**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.69) – APRIL 2019

**PREPARED FOR**
**CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT (CEDD)**

| Date | Reference No. | Prepared By | Certified By |
|---|---|---|---|
| 15 May 2019 | TCS00694/13/600/R2049v3 |  |  |
| | | Nicola Hon<br>(Environmental Consultant) | Tam Tak Wing<br>(Environmental Team Leader) |

| Version | Date | Remarks |
|---|---|---|
| 1 | 10 May 2019 | First Submission |
| 2 | 15 May 2019 | Amended according to the IEC's comment on 10 May 2019 |
| 3 | 15 May 2019 | Amended according to the IEC's comment on 10 May 2019 |

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16 May 2019

AECOM
8/F, Grand Central Plaza, Tower 2
138 Shatin Rural Committee Road
Shatin, N.T.

**By Email & Post**

Attention: Mr Owen NG

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. 69) – April 2019**

With reference to the Monthly EM&A Report No. 69 for April 2019 (Version 3) 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

| | | | | |
|---|---|---|---|---|
| cc | CEDD/BCP | - | Mr LU Pei Yu / Mr William CHEUNG | by fax: 3547 1659 |
| | ArchSD | - | Mr William WL CHENG | by fax: 2804 6805 |
| | AECOM | - | Mr Pat LAM / Mr Perry YAM | by email |
| | Ronald Lu | - | Mr Peter YAM / Mr Justin CHEUNG | by email |
| | CW | - | Mr Daniel HO | by email |
| | DHK | - | Mr Alan KAM | by email |
| | CCKJV | - | Mr Vincent CHAN | by email |
| | KRSJV | - | Mr Matthew TSANG | by email |
| | Leighton | - | Mr Ray HO | by email |
| | Siemens | - | Mr Patrick LEUNG | by email |
| | AUES | - | Mr TW TAM | by email |

**SMEC ASIA LIMITED**
27/F Ford Glory Plaza
37-39 Wing Hong Street
Cheung Sha Wan, Kowloon, Hong Kong
**T** +852 3995 8100 **F** +852 3995 8101 **E** hongkong@smec.com
**www.smec.com**

## EXECUTIVE SUMMARY

ES01 This is the **69th** monthly EM&A report presenting the monitoring results and inspection findings for the reporting period from **1 to 30 April 2019** (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 | 162 |
| | 24-hour TSP | 9 | 50 |
| Construction Noise | $L_{eq(30min)}$ Daytime | 10 | 50 |
| Water Quality | Water in-situ measurement and/or sampling | WM1 & WM1-C | 13 Scheduled & 0 extra |
| | | WM2A(a) & WM2A-Cx | 13 Scheduled & 0 extra |
| | | WM2B & WM2B-C | 13 Scheduled & 0 extra (*) |
| | | WM3x &WM3-C | 13 Scheduled & 0 extra |
| | | WM4, WM4-CA &WM4-CB | 13 Scheduled & 0 extra |
| Ecology | Woodland compensation<br>i) General Health condition of planted species<br>ii) Survival of planted species | 9 Quadrats and transect | 1 |
| 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 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, no exceedance of 1-hour and 24-hour TSP was recorded. Furthermore, no exceedance was 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 | -- | -- | -- |
| | 24-hour TSP | 0 | 0 | 0 | -- | -- | -- |

| Environmental Aspect | Monitoring Parameters | Action Level | Limit Level | Event & Action | | | |
|---|---|---|---|---|---|---|---|
| | | | | NOE Issued | Investigation Result | Project related exceedance | Corrective Actions |
| Construction Noise | $L_{eq(30min)}$ Daytime | 0 | 0 | 0 | -- | -- | -- |
| Water Quality | DO | 0 | 0 | 0 | -- | -- | -- |
| | Turbidity | 0 | 0 | 0 | -- | | -- |
| | SS | 0 | 0 | 0 | | | |

**ENVIRONMENTAL COMPLAINT**

ES05 In this Reporting Period, no documented environmental complaints were received/

**NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS**

ES06 No environmental summons and prosecutions were recorded in the Reporting Period.

**REPORTING CHANGE**

ES07 No reporting changes were made in the Reporting Period.

**SITE INSPECTION**

ES08 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 **2, 12, 18 and 26 April 2019**. No non-compliance was noted during the site inspection.

ES09 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, 17 and 25 April 2019**. No non-compliance was noted during the site inspection.

ES10 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 **2, 12, 15 and 26 April 2019**. No non-compliance was noted.

ES11 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 April 2019**. No non-compliance was noted during the site inspection.

ES12 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 **2, 12, 16 and 26 April 2019**. No non-compliance was noted during the site inspection.

ES13 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, 17, 24 and 29 April 2019** in which IEC joined the site inspection on **17 April 2019**. No non-compliance was noted during the site inspection.

**FUTURE KEY ISSUES**

ES14 As wet season is approaching, 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.

ES15 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.

ES16 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.

ES17 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 **69th** monthly EM&A report presenting the monitoring results and inspection findings for reporting period from **1** to **30 April 2019**.

## 1.2 REPORT STRUCTURE

1.2.1 The Monthly Environmental Monitoring and Audit (EM&A) Report is structured into the following sections:-

***Section 1*** *Introduction*
***Section 2*** *Project Organization and Construction Progress*
***Section 3*** *Summary of Impact Monitoring Requirements*
***Section 4*** *Air Quality Monitoring*
***Section 5*** *Construction Noise Monitoring*
***Section 6*** *Water Quality Monitoring*

# 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 Regulaiton 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 lEC 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, lEC 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, lEC 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 | • Defect rectification for the Mid-Ventilation Building<br>• T&C for E&M facilities<br>• External reinstatement works and soft landscaping works |
| North Portal | • Defect rectification for the North Ventilation Building<br>• Construction of permanent drainage and slip road<br>• Cladding installation, road paving and T&C for E&M facilities<br>• External backfilling and reinstatement works<br>• Soft landscaping works |
| South Portal | • Defect rectification for the South Ventilation Building<br>• Construction permanent drainage and slip road<br>• Cladding installation, road paving and T&C for E&M facilities<br>• External backfilling and reinstatement works<br>• Soft landscaping works |
| Admin Building | • Defect rectification for the Admin Build.<br>• T&C for E&M facilities<br>• External reinstatement and soft landscaping works |

*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)
- Installation of Noise barrier panel (on Grade)
- Road Drainage Works
- Construction of Pavilion and Pai Lau
- Construction of Slope works
- 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:

- T&C at Admin Building, tunnel & highway
- Panel installation at Cheung Shan Tunnel

*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:

- Parapet installation at Bridge A & E
- Waterproofing and Drainage works at roof of Bridge C
- Boundary fence at roof of Bridge C
- Drainage and watermains at perimeter road
- Street lighting and CCTV installation at perimeter road
- Shenzhen River Reinstatement

*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) Structure Works - G/F Plant Rooms Structure Works, G/F Backfiling & Drainage, Under Ground Utilities, Fence Wall and On Grade Slab
- PTB - ABWF Works & MEP Installation - Front/Back of House Area, External Staircases, External Staircases, Hall Block External Façade, Southern Entrance Construction, Major Plant Rooms & EAC Doors
- 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 & MXRVSS), Podium Open Area & 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 at G/F, R/F & External
- Bldg 2 - HKPF Building and Observation Tower Phase 1 - External Works, Integrated ABWF & MEP Works at G/F to 4/F, Observation Tower (incluidng Lift) & External Works
- 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 & 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 (FXI 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 to 1/F & Roof works
- 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, Integrated ABWF and MEP Works at G/F & R/F
- Bldg 11 - GV Kiosk (Outbound) Phase 2 - On-Grade Slab, 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 - 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 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 - 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 - Integrated ABWF and MEP Works at G/F & Envelope
- Bldg 29 - Guard Booths (Vehicle Detention Area) Phase 2 - Integrated ABWF and MEP Works at G/F & Envelope
- Bldg 30 - Guard Booth (Outbound) Phase 2 - Integrated ABWF and MEP Works at G/F & Envelope
- Bldg 31 - Guard Booth (Inbound) Phase 2 - Integrated ABWF and MEP Works at G/F & Envelope
- Bldg 32/33/34/35 Phase 2 - Steel Canopy 1 to 4 Integrated ABWF and MEP Works
- Bldg 36 - Fire Hydrant Tank & Pump Room Phase 1 - Integrated ABWF and MEP Works at R/F
- Bldg 37/38/39/40 - Elevated Walkways (E1, E2, E3 & E4) Phase 2 - ABWF and BS Works
- Vehicular Bridge 1 Phase 3 - Retaining walls, Bridge Decks 1A as Temp. Road, Bridge Decks 1B RC works, Road and Finishes Works
- Vehicular Bridges 2, 3 & 5 Phase 3 - Road and Finishes Works
- Vehicular Bridge 4 Phase 3 - Retaining walls, Road and Finishes Works
- External Works - Water Meter Room Connection (inbound & outbound)
- External Utilities Works - UU works for phase 2 FS inspection & DSD inspection
- External Road & Pavement Works - for inbound - Phase 1 FS inspection (concrete pavement) & for Phase 2 FS inspection
- External Landscape - Inbound & Outbound area
- "Testing & Commissioning (T&C) and FSD/SCCU Inspection Phase 1
- T&C - FSD, HKPF, CBI, FXI, DOG & Bldg 36
- FS Inspection & SCCU Inspection & Handover "
- "Testing & Commissioning (T&C) and FSD/SCCU Inspection Phase 2
- T&C - CBO, FXO, Inbound & Outbound Groups
- FS Inspection - EVA, CBO & FXO, Inbound & Outbound Groups"
- "Testing & Commissioning (T&C) and FSD Inspection Phase 3
- T&C - EVA & PTB"

## 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 and 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 |
| **Contract 2** | | | | | |
| **1** | Air pollution Control (Construction Dust) Regulation | Ref No.: 368864 | | 31 Dec 2013 | Till Contract ends |
| **2** | Chemical Waste Producer Registration | ***North Portal*** Waste Producers Number: No.5213-652-D2523-01 | | 25 Mar 2014 | Till Contract ends |
| | | ***Mid-Vent Portal*** Waste Producers Number: No.5213-634-D2524-01 | | 25 Mar 2014 | Till Contract ends |
| | | ***South Portal*** 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) | | 8 Oct 2014 | 30 Sep 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-RN0063-19 | North Portal | 31-Jan-2019 | 31-May-2019 |
| | | GW-RN0065-19 | | 31-Jan-2019 | 31-May-2019 |
| | | GW-RN0084-19 | | 11-Feb-2019 | 31-May-2019 |
| | | GW-RN0099-19 | Mid Vent | 13-Feb-2019 | 31-May-2019 |
| | | GW-RN0098-19 | | 13-Feb-2019 | 31-May-2019 |
| | | GW-RN0180-19 | South Portal | 03-Apr-2019 | 30-Jun-2019 |
| | | GW-RN0183-19 | | 03-Apr-2019 | 30-Jun-2019 |
| | | GW-RN0195-18 | Admin Bldg | 3-Apr-2018 | 30-Sep-2019 |
| **6** | Specified Process License **(**Mortar Plant Operation) | L-3-251(1) | | 12 Apr 2016 | 11 Apr 2021 |
| **Contract 3** | | | | | |
| **1** | Air pollution Control (Construction Dust) Regulation | Ref. No: 362101 | | 17 Jul 2013 | Till Contract ends |
| **2** | Chemical Waste Producer Registration | Waste Producers Number: No.:5113-634-C3817-01 | | 7 Oct 2013 | Till Contract ends |
| **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 |

| Item | Description | License/Permit Status | | |
|---|---|---|---|---|
| | | Ref. no. | Effective Date | Expiry Date |
| 5 | Construction Noise Permit | GW-RN0566-18 | 29 Oct 2018 | 04 Apr 2019 |
| | | GW-RN0693-18 | 18 Dec 2018 | 25 May 2019 |
| | | GW-RN0694-18 | 19 Dec 2018 | 25 May 2019 |
| | | GW-RN0696-18 | 19 Dec 2018 | 25 May 2019 |
| | | GW-RN0699-18 | 18 Dec 2018 | 25 May 2019 |
| | | GW-RN0058-19 | 25 Feb 2019 | 24 Aug 2019 |
| | | GW-RN0064-19 | 06 Mar 2019 | 05 Sep 2019 |
| | | GW-RN0067-19 | 22 Feb 2019 | 21 Aug 2019 |
| | | GW-RN0208-19 | 6 Apr 2019 | 5 Oct 2019 |
| **Contract 6** | | | | |
| 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-RN0212-19 | 3 Apr 2019 | 31 May 2019 |
| **Contract SS C505** | | | | |
| 1 | Air pollution Control (Construction Dust) Regulation | Ref. No: 390974 | 13 Jul 2015 | Till the end of Contract |
| 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-RN0133-19 | 9 Mar 2019 | 8 May 2019 |
| | | GW-RN0258-19 | 15 Apr 2019 | 14 Jun 2019 |
| **Contract 7** | | | | |
| 1 | Air pollution Control (Construction Dust) Regulation | Ref. No: 397015 | 21 Dec 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.: 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 |
| **Contract 4** | | | | |
| **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 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 | • 1-hour TSP by Real-Time Portable Dust Meter; and<br>• 24-hour TSP by High Volume Air Sampler. |
| Noise | • $L_{eq(30min)}$ in normal working days (Monday to Saturday) 07:00-19:00 except public holiday; and<br>• 3 sets of consecutive $L_{eq(5min)}$ on restricted hours i.e. 19:00 to 07:00 next day, and whole day of public holiday or Sunday<br>• Supplementary information for data auditing, statistical results such as $L_{10}$ and $L_{90}$ shall also be obtained for reference. |
| Water Quality | **In-situ Measurements**<br>• Dissolved Oxygen Concentration (mg/L);<br>• Dissolved Oxygen Saturation (% );<br>• Turbidity (NTU);<br>• pH unit;<br>• Water depth (m); and<br>• Temperature (℃). |
| | **Laboratory Analysis**<br>• Suspended Solids (mg/L) |

## 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, alterative location AM1c was proposed by ET and approved by EPD on 26 November 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 |
|---|---|---|---|
| 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 |

| Station ID | Description | Works Area | Related to the Work Contract |
|---|---|---|---|
| AM3 | Ta Kwu Ling Fire Service Station of Ta Kwu Ling Village. | LMH to Frontier Closed Area | Contract 6 |
| AM4b^ | House no. 10B1 Nga Yiu Ha Village | LMH to Frontier Closed Area | Contract 6 |
| AM5a^ | 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@ | Loi Tung Village House | Sha Tau Kok Road | Contract 2<br>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).*
*^ 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.*
** Revised proposal for alterative location AM1c was submitted to EPD on 31 October 2018 after verified by the IEC and it was approved by EPD (EPD's ref.: ( ) in Ax (1) to EP 2/N7/A/52 Pt.26 dated 26 November 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<br>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,<br>Contract 6 |
| NM6 | Tai Tong Wu Village House 2 | Sha Tau Kok Road | Contract 2,<br>Contract 6 |
| NM7 | Po Kat Tsai Village | Po Kat Tsai | Contract 2 |
| NM8 | Village House, Tong Hang | Fanling | Contract 2<br>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 | 833 679 | 845 421 | Alternative location located at upstream 51m of the | SS C505<br>Contract 6 |

| Station ID | Description | Coordinates of Designated / Alternative Location | | Nature of the location | Related to the Work Contract |
|---|---|---|---|---|---|
| | | Easting | Northing | | |
| | Channel | | | designated location | |
| 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 |
|---|---|
| ***24-Hr TSP*** | |
| High Volume Air Sampler | TISCH High Volume Air Sampler, HVS Model TE-5170* |
| Calibration Kit | TISCH Model TE-5025A* |
| ***1-Hour TSP*** | |
| Portable Dust Meter | Sibata LD-3B Laser Dust monitor Particle Mass Profiler & Counter* |

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

3.6.2 The 1-hour TSP meter 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:

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

3.6.4 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 ($L_{eq}$). $Leq_{(30min)}$ in six consecutive $Leq_{(5min)}$ measurements will use as the monitoring parameter for the time period between 0700-1900 hours on weekdays; $Leq_{(5min)}$ measurements would be used as monitoring parameter for other time periods (e.g. during restricted hours), if necessary.

3.6.8 Prior of noise measurement, the accuracy of the sound level meter 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 $4^0$C as possible without being frozen. Samples collected are delivered to the laboratory upon collection.

*In-situ Measurement*

3.6.15 YSI 550A Multifunctional Meter is used for water in-situ measures, which automates the measurements and data logging of temperature, dissolved oxygen and dissolved oxygen saturation.

3.6.16 A portable AZ Model 8685 is used for in-situ pH measurement. The pH meter is capable of measuring pH in the range of 0 – 14 and readable to 0.1.

3.6.17 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.

3.6.18 All in-situ measurement equipment are calibrated by HOKLAS accredited laboratory of three month interval.

*Laboratory Analysis*

3.6.19 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$^3$) | | Limit Level (μg/m$^3$) | |
|---|---|---|---|---|
| | 1-hour TSP | 24-hour TSP | 1-hour TSP | 24-hour TSP |

| Monitoring Station | Action Level (μg /m³) | | Limit Level (μg/m³) | |
|---|---|---|---|---|
| | 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)[Note 1 & Note 2] |

*Note 1: Acceptable Noise Levels for school should be reduced to 70 dB(A) and65 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 |
| | | **AND** | 120% of upstream control station of the same day | | | |
| | Limit Level | 67.6 | 33.8 | 12.3 | 14.0 | 38.4 |
| | | **AND** | 130% of upstream control station of the same day | | | |
| **SS (mg/L)** | Action Level | 54.5 | 14.6 | 11.8 | 12.6 | 39.4 |
| | | **AND** | 120% of upstream control station of the same day | | | |
| | Limit Level | 64.9 | 17.3 | 12.4 | 12.9 | 45.5 |
| | | **AND** | 130% of upstream control station of the same day | | | |

***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 ***162*** events of 1-hour TSP and ***45*** 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 (μg/m³) | 1-hour TSP (μg/m³) | | | | |
|---|---|---|---|---|---|---|
| | | Date | Start Time | 1st reading | 2nd reading | 3rd reading |
| 3-Apr-19 | 60 | 2-Apr-19 | 9:03 | 65 | 69 | 66 |
| 9-Apr-19 | 49 | 8-Apr-19 | 10:01 | 76 | 70 | 77 |
| 15-Apr-19 | 42 | 13-Apr-19 | 9:05 | 63 | 62 | 60 |
| 20-Apr-19 | 24 | 17-Apr-19 | 9:11 | 76 | 58 | 68 |
| 26-Apr-19 | 45 | 23-Apr-19 | 9:18 | 44 | 46 | 48 |
| -- | -- | 29-Apr-19 | 9:23 | 46 | 37 | 45 |
| Average (Range) | **44 (24-60)** | Average (Range) | | **60 (37 – 77)** | | |

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

| Date | 24-hour TSP (μg/m³) | 1-hour TSP (μg/m³) | | | | |
|---|---|---|---|---|---|---|
| | | Date | Start Time | 1st reading | 2nd reading | 3rd reading |
| 3-Apr-19 | 118 | 2-Apr-19 | 14:25 | 86 | 87 | 84 |
| 9-Apr-19 | 106 | 8-Apr-19 | 13:04 | 76 | 77 | 89 |
| 15-Apr-19 | 101 | 13-Apr-19 | 12:24 | 83 | 83 | 76 |
| 20-Apr-19 | 31 | 17-Apr-19 | 9:23 | 97 | 86 | 103 |
| 26-Apr-19 | 123 | 23-Apr-19 | 9:22 | 45 | 48 | 54 |
| -- | -- | 29-Apr-19 | 9:22 | 68 | 84 | 75 |
| Average (Range) | **96 (31 – 123)** | Average (Range) | | **78 (45 – 103)** | | |

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

| Date | 24-hour TSP (μg/m³) | 1-hour TSP (μg/m³) | | | | |
|---|---|---|---|---|---|---|
| | | Date | Start Time | 1st reading | 2nd reading | 3rd reading |
| 3-Apr-19 | 49 | 2-Apr-19 | 13:44 | 84 | 88 | 81 |
| 9-Apr-19 | 72 | 8-Apr-19 | 9:51 | 78 | 81 | 83 |
| 15-Apr-19 | 28 | 13-Apr-19 | 15:41 | 86 | 84 | 86 |
| 20-Apr-19 | 14 | 17-Apr-19 | 9:41 | 56 | 41 | 36 |
| 26-Apr-19 | 66 | 23-Apr-19 | 9:24 | 43 | 48 | 51 |
| -- | -- | 29-Apr-19 | 9:52 | 43 | 44 | 47 |
| Average | **46** | Average | | **64** | | |

| Date | 24-hour TSP (μg/m³) | 1-hour TSP (μg/m³) | | | | |
|---|---|---|---|---|---|---|
| | | Date | Start Time | 1st reading | 2nd reading | 3rd reading |
| (Range) | **(14 – 72)** | (Range) | | **(36 – 88)** | | |

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

| Date | 24-hour TSP (μg/m³) | 1-hour TSP (μg/m³) | | | | |
|---|---|---|---|---|---|---|
| | | Date | Start Time | 1st reading | 2nd reading | 3rd reading |
| 2-Apr-19 | 93 | 3-Apr-19 | 13:31 | 81 | 83 | 88 |
| 8-Apr-19 | 56 | 9-Apr-19 | 9:47 | 42 | 45 | 48 |
| 13-Apr-19 | 33 | 15-Apr-19 | 9:26 | 92 | 95 | 98 |
| 18-Apr-19 | 40 | 18-Apr-19 | 13:16 | 90 | 95 | 102 |
| 24-Apr-19 | 39 | 24-Apr-19 | 9:49 | 39 | 41 | 45 |
| 30-Apr-19 | 36 | 30-Apr-19 | 13:26 | 57 | 59 | 63 |
| Average (Range) | **50 (33 – 93)** | Average (Range) | | **70 (39 – 102)** | | |

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

| Date | 24-hour TSP (μg/m³) | 1-hour TSP (μg/m³) | | | | |
|---|---|---|---|---|---|---|
| | | Date | Start Time | 1st reading | 2nd reading | 3rd reading |
| 2-Apr-19 | 74 | 3-Apr-19 | 13:24 | 78 | 80 | 84 |
| 8-Apr-19 | 57 | 9-Apr-19 | 9:45 | 40 | 43 | 45 |
| 13-Apr-19 | 44 | 15-Apr-19 | 9:23 | 95 | 98 | 101 |
| 18-Apr-19 | 24 | 18-Apr-19 | 13:19 | 95 | 97 | 101 |
| 24-Apr-19 | 35 | 24-Apr-19 | 9:46 | 35 | 40 | 41 |
| 30-Apr-19 | 39 | 30-Apr-19 | 13:23 | 61 | 63 | 65 |
| Average (Range) | **46 (24 – 74)** | Average (Range) | | **70 (35 – 101)** | | |

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

| Date | 24-hour TSP (μg/m³) | 1-hour TSP (μg/m³) | | | | |
|---|---|---|---|---|---|---|
| | | Date | Start Time | 1st reading | 2nd reading | 3rd reading |
| 2-Apr-19 | 70 | 3-Apr-19 | 13:15 | 83 | 87 | 89 |
| 8-Apr-19 | 91 | 9-Apr-19 | 9:38 | 44 | 47 | 51 |
| 13-Apr-19 | 71 | 15-Apr-19 | 9:15 | 93 | 97 | 105 |
| 18-Apr-19 | 74 | 18-Apr-19 | 13:26 | 86 | 90 | 98 |
| 24-Apr-19 | 85 | 24-Apr-19 | 9:38 | 97 | 89 | 107 |
| 30-Apr-19 | 90 | 30-Apr-19 | 13:17 | 62 | 65 | 68 |
| Average (Range) | **80 (70 – 91)** | Average (Range) | | **81 (44 – 107)** | | |

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

| Date | 24-hour TSP (μg/m³) | 1-hour TSP (μg/m³) | | | | |
|---|---|---|---|---|---|---|
| | | Date | Start Time | 1st reading | 2nd reading | 3rd reading |
| 2-Apr-19 | 96 | 3-Apr-19 | 9:21 | 94 | 98 | 102 |
| 8-Apr-19 | 110 | 9-Apr-19 | 9:32 | 86 | 80 | 99 |
| 13-Apr-19 | 52 | 15-Apr-19 | 13:15 | 108 | 110 | 114 |

| Date | 24-hour TSP (μg/m³) | 1-hour TSP (μg/m³) | | | | |
|---|---|---|---|---|---|---|
| | | Date | Start Time | 1st reading | 2nd reading | 3rd reading |
| 18-Apr-19 | 61 | 18-Apr-19 | 13:31 | 92 | 96 | 99 |
| 24-Apr-19 | 45 | 24-Apr-19 | 9:27 | 31 | 36 | 42 |
| 30-Apr-19 | 44 | 30-Apr-19 | 9:34 | 44 | 47 | 49 |
| Average (Range) | **68 (44 – 110)** | Average (Range) | | **79 (31– 114)** | | |

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

| Date | 24-hour TSP (μg/m³) | 1-hour TSP (μg/m³) | | | | |
|---|---|---|---|---|---|---|
| | | Date | Start Time | 1st reading | 2nd reading | 3rd reading |
| 2-Apr-19 | 43 | 3-Apr-19 | 9:12 | 40 | 44 | 60 |
| 8-Apr-19 | 30 | 9-Apr-19 | 9:21 | 38 | 40 | 44 |
| 13-Apr-19 | 13 | 15-Apr-19 | 13:04 | 47 | 55 | 36 |
| 18-Apr-19 | 26 | 18-Apr-19 | 13:41 | 91 | 93 | 97 |
| 24-Apr-19 | 24 | 24-Apr-19 | 9:11 | 33 | 36 | 38 |
| 30-Apr-19 | 21 | 30-Apr-19 | 13:04 | 56 | 58 | 60 |
| Average (Range) | **26 (13 – 43)** | Average (Range) | | **54 (33 – 97)** | | |

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

| Date | 24-hour TSP (μg/m³) | 1-hour TSP (μg/m³) | | | | |
|---|---|---|---|---|---|---|
| | | Date | Start Time | 1st reading | 2nd reading | 3rd reading |
| 3-Apr-19 | 41 | 3-Apr-19 | 9:08 | 72 | 72 | 73 |
| 9-Apr-19 | 36 | 9-Apr-19 | 9:17 | 76 | 75 | 78 |
| 15-Apr-19 | 29 | 15-Apr-19 | 9:11 | 63 | 65 | 62 |
| 20-Apr-19 | 40 | 18-Apr-19 | 9:41 | 47 | 51 | 44 |
| 26-Apr-19 | 39 | 24-Apr-19 | 9:14 | 53 | 49 | 39 |
| -- | -- | 30-Apr-19 | 13:05 | 38 | 40 | 45 |
| Average (Range) | **37 (29 – 41)** | Average (Range) | | **58 (38 – 78)** | | |

4.2.2 As shown in ***Tables 4-1 to 4-9***, all the 1-hour and 24-hour TSP monitoring results were below the Action/Limit Levels. No Notification of Exceedance (NOE) was issued in this Reporting Period.

4.2.3 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 **50** 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(*)** | **NM8** | **NM9** | **NM10(*)** |
| 2-Apr-19 | 54 | 61 | 58 | 61 | 65 |
| 8-Apr-19 | 56 | 69 | 57 | 63 | 64 |
| 17-Apr-19 | 46 | 67 | 61 | 60 | 61 |
| 23-Apr-19 | 59 | 67 | 62 | 60 | 61 |
| 29-Apr-19 | 59 | 69 | 65 | 60 | 64 |
| **Limit Level** | **75 dB(A)** | | | | |

*Remarks*

**(*)** *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** |
| 3-Apr-19 | 61 | 67 | 53 | 60 | 56 |
| 9-Apr-19 | 56 | 62 | 51 | 58 | 61 |
| 15-Apr-19 | 58 | 65 | 52 | 57 | 58 |
| 24-Apr-19 | 55 | 63 | 51 | 59 | 61 |
| 30-Apr-19 | 58 | 64 | 53 | 55 | 55 |
| **Limit Level** | **75 dB(A)** | | | | |

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 **thirteen (13)** sampling days were scheduled to carry out for all designated locations with their control stations. 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-Apr-19 | 5.3 | 8.7 | 5.1 | 6.7 | 2.7 | 4.2 | 18.5 | 2.0 | 5.5 |
| 4-Apr-19 | 7.5 | 8.4 | 6.3 | 5.6 | 2.6 | 7.3 | 14.0 | <2 | 11.5 |
| 6-Apr-19 | 7.7 | 7.5 | 5.1 | 9.8 | 1.1 | 8.8 | 14.5 | <2 | 10.0 |
| 9-Apr-19 | 6.7 | 6.5 | 4.7 | 17.1 | 0.9 | 4.9 | 26.5 | <2 | 5.0 |
| 11-Apr-19 | 8.1 | 7.4 | 4.6 | 16.6 | 1.7 | 3.9 | 20.5 | <2 | 5.0 |
| 13-Apr-19 | 6.5 | 7.2 | 5.9 | 30.1 | 6.8 | 3.2 | 33.5 | 5.0 | 7.0 |
| 16-Apr-19 | 7.0 | 7.1 | 5.9 | 17.4 | 5.4 | 2.6 | 34.0 | 2.5 | 18.0 |
| 18-Apr-19 | 7.4 | 7.3 | 6.7 | 6.7 | 1.9 | 6.6 | 5.0 | 2.0 | 8.5 |
| 20-Apr-19 | 6.4 | 5.8 | 6.0 | 14.6 | 4.7 | 12.6 | 15.5 | 4.0 | 16.0 |
| 23-Apr-19 | 6.8 | 5.6 | 5.8 | 11.5 | 2.8 | 5.8 | 7.5 | 4.5 | 5.5 |
| 25-Apr-19 | 6.8 | 5.9 | 5.8 | 6.3 | 2.4 | 11.0 | 9.5 | 3.0 | 16.0 |
| 27-Apr-19 | 6.5 | 6.6 | 6.3 | 6.5 | 1.9 | 7.4 | 4.0 | 2.0 | 15.0 |
| 30-Apr-19 | 6.8 | 5.8 | 5.6 | 13.5 | 2.9 | 12.0 | 7.0 | 3.0 | 15.5 |

**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-Apr-19 | 6.3 | 6.5 | 81.7 | 267.0 | 61.0 | 300.0 |
| 4-Apr-19 | 5.4 | 4.8 | 88.7 | 102.5 | 69.0 | 158.0 |
| 6-Apr-19 | 6.8 | 6.2 | 67.0 | 111.0 | 71.5 | 131.0 |
| 9-Apr-19 | 5.2 | 3.7 | 63.3 | 216.5 | 53.0 | 107.5 |
| 11-Apr-19 | 6.4 | 3.6 | 70.0 | 271.0 | 63.5 | 163.0 |
| 13-Apr-19 | 7.6 | 6.8 | 71.1 | 61.1 | 57.5 | 64.0 |
| 16-Apr-19 | 7.6 | 7.1 | 60.7 | 52.9 | 53.5 | 43.5 |
| 18-Apr-19 | 7.0 | 6.9 | 121.5 | 142.5 | 83.5 | 180.5 |
| 20-Apr-19 | 7.1 | 6.8 | 37.6 | 11.3 | 39.0 | 7.0 |
| 23-Apr-19 | 7.7 | 7.5 | 66.9 | 109.5 | 52.0 | 156.0 |
| 25-Apr-19 | 8.0 | 7.3 | 38.4 | 12.7 | 38.5 | 6.5 |
| 27-Apr-19 | 7.4 | 7.7 | 48.2 | 11.3 | 53.0 | 7.0 |
| 30-Apr-19 | 7.4 | 7.3 | 933.5 | overrange | 585.0 | 1080.0 |

**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-Apr-19 | 9.3 | 8.0 | * | * | 11.4 | 14.5 | * | * | 7.0 | 7.5 | * | * |
| 4-Apr-19 | 8.8 | 8.0 | * | * | 13.6 | 15.0 | * | * | 12.5 | 5.0 | * | * |
| 6-Apr-19 | 8.4 | 7.7 | * | * | 9.2 | 12.7 | * | * | 5.0 | 6.0 | * | * |
| 9-Apr-19 | 7.2 | 6.9 | * | * | 8.8 | 8.8 | * | * | 7.5 | 3.0 | * | * |
| 11-Apr-19 | 9.5 | 8.3 | * | * | 9.4 | 10.6 | * | * | 5.0 | 4.0 | * | * |
| 13-Apr-19 | 7.5 | 7.7 | * | * | 55.6 | 47.1 | * | * | 30.5 | 57.5 | * | * |
| 16-Apr-19 | 7.5 | 7.4 | * | * | 606.0 | overrange | * | * | 517.5 | 640.5 | * | * |
| 18-Apr-19 | 6.8 | 7.5 | * | * | 24.4 | 41.0 | * | * | 29.0 | 56.0 | * | * |
| 20-Apr-19 | 7.4 | 7.7 | * | * | 11.2 | 7.9 | * | * | 8.0 | 4.0 | * | * |
| 23-Apr-19 | 7.3 | 7.8 | * | * | 8.0 | 4.8 | * | * | 4.5 | <2 | * | * |
| 25-Apr-19 | 7.0 | 7.6 | * | * | 11.5 | 6.9 | * | * | 5.5 | 2.5 | * | * |
| 27-Apr-19 | 7.3 | 7.7 | * | * | 6.1 | 5.9 | * | * | 3.0 | <2 | * | * |
| 30-Apr-19 | 7.0 | 7.1 | * | * | 115.0 | 672.0 | * | * | 90.0 | 350.5 | * | * |

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

**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-Apr-19 | 9.4 | 13.9 | 10.0 | 3.0 | 8.5 | 3.0 |
| 4-Apr-19 | 9.0 | 9.1 | 12.2 | 4.4 | 9.0 | <2 |
| 6-Apr-19 | 8.6 | 7.7 | 9.6 | 3.4 | 6.0 | 2.5 |
| 9-Apr-19 | 7.7 | 11.2 | 13.0 | 3.9 | 11.0 | 4.5 |
| 11-Apr-19 | 9.9 | 12.3 | 7.1 | 4.3 | 5.5 | 3.0 |
| 13-Apr-19 | 7.6 | 9.0 | 9.9 | 6.1 | 9.0 | 4.5 |
| 16-Apr-19 | 7.9 | 7.7 | 448.5 | 532.5 | 348.5 | 359.0 |
| 18-Apr-19 | 7.9 | 9.0 | 13.2 | 5.7 | 11.5 | 7.0 |
| 20-Apr-19 | 7.7 | 8.0 | 6.8 | 5.0 | 10.5 | 8.0 |
| 23-Apr-19 | 6.8 | 7.9 | 13.1 | 5.3 | 5.0 | 6.0 |
| 25-Apr-19 | 7.3 | 8.6 | 4.5 | 6.1 | 3.5 | 3.0 |
| 27-Apr-19 | 7.9 | 9.2 | 3.2 | 5.0 | 2.0 | 3.0 |
| 30-Apr-19 | 7.7 | 8.4 | 12.6 | 14.8 | 8.5 | 4.0 |

**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 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **WM2B** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **WM3x** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **WM4** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **No of Exceedance** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

6.2.2 In this Reporting Period, no exceedance was recorded during water quality monitoring and therefore no NOE was issued. The investigation results/ outstanding 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 |
|---|---|---|---|
| N/A | N/A | N/A | N/A |

# 7 ECOLOGY MONITORING

## 7.1 GENERAL

7.1.1 Ecology monitoring for woodland compensation was 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 March 2019 to May 2019 was carried out on 23th and 24th April 2019 by transects inspection and quadrat monitoring. The Quarterly Ecological Monitoring Report will be submitted separately to the EM&A Report in June 2019 tentatively.

# 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 '000$m^3$) | **1.4100** | -- | **0.787** | -- | 0 | -- | **7.285** | -- | **0.355** | -- | **2.852** | -- | **12.689** |
| Reused in this Contract (Inert) (in '000 $m^3$) | 0 | -- | **0.006** | -- | 0 | -- | **0** | -- | 0 | -- | **0.013** | -- | **0.019** |
| Reused in other Contracts/ Projects (Inert) (in '000 $m^3$) | 0 | -- | 0 | -- | 0 | -- | **0.689** | **Reused at NENT #** | **0.169** | **CEDD Contract - YL/2017/03 #** | 0 | -- | **0.858** |
| Disposal as Public Fill (Inert) (in '000 $m^3$) | **1.4100** | **Tuen Mun 38** | **0.644** | **Tuen Mun 38** | 0 | -- | **6.596** | **Tuen Mun 38** | **0.186** | **Tuen Mun 38** | **2.698** | **TKO 137** | **11.534** |

*# Approved alternative site*

**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 | -- | **2.8** | Licensed collector | **116.170** | **Licensed collector** | **118.97** |
| Recycled Paper / Cardboard Packing ('000kg) # | 0 | -- | 0 | - | 0 | - | **0.463** | **Licensed collector** | **0.1** | Licensed collector | **0.610** | **Licensed collector** | **1.173** |
| Recycled Plastic ('000kg) # | 0 | -- | 0 | - | **0.035** | **Licensed collector** | 0 | -- | **0.001** | Licensed collector | **3.330** | **Licensed collector** | **3.366** |
| Chemical Wastes ('000kg) # | 0 | -- | 0 | - | 0 | -- | 0 | -- | 0 | -- | 0 | -- | **0** |
| General Refuses ('000$m^3$) | **0.1240** | **NENT** | **0.145** | **NENT** | 0 | -- | **0.389** | **NENT** | **0.1** | **NENT** | **1.190** | **NENT** | **1.948** |

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

# 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 **2, 12, 18 and 26 April 2019**. 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 |
|---|---|---|
| 2 April 2019 | • The Contractor was reminded to provide drip tray for any chemical container. | • Reminder only. |
| 12 April 2019 | • Turbid water discharge from site was observed at South Portal. The Contractor should provide proper mitigation measure to prevent turbid water discharge and ensure the discharge comply to the discharge license requirement. | • Proper mitigation measure was implemented. |
| 18 April 2019 | • No adverse environmental issue was observed. | • NA |
| 26 April 2019 | • No adverse environmental issue was observed. | • NA |

***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, 17 and 25 April 2019**. 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 April 2019 | • No adverse environmental issue was observed. | • NA |
| 11 April 2019 | • Muddy water discharge from site was observed at WWTS1. The Contractor should provide proper mitigation measure to ensure no muddy water discharge from site and remove the silt inside the Wetsep regularly. | • Maintenance was carried out for WWTS1. |
| 17 April 2019 | • No adverse environmental issue was observed. | • NA |
| 25 April 2019 | • Muddy water discharge from site was observed at WWTS1. The Contractor should provide proper mitigation measure to prevent muddy water discharge and ensure the discharge comply to discharge license<br>• The Contractor was reminded to cover the stockpile with tarpaulin sheet to reduce dust impact. | • Maintenance was carried out for WWTS1.<br>• Reminder only. |

***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 **2, 12, 15 and 26 April 2019**. 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 |
|---|---|---|
| 2 April 2019 | • No adverse environmental issue was observed. | • NA |
| 12 April 2019 | • No adverse environmental issue was observed. | • NA |
| 15 April 2019 | • No adverse environmental issue was observed. | • NA |
| 26 April 2019 | • No adverse environmental issue was observed. | • NA |

***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 April 2019**. 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 April 2019 | • The Contractor was reminded to maintain cleanliness of site exit. | • Reminder only. |
| 11 April 2019 | • No adverse environmental issue was observed. | • NA |
| 18 April 2019 | • No adverse environmental issue was observed. | • NA |
| 25 April 2019 | • Turbid water discharge from site was observed at Bridge Y. The Contractor should provide proper mitigation measure to ensure no turbid water discharge and maintain the sedimentation tank function properly.<br>• Silt was observed at site exit and main road. The Contractor should clean the silt and provide water spraying regularly. (Bridge Y) | • Checked the sedimentation tank in good function.<br>• Water spraying was provided and the silt was cleaned. |

***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, 17, 24 and 29 April 2019** in which IEC joined the site inspection on **17 April 2019**. 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 |
|---|---|---|
| 3 April 2019 | • The contractor was reminded to remove stagnant water regularly.<br>• The Contractor was reminded to maintain | • Not required for reminder.<br>• Not required for |

| Date | Findings / Deficiencies | Follow-Up Status |
|---|---|---|
| | housekeeping on site. | reminder. |
| 10 April 2019 | • The contractor was reminded to replace broken water barrier to prevent water accumulation. | • Not required for reminder. |
| 17 April 2019 | • Over 20 bags of cement bags without proper cover were observed at PTB M floor. The Contractor should cover with tarpaulin sheet to prevent dust emission.<br>• The contractor was reminded to spray water regularly to reduce dust impact. | • Cement bags were covered with tarpaulin sheet.<br>• Not required for reminder. |
| 24 April 2019 | • The Contractor was reminded to replace the broken water barrier to prevent water accumulation.<br>• The Contractor was reminded to remove stagnant water regularly. | • Not required for reminder.<br>•<br>• Not required for reminder. |
| 29 April 2019 | • Free standing chemical containers were observed near building 5. The Contractor should provide drip tray for any chemical containers to prevent leakage.<br>• The Contractor was reminded to remove stagnant water regularly. | • The chemical containers were removed.<br>• Not required for reminder. |

***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 **2, 12, 16 and 26 April 2019**. 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**

| Date | Findings / Deficiencies | Follow-Up Status |
|---|---|---|
| 2 April 2019 | • No adverse environmental issue was observed. | • NA |
| 12 April 2019 | • The Contractor was reminded to remove waste regularly. | • Not required for reminder. |
| 16 April 2019 | • The Contractor was reminded to remove construction waste regularly. | • Not required for reminder. |
| 26 April 2019 | • No adverse environmental issue was observed. | • NA |

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, no environmental complaints, 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.

| Date of complaint | Complaint Detail | Investigation Status |
|---|---|---|
| 12 March 2019 | A public complaint was received by 1823 on 12 March 2019 regarding the noise disturbance heard at Dan Chuk Hang Village during night time which related to site area of Contract 2. | Investigation revealed that the concerned noise disturbance was related to the bitumen paving inside tunnel and the works were undertaken in accordance to the CNP. Investigation report for the complaint has been provided to IEC for review on 10 May 2019. The IR is under revising by ET according to IEC's comment on 10 May 2019. |

10.1.2 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 – 31 March 2019 | Contract 2 | 0 | **38** | • **(19)Water Quality**<br>• **(10) Dust**<br>• **(6) Noise**<br>• **(1) dust & noise**<br>• **(1) waste management**<br>• **(1) Water quality and dust** | **(7) water quality**<br>**(3) dust**<br>**(1) noise**<br>**(#)** |
| 06 Nov 2013 – 31 March 2019 | Contract 3 | 0 | **10** | • **(3) Dust**<br>• **(3) Water quality**<br>• **(2) Noise**<br>• **(2) site cleanliness (dust & water quality)** | **(1) site cleanliness (dust & water quality)** |
| 16 Aug 2013 – 31 March 2019 | Contract 4 | 0 | 0 | NA | NA |
| 16 Aug 2013 – 31 March 2019 | Contract 6 | 0 | **45** | • **(24) Water Quality**<br>• **(12) Dust**<br>• **(3) Noise**<br>• **(1) Nuisance**<br>• **(1) Noise and dust**<br>• **(3) Water quality and dust**<br>• **(1) Water quality and noise** | **(8) water quality**<br>**(3) dust**<br>**(1) nuisance**<br>**(1) water quality and dust**<br>**(1) water quality and noise** |
| 15 Feb 2016 – 31 March 2019 | Contract 7 | 0 | **4** | • **(1) Noise**<br>• **(3) Water quality and dust** | **(1) water quality and dust** |
| 16 Aug 2013 – 31 March 2019 | SS C505 | 0 | **7** | • **(1) Noise**<br>• **(2) dust**<br>• **(3) Water quality and dust**<br>• **(1) Water quality** | **(1) water quality and dust** |

| Reporting Period | Contract No | Environmental Complaint Statistics | | | Project related complaint |
|---|---|---|---|---|---|
| | | Frequency | Cumulative | Complaint Nature | |
| 1 – 30 April 2019 | Contract 2 | 0 | **38** | • **(19)Water Quality**<br>• **(10) Dust**<br>• **(6) Noise**<br>• **(1) dust & noise**<br>• **(1) waste management**<br>• **(1) Water quality and dust** | NA |
| | Contract 3 | 0 | **10** | • **(3) Dust**<br>• **(3) Water quality**<br>• **(2) Noise**<br>• **(2) site cleanliness (dust & water quality)** | NA |
| | Contract 4 | 0 | 0 | NA | NA |
| | Contract 6 | 0 | **45** | • **(24) Water Quality**<br>• **(12) Dust**<br>• **(3) Noise**<br>• **(1) Nuisance**<br>• **(1) Noise and dust**<br>• **(3) Water quality and dust**<br>• **(1) Water quality and noise** | NA |
| | Contract 7 | 0 | **4** | • **(1) Noise**<br>• **(3) Water quality and dust** | NA |
| | SS C505 | 0 | **7** | • **(1) Noise**<br>• **(2) dust**<br>• **(3) Water quality and dust**<br>• **(1) Water quality** | NA |

*Remark: (#) one complaint case was under investigation.*

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

| Reporting Period | Contract No | Environmental Summons Statistics | | |
|---|---|---|---|---|
| | | Frequency | Cumulative | Complaint Nature |
| 19 May 2014 – 31 March 2019 | Contract 2 | 0 | **1** | contravening the Water Pollution Control (General) Regulations |
| 06 Nov 2013 – 31 March 2019 | Contract 3 | 0 | 0 | NA |
| 16 Aug 2013 – 31 March 2019 | Contract 5 | 0 | 0 | NA |
| 16 Aug 2013 – 31 March 2019 | Contract 6 | 0 | 0 | NA |
| 15 Feb 2016 – 31 March 2019 | Contract 7 | 0 | 0 | NA |
| 16 Aug 2013 – 31 March 2019 | SS C505 | 0 | 0 | NA |
| 1 – 30 April 2019 | 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 – 31 March 2019 | Contract 2 | 0 | **1** | contravening the Water Pollution Control (General) Regulations |
| 06 Nov 2013 – 31 March 2019 | Contract 3 | 0 | 0 | NA |
| 16 Aug 2013 – 31 March 2019 | Contract 5 | 0 | 0 | NA |
| 16 Aug 2013 – 31 March 2019 | Contract 6 | 0 | 0 | NA |
| 15 Feb 2016 – 31 March 2019 | Contract 7 | 0 | 0 | NA |
| 16 Aug 2013 – 31 March 2019 | SS C505 | 0 | 0 | NA |
| 1 – 30 April 2019 | 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 | • Wastewater to be treated by the wastewater treatment facilities i.e. sedimentation tank or similar facility before discharge. |
| Air Quality | • Maintain damp / wet surface on access road<br>• Low vehicular speed within the works areas.<br>• All vehicles must use wheel washing facility before off site<br>• Sprayed water during breaking works<br>• A cleaning truck was regularly performed on the public road to prevent fugitive dust emission |
| Noise | • Restrain operation time of plants from 07:00 to 19:00 on any working day except for Public Holiday and Sunday.<br>• Keep good maintenance of plants<br>• Place noisy plants away from residence or school<br>• Provide noise barriers or hoarding to enclose the noisy plants or works<br>• Shut down the plants when not in used. |
| Waste and Chemical Management | • On-site sorting prior to disposal<br>• Follow requirements and procedures of the "Trip-ticket System"<br>• Predict required quantity of concrete accurately<br>• Collect the unused fresh concrete at designated locations in the sites for subsequent disposal |
| General | • The site was generally kept tidy and clean. |

## 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 | • Defect rectification for Ventilation building<br>• External reinstatement and landscaping works |
| North Portal | • Construction slip road and permanent drainage<br>• Road paving and cladding installation inside the tunnel<br>• External reinstatement and landscaping works<br>• Defect rectification for Ventilation building<br>• Testing and Commissioning for E&M facilities |
| South Portal | • Construction slip road and permanent drainage<br>• Road paving and cladding installation inside the tunnel<br>• Defect rectification for Ventilation building<br>• Testing and Commissioning for E&M facilities<br>• Construction of flexible barrier<br>• External backfilling, reinstatement and landscaping works.<br>• Dismantling the concrete pier of the temporary steel bridge |
| Admin Building | • Defect rectification<br>• External reinstatement and landscaping works |

**Contract 3**

- Cable detection and trial trenches
- Remaining works on new Footbridge
- Noise barrier construction
- Road pavement works
- Water main laying works (on Grade)
- Installation of Noise barrier panel (on Grade)
- Road Drainage Works
- Construction of Pavilion and Pai Lau
- Construction of Slope works
- Landscaping works

**Contract 4**

- T&C at Admin Building, tunnel & highway

**Contract 6**

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

**Contract 7**

- Noise barrier construction at Bridge D and E
- Parapet installation at Bridge A & E
- Waterproofing and Green roof system at Roof of Bridge C
- Boundary Fence at Roof of Bridge C
- Street lighting and CCTV installation at perimeter road
- Shenzhen River reinstatement
- Landscape Softwork

**Contract SS C505**

- Passenger Terminal Building (PTB) Structure Works - G/F Plant Rooms Structure Works, G/F Backfiling & Drainage, Under Ground Utilities, Fence Wall and On Grade Slab
- PTB - ABWF Works & MEP Installation - Front/Back of House Area, External Staircases, External Staircases, Hall Block External Façade, Southern Entrance Construction, Major Plant Rooms & EAC Doors
- 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 & MXRVSS), Podium Open Area & 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 at G/F, R/F & External
- Bldg 2 - HKPF Building and Observation Tower Phase 1 - External Works, Integrated ABWF & MEP Works at G/F to 4/F, Observation Tower (incluidng Lift) & External Works
- 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 & 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 (FXI 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 to 1/F & Roof works
- 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, Integrated ABWF and MEP Works at G/F & R/F
- Bldg 11 - GV Kiosk (Outbound) Phase 2 - On-Grade Slab, 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 - 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 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 - 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 - Integrated ABWF and MEP Works at G/F & Envelope
- Bldg 29 - Guard Booths (Vehicle Detention Area) Phase 2 - Integrated ABWF and MEP Works at G/F & Envelope
- Bldg 30 - Guard Booth (Outbound) Phase 2 - Integrated ABWF and MEP Works at G/F & Envelope
- Bldg 31 - Guard Booth (Inbound) Phase 2 - Integrated ABWF and MEP Works at G/F & Envelope
- Bldg 32/33/34/35 Phase 2 - Steel Canopy 1 to 4 Integrated ABWF and MEP Works
- Bldg 36 - Fire Hydrant Tank & Pump Room Phase 1 - Integrated ABWF and MEP Works at R/F
- Bldg 37/38/39/40 - Elevated Walkways (E1, E2, E3 & E4) Phase 2 - ABWF and BS Works
- Vehicular Bridge 1 Phase 3 - Retaining walls, Bridge Decks 1A as Temp. Road, Bridge Decks 1B RC works, Road and Finishes Works
- Vehicular Bridges 2, 3 & 5 Phase 3 - Road and Finishes Works
- Vehicular Bridge 4 Phase 3 - Retaining walls, Road and Finishes Works
- External Works - Water Meter Room Connection (inbound & outbound)
- External Utilities Works - UU works for phase 2 FS inspection & DSD inspection
- External Road & Pavement Works - for inbound - Phase 1 FS inspection (concrete pavement) & for Phase 2 FS inspection
- External Landscape - Inbound & Outbound area
- "Testing & Commissioning (T&C) and FSD/SCCU Inspection Phase 1
- T&C - FSD, HKPF, CBI, FXI, DOG & Bldg 36
- FS Inspection & SCCU Inspection & Handover "
- "Testing & Commissioning (T&C) and FSD/SCCU Inspection Phase 2
- T&C - CBO, FXO, Inbound & Outbound Groups

- FS Inspection - EVA, CBO & FXO, Inbound & Outbound Groups"
- "Testing & Commissioning (T&C) and FSD Inspection Phase 3
- T&C - EVA & PTB"

## 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 **69th** monthly EM&A report presenting the monitoring results and inspection findings for the Reporting Period from **1** to **30 April 2019**.

12.1.2 For air quality monitoring, no 1-hour TSP and 24-hour TSP monitoring results triggered the Action /Limit Level was recorded.

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 In the Reporting Period, no exceedance for water quality monitoring was recorded.

12.1.5 In this Reporting Period, no environmental complaints were received. Moreover, no summons and prosecution under the EM&A Programme was lodged in the Reporting Period.

12.1.6 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 As wet season is approaching, 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.

12.2.2 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.

