JOB NO.: TCS01025/19

CONTRACT NO. WD/11/2018
DEVELOPMENT OF LOK MA CHAU LOOP: LAND DECONTAMINATION AND ADVANCE ENGINEERING WORKS – ENVIRONMENTAL TEAM

MONTHLY ENVIRONMENTAL MONITORING AND AUDIT REPORT – SEPTEMBER 2019

PREPARED FOR
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT (CEDD)

Date	Reference No.	Prepared By	Certified By
15 October 2019	TCS01025/19/600/R00142v1	Nicola Hon (Environmental Consultant)	Tam Tak Wing (Environmental Team Leader)

Version	Date	Remarks
1	15 October 2019	First Submission

NATURE & TECHNOLOGIES (HK) LIMITED
科 技 環 保（香 港）有 限 公 司
Lot 12, Tam Kon Shan Road, North Tsing Yi, New Territories, Hong Kong
香港新界北青衣担杆山路 12 號地段 Tel 電話: (852) 2877 3122 Fax 傳真: (852) 2511 0922
Email 電郵 : enquiry@nt.com.hk Website 網址 : http://www.nt.com.hk

Date: 16th October 2019

Project Manager/West
Civil Engineering and Development Department
West Development Office/West Division (5)
25/F, Tsuen Wan Government Offices,
38 Sai Lau Kok Road, Tsuen Wan,
New Territories, Hong Kong
Attn: Mr. LUK Ka Wing

Dear Sirs,

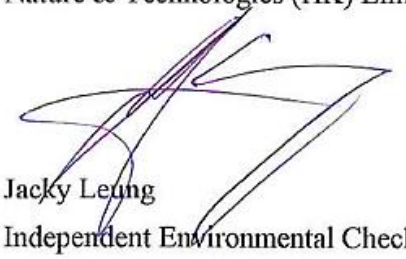
Agreement No. WD/02/2018
Development of Lok Ma Chau Loop: Land Decontamination and Advance Engineering Works
- Independent Environmental Checker

Monthly Environmental Monitoring and Audit Report for September 2019

We refer to the Monthly Environmental Monitoring and Audit Report for September 2019 approved by the Environmental Team Leader. Please note we have no adverse comments on the captioned submission. The captioned submission is hereby verified in accordance with the requirement stipulated in Condition 3.4 of EP No. EP-477/2013.

Should you have any query, please feel free to contact the undersigned at 2877 3122 (jleung@nt.com.hk) or our Mr. Vega Wong at 6113 2368 (vegawong@nt.com.hk).

Yours Sincerely,
For and on behalf of
Nature & Technologies (HK) Limited



Jacky Leung
Independent Environmental Checker

c.c. ET Leader – Ford Business International Limited (Attn: Mr. TW Tam) [by Email: twtam@fordbusiness.com]
Project Manager – SKJV (Attn: Mr. Anthony Chan) [by Email: anthony277@hotmail.com]

EXECUTIVE SUMMARY

INTRODUCTION

ES01 This is the **9th** monthly Environmental Monitoring and Audit (EM&A) Report presenting monitoring results and inspection findings for the project "Contract No. YL/2017/03 – Development of Lok Ma Chau Loop: Land Decontamination and Advance Engineering Works" (hereinafter called the "Contract") for the reporting period from **1st to 30th September 2019** (hereinafter 'the Reporting Month).

ENVIRONMENTAL MONITORING AND AUDIT ACTIVITIES

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

Environmental Aspect	Monitoring Parameter	Reporting Month	
		Monitoring Locations under the Contract	Total of Sessions
Air Quality	1-hour TSP	DMS-1, DMS-2A, DMS-3, DMS-4A	15
	24-hour TSP		5
Noise	Leq30mins	NMS-1, NMS-2, NMS-3, MMS-4A	4
Water Quality	Dissolved Oxygen	CS1, IS1, IS2 CS5, IS6 BS1, IS4	13 (#)
	Turbidity		
	Suspended Solids		
Ecological	Avifauna flight line survey	27th September 2019	
	Mammal Monitoring	Throughout the Reporting Month	

 # No water quality monitoring was carried out at IS6 due to the channel dried.

ACTION AND LIMIT LEVELS EXCEEDANCE

ES03 In the Reporting Month, no air quality monitoring exceedance and construction noise exceedance (including action level for noise complaint) was recorded. For water quality monitoring, a total of 28 exceedances, namely 9 Action Level and 19 Limit Level were recorded. Investigation for exceedances has been conducted by Environmental Team (ET) and investigation results revealed that all the exceedances were not related to the works under the Contract. The summary of exceedance is shown table below.

Environmental Aspect	Monitoring Parameters	Action Level	Limit Level	Event & Action		
				Investigation Result	Project related exceedance	Corrective Actions
Air Quality	1-hour TSP	0	0	--	--	--
	24-hour TSP	0	0	--	--	--
Construction Noise	$L_{eq(30min)}$ Daytime	0	0	--	--	--
Water Quality	DO	**4**	**10**	Non-project related	0	--
	Turbidity	**3**	**2**		0	--
	SS	**2**	**7**		0	--

ECOLOGICAL MONITORING

ES04 The flight line survey was carried out on 27th September 2019. A total of 406 birds from 7 species, i.e., Little Egret, Great Egret, Grey Heron, Chinese Pond Heron, Purple Egret, Great Cormorant and Black Crown Night Heron were recorded during the flight path monitoring in the Reporting Month.

ES05 Activities of Eurasian Otter were not recorded from the wildlife camera. Additional mitigation measure for otter was not required.

CONTAMINATED SOIL REMEDIATION

ES06 In the Reporting Month, 3922.0m^3 of contaminated soil was excavated from hotspot LD-001 and 4331.9m^{3}of contaminated soil for de-contamination treatment had been undertaken by the Contractor. For hotspot LD-003, 2067.6m^3 of contaminated soil was excavated and 90.0m^3 of contaminated soil for de-contamination had been undertaken. There were a total of 44 and 1 sets of performance samples collected from LD-001 and LD-003 respectively and the test results revealed that all the contaminated soil treatment achieved the remediation target.

SITE INSPECTION

ES07 In the Reporting Month, joint site inspection for the Contract Work to evaluate the site environmental performance has been carried out by the Consultants, ET and the Contractor on ***5th, 13th, 20th*** and ***27th September*** **2019**. Moreover, Independent Environmental Checker (IEC) attended joint site inspection on ***5th and 13th September*** **2019**. No non-compliance was noted during the site inspection.

ENVIRONMENTAL COMPLAINT

ES08 In the Reporting Month, one environmental complaint was received by EPD on 9 September 2019 regarding suspected illegal discharge and emission of construction dust from the construction site at Lok Ma Chau Loop. Investigation was undertaken by the Contractor with the Consultants and ET according to the EM&A Manual accordingly. Joint site inspection was carried out by the Contractor, the Consultants, ET and IEC on 13 September 2019 for investigation. It was observed that the Contractor had implemented dust suppressive measures properly. Moreover, there was no wastewater generated from the site activities and no discharge was made during the period of 12 August to 7 September 2019. It was concluded that the complaint was not valid to works under the Project. The investigation report conducted by the Contractor was submitted to EPD on 23 September 2019.

NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

ES09 No environmental summons and prosecutions were recorded in the Reporting Month.

REPORTING CHANGE

ES10 No reporting changes were made in the Reporting Period.

FUTURE KEY ISSUES

ES11 Water quality mitigation measures shall be fully implemented in accordance with Implementation Schedule for Environmental Mitigation Measures (ISEMM) of the EM&A Manual. Special attention should be paid on the prevention of muddy water or other water pollutants flowing from the site surface to the Old Shenzhen River Meander or public areas. In addition, all effluent discharge shall fulfill the requirement of Discharge Licence under the Water Pollution Control Ordinance.

ES12 In coming dry season, potential construction dust impact should be minimised since the Works Contract located adjacent to villages. Special attention should be paid on contaminated soil remediation processing. The Contractor should fully implement the air quality mitigation measures to reduce construction dust and contaminated soil emission as far as practicable to impact surrounding villages.

ES13 Furthermore, construction noise would be one key environmental issue concern during construction work of the Project. Noise mitigation measures such as using quiet plants or noise barriers erection should be implemented in accordance with the EM&A requirement as reduce noise impact. In addition, it was reminded that under EP's condition 2.7 (i), using powered mechanical equipment for construction works only during the period 9am to 5pm at and near the old Shenzhen River meander and other identified important ecologically sensitive areas.

Table of Contents

LIST OF TABLES

LIST OF APPENDICES

1 INTRODUCTION

1.1 PROJECT BACKGROUND

1.1.1 Civil Engineering and Development Department (CEDD) is the Project Proponent and the Permit Holder of Development of Lok Ma Chau Loop (hereinafter called the "***Project***"), which is a Designated Project (DP) and an Environmental Permit (EP) No. EP-477/2013 was granted on 22nd November 2013 for the Project.

1.1.2 The Lok Ma Chau Loop (the Loop) was once within the administrative boundary of Shenzhen Municipal Government and now becomes a part of Hong Kong Special Administrative Region (HKSAR) as a result of the regulation of Shenzhen River. As mentioned in the Policy Address in 2007, the HKSAR Government would cooperate with the Shenzhen authorities to develop the land resources of the Loop to meet the development needs in the future, as well as to consolidate the strategic position of both Hong Kong and Shenzhen.

1.1.3 In order to develop the Lok Ma Chau Loop, Contract No. YL/2017/03 – Development of Lok Ma Chau Loop: Land Decontamination and Advance Engineering Works (hereinafter called the "Contract") was awarded to Sang Hing – Kuly Joint Venture (hereinafter called the "Contractor") in June 2018 for the advance works. The works under the Contract comprise the following:

a) Land decontamination treatment within the Loop;
b) Establishment of an Ecological Area (EA) within the Loop;
c) Construction of a temporary access to the Loop;
d) Minor improvement works to Ha Wan Tsuen East Road and other ancillary works;
e) Construction of temporary noise barriers and miscellaneous road works along Lok Ma Chau Road;
f) Ground treatment works to the first batch of land parcels within the Loop for development of buildings and associated facilities for Phase 1 of the Hong Kong – Shenzhen Innovation and Technology Park and development of the western electricity substation; and
g) Implementation of environmental mitigation measures for the works mentioned in the items (a) to (f) above.

1.1.4 In May 2019, Ford Business International Limited (Ford) was appointed by CEDD as the Environmental Team (ET) to undertake the Environmental Monitoring & Audit (EM&A) programme with associated duties.

1.1.5 This is the **9th** monthly EM&A presenting monitoring results and inspection findings for the Contract for the reporting period from **1st** to **30th September 2019**.

1.2 REPORT STRUCTURE

1.2.1 The Monthly EM&A Report is structured into the following sections:-

Section 1 *Introduction*
Section 2 *Project Organisation and Construction Progress*
Section 3 *Summary of Impact Monitoring Requirements*
Section 4 *Air Quality Monitoring*
Section 5 *Construction Noise Monitoring*
Section 6 *Water Quality Monitoring*
Section 7 *Ecology Monitoring*
Section 8 *Land Contamination*
Section 9 *Waste Management*
Section 10 *Site Inspections*
Section 11 *Environmental Complaints and Non-Compliance*
Section 12 *Implementation Status of Mitigation Measures*
Section 13 *Conclusions and Recommendations*

2 PROJECT ORGANISATION AND CONSTRUCTION PROGRESS

2.1 CONSTRUCTION OF THE CONTRACT WORKS

2.1.1 Land decontamination and advance engineering works under Contract No. YL/2017/03 is to pave way for the ensuing site formation and infrastructure works within the Loop. The layout plan of construction works of the Contract is shown in **Appendix A** and the scope of the Contract works comprises the following major items:

- Land decontamination treatment within the Loop in accordance with the Contamination Assessment Report/ Remedial Action Plan of the Environmental Impact Assessment (EIA) Report;
- Construction of temporary access to the Loop (comprising an approximately 60-metre-long temporary vehicular bridge across the old Shenzhen River meander), minor improvements works to Ha Wan Tsuen East Road and other ancillary works;
- Establishment of and Ecological Area of about 12.8 ha within the Loop;
- Construction of temporary noise barriers and miscellaneous road works along Lok Ma Chau Road;
- Ground treatment works to the first batch of land parcels within the Loop for development of building and associated facilities for Phase 1 of the Hong Kong- Shenzhen Innovation and Technology Park, and for development of the western electricity substation; and
- Implementation of environmental mitigation measures and other ancillary works.

2.2 PROJECT ORGANISATION

2.2.1 The project organisation is shown in ***Appendix B***. The responsibilities of respective parties are:

Civil Engineering and Development Department (CEDD)

2.2.2 CEDD 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. An Independent Environmental Checker (IEC) shall be employed by CEDD to audit the results of the EM&A works carried out by the ET.

Environmental Protection Department (EPD)

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

The Consultants

2.2.4 ***Black & Veatch Hong Kong Ltd.*** (B&V) is the Consultants responsible for overseeing the construction works and for ensuring that the works undertaken by the Contractor in accordance with the specification and contractual requirements. The duties and responsibilities of the Consultants with respect to the EM&A may include:

- Supervise the Contractor's activities and ensure that the requirements in the EM&A Manual are fully complied with;
- Inform the Contractor when action is required to reduce impacts in accordance with the Event and Action Plans;
- Assist the Project Proponent in employing an IEC to audit the results of the EM&A works carried out by the ET;
- Participate in joint site inspection undertaken by the ET and/or IEC;
- Oversee the implementation of the agreed Event and Action Plan in the event of any project-related exceedance; and
- Adhere to the procedures for carrying out complaint investigations.

The Contractor

2.2.5 ***Sang Hing – Kuly Joint Venture*** is Contractor of the Contract Works YL/2017/03. The duties and responsibilities of the Contractor is:

- Report to the Consultants;
- Implement the EIA recommendations and requirements;
- Provide assistance to ET in carrying out monitoring and auditing;
- Submit proposals on mitigation measures in case of project-related exceedances of Action and

Limit levels in accordance with the Event and Action Plans;
- Implement measures to reduce impact where project-related exceedance of Action and Limit levels occurs; and
- Adhere to the agreed procedures for carrying out compliant investigation.

Environmental Team (ET)

2.2.6 ***Ford Business International Limited*** (Ford) was appointed by CEDD as the ET to undertake the EM&A programme with the associated duties in May 2019. The ET is managed by the ET Leader who has at least 7 years' experience in EM&A and has relevant professional qualifications. Suitably qualified staff should be included in the ET, and resources for the implementation of the EM&A programme should be allocated in time under the Contract, to enable fulfillment of the Project's EM&A requirements as specified in the EM&A Manual during construction of the Project. The duties of ET shall include:

- Set up all the required environmental monitoring stations;
- Monitor various environmental parameters as required in the EM&A Manual;
- Analyse the environmental monitoring and audit data and review the success of EM&A programme to confirm the adequacy of mitigation measures implemented and the validity of the EIA predictions and to identify any adverse environmental impacts arising;
- Carry out site inspection to investigate and audit the Contractors' site practice, equipment and work methodologies with respect to pollution control and environmental mitigation, and take proactive actions to preempt problems;
- Liaison with IEC on all environmental performance matters, and timely submission of all relevant EM&A proforma for IEC's verification;
- Prepare reports on the environmental monitoring data and site environmental conditions;
- Report on the environmental monitoring and audit results to the IEC, Contractor, the Consultants, Project Proponent and EPD;
- Recommend suitable mitigation measures to the Contractor in the case of project-related exceedance of Action and Limit levels in accordance with the Event and Action Plans;
- Give advice to the Contractor on environmental improvement, awareness, enhancement matters, etc. on site;
- Undertake regular on-site audits / inspections and report to the Contractor, the Consultants and IEC of any potential non-compliance;
- Follow up and close out non-compliance actions; and
- Adhere to the procedures for carrying out environmental complaint investigation.

Independent Environmental Checker (IEC)

2.2.7 ***Nature & Technologies (HK) Limited*** is employed by the Permit Holder (i.e. CEDD) prior to the commencement of the construction of the Project and Jacky Leung is the IEC. The IEC has had possess at least 7 years' experience in EM&A and have relevant professional qualifications. The duty of IEC should be:

- Review in an independent, objective and professional manner the EM&A works performed by the ET (at not less than monthly intervals);
- Audit the monitoring activities and results (at not less than monthly intervals);
- Validate and confirm the accuracy of monitoring results, monitoring equipment, monitoring locations, monitoring procedures and location of sensitive receivers;
- Report the audit results to the Consultants, the Project Proponent and EPD in parallel;
- Review the EM&A reports submitted by the ET;
- Check and review the proposed mitigation measures submitted by the Contractor in accordance with the Event and Action Plans;
- Check and review the effectiveness of the mitigation measures that have been recommended in the EIA and the EM&A Manual, and ensure they are properly implemented in a timely manner, when necessary;
- Report the findings of site inspections and other environmental performance reviews to the Consultants, Project Proponent and EPD.

- Coordinate the monitoring and auditing works for all the on-going contracts in the area in order to identify possible sources / causes of exceedances and recommend suitable remedial actions where appropriate;
- Coordinate the assessment and response to complaints / enquires from locals, green groups, district councils or the public at large;
- On as-needed basis, verify and certify the environmental acceptability of the Contractor's construction methodology (both temporary and permanent works), relevant design plans and submissions under the EP; and
- Verify investigation results of environmental complaint cases and the effectiveness of corrective measures.

2.3 CONSTRUCTION PROGRESS

2.3.1 In the Reporting Month, the major construction activities conducted under the Contract YL/2017/03 are summarised in below. A 3-month rolling construction programme is shown in ***Appendix C***.

(a) Erection and repair of 3m-high green fence;
(b) Construction of pier of vehicular bridge;
(c) Land decontamination works;
(d) Excavation of top and contaminated soil for land decontamination works at hotspot LD-001 and hotspot LD-003;
(e) Surcharge filling works and associated drainage works;
(f) Excavation at Ecological Area;
(g) Construction of box culvert and drainage outlet
(h) Construction of embankment at zone 1 - 3A
(i) Construction of stone blanket and stone column

2.4 SUMMARY OF ENVIRONMENTAL SUBMISSIONS

2.4.1 In according to the EP condition, the required documents should have submitted to EPD which listed in below:

- Commencement date of construction of the Project
- Layout Plans of the Project
- Management organization of the main construction companies and/or any form of joint ventures associated with the construction of the Project
- Detailed works schedule of the Project
- Emergency Contingency Plan
- Ecological Mitigation / Habitat Creation and Management Plan
- Baseline Monitoring Report for the Project
- The dedicated web site to notify EPD

2.4.2 Summary of the relevant permits, licences, and/or notifications on environmental protection for the Project are presented in ***Table 2-1***.

Table 2-1 Status of Environmental Licences and Permits of the Project

Item	Description	Licence/Permit Status		
		Ref. no.	Effective Date	Expiry Date
1	Air pollution Control (Construction Dust) Regulation	Ref No.: 435754	15/08/2018	Till the Contract Works YL/2017/03 ends
2	Waste Disposal Regulation - Billing Account for Disposal of Construction Waste	Account No. 7031266	16/08/2018	Valid and till the Contract Works YL/2017/03 ends
3	Chemical Waste Producer Registration	Waste Producers Number: No. WPN 5213-542-S4120-01	08/08/2018	Valid and till the Contract Works YL/2017/03 ends

Item	Description	Licence/Permit Status		
		Ref. no.	Effective Date	Expiry Date
4	Water Pollution Control Ordinance - Discharge Licence	Discharge Licence No.: WT00032414-2018	28/08/2019	31/08/2024

3 SUMMARY OF IMPACT MONITORING UNDER THE CONTRACT WORKS REQUIREMENT

3.1 GENERAL

3.1.1 The EM&A requirements are set out in the approved EM&A Manual. Environmental issues such as air quality, construction noise, water quality and ecology were identified as the key aspect during the construction phase of the Project.

3.1.2 A summary of construction phase EM&A requirements under the Contract Works YL/2017/03 are presented in the sub-sections below.

3.2 MONITORING PARAMETERS

3.2.1 The EM&A programme of the Contract Works YL/2017/03 construction phase monitoring shall cover the following environmental issues:

- Air quality;
- Construction noise;
- Water quality; and
- Ecology

3.2.2 A summary of the monitoring parameters is presented in ***Table 3-1.***

Table 3-1 Summary of EM&A Requirements

Environmental Aspect	Parameters
Air Quality	• One- hour and 24-hour TSP
Noise	• $L_{eq(30min)}$ in normal working days (Monday to Saturday) 07:00-19:00 except public holiday • 3 sets of consecutive $L_{eq(5min)}$ on restricted hours (i.e. 1900 to 2300 and 2300 to 0700 next day), and whole day of public holiday or Sunday, if construction work of the Project underway • Supplementary information for data auditing, statistical results such as L_{10} and L_{90} shall also be obtained for reference.
Water Quality	**In-situ Measurements** • Dissolved Oxygen Concentration (mg/L); • Dissolved Oxygen Saturation (%); • Turbidity (NTU); • pH unit; • Salinity (ppt); • Water depth (m); and • Temperature (℃). **Laboratory Analysis** • Suspended Solids (mg/L)
Ecology	**Avifauna** • Flight line survey • Avifauna utilizing Pond 12 **Mammals** • Eurasian Otter **Herpetofauna** • Chinese Bull Frog **Aquatic Fauna** • Rose Bitterling

3.3 MONITORING LOCATIONS

Air quality

3.3.1 In accordance with the EM&A Manual, a total of four (4) designated air quality monitoring locations naming, DMS-1 (ASR HWTR-1), DMS-2 (ASR LMCR-5), DMS-3 (ASR BR-4) and DMS-4 (ASR MTL-20) were recommended.

3.3.2 Since the monitoring at designated location DMS-2 was denied by the landlord during the baseline monitoring, alternative location DMS-2A was proposed. In addition, since no works under the Contract Works will be conducted near ASR MTL-20, Hong Kong Police Force Operation Base of Lok Ma Chau (named as DMS-4A) was proposed to replace DMS-4 to conduct air quality monitoring since baseline monitoring. Both alternative locations were verified by IEC and endorsed by EPD. Location of the air quality monitoring stations under the Contract Works YL/2017/03 are listed in ***Table 3-2*** and shown ***Appendix D***.

Table 3-2 Impact Monitoring Stations - Air Quality

Station ID	Location
DMS-1	Village House along Ha Wan Tsuen East Road
DMS-2A	Village House along Lok Ma Chau Road
DMS-3	Village House along Old Border Road
DMS-4A	Hong Kong Police Force, Lok Ma Chau Operation Base at Horn Hill

Construction Noise

3.3.3 In accordance with the EM&A Manual, a total of four (4) noise sensitive receivers include HWT-8 (Village house in Ha Wan Tsuen hereinafter named NMS-1), HWTR-11 (Village house along existing Ha Wan Tsuen Road hereinafter named NMS-2), BR-4 (Village house along Border Road hereinafter named NMS-3) and MTL-20 (Village house in Ma Tso Lung close to the proposed Eastern Connection Road), were recommended to perform construction noise monitoring for the Project.

3.3.4 Since no works under the Contract Works YL/2017/03 will be conducted near NSR MTL-20, Hong Kong Police Force Operation Base of Lok Ma Chau (hereinafter named NMS-4A) was proposed to replace MTL-20 to conduct noise monitoring since baseline monitoring. Alternative location was verified by IEC and endorsed by EPD. Location of the noise monitoring stations under the Contract Works YL/2017/03 are listed in ***Table 3-3*** and shown ***Appendix D***.

Table 3-3 Impact Monitoring Stations - Construction Noise

Station ID	Description	Measurement
NMS-1	Village house in Ha Wan Tsuen	Façade Measurement
NMS-2	Village house along existing Ha Wan Tsuen East Road	Free Field measurement
NMS-3	Village house along Old Border Road	Free Field measurement
NMS-4A	Hong Kong Police Force, Lok Ma Chau Operation Base at Horn Hill	Free Field measurement

Water Quality

3.3.5 In accordance with the EM&A Manual, a total of eleven (11) designated water quality monitoring stations were recommenced for the Project. According to the geographical area of Contract Works YL/2017/03, there were six (6) water quality monitoring stations under the Contract. In addition, to oversee the construction work impact at the temporary steel bridge under the Contract Works YL/2017/03, one extra station was proposed as agreed by CEDD, IEC and EPD before the baseline monitoring. Detailed water monitoring stations under the Contract Works YL/2017/03 are listed in ***Table 3-4*** and shown ***Appendix D***.

Table 3-4 Impact Monitoring Stations - Water Quality

Station ID	Description	Nature of the location
CS1	Control Station at Old Shenzhen River Meander	Control Station at Meander
IS1	Impact Station at Old Shenzhen River Meander	Impact Station at Meander
IS2	Impact Station at Old Shenzhen River Meander	Impact Station at Meander
IS4	Impact Station at Ping Hang Stream	Control / Reference Station
CS5	Control Station at channel at south of Lung Hau Road	Control Station for IS6
IS6	Impact Station near Lung Hau Road	Impact Station
BS1#	Impact Station at Old Shenzhen River Meander	Impact Station for the temporary steel bridge

 # Additional Monitoring Station from EM&A Manual

Ecology

3.3.6 Since construction works nearby Ponds 11 and 12 and south of Lung Hau Road (now renamed as Lok Ma Chau Road) have not yet commenced, the ecological parameters being monitored in this Reporting Month would only cover the flight line survey and the mammal activities. The flight line survey was undertaken at the LMC Lookout at south of the LMC Loop. Mammal activities were monitored by three wildlife cameras setup in potential movement corridor of mammal along the edge at the proposed EA zone including Locations A, B and C. The locations of ecological monitoring are illustrated in ***Appendix D***.

3.4 MONITORING FREQUENCY AND PERIOD

3.4.1 The requirements of impact monitoring are stipulated in the EM&A Manual and presented as follows.

Air Quality Monitoring

3.4.2 Frequency of impact air quality monitoring is as follows:

- 1-hour TSP 3 times every six days during course of works
- 24-hour TSP Once every 6 days during course of works.

Noise Monitoring

3.4.3 During normal construction working hours (0700-1900 Monday to Saturday), monitoring of $L_{eq(30min)}$ (as 6 consecutive $L_{eq(5min)}$) shall be carried out at the agreed monitoring locations once every week. Supplementary information for data auditing, statistical results such as L_{10} and L_{90} shall also be obtained for reference.

Water Quality Monitoring

3.4.4 The water quality monitoring frequency shall be 3 days per week during course of works. The interval between two sets of monitoring shall not be less than 36 hours.

3.5 MONITORING EQUIPMENT

Air Quality Monitoring

3.5.1 The 24-hour and 1-hour TSP levels shall be measured by following the standard high volume sampling method as set out in the *Title 40 of the Code of Federal Regulations, Chapter 1 (Part 50), Appendix B*. If the ET proposes to use a direct reading dust meter to measure 1-hour TSP levels, it shall submit sufficient information to the IEC to approve.

3.5.2 The filter paper of 24-hour TSP measurement shall be determined by HOKLAS accredited laboratory.

3.5.3 All equipment to be used for air quality monitoring as approved by IEC is listed in ***Table 3-5***.

Table 3-5 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-5025A
1-Hour TSP	
Portable Dust Meter	Sibata LD-3B Laser Dust monitor Particle Mass Profiler & Counter

Wind Data Monitoring Equipment

3.5.4 According to the approved EM&A Manual, 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 had been proposed by the ET and agreed with the IEC. For installation and operation of wind data monitoring equipment, the following points shall be observed:

i) The wind sensors installed at the location above ground shall be clear of obstructions or

turbulence caused by buildings.

ii) The wind data should be captured by a data logger and downloaded at least once a month for analysis.

iii) The wind data monitoring equipment should be re-calibrated at least once every six months.

iv) Wind direction should be divided into 16 sectors of 22.5 degrees each.

3.5.5 For the requirement, one wind data monitoring equipment (brand name "WindSonic") was setting at location of DMS-4A and verified by IEC.

Noise Monitoring

3.5.6 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.

3.5.7 Noise monitoring equipment used for monitoring is listed in ***Table 3-6***.

Table 3-6 Construction Noise Monitoring Equipment

Equipment	Model
Integrating Sound Level Meter	Brüel & Kjær 2238
Calibrator	Brüel & Kjær 4231 / Rion NL-75
Portable Wind Speed Indicator	Testo Anemometer

3.5.8 Sound level meters listed above comply with the *International Electrotechnical Commission Publications 651: 1979 (Type 1)* and *804: 1985 (Type 1)* specifications, as recommended in TM issued under the NCO. The acoustic calibrator and sound level meter to be used in the impact monitoring will be calibrated yearly.

Water Quality Monitoring

3.5.9 Dissolved Oxygen (DO) and water temperature should be measured in-situ by a DO/temperature meter. The instrument should be portable and weatherproof using a DC power source. It should have a membrane electrode with automatic temperature compensation complete with a cable. The equipment should be capable of measuring:

- a DO level in the range of 0-20 mg/l and 0-200% saturation; and
- a temperature of between 0 and 45 degree Celsius.

3.5.10 A portable pH meter capable of measuring a range between 0.0 and 14.0 should be provided to measure pH under the specified conditions accordingly to the APHA Standard Methods.

3.5.11 The instrument should be portable and weatherproof using a DC power source. It should have a photoelectric sensor capable of measuring turbidity between 0-1000 NTU.

3.5.12 A portable, battery-operated echo sounder or tape measure will be used for the determination of water depth at each designated monitoring station as appropriate.

3.5.13 A water sampler e.g. Kahlsico Water Sampler, which is a transparent PVC cylinder with capacity not less than 2 litres, will be used for water sampling if water depth over than 0.5m. For sampling from very shallow water depths e.g. <0.5 m, water sample collection will be directly from water surface below 100mm use sampling plastic bottle to avoid inclusion of bottom sediment or humus. Moreover, Teflon/stainless steel bailer or self-made sampling buckets maybe used for water sampling. The equipment used for sampling will depend on the sampling location and depth situations.

3.5.14 Water samples for laboratory measurement of Suspended Solids (SS) will be collected in high density polythene bottles, packed in ice (cooled to 4 ºC without being frozen), and delivered to the laboratory in the same day as the samples were collected.

3.5.15 SS analysis should be carried out in a HOKLAS or other accredited laboratory. Water samples of about 1L should be collected at the monitoring stations for carrying out the laboratory SS determination. The SS determination work should start within 24 hours after collection of the water samples. The SS analyses should follow the *APHA Standard Methods 2540D* with Limit of Reporting of 0.1 mg/L.

3.5.16 Water quality monitoring equipment used in the impact monitoring is listed in ***Table 3-7***. SS analysis was carried out by a local HOKLAS-accredited laboratory, namely *ALS Technichem (HK) Pty Ltd*.

Table 3-7 Water Quality Monitoring Equipment

Equipment	Model
Water Depth Detector	Eagle Sonar or tape measures
Water Sampler	A 2-litre transparent PVC cylinder with latex cups at both ends or Teflon/stainless steel bailer or self-made sampling bucket
Thermometer & DO meter	YSI Pro 20
pH meter	AZ8685 pH pen-style meter
Salinometer	AZ8371 Salinometer
Turbidimeter	Hach 2100Q
Sample Container	High density polythene bottles (provided by laboratory)
Storage Container	'Willow' 33-liter plastic cool box with Ice pad

Ecology

3.5.17 The flight line survey was undertaken with a pair of high power binocular (10x40), whereas the mammal activities was monitored by 3 motion-activated wildlife cameras.

3.6 MONITORING METHODOLOGY

Air Quality Monitoring

1-hour TSP

3.6.1 The 1-hour TSP monitor used for 1-hour TSP measurement was a brand named "Sibata LD-3B Laser Dust monitor Particle Mass Profiler & Counter" which was a portable, battery-operated laser photometer. The 1-hour TSP meter provided a real time 1-hour TSP measurement based on 90^{o} light scattering. The 1-hour TSP monitor consisted of the following:

(a.) A pump to draw sample aerosol through the optic chamber where TSP is measured;
(b.) A sheath air system to isolate the aerosol in the chamber to keep the optics clean for maximum reliability; and
(c.) A built-in data logger compatible with Windows based program to facilitate data collection, analysis and reporting.

3.6.2 The 1-hour TSP meter was used within the valid period following manufacturer's Operation and Service Manual.

24-hour TSP

3.6.3 The equipment used for 24-hour TSP measurement was 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) consisted of the following:

(b.) An anodized aluminum shelter;
(c.) A 8"x10" stainless steel filter holder;
(d.) A blower motor assembly;
(e.) A continuous flow/pressure recorder;
(f.) A motor speed-voltage control/elapsed time indicator;
(g.) A 7-day mechanical timer, and
(h.) A power supply of 220v/50 Hz

3.6.4 The HVS was operated and calibrated on a regular basis in accordance with the manufacturer's instruction using Tisch Calibration Kit Model TE-5025A. Calibration would be carried out at two month intervals.

3.6.5 24-hour TSP was 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 would keep all the sampled 24-hour TSP filters in normal air conditioned room conditions, i.e. 70% RH (Relative Humidity) and 25°C, for six months prior to disposal.

Noise Monitoring

3.6.6 Noise measurements were taken in terms of the A-weighted equivalent sound pressure level (L_{eq}) measured in decibels dB(A). Supplementary statistical results (L_{10} and L_{90}) were also obtained for reference.

3.6.7 During the monitoring, all noise measurements were performed with the meter set to FAST response and on the A-weighted equivalent continuous sound pressure level (L_{eq}). $Leq_{(30min)}$ in six consecutive $Leq_{(5min)}$ measurements were used as the monitoring parameter for the time period between 0700-1900 hours on weekdays; $Leq_{(5min)}$ measurements would be used as monitoring parameter for other time periods (e.g. during restricted hours), if necessary.

3.6.8 Prior of noise measurement, the accuracy of the sound level meter was checked using an acoustic calibrator generating a known sound pressure level at a known frequency. The checking was performed before and after the noise measurement.

Water Quality Monitoring

3.6.9 The sampling procedures of the in-situ monitoring are presented below:

Sampling Procedure

3.6.10 At the designated water quality monitoring station, a portable with battery-operated echo sounder or tape measurement was used for the determination of water depth.

3.6.11 Impact water quality monitoring was conducted at three depths (i.e. 1m below surface, mid-depth and 1m above seabed, except where the water depth was less than 6m, mid-depth station may be omitted. Should the water depth be less than 3m, only the mid-depth station was monitored) in accordance with the requirements set out in the EM&A Manual.

3.6.12 The sample container was rinsed with a portion of the water sample prior to collection of water sample. The water sample collected was then transferred to the high-density polythene bottle as provided by the laboratory, labeled with a unique sample number and sealed with a screw cap.

3.6.13 Before sampling, general information such as the date and time of sampling, weather condition as well as the personnel responsible for the monitoring were recorded on the field data sheet.

3.6.14 A 'Willow' 33-liter plastic cool box packed with ice was used to preserve the water samples prior to arrival at the laboratory for chemical determination. The water temperature of the cool box was maintained at a temperature as close to 4^0C as possible without being frozen. Samples collected were delivered to the laboratory upon collection.

In-situ Measurement

DO Measurement

3.6.15 The DO measuring instruments were portable and weatherproof. The equipment had a sensor and direct current (DC) power source and was capable of measuring:

- A DO level in the range of 0 – 20 mg/L and 0 – 200% saturation; and
- A temperature of 0 – 45 degree Celsius.

3.6.16 The equipment contained a membrane electrode with automatic temperature compensation.

3.6.17 Should salinity compensation not be built-in to the DO equipment, in-situ salinity should be measured to calibrate the DO measuring instruments prior to each measurement.

Turbidity Measurement

3.6.18 The turbidity measuring instruments were a portable and weatherproof with DC power source, and had a photoelectric sensor capable of measuring turbidity level between 0–1000 NTU (for example, Hach model 2100Q or an approved similar instrument).

Salinity Measurement

3.6.19 A portable salinometer capable of measuring salinity in the range of 0–40 parts per thousand (ppt) was used for measuring salinity of the water at each monitoring location.

pH Measurement

3.6.20 A portable pH meter capable of measuring a range between 0.0 and 14.0 was used to measure pH under the specified conditions accordingly to the APHA Standard Methods.

3.6.21 All in-situ measurement equipment would be calibrated by HOKLAS accredited laboratory at three month intervals.

Laboratory Analysis

3.6.22 SS determination of all water samples were carried out by a local HOKLAS-accredited testing laboratory (ALS Technichem (HK) Pty Ltd HOKLAS registration no. 66). SS determination using *APHA Standard Methods 2540D* as specified in the *EM&A Manual* was started within 24 hours of water sample receipt.

Ecology Survey/Monitoring

3.6.23 Flight line survey was undertaken at the LMC Lookout south of the LMC Loop as specified in the EM&A Manual, with particular focus on the the number and species composition of birds using the flight line corridor over the LMC Meander, and evaluation of whether the construction activities had caused any significant impact to the flight line. Moreover, given that the area in the northern part and north-eastern part of the LMC Loop is either too far from the vantage point or beyond the field of vision at the Lok Ma Chau Lookout, flight line at these two areas had not been recorded in the monitoring. In addition, species generally commensal with man (e.g. Black-collared Starling), common and widespread in HK (e.g. Crested Myna) or small in size and not prone to following flight lines en masse (e.g. Barn Swallow) were ignored in order to concentrate on species of conservation interest and/or those prone to using flight lines, but flights involving short hops from point to point were not recorded.

3.6.24 The estimated location of the flight paths used by waterbird species, birds of prey or other larger species of conservation interest passing through the area were marked on a standard map; and the number, the species and their height above the ground were also be recorded.

3.6.25 Given the difficulty of accurately measuring height above ground from a distance, this parameter was estimated in relation to the level of LMC Loop and adjacent fish pond area, and/or the location of the observer, and assigned into one of the three height classes as follows: 10m height class – height ranges from 5-15m, 20m height class – height ranges from 15-25m, and 30m height class – height above 25m.

3.6.26 All flight lines marked on the maps were then overlain by a $100m^2$ grid, and the quantity of birds passing through each $100m^2$ (i.e., the number of "bird-flights") had been categorized by geometrical interval classification and the map illustrated with the distribution of flight path of the Reporting Month was then compared with those presented in the EIA Report so as to review whether any significant impact on the flight lines are recorded.

3.6.27 Monitoring of Eurasians Otter is notoriously difficult due to their secretive and nocturnal habits in

Hong Kong; as such motion-activated wildlife cameras have been deployed at three potential wildlife corridors along the longitudinal gradient of the EA zone. Given the dynamism of the site condition and the on-going construction activities within the EA, the location of the camera would be reviewed on a monthly basis.

3.7 EQUIPMENT CALIBRATION

3.7.1 Calibration of the HVS was performed upon installation and thereafter at bimonthly intervals in accordance with the manufacturer's instruction using the certified standard calibrator (TISCH Model TE-5025A). Moreover, the Calibration Kit would be calibrated annually. The calibration data were properly documented and the records are maintained by ET for future reference.

3.7.2 The 1-hour TSP meter was calibrated by the supplier prior to purchase. Zero response of the equipment was checked before and after each monitoring event. Annually calibration with the High Volume Sampler (HVS) in same condition was undertaken by the Laboratory.

3.7.3 Wind data monitoring equipment was calibrated by the supplier prior to purchase.

3.7.4 The sound level meter and calibrator would be calibrated and certified by a laboratory accredited under HOKLAS or any other international accreditation scheme at yearly basis.

3.7.5 All water quality monitoring equipment would be calibrated by HOKLAS accredited laboratory at three month intervals.

3.7.6 Except wind data monitoring equipment, the calibration certificates of all monitoring equipment as used for the impact monitoring program in the Reporting Month and the HOKLAS accredited certificate of laboratory are attached in ***Appendix E***.

3.8 DERIVATION OF ACTION/LIMIT LEVELS

3.8.1 The baseline results form the basis for determining the environmental acceptance criteria for the impact monitoring. According to the approved Environmental Monitoring and Audit Manual, the air quality, construction noise and water quality criteria were set up, namely Action and Limit levels are listed in ***Tables 3-8, 3-9*** and ***3-10***.

Table 3-8 Action and Limit Levels for Air Quality Monitoring

Monitoring Station	Action Level (μg /m^3)		Limit Level (μg/m^3)	
	1-hour TSP	24-hour TSP	1-hour TSP	24-hour TSP
DMS-1	353	184	500	260
DMS-2A	370	166		
DMS-3	351	166		
DMS-4A	350	152		

Table 3-9 Action and Limit Levels for Construction Noise

Monitoring Location	Action Level	Limit Level in dB(A)
	Time Period: 0700-1900 hours on normal weekdays	
NMS-1, NMS-2, NMS-3 and NMS-4A	When one or more documented complaints are received	75 dB(A)[Note 1 & Note 2]

Note 1: Acceptable Noise Levels for school should be reduced to 70 dB(A) and 65 dB(A) during examination period.

Note 2: 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.

Table 3-10 Action and Limit Levels for Water Quality

Parameter	Performance criteria	Monitoring Location				
		IS1	IS2	IS4	IS6	BS1
DO (mg/L)	Action Level	7.0	5.3	4.1	5.9	3.9
	Limit Level	6.8	5.2	3.8	5.8	3.7

Parameter	Performance criteria	Monitoring Location				
		IS1	IS2	IS4	IS6	BS1
Turbidity (NTU)	Action Level	27.7	35.5	70.9	120% of CS5	29.9
	Limit Level	29.9	38.1	74.6	130% of CS5	32.6
SS (mg/L)	Action Level	28.0	39.8	155.0	120% of CS5	36.5
	Limit Level	28.8	41.2	175.0	130% of CS5	36.9

Remarks:

(1) Depth-averaged was calculated by taking the arithmetic means of reading of all three depths.

(2) For DO, non-compliance of water quality limit would occur when monitoring result at impact station was lower than the limit.

(3) For SS & turbidity, non-compliance of water quality limit would occur when monitoring result at impact station was higher than the limit.

3.8.2 Should project-related 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.***

3.9 DATA MANAGEMENT AND DATA QUALITY ASSURANCE / QUALITY CONTROL (QA/QC)

3.9.1 All monitoring data were handled by the ET's in-house data recording and management system. 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 then input into a computerised database maintained by the ET. The laboratory results were input directly into the computerised database and checked by personnel other than those who input the data.

3.9.2 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

4.1 GENERAL

4.1.1 The air quality monitoring schedule is presented in ***Appendix G*** and the monitoring results are summarised in the following sub-sections.

4.2 AIR QUALITY MONITORING RESULTS

4.2.1 In the Reporting Month, a total of ***15*** events of 1-hour TSP and ***5*** sessions of 24-hours TSP monitoring were carried out for each monitoring locations and the monitoring results are summarised in ***Tables 4-1 to 4-4***. 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 and 1-hour TSP Monitoring Results – DMS-1

Date	24-hour TSP (μg/m³)	1-hour TSP (μg/m³)				
		Date	Start Time	1st reading	2nd reading	3rd reading
4-Sep-19	27	5-Sep-19	9:17	84	81	87
10-Sep-19	23	11-Sep-19	9:21	85	84	88
16-Sep-19	53	17-Sep-19	9:51	87	85	84
21-Sep-19	145	23-Sep-19	9:31	95	97	98
27-Sep-19	70	28-Sep-19	9:17	82	85	87
Average (Range)	**64 (23 – 145)**	Average (Range)		**87 (81 – 98)**		

Table 4-2 Summary of 24-hour and 1-hour TSP Monitoring Results –DMS-2A

Date	24-hour TSP (μg/m³)	1-hour TSP (μg/m³)				
		Date	Start Time	1st reading	2nd reading	3rd reading
4-Sep-19	28	5-Sep-19	9:26	82	77	79
10-Sep-19	70	11-Sep-19	9:31	81	79	82
16-Sep-19	69	17-Sep-19	9:56	83	84	80
21-Sep-19	145	23-Sep-19	12:45	90	90	92
27-Sep-19	63	28-Sep-19	9:24	88	93	90
Average (Range)	**75 (28 – 145)**	Average (Range)		**85 (77 – 93)**		

Table 4-3 Summary of 24-hour and 1-hour TSP Monitoring Results – DMS-3

Date	24-hour TSP (μg/m³)	1-hour TSP (μg/m³)				
		Date	Start Time	1st reading	2nd reading	3rd reading
4-Sep-19	18	5-Sep-19	9:40	65	61	62
10-Sep-19	45	11-Sep-19	9:41	72	68	70
16-Sep-19	30	17-Sep-19	10:04	63	66	60
21-Sep-19	46	23-Sep-19	10:18	77	76	76
27-Sep-19	29	28-Sep-19	9:32	62	60	64
Average (Range)	**34 (18 – 46)**	Average (Range)		**67 (60 – 77)**		

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

Date	24-hour TSP (μg/m³)	1-hour TSP (μg/m³)				
		Date	Start Time	1st reading	2nd reading	3rd reading
4-Sep-19	23	5-Sep-19	9:51	66	70	63
10-Sep-19	20	11-Sep-19	9:56	64	61	62

Date	24-hour TSP (μg/m^3)	1-hour TSP (μg/m^3)				
		Date	Start Time	1st reading	2nd reading	3rd reading
16-Sep-19	42	17-Sep-19	10:11	69	71	68
21-Sep-19	74	23-Sep-19	16:33	83	83	82
27-Sep-19	73	28-Sep-19	9:48	60	63	59
Average (Range)	**46 (20 – 74)**	Average (Range)		**68 (59 – 83)**		

4.2.2 As shown in ***Tables 4-1 to 4-4***, all the 1-hour and 24-hour TSP monitoring results were below the Action/Limit Levels in this Reporting Month and no corrective action was therefore required.

4.2.3 The wind speed and direction data during the Reporting Month are summarised in ***Appendix J***.

5 CONSTRUCTION NOISE MONITORING

5.1 GENERAL

5.1.1 The noise monitoring schedule is presented in ***Appendix G*** and the monitoring results are summarised in the following sub-sections.

5.2 NOISE MONITORING RESULTS

5.2.1 In the Reporting Month, a total of ***4*** sessions of noise measurements were carried out at the designated locations. The sound level meter was set at 1m from the exterior of the building façade for noise monitoring locations NMS-1, therefore no façade correction (+3dB(A)) was added according to acoustical principles and EPD guidelines. For free-field status performed at NMS-2, NMS-3 and NMS-4A, façade correction (+3dB(A)) had been added according to the requirement. The noise monitoring results are summarised in ***Table 5-1.*** The detailed noise monitoring data are presented in ***Appendix H*** and the relevant graphical plots are shown in ***Appendix I***.

Table 5-1 Summary of Construction Noise Monitoring Results

Date	Construction Noise Level ($L_{eq30min}$), dB(A)			
	NMS-1	NMS-2(*)	NMS-3(*)	NMS-4A(*)
5-Sep-19	55	72	60	57
11-Sep-19	52	71	57	55
17-Sep-19	54	70	57	57
23-Sep-19	56	67	59	56
Limit Level	**75 dB(A)**			

Remarks

(*) *façade correction (+3 dB(A) was added according to acoustical principles and EPD guidelines*

5.2.2 As shown in ***Table 5-1***, no construction noise measurement results that exceeded the Limit Level were recorded in the Reporting Month. Moreover, no valid noise complaint (which would trigger Action Level exceedance) was recorded in the Reporting Month.

