



JOB No.: TCS00694/13

AGREEMENT NO. CE 45/2008 (CE)  
LIANTANG/HEUNG YUEN WAI  
BOUNDARY CONTROL POINT AND ASSOCIATED WORKS

MONTHLY ENVIRONMENTAL MONITORING AND AUDIT  
REPORT (NO.63) – OCTOBER 2018

PREPARED FOR  
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT  
(CEDD)

Date	Reference No.	Prepared By	Certified By
13 November 2018	TCS00694/13/600/R1849v2	 Nicola Hon (Environmental Consultant)	 Tam Tak Wing (Environmental Team Leader)

Version	Date	Remarks
1	8 November 2018	First Submission
2	13 November 2018	Amended according to the IEC's comments on 9 and 13 November 2018



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Our ref: 7076192/23719/AB/AW/MCC/rw

14 November 2018

AECOM  
8/F, Grand Central Plaza, Tower 2  
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Shatin, N.T.

**By Email & Post**

Attention: Mr Simon LEUNG

Dear Sir

**Agreement No. CE 45/2008 (CE)  
Liantang/Heung Yuen Wai Boundary Control Point and Associated Works  
Independent Environmental Checker – Investigation  
Monthly EM&A Report (No. 63) – October 2018**

With reference to the Monthly EM&A Report No. 63 for October 2018 (Version 2) certified by the ET Leader, please be noted that we have no adverse comments on the captioned submission. We herewith verify the captioned submission in accordance with Condition 5.4 of the Environmental Permit No. EP-404/2011/D.

Thank you for your attention and please do not hesitate to contact the undersigned on tel. 3995-8120 or by email to antony.wong@smec.com; or our Mr Arthur CHIU on tel. 3995-8144 or by email to arthur.chiu@smec.com.

Yours faithfully

**Antony WONG**

Independent Environmental Checker

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## EXECUTIVE SUMMARY

ES01 This is the 63<sup>rd</sup> monthly EM&A report presenting the monitoring results and inspection findings for the reporting period from **1 to 31 October 2018** (hereinafter ‘the Reporting Period’).

### ENVIRONMENTAL MONITORING AND AUDIT ACTIVITIES

ES02 To facilitate the project management and implementation, Liantang/Heung Yuen Wai Boundary Control Point and Associated Works of the Project is divided to seven CEDD contracts including Contract 2 (CV/2012/08), Contract 3 (CV/2012/09), Contract 4 (NE/2014/02), Contract 5 (CV/2013/03), Contract 6 (CV/2013/08) and Contract 7 (NE/2014/03) and an ArshSD contract (Contract SS C505).

ES03 In the Reporting Period, the major construction works under Liantang/Heung Yuen Wai Boundary Control Point and Associated Works of the Project included Contract 2, Contract 3, Contract 4, Contract 6, Contract 7 and Contract SS C505. Environmental monitoring activities under the EM&A programme in the Reporting Period are summarized in the following table.

Environmental Aspect	Environmental Monitoring Parameters / Inspection	Reporting Period	
		Number of Monitoring Locations to undertake	Total Occasions
Air Quality	1-hour TSP	9	150
	24-hour TSP	9	49
Construction Noise	L <sub>eq(30min)</sub> Daytime	10	45
Water Quality	Water in-situ measurement and/or sampling	WM1 & WM1-C	14 Scheduled & 0 extra
		WM2A(a) & WM2A-Cx	14 Scheduled & 3 extra
		WM2B & WM2B-C	14 Scheduled & 0 extra (*)
		WM3x & WM3-C	14 Scheduled & 1 extra
		WM4, WM4-CA & WM4-CB	14 Scheduled & 0 extra
Ecology	Woodland compensation i) General Health condition of planted species ii) Survival of planted species	9 Quadrats and transect	0
Joint Site Inspection / Audit	IEC, ET, the Contractor and RE joint site Environmental Inspection and Auditing	Contract 2	4
		Contract 3	4
		Contract 4	4
		Contract 6	4
		Contract 7	4
		Contract SS C505 (#)	5

Remark: (#) IEC only joined one (1) event of site inspection for Contract SS C505.

(\*) In the whole Reporting Period, water sampling was unable to carry out at WM2B and WM2B-C due to shallow water (water depth under 150mm)

### ACTION AND LIMIT (A/L) LEVELS EXCEEDANCE

ES04 In the Reporting Period, no construction noise exceedance and valid noise complaint was recorded. For air quality monitoring, two (2) Limit Level exceedances of 24-hour TSP was recorded. Moreover, sixteen (16) Limit Level exceedances were recorded during water quality monitoring. The summary of exceedance in the Reporting Period is shown below.

Environmental Aspect	Monitoring Parameters	Action Level	Limit Level	Event & Action			
				NOE Issued	Investigation Result	Project related exceedance	Corrective Actions
Air Quality	1-hour TSP	0	0	0	--	--	--

Environmental Aspect	Monitoring Parameters	Action Level	Limit Level	Event & Action			
				NOE Issued	Investigation Result	Project related exceedance	Corrective Actions
	24-hour TSP	0	2	2	Underway by ET	--	--
Construction Noise	L <sub>eq</sub> (30min) Daytime	0	0	0	--	--	--
Water Quality	DO	0	0	0	-	--	--
	Turbidity	0	7	7	Refer to ES.06		The Contractor should fully implement water quality mitigation measure.
	SS	0	9	9			

ES05 There were two (2) Limit Level exceedances of 24-hour TSP recorded at Locations AM2 and AM3. Investigation for cause of exceedances was underway by ET and will be presented in next Monthly EM&A Report.

ES06 A total of sixteen (16) Limit Level exceedances were recorded during water quality monitoring. Investigation for cause of water quality exceedances have conducted by ET. Investigation report revealed that the exceedances recorded at WM2A(a) on 9, 10, 11 and 12 October 2018 were not caused by the works under the Project. Furthermore, the investigation for exceedances recorded at WM2A(a) on 27 and 29 October 2018 and at WM3x on 27, 29 and 30 October 2018 are still underway by ET and the investigation result will be presented in next Monthly EM&A Report.

**ENVIRONMENTAL COMPLAINT**

ES07 In this Reporting Period, three (3) documented environmental complaints were received under the EM&A programme with respective to the dust, muddy water and noise issues. The complaint details and status of investigation are summarized below.

- (a) A public complaint was received on 5 October 2018 regarding the dust concerns near the junction of Sha Tau Kok Road and Wo Keng Shan Road and site exit at Tai Tong Wu. Investigation has conducted by ET and the report revealed the Contractors have implemented wheel washing facilities and no dust and soil carrying by site vehicles to STK road were observed. It is considered that the complaint was not valid to the project.
- (b) A public complaint was on 5 October 2018 regarding muddy road found on Ping Yeung Village and the noise of construction equipment that leading to nuisance to nearby residents at night. Investigation has conducted by ET and the report revealed that the muddy road was related to the unpaved haul road near the Ping Yeung Interchange and insufficient cleaning of vehicles at site exit. Rectification works has immediately undertaken by the Contractor. Besides, the noise issue was considered that not valid to the project.
- (c) A public complaint was received on 25 October 2018 regarding dust concern in Shui Lau Hang Village intersection with Ng Chow Road. Investigation has conducted by ET and the report revealed the Contractor has implemented wheel washing facilities and no loose materials carrying by site vehicles to Ng Chow Road was observed. It is considered that the complaint was not valid to the project.

**NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS**

ES08 No environmental summons and prosecutions were recorded in the Reporting Period.

**REPORTING CHANGE**

ES09 No reporting changes were made in the Reporting Period.

#### SITE INSPECTION

- ES10 In this Reporting Period, joint site inspection to evaluate the site environmental performance at **Contract 2** has been carried out by the RE, IEC, ET and the Contractor on **5, 12, 19 and 26 October 2018**. No non-compliance was noted during the site inspection.
- ES11 In the Reporting Period, joint site inspection to evaluate the site environmental performance at **Contract 3** has been carried out by the RE, IEC, ET and the Contractor on **4, 11, 18 and 24 October 2018**. No non-compliance was noted during the site inspection.
- ES12 In the Reporting Period, joint site inspection to evaluate the site environmental performance at **Contract 4** has been carried out by the RE, IEC, ET and the Contractor on **5, 12, 19 and 22 October 2018**. No non-compliance was noted.
- ES13 In the Reporting Period, joint site inspection to evaluate the site environmental performance at **Contract 6** has been carried out by the RE, IEC, ET and the Contractor on **4, 11, 18 and 25 October 2018**. No non-compliance was noted during the site inspection.
- ES14 In the Reporting Period, joint site inspection for **Contract 7** to evaluate the site environmental performance has been carried out by the RE, IEC, ET and the Contractor on **5, 12, 16 and 26 October 2018**. No non-compliance was noted during the site inspection.
- ES15 In the Reporting Period, joint site inspection to evaluate the site environmental performance at **Contract SS C505** has been carried out by the RE, ET and the Contractor on **3, 10, 15, 25 and 31 October 2018** in which IEC joined the site inspection on **25 October 2018**. No non-compliance was noted during the site inspection.

#### FUTURE KEY ISSUES

- ES16 During dry season, special attention should be paid on the potential construction dust impact since most of the construction sites are adjacent to villages. The Contractor should fully implement the construction dust mitigation measures as appropriately.
- ES17 Preventive measures for muddy water or other water pollutants from site surface flow to local stream such as Kong Yiu Channel, Ma Wat Channel, Ping Yuen River, Kwan Tei River or public area should be properly maintained. The Contractors should paid special attention on water quality mitigation measures and fully implement according ISEMM of the EM&A Manual, in particular for working areas near Ma Wat Channel and Ping Yuen River.
- ES18 In addition, all effluent discharge shall be ensure to fulfill Technical Memorandum of Effluent Discharged into Drainage and Sewerage Systems, inland and Coastal Waters criteria or discharge permits stipulation.
- ES19 Construction noise would be a key environmental issue during construction work of the Project. Noise mitigation measures such as using quiet plants should be implemented in accordance with the EM&A requirement.
- ES20 Since most of construction sites under the Project are located adjacent to villages, the Contractors should fully implement air quality mitigation measures to reduce construction dust emission.

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## 1 INTRODUCTION

### 1.1 PROJECT BACKGROUND

- 1.1.1 Civil Engineering and Development Department is the Project Proponent and the Permit Holder of Agreement No. CE 45/2008 (CE) Liantang / Heung Yuen Wai Boundary Control Point and Associated Works, which is a Designated Project to be implemented under Environmental Permit number EP-404/2011/D granted on 20 January 2017.
- 1.1.2 The Project consists of two main components: Construction of a Boundary Control Point (hereinafter referred as “BCP”); and Construction of a connecting road alignment. Layout plan of the Project is shown in *Appendix A*.
- 1.1.3 The proposed BCP is located at the boundary with Shenzhen near the existing Chuk Yuen Village, comprising a main passenger building with passenger and cargo processing facilities and the associated customs, transport and ancillary facilities. The connecting road alignment consists of six main sections:
- 1) Lin Ma Hang to Frontier Closed Area (FCA) Boundary – this section comprises at-grade and viaducts and includes the improvement works at Lin Ma Hang Road;
  - 2) Ping Yeung to Wo Keng Shan – this section stretches from the Frontier Closed Area Boundary to the tunnel portal at Cheung Shan and comprises at-grade and viaducts including an interchange at Ping Yeung;
  - 3) North Tunnel – this section comprises the tunnel segment at Cheung Shan and includes a ventilation building at the portals on either end of the tunnel;
  - 4) Sha Tau Kok Road – this section stretches from the tunnel portal at Wo Keng Shan to the tunnel portal south of Loi Tung and comprises at-grade and viaducts including an interchange at Sha Tau Kok and an administration building;
  - 5) South Tunnel – this section comprises a tunnel segment that stretches from Loi Tung to Fanling and includes a ventilation building at the portals on either end of the tunnel as well as a ventilation building in the middle of the tunnel near Lau Shui Heung;
  - 6) Fanling – this section comprises the at-grade, viaducts and interchange connection to the existing Fanling Highway.
- 1.1.4 Action-United Environmental Services & Consulting has been commissioned as an Independent ET to implement the relevant EM&A program in accordance with the approved EM&A Manual, as well as the associated duties. As part of the EM&A program, the baseline monitoring has carried out between **13 June 2013** and **12 July 2013** for all parameters including air quality, noise and water quality before construction work commencement. The Baseline Monitoring Report summarized the key findings and the rationale behind determining a set of Action and Limit Levels (A/L Levels) from the baseline data. Also, the Project baseline monitoring report which verified by the IEC has been submitted to EPD on **16 July 2013** for endorsement. The major construction works of the Project was commenced on **16 August 2013** in accordance with the EP Section 5.3 stipulation.
- 1.1.5 This is **63<sup>rd</sup>** monthly EM&A report presenting the monitoring results and inspection findings for reporting period from **1 to 31 October 2018**.

### 1.2 REPORT STRUCTURE

- 1.2.1 The Monthly Environmental Monitoring and Audit (EM&A) Report is structured into the following sections:-
- |                  |   |
|------------------|---|
| <i>Section 1</i> | <i>Introduction</i>                                   |
| <i>Section 2</i> | <i>Project Organization and Construction Progress</i> |
| <i>Section 3</i> | <i>Summary of Impact Monitoring Requirements</i>      |
| <i>Section 4</i> | <i>Air Quality Monitoring</i>                         |
| <i>Section 5</i> | <i>Construction Noise Monitoring</i>                  |
| <i>Section 6</i> | <i>Water Quality Monitoring</i>                       |

<b>Section 7</b>	<i>Ecology Monitoring</i>
<b>Section 8</b>	<i>Waste Management</i>
<b>Section 9</b>	<i>Site Inspections</i>
<b>Section 10</b>	<i>Environmental Complaints and Non-Compliance</i>
<b>Section 11</b>	<i>Implementation Status of Mitigation Measures</i>
<b>Section 12</b>	<i>Conclusions and Recommendations</i>



## 2 PROJECT ORGANIZATION AND CONSTRUCTION PROGRESS

### 2.1 CONSTRUCTION CONTRACT PACKAGING

2.1.1 To facilitate the project management and implementation, the Project would be divided by the following contracts:

- Contract 2 (CV/2012/08)
- Contract 3 (CV/2012/09)
- Contract 4 (NE/2014/02)
- Contract 5 (CV/2013/03)
- Contract 6 (CV/2013/08)
- Contract 7 (NE/2014/03)
- ArchSD Contract No. SS C505

2.1.2 The details of each contracts is summarized below and the delineation of each contracts is shown in *Appendix A*.

#### Contract 2 (CV/2012/08)

2.1.3 Contract 2 has awarded in December 2013 and construction work was commenced on 19 May 2014. Major Scope of Work of the Contract 2 is listed below:

- construction of an approximately 5.2km long dual two-lane connecting road (with about 0.4km of at-grade road and 4.8km of tunnel) connecting the Fanling Interchange with the proposed Sha Tau Kok Interchange;
- construction of a ventilation adit tunnel and the mid-ventilation building;
- construction of the north and south portal buildings of the Lung Shan Tunnel and their associated slope works;
- provision and installation of ventilation system, E&M works and building services works for Lung Shan tunnel and Cheung Shan tunnel and their portal buildings;
- construction of Tunnel Administration Building adjacent to Wo Keng Shan Road and the associated E&M and building services works; and
- construction of associated footpath, slopes, retaining structures, drainage, sewerage, waterworks, landscaping works and other ancillary works.

#### Contract 3 (CV/2012/09)

2.1.4 Contract 3 was awarded in July 2013 and construction work was commenced on 5 November 2013. Major Scope of Work of the Contract 3 is listed below:

- construction of four link roads connecting the existing Fanling Highway and the south portal of the Lung Shan Tunnel;
- realignment of the existing Tai Wo Service Road West and Tai Wo Service Road East;
- widening of the existing Fanling Highway (HyD's entrustment works);
- demolishing existing Kiu Tau vehicular bridge and Kiu Tau footbridge and reconstruction of the existing Kiu Tau Footbridge (HyD's entrustment works); and
- construction of associated footpath, slopes, retaining structures, drainage, sewerage, waterworks, landscaping works and other ancillary works.

#### Contract 4 (NE/2014/02)

2.1.5 Contract 4 has awarded in mid-April 2016 and construction work was commenced on 2 May 2017. The scope of work of the Contract 4 includes:

- design, supply, delivery, installation, testing and commissioning of a traffic control and surveillance system for the connecting road linking up the Liantang / Heung Yuen Wai Boundary Control Point and the existing Fanling Highway.

Contract 5 (CV/2013/03)

2.1.6 Contract 5 has awarded in April 2013 and construction work was commenced in August 2013. Major Scope of Work of the Contract 5 is listed below:

- site formation of about 23 hectares of land for the development of the BCP;
- construction of an approximately 1.6 km long perimeter road at the BCP including a 175m long depressed road;
- associated diversion/modification works at existing local roads and junctions including Lin Ma Hang Road;
- construction of pedestrian subway linking the BCP to Lin Ma Hang Road;
- provision of resite area with supporting infrastructure for reprovisioning of the affected village houses; and
- construction of associated footpath, slopes, retaining structures, drainage, sewerage, waterworks, landscaping works and other ancillary works.

Contract 6 (CV/2013/08)

2.1.7 Contract 6 has awarded in June 2015 and construction work was commenced on 23 October 2015. Major Scope of Work of the Contract 6 would be included below:

- construction of an approximately 4.6km long dual two-lane connecting road (with about 0.6km of at-grade road, 3.3km of viaduct and 0.7km of tunnel) connecting the BCP with the proposed Sha Tau Kok Road Interchange and the associated ventilation buildings;
- associated diversion/modification works at access roads to the resite of Chuk Yuen Village;
- provision of sewage collection, treatment and disposal facilities for the BCP and the resite of Chuk Yuen Village;
- construction of a pedestrian subway linking the BCP to Lin Ma Hang Road;
- provisioning of the affected facilities including Wo Keng Shan Road garden; and
- construction of associated footpath, slopes, retaining structures, drainage, sewerage, waterworks, landscaping works and other ancillary works.

Contract 7 (NE/2014/03)

2.1.8 Contract 7 has awarded in December 2015 and the construction works of Contract 7 was commenced on 15 February 2016. Major Scope of Work of the Contract 7 would be included below:

- construction of the Hong Kong Special Administrative Region (HKSAR) portion of four vehicular bridge
- construction of one pedestrian bridge crossing Shenzhen (SZ) River (cross boundary bridges)

ArchSD Contract No. SS C505

2.1.9 SS C505 has awarded in July 2015 and construction work was commenced on 1 September 2015. Major Scope of Work of the SS C505 would be included below:

- passenger-related facilities including processing kiosks and examination facilities for private cars and coaches, passenger clearance building and halls, the interior fitting works for the pedestrian bridge crossing Shenzhen River, etc.;
- cargo processing facilities including kiosks for clearance of goods vehicles, customs inspection platforms, X-ray building, etc.;
- accommodation for the facilities inside of the Government departments providing services in connection with the BCP;
- transport-related facilities inside the BCP including road networks, public transport interchange, transport drop-off and pick-up areas, vehicle holding areas and associated road furniture etc;
- a public carpark; and

- other ancillary facilities such as sewerage and drainage, building services provisions and electronic systems, associated environmental mitigation measure and landscape works.

## 2.2 PROJECT ORGANIZATION

2.2.1 The project organization 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.

### Architectural Services Department (ArchSD)

2.2.3 ArchSD acts as the works agent for Development Bureau (DEVB), for Contract SS C505 Liantang/ Heung Yuen Wai Boundary Control Point (BCP) – BCP Buildings and Associated Facilities.

### Environmental Protection Department (EPD)

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

### Ronald Lu & Partners (Hong Kong) Ltd (The Architect)

2.2.5 Ronald Lu & Partners (Hong Kong) Ltd is appointed by ArchSD as an Architect for Contract SS C505 Liantang/ Heung Yuen Wai Boundary Control Point (BCP) – BCP Buildings and Associated Facilities. It responsible for overseeing the construction works of Contract SS C505 and for ensuring that the works are undertaken by the Contractor in accordance with the specification and contract requirements. The duties and responsibilities of the Architect with respect to EM&A are:

- Monitor the Contractors' compliance with contract specifications, including the implementation and operation of the environmental mitigation measures and their effectiveness
- Monitor Contractors' and ET's compliance with the requirements in the Environmental Permit (EP) and EM&A Manual
- Facilitate ET's implementation of the EM&A programme
- Participate in joint site inspection by the ET and IEC
- Oversee the implementation of the agreed Event / Action Plan in the event of any exceedance
- Adhere to the procedures for carrying out complaint investigation
- Liaison with DSD, Engineer/Engineer's Representative, ET, IEC and the Contractor of the "Construction of the DSD's Regulation of Shenzhen River Stage 4 (RSR 4)" Project discussing regarding the cumulative impact issues.

### Engineer or Engineers Representative (ER)

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

- Monitor the Contractors' compliance with contract specifications, including the implementation and operation of the environmental mitigation measures and their effectiveness
- Monitor Contractors's, ET's and IEC's compliance with the requirements in the Environmental Permit (EP) and EM&A Manual
- Facilitate ET's implementation of the EM&A programme
- Participate in joint site inspection by the ET and IEC
- Oversee the implementation of the agreed Event / Action Plan in the event of any exceedance

- Adhere to the procedures for carrying out complaint investigation
- Liaison with DSD, Engineer/Engineer's Representative, ET, IEC and the Contractor of the "Construction of the DSD's Regulation of Shenzhen River Stage 4 (RSR 4)" Project discussing regarding the cumulative impact issues.

The Contractor(s)

- 2.2.7 There will be one contractor for each individual works contract. Once the contractors are appointed, EPD, ET and IEC will be notified the details of the contractor.
- 2.2.8 The Contractor for Contracts under CEDD should report to the ER. For ArchSD Contract, the Contractor should report to the Architect or Architect's Representative (AR). The duties and responsibilities of the Contractor are:
- Comply with the relevant contract conditions and specifications on environmental protection
  - Employ an Environmental Team (ET) to undertake monitoring, laboratory analysis and reporting of EM & A Facilitate ET's monitoring and site inspection activities
  - Participate in the site inspections by the ET and IEC, and undertake any corrective actions
  - Provide information / advice to the ET regarding works programme and activities which may contribute to the generation of adverse environmental impacts
  - Submit proposals on mitigation measures in case of exceedances of Action and Limit levels in accordance with the Event / Action Plans
  - Implement measures to reduce impact where Action and Limit levels are exceeded
  - Adhere to the procedures for carrying out complaint investigation

Environmental Team (ET)

- 2.2.9 Once the ET is appointed, the EPD, CEDD, ER, Architect and IEC will be notified the details of the ET.
- 2.2.10 The ET shall not be in any way an associated body of the Contractor(s), and shall be employed by the Project Proponent/Contractor to conduct the EM&A programme. The ET should be managed by the ET Leader. The ET Leader shall be a person 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(s), to enable fulfillment of the Project's EM&A requirements as specified in the EM&A Manual during construction of the Project. The ET shall report to the Project Proponent and the duties shall include:
- Monitor and audit various environmental parameters as required in this EM&A Manual
  - Analyse the environmental monitoring and audit data, review the success of EM&A programme and the adequacy of mitigation measures implemented, confirm the validity of the EIA predictions and identify any adverse environmental impacts arising
  - Carry out regular site inspection to investigate and audit the Contractors' site practice, equipment/plant and work methodologies with respect to pollution control and environmental mitigation, and effect proactive action to pre-empt problems
  - Monitor compliance with conditions in the EP, environmental protection, pollution prevention and control regulations and contract specifications
  - Audit environmental conditions on site
  - Report on the environmental monitoring and audit results to EPD, the ER, the Architect, the IEC and Contractor or their delegated representatives
  - Recommend suitable mitigation measures to the Contractor in the case of exceedance of Action and Limit levels in accordance with the Event and Action Plans
  - Liaise with the IEC on all environmental performance matters and timely submit all relevant EM&A proforma for approval by IEC
  - Advise the Contractor(s) on environmental improvement, awareness, enhancement measures etc., on site
  - Adhere to the procedures for carrying out complaint investigation

- Liaison with the client departments, Engineer/Engineer’s Representative, ET, IEC and the Contractor(s) of the concurrent projects as listed under Section 2.3 below regarding the cumulative impact issues.

Independent Environmental Checker (IEC)

- 2.2.11 One IEC will be employed for this Project. Once the IEC is appointed, EPD, ER, the Architect and ET will be notified the details of the IEC.
- 2.2.12 The Independent Environmental Checker (IEC) should not be in any way an associated body of the Contractor or the ET for the Project. The IEC should be employed by the Permit Holder (i.e., CEDD) prior to the commencement of the construction of the Project. The IEC should have at least 10 years’ experience in EM&A and have relevant professional qualifications. The appointment of IEC should be subject to the approval of EPD. The IEC should:
- Provide proactive advice to the ER and the Project Proponent on EM&A matters related to the project, independent from the management of construction works, but empowered to audit the environmental performance of construction
  - Review and audit all aspects of the EM&A programme implemented by the ET
  - Review and verify the monitoring data and all submissions in connection with the EP and EM&A Manual submitted by the ET
  - Arrange and conduct regular, at least monthly site inspections of the works during construction phase, and ad hoc inspections if significant environmental problems are identified
  - Check compliance with the agreed Event / Action Plan in the event of any exceedance
  - Check compliance with the procedures for carrying out complaint investigation
  - Check the effectiveness of corrective measures
  - Feedback audit results to ET by signing off relevant EM&A proforma
  - Check that the mitigation measures are effectively implemented
  - Verify the log-book(s) mentioned in Condition 2.2 of the EP, notify the Director by fax, within one working day of receipt of notification from the ET Leader of each and every occurrence, change of circumstances or non-compliance with the EIA Report and/or the EP, which might affect the monitoring or control of adverse environmental impacts from the Project
  - Report the works conducted, the findings, recommendation and improvement of the site inspections, after reviewing ET’s and Contractor’s works, and advices to the ER and Project Proponent on a monthly basis
  - Liaison with the client departments, Engineer/Engineer’s Representative, the Architect, ET, IEC and the Contractor of the concurrent projects as listed under Section 2.3 below regarding the cumulative impact issues.

**2.3 CONCURRENT PROJECTS**

- 2.3.1 The concurrent construction works that may be carried out include, but not limited to, the following:
- (a) Regulation of Shenzhen River Stage IV;
  - (b) Widening of Fanling Highway – Tai Hang to Wo Hop Shek Interchange – Contract No. HY/2012/06;
  - (c) Construction of BCP facilities in Shenzhen.

**2.4 CONSTRUCTION PROGRESS**

- 2.4.1 In the Reporting Period, the major construction activity conducted under the Project is located in Contracts 2, 3, 6, 7 and SS C505 and they are summarized in below. Moreover, 3-month rolling construction program for all the current contracts is enclosed in **Appendix C**.

Contract 2 (CV/2012/08)

2.4.2 The contract commenced in May 2014. In this Reporting Period, construction activities conducted are listed below:

Mid-Vent Portal	<ul style="list-style-type: none"> <li>• Building fit out and E&amp;M installation</li> <li>• Construction of flexible barrier and permanent drainage and external works</li> <li>• Landscaping works.</li> </ul>
North Portal	<ul style="list-style-type: none"> <li>• Construction of retaining wall, permanent drainage and slip road</li> <li>• Tunnel backfilling, VE panel and E&amp;M installation</li> <li>• Construction of tunnel internal structure</li> <li>• Landscaping works</li> <li>• Ventilation building fit out and E&amp;M installation</li> </ul>
South Portal	<ul style="list-style-type: none"> <li>• Construction of tunnel internal structure</li> <li>• Ventilation building fit out and E&amp;M installation</li> <li>• Construction of flexible barrier, permanent drainage and slip road</li> <li>• Landscaping works.</li> <li>• Tunnel Backfilling, VE panel and E&amp;M installation</li> </ul>
Admin Building	<ul style="list-style-type: none"> <li>• Building fit out, permanent drainage and E&amp;M installation</li> <li>• Landscaping works</li> </ul>

Contract 3 (CV/2012/09)

2.4.3 The Contract commenced in November 2013. In this Reporting Period, construction activities conducted are listed below:

- Cable detection and trial trenches
- Remaining works on new Footbridge
- Noise barrier construction
- Road pavement works
- Water main laying works (on Grade and on bridge deck)
- Installation of Noise barrier steel column & panel, and sign gantry (on Grade and on bridge deck)
- Construction of Pavilion and Pai Lau
- Road Drainage Works
- Construction of retaining wall
- Landscaping works

Contract 4 (NE/2014/02)

2.4.4 The Contract was awarded in mid-April 2016 and the construction work was commenced on 2 May 2017. In this Reporting Period, construction activities conducted are listed below:

- E&M installation at Admin Building
- E&M installation at Ventilation Building
- E&M installation at tunnel
- Cladding installation at Cheung Shan Tunnel
- Sign fabrication & installation

Contract 5 (CV/2013/03)

2.4.5 The construction works under Contract 5 was substantially completed on 31 August 2016.

Contract 6 (CV/2013/08)

2.4.6 Contract 6 has awarded in June 2015 and construction work was commenced on 23 October 2015. In this Reporting Period, construction activities conducted are listed below:

- Bridge construction
- Tunneling Works
- Sewage Treatment Plant Construction



- Tunnel Ventilation Building Construction
- Slip Road/At-grade Road/Periphery Road Construction

Contract 7 (NE/2014/03)

2.4.7 Contract 7 has awarded in December 2015 and construction work was commenced on 15 February 2016. In this Reporting Period, construction activities conducted are listed below:

- Profile barrier construction at Bridges A & E
- Noise barrier construction at Bridge D & E
- Parapet installation at Bridge A, B, D & E
- Drainage pipe laying at Bridge A, B, D & E
- Waterproofing and Drainage works at roof of Bridge C
- Drainage and watermains at perimeter road
- Bitumen pavement at Bridge B & D

Contract SS C505

2.4.8 Contract SS C505 has awarded in July 2015 and construction work was commenced on 1 September 2015. In this Reporting Period, construction activities conducted are listed below:

- Passenger Terminal Building (PTB) G/F - Plant Room Structure Works, Backfilling & Drainage, Under Ground Utilities, Fence Wall and On Grade Slab
- PTB - ABWF Works & MEP Installation - Front/Back of House Area, External Staircases, Hall Block External Façade, Southern Entrance Construction, Major Plant Rooms
- PTB - External Works incl. Building 21-24, M/F External Wall (Ewall), Roof & Upper Roof Roofing Works, Podium Coach Canopy, 21&22 (C&PC KIOSKS) & 23&24 (PC Examination Building & MSRVSS) Superstructure & ABWF Works and MEP Installation, Podium Open Area Waterproofing, Paving, Hard and Soft Landscaping works, Ambulance Canopy / Glazed Canopy
- Bridge C Integrated ABWF and MEP Installation Works (C7 Portion)
- Bldg 1 - C&ED Detector Dog Base Phase 1 - Integrated ABWF & MEP Works Works at G/F & R/F
- Bldg 2 - HKPF Building and Observation Tower Phase 1 - External Works, Integrated ABWF & MEP Works at G/F to 4/F and Observation Tower (including Lift)
- Bldg 3 - Fire Station and Drill Tower Phase 1 - External Works, Integrated ABWF & MEP Works at G/F to UR/F, Drill Tower
- Bldg 4 - Cargo Examination Building (Inbound) Phase 1 - External Works, Integrated ABWF & MEP Works at G/F to R/F, Loading Dock
- Bldg 5 - Cargo Examination Building (Outbound) Phase 2 - External Works, Integrated ABWF & MEP Works at G/F to R/F, Loading Dock
- Bldg 6 - Fixed X-ray Vehicle Inspection System (FXRVIS) Buildings (Inbound) - External Works Fence Wall, Integrated ABWF & MEP Works at G/F to R/F
- Bldg 7 - Fixed X-ray Vehicle Inspection System (FXRVIS) Buildings (Outbound) - Integrated ABWF & MEP Works at G/F
- Bldg 8 - MXRVSS (Inbound) Phase 2 - Integrated ABWF and MEP Works at G/F & R/F
- Bldg 9 - MXRVSS (Outbound) Phase 2 - Structure Works at G/F, Integrated ABWF and MEP Works at G/F & Envelope
- Bldg 10 - GV Kiosk (Inbound) Phase 2 - On-Grade Slab, Steel Structure Works, Integrated ABWF and MEP Works at G/F & R/F
- Bldg 11 - GV Kiosk (Outbound) Phase 2 - Steel Structure Works, Integrated ABWF & MEP Works at G/F & R/F
- Bldg 12 - Public Toilets (Inbound) Phase 2 - Structure Works, Integrated ABWF and MEP Works at G/F & Envelope
- Bldg 13 - Public Toilets (Outbound) Phase 2 - Structures Works, Integrated ABWF and MEP Works at G/F & R/F

- Bldg 14 - Disinsection Facilities (Inbound) Phase 2 - Integrated ABWF & MEP Works at G/F & Envelope
- Bldg 15 - Disinsection Facilities (Outbound) Phase 2 - Substructure and Structure Works, Integrated ABWF & MEP Works at G/F & Envelope
- Bldg 16 - Weigh Station Phase 2 - Integrated ABWF and MEP Works at G/F & Envelope
- Bldg 17 - EUVSS & Monitoring Room Phase 2 - Structure Works, Integrated ABWF & MEP Works at G/F & R/F
- Bldg 18 - Refuse Collection Point Phase 2 - Integrated ABWF and MEP Works at G/F & Envelope
- Bldg 25 - Traffic Control Office (Inbound) Phase 2 - Integrated ABWF and MEP Works at G/F & Envelope
- Bldg 26 - Traffic Control Office (Outbound) Phase 2 - Structure Works, Integrated ABWF and MEP Works at G/F & Envelope
- Bldg 27 - Inspection Post Phase 2 - Structure Works, Integrated ABWF and MEP Work at G/F & Envelope
- Bldg 28, 30 & 31 - Guard Booth (Inbound/Outbound) Phase 2 - Structure Works, Integrated ABWF and MEP Works at G/F & Envelope
- Bldg 32 to 35 - Steel Canopies Phase 2 - Structure Works, Integrated ABWF and MEP Works
- Bldg 37 to 40 - Elevated Walkway (E1, E2, E3 & E4) Phase 2 - Structures Works, ABWF and BS Works
- Vehicular bridges 1 to 5 Phase 3 - Retaining walls, Road and Finishes Works
- External Works - CLP Cable & Power ON Transfer room
- External Works - Water Meter Room Connection (Inbound & Outbound)
- External Works - External Utilities, UU works & DSD Inspection
- External Works - Road & Pavement Works
- Landscape - Inbound Area
- Testing & Commissioning (T&C) and FSD Inspection - CBO, FXO, Inbound & Outbound Group Buildings

## 2.5 SUMMARY OF ENVIRONMENTAL SUBMISSIONS

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

- Project Layout Plans of Contracts 2, 3, 4, 5, 6, 7 and SS C505
- Landscape Plan
- Topsoil Management Plan
- Environmental Monitoring and Audit Programme
- Baseline Monitoring Report (TCS00690/13/600/R0030v3) for the Project
- Waste Management Plan of the Contracts 2, 3, 4, 5, 6, 7 and SS C505
- Contamination Assessment Plan (CAP) and Contamination Assessment Report (CAR) for Po Kat Tsai, Loi Tung and the workshops in Fanling
- Vegetation Survey Report
- Woodland Compensation Plan
- Habitat Creation Management Plan
- Wetland Compensation Plan

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

**Table 2-1 Status of Environmental Licenses and Permits of the Contracts**

Item	Description	License/Permit Status		
		Ref. no.	Effective Date	Expiry Date
<b>Contract 2</b>				
1	Air pollution Control	Ref No.: 368864	31 Dec 2013	Till Contract ends



Item	Description	License/Permit Status			
		Ref. no.	Effective Date	Expiry Date	
	(Construction Dust) Regulation				
2	Chemical Waste Producer Registration	<b>North Portal</b> Waste Producers Number: No.5213-652-D2523-01	25 Mar 2014	Till Contract ends	
		<b>Mid-Vent Portal</b> Waste Producers Number: No.5213-634-D2524-01	25 Mar 2014	Till Contract ends	
		<b>South Portal</b> Waste Producers Number: No.5213-634-D2526-01	9 Apr 2014	Till Contract ends	
3	Water Pollution Control Ordinance - Discharge License	No.WT00018374-2014 (South Portal)	3 Mar 2014	28 Feb 2019	
		No. WT00023063-2015 (North Portal)	18 Dec 2015	31 Mar 2019	
		No.: W5/11392 (Admin Building)	28 Mar 2014	31 Mar 2019	
		No.: WT00025594-2016 (Mid-Vent Portal)	7 Oct 2016	31 Mar 2019	
4	Waste Disposal Regulation - Billing Account for Disposal of Construction Waste	Account No. 7019105	8 Jan 2014	Till Contract ends	
5	Construction Noise Permit	GW-RN0211-18	North Portal	10-May-2018	09-Nov-2018
		GW-RN0212-18		10-May-2018	09-Nov-2018
		GW-RN0307-18		18-Jun-2018	17-Dec-2018
		GW-RN0400-18	Mid Vent	06-Aug-2018	01-Feb-2019
		GW-RN0401-18		06-Aug-2018	31-Jan-2019
		GW-RN0511-18	South Portal	30-Sep-2018	25-Mar-2019
		GW-RN0513-18		30-Sep-2018	25-Mar-2019
		GW-RN0176-18		30-Apr-2018	27-Oct-2018
		GW-RN0523-18	Admin Bldg	28-Sep-2018	27-Mar-2019
GW-RN0522-18	Cheung Shan Tunnel	26-Sep-2018	22-Mar-2019		
6	Specified Process License (Mortar Plant Operation)	L-3-251(1)	12 Apr 2016	11 Apr 2021	
<b>Contract 3</b>					
1	Air pollution Control (Construction Dust) Regulation	Ref. No: 362101	17 Jul 2013	Till Contract ends	
2	Chemical Waste Producer	Waste Producers Number: No.:5113-634-C3817-01	7 Oct 2013	Till Contract ends	

Item	Description	License/Permit Status		
		Ref. no.	Effective Date	Expiry Date
	Registration			
3	Water Pollution Control Ordinance - Discharge License	No.:WT00032188 – 2018	20 Sep 2018	31 Aug 2023
4	Waste Disposal Regulation - Billing Account for Disposal of Construction Waste	Account No. 7017914	2 Aug 2013	Till Contract ends
5	Construction Noise Permit	GW-RN0259-18	19 Jun 2018	17 Dec 2018
		GW-RN0305-18	22 Jun 2018	17 Dec 2018
		GW-RN0366-18	9 Jul 2018	18 Dec 2018
		GW-RN0361-18	15 Jul 2018	18 Dec 2018
		GW-RN0388-18	25 Aug 2018	24 Feb 2019
		GW-RN0424-18	01 Sep 2018	21 Feb 2019
		GW-RN0425-18	22 Aug 2018	21 Feb 2019
		GW-RN0454-18	06 Sep 2018	05 Mar 2019
		GW-RN0509-18	10 Oct 2018	17 Dec 2018
		GW-RN0566-18	29 Oct 2018	04 Apr 2019
<b>Contract 6</b>				
1	Air pollution Control (Construction Dust) Regulation	Ref. No: 390614	29 Jun 2015	Till the end of Contract
2	Chemical Waste Producer Registration	Waste Producers Number No.: 5213-652-C3969-01	31 Aug 2015	Till the end of Contract
3	Waste Disposal Regulation - Billing Account for Disposal of Construction Waste	Account No. 7022707	9 Jul 2015	Till the end of Contract
4	Water Pollution Control Ordinance - Discharge License	No.:WT00024574-2016	31 May 2016	31 May 2021
		No.:WT00024576-2016	31 May 2016	31 May 2021
		No.:WT00024742-2016	14 June 2016	30 June 2021
		No.:WT00024746-2016	14 June 2016	30 June 2021
5	Construction Noise Permit	GW-RW0121-18	30 Apr 2018	29 Oct 2018
		GW-RW0481-18	14 Sep 2018	13 Mar 2019
		GW-RW0595-18	30 Oct 2018	28 Feb 2019
<b>Contract SS C505</b>				
1	Air pollution Control (Construction Dust) Regulation	Ref. No: 390974	13 Jul 2015	Till the end of Contract

Item	Description	License/Permit Status		
		Ref. no.	Effective Date	Expiry Date
2	Chemical Waste Producer Registration	Waste Producer No.: 5213-642-L1048-07	16 Sep 2015	Till the end of Contract
3	Water Pollution Control Ordinance - Discharge License	No.: WT00024865-2016	8 Jul 2016	30 Nov 2020
4	Waste Disposal Regulation - Billing Account for Disposal of Construction Waste	Account No. 7022831	23 Jul 2015	Till the end of Contract
5	Construction Noise Permit	GW-RN0114-18	5 Apr 2018	4 Oct 2018
		GW-RN0198-18	8 May 2018	7 Nov 2018
		GW-RN0529-18	5 Oct 2018	3 Apr 2019
<b>Contract 7</b>				
1	Air pollution Control (Construction Dust) Regulation	Ref. No: 397015	21 Dec 2015	Till the end of Contract
2	Chemical Waste Producer Registration	Waste Producer No.: 5214-641-K3202-01	24 Mar 2016	Till the end of Contract
3	Water Pollution Control Ordinance - Discharge License	No.: WT00024422-2016	10 May 2016	31 May 2021
4	Waste Disposal Regulation - Billing Account for Disposal of Construction Waste	Account No. 7024129	21 Jan 2016	Till the end of Contract
5	Construction Noise Permit	GW-RN0206-18	8 May 2018	4 Nov 2018
<b>Contract 4</b>				
1	Air pollution Control (Construction Dust) Regulation	Ref. No. 405353	22 July 2016	Till the end of Contract
2	Waste Disposal Regulation - Billing Account for Disposal of Construction Waste	Account No. 7024973	13 May 2016	Till the end of Contract
3	Construction Noise Permit	GW-RN0568-18	15 Oct 2018	14 Dec 2018

### 3 SUMMARY OF IMPACT MONITORING REQUIREMENTS

#### 3.1 GENERAL

3.1.1 The Environmental Monitoring and Audit requirements are set out in the Approved EM&A manual. Environmental issues such as air quality, construction noise and water quality were identified as the key issues during the construction phase of the Project.

3.1.2 A summary of construction phase EM&A requirements are presented in the sub-sections below.

#### 3.2 MONITORING PARAMETERS

3.2.1 The EM&A program of construction phase monitoring shall cover the following environmental issues:

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

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

**Table 3-1 Summary of EM&A Requirements**

Environmental Issue	Parameters
Air Quality	<ul style="list-style-type: none"> <li>• 1-hour TSP by Real-Time Portable Dust Meter; and</li> <li>• 24-hour TSP by High Volume Air Sampler.</li> </ul>
Noise	<ul style="list-style-type: none"> <li>• <math>L_{eq(30min)}</math> in normal working days (Monday to Saturday) 07:00-19:00 except public holiday; and</li> <li>• 3 sets of consecutive <math>L_{eq(5min)}</math> on restricted hours i.e. 19:00 to 07:00 next day, and whole day of public holiday or Sunday</li> <li>• Supplementary information for data auditing, statistical results such as <math>L_{10}</math> and <math>L_{90}</math> shall also be obtained for reference.</li> </ul>
Water Quality	<b>In-situ Measurements</b> <ul style="list-style-type: none"> <li>• Dissolved Oxygen Concentration (mg/L);</li> <li>• Dissolved Oxygen Saturation (%);</li> <li>• Turbidity (NTU);</li> <li>• pH unit;</li> <li>• Water depth (m); and</li> <li>• Temperature (°C).</li> </ul>
	<b>Laboratory Analysis</b> <ul style="list-style-type: none"> <li>• Suspended Solids (mg/L)</li> </ul>

#### 3.3 MONITORING LOCATIONS

3.3.1 The designated monitoring locations as recommended in the *EM&A Manual* are shown in *Appendix D*. As the access to some of the designated monitoring locations was questionable due to safety reason or denied by the landlords, alternative locations therefore have had proposed. The latest alternative monitoring locations has been updated in the revised EM&A Programme (Rev.7) which approved by EPD on 7 April 2017. Besides, in view of Location AM1b was demolished and returned to the landlord on 27 April 2018, alternative location AM1c was proposed by ET. The proposal for alternative location AM1c which verified by IEC on 5 June 2018 submitted to EPD for approval on 6 June 2018. EPD issued comments on 16 July 2018 and the revised proposal was submitted to EPD on 20 August 2018. Further comment was given from EPD on 13 September 2018 and the revised proposal was submitted to EPD on 31 October 2018. Table 3-2, Table 3-3 and Table 3-4 listed the air quality, construction noise and water quality monitoring locations for the Project and a map showing these monitoring stations is presented in *Appendix E*.

**Table 3-2 Impact Monitoring Stations - Air Quality**

Station ID	Description	Works Area	Related to the Work Contract
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Station ID	Description	Works Area	Related to the Work Contract
AM1b <sup>^</sup>	Open area at Tsung Yuen Ha Village	BCP	SS C505 Contract 7
AM1c(*)	Open area of Tsung Yuen Ha Village No. 63	BCP	SS C505 Contract 7
AM2	Village House near Lin Ma Hang Road	LMH to Frontier Closed Area	Contract 6
AM3	Ta Kwu Ling Fire Service Station of Ta Kwu Ling Village.	LMH to Frontier Closed Area	Contract 6
AM4b <sup>^</sup>	House no. 10B1 Nga Yiu Ha Village	LMH to Frontier Closed Area	Contract 6
AM5a <sup>^</sup>	Ping Yeung Village House	Ping Yeung to Wo Keng Shan	Contract 6
AM6	Wo Keng Shan Village House	Ping Yeung to Wo Keng Shan	Contract 6
AM7b <sup>@</sup>	Loi Tung Village House	Sha Tau Kok Road	Contract 2 Contract 6
AM8	Po Kat Tsai Village No. 4	Po Kat Tsai	Contract 2
AM9b#	Nam Wa Po Village House No. 80	Fanling	Contract 3

# Proposal for the change of air quality monitoring location from AM9a to AM9b was submitted to EPD on 4 Nov 2013 after verified by the IEC and it was approved by EPD (EPD's ref.: (15) in EP 2/N7/A/52 Pt.10 dated 8 Nov 2013).

@ Proposal for the change of air quality monitoring location from AM7a to AM7b was submitted to EPD on 4 June 2014 after verified by the IEC. It was approved by EPD (EPD's ref.: (7) in EP 2/N7/A/52 Pt.12 dated 9 Jun 2014).

<sup>^</sup> Proposal for change of air quality monitoring locations was enclosed in the updated EM&A Programme which approval by EPD on 29 Mar 2016. Besides, Location AM1b was temporary suspended (24-hour TSP monitoring) since 27 April 2018 as the rented land was demolished and returned to the landlord.

\* Proposal for alternative location AM1c which verified by the IEC on 5 June 2018 was submitted to EPD on 6 June 2018. EPD issued comments on 16 July 2018 and the revised proposal was submitted to EPD on 20 August 2018. Further comment was given from EPD on 13 September 2018 and the revised proposal was submitted to EPD on 31 October 2018.

**Table 3-3 Impact Monitoring Stations - Construction Noise**

Station ID	Description	Works Area	Related to the Work Contract
NM1	Tsung Yuen Ha Village House No. 63	BCP	SS C505 Contract 7
NM2a#	Village House near Lin Ma Hang Road	Lin Ma Hang to Frontier Closed Area	Contract 6
NM3	Ping Yeung Village House (facade facing northeast)	Ping Yeung to Wo Keng Shan	Contract 6
NM4	Wo Keng Shan Village House	Ping Yeung to Wo Keng Shan	Contract 6
NM5	Village House, Loi Tung	Sha Tau Kok Road	Contract 2, Contract 6
NM6	Tai Tong Wu Village House 2	Sha Tau Kok Road	Contract 2, Contract 6
NM7	Po Kat Tsai Village	Po Kat Tsai	Contract 2
NM8	Village House, Tong Hang	Fanling	Contract 2 Contract 3
NM9	Village House, Kiu Tau Village	Fanling	Contract 3
NM10	Nam Wa Po Village House No. 80	Fanling	Contract 3

# Proposal for the change of construction noise monitoring location from NM2 to NM2a was verified by the IEC on 6 May 2016 and was effective on 9 May 2016.

Table 3-4 Impact Monitoring Stations - Water Quality

Station ID	Description	Coordinates of Designated / Alternative Location		Nature of the location	Related to the Work Contract
		Easting	Northing		
WM1	Downstream of Kong Yiu Channel	833 679	845 421	Alternative location located at upstream 51m of the designated location	SS C505 Contract 6
WM1-Control	Upstream of Kong Yiu Channel	834 185	845 917	NA	SS C505 Contract 6
WM2A	Downstream of River Ganges	834 204	844 471	Alternative location located at upstream 81m of the designated location	Contract 6
WM2A(a)*	Downstream of River Ganges	834 191	844 474	Alternative location located at upstream 70m of the designated location	Contract 6
WM2A-Controlx#	Upstream of River Ganges	835 377	844 188	Alternative location located at upstream 160m of the designated location	Contract 6
WM2B	Downstream of River Ganges	835 433	843 397	NA	Contract 6
WM2B-Control	Upstream of River Ganges	835 835	843 351	Alternative location located at downstream 31m of the designated location	Contract 6
WM3x#	Downstream of River Indus	836 206	842 270	Alternative location located at downstream 180m of the designated location	Contract 2 Contract 6
WM3-Control	Upstream of River Indus	836 763	842 400	Alternative location located at downstream 26m of the designated location	Contract 2 Contract 6
WM4	Downstream of Ma Wat Channel	833 850	838 338	Alternative location located at upstream 11m of the designated location	Contract 2 Contract 3
WM4-Control A	Kau Lung Hang Stream	834 028	837 695	Alternative location located at downstream 28m of the designated location	Contract 2 Contract 3
WM4-Control B	Upstream of Ma Wat Channel	833760	837395	Alternative location located at upstream 15m of the designated location	Contract 2 Contract 3

Note: EPD has approved the revised EM&A Programme (Rev.7) which proposed that (1) if the measured water depth of the monitoring station is lower than 150 mm, alternative location based on the criteria were selected to perform water monitoring; and (2) If no suitable alternative location could be found within 15m far from the original location, the sampling at that location will be cancelled since sampling at too far from the designated location could not make a representative sample in accordance with the updated EM&A Programme (Rev. 07) (Section 4.1.4) (EPD ref.: ( ) in EP2/N7/A/52 Ax(1) Pt.20 dated 7 April 2017)

(\*) Proposal for the change of water monitoring location from WM2A to WM2A(a) was verified by the IEC and it was approved by EPD. (EPD's ref. (10) in EP 2/N7/A/52 Pt.19)

(#) Proposal for the change of water quality monitoring location (WM3x and WM2A-Cx) was included in the EM&A Programme Rev .05 which approved by EPD on 29 March 2016 (EPD ref.: (3) in EP2/N7/A/52 Ax(1) Pt.19)

### 3.4 MONITORING FREQUENCY AND PERIOD

The requirements of impact monitoring are stipulated in Sections 2.1.6, 3.1.5 and 4.1.6 of the approved EM&A Manual and presented as follows.

#### Air Quality Monitoring

##### 3.4.1 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

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

Water Quality Monitoring

3.4.3 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 is listed in **Table 3-5**.

**Table 3-5 Air Quality Monitoring Equipment**

Equipment	Model
<b>24-Hr TSP</b>	
High Volume Air Sampler	TISCH High Volume Air Sampler, HVS Model TE-5170*
Calibration Kit	TISCH Model TE-5025A*
<b>1-Hour TSP</b>	
Portable Dust Meter	Sibata LD-3B Laser Dust monitor Particle Mass Profiler & Counter*

\* Instrument was used in the Reporting Period and the calibration certificate could be referred in Appendix F.

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 shall be proposed by the ET and agreed with the IEC. For installation and operation of wind data monitoring equipment, the following points shall be observed:

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

3.5.5 ET has liaised with the landlords of the successful granted HVS installation premises. However, the owners rejected to provide premises for wind data monitoring equipment installation.

3.5.6 Under this situation, the ET proposed alternative methods to obtain representative wind data. Meteorological information as extracted from “the Hong Kong Observatory Ta Kwu Ling Station” is alternative method to obtain representative wind data. For Ta Kwu Ling Station, it is located nearby the Project site. Moreover, this station is located at 15m above mean sea level while its anemometer is located at 13m above the existing ground which in compliance with the general setting up requirement. Furthermore, this station also can be to provide the humidity, rainfall, and air pressure and temperature etc. meteorological information. In Hong Kong of a lot development projects, weather information extracted from Hong Kong Observatory is common alternative method if weather station installation not allowed.

Noise Monitoring

3.5.7 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.

3.5.8 Noise monitoring equipment to be used for monitoring is listed in **Table 3-6**.

**Table 3-6 Construction Noise Monitoring Equipment**

Equipment	Model
Integrating Sound Level Meter	B&K Type 2238* and Rion NL-52*
Calibrator	Rion NC-74*
Portable Wind Speed Indicator	Testo Anemometer

\* Instrument was used in the Reporting Period and the calibration certificate could be referred in Appendix F.

3.5.9 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

3.5.10 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.

3.5.11 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.

3.5.12 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.

3.5.13 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.

3.5.14 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 be depended the



sampling location and depth situations.

- 3.5.15 Water samples for laboratory measurement of SS will be collected in high density polythene bottles, packed in ice (cooled to 4 °C without being frozen), and delivered to the laboratory in the same day as the samples were collected.
- 3.5.16 Analysis of suspended solids 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 suspended solids 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 2 mg/L.
- 3.5.17 Water quality monitoring equipment used in the impact monitoring is listed in **Table 3-7**. Suspended solids (SS) analysis is 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 Professional Plus* /YSI PRO20 Handheld Dissolved Oxygen Instrument/ YSI 550A Multifunctional Meter/ YSI Professional DSS
pH meter	YSI Professional Plus* / AZ8685 pH pen-style meter/ YSI 6820/ 650MDS/ YSI Professional DSS
Turbidimeter	Hach 2100Q*/ YSI 6820/ 650MDS/ YSI Professional DSS
Sample Container	High density polythene bottles (provided by laboratory)
Storage Container	'Willow' 33-liter plastic cool box with Ice pad

\* Instrument was used in the Reporting Period and the calibration certificate could be referred in Appendix F.

### 3.6 MONITORING METHODOLOGY

#### 1-hour TSP Monitoring

- 3.6.1 The 1-hour TSP monitor was a brand named “Sibata LD-3B Laser Dust monitor Particle Mass Profiler & Counter” which is a portable, battery-operated laser photometer. The 1-hour TSP meter provides a real time 1-hour TSP measurement based on 90° light scattering. The 1-hour TSP monitor consists of the following:
- A pump to draw sample aerosol through the optic chamber where TSP is measured;
  - A sheath air system to isolate the aerosol in the chamber to keep the optics clean for maximum reliability; and
  - A built-in data logger compatible with Windows based program to facilitate data collection, analysis and reporting.

- 3.6.2 The 1-hour TSP meter is used within the valid period as follow manufacturer’s Operation and Service Manual.

#### 24-hour TSP Monitoring

- 3.6.3 The equipment used for 24-hour TSP measurement is Tisch Environmental, Inc. Model TE-5170 TSP high volume air sampling system, which complied with *EPA Code of Federal Regulation, Appendix B to Part 50*. The High Volume Air Sampler (HVS) consists of the following:
- An anodized aluminum shelter;
  - A 8”x10” stainless steel filter holder;
  - A blower motor assembly;
  - A continuous flow/pressure recorder;

- (e.) A motor speed-voltage control/elapsed time indicator;
- (f.) A 7-day mechanical timer, and
- (g.) A power supply of 220v/50 Hz

- 3.6.4 The HVS is operated and calibrated on a regular basis in accordance with the manufacturer's instruction using Tisch Calibration Kit Model TE-5025A. Calibration would carry out in two month interval.
- 3.6.5 24-hour TSP is collected by the ET on filters of HVS and quantified by a local HOKLAS accredited laboratory, ALS Technichem (HK) Pty Ltd (ALS), upon receipt of the samples. The ET 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 would be performed with the meter set to FAST response and on the A-weighted equivalent continuous sound pressure level ( $L_{eq}$ ).  $L_{eq(30min)}$  in six consecutive  $L_{eq(5min)}$  measurements will use as the monitoring parameter for the time period between 0700-1900 hours on weekdays;  $L_{eq(5min)}$  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 is checked using an acoustic calibrator generating a known sound pressure level at a known frequency. The checking is performed before and after the noise measurement.

#### Water Quality

- 3.6.9 Water quality monitoring is conducted at the designated or alternative locations. The sampling procedures with the in-situ monitoring are presented as below:

##### *Sampling Procedure*

- 3.6.10 A Digital Global Positioning System (GPS) is used to identify the designated monitoring stations prior to water sampling. A portable, battery-operated echo sounder or tape measurement is used for the determination of water depth at each station. At each station, water sample would be collected from 0.1m below water surface or the water surface to prevent the river bed sediment for stirring.
- 3.6.11 If the water level of a monitoring station is too shallow when sampling, sediment would be disturbed which affecting the accuracy of water quality monitoring. In order to avoid disturbing sediment, depth limits should be set up for the water sampling for the ease of reference. When the measured water depth of the monitoring station (both control and impact stations) is lower than 150mm, water monitoring would not be to perform at that monitoring location. Instead, the monitoring location will be moved to a temporary alternative location monitoring location based on the criteria below:-
- (a) the alternative location should be either upstream or downstream of the original location and at the same the river/drain channel
  - (b) the alternative location should be within 15m far from the original location
  - (c) if no suitable alternative location could be found within 15m far from the original location, the sampling at that location will be cancelled since sampling at too far from the designated location could not make a representative sample.
- 3.6.12 The sample container will be rinsed with a portion of the water sample. The water sample then will be transferred to the high-density polythene bottles 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 would be recorded on the field data sheet.
- 3.6.14 A ‘Willow’ 33-liter plastic cool box packed with ice will be used to preserve the water samples prior to arrival at the laboratory for chemical determination. The water temperature of the cool box is maintained at a temperature as close to 4<sup>0</sup>C as possible without being frozen. Samples collected are delivered to the laboratory upon collection.

In-situ Measurement

- 3.6.15 YSI Professional Plus is used for water in-situ measures, which automates the measurements and data logging of temperature, dissolved oxygen and dissolved oxygen saturation and pH measurement.
- 3.6.16 A portable Hach 2100Q Turbidimeter is used for in-situ turbidity measurement. The turbidity meter is capable of measuring turbidity in the range of 0 – 1000 NTU.
- 3.6.17 All in-situ measurement equipment are calibrated by HOKLAS accredited laboratory of three month interval.

Laboratory Analysis

- 3.6.18 All water samples analyzed Suspended Solids (SS) will be 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* will start within 48 hours of water sample receipt.

**3.7 EQUIPMENT CALIBRATION**

- 3.7.1 Calibration of the HVS is 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 are 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 would be checked before and after each monitoring event. Annually calibration with the High Volume Sampler (HVS) in same condition would be undertaken by the Laboratory.
- 3.7.3 The sound level meter and calibrator are calibrated and certified by a laboratory accredited under HOKLAS or any other international accreditation scheme at yearly basis.
- 3.7.4 All water quality monitoring equipment would be calibrated by HOKLAS accredited laboratory of three month intervals.
- 3.7.5 The calibration certificates of all monitoring equipment used for the impact monitoring program in the Reporting Period and the HOKLAS accredited certificate of laboratory are attached in *Appendix F*.

**3.8 DERIVATION OF ACTION/LIMIT (A/L) 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 <sup>3</sup> )		Limit Level (µg/m <sup>3</sup> )	
	1-hour TSP	24-hour TSP	1-hour TSP	24-hour TSP

Monitoring Station	Action Level ( $\mu\text{g}/\text{m}^3$ )		Limit Level ( $\mu\text{g}/\text{m}^3$ )	
	1-hour TSP	24-hour TSP	1-hour TSP	24-hour TSP
AM1c	265	143	500	260
AM2	268	149		
AM3	269	145		
AM4b	267	148		
AM5a	268	143		
AM6	269	148		
AM7b	275	156		
AM8	269	144		
AM9b	271	151		

**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	
NM1, NM2a, NM3, NM4, NM5, NM6, NM7, NM8, NM9, NM10	When one or more documented complaints are received	75 dB(A) <sup>Note 1 &amp; Note 2</sup>

*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				
		WM1	WM2A(a)	WM2B	WM3x	WM4
DO (mg/L)	Action Level	(*)4.23	(**)4.00	(*)4.74	(**)4.00	(*)4.14
	Limit Level	(#)4.19	(**)4.00	(#)4.60	(**)4.00	(#)4.08
Turbidity (NTU)	Action Level	51.3	24.9	11.4	13.4	35.2
	Limit Level	67.6	33.8	12.3	14.0	38.4
SS (mg/L)	Action Level	54.5	14.6	11.8	12.6	39.4
	Limit Level	64.9	17.3	12.4	12.9	45.5

**Remarks:**

(\*) The Proposed **Action Level** of Dissolved Oxygen is adopted to be used 5%-ile of baseline data

(\*\*) The Proposed **Action & Limit Level** of Dissolved Oxygen is used 4mg/L

(#) The Proposed **Limit Level** of Dissolved Oxygen is adopted to be used 1%-ile of baseline data

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

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

3.9.1 All monitoring data will be handled by the ET's in-house data recording and management system. The monitoring data recorded in the equipment will be downloaded directly from the equipment at the end of each monitoring day. The downloaded monitoring data will input into a computerized database maintained by the ET. The laboratory results will be input directly into the computerized 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 In the Reporting Period, construction works under the project have been commenced in Contracts 2, 3, 4, 6, 7 and Contract SS C505. Hence, air quality monitoring was performed at all designated locations.
- 4.1.2 The air quality monitoring schedule is presented in *Appendix H* and the monitoring results are summarized in the following sub-sections.

**4.2 AIR QUALITY MONITORING RESULTS**

- 4.2.1 In the Reporting Period, a total of **150** events of 1-hour TSP and **49** events 24-hours TSP monitoring were carried out and the monitoring results are summarized in *Tables 4-1 to 4-9*. The detailed 24-hour TSP monitoring data are presented in *Appendix I* and the relevant graphical plots are shown in *Appendix J*.

