9	57.9	46.1	57.2	58.9	46.0	60.0	62.1	46.3	51.0	54.6	45.3	58.3	61.3
	9:46	58.2	61.1	46.8	59.2	62.0	46.6	57.8	60.0	46.2	57.9	59.9	46.3	61.0	62.0	46.4	59.5	61.8	46.6	59.1	62.1
	11:30	55.8	54.0	45.0	60.6	63.5	45.5	57.8	59.9	45.4	60.8	59.7	45.7	60.9	62.5	46.2	55.8	60.4	48.7	59.2	62.2
30-Jan-17	13:24	65.3	65.4	47.8	61.5	64.1	48.4	58.6	61.0	48.4	58.9	62.9	48.1	59.5	63.1	48.5	58.7	62.7	47.4	61.2	64.2
	13:54	59.2	63.3	48.1	58.8	62.9	47.5	60.7	64.6	48.0	59.8	62.6	47.5	59.4	63.9	48.9	61.7	64.9	48.9	60.1	63.1
	14:24	61.8	64.5	48.1	59.6	63.0	48.5	59.9	63.7	47.7	58.8	62.7	47.2	59.7	63.5	48.5	59.4	63.5	47.7	60.0	63.0

Remark: (*) The sound meter was set in a free field situation at monitoring locations (NMS-1), therefore, a façade correction of +3 dB(A) has been added according to acoustical principles and EPD guidelines.

Public Holiday	
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Normal Day			Holiday Day	
Average	69 dB(A)		Average	65 dB(A)
Min	63 dB(A)		Min	61 dB(A)
Max	74 dB(A)		Max	67 dB(A)