6 WATER QUALITY MONITORING

6.1 GENERAL

6.1.1 In the Reporting Month, water quality monitoring was performed at designated locations included CS1, IS1, IS2, IS4, CS5, IS6 and the extra location BS1. The water quality monitoring schedule is presented in ***Appendix G***. The monitoring results are summarised in the following sub-sections.

6.2 RESULTS OF WATER QUALITY MONITORING

6.2.1 In the Reporting Month, **thirteen (13)** sampling days were scheduled for water quality monitoring. Since the monitoring channel was dried out at IS6 thought out September 2019, no water quality monitoring was performed at IS6.

6.2.2 The key monitoring parameters including DO, Turbidity and SS are summarised in ***Tables 6-1 to 6-3***. Summary of non-project related exceedances are shown in ***Table 6-4***. Detailed monitoring database including in-situ measurements and laboratory analysis data are shown in ***Appendix H*** and the relevant graphical plot are shown in ***Appendix I***.

Table 6-1 Water Quality Monitoring of DO Results, (mg/L)

Date	CS1	CS5	IS1	IS2	IS4	IS6	BS1
	Control Station	Control Station	Impact Station	Impact Station	Reference Station	Impact Station	Extra Impact Station
3-Sep-19	6.6	4.0	**5.6**	**5.0**	6.1	#	6.1
5-Sep-19	6.5	6.2	**3.3**	5.3	5.3	#	***3.4***
7-Sep-19	6.4	5.0	**5.4**	***4.9***	5.3	#	4.8
9-Sep-19	12.2	3.1	8.0	5.6	6.1	#	11.1
11-Sep-19	8.5	4.8	***6.8***	**4.7**	4.4	#	8.5
13-Sep-19	6.2	3.7	7.3	**5.1**	4.5	#	6.9
17-Sep-19	7.6	4.5	***6.9***	5.4	5.0	#	6.4
19-Sep-19	6.0	4.8	**5.9**	**4.7**	6.0	#	6.9
21-Sep-19	8.0	10.3	8.7	6.0	***4.0***	#	8.2
24-Sep-19	7.0	11.4	7.8	5.8	***4.0***	#	6.6
26-Sep-19	10.8	10.7	7.4	6.6	6.4	#	8.8
28-Sep-19	8.7	6.5	10.3	6.0	6.0	#	11.6
30-Sep-19	9.8	6.3	14.7	6.5	4.1	#	9.9

Remark: # Water quality monitoring was unable to be carried out due to dried out channel.
Italic and bold value indicated Action Level non-project related exceedance
Underlined and bold value indicated Limit Level non-project related exceedance

Table 6-2 Water Quality Monitoring of Turbidity Results, (NTU)

Date	CS1	CS5	IS1	IS2	IS4	IS6	BS1
	Control Station	Control Station	Impact Station	Impact Station	Reference Station	Impact Station	Extra Impact Station
3-Sep-19	10.8	8.8	25.4	**44.8**	2.9	#	26.0
5-Sep-19	9.3	6.3	15.9	33.0	5.1	#	25.6
7-Sep-19	8.2	5.1	18.4	24.4	2.4	#	20.9
9-Sep-19	8.2	4.9	15.0	20.0	1.9	#	16.0
11-Sep-19	10.9	12.9	21.3	19.1	11.8	#	23.9
13-Sep-19	11.2	22.7	23.7	34.8	11.6	#	25.7
17-Sep-19	14.0	8.4	22.2	20.6	38.9	#	***31.9***
19-Sep-19	11.7	9.6	***27.8***	6.8	6.8	#	24.6
21-Sep-19	14.8	4.5	23.7	7.9	7.6	#	25.9
24-Sep-19	10.0	8.4	20.5	16.7	21.4	#	15.3
26-Sep-19	16.0	1.6	8.8	19.6	18.6	#	18.1
28-Sep-19	11.7	3.2	24.0	13.2	8.0	#	***31.4***

Date	CS1	CS5	IS1	IS2	IS4	IS6	BS1
	Control Station	Control Station	Impact Station	Impact Station	Reference Station	Impact Station	Extra Impact Station
30-Sep-19	12.7	2.9	25.1	**> 1000**	26.3	#	28.5

Remark: *# Water quality monitoring was unable to be carried out due to dried out channel.*
Italic and bold value indicated Action Level non-project related exceedance
Underlined and bold value indicated Limit Level non-project related exceedance

Table 6-3 Water Quality Monitoring of SS Results (mg/L)

Date	CS1	CS5	IS1	IS2	IS4	IS6	BS1
	Control Station	Control Station	Impact Station	Impact Station	Reference Station	Impact Station	Extra Impact Station
3-Sep-19	9.5	4.5	14.0	***40.0***	2.0	#	20.0
5-Sep-19	10.0	9.5	11.5	**45.5**	7.5	#	19.0
7-Sep-19	9.5	4.0	9.0	***40.0***	3.5	#	15.5
9-Sep-19	11.5	10.5	15.5	34.0	4.0	#	13.0
11-Sep-19	17.0	15.5	17.0	20.0	12.5	#	26.5
13-Sep-19	10.5	20.5	18.5	37.0	16.5	#	26.0
17-Sep-19	20.5	10.0	16.0	33.5	18.0	#	28.0
19-Sep-19	15.0	9.0	25.0	11.0	11.5	#	23.5
21-Sep-19	15.5	2.0	**30.5**	21.0	7.0	#	25.5
24-Sep-19	16.0	11.5	**37.5**	32.0	13.5	#	20.0
26-Sep-19	14.5	3.0	**29.5**	34.5	8.5	#	32.5
28-Sep-19	15.0	6.0	24.0	31.0	13.5	#	**41.5**
30-Sep-19	13.5	7.5	**29.0**	**681.5**	10.5	#	36.5

Remark: *# Water quality monitoring was unable to be carried out due to dried out channel.*
Italic and bold value indicated Action Level non-project related exceedance
Underlined and bold value indicated Limit Level non-project related exceedance

6.2.3 In this Reporting Month, there were **twenty-eight (28)** Action Level / Limit Level non-project related exceedances, namely **14, 5** and **9** non-project related exceedances of DO, turbidity and Suspended Solids recorded respectively and they are summarised in ***Table 6-4***.

Table 6-4 Summary of Action and Limit Levels Exceedance Recorded in the Reporting Month

Location	Dissolved Oxygen		Turbidity		Suspended Solids		Non-project related Exceedance		Project Related Exceedance	
	AL	LL	AL	LL	AL	LL	AL	LL	AL	LL
IS1	**2**	**4**	**1**	**0**	0	**4**	**3**	**8**	0	0
IS2	0	**5**	0	**2**	**2**	**2**	**2**	**9**	0	0
IS4	**2**	0	0	0	0	0	**2**	0	0	0
IS6	0	0	0	0	0	0	0	0	0	0
BS1	0	**1**	**2**	0	0	**1**	**2**	**2**	0	0
No of Exceedance	**4**	**10**	**3**	**2**	**2**	**7**	**9**	**19**	0	0

6.2.4 Investigation had conducted by ET and investigation report revealed that all the exceedances were non-project related. The investigation findings are summarised below.

- Water quality mitigation measures were implemented by the Contractor;
- There were no water-based construction activity conducted;
- Runoff from surrounding environment (outside the Project boundaries) to the Meander was observed during rainstorm;
- No pollution discharge from land-based construction activity was observed;

- Backflow of turbid water from Shenzhen River to Old Shenzhen River Meander was observed which affecting the water quality of Meander at IS2 especially on 30 Sep 2019;
- DO non-project related exceedances were likely related to seasonal change;
- The water body of IS4 was very stagnant may result in relative low dissolved oxygen concentration.

7 ECOLOGY MONITORING

7.1 REQUIREMENTS

7.1.1 As required under Section 11.4.1.1 of the EM&A Manual, survey of flight line corridor of Avifauna is required from the beginning of work until 12 months after the establishment of the Ecological Area or completion of work on the Western Connect Road, whichever is the later. The purpose of the survey is to identify the number and species composition of birds using the flight line and monitor if any impact from construction works.

7.1.2 Furthermore, as required under Section 11.4.1.2 of the EM&A Manual, monitoring of mammals is required for Eurasian Otter, other mammals and dogs during the site formation and establishment period of Ecological Area. The purpose of the monitor is to observe the connectivity between the existing reed marsh and the Ecological Area, and if there is any sign of otter and mammals around the Ecological Area.

7.2 MONITORING RESULT

Avifauna

7.2.1 The flight line survey was carried out on 27th September 2019. The survey started at 5:32AM (sunrise time at 6:12 AM) and lasted for 2 hours. The weather was fine during the monitoring.

7.2.2 A total of 406 birds from 7 species, i.e., Little Egret, Great Egret, Grey Heron, Chinese Pond Heron, Purple Egret, Great Cormorant and Black Crown Night Heron were recorded during the flight path monitoring in the reporting month. ***Table 7-1*** below summarises the number of birds observed during the monitoring and the height of the flightpath observed by each of the species respectively.

Table 7-1 Number of birds recorded in Reporting Month

Species	Number of birds	Height Class 1	Height Class 2	Height Class 3
Little Egret 小白鷺	94	6	40	48
Great Egret 大白鷺	275			275
Grey Heron 蒼鷺	4			4
Chinese Pond Heron 池鷺	24	12	8	4
Purple Egret 草鷺	1			1
Great Cormorant 鸕鷀	7			7
Black Crown Night Heron 夜鷺	1	1		

7.2.3 The total number of bird-flights (number of birds of each species passing through each 100m square) observed across all 100m grid squares was 5008. ***Table 7-2*** shows the number of bird-flights for the 7 species respectively.

Table 7-2 Number of Bird-flights in Reporting Month

Species	Total Number of Bird-Flights
Little Egret 小白鷺	1099
Great Egret 大白鷺	3517
Grey Heron 蒼鷺	44
Chinese Pond Heron 池鷺	281
Purple Egret 草鷺	11
Great cormorant 鸕鷀	44
Black Crown Night Heron 夜鷺	12

7.2.4 The distribution of bird flights is shown in the ***Appendix K,*** and it has indicted that the majority of the flights across the LMC Loop were over the Shenzhen River instead of the area around the LMC Meander and its immediate vicinity in the reporting month (i.e., the core part of the flight line, which comprising the southeast edge of LMC Loop up to a width of approximately 150m and fish ponds up to width of approximately 50m). Moreover it should be noted that the findings have been biased by

two large groups of Great Egret (which together composed with 244 birds) that were found flying towards HHW along the northern boundary of the LMC loop, i.e., near the Shenzhen River. The flight line study of the EIA report has already suggested that Great Egret, which is a more disturbance-sensitive species, appeared to not so reliant on LMC Meander in wet season, as such whether the site formation work within the EA has affected the route preference of the Great Egret will be further reviewed from data to be collected in the future monitoring.

Mammals

7.2.5 The latest locations of the camera set deployed within the EA zone are shown in ***Appendix D***, and except Location A which pointed at the shoreline of the LMC meander, location B had been relocated further east and pointed towards the vegetation at the embankment of the meander, whereas Location C had been relocated to the northern boundary of the EA and pointed towards the green fence near the reedbed. However, mammal activities had not been captured by the camera or seen during the setting up and checking of the camera within the Reporting Month.

8 LAND CONTAMINATION REMEDIATION

8.1 GENERAL

8.1.1 According to the EM&A Manual Section 8.2 and the details of the remediation and associated testing referred to Chapter 8 of the EIA Report (AEIAR-176/2013), five (5) arsenic-contaminated zones were identified in within the Project area of the Development of LMC Loop. The estimated depth and volume of contaminated soil for each remediation zone are listed below table.

Table 8-1 Detailed Contamination Information for Designated Remediation Areas

Contamination Zone ID in EIA	Designated Contamination Zone	Estimated Vertical Extent of Contamination	Estimated Thickness (m)	Estimated Covering Area of Contamination Zone (m^2)	Estimated Volume of Contaminated Soil (m^3)
A-S24	LD-001	2.5m to 4.0m below existing ground level	1.5	4001	6002
A-SG10	LD-002	4.0m to 5.5m below existing ground level	1.5	3520	5280
A-S20	LD-003	2.5m to 4.0m below existing ground level	1.5	4989	7484
A-S03	LD-004-A	2.5m to 4.0m below existing ground level	1.5	4580	6870
A-S03a1	LD-004-B	4.0m to 5.5m below existing ground level	1.5	4452	6678
A-S03c1	LD-004-C	1.0m to 2.5m below existing ground level	1.5	5601	8402
A-S01	LD-005	2.5m to 5.5m below existing ground level	3.0	5576	16728

8.1.2 Based on the Contract requirements, "Solidification / Stabilisation" is the recommended treatment method to remediate all contaminated soils. Therefore, Portland cement was proposed to perform the treatment of contaminated soil solidification and stabilisation. The target of soil remediation is listed in ***Table 8-2***.

Table 8-2 Contaminant Solidification & Stabilisation Target for Cement Solidification / Stabilization (CS/S)

Contaminant	Toxicity Characteristic Leaching Procedure (TCLP) Limit of Arsenic	Unconfined Compressive Strength (UCS)
Metal - Arsenic	≤5 mg/L	≥1 MPa

8.1.3 Trial of CS/S was undertaken between April and June 2019. According to trial performance sample result, 10% of cement content used as cement/soil ratio could achieve the remediation target and this ratio was adopted for the subsequent remediation work.

8.1.4 Upon the cement ratio was accepted, the contaminated soil excavation and treatment works commenced in mid-July 2019.

8.2 REMEDIATION WORK PROGRESS IN THE REPORTING MONTH

8.2.1 According to information as provided by the Contractor, the progress of excavation of contaminated soil and remediation works are summarised in below ***Table 8-3***.

Table 8-3 Progress of Contaminated Soil Excavation and Remediation

Remediation Zone	Volumes of Contaminated Soil Excavation		Contaminated Soil / Cement Mixing Volumes		Treatment Performance Sample collected (set)
	(Tonne)	(m^3)	(Tonne)	(m^3)	
LD-001	6275.2	3922.0	6931.0	4331.9	44
LD-002	NA	NA	NA	NA	NA
LD-003	3308.2	2067.6	144.0	90.0	1
LD-004-A	NA	NA	NA	NA	NA
LD-004-B	NA	NA	NA	NA	NA
LD-004-C	NA	NA	NA	NA	NA
LD-005	NA	NA	NA	NA	NA

8.2.2 Based on the Approved Remediation Action Plan (RAP) requirements, one set CS/S performance testing sample was collected for each 100m^3 of the mixed products. The samples were sent to the HOKLAS accredited laboratory for analysing of TCLP / UCS to determine the Arsenic leakage condition and the mixed product strength.

8.3 SOLIDIFICATION AND STABILISATION PERFORMANCE RESULTS IN THE REPORTING MONTH

8.3.1 In the Reporting Month, 3922.0m^3 of contaminated soil was excavated from LD-001 and 4331.9m^3 of contaminated soil for de-contamination treatment had been undertaken by the Contractor. For LD-003, 2067.6m^3 of contaminated soil was excavated and 90.0m^3 of contaminated soil for de-contamination had been undertaken. There were a total of 44 and 1 sets of performance samples collected from LD-001 and LD-003 respectively and the test results revealed that all the contaminated soil treatment achieved the remediation target.

9 WASTE MANAGEMENT

9.1 GENERAL WASTE MANAGEMENT

9.1.1 Waste management was carried out in accordance with the Waste Management Plan (WMP) for the Contract Works YL/2017/03.

9.2 RECORDS OF WASTE QUANTITIES

9.2.1 All types of waste arising from the construction works are classified into the following:

- Construction & demolition (C&D) Material;
- Chemical waste;
- General refuse; and
- Excavated soil.

9.2.2 The quantities of waste for disposal in this Reporting Month under the Contract are summarised in ***Tables 9-1*** and ***9-2*** and the Monthly Summary Waste Flow Table is shown in ***Appendix M***. Whenever possible, materials were reused on-site as far as practicable.

Table 9-1 Summary of Quantities of Inert C&D Materials for the Project

Type of Waste	Quantity in Reporting Month	Disposal / Dumping Grounds
Reused in this Contract (Inert) (in '000 m^3)	0	NA
Reused in other Contracts/ Projects (Inert) (in '000 m^3)	0	NA
Disposal as Public Fill (Inert) (in '000 m^3)	0	NA

Table 9-2 Summary of Quantities of C&D Wastes for the Project

Type of Waste	Quantity in Reporting Month	Disposal / Dumping Grounds
Recycled Metal ('000kg)	0	NA
Recycled Paper / Cardboard Packing ('000kg)	(*)	NA
Recycled Plastic ('000kg)	(*)	NA
Chemical Wastes ('000kg)	0	NA
General Refuses ('000m^3)	0.02	NENT

Remark: (*) negligible amount

10 SITE INSPECTION

10.1 REQUIREMENTS

10.1.1 According to the approved EM&A Manual, the programme of environmental site inspection shall be formulation by ET Leader. Weekly environmental site inspections were carried out to confirm the environmental performance.

10.2 FINDINGS / DEFICIENCIES DURING THE REPORTING MONTH

10.2.1 In the Reporting Month, joint site inspections for the Contract Works YL/2017/03 to evaluate the site environmental performance had been carried out by the Consultants, ET and the Contractor on ***5th, 13th, 20th*** and ***27th September* 2019** and IEC attended joint site inspection dated on ***5th and 13th September* 2019**. No non-compliance was noted.

10.2.2 The findings / deficiencies observed during the weekly site inspection are listed in ***Table 10-1***.

Table 10-1 Site Observations for the Contract Works YL/2017/03

Date	Findings / Deficiencies	Follow-Up Status
5th September 2019	• No adverse environmental issue was observed.	• N/A
13th September 2019	• Accumulated sediment at temporary drain channel was observed, the Contractor should remove the sediment regularly. (Portion A)	• Accumulated sediment at the temporary drain channel was removed. The channel has been filled by gravel to prevent accumulation of wastewater and sediment.
20th September 2019	• Damaged green fence was observed, the Contractor should repair the damaged section properly. (Near Worker Rest Area)	• Broken green fence was repaired.
27th September 2019	• Sand bag barrier should be provided at the edge of work area near site entrance to avoid any leakage of muddy runoff into the meander.	• Sand bag barrier was provided at the edge of work area.
	• Broken water barriers should be replaced to avoid accumulation of stagnant water. (Near Site Entrance)	• Broken water barriers had been replaced.

10.2.3 To minimise adverse environmental impact, several advices / reminders were provided to Contractor during the site inspections and summarized below:

- To clean up the temporary drainage on site regularly to ensure it could function properly.
- To keep all the unused containers turned over on site to avoid accumulation of stagnant water.
- To avoid any surface runoff being discharge out from the worker rest area without treatment.
- To ensure that all the engine doors of all air compressors at Stone Column Area are closed during operation.
- To dispose the general refuse as stored on site regularly.

10.2.4 General housekeeping such as daily site tidiness and cleanliness should be maintained for all the working areas. Furthermore, the Contractor was reminded to implement Waste Management Plan of the Contract Works.

10.2.5 Although rainy season will pass soon, water quality mitigation measures as recommended in the Implementation Schedule for Environmental Mitigation Measures (ISEMM) shall be implemented as far as practicable. Special attention should be paid on prevention of muddy water or wastewater flowing from the site to the Old Shenzhen River Meander or public areas.

11 ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE

11.1 ENVIRONMENTAL COMPLAINT, SUMMONS AND PROSECUTIONS

11.1.1 In the Reporting Month, no summons and prosecution was lodged for the Contract.

11.1.2 However, one environmental complaint was received by EPD on 9 September 2019 regarding suspected illegal discharge and emission of construction dust from the construction site at Lok Ma Chau Loop. Investigation was undertaken by the Contractor with the Consultants and ET according to the EM&A Manual accordingly. Joint site inspection was carried out by the Contractor, the Consultants, ET and IEC on 13 September 2019 for investigation. It was observed that the Contractor had implemented dust suppressive measures properly. Moreover, there was no wastewater generated from the site activities and no discharge was made during the period of 12 August to 7 September 2019. It was concluded that the complaint was not valid to works under the Project. The investigation report conducted by the Contractor was submitted to EPD on 23 September 2019.

11.1.3 The statistical summary table of the environmental complaint, summons and prosecution are presented in ***Tables 11-1, 11-2*** and ***11-3***.

Table 11-1 Statistical Summary of Environmental Complaints

Reporting Month	Environmental Complaint Statistics		
	Frequency	**Cumulative**	**Complaint Nature**
1 – 30 September 2019	1	0	• Water quality; and • Air Quality

Table 11-2 Statistical Summary of Environmental Summons

Reporting Month	Environmental Summons Statistics		
	Frequency	**Cumulative**	**Complaint Nature**
1 – 30 September 2019	0	0	NA

Table 11-3 Statistical Summary of Environmental Prosecution

Reporting Month	Environmental Prosecution Statistics		
	Frequency	**Cumulative**	**Complaint Nature**
1 – 30 September 2019	0	0	NA

11.2 ENVIRONMENTAL COMPLAINT INVESTIGATION AND FINDINGS

11.2.1 According to the complainant said that suspected illegal discharge and construction dust emission were come from the construction site of Lok Ma Chau Loop.

11.2.2 After the regarding complaint received, joint site investigation among the Contractor, the Consultants, ET and IEC was carried out on 13 September 2019.

Illegal Discharge Investigation

11.2.3 According to the observation of site investigation, there was no wastewater generated from the site activities and no wastewater discharge was observed. Furthermore, all potential discharge pits within the Loop areas had been sealed up and no unattended water ponding was discovered. Runoff within all work fronts was retained within the site and drained to temporary drainage systems into sedimentation base.

11.2.4 Furthermore, no trace of wastewater discharge trace was observed along the boundary between the construction site and the old Shenzhen River meander.

Construction Dust Emission Investigation

11.2.5 According to site investigation dated 13 September 2019, it was observed that all access roads were made to moisten by two water trucks running continuously; all vehicles travelling through the site were limited to traffic speed below 8km/hr; and dusty materials stockpiles were fully covered with

tarpaulin sheeting.

11.2.6 Moreover, no dust emission was observed within the construction site during weekly site inspections in August and September 2019.

Environmental Mitigation Measures provided on site

11.2.7 In order to prevent discharge of wastewater directly into the surrounding water body, mitigation measures such as temporary drainage systems, sedimentation base and wastewater treatment facilities had provided on site. Hence, all wastewater generated on site or site runoff was collected by temporary drainage systems and then drained to wastewater treatment facilities for treatment or to sedimentation base for soakaway.

11.2.8 Furthermore, air quality mitigation measures were implemented to prevent dust emission from construction site, which are included:

- All vehicles travelling through the site were limited to a traffic speed below 8km per hour to reduce construction dust emission;
- Water trucks were deployed and sprayed water to the haul road regularly to keep them moist;
- Double wheel washing bays were provided at the site exist to reduce dust impact to surrounding public roads; all vehicles leaving the site passed through the wheel washing bays;
- Extra manual watering was provided at the main exit to further reduce dust emission;
- Deployment of water trucks to spray water along the Ha Wan Tsuen East Road.

Investigation Conclusion

11.2.9 Based on the investigation findings, there was no evidence showing that there was illegal discharge from the construction site to the Old Shenzhen River meander. After construction works of the Contract commenced, air quality monitoring results including 1-Hour and 24-Hr TSP did not exceeded the established Action / Limit Levels. Effective water and air quality mitigation measures had also been implemented by the Contractor on site.

11.2.10 According to the investigation findings, the regarding complaint was concluded as untenable and invalid.

Recommendation

11.2.11 Although the regarding complaint was concluded as invalid, the Contractor should continue to implement effective mitigation measures to accordance with ISEMM requirements.

11.3 OTHER ENVIRONMENTAL NON-COMPLIANCE

11.3.1 In addition, no emergency events relating to violation of environmental legislation for illegal dumping and landfilling were received in the Reporting Month.

12 IMPLEMENTATION STATUS OF MITIGATION MEASURES

12.1 GENERAL REQUIREMENTS

12.1.1 The environmental mitigation measures that recommended in the Implementation Schedule for Environmental Mitigation Measures (ISEMM) in the approved EM&A Manual covered the issues of dust, noise, water, waste and ecology and they are summarised and presented in ***Appendix N.***

12.1.2 The Contract Works under the Project shall be implementing the required environmental mitigation measures according to the approved EM&A Manual as subject to the site condition. Environmental mitigation measures generally implemented by the Contract Works YL/2017/03 and the implementation status are shown in ***Appendix N***.

12.2 TENTATIVE CONSTRUCTION ACTIVITIES IN THE COMING MONTH

12.2.1 According to the Contractor information provide, the construction works under the Contract Works YL/2017/03 in the coming month is listed below:

(a) Erection and repair of 3m-high green fence;
(b) Construction of retaining wall at Ha Wan Tsuen East Road;
(c) Construction of pier & abutments of vehicular bridge;
(d) Erection of steel I-beam for the Temporary Vehicular Bridge
(e) Excavation of top and contaminated soil for land decontamination works at hotspot LD-003;
(f) Land decontamination works;
(g) Surcharge filling works and associated drainage works;
(h) Excavation at Ecological Area;
(i) Construction of box culvert and drainage outlet
(j) Construction of embankment at zone 1 - 3A
(k) Construction of stone blanket and stone column

12.3 KEY ISSUES FOR THE COMING MONTH

12.3.1 Although rainy season will pass soon, water quality mitigation measures shall be fully implementation in accordance with Implementation Schedule for Environmental Mitigation Measures (ISEMM) of the EM&A Manual to prevent muddy water or other water pollutants flowing from the site surface to the Old Shenzhen River Meander. In addition, all effluent discharge shall fulfill the requirement of the granted Discharge Licence criteria.

12.3.2 Since the construction site is located adjacent to villages and winter season will come soon, the Contractor should pay special attention and fully implement the air mitigation measures to reduce construction dust and/or contaminated soil emission as far as practicable.

12.3.3 Furthermore, construction noise would be one key environmental issue concern during construction work of the Project. Noise mitigation measures such as using quiet plants or noise barriers erection should be implemented in accordance with the EM&A requirement to reduce noise impact. In addition, near the old Shenzhen River meander and other identified important ecologically sensitive areas, the use of powered mechanical equipment for construction works should be restricted to within the period of 9am to 5pm.

13 CONCLUSIONS AND RECOMMENDATIONS

13.1 CONCLUSIONS

13.1.1 This is the **9th** monthly EM&A report presenting the monitoring results and inspection findings for the Reporting Month from **1st** to **30th September 2019**.

13.1.2 No 24-hour or 1-hour TSP of air quality monitoring result that triggered the Action or Limit Levels was recorded.

13.1.3 In this Reporting Month, no construction noise complaint was received. All construction noise measurement results were within the performance criteria.

13.1.4 For water quality monitoring, a total of 28 exceedances including 9 Action and 19 Limit Levels were recorded in the Reporting Month. Investigations for the water quality exceedances were conducted by ET which revealed that all the exceedances were non-project related.

13.1.5 The flight line survey was carried out on 27th September 2019. A total of 406 birds from 7 species, i.e., Little Egret, Great Egret, Grey Heron, Chinese Pond Heron, Purple Egret, Great Cormorant and Black Crown Night Heron were recorded during the flight path monitoring in the Reporting Month.

13.1.6 Activities of Eurasian Otter were not recorded from the wildlife camera and therefore additional mitigation measure for otter is not required.

13.1.7 In the Reporting Month, 3922.0m^3 of contaminated soil was excavated from hotspot LD-001 and 4331.9$m^3$of contaminated soil for de-contamination treatment had been undertaken by the Contractor. For hotspot LD-003, 2067.6m^3 of contaminated soil was excavated and 90.0m^3 of contaminated soil for de-contamination had been undertaken. There were a total of 44 and 1 sets of performance samples collected from LD-001 and LD-003 respectively and the test results revealed that all the contaminated soil treatment achieved the remediation target.

13.1.8 In the Reporting Month, no summon or prosecution was received. In addition, no emergency events relating to violation of environmental legislation for illegal dumping and landfilling were received.

13.1.9 In the Reporting Month, one environmental complaint was received by EPD on 9 September 2019 regarding suspected illegal discharge and emission of construction dust from the construction site at Lok Ma Chau Loop. Investigation was undertaken by the Contractor with the Consultants, and ET according to the EM&A Manual. Joint site inspection was carried out by the Contractor, the Consultants, ET and IEC on 13 September 2019 for investigation. It was observed that the Contractor had implemented dust suppressive measures properly. Moreover, there was no wastewater generated from the site activities and no discharge was made during the period of 12 August to 7 September 2019. It was concluded that the complaint was not valid to works under the Project. The investigation report conducted by the Contractor was submitted to EPD on 23 September 2019.

13.1.10 In the Reporting Month, joint site inspections for the Contract Works YL/2017/03 to evaluate the site environmental performance were carried out by the Consultants, ET and the Contractor on ***5th, 13th, 20th*** and ***27th September* 2019** and IEC attended joint site inspection dated on ***5th and 13th September* 2019**. No non-compliance was noted but 4 deficiencies were found and had been rectified.

13.2 RECOMMENDATIONS

13.2.1 Water quality mitigation measures shall be fully implemented in accordance with Implementation Schedule for Environmental Mitigation Measures (ISEMM) of the EM&A Manual. Special attention should be paid on the prevention of muddy water or other water pollutants flowing from the site surface to the Old Shenzhen River Meander or public areas. In addition, all effluent discharge shall fulfill the requirement of Discharge Licence under the Water Pollution Control Ordinance.

13.2.2 In the coming dry season, potential construction dust impact should be minimised since the

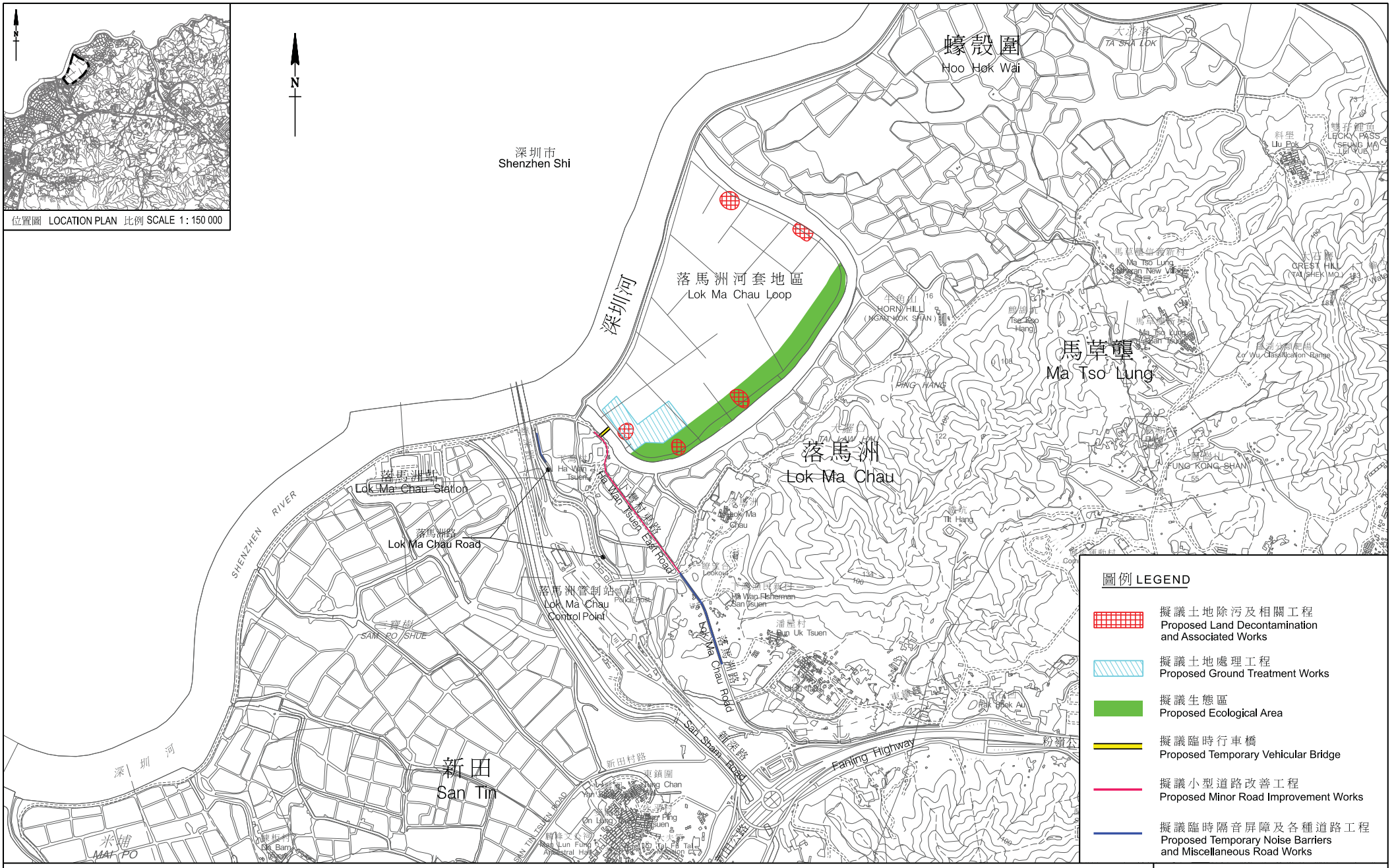
construction site is located adjacent to villages. Special attention should be paid on contaminated soil remediation processing. The Contractor should fully implement the air quality mitigation measures to reduce construction dust and contaminated soil emission as far as practicable to impact surrounding villages.

13.2.3 Furthermore, construction noise would be one key environmental issue to be concerned during construction. Noise mitigation measures such as using quiet plants or noise barriers erection should be implemented in accordance with the EM&A requirement to reduce noise impact. In addition, the Contractor was reminded of EP's condition 2.7 (i), using powered mechanical equipment for construction works only during the period 9am to 5pm at and near the old Shenzhen River meander and other identified important ecologically sensitive areas

13.2.4 Furthermore, daily cleaning shall be performed properly in order to maintain site tidiness. In addition, mosquito control should be performed to prevent mosquito breeding on site.

Appendix A

Layout Plan of Construction Works of the Contract



工務計劃項目第748CL號—落馬洲河套地區發展：土地除污及前期工程

PWP ITEM No. 748CL-DEVELOPMENT OF LOK MA CHAU LOOP : LAND DECONTAMINATION AND ADVANCE ENGINEERING WORKS

平面圖
LAYOUT PLAN

R:\Sketch-WDO\W1\W1-008\W1-008.dgn

1/2/2018

A3 420MM X 297MM

Appendix B

Project Organisation

Contact Details of Key Personnel for Contract YL/2017/03

Organization	Project Role	Name of Key Staff	Tel No.	Fax No.
CEDD	Project Proponent	Mr. K.W. Luk	2417 6397	2412 0358
B&V	Consultants	Mr. Victor Go	2601 3988	2452 5170
SKJV	Contractor	Mr. Alan Sung - Project Director	9051 4060	2452 5170
SKJV	Contractor	Mr. Anthony Chan - Project Manager	9179 2092	2452 5170
SKJV	Contractor	Mr. Alex Po - Deputy Project Manager	9369 0403	2452 5170
SKJV	Contractor	Mr. Eric Fong - Site Agent	9472 2694	2452 5170
SKJV	Contractor	Mr. Nam Kam Pui - Environmental Officer	6448 8963	2452 5170
SKJV	Contractor	Mr. Hung Hin Yuen - Environmental Supervisor	9250 5290	2452 5170
Nature & Technologies	Independent Environmental Checker	Mr. Jacky Leung - Independent Environmental Checker	2877 3122	2511 0922
Ford	Environmental Team	TW Tam - Environmental Team Leader	2959 6059	2959 6079
Ford	Environmental Team	Ben Tam - Deputy Environmental Team Leader	2959 6059	2959 6079
Ford	Environmental Team	Nicola Hon - Environmental Consultant	2959 6059	2959 6079

Legend:

CEDD – (Project Proponent) – Civil Engineering and Development Department

B&V – (Consultants) –Black & Veatch Hong Kong Limited

Nature & Technologies (IEC) –Nature & Technologies (HK) Limited

Ford (ET) – Ford Business International Limited

SKJV (the Contractor of the Contract YL/2017/03) – Sang Hing – Kuly Joint Venture

Appendix C

3-month Rolling Construction Programme

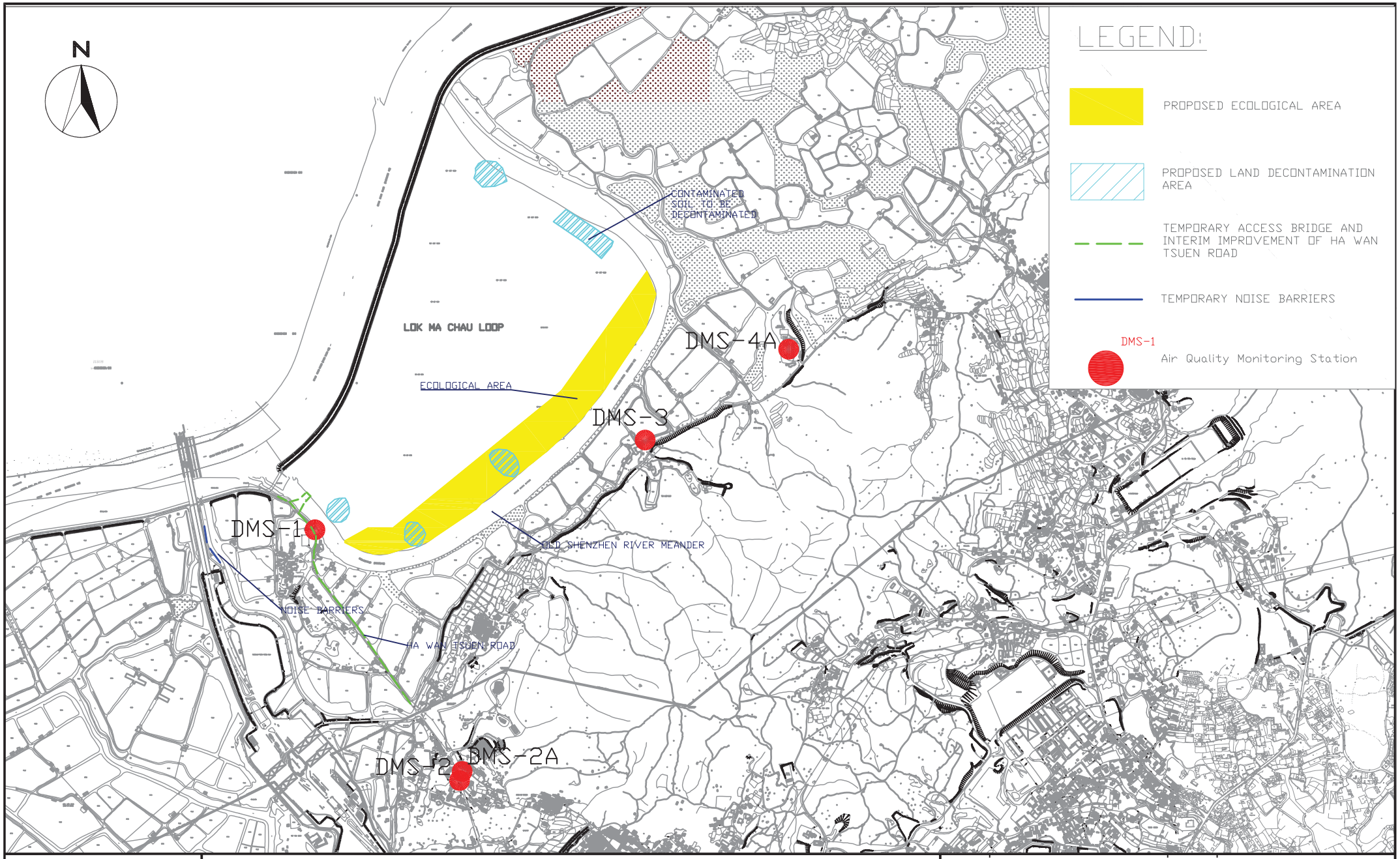
Sang Hing - Kuly Joint Venture
Contract No. YL/2017/03
Development of Lok Ma Chau Loop：Land Decontamination and Advance Engineering Works

3-Month Rolling Programme for the Works

ITEM	WORKS DESCRIPTION	YEAR 2019					
		SEPTEMBER		OCTOBER		NOVEMBER	
1	TEMPORARY VEHICULAR BRIDGE AND APPROACHING RAMP						
2	LAND DECONTAMINATION WORKS						
3	GROUND TREATMENT WORKS						
4	CREATION OF ECOLOGICAL AREA						

Appendix D

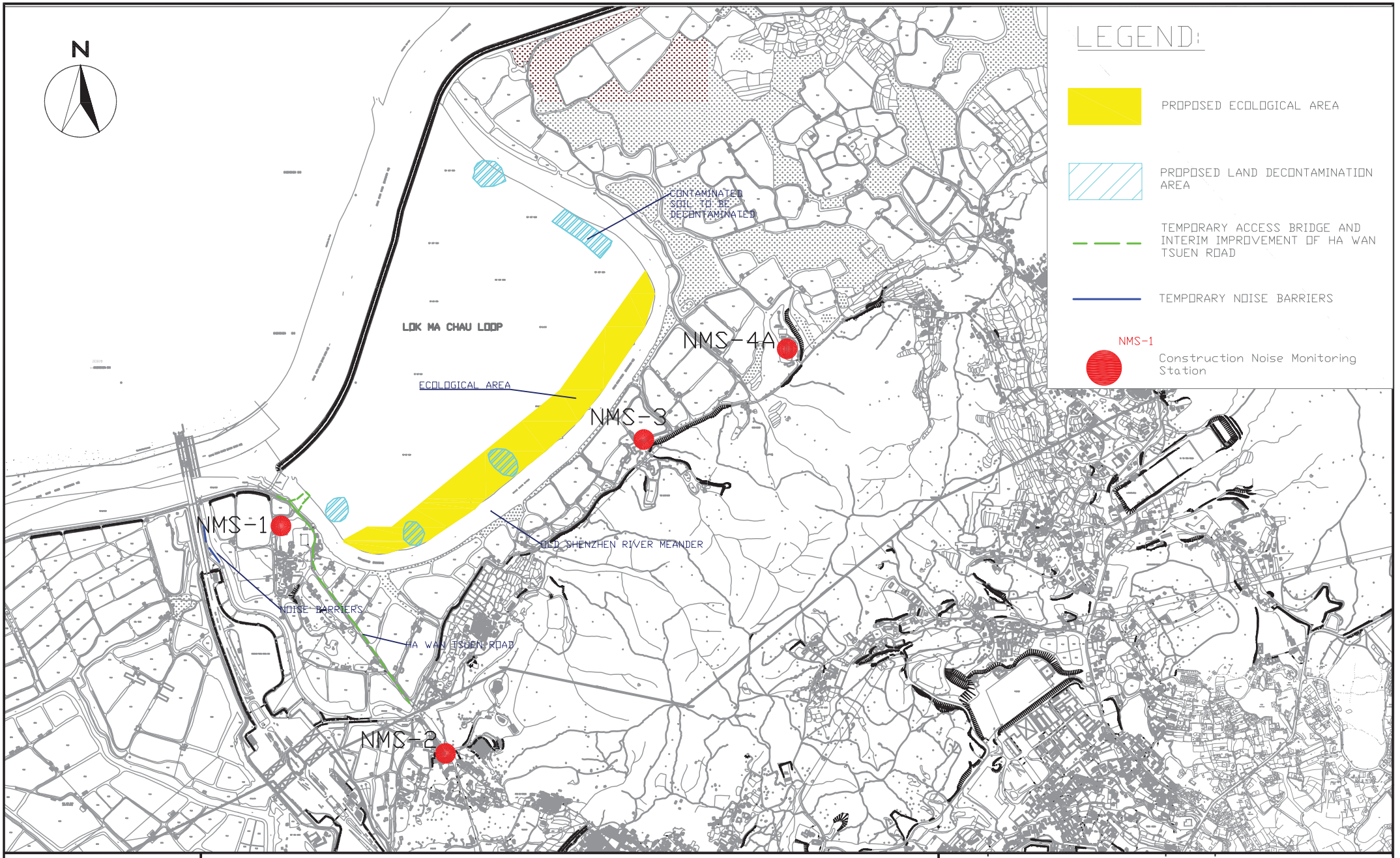
Monitoring Locations



CONTRACT NO. WD/11/2018

DEVELOPMENT OF LOK MA CHAU LOOP: LAND DECONTAMINATION AND ADVANCE ENGINEERING WORKS – ENVIRONMENTAL TEAM

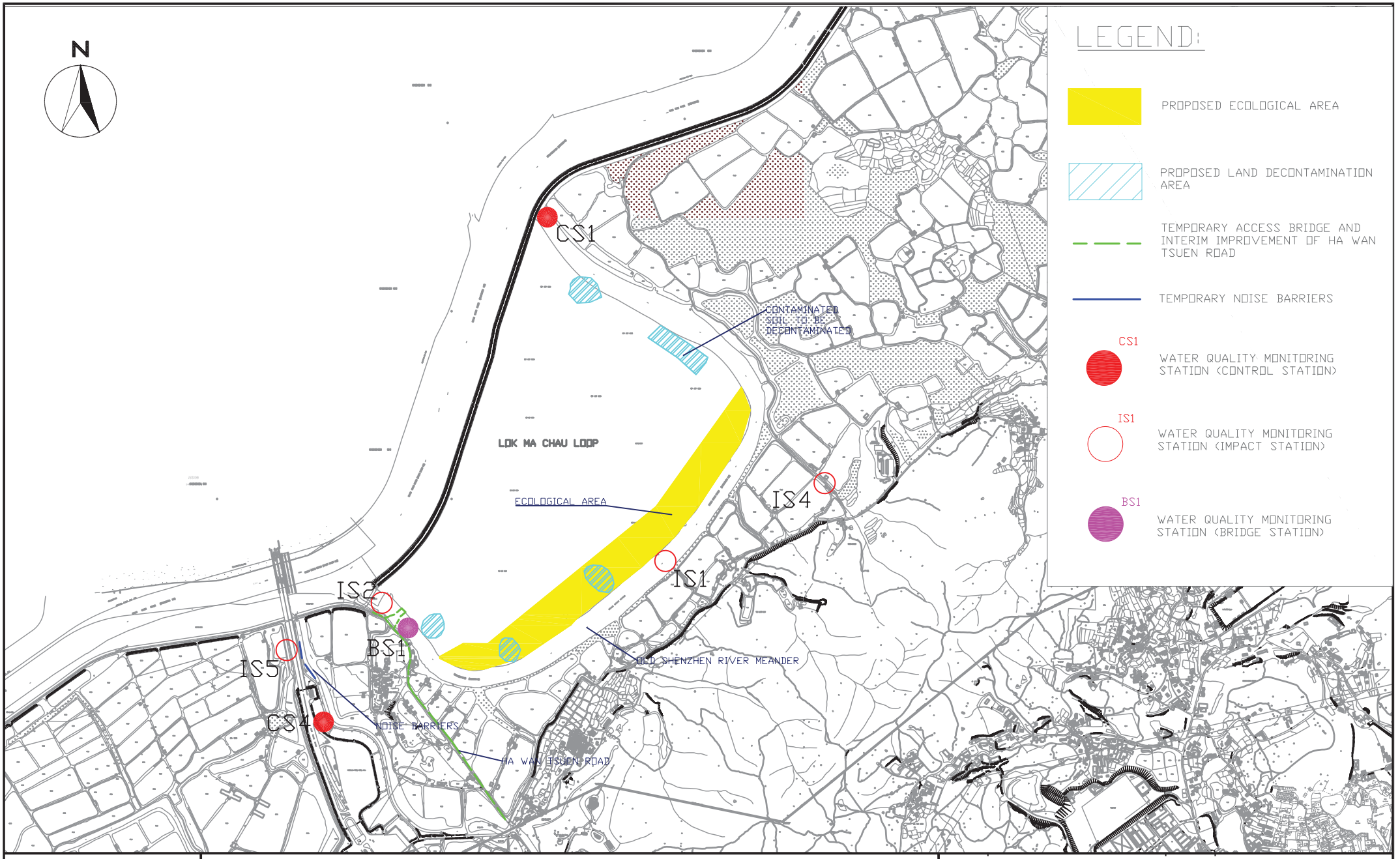
LOCATION OF AIR QUALITY MONITORING STATIONS



CONTRACT NO. WD/11/2018

DEVELOPMENT OF LOK MA CHAU LOOP: LAND DECONTAMINATION AND ADVANCE ENGINEERING WORKS – ENVIRONMENTAL TEAM

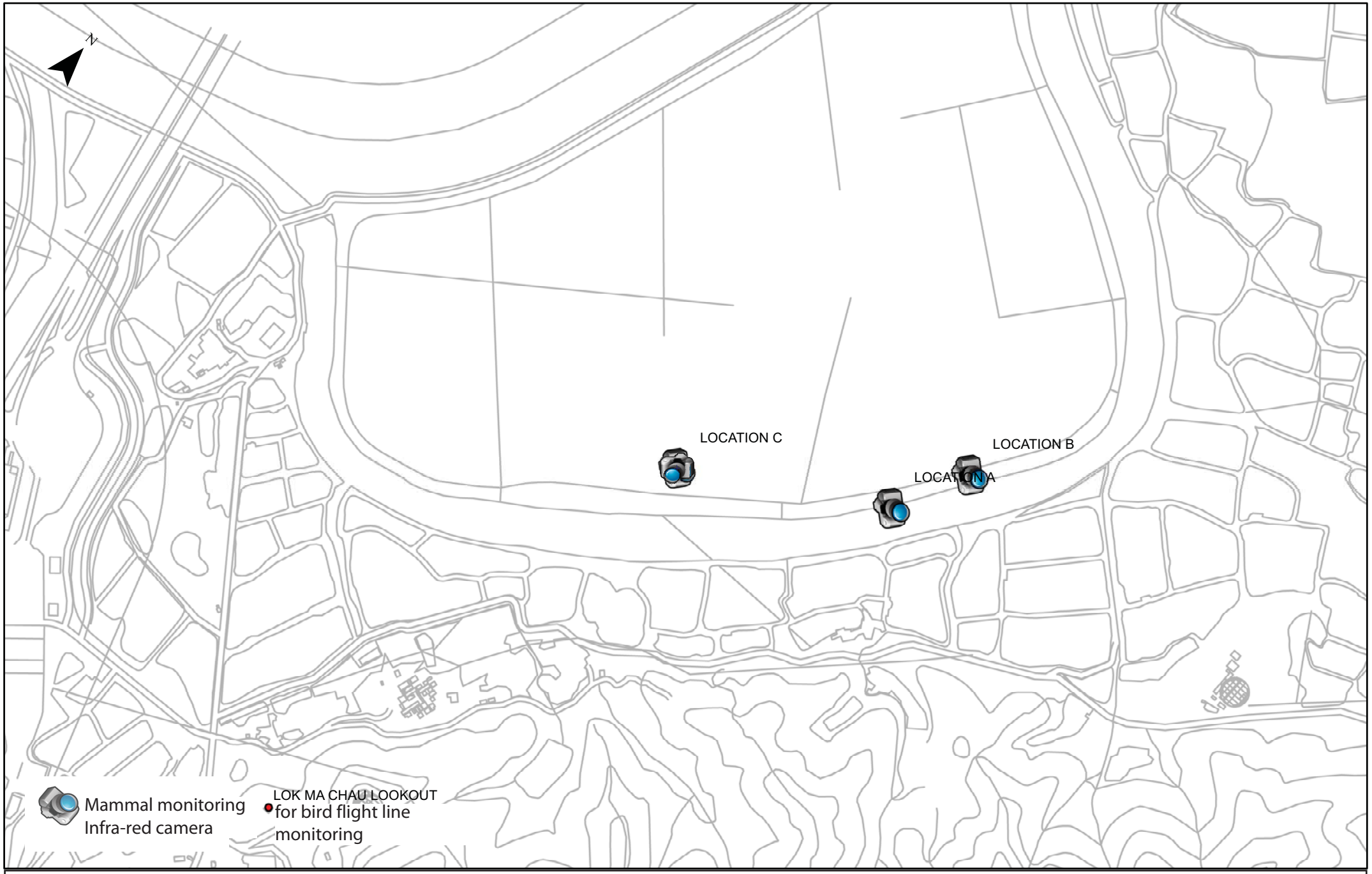
LOCATION OF NOISE MONITORING STATIONS



CONTRACT NO. WD/11/2018

DEVELOPMENT OF LOK MA CHAU LOOP: LAND DECONTAMINATION AND ADVANCE ENGINEERING WORKS – ENVIRONMENTAL TEAM

LOCATION OF WATER QUALITY MONITORING STATIONS



DEVELOPMENT OF LOK MA CHAU LOOP:
LAND DECONTAMINATION AND ADVANCE ENGINEERING WORKS – DESIGN AND CONSTRUCTION
LOCATION OF ECOLOGICAL MONITORING

