



AUES PROJECT NO. TCS/00704/14

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

4TH QUARTERLY ENVIRONMENTAL MONITORING
AND AUDIT (EM&A) SUMMARY REPORT – JUNE
2015 TO AUGUST 2015

PREPARED FOR
KADEN CONSTRUCTION LIMITED

Quality Index

Date	Reference No.	Prepared By	Approved By
20 October 2015	TCS00704/14/600/R0070v1	 Nicola Hon Environmental Consultant	 T.W. Tam Environmental Team Leader

Version	Date	Description
1	20 October 2015	First Submission

17 November 2015

By Email and PostMTR Corporation Limited
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Your Ref.:

Our Ref.: 40032976/448287

Attention: Mr. Kenneth Chow / Environmental Engineer II

Dear Sir,

**Consultancy Agreement A130-13
Independent Environmental Checker for CRS and LTS
LTS - Verification for Fourth Quarterly Environmental Monitoring and
Audit (EM&A) Report (June 2015 to August 2015) (Report No.: TCS00704/14/600/R0070v1)**

We refer to the Fourth Quarterly EM&A Report (June 2015 to August 2015) received under cover of the email from the Environmental Team, AUES, dated on 20 October 2015.

We have no further comment and have verified the captioned report (Report No.: TCS00704/14/600/R0070v1).

Should you have any queries, please feel free to contact the undersigned at 3922 9529.

Yours faithfully
AECOM Consulting Services LtdRodney Ip
Independent Environmental Checker

DCYO/wwsc

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

EXECUTIVE SUMMARY

ES01 This is the 4th Quarterly EM&A Summary Report for 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/A (hereinafter referred as “the EP-444/2012/A” or “the EP”), covering the period from **1 June 2015 to 31 August 2015** (hereinafter “Reporting Period”).

ENVIRONMENTAL MONITORING AND AUDIT ACTIVITIES

ES02 Environmental monitoring activities under the EM&A programme in the Reporting Period are summarized in the following table.

Environmental Aspect	Environmental Monitoring Parameters / Inspection	Reporting Period	
		Number of Monitoring Locations to undertake	Total Occasions
Air Quality	24-hour TSP	1	16
Construction Noise	$L_{eq(30min)}$ Daytime	2	26
Site Inspection / Audit	Joint with ET, the Contractor and RE	--	13
	Joint with IEC, ET, the Contractor and RE	--	3

BREACHES OF ACTION/LIMIT LEVELS

ES03 In this Reporting Period, monitoring results demonstrated that no exceedance of environmental quality criteria recorded in air quality and construction noise. The summary of breach of environmental performance is shown below.

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	$L_{eq(30min)}$ Daytime	0	0	0	0	0

ENVIRONMENTAL COMPLAINT

ES04 No public 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 CHANGES

ES06 No reporting changes were made in the Reporting Period.

FUTURE KEY ISSUES

ES07 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.

ES08 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.

ES09 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.

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1 INTRODUCTION

PROJECT BACKGROUND

- 1.01 **KADEN CONSTRUCTION LIMITED** (hereinafter ‘KCL’) has been awarded by the MTR Corporation Limited (MTRCL) of 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:
- (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 take about 36 months. In order to effectively implement the environmental protection measures as stipulated in the Particular Specification (PS) of Project, 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. The construction of the Project was commenced on 28 August 2014.
- 1.04 Action-United Environmental Services and Consulting (AUES) has been commissioned by KCL as the independent environmental team (ET) to implement the relevant EM&A programme of the Project.
- 1.05 This is the 4th Quarterly EM&A Summary Report presenting the monitoring results and inspection findings in the Reporting Period from **1 June 2015** to **31 August 2015**.

REPORT STRUCTURE

- 1.06 This Report is structured into the following sections:-

Section 1	<i>Introduction</i>
Section 2	<i>Project Organization</i>
Section 3	<i>Summary of Impact monitoring Requirements</i>
Section 4	<i>Air Quality Monitoring Results</i>
Section 5	<i>Construction Noise Monitoring Results</i>
Section 6	<i>Waste Management</i>
Section 7	<i>Site Inspections</i>
Section 8	<i>Environmental Complaint and Non-Compliance</i>
Section 9	<i>Implementation Status of Mitigation Measures</i>
Section 10	<i>Conclusions and Recommendations</i>

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 according with the EP stipulation, the required documents submission status to EPD for retention as listed below:

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

Table 2-2 Status of Environmental Licenses and Permits

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.: WT00019539-2014 Approved on 16/07/2014 Valid to: 31/07/2019
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-RS0290-15 obtained on 18 March 2015 Valid from 19:00 of 19 March 2015 to 07:00 of 11 September 2015 GW-RS1453-14 obtained on 24 December 2014 Valid from 19:00 of 27 December 2014 to 06:00 of 23 June 2015 GW-RS0600-15 obtained on 4 June 2015 Valid from 19:00 of 23 June 2015 to 07:00 of 12 December 2015 GW-RS0656-15 obtained on 12 June 2015 Valid from 01:30 of 12 June 2015 to 04:30 of 11 December 2015

CONSTRUCTION PROGRESS

2.11 In the Reporting Period, construction activities conducted are listed below. Moreover, the master construction program is enclosed in [Appendix C](#).

- Sheet piling
- Backfilling
- Painting
- Concreting
- Grouting
- Reinstatement of SBC
- Pre-Drilling
- Cable Containment works

3 SUMMARY ENVIRONMENTAL IMPACT MONITORING REQUIREMENTS

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"> • 24-hour Total Suspended Particulate (hereinafter '24-hour TSP') • 1-hour TSP monitoring ^(*)
Construction Noise	<ul style="list-style-type: none"> • A-weighted equivalent continuous sound pressure level (30min) (hereinafter 'L_{eq(30min)}') during the normal working hours

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 attached to the Project Profile (Register No. PP-472/2012), construction noise and air quality monitoring location is 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. The monitoring stations proposed for the Project are summarized *Table 3-2* and illustrated in *Appendix D*.

Table 3-2 Air and Noise Monitoring Locations

Aspect	Monitoring Location	Location ID	Address	Description
Air Quality	Chiu Hin Mansion	A1	balcony at 1/F of Chiu Hin Mansion	ASR close to the Project site
Construction Noise	Hennessey Building	N1	2/F floor of Hennessey Building	NSR facing to the Project site
	Chiu Hin Mansion	N2	balcony at 1/F of Chiu Hin Mansion	NSR facing to the Project site

MONITORING FREQUENCY AND PERIOD

3.05 The requirements of impact monitoring are stipulated in the EMAP and presented as follows.

Air Quality

3.06 Frequency of impact air quality monitoring is as follows:

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

3.07 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

- 3.08 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 depended 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

- 3.09 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*. A direct reading dust meter is used to measure 1-hour TSP air quality in case of non-compliance with air quality criteria of the 24-Hour TSP measurement.
- 3.10 The filter paper of 24-hour TSP measurement shall be determined by HOKLAS accredited laboratory. All equipment to be used for air quality monitoring is listed in **Table 3-3**.

Table 3-3 Air Quality Monitoring Equipment

Equipment	Model
24-hour TSP	
High Volume Air Sampler	TISCH High Volume Air Sampler, HVS Model TE-5170
Calibration Kit	TISCH Model TE-5028A
1- hour TSP	
Portable Dust Meter	TSI Model 8520 DustTrak Aerosol Monitor / Aerocet 531 Handheld Particle Mass Profiler & Counter / Sibata LD-3A Laser Dust Monitor

- 3.11 According to the EMAP, wind data monitoring equipment shall also 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.
- 3.12 Although ET was successful granted HVS installation premises, however, the owners rejected to provide premises for wind data monitoring equipment installation.
- 3.13 In this situation, the ET proposed alternative methods to obtain representative wind data. Meteorological information as extracted from “the Hong Kong Observatory King’s Park Station” is alternative method to obtain representative wind data. For King’s Park Station, it also can provide the humidity, rainfall, and air pressure and temperature etc. meteorological information. In Hong Kong of a lot development projects, weather information extracted from Hong Kong Observatory is common alternative method if weather station installation not allowed.
- 3.14 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

- 3.15 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 m s⁻¹. Furthermore, an acoustic calibrator and sound level meter shall be calibrated yearly.
- 3.16 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 or Rion NL-14
Calibrator	Rion NC-73 / B&K Type 4231
Portable Wind Speed Indicator	Testo Anemometer

MONITORING METHODOLOGY

24-hour TSP

- 3.17 The equipment used for 24-hour TSP measurement listed in Table 3-3, is a Tisch Environmental, Inc. Model TE-5170 TSP high volume air sampling system, which complied with EPA 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
- 3.18 The HVS is calibrated in accordance with the manufacturer’s instruction using the NIST-certified standard calibrator (Tisch Calibration Kit Model TE-5028A). The 24-hour TSP Monitoring using the HVS is also processed in accordance with the manufacturer’s Operations Manual.
- 3.19 24-hour TSP is collected by the ET on filters of HVS and quantified by a local HOKLAS accredited laboratory, ALS Technichem (HK) Pty Ltd (ALS), upon receipt of the samples. The ET keeps 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.

