



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.35) – JUNE 2016**

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

Date	Reference No.	Prepared By	Certified By
14 July 2016	TCS00694/13/600/R0460v2	 Winnie Chiu (Assistant Environmental Consultant)	 Tam Tak Wing (Environmental Team Leader)

Version	Date	Remarks
1	11 July 2016	First Submission
2	14 July 2016	Amended against IEC's comments on 12 July 2016



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By Email and Fax
(no. 2981 1146)

Attention: Mr. Ernest CHAN

Dear Sir

**Contract No. 1/WSD/13
Independent Environmental Checker Services for
Improvement of Freshwater Supply to Cheung Chau
Verification of Monthly EM&A Report**

Reference is made to the *Monthly Environmental Monitoring and Audit (EM&A) Report (No.27) – June 2016 Version 2 (Ref No: TCS00684/13/600/RO0235v2)* dated 13 July 2016 submitted by the Environmental Team via their e-mail on 13 July 2016.

We are pleased to inform you that we have no further comment on the captioned document. We herewith verify that the Monthly EM&A Report for June 2016 is prepared in accordance with Condition 5.4 of Environmental Permit No. EP-392/2010A.

Thank you very much for your kind attention. Please do not hesitate to contact the undersigned should you have any queries.

Yours faithfully
for and on behalf of
SMEC Asia Limited

Vivian CHAN
Independent Environmental Checker

cc:	WSD	Mr. Lo	(By Fax: 2351 6949)
	CRBC	Mr. Raymond Mau	(By Fax: 2283 1689)
	AUES	Mr. Tam	(By Fax: 2959 6079)

EXECUTIVE SUMMARY

ES01 This is the 35th monthly EM&A report presenting the monitoring results and inspection findings for the reporting period from **1 to 30 June 2016** (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 (TCSS), 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 construction works under Liantang/Heung Yuen Wai Boundary Control Point and Associated Works of the Project currently included Contract 2, Contract 3, Contract 5, Contract 6, Contract 7 and Contract SS C505. Environmental monitoring activities under the EM&A programme in the Reporting Period are summarized in the following table.

Environmental Aspect	Environmental Monitoring Parameters / Inspection	Reporting Period	
		Number of Monitoring Locations to undertake	Total Occasions
Air Quality	1-hour TSP	9	150
	24-hour TSP	9	50
Construction Noise	L _{eq(30min)} Daytime	10	45
Water Quality	Water in-situ measurement and/or sampling	WM1 & WM1-C,	13 Scheduled & 1 extra
		WM2A & WM2A-C	13 Scheduled & 7 extra
		WM2B & WM2B-C	13 Scheduled & 1 extra
		WM3 & WM3-C	13 Scheduled & 0 extra
		WM4, WM4-CA & WM4-CB	13 Scheduled & 1 extra
Joint Site Inspection / Audit	IEC, ET, the Contractor and RE joint site Environmental Inspection and Auditing	Contract 2	5
		Contract 3	4
		Contract 5	4
		Contract 6	5
		Contract 7	4
		Contract SS C505	5

Note: Extra monitoring day was due to measurement results exceedance

One scheduled day and one extra day were unsuccessful conducted water quality monitoring at WM2A

BREACH OF ACTION AND LIMIT (A/L) LEVELS

ES04 In the Reporting Period, no air quality exceedance and one construction noise exceedance was registered for the Project. For water quality monitoring, a total of thirty-two (31) Limit Level (LL) exceedances and one (1) Action Level (AL) exceedance, namely fifteen (15) LL exceedances and one (1) AL exceedances of turbidity and sixteen (16) LL exceedances of Suspended Solids. 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	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	Corrective Actions
Construction Noise	L _{eq(30min)} Daytime	1	0	0	The noise complaint is not related to CEDD's Contracts and the complaint is under investigation.	--
Water Quality	DO	0	0	0	--	--
	Turbidity	1	15	16	Eight exceedances are not due to the project construction activities. Eight exceedances are due to the project construction activities.	The relevant Contractor shall implemented water quality mitigation measures in accordance with ISEMM of the EM&A Manual requirements
	SS	0	16	16	Eight exceedances are not due to the project construction activities. Eight exceedances are due to the project construction activities.	

ENVIRONMENTAL COMPLAINT

ES05 In this Reporting Period, three (3) documented environmental complaints were received by 1823. The complaint received on 20 June 2016 regarding noise nuisance from Lain Tang Construction work is under investigation.

NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

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

REPORTING CHANGE

ES07 No reporting changes were made in the Reporting Period.

SITE INSPECTION

ES08 In this Reporting Period, joint site inspection to evaluate the site environmental performance at **Contract 2** has been carried out by the RE, IEC, ET and the Contractor on **3, 10, 17, 24, 29 June 2016**. No non-compliance was noted.

ES09 In the Reporting Period, joint site inspection to evaluate the site environmental performance at **Contract 3** has been carried out by the RE, IEC, ET and the Contractor on **6, 13, 22, 27 June 2016**. No non-compliance was noted.

ES10 In the Reporting Period, joint site inspection to evaluate the site environmental performance at **Contract 5** has been carried out by the RE, IEC, ET and the Contractor on **7, 14, 22, 28 June 2016**. No non-compliance was noted.

ES11 In the Reporting Period, joint site inspection to evaluate the site environmental performance at **Contract 6** has been carried out by the RE, IEC, ET and the Contractor on **2, 10, 16, 23, 30 June 2016**. No non-compliance was noted.

ES12 In the Reporting Period, joint site inspection to evaluate the site environmental performance at **Contract SS C505** has been carried out by the RE, IEC, ET and the Contractor on **1, 8, 15, 22, 29 June 2016**. No non-compliance was noted.

ES13 In the Reporting Period, joint site inspection to evaluate the site environmental performance at **Contract 7** has been carried out by the RE, IEC, ET and the Contractor on **7, 14, 22, 28 June 2016**. No non-compliance was noted.

FUTURE KEY ISSUES

- ES14 As wet season has come, 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 or public area would be the key issue. The Contractors should paid special attention on water quality mitigation measures and fully implement according ISEMM of the EM&A Manual, in particular for working areas near Ma Wat Channel and Ping Yuen River. Moreover, 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.
- ES15 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.
- ES16 Since most of construction sites under the Project are located adjacent to villages, the Contractors should fully implement air quality mitigation measures to reduce construction dust emission.

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1 INTRODUCTION

1.1 PROJECT BACKGROUND

- 1.1.1 Civil Engineering and Development Department is the Project Proponent and the Permit Holder of *Agreement No. CE 45/2008 (CE) Liantang / Heung Yuen Wai Boundary Control Point and Associated Works*, which is a Designated Project to be implemented under Environmental Permit number EP-404/2011/C granted on 12 March 2015.
- 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 **35th** monthly EM&A report presenting the monitoring results and inspection findings for reporting period from **1** to **30 June 2016**.

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*

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

2 PROJECT ORGANIZATION AND CONSTRUCTION PROGRESS

2.1 CONSTRUCTION CONTRACT PACKAGING

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

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

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

Contract 2 (CV/2012/08)

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

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

Contract 3 (CV/2012/09)

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

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

Contract 4 (NE/2014/02)

2.1.5 Contract 4 has awarded in mid-April 2016. However, the major construction work still is not yet commenced. 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 is 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', ET's and IEC's compliance with the requirements in the Environmental Permit (EP) and EM&A Manual
- Facilitate ET's implementation of the EM&A programme
- Participate in joint site inspection by the ET and IEC
- Oversee the implementation of the agreed Event / Action Plan in the event of any exceedance
- Adhere to the procedures for carrying out complaint investigation
- Liaison with DSD, Engineer/Engineer's Representative, ET, IEC and the Contractor of the "Construction of the DSD's Regulation of Shenzhen River Stage 4 (RSR 4)" Project discussing regarding the cumulative impact issues.

The Contractor(s)

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

Environmental Team (ET)

- 2.2.9 Once the ET is appointed, the EPD, CEDD, ER, Architect and IEC will be notified the details of the ET.
- 2.2.10 The ET shall not be in any way an associated body of the Contractor(s), and shall be employed by the Project Proponent/Contractor to conduct the EM&A programme. The ET should be managed by the ET Leader. The ET Leader shall be a person who has at least 7 years' experience in EM&A and has relevant professional qualifications. Suitably qualified staff should be included in the ET, and resources for the implementation of the EM&A programme should be allocated in time under the Contract(s), to enable fulfillment of the Project's EM&A requirements as specified in the EM&A Manual during construction of the Project. The ET shall report to the Project Proponent and the duties shall include:
- Monitor and audit various environmental parameters as required in this EM&A Manual
 - Analyse the environmental monitoring and audit data, review the success of EM&A programme and the adequacy of mitigation measures implemented, confirm the validity of the EIA predictions and identify any adverse environmental impacts arising
 - Carry out regular site inspection to investigate and audit the Contractors' site practice, equipment/plant and work methodologies with respect to pollution control and environmental mitigation, and effect proactive action to pre-empt problems
 - Monitor compliance with conditions in the EP, environmental protection, pollution prevention and control regulations and contract specifications
 - Audit environmental conditions on site
 - Report on the environmental monitoring and audit results to EPD, the ER, the Architect, the IEC and Contractor or their delegated representatives
 - Recommend suitable mitigation measures to the Contractor in the case of exceedance of Action and Limit levels in accordance with the Event and Action Plans
 - Liaise with the IEC on all environmental performance matters and timely submit all relevant EM&A proforma for approval by IEC
 - Advise the Contractor(s) on environmental improvement, awareness, enhancement measures etc., on site
 - Adhere to the procedures for carrying out complaint investigation
 - Liaison with the client departments, Engineer/Engineer's Representative, ET, IEC and the Contractor(s) of the concurrent projects as listed under Section 2.3 below regarding the cumulative impact issues.