Appendix E

Calibration certificates

CALIBRATION CERTIFICATES FOR MONITORING EQUIPMENT USED IN THE REPORTING MONTH

Items	Aspect	Description of Equipment	Date of Calibration	Date of Next Calibration
1	Air	TISCH High Volume Air Sampler, HVS Model TE-5170 TSP Sampler Calibration Spreadsheet for DMS-1 (Serial No of mass controller: 1105)	4 Jul 2019	4 Sep 2019
1a		TISCH High Volume Air Sampler, HVS Model TE-5170 TSP Sampler Calibration Spreadsheet for DMS-1 (Serial No of mass controller: 1105)	3 Sep 2019	3 Nov 2019
2		TISCH High Volume Air Sampler, HVS Model TE-5170 TSP Sampler Calibration Spreadsheet for DMS-2A (Serial No of mass controller: 1259)	4 Jul 2019	4 Sep 2019
2a		TISCH High Volume Air Sampler, HVS Model TE-5170 TSP Sampler Calibration Spreadsheet for DMS-2A (Serial No of mass controller: 1259)	3 Sep 2019	3 Nov 2019
3		TISCH High Volume Air Sampler, HVS Model TE-5170 TSP Sampler Calibration Spreadsheet for DMS-3 (Serial No of mass controller: 1260)	4 Jul 2019	4 Sep 2019
3a		TISCH High Volume Air Sampler, HVS Model TE-5170 TSP Sampler Calibration Spreadsheet for DMS-3 (Serial No of mass controller: 1260)	3 Sep 2019	3 Nov 2019
4		TISCH High Volume Air Sampler, HVS Model TE-5170 TSP Sampler Calibration Spreadsheet for DMS-4A (Serial No of mass controller:1895)	4 Jul 2019	4 Sep 2019
4a		TISCH High Volume Air Sampler, HVS Model TE-5170 TSP Sampler Calibration Spreadsheet for DMS-4A (Serial No of mass controller:1895)	3 Sep 2019	3 Nov 2019
5		Calibration Kit TISCH Model TE-5025A Orifice ID 1941 and Rootsmeter S/N: 438320	5 Feb 2019	5 Feb 2020
6		Laser Dust Monitor, Model LD-3B (Serial No. 366418) – EQ108	18 Mar 2019	18 Mar 2020
7		Laser Dust Monitor, Model LD-3B (Serial No. 366410) – EQ110	14 Jan 2019	14 Jan 2020
8		Laser Dust Monitor, Model LD-3B (Serial No. 3Y6501) – EQ111	18 Mar 2019	18 Mar 2020
8		Laser Dust Monitor, Model LD-3B (Serial No. 3Y6502) – EQ113	15 Mar 2019	15 Mar 2020
9	Noise	Brüel & Kjær Sound Level Meter (Serial No. 2285722) – EQ009	19 Jun 2019	19 Jun 2020
10		Brüel & Kjær Sound Level Meter (Serial No. 3012330) – EQ017	7 Jun 2019	7 Jun 2020
11		Brüel & Kjær Acoustical Calibrator (Serial No. 2713428) – EQ082	7 Jun 2019	7 Jun 2020
12		Rion NL-75 Acoustical Calibrator (Serial No. 34680623) – EQ089	27 Nov 2018	27 Nov 2019
13	Water	YSI Pro 20 (Serial No. 12C100570)	25 Jul 2019	25 Oct 2019
14		HACH 2100Q Turbidimeter (Serial No. 12060C18266)	26 Jul 2019	26 Oct 2019
15		AZ 8685 pH Meter (Serial No. 1141943)	14 Jun 2019	14 Sep 2019
15a		AZ 8685 pH Meter (Serial No. 1118396)	16 Sep 2019	16 Dec 2019
16		AZ8371 Salinity Meter (Serial No. 1219381)	14 Jun 2019	14 Sep 2019
16a		AZ8371 Salinity Meter (Serial No. 1219392)	16 Sep 2019	16 Dec 2019

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Village House along Ha Wan Tsuen Road — Date of Calibration: 3-Jul-19
Location ID : DMS1 — Next Calibration Date: 3-Sep-19
Name and Model: TISCH HVS Model TE-5170 — Technician: Eric

CONDITIONS

Sea Level Pressure (hPa)	1004	Corrected Pressure (mm Hg)	753
Temperature (°C)	26.6	Temperature (K)	300

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.0968
Model->	5025A	Qstd Intercept ->	-0.00065
Serial # ->	1941		

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.80	5.80	11.6	1.613	55	54.45	Slope = 27.2048
13	4.40	4.40	8.8	1.405	49	48.51	Intercept = 10.2178
10	3.50	3.50	7.0	1.253	44	43.56	Corr. coeff. = 0.9988
7	2.10	2.10	4.2	0.971	37	36.63	
5	1.35	1.35	2.7	0.778	32	31.68	

Calculations :

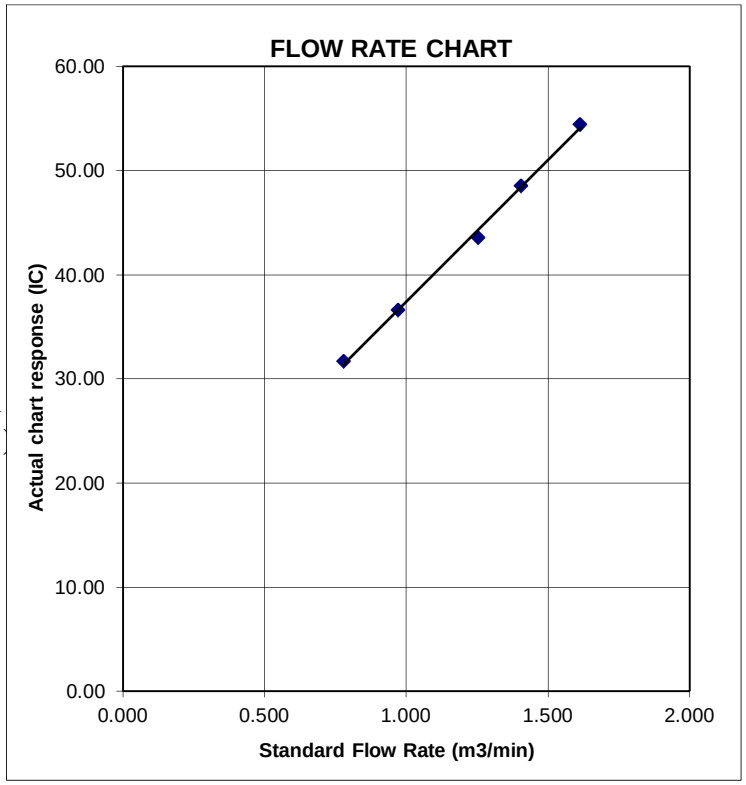
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate
IC = corrected chart respones
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)[Sqrt(298/Tav)(Pav/760)]-b)

m = sampler slope
b = sampler intercept
I = chart response
Tav = daily average temperature
Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Village House along Lok Ma Chau Road — Date of Calibration: 3-Jul-19
Location ID : DMS2A — Next Calibration Date: 3-Sep-19
Name and Model: TISCH HVS Model TE-5170 — Technician: Eric

CONDITIONS

Sea Level Pressure (hPa)	1004	Corrected Pressure (mm Hg)	753
Temperature (°C)	26.6	Temperature (K)	300

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.0968
Model->	5025A	Qstd Intercept ->	-0.00065
Serial # ->	1941		

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	7.00	7.00	14.0	1.772	56	55.44	Slope = 29.4102
13	5.40	5.40	10.8	1.556	51	50.49	Intercept = 4.0803
10	3.90	3.90	7.8	1.323	44	43.56	Corr. coeff. = 0.9985
7	2.60	2.60	5.2	1.080	36	35.64	
5	1.60	1.60	3.2	0.847	29	28.71	

Calculations :

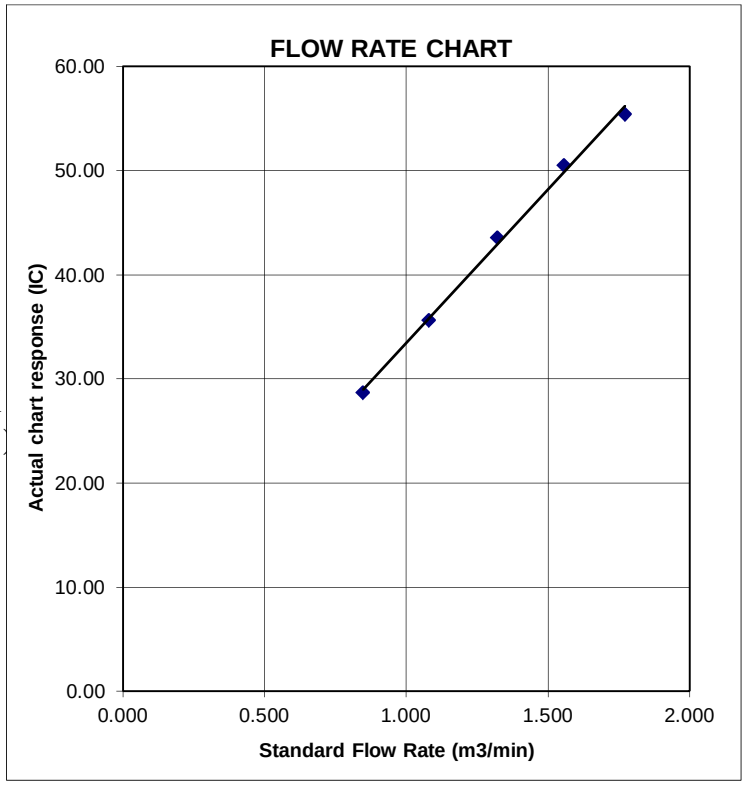
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate
IC = corrected chart respones
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)[Sqrt(298/Tav)(Pav/760)]-b)

m = sampler slope
b = sampler intercept
I = chart response
Tav = daily average temperature
Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Village House along Border Road
Location ID : DMS3
Name and Model: TISCH HVS Model TE-5170

Date of Calibration: 3-Jul-19
Next Calibration Date: 3-Sep-19
Technician: Eric

CONDITIONS

Sea Level Pressure (hPa)	1004	Corrected Pressure (mm Hg)	753
Temperature (ºC)	26.6	Temperature (K)	300

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.0968
Model->	5025A	Qstd Intercept ->	-0.00065
Serial # ->	1941		

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.70	6.70	13.4	1.733	49	48.51	Slope = 38.3184
13	5.20	5.20	10.4	1.527	41	40.59	Intercept = -17.9512
10	4.40	4.40	8.8	1.405	36	35.64	Corr. coeff. = 0.9999
7	2.60	2.60	5.2	1.080	24	23.76	
5	1.65	1.65	3.3	0.860	15	14.85	

Calculations :

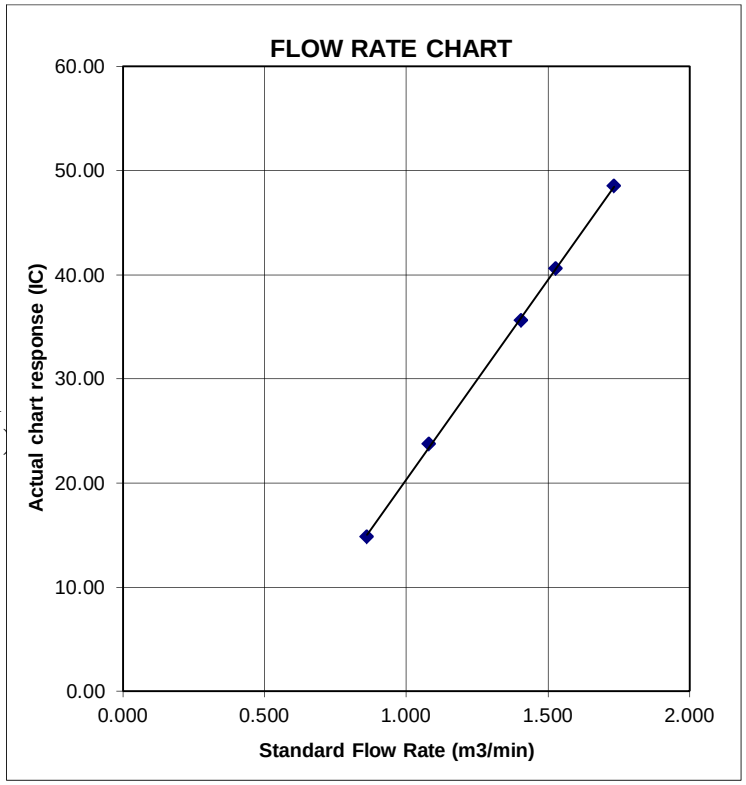
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate
IC = corrected chart respones
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)[Sqrt(298/Tav)(Pav/760)]-b)

m = sampler slope
b = sampler intercept
I = chart response
Tav = daily average temperature
Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Hong Kong Police Forec, Lok ma Chau
Operation Base at Horn Hill
Location ID : DMS4A

Date of Calibration: 3-Jul-19
Next Calibration Date: 3-Sep-19

Name and Model: TISCH HVS Model TE-5170

Technician: Eric

CONDITIONS

Sea Level Pressure (hPa)	1004	Corrected Pressure (mm Hg)	753
Temperature (°C)	26.6	Temperature (K)	300

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.0968
Model->	5025A	Qstd Intercept ->	-0.00065
Serial # ->	1941		

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.70	6.70	13.4	1.733	52	51.48	Slope = 32.4993
13	4.80	4.80	9.6	1.467	42	41.58	Intercept = -5.7850
10	3.65	3.65	7.3	1.279	35	34.65	Corr. coeff. = 0.9979
7	2.00	2.00	4.0	0.947	25	24.75	
5	1.10	1.10	2.2	0.703	18	17.82	

Calculations :

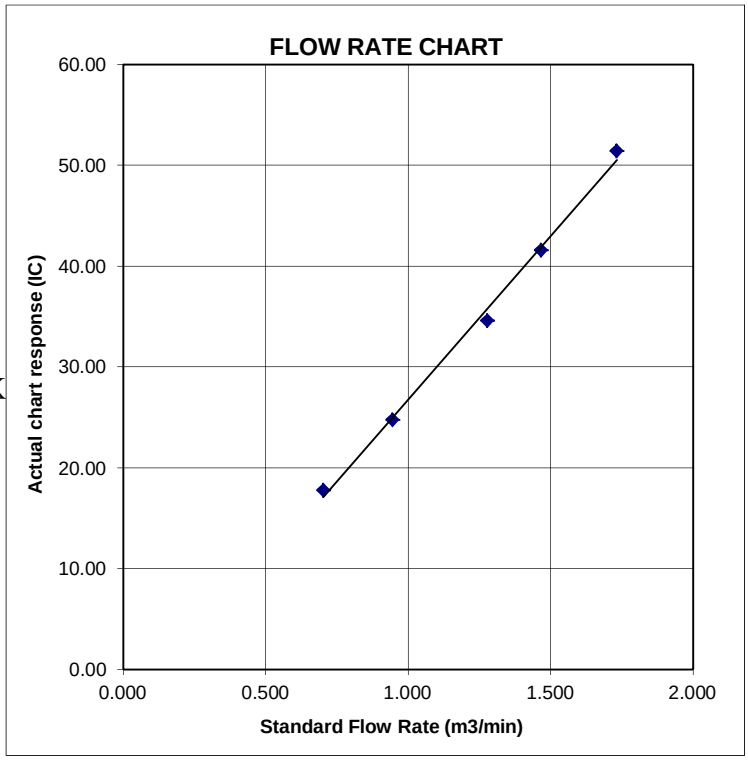
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate
IC = corrected chart respones
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)[Sqrt(298/Tav)(Pav/760)]-b)

m = sampler slope
b = sampler intercept
I = chart response
Tav = daily average temperature
Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Village House along Ha Wan Tsuen Road — Date of Calibration: 3-Sep-19
Location ID : DMS1 — Next Calibration Date: 3-Nov-19
Name and Model: TISCH HVS Model TE-5170 — Technician: Eric Chan

CONDITIONS

Sea Level Pressure (hPa)	1005.6	Corrected Pressure (mm Hg)	754.2
Temperature (°C)	28.4	Temperature (K)	301

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.0968
Model->	5025A	Qstd Intercept ->	-0.00065
Serial # ->	1941		

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.50	5.50	11.0	1.567	50	49.25	Slope = 27.7398
13	4.35	4.35	8.7	1.394	44	43.34	Intercept = 5.1454
10	3.40	3.40	6.8	1.232	40	39.40	Corr. coeff. = 0.9956
7	2.20	2.20	4.4	0.991	32	31.52	
5	1.35	1.35	2.7	0.777	28	27.58	

Calculations :

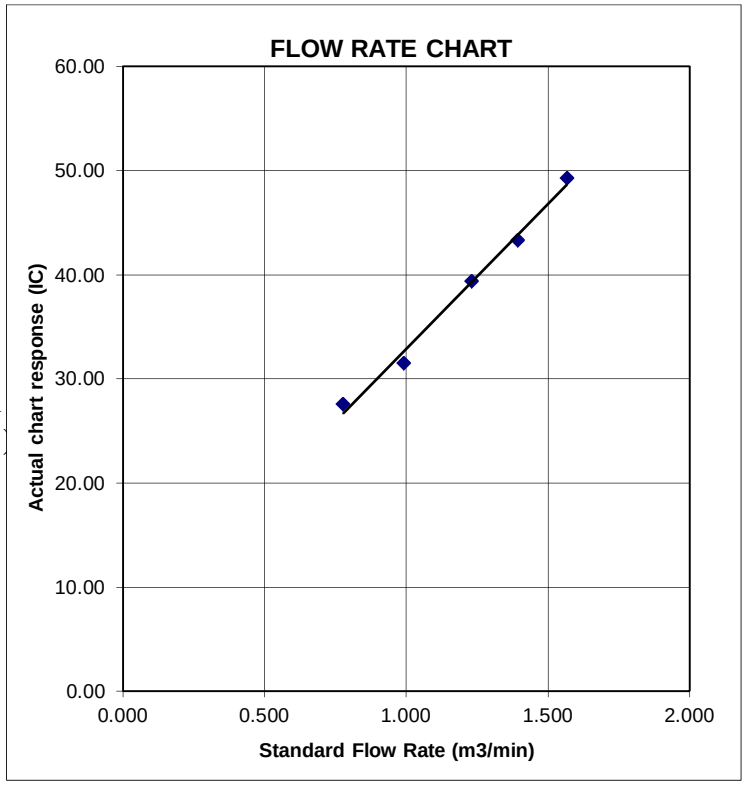
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate
IC = corrected chart respones
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)[Sqrt(298/Tav)(Pav/760)]-b)

m = sampler slope
b = sampler intercept
I = chart response
Tav = daily average temperature
Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Village House along Lok Ma Chau Road — Date of Calibration: 3-Sep-19
Location ID : DMS2A — Next Calibration Date: 3-Nov-19
Name and Model: TISCH HVS Model TE-5170 — Technician: Eric Chan

CONDITIONS

Sea Level Pressure (hPa)	1005.6	Corrected Pressure (mm Hg)	754.2
Temperature (°C)	28.4	Temperature (K)	301

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.0968
Model->	5025A	Qstd Intercept ->	-0.00065
Serial # ->	1941		

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected
18	6.25	6.25	12.5	1.671	56	55.16
13	4.90	4.90	9.8	1.479	48	47.28
10	3.70	3.70	7.4	1.285	42	41.37
7	2.30	2.30	4.6	1.014	34	33.49
5	1.35	1.35	2.7	0.777	28	27.58

LINEAR REGRESSION
Slope = 30.4270
Intercept = 3.0910
Corr. coeff. = 0.9960

Calculations :

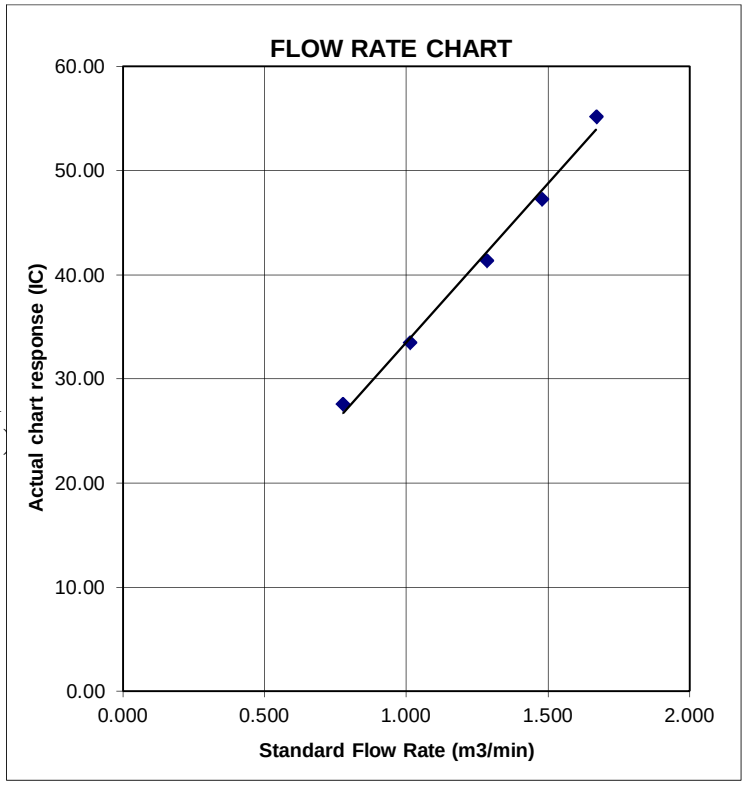
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate
IC = corrected chart respones
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)[Sqrt(298/Tav)(Pav/760)]-b)

m = sampler slope
b = sampler intercept
I = chart response
Tav = daily average temperature
Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Village House along Border Road
Location ID : DMS3
Name and Model: TISCH HVS Model TE-5170

Date of Calibration: 3-Sep-19
Next Calibration Date: 3-Nov-19
Technician: Eric Chan

CONDITIONS

Sea Level Pressure (hPa)	1005.6	Corrected Pressure (mm Hg)	754.2
Temperature (°C)	28.4	Temperature (K)	301

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.0968
Model->	5025A	Qstd Intercept ->	-0.00065
Serial # ->	1941		

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.50	5.50	11.0	1.567	52	51.22	Slope = 30.0795
13	4.25	4.25	8.5	1.378	48	47.28	Intercept = 4.4236
10	3.50	3.50	7.0	1.250	42	41.37	Corr. coeff. = 0.9944
7	2.25	2.25	4.5	1.002	34	33.49	
5	1.25	1.25	2.5	0.747	28	27.58	

Calculations :

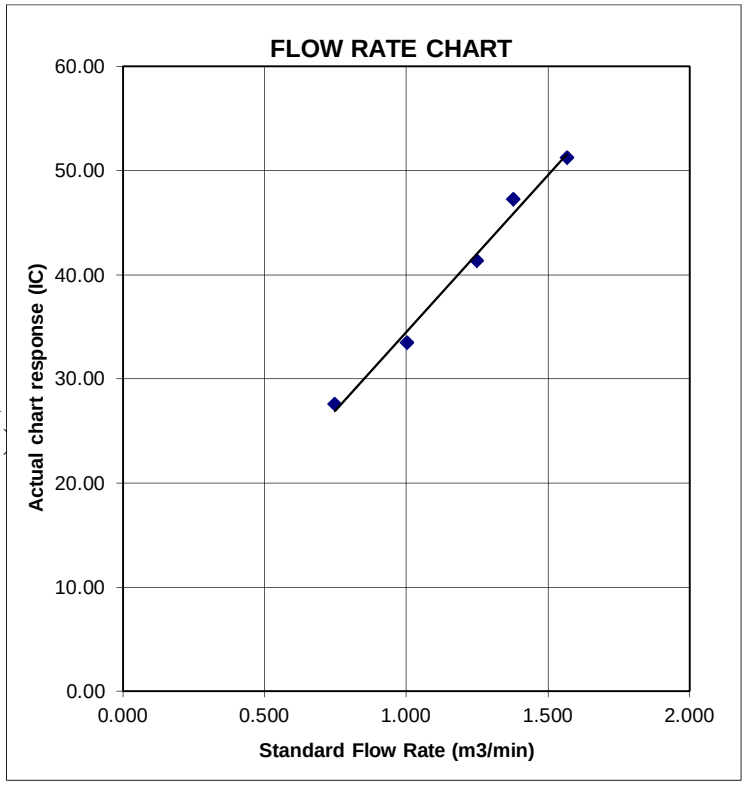
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate
IC = corrected chart respones
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)[Sqrt(298/Tav)(Pav/760)]-b)

m = sampler slope
b = sampler intercept
I = chart response
Tav = daily average temperature
Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Hong Kong Police Forec, Lok ma Chau
Operation Base at Horn Hill
Location ID : DMS4A

Date of Calibration: 3-Sep-19
Next Calibration Date: 3-Nov-19

Name and Model: TISCH HVS Model TE-5170

Technician: Eric Chan

CONDITIONS

Sea Level Pressure (hPa)	1005.6	Corrected Pressure (mm Hg)	754.2
Temperature (°C)	28.4	Temperature (K)	301

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.0968
Model->	5025A	Qstd Intercept ->	-0.00065
Serial # ->	1941		

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.75	5.75	11.5	1.602	52	51.22	Slope = 28.5272
13	5.00	5.00	10.0	1.494	47	46.29	Intercept = 4.6404
10	3.85	3.85	7.7	1.311	42	41.37	Corr. coeff. = 0.9936
7	2.20	2.20	4.4	0.991	35	34.47	
5	1.30	1.30	2.6	0.762	26	25.61	

Calculations :

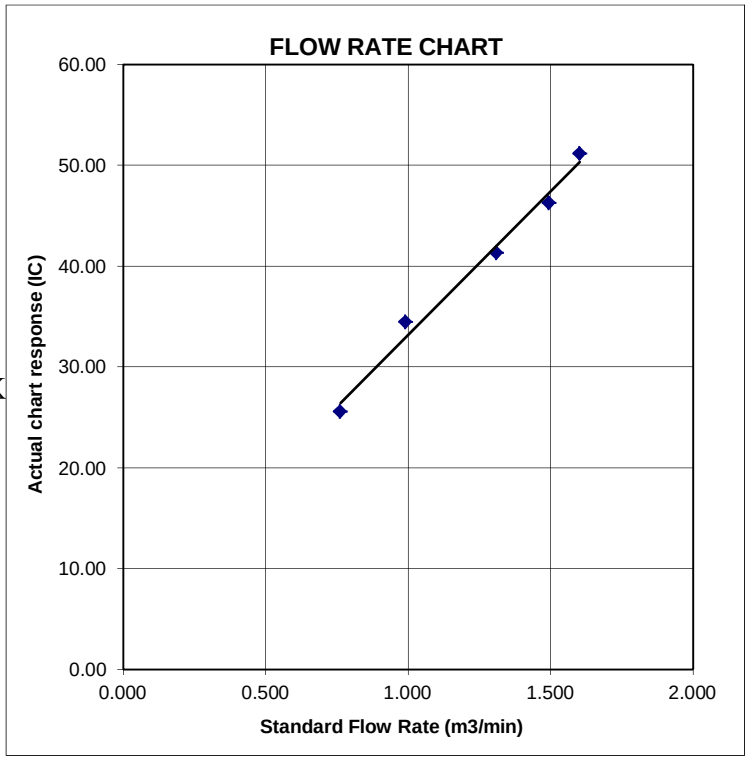
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate
IC = corrected chart respones
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)[Sqrt(298/Tav)(Pav/760)]-b)

m = sampler slope
b = sampler intercept
I = chart response
Tav = daily average temperature
Pav = daily average pressure



TISCH Environmental

RECALIBRATION DUE DATE:
February 5, 2020

Certificate of Calibration

Calibration Certification Information				
Cal. Date:	February 5, 2019	**Rootsmeter S/N:** 438320	**Ta:** 293	°K
Operator:	Jim Tisch		**Pa:** 753.1	mm Hg
Calibration Model #:	TE-5025A	**Calibrator S/N:** **1941**		

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.4830	3.2	2.00
2	3	4	1	1.0430	6.4	4.00
3	5	6	1	0.9300	7.9	5.00
4	7	8	1	0.8870	8.7	5.50
5	9	10	1	0.7320	12.7	8.00

Data Tabulation

Vstd (m3)	Qstd (x-axis)	$\sqrt{\Delta H\left(\frac{Pa}{Pstd}\right)\left(\frac{Tstd}{Ta}\right)}$ (y-axis)	Va	Qa (x-axis)	$\sqrt{\Delta H\left(Ta/Pa\right)}$ (y-axis)
1.0036	0.6767	1.4197	0.9958	0.6714	0.8821
0.9993	0.9581	2.0078	0.9915	0.9506	1.2475
0.9973	1.0723	2.2448	0.9895	1.0640	1.3947
0.9962	1.1231	2.3544	0.9884	1.1144	1.4628
0.9908	1.3536	2.8395	0.9831	1.3431	1.7642
QSTD	**m=**	**2.09680**	**QA**	**m=**	**1.31298**
	b=	**-0.00065**		**b=**	**-0.00040**
	r=	**0.99999**		**r=**	**0.99999**

Calculations

Vstd=	ΔVol((Pa-ΔP)/Pstd)(Tstd/Ta)	**Va=**	ΔVol((Pa-ΔP)/Pa)
Qstd=	Vstd/ΔTime	**Qa=**	Va/ΔTime

For subsequent flow rate calculations:

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

Qa= $1/m\left(\left(\sqrt{\Delta H\left(Ta/Pa\right)}\right)-b\right)$

Standard Conditions	
Tstd:	298.15 °K
Pstd:	760 mm Hg

Key
ΔH: calibrator manometer reading (in H2O)
ΔP: rootsmeter manometer reading (mm Hg)
Ta: actual absolute temperature (°K)
Pa: actual barometric pressure (mm Hg)
b: intercept
m: slope

RECALIBRATION
US EPA recommends annual recalibration per 1998 40 Code of Federal Regulations Part 50 to 51, Appendix B to Part 50, Reference Method for the Determination of Suspended Particulate Matter in the Atmosphere, 9.2.17, page 30

Tisch Environmental, Inc.
145 South Miami Avenue
Village of Cleves, OH 45002

www.tisch-env.com
TOLL FREE: (877)263-7610
FAX: (513)467-9009

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

SUB-CONTRACTING REPORT

CONTACT	:	MR BEN TAM	WORK ORDER	:	**HK1912131**
CLIENT	:	**ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING**			
ADDRESS	:	RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T. HONG KONG	SUB-BATCH	:	1
			DATE RECEIVED	:	20-MAR-2019
			DATE OF ISSUE	:	22-MAR-2019
PROJECT	:	----	NO. OF SAMPLES	:	1
			CLIENT ORDER	:	----

General Comments

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

Signatories

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

Signatories	*Position*
Richard Fung	General Manager

This is the Final Report and supersedes any preliminary report with this batch number.

Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

ALS Technichem (HK) Pty Ltd
Part of the ALS Laboratory Group
11/F. Chung Shun Knitting Centre 1 - 3 Wing Yip Street Kwai Chung N.T. Hong Kong
Tel. +852 2610 1044 Fax. +852 2610 2021 **www.alsglobal.com**

WORK ORDER	:	HK1912131
SUB-BATCH	:	1
CLIENT	:	ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING
PROJECT	:	----

ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK1912131-001	S/N: 366418	AIR	20-Mar-2019	366418

Equipment Verification Report (TSP)

Equipment Calibrated:

Type:	Laser Dust monitor
Manufacturer:	Sibata LD-3B
Serial No.	366418
Equipment Ref:	EQ108
Job Order	HK1912131

Standard Equipment:

Standard Equipment:	Higher Volume Sampler
Location & Location ID:	AUES office (calibration room)
Equipment Ref:	HVS 018
Last Calibration Date:	12 February 2019

Equipment Verification Results:

Calibration Date: 11 March 2019

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m^3 (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr00min	09:21 ~ 11:21	18.4	1014.9	0.021	2811	23.4
2hr00min	11:30 ~ 13:30	18.4	1014.9	0.025	3012	25.1
2hr00min	13:40 ~ 15:40	18.4	1014.9	0.032	3345	27.9

Sensitivity Adjustment Scale Setting (Before Calibration) 685 (CPM)

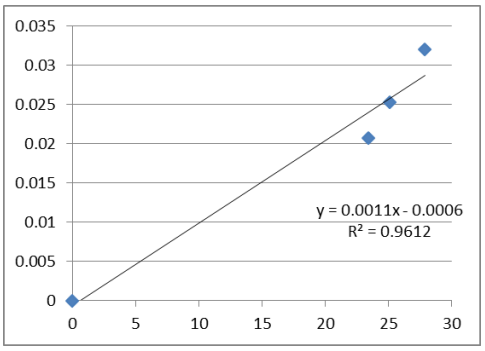
Sensitivity Adjustment Scale Setting (After Calibration) 685 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0011

Correlation Coefficient (R) 0.9804

Date of Issue 18 March 2019



Remarks:

1. **Strong** Correlation (R>0.8)
2. Factor 0.0011 should be apply for TSP monitoring

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

Operator : Fai So Signature : Date : 18 March 2019

QC Reviewer : Ben Tam Signature : Date : 18 March 2019

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Gold King Industrial Building, Kwai Chung	Date of Calibration:	12-Feb-19
Location ID :	Calibration Room	Next Calibration Date:	12-May-19

CONDITIONS

Sea Level Pressure (hPa)	1024.2	Corrected Pressure (mm Hg)	768.15
Temperature (°C)	19.0	Temperature (K)	292

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.02017
Model->	5025A	Qstd Intercept ->	-0.03691
Calibration Date->	13-Feb-18	Expiry Date->	13-Feb-19

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	4	7.7	11.7	1.738	60	60.94	Slope = 35.5369
13	2.8	6.9	9.7	1.584	52	52.81	Intercept = -1.8924
10	1.9	5.4	7.3	1.377	46	46.72	Corr. coeff. = 0.9951
8	0.6	4	4.6	1.097	38	38.59	
5	-0.4	3.1	2.7	0.844	27	27.42	

Calculations :

Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]

IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate

IC = corrected chart respones

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)[Sqrt(298/Tav)(Pav/760)]-b)

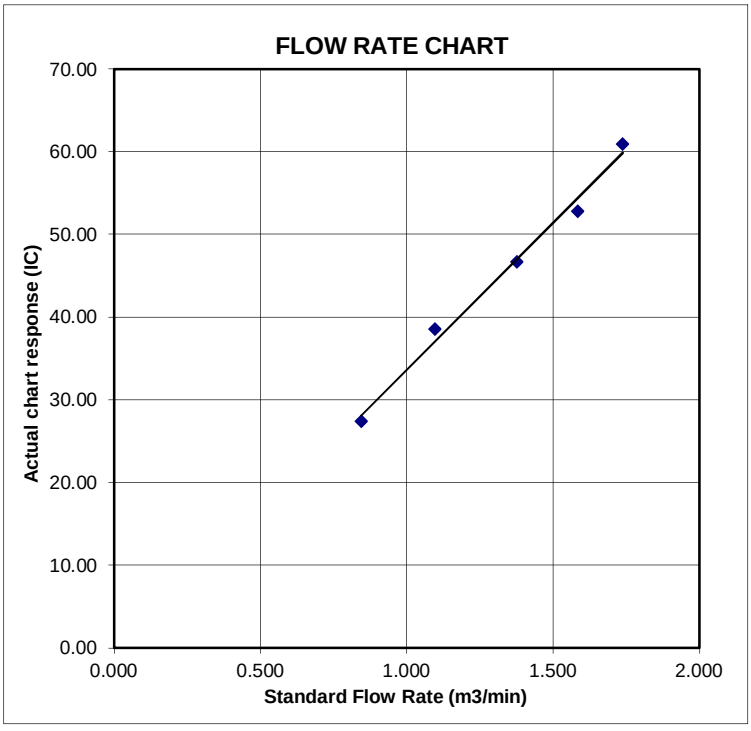
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TISCH Environmental

RECALIBRATION DUE DATE:
February 13, 2019

Certificate of Calibration

Calibration Certification Information				
Cal. Date:	February 13, 2018	**Rootsmeter S/N:** 438320	**Ta:** 293	°K
Operator:	Jim Tisch		**Pa:** 763.3	mm Hg
Calibration Model #:	TE-5025A	**Calibrator S/N:** **1612**		

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.3970	3.2	2.00
2	3	4	1	1.0000	6.3	4.00
3	5	6	1	0.8900	7.9	5.00
4	7	8	1	0.8440	8.7	5.50
5	9	10	1	0.7010	12.6	8.00

Data Tabulation

Vstd (m3)	Qstd (x-axis)	$\sqrt{\Delta H\left(\frac{Pa}{Pstd}\right)\left(\frac{Tstd}{Ta}\right)}$ (y-axis)	Va	Qa (x-axis)	$\sqrt{\Delta H\left(Ta/Pa\right)}$ (y-axis)
1.0172	0.7281	1.4293	0.9958	0.7128	0.8762
1.0130	1.0130	2.0213	0.9917	0.9917	1.2392
1.0109	1.1358	2.2599	0.9896	1.1120	1.3854
1.0098	1.1964	2.3702	0.9886	1.1713	1.4530
1.0046	1.4331	2.8586	0.9835	1.4030	1.7524
QSTD	**m=**	**2.02017**	**QA**	**m=**	**1.26500**
	b=	**-0.03691**		**b=**	**-0.02263**
	r=	**0.99988**		**r=**	**0.99988**

Calculations

Vstd=	ΔVol((Pa-ΔP)/Pstd)(Tstd/Ta)	**Va=**	ΔVol((Pa-ΔP)/Pa)
Qstd=	Vstd/ΔTime	**Qa=**	Va/ΔTime

For subsequent flow rate calculations:

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

Qa= $1/m\left(\left(\sqrt{\Delta H\left(Ta/Pa\right)}\right)-b\right)$

Standard Conditions	
Tstd:	298.15 °K
Pstd:	760 mm Hg

Key
ΔH: calibrator manometer reading (in H2O)
ΔP: rootsmeter manometer reading (mm Hg)
Ta: actual absolute temperature (°K)
Pa: actual barometric pressure (mm Hg)
b: intercept
m: slope

RECALIBRATION

US EPA recommends annual recalibration per 1998 40 Code of Federal Regulations Part 50 to 51, Appendix B to Part 50, Reference Method for the Determination of Suspended Particulate Matter in the Atmosphere, 9.2.17, page 30

Tisch Environmental, Inc.
145 South Miami Avenue
Village of Cleves, OH 45002

www.tisch-env.cor
TOLL FREE: (877)263-761(
FAX: (513)467-900

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

SUB-CONTRACTING REPORT

CONTACT	:	MR BEN TAM	WORK ORDER	:	**HK1908929**
CLIENT	:	**ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING**			
ADDRESS	:	RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T. HONG KONG	SUB-BATCH	:	1
			DATE RECEIVED	:	25-FEB-2019
			DATE OF ISSUE	:	4-MAR-2019
PROJECT	:	----	NO. OF SAMPLES	:	1
			CLIENT ORDER	:	----

General Comments

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

Signatories

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

Signatories	*Position*
Richard Fung	General Manager

This is the Final Report and supersedes any preliminary report with this batch number.

Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

ALS Technichem (HK) Pty Ltd
Part of the ALS Laboratory Group
11/F. Chung Shun Knitting Centre 1 - 3 Wing Yip Street Kwai Chung N.T. Hong Kong
Tel. +852 2610 1044 Fax. +852 2610 2021 **www.alsglobal.com**

WORK ORDER : HK1908929
SUB-BATCH : 1
CLIENT : ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING
PROJECT : ----

ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK1908929-001	S/N: 366410	AIR	25-Feb-2019	S/N: 366410

Equipment Verification Report (TSP)

Equipment Calibrated:

Type:	Laser Dust monitor
Manufacturer:	Sibata LD-3B
Serial No.	366410
Equipment Ref:	EQ110
Job Order	HK1908929

Standard Equipment:

Standard Equipment:	Higher Volume Sampler
Location & Location ID:	AUES office (calibration room)
Equipment Ref:	HVS 018
Last Calibration Date:	21 December 2018

Equipment Verification Results:

Testing Date: 7 January 2019

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m^3 (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr07min	09:01 ~ 11:08	18.5	1021.4	0.045	2377	18.8
2hr11min	11:13 ~ 13:24	18.5	1021.4	0.032	1522	11.6
2hr07min	13:30 ~ 15:37	18.5	1021.4	0.089	5117	40.4

Sensitivity Adjustment Scale Setting (Before Calibration) 674 (CPM)

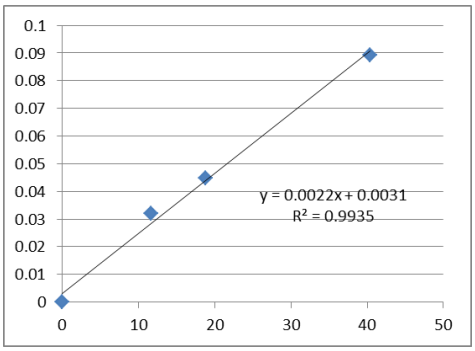
Sensitivity Adjustment Scale Setting (After Calibration) 674 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022

Correlation Coefficient 0.9967

Date of Issue 14 January 2019



Remarks:

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

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

Operator : Martin Li Signature : Date : 14 January 2019

QC Reviewer : Ben Tam Signature : Date : 14 January 2019

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Gold King Industrial Building, Kwai Chung	Date of Calibration:	21-Dec-18
Location ID :	Calibration Room	Next Calibration Date:	21-Mar-19

CONDITIONS

Sea Level Pressure (hPa)	1016.1	Corrected Pressure (mm Hg)	762.075
Temperature (°C)	22.4	Temperature (K)	295

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.02017
Model->	5025A	Qstd Intercept ->	-0.03691
Calibration Date->	13-Feb-18	Expiry Date->	13-Feb-19

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.7	5.7	11.4	1.699	56	56.32	Slope = 34.0074
13	4.4	4.4	8.8	1.495	51	51.29	Intercept = -0.4093
10	3.4	3.4	6.8	1.317	45	45.26	Corr. coeff. = 0.9972
8	2.3	2.3	4.6	1.086	36	36.21	
5	1.4	1.4	2.8	0.851	28	28.16	

Calculations :

Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]

IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate

IC = corrected chart respones

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)[Sqrt(298/Tav)(Pav/760)]-b)

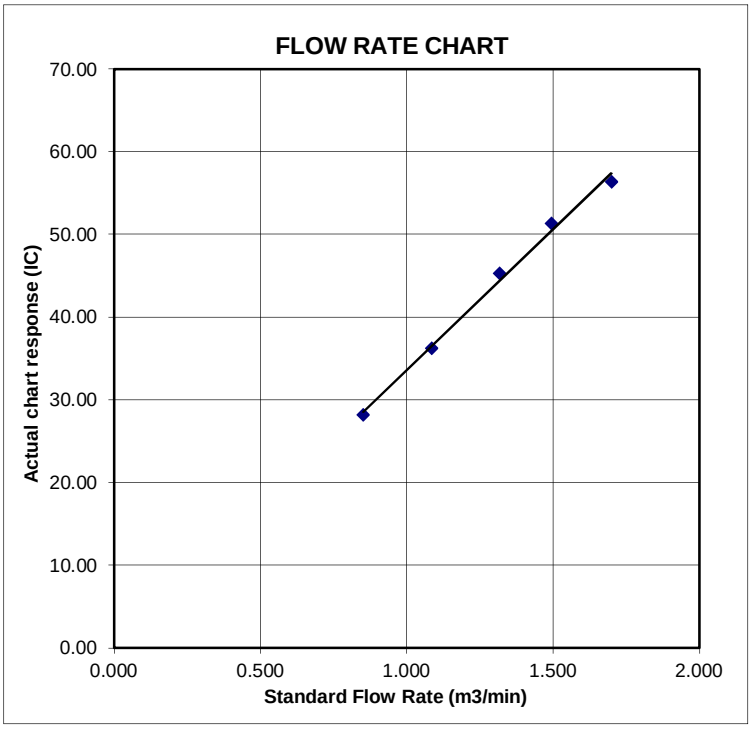
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TISCH Environmental

RECALIBRATION DUE DATE:
February 13, 2019

Certificate of Calibration

Calibration Certification Information				
Cal. Date:	February 13, 2018	**Rootsmeter S/N:** 438320	**Ta:** 293	°K
Operator:	Jim Tisch		**Pa:** 763.3	mm Hg
Calibration Model #:	TE-5025A	**Calibrator S/N:** **1612**		

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.3970	3.2	2.00
2	3	4	1	1.0000	6.3	4.00
3	5	6	1	0.8900	7.9	5.00
4	7	8	1	0.8440	8.7	5.50
5	9	10	1	0.7010	12.6	8.00

Data Tabulation

Vstd (m3)	Qstd (x-axis)	$\sqrt{\Delta H\left(\frac{Pa}{Pstd}\right)\left(\frac{Tstd}{Ta}\right)}$ (y-axis)	Va	Qa (x-axis)	$\sqrt{\Delta H\left(Ta/Pa\right)}$ (y-axis)
1.0172	0.7281	1.4293	0.9958	0.7128	0.8762
1.0130	1.0130	2.0213	0.9917	0.9917	1.2392
1.0109	1.1358	2.2599	0.9896	1.1120	1.3854
1.0098	1.1964	2.3702	0.9886	1.1713	1.4530
1.0046	1.4331	2.8586	0.9835	1.4030	1.7524
QSTD	**m=**	**2.02017**	**QA**	**m=**	**1.26500**
	b=	**-0.03691**		**b=**	**-0.02263**
	r=	**0.99988**		**r=**	**0.99988**

Calculations

Vstd=	ΔVol((Pa-ΔP)/Pstd)(Tstd/Ta)	**Va=**	ΔVol((Pa-ΔP)/Pa)
Qstd=	Vstd/ΔTime	**Qa=**	Va/ΔTime

For subsequent flow rate calculations:

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

Qa= $1/m\left(\left(\sqrt{\Delta H\left(Ta/Pa\right)}\right)-b\right)$

Standard Conditions	
Tstd:	298.15 °K
Pstd:	760 mm Hg

Key
ΔH: calibrator manometer reading (in H2O)
ΔP: rootsmeter manometer reading (mm Hg)
Ta: actual absolute temperature (°K)
Pa: actual barometric pressure (mm Hg)
b: intercept
m: slope

RECALIBRATION

US EPA recommends annual recalibration per 1998 40 Code of Federal Regulations Part 50 to 51, Appendix B to Part 50, Reference Method for the Determination of Suspended Particulate Matter in the Atmosphere, 9.2.17, page 30

Tisch Environmental, Inc.
145 South Miami Avenue
Village of Cleves, OH 45002

www.tisch-env.cor
TOLL FREE: (877)263-761(
FAX: (513)467-900

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

SUB-CONTRACTING REPORT

CONTACT	:	MR BEN TAM	WORK ORDER	:	**HK1912133**
CLIENT	:	**ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING**			
ADDRESS	:	RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T. HONG KONG	SUB-BATCH	:	1
			DATE RECEIVED	:	20-MAR-2019
			DATE OF ISSUE	:	22-MAR-2019
PROJECT	:	----	NO. OF SAMPLES	:	1
			CLIENT ORDER	:	----

General Comments

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

Signatories

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

Signatories	*Position*
Richard Fung	General Manager

This is the Final Report and supersedes any preliminary report with this batch number.

Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

ALS Technichem (HK) Pty Ltd
Part of the ALS Laboratory Group
11/F. Chung Shun Knitting Centre 1 - 3 Wing Yip Street Kwai Chung N.T. Hong Kong
Tel. +852 2610 1044 Fax. +852 2610 2021 **www.alsglobal.com**

WORK ORDER : HK1912133
SUB-BATCH : 1
CLIENT : ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING
PROJECT : ----

ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK1912133-001	S/N: 3Y6501	AIR	20-Mar-2019	3Y6501

Equipment Verification Report (TSP)

Equipment Calibrated:

Type:	Laser Dust monitor
Manufacturer:	Sibata LD-3B
Serial No.	3Y6501
Equipment Ref:	EQ111
Job Order	HK1912133

Standard Equipment:

Standard Equipment:	Higher Volume Sampler
Location & Location ID:	AUES office (calibration room)
Equipment Ref:	HVS 018
Last Calibration Date:	12 February 2019

Equipment Verification Results:

Calibration Date: 11 March 2019

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m^3 (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr00min	09:21 ~ 11:21	18.4	1014.9	0.021	3650	30.4
2hr00min	11:30 ~ 13:30	18.4	1014.9	0.025	4111	34.3
2hr00min	13:40 ~ 15:40	18.4	1014.9	0.032	4611	38.4

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

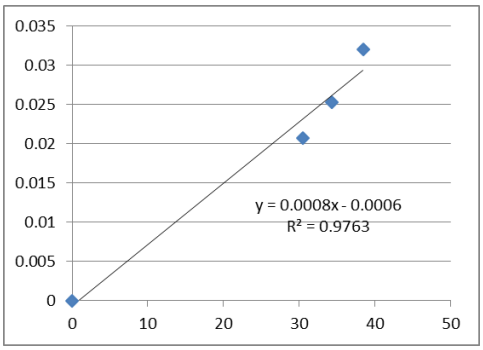
Sensitivity Adjustment Scale Setting (After Calibration) 656 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0008

Correlation Coefficient (R) 0.9881

Date of Issue 18 March 2019



Remarks:

1. **Strong** Correlation (R>0.8)
2. Factor 0.0008 should be apply for TSP monitoring

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

Operator : Fai So Signature : Date : 18 March 2019

QC Reviewer : Ben Tam Signature : Date : 18 March 2019

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Gold King Industrial Building, Kwai Chung	Date of Calibration:	12-Feb-19
Location ID :	Calibration Room	Next Calibration Date:	12-May-19

CONDITIONS

Sea Level Pressure (hPa)	1024.2	Corrected Pressure (mm Hg)	768.15
Temperature (°C)	19.0	Temperature (K)	292

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.02017
Model->	5025A	Qstd Intercept ->	-0.03691
Calibration Date->	13-Feb-18	Expiry Date->	13-Feb-19

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	4	7.7	11.7	1.738	60	60.94	Slope = 35.5369
13	2.8	6.9	9.7	1.584	52	52.81	Intercept = -1.8924
10	1.9	5.4	7.3	1.377	46	46.72	Corr. coeff. = 0.9951
8	0.6	4	4.6	1.097	38	38.59	
5	-0.4	3.1	2.7	0.844	27	27.42	

Calculations :

Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]

IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate

IC = corrected chart respones

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)[Sqrt(298/Tav)(Pav/760)]-b)

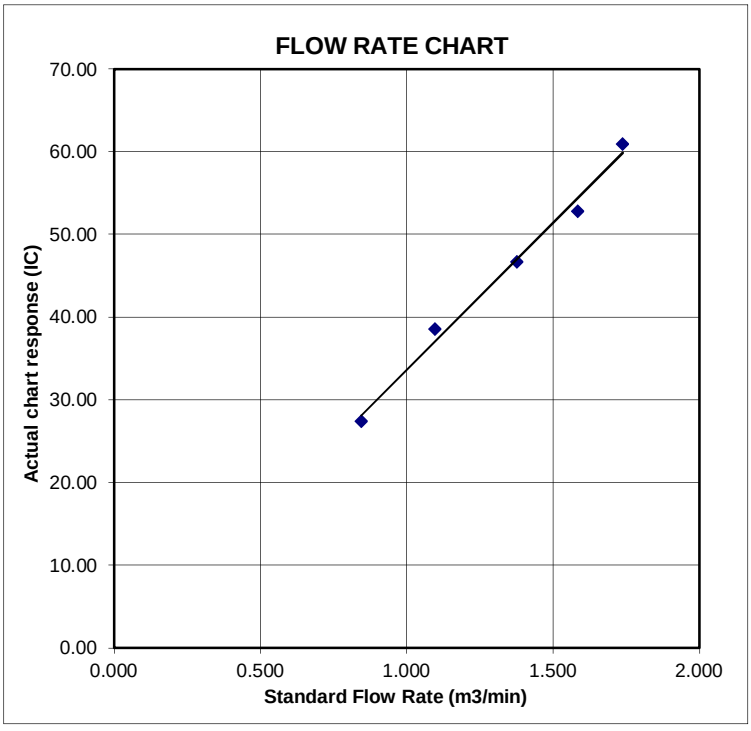
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TISCH Environmental

RECALIBRATION DUE DATE:
February 13, 2019

Certificate of Calibration

Calibration Certification Information				
Cal. Date:	February 13, 2018	**Rootsmeter S/N:** 438320	**Ta:** 293	°K
Operator:	Jim Tisch		**Pa:** 763.3	mm Hg
Calibration Model #:	TE-5025A	**Calibrator S/N:** **1612**		

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.3970	3.2	2.00
2	3	4	1	1.0000	6.3	4.00
3	5	6	1	0.8900	7.9	5.00
4	7	8	1	0.8440	8.7	5.50
5	9	10	1	0.7010	12.6	8.00

Data Tabulation

Vstd (m3)	Qstd (x-axis)	$\sqrt{\Delta H\left(\frac{Pa}{Pstd}\right)\left(\frac{Tstd}{Ta}\right)}$ (y-axis)	Va	Qa (x-axis)	$\sqrt{\Delta H\left(Ta/Pa\right)}$ (y-axis)
1.0172	0.7281	1.4293	0.9958	0.7128	0.8762
1.0130	1.0130	2.0213	0.9917	0.9917	1.2392
1.0109	1.1358	2.2599	0.9896	1.1120	1.3854
1.0098	1.1964	2.3702	0.9886	1.1713	1.4530
1.0046	1.4331	2.8586	0.9835	1.4030	1.7524
QSTD	**m=**	**2.02017**	**QA**	**m=**	**1.26500**
	b=	**-0.03691**		**b=**	**-0.02263**
	r=	**0.99988**		**r=**	**0.99988**

Calculations

Vstd=	ΔVol((Pa-ΔP)/Pstd)(Tstd/Ta)	**Va=**	ΔVol((Pa-ΔP)/Pa)
Qstd=	Vstd/ΔTime	**Qa=**	Va/ΔTime

For subsequent flow rate calculations:

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

Qa= $1/m\left(\left(\sqrt{\Delta H\left(Ta/Pa\right)}\right)-b\right)$

Standard Conditions	
Tstd:	298.15 °K
Pstd:	760 mm Hg

Key
ΔH: calibrator manometer reading (in H2O)
ΔP: rootsmeter manometer reading (mm Hg)
Ta: actual absolute temperature (°K)
Pa: actual barometric pressure (mm Hg)
b: intercept
m: slope

RECALIBRATION

US EPA recommends annual recalibration per 1998 40 Code of Federal Regulations Part 50 to 51, Appendix B to Part 50, Reference Method for the Determination of Suspended Particulate Matter in the Atmosphere, 9.2.17, page 30

Tisch Environmental, Inc.
145 South Miami Avenue
Village of Cleves, OH 45002

www.tisch-env.cor
TOLL FREE: (877)263-761(
FAX: (513)467-900

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

SUB-CONTRACTING REPORT

CONTACT	:	MR BEN TAM	WORK ORDER	:	**HK1912134**
CLIENT	:	**ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING**			
ADDRESS	:	RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T. HONG KONG	SUB-BATCH	:	1
			DATE RECEIVED	:	20-MAR-2019
			DATE OF ISSUE	:	22-MAR-2019
PROJECT	:	----	NO. OF SAMPLES	:	1
			CLIENT ORDER	:	----

General Comments

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

Signatories

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

Signatories	*Position*
Richard Fung	General Manager

This is the Final Report and supersedes any preliminary report with this batch number.

Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

ALS Technichem (HK) Pty Ltd
Part of the ALS Laboratory Group
11/F. Chung Shun Knitting Centre 1 - 3 Wing Yip Street Kwai Chung N.T. Hong Kong
Tel. +852 2610 1044 Fax. +852 2610 2021 **www.alsglobal.com**

WORK ORDER : HK1912134
SUB-BATCH : 1
CLIENT : ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING
PROJECT : ----

ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK1912134-001	S/N: 3Y6502	AIR	20-Mar-2019	3Y6502

Equipment Verification Report (TSP)

Equipment Calibrated:

Type:	Laser Dust monitor
Manufacturer:	Sibata LD-3B
Serial No.	3Y6502
Equipment Ref:	EQ113
Job Order	HK1912134

Standard Equipment:

Standard Equipment:	Higher Volume Sampler
Location & Location ID:	AUES office (calibration room)
Equipment Ref:	HVS 018
Last Calibration Date:	12 February 2019

Equipment Verification Results:

Calibration Date: 11 March 2019

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m^3 (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr00min	09:21 ~ 11:21	18.4	1014.9	0.021	2670	22.3
2hr00min	11:30 ~ 13:30	18.4	1014.9	0.025	2917	24.3
2hr00min	13:40 ~ 15:40	18.4	1014.9	0.032	3301	27.5

Sensitivity Adjustment Scale Setting (Before Calibration) 573 (CPM)

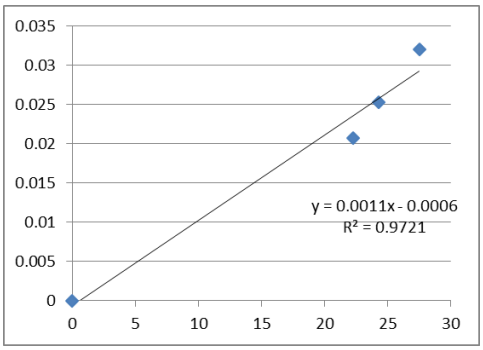
Sensitivity Adjustment Scale Setting (After Calibration) 573 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0011

Correlation Coefficient (R) 0.9860

Date of Issue 15 March 2019



Remarks:

1. **Strong** Correlation (R>0.8)
2. Factor 0.0011 should be apply for TSP monitoring

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

Operator : Fai So Signature : Date : 15 March 2019

QC Reviewer : Ben Tam Signature : Date : 15 March 2019

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Gold King Industrial Building, Kwai Chung	Date of Calibration:	12-Feb-19
Location ID :	Calibration Room	Next Calibration Date:	12-May-19

CONDITIONS

Sea Level Pressure (hPa)	1024.2	Corrected Pressure (mm Hg)	768.15
Temperature (°C)	19.0	Temperature (K)	292

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.02017
Model->	5025A	Qstd Intercept ->	-0.03691
Calibration Date->	13-Feb-18	Expiry Date->	13-Feb-19

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	4	7.7	11.7	1.738	60	60.94	Slope = 35.5369
13	2.8	6.9	9.7	1.584	52	52.81	Intercept = -1.8924
10	1.9	5.4	7.3	1.377	46	46.72	Corr. coeff. = 0.9951
8	0.6	4	4.6	1.097	38	38.59	
5	-0.4	3.1	2.7	0.844	27	27.42	

Calculations :

Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]

IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate

IC = corrected chart respones

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)[Sqrt(298/Tav)(Pav/760)]-b)

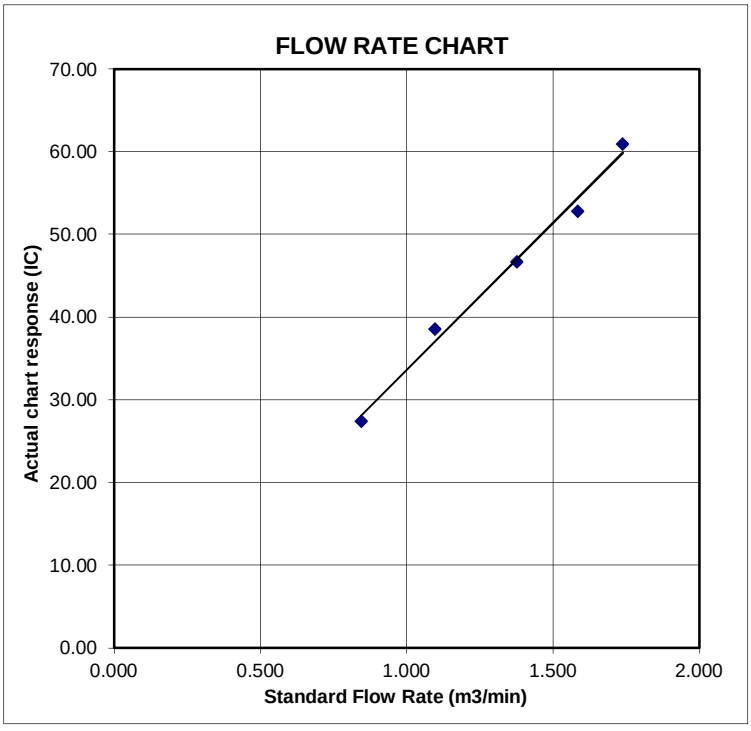
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TISCH Environmental

RECALIBRATION DUE DATE:
February 13, 2019

Certificate of Calibration

Calibration Certification Information				
Cal. Date:	February 13, 2018	**Rootsmeter S/N:** 438320	**Ta:** 293	°K
Operator:	Jim Tisch		**Pa:** 763.3	mm Hg
Calibration Model #:	TE-5025A	**Calibrator S/N:** **1612**		

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.3970	3.2	2.00
2	3	4	1	1.0000	6.3	4.00
3	5	6	1	0.8900	7.9	5.00
4	7	8	1	0.8440	8.7	5.50
5	9	10	1	0.7010	12.6	8.00

Data Tabulation

Vstd (m3)	Qstd (x-axis)	$\sqrt{\Delta H\left(\frac{Pa}{Pstd}\right)\left(\frac{Tstd}{Ta}\right)}$ (y-axis)	Va	Qa (x-axis)	$\sqrt{\Delta H\left(Ta/Pa\right)}$ (y-axis)
1.0172	0.7281	1.4293	0.9958	0.7128	0.8762
1.0130	1.0130	2.0213	0.9917	0.9917	1.2392
1.0109	1.1358	2.2599	0.9896	1.1120	1.3854
1.0098	1.1964	2.3702	0.9886	1.1713	1.4530
1.0046	1.4331	2.8586	0.9835	1.4030	1.7524
QSTD	**m=**	**2.02017**	**QA**	**m=**	**1.26500**
	b=	**-0.03691**		**b=**	**-0.02263**
	r=	**0.99988**		**r=**	**0.99988**

Calculations

Vstd=	ΔVol((Pa-ΔP)/Pstd)(Tstd/Ta)	**Va=**	ΔVol((Pa-ΔP)/Pa)
Qstd=	Vstd/ΔTime	**Qa=**	Va/ΔTime

For subsequent flow rate calculations:

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

Qa= $1/m\left(\left(\sqrt{\Delta H\left(Ta/Pa\right)}\right)-b\right)$

Standard Conditions	
Tstd:	298.15 °K
Pstd:	760 mm Hg

Key
ΔH: calibrator manometer reading (in H2O)
ΔP: rootsmeter manometer reading (mm Hg)
Ta: actual absolute temperature (°K)
Pa: actual barometric pressure (mm Hg)
b: intercept
m: slope

RECALIBRATION

US EPA recommends annual recalibration per 1998 40 Code of Federal Regulations Part 50 to 51, Appendix B to Part 50, Reference Method for the Determination of Suspended Particulate Matter in the Atmosphere, 9.2.17, page 30

Tisch Environmental, Inc.
145 South Miami Avenue
Village of Cleves, OH 45002

www.tisch-env.cor
TOLL FREE: (877)263-761(
FAX: (513)467-900

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

Certificate of Calibration
校正證書

Certificate No. : C192957
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC19-1098) Date of Receipt / 收件日期 : 30 May 2019

Description / 儀器名稱 : Sound Level Meter (EQ017)
Manufacturer / 製造商 : Brüel & Kjær
Model No. / 型號 : 2250
Serial No. / 編號 : 3012330
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 ± 2)°C Relative Humidity / 相對濕度 : (50 ± 25)%
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 7 June 2019

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
- The Bruel & Kjaer Calibration Laboratory, Denmark
- Agilent Technologies / Keysight Technologies
- 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 : 12 June 2019

Sun Creation Engineering Limited – Calibration & Testing Laboratory
c/o 4/F, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
輝創工程有限公司 — 校正及檢測實驗所
c/o 香港新界屯門興安里一號四樓
Tel/電話: (852) 2927 2606 Fax/傳真: (852) 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com

Certificate of Calibration
校正證書

Certificate No. : C192957
證書編號

1. 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.

2. Self-calibration using laboratory acoustic calibrator was performed before the test 6.1.1.2 to 6.3.2.

3. 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	C190176
CL281	Multifunction Acoustic Calibrator	CDK1806821

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
Range (dB)	Main	Level (dB)	Freq. (kHz)	(dB)
20 - 140	LAF (SPL)	94.00	1	94.1

6.1.1.2 After Self-calibration

UUT Setting		Applied Value		UUT Reading	IEC 61672 Class 1
Range (dB)	Main	Level (dB)	Freq. (kHz)	(dB)	Spec. (dB)
20 - 140	LAF (SPL)	94.00	1	94.0	± 1.1

6.1.2 Linearity

UUT Setting		Applied Value		UUT Reading
Range (dB)	Main	Level (dB)	Freq. (kHz)	(dB)
20 - 140	LAF (SPL)	94.00	1	94.0 (Ref.)
		104.00		104.0
		114.00		114.0

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

Certificate of Calibration
校正證書

Certificate No. : C192957
證書編號

6.2 Time Weighting

UUT Setting		Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Main	Level (dB)	Freq. (kHz)		
20 - 140	LAF (SPL)	94.00	1	94.0	Ref.
	LAS (SPL)			94.0	± 0.3

6.3 Frequency Weighting

6.3.1 A-Weighting

UUT Setting		Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Main	Level (dB)	Freq.		
20 - 140	LAF (SPL)	94.00	63 Hz	67.8	-26.2 ± 1.5
			125 Hz	77.8	-16.1 ± 1.5
			250 Hz	85.3	-8.6 ± 1.4
			500 Hz	90.7	-3.2 ± 1.4
			1 kHz	94.0	Ref.
			2 kHz	95.2	+1.2 ± 1.6
			4 kHz	95.0	+1.0 ± 1.6
			8 kHz	92.9	-1.1(+2.1 ; -3.1)
			12.5 kHz	89.3	-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)	Main	Level (dB)	Freq.		
20 - 140	LCF (SPL)	94.00	63 Hz	93.2	-0.8 ± 1.5
			125 Hz	93.8	-0.2 ± 1.5
			250 Hz	94.0	0.0 ± 1.4
			500 Hz	94.0	0.0 ± 1.4
			1 kHz	94.0	Ref.
			2 kHz	93.8	-0.2 ± 1.6
			4 kHz	93.2	-0.8 ± 1.6
			8 kHz	91.0	-3.0 (+2.1 ; -3.1)
			12.5 kHz	87.4	-6.2 (+3.0 ; -6.0)

Sun Creation Engineering Limited – Calibration & Testing Laboratory
c/o 4/F, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
輝創工程有限公司 — 校正及檢測實驗所
c/o 香港新界屯門興安里一號四樓
Tel/電話: (852) 2927 2606 Fax/傳真: (852) 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com

Certificate of Calibration
校正證書

Certificate No. : C192957
證書編號

Remarks : - UUT Microphone Model No. : 4189 & S/N : 3130396

- Mfr's Spec. : IEC 61672 Class 1

- Uncertainties of Applied Value :

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

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

Note :
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.

Sun Creation Engineering Limited – Calibration & Testing Laboratory
c/o 4/F, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
輝創工程有限公司 — 校正及檢測實驗所
c/o 香港新界屯門興安里一號四樓
Tel/電話: (852) 2927 2606 Fax/傳真: (852) 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com

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

Certificate of Calibration
校正證書

Certificate No. : C193172
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC19-1098) Date of Receipt / 收件日期 : 18 June 2019

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 ± 2)°C Relative Humidity / 相對濕度 : (50 ± 25)%
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 19 June 2019

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
- The Bruel & Kjaer Calibration Laboratory, Denmark
- Agilent Technologies / Keysight Technologies
- Fluke Everett Service Center, USA

Tested By 測試 : Cheuk
K P Cheuk
Assistant Engineer

Certified By 核證 :
K C Lee
Engineer

Date of Issue 簽發日期 : 20 June 2019

Sun Creation Engineering Limited – Calibration & Testing Laboratory
c/o 4/F, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
輝創工程有限公司 — 校正及檢測實驗所
c/o 香港新界屯門興安里一號四樓
Tel/電話: (852) 2927 2606 Fax/傳真: (852) 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com

Certificate of Calibration
校正證書

Certificate No. : C193172
證書編號

1. 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.

2. Self-calibration using laboratory acoustic calibrator was performed before the test from 6.1.1.2 to 6.4.

3. 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	C190176
CL281	Multifunction Acoustic Calibrator	CDK1806821

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)	
52 - 132	L_{AFP}	A	F	94.00	1	94.3

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)		
52 - 132	L_{AFP}	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)	
52 - 132	L_{AFP}	A	F	94.00	1	94.0 (Ref.)
				104.00		104.0
				114.00		113.9

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

Sun Creation Engineering Limited – Calibration & Testing Laboratory
c/o 4/F, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
輝創工程有限公司 — 校正及檢測實驗所
c/o 香港新界屯門興安里一號四樓
Tel/電話: (852) 2927 2606 Fax/傳真: (852) 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com

Certificate of Calibration
校正證書

Certificate No. : C193172
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)		
52 - 132	L_{AFP}	A	F	94.00	1	94.0	Ref.
	L_{ASP}		S			94.0	± 0.1
	L_{AIP}		I			94.1	± 0.1

6.2.2 Tone Burst Signal (2 kHz)

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Burst Duration		
32 - 112	L_{AFP}	A	F	106.0	Continuous	106.0	Ref.
	L_{AFMax}				200 ms	105.0	-1.0 ± 1.0
	L_{ASP}		S		Continuous	106.0	Ref.
	L_{ASMax}				500 ms	102.0	-4.1 ± 1.0

6.3 Frequency Weighting

6.3.1 A-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
52 - 132	L_{AFP}	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	94.9	+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)

Certificate of Calibration
校正證書

Certificate No. : C193172
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.		
52 - 132	L_{CFP}	C	F	94.00	31.5 Hz	90.9	-3.0 ± 1.5
					63 Hz	93.2	-0.8 ± 1.5
					125 Hz	93.8	-0.2 ± 1.0
					250 Hz	94.0	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	87.8	-6.2 (+3.0 ; -6.0)

6.4 Time Averaging

UUT Setting				Applied Value					UUT Reading (dB)	IEC 60804 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Integrating Time	Frequency (kHz)	Burst Duration (ms)	Burst Duty Factor	Burst Level (dB)	Equivalent Level (dB)		
32 - 112	L_{Aeq}	A	10 sec.	4	1	1/10	110.0	100	99.9	± 0.5
						$1/10^2$		90	89.8	± 0.5
			60 sec.			$1/10^3$		80	79.1	± 1.0
			5 min.			$1/10^4$		70	69.1	± 1.0

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

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

- Uncertainties of Applied Value :

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

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

Note :
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.

Sun Creation Engineering Limited – Calibration & Testing Laboratory
c/o 4/F, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
輝創工程有限公司 — 校正及檢測實驗所
c/o 香港新界屯門興安里一號四樓
Tel/電話: (852) 2927 2606 Fax/傳真: (852) 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com

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

Certificate of Calibration
校正證書

Certificate No. : C186448
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC18-0867) Date of Receipt / 收件日期 : 8 November 2018

Description / 儀器名稱 : Sound Calibrator (EQ089)
Manufacturer / 製造商 : Rion
Model No. / 型號 : NC-75
Serial No. / 編號 : 34680623
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 ± 2)°C Relative Humidity / 相對濕度 : (50 ± 25)%
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 24 November 2018

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
- The Bruel & Kjaer Calibration Laboratory, Denmark
- 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 : 27 November 2018

Sun Creation Engineering Limited – Calibration & Testing Laboratory
c/o 4/F, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
輝創工程有限公司 — 校正及檢測實驗所
c/o 香港新界屯門興安里一號四樓
Tel/電話: (852) 2927 2606 Fax/傳真: (852) 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com

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

Certificate of Calibration
校正證書

Certificate No. : C186448
證書編號

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours before the commencement of the test.

2. The results presented are the mean of 3 measurements at each calibration point.

3. Test equipment :

Equipment ID	Description	Certificate No.
CL130	Universal Counter	C183775
CL281	Multifunction Acoustic Calibrator	CDK1806821
TST150A	Measuring Amplifier	C181288

4. Test procedure : MA100N.

5. 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	± 0.25	± 0.2

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.

Sun Creation Engineering Limited – Calibration & Testing Laboratory
c/o 4/F, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
輝創工程有限公司 — 校正及檢測實驗所
c/o 香港新界屯門興安里一號四樓
Tel/電話: (852) 2927 2606 Fax/傳真: (852) 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com

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

Certificate of Calibration
校正證書

Certificate No. : C192956
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC19-1098) Date of Receipt / 收件日期 : 30 May 2019

Description / 儀器名稱 : Sound Calibrator (EQ082)
Manufacturer / 製造商 : Brüel & Kjær
Model No. / 型號 : 4231
Serial No. / 編號 : 2713428
Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

Temperature / 溫度 : (23 ± 2)°C Relative Humidity / 相對濕度 : (50 ± 25)%
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 7 June 2019

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
- The Bruel & Kjaer Calibration Laboratory, Denmark
- Agilent Technologies / Keysight Technologies
- 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 : 12 June 2019

Sun Creation Engineering Limited – Calibration & Testing Laboratory
c/o 4/F, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
輝創工程有限公司 — 校正及檢測實驗所
c/o 香港新界屯門興安里一號四樓
Tel/電話: (852) 2927 2606 Fax/傳真: (852) 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com

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

Certificate of Calibration
校正證書

Certificate No. : C192956
證書編號

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours before the commencement of the test.

2. The results presented are the mean of 3 measurements at each calibration point.

3. Test equipment :

Equipment ID	Description	Certificate No.
CL130	Universal Counter	C183775
CL281	Multifunction Acoustic Calibrator	CDK1806821
TST150A	Measuring Amplifier	C181288

4. Test procedure : MA100N.

5. Results :

5.1 Sound Level Accuracy

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

5.2 Frequency Accuracy

UUT Nominal Value (kHz)	Measured Value (kHz)	Mfr's Spec.	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.

Sun Creation Engineering Limited – Calibration & Testing Laboratory
c/o 4/F, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
輝創工程有限公司 — 校正及檢測實驗所
c/o 香港新界屯門興安里一號四樓
Tel/電話: (852) 2927 2606 Fax/傳真: (852) 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com

ALS Technichem (HK) Pty Ltd
11/F, Chung Shun Knitting Centre
1-3 Wing Yip Street, Kwai Chung
N.T., Hong Kong
T: +852 2610 1044 | F: +852 2610 2021

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT:	MR BEN TAM	WORK ORDER:	HK1931216
CLIENT:	ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING		
ADDRESS:	RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T. HONG KONG	SUB-BATCH: LABORATORY: DATE RECEIVED: DATE OF ISSUE:	0 HONG KONG 19-Jul-2019 25-Jul-2019

COMMENTS

The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.

The "Tolerance Limit" quoted is the acceptance criteria applicable for similar equipment used by the ALS Hong Kong laboratory or quoted from relevant international standards.

The "Next Calibration Date" is recommended according to best practice principle as practised by the ALS Hong Kong laboratory or quoted from relevant international standards.

Scope of Test:	Dissolved Oxygen and Temperature
Equipment Type:	Dissolved Oxygen Meter
Brand Name:	YSI
Model No.:	Pro 20
Serial No.:	12C100570
Equipment No.:	--
Date of Calibration:	25-Jul-2019

NOTES

This is the Final Report and supersedes any preliminary report with this batch number.

Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

Mr Chan Siu Ming, Vico
Manager - Inorganic

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

WORK ORDER: HK1931216

SUB-BATCH: 0
DATE OF ISSUE: 25-Jul-2019
CLIENT: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING

Equipment Type: Dissolved Oxygen Meter
Brand Name: YSI
Model No.: Pro 20
Serial No.: 12C100570
Equipment No.: --
Date of Calibration: 25-Jul-2019 Date of Next Calibration: 25-Oct-2019

PARAMETERS:

Dissolved Oxygen Method Ref: APHA (21st edition), 4500-O: G

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
7.23	7.22	-0.01
5.75	5.70	-0.05
3.70	3.62	-0.08
	Tolerance Limit (mg/L)	±0.20

Temperature Method Ref: Section 6 of International Accreditation New Zealand Technical Guide No. 3 Second edition March 2008: Working Thermometer Calibration Procedure.

Expected Reading (^{o}C)	Displayed Reading (^{o}C)	Tolerance (^{o}C)
10.5	10.8	+0.3
20.0	19.0	-1.0
41.0	39.1	-1.9
	Tolerance Limit (^{o}C)	±2.0

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

Mr Chan Siu Ming, Vico
Manager - Inorganic

ALS Technichem (HK) Pty Ltd
11/F, Chung Shun Knitting Centre
1-3 Wing Yip Street, Kwai Chung
N.T., Hong Kong
T: +852 2610 1044 | F: +852 2610 2021

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT:	MR BEN TAM	WORK ORDER:	HK1931419
CLIENT:	ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING		
ADDRESS:	RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T. HONG KONG	SUB-BATCH:	0
		LABORATORY:	HONG KONG
		DATE RECEIVED:	22-Jul-2019
		DATE OF ISSUE:	31-Jul-2019

COMMENTS

The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.

The "Tolerance Limit" quoted is the acceptance criteria applicable for similar equipment used by the ALS Hong Kong laboratory or quoted from relevant international standards.

The "Next Calibration Date" is recommended according to best practice principle as practised by the ALS Hong Kong laboratory or quoted from relevant international standards.

Scope of Test:	Turbidity
Equipment Type:	Turbidimeter
Brand Name:	Hach
Model No.:	2100Q
Serial No.:	12060C18266
Equipment No.:	--
Date of Calibration:	26-Jul-2019

NOTES

This is the Final Report and supersedes any preliminary report with this batch number.

Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

Mr Chan Siu Ming, Vico
Manager - Inorganic

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

WORK ORDER: HK1931419

SUB-BATCH: 0
DATE OF ISSUE: 31-Jul-2019
CLIENT: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING

Equipment Type: Turbidimeter
Brand Name: Hach
Model No.: 2100Q
Serial No.: 12060C18266
Equipment No.: --
Date of Calibration: 26-Jul-2019 Date of Next Calibration: 26-Oct-2019

PARAMETERS:
Turbidity Method Ref: APHA (21st edition), 2130B

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.14	--
4	4.30	+7.5
40	43.2	+8.0
80	85.8	+7.3
400	424	+6.0
	Tolerance Limit (%)	±10.0

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

Mr Chan Siu Ming, Vico
Manager - Inorganic

ALS Technichem (HK) Pty Ltd
11/F, Chung Shun Knitting Centre
1-3 Wing Yip Street, Kwai Chung
N.T., Hong Kong
T: +852 2610 1044 | F: +852 2610 2021

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT:	BEN TAM	WORK ORDER:	HK1924774
CLIENT:	ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING		
ADDRESS:	RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T. HONG KONG	SUB-BATCH:	0
		LABORATORY:	HONG KONG
		DATE RECEIVED:	11-Jun-2019
		DATE OF ISSUE:	18-Jun-2019

COMMENTS

The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.
The "Tolerance Limit" quoted is the acceptance criteria applicable for similar equipment used by the ALS Hong Kong laboratory or quoted from relevant international standards.
The "Next Calibration Date" is recommended according to best practice principle as practised by the ALS Hong Kong laboratory or quoted from relevant international standards.

Scope of Test:	pH Value
Equipment Type:	pH meter
Brand Name:	AZ
Model No.:	8685
Serial No.:	1141943
Equipment No.:	--
Date of Calibration:	14-Jun-2019

NOTES

This is the Final Report and supersedes any preliminary report with this batch number.

Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

Ms. Lin Wai Yu, Iris
Assistant Manager - Inorganic

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

WORK ORDER: HK1924774

SUB-BATCH: 0
DATE OF ISSUE: 18-Jun-2019
CLIENT: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING

Equipment Type: pH meter
Brand Name: AZ
Model No.: 8685
Serial No.: 1141943
Equipment No.: --
Date of Calibration: 14-Jun-2019 Date of Next Calibration: 14-Sep-2019

PARAMETERS:
pH Value

Method Ref: APHA (21st edition), 4500H:B

Expected Reading (pH unit)	Displayed Reading (pH unit)	Tolerance (pH unit)
4.0	4.1	+0.10
7.0	6.8	-0.20
10.0	9.8	-0.20
	Tolerance Limit (pH unit)	±0.20

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

Ms. Lin Wai Yu, Iris
Assistant Manager - Inorganic

ALS Technichem (HK) Pty Ltd
11/F, Chung Shun Knitting Centre
1-3 Wing Yip Street, Kwai Chung
N.T., Hong Kong
T: +852 2610 1044 | F: +852 2610 2021

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT:	MR BEN TAM	WORK ORDER:	HK1938899
CLIENT:	ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING		
ADDRESS:	RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T. HONG KONG	SUB-BATCH:	0
		LABORATORY:	HONG KONG
		DATE RECEIVED:	09-Sep-2019
		DATE OF ISSUE:	16-Sep-2019

COMMENTS

Equipment information (Brand name, Model No., Serial No. and Equipment No.) is provided by client.
The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.
The "Tolerance Limit" quoted is the acceptance criteria applicable for similar equipment used by the ALS Hong Kong laboratory or quoted from relevant international standards.
The "Next Calibration Date" is recommended according to best practice principle as practised by the ALS Hong Kong laboratory or quoted from relevant international standards.

Scope of Test:	pH Value and Temperature
Equipment Type:	pH meter
Brand Name/ Model No.:	AZ 8685
Serial No./ Equipment No.:	1118396
Date of Calibration:	16-Sep-2019

NOTES

This is the Final Report and supersedes any preliminary report with this batch number.

Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

Mr Chan Siu Ming, Vico
Manager - Inorganic

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

WORK ORDER: HK1938899

SUB-BATCH: 0
DATE OF ISSUE: 16-Sep-2019
CLIENT: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING

Equipment Type: pH meter
Brand Name/ Model No.: AZ 8685
Serial No./ Equipment No.: 1118396
Date of Calibration: 16-Sep-2019 Date of Next Calibration: 16-Dec-2019

PARAMETERS:

pH Value

Method Ref: APHA (21st edition), 4500H:B

Expected Reading (pH unit)	Displayed Reading (pH unit)	Tolerance (pH unit)
4.0	3.8	-0.20
7.0	7.0	+0.00
10.0	9.8	-0.20
	Tolerance Limit (pH unit)	±0.20

Temperature

Method Ref: Section 6 of International Accreditation New Zealand Technical Guide No. 3 Second edition March 2008: Working Thermometer Calibration Procedure.

Expected Reading (^{o}C)	Displayed Reading (^{o}C)	Tolerance (^{o}C)
13.0	13.5	+0.5
25.5	24.0	-1.5
39.0	38.0	-1.0
	Tolerance Limit (^{o}C)	±2.0

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

Mr Chan Siu Ming, Vico
Manager - Inorganic

ALS Technichem (HK) Pty Ltd
11/F, Chung Shun Knitting Centre
1-3 Wing Yip Street, Kwai Chung
N.T., Hong Kong
T: +852 2610 1044 | F: +852 2610 2021

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT:	BEN TAM	WORK ORDER:	HK1924766
CLIENT:	ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING		
ADDRESS:	RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T. HONG KONG	SUB-BATCH:	0
		LABORATORY:	HONG KONG
		DATE RECEIVED:	11-Jun-2019
		DATE OF ISSUE:	17-Jun-2019

COMMENTS

The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.
The "Tolerance Limit" quoted is the acceptance criteria applicable for similar equipment used by the ALS Hong Kong laboratory or quoted from relevant international standards.
The "Next Calibration Date" is recommended according to best practice principle as practised by the ALS Hong Kong laboratory or quoted from relevant international standards.

Scope of Test:	Salinity
Equipment Type:	Salinity Meter
Brand Name:	AZ
Model No.:	8371
Serial No.:	1219381
Equipment No.:	--
Date of Calibration:	14-Jun-2019

NOTES

This is the Final Report and supersedes any preliminary report with this batch number.

Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

Ms. Lin Wai Yu, Iris
Assistant Manager - Inorganic

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

WORK ORDER: HK1924766

SUB-BATCH: 0
DATE OF ISSUE: 17-Jun-2019
CLIENT: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING

Equipment Type: Salinity Meter
Brand Name: AZ
Model No.: 8371
Serial No.: 1219381
Equipment No.: --
Date of Calibration: 14-Jun-2019 Date of Next Calibration: 14-Sep-2019

PARAMETERS:
Salinity Method Ref: APHA (21st edition), 2520B

Expected Reading (ppt)	Displayed Reading (ppt)	Tolerance (%)
0	0.00	--
10	9.26	-7.4
20	18.4	-8.0
30	29.1	-3.0
	Tolerance Limit (%)	±10.0

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

Ms. Lin Wai Yu, Iris
Assistant Manager - Inorganic

ALS Technichem (HK) Pty Ltd
11/F, Chung Shun Knitting Centre
1-3 Wing Yip Street, Kwai Chung
N.T., Hong Kong
T: +852 2610 1044 | F: +852 2610 2021

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT:	MR BEN TAM	WORK ORDER:	HK1938902
CLIENT:	ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING		
ADDRESS:	RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T. HONG KONG	SUB-BATCH: LABORATORY: DATE RECEIVED: DATE OF ISSUE:	0 HONG KONG 09-Sep-2019 16-Sep-2019

COMMENTS

Equipment information (Brand name, Model No., Serial No. and Equipment No.) is provided by client.
The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.
The "Tolerance Limit" quoted is the acceptance criteria applicable for similar equipment used by the ALS Hong Kong laboratory or quoted from relevant international standards.
The "Next Calibration Date" is recommended according to best practice principle as practised by the ALS Hong Kong laboratory or quoted from relevant international standards.

Scope of Test:	Salinity
Equipment Type:	Salinity Meter
Brand Name/ Model No.:	AZ8371
Serial No./ Equipment No.:	1219392
Date of Calibration:	16-Sep-2019

NOTES

This is the Final Report and supersedes any preliminary report with this batch number.

Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

Mr Chan Siu Ming, Vico
Manager - Inorganic

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

WORK ORDER: HK1938902

SUB-BATCH: 0
DATE OF ISSUE: 16-Sep-2019
CLIENT: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING

Equipment Type: Salinity Meter
Brand Name/ Model No.: AZ8371
Serial No./ Equipment No.: 1219392
Date of Calibration: 16-Sep-2019 Date of Next Calibration: 16-Dec-2019

PARAMETERS:
Salinity

Method Ref: APHA (21st edition), 2520B

Expected Reading (ppt)	Displayed Reading (ppt)	Tolerance (%)
0	0.00	--
10	9.7	-3.0
20	19.5	-2.5
30	28.3	-5.7
	Tolerance Limit (%)	±10.0

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

Mr Chan Siu Ming, Vico
Manager - Inorganic

Appendix F

Event and Action Plan

Event / Action Plan for Air Quality

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

Event / Action Plan for Construction Noise

Event	Action			
	ET	**IEC**	**ER**	**Contractor**
Action Level	1. Notify IEC, ER and Contractor; 2. Carry out investigation; 3. Report the results of investigation to the IEC, ER and Contractor; 4. Discuss with the Contractor and formulate remedial measures; and 5. Increase monitoring frequency to check mitigation effectiveness.	1. Review the analysed results submitted by the ET; 2. Review the proposed remedial measures by the Contractor and advise the ER accordingly; and 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analysed noise problem; and 4. Ensure remedial measures are properly implemented.	1. Submit noise mitigation proposals to IEC and ER; and 2. Implement noise mitigation proposals.
Limit Level	1. Identify source; 2. Inform IEC, ER, EPD and Contractor; 3. Repeat measurements to confirm findings; 4. Increase monitoring frequency; 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 6. Inform IEC, ER and EPD the causes and actions taken for the exceedances; 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results; and 8. If exceedance stops, cease additional monitoring.	1. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 2. Review Contractors remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly; 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analysed noise problem; 4. Ensure Remedial measures properly implemented; and 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated.	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; and 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated.