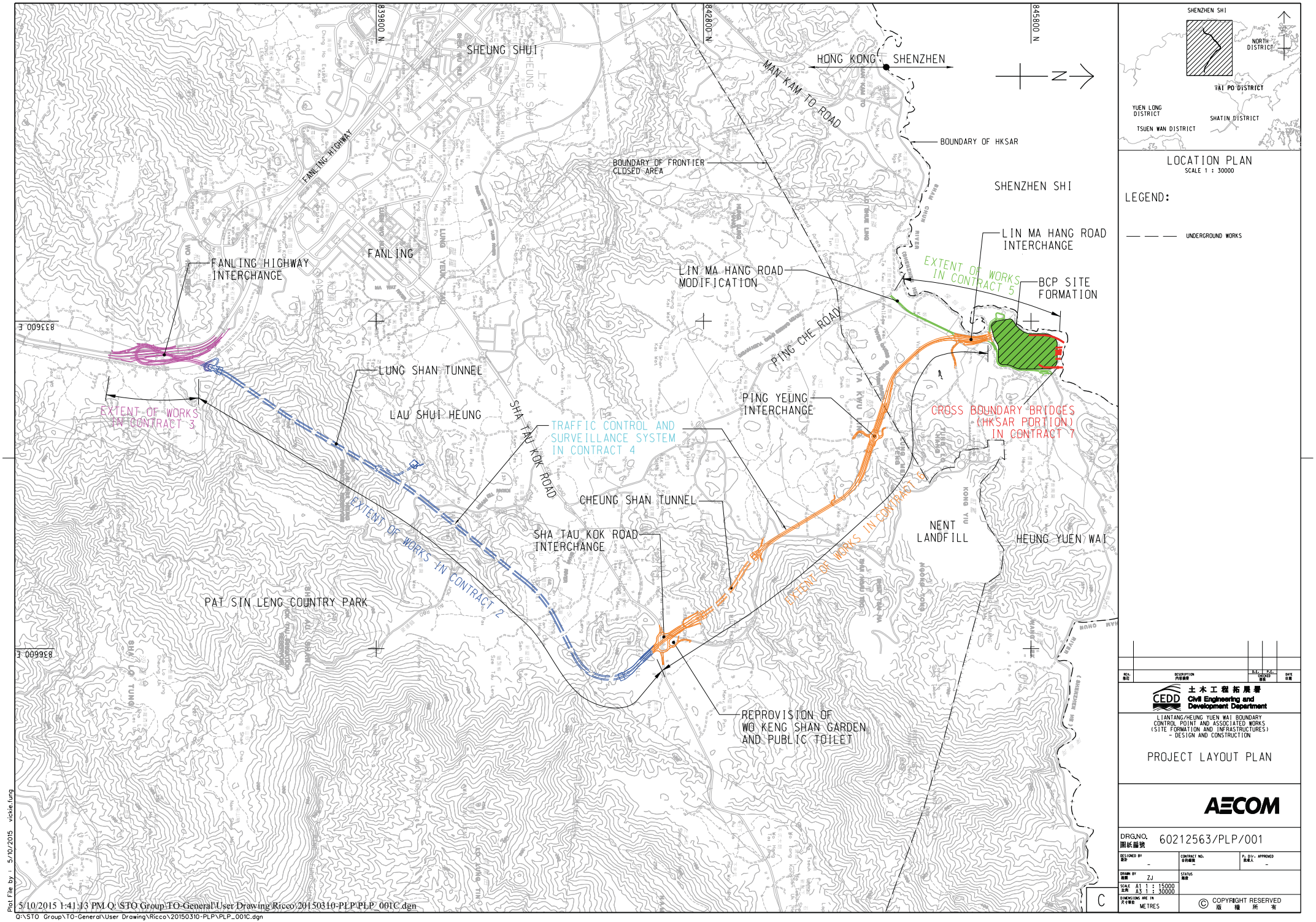
12.2.3 Construction noise would be a key environmental issue during construction work of the Project. Noise mitigation measures such as using quiet plants should be implemented in accordance with the EM&A requirement.

12.2.4 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.

12.2.5 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 : 30000

LEGEND:

UNDERGROUND WORKS

| REV. 修訂 | DESCRIPTION 內容摘要 | D.E. | P.E. CHECKED 審核 | DATE 日期 |
|---|---|---|---|---|

CEDD 土木工程拓展署 Civil Engineering and Development Department

LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS (SITE FORMATION AND INFRASTRUCTURES) - DESIGN AND CONSTRUCTION

PROJECT LAYOUT PLAN

AECOM

DRG.NO. 圖紙編號 60212563/PLP/001

| DESIGNED BY 設計 | CONTRACT NO. 合約編號 | P. DIV. APPROVED 批准人 |
|---|---|---|
| – | – | – |
| DRAWN BY 繪圖 ZJ | STATUS 階段 | |
| SCALE 比例 A1 1 : 15000 A3 1 : 30000 | | |
| DIMENSIONS ARE IN 尺寸單位 METRES | © COPYRIGHT RESERVED 版權所有 | |

C

Plot File by : 5/10/2015 vickie.fung

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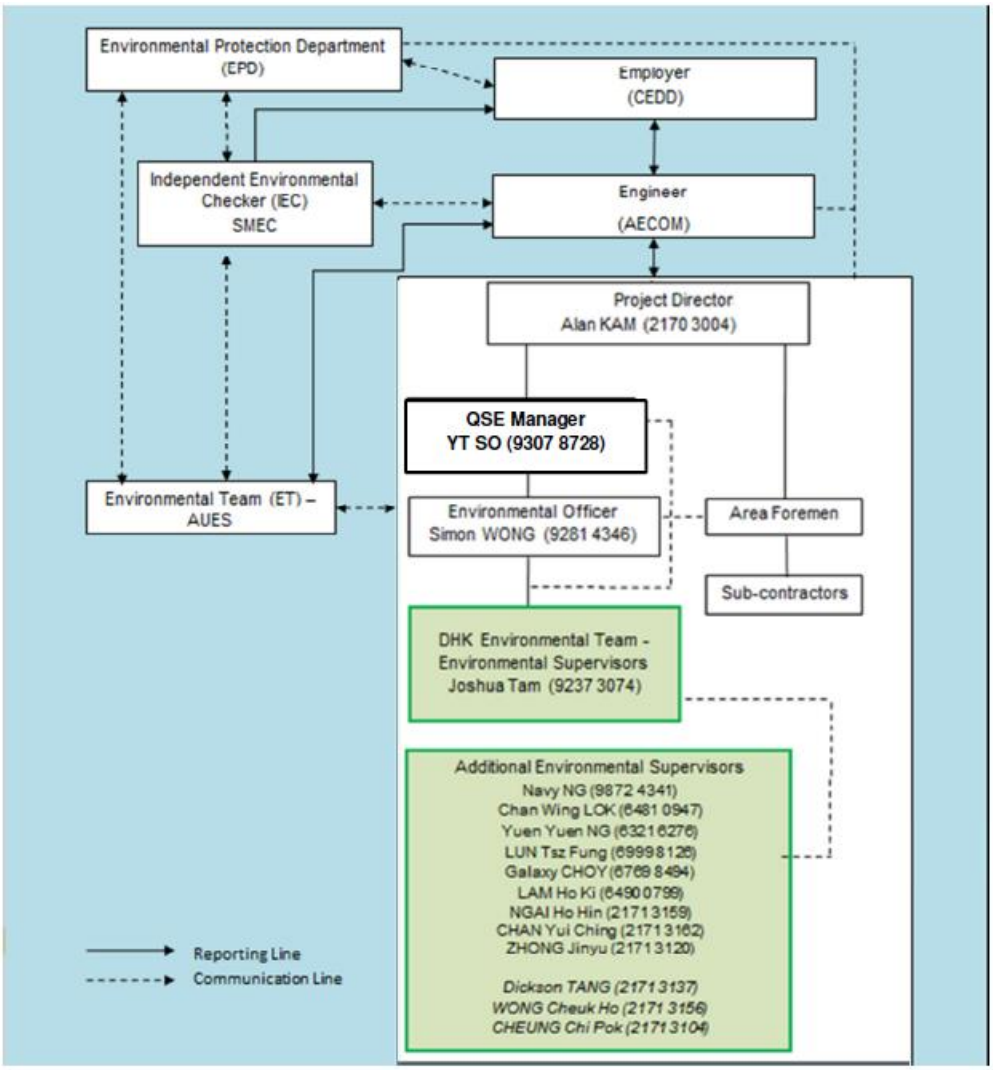
# Appendix B

# Organization Chart




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

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

| Organization | Project Role | Name of Key Staff | Tel No | Fax No. |
|---|---|---|---|---|
| AECOM | Engineer's Representative | Edwin Ching | 2171 3301 | 2171 3498 |
| SMEC | Independent Environmental Checker | Antony Wong | 3995 8120 | 3995 8101 |
| DHK | Project Director | Alan Kam | 2170 3004 | 2171 3299 |
| DHK | QSE Manager | Y. T. So | 9307 8728 | 2171 3299 |
| DHK | Environmental Officer | TBA | TBA | TBA |
| 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:

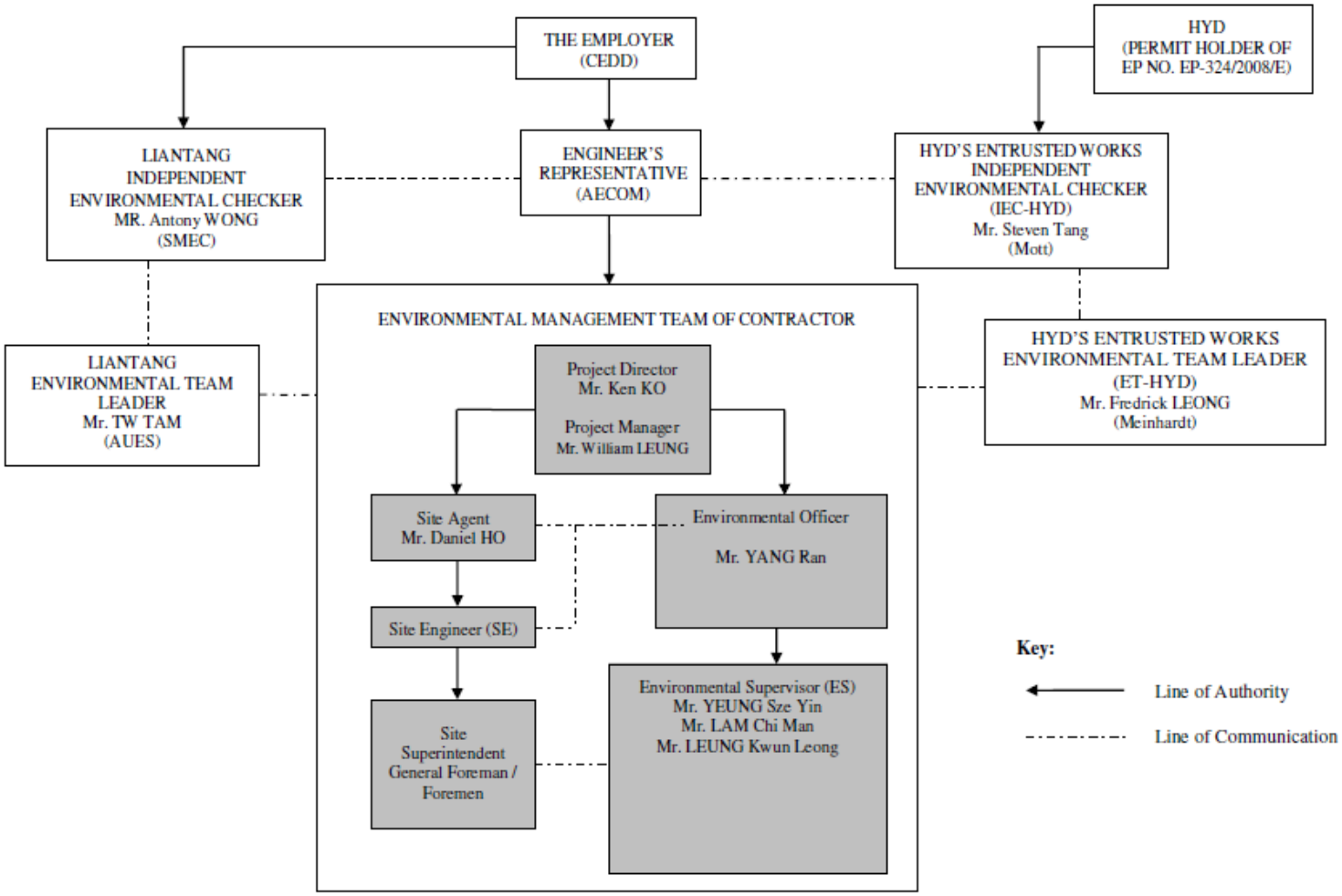
*CEDD (Employer) – Civil Engineering and Development Department*

*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

| Organization | Project Role | Name of Key Staff | Tel No | Fax No. |
|---|---|---|---|---|
| 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*

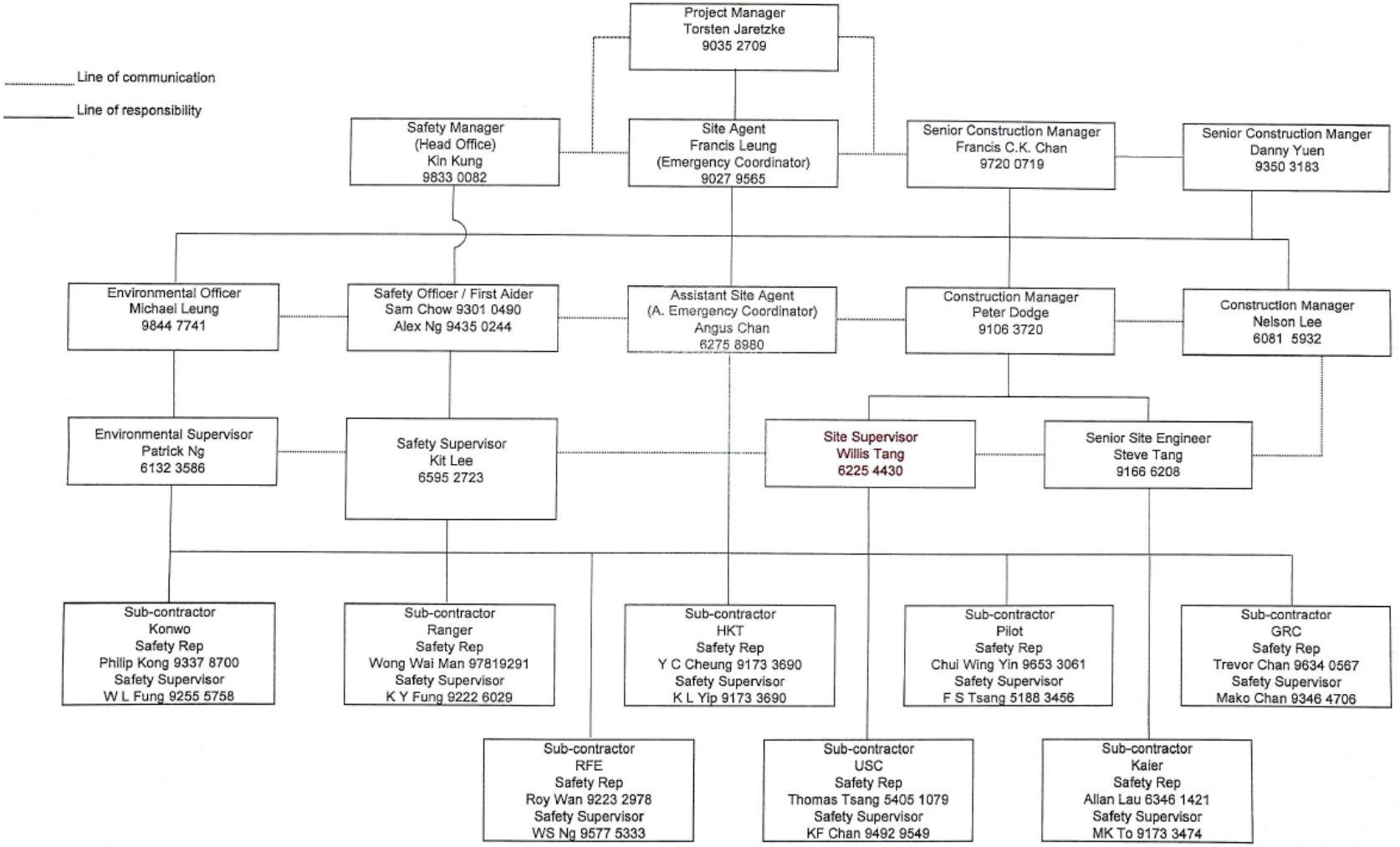
*AECOM (Engineer) – AECOM Asia Co. Ltd.*

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

*SMEC (IEC) – SMEC Asia Limited*

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

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



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

| Organization | Project Role | Name of Key Staff | Tel No | Fax No. |
|---|---|---|---|---|
| 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 | 9444 5577 | -- |
| Siemens | Site Agent | Francis C K Chan | -- | -- |
| 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 |

Legend:

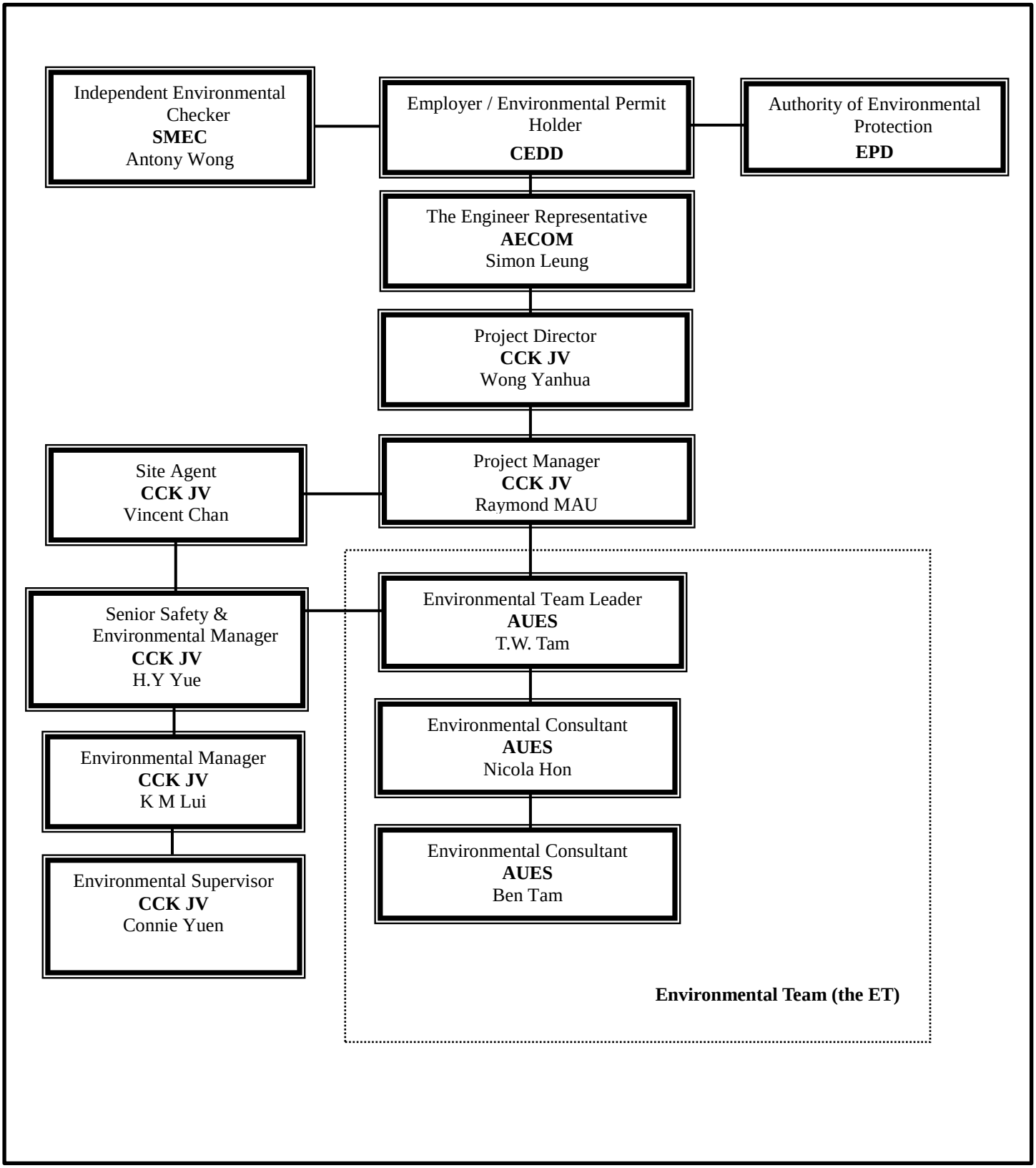
*CEDD (Employer) – Civil Engineering and Development Department*

*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 | Owen Ng | 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 |

Legend:

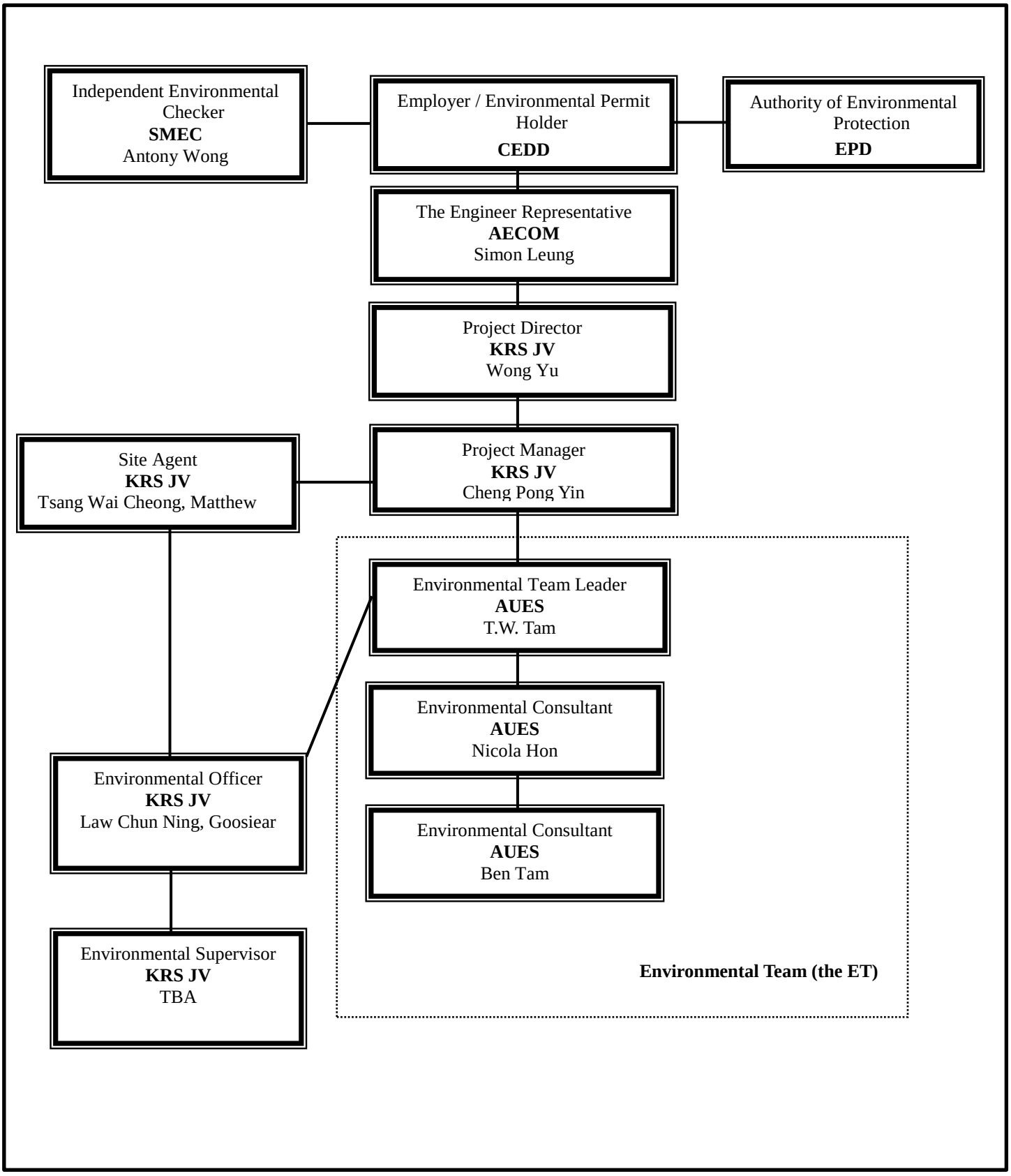
*CEDD (Employer) – Civil Engineering and Development Department*

*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

| Organization | Project Role | Name of Key Staff | Tel No. | Fax No. |
|---|---|---|---|---|
| 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:

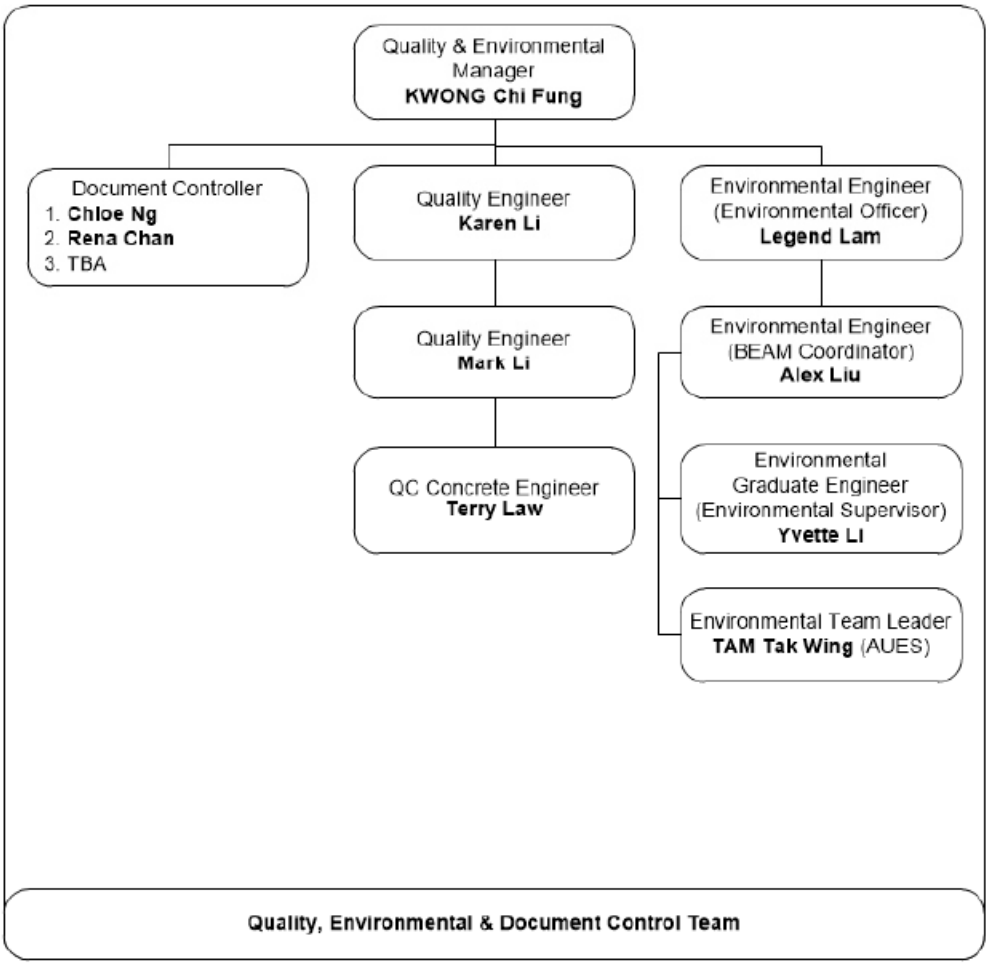
*CEDD (Employer) – Civil Engineering and Development Department*

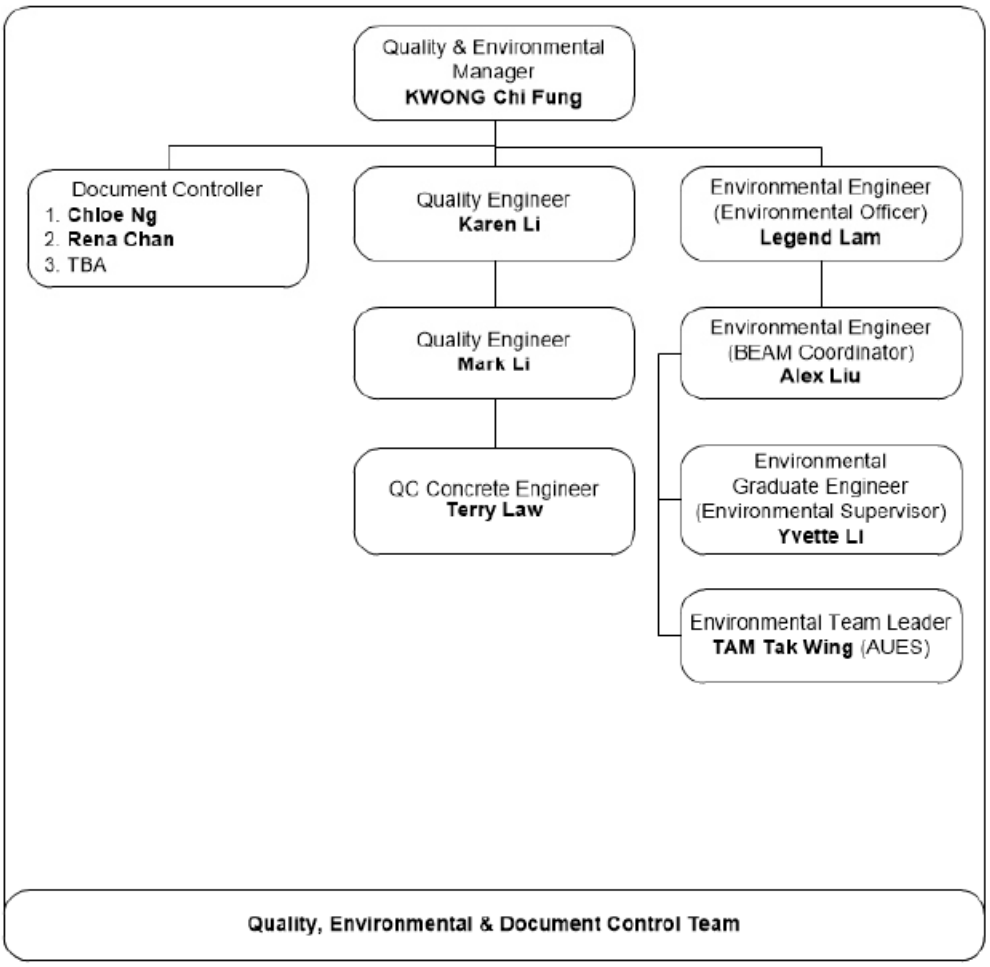
*AECOM (Engineer) – AECOM Asia Co. Ltd.*

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

*SMEC (IEC) – SMEC Asia Limited*

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


Quality & Environmental Manager
KWONG Chi Fung
Document Controller
1. Chloe Ng
2. Rena Chan
3. TBA
Quality Engineer
Karen Li
Quality Engineer
Mark Li
QC Concrete Engineer
Terry Law
Environmental Engineer (Environmental Officer)
Legend Lam
Environmental Engineer (BEAM Coordinator)
Alex Liu
Environmental Graduate Engineer (Environmental Supervisor)
Yvette LI
Environmental Team Leader
TAM Tak Wing (AUES)
Quality, Environmental & Document Control Team




**Environmental Management Organization for Contract SS C505**

## Contact Details of Key Personnel for Contract SS C505

| Organization | Project Role | Name of Key Staff | Tel No. | Fax No. |
|---|---|---|---|---|
| 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 (Apr 2019 - Jun 2019) Construction Rolling Progam

| Item | Construction Activites |
|---|---|
| 1 | Admin Bldg - Defect rectification |
| 2 | Admin Bldg - External reinstatement and landscaping works |
| 3 | Mid-Vent Portal - Defect rectification for Ventilation building |
| 4 | Mid-Vent Portal - Construction of flexible barrier |
| 5 | Mid-Vent Portal - External reinstatement and landscaping works |
| 6 | Mid-Vent Portal - Testing and Commissioning for E&M facilities |
| 7 | North Portal - Construction slip road and permanent drainage |
| 8 | North Portal - Road paving and cladding installation inside the tunnel |
| 9 | North Portal - External reinstatement and landscaping works |
| 10 | North Portal - Defect rectification for Ventilation building |
| 11 | North Portal - Testing and Commissioning for E&M facililties |
| 12 | South Portal - Construction slip road and permanent drainage |
| 13 | South Portal - Road paving and cladding installation inside the tunnel |
| 14 | South Portal - Defect rectification for Ventilation building |
| 15 | South Portal - Testing and Commissioning for E&M facililties |
| 16 | South Portal - Construction of flexible barrier |
| 17 | South Portal - External backfilling, reinstatement and landscaping works. |

# 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 (April 2019, May 2019 and June 2019) Construction Rolling Progam

| 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) |
| 6 | Installation of Noise barrier panel (on Grade) |
| 7 | Road Drainage Works |
| 8 | Construction of Pavilion and Pai Lau |
| 9 | Construction of Slope Works |
| 10 | Landscaping works |
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# Contract 4

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

SIEMENS
Ingenuity for life

## Tentative Three Months (April 2019, May 2019 and June 2019) Construction Rolling Progam

| Item | Construction Activites |
|---|---|
| 1 | T&C at admin building |
| 2 | T&C at tunnel & highway |
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# Contract 6

**Liantang / Heung Yuen Wai Boundary Control Point and Associated Works**
**CEDD Contract No: CV/2013/08**
**Main Contractor: CRBE-CEC-Kaden Joint Venture**

CRBC-CEC-KADEN Joint Venture

# Tentative Three Months (April 2019, May 2019 and June 2019) Construction Rolling Progam

| Item | Construction Activites |
|---|---|
| 1 | Bridge Construction |
| 2 | Tunneling Works |
| 3 | Sewage Treatment Plant Construction |
| 4 | Tunnel Ventilation Building Construction |
| 5 | Slip Road/At-grade Road/Periphery Road Construction |
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# Contract 7

**Liantang / Heung Yuen Wai Boundary Control Point and Associated Works**
**CEDD Contract No: NE/2014/03**
**Main Contractor: Kwan On-Richwell-SCG Joint Venture**

均安 - 顯豐機械 - 上海建工 聯營
Kwan On - Richwell - SCG JV

## Tentative Three Months(April, May and June 2019) Construction Rolling Progam

| Item | Construction Activites |
|---|---|
| 1 | Bridge A - Street Lighting, Drainage and Parapet Construction |
| 2 | Bridge B - Street Lighting, Drainage and Parapet Construction |
| 3 | Bridge C - Green Roof System |
| 4 | Bridge D - Street Lighting, Drainage and Parapet Construction |
| 5 | Bridge D - Noise Barrier Construction |
| 6 | Bridge E - Street Lighting, Drainage and Parapet Construction |
| 7 | Bridge E - Noise Barrier Construction |
| 8 | Perimeter Road - Drainage and Watermains |
| 9 | Perimeter Road - Bitumen Pavement |
| 10 | Perimeter Road - Boundary Fencing |
| 11 | Portion A - Shenzhen River Reinstatement |
| 12 | Portion Z - Landscape Softwork |
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# Contract SS C505

**Liantang / Heung Yuen Wai Boundary Control Point and Associated Works**
**ArchSD Contract No: SSC505**
**Main Contractor: Leighton**

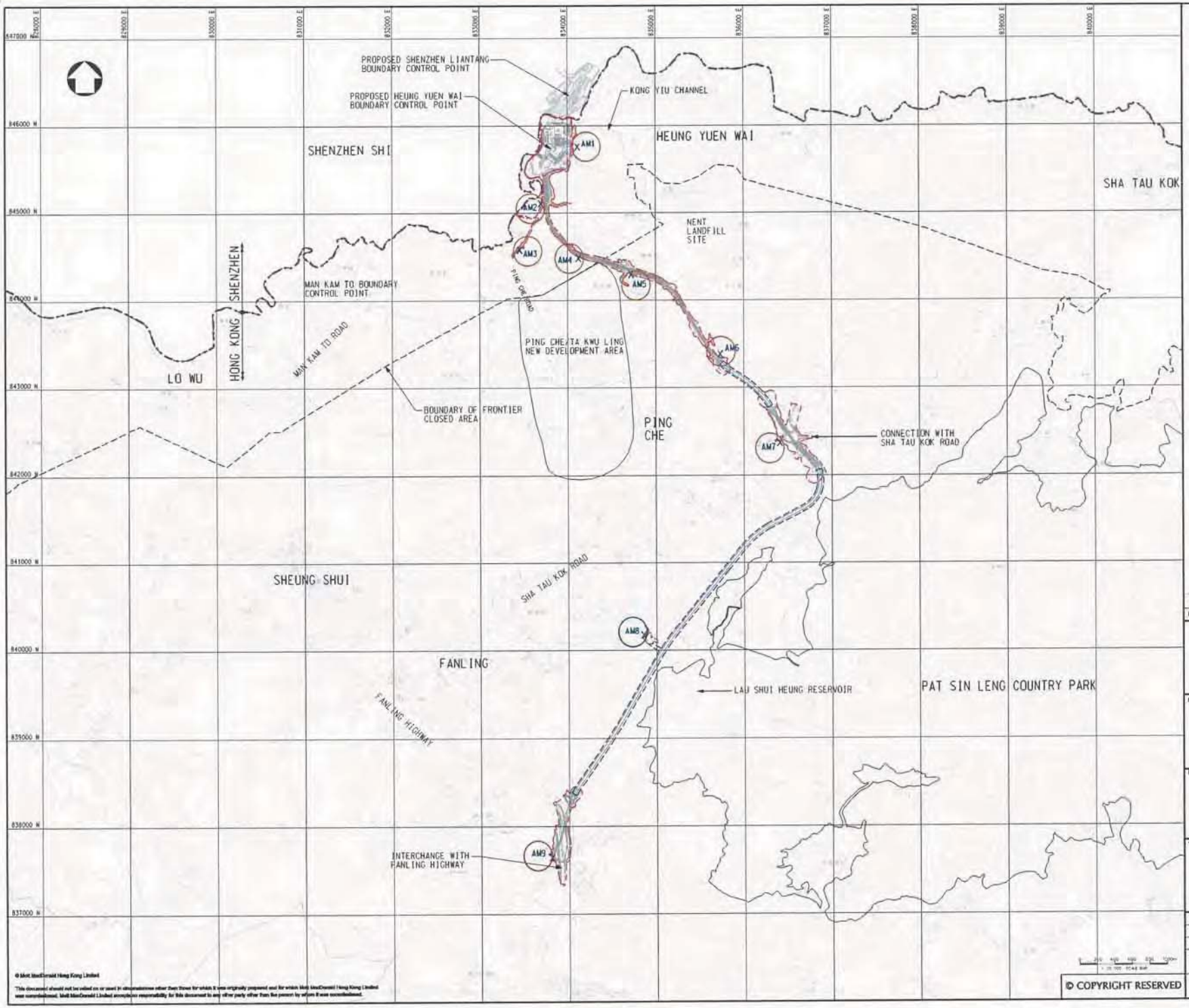
LEIGHTON 禮頓

## Tentative Three Months (April, May & June 2019) Construction Rolling Progam

| Item | Construction Activites |
|---|---|
| 1 | Passenger Terminal Building (PTB) Structure Works - G/F Plant Rooms Structure Works, G/F Backfiling & 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, Hall Block External Façade, Southern Entrance Construction, Major Plant Rooms & EAC Doors |
| 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 & MXRVSS), Podium Open Area & 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 at G/F, R/F & External |
| 6 | Bldg 2 - HKPF Building and Observation Tower Phase 1 - External Works, Integrated ABWF & MEP Works at G/F to 4/F, Observation Tower (incluidng Lift) & External Works |
| 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 & 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 (FXI 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 to 1/F & Roof works |
| 12 | Bldg 8 - MXRVSS (Inbound) Phase 2 - 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, Integrated ABWF and MEP Works at G/F & R/F |
| 15 | Bldg 11 - GV Kiosk (Outbound) Phase 2 - On-Grade Slab, 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 - 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 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 - 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 - Integrated ABWF and MEP Works at G/F & Envelope |
| 27 | Bldg 29 - Guard Booths (Vehicle Detention Area) Phase 2 - Integrated ABWF and MEP Works at G/F & Envelope |
| 28 | Bldg 30 - Guard Booth (Outbound) Phase 2 - Integrated ABWF and MEP Works at G/F & Envelope |
| 29 | Bldg 31 - Guard Booth (Inbound) Phase 2 - Integrated ABWF and MEP Works at G/F & Envelope |
| 30 | Bldg 32/33/34/35 Phase 2 - Steel Canopy 1 to 4 Integrated ABWF and MEP Works |
| 31 | Bldg 36 - Fire Hydrant Tank & Pump Room Phase 1 - Integrated ABWF and MEP Works at R/F |
| 32 | Bldg 37/38/39/40 - Elevated Walkways (E1, E2, E3 & E4) Phase 2 - ABWF and BS Works |
| 33 | Vehicular Bridge 1 Phase 3 - Retaining walls, Bridge Decks 1A as Temp. Road, Bridge Decks 1B RC works, Road and Finishes Works |
| 34 | Vehicular Bridges 2, 3 & 5 Phase 3 - Road and Finishes Works |
| 35 | Vehicular Bridge 4 Phase 3 - Retaining walls, Road and Finishes Works |
| 36 | External Works - Water Meter Room Connection (inbound & outbound) |
| 37 | External Utilities Works - UU works for phase 2 FS inspection & DSD inspection |
| 38 | External Road & Pavement Works - for inbound - Phase 1 FS inspection (concrete pavement) & for Phase 2 FS inspection |
| 39 | External Landscape - Inbound & Outbound area |
| 40 | Testing & Commissioning (T&C) and FSD/SCCU Inspection Phase 1<br>T&C - FSD, HKPF, CBI, FXI, DOG & Bldg 36<br>FS Inspection & SCCU Inspection & Handover |
| 41 | Testing & Commissioning (T&C) and FSD/SCCU Inspection Phase 2<br>T&C - CBO, FXO, Inbound & Outbound Groups<br>FS Inspection - EVA, CBO & FXO, Inbound & Outbound Groups |
| 42 | Testing & Commissioning (T&C) and FSD Inspection Phase 3<br>T&C - EVA & PTB |
| | |

# Appendix D

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




| Rev | Date | Drawn | Description | Ch'k'd | App'd |
|---|---|---|---|---|---|
| P1 | AUG 10 | MENG | FIRST ISSUE | DC | HT |

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Client: CEDD — 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 | MENG | | Coordination | EC | |
| Eng.Chk. | DC | | Approved | HT | |
| Scale at A1 | 1:20000 | Project | 255228 | | Status PRE |
| Drawing No | FIGURE 2.1 | | | | Rev P1 |

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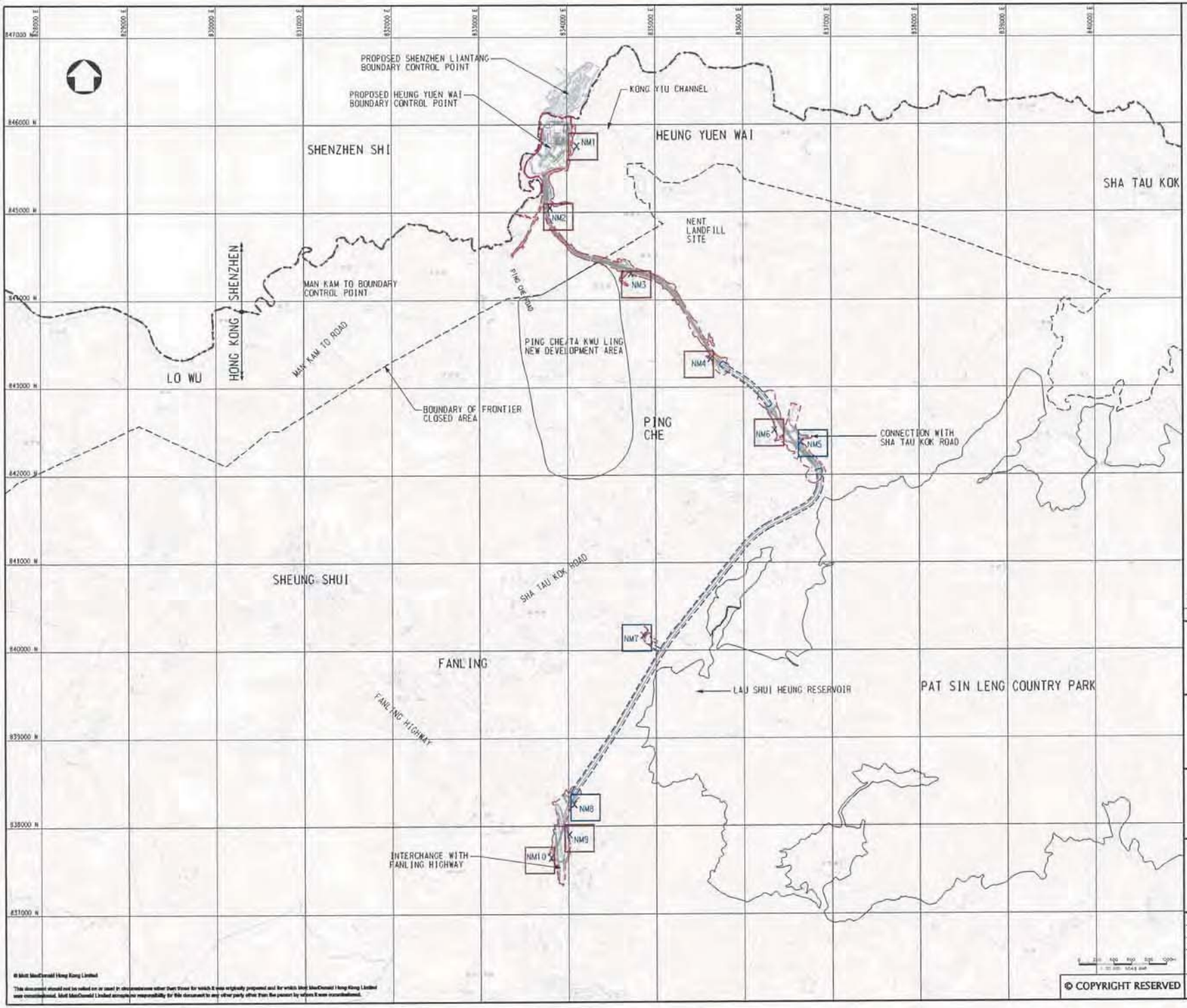


| Rev | Date | Drawn | Description | Ch'k'd | App'd |
|---|---|---|---|---|---|
| P1 | AUG 10 | WING | FIRST ISSUE | DC | HT |

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Client

CEDD 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 NOISE MONITORING STATIONS

| | | | | | |
|---|---|---|---|---|---|
| Designed | DC | | Eng.Chk. | EC | |
| Drawn | WING | | Coordination | EC | |
| Dwg.Chk. | DC | | Approved | HT | |

Scale at A1: 1:20000
Project: 255228
CAD file: J:\255228\Document\env\cad\c\0083\FIG 3.1.dgn
Status: PRE
Drawing No: FIGURE 3.1
Rev: P1

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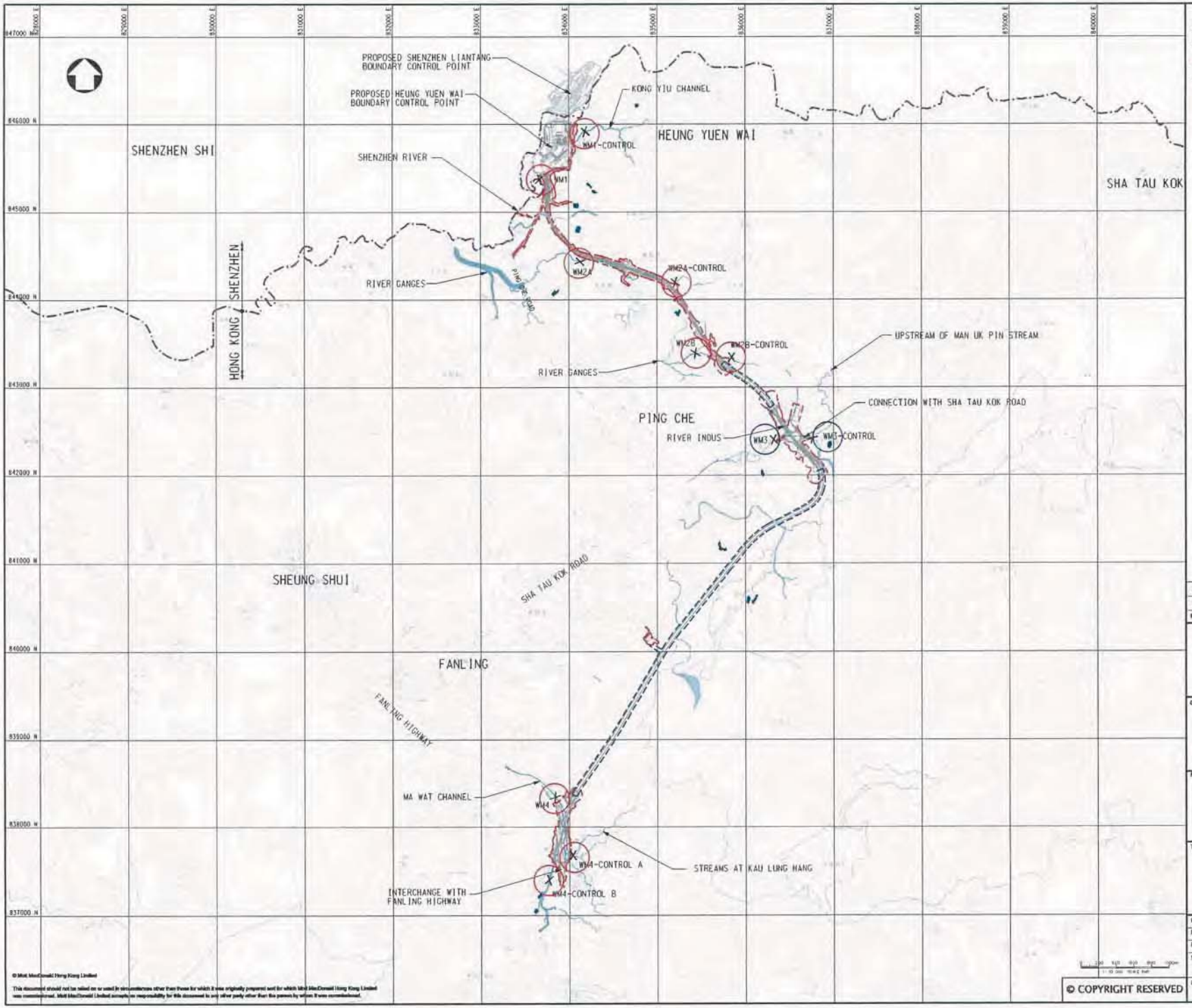


LEGEND:

- BOUNDARY OF HKSAR
- LAND REQUIREMENT LIMIT (ABOVE GROUND)
- LAND REQUIREMENT LIMIT (TUNNEL)
- X PROPOSED WATER QUALITY MONITORING STATION

| MONITORING STATION | CO-ORDINATES | |
|---|---|---|
| | EASTING(m) | NORTHING(m) |
| WM1 | 833668.635 | 845371.097 |
| WM1-CONTROL | 834185.480 | 845916.662 |
| WM2A | 834132.193 | 844432.910 |
| WM2A-CONTROL | 835205.329 | 844200.151 |
| WM2B | 835434.744 | 843394.606 |
| WM2B-CONTROL | 835845.878 | 843343.625 |
| WM3 | 836323.622 | 842404.977 |
| WM3-CONTROL | 836763.419 | 842425.507 |
| WM4 | 833840.783 | 838344.842 |
| WM4-CONTROL A | 834038.937 | 837688.995 |
| WM4-CONTROL B | 833769.123 | 837406.936 |

| Rev | Date | Drawn | Description | Ch'k'd | App'd |
|---|---|---|---|---|---|
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| P1 | OCT 10 | WING | FIRST ISSUE | HC | HT |

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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 | | Dwg.Chk. | EC | |
| Drawn | WING | | Coordination | EC | |
| Dwg.Chk. | HC | | Approved | HT | |
| Scale at A1 | 1:20000 | Project | 255228 | Status | PRE |
| Drawing No | FIGURE 4.1 | CAD file | | Rev | P2 |

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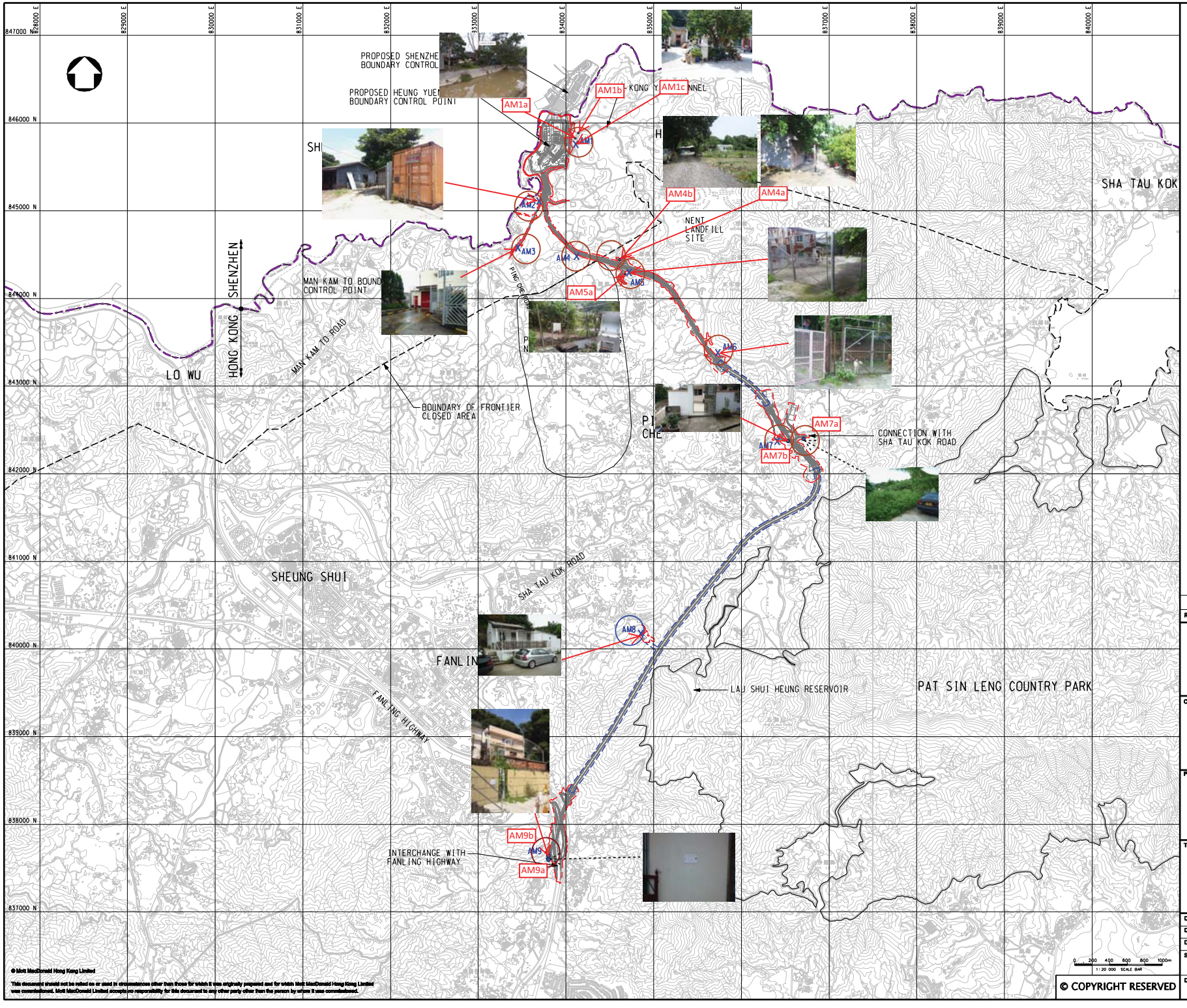
# Appendix E

