



**AUES PROJECT NO. TCS/00704/14**

**CONTRACT NO. MTRC6593-13C –  
WAN CHAI STATION LEE TUNG STREET SUBWAY**

**35<sup>TH</sup> ENVIRONMENTAL MONITORING AND AUDIT  
(EM&A) MONTHLY REPORT – JULY 2017**

**PREPARED FOR  
BUILD KING CONSTRUCTION LIMITED**

**Quality Index**

<b>Date</b>	<b>Reference No.</b>	<b>Prepared By</b>	<b>Approved By</b>
10 August 2017	TCS00704/14/600/R0166v2		
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<b>Version</b>	<b>Date</b>	<b>Description</b>
1	8 August 2017	First Submission
2	10 August 2017	Amended against IEC's comments

Your Ref:  
Our Ref: 60453136.40032976/2017000320E

**By Email and Post**

MTR Corporation Limited  
Fo Tan Railway House  
No. 9, Lok King Street, Fo Tan  
Shatin, N.T.,  
Hong Kong

Attn.: Mr. Kenneth Chow / Environmental Engineer II

11 August 2017

Dear Sirs

**Consultancy Agreement A130-13  
Independent Environmental Checker for CRS and LTS  
LTS - Verification for 35<sup>th</sup> Monthly Environmental Monitoring and Audit (EM&A) Report  
(July 2017) (Report No.: TCS00704/14/600/R0166v2)**

We refer to the 35<sup>th</sup> Monthly EM&A Report (July 2017) received under cover of the email from the Environmental Team, AUES, dated on 8 August 2017.

Further to our comments provided on 8 August 2017 and subsequent revision of the Report by AUES on 10 August 2017, we have no further comment and have verified the captioned report (Report No.: TCS00704/14/600/R0166v2).

Should you have any queries, please feel free to contact the undersigned at 3922 9366.

Yours faithfully  
**AECOM Consulting Services Ltd**



Y. W. Fung  
Independent Environmental Checker

LLMC/wwsc

cc Kaden Consturction Limited (Attn.: Mr. Ronald Fung) via email  
AUES (Attn.: Ms. Nicola Hon) via email

## EXECUTIVE SUMMARY

ES01 This is the 35<sup>th</sup> monthly EM&A Report presenting the monitoring results and inspection findings for the period from **1 to 31 July 2017** (hereinafter ‘the Reporting Period’).

### SUMMARY OF ENVIRONMENTAL MONITORING AND AUDIT ACTIVITIES

ES02 The monitoring and audit activities during the Reporting Period are summarized in below:-

Environmental Aspect	Environmental Monitoring Parameters / Inspection	Reporting Period	
		Number of Monitoring Location	Total Occasions
Air Quality	24-hour TSP	1	5
Construction Noise	L <sub>eq(30min)</sub> Daytime	2	8
Site Inspection Audit	Weekly inspection with ET, the Contractor and RE	--	4
	Monthly joint inspection with ET, the Contractor, RE and IEC	--	1

### BREACH OF ACTION AND LIMIT (A/L) LEVELS

ES03 In the Reporting Period, no air quality and noise monitoring exceedances were registered. The statistics of environmental exceedance, NOE issued and investigation of exceedance are summarized in the following table.

Environmental Aspect	Monitoring Parameters	Action Level	Limit Level	Event & Action		
				NOE Issued	Investigation	Corrective Actions
Air Quality	24-hour TSP	0	0	0	0	0
Construction Noise	L <sub>eq(30min)</sub> Daytime	0	0	0	0	0

### ENVIRONMENTAL COMPLAINT

ES04 No complaint was received in the Reporting Period.

### NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

ES05 No environmental summons or successful prosecutions were recorded in the Reporting Period.

### REPORTING CHANGE

ES06 No reporting changes were made in the Reporting Period.

### SITE INSPECTION

ES07 In the Reporting Period, weekly site inspection by the MTRC, ET and Contractor was carried out on **7, 14, 21 and 28 July 2017** and the IEC was joined the site inspection on **28 July 2017**. No non-compliance but four (4) observations and six (6) reminders were recorded during the site inspection.

ES08 It is reported that the transplanted tree TR-02 for this project was collapsed due to typhoon signal No. 8 HAIMA on 22 October 2016 and the tree has been subsequently removed. Further follow-up action will be made after an agreement is reached with Leisure and Cultural Services Department (LCSD).

### FUTURE KEY ISSUES

ES09 Construction noise is the key environmental issue during construction work of the Project as there are residential buildings nearby. Noise mitigation measures should be fully implemented in accordance with the EM&A requirement.

- ES010 Special attention should be paid on the potential construction dust impact as the construction site is located near the residential area. The Contractor should fully implement the construction dust mitigation measures properly.
- ES011 The Contractor should prevent muddy water and other water pollutants via site surface water runoff get into public areas and implement water quality mitigation measures properly. Any discharge water should be strictly complied with wastewater discharge license requirement.
- ES012 The Contractor should pay attention and implement sufficient protection to the transplanted tree for this project to avoid any damage done to the transplanted tree and prevent tree collapse in the future.

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## **1 INTRODUCTION**

### **PROJECT BACKGROUND**

- 1.01 **BUILD KING CONSTRUCTION LIMITED** (hereinafter ‘BKCL’) has been awarded by the MTR Corporation Limited (MTRCL) the Contract No. *MTRC6593-13C – Wan Chai Station Lee Tung Street Subway* (hereinafter “the Project”), which is a Designated Project to be implemented under Environmental Permit EP-444/2012 (hereinafter referred as “the EP-444/2012” or “the EP”).
- 1.02 The Project includes redevelopment of the Lee Tung Street area to improve pedestrian networking by enhancing the accessibility, connectivity and circulation of human traffic north-south from Queen’s Road East area to Wan Chai MTR Station, and providing a safe and attractive means for pedestrian crossing of Johnston Road. The Project site layout plan is shown in *Appendix A* and works under the Project comprise of:
- (i) Construction of a pedestrian subway link between Urban Renewal Authority’s Redevelopment at Site H15 (the Development) and Wan Chai Station (WAC);
  - (ii) Construction of two ventilation shafts; and
  - (iii) Modification works of some of the station concourse.
- 1.03 The Project is expected to be undertaken for 36 months. In order to effectively implement the environmental protection measures as stipulated in the Particular Specification (PS), an Environmental Monitoring and Audit Plan (EMAP) which enclosed in the Project Profile (PP) was prepared to guide the setup of the environmental monitoring and audit (EM&A) programme of the Project.
- 1.04 Action-United Environmental Services and Consulting (AUES) has been commissioned by the KCL as the independent environmental team (ET) to implement the relevant EM&A programme for the Project.
- 1.05 The baseline monitoring program was carried out between 3 June 2014 and 19 June 2014 at the proposed monitoring locations by the ET according to the approved EMAP. The “Baseline Monitoring Report (R0010 Version 4)” has been verified by IEC submitted to the EPD on *15 July 2014* before commencement of major construction works. The construction of the Project was commenced on 28 August 2014 as notified by KCL. Accordingly, relevant EM&A programme was started on 28 August 2014.
- 1.06 This is **35<sup>th</sup>** monthly EM&A report presenting the monitoring results and inspection findings in the Reporting Period from **1 to 31 July 2017**.

### **REPORT STRUCTURE**

- 1.07 This Report is structured into the following sections:-
- Section 1 Introduction*
  - Section 2 Project Organization*
  - Section 3 Environmental Impact Monitoring Requirement*
  - Section 4 Monitoring Results*
  - Section 5 Waste Management*
  - Section 6 Site Inspections*
  - Section 7 Environmental Complaint and Non-Compliance*
  - Section 8 Implementation Status of Mitigation Measures*
  - Section 9 Conclusions and Recommendations*

## 2 PROJECT ORGANIZATION AND SUBMISSION

### PROJECT ORGANIZATION

2.01 The project organization is shown in *Appendix B*. The responsibilities of respective parties are:

#### *MTR Corporation Limited (MTRCL)*

2.02 MTRCL is the Project Proponent and the Permit Holder of the EP of the development of the Project and will assume overall responsibility for the project. Also, an Independent Environmental Checker (IEC) should be employed by MTRCL to audit the results of the EM&A work conducted by Environmental Team.

#### *Environmental Protection Department (EPD)*

2.03 EPD is the statutory enforcement body for environmental protection matters in Hong Kong.

#### *Resident Engineer (RE)*

2.04 The RE is responsible for overseeing the construction works and for ensuring that the works are undertaken by the Contractor in accordance with the specification and contract requirements. The duties and responsibilities of the ER with respect to EM&A are:

- Monitor the Contractor's compliance with Contract Specifications, including the effective implementation and operation of the environmental mitigation measures;
- Inform the Contractor when action is required to reduce impacts in accordance with the Event and Action Plans;
- Participate in site inspections undertaken by the ET; and
- Co-operate with the ET in providing all the necessary information and assistance for completion of the complaint investigation works.

#### *Independent Environmental Checker (IEC)*

2.05 The IEC should advise the ET and RE on environmental issues related to the project. The IEC should audit from an independent viewpoint on the environmental performance during the construction of the project. The IEC should be a person who has relevant professional qualifications in environmental control and at least 7 years' experience in EM&A and environmental management. The duties and responsibilities of the IEC are:

- Review and audit in an independent, objective and professional manner in all aspects of the EM&A programme;
- Validate and confirm the accuracy of monitoring results, appropriateness of monitoring equipment, monitoring locations with reference to the locations of the nearby sensitive receivers, and monitoring procedures;
- Carry out random sample check and audit on monitoring data and sampling procedures, etc;
- Conduct random site inspection;
- Review the effectiveness of environmental mitigation measures and project environmental performance;
- On an as-need basis, verify and certify the environmental acceptability of the construction methodology (both temporary and permanent works), relevant design plans and submissions under the environmental permit. Where necessary, the IEC should agree in consultation with the ET and the Contractor least impact alternative;
- Check complaint cases and the effectiveness of corrective measures;
- Verify EM&A report certified by the ET Leader; and
- Feedback audit results to RE/ET according to the Event/Action Plan.

#### *Environmental Team (ET)*

2.06 The ET should conduct the EM&A programme and ensure the Contractor's compliance with the project's environmental performance requirements during construction. The ET should plan, organize and manage the implementation of the EM&A programme and ensure that the EM&A works are undertaken to the required standard.

2.07 The ET should be led and managed by the ET Leader. The ET Leader should have relevant



professional qualifications in environmental control and possess at least 7 years' experience in EM&A. The ET Leader should be responsible for the implementation of the EM&A programmes in accordance with the EM&A requirements. The duties and responsibilities of the ET include:

- Sampling, analysis and statistical evaluation of monitoring parameters;
- Environmental site surveillance;
- Inspection and audit of compliance with environmental protection, and pollution prevention and control regulations;
- Assess the effectiveness of the environmental mitigation measures implemented;
- Monitor compliance with the environmental protection clauses/specifications in the Contract;
- Review construction programme and comment as necessary;
- Review work methodologies which may affect the extent of environmental impact during the construction phase and comment as necessary;
- Complaint investigation, evaluation and identification of corrective measures;
- Liaison with the IEC on all environmental performance matters, and timely submission of all relevant EM&A proforma for IEC's approval; and
- Advice to Contractor on environmental improvement, awareness and enhancement matters etc.

**The Contractor**

- 2.08 The Contractor should report to the RE. The duties and responsibilities of the Contractor are:
- Comply with the relevant contract conditions and specifications on environmental protection
  - Participate in the site inspections undertaken by the ET;
  - Provide assistance to ET to carry out monitoring;
  - Provide requested information to the ET in the event of any exceedance in the environmental criteria (Action/Limit levels);
  - Submit proposals on mitigation measures in case of exceedances of Action and Limit levels in accordance with the Event / Action Plans; and
  - Cooperate with the ET in providing all the necessary information and assistance for completion of the complaint investigation works. If mitigation measures are required following the investigation, the Contractor should promptly carry out these measures.