Event / Action Plan for Water Quality

Event	Action			
	ET	**IEC**	**ER**	**Contractor**
Action level being exceeded by one sampling day	1. Inform IEC, Contractor and ER; 2. Check monitoring data, all plant, equipment and Contractor's working methods; and 3. Discuss remedial measures with IEC and Contractor and ER.	1. Discuss with ET, ER and Contractor on the implemented Mitigation measures; 2. Review proposals on remedial measures submitted by Contractor and advise the ER accordingly; and 3. Review and advise the ET and ER on the effectiveness of the implemented mitigation measures.	1. Discuss with IEC, ET and Contractor on the implemented mitigation measures; 2. Make agreement on the remedial measures to be implemented; and 3. Supervise the implementation of agreed.	1. Identify source(s) of impact; 2. Inform the ER and confirm notification of the non-compliance in writing; 3. Rectify unacceptable practice; 4. Check all plant and equipment; 5. Consider changes of working methods; 6. Discuss with ER, ET and IEC and purpose remedial measures to IEC and ER; and 7. Implement the agreed mitigation measures.
Action level being exceeded by two or more consecutive sampling days	1. Repeat in-situ measurement 2. on next day of exceedance 3. to confirm findings; 4. Inform IEC, contractor and ER; 5. Check monitoring data, all plant, equipment and Contractor's working methods; 6. Discuss remedial measures with IEC, contractor and ER; and 7. Ensure remedial measures are implemented	1. Discuss with ET, Contractor and ER on the implemented Mitigation measures; 2. Review the proposed remedial Measures submitted by Contractor and advise the ER accordingly; and 3. Review and advise the ET and ER on the effectiveness of the implemented mitigation measures.	1. Discuss with ET, IEC and Contractor on the proposed mitigation measures; 2. Make agreement on the remedial measures to be implemented ; and 3. Discuss with ET, IEC and Contractor on the effectiveness of the implemented remedial measures.	1. Identify source(s) of impact; 2. Inform the ER and confirm notification of the non-compliance in writing; 3. Rectify unacceptable practice; 4. Check all plant and equipment and consider changes of working methods; 5. Discuss with ET, IEC and ER and submit proposal of remedial measures to ER and IEC within 3 working days of notification; and 6. Implement the agreed mitigation measures.
Limit level being exceeded by one sampling day	1. Repeat measurement on next day of exceedance to confirm findings; 2. Inform IEC, contractor and ER; 3. Rectify unacceptable practice; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Consider changes of working methods; 6. Discuss mitigation measures with IEC, ER and Contractor; and 7. Ensure the agreed remedial measures are implemented.	1. Discuss with ET, Contractor and ER on the implemented mitigation measures; 2. Review the proposed remedial measures submitted by Contractor and advise the ER accordingly; and 3. Review and advise the ET and ER on the effectiveness of the Implemented mitigation measures.	1. Discuss with ET, IEC and Contractor on the implemented remedial measures; 2. Request Contractor to critically review the working methods; 3. Make agreement on the remedial measures to be implemented; and 4. Discuss with ET, IEC and Contractor on the effectiveness of the implemented remedial measures.	1. Identify source(s) of impact; 2. Inform the ER and confirm notification of the non-compliance in writing; 3. Rectify unacceptable practice; 4. Check all plant and equipment and consider changes of working methods; 5. Discuss with ET, IEC and ER and submit proposal of additional mitigation measures to ER and IEC within 3 working days of notification; and 6. Implement the agreed remedial measures.
Limit level being exceeded by two or more consecutive sampling days	1. Inform IEC, contractor and ER; 2. Check monitoring data, all plant, equipment and Contractor's working methods; 3. Discuss mitigation measures with IEC, ER and Contractor; and 4. Ensure mitigation measures are implemented; and 5. Increase the monitoring frequency to daily until no exceedance of Limit Level for two consecutive days	1. Discuss with ET, Contractor and ER on the implemented mitigation measures; 2. Review the proposed remedial measures submitted by Contractor and advise the ER accordingly; and 3. Review and advise the ET and ER on the effectiveness of the implemented mitigation measures.	1. Discuss with ET, IEC and Contractor on the implemented remedial measures; 2. Request Contractor to critically review the working methods; 3. Make agreement on the remedial measures to be implemented; 4. Discuss with ET and IEC on the effectiveness of the implemented mitigation measures; and 5. Consider and instruct, if necessary, the Contractor to slow down or to stop all or part of the dredging activities until no exceedance of Limit level.	1. Identify source(s) of impact; 2. Inform the ER and confirm notification of the non-compliance in writing; 3. Rectify unacceptable practice; 4. Check all plant and equipment and consider changes of working methods; 5. Discuss with ET, IEC and ER and submit proposal of additional mitigation measures to ER and IEC within 3 working days of notification; and 6. Implement the agreed remedial measures. 7. As directed by the ER, to slow down or stop all or part of the dredging activities until no exceedance of Limit level.

Appendix G

Monitoring schedule

Impact Monitoring Schedule for Reporting Month – September 2019

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2	3 Water quality	4 24-hr TSP	5 Water quality 1-hr TSP X3 Noise	6	7 Water quality
8	9 Water quality	10 24-hr TSP	11 Water quality 1-hr TSP X3 Noise	12	13 Water quality	14
15	16 24-hr TSP	17 Water quality 1-hr TSP X3 Noise	18	19 Water quality	20	21 Water quality 24-hr TSP
22	23 1-hr TSP X3 Noise	24 Water quality	25	26 Water quality	27 24-hr TSP	28 Water quality 1-hr TSP X3
29	30					

Impact Monitoring Schedule for next Reporting Month – October 2019

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1	2 24-hr TSP	3 Water quality 1-hr TSP X3 Noise	4	5 Water quality
6	7	8 Water quality 24-hr TSP	9 1-hr TSP X3 Noise	10 Water quality	11	12 Water quality
13	14 24-hr TSP	15 Water quality 1-hr TSP X3 Noise	16	17 Water quality	18	19 Water quality 24-hr TSP
20	21 1-hr TSP X3 Noise	22 Water quality	23	24 Water quality	25 24-hr TSP	26 Water quality 1-hr TSP X3
27	28	29 Water quality	30	31 Water quality 24-hr TSP		

Appendix H

Database of Monitoring Result

24-hour TSP Monitoring Database

Location DMS-1 – Village House along Ha Wan Tsuen Road

DATE	SAMPLE NUMBER	ELAPSED TIME			CHART READING			AVG TEMP	AVG AIR PRESS	STANDARD FLOW RATE	AIR VOLUME	FILTER WEIGHT (g)		DUST WEIGHT COLLECTED	24-HR TSP (μg/m³)
		INITIAL	FINAL	(min)	MIN	MAX	AVG	(℃)	(hPa)	(m³/min)	(std m³)	INITIAL	FINAL	(g)	
4-Sep-19	24652	15107.05	15131.45	1464.00	44	44	44.0	26.8	1004	1.39	2033	2.6651	2.7202	0.0551	27
10-Sep-19	24707	15131.45	15155.46	1440.60	50	50	50.0	30.1	1008.9	1.60	2302	2.7106	2.7646	0.0540	23
16-Sep-19	24744	15155.46	15179.46	1440.00	50	50	50.0	29.3	1007.7	1.60	2303	2.6626	2.7840	0.1214	53
21-Sep-19	24756	15179.46	15203.46	1440.00	48	48	48.0	29.8	1009.7	1.53	2200	2.7367	3.0549	0.3182	145
27-Sep-19	24788	15203.46	15227.41	1437.00	46	46	46.0	29.3	1011.2	1.46	2097	2.7062	2.8540	0.1478	70

Location DMS-2A – Village House along Lok Ma Chau Road

DATE	SAMPLE NUMBER	ELAPSED TIME			CHART READING			AVG TEMP	AVG AIR PRESS	STANDARD FLOW RATE	AIR VOLUME	FILTER WEIGHT (g)		DUST WEIGHT COLLECTED	24-HR TSP (μg/m³)
		INITIAL	FINAL	(min)	MIN	MAX	AVG	(℃)	(hPa)	(m³/min)	(std m³)	INITIAL	FINAL	(g)	
4-Sep-19	24651	12204.62	12228.71	1445.40	40	40	40.0	26.8	1004	1.20	1739	2.6690	2.7171	0.0481	28
10-Sep-19	24709	12289.05	12313.06	1440.60	40	40	40.0	30.1	1008.9	1.20	1727	2.6964	2.8166	0.1202	70
16-Sep-19	24743	12313.06	12337.06	1440.00	40	40	40.0	29.3	1007.7	1.20	1728	2.6604	2.7797	0.1193	69
21-Sep-19	24756	12337.06	12361.06	1440.00	40	40	40.0	29.8	1009.7	1.20	1728	2.7068	2.9572	0.2504	145
27-Sep-19	24787	12361.06	12385.04	1438.80	40	40	40.0	29.3	1011.2	1.20	1730	2.6850	2.7948	0.1098	63

Location DMS-3 – Village House along Border Road

DATE	SAMPLE NUMBER	ELAPSED TIME			CHART READING			AVG TEMP	AVG AIR PRESS	STANDARD FLOW RATE	AIR VOLUME	FILTER WEIGHT (g)		DUST WEIGHT COLLECTED	24-HR TSP (μg/m³)
		INITIAL	FINAL	(min)	MIN	MAX	AVG	(℃)	(hPa)	(m³/min)	(std m³)	INITIAL	FINAL	(g)	
4-Sep-19	24683	10084.59	10108.38	1427.40	30	30	30.0	26.8	1004	0.84	1203	2.6699	2.6919	0.0220	18
10-Sep-19	24705	10108.38	10132.08	1422.00	30	30	30.0	30.1	1008.9	0.84	1194	2.7090	2.7626	0.0536	45
16-Sep-19	24745	10132.08	10155.88	1428.00	30	30	30.0	29.3	1007.7	0.84	1200	2.6758	2.7120	0.0362	30
21-Sep-19	24755	10155.88	10179.48	1416.00	32	32	32.0	29.8	1009.4	0.91	1283	2.7068	2.7662	0.0594	46
27-Sep-19	24658	10179.48	10203.03	1413.00	30	30	30.0	29.3	1011.2	0.84	1190	2.6734	2.7080	0.0346	29

Location DMS-4A – Hong Kong Police Force, Lok Ma Chau Operation Base at Horn Hill

DATE	SAMPLE NUMBER	ELAPSED TIME			CHART READING			AVG TEMP	AVG AIR PRESS	STANDARD FLOW RATE	AIR VOLUME	FILTER WEIGHT (g)		DUST WEIGHT COLLECTED	24-HR TSP (μg/m³)
		INITIAL	FINAL	(min)	MIN	MAX	AVG	(℃)	(hPa)	(m³/min)	(std m³)	INITIAL	FINAL	(g)	
4-Sep-19	24650	15561.64	15585.64	1440.00	32	32	32.0	26.8	1004	0.95	1369	2.6449	2.6763	0.0314	23
10-Sep-19	24708	15585.64	15609.64	1440.00	32	32	32.0	30.1	1008.9	0.95	1364	2.6980	2.7250	0.0270	20
16-Sep-19	24746	15609.64	15633.64	1440.00	32	32	32.0	29.3	1007.7	0.95	1365	2.6793	2.7365	0.0572	42
21-Sep-19	24756	15633.64	15657.64	1440.00	30	30	30.0	29.8	1009.7	0.88	1265	2.7265	2.8200	0.0935	74
27-Sep-19	24659	15657.64	15681.65	1440.60	32	32	32.0	29.3	1011.2	0.95	1368	2.6664	2.7662	0.0998	73

Construction Noise Monitoring Results, dB(A)

NMS-1 - Village House Ha Wan Tsuen

Date	Start Time	1st Leq_{5min}	L10	L90	2nd Leq_{5min}	L10	L90	3rd Leq_{5min}	L10	L90	4th Leq_{5min}	L10	L90	5th Leq_{5min}	L10	L90	6th Leq_{5min}	L10	L90	Leq30	façade correction
5-Sep-19	9:18	53.4	54.6	47.1	55.9	55.2	47.6	52.3	53.8	48.5	53.3	54.7	49.5	57.3	59.1	49.9	53.9	56.6	49.2	55	NA
11-Sep-19	10:15	52.9	54.5	48.7	51.4	53.7	48.2	53.6	56.7	47.3	50.8	52.2	48.7	51.4	52.8	48.4	53.1	55.2	49.3	52	NA
17-Sep-19	10:03	54.4	56.1	49.1	53.7	55.8	48.5	53.3	55.3	48.5	53.1	55.1	49.1	55.4	58.1	49.2	54.5	56.4	49.3	54	NA
23-Sep-19	9:39	55.4	55.5	54.5	55.1	55.5	54.5	54.9	55.0	54.5	54.9	55.5	54.5	55.0	54.5	54.5	57.8	55.5	54.5	56	NA

NMS-2 - Village House along existing Ha Wan Tsuen East Road

Date	Start Time	1st Leq_{5min}	L10	L90	2nd Leq_{5min}	L10	L90	3rd Leq_{5min}	L10	L90	4th Leq_{5min}	L10	L90	5th Leq_{5min}	L10	L90	6th Leq_{5min}	L10	L90	Leq30	façade correction
5-Sep-19	10:03	70.5	73.3	62.4	69.5	73.6	60.1	67.2	71.2	59.3	64.1	66.4	58.9	66.5	69.3	62.4	70.6	73.7	60.8	69	72
11-Sep-19	10:56	67.1	70.5	49.0	66.4	69.5	51.0	69.5	72.5	50.5	67.6	71.5	51.0	67.7	71.5	50.5	67.2	71.5	52.0	68	71
17-Sep-19	10:38	66.4	70.6	52.7	68.1	72.2	53.1	65.4	69.4	53.6	65.1	70.0	52.4	67.3	71.2	53.2	66.8	70.6	53.5	67	70
23-Sep-19	10:28	63.4	63.5	62.5	63.1	63.5	62.5	62.9	63.0	62.5	62.9	63.5	62.5	63.0	62.5	62.5	65.8	63.5	62.5	64	67

NMS-3 - Village house along Border Road

Date	Start Time	1st Leq_{5min}	L10	L90	2nd Leq_{5min}	L10	L90	3rd Leq_{5min}	L10	L90	4th Leq_{5min}	L10	L90	5th Leq_{5min}	L10	L90	6th Leq_{5min}	L10	L90	Leq30	façade correction
5-Sep-19	10:48	51.9	52.5	48.7	51.7	53.7	49.4	52.7	53.6	50.1	53.6	54.3	51.4	52.3	53.5	50.3	51.8	52.2	49.2	52	55
11-Sep-19	13:13	55.2	59.7	50.2	56.4	59.6	50.4	54.7	59.1	50.1	57.8	61.3	51.2	56.7	60.1	50.9	58.1	61.6	51.6	57	60
17-Sep-19	11:16	52.6	53.5	50.6	53.3	54.2	52.3	52.7	55.4	50.3	55.6	56.6	53.5	52.4	53.5	51.3	55.1	56.4	53.2	54	57
23-Sep-19	13:39	53.7	55.3	49.4	52.5	54.1	48.7	55.5	56.1	49.2	53.4	54.7	49.4	54.3	56.3	50.2	52.1	53.9	49.6	54	57

NMS-4A - Hong Kong Police Force, Lok Ma Chau Operation Base at Horn Hill

Date	Start Time	1st Leq_{5min}	L10	L90	2nd Leq_{5min}	L10	L90	3rd Leq_{5min}	L10	L90	4th Leq_{5min}	L10	L90	5th Leq_{5min}	L10	L90	6th Leq_{5min}	L10	L90	Leq30	façade correction
5-Sep-19	11:28	52.4	53.8	47.6	55.1	57.1	49.2	53.8	55.9	48.4	52.7	54.0	47.9	55.7	57.6	50.2	52.4	54.8	50.1	54	57
11-Sep-19	13:56	51.8	52.3	49.2	50.3	51.7	48.6	52.3	52.6	48.8	51.3	54.6	48.1	53.6	54.4	48.6	51.7	53.8	48.4	52	55
17-Sep-19	13:08	53.4	54.4	50.3	55.3	56.4	49.5	52.2	52.4	48.7	50.7	52.5	48.4	55.7	57.4	49.6	53.6	55.2	49.6	54	57
23-Sep-19	14:55	49.6	53.5	45.0	53.3	56.0	48.0	56.0	59.5	48.5	51.3	54.0	45.5	54.5	57.0	47.5	51.5	54.0	45.5	53	56

Environmental Team for Contract No. YL/2017/03
Development of Lok Ma Chau Loop: Land Decontamination and Advance Engineering Works – Design and Construction

Water Quailty Monitoring Results
3-Sep-19
Weather condition: Fine

Location	Sampling Time	Depth (m)	Temperature(˚C)		DO (mg/L)		DO (%)		Turbidity (NTU)		Salinity (ppt)		pH		SS(mg/L)	
			Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average
CS1	10:33	1.47	29.3	29.3	6.55	6.6	85.7	85.7	10.8	10.8	0.68	0.68	7.30	7.3	10	9.5
			29.3		6.55		85.7		10.7		0.68		7.30		9	
IS1	10:20	1.33	28.9	28.9	5.61	5.6	72.8	72.8	25.2	25.4	0.45	0.45	7.50	7.5	14	14.0
			28.9		5.6		72.7		25.5		0.45		7.50		14	
BS1	10:01	0.91	29	29.0	6.13	6.1	80.2	80.0	25.8	26.0	0.39	0.39	7.40	7.4	20	20.0
			29		6.11		79.7		26.2		0.39		7.40		20	
IS2	9:55	0.25	28.7	28.7	5	5.0	64.6	64.7	43.8	44.8	0.42	0.42	8.30	8.3	40	40.0
			28.7		5.01		64.7		45.7		0.42		8.30		40	
CS5	10:15	0.25	28.5	28.5	4.01	4.0	52.3	52.4	8.4	8.8	0.1	0.1	8.40	8.4	4	4.5
			28.5		4.02		52.4		9.3		0.1		8.40		5	
IS6	10:05	0.01*														
IS4	11:17	0.15	27.1	27.1	6.07	6.1	76.3	76.4	2.9	2.9	0.01	0.01	8.30	8.3	<2	<2
			27.1		6.05		76.4		2.9		0.01		8.30		<2	

* No water quality monitoring could be conducted at IS6 which was found dried up completely

Environmental Team for Contract No. YL/2017/03
Development of Lok Ma Chau Loop: Land Decontamination and Advance Engineering Works – Design and Construction

Water Quailty Monitoring Results
5-Sep-19
Weather condition: Fine

Location	Sampling Time	Depth (m)	Temperature(˚C)		DO (mg/L)		DO (%)		Turbidity (NTU)		Salinity (ppt)		pH		SS(mg/L)	
			Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average
CS1	10:24	1.40	28.6	28.6	6.41	6.5	83.1	84.1	9.3	9.3	0.73	0.73	7.39	7.4	10	10.0
			28.6		6.56		85.0		9.3		0.73		7.39		10	
IS1	10:16	1.28	27	27.0	3.31	3.3	41.6	41.6	15.8	15.9	0.48	0.48	7.13	7.1	11	11.5
			27		3.3		41.5		15.9		0.48		7.12		12	
BS1	10:02	0.90	27.3	27.3	3.37	3.4	42.6	42.6	25.7	25.6	0.38	0.38	7.74	7.6	18	19.0
			27.3		3.36		42.5		25.6		0.38		7.46		20	
IS2	9:50	0.25	27	27.0	5.27	5.3	66.0	65.9	32.8	33.0	0.37	0.37	7.51	7.5	52	45.5
			27		5.26		65.8		33.2		0.37		7.51		39	
CS5	10:05	0.25	27.5	27.5	6.19	6.2	82.1	82.2	6.0	6.3	0.2	0.2	7.60	7.6	10	9.5
			27.5		6.2		82.2		6.6		0.2		7.60		9	
IS6	10:20	0.02*														
IS4	10:35	0.14	27.1	27.1	5.34	5.3	70.9	70.9	4.9	5.1	0.03	0.03	7.70	7.7	7	7.5
			27.1		5.33		70.8		5.3		0.03		7.70		8	

* No water quality monitoring could be conducted at IS6 which was found dried up completely

Environmental Team for Contract No. YL/2017/03
Development of Lok Ma Chau Loop: Land Decontamination and Advance Engineering Works – Design and Construction

Water Quailty Monitoring Results
7-Sep-19
Weather condition: Sunny

Location	Sampling Time	Depth (m)	Temperature(˚C)		DO (mg/L)		DO (%)		Turbidity (NTU)		Salinity (ppt)		pH		SS(mg/L)	
			Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average
CS1	10:49	1.40	31	30.9	6.58	6.4	89.0	87.0	8.2	8.2	0.78	0.78	7.76	7.8	9	9.5
			30.8		6.31		85.0		8.3		0.78		7.75		10	
IS1	10:24	1.30	28.8	28.7	5.38	5.4	70.0	69.9	18.5	18.4	0.46	0.47	7.86	7.8	9	9.0
			28.6		5.39		69.7		18.3		0.47		7.80		9	
BS1	10:01	0.90	29.7	29.7	4.83	4.8	63.8	63.3	20.9	20.9	0.47	0.47	7.75	7.7	15	15.5
			29.7		4.76		62.8		20.9		0.47		7.74		16	
IS2	10:30	0.25	30	30.0	4.91	4.9	66.9	67.0	22.4	24.4	0.34	0.34	7.40	7.4	40	40.0
			30		4.93		67.1		26.4		0.34		7.40		40	
CS5	10:20	0.20	29.7	29.7	4.95	5.0	67.6	67.7	5.2	5.1	0.26	0.26	7.80	7.8	4	4.0
			29.7		4.97		67.8		5.1		0.26		7.80		4	
IS6	10:05	0*														
IS4	10:45	0.13	28.9	28.9	5.32	5.3	72.8	72.9	2.0	2.4	0.03	0.03	7.60	7.6	4	3.5
			28.9		5.33		72.9		2.8		0.03		7.60		3	

* No water quality monitoring could be conducted at IS6 which was found dried up completely

Environmental Team for Contract No. YL/2017/03
Development of Lok Ma Chau Loop: Land Decontamination and Advance Engineering Works – Design and Construction

Water Quailty Monitoring Results
9-Sep-19
Weather condition: Fine

Location	Sampling Time	Depth (m)	Temperature(˚C)		DO (mg/L)		DO (%)		Turbidity (NTU)		Salinity (ppt)		pH		SS(mg/L)	
			Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average
CS1	14:08	1.44	34	34.0	12.2	12.2	173.3	173.9	8.2	8.2	0.80	0.80	8.27	8.3	11	11.5
			34		12.27		174.4		8.2		0.80		8.29		12	
IS1	13:49	1.31	31.4	31.4	8.04	8.0	109.1	108.9	15.0	15.0	0.46	0.46	8.01	8.0	15	15.5
			31.4		8.01		108.7		15.1		0.46		7.99		16	
BS1	13:33	0.96	31.6	31.6	11.13	11.1	151.6	151.0	16.0	16.0	0.43	0.43	8.08	8.1	12	13.0
			31.5		11.05		150.3		16.0		0.43		8.06		14	
IS2	12:45	0.25	30.4	30.4	5.6	5.6	76.7	76.8	19.7	20.0	0.37	0.37	7.50	7.5	34	34.0
			30.4		5.61		76.8		20.2		0.37		7.50		34	
CS5	12:30	0.25	30.4	30.4	3.04	3.1	41.3	41.7	4.7	4.9	0.30	0.3	7.61	7.6	10	10.5
			30.4		3.11		42.0		5.1		0.30		7.61		11	
IS6	12:15	0.02*														
IS4	11:10	0.15	30.2	30.2	6.06	6.1	87.1	87.1	1.9	1.9	0.04	0.04	7.84	7.8	4	4.0
			30.2		6.04		87.0		2.0		0.04		7.84		4	

* No water quality monitoring could be conducted at IS6 which was found dried up completely

Environmental Team for Contract No. YL/2017/03
Development of Lok Ma Chau Loop: Land Decontamination and Advance Engineering Works – Design and Construction

Water Quailty Monitoring Results
11-Sep-19
Weather condition: Fine

Location	Sampling Time	Depth (m)	Temperature(˚C)		DO (mg/L)		DO (%)		Turbidity (NTU)		Salinity (ppt)		pH		SS(mg/L)	
			Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average
CS1	11:11	1.32	31.5	31.5	8.54	8.5	118.6	118.3	11.1	10.9	0.79	0.79	7.40	7.4	16	17.0
			31.5		8.51		117.9		10.7		0.79		7.40		18	
IS1	10:58	1.28	31.7	31.7	6.8	6.8	94.1	94.0	21.3	21.3	0.44	0.44	7.60	7.6	18	17.0
			31.7		6.78		93.8		21.2		0.44		7.60		16	
BS1	10:46	1.21	31.3	31.3	8.53	8.5	117.9	117.3	23.6	23.9	0.52	0.52	7.80	7.8	25	26.5
			31.3		8.46		116.7		24.1		0.52		7.80		28	
IS2	10:50	0.22	31.1	31.1	4.74	4.7	63.8	63.9	19.1	19.1	0.73	0.73	7.10	7.1	19	20.0
			31.1		4.75		64.0		19.0		0.73		7.10		21	
CS5	11:20	0.25	30.2	30.2	4.79	4.8	63.6	63.4	13.1	12.9	0.27	0.27	7.40	7.4	17	15.5
			30.2		4.76		63.2		12.7		0.27		7.40		14	
IS6	11:00	0.01*														
IS4	11:50	0.14	31	31.0	4.37	4.4	59.3	60.3	10.8	11.8	0.05	0.05	8.40	8.4	12	12.5
			31		4.47		61.3		12.7		0.05		8.40		13	

* No water quality monitoring could be conducted at IS6 which was found dried up completely

Environmental Team for Contract No. YL/2017/03
Development of Lok Ma Chau Loop: Land Decontamination and Advance Engineering Works – Design and Construction

Water Quailty Monitoring Results
13-Sep-19
Weather condition: Fine

Location	Sampling Time	Depth (m)	Temperature(˚C)		DO (mg/L)		DO (%)		Turbidity (NTU)		Salinity (ppt)		pH		SS(mg/L)	
			Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average
CS1	11:39	1.35	31.6	31.6	6.22	6.2	84.6	84.7	11.1	11.2	0.90	0.90	7.40	7.4	10	10.5
			31.6		6.23		84.7		11.2		0.90		7.40		11	
IS1	11:21	1.30	31.5	31.5	7.34	7.3	99.7	99.5	23.3	23.7	0.49	0.49	7.70	7.7	19	18.5
			31.5		7.32		99.3		24.1		0.49		7.70		18	
BS1	11:05	0.99	31.6	31.6	6.92	6.9	94.2	93.8	25.4	25.7	0.59	0.59	7.90	7.9	25	26.0
			31.6		6.87		93.4		26.0		0.59		7.90		27	
IS2	10:55	0.30	31	31.0	5.06	5.1	68.1	68.2	35.1	34.8	2.03	2.03	7.00	7.0	37	37.0
			31		5.07		68.2		34.5		2.03		7.00		37	
CS5	11:25	0.30	29.9	29.9	3.66	3.7	48.3	48.4	23.0	22.7	0.3	0.3	7.80	7.8	22	20.5
			29.9		3.68		48.5		22.4		0.3		7.80		19	
IS6	11:10	0.01*														
IS4	12:15	0.14	31.1	31.1	4.53	4.5	62.6	62.7	11.9	11.6	0.03	0.03	8.20	8.2	9	16.5
			31.1		4.54		62.7		11.3		0.03		8.20		24	

* No water quality monitoring could be conducted at IS6 which was found dried up completely

Environmental Team for Contract No. YL/2017/03
Development of Lok Ma Chau Loop: Land Decontamination and Advance Engineering Works – Design and Construction

Water Quailty Monitoring Results
17-Sep-19
Weather condition: Fine

Location	Sampling Time	Depth (m)	Temperature(˚C)		DO (mg/L)		DO (%)		Turbidity (NTU)		Salinity (ppt)		pH		SS(mg/L)	
			Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average
CS1	10:57	1.32	31.9	31.9	7.6	7.6	104.0	103.9	13.9	14.0	1.03	1.03	7.80	7.8	20	20.5
			31.9		7.59		103.8		14.1		1.03		7.80		21	
IS1	10:28	1.21	31.5	31.5	6.94	6.9	93.5	93.4	22.7	22.2	0.54	0.54	8.00	8.0	17	16.0
			31.5		6.92		93.3		21.7		0.54		8.00		15	
BS1	10:16	1.20	31.6	31.6	6.35	6.4	86.3	86.4	31.5	31.9	0.61	0.61	7.90	7.9	30	28.0
			31.6		6.36		86.5		32.3		0.61		7.90		26	
IS2	10:15	0.30	31.2	31.2	5.36	5.4	73.0	73.1	20.8	20.6	1.99	1.99	8.10	8.1	36	33.5
			31.2		5.37		73.1		20.4		1.99		8.10		31	
CS5	10:25	0.25	31.5	31.5	4.24	4.5	64.5	64.6	8.7	8.4	0.4	0.43	9.10	9.1	10	10.0
			31.5		4.76		64.6		8.1		0.4		9.10		10	
IS6	10:40	0.01*														
IS4	11:05	0.15	30.8	30.8	4.99	5.0	68.3	68.4	38.8	38.9	0.03	0.03	9.00	9.0	13	18.0
			30.8		5.01		68.5		38.9		0.03		9.00		23	

* No water quality monitoring could be conducted at IS6 which was found dried up completely

Environmental Team for Contract No. YL/2017/03
Development of Lok Ma Chau Loop: Land Decontamination and Advance Engineering Works – Design and Construction

Water Quailty Monitoring Results
19-Sep-19
Weather condition: Sunny

Location	Sampling Time	Depth (m)	Temperature(˚C)		DO (mg/L)		DO (%)		Turbidity (NTU)		Salinity (ppt)		pH		SS(mg/L)	
			Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average
CS1	10:43	1.23	30.8	30.8	6.05	6.0	81.3	81.3	11.9	11.7	1.01	1.01	7.40	7.4	14	15.0
			30.8		6.02		81.2		11.5		1.01		7.40		16	
IS1	10:19	1.20	30.5	30.5	5.96	5.9	79.4	79.3	27.7	27.8	0.58	0.58	7.60	7.6	24	25.0
			30.5		5.93		79.2		27.8		0.58		7.60		26	
BS1	10:02	1.18	31.1	31.1	6.92	6.9	93.2	93.1	25.1	24.6	0.53	0.53	7.50	7.5	22	23.5
			31.1		6.9		93.0		24.0		0.53		7.50		25	
IS2	10:45	0.25	30.5	30.5	4.7	4.7	63.1	63.2	6.6	6.8	0.74	0.74	8.20	8.2	8	11.0
			30.5		4.71		63.2		7.0		0.74		8.20		14	
CS5	10:30	0.25	30.8	30.8	4.78	4.8	6.4	6.4	9.2	9.6	0.4	0.40	9.00	9.0	9	9.0
			30.8		4.79		6.4		10.1		0.4		9.00		9	
IS6	10:10	0.01*														
IS4	11:25	0.14	29.9	29.9	5.96	6.0	80.2	80.4	7.0	6.8	0.03	0.03	8.80	8.8	12	11.5
			29.9		5.99		80.5		6.5		0.03		8.80		11	

* No water quality monitoring could be conducted at IS6 which was found dried up completely

Environmental Team for Contract No. YL/2017/03
Development of Lok Ma Chau Loop: Land Decontamination and Advance Engineering Works – Design and Construction

Water Quailty Monitoring Results
21-Sep-19
Weather condition: Fine

Location	Sampling Time	Depth (m)	Temperature(˚C)		DO (mg/L)		DO (%)		Turbidity (NTU)		Salinity (ppt)		pH		SS(mg/L)	
			Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average
CS1	10:48	1.44	30.1	30.1	7.98	8.0	105.5	105.7	14.9	14.8	1.03	1.03	7.50	7.5	15	15.5
			30.1		8.01		105.9		14.7		1.03		7.50		16	
IS1	10:24	1.36	29.4	29.5	8.71	8.7	114.1	114.0	23.8	23.7	0.62	0.62	7.70	7.7	30	30.5
			29.5		8.69		113.8		23.5		0.62		7.70		31	
BS1	9:55	0.93	29.6	29.6	8.14	8.2	107.2	107.6	26.0	25.9	0.55	0.55	7.70	7.7	25	25.5
			29.6		8.18		107.9		25.7		0.55		7.70		26	
IS2	10:30	0.20	29.8	29.8	6.02	6.0	80.4	80.5	8.0	7.9	0.85	0.85	8.00	8.0	20	21.0
			29.8		6.04		80.5		7.8		0.85		8.00		22	
CS5	10:00	0.15	27.7	27.7	10.33	10.3	130.4	130.5	4.6	4.5	0.3	0.31	8.50	8.5	<2	<2
			27.7		10.34		130.5		4.4		0.3		8.50		<2	
IS6	10:20	0*														
IS4	11:30	0.14	26	26.0	3.96	4.0	48.9	49.1	7.9	7.6	0.02	0.02	8.60	8.6	7	7.0
			26		3.99		49.3		7.2		0.02		8.60		7	

* No water quality monitoring could be conducted at IS6 which was found dried up completely

Environmental Team for Contract No. YL/2017/03
Development of Lok Ma Chau Loop: Land Decontamination and Advance Engineering Works – Design and Construction

Water Quailty Monitoring Results
24-Sep-19
Weather condition: Fine

Location	Sampling Time	Depth (m)	Temperature(°C)		DO (mg/L)		DO (%)		Turbidity (NTU)		Salinity (ppt)		pH		SS(mg/L)	
			Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average
CS1	11:09	1.34	28.5	28.5	7.02	7.0	90.5	90.4	10.0	10.0	1.05	1.05	8.00	8.0	16	16.0
			28.5		6.98		90.2		9.9		1.05		8.00		16	
IS1	10:57	1.21	28.5	28.5	7.85	7.8	101.5	101.4	20.7	20.5	0.67	0.67	8.30	8.3	38	37.5
			28.5		7.82		101.3		20.3		0.67		8.30		37	
BS1	10:40	1.24	28.7	28.7	6.61	6.6	84.8	84.7	15.4	15.3	0.73	0.73	8.50	8.5	20	20.0
			28.7		6.58		84.5		15.3		0.73		8.50		20	
IS2	11:34	0.58	28.6	28.6	5.82	5.8	75.4	75.3	16.9	16.7	0.81	0.81	8.80	8.8	33	32.0
			28.6		5.81		75.2		16.5		0.81		8.80		31	
CS5	12:10	0.15	31.2	31.2	11.47	11.4	154.2	153.3	8.4	8.4	0.3	0.29	8.90	8.9	12	11.5
			31.2		11.35		152.3		8.3		0.3		8.90		11	
IS6	11:50	0*														
IS4	10:30	0.14	28.7	28.7	3.99	4.0	51.7	52.0	21.6	21.4	0.03	0.03	7.80	7.8	13	13.5
			28.7		4.03		52.2		21.2		0.03		7.80		14	

* No water quality monitoring could be conducted at IS6 which was found dried up completely

Environmental Team for Contract No. YL/2017/03
Development of Lok Ma Chau Loop: Land Decontamination and Advance Engineering Works – Design and Construction

Water Quailty Monitoring Results
26-Sep-19
Weather condition: Fine

Location	Sampling Time	Depth (m)	Temperature(°C)		DO (mg/L)		DO (%)		Turbidity (NTU)		Salinity (ppt)		pH		SS(mg/L)	
			Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average
CS1	10:16	1.31	30.3	30.3	10.74	10.8	130.6	130.7	15.9	16.0	0.90	0.90	8.28	8.3	14	14.5
			30.3		10.76		130.7		16.1		0.90		8.28		15	
IS1	10:39	1.43	30.6	30.6	7.37	7.4	90.5	90.3	8.8	8.8	1.14	1.14	7.80	7.8	30	29.5
			30.6		7.34		90.1		8.8		1.14		7.80		29	
BS1	9:48	0.95	29.4	29.4	8.75	8.8	107.6	107.9	18.1	18.1	1.72	1.72	7.60	7.6	32	32.5
			29.4		8.78		108.1		18.1		1.72		7.60		33	
IS2	11:02	0.22	29.7	29.7	6.58	6.6	80.9	80.7	19.8	19.6	1.71	1.71	7.52	7.5	34	34.5
			29.7		6.53		80.5		19.4		1.71		7.52		35	
CS5	10:00	0.17	28.1	28.1	10.66	10.7	131.5	131.9	1.6	1.6	0.35	0.35	8.61	8.6	4	3.0
			28.1		10.72		132.2		1.5		0.35		8.61		2	
IS6	9:45	0*														
IS4	13:00	0.15	27.3	27.3	6.44	6.4	78.7	77.9	19.0	18.6	0.06	0.06	7.61	7.6	9	8.5
			27.3		6.3		77.0		18.2		0.06		7.61		8	

* No water quality monitoring could be conducted at IS6 which was found dried up completely

Environmental Team for Contract No. YL/2017/03
Development of Lok Ma Chau Loop: Land Decontamination and Advance Engineering Works – Design and Construction

Water Quailty Monitoring Results
28-Sep-19
Weather condition: Fine

Location	Sampling Time	Depth (m)	Temperature(°C)		DO (mg/L)		DO (%)		Turbidity (NTU)		Salinity (ppt)		pH		SS(mg/L)	
			Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average
CS1	11:03	1.28	28.2	28.2	8.77	8.7	115.3	114.0	11.6	11.7	1.05	1.05	8.70	8.7	15	15.0
			28.2		8.68		112.7		11.7		1.05		8.70		15	
IS1	10:49	1.26	27.8	27.8	10.37	10.3	136.2	135.3	23.9	24.0	1.23	1.23	8.90	8.9	24	24.0
			27.8		10.28		134.4		24.0		1.23		8.90		24	
BS1	10:35	1.22	27.6	27.6	11.64	11.6	147.5	145.7	30.7	31.4	1.88	1.88	8.90	8.9	42	41.5
			27.6		11.52		143.9		32.1		1.88		8.90		41	
IS2	10:40	0.20	28.8	28.8	5.98	6.0	77.6	77.7	13.3	13.2	0.81	0.81	8.30	8.3	32	31.0
			28.8		5.99		77.7		13.1		0.81		8.30		30	
CS5	11:10	0.16	28.4	28.4	6.49	6.5	83.6	83.7	2.9	3.2	0.3	0.32	8.70	8.7	6	6.0
			28.4		6.5		83.7		3.4		0.3		8.70		6	
IS6	10:55	0*														
IS4	11:55	0.14	28.7	28.7	5.95	6.0	76.6	76.7	8.7	8.0	0.03	0.03	8.60	8.6	13	13.5
			28.7		5.96		76.7		7.3		0.03		8.60		14	

* No water quality monitoring could be conducted at IS6 which was found dried up completely

Environmental Team for Contract No. YL/2017/03
Development of Lok Ma Chau Loop: Land Decontamination and Advance Engineering Works – Design and Construction

Water Quailty Monitoring Results
30-Sep-19
Weather condition: Fine

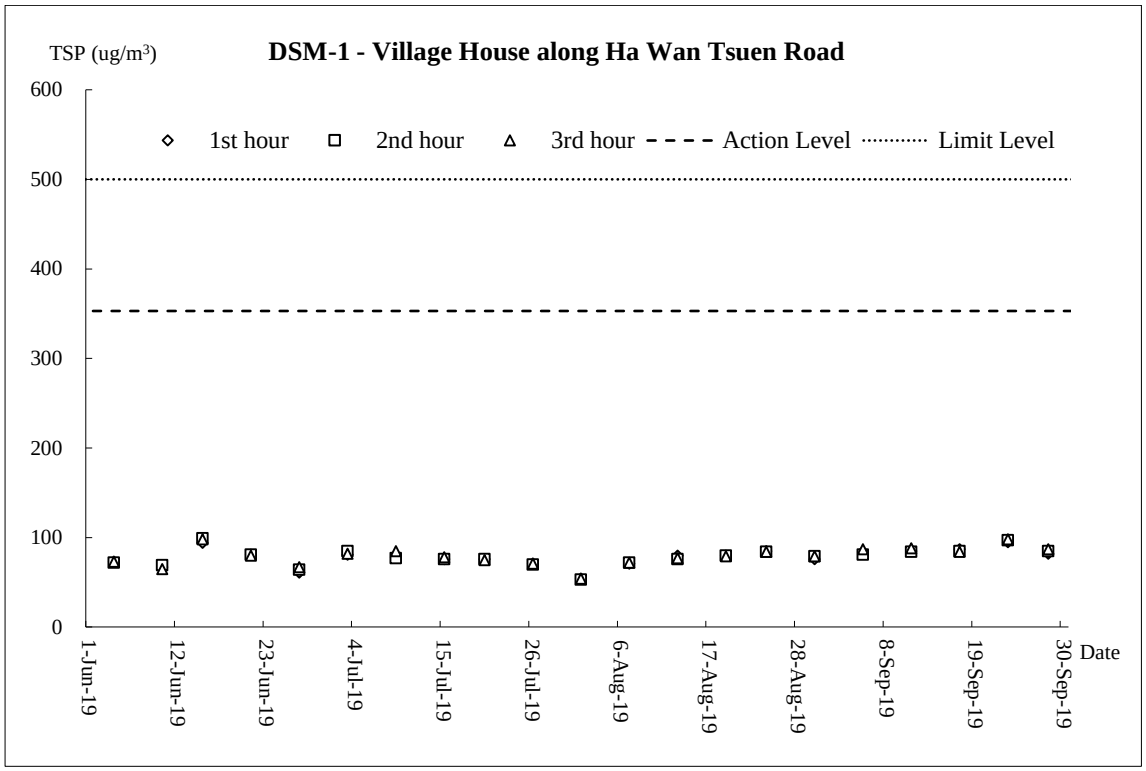
Location	Sampling Time	Depth (m)	Temperature(°C)		DO (mg/L)		DO (%)		Turbidity (NTU)		Salinity (ppt)		pH		SS(mg/L)	
			Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average
CS1	11:50	1.40	31.5	31.5	9.79	9.8	128.3	128.5	12.9	12.7	1.02	1.02	9.10	9.1	13	13.5
			31.5		9.83		128.6		12.5		1.02		9.10		14	
IS1	11:25	1.30	30.8	30.8	14.75	14.7	193.4	193.1	25.6	25.1	1.85	1.85	8.90	8.9	29	29.0
			30.8		14.69		192.8		24.6		1.85		8.90		29	
BS1	11:05	0.90	31	31.0	9.9	9.9	132.9	133.2	28.5	28.5	2.71	2.71	8.80	8.8	36	36.5
			31		9.97		133.4		28.5		2.71		8.80		37	
IS2	11:45	0.20	29.2	29.2	6.53	6.5	85.0	85.0	Over range	>1000	2.39	2.39	7.80	7.8	679	681.5
			29.2		6.52		84.9		Over range		2.39		7.80		684	
CS5	11:25	0.17	29.3	29.3	6.28	6.3	82.0	82.1	3.2	2.9	0.3	0.32	8.40	8.4	7	7.5
			29.3		6.3		82.2		2.7		0.3		8.40		8	
IS6	11:15	0*														
IS4	13:35	0.14	29.7	29.7	4.05	4.1	52.5	52.6	24.4	26.3	0.08	0.08	8.60	8.6	10	10.5
			29.7		4.07		52.7		28.1		0.08		8.60		11	

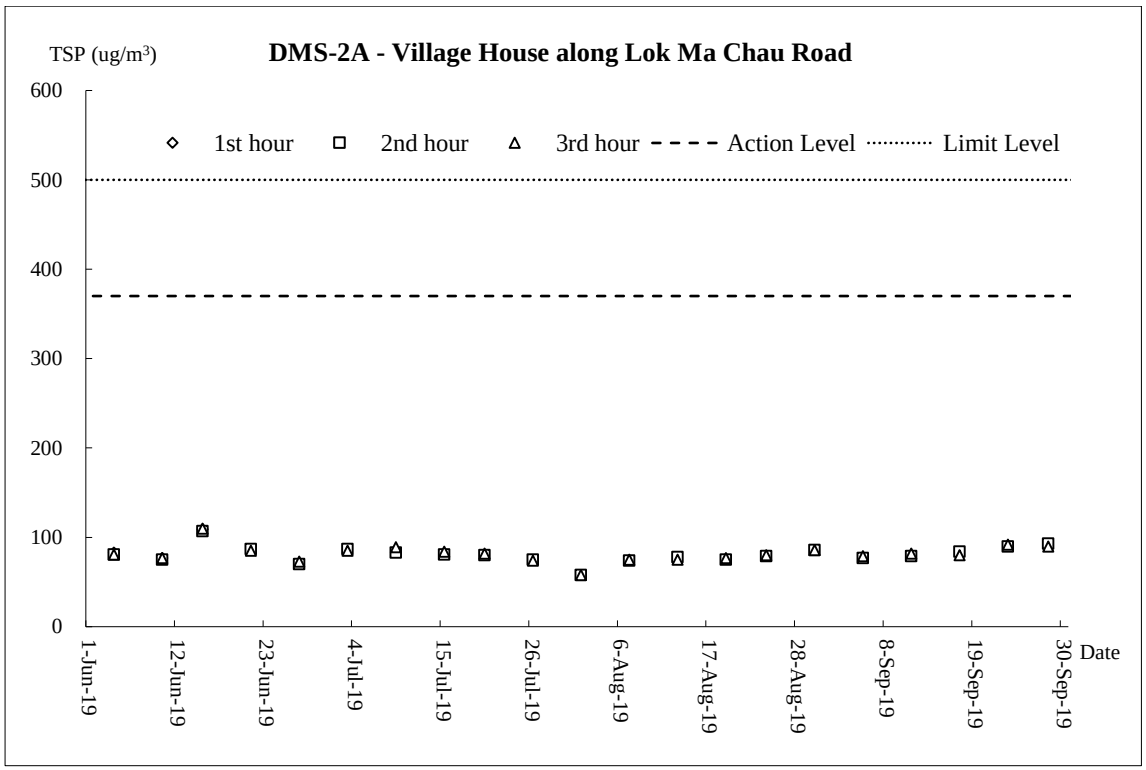
* No water quality monitoring could be conducted at IS6 which was found dried up completely