Independent Environmental Checker (IEC)

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

2.3 CONCURRENT PROJECTS

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

2.4 CONSTRUCTION PROGRESS

- 2.4.1 In the Reporting Period, the major construction activity conducted under the Project is located in Contracts 2, 3, 5, 6, 7 and SS C505 and they are summarized in below. Moreover, 3-month rolling construction program for all the current contracts is enclosed in *Appendix C*.

Contract 2 (CV/2012/08)

- 2.4.2 The contract commenced in May 2014. In this Reporting Period, construction activities conducted are listed below:
- | | |
|--------------|--|
| Mid-Vent | • Tube excavation (NB + SB) |
| Portal | • Adit invert slab, waterproofing and lining, post-excavation grouting |
| | • Ventilation building superstructure |
| North Portal | • Slope stabilization and retaining wall |
| | • Southbound TBM excavation |
| | • Northbound bottom bench excavation and tunnel enlargement |

- Ventilation building foundation
- South Portal • Southbound and Northbound Drill and Blast (D&B) excavation
- South ventilation building superstructure
- Admin Building • Building works foundation

Contract 3 (CV/2012/09)

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

- Cable detection and trial trenches
- Filling works at Tong Hang East
- Storm drain laying
- Noise barrier construction
- Pier / pier table construction
- Pile cap works
- Portal beam construction
- Pre-drilling Works and Piling Works for Viaduct
- Pre-drilling Works and Piling Works for Noise Barrier
- Retaining Wall construction
- Road works
- Sewer works
- Slope works
- Socket H-pile Installation
- Waterworks
- Tree Felling Works
- Utilities Duct Laying
- Viaduct segment erection

Contract 4 (Contract number to be assigned)

2.4.4 The Contract was awarded in mid-April 2016 and the major construction work has not yet commenced.

Contract 5 (CV/2013/03)

2.4.5 The Contract awarded in April 2013 and commenced on August 2013. In this Reporting Period, construction activities conducted are listed below:

- Construction of rising main (VO61) at existing Lin Ma Hang (LMH) Road
- Bituminous laying at existing LMH road
- Brick laying at footpath at LMH road
- Planting at proposed and existing LMH road
- Installation of Underground Utility (UU) at proposed and existing LMH road
- Irrigation system at existing LMH Road

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:

- Site Clearance
- Slope Works
- Site Accesses Construction
- Ground Investigation Works
- Soil Nail
- Bored Piling
- Pile Cap Construction

- Tunnel Excavation
- Sewage Treatment Plant Construction

Contract 7 (NE/2014/03)

- 2.4.7 Contract 7 has awarded in December 2015 and construction work was commenced on 15 February 2016. In this Reporting Period, construction activities conducted are listed below:
- Ground Investigation Works at Bridge C and E
 - Piling Works at Bridge C, D
 - Pile Caps Construction at Bridge B

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:
- General Site Setup
 - CLP temporally sub-station works
 - Erection of Welfare Shelter
 - Building number 4, 5, 6, 9 and 36 construction
 - Pile cap construction for Building number 4, 6 & 7
 - Tower crane operation and Tower crane TC10 construction
 - H-pile works and loading test
 - Disassembly of crawler crane
 - Grouting and full core to completed bored piles
 - Bridge construction works including construction of bridge column, retaining wall, pile cap
 - Underground drainage works
 - Prototype “A” Construction works
 - Mock up for south entrance double curve cladding
 - Formwork and falsework for PTB’s slab construction
 - Pile Cap construction for PTB, including excavation and backfilling works
 - Footing construction

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, 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, 5, 6, 7 and SS C505
 - Contamination Assessment Plan (CAP) and Contamination Assessment Report (CAR) for Po Kat Tsai, Loi Tung and the workshops in Fanling
 - Vegetation Survey Report
 - Woodland Compensation Plan
 - Habitat Creation Management Plan
 - Wetland Compensation Plan
- 2.5.2 Summary of the relevant permits, licenses, and/or notifications on environmental protection for the Project of each contracts are presented in **Table 2-1**.

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

Item	Description	License/Permit Status		
		Ref. no.	Effective Date	Expiry Date
Contract 2				
1	Air pollution Control (Construction Dust) Regulation	Ref No.: 368864	31 Dec 2013	Till Contract ends
2	Chemical Waste Producer Registration	<i>North Portal</i> Waste Producers Number: No.5213-652-D2523-01	25 Mar 2014	Till Contract ends
		<i>Mid-Vent Portal</i> Waste Producers Number: No.5213-634-D2524-01	25 Mar 2014	Till Contract ends
		<i>South Portal</i> Waste Producers Number: No.5213-634-D2526-01	9 Apr 2014	Till Contract ends
3	Water Pollution Control Ordinance - Discharge License	No.WT00018374-2014	8 Oct 2014	30 Sep 2019
		No.: W5/1I389	28 Mar 2014	31 Mar 2019
		No. WT00023063-2015	18 Dec 2015	31 Mar 2019
		No.: W5/1I392	28 Mar 2014	31 Mar 2019
4	Waste Disposal Regulation - Billing Account for Disposal of Construction Waste	Account No. 7019105	8 Jan 2014	Till Contract ends
5	Construction Noise Permit	GW-RN0795-15	7 Dec 2015	6 Jun 2016
		GW-RN0893-15	01-Jan-2016	27-Jun-2016
		GW-RN0071-16	02-Feb-16	31-Jul-2016
		GW-RN0077-16	07-Feb-2016	06-Aug-2016
		GW-RN0199-16	24-Mar-2016	17-Sep-2016
		GW-RN0323-16	30-Apr-2016	29-Jun-2016
		GW-RN0321-16	30-Apr-2016	29-Jun-2016
		GW-RN0359-16	20-May-2016	19-Aug-2016
		GW-RN0378-16	30-May-2016	29-Aug-2016
		GW-RN0451-16	24-Jun-2016	19-Sep-2016
		GW-RN0457-16	22-Jun-2016	14-Dec-2016
		GW-RN0435-16	27-Jun-2016	26-Dec-2016
GW-RN0332-16	09-May-2016	08-Aug-2016		
6	Specified Process License (Mortar Plant Operation)	L-3-251(1)	12-Apr-2016	11-Apr-2021
Contract 3				
1	Air pollution Control (Construction Dust) Regulation	Ref. No: 362101	17 Jul 2013	Till Contract ends
2	Chemical Waste Producer Registration	Waste Producers Number: No.:5113-634-C3817-01	7 Oct 2013	Till Contract ends
3	Water Pollution Control Ordinance -	No.:WT00016832 – 2013	28 Aug 13	31 Aug 2018

Item	Description	License/Permit Status		
		Ref. no.	Effective Date	Expiry Date
	Discharge License			
4	Waste Disposal Regulation - Billing Account for Disposal of Construction Waste	Account No. 7017914	2 Aug 13	Till Contract ends
5	Construction Noise Permit	GW-RN0892-15	9 Jan 2016	8 July 2016
		GW-RN0064-16	16 Feb 2016	13 Aug 2016
		GW-RN0096-16	6 Mar 2016	12 Jun 2016
		GW-RN0097-16	1 Mar 2016	17 Jun 2016
		GW-RN0098-16	1 Mar 2016	4 Sep 2016
		GW-RN0113-16	25 Feb 2016	24 Aug 2016
		GW-RN0139-16	2 Mar 2016	24 Aug 2016
		GW-RN0140-16	2 Mar 2016	24 Aug 2016
		GW-RN0158-16	8 Mar 2016	31 Aug 2016
		GW-RN0168-16	15 Mar 2016	14 Jun 2016
		GW-RN0170-16	11 Mar 2016	10 Sep 2016
		GW-RN0218-16	6 April 2016	30 Sep 2016
		GW-RN0233-16	11 April 2016	10 Oct 2016
		GW-RN0297-16	4 May 2016	30 June 2016
		GW-RN0303-16	30 April 2016	29 July 2016
		GW-RN0307-16	10 May 2016	9 Sep 2016
		GW-RN0308-16	10 May 2016	9 Sep 2016
		GW-RN0309-16	30 April 2016	29 Oct 2016
		GW-RN0414-16	18 June 2016	17 Dec 2016
		GW-RN0419-16	21 June 2016	30 Sep 2016
GW-RN0421-16	21 June 2016	30 Sep 2016		
GW-RN0446-16	24 June 2016	31 Aug 2016		
GW-RN0434-16	22 June 2016	21 Dec 2016		
GW-RN0305-16	5 May 2016	4 Aug 2016		
Contract 5				
1	Air pollution Control (Construction Dust) Regulation	Ref. No: 359338	13 May 2013	Till the end of Contract
2	Chemical Waste Producer Registration	Waste Producers Number No.: 5213-642-S3735-01	8 Jun 2013	Till the end of Contract
3	Water Pollution Control Ordinance - Discharge License	No.: W5/1G44/1	8 Jun 13	30 Jun 2018
4	Waste Disposal Regulation - Billing Account for Disposal of Construction Waste	Account No. 7017351	29 Apr 13	Till the end of Contract
Contract 6				
1	Air pollution Control (Construction Dust)	Ref. No: 390614	29 Jun 2015	Till the end of Contract