**SUMMARY OF ENVIRONMENTAL SUBMISSIONS**

- 2.09 In accordance with the EP stipulation, the required documents and submission status to EPD are listed in Table 2-1.

**Table 2-1 Submission/Set-up Status of the EP Requirements**

EP Condition	Submission	Status
2.3	Management Organization of Main Construction Companies	Submitted
2.7	Landscape Plan	Submitted
3.3	Baseline Monitoring Report (TCS00704/14/600/R0010v4)	Submitted
4.2	Internet website	live

- 2.10 Summary of environmental permits, licenses, and relevant notifications on environmental protection for the Project are presented in **Table 2-2**.

**Table 2-2 Status of Environmental Licenses and Permits of the Project**

Item	Description	License/Permit Status
1	Air Pollution Control (Construction Dust) Regulation	Notified EPD.
2	Chemical Waste Producer Registration - Waste Producers Number	WPN:5213-131-K3099-01 Approved on 14/05/2014
3	Water Pollution Control Ordinance - Discharge License	License no.: WT00022835-2015 Approved on 6/11/2015 Valid to: 31/07/2018
4	Waste Disposal Regulation - Billing Account for Disposal of Construction Waste	Account no.: 7019837 Approved on 30/04/2014

Item	Description	License/Permit Status
5	Construction Noise Permit under Noise Control Ordinance	GW-RS0197-17 obtained on 9 March 2017 Valid from 9 March 2017 to 8 September 2017  GW-RS0190-17 obtained on 9 March 2017 Valid from 14 March 2017 to 13 September 2017  GW-RS0512-17 obtained on 9 June 2017 Valid from 13 June 2017 to 10 December 2017

### CONSTRUCTION PROGRESS

2.11 The construction activities conducted in the Reporting Period are listed in below. Moreover, the master construction program is shown in *Appendix B*.

- BS and ABWF Work in Subway

### 3 ENVIRONMENTAL IMPACT MONITORING REQUIREMENT

3.01 The ET will implement the EM&A programme in accordance with the requirements in EMAP. Details of the EM&A programme are presented in the following sub-sections.

#### MONITORING PARAMETERS

3.02 The EM&A impact monitoring program covers the following environmental aspects:

- Air quality; and
- Construction noise

3.03 A summary of the monitoring parameters is presented in *Table 3-1*:

**Table 3-1 Summary of the monitoring parameters of EM&A Requirements**

Environmental Issue	Parameters
Air Quality	<ul style="list-style-type: none"> <li>• 24-hour Total Suspended Particulate (hereinafter ‘24-hour TSP’)</li> <li>• 1-hour TSP monitoring (*)</li> </ul>
Construction Noise	<ul style="list-style-type: none"> <li>• A-weighted equivalent continuous sound pressure level (30min) (hereinafter ‘L<sub>eq(30min)</sub>’ during the normal working hours)</li> </ul>

**Remarks:**

(\*) *In case 24-hour TSP exceed the air quality criteria to be carried out*

#### MONITORING LOCATIONS

3.04 According to Sections 2.3 and 3.4 of the EMAP which enclosed in the Project Profile (Register No. PP-472/2012), construction noise and air quality monitoring locations are required to be set up at Hennessy Building and Chiu Hin Mansion. In early May 2014, site visit was conducted to select suitable locations to carry out relevant noise and air monitoring for the EM&A Programme. It was noted that both Hennessy Building and Chiu Hin Mansion are residential buildings and only the 1/F to 2/F of the buildings could be accessed which are commercial premises. It is not possible to set up the monitoring station at upper floors inside the residential apartment which will cause nuisance to the residents. Finally, two locations at lower floor were selected which access were successfully granted by the premises occupiers.

3.05 However, dust monitoring station A1 and noise monitoring station N2 at Chiu Hin Mansion were removed on 8 March 2017 as per the apartment owner’s request and are no longer available as dust and noise monitoring station, alternative locations A1a and N2a were proposed to EPD. Dust and noise monitoring originally at A1 and N2 were carried out at the proposed alternative locations A1a and N2a starting from 14 March 2017. The monitoring stations proposed for the Project are summarized in *Table 3-2* and illustrated in *Appendix C*.

**Table 3-2 Air and Noise Monitoring Locations**

Aspect	Monitoring Location	Location ID	Address	Description
Air Quality	Site area	A1a	Southern Playground works area	Within the Project site
Construction Noise	Hennessey Building	N1	2/F floor of Hennessey Building	NSR facing to the Project site
	Chiu Hin Mansion	N2a	Rooftop of Chiu Hin Mansion	NSR facing to the Project site

#### MONITORING FREQUENCY AND PERIOD

3.06 The requirements of impact monitoring as stipulated in the EMAP are presented in following.

##### Air Quality

3.07 Frequency of impact air quality monitoring:

- 24-hour TSP Once every 6 days during course of works.

3.08 In case of non-compliance with the air quality criteria, a more frequent monitoring exercise adopting 1-hour TSP monitoring undertaken when the highest dust impact occurs, as specified in the Event and Action Plan, should be conducted within 24 hours after the result is obtained. This additional monitoring should be continued until excessive dust emission or the deterioration in air quality is rectified.

**Construction Noise**

3.09 One set of  $L_{eq(30min)}$  as 6 consecutive  $L_{eq(5min)}$  between 0700-1900 hours on normal weekdays and once every week during course of works. If construction work necessary to carry out at other time periods, i.e. restricted time period (19:00 to 07:00 the next morning and whole day on public holidays) (hereinafter referred as “the restricted hours”), 3 consecutive  $L_{eq(5min)}$  measurement will be depended on CNP requirements to undertake. Supplementary information for data auditing, statistical results such as  $L_{10}$  and  $L_{90}$  shall also be obtained for reference.

**MONITORING EQUIPMENT**

**Air Quality Monitoring**

3.10 The 24-hour TSP 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 (USEPA)*. A direct reading dust meter is used to measure 1-hour TSP air quality, in case of non-compliance of air quality criteria occurred in 24-hour TSP measurement.

3.11 The filter paper sample collected in 24-hour TSP measurement shall be determined by HOKLAS accredited laboratory. All equipments to be used for air quality monitoring are listed in **Table 3-3**.

**Table 3-3 Air Quality Monitoring Equipment**

Equipment	Model
<b>24-hour TSP</b>	
High Volume Air Sampler	TISCH High Volume Air Sampler, HVS Model TE-5170
Calibration Kit	TISCH Model TE-5025A
<b>1- hour TSP</b>	
Portable Dust Meter	TSI Model 8520 DustTrak Aerosol Monitor / Aerocet 531 Handheld Particle Mass Profiler & Counter / Sibata LD-3A Laser Dust Monitor

3.12 According to the EMAP, wind data monitoring equipment shall be provided and set up for logging wind speed and wind direction near the dust monitoring locations. The equipment installation location shall be proposed by the ET and agreed with the IEC. For installation and operation of wind data monitoring equipment, the following points shall be observed:

- 1) The wind sensors should be installed 10 m above ground so that they are clear of obstructions or turbulence caused by buildings.
- 2) The wind data should be captured by a data logger. The data shall be downloaded for analysis at least once a month.
- 3) The wind data monitoring equipment should be re-calibrated at least once every six months.
- 4) Wind direction should be divided into 16 sectors of 22.5 degrees each.

3.13 Although ET was successful granted HVS installation premises, the owners rejected to install wind data monitoring equipment.

3.14 In this situation, the ET proposed to adopt the meteorological information from King’s Park Weather Station from the Hong Kong Observatory as the representative wind data. King’s Park Station provided all useful from information such as humidity, rainfall, and air pressure and temperature etc.

3.15 Although there are other closer weather stations, King’s Park Station was selected as it is the nearest weather station that measures all the relevant parameters mentioned above. Moreover, the ET has compared the data among the stations, and concluded that there is minimal difference

between meteorological data collected at the King’s Park station and other stations.

**Construction Noise Monitoring**

- 3.16 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<sup>-1</sup>. Furthermore, an acoustic calibrator and sound level meter shall be calibrated yearly.
- 3.17 Noise monitoring equipment to be used for monitoring is listed in *Table 3-4*.

**Table 3-4 Construction Noise Monitoring Equipment**

Equipment	Model
Integrating Sound Level Meter	B&K Type 2238 / Rion NL-31
Calibrator	B&K Type 4231/ Rion NC-74/ Cesva CB-5
Portable Wind Speed Indicator	Testo Anemometer

**MONITORING METHODOLOGY**

**24-hour TSP**

- 3.18 The equipment used for 24-hour TSP measurement is a Tisch Environmental, Inc. Model TE-5170 TSP high volume air sampling system, which complied with USEPA Code of Federal Regulation, Appendix B to Part 50. The High Volume Air Sampler (HVS) consists of the following:
  - a. An anodized aluminum shelter;
  - b. A 8”x10” stainless steel filter holder;
  - c. A blower motor assembly;
  - d. A continuous flow/pressure recorder;
  - e. A motor speed-voltage control/elapsed time indicator;
  - f. A 7-day mechanical timer, and
  - g. A power supply of 220v/50 hz
- 3.19 The HVS is calibrated in accordance with the manufacturer’s instruction using the NIST-certified standard calibrator (Tisch Calibration Kit Model TE-5025A). The 24-hour TSP monitoring using the HVS is also processed in accordance with the manufacturer’s Operations Manual. The valid calibration certificate of the calibration kit with the certificate of HVS calibrated is shown in *Appendix D*.
- 3.20 24-hour TSP is collected on filters of the HVS and quantified by a local HOKLAS accredited laboratory, ALS Technichem (HK) Pty Ltd (ALS), upon receipt of the samples. The ET will keep all the sampled 24-hour TSP filters in normal air conditioned room conditions, i.e. 70% HR (Relative Humidity) and 25°C, for six months prior to disposal. HOKLAS-accreditation certificate of ALS Technichem (HK) Pty Ltd (ALS) is provided in *Appendix E*.

**Noise**

- 3.21 Sound level meter complied with the International Electrotechnical Commission Publications 651: 1979 (Type 1) and 804: 1985 (Type 1) specifications, as recommended in Technical Memorandum (TM) issued under the Noise Control Ordinance (NCO). The valid of calibration certificates including sound level meter and an acoustic were shown in *Appendix D*.
- 3.22 The noise measurement is performed with the meter set to FAST response and on the A-weighted equivalent continuous sound pressure level (L<sub>eq</sub>). L<sub>eq(30min)</sub> in six consecutive L<sub>eq(5min)</sub> measurements were used as the monitoring parameter.
- 3.23 During monitoring, the sound level meter mounted at the monitoring locations and oriented such that the microphone pointed to the site with the microphone facing perpendicular to the line of sight. The windshield was fitted for the measurement. For the monitoring, N1 and N2a are conducted 1 m from the exterior of the building façade.

- 3.24 Prior construction noise measurement, the accuracy of the sound level meter checked using an acoustic calibrator generating a known sound pressure level at a known frequency. The calibration level from before and after the noise measurement agrees to within 1.0dB.

**DERIVATION OF ACTION/LIMIT (A/L) LEVELS**

- 3.25 The baseline results form the basis for determining the environmental acceptance criteria for the impact monitoring. According to EMAP, the air quality and construction noise criteria were set up, namely Action and Limit levels are listed in *Tables 3-5* and *3-6*.

**Table 3-5 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
A1	290	162	500	260

**Table 3-6 Action and Limit Levels for Construction Noise**

Monitoring Station	0700-1900 hours on normal weekdays	
	Action Level	Limit Level
N1 and N2	When one documented complaint is received	75 dB(A)

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

- 3.26 Should non-compliance of the environmental quality criteria occurs, remedial actions will be triggered according to the Event and Action Plan which presented in *Appendix F*.

**DATA MANAGEMENT AND DATA QA/QC CONTROL**

- 3.27 The all monitoring data were handled by the ET's in-house data recording and management system.
- 3.28 The monitoring data recorded in the equipment were downloaded directly from the equipment at the end of each monitoring day. 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.
- 3.29 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 MONITORING RESULTS

4.01 The impact air quality and construction noise monitoring schedule is presented in *Appendix G* and the monitoring results are summarized in the following sub-sections.

