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.80) – MARCH 2020

PREPARED FOR
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT (CEDD)

Date	Reference No.	Prepared By	Certified By
14 April 2020	TCS00694/13/600/R2380v2		
		Nicola Hon (Environmental Consultant)	Tam Tak Wing (Environmental Team Leader)

Version	Date	Remarks
1	8 April 2020	First Submission
2	14 April 2020	Amended against IEC's comment

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15 April 2020

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. 80) – March 2020

With reference to the Monthly EM&A Report No. 80 for March 2020 (Version 2) certified by the ET Leader, please note that we have no adverse comment 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 Julian LING	by email
	Ronald Lu	-	Mr Peter YAM / Mr Justin CHEUNG	by email
	CW	-	Mr Ken LUN	by email
	DHK	-	Mr Alan KAM	by email
	CCKJV	-	Mr Vincent CHAN	by email
	KRSJV	-	Mr Matthew TSANG	by email
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EXECUTIVE SUMMARY

ES01 This is the **80th** monthly EM&A report presenting the monitoring results and inspection findings for the reporting period from **1 to 31 March 2020** (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	135
	24-hour TSP	9	45
Construction Noise	$L_{eq(30min)}$ Daytime	10	40
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 i) General Health condition of planted species ii) Survival of planted species	9 Quadrats and transect	0
	Wetland compensation i) Site inspection	Contract 6	4
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	4

Remark: (*)Water sampling was unable to carry out at WM2B, WM2B-C and WM3-C in the Reporting Period due to shallow water (water depth under 150mm).

ACTION AND LIMIT (A/L) LEVELS EXCEEDANCE

ES04 In the Reporting Period, no exceedance was recorded for construction noise, air quality and 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, one environmental complaint was received regarding night time construction work (at about 2330 – 0300 hrs) and construction dust nuisance related to Contract 6. The investigation report was conducted by ET accordingly and revealed that there were no construction activities under Contract 6 during the concerned period and it is considered that the complaint was no valid to Contract 6.

NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

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

REPORTING CHANGE

ES07 No reporting change was recorded 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, ET and the Contractor on **6, 13, 20 and 27 March 2020** in which IEC joined the site inspection on **20 March 2020**. 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, ET and the Contractor on **5, 13, 19 and 25 March 2020** in which IEC joined the site inspection on **19 March 2020**. 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, ET and the Contractor on **6, 13, 16 and 27 March 2020** in which IEC joined the site inspection on **16 March 2020**. No non-compliance was noted during the site inspection.

ES11 In the Reporting Period, joint site inspection to evaluate the site environmental performance at ***Contract 6*** has been carried out by the RE, ET and the Contractor on **5, 12, 17 and 26 March 2020** in which IEC joined the site inspection on **17 March 2020**. No non-compliance was noted during the site inspection.

ES12 In the Reporting Period, joint site inspection to evaluate the site environmental performance at ***Contract 7*** has been carried out by the RE, ET and the Contractor on **5, 12, 17 and 26 March 2020** in which IEC joined the site inspection on **17 March 2020**. 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 **5, 12, 20 and 26 March 2020**. IEC carried out site inspection on **20 March 2020**. 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.

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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 **80th** monthly EM&A report presenting the monitoring results and inspection findings for reporting period from **1** to **31 March 2020**.

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 Regulation of Shenzhen River Stage 4 (RSR 4)" Project discussing regarding the cumulative impact issues.

The Contractor(s)

2.2.7 There will be one contractor for each individual works contract. Once the contractors are appointed, EPD, ET and IEC will be notified the details of the contractor.

2.2.8 The Contractor for Contracts under CEDD should report to the ER. For ArchSD Contract, the Contractor should report to the Architect or Architect's Representative (AR). The duties and responsibilities of the Contractor are:

- Comply with the relevant contract conditions and specifications on environmental protection
- Employ an Environmental Team (ET) to undertake monitoring, laboratory analysis and reporting of EM &A Facilitate ET's monitoring and site inspection activities
- Participate in the site inspections by the ET and IEC, and undertake any corrective actions
- Provide information / advice to the ET regarding works programme and activities which may contribute to the generation of adverse environmental impacts
- Submit proposals on mitigation measures in case of exceedances of Action and Limit levels in accordance with the Event / Action Plans
- Implement measures to reduce impact where Action and Limit levels are exceeded
- Adhere to the procedures for carrying out complaint investigation

Environmental Team (ET)

2.2.9 Once the ET is appointed, the EPD, CEDD, ER, Architect and IEC will be notified the details of the ET.

2.2.10 The ET shall not be in any way an associated body of the Contractor(s), and shall be employed by the Project Proponent/Contractor to conduct the EM&A programme. The ET should be managed by the ET Leader. The ET Leader shall be a person who has at least 7 years' experience in EM&A and has relevant professional qualifications. Suitably qualified staff should be included in the ET, and resources for the implementation of the EM&A programme should be allocated in time under the Contract(s), to enable fulfillment of the Project's EM&A requirements as specified in the EM&A Manual during construction of the Project. The ET shall report to the Project Proponent and the duties shall include:

- Monitor and audit various environmental parameters as required in this EM&A Manual
- Analyse the environmental monitoring and audit data, review the success of EM&A programme and the adequacy of mitigation measures implemented, confirm the validity of the EIA predictions and identify any adverse environmental impacts arising
- Carry out regular site inspection to investigate and audit the Contractors' site practice, equipment/plant and work methodologies with respect to pollution control and environmental mitigation, and effect proactive action to pre-empt problems
- Monitor compliance with conditions in the EP, environmental protection, pollution prevention and control regulations and contract specifications
- Audit environmental conditions on site
- Report on the environmental monitoring and audit results to EPD, the ER, the Architect, the 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:

- Rectification of identified defects
- Rectification of soft landscape defects
- Maintenance works during the defect liability period

Contract 3 (CV/2012/09)

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

- Road pavement 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:

- OPT & DLP of control room, TCSS & PA
- Cabling, TCSS & FVMS installation

Contract 5 (CV/2013/03)

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

Contract 6 (CV/2013/08)

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

- Water Pipe Connection Work
- Road Construction
- Landscaping
- Construction of Wetland

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:

- General Cleaning
- Defect rectification

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:

- Defect Rectification Works involving primarily:
- Building cladding and curtain walls;
- Building internal fit-out, finishing and signages;
- E&M defect rectifications, testing and commissioning;
- Soft Landscaping and related green area maintenance works

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	Waste Disposal Regulation - Billing Account for Disposal of Construction Waste	Account No. 7019105	8 Jan 2014	Till Contract ends
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
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

Item	Description	License/Permit Status		
		Ref. no.	Effective Date	Expiry Date
5	Construction Noise Permit	GW-RN0058-20	15 Feb 2020	31 May 2020
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-RN0040-20	9 Feb 2020	8 Jun 2020
Contract 7				
1	Air pollution Control (Construction Dust) Regulation	Ref. No: 397015	21 Dec 2015	Till the end of Contract
2	Chemical Waste Producer Registration	Waste Producer No.: 5214-641-K3202-01	24 Mar 2016	Till the end of Contract
3	Water Pollution Control Ordinance - Discharge License	No.: WT00024422-2016	10 May 2016	31 May 2021
4	Waste Disposal Regulation - Billing Account for Disposal of Construction Waste	Account No. 7024129	21 Jan 2016	Till the end of Contract
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 • 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 • 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 • Supplementary information for data auditing, statistical results such as L_{10} and L_{90} shall also be obtained for reference.
Water Quality	**In-situ Measurements** • Dissolved Oxygen Concentration (mg/L); • Dissolved Oxygen Saturation (%); • Turbidity (NTU); • pH unit; • Water depth (m); and • Temperature (℃).
	Laboratory Analysis • 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 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 Contract 7
NM2a#	Village House near Lin Ma Hang Road	Lin Ma Hang to Frontier Closed Area	Contract 6
NM3	Ping Yeung Village House (facade facing northeast)	Ping Yeung to Wo Keng Shan	Contract 6
NM4	Wo Keng Shan Village House	Ping Yeung to Wo Keng Shan	Contract 6
NM5	Village House, Loi Tung	Sha Tau Kok Road	Contract 2, Contract 6
NM6	Tai Tong Wu Village House 2	Sha Tau Kok Road	Contract 2, Contract 6
NM7	Po Kat Tsai Village	Po Kat Tsai	Contract 2
NM8	Village House, Tong Hang	Fanling	Contract 2 Contract 3
NM9	Village House, Kiu Tau Village	Fanling	Contract 3
NM10	Nam Wa Po Village House No. 80	Fanling	Contract 3

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

Table 3-4 Impact Monitoring Stations - Water Quality

Station ID	Description	Coordinates of Designated / Alternative Location		Nature of the location	Related to the Work Contract
		Easting	Northing		
WM1	Downstream of Kong Yiu	833 679	845 421	Alternative location located at upstream 51m of the	SS C505 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 ℃ 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^{o} 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^{o}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 4^0C 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
AM1c	265	143	500	260

Monitoring Station	Action Level (μg /m^3)		Limit Level (μg/m^3)	
	1-hour TSP	24-hour TSP	1-hour TSP	24-hour TSP
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 ***135*** 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
5-Mar-20	26	3-Mar-20	9:32	68	73	80
11-Mar-20	44	9-Mar-20	9:21	57	61	65
17-Mar-20	72	14-Mar-20	9:53	64	68	71
23-Mar-20	49	20-Mar-20	9:42	55	59	63
28-Mar-20	37	26-Mar-20	9:24	51	54	58
Average (Range)	**46 (26 – 72)**	Average (Range)		**63 (51 – 80)**		

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
5-Mar-20	117	3-Mar-20	9:44	104	109	117
11-Mar-20	136	9-Mar-20	9:27	113	119	125
17-Mar-20	131	14-Mar-20	9:42	125	127	131
23-Mar-20	96	20-Mar-20	9:36	112	115	119
28-Mar-20	101	26-Mar-20	9:39	98	102	108
Average (Range)	**116 (96 – 136)**	Average (Range)		**115 (98 – 131)**		

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
5-Mar-20	24	3-Mar-20	13:16	84	95	89
11-Mar-20	71	9-Mar-20	9:32	61	64	71
17-Mar-20	93	14-Mar-20	13:51	87	93	99
23-Mar-20	63	20-Mar-20	9:31	66	69	73
28-Mar-20	67	26-Mar-20	13:37	64	67	70
Average (Range)	**64 (24 – 93)**	Average (Range)		**77 (61 – 99)**		

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
3-Mar-20	54	4-Mar-20	9:20	68	63	72
9-Mar-20	53	10-Mar-20	9:15	71	76	74
14-Mar-20	66	16-Mar-20	9:15	72	72	69
20-Mar-20	73	21-Mar-20	9:09	61	66	59
26-Mar-20	45	27-Mar-20	9:21	78	65	55
Average (Range)	**58 (45 – 73)**	Average (Range)		**68 (55 – 78)**		

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
3-Mar-20	90	4-Mar-20	13:00	66	71	76
9-Mar-20	57	10-Mar-20	9:19	71	64	62
14-Mar-20	88	16-Mar-20	9:18	71	68	65
20-Mar-20	77	21-Mar-20	9:15	73	61	66
26-Mar-20	56	27-Mar-20	9:33	68	57	71
Average (Range)	**74 (56 – 90)**	Average (Range)		**67 (57 – 76)**		

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
3-Mar-20	88	4-Mar-20	10:30	67	74	65
9-Mar-20	71	10-Mar-20	9:34	71	74	69
14-Mar-20	118	16-Mar-20	9:25	67	70	72
20-Mar-20	54	21-Mar-20	9:26	70	66	75
26-Mar-20	92	27-Mar-20	9:45	99	78	83
Average (Range)	**85 (54 – 118)**	Average (Range)		**73 (65 – 99)**		

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
3-Mar-20	47	4-Mar-20	9:38	65	68	64
9-Mar-20	45	10-Mar-20	9:47	60	65	68
14-Mar-20	71	16-Mar-20	9:29	66	68	64
20-Mar-20	63	21-Mar-20	14:02	69	62	75
26-Mar-20	39	27-Mar-20	13:09	86	91	77
Average (Range)	**53 (39 – 71)**	Average (Range)		**70 (60– 91)**		

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
3-Mar-20	39	4-Mar-20	13:13	61	64	59
9-Mar-20	28	10-Mar-20	9:34	53	52	56
14-Mar-20	79	16-Mar-20	9:41	64	66	61
20-Mar-20	55	21-Mar-20	14:10	72	61	69
26-Mar-20	27	27-Mar-20	13:19	83	77	71
Average (Range)	**46 (27 – 79)**	Average (Range)		**65 (52 – 83)**		

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
5-Mar-20	38	3-Mar-20	9:26	77	70	73
11-Mar-20	89	9-Mar-20	9:08	60	56	57
17-Mar-20	90	14-Mar-20	14:21	68	67	62
23-Mar-20	28	20-Mar-20	9:19	68	62	65
28-Mar-20	45	26-Mar-20	14:08	61	63	60
Average (Range)	**58 (28 – 90)**	Average (Range)		**65 (56 – 77)**		

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 **40** 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(*)**
3-Mar-20	56	68	59	62	62
9-Mar-20	55	71	58	63	60
20-Mar-20	55	71	59	60	61
26-Mar-20	51	68	57	61	62
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**
4-Mar-20	58	60	55	56	51
10-Mar-20	59	63	51	59	46
16-Mar-20	59	63	53	59	53
27-Mar-20	60	63	56	59	56
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.

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

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

Date	Dissolved Oxygen (mg/L)			Turbidity (NTU)			Suspended Solids (mg/L)		
	WM4	WM4-CA	WM4-CB	WM4	WM4-CA	WM4-CB	WM4	WM4-CA	WM4-CB
2-Mar-20	5.7	7.2	6.3	4.4	0.8	13.0	6.0	<2	25.5
4-Mar-20	6.0	7.1	7.8	4.0	1.6	10.7	5.5	<2	21.0
6-Mar-20	6.5	6.8	8.0	6.8	1.6	15.6	8.5	2.0	18.5
9-Mar-20	5.5	6.7	6.7	4.3	2.1	11.5	8.0	2.0	19.5
11-Mar-20	5.8	6.8	7.0	2.4	0.9	7.7	4.0	<2	16.5
13-Mar-20	5.7	6.9	8.0	4.1	2.0	8.7	8.0	3.0	12.5
16-Mar-20	6.1	6.5	9.5	2.9	0.8	8.5	5.0	<2	12.5
18-Mar-20	6.6	7.0	6.7	175.0	90.7	208.5	198.0	185.5	434.0
20-Mar-20	5.8	6.4	7.4	3.8	3.4	12.2	5.0	4.0	28.0
23-Mar-20	5.7	6.6	8.1	5.0	1.5	10.0	7.5	<2	15.5
25-Mar-20	5.7	6.6	8.7	6.6	0.8	8.0	10.0	<2	12.5
27-Mar-20	5.8	6.3	8.9	4.3	1.3	8.6	6.0	<2	12.0
30-Mar-20	6.4	7.6	6.9	12.4	2.7	9.3	25.5	3.5	19.0

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

Date	Dissolved Oxygen (mg/L)		Turbidity (NTU)		Suspended Solids (mg/L)	
	WM1	WM1-C	WM1	WM1-C	WM1	WM1-C
2-Mar-20	7.2	3.7	10.8	62.0	15.5	63.0
4-Mar-20	7.3	7.0	18.5	52.8	17.0	93.5
6-Mar-20	8.6	7.5	42.3	57.8	36.0	117.0
9-Mar-20	4.7	7.7	6.4	69.4	4.5	136.0
11-Mar-20	5.4	3.2	60.2	96.0	84.0	119.0
13-Mar-20	5.3	4.0	10.0	23.1	4.5	12.5
16-Mar-20	8.1	3.8	6.1	50.7	2.0	53.5
18-Mar-20	6.6	3.0	3.8	69.4	2.0	73.0
20-Mar-20	6.1	3.7	717.0	Ove range	300.5	476.5
23-Mar-20	5.1	2.1	41.5	210.0	27.5	129.5
25-Mar-20	6.5	5.8	13.9	79.1	9.5	62.5
27-Mar-20	7.2	3.7	40.6	639.0	34.5	618.5
30-Mar-20	6.8	5.8	16.9	105.5	7.0	79.0

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

Date	Dissolved Oxygen (mg/L)	Turbidity (NTU)	Suspended Solids (mg/L)

	WM2 A(a)	WM2 A- Cx	WM2 B	WM2 B- C	WM2A(a)	WM2 A- Cx	WM2 B	WM2 B- C	WM2 A(a)	WM2A - Cx	WM2 B	WM 2B-C
2-Mar-20	4.9	7.4	*	*	7.1	4.7	*	*	7.0	<2	*	*
4-Mar-20	6.4	8.0	*	*	14.5	6.3	*	*	7.5	<2	*	*
6-Mar-20	5.0	8.3	*	*	14.1	2.9	*	*	13.5	<2	*	*
9-Mar-20	5.5	6.8	*	*	8.0	3.9	*	*	12.5	4.0	*	*
11-Mar-20	4.9	7.8	*	*	8.4	4.0	*	*	14.5	3.0	*	*
13-Mar-20	6.2	7.5	*	*	5.9	3.4	*	*	7.5	<2	*	*
16-Mar-20	6.0	7.5	*	*	7.7	4.2	*	*	10.0	2.0	*	*
18-Mar-20	4.5	6.9	*	*	10.4	5.5	*	*	8.5	<2	*	*
20-Mar-20	6.7	6.4	*	*	22.4	25.3	*	*	13.5	12.0	*	*
23-Mar-20	6.3	7.4	*	*	18.4	2.8	*	*	10.0	2.0	*	*
25-Mar-20	4.6	6.3	*	*	20.2	8.8	*	*	10.5	7.5	*	*
27-Mar-20	5.7	6.5	*	*	21.3	6.0	*	*	14.0	3.0	*	*
30-Mar-20	6.6	7.1	*	*	19.8	4.6	*	*	11.5	3.0	*	*

*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-Mar-20	8.2	*	4.2	*	6.5	*
4-Mar-20	8.0	*	2.7	*	<2	*
6-Mar-20	8.6	*	4.5	*	2.5	*
9-Mar-20	7.9	*	5.0	*	4.5	*
11-Mar-20	8.3	*	3.5	*	2.5	*
13-Mar-20	8.2	*	6.2	*	4.5	*
16-Mar-20	8.4	*	5.3	*	11.5	*
18-Mar-20	9.2	*	11.4	*	12.0	*
20-Mar-20	5.4	*	3.1	*	5.5	*
23-Mar-20	4.6	*	5.1	*	7.0	*
25-Mar-20	4.9	*	3.1	*	11.0	*
27-Mar-20	6.0	*	3.1	*	3.0	*
30-Mar-20	6.2	*	4.2	*	5.0	*

*Remarks: * water sampling was unable to carry out at WM3-C due to shallow water (water depth under 150mm)*

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

6.2.3 In this Reporting Period, no exceedance was recorded for water quality monitoring. No corrective measure was therefore required.

7 ECOLOGY MONITORING

7.1 MONITORING ON WOODLAND COMPENSATION

7.1.1 According to the approved Woodland Compensation Plan (WCP), ecological monitoring for woodland compensation shall be conducted at bi-monthly interval for the first year and the monitoring frequency would be reduced to quarterly from the second year.

7.1.2 As Stage 2 of the enhancement planting work was undertaken in August 2019 has covered all of the 9 monitoring quadrats, the monitoring frequency should have increased from quarterly to bi-monthly interval for the first year of enhancement planting.

7.1.3 The bi-monthly ecological monitoring for period of January 2020 to February 2020 had carried out on 17th and 18th February 2020 by transects inspection and quadrat monitoring. The bi-monthly Ecological Monitoring Report was verified by IEC on 19 March 2020 and it has been submitted as a stand-alone copy to supplement the EM&A Report on 19 March 2020.

7.2 MONITORING ON WETLAND COMPENSATION

7.2.1 According to the approved Habitat Creation and Management Plan (HCMP), the proposed Wetland Compensation Area (WCA) near the Ping Yeung Interchange adjacent to the section of Ping Yuen River was adopted. Ecological monitoring at implementation and establishment periods of WCA will be conducted to cover the ecological attributes. Implementation of the wetland will commence within the construction phase after completion of the construction works at Ping Yeung Section. Monitoring on the WCA will be conducted in implementation and establishment stages.

7.2.2 Site inspection for the implementation of WCA was conducted by ET as part of the weekly inspection of Contract 6 on **5, 12, 17 and 26 March 2020.** It was observed that excavation of the water ponds was completed and water proof layering was on-going in the WCA. The forthcoming remaining activities would be landscaping in the WCA. There was no non-compliance observed during the site inspection. The findings / deficiencies observed during site inspection could be referred to ***Table 9-4 Site Observations for Contract 6***.

7.2.3 The photographic record for site inspection of WCA is presented in ***Appendix L.***

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 M***. Whenever possible, materials were reused on-site as far as practicable.

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

Type of Waste	Contract 2		Contract 3		Contract 4		Contract 6		Contract 7		Contract SS C505		Total Qty.
	Qty.	Disposal location	Qty.	Disposal location	Qty.	Disposal location	Qty.	Disposal location	Qty.	Disposal location	Qty.	Disposal location	
C&D Materials (Inert) (in '000m^3)	**2.5938**	--	**0.089**	--	0	--	**7.623**	--	0	--	**0.026**	--	**10.3318**
Reused in this Contract (Inert) (in '000 m^3)	0	--	0	--	0	--	0	--	0	--	0	--	0
Reused in other Contracts/ Projects (Inert) (in '000 m^3)	0	--	0	--	0	--	0	--	0	--	0	--	0
Disposal as Public Fill (Inert) (in '000 m^3)	**2.5938**	**Tuen Mun 38**	**0.089**	**Tuen Mun 38**	0	--	**7.623**	**Tuen Mun 38**	0	--	**0.026**	**Tuen Mun 38**	**10.3318**

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	--	0	--	0	--	0
Recycled Paper / Cardboard Packing ('000kg) #	0	--	0	-	0	-	0	--	0	-	0	--	0
Recycled Plastic ('000kg) #	0	--	0	-	0	-	0	--	0	-	0	--	0
Chemical Wastes ('000kg) #	0	--	0	-	0	--	0	--	0	--	0	--	0
General Refuses ('000m^3)	**0.0634**	**NENT**	**0.025**	**NENT**	0	--	**0.417**	**NENT**	0	--	**0.234**	**NENT**	**0.7394**

Remark #: Unit of recycled metal, recycled paper/ cardboard packing and recycled plastic under Contract 3 was in ('000m^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, ET and the Contractor on **6, 13, 20 and 27 March 2020** in which IEC joined the site inspection on **20 March 2020**. 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
6 March 2020	• No adverse environmental issue was observed.	• NA
13 March 2020	• The Contractor was reminded to remove silt in the channel.	• Not required for reminder.
20 March 2020	• The Contractor was reminded to remove silt and stagnant water in the channel.	• Not required for reminder.
27 March 2020	• 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, ET and the Contractor on **5, 13, 19 and 25 March 2020** in which IEC joined the site inspection on **19 March 2020**. 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
5 March 2020	• Muddy trails were observed at TWSRE. The Contractor should clean the trail and ensure wash the wheel thoroughly before leaving the site. • The Contractor was reminded to removed silt and waste in the channel.	• The muddy trail was removed. • Not required for reminder.
13 March 2020	• The Contractor was reminded to cover the stockpile properly. • The Contractor was reminded to maintain site exit clean and tidy.	• Not required for reminder. • Not required for reminder.
19 March 2020	• Muddy trail was observed at TWSRE site exit. The Contractor should clean the muddy trail as soon as possible and wash the wheels thoroughly before leaving the site. • Open stockpile was observed at TWSRW. The Contractor should cover the stockpile with	• Muddy trail was removed. • Water spraying was provided to

Date	Findings / Deficiencies	Follow-Up Status
	tarpaulin sheet to reduce dust emission. • The Contractor was reminded to provide drip tray for any chemical containers.	reduce dust impact. • Not required for reminder.
25 March 2020	• Free standing chemical containers were observed at TWSRW. The Contractor should provide drip tray for chemical containers to prevent land contamination.	• Chemical containers were removed.

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, ET and the Contractor on **6, 13, 16 and 27 March 2020** in which IEC joined the site inspection on **16 March 2020**. 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
6 March 2020	• No adverse environmental issue was observed.	• NA
13 March 2020	• No adverse environmental issue was observed.	• NA
16 March 2020	• No adverse environmental issue was observed.	• NA
27 March 2020	• 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, ET and the Contractor on **5, 12, 17 and 26 March 2020** in which IEC joined the site inspection on **17 March 2020**. 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
5 March 2020	• Muddy trail was observed at check dam. The contractor should clean the trail and provide proper wheel washing facility. • Free standing chemical containers were observed at WCA. The Contractor should place drip tray underneath the containers to prevent land contamination.	• Muddy trail was cleaned. • Chemical containers were removed.
12 March 2020	• No adverse environmental issue was observed.	• NA
17 March 2020	• No adverse environmental issue was observed.	• NA
26 March 2020	• Free standing chemical containers were observed on ground at WCA. The Contractor should provide drip tray underneath the containers to prevent land contamination.	• Chemical containers were removed.

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 **5, 12, 20 and 26 March 2020**. IEC carried out site inspection on **20 March 2020**. 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
5 March 2020	• No adverse environmental issue was observed.	• NA
12 March 2020	• No adverse environmental issue was observed.	• NA
20 March 2020	• No adverse environmental issue was observed.	• NA
26 March 2020	• No adverse environmental issue was observed.	• NA

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, ET and the Contractor on **5, 12, 17 and 26 March 2020** in which IEC joined the site inspection on **17 March 2020**. 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
5 March 2020	• No adverse environmental issue was observed.	• NA
12 March 2020	• No adverse environmental issue was observed.	• NA
17 March 2020	• No adverse environmental issue was observed.	• NA
26 March 2020	• 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, one environmental complaint regarding to noise and dust nuisance was recorded. The status of the investigation report in reporting months is summarized below.

Date of complaint	Complaint Detail	Investigation Status
26 March 2020	EPD received a public complaint in early March 2020 against the captioned C6 project about night time construction work (at about 2330-0030 hrs) and construction dust nuisance and requested follow up. (Contract 6)	In our investigation, there were no construction activities under Contract 6 during the concerned period, it is considered that the complaint is not valid to Contract 6. Nevertheless, CCKJV was reminded to strictly follow the relevant requirements of the CNP when carrying out the construction works in restricted hours. The IR was completed by ET without comment by IEC which enclosed in ***Appendix R***.

10.1.2 No summons and prosecution under the EM&A Programme was lodged for all Contracts.

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

Table 10-1 Statistical Summary of Environmental Complaints

Reporting Period	Contract No	Environmental Complaint Statistics			Project related complaint
		Frequency	Cumulative	Complaint Nature	
19 May 2014 – 29 February 2020	Contract 2	0	**38**	• **(19)Water Quality** • **(10) Dust** • **(6) Noise** • **(1) dust & noise** • **(1) waste management** • **(1) Water quality and dust**	**(7) water quality** **(3) dust** **(1) noise**
06 Nov 2013 – 29 February 2020	Contract 3	0	**10**	• **(3) Dust** • **(3) Water quality** • **(2) Noise** • **(2) site cleanliness (dust & water quality)**	**(1) site cleanliness (dust & water quality)**
16 Aug 2013 – 29 February 2020	Contract 4	0	0	NA	NA
16 Aug 2013 – 29 February 2020	Contract 6	0	**45**	• **(24) Water Quality** • **(12) Dust** • **(3) Noise** • **(1) Nuisance** • **(1) Noise and dust** • **(3) Water quality and dust** • **(1) Water quality and noise**	**(8) water quality** **(3) dust** **(1) nuisance** **(1) water quality and dust** **(1) water quality and noise**
15 Feb 2016 – 29 February 2020	Contract 7	0	**4**	• **(1) Noise** • **(3) Water quality and dust**	**(1) water quality and dust**
16 Aug 2013 – 29 February 2020	SS C505	0	**8**	• **(1) Noise** • **(2) dust** • **(3) Water quality and dust** • **(2) Water quality**	**(1) water quality and dust**

Reporting Period	Contract No	Environmental Complaint Statistics			Project related complaint
		Frequency	Cumulative	Complaint Nature	
1 – 31 March 2020	Contract 2	0	**38**	• **(19)Water Quality** • **(10) Dust** • **(6) Noise** • **(1) dust & noise** • **(1) waste management** • **(1) Water quality and dust**	NA
	Contract 3	0	**10**	• **(3) Dust** • **(3) Water quality** • **(2) Noise** • **(2) site cleanliness (dust & water quality)**	NA
	Contract 4	0	0	NA	NA
	Contract 6	**1**	**46**	• **(24) Water Quality** • **(12) Dust** • **(3) Noise** • **(1) Nuisance** • **(2) Noise and dust** • **(3) Water quality and dust** • **(1) Water quality and noise**	NA
	Contract 7	0	**4**	• **(1) Noise** • **(3) Water quality and dust**	NA
	SS C505	0	**8**	• **(1) Noise** • **(2) dust** • **(3) Water quality and dust** • **(2) Water quality**	NA

Table 10-2 Statistical Summary of Environmental Summons

Reporting Period	Contract No	Environmental Summons Statistics		
		Frequency	Cumulative	Complaint Nature
19 May 2014 – 29 February 2020	Contract 2	0	**1**	contravening the Water Pollution Control (General) Regulations
06 Nov 2013 – 29 February 2020	Contract 3	0	0	NA
16 Aug 2013 – 29 February 2020	Contract 5	0	0	NA
16 Aug 2013 – 29 February 2020	Contract 6	0	0	NA
15 Feb 2016 – 29 February 2020	Contract 7	0	0	NA
16 Aug 2013 – 29 February 2020	SS C505	0	0	NA
1 – 31 March 2020	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 – 29 February 2020	Contract 2	0	**1**	contravening the Water Pollution Control (General) Regulations
06 Nov 2013 – 29 February 2020	Contract 3	0	0	NA
16 Aug 2013 – 29 February 2020	Contract 5	0	0	NA
16 Aug 2013 – 29 February 2020	Contract 6	0	0	NA
15 Feb 2016 – 29 February 2020	Contract 7	0	0	NA
16 Aug 2013 – 29 February 2020	SS C505	0	0	NA
1 – 31 March 2020	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 O.***

Implementation of Mitigation Measures during Construction Phase

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, 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 • Low vehicular speed within the works areas. • All vehicles must use wheel washing facility before off site • Sprayed water during breaking works • 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. • Keep good maintenance of plants • Place noisy plants away from residence or school • Provide noise barriers or hoarding to enclose the noisy plants or works • Shut down the plants when not in used.
Waste and Chemical Management	• On-site sorting prior to disposal • Follow requirements and procedures of the "Trip-ticket System" • Predict required quantity of concrete accurately • Collect the unused fresh concrete at designated locations in the sites for subsequent disposal
General	• The site was generally kept tidy and clean.

Implementation of Mitigation Measures during Operation Phase

11.1.3 The Heung Yuen Wai (HYW) Highway and connecting roads under the Project was opened on 26 May 2019. Since partial commencement of operation is the same as the commencement of operation for the entire project from EIAO perspective. All relevant requirements as stipulated in the EP and the approved EIA report (including the EM&A Manual) for the commencement of operation of the Project shall be strictly complied with.

11.1.4 In general, the recommended mitigation measures for operation stage of HYW Highway and connecting roads under the Project have been implemented. The implementation status of mitigation measures for operation phase in the Reporting Period are summarized in ***Appendix P***.

11.1.5 For more details about the implementation status of mitigation measures for operation phase with photo illustration, an Environmental Monitoring and Audit report on the implementation of the mitigation measures for operation stage of the Project will be disposed to EPD not later than three months after the commencement of operation of the Project under EP-404/2011/D condition 5.5. The abovementioned report was submitted to EPD on 23 August 2019.

11.1.6 Pursuant to EM&A Manual Section 10.2, the implementation of landscape mitigation measures during establishment period shall be audited by a qualified landscape architect of the ET, to

ensure compliance with the aims of proposed measures. Site inspection should be undertaken at least once per month. The checklist for the implementation status is shown in ***Appendix P***.

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

- Rectification of identified defects
- Rectification of soft landscape defects
- Maintenance works during the defect liability period

Contract 3

- Road pavement works

Contract 4

- OPT & DLP of control room, TCSS & PA
- Cabling, TCSS&FVMS installation

Contract 6

- Water Pipe Connection Work
- Road Construction
- Landscaping
- Landscaping works for the proposed Wetland

Contract 7

- General cleaning
- Defect rectification
- Street Lighting Ducting at Bridge B&D

Contract SS C505

- Defect Rectification Works involving primarily:
- Building cladding and curtain walls;
- Building internal fit-out, finishing and signages;
- E&M defect rectifications, testing and commissioning;
- Soft Landscaping and related green area maintenance works

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

11.3.2 The project (except for the BCP building complex) was commenced on 26 May 2019. All relevant requirements as stipulated in the EP and the approved EIA report (including the EM&A Manual) for the commencement of operation of the Project shall be strictly complied with.

11.3.3 As rainy season approaching, the contractors should pay special attention on water quality mitigation measures and fully implement according to the ISEMM of the EM&A Manual, in particular to prevent muddy water or other water pollutants from site surface overflow to public area should be properly maintained. The statuses of implemented water quality mitigation measures for the project are shown in ***Appendix Q***.

12 CONCLUSIONS AND RECOMMENDATIONS

12.1 CONCLUSIONS

12.1.1 This is the **80th** monthly EM&A report presenting the monitoring results and inspection findings for the Reporting Period from **1** to **31 March 2020**.

12.1.2 The project (except for the BCP building complex) was commenced on 26 May 2019. In view of the partial commencement of operation to be considered as the same as the commencement of operation for the entire project, all relevant requirements as stipulated in the EP and the approved EIA report (including the EM&A Manual) for the commencement of operation of the Project shall be strictly complied with. The implementation status of mitigation measures for operation phase in the Reporting Period will be presented in the Report.

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

12.1.4 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.

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

12.1.6 Site inspection for the construction of WCA was conducted by ET as part of the weekly inspection of Contract 6 on **5, 12, 17 and 26 March 2020.** It was observed that excavation of the water ponds was completed and water proof layering was on-going in the WCA. There was no non-compliance observed during the site inspection. The forthcoming remaining activities would be landscaping in the WCA.

12.1.7 In this Reporting Period, one environmental complaint was received regarding night time construction work (at about 2330 – 0300 hrs) and construction dust nuisance related to Contract 6. The investigation report was conducted by ET accordingly and revealed that there were no construction activities under Contract 6 during the concerned period and it is considered that the complaint was no valid to Contract 6.

12.1.8 During the Reporting Period, weekly joint site inspection by the RE, ET with the relevant Main-contractor were carried out for Contracts 2, 3, 4, 6, 7 and SS C505 in accordance with the EM&A Manual stipulation. 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 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.

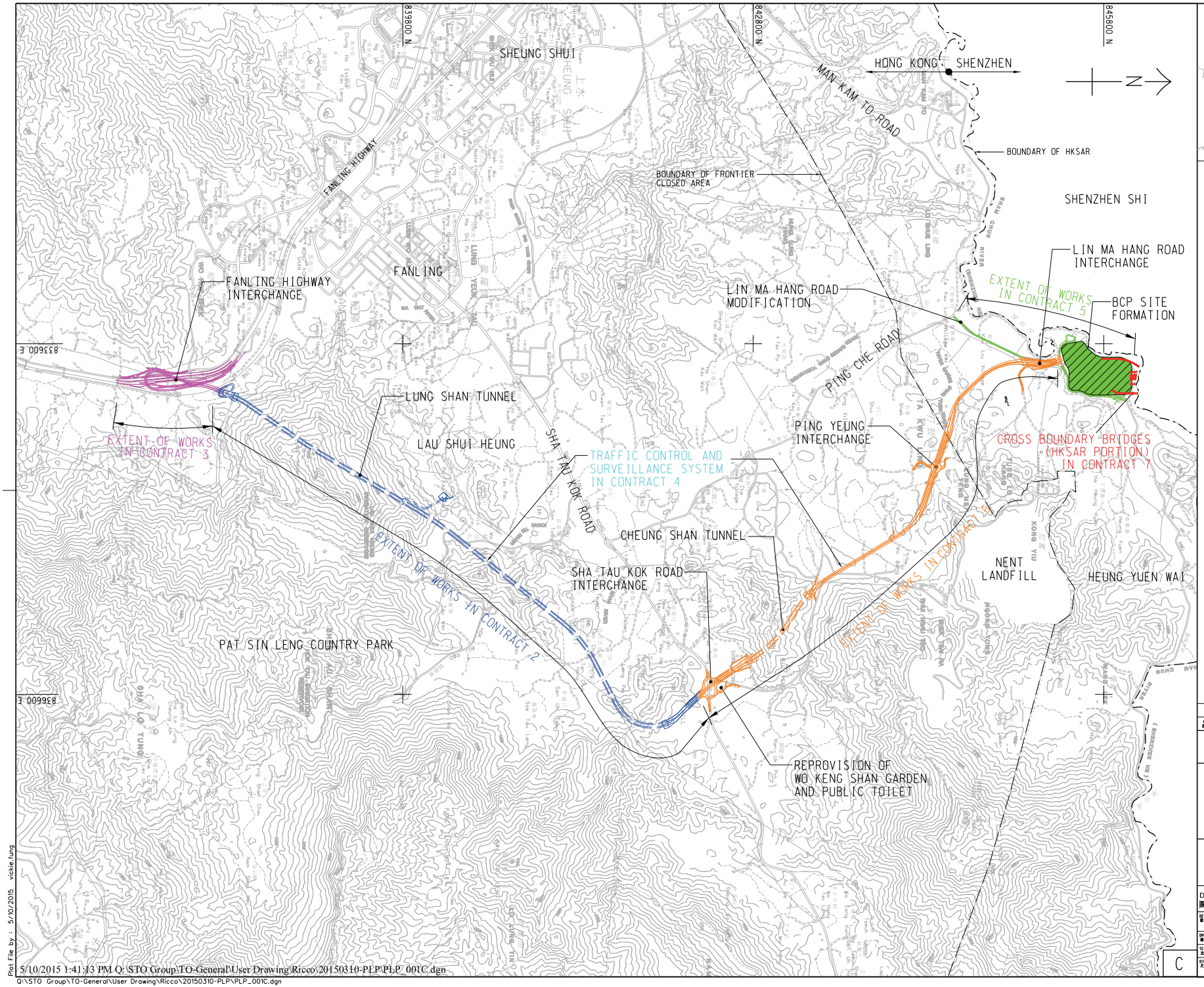
12.2.2 In addition, all effluent discharge shall be ensure to fulfill Technical Memorandum of Effluent Discharged into Drainage and Sewerage Systems, inland and Coastal Waters criteria or discharge permits stipulation.

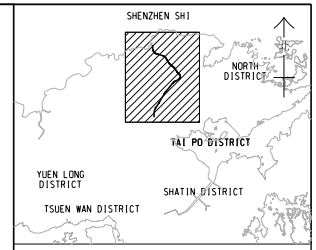
12.2.3 Construction noise would be a key environmental issue during construction work of the Project. Noise mitigation measures such as using quiet plants should be implemented in accordance with the EM&A requirement.

12.2.4 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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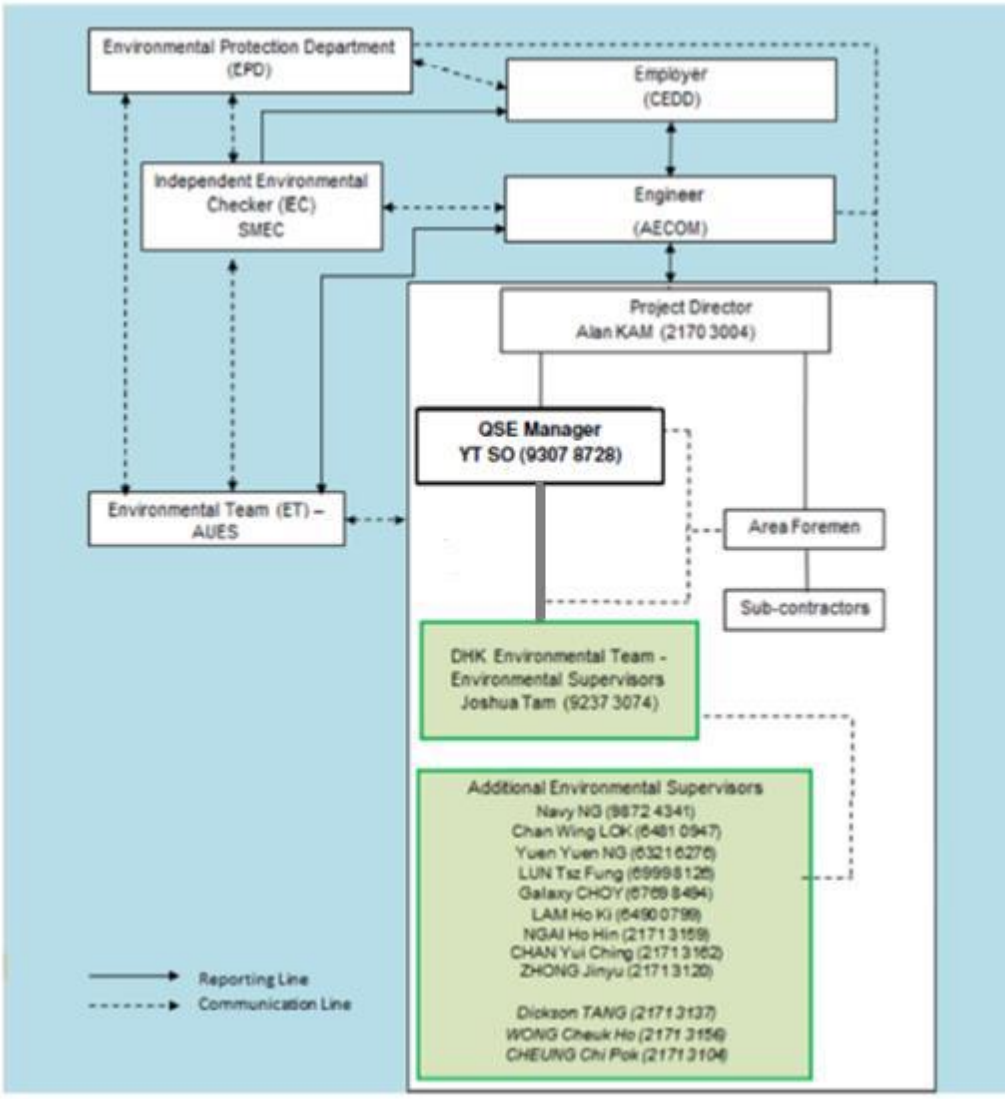
Appendix B

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	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:

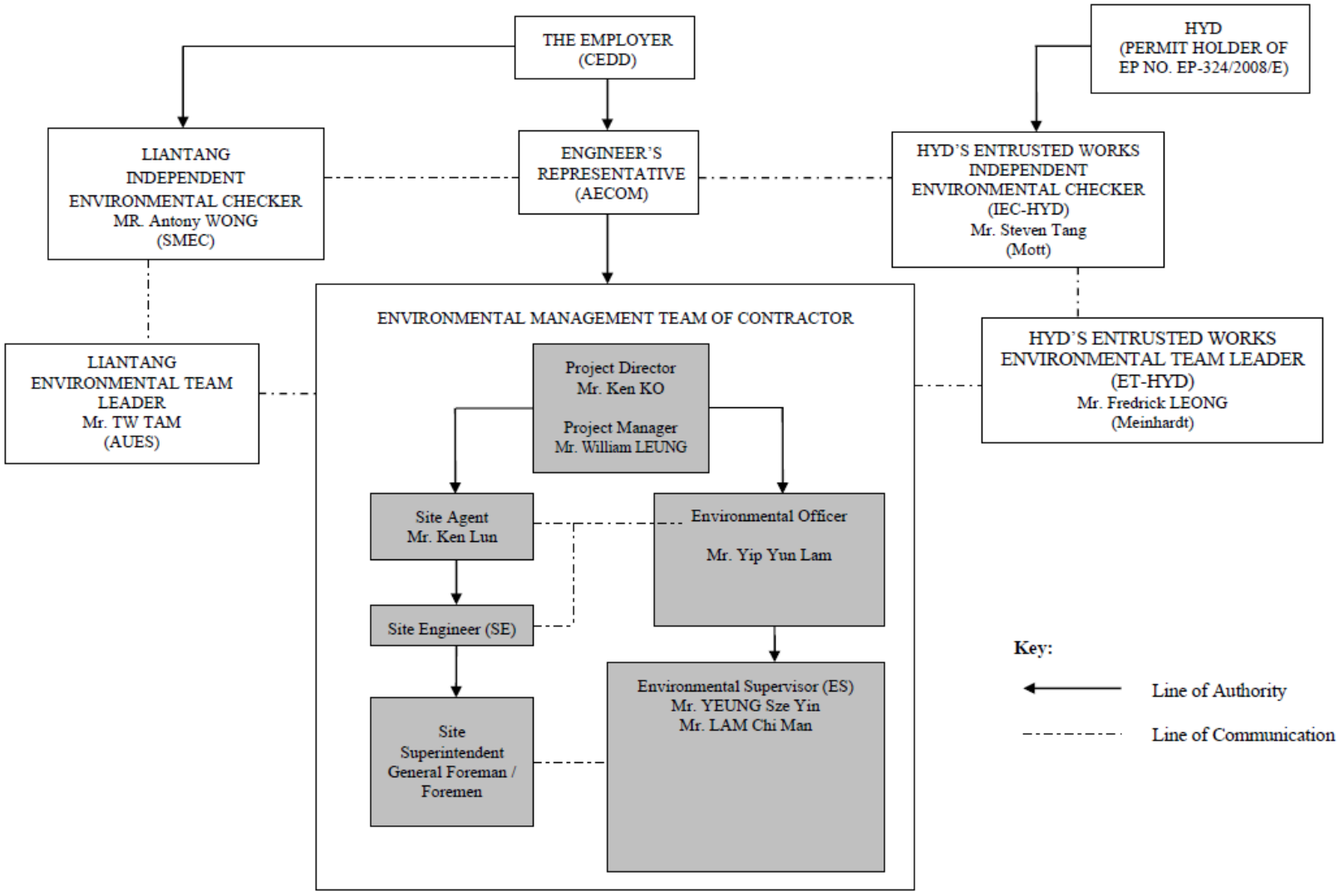
CEDD (Employer) – Civil Engineering and Development Department

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	Ken Lun	2638 6144	2638 7077
Chun Wo	Environmental Officer	Yip Yun Lam	2638 6151	2638 7077
Chun Wo	Environmental Supervisor	YEUNG Sze yin	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

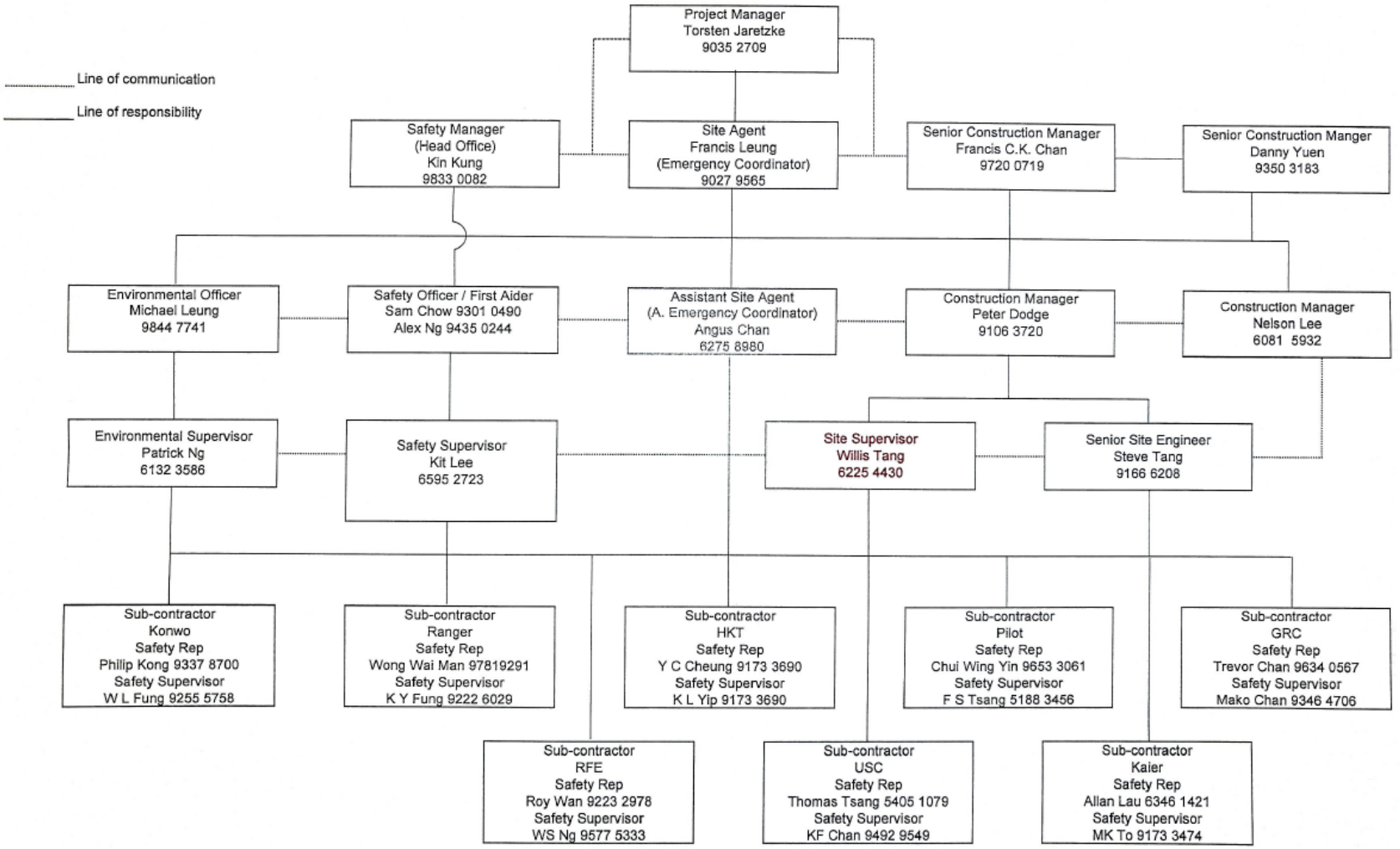
AECOM (Engineer) – AECOM Asia Co. Ltd.