NMS-2

Noise Measurement results at Location NMS2																					
Date	Start Time	1st Leq (5min)			2nd Leq (5min)			3rd Leq (5min)			4th Leq (5min)			5th Leq (5min)			6th Leq (5min)			Leq30min, dB(A)	Corrected Noise Level*, dB(A)
		Leq, dB(A)	L10, dB(A)	L90, dB(A)	Leq, dB(A)	L10, dB(A)	L90, dB(A)	Leq, dB(A)	L10, dB(A)	L90, dB(A)	Leq, dB(A)	L10, dB(A)	L90, dB(A)	Leq, dB(A)	L10, dB(A)	L90, dB(A)	Leq, dB(A)	L10, dB(A)	L90, dB(A)		
17-Jan-17	13:00	62.4	65.5	56.0	61.7	65.5	52.5	60.9	63.5	50.0	59.8	64.0	50.0	60.7	64.5	51.5	62.2	66.0	52.5	61.4	64.4
	13:30	59.6	63.5	53.5	59.2	62.5	54.5	59.0	61.5	54.0	59.9	62.5	54.5	59.7	62.0	55.5	59.3	60.5	56.5	59.5	62.5
	14:49	59.3	61.0	56.5	59.8	61.5	56.5	59.5	61.5	55.5	59.2	61.0	56.5	59.5	61.5	56.5	61.8	63.5	57.0	60.0	63.0
18-Jan-17	11:25	63.4	65.5	60.0	62.1	64.0	59.5	69.4	69.0	59.0	68.6	69.0	59.5	61.0	63.5	59.5	62.0	64.5	59.5	65.8	68.8
	13:09	62.5	64.0	60.0	64.9	68.5	59.5	69.7	72.0	58.0	71.0	73.0	64.5	71.2	74.5	65.5	71.6	74.5	66.0	69.6	72.6
	13:55	63.7	65.0	61.2	64.3	67.0	60.2	66.5	68.7	62.1	64.5	66.7	60.0	66.5	68.2	62.3	62.5	65.0	58.0	64.9	67.9
19-Jan-17	13:37	63.1	66.7	56.8	63.8	67.5	57.2	66.2	70.1	57.7	63.3	66.9	56.5	65.5	69.3	58.0	65.7	69.5	57.7	64.8	67.8
	14:07	65.8	67.1	56.3	66.7	68.7	57.0	65.5	67.8	56.5	64.9	66.9	56.5	65.9	67.8	57.8	66.8	68.7	58.0	66.0	69.0
	14:38	64.4	66.9	56.2	64.9	66.8	56.6	65.8	67.4	57.9	66.9	68.8	58.8	64.8	67.6	57.4	65.4	68.8	57.4	65.4	68.4
20-Jan-17	9:50	61.4	64.0	57.0	62.2	65.0	57.0	65.4	69.5	58.0	59.1	64.5	53.5	61.7	65.0	53.0	63.2	65.0	55.0	62.6	65.6
	10:20	64.6	68.0	58.0	60.0	62.0	54.0	60.2	63.0	54.5	60.9	64.0	56.0	63.8	63.0	53.5	61.0	64.5	54.5	62.1	65.1
	14:06	59.0	61.5	54.5	59.1	62.0	53.5	57.8	60.5	52.5	57.8	60.5	53.5	57.7	60.5	53.6	59.7	61.0	55.0	58.6	61.6
21-Jan-17	10:37	61.5	64.3	60.0	62.0	65.5	59.6	63.6	67.4	60.0	64.0	68.5	61.2	64.5	69.0	61.0	65.0	69.5	61.5	63.6	66.6
	11:11	61.7	65.0	59.7	62.0	65.5	60.1	62.5	65.6	60.5	63.7	67.6	61.5	63.0	66.5	61.0	63.5	66.0	61.0	62.8	65.8
	15:02	62.2	64.9	59.8	62.1	64.0	59.0	62.0	64.5	59.9	61.7	63.5	59.0	61.5	64.0	59.0	61.0	63.7	58.7	61.8	64.8
22-Jan-17	7:11	48.9	49.0	44.5	49.4	51.0	43.0	52.5	54.0	49.5	55.3	56.0	54.0	55.2	56.5	53.0	57.5	61.0	52.5	54.2	57.2
	7:42	50.5	53.5	46.5	50.0	52.0	46.5	48.8	50.5	46.0	51.5	54.3	46.6	50.8	52.9	46.5	52.5	55.7	47.3	50.8	53.8
	13:27	52.7	56.6	47.8	52.5	56.0	47.7	53.0	57.1	48.0	52.0	56.5	47.0	53.5	57.7	47.6	54.0	58.1	48.1	53.0	56.0
23-Jan-17	9:43	53.4	54.0	45.5	48.1	50.0	45.0	50.1	52.0	46.5	58.4	62.0	48.0	59.9	63.0	54.0	65.0	68.5	54.0	59.4	62.4