**Table 4-1 Summary of 24-hour and 1-hour TSP Monitoring Results – AM1c**

Date	24-hour TSP ( $\mu\text{g}/\text{m}^3$ )	1-hour TSP ( $\mu\text{g}/\text{m}^3$ )				
		Date	Start Time	1 <sup>st</sup> reading	2 <sup>nd</sup> reading	3 <sup>rd</sup> reading
2-Oct-18	141	4-Oct-18	9:33	114	117	126
8-Oct-18	98	10-Oct-18	9:30	79	74	77
13-Oct-18	48	15-Oct-18	9:15	47	51	44
19-Oct-18	37	20-Oct-18	9:24	41	48	56
25-Oct-18	38	26-Oct-18	9:46	45	55	40
31-Oct-18	117	--	--	--	--	--
Average (Range)	<b>80</b> (37-141)	Average (Range)		<b>68</b> (40 – 126)		

**Table 4-2 Summary of 24-hour and 1-hour TSP Monitoring Results – AM2**

Date	24-hour TSP ( $\mu\text{g}/\text{m}^3$ )	1-hour TSP ( $\mu\text{g}/\text{m}^3$ )				
		Date	Start Time	1 <sup>st</sup> reading	2 <sup>nd</sup> reading	3 <sup>rd</sup> reading
2-Oct-18	146	4-Oct-18	9:30	123	127	132
8-Oct-18	139	10-Oct-18	9:38	99	102	99
13-Oct-18	107	15-Oct-18	9:18	94	98	86
19-Oct-18	134	20-Oct-18	9:20	98	101	110
25-Oct-18	110	26-Oct-18	9:33	150	147	161
31-Oct-18	<b>303</b>	--	--	--	--	--
Average (Range)	<b>157</b> (107 – 303)	Average (Range)		<b>115</b> (86 – 161)		

*Bold and underline indicated Limit Level exceedance*

**Table 4-3 Summary of 24-hour and 1-hour TSP Monitoring Results – AM3**

Date	24-hour TSP ( $\mu\text{g}/\text{m}^3$ )	1-hour TSP ( $\mu\text{g}/\text{m}^3$ )				
		Date	Start Time	1 <sup>st</sup> reading	2 <sup>nd</sup> reading	3 <sup>rd</sup> reading
2-Oct-18	43	4-Oct-18	9:26	119	122	128
8-Oct-18	105	10-Oct-18	9:35	92	94	92
13-Oct-18	34	15-Oct-18	9:20	89	90	87
19-Oct-18	30	20-Oct-18	9:17	47	51	55
25-Oct-18	36	26-Oct-18	13:24	95	110	126

Date	24-hour TSP ( $\mu\text{g}/\text{m}^3$ )	1-hour TSP ( $\mu\text{g}/\text{m}^3$ )				
		Date	Start Time	1 <sup>st</sup> reading	2 <sup>nd</sup> reading	3 <sup>rd</sup> reading
31-Oct-18	<b>309</b>	--	--	--	--	--
Average (Range)	<b>93</b> (30 – 309)	Average (Range)		<b>93</b> (47 – 128)		

*Bold and underline indicated Limit Level exceedance*

**Table 4-4 Summary of 24-hour and 1-hour TSP Monitoring Results – AM4b**

Date	24-hour TSP ( $\mu\text{g}/\text{m}^3$ )	1-hour TSP ( $\mu\text{g}/\text{m}^3$ )				
		Date	Start Time	1 <sup>st</sup> reading	2 <sup>nd</sup> reading	3 <sup>rd</sup> reading
5-Oct-18	33	2-Oct-18	9:33	117	120	124
11-Oct-18	43	8-Oct-18	10:00	90	93	95
16-Oct-18	45	13-Oct-18	9:03	80	84	83
22-Oct-18	67	19-Oct-18	9:22	52	51	50
27-Oct-18	79	25-Oct-18	10:15	67	69	70
--	--	31-Oct-18	9:35	49	51	53
Average (Range)	<b>53</b> (33 – 79)	Average (Range)		<b>78</b> (49 – 124)		

**Table 4-5 Summary of 24-hour and 1-hour TSP Monitoring Results – AM5a**

Date	24-hour TSP ( $\mu\text{g}/\text{m}^3$ )	1-hour TSP ( $\mu\text{g}/\text{m}^3$ )				
		Date	Start Time	1 <sup>st</sup> reading	2 <sup>nd</sup> reading	3 <sup>rd</sup> reading
5-Oct-18	141	2-Oct-18	9:31	112	117	121
11-Oct-18	60	8-Oct-18	10:03	91	105	109
16-Oct-18	44	13-Oct-18	9:09	71	68	71
22-Oct-18	33	19-Oct-18	9:47	49	49	49
27-Oct-18	111	25-Oct-18	10:22	110	101	99
--	--	31-Oct-18	9:33	89	76	90
Average (Range)	<b>78</b> (33 – 141)	Average (Range)		<b>88</b> (49 – 121)		

**Table 4-6 Summary of 24-hour and 1-hour TSP Monitoring Results – AM6**

Date	24-hour TSP ( $\mu\text{g}/\text{m}^3$ )	1-hour TSP ( $\mu\text{g}/\text{m}^3$ )				
		Date	Start Time	1 <sup>st</sup> reading	2 <sup>nd</sup> reading	3 <sup>rd</sup> reading
5-Oct-18	146	2-Oct-18	9:24	115	119	123
11-Oct-18	146	8-Oct-18	10:10	137	120	133
16-Oct-18	49	13-Oct-18	9:16	81	78	83
22-Oct-18	94	19-Oct-18	9:39	78	82	90
27-Oct-18	137	25-Oct-18	10:41	122	125	135
--	--	31-Oct-18	9:27	90	89	110
Average (Range)	<b>114</b> (49 – 146)	Average (Range)		<b>106</b> (78 – 137)		



**Table 4-7 Summary of 24-hour and 1-hour TSP Monitoring Results – AM7b**

Date	24-hour TSP ( $\mu\text{g}/\text{m}^3$ )	1-hour TSP ( $\mu\text{g}/\text{m}^3$ )				
		Date	Start Time	1 <sup>st</sup> reading	2 <sup>nd</sup> reading	3 <sup>rd</sup> reading
5-Oct-18	155	2-Oct-18	9:14	133	141	156
13-Oct-18	85	8-Oct-18	10:15	86	99	101
16-Oct-18	55	13-Oct-18	9:16	88	86	83
22-Oct-18	114	19-Oct-18	12:50	98	110	107
27-Oct-18	24	25-Oct-18	9:48	43	48	50
--	--	31-Oct-18	9:27	60	59	65
Average (Range)	<b>87</b> (24 – 155)	Average (Range)		<b>90</b> (43– 156)		

**Table 4-8 Summary of 24-hour and 1-hour TSP Monitoring Results – AM8**

Date	24-hour TSP ( $\mu\text{g}/\text{m}^3$ )	1-hour TSP ( $\mu\text{g}/\text{m}^3$ )				
		Date	Start Time	1 <sup>st</sup> reading	2 <sup>nd</sup> reading	3 <sup>rd</sup> reading
5-Oct-18	42	2-Oct-18	13:10	62	60	56
13-Oct-18	53	8-Oct-18	13:30	93	88	90
16-Oct-18	37	13-Oct-18	13:08	67	71	73
22-Oct-18	62	19-Oct-18	13:10	54	52	52
27-Oct-18	73	25-Oct-18	13:43	52	56	58
--	--	31-Oct-18	12:55	52	51	50
Average (Range)	<b>54</b> (37 – 73)	Average (Range)		<b>63</b> (50 – 93)		

**Table 4-9 Summary of 24-hour and 1-hour TSP Monitoring Results – AM9b**

Date	24-hour TSP ( $\mu\text{g}/\text{m}^3$ )	1-hour TSP ( $\mu\text{g}/\text{m}^3$ )				
		Date	Start Time	1 <sup>st</sup> reading	2 <sup>nd</sup> reading	3 <sup>rd</sup> reading
2-Oct-18	68	4-Oct-18	9:37	67	70	69
8-Oct-18	77	10-Oct-18	9:33	63	66	61
13-Oct-18	74	15-Oct-18	8:45	80	71	78
19-Oct-18	48	20-Oct-18	9:30	56	61	60
25-Oct-18	51	26-Oct-18	9:20	64	66	62
31-Oct-18	78	--	--	--	--	--
Average (Range)	<b>66</b> (48 – 78)	Average (Range)		<b>66</b> (56 – 80)		

- 4.2.2 As shown in *Tables 4-1 to 4-9*, all the 1-hour TSP monitoring results were below the Action/Limit Levels. For 24-hour TSP monitoring, two (2) Limit Level exceedances were recorded at AM2 and AM3 on 31 October 2018. Notification of Exceedance (NOE) was issued to all relevant parties upon confirmation of the exceedance.
- 4.2.3 Investigation Reports for 24 –hour TSP monitoring was still underway by ET and will be presented in next Monthly EM&A Report.
- 4.2.4 The meteorological data during the impact monitoring days are summarized in *Appendix K*.

## 5 CONSTRUCTION NOISE MONITORING

### 5.1 GENERAL

- 5.1.1 In the Reporting Period, construction works under the project have been commenced in Contracts 2, 3, 4, 6, 7 and Contract SS C505 and noise monitoring was performed at all designated locations.
- 5.1.2 The noise monitoring schedule is presented in *Appendix H* and the monitoring results are summarized in the following sub-sections.

### 5.2 NOISE MONITORING RESULTS

- 5.2.1 In the Reporting Period, a total of **45** events noise measurements were carried out at the designated locations. The sound level meter was set in 1m from the exterior of the building façade including noise monitoring locations NM1, NM3, NM4, NM5, NM6, NM7, NM8 and NM9. Therefore, no façade correction (+3 dB(A)) is added according to acoustical principles and EPD guidelines. However, free-field status were performed at NM2a and NM10 and façade correction (+3 dB(A)) has added according to the requirement in this month. The noise monitoring results at the designated locations are summarized in *Tables 5-1 and 5-2*. The detailed noise monitoring data are presented in *Appendix I* and the relevant graphical plots are shown in *Appendix J*.

**Table 5-1 Summary of Construction Noise Monitoring Results**

Construction Noise Level ( $L_{eq30min}$ ), dB(A)					
Date	NM1	NM2a <sup>(*)</sup>	NM8	NM9	NM10 <sup>(*)</sup>
4-Oct-18	55	70	61	57	58
10-Oct-18	55	73	60	63	64
15-Oct-18	60	69	64	73	61
26-Oct-18	57	68	57	65	64
<b>Limit Level</b>	<b>75 dB(A)</b>				

Remarks

<sup>(\*)</sup> façade correction (+3 dB(A)) is added according to acoustical principles and EPD guidelines

**Table 5-2 Summary of Construction Noise Monitoring Results**

Construction Noise Level ( $L_{eq30min}$ ), dB(A)					
Date	NM3	NM4	NM5	NM6	NM7
2-Oct-18	58	64	58	58	63
8-Oct-18	64	66	57	65	64
19-Oct-18	64	64	58	61	63
25-Oct-18	63	65	54	59	60
31-Oct-18	59	64	61	64	63
<b>Limit Level</b>	<b>75 dB(A)</b>				

- 5.2.2 As shown in *Tables 5-1 and 5-2*, no construction noise measurement results that exceeded the Limit Level were recorded. Moreover, no valid noise complaint (which triggered Action Level exceedance) was recorded in the Reporting Period.



## 6 WATER QUALITY MONITORING

### 6.1 GENERAL

6.1.1 In the Reporting Period, construction works under the project has been commenced in Contracts 2, 3, 4, 6, 7 and Contract SS C505 and water quality monitoring was performed at all designated locations. The water quality monitoring schedule is presented in *Appendix H*. The monitoring results are summarized in the following sub-sections.

### 6.2 RESULTS OF WATER QUALITY MONITORING

6.2.1 In the Reporting Period, a total of **fourteen (14)** sampling days was scheduled to carry out for all designated locations with their control stations. Since exceedances was recorded at WM2A(a) and WM3x, according to “*Event and Action Plan*” stipulation, **3** and **1** additional water quality monitoring day was conducted for WM2A(a) and WM3x and its control stations.

6.2.2 The key monitoring parameters including Dissolved Oxygen, Turbidity and Suspended Solids are summarized in *Tables 6-1 to 6-5*. Breaches of water quality monitoring criteria are shown in *Table 6-6*. Detailed monitoring database including in-situ measurements and laboratory analysis data are shown in *Appendix I* and the relevant graphical plot are shown in *Appendix J*.

**Table 6-1 Water Quality Monitoring Results Associated of Contracts 2 and 3**

Date	Dissolved Oxygen (mg/L)			Turbidity (NTU)			Suspended Solids (mg/L)		
	WM4	WM4-CA	WM4-CB	WM4	WM4-CA	WM4-CB	WM4	WM4-CA	WM4-CB
2-Oct-18	7.3	7.4	6.7	9.4	4.0	6.4	7.5	3.0	5.0
4-Oct-18	7.4	7.6	6.5	7.6	3.6	6.2	7.0	<2	8.0
6-Oct-18	8.0	7.7	6.4	16.0	4.1	8.5	12.5	2.5	11.5
9-Oct-18	6.6	7.2	5.7	12.9	4.1	7.9	12.5	3.0	9.5
11-Oct-18	7.0	7.3	4.5	21.8	3.8	10.4	19.5	2.0	10.5
13-Oct-18	7.1	7.5	5.8	32.7	7.6	16.0	34.5	3.5	14.5
16-Oct-18	6.8	7.2	5.3	10.9	5.7	8.1	10.0	3.5	6.5
18-Oct-18	6.5	7.0	4.9	24.2	6.6	11.0	21.5	3.5	11.0
20-Oct-18	7.1	7.2	5.4	7.9	3.4	8.2	7.0	3.0	7.0
23-Oct-18	6.7	7.1	5.9	11.2	4.1	6.4	8.5	2.5	5.0
25-Oct-18	6.3	6.8	6.2	16.4	3.8	6.7	14.5	4.0	9.0
27-Oct-18	6.9	7.3	6.1	15.2	4.1	6.9	10.0	3.5	31.5
29-Oct-18	7.0	7.2	6.4	10.4	3.4	16.5	8.5	2.5	6.5
31-Oct-18	7.0	7.6	6.7	8.3	2.7	6.5	8.5	2.0	9.0

**Table 6-2 Water Quality Monitoring Results Associated of Contracts 6 and SS C505**

Date	Dissolved Oxygen (mg/L)		Turbidity (NTU)		Suspended Solids (mg/L)	
	WM1	WM1-C	WM1	WM1-C	WM1	WM1-C
2-Oct-18	6.5	7.5	22.0	11.4	18.5	6.0
4-Oct-18	6.7	7.5	17.9	10.9	14.5	6.0
6-Oct-18	6.7	6.3	14.4	12.8	13.5	8.0
9-Oct-18	6.7	6.9	16.7	10.2	10.0	4.5
11-Oct-18	7.9	7.2	15.2	12.5	11.5	7.5
13-Oct-18	7.2	6.9	16.2	11.4	8.5	10.0
16-Oct-18	7.1	6.3	14.4	10.3	11.5	8.5
18-Oct-18	7.0	6.2	20.2	24.8	14.0	15.0
20-Oct-18	7.1	6.4	16.1	8.7	12.5	4.0
23-Oct-18	7.1	6.4	16.8	15.8	12.5	11.5
25-Oct-18	7.0	6.4	14.4	7.4	15.0	6.0
27-Oct-18	7.3	6.8	16.1	10.8	16.0	11.0
29-Oct-18	7.5	8.1	14.6	11.2	10.5	9.0
31-Oct-18	8.0	7.7	10.5	10.3	8.0	8.5

**Table 6-3 Water Quality Monitoring Results Associated only Contract 6**

Date	Dissolved Oxygen (mg/L)				Turbidity (NTU)				Suspended Solids (mg/L)			
	WM2A(a)	WM2A-Cx	WM2B	WM2B-C	WM2A(a)	WM2A-Cx	WM2B	WM2B-C	WM2A(a)	WM2A-Cx	WM2B	WM2B-C
2-Oct-18	6.9	7.2	*	*	24.4	5.8	*	*	14.5	<2	*	*
4-Oct-18	6.7	7.4	*	*	21.2	5.5	*	*	12.5	2.5	*	*
6-Oct-18	7.4	7.2	*	*	14.6	7.4	*	*	10.0	4.0	*	*
9-Oct-18	7.3	6.6	*	*	<b>75.2</b>	7.2	*	*	<b>104.5</b>	9.0	*	*
10-Oct-18#	#	#	*	*	<b>65.0</b>	6.4	*	*	<b>98.0</b>	3.0	*	*
11-Oct-18	6.6	7.0	*	*	<b>58.4</b>	13.1	*	*	<b>60.5</b>	11.0	*	*
12-Oct-18#	#	#	*	*	20.6	9.5	*	*	<b>32.0</b>	8.0	*	*
13-Oct-18	6.9	7.6	*	*	23.1	12.2	*	*	14.0	3.5	*	*
16-Oct-18	6.6	6.9	*	*	13.9	14.1	*	*	12.0	5.0	*	*
18-Oct-18	6.6	6.6	*	*	51.5	47.4	*	*	31.0	29.5	*	*
20-Oct-18	6.7	6.3	*	*	24.0	15.1	*	*	14.5	7.0	*	*
23-Oct-18	6.5	6.8	*	*	24.7	12.7	*	*	12.0	5.5	*	*
25-Oct-18	6.4	6.7	*	*	10.5	13.5	*	*	10.0	9.5	*	*
27-Oct-18	6.7	7.4	*	*	<b>214.0</b>	23.1	*	*	<b>168.0</b>	17.0	*	*
29-Oct-18	7.0	7.2	*	*	22.6	10.4	*	*	<b>26.0</b>	7.5	*	*
30-Oct-18#	#	#	*	*	18.6	9.2	*	*	14.0	6.0	*	*
31-Oct-18	7.5	7.2	*	*	8.0	11.6	*	*	5.0	4.5	*	*

Remarks: \* water sampling was unable to carry out at WM2B and WM2B-C due to shallow water (water depth under 150mm)

Bold and underline indicated Limit Level exceedance

(#) Additional water quality monitoring at the exceeded location(s) due to two consecutive monitoring days indicated Limit Level exceedance

**Table 6-4 Water Quality Monitoring Results Associated Contracts 2 and 6**

Date	Dissolved Oxygen (mg/L)		Turbidity (NTU)		Suspended Solids (mg/L)	
	WM3x	WM3-C	WM3x	WM3-C	WM3x	WM3-C
2-Oct-18	6.6	6.7	3.8	1.8	<2	<2
4-Oct-18	6.5	6.5	4.3	6.4	2.0	7.0
6-Oct-18	6.7	7.0	4.1	4.7	3.5	11.5
9-Oct-18	6.4	6.4	5.3	2.8	7.0	10.0
11-Oct-18	6.7	6.5	13.4	8.3	15.5	20.0
13-Oct-18	6.7	6.6	13.1	6.5	14.0	15.0
16-Oct-18	6.2	6.3	7.8	5.7	9.0	10.5
18-Oct-18	7.4	6.5	13.2	8.1	12.0	10.0
20-Oct-18	6.6	7.1	12.0	10.9	10.5	9.5
23-Oct-18	6.4	6.4	9.7	24.1	9.0	46.0
25-Oct-18	6.6	6.3	8.9	5.4	10.5	7.5
27-Oct-18	6.6	6.6	<b>71.4</b>	5.2	<b>100.5</b>	7.0
29-Oct-18	6.7	6.5	<b>133.5</b>	5.4	<b>114.5</b>	5.0
30-Oct-18#	#	#	<b>178.0</b>	5.7	<b>213.0</b>	7.0
31-Oct-18	6.8	6.7	13.3	7.6	10.0	6.0

Bold and underline indicated Limit Level exceedance

(#) Additional water quality monitoring at the exceeded location(s) due to two consecutive monitoring days indicated Limit Level exceedance

**Table 6-5 Action and Limit (A/L) Levels Exceedance Recorded**

Location	Dissolved Oxygen		Turbidity		Suspended Solids		Total Exceedance		Project Related exceedance	
	AL	LL	AL	LL	AL	LL	AL	LL	AL	LL
WM1	0	0	0	0	0	0	0	0	0	0
WM2A(a)	0	0	0	4	0	6	0	10	#	#
WM2B	0	0	0	0	0	0	0	0	0	0

Location	Dissolved Oxygen		Turbidity		Suspended Solids		Total Exceedance		Project Related exceedance	
	AL	LL	AL	LL	AL	LL	AL	LL	AL	LL
WM3x	0	0	0	3	0	3	0	6	#	#
WM4	0	0	0	0	0	0	0	0	0	0
<b>No of Exceedance</b>	0	0	0	7	0	9	0	16	0	0

# The exceedances recorded at WM2A(a) on 27 and 29 October and at WM3x on 27, 29 and 30 October 2018 are still underway by ET.

6.2.3 In this Reporting Period, a total of sixteen (16) Limit Level exceedances, namely seven (7) Limit Level exceedances of turbidity and nine (9) Limit Level exceedances of Suspended Solids were recorded for the Project and they are summarized in Table 6-5. Investigation reports for water quality exceedances have been conducted by ET accordingly. Investigation report revealed that the exceedances recorded at WM2A(a) on 9, 10, 11 and 12 October 2018 were not caused by the works under the Project. Furthermore, the investigation for exceedances recorded at WM2A(a) on 27 and 29 October 2018 and at WM3x on 27, 29 and 30 October 2018 are still underway by ET and the investigation result will be presented in next Monthly EM&A Report.

6.2.4 NOE was issued to relevant parties upon confirmation of the monitoring result. The investigation results and summary of exceedances are summarized in **Table 6-6**. The details of the completed investigation reports for the exceedances are attached in **Appendix N**.

**Table 6-6 Summary of Water Quality Exceedance in the Reporting Period**

Date of Exceedance	Location	Exceeded Parameter	Cause of Water Quality Exceedance In Brief
24 and 27 September 2018 (last reporting period)	WM2A(a)	Turbidity & SS	In our investigation, CCKJV had implemented water quality mitigation measures such as providing tarpaulin sheet for open slope and surface to minimize muddy runoff. There was no adverse water quality impact observed during the site inspection at works area of Bridge D. It is concluded that the exceedances were unlikely caused by the works under the Project.
9 and 10 October 2018	WM2A(a)	Turbidity & SS	In our investigation, CCKJV had implemented water quality mitigation measures such as providing tarpaulin sheet for open slope and surface to minimize muddy runoff. There was no adverse water quality impact observed during the site inspection at works area of Bridge D. It is concluded that the exceedances were unlikely caused by the works under the Project.
11 and 12 October 2018	WM2A(a)	Turbidity & SS	In our investigation, CCKJV had implemented water quality mitigation measures such as providing tarpaulin sheet for open slope and surface to minimize muddy runoff. In view of the heavy rainstorm on 10 October 2018 affecting the water quality of the river course in subsequent days, it is concluded that the exceedances were related to the impact of rainstorm and unlikely caused by the works under the Project.
27 and 29 October 2018	WM2A(a)	Turbidity & SS	The investigation is underway by ET and the investigation findings will be presented in next Reporting Period.
27, 29 and 30 October 2018	WM3x	Turbidity & SS	The investigation is underway by ET and the investigation findings will be presented in next Reporting Period.

## **7 ECOLOGY MONITORING**

### **7.1 GENERAL**

- 7.1.1 Ecology monitoring for woodland compensation shall be conducted at bi-monthly interval for the first year and the monitoring frequency would be reduced to quarterly from the second year.
- 7.1.2 The Ecology Monitoring for period of June to August 2018 was carried out on 3<sup>rd</sup> and 6<sup>th</sup> August 2018 by transects inspection and quadrat monitoring. The Quarterly Ecological Monitoring Report (June to August 2018) which verified by IEC has submitted to EPD as supplementary of the EM&A Report (August 2018) in September 2018. Besides, ecology monitoring is not required in the Reporting Period.

## 8 WASTE MANAGEMENT

### 8.1 GENERAL WASTE MANAGEMENT

8.1.1 Waste management was carried out in accordance with the Waste Management Plan (WMP) for each contract.

### 8.2 RECORDS OF WASTE QUANTITIES

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

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

8.2.2 The quantities of waste for disposal in this Reporting Period are summarized in *Tables 8-1* and *8-2* and the Monthly Summary Waste Flow Table is shown in *Appendix L*. Whenever possible, materials were reused on-site as far as practicable.

**Table 8-1 Summary of Quantities of Inert C&D Materials for the Project**

Type of Waste	Contract 2		Contract 3		Contract 4		Contract 6		Contract 7		Contract SS C505		Total Qty.
	Qty.	Disposal location	Qty.	Disposal location	Qty.	Disposal location	Qty.	Disposal location	Qty.	Disposal location	Qty.	Disposal location	
C&D Materials (Inert) (in '000m <sup>3</sup> )	3.2564	--	1.198	--	0	--	1.896	--	0.047	--	3.619	--	10.0164
Reused in this Contract (Inert) (in '000 m <sup>3</sup> )	0	--	0	--	0	--	0	--	0	--	0.196	--	0.196
Reused in other Contracts/ Projects (Inert) (in '000 m <sup>3</sup> )	1.1273	Recycling facility as approved alternative site	0	--	0	--	1.386	NENT	0	--	0	--	2.5133
Disposal as Public Fill (Inert) (in '000 m <sup>3</sup> )	2.1291	Tuen Mun 38	0.882	Tuen Mun 38	0	--	0.510	Tuen Mun 38	0.047	Tuen Mun 38	2.275	TKO 137	5.8431

**Table 8-2 Summary of Quantities of C&D Wastes for the Project**

Type of Waste	Contract 2		Contract 3		Contract 4		Contract 6		Contract 7		Contract SS C505		Total Quantity
	Qty.	Disposal location	Qty.	Disposal location	Qty.	Disposal location	Qty.	Disposal location	Qty.	Disposal location	Qty.	Disposal location	
Recycled Metal ('000kg) #	0	--	0	-	0	--	0	--	1.5	Licensed collector	351.580	Licensed collector	353.08
Recycled Paper / Cardboard Packing ('000kg) #	0.1700	Licensed collector	0	-	0	--	0.188	Licensed collector	0.2	Licensed collector	0.460	Licensed collector	1.018
Recycled Plastic ('000kg) #	1.0125	Licensed collector	0	-	0	--	0	--	0.001	Licensed collector	0.490	Licensed collector	1.5035
Chemical Wastes ('000kg) #	9.5200	Licensed collector	0	-	0	--	0	--	0	--	0	--	9.52
General Refuses ('000m <sup>3</sup> )	0.5969	NENT	0.115	NENT	0.012	NENT	0.855	NENT	0.2	NENT	2.035	NENT	3.8139

Remark #: Unit of recycled metal, recycled paper/ cardboard packing and recycled plastic under Contract 3 was in ('000m<sup>3</sup>) while the unit of chemical wastes for Contract 3 was in (m<sup>3</sup>).

**9 SITE INSPECTION**

**9.1 REQUIREMENTS**

9.1.1 According to the approved EM&A Manual, the environmental site inspection shall be formulation by ET Leader. Weekly environmental site inspections should carry out to confirm the environmental performance.

**9.2 FINDINGS / DEFICIENCIES DURING THE REPORTING MONTH**

**Contract 2**

9.2.1 In the Reporting Period, joint site inspection for Contract 2 to evaluate the site environmental performance has been carried out by the RE, IEC, ET and the Contractor on **5, 12, 19 and 26 October 2018**. No non-compliance was noted.

9.2.2 The findings / deficiencies of **Contract 2** that observed during the weekly site inspection are listed in **Table 9-1**.

**Table 9-1 Site Observations for Contract 2**

Date	Findings / Deficiencies	Follow-Up Status
28 September 2018 (last reporting period)	<ul style="list-style-type: none"> <li>Water appeared to be turbid was observed at south portal of discharge point. The contractor should properly treated the wastewater before discharge</li> </ul>	<ul style="list-style-type: none"> <li>The wastewater was properly treated.</li> </ul>
05 October 2018	<ul style="list-style-type: none"> <li>No adverse environmental issue was observed.</li> </ul>	<ul style="list-style-type: none"> <li>NA</li> </ul>
12 October 2018	<ul style="list-style-type: none"> <li>Free standing chemical containers were observed at South Portal. The Contractor should provide drip tray for any chemical containers to prevent leakage.</li> </ul>	<ul style="list-style-type: none"> <li>The chemical containers were removed.</li> </ul>
19 October 2018	<ul style="list-style-type: none"> <li>No adverse environmental issue was observed.</li> </ul>	<ul style="list-style-type: none"> <li>NA</li> </ul>
26 October 2018	<ul style="list-style-type: none"> <li>Free standing chemical containers were observed at South Portal. The Contractor should provide drip trays for any chemical containers to prevent leakage.</li> <li>Water appeared to be turbid was observed at South Portal. The contractor should provide proper mitigation measures to prevent muddy water discharge from the site.</li> <li>The Contractor was reminded to maintain the WetSep in proper function.</li> <li>The Contractor was reminded to properly treated the wastewater before discharge.</li> </ul>	<ul style="list-style-type: none"> <li>The chemical containers were removed.</li> <li>Muddy water discharge was prevented.</li> <li>Not required for reminder.</li> <li>Not required for reminder.</li> </ul>

**Contract 3**

9.2.3 In the Reporting Period, joint site inspection for Contract 3 to evaluate the site environmental performance has been carried out by the RE, IEC, ET and the Contractor on **4, 11, 18 and 24 October 2018**. No non-compliance was noted.

9.2.4 The findings / deficiencies of **Contract 3** that observed during the weekly site inspection are listed in **Table 9-2**.

**Table 9-2 Site Observations for Contract 3**

Date	Findings / Deficiencies	Follow-Up Status
4 October 2018	<ul style="list-style-type: none"> <li>Open slope was observed near BC02. The Contractor should provide tarpaulin sheet to</li> </ul>	<ul style="list-style-type: none"> <li>Open slope was covered with</li> </ul>



Date	Findings / Deficiencies	Follow-Up Status
	cover it to avoid muddy surface runoff.	tarpaulin sheets.
11 October 2018	<ul style="list-style-type: none"> <li>Leakage of damaged pipe was observed near BC02. The Contractor should replace the pipe to prevent leakage of wastewater to the stream.</li> <li>The Contractor was reminded to provide sand bags to prevent surface runoff.</li> </ul>	<ul style="list-style-type: none"> <li>The pipe has been replaced.</li> <li>Not required for reminder.</li> </ul>
18 October 2018	<ul style="list-style-type: none"> <li>The Contractor was reminded to fill in the record after monitoring the pH value of the WetSep.</li> </ul>	<ul style="list-style-type: none"> <li>Not required for reminder.</li> </ul>
24 October 2018	<ul style="list-style-type: none"> <li>No adverse environmental issue was observed.</li> </ul>	<ul style="list-style-type: none"> <li>NA</li> </ul>

**Contract 4**

9.2.5 In the Reporting Period, joint site inspection for Contract 4 to evaluate the site environmental performance has been carried out by the RE, IEC, ET and the Contractor on **5, 12, 19 and 22 October 2018**. No non-compliance was noted.

9.2.6 The findings / deficiencies of **Contract 4** that observed during the weekly site inspection are listed in **Table 9-3**.

**Table 9-3 Site Observations for Contract 4**

Date	Findings / Deficiencies	Follow-Up Status
5 October 2018	<ul style="list-style-type: none"> <li>No adverse environmental issue was observed.</li> </ul>	<ul style="list-style-type: none"> <li>NA</li> </ul>
12 October 2018	<ul style="list-style-type: none"> <li>No adverse environmental issue was observed.</li> </ul>	<ul style="list-style-type: none"> <li>NA</li> </ul>
19 October 2018	<ul style="list-style-type: none"> <li>No adverse environmental issue was observed.</li> </ul>	<ul style="list-style-type: none"> <li>NA</li> </ul>
22 October 2018	<ul style="list-style-type: none"> <li>No adverse environmental issue was observed.</li> </ul>	<ul style="list-style-type: none"> <li>NA</li> </ul>

**Contract 6**

9.2.7 In the Reporting Period, joint site inspection for Contract 6 to evaluate the site environmental performance has been carried out by the RE, IEC, ET and the Contractor on **4, 11, 18 and 25 October 2018**. No non-compliance was noted.

9.2.8 The findings / deficiencies of **Contract 6** that observed during the weekly site inspection are listed in **Table 9-4**.

**Table 9-4 Site Observations for Contract 6**

Date	Findings / Deficiencies	Follow-Up Status
4 October 2018	<ul style="list-style-type: none"> <li>No adverse environmental issue was observed.</li> </ul>	<ul style="list-style-type: none"> <li>NA</li> </ul>
11 October 2018	<ul style="list-style-type: none"> <li>The Contractor was reminded to maintain the site entrance clean and tidy.</li> </ul>	<ul style="list-style-type: none"> <li>Not required for reminder.</li> </ul>
18 October 2018	<ul style="list-style-type: none"> <li>Muddy road was observed at Ping Yeung, The Contractor should provide proper mitigation measures to clean the mud and maintain the road clean and tidy, also, wash the wheels thoroughly before leaving the site.</li> <li>Muddy runoff to public road and stream was observed near lighting pole EB5345. The Contractor should provide proper mitigation measures to ensure all wastewater was treated before discharge.</li> </ul>	<ul style="list-style-type: none"> <li>The Road at Ping Yeung was cleaned and maintained.</li> <li>No muddy run-off to public road was observed near lighting pole EB5345.</li> </ul>
25 October	<ul style="list-style-type: none"> <li>The Contractor was reminded to spray water</li> </ul>	<ul style="list-style-type: none"> <li>Not required for</li> </ul>

Date	Findings / Deficiencies	Follow-Up Status
2018	regularly at exposed work area of Ping Yeung interchange to avoid dust emission. <ul style="list-style-type: none"> <li>The Contractor was reminded to avoid muddy surface run-off into public access at Ping Yeung interchange.</li> </ul>	reminder. <ul style="list-style-type: none"> <li>Not required for reminder.</li> </ul>

**Contract SS C505**

9.2.9 In the Reporting Period, joint site inspection for Contract SS C505 to evaluate the site environmental performance has been carried out by the RE, ET and the Contractor on **3, 10, 15, 25 and 31 October 2018** in which IEC joined the site inspection on **25 October 2018**. No non-compliance was noted.

9.2.10 The findings / deficiencies of **Contract SS C505** that observed during the weekly site inspection are listed in **Table 9-5**.

**Table 9-5 Site Observations for Contract SS C505**

Date	Findings / Deficiencies	Follow-Up Status
27 September 2018 (Last reporting period)	<ul style="list-style-type: none"> <li>Two unknown chemical containers were observed on the ground of 1st floor of PTB. The contractor should check whether they are chemical wastes, if yes they should properly handle and place chemical containers inside drip tray to avoid leakage and provide with proper labelling.</li> <li>Cement grouting activity without proper shelter area was observed at 1st floor of PTB. The Contractor should provide shelter area with three-side and top for cement grouting activity to avoid dust emission.</li> </ul>	<ul style="list-style-type: none"> <li>Unknown chemical containers were removed.</li> <li>Three-side shelter was provided.</li> </ul>
3 October 2018	<ul style="list-style-type: none"> <li>Stagnant water was observed at first floor of PTB(west side).The Contractor should remove the stagnant water regularly to prevent mosquito breeding,</li> <li>Free standing chemical containers were observed at first floor of PTB. The Contractor should provide drip tray for any chemical containers to prevent leakage.</li> </ul>	<ul style="list-style-type: none"> <li>Stagnant water was removed.</li> <li>The chemical containers were removed.</li> </ul>
10 October 2018	<ul style="list-style-type: none"> <li>Open stockpile was observed under bridge 5. The Contractor should provide tarpaulin sheet to cover it to prevent dust emission.</li> <li>Free standing chemical containers were observed at No.15 Stair. The Contractor should provide drip tray for any chemical containers to prevent leakage..</li> </ul>	<ul style="list-style-type: none"> <li>Water spraying was provided.</li> <li>Chemical containers were removed.</li> </ul>
15 October 2018	<ul style="list-style-type: none"> <li>Stagnant water was observed at PTB RF. The Contractor should remove the stagnant water to prevent mosquito breeding.</li> </ul>	<ul style="list-style-type: none"> <li>Stagnant water has been removed.</li> </ul>
25 October 2018	<ul style="list-style-type: none"> <li>No adverse environmental issue was observed.</li> </ul>	<ul style="list-style-type: none"> <li>NA</li> </ul>
31 October 2018	<ul style="list-style-type: none"> <li>No adverse environmental issue was observed.</li> </ul>	<ul style="list-style-type: none"> <li>NA</li> </ul>

**Contract 7**

9.2.11 In the Reporting Period, joint site inspection for Contract 7 to evaluate the site environmental performance has been carried out by the RE, IEC, ET and the Contractor on **5, 12, 16 and 26 October 2018**. No non-compliance was noted.

9.2.12 The findings / deficiencies of **Contract 7** that observed during the weekly site inspection are listed in **Table 9-6**.

**Table 9-6 Site Observations for Contract 7**

<b>Date</b>	<b>Findings / Deficiencies</b>	<b>Follow-Up Status</b>
5 October 2018	<ul style="list-style-type: none"> <li>Stagnant water was observed near Bridge C. The Contractor should provide proper mitigation measure to avoid mosquito breeding.</li> </ul>	<ul style="list-style-type: none"> <li>The stagnant water was removed.</li> </ul>
12 October 2018	<ul style="list-style-type: none"> <li>Stagnant water was observed on the ground. The Contractor should remove the stagnant water to prevent mosquito breeding.</li> <li>The Contractor was reminded to clean the sedimentation tank regularly.</li> </ul>	<ul style="list-style-type: none"> <li>Stagnant water was removed.</li> <li>Not required for reminder.</li> </ul>
16 October 2018	<ul style="list-style-type: none"> <li>Oil stain was observed on the ground. The Contractor should clean it up and dispose as chemical waste.</li> </ul>	<ul style="list-style-type: none"> <li>Oil stain has been removed.</li> </ul>
26 October 2018	<ul style="list-style-type: none"> <li>No adverse environmental issue was observed.</li> </ul>	<ul style="list-style-type: none"> <li>NA</li> </ul>

9.2.13 General housekeeping such as daily site tidiness and cleanliness should be maintained for all Contracts. Furthermore, the Contractors were reminded to implement Waste Management Plan of the Project.

**10 ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE****10.1 ENVIRONMENTAL COMPLAINT, SUMMONS AND PROSECUTIONS**

10.1.1 In the Reporting Period, three (3) documented environmental complaints were received under the EM&A programme with respect to the dust, muddy water and noise issues. No summons and prosecution under the EM&A Programme was lodged for all Contracts. The status of the investigation report in previous months is summarized below.

10.1.2

Date of complaint	Complaint Detail	Investigation Status
5 October 2018	A public complaint was received from project hotline on 5 October 2018 stated that the section of road near the junction of Sha Tau Kok Road and Wo Keng Shan Road and site exit at Tai Tong Wu was dusty and full of mud. There were no workers to wash the vehicles' wheels at the site exit and the complainant requested the relevant department to follow up.	In our investigation, the Contractors have implemented wheel washing facilities and no dust and soil carrying by site vehicles to STK road were observed. Having inspected the existing condition of STK Road and WKS Road which away from the construction site, soil and debris were also found at the middle and edges of the road which suspected to be caused by frequent use of dump truck transporting loose material to NENT and the majority of dump truck was not belong to LT/HYW project. Therefore, it is considered that the complaint was not valid to the project. The IR was completed by ET without comment by IEC which enclosed in <i>Appendix O</i> .
5 October 2018	A public complaint was received from 1823 on 5 October 2018 regarding muddy road found on Ping Yeung Village between Lamp Poles EB5343 to EB5350. On 10 October 2018, the North District Office contacted the complainant and figured out that the complaint was in relation to water pollution which suspected to be raised by Liantang/Heung Yuen Wai Boundary Control Point Project (the Project). The complainant also mentioned about the noise of construction equipment that leading to nuisance to nearby residents at night.	In our investigation, it is considered the muddy road was related to the unpaved haul road near the Ping Yeung Interchange and insufficient cleaning of vehicles at site exit. There was no discharge of muddy water observed in relation to the project during the site inspection and it is considered that wastewater generated from site work was limited due to the work nature. To address the complainant's concerns, the Contractor immediately paved the site haul road using reused milled asphalt. Moreover, the Contractor will enhance the management of wheel washing site exit by deployment of labour for wheel washing and better maintenance of the wheel washing bay. The IR was completed by ET without comment by IEC which enclosed in <i>Appendix O</i> .
25 October 2018	A public complaint was received from 1823 on 25 October 2018 regarding dust concern in Shui Lau Hang Village intersection with Ng Chow Road as “投訴人投訴粉嶺坪峯附近的工程引致十分大塵，指蓮塘/香園圍口岸的工程引致水流坑村四處都十分大塵，投訴人指問題已經維持一年有多，影響居民生活，希望部門能派出洗地車經過由禾徑山路轉入五洲路大概五分鐘的路段，因為該路段深受工程所引致的空氣污染問題，希望部門能改善有關問題。”	In our investigation, the Contractor has implemented wheel washing facilities and no loose materials carrying by site vehicles to Ng Chow Road was observed. Having inspected the existing condition of Ng Chow Road near Shui Lau Hang Village, it is considered that the dust impact was likely to be the localized traffic dust impact and therefore the complaint is not valid to the project. The IR was completed by ET without comment by IEC which enclosed in <i>Appendix O</i> .

10.1.3 The statistical summary of environmental complaint is presented in *Tables 10-1, 10-2 and 10-3.*

**Table 10-1 Statistical Summary of Environmental Complaints**

Reporting Period	Contract No	Environmental Complaint Statistics			Project related complaint
		Frequency	Cumulative	Complaint Nature	
19 May 2014 – 30 September 2018	Contract 2	0	35	<ul style="list-style-type: none"> <li>• (19) Water Quality</li> <li>• (8) Dust</li> <li>• (5) Noise</li> <li>• (1) dust &amp; noise</li> <li>• (1) waste management</li> <li>• (1) Water quality and dust</li> </ul>	(7) water quality (2) dust (1) noise
06 Nov 2013 – 30 September 2018	Contract 3	0	6	<ul style="list-style-type: none"> <li>• (2) Dust</li> <li>• (3) Water quality</li> <li>• (1) Noise</li> </ul>	0
16 Aug 2013 – 30 September 2018	Contract 5	0	4	<ul style="list-style-type: none"> <li>• (3) Dust</li> <li>• (1) Noise</li> </ul>	0
16 Aug 2013 – 30 September 2018	Contract 6	0	39	<ul style="list-style-type: none"> <li>• (24) Water Quality</li> <li>• (8) Dust</li> <li>• (3) Noise</li> <li>• (1) Nuisance</li> <li>• (1) Noise and dust</li> <li>• (2) Water quality and dust</li> </ul>	(8) water quality (3) dust (1) Nuisance (1) Water quality and dust
15 Feb 2016 – 30 September 2018	Contract 7	0	3	<ul style="list-style-type: none"> <li>• (1) Noise</li> <li>• (2) Water quality and dust</li> </ul>	(1) Water quality and dust
16 Aug 2013 – 30 September 2018	SS C505	0	5	<ul style="list-style-type: none"> <li>• (1) Noise</li> <li>• (1) dust</li> <li>• (2) Water quality and dust</li> <li>• (1) Water quality</li> </ul>	(1) Water quality and dust
1 – 31 October 2018	Contract 2	1	36	<ul style="list-style-type: none"> <li>• (19) Water Quality</li> <li>• (9) Dust</li> <li>• (5) Noise</li> <li>• (1) dust &amp; noise</li> <li>• (1) waste management</li> <li>• (1) Water quality and dust</li> </ul>	NA
	Contract 3	0	6	<ul style="list-style-type: none"> <li>• (2) Dust</li> <li>• (3) Water quality</li> <li>• (1) Noise</li> </ul>	NA
	Contract 4	0	0	NA	NA
	Contract 6	3	42	<ul style="list-style-type: none"> <li>• (24) Water Quality</li> <li>• (10) Dust</li> <li>• (3) Noise</li> <li>• (1) Nuisance</li> <li>• (1) Noise and dust</li> <li>• (2) Water quality and dust</li> <li>• (1) Water quality and noise</li> </ul>	(1) Water quality and noise
	Contract 7	0	3	<ul style="list-style-type: none"> <li>• (1) Noise</li> <li>• (2) Water quality and dust</li> </ul>	NA

Reporting Period	Contract No	Environmental Complaint Statistics			Project related complaint
		Frequency	Cumulative	Complaint Nature	
	SS C505	0	5	<ul style="list-style-type: none"> <li>• (1) Noise</li> <li>• (1) dust</li> <li>• (2) Water quality and dust</li> <li>• (1) Water quality</li> </ul>	NA

**Table 10-2 Statistical Summary of Environmental Summons**

Reporting Period	Contract No	Environmental Summons Statistics		
		Frequency	Cumulative	Complaint Nature
19 May 2014 – 30 September 2018	Contract 2	0	1	contravening the Water Pollution Control (General) Regulations
06 Nov 2013 – 30 September 2018	Contract 3	0	0	NA
16 Aug 2013 – 30 September 2018	Contract 5	0	0	NA
16 Aug 2013 – 30 September 2018	Contract 6	0	0	NA
15 Feb 2016 – 30 September 2018	Contract 7	0	0	NA
16 Aug 2013 – 30 September 2018	SS C505	0	0	NA
1 – 31 October 2018	Contract 2	0	1	NA
	Contract 3	0	0	NA
	Contract 4	0	0	NA
	Contract 6	0	0	NA
	Contract 7	0	0	NA
	SS C505	0	0	NA

**Table 10-3 Statistical Summary of Environmental Prosecutions**

Reporting Period	Contract No	Environmental Prosecutions Statistics		
		Frequency	Cumulative	Complaint Nature
19 May 2014 – 30 September 2018	Contract 2	0	1	contravening the Water Pollution Control (General) Regulations
06 Nov 2013 – 30 September 2018	Contract 3	0	0	NA
16 Aug 2013 – 30 September 2018	Contract 5	0	0	NA
16 Aug 2013 – 30 September 2018	Contract 6	0	0	NA
15 Feb 2016 – 30 September 2018	Contract 7	0	0	NA
16 Aug 2013 – 30 September 2018	SS C505	0	0	NA
1 – 31 October 2018	Contract 2	0	1	NA
	Contract 3	0	0	NA
	Contract 4	0	0	NA
	Contract 6	0	0	NA
	Contract 7	0	0	NA
	SS C505	0	0	NA



## 11 IMPLEMENTATION STATUS OF MITIGATION MEASURES

### 11.1 GENERAL REQUIREMENTS

- 11.1.1 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 and waste and they are summarized presented in *Appendix M*.
- 11.1.2 All contracts 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 Contracts 2, 3, 4, 5, 6, 7 and Contract SS C505 in this Reporting Period are summarized in *Table 11-1*.

**Table 11-1 Environmental Mitigation Measures**

Issues	Environmental Mitigation Measures
Water Quality	<ul style="list-style-type: none"> <li>Wastewater to be treated by the wastewater treatment facilities i.e. sedimentation tank or similar facility before discharge.</li> </ul>
Air Quality	<ul style="list-style-type: none"> <li>Maintain damp / wet surface on access road</li> <li>Low vehicular speed within the works areas.</li> <li>All vehicles must use wheel washing facility before off site</li> <li>Sprayed water during breaking works</li> <li>A cleaning truck was regularly performed on the public road to prevent fugitive dust emission</li> </ul>
Noise	<ul style="list-style-type: none"> <li>Restrain operation time of plants from 07:00 to 19:00 on any working day except for Public Holiday and Sunday.</li> <li>Keep good maintenance of plants</li> <li>Place noisy plants away from residence or school</li> <li>Provide noise barriers or hoarding to enclose the noisy plants or works</li> <li>Shut down the plants when not in used.</li> </ul>
Waste and Chemical Management	<ul style="list-style-type: none"> <li>On-site sorting prior to disposal</li> <li>Follow requirements and procedures of the “Trip-ticket System”</li> <li>Predict required quantity of concrete accurately</li> <li>Collect the unused fresh concrete at designated locations in the sites for subsequent disposal</li> </ul>
General	<ul style="list-style-type: none"> <li>The site was generally kept tidy and clean.</li> </ul>

### 11.2 TENTATIVE CONSTRUCTION ACTIVITIES IN THE COMING MONTH

- 11.2.1 As advised by the ER, the construction works under Contract 5 was substantially completed on 31 August 2016. Construction activities for other Contracts in the coming month are listed below:

#### Contract 2

Mid-Vent Portal	<ul style="list-style-type: none"> <li>Building fit out and E&amp;M installation</li> <li>Construction of flexible barrier and permanent drainage</li> <li>Landscaping works.</li> </ul>
North Portal	<ul style="list-style-type: none"> <li>Construction of retaining wall, permanent drainage and slip road</li> <li>Tunnel backfilling, VE panel and E&amp;M installation</li> <li>Construction of tunnel internal structure</li> <li>Landscaping works</li> <li>Dismantling of MS slurry and waste water treatment plant</li> <li>Installation of WetSep system to replace the MS plant</li> <li>North ventilation building fit out and E&amp;M installation</li> <li>Construction of flexible barrier</li> </ul>
South Portal	<ul style="list-style-type: none"> <li>Construction of tunnel internal structure, tunnel backfilling and E&amp;M installation</li> <li>South ventilation building fit out and E&amp;M installation</li> <li>Construction of flexible barrier</li> <li>Landscaping works.</li> <li>Backfilling and construction of slip road</li> </ul>

Admin Building	<ul style="list-style-type: none"> <li>• Building fit out, permanent drainage and E&amp;M installation</li> <li>• Landscaping works</li> </ul>
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**Contract 3**

- Cable detection and trial trenches
- Remaining works on new Footbridge
- Noise barrier construction
- Road pavement works
- Water main laying works (on Grade and on bridge deck)
- Installation of Noise barrier steel column & panel, and sign gantry (on Grade and on bridge deck)
- Construction of Pavilion and Pai Lau
- Road Drainage Works
- Construction of retaining wall
- Landscaping works

**Contract 4**

- E&M installation at Admin Building
- E&M installation at Ventilation Building
- E&M installation at tunnel
- Cladding installation at Cheung Shan Tunnel
- Sign fabrication & installation

**Contract 6**

- Bridge construction
- Tunnel Works
- Sewage Treatment Plant Construction
- Tunnel Ventilation Building Construction
- Slip Road/At-grade Road/Periphery Road Construction

**Contract 7**

- Profile barrier construction at Bridge A and E
- Noise barrier construction at Bridge D and E
- Parapet installation at Bridge A, B, D and E
- Drainage pipe laying at Bridge A, B, D and E
- Waterproofing and drainage works at Roof of Bridge C
- Bitumen pavement at Bridge A and E

**Contract SS C505**

- Passenger Terminal Building (PTB) G/F - Plant Room Structure Works, Backfilling & Drainage, Under Ground Utilities, Fence Wall and On Grade Slab
- PTB - ABWF Works & MEP Installation - Front/Back of House Area, External Staircases, External Staircases ABWF Works, Hall Block External Façade, Southern Entrance Construction & Major Plant Rooms
- PTB - External Works incl. Building 21-24, M/F External Wall (Ewall), Roof & Upper Roof Roofing Works, Podium Coach Canopy, 21&22 (C&PC KIOSKS) & 23&24 (PC Examination Building & MSRVSS) Superstructure & ABWF Works and MEP Installation, Podium Open Area Waterproofing, Paving, Hard and Soft Landscaping works, Ambulance Canopy / Glazed Canopy
- Bridge C Integrated ABWF and MEP Installation Works (C7 Portion) - Arrival & Departure Hall, Staircases, Test & Commissioning
- Bldg 1 - C&ED Detector Dog Base Phase 1 - Integrated ABWF & MEP Works Works at G/F & R/F
- Bldg 2 - HKPF Building and Observation Tower Phase 1 - External Works, Integrated ABWF & MEP Works at G/F to 4/F and Observation Tower (including Lift)

- Bldg 3 - Fire Station and Drill Tower Phase 1 - External Works, Integrated ABWF & MEP Works at G/F to UR/F, Drill Tower
- Bldg 4 - Cargo Examination Building (Inbound) Phase 1 - External Works at G/F under Steel Roof, Integrated ABWF & MEP Works at G/F to R/F, and Loading Dock
- Bldg 5 - Cargo Examination Building (Outbound) Phase 2 - External Works at G/F under Steel Roof, Integrated ABWF & MEP Works at G/F to R/F, Loading Dock
- Bldg 6 - Fixed X-ray Vehicle Inspection System (FXRVIS) Buildings (Inbound) Phase 1 - External Works (Fence Wall), Integrated ABWF & MEP Works at G/F to R/F
- Bldg 7 - Fixed X-ray Vehicle Inspection System (FXRVIS) Buildings (Outbound) Phase 2 - External Works, Integrated ABWF & MEP Works at G/F
- Bldg 8 - MXRVSS (Inbound) Phase 2 - Structure Works, Integrated ABWF and MEP Works at G/F & R/F
- Bldg 9 - MXRVSS (Outbound) Phase 2 - Structure Works at G/F, Integrated ABWF and MEP Works at G/F & Envelope
- Bldg 10 - GV Kiosk (Inbound) Phase 2 - On-Grade Slab, Steel Structure Works, Integrated ABWF and MEP Works at G/F & R/F
- Bldg 11 - GV Kiosk (Outbound) Phase 2 - On-Grade Slab, Steel Structure Works, Integrated ABWF & MEP Works at G/F & R/F
- Bldg 12 - Public Toilets (Inbound) Phase 2 - Integrated ABWF and MEP Works at G/F & Envelope
- Bldg 13 - Public Toilets (Outbound) Phase 2 - Structures Works, Integrated ABWF and MEP Works at G/F & R/F
- Bldg 14 - Disinsection Facilities (Inbound) Phase 2 - Integrated ABWF & MEP Works at G/F & Envelope
- Bldg 15 - Disinsection Facilities (Outbound) Phase 2 - Substructure and Structure Works, Integrated ABWF & MEP Works at G/F & Envelope
- Bldg 16 - Weigh Station Phase 2 - Integrated ABWF and MEP Works at G/F & Envelope
- Bldg 17 - EUVSS & Monitoring Room Phase 2 - Structure Works, Integrated ABWF & MEP Works at G/F & R/F
- Bldg 18 - Refuse Collection Point Phase 2 - Integrated ABWF and MEP Works at G/F & Envelope
- Bldg 25 - Traffic Control Office (Inbound) Phase 2 - Integrated ABWF and MEP Works at G/F & Envelope
- Bldg 26 - Traffic Control Office (Outbound) Phase 2 - Structure Works, Integrated ABWF and MEP Works at G/F & Envelope
- Bldg 27 - Inspection Post Phase 2 - Integrated ABWF and MEP Work at G/F & Envelope
- Bldg 28 - Guard Booth (Inbound) Phase 2 - Structure Works, Integrated ABWF and MEP Works at G/F & Envelope
- Bldg 29 - Guard Booth (Vehicle Detention Area) Phase 2 - Structure Works, Integrated ABWF and MEP Works at G/F & Envelope
- Bldg 30 - Guard Booth (Outbound) Phase 2 - Structure Works, Integrated ABWF and MEP Works at G/F & Envelope
- Bldg 31 - Guard Booth (Inbound) Phase 2 - Structure Works, Integrated ABWF and MEP Works at G/F & Envelope
- Bldg 32/33/34/35 - Steel Canopies Phase 2 - Structure Works, Integrated ABWF and MEP Works
- Bldg 37/38/39/40 - Elevated Walkway (E1, E2, E3 & E4) Phase 2 - Structures Works, ABWF and BS Works
- Vehicular bridges 1 to 5 Phase 3 - Retaining walls, Road and Finishes Works
- External Works - CLP Cable & Power ON Transfer room
- External Works - Water Meter Room Connection (Inbound & Outbound)
- External Works - External Utilities Works for Phase 1 & 2 FS Inspection, DSD Inspection
- External Works - Road & Pavement Works for Inbound Phase 1 FS Inspection (Concrete Pavement)

- External Works - Landscape for Inbound & Outbound Area
- Testing & Commissioning (T&C) and FSD/SCCU Inspection - Phase 1 - Bldg 1 to 4, 6 & 36

### 11.3 KEY ISSUES FOR THE COMING MONTH

- 11.3.1 Key issues to be considered in the coming month for Contracts 2, 3, 4, 6, 7 and SS C505 include:
- Implementation of control measures for rainstorm;
  - Regular clearance of stagnant water during wet season;
  - Implementation of dust suppression measures at all times;
  - Potential wastewater quality impact due to surface runoff;
  - Potential fugitive dust quality impact due from the dry/loose/exposure soil surface/dusty material;
  - Disposal of empty engine oil containers within site area;
  - Ensure dust suppression measures are implemented properly;
  - Sediment catch-pits and silt removal facilities should be regularly maintained;
  - Management of chemical wastes;
  - Discharge of site effluent to the nearby wetland, stockpiling or disposal of materials, and any dredging or construction area at this area are prohibited;
  - Follow-up of improvement on general waste management issues; and
  - Implementation of construction noise preventative control measures

## 12 CONCLUSIONS AND RECOMMENDATIONS

### 12.1 CONCLUSIONS

- 12.1.1 This is the 63<sup>rd</sup> monthly EM&A report presenting the monitoring results and inspection findings for the Reporting Period from 1 to 31 October 2018.
- 12.1.2 For air quality monitoring, no 1-hour TSP monitoring results triggered the Action /Limit Level, however, two (2) Limit Level exceedances of 24-hour TSP were recorded. Investigation for the cause for the exceedance was still underway by ET.
- 12.1.3 In the Reporting Period, no construction noise measurement results that exceeded the Limit Level were recorded. Moreover, no valid noise complaint which triggered an Action Level exceedance was recorded.
- 12.1.4 For water quality monitoring, a total of sixteen (16) Limit Level exceedances, namely seven (7) Limit Level exceedance of turbidity and nine (9) Limit Level exceedances of Suspended Solids were recorded for the Project. Investigation report revealed that the exceedances recorded at WM2A(a) on 9 to 12 October 2018 were not caused by the works under the Project. Furthermore, the investigation for exceedances recorded at WM2A(a) on 27 and 29 October 2018 and at WM3x on 27, 29 and 30 October 2018 are still underway by ET and the investigation result will be presented in next Monthly EM&A Report.
- 12.1.5 In this Reporting Period, three (3) documented environmental complaints were received under the EM&A programme with respective to the dust, muddy water and noise issues. Two complaints regarding to dust concerns near the junction on Sha Tau Kok Road and Wo Keng Shan Road and Shui Lau Hang Village were considered not related to the project. For the complaint about muddy road and noise nuisance found on Ping Yeung Village, investigation revealed that it was related to the unpaved haul road near the Ping Yeung Interchange and insufficient cleaning of vehicles at site exit. Rectification works has immediately undertaken by the Contractor. Besides, the noise nuisance was found no related to the project.
- 12.1.6 No summons and prosecution under the EM&A Programme was lodged in the Reporting Period.
- 12.1.7 During the Reporting Period, weekly joint site inspection by the RE, IEC, ET with the relevant Main-contractor were carried out for Contracts 2, 3, 4, 6 and 7 in accordance with the EM&A Manual stipulation. For Contract SS C505, weekly joint site inspection was carried out by the RE, IEC, ET and main-contractor whereas IEC performed monthly site inspection. No non-compliance observed during the site inspection.

### 12.2 RECOMMENDATIONS

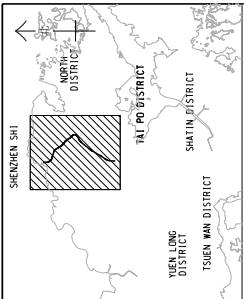
- 12.2.1 During dry season, special attention should be paid on the potential construction dust impact since most of the construction sites are adjacent to villages. The Contractor should fully implement the construction dust mitigation measures as appropriately.
- 12.2.2 Preventive measures for muddy water or other water pollutants from site surface flow to local stream such as Kong Yiu Channel, Ma Wat Channel, Ping Yuen River, Kwan Tei River or public area should be properly maintained. The Contractors should paid special attention on water quality mitigation measures and fully implement according ISEMM of the EM&A Manual, in particular for working areas near Ma Wat Channel and Ping Yuen River.
- 12.2.3 In addition, all effluent discharge shall be ensure to fulfill Technical Memorandum of Effluent Discharged into Drainage and Sewerage Systems, inland and Coastal Waters criteria or discharge permits stipulation.
- 12.2.4 Construction noise would be a key environmental issue during construction work of the Project. Noise mitigation measures such as using quiet plants should be implemented in accordance with the EM&A requirement.

- 12.2.5 Since most of construction sites under the Project are located adjacent to villages, the Contractors should fully implement air quality mitigation measures to reduce construction dust emission.
- 12.2.6 Furthermore, daily cleaning and weekly tidiness shall be properly performed and maintained. In addition, mosquito control should be kept to prevent mosquito breeding on site.