##### 24-HOUR TSP AIR QUALITY MONITORING RESULTS

4.02 In the Reporting Period, 5 occasions of 24-hours TSP monitoring were carried out at the newly proposed location A1a. The monitoring results are summarized in *Table 4-1*. The detailed 24-hour TSP monitoring data are presented in *Appendix H* and the relevant graphical plots are shown in *Appendix I*.

**Table 4-1 Summary of 24-hour TSP Monitoring Results – A1a**

Date	24-hour TSP ( $\mu\text{g}/\text{m}^3$ )	Action Level	Limit Level
3-Jul-17	23	162	260
8-Jul-17	32		
14-Jul-17	25		
20-Jul-17	24		
26-Jul-17	45		
Average (Range)	<b>30 (23 – 45)</b>		

4.03 As shown in *Table 4-1*, 24-hour TSP monitoring results are fluctuated below Action/ Limit Levels.

##### NOISE MONITORING RESULTS

In the Reporting Period, 8 occasions noise measurement were conducted at N1, and N2a. The sound level meter was set in 1m from the exterior of the building façade at N1 and N2a. Therefore, no façade correction (+3dB(A)) is added according to acoustical principles and EPD guidelines. However, a correction of +5.1 dB(A) has been added to the noise monitoring result which carried out at the newly proposed location N2a as an adjustment to take into account the difference of slant distance between the construction site and newly proposed rooftop location and that between the construction site and the nearest NSR at N2.

4.04 The noise measurement results at N1 and N2a are listed in *Tables 4-2* and *4-3*. The relevant graphical plots are shown in *Appendix I*.

**Table 4-2 Noise Monitoring Results of N1 (2/F floor of Hennessey Building), dB(A)**

Date	Start Time	1st Leq5	2nd Leq5	3rd Leq5	4th Leq5	5th Leq5	6th Leq5	$L_{\text{eq}30\text{min}}$
7-Jul-17	9:33	70.0	69.6	69.3	69.5	67.1	69.3	69
14-Jul-17	8:57	70.9	71.1	69.5	69.7	70.0	71.0	70
21-Jul-17	9:53	69.7	71.7	69.4	70.1	71.2	69.9	70
28-Jul-17	10:01	69.9	69.8	69.8	67.9	68.2	69.8	69
<b>Limit Level of Construction Noise</b>		<b>75 dB(A)</b>						

**Table 4-3 Noise Monitoring Results N2a (rooftop of Chiu Hin Mansion), dB(A)**

Date	Start Time	1st Leq5	2nd Leq5	3rd Leq5	4th Leq5	5th Leq5	6th Leq5	L <sub>eq30min</sub>	*Corrected L <sub>eq30min</sub>
7-Jul-17	8:47	67.8	68.2	70.1	67.0	70.5	68.5	69	74
14-Jul-17	9:47	66.7	68.1	67.7	67.5	68.3	68.8	68	73
21-Jul-17	10:32	66.5	67.2	66.4	66.9	67.1	67.6	67	72
28-Jul-17	9:11	67.6	69.2	68.1	65.7	66.0	66.8	67	72
<b>Limit Level of Construction Noise</b>		<b>75dB(A)</b>							

\* A correction of +5.1 dB(A) has been added to the noise monitoring result which carried out at the newly proposed location N2a as an adjustment to take into account the difference of slant distance between the construction site and newly proposed rooftop location and that between the construction site and the nearest NSR at N2.

- 4.05 As shown in Tables 4-2 and 4-3, no noise measurement exceedance was recorded at both N1 and N2a. Furthermore, there is no noise complaint within 0700 -1900 hours on normal weekdays (Action Level exceedance) received by the MTRCL and Contractor or EPD in the Reporting Period. The meteorological data during the impact monitoring days are shown in *Appendix J*.



## 5 WASTE MANAGEMENT

### GENERAL WASTE MANAGEMENT

5.01 Waste management was carried out by an on-site Environmental Officer or an Environmental Supervisor from time to time.

### RECORDS OF WASTE QUANTITIES

5.02 All types of waste arising from the construction work are classified into the following:

- Construction & Demolition (C&D) Material;
- Chemical Waste;
- General Refuse; and
- Excavated Soil.

5.03 The quantities of waste for disposal in this Reporting Period are summarized in *Tables 5-1* and *5-2* and the Monthly Summary Waste Flow Table is shown in *Appendix K*.

**Table 5-1 Summary of Quantities of Inert C&D Materials**

Type of Waste	Quantity	Disposal Location
Total C&D Materials (Inert) (m <sup>3</sup> )	0	-
Reused in this Contract (Inert) (m <sup>3</sup> )	0	-
Reused in other Projects (Inert) (m <sup>3</sup> )	0	-
Disposal as Public Fill (Inert) (m <sup>3</sup> )	0	TKO 137

**Table 5-2 Summary of Quantities of Non-Inert C&D Wastes**

Type of Waste	Quantity	Disposal Location
Recycled Metal (m <sup>3</sup> )	0	-
Recycled Paper / Cardboard Packing (m <sup>3</sup> )	0	-
Recycled Plastic (m <sup>3</sup> )	0	-
Chemical Wastes (m <sup>3</sup> /L)	0	-
General Refuses (m <sup>3</sup> )	22.5	SENT Landfill

5.04 In the Reporting Period, effluent generated from the Project was discharged in accordance with the Wastewater Discharge License.

5.05 Moreover, it is reminded that C&D materials would be reused on-site as far as practicable.

**6 SITE INSPECTION**

6.01 According to the EMAP, the environmental site inspection shall be formulation by ET Leader. Weekly environmental site inspections should carry out to confirm the environmental performance.

**FINDINGS / DEFICIENCIES DURING THE REPORTING MONTH**

6.02 During the Reporting Period, **four (4)** occasions of weekly site inspections to evaluate site environmental performance was carried out by the RE, ET and the Contractor on **7, 14, 21 and 28 July 2017** and the IEC was joined the site inspection on **28 July 2017**.

6.03 No non-compliance was noted. However, four (4) observations and six (6) reminders were recorded by the ET. The findings / deficiencies observed during the weekly site inspections are listed in **Table 6-1**.

**Table 6-1 Site Observations**

Date	Findings / Deficiencies	Follow-Up Status
23 June 2017	<ul style="list-style-type: none"> <li>• Retained tree without proper tree protection zone was observed. The contractor was advised to provide proper zone for retained tree.</li> </ul>	<ul style="list-style-type: none"> <li>• Proper tree protection zone was provided for retained trees. Last observation closed.</li> </ul>
30 June 2017	<ul style="list-style-type: none"> <li>• Chemical containers were observed on the ground. The contractor was advised to place chemical containers inside drip tray to avoid leakage.</li> <li>• The contractor was advised to display EP and CNP at site entrance.</li> </ul>	<ul style="list-style-type: none"> <li>• Chemical containers were removed from site area. Last observation closed.</li> <li>• New EP and CNP were displayed at site entrance. Last observaiton closed.</li> </ul>
7 July 2017	<ul style="list-style-type: none"> <li>• Construction wastes were observed on the ground. The contractor was advised to store the wastes on designated area.</li> </ul>	<ul style="list-style-type: none"> <li>• Construction wastes on the ground were disposed. Last observation closed.</li> </ul>
14 July 2017	<ul style="list-style-type: none"> <li>• The contractor was reminded to provide labelling for tree protection zone.</li> </ul>	<ul style="list-style-type: none"> <li>• Not required for reminder.</li> </ul>
21 July 2017	<ul style="list-style-type: none"> <li>• Construction materials and waste placed near the tree protection zone was observed. The Contractor should maintain the tree protection zone in good condition and keep the construction material away from the tree protection zone.</li> <li>• Stagnant water was observed on site. The Contractor should remove the stagnant water to prevent mosquito breeding.</li> <li>• The Contractor was reminded to ensure all the wastewater generated on site is properly treat prior discharge.</li> <li>• The Contractor was reminded to cover the stockpile well with tarpaulin sheet when not in use to reduce dust generation.</li> <li>• The Contractor was reminded to shelter the grout mixer on top and three sides when carrying out cement batching and mixing works.</li> </ul>	<ul style="list-style-type: none"> <li>• Construction materials and waste was removed from tree protection zone.</li> <li>• No stagnant water was observed within site area. Last observation closed.</li> <li>• Not required for reminder.</li> <li>• Not required for reminder.</li> <li>• Not required for reminder.</li> </ul>

28 July 2017	<ul style="list-style-type: none"> <li>• The contractor was advised to provide proper station for grout mixer.</li> <li>• The contractor was reminded to spray water regularly.</li> <li>• The contractor was reminded to review the efficiency of the sedimentation tank in the subway.</li> </ul>	<ul style="list-style-type: none"> <li>• To be followed up.</li> <li>• Not required for reminder.</li> <li>• Not required for reminder.</li> </ul>
--------------	---	--

6.04 It is reported that the transplanted tree TR-02 for this project was collapsed due to typhoon signal No. 8 HAIMA on 22 October 2016 and the tree has been subsequently removed. Further follow-up action will be made after an agreement is reached with Leisure and Cultural Services Department (LCSD).

6.05 No site inspection was undertaken by external parties i.e. EPD in this Reporting Month.

**7 ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE**

**ENVIRONMENTAL COMPLAINT, SUMMONS AND PROSECUTION**

- 7.01 For the Project, no environmental complaint, summons and prosecution was received in the Reporting Period. The statistical summary table of environmental complaint is presented in *Tables 7-1, 7-2 and 7-3*.
- 7.02 The environmental complaint about noise nuisance arising from the construction site of Wan Chai Station Lee Tung Street Subway near Hennessy Road on 13 March 2017 was received by ET on 26 May 2017 and the investigation report had been submitted.

**Table 7-1 Statistical Summary of Environmental Complaints**

Reporting Period	Environmental Complaint Statistics					
	Frequency	Cumulative	Complaint Nature			
			Air	Noise	Water	Others
28 Aug 2014 – 30 June 2017	1	1	NA	1	NA	NA
1– 31 July 2017	0	0	NA	NA	NA	NA

**Table 7-2 Statistical Summary of Environmental Summons**

Reporting Period	Environmental Summons Statistics					
	Frequency	Cumulative	Air	Noise	Water	Others
28 Aug 2014 – 30 June 2017	0	0	NA	NA	NA	NA
1– 31 July 2017	0	0	NA	NA	NA	NA

**Table 7-3 Statistical Summary of Environmental Prosecution**

Reporting Period	Environmental Prosecution Statistics					
	Frequency	Cumulative	Air	Noise	Water	Others
28 Aug 2014 – 30 June 2017	0	0	NA	NA	NA	NA
1– 31 July 2017	0	0	NA	NA	NA	NA

## 8 IMPLEMENTATION STATUS OF MITIGATION MEASURES

### GENERAL REQUIREMENTS

- 8.01 The environmental mitigation measures that recommended in the Implementation Schedule for Environmental Mitigation Measures (ISEMM) in the EMAP covered the issues of dust, noise, water and waste and they are summarized presented in *Appendix L*.
- 8.02 The Works under the Project shall be implementing the required environmental mitigation measures according to the EMAP as subject to the site condition. Environmental mitigation measures generally to be implemented by the Contractor is listed in *Table 8-1*.