Noise

- 3.20 Sound level meter listed in **Table 3-4** comply 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), which was used for baseline noise monitoring.
- 3.21 The noise measurement is performed with the meter set to FAST response and on the A-weighted equivalent continuous sound pressure level (Leq). Leq(30min) in six consecutive Leq(5 min) measurements were used as the monitoring parameter.
- 3.22 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 N2 are conducted 1 m from the exterior of the building façade.
- 3.23 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

- 3.24 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.

- 3.25 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 E](#).

DATA MANAGEMENT AND DATA QA/QC CONTROL

- 3.26 The all monitoring data were handled by the ET's in-house data recording and management system.
- 3.27 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.
- 3.28 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 AIR QUALITY MONITORING RESULTS

4.01 In the Reporting Period, **16** occasions of 24-hours TSP monitoring was carried out at the proposed location A1.

24-HOUR TSP AIR QUALITY MONITORING RESULTS

4.02 The monitoring results are summarized in *Table 4-1*. The relevant graphical plots are shown in *Appendix F*.

Table 4-1 Summary of 24-hour TSP Monitoring Results

Date	A1 - Balcony at 1/F of Chiu Hin Mansion		
	24-hour TSP ($\mu\text{g}/\text{m}^3$)	Action Level ($\mu\text{g}/\text{m}^3$)	Limit Level ($\mu\text{g}/\text{m}^3$)
4-Jun-15	33	162	260
10-Jun-15	45		
16-Jun-15	37		
22-Jun-15	36		
27-Jun-15	46		
3-Jul-15	55		
9-Jul-15	78		
14-Jul-15	54		
21-Jul-15	13		
27-Jul-15	60		
1-Aug-15	32		
7-Aug-15	140		
13-Aug-15	43		
19-Aug-15	50		
25-Aug-15	56		
31-Aug-15	44		
Average (Range)	51 (32 - 140)		

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

4.04 In the Reporting Period, dust concentration of the minimum was measured on **1 August 2015** and maximum was measured on **7 August 2015**. Moreover, Average value in the Reporting Period is $79\mu\text{g}/\text{m}^3$.

4.05 The summary of meteorological information during the Reporting Period is presented in *Appendix G*.

5 CONSTRUCTION NOISE MONITORING RESULTS

5.01 In the Reporting Period, total 26 occasion’s construction noise measurement was conducted at N1 and N2. The sound level meter was set in 1m from the exterior of the building façade at N1 and N2. Therefore, no façade correction (+3 dB(A) is added according to acoustical principles and EPD guidelines.

NOISE MONITORING RESULTS

5.02 The noise measurement results at N1 and N2 are listed in *Table 5-1*. The relevant graphical plots are shown in *Appendix F*.

Table 5-1 Summary of Noise Monitoring Results

Measurement Date	Leq30min (dB(A))	
	N1 2/F floor of Hennessey Building	N2 Balcony at 1/F of Chiu Hin Mansion
2-Jun-15	66	66
9-Jun-15	70	75
18-Jun-15	75	71
23-Jun-15	68	75
2-Jul-15	75	67
7-Jul-15	76	69
14-Jul-15	68	74
21-Jul-15	71	74
28-Jul-15	77	71
4-Aug-15	75	67
11-Aug-15	75	70
18-Aug-15	75	67
25-Aug-15	74	71
Limit Level of Construction Noise	75 dB(A)	

5.03 Referred to above tables, no noise measurement result is higher than 75dB(A) was recorded at N2, but two (2) occasions of noise measurement result higher than 75dB(A) were recorded at N1. As reviewed the baseline noise monitoring data of N1, high background noise is already exist. In order to find the actual construction noise, the exceeded noise measurement results were adjusted by the baseline monitoring data show in *Table 5-2*.

Table 5-2 Adjustment of Construction Noise Level for N1, dB(A)

Date	Time Period	Leq30min Measurement Record at the Receiver	Average Background Noise at the Receiver	Actual Construction Noise of the Project
7-Jul-15	11:10	76	75 (11:00 – 12:00)	68
28-Jul-15	17:00	77	76 (17:00 – 18:00)	70

Equation of Adjustment: $C = 10\log(10^{A/10} - 10^{B/10})$

Where:

A is noise level measurement at the receiver position;

B is average background noise at the measurement time at the receiver position; and

C is actual construction noise.

5.04 After the correction, the construction noise of the Project were indicated not exceed 75dB. No Notifications of Exceedances (NOEs) therefore was issued to the RE, IEC and the Main Contractor.

5.05 Furthermore, there is no noise complaint (Action Level exceedance) received by the MTRC and Contractor or EPD in the Reporting Period.

6 WASTE MANAGEMENT

GENERAL WASTE MANAGEMENT

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

RECORDS OF WASTE QUANTITIES

6.02 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.

6.03 The quantities of waste for disposal in this Reporting Period are summarized in *Tables 6-1* and *6-2* and the Summary of Waste Flow Table is shown in *Appendix H*.

Table 6-1 Summary of Quantities of Inert C&D Materials

Type of Waste	Quantity			Disposal Location
	Jun 15	Jul 15	Aug 15	
Total C&D Materials (Inert) (m ³)	0.13793	0.09909	0.06101	-
Reused in this Contract (Inert) (m ³)	0	0	0	-
Reused in other Projects (Inert) (m ³)	0	0	0	-
Disposal as Public Fill (Inert) (m ³)	0.13793	0.09909	0.06101	TKO 137

Table 6-2 Summary of Quantities of Non-Inert C&D Wastes

Type of Waste	Quantity			Disposal Location
	Mar 15	Jul 15	Aug 15	
Recycled Metal (m ³)	0	0	0	-
Recycled Paper / Cardboard Packing (m ³)	0	0	0	-
Recycled Plastic (m ³)	0	0	0	-
Chemical Wastes (m ³ /L)	0	0	0	-
General Refuses (m ³)	0.01913	0.01298	0.00731	SENT Landfill

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

7 SITE INSPECTION

7.01 According to the EMAP, weekly site inspection undertaken by the RE, ET and the Contractor to confirm the environmental performance. In the reporting Period, total fourteen (14) occasions weekly site inspection were undertaken.

FINDINGS / DEFICIENCIES DURING THE REPORTING MONTH

7.02 During June 2015, **four (4)** occasions of weekly site inspections to evaluate site environmental performance was carried out by the RE, ET and the Contractor on **4, 10, 18 and 25 June 2015** and the IEC was joined the site inspection on **18 June 2015**. No non-compliance was noted. However, four (4) observations and one (1) reminder were recorded by the ET.

7.03 During July 2015, **five (5)** occasions of weekly site inspections to evaluate site environmental performance was carried out by the RE, ET and the Contractor on **2, 8, 16, 23 and 30 July 2015** and the IEC was joined the site inspection on **30 July 2015**. No non-compliance was noted. However, six (6) observations were recorded by the ET.

7.04 During August 2015, **four (4)** occasions of weekly site inspections to evaluate site environmental performance was carried out by the RE, ET and the Contractor on **6, 12, 21 and 27 August 2015** and the IEC was joined the site inspection on **27 August 2015**. No non-compliance was noted. However, two (2) observations and five (5) reminders were recorded by the ET.