	12:55	55.2	56.5	48.0	51.1	53.0	48.0	50.0	52.0	47.0	51.7	54.5	47.5	50.0	52.0	47.5	60.4	63.0	53.5	55.0	58.0
	13:25	60.8	64.0	53.5	60.4	63.5	52.5	60.6	65.0	49.0	51.3	53.5	47.5	51.9	54.0	47.0	51.1	52.5	48.5	58.1	61.1
24-Jan-17	10:38	62.6	64.5	60.0	63.2	65.0	61.0	62.0	64.0	61.2	63.2	65.7	61.5	62.7	65.0	60.0	63.9	66.0	61.2	63.0	66.0
	11:22	62.5	65.0	61.2	62.0	64.5	61.0	63.0	65.1	61.5	61.7	63.1	59.2	61.2	63.0	59.5	62.7	64.5	60.5	62.2	65.2
	15:07	63.5	66.2	61.0	64.2	67.0	62.0	64.0	67.5	62.5	63.6	66.0	61.5	64.0	66.7	62.0	63.7	65.9	61.0	63.8	66.8
25-Jan-17	10:39	62.1	64.5	61.0	62.2	64.2	59.9	62.0	64.0	60.0	63.2	65.5	61.0	62.8	64.5	59.9	62.2	65.0	61.2	62.4	65.4
	11:12	62.5	65.0	60.5	61.6	64.5	60.0	62.7	65.0	60.5	63.0	66.2	61.0	63.6	66.5	61.5	63.0	66.2	61.0	62.8	65.8
	15:20	63.0	65.2	61.0	63.6	66.2	61.0	64.2	67.3	62.0	64.0	66.5	62.0	63.8	66.0	61.9	62.9	65.5	61.0	63.6	66.6
26-Jan-17	10:51	48.1	51.5	42.5	47.6	49.0	42.0	49.9	54.0	44.5	47.6	49.5	44.5	53.7	56.5	46.0	48.2	50.0	44.5	49.8	52.8
	11:11	47.8	49.5	45.5	58.3	61.5	51.0	58.4	62.0	51.0	56.9	60.0	44.0	52.9	56.5	43.0	50.6	53.5	43.0	55.7	58.7
	14:00	48.7	49.5	46.5	49.5	51.0	46.5	51.5	54.5	47.5	48.9	52.0	43.0	53.2	54.0	47.0	58.4	59.5	49.5	53.3	56.3
27-Jan-17	10:34	62.7	64.5	60.0	63.0	64.5	59.8	63.5	64.7	60.5	62.6	64.4	60.0	63.2	64.5	61.0	64.0	67.6	62.0	63.2	66.2
	11:15	62.2	64.5	59.7	62.0	64.3	59.5	63.2	65.0	61.0	64.0	67.7	60.5	63.2	66.9	61.0	63.0	65.5	61.0	63.0	66.0
	15:36	63.6	66.5	61.0	63.7	67.0	61.5	64.3	67.7	62.0	64.3	67.5	62.0	63.0	66.5	60.5	63.2	66.0	60.5	63.7	66.7
28-Jan-17	11:04	48.3	51.9	43.7	46.4	48.6	43.1	44.1	45.6	41.6	45.7	48.6	42.7	47.0	51.7	42.8	47.8	51.4	42.7	46.8	49.8
	12:18	47.2	50.2	42.4	48.7	51.2	43.8	45.6	49.6	41.9	45.8	49.2	42.7	45.2	48.8	42.4	46.6	50.5	43.1	46.7	49.7
	14:46	46.8	51.2	42.8	47.2	51.5	43.2	48.8	50.8	42.4	48.2	51.9	42.7	49.5	52.6	42.4	47.6	53.4	43.8	48.1	51.1
29-Jan-17	10:58	48.2	51.5	44.5	48.9	52.0	43.8	47.3	51.4	43.8	49.2	53.4	44.2	48.7	52.5	44.8	50.4	54.2	45.6	48.9	51.9
	12:18	46.9	49.1	43.2	46.9	49.4	44.2	48.4	51.1	44.1	47.7	50.0	43.9	46.9	48.7	43.9	47.7	49.8	44.0	47.5	50.5
	13:35	49.7	53.5	43.7	50.2	53.3	45.9	48.6	51.9	44.2	50.6	54.5	44.0	49.6	53.3	43.9	49.4	52.3	44.0	49.7	52.7
30-Jan-17	7:39	49.6	47.0	41.5	45.7	48.0	40.5	43.1	44.5	40.5	45.2	47.5	41.5	42.5	43.5	40.0	44.1	45.5	41.5	45.7	48.7
	8:10	59.4	58.5	42.5	43.3	45.5	40.0	44.3	46.8	41.0	45.0	47.3	41.0	42.8	44.3	40.1	43.1	45.0	41.1	52.2	55.2
	13:11	47.5	49.3	42.5	46.9	48.8	41.7	47.5	49.5	42.4	46.5	48.9	42.0	46.7	49.1	42.5	47.3	49.0	41.9	47.1	50.1