**Table 8-1 Environmental Mitigation Measures**

Issues	Environmental Mitigation Measures
Air Quality	<ul style="list-style-type: none"> <li>• Regular watering to reduce dust emissions from all exposed site surface, particularly during dry weather;</li> <li>• Frequent watering for particularly dusty construction areas and areas close to air sensitive receivers;</li> <li>• Cover all excavated or stockpile of dusty material by impervious sheeting or sprayed with water to maintain the entire surface wet;</li> <li>• Public areas around the site entrance/exit had been kept clean and free from dust; and</li> <li>• Tarpaulin covering of any dusty materials on a vehicle leaving the site.</li> </ul>
Noise	<ul style="list-style-type: none"> <li>• Good site practices to limit noise emissions at the sources;</li> <li>• Use of quiet plant and working methods;</li> <li>• Use of site hoarding or other mass materials as noise barrier to screen the working site;</li> <li>• Use of shrouds/temporary noise barriers to screen noise from relatively static PMEs; and</li> <li>• Limiting as use one construction plant within worksite, where practicable.</li> </ul>
Water Quality	<ul style="list-style-type: none"> <li>• Wastewater were appropriately treated by treatment facilities;</li> <li>• Drainage channels were provided to convey run-off into the treatment facilities; and</li> <li>• Drainage systems were regularly and adequately maintained.</li> </ul>
Waste and Chemical Management	<ul style="list-style-type: none"> <li>• Excavated material should be reused on site as far as possible to minimize off-site disposal. Scrap metals or abandoned equipment should be recycled if possible;</li> <li>• Waste arising should be kept to a minimum and be handled, transported and disposed of in a suitable manner;</li> <li>• The Contractor should adopt a trip ticket system for the disposal of C&amp;D materials to any designed public filling facility and/or landfill; and</li> <li>• Chemical waste should be handled in accordance with the Code of Practice on the Packaging, Handling and Storage of Chemical Wastes.</li> </ul>
Landscape and Visual	<ul style="list-style-type: none"> <li>• Clear demarcation of works area to prevent damages to existing trees in close proximity;</li> <li>• Protection of all trees planned to be retained onsite;</li> <li>• Preserving all affected trees by transplanting where practical. Tree transplanting application and tree removal application shall be submitted for approval in accordance with ETWB TCW 3/2006; and</li> <li>• Screening of construction works by hoardings/noise barriers around Works area in visually unobtrusive colors.</li> </ul>
General	<ul style="list-style-type: none"> <li>• The site was generally kept tidy and clean.</li> </ul>

**TENTATIVE CONSTRUCTION ACTIVITIES IN THE COMING MONTH**

8.03 Construction activities as undertaken in the coming month for the Project lists below:

- BS and ABWF Work in Subway

**KEY ISSUES FOR THE COMING MONTH**

8.04 Key issues to be considered in the coming month of the Project include:

- Implementation of dust suppression measures at all times;
- Potential wastewater quality impact due to surface runoff;
- Potential fugitive dust quality impact due from the dry/loose/exposure soil surface/dusty material;
- Disposal of empty engine oil containers within site area;
- Ensure dust suppression measures are implemented properly;
- Silt removal facilities should be regularly maintained;
- Management of chemical wastes;
- Discharge of site effluent and stockpiling or disposal of materials at this area are prohibited;
- Follow-up of improvement on general waste management issues; and
- Implementation of construction noise preventative control measures

8.05 In addition, mosquito control measures should be continued to prevent mosquito breeding on site.

## 9 CONCLUSIONS AND RECOMMENDATIONS

### CONCLUSION

- 9.01 This is the **35<sup>th</sup>** monthly EM&A report presenting the monitoring results and inspection findings in the Reporting Period from **1 to 31 July 2017**.
- 9.02 In the Reporting Period, **five (5)** occasions of 24-hours TSP monitoring were conducted at A1a. The monitoring results are all below the Action/ Limit Level. No Notifications of Exceedances (NOEs) or the associated corrective actions were therefore issued.
- 9.03 In the Reporting Period, total of **eight (8)** occasions of noise measurement were conducted at N1 and N2a, and no exceedance were recorded.
- 9.04 No environmental complaint, notification of summons or successful prosecution was received in the Reporting Period.
- 9.05 **Four (4)** occasions of weekly site inspections to evaluate site environmental performance was carried out by the RE, ET and the Contractor on **7, 14, 21 and 28 July 2017** and the IEC was joined the site inspection on **28 July 2017**. No non-compliance was noted but four (4) observations and six (6) reminders was recorded by the ET.
- 9.06 It is reported that the transplanted tree TR-02 for this project was collapsed due to typhoon signal No. 8 HAIMA on 22 October 2016 and the tree has been subsequently removed. Further follow-up action will be made after an agreement is reached with Leisure and Cultural Services Department (LCSD).
- 9.07 In the Reporting Period, no site inspection was undertaken by external parties i.e. EPD.

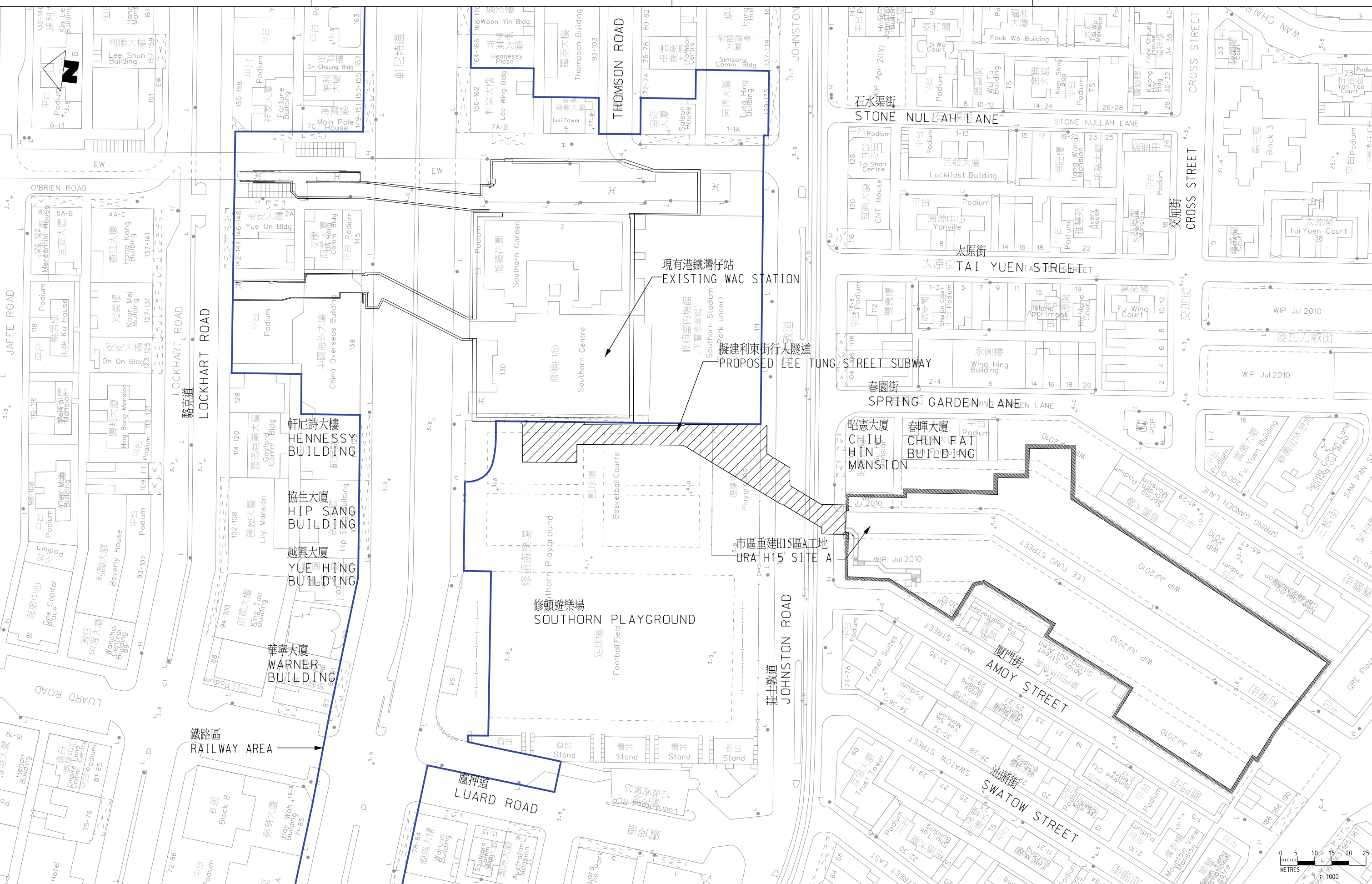
### RECOMMENDATIONS

- 9.08 Construction noise is the key environmental issue during construction work of the Project as there are residential buildings nearby. Noise mitigation measures should be fully implemented in accordance with the EM&A requirement.
- 9.09 Also, special attention should be paid on the potential construction dust impact as the construction site is located near the residential area. The Contractor should fully implement the construction dust mitigation measures properly.
- 9.10 The Contractor should also prevent muddy water and other water pollutants via site surface water runoff get into public areas. Any discharge water should be strictly complied with wastewater discharge license requirement. As a reminder, water quality mitigation measures should be properly implemented in accordance with the EM&A requirement.
- 9.11 As a reminder, the Contractor should be regular checking and maintenance wastewater treatment facilities ensure compliance with the currently Discharge License stipulation. A warning sign should be provided all the retained trees as remind the workers prevent scratch the trees. In addition, mosquito control should be kept to prevent mosquito breeding on site.

**Appendix A**  
**Project Site Layout Plan**



C:\ProgramData\Bentley\MicroStation\18\USELECT\series\WorkSpace\System\pctrig\MTR\_PDF\_BW\_COL\_300DP.dgn  
 PLOT DATE: 20/06/2012 16:50  
 MODEL NAME: NEX1050\_2.7A\_0010.dgn  
 FILE NAME: J:\282435\REPORT\ENV\202056\NEX1050\_2.7A\_0010.dgn



REV	DESCRIPTION	BY	DATE	APPROVED	REV	DESCRIPTION	BY	DATE	APPROVED
D	GENERAL REVISION		16MAY12	AFK	HD				
C	GENERAL REVISION		12AUG11	AFK	HD				
B	GENERAL REVISION		18JUL11	AFK	HD				
A	PROJECT PROFILE		04MAY11	AFK	HD				

DRAWN	HO
DESIGNED	BW
CHECKED	BL
APPROVED	AFK
DATE	04MAY2011

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ORIGINATOR: MTR

CADD REF.: NEX1050\_2.7A\_0010.dgn

TITLE: CONSULTANCY AGREEMENT NO. NEX/1050  
 DETAILED DESIGN FOR LEE TUNG STREET SUBWAY  
 SITE LOCATION PLAN  
 施工位置圖

SCALE: 1:1000 (A3)