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:

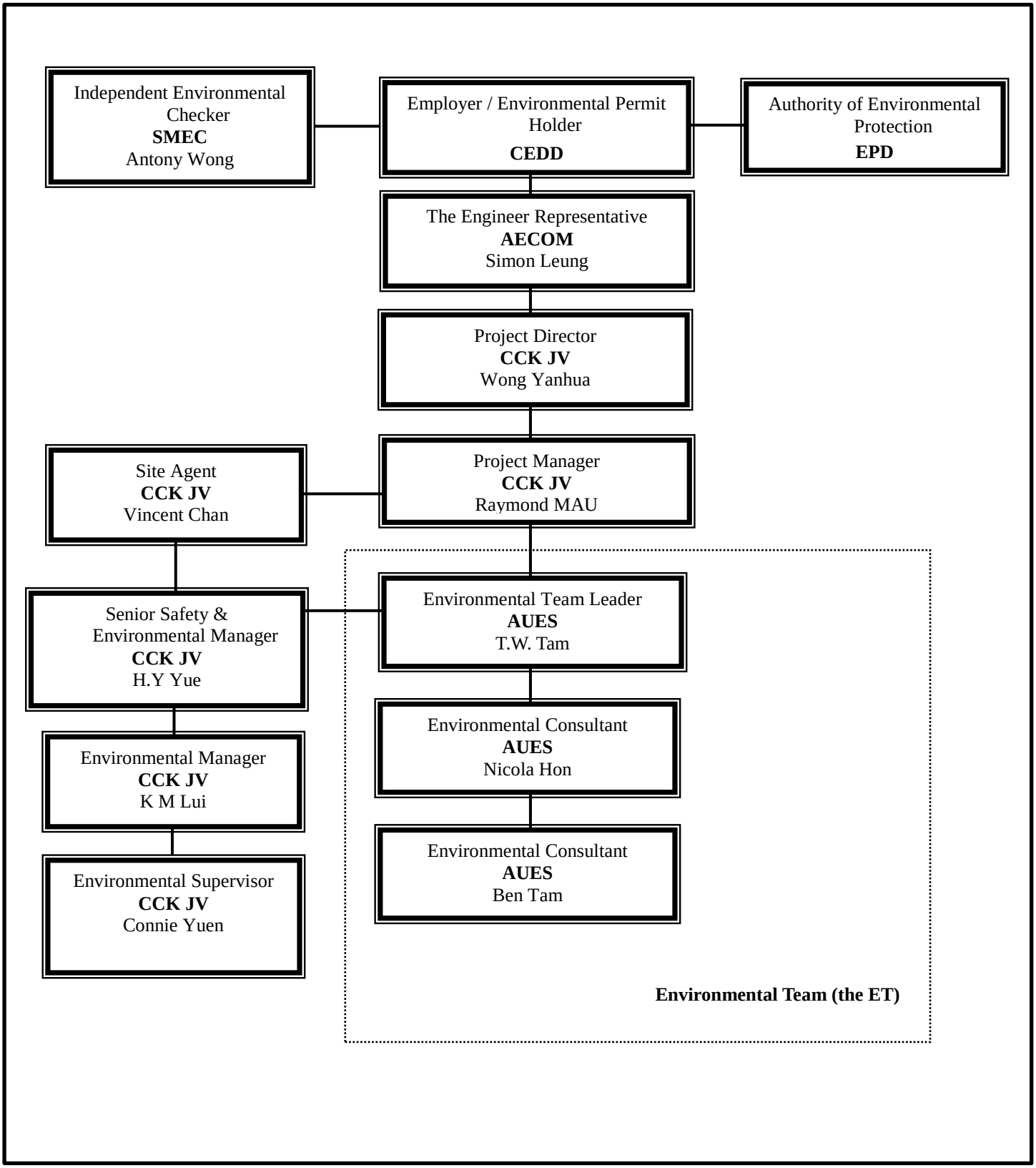
CEDD (Employer) – Civil Engineering and Development Department

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	--
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:

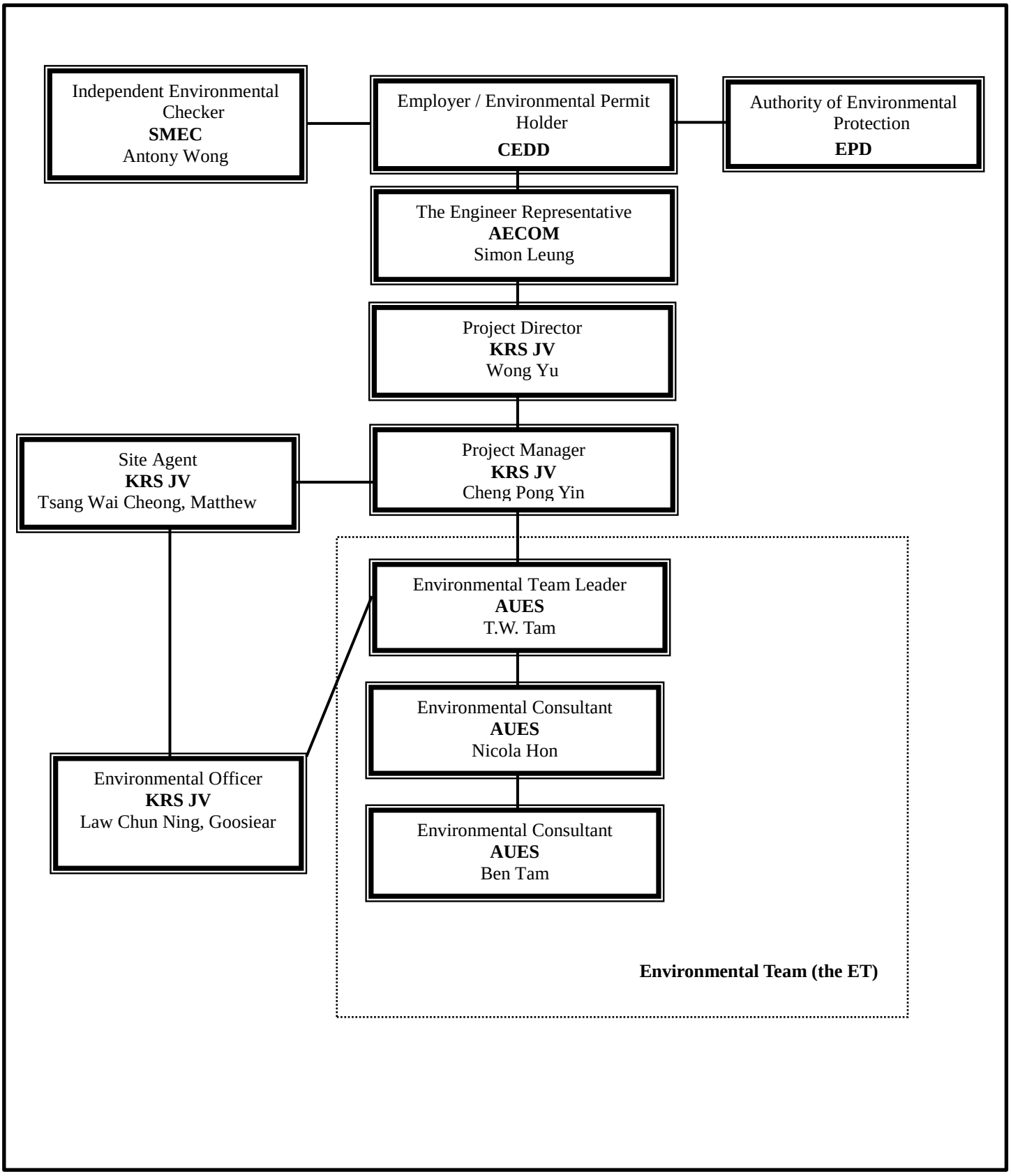
CEDD (Employer) – Civil Engineering and Development Department

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
AUES	Environmental Team Leader	TW Tam	2959 6059	2959 6079
AUES	Environmental Consultant	Ben Tam	2959 6059	2959 6079
AUES	Environmental Consultant	Nicola Hon	2959 6059	2959 6079

Legend:

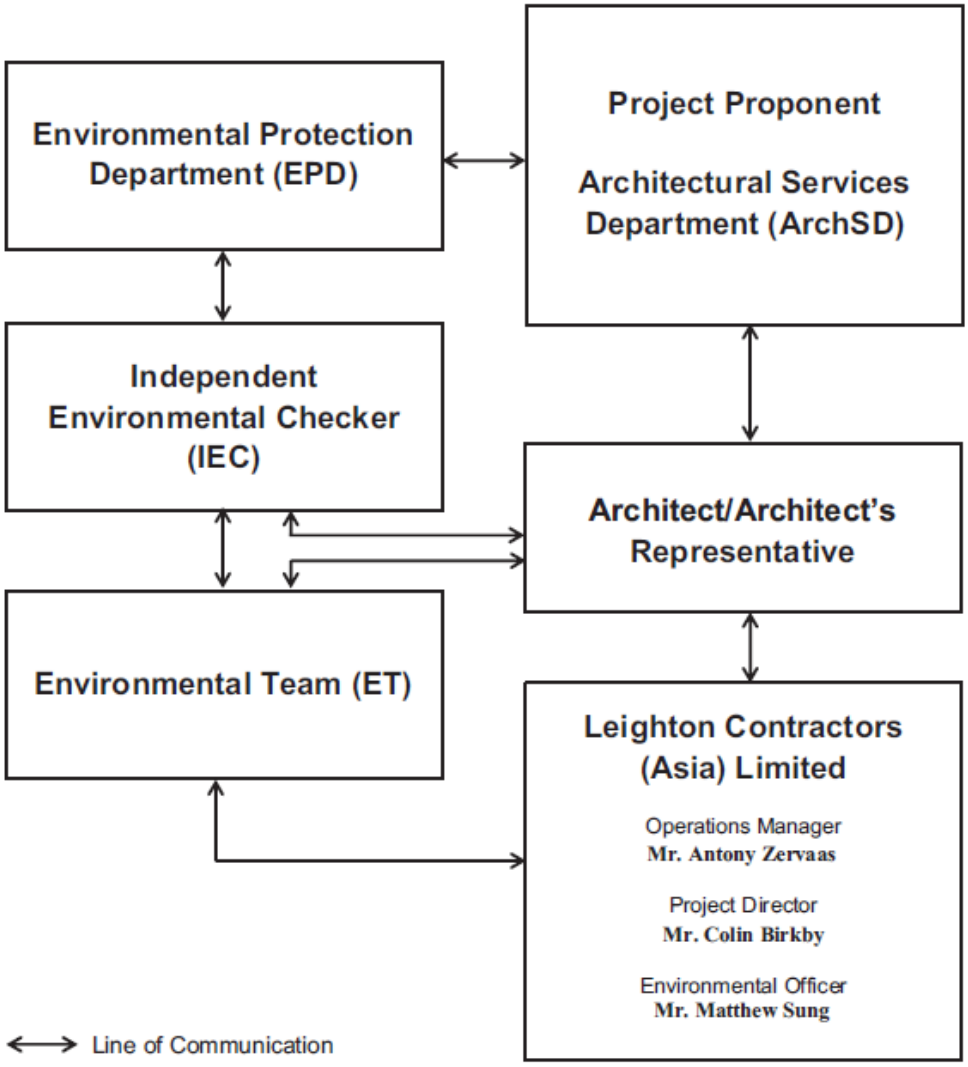
CEDD (Employer) – Civil Engineering and Development Department

AECOM (Engineer) – AECOM Asia Co. Ltd.

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

SMEC (IEC) – SMEC Asia Limited

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



Environmental Management 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. Colin Birkby	3973 1399	2752 0696
Leighton	Site Agent	Mr. Matthew Sung	3973 1399	2752 0696
Leighton	Quality & Environmental Manager	Mr. C. F. Kwong	3973 1542	2752 0696
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

香港寶嘉 Dragages HongKong
A member of the Bouygues Construction group

Tentative Three Months (Mar 2020, Apr 2020 and May 2020) Construction Rolling Programme

Item	Construction Activites
1	Rectification of identified defects
2	Rectification of soft landscape defects
3	Minor maintenance works during the defect liability period

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 (March 2020, April 2020 and May 2020) Construction Rolling Programme

Item	Construction Activites
1	Road pavement works

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 (Mar, Apr&May 2020,) Construction Rolling Programme

Item	Construction Activites
1	OPT & DLP of control room, TCSS & PA
2	Cabling, TCSS & FVMS installation at Fanling highway

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 (Mar, Apr&May 2020) Construction Rolling Progam

Item	Construction Activites
1	Water Pipe Connection Work
2	Road Construction
3	Landscaping
4	Wetland Construction

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 (Mar, Apr&May 2020) Construction Rolling Programme

Item	Construction Activites
1	General Cleaning
2	Defect Rectification
3	Street Lighting Ducting at Bridge B&D

Contract SS C505

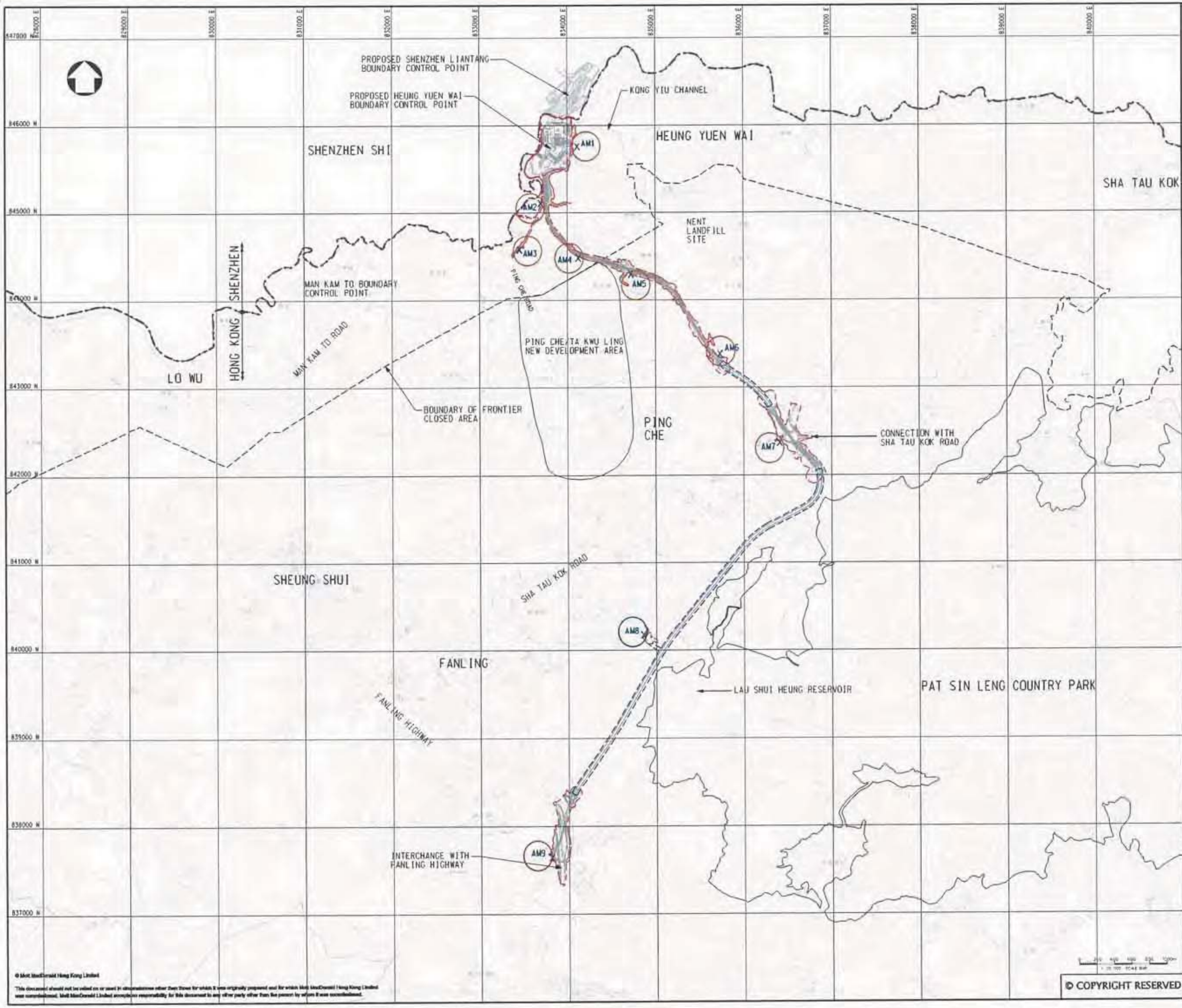
Liantang / Heung Yuen Wai Boundary Control Point and Associated Works
ArchSD Contract No: SSC505
Main Contractor: Leighton

Tentative Three Months (Mar, Apr&May 2020) Construction Rolling Progam

Item	Construction Activites
1	Defect Rectification Works involving primarily:
2	Building cladding and curtain walls;
3	Building internal fit-out, finishing and signages;
4	E&M defect rectifications, testing and commissioning;
5	Soft Landscaping and related green area maintenance works

Appendix D

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



LEGEND:

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

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

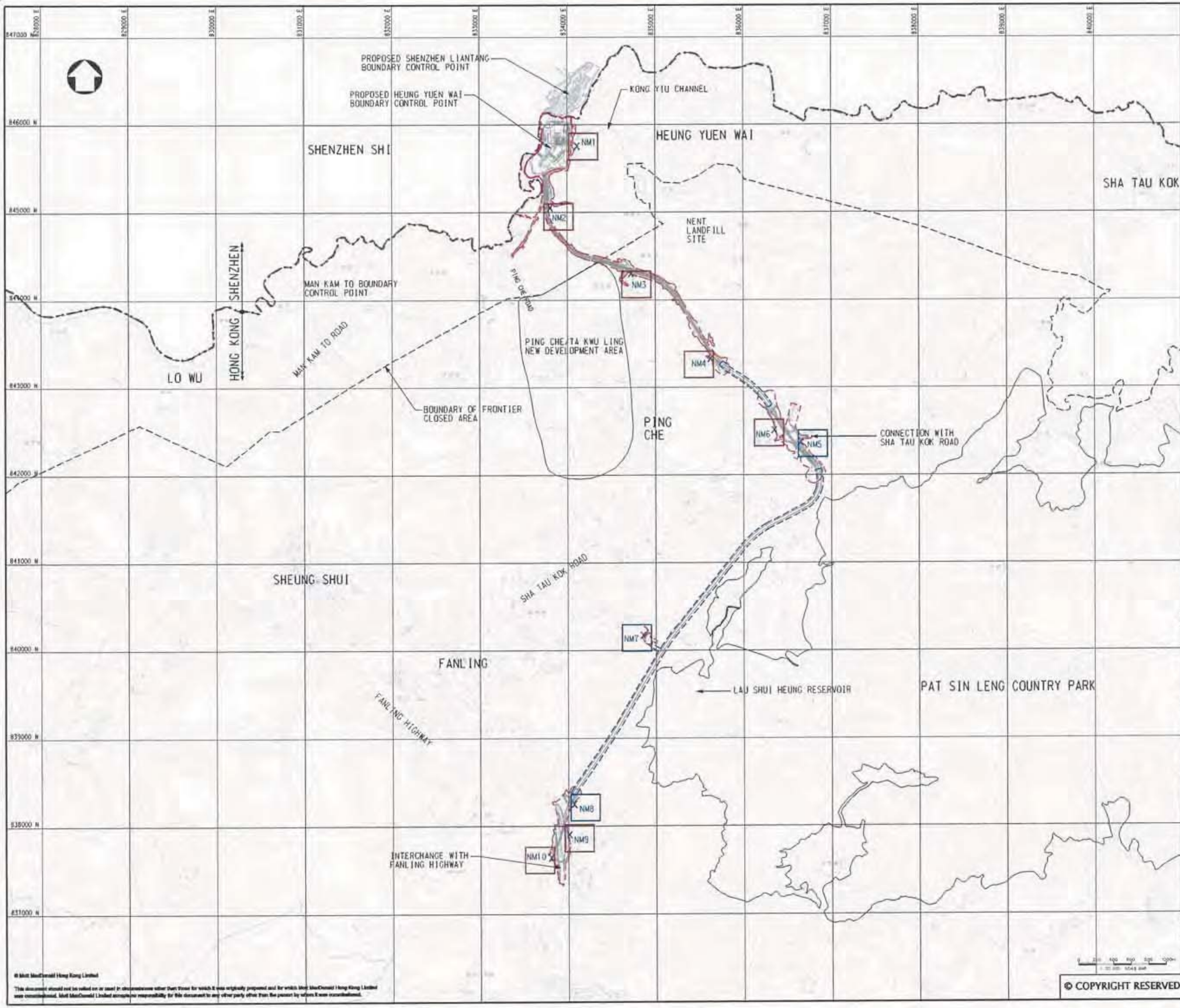
Mott MacDonald

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	WING	Coordination	EC
Dwg.Chk	DC	Approved	HT
Scale at A1	1:20000	Project	255228
Status	PRE		
Drawing No	FIGURE 2.1	Rev	P1



LEGEND:
- BOUNDARY OF HKSAR
- WORKS AREA (ABOVE GROUND)
- WORKS AREA (TUNNEL)
- X CONSTRUCTION NOISE MONITORING STATIONS

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

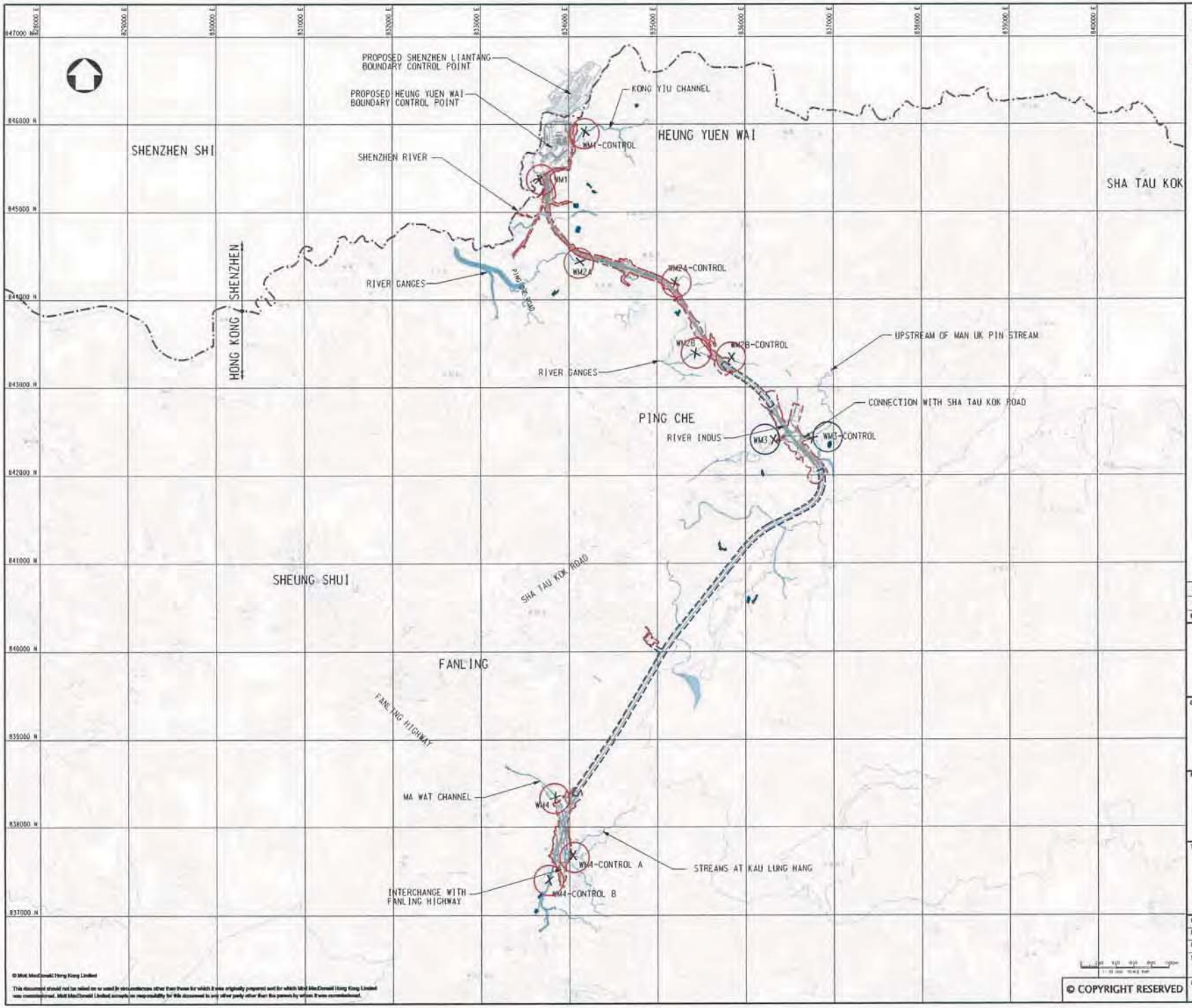
Mott MacDonald

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	Status	PRE
Drawing No	FIGURE 3.1			Rev	P1



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
P2	NOV 10	WING	GENERAL REVISION	HC	HT
P1	OCT 10	WING	FIRST ISSUE	HC	HT

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CEDD CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Project

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

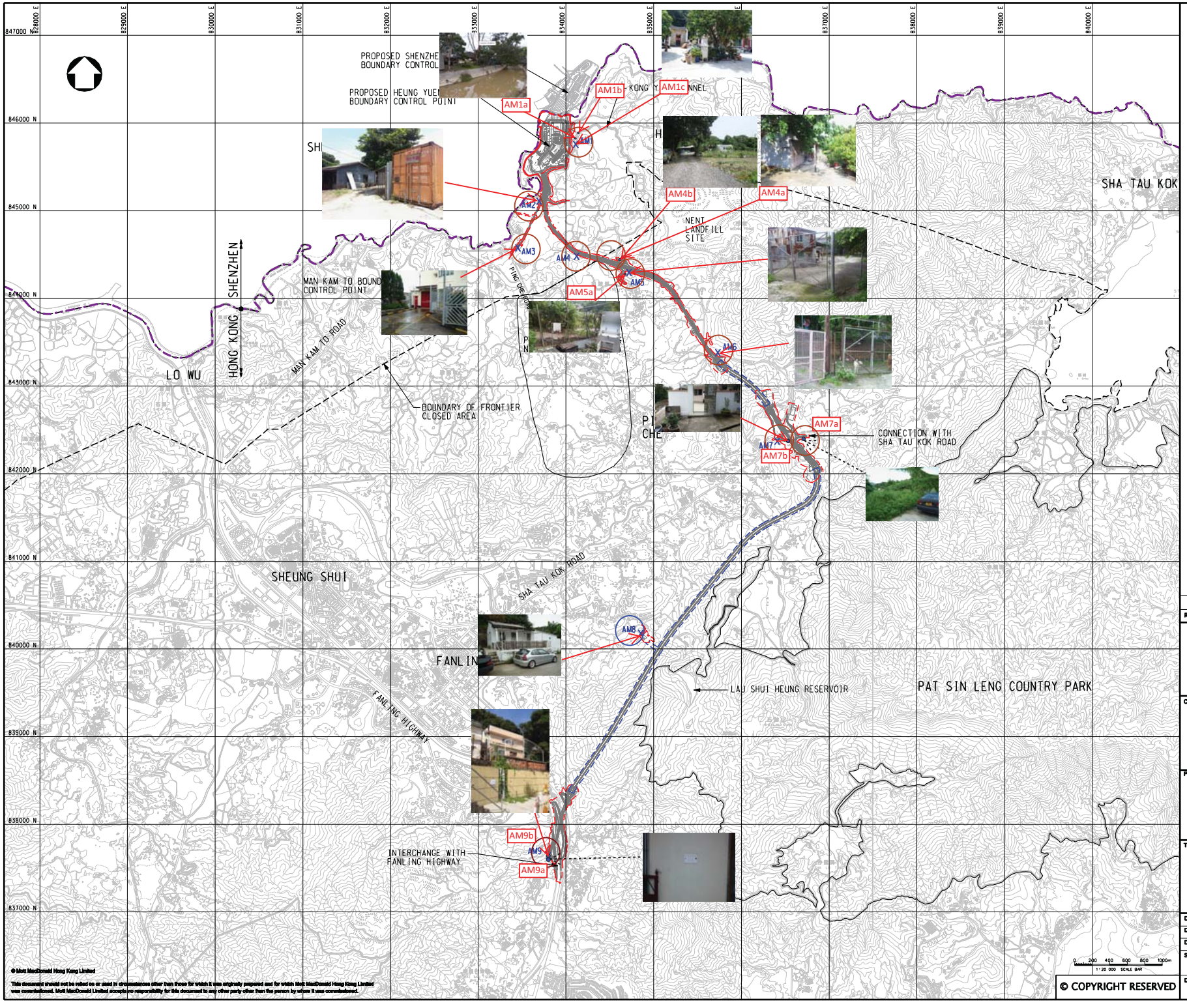
Title

LOCATIONS OF PROPOSED WATER QUALITY MONITORING STATIONS

Designed	HC		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

Appendix E

Monitoring Locations for Impact Monitoring



LEGEND:

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

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

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20/F Two Landmark East
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CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Project

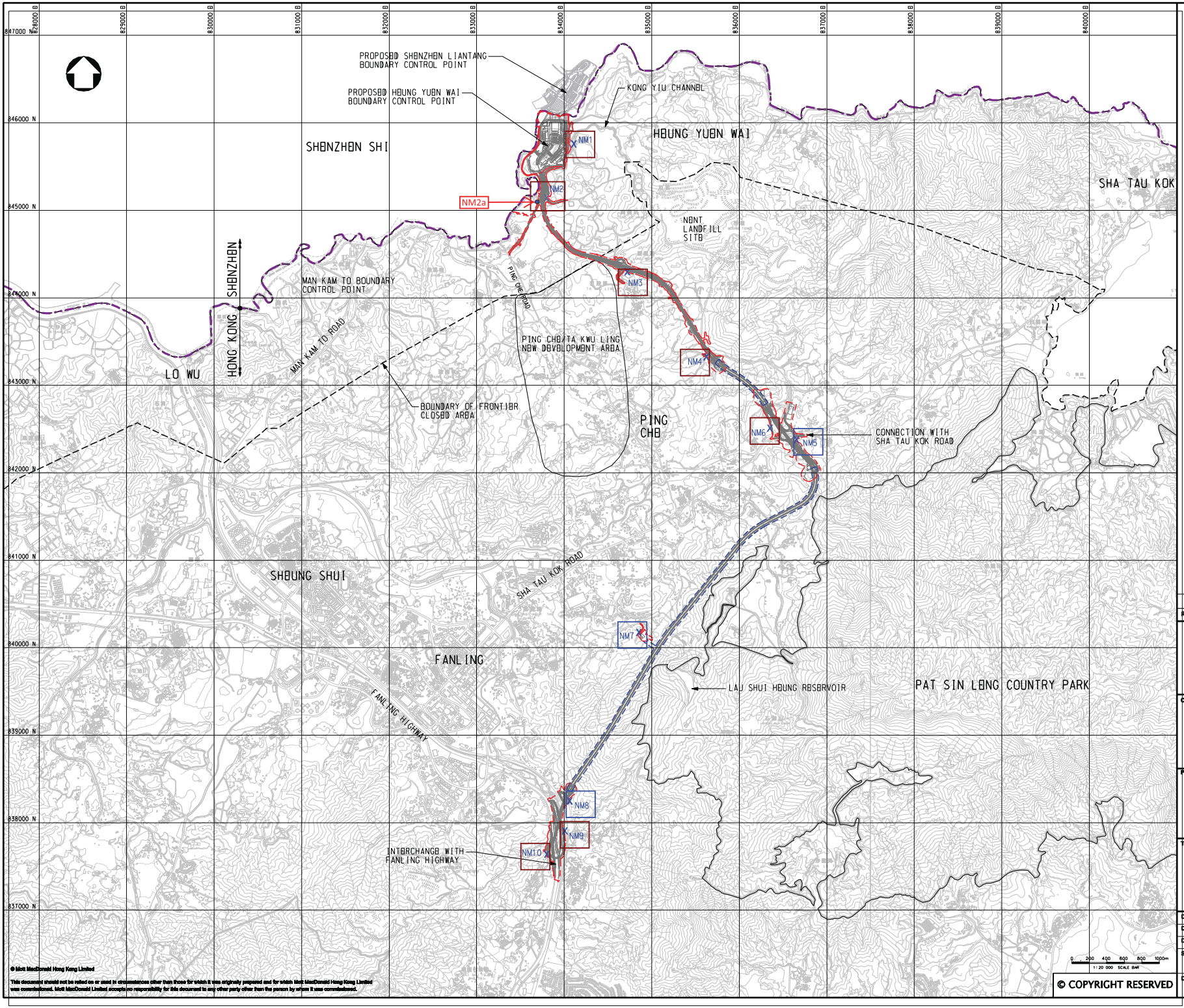
AGREEMENT NO. CE45/2008(CE)
LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS

Title

PROPOSED LOCATION OF CONSTRUCTION AIR QUALITY MONITORING STATIONS

Designed	DC		Eng.Chk.	EC	
Drawn	MING		Coordination	EC	
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

0 200 400 600 800 1000m
1:20 000 SCALE BAR



LEGEND:

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

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

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Project

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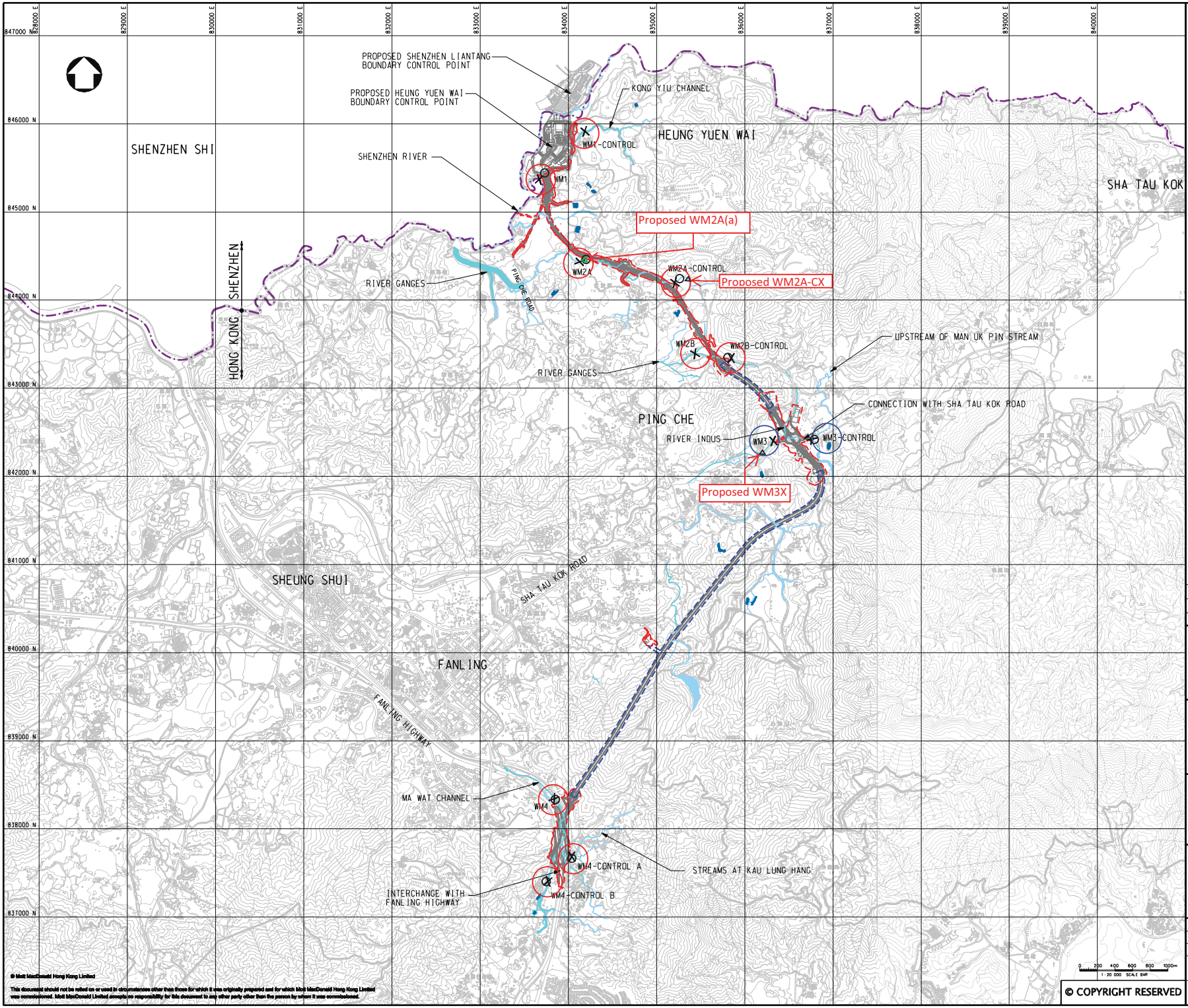
LIANTANG/HUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS

Title

PROPOSED LOCATION OF CONSTRUCTION NOISE MONITORING STATIONS

Designed	DC		Eng.Chk.	BC	
Drawn	MING		Coordination	BC	
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



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	833840.784	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
P2	NOV 10	MING	GENERAL REVISION	HC	HT
P1	OCT 10	MING	FIRST ISSUE	HC	HT

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CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Project

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

Title

LOCATIONS OF PROPOSED WATER QUALITY MONITORING STATIONS

Designed	HC		Eng.Chk.	EC	
Drawn	MING		Coordination	EC	
Dwg.Chk.	HC		Approved	HT	
Scale at A1	1:20000	Project	255228		Status PRE
		CAD file	u:\255228\REPORT\ENV\EM&A\DWS\FIG 4-1.dgn		
Drawing No	Appendix C				Rev P2

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:	31/3/2020
Location ID : AM1c		Next Calibration Date:	31/5/2020
		Technician:	Eric

CONDITIONS

Sea Level Pressure (hPa)	1013.1	Corrected Pressure (mm Hg)	759.825
Temperature (°C)	20.3	Temperature (K)	293

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.03014
Model->	5025A	Qstd Intercept ->	-0.04616
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	6.1	12.2	1.757	52	52.41	Slope = 33.2358
13	4.6	4.6	9.2	1.529	44	44.35	Intercept = -6.6531
10	3.9	3.9	7.8	1.409	38	38.30	Corr. coeff. = 0.9940
7	2.2	2.2	4.4	1.064	30	30.24	
5	1.5	1.5	3.0	0.883	22	22.17	

Calculations :

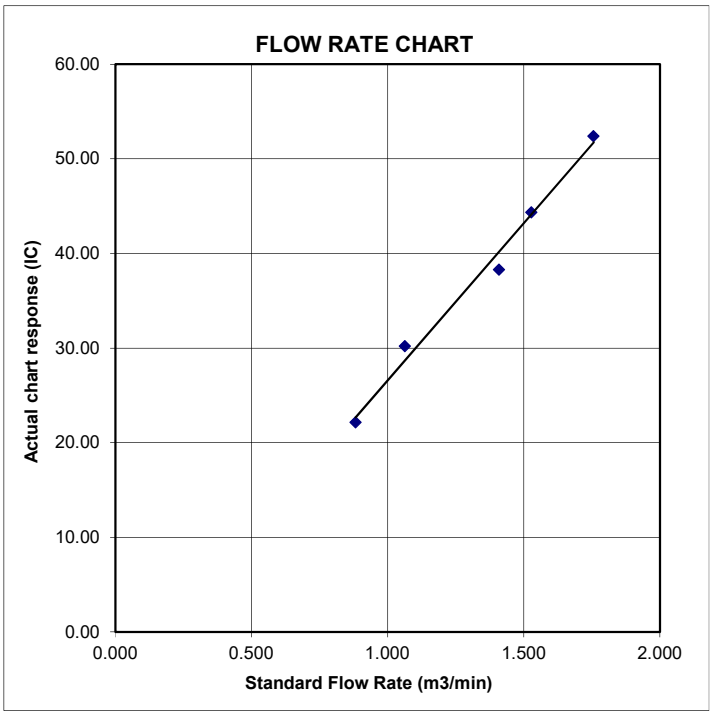
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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 : Open area at Tsung Yuen Ha Village		Date of Calibration:	29/1/2020
Location ID : AM1c		Next Calibration Date:	29/3/2020
		Technician:	Eric

CONDITIONS

Sea Level Pressure (hPa)	1020.6	Corrected Pressure (mm Hg)	765.45
Temperature (°C)	13.8	Temperature (K)	287

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	1.690	50	51.15	Slope = 33.4113
13	4.6	4.6	9.2	1.480	44	45.01	Intercept = -5.2905
10	3.9	3.9	7.8	1.363	38	38.87	Corr. coeff. = 0.9963
7	2.3	2.3	4.6	1.047	30	30.69	
5	1.5	1.5	3.0	0.845	22	22.51	

Calculations :

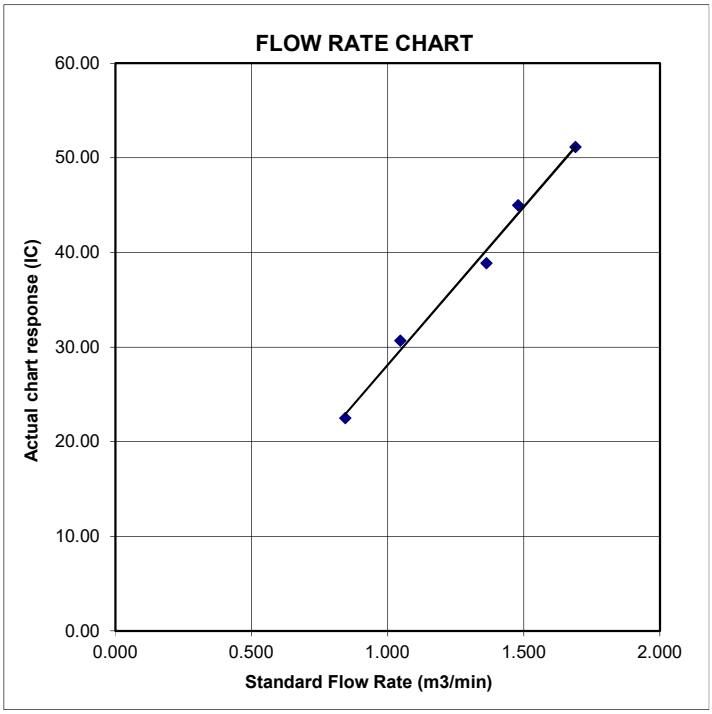
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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:	1/2/2020
Location ID : AM2		Next Calibration Date:	1/4/2020
		Technician:	Eric

CONDITIONS

Sea Level Pressure (hPa)	1022.4	Corrected Pressure (mm Hg)	766.8
Temperature (°C)	16.0	Temperature (K)	289

CALIBRATION ORIFICE

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

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected
18	5.1	5.1	10.2	1.554	54	55.08
13	4.1	4.1	8.2	1.393	48	48.96
10	3.4	3.4	6.8	1.269	44	44.88
7	2.1	2.1	4.2	0.997	36	36.72
5	1.4	1.4	2.8	0.814	28	28.56

LINEAR REGRESSION

Slope =	34.7371
Intercept =	0.9636
Corr. coeff. =	0.9978

Calculations :

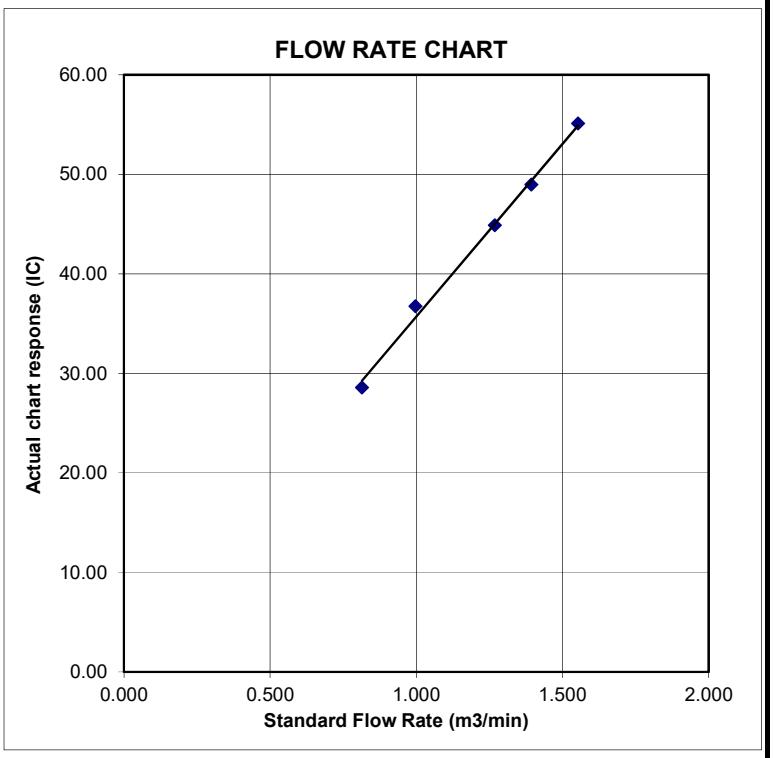
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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:	1/2/2020
Location ID : AM3		Next Calibration Date:	1/4/2020
		Technician:	Eric

CONDITIONS

Sea Level Pressure (hPa)	1022.4	Corrected Pressure (mm Hg)	766.8
Temperature (°C)	16.0	Temperature (K)	289

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	6.2	6.2	12.4	1.713	56	57.12	Slope = 36.2229
13	4.9	4.9	9.8	1.523	48	48.96	Intercept = -5.6067
10	4.1	4.1	8.2	1.393	44	44.88	Corr. coeff. = 0.9986
7	2.7	2.7	5.4	1.131	34	34.68	
5	1.6	1.6	3.2	0.870	26	26.52	

Calculations :

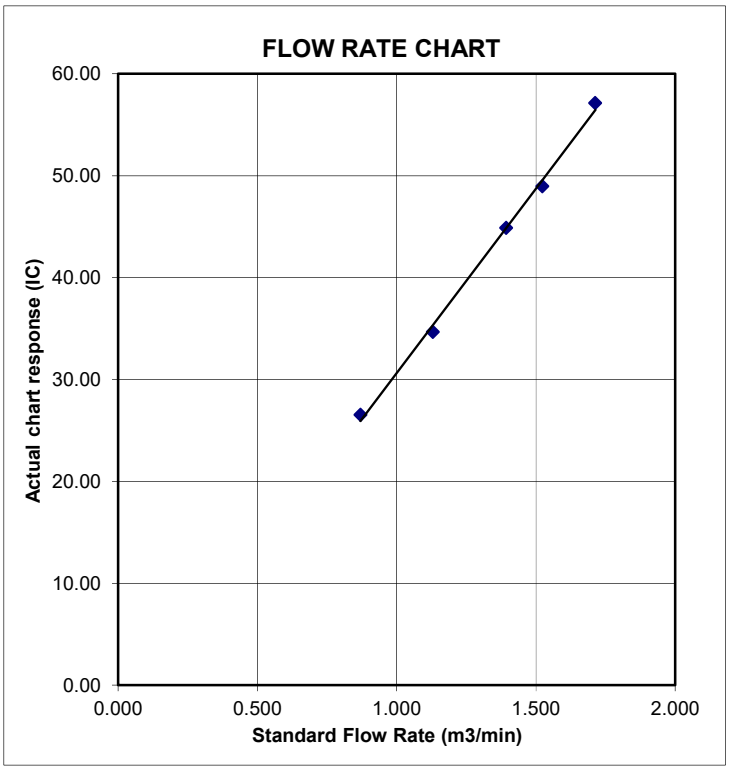
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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:	1/2/2020
Location ID : AM4b		Next Calibration Date:	1/4/2020
		Technician:	Eric

CONDITIONS

Sea Level Pressure (hPa)	1022.4	Corrected Pressure (mm Hg)	766.8
Temperature (°C)	16.0	Temperature (K)	289

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	5.9	5.9	11.8	1.671	56	57.12	Slope = 30.2355
13	5	5	10.0	1.539	50	51.00	Intercept = 5.5215
10	3.7	3.7	7.4	1.324	44	44.88	Corr. coeff. = 0.9957
7	2.1	2.1	4.2	0.997	36	36.72	
5	1.5	1.5	3.0	0.843	30	30.60	

Calculations :

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

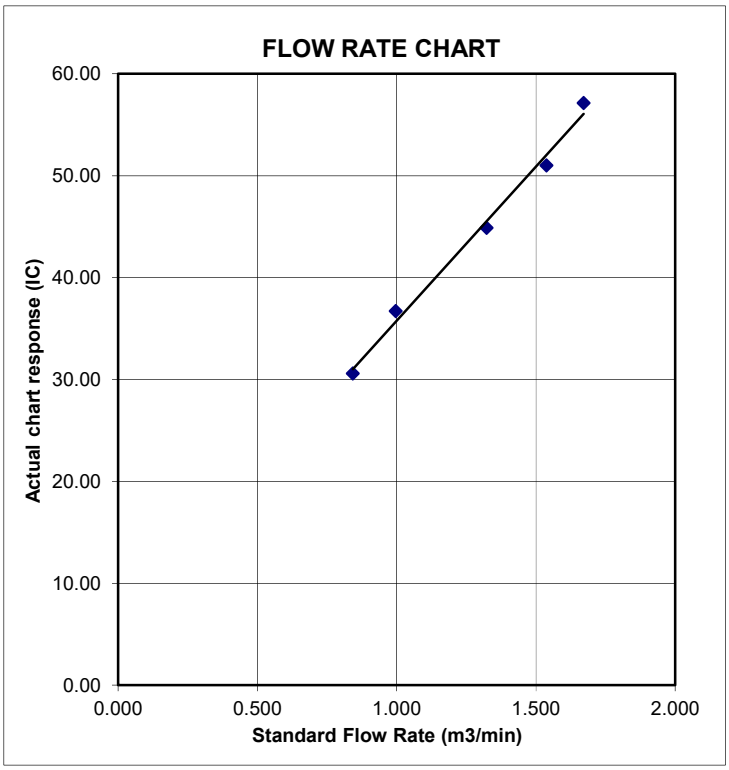
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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:	1/2/2020
Location ID : AM5a		Next Calibration Date:	1/4/2020
		Technician:	Eric

CONDITIONS

Sea Level Pressure (hPa)	1022.4	Corrected Pressure (mm Hg)	766.8
Temperature (°C)	16.0	Temperature (K)	289

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	5.7	5.7	11.4	1.643	52	53.04	Slope = 35.8061
13	4.4	4.4	8.8	1.443	46	46.92	Intercept = -4.7206
10	3.2	3.2	6.4	1.231	40	40.80	Corr. coeff. = 0.9914
7	2.1	2.1	4.2	0.997	32	32.64	
5	1.4	1.4	2.8	0.814	22	22.44	

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)

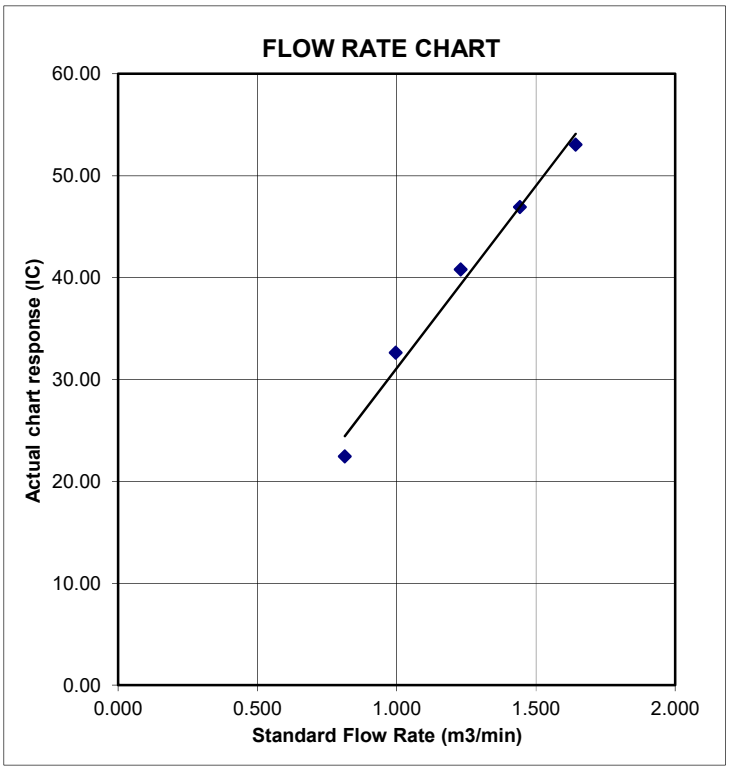
m = sampler slope

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:	1/2/2020
Location ID : AM6		Next Calibration Date:	1/4/2020
		Technician:	Eric