## **Appendix A**

### **Layout plan of the Project**

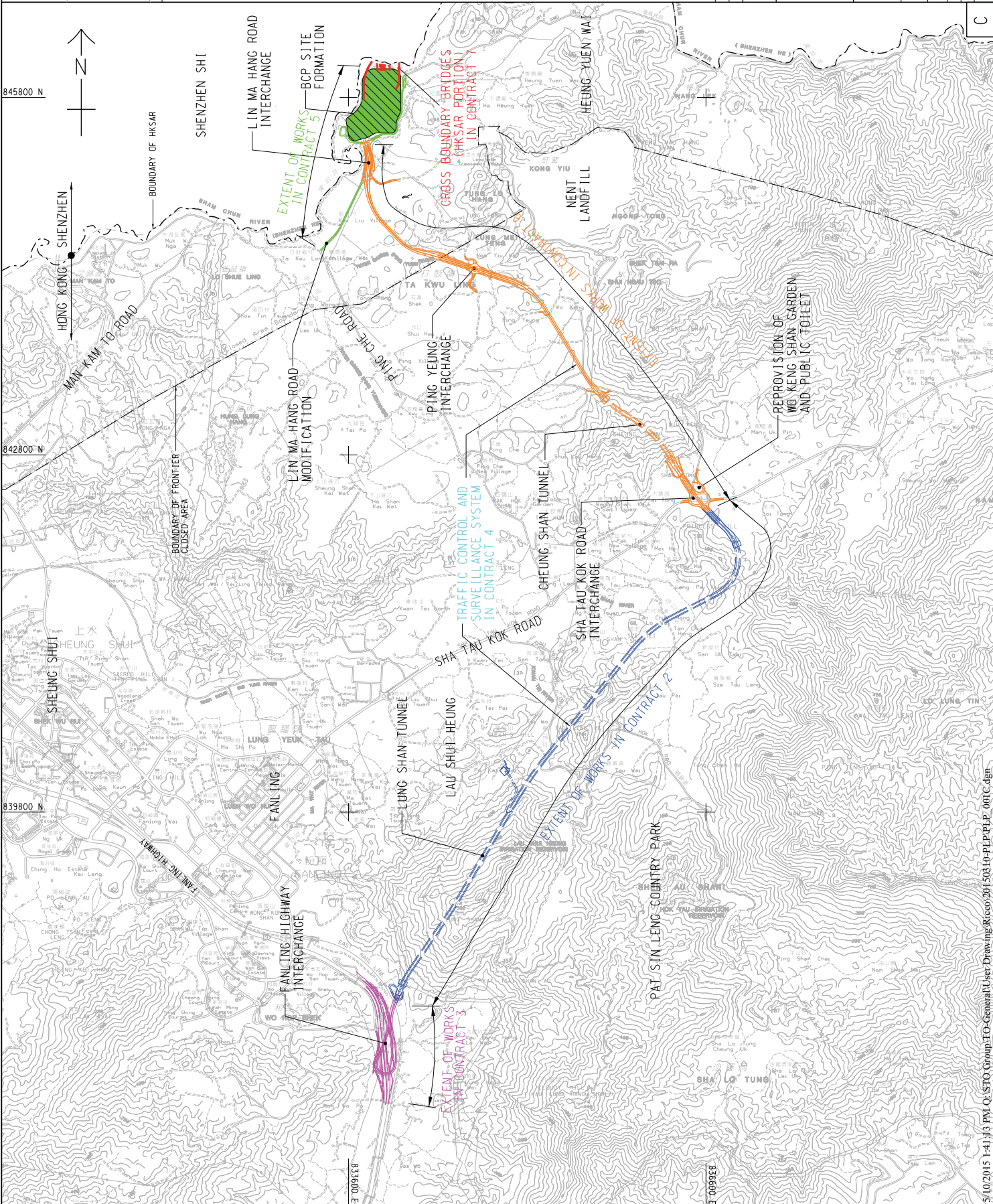


**LOCATION PLAN**  
SCALE 1 : 3000

**LEGEND:**

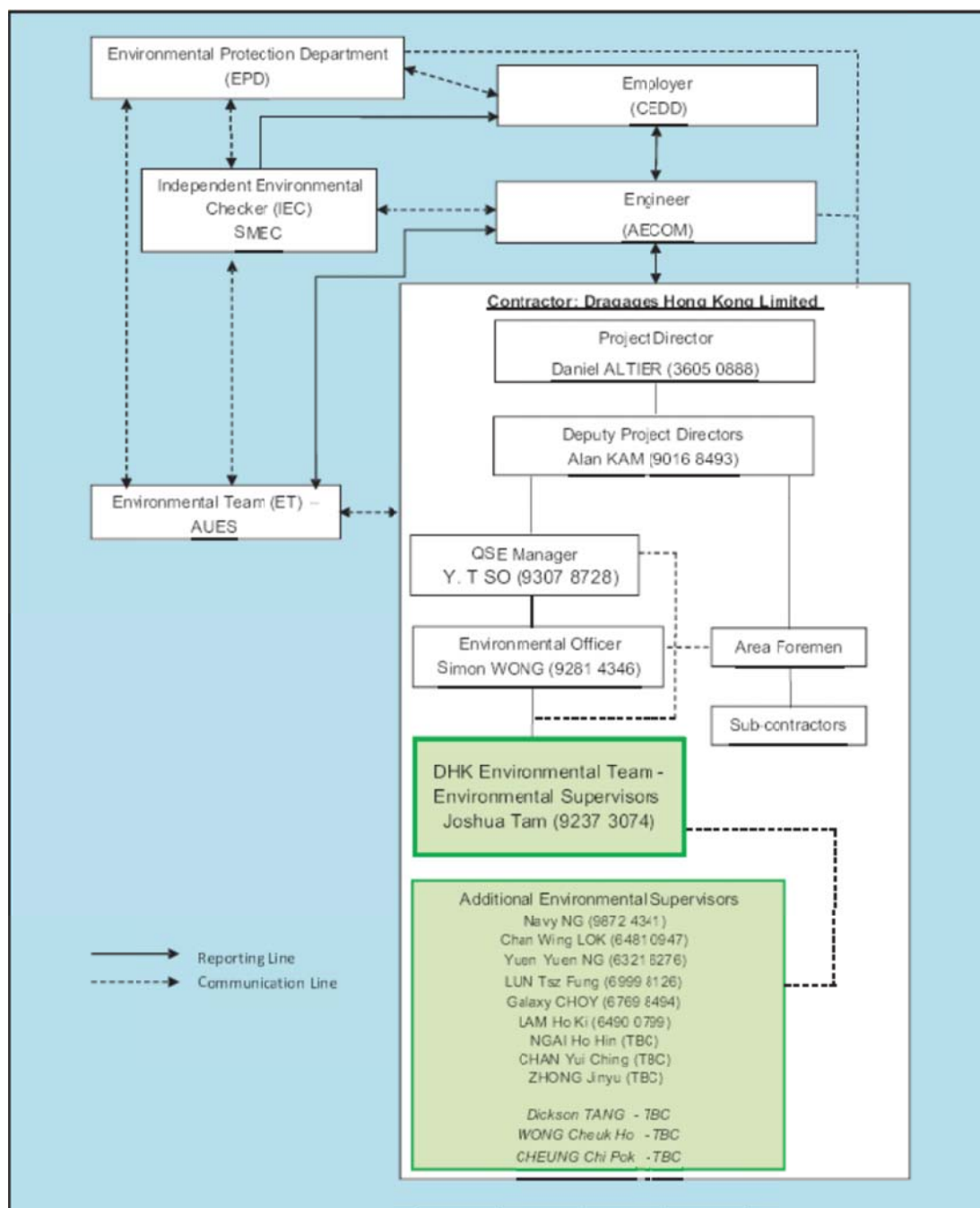
UNDERGROUND WORKS

DESIGN NO.	60212563/PLP/001
DATE	
SCALE	
PROJECT	
DESIGNER	土木工務發展署 CEDD Civil Engineering and Development Department
CLIENT	LIANJIAN/HEUNG YUEN WAI BOUNDARY CROSS-BRIDGE (HKSAR PORTION) SITE FORMATION AND INFRASTRUCTURES DESIGN AND CONSTRUCTION
PROJECT	PROJECT LAYOUT PLAN
DESIGNER	<b>AECOM</b>
DRGNO.	60212563/PLP/001
DATE	
SCALE	
PROJECT	
DESIGNER	土木工務發展署 CEDD Civil Engineering and Development Department
CLIENT	LIANJIAN/HEUNG YUEN WAI BOUNDARY CROSS-BRIDGE (HKSAR PORTION) SITE FORMATION AND INFRASTRUCTURES DESIGN AND CONSTRUCTION
PROJECT	PROJECT LAYOUT PLAN
DESIGNER	<b>AECOM</b>



## **Appendix B**

### **Organization Chart**



**Environmental Management Organization for Contract 2 - (CV/2012/08)**

**Contact Details of Key Personnel for Contract 2 - CV/2012/08**

<b>Organization</b>	<b>Project Role</b>	<b>Name of Key Staff</b>	<b>Tel No</b>	<b>Fax No.</b>
AECOM	Engineer's Representative	Edwin Ching	2171 3301	2171 3498
SMEC	Independent Environmental Checker	Antony Wong	3995 8120	3995 8101
DHK	Project Director	Daniel Altier	3605 0888	2171 3299
DHK	Deputy Project Director	Alan Kam	9016 8493	2171 3299
DHK	QSE Manager	Y. T So	9307 8728	2171 3299
DHK	Environmental Officer	Simon Wong	2171 3017	2171 3299
DHK	Environmental Supervisor	Joshua Tam	9237 3074	2171 3299
AUES	Environmental Team Leader	T. W. Tam	2959 6059	2959 6079
AUES	Environmental Consultant	Nicola Hon	2959 6059	2959 6079
AUES	Environmental Consultant	Ben Tam	2959 6059	2959 6079

Legend:

*CEDD (Employer) – Civil Engineering and Development Department*

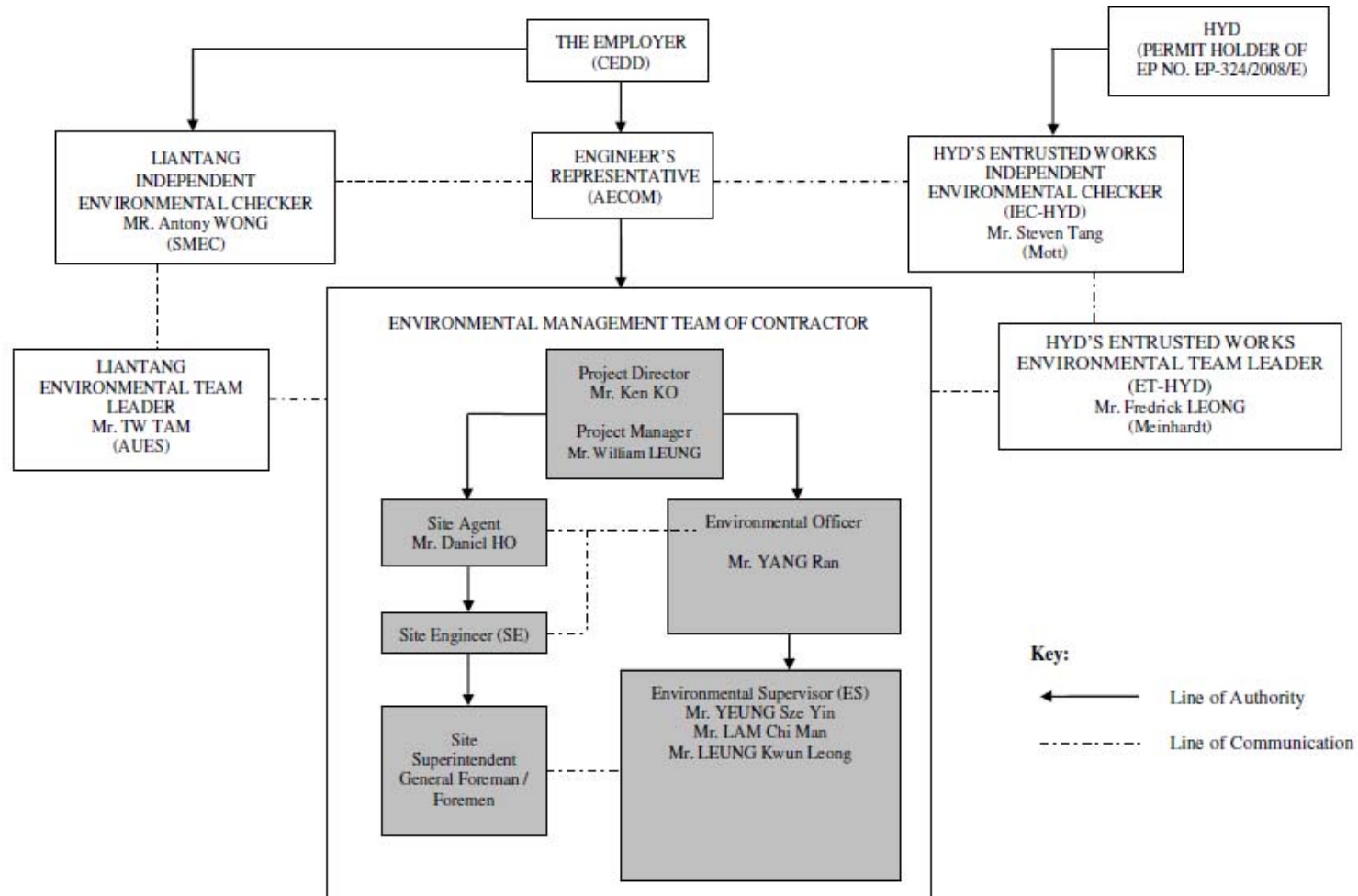
*AECOM (Engineer) – AECOM Asia Co. Ltd.*

*DHK(Main Contractor) –Dragages Hong Kong Ltd.*

*SMEC (IEC) – SMEC Asia Limited*

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





**Environmental Management Organization for Contract 3 - CV/2012/09**



**Contact Details of Key Personnel for Contract 3 - CV/2012/09**

<b>Organization</b>	<b>Project Role</b>	<b>Name of Key Staff</b>	<b>Tel No</b>	<b>Fax No.</b>
AECOM	Engineer's Representative	Alan Lee	2171 3303	2171 3498
SMEC	Independent Environmental Checker	Antony Wong	3995 8120	3995 8101
Chun Wo	Project Director	Ken Ko	3758 8735	2638 7077
Chun Wo	Project Manager	William Leung	2638 6136	2638 7077
Chun Wo	Site Agent	Daniel Ho	2638 6144	2638 7077
Chun Wo	Environmental Officer	Mr. YANG Ran	2638 6151	2638 7077
Chun Wo	Environmental Supervisor	Frankie Leung	2638 6125	2638 7077
AUES	Environmental Team Leader	T. W. Tam	2959 6059	2959 6079
AUES	Environmental Consultant	Nicola Hon	2959 6059	2959 6079
AUES	Environmental Consultant	Ben Tam	2959 6059	2959 6079

Legend:

*CEDD (Employer) – Civil Engineering and Development Department*

*AECOM (Engineer) – AECOM Asia Co. Ltd.*

*Chun Wo (Main Contractor) – Chun Wo Construction Ltd.*

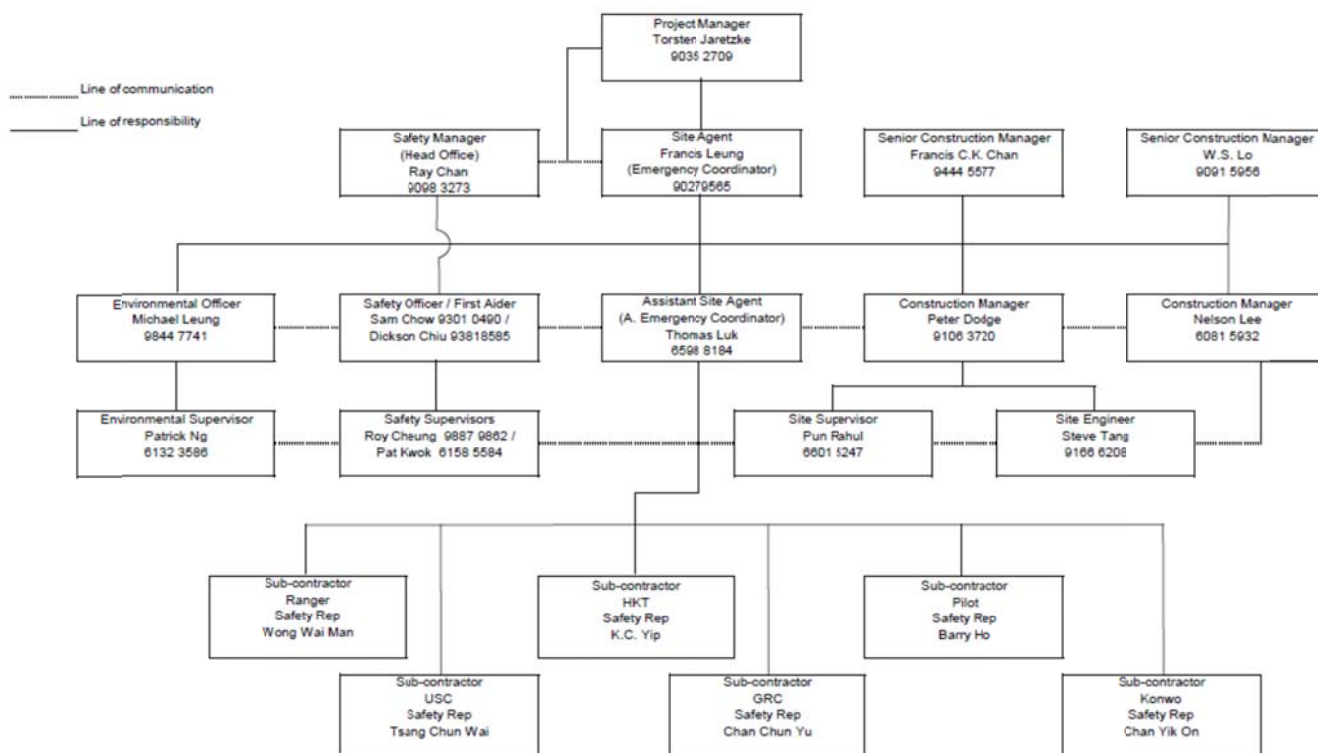
*SMEC (IEC) – SMEC Asia Limited*

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

Contract No. NE/2014/02 (C4)

Site Safety and Environmental Organizational Chart

As of 31 Jul 2018



**Environmental Management Organization for Contract 4 - NE/2014/02**

**Contact Details of Key Personnel for Contract 4 - NE/2014/02**

<b>Organization</b>	<b>Project Role</b>	<b>Name of Key Staff</b>	<b>Tel No</b>	<b>Fax No.</b>
AECOM	Engineer's Representative	Leo Lai	2171 3310	2171 3498
SMEC	Independent Environmental Checker	Antony Wong	3995 8120	3995 8101
Siemens	Project Manager	Torsetn Jaretzke	9035 2709	--
Siemens	Site Agent	Francis Leung	9027 9565	--
Siemens	Environmental Officer	Michael Leung	9844 7741	--
Siemens	Environmental Supervisors	Eric Lee	9092 3356	--
AUES	Environmental Team Leader	T. W. Tam	2959 6059	2959 6079
AUES	Environmental Consultant	Nicola Hon	2959 6059	2959 6079
AUES	Environmental Consultant	Ben Tam	2959 6059	2959 6079

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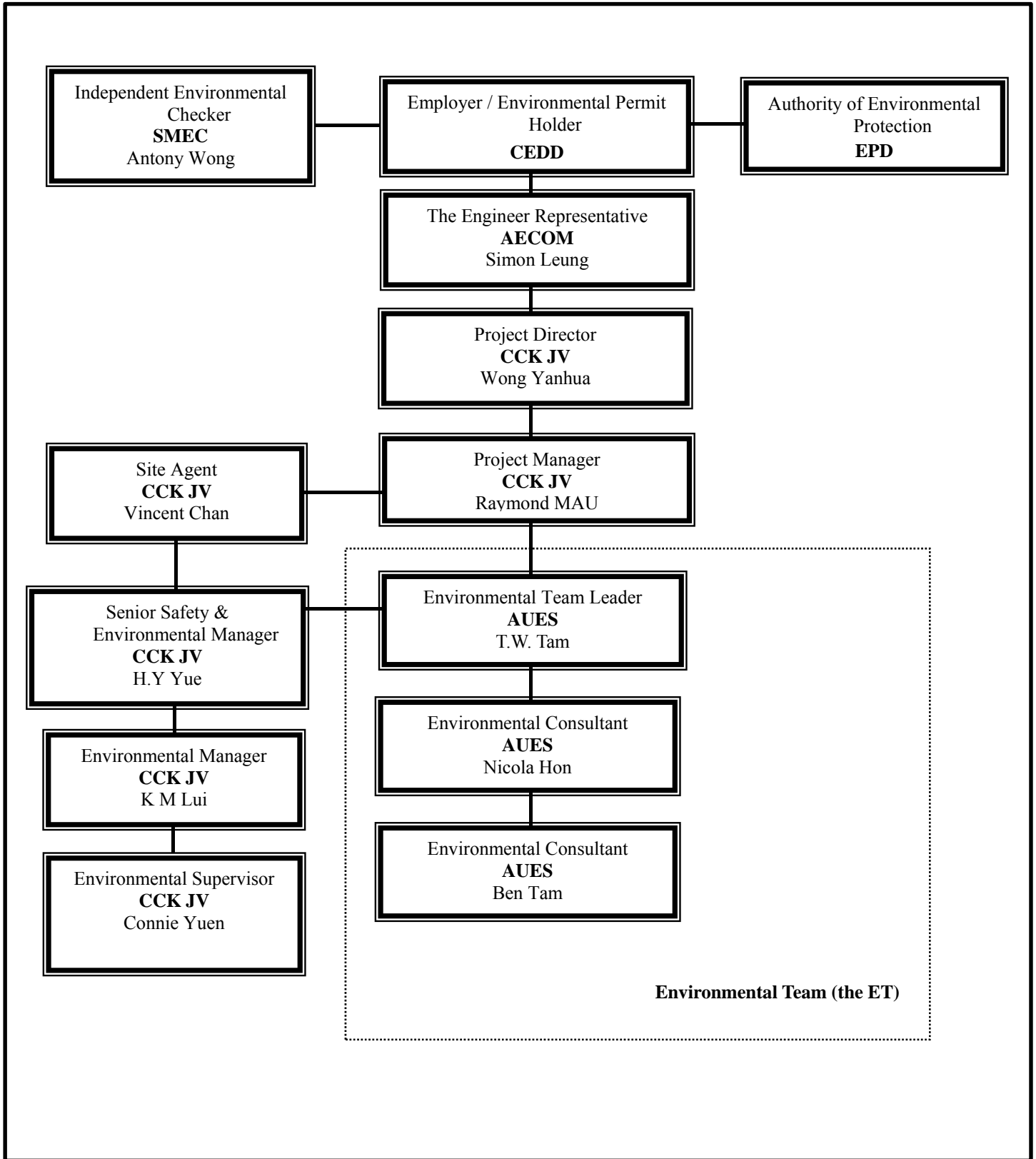
*CEDD (Employer) – Civil Engineering and Development Department*

*AECOM (Engineer) – AECOM Asia Co. Ltd.*

*Siemens (Main Contractor) – Siemens Ltd.*

*SMEC (IEC) – SMEC Asia Limited*

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



Environmental Management Organization – CV/2013/08

Contact Details of Key Personnel for Contract 6 - CV/2013/08

Organization	Project Role	Name of Key Staff	Tel No.	Fax No.
AECOM	Engineer's Representative	Simon Leung	2251 0688	2251 0698
SMEC	Independent Environmental Checker	Antony Wong	3995 8120	3995 8101
CCK JV	Project Director	Wang Yanhua	6190 4212	--
CCK JV	Project Manager	Raymond Mau Sai-Wai	9011 5340	--
CCK JV	Site Agent	Vincent Chan	9655 9404	--
CCK JV	Senior Safety & Environmental Manager	H.Y. Yue	9185 8186	--
CCK JV	Environmental Manager	K M Lui	5113 8223	--
CCK JV	Environmental Supervisor	Connie Yuen	6316 6931	--
AUES	Environmental Team Leader	TW Tam	2959 6059	2959 6079
AUES	Environmental Consultant	Ben Tam	2959 6059	2959 6079
AUES	Environmental Consultant	Nicola Hon	2959 6059	2959 6079

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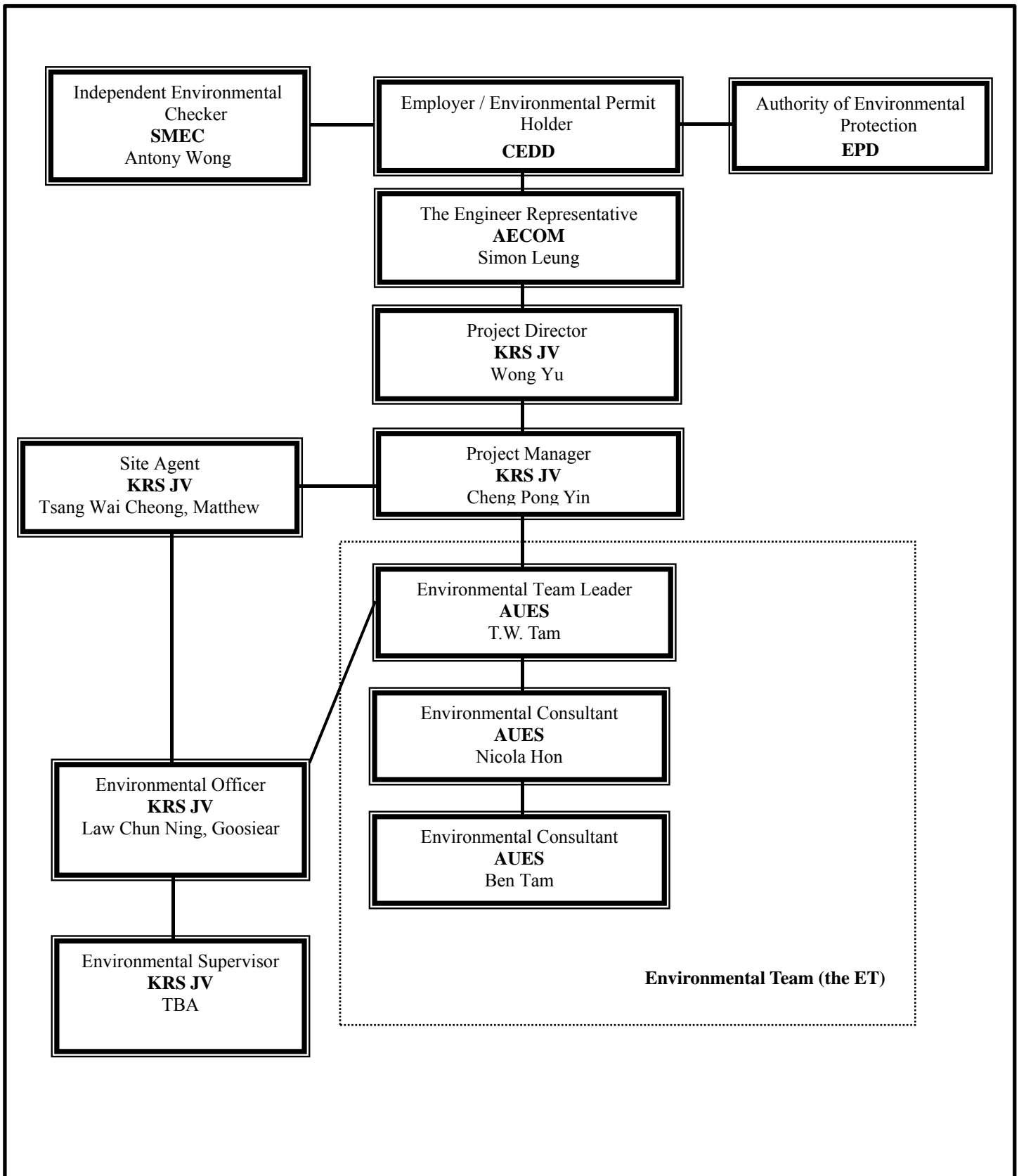
*CEDD (Employer) – Civil Engineering and Development Department*

*AECOM (Engineer) – AECOM Asia Co. Ltd.*

*CCK JV (Main Contractor) – CRBE-CEC-Kaden Joint Venture*

*SMEC (IEC) – SMEC Asia Limited*

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



Environmental Management Organization –NE/2014/03



Contact Details of Key Personnel for Contract 7 – NE/2014/03

<b>Organization</b>	<b>Project Role</b>	<b>Name of Key Staff</b>	<b>Tel No.</b>	<b>Fax No.</b>
AECOM	Engineer's Representative	Kelvin lee	2251 0609	2251 0698
SMEC	Independent Environmental Checker	Antony Wong	3995 8120	3995 8101
KRSJV	Project Director	Wong Yu	2682 6691	2682 2783
KRSJV	Project Manager	Cheng Pong Yin	9023 4821	2682 2783
KRSJV	Site Agent	Tsang Wai Cheong, Matthew	9705 7536	2682 2783
KRSJV	Environmental Officer	Law Chun Ning, Goosiear	9625 2381	2682 2783
KRSJV	Environmental Supervisor	TBA	--	--
AUES	Environmental Team Leader	TW Tam	2959 6059	2959 6079
AUES	Environmental Consultant	Ben Tam	2959 6059	2959 6079
AUES	Environmental Consultant	Nicola Hon	2959 6059	2959 6079

Legend:

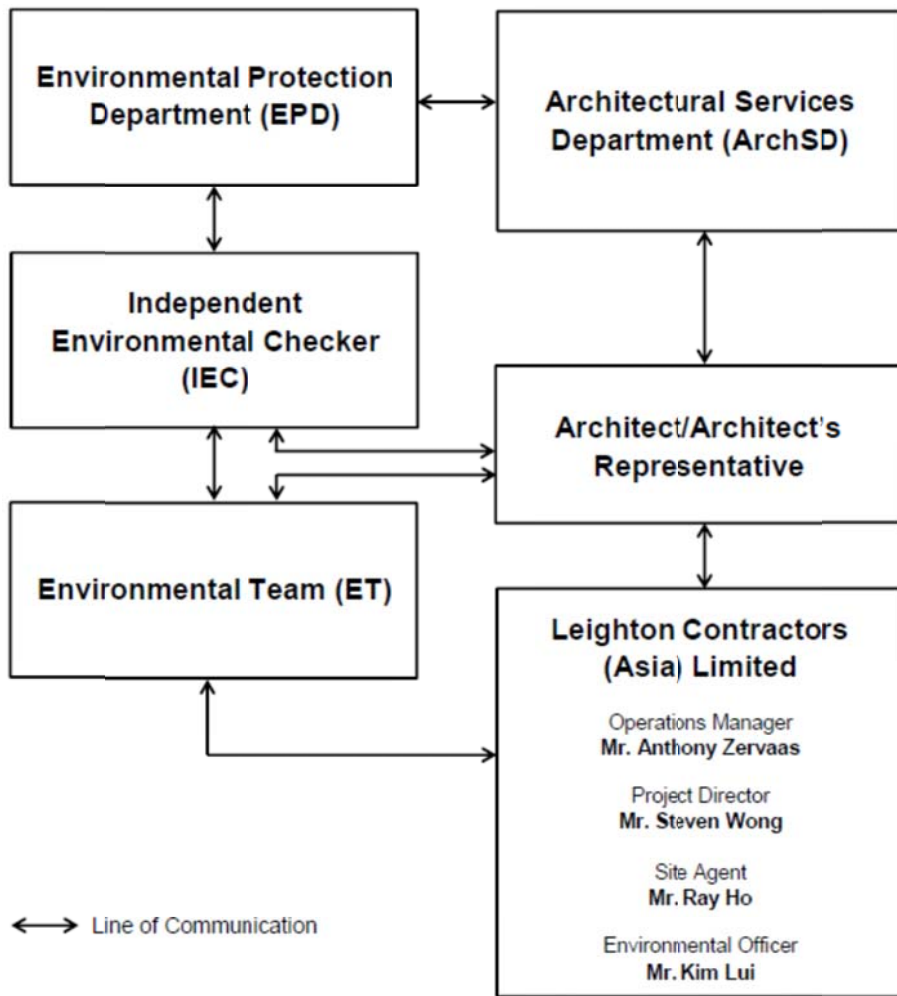
*CEDD (Employer) – Civil Engineering and Development Department*

*AECOM (Engineer) – AECOM Asia Co. Ltd.*

*KRS JV (Main Contractor) –Kwan On-Richwell-SCG Joint Venture*

*SMEC (IEC) – SMEC Asia Limited*

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



Environmental Management Organigram

Environmental Management Organization for Contract SS C505

Contact Details of Key Personnel for Contract SS C505

<b>Organization</b>	<b>Project Role</b>	<b>Name of Key Staff</b>	<b>Tel No.</b>	<b>Fax No.</b>
ArchSD	Works agent for the Development Bureau (DEVB)	Mr. William Cheng	2867 3904	2804 6805
Ronald Lu & Partners	Architect/ Architect's Representative	Mr. Justin Cheung	3189 9272	2834 5442
SMEC	Independent Environmental Checker	Mr. Antony Wong	3995 8120	3995 8101
Leighton	Operation Manager	Mr. Antony Zervaas	2823 1433	2529 8784
Leighton	Project Director	Mr. Steven Wong	2858 1519	2858 1899
Leighton	Site Agent	Mr. Ray Ho	2858 1519	2858 1899
Leighton	Environmental Officer	Mr. Legend Lam	3973 1003	-
Leighton	Assistant Environmental Officer	Mr. Alex Liu	3973 0818	-
AUES	Environmental Team Leader	Mr. T. W. Tam	2959 6059	2959 6079
AUES	Environmental Consultant	Ms. Nicola Hon	2959 6059	2959 6079
AUES	Environmental Consultant	Mr. Ben Tam	2959 6059	2959 6079

Legend:

*ArchSD (Project Proponent) – Architectural Services Department*

*Ronald Lu & Partners (Architect/ Architect's Representative) – Ronald Lu & Partners (Hong Kong) Ltd*

*Leighton (Main Contractor) – Leighton Contractors (Asia) Limited*

*SMEC (IEC) – SMEC Asia Limited*

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

## **Appendix C**

### **3-month rolling construction program**

## Contract 2

Liantang / Heung Yuen Wai Boundary Control Point and Associated Works

CEDD Contract No: CV/2012/08

Main Contractor: Dragages Hong Kong Ltd



### Tentative Three Months (Oct 2018, Nov 2018 and Dec 2018) Construction Rolling Program

Item	Construction Activities
1	Admin Bldg - Building fit out, permanent drainage and E&M installation
2	Admin Bldg - Landscaping works
3	Mid-Vent Portal - Building fit out and E&M installation
4	Mid-Vent Portal - Construction of flexible barrier and permanent drainage
5	Mid-Vent Portal - Landscaping works.
6	North Portal - Construction of retaining wall, permanent drainage and slip road
7	North Portal - Tunnel backfilling, VE panel and E&M installation
8	North Portal - Construction of tunnel internal structure
9	North Portal - Landscaping works
10	North Portal - Dismantling of MS slurry and waste water treatment plant
11	North Portal - Installation of WetSep system to replace the MS plant
12	North Portal - North ventilation building fit out and E&M installation
13	North Portal - Construction of flexible barrier
14	South Portal - Construction of tunnel internal structure, tunnel backfilling and E&M installation
15	South Portal - South ventilation building fit out and E&M installation
16	South Portal - Construction of flexible barrier
17	South Portal - Landscaping works.
18	South Portal - Backfilling and construction of slip road



## Contract 3

Liantang / Heung Yuen Wai Boundary Control Point and Associated Works

CEDD Contract No: CV/2012/09

Main Contractor: Chun Wo Construction Ltd



俊和建築工程有限公司

CHUN WO CONSTRUCTION & ENGINEERING CO., LTD.

### Tentative Three Months (October, November and December 2018) Construction Rolling Program

Item	Construction Activites
1	Cable detection and trial trenches
2	Remaining works on new Footbridge
3	Noise barrier construction
4	Road pavement works
5	Water main laying works (on Grade and on bridge deck)
6	Installation of Noise barrier steel column & panel, and sign gantry (on Grade and on bridge deck)
7	Construction of Pavilion and Pai Lau
8	Road Drainage Works
9	Construction of retaining wall
10	Landscaping works

## Contract 4

Liantang / Heung Yuen Wai Boundary Control Point and Associated Works  
CEDD Contract No: NE/2014/02  
Main Contractor: Siemens Ltd.



**Tentative Three Months (Oct, Nov and Dec 2018) Construction Rolling Program**

Item	Construction Activites
1	E&M installation at admin building
2	E&M installation at Ventilation Building
3	E&M installation at tunnel
4	Cladding installation at Cheung Shan Tunnel
5	Sign fabricaiton and Installation

## Contract 6





## Contract 7



## Contract SS C505

**Tentative Three Months (October, November and December 2018) Construction Rolling Program**

Item	Construction Activities
1	Passenger Terminal Building (PTB) G/F - Plant Room Structure Works, Backfilling & Drainage, Under Ground Utilities, Fence Wall and On Grade Slab
2	PTB - ABWF Works & MEP Installation - Front/Back of House Area, External Staircases, External Staircases ABWF Works, Hall Block External Façade, Southern Entrance Construction & Major Plant Rooms
3	PTB - External Works incl. Building 21-24, M/F External Wall (Ewall), Roof & Upper Roof Roofing Works, Podium Coach Canopy, 21&22 (C&PC KIOSKS) & 23&24 (PC Examination Building & MSRVS) Superstructure & ABWF Works and MEP Installation, Podium Open Area Waterproofing, Paving, Hard and Soft Landscaping works, Ambulance Canopy / Glazed Canopy
4	Bridge C Integrated ABWF and MEP Installation Works (C7 Portion) - Arrival & Departure Hall, Staircases, Test & Commissioning
5	Bldg 1 - C&ED Detector Dog Base Phase 1 - Integrated ABWF & MEP Works Works at G/F & R/F
6	Bldg 2 - HKPF Building and Observation Tower Phase 1 - External Works, Integrated ABWF & MEP Works at G/F to 4/F and Observation Tower (including Lift)
7	Bldg 3 - Fire Station and Drill Tower Phase 1 - External Works, Integrated ABWF & MEP Works at G/F to UR/F, Drill Tower
8	Bldg 4 - Cargo Examination Building (Inbound) Phase 1 - External Works at G/F under Steel Roof, Integrated ABWF & MEP Works at G/F to R/F, and Loading Dock
9	Bldg 5 - Cargo Examination Building (Outbound) Phase 2 - External Works at G/F under Steel Roof, Integrated ABWF & MEP Works at G/F to R/F, Loading Dock
10	Bldg 6 - Fixed X-ray Vehicle Inspection System (FXRVIS) Buildings (Inbound) Phase 1 - External Works (Fence Wall), Integrated ABWF & MEP Works at G/F to R/F
11	Bldg 7 - Fixed X-ray Vehicle Inspection System (FXRVIS) Buildings (Outbound) Phase 2 - External Works, Integrated ABWF & MEP Works at G/F
12	Bldg 8 - MXRVSS (Inbound) Phase 2 - Structure Works, Integrated ABWF and MEP Works at G/F & R/F
13	Bldg 9 - MXRVSS (Outbound) Phase 2 - Structure Works at G/F, Integrated ABWF and MEP Works at G/F & Envelope
14	Bldg 10 - GV Kiosk (Inbound) Phase 2 - On-Grade Slab, Steel Structure Works, Integrated ABWF and MEP Works at G/F & R/F
15	Bldg 11 - GV Kiosk (Outbound) Phase 2 - On-Grade Slab, Steel Structure Works, Integrated ABWF & MEP Works at G/F & R/F
16	Bldg 12 - Public Toilets (Inbound) Phase 2 - Integrated ABWF and MEP Works at G/F & Envelope
17	Bldg 13 - Public Toilets (Outbound) Phase 2 - Structures Works, Integrated ABWF and MEP Works at G/F & R/F
18	Bldg 14 - Disinsection Facilities (Inbound) Phase 2 - Integrated ABWF & MEP Works at G/F & Envelope
19	Bldg 15 - Disinsection Facilities (Outbound) Phase 2 - Substructure and Structure Works, Integrated ABWF & MEP Works at G/F & Envelope
20	Bldg 16 - Weigh Station Phase 2 - Integrated ABWF and MEP Works at G/F & Envelope
21	Bldg 17 - EUVSS & Monitoring Room Phase 2 - Structure Works, Integrated ABWF & MEP Works at G/F & R/F
22	Bldg 18 - Refuse Collection Point Phase 2 - Integrated ABWF and MEP Works at G/F & Envelope
23	Bldg 25 - Traffic Control Office (Inbound) Phase 2 - Integrated ABWF and MEP Works at G/F & Envelope
24	Bldg 26 - Traffic Control Office (Outbound) Phase 2 - Structure Works, Integrated ABWF and MEP Works at G/F & Envelope
25	Bldg 27 - Inspection Post Phase 2 - Integrated ABWF and MEP Work at G/F & Envelope
26	Bldg 28 - Guard Booth (Inbound) Phase 2 - Structure Works, Integrated ABWF and MEP Works at G/F & Envelope

## **Appendix D**

### **Designated Monitoring Locations as Recommended in the Approved EM&A Manual**

LEGEND:

- - - - - BOUNDARY OF HK SAR
- - - - - WORKS AREA (ABOVE GROUND)
- - - - - WORKS AREA (TUNNEL)
- X AIR MONITORING STATIONS

PI	REV. TO	REVISION	DATE	BY	CHKD	APP'D
		FIRST ISSUE				

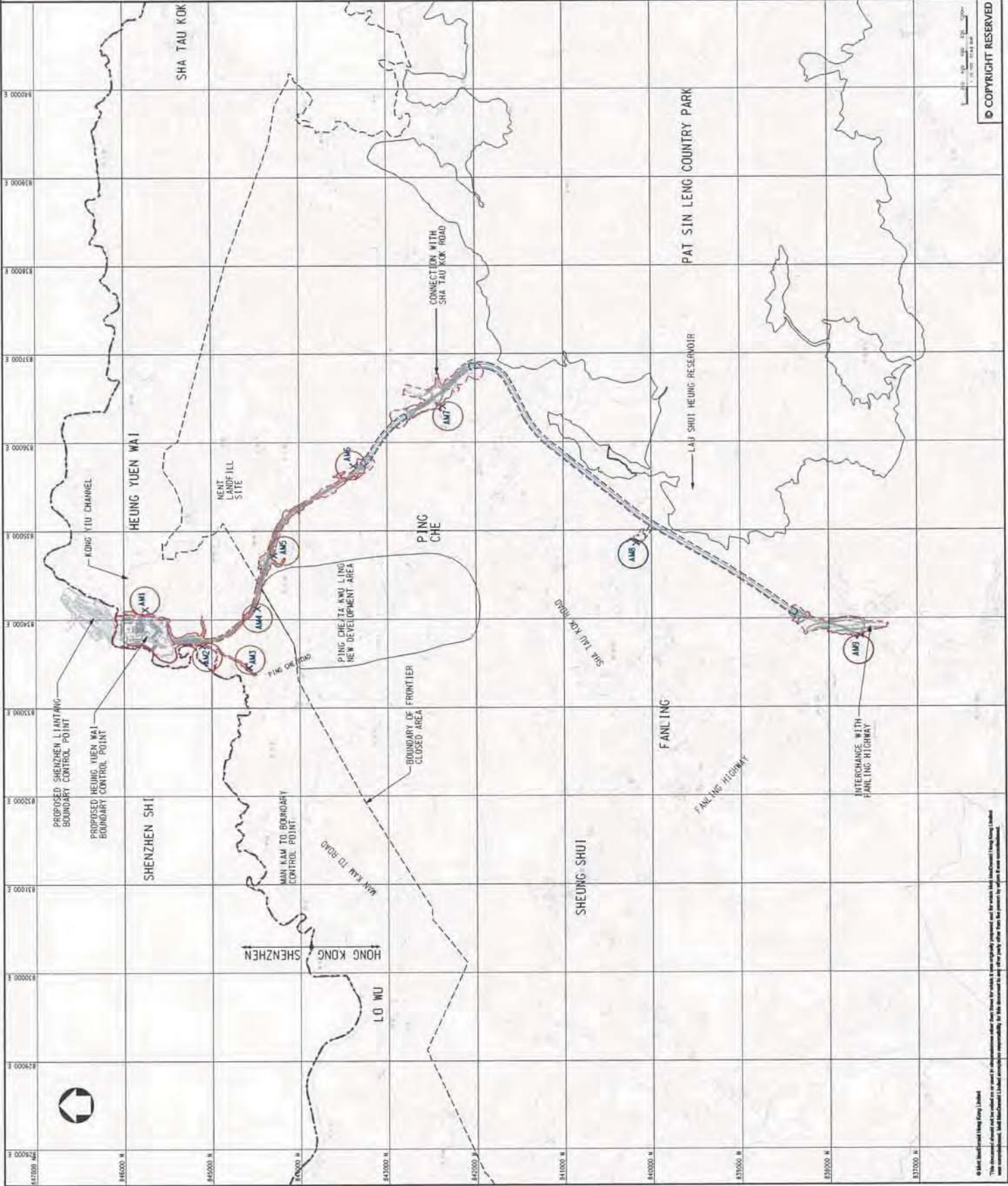


CIVIL ENGINEERING  
AND DEVELOPMENT  
DEPARTMENT

AGREEMENT NO. CE-45/2008(CE)  
LIANTANG/HEUNG YUEN WAI BOUNDARY  
CONTROL POINT AND ASSOCIATED WORKS

PROPOSED LOCATION OF CONSTRUCTION  
AIR QUALITY MONITORING STATIONS

Designated	DC	Eng. Ck	EC
Drawn	AI/EC	Checked	EC
Scale of A1	DC	Approved	BT
Scale of A2	DC	Project	253228
Scale of A3	DC	QA/QC	2025/2026/2027/2028/2029/2030
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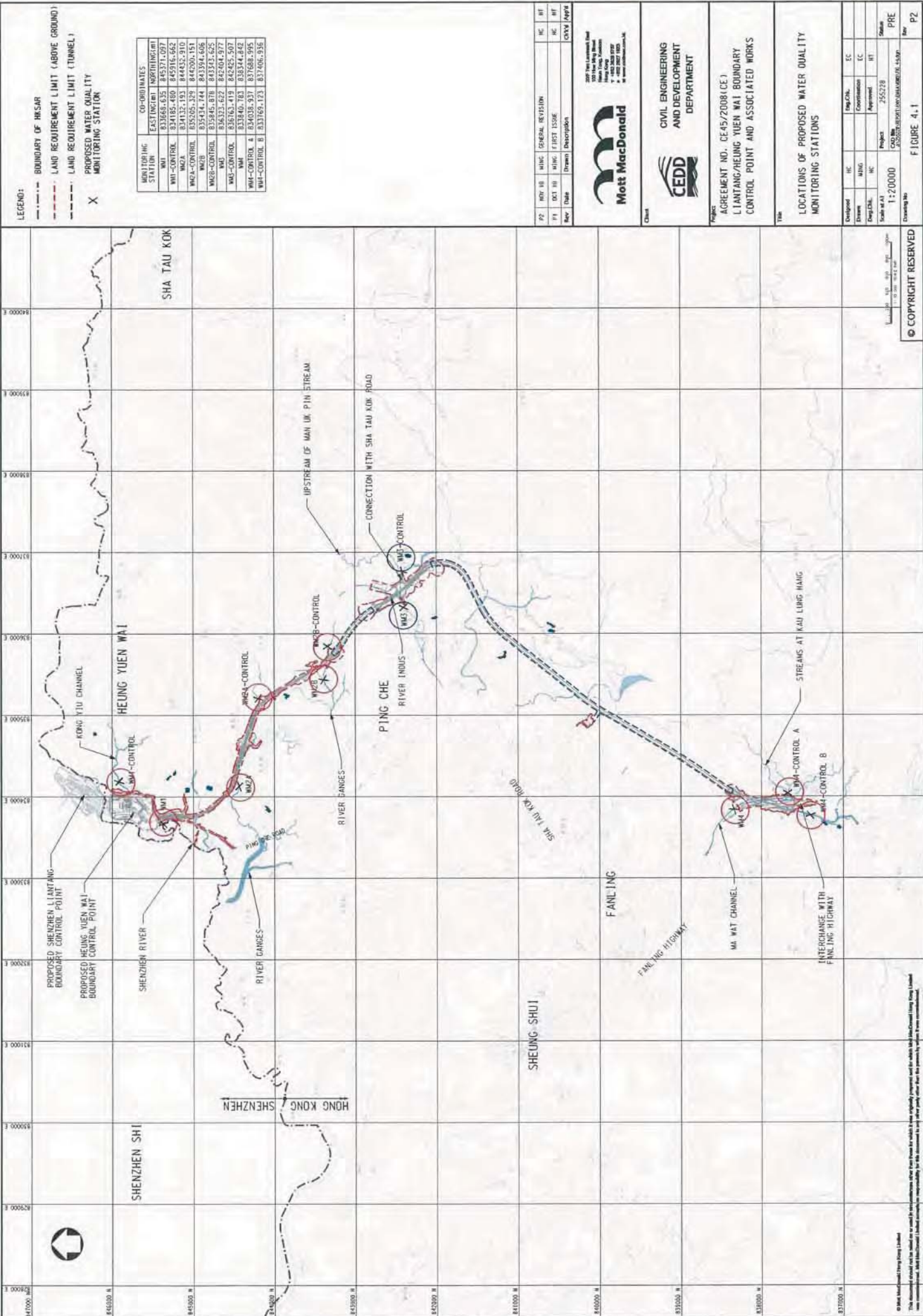
P1

FIGURE 2.1









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P1	DEC 10	MISC	FIRST ISSUE	HC	HT
Rev	Date	Drawn	Description	HC	HT
				CEM	APR

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25th Floor, Victoria  
Centre, Hong Kong

**CEDD**

CIVIL ENGINEERING  
AND DEVELOPMENT  
DEPARTMENT

Developed	HC	HT	EC
Drawn			
Eng. Ck.			
Scale	1:20000		
Project	255278		
CD No.	255278/01/01/001/001/001		
Drawn By			
Check By			
Rev			

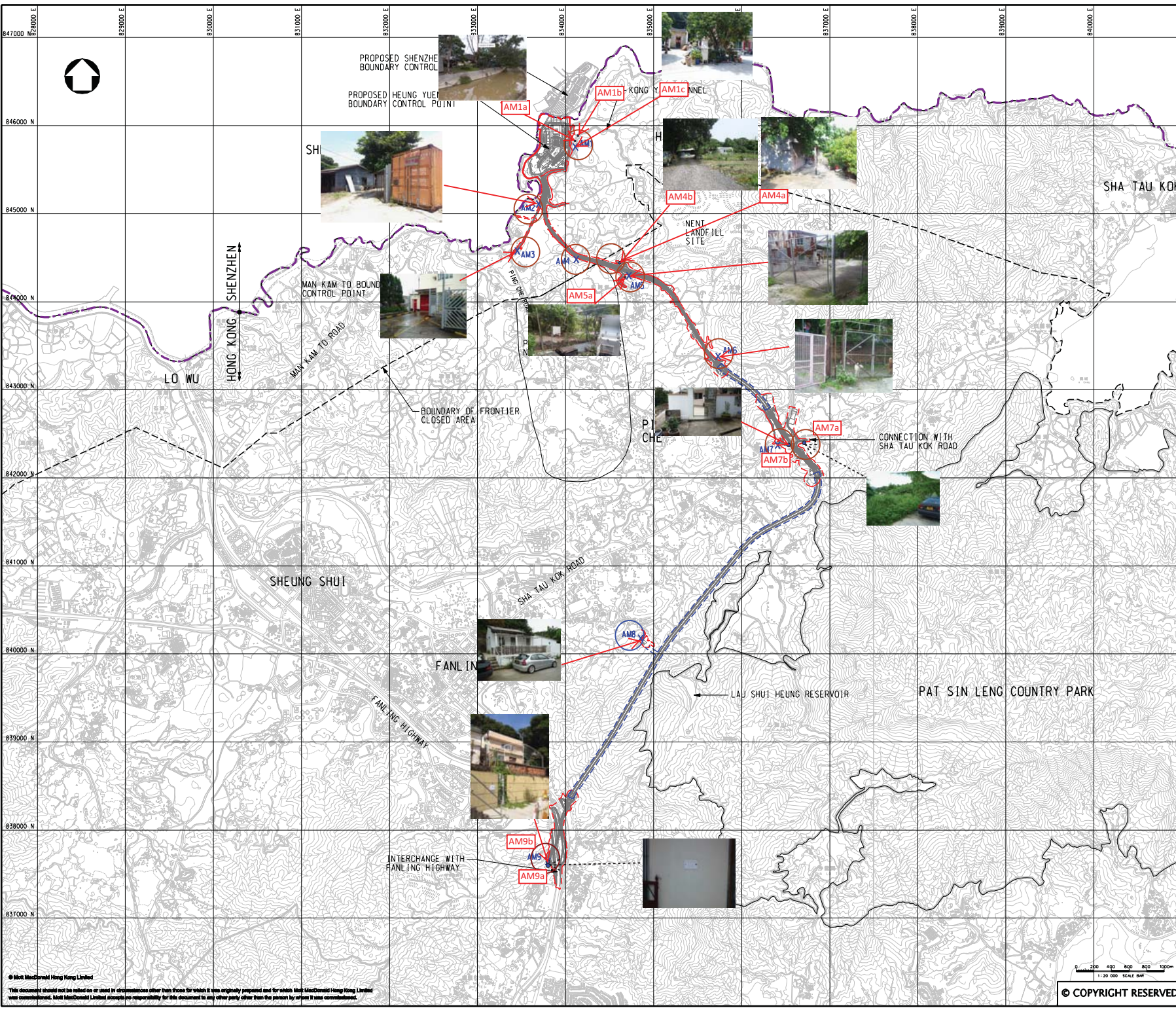
FIGURE 4.1

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## **Appendix E**

### **Monitoring Locations for Impact Monitoring**






- LEGEND:**
- BOUNDARY OF HKSAR
  - WORKS AREA (ABOVE GROUND)
  - WORKS AREA (TUNNEL)
  - X Air Monitoring Stations in the EM&A Manual
  - Proposed Air Monitoring Stations

P1	AUG 10	MING	FIRST ISSUE	DC	HT
Rev	Date	Drawn	Description	Chk'd	App'd



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Kowloon, Hong Kong  
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Client



**CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT**

Project  
 AGREEMENT NO. CE45/2008(CE)  
 LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS

Title  
 PROPOSED LOCATION OF CONSTRUCTION AIR QUALITY MONITORING STATIONS

Designed	DC	Eng.Chk.	EC	
Drawn	MING	Coordination	EC	
Draw.Chk.	DC	Approved	HT	
Scale at A1	1:20000	Project	255228	Status
		CAD file	255228\report\env\em&a\00831\FE_21.dgn	PRE
Drawing No				Rev
				P1

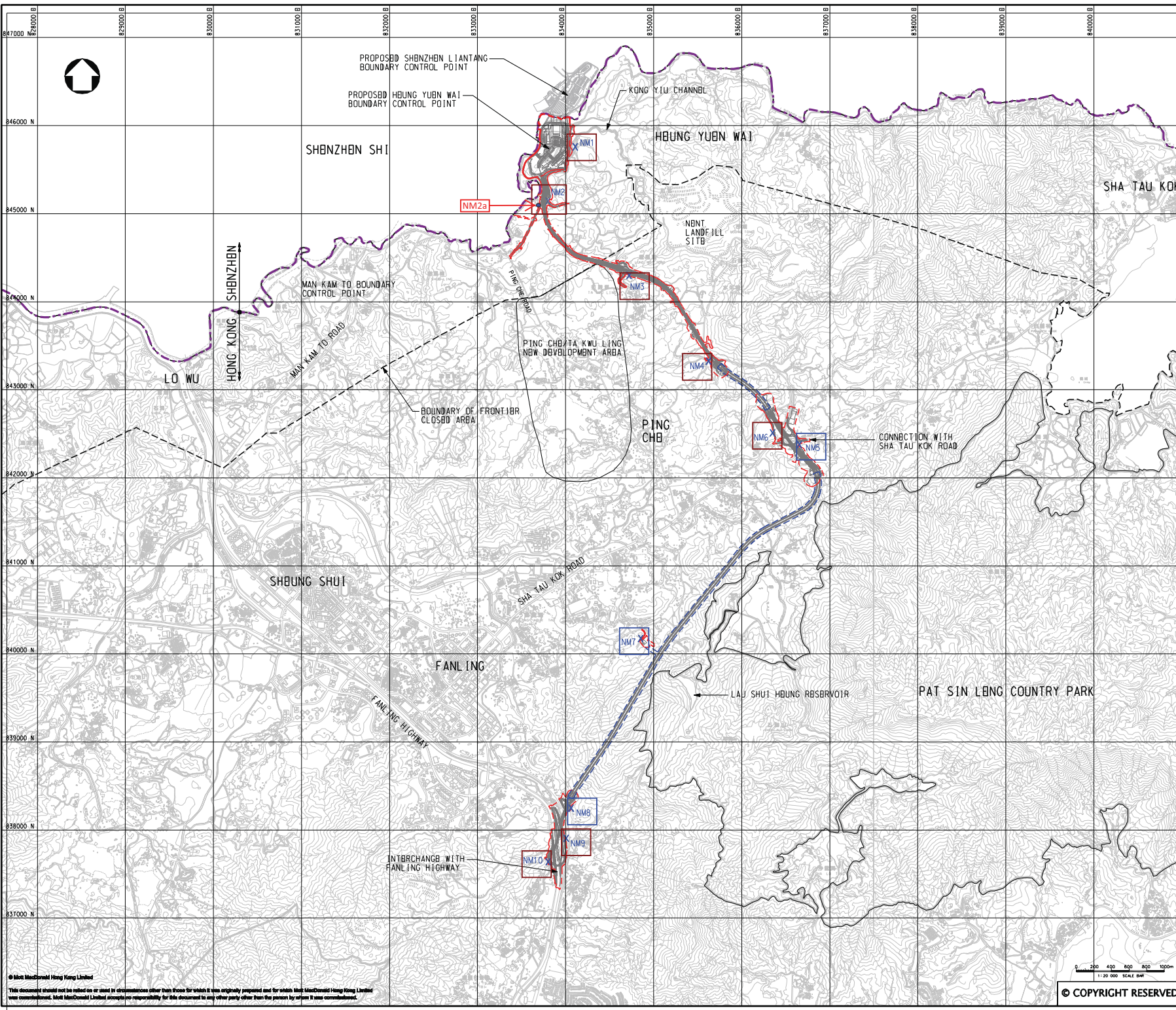
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 1:20 000 SCALE BM  
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FIGURE 2.1






- LEGEND:**
- BOUNDARY OF HKSAR
  - WORKS AREA (ABOVE GROUND)
  - WORKS AREA (TUNNELL)
  - X CONSTRUCTION NOISE MONITORING STATIONS
  - Proposed Noise Monitoring Stations

P1	AUG 10	MING	FIRST ISSUE	DC	HT
Rev	Date	Drawn	Description	Chk'd	App'd



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100 Hoo Ming Street  
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F +852 2827 1823  
W www.mottmac.com.hk

Client



**CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT**

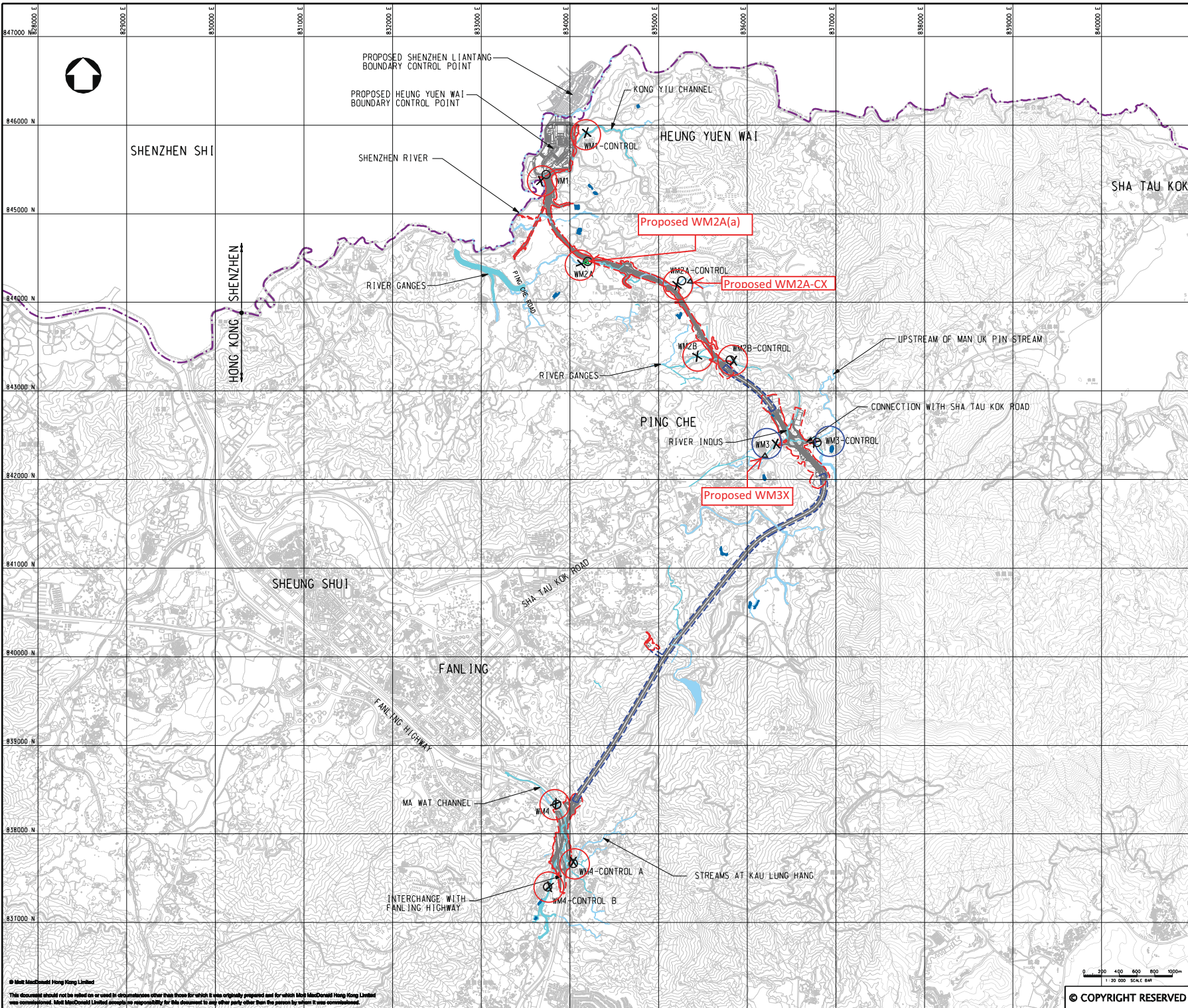
Project  
AGREEMENT NO. CB45/2008(CB)  
LIANTANG/HUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS

Title  
PROPOSED LOCATION OF CONSTRUCTION NOISE MONITORING STATIONS

Designed	DC	Eng.Chk.	BC	
Drawn	MING	Coordination	BC	
Dep.Chk.	DC	Approved	HT	
Scale at A1	1:20000	Project	255228	Status
		CAD file	255228\report\env\env\00831\FE_31.dgn	PRB
Drawing No				Rev
				P1

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- LEGEND:**
- BOUNDARY OF HKSAR
  - LAND REQUIREMENT LIMIT (ABOVE GROUND)
  - LAND REQUIREMENT LIMIT (TUNNEL)
  - X Water Quality Monitoring Location Recommended in EM&A Manual
  - Alternative Water Quality Monitoring Location for EM&A Programme
  - △ New Proposed Water Quality Monitoring Location in November 2015
  - ▲ New Proposed Water Quality Monitoring Location in May 2016

Station ID	Location recommended in EM&A Manual		Location found during site visit	
	Coordinates		Coordinates	
	Easting	Northing	Easting	Northing
WM1	83456.833	84577.072	83457.1	84542.1
WM1-Control	83418.480	84591.662	83418.5	84517.3
WM2A	83418.319	84412.910	83420.4	84417.3
WM2A-Control	83505.329	84420.151	83527.0	84424.5
WM2B	83543.744	84339.606	83543.5	84339.7
WM2B-Control	83545.878	84343.625	83535.1	84355.1
WM3	83623.622	84205.377	83624.0	84202.7
WM3-Control	83673.415	84242.507	83673.5	84240.0
WM4	83840.781	83834.842	83850.0	83838.0
WM4-Control A	83408.837	83768.995	83402.8	83765.0
WM4-Control B	83769.123	83740.936	83760.0	83739.5

**New Proposed Water Quality Monitoring Location in November 2015**

Location ID	Easting	Northing
WM2A-C (Original)	0835270	0844243
WM2A-Cx (Proposed)	0835377	0844188
WM3 (Original)	0836324	0842402
WM3x (Proposed)	0836206	0842270

**New Proposed Water Quality Monitoring Location in May 2016**

Location ID	Easting	Northing
WM2A (Original)	834204	844471
WM2A(a) (Proposed)	834191	844474

Rev	Date	Drawn	Description	CHK'd	App'd
P2	NOV 10	MING	GENERAL REVISION	HC	HT
P1	OCT 10	MING	FIRST ISSUE	HC	HT

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Client

**CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT**

Project  
**AGREEMENT NO. CE45/2008 (CE)  
 LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS**

Title  
**LOCATIONS OF PROPOSED WATER QUALITY MONITORING STATIONS**

Designed	HC	Eng.Chk.	EC
Drawn	MING	Coordination	EC
Dwg.Chk.	HC	Approved	HT
Scale at A1	Project 255228		Status
1:20000	CAD file: S:\255228\REP\PORT1\ENV\EM&A\WQMS\LOC_41.dgn		PRE
Drawing No	Appendix C		Rev P2

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## **Appendix F**

### **Calibration Certificate of Monitoring Equipment and HOKLAS-accreditation Certificate of the Testing Laboratory**

## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Open area at Tsung Yuen Ha Village	Date of Calibration:	24/9/2018
Location ID : AM1c	Next Calibration Date:	24/11/2018
	Technician:	Eric

### CONDITIONS

Sea Level Pressure (hPa)	1011.1	Corrected Pressure (mm Hg)	758.325
Temperature (°C)	27.0	Temperature (K)	300

### CALIBRATION ORIFICE

Make-> TISCH	Qstd Slope ->	2.02017
Model-> 5025A	Qstd Intercept ->	-0.03691
Serial # -> 1612		

### CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION		
							Slope =	Intercept =	Corr. coeff. =
18	5.5	5.7	11.2	1.668	46	45.80	Slope =	27.5780	
13	4.4	4.4	8.8	1.480	42	41.81	Intercept =	0.2924	
10	3.5	3.3	6.8	1.303	36	35.84	Corr. coeff. =	0.9981	
7	2.2	2.2	4.4	1.052	30	29.87			
5	1.2	1.3	2.5	0.797	22	21.90			

**Calculations :**

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration ( deg K )

Pstd = actual pressure during calibration ( mm Hg )

**For subsequent calculation of sampler flow:**

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

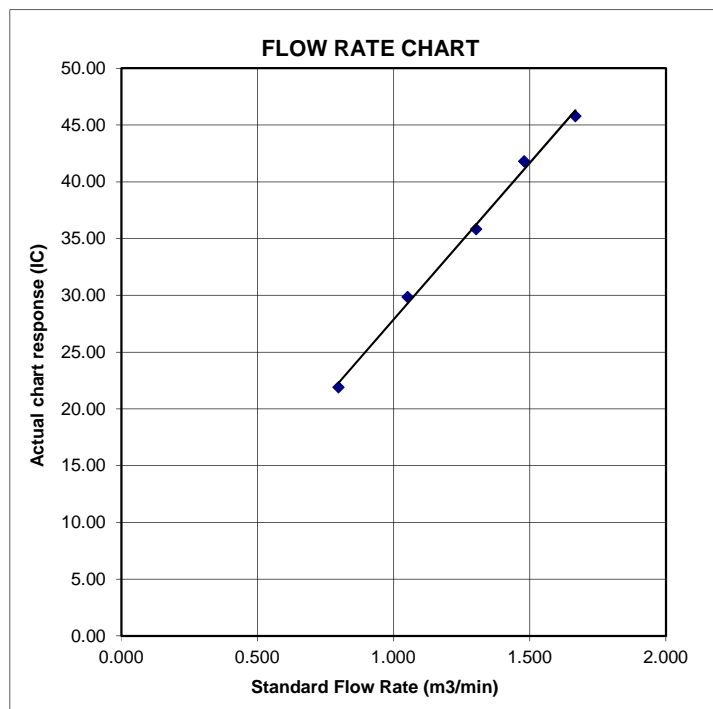
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure





## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Village House near Lin Ma Hang Road  
 Location ID : AM2

Date of Calibration: 8/8/2018  
 Next Calibration Date: 8/10/2018  
 Technician: Fai So

### CONDITIONS

Sea Level Pressure (hPa)	1004.2	Corrected Pressure (mm Hg)	753.15
Temperature (°C)	30.3	Temperature (K)	303

### CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.02017
Model->	5025A	Qstd Intercept ->	-0.03691
Serial # ->	1612		

### CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION Slope = 31.7234 Intercept = -0.8916 Corr. coeff. = 0.9940
18	4.9	4.9	9.8	1.547	50	49.34	
13	4.1	4.1	8.2	1.417	44	43.42	
10	3.2	3.2	6.4	1.254	38	37.50	
7	2	2	4.0	0.995	32	31.58	
5	1.3	1.3	2.6	0.806	25	24.67	

**Calculations :**

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

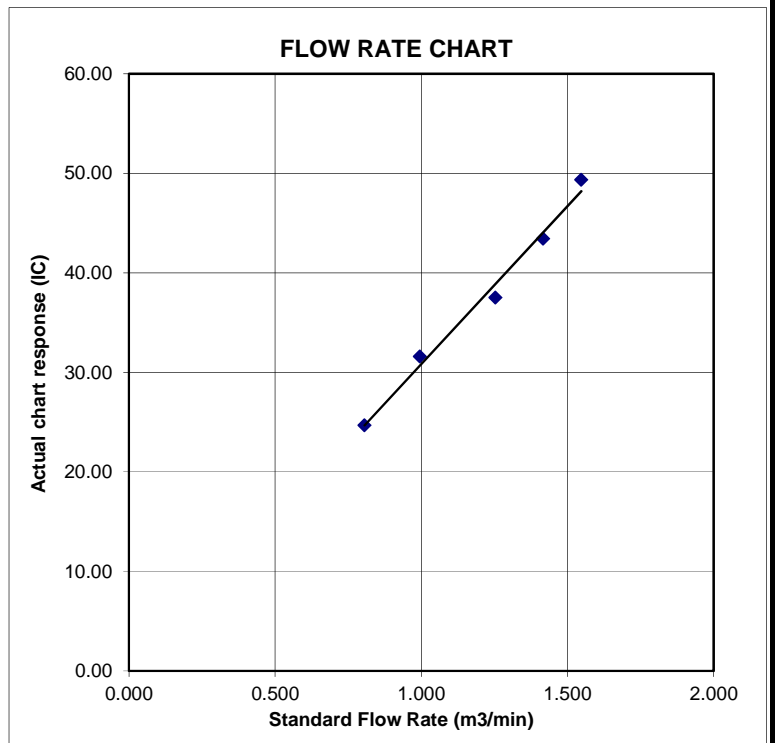
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate  
 IC = corrected chart responses  
 I = actual chart response  
 m = calibrator Qstd slope  
 b = calibrator Qstd intercept  
 Ta = actual temperature during calibration ( deg K )  
 Pstd = actual pressure during calibration ( mm Hg )

**For subsequent calculation of sampler flow:**

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

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



## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Village House near Lin Ma Hang Road  
 Location ID : AM2

Date of Calibration: 6/10/2018  
 Next Calibration Date: 6/12/2018  
 Technician: Fai So

### CONDITIONS

Sea Level Pressure (hPa)	1013.4	Corrected Pressure (mm Hg)	760.05
Temperature (°C)	26.8	Temperature (K)	300

### CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.02017
Model->	5025A	Qstd Intercept ->	-0.03691
Serial # ->	1612		

### CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	0.4	11.4	11.8	1.714	54	53.84	Slope = 29.9580 Intercept = 2.7646 Corr. coeff. = 0.9986
13	-0.9	10.1	9.2	1.515	48	47.86	
10	-1.9	9.2	7.3	1.352	44	43.87	
7	-3.2	7.9	4.7	1.088	36	35.89	
5	-4.1	7.0	2.9	0.859	28	27.92	

**Calculations :**

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration ( deg K )

Pstd = actual pressure during calibration ( mm Hg )

**For subsequent calculation of sampler flow:**

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

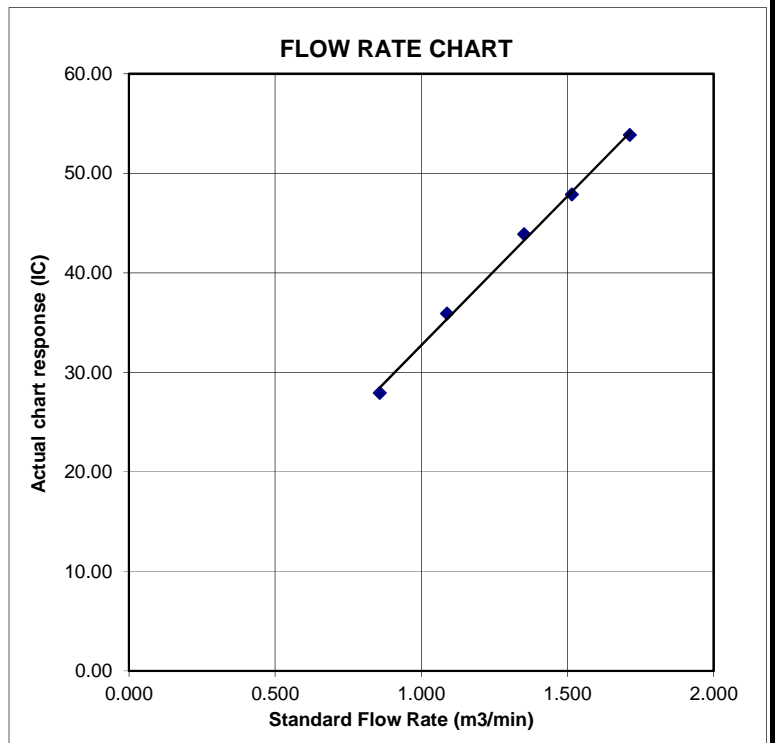
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Ta Kwu Ling Fire Service Station	Date of Calibration:	8/8/2018
Location ID : AM3	Next Calibration Date:	8/10/2018
	Technician:	Fai So

### CONDITIONS

Sea Level Pressure (hPa)	1004.2	Corrected Pressure (mm Hg)	753.15
Temperature (°C)	30.3	Temperature (K)	303

### CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.02017
Model->	5025A	Qstd Intercept ->	-0.03691
Serial # ->	1612		

### CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.6	5.6	11.2	1.653	50	49.34	Slope = 26.7072 Intercept = 5.3642 Corr. coeff. = 0.9963
13	4.4	4.4	8.8	1.467	46	45.39	
10	3.4	3.4	6.8	1.292	40	39.47	
7	2.1	2.1	4.2	1.019	32	31.58	
5	1.3	1.3	2.6	0.806	28	27.63	

**Calculations :**

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration ( deg K )

Pstd = actual pressure during calibration ( mm Hg )

**For subsequent calculation of sampler flow:**

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

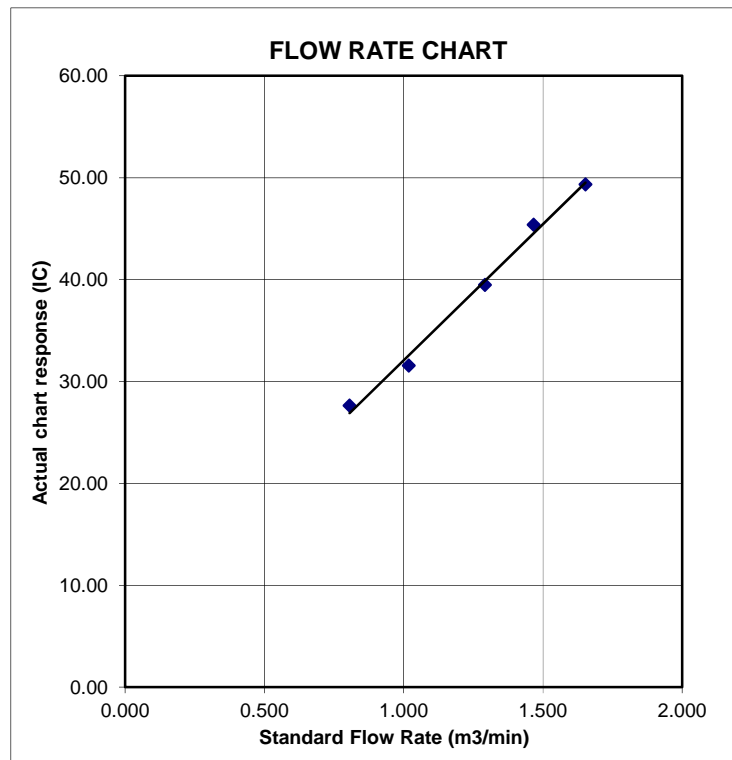
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Ta Kwu Ling Fire Service Station  
 Location ID : AM3

Date of Calibration: 6/10/2018  
 Next Calibration Date: 6/12/2018  
 Technician: Fai So

### CONDITIONS

Sea Level Pressure (hPa)	1013.4	Corrected Pressure (mm Hg)	760.05
Temperature (°C)	26.8	Temperature (K)	300

### CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.02017
Model->	5025A	Qstd Intercept ->	-0.03691
Serial # ->	1612		

### CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	0.5	11.5	12.0	1.728	54	53.84	Slope = 29.2673 Intercept = 4.0856 Corr. coeff. = 0.9970
13	-0.8	9.5	8.7	1.474	48	47.86	
10	-2.0	8.5	6.5	1.277	42	41.88	
7	-3.3	7.8	4.5	1.065	36	35.89	
5	-4.2	7.0	2.8	0.844	28	27.92	

**Calculations :**

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration ( deg K )

Pstd = actual pressure during calibration ( mm Hg )

**For subsequent calculation of sampler flow:**

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

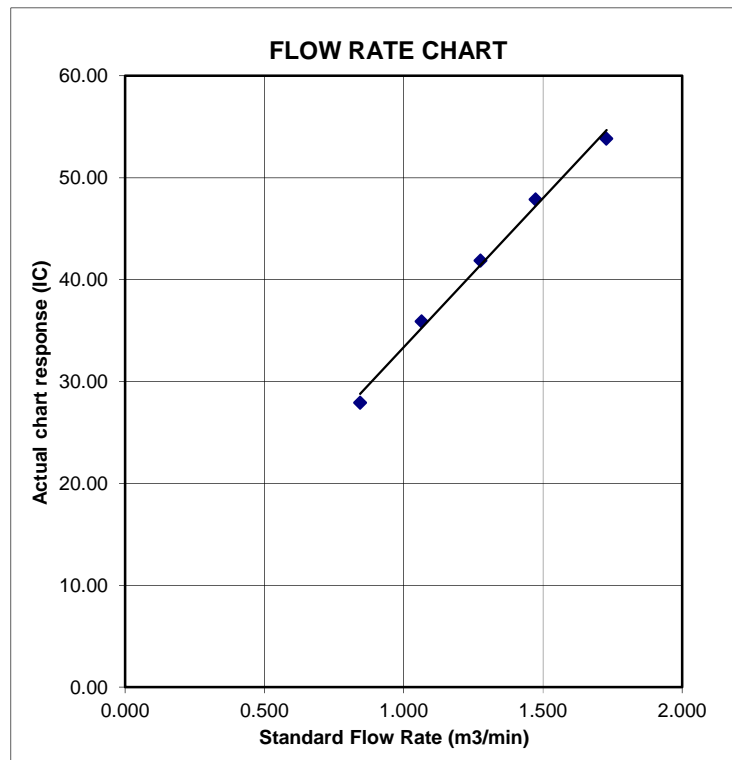
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Nga Yiu Ha Village	Date of Calibration:	8/8/2018
Location ID : AM4b	Next Calibration Date:	8/10/2018
	Technician:	Fai So

### CONDITIONS

Sea Level Pressure (hPa)	1004.2	Corrected Pressure (mm Hg)	753.15
Temperature (°C)	30.3	Temperature (K)	303

### CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.02017
Model->	5025A	Qstd Intercept ->	-0.03691
Serial # ->	1612		

### CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.5	5.5	11.0	1.638	54	53.28	Slope = 31.2497 Intercept = 1.8456 Corr. coeff. = 0.9992
13	4.4	4.4	8.8	1.467	48	47.36	
10	3.3	3.3	6.6	1.273	42	41.44	
7	2	2	4.0	0.995	34	33.55	
5	1.4	1.4	2.8	0.836	28	27.63	

**Calculations :**

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration ( deg K )

Pstd = actual pressure during calibration ( mm Hg )

**For subsequent calculation of sampler flow:**

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

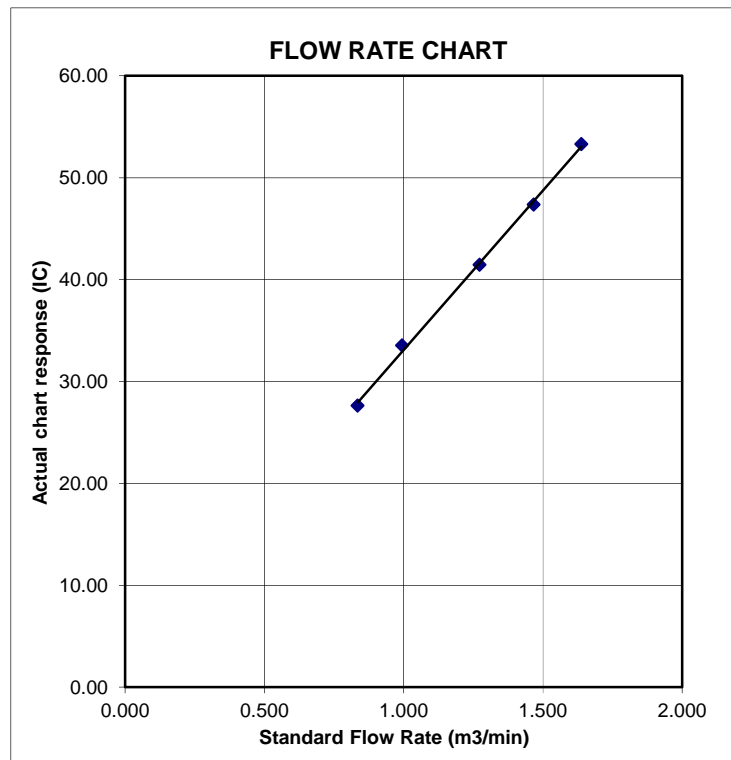
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Nga Yiu Ha Village	Date of Calibration:	6/10/2018
Location ID : AM4b	Next Calibration Date:	6/12/2018
	Technician:	Fai So

### CONDITIONS

Sea Level Pressure (hPa)	1013.4	Corrected Pressure (mm Hg)	760.05
Temperature (°C)	26.8	Temperature (K)	300

### CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.02017
Model->	5025A	Qstd Intercept ->	-0.03691
Serial # ->	1612		

### CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	-0.2	11	10.8	1.640	51	50.85	Slope = 25.4343 Intercept = 9.3044 Corr. coeff. = 0.9999
13	-1.5	9.7	8.2	1.432	46	45.86	
10	-2.5	9	6.5	1.277	42	41.88	
7	-3.6	7.6	4.0	1.005	35	34.90	
5	-4.3	6.9	2.6	0.814	30	29.91	

**Calculations :**

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration ( deg K )

Pstd = actual pressure during calibration ( mm Hg )

**For subsequent calculation of sampler flow:**

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

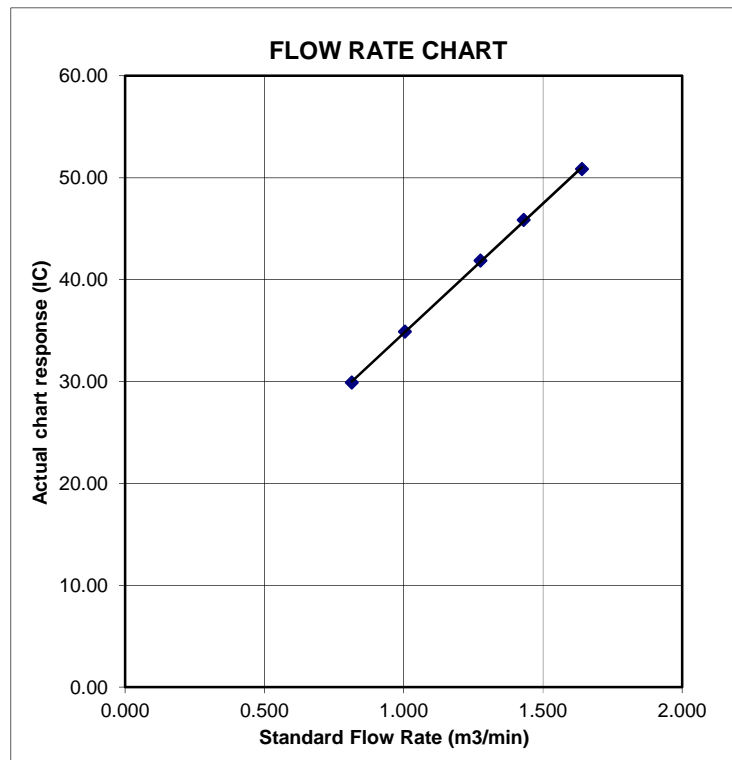
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Ping Yeung Village House	Date of Calibration:	8/8/2018
Location ID : AM5a	Next Calibration Date:	8/10/2018
	Technician:	Fai So

### CONDITIONS

Sea Level Pressure (hPa)	1004.2	Corrected Pressure (mm Hg)	753.15
Temperature (°C)	30.3	Temperature (K)	303

### CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.02017
Model->	5025A	Qstd Intercept ->	-0.03691
Serial # ->	1612		

### CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.8	5.8	11.6	1.682	44	43.42	Slope = 36.9710 Intercept = -19.0002 Corr. coeff. = 0.9965
13	4.5	4.5	9.0	1.484	35	34.54	
10	3.4	3.4	6.8	1.292	30	29.60	
7	2.2	2.2	4.4	1.043	21	20.72	
5	1.3	1.3	2.6	0.806	10	9.87	

**Calculations :**

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration ( deg K )

Pstd = actual pressure during calibration ( mm Hg )

**For subsequent calculation of sampler flow:**

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

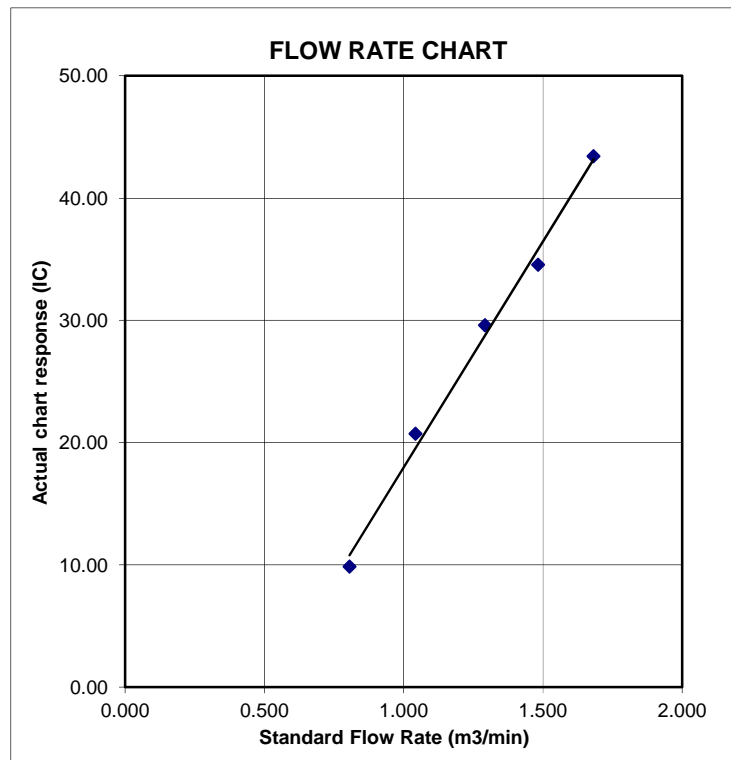
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure





## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Ping Yeung Village House	Date of Calibration:	6/10/2018
Location ID : AM5a	Next Calibration Date:	6/12/2018
	Technician:	Fai So

### CONDITIONS

Sea Level Pressure (hPa)	1013.4	Corrected Pressure (mm Hg)	760.05
Temperature (°C)	26.8	Temperature (K)	300

### CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.02017
Model->	5025A	Qstd Intercept ->	-0.03691
Serial # ->	1612		

### CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	0.1	10.9	11.0	1.655	51	50.85	Slope = 35.1355 Intercept = -6.4788 Corr. coeff. = 0.9954
13	-1.1	10	8.9	1.491	46	45.86	
10	-2.2	8.8	6.6	1.286	40	39.88	
7	-3.3	7.8	4.5	1.065	32	31.90	
5	-4.0	7.0	3.0	0.873	23	22.93	

**Calculations :**

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration ( deg K )

Pstd = actual pressure during calibration ( mm Hg )

**For subsequent calculation of sampler flow:**

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

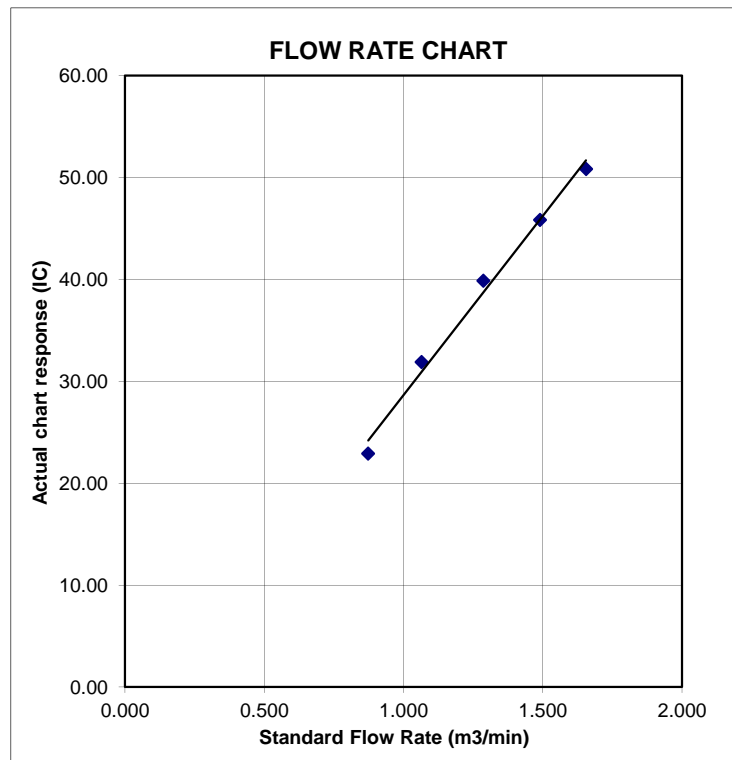
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Wo Keng Shan Village House	Date of Calibration:	8/8/2018
Location ID : AM6	Next Calibration Date:	8/10/2018
	Technician:	Fai So

### CONDITIONS

Sea Level Pressure (hPa)	1004.2	Corrected Pressure (mm Hg)	753.15
Temperature (°C)	30.3	Temperature (K)	303

### CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.02017
Model->	5025A	Qstd Intercept ->	-0.03691
Serial # ->	1612		

### CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.3	5.3	10.6	1.609	52	51.31	Slope = 30.7268 Intercept = 0.3083 Corr. coeff. = 0.9940
13	4.6	4.6	9.2	1.500	46	45.39	
10	3.5	3.5	7.0	1.311	40	39.47	
7	2.1	2.1	4.2	1.019	32	31.58	
5	1.3	1.3	2.6	0.806	26	25.66	

**Calculations :**

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration ( deg K )

Pstd = actual pressure during calibration ( mm Hg )

**For subsequent calculation of sampler flow:**

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

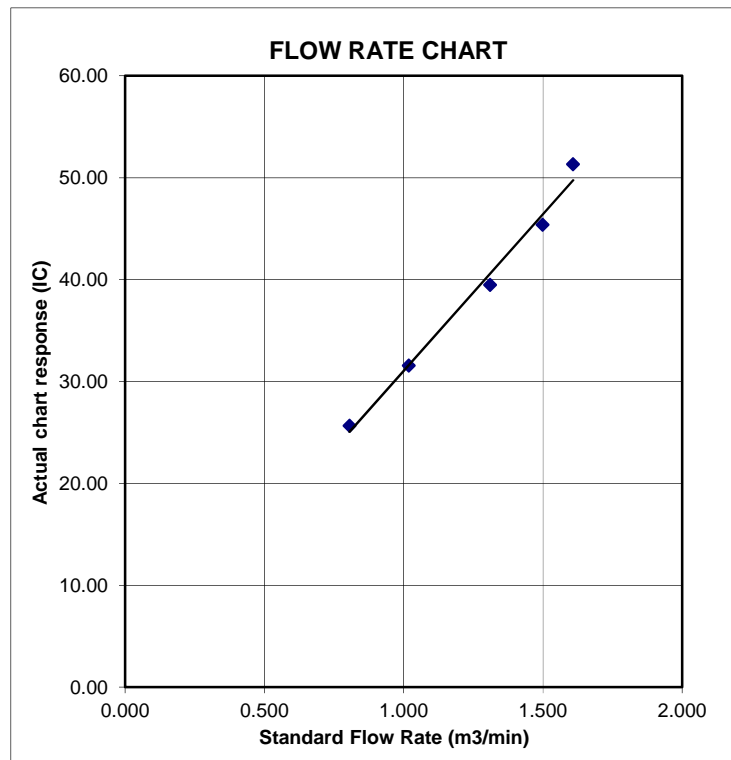
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Wo Keng Shan Village House	Date of Calibration:	6/10/2018
Location ID : AM6	Next Calibration Date:	6/12/2018
	Technician:	Fai So

### CONDITIONS

Sea Level Pressure (hPa)	1013.4	Corrected Pressure (mm Hg)	760.05
Temperature (°C)	26.8	Temperature (K)	300

### CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.02017
Model->	5025A	Qstd Intercept ->	-0.03691
Serial # ->	1612		

### CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	0.1	11.2	11.3	1.677	60	59.82	Slope = 34.9447 Intercept = 2.3726 Corr. coeff. = 0.9958
13	-1.3	9.9	8.6	1.466	54	53.84	
10	-2.1	9	6.9	1.315	50	49.85	
7	-3.3	7.8	4.5	1.065	40	39.88	
5	-4.2	6.8	2.6	0.814	30	29.91	

**Calculations :**

$$Q_{std} = 1/m[\sqrt{H_2O(P_a/P_{std})(T_{std}/T_a)}] - b$$

$$IC = I[\sqrt{P_a/P_{std}}(T_{std}/T_a)]$$

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

T<sub>a</sub> = actual temperature during calibration ( deg K )

P<sub>std</sub> = actual pressure during calibration ( mm Hg )

**For subsequent calculation of sampler flow:**

$$1/m((I) [\sqrt{298/T_{av}}(P_{av}/760)] - b)$$

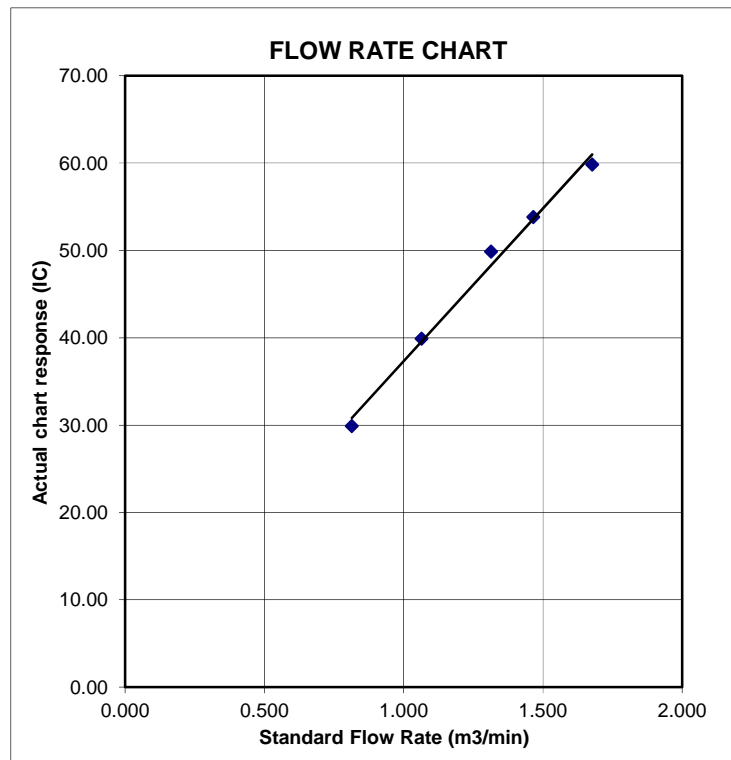
m = sampler slope

b = sampler intercept

I = chart response

T<sub>av</sub> = daily average temperature

P<sub>av</sub> = daily average pressure



## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Village House of Loi Tung Village	Date of Calibration: 8/8/2018
Location ID : AM7b	Next Calibration Date: 8/10/2018
	Technician: Fai So

### CONDITIONS

Sea Level Pressure (hPa)	1004.2	Corrected Pressure (mm Hg)	753.15
Temperature (°C)	30.3	Temperature (K)	303

### CALIBRATION ORIFICE

Make-> TISCH	Qstd Slope -> 2.02017
Model-> 5025A	Qstd Intercept -> -0.03691
Serial # -> 1612	

### CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.4	5.4	10.8	1.623	54	53.28	Slope = 37.7511 Intercept = -8.6603 Corr. coeff. = 0.9982
13	4.6	4.6	9.2	1.500	48	47.36	
10	3.4	3.4	6.8	1.292	40	39.47	
7	2.2	2.2	4.4	1.043	32	31.58	
5	1.5	1.5	3.0	0.864	24	23.68	

#### Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration ( deg K )

Pstd = actual pressure during calibration ( mm Hg )

#### For subsequent calculation of sampler flow:

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

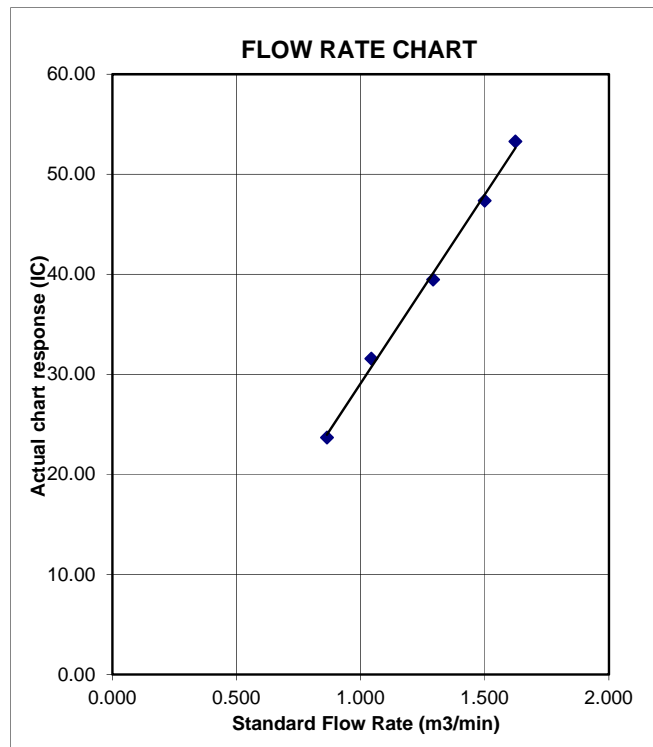
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Village House of Loi Tung Village	Date of Calibration: 6/10/2018
Location ID : AM7b	Next Calibration Date: 6/12/2018
	Technician: Fai So

### CONDITIONS

Sea Level Pressure (hPa)	1013.4	Corrected Pressure (mm Hg)	760.05
Temperature (°C)	26.8	Temperature (K)	300

### CALIBRATION ORIFICE

Make-> TISCH	Qstd Slope ->
Model-> 5025A	Qstd Intercept ->
Serial # -> 1612	2.02017
	-0.03691

### CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	0.2	11.2	11.4	1.685	58	57.83	Slope = 34.5040 Intercept = -0.6376 Corr. coeff. = 0.9956
13	-0.9	10.2	9.3	1.523	51	50.85	
10	-2	9.1	7.1	1.333	47	46.86	
7	-3.3	7.8	4.5	1.065	35	34.90	
5	-4.2	6.8	2.6	0.814	28	27.92	

#### Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration ( deg K )

Pstd = actual pressure during calibration ( mm Hg )

#### For subsequent calculation of sampler flow:

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

m = sampler slope

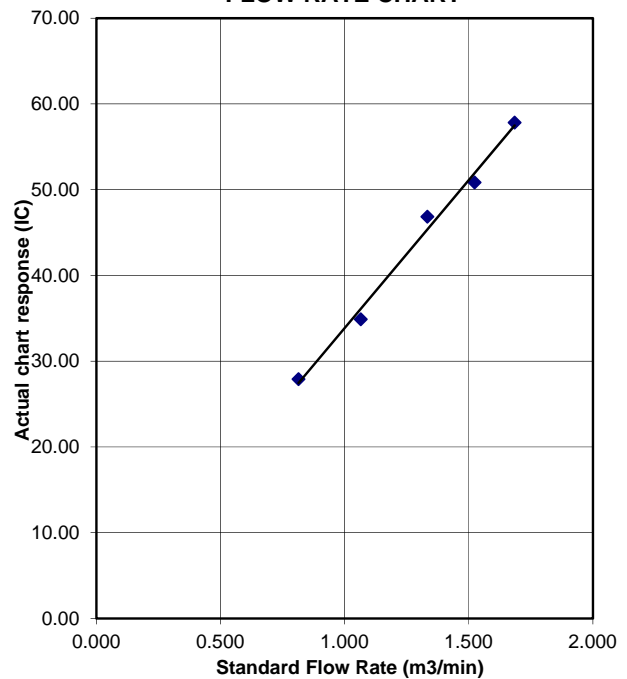
b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

#### FLOW RATE CHART



## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Po Kat Tsai Village No. 4  
 Location ID : AM8

Date of Calibration: 8/8/2018  
 Next Calibration Date: 8/10/2018  
 Technician: Fai So

### CONDITIONS

Sea Level Pressure (hPa)	1004.2	Corrected Pressure (mm Hg)	753.15
Temperature (°C)	30.3	Temperature (K)	303

### CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.02017
Model->	5025A	Qstd Intercept ->	-0.03691
Serial # ->	1612		

### CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION		
							Slope =	Intercept =	Corr. coeff. =
18	6.1	6.1	12.2	1.724	58	57.23	43.9506	-17.6019	0.9952
13	4.8	4.8	9.6	1.532	50	49.34			
10	3.6	3.6	7.2	1.329	44	43.42			
7	2.4	2.4	4.8	1.088	30	29.60			
5	1.5	1.5	3.0	0.864	20	19.73			

**Calculations :**

$$Q_{std} = 1/m[\sqrt{H_2O(P_a/P_{std})(T_{std}/T_a)} - b]$$

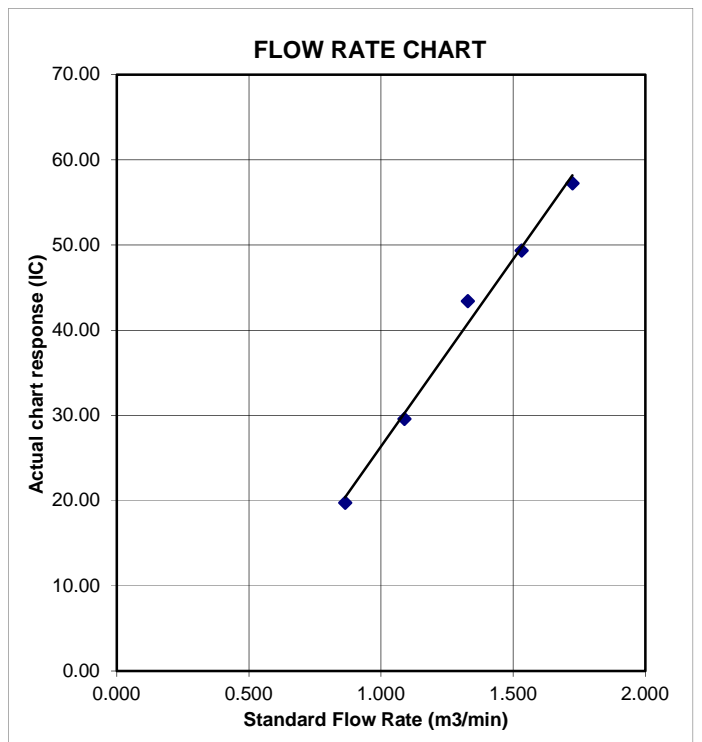
$$IC = I[\sqrt{P_a/P_{std}}(T_{std}/T_a)]$$

Qstd = standard flow rate  
 IC = corrected chart responses  
 I = actual chart response  
 m = calibrator Qstd slope  
 b = calibrator Qstd intercept  
 Ta = actual temperature during calibration ( deg K )  
 Pstd = actual pressure during calibration ( mm Hg )

**For subsequent calculation of sampler flow:**

$$1/m(( I )[\sqrt{298/T_{av}}(P_{av}/760)] - b)$$

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



## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Po Kat Tsai Village No. 4  
 Location ID : AM8

Date of Calibration: 6/10/2018  
 Next Calibration Date: 6/12/2018  
 Technician: Fai So

### CONDITIONS

Sea Level Pressure (hPa) 1013.4  
 Temperature (°C) 26.8

Corrected Pressure (mm Hg) 760.05  
 Temperature (K) 300

### CALIBRATION ORIFICE

Make-> TISCH  
 Model-> 5025A  
 Serial # -> 1612

Qstd Slope -> 2.02017  
 Qstd Intercept -> -0.03691

### CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION Slope = 41.7016 Intercept = -14.1664 Corr. coeff. = 0.9990
18	-0.2	11.1	10.9	1.648	54	53.84	
13	-1.3	10.1	8.8	1.482	48	47.86	
10	-2.2	9.2	7.0	1.324	42	41.88	
7	-3.5	7.9	4.4	1.054	30	29.91	
5	-4.3	7.0	2.7	0.829	20	19.94	

**Calculations :**

$$Q_{std} = 1/m[\sqrt{H_2O(P_a/P_{std})(T_{std}/T_a)} - b]$$

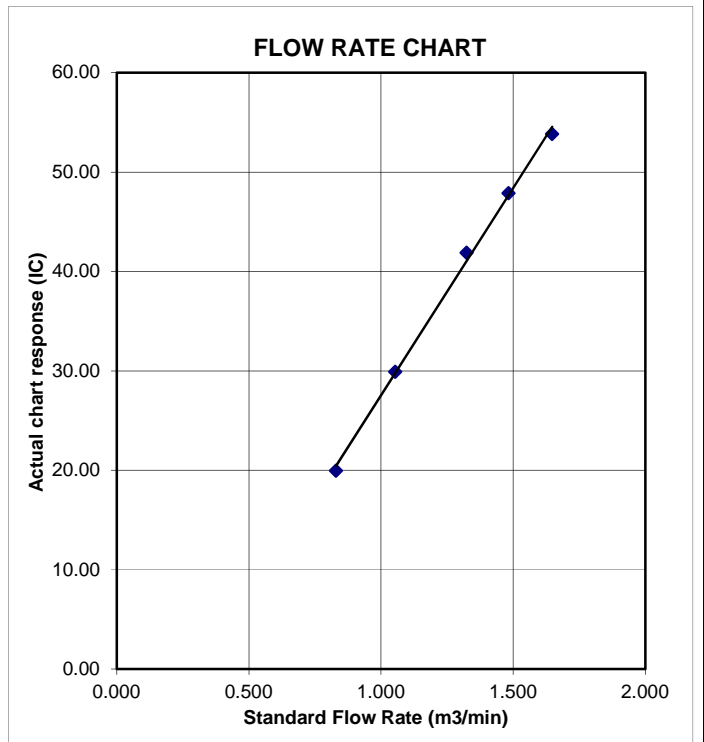
$$IC = I[\sqrt{P_a/P_{std}}(T_{std}/T_a)]$$

Qstd = standard flow rate  
 IC = corrected chart responses  
 I = actual chart response  
 m = calibrator Qstd slope  
 b = calibrator Qstd intercept  
 Ta = actual temperature during calibration ( deg K )  
 Pstd = actual pressure during calibration ( mm Hg )

**For subsequent calculation of sampler flow:**

$$1/m(( I )[\sqrt{298/T_{av}}(P_{av}/760)] - b)$$

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





## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Nam Wa Po Village House No. 80	Date of Calibration:	8/8/2018
Location ID : AM9b	Next Calibration Date:	8/10/2018
	Technician:	Fai So

### CONDITIONS

Sea Level Pressure (hPa)	1004.2	Corrected Pressure (mm Hg)	753.15
Temperature (°C)	30.3	Temperature (K)	303

### CALIBRATION ORIFICE

Make-> TISCH	Qstd Slope ->	2.02017
Model-> 5025A	Qstd Intercept ->	-0.03691
Serial # -> 1612		

### CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.8	5.8	11.6	1.682	55	54.27	Slope = 36.6903 Intercept = -8.6996 Corr. coeff. = 0.9952
13	4.7	4.7	9.4	1.516	46	45.39	
10	3.6	3.6	7.2	1.329	40	39.47	
7	2.3	2.3	4.6	1.066	32	31.58	
5	1.5	1.5	3.0	0.864	23	22.70	

**Calculations :**

$$Qstd = 1/m[\text{Sqrt}(H20(Pa/Pstd)(Tstd/Ta))-b]$$

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration ( deg K )

Pstd = actual pressure during calibration ( mm Hg )

**For subsequent calculation of sampler flow:**

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

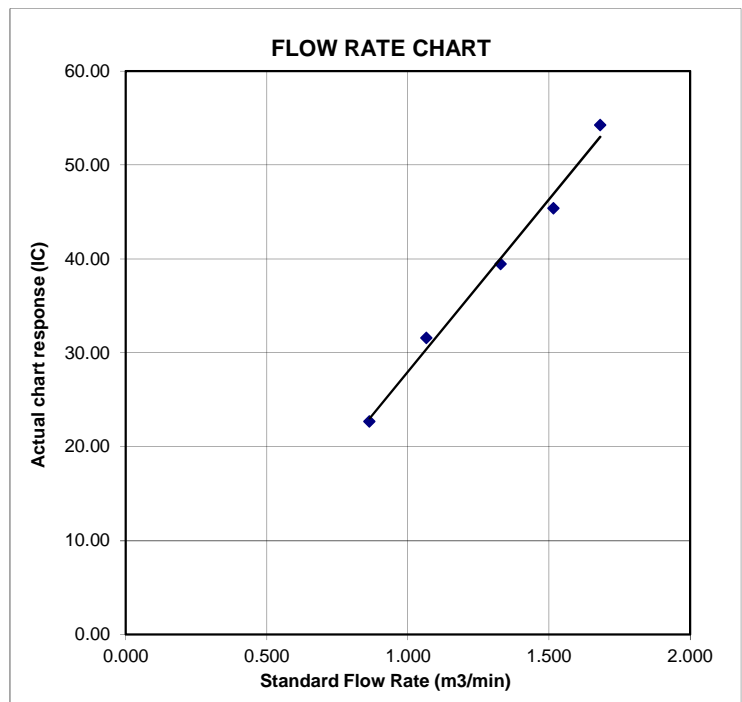
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Nam Wa Po Village House No. 80  
 Location ID : AM9b

Date of Calibration: 6/10/2018  
 Next Calibration Date: 6/12/2018  
 Technician: Fai So

### CONDITIONS

Sea Level Pressure (hPa)	1013.4	Corrected Pressure (mm Hg)	760.05
Temperature (°C)	26.8	Temperature (K)	300

### CALIBRATION ORIFICE

Make-> TISCH	Qstd Slope -> 2.02017
Model-> 5025A	Qstd Intercept -> -0.03691
Serial # -> 1612	

### CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	0.7	11.8	12.5	1.763	54	53.84	Slope = 30.0889 Intercept = 1.6929 Corr. coeff. = 0.9962
13	-0.7	10.3	9.6	1.547	49	48.85	
10	-1.8	9.2	7.4	1.361	44	43.87	
7	-3.2	8	4.8	1.100	34	33.90	
5	-4.0	7.0	3.0	0.873	28	27.92	

**Calculations :**

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

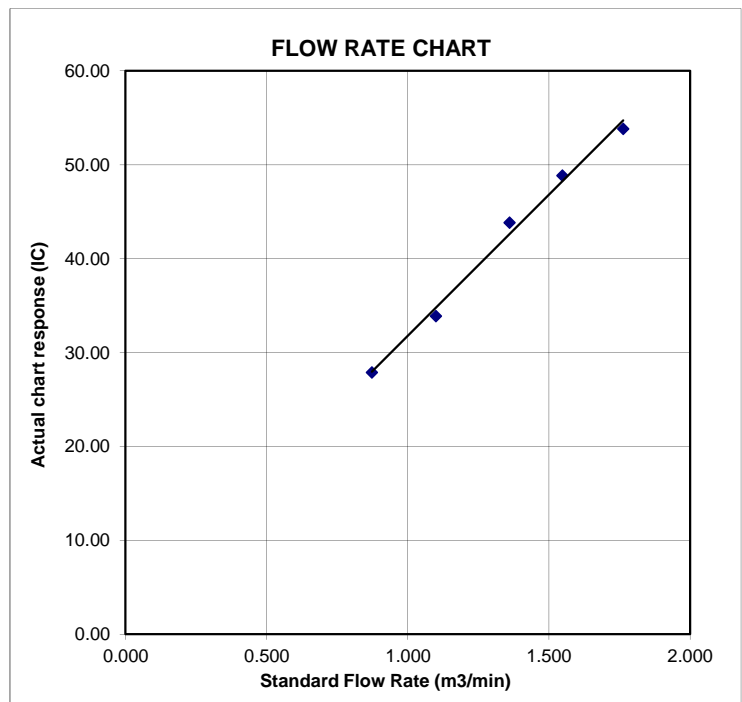
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate  
 IC = corrected chart responses  
 I = actual chart response  
 m = calibrator Qstd slope  
 b = calibrator Qstd intercept  
 Ta = actual temperature during calibration ( deg K )  
 Pstd = actual pressure during calibration ( mm Hg )

**For subsequent calculation of sampler flow:**

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

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



# 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: <b>1612</b>		

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)	$\sqrt{\Delta H \left( \frac{Ta}{Pa} \right)}$ (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
<b>QSTD</b>	m=	<b>2.02017</b>	<b>QA</b>	m=	<b>1.26500</b>
	b=	<b>-0.03691</b>		b=	<b>-0.02263</b>
	r=	<b>0.99988</b>		r=	<b>0.99988</b>

Calculations	
Vstd= $\Delta Vol \left( \frac{Pa - \Delta P}{Pstd} \right) \left( \frac{Tstd}{Ta} \right)$	Va= $\Delta Vol \left( \frac{Pa - \Delta P}{Pa} \right)$
Qstd= $Vstd / \Delta Time$	Qa= $Va / \Delta Time$
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= $1/m \left( \left( \sqrt{\Delta H \left( \frac{Ta}{Pa} \right)} \right) - b \right)$

Standard Conditions	
Tstd:	298.15 °K
Pstd:	760 mm Hg
<b>Key</b>	
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

# ALS Technichem (HK) Pty Ltd

## ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES



### SUB-CONTRACTING REPORT

CONTACT	: MR BEN TAM	WORK ORDER	: <b>HK1825890</b>
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	: 12-APR-2018
		DATE OF ISSUE	: 19-APR-2018
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**

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Tel. +852 2610 1044 Fax. +852 2610 2021 [www.alsglobal.com](http://www.alsglobal.com)

WORK ORDER : HK1825890  
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.
HK1825890-001	S/N: 456658	Equipments	12-Apr-2018	S/N: 456658



# Equipment Verification Report (TSP)

## Equipment Calibrated:

Type: Laser Dust monitor  
 Manufacturer: Sibata LD-3B  
 Serial No. 456658  
 Equipment Ref: EQ115  
 Job Order HK1825890

## Standard Equipment:

Standard Equipment: Higher Volume Sampler  
 Location & Location ID: AUES office (calibration room)  
 Equipment Ref: HVS 018  
 Last Calibration Date: 27 February 2018

## Equipment Verification Results:

Calibration Date: 12 & 13 March 2018

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m <sup>3</sup> (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr07min	9:50 ~ 11:57	19.6	1019.0	0.073	4333	34.2
2hr14min	12:05 ~ 14:19	19.6	1019.0	0.075	4469	33.3
2hr17min	9:50 ~ 12:07	20.9	1016.7	0.075	4912	35.7

Sensitivity Adjustment Scale Setting (Before Calibration) 705 (CPM)

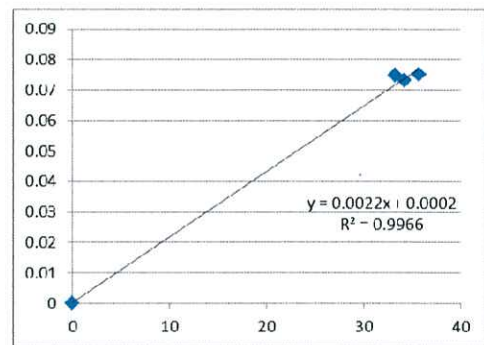
Sensitivity Adjustment Scale Setting (After Calibration) 705 (CPM)

## Linear Regression of Y or X

Slope (K-factor): 0.0022

Correlation Coefficient (R) 0.9983


Date of Issue 15 March 2018



## Remarks:

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

Operator : Martin Li Signature :  Date : 15 March 2018

QC Reviewer : Ben Tam Signature :  Date : 15 March 2018

## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Gold King Industrial Building, Kwai Chung	Date of Calibration: 27-Feb-18
Location ID :	Calibration Room	Next Calibration Date: 27-May-18

### CONDITIONS

Sea Level Pressure (hPa)	1017.3	Corrected Pressure (mm Hg)	762.975
Temperature (°C)	19.1	Temperature (K)	292

### CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.11965
Model->	5025A	Qstd Intercept ->	-0.02696
Calibration Date->	28-Feb-17	Expiry Date->	28-Feb-18

### CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.2	6.2	12.4	1.694	52	52.63	Slope = 39.8525 Intercept = -14.3322 Corr. coeff. = 0.9974
13	5.1	5.1	10.2	1.538	46	46.55	
10	3.9	3.9	7.8	1.346	40	40.48	
8	2.6	2.6	5.2	1.101	30	30.36	
5	1.7	1.7	3.4	0.893	20	20.24	

**Calculations :**

$$Q_{std} = 1/m[\sqrt{H_2O(P_a/P_{std})(T_{std}/T_a)}] - b$$

$$IC = I[\sqrt{P_a/P_{std}}(T_{std}/T_a)]$$

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

T<sub>a</sub> = actual temperature during calibration ( deg K )

P<sub>std</sub> = actual pressure during calibration ( mm Hg )

**For subsequent calculation of sampler flow:**

$$1/m(( I )[\sqrt{298/T_{av}}(P_{av}/760)] - b)$$

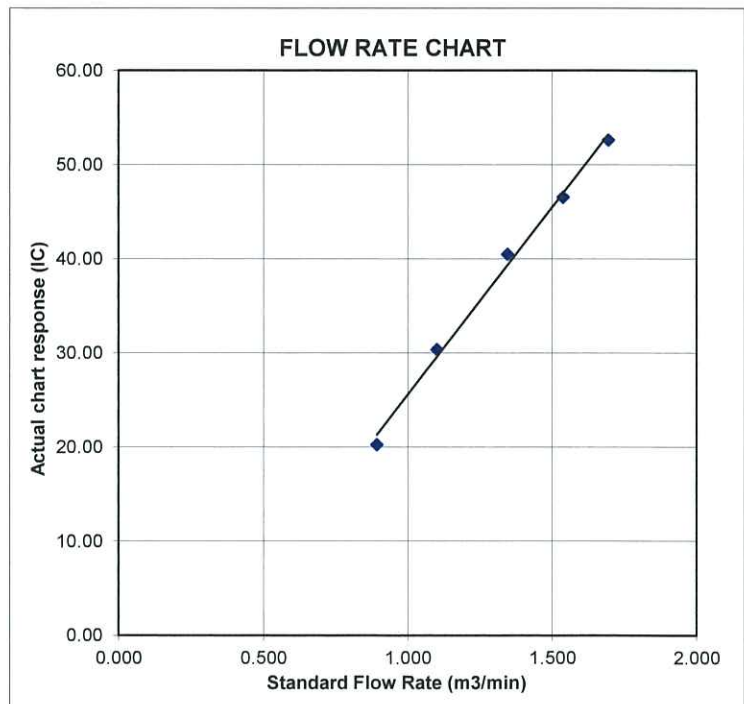
m = sampler slope

b = sampler intercept

I = chart response

T<sub>av</sub> = daily average temperature

P<sub>av</sub> = daily average pressure







## ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

### SUB-CONTRACTING REPORT

CONTACT	: MR BEN TAM	WORK ORDER	: <b>HK1815074</b>
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	: 5-JAN-2018
		DATE OF ISSUE	: 5-FEB-2018
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.

#### Signatories

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

Signatories

Position

Richard Fung  General Manager

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

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

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

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Tel. +852 2610 1044 Fax. +852 2610 2021 [www.alsglobal.com](http://www.alsglobal.com)

WORK ORDER : HK1815074  
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.
HK1815074-001	S/N: 3Y6505	AIR	05-Jan-2018	S/N: 3Y6505

# Equipment Verification Report (TSP)

## Equipment Calibrated:

Type: Laser Dust monitor  
 Manufacturer: Sibata LD-3B  
 Serial No. 3Y6505  
 Equipment Ref: EQ114  
 Job Order HK1815074

## Standard Equipment:

Standard Equipment: Higher Volume Sampler  
 Location & Location ID: AUES office (calibration room)  
 Equipment Ref: HVS 018  
 Last Calibration Date: 1 December 2017

## Equipment Verification Results:

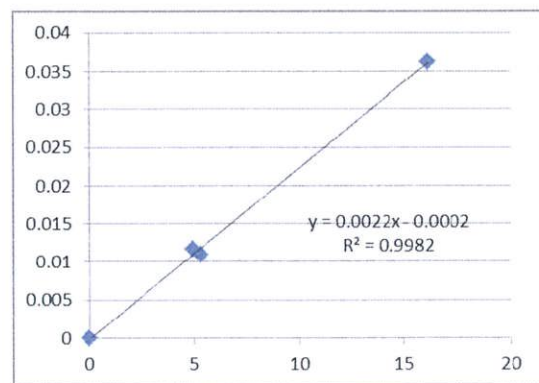
Testing Date: 5 January 2018

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m <sup>3</sup> (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr07min	10:27 ~ 12:34	19.3	1015.3	0.011	677	5.3
2hr01min	12:38 ~ 14:39	19.3	1015.3	0.012	601	5.0
2hr08min	14:42 ~ 16:50	19.3	1015.3	0.036	2064	16.2

Sensitivity Adjustment Scale Setting (Before Calibration) 591 (CPM)  
 Sensitivity Adjustment Scale Setting (After Calibration) 590 (CPM)

## Linear Regression of Y or X

Slope (K-factor): 0.0022  
 Correlation Coefficient 0.9991  
 Date of Issue 9 January 2018



## Remarks:

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

Operator : Martin Li Signature : [Signature] Date : 9 January 2018

QC Reviewer : Ben Tam Signature : [Signature] Date : 9 January 2018

## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Gold King Industrial Building, Kwai Chung Date of Calibration: 1-Dec-17  
 Location ID : Calibration Room Next Calibration Date: 1-Mar-18

### CONDITIONS

Sea Level Pressure (hPa)	1018.8	Corrected Pressure (mm Hg)	764.1
Temperature (°C)	21.2	Temperature (K)	294

### CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.11965
Model->	5025A	Qstd Intercept ->	-0.02696
Calibration Date->	28-Feb-17	Expiry Date->	28-Feb-18

### CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.3	6.3	12.6	1.703	54	54.49	Slope = 31.2239 Intercept = 0.7901 Corr. coeff. = 0.9971
13	5	5	10.0	1.518	48	48.44	
10	3.9	3.9	7.8	1.342	42	42.38	
8	2.4	2.4	4.8	1.056	32	32.29	
5	1.0	1.0	2.0	0.686	23	23.21	

**Calculations :**

$$Q_{std} = 1/m[\text{Sqrt}(H2O(Pa/P_{std})(T_{std}/T_a))-b]$$

$$IC = I[\text{Sqrt}(Pa/P_{std})(T_{std}/T_a)]$$

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration ( deg K )

Pstd = actual pressure during calibration ( mm Hg )

**For subsequent calculation of sampler flow:**

$$1/m(( I )[\text{Sqrt}(298/T_{av})(P_{av}/760)]-b)$$

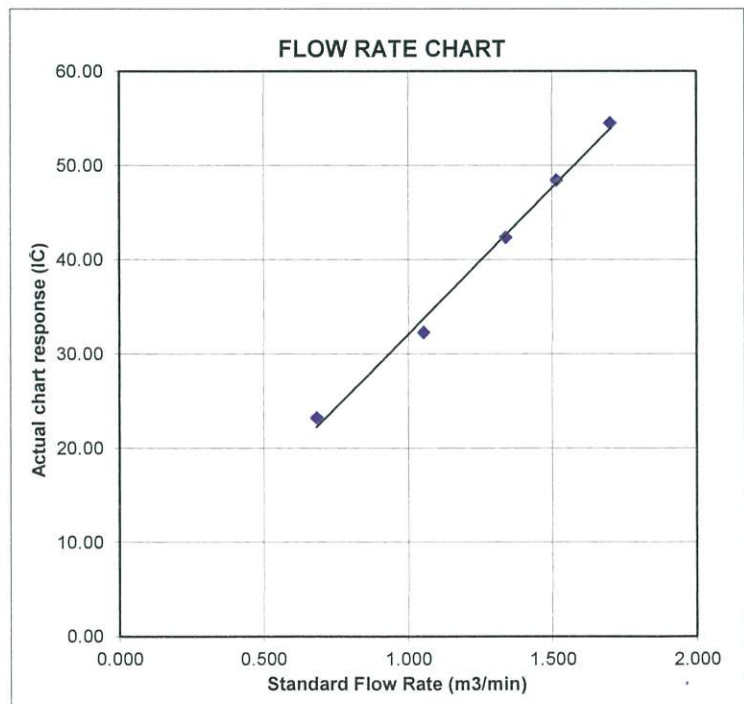
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure





# ALS Technichem (HK) Pty Ltd

## ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES



### SUB-CONTRACTING REPORT

CONTACT	: MR BEN TAM	WORK ORDER	: <b>HK1825889</b>
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	: 12-APR-2018
		DATE OF ISSUE	: 19-APR-2018
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

*R.F.*  
Richard Fung

General Manager

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

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

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

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Tel. +852 2610 1044 Fax. +852 2610 2021 [www.alsglobal.com](http://www.alsglobal.com)

WORK ORDER : HK1825889  
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.
HK1825889-001	S/N: 3Y6502	Equipments	12-Apr-2018	S/N: 3Y6502



# Equipment Verification Report (TSP)

## Equipment Calibrated:

Type: Laser Dust monitor  
 Manufacturer: Sibata LD-3B  
 Serial No. 3Y6502  
 Equipment Ref: EQ113  
 Job Order HK1825889

## Standard Equipment:

Standard Equipment: Higher Volume Sampler  
 Location & Location ID: AUES office (calibration room)  
 Equipment Ref: HVS 018  
 Last Calibration Date: 27 February 2018

## Equipment Verification Results:

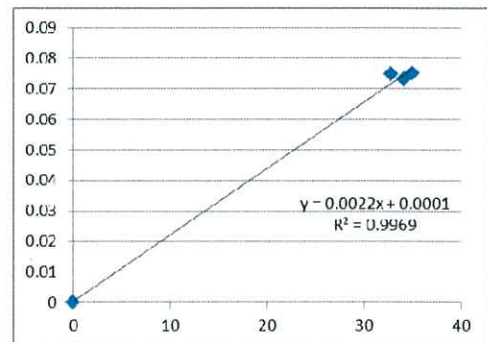
Calibration Date: 12 & 13 March 2018

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m <sup>3</sup> (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr07min	9:50 ~ 11:57	19.6	1019.0	0.073	4322	34.1
2hr14min	12:05 ~ 14:19	19.6	1019.0	0.075	4416	32.9
2hr17min	9:50 ~ 12:07	20.9	1016.7	0.075	4811	35.0

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): 0.0022  
 Correlation Coefficient (R) 0.9984  
 Date of Issue 15 March 2018



## Remarks:

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

Operator : Martin Li Signature : [Signature] Date : 15 March 2018

QC Reviewer : Ben Tam Signature : [Signature] Date : 15 March 2018

## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Gold King Industrial Building, Kwai Chung	Date of Calibration: 27-Feb-18
Location ID :	Calibration Room	Next Calibration Date: 27-May-18

### CONDITIONS

Sea Level Pressure (hPa)	1017.3	Corrected Pressure (mm Hg)	762.975
Temperature (°C)	19.1	Temperature (K)	292

### CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.11965
Model->	5025A	Qstd Intercept ->	-0.02696
Calibration Date->	28-Feb-17	Expiry Date->	28-Feb-18

### CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.2	6.2	12.4	1.694	52	52.63	Slope = 39.8525 Intercept = -14.3322 Corr. coeff. = 0.9974
13	5.1	5.1	10.2	1.538	46	46.55	
10	3.9	3.9	7.8	1.346	40	40.48	
8	2.6	2.6	5.2	1.101	30	30.36	
5	1.7	1.7	3.4	0.893	20	20.24	

**Calculations :**

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration ( deg K )

Pstd = actual pressure during calibration ( mm Hg )

**For subsequent calculation of sampler flow:**

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

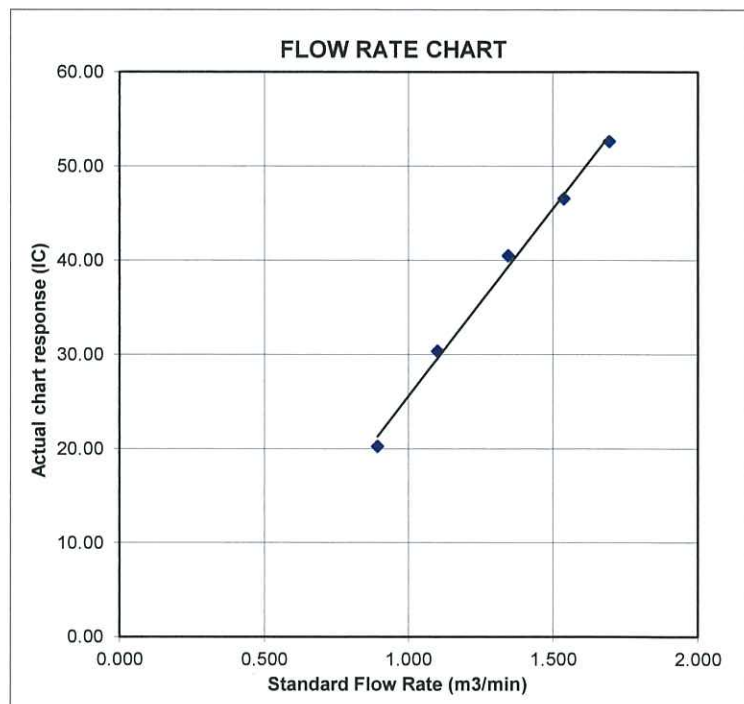
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure





### SUB-CONTRACTING REPORT

CONTACT	: MR BEN TAM	WORK ORDER	: <b>HK1815072</b>
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	: 5-JAN-2018
		DATE OF ISSUE	: 5-FEB-2018
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.