# Monitoring Locations for Impact Monitoring

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20/F Two Landmark East
100 How Ming Street
Kwun Tong, Kowloon
Hong Kong
T +852 2828 5757
F +852 2827 1823
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Title

PROPOSED LOCATION OF CONSTRUCTION AIR QUALITY MONITORING STATIONS

| | | | | | |
|---|---|---|---|---|---|
| Designed | DC | | Eng.Chk. | EC | |
| Drawn | MING | | Coordination | EC | |
| Dwg.Chk. | DC | | Approved | HT | |
| Scale at A1 | 1:20000 | Project | 255228 | Status | PRE |
| | | CAD file | j:\255228\report\env\em&a\00B3\FIG 2-1.dgn | | |
| Drawing No | FIGURE 2.1 | | | Rev | P1 |


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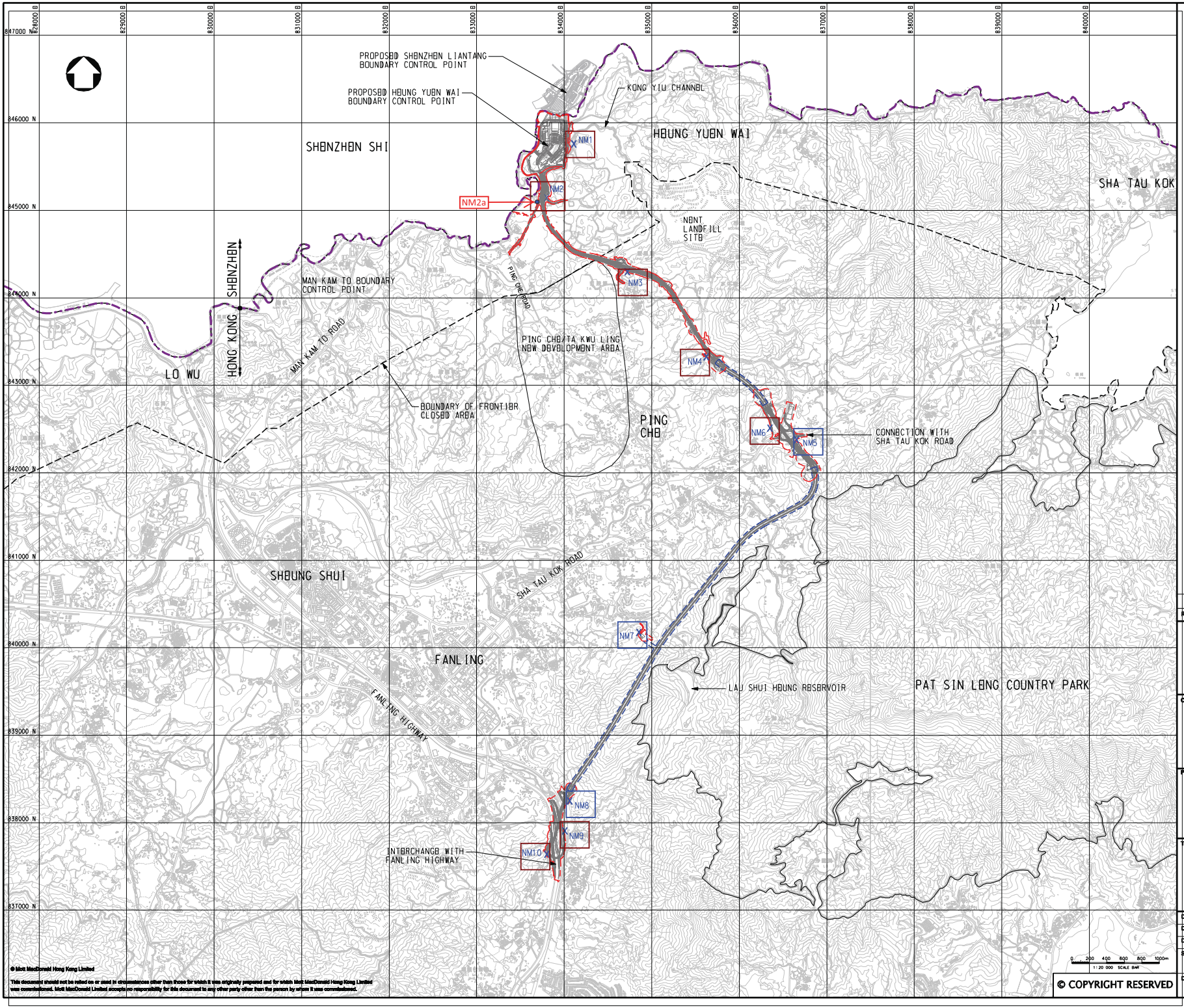


LEGEND:

- BOUNDARY OF HKSAR
- WORKS AREA (ABOVE GROUND)
- WORKS AREA (TUNNEL)
- X CONSTRUCTION NOISE MONITORING STATIONS
- Proposed Noise Monitoring Stations

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|---|---|---|---|---|---|
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Kwun Tong, Kowloon
Hong Kong
T +852 2828 5757
F +852 2827 1823
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Title

PROPOSED LOCATION OF CONSTRUCTION NOISE MONITORING STATIONS

| | | | | | |
|---|---|---|---|---|---|
| Designed | DC | | Eng.Chk. | BC | |
| Drawn | MING | | Coordination | BC | |
| Dwg.Chk. | DC | | Approved | HT | |
| Scale at A1 | 1:20000 | Project | 255228 | Status | PRE |
| | | CAD file | j:\255228\report\env\em&o\00B3\FIG 3-1.dgn | | |
| Drawing No | FIGURE 3.1 | | | Rev | P1 |


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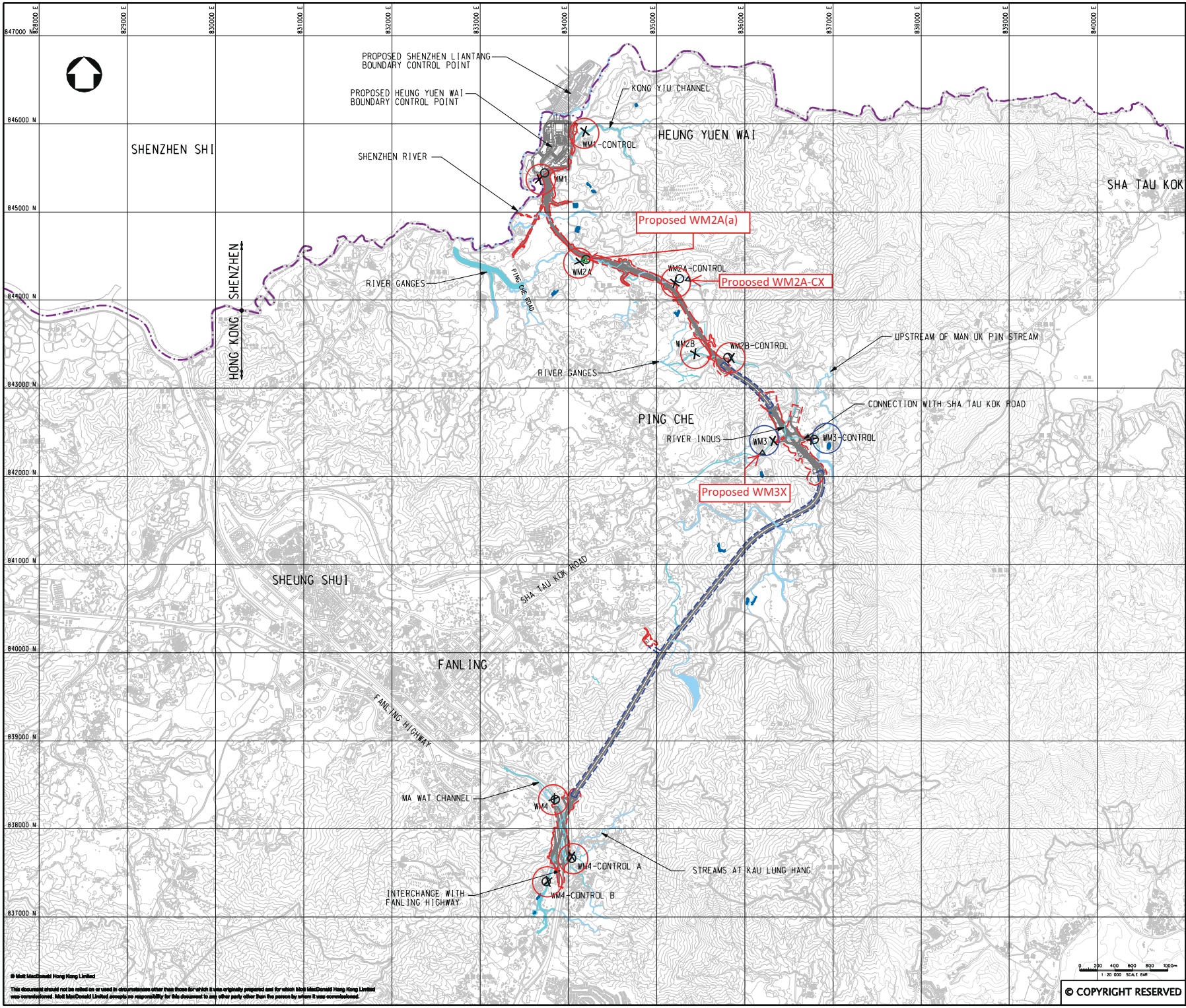


LEGEND:

- BOUNDARY OF HKSAR
- LAND REQUIREMENT LIMIT (ABOVE GROUND)
- LAND REQUIREMENT LIMIT (TUNNEL)
- X — Water Quality Monitoring Location Recommended in EM&A Manual
- O — 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 Coordinates | | Location found during site visit Coordinates | |
|---|---|---|---|---|
| | Easting | Northing | Easting | Northing |
| WM1 | 833668.655 | 845371.897 | 833679 | 845421 |
| WM1 Control | 834187.480 | 845916.662 | 834185 | 845917 |
| WM2A | 834132.193 | 844432.910 | 834204 | 844471 |
| WM2A-Control | 835205.329 | 844200.151 | 835270 | 844243 |
| WM2B | 835414.744 | 843304.606 | 835435 | 843397 |
| WM2B-Control | 835845.878 | 843343.625 | 835835 | 843351 |
| WM3 | 836323.622 | 842404.377 | 836324 | 842407 |
| WM3-Control | 836763.419 | 842425.507 | 836763 | 842400 |
| WM4 | 833840.783 | 838344.842 | 833850 | 838338 |
| WM4-Control A | 834038.937 | 837668.985 | 834028 | 837695 |
| WM4-Control B | 833769.123 | 837406.936 | 833760 | 837395 |

| 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 | 0842407 |
| WM3x(Proposed) | 0836206 | 0842270 |

| New Proposed Wate Quality Monitoring Location in May 2016 | | |
|---|---|---|
| Location ID | Easting | Northing |
| WM2A (Original) | 834204 | 844471 |
| WM2A(a) (Proposed | 834191 | 844474 |

| Rev | Date | Drawn | Description | Ch'k'd | App'd |
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Hong Kong
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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 | 1:20000 | Project | 255228 | | Status PRE |
| | | CAD file | \\hk1255228\REPORT\ENV\EM&A\DWS\FIG 4-1.dgn | | |
| 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: | 25/3/2019 |
| Location ID : AM1c | | Next Calibration Date: | 25/5/2019 |
| | | Technician: | Eric |

## CONDITIONS

| | | | |
|---|---|---|---|
| Sea Level Pressure (hPa) | 1016.8 | Corrected Pressure (mm Hg) | 762.6 |
| Temperature (°C) | 20.5 | Temperature (K) | 294 |

## CALIBRATION ORIFICE

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

## CALIBRATION

| Plate No. | H20 (L) (in) | H2O (R) (in) | H20 (in) | Qstd (m3/min) | I (chart) | IC corrected | LINEAR REGRESSION |
|---|---|---|---|---|---|---|---|
| 18 | 6.1 | 5.9 | 12.0 | 1.668 | 50 | 50.47 | Slope = 32.2929 |
| 13 | 5.1 | 5.1 | 10.2 | 1.538 | 44 | 44.41 | Intercept = -4.1327 |
| 10 | 3.8 | 3.7 | 7.5 | 1.319 | 38 | 38.36 | Corr. coeff. = 0.9967 |
| 7 | 2.3 | 2.3 | 4.6 | 1.033 | 30 | 30.28 | |
| 5 | 1.6 | 1.4 | 3.0 | 0.834 | 22 | 22.21 | |

***Calculations :***

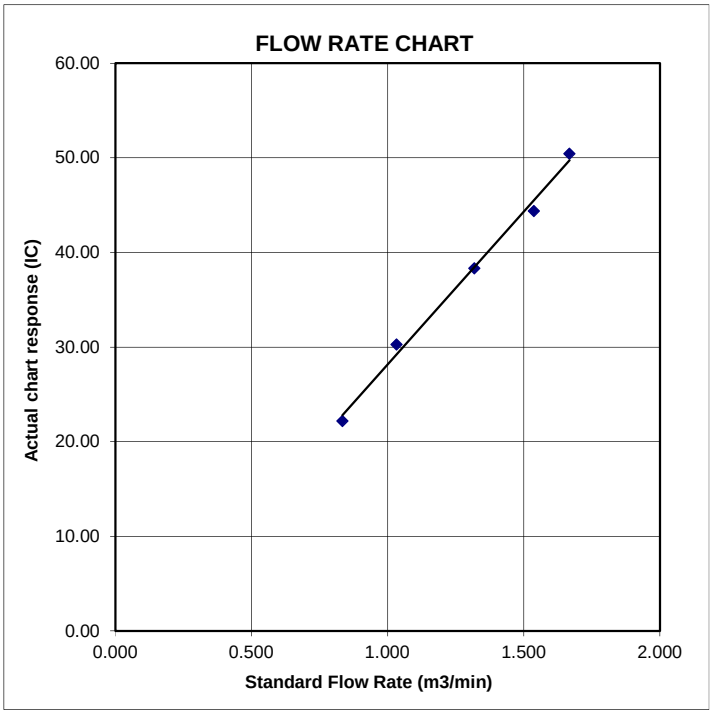
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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

***For subsequent calculation of sampler flow:***

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

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



# TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

| | | | |
|---|---|---|---|
| Location : Village House near Lin Ma Hang Road | | Date of Calibration: | 8/2/2019 |
| Location ID : AM2 | | Next Calibration Date: | 8/4/2019 |
| | | Technician: | Eric |

## CONDITIONS

| | | | |
|---|---|---|---|
| Sea Level Pressure (hPa) | 1015.3 | Corrected Pressure (mm Hg) | 761.475 |
| Temperature (ºC) | 25.1 | Temperature (K) | 298 |

## CALIBRATION ORIFICE

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

## CALIBRATION

| Plate No. | H20 (L) (in) | H2O (R) (in) | H20 (in) | Qstd (m3/min) | I (chart) | IC corrected |
|---|---|---|---|---|---|---|
| 18 | 5.1 | 5 | 10.1 | 1.593 | 54 | 54.04 |
| 13 | 4.7 | 4.1 | 8.8 | 1.488 | 48 | 48.04 |
| 10 | 3.8 | 3.2 | 7.0 | 1.329 | 44 | 44.04 |
| 7 | 2.4 | 1.7 | 4.1 | 1.021 | 36 | 36.03 |
| 5 | 1.8 | 0.9 | 2.7 | 0.832 | 28 | 28.02 |

LINEAR REGRESSION

Slope = 31.7655
Intercept = 2.2426
Corr. coeff. = 0.9927

***Calculations :***

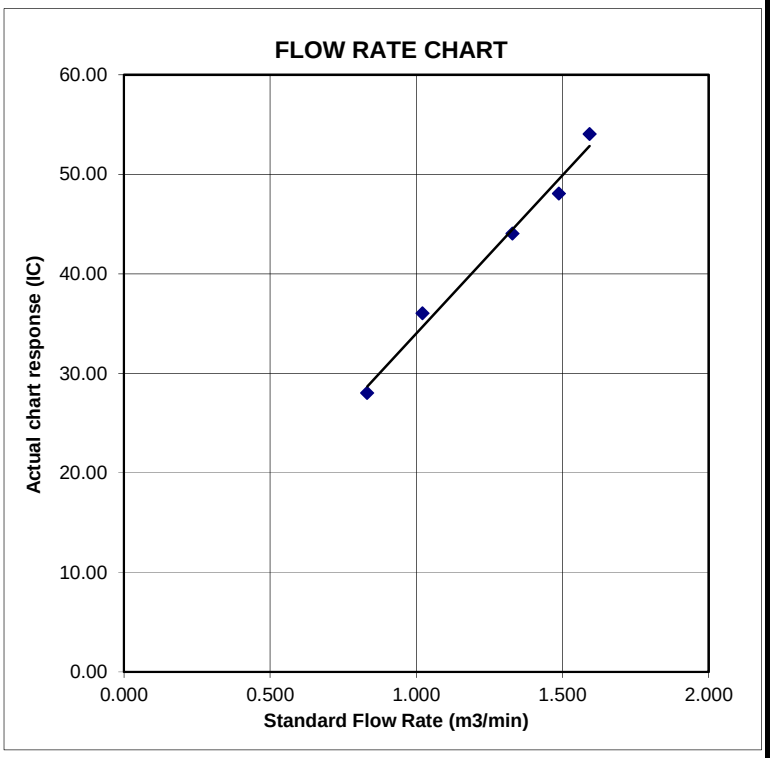
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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

***For subsequent calculation of sampler flow:***

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

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



# TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

| | | | |
|---|---|---|---|
| Location : Ta Kwu Ling Fire Service Station | | Date of Calibration: | 8/2/2019 |
| Location ID : AM3 | | Next Calibration Date: | 8/4/2019 |
| | | Technician: | Eric |

## CONDITIONS

| | | | |
|---|---|---|---|
| Sea Level Pressure (hPa) | 1015.3 | Corrected Pressure (mm Hg) | 761.475 |
| Temperature (°C) | 25.1 | Temperature (K) | 298 |

## CALIBRATION ORIFICE

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

## CALIBRATION

| Plate No. | H20 (L) (in) | H2O (R) (in) | H20 (in) | Qstd (m3/min) | I (chart) | IC corrected | LINEAR REGRESSION |
|---|---|---|---|---|---|---|---|
| 18 | 6.2 | 5.8 | 12.0 | 1.734 | 54 | 54.04 | Slope = 28.3328 |
| 13 | 5.4 | 4.4 | 9.8 | 1.569 | 48 | 48.04 | Intercept = 4.2349 |
| 10 | 4 | 3.3 | 7.3 | 1.357 | 42 | 42.03 | Corr. coeff. = 0.9975 |
| 7 | 2.7 | 2 | 4.7 | 1.092 | 36 | 36.03 | |
| 5 | 1.8 | 1.0 | 2.8 | 0.847 | 28 | 28.02 | |

***Calculations :***

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

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

Qstd = standard flow rate

IC = corrected chart respones

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration ( deg K )

Pstd = actual pressure during calibration ( mm Hg )

***For subsequent calculation of sampler flow:***

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

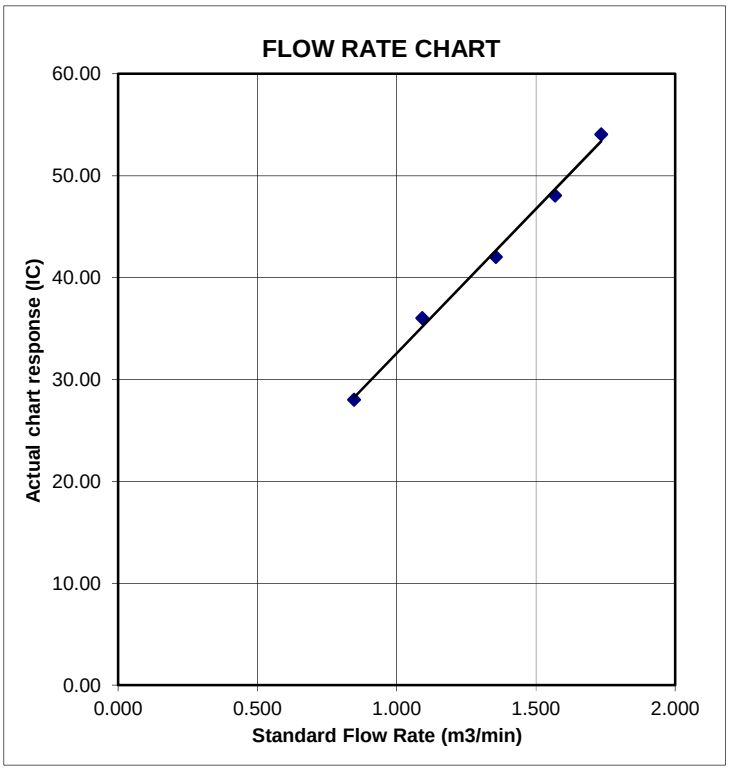
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



# TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Nga Yiu Ha Village
Location ID : AM4b

Date of Calibration: 4/2/2019
Next Calibration Date: 4/4/2019
Technician: Eric

## CONDITIONS

| | | | |
|---|---|---|---|
| Sea Level Pressure (hPa) | 1018.1 | Corrected Pressure (mm Hg) | 763.575 |
| Temperature (ºC) | 21.7 | Temperature (K) | 295 |

## CALIBRATION ORIFICE

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

## CALIBRATION

| Plate No. | H20 (L) (in) | H2O (R) (in) | H20 (in) | Qstd (m3/min) | I (chart) | IC corrected | LINEAR REGRESSION |
|---|---|---|---|---|---|---|---|
| 18 | 6.6 | 5.5 | 12.1 | 1.754 | 56 | 56.44 | Slope = 29.4504 |
| 13 | 5.4 | 4.4 | 9.8 | 1.580 | 50 | 50.40 | Intercept = 4.2124 |
| 10 | 4.2 | 3.2 | 7.4 | 1.376 | 44 | 44.35 | Corr. coeff. = 0.9990 |
| 7 | 2.8 | 1.9 | 4.7 | 1.100 | 36 | 36.29 | |
| 5 | 1.9 | 1.0 | 2.9 | 0.868 | 30 | 30.24 | |

***Calculations :***

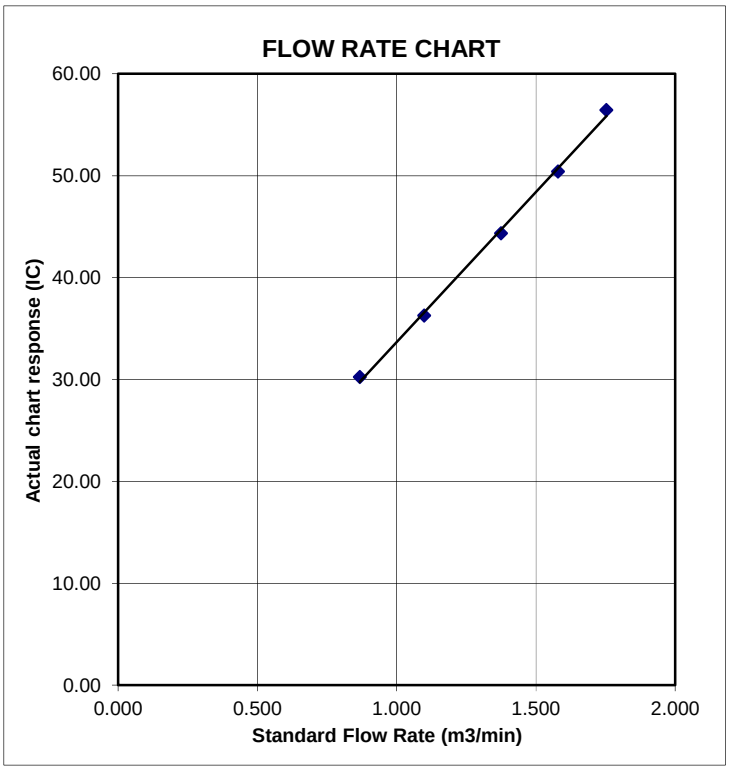
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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

***For subsequent calculation of sampler flow:***

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

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



# TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

| | | | |
|---|---|---|---|
| Location : Ping Yeung Village House | | Date of Calibration: | 4/2/2019 |
| Location ID : AM5a | | Next Calibration Date: | 4/4/2019 |
| | | Technician: | Eric |

## CONDITIONS

| | | | |
|---|---|---|---|
| Sea Level Pressure (hPa) | 1018.1 | Corrected Pressure (mm Hg) | 763.575 |
| Temperature (ºC) | 21.7 | Temperature (K) | 295 |

## CALIBRATION ORIFICE

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

## CALIBRATION

| Plate No. | H20 (L) (in) | H2O (R) (in) | H20 (in) | Qstd (m3/min) | I (chart) | IC corrected | LINEAR REGRESSION |
|---|---|---|---|---|---|---|---|
| 18 | 6.1 | 4.8 | 10.9 | 1.666 | 52 | 52.41 | Slope = 35.0033 |
| 13 | 5.1 | 3.6 | 8.7 | 1.490 | 46 | 46.37 | Intercept = -5.3960 |
| 10 | 3.7 | 2.7 | 6.4 | 1.281 | 40 | 40.32 | Corr. coeff. = 0.9963 |
| 7 | 2.5 | 1.7 | 4.2 | 1.041 | 32 | 32.25 | |
| 5 | 1.8 | 0.8 | 2.6 | 0.823 | 22 | 22.17 | |

***Calculations :***

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

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

Qstd = standard flow rate

IC = corrected chart respones

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration ( deg K )

Pstd = actual pressure during calibration ( mm Hg )

***For subsequent calculation of sampler flow:***

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

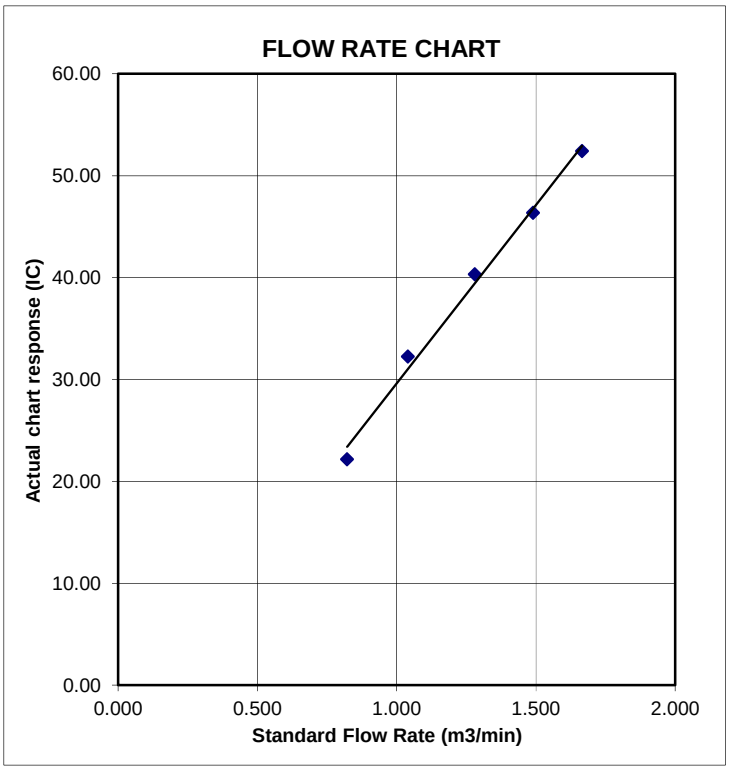
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



# TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

| | | | |
|---|---|---|---|
| Location : Wo Keng Shan Village House | | Date of Calibration: | 4/2/2019 |
| Location ID : AM6 | | Next Calibration Date: | 4/4/2019 |
| | | Technician: | Eric |

## CONDITIONS

| | | | |
|---|---|---|---|
| Sea Level Pressure (hPa) | 1018.1 | Corrected Pressure (mm Hg) | 763.575 |
| Temperature (ºC) | 21.7 | Temperature (K) | 295 |

## CALIBRATION ORIFICE

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

## CALIBRATION

| Plate No. | H20 (L) (in) | H2O (R) (in) | H20 (in) | Qstd (m3/min) | I (chart) | IC corrected | LINEAR REGRESSION |
|---|---|---|---|---|---|---|---|
| 18 | 5.1 | 5.1 | 10.2 | 1.612 | 53 | 53.42 | Slope = 30.5588 |
| 13 | 4.8 | 4 | 8.8 | 1.498 | 48 | 48.38 | Intercept = 3.3339 |
| 10 | 4 | 3 | 7.0 | 1.338 | 43 | 43.34 | Corr. coeff. = 0.9938 |
| 7 | 2.4 | 1.7 | 4.1 | 1.029 | 36 | 36.29 | |
| 5 | 1.7 | 1.0 | 2.7 | 0.838 | 28 | 28.22 | |

***Calculations :***

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

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

Qstd = standard flow rate

IC = corrected chart respones

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration ( deg K )

Pstd = actual pressure during calibration ( mm Hg )

***For subsequent calculation of sampler flow:***

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

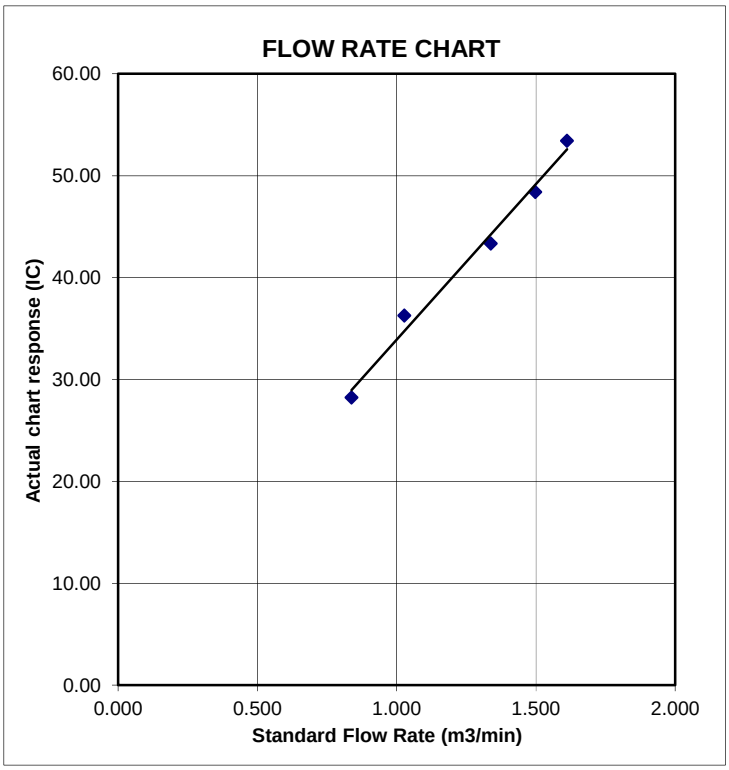
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



# TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Village House of Loi Tung Village
Location ID : AM7b

Date of Calibration: 4/2/2019
Next Calibration Date: 4/4/2019
Technician: Eric

## CONDITIONS

| | | | |
|---|---|---|---|
| Sea Level Pressure (hPa) | 1018.1 | Corrected Pressure (mm Hg) | 763.575 |
| Temperature (°C) | 21.7 | Temperature (K) | 295 |

## CALIBRATION ORIFICE

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

## CALIBRATION

| Plate No. | H20 (L) (in) | H2O (R) (in) | H20 (in) | Qstd (m3/min) | I (chart) | IC corrected | LINEAR REGRESSION |
|---|---|---|---|---|---|---|---|
| 18 | 6.4 | 5.5 | 11.9 | 1.739 | 60 | 60.48 | Slope = 37.6279 |
| 13 | 5.1 | 4.2 | 9.3 | 1.540 | 52 | 52.41 | Intercept = -4.8274 |
| 10 | 3.7 | 3.2 | 6.9 | 1.329 | 46 | 46.37 | Corr. coeff. = 0.9985 |
| 7 | 2.5 | 2.1 | 4.6 | 1.088 | 36 | 36.29 | |
| 5 | 1.7 | 1.0 | 2.7 | 0.838 | 26 | 26.21 | |

***Calculations :***

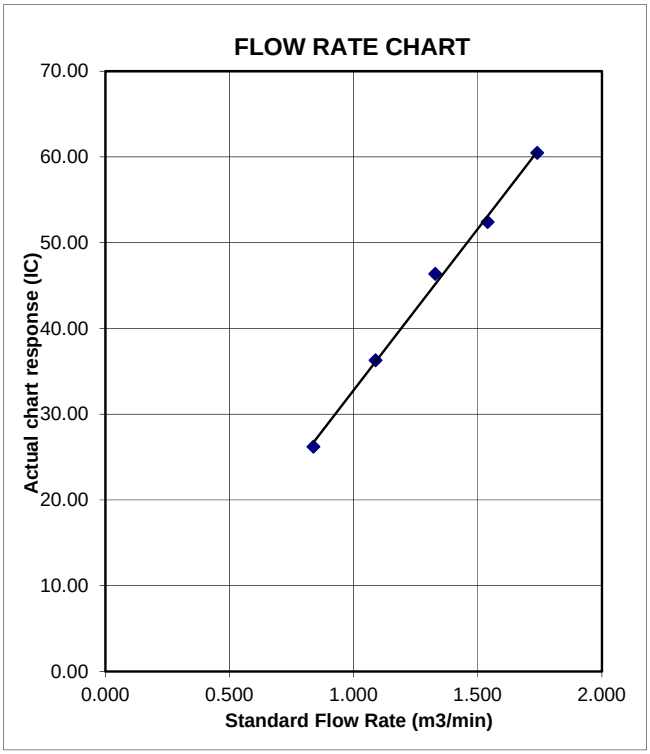
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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

***For subsequent calculation of sampler flow:***

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

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



# TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

| | | | |
|---|---|---|---|
| Location : Po Kat Tsai Village No. 4 | | Date of Calibration: | 8/2/2019 |
| Location ID : AM8 | | Next Calibration Date: | 8/4/2019 |
| | | Technician: | Eric |

## CONDITIONS

| | | | |
|---|---|---|---|
| Sea Level Pressure (hPa) | 1015.3 | Corrected Pressure (mm Hg) | 761.475 |
| Temperature (°C) | 25.1 | Temperature (K) | 298 |

## CALIBRATION ORIFICE

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

## CALIBRATION

| Plate No. | H20 (L) (in) | H2O (R) (in) | H20 (in) | Qstd (m3/min) | I (chart) | IC corrected |
|---|---|---|---|---|---|---|
| 18 | 6.3 | 6.6 | 12.9 | 1.798 | 54 | 54.04 |
| 13 | 5 | 4.5 | 9.5 | 1.545 | 48 | 48.04 |
| 10 | 4 | 3.4 | 7.4 | 1.366 | 42 | 42.03 |
| 7 | 2.5 | 2 | 4.5 | 1.069 | 30 | 30.02 |
| 5 | 1.6 | 1.1 | 2.7 | 0.832 | 20 | 20.02 |

LINEAR REGRESSION

Slope = 35.8816
Intercept = -8.6058
Corr. coeff. = 0.9940

***Calculations :***

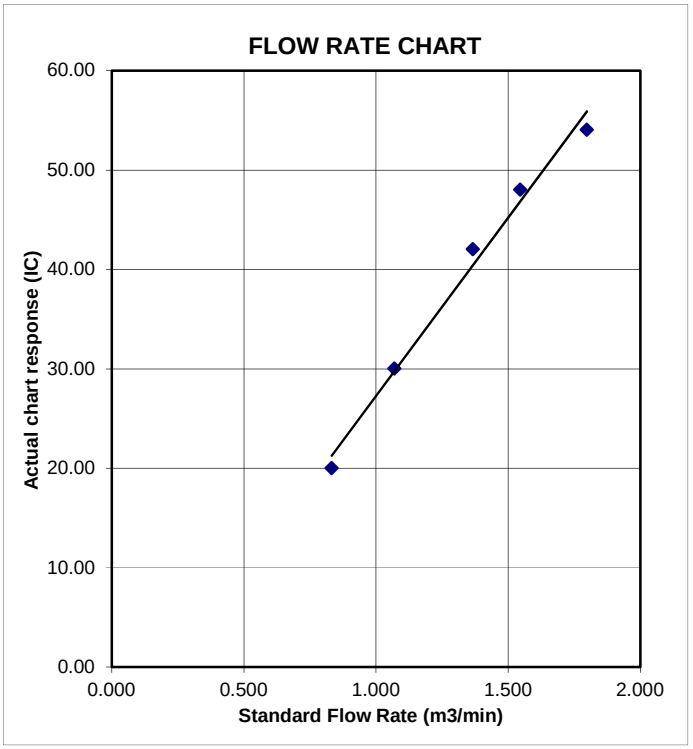
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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

***For subsequent calculation of sampler flow:***

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

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



# TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

| | | | |
|---|---|---|---|
| Location : Nam Wa Po Village House No. 80 | | Date of Calibration: | 8/2/2019 |
| Location ID : AM9b | | Next Calibration Date: | 8/4/2019 |
| | | Technician: | Eric |

## CONDITIONS

| | | | |
|---|---|---|---|
| Sea Level Pressure (hPa) | 1015.3 | Corrected Pressure (mm Hg) | 761.475 |
| Temperature (ºC) | 25.1 | Temperature (K) | 298 |

## CALIBRATION ORIFICE

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

## CALIBRATION

| Plate No. | H20 (L) (in) | H2O (R) (in) | H20 (in) | Qstd (m3/min) | I (chart) | IC corrected | LINEAR REGRESSION |
|---|---|---|---|---|---|---|---|
| 18 | 6.4 | 6.5 | 12.9 | 1.798 | 54 | 54.04 | Slope = 28.1079 |
| 13 | 5.1 | 4.3 | 9.4 | 1.537 | 49 | 49.04 | Intercept = 4.5520 |
| 10 | 4.1 | 3.5 | 7.6 | 1.384 | 44 | 44.04 | Corr. coeff. = 0.9958 |
| 7 | 2.5 | 2.1 | 4.6 | 1.081 | 34 | 34.03 | |
| 5 | 1.7 | 1.0 | 2.7 | 0.832 | 28 | 28.02 | |

***Calculations :***

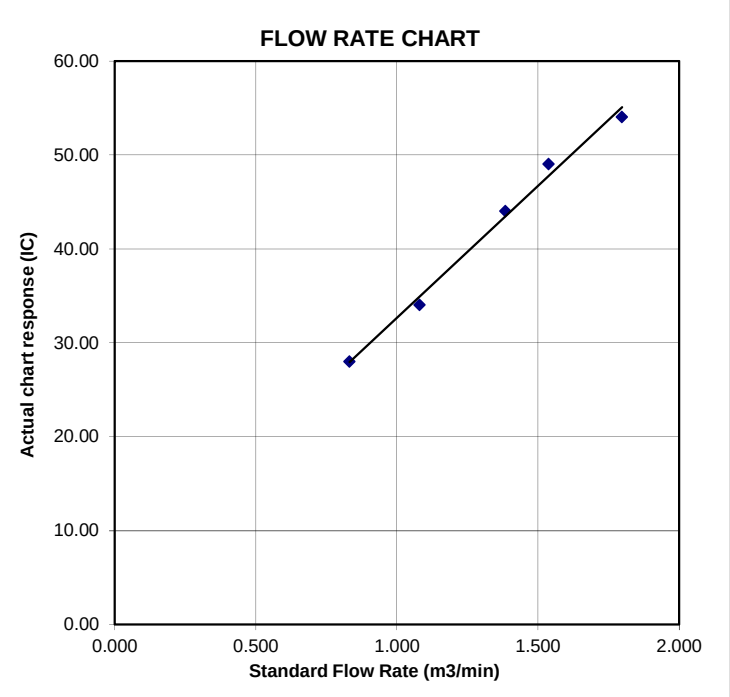
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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

***For subsequent calculation of sampler flow:***

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

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



# TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

| | | | |
|---|---|---|---|
| Location : Village House near Lin Ma Hang Road | | Date of Calibration: | 4/4/2019 |
| Location ID : AM2 | | Next Calibration Date: | 4/6/2019 |
| | | Technician: | Eric |

## CONDITIONS

| | | | |
|---|---|---|---|
| Sea Level Pressure (hPa) | 1016.7 | Corrected Pressure (mm Hg) | 762.525 |
| Temperature (ºC) | 21.7 | Temperature (K) | 295 |

## CALIBRATION ORIFICE

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

## CALIBRATION

| Plate No. | H20 (L) (in) | H2O (R) (in) | H20 (in) | Qstd (m3/min) | I (chart) | IC corrected | LINEAR REGRESSION |
|---|---|---|---|---|---|---|---|
| 18 | 5 | 5 | 10.0 | 1.519 | 54 | 54.39 | Slope = 33.8823 |
| 13 | 4.3 | 4.3 | 8.6 | 1.409 | 48 | 48.35 | Intercept = 2.0076 |
| 10 | 3.4 | 3.4 | 6.8 | 1.253 | 44 | 44.32 | Corr. coeff. = 0.9920 |
| 7 | 2 | 2 | 4.0 | 0.961 | 36 | 36.26 | |
| 5 | 1.4 | 1.4 | 2.8 | 0.804 | 28 | 28.20 | |

***Calculations :***

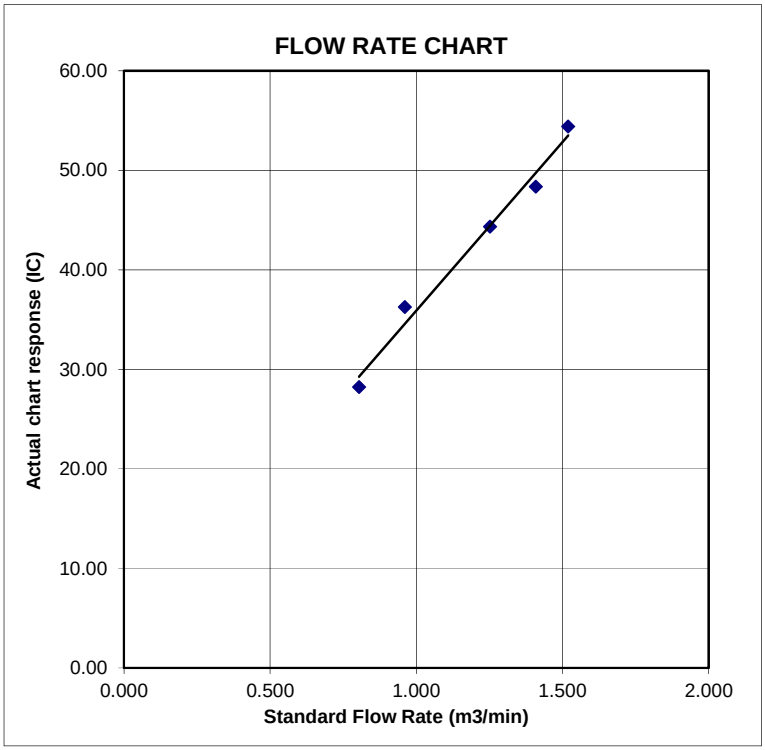
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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

***For subsequent calculation of sampler flow:***

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

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



# TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

| | | | |
|---|---|---|---|
| Location : Ta Kwu Ling Fire Service Station | | Date of Calibration: | 4/4/2019 |
| Location ID : AM3 | | Next Calibration Date: | 4/6/2019 |
| | | Technician: | Eric |

## CONDITIONS

| | | | |
|---|---|---|---|
| Sea Level Pressure (hPa) | 1016.7 | Corrected Pressure (mm Hg) | 762.525 |
| Temperature (°C) | 21.7 | Temperature (K) | 295 |

## CALIBRATION ORIFICE

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

## CALIBRATION

| Plate No. | H20 (L) (in) | H2O (R) (in) | H20 (in) | Qstd (m3/min) | I (chart) | IC corrected | LINEAR REGRESSION |
|---|---|---|---|---|---|---|---|
| 18 | 6 | 6 | 12.0 | 1.664 | 54 | 54.39 | Slope = 29.1960 |
| 13 | 4.9 | 4.9 | 9.8 | 1.504 | 48 | 48.35 | Intercept = 5.0545 |
| 10 | 3.7 | 3.7 | 7.4 | 1.307 | 42 | 42.30 | Corr. coeff. = 0.9962 |
| 7 | 2.3 | 2.3 | 4.6 | 1.031 | 36 | 36.26 | |
| 5 | 1.4 | 1.4 | 2.8 | 0.804 | 28 | 28.20 | |

***Calculations :***

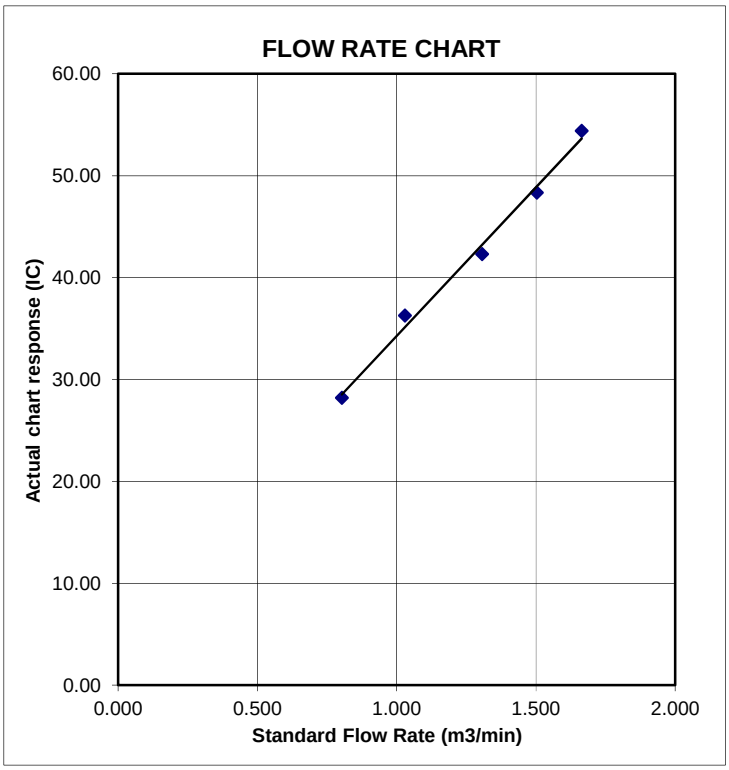
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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

***For subsequent calculation of sampler flow:***

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

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



# TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

| | | | |
|---|---|---|---|
| Location : Nga Yiu Ha Village | | Date of Calibration: | 4/4/2019 |
| Location ID : AM4b | | Next Calibration Date: | 4/6/2019 |
| | | Technician: | Eric |

## CONDITIONS

| | | | |
|---|---|---|---|
| Sea Level Pressure (hPa) | 1016.7 | Corrected Pressure (mm Hg) | 762.525 |
| Temperature (ºC) | 21.7 | Temperature (K) | 295 |

## CALIBRATION ORIFICE

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

## CALIBRATION

| Plate No. | H20 (L) (in) | H2O (R) (in) | H20 (in) | Qstd (m3/min) | I (chart) | IC corrected | LINEAR REGRESSION |
|---|---|---|---|---|---|---|---|
| 18 | 6 | 6 | 12.0 | 1.664 | 56 | 56.41 | Slope = 31.3308 |
| 13 | 4.9 | 4.9 | 9.8 | 1.504 | 50 | 50.36 | Intercept = 3.6562 |
| 10 | 3.7 | 3.7 | 7.4 | 1.307 | 44 | 44.32 | Corr. coeff. = 0.9989 |
| 7 | 2.4 | 2.4 | 4.8 | 1.053 | 36 | 36.26 | |
| 5 | 1.5 | 1.5 | 3.0 | 0.832 | 30 | 30.22 | |

***Calculations :***

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

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

Qstd = standard flow rate

IC = corrected chart respones

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration ( deg K )

Pstd = actual pressure during calibration ( mm Hg )

***For subsequent calculation of sampler flow:***

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

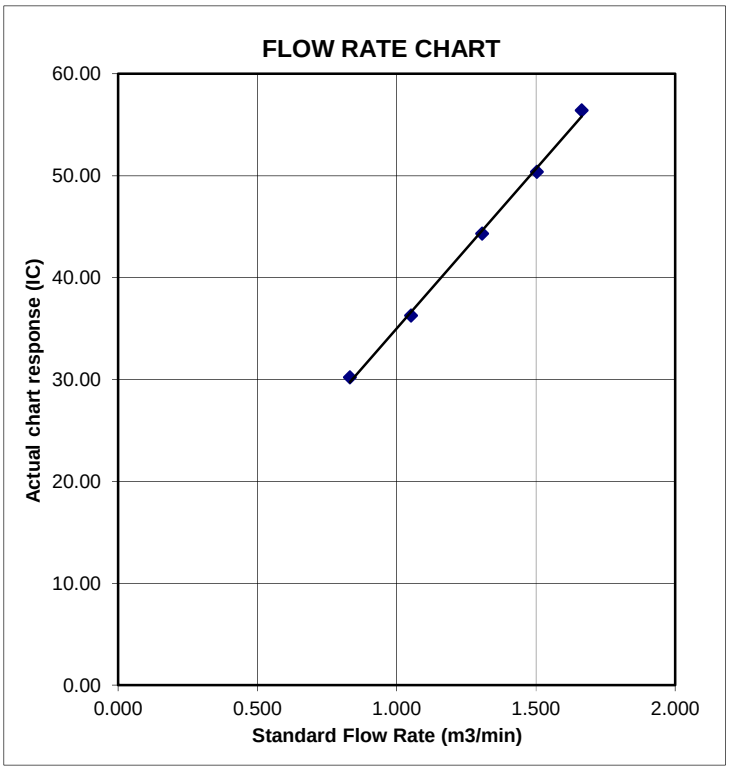
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



# TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

| | | | |
|---|---|---|---|
| Location : Ping Yeung Village House | | Date of Calibration: | 4/4/2019 |
| Location ID : AM5a | | Next Calibration Date: | 4/6/2019 |
| | | Technician: | Eric |

## CONDITIONS

| | | | |
|---|---|---|---|
| Sea Level Pressure (hPa) | 1016.7 | Corrected Pressure (mm Hg) | 762.525 |
| Temperature (ºC) | 21.7 | Temperature (K) | 295 |

## CALIBRATION ORIFICE

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

## CALIBRATION

| Plate No. | H20 (L) (in) | H2O (R) (in) | H20 (in) | Qstd (m3/min) | I (chart) | IC corrected | LINEAR REGRESSION |
|---|---|---|---|---|---|---|---|
| 18 | 5.5 | 5.5 | 11.0 | 1.594 | 52 | 52.38 | Slope = 35.9208 |
| 13 | 4.4 | 4.4 | 8.8 | 1.425 | 46 | 46.33 | Intercept = -4.3843 |
| 10 | 3.2 | 3.2 | 6.4 | 1.216 | 40 | 40.29 | Corr. coeff. = 0.9958 |
| 7 | 2.1 | 2.1 | 4.2 | 0.985 | 32 | 32.23 | |
| 5 | 1.3 | 1.3 | 2.6 | 0.775 | 22 | 22.16 | |

***Calculations :***

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

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

Qstd = standard flow rate

IC = corrected chart respones

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration ( deg K )

Pstd = actual pressure during calibration ( mm Hg )

***For subsequent calculation of sampler flow:***

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

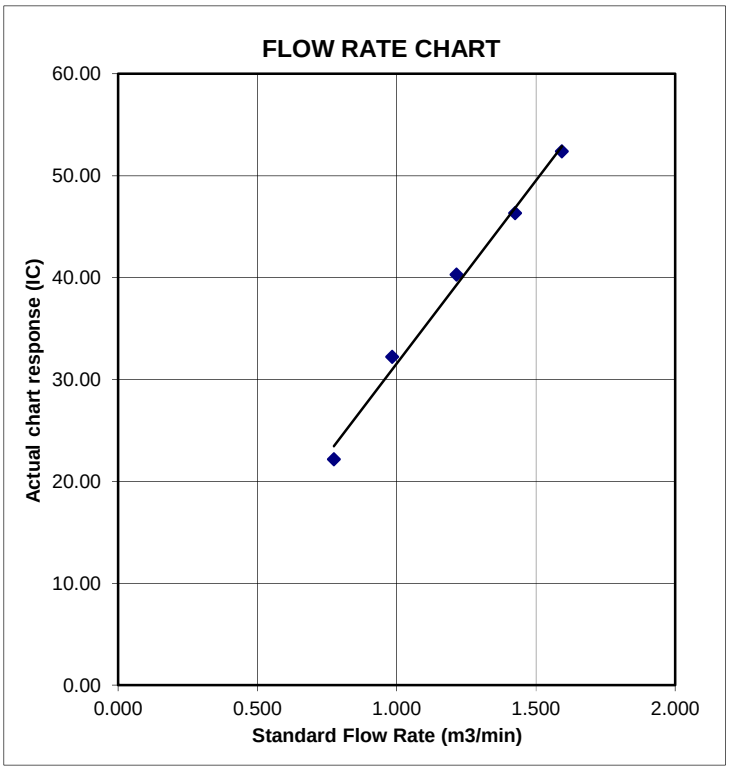
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



# TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

| | | | |
|---|---|---|---|
| Location : Wo Keng Shan Village House | | Date of Calibration: | 4/4/2019 |
| Location ID : AM6 | | Next Calibration Date: | 4/6/2019 |
| | | Technician: | Eric |

## CONDITIONS

| | | | |
|---|---|---|---|
| Sea Level Pressure (hPa) | 1016.7 | Corrected Pressure (mm Hg) | 762.525 |
| Temperature (°C) | 21.7 | Temperature (K) | 295 |

## CALIBRATION ORIFICE

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

## CALIBRATION

| Plate No. | H20 (L) (in) | H2O (R) (in) | H20 (in) | Qstd (m3/min) | I (chart) | IC corrected | LINEAR REGRESSION |
|---|---|---|---|---|---|---|---|
| 18 | 5.1 | 5.1 | 10.2 | 1.535 | 53 | 53.38 | Slope = 30.9993 |
| 13 | 4.4 | 4.4 | 8.8 | 1.425 | 48 | 48.35 | Intercept = 4.9067 |
| 10 | 3.5 | 3.5 | 7.0 | 1.271 | 43 | 43.31 | Corr. coeff. = 0.9932 |
| 7 | 2 | 2 | 4.0 | 0.961 | 36 | 36.26 | |
| 5 | 1.3 | 1.3 | 2.6 | 0.775 | 28 | 28.20 | |

***Calculations :***

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

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

Qstd = standard flow rate

IC = corrected chart respones

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration ( deg K )

Pstd = actual pressure during calibration ( mm Hg )

***For subsequent calculation of sampler flow:***

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

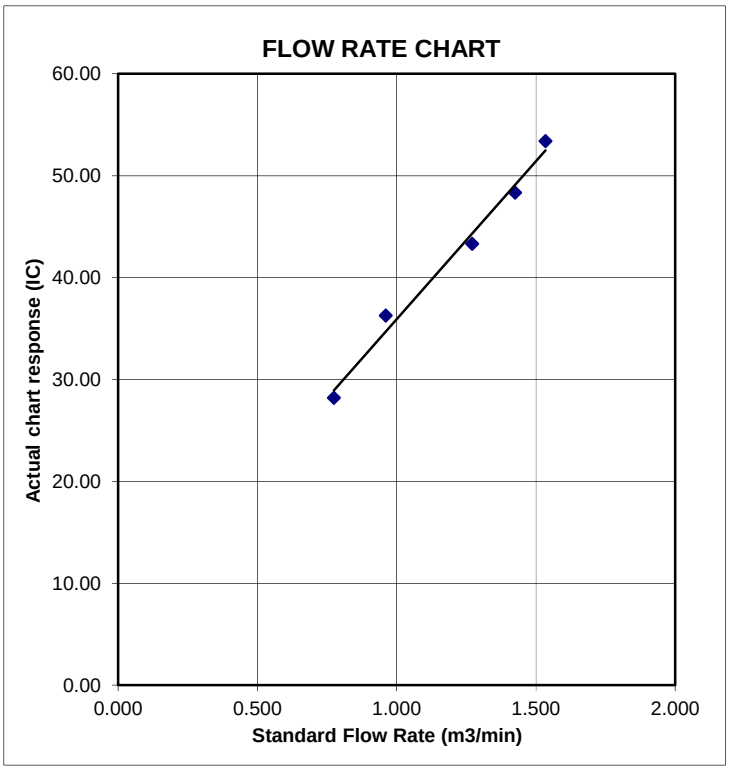
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



# TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Village House of Loi Tung Village
Location ID : AM7b

Date of Calibration: 4/4/2019
Next Calibration Date: 4/6/2019
Technician: Eric

## CONDITIONS

| | | | |
|---|---|---|---|
| Sea Level Pressure (hPa) | 1016.7 | Corrected Pressure (mm Hg) | 762.525 |
| Temperature (°C) | 21.7 | Temperature (K) | 295 |

## CALIBRATION ORIFICE

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

## CALIBRATION

| Plate No. | H20 (L) (in) | H2O (R) (in) | H20 (in) | Qstd (m3/min) | I (chart) | IC corrected | LINEAR REGRESSION |
|---|---|---|---|---|---|---|---|
| 18 | 6 | 6 | 12.0 | 1.664 | 60 | 60.44 | Slope = 39.4665 |
| 13 | 4.6 | 4.6 | 9.2 | 1.457 | 52 | 52.38 | Intercept = -4.6940 |
| 10 | 3.4 | 3.4 | 6.8 | 1.253 | 46 | 46.33 | Corr. coeff. = 0.9974 |
| 7 | 2.3 | 2.3 | 4.6 | 1.031 | 36 | 36.26 | |
| 5 | 1.4 | 1.4 | 2.8 | 0.804 | 26 | 26.19 | |

***Calculations :***

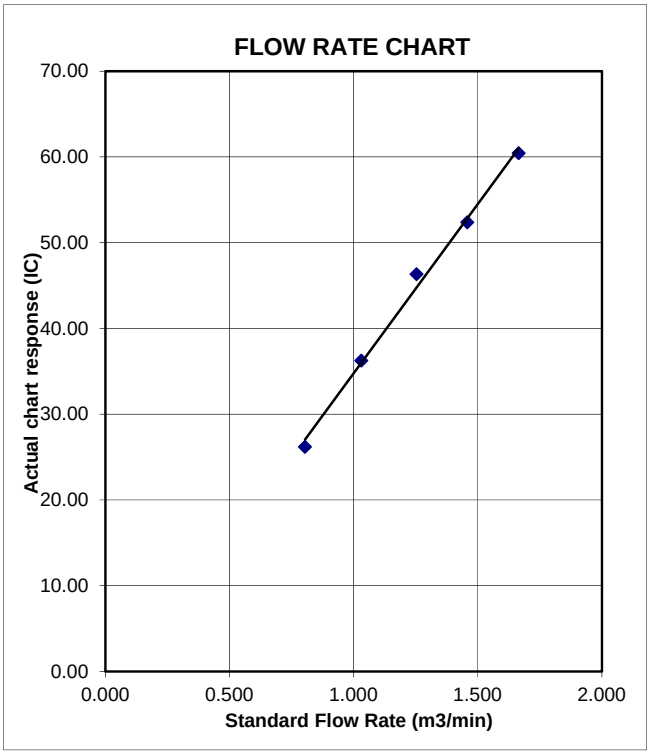
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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

***For subsequent calculation of sampler flow:***

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

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



# TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

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

Date of Calibration: 4/4/2019
Next Calibration Date: 4/6/2019
Technician: Eric

## CONDITIONS

| | | | |
|---|---|---|---|
| Sea Level Pressure (hPa) | 1016.7 | Corrected Pressure (mm Hg) | 762.525 |
| Temperature (°C) | 21.7 | Temperature (K) | 295 |

## CALIBRATION ORIFICE

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

## CALIBRATION

| Plate No. | H20 (L) (in) | H2O (R) (in) | H20 (in) | Qstd (m3/min) | I (chart) | IC corrected | LINEAR REGRESSION |
|---|---|---|---|---|---|---|---|
| 18 | 6.5 | 6.5 | 13.0 | 1.732 | 54 | 54.39 | Slope = 37.7296 |
| 13 | 4.7 | 4.7 | 9.4 | 1.473 | 48 | 48.35 | Intercept = -8.8144 |
| 10 | 3.7 | 3.7 | 7.4 | 1.307 | 42 | 42.30 | Corr. coeff. = 0.9919 |
| 7 | 2.3 | 2.3 | 4.6 | 1.031 | 30 | 30.22 | |
| 5 | 1.4 | 1.4 | 2.8 | 0.804 | 20 | 20.15 | |

***Calculations :***

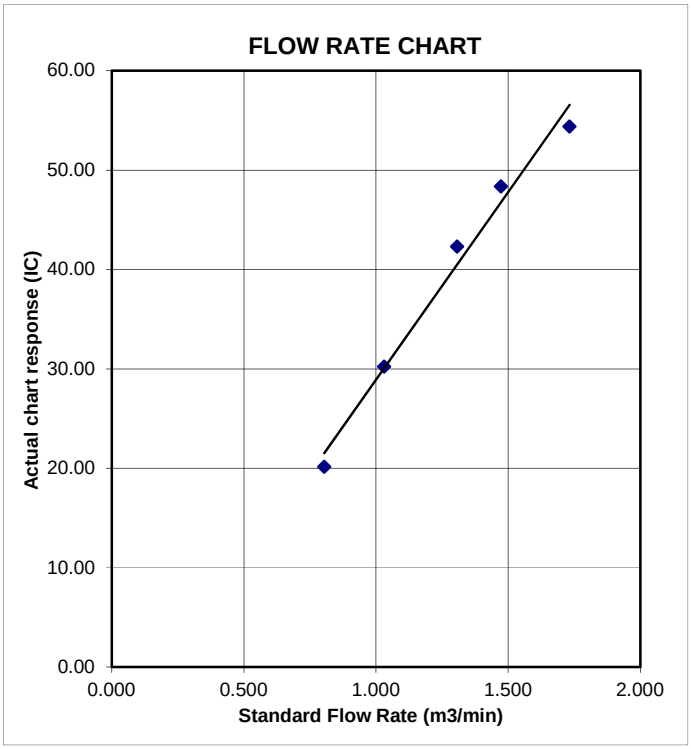
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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

***For subsequent calculation of sampler flow:***

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

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



# TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

| | | | |
|---|---|---|---|
| Location : Nam Wa Po Village House No. 80 | | Date of Calibration: | 4/4/2019 |
| Location ID : AM9b | | Next Calibration Date: | 4/6/2019 |
| | | Technician: | Eric |

## CONDITIONS

| | | | |
|---|---|---|---|
| Sea Level Pressure (hPa) | 1016.7 | Corrected Pressure (mm Hg) | 762.525 |
| Temperature (ºC) | 21.7 | Temperature (K) | 295 |

## CALIBRATION ORIFICE

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

## CALIBRATION

| Plate No. | H20 (L) (in) | H2O (R) (in) | H20 (in) | Qstd (m3/min) | I (chart) | IC corrected | LINEAR REGRESSION |
|---|---|---|---|---|---|---|---|
| 18 | 6.5 | 6.5 | 13.0 | 1.732 | 54 | 54.39 | Slope = 28.7387 |
| 13 | 4.6 | 4.6 | 9.2 | 1.457 | 49 | 49.36 | Intercept = 5.7786 |
| 10 | 3.8 | 3.8 | 7.6 | 1.325 | 44 | 44.32 | Corr. coeff. = 0.9937 |
| 7 | 2.3 | 2.3 | 4.6 | 1.031 | 34 | 34.25 | |
| 5 | 1.3 | 1.3 | 2.6 | 0.775 | 28 | 28.20 | |

***Calculations :***

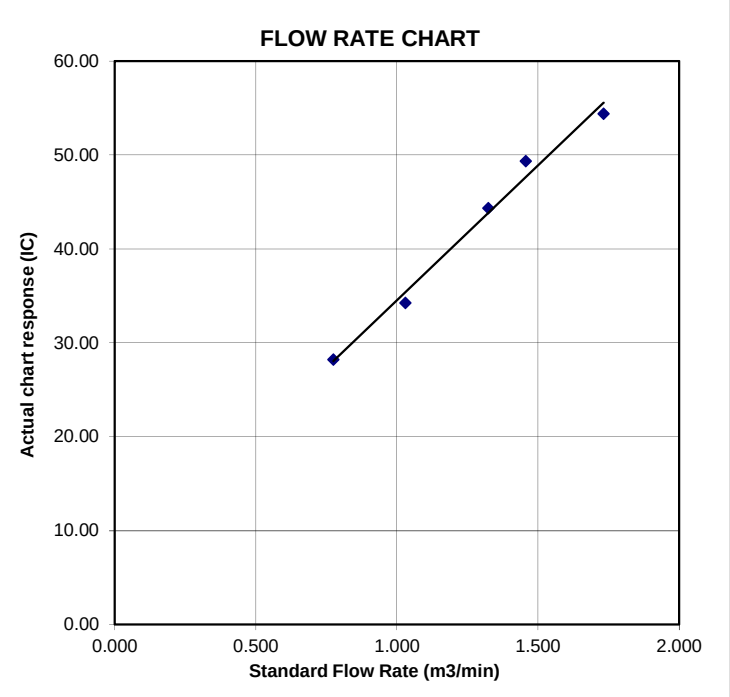
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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

***For subsequent calculation of sampler flow:***

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

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



TISCH Environmental

| RECALIBRATION DUE DATE: |
|---|
| February 5, 2020 |

# Certificate of Calibration

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

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

**Data Tabulation**

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

**Calculations**

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

**For subsequent flow rate calculations:**

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

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

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

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

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

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

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

# ALS Technichem (HK) Pty Ltd

## ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

## SUB-CONTRACTING REPORT

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

## *General Comments*

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

## *Signatories*

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

| *Signatories* | *Position* |
|---|---|
| Richard Fung | General Manager |

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

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

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

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

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

# Equipment Verification Report (TSP)

**Equipment Calibrated:**

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

**Standard Equipment:**

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

**Equipment Verification Results:**

Testing Date: 7 January 2019

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

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

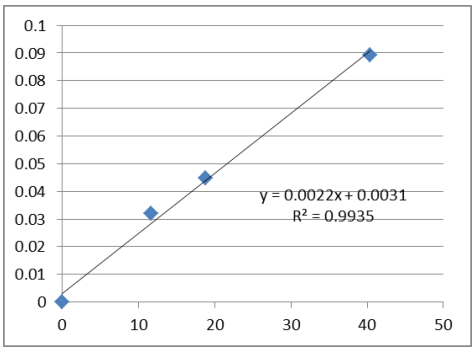
Sensitivity Adjustment Scale Setting (After Calibration) 674 (CPM)

**Linear Regression of Y or X**

Slope (K-factor): 0.0022

Correlation Coefficient 0.9967

Date of Issue 14 January 2019




Remarks:

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

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

Operator : Martin Li Signature : Date : 14 January 2019

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

# TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

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

## CONDITIONS

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

## CALIBRATION ORIFICE

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

## CALIBRATION

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

***Calculations :***

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

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

Qstd = standard flow rate

IC = corrected chart respones

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration ( deg K )

Pstd = actual pressure during calibration ( mm Hg )

***For subsequent calculation of sampler flow:***

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

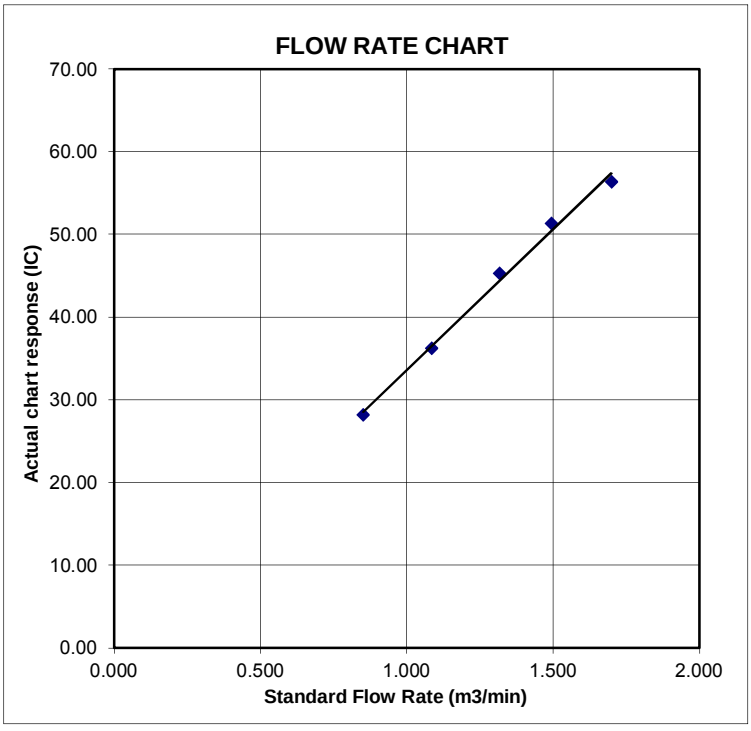
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TISCH Environmental

| RECALIBRATION DUE DATE: |
|---|
| February 13, 2019 |

# Certificate of Calibration

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

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

**Data Tabulation**

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

**Calculations**

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

**For subsequent flow rate calculations:**

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

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

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

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

**RECALIBRATION**

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

Tisch Environmental, Inc.
145 South Miami Avenue
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FAX: (513)467-900

# ALS Technichem (HK) Pty Ltd

## ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

## SUB-CONTRACTING REPORT

| | | | | | |
|---|---|---|---|---|---|
| CONTACT | : | MR BEN TAM | WORK ORDER | : | **HK1908928** |
| 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<br>DATE RECEIVED<br>DATE OF ISSUE | :<br>:<br>: | 1<br>25-FEB-2019<br>4-MAR-2019 |
| PROJECT | : | ---- | NO. OF SAMPLES<br>CLIENT ORDER | :<br>: | 1<br>---- |

### *General Comments*

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

### *Signatories*

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

| *Signatories* | *Position* |
|---|---|
| Richard Fung | General Manager |

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

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

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

WORK ORDER : HK1908928
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. |
|---|---|---|---|---|
| HK1908928-001 | S/N: 366409 | AIR | 25-Feb-2019 | S/N: 366409 |

# Equipment Verification Report (TSP)

**Equipment Calibrated:**

| | |
|---|---|
| Type: | Laser Dust monitor |
| Manufacturer: | Sibata LD-3B |
| Serial No. | 366409 |
| Equipment Ref: | EQ109 |
| Job Order | HK1908928 |

**Standard Equipment:**

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

**Equipment Verification Results:**

Testing Date: 7 January 2019

| Hour | Time | Mean Temp °C | Mean Pressure (hPa) | Concentration in mg/m$^3$ (Standard Equipment) | Total Count (Calibrated Equipment) | Count/Minute (Total Count/60min) |
|---|---|---|---|---|---|---|
| 2hr07min | 09:01 ~ 11:08 | 18.5 | 1021.4 | 0.045 | 2419 | 19.1 |
| 2hr11min | 11:13 ~ 13:24 | 18.5 | 1021.4 | 0.032 | 1698 | 13.0 |
| 2hr07min | 13:30 ~ 15:37 | 18.5 | 1021.4 | 0.089 | 5066 | 40.0 |

Sensitivity Adjustment Scale Setting (Before Calibration) 517 (CPM)

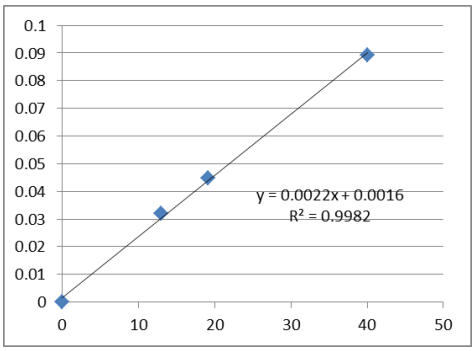
Sensitivity Adjustment Scale Setting (After Calibration) 517 (CPM)

**Linear Regression of Y or X**

Slope (K-factor): 0.0022

Correlation Coefficient 0.9991

Date of Issue 14 January 2019




Remarks:

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

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

Operator : Martin Li Signature : Date : 14 January 2019

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

# TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

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

## CONDITIONS

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

## CALIBRATION ORIFICE

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

## CALIBRATION

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

***Calculations :***

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

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

Qstd = standard flow rate

IC = corrected chart respones

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration ( deg K )

Pstd = actual pressure during calibration ( mm Hg )

***For subsequent calculation of sampler flow:***

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

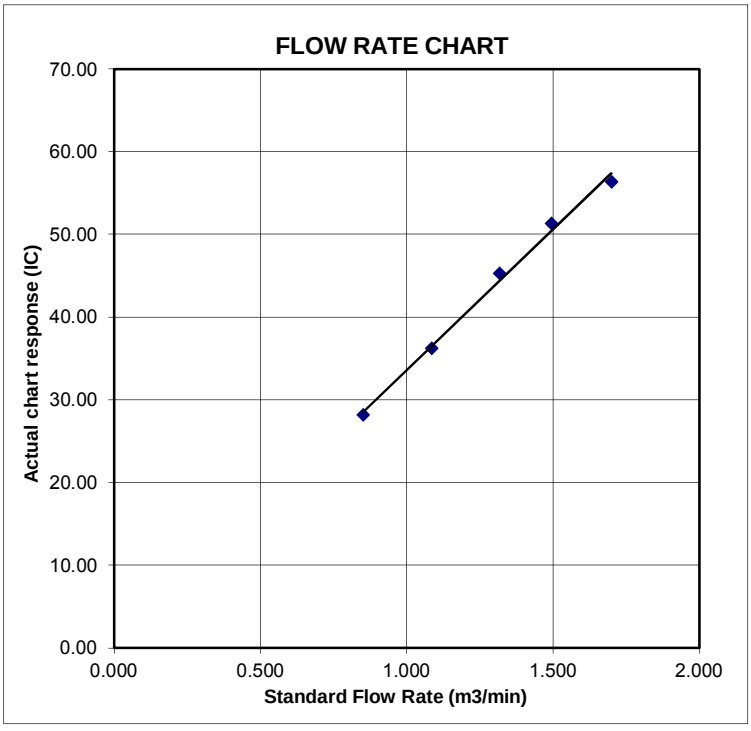
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TISCH Environmental

| RECALIBRATION DUE DATE: |
|---|
| February 13, 2019 |

# Certificate of Calibration

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

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

**Data Tabulation**

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

**Calculations**

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

**For subsequent flow rate calculations:**

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

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

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

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

**RECALIBRATION**

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

Tisch Environmental, Inc.
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FAX: (513)467-900

# ALS Technichem (HK) Pty Ltd

## ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

## SUB-CONTRACTING REPORT

| | | | | | |
|---|---|---|---|---|---|
| CONTACT | : | MR BEN TAM | WORK ORDER | : | **HK1908931** |
| CLIENT | : | **ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING** | | | |
| ADDRESS | : | RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T. HONG KONG | SUB-BATCH | : | 1 |
| | | | DATE RECEIVED | : | 25-FEB-2019 |
| | | | DATE OF ISSUE | : | 4-MAR-2019 |
| PROJECT | : | ---- | NO. OF SAMPLES | : | 1 |
| | | | CLIENT ORDER | : | ---- |

## *General Comments*

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

## *Signatories*

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

| *Signatories* | *Position* |
|---|---|
| Richard Fung | General Manager |

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

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

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

WORK ORDER : HK1908931
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. |
|---|---|---|---|---|
| HK1908931-001 | S/N: 3Y6505 | AIR | 25-Feb-2019 | 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 | HK1908931 |

**Standard Equipment:**

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

**Equipment Verification Results:**

Testing Date: 7 January 2019

| Hour | Time | Mean Temp °C | Mean Pressure (hPa) | Concentration in mg/m$^3$ (Standard Equipment) | Total Count (Calibrated Equipment) | Count/Minute (Total Count/60min) |
|---|---|---|---|---|---|---|
| 2hr07min | 09:01 ~ 11:08 | 18.5 | 1021.4 | 0.045 | 2318 | 18.3 |
| 2hr11min | 11:13 ~ 13:24 | 18.5 | 1021.4 | 0.032 | 1433 | 11.0 |
| 2hr07min | 13:30 ~ 15:37 | 18.5 | 1021.4 | 0.089 | 5022 | 39.7 |

Sensitivity Adjustment Scale Setting (Before Calibration) 602 (CPM)

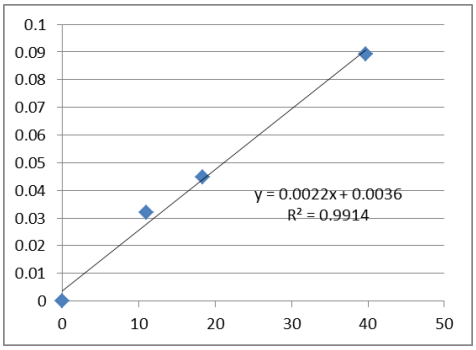
Sensitivity Adjustment Scale Setting (After Calibration) 602 (CPM)

**Linear Regression of Y or X**

Slope (K-factor): 0.0022

Correlation Coefficient 0.9957

Date of Issue 14 January 2019




Remarks:

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

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

Operator : Martin Li Signature : Date : 14 January 2019

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

# TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

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

## CONDITIONS

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

## CALIBRATION ORIFICE

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

## CALIBRATION

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

***Calculations :***

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

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

Qstd = standard flow rate

IC = corrected chart respones

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration ( deg K )

Pstd = actual pressure during calibration ( mm Hg )

***For subsequent calculation of sampler flow:***

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

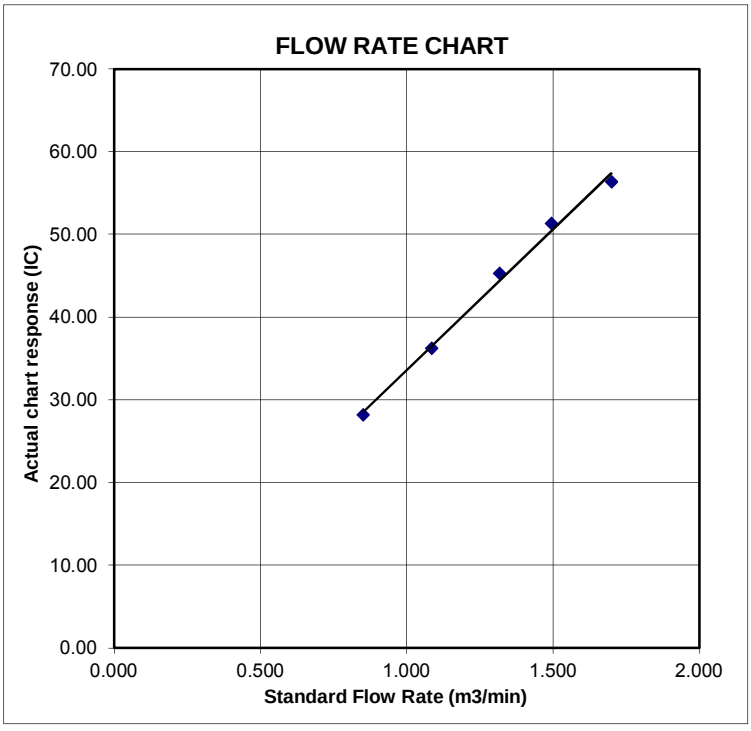
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TISCH Environmental

| RECALIBRATION DUE DATE: |
|---|
| February 13, 2019 |

# Certificate of Calibration

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

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

**Data Tabulation**

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

**Calculations**

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

**For subsequent flow rate calculations:**

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

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

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

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

**RECALIBRATION**

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

Tisch Environmental, Inc.
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FAX: (513)467-900

# ALS Technichem (HK) Pty Ltd

## ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

## SUB-CONTRACTING REPORT

| | | | | | |
|---|---|---|---|---|---|
| CONTACT | : | MR BEN TAM | WORK ORDER | : | **HK1908930** |
| CLIENT | : | **ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING** | | | |
| ADDRESS | : | RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T. HONG KONG | SUB-BATCH | : | 1 |
| | | | DATE RECEIVED | : | 25-FEB-2019 |
| | | | DATE OF ISSUE | : | 4-MAR-2019 |
| PROJECT | : | ---- | NO. OF SAMPLES | : | 1 |
| | | | CLIENT ORDER | : | ---- |

## *General Comments*

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

## *Signatories*

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

| *Signatories* | *Position* |
|---|---|
| Richard Fung | General Manager |

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

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

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

WORK ORDER : HK1908930
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. |
|---|---|---|---|---|
| HK1908930-001 | S/N: 3Y6503 | AIR | 25-Feb-2019 | S/N: 3Y6503 |

# Equipment Verification Report (TSP)

**Equipment Calibrated:**

| | |
|---|---|
| Type: | Laser Dust monitor |
| Manufacturer: | Sibata LD-3B |
| Serial No. | 3Y6503 |
| Equipment Ref: | EQ112 |
| Job Order | HK1908930 |

**Standard Equipment:**

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

**Equipment Verification Results:**

Testing Date: 7 January 2019

| Hour | Time | Mean Temp °C | Mean Pressure (hPa) | Concentration in mg/m$^3$ (Standard Equipment) | Total Count (Calibrated Equipment) | Count/Minute (Total Count/60min) |
|---|---|---|---|---|---|---|
| 2hr07min | 09:01 ~ 11:08 | 18.5 | 1021.4 | 0.045 | 2403 | 19.0 |
| 2hr11min | 11:13 ~ 13:24 | 18.5 | 1021.4 | 0.032 | 1577 | 12.1 |
| 2hr07min | 13:30 ~ 15:37 | 18.5 | 1021.4 | 0.089 | 5129 | 40.5 |

Sensitivity Adjustment Scale Setting (Before Calibration) 655 (CPM)

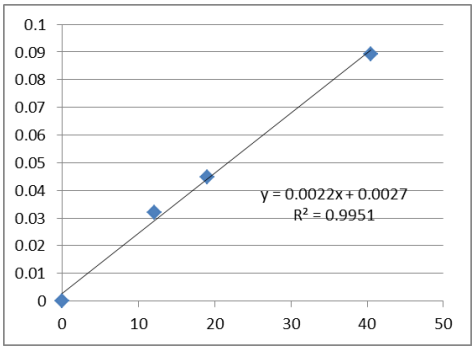
Sensitivity Adjustment Scale Setting (After Calibration) 655 (CPM)

**Linear Regression of Y or X**

Slope (K-factor): 0.0022

Correlation Coefficient 0.9975

Date of Issue 14 January 2019




Remarks:

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

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

Operator : Martin Li Signature : Date : 14 January 2019

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

# TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

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

## CONDITIONS

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

## CALIBRATION ORIFICE

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

## CALIBRATION

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

***Calculations :***

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

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

Qstd = standard flow rate

IC = corrected chart respones

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***For subsequent calculation of sampler flow:***

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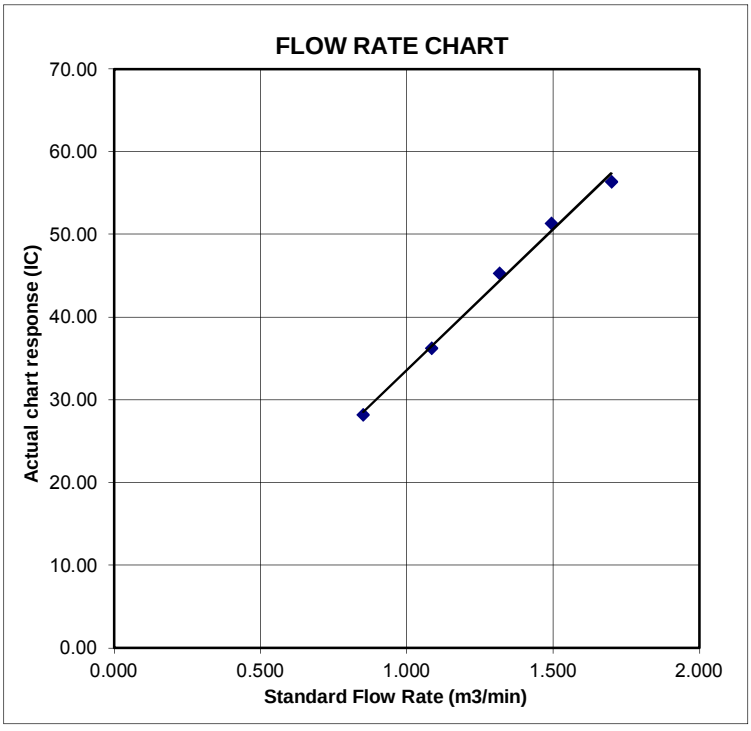

TISCH Environmental

| RECALIBRATION DUE DATE: |
|---|
| February 13, 2019 |

# Certificate of Calibration

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

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

**Data Tabulation**

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

**Calculations**

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

**For subsequent flow rate calculations:**

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

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

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

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

**RECALIBRATION**

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

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

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

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

# Certificate of Calibration
# 校正證書

Certificate No. : 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 ± 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** : 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 簽發日期 : 11 June 2018

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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 — 校正及檢測實驗所
c/o 香港新界屯門興安里一號四樓
Tel/電話: (852) 2927 2606 Fax/傳真: (852) 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com

# Certificate of Calibration
# 校正證書

Certificate No. : C183086
證書編號

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours, and switched on to warm up for over 10 minutes before the commencement of the test.

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

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

4. Test equipment :

| Equipment ID | Description | Certificate No. |
|---|---|---|
| CL280 | 40 MHz Arbitrary Waveform Generator | 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 | $L_{AFP}$ | 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 | $L_{AFP}$ | A | F | 94.00 | 1 | 94.0 | ± 0.7 |

6.1.2 Linearity

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

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

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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. : 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 | $L_{AFP}$ | A | F | 94.00 | 1 | 94.0 | Ref. |
| | $L_{ASP}$ | | S | | | 94.1 | ± 0.1 |
| | $L_{AIP}$ | | I | | | 94.1 | ± 0.1 |

6.2.2 Tone Burst Signal (2 kHz)

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

6.3 Frequency Weighting

6.3.1 A-Weighting

| UUT Setting | | | | Applied Value | | UUT Reading (dB) | IEC 60651 Type 1 Spec. (dB) |
|---|---|---|---|---|---|---|---|
| Range (dB) | Parameter | Frequency Weighting | Time Weighting | Level (dB) | Freq. | | |
| 50 - 130 | $L_{AFP}$ | A | F | 94.00 | 31.5 Hz | 54.5 | -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) |

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# 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 | $L_{CFP}$ | 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 | $L_{Aeq}$ | A | 10 sec. | 4 | 1 | 1/10 | 110.0 | 100 | 99.9 | ± 0.5 |
| | | | | | | $1/10^2$ | | 90 | 90.0 | ± 0.5 |
| | | | 60 sec. | | | $1/10^3$ | | 80 | 79.0 | ± 1.0 |
| | | | 5 min. | | | $1/10^4$ | | 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 :
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輝創工程有限公司 — 校正及檢測實驗所
c/o 香港新界屯門興安里一號四樓
Tel/電話: (852) 2927 2606 Fax/傳真: (852) 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com

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Sun Creation Engineering Limited
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# 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 ± 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** : 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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輝創工程有限公司 — 校正及檢測實驗所
c/o 香港新界屯門興安里一號四樓
Tel/電話: (852) 2927 2606 Fax/傳真: (852) 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com

# Certificate of Calibration
# 校正證書

Certificate No. : 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 :

| Equipment ID | Description | Certificate No. |
|---|---|---|
| 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 | $L_A$ | 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 | $L_A$ | 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 | $L_A$ | 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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c/o 香港新界屯門興安里一號四樓
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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 | $L_A$ | 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 | $L_C$ | 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.

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

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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

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輝創工程有限公司 — 校正及檢測實驗所
c/o 香港新界屯門興安里一號四樓
Tel/電話: (852) 2927 2606 Fax/傳真: (852) 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com

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

# Certificate of Calibration
# 校正證書

Certificate No. : C183260
證書編號

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

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

3. Test equipment :

| Equipment ID | Description | Certificate No. |
|---|---|---|
| CL130 | Universal Counter | 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 | 94.0 | ± 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.

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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<br>Unit A, 20/F., Gold King Industrial Building,<br>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 — 校正及檢測實驗所
c/o 香港新界屯門興安里一號四樓
Tel/電話: (852) 2927 2606 Fax/傳真: (852) 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com

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

# Certificate of Calibration
# 校正證書

Certificate No. : 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 :

| Equipment ID | Description | Certificate No. |
|---|---|---|
| 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.

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。

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輝創工程有限公司 — 校正及檢測實驗所
c/o 香港新界屯門興安里一號四樓
Tel/電話: (852) 2927 2606 Fax/傳真: (852) 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com

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

# REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

| | | | |
|---|---|---|---|
| CONTACT: | BEN TAM | WORK ORDER: | HK1906858 |
| CLIENT: | ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING | | |
| ADDRESS: | RM A 20/F., GOLD KING IND BLDG, | SUB-BATCH: | 0 |
| | NO. 35-41 TAI LIN PAI ROAD, | LABORATORY: | HONG KONG |
| | KWAI CHUNG, N.T. | DATE RECEIVED: | 18-Feb-2019 |
| | HONG KONG | DATE OF ISSUE: | 25-Feb-2019 |

## COMMENTS

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

| | |
|---|---|
| Scope of Test: | Dissolved Oxygen and Temperature |
| Equipment Type: | Dissolved Oxygen Meter |
| Brand Name: | YSI |
| Model No.: | 550A |
| Serial No.: | 16A104433 |
| Equipment No.: | -- |
| Date of Calibration: | 25 February, 2019 |

## NOTES

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

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

Ms. Lin Wai Yu
Assistant Manager - Inorganic

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# REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

WORK ORDER: HK1906858

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

Equipment Type: Dissolved Oxygen Meter
Brand Name: YSI
Model No.: 550A
Serial No.: 16A104433
Equipment No.: --
Date of Calibration: 25 February, 2019 Date of Next Calibration: 25 May, 2019

PARAMETERS:

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

| Expected Reading (mg/L) | Displayed Reading (mg/L) | Tolerance (mg/L) |
|---|---|---|
| 2.81 | 2.97 | +0.16 |
| 6.10 | 6.25 | +0.15 |
| 8.53 | 8.55 | +0.02 |
| | Tolerance Limit (mg/L) | ±0.20 |

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

| Expected Reading ($^{o}$C) | Displayed Reading ($^{o}$C) | Tolerance ($^{o}$C) |
|---|---|---|
| 10.5 | 11.3 | +0.8 |
| 21.0 | 20.2 | -0.8 |
| 39.0 | 37.6 | -1.4 |
| | Tolerance Limit ($^{o}$C) | ±2.0 |

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

Ms. Lin Wai Yu
Assistant Manager - Inorganic

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

# REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

| | | | |
|---|---|---|---|
| CONTACT: | BEN TAM | WORK ORDER: | HK1906869 |
| CLIENT: | ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING | | |
| ADDRESS: | RM A 20/F., GOLD KING IND BLDG, | SUB-BATCH: | 0 |
| | NO. 35-41 TAI LIN PAI ROAD, | LABORATORY: | HONG KONG |
| | KWAI CHUNG, N.T. | DATE RECEIVED: | 18-Feb-2019 |
| | HONG KONG | DATE OF ISSUE: | 25-Feb-2019 |

## COMMENTS

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

| | |
|---|---|
| Scope of Test: | pH Value and Temperature |
| Equipment Type: | pH meter |
| Brand Name: | AZ |
| Model No.: | 8685 |
| Serial No.: | 1141943 |
| Equipment No.: | -- |
| Date of Calibration: | 25 February, 2019 |

## NOTES

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

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

Ms. Lin Wai Yu
Assistant Manager - Inorganic

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# REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

WORK ORDER: HK1906869

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

Equipment Type: pH meter
Brand Name: AZ
Model No.: 8685
Serial No.: 1141943
Equipment No.: --
Date of Calibration: 25 February, 2019 Date of Next Calibration: 25 May, 2019

PARAMETERS:

pH Value

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

| Expected Reading (pH unit) | Displayed Reading (pH unit) | Tolerance (pH unit) |
|---|---|---|
| 4.0 | 4.2 | +0.20 |
| 7.0 | 6.9 | -0.10 |
| 10.0 | 9.8 | -0.20 |
| | Tolerance Limit (pH unit) | ±0.20 |

Temperature

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

| Expected Reading ($^{o}$C) | Displayed Reading ($^{o}$C) | Tolerance ($^{o}$C) |
|---|---|---|
| 11.5 | 12.5 | +1.0 |
| 20.0 | 19.5 | -0.5 |
| 38.0 | 37.0 | -1.0 |
| | Tolerance Limit ($^{o}$C) | ±2.0 |

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

Ms. Lin Wai Yu
Assistant Manager - Inorganic



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

# REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

| | | | |
|---|---|---|---|
| CONTACT: | BEN TAM | WORK ORDER: | HK1909740 |
| 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: | 06-Mar-2019 |
| | | DATE OF ISSUE: | 18-Mar-2019 |

## COMMENTS

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

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

| | |
|---|---|
| Scope of Test: | Turbidity |
| Equipment Type: | Turbidimeter |
| Brand Name: | Hach |
| Model No.: | 2100Q |
| Serial No.: | 11030C008499 |
| Equipment No.: | -- |
| Date of Calibration: | 15 March, 2019 |

## NOTES

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

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

Mr Chan Siu Ming, Vico
Manager - Inorganic

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# REPORT OF EQUIPMENT CALIBRATION

WORK ORDER: HK1909740

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

Equipment Type: Turbidimeter
Brand Name: Hach
Model No.: 2100Q
Serial No.: 11030C008499
Equipment No.: --
Date of Calibration: 15 March, 2019 Date of Next Calibration: 15 June, 2019

PARAMETERS:

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

| Expected Reading (NTU) | Displayed Reading (NTU) | Tolerance (%) |
|---|---|---|
| 0 | 0.11 | -- |
| 4 | 4.22 | +5.5 |
| 40 | 39.7 | -0.7 |
| 80 | 87.7 | +9.6 |
| 400 | 405 | +1.3 |
| 800 | 788 | -1.5 |
| | Tolerance Limit (%) | ±10.0 |

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

Mr Chan Siu Ming, Vico
Manager - Inorganic

Hong Kong Accreditation Service
香港認可處

# Certificate of Accreditation
# 認可證書

*This is to certify that*
*特此證明*

## ALS TECHNICHEM (HK) PTY LIMITED

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

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

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

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

## Environmental Testing
## 環境測試

*This laboratory is accredited in accordance with the recognised International Standard ISO / IEC 17025 : 2005.*
*本實驗所乃根據公認的國際標準 ISO / IEC 17025 : 2005 獲得認可。*
*This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (see joint IAF-ILAC-ISO Communiqué).*
*這項認可資格演示在指定範疇所需的技術能力及實驗所質量管理體系的運作（見國際認可論壇、國際實驗所認可合作組織及國際標準化組織的聯合公報）。*

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

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

Registration Number : HOKLAS 066
註冊號碼：

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

*This certificate is issued subject to the terms and conditions laid down by HKAS*
*本證書按照香港認可處訂立的條款及條件發出*

L 000552

# Appendix G

# Event and Action Plan

## Event and Action Plan for Air Quality

| Event | Action | | | |
|---|---|---|---|---|
| | ET | IEC | ER | Contractor |
| Action Level | | | | |
| 1. Exceedance for one sample | 1. Identify source, investigate the causes of exceedance and propose remedial measures;<br>2. Inform IEC and ER;<br>3. Repeat measurement to confirm finding;<br>4. Increase monitoring frequency to daily. | 1. Check monitoring data submitted by ET;<br>2. Check Contractor's working method. | 1. Notify Contractor. | 1. Rectify any unacceptable practice;<br>2. Amend working methods if appropriate. |
| 2. Exceedance for two or more consecutive samples | 1. Identify source;<br>2. Inform IEC and ER;<br>3. Advise the ER on the effectiveness of the proposed remedial measures;<br>4. Repeat measurements to confirm findings;<br>5. Increase monitoring frequency to daily;<br>6. Discuss with IEC and Contractor on remedial actions required;<br>7. If exceedance continues, arrange meeting with IEC and ER;<br>8. If exceedance stops, cease additional monitoring. | 1. Check monitoring data submitted by ET;<br>2. Check Contractor's working method;<br>3. Discuss with ET and Contractor on possible remedial measures;<br>4. Advise the ET on the effectiveness of the proposed remedial measures;<br>5. Monitor the implementation of remedial measures. | 1. Confirm receipt of notification of failure in writing;<br>2. Notify Contractor;<br>3. Ensure remedial measures properly implemented. | 1. Submit proposals for remedial to ER within 3 working days of notification;<br>2. Implement the agreed proposals;<br>3. Amend proposal if appropriate. |
| Limit Level | | | | |
| 1. Exceedance for one sample | 1. Identify source, investigate the causes of exceedance and propose remedial measures;<br>2. Inform ER, Contractor and EPD;<br>3. Repeat measurement to confirm finding;<br>4. Increase monitoring frequency to daily;<br>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;<br>2. Check Contractor's working method;<br>3. Discuss with ET and Contractor on possible remedial measures;<br>4. Advise the ER on the effectiveness of the proposed remedial measures;<br>5. Monitor theimplementation of remedial measures. | 1. Confirm receipt of notification of failure in writing;<br>2. Notify Contractor;<br>3. Ensure remedial measures properly implemented. | 1. Take immediate action to avoid further exceedance;<br>2. Submit proposals for remedial actions to IEC within 3 working days of notification;<br>3. Implement the agreed proposals;<br>4. Amend proposal if appropriate. |
| 2. Exceedance for two or more consecutive samples | 1. Notify IEC, ER, Contractor and EPD;<br>2. Identify source;<br>3. Repeat measurement to confirm findings;<br>4. Increase monitoring frequency to daily;<br>5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented;<br>6. Arrange meeting with IEC and ER to discuss the remedial actions to be taken;<br>7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results;<br>8. If exceedance stops, cease additional monitoring. | 1. Check monitoring data submitted by ET;<br>2. Check Contractor's working method;<br>3. Discuss amongst ER, ET, and Contractor on the potential remedial actions;<br>4. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly;<br>5. Monitor the implementation of remedial measures. | 1. Confirm receipt of notification of failure in writing;<br>2. Notify Contractor;<br>3. In consolidation with the IEC, agree with the Contractor on the remedial measures to be implemented;<br>4. Ensure remedial measures properly implemented;<br>5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated. | 1. Take immediate action to avoid further exceedance;<br>2. Submit proposals for remedial actions to IEC within 3 working days of notification;<br>3. Implement the agreed proposals;<br>4. Resubmit proposals if problem still not under control;<br>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;<br>2. Carry out investigation;<br>3. Report the results of investigation to the IEC, ER and Contractor;<br>4. Discuss with the IEC and Contractor on remedial measures required;<br>5. Increase monitoring frequency to check mitigation effectiveness. | 1. Review the investigation results submitted by the ET;<br>2. Review the proposed remedial measures by the Contractor and advise the ER accordingly;<br>3. Advise the ER on the effectiveness of the proposed remedial measures. | 1. Confirm receipt of notification of failure in writing;<br>2. Notify Contractor;<br>3. In consolidation with the IEC, agree with the Contractor on the remedial measures to be implemented;<br>4. Supervise the implementation of remedial measures. | 1. Submit noise mitigation proposals to IEC and ER;<br>2. Implement noise mitigation proposals. |
| Limit Level | 1. Inform IEC, ER, Contractor and EPD;<br>2. Repeat measurements to confirm findings;<br>3. Increase monitoring frequency;<br>4. Identify source and investigate the cause of exceedance;<br>5. Carry out analysis of Contractor's working procedures;<br>6. Discuss with the IEC, Contractor and ER on remedial measures required;<br>7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results;<br>8. If exceedance stops, cease additional monitoring. | 1. Discuss amongst ER, ET, and Contractor on the potential remedial actions;<br>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;<br>2. Notify Contractor;<br>3. In consolidation with the IEC, agree with the Contractor on the remedial measures to be implemented;<br>4. Supervise the implementation of remedial measures;<br>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;<br>2. Submit proposals for remedial actions to IEC and ER within 3 working days of notification;<br>3. Implement the agreed proposals;<br>4. Submit further proposal if problem still not under control;<br>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 | 1. Repeat in-situ measurement to confirm findings;<br>2. Identify reasons for non-compliance and sources of impact;<br>3. Inform IEC and Contractor;<br>4. Check monitoring data, all plant, equipment and Contractor's working methods;<br>5. Discuss mitigation measures with IEC and Contractor;<br>6. Repeat measurement on next day of exceedance. | 1. Discuss with ET and Contractor on the mitigation measures;<br>2. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly;<br>3. Assess the effectiveness of the implemented mitigation measures | 1. Discuss with IEC on the proposed mitigation measures;<br>2. Make agreement on the mitigation measures to be implemented;<br>3. Assess the effectiveness of the implemented mitigation measures | 1. Inform the ER and confirm notification of the non-compliance in writing;<br>2. Rectify unacceptable practice;<br>3. Check all plant and equipment;<br>4. Consider changes of working methods;<br>5. Discuss with ET and IEC and propose mitigation measures to IEC and ER;<br>6. Implement the agreed mitigation measures. |
| Action Level being exceeded by more than two consecutive sampling days | 1. Repeat in-situ measurement to confirm findings;<br>2. Identify reasons for non-compliance and sources of impact;<br>3. Inform IEC and Contractor;<br>4. Check monitoring data, all plant, equipment and Contractor's working methods;<br>5. Discuss mitigation measures with IEC and Contractor;<br>6. Ensure mitigation measures are implemented;<br>7. Prepare to increase the monitoring frequency to daily;<br>8. Repeat measurement on next day of exceedance. | 1. Discuss with ET and Contractor on the mitigation measures;<br>2. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly;<br>3. Assess the effectiveness of the implemented mitigation measures | 1. Discuss with IEC on the proposed mitigation measures;<br>2. Make agreement on the mitigation measures to be implemented;<br>3. Assess the effectiveness of the implemented mitigation measures | 1. Inform the ER and confirm notification of the non-compliance in writing;<br>2. Rectify unacceptable practice;<br>3. Check all plant and equipment;<br>4. Consider changes of working methods;<br>5. Discuss with ET and IEC and propose mitigation measures to IEC and ER within 3 working days;<br>6. Implement the agreed mitigation measures. |
| Limit Level being exceeded by one sampling day | 1. Repeat in-situ measurement to confirm findings;<br>2. Identify reasons for non-compliance and sources of impact;<br>3. Inform IEC, Contractor and EPD;<br>4. Check monitoring data, all plant, equipment and Contractor's working methods;<br>5. Discuss mitigation measures with IEC, ER and Contractor;<br>6. Ensure mitigation measures are implemented;<br>7. Increase the monitoring frequency to daily until no exceedance of Limit Level. | 1. Discuss with ET and Contractor on the mitigation measures;<br>2. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly;<br>3. Assess the effectiveness of the implemented mitigation measures | 1. Discuss with IEC, ET and Contractor on the proposed mitigation measures;<br>2. Request Contractor to critically review the working methods;<br>3. Make agreement on the mitigation measures to be implemented;<br>4. Assess the effectiveness of the implemented mitigation measures | 1. Inform the ER and confirm notification of the non-compliance in writing;<br>2. Rectify unacceptable practice;<br>3. Check all plant and equipment;<br>4. Consider changes of working methods;<br>5. Discuss with ET, IEC and ER and propose mitigation measures to IEC and ER within 3 working days;<br>6. Implement the agreed mitigation measures. |
| Limit level being exceeded by more than one consecutive sampling days | 1. Repeat in-situ measurement to confirm findings;<br>2. Identify reasons for non-compliance and sources of impact;<br>3. Inform IEC, Contractor and EPD;<br>4. Check monitoring data, all plant, equipment and Contractor's working methods;<br>5. Discuss mitigation measures with IEC, ER and Contractor;<br>6. Ensure mitigation measures are implemented;<br>7. Increase the monitoring frequency to daily until no exceedance of Limit Level for two consecutive days. | 1. Discuss with ET and Contractor on the mitigation measures;<br>2. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly;<br>3. Assess the effectiveness of the implemented mitigation measures. | 1. Discuss with IEC, ET and Contractor on the proposed mitigation measures;<br>2. Request Contractor to critically review the working methods;<br>3. Make agreement on the mitigation measures to be implemented;<br>4. Assess the effectiveness of the implemented mitigation measures;<br>5. 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. | 1. Inform the ER and confirm notification of the non-compliance in writing;<br>2. Rectify unacceptable practice;<br>3. Check all plant and equipment;<br>4. Consider changes of working methods;<br>5. Discuss with ET, IEC and ER and propose mitigation measures to IEC and ER within 3 working days;<br>6. Implement the agreed mitigation measures;<br>7. As directed by the ER, to slow down or to stop all or part of the construction activities. |