Item	Description	License/Permit Status		
		Ref. no.	Effective Date	Expiry Date
	Regulation			
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
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.: WT00022774-2015	17 Nov 2015	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-RN0396-16	5 June 2016	4 Nov 2016
		PP-RN0015-16	16 May 2016	15 July 2016
		GW-RN0337-16	23 May 2016	22 July 2016
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
5	Construction Noise Permit	GW-RN0329-16	23 May 2016	22 July 2016
Contract 4				
1	Air pollution Control (Construction Dust)	Application is under preparation		

Item	Description	License/Permit Status		
		Ref. no.	Effective Date	Expiry Date
	Regulation			
2	Chemical Waste Producer Registration	Application is under preparation		
3	Water Pollution Control Ordinance - Discharge License	Application is under preparation		
4	Waste Disposal Regulation - Billing Account for Disposal of Construction Waste	Application is under preparation		

3 SUMMARY OF IMPACT MONITORING REQUIREMENTS

3.1 GENERAL

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

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

3.2 MONITORING PARAMETERS

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

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

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

Table 3-1 Summary of EM&A Requirements

Environmental Issue	Parameters
Air Quality	<ul style="list-style-type: none"> • 1-hour TSP by Real-Time Portable Dust Meter; and • 24-hour TSP by High Volume Air Sampler.
Noise	<ul style="list-style-type: none"> • $L_{eq(30min)}$ 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 <ul style="list-style-type: none"> • Dissolved Oxygen Concentration (mg/L); • Dissolved Oxygen Saturation (%); • Turbidity (NTU); • pH unit; • Water depth (m); and • Temperature (°C).
	Laboratory Analysis <ul style="list-style-type: none"> • 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 proposed alternative monitoring locations has updated in the revised EM&A Programme which verified by IEC and certified by ET Leader prior submitted to EPD on 10 July 2013. *Table 3-2*, *Table 3-3* and *Table 3-4* are respectively 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
AM1b^	Open area at Tsung Yuen Ha Village	BCP	SS C505 Contract 5 Contract 7
AM2	Village House near Lin Ma Hang Road	LMH to Frontier Closed Area	Contract 5 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 5 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 AM1 to AM1a was submitted to EPD on 24 March 2014 after verified by the IEC. It was approved by EPD (EPD's ref.: (6) in EP 2/N7/A/52 Pt.12 dated 9 Jun 2014).

[@] 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.

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 5 Contract 7
NM2a [#]	Village House near Lin Ma Hang Road	Lin Ma Hang to Frontier Closed Area	Contract 5, 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
WM1	Downstream of Kong Yiu Channel	833 679	845 421	Alternative location located at upstream 51m of the designated location	SS C505 Contract 5 Contract 6
WM1-Control	Upstream of Kong Yiu Channel	834 185	845 917	NA	SS C505 Contract 5 Contract 6
WM2A	Downstream of River Ganges	834 204	844 471	Alternative location located at downstream 81m 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 on 29th March 2016. If the measured water depth of the monitoring station is lower than 150 mm, alternative location (WM3x and WM2A-Controlx) based on the criteria were selected to perform water monitoring in accordance with the updated EM&A Programme (Rev. 05) (Section 4.1.4)

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”), 3 consecutive $L_{eq(5min)}$ measurement will depended CNP requirements to undertake. Supplementary information for data auditing, statistical results such as L_{10} and L_{90} shall also be obtained for reference.

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* or Rion NL-31 or Rion NL-52*
Calibrator	B&K Type 4231* or Cesva CB-5 or Rion NC-74
Portable Wind Speed Indicator	Testo Anemometer

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

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

Water Quality Monitoring

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

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

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

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

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

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

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

3.5.16 Analysis of suspended solids should be carried out in a HOKLAS or other accredited laboratory. Water samples of about 1L should be collected at the monitoring stations for carrying out the

laboratory suspended solids determination. The SS determination work should start within 24 hours after collection of the water samples. The SS analyses should follow the *APHA Standard Methods 2540D* with Limit of Reporting of 2 mg/L.

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

Table 3-7 Water Quality Monitoring Equipment

Equipment	Model
Water Depth Detector	Eagle Sonar or tape measures
Water Sampler	A 2-litre transparent PVC cylinder with latex cups at both ends or teflon/stainless steel bailer or self-made sampling bucket
Thermometer & DO meter	YSI Professional Plus /YSI PRO20 Handheld Dissolved Oxygen Instrument* / YSI 550A Multifunctional Meter/ YSI Professional DSS*
pH meter	YSI Professional Plus / AZ8685 pH pen-style meter*/ YSI 6820/ 650MDS/ YSI Professional DSS*
Turbidimeter	Hach 2100Q*/ YSI 6820/ 650MDS/ YSI Professional DSS*
Sample Container	High density polythene bottles (provided by laboratory)
Storage Container	'Willow' 33-liter plastic cool box with Ice pad

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

3.6 MONITORING METHODOLOGY

1-hour TSP Monitoring

- 3.6.1 The 1-hour TSP monitor was a brand named “Sibata LD-3B Laser Dust monitor Particle Mass Profiler & Counter” which is a portable, battery-operated laser photometer. The 1-hour TSP meter provides a real time 1-hour TSP measurement based on 90° light scattering. The 1-hour TSP monitor consists of the following:

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

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

24-hour TSP Monitoring

- 3.6.3 The equipment used for 24-hour TSP measurement is Tisch Environmental, Inc. Model TE-5170 TSP high volume air sampling system, which complied with *EPA Code of Federal Regulation, Appendix B to Part 50*. The High Volume Air Sampler (HVS) consists of the following:

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

- 3.6.4 The HVS is operated and calibrated on a regular basis in accordance with the manufacturer’s instruction using Tisch Calibration Kit Model TE-5025A. Calibration would carry out in two month interval.

- 3.6.5 24-hour TSP is collected by the ET on filters of HVS and quantified by a local HOKLAS accredited laboratory, ALS Technichem (HK) Pty Ltd (ALS), upon receipt of the samples. The ET keep all the sampled 24-hour TSP filters in normal air conditioned room conditions, i.e. 70% RH (Relative Humidity) and 25°C, for six months prior to disposal.

Noise Monitoring

- 3.6.6 Noise measurements were taken in terms of the A-weighted equivalent sound pressure level (L_{eq}) measured in decibels dB(A). Supplementary statistical results (L_{10} and L_{90}) were also obtained for reference.
- 3.6.7 During the monitoring, all noise measurements would be performed with the meter set to FAST response and on the A-weighted equivalent continuous sound pressure level (L_{eq}). $L_{eq(30min)}$ in six consecutive $L_{eq(5min)}$ measurements will use as the monitoring parameter for the time period between 0700-1900 hours on weekdays; and also $L_{eq(15min)}$ in three consecutive $L_{eq(5min)}$ measurements would be used as monitoring parameter for other time periods (e.g. during restricted hours), if necessary.
- 3.6.8 Prior of noise measurement, the accuracy of the sound level meter is checked using an acoustic calibrator generating a known sound pressure level at a known frequency. The checking is performed before and after the noise measurement.

Water Quality

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

Sampling Procedure

- 3.6.10 A Digital Global Positioning System (GPS) is used to identify the designated monitoring stations prior to water sampling. A portable, battery-operated echo sounder or tape measurement is used for the determination of water depth at each station. At each station, water sample would be collected from 0.1m below water surface or the water surface to prevent the river bed sediment for stirring.
- 3.6.11 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.
- 3.6.12 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.
- 3.6.13 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°C as possible without being frozen. Samples collected are delivered to the laboratory upon collection.

In-situ Measurement

- 3.6.14 YSI PRO20 Handheld Dissolved Oxygen Instrument or YSI Professional DSS is used for water in-situ measures, which automates the measurements and data logging of temperature, dissolved oxygen and dissolved oxygen saturation.
- 3.6.15 A portable AZ Model 8685 pH pen-style meter or YSI Professional DSS 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.
- 3.6.16 A portable Hach 2100Q Turbidimeter or YSI Professional DSS is used for in-situ turbidity measurement. The turbidity meter is capable of measuring turbidity in the range of 0 – 1000 NTU.