CONDITIONS

Sea Level Pressure (hPa)	1022.4	Corrected Pressure (mm Hg)	766.8
Temperature (°C)	16.0	Temperature (K)	289

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	5.2	5.2	10.4	1.569	53	54.06	Slope = 30.8096
13	4.5	4.5	9.0	1.460	48	48.96	Intercept = 4.8562
10	3.5	3.5	7.0	1.287	43	43.86	Corr. coeff. = 0.9957
7	2.1	2.1	4.2	0.997	36	36.72	
5	1.3	1.3	2.6	0.785	28	28.56	

Calculations :

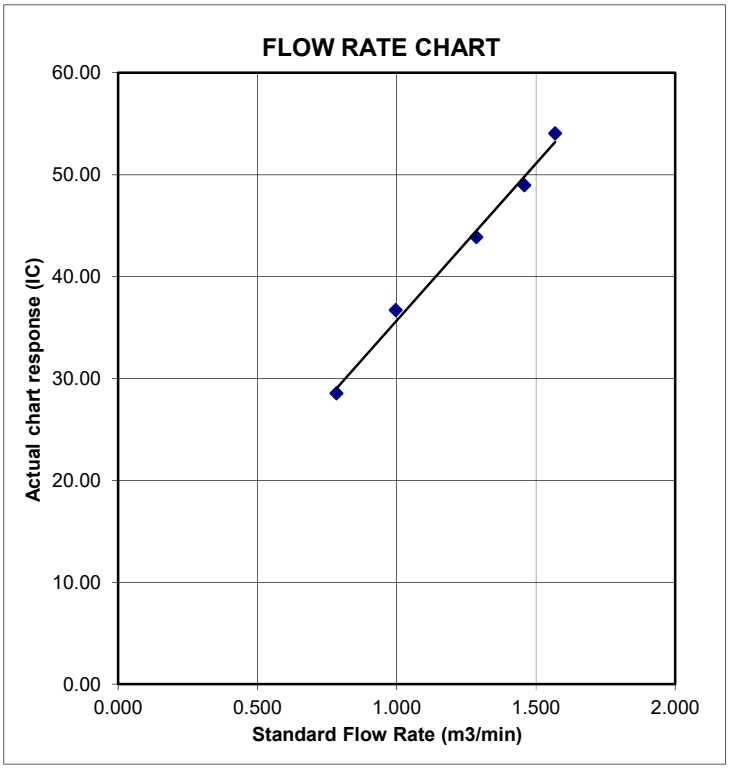
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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: 1/2/2020
Next Calibration Date: 1/4/2020
Technician: Eric

CONDITIONS

Sea Level Pressure (hPa)	1022.4	Corrected Pressure (mm Hg)	766.8
Temperature (°C)	16.0	Temperature (K)	289

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	1.685	60	61.20	Slope = 38.7328
13	4.5	4.5	9.0	1.460	52	53.04	Intercept = -3.6311
10	3.6	3.6	7.2	1.306	46	46.92	Corr. coeff. = 0.9965
7	2.1	2.1	4.2	0.997	36	36.72	
5	1.4	1.4	2.8	0.814	26	26.52	

Calculations :

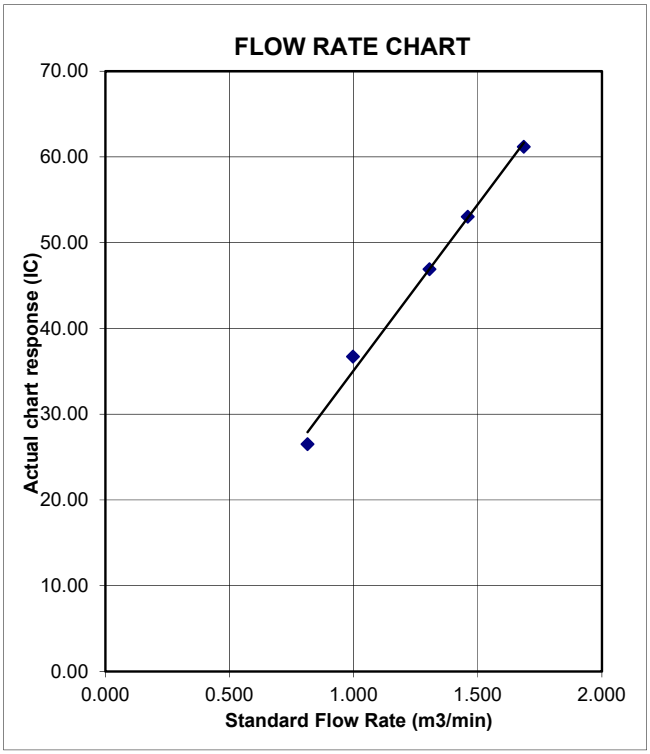
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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:	1/2/2020
Location ID : AM8		Next Calibration Date:	1/4/2020
		Technician:	Eric

CONDITIONS

Sea Level Pressure (hPa)	1022.4	Corrected Pressure (mm Hg)	766.8
Temperature (°C)	16.0	Temperature (K)	289

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	6.4	6.4	12.8	1.741	54	55.08	Slope = 38.0133
13	4.8	4.8	9.6	1.508	48	48.96	Intercept = -9.4426
10	3.8	3.8	7.6	1.341	42	42.84	Corr. coeff. = 0.9956
7	2.3	2.3	4.6	1.044	30	30.60	
5	1.4	1.4	2.8	0.814	20	20.40	

Calculations :

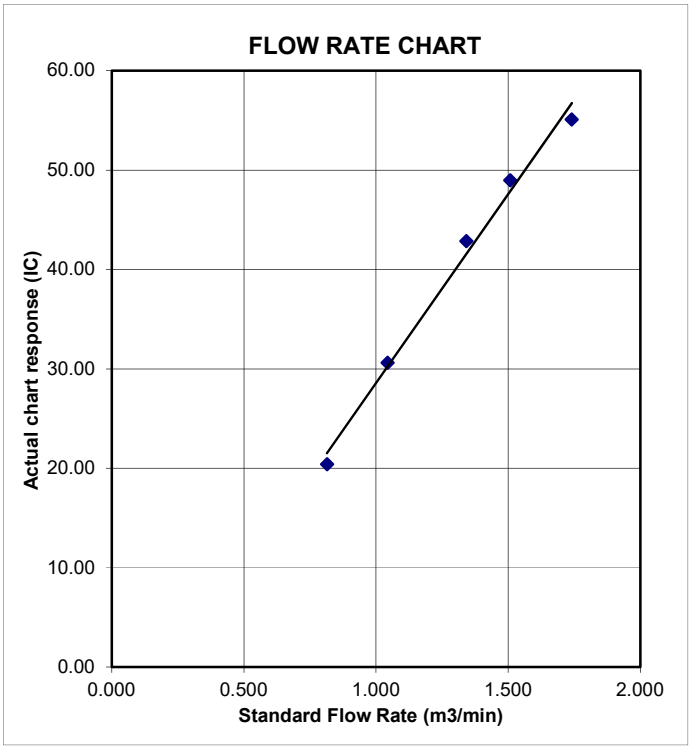
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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:	1/2/2020
Location ID : AM9b		Next Calibration Date:	1/4/2020
		Technician:	Eric

CONDITIONS

Sea Level Pressure (hPa)	1022.4	Corrected Pressure (mm Hg)	766.8
Temperature (°C)	16.0	Temperature (K)	289

CALIBRATION ORIFICE

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

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected
18	6.6	6.6	13.2	1.768	54	55.08
13	4.9	4.9	9.8	1.523	49	49.98
10	3.7	3.7	7.4	1.324	44	44.88
7	2.1	2.1	4.2	0.997	34	34.68
5	1.3	1.3	2.6	0.785	28	28.56

LINEAR REGRESSION

Slope = 27.5160
Intercept = 7.4352
Corr. coeff. = 0.9972

Calculations :

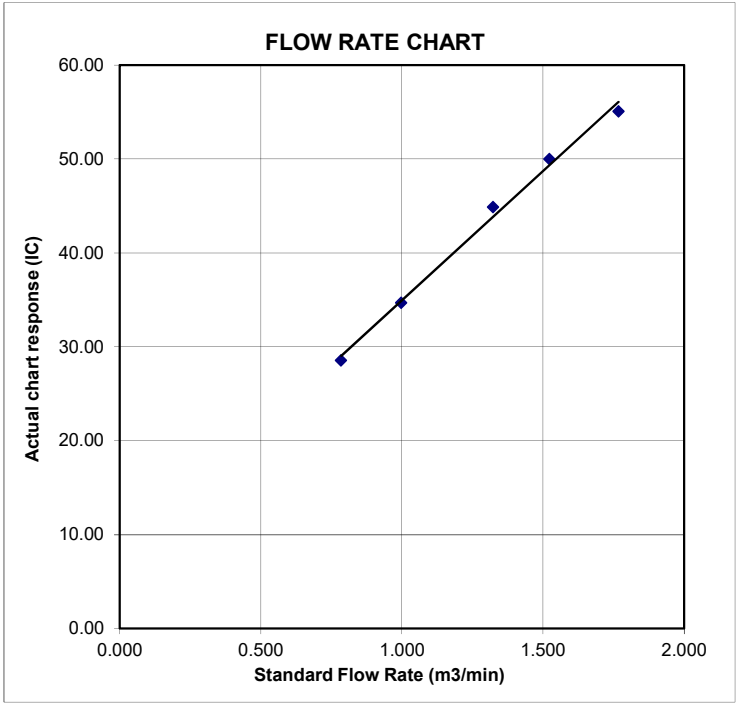
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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 7, 2021

Certificate of Calibration

Calibration Certification Information				
Cal. Date:	February 7, 2020	**Rootsmeter S/N:** 438320	**Ta:** 295	°K
Operator:	Jim Tisch		**Pa:** 745.5	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	1.3730	3.2	2.00
2	3	4	1	0.9820	6.4	4.00
3	5	6	1	0.8780	8.0	5.00
4	7	8	1	0.8340	8.8	5.50
5	9	10	1	0.6900	12.8	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)
0.9866	0.7186	1.4078	0.9957	0.7252	0.8896
0.9824	1.0004	1.9909	0.9914	1.0096	1.2581
0.9802	1.1165	2.2259	0.9893	1.1267	1.4066
0.9792	1.1741	2.3345	0.9882	1.1849	1.4753
0.9739	1.4114	2.8155	0.9828	1.4244	1.7792
QSTD	**m=**	**2.03014**	**QA**	**m=**	**1.27124**
	b=	**-0.04616**		**b=**	**-0.02917**
	r=	**0.99995**		**r=**	**0.99995**

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

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FAX: (513)467-9009

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

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

General Comments

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

Signatories

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

Signatories	*Position*
Richard Fung	General Manager

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

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

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

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

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

Equipment Verification Report (TSP)

Equipment Calibrated:

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

Standard Equipment:

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

Equipment Verification Results:

Calibration Date: 11 March 2019

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

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

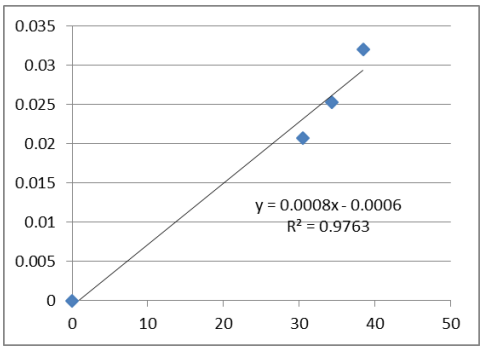
Sensitivity Adjustment Scale Setting (After Calibration) 656 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0008

Correlation Coefficient (R) 0.9881

Date of Issue 18 March 2019



Remarks:

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

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

Operator : Fai So Signature : Date : 18 March 2019

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

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

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

CONDITIONS

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

CALIBRATION ORIFICE

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

CALIBRATION

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

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart respones

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

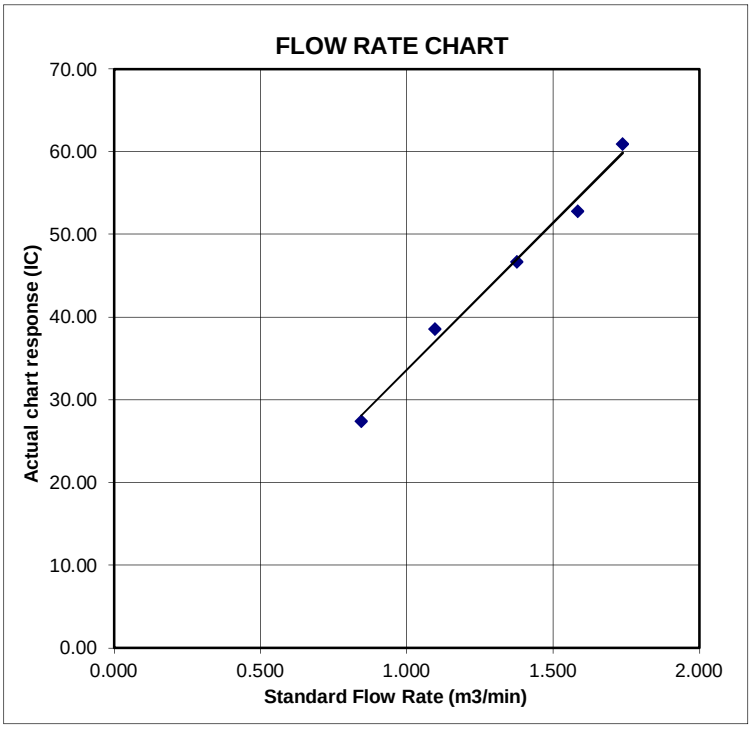
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TISCH Environmental

RECALIBRATION DUE DATE:
February 13, 2019

Certificate of Calibration

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

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

Data Tabulation

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

Calculations

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

For subsequent flow rate calculations:

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

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

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

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

RECALIBRATION

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

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ALS Technichem (HK) Pty Ltd

ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

SUB-CONTRACTING REPORT

CONTACT	: MR BEN TAM	WORK ORDER	:	**HK2012986**
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	:	6-APR-2020
		DATE OF ISSUE	:	7-APR-2020
PROJECT	: ----	NO. OF SAMPLES	:	1
		CLIENT ORDER	:	---

General Comments

- **Sample(s) was/ were submitted by client. Sample(s) arrived laboratory in ambient condition. The result(s) related only to the item(s) tested.**
- **Sample information (Project name, Sample ID, Sampling date/time, etc., if any) is provided by client.**
- **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	Managing Director

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

All pages of this report have been checked and approved for release.

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WORK ORDER	:	HK2012986
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.
HK2012986-001	S/N: 3Y6501	AIR	06-Apr-2020	S/N: 3Y6501

Equipment Verification Report (TSP)

Equipment Calibrated:

Type:	Laser Dust monitor
Manufacturer:	Sibata LD-3B
Serial No.	3Y6501
Equipment Ref:	EQ111
Job Order	HK2012986

Standard Equipment:

Standard Equipment:	Higher Volume Sampler
Location & Location ID:	AUES office (calibration room)
Equipment Ref:	HVS 018
Last Calibration Date:	9 March 2020

Equipment Verification Results:

Verification Date: 13 March 2020

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m^3 (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr	09:20 ~ 11:20	21.4	1015.7	0.044	2250	18.8
2hr01min	11:25 ~ 13:26	21.4	1015.7	0.045	2711	22.5
2hr01min	13:42 ~ 15:43	21.4	1015.7	0.046	2311	19.2

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

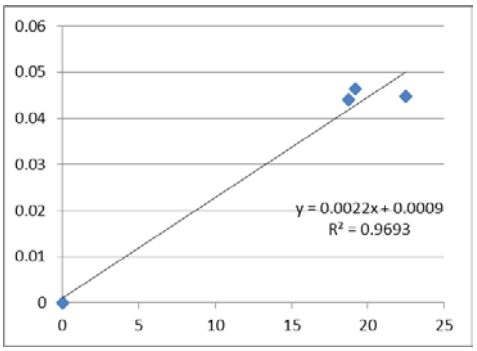
Sensitivity Adjustment Scale Setting (After Calibration) 656 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022

Correlation Coefficient (R) 0.9845

Date of Issue 16 March 2020



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 : Fai So Signature : Date : 16 March 2020

QC Reviewer : Ben Tam Signature : Date : 16 March 2020

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Gold King Industrial Building, Kwai Chung	Date of Calibration:	9-Mar-20
Location ID :	Calibration Room	Next Calibration Date:	9-Jun-20

CONDITIONS

Sea Level Pressure (hPa)	1008.5	Corrected Pressure (mm Hg)	756.375
Temperature (°C)	23.4	Temperature (K)	296

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.03014
Model->	5025A	Qstd Intercept ->	-0.04616
Calibration Date->	7-Feb-20	Expiry Date->	7-Feb-21

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.1	6.1	12.2	1.744	55	55.02	Slope = 36.8508
13	4.9	4.9	9.8	1.565	49	49.01	Intercept = -8.9222
10	3.8	3.8	7.6	1.381	42	42.01	Corr. coeff. = 0.9997
8	2.4	2.4	4.8	1.102	32	32.01	
5	1.4	1.4	2.8	0.847	22	22.01	

Calculations :

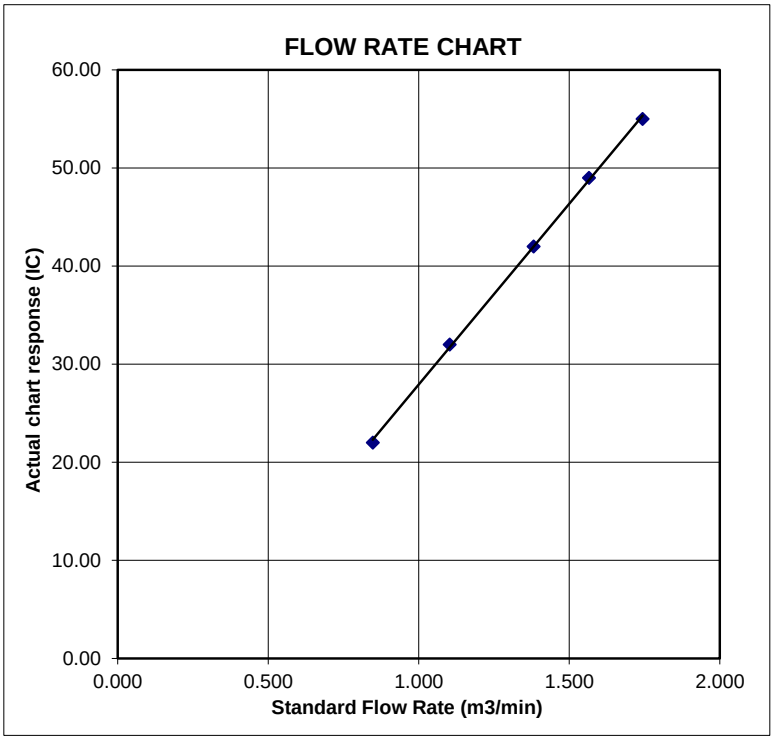
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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 7, 2021

Certificate of Calibration

Calibration Certification Information				
Cal. Date:	February 7, 2020	**Rootsmeter S/N:** 438320	**Ta:** 295	°K
Operator:	Jim Tisch		**Pa:** 745.5	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	1.3730	3.2	2.00
2	3	4	1	0.9820	6.4	4.00
3	5	6	1	0.8780	8.0	5.00
4	7	8	1	0.8340	8.8	5.50
5	9	10	1	0.6900	12.8	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)
0.9866	0.7186	1.4078	0.9957	0.7252	0.8896
0.9824	1.0004	1.9909	0.9914	1.0096	1.2581
0.9802	1.1165	2.2259	0.9893	1.1267	1.4066
0.9792	1.1741	2.3345	0.9882	1.1849	1.4753
0.9739	1.4114	2.8155	0.9828	1.4244	1.7792
QSTD	**m=**	**2.03014**	**QA**	**m=**	**1.27124**
	b=	**-0.04616**		**b=**	**-0.02917**
	r=	**0.99995**		**r=**	**0.99995**

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

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FAX: (513)467-9009

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ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

SUB-CONTRACTING REPORT

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

General Comments

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

Signatories

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

Signatories	*Position*
Richard Fung	General Manager

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

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

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

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

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

Equipment Verification Report (TSP)

Equipment Calibrated:

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

Standard Equipment:

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

Equipment Verification Results:

Calibration Date: 11 March 2019

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

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

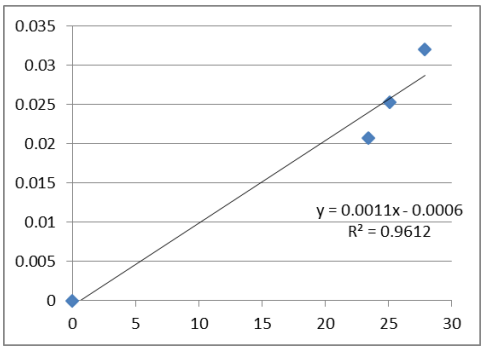
Sensitivity Adjustment Scale Setting (After Calibration) 685 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0011

Correlation Coefficient (R) 0.9804

Date of Issue 18 March 2019



Remarks:

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

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

Operator : Fai So Signature : Date : 18 March 2019

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

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

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

CONDITIONS

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

CALIBRATION ORIFICE

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

CALIBRATION

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

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart respones

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

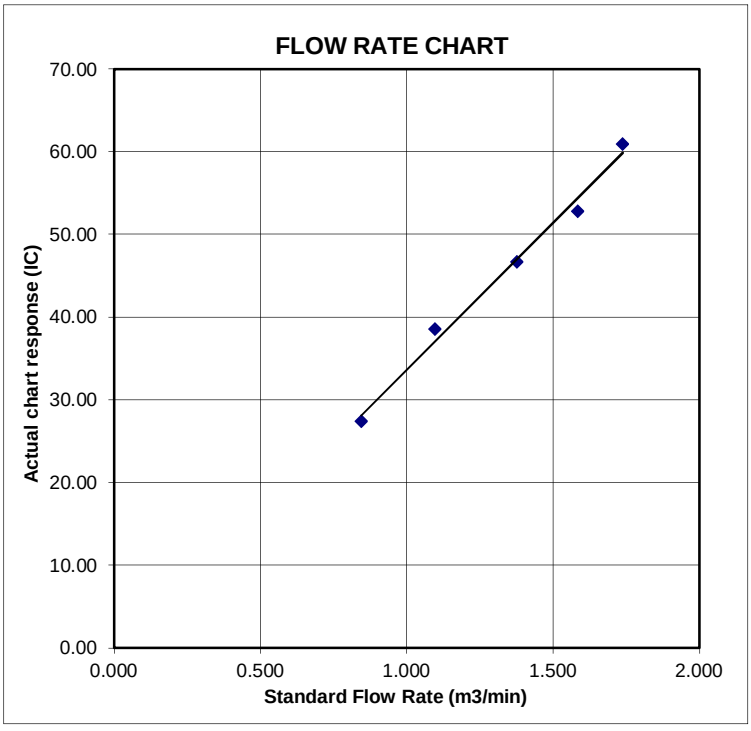
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TISCH Environmental

RECALIBRATION DUE DATE:
February 13, 2019

Certificate of Calibration

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

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

Data Tabulation

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

Calculations

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

For subsequent flow rate calculations:

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

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

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

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

RECALIBRATION

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

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ALS Technichem (HK) Pty Ltd

ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

SUB-CONTRACTING REPORT

CONTACT	: MR BEN TAM	WORK ORDER	:	**HK2012985**
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 DATE RECEIVED DATE OF ISSUE	: : :	1 6-APR-2020 7-APR-2020
PROJECT	: ----	NO. OF SAMPLES CLIENT ORDER	: :	1 ----

General Comments

- **Sample(s) was/ were submitted by client. Sample(s) arrived laboratory in ambient condition. The result(s) related only to the item(s) tested.**
- **Sample information (Project name, Sample ID, Sampling date/time, etc., if any) is provided by client.**
- **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	Managing Director

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

All pages of this report have been checked and approved for release.

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WORK ORDER : HK2012985
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.
HK2012985-001	S/N: 366418	AIR	06-Apr-2020	S/N: 366418

Equipment Verification Report (TSP)

Equipment Calibrated:

Type:	Laser Dust monitor
Manufacturer:	Sibata LD-3B
Serial No.	366418
Equipment Ref:	EQ108
Job Order	HK2012985

Standard Equipment:

Standard Equipment:	Higher Volume Sampler
Location & Location ID:	AUES office (calibration room)
Equipment Ref:	HVS 018
Last Calibration Date:	9 March 2020

Equipment Verification Results:

Verification Date: 13 March 2020

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m^3 (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr	09:20 ~ 11:20	21.4	1015.7	0.044	2297	19.1
2hr01min	11:25 ~ 13:26	21.4	1015.7	0.045	2498	20.7
2hr01min	13:42 ~ 15:43	21.4	1015.7	0.046	2647	21.9

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

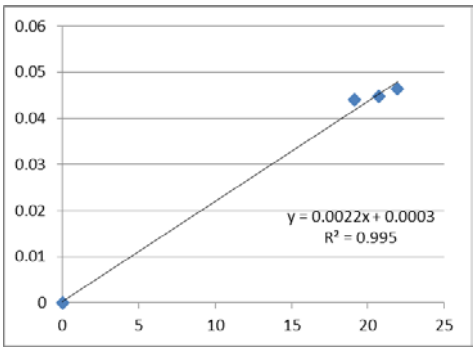
Sensitivity Adjustment Scale Setting (After Calibration) 685 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022

Correlation Coefficient (R) 0.9975

Date of Issue 16 March 2020



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 : Fai So Signature : Date : 16 March 2020

QC Reviewer : Ben Tam Signature : Date : 16 March 2020

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Gold King Industrial Building, Kwai Chung	Date of Calibration:	9-Mar-20
Location ID :	Calibration Room	Next Calibration Date:	9-Jun-20

CONDITIONS

Sea Level Pressure (hPa)	1008.5	Corrected Pressure (mm Hg)	756.375
Temperature (°C)	23.4	Temperature (K)	296

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.03014
Model->	5025A	Qstd Intercept ->	-0.04616
Calibration Date->	7-Feb-20	Expiry Date->	7-Feb-21

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.1	6.1	12.2	1.744	55	55.02	Slope = 36.8508
13	4.9	4.9	9.8	1.565	49	49.01	Intercept = -8.9222
10	3.8	3.8	7.6	1.381	42	42.01	Corr. coeff. = 0.9997
8	2.4	2.4	4.8	1.102	32	32.01	
5	1.4	1.4	2.8	0.847	22	22.01	

Calculations :

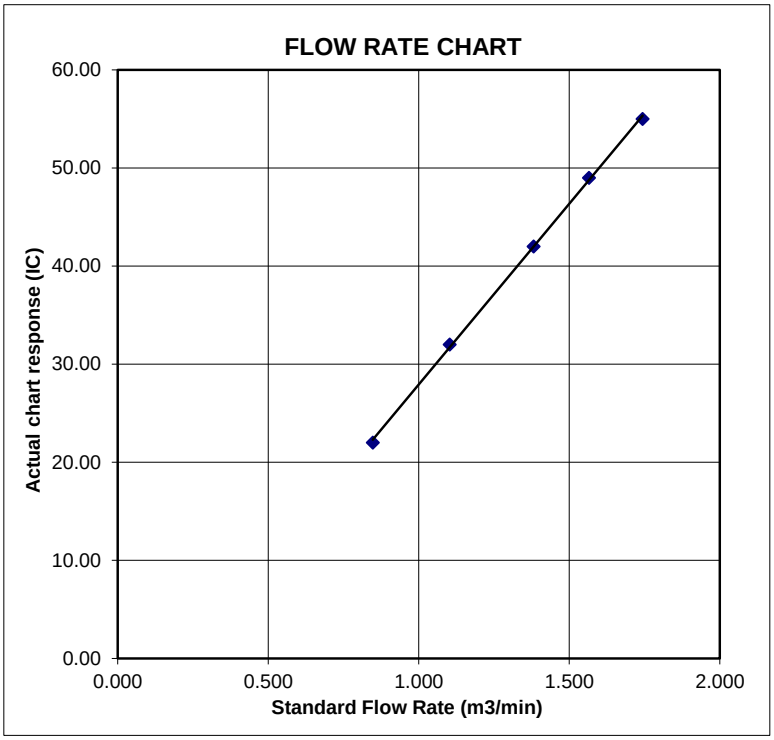
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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 7, 2021

Certificate of Calibration

Calibration Certification Information				
Cal. Date:	February 7, 2020	**Rootsmeter S/N:** 438320	**Ta:** 295	°K
Operator:	Jim Tisch		**Pa:** 745.5	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	1.3730	3.2	2.00
2	3	4	1	0.9820	6.4	4.00
3	5	6	1	0.8780	8.0	5.00
4	7	8	1	0.8340	8.8	5.50
5	9	10	1	0.6900	12.8	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)
0.9866	0.7186	1.4078	0.9957	0.7252	0.8896
0.9824	1.0004	1.9909	0.9914	1.0096	1.2581
0.9802	1.1165	2.2259	0.9893	1.1267	1.4066
0.9792	1.1741	2.3345	0.9882	1.1849	1.4753
0.9739	1.4114	2.8155	0.9828	1.4244	1.7792
QSTD	**m=**	**2.03014**	**QA**	**m=**	**1.27124**
	b=	**-0.04616**		**b=**	**-0.02917**
	r=	**0.99995**		**r=**	**0.99995**

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

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ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

SUB-CONTRACTING REPORT

CONTACT	:	MR BEN TAM	WORK ORDER	:	**HK1912129**
CLIENT	:	**ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING**			
ADDRESS	:	RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T. HONG KONG	SUB-BATCH	:	1
			DATE RECEIVED	:	20-MAR-2019
			DATE OF ISSUE	:	22-MAR-2019
PROJECT	:	----	NO. OF SAMPLES	:	1
			CLIENT ORDER	:	

General Comments

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

Signatories

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

Signatories	*Position*
Richard Fung	General Manager

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

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

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WORK ORDER	:	HK1912129
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.
HK1912129-001	S/N: 366407	AIR	20-Mar-2019	366407

Equipment Verification Report (TSP)

Equipment Calibrated:

Type:	Laser Dust monitor
Manufacturer:	Sibata LD-3B
Serial No.	366407
Equipment Ref:	EQ107
Job Order	HK1912129

Standard Equipment:

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

Equipment Verification Results:

Testing Date: 11 March 2019

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m^3 (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr00min	09:21 ~ 11:21	18.4	1014.9	0.021	2514	21.0
2hr00min	11:30 ~ 13:30	18.4	1014.9	0.025	2861	23.8
2hr00min	13:40 ~ 15:40	18.4	1014.9	0.032	3211	26.8

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

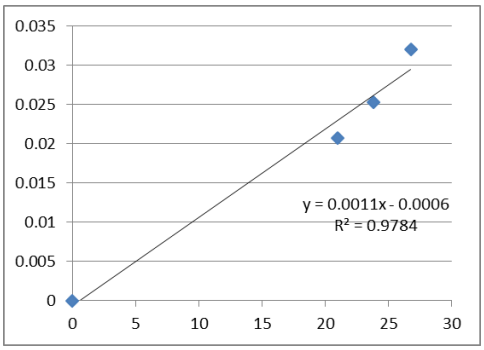
Sensitivity Adjustment Scale Setting (After Calibration) 566 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0011

Correlation Coefficient (R) 0.9891

Date of Issue 18 March 2019



Remarks:

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

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

Operator : Fai So Signature : Date : 18 March 2019

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

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

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

CONDITIONS

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

CALIBRATION ORIFICE

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

CALIBRATION

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

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart respones

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

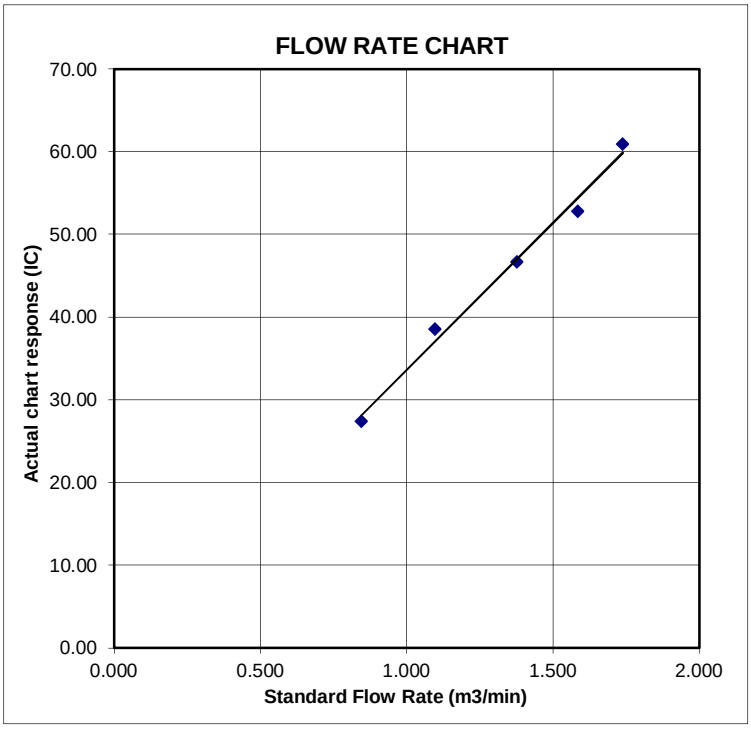
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TISCH Environmental

RECALIBRATION DUE DATE:
February 13, 2019

Certificate of Calibration

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

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

Data Tabulation

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

Calculations

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

For subsequent flow rate calculations:

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

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

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

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

RECALIBRATION

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

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ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

SUB-CONTRACTING REPORT

CONTACT	: MR BEN TAM	WORK ORDER	:	**HK2012980**
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	:	6-APR-2020
		DATE OF ISSUE	:	7-APR-2020
PROJECT	: ----	NO. OF SAMPLES	:	1
		CLIENT ORDER	:	----

General Comments

- **Sample(s) was/ were submitted by client. Sample(s) arrived laboratory in ambient condition. The result(s) related only to the item(s) tested.**
- **Sample information (Project name, Sample ID, Sampling date/time, etc., if any) is provided by client.**
- **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	Managing Director

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

All pages of this report have been checked and approved for release.

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Part of the ALS Laboratory Group
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Tel. +852 2610 1044 Fax. +852 2610 2021 **www.alsglobal.com**

WORK ORDER : HK2012980
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.
HK2012980-001	S/N: 366407	AIR	06-Apr-2020	S/N: 366407

Equipment Verification Report (TSP)

Equipment Calibrated:

Type:	Laser Dust monitor
Manufacturer:	Sibata LD-3B
Serial No.	366407
Equipment Ref:	EQ107
Job Order	HK2012980

Standard Equipment:

Standard Equipment:	Higher Volume Sampler
Location & Location ID:	AUES office (calibration room)
Equipment Ref:	HVS 018
Last Calibration Date:	9 March 2020

Equipment Verification Results:

Verification Date: 13 March 2020

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m^3 (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr	09:20 ~ 11:20	21.4	1015.7	0.044	2247	18.7
2hr01min	11:25 ~ 13:26	21.4	1015.7	0.045	2518	20.9
2hr01min	13:42 ~ 15:43	21.4	1015.7	0.046	2699	22.4

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

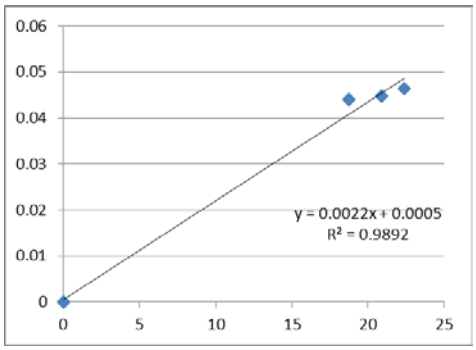
Sensitivity Adjustment Scale Setting (After Calibration) 566 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022

Correlation Coefficient (R) 0.9946

Date of Issue 16 March 2020



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 : Fai So Signature : Date : 16 March 2020

QC Reviewer : Ben Tam Signature : Date : 16 March 2020

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Gold King Industrial Building, Kwai Chung	Date of Calibration:	9-Mar-20
Location ID :	Calibration Room	Next Calibration Date:	9-Jun-20

CONDITIONS

Sea Level Pressure (hPa)	1008.5	Corrected Pressure (mm Hg)	756.375
Temperature (°C)	23.4	Temperature (K)	296

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.03014
Model->	5025A	Qstd Intercept ->	-0.04616
Calibration Date->	7-Feb-20	Expiry Date->	7-Feb-21

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.1	6.1	12.2	1.744	55	55.02	Slope = 36.8508
13	4.9	4.9	9.8	1.565	49	49.01	Intercept = -8.9222
10	3.8	3.8	7.6	1.381	42	42.01	Corr. coeff. = 0.9997
8	2.4	2.4	4.8	1.102	32	32.01	
5	1.4	1.4	2.8	0.847	22	22.01	

Calculations :

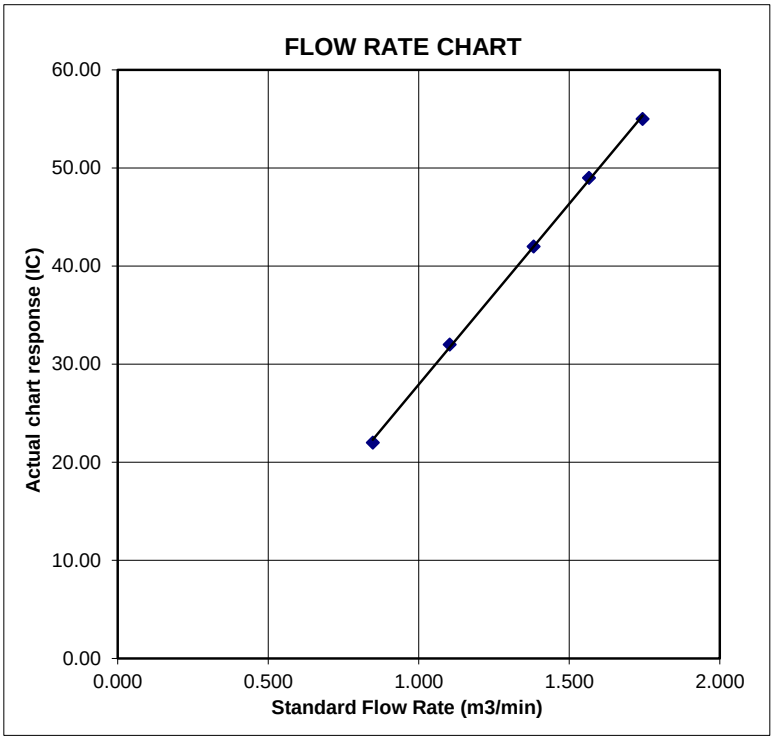
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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 7, 2021

Certificate of Calibration

Calibration Certification Information				
Cal. Date:	February 7, 2020	**Rootsmeter S/N:** 438320	**Ta:** 295	°K
Operator:	Jim Tisch		**Pa:** 745.5	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	1.3730	3.2	2.00
2	3	4	1	0.9820	6.4	4.00
3	5	6	1	0.8780	8.0	5.00
4	7	8	1	0.8340	8.8	5.50
5	9	10	1	0.6900	12.8	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)
0.9866	0.7186	1.4078	0.9957	0.7252	0.8896
0.9824	1.0004	1.9909	0.9914	1.0096	1.2581
0.9802	1.1165	2.2259	0.9893	1.1267	1.4066
0.9792	1.1741	2.3345	0.9882	1.1849	1.4753
0.9739	1.4114	2.8155	0.9828	1.4244	1.7792
QSTD	**m=**	**2.03014**	**QA**	**m=**	**1.27124**
	b=	**-0.04616**		**b=**	**-0.02917**
	r=	**0.99995**		**r=**	**0.99995**

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

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ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

SUB-CONTRACTING REPORT

CONTACT	: MR BEN TAM	WORK ORDER	:	**HK2001298**
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	:	6-JAN-2020
		DATE OF ISSUE	:	10-JAN-2020
PROJECT	: ----	NO. OF SAMPLES	:	1
		CLIENT ORDER	:	---

General Comments

- **Sample(s) was/ were submitted by client. Sample(s) arrived laboratory in ambient condition. The result(s) related only to the item(s) tested.**
- **Sample information (Project name, Sample ID, Sampling date/time, etc., if any) is provided by client.**
- **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	Managing Director

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

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

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WORK ORDER : HK2001298
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.
HK2001298-001	S/N: 2X6145	AIR	06-Jan-2020	S/N: 2X6145

Equipment Verification Report (TSP)

Equipment Calibrated:

Type:	Laser Dust monitor
Manufacturer:	Sibata LD-3B
Serial No.	2X6145
Equipment Ref:	EQ105
Job Order	HK2001298

Standard Equipment:

Standard Equipment:	Higher Volume Sampler
Location & Location ID:	AUES office (calibration room)
Equipment Ref:	HVS 018
Last Calibration Date:	3 December 2019

Equipment Verification Results:

Testing Date: 27&31 December 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)
2hr	09:08 ~ 11:10	18.0	1020.3	0.040	2254	18.8
2hr	11:15 ~ 13:16	19.2	1024.9	0.048	2561	21.3
2hr15min	13:22 ~ 15:23	19.2	1024.9	0.034	1841	13.6

Sensitivity Adjustment Scale Setting (Before Calibration) 586 (CPM)

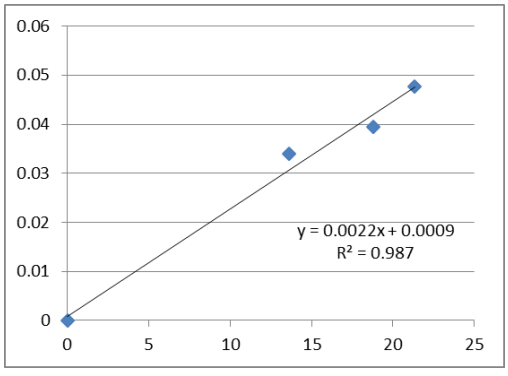
Sensitivity Adjustment Scale Setting (After Calibration) 586 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022

Correlation Coefficient 0.9935

Date of Issue 6 January 2020



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 : Fai So Signature : Date : 6 January 2020

QC Reviewer : Ben Tam Signature : Date : 6 January 2020

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Gold King Industrial Building, Kwai Chung	Date of Calibration:	3-Dec-19
Location ID :	Calibration Room	Next Calibration Date:	3-Mar-20

CONDITIONS

Sea Level Pressure (hPa)	1023.1	Corrected Pressure (mm Hg)	767.325
Temperature (°C)	16.4	Temperature (K)	289

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.0968
Model->	5025A	Qstd Intercept ->	-0.00065
Calibration Date->	5-Feb-19	Expiry Date->	5-Feb-20

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	1.754	53	54.04	Slope = 36.7338
13	5.2	5.2	10.4	1.569	48	48.94	Intercept = -9.6198
10	4.1	4.1	8.2	1.393	41	41.80	Corr. coeff. = 0.9986
8	2.6	2.6	5.2	1.109	30	30.59	
5	1.6	1.6	3.2	0.870	22	22.43	

Calculations :

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

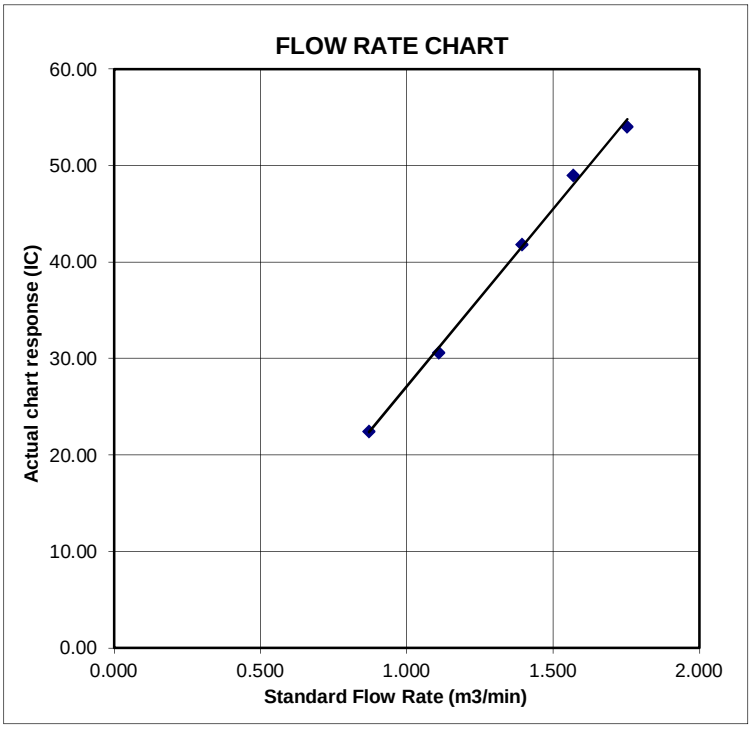
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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

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Sun Creation Engineering Limited
Calibration & Testing Laboratory

Certificate of Calibration
校正證書

Certificate No. : C193785
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC19-1098) Date of Receipt / 收件日期 : 5 July 2019

Description / 儀器名稱 : Sound Level Meter (EQ013)
Manufacturer / 製造商 : Rion
Model No. / 型號 : NL-52
Serial No. / 編號 : 00921191
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

DATE OF TEST / 測試日期 : 17 July 2019

TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.
The results do not exceed manufacturer's specification. (after adjustment)
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :
- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- The Bruel & Kjaer Calibration Laboratory, Denmark
- Agilent Technologies / Keysight Technologies
- Fluke Everett Service Center, USA

Tested By 測試 : Cheuk
K P Cheuk
Assistant Engineer

Certified By 核證 :
K C Lee
Engineer

Date of Issue 簽發日期 : 22 July 2019

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

Certificate of Calibration
校正證書

Certificate No. : C193785
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 the internal standard (After Adjustment) was performed before the test 6.1.1.2 to 6.3.2.

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

4. Test equipment :

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C190176
CL281	Multifunction Acoustic Calibrator	CDK1806821

5. Test procedure : MA101N.

6. Results :

6.1 Sound Pressure Level

6.1.1 Reference Sound Pressure Level

6.1.1.1 Before Adjustment

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	* 92.8	± 1.1

* Out of IEC 61672 Class 1 Spec.

6.1.1.2 After Adjustment

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	94.0	± 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	94.0 (Ref.)
				104.00		104.0
				114.00		114.0

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

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Certificate of Calibration
校正證書

Certificate No. : C193785
證書編號

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	94.0	Ref.
			Slow			94.0	± 0.3

6.3 Frequency Weighting

6.3.1 A-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 130	L_A	A	Fast	94.00	63 Hz	67.8	-26.2 ± 1.5
					125 Hz	77.8	-16.1 ± 1.5
					250 Hz	85.4	-8.6 ± 1.4
					500 Hz	90.8	-3.2 ± 1.4
					1 kHz	94.0	Ref.
					2 kHz	95.3	+1.2 ± 1.6
					4 kHz	95.1	+1.0 ± 1.6
					8 kHz	93.0	-1.1 (+2.1 ; -3.1)
					12.5 kHz	89.6	-4.3 (+3.0 ; -6.0)

6.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 130	L_C	C	Fast	94.00	63 Hz	93.2	-0.8 ± 1.5
					125 Hz	93.8	-0.2 ± 1.5
					250 Hz	94.0	0.0 ± 1.4
					500 Hz	94.1	0.0 ± 1.4
					1 kHz	94.0	Ref.
					2 kHz	93.9	-0.2 ± 1.6
					4 kHz	93.3	-0.8 ± 1.6
					8 kHz	91.1	-3.0 (+2.1 ; -3.1)
					12.5 kHz	87.7	-6.2 (+3.0 ; -6.0)

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

Certificate of Calibration
校正證書

Certificate No. : C193785
證書編號

Remarks : - UUT Microphone Model No. : UC-59 & S/N : 12910

- Mfr's Spec. : IEC 61672 Class 1

- Uncertainties of Applied Value :

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

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

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

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

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

Certificate of Calibration
校正證書

Certificate No. : C193752
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC19-1098) Date of Receipt / 收件日期 : 9 July 2019

Description / 儀器名稱 : Sound Calibrator (EQ086)
Manufacturer / 製造商 : Rion
Model No. / 型號 : NC-74
Serial No. / 編號 : 34657230
Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

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

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 16 July 2019

TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.
The results do not exceed manufacturer's specification.
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :
- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- The Bruel & Kjaer Calibration Laboratory, Denmark
- Agilent Technologies / Keysight Technologies
- Fluke Everett Service Center, USA

Tested By 測試 : Cheuk
K P Cheuk
Assistant Engineer

Certified By 核證 :
K C Lee
Engineer

Date of Issue 簽發日期 : 22 July 2019

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

Certificate of Calibration
校正證書

Certificate No. : C193752
證書編號

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

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

3. Test equipment :

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

4. Test procedure : MA100N.

5. Results :

5.1 Sound Level Accuracy

UUT Nominal Value	Measured Value (dB)	Mfr's Spec. (dB)	Uncertainty of Measured Value (dB)
94 dB, 1 kHz	94.1	± 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.