# Appendix H

# Impact Monitoring Schedule

**Impact Monitoring Schedule for Reporting Period – April 2019**

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

| | |
|---|---|
| | Monitoring Day |
| | Sunday or Public Holiday |

**Impact Monitoring Schedule for next Reporting Period – May 2019**

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

| | |
|---|---|
| | 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 | AVG AIR PRESS | STANDARD FLOW RATE | AIR VOLUME | FILTER WEIGHT (g) | | DUST WEIGHT COLLECTED | 24-HR TSP (μg/m³) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | INITIAL | FINAL | (min) | MIN | MAX | AVG | (℃) | (hPa) | (m³/min) | (std m³) | INITIAL | FINAL | (g) | |
| **AM1c – Open Area, Tsung Yuen Ha Village No.63** | | | | | | | | | | | | | | | |
| 3-Apr-19 | 23912 | 15833.53 | 15857.53 | 1440.00 | 26 | 26 | 26.0 | 22.8 | 1016.9 | 0.94 | 1350 | 2.6700 | 2.7505 | 0.0805 | 60 |
| 9-Apr-19 | 23926 | 15857.53 | 15881.53 | 1440.00 | 25 | 25 | 25.0 | 26.6 | 1011.1 | 0.90 | 1295 | 2.6571 | 2.7206 | 0.0635 | 49 |
| 15-Apr-19 | 24013 | 15881.53 | 15905.53 | 1440.00 | 25 | 25 | 25.0 | 22.1 | 1014.4 | 0.91 | 1305 | 2.6428 | 2.6981 | 0.0553 | 42 |
| 20-Apr-19 | 24032 | 15905.53 | 15929.53 | 1440.00 | 25 | 25 | 25.0 | 23.3 | 1007.2 | 0.90 | 1299 | 2.6385 | 2.6700 | 0.0315 | 24 |
| 26-Apr-19 | 24056 | 15929.53 | 15953.53 | 1440.00 | 25 | 25 | 25.0 | 28.4 | 1010.4 | 0.90 | 1291 | 2.6451 | 2.7029 | 0.0578 | 45 |
| **AM2 - Village House near Lin Ma Hang Road** | | | | | | | | | | | | | | | |
| 3-Apr-19 | 23913 | 11442.09 | 11465.65 | 1413.60 | 42 | 42 | 42.0 | 22.8 | 1016.9 | 1.26 | 1779 | 2.6668 | 2.8776 | 0.2108 | 118 |
| 9-Apr-19 | 23925 | 11465.65 | 11489.15 | 1410.00 | 34 | 34 | 34.0 | 26.6 | 1011.1 | 0.94 | 1326 | 2.6577 | 2.7977 | 0.1400 | 106 |
| 15-Apr-19 | 24014 | 11489.15 | 11512.70 | 1413.00 | 34 | 34 | 34.0 | 22.1 | 1014.4 | 0.95 | 1342 | 2.6383 | 2.7740 | 0.1357 | 101 |
| 20-Apr-19 | 24031 | 11512.70 | 11536.22 | 1411.20 | 32 | 32 | 32.0 | 23.3 | 1007.2 | 0.89 | 1249 | 2.6529 | 2.6918 | 0.0389 | 31 |
| 26-Apr-19 | 24055 | 11536.22 | 11559.81 | 1415.40 | 36 | 36 | 36.0 | 28.4 | 1010.4 | 1.00 | 1409 | 2.6497 | 2.8234 | 0.1737 | 123 |
| **AM3 - Ta Kwu Ling Fire Service Station of Ta Kwu Ling Village** | | | | | | | | | | | | | | | |
| 3-Apr-19 | 23914 | 12573.72 | 12597.72 | 1440.00 | 50 | 50 | 50.0 | 22.8 | 1016.9 | 1.55 | 2230 | 2.6598 | 2.7690 | 0.1092 | 49 |
| 9-Apr-19 | 23924 | 12597.72 | 12621.72 | 1440.00 | 20 | 20 | 20.0 | 26.6 | 1011.1 | 0.51 | 733 | 2.6548 | 2.7076 | 0.0528 | 72 |
| 15-Apr-19 | 24015 | 12621.72 | 12645.72 | 1440.00 | 40 | 40 | 40.0 | 22.1 | 1014.4 | 1.20 | 1734 | 2.6307 | 2.6786 | 0.0479 | 28 |
| 20-Apr-19 | 24030 | 12645.72 | 12669.72 | 1440.00 | 40 | 40 | 40.0 | 23.3 | 1007.2 | 1.20 | 1723 | 2.6399 | 2.6633 | 0.0234 | 14 |
| 26-Apr-19 | 24054 | 12669.72 | 12693.72 | 1440.00 | 50 | 50 | 50 | 28.4 | 1010.4 | 1.53 | 2199 | 2.6577 | 2.8018 | 0.1441 | 66 |
| **AM4b - House no. 10B1 Nga Yiu Ha Village** | | | | | | | | | | | | | | | |
| 2-Apr-19 | 23907 | 14559.52 | 14583.52 | 1440.00 | 38 | 38 | 38.0 | 20.7 | 1018.2 | 1.16 | 1670 | 2.6718 | 2.8268 | 0.1550 | 93 |
| 8-Apr-19 | 23919 | 14583.52 | 14607.52 | 1440.00 | 38 | 38 | 38.0 | 26.7 | 1011.6 | 1.09 | 1572 | 2.6664 | 2.7547 | 0.0883 | 56 |
| 13-Apr-19 | 23952 | 14607.52 | 14631.52 | 1440.00 | 38 | 38 | 38.0 | 21.2 | 1014.3 | 1.10 | 1591 | 2.6512 | 2.7042 | 0.0530 | 33 |
| 18-Apr-19 | 24021 | 14631.52 | 14655.52 | 1440.00 | 34 | 34 | 34.0 | 24 | 1010 | 0.97 | 1395 | 2.6309 | 2.6870 | 0.0561 | 40 |
| 24-Apr-19 | 24049 | 14655.52 | 14679.52 | 1440.00 | 38 | 38 | 38.0 | 28 | 1009.9 | 1.09 | 1567 | 2.6322 | 2.6934 | 0.0612 | 39 |
| 30-Apr-19 | 24062 | 14679.52 | 14703.52 | 1440.00 | 40 | 40 | 40.0 | 26.7 | 1008 | 1.15 | 1660 | 2.6407 | 2.6997 | 0.0590 | 36 |
| **AM5a - Ping Yeung Village House** | | | | | | | | | | | | | | | |
| 2-Apr-19 | 23908 | 13402.80 | 13426.88 | 1444.80 | 26 | 26 | 26.0 | 20.7 | 1018.2 | 0.73 | 1056 | 2.6777 | 2.7557 | 0.0780 | 74 |
| 8-Apr-19 | 23920 | 13426.88 | 13450.92 | 1442.40 | 26 | 26 | 26.0 | 26.7 | 1011.6 | 0.84 | 1216 | 2.6673 | 2.7365 | 0.0692 | 57 |
| 13-Apr-19 | 23953 | 13450.92 | 13474.93 | 1440.60 | 30 | 30 | 30.0 | 21.2 | 1014.3 | 0.96 | 1387 | 2.6602 | 2.7215 | 0.0613 | 44 |
| 18-Apr-19 | 24022 | 13474.93 | 13499.12 | 1451.40 | 30 | 30 | 30.0 | 24 | 1010 | 0.96 | 1389 | 2.6437 | 2.6767 | 0.0330 | 24 |
| 24-Apr-19 | 24050 | 13499.12 | 13523.22 | 1446.00 | 36 | 36 | 36.0 | 28 | 1009.9 | 1.12 | 1616 | 2.6529 | 2.7090 | 0.0561 | 35 |
| 30-Apr-19 | 24061 | 13523.22 | 13547.25 | 1441.80 | 30 | 30 | 30.0 | 26.7 | 1008 | 0.95 | 1374 | 2.6580 | 2.7118 | 0.0538 | 39 |
| **AM6 - Wo Keng Shan Village House** | | | | | | | | | | | | | | | |
| 2-Apr-19 | 23909 | 11005.13 | 11029.13 | 1440.00 | 34 | 34 | 34.0 | 20.7 | 1018.2 | 1.01 | 1461 | 2.6551 | 2.7568 | 0.1017 | 70 |

| DATE | SAMPLE NUMBER | ELAPSED TIME | | | CHART READING | | | AVG TEMP | AVG AIR PRESS | STANDARD FLOW RATE | AIR VOLUME | FILTER WEIGHT (g) | | DUST WEIGHT COLLECTED | 24-HR TSP ($\mu g/m^3$) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | INITIAL | FINAL | (min) | MIN | MAX | AVG | (℃) | (hPa) | ($m^3$/min) | (std $m^3$) | INITIAL | FINAL | (g) | |
| 8-Apr-19 | 23921 | 11029.13 | 11053.13 | 1440.00 | 34 | 34 | 34.0 | 26.7 | 1011.6 | 0.93 | 1346 | 2.6558 | 2.7783 | 0.1225 | 91 |
| 13-Apr-19 | 23954 | 11053.13 | 11077.13 | 1440.00 | 34 | 34 | 34.0 | 21.2 | 1014.3 | 0.95 | 1362 | 2.6520 | 2.7482 | 0.0962 | 71 |
| 18-Apr-19 | 24023 | 11077.13 | 11101.13 | 1440.00 | 30 | 30 | 30.0 | 24.0 | 1010.0 | 0.81 | 1166 | 2.6584 | 2.7450 | 0.0866 | 74 |
| 24-Apr-19 | 24051 | 11101.13 | 11125.13 | 1440.00 | 30 | 30 | 30.0 | 28.0 | 1009.9 | 0.80 | 1156 | 2.6348 | 2.7332 | 0.0984 | 85 |
| 30-Apr-19 | 24060 | 11125.13 | 11149.14 | 1440.60 | 32 | 32 | 32.0 | 26.7 | 1008.0 | 0.87 | 1251 | 2.6286 | 2.7409 | 0.1123 | 90 |
| **AM7b - Loi Tung Village House** | | | | | | | | | | | | | | | |
| 2-Apr-19 | 23910 | 20051.47 | 20075.46 | 1439.40 | 46 | 46 | 46 | 20.7 | 1018.2 | 1.36 | 1961 | 2.6521 | 2.8397 | 0.1876 | 96 |
| 8-Apr-19 | 23922 | 20075.46 | 20099.46 | 1440.00 | 44 | 44 | 44 | 26.7 | 1011.6 | 1.23 | 1771 | 2.6694 | 2.8633 | 0.1939 | 110 |
| 13-Apr-19 | 24011 | 20099.46 | 20123.46 | 1440.00 | 45 | 45 | 45 | 21.2 | 1014.3 | 1.27 | 1825 | 2.6346 | 2.7286 | 0.0940 | 52 |
| 18-Apr-19 | 24024 | 20123.46 | 20147.45 | 1439.40 | 45 | 45 | 45 | 24 | 1010 | 1.26 | 1812 | 2.6366 | 2.7469 | 0.1103 | 61 |
| 24-Apr-19 | 24052 | 20147.45 | 20171.53 | 1444.80 | 43 | 43 | 43 | 28 | 1009.9 | 1.20 | 1735 | 2.6395 | 2.718 | 0.0785 | 45 |
| 30-Apr-19 | 24059 | 20171.53 | 20195.53 | 1440.00 | 44 | 44 | 44.0 | 26.7 | 1008 | 1.23 | 1768 | 2.6383 | 2.7163 | 0.0780 | 44 |
| **AM8 - Po Kat Tsai Village No. 4** | | | | | | | | | | | | | | | |
| 2-Apr-19 | 23911 | 13948.93 | 13972.93 | 1440.00 | 28 | 28 | 28.0 | 20.7 | 1018.2 | 1.03 | 1480 | 2.6655 | 2.7296 | 0.0641 | 43 |
| 8-Apr-19 | 23923 | 13972.93 | 13996.93 | 1440.00 | 28 | 28 | 28.0 | 26.7 | 1011.6 | 0.97 | 1401 | 2.6619 | 2.7041 | 0.0422 | 30 |
| 13-Apr-19 | 24012 | 13996.93 | 14020.92 | 1439.40 | 28 | 28 | 28.0 | 21.2 | 1014.3 | 0.98 | 1412 | 2.6187 | 2.6371 | 0.0184 | 13 |
| 18-Apr-19 | 24025 | 14020.92 | 14044.92 | 1440.00 | 30 | 30 | 30.0 | 24 | 1010 | 1.03 | 1481 | 2.648 | 2.6865 | 0.0385 | 26 |
| 24-Apr-19 | 24053 | 14044.92 | 14068.93 | 1440.60 | 30 | 30 | 30.0 | 28 | 1009.9 | 1.02 | 1474 | 2.6357 | 2.6716 | 0.0359 | 24 |
| 30-Apr-19 | 24058 | 14068.93 | 14092.93 | 1440.00 | 30 | 30 | 30.0 | 26.7 | 1008 | 1.02 | 1475 | 2.6374 | 2.6687 | 0.0313 | 21 |
| **AM9b - Nam Wa Po Village House No. 80** | | | | | | | | | | | | | | | |
| 3-Apr-19 | 23918 | 21320.47 | 21344.46 | 1439.40 | 26 | 26 | 26.0 | 22.8 | 1016.9 | 0.63 | 900 | 2.6581 | 2.6947 | 0.0366 | 41 |
| 9-Apr-19 | 23948 | 21344.46 | 21368.46 | 1440.00 | 26 | 26 | 26.0 | 26.6 | 1011.1 | 0.70 | 1008 | 2.6692 | 2.7055 | 0.0363 | 36 |
| 15-Apr-19 | 24016 | 21368.46 | 21392.46 | 1440.00 | 26 | 26 | 26.0 | 22.1 | 1014.4 | 0.71 | 1020 | 2.6354 | 2.6649 | 0.0295 | 29 |
| 20-Apr-19 | 24033 | 21392.46 | 21416.47 | 1440.60 | 26 | 26 | 26.0 | 23.3 | 1007.2 | 0.70 | 1013 | 2.6343 | 2.6748 | 0.0405 | 40 |
| 26-Apr-19 | 24057 | 21416.47 | 21440.47 | 1440.00 | 26 | 26 | 26.0 | 28.4 | 1010.4 | 0.70 | 1004 | 2.6488 | 2.6877 | 0.0389 | 39 |

## Construction Noise Monitoring Results, dB(A)

| Date | Start Time | 1st Leq5min | L10 | L90 | 2nd Leq5min | L10 | L90 | 3nd Leq5min | L10 | L90 | 4th Leq5min | L10 | L90 | 5th Leq5min | L10 | L90 | 6th Leq5min | L10 | L90 | Leq30 | façade correction |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **NM1 - Tsung Yuen Ha Village House No. 63** | | | | | | | | | | | | | | | | | | | | | |
| 2-Apr-19 | 9:13 | 55.1 | 58.0 | 51.5 | 52.5 | 55.0 | 49.0 | 53.2 | 55.0 | 50.5 | 54.5 | 56.5 | 52.5 | 55.6 | 58.0 | 52.5 | 52.5 | 54.0 | 50.0 | 54 | NA |
| 8-Apr-19 | 10:41 | 57.7 | 59.9 | 53.7 | 56.0 | 57.9 | 51.3 | 55.7 | 57.1 | 54.1 | 57.9 | 60.8 | 54.4 | 55.1 | 56.7 | 53.0 | 55.6 | 57.0 | 53.5 | 56 | NA |
| 17-Apr-19 | 10:08 | 49.5 | 51.3 | 42.8 | 44.5 | 46.9 | 42.3 | 45.2 | 47.0 | 43.5 | 44.4 | 46.5 | 42.4 | 43.9 | 44.9 | 42.5 | 44.5 | 45.5 | 42.5 | 46 | NA |
| 23-Apr-19 | 14:36 | 58.1 | 58.0 | 54.6 | 57.5 | 58.5 | 53.9 | 60.1 | 64.3 | 52.5 | 57.3 | 56.6 | 53.8 | 58.6 | 57.5 | 54.6 | 59.5 | 58.8 | 54.8 | 59 | NA |
| 29-Apr-19 | 9:33 | 58.6 | 60.7 | 54.9 | 61.0 | 65.2 | 55.3 | 56.8 | 59.2 | 53.8 | 57.0 | 59.1 | 53.6 | 59.8 | 62.7 | 55.1 | 58.2 | 60.8 | 53.6 | 59 | NA |
| **NM2a - Village House near Lin Ma Hang Road** | | | | | | | | | | | | | | | | | | | | | |
| 2-Apr-19 | 10:09 | 56.9 | 57.5 | 52.0 | 54.0 | 57.0 | 51.5 | 55.8 | 57.5 | 52.5 | 58.3 | 62.0 | 52.5 | 62.8 | 66.5 | 56.0 | 56.8 | 59.5 | 53.0 | 58 | 61 |
| 8-Apr-19 | 14:09 | 70.3 | 73.1 | 62.3 | 64.8 | 65.7 | 59.9 | 63.5 | 65.2 | 60.5 | 64.3 | 64.6 | 59.7 | 62.2 | 63.5 | 59.7 | 62.3 | 64.5 | 60.5 | 66 | 69 |
| 17-Apr-19 | 10:06 | 65.3 | 68.3 | 60.0 | 62.4 | 64.2 | 59.8 | 64.2 | 66.1 | 60.2 | 62.5 | 64.9 | 56.7 | 65.4 | 67.1 | 63.3 | 63.2 | 64.9 | 60.3 | 64 | 67 |
| 23-Apr-19 | 13:55 | 65.5 | 68.1 | 56.6 | 63.5 | 66.3 | 57.4 | 61.9 | 66.1 | 54.6 | 63.9 | 67.8 | 56.1 | 63.3 | 66.8 | 55.3 | 62.5 | 66.3 | 54.8 | 64 | 67 |
| 29-Apr-19 | 10:21 | 70.8 | 73.2 | 62.5 | 64.8 | 65.7 | 59.7 | 62.4 | 64.1 | 59.9 | 59.6 | 61.1 | 58.9 | 64.8 | 64.5 | 59.9 | 63.0 | 63.0 | 58.2 | 66 | 69 |
| **NM3 - Ping Yeung Village House** | | | | | | | | | | | | | | | | | | | | | |
| 3-Apr-19 | 14:33 | 61.2 | 64.1 | 54.6 | 60.2 | 63.2 | 54.4 | 59.7 | 63.7 | 52.2 | 64.3 | 66.2 | 55.3 | 58.1 | 62.6 | 54.2 | 59.6 | 63.2 | 55.3 | 61 | NA |
| 9-Apr-19 | 9:41 | 55.5 | 58.8 | 44.1 | 54.9 | 54.1 | 45.2 | 56.7 | 57.6 | 45.9 | 55.5 | 56.3 | 44.4 | 54.2 | 55.8 | 44.6 | 56.6 | 57.0 | 45.2 | 56 | NA |
| 15-Apr-19 | 9:20 | 60.3 | 60.6 | 53.1 | 59.5 | 61.2 | 53.4 | 57.3 | 59.8 | 53.1 | 59.2 | 61.6 | 53.2 | 54.3 | 54.2 | 53.6 | 58.0 | 60.0 | 52.2 | 58 | NA |
| 24-Apr-19 | 9:56 | 55.8 | 56.6 | 47.6 | 56.6 | 55.1 | 48.1 | 53.2 | 54.7 | 47.9 | 56.6 | 56.5 | 48.5 | 54.3 | 55.6 | 48.8 | 55.0 | 56.8 | 49.6 | 55 | NA |
| 30-Apr-19 | 13:23 | 54.9 | 55.8 | 52.7 | 54.2 | 56.1 | 52.3 | 61.2 | 61.6 | 52.6 | 54.6 | 55.5 | 53.7 | 55.8 | 56.9 | 53.7 | 59.2 | 60.2 | 52.5 | 58 | NA |
| **NM4 - Wo Keng Shan Village House** | | | | | | | | | | | | | | | | | | | | | |
| 3-Apr-19 | 13:22 | 65.7 | 62.6 | 52.1 | 62.1 | 64.0 | 55.2 | 67.6 | 65.3 | 53.4 | 65.7 | 63.0 | 52.6 | 67.2 | 65.7 | 53.5 | 69.3 | 67.7 | 54.0 | 67 | NA |
| 9-Apr-19 | 10:38 | 64.4 | 61.5 | 49.9 | 62.0 | 62.8 | 48.9 | 55.9 | 59.1 | 48.6 | 60.8 | 60.6 | 48.6 | 63.2 | 62.2 | 49.0 | 58.6 | 60.6 | 48.3 | 62 | NA |
| 15-Apr-19 | 10:18 | 66.0 | 63.0 | 52.2 | 64.8 | 62.3 | 51.2 | 62.0 | 61.0 | 51.6 | 65.3 | 62.2 | 52.5 | 62.5 | 64.6 | 55.1 | 65.1 | 63.5 | 53.7 | 65 | NA |
| 24-Apr-19 | 9:40 | 67.3 | 65.9 | 52.5 | 60.2 | 62.0 | 50.7 | 61.0 | 63.2 | 50.7 | 60.2 | 62.9 | 50.6 | 64.6 | 64.9 | 52.0 | 62.4 | 62.4 | 52.6 | 63 | NA |
| 30-Apr-19 | 14:28 | 60.3 | 60.9 | 48.8 | 63.6 | 62.2 | 50.8 | 65.1 | 66.9 | 50.8 | 63.3 | 65.1 | 48.2 | 65.1 | 66.0 | 49.7 | 62.1 | 63.5 | 50.4 | 64 | NA |
| **NM5– Ping Yeung Village House** | | | | | | | | | | | | | | | | | | | | | |
| 3-Apr-19 | 11:12 | 54.6 | 56.1 | 50.5 | 52.2 | 54.8 | 48.9 | 52.2 | 54.4 | 48.1 | 51.6 | 53.1 | 47.5 | 51.4 | 53.2 | 47.4 | 53.5 | 55.6 | 49.6 | 53 | NA |
| 9-Apr-19 | 13:52 | 48.8 | 51.6 | 44.5 | 49.0 | 51.6 | 44.4 | 53.4 | 56.9 | 45.0 | 50.4 | 53.8 | 44.8 | 52.6 | 55.1 | 45.1 | 49.2 | 52.0 | 44.0 | 51 | NA |
| 15-Apr-19 | 13:11 | 53.2 | 55.4 | 49.4 | 51.1 | 55.2 | 50.4 | 53.3 | 56.1 | 50.6 | 52.2 | 55.6 | 49.1 | 50.0 | 54.4 | 48.9 | 52.0 | 55.4 | 49.0 | 52 | NA |
| 24-Apr-19 | 13:20 | 52.4 | 56.5 | 51.3 | 50.2 | 54.3 | 50.0 | 50.2 | 55.2 | 48.3 | 48.7 | 53.2 | 48.5 | 49.6 | 54.5 | 48.1 | 51.5 | 55.2 | 49.3 | 51 | NA |
| 30-Apr-19 | 9:41 | 52.8 | 55.4 | 49.0 | 50.5 | 54.4 | 48.3 | 53.7 | 55.7 | 48.5 | 53.2 | 55.5 | 48.6 | 51.5 | 55.6 | 49.0 | 53.6 | 56.5 | 50.8 | 53 | NA |
| **NM6 – Tai Tong Wu Village House 2** | | | | | | | | | | | | | | | | | | | | | |
| 3-Apr-19 | 10:32 | 60.5 | 62.2 | 54.9 | 58.6 | 60.1 | 52.1 | 59.1 | 61.6 | 51.9 | 61.7 | 62.5 | 52.8 | 58.5 | 61.6 | 53.4 | 59.6 | 62.8 | 54.5 | 60 | NA |
| 9-Apr-19 | 13:11 | 57.1 | 60.1 | 50.9 | 58.3 | 60.5 | 50.0 | 57.7 | 59.2 | 49.1 | 58.2 | 60.1 | 50.5 | 59.5 | 61.5 | 49.2 | 57.1 | 59.9 | 49.3 | 58 | NA |
| 15-Apr-19 | 13:51 | 56.5 | 59.6 | 51.2 | 58.5 | 63.1 | 53.0 | 56.1 | 60.5 | 52.3 | 57.4 | 61.9 | 52.0 | 57.6 | 61.9 | 52.6 | 56.4 | 59.9 | 50.2 | 57 | NA |
| 24-Apr-19 | 13:52 | 57.7 | 60.6 | 50.5 | 58.7 | 60.4 | 50.5 | 58.8 | 61.8 | 51.4 | 59.2 | 61.5 | 50.9 | 59.5 | 62.8 | 51.5 | 57.6 | 60.1 | 50.4 | 59 | NA |
| 30-Apr-19 | 10:20 | 55.5 | 58.0 | 50.6 | 55.3 | 58.6 | 49.2 | 53.5 | 56.2 | 49.6 | 55.1 | 57.0 | 49.8 | 56.6 | 58.7 | 50.8 | 54.0 | 57.6 | 50.9 | 55 | NA |
| **NM7 – Po Kat Tsai Village** | | | | | | | | | | | | | | | | | | | | | |
| 3-Apr-19 | 9:16 | 53.5 | 53.2 | 49.9 | 51.6 | 50.1 | 48.1 | 55.1 | 55.6 | 49.9 | 58.7 | 58.5 | 48.8 | 54.5 | 56.6 | 48.4 | 56.6 | 57.8 | 48.5 | 56 | NA |
| 9-Apr-19 | 11:42 | 64.4 | 61.5 | 49.9 | 62.0 | 62.8 | 48.9 | 55.9 | 59.1 | 48.6 | 58.6 | 60.3 | 48.8 | 60.1 | 61.1 | 48.8 | 57.4 | 60.2 | 48.6 | 61 | NA |

| Date | Start Time | 1st $Leq_{5min}$ | L10 | L90 | 2nd $Leq_{5min}$ | L10 | L90 | 3nd $Leq_{5min}$ | L10 | L90 | 4th $Leq_{5min}$ | L10 | L90 | 5th $Leq_{5min}$ | L10 | L90 | 6th $Leq_{5min}$ | L10 | L90 | Leq30 | façade correction |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 15-Apr-19 | 14:56 | 59.1 | 64.4 | 50.9 | 59.1 | 63.9 | 50.5 | 58.4 | 62.8 | 49.9 | 59.0 | 65.5 | 50.6 | 53.2 | 58.8 | 50.8 | 51.3 | 55.9 | 48.7 | 58 | NA |
| 24-Apr-19 | 14:45 | 63.8 | 65.4 | 50.0 | 57.5 | 58.4 | 50.3 | 55.7 | 55.7 | 49.5 | 62.2 | 66.5 | 50.6 | 58.5 | 62.6 | 49.0 | 60.6 | 64.5 | 49.8 | 61 | NA |
| 30-Apr-19 | 15:27 | 55.6 | 56.7 | 43.3 | 52.3 | 54.4 | 42.5 | 53.6 | 55.0 | 42.1 | 57.5 | 57.4 | 44.8 | 55.5 | 55.5 | 42.0 | 53.4 | 53.7 | 43.3 | 55 | NA |
| **NM8 - Village House, Tong Hang** | | | | | | | | | | | | | | | | | | | | | |
| 2-Apr-19 | 10:58 | 58.3 | 59.5 | 56.4 | 57.8 | 58.7 | 56.7 | 57 | 59 | 54.6 | 57.7 | 59.5 | 54.9 | 57.1 | 58.7 | 55 | 58.4 | 59.9 | 56.6 | 58 | NA |
| 8-Apr-19 | 11:01 | 58.6 | 59.5 | 57.5 | 57.3 | 58.5 | 56.1 | 56.5 | 57.4 | 55.3 | 57.7 | 58.8 | 55.6 | 56.7 | 57.5 | 55.6 | 57.8 | 58.9 | 56.5 | 57 | NA |
| 17-Apr-19 | 11:12 | 58.1 | 61.6 | 50.1 | 61.5 | 63.6 | 51.1 | 59.4 | 62.9 | 51.3 | 60.7 | 63.4 | 52.7 | 61.3 | 63 | 51.6 | 62.5 | 64 | 52.6 | 61 | NA |
| 23-Apr-19 | 11:30 | 62.2 | 62.5 | 50.4 | 64 | 68.5 | 50.9 | 62.5 | 68 | 49.6 | 61.3 | 58 | 48.9 | 59.2 | 55.6 | 50.6 | 62.5 | 66.6 | 49.5 | 62 | NA |
| 29-Apr-19 | 13:41 | 62.9 | 64.5 | 51.5 | 63.3 | 67.5 | 47.5 | 68.1 | 69 | 47.5 | 66.6 | 69.5 | 45 | 58.9 | 62.5 | 44 | 65.5 | 68 | 44.5 | 65 | NA |
| **NM9 - Village House, Kiu Tau Village** | | | | | | | | | | | | | | | | | | | | | |
| 2-Apr-19 | 10:03 | 58.9 | 59.8 | 57.9 | 61.3 | 62.4 | 60.1 | 60.1 | 61.1 | 59.2 | 59.6 | 60.8 | 58.3 | 60.6 | 61.6 | 59.5 | 61.6 | 62.6 | 60.5 | 61 | NA |
| 8-Apr-19 | 10:04 | 63.1 | 64.0 | 62.0 | 62.4 | 63.1 | 61.4 | 62.7 | 63.8 | 61.3 | 62.6 | 63.5 | 61.8 | 62.8 | 63.7 | 61.6 | 62.5 | 63.6 | 61.2 | 63 | NA |
| 17-Apr-19 | 9:21 | 57.4 | 60.1 | 52.3 | 56.9 | 59.4 | 53.4 | 57.8 | 59.9 | 53.1 | 55.3 | 58.6 | 53.7 | 56.9 | 60.4 | 54.3 | 57.8 | 61.7 | 53.2 | 60 | NA |
| 23-Apr-19 | 11:25 | 58.3 | 61.7 | 53.6 | 57.9 | 60.4 | 54.2 | 57.1 | 59.3 | 53.6 | 56.8 | 58.4 | 53.1 | 56.2 | 60.3 | 52.4 | 57.9 | 60.1 | 53.8 | 60 | NA |
| 29-Apr-19 | 9:52 | 59.9 | 64.4 | 48.9 | 56.4 | 61.4 | 45.8 | 52.8 | 53.8 | 44.6 | 57.0 | 61.6 | 46.9 | 57.2 | 60.2 | 47.2 | 70.0 | 60.7 | 46.0 | 60 | NA |
| **NM10 - Nam Wa Po Village House No. 80** | | | | | | | | | | | | | | | | | | | | | |
| 2-Apr-19 | 9:11 | 63.1 | 64.1 | 61.2 | 60.3 | 61.2 | 59.1 | 61.7 | 62.6 | 60.7 | 62.9 | 64.1 | 60.4 | 60.3 | 61.7 | 58.7 | 59.8 | 60.8 | 57.6 | 62 | 65 |
| 8-Apr-19 | 9:07 | 62.5 | 63.4 | 61.5 | 59.8 | 61.1 | 58.4 | 60.1 | 60.8 | 59.3 | 61.7 | 63.2 | 60.3 | 60.9 | 61.7 | 59.9 | 60.3 | 60.9 | 59.6 | 61 | 64 |
| 17-Apr-19 | 14:48 | 60.1 | 64.6 | 50.6 | 54.2 | 58.0 | 49.6 | 54.0 | 57.6 | 49.2 | 59.1 | 63.8 | 50.3 | 60.2 | 63.6 | 48.5 | 59.2 | 62.5 | 47.1 | 58 | 61 |
| 23-Apr-19 | 13:29 | 58.1 | 60.7 | 54.6 | 57.3 | 59.2 | 53.1 | 58.6 | 59.6 | 53.4 | 58.9 | 60.2 | 54.1 | 57.7 | 61.7 | 55.8 | 57.4 | 61.9 | 54.9 | 58 | 61 |
| 29-Apr-19 | 9:21 | 61.8 | 62.8 | 58.2 | 60.5 | 62.4 | 58.8 | 60.7 | 62.4 | 58.9 | 61.2 | 63.8 | 59.8 | 61.3 | 63.0 | 60.9 | 62.2 | 64.0 | 60.8 | 61 | 64 |

## Water Quality Monitoring Data for Contract 6 and SS C505

| Date | 2-Apr-19 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Time** | **Depth (m)** | **Temp (oC)** | | **DO (mg/L)** | | **DO (%)** | | **Turbidity (NTU)** | | **pH** | | **SS(mg/L)** | |
| WM1-C | 10:50 | 0.30 | 21.2 | 21.2 | 6.46 | 6.5 | 72.7 | 72.8 | 268.0 | 267.0 | 7.2 | 7.2 | 304 | 300.0 |
| | | | 21.2 | | 6.47 | | 72.8 | | 266.0 | | 7.2 | | 296 | |
| WM1 | 10:35 | 0.15 | 21.8 | 21.8 | 6.27 | 6.3 | 71.4 | 71.5 | 81.5 | 81.7 | 7.2 | 7.2 | 63 | 61.0 |
| | | | 21.8 | | 6.29 | | 71.6 | | 81.9 | | 7.2 | | 59 | |

| Date | 4-Apr-19 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Time** | **Depth (m)** | **Temp (oC)** | | **DO (mg/L)** | | **DO (%)** | | **Turbidity (NTU)** | | **pH** | | **SS(mg/L)** | |
| WM1-C | 10:10 | 0.30 | 22.4 | 22.4 | 4.81 | 4.8 | 55.5 | 55.7 | 101.0 | 102.5 | 6.9 | 6.9 | 162 | 158.0 |
| | | | 22.4 | | 4.85 | | 55.9 | | 104.0 | | 6.9 | | 154 | |
| WM1 | 10:00 | 0.15 | 22.1 | 22.1 | 5.34 | 5.4 | 61.3 | 61.5 | 87.9 | 88.7 | 7.1 | 7.1 | 69 | 69.0 |
| | | | 22.1 | | 5.38 | | 61.6 | | 89.5 | | 7.1 | | 69 | |

| Date | 6-Apr-19 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Time** | **Depth (m)** | **Temp (oC)** | | **DO (mg/L)** | | **DO (%)** | | **Turbidity (NTU)** | | **pH** | | **SS(mg/L)** | |
| WM1-C | 14:10 | 0.30 | 23.7 | 23.7 | 6.21 | 6.2 | 74.8 | 74.8 | 109.0 | 111.0 | 7.2 | 7.2 | 129 | 131.0 |
| | | | 23.7 | | 6.2 | | 74.7 | | 113.0 | | 7.2 | | 133 | |
| WM1 | 14:00 | 0.15 | 23.7 | 23.7 | 6.82 | 6.8 | 82.2 | 82.1 | 69.0 | 67.0 | 6.8 | 6.8 | 70 | 71.5 |
| | | | 23.7 | | 6.8 | | 82.0 | | 65.0 | | 6.8 | | 73 | |

| Date | 9-Apr-19 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Time** | **Depth (m)** | **Temp (oC)** | | **DO (mg/L)** | | **DO (%)** | | **Turbidity (NTU)** | | **pH** | | **SS(mg/L)** | |
| WM1-C | 10:15 | 0.30 | 25.7 | 25.7 | 3.73 | 3.7 | 46.0 | 46.1 | 215.0 | 216.5 | 7.3 | 7.3 | 110 | 107.5 |
| | | | 25.7 | | 3.75 | | 46.2 | | 218.0 | | 7.3 | | 105 | |
| WM1 | 10:10 | 0.15 | 24.8 | 24.8 | 5.23 | 5.2 | 63.1 | 63.2 | 61.7 | 63.3 | 7.2 | 7.2 | 52 | 53.0 |
| | | | 24.8 | | 5.24 | | 63.2 | | 64.9 | | 7.2 | | 54 | |

| Date | 11-Apr-19 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Time** | **Depth (m)** | **Temp (oC)** | | **DO (mg/L)** | | **DO (%)** | | **Turbidity (NTU)** | | **pH** | | **SS(mg/L)** | |
| WM1-C | 9:55 | 0.30 | 26.8 | 26.8 | 3.6 | 3.6 | 45.3 | 45.8 | 269.0 | 271.0 | 7.89 | 7.9 | 156 | 163.0 |
| | | | 26.8 | | 3.69 | | 46.2 | | 273.0 | | 7.89 | | 170 | |
| WM1 | 9:45 | 0.15 | 25.8 | 25.8 | 6.38 | 6.4 | 78.8 | 79.0 | 69.1 | 70.0 | 8.07 | 8.1 | 61 | 63.5 |
| | | | 25.8 | | 6.41 | | 79.1 | | 70.9 | | 8.07 | | 66 | |

| Date | 13-Apr-19 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Time** | **Depth (m)** | **Temp (oC)** | | **DO (mg/L)** | | **DO (%)** | | **Turbidity (NTU)** | | **pH** | | **SS(mg/L)** | |
| WM1-C | 9:55 | 0.30 | 22 | 22.0 | 6.83 | 6.8 | 78.0 | 78.2 | 61.6 | 61.1 | 7.2 | 7.2 | 64 | 64.0 |
| | | | 22 | | 6.84 | | 78.3 | | 60.5 | | 7.2 | | 64 | |
| WM1 | 9:45 | 0.15 | 22.2 | 22.2 | 7.6 | 7.6 | 87.5 | 87.6 | 70.9 | 71.1 | 7.2 | 7.2 | 55 | 57.5 |
| | | | 22.2 | | 7.63 | | 87.7 | | 71.3 | | 7.2 | | 60 | |

| Date | 16-Apr-19 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Time** | **Depth (m)** | **Temp (oC)** | | **DO (mg/L)** | | **DO (%)** | | **Turbidity (NTU)** | | **pH** | | **SS(mg/L)** | |
| WM1-C | 10:30 | 0.30 | 21.3 | 21.3 | 7.04 | 7.1 | 79.3 | 79.4 | 54.7 | 52.9 | 6.7 | 6.7 | 42 | 43.5 |
| | | | 21.3 | | 7.06 | | 79.5 | | 51.0 | | 6.7 | | 45 | |
| WM1 | 10:15 | 0.15 | 21.7 | 21.7 | 7.55 | 7.6 | 85.8 | 85.9 | 60.2 | 60.7 | 7.1 | 7.1 | 52 | 53.5 |
| | | | 21.7 | | 7.57 | | 85.9 | | 61.2 | | 7.1 | | 55 | |

| Date | 18-Apr-19 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Time** | **Depth (m)** | **Temp (oC)** | | **DO (mg/L)** | | **DO (%)** | | **Turbidity (NTU)** | | **pH** | | **SS(mg/L)** | |
| WM1-C | 10:30 | 0.30 | 23.6 | 23.6 | 6.86 | 6.9 | 80.8 | 81.0 | 139.0 | 142.5 | 8.3 | 8.3 | 177 | 180.5 |
| | | | 23.6 | | 6.88 | | 81.2 | | 146.0 | | 8.3 | | 184 | |
| WM1 | 10:20 | 0.15 | 24.4 | 24.4 | 7.04 | 7.0 | 84.3 | 84.4 | 119.0 | 121.5 | 8 | 8.0 | 83 | 83.5 |
| | | | 24.4 | | 7.05 | | 84.4 | | 124.0 | | 8 | | 84 | |

| Date | 20-Apr-19 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Time** | **Depth (m)** | **Temp (oC)** | | **DO (mg/L)** | | **DO (%)** | | **Turbidity (NTU)** | | **pH** | | **SS(mg/L)** | |
| WM1-C | 9:23 | 0.29 | 25.1 | 25.1 | 6.75 | 6.8 | 79.5 | 43.8 | 11.4 | 11.3 | 6.8 | 6.8 | 7 | 7.0 |
| | | | 25.1 | | 6.77 | | 8.0 | | 11.2 | | 6.8 | | 7 | |
| WM1 | 9:11 | 0.15 | 24.8 | 24.8 | 7.1 | 7.1 | 88.2 | 89.0 | 37.0 | 37.6 | 7 | 7.0 | 38 | 39.0 |
| | | | 24.8 | | 7.12 | | 89.7 | | 38.1 | | 7 | | 40 | |

| Date | 23-Apr-19 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Time** | **Depth (m)** | **Temp (oC)** | | **DO (mg/L)** | | **DO (%)** | | **Turbidity (NTU)** | | **pH** | | **SS(mg/L)** | |
| WM1-C | 11:15 | 0.30 | 25.2 | 25.2 | 7.48 | 7.5 | 90.8 | 91.1 | 110.0 | 109.5 | 7.8 | 7.8 | 154 | 156.0 |
| | | | 25.2 | | 7.51 | | 91.4 | | 109.0 | | 7.8 | | 158 | |
| WM1 | 11:05 | 0.15 | 25 | 25.0 | 7.74 | 7.7 | 93.8 | 93.8 | 65.0 | 66.9 | 8.1 | 8.1 | 53 | 52.0 |
| | | | 25 | | 7.74 | | 93.8 | | 68.7 | | 8.1 | | 51 | |

| Date | 25-Apr-19 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Time** | **Depth (m)** | **Temp (oC)** | | **DO (mg/L)** | | **DO (%)** | | **Turbidity (NTU)** | | **pH** | | **SS(mg/L)** | |
| WM1-C | 11:20 | 0.30 | 25.7 | 25.7 | 7.32 | 7.3 | 89.6 | 89.7 | 12.5 | 12.7 | 6.6 | 6.6 | 7 | 6.5 |
| | | | 25.7 | | 7.33 | | 89.7 | | 12.9 | | 6.6 | | 6 | |
| WM1 | 11:10 | 0.15 | 25.4 | 25.4 | 7.99 | 8.0 | 97.3 | 97.4 | 37.6 | 38.4 | 6.8 | 6.8 | 38 | 38.5 |
| | | | 25.4 | | 8.01 | | 97.5 | | 39.1 | | 6.8 | | 39 | |

| Date | 27-Apr-19 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Time** | **Depth (m)** | **Temp (oC)** | | **DO (mg/L)** | | **DO (%)** | | **Turbidity (NTU)** | | **pH** | | **SS(mg/L)** | |
| WM1-C | 10:35 | 0.30 | 25.5 | 25.5 | 7.68 | 7.7 | 93.7 | 94.0 | 10.4 | 11.3 | 7.4 | 7.4 | 7 | 7.0 |
| | | | 25.5 | | 7.7 | | 94.2 | | 12.2 | | 7.4 | | 7 | |
| WM1 | 10:25 | 0.15 | 25.9 | 25.9 | 7.4 | 7.4 | 91.2 | 91.2 | 47.3 | 48.2 | 7.9 | 7.9 | 53 | 53.0 |
| | | | 25.9 | | 7.4 | | 91.1 | | 49.1 | | 7.9 | | 53 | |

| Date | 30-Apr-19 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Time** | **Depth (m)** | **Temp (oC)** | | **DO (mg/L)** | | **DO (%)** | | **Turbidity (NTU)** | | **pH** | | **SS(mg/L)** | |
| WM1-C | 13:55 | 0.30 | 26 | 26.0 | 7.33 | 7.3 | 90.4 | 90.6 | over | overrange | 6.8 | 6.8 | 1080 | 1080.0 |
| | | | 26 | | 7.35 | | 90.7 | | range | | 6.8 | | 1080 | |
| WM1 | 13:45 | 0.15 | 26.3 | 26.3 | 7.4 | 7.4 | 91.7 | 91.6 | 945.0 | 933.5 | 6.8 | 6.8 | 575 | 585.0 |
| | | | 26.3 | | 7.41 | | 91.5 | | 922.0 | | 6.8 | | 595 | |

## Water Quality Monitoring Data for Contract 2 and 3

| Date | 2-Apr-19 | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Time** | **Depth (m)** | **Temp (oC)** | | **DO (mg/L)** | | **DO (%)** | | **Turbidity (NTU)** | | **pH** | | **SS(mg/L)** | |
| WM4-CA | 13:25 | 0.15 | 22.6 | 22.6 | 8.7 | 8.7 | 102.6 | 102.7 | 2.6 | 2.7 | 7.4 | 7.4 | <2 | 2.0 |
| | | | 22.6 | | 8.71 | | 102.8 | | 2.9 | | 7.4 | | 2 | |
| WM4-CB | 13:40 | 0.28 | 22.9 | 22.9 | 5.1 | 5.1 | 60.5 | 60.6 | 4.4 | 4.2 | 7.2 | 7.2 | 5 | 5.5 |
| | | | 22.9 | | 5.11 | | 60.6 | | 4.0 | | 7.2 | | 6 | |
| WM4 | 13:15 | 0.20 | 22.5 | 22.5 | 5.3 | 5.3 | 62.1 | 61.6 | 6.1 | 6.7 | 7.4 | 7.4 | 18 | 18.5 |
| | | | 22.5 | | 5.2 | | 61.1 | | 7.2 | | 7.4 | | 19 | |

| Date | 4-Apr-19 | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Time** | **Depth (m)** | **Temp (oC)** | | **DO (mg/L)** | | **DO (%)** | | **Turbidity (NTU)** | | **pH** | | **SS(mg/L)** | |
| WM4-CA | 13:35 | 0.15 | 23.2 | 23.2 | 8.41 | 8.4 | 100.4 | 100.3 | 2.7 | 2.6 | 7.1 | 7.1 | <2 | <2 |
| | | | 23.2 | | 8.39 | | 100.1 | | 2.5 | | 7.1 | | <2 | |
| WM4-CB | 13:45 | 0.25 | 23.5 | 23.5 | 6.3 | 6.3 | 76.0 | 76.0 | 7.1 | 7.3 | 6.9 | 6.9 | 11 | 11.5 |
| | | | 23.5 | | 6.29 | | 75.9 | | 7.4 | | 6.9 | | 12 | |
| WM4 | 13:30 | 0.20 | 23.5 | 23.5 | 7.45 | 7.5 | 89.3 | 89.4 | 5.9 | 5.6 | 7.2 | 7.2 | 14 | 14.0 |
| | | | 23.5 | | 7.47 | | 89.5 | | 5.4 | | 7.2 | | 14 | |

| Date | 6-Apr-19 | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Time** | **Depth (m)** | **Temp (oC)** | | **DO (mg/L)** | | **DO (%)** | | **Turbidity (NTU)** | | **pH** | | **SS(mg/L)** | |
| WM4-CA | 15:45 | 0.15 | 22.3 | 22.3 | 7.5 | 7.5 | 86.4 | 86.5 | 1.1 | 1.1 | 7.4 | 7.4 | <2 | <2 |
| | | | 22.3 | | 7.51 | | 86.5 | | 1.1 | | 7.4 | | <2 | |
| WM4-CB | 16:00 | 0.25 | 23.2 | 23.2 | 5.11 | 5.1 | 59.8 | 59.9 | 8.5 | 8.8 | 7.3 | 7.3 | 10 | 10.0 |
| | | | 23.2 | | 5.12 | | 59.9 | | 9.1 | | 7.3 | | 10 | |
| WM4 | 15:40 | 0.26 | 23.1 | 23.1 | 7.65 | 7.7 | 89.5 | 89.9 | 9.7 | 9.8 | 7.5 | 7.5 | 15 | 14.5 |
| | | | 23.1 | | 7.71 | | 90.2 | | 9.9 | | 7.5 | | 14 | |

| Date | 9-Apr-19 | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Time** | **Depth (m)** | **Temp (oC)** | | **DO (mg/L)** | | **DO (%)** | | **Turbidity (NTU)** | | **pH** | | **SS(mg/L)** | |
| WM4-CA | 13:40 | 0.15 | 23.6 | 23.6 | 6.49 | 6.5 | 76.5 | 76.5 | 0.9 | 0.9 | 7.8 | 7.8 | <2 | <2 |
| | | | 23.6 | | 6.48 | | 76.4 | | 0.9 | | 7.8 | | <2 | |
| WM4-CB | 13:55 | 0.25 | 26.8 | 26.8 | 4.74 | 4.7 | 59.4 | 59.5 | 4.8 | 4.9 | 7.6 | 7.6 | 5 | 5.0 |
| | | | 26.8 | | 4.75 | | 59.5 | | 4.9 | | 7.6 | | 5 | |
| WM4 | 13:30 | 0.20 | 26.7 | 26.7 | 6.68 | 6.7 | 83.3 | 83.4 | 18.0 | 17.1 | 8 | 8.0 | 26 | 26.5 |
| | | | 26.7 | | 6.69 | | 83.4 | | 16.2 | | 8 | | 27 | |

| Date | 11-Apr-19 | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Time** | **Depth (m)** | **Temp (oC)** | | **DO (mg/L)** | | **DO (%)** | | **Turbidity (NTU)** | | **pH** | | **SS(mg/L)** | |
| WM4-CA | 13:20 | 0.15 | 24.4 | 24.4 | 7.43 | 7.4 | 89.3 | 89.4 | 1.6 | 1.7 | 8.21 | 8.2 | <2 | <2 |
| | | | 24.4 | | 7.45 | | 89.5 | | 1.7 | | 8.21 | | <2 | |
| WM4-CB | 13:40 | 0.25 | 26.9 | 26.9 | 4.56 | 4.6 | 57.2 | 58.2 | 3.9 | 3.9 | 7.67 | 7.7 | 5 | 5.0 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 26.9 | | 4.64 | | 59.1 | | 4.0 | | 7.67 | | 5 | |
| WM4 | 13:15 | 0.20 | 26.5 | 26.5 | 8.13 | 8.1 | 101.3 | 101.4 | 16.7 | 16.6 | 8.04 | 8.0 | 20 | 20.5 |
| | | | 26.5 | | 8.14 | | 101.4 | | 16.5 | | 8.04 | | 21 | |

| **Date** | **13-Apr-19** | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Time** | **Depth (m)** | **Temp (oC)** | | **DO (mg/L)** | | **DO (%)** | | **Turbidity (NTU)** | | **pH** | | **SS(mg/L)** | |
| WM4-CA | 11:05 | 0.15 | 22.7 | 22.7 | 7.22 | 7.2 | 86.9 | 87.0 | 6.8 | 6.8 | 7 | 7.0 | 4 | 5.0 |
| | | | 22.7 | | 7.23 | | 87.1 | | 6.9 | | 7 | | 6 | |
| WM4-CB | 11:25 | 0.25 | 22.9 | 22.9 | 5.9 | 5.9 | 71.2 | 71.2 | 3.5 | 3.2 | 6.8 | 6.8 | 7 | 7.0 |
| | | | 22.9 | | 5.89 | | 71.1 | | 3.0 | | 6.8 | | 7 | |
| WM4 | 11:10 | 0.20 | 22.9 | 22.9 | 6.47 | 6.5 | 77.9 | 78.2 | 30.7 | 30.1 | 6.8 | 6.8 | 36 | 33.5 |
| | | | 22.9 | | 6.5 | | 78.4 | | 29.5 | | 6.8 | | 31 | |

| **Date** | **16-Apr-19** | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Time** | **Depth (m)** | **Temp (oC)** | | **DO (mg/L)** | | **DO (%)** | | **Turbidity (NTU)** | | **pH** | | **SS(mg/L)** | |
| WM4-CA | 14:10 | 0.15 | 21.8 | 21.8 | 7.08 | 7.1 | 83.0 | 83.1 | 5.6 | 5.4 | 7.9 | 7.9 | 2 | 2.5 |
| | | | 21.8 | | 7.09 | | 83.1 | | 5.2 | | 7.9 | | 3 | |
| WM4-CB | 14:25 | 0.28 | 22.6 | 22.6 | 5.84 | 5.9 | 68.9 | 69.0 | 2.8 | 2.6 | 7.8 | 7.8 | 18 | 18.0 |
| | | | 22.6 | | 5.86 | | 69.1 | | 2.3 | | 7.8 | | 18 | |
| WM4 | 14:00 | 0.22 | 22 | 22.0 | 7.01 | 7.0 | 80.1 | 80.2 | 17.9 | 17.4 | 8.3 | 8.3 | 34 | 34.0 |
| | | | 22 | | 7.02 | | 80.2 | | 16.9 | | 8.3 | | 34 | |

| **Date** | **18-Apr-19** | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Time** | **Depth (m)** | **Temp (oC)** | | **DO (mg/L)** | | **DO (%)** | | **Turbidity (NTU)** | | **pH** | | **SS(mg/L)** | |
| WM4-CA | 14:30 | 0.15 | 24.2 | 24.2 | 7.34 | 7.3 | 89.1 | 89.1 | 2.2 | 1.9 | 7.5 | 7.5 | 2 | 2.0 |
| | | | 24.1 | | 7.35 | | 89.0 | | 1.7 | | 7.5 | | 2 | |
| WM4-CB | 14:45 | 0.25 | 24.3 | 24.3 | 6.68 | 6.7 | 81.8 | 81.7 | 6.9 | 6.6 | 7.5 | 7.5 | 8 | 8.5 |
| | | | 24.3 | | 6.66 | | 81.5 | | 6.3 | | 7.5 | | 9 | |
| WM4 | 14:20 | 0.20 | 24.3 | 24.3 | 7.43 | 7.4 | 90.3 | 90.2 | 6.9 | 6.7 | 7.6 | 7.6 | 5 | 5.0 |
| | | | 24.3 | | 7.42 | | 90.1 | | 6.6 | | 7.6 | | 5 | |

| **Date** | **20-Apr-19** | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Time** | **Depth (m)** | **Temp (oC)** | | **DO (mg/L)** | | **DO (%)** | | **Turbidity (NTU)** | | **pH** | | **SS(mg/L)** | |
| WM4-CA | 10:47 | 0.15 | 24.4 | 24.4 | 5.79 | 5.8 | 67.1 | 67.2 | 4.7 | 4.7 | 7.5 | 7.5 | 4 | 4.0 |
| | | | 24.4 | | 5.83 | | 67.3 | | 4.6 | | 7.5 | | 4 | |
| WM4-CB | 11:01 | 0.27 | 24.2 | 24.2 | 5.95 | 6.0 | 68.5 | 68.7 | 12.1 | 12.6 | 7.6 | 7.6 | 16 | 16.0 |
| | | | 24.2 | | 5.97 | | 68.8 | | 13.0 | | 7.6 | | 16 | |
| WM4 | 10:35 | 0.21 | 24.3 | 24.3 | 6.34 | 6.4 | 82.3 | 82.3 | 14.1 | 14.6 | 7 | 7.0 | 16 | 15.5 |
| | | | 24.3 | | 6.37 | | 82.2 | | 15.1 | | 7 | | 15 | |

| **Date** | **23-Apr-19** | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Time** | **Depth (m)** | **Temp (oC)** | | **DO (mg/L)** | | **DO (%)** | | **Turbidity (NTU)** | | **pH** | | **SS(mg/L)** | |
| WM4-CA | 14:50 | 0.15 | 24.5 | 24.5 | 5.58 | 5.6 | 66.9 | 66.9 | 3.0 | 2.8 | 7.6 | 7.6 | 4 | 4.5 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 24.5 | | 5.57 | | 66.8 | | 2.6 | | 7.6 | | 5 | |
| WM4-CB | 15:00 | 0.28 | 28.7 | 28.7 | 5.8 | 5.8 | 75.1 | 75.0 | 5.8 | 5.8 | 7.5 | 7.5 | 6 | 5.5 |
| | | | 28.7 | | 5.79 | | 74.8 | | 5.7 | | 7.5 | | 5 | |
| WM4 | 14:40 | 0.20 | 27.7 | 27.6 | 6.82 | 6.8 | 86.7 | 86.8 | 11.9 | 11.5 | 7.5 | 7.5 | 8 | 7.5 |
| | | | 27.5 | | 6.82 | | 86.8 | | 11.0 | | 7.5 | | 7 | |

| **Date** | **25-Apr-19** | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Time** | **Depth (m)** | **Temp (oC)** | | **DO (mg/L)** | | **DO (%)** | | **Turbidity (NTU)** | | **pH** | | **SS(mg/L)** | |
| WM4-CA | 13:40 | 0.15 | 24.9 | 24.9 | 5.89 | 5.9 | 71.2 | 71.2 | 2.2 | 2.4 | 7.6 | 7.6 | 3 | 3.0 |
| | | | 24.9 | | 5.88 | | 71.1 | | 2.6 | | 7.6 | | 3 | |
| WM4-CB | 13:55 | 0.28 | 29 | 29.0 | 5.81 | 5.8 | 75.7 | 75.5 | 11.0 | 11.0 | 7.5 | 7.5 | 16 | 16.0 |
| | | | 29 | | 5.77 | | 75.3 | | 10.9 | | 7.5 | | 16 | |
| WM4 | 13:30 | 0.20 | 27.5 | 27.5 | 6.8 | 6.8 | 86.1 | 86.2 | 6.6 | 6.3 | 7.6 | 7.6 | 9 | 9.5 |
| | | | 27.5 | | 6.82 | | 86.3 | | 6.0 | | 7.6 | | 10 | |

| **Date** | **27-Apr-19** | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Time** | **Depth (m)** | **Temp (oC)** | | **DO (mg/L)** | | **DO (%)** | | **Turbidity (NTU)** | | **pH** | | **SS(mg/L)** | |
| WM4-CA | 12:15 | 0.15 | 25.3 | 25.3 | 6.59 | 6.6 | 84.8 | 84.7 | 1.6 | 1.9 | 7.1 | 7.1 | <2 | 2.0 |
| | | | 25.3 | | 6.58 | | 84.6 | | 2.2 | | 7.1 | | 2 | |
| WM4-CB | 12:30 | 0.28 | 25.7 | 25.7 | 6.35 | 6.3 | 82.1 | 82.0 | 7.5 | 7.4 | 7 | 7.0 | 15 | 15.0 |
| | | | 25.7 | | 6.34 | | 81.8 | | 7.2 | | 7 | | 15 | |
| WM4 | 12:05 | 0.20 | 25.9 | 25.9 | 6.53 | 6.5 | 84.6 | 84.7 | 6.5 | 6.5 | 7 | 7.0 | 4 | 4.0 |
| | | | 25.9 | | 6.54 | | 84.8 | | 6.5 | | 7 | | 4 | |

| **Date** | **30-Apr-19** | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Time** | **Depth (m)** | **Temp (oC)** | | **DO (mg/L)** | | **DO (%)** | | **Turbidity (NTU)** | | **pH** | | **SS(mg/L)** | |
| WM4-CA | 16:10 | 0.15 | 24.8 | 24.8 | 5.8 | 5.8 | 70.0 | 70.1 | 2.9 | 2.9 | 7.1 | 7.1 | 3 | 3.0 |
| | | | 24.8 | | 5.8 | | 70.1 | | 3.0 | | 7.1 | | 3 | |
| WM4-CB | 16:25 | 0.30 | 26.7 | 26.7 | 5.62 | 5.6 | 70.2 | 70.1 | 11.2 | 12.0 | 7.1 | 7.1 | 16 | 15.5 |
| | | | 26.7 | | 5.61 | | 70.0 | | 12.7 | | 7.1 | | 15 | |
| WM4 | 16:00 | 0.20 | 26.6 | 26.6 | 6.77 | 6.8 | 84.4 | 84.5 | 13.7 | 13.5 | 7.1 | 7.1 | 7 | 7.0 |
| | | | 26.6 | | 6.78 | | 84.5 | | 13.3 | | 7.1 | | 7 | |