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

Laboratory Analysis

3.6.18 All water samples analyzed Suspended Solids (SS) will be carried out by a local HOKLAS-accredited testing laboratory (ALS Technichem (HK) Pty Ltd HOKLAS registration no. 66). SS determination using *APHA Standard Methods 2540D* as specified in the *EM&A Manual* will start within 48 hours of water sample receipt.

3.7 EQUIPMENT CALIBRATION

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

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

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

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

3.7.5 The calibration certificates of all monitoring equipment used for the impact monitoring program in the Reporting Period and the HOKLAS accredited certificate of laboratory are attached in *Appendix F*.

3.8 DERIVATION OF ACTION/LIMIT (A/L) LEVELS

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

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

Monitoring Station	Action Level ($\mu\text{g}/\text{m}^3$)		Limit Level ($\mu\text{g}/\text{m}^3$)	
	1-hour TSP	24-hour TSP	1-hour TSP	24-hour TSP
AM1b	265	143	500	260
AM2	268	149		
AM3	269	145		
AM4b	267	148		
AM5a	268	143		
AM6	269	148		
AM7b	275	156		
AM8	269	144		
AM9b	271	151		

Table 3-9 Action and Limit Levels for Construction Noise

Monitoring Location	Action Level	Limit Level in dB(A)
	Time Period: 0700-1900 hours on normal weekdays	
NM1, NM2a, NM3, NM4, NM5, NM6, NM7, NM8, NM9, NM10	When one or more documented complaints are received	75 dB(A) ^{Note 1 & Note 2}

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

Note 2: If works are to be carried out during restricted hours, the conditions stipulated in the construction noise permit issued by the NCA have to be followed.

Table 3-10 Action and Limit Levels for Water Quality

Parameter	Performance criteria	Monitoring Location				
		WM1	WM2A	WM2B	WM3	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, 5, 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 IN REPORTING MONTH

4.2.1 In the Reporting Period, a total of **150** events of 1-hour TSP and **50** 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 – AM1b

Date	24-hour TSP ($\mu\text{g}/\text{m}^3$)	1-hour TSP ($\mu\text{g}/\text{m}^3$)				
		Date	Start Time	1 st reading	2 nd reading	3 rd reading
4-Jun-16	83	6-Jun-16	13:00	41	43	44
10-Jun-16	37	11-Jun-16	10:18	45	47	44
16-Jun-16	51	17-Jun-16	10:21	37	36	59
22-Jun-16	60	23-Jun-16	13:01	100	102	99
27-Jun-16	23	28-Jun-16	13:00	69	69	67
Average (Range)	51 (23 – 83)	Average (Range)		60 (36 – 102)		

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

Date	24-hour TSP ($\mu\text{g}/\text{m}^3$)	1-hour TSP ($\mu\text{g}/\text{m}^3$)				
		Date	Start Time	1 st reading	2 nd reading	3 rd reading
4-Jun-16	74	6-Jun-16	13:02	43	45	42
10-Jun-16	54	11-Jun-16	10:05	39	40	38
16-Jun-16	73	17-Jun-16	10:08	30	37	53
22-Jun-16	57	23-Jun-16	13:04	102	104	103
27-Jun-16	115	28-Jun-16	13:02	74	74	70
Average (Range)	75 (54 – 115)	Average (Range)		60 (30 – 104)		

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

Date	24-hour TSP ($\mu\text{g}/\text{m}^3$)	1-hour TSP ($\mu\text{g}/\text{m}^3$)				
		Date	Start Time	1 st reading	2 nd reading	3 rd reading
4-Jun-16	144	6-Jun-16	13:10	45	47	46
10-Jun-16	63	11-Jun-16	10:00	36	38	35
16-Jun-16	99	17-Jun-16	10:05	65	39	40
22-Jun-16	118	23-Jun-16	13:07	98	100	101
27-Jun-16	41	28-Jun-16	13:04	76	73	66
Average (Range)	93 (41 – 144)	Average (Range)		60 (35 – 101)		

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

Date	24-hour TSP ($\mu\text{g}/\text{m}^3$)	1-hour TSP ($\mu\text{g}/\text{m}^3$)				
		Date	Start Time	1 st reading	2 nd reading	3 rd reading
1-Jun-16	57	2-Jun-16	11:18	56	42	41
7-Jun-16	33	8-Jun-16	10:12	67	70	70
13-Jun-16	41	14-Jun-16	10:08	63	64	62
18-Jun-16	50	20-Jun-16	10:25	96	95	92
24-Jun-16	42	25-Jun-16	10:00	78	77	85
29-Jun-16	34	30-Jun-16	9:12	82	75	76
Average (Range)	43 (33 - 57)	Average (Range)		72 (41 – 96)		

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

Date	24-hour TSP ($\mu\text{g}/\text{m}^3$)	1-hour TSP ($\mu\text{g}/\text{m}^3$)				
		Date	Start Time	1 st reading	2 nd reading	3 rd reading
1-Jun-16	23	2-Jun-16	11:17	33	23	23
7-Jun-16	26	8-Jun-16	10:13	74	69	57
13-Jun-16	37	14-Jun-16	10:00	85	86	84
18-Jun-16	26	20-Jun-16	10:24	91	90	92
24-Jun-16	29	25-Jun-16	9:55	83	85	76
29-Jun-16	24	30-Jun-16	9:21	73	74	71
Average (Range)	27 (23 - 37)	Average (Range)		71 (23 – 92)		

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

Date	24-hour TSP ($\mu\text{g}/\text{m}^3$)	1-hour TSP ($\mu\text{g}/\text{m}^3$)				
		Date	Start Time	1 st reading	2 nd reading	3 rd reading
1-Jun-16	44	2-Jun-16	10:29	50	36	27
7-Jun-16	68	8-Jun-16	10:01	67	69	66
13-Jun-16	81	14-Jun-16	9:45	80	82	79
18-Jun-16	94	20-Jun-16	9:56	94	94	97
24-Jun-16	65	25-Jun-16	9:45	80	79	87
29-Jun-16	127	30-Jun-16	9:26	67	65	66
Average (Range)	80 (44 - 127)	Average (Range)		71 (27 – 97)		

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

Date	24-hour TSP ($\mu\text{g}/\text{m}^3$)	1-hour TSP ($\mu\text{g}/\text{m}^3$)				
		Date	Start Time	1 st reading	2 nd reading	3 rd reading
1-Jun-16	54	2-Jun-16	9:22	88	83	88
7-Jun-16	32	8-Jun-16	10:16	36	32	31
13-Jun-16	49	14-Jun-16	9:21	117	113	91
18-Jun-16	44	20-Jun-16	9:28	54	53	50
24-Jun-16	43	25-Jun-16	9:49	23	25	24
29-Jun-16	124	30-Jun-16	9:13	82	87	102
Average (Range)	58 (32 - 124)	Average (Range)		66 (23 – 117)		

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

Date	24-hour TSP ($\mu\text{g}/\text{m}^3$)	1-hour TSP ($\mu\text{g}/\text{m}^3$)				
		Date	Start Time	1 st reading	2 nd reading	3 rd reading
1-Jun-16	32	2-Jun-16	13:04	68	58	68
7-Jun-16	29	8-Jun-16	9:28	15	14	14
13-Jun-16	40	14-Jun-16	13:07	124	119	96
18-Jun-16	30	20-Jun-16	13:07	58	53	35
24-Jun-16	34	25-Jun-16	9:33	23	25	24
29-Jun-16	22	30-Jun-16	13:01	65	68	79
Average (Range)	31 (22 - 40)	Average (Range)		56 (14 -124)		

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

Date	24-hour TSP ($\mu\text{g}/\text{m}^3$)	1-hour TSP ($\mu\text{g}/\text{m}^3$)				
		Date	Start Time	1 st reading	2 nd reading	3 rd reading
6-Jun-16	68	6-Jun-16	13:04	26	27	26
11-Jun-16	52	11-Jun-16	13:04	50	51	49
16-Jun-16	10	17-Jun-16	13:07	50	36	37
22-Jun-16	24	23-Jun-16	9:35	17	17	23
27-Jun-16	36	28-Jun-16	13:10	35	31	32
Average (Range)	38 (10 – 68)	Average (Range)		34 (17 – 111)		

4.2.2 As shown in *Tables 4-1 to 4-9*, all the 1-hour TSP 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, 5, 6, 7 and Contract SS C505 and noise monitoring was performed at all designated locations.
- 5.1.2 Relocation of Noise Monitoring Location NM2 to NM2a was proposed and verified by IEC on 6 May 2016 and was effective on 9 May 2016.
- 5.1.3 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 IN REPORTING MONTH

- 5.2.1 In the Reporting Period, a total of **45** event 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(*)
6-Jun-16	63	67	60	61	65
17-Jun-16	65	73	59	64	61
23-Jun-16	65	68	58	65	68
28-Jun-16	54	63	59	62	60
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
2-Jun-16	62	64	54	52	68
8-Jun-16	66	69	55	57	67
14-Jun-16	58	59	58	54	61
20-Jun-16	56	65	55	59	67
30-Jun-16	59	63	64	59	70
Limit Level	75 dB(A)				

- 5.2.2 As shown in *Tables 5-1 and 5-2*, the noise level measured at all designated monitoring locations were below 75dB(A). Furthermore, there was one noise complaint (Action Level exceedance) received from 1823 on 20 June 2016 and further clarification with the complainant by RE on 24 June 2016. Therefore, one Action Level exceedance was triggered.