#### Signatories

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

Signatories

Position

Richard Fung  General Manager

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

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

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Part of the **ALS Laboratory Group**

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WORK ORDER : HK1815072  
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.
HK1815072-001	S/N: 366410	AIR	05-Jan-2018	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 HK1815072

## Standard Equipment:

Standard Equipment: Higher Volume Sampler  
 Location & Location ID: AUES office (calibration room)  
 Equipment Ref: HVS 018  
 Last Calibration Date: 1 December 2017

## Equipment Verification Results:

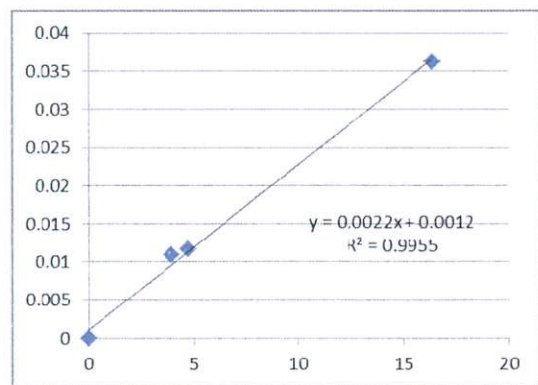
Testing Date: 5 January 2018

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m <sup>3</sup> (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr07min	10:27 ~ 12:34	19.3	1015.3	0.011	498	3.9
2hr01min	12:38 ~ 14:39	19.3	1015.3	0.012	571	4.7
2hr08min	14:42 ~ 16:50	19.3	1015.3	0.036	2095	16.4

Sensitivity Adjustment Scale Setting (Before Calibration) 670 (CPM)  
 Sensitivity Adjustment Scale Setting (After Calibration) 669 (CPM)

## Linear Regression of Y or X

Slope (K-factor): 0.0022  
 Correlation Coefficient 0.9977  
 Date of Issue 9 January 2018



## Remarks:

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

Operator : Martin Li Signature : [Signature] Date : 9 January 2018

QC Reviewer : Ben Tam Signature : [Signature] Date : 9 January 2018

## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Gold King Industrial Building, Kwai Chung	Date of Calibration: 1-Dec-17
Location ID :	Calibration Room	Next Calibration Date: 1-Mar-18

### CONDITIONS

Sea Level Pressure (hPa)	1018.8	Corrected Pressure (mm Hg)	764.1
Temperature (°C)	21.2	Temperature (K)	294

### CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.11965
Model->	5025A	Qstd Intercept ->	-0.02696
Calibration Date->	28-Feb-17	Expiry Date->	28-Feb-18

### CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.3	6.3	12.6	1.703	54	54.49	Slope = 31.2239 Intercept = 0.7901 Corr. coeff. = 0.9971
13	5	5	10.0	1.518	48	48.44	
10	3.9	3.9	7.8	1.342	42	42.38	
8	2.4	2.4	4.8	1.056	32	32.29	
5	1.0	1.0	2.0	0.686	23	23.21	

**Calculations :**

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration ( deg K )

Pstd = actual pressure during calibration ( mm Hg )

**For subsequent calculation of sampler flow:**

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

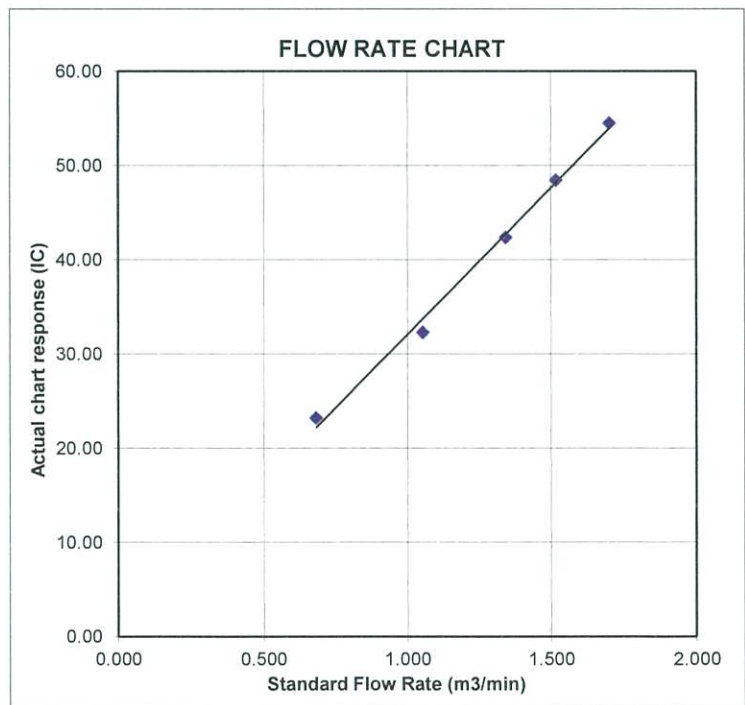
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure







### SUB-CONTRACTING REPORT

CONTACT	: MR BEN TAM	WORK ORDER	: <b>HK1825886</b>
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	: 12-APR-2018
		DATE OF ISSUE	: 19-APR-2018
PROJECT	: ITEM B5 (CALIBRATION SERVICE) OF WATER ANALYSIS IN YEAR NO. OF SAMPLES		: 1
	2018	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*

p.p Richard Fung  General Manager

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

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

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

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Tel. +852 2610 1044 Fax. +852 2610 2021 [www.alsglobal.com](http://www.alsglobal.com)

WORK ORDER : HK1825886  
SUB-BATCH : 1  
CLIENT : ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING  
PROJECT : ITEM B5 (CALIBRATION SERVICE) OF WATER ANALYSIS IN YEAR 2018



ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK1825886-001	S/N. 366407	Equipments	17-Apr-2018	S/N. 366407

## Equipment Verification Report (TSP)

### Equipment Calibrated:

Type: Laser Dust monitor  
 Manufacturer: Sibata LD-3B  
 Serial No. 366407  
 Equipment Ref: EQ107  
 Job Order HK1825886

### Standard Equipment:

Standard Equipment: Higher Volume Sampler  
 Location & Location ID: AUES office (calibration room)  
 Equipment Ref: HVS 018  
 Last Calibration Date: 27 February 2018

### Equipment Verification Results:

Testing Date: 12 & 13 March 2018

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m <sup>3</sup> (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr07min	9:50 ~ 11:57	19.6	1019.0	0.073	4126	32.6
2hr14min	12:05 ~ 14:19	19.6	1019.0	0.075	4414	32.8
2hr17min	9:50 ~ 12:07	20.9	1016.7	0.075	4723	34.4

Sensitivity Adjustment Scale Setting (Before Calibration) 565 (CPM)

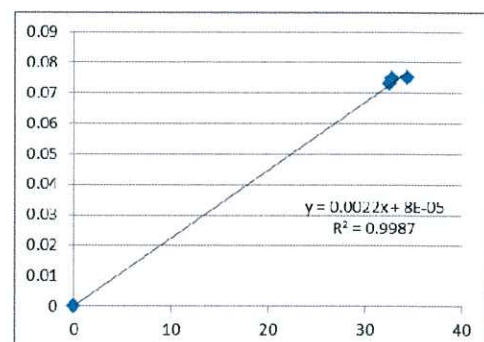
Sensitivity Adjustment Scale Setting (After Calibration) 566 (CPM)

### Linear Regression of Y or X

Slope (K-factor): 0.0022

Correlation Coefficient (R) 0.9993

Date of Issue 15 March 2018



### Remarks:

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

Operator : Martin Li Signature :  Date : 15 March 2018

QC Reviewer : Ben Tam Signature :  Date : 15 March 2018

## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Gold King Industrial Building, Kwai Chung	Date of Calibration: 27-Feb-18
Location ID :	Calibration Room	Next Calibration Date: 27-May-18

### CONDITIONS

Sea Level Pressure (hPa)	1017.3	Corrected Pressure (mm Hg)	762.975
Temperature (°C)	19.1	Temperature (K)	292

### CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.11965
Model->	5025A	Qstd Intercept ->	-0.02696
Calibration Date->	28-Feb-17	Expiry Date->	28-Feb-18

### CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.2	6.2	12.4	1.694	52	52.63	Slope = 39.8525 Intercept = -14.3322 Corr. coeff. = 0.9974
13	5.1	5.1	10.2	1.538	46	46.55	
10	3.9	3.9	7.8	1.346	40	40.48	
8	2.6	2.6	5.2	1.101	30	30.36	
5	1.7	1.7	3.4	0.893	20	20.24	

**Calculations :**

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration ( deg K )

Pstd = actual pressure during calibration ( mm Hg )

**For subsequent calculation of sampler flow:**

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

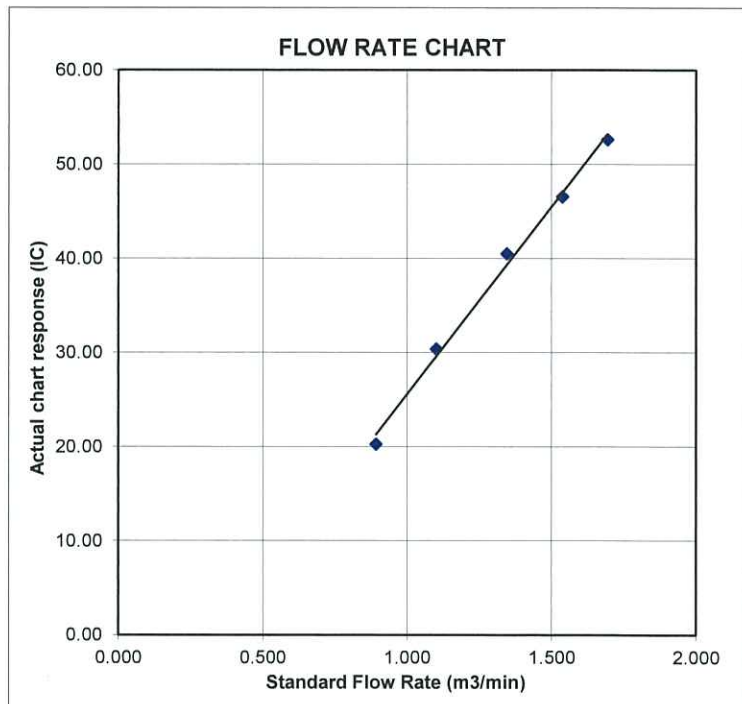
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure







輝創工程有限公司

Sun Creation Engineering Limited

Calibration & Testing Laboratory

# Certificate of Calibration

## 校正證書

Certificate No. : C183261  
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 : 12 June 2018

Description / 儀器名稱 : Sound Calibrator (EQ086)

Manufacturer / 製造商 : Rion

Model No. / 型號 : NC-74

Serial No. / 編號 : 34657230

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 : 18 June 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.

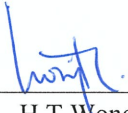
The results are detailed in the subsequent page(s).

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

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- 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

20 June 2018

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

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

Sun Creation Engineering Limited – Calibration & Testing Laboratory

c/o 4/F, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

輝創工程有限公司 — 校正及檢測實驗室

c/o 香港新界屯門興安里一號四樓

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. : C183261

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 :

<u>Equipment ID</u>	<u>Description</u>	<u>Certificate No.</u>
CL130	Universal Counter	C173864
CL281	Multifunction Acoustic Calibrator	PA160023
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	94.1	± 0.3	± 0.2

### 5.2 Frequency Accuracy

UUT Nominal Value (kHz)	Measured Value (kHz)	Mfr's Spec.	Uncertainty of Measured Value (Hz)
1	1.002	1 kHz ± 1 %	± 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.





輝創工程有限公司

Sun Creation Engineering Limited

Calibration & Testing Laboratory

# Certificate of Calibration

## 校正證書

Certificate No. : C183260

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 : 12 June 2018

Description / 儀器名稱 : Sound Calibrator (EQ083)

Manufacturer / 製造商 : Rion

Model No. / 型號 : NC-74

Serial No. / 編號 : 34246492

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 : 18 June 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.

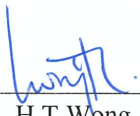
The results are detailed in the subsequent page(s).

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

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- 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

20 June 2018

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

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Sun Creation Engineering Limited – Calibration & Testing Laboratory

c/o 4/F, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

輝創工程有限公司 — 校正及檢測實驗室

c/o 香港新界屯門興安里一號四樓

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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. : C183260

證書編號

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

<u>Equipment ID</u>	<u>Description</u>	<u>Certificate No.</u>
CL130	Universal Counter	C173864
CL281	Multifunction Acoustic Calibrator	PA160023
TST150A	Measuring Amplifier	C181288

- Test procedure : MA100N.

- Results :

- 5.1 Sound Level Accuracy

UUT Nominal Value	Measured Value (dB)	Mfr's Spec. (dB)	Uncertainty of Measured Value (dB)
94 dB, 1 kHz	94.0	± 0.3	± 0.2

- 5.2 Frequency Accuracy

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

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

Note :

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

The values given in this Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

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

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輝創工程有限公司

Sun Creation Engineering Limited

Calibration & Testing Laboratory

# Certificate of Calibration

## 校正證書

Certificate No. : C182473

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 : 26 April 2018

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

Manufacturer / 製造商 : Rion

Model No. / 型號 : NL-52

Serial No. / 編號 : 00142581

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

### TEST CONDITIONS / 測試條件

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

Relative Humidity / 相對濕度 :  $(50 \pm 25)\%$

Line Voltage / 電壓 : ---

### TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 12 May 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
- 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

15 May 2018

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

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Sun Creation Engineering Limited – Calibration & Testing Laboratory

c/o 4/F, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

輝創工程有限公司 – 校正及檢測實驗室

c/o 香港新界屯門興安里一號四樓

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. : C182473

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 was performed before the test.
3. The results presented are the mean of 3 measurements at each calibration point.
4. Test equipment :

<u>Equipment ID</u>	<u>Description</u>	<u>Certificate No.</u>
CL280	40 MHz Arbitrary Waveform Generator	C180024
CL281	Multifunction Acoustic Calibrator	PA160023

5. Test procedure : MA101N.

6. Results :

- 6.1 Sound Pressure Level

- 6.1.1 Reference Sound Pressure Level

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 130	L <sub>A</sub>	A	Fast	94.00	1	94.3	± 1.1

- 6.1.2 Linearity

UUT Setting				Applied Value		UUT Reading (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
30 - 130	L <sub>A</sub>	A	Fast	94.00	1	94.3 (Ref.)
				104.00		104.3
				114.00		114.3

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

- 6.2 Time Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 130	L <sub>A</sub>	A	Fast	94.00	1	94.3	Ref.
			Slow			94.3	± 0.3

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

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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 — 校正及檢測實驗室

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# Certificate of Calibration

## 校正證書

Certificate No. : C182473

證書編號

### 6.3 Frequency Weighting

#### 6.3.1 A-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 130	L <sub>A</sub>	A	Fast	94.00	63 Hz	68.0	-26.2 ± 1.5
					125 Hz	78.1	-16.1 ± 1.5
					250 Hz	85.6	-8.6 ± 1.4
					500 Hz	91.0	-3.2 ± 1.4
					1 kHz	94.3	Ref.
					2 kHz	95.5	+1.2 ± 1.6
					4 kHz	95.3	+1.0 ± 1.6
					8 kHz	93.3	-1.1 (+2.1 ; -3.1)
					12.5 kHz	89.9	-4.3 (+3.0 ; -6.0)

#### 6.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 130	L <sub>C</sub>	C	Fast	94.00	63 Hz	93.5	-0.8 ± 1.5
					125 Hz	94.1	-0.2 ± 1.5
					250 Hz	94.3	0.0 ± 1.4
					500 Hz	94.3	0.0 ± 1.4
					1 kHz	94.3	Ref.
					2 kHz	94.1	-0.2 ± 1.6
					4 kHz	93.5	-0.8 ± 1.6
					8 kHz	91.4	-3.0 (+2.1 ; -3.1)
					12.5 kHz	87.9	-6.2 (+3.0 ; -6.0)

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

- Mfr's Spec. : IEC 61672 Class 1

- Uncertainties of Applied Value :

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

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

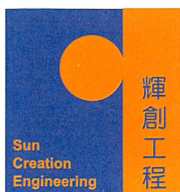
Note :

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

The values given in this Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

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

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# Certificate of Calibration 校正證書

Certificate No. : C183086  
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 : 29 May 2018  
Description / 儀器名稱 : Integrating Sound Level Meter (EQ009)  
Manufacturer / 製造商 : Brüel & Kjær  
Model No. / 型號 : 2238  
Serial No. / 編號 : 2285722  
Supplied By / 委託者 : Action-United Environmental Services and Consulting  
Unit A, 20/F., Gold King Industrial Building,  
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

## TEST CONDITIONS / 測試條件

Temperature / 溫度 :  $(23 \pm 2)^{\circ}\text{C}$       Relative Humidity / 相對濕度 :  $(50 \pm 25)\%$   
Line Voltage / 電壓 : ---

## TEST SPECIFICATIONS / 測試規範

Calibration check

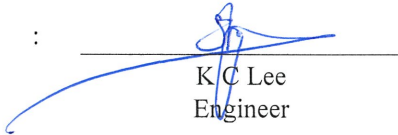
**DATE OF TEST / 測試日期** : 10 June 2018

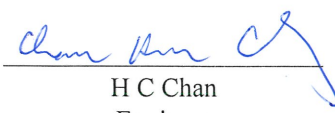
## TEST RESULTS / 測試結果

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
- Agilent Technologies / Keysight Technologies
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA

Tested By :   
測試 : K C Lee  
Engineer

Certified By :   
核證 : H C Chan  
Engineer

Date of Issue : 11 June 2018  
簽發日期

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

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# Certificate of Calibration

## 校正證書

Certificate No. : C183086  
證書編號

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

4. Test equipment :

<u>Equipment ID</u>	<u>Description</u>	<u>Certificate No.</u>
CL280	40 MHz Arbitrary Waveform Generator	C180024
CL281	Multifunction Acoustic Calibrator	PA160023

5. Test procedure : MA101N.

6. Results :

6.1 Sound Pressure Level

6.1.1 Reference Sound Pressure Level

6.1.1.1 Before Self-calibration

UUT Setting				Applied Value		UUT Reading (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
50 - 130	L <sub>AFP</sub>	A	F	94.00	1	94.1

6.1.1.2 After Self-calibration

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

6.1.2 Linearity

UUT Setting				Applied Value		UUT Reading (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
50 - 130	L <sub>AFP</sub>	A	F	94.00	1	94.0 (Ref.)
				104.00		104.0
				114.00		114.0

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

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

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# Certificate of Calibration

## 校正證書

Certificate No. : C183086  
證書編號

### 6.2 Time Weighting

#### 6.2.1 Continuous Signal

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

#### 6.2.2 Tone Burst Signal (2 kHz)

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Burst Duration		
30 - 110	L <sub>AFP</sub>	A	F	106.0	Continuous	106.0	Ref.
	L <sub>AFMax</sub>				200 ms	104.9	-1.0 ± 1.0
	L <sub>ASP</sub>	S	Continuous		106.0	Ref.	
	L <sub>ASMax</sub>		500 ms		102.0	-4.1 ± 1.0	

### 6.3 Frequency Weighting

#### 6.3.1 A-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
50 - 130	L <sub>AFP</sub>	A	F	94.00	31.5 Hz	54.5	-39.4 ± 1.5
					63 Hz	67.8	-26.2 ± 1.5
					125 Hz	77.8	-16.1 ± 1.0
					250 Hz	85.3	-8.6 ± 1.0
					500 Hz	90.8	-3.2 ± 1.0
					1 kHz	94.0	Ref.
					2 kHz	95.2	+1.2 ± 1.0
					4 kHz	95.0	+1.0 ± 1.0
					8 kHz	92.8	-1.1 (+1.5 ; -3.0)
12.5 kHz	89.7	-4.3 (+3.0 ; -6.0)					

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

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

# Certificate of Calibration

## 校正證書

Certificate No. : C183086  
證書編號

### 6.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
50 - 130	L <sub>CFP</sub>	C	F	94.00	31.5 Hz	90.9	-3.0 ± 1.5
					63 Hz	93.1	-0.8 ± 1.5
					125 Hz	93.8	-0.2 ± 1.0
					250 Hz	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	87.7	-6.2 (+3.0 ; -6.0)

### 6.4 Time Averaging

UUT Setting				Applied Value					UUT Reading (dB)	IEC 60804 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Integrating Time	Frequency (kHz)	Burst Duration (ms)	Burst Duty Factor	Burst Level (dB)	Equivalent Level (dB)		
30 - 110	L <sub>Aeq</sub>	A	10 sec.	4	1	1/10	110.0	100	99.9	± 0.5
								90	90.0	± 0.5
			60 sec.					80	79.0	± 1.0
			5 min.					70	69.1	± 1.0

Remarks : - UUT Microphone Model No. : 4188 & S/N : 2658547

- 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.

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## REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT:	MR BEN TAM	WORK ORDER:	HK1848018
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:	05-Sep-2018
		DATE OF ISSUE:	11-Sep-2018

### 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:	Conductivity, Dissolved Oxygen, pH Value, Salinity and Temperature
Equipment Type:	Multifunctional Meter
Brand Name:	YSI
Model No.:	Professional Plus
Serial No.:	10G101946
Equipment No.:	--
Date of Calibration:	11 September, 2018

### 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

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# REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



WORK ORDER: HK1848018  
 SUB-BATCH: 0  
 DATE OF ISSUE: 11-Sep-2018  
 CLIENT: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING

Equipment Type: Multifunctional Meter  
 Brand Name: YSI  
 Model No.: Professional Plus  
 Serial No.: 10G101946  
 Equipment No.: --  
 Date of Calibration: 11 September, 2018      Date of Next Calibration: 11 December, 2018

**PARAMETERS:**

Conductivity      Method Ref: APHA (21st edition), 2510B

Expected Reading ( $\mu\text{S/cm}$ )	Displayed Reading ( $\mu\text{S/cm}$ )	Tolerance (%)
146.9	158.8	+8.1
6667	6387	-4.2
12890	12700	-1.5
58670	57251	-2.4
	Tolerance Limit (%)	$\pm 10.0$

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

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
3.21	3.04	-0.17
5.42	5.56	+0.14
7.85	7.80	-0.05
	Tolerance Limit (mg/L)	$\pm 0.20$

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

Expected Reading (pH unit)	Displayed Reading (pH unit)	Tolerance (pH unit)
4.0	4.07	+0.07
7.0	7.09	+0.09
10.0	9.94	-0.06
	Tolerance Limit (pH unit)	$\pm 0.20$

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



# REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



WORK ORDER: HK1848018  
 SUB-BATCH: 0  
 DATE OF ISSUE: 11-Sep-2018  
 CLIENT: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING

Equipment Type: Multifunctional Meter  
 Brand Name: YSI  
 Model No.: Professional Plus  
 Serial No.: 10G101946  
 Equipment No.: --  
 Date of Calibration: 11 September, 2018      Date of Next Calibration: 11 December, 2018

**PARAMETERS:**

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

Expected Reading (ppt)	Displayed Reading (ppt)	Tolerance (%)
0	0.00	--
10	9.94	-0.6
20	19.38	-3.1
30	30.19	+0.6
	Tolerance Limit (%)	±10.0

Temperature

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

Expected Reading (°C)	Displayed Reading (°C)	Tolerance (°C)
13.3	14.1	+0.8
24.0	25.0	+1.0
37.2	37.1	-0.1
	Tolerance Limit (°C)	±2.0

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

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Mr Chan Siu Ming, Vico  
 Manager - Inorganic



## REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT:	MR BEN TAM	WORK ORDER:	HK1847322
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:	03-Sep-2018
		DATE OF ISSUE:	10-Sep-2018

### 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:	04 September, 2018

### 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  
Assistant Manager - Inorganic

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# REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



WORK ORDER: HK1847322  
SUB-BATCH: 0  
DATE OF ISSUE: 10-Sep-2018  
CLIENT: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING

Equipment Type: Turbidimeter  
Brand Name: Hach  
Model No.: 2100Q  
Serial No.: 12060C18266  
Equipment No.: --  
Date of Calibration: 04 September, 2018      Date of Next Calibration: 04 December, 2018

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

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.18	--
4	--	N/A
40	40.30	+0.7
80	86.2	+7.8
400	386	-3.5
800	801	+0.1
	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  
Assistant Manager - Inorganic

## **Appendix G**

### **Event and Action Plan**

Event and Action Plan for Air Quality

Event	ET	IEC	ER	Action Contractor
<b>Action Level</b>				
1. Exceedance for one sample	1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Inform IEC and ER; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency to daily.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method.	1. Notify Contractor.	1. Rectify any unacceptable practice; 2. Amend working methods if appropriate.
2. Exceedance for two or more consecutive samples	1. Identify source; 2. Inform IEC and ER; 3. Advise the ER on the effectiveness of the proposed remedial measures; 4. Repeat measurements to confirm findings; 5. Increase monitoring frequency to daily; 6. Discuss with IEC and Contractor on remedial actions required; 7. If exceedance continues, arrange meeting with IEC and ER; 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 on the effectiveness of the proposed remedial measures; 5. Monitor the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented.	1. Submit proposals for remedial to ER within 3 working days of notification; 2. Implement the agreed proposals; 3. Amend proposal if appropriate.
<b>Limit Level</b>				
1. Exceedance for one sample	1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Inform ER, Contractor and EPD; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency to daily; 5. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and Contractor on possible remedial measures; 4. Advise the ER on the effectiveness of the proposed remedial measures; 5. Monitor the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented.	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Amend proposal if appropriate.
2. 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	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	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. In consolidation with the IEC, agree with the Contractor on the remedial measures to be implemented; 4. Ensure remedial measures properly implemented;	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Resubmit proposals if problem still not
	and ER to discuss the remedial actions to be taken; 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results; 8. If exceedance stops, cease additional monitoring.	the ER accordingly; 5. Monitor the implementation of remedial measures.	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.	under control; 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated.



**Event and Action Plan for Construction Noise**

Event	ET	IEC	ER	Action Contractor
Action Level	1. Notify ER, IEC and Contractor; 2. Carry out investigation; 3. Report the results of investigation to the IEC, ER and Contractor; 4. Discuss with the IEC and Contractor on remedial measures required; 5. Increase monitoring frequency to check mitigation effectiveness.	1. Review the investigation results submitted by the ET; 2. Review the proposed remedial measures by the Contractor and advise the ER accordingly; 3. Advise the ER on the effectiveness of the proposed remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. In consolidation with the IEC, agree with the Contractor on the remedial measures to be implemented; 4. Supervise the implementation of remedial measures.	1. Submit noise mitigation proposals to IEC and ER; 2. Implement noise mitigation proposals.
Limit Level	1. Inform IEC, ER, Contractor and EPD; 2. Repeat measurements to confirm findings; 3. Increase monitoring frequency; 4. Identify source and investigate the cause of exceedance; 5. Carry out analysis of Contractor's working procedures; 6. Discuss with the IEC, Contractor and ER on remedial measures required; 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results; 8. If exceedance stops, cease additional monitoring.	1. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. In consolidation with the IEC, agree with the Contractor on the remedial measures to be implemented; 4. Supervise the implementation of remedial measures; 5. If exceedance continues, consider stopping the Contractor to continue working on that portion of work which causes the exceedance until the exceedance is abated.	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC and ER within 3 working days of notification; 3. Implement the agreed proposals; 4. Submit further proposal if problem still not under control; 5. Stop the relevant portion of works as instructed by the ER until the exceedance is abated.

### Event and Action Plan for Water Quality

EVENT				ACTION
	ET	IEC	ER	CONTRACTOR
Action level being exceeded by one sampling day	<ol style="list-style-type: none"> <li>Repeat in-situ measurement to confirm findings;</li> <li>Identify reasons for non-compliance and sources of impact;</li> <li>Inform IEC and Contractor;</li> <li>Check monitoring data, all plant, equipment and Contractor's working methods;</li> <li>Discuss mitigation measures with IEC and Contractor;</li> <li>Repeat measurement on next day of exceedance.</li> </ol>	<ol style="list-style-type: none"> <li>Discuss with ET and Contractor on the mitigation measures;</li> <li>Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly;</li> <li>Assess the effectiveness of the implemented mitigation measures</li> </ol>	<ol style="list-style-type: none"> <li>Discuss with IEC on the proposed mitigation measures;</li> <li>Make agreement on the mitigation measures to be implemented;</li> <li>Assess the effectiveness of the implemented mitigation measures</li> </ol>	<ol style="list-style-type: none"> <li>Inform the ER and confirm notification of the non-compliance in writing;</li> <li>Rectify unacceptable practice;</li> <li>Check all plant and equipment;</li> <li>Consider changes of working methods;</li> <li>Discuss with ET and IEC and propose mitigation measures to IEC and ER;</li> <li>Implement the agreed mitigation measures.</li> </ol>
Action Level being exceeded by more than two consecutive sampling days	<ol style="list-style-type: none"> <li>Repeat in-situ measurement to confirm findings;</li> <li>Identify reasons for non-compliance and sources of impact;</li> <li>Inform IEC and Contractor;</li> <li>Check monitoring data, all plant, equipment and Contractor's working methods;</li> <li>Discuss mitigation measures with IEC and Contractor;</li> <li>Ensure mitigation measures are implemented;</li> <li>Prepare to increase the monitoring frequency to daily;</li> <li>Repeat measurement on next day of exceedance.</li> </ol>	<ol style="list-style-type: none"> <li>Discuss with ET and Contractor on the mitigation measures;</li> <li>Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly;</li> <li>Assess the effectiveness of the implemented mitigation measures</li> </ol>	<ol style="list-style-type: none"> <li>Discuss with IEC on the proposed mitigation measures;</li> <li>Make agreement on the mitigation measures to be implemented;</li> <li>Assess the effectiveness of the implemented mitigation measures</li> </ol>	<ol style="list-style-type: none"> <li>Inform the ER and confirm notification of the non-compliance in writing;</li> <li>Rectify unacceptable practice;</li> <li>Check all plant and equipment;</li> <li>Consider changes of working methods;</li> <li>Discuss with ET and IEC and propose mitigation measures to IEC and ER within 2 working days;</li> <li>Implement the agreed mitigation measures.</li> </ol>
Limit Level being exceeded by one sampling day	<ol style="list-style-type: none"> <li>Repeat in-situ measurement to confirm findings;</li> <li>Identify reasons for non-compliance and sources of impact;</li> <li>Inform IEC, Contractor and EPD;</li> <li>Check monitoring data, all plant, equipment and Contractor's working methods;</li> <li>Discuss mitigation measures with IEC, ER and Contractor;</li> <li>Ensure mitigation measures are implemented;</li> <li>Increase the monitoring frequency to daily until no exceedance of Limit Level.</li> </ol>	<ol style="list-style-type: none"> <li>Discuss with ET and Contractor on the mitigation measures;</li> <li>Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly;</li> <li>Assess the effectiveness of the implemented mitigation measures</li> </ol>	<ol style="list-style-type: none"> <li>Discuss with IEC, ET and Contractor on the proposed mitigation measures;</li> <li>Request Contractor to critically review the working methods;</li> <li>Make agreement on the mitigation measures to be implemented;</li> <li>Assess the effectiveness of the implemented mitigation measures</li> </ol>	<ol style="list-style-type: none"> <li>Inform the ER and confirm notification of the non-compliance in writing;</li> <li>Rectify unacceptable practice;</li> <li>Check all plant and equipment;</li> <li>Consider changes of working methods;</li> <li>Discuss with ET, IEC and ER and propose mitigation measures to IEC and ER within 3 working days;</li> <li>Implement the agreed mitigation measures.</li> </ol>
Limit level being exceeded by more than one consecutive sampling days	<ol style="list-style-type: none"> <li>Repeat in-situ measurement to confirm findings;</li> <li>Identify reasons for non-compliance and sources of impact;</li> <li>Inform IEC, Contractor and EPD;</li> <li>Check monitoring data, all plant, equipment and Contractor's working methods;</li> <li>Discuss mitigation measures with IEC, ER and Contractor;</li> <li>Ensure mitigation measures are implemented;</li> <li>Increase the monitoring frequency to daily until no exceedance of Limit Level for two consecutive days.</li> </ol>	<ol style="list-style-type: none"> <li>Discuss with ET and Contractor on the mitigation measures;</li> <li>Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly;</li> <li>Assess the effectiveness of the implemented mitigation measures.</li> </ol>	<ol style="list-style-type: none"> <li>Discuss with IEC, ET and Contractor on the proposed mitigation measures;</li> <li>Request Contractor to critically review the working methods;</li> <li>Make agreement on the mitigation measures to be implemented;</li> <li>Assess the effectiveness of the implemented mitigation measures;</li> <li>Consider and instruct, if necessary, the Contractor to slow down or to stop all or part of the construction activities until no exceedance of Limit Level.</li> </ol>	<ol style="list-style-type: none"> <li>Inform the ER and confirm notification of the non-compliance in writing;</li> <li>Rectify unacceptable practice;</li> <li>Check all plant and equipment;</li> <li>Consider changes of working methods;</li> <li>Discuss with ET, IEC and ER and propose mitigation measures to IEC and ER within 3 working days;</li> <li>Implement the agreed mitigation measures;</li> <li>As directed by the ER, to slow down or to stop all or part of the construction activities.</li> </ol>

## **Appendix H**

### **Impact Monitoring Schedule**

**Impact Monitoring Schedule for Reporting Period – October 2018**

Date		Dust Monitoring		Noise Monitoring	Water Quality
		1-hour TSP	24-hour TSP		
Mon	1-Oct-18				
Tue	2-Oct-18	AM4b, AM5, AM6, AM7b & AM8	AM1c, AM2, AM3 & AM9b	NM3, NM4, NM5, NM6 & NM7	All Water Quality Monitoring Locations
Wed	3-Oct-18				
Thu	4-Oct-18	AM1c, AM2, AM3 & AM9b		NM1, NM2a, NM8, NM9 & NM10	All Water Quality Monitoring Locations
Fri	5-Oct-18		AM4b, AM5, AM6, AM7b & AM8		
Sat	6-Oct-18				All Water Quality Monitoring Locations
Sun	7-Oct-18				
Mon	8-Oct-18	AM4b, AM5, AM6, AM7b & AM8	AM1c, AM2, AM3 & AM9b	NM3, NM4, NM5, NM6 & NM7	
Tue	9-Oct-18				All Water Quality Monitoring Locations
Wed	10-Oct-18	AM1c, AM2, AM3 & AM9b		NM1, NM2a, NM8, NM9 & NM10	
Thu	11-Oct-18		AM4b, AM5, AM6, AM7b & AM8		All Water Quality Monitoring Locations
Fri	12-Oct-18				
Sat	13-Oct-18	AM4b, AM5, AM6, AM7b & AM8	AM1c, AM2, AM3 & AM9b		All Water Quality Monitoring Locations
Sun	14-Oct-18				
Mon	15-Oct-18	AM1c, AM2, AM3 & AM9b		NM1, NM2a, NM8, NM9 & NM10	
Tue	16-Oct-18		AM4b, AM5, AM6, AM7b & AM8		All Water Quality Monitoring Locations
Wed	17-Oct-18				
Thu	18-Oct-18				All Water Quality Monitoring Locations
Fri	19-Oct-18	AM4b, AM5, AM6, AM7b & AM8	AM1c, AM2, AM3 & AM9b	NM3, NM4, NM5, NM6 & NM7	
Sat	20-Oct-18	AM1c, AM2, AM3 & AM9b			All Water Quality Monitoring Locations
Sun	21-Oct-18				
Mon	22-Oct-18		AM4b, AM5, AM6, AM7b & AM8		
Tue	23-Oct-18				All Water Quality Monitoring Locations
Wed	24-Oct-18				
Thu	25-Oct-18	AM4b, AM5, AM6, AM7b & AM8	AM1c, AM2, AM3 & AM9b	NM3, NM4, NM5, NM6 & NM7	All Water Quality Monitoring Locations
Fri	26-Oct-18	AM1c, AM2, AM3 & AM9b		NM1, NM2a, NM8, NM9 & NM10	
Sat	27-Oct-18		AM4b, AM5, AM6, AM7b & AM8		All Water Quality Monitoring Locations
Sun	28-Oct-18				
Mon	29-Oct-18				All Water Quality Monitoring Locations
Tue	30-Oct-18				
Wed	31-Oct-18	AM4b, AM5, AM6, AM7b & AM8	AM1c, AM2, AM3 & AM9b	NM3, NM4, NM5, NM6 & NM7	All Water Quality Monitoring Locations

	Monitoring Day
	Sunday or Public Holiday



**Impact Monitoring Schedule for next Reporting Period – November 2018**

Date		Dust Monitoring		Noise Monitoring	Water Quality
		1-hour TSP	24-hour TSP		
Thu	1-Nov-18	AM1c, AM2, AM3 & AM9b		NM1, NM2a, NM8, NM9 & NM10	
Fri	2-Nov-18		AM4b, AM5, AM6, AM7b & AM8		All Water Quality Monitoring Locations
Sat	3-Nov-18				
Sun	4-Nov-18				
Mon	5-Nov-18				
Tue	6-Nov-18	AM4b, AM5, AM6, AM7b & AM8	AM1c, AM2, AM3 & AM9b	NM3, NM4, NM5, NM6 & NM7	All Water Quality Monitoring Locations
Wed	7-Nov-18	AM1c, AM2, AM3 & AM9b		NM1, NM2a, NM8, NM9 & NM10	
Thu	8-Nov-18		AM4b, AM5, AM6, AM7b & AM8		All Water Quality Monitoring Locations
Fri	9-Nov-18				
Sat	10-Nov-18				All Water Quality Monitoring Locations
Sun	11-Nov-18				
Mon	12-Nov-18	AM4b, AM5, AM6, AM7b & AM8	AM1c, AM2, AM3 & AM9b	NM3, NM4, NM5, NM6 & NM7	
Tue	13-Nov-18	AM1c, AM2, AM3 & AM9b		NM1, NM2a, NM8, NM9 & NM10	All Water Quality Monitoring Locations
Wed	14-Nov-18		AM4b, AM5, AM6, AM7b & AM8		
Thu	15-Nov-18				All Water Quality Monitoring Locations
Fri	16-Nov-18				
Sat	17-Nov-18	AM4b, AM5, AM6, AM7b & AM8	AM1c, AM2, AM3 & AM9b		All Water Quality Monitoring Locations
Sun	18-Nov-18				
Mon	19-Nov-18	AM1c, AM2, AM3 & AM9b		NM1, NM2a, NM8, NM9 & NM10	
Tue	20-Nov-18		AM4b, AM5, AM6, AM7b & AM8		All Water Quality Monitoring Locations
Wed	21-Nov-18				
Thu	22-Nov-18				All Water Quality Monitoring Locations
Fri	23-Nov-18	AM4b, AM5, AM6, AM7b & AM8	AM1c, AM2, AM3 & AM9b	NM3, NM4, NM5, NM6 & NM7	
Sat	24-Nov-18	AM1c, AM2, AM3 & AM9b			All Water Quality Monitoring Locations
Sun	25-Nov-18				
Mon	26-Nov-18		AM4b, AM5, AM6, AM7b & AM8		
Tue	27-Nov-18				All Water Quality Monitoring Locations
Wed	28-Nov-18				
Thu	29-Nov-18	AM4b, AM5, AM6, AM7b & AM8	AM1c, AM2, AM3 & AM9b	NM3, NM4, NM5, NM6 & NM7	All Water Quality Monitoring Locations
Fri	30-Nov-18	AM1c, AM2, AM3 & AM9b		NM1, NM2a, NM8, NM9 & NM10	

	Monitoring Day
	Sunday or Public Holiday



## **Appendix I**

### **Database of Monitoring Result**

**24-hour TSP Monitoring Data**

DATE	SAMPLE NUMBER	ELAPSED TIME			CHART READING			AVG TEMP (°C)	AVG AIR PRESS (hPa)	STANDARD FLOW RATE (m <sup>3</sup> /min)	AIR VOLUME (std m <sup>3</sup> )	FILTER WEIGHT (g)		DUST WEIGHT COLLECTED (g)	24-HR TSP (µg/m <sup>3</sup> )
		INITIAL	FINAL	(min)	MIN	MAX	AVG					INITIAL	FINAL		
<b>AM1c – Open Area, Tsung Yuen Ha Village No.63</b>															
2-Oct-18	23143	15066.52	15090.05	1411.80	25	25	25.0	27.2	1014.9	0.62	877	2.6925	2.8164	0.1239	141
8-Oct-18	23169	15090.05	15113.60	1413.00	21	21	21.0	26.7	1014.2	0.48	675	2.6221	2.6879	0.0658	98
13-Oct-18	23180	15113.60	15137.13	1411.80	25	25	25.0	24.7	1017.5	0.90	1268	2.6445	2.7052	0.0607	48
19-Oct-18	23189	15137.13	15161.15	1441.20	25	25	25.0	24.2	1017.2	0.90	1295	2.6390	2.6868	0.0478	37
25-Oct-18	23215	15161.15	15185.16	1440.60	28	28	28.0	24.4	1015.3	1.01	1450	2.6484	2.7030	0.0546	38
31-Oct-18	23222	15185.16	15209.18	1441.20	25	25	25.0	25	1014.2	0.90	1292	2.6322	2.7832	0.1510	117
<b>AM2 - Village House near Lin Ma Hang Road</b>															
2-Oct-18	23142	10684.74	10708.80	1443.60	48	48	48.0	27.2	1014.9	1.54	2219	2.6726	2.9970	0.3244	146
8-Oct-18	23170	10708.50	10732.15	1419.00	42	42	42.0	26.7	1014.2	1.31	1854	2.6401	2.8979	0.2578	139
13-Oct-18	23179	10732.15	10755.90	1425.00	45	45	45.0	24.7	1017.5	1.41	2014	2.6419	2.8565	0.2146	107
19-Oct-18	23188	10755.90	10779.64	1424.40	42	42	42.0	24.2	1017.2	1.31	1872	2.6494	2.9007	0.2513	134
25-Oct-18	23216	10779.64	10803.37	1423.80	42	42	42.0	24.4	1015.3	1.31	1869	2.6443	2.8500	0.2057	110
31-Oct-18	23221	10803.37	10827.10	1423.80	42	42	42.0	25	1014.2	1.31	1866	2.6276	3.1926	0.5650	<b>303</b>
<b>AM3 - Ta Kwu Ling Fire Service Station of Ta Kwu Ling Village</b>															
2-Oct-18	23144	11805.32	11829.37	1443.00	30	30	30.0	27.2	1014.9	0.92	1326	2.6773	2.7344	0.0571	43
8-Oct-18	23171	11829.37	11853.37	1440.00	29	29	29.0	26.7	1014.2	0.85	1222	2.6342	2.7620	0.1278	105
13-Oct-18	23178	11853.37	11877.38	1440.60	25	25	25.0	24.7	1017.5	0.72	1033	2.6463	2.6818	0.0355	34
19-Oct-18	23187	11877.38	11901.38	1440.00	25	25	25.0	24.2	1017.2	0.72	1033	2.6424	2.6732	0.0308	30
25-Oct-18	23214	11901.38	11925.39	1440.60	25	25	25.0	24.4	1015.3	0.72	1032	2.6590	2.6958	0.0368	36
31-Oct-18	23223	11925.39	11949.41	1441.20	44	44	44.0	25	1014.2	1.36	1966	2.6338	3.2424	0.6086	<b>309</b>
<b>AM4b - House no. 10B1 Nga Yiu Ha Village</b>															
5-Oct-18	23168	13815.93	13839.93	1440.00	34	34	34.0	27.1	1012.1	1.02	1475	2.6534	2.7019	0.0485	33
11-Oct-18	23174	13839.93	13863.94	1440.60	38	38	38.0	26.2	1013.7	1.13	1621	2.6403	2.7095	0.0692	43
16-Oct-18	23184	13863.94	13887.94	1440.00	37	37	37.0	24.3	1013.2	1.09	1570	2.6563	2.7273	0.0710	45
22-Oct-18	23192	13887.94	13911.95	1440.60	38	38	38.0	25	1015.9	1.13	1628	2.6518	2.7607	0.1089	67
27-Oct-18	23219	13911.95	13935.92	1438.20	38	38	38.0	24.2	1015.6	1.13	1628	2.6277	2.7557	0.1280	79
<b>AM5a - Ping Yeung Village House</b>															
5-Oct-18	23167	12662.86	12687.10	1454.40	48	48	48.0	27.1	1012.1	1.81	2628	2.6610	3.0315	0.3705	141
11-Oct-18	23175	12686.00	12709.67	1420.20	40	40	40.0	26.2	1013.7	1.32	1876	2.6466	2.7588	0.1122	60
16-Oct-18	23183	12709.67	12733.23	1413.60	40	40	40.0	24.3	1013.2	1.32	1872	2.6552	2.7375	0.0823	44

DATE	SAMPLE NUMBER	ELAPSED TIME			CHART READING			AVG TEMP (°C)	AVG AIR PRESS (hPa)	STANDARD FLOW RATE (m <sup>3</sup> /min)	AIR VOLUME (std m <sup>3</sup> )	FILTER WEIGHT (g)		DUST WEIGHT COLLECTED (g)	24-HR TSP (µg/m <sup>3</sup> )
		INITIAL	FINAL	(min)	MIN	MAX	AVG					INITIAL	FINAL		
22-Oct-18	23193	12733.23	12756.75	1411.20	46	46	46.0	25	1015.9	1.50	2110	2.6567	2.7265	0.0698	33
27-Oct-18	23218	12756.75	12780.25	1410.00	46	46	46.0	24.2	1015.6	1.50	2111	2.6424	2.8769	0.2345	111
<b>AM6 - Wo Keng Shan Village House</b>															
5-Oct-18	23166	10261.61	10286.00	1463.40	43	43	43.0	27.1	1012.1	1.38	2025	2.6481	2.9444	0.2963	146
11-Oct-18	23176	10285.61	10309.62	1440.60	52	52	52.0	26.2	1013.7	1.42	2042	2.6293	2.9276	0.2983	146
16-Oct-18	23182	10309.62	10333.65	1441.80	48	48	48.0	24.3	1013.2	1.31	1885	2.6709	2.7633	0.0924	49
22-Oct-18	23194	10333.65	10357.66	1440.60	30	30	30.0	25.0	1015.9	0.79	1141	2.6586	2.7657	0.1071	94
27-Oct-18	23217	10357.66	10381.66	1440.00	30	30	30.0	24.2	1015.6	0.79	1142	2.6518	2.8084	0.1566	137
<b>AM7b - Loi Tung Village House</b>															
5-Oct-18	23151	19308.31	19332.80	1469.40	50	51	50.5	27.1	1012.1	1.56	2295	2.6750	3.0309	0.3559	155
13-Oct-18	23173	19332.31	19356.32	1440.60	38	40	39.0	23.2	1017.6	1.15	1663	2.6307	2.7727	0.1420	85
16-Oct-18	23185	19356.32	19380.33	1440.60	40	40	40.0	24.3	1013.2	1.18	1699	2.6547	2.7488	0.0941	55
22-Oct-18	23213	19380.33	19404.34	1440.60	28	30	29.0	24.8	1015	0.86	1239	2.6517	2.7932	0.1415	114
27-Oct-18	23230	19404.34	19428.35	1440.60	28	28	28.0	27	1001.3	0.82	1185	2.6504	2.6786	0.0282	24
<b>AM8 - Po Kat Tsai Village No. 4</b>															
5-Oct-18	23165	13204.55	13228.55	1440.00	34	34	34.0	27.1	1012.1	1.17	1686	2.6682	2.7397	0.0715	42
13-Oct-18	23177	13228.55	13252.55	1440.00	34	34	34.0	23.2	1017.6	1.16	1669	2.6426	2.7313	0.0887	53
16-Oct-18	23186	13252.55	13276.56	1440.60	36	36	36.0	24.3	1013.2	1.20	1734	2.6575	2.7212	0.0637	37
22-Oct-18	23191	13276.56	13300.57	1440.60	38	38	38.0	24.8	1015	1.25	1804	2.6690	2.7816	0.1126	62
27-Oct-18	23227	13300.57	13324.58	1440.60	34	34	34.0	27	1001.3	1.15	1653	2.6572	2.7783	0.1211	73
<b>AM9b - Nam Wa Po Village House No. 80</b>															
2-Oct-18	23145	20560.65	20584.65	1440.00	25	25	25.0	27.2	1014.9	0.92	1320	2.6715	2.7606	0.0891	68
8-Oct-18	23172	20584.65	20608.66	1440.60	25	25	25.0	26.3	1013.3	0.77	1113	2.6295	2.7153	0.0858	77
13-Oct-18	23154	20608.66	20632.66	1440.00	25	25	25.0	24.7	1017.5	0.78	1118	2.6788	2.7619	0.0831	74
19-Oct-18	23190	20632.66	20656.67	1440.60	22	22	22.0	24.2	1017.2	0.67	964	2.6667	2.7125	0.0458	48
25-Oct-18	23277	20656.67	20680.67	1440.00	22	22	22.0	24.4	1015.3	0.67	637	2.6654	2.6976	0.0322	51
31-Oct-18	23278	20680.67	20704.67	1440.00	22	22	22.0	23.6	1016.7	0.68	976	2.6700	2.7457	0.0757	78

*Bold and underline indicated Limit Level exceedance*

**Construction Noise Monitoring Results, dB(A)**

Date	Start Time	1 <sup>st</sup> Leq <sub>5min</sub>	L10	L90	2 <sup>nd</sup> Leq <sub>5min</sub>	L10	L90	3 <sup>rd</sup> Leq <sub>5min</sub>	L10	L90	4 <sup>th</sup> Leq <sub>5min</sub>	L10	L90	5 <sup>th</sup> Leq <sub>5min</sub>	L10	L90	6 <sup>th</sup> Leq <sub>5min</sub>	L10	L90	Leq30	façade correction
<b>NM1 - Tsung Yuen Ha Village House No. 63</b>																					
4-Oct-18	9:34	53.7	55.0	51.1	52.5	54.2	52.7	52.9	54.7	51.2	54.0	56.0	52.3	56.2	60.4	52.3	57.0	62.0	52.2	55	NA
10-Oct-18	9:25	56.7	59.1	52.7	54.9	56.8	51.8	53.8	55.4	51.6	53.9	55.6	51.8	55.5	57.6	52.5	56.5	58.7	54.0	55	NA
15-Oct-18	9:15	59.1	61.3	53.0	56.4	59.4	51.1	57.7	60.1	52.3	58.6	59.3	52.1	63.5	58.8	51.6	57.9	60.2	50.2	60	NA
26-Oct-18	9:47	56.4	59.4	53.2	58.2	62.8	53.2	55.3	56.9	53.7	56.2	57.8	52.5	57.1	58.9	52.2	58.3	59.0	52.7	57	NA
<b>NM2a - Village House near Lin Ma Hang Road</b>																					
4-Oct-18	10:12	72.8	68.4	53.7	63.4	67.8	53.8	62.2	67.8	53.7	62.3	68.9	54.9	65.4	69.5	54.5	64.1	68.5	54.1	67	70
10-Oct-18	10:00	71.1	62.6	56.1	62.5	65.4	56.7	59.9	61.2	56.2	60.0	62.3	56.0	64.9	66.0	59.9	75.7	67.4	59.1	70	73
15-Oct-18	9:50	66.3	68.9	60.2	68.0	70.9	61.9	65.7	68.8	59.1	64.9	67.5	61.1	65.3	68.5	58.9	65.4	68.5	59.2	66	69
26-Oct-18	10:31	69.8	67.1	53.8	62.4	63.7	53.4	64.8	66.5	52.6	63.3	65.3	52.8	61.5	63.2	52.3	65.2	66.4	54.3	65	68
<b>NM3 - Ping Yeung Village House</b>																					
2-Oct-18	10:43	55.5	55.4	52.4	55.1	56.7	53.7	59.7	60.5	51.5	56.5	56.3	52.6	60.8	61.2	53.9	56.9	56.2	53.5	58	NA
8-Oct-18	12:04	61.5	65.1	49.6	59.4	63.9	45.7	64.0	66.4	49.7	64.6	67.5	58.0	65.2	68.5	57.3	64.6	67.4	58.4	64	NA
19-Oct-18	9:28	62.6	65.5	57.5	59.1	60.0	57.0	60.9	63.0	58.0	65.6	66.5	57.5	66.8	68.5	64.0	64.8	67.5	56.5	64	NA
25-Oct-18	10:07	65.6	68.5	59.0	63.6	65.5	60.0	60.6	62.5	58.0	61.0	61.5	58.5	63.8	67.0	58.5	60.1	61.0	58.0	63	NA
31-Oct-18	10:47	58.3	61.6	53.4	59.5	62.2	54.4	60.7	62.7	53.8	56.5	58.8	53.7	59.2	61.7	52.8	57.2	59.7	52.8	59	NA
<b>NM4 - Wo Keng Shan Village House</b>																					
2-Oct-18	11:32	65.0	63.1	51.4	66.3	57.1	52.8	65.5	62.8	52.4	62.3	60.9	52.9	61.3	59.5	52.0	63.2	61.1	52.1	64	NA
8-Oct-18	11:28	64.6	68.0	49.7	65.9	69.0	59.6	68.5	72.3	57.6	67.1	70.4	58.7	65.6	69.2	53.0	66.2	70.1	51.2	66	NA
19-Oct-18	10:08	63.1	68.0	54.0	68.2	67.5	54.5	59.8	63.0	53.5	64.4	64.0	54.0	60.0	61.5	53.5	61.0	60.5	53.5	64	NA
25-Oct-18	11:01	62.6	65.5	58.0	65.6	68.5	59.0	66.4	65.5	58.5	64.7	67.0	59.0	62.9	64.5	59.5	66.2	67.5	60.0	65	NA
31-Oct-18	11:28	65.8	63.1	52.1	66.2	61.1	51.7	63.8	61.6	51.8	62.9	60.8	51.9	61.8	60.5	51.8	63.0	62.2	52.4	64	NA
<b>NM5- Ping Yeung Village House</b>																					
2-Oct-18	10:41	58.2	59.0	55.8	58.7	59.1	55.7	57.5	58.0	55.4	57.3	58.3	55.0	56.5	57.7	55.1	60.1	60.8	55.4	58	NA
8-Oct-18	10:54	56.3	60.5	46.9	51.5	54.0	46.8	56.6	60.8	47.3	58.5	61.8	48.5	58.0	61.1	48.2	56.6	60.7	46.3	57	NA
19-Oct-18	12:57	53.4	56.0	48.0	58.0	62.0	49.0	54.4	58.0	48.5	55.7	58.0	50.0	60.5	65.0	50.0	60.1	63.0	52.5	58	NA
25-Oct-18	9:58	53.7	55.4	48.4	52.5	54.6	48.7	54.7	55.9	48.3	53.6	54.8	48.6	55.0	55.1	48.9	53.3	54.0	49.8	54	NA
31-Oct-18	9:57	60.0	63.5	52.0	65.8	57.5	52.5	56.6	56.0	51.5	56.7	59.5	51.5	61.5	64.5	52.5	55.7	57.0	51.0	61	NA
<b>NM6 – Tai Tong Wu Village House 2</b>																					
2-Oct-18	9:23	58.5	59.9	56.1	58.7	59.6	56.4	58.4	59.7	54.3	55.4	56.6	53.8	57.8	59.2	54.0	56.9	57.7	55.0	58	NA
8-Oct-18	10:20	67.2	70.8	54.4	63.8	67.4	52.8	64.3	67.2	57.2	65.4	69.0	56.3	64.6	68.1	54.2	62.7	65.7	55.3	65	NA
19-Oct-18	13:41	60.0	63.5	52.0	65.8	57.5	52.5	56.6	56.0	51.5	56.7	59.5	51.5	61.5	64.5	52.5	55.7	57.0	51.0	61	NA

Date	Start Time	1 <sup>st</sup> Leq <sub>5min</sub>	L10	L90	2 <sup>nd</sup> Leq <sub>5min</sub>	L10	L90	3 <sup>rd</sup> Leq <sub>5min</sub>	L10	L90	4 <sup>th</sup> Leq <sub>5min</sub>	L10	L90	5 <sup>th</sup> Leq <sub>5min</sub>	L10	L90	6 <sup>th</sup> Leq <sub>5min</sub>	L10	L90	Leq30	façade correction
25-Oct-18	10:41	58.8	60.7	51.3	59.0	62.3	52.8	58.2	61.7	52.4	60.3	63.7	51.9	58.2	61.4	52.8	57.1	60.2	52.9	59	NA
31-Oct-18	11:00	63.1	68.0	54.0	68.2	67.0	54.5	59.8	63.0	53.5	64.4	64.0	54.0	60.0	61.5	53.5	61.0	60.5	53.5	64	NA
<b>NM7 – Po Kat Tsai Village</b>																					
2-Oct-18	13:06	63.0	65.3	60.4	64.0	66.0	60.0	62.7	65.3	57.5	61.7	64.9	54.2	62.5	66.5	56.1	62.4	64.7	58.9	63	NA
8-Oct-18	13:30	64.3	67.4	55.5	65.2	67.9	55.3	65.3	68.6	54.7	64.1	66.8	53.8	65.6	65.0	53.6	60.9	64.1	53.4	64	NA
19-Oct-18	14:30	58.9	60.5	54.5	66.3	64.5	54.5	62.1	64.0	55.0	58.3	60.0	51.0	66.4	68.5	55.0	55.7	57.0	53.5	63	NA
25-Oct-18	13:41	58.0	59.1	55.4	59.7	60.7	55.8	60.5	61.5	55.0	59.0	58.2	53.2	63.3	62.3	54.3	60.2	60.3	55.2	60	NA
31-Oct-18	13:01	58.9	60.5	54.5	66.3	64.5	54.5	62.1	64.0	55.0	58.3	60.0	51.0	66.4	68.5	55.0	55.7	57.0	53.5	63	NA
<b>NM8 - Village House, Tong Hang</b>																					
4-Oct-18	9:09	58.9	59.7	49.6	59.9	61	49.5	58.1	61.3	47.6	63.9	62.2	48.9	60.7	63.6	48.4	58.6	62.5	47.6	61	NA
10-Oct-18	10:59	60.4	62.4	54.1	59.8	60.8	58.7	59.4	60.3	58	59.4	60.2	58.6	59.8	60.9	58.6	60	60.7	58.8	60	NA
15-Oct-18	11:00	67.6	68.1	52	64.6	62.8	52.9	59.9	63.3	49.5	60.4	64.5	47	62.1	64.5	50.8	61.1	63.6	53.4	64	NA
26-Oct-18	10:54	53.8	55.4	51.8	55.2	56.6	53.6	56	57.3	54.2	56.1	58.8	52.4	59.8	61.6	55.7	57.2	59.3	54.5	57	NA
<b>NM9 - Village House, Kiu Tau Village</b>																					
4-Oct-18	9:57	53.3	56.1	46	58.7	56.9	45.0	51.3	54.4	44.3	56.1	59.0	46.9	54.1	57.4	43.3	53.2	57.1	43.2	57	NA
10-Oct-18	10:13	62.7	64.9	60.4	62.7	64.1	61.0	61.5	62.9	59.7	62.6	63.6	61.4	62.0	63.0	60.7	62.2	63.0	61.2	63	NA
15-Oct-18	11:40	69.5	73.0	61.0	67.5	70.9	53.7	70.4	74.1	58.7	70.7	74.4	59.0	70.9	74.6	61.6	69.3	72.9	57.8	73	NA
26-Oct-18	10:06	64.8	66.3	62.2	65.8	66.0	61.4	64.3	65.5	61.6	63.5	65.3	61.2	64.4	65.4	63.0	64.9	65.6	63.9	65	NA
<b>NM10 - Nam Wa Po Village House No. 80</b>																					
4-Oct-18	10:46	56.4	58.5	49.2	54.9	58.4	46.5	55.8	58.8	44.1	55.9	58.4	47.5	54.3	57.1	46.3	54.7	56.7	45.0	55	65
10-Oct-18	9:21	61.4	62.2	60.3	62.3	64.3	60.6	60.8	61.7	59.6	60.9	61.9	59.9	61.7	63.1	60.2	61.5	62.1	60.8	61	64
15-Oct-18	13:30	57.6	60.7	48.4	57.2	60.2	49.4	57.9	60.8	50.4	55.7	58.9	48.1	57.0	60.0	50.5	59.1	62.0	52.6	58	62
26-Oct-18	9:21	61.0	61.7	60.0	60.8	62.0	59.6	62.4	63.8	60.7	60.6	61.3	59.5	61.0	61.8	60.1	61.8	62.8	60.9	61	61



Water Quality Monitoring Data for Contract 6 and SS C505

Date	2-Oct-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	10:25	0.30	24.9	24.9	7.47	7.5	90.3	90.5	11.5	11.4	7.39	7.4	7	6.0
			24.9		7.5		90.7		11.3		7.39		5	
WM1	10:15	0.25	24.5	24.5	6.53	6.5	78.4	78.3	21.2	22.0	8.21	8.2	18	18.5
			24.5		6.51		78.1		22.7		8.21		19	

Date	4-Oct-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	10:20	0.30	24.9	24.9	7.47	7.5	90.3	91.0	11.1	10.9	7.29	7.3	6	6.0
			24.9		7.57		91.6		10.7		7.29		6	
WM1	10:10	0.25	24.4	24.4	6.72	6.7	80.6	80.6	18.0	17.9	7.95	8.0	14	14.5
			24.4		6.73		80.6		17.8		7.95		15	

Date	6-Oct-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	10:30	0.25	21.8	21.8	6.24	6.3	71.1	71.6	13.0	12.8	7.64	7.6	8	8.0
			21.8		6.44		72.0		12.5		7.64		8	
WM1	10:20	0.20	23.2	23.2	6.74	6.7	77.7	77.4	14.3	14.4	8.21	8.2	14	13.5
			23.2		6.68		77.1		14.5		8.21		13	

Date	9-Oct-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	10:30	0.25	26.1	26.1	6.82	6.9	84.8	85.3	10.3	10.2	7.95	8.0	5	4.5
			26.1		6.92		85.7		10.0		7.95		4	
WM1	10:35	0.20	25.8	25.8	6.65	6.7	81.7	81.9	17.0	16.7	7.26	7.3	10	10.0
			25.8		6.68		82.1		16.3		7.26		10	

Date	11-Oct-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	

WM1-C	10:30	0.30	22.3	22.3	7.14	7.2	82.2	82.6	12.2	12.5	8.29	8.3	7	7.5
			22.3		7.2		82.9		12.7		8.29		8	
WM1	10:20	0.25	22.8	22.8	7.87	7.9	91.5	91.2	15.7	15.2	8.75	8.8	11	11.5
			22.8		7.83		90.9		14.7		8.75		12	

Date	13-Oct-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	10:30	0.25	23.3	23.3	6.91	6.9	81.2	81.4	10.9	11.4	7.17	7.2	10	10.0
			23.3		6.94		81.6		11.8		7.17		10	
WM1	10:15	0.20	23.6	23.6	7.24	7.2	85.4	85.1	16.3	16.2	8.15	8.2	8	8.5
			23.6		7.18		84.7		16.0		8.15		9	

Date	16-Oct-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	11:25	0.25	24.7	24.7	6.22	6.3	74.9	75.5	10.1	10.3	8.02	8.0	8	8.5
			24.7		6.32		76.0		10.4		8.02		9	
WM1	11:15	0.20	24.6	24.6	7.15	7.1	86.0	85.4	14.1	14.4	8.65	8.7	11	11.5
			24.6		7.04		84.7		14.7		8.65		12	