## Water Quality Monitoring Data for Contract 6

| Date | **2-Apr-19** | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Time | Depth (m) | Temp (oC) | | DO (mg/L) | | DO (%) | | Turbidity (NTU) | | pH | | SS(mg/L) | |
| WM2A-C | 11:10 | 0.23 | 20.7 | 20.7 | 7.97 | 8.0 | 89.0 | 89.1 | 14.9 | 14.5 | 7.40 | 7.4 | 7 | 7.5 |
| | | | 20.7 | | 7.98 | | 89.2 | | 14.0 | | 7.40 | | 8 | |
| WM2A | 11:00 | 0.18 | 20.8 | 20.8 | 9.34 | 9.3 | 104.3 | 104.4 | 11.5 | 11.4 | 7.00 | 7.0 | 7 | 7.0 |
| | | | 20.8 | | 9.34 | | 104.4 | | 11.3 | | 7.00 | | 7 | |

| Date | **4-Apr-19** | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Time | Depth (m) | Temp (oC) | | DO (mg/L) | | DO (%) | | Turbidity (NTU) | | pH | | SS(mg/L) | |
| WM2A-C | 11:00 | 0.23 | 21.2 | 21.2 | 7.99 | 8.0 | 90.1 | 90.0 | 14.2 | 15.0 | 7.70 | 7.7 | 5 | 5.0 |
| | | | 21.2 | | 7.97 | | 89.8 | | 15.7 | | 7.70 | | 5 | |
| WM2A | 10:25 | 0.15 | 21.5 | 21.5 | 8.85 | 8.8 | 100.3 | 100.2 | 13.6 | 13.6 | 7.70 | 7.7 | 13 | 12.5 |
| | | | 21.5 | | 8.84 | | 100.1 | | 13.6 | | 7.70 | | 12 | |

| Date | **6-Apr-19** | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Time | Depth (m) | Temp (oC) | | DO (mg/L) | | DO (%) | | Turbidity (NTU) | | pH | | SS(mg/L) | |
| WM2A-C | 14:40 | 0.24 | 23.9 | 23.9 | 7.64 | 7.7 | 92.2 | 92.6 | 11.2 | 12.7 | 6.80 | 6.8 | 6 | 6.0 |
| | | | 23.9 | | 7.7 | | 92.9 | | 14.2 | | 6.80 | | 6 | |
| WM2A | 14:25 | 0.15 | 23.9 | 23.9 | 8.41 | 8.4 | 101.5 | 101.9 | 9.1 | 9.2 | 6.70 | 6.7 | 5 | 5.0 |
| | | | 23.9 | | 8.41 | | 102.3 | | 9.4 | | 6.70 | | 5 | |

| Date | **9-Apr-19** | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Time | Depth (m) | Temp (oC) | | DO (mg/L) | | DO (%) | | Turbidity (NTU) | | pH | | SS(mg/L) | |
| WM2A-C | 11:05 | 0.23 | 23.6 | 23.6 | 6.87 | 6.9 | 81.3 | 81.4 | 8.7 | 8.8 | 7.80 | 7.8 | 3 | 3.0 |
| | | | 23.6 | | 6.89 | | 81.5 | | 8.8 | | 7.80 | | 3 | |
| WM2A | 10:30 | 0.15 | 24.3 | 24.3 | 7.23 | 7.2 | 86.4 | 86.5 | 9.4 | 8.8 | 7.90 | 7.9 | 8 | 7.5 |
| | | | 24.3 | | 7.25 | | 86.5 | | 8.1 | | 7.90 | | 7 | |

| Date | **11-Apr-19** | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Time | Depth (m) | Temp (oC) | | DO (mg/L) | | DO (%) | | Turbidity (NTU) | | pH | | SS(mg/L) | |
| WM2A-C | 10:30 | 0.23 | 24.1 | 24.1 | 8.33 | 8.3 | 99.4 | 99.5 | 10.9 | 10.6 | 7.81 | 7.8 | 4 | 4.0 |
| | | | 24.1 | | 8.34 | | 99.5 | | 10.3 | | 7.81 | | 4 | |
| WM2A | 10:15 | 0.15 | 24.9 | 24.9 | 9.44 | 9.5 | 114.4 | 114.5 | 9.4 | 9.4 | 8.05 | 8.1 | 6 | 5.0 |
| | | | 24.9 | | 9.46 | | 114.5 | | 9.5 | | 8.05 | | 4 | |

| Date | **13-Apr-19** | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Time | Depth (m) | Temp (oC) | | DO (mg/L) | | DO (%) | | Turbidity (NTU) | | pH | | SS(mg/L) | |
| WM2A-C | 10:25 | 0.23 | 21.5 | 21.5 | 7.74 | 7.7 | 87.6 | 87.6 | 48.4 | 47.1 | 7.50 | 7.5 | 58 | 57.5 |
| | | | 21.5 | | 7.74 | | 87.6 | | 45.7 | | 7.50 | | 57 | |
| WM2A | 10:10 | 0.15 | 21.7 | 21.7 | 7.47 | 7.5 | 84.8 | 85.1 | 55.3 | 55.6 | 7.50 | 7.5 | 30 | 30.5 |
| | | | 21.7 | | 7.49 | | 85.3 | | 55.8 | | 7.50 | | 31 | |

| Date | **16-Apr-19** | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Time | Depth (m) | Temp (oC) | | DO (mg/L) | | DO (%) | | Turbidity (NTU) | | pH | | SS(mg/L) | |
| WM2A-C | 11:30 | 0.25 | 21.1 | 21.1 | 7.4 | 7.4 | 83.2 | 83.3 | Overange | overrange | 7.90 | 7.9 | 636 | 640.5 |
| | | | 21.1 | | 7.41 | | 83.3 | | Overange | | 7.90 | | 645 | |
| WM2A | 10:55 | 0.15 | 20.9 | 20.9 | 7.48 | 7.5 | 83.6 | 83.8 | 605.0 | 606.0 | 7.30 | 7.3 | 502 | 517.5 |
| | | | 20.9 | | 7.49 | | 83.9 | | 607.0 | | 7.30 | | 533 | |

| Date | **18-Apr-19** | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Time | Depth (m) | Temp (oC) | | DO (mg/L) | | DO (%) | | Turbidity (NTU) | | pH | | SS(mg/L) | |
| WM2A-C | 11:10 | 0.35 | 22.7 | 22.7 | 7.53 | 7.5 | 87.4 | 87.6 | 42.1 | 41.0 | 7.80 | 7.8 | 57 | 56.0 |
| | | | 22.7 | | 7.56 | | 87.7 | | 39.8 | | 7.80 | | 55 | |
| WM2A | 10:55 | 0.15 | 22.8 | 22.8 | 6.75 | 6.8 | 78.5 | 78.7 | 24.0 | 24.4 | 7.80 | 7.8 | 28 | 29.0 |
| | | | 22.8 | | 6.76 | | 78.8 | | 24.7 | | 7.80 | | 30 | |

| Date | **20-Apr-19** | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Time | Depth (m) | Temp (oC) | | DO (mg/L) | | DO (%) | | Turbidity (NTU) | | pH | | SS(mg/L) | |
| WM2A-C | 9:44 | 0.28 | 23.1 | 23.1 | 7.61 | 7.7 | 93.1 | 93.5 | 7.8 | 7.9 | 7.30 | 7.3 | 4 | 4.0 |
| | | | 23.1 | | 7.71 | | 93.9 | | 7.9 | | 7.30 | | 4 | |
| WM2A | 9:34 | 0.15 | 23.5 | 23.5 | 7.43 | 7.4 | 90.9 | 91.0 | 11.1 | 11.2 | 7.50 | 7.5 | 8 | 8.0 |
| | | | 23.5 | | 7.45 | | 91.1 | | 11.2 | | 7.50 | | 8 | |

| Date | **23-Apr-19** | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Time | Depth (m) | Temp (oC) | | DO (mg/L) | | DO (%) | | Turbidity (NTU) | | pH | | SS(mg/L) | |
| WM2A-C | 11:45 | 0.25 | 24.2 | 24.2 | 7.75 | 7.8 | 92.4 | 92.6 | 4.9 | 4.8 | 7.80 | 7.8 | <2 | <2 |
| | | | 24.2 | | 7.76 | | 92.8 | | 4.8 | | 7.80 | | <2 | |
| WM2A | 11:30 | 0.15 | 24.4 | 24.4 | 7.3 | 7.3 | 87.4 | 87.8 | 8.5 | 8.0 | 7.80 | 7.8 | 4 | 4.5 |
| | | | 24.4 | | 7.36 | | 88.2 | | 7.6 | | 7.80 | | 5 | |

| Date | **25-Apr-19** | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Time | Depth (m) | Temp (oC) | | DO (mg/L) | | DO (%) | | Turbidity (NTU) | | pH | | SS(mg/L) | |
| WM2A-C | 11:50 | 0.25 | 24.5 | 24.5 | 7.58 | 7.6 | 90.9 | 91.0 | 6.9 | 6.9 | 7.20 | 7.2 | 2 | 2.5 |
| | | | 24.5 | | 7.59 | | 91.0 | | 6.9 | | 7.20 | | 3 | |
| WM2A | 11:35 | 0.15 | 25.1 | 25.1 | 6.97 | 7.0 | 84.6 | 84.7 | 11.5 | 11.5 | 6.80 | 6.8 | 5 | 5.5 |
| | | | 25.1 | | 6.99 | | 84.7 | | 11.5 | | 6.80 | | 6 | |

| Date | **27-Apr-19** | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Time | Depth (m) | Temp (oC) | | DO (mg/L) | | DO (%) | | Turbidity (NTU) | | pH | | SS(mg/L) | |
| WM2A-C | 11:10 | 0.28 | 24.2 | 24.2 | 7.73 | 7.7 | 92.2 | 92.4 | 5.9 | 5.9 | 7.20 | 7.2 | <2 | <2 |
| | | | 24.2 | | 7.75 | | 92.6 | | 5.9 | | 7.20 | | <2 | |
| WM2A | 10:55 | 0.15 | 25 | 25.0 | 7.3 | 7.3 | 88.4 | 88.5 | 5.8 | 6.1 | 7.10 | 7.1 | 3 | 3.0 |
| | | | 25 | | 7.3 | | 88.5 | | 6.5 | | 7.10 | | 3 | |

| Date | **30-Apr-19** | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Time | Depth (m) | Temp (oC) | | DO (mg/L) | | DO (%) | | Turbidity (NTU) | | pH | | SS(mg/L) | | |
| WM2A-C | 14:20 | 0.28 | 25.2 | 25.2 | 7.08 | 7.1 | 86.0 | 86.1 | 669.0 | 672.0 | 7.20 | 7.2 | 347 | 350.5 | |
| | | | 25.2 | | 7.09 | | 86.2 | | 675.0 | | 7.20 | | 354 | | |
| WM2A | 14:05 | 0.15 | 25.2 | 25.2 | 6.94 | 7.0 | 84.4 | 84.6 | 115.0 | 115.0 | 7.30 | 7.3 | 92 | 90.0 | |
| | | | 25.2 | | 6.96 | | 84.7 | | 115.0 | | 7.30 | | 88 | | |

## Water Quality Monitoring Data for Contract 2 and 6

| Date | 2-Apr-19 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Time** | **Depth (m)** | **Temp (oC)** | | **DO (mg/L)** | | **DO (%)** | | **Turbidity (NTU)** | | **pH** | | **SS(mg/L)** | |
| WM3-c | 11:20 | 0.15 | 22.1 | 22.1 | 13.85 | 13.9 | 159.0 | 159.2 | 3.2 | 3.0 | 7.6 | 7.6 | <2 | 3.0 |
| | | | 22.1 | | 13.9 | | 159.3 | | 2.9 | | 7.6 | | 3 | |
| WM3 | 11:35 | 0.20 | 21.6 | 21.6 | 9.41 | 9.4 | 106.7 | 106.9 | 9.2 | 10.0 | 7.5 | 7.5 | 9 | 8.5 |
| | | | 21.6 | | 9.43 | | 107.0 | | 10.9 | | 7.5 | | 8 | |

| Date | 4-Apr-19 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Time** | **Depth (m)** | **Temp (oC)** | | **DO (mg/L)** | | **DO (%)** | | **Turbidity (NTU)** | | **pH** | | **SS(mg/L)** | |
| WM3-c | 11:25 | 0.15 | 22 | 22.0 | 9.05 | 9.1 | 103.6 | 103.7 | 4.5 | 4.4 | 7.7 | 7.7 | <2 | <2 |
| | | | 22 | | 9.06 | | 103.7 | | 4.3 | | 7.7 | | <2 | |
| WM3 | 11:45 | 0.20 | 21.8 | 21.8 | 8.96 | 9.0 | 105.8 | 106.1 | 12.0 | 12.2 | 7.6 | 7.6 | 10 | 9.0 |
| | | | 21.8 | | 9 | | 106.4 | | 12.3 | | 7.6 | | 8 | |

| Date | 6-Apr-19 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Time** | **Depth (m)** | **Temp (oC)** | | **DO (mg/L)** | | **DO (%)** | | **Turbidity (NTU)** | | **pH** | | **SS(mg/L)** | |
| WM3-c | 15:00 | 0.15 | 23.8 | 23.8 | 7.72 | 7.7 | 93.1 | 92.8 | 3.0 | 3.4 | 6.7 | 6.7 | 3 | 2.5 |
| | | | 23.8 | | 7.66 | | 92.4 | | 3.7 | | 6.7 | | 2 | |
| WM3 | 15:15 | 0.20 | 24 | 24.0 | 8.61 | 8.6 | 104.0 | 103.9 | 9.2 | 9.6 | 6.7 | 6.7 | 6 | 6.0 |
| | | | 24 | | 8.59 | | 103.8 | | 10.0 | | 6.7 | | 6 | |

| Date | 9-Apr-19 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Time** | **Depth (m)** | **Temp (oC)** | | **DO (mg/L)** | | **DO (%)** | | **Turbidity (NTU)** | | **pH** | | **SS(mg/L)** | |
| WM3-c | 11:45 | 0.15 | 27.1 | 27.1 | 11.18 | 11.2 | 140.6 | 140.7 | 3.7 | 3.9 | 8 | 8.0 | 4 | 4.5 |
| | | | 27.1 | | 11.19 | | 140.7 | | 4.1 | | 8 | | 5 | |
| WM3 | 11:55 | 0.20 | 25.5 | 25.5 | 7.67 | 7.7 | 93.8 | 93.9 | 13.2 | 13.0 | 7.9 | 7.9 | 10 | 11.0 |
| | | | 25.5 | | 7.69 | | 94.0 | | 12.7 | | 7.9 | | 12 | |

| Date | 11-Apr-19 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Time** | **Depth (m)** | **Temp (oC)** | | **DO (mg/L)** | | **DO (%)** | | **Turbidity (NTU)** | | **pH** | | **SS(mg/L)** | |
| WM3-c | 11:15 | 0.15 | 27.5 | 27.5 | 12.31 | 12.3 | 156.1 | 156.0 | 4.3 | 4.3 | 8.22 | 8.2 | 3 | 3.0 |
| | | | 27.5 | | 12.28 | | 155.9 | | 4.3 | | 8.22 | | 3 | |
| WM3 | 10:55 | 0.20 | 25.1 | 25.1 | 9.9 | 9.9 | 120.2 | 120.3 | 7.0 | 7.1 | 7.73 | 7.7 | 5 | 5.5 |
| | | | 25.1 | | 9.92 | | 120.4 | | 7.2 | | 7.73 | | 6 | |

| Date | 11-Apr-19 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Time** | **Depth (m)** | **Temp (oC)** | | **DO (mg/L)** | | **DO (%)** | | **Turbidity (NTU)** | | **pH** | | **SS(mg/L)** | |
| WM3-c | 11:15 | 0.15 | 27.5 | 27.5 | 12.31 | 12.3 | 156.1 | 156.0 | 4.3 | 4.3 | 8.22 | 8.2 | 3 | 3.0 |
| | | | 27.5 | | 12.28 | | 155.9 | | 4.3 | | 8.22 | | 3 | |
| WM3 | 10:55 | 0.20 | 25.1 | 25.1 | 9.9 | 9.9 | 120.2 | 120.3 | 7.0 | 7.1 | 7.73 | 7.7 | 5 | 5.5 |
| | | | 25.1 | | 9.92 | | 120.4 | | 7.2 | | 7.73 | | 6 | |

| Date | 13-Apr-19 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Time** | **Depth (m)** | **Temp (oC)** | | **DO (mg/L)** | | **DO (%)** | | **Turbidity (NTU)** | | **pH** | | **SS(mg/L)** | |
| WM3-c | 10:40 | 0.15 | 21.9 | 21.9 | 8.93 | 9.0 | 101.8 | 102.1 | 5.8 | 6.1 | 7.5 | 7.5 | 5 | 4.5 |
| | | | 21.9 | | 8.97 | | 102.4 | | 6.3 | | 7.5 | | 4 | |
| WM3 | 10:50 | 0.20 | 21.8 | 21.8 | 7.54 | 7.6 | 86.0 | 86.1 | 9.7 | 9.9 | 7.6 | 7.6 | 9 | 9.0 |
| | | | 21.8 | | 7.56 | | 86.2 | | 10.2 | | 7.6 | | 9 | |

| Date | 16-Apr-19 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Time** | **Depth (m)** | **Temp (oC)** | | **DO (mg/L)** | | **DO (%)** | | **Turbidity (NTU)** | | **pH** | | **SS(mg/L)** | |
| WM3-c | 11:50 | 0.15 | 20.9 | 20.9 | 7.64 | 7.7 | 85.6 | 85.8 | 525.0 | 532.5 | 7.9 | 7.9 | 372 | 359.0 |
| | | | 20.9 | | 7.67 | | 86.0 | | 540.0 | | 7.9 | | 346 | |
| WM3 | 12:15 | 0.22 | 21.6 | 21.6 | 7.94 | 7.9 | 90.2 | 89.8 | 448.0 | 448.5 | 8.7 | 8.7 | 343 | 348.5 |
| | | | 21.6 | | 7.87 | | 89.3 | | 449.0 | | 8.7 | | 354 | |

| Date | 18-Apr-19 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Time** | **Depth (m)** | **Temp (oC)** | | **DO (mg/L)** | | **DO (%)** | | **Turbidity (NTU)** | | **pH** | | **SS(mg/L)** | |
| WM3-c | 11:55 | 0.15 | 23.4 | 23.4 | 8.93 | 9.0 | 104.9 | 105.3 | 5.7 | 5.7 | 7.6 | 7.6 | 7 | 7.0 |
| | | | 23.4 | | 8.98 | | 105.6 | | 5.7 | | 7.6 | | 7 | |
| WM3 | 12:05 | 0.20 | 24.4 | 24.4 | 7.87 | 7.9 | 94.2 | 94.3 | 13.0 | 13.2 | 7.7 | 7.7 | 11 | 11.5 |
| | | | 24.4 | | 7.88 | | 94.3 | | 13.4 | | 7.7 | | 12 | |

| Date | 20-Apr-19 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Time** | **Depth (m)** | **Temp (oC)** | | **DO (mg/L)** | | **DO (%)** | | **Turbidity (NTU)** | | **pH** | | **SS(mg/L)** | |
| WM3-c | 10:00 | 0.15 | 24.5 | 24.5 | 7.99 | 8.0 | 92.1 | 92.2 | 4.7 | 5.0 | 8 | 8.0 | 8 | 8.0 |
| | | | 24.5 | | 8.01 | | 92.3 | | 5.2 | | 8 | | 8 | |
| WM3 | 10:09 | 0.22 | 25 | 25.0 | 7.65 | 7.7 | 86.7 | 86.8 | 6.7 | 6.8 | 7.8 | 7.8 | 10 | 10.5 |
| | | | 25 | | 7.68 | | 86.9 | | 6.8 | | 7.8 | | 11 | |

| Date | 23-Apr-19 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Time** | **Depth (m)** | **Temp (oC)** | | **DO (mg/L)** | | **DO (%)** | | **Turbidity (NTU)** | | **pH** | | **SS(mg/L)** | |
| WM3-c | 9:35 | 0.15 | 26.1 | 26.1 | 7.85 | 7.9 | 97.0 | 97.2 | 5.3 | 5.3 | 7.6 | 7.6 | 6 | 6.0 |
| | | | 26.1 | | 7.86 | | 97.3 | | 5.4 | | 7.6 | | 6 | |
| WM3 | 9:25 | 0.20 | 25.5 | 25.5 | 6.82 | 6.8 | 83.3 | 83.5 | 13.0 | 13.1 | 7.7 | 7.7 | 5 | 5.0 |
| | | | 25.5 | | 6.84 | | 83.6 | | 13.2 | | 7.7 | | 5 | |

| Date | 25-Apr-19 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Time** | **Depth (m)** | **Temp (oC)** | | **DO (mg/L)** | | **DO (%)** | | **Turbidity (NTU)** | | **pH** | | **SS(mg/L)** | |
| WM3-c | 12:10 | 0.15 | 27 | 27.0 | 8.57 | 8.6 | 107.7 | 107.8 | 6.0 | 6.1 | 7.3 | 7.3 | 3 | 3.0 |
| | | | 27 | | 8.58 | | 107.8 | | 6.1 | | 7.3 | | 3 | |
| WM3 | 12:25 | 0.20 | 26.5 | 26.5 | 7.3 | 7.3 | 90.7 | 90.8 | 4.6 | 4.5 | 7.4 | 7.4 | 4 | 3.5 |
| | | | 26.5 | | 7.32 | | 90.8 | | 4.3 | | 7.4 | | 3 | |

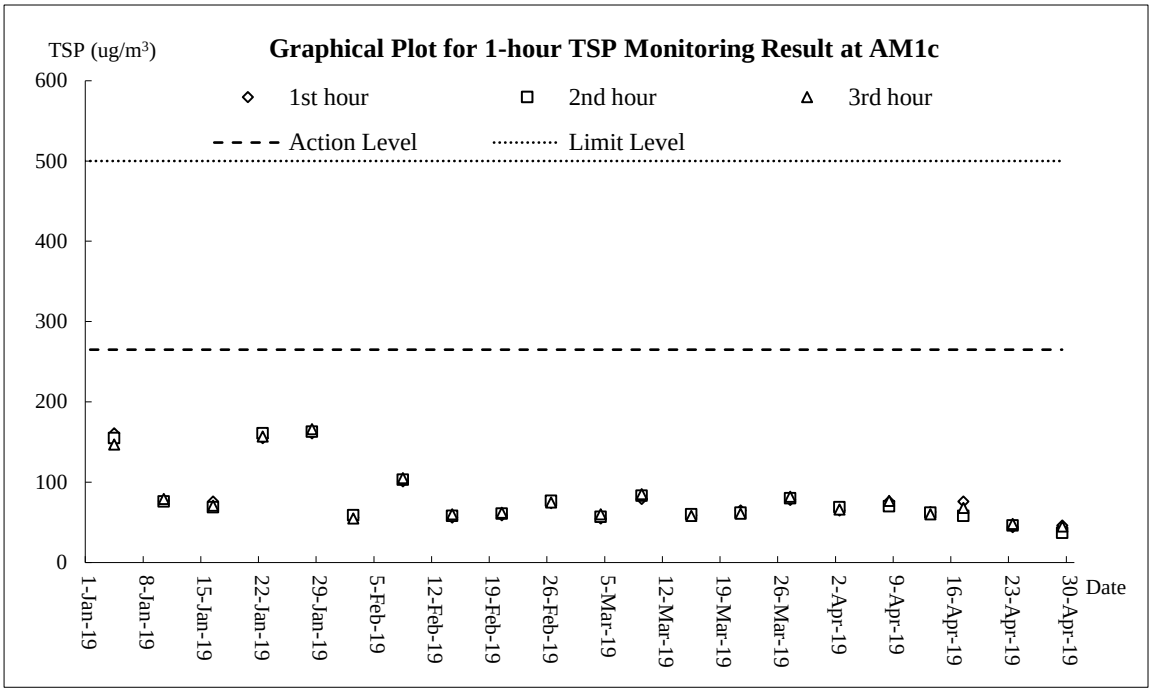
| Date | 27-Apr-19 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Time** | **Depth (m)** | **Temp (oC)** | | **DO (mg/L)** | | **DO (%)** | | **Turbidity (NTU)** | | **pH** | | **SS(mg/L)** | |
| WM3-c | 11:25 | 0.15 | 25.2 | 25.2 | 9.23 | 9.2 | 112.2 | 112.4 | 5.2 | 5.0 | 7.1 | 7.1 | 3 | 3.0 |
| | | | 25.2 | | 9.25 | | 112.5 | | 4.8 | | 7.1 | | <2 | |
| WM3 | 11:40 | 0.20 | 25.1 | 25.1 | 7.91 | 7.9 | 95.9 | 96.1 | 3.4 | 3.2 | 7.2 | 7.2 | <2 | 2.0 |
| | | | 25.1 | | 7.93 | | 96.2 | | 3.1 | | 7.2 | | 2 | |

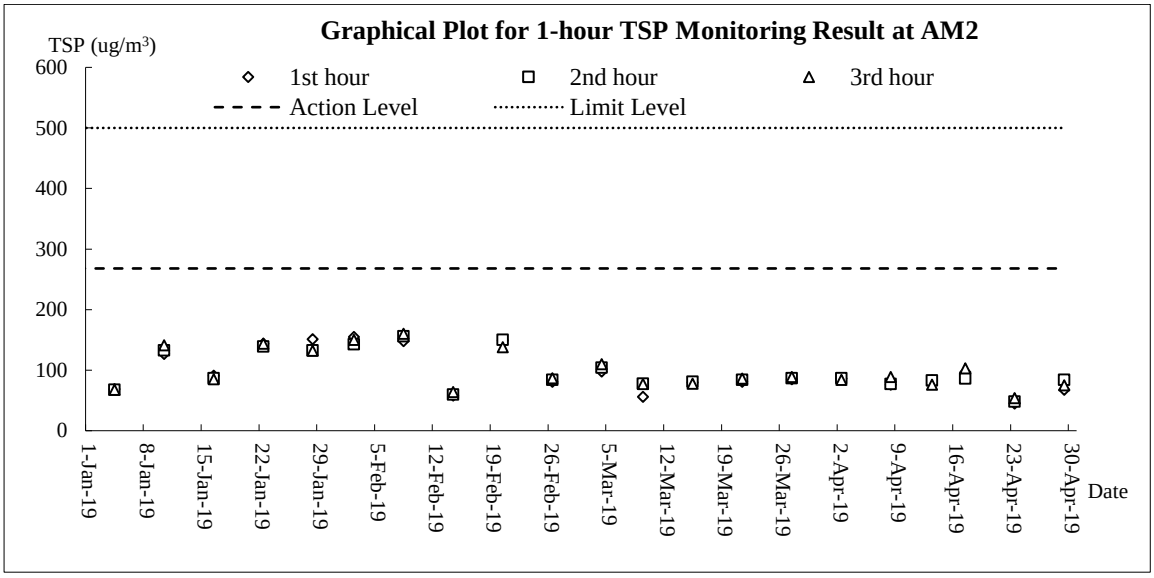
| Date | 30-Apr-19 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Time** | **Depth (m)** | **Temp (oC)** | | **DO (mg/L)** | | **DO (%)** | | **Turbidity (NTU)** | | **pH** | | **SS(mg/L)** | |
| WM3-c | 15:10 | 0.15 | 26.1 | 26.1 | 8.4 | 8.4 | 103.8 | 104.0 | 15.2 | 14.8 | 7.1 | 7.1 | 4 | 4.0 |
| | | | 26.1 | | 8.42 | | 104.1 | | 14.4 | | 7.1 | | 4 | |
| WM3 | 15:15 | 0.20 | 25.8 | 25.8 | 7.73 | 7.7 | 95.1 | 95.1 | 12.9 | 12.6 | 7.2 | 7.2 | 8 | 8.5 |
| | | | 25.8 | | 7.72 | | 95.0 | | 12.3 | | 7.2 | | 9 | |

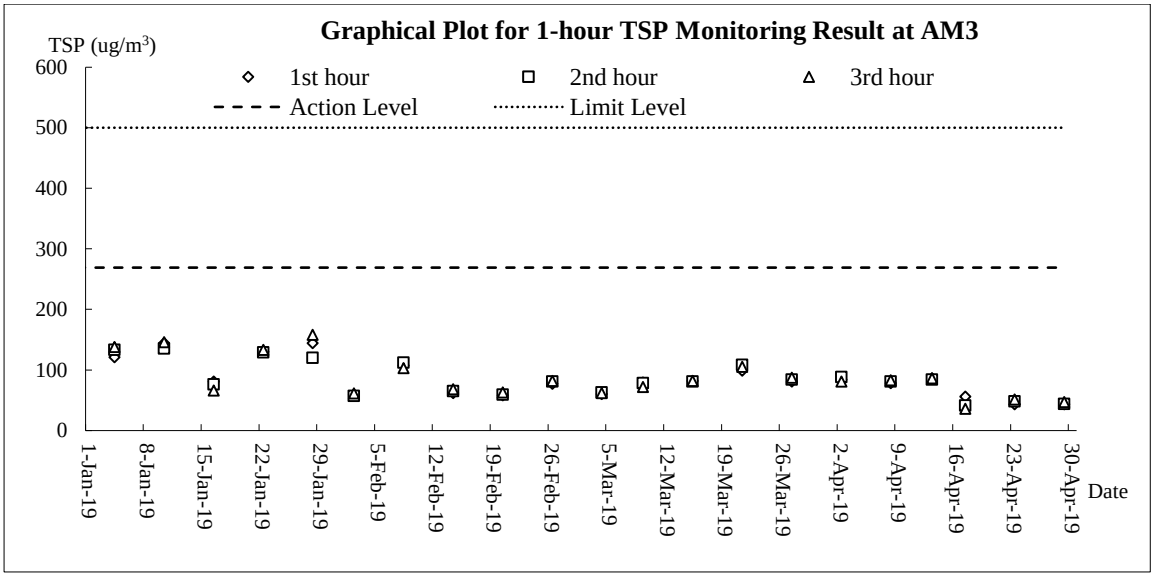
# Appendix J

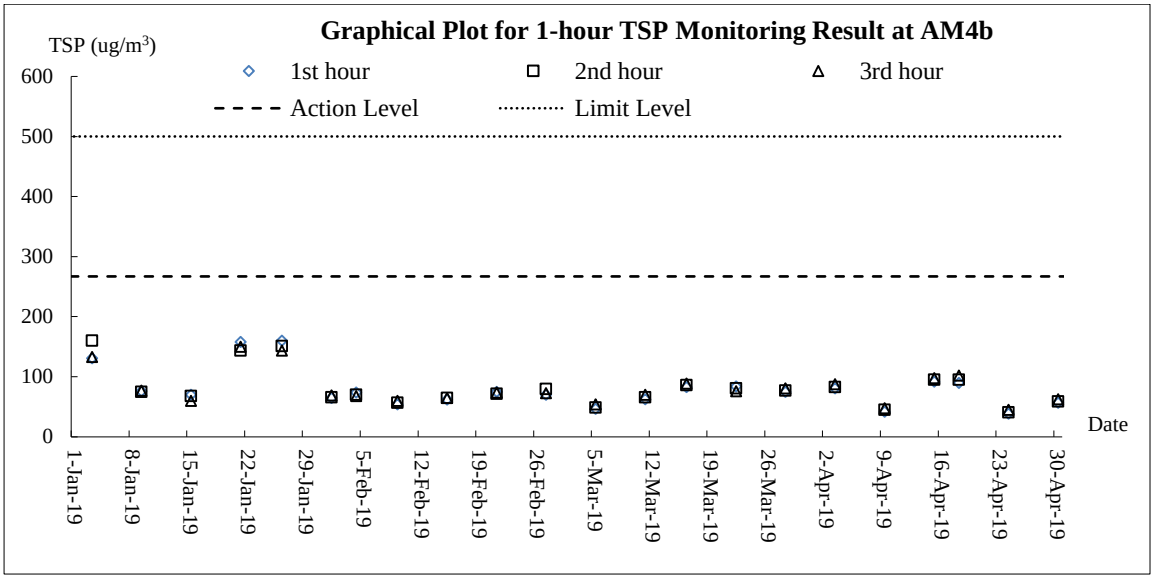
# Graphical Plots for Monitoring Result

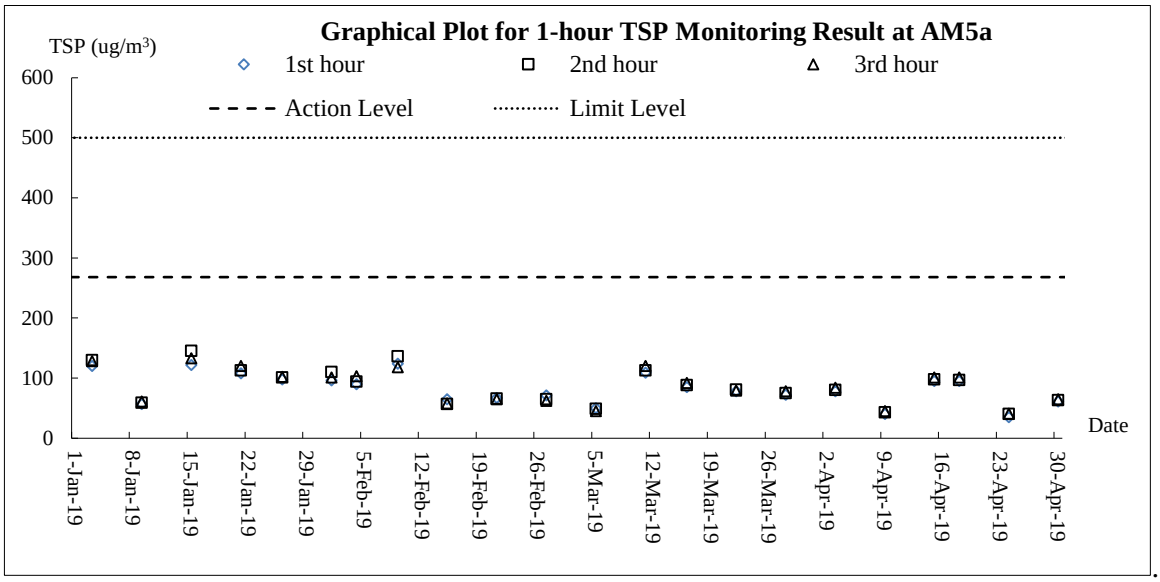
## Air Quality – 1-hour TSP

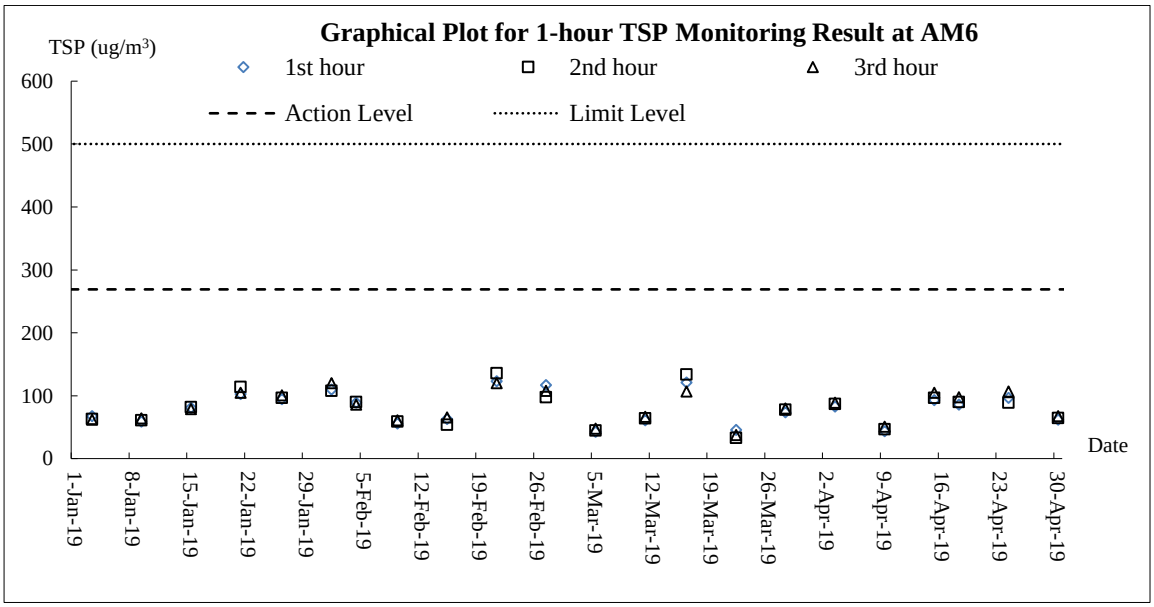


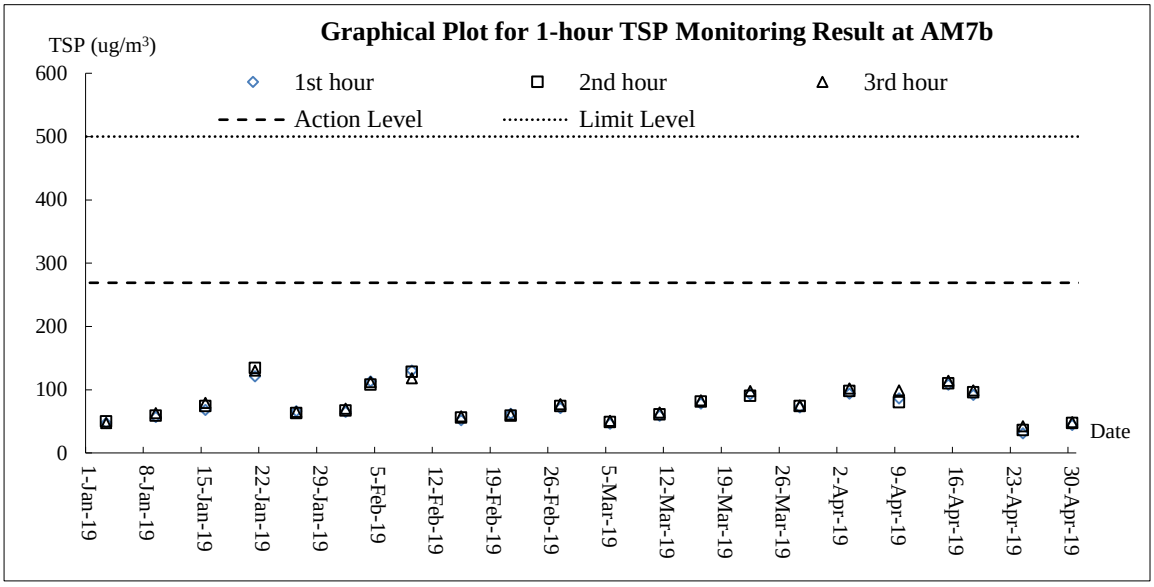



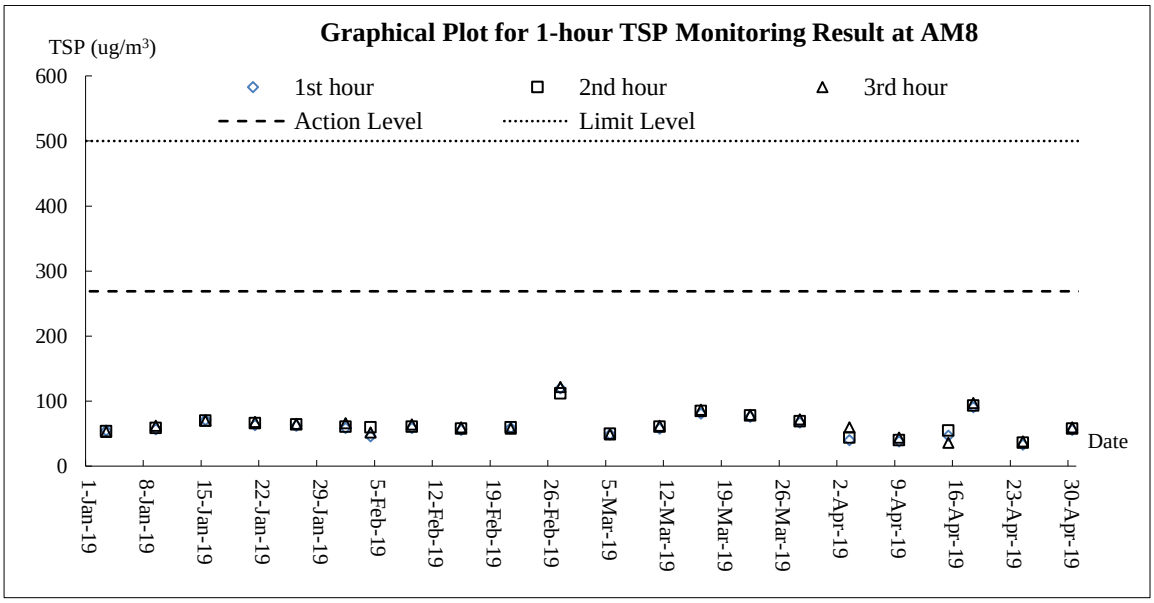



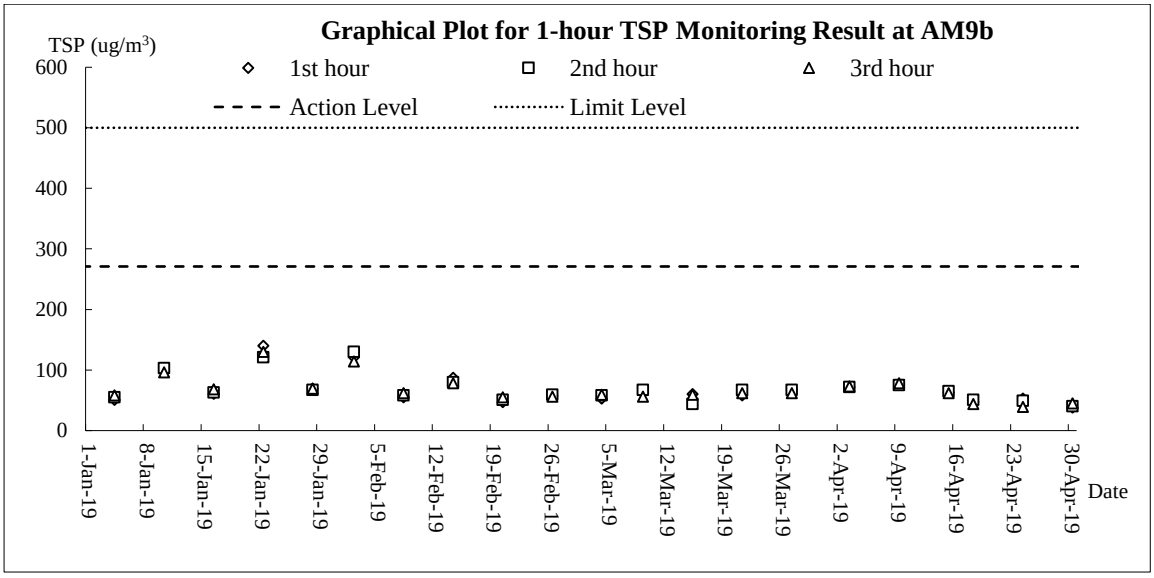

Graphical Plot for 1-hour TSP Monitoring Result at AM4b
TSP (ug/m3)
1st hour
2nd hour
3rd hour
Action Level
Limit Level
600
500
400
300
200
100
0
1-Jan-19
8-Jan-19
15-Jan-19
22-Jan-19
29-Jan-19
5-Feb-19
12-Feb-19
19-Feb-19
26-Feb-19
5-Mar-19
12-Mar-19
19-Mar-19
26-Mar-19
2-Apr-19
9-Apr-19
16-Apr-19
23-Apr-19
30-Apr-19
Date


Graphical Plot for 1-hour TSP Monitoring Result at AM5a
TSP (ug/m3)
1st hour
2nd hour
3rd hour
Action Level
Limit Level
600
500
400
300
200
100
0
1-Jan-19
8-Jan-19
15-Jan-19
22-Jan-19
29-Jan-19
5-Feb-19
12-Feb-19
19-Feb-19
26-Feb-19
5-Mar-19
12-Mar-19
19-Mar-19
26-Mar-19
2-Apr-19
9-Apr-19
16-Apr-19
23-Apr-19
30-Apr-19
Date

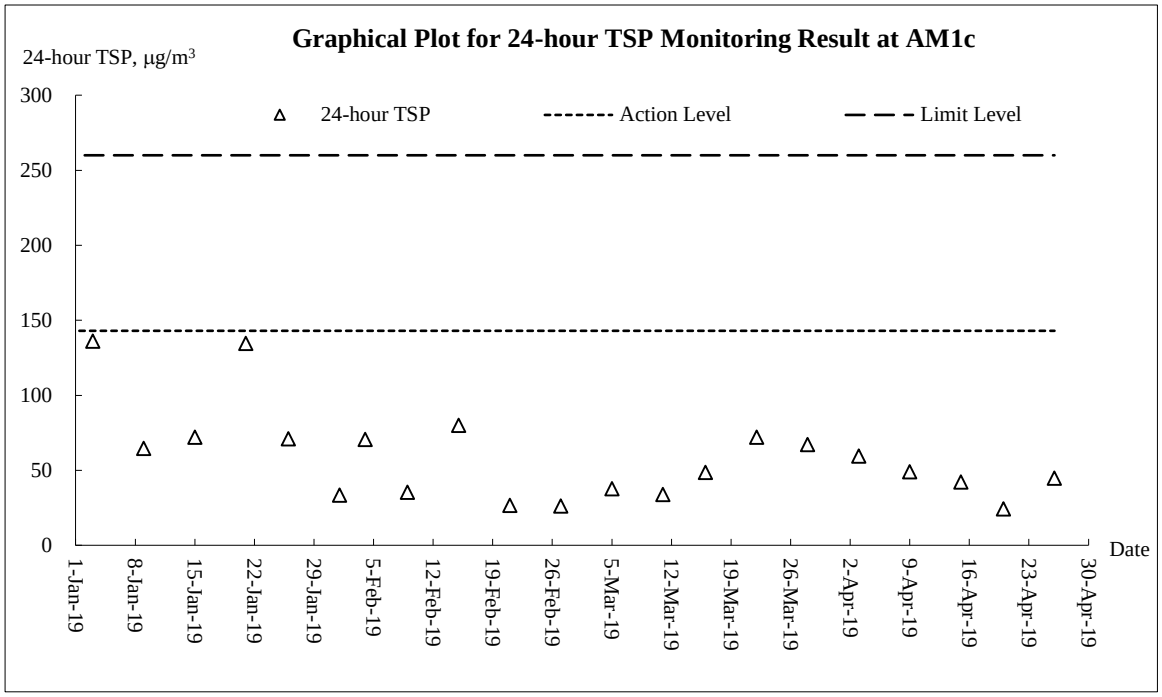

Graphical Plot for 1-hour TSP Monitoring Result at AM6
TSP (ug/m3)
1st hour
2nd hour
3rd hour
Action Level
Limit Level
600
500
400
300
200
100
0
1-Jan-19
8-Jan-19
15-Jan-19
22-Jan-19
29-Jan-19
5-Feb-19
12-Feb-19
19-Feb-19
26-Feb-19
5-Mar-19
12-Mar-19
19-Mar-19
26-Mar-19
2-Apr-19
9-Apr-19
16-Apr-19
23-Apr-19
30-Apr-19
Date

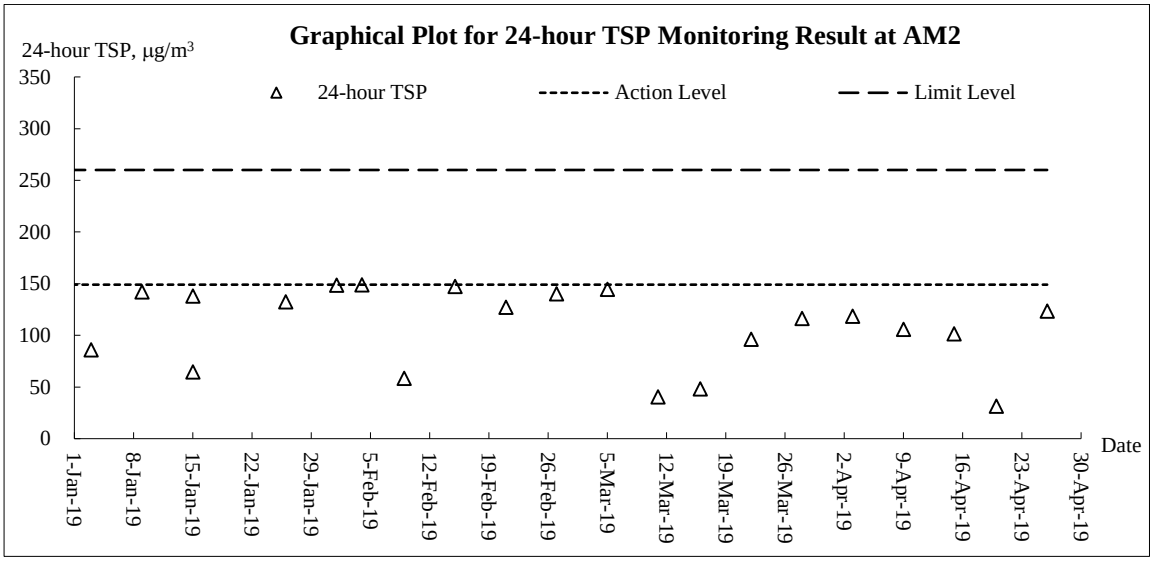

Graphical Plot for 1-hour TSP Monitoring Result at AM7b
TSP (ug/m3)
1st hour
2nd hour
3rd hour
Action Level
Limit Level
600
500
400
300
200
100
0
1-Jan-19
8-Jan-19
15-Jan-19
22-Jan-19
29-Jan-19
5-Feb-19
12-Feb-19
19-Feb-19
26-Feb-19
5-Mar-19
12-Mar-19
19-Mar-19
26-Mar-19
2-Apr-19
9-Apr-19
16-Apr-19
23-Apr-19
30-Apr-19
Date