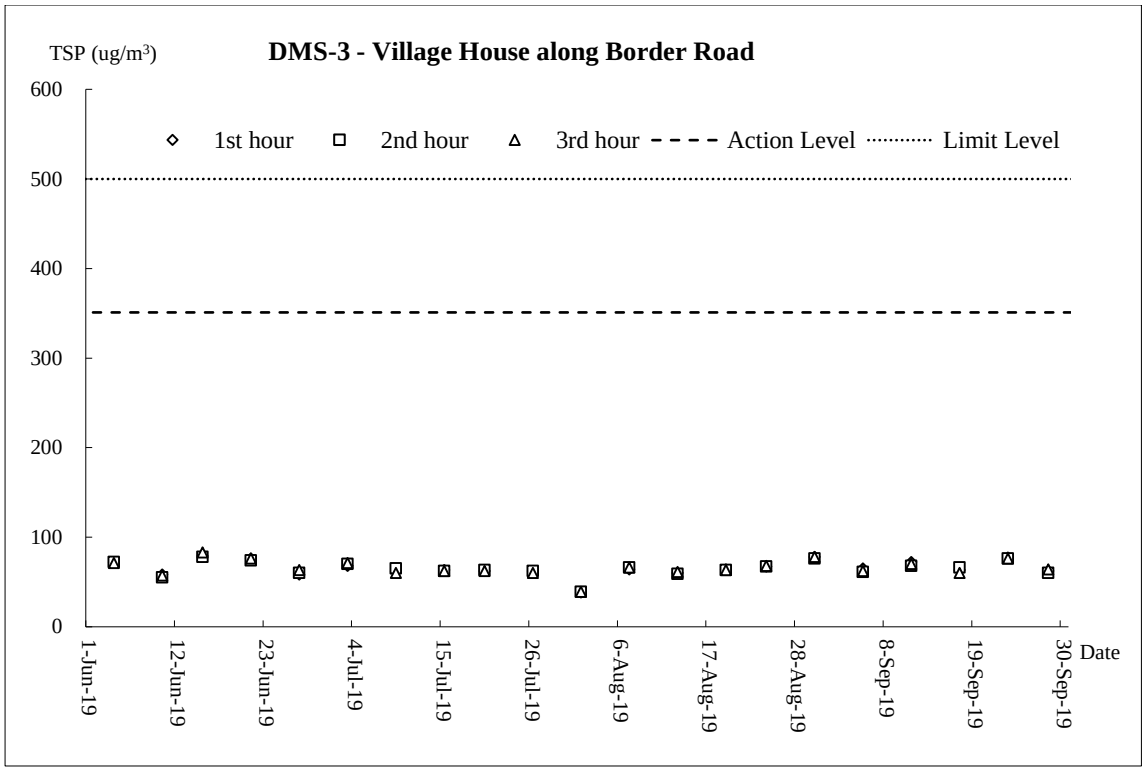
Appendix I

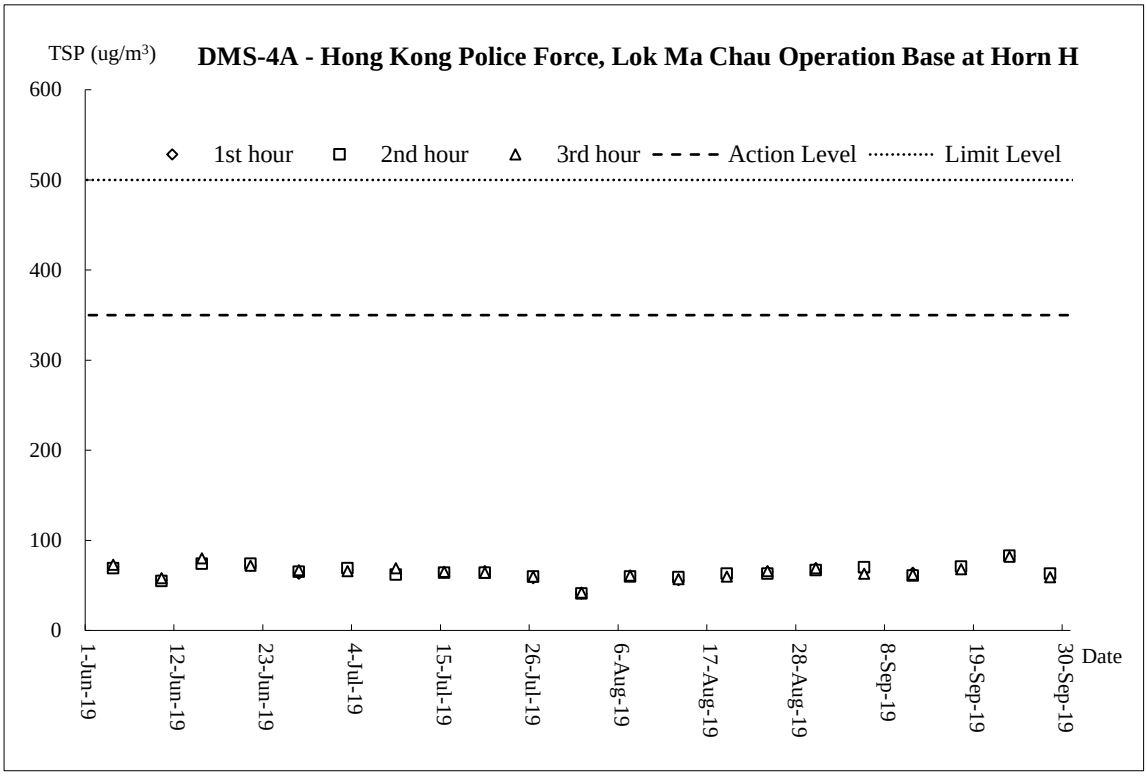
Graphical Plots for Monitoring Result

Air Quality – 1-hour TSP

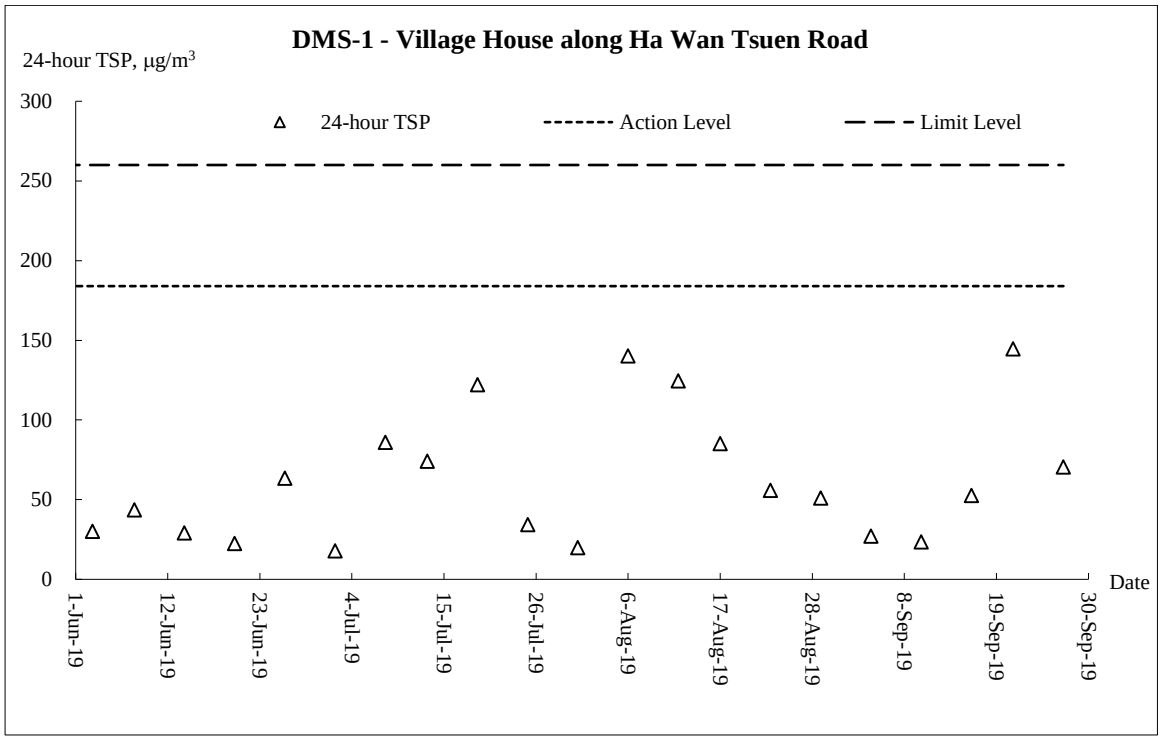


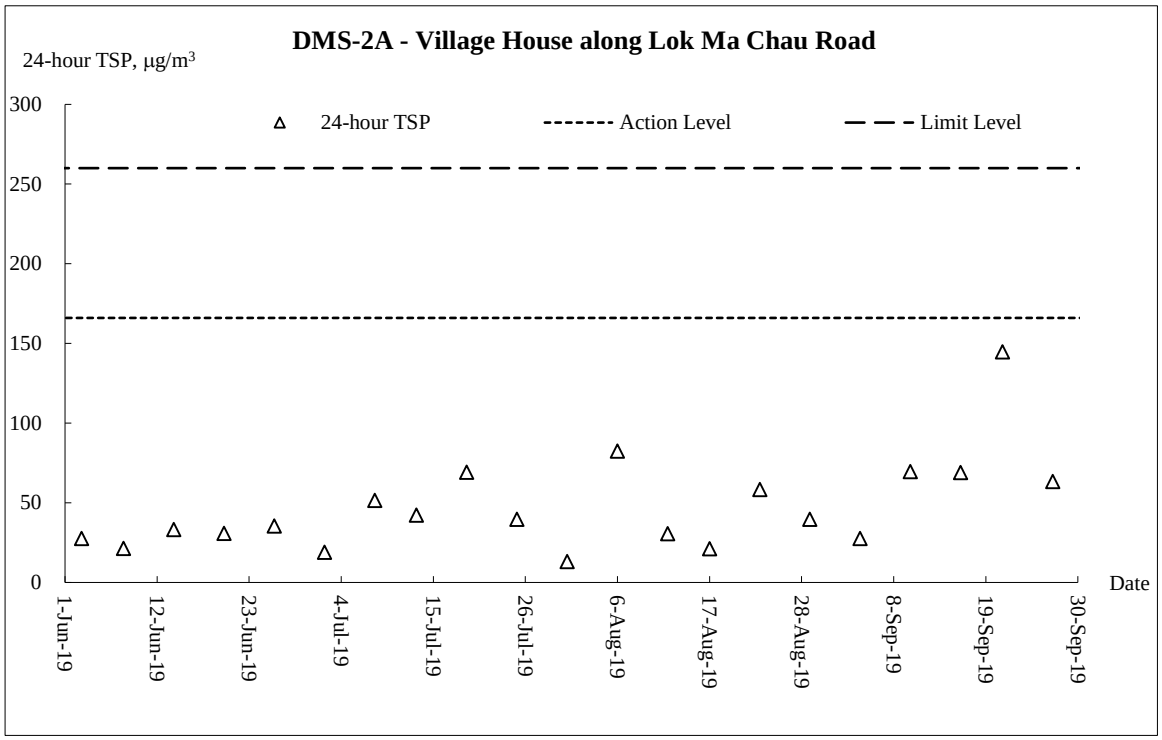


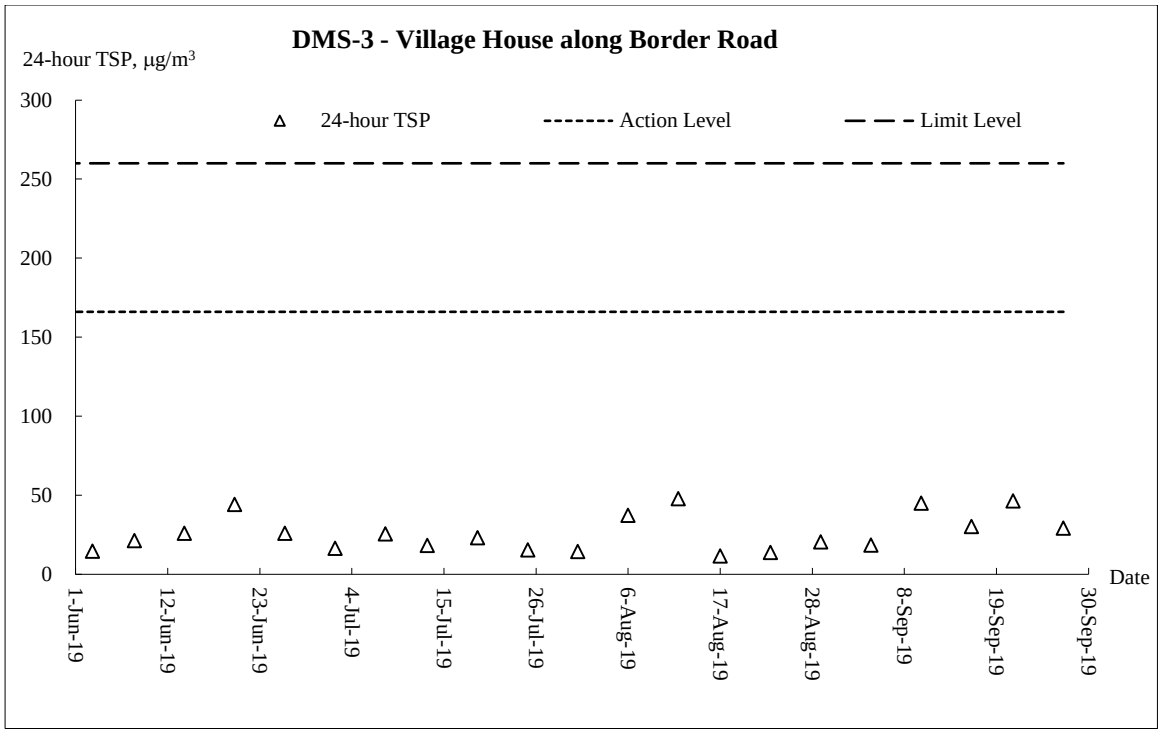

TSP (ug/m3)
DMS-3 - Village House along Border Road
1st hour
2nd hour
3rd hour
Action Level
Limit Level
600
500
400
300
200
100
0
1-Jun-19
12-Jun-19
23-Jun-19
4-Jul-19
15-Jul-19
26-Jul-19
6-Aug-19
17-Aug-19
28-Aug-19
8-Sep-19
19-Sep-19
30-Sep-19
Date

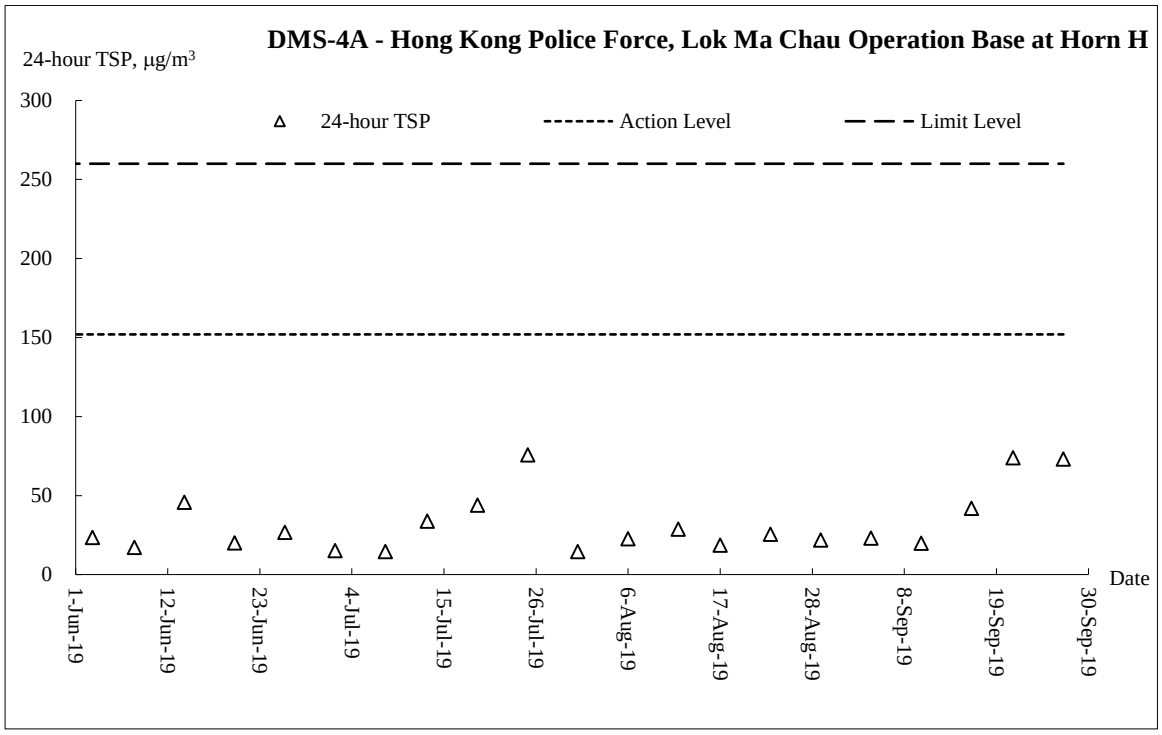

TSP (ug/m3)
DMS-4A - Hong Kong Police Force, Lok Ma Chau Operation Base at Horn H
1st hour
2nd hour
3rd hour
Action Level
Limit Level
600
500
400
300
200
100
0
1-Jun-19
12-Jun-19
23-Jun-19
4-Jul-19
15-Jul-19
26-Jul-19
6-Aug-19
17-Aug-19
28-Aug-19
8-Sep-19
19-Sep-19
30-Sep-19
Date

Air Quality – 24-hour TSP

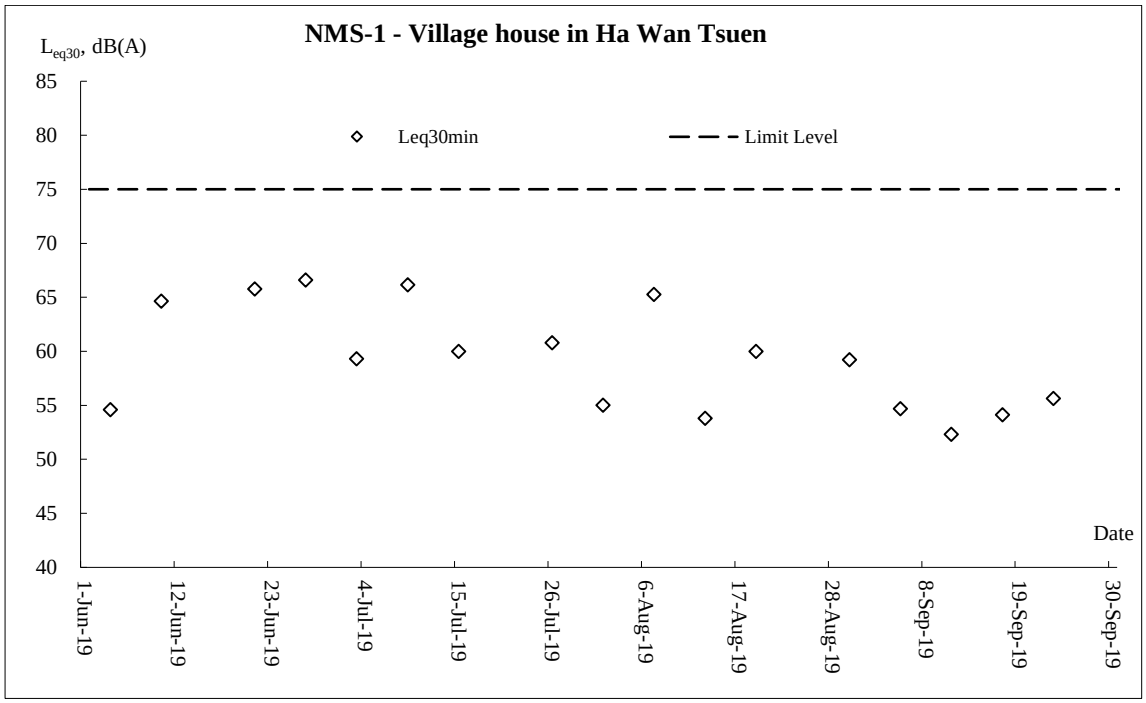


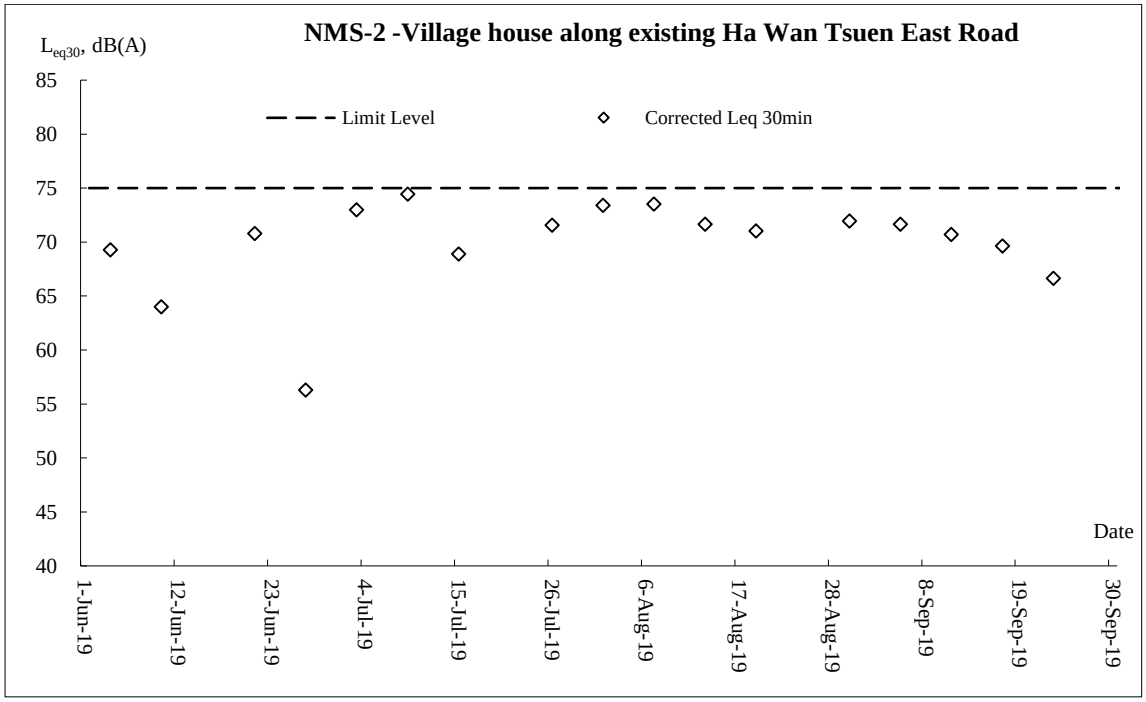


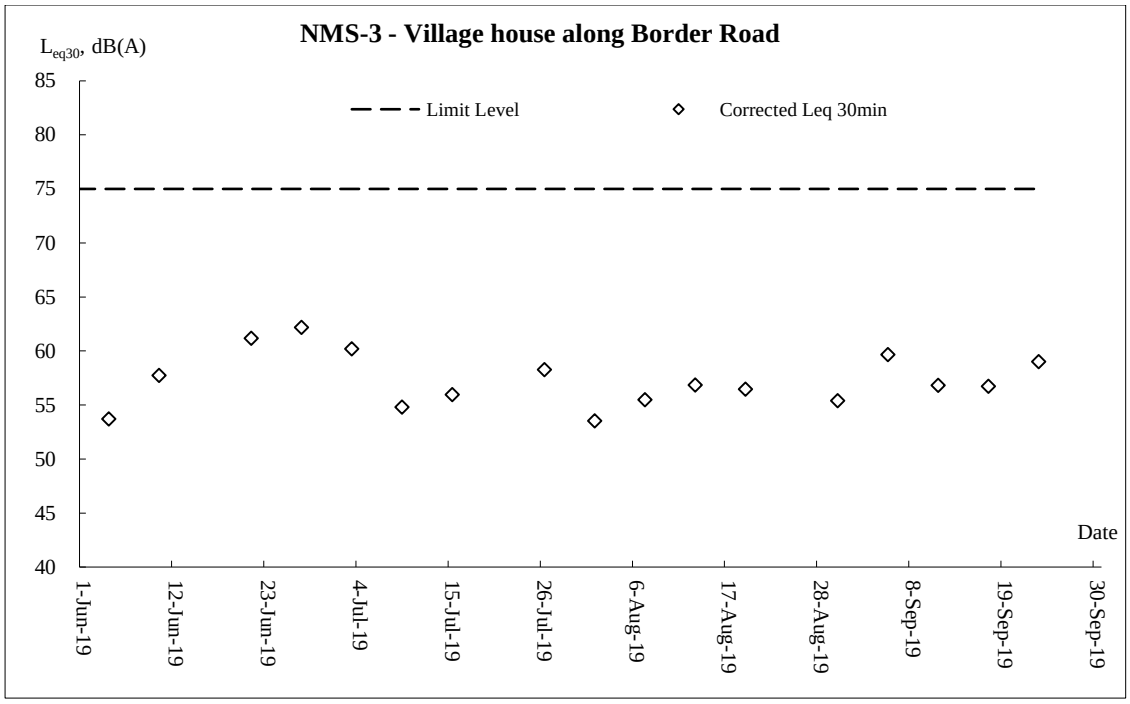

DMS-3 - Village House along Border Road
24-hour TSP, μg/m³
24-hour TSP
Action Level
Limit Level
300
250
200
150
100
50
0
Date
1-Jun-19
12-Jun-19
23-Jun-19
4-Jul-19
15-Jul-19
26-Jul-19
6-Aug-19
17-Aug-19
28-Aug-19
8-Sep-19
19-Sep-19
30-Sep-19

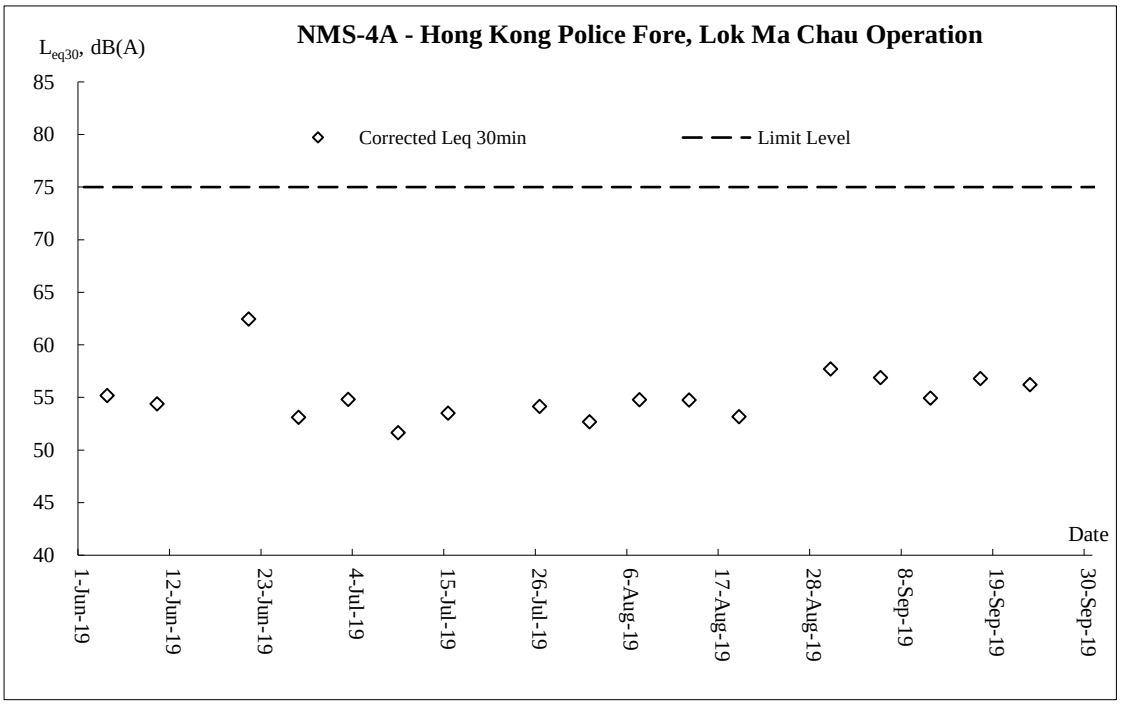

DMS-4A - Hong Kong Police Force, Lok Ma Chau Operation Base at Horn H
24-hour TSP, μg/m³
24-hour TSP
Action Level
Limit Level
300
250
200
150
100
50
0
Date
1-Jun-19
12-Jun-19
23-Jun-19
4-Jul-19
15-Jul-19
26-Jul-19
6-Aug-19
17-Aug-19
28-Aug-19
8-Sep-19
19-Sep-19
30-Sep-19

Noise

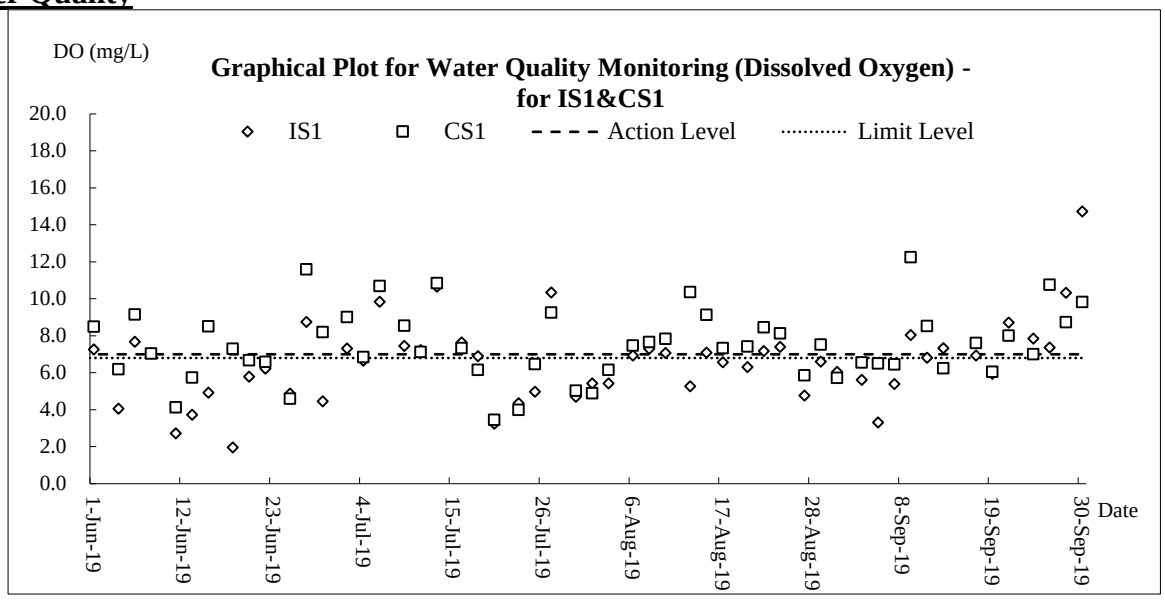

NMS-1 - Village house in Ha Wan Tsuen
L_{eq30}, dB(A)
Leq30min
Limit Level
85
80
75
70
65
60
55
50
45
40
Date
1-Jun-19
12-Jun-19
23-Jun-19
4-Jul-19
15-Jul-19
26-Jul-19
6-Aug-19
17-Aug-19
28-Aug-19
8-Sep-19
19-Sep-19
30-Sep-19

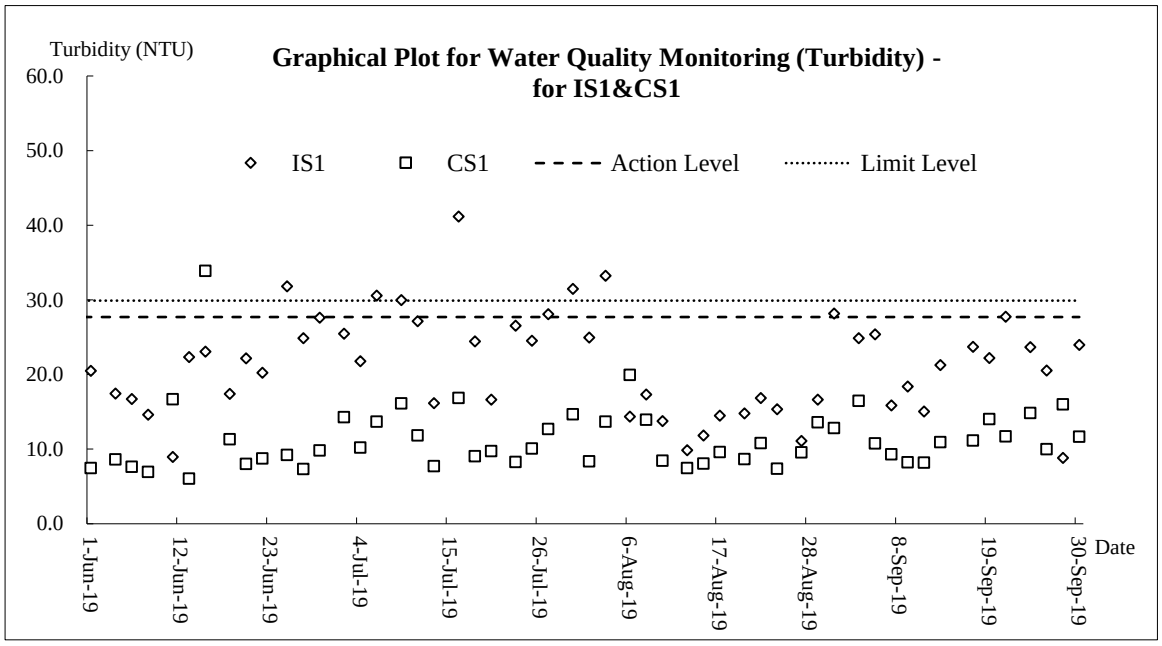

NMS-2 -Village house along existing Ha Wan Tsuen East Road
L_{eq30}, dB(A)
Limit Level
Corrected Leq 30min
85
80
75
70
65
60
55
50
45
40
Date
1-Jun-19
12-Jun-19
23-Jun-19
4-Jul-19
15-Jul-19
26-Jul-19
6-Aug-19
17-Aug-19
28-Aug-19
8-Sep-19
19-Sep-19
30-Sep-19

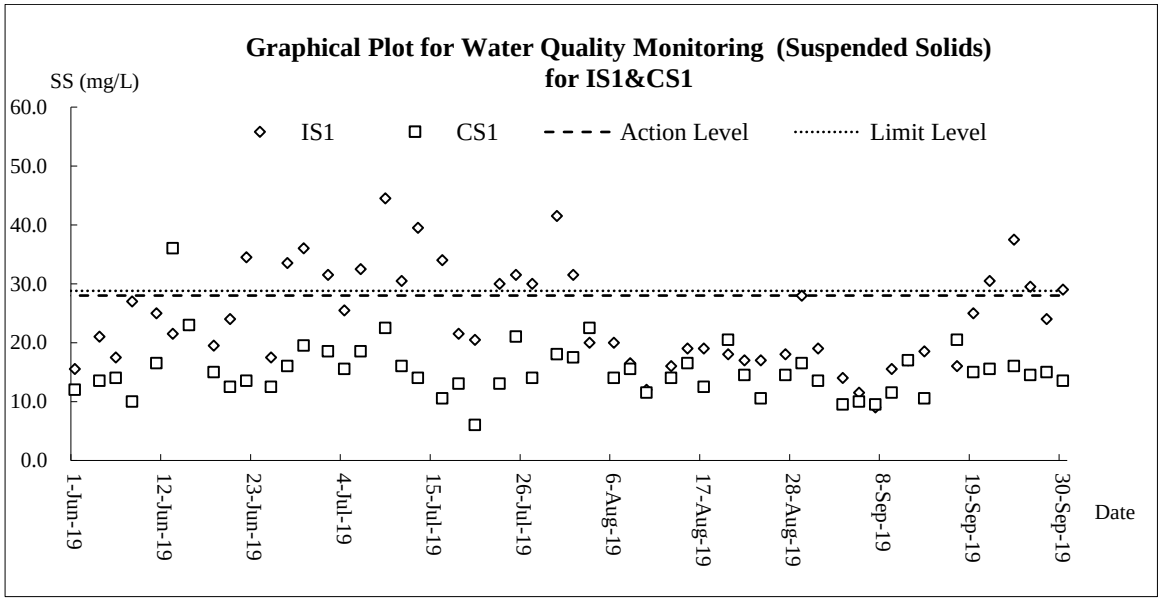

NMS-3 - Village house along Border Road
L_{eq30}, dB(A)
Limit Level
Corrected Leq 30min
85
80
75
70
65
60
55
50
45
40
Date
1-Jun-19
12-Jun-19
23-Jun-19
4-Jul-19
15-Jul-19
26-Jul-19
6-Aug-19
17-Aug-19
28-Aug-19
8-Sep-19
19-Sep-19
30-Sep-19

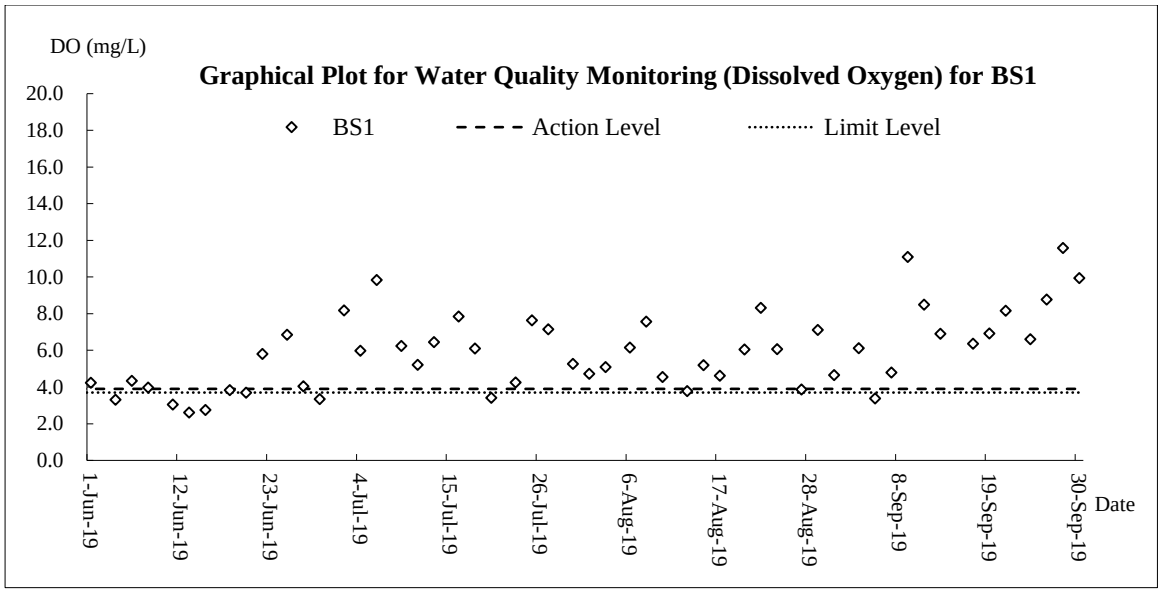

NMS-4A - Hong Kong Police Fore, Lok Ma Chau Operation
L_{eq30}, dB(A)
Corrected Leq 30min
Limit Level
85
80
75
70
65
60
55
50
45
40
Date
1-Jun-19
12-Jun-19
23-Jun-19
4-Jul-19
15-Jul-19
26-Jul-19
6-Aug-19
17-Aug-19
28-Aug-19
8-Sep-19
19-Sep-19
30-Sep-19

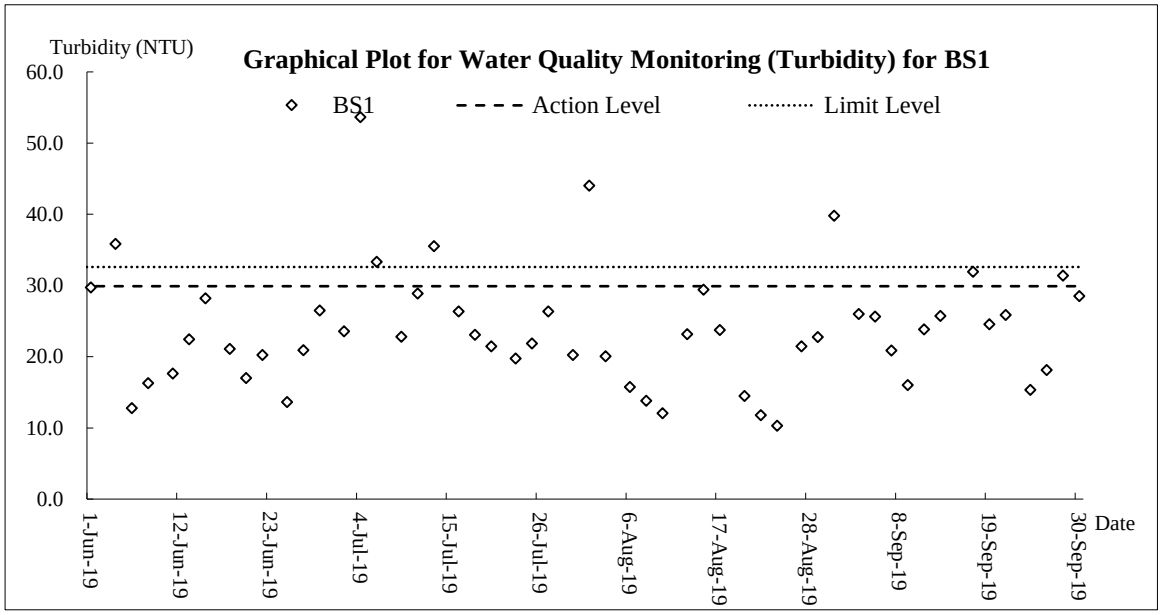
Water Quality

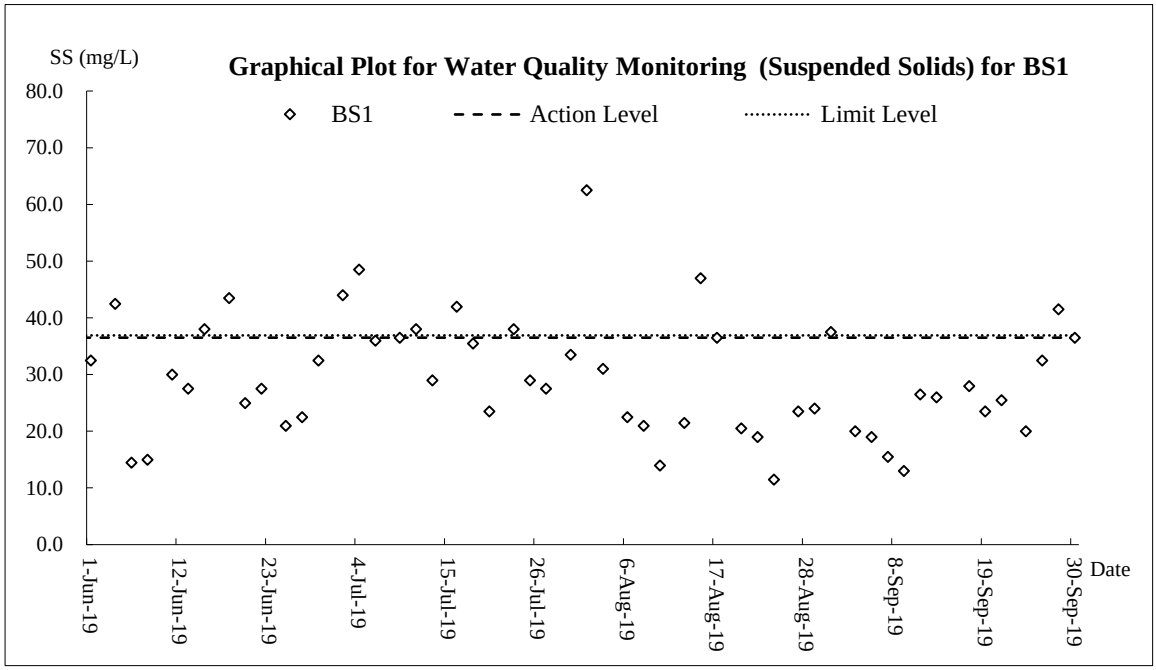


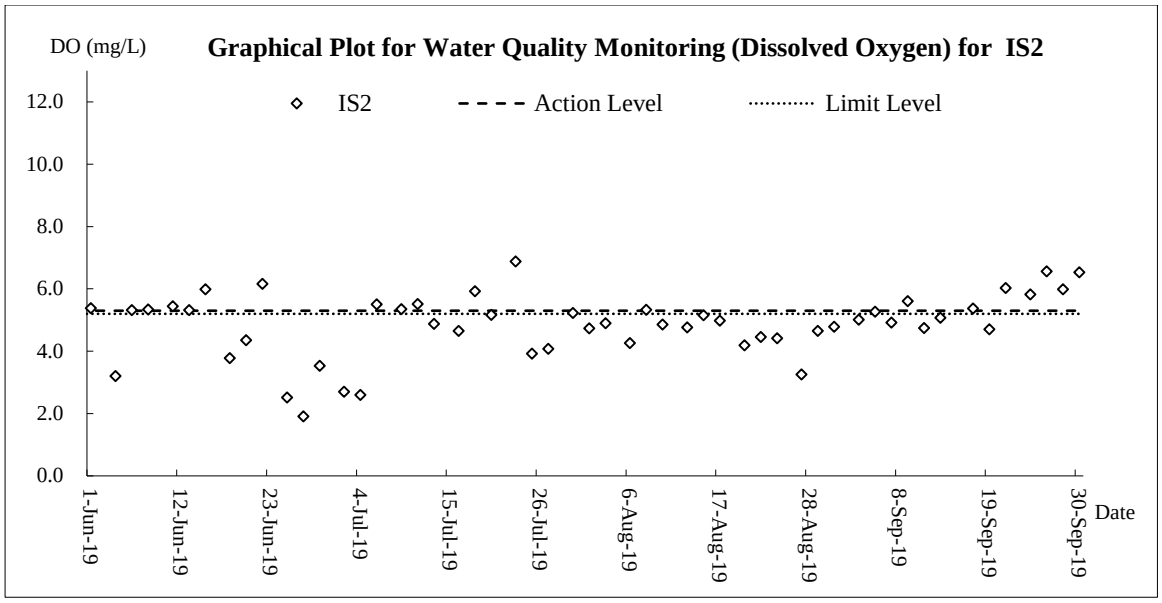


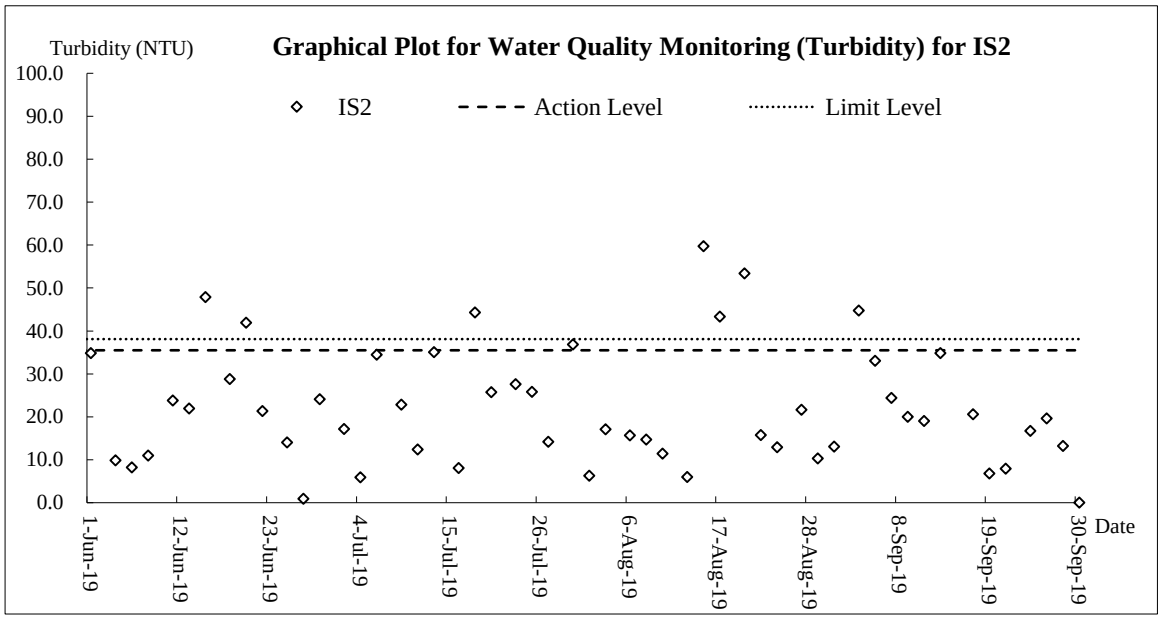


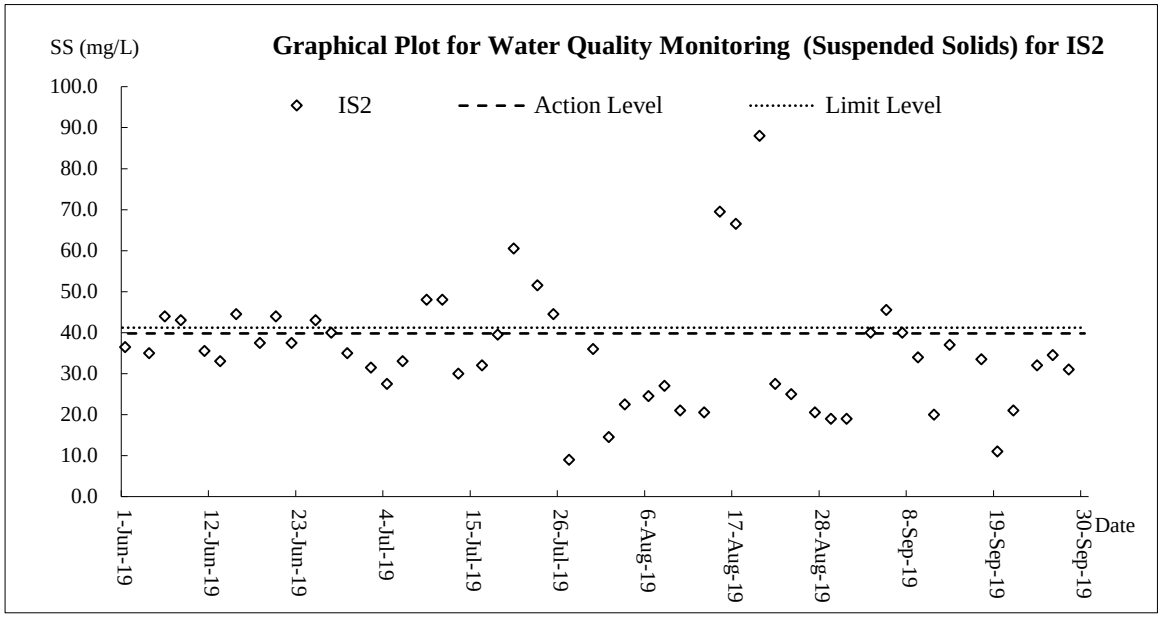

DO (mg/L)
Graphical Plot for Water Quality Monitoring (Dissolved Oxygen) for BS1
BS1
Action Level
Limit Level
20.0
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
1-Jun-19
12-Jun-19
23-Jun-19
4-Jul-19
15-Jul-19
26-Jul-19
6-Aug-19
17-Aug-19
28-Aug-19
8-Sep-19
19-Sep-19
30-Sep-19
Date