Sun Creation Engineering Limited – Calibration & Testing Laboratory
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Sun Creation Engineering Limited
Calibration & Testing Laboratory

Certificate of Calibration
校正證書

Certificate No. : C193172
證書編號

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

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

TEST CONDITIONS / 測試條件

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

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 19 June 2019

TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.
The results do not exceed manufacturer's specification.
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :
- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- The Bruel & Kjaer Calibration Laboratory, Denmark
- Agilent Technologies / Keysight Technologies
- Fluke Everett Service Center, USA

Tested By 測試 : Cheuk
K P Cheuk
Assistant Engineer

Certified By 核證 :
K C Lee
Engineer

Date of Issue 簽發日期 : 20 June 2019

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

Certificate of Calibration
校正證書

Certificate No. : C193172
證書編號

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

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

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

4. Test equipment :

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C190176
CL281	Multifunction Acoustic Calibrator	CDK1806821

5. Test procedure : MA101N.

6. Results :

6.1 Sound Pressure Level

6.1.1 Reference Sound Pressure Level

6.1.1.1 Before Self-calibration

UUT Setting				Applied Value		UUT Reading (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
52 - 132	L_{AFP}	A	F	94.00	1	94.3

6.1.1.2 After Self-calibration

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
52 - 132	L_{AFP}	A	F	94.00	1	94.0	± 0.7

6.1.2 Linearity

UUT Setting				Applied Value		UUT Reading (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
52 - 132	L_{AFP}	A	F	94.00	1	94.0 (Ref.)
				104.00		104.0
				114.00		113.9

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

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Certificate of Calibration
校正證書

Certificate No. : C193172
證書編號

6.2 Time Weighting

6.2.1 Continuous Signal

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
52 - 132	L_{AFP}	A	F	94.00	1	94.0	Ref.
	L_{ASP}		S			94.0	± 0.1
	L_{AIP}		I			94.1	± 0.1

6.2.2 Tone Burst Signal (2 kHz)

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

6.3 Frequency Weighting

6.3.1 A-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
52 - 132	L_{AFP}	A	F	94.00	31.5 Hz	54.5	-39.4 ± 1.5
					63 Hz	67.8	-26.2 ± 1.5
					125 Hz	77.8	-16.1 ± 1.0
					250 Hz	85.3	-8.6 ± 1.0
					500 Hz	90.7	-3.2 ± 1.0
					1 kHz	94.0	Ref.
					2 kHz	95.2	+1.2 ± 1.0
					4 kHz	94.9	+1.0 ± 1.0
					8 kHz	92.8	-1.1 (+1.5 ; -3.0)
					12.5 kHz	89.7	-4.3 (+3.0 ; -6.0)

Certificate of Calibration
校正證書

Certificate No. : C193172
證書編號

6.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
52 - 132	L_{CFP}	C	F	94.00	31.5 Hz	90.9	-3.0 ± 1.5
					63 Hz	93.2	-0.8 ± 1.5
					125 Hz	93.8	-0.2 ± 1.0
					250 Hz	94.0	0.0 ± 1.0
					500 Hz	94.0	0.0 ± 1.0
					1 kHz	94.0	Ref.
					2 kHz	93.8	-0.2 ± 1.0
					4 kHz	93.1	-0.8 ± 1.0
					8 kHz	90.9	-3.0 (+1.5 ; -3.0)
					12.5 kHz	87.8	-6.2 (+3.0 ; -6.0)

6.4 Time Averaging

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

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

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

- Uncertainties of Applied Value :

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

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

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

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

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N.T., Hong Kong
T: +852 2610 1044 | F: +852 2610 2021

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT:	MR BEN TAM	WORK ORDER:	HK2001852
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:	13-Jan-2020
		DATE OF ISSUE:	17-Jan-2020

COMMENTS

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

Scope of Test:	Dissolved Oxygen and Temperature
Equipment Type:	Dissolved Oxygen Meter
Brand Name/ Model No.:	YSI 550A
Serial No./ Equipment No.:	05F2063AZ
Date of Calibration:	16-Jan-2020

NOTES

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

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

Ms. Lin Wai Yu, Iris
Assistant Manager - Inorganic

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

WORK ORDER: HK2001852

SUB-BATCH: 0
DATE OF ISSUE: 17-Jan-2020
CLIENT: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING

Equipment Type: Dissolved Oxygen Meter
Brand Name/ Model No.: YSI 550A
Serial No./ Equipment No.: 05F2063AZ
Date of Calibration: 16-Jan-2020 Date of Next Calibration: 16-Apr-2020

PARAMETERS:

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

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
4.95	4.87	-0.08
6.06	6.08	+0.02
7.20	7.39	+0.19
	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)
11.0	11.1	+0.1
21.0	20.2	-0.8
41.0	39.4	-1.6
	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, Iris
Assistant Manager - Inorganic

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REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT:	MR BEN TAM	WORK ORDER:	HK2001850
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:	13-Jan-2020
		DATE OF ISSUE:	17-Jan-2020

COMMENTS

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

Scope of Test:	Turbidity
Equipment Type:	Turbidimeter
Brand Name/ Model No.:	Hach 2100Q
Serial No./ Equipment No.:	11030C008499
Date of Calibration:	16-Jan-2020

NOTES

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

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

Ms. Lin Wai Yu, Iris
Assistant Manager - Inorganic

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

WORK ORDER: HK2001850

SUB-BATCH: 0
DATE OF ISSUE: 17-Jan-2020
CLIENT: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING

Equipment Type: Turbidimeter
Brand Name/ Model No.: Hach 2100Q
Serial No./ Equipment No.: 11030C008499
Date of Calibration: 16-Jan-2020 Date of Next Calibration: 16-Apr-2020

PARAMETERS:
Turbidity

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

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.39	--
4	4.22	+5.5
40	36.8	-8.0
80	73.6	-8.0
400	385	-3.8
800	739	-7.6
	Tolerance Limit (%)	±10.0

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

Ms. Lin Wai Yu, Iris
Assistant Manager - Inorganic

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REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT:	MR BEN TAM	WORK ORDER:	HK2006620
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:	21-Feb-2020
		DATE OF ISSUE:	26-Feb-2020

SPECIFIC COMMENTS

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

Scope of Test:	pH Value and Temperature
Equipment Type:	pH meter
Brand Name/ Model No.:	AZ8685
Serial No./ Equipment No.:	1168272
Date of Calibration:	26-Feb-2020

GENERAL COMMENTS

This is the Final Report and supersedes any preliminary report with this batch number.
All pages of this report have been checked and approved for release.

Ms. Lin Wai Yu, Iris
Assistant Manager - Inorganic

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

WORK ORDER: HK2006620

SUB-BATCH: 0
DATE OF ISSUE: 26-Feb-2020
CLIENT: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING

Equipment Type: pH meter
Brand Name/ Model No.: AZ8685
Serial No./ Equipment No.: 1168272
Date of Calibration: 26-Feb-2020 Date of Next Calibration: 26-May-2020

PARAMETERS:

pH Value

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

Expected Reading (pH unit)	Displayed Reading (pH unit)	Tolerance (pH unit)
4.0	4.00	+0.00
7.0	7.10	+0.10
10.0	10.00	+0.00
	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)
10.0	10.0	+0.0
20.0	20.0	+0.0
39.0	38.5	-0.5
	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, Iris
Assistant 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
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，
of testing and calibration laboratories and it has been accredited for performing specific tests or calibrations as
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
listed in the HOKLAS Directory of Accredited Laboratories within the test category of
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
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
quality management system (see joint IAF-ILAC-ISO Communiqué).
(見國際認可論壇、國際實驗所認可合作組織及國際標準化組織的聯合公報)。

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

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

Registration Number : HOKLAS 066
註冊號碼：

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

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

Event and Action Plan for Construction Noise

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

Event and Action Plan for Water Quality

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
Action level being exceeded by one sampling day	1. Repeat in-situ measurement to confirm findings; 2. Identify reasons for non-compliance and sources of impact; 3. Inform IEC and Contractor; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC and Contractor; 6. Repeat measurement on next day of exceedance.	1. Discuss with ET and Contractor on the mitigation measures; 2. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; 3. Assess the effectiveness of the implemented mitigation measures	1. Discuss with IEC on the proposed mitigation measures; 2. Make agreement on the mitigation measures to be implemented; 3. Assess the effectiveness of the implemented mitigation measures	1. Inform the ER and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of working methods; 5. Discuss with ET and IEC and propose mitigation measures to IEC and ER; 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; 2. Identify reasons for non-compliance and sources of impact; 3. Inform IEC and Contractor; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC and Contractor; 6. Ensure mitigation measures are implemented; 7. Prepare to increase the monitoring frequency to daily; 8. Repeat measurement on next day of exceedance.	1. Discuss with ET and Contractor on the mitigation measures; 2. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; 3. Assess the effectiveness of the implemented mitigation measures	1. Discuss with IEC on the proposed mitigation measures; 2. Make agreement on the mitigation measures to be implemented; 3. Assess the effectiveness of the implemented mitigation measures	1. Inform the ER and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of working methods; 5. Discuss with ET and IEC and propose mitigation measures to IEC and ER within 3 working days; 6. Implement the agreed mitigation measures.
Limit Level being exceeded by one sampling day	1. Repeat in-situ measurement to confirm findings; 2. Identify reasons for non-compliance and sources of impact; 3. Inform IEC, Contractor and EPD; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, ER and Contractor; 6. Ensure mitigation measures are implemented; 7. Increase the monitoring frequency to daily until no exceedance of Limit Level.	1. Discuss with ET and Contractor on the mitigation measures; 2. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; 3. Assess the effectiveness of the implemented mitigation measures	1. Discuss with IEC, ET and Contractor on the proposed mitigation measures; 2. Request Contractor to critically review the working methods; 3. Make agreement on the mitigation measures to be implemented; 4. Assess the effectiveness of the implemented mitigation measures	1. Inform the ER and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of working methods; 5. Discuss with ET, IEC and ER and propose mitigation measures to IEC and ER within 3 working days; 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; 2. Identify reasons for non-compliance and sources of impact; 3. Inform IEC, Contractor and EPD; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, ER and Contractor; 6. Ensure mitigation measures are implemented; 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; 2. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; 3. Assess the effectiveness of the implemented mitigation measures.	1. Discuss with IEC, ET and Contractor on the proposed mitigation measures; 2. Request Contractor to critically review the working methods; 3. Make agreement on the mitigation measures to be implemented; 4. Assess the effectiveness of the implemented mitigation measures; 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; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of working methods; 5. Discuss with ET, IEC and ER and propose mitigation measures to IEC and ER within 3 working days; 6. Implement the agreed mitigation measures; 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 – March 2020

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

	Monitoring Day
	Sunday or Public Holiday

Impact Monitoring Schedule for next Reporting Period – April 2020

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

Remark: There will be no construction activity during Easter holiday on 10 to 13 April 2020.

	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															
5-Mar-20	25310	17249.17	17273.18	1440.60	31	32	31.5	18.2	1019	1.11	1606	2.8318	2.8733	0.0415	26
11-Mar-20	25440	17273.18	17297.18	1440.00	31	32	31.5	18.3	1017	1.11	1604	2.8078	2.8782	0.0704	44
17-Mar-20	25515	17297.18	17321.18	1440.00	30	30	30.0	20.3	1018.7	1.07	1535	2.8473	2.9580	0.1107	72
23-Mar-20	25531	17321.18	17345.18	1440.00	31	32	31.5	20	1014.6	1.11	1598	2.8612	2.9401	0.0789	49
28-Mar-20	25539	17345.18	17369.18	1440.00	31	32	31.5	20.2	1014.9	1.11	1598	2.8818	2.9409	0.0591	37
AM2 - Village House near Lin Ma Hang Road															
5-Mar-20	25436	12867.12	12891.40	1456.80	38	38	38.0	18.2	1019.4	1.08	1577	2.7827	2.9675	0.1848	117
11-Mar-20	25439	12891.79	12916.00	1452.60	42	42	42.0	18.3	1017	1.20	1739	2.7673	3.0034	0.2361	136
17-Mar-20	25514	12916.00	12940.16	1449.60	44	44	44.0	20.3	1018.7	1.25	1815	2.8444	3.0820	0.2376	131
23-Mar-20	25438	12940.16	12964.31	1449.00	31	32	31.5	20	1014.6	0.89	1286	2.7831	2.9067	0.1236	96
28-Mar-20	25537	12964.31	12988.54	1453.80	31	32	31.5	20.2	1014.9	0.89	1290	2.8779	3.0083	0.1304	101
AM3 - Ta Kwu Ling Fire Service Station of Ta Kwu Ling Village															
5-Mar-20	25437	16583.44	16607.44	1440.00	30	30	30	18.2	1019.4	1.00	1433	2.7515	2.7855	0.0340	24
11-Mar-20	25441	16607.44	16631.44	1440.00	31	32	31.5	18.3	1017.1	1.04	1492	2.7557	2.8618	0.1061	71
17-Mar-20	25513	16631.44	16655.44	1440.00	34	34	34	20.3	1018.7	1.10	1589	2.8629	3.0107	0.1478	93
23-Mar-20	25407	16655.44	16679.45	1440.60	31	32	31.5	20	1014.2	1.03	1487	2.782	2.875	0.0930	63
28-Mar-20	25538	16679.45	16703.45	1440.00	31	32	31.5	20.2	1014.9	1.03	1486	2.8543	2.9537	0.0994	67
AM4b - House no. 10B1 Nga Yiu Ha Village															
3-Mar-20	25481	15975.92	15999.92	1440.00	37	37	37.0	17.3	1018.1	1.06	1527	2.7866	2.8695	0.0829	54
9-Mar-20	25410	15999.92	16023.91	1439.40	37	37	37.0	23.4	1008.5	1.04	1499	2.7914	2.8712	0.0798	53
14-Mar-20	25443	16023.91	16047.91	1440.00	35	35	35.0	21.6	1017.6	0.98	1417	2.7910	2.8850	0.0940	66
20-Mar-20	25503	16047.91	16071.92	1440.60	35	35	35.0	21.2	1015.4	0.98	1417	2.8240	2.9272	0.1032	73
26-Mar-20	25532	16071.92	16095.92	1440.00	35	35	35.0	23.3	1013.5	0.98	1409	2.8250	2.8890	0.0640	45
AM5a - Ping Yeung Village House															
3-Mar-20	25401	14798.93	14822.65	1423.20	24	24	24.0	17.3	1018.1	0.81	1156	2.7812	2.8858	0.1046	90
9-Mar-20	25409	14822.65	14846.43	1426.80	25	25	25.0	23.4	1008.5	0.83	1185	2.7689	2.8369	0.0680	57
14-Mar-20	25444	14846.43	14870.25	1429.20	25	25	25.0	21.6	1017.6	0.84	1194	2.7838	2.8891	0.1053	88
20-Mar-20	25504	14870.25	14894.06	1428.60	26	26	26.0	21.2	1015.4	0.86	1233	2.8307	2.9252	0.0945	77
26-Mar-20	25534	14894.06	14917.87	1428.60	25	25	25.0	23.3	1013.5	0.83	1189	2.8647	2.9317	0.0670	56
AM6 - Wo Keng Shan Village House															
3-Mar-20	25482	12421.09	12445.09	1440.00	32	32	32.0	17.3	1018.1	0.90	1292	2.8299	2.9440	0.1141	88
9-Mar-20	25408	12445.09	12469.09	1440.00	32	32	32.0	23.4	1008.5	0.88	1269	2.7674	2.8580	0.0906	71
14-Mar-20	25445	12469.09	12493.09	1440.00	32	32	32.0	21.6	1017.6	0.89	1280	2.7772	2.9282	0.1510	118

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)	
20-Mar-20	25505	12493.09	12517.09	1440.00	32	32	32.0	21.2	1015.4	0.89	1280	2.8388	2.9077	0.0689	54
26-Mar-20	25534	12517.09	12541.09	1440.00	30	30	30.0	23.3	1013.5	0.82	1179	2.8562	2.9649	0.1087	92
AM7b - Loi Tung Village House															
3-Mar-20	25402	21442.02	21466.02	1440.00	38	40	39	19.4	1018.2	1.11	1602	2.7707	2.8458	0.0751	47
9-Mar-20	25396	21466.02	21490.02	1440.00	37	38	37.5	18	1017.8	1.08	1549	2.8091	2.8785	0.0694	45
14-Mar-20	25447	21490.02	21514.02	1440.00	36	38	37	21.6	1017.6	1.06	1521	2.784	2.8915	0.1075	71
20-Mar-20	25508	21514.02	21538.02	1440.00	37	37	37	21.2	1015.4	1.06	1521	2.8379	2.9337	0.0958	63
26-Mar-20	25535	21538.02	21562.02	1440.00	35	35	35	23.3	1013.5	1.00	1440	2.8529	2.9093	0.0564	39
AM8 - Po Kat Tsai Village No. 4															
3-Mar-20	25408	15364.46	15388.46	1440.00	32	34	33.0	19.4	1018.2	1.13	1623	2.7766	2.8391	0.0625	39
9-Mar-20	25378	15388.47	15412.47	1440.00	31	32	31.5	18	1017.8	1.09	1568	2.7577	2.8012	0.0435	28
14-Mar-20	25376	15412.47	15436.47	1440.00	30	32	31.0	21.6	1017.6	1.07	1541	2.7794	2.9016	0.1222	79
20-Mar-20	25450	15436.47	15460.47	1440.00	31	32	31.5	21.2	1015.4	1.08	1560	2.7858	2.8722	0.0864	55
26-Mar-20	25377	15460.47	15484.47	1440.00	32	32	32.0	23.3	1013.5	1.09	1573	2.7956	2.8375	0.0419	27
AM9b - Nam Wa Po Village House No. 80															
5-Mar-20	25433	22736.44	22760.44	1440.00	26	28	27	18.2	1019.4	0.73	1045	2.7676	2.8077	0.0401	38
11-Mar-20	25442	22760.44	22784.44	1440.00	26	28	27	18.3	1017	0.72	1043	2.8109	2.9032	0.0923	89
17-Mar-20	25425	22784.44	22808.44	1440.00	26	28	27	20.3	1018.7	0.72	1039	2.8069	2.9008	0.0939	90
23-Mar-20	25563	22808.44	22832.44	1440.00	28	30	29	24.6	1014.2	0.78	1130	2.8444	2.876	0.0316	28
28-Mar-20	25427	22832.44	22856.44	1440.00	28	29	28.5	20.2	1014.9	0.77	1116	2.8112	2.8612	0.0500	45

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																					
3-Mar-20	10:26	56.3	58.1	54.3	55.4	58.5	53.1	57	60.1	52.4	55.6	57.8	52.3	55.5	57.7	52.5	56	59.5	52.5	56	NA
9-Mar-20	9:24	54.6	56.6	47.6	57.5	59.1	49.1	55.3	55.7	47	54.2	59.5	47.6	51.2	52	46.5	50.5	51.4	46.6	55	NA
20-Mar-20	9:40	55.8	56.3	49.3	54.1	55.5	47.6	55.5	56.7	47	57	59.4	49.6	54	55.5	47	50.6	51.1	46.5	55	NA
26-Mar-20	14:09	50.6	51.9	48.3	51.4	52.4	47.1	50.7	51.7	47	50.5	51.6	48.5	51.6	52.8	48	52.6	53.8	49.3	51	NA
NM2a - Village House near Lin Ma Hang Road																					
3-Mar-20	9:46	68.9	68.4	53.6	65.6	67.1	52.9	62.2	63.7	53.6	63.8	66.4	52.2	62.7	60.9	52.4	59.9	60.2	52.3	65	68
9-Mar-20	10:06	74	72.7	59.8	59.6	62.3	52.7	62.4	64.4	55.6	63.8	65.7	55.7	63.7	66.5	56.9	62.2	65.1	55.1	68	71
20-Mar-20	10:23	75	65.1	53.5	66.9	69.9	53.1	57.2	60.7	50.9	59.5	63.1	52.4	60.6	65.9	53.1	58.2	63.4	52.7	68	71
26-Mar-20	13:27	70.7	63.3	50	65.5	61.3	49.6	56.7	60.3	47.4	58.2	62.7	48	55.5	60	48.5	59.3	63.5	49	65	68
NM3 - Ping Yeung Village House																					
4-Mar-20	9:45	56.0	58.8	50.8	55.8	57.8	49.4	61.0	60.4	49.8	58.8	61.7	51.1	58.1	61.4	48.3	53.9	56.8	47.4	58	NA
10-Mar-20	13:20	59.7	62.5	53.0	58.7	61.5	53.0	58.2	62.0	50.5	62.8	64.5	54.0	56.6	61.0	52.5	58.1	61.5	53.5	59	NA
16-Mar-20	12:05	56.3	58.1	52.4	58.1	60.0	54.8	58.9	63.3	50.4	57.4	59.6	52.7	61.7	63.2	55.1	60.5	62.0	56.1	59	NA
27-Mar-20	11:03	56.4	57.6	54.0	56.9	58.9	54.8	64.9	64.8	54.0	56.7	57.2	54.1	58.0	58.4	55.3	57.6	57.1	54.1	60	NA
NM4 - Wo Keng Shan Village House																					
4-Mar-20	10:50	58.2	59.9	49.8	59.8	61.3	52.6	60.1	61.5	51.6	59.8	64.2	55.3	61.2	64.1	53.3	61.9	64.1	54.0	60	NA
10-Mar-20	13:56	62.9	63.5	52.5	62.7	67.5	52.0	63.1	64.0	52.0	61.7	63.5	51.5	63.0	64.5	52.0	61.7	63.5	51.5	63	NA
16-Mar-20	11:13	62.7	62.9	54.0	62.2	62.3	54.2	61.8	63.4	55.5	63.8	62.8	56.2	63.7	64.3	53.8	62.3	63.5	55.0	63	NA
27-Mar-20	9:37	58.4	59.2	50.2	63.1	65.7	48.8	63.0	62.6	49.7	66.1	66.0	49.8	60.5	63.2	50.9	61.5	61.2	50.8	63	NA
NM5– Ping Yeung Village House																					
4-Mar-20	9:48	53.1	55.4	46.0	54.2	56.7	47.4	54.1	56.2	47.0	54.7	54.5	47.0	55.6	57.6	48.3	55.4	55.5	49.6	55	NA
10-Mar-20	13:56	51.5	55.0	46.8	50.2	52.7	46.6	50.7	54.0	46.7	51.6	55.7	46.5	51.6	55.5	46.4	52.8	56.9	46.0	51	NA
16-Mar-20	10:15	51.9	53.4	47.4	51.7	56.4	49.4	52.7	55.0	50.0	53.1	55.9	50.1	52.9	53.3	49.7	53.5	56.6	50.4	53	NA
27-Mar-20	10:17	54.5	56.8	51.8	55.1	56.3	47.9	55.9	58.7	51.7	56.8	58.9	50.1	56.1	58.2	49.0	55.5	58.6	52.4	56	NA
NM6 – Tai Tong Wu Village House 2																					
4-Mar-20	10:43	55.6	53.5	47.5	56.4	57.0	46.5	57.3	60.8	49.7	56.6	59.9	49.5	54.6	59.6	48.6	54.7	56.8	47.9	56	NA
10-Mar-20	14:34	59.6	61.6	50.1	59.3	60.5	48.5	57.2	59.7	45.6	59.0	59.3	47.6	58.5	59.6	46.9	57.1	59.8	45.7	59	NA
16-Mar-20	9:32	58.4	62.7	51.4	59.3	61.2	52.1	58.0	61.5	51.2	59.4	61.3	51.1	57.7	61.4	51.9	58.5	61.2	52.9	59	NA
27-Mar-20	13:02	57.8	60.1	50.3	57.6	60.5	51.1	58.5	61.1	50.1	58.2	62.0	52.1	60.3	63.4	53.5	61.1	64.0	53.4	59	NA
NM7 – Po Kat Tsai Village																					
4-Mar-20	13:15	50.5	50.4	41.5	50.2	52.4	40.6	51.0	50.1	40.2	50.0	51.0	40.7	51.4	52.4	42.5	51.7	50.7	40.2	51	NA
10-Mar-20	9:39	45.1	48.0	39.3	42.6	46.2	36.4	45.9	46.8	36.6	50.6	48.3	38.2	45.5	47.2	36.7	43.7	46.2	36.7	46	NA
16-Mar-20	13:40	52.5	52.7	42.0	52.4	50.9	51.6	51.5	50.2	51.3	52.9	54.5	42.5	53.0	55.6	40.4	54.1	54.8	42.5	53	NA
27-Mar-20	14:21	56.6	58.6	52.4	57.5	59.5	51.3	54.7	62.3	51.1	56.3	55.3	51.4	55.5	57.6	59.4	54.5	54.2	60.9	56	NA
NM8 - Village House, Tong Hang																					
3-Mar-20	9:13	58.6	60.5	54	56.4	58	54.5	59.3	60.5	54.5	61.4	62.5	54	57.1	59.5	53	57.3	60	52.5	59	NA
9-Mar-20	10:49	57.7	58.8	55.6	56.7	57.5	55.6	58.3	59.9	56.3	57.5	58.1	56.9	57.9	59.2	56.4	58.1	58.7	54.1	58	NA
20-Mar-20	11:08	58.9	60.5	54.5	56.5	58	54.5	59.4	61	54.5	61.5	62.5	54.5	57.4	60.5	53.5	56.9	60.5	54	59	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
26-Mar-20	15:03	57.5	59	55	57.1	58.7	55	56.7	57.5	55.6	55	56.6	52.9	59.2	61.4	57.6	55.9	56.5	55.2	57	NA
NM9 - Village House, Kiu Tau Village																					
3-Mar-20	10:09	62.1	62.5	58.5	62.5	63	59.5	61.5	62	58.5	61.2	62	58.5	62.6	62.5	59	62	63	59.5	62	NA
9-Mar-20	9:51	60.5	63	55.5	63.3	65.2	59.1	62.8	63.5	55.9	63.1	66	65.6	62.4	65.3	58.5	63.7	66.1	58.3	63	NA
20-Mar-20	10:17	60.6	64.5	56	59.3	60.5	58	60.7	62.5	58.5	59.2	60.5	56.5	61.5	65.5	59	59.2	60.5	58	60	NA
26-Mar-20	14:51	59.4	61.4	55.2	62.8	65.5	55.9	61.4	64.8	55.6	59	61	56	59.6	61.7	57.1	62.1	67.1	56.9	61	NA
NM10 - Nam Wa Po Village House No. 80																					
3-Mar-20	11:10	59.2	60.5	55.5	57.9	59.5	56	58.1	59.5	56	58.6	61.5	57	58.7	60.5	58	59.6	61.5	58	59	62
9-Mar-20	9:05	56.8	60.3	54.3	56	58.2	53.2	56.6	58.5	54.2	57.2	60.3	55.3	55.8	57.2	54.1	56.7	58	54.8	57	60
20-Mar-20	9:23	58.3	59.5	55.5	57.6	58.5	56.5	57.8	58.5	56.5	57.7	59	56.5	59.1	60.5	57	58.6	60	57.5	58	61
26-Mar-20	14:05	61.5	62	57	58.6	60.1	56.7	58.9	60.4	57.3	58.2	60.4	64.5	57.6	58.3	55.6	57.6	58.8	55.2	59	62

Water Quality Monitoring Data for Contract 6 and SS C505

Date	2-Mar-20															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM1-C	11:30	0.30	21.4	21.4	3.7	3.7	41.7	41.8	61.0	62.0	7.6	7.6	64	63.0
			21.4		3.72		41.9		62.9		7.6		62	
WM1	11:15	0.20	20.5	20.5	7.15	7.2	79.3	79.6	10.3	10.8	7.7	7.7	15	15.5
			20.5		7.17		79.8		11.2		7.7		16	

Date	4-Mar-20															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM1-C	11:20	0.09	20.7	20.7	7.02	7.0	78.0	78.3	53.1	52.8	7.8	7.8	93	93.5
			20.7		7.05		78.5		52.4		7.8		94	
WM1	11:00	0.23	20.4	20.4	7.26	7.3	80.4	80.5	19.6	18.5	7.7	7.7	17	17.0
			20.4		7.27		80.5		17.4		7.7		17	

Date	6-Mar-20															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM1-C	11:15	0.13	19.2	19.2	7.56	7.5	81.4	81.3	58.4	57.8	8.1	8.1	116	117.0
			19.2		7.53		81.1		57.2		8.1		118	
WM1	10:55	0.16	20.7	20.7	8.56	8.6	96.3	96.6	41.5	42.3	8.4	8.4	36	36.0
			20.7		8.58		96.8		43.1		8.4		36	

Date	9-Mar-20															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM1-C	11:05	0.12	22.9	22.9	7.68	7.7	89.4	89.5	72.0	69.4	7.9	7.9	135	136.0
			22.9		7.69		89.5		66.8		7.9		137	
WM1	10:50	0.23	21.8	21.8	4.7	4.7	53.5	53.7	6.3	6.4	7.8	7.8	5	4.5
			21.8		4.71		53.8		6.5		7.8		4	

Date	11-Mar-20															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM1-C	11:15	0.12	18.3	18.3	3.16	3.2	33.4	33.6	95.6	96.0	7.5	7.5	120	119.0
			18.3		3.19		33.8		96.4		7.5		118	
WM1	10:55	0.20	19.5	19.5	5.4	5.4	58.6	58.7	59.4	60.2	7.1	7.1	84	84.0
			19.5		5.42		58.8		61.0		7.1		84	

Date	13-Mar-20															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	

WM1-C	11:05	0.13	23	23.0	3.98	4.0	46.3	47.1	23.1	23.1	8	8.0	13	12.5
			23		4.09		47.8		23.1		8		12	
WM1	10:50	0.22	22.5	22.5	5.26	5.3	60.6	61.0	10.5	10.0	8	8.0	5	4.5
			22.5		5.3		61.3		9.6		8		4	

Date	**16-Mar-20**													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM1-C	11:25	0.13	19.5	19.5	3.74	3.8	40.6	40.8	50.0	50.7	7.6	7.6	60	53.5
			19.5		3.8		41.0		51.3		7.6		47	
WM1	11:10	0.22	20.3	20.3	8.13	8.1	89.8	89.8	6.0	6.1	8.3	8.3	2	2.0
			20.3		8.11		89.7		6.1		8.3		2	

Date	**18-Mar-20**													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM1-C	10:55	0.10	20.4	20.4	2.98	3.0	32.8	32.9	70.2	69.4	8.2	8.2	73	73.0
			20.4		2.99		32.9		68.6		8.2		73	
WM1	10:35	0.20	20.7	20.7	6.56	6.6	72.8	72.9	3.8	3.8	8.2	8.2	2	2.0
			20.7		6.57		72.9		3.8		8.2		<2	

Date	**20-Mar-20**													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM1-C	11:30	0.30	20.6	20.6	3.72	3.7	41.4	41.8	Overange	Overange	7.9	7.9	483	476.5
			20.6		3.77		42.1		Overange		7.9		470	
WM1	11:10	0.25	20.7	20.7	6.13	6.1	68.5	67.8	713.0	717.0	7.8	7.8	304	300.5
			20.7		6.04		67.1		721.0		7.8		297	

Date	**23-Mar-20**													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM1-C	11:10	0.25	23.2	23.2	2.14	2.1	24.9	25.0	210.0	210.0	7.8	7.8	129	129.5
			23.2		2.15		25.0		210.0		7.8		130	
WM1	10:55	0.30	22.8	22.8	5.11	5.1	59.3	59.4	43.7	41.5	8.1	8.1	28	27.5
			22.8		5.12		59.5		39.3		8.1		27	

Date	**25-Mar-20**													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM1-C	11:05	0.23	22.2	22.2	5.81	5.8	66.3	66.7	80.4	79.1	7	7.0	62	62.5
			22.2		5.85		67.0		77.7		7		63	
WM1	10:50	0.25	22.4	22.4	6.53	6.5	75.0	75.3	11.0	13.9	7	7.0	9	9.5
			22.4		6.56		75.5		16.8		7		10	

Date	27-Mar-20													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM1-C	11:20	0.28	24	24.0	3.73	3.7	44.2	44.3	633.0	639.0	7.6	7.6	622	618.5
			24		3.75		44.4		645.0		7.6		615	
WM1	11:05	0.30	23.9	23.9	7.18	7.2	85.0	85.1	41.1	40.6	7.5	7.5	34	34.5
			23.9		7.19		85.2		40.1		7.5		35	

Date	30-Mar-20													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM1-C	10:00	0.20	21	21.0	5.79	5.8	63.6	63.7	104.0	105.5	7.7	7.7	78	79.0
			21		5.8		63.7		107.0		7.7		80	
WM1	9:40	0.30	20.5	20.5	6.88	6.8	76.2	75.5	16.8	16.9	7.9	7.9	7	7.0
			20.5		6.8		74.7		17.0		7.9		7	

Water Quality Monitoring Data for Contract 2 and 3

Date	2-Mar-20															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	14:10	0.13	20.1	20.1	7.22	7.2	79.5	79.6	0.9	0.8	7.9	7.9	<2	<2
			20.1		7.23		79.7		0.8		7.9		<2	
WM4-CB	14:30	0.26	20.6	20.6	6.33	6.3	70.3	70.6	13.9	13.0	7.6	7.6	25	25.5
			20.6		6.36		70.9		12.0		7.6		26	
WM4	14:00	0.20	21.1	21.4	5.71	5.7	64.0	64.3	4.4	4.4	7.7	7.7	6	6.0
			21.7		5.74		64.5		4.4		7.7		6	

Date	4-Mar-20															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	13:55	0.13	20.3	20.3	7.08	7.1	77.9	78.6	1.2	1.6	7.8	7.8	<2	<2
			20.3		7.15		79.2		1.9		7.8		<2	
WM4-CB	14:20	0.28	21.1	21.1	7.67	7.8	86.5	88.0	10.8	10.7	7.4	7.4	21	21.0
			21.1		7.86		89.5		10.5		7.4		21	
WM4	13:40	0.21	21.1	21.1	6.02	6.0	67.6	68.0	3.9	4.0	7.7	7.7	5	5.5
			21.1		6.06		68.3		4.1		7.7		6	

Date	6-Mar-20															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	13:50	0.13	20.2	20.2	6.67	6.8	73.1	74.8	1.5	1.6	8.1	8.1	2	2.0
			20.2		6.91		76.5		1.8		8.1		2	
WM4-CB	14:10	0.27	19.5	19.5	7.84	8.0	84.7	87.3	15.1	15.6	7.7	7.7	19	18.5
			19.5		8.19		89.8		16.1		7.7		18	
WM4	13:35	0.20	19.9	19.9	6.52	6.5	71.4	71.3	7.0	6.8	7.8	7.8	9	8.5
			19.9		6.5		71.2		6.6		7.8		8	

Date	9-Mar-20															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	13:35	0.13	21.1	21.1	6.67	6.7	74.9	75.2	1.9	2.1	8	8.0	2	2.0
			21.1		6.7		75.4		2.3		8		2	
WM4-CB	13:50	0.27	22.7	22.7	6.64	6.7	77.0	77.2	10.9	11.5	7.8	7.8	19	19.5
			22.7		6.67		77.4		12.1		7.8		20	
WM4	13:20	0.20	22.3	22.3	5.49	5.5	63.2	63.5	4.7	4.3	7.8	7.8	8	8.0
			22.3		5.51		63.8		3.9		7.8		8	

Date	11-Mar-20													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	13:45	0.13	21	21.0	6.74	6.8	75.6	75.7	0.9	0.9	8.4	8.4	<2	<2
			21		6.76		75.7		0.9		8.4		<2	
WM4-CB	14:05	0.27	20.2	20.2	6.98	7.0	76.8	76.9	7.6	7.7	8.1	8.1	17	16.5
			20.2		6.99		76.9		7.7		8.1		16	
WM4	13:30	0.20	20.5	20.5	5.81	5.8	64.5	64.6	2.5	2.4	8.1	8.1	4	4.0
			20.5		5.82		64.6		2.4		8.1		4	

Date	13-Mar-20													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	13:45	0.13	21.6	21.6	6.88	6.9	78.0	78.2	2.0	2.0	8.1	8.1	3	3.0
			21.6		6.91		78.4		1.9		8.1		3	
WM4-CB	14:05	0.27	22.7	22.7	7.93	8.0	91.3	92.0	7.9	8.7	7.9	7.9	12	12.5
			22.7		7.99		92.7		9.5		7.9		13	
WM4	13:30	0.22	22.4	22.4	5.71	5.7	65.8	66.1	4.3	4.1	8	8.0	8	8.0
			22.4		5.75		66.3		4.0		8		8	

Date	16-Mar-20													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	14:10	0.13	21.6	21.6	6.47	6.5	73.4	73.7	0.8	0.8	8.7	8.7	<2	<2
			21.6		6.51		73.9		0.8		8.7		<2	
WM4-CB	14:30	0.27	22.5	22.5	9.49	9.5	109.2	110.2	9.1	8.5	7.3	7.3	12	12.5
			22.5		9.59		111.1		7.9		7.3		13	
WM4	14:00	0.20	21.3	21.3	6.1	6.1	68.7	68.9	2.6	2.9	7.7	7.7	5	5.0
			21.3		6.12		69.0		3.1		7.7		5	

Date	18-Mar-20													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	13:25	0.23	20.9	20.9	6.95	7.0	77.9	78.2	89.5	90.7	8.3	8.3	188	185.5
			20.9		7.03		78.5		91.9		8.3		183	
WM4-CB	13:40	0.30	19.7	19.7	6.71	6.7	74.2	74.3	208.0	208.5	8.7	8.7	441	434.0
			19.7		6.73		74.4		209.0		8.7		427	
WM4	13:10	0.33	20.7	20.7	6.54	6.6	72.9	73.0	172.0	175.0	8.6	8.6	197	198.0
			20.7		6.56		73.0		178.0		8.6		199	

Date	20-Mar-20															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	13:55	0.13	21.6	21.6	6.36	6.4	72.1	72.3	3.4	3.4	7.9	7.9	4	4.0
			21.6		6.38		72.5		3.4		7.9		4	
WM4-CB	14:20	0.30	21.8	21.8	7.39	7.4	84.3	84.6	11.1	12.2	7.8	7.8	28	28.0
			21.8		7.41		84.8		13.2		7.8		28	
WM4	13:40	0.20	21.7	21.7	5.76	5.8	65.4	65.6	3.6	3.8	7.9	7.9	5	5.0
			21.7		5.79		65.8		4.0		7.9		5	

Date	23-Mar-20															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	13:50	0.13	22.3	22.3	6.6	6.6	75.7	76.0	1.6	1.5	8.2	8.2	<2	<2
			22.3		6.64		76.3		1.4		8.2		<2	
WM4-CB	14:10	0.30	26.8	26.8	8.09	8.1	101.5	101.7	10.4	10.0	8.3	8.3	15	15.5
			26.8		8.1		101.8		9.6		8.3		16	
WM4	13:30	0.20	22.6	22.6	5.67	5.7	67.6	67.5	4.8	5.0	8.2	8.2	7	7.5
			22.6		5.65		67.4		5.3		8.2		8	

Date	25-Mar-20															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	13:35	0.13	22.5	22.5	6.56	6.6	75.7	76.0	0.7	0.8	7.1	7.1	<2	<2
			22.5		6.59		76.2		0.9		7.1		<2	
WM4-CB	13:50	0.26	25.1	25.1	8.62	8.7	103.0	104.6	9.1	8.0	7	7.0	13	12.5
			25.1		8.74		106.2		7.0		7		12	
WM4	13:20	0.20	23.3	23.3	5.7	5.7	66.8	67.1	5.6	6.6	7	7.0	10	10.0
			23.3		5.72		67.3		7.7		7		10	

Date	27-Mar-20															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	15:05	0.13	23.1	23.1	6.29	6.3	73.3	73.4	1.3	1.3	7.8	7.8	<2	<2
			23.1		6.31		73.5		1.3		7.8		<2	
WM4-CB	15:20	0.25	26.7	26.7	8.87	8.9	111.8	111.8	8.9	8.6	7.6	7.6	12	12.0
			26.7		8.86		111.7		8.2		7.6		12	
WM4	15:00	0.20	24.9	24.9	5.75	5.8	69.6	69.7	4.6	4.3	7.7	7.7	6	6.0
			24.9		5.76		69.7		4.0		7.7		6	

Date	30-Mar-20													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	13:20	0.13	22.1	22.1	7.53	7.6	86.7	87.9	3.3	2.7	8.2	8.2	3	3.5
			22.1		7.64		89.0		2.2		8.2		4	
WM4-CB	13:45	0.28	21.8	21.8	6.87	6.9	77.6	78.2	9.1	9.3	8.3	8.3	20	19.0
			21.8		6.89		78.8		9.6		8.3		18	
WM4	13:00	0.20	21	21.0	6.28	6.4	70.3	72.4	12.0	12.4	7	7.0	26	25.5
			21		6.58		74.5		12.7		7		25	

Water Quality Monitoring Data for Contract 6

Date	**2-Mar-20**															
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	12:15	0.25	19.5	19.5	7.37	7.4	80.1	80.3	4.6	4.7	8.00	8.0	<2	<2
			19.5		7.39		80.5		4.9		8.00		<2	
WM2A	11:50	0.15	20.5	20.5	4.85	4.9	53.7	54.2	7.0	7.1	7.80	7.8	7	7.0
			20.5		4.91		54.6		7.2		7.80		7	

Date	**4-Mar-20**															
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	12:00	0.24	20.1	20.1	7.99	8.0	91.6	91.7	6.5	6.3	7.80	7.8	<2	<2
			20.1		8.01		91.8		6.0		7.80		<2	
WM2A	11:45	0.15	20	20.0	6.4	6.4	70.1	70.2	14.6	14.5	7.90	7.9	8	7.5
			20		6.41		70.2		14.4		7.90		7	

Date	**6-Mar-20**															
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	11:55	0.27	19.1	19.1	8.27	8.3	93.4	93.6	2.8	2.9	7.80	7.8	<2	<2
			19.1		8.3		93.8		2.9		7.80		<2	
WM2A	11:35	0.15	19.2	19.2	4.98	5.0	53.8	54.1	14.4	14.1	8.10	8.1	14	13.5
			19.2		5.01		54.3		13.8		8.10		13	

Date	**9-Mar-20**															
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	11:40	0.28	21.1	21.1	6.82	6.8	76.5	76.8	3.9	3.9	8.10	8.1	4	4.0
			21.1		6.85		77.0		3.9		8.10		4	
WM2A	11:25	0.15	21.4	21.4	5.5	5.5	61.9	62.2	8.2	8.0	7.90	7.9	13	12.5
			21.4		5.53		62.5		7.8		7.90		12	

Date	**11-Mar-20**															
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	11:50	0.28	20.6	20.6	7.76	7.8	90.2	90.3	4.1	4.0	8.20	8.2	3	3.0
			20.6		7.77		90.3		4.0		8.20		3	
WM2A	11:35	0.15	20.8	20.8	4.92	4.9	54.8	55.0	8.2	8.4	8.20	8.2	14	14.5
			20.8		4.95		55.1		8.6		8.20		15	

Date	**13-Mar-20**															
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	

WM2A-C	11:40	0.25	21.1	21.1	7.46	7.5	88.5	88.6	3.5	3.4	7.90	7.9	<2	<2
			21.1		7.48		88.7		3.3		7.90		<2	
WM2A	11:25	0.15	21.6	21.6	6.2	6.2	70.2	70.5	5.9	5.9	8.00	8.0	8	7.5
			21.6		6.22		70.7		5.9		8.00		7	

Date	**16-Mar-20**													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	12:00	0.25	19.5	19.5	7.52	7.5	81.7	81.9	4.4	4.2	7.70	7.7	2	2.0
			19.5		7.54		82.1		4.0		7.70		2	
WM2A	11:45	0.13	21.8	21.8	5.83	6.0	65.6	67.1	7.8	7.7	8.00	8.0	10	10.0
			21.8		6.16		68.6		7.7		8.00		10	

Date	**18-Mar-20**													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	11:25	0.20	20.1	20.1	6.94	6.9	76.2	76.3	5.4	5.5	8.40	8.4	<2	<2
			20.1		6.95		76.4		5.5		8.40		<2	
WM2A	11:10	0.15	21.9	21.9	4.49	4.5	49.7	49.9	10.4	10.4	8.50	8.5	8	8.5
			21.9		4.51		50.0		10.3		8.50		9	

Date	**20-Mar-20**													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	12:10	0.30	21.7	21.7	6.35	6.4	72.2	72.5	24.8	25.3	7.80	7.8	11	12.0
			21.7		6.39		72.8		25.7		7.80		13	
WM2A	11:45	0.16	21.6	21.6	6.67	6.7	75.7	76.0	22.1	22.4	7.90	7.9	13	13.5
			21.6		6.71		76.2		22.6		7.90		14	

Date	**23-Mar-20**													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	11:50	0.25	23.1	23.1	7.38	7.4	88.1	88.2	3.0	2.8	8.10	8.1	2	2.0
			23.1		7.39		88.2		2.7		8.10		2	
WM2A	11:30	0.15	23.5	23.5	6.26	6.3	74.3	74.4	18.0	18.4	8.40	8.4	10	10.0
			23.5		6.28		74.4		18.8		8.40		10	

Date	**25-Mar-20**													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	11:45	0.27	21.4	21.4	6.28	6.3	70.9	71.0	8.5	8.8	7.10	7.1	7	7.5
			21.4		6.28		71.0		9.0		7.10		8	
WM2A	11:25	0.15	22.8	22.8	4.56	4.6	52.8	53.4	20.7	20.2	7.00	7.0	11	10.5

			22.8		4.62		53.9		19.7		7.00		10	

Date	**27-Mar-20**													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	11:55	0.25	24.2	24.2	6.54	6.5	80.0	80.1	6.0	6.0	7.60	7.6	3	3.0
			24.2		6.55		80.1		6.1		7.60		3	
WM2A	11:35	0.15	24.3	24.3	5.64	5.7	67.4	67.5	22.1	21.3	7.70	7.7	14	14.0
			24.3		5.66		67.5		20.5		7.70		14	

Date	**30-Mar-20**													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:40	0.27	20.7	20.7	7	7.1	80.8	82.1	4.8	4.6	7.80	7.8	3	3.0
			20.7		7.13		83.3		4.4		7.80		3	
WM2A	10:20	0.15	20.8	20.8	6.45	6.6	70.4	72.6	19.7	19.8	8.10	8.1	12	11.5
			20.8		6.66		74.8		19.8		8.10		11	

Water Quality Monitoring Data for Contract 2 and 6

Date	2-Mar-20													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM3-c	12:30	0.00												
WM3	12:45	0.15	21	21.0	8.19	8.2	89.6	89.7	4.0	4.2	8.3	8.3	7	6.5
			21		8.2		89.7		4.3		8.3		6	

Date	4-Mar-20													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM3-c	12:20	0.00												
WM3	12:30	0.14	20.1	20.1	8.02	8.0	88.3	88.4	2.9	2.7	7.7	7.7	<2	<2
			20.1		8.02		88.4		2.5		7.7		<2	

Date	6-Mar-20													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM3-c	12:10	0.00												
WM3	12:20	0.15	18.9	18.9	8.59	8.6	92.1	92.2	4.7	4.5	8	8.0	2	2.5
			18.9		8.6		92.3		4.3		8		3	

Date	9-Mar-20													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM3-c	11:55	0.00												
WM3	12:10	0.13	21.3	21.3	7.87	7.9	88.8	88.9	4.9	5.0	8.1	8.1	4	4.5
			21.3		7.88		89.0		5.1		8.1		5	

Date	11-Mar-20													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM3-c	12:10	0.00												
WM3	12:20	0.15	19.6	19.6	8.3	8.3	90.1	90.3	3.8	3.5	8.2	8.2	2	2.5
			19.6		8.33		90.5		3.2		8.2		3	

Date	13-Mar-20													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM3-c	12:00	0.00												
WM3	12:15	0.15	21.4 21.4	21.4	8.22 8.23	8.2	92.9 93.2	93.1	6.6 5.9	6.2	8 8	8.0	5 4	4.5

Date	16-Mar-20													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM3-c	12:15	0.00												
WM3	12:30	0.15	20.2 20.2	20.2	8.4 8.41	8.4	92.7 93.0	92.9	5.7 5.0	5.3	7.8 7.8	7.8	11 12	11.5

Date	18-Mar-20													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM3-c	11:55	0.00												
WM3	11:45	0.15	20.2 20.2	20.2	9.16 9.17	9.2	105.1 105.2	105.2	11.7 11.0	11.4	8.2 8.2	8.2	12 12	12.0

Date	20-Mar-20													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM3-c	12:25	0.00												
WM3	12:35	0.13	21.5 21.5	21.5	5.36 5.39	5.4	60.6 61.0	60.8	3.1 3.1	3.1	7.7 7.7	7.7	5 6	5.5

Date	23-Mar-20													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM3-c	12:10	0.00												
WM3	12:25	0.12	23.4 23.4	23.4	4.65 4.63	4.6	55.6 55.5	55.6	4.9 5.4	5.1	8.2 8.2	8.2	7 7	7.0

Date	25-Mar-20													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM3-c	11:55	0.00												
WM3	12:10	0.13	23.4	23.4	4.87	4.9	57.2	57.6	3.4	3.1	6.9	6.9	11	11.0
			23.4		4.91		57.9		2.9		6.9		11	

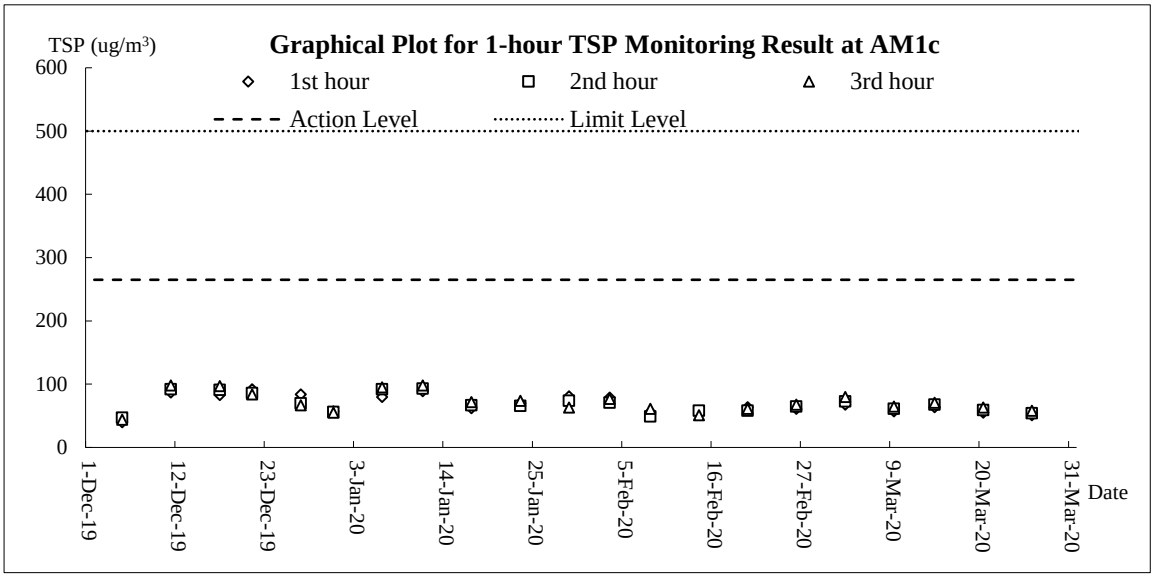
Date	27-Mar-20													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM3-c	12:30	0.00												
WM3	12:35	0.13	23.7	23.7	5.98	6.0	70.6	70.7	2.9	3.1	7.7	7.7	3	3.0
			23.7		6		70.8		3.2		7.7		3	

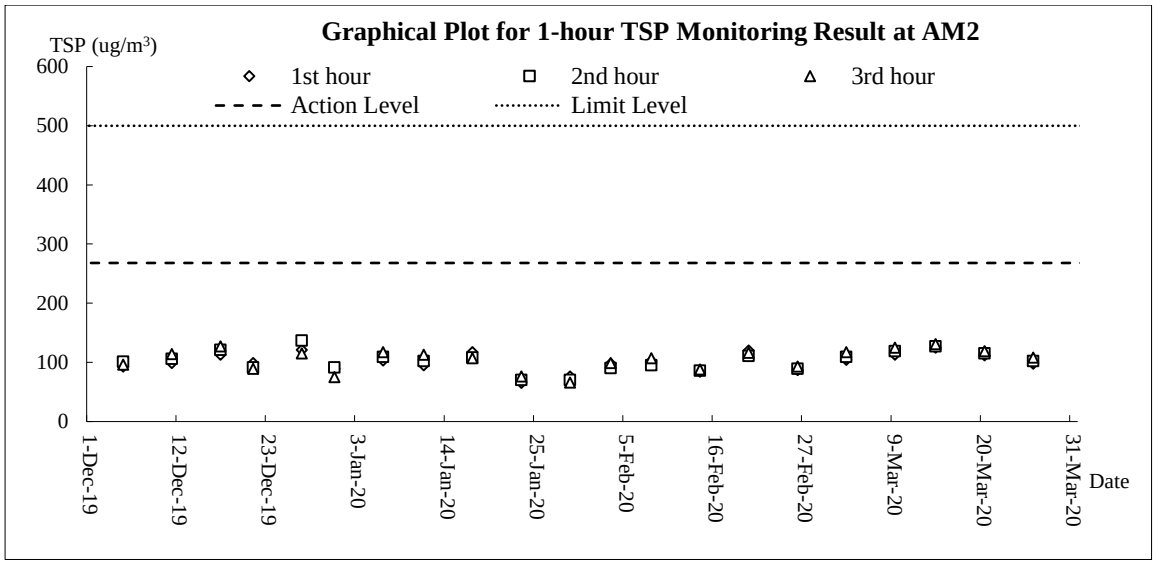
Date	30-Mar-20													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM3-c	11:00	0.00												
WM3	11:10	0.13	21.6	21.6	5.83	6.2	64.8	68.7	4.2	4.2	7.5	7.5	5	5.0
			21.6		6.48		72.5		4.1		7.5		5	