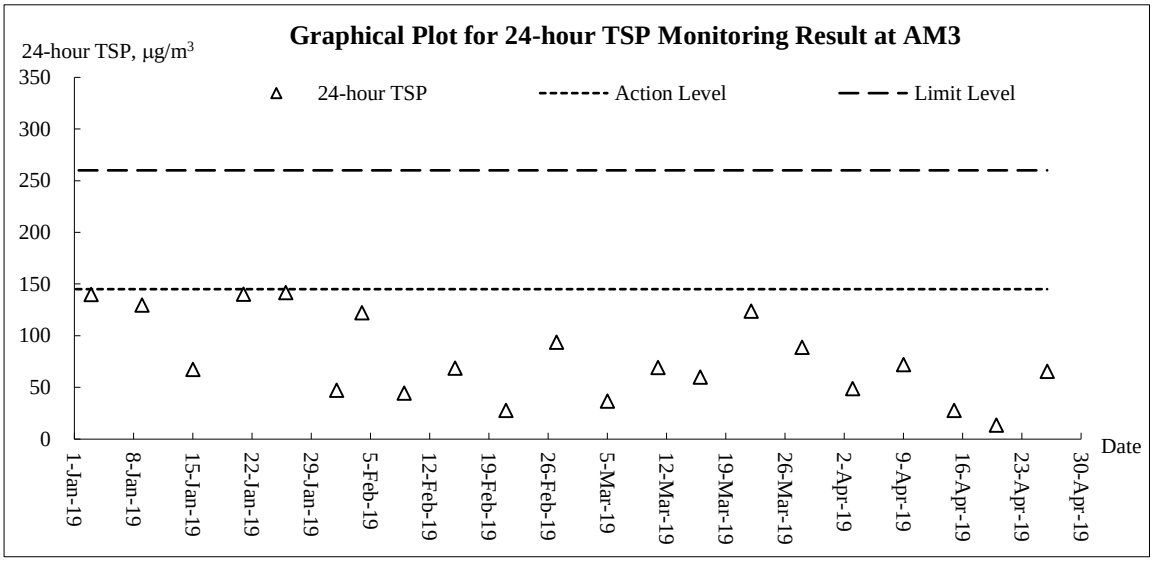

Graphical Plot for 1-hour TSP Monitoring Result at AM8
TSP (ug/m3)
1st hour
2nd hour
3rd hour
Action Level
Limit Level
600
500
400
300
200
100
0
1-Jan-19
8-Jan-19
15-Jan-19
22-Jan-19
29-Jan-19
5-Feb-19
12-Feb-19
19-Feb-19
26-Feb-19
5-Mar-19
12-Mar-19
19-Mar-19
26-Mar-19
2-Apr-19
9-Apr-19
16-Apr-19
23-Apr-19
30-Apr-19
Date

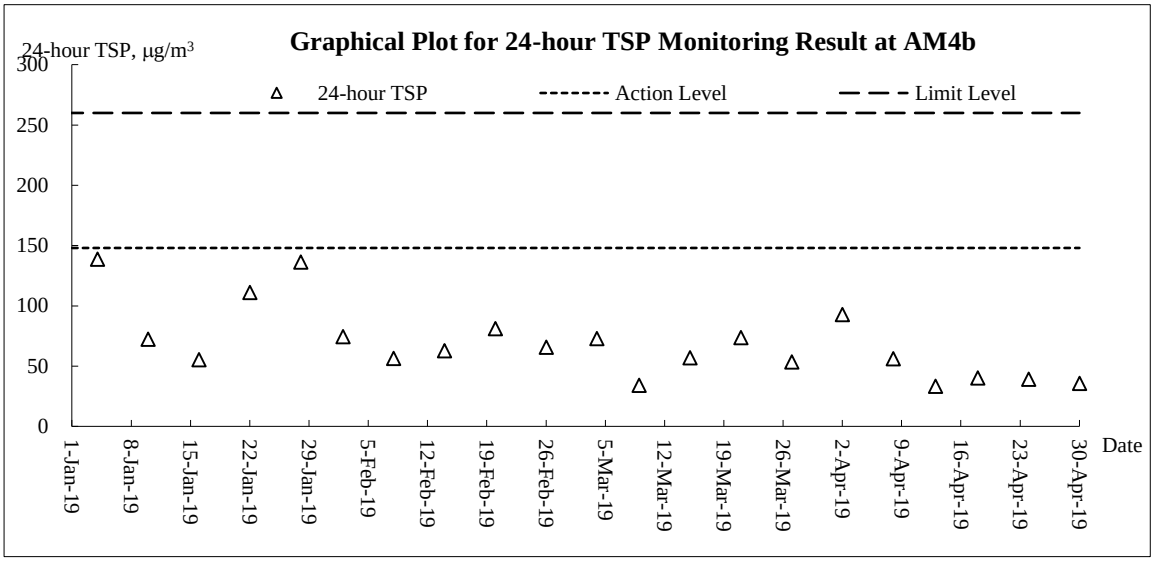

Graphical Plot for 1-hour TSP Monitoring Result at AM9b
TSP (ug/m3)
1st hour
2nd hour
3rd hour
Action Level
Limit Level
600
500
400
300
200
100
0
1-Jan-19
8-Jan-19
15-Jan-19
22-Jan-19
29-Jan-19
5-Feb-19
12-Feb-19
19-Feb-19
26-Feb-19
5-Mar-19
12-Mar-19
19-Mar-19
26-Mar-19
2-Apr-19
9-Apr-19
16-Apr-19
23-Apr-19
30-Apr-19
Date

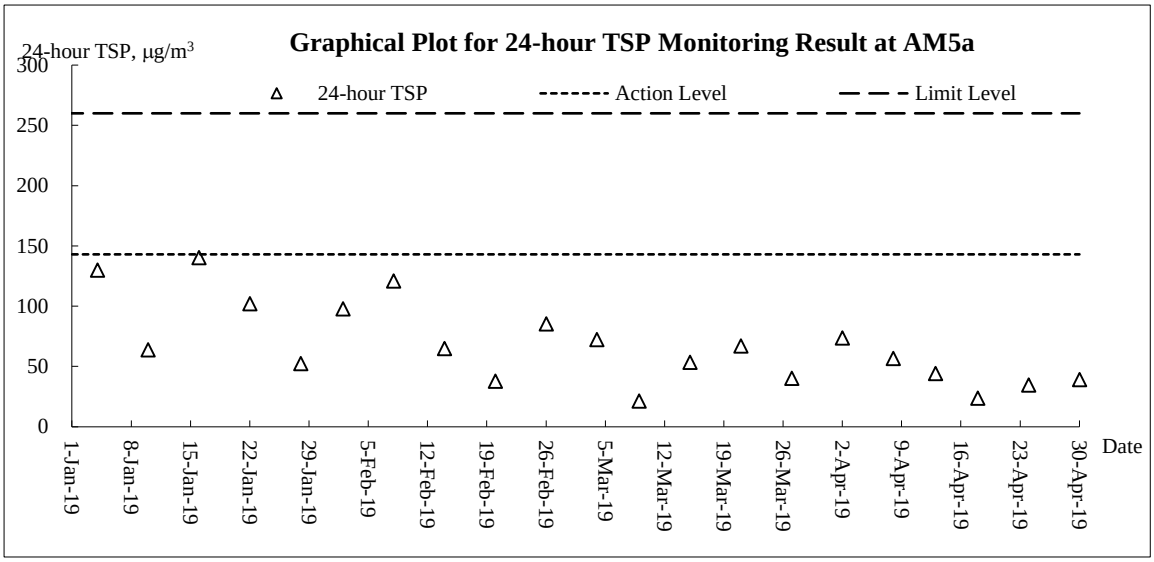
## Air Quality – 24-hour TSP

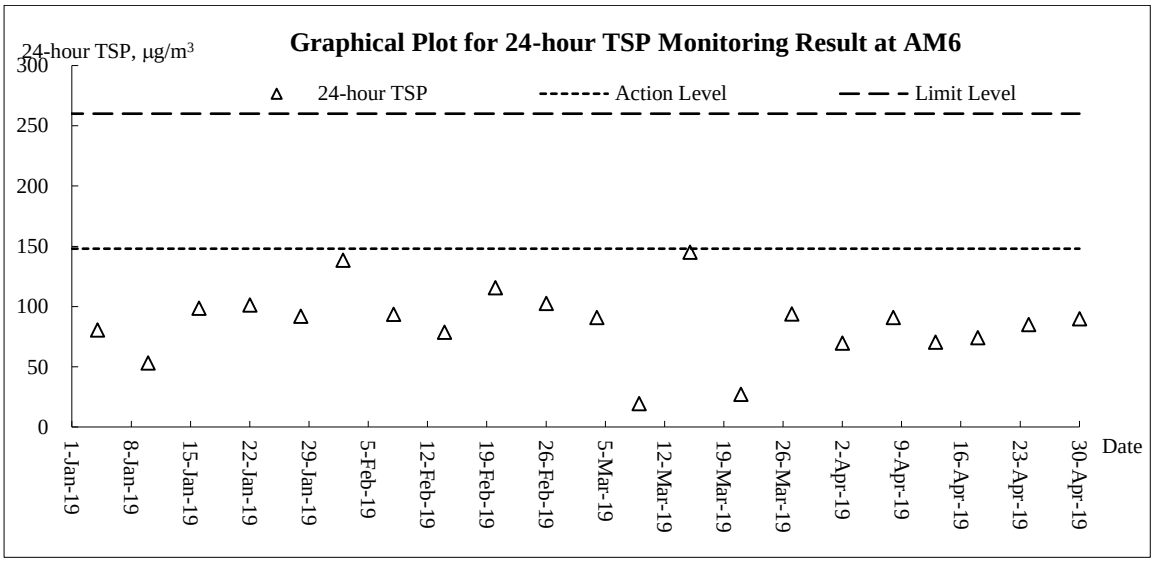


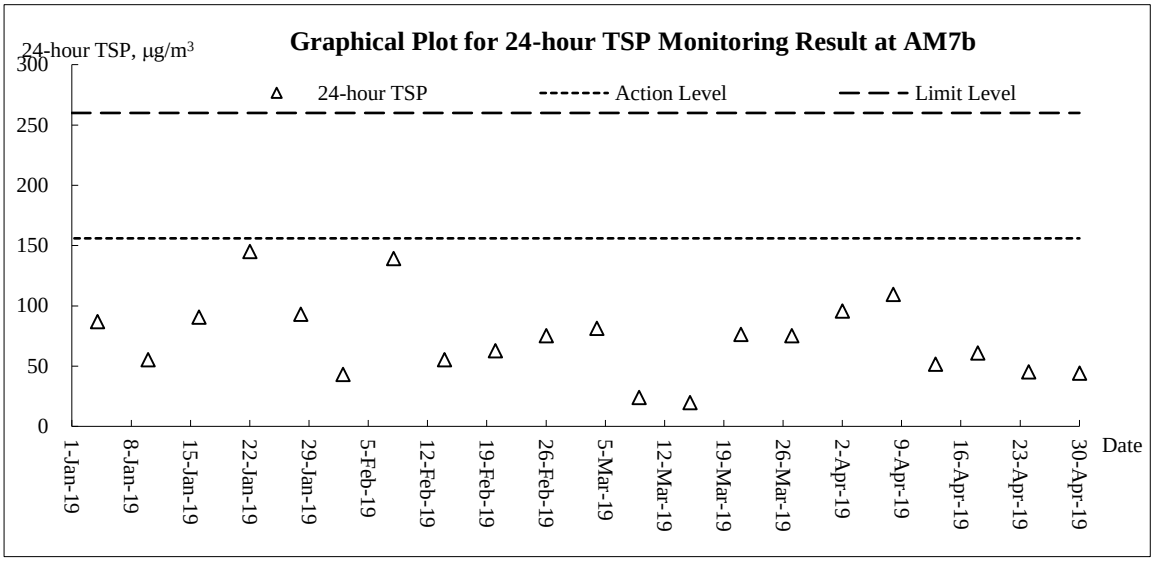



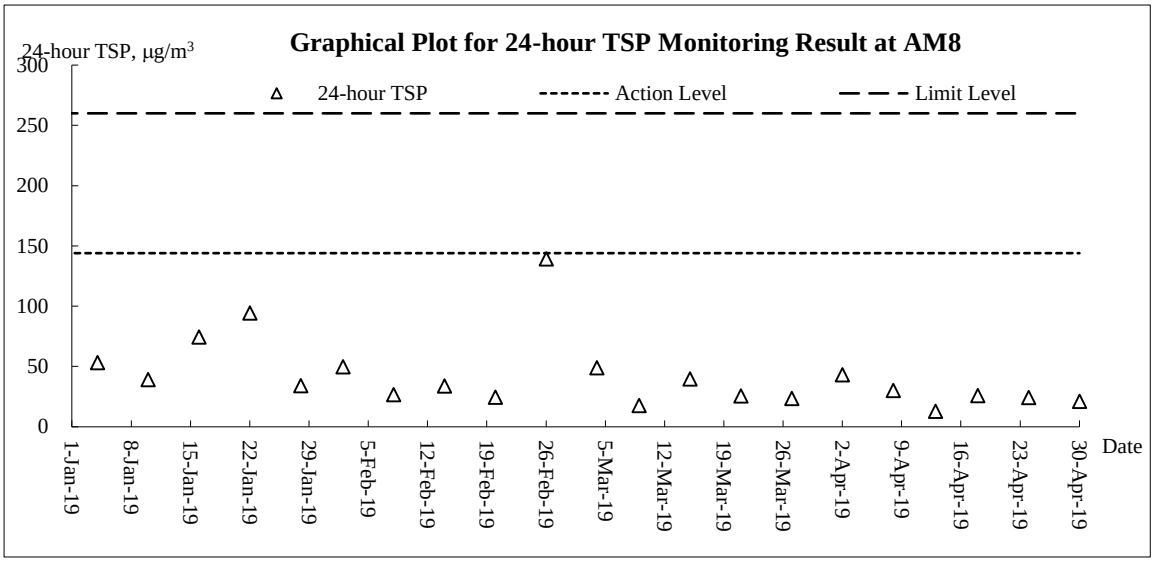



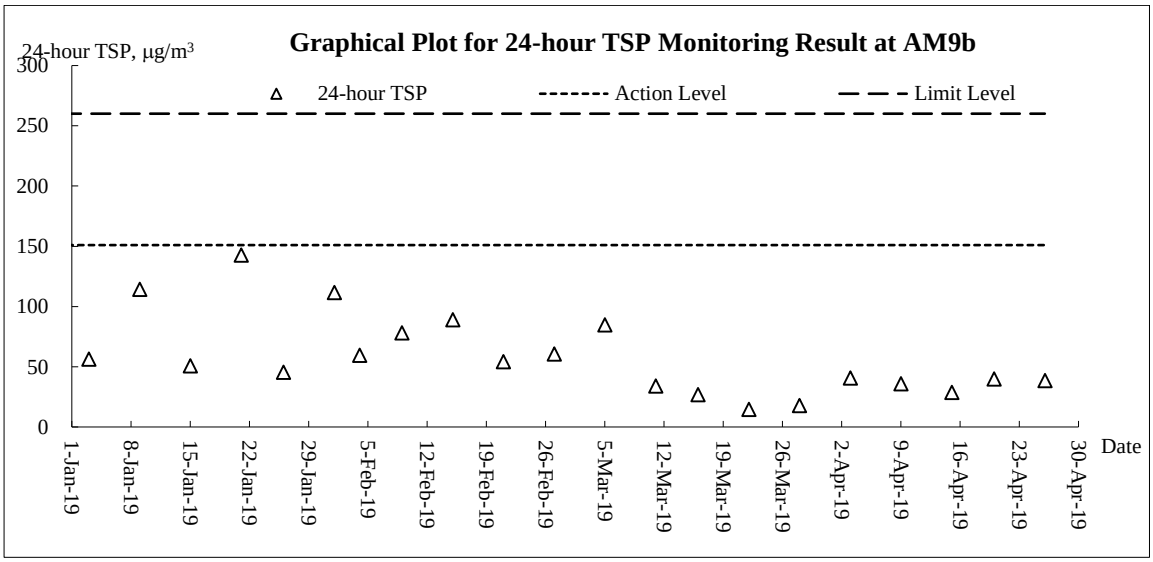

Graphical Plot for 24-hour TSP Monitoring Result at AM4b
24-hour TSP, μg/m³
24-hour TSP
Action Level
Limit Level
300
250
200
150
100
50
0
1-Jan-19
8-Jan-19
15-Jan-19
22-Jan-19
29-Jan-19
5-Feb-19
12-Feb-19
19-Feb-19
26-Feb-19
5-Mar-19
12-Mar-19
19-Mar-19
26-Mar-19
2-Apr-19
9-Apr-19
16-Apr-19
23-Apr-19
30-Apr-19
Date


Graphical Plot for 24-hour TSP Monitoring Result at AM5a
24-hour TSP, μg/m³
24-hour TSP
Action Level
Limit Level
300
250
200
150
100
50
0
1-Jan-19
8-Jan-19
15-Jan-19
22-Jan-19
29-Jan-19
5-Feb-19
12-Feb-19
19-Feb-19
26-Feb-19
5-Mar-19
12-Mar-19
19-Mar-19
26-Mar-19
2-Apr-19
9-Apr-19
16-Apr-19
23-Apr-19
30-Apr-19
Date

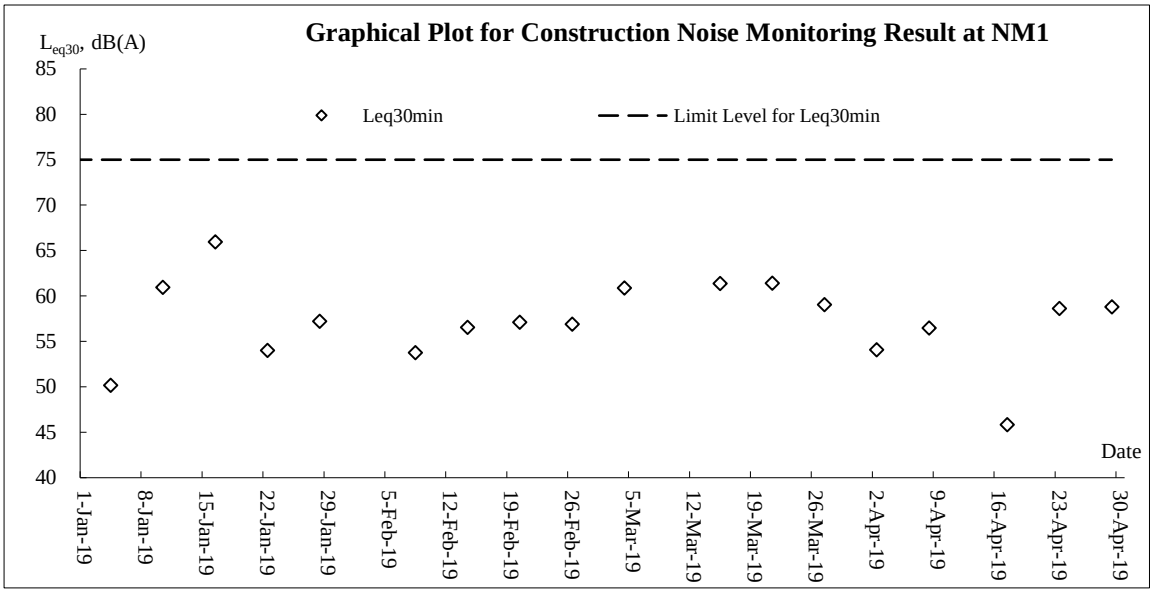

Graphical Plot for 24-hour TSP Monitoring Result at AM6
24-hour TSP, μg/m³
24-hour TSP
Action Level
Limit Level
300
250
200
150
100
50
0
1-Jan-19
8-Jan-19
15-Jan-19
22-Jan-19
29-Jan-19
5-Feb-19
12-Feb-19
19-Feb-19
26-Feb-19
5-Mar-19
12-Mar-19
19-Mar-19
26-Mar-19
2-Apr-19
9-Apr-19
16-Apr-19
23-Apr-19
30-Apr-19
Date

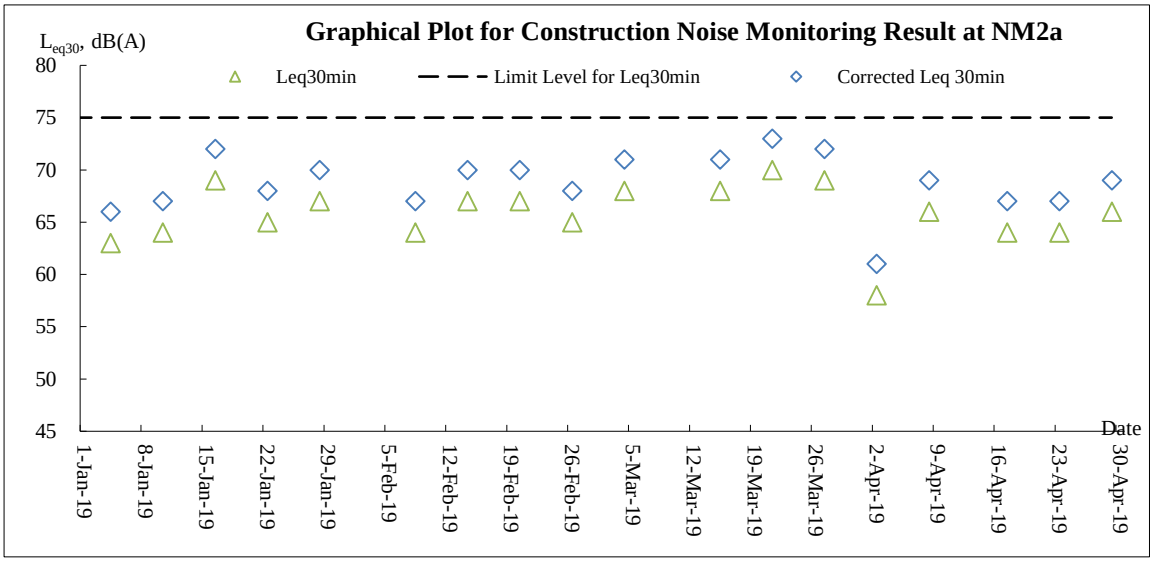

Graphical Plot for 24-hour TSP Monitoring Result at AM7b
24-hour TSP, μg/m³
24-hour TSP
Action Level
Limit Level
300
250
200
150
100
50
0
1-Jan-19
8-Jan-19
15-Jan-19
22-Jan-19
29-Jan-19
5-Feb-19
12-Feb-19
19-Feb-19
26-Feb-19
5-Mar-19
12-Mar-19
19-Mar-19
26-Mar-19
2-Apr-19
9-Apr-19
16-Apr-19
23-Apr-19
30-Apr-19
Date

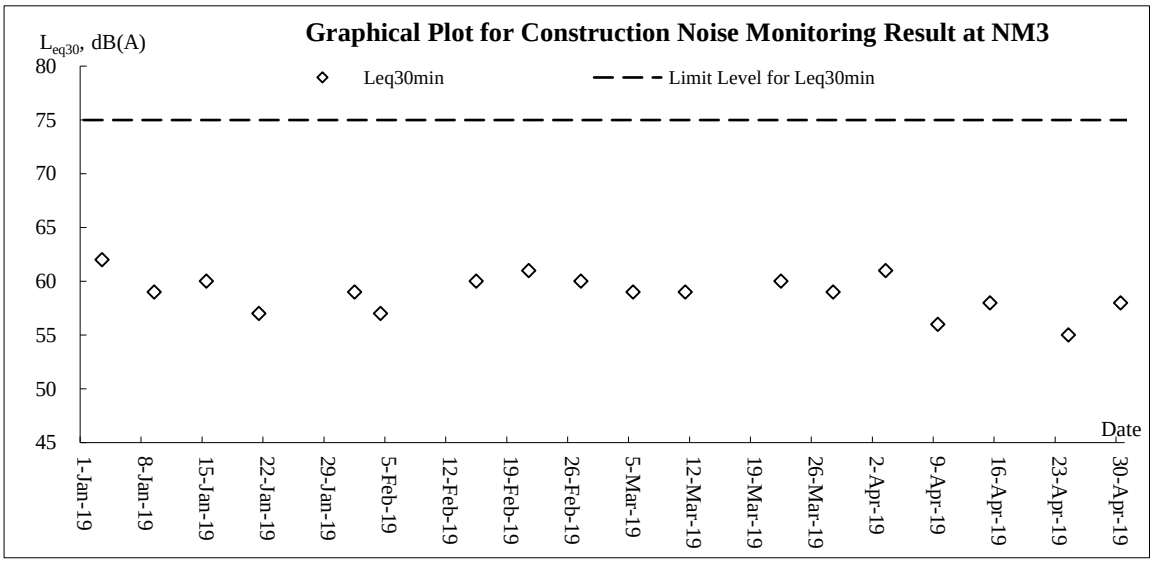

Graphical Plot for 24-hour TSP Monitoring Result at AM8
24-hour TSP, μg/m³
24-hour TSP
Action Level
Limit Level
300
250
200
150
100
50
0
1-Jan-19
8-Jan-19
15-Jan-19
22-Jan-19
29-Jan-19
5-Feb-19
12-Feb-19
19-Feb-19
26-Feb-19
5-Mar-19
12-Mar-19
19-Mar-19
26-Mar-19
2-Apr-19
9-Apr-19
16-Apr-19
23-Apr-19
30-Apr-19
Date

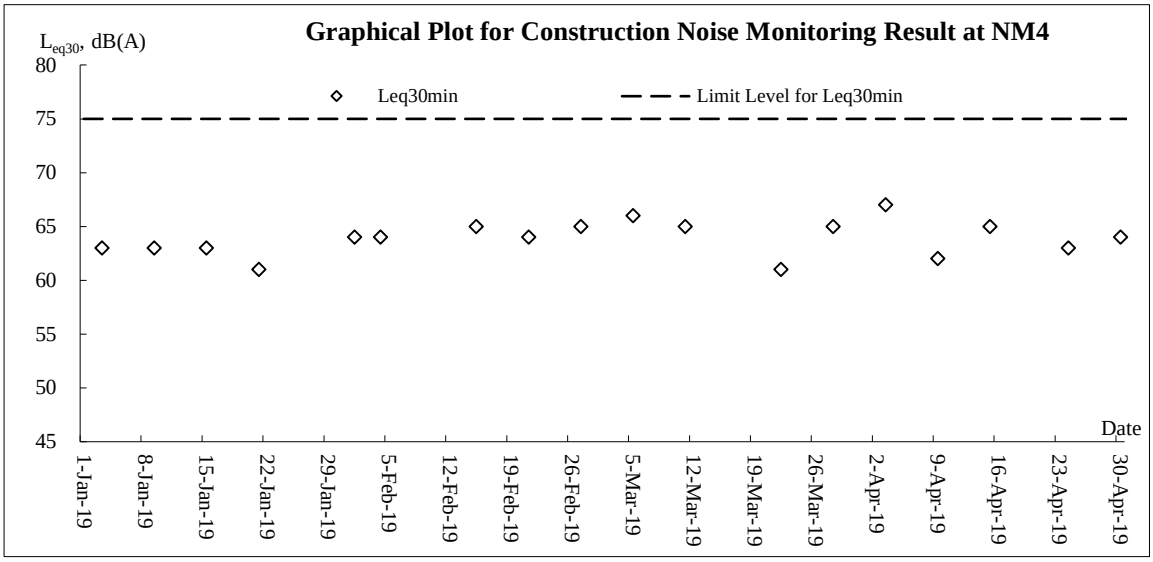

Graphical Plot for 24-hour TSP Monitoring Result at AM9b
24-hour TSP, μg/m³
24-hour TSP
Action Level
Limit Level
300
250
200
150
100
50
0
1-Jan-19
8-Jan-19
15-Jan-19
22-Jan-19
29-Jan-19
5-Feb-19
12-Feb-19
19-Feb-19
26-Feb-19
5-Mar-19
12-Mar-19
19-Mar-19
26-Mar-19
2-Apr-19
9-Apr-19
16-Apr-19
23-Apr-19
30-Apr-19
Date

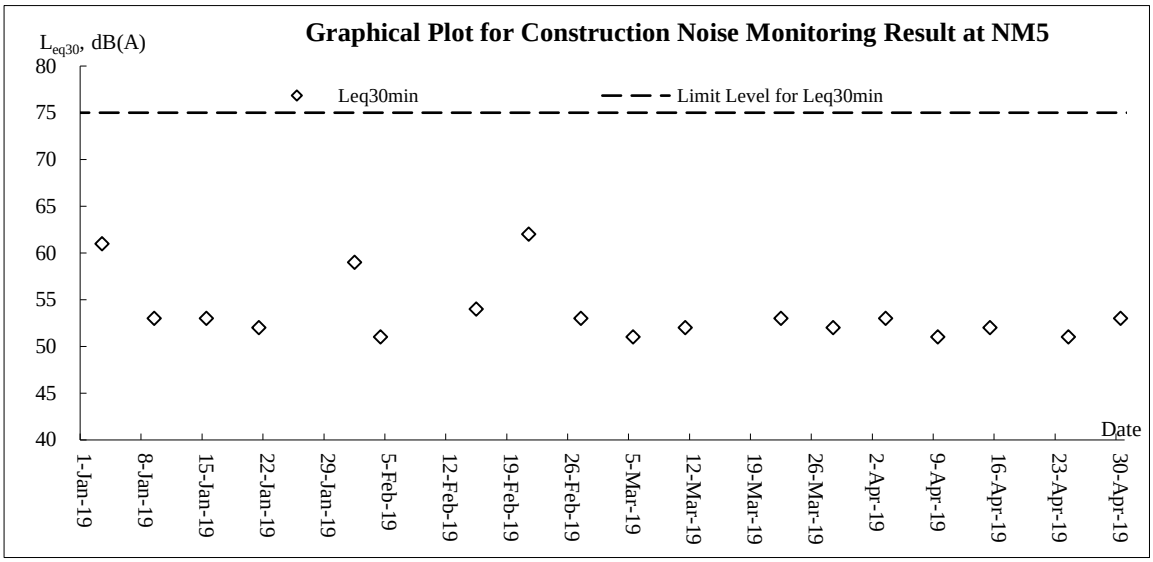
# Noise

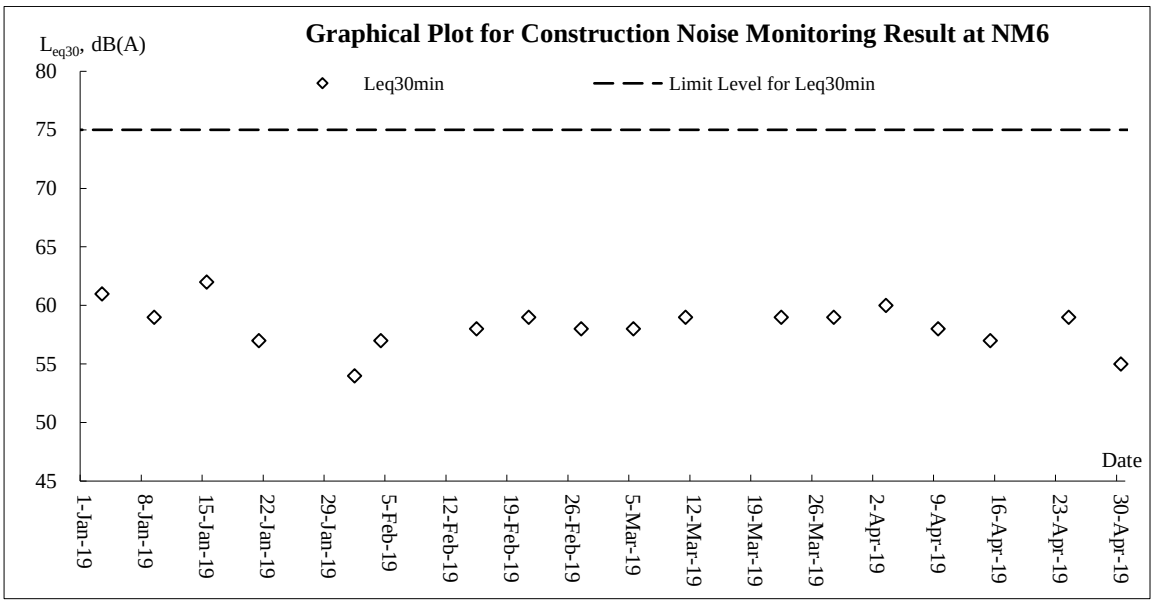

Graphical Plot for Construction Noise Monitoring Result at NM1
$L_{eq30}$, dB(A)
Leq30min
Limit Level for Leq30min
Date

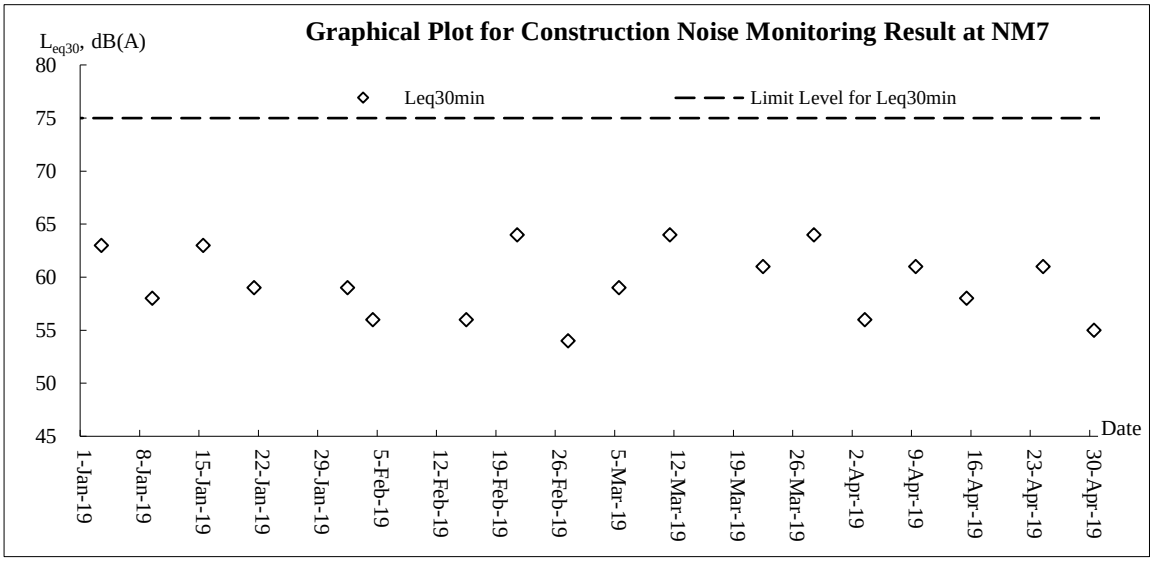

Graphical Plot for Construction Noise Monitoring Result at NM2a
$L_{eq30}$, dB(A)
Leq30min
Limit Level for Leq30min
Corrected Leq 30min
Date

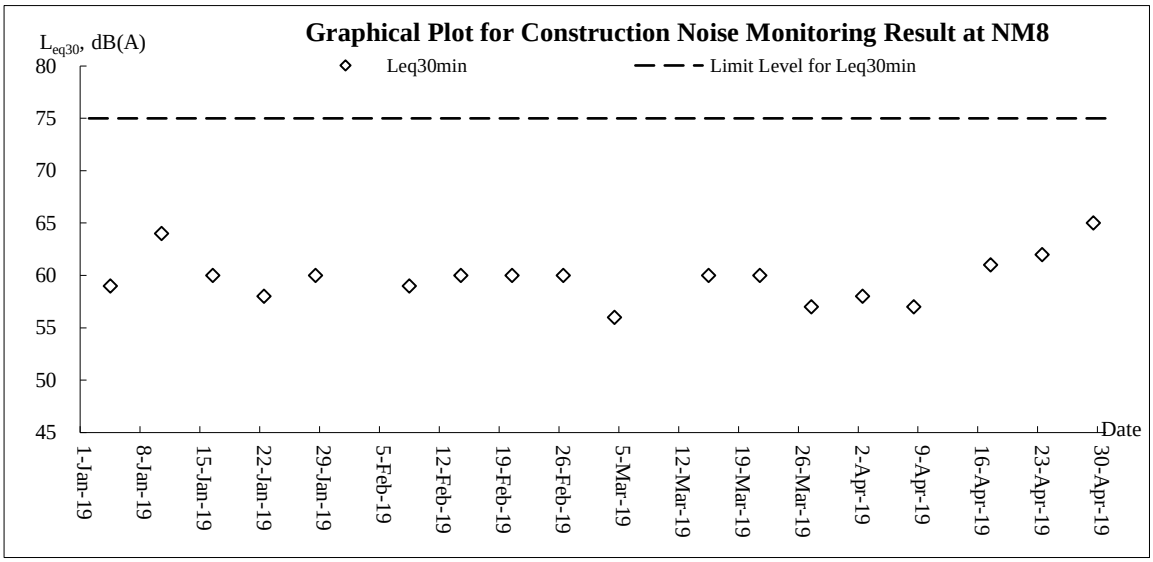

Graphical Plot for Construction Noise Monitoring Result at NM3
$L_{eq30}$, dB(A)
Leq30min
Limit Level for Leq30min
Date

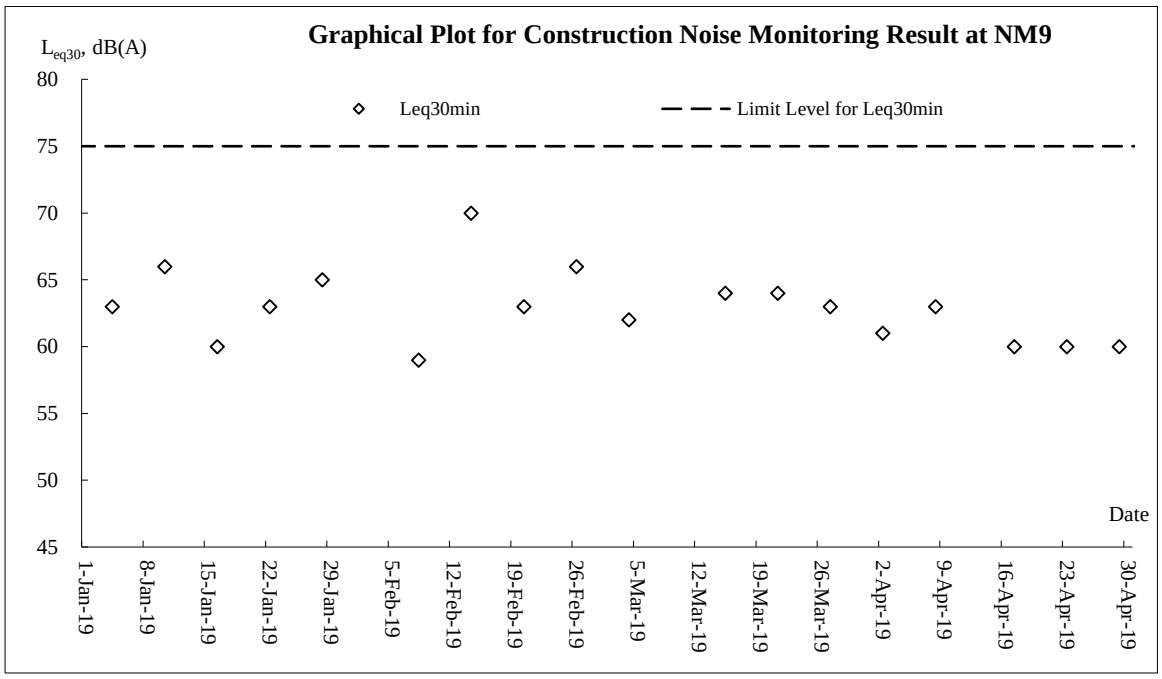

Graphical Plot for Construction Noise Monitoring Result at NM4
$L_{eq30}$, dB(A)
Leq30min
Limit Level for Leq30min
80
75
70
65
60
55
50
45
Date
1-Jan-19
8-Jan-19
15-Jan-19
22-Jan-19
29-Jan-19
5-Feb-19
12-Feb-19
19-Feb-19
26-Feb-19
5-Mar-19
12-Mar-19
19-Mar-19
26-Mar-19
2-Apr-19
9-Apr-19
16-Apr-19
23-Apr-19
30-Apr-19


Graphical Plot for Construction Noise Monitoring Result at NM5
$L_{eq30}$, dB(A)
Leq30min
Limit Level for Leq30min
80
75
70
65
60
55
50
45
40
Date
1-Jan-19
8-Jan-19
15-Jan-19
22-Jan-19
29-Jan-19
5-Feb-19
12-Feb-19
19-Feb-19
26-Feb-19
5-Mar-19
12-Mar-19
19-Mar-19
26-Mar-19
2-Apr-19
9-Apr-19
16-Apr-19
23-Apr-19
30-Apr-19


Graphical Plot for Construction Noise Monitoring Result at NM6
$L_{eq30}$, dB(A)
Leq30min
Limit Level for Leq30min
80
75
70
65
60
55
50
45
Date
1-Jan-19
8-Jan-19
15-Jan-19
22-Jan-19
29-Jan-19
5-Feb-19
12-Feb-19
19-Feb-19
26-Feb-19
5-Mar-19
12-Mar-19
19-Mar-19
26-Mar-19
2-Apr-19
9-Apr-19
16-Apr-19
23-Apr-19
30-Apr-19


Graphical Plot for Construction Noise Monitoring Result at NM7
$L_{eq30}$, dB(A)
Leq30min
Limit Level for Leq30min
80
75
70
65
60
55
50
45
Date
1-Jan-19
8-Jan-19
15-Jan-19
22-Jan-19
29-Jan-19
5-Feb-19
12-Feb-19
19-Feb-19
26-Feb-19
5-Mar-19
12-Mar-19
19-Mar-19
26-Mar-19
2-Apr-19
9-Apr-19
16-Apr-19
23-Apr-19
30-Apr-19


Graphical Plot for Construction Noise Monitoring Result at NM8
$L_{eq30}$, dB(A)
Leq30min
Limit Level for Leq30min
80
75
70
65
60
55
50
45
Date
1-Jan-19
8-Jan-19
15-Jan-19
22-Jan-19
29-Jan-19
5-Feb-19
12-Feb-19
19-Feb-19
26-Feb-19
5-Mar-19
12-Mar-19
19-Mar-19
26-Mar-19
2-Apr-19
9-Apr-19
16-Apr-19
23-Apr-19
30-Apr-19


Graphical Plot for Construction Noise Monitoring Result at NM9
$L_{eq30}$, dB(A)
Leq30min
Limit Level for Leq30min
80
75
70
65
60
55
50
45
Date
1-Jan-19
8-Jan-19
15-Jan-19
22-Jan-19
29-Jan-19
5-Feb-19
12-Feb-19
19-Feb-19
26-Feb-19
5-Mar-19
12-Mar-19
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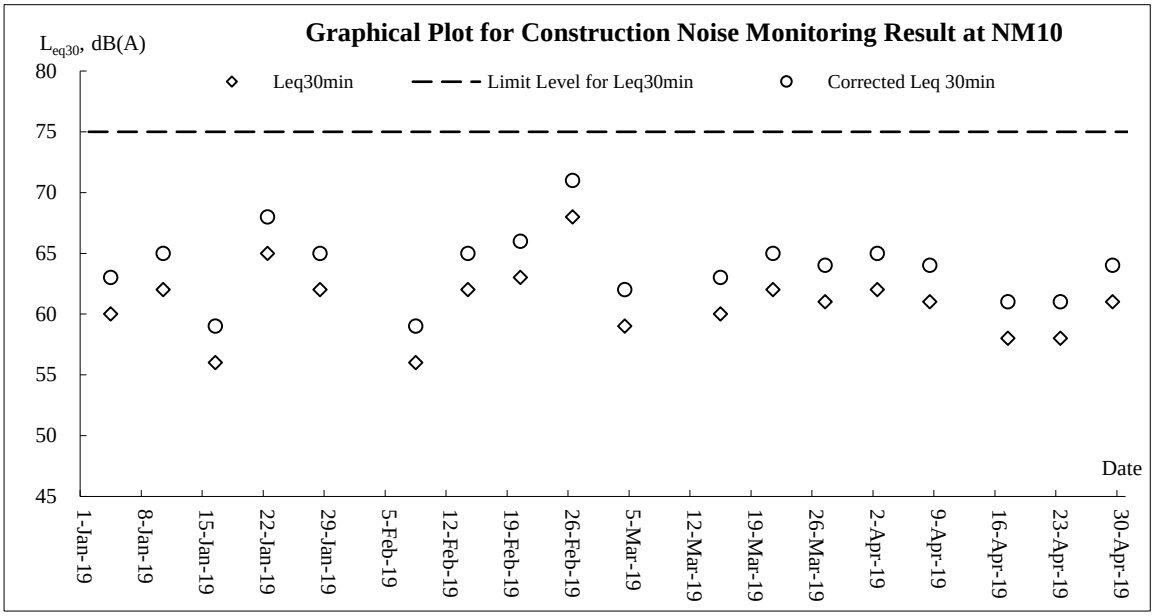
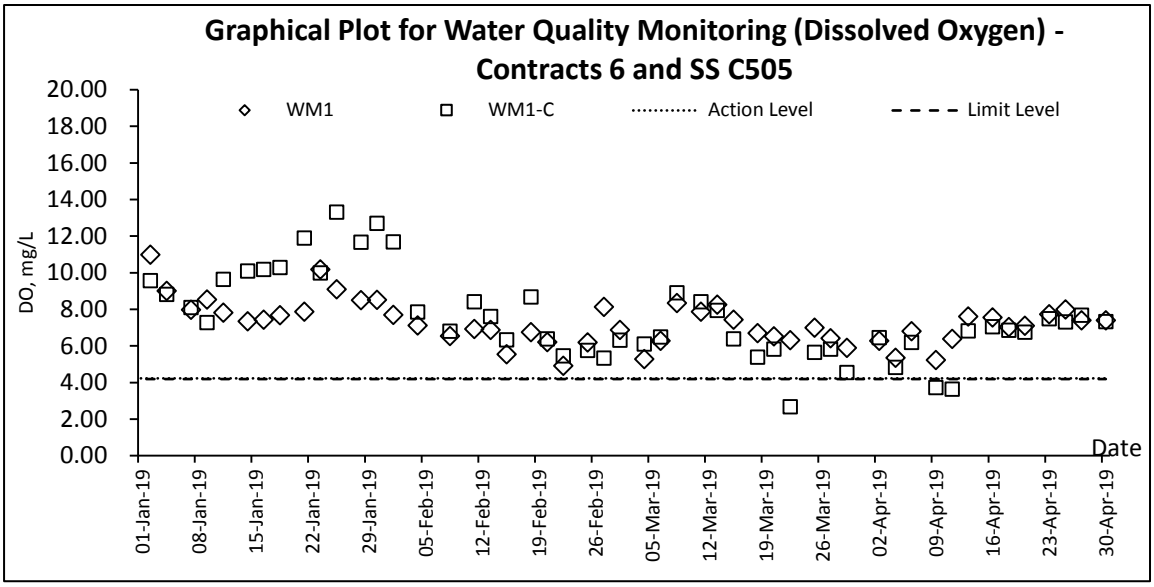
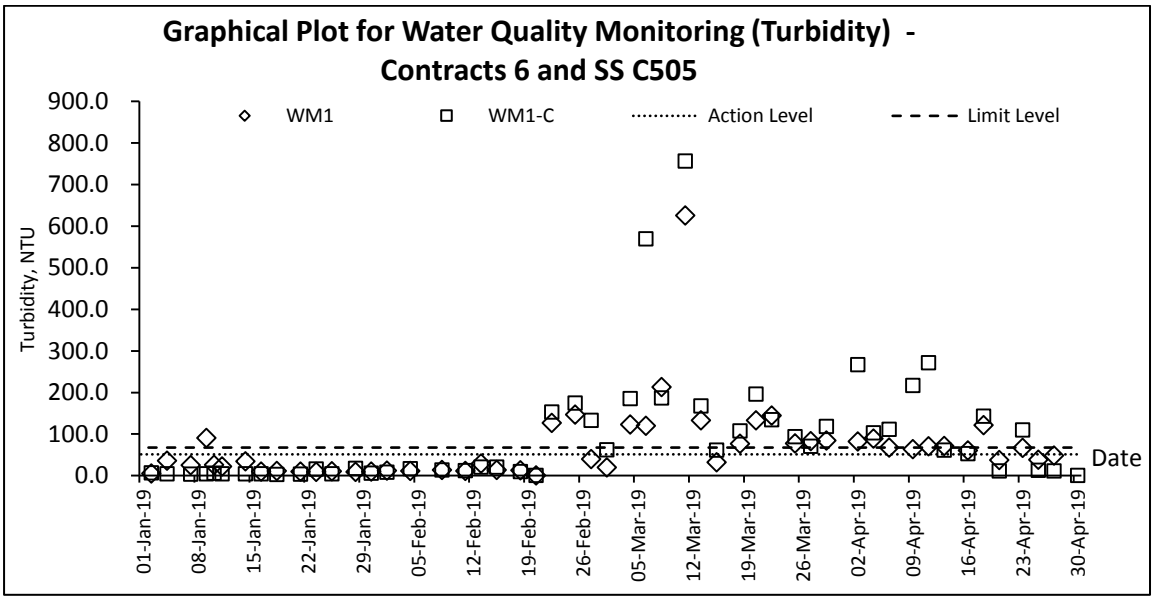
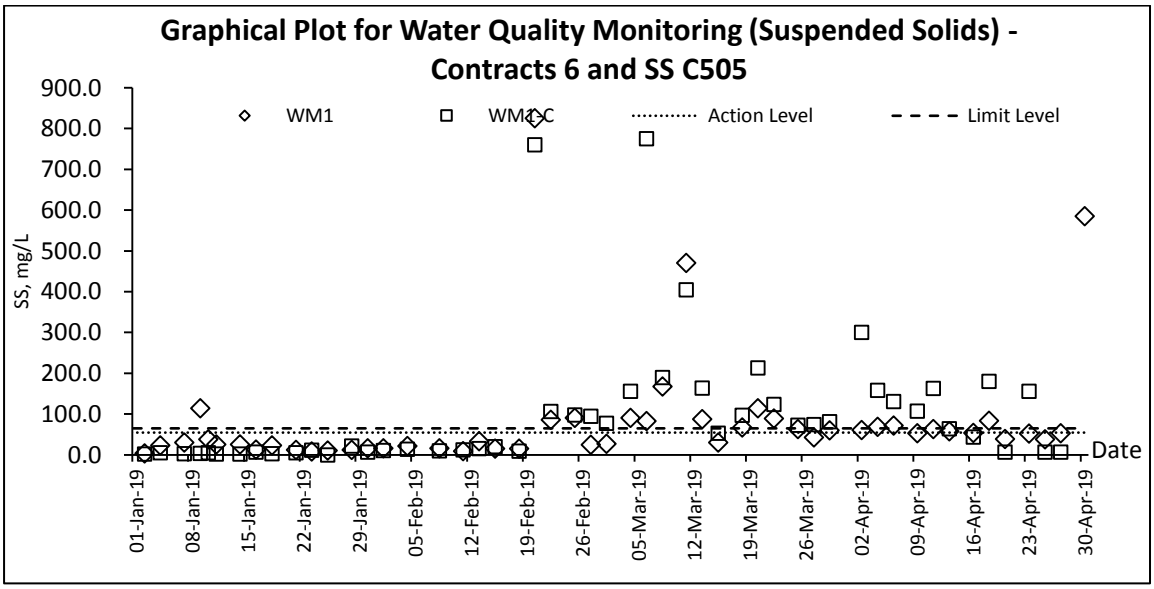
26-Mar-19
2-Apr-19
9-Apr-19
16-Apr-19
23-Apr-19
30-Apr-19

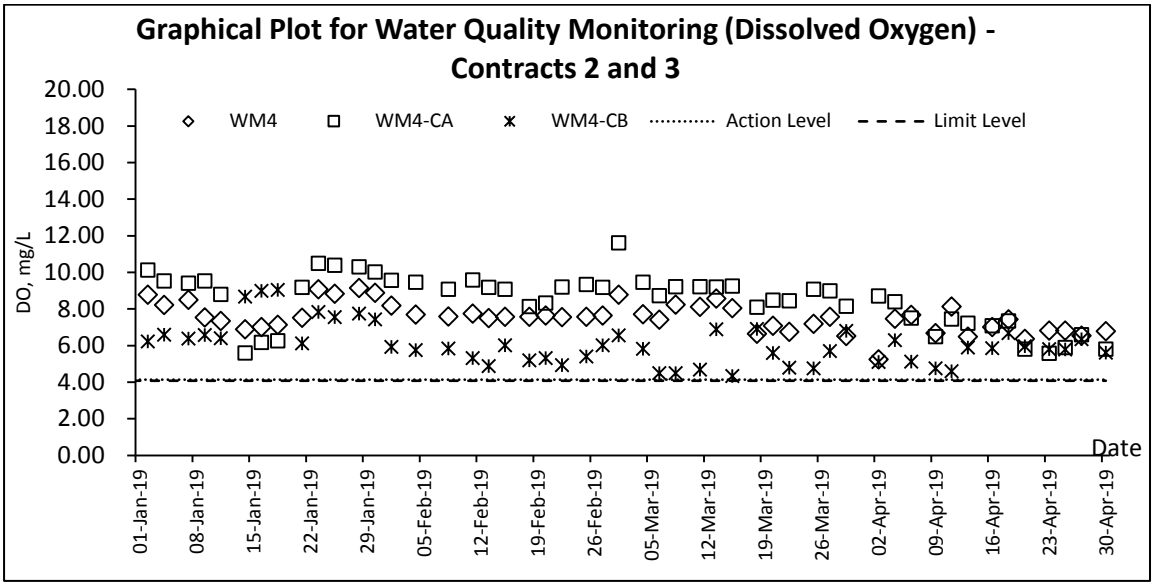

Graphical Plot for Construction Noise Monitoring Result at NM10
$L_{eq30}$, dB(A)
Leq30min
Limit Level for Leq30min
Corrected Leq 30min
80
75
70
65
60
55
50
45
Date
1-Jan-19
8-Jan-19
15-Jan-19
22-Jan-19
29-Jan-19
5-Feb-19
12-Feb-19
19-Feb-19
26-Feb-19
5-Mar-19
12-Mar-19
19-Mar-19
26-Mar-19
2-Apr-19
9-Apr-19
16-Apr-19
23-Apr-19
30-Apr-19