7.05 The detailed findings / deficiencies and follow-up in the Reporting Period listed in **Table 7-1**.

Table 7-1 Site Observations

Date	Findings / Deficiencies	Follow-Up Status
4 June 2015	<ul style="list-style-type: none"> • The Contractor should extend the shelter for the area of batching plant and storage of cement bags to minimize fugitive dust. • The Contractor should provide proper dust mitigation measure such as water spraying for the disposed cement bags in the waste skip to reduce the possible dust impact. • The Contractor was reminded to provide full screen site hoarding for the construction site area. 	<ul style="list-style-type: none"> • Enlarged shelter has been provided and cement bag were removed. • The disposed cement bags in the waste skip were removed. • Only reminder.
10 June 2015	No specific findings were observed.	NA
18 June 2015	<ul style="list-style-type: none"> • The pH reading shown in the panel screen of the WetSep was less than 6 which inconsistent with the in situ pH paper testing (~7), the Contractor should check the condition of WetSep and repair if required. 	<ul style="list-style-type: none"> • The pH reading was in proper range.
25 June 2015	<ul style="list-style-type: none"> • Excavated soil mix up with the construction waste and disposed in a labelled construction waste skip was observed, the Contractor should provide proper area or container for the excavated soil. 	<ul style="list-style-type: none"> • The excavated soil has been cleared.
2 July 2015	No specific findings were observed.	NA
8 July 2015	<ul style="list-style-type: none"> • Construction material next to the retained tree was observed, the Contractor should maintain a buffer distance for the retained tree and construction material. 	<ul style="list-style-type: none"> • Construction material next to the retained tree has been removed.

Date	Findings / Deficiencies	Follow-Up Status
	<ul style="list-style-type: none"> Sand generated from construction work was disposed in the planter of the retained tree, the Contractor should remove the sand otherwise it may affect the tree growing. 	<ul style="list-style-type: none"> The sand has been removed from the planter.
16 July 2015	<ul style="list-style-type: none"> Construction material next to the retained tree was observed, the Contractor should maintain a buffer distance for the retained tree and construction material. Opened sand stockpile was observed, the Contractor should cover the stockpile with impervious sheeting to minimize dust impact. 	<ul style="list-style-type: none"> The construction material next to the retained tree has been removed. The sand stockpile has been removed
23 July 2015	<ul style="list-style-type: none"> No adverse environmental issues were observed. 	<ul style="list-style-type: none"> NA
30 July 2015	<ul style="list-style-type: none"> Proper label should be provided for each chemical waste inside the chemical waste storage container. The hoarding enclosed the works area should be full screen without gap. 	<p>Chemical label was provided.</p> <p>Proper hoarding was installed for works area.</p>
6 August 2015	<ul style="list-style-type: none"> The Contractor was reminded to maintain the protective fence for the retained tree within the site. 	<p>Not required for reminder.</p>
12 August 2015	<ul style="list-style-type: none"> The Contractor was reminded to display the updated EP at the new works area. The Contractor was reminded to provide chemical waste storage area at the new works area. 	<p>Not required for reminder.</p> <p>Not required for reminder.</p>
21 August 2015	<ul style="list-style-type: none"> No adverse environmental issues were observed. 	<ul style="list-style-type: none"> NA
27 August 2015	<ul style="list-style-type: none"> Proper full screen site hoarding should be provided for the new works area Protective fence should be provided for the retained trees within the new works area The Contractor was reminded to display the updated EP at exit of the new works area. The Contractor was reminded to provide wheel washing facilities for new works area. 	<p>To be followed.</p> <p>Protective fence was provided for the retained trees.</p> <p>Not required for reminder.</p> <p>Not required for reminder.</p>

7.06 No site inspection was undertaken by external parties i.e. EPD in the Reporting Period.

8 ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE

ENVIRONMENTAL COMPLAINT, SUMMONS AND PROSECUTION

8.01 In the Reporting Period, no environmental complaint, summons and prosecution are received by either the EPD or MTRCL or the Main Contractor. The statistical summary table of environmental complaint is presented in *Tables 8-1, 8-2 and 8-3*.

Table 8-1 Statistical Summary of Environmental Complaints

Reporting Period	Environmental Complaint Statistics					
	Frequency	Cumulative	Complaint Nature			
			Air	Noise	Water	Others
1– 30 Jun 2015	0	0	NA	NA	NA	NA
1– 31 Jul 2015	0	0	NA	NA	NA	NA
1– 31 Aug 2015	0	0	NA	NA	NA	NA

Table 8-2 Statistical Summary of Environmental Summons

Reporting Period	Environmental Summons Statistics					
	Frequency	Cumulative	Complaint Nature			
			Air	Noise	Water	Others
1– 30 Jun 2015	0	0	NA	NA	NA	NA
1– 31 Jul 2015	0	0	NA	NA	NA	NA
1– 31 Aug 2015	0	0	NA	NA	NA	NA

Table 8-3 Statistical Summary of Environmental Prosecution

Reporting Period	Environmental Prosecution Statistics					
	Frequency	Cumulative	Complaint Nature			
			Air	Noise	Water	Others
1– 30 Jun 2015	0	0	NA	NA	NA	NA
1– 31 Jul 2015	0	0	NA	NA	NA	NA
1– 31 Aug 2015	0	0	NA	NA	NA	NA

9 IMPLEMENTATION STATUS OF MITIGATION MEASURES

9.01 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 I*.

MITIGATION MEASURES UNDERTAKE IN THE REPORTING PERIOD

9.02 In the Reporting Period, the environmental mitigation measures implemented by the Contractor are listed in *Table 9-1*.

Table 9-1 Summary of Environmental Mitigation Measures

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

9.03 In addition, mosquito control measures to prevent mosquito breeding on site are conducted in the Reporting Period.

10 CONCLUSIONS AND RECOMMENDATIONS

10.01 This is the 4th Quarterly EM&A Summary Report presenting the monitoring results and inspection findings in the Reporting Period from *1 June 2015* to *31 August 2015*.

CONCLUSION

10.02 In the Reporting Period, **16** occasions of 24-hours TSP monitoring was conducted at the proposed Monitoring Location A1. The monitoring results are all below the Action/ Limit Level. No Notifications of Exceedances (NOEs) or the associated corrective actions were therefore issued.

10.03 In the Reporting Period, a total of **26** occasions of noise measurement was conducted at N1 and N2. No noise measurement result is higher than 75dB(A) was recorded at N2, but two occasions of noise measurement result higher than 75dB(A) were recorded at N1. As reviewed the baseline noise monitoring data of N1, high background noise is already exist. In order to find the actual construction noise, the exceeded noise measurement results were adjusted by the baseline monitoring data. After correction, the construction noise levels of the Project were indicated below 75dB(A). No Notifications of Exceedances (NOEs) or the associated corrective actions were therefore issued. Furthermore, no noise complaint (which is an Action Level exceedance) was received.

10.04 No environmental complaint, notification of summons or successful prosecution was received in the Reporting Period.

10.05 A total of thirteen (13) occasions of weekly site inspections to evaluate site environmental performance was carried out by the RE, ET and the Contractor in the Reporting Period. Moreover, the IEC attended the site inspections on *18 June 2015*, *30 July 2015* and *27 August 2015*. In the Reporting Period, no non-compliance was noted and total 8 observations were recorded by the ET. Minor deficiencies found in the weekly site inspection were in general rectified within the specified deadlines. The environmental performance of the Project was considered as satisfactory in this reporting period.

10.06 In the Reporting Period, no joint site inspection was attended by external parties i.e. EPD.

RECOMMENDATIONS

10.07 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.

10.08 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.