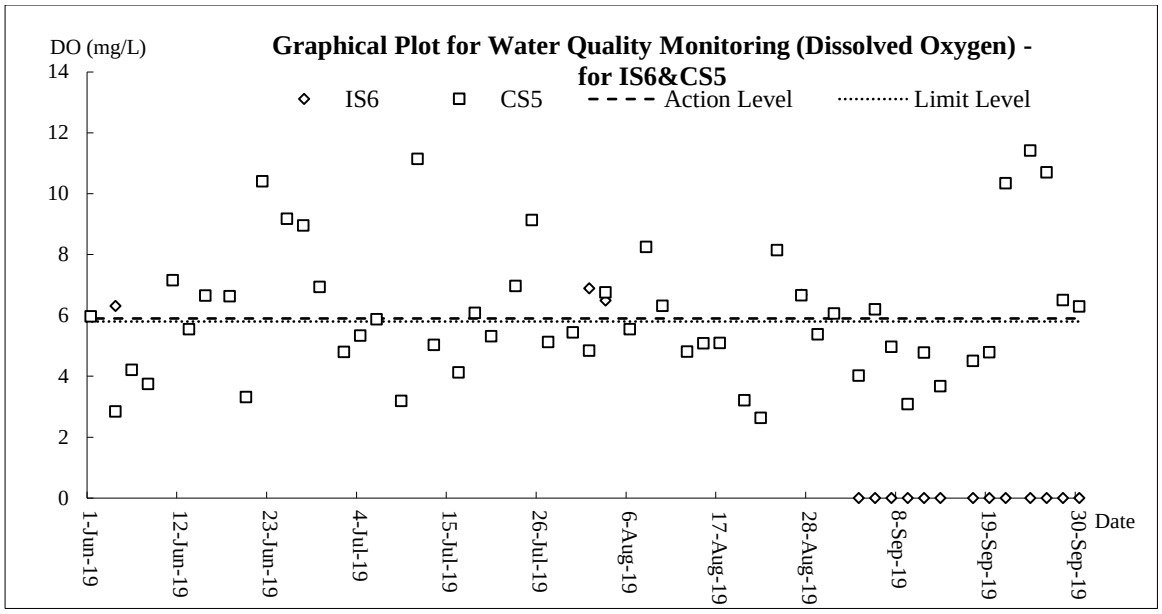

Turbidity (NTU)
Graphical Plot for Water Quality Monitoring (Turbidity) for BS1
BS1
Action Level
Limit Level
60.0
50.0
40.0
30.0
20.0
10.0
0.0
1-Jun-19
12-Jun-19
23-Jun-19
4-Jul-19
15-Jul-19
26-Jul-19
6-Aug-19
17-Aug-19
28-Aug-19
8-Sep-19
19-Sep-19
30-Sep-19
Date

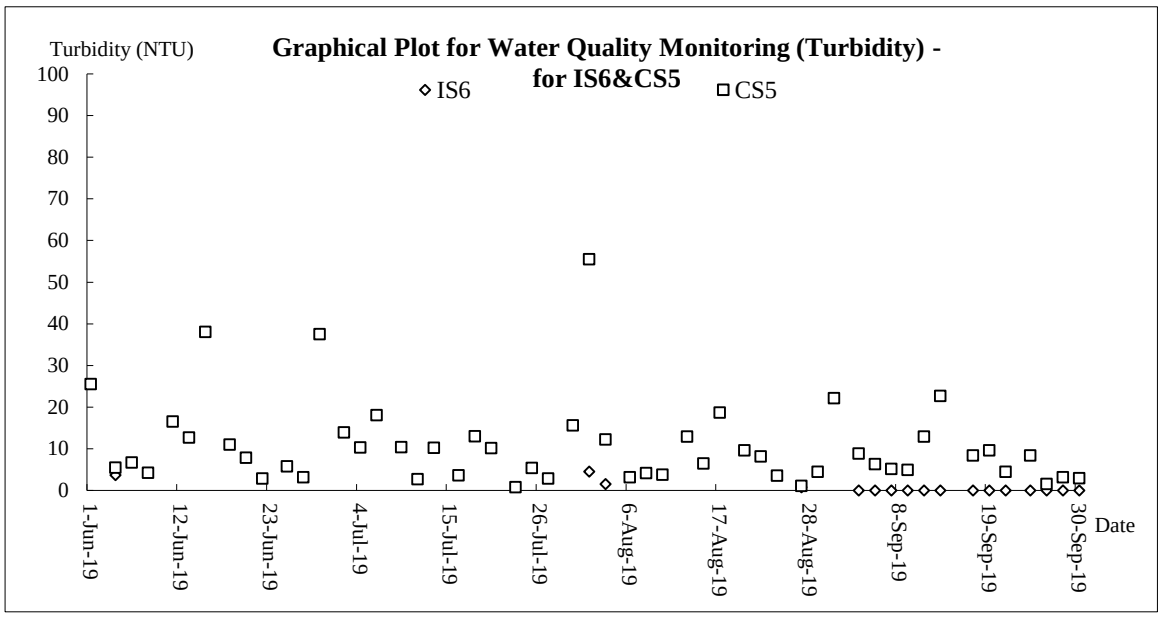

SS (mg/L)
Graphical Plot for Water Quality Monitoring (Suspended Solids) for BS1
BS1
Action Level
Limit Level
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
1-Jun-19
12-Jun-19
23-Jun-19
4-Jul-19
15-Jul-19
26-Jul-19
6-Aug-19
17-Aug-19
28-Aug-19
8-Sep-19
19-Sep-19
30-Sep-19
Date

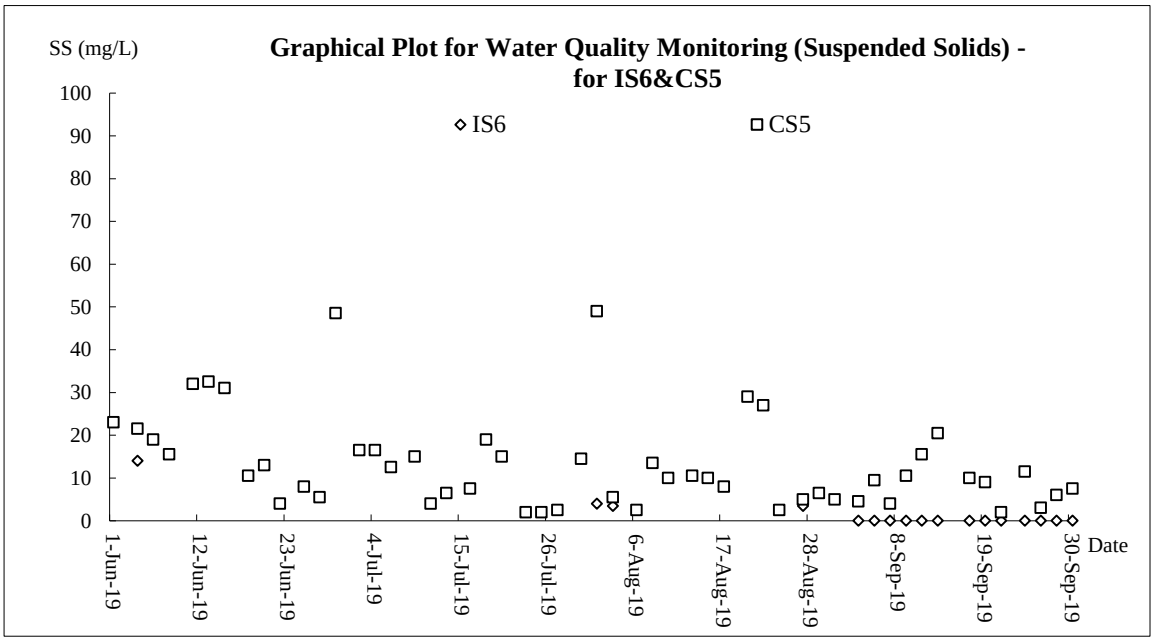

DO (mg/L)
Graphical Plot for Water Quality Monitoring (Dissolved Oxygen) for IS2
IS2
Action Level
Limit Level
12.0
10.0
8.0
6.0
4.0
2.0
0.0
1-Jun-19
12-Jun-19
23-Jun-19
4-Jul-19
15-Jul-19
26-Jul-19
6-Aug-19
17-Aug-19
28-Aug-19
8-Sep-19
19-Sep-19
30-Sep-19
Date

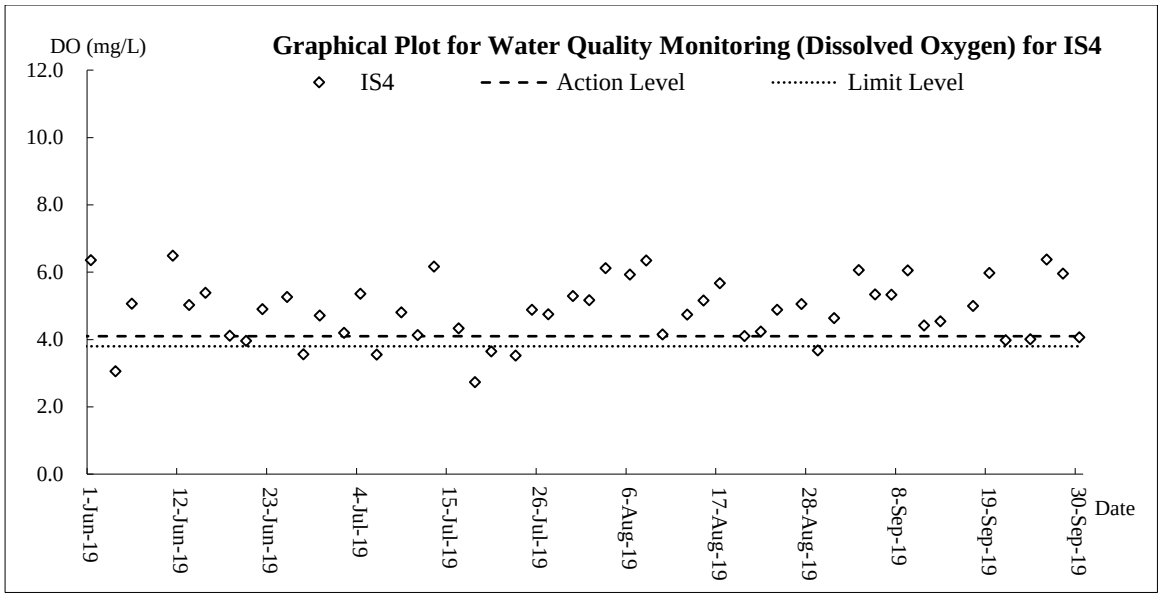

Turbidity (NTU)
Graphical Plot for Water Quality Monitoring (Turbidity) for IS2
IS2
Action Level
Limit Level
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
1-Jun-19
12-Jun-19
23-Jun-19
4-Jul-19
15-Jul-19
26-Jul-19
6-Aug-19
17-Aug-19
28-Aug-19
8-Sep-19
19-Sep-19
30-Sep-19
Date

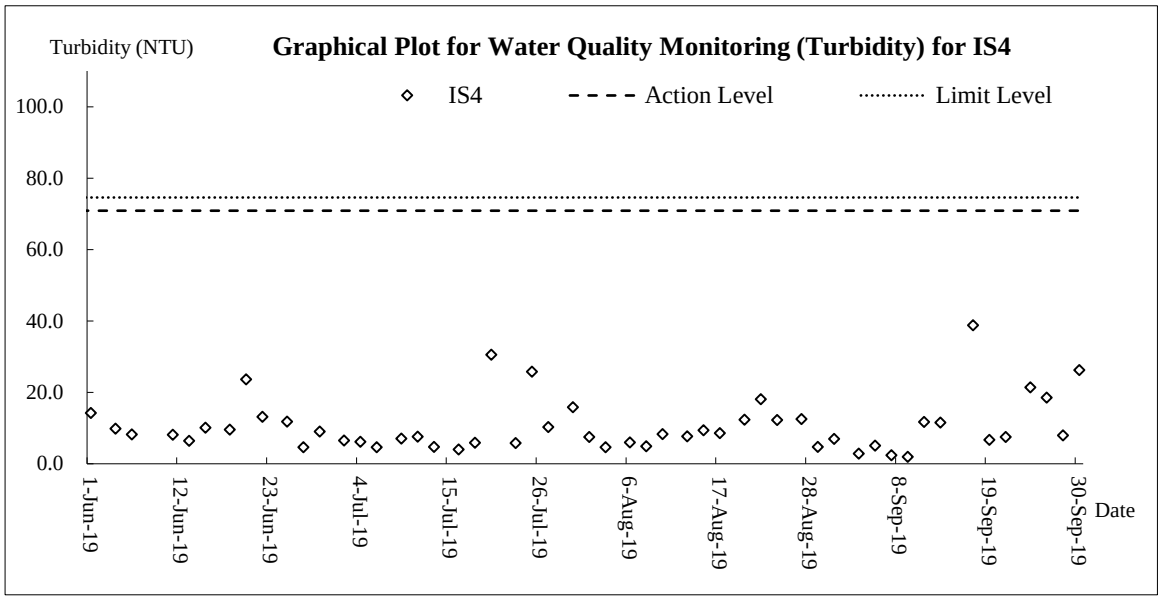

SS (mg/L)
Graphical Plot for Water Quality Monitoring (Suspended Solids) for IS2
IS2
Action Level
Limit Level
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
1-Jun-19
12-Jun-19
23-Jun-19
4-Jul-19
15-Jul-19
26-Jul-19
6-Aug-19
17-Aug-19
28-Aug-19
8-Sep-19
19-Sep-19
30-Sep-19
Date

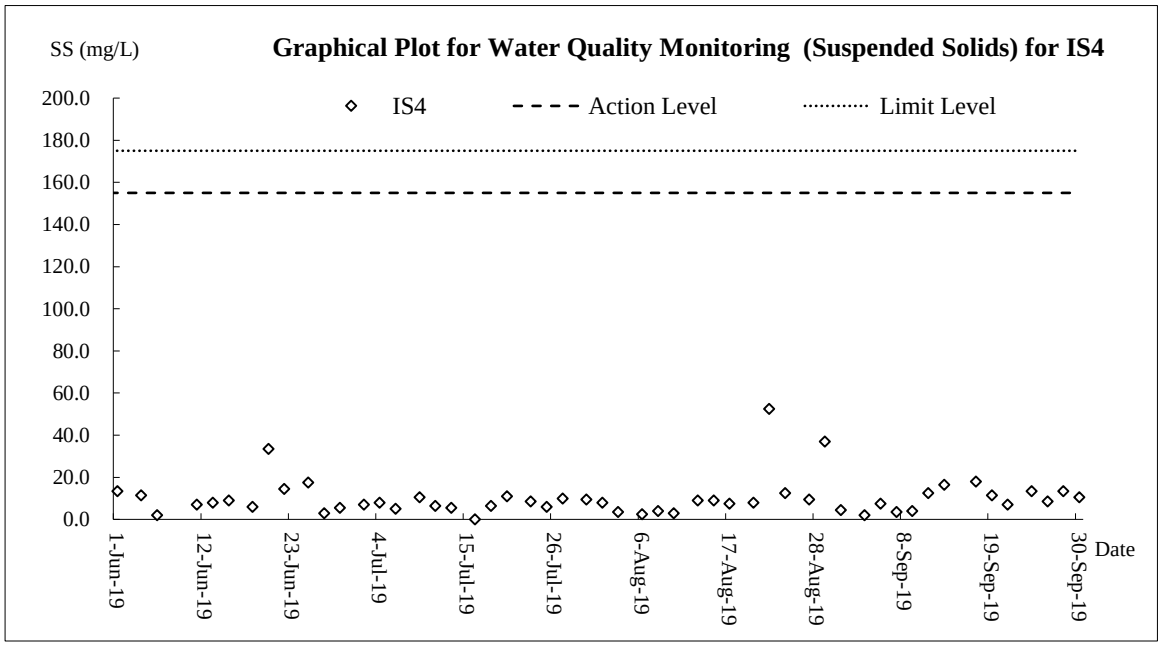

Graphical Plot for Water Quality Monitoring (Dissolved Oxygen) - for IS6&CS5
DO (mg/L)
IS6
CS5
Action Level
Limit Level
0
2
4
6
8
10
12
14
1-Jun-19
12-Jun-19
23-Jun-19
4-Jul-19
15-Jul-19
26-Jul-19
6-Aug-19
17-Aug-19
28-Aug-19
8-Sep-19
19-Sep-19
30-Sep-19
Date


Graphical Plot for Water Quality Monitoring (Turbidity) - for IS6&CS5
Turbidity (NTU)
IS6
CS5
0
10
20
30
40
50
60
70
80
90
100
1-Jun-19
12-Jun-19
23-Jun-19
4-Jul-19
15-Jul-19
26-Jul-19
6-Aug-19
17-Aug-19
28-Aug-19
8-Sep-19
19-Sep-19
30-Sep-19
Date


Graphical Plot for Water Quality Monitoring (Suspended Solids) - for IS6&CS5
SS (mg/L)
IS6
CS5
0
10
20
30
40
50
60
70
80
90
100
1-Jun-19
12-Jun-19
23-Jun-19
4-Jul-19
15-Jul-19
26-Jul-19
6-Aug-19
17-Aug-19
28-Aug-19
8-Sep-19
19-Sep-19
30-Sep-19
Date


DO (mg/L)
Graphical Plot for Water Quality Monitoring (Dissolved Oxygen) for IS4
IS4
Action Level
Limit Level
12.0
10.0
8.0
6.0
4.0
2.0
0.0
1-Jun-19
12-Jun-19
23-Jun-19
4-Jul-19
15-Jul-19
26-Jul-19
6-Aug-19
17-Aug-19
28-Aug-19
8-Sep-19
19-Sep-19
30-Sep-19
Date


Turbidity (NTU)
Graphical Plot for Water Quality Monitoring (Turbidity) for IS4
IS4
Action Level
Limit Level
100.0
80.0
60.0
40.0
20.0
0.0
1-Jun-19
12-Jun-19
23-Jun-19
4-Jul-19
15-Jul-19
26-Jul-19
6-Aug-19
17-Aug-19
28-Aug-19
8-Sep-19
19-Sep-19
30-Sep-19
Date


SS (mg/L)
Graphical Plot for Water Quality Monitoring (Suspended Solids) for IS4
IS4
Action Level
Limit Level
200.0
180.0
160.0
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
1-Jun-19
12-Jun-19
23-Jun-19
4-Jul-19
15-Jul-19
26-Jul-19
6-Aug-19
17-Aug-19
28-Aug-19
8-Sep-19
19-Sep-19
30-Sep-19
Date

Appendix J

Meteorological Data

Date		Weather	Total Rainfall (mm)	Ta Kwu Ling Station	
				Mean Air Temp. (°C)	Mean Relative Humidity (%)
1-Sep-19	Sun	Sunny periods and isolated showers in the afternoon	8.5	29	80.5
2-Sep-19	Mon	Mainly fine tonight. Moderate east to northeasterly winds.	38.4	27.6	86.5
3-Sep-19	Tue	Mainly fine tonight. Light to moderate southerly winds.	12.9	28.6	79.2
4-Sep-19	Wed	Mainly fine and very hot apart from isolated showers.	62.2	27.4	84.5
5-Sep-19	Thu	Temperatures will range between 28 and 33 degrees. Light winds.	31.8	28.3	90
6-Sep-19	Fri	Mainly fine tonight. Moderate east to northeasterly winds.	0.2	29.3	79.5
7-Sep-19	Sat	Sunny periods and isolated showers in the afternoon	0.4	30.4	81.2
8-Sep-19	Sun	Very hot with sunny periods and isolated showers in the afternoon	0.4	30.8	Maintenance
9-Sep-19	Mon	Mainly fine tonight. Light to moderate southerly winds.	0	30.2	Maintenance
10-Sep-19	Tue	Mainly fine and very hot apart from isolated showers.	0	29.7	76.5
11-Sep-19	Wed	Temperatures will range between 28 and 33 degrees. Light winds.	Trace	30.1	77.9
12-Sep-19	Thu	Moderate east to northeasterly winds.Mainly fine.	0	29.4	73.7
13-Sep-19	Fri	Mainly fine tonight. Moderate east to northeasterly winds.	Trace	30.5	75.7
14-Sep-19	Sat	Mainly fine tonight. Light to moderate southerly winds.	Trace	29.8	69.7
15-Sep-19	Sun	Mainly fine and very hot apart from isolated showers.	11	29.4	79.5
16-Sep-19	Mon	Temperatures will range between 28 and 33 degrees. Light winds.	4.3	29.6	76.7
17-Sep-19	Tue	Mainly fine tonight. Moderate east to northeasterly winds.	2.1	28.3	80
18-Sep-19	Wed	Sunny periods and isolated showers in the afternoon	18	29.2	73.5
19-Sep-19	Thu	Very hot with sunny periods and isolated showers in the afternoon	8.7	29.1	66.2
20-Sep-19	Fri	Mainly fine tonight. Light to moderate southerly winds.	0	26.6	64.7
21-Sep-19	Sat	Moderate east to northeasterly winds.Mainly fine.	0	25.2	69.2
22-Sep-19	Sun	Mainly fine tonight. Light to moderate southerly winds.	0	25.6	50
23-Sep-19	Mon	Moderate east to northeasterly winds.Mainly fine.	0	26.2	58
24-Sep-19	Tue	Moderate east to northeasterly winds.Mainly fine.	0	27.2	71
25-Sep-19	Wed	Mainly fine. Moderate east to northeasterly winds.	Trace	26.5	69.2
26-Sep-19	Thu	Hot and dry in the afternoon. Light to moderate southwesterly winds.	0	26.1	72
27-Sep-19	Fri	Moderate east to northeasterly winds.Mainly fine.	Trace	26.7	69
28-Sep-19	Sat	Mainly fine. Moderate east to northeasterly winds.	0	27.3	67.5
29-Sep-19	Sun	Moderate east to northeasterly winds.Mainly fine.	0	28.2	66
30-Sep-19	Mon	Temperatures will range between 28 and 33 degrees. Light winds.	0	28.8	67.5

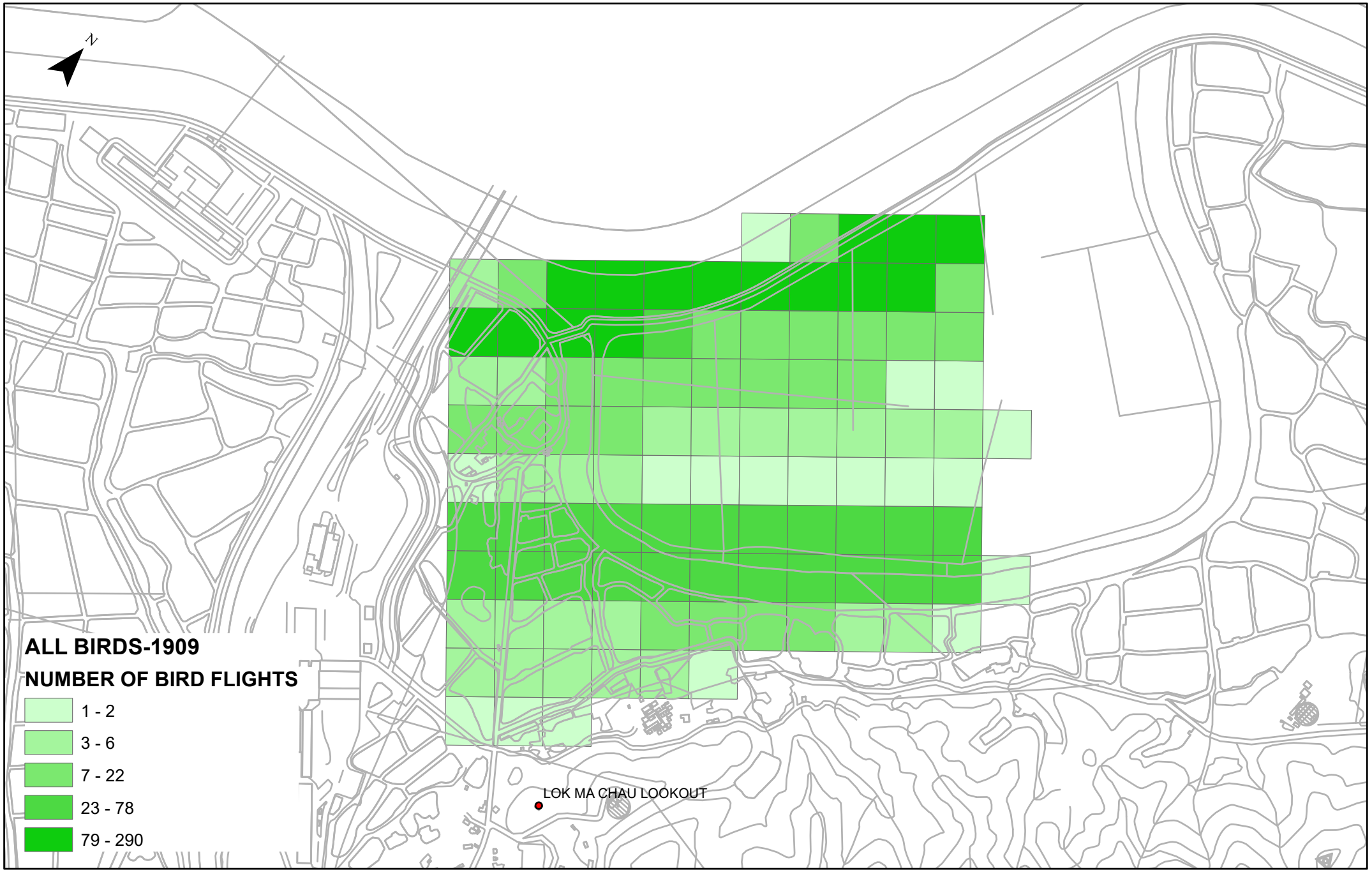
Date	Wind Speed & Direction data measuring records in the Reporting Month												
1-Sep-19	**Time**	**0:00**	**1:00**	**2:00**	**3:00**	**4:00**	**5:00**	**6:00**	**7:00**	**8:00**	**9:00**	**10:00**	**11:00**
	Speed (m/s)	0.6	0.6	0.7	0.5	0.6	0.5	0.2	0.4	0.5	0.6	0.6	0.9
	Direction (Deg.)	93	99	106	92	95	114	88	45	46	60	59	90
	Time	**12:00**	**13:00**	**14:00**	**15:00**	**16:00**	**17:00**	**18:00**	**19:00**	**20:00**	**21:00**	**22:00**	**23:00**
	Speed (m/s)	0.8	1.0	1.1	1.3	1.4	0.8	0.8	0.8	0.5	0.5	0.5	0.4
	Direction (Deg.)	77	75	79	74	82	82	81	78	87	87	94	82
2-Sep-19	**Time**	**0:00**	**1:00**	**2:00**	**3:00**	**4:00**	**5:00**	**6:00**	**7:00**	**8:00**	**9:00**	**10:00**	**11:00**
	Speed (m/s)	0.8	0.6	0.4	0.4	0.5	0.5	0.6	0.5	0.9	0.4	0.7	1.1
	Direction (Deg.)	76	84	85	87	52	77	69	59	88	78	75	76
	Time	**12:00**	**13:00**	**14:00**	**15:00**	**16:00**	**17:00**	**18:00**	**19:00**	**20:00**	**21:00**	**22:00**	**23:00**
	Speed (m/s)	1.4	0.9	0.9	0.9	0.8	0.5	0.4	0.4	0.3	0.3	0.2	0.2
	Direction (Deg.)	85	110	67	80	84	82	88	94	114	118	98	91
3-Sep-19	**Time**	**0:00**	**1:00**	**2:00**	**3:00**	**4:00**	**5:00**	**6:00**	**7:00**	**8:00**	**9:00**	**10:00**	**11:00**
	Speed (m/s)	0.2	0.3	0.4	0.3	0.3	0.3	0.5	0.5	0.6	0.7	0.7	0.8
	Direction (Deg.)	77	89	67	108	80	85	92	67	74	72	62	83
	Time	**12:00**	**13:00**	**14:00**	**15:00**	**16:00**	**17:00**	**18:00**	**19:00**	**20:00**	**21:00**	**22:00**	**23:00**
	Speed (m/s)	0.8	1.1	0.9	0.9	0.8	0.8	1.0	0.8	0.6	0.7	0.9	0.6
	Direction (Deg.)	74	73	78	68	79	91	82	81	81	71	102	116
4-Sep-19	**Time**	**0:00**	**1:00**	**2:00**	**3:00**	**4:00**	**5:00**	**6:00**	**7:00**	**8:00**	**9:00**	**10:00**	**11:00**
	Speed (m/s)	0.6	0.9	0.9	0.6	0.5	0.3	0.4	0.4	0.6	0.6	0.7	1.1
	Direction (Deg.)	73	87	87	96	96	88	76	72	44	89	74	98
	Time	**12:00**	**13:00**	**14:00**	**15:00**	**16:00**	**17:00**	**18:00**	**19:00**	**20:00**	**21:00**	**22:00**	**23:00**
	Speed (m/s)	0.9	1.0	1.4	1.2	0.9	0.5	0.5	0.6	0.5	0.7	0.4	0.7
	Direction (Deg.)	85	76	72	80	84	76	78	88	70	82	81	86
5-Sep-19	**Time**	**0:00**	**1:00**	**2:00**	**3:00**	**4:00**	**5:00**	**6:00**	**7:00**	**8:00**	**9:00**	**10:00**	**11:00**
	Speed (m/s)	0.7	0.4	0.3	0.3	0.5	0.7	1.0	0.7	0.7	0.4	0.5	0.4
	Direction (Deg.)	77	73	100	87	103	105	104	92	78	91	91	93
	Time	**12:00**	**13:00**	**14:00**	**15:00**	**16:00**	**17:00**	**18:00**	**19:00**	**20:00**	**21:00**	**22:00**	**23:00**
	Speed (m/s)	0.6	1.1	0.7	0.6	1	0.8	1.1	0.3	0.2	0.3	0.5	0.5
	Direction (Deg.)	87	88	84	89	90	93	91	168	155	122	169	122
6-Sep-19	**Time**	**0:00**	**1:00**	**2:00**	**3:00**	**4:00**	**5:00**	**6:00**	**7:00**	**8:00**	**9:00**	**10:00**	**11:00**
	Speed (m/s)	0.3	0.3	0.3	0.4	0.7	1.1	0.4	0.3	0.9	0.7	0.9	1.1
	Direction (Deg.)	156	176	174	113	136	126	129	117	240	224	219	226
	Time	**12:00**	**13:00**	**14:00**	**15:00**	**16:00**	**17:00**	**18:00**	**19:00**	**20:00**	**21:00**	**22:00**	**23:00**
	Speed (m/s)	0.7	0.8	0.8	0.5	0.5	0.4	0.4	0.5	0.5	0.7	1	1
	Direction (Deg.)	95	126	124	183	206	130	124	103	107	113	105	112
7-Sep-19	**Time**	**0:00**	**1:00**	**2:00**	**3:00**	**4:00**	**5:00**	**6:00**	**7:00**	**8:00**	**9:00**	**10:00**	**11:00**
	Speed (m/s)	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.6	0.8	0.6	0.5	0.6
	Direction (Deg.)	162	152	146	0	187	151	177	225	233	229	245	236
	Time	**12:00**	**13:00**	**14:00**	**15:00**	**16:00**	**17:00**	**18:00**	**19:00**	**20:00**	**21:00**	**22:00**	**23:00**
	Speed (m/s)	1.3	1.1	1.4	0.5	0.5	0.6	1.1	0.4	0.5	0.6	0.5	1
	Direction (Deg.)	239	244	243	207	193	223	239	197	129	99	128	133
8-Sep-19	**Time**	**0:00**	**1:00**	**2:00**	**3:00**	**4:00**	**5:00**	**6:00**	**7:00**	**8:00**	**9:00**	**10:00**	**11:00**
	Speed (m/s)	0.3	0.3	0.3	0.4	0.7	1.1	0.4	0.3	0.9	0.7	0.9	1.3
	Direction (Deg.)	156	176	174	113	136	126	129	117	240	224	219	313
	Time	**12:00**	**13:00**	**14:00**	**15:00**	**16:00**	**17:00**	**18:00**	**19:00**	**20:00**	**21:00**	**22:00**	**23:00**
	Speed (m/s)	1	0.8	1.1	0.9	0.3	0.7	0.7	0.4	0.5	0.6	0.3	0.3
	Direction (Deg.)	265	217	214	180	161	130	135	136	134	135	137	155
9-Sep-19	**Time**	**0:00**	**1:00**	**2:00**	**3:00**	**4:00**	**5:00**	**6:00**	**7:00**	**8:00**	**9:00**	**10:00**	**11:00**
	Speed (m/s)	0.7	1.1	1.3	0.4	0.8	0.9	0.4	0.9	0.8	1	1.1	1.4
	Direction (Deg.)	133	136	135	138	133	132	137	134	140	324	322	271
	Time	**12:00**	**13:00**	**14:00**	**15:00**	**16:00**	**17:00**	**18:00**	**19:00**	**20:00**	**21:00**	**22:00**	**23:00**
	Speed (m/s)	0.7	0.8	0.8	0.5	0.5	0.4	1	1.1	0.5	0.4	0.6	0.7
	Direction (Deg.)	95	126	124	183	206	130	90	88	89	94	86	167
10-Sep-19	**Time**	**0:00**	**1:00**	**2:00**	**3:00**	**4:00**	**5:00**	**6:00**	**7:00**	**8:00**	**9:00**	**10:00**	**11:00**
	Speed (m/s)	0.4	0.7	0.8	0.5	0.9	0.7	0.3	0.3	0.5	0.3	0.4	0.3
	Direction (Deg.)	11	90	138	135	127	3	181	224	203	231	180	81
	Time	**12:00**	**13:00**	**14:00**	**15:00**	**16:00**	**17:00**	**18:00**	**19:00**	**20:00**	**21:00**	**22:00**	**23:00**
	Speed (m/s)	0.2	0.1	0.3	0.8	0.3	0.3	1.1	1	0.7	0.8	1	0.3
	Direction (Deg.)	76	77	76	84	86	89	92	46	83	89	133	271
11-Sep-19	**Time**	**0:00**	**1:00**	**2:00**	**3:00**	**4:00**	**5:00**	**6:00**	**7:00**	**8:00**	**9:00**	**10:00**	**11:00**
	Speed (m/s)	0.4	0.3	0	0.3	0.3	1.4	0.3	0.8	0.9	0.7	1.1	1.1
	Direction (Deg.)	181	3	4	223	13	224	327	103	113	93	84	112
	Time	**12:00**	**13:00**	**14:00**	**15:00**	**16:00**	**17:00**	**18:00**	**19:00**	**20:00**	**21:00**	**22:00**	**23:00**
	Speed (m/s)	0.4	0.7	1.1	0.5	0.8	1.1	0.3	0.5	0.8	0.4	0.7	0.7
	Direction (Deg.)	89	133	104	110	97	88	177	91	133	179	134	137

Date	Wind Speed & Direction data measuring records in the Reporting Month												
12-Sep-19	**Time**	**0:00**	**1:00**	**2:00**	**3:00**	**4:00**	**5:00**	**6:00**	**7:00**	**8:00**	**9:00**	**10:00**	**11:00**
	Speed (m/s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.2	0.4	0.1
	Direction (Deg.)	11	181	145	11	221	4	137	180	39	90	131	98
	Time	**12:00**	**13:00**	**14:00**	**15:00**	**16:00**	**17:00**	**18:00**	**19:00**	**20:00**	**21:00**	**22:00**	**23:00**
	Speed (m/s)	0.8	0.7	0.6	1.1	0.4	0.7	0.9	0.7	0.6	0.6	0.8	1.1
	Direction (Deg.)	137	51	91	104	193	91	99	132	117	120	93	111
13-Sep-19	**Time**	**0:00**	**1:00**	**2:00**	**3:00**	**4:00**	**5:00**	**6:00**	**7:00**	**8:00**	**9:00**	**10:00**	**11:00**
	Speed (m/s)	0.8	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.8	1.1	0.7
	Direction (Deg.)	134	129	175	223	3	4	3	160	5	36	104	113
	Time	**12:00**	**13:00**	**14:00**	**15:00**	**16:00**	**17:00**	**18:00**	**19:00**	**20:00**	**21:00**	**22:00**	**23:00**
	Speed (m/s)	0.9	0.5	0.9	1.1	0.6	0.8	1.1	0.3	0.8	0.5	0.7	0.6
	Direction (Deg.)	104	102	98	104	134	112	116	91	102	185	176	131
14-Sep-19	**Time**	**0:00**	**1:00**	**2:00**	**3:00**	**4:00**	**5:00**	**6:00**	**7:00**	**8:00**	**9:00**	**10:00**	**11:00**
	Speed (m/s)	0.6	0.8	0.5	0.4	0.2	0.3	0.3	0.9	0.8	0.5	0.7	1.2
	Direction (Deg.)	2	4	228	268	252	269	312	351	325	198	202	161
	Time	**12:00**	**13:00**	**14:00**	**15:00**	**16:00**	**17:00**	**18:00**	**19:00**	**20:00**	**21:00**	**22:00**	**23:00**
	Speed (m/s)	1.1	1.4	0.9	0.6	0.8	0.4	0.4	0.9	0.8	1.0	0.5	0.2
	Direction (Deg.)	322	324	288	276	252	284	312	189	215	184	176	152
15-Sep-19	**Time**	**0:00**	**1:00**	**2:00**	**3:00**	**4:00**	**5:00**	**6:00**	**7:00**	**8:00**	**9:00**	**10:00**	**11:00**
	Speed (m/s)	0.2	0.4	0.9	1.0	0.7	0.8	0.6	0.7	0.4	0.2	0.8	0.3
	Direction (Deg.)	132	96	102	85	42	46	91	132	81	112	76	54
	Time	**12:00**	**13:00**	**14:00**	**15:00**	**16:00**	**17:00**	**18:00**	**19:00**	**20:00**	**21:00**	**22:00**	**23:00**
	Speed (m/s)	0.6	1.4	1.1	0.9	0.7	0.5	1.1	1.4	0.8	0.8	0.6	0.9
	Direction (Deg.)	32	12	46	85	69	6	19	54	22	324	312	6
16-Sep-19	**Time**	**0:00**	**1:00**	**2:00**	**3:00**	**4:00**	**5:00**	**6:00**	**7:00**	**8:00**	**9:00**	**10:00**	**11:00**
	Speed (m/s)	0.6	0.6	0.8	0.3	0.8	0.1	0.1	0.1	0.1	0.4	0.3	1.5
	Direction (Deg.)	132	151	176	285	197	183	137	159	323	35	2	60
	Time	**12:00**	**13:00**	**14:00**	**15:00**	**16:00**	**17:00**	**18:00**	**19:00**	**20:00**	**21:00**	**22:00**	**23:00**
	Speed (m/s)	1.2	1.2	0.9	0.9	0.9	0.6	1.7	0.3	0.7	0.8	0.3	1.0
	Direction (Deg.)	89	78	66	94	177	169	265	273	85	100	137	124
17-Sep-19	**Time**	**0:00**	**1:00**	**2:00**	**3:00**	**4:00**	**5:00**	**6:00**	**7:00**	**8:00**	**9:00**	**10:00**	**11:00**
	Speed (m/s)	0.8	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.4	1.6	1.8
	Direction (Deg.)	135	266	135	220	183	0	150	358	60	102	79	20
	Time	**12:00**	**13:00**	**14:00**	**15:00**	**16:00**	**17:00**	**18:00**	**19:00**	**20:00**	**21:00**	**22:00**	**23:00**
	Speed (m/s)	0.4	1.7	1.7	2.6	2.7	0.9	0.1	1.1	1.2	1.2	0.1	0.6
	Direction (Deg.)	77	203	135	94	90	41	108	110	130	152	0	189
18-Sep-19	**Time**	**0:00**	**1:00**	**2:00**	**3:00**	**4:00**	**5:00**	**6:00**	**7:00**	**8:00**	**9:00**	**10:00**	**11:00**
	Speed (m/s)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1.7	2.2
	Direction (Deg.)	0	0	180	117	178	120	221	149	177	225	354	14
	Time	**12:00**	**13:00**	**14:00**	**15:00**	**16:00**	**17:00**	**18:00**	**19:00**	**20:00**	**21:00**	**22:00**	**23:00**
	Speed (m/s)	0.6	1.2	1.7	1.3	1.4	2.0	1.9	1.7	0.8	1.7	2.5	1.0
	Direction (Deg.)	0	53	38	36	12	88	121	128	100	109	127	126
19-Sep-19	**Time**	**0:00**	**1:00**	**2:00**	**3:00**	**4:00**	**5:00**	**6:00**	**7:00**	**8:00**	**9:00**	**10:00**	**11:00**
	Speed (m/s)	0.9	1.5	1.0	1.1	0.4	0.8	0.5	0.1	1.5	1.7	2.4	2.0
	Direction (Deg.)	111	98	50	172	140	165	28	40	11	16	16	0
	Time	**12:00**	**13:00**	**14:00**	**15:00**	**16:00**	**17:00**	**18:00**	**19:00**	**20:00**	**21:00**	**22:00**	**23:00**
	Speed (m/s)	2.1	1.8	1.5	2.6	1.5	1.3	0.8	1.0	0.8	0.9	0.1	0.1
	Direction (Deg.)	46	39	22	21	45	83	18	169	130	134	151	144
20-Sep-19	**Time**	**0:00**	**1:00**	**2:00**	**3:00**	**4:00**	**5:00**	**6:00**	**7:00**	**8:00**	**9:00**	**10:00**	**11:00**
	Speed (m/s)	0.7	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.8	2.5	1.7	2.2
	Direction (Deg.)	148	113	180	268	244	210	364	220	78	45	0	45
	Time	**12:00**	**13:00**	**14:00**	**15:00**	**16:00**	**17:00**	**18:00**	**19:00**	**20:00**	**21:00**	**22:00**	**23:00**
	Speed (m/s)	1.6	1.0	0.9	0.3	1.1	1.3	0.9	0.8	1.2	0.4	0.6	0.9
	Direction (Deg.)	0	0	0	23	8	11	45	85	76	124	234	69
21-Sep-19	**Time**	**0:00**	**1:00**	**2:00**	**3:00**	**4:00**	**5:00**	**6:00**	**7:00**	**8:00**	**9:00**	**10:00**	**11:00**
	Speed (m/s)	1.4	1.6	0.9	0.5	1.4	0.8	0.9	0.4	1.3	1.5	2.1	1.4
	Direction (Deg.)	84	125	96	181	186	212	224	215	105	96	42	162
	Time	**12:00**	**13:00**	**14:00**	**15:00**	**16:00**	**17:00**	**18:00**	**19:00**	**20:00**	**21:00**	**22:00**	**23:00**
	Speed (m/s)	0.5	0.8	0.3	0.9	1.1	0.5	0.9	0.8	1.9	1.5	0.9	1.1
	Direction (Deg.)	236	220	190	192	252	312	224	335	22	26	12	345
22-Sep-19	**Time**	**0:00**	**1:00**	**2:00**	**3:00**	**4:00**	**5:00**	**6:00**	**7:00**	**8:00**	**9:00**	**10:00**	**11:00**
	Speed (m/s)	0.4	0.8	0.5	0.6	1.1	1.5	0.9	0.8	0.4	0.9	1.5	2.0
	Direction (Deg.)	112	161	155	142	36	12	45	96	84	55	42	35
	Time	**12:00**	**13:00**	**14:00**	**15:00**	**16:00**	**17:00**	**18:00**	**19:00**	**20:00**	**21:00**	**22:00**	**23:00**
	Speed (m/s)	2.3	1.6	1.8	2.2	2.0	1.9	1.7	0.6	1.0	1.4	1.5	1.7
	Direction (Deg.)	13	16	2	11	0	26	28	45	51	58	23	0
23-Sep-19	**Time**	**0:00**	**1:00**	**2:00**	**3:00**	**4:00**	**5:00**	**6:00**	**7:00**	**8:00**	**9:00**	**10:00**	**11:00**