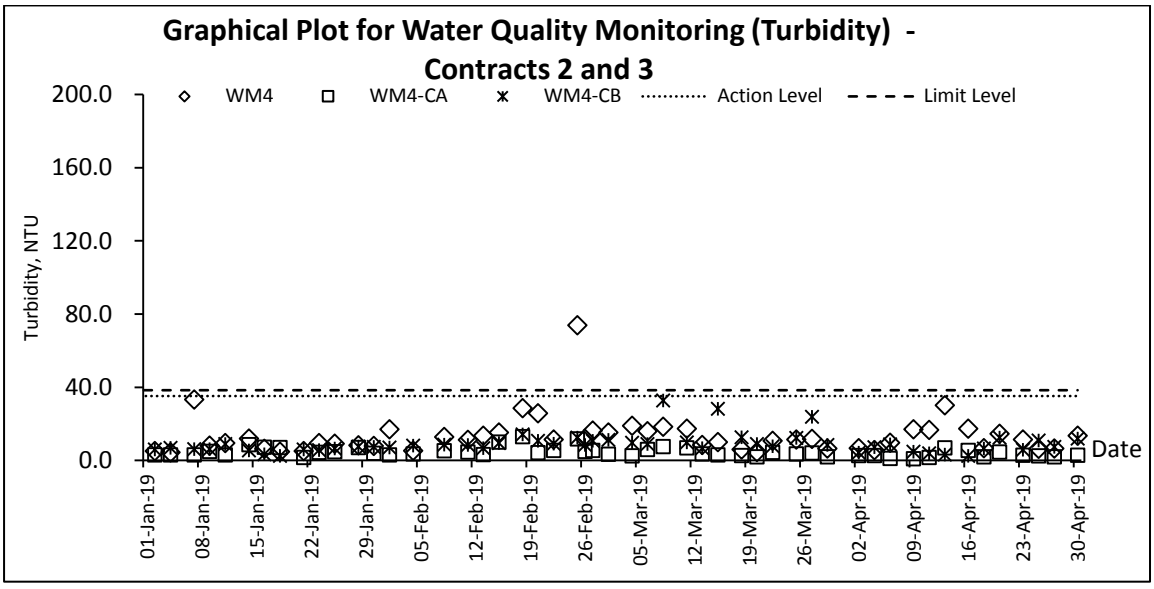
## Water Quality

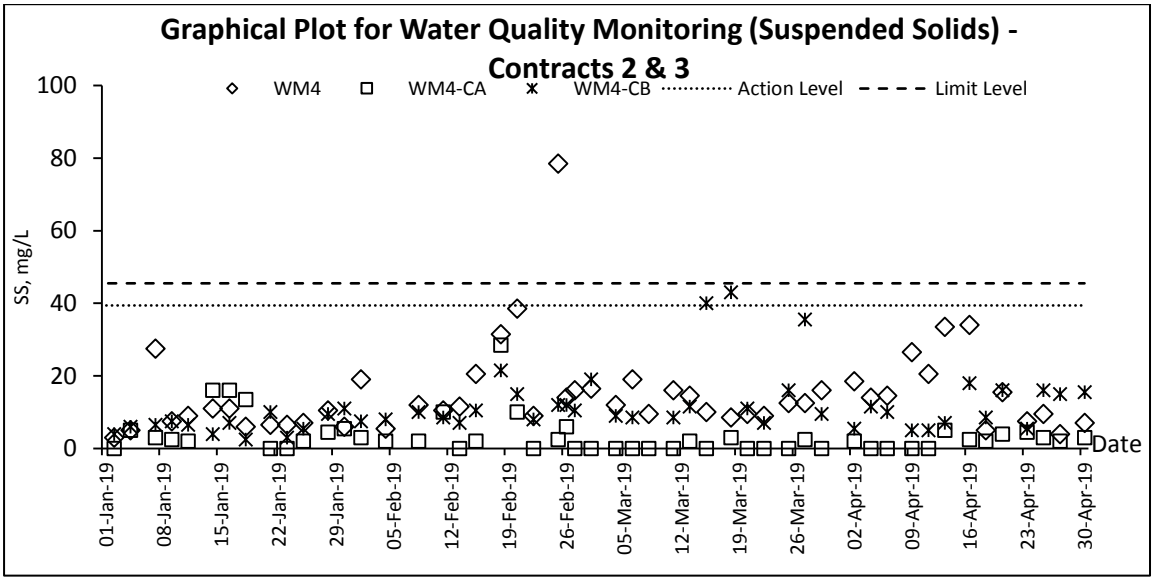


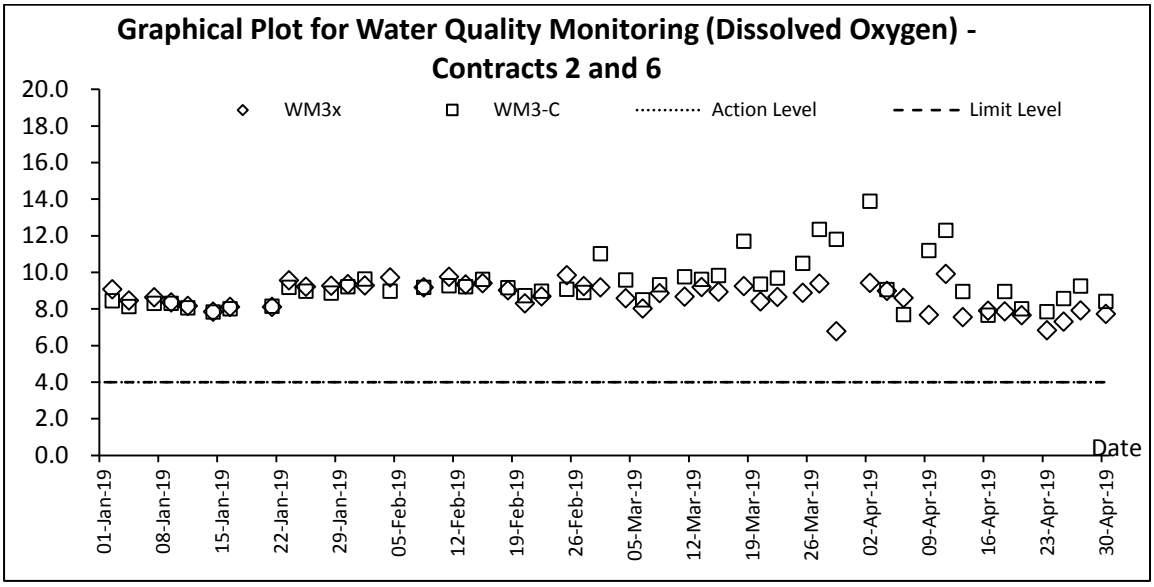



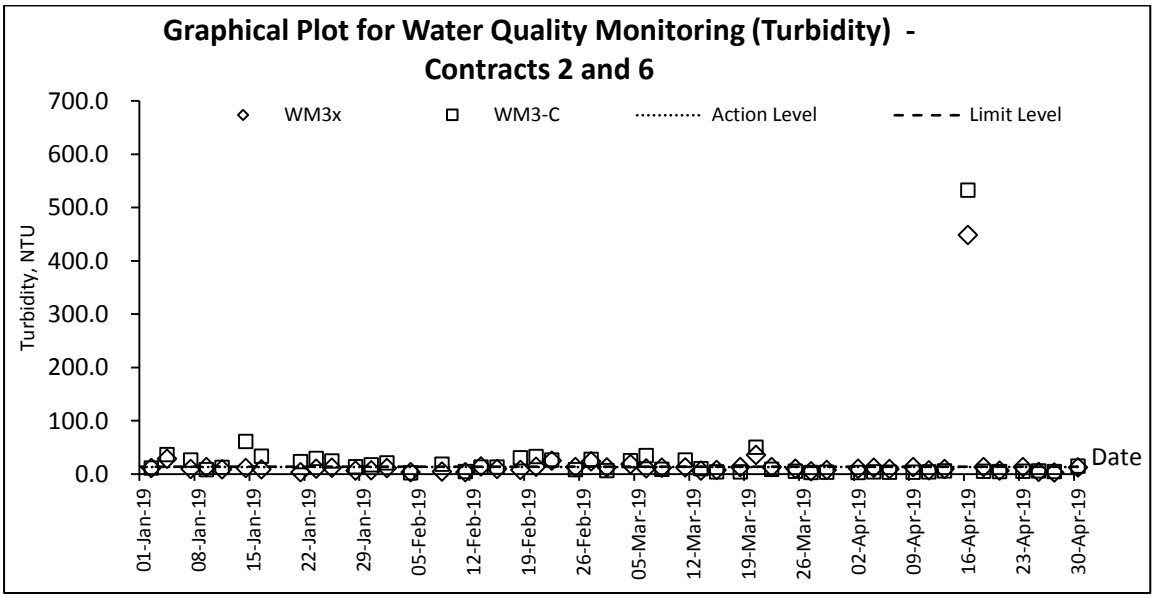



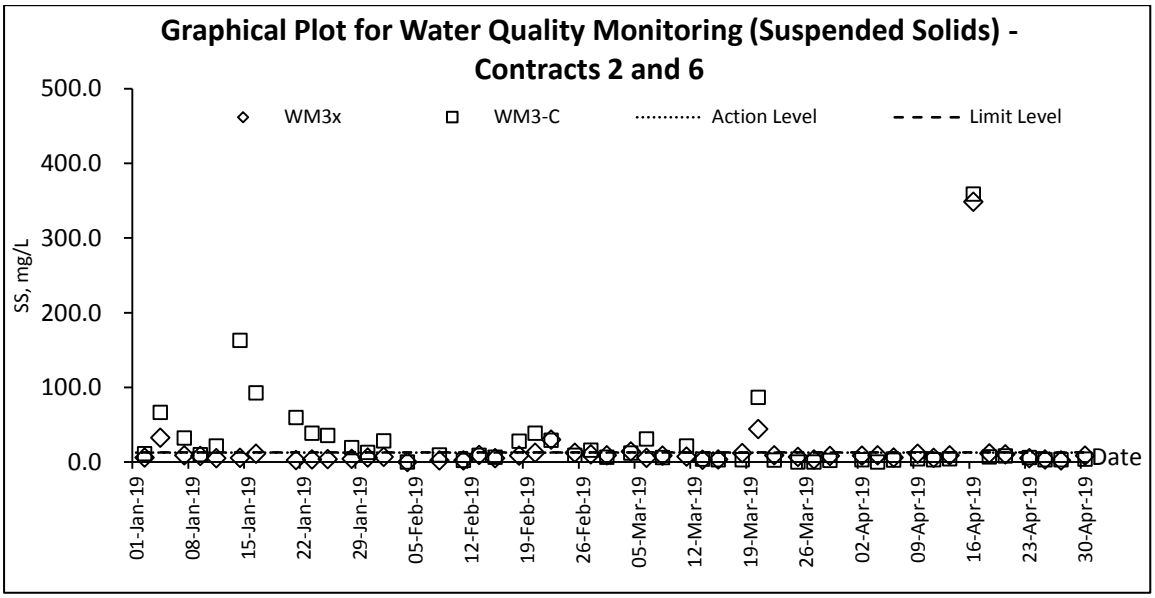

Graphical Plot for Water Quality Monitoring (Dissolved Oxygen) - Contracts 2 and 3
WM4
WM4-CA
WM4-CB
Action Level
Limit Level
DO, mg/L
20.00
18.00
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Date
01-Jan-19
08-Jan-19
15-Jan-19
22-Jan-19
29-Jan-19
05-Feb-19
12-Feb-19
19-Feb-19
26-Feb-19
05-Mar-19
12-Mar-19
19-Mar-19
26-Mar-19
02-Apr-19
09-Apr-19
16-Apr-19
23-Apr-19
30-Apr-19

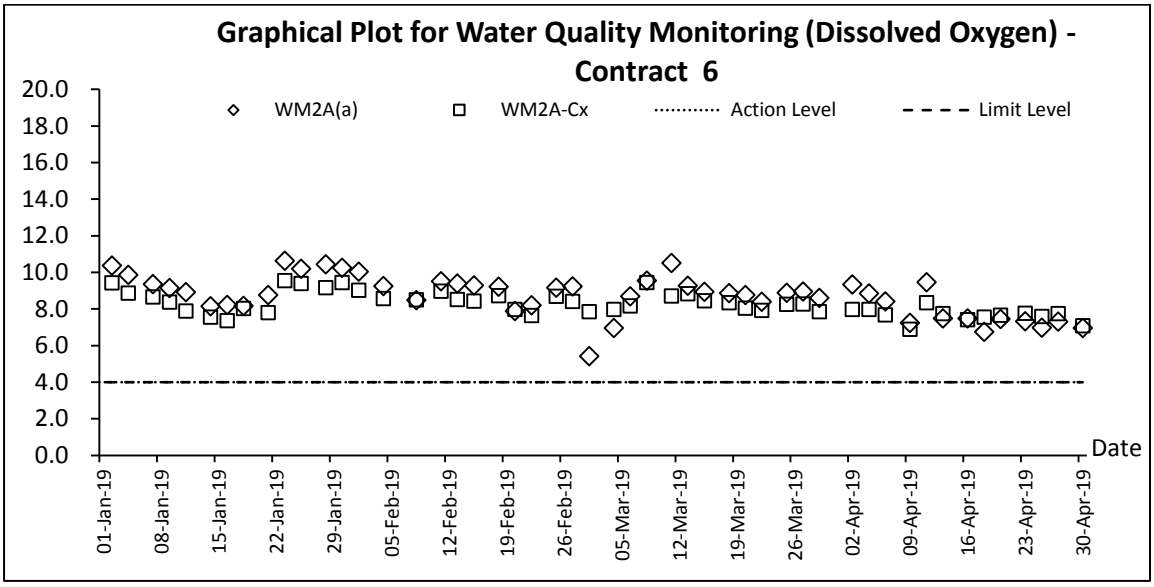

Graphical Plot for Water Quality Monitoring (Turbidity) - Contracts 2 and 3
WM4
WM4-CA
WM4-CB
Action Level
Limit Level
Turbidity, NTU
200.0
160.0
120.0
80.0
40.0
0.0
Date
01-Jan-19
08-Jan-19
15-Jan-19
22-Jan-19
29-Jan-19
05-Feb-19
12-Feb-19
19-Feb-19
26-Feb-19
05-Mar-19
12-Mar-19
19-Mar-19
26-Mar-19
02-Apr-19
09-Apr-19
16-Apr-19
23-Apr-19
30-Apr-19

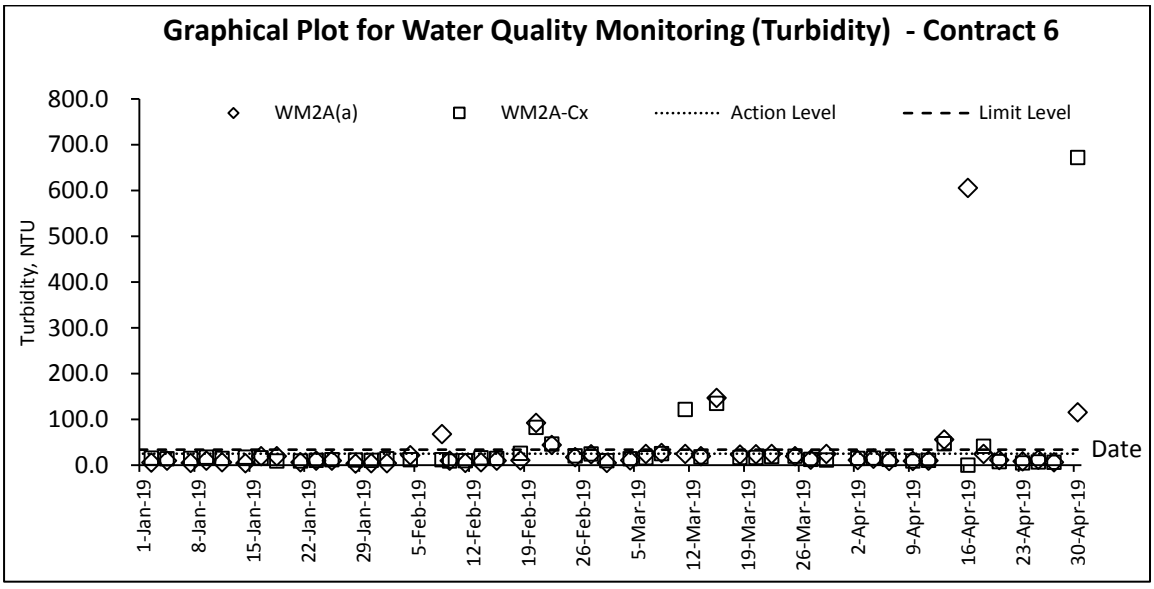

Graphical Plot for Water Quality Monitoring (Suspended Solids) - Contracts 2 & 3
WM4
WM4-CA
WM4-CB
Action Level
Limit Level
SS, mg/L
100
80
60
40
20
0
Date
01-Jan-19
08-Jan-19
15-Jan-19
22-Jan-19
29-Jan-19
05-Feb-19
12-Feb-19
19-Feb-19
26-Feb-19
05-Mar-19
12-Mar-19
19-Mar-19
26-Mar-19
02-Apr-19
09-Apr-19
16-Apr-19
23-Apr-19
30-Apr-19

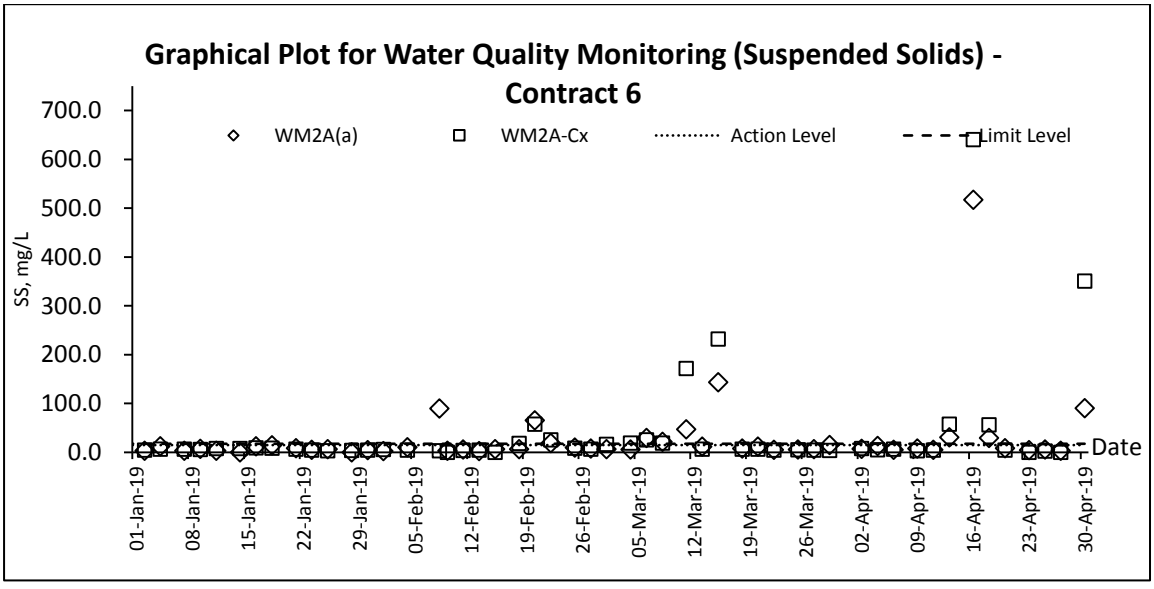

Graphical Plot for Water Quality Monitoring (Dissolved Oxygen) - Contracts 2 and 6
WM3x
WM3-C
Action Level
Limit Level
20.0
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
Date
01-Jan-19
08-Jan-19
15-Jan-19
22-Jan-19
29-Jan-19
05-Feb-19
12-Feb-19
19-Feb-19
26-Feb-19
05-Mar-19
12-Mar-19
19-Mar-19
26-Mar-19
02-Apr-19
09-Apr-19
16-Apr-19
23-Apr-19
30-Apr-19


Graphical Plot for Water Quality Monitoring (Turbidity) - Contracts 2 and 6
WM3x
WM3-C
Action Level
Limit Level
Turbidity, NTU
700.0
600.0
500.0
400.0
300.0
200.0
100.0
0.0
Date
01-Jan-19
08-Jan-19
15-Jan-19
22-Jan-19
29-Jan-19
05-Feb-19
12-Feb-19
19-Feb-19
26-Feb-19
05-Mar-19
12-Mar-19
19-Mar-19
26-Mar-19
02-Apr-19
09-Apr-19
16-Apr-19
23-Apr-19
30-Apr-19


Graphical Plot for Water Quality Monitoring (Suspended Solids) - Contracts 2 and 6
WM3x
WM3-C
Action Level
Limit Level
SS, mg/L
500.0
400.0
300.0
200.0
100.0
0.0
Date
01-Jan-19
08-Jan-19
15-Jan-19
22-Jan-19
29-Jan-19
05-Feb-19
12-Feb-19
19-Feb-19
26-Feb-19
05-Mar-19
12-Mar-19
19-Mar-19
26-Mar-19
02-Apr-19
09-Apr-19
16-Apr-19
23-Apr-19
30-Apr-19


Graphical Plot for Water Quality Monitoring (Dissolved Oxygen) - Contract 6
WM2A(a)
WM2A-Cx
Action Level
Limit Level
20.0
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
Date
01-Jan-19
08-Jan-19
15-Jan-19
22-Jan-19
29-Jan-19
05-Feb-19
12-Feb-19
19-Feb-19
26-Feb-19
05-Mar-19
12-Mar-19
19-Mar-19
26-Mar-19
02-Apr-19
09-Apr-19
16-Apr-19
23-Apr-19
30-Apr-19


Graphical Plot for Water Quality Monitoring (Turbidity) - Contract 6
WM2A(a)
WM2A-Cx
Action Level
Limit Level
Turbidity, NTU
800.0
700.0
600.0
500.0
400.0
300.0
200.0
100.0
0.0
Date
1-Jan-19
8-Jan-19
15-Jan-19
22-Jan-19
29-Jan-19
5-Feb-19
12-Feb-19
19-Feb-19
26-Feb-19
5-Mar-19
12-Mar-19
19-Mar-19
26-Mar-19
2-Apr-19
9-Apr-19
16-Apr-19
23-Apr-19
30-Apr-19


Graphical Plot for Water Quality Monitoring (Suspended Solids) - Contract 6
WM2A(a)
WM2A-Cx
Action Level
Limit Level
SS, mg/L
700.0
600.0
500.0
400.0
300.0
200.0
100.0
0.0
Date
01-Jan-19
08-Jan-19
15-Jan-19
22-Jan-19
29-Jan-19
05-Feb-19
12-Feb-19
19-Feb-19
26-Feb-19
05-Mar-19
12-Mar-19
19-Mar-19
26-Mar-19
02-Apr-19
09-Apr-19
16-Apr-19
23-Apr-19
30-Apr-19

# 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-Apr-19 | Mon | Cloudy with one or two rain patches. Fresh easterly winds, | Trace | 21 | 11 | 75 | E |
| 2-Apr-19 | Tue | Warm with sunny periods. Mainly cloudy tonight. | Trace | 22 | 9.9 | 67.5 | E/SE |
| 3-Apr-19 | Wed | Mainly cloudy. Sunny intervals and a few showers | Trace | 23.9 | 9.2 | 73 | E |
| 4-Apr-19 | Thu | Mainly cloudy. A few showers overnight. Sunny periods | Trace | 22.7 | 13.2 | 75.5 | E |
| 5-Apr-19 | Fri | Mainly cloudy tonight. Light to moderate southerly winds. | 0 | 24.5 | 5.5 | 72.7 | W/SW |
| 6-Apr-19 | Sat | Mainly fine. Hot in the afternoon. Moderate southerly winds. | 0 | 24.7 | 6.4 | 74.2 | W/SW |
| 7-Apr-19 | Sun | Hot with sunny periods. A few showers later. | 0 | 25.1 | 5.9 | 75.7 | W/SW |
| 8-Apr-19 | Mon | Hot with sunny periods in the afternoon. Mainly cloudy tonight. | 0 | 26.4 | 6.4 | 73.5 | S/SW |
| 9-Apr-19 | Tue | Mainly fine. Hot in the afternoon. Moderate southerly winds. | 0 | 26.9 | 8.2 | 70.5 | S/SW |
| 10-Apr-19 | Wed | Hot with sunny periods. A few showers later. | 0 | 27.3 | 5.8 | 75.5 | W/SW |
| 11-Apr-19 | Thu | Warm with sunny periods. Mainly cloudy tonight. | 0.7 | 26.1 | 6.6 | 77.5 | S/SW |
| 12-Apr-19 | Fri | Mainly cloudy. Sunny intervals and a few showers | 6.1 | 21.2 | 8.3 | 91.5 | E/SE |
| 13-Apr-19 | Sat | Mainly cloudy. A few showers overnight. Sunny periods | 3.8 | 21.5 | 7.5 | 87.2 | E/SE |
| 14-Apr-19 | Sun | Hot with sunny periods in the afternoon. Mainly cloudy tonight. | 10.4 | 24.3 | 7.8 | 83.7 | E/SE |
| 15-Apr-19 | Mon | Mainly fine. Hot in the afternoon. Moderate southerly winds. | 1.1 | 23.1 | 8.5 | 76.5 | E/SE |
| 16-Apr-19 | Tue | Hot with sunny periods. A few showers later. | 9.2 | 21.1 | 10.6 | 83.5 | E/SE |
| 17-Apr-19 | Wed | Warm with sunny periods. Mainly cloudy tonight. | 0 | 23.4 | 5.6 | 79 | E/SE |
| 18-Apr-19 | Thu | Warm with sunny periods. Mainly cloudy tonight. | 6.7 | 23.6 | 9.6 | 84.5 | E |
| 19-Apr-19 | Fri | Mainly cloudy. Sunny intervals and a few showers | 75.8 | 24.1 | 18.5 | 84 | E/SE |
| 20-Apr-19 | Sat | Mainly cloudy. A few showers overnight. Sunny periods | 43.6 | 23.4 | 15 | 79 | E/SE |
| 21-Apr-19 | Sun | Mainly cloudy tonight. Light to moderate southerly winds. | 0.3 | 26.1 | 11.5 | 79.5 | S/SW |
| 22-Apr-19 | Mon | Mainly cloudy. A few showers overnight. Sunny periods | 0 | 27.8 | 8.7 | 74.5 | S/SW |
| 23-Apr-19 | Tue | Mainly cloudy. A few showers overnight. Sunny periods | 0 | 27.5 | 6.5 | 77 | S/SW |
| 24-Apr-19 | Wed | Moderate southerly winds, strengthening from the east tonight. | 0 | 27.4 | 6.5 | 75.5 | S/SW |
| 25-Apr-19 | Thu | There will also be a few squally thunderstorms. | 0 | 27.6 | 9 | 76.5 | SW |
| 26-Apr-19 | Fri | Mainly cloudy with occasional showers. | 0.9 | 28.3 | 6.8 | 71.2 | E |
| 27-Apr-19 | Sat | Cloudy with showers. | 16.6 | 24.8 | 14.2 | 81.7 | E |
| 28-Apr-19 | Sun | Showers will be heavier at times with squally thunderstorms. | 3.1 | 26.1 | 11.3 | 80 | E |
| 29-Apr-19 | Mon | Moderate southerly winds, becoming northeasterlies tonight. | 0 | 27 | 7.8 | 80 | E |
| 30-Apr-19 | Tue | Mainly cloudy with occasional showers. | 7.5 | 26.5 | 8.2 | 78.2 | W/SW |

# Appendix L

# Waste Flow Table

香寶嘉 Dragages HongKong
A member of the Bouygues Construction group

**Contract No. CV/2012/08**
**Liantang/ Heung Yuen Wai Boundary Control Point Site Formation and Infrastructure Works – Contract 2**

**Name of Department :** CEDD **Contract No./ Work Order No. :** CV/2012/08

# Appendix I - Monthly Summary Waste Flow Table for 2019

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

| Month | Actual Quantities of Inert C&D Materials Generated / Imported (in '000 m3) | | | | | | Actual Quantities of Other C&D Materials / Wastes Generated | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total Quantities Generated | Broken Concrete (including rock for recycling into aggregates) | Reused in the Contract | Reused in Other Projects | Disposed as Public Fill | Imported C&D Material | Metal | Paper/ Cardboard Packaging | Plastic (Recycled) | Chemical Waste | General Refuse (in '000 m3) |
| | [a+b+c+d] | (a) | (b) | (c) | (d) | | (in '000kg) | (in '000kg) | (in kg) | (in '000kg) | (in '000m3) |
| January | 8.1000 | 0.0000 | 0.0000 | 1.5360 | 6.5640 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 9.4000 | 0.3000 |
| February | 1.5710 | 0.0000 | 0.0000 | 0.2000 | 1.3710 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.1060 |
| March | 3.4900 | 0.0000 | 0.0000 | 0.0000 | 3.4900 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.1900 |
| April | 1.4100 | 0.0000 | 0.0000 | 0.0000 | 1.4100 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.1240 |
| May | 0.0000 | | | | | | | | | | |
| June | 0.0000 | | | | | | | | | | |
| Half-year total | 14.5710 | 0.0000 | 0.0000 | 1.7360 | 12.8350 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 9.4000 | 0.7200 |
| July | 0.0000 | | | | | | | | | | |
| August | 0.0000 | | | | | | | | | | |
| September | 0.0000 | | | | | | | | | | |
| October | 0.0000 | | | | | | | | | | |
| November | 0.0000 | | | | | | | | | | |
| December | 0.0000 | | | | | | | | | | |
| Yearly Total | 14.5710 | 0.0000 | 0.0000 | 1.7360 | 12.8350 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 9.4000 | 0.7200 |

| Year | Actual Quantities of Inert C&D Materials Generated / Imported (in '000 m3) | | | | | | Actual Quantities of Other C&D Materials / Wastes Generated | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total Quantities Generated | Broken Concrete (including rock for recycling into aggregates) | Reused in the Contract | Reused in Other Projects | Disposed as Public Fill | Imported C&D Material | Metal | Paper/ Cardboard Packaging | Plastic (Recycled) | Chemical Waste | General Refuse (in '000 m3) |
| | [a+b+c+d] | (a) | (b) | (c) | (d) | | (in '000kg) | (in '000kg) | (in kg) | (in '000kg) | (in '000m3) |
| 2013 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 220.6270 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 2014 | 425.4406 | 0.0000 | 2.7362 | 376.3945 | 46.3099 | 5.6245 | 3.2100 | 0.4390 | 0.0070 | 10.8800 | 2.2609 |
| 2015 | 570.9459 | 0.0000 | 20.8159 | 543.2162 | 6.9138 | 4.5492 | 37.6310 | 3.9220 | 11.9700 | 16.1920 | 1.1696 |
| 2016 | 905.0989 | 0.0000 | 7.4372 | 427.7834 | 469.8783 | 24.8350 | 430.5200 | 3.8500 | 18.7262 | 34.2936 | 1.9720 |
| 2017 | 741.9482 | 0.0000 | 8.0385 | 175.6792 | 558.2305 | 78.3865 | 1681.8000 | 4.0700 | 30.5175 | 48.7906 | 5.9610 |
| 2018 | 268.1000 | 0.0000 | 0.0000 | 31.3490 | 236.7584 | 13.0110 | 326.0200 | 3.0570 | 27.0700 | 100.8100 | 7.1200 |
| 2019 | 14.5710 | 0.0000 | 0.0000 | 1.7360 | 12.8350 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 9.4000 | 0.7200 |
| Total | 2926.1046 | 0.0000 | 39.0278 | 1556.1584 | 1330.9259 | 126.4062 | 2699.8080 | 15.3380 | 88.2907 | 220.3662 | 19.2035 |

Remark:

1) Density of C&D material to be 2.2 metric ton/m3
2) Density of General Refuse to be 1.6 metric ton/m3
3) Density of Spent Oil to be 0.88 metric ton/m3

(All quantities rounded off to 3 decimal places)

Name of Department: CEDD

Contract No.: CV/2012/09

# Monthly Summary Waste Flow Table for 2019 (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 '000$m^3$) | (in '000$m^3$) | (in '000$m^3$) | (in '000$m^3$) | (in '000$m^3$) | (in '000$m^3$) | (in '000$m^3$) | (in '000$m^3$) | (in '000$m^3$) | (in $m^3$) | (in '000$m^3$) |
| **Jan** | 2.937 | 0.927 | 0.000 | 0.000 | 2.010 | 0.997 | 0.000 | 0.000 | 0.000 | 0.000 | 0.145 |
| **Feb** | 4.659 | 0.841 | 0.000 | 0.000 | 3.818 | 0.030 | 0.000 | 0.000 | 0.000 | 0.000 | 0.075 |
| **Mar** | 5.146 | 0.376 | 0.000 | 0.000 | 4.770 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.075 |
| **Apr** | 0.787 | 0.138 | 0.006 | 0.000 | 0.644 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.145 |
| **May** | | | | | | | | | | | |
| **Jun** | | | | | | | | | | | |
| **Sub-total** | 13.529 | 2.282 | 0.006 | 0.000 | 11.242 | 1.027 | 0.000 | 0.000 | 0.000 | 0.000 | 0.440 |
| **Jul** | | | | | | | | | | | |
| **Aug** | | | | | | | | | | | |
| **Sep** | | | | | | | | | | | |
| **Oct** | | | | | | | | | | | |
| **Nov** | | | | | | | | | | | |
| **Dec** | | | | | | | | | | | |
| **Total** | 13.529 | 2.282 | 0.006 | 0.000 | 11.242 | 1.027 | 0.000 | 0.000 | 0.000 | 0.000 | 0.440 |

**Note:**

1. Assume the density of soil fill is 2 ton/$m^3$.
2. Assume the density of rock and broken concrete is 2.5 ton/$m^3$.
3. Assume each truck of C&D wastes is 5$m^3$.
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/$m^3$.
8. Assume the density of plastic is 941 kg/$m^3$.
9. Assume the density of paper is 800 kg/$m^3$.

| 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 '000$m^3$)** | **(in '000$m^3$)** | **(in '000$m^3$)** | **(in '000$m^3$)** | **(in '000$m^3$)** | **(in '000$m^3$)** | **(in '000$m^3$)** | **(in '000$m^3$)** | **(in '000$m^3$)** | **(in '000$m^3$)** | **(in '000$m^3$)** |
| 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 $m^3$.

**SUMMARY TABLE FOR WORK PROCESSES OR ACTIVITIES REQUIRING TIMBER FOR TEMPORARY WORKS**

Contract No.: CV/2012/09

Contract Title: Liantang /Heung Yuen Wai Boundary Control Point Site Formation and Infrastructure Works - Contract 3

| Item No. | Description of Works Process or Activity [see note (a) below] | Justifications for Using Timber in Temporary Construction Works | Est. Quantities of Timber Used ($m^3$) | Actual Quantities Used ($m^3$) | Remarks |
|---|---|---|---|---|---|
| 1 | Formwork for Construction of Noise Barrier | Easy handling by manpower | 38.00 | 38.00 | |
| 3 | Formwork for Construction of Road Works | Easy handling by manpower | 200.00 | 200.00 | |
| 4 | Formwork for Construction of Drainage | Easy handling by manpower | 117.00 | 117.00 | |
| 5 | Formwork for Construction of Steel Ramp | Easy handling by manpower | 34.00 | 34.00 | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | Total Estimated Quantity of Timber Used | 389.00 | | |

Notes:

(a) The Contractor shall list out all the work items requiring timber for use in temporary construction works. Several minor work items may be grouped into one for ease of updating.

(b) The summary table shall be submitted to the Engineer's Representative monthly together with the Waste Flow Table for review and monitoring in accordance with the PS Clause 25.24(11)..

Appendix A

Name of Department: CEDD

Contract No.: NE/2014/02

## Monthly Summary Waste Flow Table for 2016- 2019

| 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 '000$m^3$) | (in '000$m^3$) | (in '000$m^3$) | (in '000$m^3$) | (in '000$m^3$) | (in '000$m^3$) | (in '000 kg) | (in '000kg) | (in '000kg) | (in '000kg) | (in '000$m^3$) |
| 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 |
| 2018 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.250 | 0.049 | 0.000 | 0.000 | 0.030 |
| Jan-19 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Feb-19 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Mar-19 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.035 | 0.000 | 0.000 |
| Apr-19 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.035 | 0.000 | 0.000 |
| May-19 | | | | | | | | | | | |
| Jun-19 | | | | | | | | | | | |
| Jul-19 | | | | | | | | | | | |
| Aug-19 | | | | | | | | | | | |
| Sep-19 | | | | | | | | | | | |
| Oct-19 | | | | | | | | | | | |
| Nov-19 | | | | | | | | | | | |
| Dec-19 | | | | | | | | | | | |
| Total | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.250 | 0.049 | 0.069 | 0.000 | 0.030 |

| 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 '000$m^3$) | (in '000$m^3$) | (in '000$m^3$) | (in '000$m^3$) | (in '000$m^3$) | (in '000$m^3$) | (in '000 kg) | (in '000kg) | (in '000kg) | (in '000kg) | (in '000$m^3$) |
| 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 6m3 capacity per dump truck

# Monthly Summary Waste Flow Table for 2019 (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 '000$m^3$) | (in '000$m^3$) | (in '000$m^3$) | (in '000$m^3$) | (in '000$m^3$) | (in '000$m^3$) | (in '000 kg) | (in '000kg) | (in '000kg) | (in '000kg) | (in '000 $m^3$) |
| Jan | 25.725 | 0 | 0 | 0.385 | 16.126 | 9.214 | 0 | 0.233 | 0 | 0 | 0.521 |
| Feb | 17.959 | 0 | 0 | 0.280 | 11.168 | 6.511 | 0 | 0 | 0 | 0 | 0.278 |
| Mar | 11.076 | 0 | 0 | 0.842 | 10.234 | 0 | 0 | 0.339 | 0 | 0 | 0.580 |
| Apr | 7.285 | 0 | 0 | 0.689 | 6.596 | 0 | 0 | 0.463 | 0 | 0 | 0.389 |
| May | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Jun | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sub-total | 62.045 | 0.000 | 0.000 | 2.196 | 44.124 | 15.725 | 0.000 | 1.035 | 0.000 | 0.000 | 1.768 |
| Jul | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Aug | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sep | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Oct | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Nov | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Dec | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 1098.654 | 0.000 | 166.627 | 285.949 | 630.355 | 111.037 | 0.000 | 12.176 | 0.007 | 34.045 | 20.618 |

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.

**Appendix I**

# MONTHLY SUMMARY WASTE FLOW TABLE

**Name of Department:** CEDD

**Contract Title:** Liantang/ Heung Yuen Wai Boundary Control Point Site Formation and Infrastructure Works – Contract 7

**Contract No.:** NE/2014/03

## Monthly Summary Waste Flow Table for 2019 (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 '000$m^3$) | (in '000m3) | (in '000m3) | (in '000m3) | (in '000m3) | (in '000m3) | (in '000kg) | (in '000kg) | (in '000kg) | (in '000kg) | (in '000m3) |
| Jan | 1.919 | 0.95 | 0 | 0 | 1.919 | 0 | 6.7 | 0.1 | 0.001 | 0 | 0.1 |
| Feb | 2.035 | 1.386 | 0 | 1.386 | 0.649 | 0 | 1.2 | 0.1 | 0.001 | 0 | 0.1 |
| Mar | 0.591 | 0.282 | 0 | 0.282 | 0.309 | 0 | 4.7 | 0.1 | 0.001 | 0 | 0.1 |
| Apr | 0.355 | 0.169 | 0 | 0.169 | 0.186 | 0 | 2.8 | 0.1 | 0.001 | 0 | 0.1 |
| May | | | | | | | | | | | |
| June | | | | | | | | | | | |
| Sub-total | 4.900 | 2.787 | 0 | 1.837 | 3.063 | 0 | 15.4 | 0.4 | 0.004 | 0 | 0.4 |
| July | | | | | | | | | | | |
| Aug | | | | | | | | | | | |
| Sept | | | | | | | | | | | |
| Oct | | | | | | | | | | | |
| Nov | | | | | | | | | | | |
| Dec | | | | | | | | | | | |
| Total | 4.900 | 2.787 | 0 | 1.837 | 3.063 | 0 | 15.4 | 0.4 | 0.004 | 0 | 0.400 |

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.

| Architectural Services Department | Form No. D/OI.03/09.002 |
|---|---|

**Contract No. / Works Order No.: -** SSC505

# Monthly Summary Waste Flow Table for 2019 [year] [to be submitted not later than the 15th 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 '000$m^3$) | (in '000$m^3$) | (in '000$m^3$) | (in '000$m^3$) | (in '000$m^3$) |
| Jan | 4.815 | 1.963 | 0.160 | 0.000 | 2.691 |
| Feb | 4.609 | 0.598 | 0.150 | 0.000 | 3.861 |
| Mar | 4.233 | 0.300 | 0.026 | 0.000 | 3.907 |
| Apr | 2.852 | 0.141 | 0.013 | 0.000 | 2.698 |
| May | | | | | |
| Jun | | | | | |
| Sub-total | 16.508 | 3.003 | 0.349 | 0.000 | 13.156 |
| Jul | | | | | |
| Aug | | | | | |
| Sep | | | | | |
| Oct | | | | | |
| Nov | | | | | |
| Dec | | | | | |
| Total | 16.508 | 3.003 | 0.349 | 0.000 | 13.156 |

| 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 '000$m^3$) |
| | generated | recycled | generated | recycled | generated | recycled | generated | recycled | generated | recycled | generated | recycled | generated |
| Jan | 0.000 | 0.000 | 238.550 | 238.550 | 0.290 | 0.290 | 0.950 | 0.950 | 0.000 | 0.000 | 0.000 | 0.000 | 1.417 |
| Feb | 1.510 | 1.510 | 0.000 | 0.000 | 0.410 | 0.410 | 2.660 | 2.660 | 0.000 | 0.000 | 0.000 | 0.000 | 1.157 |
| Mar | 1.900 | 1.900 | 337.420 | 337.420 | 0.360 | 0.360 | 1.330 | 1.330 | 0.000 | 0.000 | 0.000 | 0.000 | 1.586 |
| Apr | 0.560 | 0.560 | 116.170 | 116.170 | 0.610 | 0.610 | 3.330 | 3.330 | 0.000 | 0.000 | 0.000 | 0.000 | 1.190 |
| May | | | | | | | | | | | | | |
| Jun | | | | | | | | | | | | | |
| Sub-total | 3.970 | 3.970 | 692.140 | 692.140 | 1.670 | 1.670 | 8.270 | 8.270 | 0.000 | 0.000 | 0.000 | 0.000 | 5.350 |
| Jul | | | | | | | | | | | | | |
| Aug | | | | | | | | | | | | | |
| Sep | | | | | | | | | | | | | |
| Oct | | | | | | | | | | | | | |
| Nov | | | | | | | | | | | | | |
| Dec | | | | | | | | | | | | | |
| Total | 3.970 | 3.970 | 692.140 | 692.140 | 1.670 | 1.670 | 8.270 | 8.270 | 0.000 | 0.000 | 0.000 | 0.000 | 5.350 |

| 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 | | | | | |
|---|---|---|---|---|---|
| 0.56 tons of timber were sent to HK Biomass(Wood) Collect and Recycle Company | 282.82 tons of broken concrete were sent to Tailor Recycled Aggregates Ltd. for recycling. | 610 kg of paper were sent to Lau Choi Kee Papers Co. Ltd. for recycling. | 3,330 kg of plastic barrier were sent 3R HK International Eco-action Ltd | 116.17 ton of scrap metal were sent to Hop Hing Metal ltd. & Fung Sun Metal Ltd. for recycling. | |

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 $m^3$ by volume.

| Forecast of Total Quantities of C&D Materials to be Generated from the Contract | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Quantity Generated | Broken Concrete | Reused in the Contract | Reused in other Projects | Disposed of as Public Fill | Imported Fill | Metals | Paper/cardboard packaging | Plastics | Chemical Waste | General refuse |
| (in '000$m^3$) | (in '000$m^3$) | (in '000$m^3$) | (in '000$m^3$) | (in '000$m^3$) | (in '000$m^3$) | (in '000 kg) | (in '000 kg) | (in '000 kg) | (in '000 kg) | (in '000 $m^3$) |
| 297.838 | 14.592 | 49.261 | 0.000 | 174.412 | 60.360 | 19,400.851 | 18.526 | 19.343 | 5.000 | 39.012 |

# 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? |
|---|---|---|---|---|---|---|---|
| **Air Quality Impact (Construction)** | | | | | | | |
| 3.6.1.1 | 2.1 | **General Dust Control Measures**<br>The following dust suppression measures should be implemented:<br>■ 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<br>■ 80% of stockpile areas should be covered by impervious sheets<br>■ Speed of trucks within the site should be controlled to about 10 km/hr<br>■ All haul roads within the site should be paved to avoid dust emission due to vehicular movement | 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 | **Best Practice for Dust Control**<br>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:<br>*Good site management*<br>■ The Contractor should maintain high standard of housekeeping to prevent emission of fugitive dust.<br>■ 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.<br>■ Any piles of materials accumulated on or around the work areas should be cleaned up regularly.<br>■ 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.<br>■ The material should be handled properly to prevent fugitive dust emission before cleaning.<br>*Disturbed Parts of the Roads*<br>■ Each and every main temporary access should be paved with | 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? |
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| | | concrete, bituminous hardcore materials or metal plates and kept clear of dusty materials; or<br>■ Unpaved parts of the road should be sprayed with water or a dust suppression chemical so as to keep the entire road surface wet.<br>*Exposed Earth*<br>■ Exposed earth should be properly treated by compaction, hydroseeding, vegetation planting or seating 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.<br>*Loading, Unloading or Transfer of Dusty Materials*<br>■ All dusty materials should be sprayed with water immediately prior to any loading or transfer operation so as to keep the dusty material wet.<br>*Debris Handling*<br>■ Any debris should be covered entirely by impervious sheeting or stored in a debris collection area sheltered on the top and the three sides.<br>■ Before debris is dumped into a chute, water should be sprayed so that it remains wet when it is dumped.<br>*Transport of Dusty Materials*<br>■ 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.<br>*Wheel washing*<br>■ 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.<br>*Use of vehicles*<br>■ Immediately before leaving the construction site, every vehicle should be washed to remove any dusty materials from its body and wheels.<br>■ 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. | | | | |

| 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? |
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| | | *Site hoarding*<br>■ 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.<br>*Blasting*<br>■ The areas within 30m from the blasting area should be wetted with water prior to blasting. | | | | | |
| **Air Quality Impact (Operation)** | | | | | | | |
| 3.5.2.2 | 2.2 | The following odour containment and control measures will be provided for the proposed sewage treatment work at the BCP site:<br>■ 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.<br>■ Further odour containment will be achieved by covering or confining the sewage channels, sewage tanks, and equipment with potential odour emission.<br>■ Proper mixing will be provided at the equalization and sludge holding tanks to prevent sewage septicity.<br>■ 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. | To minimize potential odour impact from operation of the proposed sewage treatment work at BCP | DSD | BCP | Operation Phase | EIA recommendation |
| **Noise Impact (Construction)** | | | | | | | |
| 4.4.1.4 | 3.1 | **Adoption of Quieter PME**<br>Use of the recommended quieter PME such as those given in the BS5228: Part 1:2009 and presented in **Table 4.14**, which can be found in Hong Kong. | 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? |
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| 4.4.1.4 | 3.1 | **Use of Movable Noise Barrier**<br>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/$m^2$ is recommended to achieve the predicted screening effect. | 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 | **Use of Noise Enclosure/ Acoustic Shed**<br>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. | 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 | **Use of Noise Insulating Fabric**<br>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. | 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? |
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| 4.4.1.4 | 3.1 | **Good Site Practice**<br>The good site practices listed below should be followed during each phase of construction:<br>• Only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction programme;<br>• Silencers or mufflers on construction equipment should be utilized and should be properly maintained during the construction programme;<br>• Mobile plant, if any, should be sited as far from NSRs as possible;<br>• 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;<br>• 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<br>• Material stockpiles and other structures should be effectively utilized, wherever practicable, in screening noise from on-site construction activities. | To minimize the construction air-borne noise impact | Contractors | Construction Work Sites | During Construction | EIA recommendation, EIAO and NCO |
| **Noise Impact (Operation)** | | | | | | | |
| | | Road Traffic Noise | | | | | |
| 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 |
| | | Fixed Plant Noise | | | | | |
| 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? |
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| 4.5.2.4 | 3.2 | The following noise reduction measures shall be considered as far as practicable during operation:<br>• Choose quieter plant such as those which have been effectively silenced;<br>• Include noise levels specification when ordering new plant (including chillier and E/M equipment);<br>• Locate fixed plant/louver away from any NSRs as far as practicable;<br>• Locate fixed plant in walled plant rooms or in specially designed enclosures;<br>• Locate noisy machines in a basement or a completely separate building;<br>• Install direct noise mitigation measures including silencers, acoustic louvers and acoustic enclosure where necessary; and<br>• 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. | 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 |
| **Water Quality Impact (Construction)** | | | | | | | |
| 5.6.1.1 | 4.1 | **Construction site runoff and drainage**<br>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:<br>▪ 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.<br>▪ The dikes or embankments for flood protection should be implemented around the boundaries of earthwork areas. | 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? |
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| | | 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.<br>▪ 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.<br>▪ 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.<br>▪ 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.<br>▪ 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.<br>▪ The overall slope of the site should be kept to a minimum to reduce | | | | | |

| 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? |
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| | | the erosive potential of surface water flows.<br>▪ 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.<br>▪ 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.<br>▪ 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.<br>▪ 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.<br>▪ 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. | | | | | |
| 5.6.1.1 | 4.1 | **Good site practices for works within water gathering grounds**<br>The following conditions should be complied, if there is any works to be carried out within the water gathering grounds: | 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? |
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| | | ▪ Adequate measures should be implemented to ensure no pollution or siltation occurs to the catchwaters and catchments.<br>▪ 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.<br>▪ All surplus spoil should be removed from water gathering grounds as soon as possible.<br>▪ Temporary drains with silt traps should be constructed at the site boundary before the commencement of any earthworks.<br>▪ Regular cleaning of silt traps should be carried out to ensure proper operation at all time.<br>▪ All excavated or filled surfaces which have the risk of erosion should always be protected form erosion.<br>▪ Facilities for washing the wheels of vehicles before leaving the site should be provided.<br>▪ Any construction plant which causes pollution to catchwaters or catchments due to the leakage of oil or fuel should be removed off site immediately.<br>▪ 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.<br>▪ 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.<br>▪ 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.<br>▪ Drainage plans should be submitted for approval by the Director of | | | 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? |
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| | | Water Supplies.<br>▪ An unimpeded access through the waterworks access road should always be maintained.<br>▪ Earthworks near catchwaters or streamcourses should only be carried out in dry season between October and March,<br>▪ Advance notice must be given before the commencement of works on site quoting WSD's approval letter reference. | | | | | |
| 5.6.1.2 | 4.1 | **Good site practices of general construction activities**<br>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.<br>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. | To minimize water quality impacts | Contractor | All construction works sites | Construction phase | EIA Recommendation |
| 5.6.1.3 | 4.1 | **Sewage effluent from construction workforce**<br>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. | 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 | **Hydrogeological Impact**<br>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. | To minimize water quality impacts | Contractor | Construction works sites of the drill and blast tunnel | Construction phase | EIA Recommendation and WPCO |
| **Water Quality Impact (Operation)** | | | | | | | |
| | | 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? |
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| **Sewage and Sewerage Treatment Impact (Construction)** | | | | | | | |
| 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 |
| **Sewage and Sewerage Treatment Impact (Operation)** | | | | | | | |
| 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 |
| **Waste Management Implication (Construction)** | | | | | | | |
| 7.6.1.1 | 6 | **Good Site Practices**<br>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:<br>▪ 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<br>▪ Training of site personnel in proper waste management and chemical handling procedures<br>▪ Provision of sufficient waste disposal points and regular collection of waste<br>▪ 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<br>▪ General refuse shall be removed away immediately for disposal. As | 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? |
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| | | such odour is not anticipated to be an issue to distant sensitive receivers<br>▪ Provision of wheel washing facilities before the trucks leaving the works area so as to minimise dust introduction from public road<br>▪ Covers and water spraying system should be provided for the stockpiled C&D material to prevent dust impact or being washed away<br>▪ Designate different locations for storage of C&D material to enhance reuse<br>▪ Well planned programme for transportation of C&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&D material is not anticipated<br>▪ 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<br>▪ Provision of cover for the stockpile material, sand bag or earth bund as barrier to prevent material from washing away and entering the drains | | | | | |
| 7.6.1.2 | 6 | **Waste Reduction Measures**<br>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:<br>▪ 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<br>▪ 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<br>▪ Proper storage and site practices to minimise the potential for damage or contamination of construction materials<br>▪ Plan and stock construction materials carefully to minimise amount | 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? |
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| | | of waste generated and avoid unnecessary generation of waste<br>▪ 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. | | | | | |
| 7.6.1.3 | 6 | **C&D Materials**<br>In order to minimise impacts resulting from collection and transportation of C&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&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&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:<br>▪ A Waste Management Plan should be prepared and implemented in accordance with ETWB TC(W) No. 19/2005 Environmental Management on Construction Site; and<br>▪ In order to monitor the disposal of C&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. | 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 | **General refuse**<br>General refuse should be stored in enclosed bins or compaction units separated from other C&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. | 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 | **Chemical waste**<br>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 *Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes*. 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 | 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 (Not Applicable)

# Appendix O

# Investigation Report for Complaint (Not Applicable)