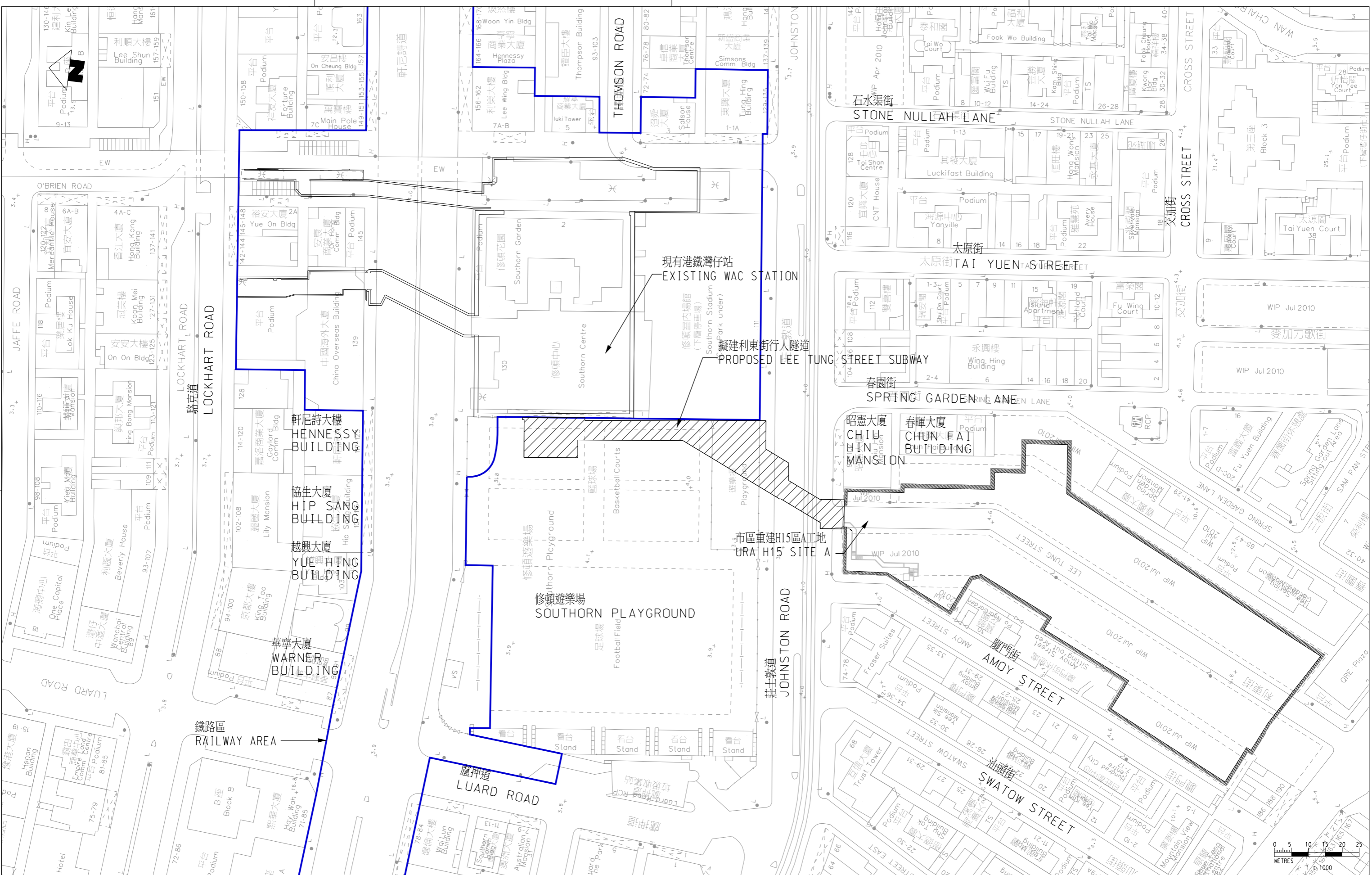
10.09 The Contractor should also prevent muddy water and other water pollutants via site surface water runoff get into public areas. Any discharge water should be strictly complied with wastewater discharge license requirement. As a reminder, water quality mitigation measures should be properly implemented in accordance with the EM&A requirement.

10.10 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

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

DRAWN	HO
DESIGNED	BW
CHECKED	BL
APPROVED	AFK
DATE	04MAY2011

MTR

WAC STATION LEE TUNG STREET SUBWAY

ORIGINATOR

Mott MacDonald

20/F Two Landmark East
 100 How Ming Street
 Kowloon, Hong Kong
 Tel: +852 2808 8257
 Fax: +852 2807 1893
 www.mottmacdonald.com.hk

CADD REF. NEX1050_2.7A_0010.dgn

TITLE

CONSULTANCY AGREEMENT NO. NEX/1050
 DETAILED DESIGN FOR LEE TUNG STREET SUBWAY
 施工位置圖

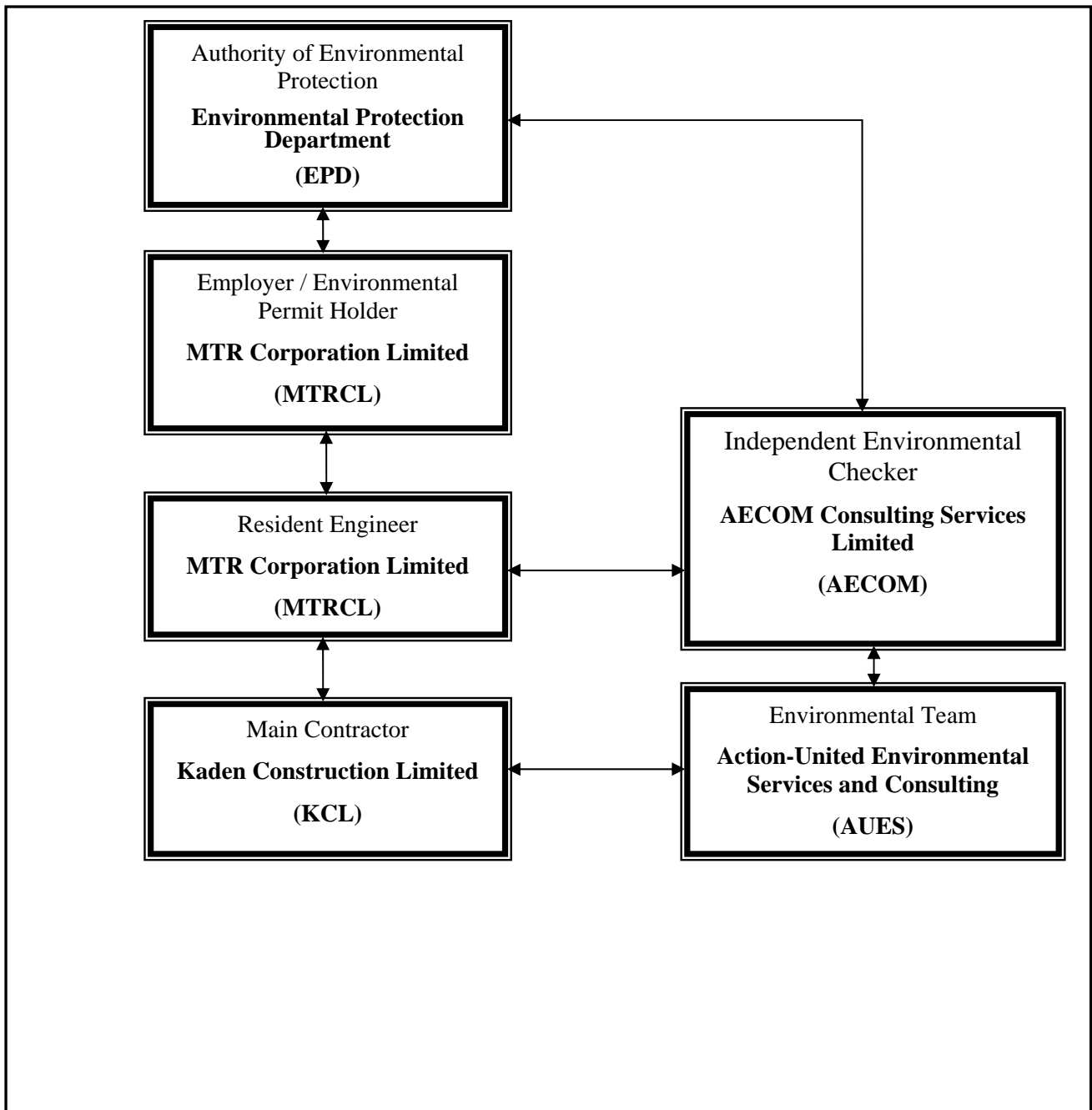
SCALE 1:1000 (A3)

DRAWING NO. NEX1050/2.7A/001

REV. D

Appendix B

Organization of the Project



Contact Details of Key Personnel for the Project

Organization	Project Role	Name of Key Staff	Tel No.	Fax No.
MTRCL	Resident Engineer	Mr. Raymond Lee	3547 0002	3547 0090
AECOM	Independent Environmental Checker	Mr. Rodney Ip	2410 3750	2428 9922
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

Legend:

MTRCL (Employer) – MTR Corporation Limited

MTRCL (Resident Engineer) – MTR Corporation Limited

KCL (Main Contractor) – Kaden Construction Limited

AECOM (IEC) – AECOM Consulting Services Limited

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

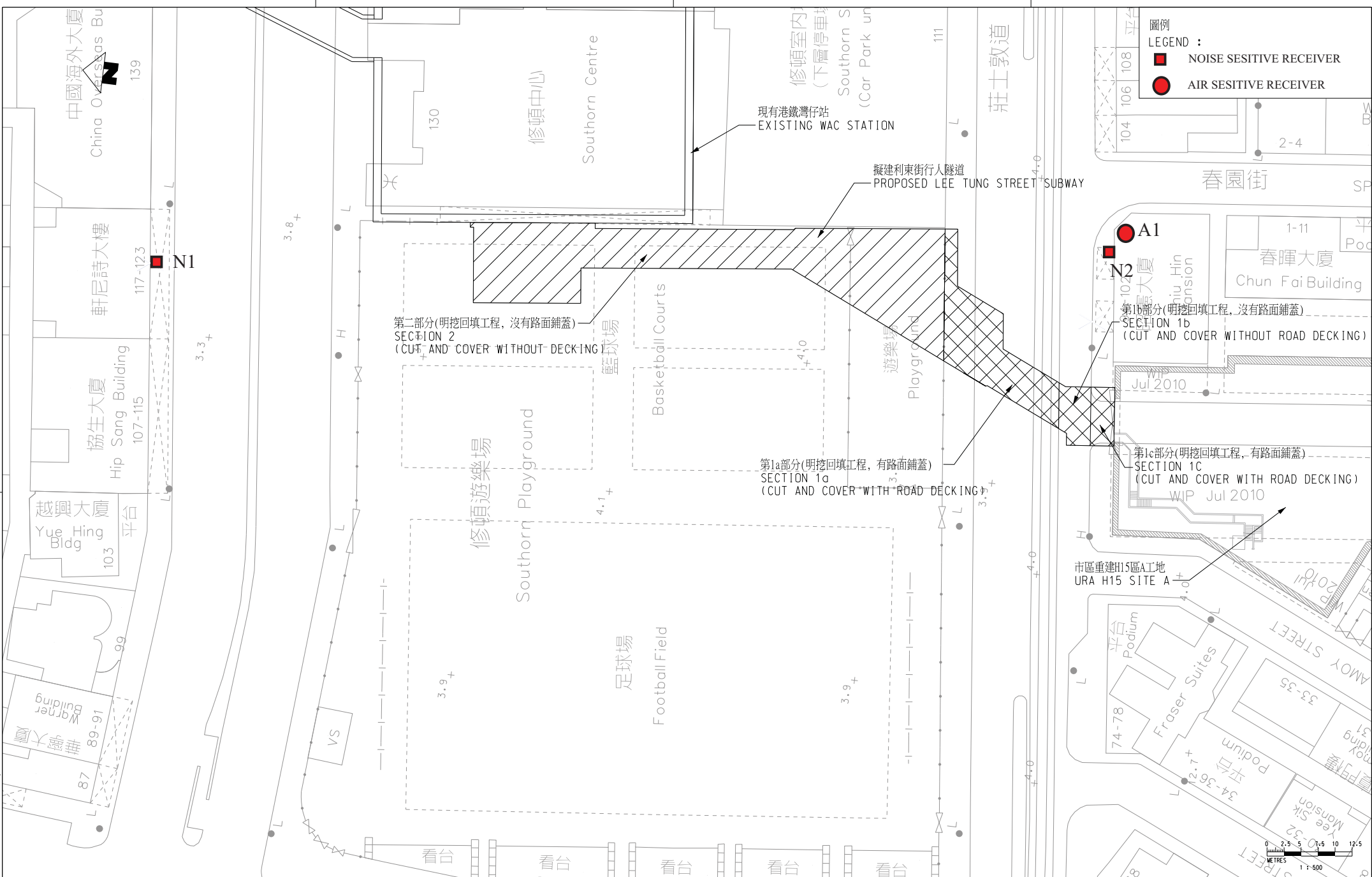
Appendix C

Master Construction Programme

Appendix D

Monitoring Locations

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 06/29/2016 10:46:20Z



圖例
 LEGEND :
 ■ NOISE SENSITIVE RECEIVER
 ● AIR SENSITIVE RECEIVER

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

MTR
 WAC STATION LEE TUNG STREET SUBWAY
 ORIGINATOR
Mott MacDonald
 25F Two Landmark East
 100 Tsim Sha Tsui Street
 Kowloon, Hong Kong
 Tel: +852 2828 0107
 Fax: +852 2828 1050
 www.mottmacdonald.com.hk

DESIGNED	
CHECKED	
APPROVED	
DATE	

D	GENERAL REVISION		
C	GENERAL REVISION		
B	GENERAL REVISION		
A	PROJECT PROFILE		

REV	DESCRIPTION	BY	DATE	APPROVED	REV	DESCRIPTION	BY	DATE	APPROVED

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

Appendix E

Event and Action Plan

Event and Action Plan for Construction Noise

Event	Action			
	ET	IEC	ER	Contractor
Action Level	1. Notify IEC and Contractor. 2. Carry out investigation. 3. Report the results of investigation to the IEC and Contractor. 4. Discuss with the Contractor and formulate remedial measures 5. Increase monitoring frequency to check mitigation effectiveness.	1. Review the analyzed result submitted by ET. 2. Review the proposed remedial measures by the Contractor and advise the ER accordingly. 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of exceedance 2. Notify Contractor 3. Require Contractor to propose remedial measures for the analyzed noise problem 4. Ensure remedial measures are properly implemented.	1. Submit noise mitigation proposals to IEC 2. Implement noise mitigation proposals
Limit Level	1. Notify IEC, ER, EPD and Contractor, and follow other actions 2. Identify source 3. Repeat measurement to confirm findings 4. Increase monitoring frequency 5. Check Contractor's working procedures to determine possible mitigation to be implemented 6. Inform IEC, ER and EPD the causes and actions taken for the exceedances 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD, ER informed of the results 8. If exceedance stops, cease additional monitoring	1. Discuss amongst ER, ET and Contractor on the potential remedial actions 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ET accordingly 3. Supervise the implementation of remedial measures	1. Confirm receipt of notification of exceedances 2. Notify Contractor 3. Require Contractor to propose remedial measures 4. Ensure remedial measures are properly implemented 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated.	1. Take immediate action to avoid further exceedance 2. Submit proposals for remedial actions to IEC within 3 working days of notifications 3. Implement the agreed proposals 4. Revise and resubmit proposals if problem still not under control 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated

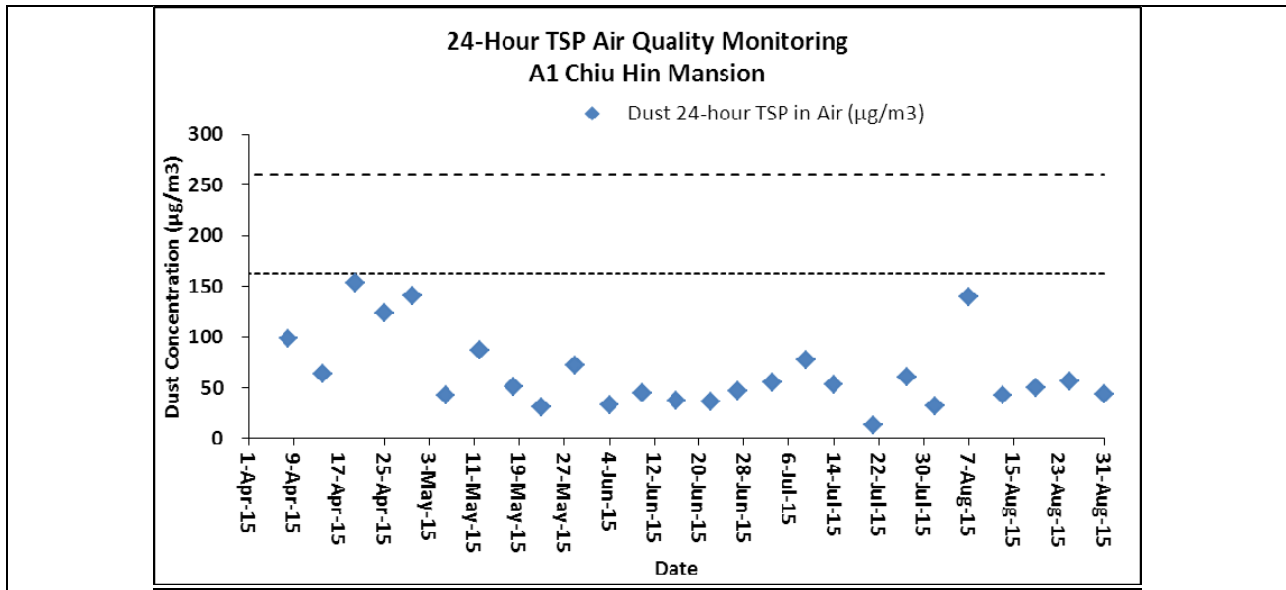
Event and Action Plan for Air Quality

Event	Action			
	ET	IEC	ER	Contractor
Action Level				
Exceedance for one sample	1. Identify source; 2. If valid, inform IEC and ER; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency to daily	1. Check monitoring data submitted by ET; 2. Check Contractor's working method.	1. Notify Contractor	1. Rectify any unacceptable practice; 2. Amend working methods if appropriate
Exceedance for two or more consecutive samples	1. Identify source; 2. Inform IEC and EPD; 3. Repeat measurements to confirm findings; 4. Increase monitoring frequency to daily; 5. Discuss with IEC and Contractor on remedial action required; 6. If exceedance continues, arrange meeting with IEC and ER; 7. If exceedance stops, cease additional monitoring.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and Contractor on possible remedial measures; 4. Advise the ER on the effectiveness of the proposed remedial measures; 5. Supervisor implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Ensure remedial Measure properly implemented.	1. Submit proposals for remedial action to IEC within 3 working days of notification; 2. Implement the agreed proposals; 3. Amend proposal if appropriate.
Limit Level				
Exceedance for one sample	1. Identify source; 2. Inform ER and EPD; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency to daily; 5. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and the Contractor on possible remedial measures; 4. Advise the ER on the effectiveness of the proposed remedial measures; 5. Supervise implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented.	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Amend proposal if appropriate.
Exceedance for two or more consecutive samples	1. Notify IEC, ER, Contractor and EPD; 2. Identify sources; 3. Repeat measurement to confirm findings; 4. Increase monitoring frequency to daily; 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 6. Arrange meeting with IEC and ER to discuss the remedial actions to be taken; 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results; 8. If exceedance stops cease additional monitoring.	1. Discuss amongst ER, ET and Contractor on the potential remedial actions; 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ET accordingly. 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. In consultation with IEC, agree with the Contractor on the remedial measures to be implemented; 4. Ensure remedial measures properly implemented; 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Resubmit proposals if problem still not under control; 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated.

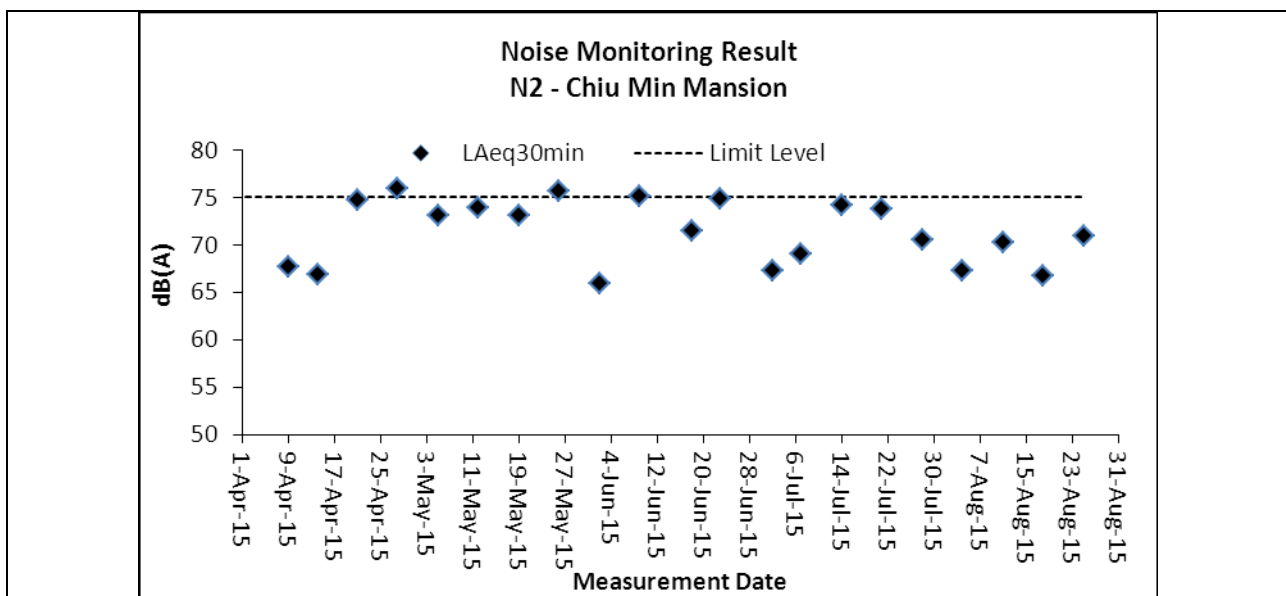
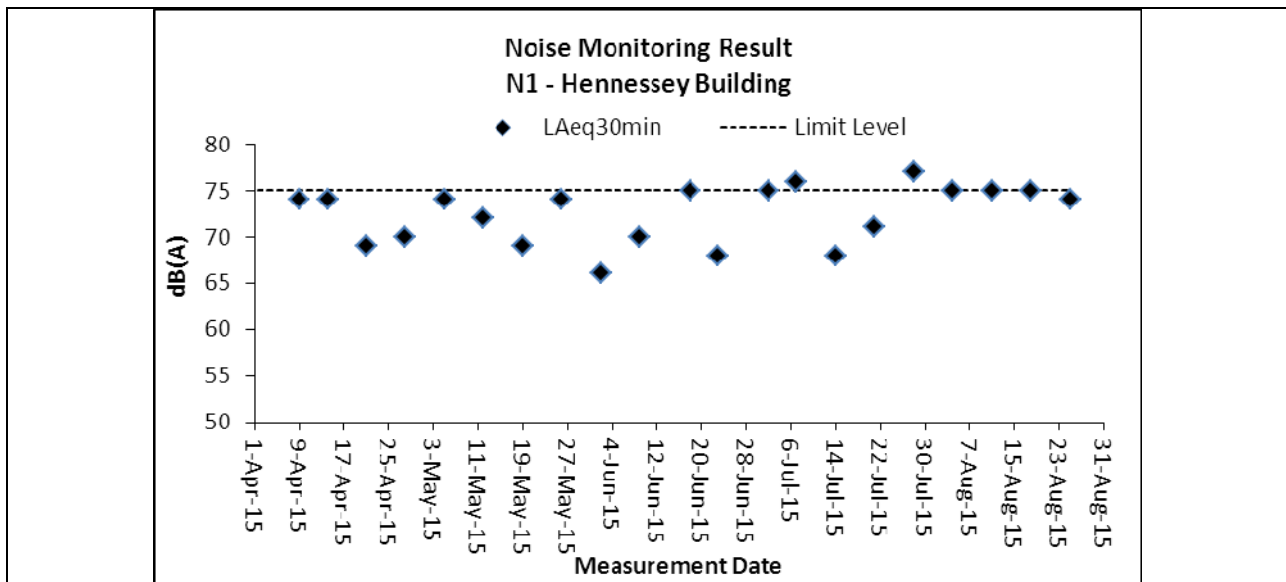
Appendix F