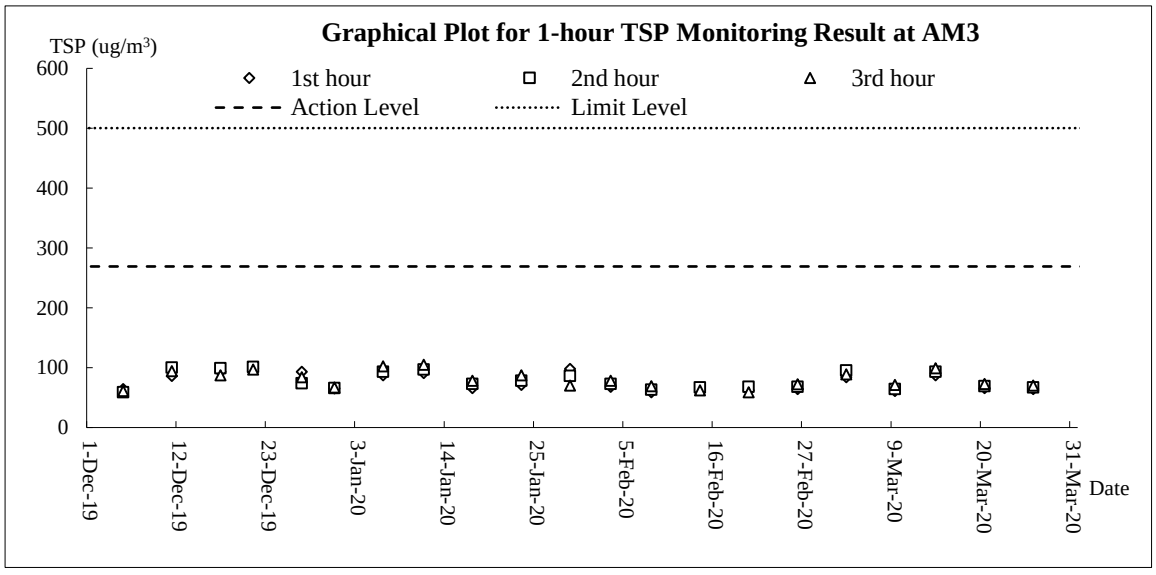
Appendix J

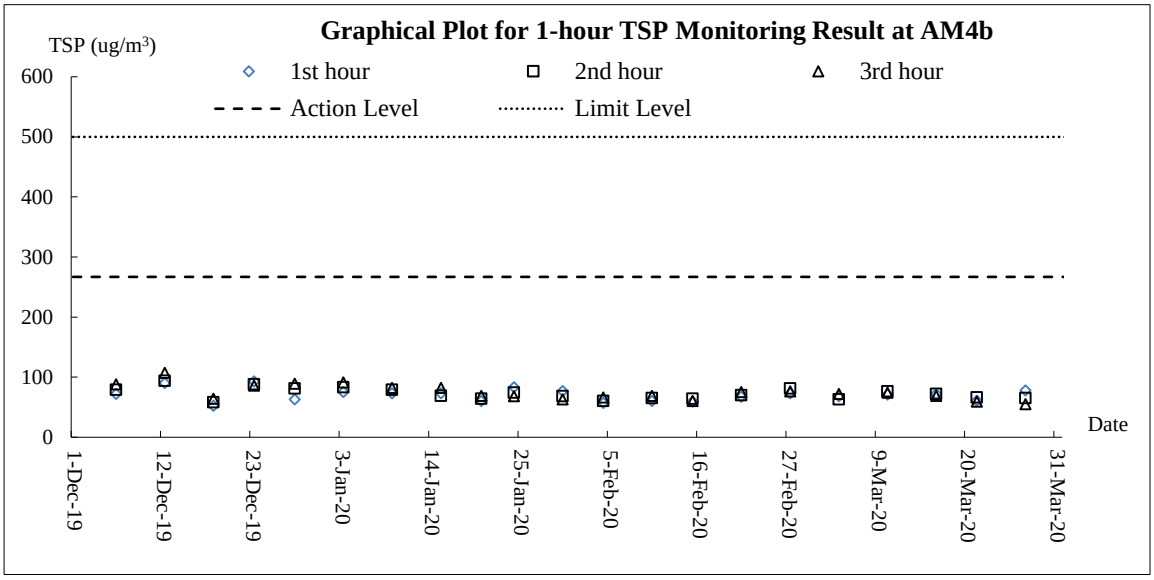
Graphical Plots for Monitoring Result

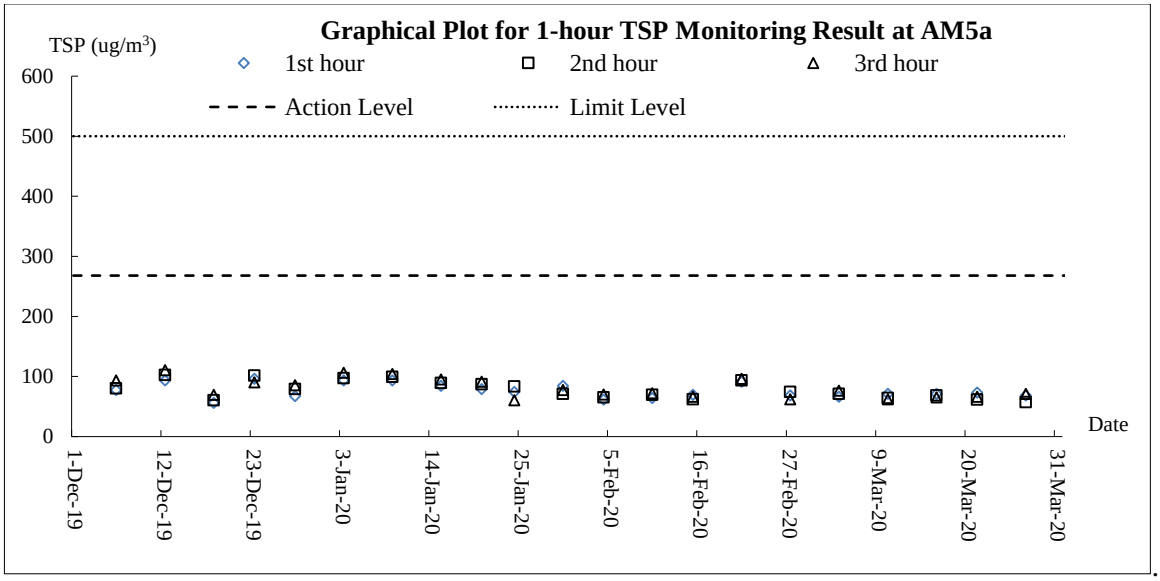
Air Quality – 1-hour TSP

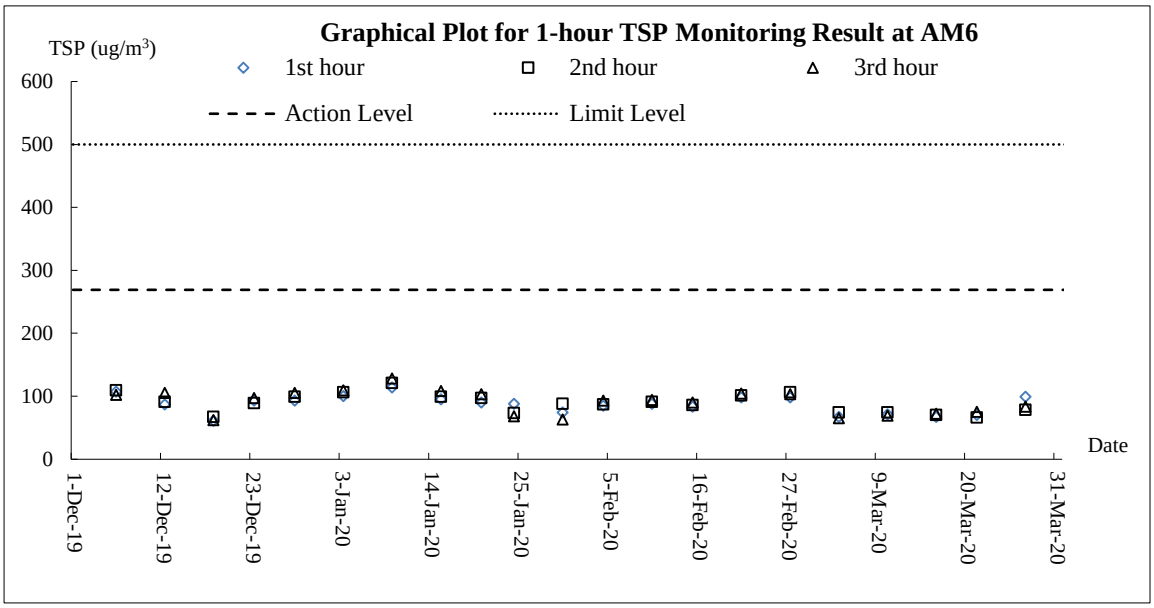


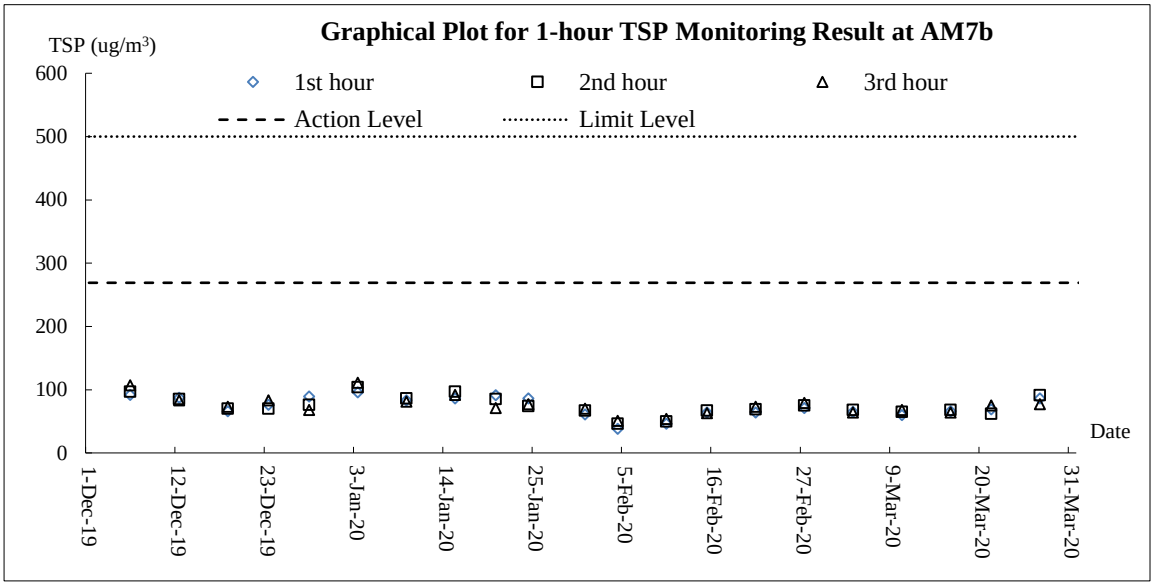


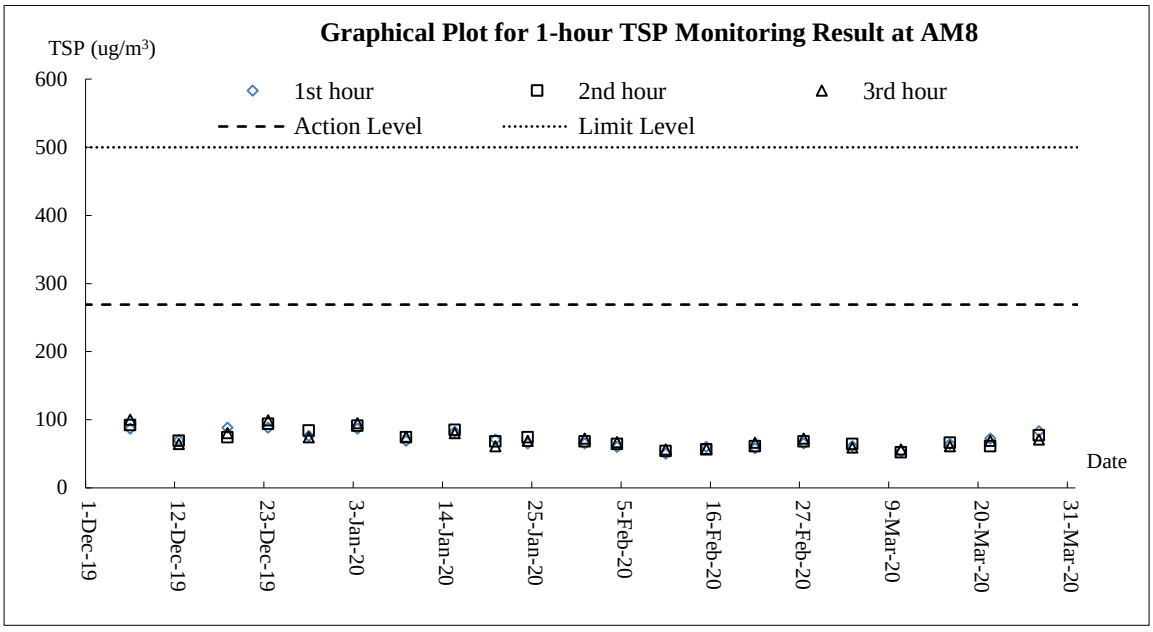


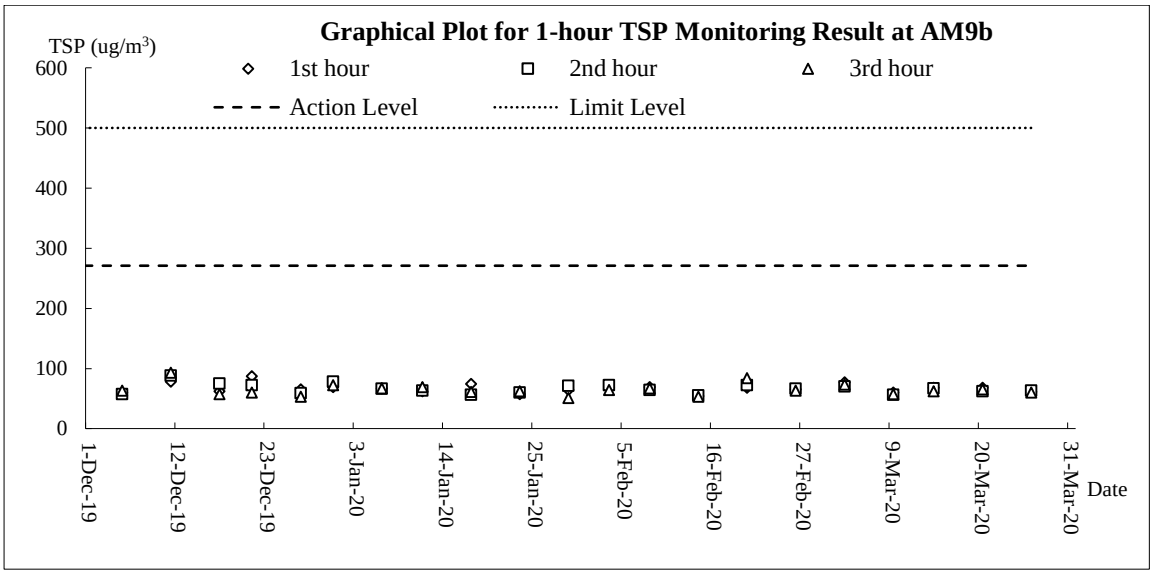

Graphical Plot for 1-hour TSP Monitoring Result at AM4b
TSP (ug/m3)
1st hour
2nd hour
3rd hour
Action Level
Limit Level
600
500
400
300
200
100
0
Date
1-Dec-19
12-Dec-19
23-Dec-19
3-Jan-20
14-Jan-20
25-Jan-20
5-Feb-20
16-Feb-20
27-Feb-20
9-Mar-20
20-Mar-20
31-Mar-20


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
Date
1-Dec-19
12-Dec-19
23-Dec-19
3-Jan-20
14-Jan-20
25-Jan-20
5-Feb-20
16-Feb-20
27-Feb-20
9-Mar-20
20-Mar-20
31-Mar-20

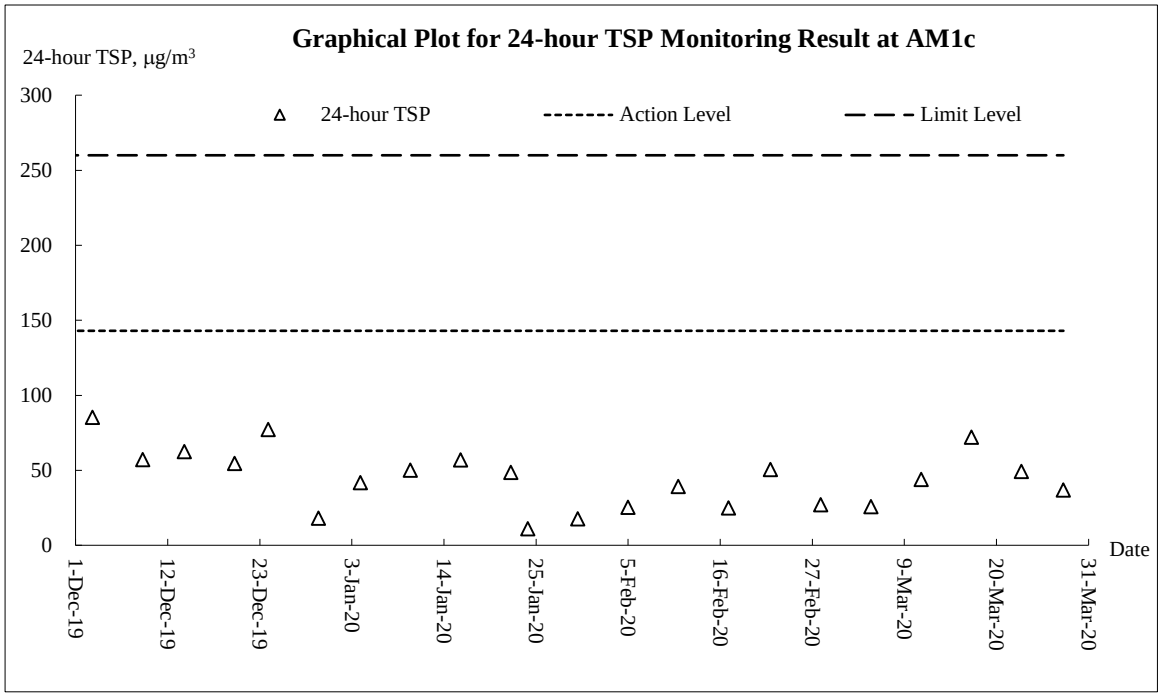

Graphical Plot for 1-hour TSP Monitoring Result at AM6
TSP (ug/m3)
1st hour
2nd hour
3rd hour
Action Level
Limit Level
600
500
400
300
200
100
0
Date
1-Dec-19
12-Dec-19
23-Dec-19
3-Jan-20
14-Jan-20
25-Jan-20
5-Feb-20
16-Feb-20
27-Feb-20
9-Mar-20
20-Mar-20
31-Mar-20

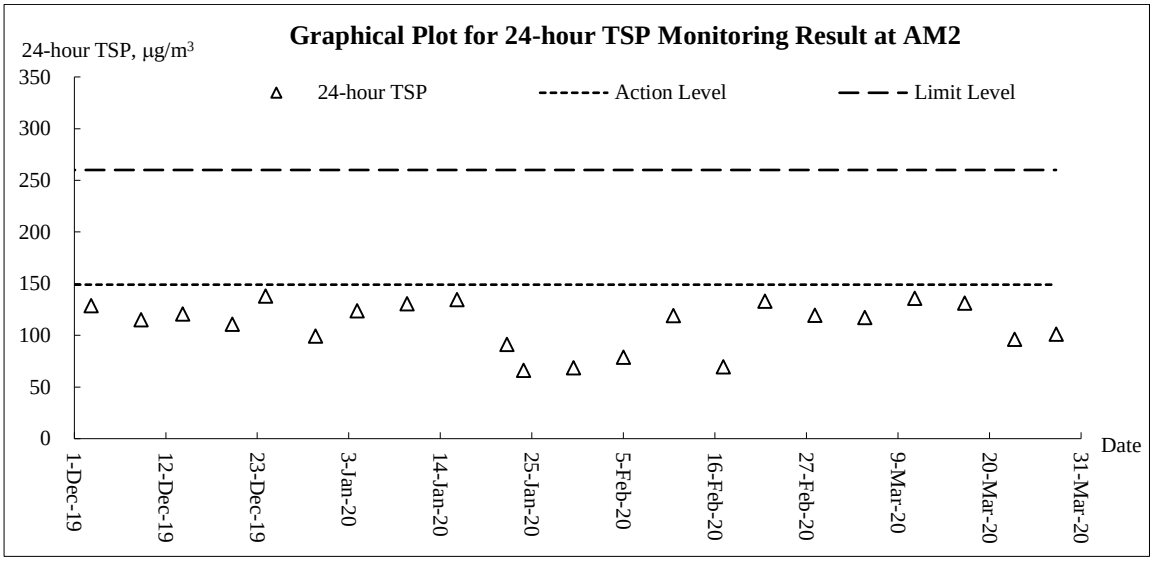

Graphical Plot for 1-hour TSP Monitoring Result at AM7b
TSP (ug/m3)
1st hour
2nd hour
3rd hour
Action Level
Limit Level
600
500
400
300
200
100
0
Date
1-Dec-19
12-Dec-19
23-Dec-19
3-Jan-20
14-Jan-20
25-Jan-20
5-Feb-20
16-Feb-20
27-Feb-20
9-Mar-20
20-Mar-20
31-Mar-20

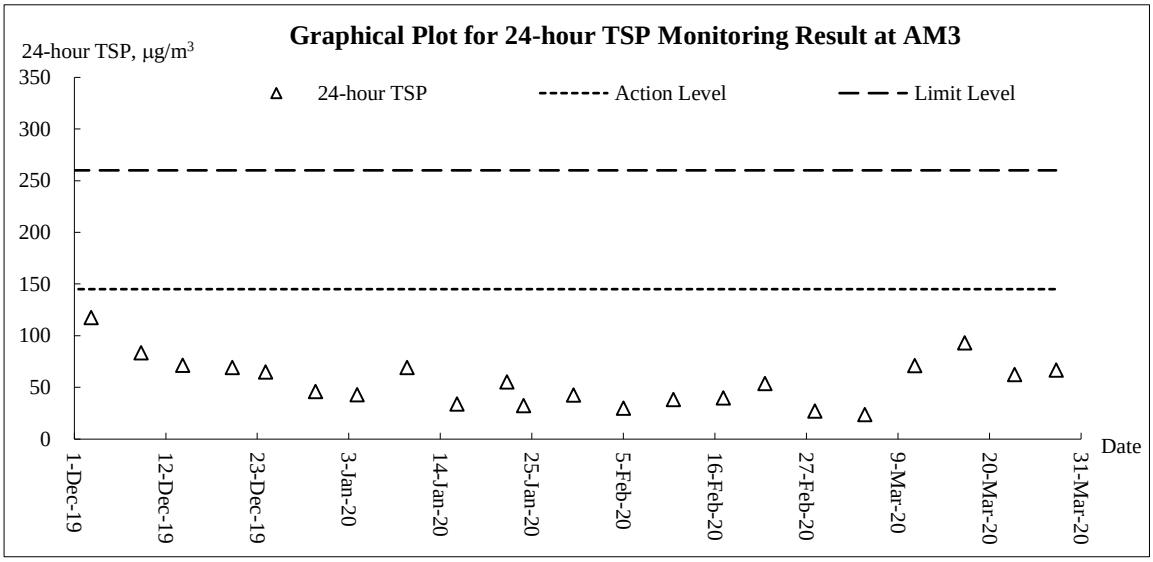

Graphical Plot for 1-hour TSP Monitoring Result at AM8
TSP (ug/m3)
1st hour
2nd hour
3rd hour
Action Level
Limit Level
600
500
400
300
200
100
0
Date
1-Dec-19
12-Dec-19
23-Dec-19
3-Jan-20
14-Jan-20
25-Jan-20
5-Feb-20
16-Feb-20
27-Feb-20
9-Mar-20
20-Mar-20
31-Mar-20

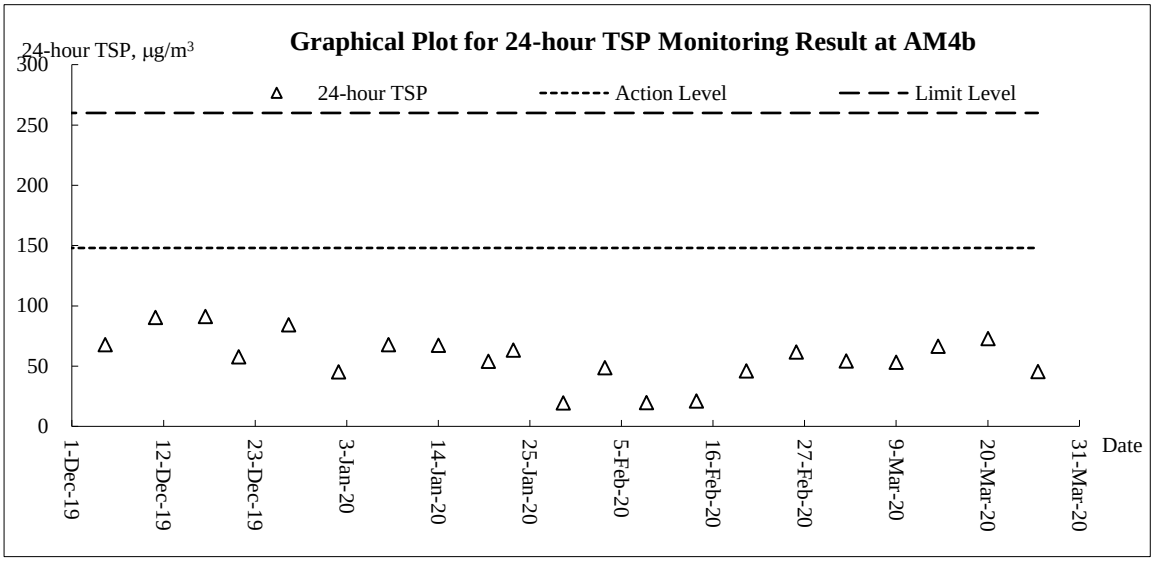

Graphical Plot for 1-hour TSP Monitoring Result at AM9b
TSP (ug/m3)
1st hour
2nd hour
3rd hour
Action Level
Limit Level
600
500
400
300
200
100
0
Date
1-Dec-19
12-Dec-19
23-Dec-19
3-Jan-20
14-Jan-20
25-Jan-20
5-Feb-20
16-Feb-20
27-Feb-20
9-Mar-20
20-Mar-20
31-Mar-20

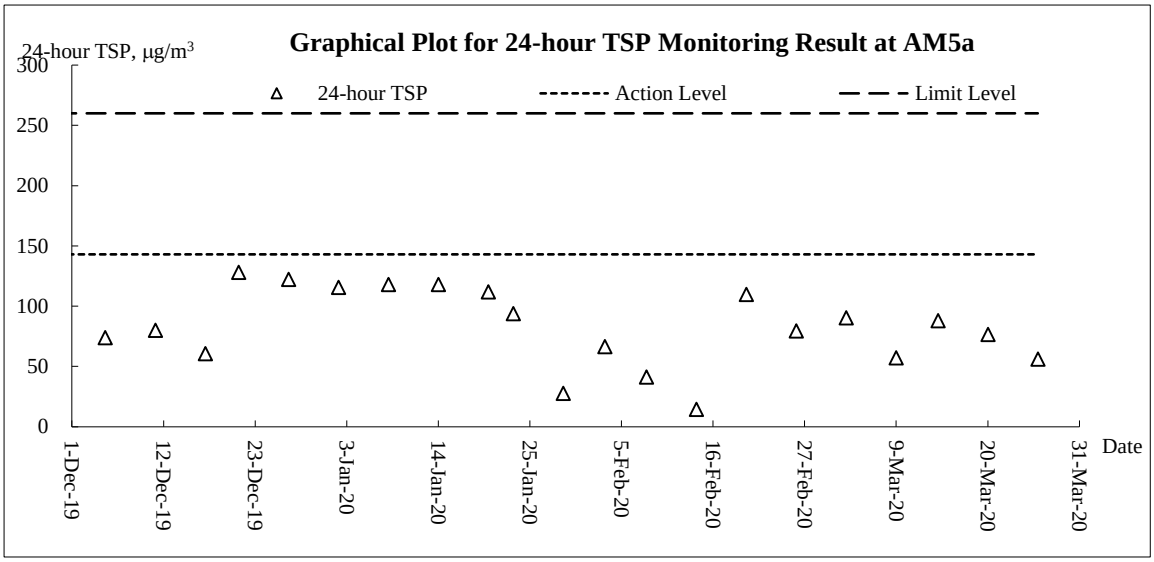
Air Quality – 24-hour TSP

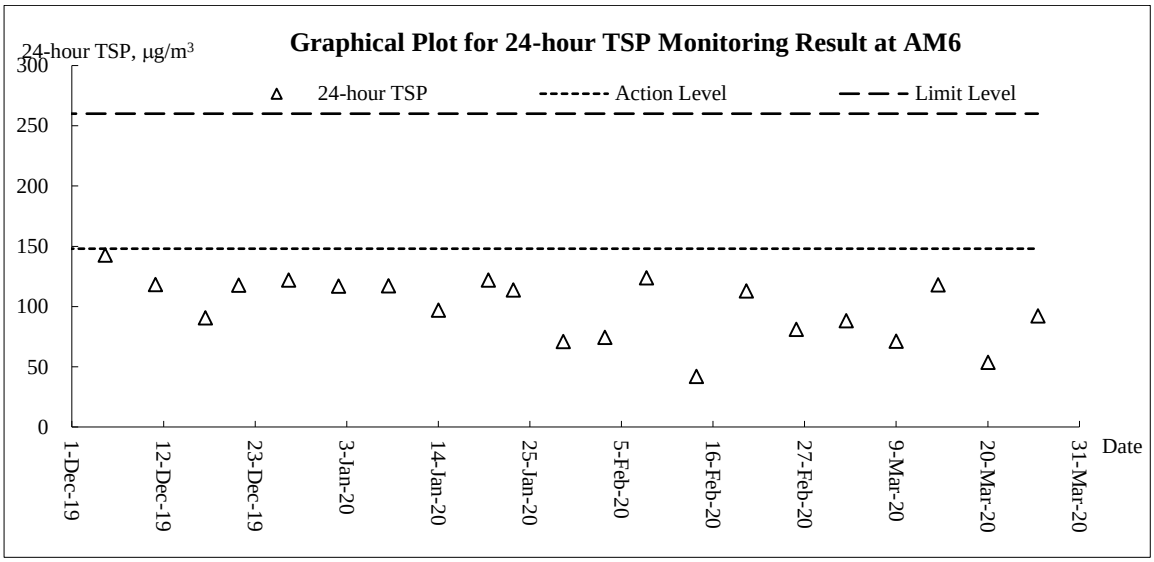


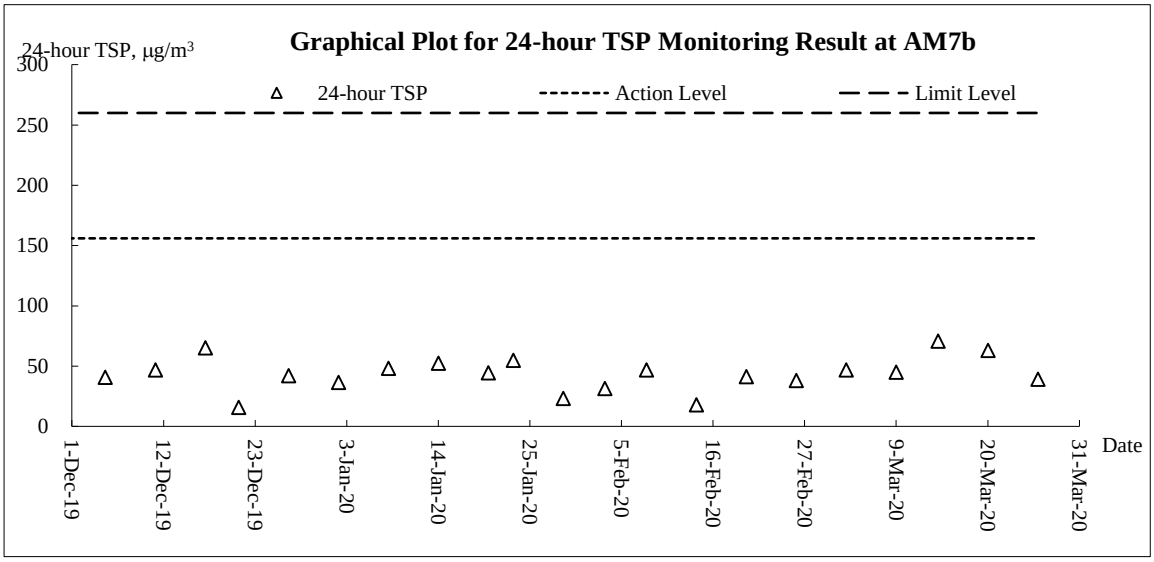


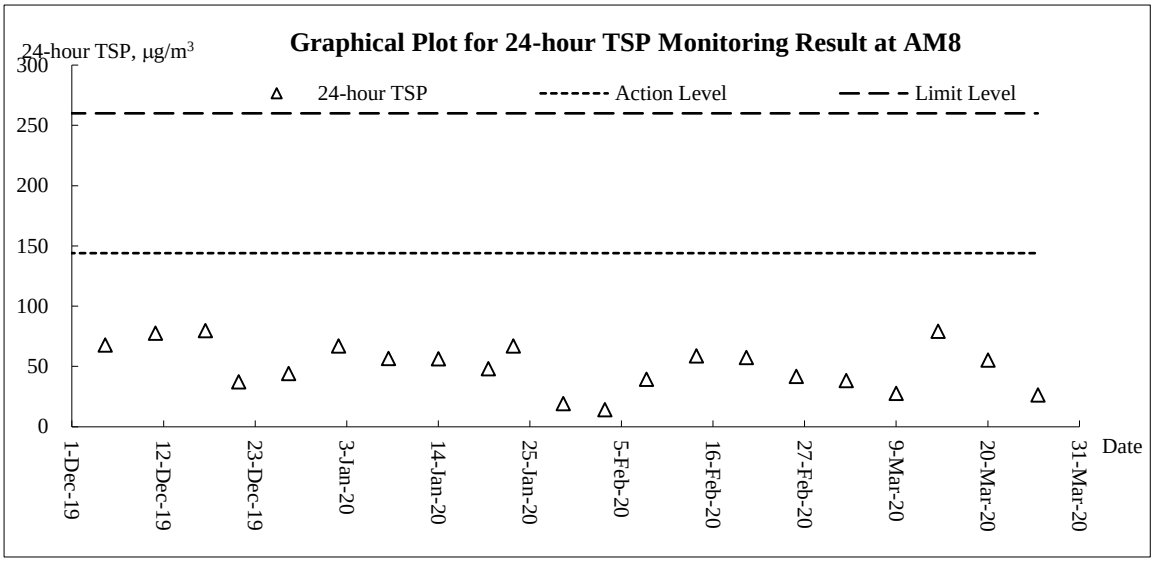


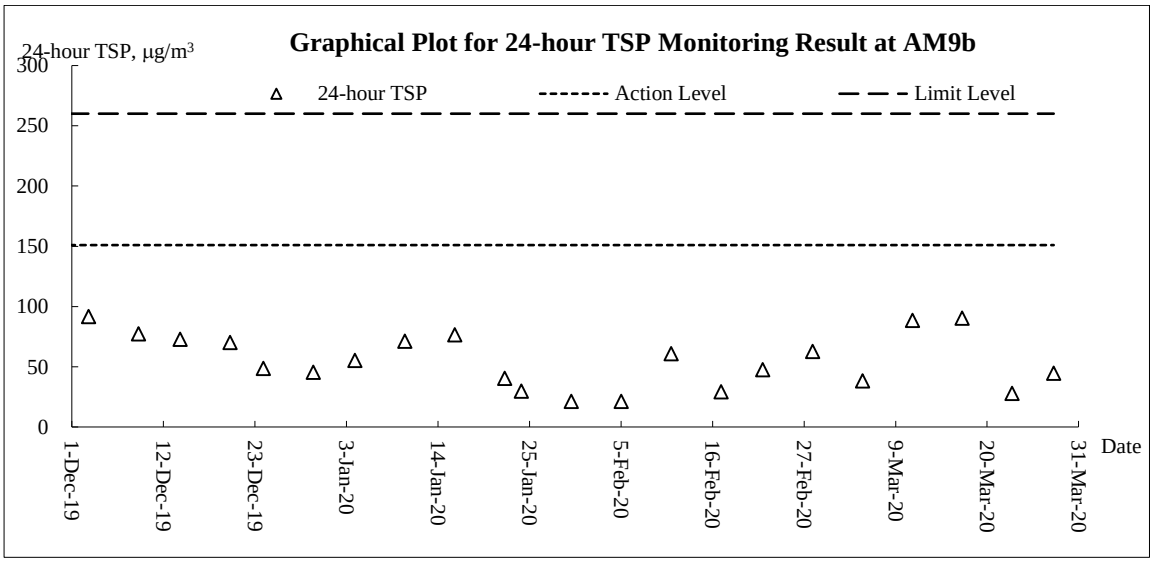

Graphical Plot for 24-hour TSP Monitoring Result at AM4b
24-hour TSP, μg/m³
24-hour TSP
Action Level
Limit Level
300
250
200
150
100
50
0
1-Dec-19
12-Dec-19
23-Dec-19
3-Jan-20
14-Jan-20
25-Jan-20
5-Feb-20
16-Feb-20
27-Feb-20
9-Mar-20
20-Mar-20
31-Mar-20
Date


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-Dec-19
12-Dec-19
23-Dec-19
3-Jan-20
14-Jan-20
25-Jan-20
5-Feb-20
16-Feb-20
27-Feb-20
9-Mar-20
20-Mar-20
31-Mar-20
Date

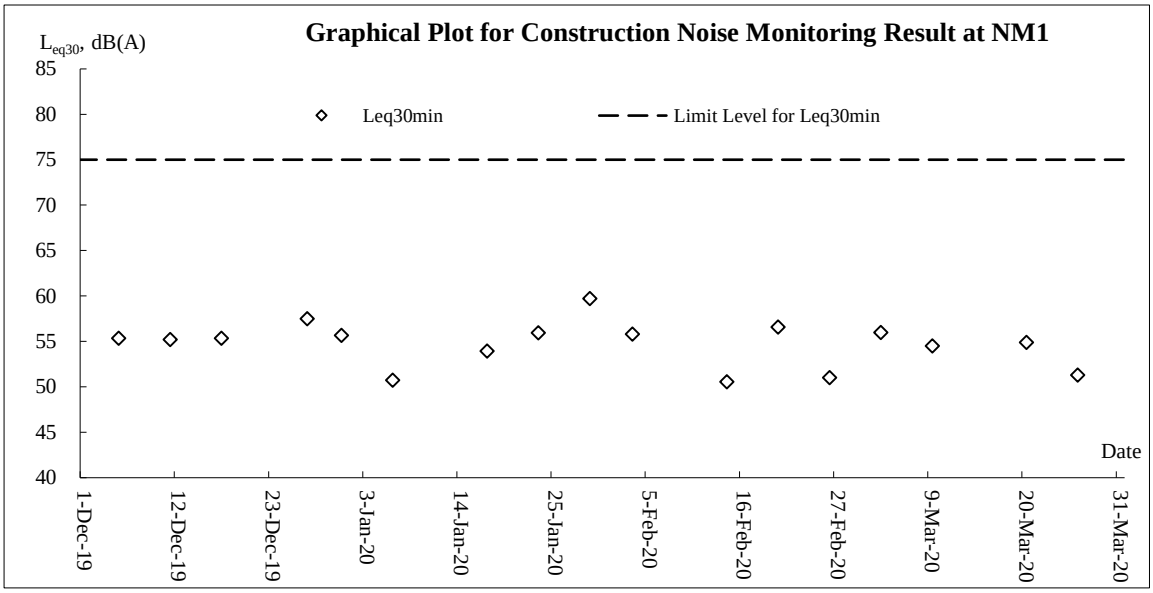

Graphical Plot for 24-hour TSP Monitoring Result at AM6
24-hour TSP, μg/m³
24-hour TSP
Action Level
Limit Level
300
250
200
150
100
50
0
1-Dec-19
12-Dec-19
23-Dec-19
3-Jan-20
14-Jan-20
25-Jan-20
5-Feb-20
16-Feb-20
27-Feb-20
9-Mar-20
20-Mar-20
31-Mar-20
Date

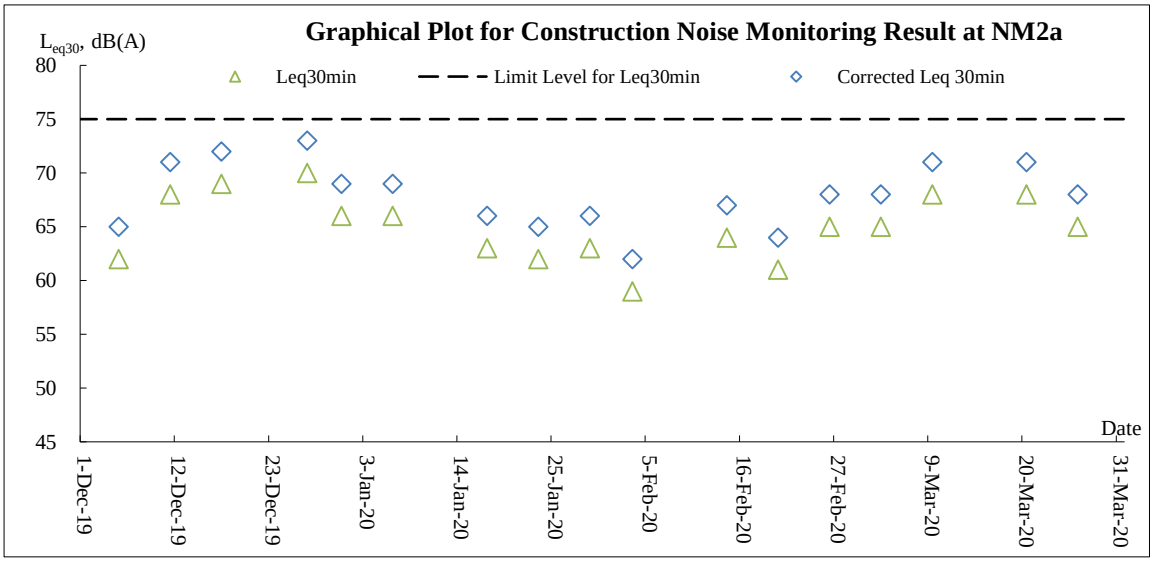

Graphical Plot for 24-hour TSP Monitoring Result at AM7b
24-hour TSP, μg/m³
24-hour TSP
Action Level
Limit Level
300
250
200
150
100
50
0
1-Dec-19
12-Dec-19
23-Dec-19
3-Jan-20
14-Jan-20
25-Jan-20
5-Feb-20
16-Feb-20
27-Feb-20
9-Mar-20
20-Mar-20
31-Mar-20
Date

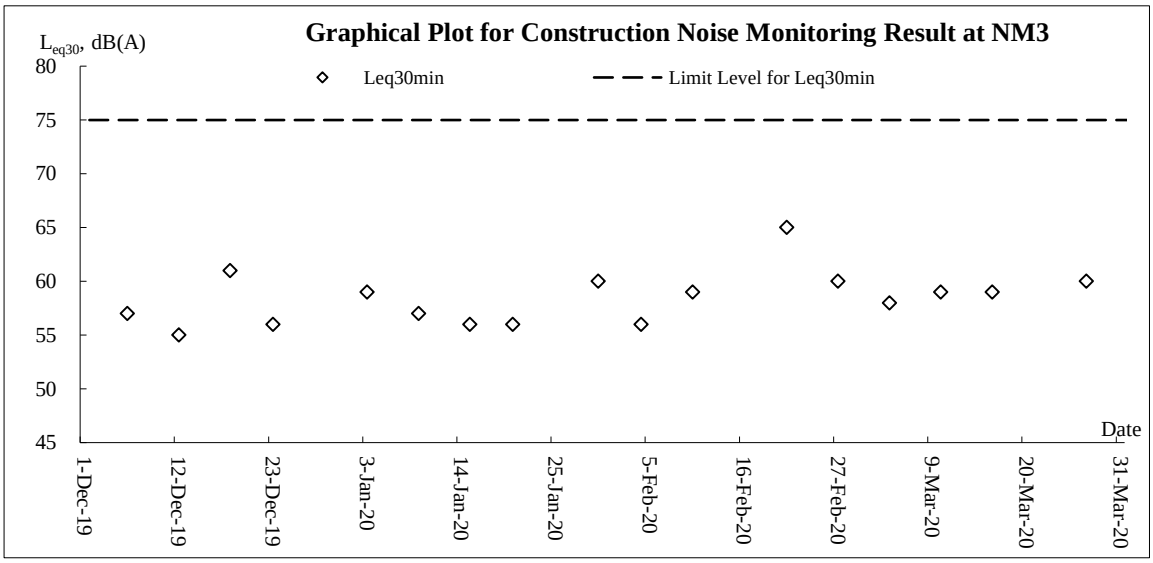

Graphical Plot for 24-hour TSP Monitoring Result at AM8
24-hour TSP, μg/m³
24-hour TSP
Action Level
Limit Level
300
250
200
150
100
50
0
1-Dec-19
12-Dec-19
23-Dec-19
3-Jan-20
14-Jan-20
25-Jan-20
5-Feb-20
16-Feb-20
27-Feb-20
9-Mar-20
20-Mar-20
31-Mar-20
Date

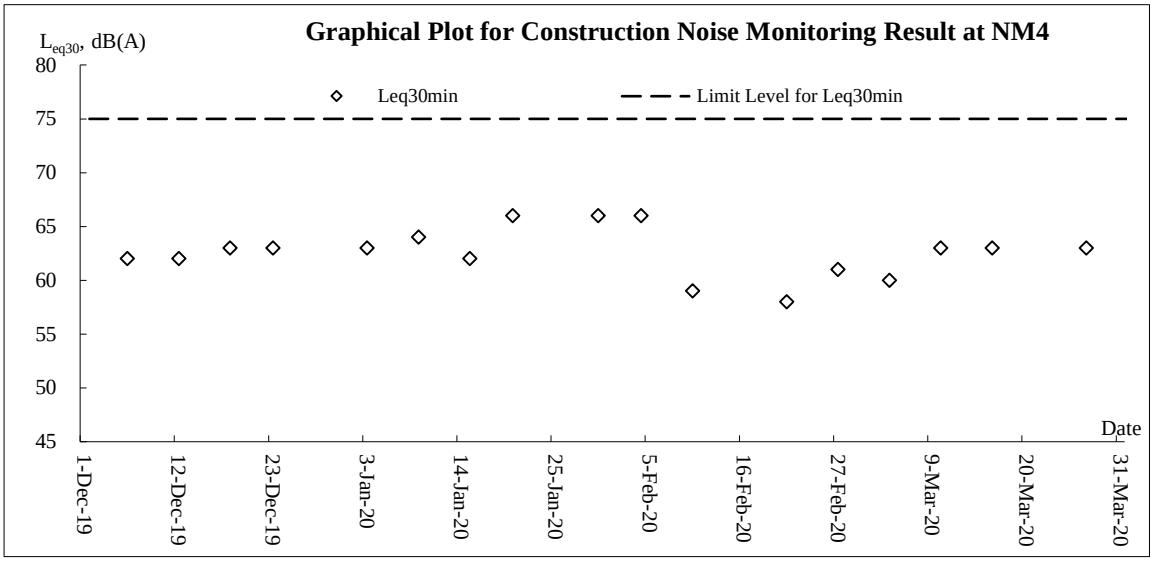

Graphical Plot for 24-hour TSP Monitoring Result at AM9b
24-hour TSP, μg/m³
24-hour TSP
Action Level
Limit Level
300
250
200
150
100
50
0
1-Dec-19
12-Dec-19
23-Dec-19
3-Jan-20
14-Jan-20
25-Jan-20
5-Feb-20
16-Feb-20
27-Feb-20
9-Mar-20
20-Mar-20
31-Mar-20
Date