Remark: (*) The sound meter was set in a free field situation at monitoring locations (NMS-2), therefore, a façade correction of +3 dB(A) has been added according to acoustical principles and EPD guidelines.

Public Holiday	
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Normal Day		Holiday Day	
Average	66 dB(A)	Average	53 dB(A)
Min	53 dB(A)	Min	49 dB(A)
Max	73 dB(A)	Max	57 dB(A)

NMS-3

Noise Measurement results at Location NMS3																					
Date	Start Time	1st Leq (5min)			2nd Leq (5min)			3rd Leq (5min)			4th Leq (5min)			5th Leq (5min)			6th Leq (5min)			Leq30min, dB(A)	Corrected Noise Level*, dB(A)
		Leq, dB(A)	L10, dB(A)	L90, dB(A)	Leq, dB(A)	L10, dB(A)	L90, dB(A)	Leq, dB(A)	L10, dB(A)	L90, dB(A)	Leq, dB(A)	L10, dB(A)	L90, dB(A)	Leq, dB(A)	L10, dB(A)	L90, dB(A)	Leq, dB(A)	L10, dB(A)	L90, dB(A)		
17-Jan-17	10:50	65.3	68.0	58.0	64.3	68.0	57.5	64.4	67.0	58.0	63.2	67.0	56.5	63.3	65.5	55.5	63.6	66.5	55.5	64.1	67.1
	11:11	65.4	68.3	58.1	64.7	68.5	57.6	64.7	67.9	58.3	64.4	67.9	56.6	63.8	66.7	55.8	64.1	67.1	55.7	64.5	67.5
	14:01	67.5	69.5	63.0	69.9	72.5	64.0	67.5	69.5	63.0	67.4	69.5	63.5	70.9	71.5	63.5	67.1	69.5	62.5	68.6	71.6
18-Jan-17	10:07	66.5	69.7	60.8	68.8	72.3	63.8	67.2	69.7	62.6	67.1	70.2	63.4	66.5	68.8	63.7	67.2	69.7	63.4	67.3	70.3
	10:44	64.4	68.5	58.7	64.0	67.5	57.2	61.3	64.1	57.1	66.1	69.9	59.6	65.3	67.7	58.7	66.0	70.4	58.0	64.8	67.8
	15:03	68.5	70.2	64.8	67.4	69.7	63.8	67.0	69.3	62.4	65.1	67.8	61.9	65.2	68.1	61.4	64.6	66.4	61.5	66.5	69.5
19-Jan-17	9:46	64.3	67.8	58.9	64.1	67.6	59.4	64.2	66.9	59.8	64.2	67.3	56.2	64.8	68.3	57.3	65.6	67.1	58.9	64.6	67.6
	10:54	65.8	68.7	60.2	65.9	69.1	59.3	66.6	68.2	58.7	67.8	70.0	61.2	65.0	68.4	59.2	66.2	67.8	58.1	66.3	69.3
	13:38	65.3	67.5	58.4	66.6	69.7	60.1	64.3	67.8	57.6	67.7	70.4	61.2	64.9	67.2	56.8	64.2	67.4	57.3	65.7	68.7
20-Jan-17	12:01	64.6	65.1	50.7	62.6	64.1	52.1	63.1	64.2	51.6	61.2	63.4	51.3	65.1	67.1	50.0	63.3	64.2	49.2	63.5	66.5
	14:02	68.2	69.3	54.6	67.6	68.1	53.1	69.2	71.1	55.1	66.1	68.4	56.2	65.2	68.1	53.4	69.0	72.4	54.7	67.8	70.8
	14:45	64.2	65.8	51.1	65.6	66.7	50.9	63.1	64.4	51.8	65.2	67.1	50.0	62.1	64.3	51.4	68.1	69.0	53.4	65.2	68.2
21-Jan-17	11:48	68.8	72.1	61.6	67.4	70.5	60.6	70.6	68.9	60.3	67.0	69.4	61.5	68.9	70.3	61.8	68.4	71.6	61.0	68.7	71.7
	12:18	67.4	69.5	60.1	68.5	70.1	60.5	67.8	69.0	60.0	68.5	70.5	61.1	69.6	71.9	61.1	70.4	72.8	61.0	68.8	71.8
	12:48	69.4	71.2	61.0	70.8	72.7	61.5	69.7	71.4	60.6	68.8	70.5	60.0	69.9	71.1	60.1	69.4	70.1	60.7	69.7	72.7
22-Jan-17	13:15	62.3	64.9	55.3	61.5	64.4	54.8	64.4	67.7	54.2	64.8	64.5	54.3	61.0	63.4	55.5	60.4	62.6	55.2	62.7	65.7
	17:03	62.1	67.1	51.6	61.0	64.2	51.5	61.1	64.0	51.5	62.4	66.9	51.6	62.1	66.0	52.1	62.2	65.0	51.6	61.9	64.9
	18:07	60.2	62.5	50.9	57.7	61.5	49.9	60.8	65.3	49.8	63.1	65.5	51.0	61.2	64.8	49.6	61.1	62.4	49.6	61.0	64.0