DRAWING NO.: NEX1050/2.7A/001

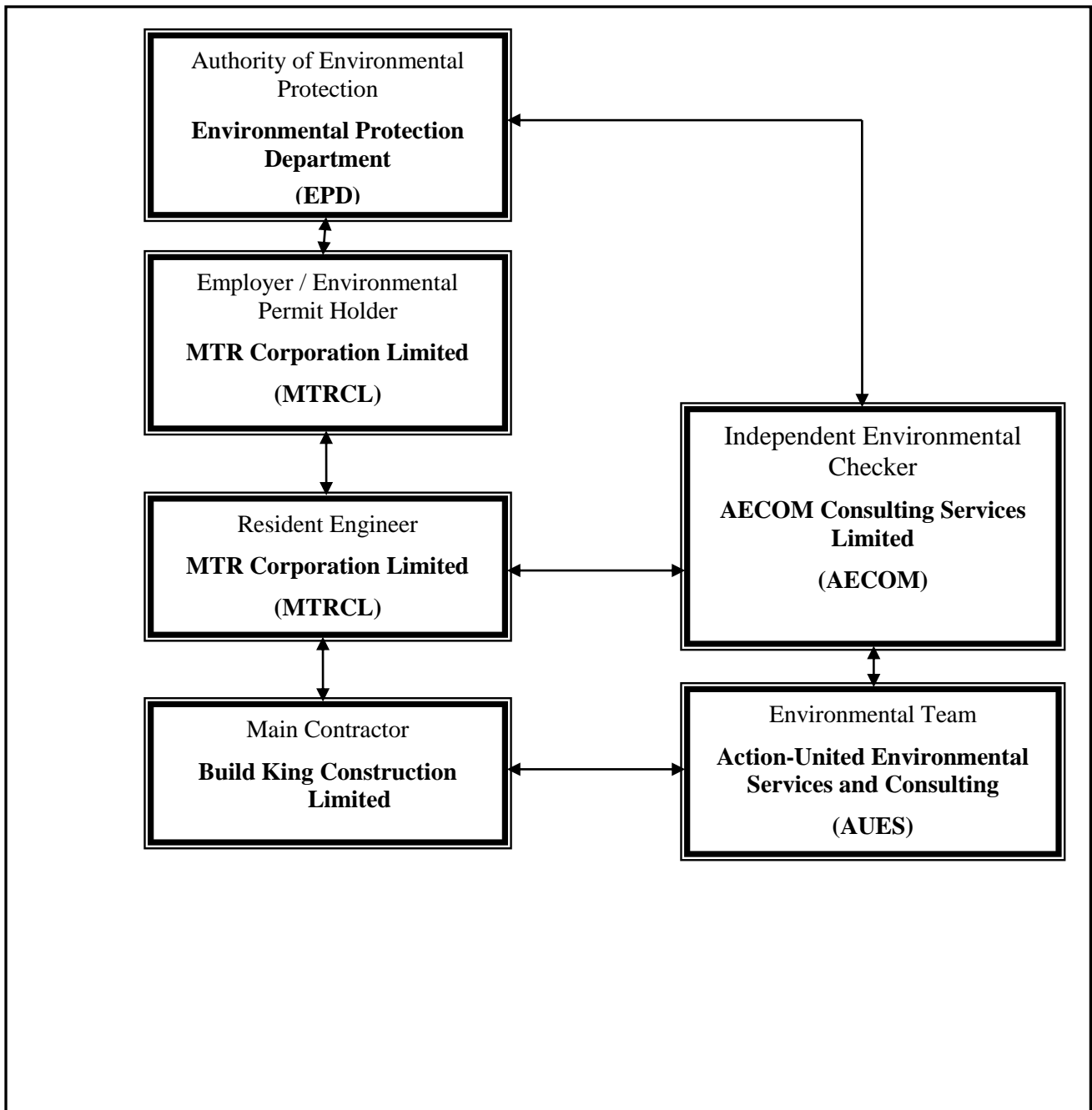
REV: D



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 100 How Ming Street  
 Kowloon  
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**Appendix B**

**Organization of the Project  
and  
Master Construction Programme**



**Contact Details of Key Personnel for the Project**

<b>Organization</b>	<b>Project Role</b>	<b>Name of Key Staff</b>	<b>Tel No.</b>	<b>Fax No.</b>
MTRCL	Senior Construction Engineer	Mr. Sky Yip	3163 8630	3163 8699
AECOM	Independent Environmental Checker	Mr. Y. W. Fung	3922 9366	3922 9797
KCL	Project Manager	Mr. Vincent, Kwan Chun Yin	9833 1313	2770 4278
KCL	Site Agent	Mr. Chan Kam Chuen	6462 8910	2770 4278
KCL	Environmental Officer	Ms. Ricci Poon Wai Tin	9533 1115	2770 4278
AUES	Environmental Team Leader	Mr. T. W. Tam	2959 6059	2959 6079
AUES	Environmental Consultant	Ms. Nicola Hon	2959 6059	2959 6079
AUES	Environmental Consultant	Mr. Ben Tam	2959 6059	2959 6079
AUES	Assistant Environmental Consultant	Mr. Martin Li	2959 6059	2959 6079

**Legend:**

*MTRCL (Employer) – MTR Corporation Limited*

*MTRCL (Resident Engineer) – MTR Corporation Limited*

*BKCL (Main Contractor) – Build King Construction Limited*

*AECOM (IEC) – AECOM Consulting Services Limited*

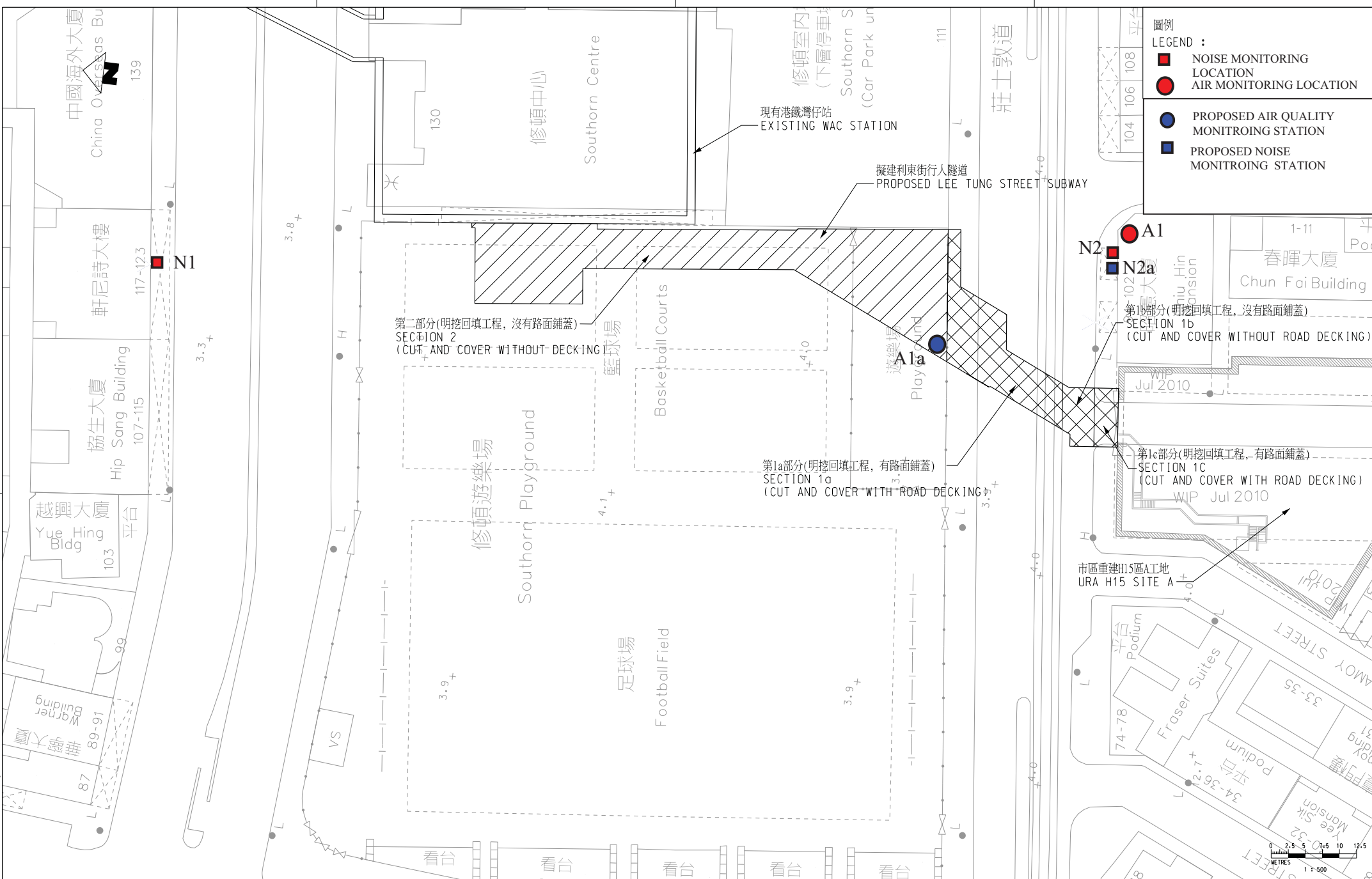
*AUES (ET) – Action-United Environmental Services & Consulting*



## **Appendix C**

### **Monitoring Locations**

Ca:\ProgramData\Bentley\MicroStation\B1\SELECTseries\WorkSpace\System\cwg\WTR\_PDF\_BM\_COA\_3000P.dwg  
 06/2024/5/REP/REP1/CONTR/CSS/556/NE/150\_27A\_005/556P  
 PLOT BY: MTR  
 FILE NAME: 1:500



**圖例**  
**LEGEND :**

- NOISE MONITORING LOCATION
- AIR MONITORING LOCATION
- PROPOSED AIR QUALITY MONITORING STATION
- PROPOSED NOISE MONITORING STATION

TITLE  
 CONSULTANCY AGREEMENT NO. NEX/1050  
 DETAILED DESIGN FOR LEE TUNG STREET SUBWAY  
 LOCATION OF NOISE AND AIR MONITORING LOCATION

**MTR**  
 WAC STATION LEE TUNG STREET SUBWAY  
 ORIGINATOR  
**Mott MacDonald**  
 25F Two Landmark East  
 100 Tsim Sha Tsui Street  
 Kowloon, Hong Kong  
 Tel: +852 2182 0107  
 Fax: +852 2182 1000  
 www.mottmacdonald.com.hk

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CHECKED	
APPROVED	
DATE	
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REV	DESCRIPTION	BY	DATE	APPROVED	REV	DESCRIPTION	BY	DATE	APPROVED
D	GENERAL REVISION								
C	GENERAL REVISION								
B	GENERAL REVISION								
A	PROJECT PROFILE								

SCALE: 1:500 (A3) DRAWING NO. REV.

**Appendix D**

**Calibration Certificate of  
Monitoring Equipment**



Location : Chiu Hin Mansion  
 Location ID : A1a

Date of Calibration: 2-Jul-17  
 Next Calibration Date: 1-Sep-17  
 Technician: Mr. Ip Ka Hing

**CONDITIONS**

Sea Level Pressure (hPa)	<input type="text" value="1005.8"/>	Corrected Pressure (mm Hg)	<input type="text" value="754.35"/>
Temperature (°C)	<input type="text" value="28.9"/>	Temperature (K)	<input type="text" value="302"/>

**CALIBRATION ORIFICE**

Make->	<input type="text" value="TISCH"/>	Qstd Slope ->	<input type="text" value="2.11965"/>
Model->	<input type="text" value="5025A"/>	Qstd Intercept ->	<input type="text" value="-0.02696"/>
Serial # ->	<input type="text" value="1941"/>		

**CALIBRATION**

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	7.0	3.8	10.8	1.547	51	50.15	Slope = 33.8304 Intercept = -1.1636 Corr. coeff. = 0.9958
13	5.9	2.3	8.2	1.350	46	45.24	
10	5	1.3	6.3	1.185	40	39.34	
7	3.8	0.1	3.9	0.935	32	31.47	
5	3.1	-0.7	2.4	0.736	23	22.62	

**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:**

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

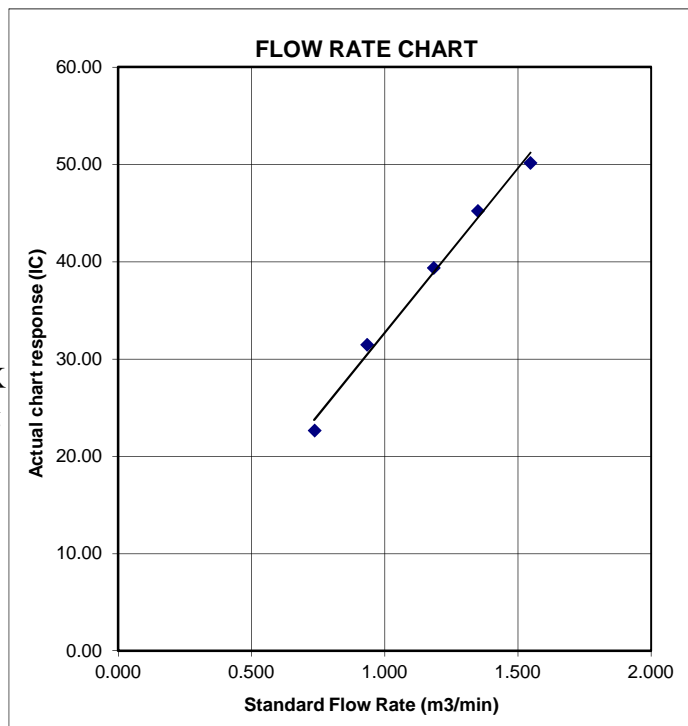
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



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	ORFICE
					DIFF Hg (mm)	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

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

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

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

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

For subsequent flow rate calculations:

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

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



# 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 :  $(23 \pm 2)^{\circ}\text{C}$       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** : 27 July 2016

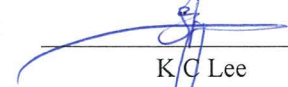
## TEST RESULTS / 測試結果

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 :

<u>Equipment ID</u>	<u>Description</u>	<u>Certificate No.</u>
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 ± 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.