Date	18-Oct-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	11:00	0.30	22.7	22.7	6.23	6.2	72.3	72.4	24.8	24.8	7.9	7.9	14	15.0
			22.7		6.23		72.4		24.8		7.9		16	
WM1	10:50	0.20	22.5	22.5	6.99	7.0	80.9	80.8	20.4	20.2	7.69	7.6	15	14.0
			22.5		6.96		80.6		20.0		7.54		13	

Date	20-Oct-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	10:10	0.25	23.5	23.5	6.37	6.4	75.1	75.7	8.7	8.7	7.59	7.6	4	4.0
			23.5		6.46		76.2		8.8		7.59		4	
WM1	10:00	0.20	24	24.0	7.08	7.1	84.1	84.2	16.3	16.1	7.79	7.8	11	12.5
			24		7.09		84.3		15.8		7.79		14	

Date	23-Oct-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	10:25	0.30	24	24.0	6.37	6.4	75.8	75.7	15.5	15.8	7.39	7.4	11	11.5
			24		6.36		75.6		16.1		7.39		12	
WM1	10:15	0.20	24.4	24.4	7.1	7.1	85.0	84.6	16.6	16.8	7.76	7.8	13	12.5
			24.4		7.03		84.1		16.9		7.76		12	

Date	25-Oct-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	10:10	0.30	24.4	24.4	6.34	6.4	75.8	76.0	7.4	7.4	8.2	8.2	6	6.0
			24.4		6.37		76.2		7.4		8.2		6	
WM1	10:00	0.20	25.1	25.1	7.06	7.0	84.7	84.5	14.4	14.4	8.59	8.6	15	15.0
			25.1		7.01		84.3		14.3		8.59		15	

Date	27-Oct-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	10:25	0.30	22.3	22.3	6.78	6.8	78.1	78.3	10.8	10.8	7.49	7.5	11	11.0
			22.3		6.8		78.5		10.8		7.49		11	
WM1	10:15	0.20	23.6	23.6	7.32	7.3	86.5	86.3	16.4	16.1	8.21	8.2	16	16.0
			23.6		7.29		86.1		15.8		8.21		16	

Date	29-Oct-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	10:40	0.30	21.1	21.1	8.1	8.1	91.1	91.2	11.5	11.2	7.4	7.4	9	9.0
			21.1		8.12		91.3		10.9		7.4		9	
WM1	10:30	0.20	21.8	21.8	7.45	7.5	84.9	85.0	15.1	14.6	8.24	8.2	11	10.5
			21.8		7.46		85.0		14.0		8.24		10	

Date	31-Oct-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	10:30	0.30	18.6	18.6	7.73	7.7	82.8	82.9	9.4	10.3	7.64	7.6	7	8.5

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			18.6		7.74		83.0		11.2		7.64		10	
WM1	10:20	0.20	20.6	20.6	8.01	8.0	89.1	89.2	10.0	10.5	8.5	8.5	8	8.0
			20.6		8.02		89.3		11.0		8.5		8	

Water Quality Monitoring Data for Contract 2 and 3

Date	2-Oct-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	12:10	0.15	26.7	26.7	7.35	7.4	91.5	91.6	3.7	4.0	7.88	7.9	3	3.0
			26.7		7.36		91.7		4.4		7.88		3	
WM4-CB	12:20	0.25	28.2	28.2	6.66	6.7	85.9	86.3	6.5	6.4	7.64	7.6	5	5.0
			28.2		6.76		86.7		6.4		7.64		5	
WM4	12:05	0.20	26.8	26.8	7.29	7.3	91.2	91.1	9.4	9.4	8.03	8.0	7	7.5
			26.8		7.27		91.0		9.4		8.03		8	

Date	4-Oct-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	11:35	0.15	26	26.0	7.6	7.6	93.7	93.9	3.8	3.6	7.69	7.7	<2	<2
			26		7.63		94.1		3.5		7.69		<2	
WM4-CB	11:45	0.25	27.7	27.7	6.5	6.5	82.6	82.3	6.0	6.2	7.33	7.3	8	8.0
			27.7		6.46		82.0		6.4		7.33		8	
WM4	11:30	0.20	26.3	26.3	7.36	7.4	91.2	91.3	7.7	7.6	7.82	7.8	7	7.0
			26.3		7.37		91.3		7.4		7.82		7	

Date	6-Oct-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	12:35	0.15	25	25.0	7.7	7.7	93.3	93.4	4.2	4.1	7.84	7.8	2	2.5
			25		7.72		93.5		4.0		7.84		3	
WM4-CB	12:55	0.25	27.5	27.5	6.42	6.4	81.5	81.6	8.1	8.5	7.4	7.4	12	11.5
			27.5		6.44		81.6		8.8		7.4		11	
WM4	12:30	0.20	27.1	27.1	8.01	8.0	97.6	97.7	16.1	16.0	8.19	8.2	12	12.5
			27.1		8.03		97.7		15.8		8.19		13	

Date	9-Oct-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	12:00	0.15	25.2	25.2	7.16	7.2	87.3	87.7	3.8	4.1	7.88	7.9	<2	3.0
			25.2		7.22		88.1		4.3		7.88		3	



WM4-CB	12:10	0.25	26.9	26.9	5.68	5.7	71.4	71.4	8.0	7.9	7.37	7.4	9	9.5
			26.9		5.67		71.3		7.8		7.37		10	
WM4	11:55	0.20	26.4	26.4	6.58	6.6	82.0	82.2	12.9	12.9	8.08	8.1	12	12.5
			26.4		6.63		82.4		12.9		8.08		13	

Date	11-Oct-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	11:50	0.15	23.5	23.5	7.3	7.3	85.8	86.3	4.3	3.8	8.2	8.2	2	2.0
			23.5		7.36		86.7		3.4		8.2		2	
WM4-CB	11:55	0.25	24.6	24.6	4.41	4.5	52.9	53.7	9.5	10.4	7.5	7.5	11	10.5
			24.6		4.53		54.5		11.4		7.5		10	
WM4	11:45	0.20	24	24.0	7.01	7.0	83.3	83.2	21.0	21.8	8.09	8.1	20	19.5
			24		6.98		83.0		22.6		8.09		19	

Date	13-Oct-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	11:55	0.15	24.7	24.7	7.56	7.5	91.1	90.9	8.0	7.6	7.94	7.9	4	3.5
			24.7		7.53		90.6		7.3		7.94		3	
WM4-CB	12:05	0.25	26.1	26.1	5.76	5.8	71.3	71.6	15.4	16.0	7.45	7.5	16	14.5
			26.1		5.8		71.8		16.6		7.45		13	
WM4	11:45	0.20	26.2	26.2	7.08	7.1	87.7	87.7	31.8	32.7	8.1	8.1	35	34.5
			26.2		7.07		87.6		33.6		8.1		34	

Date	16-Oct-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	13:05	0.15	24.9	24.9	7.21	7.2	87.1	87.2	6.0	5.7	7.84	7.8	3	3.5
			24.9		7.21		87.2		5.5		7.84		4	
WM4-CB	13:15	0.25	25.9	25.9	5.32	5.3	65.4	65.6	8.9	8.1	7.51	7.5	7	6.5
			25.9		5.33		65.7		7.3		7.51		6	
WM4	13:00	0.20	25.5	25.5	6.79	6.8	83.1	83.0	10.6	10.9	7.81	7.8	10	10.0
			25.5		6.77		82.8		11.1		7.81		10	

Date	18-Oct-18													
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Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	12:35	0.16	22.8	22.8	7.02	7.0	81.5	81.6	6.9	6.6	8	8.0	3	3.5
			22.8		7.03		81.6		6.4		8		4	
WM4-CB	12:45	0.25	23.8	23.8	4.9	4.9	58.1	58.2	11.0	11.0	7.62	7.6	11	11.0
			23.8		4.93		58.2		10.9		7.62		11	
WM4	12:25	0.22	23.5	23.5	6.48	6.5	76.4	76.3	24.2	24.2	7.97	8.0	21	21.5
			23.5		6.47		76.2		24.2		7.97		22	

Date	20-Oct-18														
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)		
WM4-CA	11:50	0.15	24.7	24.7	7.2	7.2	86.7	86.7	3.5	3.4	7.92	7.9	3	3.0	
			24.7		7.19		86.6		3.3		7.92		3		
WM4-CB	12:00	0.23	25.8	25.8	5.36	5.4	65.9	66.0	8.2	8.2	7.42	7.4	7	7.0	
			25.8		5.38		66.1		8.3		7.42		7		
WM4	11:40	0.20	25.1	25.1	7.09	7.1	86.0	85.9	8.0	7.9	7.98	8.0	7	7.0	
			25.1		7.07		85.8		7.8		7.98		7		

Date	23-Oct-18														
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)		
WM4-CA	12:00	0.15	24.9	24.9	7.11	7.1	85.8	85.9	4.1	4.1	7.88	7.9	2	2.5	
			24.9		7.1		85.9		4.2		7.88		3		
WM4-CB	12:10	0.25	26.2	26.2	5.94	5.9	73.5	73.6	6.2	6.4	7.41	7.4	4	5.0	
			26.2		5.95		73.7		6.6		7.41		6		
WM4	11:50	0.20	25.5	25.5	6.68	6.7	81.7	81.8	11.1	11.2	8	8.0	8	8.5	
			25.5		6.69		81.8		11.2		8		9		

Date	25-Oct-18														
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)		
WM4-CA	11:25	0.15	26.5	26.5	6.84	6.8	85.2	85.3	3.9	3.8	8.04	8.0	4	4.0	
			26.5		6.85		85.3		3.7		8.04		4		
WM4-CB	11:35	0.25	27.3	27.3	6.23	6.2	78.6	78.6	6.6	6.7	7.53	7.5	9	9.0	
			27.3		6.21		78.5		6.8		7.53		9		
WM4	11:20	0.20	26.3	26.3	6.25	6.3	77.6	77.7	16.2	16.4	8.09	8.1	15	14.5	

			26.3		6.27		77.8		16.5		8.09		14	
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Date	27-Oct-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	12:00	0.15	24.8	24.8	7.3	7.3	88.0	88.3	4.0	4.1	7.72	7.7	4	3.5
			24.8		7.34		88.5		4.3		7.72		3	
WM4-CB	12:10	0.25	26.4	26.4	6.06	6.1	75.3	75.6	7.4	6.9	7.34	7.3	31	31.5
			26.4		6.1		75.9		6.4		7.34		32	
WM4	11:50	0.20	24.9	24.9	6.92	6.9	83.7	83.8	14.8	15.2	7.73	7.7	10	10.0
			24.9		6.93		83.8		15.5		7.73		10	

Date	29-Oct-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	12:15	0.15	24.6	24.6	7.16	7.2	86.0	86.3	3.3	3.4	7.84	7.8	3	2.5
			24.6		7.19		86.5		3.6		7.84		2	
WM4-CB	12:30	0.25	26.6	26.6	6.35	6.4	79.2	79.4	16.6	16.5	7.35	7.4	7	6.5
			26.6		6.38		79.6		16.4		7.35		6	
WM4	12:10	0.20	24.8	24.8	7.03	7.0	84.7	84.7	10.9	10.4	7.92	7.9	9	8.5
			24.8		7.02		84.6		9.8		7.92		8	

Date	31-Oct-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	11:50	0.15	22.5	22.5	7.56	7.6	87.5	87.6	2.7	2.7	7.74	7.7	<2	2.0
			22.5		7.58		87.7		2.6		7.74		2	
WM4-CB	12:00	0.25	24	24.0	6.67	6.7	79.2	79.4	6.5	6.5	7.28	7.3	9	9.0
			24		6.7		79.5		6.6		7.28		9	
WM4	11:40	0.20	22.9	22.9	7.01	7.0	81.8	81.8	8.5	8.3	7.86	7.9	8	8.5
			22.9		7.02		81.8		8.1		7.86		9	

**Water Quality Monitoring Data for Contract 6**

Date	2-Oct-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:50	0.25	24	24.0	7.17	7.2	85.3	85.5	5.8	5.8	7.48	7.5	<2	<2
			24		7.21		85.7		5.9		7.48			
WM2A	10:35	0.20	26.9	26.9	6.86	6.9	84.5	84.4	24.2	24.4	7.58	7.6	14	14.5
			26.9		6.84		84.2		24.5		7.58			

Date	4-Oct-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:45	0.25	23.5	23.5	7.42	7.4	87.5	87.5	5.5	5.5	7.26	7.3	2	2.5
			23.5		7.42		87.5		5.6		7.26			
WM2A	10:35	0.20	24.4	24.4	6.69	6.7	80.3	80.7	20.4	21.2	7.42	7.4	12	12.5
			24.4		6.77		81.0		21.9		7.42			

Date	6-Oct-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:45	0.25	21.8	21.8	7.16	7.2	81.8	81.9	7.7	7.4	7.34	7.3	4	4.0
			21.8		7.18		81.9		7.0		7.34			
WM2A	10:30	0.20	23.2	23.2	7.4	7.4	85.7	85.7	14.7	14.6	7.31	7.3	10	10.0
			23.2		7.39		85.6		14.5		7.31			

Date	9-Oct-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	11:05	0.25	24.9	24.9	6.57	6.6	79.3	80.1	7.3	7.2	7.40	7.4	5	9.0
			24.9		6.68		80.8		7.1		7.40			
WM2A	10:50	0.20	25.7	25.7	7.45	7.3	91.3	89.8	78.7	<b>75.2</b>	7.50	7.5	107	<b>104.5</b>
			25.7		7.22		88.2		71.7		7.50			

Date	10-Oct-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	9:45	0.27							6.2	6.4			3	3.0

									6.7				3	
WM2A	10:10	0.20							65.8	<b>65.0</b>			98	<b>98.0</b>
								64.1					98	

Date <b>11-Oct-18</b>														
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	11:00	0.25	22.7	22.7	7.03	7.0	81.7	81.7	13.0	13.1	7.70	7.7	11	11.0
			22.7		7.04		81.7		13.1		7.70		11	
WM2A	10:38	0.20	23	23.0	6.54	6.6	76.4	76.8	58.2	<b>58.4</b>	7.85	7.9	61	<b>60.5</b>
			23		6.59		77.1		58.5		7.85		60	

Date <b>12-Oct-18</b>														
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	11:50	0.25							9.4	9.5			8	8.0
							9.5		8					
WM2A	12:00	0.20							20.9	20.6			32	<b>32.0</b>
							20.3		32					

Date <b>13-Oct-18</b>														
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:55	0.25	23.4	23.4	7.68	7.6	90.0	89.6	12.0	12.2	7.43	7.4	4	3.5
			23.4		7.6		89.1		12.3		7.43		3	
WM2A	10:45	0.20	23.3	23.3	6.92	6.9	81.3	81.5	23.5	23.1	7.44	7.4	14	14.0
			23.3		6.95		81.6		22.7		7.44		14	

Date <b>16-Oct-18</b>														
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	11:50	0.25	24	24.0	6.91	6.9	82.1	81.4	14.1	14.1	7.59	7.6	6	5.0
			24		6.79		80.6		14.0		7.59		4	
WM2A	11:35	0.20	24.3	24.3	6.61	6.6	79.0	79.1	13.6	13.9	7.81	7.8	12	12.0
			24.3		6.64		79.2		14.1		7.81		12	

Date		18-Oct-18												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	11:20	0.25	22.3	22.3	6.58	6.6	75.8	75.9	47.9	47.4	7.45	7.5	28	29.5
			22.3		6.6		75.9		46.9		7.45		31	
WM2A	11:10	0.22	22.6	22.6	6.57	6.6	76.1	76.2	50.4	51.5	7.52	7.5	30	31.0
			22.6		6.58		76.2		52.5		7.52		32	

Date		20-Oct-18												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:45	0.23	23.2	23.2	6.26	6.3	73.7	74.5	14.7	15.1	7.58	7.6	6	7.0
			23.2		6.41		75.3		15.5		7.58		8	
WM2A	10:25	0.20	24.8	24.8	6.72	6.7	81.1	81.1	23.0	24.0	7.57	7.6	14	14.5
			24.8		6.73		81.1		24.9		7.57		15	

Date		23-Oct-18												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:50	0.25	23.6	23.6	6.83	6.8	80.7	80.3	13.0	12.7	7.47	7.5	6	5.5
			23.6		6.77		79.9		12.3		7.47		5	
WM2A	10:35	0.20	24.3	24.3	6.51	6.5	77.4	77.3	24.5	24.7	7.59	7.6	12	12.0
			24.3		6.49		77.2		24.9		7.59		12	

Date		25-Oct-18												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:30	0.25	23.9	23.9	6.68	6.7	79.1	79.3	12.8	13.5	7.77	7.8	10	9.5
			23.9		6.71		79.5		14.1		7.77		9	
WM2A	10:20	0.20	24.6	24.6	6.32	6.4	75.3	76.0	10.7	10.5	7.98	8.0	10	10.0
			24.6		6.44		76.7		10.2		7.98		10	

Date		27-Oct-18												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:55	0.23	22.8	22.8	7.43	7.4	86.1	85.6	23.1	23.1	7.37	7.4	16	17.0
			22.8		7.33		85.1		23.0		7.37		18	
WM2A	10:40	0.20	23.2	23.2	6.7	6.7	78.4	78.3	210.0	<b>214.0</b>	7.60	7.6	163	<b>168.0</b>



			23.2		6.67		78.1		218.0		7.60		173	
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Date <b>29-Oct-18</b>														
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	11:15	0.25	21	21.0	7.14	7.2	80.2	80.4	10.2	10.4	7.46	7.5	7	7.5
			21		7.16		80.5		10.6		7.46		8	
WM2A	11:00	0.20	22.1	22.1	6.97	7.0	80.1	80.2	23.3	22.6	7.53	7.5	26	<b>26.0</b>
			22.1		6.99		80.3		21.8		7.53		26	

Date <b>30-Oct-18</b>														
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	11:25	0.25							9.2	9.2			6	6.0
									9.2		6			
WM2A	11:35	0.20							19.1	18.6			14	14.0
									18.1		14			

Date <b>31-Oct-18</b>														
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:50	0.25	20.3	20.3	7.19	7.2	79.6	79.7	11.9	11.6	7.45	7.5	5	4.5
			20.3		7.21		79.8		11.3		7.45		4	
WM2A	10:40	0.20	20.5	20.5	7.43	7.5	82.6	82.9	7.4	8.0	7.58	7.6	5	5.0
			20.5		7.47		83.1		8.5		7.58		5	

**Remarks:** # Additional water quality monitoring for the parameters with Action/Limit Level exceedance triggered only.

	<b>Action Level</b>
	<b>Limit Level</b>

**Water Quality Monitoring Data for Contract 2 and 6**

Date	2-Oct-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	11:25	0.15	26.8	26.8	6.69	6.7	83.9	83.9	1.9	1.8	11.17	11.2	<2	<2
			26.8		6.7		83.9		1.7		11.17			
WM3	11:35	0.15	25.8	25.8	6.58	6.6	80.9	80.8	3.9	3.8	9.07	9.1	<2	<2
			25.8		6.56		80.7		3.6		9.07			

Date	4-Oct-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	11:05	0.15	26.2	26.2	6.44	6.5	79.8	80.4	6.5	6.4	10.44	10.4	6	7.0
			26.2		6.53		80.9		6.3		10.44		8	
WM3	11:15	0.15	25.3	25.3	6.46	6.5	78.6	79.2	4.1	4.3	8.72	8.7	2	2.0
			25.3		6.55		79.7		4.6		8.72		2	

Date	6-Oct-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	11:00	0.15	25.8	25.8	7.02	7.0	86.6	86.7	4.7	4.7	10.28	10.3	11	11.5
			25.8		7.04		86.7		4.6		10.28		12	
WM3	11:10	0.15	24.2	24.2	6.69	6.7	80.0	80.0	3.8	4.1	9.37	9.4	3	3.5
			24.2		6.68		80.0		4.5		9.37		4	

Date	9-Oct-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	11:25	0.15	27.8	27.8	6.33	6.4	80.9	81.4	2.7	2.8	11.34	11.3	10	10.0
			27.8		6.41		81.9		3.0		11.34		10	
WM3	11:30	0.15	26.5	26.5	6.4	6.4	79.7	79.7	5.6	5.3	9.71	9.7	7	7.0
			26.5		6.39		79.6		5.0		9.71		7	

Date	11-Oct-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	11:10	0.15	26	26.0	6.48	6.5	80.4	80.5	8.9	8.3	11.35	11.4	20	20.0

			26		6.5		80.6		7.7		11.35		20	
WM3	11:20	0.15	25.1	25.1	6.72	6.7	81.5	81.5	13.4	13.4	9.51	9.5	15	15.5
			25.1		6.71		81.4		13.4		9.51		16	

<b>Date</b>	<b>13-Oct-18</b>													
<b>Location</b>	<b>Time</b>	<b>Depth (m)</b>	<b>Temp (oC)</b>		<b>DO (mg/L)</b>		<b>DO (%)</b>		<b>Turbidity (NTU)</b>		<b>pH</b>		<b>SS(mg/L)</b>	
WM3-C	11:15	0.15	26.4	26.4	6.56	6.6	81.7	81.9	6.8	6.5	11.21	11.2	15	15.0
			26.4		6.6		82.1		6.2		11.21		15	
WM3	11:25	0.15	25.5	25.5	6.69	6.7	81.8	82.0	13.2	13.1	9.15	9.2	14	14.0
			25.5		6.71		82.1		13.0		9.15		14	

<b>Date</b>	<b>16-Oct-18</b>													
<b>Location</b>	<b>Time</b>	<b>Depth (m)</b>	<b>Temp (oC)</b>		<b>DO (mg/L)</b>		<b>DO (%)</b>		<b>Turbidity (NTU)</b>		<b>pH</b>		<b>SS(mg/L)</b>	
WM3-C	12:05	0.15	26.8	26.8	6.28	6.3	78.8	79.3	5.8	5.7	11.16	11.2	10	10.5
			26.8		6.35		79.7		5.7		11.16		11	
WM3	12:15	0.15	25.4	25.4	6.2	6.2	75.5	75.7	8.0	7.8	9.44	9.4	9	9.0
			25.4		6.24		75.9		7.5		9.44		9	

<b>Date</b>	<b>18-Oct-18</b>													
<b>Location</b>	<b>Time</b>	<b>Depth (m)</b>	<b>Temp (oC)</b>		<b>DO (mg/L)</b>		<b>DO (%)</b>		<b>Turbidity (NTU)</b>		<b>pH</b>		<b>SS(mg/L)</b>	
WM3-C	11:40	0.17	23	23.0	6.43	6.5	78.0	78.2	8.2	8.1	10.99	11.0	10	10.0
			23		6.48		78.4		8.0		10.99		10	
WM3	11:50	0.20	26	26.0	7.54	7.4	89.3	86.5	13.2	13.2	8.94	8.9	12	12.0
			26		7.16		83.7		13.2		8.94		12	

<b>Date</b>	<b>20-Oct-18</b>													
<b>Location</b>	<b>Time</b>	<b>Depth (m)</b>	<b>Temp (oC)</b>		<b>DO (mg/L)</b>		<b>DO (%)</b>		<b>Turbidity (NTU)</b>		<b>pH</b>		<b>SS(mg/L)</b>	
WM3-C	11:00	0.15	26	26.0	7.13	7.1	88.1	87.1	10.1	10.9	11.41	11.4	10	9.5
			26		6.97		86.0		11.8		11.41		9	
WM3	11:10	0.20	25.3	25.3	6.56	6.6	79.9	80.1	11.7	12.0	9.21	9.2	10	10.5
			25.3		6.59		80.2		12.3		9.21		11	

<b>Date</b>	<b>23-Oct-18</b>													
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Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	11:10	0.15	26.7	26.7	6.37	6.4	79.6	79.9	24.2	24.1	11	11.0	46	46.0
			26.7		6.4		80.1		23.9		11		46	
WM3	11:20	0.15	25.2	25.2	6.34	6.4	77.0	77.2	9.7	9.7	8.89	8.9	9	9.0
			25.2		6.37		77.4		9.7		8.89		9	

Date		25-Oct-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)		
WM3-C	10:50	0.15	27.4	27.4	6.26	6.3	79.3	79.5	5.5	5.4	10.86	10.9	8	7.5	
			27.4		6.28		79.7		5.2		10.86		7		
WM3	11:00	0.20	25.9	25.9	6.56	6.6	80.9	80.8	9.7	8.9	8.81	8.8	11	10.5	
			25.9		6.55		80.7		8.1		8.81		10		

Date		27-Oct-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)		
WM3-C	11:15	0.15	25.8	25.8	6.54	6.6	80.4	80.5	4.9	5.2	10.14	10.1	7	7.0	
			25.8		6.56		80.6		5.5		10.14		7		
WM3	11:25	0.20	24.5	24.5	6.6	6.6	79.1	79.2	70.8	<b>71.4</b>	8.64	8.6	102	<b>100.5</b>	
			24.5		6.61		79.3		71.9		8.64		99		

Date		29-Oct-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)		
WM3-C	11:35	0.15	25.9	25.9	6.49	6.5	79.9	80.1	5.7	5.4	10.22	10.2	4	5.0	
			25.9		6.52		80.3		5.2		10.22		6		
WM3	11:50	0.20	23	23.0	6.66	6.7	77.7	77.8	129.0	<b>133.5</b>	8.56	8.6	111	<b>114.5</b>	
			23		6.67		77.9		138.0		8.56		118		

Date		30-Oct-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)		
WM3-C	11:05	0.15							5.7	5.7			7	7.0	
							5.8		7						
WM3	10:45	0.20							176.0	<b>178.0</b>			213	<b>213.0</b>	
							180.0		213						

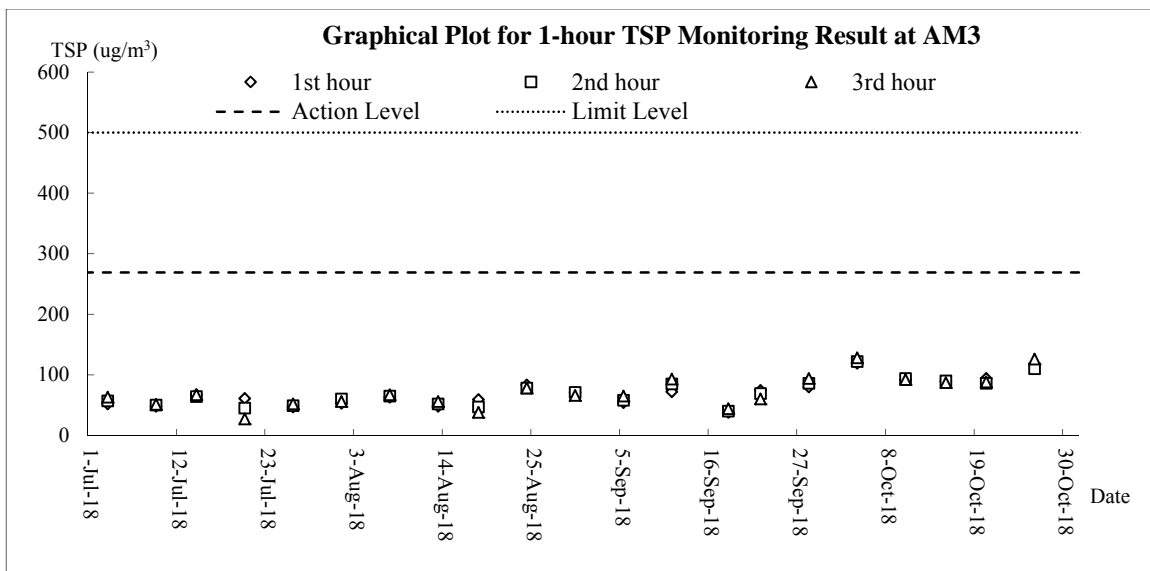
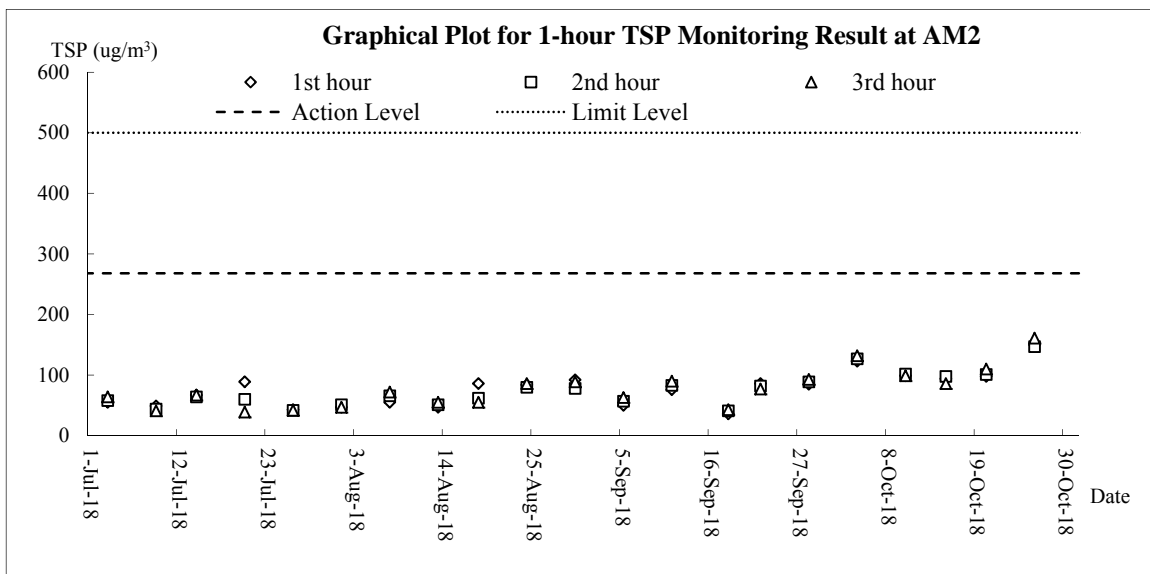
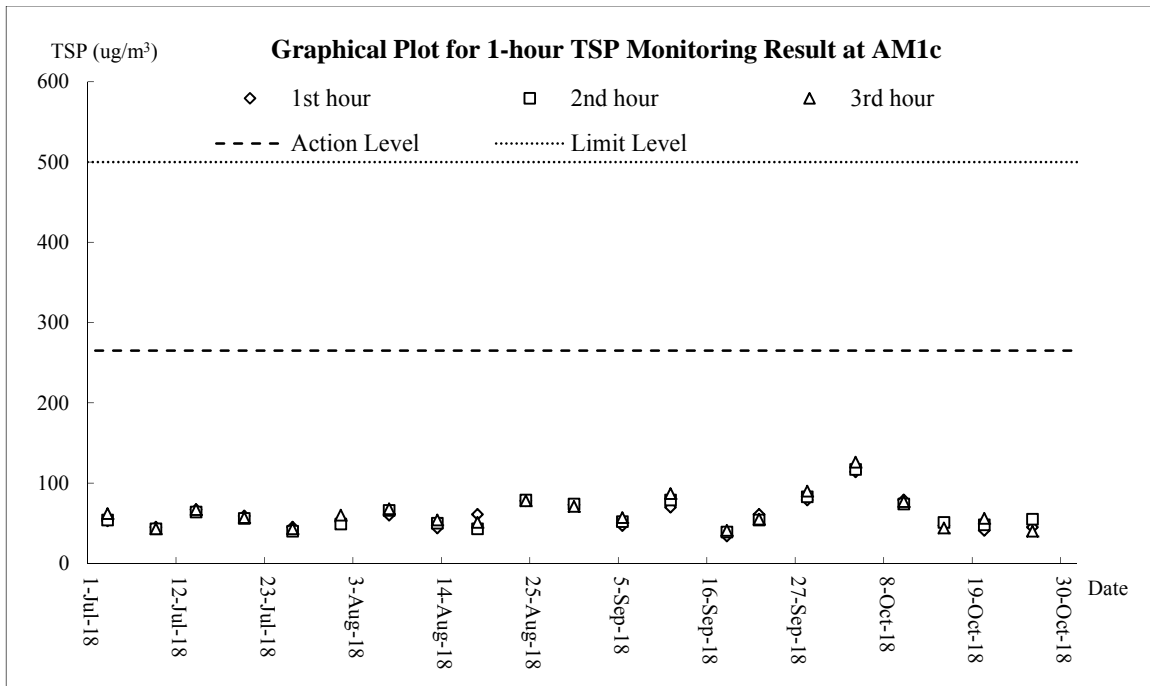
Date	31-Oct-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	11:10	0.15	24.9	24.9	6.69	6.7	81.3	81.5	6.6	7.6	10.1	10.1	6	6.0
			24.9		6.72		81.6		8.5		10.1		6	
WM3	11:20	0.20	22.6	22.6	6.76	6.8	78.3	78.6	13.1	13.3	8.48	8.5	10	10.0
			22.6		6.79		78.9		13.4		8.48		10	

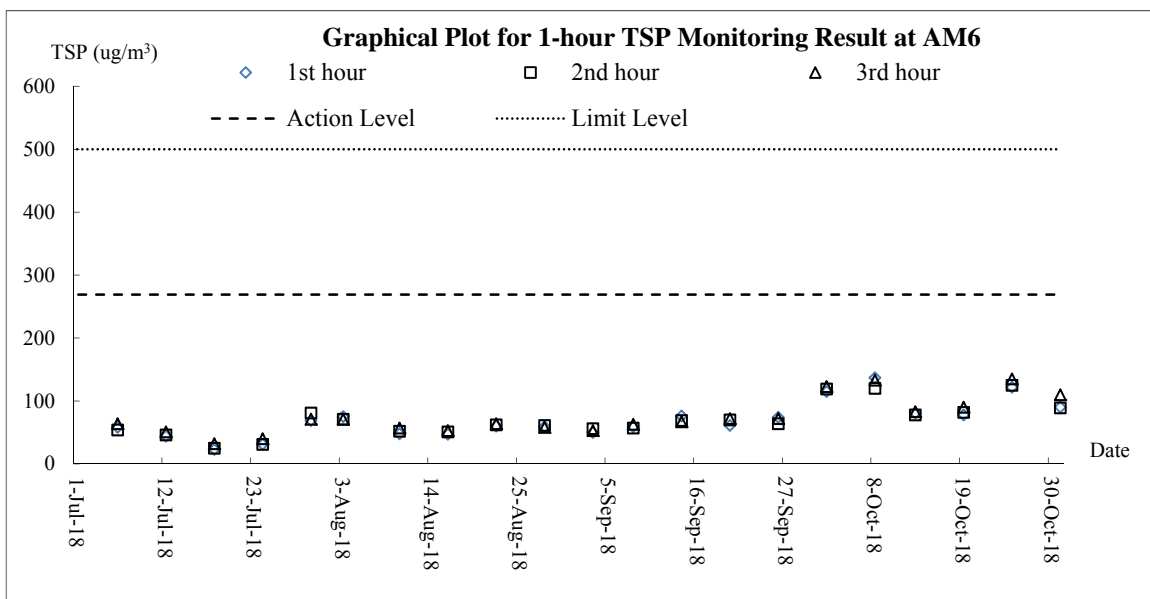
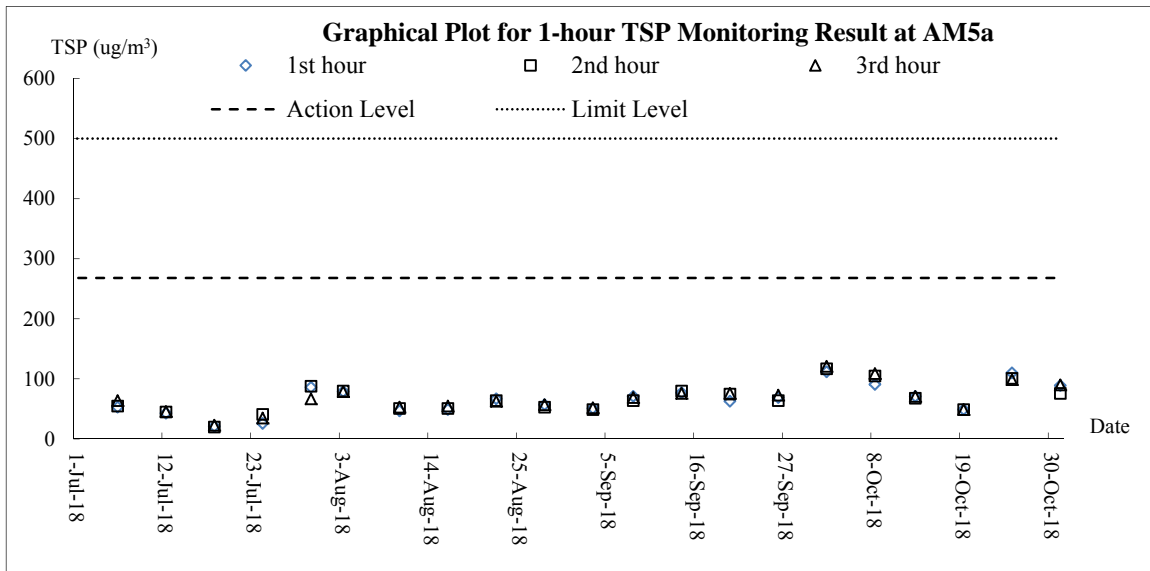
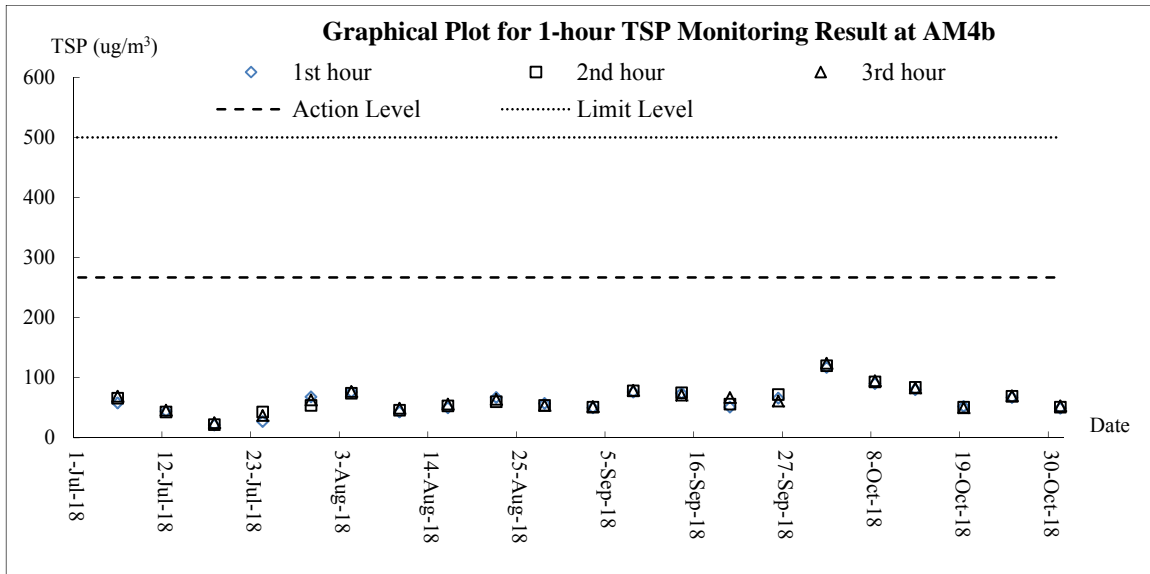
## **Appendix J**

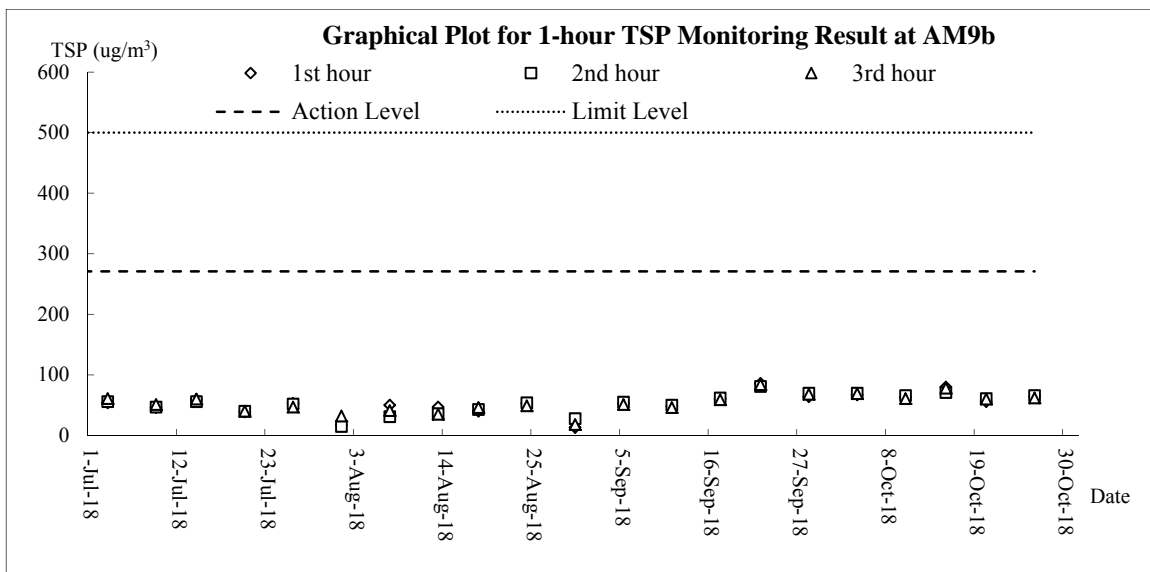
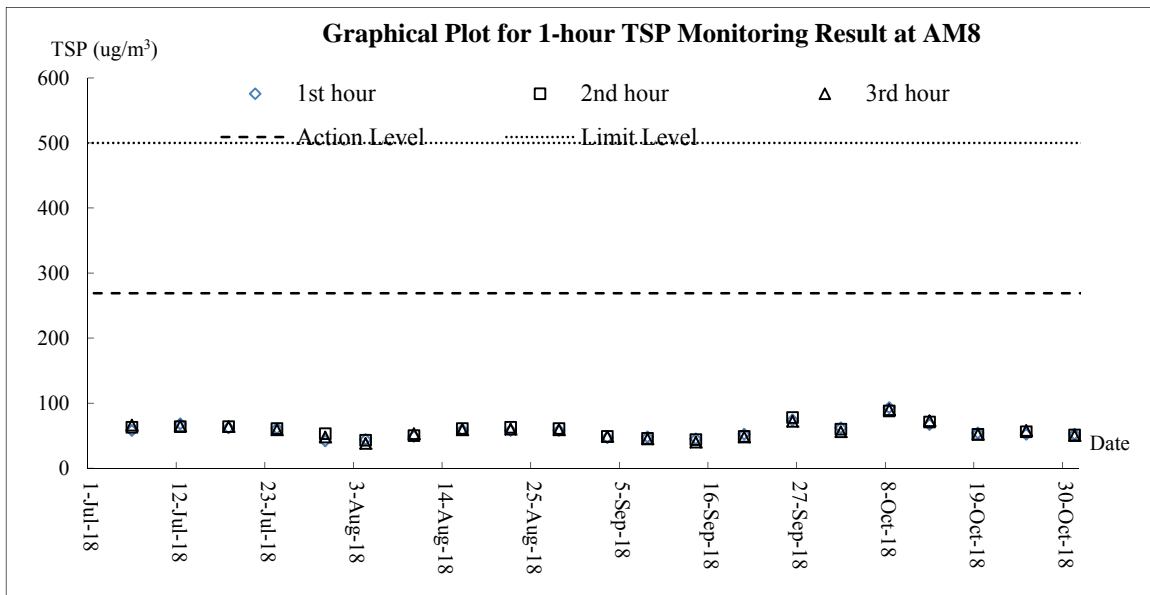
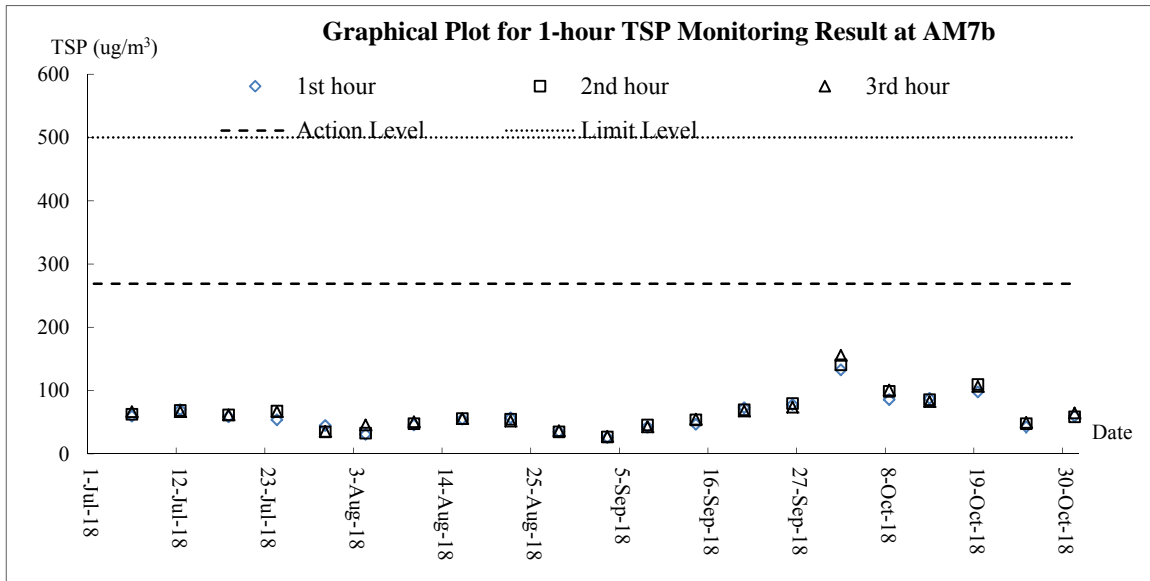
### **Graphical Plots for Monitoring Result**



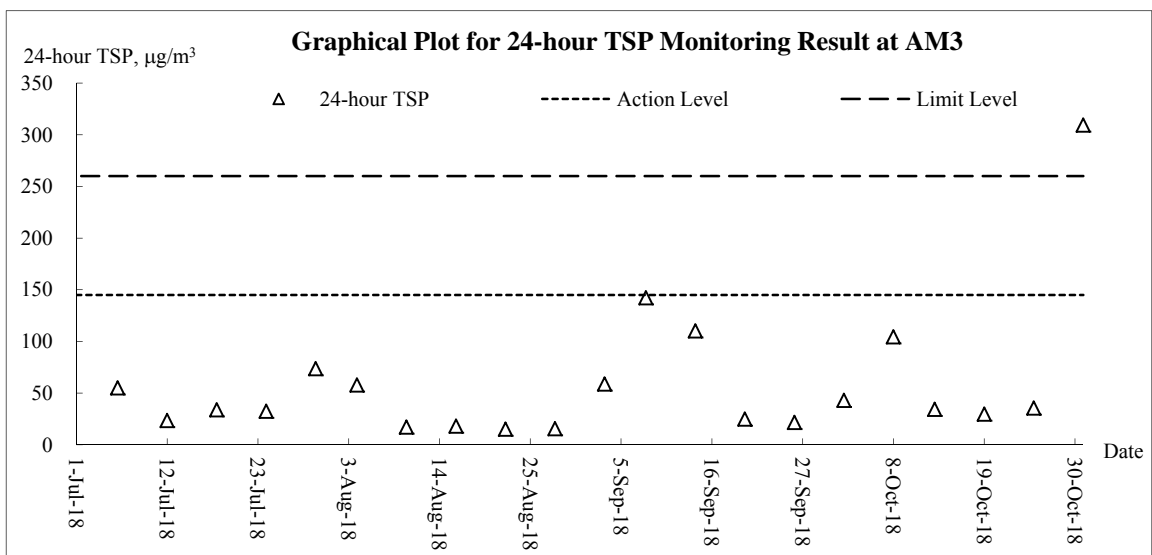
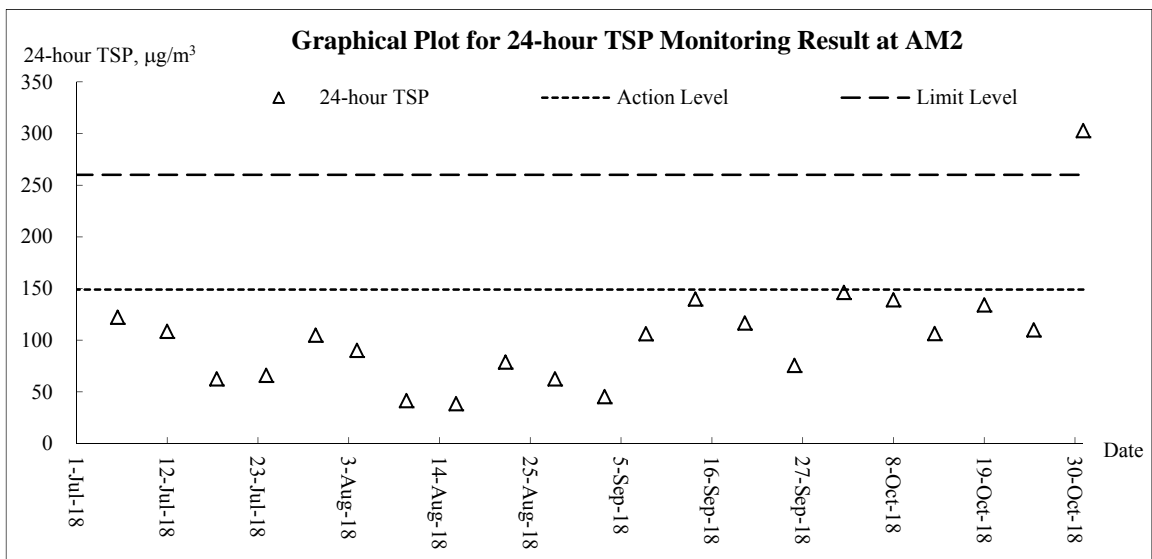
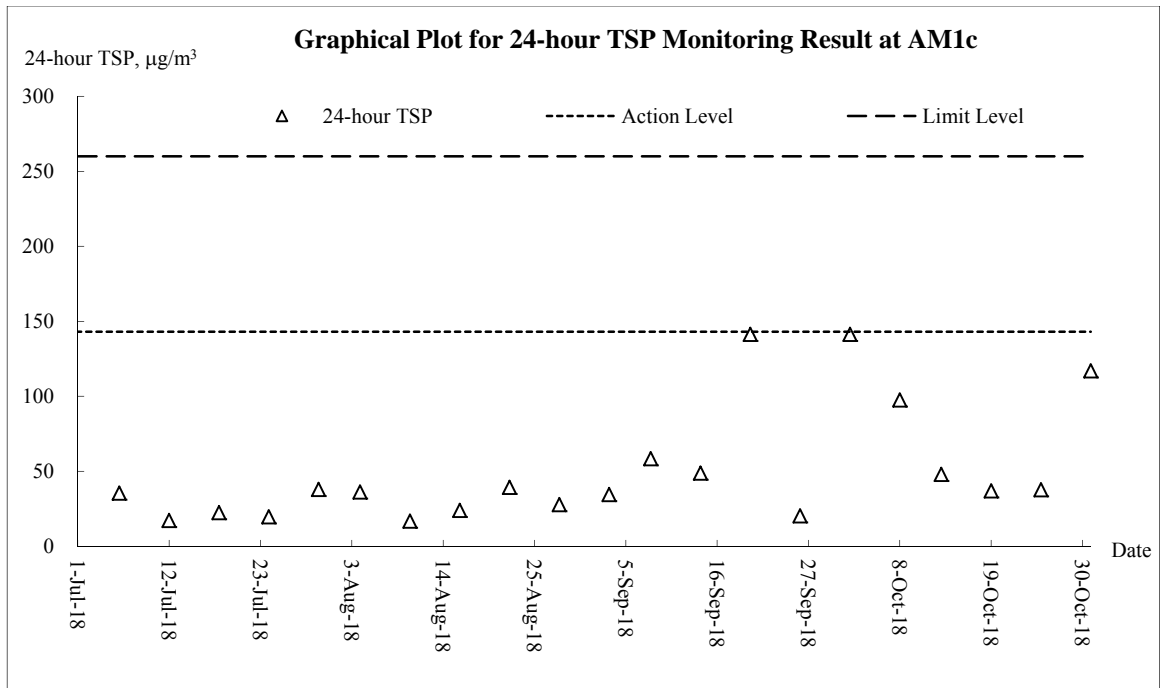
**Air Quality – 1-hour TSP**

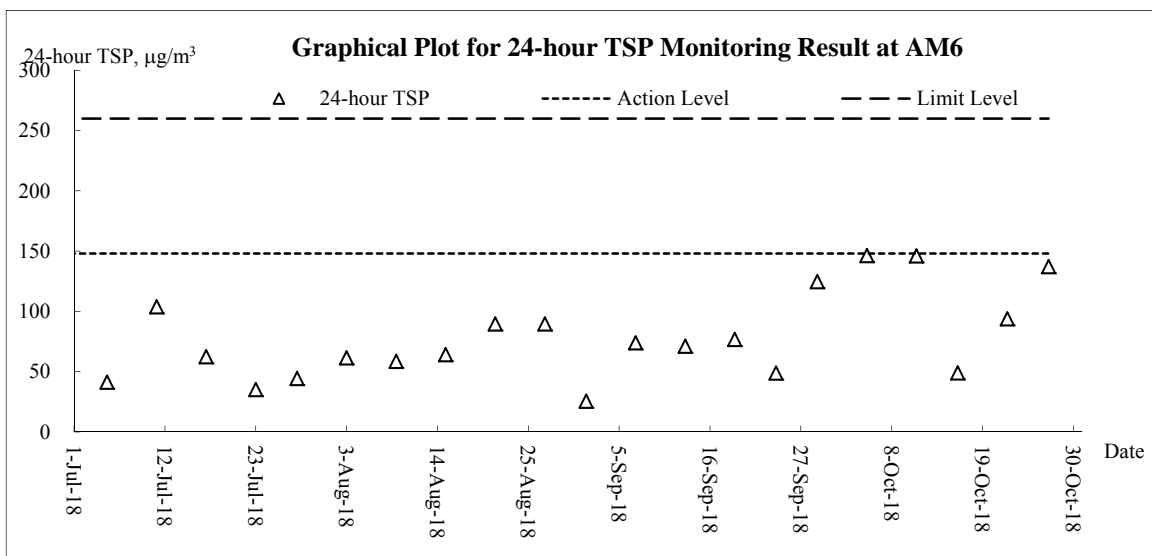
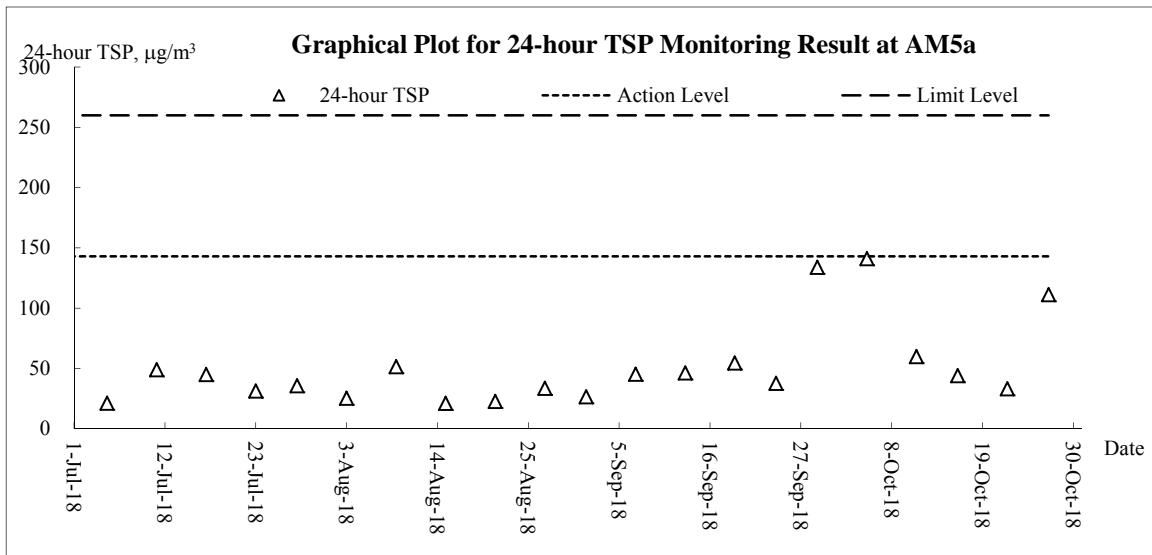
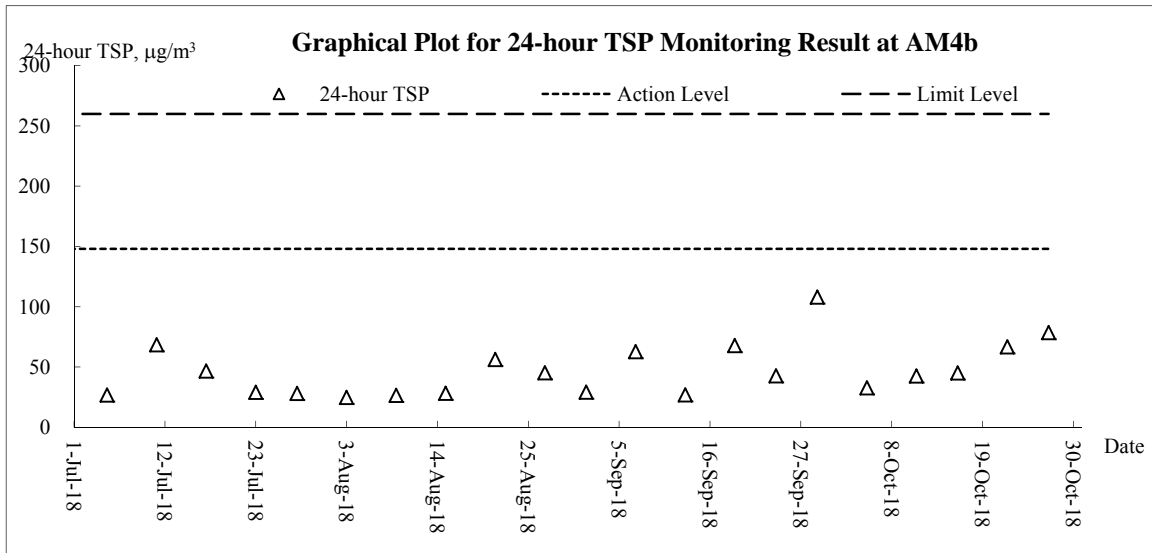


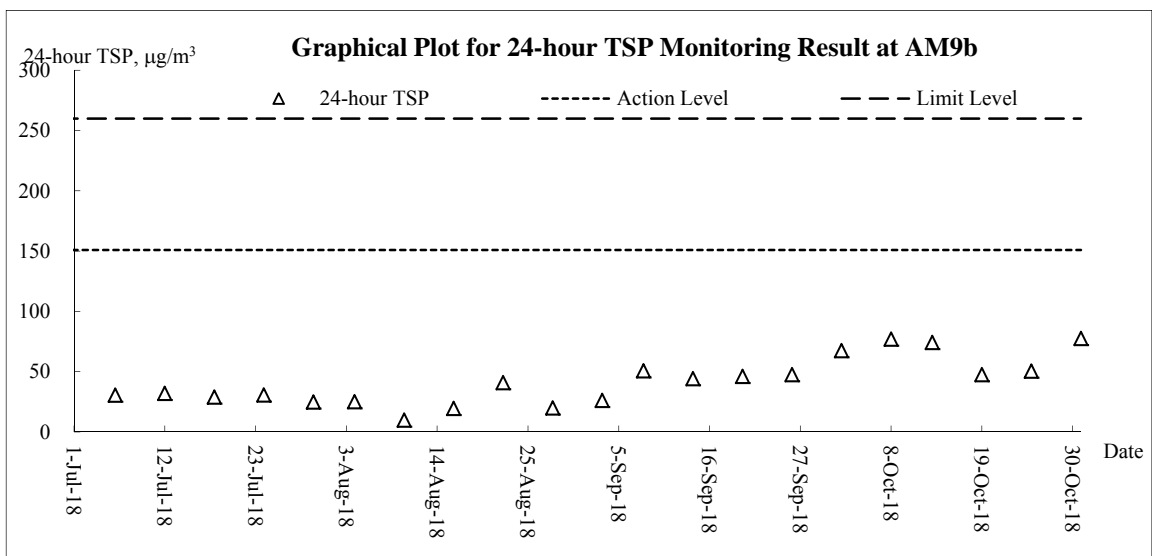
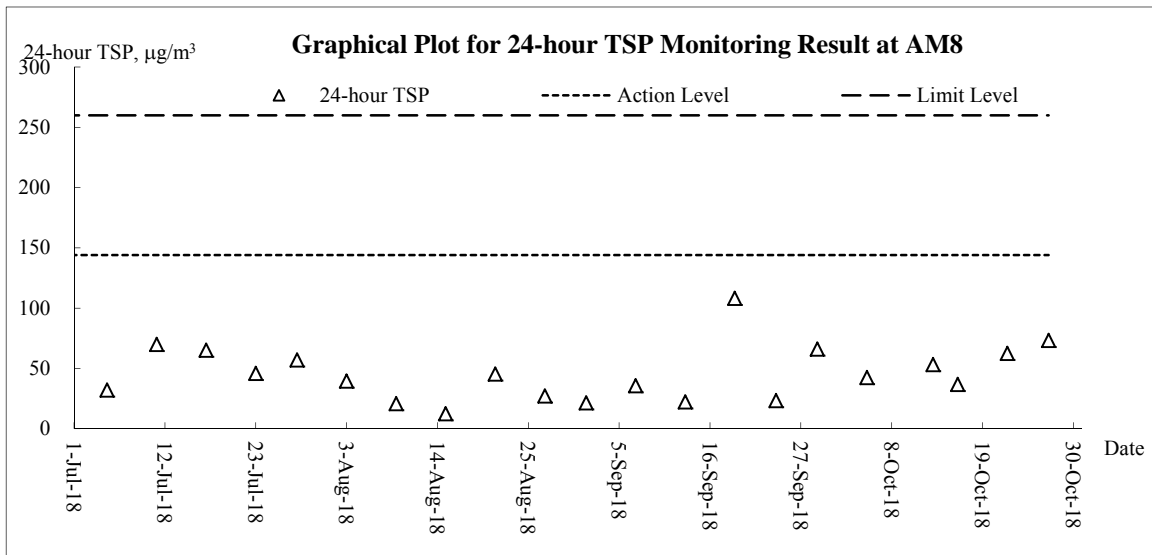
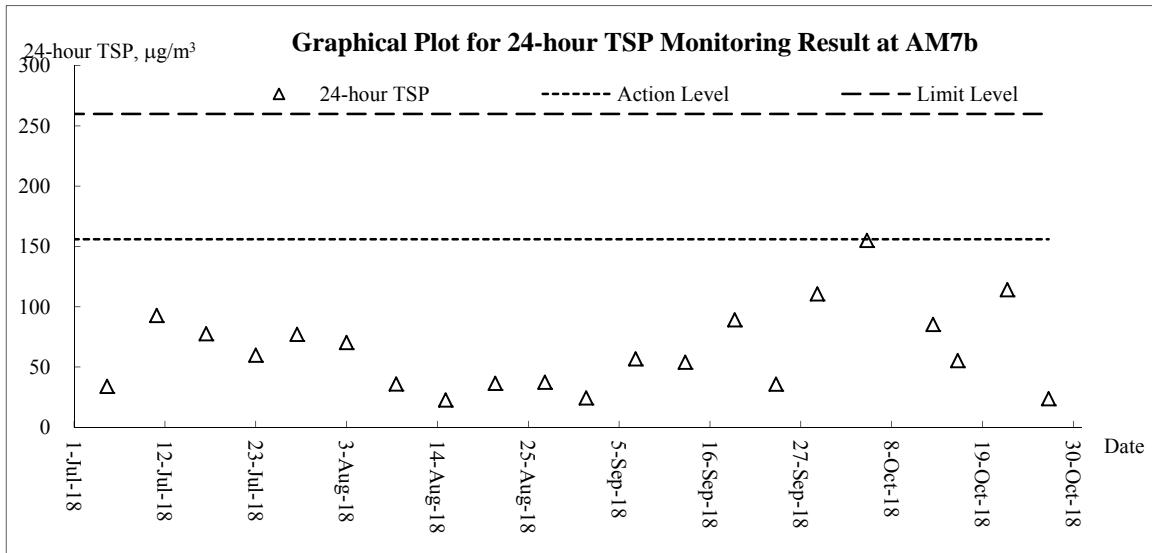