23-Jan-17	11:04	65.4	67.6	60.9	66.8	68.1	61.2	67.4	69.6	60.9	65.0	67.5	60.9	66.5	70.7	59.7	65.5	69.1	59.7	66.2	69.2
	15:06	66.5	68.7	62.8	69.0	71.1	65.0	67.8	69.7	64.3	67.1	69.2	64.3	73.8	70.9	64.4	67.1	69.1	64.4	69.4	72.4
	16:41	68.3	70.2	63.9	66.6	68.3	61.6	66.9	69.0	63.5	67.1	70.0	61.8	67.2	69.3	64.3	67.8	70.7	63.2	67.4	70.4
24-Jan-17	10:07	69.8	71.3	55.9	68.4	72.1	54.9	69.1	70.0	57.3	68.4	70.3	56.1	70.6	71.1	57.2	67.9	69.2	58.1	69.1	72.1
	10:09	67.6	69.1	53.1	68.4	70.1	54.1	70.0	72.4	57.8	66.4	68.7	54.3	68.1	69.0	57.1	69.1	72.4	55.4	68.4	71.4
	13:45	69.4	71.1	57.4	68.5	70.4	57.9	72.4	72.4	58.1	68.9	69.2	55.4	69.1	73.4	56.2	67.2	72.3	57.4	69.6	72.6
25-Jan-17	10:44	64.8	66.5	60.5	68.6	71.0	62.5	66.1	68.5	62.5	66.1	68.5	59.5	65.8	68.5	60.5	64.8	67.0	61.0	66.2	69.2
	11:14	66.6	68.5	63.0	66.6	68.5	62.0	68.1	69.5	64.0	66.5	68.5	62.5	66.0	69.0	61.5	62.5	65.0	56.0	66.3	69.3
	16:22	61.3	64.0	54.0	61.9	64.5	55.5	66.6	64.5	55.5	59.4	61.5	53.0	61.5	63.5	52.0	62.0	65.5	52.5	62.8	65.8
26-Jan-17	8:45	62.4	64.1	53.1	60.9	62.1	52.4	58.2	59.3	54.6	60.1	61.4	51.4	59.2	61.3	50.9	62.0	65.6	52.5	60.7	63.7
	9:17	59.2	62.4	52.1	60.7	61.6	53.0	62.4	65.3	52.1	61.1	63.8	51.6	65.2	67.1	50.2	64.6	65.3	52.8	62.7	65.7
	15:36	67.2	69.3	55.2	66.4	68.0	54.3	67.1	69.2	55.8	65.4	66.7	54.2	69.1	71.2	53.2	67.8	68.5	54.0	67.3	70.3
27-Jan-17	9:07	60.6	63.5	47.0	58.1	62.0	47.5	62.4	66.0	48.0	63.2	65.0	48.5	62.3	63.0	48.0	61.0	63.0	48.5	61.6	64.6
	9:38	61.7	64.0	48.0	62.2	65.0	48.5	59.8	65.0	48.5	61.5	64.1	48.0	62.0	64.7	48.1	63.5	66.7	49.0	61.9	64.9
	12:48	62.6	65.4	48.7	63.5	66.7	49.0	64.1	67.1	49.5	64.4	67.3	49.1	65.1	68.1	50.1	64.8	67.1	50.1	64.2	67.2
28-Jan-17	9:02	62.4	64.2	55.1	61.3	64.7	54.9	64.7	65.2	52.0	60.8	62.7	51.6	62.9	64.6	52.8	65.2	67.8	54.5	63.2	66.2
	9:41	64.2	66.7	57.2	65.2	68.4	55.3	63.8	66.2	54.5	65.0	67.3	55.2	63.2	62.4	54.7	65.0	59.9	55.2	64.5	67.5
	13:07	66.2	68.4	55.2	66.1	67.3	54.6	65.5	66.8	55.8	64.2	66.7	56.8	65.2	67.3	55.2	68.9	69.4	54.7	66.3	69.3
29-Jan-17	10:20	55.4	58.2	49.9	55.3	57.0	50.1	58.8	63.3	50.5	60.0	59.9	50.6	54.4	56.7	50.6	56.3	61.2	51.2	57.2	60.2
	12:25	56.6	59.1	50.1	55.8	57.3	50.5	58.7	62.9	50.7	59.3	59.8	50.6	54.7	56.9	50.7	55.8	57.1	50.7	57.1	60.1
	12:56	56.3	61.0	51.1	60.1	59.2	50.7	55.8	57.5	50.5	55.7	57.6	50.5	56.1	59.8	50.8	56.3	59.2	50.7	57.0	60.0
30-Jan-17	14:56	61.2	61.7	50.8	58.0	61.9	50.6	58.1	59.7	50.7	59.8	63.0	50.9	60.1	64.5	50.3	59.0	63.1	50.9	59.5	62.5
	15:26	59.8	62.1	50.1	59.4	63.6	51.4	58.6	62.5	50.5	58.6	62.6	49.9	59.0	63.7	50.4	60.5	64.4	50.1	59.4	62.4
	15:56	58.9	62.3	51.0	58.5	61.7	50.6	59.5	61.0	51.5	60.1	63.4	51.0	61.6	64.8	52.8	59.0	62.4	51.7	59.7	62.7

Remark: (*) The sound meter was set in a free field situation at monitoring locations (NMS-3), therefore, a façade correction of +3 dB(A) has been added according to acoustical principles and EPD guidelines.