# Certificate of Calibration

## 校正證書

Certificate No. : C172792  
證書編號

ITEM TESTED / 送檢項目 ( Job No. / 序引編號 : IC17-0924 )

Date of Receipt / 收件日期 : 16 May 2017

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

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 : 23 May 2017

### 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

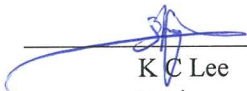
Tested By  
測試

:

  
H T Wong  
Technical Officer

Certified By  
核證

:

  
K C Lee  
Engineer

Date of Issue  
簽發日期

:

24 May 2017

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。

# Certificate of Calibration

## 校正證書

Certificate No. : C172792

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 :

<u>Equipment ID</u>	<u>Description</u>	<u>Certificate No.</u>
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	94.0	± 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 :

Only the original copy or the laboratory's certified true copy is valid.

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. : C172791

證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC17-0924)

Date of Receipt / 收件日期 : 16 May 2017

Description / 儀器名稱 : Sound Level Calibrator (EQ084)

Manufacturer / 製造商 : Cesva

Model No. / 型號 : CB-5

Serial No. / 編號 : 030023

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 : 23 May 2017

### 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

Engineer

Date of Issue

簽發日期

24 May 2017

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. : C172791

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 :

<u>Equipment ID</u>	<u>Description</u>	<u>Certificate No.</u>
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	93.8	± 0.3	± 0.2
104 dB, 1 kHz	103.9		± 0.3

### 5.2 Frequency Accuracy

UUT Nominal Value (kHz)	Measured Value (kHz)	Mfr's Spec.	Uncertainty of Measured Value (Hz)
1	0.994	1 kHz ± 1.5 %	± 1

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

#### Note :

Only the original copy or the laboratory's certified true copy is valid.

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

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Fax/傳真: 2744 8986

E-mail/電郵: callab@suncreation.com

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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. : C172795

證書編號

ITEM TESTED / 送檢項目 ( Job No. / 序引編號 : IC17-0924 )

Date of Receipt / 收件日期 : 16 May 2017

Description / 儀器名稱 : Sound Level Meter (EQ068)

Manufacturer / 製造商 : Rion

Model No. / 型號 : NL-31

Serial No. / 編號 : 00410247

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 : 23 May 2017

### 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  
Engineer

Date of Issue

簽發日期

24 May 2017

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. : C172795

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	C170048
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)	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 120	L <sub>A</sub>	A	Fast	94.00	1	93.6	± 1.1

#### 6.1.2 Linearity

UUT Setting				Applied Value		UUT Reading (dB)
Range (dB)	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
30 - 120	L <sub>A</sub>	A	Fast	94.00	1	93.6 (Ref.)
				104.00		103.7
				114.00		113.7

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)	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 120	L <sub>A</sub>	A	Fast	94.00	1	93.6	Ref.
			Slow			93.6	± 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. : C172795

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)	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 120	L <sub>A</sub>	A	Fast	94.00	63 Hz	67.2	-26.2 ± 1.5
					125 Hz	77.3	-16.1 ± 1.5
					250 Hz	84.8	-8.6 ± 1.4
					500 Hz	90.3	-3.2 ± 1.4
					1 kHz	93.6	Ref.
					2 kHz	94.8	+1.2 ± 1.6
					4 kHz	94.7	+1.0 ± 1.6
					8 kHz	92.6	-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)	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 120	L <sub>C</sub>	C	Fast	94.00	63 Hz	92.8	-0.8 ± 1.5
					125 Hz	93.4	-0.2 ± 1.5
					250 Hz	93.5	0.0 ± 1.4
					500 Hz	93.6	0.0 ± 1.4
					1 kHz	93.6	Ref.
					2 kHz	93.5	-0.2 ± 1.6
					4 kHz	92.9	-0.8 ± 1.6
					8 kHz	90.7	-3.0 (+2.1 ; -3.1)
					12.5 kHz	87.8	-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. : C172795  
證書編號

Remarks : - UUT Microphone Model No. : UC-53A & S/N : 319841

- Mfr's Spec. : IEC 61672 Class 1

- Uncertainties of Applied Value : 94 dB : 63 Hz - 125 Hz :  $\pm 0.35$  dB  
250 Hz - 500 Hz :  $\pm 0.30$  dB  
1 kHz :  $\pm 0.20$  dB  
2 kHz - 4 kHz :  $\pm 0.35$  dB  
8 kHz :  $\pm 0.45$  dB  
12.5 kHz :  $\pm 0.70$  dB  
104 dB : 1 kHz :  $\pm 0.10$  dB (Ref. 94 dB)  
114 dB : 1 kHz :  $\pm 0.10$  dB (Ref. 94 dB)

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

### Note :

Only the original copy or the laboratory's certified true copy is valid.

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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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. : C173482  
證書編號

**ITEM TESTED / 送檢項目** (Job No. / 序引編號 : IC17-0924)      Date of Receipt / 收件日期 : 20 June 2017

Description / 儀器名稱 : Integrating Sound Level Meter (EQ009)  
Manufacturer / 製造商 : Brüel & Kjær  
Model No. / 型號 : 2238  
Serial No. / 編號 : 2285722  
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

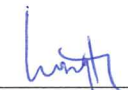
**DATE OF TEST / 測試日期** : 28 June 2017

### 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  
Engineer

Date of Issue : 29 June 2017  
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.

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。

# Certificate of Calibration

## 校正證書

Certificate No. : C173482

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.

4. Test equipment :

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C170048
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 Self-calibration

UUT Setting				Applied Value		UUT Reading (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
50 - 130	L <sub>AFP</sub>	A	F	94.00	1	94.2

6.1.1.2 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 <sub>AFP</sub>	A	F	94.00	1	94.0	± 0.7

6.1.2 Linearity

UUT Setting				Applied Value		UUT Reading (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
50 - 130	L <sub>AFP</sub>	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.

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

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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. : C173482

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 <sub>AFP</sub>	A	F	94.00	1	94.0	Ref.
	L <sub>ASP</sub>		S			94.0	± 0.1
	L <sub>AIP</sub>		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 <sub>AFP</sub>	A	F	106.0	Continuous	106.0	Ref.
	L <sub>AFMax</sub>				200 ms	105.0	-1.0 ± 1.0
	L <sub>ASP</sub>	S	Continuous		106.0	Ref.	
	L <sub>ASMax</sub>		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 <sub>AFP</sub>	A	F	94.00	31.5 Hz	54.5	-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	92.8	-1.1 (+1.5 ; -3.0)
					12.5 kHz	89.7	-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.

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。

# Certificate of Calibration

## 校正證書

Certificate No. : C173482

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 <sub>CFP</sub>	C	F	94.00	31.5 Hz	90.9	-3.0 ± 1.5
					63 Hz	93.1	-0.8 ± 1.5
					125 Hz	93.8	-0.2 ± 1.0
					250 Hz	93.9	0.0 ± 1.0
					500 Hz	94.0	0.0 ± 1.0
					1 kHz	94.0	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	87.7	-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 <sub>Aeq</sub>	A	10 sec.	4	1	1/10	110.0	100	99.9	± 0.5
			60 sec.					90	89.7	± 0.5
			5 min.					80	79.2	± 1.0
			1/10 <sup>2</sup>					70	69.2	± 1.0

Remarks : - UUT Microphone Model No. : 4188 & S/N : 2812707

- 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 :

Only the original copy or the laboratory's certified true copy is valid.

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室書面批准。



## **Appendix E**

### **HOKLAS-Accreditation Certificate of the Testing Laboratory**



Hong Kong Accreditation Service  
香港認可處

**Certificate of Accreditation**  
認可證書

*This is to certify that*  
特此證明

**ALS TECHNICHEM (HK) PTY LIMITED**

**11/F., Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong**  
香港新界葵涌永業街1-3號忠信針織中心11樓

*has been accepted by the HKAS Executive, on the recommendation of the Accreditation Advisory Board, as a*  
為香港認可處執行機關根據認可諮詢委員會建議而接受的

**HOKLAS Accredited Laboratory**  
「香港實驗所認可計劃」認可實驗所

*This laboratory meets the requirements of ISO / IEC 17025 : 2005 – General requirements for the competence of testing and calibration laboratories and it has been accredited for performing specific tests or calibrations as listed in the HOKLAS Directory of Accredited Laboratories within the test category of*  
此實驗所符合ISO / IEC 17025 : 2005 –《測試及校正實驗所能力的通用規定》所訂的要求，獲認可進行載於香港實驗所認可計劃《認可實驗所名冊》內下述測試類別中的指定  
測試或校正工作

**Environmental Testing**  
環境測試

*This laboratory is accredited in accordance with the recognised International Standard ISO / IEC 17025 : 2005.*  
本實驗所乃根據公認的國際標準 ISO / IEC 17025 : 2005 獲得認可。

*This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (see joint IAF-ILAC-ISO Communiqué).*  
這項認可資格演示在指定範疇所需的技術能力及實驗所質量管理體系的運作  
(見國際認可論壇、國際實驗所認可合作組織及國際標準化組織的聯合公報)。

*The common seal of the Hong Kong Accreditation Service is affixed hereto by the authority of the HKAS Executive*  
香港認可處根據認可處執行機關的權限在此蓋上通用印章

CHAN Sing Sing, Terence, Executive Administrator  
執行幹事 陳成城  
Issue Date : 5 May 2009  
簽發日期：二零零九年五月五日

Registration Number : **HOKLAS 066**  
註冊號碼：

Date of First Registration : 15 September 1995  
首次註冊日期：一九九五年九月十五日



## **Appendix F**

### **Event and Action Plan**

**Event and Action Plan for Construction Noise**

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

### Event and Action Plan for Air Quality

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

## **Appendix G**

### **Monitoring Schedule**

**Monitoring Schedule in the Reporting Period – July 2017**

DATE		AIR QUALITY	NOISE
		24-HOUR TSP	L <sub>EQ</sub> 30MIN
SAT	1-JUL-17		
SUN	2-JUL-17		
MON	3-JUL-17	✓	
TUE	4-JUL-17		
WED	5-JUL-17		
THU	6-JUL-17		
FRI	7-JUL-17		✓
SAT	8-JUL-17	✓	
SUN	9-JUL-17		
MON	10-JUL-17		
TUE	11-JUL-17		
WED	12-JUL-17		
THU	13-JUL-17		
FRI	14-JUL-17	✓	✓
SAT	15-JUL-17		
SUN	16-JUL-17		
MON	17-JUL-17		
TUE	18-JUL-17		
WED	19-JUL-17		
THU	20-JUL-17	✓	
FRI	21-JUL-17		✓
SAT	22-JUL-17		
SUN	23-JUL-17		
MON	24-JUL-17		
TUE	25-JUL-17		
WED	26-JUL-17	✓	
THU	27-JUL-17		
FRI	28-JUL-17		✓
SAT	29-JUL-17		
SUN	30-JUL-17		
MON	31-JUL-17		