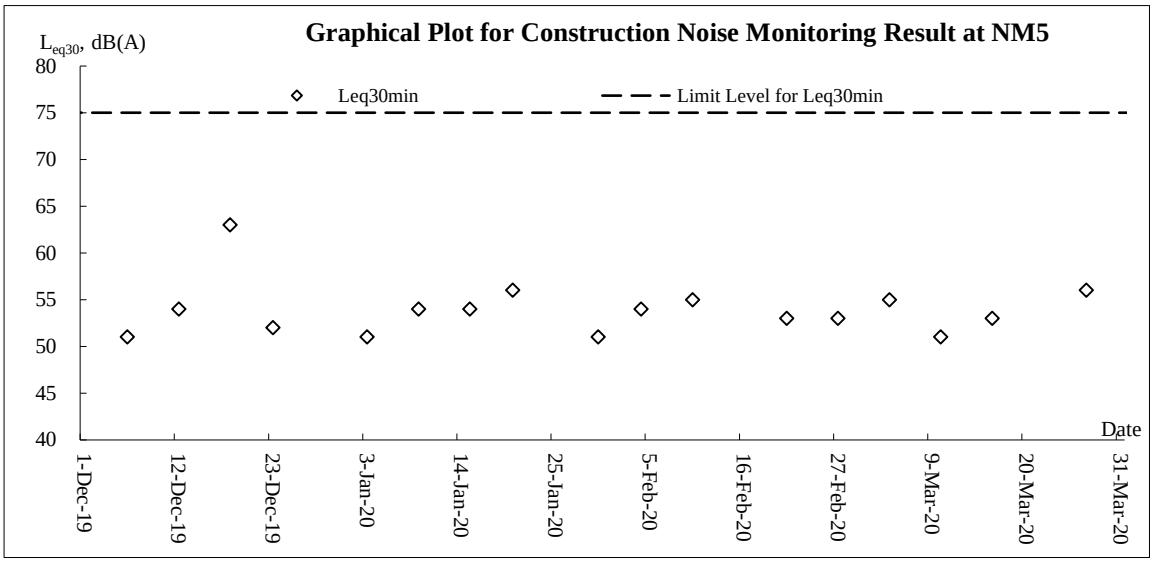
Noise

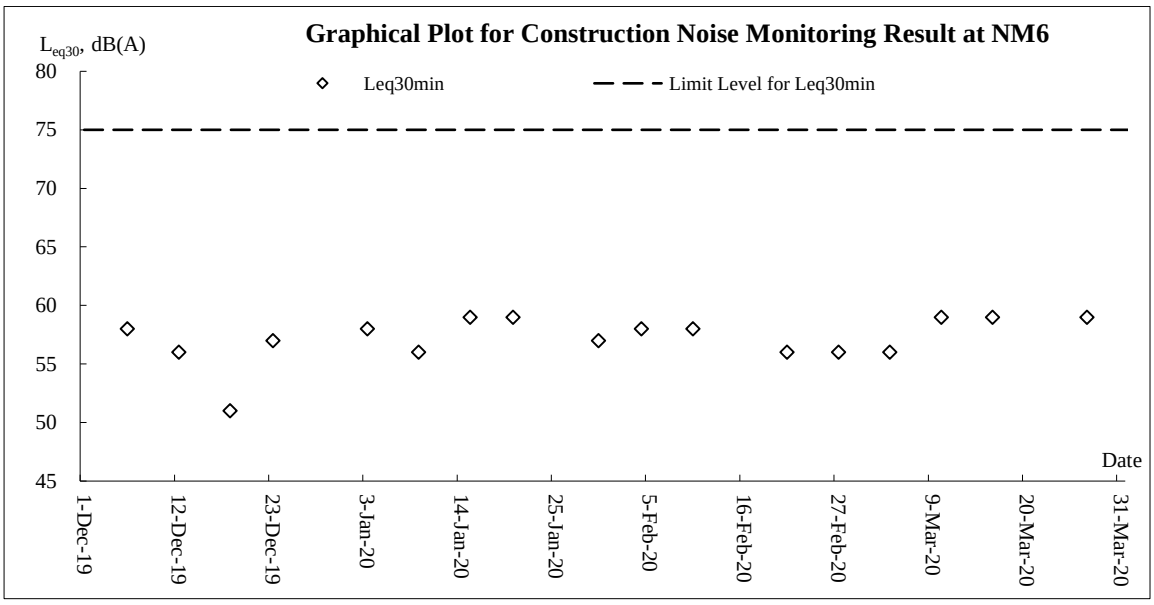

Graphical Plot for Construction Noise Monitoring Result at NM1
L_{eq30}, dB(A)
Leq30min
Limit Level for Leq30min
85
80
75
70
65
60
55
50
45
40
Date
1-Dec-19
12-Dec-19
23-Dec-19
3-Jan-20
14-Jan-20
25-Jan-20
5-Feb-20
16-Feb-20
27-Feb-20
9-Mar-20
20-Mar-20
31-Mar-20

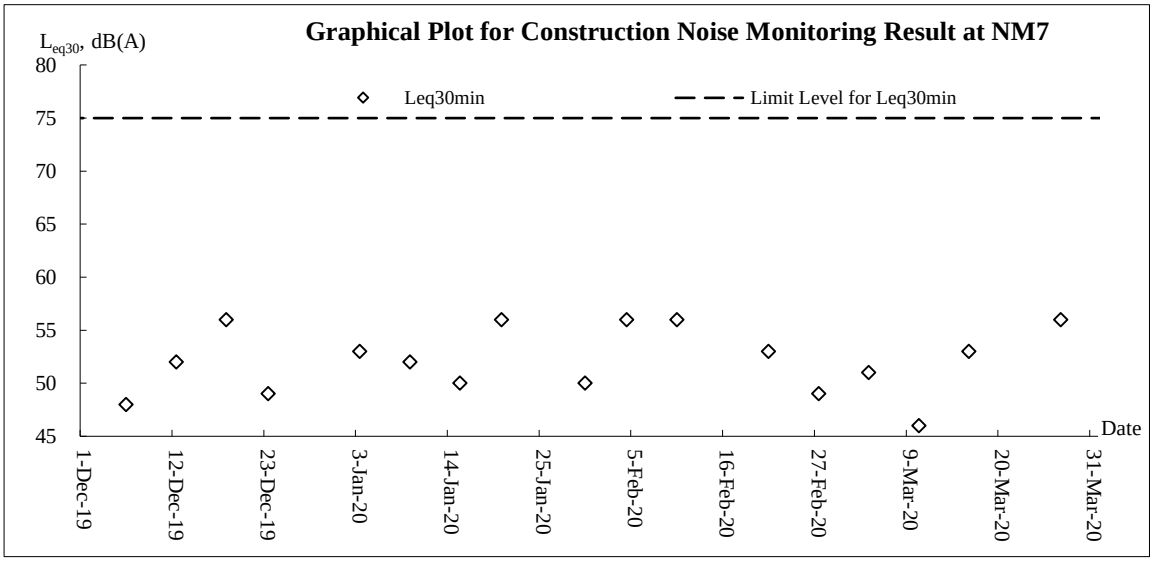

Graphical Plot for Construction Noise Monitoring Result at NM2a
L_{eq30}, dB(A)
Leq30min
Limit Level for Leq30min
Corrected Leq 30min
80
75
70
65
60
55
50
45
Date
1-Dec-19
12-Dec-19
23-Dec-19
3-Jan-20
14-Jan-20
25-Jan-20
5-Feb-20
16-Feb-20
27-Feb-20
9-Mar-20
20-Mar-20
31-Mar-20

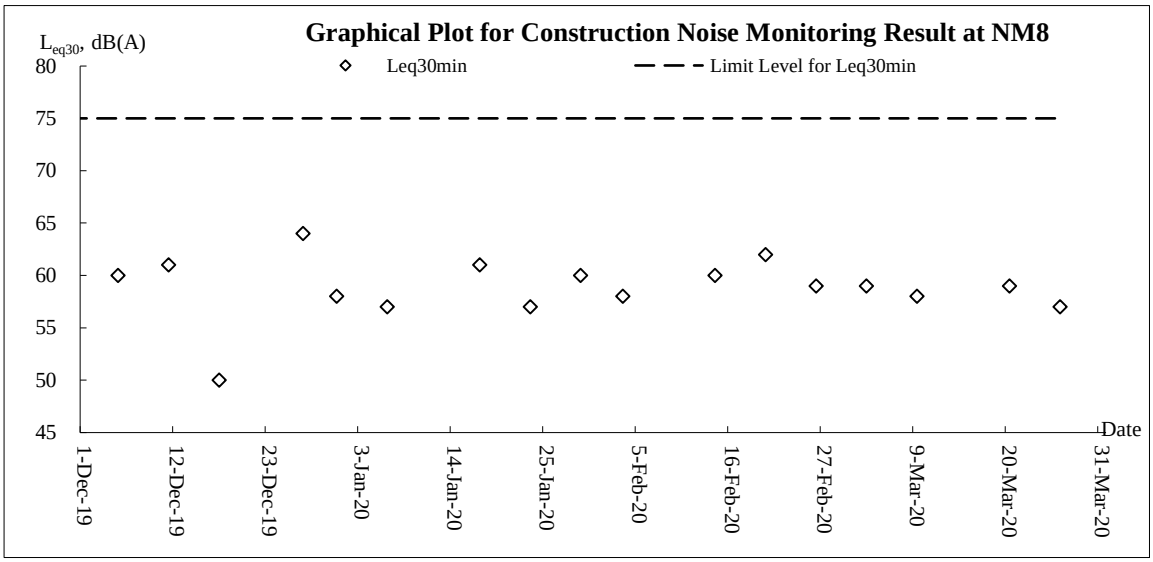

Graphical Plot for Construction Noise Monitoring Result at NM3
L_{eq30}, dB(A)
Leq30min
Limit Level for Leq30min
80
75
70
65
60
55
50
45
Date
1-Dec-19
12-Dec-19
23-Dec-19
3-Jan-20
14-Jan-20
25-Jan-20
5-Feb-20
16-Feb-20
27-Feb-20
9-Mar-20
20-Mar-20
31-Mar-20

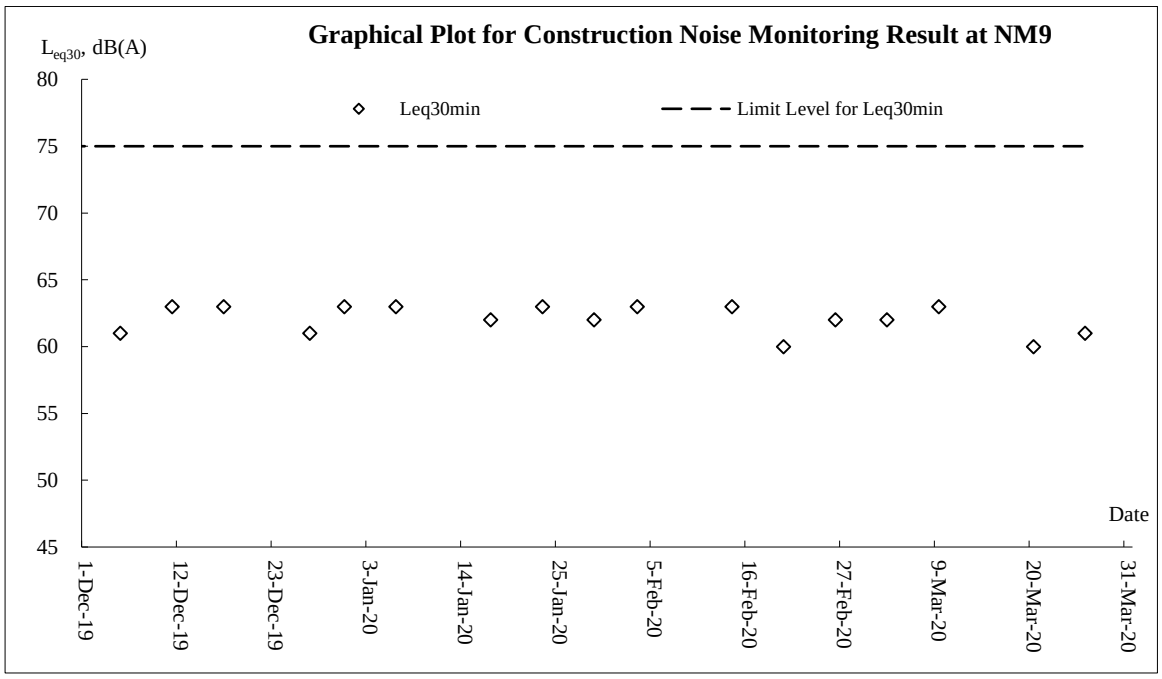

Graphical Plot for Construction Noise Monitoring Result at NM4
L_{eq30}, dB(A)
Leq30min
Limit Level for Leq30min
80
75
70
65
60
55
50
45
Date
1-Dec-19
12-Dec-19
23-Dec-19
3-Jan-20
14-Jan-20
25-Jan-20
5-Feb-20
16-Feb-20
27-Feb-20
9-Mar-20
20-Mar-20
31-Mar-20

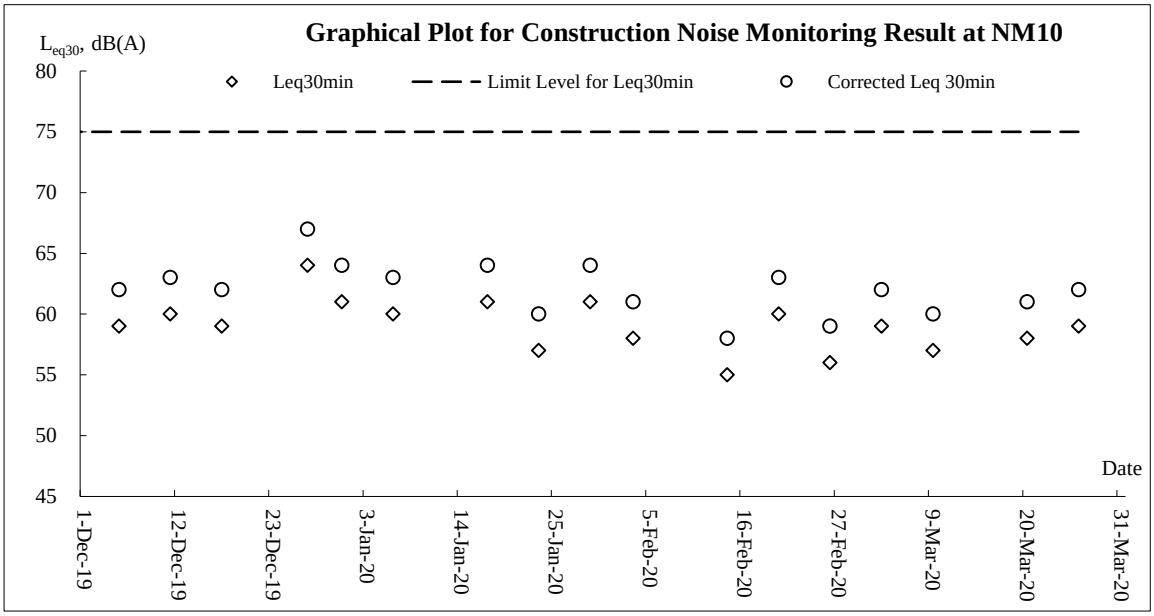

Graphical Plot for Construction Noise Monitoring Result at NM5
L_{eq30}, dB(A)
Leq30min
Limit Level for Leq30min
80
75
70
65
60
55
50
45
40
Date
1-Dec-19
12-Dec-19
23-Dec-19
3-Jan-20
14-Jan-20
25-Jan-20
5-Feb-20
16-Feb-20
27-Feb-20
9-Mar-20
20-Mar-20
31-Mar-20


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-Dec-19
12-Dec-19
23-Dec-19
3-Jan-20
14-Jan-20
25-Jan-20
5-Feb-20
16-Feb-20
27-Feb-20
9-Mar-20
20-Mar-20
31-Mar-20

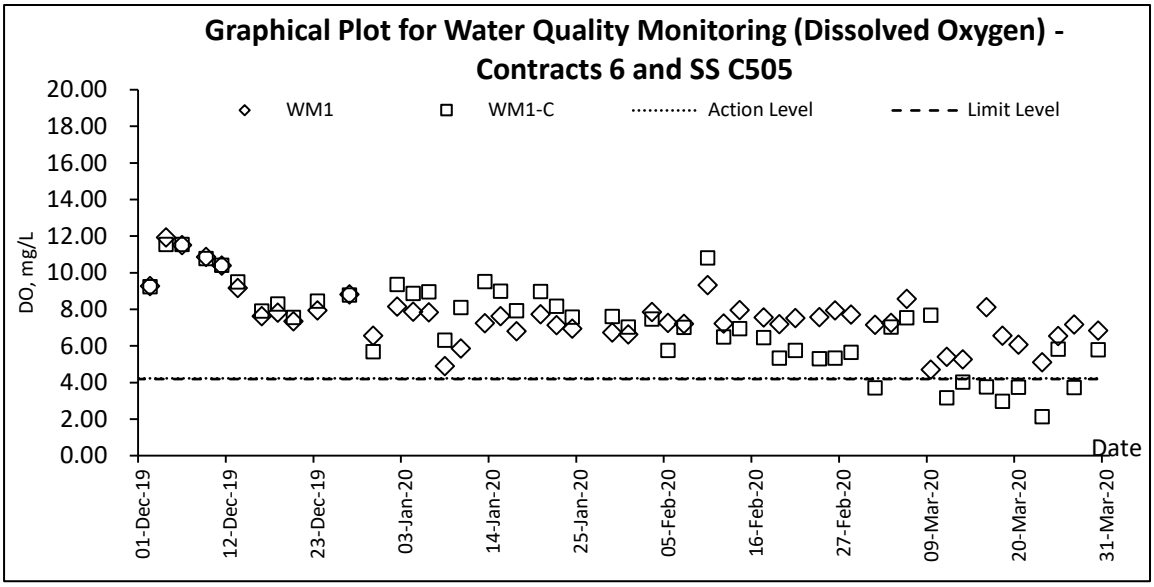

Graphical Plot for Construction Noise Monitoring Result at NM7
L_{eq30}, dB(A)
Leq30min
Limit Level for Leq30min
80
75
70
65
60
55
50
45
Date
1-Dec-19
12-Dec-19
23-Dec-19
3-Jan-20
14-Jan-20
25-Jan-20
5-Feb-20
16-Feb-20
27-Feb-20
9-Mar-20
20-Mar-20
31-Mar-20

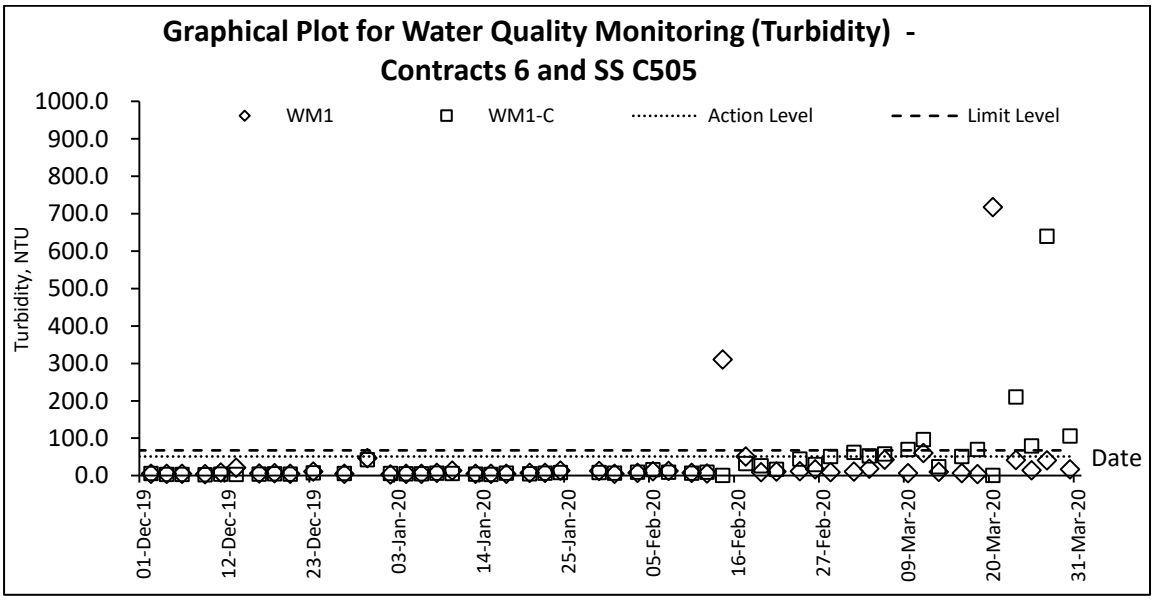

Graphical Plot for Construction Noise Monitoring Result at NM8
L_{eq30}, dB(A)
Leq30min
Limit Level for Leq30min
80
75
70
65
60
55
50
45
Date
1-Dec-19
12-Dec-19
23-Dec-19
3-Jan-20
14-Jan-20
25-Jan-20
5-Feb-20
16-Feb-20
27-Feb-20
9-Mar-20
20-Mar-20
31-Mar-20

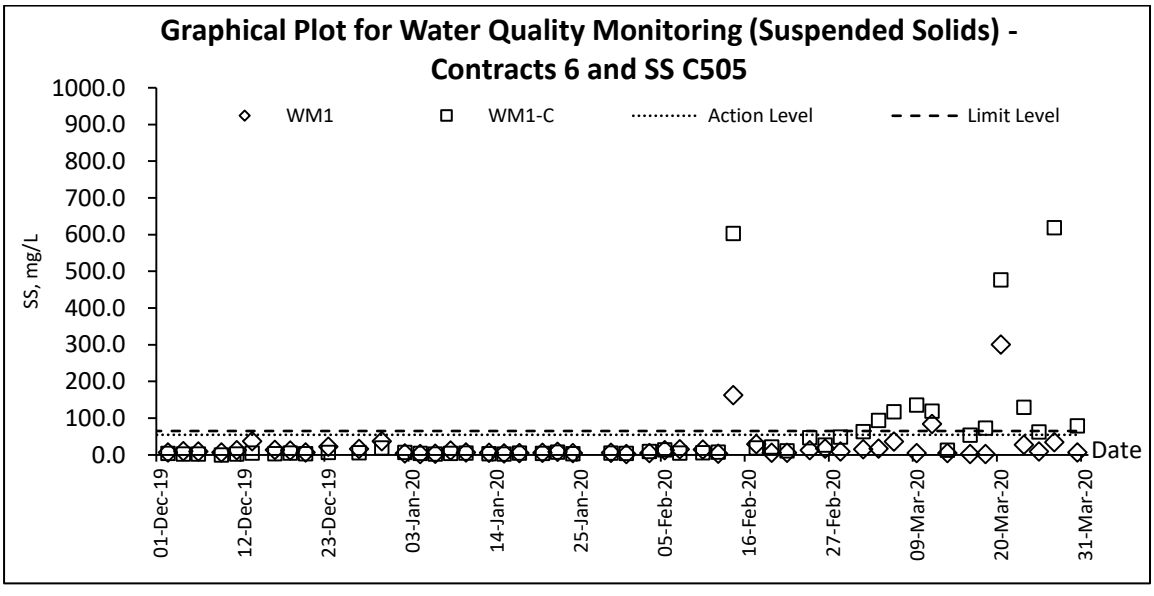

Graphical Plot for Construction Noise Monitoring Result at NM9
L_{eq30}, dB(A)
Leq30min
Limit Level for Leq30min
80
75
70
65
60
55
50
45
Date
1-Dec-19
12-Dec-19
23-Dec-19
3-Jan-20
14-Jan-20
25-Jan-20
5-Feb-20
16-Feb-20
27-Feb-20
9-Mar-20
20-Mar-20
31-Mar-20

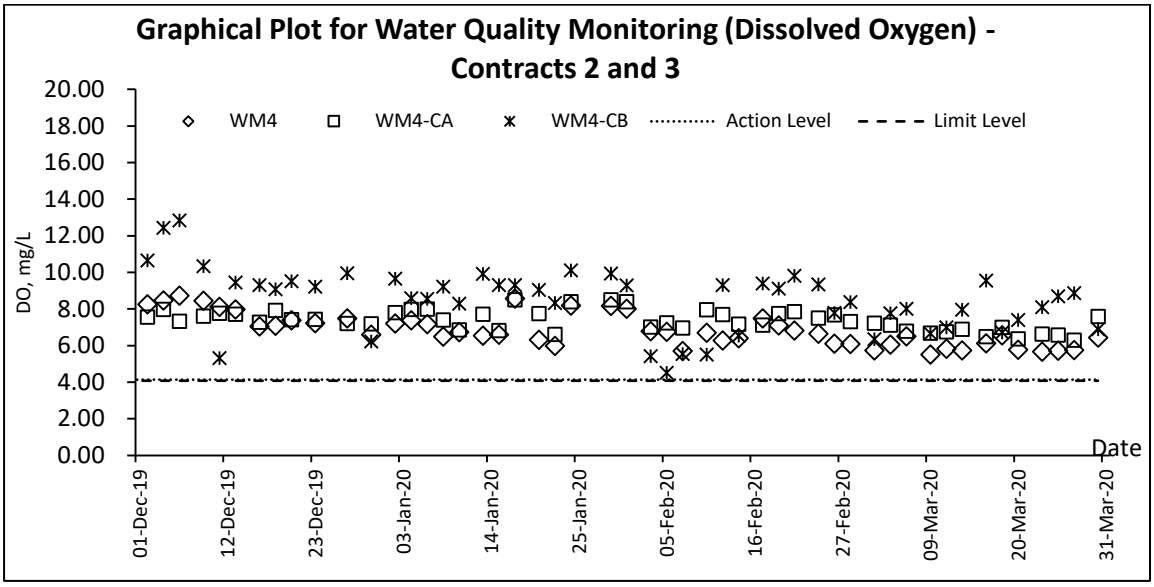

Graphical Plot for Construction Noise Monitoring Result at NM10
L_{eq30}, dB(A)
Leq30min
Limit Level for Leq30min
Corrected Leq 30min
80
75
70
65
60
55
50
45
Date
1-Dec-19
12-Dec-19
23-Dec-19
3-Jan-20
14-Jan-20
25-Jan-20
5-Feb-20
16-Feb-20
27-Feb-20
9-Mar-20
20-Mar-20
31-Mar-20

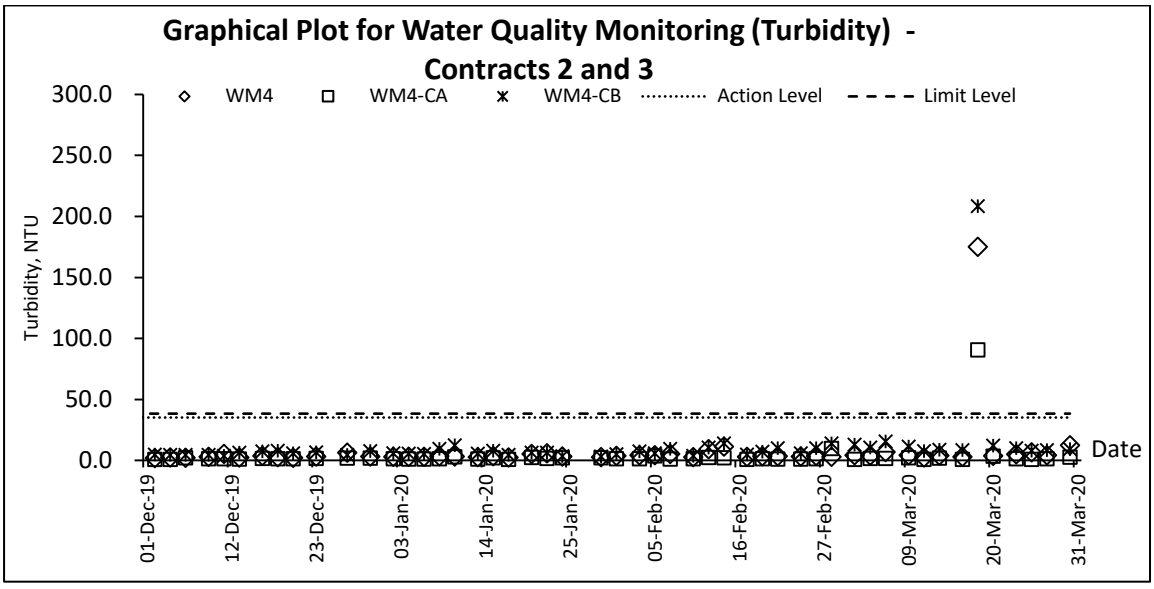
Water Quality

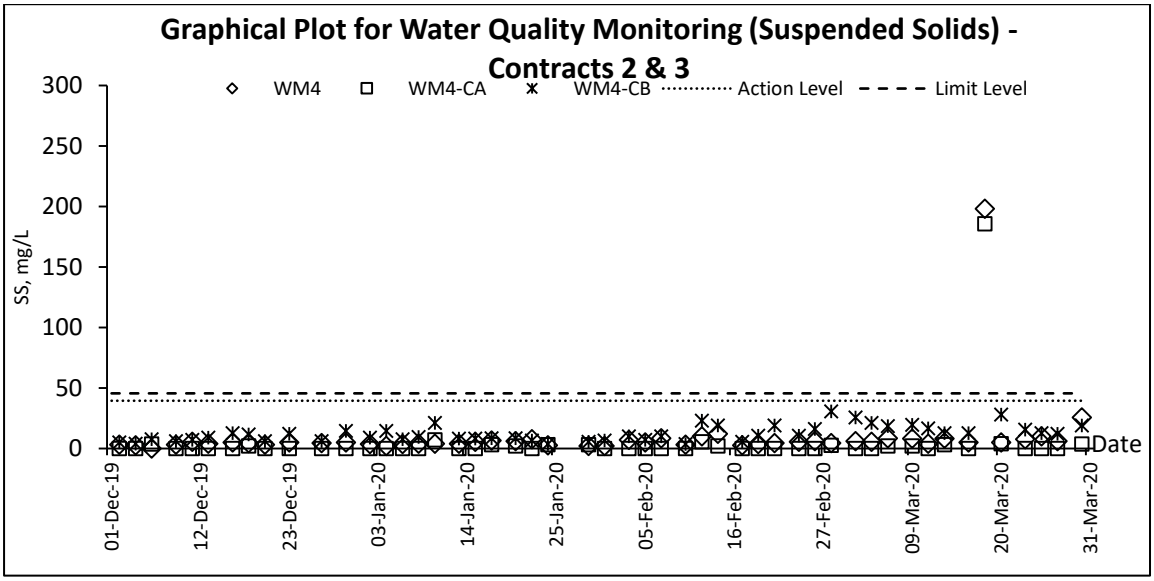


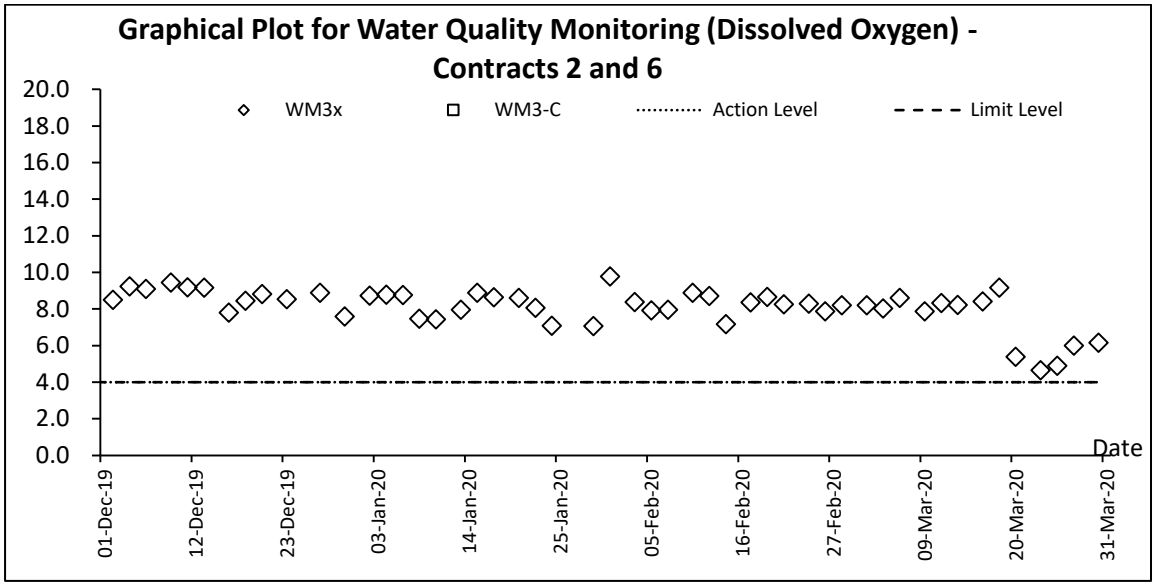


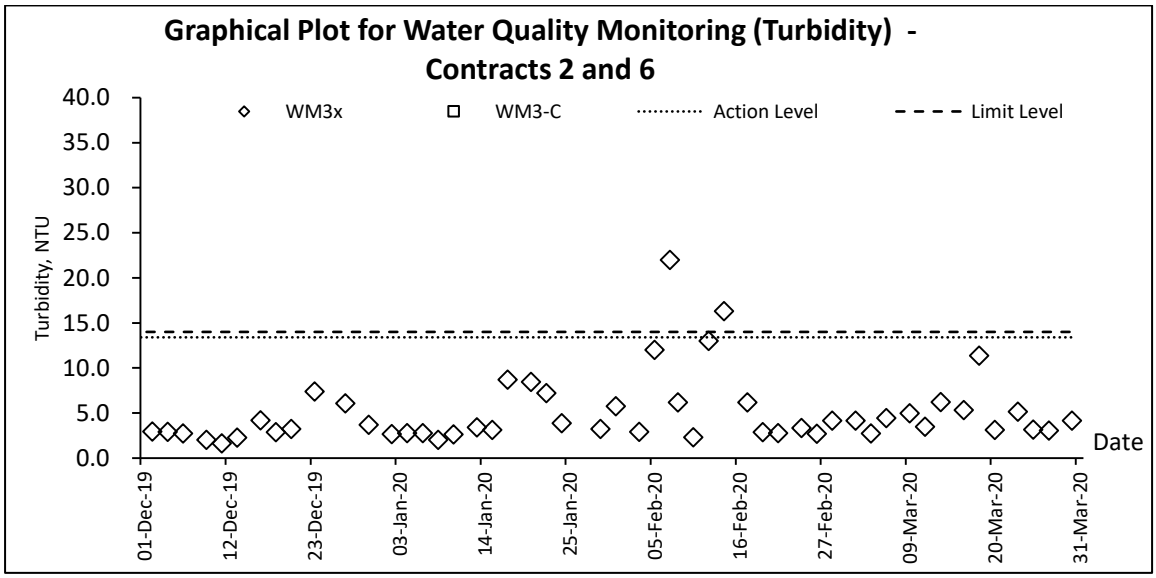


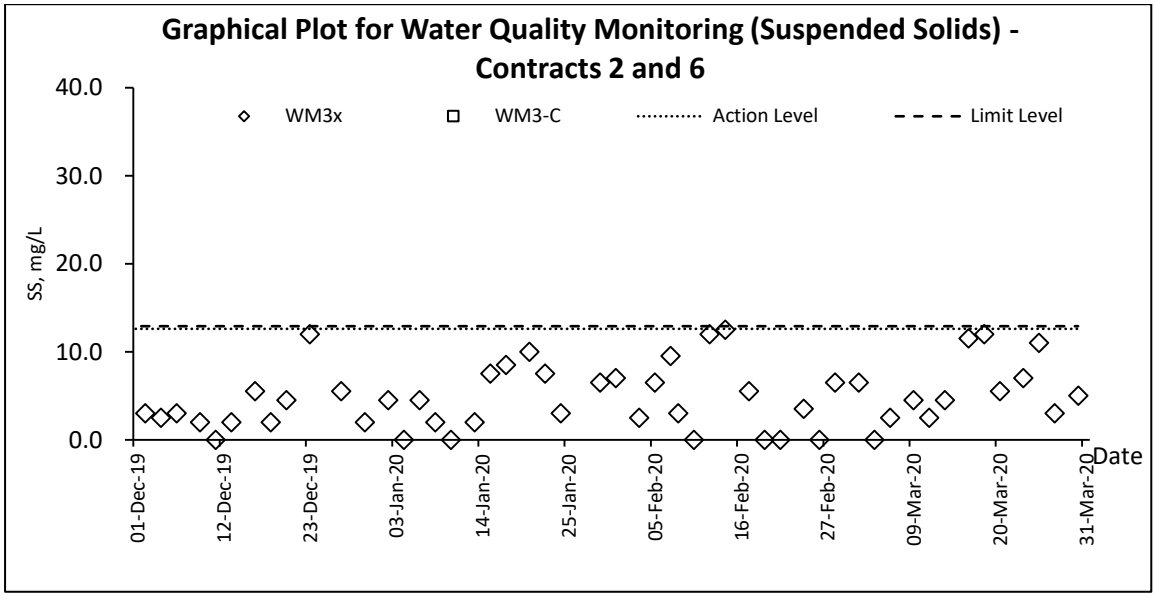

Graphical Plot for Water Quality Monitoring (Dissolved Oxygen) - Contracts 2 and 3
WM4
WM4-CA
WM4-CB
Action Level
Limit Level
DO, mg/L
20.00
18.00
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Date
01-Dec-19
12-Dec-19
23-Dec-19
03-Jan-20
14-Jan-20
25-Jan-20
05-Feb-20
16-Feb-20
27-Feb-20
09-Mar-20
20-Mar-20
31-Mar-20

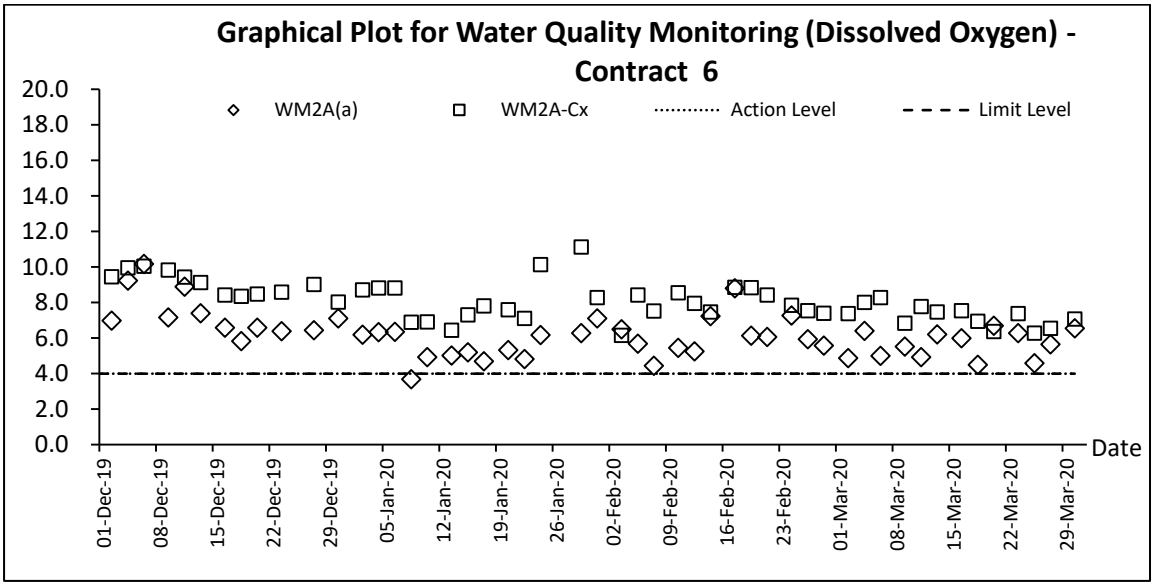

Graphical Plot for Water Quality Monitoring (Turbidity) - Contracts 2 and 3
WM4
WM4-CA
WM4-CB
Action Level
Limit Level
Turbidity, NTU
300.0
250.0
200.0
150.0
100.0
50.0
0.0
Date
01-Dec-19
12-Dec-19
23-Dec-19
03-Jan-20
14-Jan-20
25-Jan-20
05-Feb-20
16-Feb-20
27-Feb-20
09-Mar-20
20-Mar-20
31-Mar-20

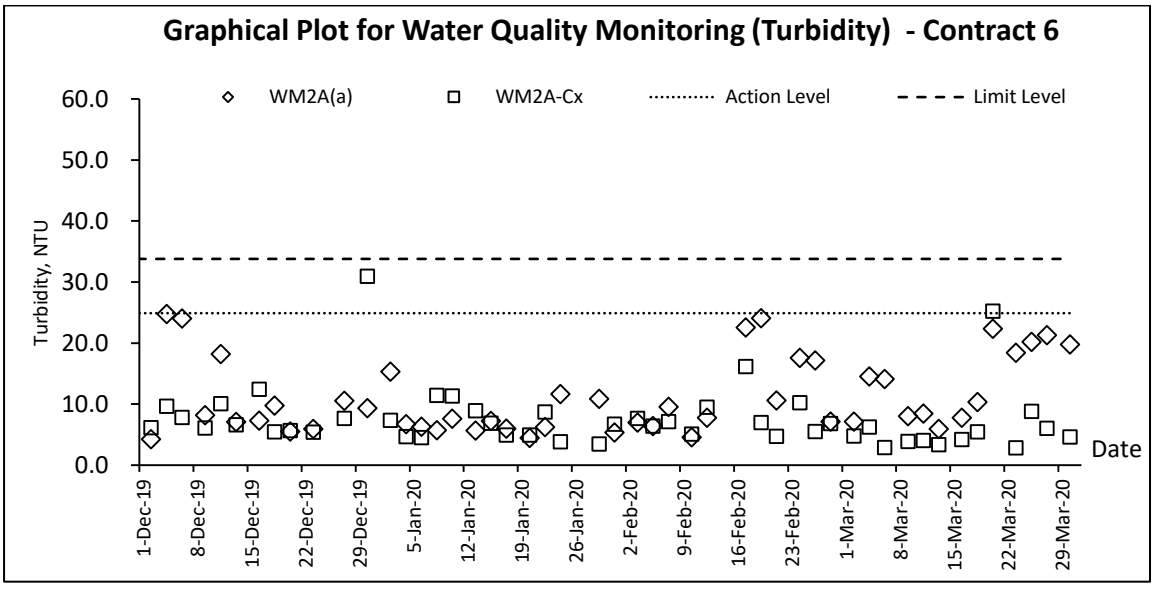

Graphical Plot for Water Quality Monitoring (Suspended Solids) - Contracts 2 & 3
WM4
WM4-CA
WM4-CB
Action Level
Limit Level
SS, mg/L
300
250
200
150
100
50
0
Date
01-Dec-19
12-Dec-19
23-Dec-19
03-Jan-20
14-Jan-20
25-Jan-20
05-Feb-20
16-Feb-20
27-Feb-20
09-Mar-20
20-Mar-20
31-Mar-20

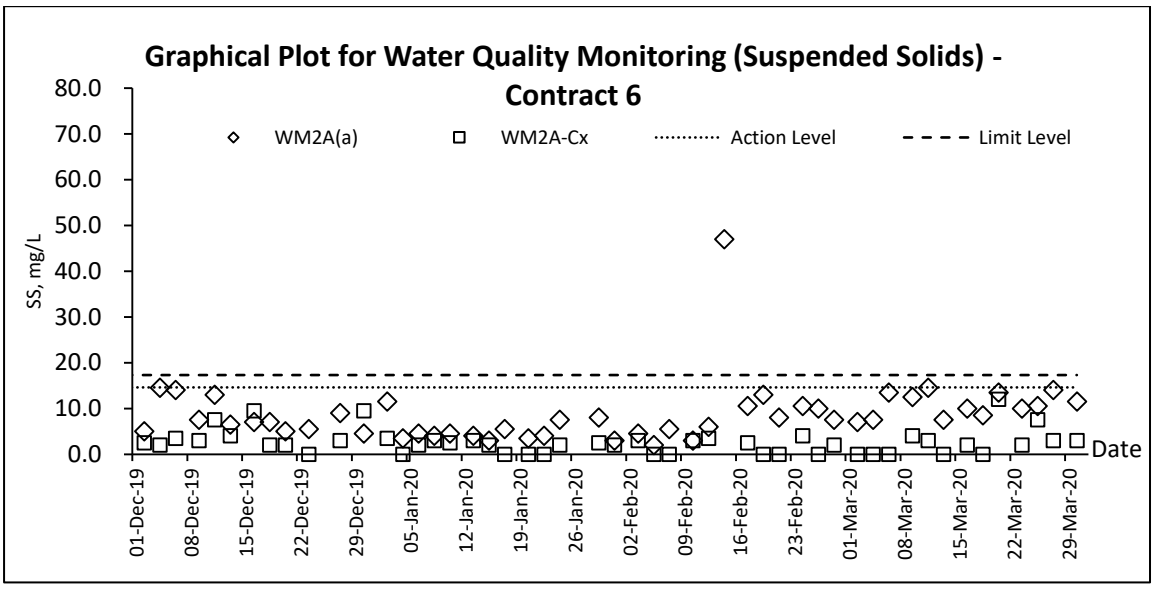

Graphical Plot for Water Quality Monitoring (Dissolved Oxygen) - Contracts 2 and 6
WM3x
WM3-C
Action Level
Limit Level
20.0
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
Date
01-Dec-19
12-Dec-19
23-Dec-19
03-Jan-20
14-Jan-20
25-Jan-20
05-Feb-20
16-Feb-20
27-Feb-20
09-Mar-20
20-Mar-20
31-Mar-20


Graphical Plot for Water Quality Monitoring (Turbidity) - Contracts 2 and 6
WM3x
WM3-C
Action Level
Limit Level
Turbidity, NTU
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Date
01-Dec-19
12-Dec-19
23-Dec-19
03-Jan-20
14-Jan-20
25-Jan-20
05-Feb-20
16-Feb-20
27-Feb-20
09-Mar-20
20-Mar-20
31-Mar-20


Graphical Plot for Water Quality Monitoring (Suspended Solids) - Contracts 2 and 6
WM3x
WM3-C
Action Level
Limit Level
SS, mg/L
40.0
30.0
20.0
10.0
0.0
Date
01-Dec-19
12-Dec-19
23-Dec-19
03-Jan-20
14-Jan-20
25-Jan-20
05-Feb-20
16-Feb-20
27-Feb-20
09-Mar-20
20-Mar-20
31-Mar-20


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-Dec-19
08-Dec-19
15-Dec-19
22-Dec-19
29-Dec-19
05-Jan-20
12-Jan-20
19-Jan-20
26-Jan-20
02-Feb-20
09-Feb-20
16-Feb-20
23-Feb-20
01-Mar-20
08-Mar-20
15-Mar-20
22-Mar-20
29-Mar-20


Graphical Plot for Water Quality Monitoring (Turbidity) - Contract 6
WM2A(a)
WM2A-Cx
Action Level
Limit Level
Turbidity, NTU
60.0
50.0
40.0
30.0
20.0
10.0
0.0
Date
1-Dec-19
8-Dec-19
15-Dec-19
22-Dec-19
29-Dec-19
5-Jan-20
12-Jan-20
19-Jan-20
26-Jan-20
2-Feb-20
9-Feb-20
16-Feb-20
23-Feb-20
1-Mar-20
8-Mar-20
15-Mar-20
22-Mar-20
29-Mar-20


Graphical Plot for Water Quality Monitoring (Suspended Solids) - Contract 6
WM2A(a)
WM2A-Cx
Action Level
Limit Level
SS, mg/L
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
Date
01-Dec-19
08-Dec-19
15-Dec-19
22-Dec-19
29-Dec-19
05-Jan-20
12-Jan-20
19-Jan-20
26-Jan-20
02-Feb-20
09-Feb-20
16-Feb-20
23-Feb-20
01-Mar-20
08-Mar-20
15-Mar-20
22-Mar-20
29-Mar-20

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-Mar-20	Sun	Mainly cloudy. Visibility rather low at first.	0	22.3	10.2	79	E
2-Mar-20	Mon	A few showers in the morning and at night.	24.2	18.7	9.5	84.7	E
3-Mar-20	Tue	Sunny periods during the day tomorrow.	Trace	20.2	12.5	76.2	E/SE
4-Mar-20	Wed	Moderate southerly winds	3.1	19.3	6	82.5	E
5-Mar-20	Thu	Becoming moderate to fresh northerly winds shortly after midnight.	0.4	17.4	6	81.5	E
6-Mar-20	Fri	Sunny periods.Dry during the day.	Trace	19.1	10.8	73	E/SE
7-Mar-20	Sat	Moderate to fresh northerly winds	Trace	22	11.5	69.2	E
8-Mar-20	Sun	Moderate southerly winds	Trace	22.1	9.5	84.5	E
9-Mar-20	Mon	Becoming moderate to fresh northerly winds shortly after midnight.	Trace	24	10.7	80.7	E
10-Mar-20	Tue	Moderate to fresh northerly winds	Trace	22.4	13	70.5	N
11-Mar-20	Wed	A few showers in the morning and at night.	Trace	17.7	8.5	68.5	E
12-Mar-20	Thu	Sunny periods during the day tomorrow.	Trace	20.2	14.5	82	E
13-Mar-20	Fri	Moderate southerly winds	0	22.9	12.5	84.2	E
14-Mar-20	Sat	Becoming moderate to fresh northerly winds shortly after midnight.	0.4	22.4	10.5	69.5	E
15-Mar-20	Sun	Moderate southerly winds	0	21	7.5	62.5	E/SE
16-Mar-20	Mon	Moderate to fresh northerly winds	0	20.9	10	62.5	E
17-Mar-20	Tue	A few showers in the morning and at night.	0	20.1	8.7	77.5	E
18-Mar-20	Wed	Sunny periods during the day tomorrow.	10.7	20.4	8.7	85	E
19-Mar-20	Thu	Moderate southerly winds	0.8	20.4	5.5	87	E/SE
20-Mar-20	Fri	Sunny periods during the day tomorrow.	0.4	21.3	7	86.7	E
21-Mar-20	Sat	Moderate southerly winds	0.2	21.8	5	81.2	E
22-Mar-20	Sun	Becoming moderate to fresh northerly winds shortly after midnight.	0	24.7	6	74.5	E/SE
23-Mar-20	Mon	Moderate southerly winds	0	24.7	6.2	74.7	W/SW
24-Mar-20	Tue	Mainly cloudy. A few rain patches in the morning	Trace	24	11.5	74.5	E
25-Mar-20	Wed	Sunny periods during the day tomorrow.	Trace	24.3	10.5	73	E
26-Mar-20	Thu	Moderate southerly winds	1	24.2	8.7	83.5	E
27-Mar-20	Fri	Cloudy and windy in the next couple of days	Trace	25.4	8.5	77	E/SE
28-Mar-20	Sat	A few showers in the morning and at night.	9.8	22.3	9	79	E/SE
29-Mar-20	Sun	Cloudy and windy in the next couple of days	2.2	19.2	10.5	87.0	E
30-Mar-20	Mon	Moderate northerly winds, freshening from the east later.	6.5	18.9	10	91.5	E/SE
31-Mar-20	Tue	Mainly cloudy. A few rain patches in the morning	5.8	19.5	8.7	90.5	E

Appendix L

Photographic Record for Site Inspection at Wetland Compensation Area

Summary of site Inspection Record

AUES

Project:	**Agreement No. CE 45/2008 (CE) -** ***Liantang/Heung Yuen Wai Boundary Control Point and Associated Works***
Title	***Site Inspection for Wetland Compensation Area***
Date:	**5 March 2020**
Time:	0930
Environmental Permit	**EP- 404/2011/D**

PART A: GENERAL INFORMATION

Weather:	Sunny	☐	Fine	☐	Cloudy	☑	Rainy	☐	Temperature:	17 ^{0}C
Humidity:	High	☐	Moderate	☑	Low	☐				
Wind:	Strong	☐	Breeze	☐	Light	☑	Calm	☐		

Observation on Site:

Photo 1
Overveiw of Wetalnd Compensation Area (WCA)

Photo 2
Excavation of soil at pond D was observed at WCA.

Photo 3
Wastewater treatment facility was implemented at WCA.

Summary of site Inspection Record

AUES

Project:	**Agreement No. CE 45/2008 (CE) - *Liantang/Heung Yuen Wai Boundary Control Point and Associated Works***
Title	***Site Inspection for Wetland Compensation Area***
Date:	**12 March 2020**
Time:	0930
Environmental Permit	**EP- 404/2011/D**

PART A: GENERAL INFORMATION

Weather:	Sunny	☐	Fine	☑	Cloudy	☐	Rainy	☐	Temperature:	22 ^{0}C
Humidity:	High	☐	Moderate	☐	Low	☑				
Wind:	Strong	☐	Breeze	☐	Light	☑	Calm	☐		

Observation on Site:

Photo 1
Overveiw of Wetalnd Compensation Area (WCA)

Photo 2
The exposed surface was covered with waterproof membrane at proposed pond at WCA.

Photo 3
The water quality of the stream adjacent to the site was clear.