Public Holiday	
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Normal Day			Holiday Day	
Average	70 dB(A)		Average	65 dB(A)
Min	64 dB(A)		Min	60 dB(A)
Max	73 dB(A)		Max	69 dB(A)

NMS-4

Noise Measurement results at Location NMS4																				
Date	Start Time	1st Leq (5min)			2nd Leq (5min)			3rd Leq (5min)			4th Leq (5min)			5th Leq (5min)			6th Leq (5min)			Leq30min, dB(A)
		Leq, dB(A)	L10, dB(A)	L90, dB(A)	Leq, dB(A)	L10, dB(A)	L90, dB(A)	Leq, dB(A)	L10, dB(A)	L90, dB(A)	Leq, dB(A)	L10, dB(A)	L90, dB(A)	Leq, dB(A)	L10, dB(A)	L90, dB(A)	Leq, dB(A)	L10, dB(A)	L90, dB(A)	
17-Jan-17	10:43	61.8	64.0	57.5	63.4	66.5	57.5	61.0	63.5	56.0	60.1	63.0	55.5	59.9	61.5	53.0	59.2	63.0	51.5	61.1
	11:13	55.6	59.0	49.5	59.5	61.0	52.0	57.0	59.5	52.5	63.5	67.5	61.5	57.7	61.0	50.5	58.0	61.0	50.5	59.4
	14:09	58.8	60.5	56.5	58.5	60.0	56.5	58.2	59.5	56.5	59.0	60.5	57.0	60.0	61.5	57.5	59.0	61.0	56.0	59.0
18-Jan-17	9:25	61.2	62.5	58.5	61.0	62.5	59.0	61.5	63.5	58.5	60.5	62.0	58.0	60.8	62.5	58.0	63.7	66.0	58.5	61.6
	10:21	62.7	65.0	58.0	63.8	66.0	59.0	60.4	62.0	58.0	65.1	63.5	59.5	62.5	64.5	59.5	65.4	69.0	58.0	63.6
	14:31	62.4	62.0	49.5	59.5	59.5	49.5	54.6	58.5	61.0	62.5	65.0	59.7	61.2	64.5	59.8	63.0	65.7	60.1	61.3
19-Jan-17	10:16	58.0	61.0	52.4	60.0	62.7	54.4	62.4	65.3	54.5	60.4	62.5	53.7	61.8	64.7	57.4	61.2	63.4	55.2	60.8
	10:46	61.6	62.3	54.5	61.9	63.5	55.0	60.9	62.6	54.8	61.8	63.1	55.7	62.7	63.0	56.0	60.4	61.4	55.0	61.6
	11:16	62.2	64.6	55.1	58.2	61.8	53.8	60.7	62.7	54.0	62.8	64.8	55.4	61.8	63.9	54.1	61.7	63.8	54.4	61.5
20-Jan-17	10:59	61.9	65.5	54.5	59.6	62.5	54.5	58.5	61.5	53.5	59.7	62.5	54.5	58.9	62.0	54.0	58.5	61.5	53.0	59.7
	12:58	59.4	62.5	54.0	58.1	61.0	53.5	57.1	59.5	53.0	60.1	63.0	53.0	61.8	64.5	55.5	60.4	64.0	54.0	59.7
	13:28	59.0	61.5	54.0	59.3	62.0	54.0	60.9	64.5	55.0	59.8	63.0	54.0	59.2	61.5	54.0	59.8	63.0	53.5	59.7
21-Jan-17	9:27	61.2	63.0	58.0	61.7	63.6	58.5	62.1	63.7	59.0	61.8	63.0	58.0	61.0	63.0	58.8	61.5	62.5	58.0	61.6
	13:03	62.7	64.5	59.0	63.0	65.7	61.0	63.5	67.2	61.5	63.0	66.5	61.0	63.5	66.5	61.5	63.2	66.0	60.0	63.2
	13:43	63.0	66.5	60.5	63.0	66.7	60.0	62.5	67.0	60.0	62.0	66.7	59.5	62.2	66.0	59.5	63.1	67.0	60.0	62.7
22-Jan-17	8:23	55.5	59.0	41.5	55.3	58.0	47.5	51.5	53.5	47.0	53.7	56.5	47.0	58.2	59.5	49.0	58.3	61.0	48.0	56.0
	8:54	55.1	58.5	49.5	55.1	58.5	47.5	52.0	54.5	46.5	53.4	56.7	47.5	54.7	57.7	46.9	53.0	56.8	47.5	54.0
	14:07	57.3	60.4	50.7	56.4	59.7	50.0	57.0	61.1	50.6	57.3	60.7	51.1	55.3	59.0	49.5	56.4	60.3	50.1	56.7
23-Jan-17	10:19	56.7	59.5	52.0	56.8	60.0	51.5	59.0	62.5	51.5	59.3	62.0	54.0	59.6	62.5	53.5	59.2	61.5	51.0	58.6
	10:49	55.4	58.5	49.0	57.6	60.5	50.5	56.7	60.5	48.5	59.4	60.5	50.0	57.7	61.5	50.0	55.9	59.5	48.5	57.3
	14:03	57.6	60.5	51.5	58.4	61.5	51.0	58.6	62.0	52.0	59.1	62.5	47.0	53.6	56.0	47.0	61.0	63.0	50.5	58.5
24-Jan-17	9:29	61.5	64.0	58.7	62.0	65.0	59.0	61.4	64.3	59.5	62.2	64.5	60.0	61.7	64.0	60.0	61.5	63.0	59.0	61.7
	13:27	62.5	65.7	60.0	63.7	65.0	60.0	63.6	66.5	61.2	63.0	67.2	61.5	63.5	67.0	61.0	64.0	67.5	62.2	63.4
	14:02	63.0	65.5	60.0	65.7	65.7	61.2	61.0	65.7	61.0	62.5	65.0	61.0	62.2	65.0	60.0	61.2	64.5	59.5	62.9
25-Jan-17	9:18	62.5	65.0	59.3	62.7	65.0	59.5	61.8	64.2	59.5	61.2	64.0	59.0	61.0	63.5	58.7	61.5	63.5	58.9	61.8
	13:20	63.6	66.7	61.5	64.0	67.2	62.5	63.7	66.9	62.3	63.0	66.5	61.0	63.7	66.5	61.2	64.0	67.2	62.0	63.7
	14:20	63.7	66.5	61.2	64.0	67.3	62.5	64.5	67.8	62.5	61.9	64.7	60.0	63.6	64.9	61.2	64.0	67.0	61.5	63.7
26-Jan-17	9:44	55.2	57.0	52.0	56.0	58.0	52.5	58.2	60.5	49.0	52.9	55.0	46.5	57.6	59.0	48.5	54.3	56.0	51.0	56.1
	10:14	54.0	58.0	46.0	54.9	58.5	46.0	54.9	56.5	46.0	52.6	55.5	46.5	52.2	55.5	45.5	50.3	53.5	45.0	53.4
	13:22	55.7	57.5	52.0	54.6	56.5	51.5	55.3	58.0	51.5	55.5	57.5	52.5	55.5	57.5	52.0	56.0	58.0	50.5	55.5
27-Jan-17	9:17	61.7	63.6	59.2	62.2	64.5	59.0	62.7	64.5	60.0	62.2	65.0	59.9	63.2	66.0	61.0	64.5	67.0	61.5	62.9
	13:17	62.3	64.5	59.0	63.0	65.0	59.5	61.2	64.0	59.7	62.5	64.7	60.3	62.2	64.5	66.0	61.7	64.0	57.0	62.2
	13:52	63.7	66.5	61.2	63.5	65.0	62.0	62.5	65.0	60.0	62.0	65.5	60.5	62.2	66.0	61.0	62.2	66.5	61.5	62.7
28-Jan-17	10:22	52.3	56.9	46.5	55.3	59.4	48.0	52.7	55.3	48.6	52.2	55.8	45.9	53.0	55.1	46.0	54.7	59.0	46.7	53.5
	11:41	53.8	57.9	47.2	54.6	58.2	47.0	53.4	58.4	47.3	51.9	57.2	46.9	53.2	58.5	47.7	52.8	58.5	47.2	53.4
	14:08	52.5	59.2	46.5	51.8	58.2	47.7	53.5	60.1	47.5	52.4	57.5	47.1	51.1	58.6	47.5	53.4	60.5	47.6	52.5
29-Jan-17	10:23	50.4	56.0	47.8	55.5	58.1	49.3	54.1	57.2	43.6	51.3	60.2	49.6	52.1	59.8	49.7	53.2	57.5	49.8	53.1
	11:36	53.4	55.8	49.2	54.3	57.2	50.1	53.6	58.1	51.2	54.4	56.6	48.1	53.4	55.2	47.6	54.1	56.8	47.3	53.9
	12:58	54.2	57.0	47.0	53.7	56.5	46.0	54.4	56.5	45.5	57.3	58.3	50.1	56.2	56.8	49.3	54.2	56.2	47.6	55.2
30-Jan-17	8:53	49.6	52.0	44.0	52.9	56.5	46.0	48.8	51.0	43.5	51.7	55.0	44.5	52.0	55.0	45.0	53.4	56.5	44.5	51.7
	9:24	52.3	54.0	44.5	48.8	51.5	44.0	49.7	52.3	44.3	50.4	53.5	44.5	51.5	54.0	44.6	51.0	53.9	44.5	50.8
	12:30	52.4	54.7	45.0	51.7	53.9	45.1	52.0	54.6	45.2	58.9	60.3	47.1	53.0	54.1	45.7	55.0	57.4	47.0	54.7

Public Holiday	
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Normal Day		Holiday Day	
Average	61 dB(A)	Average	54 dB(A)
Min	53 dB(A)	Min	51 dB(A)
Max	64 dB(A)	Max	57 dB(A)