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, 5, 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 was scheduled to carry out for all designated locations with their control stations. Except for WM3, total thirty-one (31) Limit Level (LL) and one (1) Action Level (AL) of water quality exceedances were respectively recorded at the monitoring stations WM1, WM2A, WM2B and WM4. According to “*Event and Action Plan*” stipulation, additional water quality monitoring days respectively were conducted one day for WM1 and its control station, seven days for WM2A and its control station, one days for WM2B and its control station, one day for WM4 and its control stations.

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

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

Date	Dissolved Oxygen (mg/L)			Turbidity (NTU)			Suspended Solids (mg/L)		
	WM4	WM4-CA	WM4-CB	WM4	WM4-CA	WM4-CB	WM4	WM4-CA	WM4-CB
2-Jun-16	7.2	7.3	6.8	9.4	7.5	16.6	8.0	7.0	13.5
4-Jun-16	7.3	7.5	6.8	8.9	6.9	11.6	8.5	3.0	9.0
6-Jun-16	7.9	8.2	7.5	423.0	336.0	231.5	542.5	368.5	206.5
#7-Jun-16	--	--	--	28.8	15.1	16.6	18.0	16.0	20.0
8-Jun-16	7.0	7.4	6.8	253.0	214.0	148.5	318.5	381.5	162.0
10-Jun-16	6.5	7.4	5.5	26.7	4.7	15.8	34.5	7.0	24.0
13-Jun-16	7.3	7.6	6.5	34.1	14.9	30.7	22.0	8.0	30.5
15-Jun-16	6.9	7.4	6.4	34.0	29.4	29.7	38.5	31.5	31.0
17-Jun-16	7.2	7.5	6.6	24.8	15.3	20.9	17.5	9.5	17.5
20-Jun-16	6.4	7.1	5.4	26.6	17.9	21.8	13.5	11.5	15.0
22-Jun-16	5.8	5.8	6.5	11.2	8.0	16.1	10.0	6.0	17.0
24-Jun-16	5.5	5.5	5.5	13.7	8.5	16.7	14.0	8.5	22.5
28-Jun-16	6.8	7.0	5.5	33.0	14.6	17.5	26.5	9.0	13.0
30-Jun-16	6.8	6.7	6.5	13.7	58.5	19.0	10.5	39.5	11.0

Remarks: *bold with underline indicated Limit Level exceedance*

bold without underline indicated Action Level exceedance

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

Table 6-2 Water Quality Monitoring Results Associated of Contracts 5, 6 and SS C505

Date	Dissolved Oxygen (mg/L)		Turbidity (NTU)		Suspended Solids (mg/L)	
	WM1	WM1-Control	WM1	WM1-Control	WM1	WM1-Control
2-Jun-16	7.1	7.4	14.8	10.3	15.5	3.0
4-Jun-16	7.3	7.4	15.9	9.0	13.5	2.0
6-Jun-16	7.4	7.2	543.5	229.0	409.0	259.5
#7-Jun-16	--	--	18.8	8.1	34.0	11.0
8-Jun-16	5.7	6.5	26.5	11.9	41.5	27.0
10-Jun-16	7.2	7.4	15.1	17.3	25.5	6.0
13-Jun-16	7.0	6.5	10.7	8.1	39.5	10.0

Date	Dissolved Oxygen (mg/L)		Turbidity (NTU)		Suspended Solids (mg/L)	
	WM1	WM1-Control	WM1	WM1-Control	WM1	WM1-Control
15-Jun-16	7.1	7.1	21.9	11.4	20.0	5.5
17-Jun-16	7.5	7.5	29.8	96.0	23.0	100.5
20-Jun-16	7.4	7.6	27.6	21.7	25.5	6.0
22-Jun-16	6.5	6.7	39.6	16.6	53.5	10.5
24-Jun-16	6.1	5.9	28.2	22.5	35.5	12.5
28-Jun-16	6.5	5.4	44.3	43.5	28.5	21.0
30-Jun-16	6.6	6.7	39.7	21.9	51.0	16.5

Remarks: *bold with underline indicated Limit Level exceedance*

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

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

Date	Dissolved Oxygen (mg/L)				Turbidity (NTU)				Suspended Solids (mg/L)			
	WM2A	WM2A-C	WM2B	WM2B-C	WM2A	WM2A-C	WM2B	WM2B-C	WM2A	WM2A-C	WM2B	WM2B-C
#1-Jun-16	--	--	--	--	22.4	4.8	--	--	13.0	6.0	--	--
2-Jun-16	7.3	7.6	8.1	7.0	16.4	8.1	10.7	3.2	14.0	5.0	10.5	2.0
4-Jun-16	7.2	7.4	7.3	6.9	<u>258.0</u>	9.8	11.2	4.4	<u>457.0</u>	11.5	10.5	<2
6-Jun-16	7.6	8.1	7.9	7.9	<u>421.0</u>	96.0	<u>213.5</u>	96.5	<u>534.5</u>	86.5	<u>256.0</u>	207.5
#7-Jun-16	--	--	--	--	<u>137.0</u>	7.0	10.8	4.7	<u>168.0</u>	6.0	11.0	2.0
8-Jun-16	7.2	7.8	8.1	6.8	<u>131.0</u>	6.1	10.2	6.9	<u>395.5</u>	<2	9.5	<2
10-Jun-16	6.9	7.6	7.7	6.8	22.0	8.6	6.6	2.8	13.5	3.5	10.5	<2
13-Jun-16	7.4	7.8	7.7	6.6	<u>218.5</u>	8.7	10.9	9.7	<u>111.5</u>	6.0	9.0	<2
#14-Jun-16	--	--	--	--	<u>212.0</u>	6.2	--	--	<u>203.0</u>	5.0	--	--
15-Jun-16	7.1	7.6	7.3	6.7	<u>71.2</u>	7.0	10.9	4.0	<u>73.5</u>	3.0	10.5	<2
#16-Jun-16	--	--	--	--	<u>159.5</u>	33.3	--	--	<u>152.0</u>	29.0	--	--
17-Jun-16	7.2	7.7	7.9	6.5	<u>358.0</u>	44.4	11.1	8.2	<u>300.5</u>	6.5	10.5	13.5
#18-Jun-16	--	--	--	--	<u>54.7</u>	12.1	--	--	<u>63.0</u>	3.0	--	--
20-Jun-16	7.3	7.5	8.5	7.6	<u>196.0</u>	12.4	4.8	3.9	<u>141.5</u>	4.5	3.0	2.5
#21-Jun-16	--	--	--	--	<u>231.0</u>	10.3	--	--	<u>300.0</u>	7.0	--	--
22-Jun-16	6.5	5.2	5.9	4.4	24.2	13.8	10.8	3.3	13.5	3.0	10.5	2.0
#23-Jun-16	--	--	--	--	21.9	9.9	--	--	12.0	4.0	--	--
24-Jun-16	6.4	4.9	6.5	4.0	24.5	12.6	10.2	4.6	12.5	3.5	11.5	<2
28-Jun-16	6.6	7.1	7.4	5.2	44.2	40.5	11.2	3.3	14.5	14.0	6.5	<2
30-Jun-16	5.9	6.2	7.0	4.8	<u>130.0</u>	10.6	10.0	3.4	<u>117.5</u>	4.5	5.0	<2

Remarks: *bold with underline indicated Limit Level exceedance*

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

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

Date	Dissolved Oxygen (mg/L)		Turbidity (NTU)		Suspended Solids (mg/L)	
	WM3	WM3-Control	WM3	WM3-Control	WM3	WM3-Control
2-Jun-16	7.5	6.9	7.6	3.4	9.5	7.5
4-Jun-16	7.0	6.8	12.8	12.8	4.5	26.0
6-Jun-16	7.6	7.5	714.5	Over-range	900.0	1350.0
8-Jun-16	6.9	7.1	28.3	Over-range	30.0	1560.0
10-Jun-16	6.6	6.8	5.5	6.1	10.0	57.0
13-Jun-16	7.0	6.9	10.8	26.7	12.5	55.5
15-Jun-16	6.4	6.9	10.4	16.1	10.5	26.0
17-Jun-16	6.8	6.8	8.7	4.3	8.5	16.0
20-Jun-16	7.1	6.9	10.9	8.7	8.0	8.0

Date	Dissolved Oxygen (mg/L)		Turbidity (NTU)		Suspended Solids (mg/L)	
	WM3	WM3-Control	WM3	WM3-Control	WM3	WM3-Control
22-Jun-16	5.7	5.9	5.7	4.3	4.0	4.0
24-Jun-16	5.7	5.8	6.5	6.8	7.0	8.0
28-Jun-16	6.0	6.5	18.3	17.1	9.5	5.5
30-Jun-16	6.2	6.5	11.3	10.0	8.5	8.5

Table 6-5 Breaches of Water Quality Monitoring Criteria in Reporting Period

Location	Dissolved Oxygen		Turbidity		Suspended Solids		Total Exceedance	
	Action	Limit	Action	Limit	Action	Limit	Action	Limit
WM1	0	0	0	1	0	1	0	2
WM2A	0	0	0	13	0	13	0	26
WM2B	0	0	0	1	0	1	0	2
WM3	0	0	0	0	0	0	0	0
WM4	0	0	1	0	0	1	1	1
No of Exceedance	0	0	1	15	0	16	1	31

6.2.3 In this Reporting Period, a total of thirty-one (31) Limit Level (LL) exceedances and one (1) Action Level (AL) exceedance, namely fifteen (15) LL exceedances and one (1) AL exceedance of turbidity and sixteen (16) LL exceedances of Suspended Solids were recorded for the Project and they are summarized in *Table 6-5*.