**Air Quality – 24-hour TSP**

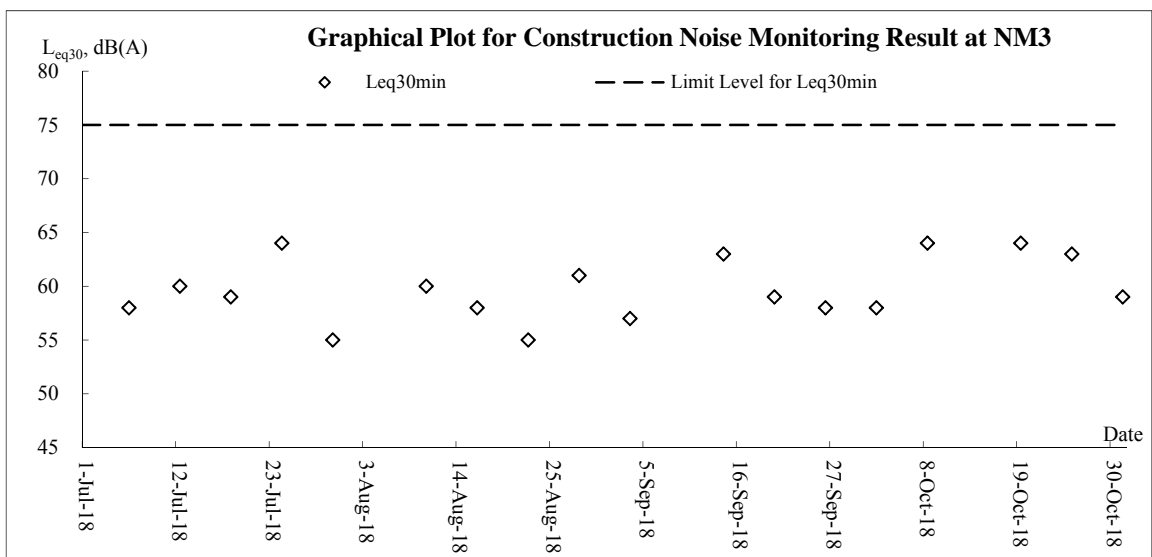
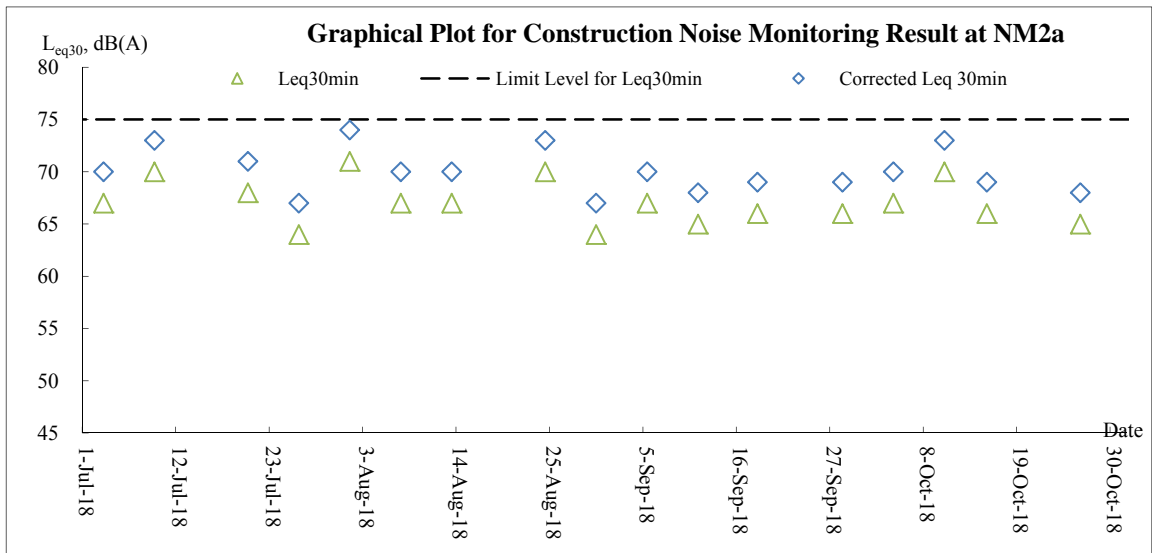
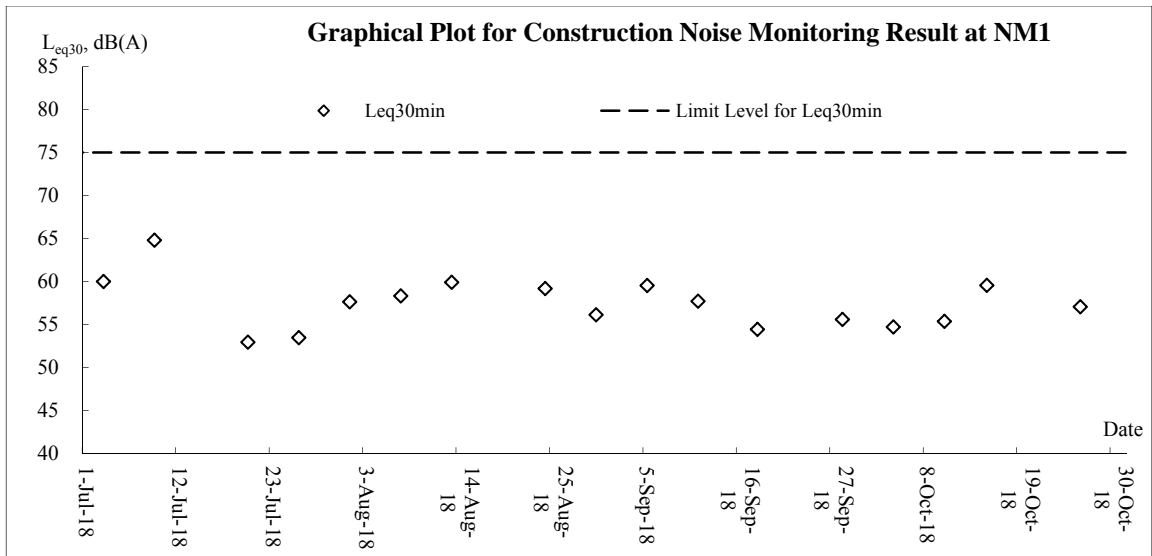


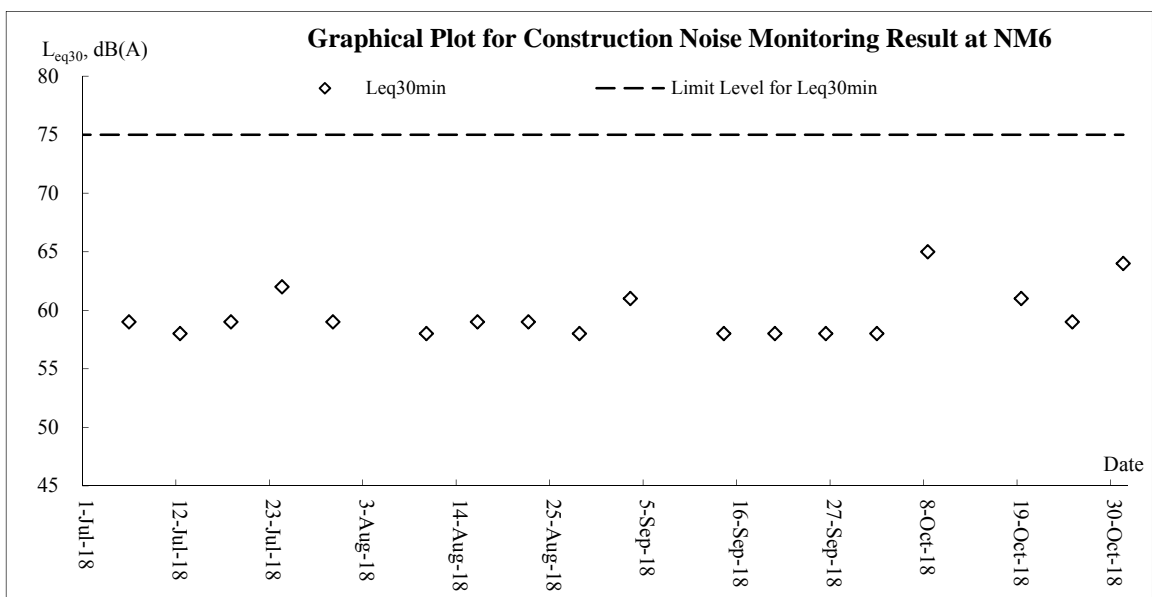
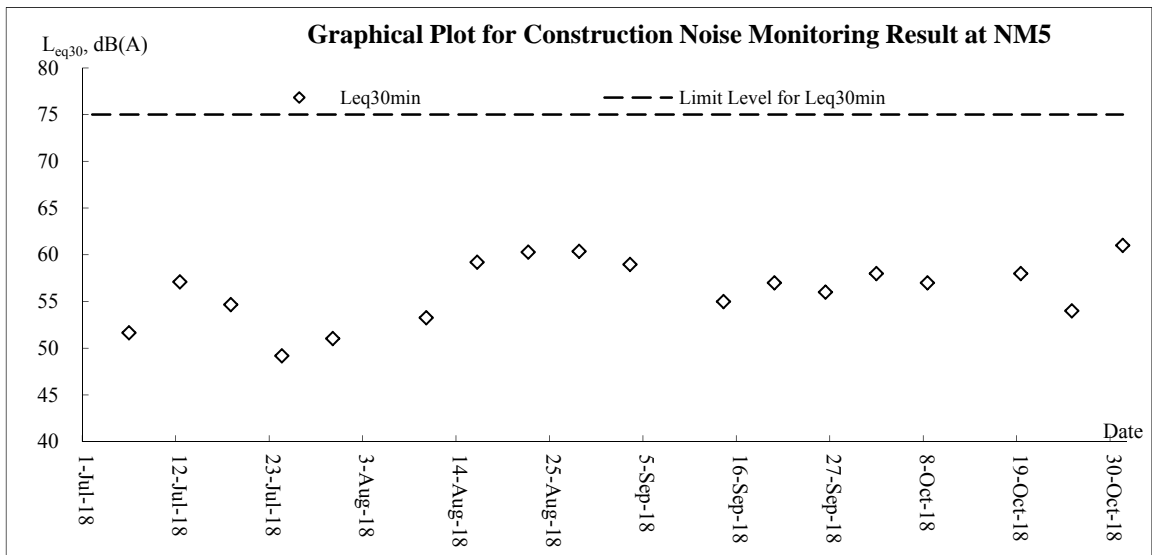
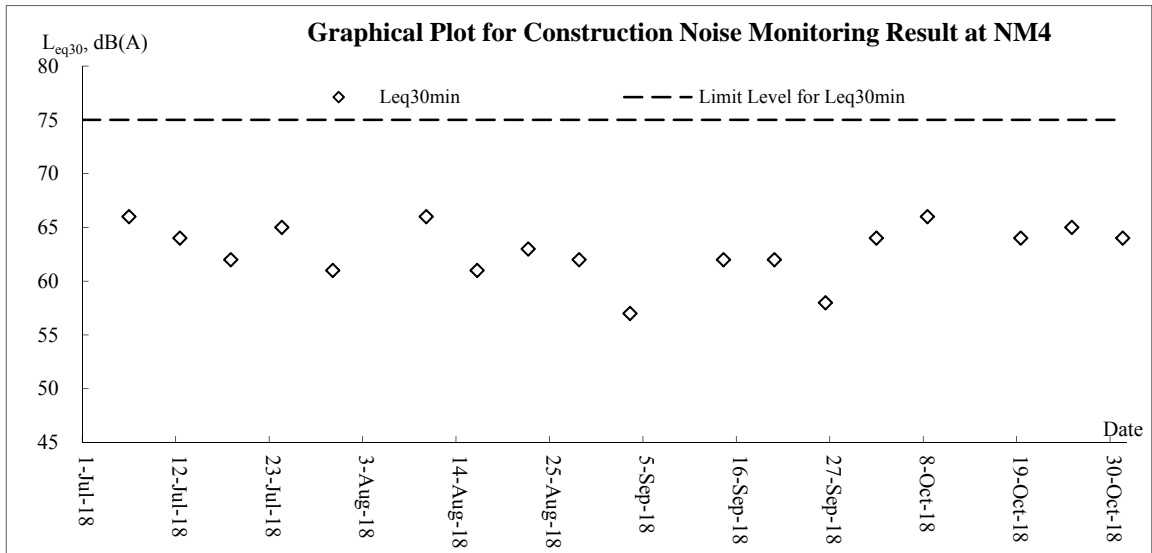


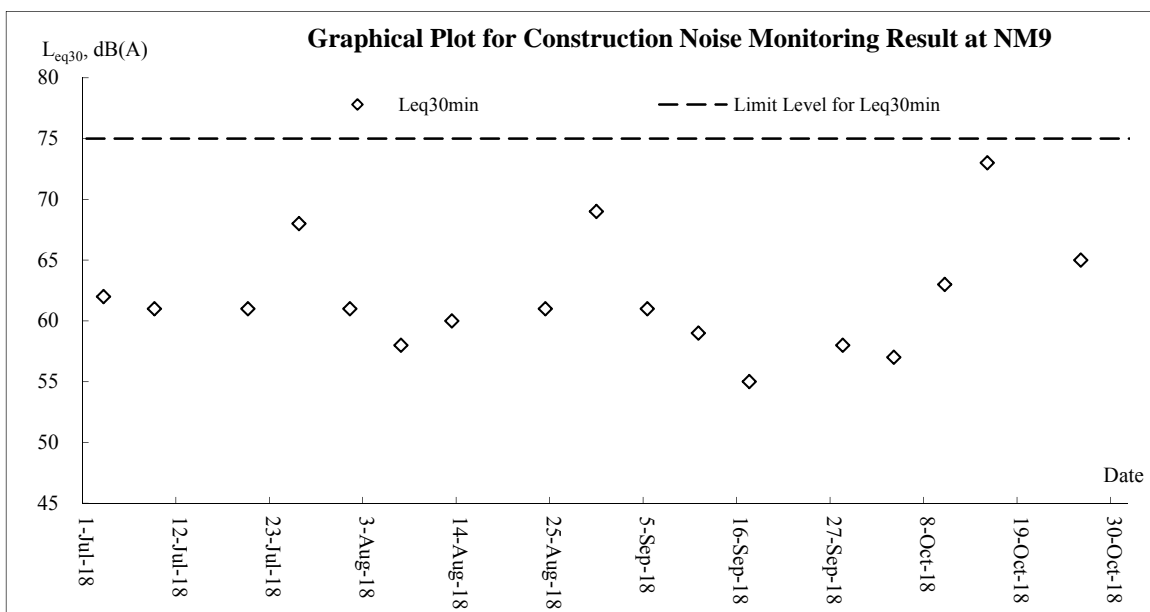
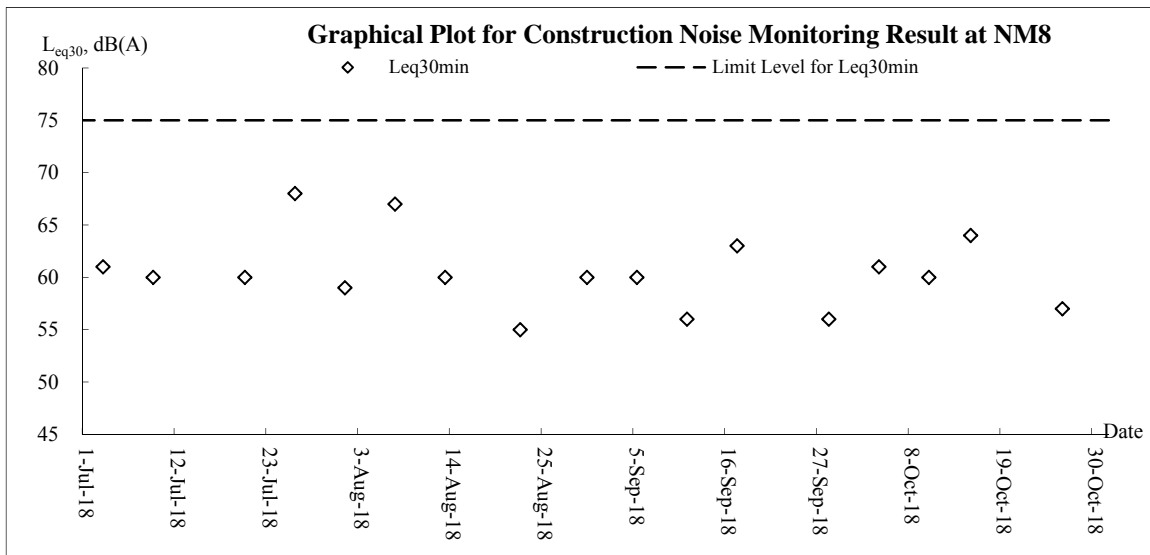
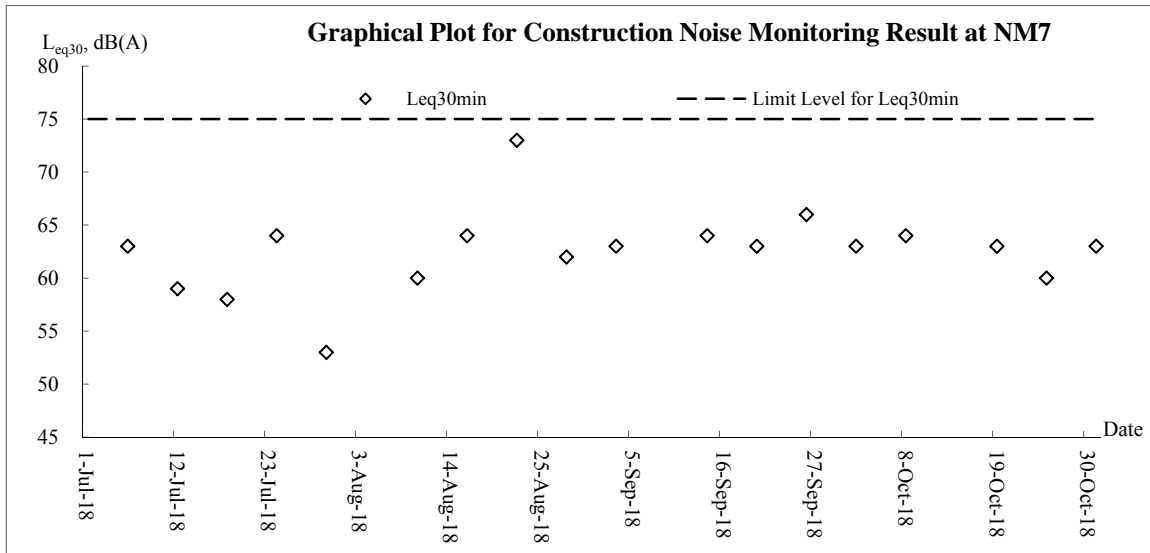


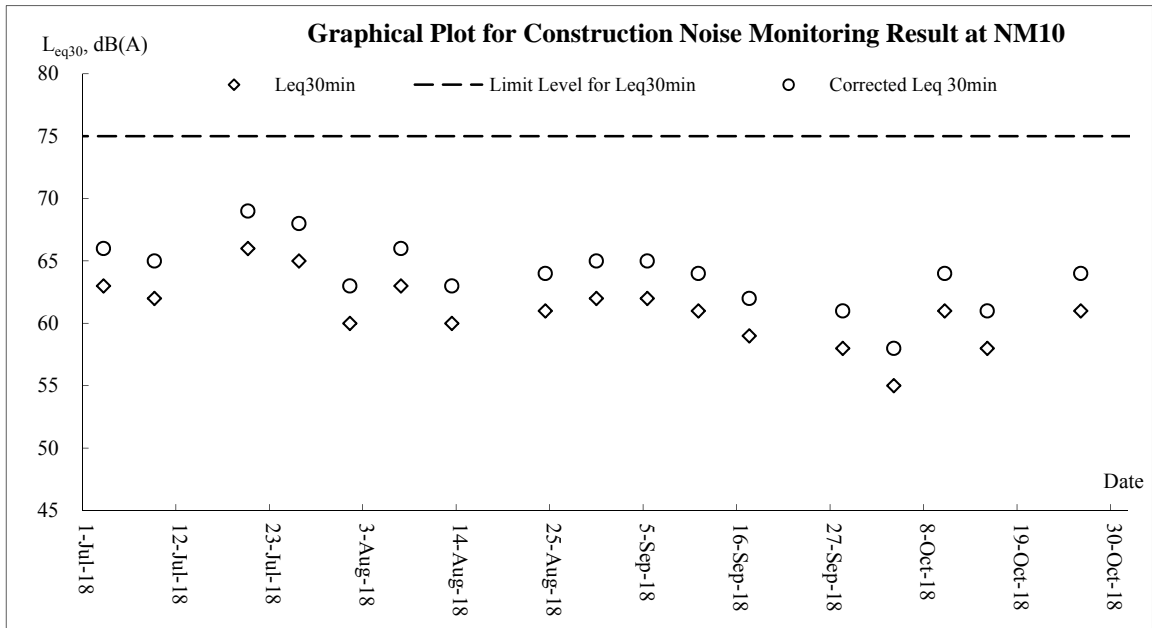


**Noise**

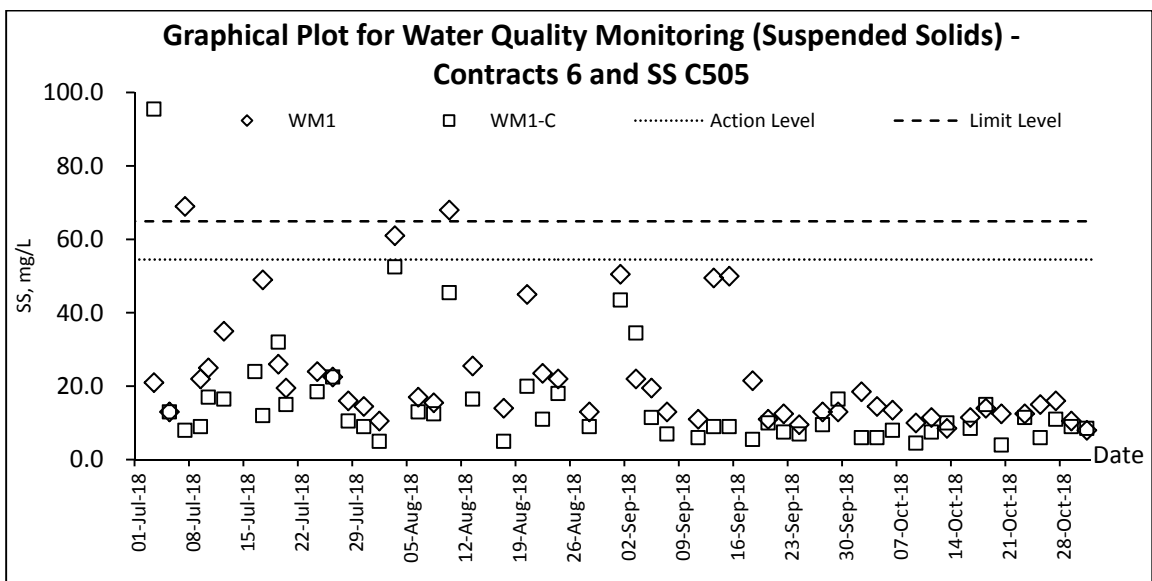
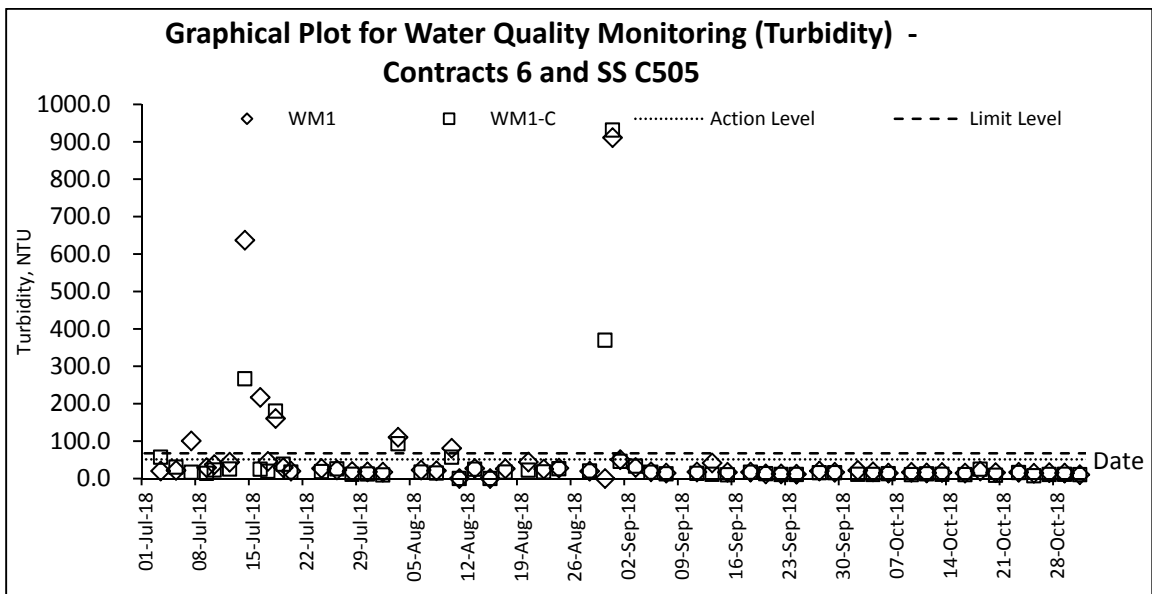
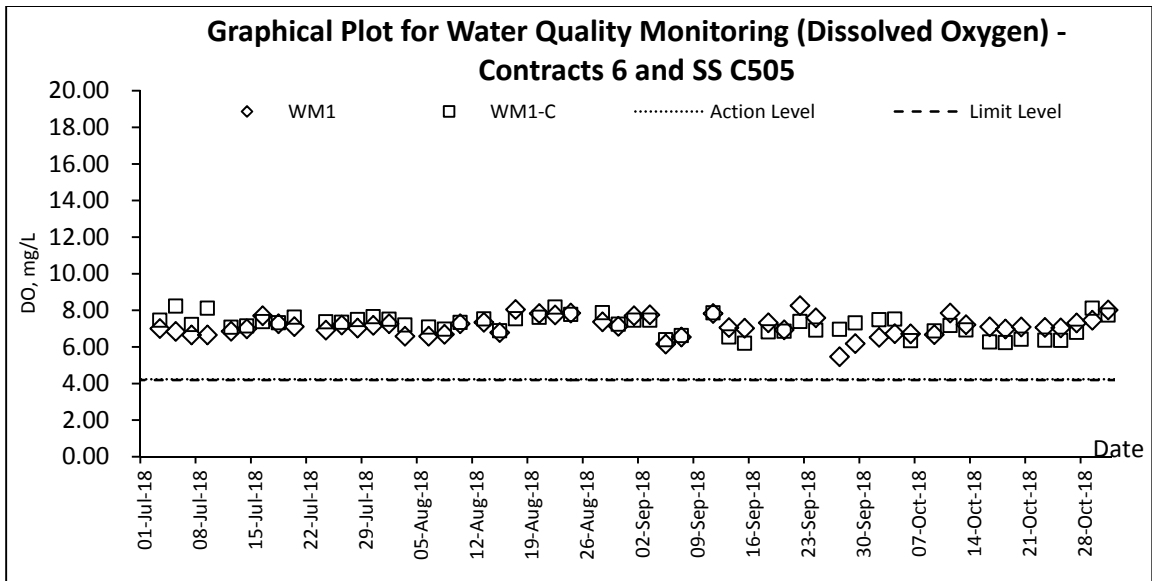


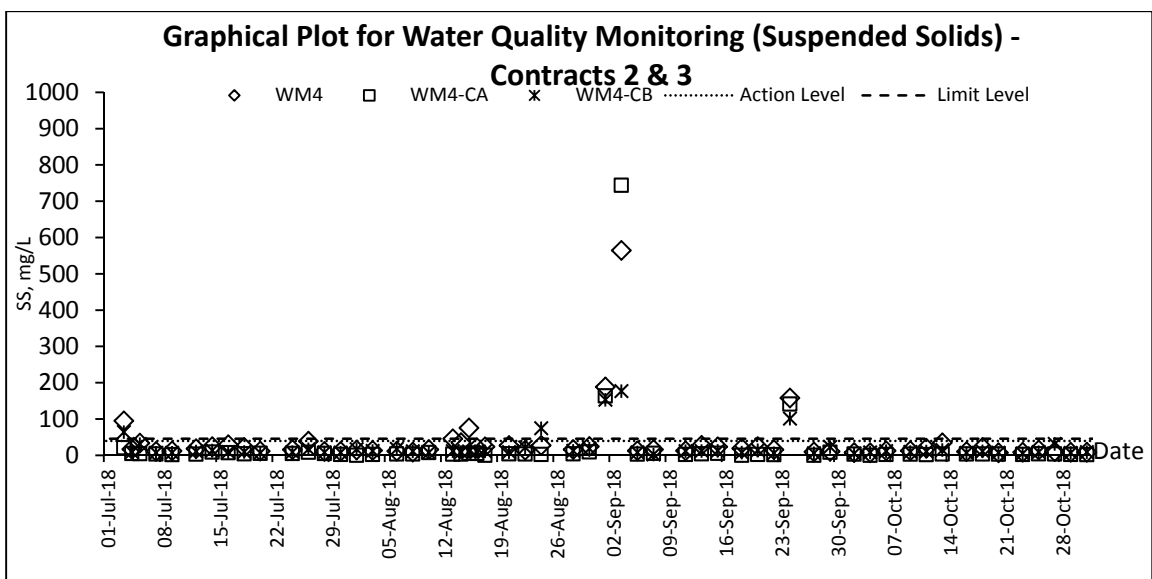
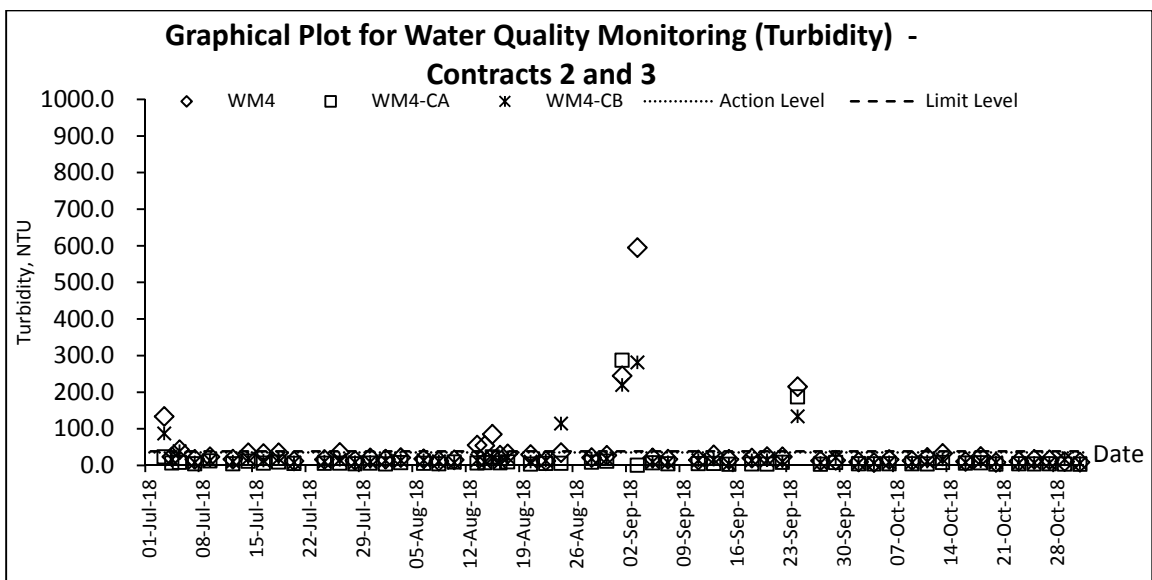
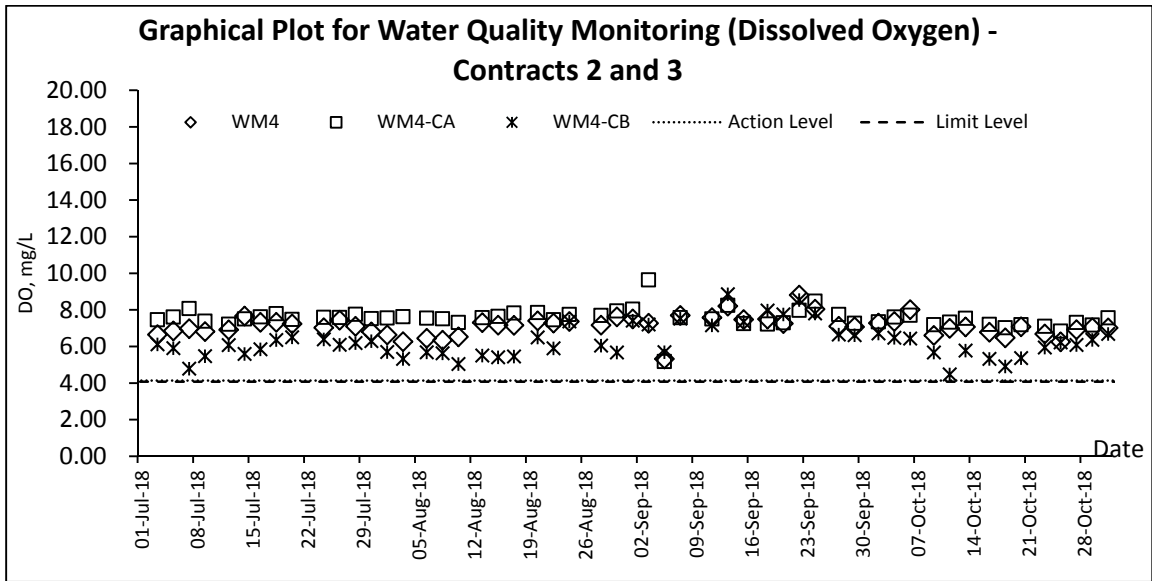




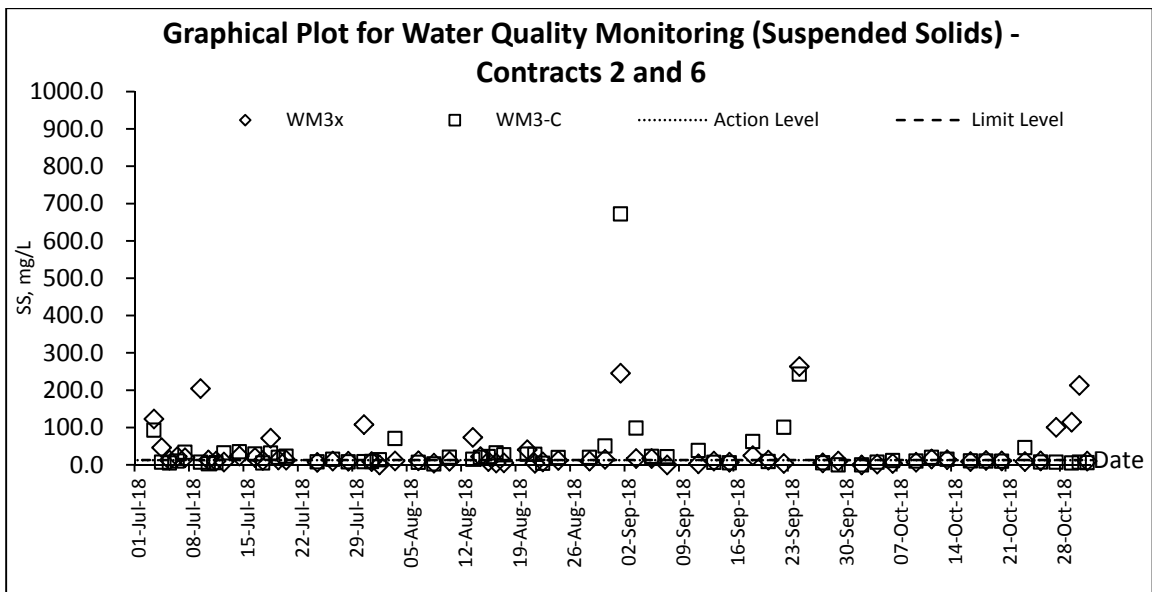
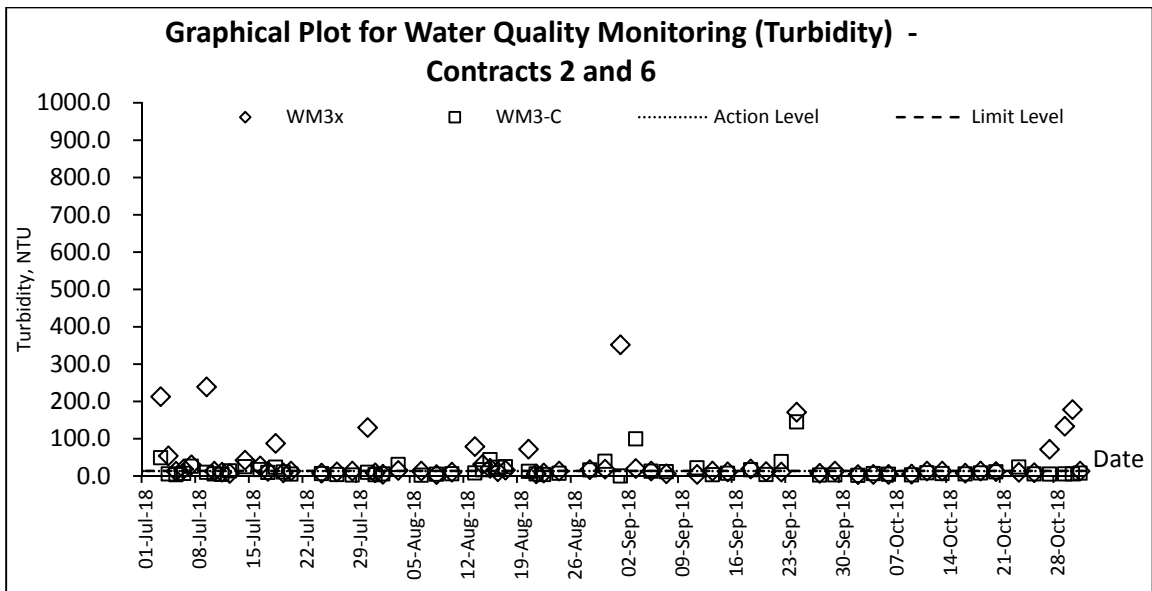
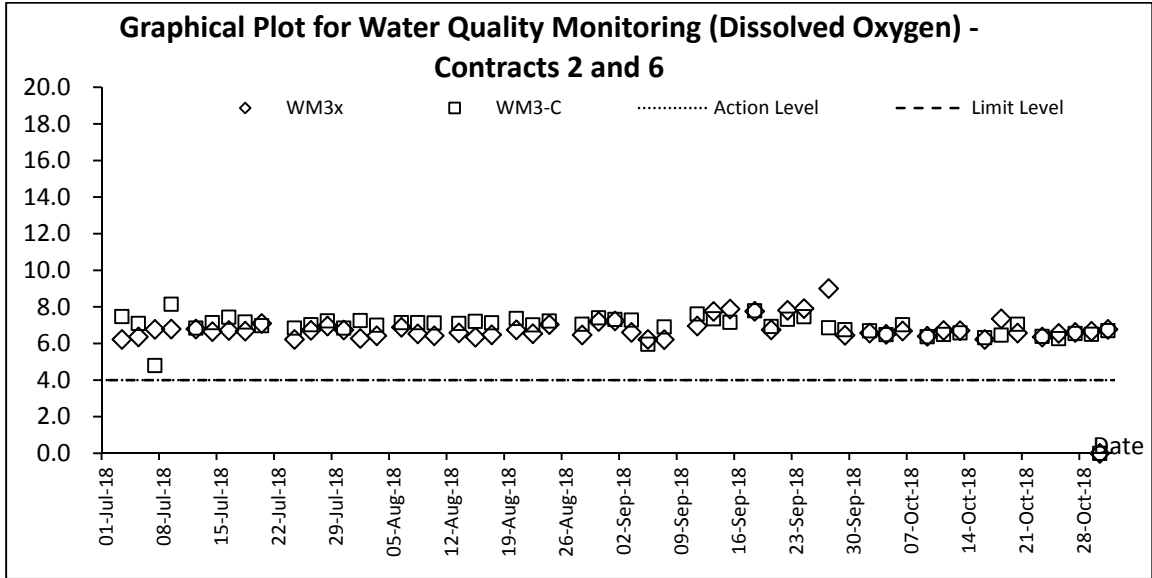


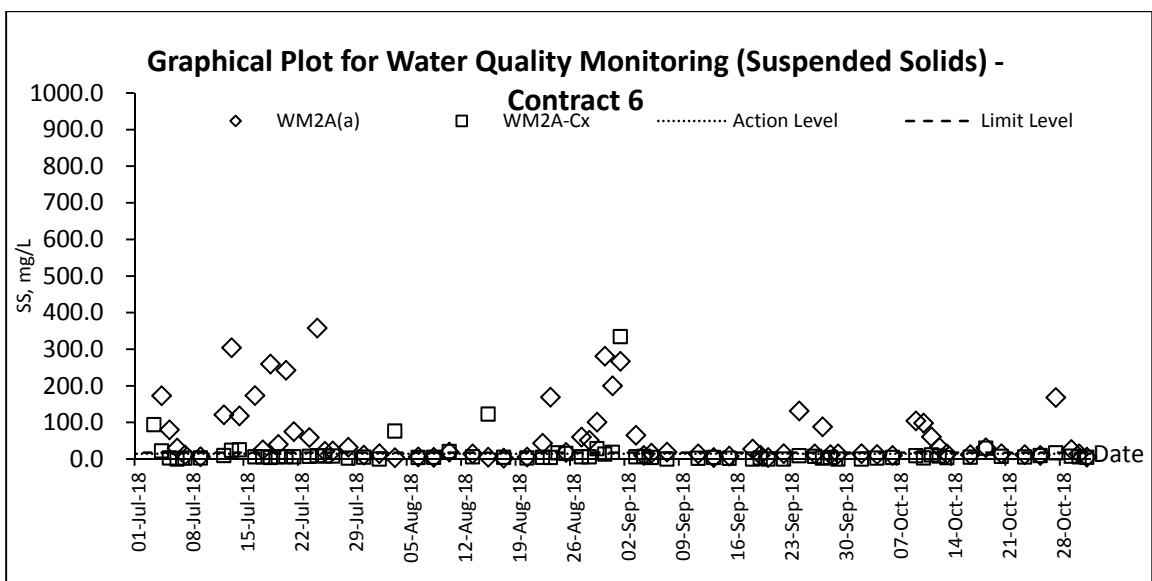
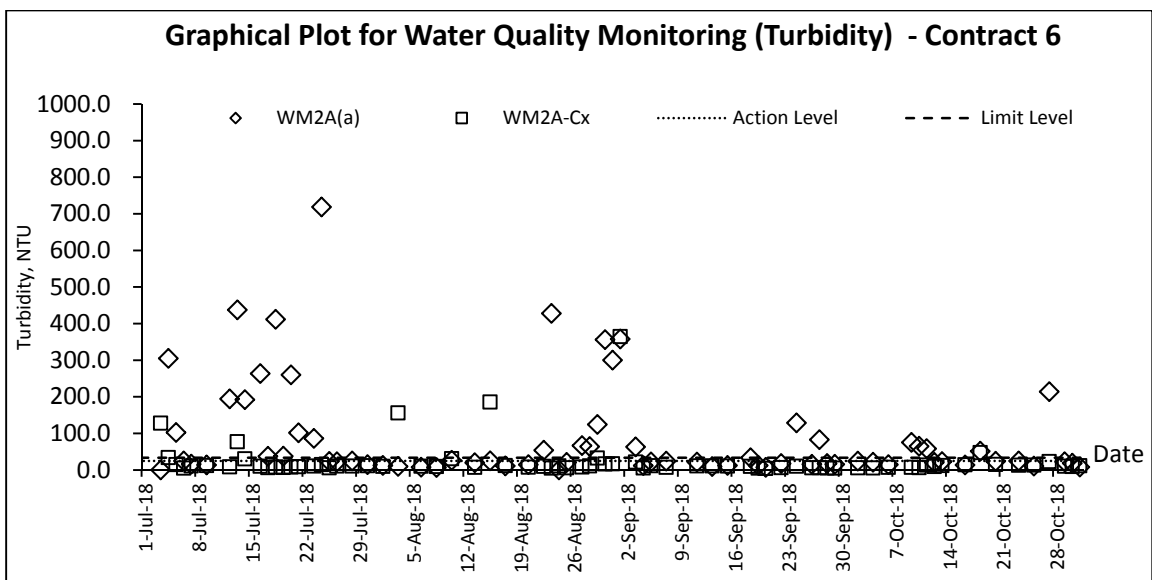
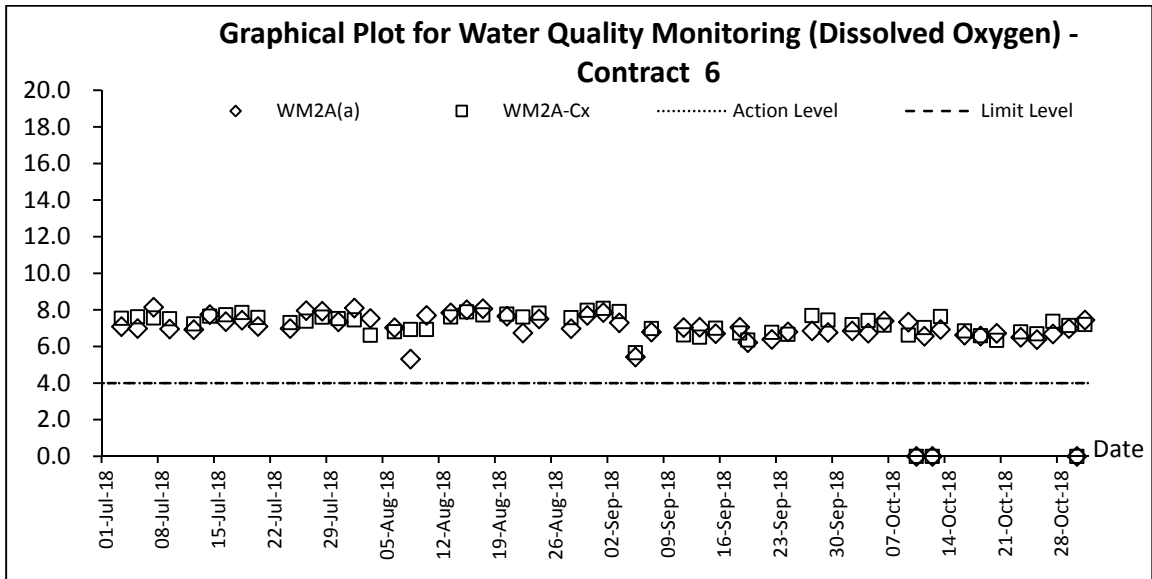
**Water Quality**











## **Appendix K**

### **Meteorological Data**

Date		Weather	Total Rainfall (mm)	Ta Kwu Ling Station			
				Mean Air Temp. (°C)	Wind Speed (km/h)	Mean Relative Humidity (%)	Wind Direction
1-Oct-18	Mon	Mainly fine and dry. Moderate east to northeasterly winds.	2.9	26.4	7.5	64.5	E/SE
2-Oct-18	Tue	Fine. Very dry in the afternoon. Moderate east to northeasterly winds.	0	25.8	7.5	68	E
3-Oct-18	Wed	Fine and very dry. Light to moderate northerly winds.	0	26	6.5	66.5	N.NE
4-Oct-18	Thu	Fine. Very dry in the afternoon. Light to moderate northerly winds.	0	25.2	8.5	60.5	N/NE
5-Oct-18	Fri	Sunny and very dry. Moderate northerly winds, occasionally fresh.	0	23.3	9.7	59.2	N/NE
6-Oct-18	Sat	Sunny and very dry. Moderate northerly winds, occasionally fresh.	0	24.9	10.1	60.1	SE
7-Oct-18	Sun	Sunny and very dry. Moderate northerly winds, occasionally fresh.	0	25.7	7	63	E/SE
8-Oct-18	Mon	Sunny periods during the day. Moderate easterly winds.	2	26.9	7	72	E
9-Oct-18	Tue	Mainly cloudy with a few showers. Sunny intervals	0.6	26.1	5.5	78.5	E
10-Oct-18	Wed	Cloudy and slightly cooler. Moderate north to northeasterly winds	42.8	24.6	6.5	83	N/NW
11-Oct-18	Thu	Moderate north to northeasterly winds, fresh offshore.	0	21.9	9.8	75	N
12-Oct-18	Fri	Mainly cloudy. Sunny intervals in the afternoon.	0.3	23.1	8.7	69.7	N
13-Oct-18	Sat	Moderate to fresh east to northeasterly winds	0.4	24.4	9.6	70.1	N
14-Oct-18	Sun	Moderate easterly winds, becoming northeasterlies tomorrow.	0.6	25.3	10	75	E/SE
15-Oct-18	Mon	Cloudy with a few showers.	31.4	26	10	78.5	E/SE
16-Oct-18	Tue	Cloudy and slightly cooler with a few rain patches.	8.9	23.6	5.9	87.2	N/NW
17-Oct-18	Wed	Cloudy with a few rain patches. It will be slightly cooler.	1.5	21.9	7.5	86	N/NW
18-Oct-18	Thu	Fresh east to northeasterly winds, occasionally strong offshore later.	12.6	21.5	5.7	88	E/SE
19-Oct-18	Fri	Sunny intervals in the afternoon. Mainly cloudy tonight.	0.2	24.7	8.5	76	E/SE
20-Oct-18	Sat	Cloudy with one or two light rain patches.	Trace	25	8.8	80	SE
21-Oct-18	Sun	Light to moderate easterly winds.	Trace	25.2	8.8	71.2	E/NE
22-Oct-18	Mon	Mainly cloudy. Moderate northeasterly winds.	Trace	25.3	6	77.5	E
23-Oct-18	Tue	Mainly cloudy with bright periods. Moderate east to northeasterly winds.	0.1	24.8	4.5	77.5	N/NW
24-Oct-18	Wed	Sunny intervals in the afternoon. Mainly cloudy tonight.	Trace	24.8	5.5	78	E
25-Oct-18	Thu	Cloudy with one or two light rain patches.	0	26.3	8	71.2	E
26-Oct-18	Fri	Light to moderate easterly winds.	0	25.6	5.5	76	W/SW
27-Oct-18	Sat	Mainly cloudy. Moderate northeasterly winds.	0	24.3	9.1	58	E/NE
28-Oct-18	Sun	Mainly cloudy with bright periods. Moderate east to northeasterly winds.	0	22	5.5	53	N/NW
29-Oct-18	Mon	It will be fine. Very dry in the afternoon.	0	22.1	11.2	53	N
30-Oct-18	Tue	Mainly cloudy tonight. Moderate to fresh northerly winds	0	23.9	10.8	40.5	N/NE
31-Oct-18	Wed	Very dry with sunny periods in the afternoon.	0	23.9	14.3	35.7	N/NE

## **Appendix L**

### **Waste Flow Table**

**APPENDIX G: MONTHLY SUMMARY WASTE FLOW TABLE**

**FOR: 2018**

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 Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill*	Imported Fill	Metals	Paper/ cardboard packaging	Plastics (see Note 3)	Chemical Waste	Others, e.g. general refuse#
	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000 kg)	(in '000 kg)	(in '000 kg)	(in '000 kg)	(in '000m <sup>3</sup> )
Jan	86.6400	0.0000	0.0000	5.2900	81.3500	1.6570	45.0000	0.3100	2.8000	4.5760	0.6575
Feb	33.2700	0.0000	0.0000	3.6700	29.6000	1.3470	32.0000	0.2500	2.4000	1.9500	0.2850
Mar	39.7600	0.0000	0.0000	3.4600	36.3000	1.3380	36.0000	0.3050	2.7000	9.8560	0.6290
Apr	55.5979	0.0000	0.0000	3.3680	52.2299	1.2470	33.7800	0.3240	2.5000	0.0000	0.5748
May	12.9815	0.0000	0.0000	4.6780	8.3035	1.1470	30.1400	0.3040	2.6000	44.9600	0.7056
June	9.0720	0.0000	0.0000	3.1910	5.8810	1.2200	31.7800	0.2870	2.3000	0.1760	0.7534
Sub-total	237.3214	0.0000	0.0000	23.6570	213.6644	7.9560	208.7000	1.7800	15.3000	61.5180	3.6053
July	6.0440	0.0000	0.0000	0.5840	5.4600	1.4570	30.7500	0.2750	2.1000	1.5840	0.8810
Aug	5.4100	0.0000	0.0000	0.7600	4.6500	1.3520	31.5900	0.2570	2.2000	3.0800	0.8400
Sep	8.2680	0.0000	0.0000	3.0430	5.2250	1.2300	30.7800	0.2200	1.8000	1.2300	0.4440
Oct	3.2564	0.0000	0.0000	1.1273	2.1291	1.2600	0.0000	0.1700	1.0125	9.5200	0.5969
Nov											
Dec											
Sub-total	22.9784	0.0000	0.0000	5.5143	17.4641	5.2990	93.1200	0.9220	7.1125	15.4140	2.7619
Total	260.2998	0.0000	0.0000	29.1713	231.1285	13.2550	301.8200	2.7020	22.4125	76.9320	6.3672

Notes:

- (1) The performance targets are given in PS 1.100(14)(a)
- (2) The waste flow table shall also include C&D materials that are specified in the Contract to be imported for use at the Site.
- (3) Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material.
- (4) The Contractor shall also submit the latest forecast of the total amount of C&D materials expected to be generated from the Works, together with a breakdown of the nature where the amount of C&D materials.
- (5) Assumption: 1m<sup>3</sup> of inert material weight 2.2 tonne    1m<sup>3</sup> of non-inert material weight 1.6 tonne    1m<sup>3</sup> of chemical waste weight 0.88 tonne



### Monthly Summary Waste Flow Table for 2018 (year)

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 Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastics	Chemical Waste	Others, e.g. general refuse
	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in m <sup>3</sup> )	(in '000m <sup>3</sup> )
Jan	3.089	0.304	0.060	0.000	2.725	0.923	0.000	0.000	0.000	0.000	0.150
Feb	2.697	0.256	0.150	0.000	2.292	1.144	0.000	0.000	0.000	0.000	0.095
Mar	1.524	0.141	0.120	0.000	1.263	0.211	0.000	0.000	0.000	0.000	0.085
Apr	2.880	0.786	0.360	0.000	1.734	0.788	0.000	0.000	0.000	0.000	0.125
May	1.164	0.290	0.101	0.000	0.773	0.185	0.000	0.000	0.000	0.000	0.150
Jun	0.862	0.082	0.515	0.000	0.265	0.000	0.000	0.000	0.000	0.000	0.110
<b>Sub-total</b>	<b>12.216</b>	<b>1.859</b>	<b>1.306</b>	<b>0.000</b>	<b>9.051</b>	<b>3.251</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.715</b>
Jul	1.520	0.261	0.476	0.000	0.783	0.039	0.000	0.000	0.000	0.000	0.135
Aug	2.372	0.478	0.613	0.000	1.281	0.193	0.000	0.000	0.000	0.000	0.095
Sep	1.709	0.361	0.381	0.000	0.967	0.272	0.000	0.000	0.000	0.000	0.150
Oct	1.198	0.316	0.000	0.000	0.882	0.000	0.000	0.000	0.000	0.000	0.115
Nov											
Dec											
<b>Total</b>	<b>19.015</b>	<b>3.275</b>	<b>2.776</b>	<b>0.000</b>	<b>12.964</b>	<b>3.755</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>1.210</b>

- Note:**
1. Assume the density of soil fill is 2 ton/m<sup>3</sup>.
  2. Assume the density of rock and broken concrete is 2.5 ton/m<sup>3</sup>.
  3. Assume each truck of C&D wastes is 5m<sup>3</sup>.
  4. The inert C&D materials except slurry and bentonite are disposed at Tuen Mun 38.
  5. The slurry and bentonite are disposed at Tseung Kwun O 137.
  6. The non-inert C&D wastes are disposed at NENT.
  7. Assume the density of metal is 7,850 kg/m<sup>3</sup>.
  8. Assume the density of plastic is 941 kg/m<sup>3</sup>.
  9. Assume the density of paper is 800 kg/m<sup>3</sup>.

Forecast of Total Quantities of C&D Materials to be Generated from the Contract										
Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Diposal as Public Fill	Imported Fill	Metals	Paper/card board packaging	Plastics (see Note 3)	Chemical Waste	Others, e.g. general refuse
(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )
52.5	5.2	12.3	0.0	35.0	41.8	5.0	1.0	1.0	0.5	44.8

- Notes:
- (1) The performance targets are given in PS Clause 6(14).
  - (2) The waste flow table shall also include C&D materials that are specified in the Contract to be imported for use at the Site.
  - (3) Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material.
  - (4) The Contractor shall also submit the latest forecast of the total amount of C&D materials expected to be generated from the Works, together with a breakdown of the nature where the total amount of C&D materials expected to be generated from the Works if equal to or exceed 50,000 m<sup>3</sup>.



Name of Department: CEDD

Contract No.: NE/2014/02

## Monthly Summary Waste Flow Table for 2018

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 Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastics (see Note 3)	Chemical Waste	Others, e.g. general refuse
	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000 kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m <sup>3</sup> )
2016	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2017	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Jan-18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Feb-18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mar-18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Apr-18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
May-18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Jun-18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Jul-18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Aug-18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Sep-18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Oct-18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.012
Nov-18											
Dec-18											
Total	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.012

Forecast of Total Quantities of C&D Materials to be Generated from the Contract*										
Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastics (see Note 3)	Chemical Waste	Others, e.g. general refuse
(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000 kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m <sup>3</sup> )
0.500	0.000	0.000	0.000	0.500	0.000	0.500	0.200	0.000	0.000	0.200

Notes :

- (1) The performance targets are given in PS Clause 1.84(14).
- (2) The waste flow table shall also include C&D materials that are specified in the Contract to be imported for use at the Sites.
- (3) Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging materials.
- (4) Estimate 6m<sup>3</sup> capacity per dump truck

## Monthly Summary Waste Flow Table for 2018 (year)

Name of Person completing the record: K.M. Lui (EO)

Project : Liangtang / Heung Yuen Wai Boundary Control Point Site Formation and Infrastructure Works – Contract 6

Contract No.: CV/2013/08

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 Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastics (see Note 3)	Chemical Waste	Others, e.g. general refuse
	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000 kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000 m <sup>3</sup> )
Jan	4.152	0	0.629	1.947	1.576	0	0	0.240	0	0	0.892
Feb	2.740	0	0.867	0.544	1.329	0	0	0.402	0	0	0.578
Mar	3.269	0	1.581	0.969	0.719	0	0	0.380	0	0	0.725
Apr	2.901	0	0.255	1.955	0.691	0	0	0.360	0	0	0.921
May	3.194	0	0.068	1.964	1.162	0	0	0.384	0	0	1.340
Jun	2.206	0	0	0.9775	1.228	0	0	0.270	0	0	0.714
Sub-total	18.462	0.000	3.400	8.357	6.705	0.000	0.000	2.036	0.000	0.000	5.170
Jul	1.512	0	0	0.816	0.696	0	0	1.608	0	0	0.846
Aug	2.562	0	0	1.989	0.573	0.886	0	0.360	0	0	0.866
Sep	0.997	0	0	0.552	0.445	3.070	0	0.225	0	0	0.633
Oct	1.896	0	0	1.386	0.510	13.192	0	0.188	0	0	0.855
Nov											
Dec											
Total	1023.822	0.000	166.627	283.743	573.454	71.087	0.000	10.796	0.007	34.045	17.121

- Notes:
- (1) The waste flow table shall also include C&D materials that are specified in the Contract to be imported for use at the Site.
  - (2) Plastics refer to plastic bottles/containers, plastic sheets/ foam from packaging materials.
  - (3) Broken concrete for recycling into aggregates.

**MONTHLY SUMMARY WASTE FLOW TABLE**Name of Department:           CEDD          Contract Title: Liantang/ Heung Yuen Wai Boundary Control Point  
Site Formation and Infrastructure Works – Contract 7Contract No.:                   NE/2014/03                  **Monthly Summary Waste Flow Table for 2018 (year)**

Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of Non-Inert C&D Wastes Generated Monthly				
	Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/cardboard packaging	Plastic (see Note 3)	Chemical Waste	Others, e.g. general refuse
	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m <sup>3</sup> )
Jan	0.015	0	0	0	0.015	0	14.5	0.5	0.001	0	0.15
Feb	0	0	0	0	0	0	9	0.18	0.001	0	0.13
Mar	0.005	0	0	0	0.005	0	6	0.15	0.001	0	0.2
Apr	1.1	0	0	0	1.1	0	6.6	0.22	0.001	0	0.3
May	0.077	0	0	0	0.077	0	1.3	0.15	0.001	0	0.1
June	0	0	0	0	0	0	6	0.4	0.001	0	0.05
Sub-total	1.197	0	0	0	1.197	0	43.4	1.6	0.006	0	0.93
July	0.5	0	0	0	0.5	0	2.5	0.1	0.001	0	0.2
Aug	0.047	0	0	0	0.047	0	5.8	0.1	0.001	0	0.1
Sept	0.041	0	0	0	0.041	0	1.1	0.1	0.001	0	0.1
Oct	0.047	0	0	0	0.047	0	1.5	0.2	0.001	0	0.2
Nov											
Dec											
Total	1.832	0	0	0	1.832	0	54.3	2.1	0.01	0	1.530

Notes: (1) The waste flow table shall also include C&D materials that are specified in the Contract to be imported for use at the Site.  
(2) Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material.



Contract No. / Works Order No.: - SSC505**Monthly Summary Waste Flow Table for 2018** [year] [to be submitted not later than the 15<sup>th</sup> day of each month following reporting month]

(All quantities shall be rounded off to 3 decimal places.)