Date	Wind Speed & Direction data measuring records in the Reporting Month												
	Speed (m/s)	1.8	0.1	0.3	0.8	0.8	1.0	1.2	0.1	1.6	1.1	1.4	0.9
	Direction (Deg.)	10	317	225	219	25	0	20	0	19	0	13	20
	Time	**12:00**	**13:00**	**14:00**	**15:00**	**16:00**	**17:00**	**18:00**	**19:00**	**20:00**	**21:00**	**22:00**	**23:00**
	Speed (m/s)	1.3	1.2	0.7	0.6	0.7	0.5	1.2	0.6	1.3	1.6	1.5	0.8
	Direction (Deg.)	105	95	50	46	96	85	35	46	53	56	25	63
24-Sep-19	**Time**	**0:00**	**1:00**	**2:00**	**3:00**	**4:00**	**5:00**	**6:00**	**7:00**	**8:00**	**9:00**	**10:00**	**11:00**
	Speed (m/s)	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.3	0.8	0.7	0.9
	Direction (Deg.)	35	95	78	65	68	80	46	45	46	13	89	72
	Time	**12:00**	**13:00**	**14:00**	**15:00**	**16:00**	**17:00**	**18:00**	**19:00**	**20:00**	**21:00**	**22:00**	**23:00**
	Speed (m/s)	1.2	1.3	1.4	1.6	1.5	1.4	0.8	1.0	0.8	0.2	0.1	0.4
	Direction (Deg.)	66	70	89	85	78	93	95	98	105	115	103	100
25-Sep-19	**Time**	**0:00**	**1:00**	**2:00**	**3:00**	**4:00**	**5:00**	**6:00**	**7:00**	**8:00**	**9:00**	**10:00**	**11:00**
	Speed (m/s)	0.2	0.1	0.1	0.2	0.1	0.2	0.2	0.1	0.1	0.4	0.9	1.4
	Direction (Deg.)	23	25	24	27	28	25	28	31	35	38	43	32
	Time	**12:00**	**13:00**	**14:00**	**15:00**	**16:00**	**17:00**	**18:00**	**19:00**	**20:00**	**21:00**	**22:00**	**23:00**
	Speed (m/s)	1.8	1.2	1.4	1.6	1.8	1.7	1.0	0.8	0.4	0.3	0.1	0.2
	Direction (Deg.)	16	18.0	39	40	44	46	127	126	130	125	130	126
26-Sep-19	**Time**	**0:00**	**1:00**	**2:00**	**3:00**	**4:00**	**5:00**	**6:00**	**7:00**	**8:00**	**9:00**	**10:00**	**11:00**
	Speed (m/s)	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.9	0.7	0.5
	Direction (Deg.)	46	48	43	38	42	39	37	43	64	86	68	65
	Time	**12:00**	**13:00**	**14:00**	**15:00**	**16:00**	**17:00**	**18:00**	**19:00**	**20:00**	**21:00**	**22:00**	**23:00**
	Speed (m/s)	0.8	0.5	0.9	1.6	1.5	1.4	1.4	0.9	0.8	1.2	0.8	0.4
	Direction (Deg.)	64	58	68	79	76	98	92	90	93	89	90	88
27-Sep-19	**Time**	**0:00**	**1:00**	**2:00**	**3:00**	**4:00**	**5:00**	**6:00**	**7:00**	**8:00**	**9:00**	**10:00**	**11:00**
	Speed (m/s)	0.1	0.1	0.1	0.3	0.2	0.1	0.2	0.1	0.1	0.6	1.2	1.4
	Direction (Deg.)	47	49	45	136	98	43	68	79	227	98	46	49
	Time	**12:00**	**13:00**	**14:00**	**15:00**	**16:00**	**17:00**	**18:00**	**19:00**	**20:00**	**21:00**	**22:00**	**23:00**
	Speed (m/s)	1.8	1.6	1.7	1.4	1.6	1.5	0.8	1.1	1.2	1.4	1.3	0.8
	Direction (Deg.)	50	52	60	38	85	86	135	93	912	98	100	125
28-Sep-19	**Time**	**0:00**	**1:00**	**2:00**	**3:00**	**4:00**	**5:00**	**6:00**	**7:00**	**8:00**	**9:00**	**10:00**	**11:00**
	Speed (m/s)	1.5	2.1	1.6	1.2	0.6	0.4	0.8	0.7	1.2	1.8	2.1	1.9
	Direction (Deg.)	137	125	136	103	112	98	88	92	116	272	253	198
	Time	**12:00**	**13:00**	**14:00**	**15:00**	**16:00**	**17:00**	**18:00**	**19:00**	**20:00**	**21:00**	**22:00**	**23:00**
	Speed (m/s)	0.5	1.6	1.3	1.1	0.8	1.4	1.9	0.4	0.8	1.6	2.2	1.1
	Direction (Deg.)	162	88	76	136	45	32	16	25	55	56	82	76
29-Sep-19	**Time**	**0:00**	**1:00**	**2:00**	**3:00**	**4:00**	**5:00**	**6:00**	**7:00**	**8:00**	**9:00**	**10:00**	**11:00**
	Speed (m/s)	0.5	0.3	0.9	1.1	0.5	0.8	1.6	1.8	2.1	0.6	1.5	1.1
	Direction (Deg.)	54	82	96	133	235	182	167	225	198	214	272	256
	Time	**12:00**	**13:00**	**14:00**	**15:00**	**16:00**	**17:00**	**18:00**	**19:00**	**20:00**	**21:00**	**22:00**	**23:00**
	Speed (m/s)	0.9	1.7	1.8	2.2	1.5	1.2	2.1	1.1	1.3	0.2	0.3	0.2
	Direction (Deg.)	334	312	98	23	46	92	102	140	175	232	0	192
30-Sep-19	**Time**	**0:00**	**1:00**	**2:00**	**3:00**	**4:00**	**5:00**	**6:00**	**7:00**	**8:00**	**9:00**	**10:00**	**11:00**
	Speed (m/s)	0.2	0.2	0.3	0.2	0.4	0.6	0.3	0.2	0.2	0.1	1.8	2.1
	Direction (Deg.)	176	162	178	221	232	228	241	250	46	272	351	342
	Time	**12:00**	**13:00**	**14:00**	**15:00**	**16:00**	**17:00**	**18:00**	**19:00**	**20:00**	**21:00**	**22:00**	**23:00**
	Speed (m/s)	1.6	1.8	2.3	2.6	2.9	2.3	1.2	1.6	0.9	0.6	1.6	1.8
	Direction (Deg.)	336	349	352	346	324	335	312	297	225	146	212	92

Appendix K

Distribution of Flight Line Usage


N
ALL BIRDS-1909
NUMBER OF BIRD FLIGHTS
1 - 2
3 - 6
7 - 22
23 - 78
79 - 290
LOK MA CHAU LOOKOUT

Appendix L

Photos records for Mammal Monitoring

(Not Used)

Appendix M

Waste Flow Table

生興 － 豐利聯營
Sang Hing – Kuly Joint Venture

Monthly Summary Waste Flow Table for 2019

Contract No.: YL/2017/03

Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of C&D Wastes Generated Monthly				
	Total Quantity Generated	Hard Rock and Large Borken Concrete	Reused in the Contract	Reused in other Projects	Disposal as Public Fill	Imported Fill	Metals	Paper / Cardboard Packaging	Plastics (See note 3)	Chemical Waste	Other, e.g. general refuse
	[in '000m^3]	[in '000m^3]	[in '000m^3]	[in '000m^3]	[in '000m^3]	[in '000m^3]	[in '000kg]	[in '000kg]	[in '000kg]	[in '000kg]	[in '000m^3]
Jan	0.0	0.0	15.0	0.0	0.0	0.0	0.0	0 (*)	0 (*)	0.0	0 (*)
Feb	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0 (*)	0 (*)	0.0	0 (*)
Mar	0.0	0.0	33.0	0.0	0.0	0.0	0.0	0 (*)	0 (*)	0.0	0.05
Apr	0.0	0.0	8.0	0.0	0.0	0.0	0.0	0 (*)	0 (*)	0.07	0.38
May	0.0	0.0	18.0	0.0	0.0	0.0	0.0	0 (*)	0 (*)	0.0	0.05
Jun	0.0	0.0	21.0	0.0	0.0	0.0	0.0	0 (*)	0 (*)	0.0	0.07
Jul	0.0	0.0	28.0	0.0	0.0	0.0	0.0	0 (*)	0 (*)	0.00	0.09
Aug	0.0	0.0	24.0	0.0	0.0	0.0	0.0	0 (*)	0 (*)	0.06	0.01
Sep	0.0	0.0	0.0	0.0	0.0	27.0	0.0	0 (*)	0 (*)	0.0	0.02
SUB-TOTAL	0.0	0.0	149.0	0.0	0.0	27.0	0.0	0 (*)	0 (*)	0.13	0.67
TOTAL	0.0	0.0	149.0	0.0	0.0	27.0	0.0	0 (*)	0 (*)	0.13	0.67

Note: **Conversion to 1000m^3 for general refuse is number of truck dumped multiply by 13.5 m3 (volumn of rubbish skip on site)**
Conversion to 1000m^3 for Inert C&D is weight in 1000kg multiply by 0.0005
Plastics refer to plastic bottles / containers, plastic sheets / foam from packaging material
(*) Represents the waste generated is negligible

Appendix N

Implementation Schedule for Environmental Mitigation Measures (ISEMM)

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
Construction Dust Impact							
S3.8	D1-DP1/DP2	Mitigation measures in form of regular watering under a good site practice should be adopted. Watering once per hour on exposed worksites and haul road is proposed to achieve dust removal efficiency of 92.1%. While the above watering frequencies are to be followed, the extent of watering may vary depending on actual site conditions but should be sufficient to maintain an equivalent intensity of no less than 1.6 L/m2 to achieve the respective dust removal efficiencies	Minimize dust impact at the nearby sensitive receivers	Contractor	All construction sites	Construction stage	*
S3.8	D2-DP1/DP2	The contractor shall follow the procedures and requirements given in the Air Pollution Control (Construction Dust) Regulation • All vehicles shall be shut down in intermittent use • Only well-maintained plant should be operated on-site to avoid emission of dark smoke • Valid No-Road Mobile Machinery (NRMM) labels should be provided to regulated machines	Reduce air pollution emission from construction vehicles and plants	Contractor	All construction sites	Construction stage	* * *
S3.8	D2-DP1/DP2	• Following dust suppression measures should also be incorporated by the Contractor to control the dust nuisance throughout the construction Phase • Any excavated or stockpile of dusty material should be covered entirely by impervious sheeting or sprayed with water to maintain the entire surface wet and then removed or backfilled or reinstated where practicable within 24 hours of the excavation or unloading; • Any dusty materials remaining after a stockpile is removed should be wetted with water and cleared from the surface of roads; • A stockpile of dusty material should not be extend beyond the pedestrian barriers, fencing or traffic cones; • The load of dusty materials on a vehicle leaving a construction site should be covered entirely by impervious sheeting to ensure that the dusty material do not leak from the vehicle;	Minimize dust impact at the nearby sensitive receivers	Contractor	All construction sites	Construction stage	* * * * *

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		• Where practicable, vehicle washing facilities with high pressure water jet should be provided at every discernible or designated vehicle exit point. The area where vehicle washing takes place and the road section between the washing facilities and the exit point should be paved with concrete, bituminous materials or hardcores; • When there are open excavation and reinstatement works, hoarding of not less than 2.4m high should be provided as far as practicable along the site boundary with provision for public crossing. Good site practice shall also be adopted by the Contractor to ensure the conditions of the hoardings are properly maintained throughout the construction period. • The portion of any road leading only to construction site that is within 30m of a vehicle entrance or exit should be kept clear of dusty materials; Surfaces where any pneumatic or power-driven drilling, cutting, polishing or other mechanical breaking operation takes place should be sprayed with water or a dust suppression chemical continuously; • Any area that involves demolition activities should be sprayed with water or a dust suppression chemical immediately prior to, during and immediately after the activities so as to maintain the entire surface wet; • Where a scaffolding is erected around the perimeter of a building under construction, effective dust screens, sheeting or netting should be provided to enclose the scaffolding from the ground floor level of the building, or a canopy should be provided from the first floor level up to the highest level of the scaffolding; Any skip hoist for material transport should be totally enclosed by impervious sheeting; • Every stock of more than 20 bags of cement or dry pulverised fuel ash (PFA) should be covered entirely by impervious sheeting or placed in an area sheltered on the top and the 3 sides;					* * ^ * * *

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		• Cement or dry PFA delivered in bulk should be stored in a closed silo fitted with an audible high level alarm which is interlocked with the material filling line and no overfilling is allowed; • Loading, unloading, transfer, handling or storage of bulk cement or dry PFA should be carried out in a totally enclosed system or facility, and any vent or exhaust should be fitted with an effective fabric filter or equivalent air pollution control system; and • Exposed earth should be properly treated by compaction, turfing, hydroseeding, vegetation planting or sealing with latex, vinyl, bitumen, shortcrete or other suitable surface stabiliser within six months after the last construction activity on the construction site or part of the construction site where the exposed earth lies.					* * *
S3.8	D4-DP1/DP2	Implement regular dust monitoring under EM&A programme during the construction stage.	Monitoring of dust impact	Contractor	Selected representative dust monitoring station	Construction stage	*
Construction Noise Impact							
S4.8	N-CP1-DP1/DP2	Implement the following good site management practices: • Only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction programme; • Machines and plant (such as trucks, cranes) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum; • Plant known to emit noise strongly in one direction, where possible, be orientated so that the noise is directed away from nearby NSRs; silencers or mufflers on construction equipment should be properly fitted and maintained during the construction works; • Mobile plant should be sited as far away from NSRs as possible and practicable;	Control construction airborne noise	Contractor	All construction sites	Construction stage	^ ^ ^ ^

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		• Material stockpiles, mobile container site office and other structures should be effectively utilised, where practicable, to screen noise from on-site construction activities.					^
S4.8	N-CP2-DP1/DP2	Install temporary site hoarding (approx 2.4m high) located on the site boundaries between noisy construction activities and NSRs. The conditions of the hoardings shall be properly maintained throughout the construction period.	Reduce the construction noise levels at low-level zone of NSRs through partial screening.	Contractor	All construction sites where practicable	Construction phase	^
S4.8	N-CP3-DP1/DP2	Install movable noise barriers and full enclosure, screen the noisy plants including air compressor and generator.	Screen the noisy plant items to be used at all construction sites	Contractor	All construction sites where practicable	Construction phase	^
S4.8	N-CP4-DP1/DP2	Use of “Quiet” Plant and Working Methods	Reduce the noise levels of plant items	Contractor	All construction sites where practicable	Construction phase	^
S4.8	N-CP5-DP1/DP2	Sequencing operation of construction plants where practicable.	Operate sequentially within the same work site to reduce the construction airborne noise	Contractor	All construction sites where practicable	Construction phase	^
S4.8	N-CP6-DP2	Setting the concrete lorry mixer at around 25m away from the existing NSRs along Ha Wan Tsuen Road and Lok Ma Chau Road	Reduce the noise levels from concrete lorry mixer	Contractor	Sections with NSRs along Ha Wan Tsuen Road and Lok Ma Chau Road	Construction phase	^
S4.8	N-CP8-DP2	Provide temporary noise barrier during construction phase.	Control airborne noise from construction access road traffic	Contractor	Refer to Figure 4-8 of the EIA report	Construction phase	^

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
S4.8	N-CP7-DP2/N-CP6-DP1	Implement a noise monitoring under EM&A programme.	Monitor the construction noise levels at the selected representative locations	Contractor	Selected representative noise monitoring station	Construction phase	^
Water Quality Impact (Construction Phase)							
S5.7	W1-CP-DP1/DP2	Construction Runoff and Site Drainage In accordance with the Practice Note for Professional Persons on Construction Site Drainage, Environmental Protection Department, 1994 (ProPECC PN 1/94), construction phase mitigation measures, where appropriate, should include the following: • Update and implementation of Stormwater Pollution Control Plan • At the start of site establishment, perimeter cut-off drains to direct off-site water around the site should be constructed with internal drainage works and erosion and sedimentation control facilities implemented. Channels (both temporary and permanent drainage pipes and culverts), earth bunds or sand bag barriers should be provided on site to direct stormwater to silt removal facilities. The design of the temporary on-site drainage system will be undertaken by the contractor prior to the commencement of construction. • Diversion of natural stormwater should be provided as far as possible. The design of temporary on-site drainage should prevent runoff going through site surface, construction machinery and equipments in order to avoid or minimize polluted runoff. Sedimentation tanks with sufficient capacity, constructed from pre-formed individual cells of approximately 6 to 8 m3 capacities,	Minimize water quality impact from construction site runoff and general construction activities	Contractor	All construction sites where practicable	Construction phase	^ * ^

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		are recommended as a general mitigation measure which can be used for settling surface runoff prior to disposal. The system capacity shall be flexible and able to handle multiple inputs from a variety of sources and suited to applications where the influent is pumped. • The dikes or embankments for flood protection should be implemented around the boundaries of earthwork areas. Temporary ditches should be provided to facilitate the runoff discharge into an appropriate watercourse, through a silt/sediment trap. The silt/sediment traps should be incorporated in the permanent drainage channels to enhance deposition rates. • The design of efficient silt removal facilities should be based on the guidelines in Appendix A1 of ProPECC PN 1/94. The detailed design of the sand/silt traps should be undertaken by the contractor prior to the commencement of construction. • Construction works should be programmed to minimize surface excavation works during the rainy seasons (April to September). All exposed earth areas should be completed and vegetated as soon as possible after earthworks have been completed. If excavation of soil cannot be avoided during the rainy season, or at any time of year when rainstorms are likely, exposed slope surfaces should be covered by tarpaulin or other means. • All drainage facilities and erosion and sediment control structures should be regularly inspected and maintained to ensure proper and efficient operation at all times and particularly following rainstorms. Deposited silt and grit should be removed regularly and disposed of by spreading evenly over stable, vegetated areas.					* * ^ ^

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		• Measures should be taken to minimise the ingress of site drainage into excavations. If the excavation of trenches in wet periods is necessary, it should be dug and backfilled in short sections wherever practicable. Water pumped out from trenches or foundation excavations should be discharged into storm drains via silt removal facilities. • All open stockpiles of construction materials (for example, aggregates, sand and fill material) of should be covered with tarpaulin or similar fabric during rainstorms. Measures should be taken to prevent the washing away of construction materials, soil, silt or debris into any drainage system. • Manholes (including newly constructed ones) should always be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris being washed into the drainage system and storm runoff being directed into foul sewers. • Precautions to be taken at any time of year when rainstorms are likely, actions to be taken when a rainstorm is imminent or forecasted, and actions to be taken during or after rainstorms are summarized in Appendix A2 of ProPECC PN 1/94. Particular attention should be paid to the control of silty surface runoff during storm events. • All vehicles and plant should be cleaned before leaving a construction site to ensure no earth, mud, debris and the like is deposited by them on roads. An adequately designed and sited wheel washing facilities should be provided at every construction site exit where practicable. Wash-water should have sand and silt settled out and removed at least on a weekly basis to ensure the continued efficiency of the process. The section of					^ * ^ ^ ^

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		access road leading to, and exiting from, the wheel-wash bay to the public road should be paved with sufficient backfall toward the wheelwash bay to prevent vehicle tracking of soil and silty water to public roads and drains. • Oil interceptors should be provided in the drainage system downstream of any oil/fuel pollution sources. The oil interceptors should be emptied and cleaned regularly to prevent the release of oil and grease into the storm water drainage system after accidental spillage. A bypass should be provided for the oil interceptors to prevent flushing during heavy rain. • Construction solid waste, debris and rubbish on site should be collected, handled and disposed of properly to avoid water quality impacts. • All fuel tanks and storage areas should be provided with locks and sited on sealed areas, within bunds of a capacity equal to 110% of the storage capacity of the largest tank to prevent spilled fuel oils from reaching water sensitive receivers nearby. • Regular environmental audit on the construction site should be carried out in order to prevent any malpractices. Notices should be posted at conspicuous locations to remind the workers not to discharge any sewage or wastewater into the meander, wetlands and fish ponds.					^ ^ ^ ^
S5.7	W3-CP-DP1/DP2	*Groundwater from Contaminated Area* • No mitigation measure is required for groundwater treatment in LMC Loop. • Additional investigation is required to identify if contaminated groundwater is found	Minimize groundwater quality impact from contaminated area	Contractor	Areas where contamination is found.	Construction phase	^ ^

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		• If the investigation results indicated that the groundwater to be generated from construction works would be contaminated, the contaminated groundwater should be either discharged into recharged wells, or properly treated in compliance with the requirements of Technical Memorandum on Standards for Effluents Discharged into Drainage on Sewerage Systems, Inland and Coastal Waters. • If recharged well method were used, the groundwater quality in the recharged well should not be affected by recharging operation, i.e. the pollution levels of the recharged groundwater should not be higher than that in the recharging wells. • If treatment and discharge method were used, the design of wastewater treatment facilities, such as active carbon and petrol interceptor, should be submitted to the EPD and a discharge license should be obtained under the WPCO through the Regional Offices of EPD.					^ ^ ^
S5.7	W3-CP-DP1/DP2	*Sewage from Workforce* • Portable chemical toilets and sewage holding tanks should be provided for handling the construction sewage generated by the workforce. A licensed contractor should be employed to provide appropriate and adequate portable toilets to cater 0.15m3/day/employed populations and be responsible for appropriate disposal and maintenance. • Notices should be posted at conspicuous locations to remind the workers not to discharge any sewage or wastewater into the nearby environment during the construction phase of the Project. Regular environmental audit on the construction site should be conducted in order to provide an effective control of any	Minimize water quality from sewage effluent	Contractor	All construction sites where practicable	Construction phase	^ ^

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		malpractices and achieve continual improvement of environmental performance on site.					
S5.7	W4-CP-DP1	*Riverbanks Formation* • In order to prevent sediment transport during riverbank works, deployment of silt curtain should be implemented, especially when construction works encroach or occur in close distance to water body. It is recommended to carry out all the riverbank works within a cofferdam or diaphragm wall. • Water quality of the Shenzhen River and the meander would be monitored to ensure effectiveness of the implemented mitigation measures.	Minimize water quality impact from riverbank works	Contractor	Riverbank works	Construction Phase	^ ^
S5.7	W1-CP-BR	*Bio-remediation in Shenzhen River* • Water quality monitoring and audit is recommended to ensure that the proposed bio-remediation operation would not result in adverse water quality impact. Details of the water quality monitoring programme are presented in the EM&A Manual. If unacceptable water quality impact in the receiving water is recorded, additional measures such as slowing down, or rescheduling of works should be implemented as necessary.	Minimize water quality impact from bio-remediation of Shenzhen River	Contractor	Shenzhen River where practicable	Construction phase	^
S5.7	W5-CP-DP2	*Construction of Bridge Crossing* • Good site management as stipulated in ProPECC PN1/94 should be fully implemented to avoid polluted liquid or solid wastes from falling into the WSRs. • All the fishponds will be drained and no fishpond will be affected by bridge crossing.	Minimize water quality impact from construction of bridge crossing	Contractor	Construction sites for bridge crossing where practicable	Construction phase	^ ^

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		• In the meander, cofferdam or diaphragm walls should be deployed for protecting fish ponds or nearby rivers during bridge pier construction and or road widening work at fishponds. • For the low level viaducts crossing the small streams at Ma Tso Lung, Ping Hang and channel near Lung Hau Road, precast structures will be used such that there will be no construction work in the water streams, and thus, to avoid direct water quality impacts.					^ ^
Waste Management (Construction Waste)							
S7.6	WM1-DP1/DP2	*Waste Reduction Measures* Waste reduction is best achieved at the planning and design phase, as well as by ensuring the implementation of good site practices. The following recommendations are proposed to achieve reduction: • Segregate and store different types of waste in different containers, skip or stockpiles to enhance reuse or recycling of materials and their proper disposal; • proper storage and site practices to minimize the potential for damage and contamination of construction materials; • plan and stock construction materials carefully to minimize amount of waste generated and avoid unnecessary generation of waste; • sort out demolition debris and excavated materials from demolition works to recover reusable/recyclable portions (i.e. soil, broken concrete, metal etc.); • provide training to workers on the importance of appropriate	Reduce waste generation	Contractor	All construction sites where practicable	Construction phase	^ ^ ^ ^ N/A

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		waste management procedures, including waste reduction, reuse and recycling.					
S7.6	WM2-DP1/DP2	Prepare Waste Management Plan and submit to the Engineer for approval	Minimize waste generation during construction	Contractor	All construction sites	Construction phase	N/A
S7.6	WM2-DP1/DP2	*Good Site Practice* The following good site practices are recommended throughout the construction activities: • Nomination of an approved personnel, such as a site manager, to be responsible for the implementation of good site practices, arrangements for collection and effective disposal to an appropriate facility, of all wastes generated at the site; • Training of site personnel in site cleanliness, appropriate waste management procedures and concepts of waste reduction, reuse and recycling; • Provision of sufficient waste disposal points and regular collection for disposal; • Appropriate measures to minimise windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers; • Regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors;	Minimize waste generation during construction	Contractor	All construction sites	Construction phase	^ ^ ^ ^ ^
S7.6	WM4-DP1/DP2	*Storage of Waste* The following recommendation should be implemented to minimize the impacts:	Minimize waste generation during construction	Contractor	All construction sites	Construction phase	

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		• Waste such as soil should be handled and stored well to ensure secure containment; • Stockpiling area should be provided with covers and water spraying system to prevent materials from wind-blown or being washed away; • Different locations should be designated to stockpile each material to enhance reuse;					^ ^ ^
S7.6	WM5-DP1/DP2	*Collection and Transportation of Waste* The following recommendation should be implemented to minimize the impacts: • Remove waste in timely manner; • Employ the trucks with cover or enclosed containers for waste transportation; • Obtain relevant waste disposal permits from the appropriate authorities; and • Disposal of waste should be done at licensed waste disposal facilities.	Minimize waste impact from storage	Contractor	All construction sites	Construction phase	^ ^ ^ ^
S7.6	WM6-DP1/DP2	*Excavated and C&D Material* Wherever practicable, C&D materials should be segregated from other wastes to avoid contamination and ensure acceptability at Public Fill Reception Facilities areas or reclamation sites. The following mitigation measures should be implemented in handling the excavated and C&D materials: • Maintain temporary stockpiles and reuse excavated fill material for backfilling; • Carry out on-site sorting; • Make provisions in the Contract documents to allow and promote	Minimize waste impacts from excavated and C&D material	Contractor	All construction sites	Construction phase	^ ^ ^

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		the use of recycled aggregates where appropriate; and • Implement a trip-ticket system for each works contract to ensure that the disposal of C&D materials are properly documented and verified. The recommended C&D materials handling should include: • On-site Sorting of C&D Materials • Reuse of C&D Materials • Use of Standard Formwork and Planning of Construction Materials Purchasing • Provision of Wheel Wash Facilities Details refer to Section 7.6.1.4 of the EIA report.					^ ^ ^ ^ ^
S7.6	WM7-DP1/DP2	*Contaminated Soil* As a precaution, it is recommended that standard good site practice should be implemented during the construction phase to minimize any potential exposure to contaminated soils or groundwater. The details of mitigation measures to minimize the potential environmental implications arising from the handling of contaminated materials refer to Land Contamination Section.	Remediate contaminated soil	Contractor	All construction sites where applicable	Construction phase	N/A
S7.6	WM8-DP1/DP2	*Chemical Waste* • If chemical wastes are produced at the construction site, the Contractors should register with EPD as chemical waste producers. Chemical wastes should be stored in appropriate containers and collected by a licensed chemical waste contractor. Chemical wastes (e.g. spent lubricant oil) should be recycled at an appropriate facility as far as possible, while the chemical waste that cannot be recycled should be disposed of at either the Chemical Waste Treatment Centre, or another licensed facility, in	Control the chemical waste and ensure proper storage, handling and disposal	Contractor	All construction sites	Construction phase	^

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		accordance with the Waste Disposal (Chemical Waste) (General) Regulation.					
S7.6	WM9-DP1/DP2	*General Waste* • General refuse should be stored in enclosed bins separately from construction and chemical wastes. Recycling bins should also be placed to encourage recycling. • Preferably enclosed and covered areas should be provided for general refuse collection and routine cleaning for these areas should also be implemented to keep areas clean. • A reputable waste collector should be employed to remove general refuse on a daily basis.	Minimize production of the general refuse and avoid odour, pest and litter impacts	Contractor	All construction sites	Construction phase	^ ^ ^
S7.6	WM10-DP1/DP2	*Sewage* • The WMP should document the locations and number of portable chemical toilets depending on the number of workers, land availability, site condition and activities. • Regularly collection by licensed collectors should be arranged to minimize potential environmental impacts.	Minimize production of sewage impacts	Contractor	All construction sites	Construction phase	^ ^
S7.6	WM11-DP2	*Sediment* The following mitigation measures are recommended during transportation and stockpiling: • stockpiling area(s) must be properly designed and closed to the dredging locations as far as possible; • Stockpiling area(s) should be lined with impermeable sheeting and bunded; • stockpiles should be properly covered by impermeable sheeting;	Minimize waste impacts from sediment	Contractor	All construction sites	Construction phase	^ ^ *

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		• vehicles delivering the sediments should be covered, and truck bodies and tailgates should be sealed to prevent any discharge during transportation; • bulk earth moving equipments should be utilized as much as possible to minimize workers' handling and contact of the excavated materials; and • personal protective clothing should be provided to site workers. In case contamination of excavated materials is confirmed after testing, the mitigation measures described in Land Contamination Impacts section should also be implemented to minimize potential environmental impacts.					^ ^ ^
Land Contamination							
S8.7	LC1-DP2	*Remediation of arsenic-contaminated soil* • "Solidification/Stabilization" (S/S) treatment method was proposed for the remediation of arsenic-contaminated soil. Toxicity Characteristic Leaching Procedure (TCLP) test should be undertaken after S/S in order to ensure that the contaminant will not leach to the environment. Unconfined Compressive Strength (UCS) test should be conducted, and not less than 1MPa should be met prior to the backfilling or stockpiled for future reuse within the study area. Off-site disposal or reuse of the solidified material is not allowed.	To remediate arsenic-contaminated soil	Project Proponent/ Contractor	LMC Loop, contaminated area	Prior to commencement of construction works within the contaminated area	^
S8.7	LC1-DP1/DP2	*Excavation and Transportation* • Excavation profiles must be properly designed and executed with • attention to the relevant requirements for environment, health and	To minimise the potential environmental impacts arising from the handling of	Contractor	Contaminated area		^ ^

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		safety; • In case the soil to be excavated is situated beneath the groundwater table, it may be necessary to lower the groundwater table by installing well points or similar means; • Excavation should be carried out during dry season as far as possible to minimise contaminated runoff from contaminated soils; • Stockpiling site(s) should be lined with impermeable sheeting and bunded. Stockpiles should be properly covered by impermeable sheeting to reduce dust emission during dry season or contaminated run-off during rainy season. Watering should be avoided on stockpiles of contaminated soil to minimise contaminated runoff; • Supply of suitable clean backfill material after excavation, if required; • Vehicles containing any excavated materials should be suitably covered to limit potential dust emissions or contaminated run-off, and truck bodies and tailgates should be sealed to prevent any discharge during transport or during wet season; • Speed control for the trucks carrying contaminated materials should be enforced; and • Vehicle wheel washing facilities at the site's exit points should be established and used.	contaminated materials				^ ^ ^ ^ ^ ^ ^
S8.7	LC3-DP1/DP2	*Solidification/Stabilization* • The loading, unloading, handling, transfer or storage of cement should be carried out in an enclosed system;	To minimize the potential environmental impacts arising from the handling of	Contractor	Contaminated area	The course of remediation	^

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		• Mixing process and other associated material handling activities should be properly scheduled to minimise potential noise impact and dust emission; • The mixing facilities should be sited as far apart as practicable from the nearby noise sensitive receivers; • Mixing of contaminated soil and cement / water / other additive(s) should be undertaken at a solidification plant to minimise the potential for leaching; • Runoff from the solidification / stabilization area should be prevented by constructing a concrete bund along the perimeter of the solidification / stabilization area; • The run-off contained in the concrete bund area along the perimeter of the paved solidification / stabilization area, if any, will be collected, stored and used for the mixing process of cement / contaminated soil; • If stockpile of treated soil is required, the stockpiling site(s) should be lined with impermeable sheeting and bunded. Stockpiles should be properly covered by impermeable sheeting to reduce dust emission during dry season or site run-off during rainy season; and • If necessary, there should be clear and separated areas for stockpiling of untreated and treated materials.	contaminated materials				^ ^ ^ ^ ^ ^ ^
Landscape and Visual Impact (Construction Phase)							
S11.5.4 Table11.5.	L-CP1-DP1	*Preservation and Protection of Existing Trees (Good Site Practice)*	Avoid disturbance and protection of existing trees	Detailed design consultant/	Within project site	Detailed design and construction	

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
9		• The proposed works should avoid disturbance to the existing trees within and close to the works areas. The tree preservation proposals shall be coordinated with the layout and design of the engineering and architectural works at detailed design phase for further retention of individual trees. • It is recommended that a full detailed tree survey and felling application will be undertaken and submitted for approval by the relevant government departments in accordance with ETWB TCW No. 3/2006, 'Tree Preservation'. This will be conducted during the detailed design phase of the project and submitted to DLO for approval. The methodology and scope including the programme for the tree survey and felling application are also subject to the approval of the relevant authorities. • Trees which are not in conflict with the proposals would be retained and shall be protected by means of fencing during construction phase to prevent damage to tree canopies and root zones from vehicles and storage of materials. • Specifications for the protection of existing trees will be provided during the preparation of the detailed tree survey by Detailed Design consultants at detailed design and construction phase.		Contractor		phase	^ ^ ^ ^
S11.5.4 Table 11.5.9	L-CP2-DP1/DP2	*<u>Works Area and Temporary Works Areas (Good Site Practice)</u>* • The construction sequence and construction programme shall be optimized in order to minimize the duration of impact.	Minimize landscape impacts	Contractor	The whole project area where applicable	Construction phase	^

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		• Construction site controls shall be enforced including the storage of materials, the location and appearance of site accommodation and site storage; and the careful design of site lighting to prevent light spillage. • The temporary works areas shall be restored to its original condition or enhanced through the introduction of new amenity areas or planting areas following the completion of the construction phase.					^
	L-CP3-DP1/DP2	*Advance Implementation of Mitigation Planting* • Replanting of existing / disturbed vegetation shall be undertaken at the earliest possible stage of the construction phase of the project using predominantly native plant species although ornamental species may be used for roadside planting and amenity areas.	Minimize landscape impacts	Contractor	The whole project area where applicable	Construction phase	^
	L-CP4-DP1/DP2	*Transplantation of Existing Trees* • Some specimens have relatively higher amenity value which are in conflict with the proposals shall be considered for transplantation. For trees affected by the proposed infrastructure works the final receptor sites shall be preferably adjacent to their current locations alongside of the alignment to retain their contribution to the local landscape context. For the LMC Loop the receptor locations will be selected to allow the trees to be moved directly to their final locations in accordance with the detailed landscape proposals. • The transplanting proposals are subject to review at the	Minimize landscape impacts	Contractor	The whole project area where applicable	Construction phase	^

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		detailed design phase and to agreement-in-principle with the relevant management and maintenance agents and/or government departments. The implementation programme for the proposed works shall reserve sufficient time for the advanced tree transplanting preparation works to enhance the survival of the transplanted trees. • The transplanting proposals will be subject to the findings of the detailed tree survey and felling application to be undertaken by the detailed design consultants and following approval by the relevant departments.					
	L-CP6-DP1/DP2	*Creation of Wetland and Landscape Buffer* • The existing reedbed acquired for development areas for the project will be reinstated as part of the Ecological Area. The reinstatement shall be undertaken at the earliest possible stage during the construction phase of the project. • Creation of 12.78ha of Ecological Area (EA) containing reed marsh and marsh will be created at the southern portion of the LMC Loop, and a 50m width landscape buffer area will be set up in between the EA and the development area. Wetland creation concepts please refer to Figure 11.9zf and Chapter 12 Ecology Impact Assessment of this EIA. • Native tree and shrub mix will be utilised for the creation of landscape buffer along northern edge of EA to support the creation of avifauna habitat from ecologist perspectives as well as enhance the aesthetic and landscape diversity within	Compensation of the loss of landscape resources	Project Proponent/ Detailed design consultant/ Contractor/ Operator	The whole project area where applicable	Detailed design, construction and operational phases	^ ^ ^

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		the LMC Loop Development. • Creation of minimum 11.72 Ha. of permanent compensatory off-site wetland areas at Sam Po Shue and Hoo Hok Wai. For the potential locations for off-site wetlands please refer to Figure 11.9zf and 11.9zh, Chapter 2 Project Description and Chapter 12 Ecology Impact Assessment of this EIA.					^
	V-CP5-DP1/DP2	*Coordination with Concurrent Projects* • Coordinated implementation programme with concurrent projects to minimise impacts and where possible reduce the period of disturbance.	Minimize landscape impacts	Contractor	The whole project area where applicable	Construction phase	N/A
Ecology (Construction Phase)							
S12.7	E1-DP1	*Disturbance to Fish Ponds at HHW* • Development set back a minimum of 23m from the edge Meander. • Management of fish pond habitat to enhance ecological value to twice existing value, in order to compensate for disturbance to large waterbirds. • Creation and establishment will occur prior to commencement of substantive works associated with any element of the project for which fish pond compensation is required. *Construction phase* • Erection of a 3m high, dull green site boundary fence to minimise disturbance to wetland habitats caused by human activity in LMC Loop.	On the disturbance to fish ponds at HHW	Detailed design consultant/ Contractor	Fish ponds at HHW and LMC	Detailed design, construction phase	N/A N/A N/A *
S12.7	E2-DP1	*Construction run-off*	Minimise the indirect impact	Contractor	Seawall,	During	

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		• Temporary sewerage and drainage will be designed and installed to collect wastewater and prevent it from entering nearby water bodies; • Proper locations well away from nearby water bodies will be used for temporary storage of materials (i.e. equipment, filling materials, chemicals and fuel) and temporary stockpile of construction debris and spoil, and these will be identified before commencement of works; • To prevent muddy water entering nearby water bodies, work sites close to nearby water bodies will be isolated, using such items as sandbags or silt curtains with lead edge at bottom and properly supported props. Other protective measures will also be taken to ensure that no pollution or siltation occurs to the water gathering grounds of the work site; • If temporary access along a riverbed is unavoidable, this will be kept to the minimum in width and length. Temporary river crossings will be supported on stilts above the river bed; • Stockpiling of construction materials, if necessary, will be properly covered and located away from nearby water bodies; • Construction debris and spoil will be covered and/or properly disposed of as soon as possible to avoid being washed into nearby water bodies; • Construction effluent, site run-off and sewage will be properly collected and/or treated. Wastewater from any	from the increasing suspended solids and pollutants in LMC Meander			construction	^ ^ ^ ^ ^ ^ ^

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		construction site will be minimised via the following in descending order: reuse, recycling and treatment; • Proper locations for discharge outlets of wastewater treatment facilities well away from sensitive receivers will be identified (i.e. treated wastewater will not be discharged into LMC Meander, natural streams, marsh, reedbed, active or abandoned fish ponds); • Adequate lateral support will be erected where necessary in order to prevent soil/mud from slipping into the Ecological Area or LMC Meander; • Site boundary will be clearly marked and any works beyond the boundary strictly prohibited; • Regular water monitoring and site audit will be carried out at adequate points along LMC Meander, and at the outfalls of the natural streams around LMC Loop. If the monitoring and audit results show that pollution occurs, adequate measures including temporarily cessation of works will be considered.					^ ^ ^ ^
S12.7	E3-DP1/DP2	*Pollutant Runoff to Downstream areas from Accidental Spillage* • Prepare an emergency contingency plan • The plan will include, but not be limited to, the following: - Potential emergency situations; - Chemicals or hazardous materials used on-site (and their location); - Emergency response team; - Emergency response procedures;	Minimize indirect impact from pollutant runoff to downstream areas from accidental spillage	Contractor/ Operator	Area within project site near streams	Construction phase and operation phase	N/A

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		- List of emergency telephone hotlines; - Locations and types of emergency response equipment; - Training plan and testing for effectiveness.					
S12.7	E4-DP1/DP2	• Use opaque, non-transparent, non-reflective noise barriers for all developments associated with the Project. • Design of buildings should not incorporate use of night-time lighting at or near top of buildings, highly reflective materials should not be used where vegetation is adjacent and glass surfaces should not be angled upwards in a way that reflects the sky. Unnecessary lighting should be eliminated. Appropriate glass and façade treatments should be used where required to minimise impact. Unnecessary lighting should be avoided. These include the following: • Fritting, or the placement of ceramic lines or dots on glass, has little effect on the human-perceived transparency of the window but creates a visual barrier to birds outside. This treatment also has the advantage of reducing air conditioning loads by lowering heat gain, while still allowing light transmission for interior spaces. It is most successful when the frits are applied on the outside surface. Frosted glass has similar effects. • Angled glass may be used only for smaller panes in buildings with a limited amount of glass. • The use of glass that reflects UV light (primarily visible to	Minimize the mortality impacts on birds	Developer / Detailed design consultant/ contractor/ operator	Area within project site	Detailed design, construction and operation phases	^ ^ ^ ^ ^

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		birds, but not to humans) acts to reduce collision. • Film and art treatment allow glass surfaces to be used a medium of expression, often related to the nature and use of the building, as well indicating to birds their impenetrability. • Lightweight external screens can be added to windows or become a façade element of larger buildings, and are suitable where non-operable windows are prevalent, which is often the case in modern buildings in HK. In terms of reducing night-time mortality impacts, eliminating unnecessary lighting is one of the easiest methods, and has the added advantage of saving energy and expense. Potential impacts of nocturnal avian collision with buildings should be minimised by not creating sky glow from the use of night-time lighting at or near the top of buildings or other structures. In addition to avoiding uplighting, light spillage should be minimised, while green and blue lights should be used where possible. As far as possible, lights should be controlled by motion sensors, and building operations should be managed in such a way as reduce or eliminate night lighting near windows. The potential advantages of removing unnecessary lighting in terms of reducing the carbon footprint of the LMC Loop development are obvious.					^ ^
S12.7	E5-DP1/DP2	• Minimize loss of natural vegetation along LMC Meander, and suitable replacement planting with possible installation of otter holts and the provision of potential feeding area and spraint locations for otters in the stabilized bank subject to detailed design. • No significant change to velocity of water flow, water level or water quality.	Minimize impacts on Eurasian Otter	Detailed design consultant/ Contractor	Construction site within the project	Detailed design, construction phase	^ ^

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		• No direct lighting on Meander. • 3m high, dull green site boundary fence for all developments associated with the project. • Pre-construction surveys for otter holts or natal dens will be conducted in LMC Loop before the commencement of construction works. Work in the area of any otter holt found to cease pending examination by experienced Ecologist. If in use for breeding, works in the area will temporarily stop until end of breeding activity. • No construction activities within 100m of LMC Meander between one hour prior to sunset and one hour after sunrise. • Provision of compensatory reed marsh in the Ecological Area in LMC Loop, including open water channels and islands within the reed marsh, both of which features are considered to be used by the species.					^ ^ N/A ^ N/A
S12.7	E8-DP2	• Refer to E2 and E3	Prevent impacts on Rose Bitterling, small snakehead and *Somanniathelphus zanklon*	Contractor	Within project site	Construction phase	N/A
S12.7	E10-DP1	• Preserve undisturbed, semi-natural habitat conditions of LMC Meander and adjacent areas of LMC Loop up to approximately 150m in width in order to avoid disturbance to core part of flight line corridor. • This area to comprise an Ecological Area largely constituting reed marsh and a 50m wide buffer zone densely planted with	Minimize impacts on flight line corridor from LMC Loop development	Developer / Detailed design consultant/ Contractor/ Operator	Within project site	Detailed design, construction and operation phases	^ N/A

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		shrubs and trees. Small number of low buildings (max 14mPD high, except the building height of on-site STW is 15mPD high) allowed in inner 25m of this area at a plot ratio of 0.1. • At Ha Wan Tsuen entry point for many birds to LMC Loop area provide a wider Ecological Area to minimise disturbance from nearby buildings. • Further minimisation of impact by maintaining a lower building height in areas adjacent to the buffer zone for the EA. In addition, the sewage treatment works, which is located near the point where many birds cross from the Meander to HHW, should not exceed 15mPD.					N/A N/A
S12.7	E11-DP1	• Employ site boundary fence as long as possible. Use of movable barrier for more intense site formation activity. Provision of fencing with 30cm gap between the existing reed marsh and LMC Meander during the establishment period of Ecological Area and the gap will be closed once established. • Restrict work to period from 0900h to 1700h. All major works along the edge of LMC Meander and in the Ecological Area will be conducted in the wet season.	Minimize disturbance impacts of mitigation provisions	Contractor	Within project site	Construction phase	^ ^
S12.7	E12-DP1/DP2	• Minimal night-time lighting • No direct light on Meander	Minimize impacts on LMC Meander	Contractor/ Operator	All	Construction and operation phases	^ ^
S12.7	E13-	• Construction limited to wet season between the hours of 9am and	Minimize impacts from the	Contractor/	Pond habitat	Construction and	^

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
	DP2	5pm. • Use of opaque visual/noise barriers and planting of trees shrubs along length of road adjacent to fish ponds. • Compensatory habitat management elsewhere to mitigate wetland loss.	construction and operation disturbance impacts	Operator	along alignment (mainly Ha Wan Tsuen Road)	operation phases	^ ^
S12.7	E16-DP1	• Provision of compensatory reed marsh in the Ecological Area will provide habitat suitable for Common Evening Hawker. • Measures designed to protect other fauna and water quality will generally benefit odonata.	Protect Odonata	Project Proponent/ Detailed design consultant/ Contractor Operator	Ecological area	EA established prior to construction and manage at all phases	^ ^
S12.7	E14-DP2	• Replacement planting of native tree species relevant to Deep Bay area and the area impacted. Planting to occur in tandem with that required for woodland loss arising	Minimize the ecological impacts	Contractor	Woodland and shrubland habitat along Ha Wan Tsuen Road	Construction phase	^
S12.7	E15-DP2	• Use noise/visual barriers to minimise disturbance. • Construction activities should not be carried out before 0900h or after 1700h in order to minimise disturbance to the flight line corridor (and to mammals).	Minimize impacts on flight line corridor from Western Connection Road	Contractor	Construction site from Western Connection Road	Construction phase	^ ^
S12.7	E16-DP2	• Use of opaque visual/noise barriers and roadside planting of trees and shrubs to minimize disturbance impacts.	Minimize impacts on flight line corridor from Western Connection Road	Project Proponent/ Detailed design consultant/ Contractor	Construction site from Western Connection Road	Detailed design, construction and operation phases	^

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
				Operator			
Fisheries (Construction Phase)							
S13.7	F4-	• Reprovision of replacement Artificial Reefs(of the same volume as the existing ARs inside Marine Exclusion Zone)	Mitigate water quality impacts on the existing ARs	Project proponent	To be determined	Construction phase or operation phase	N/A
S11.7	F2	• Reduce re-suspension of sediments • Limit dredging and works fronts. • Good site practices • Strict enforcement of no marine dumping • Spill response plan	Minimise marine water quality impacts	Contractor	Seawall	During construction	N/A N/A N/A N/A N/A

Remarks: ^ Compliance of mitigation measure

* Recommendation was made during site audit but improved/rectified by the contractor

N/A Not Applicable at this stage as no such site activities were conducted in the reporting period (e.g. concrete batching plan, barging point, seawall dredging and filling, bored piling, landscaping works etc)