6.2.4 NOE was issued to relevant parties upon confirmation of the monitoring result. The cause of exceedance is summarized in *Table 6-6* accordance to investigation findings and the detailed investigation reports for the exceedances are attached in *Appendix N*.

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

Date of Exceedance	Location	Exceeded Parameter	Cause of Water Quality Exceedance
6 th June 2016	WM1 (C5, C6 and SS C505)	NTU & SS	According to the Daily Extract of Meteorological Observations from the Hong Kong Observatory, heavy rainfall was recorded on 6 June 2016. Water flow rate increased vigorously under the heavy rain and the sediment at the river bed was stirred up, resulting in turbid water. According to the field photos, accumulation of rubbish were observed at the bar screen of the box culvert near WM1 after heavy rainstorm on 6 June 2016. Water flow near WM1 was therefore retarded and turbid water was cumulated at WM1. Also, water level at the box culvert increased to a high level due to the combined effect of heavy rain and accumulation of rubbish, overflow of the Kong Yiu River occurred. Hence, it is considered that the exceedance on 6 June 2016 was due to the heavy rain and accumulation of rubbish at the bar screen of the box culvert near WM1, and unlikely due to the construction activities of the Contract.
4 th , 6 th , 7 th , 8 th , 13 th , 14 th , 15 th , 16 th , 17 th , 18 th , 20 th , 21 th , 30 th June 2016	WM2A (C6)	NTU & SS	<u>Exceedances on 4th, 6th, 7th, 8th June 2016</u> During joint site inspection with RE, IEC, ET and Contractor on 2 June 2016, it was observed that unknown source of turbid water was seeping out from the river bed at upstream of WM2A continuously, turning the water in the river turbid. From the photo taken by the Contractor on 4 June 2016, it was observed that turbid water was seeping out from the river bed at

Date of Exceedance	Location	Exceeded Parameter	Cause of Water Quality Exceedance
			<p>upstream of WM2A continuously. Thus, it is considered that the exceedance on 4 June was likely due to the unknown source of turbid water.</p> <p>According to the Daily Extract of Meteorological Observations from the Hong Kong Observatory, intense rainfall (100-150 mm) was recorded at Ta Kwu Ling monitoring station on 6 June 2016. Under the intense rain, water flow rate increased vigorously and the sediment at the river bed was stirred up at WM2A, resulting in turbid water. As the river bed at WM2A-C was mostly small rocks, the stirred up of sediment at WM2A-C was limited. The turbid water recorded at WM2A-C may due to runoff from upper stream or surrounding slopes.</p> <p>According to the Daily Extract of Meteorological Observations from the Hong Kong Observatory, heavy rainfall (10-20 mm) was recorded at Ta Kwu Ling monitoring station on 7 and 8 June 2016. Water flow rate increased and the stirred up sediment could not settle down in a short period of time after intense raining on 6 June 2016. The river bed at WM2A was cumulated with thick silt and sediment, while the river bed at WM2A-C was mostly small rocks. Hence, sediment stirred up more vigorous in WM2A while the stirred up of sediment at WM2A-C was limited. It is considered that the exceedances on 6, 7 and 8 June at WM2A were related to the heavy rainfall.</p> <p><u>Exceedance on 30th June 2016</u></p> <p>During weekly joint site inspection with RE, IEC, ET and Contractor(CCKJV) on 30 June 2016, no discharge and surface runoff was observed from the site. As water mitigation measures, wastewater treatment facilities including one AquaSed and three series of sedimentation tank have been installed for piling work and most of the time the wastewater was recirculated. However, it was observed that unknown source of turbid water was seeping out from the river bed. Hence, it is considered that the exceedance on 30 June 2016 was due to the above event.</p> <p><u>Exceedance on 13th, 14th, 15th 16th, 17th, 18th, 20th, 21th June</u></p> <p>During joint site inspection with RE, IEC, ET and Contractor (CCKJV) on 16 June 2016, no surface runoff was observed from the site into the river.</p> <p>As advised by the Contractor, the source of turbid water recorded at WM2A was identified. Due to continual heavy loading, uneven ground and cracks on the haul road were formed. As dust suppression measures, a series of sprinklers was installed along the haul road for continuous spraying and the excessive water was cumulated on uneven ground/ cracks. When vehicles passed the puddles, muddy water trapped on the uneven ground/ cracks was spilled from the road into a channel connecting to Ping Yuen River.</p> <p>To resolve the deficiency, the Contractor has filled the uneven ground and reduce the frequency of water spraying on that area. Also, the haul road was levelled up to avoid muddy runoff. The situation was found improved during site inspection on 7 July 2016.</p> <p>There was no exceedance recorded in the subsequent monitoring days on 22, 23 June 2016. Hence, it is considered that the rectification measures carried out by the Contractor were effective in preventing further exceedances.</p>

Date of Exceedance	Location	Exceeded Parameter	Cause of Water Quality Exceedance
6 th June 2016	WM2B (C6)	NTU &SS	<p>According to the Daily Extract of Meteorological Observations from the Hong Kong Observatory, heavy rainfall was recorded on 6 June 2016. The flow rate of the river increased vigorously, sediment and cumulated silt at the river bed was stirred up during rain, resulting in turbid water in river channel.</p> <p>Apart from the disturbance of cumulated silt at the river bed during rain, it was observed that trails of muddy runoff from the public road surface into the existing channel under the rain. Thus, it is considered that the exceedance on 6 June 2016 is due to the heavy rainfall.</p>
6 th June 2016	WM4 (C2 and C3)	NTU &SS	<p>According to the Daily Extract of Meteorological Observations from the Hong Kong Observatory, heavy rainfall was recorded on 6 June 2016. Water flow rate increased vigorously under the heavy rain and the sediment at the river bed was stirred up, resulting in turbid water.</p> <p>It is considered that the exceedances were due to the heavy rainfall and unlikely related to the construction activities under the Contracts.</p>

7 WASTE MANAGEMENT

7.1 GENERAL WASTE MANAGEMENT

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

7.2 RECORDS OF WASTE QUANTITIES

7.2.1 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.

7.2.2 The quantities of waste for disposal in this Reporting Period are summarized in *Tables 7-1* and *7-2* and the Monthly Summary Waste Flow Table is shown in *Appendix L*. Whenever possible, materials were reused on-site as far as practicable.

Table 7-1 Summary of Quantities of Inert C&D Materials for the Project

Type of Waste	Contract 2		Contract 3		Contract 5		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	
C&D Materials (Inert) (in '000m ³)	62.4192	--	0.523	--	0	--	61.126	--	0.613	--	0.104	--	124.7852
Reused in this Contract (Inert) (in '000 m ³)	0.5848	--	0	--	0	--	6.921	--	0	--	8.541	--	16.0468
Reused in other Contracts/ Projects (Inert) (in '000 m ³)	45.2952	C6/ NENT# & other projects approved by the ER	0	--	0	--	23.286	C5 & other projects approved by the ER	0	--	0	--	68.5812
Disposal as Public Fill (Inert) (in '000 m ³)	16.5392	Tuen Mun 38	0.420	Tuen Mun 38	0	--	30.919	Tuen Mun 38	0.613	Tuen Mun 38	0.104	TKO 137	48.5952

Remark #: The C&D materials were delivered to NENT for reuse by laying cover of the landfilling area.