Appendix G

Meteorological Data during Baseline Monitoring Period

Date		Weather	Total Rainfall (mm)	Kwun Tong Station	Kai Tak Station		King's Park Station
				Mean Air Temp. (°C)	Wind Speed (km/h)	Wind Direction	Mean Relative Humidity (%)
17-Jan-17	Tue	Mainly cloudy with one or two light rain patches	0	17.2	13.7	E/SE	70.5
18-Jan-17	Wed	Moderate east to northeasterly winds.	Trace	18.6	9.7	E/SE	81
19-Jan-17	Thu	Mainly fine and dry. Cool	0	21.4	11.1	SE	79
20-Jan-17	Fri	Mainly fine and dry. Cool	3.4	18.2	11.6	NW	66.5
21-Jan-17	Sat	Moderate east to northeasterly winds.	0	17.4	12.5	N	68.9
22-Jan-17	Sun	Mainly fine and dry. Cool	3.4	16.3	8.7	W/NW	65
23-Jan-17	Mon	Mainly fine and dry. Cool	0	16.5	12	N/NW	63
24-Jan-17	Tue	Fine. Dry during the day. Moderate easterly winds, fresh at times tonight.	0	16.9	17	E/NE	67
25-Jan-17	Wed	Fine. Dry during the day. Moderate easterly winds, fresh at times tonight.	0	18.1	14.8	S	70.7
26-Jan-17	Thu	Mainly fine and dry. Cool	0	17.5	12.1	S/SE	71
27-Jan-17	Fri	Fine. Dry during the day. Moderate easterly winds, fresh at times tonight.	0	18.6	13	S/SE	70.5
28-Jan-17	Sat	Moderate to fresh easterly winds	0.3	16.8	7.5	S/SE	77.8
29-Jan-17	Sun	Mainly cloudy with bright periods	2.4	20	8.5	S/SE	88.5
30-Jan-17	Mon	Moderate to fresh easterly winds	1.2	21	8.9	S/SE	90

Date		Weather	Total Rainfall (mm)	Kwun Tong Station	Kai Tak Station		King's Park Station
				Mean Air Temp. (°C)	Wind Speed (km/h)	Wind Direction	Mean Relative Humidity (%)
16-Feb-17	Thu	Fine. Dry in the afternoon. Light to moderate easterly winds.	0	19.7	12.5	SE	66
17-Feb-17	Fri	Fine. Dry in the afternoon. Light winds.	0	21.1	9.6	SE	74
18-Feb-17	Sat	Fine. Dry in the afternoon. Light winds.	0	21.3	10.5	SE	70.8
19-Feb-17	Sun	Fine and dry. Moderate to fresh easterly winds.	0.3	17.1	9	SE	84.2
20-Feb-17	Mon	Fine. Dry in the afternoon. Light winds.	Trace	22.2	10.5	SE	78
21-Feb-17	Tue	Fine and dry. Moderate to fresh easterly winds.	4.6	18.5	18.8	E/SE	86
22-Feb-17	Wed	Moderate to fresh north to northeasterly winds.	8	19	13.9	E/SE	87.2
23-Feb-17	Thu	Cloudy to overcast with a few rain patches.	Trace	17	9.5	W/SW	83
24-Feb-17	Fri	Fine and dry. Moderate to fresh easterly winds.	Trace	12.5	10	N/NW	80.5
25-Feb-17	Sat	Fine. Dry in the afternoon. Light winds.	0.7	12	8.9	N/NW	75.8
26-Feb-17	Sun	Fine and dry. Moderate to fresh easterly winds.	1.4	13.5	7	E/SE	70
27-Feb-17	Mon	Moderate to fresh north to northeasterly winds.	0	16.8	28.2	E/SE	57.5
28-Feb-17	Tue	Cloudy to overcast with a few rain patches.	0	17	13.8	E/SE	54.5
1-Mar-17	Wed	Fine. Dry in the afternoon. Light to moderate easterly winds.	0	19.6	7.5	SE	66
2-Mar-17	Thu	Fine. Dry in the afternoon. Light winds.	0	19.7	10.8	N/NE	32.5

Date		Weather	Total Rainfall (mm)	Kwun Tong Station	Kai Tak Station		King's Park Station
				Mean Air Temp. (°C)	Wind Speed (km/h)	Wind Direction	Mean Relative Humidity (%)
26-Mar-17	Sun	Light to moderate easterly winds.	1	14.6	7.5	E/NE	63.7
27-Mar-17	Mon	Warm in the afternoon.	0	18.3	17	E/SE	45
28-Mar-17	Tue	Mainly fine. Visibility relatively low in some areas.	0	20.3	16	E	62.5
29-Mar-17	Wed	Cloudy with rain patches.	0.3	21.7	14.2	E	80.5
30-Mar-17	Thu	Cloudy with rain patches.	Trace	21.7	16.5	E/SE	84.2
31-Mar-17	Fri	Warm in the afternoon.	21.9	19.6	8.5	SE	90.5
1-Apr-17	Sat	Mainly cloudy.	0.2	19.4	22.0	NE	70.0
2-Apr-17	Sun	Sunny intervals and isolated showers	0	19.4	17.7	E	48.7
3-Apr-17	Mon	Mainly cloudy.	0	19.7	13.4	E	64
4-Apr-17	Tue	Mainly cloudy. Moderate south to southwesterly winds	0	21.2	15	E/NE	73
5-Apr-17	Wed	Light to moderate southwesterly winds.	0	22.8	10.5	E/NE	76.2
6-Apr-17	Thu	Sunny intervals and isolated showers	0.3	23.2	12	SE	84
7-Apr-17	Fri	Mainly cloudy.	0	25.5	10	SE	78.7
8-Apr-17	Sat	Mainly cloudy. Moderate south to southwesterly winds	0	25	22	NE	85.0