Graphical Plots

Air Quality



Construction Noise



Appendix G

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-Jun-15	Mon	Hot with sunny periods. Isolated showers in the morning. Moderate southerly winds.	10.6	29.7	8.2	80	SW
2-Jun-15	Tue	Hot with sunny periods. Isolated showers in the morning. Moderate southerly winds.	5.4	29.3	8	74.7	S/SW
3-Jun-15	Wed	Mainly fine and very hot. Moderate south to southwesterly winds.	Trace	29.7	8.5	75.5	W/NW
4-Jun-15	Thu	It will be fine. Very hot in the afternoon. Moderate south to southwesterly winds.	10.6	29.8	7.6	76	W/NW
5-Jun-15	Fri	Mainly cloudy with a few showers. There will be isolated thunderstorms overnight. Moderate southwesterly winds.	5.4	29.5	7.6	80	W/NW
6-Jun-15	Sat	Mainly fine and hot apart from isolated showers. Moderate southwesterly winds.	Trace	29.9	8.4	76	W/NW
7-Jun-15	Sun	Mainly fine and hot apart from isolated showers. Moderate southwesterly winds.	0	29.8	8.2	83.7	S/SW
8-Jun-15	Mon	Mainly fine and hot apart from isolated showers. Moderate southwesterly winds.	0	29.9	9	75	SW
9-Jun-15	Tue	Hot with sunny periods and isolated showers. Moderate southwesterly winds.	0.8	29.9	9	76.5	W/NW
10-Jun-15	Wed	Hot with sunny periods and isolated showers. Moderate southwesterly winds.	Trace	29.3	9	77.2	W/NW
11-Jun-15	Thu	Hot with sunny intervals and isolated showers. Moderate southwesterly winds.	1.6	29.6	8.4	78.7	W/SW
12-Jun-15	Fri	Hot with sunny intervals and a few showers. Moderate southwesterly winds.	96.8	28.3	12.8	84	W/NW
13-Jun-15	Sat	Mainly fine and hot apart from isolated showers. Moderate southerly winds.	0.4	30	7.2	76	SW
14-Jun-15	Sun	Mainly fine and hot apart from isolated showers. Moderate southerly winds.	1.5	29.7	8	76.7	S/SW
15-Jun-15	Mon	Mainly fine and hot apart from isolated showers. Moderate southerly winds.	5.2	29.8	6.9	75.7	S/SW
16-Jun-15	Tue	Mainly fine and very hot. Light to moderate southerly winds.	0	30	6.5	74	W/NW
17-Jun-15	Wed	Mainly fine. Very hot in the afternoon. Moderate south to southwesterly winds.	0	30.1	8.2	76	W/NW
18-Jun-15	Thu	Mainly fine. Very hot in the afternoon. Moderate south to southwesterly winds.	0	30.5	10.2	71	W/NW
19-Jun-15	Fri	Mainly fine. Very hot in the afternoon. Moderate south to southwesterly winds.	Trace	30.6	8.4	71.5	W/NW
20-Jun-15	Sat	Mainly cloudy with a few showers. Isolated squally thunderstorms. Moderate southerly winds, occasionally fresh offshore.	0	31.1	7.2	71	E/SE
21-Jun-15	Sun	Mainly cloudy with a few showers. Isolated squally thunderstorms. Moderate southerly winds, occasionally fresh offshore.	39.9	28.7	11.2	86.2	E/SE
22-Jun-15	Mon	Mainly cloudy with a few showers. Isolated squally thunderstorms. Moderate southerly winds, occasionally fresh offshore.	18.1	28.1	9.2	88.7	E/SE
23-Jun-15	Tue	Mainly cloudy with a few showers. Isolated squally thunderstorms. Moderate southerly winds, occasionally fresh offshore.	51.3	27.1	8.5	90	E/SE
24-Jun-15	Wed	Mainly cloudy with a few showers. Isolated squally thunderstorms. Moderate southerly winds, occasionally fresh offshore.	9.7	27.9	8.9	87.5	S/SW
25-Jun-15	Thu	Mainly cloudy with scattered showers. Isolated squally thunderstorms at first. Moderate southerly winds.	28.5	27.8	8.9	87.5	S/SW
26-Jun-15	Fri	Mainly fine. Very hot in the afternoon. Moderate southerly winds.	10.4	29.1	7.2	81	W/SW
27-Jun-15	Sat	Mainly fine. Very hot in the afternoon. Moderate southerly winds.	0	30.5	8.5	75.5	S/SW
28-Jun-15	Sun	Mainly fine. Very hot in the afternoon. Moderate southerly winds.	1.9	29.9	8.5	76.7	W/NW
29-Jun-15	Mon	Mainly fine. Very hot in the afternoon. Moderate southerly winds.	Trace	30.4	8	73.5	W/NW
30-Jun-15	Tue	Mainly fine. Very hot in the afternoon. Moderate southerly winds.	Trace	30.5	7.7	76.5	W/NW

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-15	Wed	Mainly fine and very hot. Moderate southerly winds.	0	30.8	7.4	76.7	W
2-Jul-15	Thu	Mainly fine and very hot. Moderate southerly winds.	Trace	30.9	9.4	77.5	W/NW
3-Jul-15	Fri	Mainly fine and very hot. Moderate southerly winds.	0	30.9	7.6	77.2	W/NW
4-Jul-15	Sat	Mainly fine and very hot. Moderate southerly winds.	0	30.6	5	74.5	S/SW
5-Jul-15	Sun	Mainly fine and very hot. Moderate southerly winds.	0	29.4	7.5	80	E/SE
6-Jul-15	Mon	Mainly fine and very hot. Moderate southerly winds.	Trace	29.2	6	72.2	W/NW
7-Jul-15	Tue	Mainly fine and very hot. Moderate southerly winds.	0	29.2	8.9	59.7	NE
8-Jul-15	Wed	Mainly fine and very hot. Moderate southerly winds.	0	28.9	7.8	60.7	N/NE
9-Jul-15	Thu	Fresh to strong northwesterly winds, strengthening gradually. Showers will become more frequent in the afternoon.	2	27.5	8.2	65	N/NW
10-Jul-15	Fri	Fresh to strong northwesterly winds, strengthening gradually. Showers will become more frequent in the afternoon.	24.3	28.2	11.7	80.5	E/SE
11-Jul-15	Sat	Very hot with sunny periods and isolated showers. Mainly cloudy tonight. Light to moderate southerly winds.	0	30	7	71.2	W/NW
12-Jul-15	Sun	Very hot with sunny periods and isolated showers. Mainly cloudy tonight. Light to moderate southerly winds.	0	31	5.5	70	W/NW
13-Jul-15	Mon	Very hot with sunny periods and isolated showers. Mainly cloudy tonight. Light to moderate southerly winds.	0	30.7	6.9	75	W/NW
14-Jul-15	Tue	Very hot with sunny periods and isolated showers. Mainly cloudy tonight. Light to moderate southerly winds.	0	30	5.5	74.5	W/NW
15-Jul-15	Wed	Very hot with sunny periods and isolated showers. Mainly cloudy tonight. Light to moderate southerly winds.	Trace	30.9	7.6	76.5	E/SE
16-Jul-15	Thu	Very hot with sunny periods and isolated showers. Mainly cloudy tonight. Light to moderate southerly winds.	Trace	29.4	6.4	78.7	W/NW
17-Jul-15	Fri	Very hot with sunny periods and isolated showers. Mainly cloudy tonight. Light to moderate southerly winds.	12	29.1	9	77.5	W/NW
18-Jul-15	Sat	Cloudy with showers and squally thunderstorms. Showers will be heavy at times. Moderate to fresh easterly winds.	0.2	29.5	9.6	80	E/SE
19-Jul-15	Sun	Cloudy with showers and squally thunderstorms. Showers will be heavy at times. Moderate to fresh easterly winds.	Trace	30.3	9.9	70	E/SE
20-Jul-15	Mon	Cloudy with showers and squally thunderstorms. Showers will be heavy at times. Moderate to fresh easterly winds.	46.2	26.9	7.5	87.2	E/SE
21-Jul-15	Tue	Cloudy with showers. Showers will be heavy at first with a few squally thunderstorms. Moderate to fresh southwesterly winds.	51.2	26	15.2	85.5	W/SW
22-Jul-15	Wed	Sunny periods and a few showers. Hot in the afternoon. Moderate southerly winds.	19.3	26	10.5	90.5	W/SW
23-Jul-15	Thu	Sunny periods and a few showers. Hot in the afternoon. Moderate southerly winds.	45	26.8	9.6	87.5	SW
24-Jul-15	Fri	Sunny periods and a few showers. Hot in the afternoon. Moderate southerly winds.	5.7	28.4	13.2	82.5	SW
25-Jul-15	Sat	Sunny periods and a few showers. Hot in the afternoon. Moderate southerly winds.	9.6	28.2	9.1	84.2	SW
26-Jul-15	Sun	Sunny periods and a few showers. Hot in the afternoon. Moderate southerly winds.	24.9	27.8	9.1	81	S/SW
27-Jul-15	Mon	Sunny periods and a few showers. Hot in the afternoon. Moderate southerly winds.	0.3	29.1	7.1	77.5	S/SW
28-Jul-15	Tue	Fine and very hot. Light winds.	Trace	29.6	7.5	72.2	S/SW
29-Jul-15	Wed	Fine and very hot. Light winds.	3.7	28.5	6.7	71.5	S/SW
30-Jul-15	Thu	Fine and very hot. Light winds.	0.6	28.1	8.2	80.5	S/SE
31-Jul-15	Fri	Fine and very hot. Light winds.	0	28.3	8	74	E/SE