Month	Actual Quantities of Inert Construction Waste Generated Monthly				
	(a)=(b)+(c)+(d)+(e) Total Quantity Generated	(b) Broken Concrete (see Note 4)	(c) Reused in the Contract	(d) Reused in other Projects	(e) Disposed of as Public Fill
	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )
Jan	5.298	0.646	0.160	0.000	4.492
Feb	7.243	0.572	0.320	0.000	6.351
Mar	11.241	0.831	0.225	0.000	10.186
Apr	3.717	1.458	0.257	0.000	2.002
May	5.346	0.788	0.300	0.000	4.258
Jun	6.828	0.661	0.376	0.000	5.792
Sub-total	39.672	4.956	1.638	0.000	33.079
Jul	11.637	0.051	0.282	0.000	11.304
Aug	16.440	0.142	0.263	0.000	16.036
Sep	7.849	0.116	0.161	0.000	7.573
Oct	3.619	1.148	0.196	0.000	2.275
Nov					
Dec					
Total	79.217	6.412	2.540	0.000	70.265

Month	Actual Quantities of Non-inert Construction Waste Generated Monthly												
	Timber		Metals		Paper/ cardboard packaging		Plastics (see Note 3)		Chemical Waste		Other Recyclable Materials (see Page 3)		General Refuse disposed of at Landfill
	(in '000kg)		(in '000kg)		(in '000kg)		(in '000kg)		(in '000kg)		(in '000kg)		(in '000m <sup>3</sup> )
	generated	recycled	generated	recycled	generated	recycled	generated	recycled	generated	recycled	generated	recycled	generated
Jan	0.000	0.000	375.870	375.870	0.220	0.220	0.032	0.032	0.000	0.000	0.000	0.000	1.918
Feb	0.000	0.000	720.120	720.120	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.223
Mar	0.000	0.000	220.860	220.860	0.830	0.830	0.005	0.005	0.000	0.000	0.005	0.005	2.711
Apr	0.000	0.000	202.130	202.130	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.470
May	0.000	0.000	294.330	294.330	0.000	0.000	0.042	0.042	0.000	0.000	0.000	0.000	2.490
Jun	0.000	0.000	242.170	242.170	0.990	0.990	0.000	0.000	1.200	0.000	0.000	0.000	2.997
Sub-total	0.000	0.000	2,055.480	2,055.480	2.040	2.040	0.079	0.079	1.200	0.000	0.005	0.005	14.809
Jul	0.000	0.000	218.990	218.990	0.280	0.280	0.000	0.000	0.000	0.000	0.000	0.000	3.146
Aug	0.000	0.000	466.220	466.220	0.230	0.230	0.000	0.000	1.200	0.000	0.000	0.000	3.114
Sep	0.000	0.000	153.620	153.620	0.620	0.620	0.033	0.033	0.000	0.000	0.000	0.000	2.704
Oct	0.000	0.000	351.580	351.580	0.460	0.460	0.490	0.490	0.000	0.000	0.000	0.000	2.035
Nov													
Dec													
Total	0.000	0.000	3,245.890	3,245.890	3.630	3.630	0.602	0.602	2.400	0.000	0.005	0.005	25.808

Description of mode and details of recycling if any for the month e.g. XX kg of used timber was sent to YY site for transformation into fertilizers					
351.58 tons of scrap metals were sent to Global Metal Ltd. for recycling	2295.17 tons of broken concrete were sent to Tailor Recycled Aggregates Ltd. for recycling.	460.0 kg of paper were sent to Lau Choi Kee Papers Co. Ltd. for recycling.	490 kg of plastic water barrier were sent to Telford for recycle.		

- Notes:
- (1) The performance targets are given in the Particular Specification on Environmental Management Plan.
  - (2) The waste flow table shall also include construction waste that are specified in the Contract to be imported for use at the site.
  - (3) Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material.
  - (4) Broken concrete for recycling into aggregates.
  - (5) If necessary, use the conversion factor: 1 full load of dumping truck being equivalent to 6.5 m<sup>3</sup> by volume.

**Appendix M**

**Implementation Schedule for  
Environmental Mitigation Measures**

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
<b>Air Quality Impact (Construction)</b>							
3.6.1.1	2.1	<p><b>General Dust Control Measures</b></p> <p>The following dust suppression measures should be implemented:</p> <ul style="list-style-type: none"> <li>■ Frequent water spraying for active construction areas (4 times per day for active areas in Po Kak Tsai and 8 times per day for all other active areas), including areas with heavy construction and slope cutting activities</li> <li>■ 80% of stockpile areas should be covered by impervious sheets</li> <li>■ Speed of trucks within the site should be controlled to about 10 km/hr</li> <li>■ All haul roads within the site should be paved to avoid dust emission due to vehicular movement</li> </ul>	To minimize adverse dust emission generated from various construction activities of the works sites	Contractor	Construction Works Sites	During Construction	EIA Recommendation and Air Pollution Control (Construction Dust) Regulation
3.6.1.2	2.1	<p><b>Best Practice for Dust Control</b></p> <p>The relevant best practices for dust control as stipulated in the Air Pollution Control (Construction Dust) Regulation should be adopted to further reduce the construction dust impacts of the Project. These best practices include:</p> <p><i>Good site management</i></p> <ul style="list-style-type: none"> <li>■ The Contractor should maintain high standard of housekeeping to prevent emission of fugitive dust.</li> <li>■ Loading, unloading, handling and storage of raw materials, wastes or by-products should be carried out in a manner so as to minimize the release of visible dust emission.</li> <li>■ Any piles of materials accumulated on or around the work areas should be cleaned up regularly.</li> <li>■ Cleaning, repair and maintenance of all plant facilities within the work areas should be carried out in a manner minimizing generation of fugitive dust emissions.</li> <li>■ The material should be handled properly to prevent fugitive dust emission before cleaning.</li> </ul> <p><i>Disturbed Parts of the Roads</i></p> <ul style="list-style-type: none"> <li>■ Each and every main temporary access should be paved with</li> </ul>	To minimize adverse dust emission generated from various construction activities of the works sites	Contractor	Construction Works Sites	During Construction	EIA Recommendation and Air Pollution Control (Construction Dust) Regulation

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		<p>concrete, bituminous hardcore materials or metal plates and kept clear of dusty materials; or</p> <ul style="list-style-type: none"> <li>Unpaved parts of the road should be sprayed with water or a dust suppression chemical so as to keep the entire road surface wet.</li> </ul> <p><i>Exposed Earth</i></p> <ul style="list-style-type: none"> <li>Exposed earth should be properly treated by compaction, hydroseeding, vegetation planting or seeding with latex, vinyl, bitumen within six months after the last construction activity on the site or part of the site where the exposed earth lies.</li> </ul> <p><i>Loading, Unloading or Transfer of Dusty Materials</i></p> <ul style="list-style-type: none"> <li>All dusty materials should be sprayed with water immediately prior to any loading or transfer operation so as to keep the dusty material wet.</li> </ul> <p><i>Debris Handling</i></p> <ul style="list-style-type: none"> <li>Any debris should be covered entirely by impervious sheeting or stored in a debris collection area sheltered on the top and the three sides.</li> <li>Before debris is dumped into a chute, water should be sprayed so that it remains wet when it is dumped.</li> </ul> <p><i>Transport of Dusty Materials</i></p> <ul style="list-style-type: none"> <li>Vehicle used for transporting dusty materials/spoils should be covered with tarpaulin or similar material. The cover should extend over the edges of the sides and tailboards.</li> </ul> <p><i>Wheel washing</i></p> <ul style="list-style-type: none"> <li>Vehicle wheel washing facilities should be provided at each construction site exit. Immediately before leaving the construction site, every vehicle should be washed to remove any dusty materials from its body and wheels.</li> </ul> <p><i>Use of vehicles</i></p> <ul style="list-style-type: none"> <li>Immediately before leaving the construction site, every vehicle should be washed to remove any dusty materials from its body and wheels.</li> <li>Where a vehicle leaving the construction site is carrying a load of dusty materials, the load should be covered entirely by clean impervious sheeting to ensure that the dusty materials do not leak from the vehicle.</li> </ul>					



EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		<p><i>Site hoarding</i></p> <ul style="list-style-type: none"> <li>Where a site boundary adjoins a road, street, service lane or other area accessible to the public, hoarding of not less than 2.4m high from ground level should be provided along the entire length of that portion of the site boundary except for a site entrance or exit.</li> </ul> <p><i>Blasting</i></p> <ul style="list-style-type: none"> <li>The areas within 30m from the blasting area should be wetted with water prior to blasting.</li> </ul>					
<b><u>Air Quality Impact (Operation)</u></b>							
3.5.2.2	2.2	<p>The following odour containment and control measures will be provided for the proposed sewage treatment work at the BCP site:</p> <ul style="list-style-type: none"> <li>The treatment work will be totally enclosed. Negative pressure ventilation will be provided within the enclosure to avoid any fugitive odorous emission from the treatment work.</li> <li>Further odour containment will be achieved by covering or confining the sewage channels, sewage tanks, and equipment with potential odour emission.</li> <li>Proper mixing will be provided at the equalization and sludge holding tanks to prevent sewage septicity.</li> <li>Chemical or biological deodorisation facilities with a minimum odour removal efficiency of 90% will be provided to treat potential odorous emissions from the treatment plant including sewage channels / tanks, filter press and screening facilities so as to minimize any potential odour impact to the nearby ASRs.</li> </ul>	To minimize potential odour impact from operation of the proposed sewage treatment work at BCP	DSD	BCP	Operation Phase	EIA recommendation
<b><u>Noise Impact (Construction)</u></b>							
4.4.1.4	3.1	<p><b>Adoption of Quieter PME</b></p> <p>Use of the recommended quieter PME such as those given in the BS5228: Part 1:2009 and presented in <b>Table 4.14</b>, which can be found in Hong Kong.</p>	To minimize the construction air-borne noise impact	Contractors	Construction Work Sites	During Construction	EIA recommendation, EIAO and Noise Control Ordinance (NCO)

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
4.4.1.4	3.1	<p><b>Use of Movable Noise Barrier</b></p> <p>The use of movable barrier for certain PME can further alleviate the construction noise impacts. In general, a 5 dB(A) reduction for movable PME and 10 dB(A) for stationary PME can be achieved depending on the actual design of the movable noise barrier. The Contractor shall be responsible for design of the movable noise barrier with due consideration given to the size of the PME and the requirement for intercepting the line of sight between the NSRs and PME. Barrier material with surface mass in excess of 7 kg/m<sup>2</sup> is recommended to achieve the predicted screening effect.</p>	To minimize the construction air-borne noise impact	Contractors	Construction Work Sites	During Construction	EIA recommendation, EIAO and NCO
4.4.1.4	3.1	<p><b>Use of Noise Enclosure/ Acoustic Shed</b></p> <p>The use of noise enclosure or acoustic shed is to cover stationary PME such as air compressor and concrete pump. With the adoption of the noise enclosure, the PME could be completely screened, and noise reduction of 15 dB(A) can be achieved according to the GW-TM.</p>	To minimize the construction air-borne noise impact	Contractors	Construction Work Sites	During Construction	EIA recommendation, EIAO and NCO
4.4.1.4	3.1	<p><b>Use of Noise Insulating Fabric</b></p> <p>Noise insulating fabric can be adopted for certain PME (e.g. drill rig, pilling auger etc). The insulating fabric should be lapped such that there are no openings or gaps on the joints. Technical data from manufacturers state that by using the Fabric, a noise reduction of over 10 dB(A) can be achieved on noise level.</p>	To minimize the construction air-borne noise impact	Contractors	Construction Work Sites	During Construction	EIA recommendation, EIAO and NCO

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
4.4.1.4	3.1	<p><b>Good Site Practice</b></p> <p>The good site practices listed below should be followed during each phase of construction:</p> <ul style="list-style-type: none"> <li>• Only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction programme;</li> <li>• Silencers or mufflers on construction equipment should be utilized and should be properly maintained during the construction programme;</li> <li>• Mobile plant, if any, should be sited as far from NSRs as possible;</li> <li>• Machines and plant (such as trucks) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum;</li> <li>• Plant known to emit noise strongly in one direction should, wherever possible, be orientated so that the noise is directed away from the nearby NSRs; and</li> <li>• Material stockpiles and other structures should be effectively utilized, wherever practicable, in screening noise from on-site construction activities.</li> </ul>	To minimize the construction air-borne noise impact	Contractors	Construction Work Sites	During Construction	EIA recommendation, EIAO and NCO
<b>Noise Impact (Operation)</b>							
<u>Road Traffic Noise</u>							
Table 4.42 and Figure 4.20.1 to 4.20.4	3.2	Erection of noise barrier/ enclosure along the viaduct section.	To minimize the road traffic noise along the connecting road of BCP	Contractor	Loi Tung and Fanling Highway Interchange	Before Operation	EIAO and NCO
<u>Fixed Plant Noise</u>							
Table 4.46	3.2	Specification of the maximum allowable sound power levels of the proposed fixed plants during daytime and night-time.	To minimize the fixed plant noise impact	Managing Authority of the buildings / Contractor	BCP, Administration Building and all ventilation buildings	Before Operation	EIA recommendation, EIAO and NCO

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
4.5.2.4	3.2	<p>The following noise reduction measures shall be considered as far as practicable during operation:</p> <ul style="list-style-type: none"> <li>Choose quieter plant such as those which have been effectively silenced;</li> <li>Include noise levels specification when ordering new plant (including chillier and E/M equipment);</li> <li>Locate fixed plant/louver away from any NSRs as far as practicable;</li> <li>Locate fixed plant in walled plant rooms or in specially designed enclosures;</li> <li>Locate noisy machines in a basement or a completely separate building;</li> <li>Install direct noise mitigation measures including silencers, acoustic louvers and acoustic enclosure where necessary; and</li> <li>Develop and implement a regularly scheduled plant maintenance programme so that equipment is properly operated and serviced in order to maintain a controlled level of noise.</li> </ul>	To minimize the fixed plant noise impact	Managing Authority of the buildings / Contractor	BCP, Administration Building and all ventilation buildings	Before Operation	EIAO and NCO
<b>Water Quality Impact (Construction)</b>							
5.6.1.1	4.1	<p><b>Construction site runoff and drainage</b></p> <p>The site practices outlined in ProPECC Note PN 1/94 should be followed as far as practicable in order to minimise surface runoff and the chance of erosion. The following measures are recommended to protect water quality and when properly implemented should be sufficient to adequately control site discharges so as to avoid water quality impacts:</p> <ul style="list-style-type: none"> <li>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 should be undertaken by the Contractor prior to the commencement of construction.</li> <li>The dikes or embankments for flood protection should be implemented around the boundaries of earthwork areas.</li> </ul>	To control site runoff and drainage; prevent high sediment loading from reaching the nearby watercourses	Contractor	Construction Works Sites	Construction Phase	Practice Note for Professional Persons on Construction Site Drainage (ProPECC Note PN 1/94)

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		<p>Temporary ditches should be provided to facilitate the runoff discharge into stormwater drainage system through a sediment/silt trap. The sediment/silt traps should be incorporated in the permanent drainage channels to enhance deposition rates, if practical.</p> <ul style="list-style-type: none"> <li>▪ Sand/silt removal facilities such as sand/silt traps and sediment basins should be provided to remove sand/silt particles from runoff to meet the requirements of the TM standards under the WPCO. The design of efficient silt removal facilities should be based on the guidelines in Appendix A1 of ProPECC Note PN 1/94. Sizes may vary depending upon the flow rate. The detailed design of the sand/silt traps should be undertaken by the Contractor prior to the commencement of construction.</li> <li>▪ 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 during rainstorms. Deposited silt and grit should be regularly removed, at the onset of and after each rainstorm to ensure that these facilities are functioning properly at all times.</li> <li>▪ Measures should be taken to minimize the ingress of site drainage into excavations. If excavation of trenches in wet periods is necessary, they should be dug and backfilled in short sections wherever practicable. Water pumped out from foundation excavations should be discharged into storm drains via silt removal facilities.</li> <li>▪ If surface excavation works cannot be avoided during the wet season (April to September), temporarily exposed slope/soil surfaces should be covered by tarpaulin or other means, as far as practicable, and temporary access roads should be protected by crushed stone or gravel, as excavation proceeds. Interception channels should be provided (e.g. along the crest/edge of the excavation) to prevent storm runoff from washing across exposed soil surfaces. Arrangements should always be in place to ensure that adequate surface protection measures can be safely carried out well before the arrival of a rainstorm. Other measures that need to be implemented before, during and after rainstorms are summarized in ProPECC Note PN 1/94.</li> <li>▪ The overall slope of the site should be kept to a minimum to reduce</li> </ul>					

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		<p>the erosive potential of surface water flows.</p> <ul style="list-style-type: none"> <li>▪ 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 facility should be provided at construction site exit where practicable. Wash-water should have sand and silt settled out and removed regularly to ensure the continued efficiency of the process. The section of access road leading to, and exiting from, the wheel-wash bay to the public road should be paved with sufficient backfall toward the wheel-wash bay to prevent vehicle tracking of soil and silty water to public roads and drains.</li> <li>▪ Open stockpiles of construction materials or construction wastes on-site 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.</li> <li>▪ Manholes (including newly constructed ones) should be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris being washed into the drainage system and stormwater runoff being directed into foul sewers.</li> <li>▪ Precautions should be taken at any time of the year when rainstorms are likely. Actions should 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 Note PN 1/94. Particular attention should be paid to the control of silty surface runoff during storm events, especially for areas located near steep slopes.</li> <li>▪ Bentonite slurries used in piling or slurry walling should be reconditioned and reused wherever practicable. Temporary enclosed storage locations should be provided on-site for any unused bentonite that needs to be transported away after all the related construction activities are completed. The requirements in ProPECC Note PN 1/94 should be adhered to in the handling and disposal of bentonite slurries.</li> </ul>					
5.6.1.1	4.1	<p><b>Good site practices for works within water gathering grounds</b></p> <p>The following conditions should be complied, if there is any works to be carried out within the water gathering grounds:</p>	To minimize water quality impacts to the water gathering grounds	Contractor	Construction Works Sites within the water gathering	Construction Phase	ProPECC Note PN 1/94



EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		<ul style="list-style-type: none"> <li>▪ Adequate measures should be implemented to ensure no pollution or siltation occurs to the catchwaters and catchments.</li> <li>▪ No earth, building materials, oil or fuel, soil, toxic materials or any materials that may possibly cause contamination to water gathering grounds are allowed to be stockpiled on site.</li> <li>▪ All surplus spoil should be removed from water gathering grounds as soon as possible.</li> <li>▪ Temporary drains with silt traps should be constructed at the site boundary before the commencement of any earthworks.</li> <li>▪ Regular cleaning of silt traps should be carried out to ensure proper operation at all time.</li> <li>▪ All excavated or filled surfaces which have the risk of erosion should always be protected form erosion.</li> <li>▪ Facilities for washing the wheels of vehicles before leaving the site should be provided.</li> <li>▪ Any construction plant which causes pollution to catchwaters or catchments due to the leakage of oil or fuel should be removed off site immediately.</li> <li>▪ No maintenance activities which may generate chemical wastes should be undertaken in the water gathering grounds. Vehicle maintenance should be confined to designated paved areas only and any spillages should be cleared up immediately using absorbents and waste oils should be collected in designated tanks prior to disposal off site. All storm water run-off from these areas should be discharged via oil/petrol separators and sand/silt removal traps.</li> <li>▪ Any soil contaminated with fuel leaked from plant should be removed off site and the voids arising from removal of contaminated soil should be replaced by suitable material approved by the Director of Water Supplies.</li> <li>▪ Provision of temporary toilet facilities and use of chemicals or insecticide of any kind are subject to the approval of the Director of Water Supplies.</li> <li>▪ Drainage plans should be submitted for approval by the Director of</li> </ul>			grounds		

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		<p>Water Supplies.</p> <ul style="list-style-type: none"> <li>▪ An unimpeded access through the waterworks access road should always be maintained.</li> <li>▪ Earthworks near catchwaters or streamcourses should only be carried out in dry season between October and March,</li> <li>▪ Advance notice must be given before the commencement of works on site quoting WSD's approval letter reference.</li> </ul>					
5.6.1.2	4.1	<p><b>Good site practices of general construction activities</b></p> <p>Construction solid waste, debris and refuse generated on-site should be collected, handled and disposed of properly to avoid entering any nearby stormwater drain. Stockpiles of cement and other construction materials should be kept covered when not being used.</p> <p>Oils and fuels should only be stored in designated areas which have pollution prevention facilities. To prevent spillage of fuels and solvents to any nearby stormwater drain, all fuel tanks and storage areas should be provided with locks and be sited on sealed areas, within bunds of a capacity equal to 110% of the storage capacity of the largest tank. The bund should be drained of rainwater after a rain event.</p>	To minimize water quality impacts	Contractor	All construction works sites	Construction phase	EIA Recommendation
5.6.1.3	4.1	<p><b>Sewage effluent from construction workforce</b></p> <p>Temporary sanitary facilities, such as portable chemical toilets, should be employed on-site where necessary to handle sewage from the workforce. A licensed contractor should be employed to provide appropriate and adequate portable toilets and be responsible for appropriate disposal and maintenance.</p>	To minimize water quality impacts	Contractor	All construction works sites with on-site sanitary facilities	Construction phase	EIA Recommendation and Water Pollution Control Ordinance (WPCO)
5.6.1.4	4.1	<p><b>Hydrogeological Impact</b></p> <p>Grout injection works would be conducted before blasting, for sealing a limited area around the tunnel with a grout of a suitable strength for controlling the potential groundwater inflows. The pre-injection grouting method would be supplemented by post-injection grouting where necessary to further enhance the groundwater inflow control. On-site treatment for the groundwater ingress pumped out would be required to remove any contamination by grouting materials before discharge off-site.</p>	To minimize water quality impacts	Contractor	Construction works sites of the drill and blast tunnel	Construction phase	EIA Recommendation and WPCO
<b><u>Water Quality Impact (Operation)</u></b>							
No mitigation measure is required.							

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
<b><u>Sewage and Sewerage Treatment Impact (Construction)</u></b>							
6.7	5	The sewage generated by the on-site workforce should be collected in chemical toilets and disposed of off-site by a licensed waste collector.	To minimize water quality impacts	Contractor	All construction works sites with on-site sanitary facilities	Construction phase	EIA recommendation and WPCO
<b><u>Sewage and Sewerage Treatment Impact (Operation)</u></b>							
6.6.3	5	Sewage generated by the BCP and Chuk Yuen Village Resite will be collected and treated by the proposed on-site sewage treatment facility using Membrane Bioreactor treatment with a portion of the treated wastewater reused for irrigation and flushing within the BCP.	To minimize water quality impacts	DSD	BCP	Operation phase	EIA recommendation and WPCO
6.5.3	5	Sewage generated from the Administration Building will be discharged to the existing local sewerage system.	To minimize water quality impacts	DSD	Administration Building	Operation phase	EIA recommendation and WPCO
<b><u>Waste Management Implication (Construction)</u></b>							
7.6.1.1	6	<p><b>Good Site Practices</b></p> <p>Adverse impacts related to waste management such as potential hazard, air, odour, noise, wastewater discharge and public transport as mentioned in section 3.4.7.2 (ii)(c) of the Study Brief are not expected to arise, provided that good site practices are strictly followed. Recommendations for good site practices during the construction activities include:</p> <ul style="list-style-type: none"> <li>▪ Nomination of an approved person, such as a site manager, to be responsible for good site practices, arrangements for collection and effective disposal to an appropriate facility, of all wastes generated at the site</li> <li>▪ Training of site personnel in proper waste management and chemical handling procedures</li> <li>▪ Provision of sufficient waste disposal points and regular collection of waste</li> <li>▪ Dust suppression measures as required under the Air Pollution Control (Construction Dust) Regulation should be followed as far as practicable. Appropriate measures to minimise windblown litter and dust/odour during transportation of waste by covering trucks or in enclosed containers</li> <li>▪ General refuse shall be removed away immediately for disposal. As</li> </ul>	To minimize adverse environmental impact	Contractor	Construction works sites (general)	Construction Phase	EIA recommendation; Waste Disposal Ordinance; Waste Disposal (Chemical Wastes) (General) Regulation; and ETWB TC(W) No. 19/2005, Environmental Management on Construction Site

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		<p>such odour is not anticipated to be an issue to distant sensitive receivers</p> <ul style="list-style-type: none"> <li>▪ Provision of wheel washing facilities before the trucks leaving the works area so as to minimise dust introduction from public road</li> <li>▪ Covers and water spraying system should be provided for the stockpiled C&amp;D material to prevent dust impact or being washed away</li> <li>▪ Designate different locations for storage of C&amp;D material to enhance reuse</li> <li>▪ Well planned programme for transportation of C&amp;D material to lessen the off-site traffic impact. Well planned delivery programme for offsite disposal and imported filling material such that adverse noise impact from transporting of C&amp;D material is not anticipated</li> <li>▪ Site practices outlined in ProPECC PN 1/94 “Construction Site Drainage” should be adopted as far as practicable, such as cleaning and maintenance of drainage systems regularly</li> <li>▪ Provision of cover for the stockpile material, sand bag or earth bund as barrier to prevent material from washing away and entering the drains</li> </ul>					
7.6.1.2	6	<p><b>Waste Reduction Measures</b></p> <p>Good management and control can prevent the generation of a significant amount of waste. Waste reduction is best achieved at the planning and design stage, as well as by ensuring the implementation of good site practices. Recommendations to achieve waste reduction include:</p> <ul style="list-style-type: none"> <li>▪ Segregation and storage of different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal</li> <li>▪ Encourage collection of aluminium cans by providing separate labelled bins to enable this waste to be segregated from other general refuse generated by the work force</li> <li>▪ Proper storage and site practices to minimise the potential for damage or contamination of construction materials</li> <li>▪ Plan and stock construction materials carefully to minimise amount</li> </ul>	To reduce the quantity of wastes	Contractor	Construction works sites (General)	Construction Phase	EIA recommendation and Waste Disposal Ordinance

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		<p>of waste generated and avoid unnecessary generation of waste</p> <ul style="list-style-type: none"> <li>In addition to the above measures, specific mitigation measures are recommended below for the identified waste arising to minimise environmental impacts during handling, transportation and disposal of these wastes.</li> </ul>					
7.6.1.3	6	<p><b>C&amp;D Materials</b></p> <p>In order to minimise impacts resulting from collection and transportation of C&amp;D material for off-site disposal, the excavated materials should be reused on-site as backfilling material as far as practicable. The surplus rock and other inert C&amp;D material would be disposed of at the Government's Public Fill Reception Facilities (PFRFs) at Tuen Mun Area 38 for beneficial use by other projects in the HKSAR as the last resort. C&amp;D waste generated from general site clearance and tree felling works would require disposal to the designated landfill site. Other mitigation requirements are listed below:</p> <ul style="list-style-type: none"> <li>A Waste Management Plan should be prepared and implemented in accordance with ETWB TC(W) No. 19/2005 Environmental Management on Construction Site; and</li> <li>In order to monitor the disposal of C&amp;D material and solid wastes at public filling facilities and landfills, and to control fly-tipping, a trip-ticket system (e.g. ETWB TCW No. 31/2004) should be included.</li> </ul>	To minimize impacts resulting from C&D material	Contractor	Construction Works Sites (General)	Construction Phase	EIA recommendation; Waste Disposal Ordinance; and ETWB TCW No. 31/2004
7.6.1.4	6	<p><b>General refuse</b></p> <p>General refuse should be stored in enclosed bins or compaction units separated from other C&amp;D material. A reputable waste collector is to be employed by the Contractor to remove general refuse from the site separately. Preferably an enclosed and covered area should be provided to reduce the occurrence of 'wind blown' litter.</p>	To minimize impacts resulting from collection and transportation of general refuse for off-site disposal	Contractor	Construction works sites (General)	Construction phase	Waste Disposal Ordinance and Public Health and Municipal Services Ordinance - Public Cleansing and Prevention of Nuisances Regulation
7.6.1.5	6	<p><b>Chemical waste</b></p> <p>If chemical wastes are produced at the construction site, the Contractor will be required to register with the EPD as a chemical waste producer and to follow the guidelines stated in the <i>Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes</i>. Good quality containers compatible with the chemical wastes should be used, and incompatible chemicals should be stored separately. Appropriate labels should be securely attached on each chemical waste container indicating the corresponding chemical characteristics of the chemical</p>	To minimize impacts resulting from collection and transportation of chemical waste for off-site disposal	Contractor	Construction works sites (General)	Construction phase	Waste Disposal (Chemical Waste) (General) Regulation and Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes

## **Appendix N**

### **Investigation Report for Exceedance**





**Agreement No. CE 45/2008**

**Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works**

**Investigation Report on Action or Limit Level Non-compliance**

<b>Project</b>		CE 45/2008			
<b>Date</b>		24 September 2018	27 September 2018	24 September 2018	27 September 2018
<b>Location</b>		WM2A(a)			
<b>Time</b>		11:05	10:35	11:05	10:35
<b>Parameter</b>		Turbidity (NTU)		Suspended solids (mg/L)	
<b>Action Level</b>		24.9 AND 120% of upstream control station of the same day		14.6 AND 120% of upstream control station of the same day	
<b>Limit Level</b>		33.8 AND 130% of upstream control station of the same day		17.3 AND 130% of upstream control station of the same day	
<b>Measured Levels</b>	<b>WM2A-C</b>	10.5	6.1	9.0	2.5
	<b>WM2A(a)</b>	<b>128.5</b>	<b>82.9</b>	<b>131.5</b>	<b>88.0</b>
<b>Exceedance</b>		<b>Limit Level</b>	<b>Limit Level</b>	<b>Limit Level</b>	<b>Limit Level</b>
<b>Investigation Results, Recommendations &amp; Mitigation Measures</b>		<ol style="list-style-type: none"> <li>1. According to the site information provided by the Contractor of Contract 6 (CCKJV), construction activities carried out on 24 and 27 September 2018 at Bridge D (upstream of WM2A(a)) were mainly bridge construction. The monitoring locations and work boundary are shown in <i>Figure 1</i>.</li> <li>2. According to the site photo taken by the monitoring team on 24 and 27 September 2018, muddy water observed in WM2A(a) while the water quality at WM2A-C was clear. (<i>Photos 1 to 4</i>)</li> <li>3. According to the weather information from the Observatory, heavy rainstorm was recorded on 24 September 2018 in which Amber Rainstorm Warning Signal was issued during 10:10am to 12:00 noon. The water quality of the water course was highly affected by the stirred up sediment and runoff from the surrounding environmental even outside the site area. During water quality monitoring on 24 and 27 September 2018, deflation of Nylon Dam was observed and the muddy water was generated when rapid flow stirred up sediment. (<i>Photos 5 &amp; 6</i>)</li> <li>4. Weekly joint site inspections among the RE, IEC, CCKJV and ET were conducted on 27 September 2018 at Bridge D to audit the site environmental performance and implementation of mitigation measures, the observation during the site inspection is summarized below. <ol style="list-style-type: none"> <li>(a) Bridge construction work was carried out at Bridge D and there was no discharge due to nature of works.</li> <li>(b) Wastewater treatment facilities were properly provided for Bridge D and functioned properly. (<i>Figure 1</i>)</li> <li>(c) As water quality mitigation measures, open slopes were covered with tarpaulin sheet or hard paved as far as practicable to minimize muddy runoff. (<i>Photos 7 &amp; 8</i>)</li> </ol> </li> <li>5. In our investigation, CCKJV had implemented water quality mitigation</li> </ol>			

	<p>measures such as providing tarpaulin sheet for open slope and surface to minimize muddy runoff. There was no adverse water quality impact observed during the site inspection at works area of Bridge D. It is concluded that the exceedances were unlikely caused by the works under the Project.</p> <p>6. According to the Event and Action Plan, the frequency of water monitoring shall be increased to daily when exceedance recorded. There were no exceedances recorded at subsequent monitoring on 28 and 29 September 2018. Nevertheless, the Contractor should continue implement the water mitigation measures as recommended in the implementation schedule for environmental mitigation measures in the EM&amp;A Manual.</p>
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**Prepared By :** Nicola Hon

**Designation :** Environmental Consultant

**Signature :** 

**Date :** 23 October 2018

## Photo Record



**Photo 1**

On 24 September 2018, muddy water was observed at WM2A(a).



**Photo 2**

On 24 September 2018, the water quality at WM2A-C was clear.



**Photo 3**

On 27 September 2018, muddy water was observed at WM2A(a).



**Photo 4**

On 27 September 2018, the water quality at WM2A-C was clear.



**Photo 5**

During water quality monitoring on 24 September 2018, deflation of Nylon Dam was observed and the muddy water was generated when rapid flow stirred up sediment.



**Photo 6**

During water quality monitoring on 27 September 2018, deflation of Nylon Dam was observed and the muddy water was generated when rapid flow stirred up sediment.





**Photo 7**

Open slopes were covered with tarpaulin sheet as far as practicable to minimize muddy runoff.



**Photo 8**

Open slopes were covered with tarpaulin sheet as far as practicable to minimize muddy runoff.



**Figure 1 Location Map for Water Quality Monitoring Locations WM2A(a), WM2A-Control and work area under Contract 6**





**Agreement No. CE 45/2008**

**Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works**

**Investigation Report on Action or Limit Level Non-compliance**

<b>Project</b>		CE 45/2008			
<b>Date</b>		9 Oct 2018	10 Oct 2018	9 Oct 2018	10 Oct 2018
<b>Location</b>		WM2A(a)			
<b>Time</b>		10:50	10:10	10:50	10:10
<b>Parameter</b>		Turbidity (NTU)		Suspended Solids (mg/L)	
<b>Action Level</b>		24.9 AND 120% of upstream control station of the same day		14.6 AND 120% of upstream control station of the same day	
<b>Limit Level</b>		33.8 AND 130% of upstream control station of the same day		17.3 AND 130% of upstream control station of the same day	
<b>Measured Levels</b>	WM2A-C	7.2	6.4	9.0	3.0
	WM2A(a)	<b>75.2</b>	<b>65.5</b>	<b>104.5</b>	<b>98.0</b>
<b>Exceedance</b>		<b>Limit Level</b>	<b>Limit Level</b>	<b>Limit Level</b>	<b>Limit Level</b>
<b>Investigation Results, Recommendations &amp; Mitigation Measures</b>		<ol style="list-style-type: none"> <li>1. According to the site information provided by the Contractor of Contract 6 (CCKJV), construction activities carried out on 9 and 10 October 2018 at Bridge D (upstream of WM2A(a)) were mainly bridge construction. The monitoring locations and work boundary are shown in <i>Figure 1</i>.</li> <li>2. According to the site photo taken by the monitoring team on 9 and 10 October 2018, muddy water observed in WM2A(a) while the water quality at WM2A-C was clear. (<i>Photos 1 to 4</i>)</li> <li>3. Inspection on the wastewater treatment facility SH-18 was carried out by CCKJV on 9 and 10 October 2018 upon exceedances recorded. It was observed that wastewater treatment facility SH-18 was function properly and effluent was generally in good condition. (<i>Photos 5 &amp; 6</i>) As advised by CCKJV, wastewater treatment facilities SH-15 and SH-16 were not in operation and only stand-by on site.</li> <li>4. Weekly joint site inspections among the RE, IEC, CCKJV and ET were conducted on 11 October 2018 at Bridge D to audit the site environmental performance and implementation of mitigation measures, the observation during the site inspection is summarized below. <ol style="list-style-type: none"> <li>(a) Bridge construction work was carried out at Bridge D and there was no discharge due to nature of works.</li> <li>(b) Wastewater treatment facilities were properly provided for Bridge D and function properly. (<i>Figure 1</i>)</li> <li>(c) As water quality mitigation measures, open slopes were covered with tarpaulin sheet or hard paved as far as practicable to minimize muddy runoff. (<i>Photos 7 &amp; 8</i>)</li> </ol> </li> <li>5. In our investigation, CCKJV had implemented water quality mitigation measures such as providing tarpaulin sheet for open slope and surface to minimize muddy runoff. There was no adverse water quality impact observed during the site inspection at works area of Bridge D. It is</li> </ol>			

	<p>concluded that the exceedances were unlikely caused by the works under the Project.</p> <p>6. According to the Event and Action Plan, the frequency of water monitoring shall be increased to daily when exceedance recorded. There were exceedances recorded at subsequent monitoring on 11 and 12 October 2018 and another investigation will be provided. Nevertheless, the Contractor should continue implement the water mitigation measures as recommended in the implementation schedule for environmental mitigation measures in the EM&amp;A Manual.</p>
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**Prepared By :** Nicola Hon

**Designation :** Environmental Consultant

**Signature :** 

**Date :** 5 November 2018

## Photo Record



**Photo 1**

On 9 October 2018, muddy water was observed at WM2A(a).



**Photo 2**

On 9 October 2018, the water quality at WM2A-C was clear.



**Photo 3**

On 10 October 2018, muddy water was observed at WM2A(a).



**Photo 4**

On 10 October 2018, the water quality at WM2A-C was clear.





**Photo 5**

Inspection on the wastewater treatment facility SH-18 was carried out on 9 October 2018 and it was observed that SH-18 was function properly and effluent was generally in good condition.



**Photo 6**

Inspection on the wastewater treatment facility SH-18 was carried out on 10 October 2018 and it was observed that SH-18 was function properly and effluent was generally in good condition.



**Photo 7**

Open slopes were covered with tarpaulin sheet as far as practicable to minimize muddy runoff.



**Photo 8**

Open slopes were covered with tarpaulin sheet as far as practicable to minimize muddy runoff.





**Figure 1 Location Map for Water Quality Monitoring Locations WM2A(a), WM2A-Control and work area under Contract 6**



Agreement No. CE 45/2008

Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works

Investigation Report on Action or Limit Level Non-compliance

<b>Project</b>		CE 45/2008		
<b>Date</b>		11 Oct 2018	11 Oct 2018	12 Oct 2018
<b>Location</b>		WM2A(a)		
<b>Time</b>		10:38	10:38	12:00
<b>Parameter</b>		Turbidity (NTU)	Suspended solids (mg/L)	
<b>Action Level</b>		24.9 AND 120% of upstream control station of the same day	14.6 AND 120% of upstream control station of the same day	
<b>Limit Level</b>		33.8 AND 130% of upstream control station of the same day	17.3 AND 130% of upstream control station of the same day	
<b>Measured Levels</b>	WM2A-C	13.1	11.0	8.0
	WM2A(a)	<b>58.4</b>	<b>60.5</b>	<b>32.0</b>
<b>Exceedance</b>		<b>Limit Level</b>	<b>Limit Level</b>	<b>Limit Level</b>
<b>Investigation Results, Recommendations &amp; Mitigation Measures</b>		<ol style="list-style-type: none"> <li>1. According to the site information provided by the Contractor of Contract 6 (CCKJV), construction activities carried out on 11 and 12 October 2018 at Bridge D (upstream of WM2A(a)) were mainly bridge construction. The monitoring locations and work boundary are shown in <i>Figure 1</i>.</li> <li>2. According to the site photo taken by the monitoring team on 11 October 2018, muddy water was observed in WM2A(a) and the water quality at WM2A-C was slightly turbid. On 12 October 2018, the water quality at both WM2A-C and WM2A(a) were slightly turbid. (<i>Photos 1 to 4</i>)</li> <li>3. According to the weather information from the Observatory, heavy rainstorm with total rainfall of 42.8mm was recorded on 10 October 2018. The water quality of the water course was highly affected by the stirred up sediment and runoff from the surrounding environmental even outside the site area. In the afternoon of 10 October 2018, CCKJV reported that inflow of muddy water was observed from upstream of WM2A-C which affecting the water quality of the river course. (<i>Photo 5</i>) During water monitoring on 11 October 2018, muddy water was observed in Nylon Dam which suspected related to the muddy water from upstream. (<i>Photo 6</i>)</li> <li>4. Weekly joint site inspections among the RE, IEC, CCKJV and ET were conducted on 11 October 2018 at Bridge D to audit the site environmental performance and implementation of mitigation measures, the observation during the site inspection is summarized below. <ol style="list-style-type: none"> <li>(d) Bridge construction work was carried out at Bridge D and there was no discharge due to nature of works.</li> <li>(e) Wastewater treatment facilities were properly provided for Bridge D and functioned properly. (<i>Figure 1</i>)</li> <li>(f) As water quality mitigation measures, open slopes were covered with tarpaulin sheet or hard paved as far as practicable to minimize muddy</li> </ol> </li> </ol>		

	<p>runoff. (<i>Photos 7 &amp; 8</i>)</p> <p>5. In our investigation, CCKJV had implemented water quality mitigation measures such as providing tarpaulin sheet for open slope and surface to minimize muddy runoff. In view of the heavy rainstorm on 10 October 2018 affecting the water quality of the river course in subsequent days, it is concluded that the exceedances were related to the impact of rainstorm and unlikely caused by the works under the Project.</p> <p>6. According to the Event and Action Plan, the frequency of water monitoring shall be increased to daily when exceedance recorded. There were no exceedances recorded at subsequent monitoring on 13 and 16 October 2018. Nevertheless, the Contractor should continue implement the water mitigation measures as recommended in the implementation schedule for environmental mitigation measures in the EM&amp;A Manual.</p>
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**Prepared By :** Nicola Hon

**Designation :** Environmental Consultant

**Signature :**



**Date :** 5 November 2018

## Photo Record



**Photo 1**

On 11 October 2018, muddy water was observed at WM2A(a).



**Photo 2**

On 11 October 2018, the water quality at WM2A-C was slightly turbid.



**Photo 3**

On 12 October 2018, the water quality at WM2A(a) was slightly turbid.



**Photo 4**

On 12 October 2018, the water quality at WM2A-C was slightly turbid.





**Photo 5**

CCKJV reported that inflow of muddy water was observed from upstream of WM2A-C was observed during rainstorm on 10 October 2018.



**Photo 6**

During water quality monitoring on 11 October 2018, muddy water was observed in Nylon Dam which suspected related to the muddy water from upstream.



**Photo 7**

Open slopes were covered with tarpaulin sheet as far as practicable to minimize muddy runoff.



**Photo 8**

Open slopes were covered with tarpaulin sheet as far as practicable to minimize muddy runoff.





**Figure 1 Location Map for Water Quality Monitoring Locations WM2A(a), WM2A-Control and work area under Contract 6**

## **Appendix O**

### **Investigation Report for Complaint**





## Fax Cover Sheet

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**To** Mr. Vincent Chan  
Mr. Alan Kam (DHK) **Fax No** **By-email**  
2717 3299

**Company** CRBC-CEC-Kaden JV  
Dragages Hong Kong Limited

**cc**

**From** Nicola Hon **Date** 22 October 2018

**Our Ref** TCS00694/13/300/F1825a **No of Pages** 8 **(Incl. cover sheet)**

**RE** Agreement No. CE 45/2008  
Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works  
Investigation Report for Environmental Complaint of Dust Concern in Sha Tau Kok  
Road and Wo Keng Shan Road

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*If you do not receive all pages, or transmission is illegible, please contact the originator on (852) 2959-6059 to re-send. Should this facsimile be sent to the wrong fax number, would receiver please destroy this copy and notify Action-United Environmental Services & Consulting immediately. Thank you.*

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Dear all,

Enclosed please find the investigation report for the captioned for your follow up action.

Should you have any queries or need further information, please do not hesitate to contact us or the undersigned at **Tel: 2959-6059 or Fax: 2959-6079**.

Yours Faithfully,  
For and on Behalf of  
**Action-United Environmental Services & Consulting**

Nicola Hon  
Environmental Consultant

Encl.

c.c.	Ms. Clara U (EPD)	Fax:	2685 1133
	Mr. Raymond Leong (CE/BCP, NTWDO, CEDD)	Fax:	3547 1659
	Mr. Steve Lo (CE/BCP, NTEDO, CEDD/C6)	Fax:	3547 1659
	Mr. Edwin Ching (ER of C2, AECOM)	Fax:	2171 3498
	Mr. Simon Leung (ER of C6, AECOM)	Fax:	2551 0698
	Mr. Antony Wong (IEC, SMEC)	By email	

**Agreement No. CE 45/2008**  
**Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works**  
**Investigation Report on Environmental Complaint / Enquires**

<b>Log No.</b>	CE 45/2008 – 77
<b>Received Date by ET</b>	5 October 2018
<b>Related Contract under Investigation</b>	Contract 2 and Contract 6
<b>Complaint Details</b>	投訴人表示沙頭角公路與禾徑山路交界近隧道工程一段行車路及近大塘湖村的地盤出入口沙塵滾滾，佈滿污泥，地盤出入口亦沒有員工洗車，要求改善。
<b>Location</b>	Junction of Sha Tau Kok (STK) Road and Wo Keng Shan (WKS) Road as well as site exit at Tai Tong Wu
<b>Date of Complaint</b>	5 October 2018
<b>Environmental Aspect</b>	Dust
<b>Complainant</b>	Undisclosed
<b>Complaint Route</b>	Project hotline
<b>Investigation Result</b>	<ol style="list-style-type: none"> <li>1. A public complaint was received from project hotline on 5 October 2018 stated that the section of road near the junction of Sha Tau Kok Road and Wo Keng Shan Road and site exit at Tai Tong Wu was dusty and full of mud. There were no workers to wash the vehicles' wheels at the site exit and the complainant requested the relevant department to follow up. The full description of complaint can refer to "Complaint Details" and the complaint location is illustrated in <i>Figure 1</i>.</li> <li>2. Joint site inspections were carried out by RE, IEC, Contractors and ET on 11 and 12 October 2018 at the concerned STK Road and WKS Road and the related construction site exits for complaint investigation. The observations during the site inspection are summarized in below. <ol style="list-style-type: none"> <li>(a) There was a temporary works area under LT/C6 located at Tai Tong Wu adjoined the STK Road and the works area was entirely enclosed by water-filled barriers. No mud and loose soil were observed at surrounding of that temporary works area. As advised by the Contractor of LT/C6, due to the temporary traffic arrangement, no vehicles are allowed to enter STK road from Tai Tong Wu and therefore no mud brought from the works area was anticipated. (<i>Photo 1</i>) Moreover, the existing STK Road adjoined to Tai Tong Wu was dusty when vehicle passing by and the dust generated by the traffic were considered not related to the project. (<i>Photo 2</i>)</li> <li>(b) There was no site exit belong to LT/C6 on STK Road and the main vehicle site exit for works area of Contract 6 was located on WKS Road. Wheel washing facilities was provided within the construction site and site vehicle was cleaned prior leaving the site. Moreover, a labour was deployed at the site exit to maintain the site exit in clean and tidy condition. (<i>Photos 3 &amp; 4</i>) No muddy trails and mud carrying by site vehicles to public road were observed. (<i>Photo 5</i>) However, mud and debris was observed at both middle and edges of the exiting WKS road which suspected to</li> </ol> </li> </ol>

**Agreement No. CE 45/2008**  
**Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works**  
**Investigation Report on Environmental Complaint / Enquires**

	<p>be caused by frequent use of dump truck transporting loose material to NENT and the majority of dump truck was not belong to LT/HYW project. <i>(Photo 6)</i></p> <p>(c) The vehicle site exit of North Portal Site Area under LT/C2 was located on STK Road. Wheel washing facilities was provided within the construction site and site vehicle was cleaned prior leaving the site. <i>(Photo 7)</i> The access road to STK Road after the wheel washing facility was clean. No dust and soil carrying by site vehicles to STK road were observed after wheel washing. <i>(Photo 8)</i> However, mud and debris was observed at both middle and edges of the exiting STK road which suspected to be caused by frequent use of dump truck transporting loose material to NENT and the majority of dump truck was not belong to LT/HYW project. <i>(Photo 9)</i></p> <p>(d) Another vehicle site exit under LT/C2 was Admin Building which located on WKS Road. Wheel washing facilities was provided within the construction site and site vehicle was cleaned prior leaving the site. <i>(Photo 10)</i> No muddy trails and dust and soil carrying by site vehicles to public road were observed outside the site exit. <i>(Photo 12)</i></p> <p>3. As advised by the Contractor of LT/C2 and LT/C6, road washing/cleaning by water tanker was provided along Wo Keng Shan Road to Sha Tau Kok Road every normal working day (Mon-Sat), except for rainy day. The condition of STK Road after road washing by water tanker was not dusty and the fugitive dust on the road was highly suppressed. Moreover, road sweeping has been deployed on the concerned roads twice a week to maintain cleanliness of the roads. In response to the complaint, CCKJV has deployed manual sweeping for road edge behind the water-filled barrier. <i>(Photo 13)</i></p> <p>4. In addition, monitoring programme was executed under the project to closely monitor the air quality at the air sensitive receivers and immediate action would be undertaken in case of exceedance. There were two parameters for air quality including 1-hour TSP and 24-hour TSP to oversee the both day time impact and overall impact throughout the day and TSP measurements were conducted in accordance with the requirements under the EM&amp;A manual and relevant technical guidelines. Having reviewed the air quality monitoring results in the last quarter of July to September 2018, no exceedances were triggered at the air quality monitoring locations including AM7b which located outside North Portal Site of Contract 2 and adjacent to the concern STK Road. It is considered that the dust impact arising from the project was within acceptable level.</p> <p>5. In our investigation, the Contractors have implemented wheel washing facilities and no dust and soil carrying by site vehicles to STK road were observed. Having inspected the existing condition of STK Road and WKS Road which away from the construction site, soil and debris were also found at the middle and edges of the road which suspected to be caused by frequent use of dump truck transporting loose material to</p>
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**Agreement No. CE 45/2008**  
**Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works**  
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	<p>NENT and the majority of dump truck was not belong to LT/HYW project. Therefore, it is considered that the complaint was not valid to the project.</p> <p>6. In particular dry season, ET will closely monitor the implementation of dust mitigation measures in the subsequent site inspections.</p>
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**Prepared By :** Nicola Hon

**Designation :** Environmental Consultant

**Signature :** 

**Date :** 22 October 2018

**Photo Record**



**Photo 1 (temporary works area under LT/C6)**

There was a temporary works area under LT/C6 located at Tai Tong Wu adjoined the STK Road and the works area was entirely enclosed by water-filled barriers. No mud and loose soil were observed at surrounding of the temporary works area.



**Photo 2 (temporary works area under LT/C6)**

As advised by the Contractor of LT/C6, due to the temporary traffic arrangement, no vehicles are allowed entering STK road from Tai Tong Wu and therefore no mud brought from the works area was anticipated. Moreover, the existing STK Road adjoined to Tai Tong Wu was dusty when vehicle passing by.



**Photo 3 (Main Exit under LT/C6)**

Wheel washing facilities was provided on the hard paved ground within the construction site and site vehicle was cleaned prior leaving the site.



**Photo 4 (Main Exit under LT/C6)**

A labour was deployed at the site exit to maintain the site exit in clean and tidy condition.





**Photo 5 (Main Exit under LT/C6)**

No muddy trails and mud carrying by site vehicles to WKS Road were observed.



**Photo 6 (Main Exit under LT/C6)**

Mud and debris was observed at both middle and edges of the exiting WKS road which suspected to be caused by frequent use of dump truck transporting loose material to NENT and the majority of dump truck was not belong to LT/HYW project.



**Photo 7 (North Portal under LT/C2)**

The vehicle site exit of North Portal Site Area (LT/C2) was located on STK Road. Wheel washing facilities was provided within the construction site and site vehicle was cleaned prior leaving the site.



**Photo 8 (North Portal under LT/C2)**

The access road to STK Road after the wheel washing facility was clean. No dust and soil carrying by site vehicles to STK road were observed after wheel washing.





**Photo 9 (North Portal under LT/C2)**

Mud and debris was observed at both middle and edges of the exiting STK road which suspected to be caused by frequent use of dump truck transporting loose material to NENT and the majority of dump truck was not belong to LT/HYW project.



**Photo 10 (Admin Building under LT /C2)**

Another vehicle site exit under LT/C2 was Admin Building which located on WKS Road. Wheel washing facilities was provided within the construction site and site vehicle was cleaned prior leaving the site.



**Photo 11(Admin Building under LT /C2)**

No muddy trails and dust and soil carrying by site vehicles to public road were observed outside the site exit.



**Photo 12(Admin Building under LT /C2)**

No muddy trails and dust and soil carrying by site vehicles to public road were observed outside the site exit.



**Photo 13**

In response to the complaint, CCKJV has deployed manual sweeping for road edge behind the water-filled barrier.

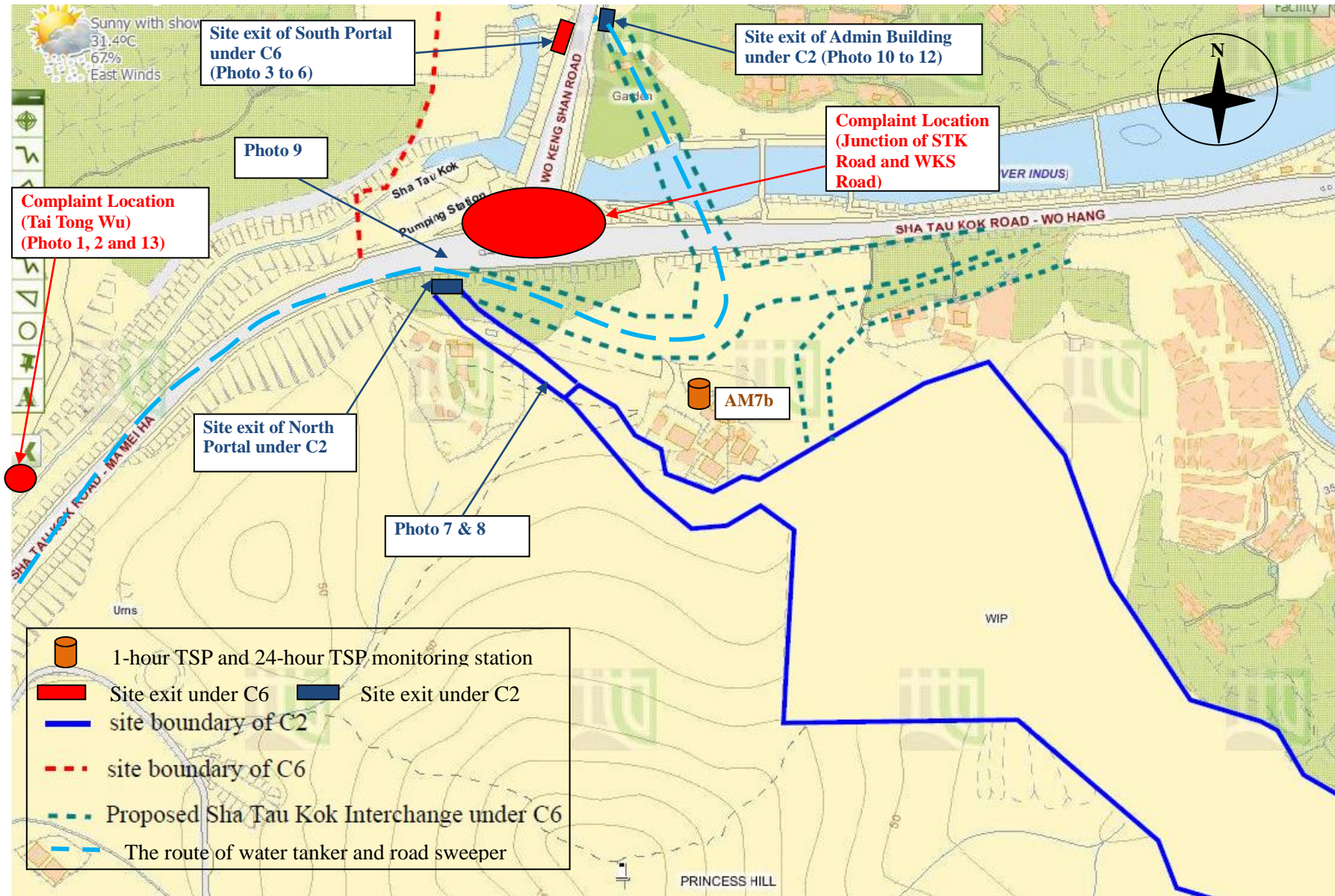


Figure1: Complaint Location and site exit along STK Road and WKS Road






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<b>Log No.</b>	CE 45/2008 – 79
<b>Received Date by ET</b>	25 October 2018
<b>Related Contract under Investigation</b>	Contract 6
<b>Complaint Details</b>	投訴人投訴粉嶺坪輦附近的工程引致十分大塵，指蓮塘/香園圍口岸的工程引致水流坑村四處都十分大塵，投訴人指問題已經維持一年有多，影響居民生活，希望部門能派出洗地車經過由禾徑山路轉入五洲路大概五分鐘的路段，因為該路段深受工程所引致的空氣污染問題，希望部門能改善有關問題。
<b>Location</b>	Shui Lau Hang Village intersection with Ng Chow Road
<b>Date of Complaint</b>	25 October 2018
<b>Environmental Aspect</b>	Dust
<b>Complainant</b>	Undisclosed
<b>Complaint Route</b>	Via 1823
<b>Investigation Result</b>	<ol style="list-style-type: none"> <li>1. A public complaint was received from 1823 on 25 October 2018 regarding dust concern in Shui Lau Hang Village intersection with Ng Chow Road as described in “Complaint Details”. According to the information provided by the complainant, the concerned construction site is North Portal of Cheung Shan Tunnel under Contract 6 and location plan is shown in <i>Figure 1</i>.</li> <li>2. Joint site inspection among the RE, IEC, ET and the Contractor of Contract 6 (CCKJV) was conducted at the concerned location on 25 October 2018 for complaint investigation. Observations during the site inspection are summarized below: <ol style="list-style-type: none"> <li>(a) The concerned road section between the intersection of Shui Lau Hang village and Ng Chow Road was hard paved public road which outside the work site boundary of LT/HYW. Some dust and gravels were observed on the road surface. (<i>Photos 1 to 2</i>)</li> <li>(b) No works areas under LT/HYW were located near Shui Lau Hang Village and Ng Chow Road. Since Ng Chow Road was outside the site boundary of Contract 6, no road cleaning / sweeping would be provided in that section of road. (<i>Photo 3</i>)</li> <li>(c) A roadside construction work area under Water Supplies Department (WSD) was observed near Shui Lau Hang Village at Ng Chow Road. Some dust and gravels were observed on the road surface and around the barriers of the road site construction work area. As advised by CCKJV, there were no construction works undertaken at Ng Chow Road and the sand/ dust was unlikely related to the project. However, it was observed that the</li> </ol> </li> </ol>

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	<p>concerned road was frequently used by heavy vehicles from other private workshop along Ng Chow Road and villager and localized traffic dust was anticipated. (<i>Photo 4 and Figure 1</i>)</p> <p>(d) Wheel washing facilities were provided within the construction site and all site vehicles were cleaned prior leaving the site. Wastewater generated from wheel washing was collected by a trench and diverted to the nearby wastewater treatment facility for proper treatment before discharge. (<i>Photos 5 to 8</i>) There was a hard paved access road leading to public road after wheel washing. No muddy water flowing from site area to public road was observed. (<i>Photo 9</i>)</p> <p>(e) As advised by CCKJV, the superstructure work and large scale excavation at North Portal was competed and heavy vehicles to access the construction site is limited. No dusty activities were observed during site inspection. The route of vehicles leaving construction site of Cheung Shan Tunnel of LT/HYW project was showed in <i>Figure 1</i>.</p> <p>3. In addition, monitoring programme was executed under the project to monitor the air quality at air sensitive receivers and immediate action would be undertaken in case of exceedance. There were two parameters for air quality including 1-hour TSP and 24-hour TSP to oversee the both day time impact and overall impact throughout the day and TSP measurements were conducted in accordance with the requirements under the EM&amp;A manual and relevant technical guidelines. Having reviewed the air quality monitoring results in the past three months, no exceedance was triggered at the closest air quality monitoring station AM6 which located at Shui Lau Hang Village. (<i>Photo 8 &amp; Figure 1</i>) It is considered that the dust impact arising from the project was within acceptable level.</p> <p>4. In our investigation, the Contractor has implemented wheel washing facilities and no loose materials carrying by site vehicles to Ng Chow Road was observed. Having inspected the existing condition of Ng Chow Road near Shui Lau Hang Village, it is considered that the dust impact was likely to be the localized traffic dust impact and therefore the complaint is not valid to the project. In particular dry season, ET will closely monitor the implementation of dust mitigation measures in the subsequent site inspections.</p>
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**Prepared By :** Nicola Hon  
**Designation :** Environmental Consultant  
**Signature :**   
**Date :** 5 November 2018

## Photo Record



**Photo 1**

The concerned road section between the intersection of Shui Lau Hang village and Ng Chow Road was hard paved public road which outside the work site boundary of LT/HYW. Some dust and gravels were observed on the road surface.



**Photo 2**

The concerned road section between the intersection of Shui Lau Hang village and Ng Chow Road was hard paved public road which outside the work site boundary of LT/HYW. Some dust and gravels were observed on the road surface.



**Photo 3**

No works areas under LT/HYW were located at Ng Chow Road near Shui Lau Hang Village. Since Ng Chow Road was outside the site boundary of Contract 6 and no road cleaning / sweeping would be provided in that section of road.



**Photo 4**

A roadside construction work area under WSD was observed near Shui Lau Hang Village at Ng Chow Road. Some sand/ dust were observed on the road surface and around the barriers of the road site construction work area.





**Photo 5**

Wheel washing facilities were provided on hard paved road within the construction site.



**Photo 6**

Wheel washing facilities were provided within the construction site and all site vehicles were cleaned prior leaving the site.



**Photo 7**

Wastewater generated from wheel washing was collected by a trench and diverted to the nearby wastewater treatment facility for proper treatment before discharge.



**Photo 8**

Wastewater generated from wheel washing was collected and diverted to the wastewater treatment facility for proper treatment before discharge.



**Photo 9**

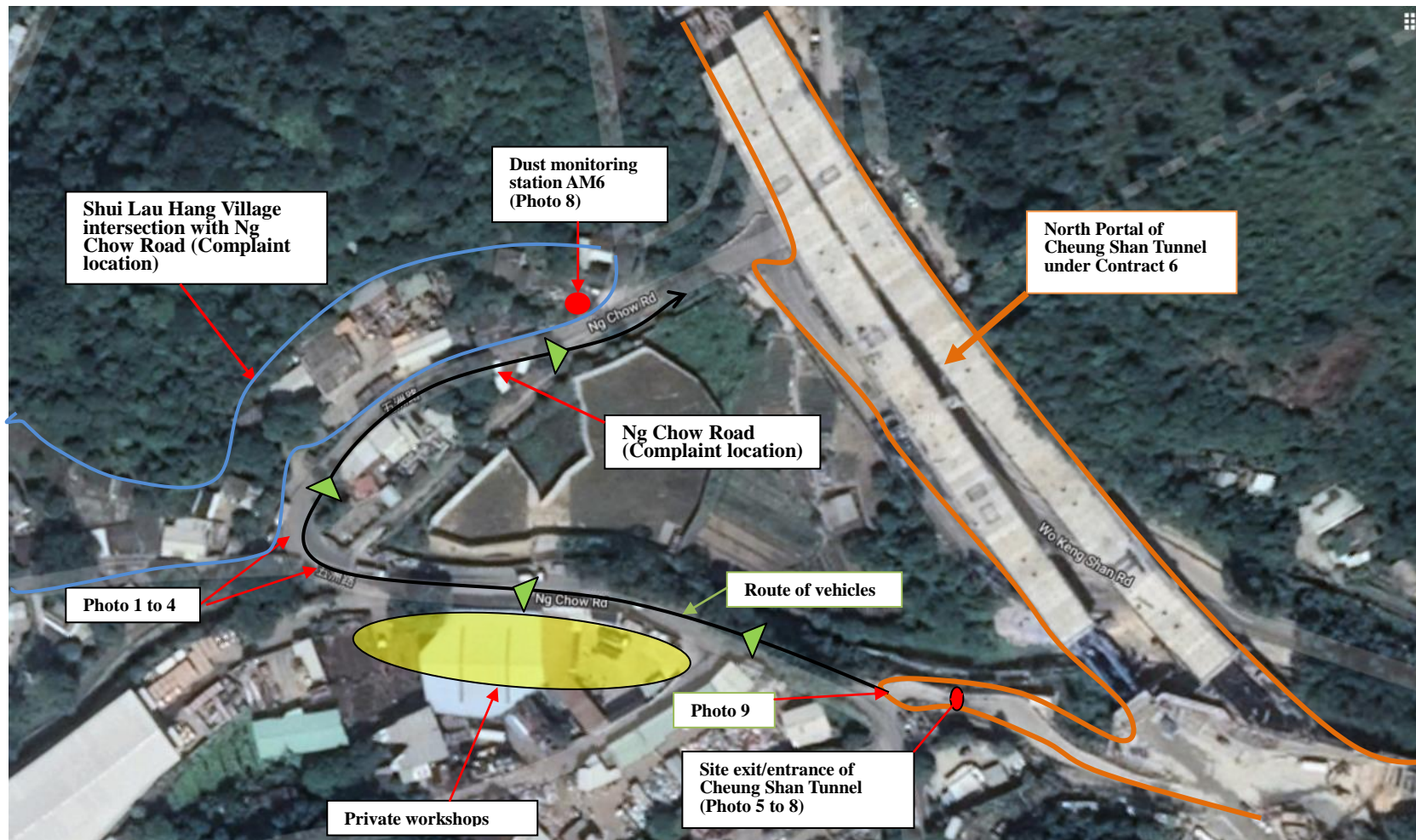
There was a hard paved access road leading to public road after wheel washing. No muddy water flowing from site area to public road was observed.



**Photo 10**

Dust Monitoring Station AM6 was located at Shui Lau Hang Village along Ng Chow Road.





**Figure 1 Location of Complaint**