Summary of site Inspection Record

AUES

Project:	**Agreement No. CE 45/2008 (CE) -** ***Liantang/Heung Yuen Wai Boundary Control Point and Associated Works***
Title	***Site Inspection for Wetland Compensation Area***
Date:	**17 March 2020**
Time:	0930
Environmental Permit	**EP- 404/2011/D**

PART A: GENERAL INFORMATION

Weather:	Sunny	☐	Fine	☐	Cloudy	☑	Rainy	☐	Temperature:	22 ^{0}C
Humidity:	High	☐	Moderate	☐	Low	☑				
Wind:	Strong	☐	Breeze	☐	Light	☑	Calm	☐		

Observation on Site:

Photo 1
Stones were distributed in different places at the proposed pond.

Photo 2
The exposed surface was covered with waterproof membrane at proposed pond at WCA.

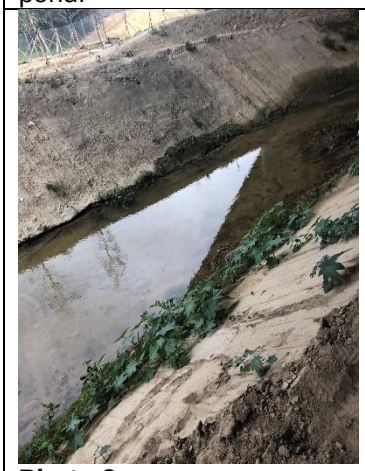


Photo 3
The water quality of the stream adjacent to the site was clear.

Summary of site Inspection Record

AUES

Project:	**Agreement No. CE 45/2008 (CE) -** ***Liantang/Heung Yuen Wai Boundary Control Point and Associated Works***
Title	***Site Inspection for Wetland Compensation Area***
Date:	**26 March 2020**
Time:	1400
Environmental Permit	**EP- 404/2011/D**

PART A: GENERAL INFORMATION

Weather:	Sunny	☑	Fine	☐	Cloudy	☐	Rainy	☐	Temperature:	26 ^{0}C
Humidity:	High	☐	Moderate	☐	Low	☑				
Wind:	Strong	☐	Breeze	☐	Light	☑	Calm	☐		

Observation on Site:

Photo 1
Soil laying at the proposed pond at WCA.

Photo 2
The exposed surface was covered with waterproof membrane at proposed pond at WCA.

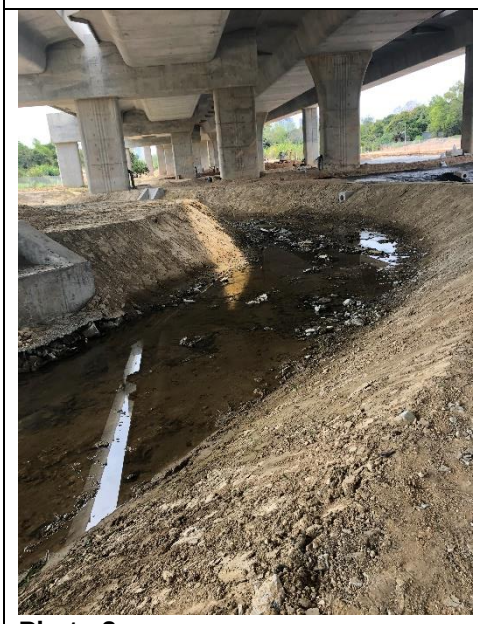


Photo 3
The water quality of the stream adjacent to the site was clear.

Appendix M

Waste Flow Table

香港寶嘉 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

Monthly Waste Flow Table

Name of Department : CEDD **Contract No. : CV/2012/08** **Year: 2020**

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	C&D Material (Rock, Soil, Slurry, Broken concrete)	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)
	[b+c+d)	(a)	(b)	(c)	(d)		(in '000kg)	(in '000kg)	(in kg)	(in '000kg)	(in '000m3)
January	0.0177	0.0177	0.0000	0.0000	0.0177	0.0000	0.0000	0.0000	0.0000	0.0000	0.0415
February	0.0845	0.0845	0.0000	0.0000	0.0845	0.0000	0.0000	0.0000	0.0000	0.0000	0.0498
March	2.5938	2.5938	0.0000	0.0000	2.5938	0.0000	0.0000	0.0000	0.0000	0.0000	0.0634
April	0.0000										
May	0.0000										
June	0.0000										
Half-year total	2.6960	2.6960	0.0000	0.0000	2.6960	0.0000	0.0000	0.0000	0.0000	0.0000	0.1547
July	0.0000										
August	0.0000										
September	0.0000										
October	0.0000										
November	0.0000										
December	0.0000										
Yearly Total	2.6960	2.6960	0.0000	0.0000	2.6960	0.0000	0.0000	0.0000	0.0000	0.0000	0.1547

Assumption:

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

Name of Department: CEDD

Contract No.: CV/2012/09

Monthly Summary Waste Flow Table for 2020 (year)

Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of C&D Wastes Generated Monthly				
	Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastics	Chemical Waste	Others, e.g. general refuse
	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in m^3)	(in '000m^3)
Jan	0.280	0.000	0.000	0.000	0.280	0.000	0.000	0.000	0.000	0.000	0.015
Feb	0.069	0.000	0.000	0.000	0.069	0.000	0.000	0.000	0.000	0.000	0.020
Mar	0.089	0.000	0.000	0.000	0.089	0.000	0.000	0.000	0.000	0.000	0.025
Apr											
May											
Jun											
Sub-total	0.437	0.000	0.000	0.000	0.437	0.000	0.000	0.000	0.000	0.000	0.060
Jul											
Aug											
Sep											
Oct											
Nov											
Dec											
Total	0.437	0.000	0.000	0.000	0.437	0.000	0.000	0.000	0.000	0.000	0.060

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 5m^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.

Appendix A

Name of Department: CEDD

Contract No.: NE/2014/02

Monthly Summary Waste Flow Table for 2016- 2020

Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of C&D Wastes Generated Monthly				
	Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastics (see Note 3)	Chemical Waste	Others, e.g. general refuse
	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000 kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m^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
2019	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.030
Jan-20	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Feb-20	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mar-20	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Apr-20											
May-20											
Jun-20											
Jul-20											
Aug-20											
Sep-20											
Oct-20											
Nov-20											
Dec-20											
Total	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.049	0.000	0.000	0.060

Forecast of Total Quantities of C&D Materials to be Generated from the Contract*										
Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastics (see Note 3)	Chemical Waste	Others, e.g. general refuse
(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000 kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m^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 2020 (year)

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

Project : Liangtang / Heung Yuen Wai Boundary Control Point Site Formation and Infrastructure Works – Contract 6 Contract No.: CV/2013/08

Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of C&D Wastes Generated Monthly				
	Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastics (see Note 3)	Chemical Waste	Others, e.g. general refuse
	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000 kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000 m^3)
Jan	10.280	0	0	0	10.280	0	0	0	0.22	0	0.377
Feb	21.439	0	0	0	21.439	0	0	0	0	0	0.522
Mar	7.623	0	0	0	7.623	0	0	0	0	0	0.417
Apr	0	0	0	0	0	0	0	0	0	0	0
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	39.342	0.000	0.000	0.000	39.342	0.000	0.000	0.000	0.220	0.000	1.316
Jul	0	0	0	0	0	0	0	0	0	0	0
Aug	0	0	0	0	0	0	0	0	0	0	0
Sep	0	0	0	0	0	0	0	0	0	0	0
Oct	0	0	0	0	0	0	0	0	0	0	0
Nov	0	0	0	0	0	0	0	0	0	0	0
Dec	0	0	0	0	0	0	0	0	0	0	0
Total	39.342	0.000	0.000	0.000	39.342	0.000	0.000	0.000	0.220	0.000	1.316

Notes: (1) The waste flow table shall also include C&D materials that are specified in the Contract to be imported for use at the Site.

(2) Plastics refer to plastic bottles/containers, plastic sheets/ foam from packaging materials.

(3) Broken concrete for recycling into aggregates.

Monthly Summary Waste Flow Table for _2020___ (year)

Name of Department: CEDD

Contract Title : Liangtang / Heung Yuen Wai Boundary Control Point Site Formation and Infrastructure Works – Contract 7 Contract No.: NE/2014/03

Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of C&D Wastes Generated Monthly				
	Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastics (see Note 3)	Chemical Waste	Others, e.g. general refuse
	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000 kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000 m^3)
Jan	0	0	0	0	0	0	0	0	0	0	0.1
Feb	0	0	0	0	0	0	0	0	0	0	0
Mar	0	0	0	0	0	0	0	0	0	0	0
Apr											
May											
Jun											
Sub-total	0	0	0	0	0	0	0	0	0	0	0.1
Jul											
Aug											
Sep											
Oct											
Nov											
Dec											
Total	0	0	0	0	0	0	0	0	0	0	0.1

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.

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

Contract No. / Works Order No.: - SSC505

Monthly Summary Waste Flow Table for 2020 [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 '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)
Jan	0.072	0.000	0.000	0.000	0.072
Feb	0.000	0.000	0.000	0.000	0.000
Mar	0.026	0.000	0.000	0.000	0.026
Apr					
May					
Jun					
Sub-total	0.098	0.000	0.000	0.000	0.098
Jul					
Aug					
Sep					
Oct					
Nov					
Dec					
Total	0.098	0.000	0.000	0.000	0.098

Month	Actual Quantities of Non-inert Construction Waste Generated Monthly												
	Timber		Metals		Paper/ cardboard packaging		Plastics (see Note 3)		Chemical Waste		Other Recyclable Materials (see Page 3)		General Refuse disposed of at Landfill
	(in '000kg)		(in '000kg)		(in '000kg)		(in '000kg)		(in '000kg)		(in '000kg)		(in '000m^3)
	generated	recycled	generated	recycled	generated	recycled	generated	recycled	generated	recycled	generated	recycled	generated
Jan	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.475
Feb	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.299
Mar	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.234
Apr													
May													
Jun													
Sub-total	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.008
Jul													
Aug													
Sep													
Oct													
Nov													
Dec													
Total	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.008

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					

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 '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000 kg)	(in '000 kg)	(in '000 kg)	(in '000 kg)	(in '000 m^3)
317.197	14.807	49.327	0.000	189.811	63.450	20,496.376	26.096	24.723	5.000	45.039

Appendix N

Investigation Report for Exceedance

(Not Applicable)

Appendix O

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** The following dust suppression measures should be implemented: ■ 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 ■ 80% of stockpile areas should be covered by impervious sheets ■ Speed of trucks within the site should be controlled to about 10 km/hr ■ 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** 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: *Good site management* ■ The Contractor should maintain high standard of housekeeping to prevent emission of fugitive dust. ■ 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. ■ Any piles of materials accumulated on or around the work areas should be cleaned up regularly. ■ 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. ■ The material should be handled properly to prevent fugitive dust emission before cleaning. *Disturbed Parts of the Roads* ■ 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?
		concrete, bituminous hardcore materials or metal plates and kept clear of dusty materials; or ■ Unpaved parts of the road should be sprayed with water or a dust suppression chemical so as to keep the entire road surface wet. *Exposed Earth* ■ 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. *Loading, Unloading or Transfer of Dusty Materials* ■ All dusty materials should be sprayed with water immediately prior to any loading or transfer operation so as to keep the dusty material wet. *Debris Handling* ■ Any debris should be covered entirely by impervious sheeting or stored in a debris collection area sheltered on the top and the three sides. ■ Before debris is dumped into a chute, water should be sprayed so that it remains wet when it is dumped. *Transport of Dusty Materials* ■ 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. *Wheel washing* ■ 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. *Use of vehicles* ■ Immediately before leaving the construction site, every vehicle should be washed to remove any dusty materials from its body and wheels. ■ 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?
		Site hoarding ■ 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. *Blasting* ■ 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: ■ 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. ■ Further odour containment will be achieved by covering or confining the sewage channels, sewage tanks, and equipment with potential odour emission. ■ Proper mixing will be provided at the equalization and sludge holding tanks to prevent sewage septicity. ■ 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** 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?
4.4.1.4	3.1	**Use of Movable Noise Barrier** 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** 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** 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?
4.4.1.4	3.1	**Good Site Practice** The good site practices listed below should be followed during each phase of construction: • Only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction programme; • Silencers or mufflers on construction equipment should be utilized and should be properly maintained during the construction programme; • Mobile plant, if any, should be sited as far from NSRs as possible; • 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; • 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 • 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?
4.5.2.4	3.2	The following noise reduction measures shall be considered as far as practicable during operation: • Choose quieter plant such as those which have been effectively silenced; • Include noise levels specification when ordering new plant (including chillier and E/M equipment); • Locate fixed plant/louver away from any NSRs as far as practicable; • Locate fixed plant in walled plant rooms or in specially designed enclosures; • Locate noisy machines in a basement or a completely separate building; • Install direct noise mitigation measures including silencers, acoustic louvers and acoustic enclosure where necessary; and • 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** 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: ▪ 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. ▪ 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?
		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. ▪ 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. ▪ 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. ▪ 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. ▪ 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. ▪ 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?
		the erosive potential of surface water flows. ▪ 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. ▪ 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. ▪ 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. ▪ 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. ▪ 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** 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?
		▪ Adequate measures should be implemented to ensure no pollution or siltation occurs to the catchwaters and catchments. ▪ 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. ▪ All surplus spoil should be removed from water gathering grounds as soon as possible. ▪ Temporary drains with silt traps should be constructed at the site boundary before the commencement of any earthworks. ▪ Regular cleaning of silt traps should be carried out to ensure proper operation at all time. ▪ All excavated or filled surfaces which have the risk of erosion should always be protected form erosion. ▪ Facilities for washing the wheels of vehicles before leaving the site should be provided. ▪ Any construction plant which causes pollution to catchwaters or catchments due to the leakage of oil or fuel should be removed off site immediately. ▪ 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. ▪ 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. ▪ 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. ▪ 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?
		Water Supplies. ▪ An unimpeded access through the waterworks access road should always be maintained. ▪ Earthworks near catchwaters or streamcourses should only be carried out in dry season between October and March, ▪ 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** 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. 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** 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** 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?
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** 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: ▪ 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 ▪ Training of site personnel in proper waste management and chemical handling procedures ▪ Provision of sufficient waste disposal points and regular collection of waste ▪ 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 ▪ 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?
		such odour is not anticipated to be an issue to distant sensitive receivers ▪ Provision of wheel washing facilities before the trucks leaving the works area so as to minimise dust introduction from public road ▪ Covers and water spraying system should be provided for the stockpiled C&D material to prevent dust impact or being washed away ▪ Designate different locations for storage of C&D material to enhance reuse ▪ 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 ▪ 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 ▪ 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** 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: ▪ 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 ▪ 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 ▪ Proper storage and site practices to minimise the potential for damage or contamination of construction materials ▪ 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?
		of waste generated and avoid unnecessary generation of waste ▪ 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** 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: ▪ A Waste Management Plan should be prepared and implemented in accordance with ETWB TC(W) No. 19/2005 Environmental Management on Construction Site; and ▪ 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** 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** 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 P

Implementation Status of Mitigation Measures for Operation Phase

EP/EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	Location of the measures	When to implement the measures?	Implementation Status	Remarks
Air Quality Impact (Operation)							
EP C3.11/ 3.5.2.2	The sewage treatment plant installed for the Project shall be installed at the location shown in Figure 3 of the EP The plant shall be designed with the following odour containment and control measures : 1. Negative Pressure Ventilation (a) The treatment plant shall be totally enclosed with negative pressure ventilation to avoid odorous emission from the treatment works. The tanks will be connected to deodorisation facilities designed for a minimum removal of 90% directly to eliminate odour problem. 2. Total Containment of Sewage Channels (a) air-tight cover shall be installed to sewage channels, sewage tanks, and equipment with potential odour emission and the trapped gases shall be collected by air handling equipment for containing and directing odorous gases to deodorisation facilities.	To minimize potential odour impact from operation of the proposed sewage treatment work at BCP	DSD	Sewage Treatment Plant (STP) at BCP	Operation Phase	Implemented Implemented Implemented	STP was implemented at BCP and it was handover to DSD on 29 July 2019 for operation. The STP was enclosed with negative pressure ventilation and the tanks are connected to deodorisation facilities. The underground sewage tank, sewage channel and potential odour emission with air tight cover and were connected to deodorisation facilities.

EP/EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	Location of the measures	When to implement the measures?	Implementation Status	Remarks
	(b) Gravity sewer, equalization and sludge holding tanks shall be designed with suitable sewer distance and retention time to prevent sewage septicity. 3. Deodorisation (a) Deodorisation facilities at the sewage treatment plant shall be designed with a minimum odour removal efficiency of 90%.					Implemented	The deodorisation facilities was monitored by control room to ensure odour removal efficiency of 90%.
Noise Impact (Operation)							
	Road Traffic Noise						
EP C3.5 / Table 4.42 and Figure 4.20.1 to 4.20.4	Erection of noise barrier/ enclosure along the viaduct section. - To mitigate the traffic noise impact arising from the operation of the Project, the noise mitigation measures shall be implemented in accordance with Fig 4, 5, 6 and 7 attached to the EP, or otherwise approved by the Director subject to the submission of a Noise Mitigation Plan by the Permit Holder to cater for the final layout and design of the Project.	To minimize the road traffic noise along the connecting road of BCP	Contractor	Loi Tung and Fanling Highway Interchange	Before Operation	Implemented	Noise barriers were installed in accordance with the Noise Mitigation Plan.
	Fixed Plant Noise						
Table	Specification of the maximum allowable	To minimize the fixed	Managing	BCP,	Before Operation	BCP not yet	

EP/EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	Location of the measures	When to implement the measures?	Implementation Status	Remarks
4.46	sound power levels of the proposed fixed plants during daytime and night-time.	plant noise impact	Authority of the buildings / Contractor	Administration Building (Admin bldg.) and all ventilation buildings		commenced Implemented in Admin bldg. and all ventilation buildings	
4.6.2	Commissioning test should be conducted for all major fixed noise sources to ensure compliance of the operational for all major fixed noise sources before operation.	To minimize the fixed plant noise impact	Managing Authority of the buildings / Contractor	BCP, Administration Building and all ventilation buildings	Before Operation	BCP not yet commenced Implemented in Admin bldg. and all ventilation buildings	
4.5.2.4	The following noise reduction measures shall be considered as far as practicable during operation: • Choose quieter plant such as those which have been effectively silenced;	To minimize the fixed plant noise impact	Managing Authority of the buildings / Contractor	BCP, Administration Building and all ventilation buildings	Before Operation	BCP not yet commenced Implemented in Admin bldg. and all ventilation buildings	
	• Include noise levels specification when ordering new plant (including chillier and E/M equipment);					BCP not yet commenced Implemented in Admin bldg. and all ventilation buildings	
	• Locate fixed plant/louver away from any NSRs as far as practicable;					BCP not yet commenced Implemented in Admin bldg. and all ventilation buildings	

EP/EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	Location of the measures	When to implement the measures?	Implementation Status	Remarks
	• Locate fixed plant in walled plant rooms or in specially designed enclosures;					BCP not yet commenced Implemented in Admin bldg. and all ventilation buildings	
	• Locate noisy machines in a basement or a completely separate building;					BCP not yet commenced Implemented in Admin bldg. and all ventilation buildings	
	• Install direct noise mitigation measures including silencers, acoustic louvers and acoustic enclosure where necessary; and;					BCP not yet commenced Implemented in Admin bldg. and all ventilation buildings	
	• 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.					BCP not yet commenced Implemented in Admin bldg. and all ventilation buildings	
Sewage and Sewerage Treatment Impact (Operation)							
6.6.3	Sewage generated by the BCP and Chuk Yuen Village Resite will be collected and treated by the proposed on-site sewage	To minimize water quality impacts	DSD	BCP	Operation phase	Implemented	STP was implemented at BCP and it was handover to DSD on 29 July 2019

EP/EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	Location of the measures	When to implement the measures?	Implementation Status	Remarks
	treatment facility using Membrane Bioreactor treatment with a portion of the treated wastewater reused for irrigation and flushing within the BCP.						for operation.
6.5.3	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	Implemented	
Waste Management (Operation Phase)							
7.6.2.1	**General refuse** General refuse should be collected on daily basis and delivered to the refuse collection point accordingly. A reputable waste collector should be employed to remove general refuse regularly to avoid odour nuisance or pest and vermin problem. Recycling containers are recommended to be provided to encourage recycling of aluminium cans and waste paper.	To minimize impacts resulting from collection and transportation of general refuse for off-site disposal	Managing Authority of the BCP	BCP and its Associated facilities	Operation phase	BCP not yet commenced.	NA

EP/EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	Location of the measures	When to implement the measures?	Implementation Status	Remarks
7.6.2.2	**Chemical waste** • Register with the EPD as a chemical waste producer should be made and guidelines stated in the *Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes* should be followed. • 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 waste, such as explosive, flammable, oxidizing, irritant, toxic, harmful, corrosive, etc. Licensed collector should be deployed to transport and dispose of the chemical wastes, to the licensed Chemical Waste Treatment Centre, or licensed facilities, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.	To minimize impacts resulting from collection and transportation of chemical waste for off-site disposal	Managing Authority of the BCP	BCP and its associated facilities	Operation phase	BCP not yet commenced.	NA

EP/EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	Location of the measures	When to implement the measures?	Implementation Status	Remarks
Ecological Impact							
9.8	**Mitigation to Anthropogenic Disturbance** • Buffer planting shall be provided for screening the proposed structures and associated facilities.	To screen the Proposed structures and associated facilities.	Contractors	Contractors	In proximity to proposed new development structures and associated facilities.	Refer to OM4 below	N/A
9.8	**Mitigation to Habitat Fragmentation** • Landscape fragmentation should be kept to a minimum and key wildlife routes preserved as far as possible (i.e. OM1 of EM&A Manual Chapter 10). • Provision of landscape plantings (i.e. OM3-7 of EM&A Manual Chapter 10)	To minimize the obstruction on wildlife movement	Contractors	All viaduct sections	Operation phase	Refer to OM1 below. Refer to OM3 to 7 below.	N/A
EP C3.6	All measures recommended in the Vegetation Survey Report, updated Woodland Compensation Plan and the Habitat Creation and Management Plan approved under Condition 2.8, 2.9 and 2.10 of this Permit respectively shall be fully implemented and thereafter maintained.	N/A	N/A	N/A	Operation phase	Implemented.	
EP C3.7	To reduce collisions from birds, the design of noise barriers shall avoid/minimize the use of transparent / reflective materials or adopt bird-friendly design on such surfaces.	To avoid bird mortality due to collision with noise barrier	Contractor	Locations with erection of noise barrier	During detailed design and construction phases	Implemented in Designed, construction phase and operation phase	The steel works of noise barrier was painted in different tone of mat finished green and avoid use of transparent / reflective materials.
Landscape, Visual and Glare Impact							

EP/EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	Location of the measures	When to implement the measures?	Implementation Status	Remarks
3.8	**(OM1) Detailed Design Considerations** Detailed design of development components should aim to reduce landscape footprint and visibility of structures. The area allowed for any development components should be reduced to a practical minimum.	To reduce architectural footprint on the land and minimize visibility of structures.	Detailed designer/ Consultants	Proposed new development structures.	During Detailed Design & Construction/ Operation Phase	Implemented in Designed and construction phase	The detail landscape design of the project is divided into 3 packages as described in the Landscape Plan.
3.8	**(OM2) Aesthetically Pleasing Design** The form, textures, finishes and colours of the proposed development components should be compatible with the existing surroundings. Light earthy tone colours such as shades of green, shades of grey, shades of brown and off-white may be utilised where technically feasible to reduce the visibility of the development components, including all roadwork, buildings and noise barriers etc. To further improve visual amenity, natural building materials such as stone and timber, should be preferably adopted for architectural features, where technically feasible.	To reduce visibility of structures and increase their compatibility with the surrounding	Detailed designer/ Consultants	Proposed new development structures.	During Detailed Design & Construction/ Operation Phase	Implemented in Designed and construction. Implement in operation phase.	
3.8	**(OM3) Compensatory Planting** All compensatory planting of trees is to be carried out in accordance with ETWB TCW No. 03/2006.	To compensate for loss of trees and some shrubs due to the Project.	Contractors	Proposed new development structures.	During Construction/ Operation Phase	Implemented	
3.8	**(OM4) Buffer Tree Planting** Tree planting shall be provided to screen the proposed structures and associated	To screen the proposed structures and associated facilities	Contractors	In proximity to proposed new development	During Construction/ Operation Phase	Implemented	

EP/EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	Location of the measures	When to implement the measures?	Implementation Status	Remarks
	facilities. In addition, the compensatory shrub and ground cover planting detailed in OM4 will provide screening and improve compatibility with the surrounding environment.	including roads.		structures and associated facilities.			
3.8	**(OM5) Aesthetic Improvement Planting - Viaduct Structure** Planters will be provided for trailer planting to soften the hard, straight edges of the viaduct. Where space allows for planters, climbers are proposed to cover vertical, hard surfaces of the piers.	To soften the hard edges on the viaduct and maximize greening opportunity.	Contractors	Viaduct Structure.	During Construction/ Operation Phase	Implemented	
3.8	**(OM6) Aesthetic Improvement Planting – under Viaduct** Shade tolerant plant will be planted, where light is insufficient, to improve value of areas under viaducts.	To soften the hard edges on the viaduct and maximize greening opportunity.	Contractors	Viaduct Structure.	During Construction/ Operation Phase	Implemented	
3.8	**(OM7) Landscaped Slope** Where existing hillside slopes are anticipated to be modified (eg cut slope at the portals of the tunnel sections and embankments along the alignment) the final slope surface will be landscaped by hydroseeding, tree or shrub planting where slope gradient allows.	To prevent soil erosion and reduce visible impact of man-made slopes.	Contractors	Construction Site Works.	During Construction/ Operation Phase	Implemented	
3.8	**(OM8) Green Roof** Green roofing should be established on proposed buildings to reduce exposure to untreated concrete surfaces and mitigate visual impact to VSRs at high levels.	To reduce exposure to untreated concrete surfaces, reduce visual impact to VSRs at high levels and	Contractors	Proposed new buildings.	During Construction/ Operation Phase	Implemented	

EP/EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	Location of the measures	When to implement the measures?	Implementation Status	Remarks
		maximize greening opportunity.					
3.8	**(OM9) Vertical Greening** Vertical planting should be established to soften the hard, vertical surfaces of the proposed development components. These components will include walls of administration and ventilation buildings, retaining walls and road abutments.	To reduce visible impact of proposed new structures and facilities and maximize greening opportunity.	Contractors	Proposed new development structures.	During Construction/ Operation Phase	Implemented	
3.8	**(OM10) Roadside Amenity Planting** Roadside amenity planting should be provided, to enhance the landscape and visual quality of the existing and proposed transport routes and car parks.	To soften edges of the proposed engineer structures and associated facilities and enhance the landscape and visual quality of the existing and proposed road.	Contractors	Proposed new development structures.	During Construction/ Operation Phase	Implemented	
3.8	**(OM11) Reinstatement** Certain areas unavoidably disturbed by the Project will be reprovisioned.	Particularly aimed at temporarily disturbed areas, to reduce long term impact on landscape.	Contractors	Construction Site Works.	During Construction/ Operation Phase	Implemented	
3.8	**(OM12) Light Control** Street and night time lighting glare will be controlled to minimize glare impact to adjacent VSRs during the operation stage.	To minimize glare impact to adjacent VSRs.	Contractors	Lit areas around proposed new development buildings and along roads.	During Operation Phase	Implemented	
3.8	**(OM13) Reprovisioned LCSD Garden** The Open Space of Wo Keng Shan public garden falls within the Project Site and	To compensate for loss of Open Space due to the Project.	Contractors	Contractors Near existing Wo Keng Shan	During Construction/ Operation Phase	Implemented	

EP/EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	Location of the measures	When to implement the measures?	Implementation Status	Remarks
	will be reprovisioned to reprovide the amenities of the garden on a one to one basis.			public garden, subject to confirmation by CEDD and LCSD			

Landscape Site Audit Checklist

Site Audit based on Mitigation Measures set out in Landscape Plan [Version: 4th Submission of Landscape Plan (Rev.03)] in accordance with Permit Conditions of Environmental Permit No. EP-404/2011/D.

Cover Period: March, 2020
Inspection Date: 2020/04/01, 10:30 AM
Temperature: 18 - 22 °C
Weather Condition*: Sunny/ (Cloudy)/ Rainy
Humidity*: High/ (Moderate)/ Low
Wind*: Calm/ Light/ Breeze/ (Strong)
(*mark as appropriate)

Measure	Operation Phase Audit	Carried Out/ Partially Carried Out	Not Yet Carried Out	Remarks (Ref. No.)
OM1	**Detailed Design Considerations** Detailed design of development components should reduce landscape footprint and visibility of structures. The area allowed for any development components should be reduced to a practical minimum.	✔		
OM2	**Aesthetically Pleasing Design** The form, textures, finishes and colours of the proposed development components should be compatible with the existing surroundings. Light earthy tone colours such as shades of green, shades of grey, shades of brown and off-white may be utilised where technically feasible to reduce the visibility of the development components, including all roadwork, buildings and noise barriers etc. To further improve visual amenity, natural building materials such as stone and timber, should be preferably adopted for architectural features, where technically feasible.	✔		
OM3	**Compensatory Planting** All compensatory planting of trees is to be carried out in accordance with ETWB TCW No. 3/2006. Woodland compensation, Wetland, tree, shrub and ground cover planting will be incorporated.	✔		
OM4	**Buffer Tree Planting** Tree planting shall be provided to screen the proposed structures and associated facilities. In addition, the compensatory shrub and ground cover planting detailed in OM3 will provide screening and improve compatibility with the surrounding environment.	✔		**Remarks A**
OM5	**Aesthetic Improvement Planting - Viaduct Structure** Planters will be provided for trailer planting to soften the hard, straight edges of the viaduct. Where space allows for planters, climbers are proposed to cover vertical, hard surfaces of the piers.	✔		
OM6	**Aesthetic Improvement Planting - Under Viaduct** Shade tolerant plants will be planted, where light is insufficient, to improve aesthetic value of areas under viaducts.		✔	**Remarks B**
OM7	**Landscape Slope** Where existing hillside slopes are anticipated to be modified (e.g. cut slope at the portals of the tunnel sections and embankments along the alignment) the final slope surface will be landscaped by hydroseeding, tree or shrub planting where slope gradient allows.	✔		**Remarks A & C**

OM8	**Green Roof** Green roofing should be established on proposed buildings to reduce exposure to untreated concrete surfaces and mitigate visual impact to VSRs at high levels.	✔		
OM9	**Vertical Greening** Vertical planting should be established to soften the hard, vertical surfaces of the proposed development components. These components will include walls of administration and ventilation buildings, retaining walls and road abutments.	✔		
OM10	**Roadside Amenity Planting** Roadside amenity planting should be provided to enhance the landscape and visual quality of the existing and proposed transport routes and car parks.	✔		**Remarks A**
OM11	**Reinstatement** Certain areas unavoidably affected by the Project will be reprovisioned.	✔		**Remarks E**
OM12	**Light Control** Street and night time lighting glare will be controlled to minimize glare impact to adjacent VSRs during the operation stage.	✔		
OM13	**Reprovision of LCSD Garden** The Open Space of Wo Keng Shan public garden falls within the Project Site and will be reprovisioned to reprovide the amenities of the garden on a one to one basis.	✔		**Remarks D**

Enclosed 1. Appendix A: Site Inspection Photos & Locations, MAR 2020

Inspection Date: 2020/04/01

Remarks No.: A

Remarks/ Recommendations for Contractor:

OM4: Buffer Tree Planting was found partly completed in photos 005A (Landscape Master Plan drawings no. *60212563/LM/005/B*) while amenity shrubs planting is still missing, contractor to provide implementation programme for the mitigation works.

Buffer trees planting was found in photo 009C (Landscape Master Plan drawings no. *60212563/LM/009/D*), while amenity shrubs/ groundcover planting is still missing, contractor to provide implementation programme for the mitigation works.

In photo 001B (Landscape Master Plan drawings no. *60212563/LM/001/C*), trashes were found over the edge planter, and a small part of edge planter is yet to complete. Contactor is recommended to remove the garbage. In photo 001C (Landscape Master Plan drawings no. *60212563/LM/001/C*), **OM10: Roadside Amenity Planting** was found improved compared to Feb, 2020 inspection, higher planting density of groundcover is recommended for amenity approvement.

In photo 009D (Landscape Master Plan drawings no. *60212563/LM/009/D*), amenity roadside tree and shrub/ groundcover planting was found missing in the edge of roundabout. In photo 009E (Landscape Master Plan drawings no. *60212563/LM/009/D*), **OM4: Buffer Tree Planting** and **OM10: Roadside Amenity Planting** were found missing and **OM7: Landscape Slope** was partly completed, which the slope was found covered with sub-soil drainage layer. Contractor to provide implementation programme for the mitigation works.

Remarks No.: B

Remarks/ Recommendations for Contractor:

Incomplete **OM6: Aesthetic Improvement Planting - Under Viaduct** was found in 3 areas in March, 2020 inspection, please refer to photos 005C, 009A and 012A in Landscape Master Plan drawings no. *60212563/LM/005/B*, *60212563/LM/009/D* and *60212563/LM/012/E* respectively (in *Appendix A*).

009A and 012A were still under construction, and no amenity plantings were found at the inspection day. In 005C, slopes were covered with sub-soil drainage layer while planting were missing. Contractor to provide implementation programme for the mitigation works.

Remarks No.: C

Remarks/ Recommendations for Contractor:

Incomplete **OM7: Landscape Slope** was inspected in March, 2020 inspection, please refer to photo 006A and 007A & 007B in Landscape Master Plan drawings no. *60212563/LM/006/B* and *60212563/LM/007/C* (in *Appendix A*).

Slopes at photos 006A and 007B were found covered with sub-soil drainage layer, but no plantings were found in berm planters (OM2&OM7) at the two sides of both Cheung Shan Tunnel South & North Ventilation Building. And woodland mix planting on slope (OM3&OM7) was found incomplete in photo 007A which a significant area was observed with bare soil.

Remarks No.: D

Remarks/ Recommendations for Contractor:

OM13: Reprovision of LCSD Garden was inspected in March, 2020 inspection, please refer to photo 005D in Landscape Master Plan drawings no. *60212563/LM/005/B* (in *Appendix A*).

The Wo Keng Shan Garden was found nearly completed, completion of works includes amenity trees, shrub and groundcover plating, irrigation system and leisure facilities. For the compensatory planting in the Eastern and western side of the garden, **OM10: Roadside Amenity Planting** and **OM4: Buffer Tree Planting** were found completed. Most area of the amenity shrub planting were found completed in this inspection while only small area is still in-progress. Contractor to provide implementation programme for the mitigation works.

Remarks No.: E

Remarks/ Recommendations for Contractor:

Incomplete **Proposed Seating** was inspected in March, 2020 inspection, please refer to photo 009B in Landscape Master Plan drawings no. *60212563/LM/009/D* (in *Appendix A*). Contractor to provide implementation programme for the mitigation works.

In photo 009F (Landscape Master Plan drawings no. *60212563/LM/009/D*), the tributary of Ping Yuen River was observed with poor waterflow, contractor please investigate and rectify.

Landscape Architects Registration Board HKSAR LARB CHAN, Yuen King Paul 陳元敬 R-105 香港園境師註冊管理局

	Signature	Name	Date
ET's Representative – Registered Landscape Architect		Paul Y K Chan	April 2020

APPENDIX A

SITE INSPECTION PHOTOS & LOCATIONS, MAR 2020

Otherland Limited | 奧特地境
AACSB (Landscape Architectural) HKSAR Government | HKILA Registered Practice
2/F On Tin Centre, 1 Sheung Hei Street, San Po Kong, Hong Kong T/2893 0370 F/2893 3139

001 A

Areas Reserved for Local Village Areas

001 B

Shrubs and/or Groundcover Planting (OM10)

001 C

Shrubs and/or Groundcover Planting (OM10)
Buffer Trees Planting with Amenity Shrubs Planting (OM3 & 4)

001 D

Existing River Bank/ Channel Bank to be Retained (OM11)

001 E

Shrubs and/or Groundcover Planting on Slope (OM10)

➤ View Angle

19/11/2018 Q:\STO Group\TO-General\Contract 2\Site Sketch (C2)\SK1390-1395_landscape\Twiggy\c3 tree\SK11.dgn

AECOM

CEDD CONTRACT NO. CV/2012/09
LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT SITE FORMATION AND INFRASTRUCTURE WORKS – CONTRACT 3

TITLE:
LANDSCAPE MASTER PLAN
(SHEET 1 OF 13)

SHEET 1 OF 2

DATE	9-NOV-18		
CHECKED	VL WK	DRAWN	MCSM
JOB NO.	60212563/C3	SCALE	1:2000(A3)
SKETCH NO.	60212563/LM/001/C	REV	–

DOCUMENT REFERENCE NO.

002 A

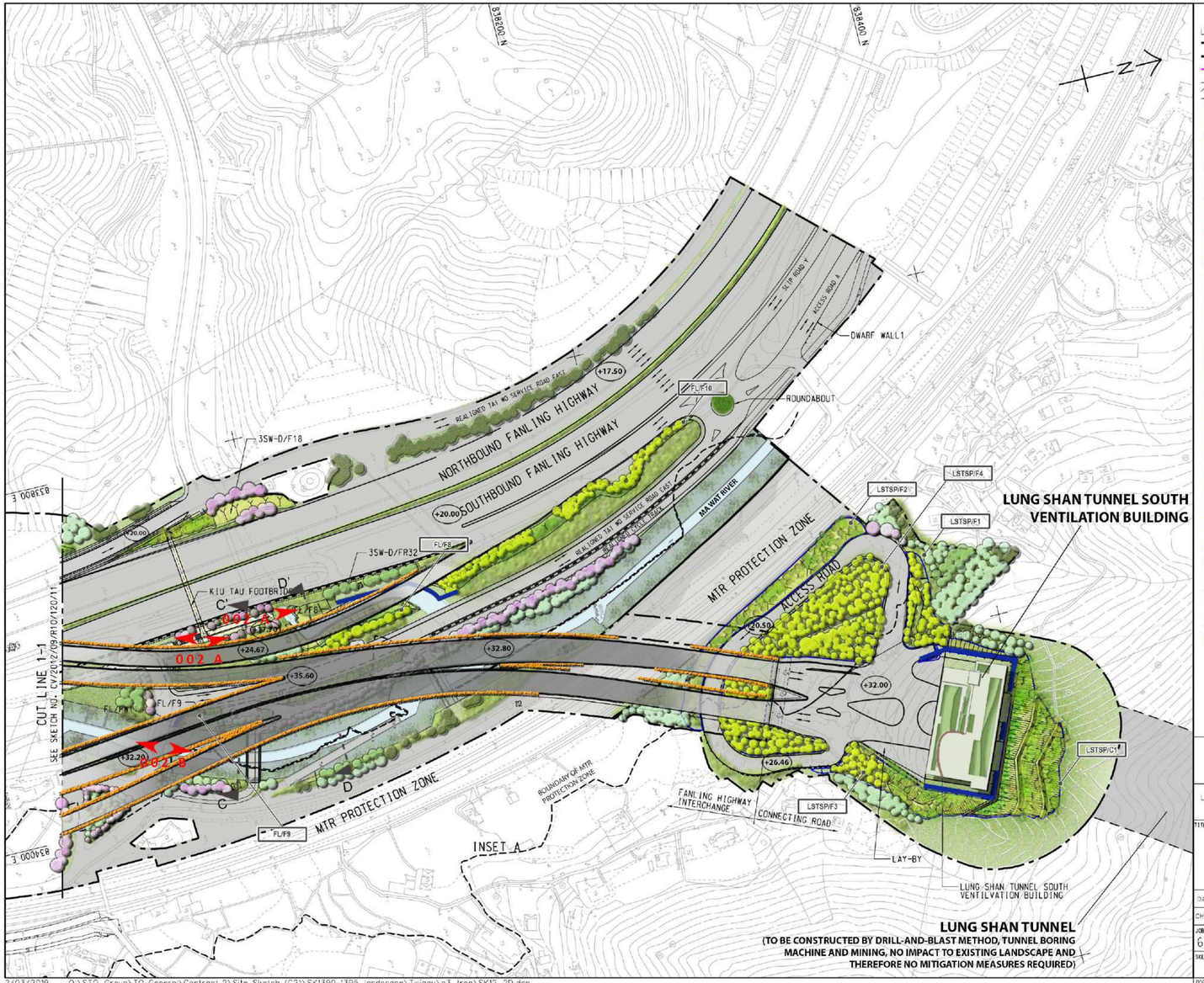
Tree Planting on Landscape Slope (OM3 & OM7)

Amenity Roadside Trees Planting (OM3 & OM10)

Shrubs and/ or Groundcover Planting (OM10)

002 B

Existing River Bank/ Channel Bank to be Retained (OM11)



LOCATION PLAN

SCALE 1 : 60000

LEGEND:

- SITE BOUNDARY
- UNDERGROUND WORKS SITE BOUNDARY
- 500m STUDY AREA OF INDIVIDUAL SECTION
- LIMIT OF WORKS AREA FOR NATURAL TERRAIN HAZARD MITIGATION MEASURES
- Existing Vegetation to be retained (CM1)
- Existing Tree/ Tree groups to be retained (CM1)
- Transplanted trees (CM2)
- Buffer trees planting with amenity shrubs planting, (OM3 and OM6)
- Trees planting on landscaped slopes (OM3 and OM7)
- Amenity roadside trees planting, (OM3, and OM10)
- Shrubs and/or Groundcover planting (OM10)
- Shrubs and/or Groundcover planting on slope (OM7)
- Shortcrete on slope (OM2 and OM7)
- Woodland mix planting on slope (OM3 and OM7)
- Berm planters on slope (OM2 and OM7)
- Hydroseeding on slope (OM7)
- Amenity Improvement planting under Viaduct (Hydroseeding and climbers) (OM6)
- Planters along Viaduct Structure (OM5)
- Roof Planters on Associated buildings (OM8)
- Existing River bank/ Channel bank to be retained (OM11)
- Proposed Noise Barriers
- Proposed Retaining Walls

0 10 30 50 M

AECOM

CEDD CONTRACT NO. CV/2012/09
LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT SITE FORMATION AND INFRASTRUCTURE WORKS – CONTRACT 3

TITLE:

LANDSCAPE MASTER PLAN
(SHEET 2 OF 13)

SHEET 2 OF 2

DATE	9-NOV-18		
CHECKED	VLWK	DRAWN	MCSM
JOB NO. 60212563/C3		SCALE	1:2000(A3)
SKETCH NO. 60212563/LM/002/C			REV –

DOCUMENT REFERENCE NO.

005 A

Buffer Trees Planting with Amenity Shrubs Planting (OM3 & 4)
Tree Planting on Landscape Slope (OM3 & 7)

005 B

Existing River Bank/ Channel Bank
to be Retained (OM11)

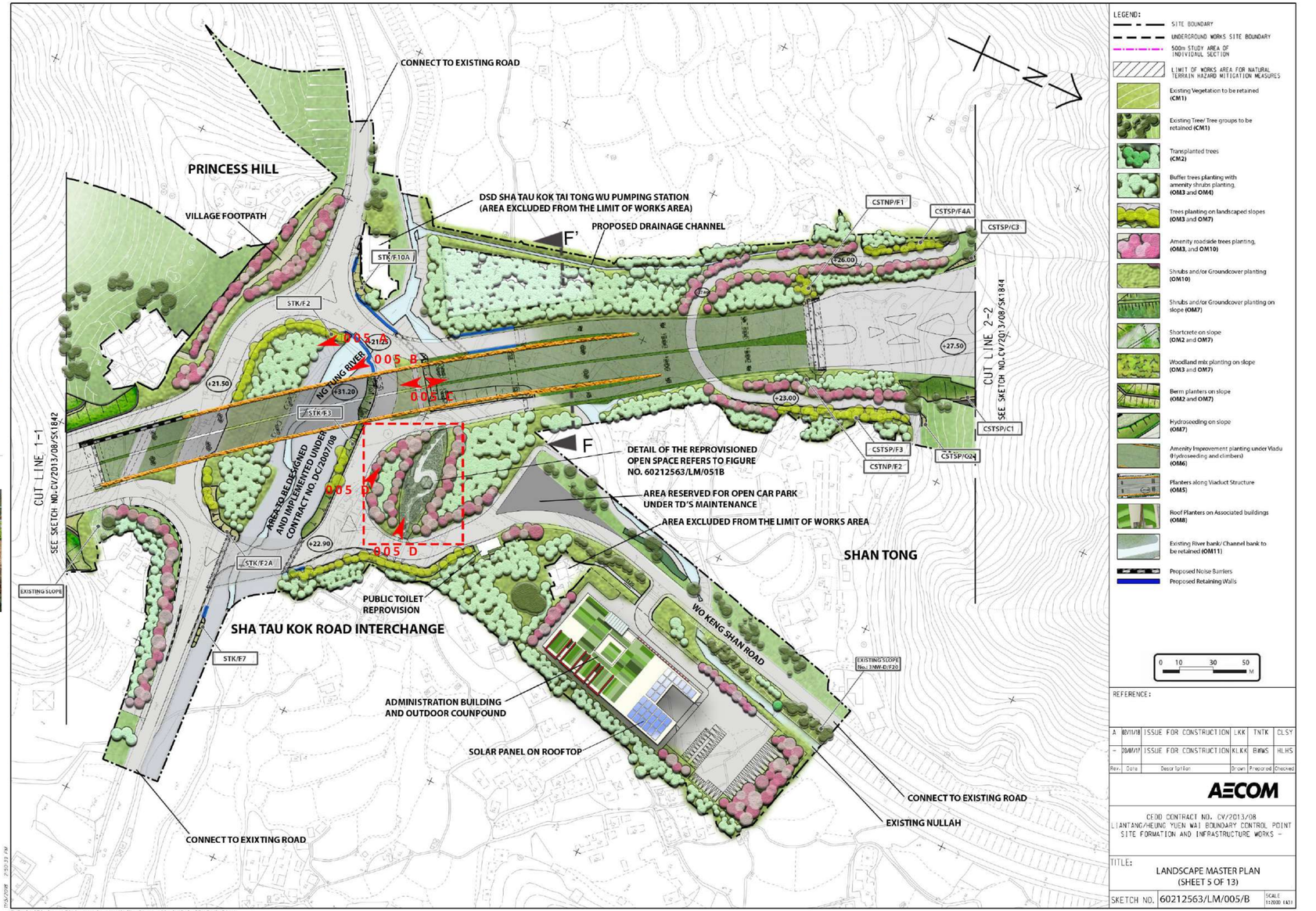
005 C

Amenity Improvement Planting under Viaduct
(Hydroseeding and Climbers) (OM6)

005 D

Wo Keng Shan Garden
Buffer Trees Planting with Amenity Shrubs Planting (OM3 & 4)
Amenity Roadside Trees Planting (OM3 & OM10)

➤ View Angle



006 A

Berm Planter on Slope (OM2 & 7)

006 A

View Angle

CHEUNG SHAN TUNNEL
SOUTH VENTILATION BUILDING

CSTSP/C1

CUT LINE 2-2
SEE SKETCH NO.CV/2013/08/SK1843

CUT LINE 3-3
SEE SKETCH NO.CV/2013/08/SK1845

CHEUNG SHAN TUNNEL
(TO BE CONSTRUCTED BY DRILL-AND-BLAST METHOD.
NO IMPACT TO EXISTING LANDSCAPE AND THEREFORE
NO MITIGATION MEASURES IS REQUIRED)

18.6ha WOODLAND COMPENSATION AREA
(TO BE SUBMITTED SEPARATELY TO FULFIL ENVIRONMENTAL PERMIT
APPROVAL CONDITION 2.9)

LEGEND:

- SITE BOUNDARY
- UNDERGROUND WORKS SITE BOUNDARY
- 500m STUDY AREA OF INDIVIDUAL SECTION
- LIMIT OF WORKS AREA FOR NATURAL TERRAIN HAZARD MITIGATION MEASURES
- Existing Vegetation to be retained (CM1)
- Existing Tree/ Tree groups to be retained (CM1)
- Transplanted trees (CM2)
- Buffer trees planting with amenity shrubs planting, (OM3 and OM4)
- Trees planting on landscaped slopes (OM3 and OM7)
- Amenity roadside trees planting, (OM3, and OM10)
- Shrubs and/or Groundcover planting (OM10)
- Shrubs and/or Groundcover planting on slope (OM7)
- Shortcrete on slope (OM2 and OM7)
- Woodland mix planting on slope (OM3 and OM7)
- Berm planters on slope (OM2 and OM7)
- Hydroseeding on slope (OM7)
- Amenity Improvement planting under Viadu (Hydroseeding and climbers) (OM6)
- Planters along Viaduct Structure (OM5)
- Roof Planters on Associated buildings (OM8)
- Existing River bank/ Channel bank to be retained (OM11)
- Proposed Noise Barriers
- Proposed Retaining Walls

0 10 30 50 M

REFERENCE:

Rev.	Date	Description	Drawn	Prepared	Checked
A	02/11/18	ISSUE FOR CONSTRUCTION	LKK	TNTK	CLSY
-	20/07/17	ISSUE FOR CONSTRUCTION	KLKK	BWWS	HLHS

AECOM

CEDD CONTRACT NO. CV/2013/08
LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT
SITE FORMATION AND INFRASTRUCTURE WORKS -
CONTRACT 6

TITLE:
LANDSCAPE MASTER PLAN
(SHEET 6 OF 13)

SKETCH NO. 60212563/LM/006/B

SCALE 1:2000 (A3)