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-Aug-15	Sat	Mainly fine and very hot apart from isolated showers. Light winds.	0	28.8	8.2	72.5	E/SE
2-Aug-15	Sun	Mainly fine and very hot apart from isolated showers. Light winds.	0	28.8	7.5	75	E/SE
3-Aug-15	Mon	Mainly fine and very hot apart from isolated showers. Light winds.	0	29.7	4.6	71.5	E/SE
4-Aug-15	Tue	Mainly fine and very hot apart from isolated showers. Light winds.	0	29.1	5.4	74.5	W/NW
5-Aug-15	Wed	Mainly fine and very hot apart from isolated showers. Light winds.	0	29.5	6.5	72.2	W/NW
6-Aug-15	Thu	Mainly fine and very hot apart from isolated showers. Light winds.	0	29.9	5.5	71.7	W/NW
7-Aug-15	Fri	Mainly fine and very hot apart from isolated showers. Light winds.	0	30.5	7.5	68.5	N/NW
8-Aug-15	Sat	Mainly fine and very hot apart from isolated showers. Light winds.	0	32.9	9.7	61.2	W/NW
9-Aug-15	Sun	Cloudy with showers and isolated thunderstorms. Moderate southwesterly winds.	11.6	30.2	12.2	73	W
10-Aug-15	Mon	Cloudy with showers and isolated thunderstorms. Moderate southwesterly winds.	23.5	27.4	9.7	82.5	N/NW
11-Aug-15	Tue	Mainly fine apart from isolated showers. Very hot. Moderate southwesterly winds.	16.8	29	7.2	76.5	W/NW
12-Aug-15	Wed	Mainly fine and very hot. Light to moderate southwesterly winds.	Trace	30.2	9.5	75.5	W/NW
13-Aug-15	Thu	Mainly fine and very hot. Light to moderate southwesterly winds.	27.5	26.9	6.9	84.5	W/NW
14-Aug-15	Fri	Mainly fine and very hot apart from isolated showers. Light winds.	18.9	26.5	11.4	29	/SW
15-Aug-15	Sat	Fine and very hot. Moderate south to southwesterly winds.	24.6	26.2	7	85	W/NW
16-Aug-15	Sun	Fine and very hot. Moderate south to southwesterly winds.	0.1	28.8	6.1	83.5	W/NW
17-Aug-15	Mon	Mainly fine apart from isolated showers. Very hot. Moderate southwesterly winds.	Trace	30	8.3	80	W/NW
18-Aug-15	Tue	Fine and very hot. Moderate south to southwesterly winds.	Trace	29.9	8.7	78	W/NW
19-Aug-15	Wed	Mainly fine and very hot. Light to moderate southwesterly winds.	0	29.9	7.5	78	W/NW
20-Aug-15	Thu	Very hot with isolated showers Light winds.	6.1	28.5	6.5	82	W/NW
21-Aug-15	Fri	Very hot with isolated showers Light winds.	0	30.7	7.5	73	W/NW
22-Aug-15	Sat	Very hot with isolated showers Light winds.	Trace	30.4	6.1	68.7	W/NW
23-Aug-15	Sun	Very hot with isolated showers Light winds.	3.4	30.4	6.5	73	N/NW
24-Aug-15	Mon	Very hot with isolated showers Light winds.	0	30.2	6.5	71	W/NW
25-Aug-15	Tue	Fine and dry apart from some haze. It will be very hot. Light winds.	0	30.8	6	62.2	W/NW
26-Aug-15	Wed	Mainly cloudy with a few showers and isolated thunderstorms. Light winds.	0.2	29.2	6	62.2	SE
27-Aug-15	Thu	Fine and dry apart from some haze. It will be very hot. Light winds.	0	29.2	7	92	E/SE
28-Aug-15	Fri	Fine and dry apart from some haze. It will be very hot. Light winds.	Trace	28.6	7	75.7	W/NW
29-Aug-15	Sat	Mainly cloudy with a few showers and isolated thunderstorms. Light winds.	0.9	28.3	6.9	79.5	W/NW
30-Aug-15	Sun	Cloudy with a few showers and squally thunderstorms. Light to moderate southeasterly winds	9.7	26.6	4.5	88.7	W/NW
31-Aug-15	Mon	Cloudy with a few showers and squally thunderstorms. Light to moderate southeasterly winds	Trace	27.5	6.5	84.2	E/SE

Appendix H

Waste Flow Table

Appendix I

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
NOISE IMPACT						
S.5.1.1	<u>Use of quieter plant</u>	To minimize construction noise emissions	Contractor	Work site	Construction Stage	ProPECC PN2/93 and Noise Control Ordinance
S.5.1.1	<u>Use of noise enclosure and movable barrier</u> <ul style="list-style-type: none"> • movable barrier can achieve a 5 dB(A) reduction for movable PME and 10 dB(A) reduction for stationary PME; • noise enclosure can achieve 15dB(A) reduction for PME; • 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; • 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; • Barrier material of surface mass in excess of 7kg/m² shall be required to achieve the maximum screening effect (and minimum 10kg/m² for noise enclosure); • 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. 	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	<u>General Construction Noise Control Measures</u> <ul style="list-style-type: none"> • 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; • The statutory and non-statutory requirements and guidelines shall be complied with; • 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; 	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"> • 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; • Noisy equipment and noisy activities shall be located as far away from the NSRs as is practical; • Unused equipment shall be turned off; • PME should be kept to a minimum and the parallel use of noisy equipment / machinery should be avoided; • All plant and equipment shall be maintained regularly; and • Material stockpiles and other structures shall be effectively utilized as noise barriers, whenever practicable. 					
AIR QUALITY IMPACT						
S.5.1.2	<p><u>Construction Dust Control Measures</u></p> <ul style="list-style-type: none"> • Regular watering to reduce dust emissions from all exposed site surface, particularly during dry weather; • Frequent watering for particularly dusty construction areas and areas close to air sensitive receivers; • Covering of stockpile of excavated dusty materials, if any, with impervious sheeting or spraying with water to maintain the entire surface wet; • Provision of vehicle washing facilities at the entry and exit points of site; • Tarpaulin covering of any dusty materials being transported to and from site by vehicle; • Positioning of construction plant at maximum practicable distance from air sensitive receivers; and • 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 	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
WATER QUALITY IMPACT						
S.5.1.3	<p><u>Construction Water Quality Impact Measures</u></p> <ul style="list-style-type: none"> • Collection of wastewater into a sedimentation tank for treatment before discharge into the public drainage system; • 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; • Installation of wheel washing facilities to minimize muddy runoff; • Regular maintenance and inspection of drainage systems and erosion control and silt removal facilities; • Management and monitoring of sewage treatment facilities (if any); • 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; • Coverage of stockpiles of C&D materials (if any) during rainstorms; and • Site toilet facilities, if needed, should be chemical toilets or should have the sewage discharge directed to a foul sewer. 	To reduce water quality impact induced by the construction work	Contractor	Work site	Construction Stage	ProPECC PN1/94; Water Pollution Control Ordinance
WASTE MANAGEMENT						
S.5.1.4	<p><u>Construction Waste Management Measures</u></p> <ul style="list-style-type: none"> • Scrap metals or abandoned equipment should be recycled if possible; • Waste arising should be kept to a minimum and be handled, transported and disposed of in a suitable manner; • The Contractor should adopt a trip ticket system for the disposal of C&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; • Chemical waste shall be handled in accordance with the Code of Practice on the Packaging, Handling and Storage of Chemical Wastes; and 	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"> 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. 					
LANDSCAPE AND VISUAL IMPACT						
S.5.1.5	<p><u>Landscape and Visual Measures</u></p> <ul style="list-style-type: none"> Clear demarcation of works area to prevent damages to existing trees in close proximity; Protection of all trees planned to be retained onsite; 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 Screening of construction works by hoardings/noise barriers around Works area in visually unobtrusive colours. 	To reduce landscape and visual impact by construction works.	Contractor	Work Site and nearby playground	Construction Stage	EIAO; ETWB TCW No. 3/2006.