Table 7-2 Summary of Quantities of C&D Wastes for the Project

Type of Waste	Contract 2		Contract 3		Contract 5		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) #	67.73	-	0	-	0	--	0	--	0	--	725.0582	Licensed collector	792.7882
Recycled Paper / Cardboard Packing ('000kg) #	0	-	0	-	0.062	--	0.166	Licensed collector	0.005	--	0.33	--	0.563
Recycled Plastic ('000kg) #	0	--	0.001	-	0	--	0	--	0.001	--	0.004	--	0.006
Chemical Wastes ('000kg) #	0	Licensed collector	0	-	0	--	0	--	0	--	0	--	0
General Refuses ('000m ³)	0.0916	NENT	0.135	NENT	0.01	NENT	0.043	NENT	0	--	0.117	NENT	0.3966

Remark #: Unit of recycled metal, recycled paper/ cardboard packing, recycled plastic and chemical waste for Contract 3 was in ('000m³).

8 SITE INSPECTION

8.1 REQUIREMENTS

- 8.1.1 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.

8.2 FINDINGS / DEFICIENCIES DURING THE REPORTING MONTH

Contract 2

- 8.2.1 In the Reporting Period, joint site inspection for Contract 2 to evaluate the site environmental performance has been carried out by the RE, IEC, ET and the Contractor on **3, 10, 17, 24, 29 June 2016**. No non-compliance was noted.
- 8.2.2 The findings / deficiencies of **Contract 2** that observed during the weekly site inspection are listed in **Table 8-1**.

Table 8-1 Site Observations for Contract 2

Date	Findings / Deficiencies	Follow-Up Status
3 June 2016	<ul style="list-style-type: none"> The contractor was reminded to provide proper maintenance for the de-silting system and make sure the system is in normal operation condition. (South and North Portal) 	<ul style="list-style-type: none"> Not required for reminder.
10 June 2016	<ul style="list-style-type: none"> Turbidity and muddy water cumulated inside the de-silting plant area should be clean to prevent overflow into the stream. (North Portal) 	<ul style="list-style-type: none"> Not required for reminder.
17 June 2016	<ul style="list-style-type: none"> Milky water was observed at the discharge outfall in Mid-vent, the Contractor should review the water diversion system and ensure the water which fulfil the discharge license before discharge. (Location: Mid-vent) It was observed that the pH value was over the standard level. The Contractor should ensure pH adjustment is provided for the wastewater treatment and ensure the pH value is within 6-9 before discharge. (Location: Mid-vent) Mosquito breeding control measures was checked during the site inspection. 	<ul style="list-style-type: none"> No turbidity water discharge was observed. pH value resumed to normal after cleaning the pH probe and testing with the pH paper the pH level is comply with the discharge license requirement. Not required for reminder.
24 June 2016	<ul style="list-style-type: none"> Stagnant water cumulated inside the lifting eye of the concrete block was observed. The contractor was reminded to fill up the lifting eye to prevent stagnant water accumulation. 	<ul style="list-style-type: none"> Lifting eyes has been filled up with sand.
29 June 2016	<ul style="list-style-type: none"> No adverse environmental issue was observed. 	<ul style="list-style-type: none"> NA

Contract 3

- 8.2.3 In the Reporting Period, joint site inspection for Contract 3 to evaluate the site environmental performance has been carried out by the RE, IEC, ET and the Contractor on **6, 13, 22, 27 June 2016**. No non-compliance was noted.

8.2.4 The findings / deficiencies of **Contract 3** that observed during the weekly site inspection are listed in **Table 8-2**.

Table 8-2 Site Observations for Contract 3

Date	Findings / Deficiencies	Follow-Up Status
6 June 2016	<ul style="list-style-type: none"> No adverse environmental issue was observed. 	<ul style="list-style-type: none"> NA
13 June 2016	<ul style="list-style-type: none"> Muddy trail was observed near SA1A. The Contractor should remove the muddy trail and ensure all the vehicles are washed properly before leaving the site. 	<ul style="list-style-type: none"> No muddy trail was observed near SA1A.
22 June 2016	<ul style="list-style-type: none"> Noise emission label was missing on a handheld breaker, the Contractor should display the noise emission label on the handheld breaker. 	<ul style="list-style-type: none"> Noise emission label was provided for the handheld breaker.
27 June 2016	<ul style="list-style-type: none"> Chemical container without drip tray was observed near NB68. The Contractor should provide drip tray for the chemical container to avoid land contamination. 	<ul style="list-style-type: none"> Not required for reminder.

Contract 5

8.2.5 In the Reporting Period, joint site inspection for Contract 5 to evaluate the site environmental performance has been carried out by the RE, IEC, ET and the Contractor on **7, 14, 22, 28 June 2016**. No non-compliance was noted.

8.2.6 The findings / deficiencies of **Contract 5** that observed during the weekly site inspection are listed in **Table 8-3**.

Table 8-3 Site Observations for Contract 5

Date	Findings / Deficiencies	Follow-Up Status
7 June 2016	<ul style="list-style-type: none"> No adverse environmental issue was observed. 	<ul style="list-style-type: none"> NA
14 June 2016	<ul style="list-style-type: none"> No adverse environmental issue was observed. 	<ul style="list-style-type: none"> NA
22 June 2016	<ul style="list-style-type: none"> No adverse environmental issue was observed. 	<ul style="list-style-type: none"> NA
28 June 2016	<ul style="list-style-type: none"> No adverse environmental issue was observed. 	<ul style="list-style-type: none"> NA

Contract 6

8.2.7 In the Reporting Period, joint site inspection for Contract 6 to evaluate the site environmental performance has been carried out by the RE, IEC, ET and the Contractor on **2, 10, 16, 23, 30 June 2016**. No non-compliance was noted.

8.2.8 The findings / deficiencies of **Contract 6** that observed during the weekly site inspection are listed in **Table 8-4**.

Table 8-4 Site Observations for Contract 6

Date	Findings / Deficiencies	Follow-Up Status
2 June 2016	<ul style="list-style-type: none"> Stagnant water accumulated was observed at Bridge D. The Contractor should remove the stagnant water to prevent mosquito breeding. Exposed slope adjacent to Ping Yuen River was observed at Bridge D. The Contractor should cover the exposed slope to prevent muddy runoff. 	<ul style="list-style-type: none"> The uneven ground has been filled up with soil. Exposed slop surface has been covered with tarpaulin sheet.
10 June 2016	<ul style="list-style-type: none"> Earth bund should be provided to prevent surface runoff overflow into public area. (Bridge D) 	<ul style="list-style-type: none"> Wooden boards have been erected to prevent run-off from entering public area.
16 June 2016	<ul style="list-style-type: none"> The cover of control panel of an air compressor was left open, the Contractor should ensure the cover of the air compressor is closed properly. (Location: Bridge D) A tree without proper protective fencing was found in Bridge D, the Contractor should provide tree protection fencing for the tree. 	<ul style="list-style-type: none"> The cover of air compressor has been closed. Tree protection fencing has been provided.
23 June 2016	<ul style="list-style-type: none"> No adverse environmental issue was observed. 	<ul style="list-style-type: none"> NA
30 June 2016	<ul style="list-style-type: none"> Sandy vehicle trails at site exit of LMH road was observed, the Contractor should ensure all the vehicles are washed before leaving the site and also to maintain the cleanliness condition at the site exit. Exposed earth surface along the site boundary at LMH road was found, the Contractor should provide relevant mitigation measures to prevent surface run-off. It was reminded that water accumulated in drip tray should be cleaned up especially after rain. 	<ul style="list-style-type: none"> The site exit has been cleaned and the wheel washing procedure is maintained. Exposed surface has been covered with tarpaulin sheet and sandbag bund is provided. Not required for reminder.

Contract SS C505

8.2.9 In the Reporting Period, joint site inspection for Contract SS C505 to evaluate the site environmental performance has been carried out by the RE, IEC, ET and the Contractor on **1, 8, 15, 22, 29 June 2016**. No non-compliance was noted.

8.2.10 The findings / deficiencies of **Contract SS C505** that observed during the weekly site inspection are listed in **Table 8-5**.

Table 8-5 Site Observations for Contract SS C505

Date	Findings / Deficiencies	Follow-Up Status
1 June 2016	<ul style="list-style-type: none"> Stagnant water was observed near Training Centre, Building 4 and PTB. The Contractor should remove the 	<ul style="list-style-type: none"> Mud clearing work at drainage channel near Training Centre was

Date	Findings / Deficiencies	Follow-Up Status
	stagnant water to prevent mosquito breeding.	carried out to avoid accumulation of stagnant water. <ul style="list-style-type: none"> • Stagnant water was removed near Building 4. • Water pump was provided to remove the stagnant water near PTB.
8 June 2016	<ul style="list-style-type: none"> • Stagnant water was observed at PTB, PTB Northside near drainage channel, near building 5 and near the portable toilet at Portion 1. The Contractor should remove the stagnant water to prevent mosquito breeding. 	<ul style="list-style-type: none"> • The stagnant water at PTB was removed. • Stagnant water near PTB Northside near drainage channel was pumped away. • Water pump was provided to remove the stagnant water near Building 5. • Stagnant water near the portable toilet at Portion 1 was removed.
15 June 2016	<ul style="list-style-type: none"> • The Contractor was reminded to remove stagnant water on site after rainy days to prevent mosquito breeding. 	<ul style="list-style-type: none"> • Not required for reminder.
22 June 2016	<ul style="list-style-type: none"> • Stagnant water was observed at container in Portion 2 storage area, lifting eye of concrete paving slabs near Portion 2 storage area, and near CLP station. The Contractor should remove the stagnant water to prevent mosquito breeding. 	<ul style="list-style-type: none"> • Stagnant water at container in Portion 2 storage area was removed. • The lifting eyes of the concrete paving slabs were filled by sand to avoid accumulation of stagnant water. • Stagnant water near CLP station was removed.
29 June 2016	<ul style="list-style-type: none"> • Chemical container without drip tray was observed near site office. The Contractor should provide drip tray for the containers to avoid land contamination. • Chemical leakage from mobile toilet near PTB was observed. The Contractor should carry out maintenance work for the mobile toilet to ensure no chemical leakage and treat the leaked chemical as chemical waste. 	<ul style="list-style-type: none"> • Chemical containers without drip tray were removed from site. • The leaked chemical was removed and treated as chemical waste.