✓	Monitoring Day
	Sunday or Public Holiday

**Air Quality Monitoring Location**

A1a - Proposed monitoring station at Southern Playground works area

**Construction Noise Monitoring Location:**

N1 - 2/F floor of Hennessey Building

N2a - Rooftop of Chiu Hin Mansion

**Monitoring Schedule for the Coming Month – August 2017**

DATE		AIR QUALITY	NOISE
		24-HOUR TSP	L <sub>EQ</sub> 30MIN
TUE	1-AUG-17	✓	
WED	2-AUG-17		
THU	3-AUG-17		✓
FRI	4-AUG-17		
SAT	5-AUG-17		
SUN	6-AUG-17		
MON	7-AUG-17	✓	
TUE	8-AUG-17		
WED	9-AUG-17		✓
THU	10-AUG-17		
FRI	11-AUG-17		
SAT	12-AUG-17	✓	
SUN	13-AUG-17		
MON	14-AUG-17		
TUE	15-AUG-17		✓
WED	16-AUG-17		
THU	17-AUG-17		
FRI	18-AUG-17	✓	
SAT	19-AUG-17		
SUN	20-AUG-17		
MON	21-AUG-17		✓
TUE	22-AUG-17		
WED	23-AUG-17		
THU	24-AUG-17	✓	
FRI	25-AUG-17		
SAT	26-AUG-17		
SUN	27-AUG-17		
MON	28-AUG-17		
TUE	29-AUG-17		
WED	30-AUG-17	✓	
THU	31-AUG-17		

✓	Monitoring Day
	Sunday or Public Holiday

**Air Quality Monitoring Location**

A1a - Proposed monitoring station at Southern Playground works area

**Construction Noise Monitoring Location:**

N1 - 2/F floor of Hennessey Building

N2a - Rooftop of Chiu Hin Mansion



## **Appendix H**

### **Database of Monitoring Results**

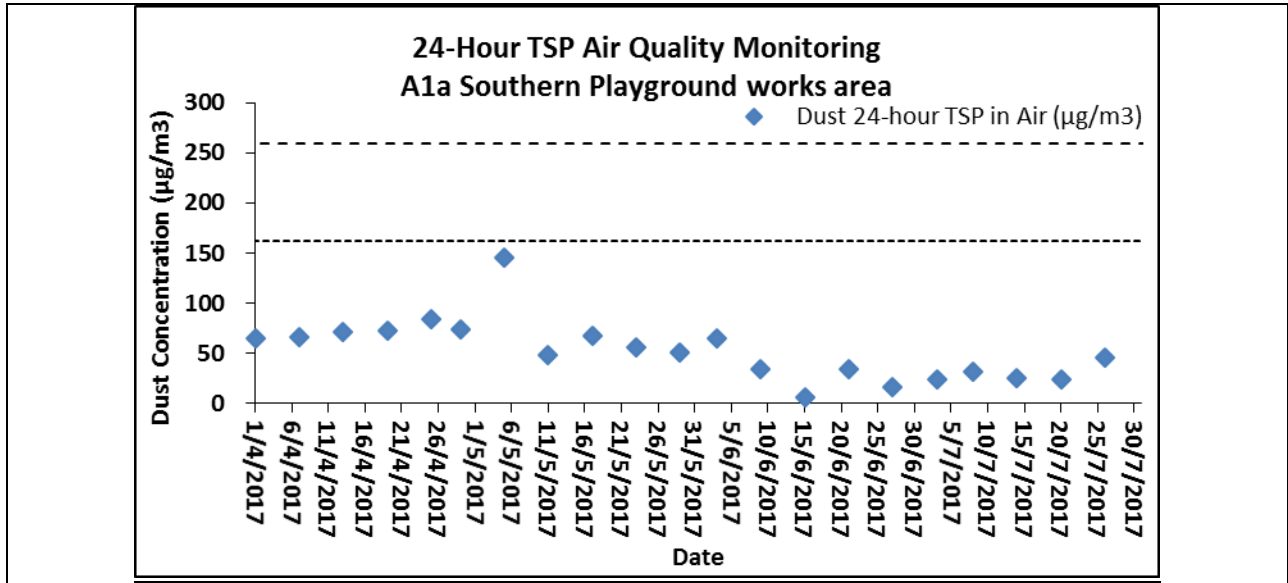
**Result of 24-hour TSP Monitoring**

<b>Location: A1a (Proposed monitoring station at Southern Playground works area)</b>															
Date	Sample Number	Elapsed Time			Chart Reading			Ave. Temp. (°C)	Standard			Filter Weight (g)		Weight Dust Collected (g)	Dust 24-hour TSP in Air (µg/m <sup>3</sup> )
		Initial	Final	Actual (min)	Min	Max	Ave		Ave. Press. (hPa)	Flow Rate (m <sup>3</sup> /min)	Air Volume (std m <sup>3</sup> )	Initial	Final		
3-Jul-17	21302	12897.75	12921.64	1433.40	37	38	37.5	28.5	1006.1	1.13	1623	2.6228	2.6608	0.0380	23
8-Jul-17	21288	12921.64	12945.47	1429.80	38	39	38.5	27.5	1009.9	1.17	1667	2.5913	2.6440	0.0527	32
14-Jul-17	21343	12945.47	12969.46	1439.40	39	40	39.5	28.9	1006.2	1.19	1713	2.6606	2.7037	0.0431	25
20-Jul-17	21377	12969.46	12993.64	1450.80	39	40	39.5	28.6	1008.6	1.19	1730	2.5900	2.6302	0.0402	24
26-Jul-17	21378	12998.64	13022.53	1433.40	39	40	39.5	29.8	1004.1	1.19	1702	2.5509	2.6270	0.0761	45

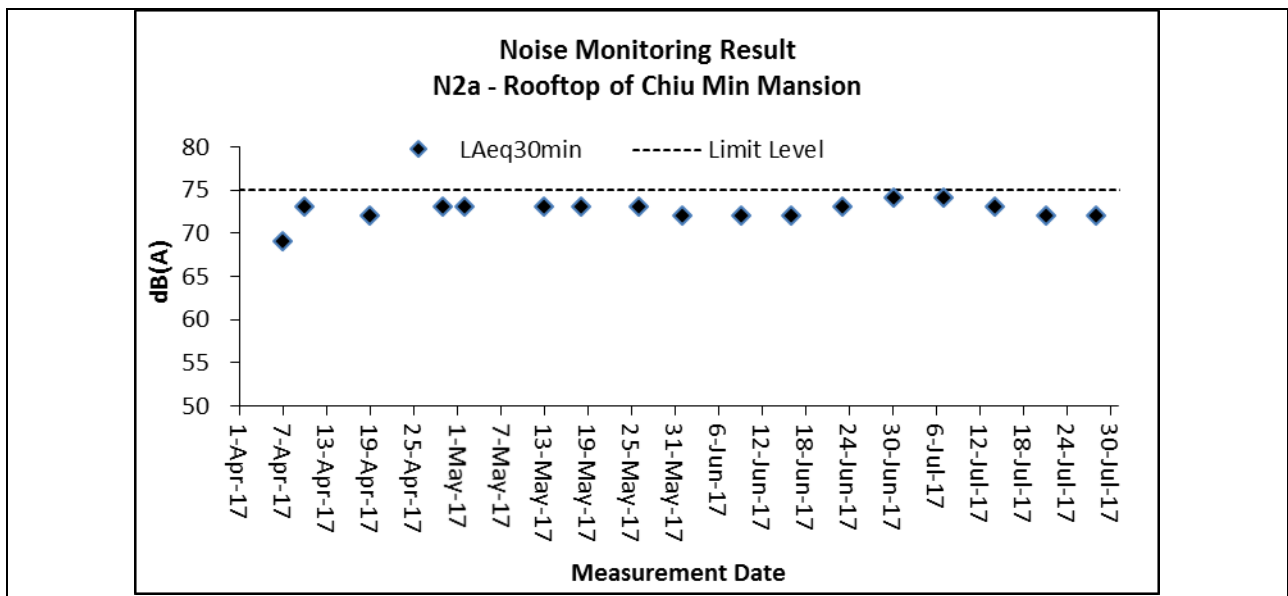
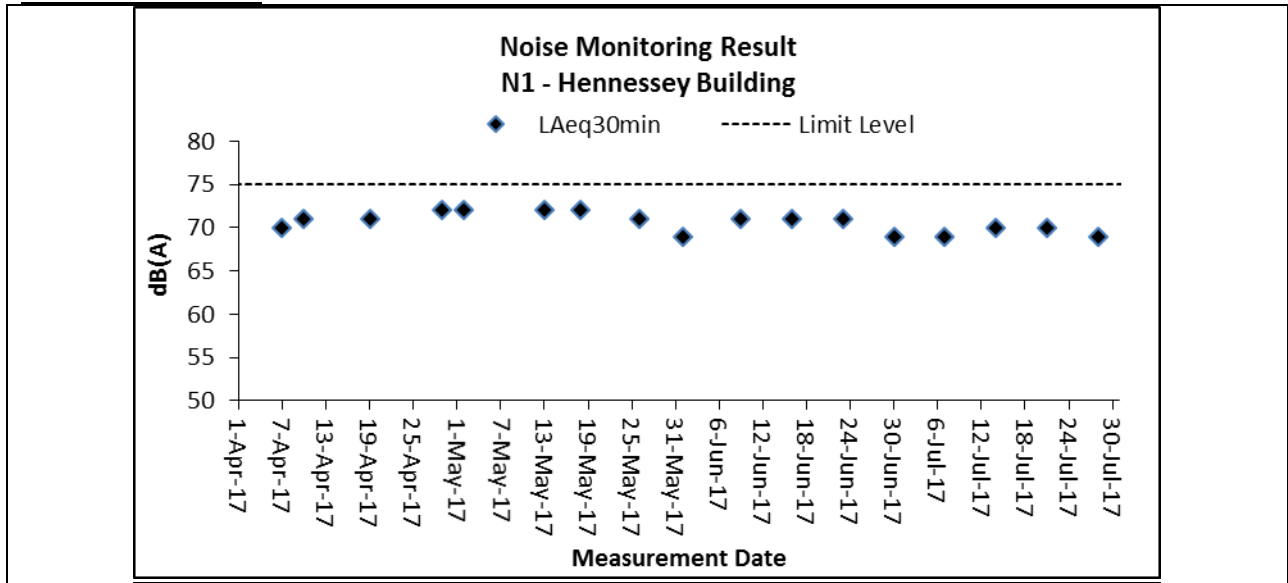
# **Appendix I**

## **Graphical Plots**

Air Quality



**Construction Noise**



## **Appendix J**

### **Meteorological Information**

Meteorological Data downloaded from HKO in the Reporting Period							
Date		Weather	Total Rainfall (mm)	Kings Park Station			
				Mean Air Temp. (°C)	Wind Speed (km/h)	Mean Relative Humidity (%)	Wind Direction
1-Jul-17	Sat	Mainly cloudy with isolated showers.	7.4	28.8	10.1	82.1	SW
2-Jul-17	Sun	Hot with sunny periods and isolated showers. Moderate southerly winds.	8.8	28.3	9.3	81.5	SW
3-Jul-17	Mon	Mainly cloudy with isolated showers.	8.4	28.8	10.5	85	S/SW
4-Jul-17	Tue	Moderate easterly winds, fresh at times.	32.3	27.7	9.7	88	E/SE
5-Jul-17	Wed	Mainly fine. Very hot	27.5	28.5	9.1	84.2	E/SE
6-Jul-17	Thu	Mainly fine. Very hot	16.3	27.3	9.1	89	E/SE
7-Jul-17	Fri	Mainly cloudy with isolated showers.	35.8	28	7.8	82.5	S/SW
8-Jul-17	Sat	Moderate easterly winds, fresh at times.	12.8	27.3	8.2	76	S
9-Jul-17	Sun	Mainly fine. Very hot	1.2	29.4	7.1	77	S/SW
10-Jul-17	Mon	Hot with sunny periods and isolated showers.	0.6	29.6	6.5	78	W/NW
11-Jul-17	Tue	Mainly fine and hot apart from isolated showers. Moderate southeasterly winds.	0	29.9	7.3	76	SE
12-Jul-17	Wed	Moderate east to southeasterly winds.	Trace	30	30	75.7	SE
13-Jul-17	Thu	Mainly cloudy with isolated showers.	Trace	30.3	30.3	76.2	SE
14-Jul-17	Fri	Hot with sunny periods and isolated showers. Moderate southerly winds.	2.3	29.5	29.5	81	SE
15-Jul-17	Sat	Mainly cloudy with isolated showers.	8.8	29.4	29.4	88.2	E
16-Jul-17	Sun	Moderate easterly winds, fresh at times.	21	27.1	27.1	88.5	E/SE
17-Jul-17	Mon	Mainly fine. Very hot	184.6	26.2	26.2	90	E/SE
18-Jul-17	Tue	Mainly fine. Very hot	134.3	26.4	26.4	89.7	E/SE
19-Jul-17	Wed	Mainly cloudy with isolated showers.	12.6	27.7	27.7	84.7	SE
20-Jul-17	Thu	Moderate easterly winds, fresh at times.	2	29.1	29.1	81.5	E/SE
21-Jul-17	Fri	Mainly fine. Very hot	0.2	29.5	29.5	78.5	E/SE
22-Jul-17	Sat	Mainly fine. Very hot	3.3	29.4	30	87.5	SE
23-Jul-17	Sun	Moderate east to southeasterly winds.	46.5	27.2	9.7	89.7	E/SE
24-Jul-17	Mon	Mainly cloudy with isolated showers.	3.3	28.2	7.5	85.7	E/SE
25-Jul-17	Tue	Hot with sunny periods and isolated showers. Moderate southerly winds.	Trace	29.8	10.7	77.8	SE
26-Jul-17	Wed	Mainly cloudy with isolated showers.	0	30.4	8.4	73.5	E/SE
27-Jul-17	Thu	Moderate easterly winds, fresh at times.	Trace	29.1	9.4	76	E/SE
28-Jul-17	Fri	Mainly fine. Very hot	0	30.8	8.5	66.2	E/SE
29-Jul-17	Sat	Very hot with sunny intervals	0	31.2	8.2	67.1	E
30-Jul-17	Sun	Moderate to fresh west to southwesterly winds,	0	32.4	8	70.5	W/NW
31-Jul-17	Mon	Very hot with sunny intervals	0	31.2	8	76.7	W/NW