Appendix H

Event Action Plan (Air Quality and Construction Noise)

Event Action Plan for Air Quality

Event	Action			
	ET	IEC	ER	Contractor
Action Level exceedance for one sample	<ol style="list-style-type: none"> 1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Inform IEC, ER and Contractor; 3. Repeat measurement to confirm finding; and 4. Increase monitoring frequency to daily. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET; 2. Check Contractor's working method; and 3. Review and advise the ET and ER on the effectiveness of the proposed remedial measures. 	<ol style="list-style-type: none"> 1. Notify Contractor. 	<ol style="list-style-type: none"> 1. Identify source, investigate the causes of exceedance and propose remedial measures 2. Rectify any unacceptable practice and implement remedial measures; and 3. Amend working methods agreed with ER if appropriate.
Action Level exceedance for two or more consecutive samples	<ol style="list-style-type: none"> 1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Inform IEC, ER and Contractor; 3. Advise the ER and Contractor on the effectiveness of the proposed remedial measures; 4. Repeat measurements to confirm findings; 5. Increase monitoring frequency to daily; 6. Discuss with IEC, ER and Contractor on remedial actions required; 7. If exceedance continues, arrange meeting with IEC and ER; and 8. If exceedance stops, cease additional monitoring. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and Contractor on possible remedial measures; 4. Advise the ET and ER on the effectiveness of the proposed remedial measures; and 5. Supervise Implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; and 3. Supervise and ensure remedial measures properly implemented. 	<ol style="list-style-type: none"> 1. Identify source, investigate the causes of exceedance and propose remedial measures 2. Submit proposals for remedial actions to ER with a copy to ET and IEC within 3 working days of notification; 3. Implement the agreed proposals; and 4. Amend proposal if appropriate.
Limit Level exceedance for one sample	<ol style="list-style-type: none"> 1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Inform ER, Contractor, IEC and EPD; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency to daily; 5. Assess effectiveness of 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET, ER and Contractor on possible remedial measures; 4. Advise the ER and ET on the effectiveness of the proposed remedial measures; 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; and 3. Supervise and ensure remedial measures properly implemented. 	<ol style="list-style-type: none"> 1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Take immediate action to avoid further exceedance; 3. Submit proposals for remedial actions to ER with a copy to ET and IEC within 3 working days of notification; 4. Implement the agreed proposals;

	Contractor's remedial actions and keep IEC, EPD and ER informed of the results.	5. Supervise implementation of remedial measures.		and 5. Amend proposal if appropriate.
Limit Level exceedance for two or more consecutive samples	<ol style="list-style-type: none"> 1. Notify IEC, ER, Contractor and EPD; 2. Identify source; 3. Repeat measurement to confirm findings; 4. Increase monitoring frequency to daily; 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 6. Arrange meeting with IEC, Contractor and ER to discuss the remedial actions to be taken; 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results; 8. If exceedance stops, cease additional monitoring. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 4. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly; and 5. Supervise the implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. In consultation with the ET and IEC, agree with the Contractor on the remedial measures to be implemented; 4. Supervise and ensure remedial measures properly implemented; and 5. 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. 	<ol style="list-style-type: none"> 1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Take immediate action to avoid further exceedance; 3. Submit proposals for remedial actions to ER with a copy to ET and IEC within 3 working days of notification; 4. Implement the agreed proposals; 5. Resubmit proposals if problem still not under control; 6. Stop the relevant portion of works as determined by the ER until the exceedance is abated.

Note:

ET – Environmental Team

IEC – Independent Environmental Checker

ER – Engineer's Representative

Event Action Plan for Construction Noise

Event	Action			
	ET	IEC	ER	Contractor
Action Exceedance Level	<ol style="list-style-type: none"> 1. Notify IEC, ER and Contractor; 2. Carry out investigation; 3. Report the results of investigation to the IEC, ER and Contractor; 4. Discuss with the Contractor and formulate remedial measures; 5. Increase monitoring frequency to check mitigation effectiveness. 	<ol style="list-style-type: none"> 1. Review the analysed results submitted by the ET; 2. Review the proposed remedial measures by the Contractor and advise the ER accordingly; 3. Supervise the implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analysed noise problem; 4. Ensure remedial measures are properly implemented 	<ol style="list-style-type: none"> 1. Submit noise mitigation proposals to IEC and ER; 2. Implement noise mitigation proposals.
Limit Exceedance Level	<ol style="list-style-type: none"> 1. Identify source; 2. Inform IEC, ER, EPD and Contractor; 3. Repeat measurements to confirm findings; 4. Increase monitoring frequency; 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 6. Inform IEC, ER and EPD the causes and actions taken for the exceedances; 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results; 8. If exceedance stops, cease additional monitoring. 	<ol style="list-style-type: none"> 1. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly; 3. Supervise the implementation of remedial 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analysed noise problem; 4. Ensure remedial measures properly implemented; 5. 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. 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Resubmit proposals if problem still not under control; 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated.

Note:

ET – Environmental Team

IEC – Independent Environmental Checker

ER – Engineer's Representative