10/2/2018 10:07:59 AM

PATH:S:\STO Group\TO-General\Contract 6\Site Sketch (GB)\SK1842-1851\SK1844A.dgn

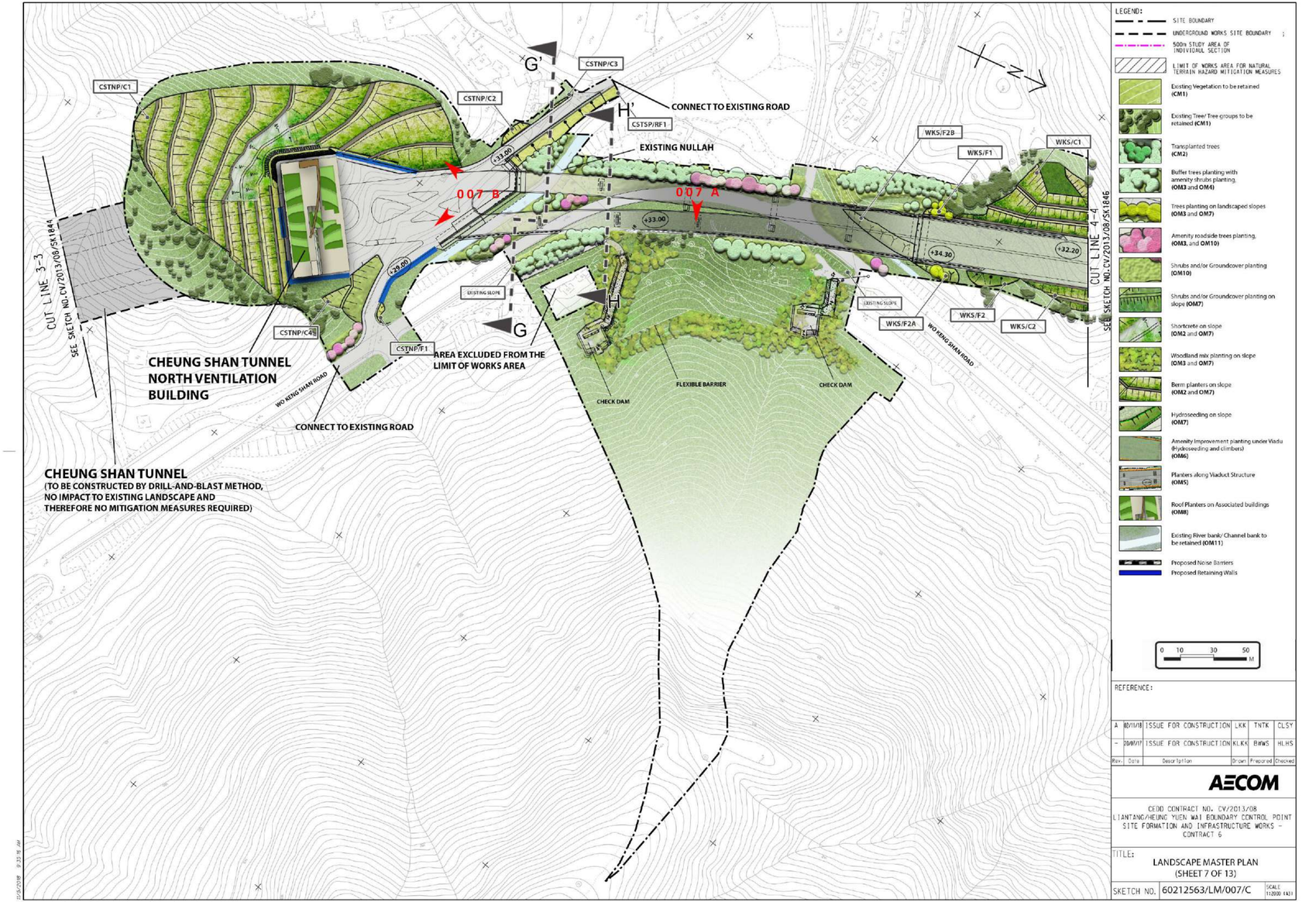
007 A

Woodland Mix Planting on Slope (OM3 & 7)
Flexible Barrier

007 B

Berm Planters on Slope (OM2 & 7)
Shrubs and/or Groundcover Planting on Slope (OM7)

View Angle



009 A

Amenity Improvement Planting under Viaduct
(Hydroseeding and Climbers) (OM6)

009 B

Proposed Seating

009 C

Buffer Trees Planting with Amenity Shrubs Planting (OM3 & 4)
Amenity Roadside Trees Planting (OM3 & OM10)

009 D

Amenity Roadside Trees Planting (OM3 & OM10)

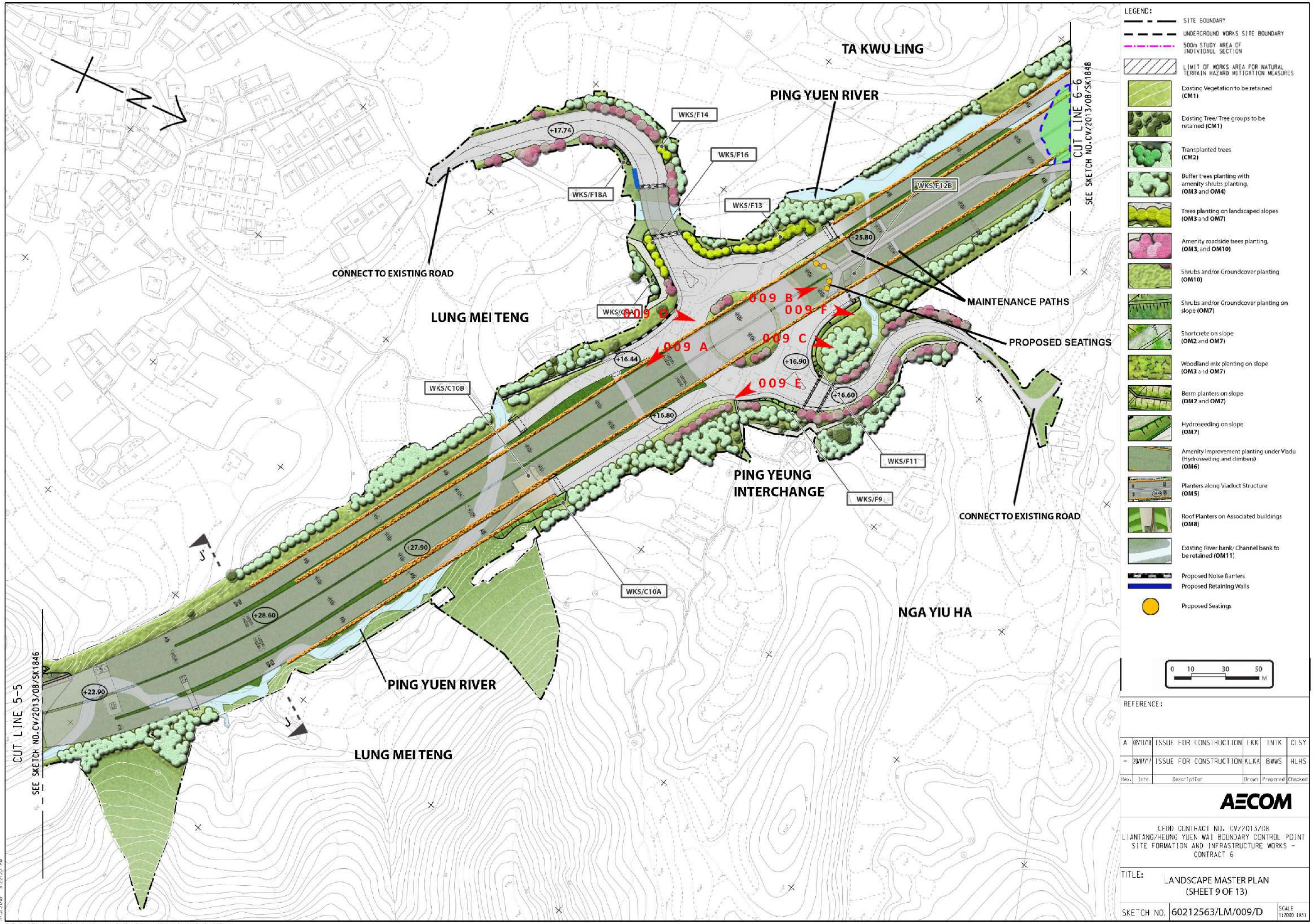
009 E

Buffer Trees Planting with
Amenity Shrubs Planting (OM3 & 4)
Amenity Roadside Trees Planting (OM3 & 10)
Hydroseeding on Slope (OM7)

009 F

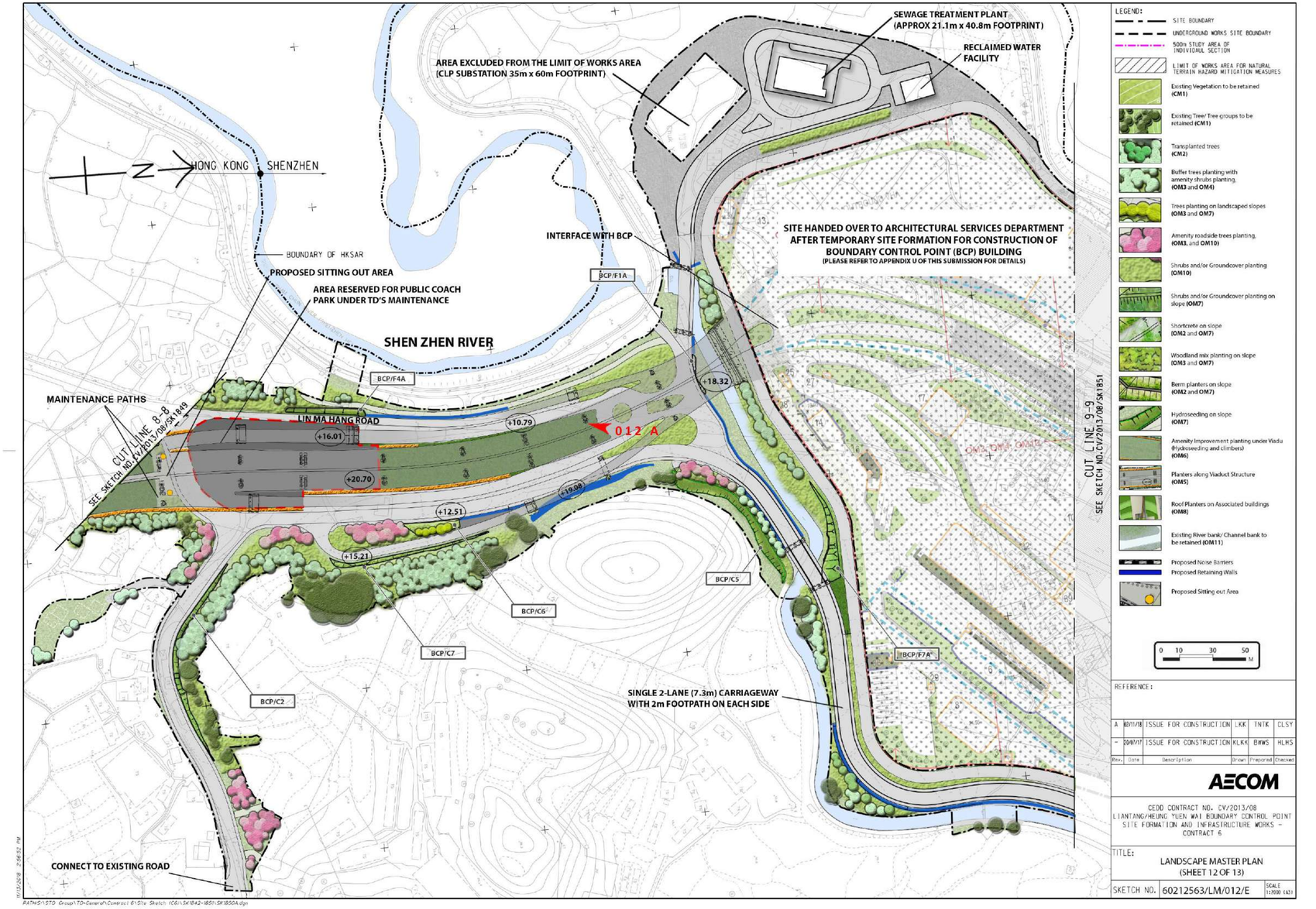
Existing River Bank/ Channel Bank
to be Retained (OM11)

➤ View Angle



012 A

Amenity Improvement Planting under Viaduct (Hydroseeding and Climbers) (OM6)



View Angle

Appendix Q

Implementation Status of Water Quality mitigation Measures

Summary of site Inspection Record

AUES

Project:	**Agreement No. CE 45/2008 (CE) - *Liantang/Heung Yuen Wai Boundary Control Point and Associated Works***	**Checklist No:**	CE45/2008-(2)-20200306
Project Contract No.	***Contract 2* / ~~*Contract 3*~~ / ~~*Contract 4*~~ / ~~*Contract 5*~~ / ~~*Contract 6*~~ / ~~*Contract 7*~~**	**Inspected by:**	
		IEC	
Date:	**6 March 2020**	**ER**	AECOM
Time:	0930	**ET**	AUES
Environmental Permit	**EP- 404/2011/D**	**Contractor**	Dragages

PART A: GENERAL INFORMATION

Weather:	Sunny	☐	Fine	☐	Cloudy	☑	Rainy	☐	Temperature:	18 ^{0}C
Humidity:	High	☐	Moderate	☐	Low	☑				
Wind:	Strong	☐	Breeze	☐	Light	☑	Calm	☐		

Observation/ Issues/ Reminder Recorded on Site:

- No adverse environmetal issue was observed.

Status of Water Quality Mitigation Measures:

Hydroseeding was applied on the exposed work area.

Photo recorded for the Recification

NA

Summary of site Inspection Record

AUES

Project:	**Agreement No. CE 45/2008 (CE) - *Liantang/Heung Yuen Wai Boundary Control Point and Associated Works***	**Checklist No:**	CE45/2008-(2)-20200313
Project Contract No.	***Contract 2* / ~~*Contract 3*~~ / ~~*Contract 4*~~ / ~~*Contract 5*~~ / ~~*Contract 6*~~ / ~~*Contract 7*~~**	**Inspected by:**	
		IEC	
Date:	**13 March 2020**	**ER**	AECOM
Time:	0930	**ET**	AUES
Environmental Permit	**EP- 404/2011/D**	**Contractor**	Dragages

PART A: GENERAL INFORMATION

Weather:	Sunny	☐	Fine	☑	Cloudy	☐	Rainy	☐	Temperature:	23 ^{0}C
Humidity:	High	☐	Moderate	☐	Low	☑				
Wind:	Strong	☐	Breeze	☑	Light	☐	Calm	☐		

Observation/ Issues/ Reminder Recorded on Site:

- No adverse environmetal issue was observed.
- The Contractor was reminded to remove silt in the channel.

Status of Water Quality Mitigation Measures:

Hydroseeding was applied on the exposed work area.

Photo recorded for the Recification

NA

Summary of site Inspection Record

AUES

Project:	**Agreement No. CE 45/2008 (CE) - *Liantang/Heung Yuen Wai Boundary Control Point and Associated Works***	**Checklist No:**	CE45/2008-(2)-20200320
Project Contract No.	***Contract 2* / ~~*Contract 3*~~ / ~~*Contract 4*~~ / ~~*Contract 5*~~ / ~~*Contract 6*~~ / ~~*Contract 7*~~**	**Inspected by:**	
		IEC	SMEC
Date:	**20 March 2020**	**ER**	AECOM
Time:	0930	**ET**	AUES
Environmental Permit	**EP- 404/2011/D**	**Contractor**	Dragages

PART A: GENERAL INFORMATION

Weather:	Sunny	☐	Fine	☐	Cloudy	☑	Rainy	☐	Temperature:	22 ^{0}C
Humidity:	High	☐	Moderate	☐	Low	☑				
Wind:	Strong	☐	Breeze	☐	Light	☑	Calm	☐		

Observation/ Issues/ Reminder Recorded on Site:

- No adverse environmetal issue was observed.
- The Contractor was reminded to remove silt and stagnant water in the channel.

Status of Water Quality Mitigation Measures:

Hydroseeding was applied on the exposed work area.

Photo recorded for the Recification

NA

Summary of site Inspection Record

AUES

Project:	**Agreement No. CE 45/2008 (CE) - *Liantang/Heung Yuen Wai Boundary Control Point and Associated Works***	**Checklist No:**	CE45/2008-(2)-20200327
Project Contract No.	***Contract 2* / ~~*Contract 3*~~ / ~~*Contract 4*~~ / ~~*Contract 5*~~ / ~~*Contract 6*~~ / ~~*Contract 7*~~**	**Inspected by:**	
		IEC	
Date:	**27 March 2020**	**ER**	AECOM
Time:	0930	**ET**	AUES
Environmental Permit	**EP- 404/2011/D**	**Contractor**	Dragages

PART A: GENERAL INFORMATION

Weather:	Sunny	☐	Fine	☑	Cloudy	☐	Rainy	☐	Temperature:	26 ^{0}C
Humidity:	High	☐	Moderate	☐	Low	☑				
Wind:	Strong	☐	Breeze	☑	Light	☐	Calm	☐		

Observation/ Issues/ Reminder Recorded on Site:

- No adverse environmetal issue was observed.

Status of Water Quality Mitigation Measures:

Hydroseeding was applied on the exposed work area.

Photo recorded for the Recification

NA

Summary of site Inspection Record

AUES

Project:	**Agreement No. CE 45/2008 (CE) - *Liantang/Heung Yuen Wai Boundary Control Point and Associated Works***	**Checklist No:**	CE45/2008-(3)-20200305
Project Contract No.	***~~Contract 2~~ / Contract 3 / ~~Contract~~ 4 / ~~Contract~~ 5 / ~~Contract~~ 6 / ~~Contract~~ 7***	**Inspected by:**	
		IEC	
Date:	**5 March 2020**	**ER**	AECOM
Time:	1400	**ET**	AUES
Environmental Permit	**EP- 404/2011/D**	**Contractor**	Chun Wo

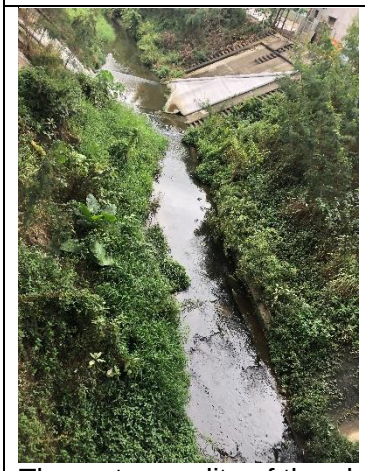
PART A: GENERAL INFORMATION

Weather:	Sunny	☑	Fine	☐	Cloudy	☐	Rainy	☐	Temperature:	19 ^{0}C
Humidity:	High	☐	Moderate	☐	Low	☑				
Wind:	Strong	☐	Breeze	☐	Light	☑	Calm	☐		

Observation / Issues/ Reminder Recorded on Site:

- Muddy trail was observed at TWSRE. The Contractor should clean the trail and ensure wash the wheel thoroughly before leaving the site.
- The Contractor was reminded to removed silt and waste in the channel.

Status of Water Quality Mitigation Measures:



The water quality of the channel adjacent to the site was clear.

Photo recorded for the Recification

The muddy trail was removed.

Summary of site Inspection Record

AUES

Project:	**Agreement No. CE 45/2008 (CE) - *Liantang/Heung Yuen Wai Boundary Control Point and Associated Works***	**Checklist No:**	CE45/2008-(3)-20200313
Project Contract No.	***~~Contract 2~~ / Contract 3 / ~~Contract~~ 4 / ~~Contract~~ 5 / ~~Contract~~ 6 / ~~Contract~~ 7***	**Inspected by:**	
		IEC	
Date:	**13 March 2020**	**ER**	AECOM
Time:	1400	**ET**	AUES
Environmental Permit	**EP- 404/2011/D**	**Contractor**	Chun Wo

PART A: GENERAL INFORMATION

Weather:	Sunny	☐	Fine	☑	Cloudy	☐	Rainy	☐	Temperature:	27 ^{0}C
Humidity:	High	☐	Moderate	☐	Low	☑				
Wind:	Strong	☐	Breeze	☑	Light	☐	Calm	☐		

Observation / Issues/ Reminder Recorded on Site:

- No adverse environmental issue was observed.
- The Contractor was reminded to cover the stockpile properly.
- The Contractor was reminded to maintain site exit clean and tidy.

Status of Water Quality Mitigation Measures:

Hydroseeding was applied on the exposed work area.

Photo recorded for the Recification

NA

Summary of site Inspection Record

AUES

Project:	**Agreement No. CE 45/2008 (CE) - *Liantang/Heung Yuen Wai Boundary Control Point and Associated Works***	**Checklist No:**	CE45/2008-(3)-20200319
Project Contract No.	***~~Contract 2~~ / Contract 3 / ~~Contract~~ 4 / ~~Contract~~ 5 / ~~Contract~~ 6 / ~~Contract~~ 7***	**Inspected by:**	
		IEC	SMEC
Date:	**19 March 2020**	**ER**	AECOM
Time:	1400	**ET**	AUES
Environmental Permit	**EP- 404/2011/D**	**Contractor**	Chun Wo

PART A: GENERAL INFORMATION

Weather:	Sunny	☐	Fine	☐	Cloudy	☐	Rainy	☑	Temperature:	22 ^{0}C
Humidity:	High	☐	Moderate	☐	Low	☑				
Wind:	Strong	☐	Breeze	☐	Light	☑	Calm	☐		

Observation / Issues/ Reminder Recorded on Site:

- Muddy trail was observed at TWSRE site exit. The Contractor should clean the muddy trail as soon as posible and wash the wheels thoroughtly before leavng the site.
- Open stockpile was observed at TWSRW. The Contractor should cover the stockpile with tarpaulin sheet to reduce dust emission.
- The Contractor was reminded to provide drip tray for any chemical containers.

Status of Water Quality Mitigation Measures:

No wastewater flowing from the site to public road was observed.

Photo recorded for the Recification

Muddy trail was removed

To be followed

Summary of site Inspection Record

AUES

Project:	**Agreement No. CE 45/2008 (CE) - *Liantang/Heung Yuen Wai Boundary Control Point and Associated Works***	**Checklist No:**	CE45/2008-(3)-20200325
Project Contract No.	***~~Contract 2~~ / Contract 3 / ~~Contract~~ 4 / ~~Contract~~ 5 / ~~Contract~~ 6 / ~~Contract~~ 7***	**Inspected by:**	
		IEC	
Date:	**25 March 2020**	**ER**	AECOM
Time:	1430	**ET**	AUES
Environmental Permit	**EP- 404/2011/D**	**Contractor**	Chun Wo

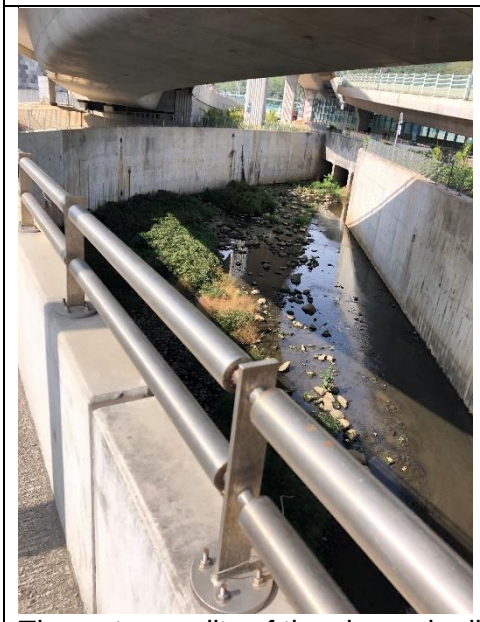
PART A: GENERAL INFORMATION

Weather:	Sunny	☑	Fine	☐	Cloudy	☐	Rainy	☐	Temperature:	26 ^{0}C
Humidity:	High	☐	Moderate	☐	Low	☑				
Wind:	Strong	☐	Breeze	☑	Light	☐	Calm	☐		

Observation / Issues/ Reminder Recorded on Site:

- Free standing chemical containers were observed at TWSRW. The Contractor should provide drip tray for chemical containers to prevent land contamination.

Status of Water Quality Mitigation Measures:



The water quality of the channel adjacent to the site was clear.

Photo recorded for the Recification

To be followed.

Summary of site Inspection Record

AUES

Project:	**Agreement No. CE 45/2008 (CE) - *Liantang/Heung Yuen Wai Boundary Control Point and Associated Works***	**Checklist No:**	CE45/2008-(4)-20200306
Project Contract No.	***~~Contract 2~~ / ~~Contract 3~~ / Contract 4 / ~~Contract 5~~ / ~~Contract 6~~ / ~~Contract 7~~***	**Inspected by:**	
		IEC	
Date:	**6 March 2020**	**ER**	AECOM
Time:	1030	**ET**	AUES
Environmental Permit	**EP- 404/2011/D**	**Contractor**	SIEMENS

PART A: GENERAL INFORMATION

Weather:	Sunny	☐	Fine	☐	Cloudy	☑	Rainy	☐	Temperature:	18 ^{0}C
Humidity:	High	☐	Moderate	☐	Low	☑				
Wind:	Strong	☐	Breeze	☑	Light	☐	Calm	☐		

Observation / Issues/ Reminder Recorded on Site:

- No adverse environmental issue was observed.

Status of Water Quality Mitigation Measures:

The site office was hard paved and no adverse water quality impact was observed.

Photo recorded for the Recification

N/A

Summary of site Inspection Record

AUES

Project:	**Agreement No. CE 45/2008 (CE) - *Liantang/Heung Yuen Wai Boundary Control Point and Associated Works***	**Checklist No:**	CE45/2008-(4)-20200313
Project Contract No.	***~~Contract 2~~* / *~~Contract 3~~* / *Contract 4* / *~~Contract 5~~* / *~~Contract 6~~* / *~~Contract 7~~***	**Inspected by:**	
		IEC	
Date:	**13 March 2020**	**ER**	AECOM
Time:	1030	**ET**	AUES
Environmental Permit	**EP- 404/2011/D**	**Contractor**	SIEMENS

PART A: GENERAL INFORMATION

Weather:	Sunny	☐	Fine	☑	Cloudy	☐	Rainy	☐	Temperature:	23 ^{0}C
Humidity:	High	☐	Moderate	☐	Low	☑				
Wind:	Strong	☐	Breeze	☑	Light	☐	Calm	☐		

Observation / Issues/ Reminder Recorded on Site:

- No adverse environmental issue was observed.

Status of Water Quality Mitigation Measures:

The site office was hard paved and no adverse water quality impact was observed.

Photo recorded for the Recification

N/A

Summary of site Inspection Record

AUES

Project:	**Agreement No. CE 45/2008 (CE) - *Liantang/Heung Yuen Wai Boundary Control Point and Associated Works***	**Checklist No:**	CE45/2008-(4)-20200316
Project Contract No.	***~~Contract 2~~* / *~~Contract 3~~* / *Contract 4* / *~~Contract 5~~* / *~~Contract 6~~* / *~~Contract 7~~***	**Inspected by:**	
		IEC	SMEC
Date:	**16 March 2020**	**ER**	AECOM
Time:	1100	**ET**	AUES
Environmental Permit	**EP- 404/2011/D**	**Contractor**	SIEMENS

PART A: GENERAL INFORMATION

Weather:	Sunny	☑	Fine	☐	Cloudy	☐	Rainy	☐	Temperature:	22 ^{0}C
Humidity:	High	☐	Moderate	☐	Low	☑				
Wind:	Strong	☐	Breeze	☑	Light	☐	Calm	☐		

Observation / Issues/ Reminder Recorded on Site:

- No adverse environmental issue was observed.

Status of Water Quality Mitigation Measures:

The site office was hard paved and no adverse water quality impact was observed.

Photo recorded for the Recification

N/A

Summary of site Inspection Record

AUES

Project:	**Agreement No. CE 45/2008 (CE) - *Liantang/Heung Yuen Wai Boundary Control Point and Associated Works***	**Checklist No:**	CE45/2008-(4)-20200327
Project Contract No.	***~~Contract 2~~* / *~~Contract 3~~* / *Contract 4* / *~~Contract 5~~* / *~~Contract 6~~* / *~~Contract 7~~***	**Inspected by:**	
		IEC	
Date:	**27 March 2020**	**ER**	AECOM
Time:	1030	**ET**	AUES
Environmental Permit	**EP- 404/2011/D**	**Contractor**	SIEMENS

PART A: GENERAL INFORMATION

Weather:	Sunny	☑	Fine	☐	Cloudy	☐	Rainy	☐	Temperature:	27 ^{0}C
Humidity:	High	☐	Moderate	☐	Low	☑				
Wind:	Strong	☐	Breeze	☐	Light	☑	Calm	☐		

Observation / Issues/ Reminder Recorded on Site:

- No adverse environmental issue was observed.

Status of Water Quality Mitigation Measures:

The site office was hard paved and no adverse water quality impact was observed.

Photo recorded for the Recification

N/A

Summary of site Inspection Record

AUES

10Project:	**Agreement No. CE 45/2008 (CE) - *Liantang/Heung Yuen Wai Boundary Control Point and Associated Works***	**Checklist No:**	CE45/2008-(6)-20200305
Project Contract No.	***~~Contract 2~~ / ~~Contract~~ 3 / ~~Contract~~ 4 / ~~Contract~~ 5 / Contract 6 / ~~Contract~~ 7***	**Inspected by:** **IEC**	
Date:	**5 March 2020**	**ER**	AECOM
Time:	0930	**ET**	AUES
Environmental Permit	**EP- 404/2011/D**	**Contractor**	CRBC-CEC-Kaden JV

PART A: GENERAL INFORMATION

Weather:	Sunny	☐	Fine	☐	Cloudy	☑	Rainy	☐	Temperature:	17 ^{0}C
Humidity:	High	☐	Moderate	☑	Low	☐				
Wind:	Strong	☐	Breeze	☐	Light	☑	Calm	☐		

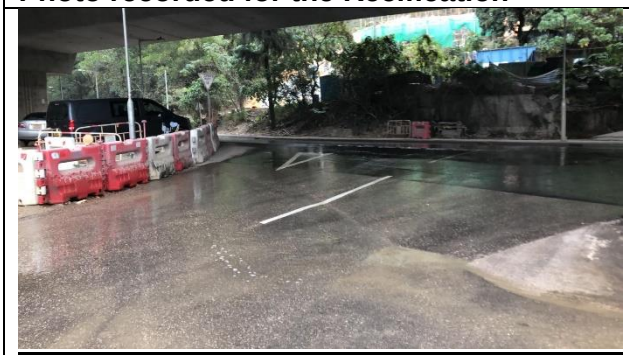
Observation / Issues/ Reminder Recorded on Site:

- Muddy trail was observed at check dam. The Contractor should clean the trail and provide proper wheel washing facility.
- Free stnding chemical contrainers were observed at WCA. The Contractor should place drip dray underneath the containers to prevent contamination.

Status of Water Quality Mitigation Measures:

The water quality of the channel adjacent to the site was clear.

Photo recorded for the Recification



Muddy trail was cleaned.

Chemical containers were removed.

Summary of site Inspection Record

AUES

10Project:	**Agreement No. CE 45/2008 (CE) - *Liantang/Heung Yuen Wai Boundary Control Point and Associated Works***	**Checklist No:**	CE45/2008-(6)-20200312
Project Contract No.	***~~Contract 2~~ / ~~Contract~~ 3 / ~~Contract~~ 4 / ~~Contract~~ 5 / Contract 6 / ~~Contract~~ 7***	**Inspected by:** **IEC**	
Date:	**12 March 2020**	**ER**	AECOM
Time:	0930	**ET**	AUES
Environmental Permit	**EP- 404/2011/D**	**Contractor**	CRBC-CEC-Kaden JV

PART A: GENERAL INFORMATION

Weather:	Sunny	☐	Fine	☑	Cloudy	☐	Rainy	☐	Temperature:	22 ^{0}C
Humidity:	High	☐	Moderate	☐	Low	☑				
Wind:	Strong	☐	Breeze	☐	Light	☑	Calm	☐		

Observation / Issues/ Reminder Recorded on Site:

- No adverse envvironmental issue was observed.

Status of Water Quality Mitigation Measures:

The water quality of the channel adjacent to the site was clear.

Photo recorded for the Recification

NA

Summary of site Inspection Record

AUES

10Project:	**Agreement No. CE 45/2008 (CE) - *Liantang/Heung Yuen Wai Boundary Control Point and Associated Works***	**Checklist No:**	CE45/2008-(6)-20200317
Project Contract No.	***~~Contract 2~~ / ~~Contract~~ 3 / ~~Contract~~ 4 / ~~Contract~~ 5 / Contract 6 / ~~Contract~~ 7***	**Inspected by:**	
		IEC	SMEC
Date:	**17 March 2020**	**ER**	AECOM
Time:	0930	**ET**	AUES
Environmental Permit	**EP- 404/2011/D**	**Contractor**	CRBC-CEC-Kaden JV

PART A: GENERAL INFORMATION

Weather:	Sunny	☐	Fine	☐	Cloudy	☑	Rainy	☐	Temperature:	22 ^{0}C
Humidity:	High	☐	Moderate	☐	Low	☑				
Wind:	Strong	☐	Breeze	☐	Light	☑	Calm	☐		

Observation / Issues/ Reminder Recorded on Site:

- No adverse envvironmental issue was observed.

Status of Water Quality Mitigation Measures:

No wastewater flowing from the site to public road was observed.

Photo recorded for the Recification

NA

Summary of site Inspection Record

AUES

10Project:	**Agreement No. CE 45/2008 (CE) - *Liantang/Heung Yuen Wai Boundary Control Point and Associated Works***	**Checklist No:**	CE45/2008-(6)-20200326
Project Contract No.	***~~Contract 2~~ / ~~Contract~~ 3 / ~~Contract~~ 4 / ~~Contract~~ 5 / Contract 6 / ~~Contract~~ 7***	**Inspected by:**	
		IEC	
Date:	**26 March 2020**	**ER**	AECOM
Time:	1400	**ET**	AUES
Environmental Permit	**EP- 404/2011/D**	**Contractor**	CRBC-CEC-Kaden JV

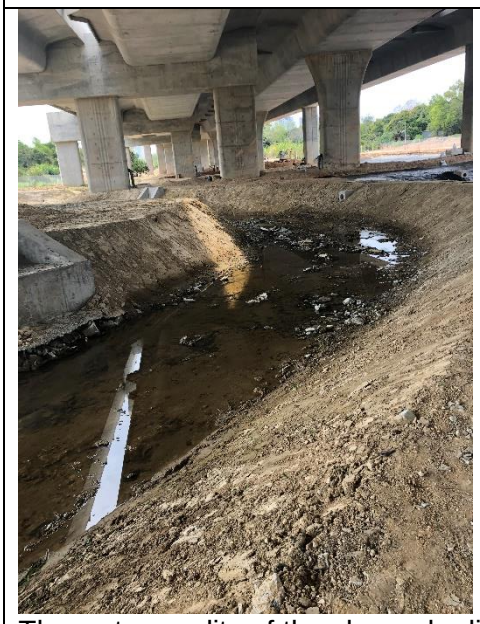
PART A: GENERAL INFORMATION

Weather:	Sunny	☑	Fine	☐	Cloudy	☐	Rainy	☐	Temperature:	26 ^{0}C
Humidity:	High	☐	Moderate	☐	Low	☑				
Wind:	Strong	☐	Breeze	☐	Light	☑	Calm	☐		

Observation / Issues/ Reminder Recorded on Site:

- Free standing chemical containers were observed on ground at WCA. The Contractor should provide drip tray underneath the containers to prevent land contamination.

Status of Water Quality Mitigation Measures:



The water quality of the channel adjacent to the site was clear.

Photo recorded for the Recification

Chemical containers were removed.

Summary of site Inspection Record

AUES

Project:	**Agreement No. CE 45/2008 (CE) - *Liantang/Heung Yuen Wai Boundary Control Point and Associated Works***	**Checklist No:**	CE45/2008-(7)-20200305
Project Contract No.	***~~Contract 2~~ / ~~Contract 3~~ / ~~Contract 4~~ / ~~Contract 5~~ / ~~Contract 6~~ / Contract 7***	**Inspected by:**	
		IEC	
Date:	**5 March 2020**	**ER**	AECOM
Time:	1030	**ET**	AUES
Environmental Permit	**EP- 404/2011/D**	**Contractor**	KRSJV

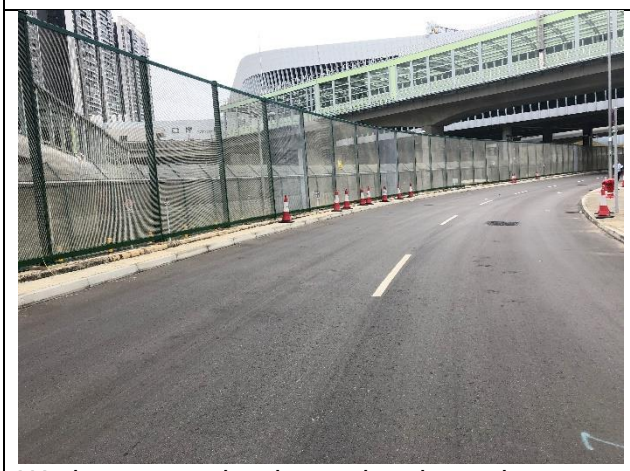
PART A: GENERAL INFORMATION

Weather:	Sunny	☐	Fine	☐	Cloudy	☑	Rainy	☐	Temperature:	17 ^{0}C
Humidity:	High	☐	Moderate	☑	Low	☐				
Wind:	Strong	☐	Breeze	☐	Light	☑	Calm	☐		

Observation / Issues/ Reminder Recorded on Site:

- No adverse environmental issue was observed.

Status of Water Quality Mitigation Measures:



Work area was hard paved and no adverse water impact was observed.

Photo recorded for the Recification

N/A

Summary of site Inspection Record

AUES

Project:	**Agreement No. CE 45/2008 (CE) - *Liantang/Heung Yuen Wai Boundary Control Point and Associated Works***	**Checklist No:**	CE45/2008-(7)-20200312
Project Contract No.	***~~Contract 2~~ / ~~Contract 3~~ / ~~Contract 4~~ / ~~Contract 5~~ / ~~Contract 6~~ / Contract 7***	**Inspected by:**	
		IEC	
Date:	**12 March 2020**	**ER**	AECOM
Time:	1030	**ET**	AUES
Environmental Permit	**EP- 404/2011/D**	**Contractor**	KRSJV

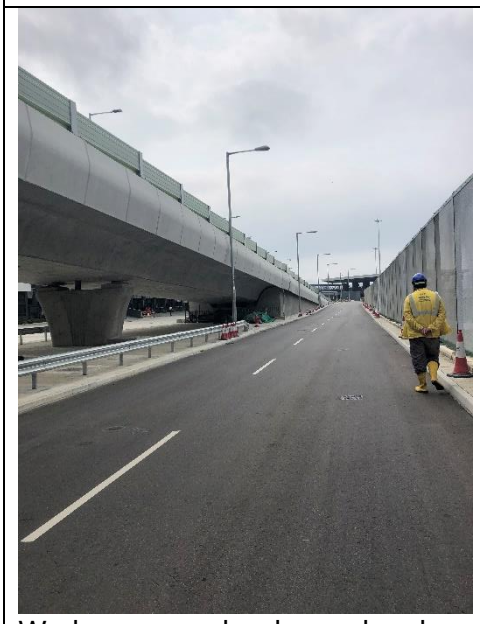
PART A: GENERAL INFORMATION

Weather:	Sunny	☐	Fine	☑	Cloudy	☐	Rainy	☐	Temperature:	22 ^{0}C
Humidity:	High	☐	Moderate	☐	Low	☑				
Wind:	Strong	☐	Breeze	☐	Light	☑	Calm	☐		

Observation / Issues/ Reminder Recorded on Site:

- No adverse environmental issue was observed.

Status of Water Quality Mitigation Measures:



Work area was hard paved and no adverse water impact was observed.

Photo recorded for the Recification

N/A

Summary of site Inspection Record

AUES

Project:	**Agreement No. CE 45/2008 (CE) - *Liantang/Heung Yuen Wai Boundary Control Point and Associated Works***	**Checklist No:**	CE45/2008-(7)-20200317
Project	***~~Contract 2~~* / *~~Contract 3~~* / *~~Contract 4~~* / *~~Contract 5~~* / *~~Contract 6~~* / *Contract 7***	**Inspected by:**	
Contract No.		**IEC**	SMEC
Date:	**17 March 2020**	**ER**	AECOM
Time:	1430	**ET**	AUES
Environmental Permit	**EP- 404/2011/D**	**Contractor**	KRSJV

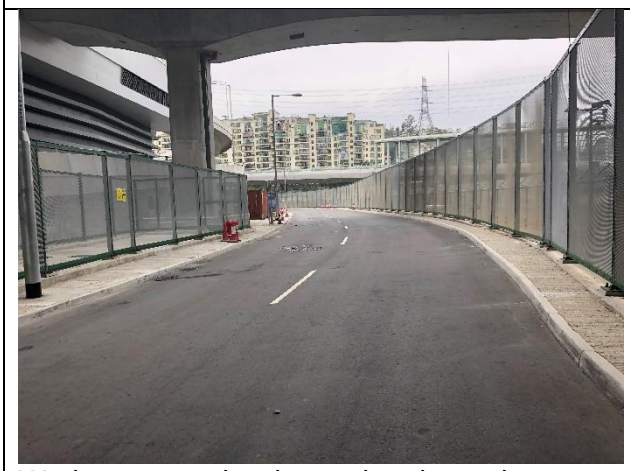
PART A: GENERAL INFORMATION

Weather:	Sunny	☐	Fine	☐	Cloudy	☑	Rainy	☐	Temperature:	21 ^{0}C
Humidity:	High	☐	Moderate	☐	Low	☑				
Wind:	Strong	☐	Breeze	☐	Light	☑	Calm	☐		

Observation / Issues/ Reminder Recorded on Site:

- No adverse environmental issue was observed.

Status of Water Quality Mitigation Measures:



Work area was hard paved and no adverse water impact was observed.

Photo recorded for the Recification

N/A

Summary of site Inspection Record

AUES

Project:	**Agreement No. CE 45/2008 (CE) - *Liantang/Heung Yuen Wai Boundary Control Point and Associated Works***	**Checklist No:**	CE45/2008-(7)-20200326
Project Contract No.	***~~Contract 2~~ / ~~Contract 3~~ / ~~Contract 4~~ / ~~Contract 5~~ / ~~Contract 6~~ / Contract 7***	**Inspected by:**	
		IEC	
Date:	**26 March 2020**	**ER**	AECOM
Time:	1000	**ET**	AUES
Environmental Permit	**EP- 404/2011/D**	**Contractor**	KRSJV

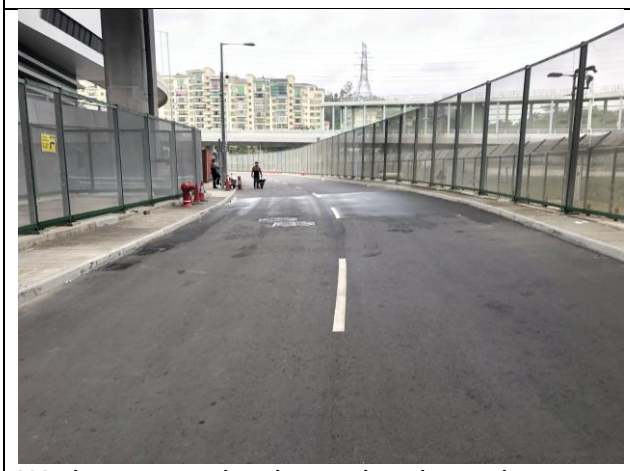
PART A: GENERAL INFORMATION

Weather:	Sunny	☐	Fine	☐	Cloudy	☑	Rainy	☐	Temperature:	24 ^{0}C
Humidity:	High	☐	Moderate	☐	Low	☑				
Wind:	Strong	☐	Breeze	☐	Light	☑	Calm	☐		

Observation / Issues/ Reminder Recorded on Site:

- No adverse environmental issue was observed.

Status of Water Quality Mitigation Measures:



Work area was hard paved and no adverse water impact was observed.

Photo recorded for the Recification

N/A

Summary of site Inspection Record

AUES

Project:	***ArchSD Contract No: SS C505 Construction of Liantang/Heung Yuen Wai Boundary Control Point (BCP) – BCP Buildings and Associated Facilities***	**Checklist No:** SSC505- 20200305	
		Inspected by:	
		IEC	
Date:	**5 March 2020**	**AR**	ArchSD
Time:	1100	**ET**	AUES
Environmental Permit	**EP- 404/2011/D**	**EO**	Leighton
		Contractor	Leighton

PART A: GENERAL INFORMATION

Weather:	Sunny	☐	Fine	☐	Cloudy	☑	Rainy	☐	Temperature: 18	^{0}C
Humidity:	High	☐	Moderate	☑	Low	☐				
Wind:	Strong	☐	Breeze	☐	Light	☑	Calm	☐		

Observations/ Issues/ Reminder Recorded on Site:

- No adverse environmental issue was observed.

Status of Water Quality Mitigation Measures:

Work area was hard paved and no adverse water impact was observed.

Photo recorded for the Recification

N/A.

Summary of site Inspection Record

AUES

Project:	***ArchSD Contract No: SS C505 Construction of Liantang/Heung Yuen Wai Boundary Control Point (BCP) – BCP Buildings and Associated Facilities***	**Checklist No:** SSC505- 20200312	
		Inspected by:	
		IEC	
Date:	**12 March 2020**	**AR**	ArchSD
Time:	1100	**ET**	AUES
Environmental Permit	**EP- 404/2011/D**	**EO**	Leighton
		Contractor	Leighton

PART A: GENERAL INFORMATION

Weather:	Sunny	☐	Fine	☑	Cloudy	☐	Rainy	☐	Temperature: 22	^{0}C
Humidity:	High	☐	Moderate	☐	Low	☑				
Wind:	Strong	☐	Breeze	☐	Light	☑	Calm	☐		

Observations/ Issues/ Reminder Recorded on Site:

- No adverse environmental issue was observed.

Status of Water Quality Mitigation Measures:

Work area was hard paved and no adverse water impact was observed.

Photo recorded for the Recification

N/A.

Summary of site Inspection Record

AUES

Project:	***ArchSD Contract No: SS C505 Construction of Liantang/Heung Yuen Wai Boundary Control Point (BCP) – BCP Buildings and Associated Facilities***	**Checklist No:** SSC505- 20200320	
		Inspected by:	
		IEC	SMEC
Date:	**20 March 2020**	**AR**	ArchSD
Time:	1330	**ET**	AUES
Environmental Permit	**EP- 404/2011/D**	**EO**	Leighton
		Contractor	Leighton

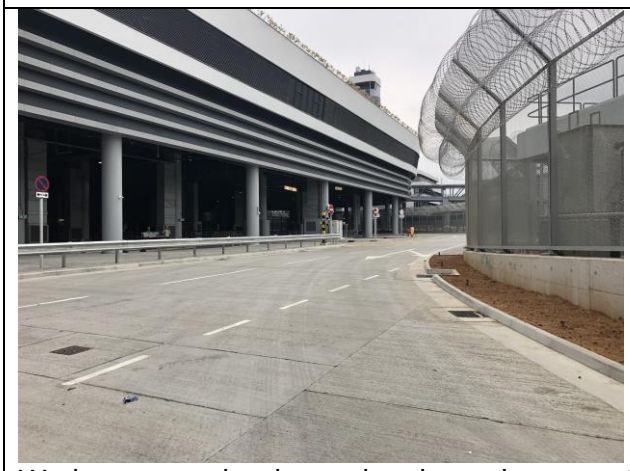
PART A: GENERAL INFORMATION

Weather:	Sunny	☐	Fine	☐	Cloudy	☑	Rainy	☐	Temperature: 24	^{0}C
Humidity:	High	☐	Moderate	☐	Low	☑				
Wind:	Strong	☐	Breeze	☐	Light	☑	Calm	☐		

Observations/ Issues/ Reminder Recorded on Site:

- No adverse environmental issue was observed.

Status of Water Quality Mitigation Measures:



Work area was hard paved and no adverse water impact was observed.

Photo recorded for the Recification

N/A.

Summary of site Inspection Record

AUES

Project:	***ArchSD Contract No: SS C505 Construction of Liantang/Heung Yuen Wai Boundary Control Point (BCP) – BCP Buildings and Associated Facilities***	**Checklist No:** SSC505- 20200326	
		Inspected by:	
		IEC	
Date:	**26 March 2020**	**AR**	ArchSD
Time:	1030	**ET**	AUES
Environmental Permit	**EP- 404/2011/D**	**EO**	Leighton
		Contractor	Leighton

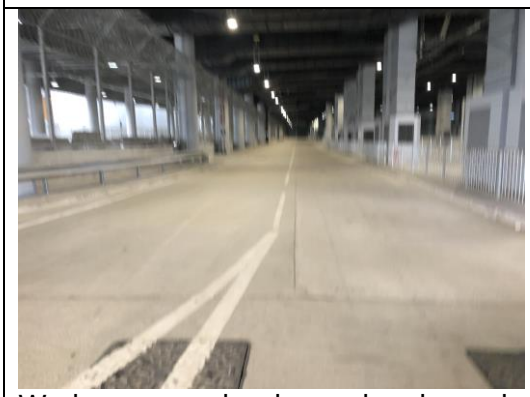
PART A: GENERAL INFORMATION

Weather:	Sunny	☐	Fine	☐	Cloudy	☑	Rainy	☐	Temperature: 26	^{0}C
Humidity:	High	☐	Moderate	☐	Low	☑				
Wind:	Strong	☐	Breeze	☐	Light	☑	Calm	☐		

Observations/ Issues/ Reminder Recorded on Site:

- No adverse environmental issue was observed.

Status of Water Quality Mitigation Measures:



Work area was hard paved and no adverse water impact was observed.

Photo recorded for the Recification

N/A.

Appendix R

Investigation Report for Complaint

AUES

Fax Cover Sheet

To	**Mr. Vincent Chan**	**Fax No**	By email
Company	**CRBC-CEC-Kaden JV**		
cc			
From	**Nicola Hon**	**Date**	**3 April 2020**
Our Ref	TCS00694/13/300/F2379a	**No of Pages**	2 **(Incl. cover sheet)**
RE	**Agreement No. CE 45/2008** **Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works** **Investigation Report for Night Time Work and construction Dust Nuisance**		

Dear all,

Enclosed please find the investigation report for the captioned for your follow up action.

Should you have any queries or need further information, please do not hesitate to contact us or the undersigned at **Tel: 2959-6059 or Fax: 2959-6079**.

Yours Faithfully,
For and on Behalf of
Action-United Environmental Services & Consulting

Nicola Hon
Environmental Consultant

Encl.

c.c.	Ms. Clara U (EPD)	Fax:	2685 1133
	Mr. Owen Ng (ER of C6, AECOM)	Fax:	2551 0698
	Mr. Antony Wong (IEC, SMEC)		By email

Agreement No. CE 45/2008
Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works

Investigation Report on Environmental Complaint / Enquires

Log No.	CE 45/2008 – 89
Received Date by ET	26 March 2020
Contract under Investigation	Contract 6
Complaint Details	Environmental Protection Department (EPD) received a public complaint in early March 2020 against the captioned C6 project about night time construction work (at about 2330-0030 hrs) and construction dust nuisance and requested follow up.
Location	C6 project
Date of Complaint	Early March 2020
Environmental Aspect	Noise and dust
Complainant	Undisclosed
Complaint Route	by EPD
Investigation Result	1. EPD received a public complaint in early March 2020 against the captioned C6 project about night time construction work (at about 2330-0030 hrs) and construction dust nuisance and requested follow up. Investigation was conducted by Environmental Team (ET) as per the EM&A Manual/ EM&A Programme upon receipt of the complaint. 2. As advised by Contractor of C6 (CCKJV), there is only one Construction Noise Permit (permit no. GW-RN0058-20 expires on 31 May 2020) on hand and it is obtained for the connection works of DN450 water main by Water Supplies Department at Sha Tau Kok Interchange. Since the connection works had been postponed until further notice due to the outbreak of Novel Coronavirus, there was no construction work around the concerned restricted hours in early March 2020 and it has been cross-checked with the site diary for the period of 1 to 15 March 2020. In general, the site activities end at 6pm from Monday to Saturday. 3. Weekly Joint site inspections were carried out by the representative of Resident Engineer, CCKJV and ET to audit the environmental site performance. According to the inspection records on 5 and 12 March 2020, there was no adverse dust impact observed. Also, there was no construction work carried out during the concerned time period and construction dust nuisance is not anticipated. 4. In addition, monitoring programme was executed under the project to monitor the air quality at the air sensitive receivers and immediate action would be undertaken in case of exceedance. Having reviewed the air quality monitoring results in March 2020, there was no exceedance triggered at all relevant monitoring stations which revealed that the dust impact arising not the project is within acceptable level. 5. In our investigation, there were no construction activities under Contract 6 during the concerned period, it is considered that the complaint is not valid to Contract 6. Nevertheless, CCKJV was reminded to strictly follow the relevant requirements of the CNP when carrying out the construction works in restricted hours.