## **Appendix K**

### **Monthly Summary Waste Flow Table**



Wan Chai Station Lee Tung Street Subway- C6593-13C

Monthly Summary Waste Flow Table for 2017

Name of Employer: MTR Corporation Limited																Contract No.: C65931-13C				
Month	Actual Quantities of Inert C&D Materials Generated Monthly										Actual Quantities of Non-Inert C&D Wastes Generated Monthly					Actual Quantities of Non-Inert C&D Wastes Generated Monthly				
	Total Quantity Generated	Broken Concrete	Building Debris	Mixed Rock & Soil	Bentonite	Rubbish	Slurry	Rock	Soil	Reused in this Project	Metals	Paper/ cardboard packaging	Plastics	Chemical Waste	Others, e.g. general refuse	Metals	Paper/ cardboard packaging	Plastics	Chemical Waste	Others, e.g. general refuse
	(in m <sup>3</sup> )	(in m <sup>3</sup> )	(in m <sup>3</sup> )	(in m <sup>3</sup> )	(in m <sup>3</sup> )	(in m <sup>3</sup> )	(in m <sup>3</sup> )	(in m <sup>3</sup> )	(in m <sup>3</sup> )	(in m <sup>3</sup> )	(in m <sup>3</sup> )	(in m <sup>3</sup> )	(in m <sup>3</sup> )	(in m <sup>3</sup> / Litre)	(in m <sup>3</sup> )	(in ton)	(in ton)	(in ton)	(in Litre)	(in ton)
Jan	463	0	0	0	0	0	0	0	463	0	0	0	0	0	0	0	0	0	0	0
Feb	267	0	0	0	0	0	0	0	267	0	0	0	0	0	0	0	0	0	0	0
Mar	19.15	0	0	0	0	0	0	0	12.6	0	0	0	0	6.55	0	0	0	0	0	0
Apr	54.88	0	0	0	0	0	0	0	18.4	0	0	0	0	36.48	0	0	0	0	0	0
May	47.49	0	0	0	0	0	0	0	17.35	0	0	0	0	30.14	0	0	0	0	0	0
Jun	45.88	0	0	0	0	0	0	0	0	0	0	0	0	45.88	0	0	0	0	0	0
Jul	22.5	0	0	0	0	0	0	0	0	0	0	0	0	22.5	0	0	0	0	0	0
Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nov	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dec	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	919.9	0	0	0	0	0	0	0	778.35	0	0	0	0	141.55	0	0	0	0	0	0

## **Appendix L**

### **Implementation Schedule for Environmental Mitigation Measures (ISEMM)**

Project Profile Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Parties	Location of the measure	When to implement the measure	Relevant requirements or standards for the measure to achieve
<b>NOISE IMPACT</b>						
S.5.1.1	<b><u>Use of quieter plant</u></b>	To minimize construction noise emissions	Contractor	Work site	Construction Stage	ProPECC PN2/93 and Noise Control Ordinance
S.5.1.1	<b><u>Use of noise enclosure and movable barrier</u></b> <ul style="list-style-type: none"> <li>• movable barrier can achieve a 5 dB(A) reduction for movable PME and 10 dB(A) reduction for stationary PME;</li> <li>• noise enclosure can achieve 15dB(A) reduction for PME;</li> <li>• noise enclosure is proposed to be built after open excavation in order to minimize the noise impact due to further excavation work and construction of subway. The enclosure should either be provided with acoustic door for access purpose which should be kept closed during the construction works or should be designed with no direct line of sight from the open side to the NSRs;</li> <li>• A typical design barrier with a steel frame of vertical / cantilever type would be adopted and located close to the noise generating part of PME;</li> <li>• Barrier material of surface mass in excess of 7kg/m<sup>2</sup> shall be required to achieve the maximum screening effect (and minimum 10kg/m<sup>2</sup> for noise enclosure);</li> <li>• The length of barrier should generally be at least five times greater than its height and the minimum height of a barrier should be such that no part of the noise source will be visible from the noise sensitive receiver being protected.</li> </ul>	To minimize construction noise emissions	Contractor	Work site	Construction Stage	ProPECC PN2/93, Noise Control Ordinance and EIAO Guidance Note NO. 9/2010
S.5.1.1	<b><u>General Construction Noise Control Measures</u></b> <ul style="list-style-type: none"> <li>• The Code of Practice on Good Management Practice to Prevent Violation of the Noise Control Ordinance (Chapter 400) (for Construction Industry) published by EPD shall be adopted;</li> <li>• The statutory and non-statutory requirements and guidelines shall be complied with;</li> <li>• Approval for the method of working, equipment and noise mitigation measures intended to be used at the site shall be granted from the Project Engineer before commencing any work;</li> </ul>	To minimize construction noise emissions	Contractor	Work site	Construction Stage	ProPECC PN2/93 and Noise Control Ordinance

Project Profile Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Parties	Location of the measure	When to implement the measure	Relevant requirements or standards for the measure to achieve
	<ul style="list-style-type: none"> <li>Working methods to minimize the noise impact on the surrounding NSRs shall be formulated and executed, and the implementation of these methods shall be monitored by experienced personnel with suitable training;</li> <li>Noisy equipment and noisy activities shall be located as far away from the NSRs as is practical;</li> <li>Unused equipment shall be turned off;</li> <li>PME should be kept to a minimum and the parallel use of noisy equipment / machinery should be avoided;</li> <li>All plant and equipment shall be maintained regularly; and</li> <li>Material stockpiles and other structures shall be effectively utilized as noise barriers, whenever practicable.</li> </ul>					
<b>AIR QUALITY IMPACT</b>						
S.5.1.2	<p><b><u>Construction Dust Control Measures</u></b></p> <ul style="list-style-type: none"> <li>Regular watering to reduce dust emissions from all exposed site surface, particularly during dry weather;</li> <li>Frequent watering for particularly dusty construction areas and areas close to air sensitive receivers;</li> <li>Covering of stockpile of excavated dusty materials, if any, with impervious sheeting or spraying with water to maintain the entire surface wet;</li> <li>Provision of vehicle washing facilities at the entry and exit points of site;</li> <li>Tarpaulin covering of any dusty materials being transported to and from site by vehicle;</li> <li>Positioning of construction plant at maximum practicable distance from air sensitive receivers; and</li> <li>Due to the small size of the works sites and lack of space for stockpiling, excavated materials should be hauled off-site almost immediately. However, in the event of any stockpiled excavated materials, they should be covered with tarpaulin and be removed offsite as soon as practicable to avoid any dust nuisance arising</li> </ul>	To minimize the dust impacts arising from the construction works	Contractor	Work site	Construction Stage	Air Pollution Control (Construction Dust) Regulation

Project Profile Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Parties	Location of the measure	When to implement the measure	Relevant requirements or standards for the measure to achieve
<b>WATER QUALITY IMPACT</b>						
S.5.1.3	<p><b><u>Construction Water Quality Impact Measures</u></b></p> <ul style="list-style-type: none"> <li>• Collection of wastewater into a sedimentation tank for treatment before discharge into the public drainage system;</li> <li>• Provision of silt trap and oil interceptor to remove the oil, lubricants, grease, silt, grit and debris from the wastewater prior to discharge to the public stormwater system. The silt traps and oil interceptors should be cleaned and maintained regularly;</li> <li>• Installation of wheel washing facilities to minimize muddy runoff;</li> <li>• Regular maintenance and inspection of drainage systems and erosion control and silt removal facilities;</li> <li>• Management and monitoring of sewage treatment facilities (if any);</li> <li>• Any foul effluent should not be discharged into any public sewer and stormwater drain, unless an effluent discharge permit is obtained under the WPCO by the Contractor;</li> <li>• Coverage of stockpiles of C&amp;D materials (if any) during rainstorms; and</li> <li>• Site toilet facilities, if needed, should be chemical toilets or should have the sewage discharge directed to a foul sewer.</li> </ul>	To reduce water quality impact induced by the construction work	Contractor	Work site	Construction Stage	ProPECC PN1/94; Water Pollution Control Ordinance
<b>WASTE MANAGEMENT</b>						
S.5.1.4	<p><b><u>Construction Waste Management Measures</u></b></p> <ul style="list-style-type: none"> <li>• Scrap metals or abandoned equipment should be recycled if possible;</li> <li>• Waste arising should be kept to a minimum and be handled, transported and disposed of in a suitable manner;</li> <li>• The Contractor should adopt a trip ticket system for the disposal of C&amp;D materials to any designated public filling facility and/or landfill. Independent audits of the Contractor and resident site staff will be undertaken to ensure that the correct procedures are being followed;</li> <li>• Chemical waste shall be handled in accordance with the Code of Practice on the Packaging, Handling and Storage of Chemical Wastes; and</li> </ul>	To adopt waste management measures in the way of avoiding, minimizing, reusing and recycling so as to reduce waste generation	Contractor	Work site	Construction Stage	Waste Disposal Ordinance (Cap. 354); Waste Disposal (Chemical Waste) (General) Regulation; DEVB TCW No. 6/2010; ETWB TCW No. 19/2005.

Project Profile Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Parties	Location of the measure	When to implement the measure	Relevant requirements or standards for the measure to achieve
	<ul style="list-style-type: none"> <li>All general refuse should be segregated and stored in enclosed bins or compaction units and waste separation facilities for paper, aluminum cans, plastic bottles etc. should be provided to facilitate reuse or recycling of materials and their proper disposal.</li> </ul>					
<b>LANDSCAPE AND VISUAL IMPACT</b>						
S.5.1.5	<p><b><u>Landscape and Visual Measures</u></b></p> <ul style="list-style-type: none"> <li>Clear demarcation of works area to prevent damages to existing trees in close proximity;</li> <li>Protection of all trees planned to be retained onsite;</li> <li>Preserving all affected trees by transplanting where practical. Tree transplanting application and tree removal application shall be submitted for approval in accordance with ETWB TCW 3/2006; and</li> <li>Screening of construction works by hoardings/noise barriers around Works area in visually unobtrusive colors.</li> </ul>	To reduce landscape and visual impact by construction works.	Contractor	Work Site and nearby playground	Construction Stage	EIAO; ETWB TCW No. 3/2006.