Contract 7

- 8.2.11 In the Reporting Period, joint site inspection for Contract 7 to evaluate the site environmental performance has been carried out by the RE, IEC, ET and the Contractor on **7, 14, 22, 28 June 2016**. No non-compliance was noted.

8.2.12 The findings / deficiencies of *Contract 7* that observed during the weekly site inspection are listed in *Table 8-6*.

Table 8-6 Site Observations for Contract 7

Date	Findings / Deficiencies	Follow-Up Status
7 June 2016	<ul style="list-style-type: none"> • No adverse environmental issue was observed. 	<ul style="list-style-type: none"> • NA
14 June 2016	<ul style="list-style-type: none"> • Smoke emission from an air compressor was observed, the Contractor should provide plant maintenance to avoid smoke emission. 	<ul style="list-style-type: none"> • Plant maintenance was provided for the air compressor, and no smoke emission was observed.
22 June 2016	<ul style="list-style-type: none"> • No adverse environmental issue was observed. 	NA
28 June 2016	<ul style="list-style-type: none"> • Free standing oil drum was observed on site, the Contractor should provide drip tray for all the chemical containers. • Water leakage through the pipe connection was found, the Contractor should maintain the condition of the pipe connection to avoid leakage. 	<ul style="list-style-type: none"> • The oil drum has been removed from site. • The condition of the pipe connection has been modified, no water leakage was observed.

8.2.13 Overall, 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.

Other Contracts

8.2.14 Since the construction work of Contract 4 has not commenced, no site inspection was performed.

9 ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE

9.1 ENVIRONMENTAL COMPLAINT, SUMMONS AND PROSECUTION

9.1.1 In the Reporting Period, no summons and prosecution under the EM&A Programme was lodged for Contracts 2, 3, 5, 6, 7 and Contract SS C505. However, a total of Three (3) documented environmental complaints were received in the reporting month regarding to dust, noise and water issues. One (1) documented complaint is under investigation and the result will be presented in the coming monthly report. Two (2) documented environmental complaint received in April 2016 and Three (3) documented environmental complaints received in May 2016 were completed investigation. The investigation reports were reviewed by IEC. The detail of the complaints and the investigation results are presented below.

Investigation Result for the Documented Complaint received by 1823 on 28 April 2016

9.1.2 A complaint was received on 28 April 2016 regarding suspected muddy water discharged from the construction site, affecting the growth of crops and condition of soil in farmland at junction of Wo Keng Shan Road and Ng Chow Road. The complainant also claimed that the gravestone was disappeared due to the construction activities in the above location.

9.1.3 As the exact location of the disappeared gravestone cannot be provided by the complainant, investigation regarding to it cannot be conducted.

9.1.4 According to Contractor's record (CCKJV), starting from the project's commencement, there is only one report of accidental leakage of muddy water from the site into the nearby farmland on 4 January 2016. Since after that, contractor and ET do not receive any record or complaint regarding to the discharge of muddy water to the nearby farms.

9.1.5 During weekly joint site inspections with RE, IEC, ET and Contractor, no leakage of muddy water to the nearby farms was observed.

9.1.6 As advised by the Contractor (CCKJV), the construction activities in the above location is mainly bored piling work. This construction activity unlikely generates any chemicals that contaminate the soil and adversely affect the growth of crops.

9.1.7 To collect runoff due to the rain, the Contractor has provided mitigation measures such as site hoardings, concrete blocks, sandbags and temporary drainage. Also, it is advised that runoff due to the rain unlikely contains any chemicals that contaminate the soil and adversely affect the growth of crops.

9.1.8 On 26 May 2016, a joint site inspection was carried out with RE, IEC, ET and Contractor, the findings during the site inspection are summarized below:

(a) No leakage of soil or muddy water was observed from the site to the concerned farm.

(b) Site hoardings, concrete blocks and sandbags barriers have been constructed along the boundary of the farm.

(c) Temporary drainage was constructed and regularly maintained. Runoff is collected and diverted to treat in wastewater treatment facilities including the sedimentation tank and AquaSed. (As advised by the Contractor, in order to further enhance the performance of collecting runoff, water pump was provided to pump runoff in the temporary drainage to the wastewater treatment facilities)

9.1.9 Based on the site observations and the work activity of the site, the complaint regarding to discharge of muddy water from the construction site, affecting the growth of crops and the condition of soil is not evidenced. Nevertheless, the Contractor (CCKJV) is reminded to follow the mitigation measures as recommended in the EM&A Manual. The ET will continue inspect the environmental performance of the construction site and ensure all activities comply with the relevant environmental contractual requirement.

Investigation Result for the Documented Complaint received by 1823 on 21 April 2016

9.1.10 A complaint was received from 1823 on 21 April 2016 and passed to CEDD and EPD. There are two concerns. Firstly, it is suspected that dump trucks were not washed in wheel washing facilities before leaving the site and the site had not carried out water spraying. Hence, these suspected

concerns lead to dust nuisance to the nearby farmlands. Secondly, it is suspected that the Contractor discharged wastewater directly into the storm drain and Ng Tung River, affecting the residents and farmers of Tai Tong Wu.

9.1.11 A joint inspection was carried out by the Contractor, CEDD and RE on 21 April 2016. The inspected area included the wastewater treatment facilities (AquaSed SH-15) of C6 (CCKJV). CEDD has not given any adverse comments.

9.1.12 Dust

As advised by Contractor C6(CCKJV), they have carried out dust suppression measures to minimize construction dust impact. For instance,

(a) Use of regular watering to reduce dust emissions from the construction sites, particularly during dry weather.

(b) Establishment and use of wheel washing facilities at the exit points of the site.

During weekly joint site inspection with RE, IEC, ET and Contractor on 7 April 2016, it was observed that wheel washing facilities was provided at vehicle exit point. Also, the exit was hard paved. The cleanliness condition of the site exit connecting to Sha Tau Kok Road was satisfactory.

9.1.13 As reported by C6, they have carried out regular watering to reduce dust impact. Besides, tarpaulin covering was provided on exposed slopes to minimize dust impact.

9.1.14 According to our air quality monitoring records from January to April 2016, no limit level exceedance was recorded on 1-hour and 24-hour Total Suspended Particulates (TSP) levels at air monitoring station AM7b, which is the nearest one to the complaint area.

9.1.15 Based on the observations from the site inspections and monitoring data, it is considered that the complaint regarding to dust is not evidenced.

9.1.16 Wastewater

As advised by Contractor of C6(CCKJV), in April 2016, all wastewater from that site area was stored in temporary pit and diverted to treat in wastewater treatment facilities including sedimentation tank and AquaSed. After that, all treated effluent was diverted to the drainage hole and then the drainage outlet for discharge.

9.1.17 During site inspection with Contractor(C6) on 23 May 2016, it was observed that the Contractor (C6) has provided AquaSed for wastewater treatment. From the photo taken, the effluent was visually clear. (Photo 8) Runoff from wheel washing is diverted to the temporary pit and then to the AquaSed. The treated effluent is used for wheel washing or diverted to the drainage outlet for discharge. Also, all storm drains were blocked. No discharge of wastewater or runoff into the storm drains and directly into Ng Tung River could be observed.

9.1.18 According to the monitoring data in April 2016, out of thirteen samplings in WM-3, four exceedances of turbidity at WM-3 was recorded and investigated. Investigation reports concluded that none of the exceedances were due to the direct discharge of wastewater into the storm drains or Ng Tung River.

9.1.19 Based on the observations from site inspection and the result of monitoring data, the complaint regarding to the direct discharge of wastewater in storm drains and Ng Tung River is not evidenced.

9.1.20 The Contractor (C6) is reminded to follow the mitigation measures as recommended in the EM&A Manual. Mitigation measures such as increasing the frequency of watering if necessary, carrying out regular desilting of sedimentation tanks shall be maintained. ET will continue inspect the environmental performance of the construction site and ensure all activities comply with the relevant environmental contractual requirement.

Investigation Result for the Documented Complaints received by 1823 on 28 May 2016

9.1.21 A complaint was received from 1823, regarding to the mud found on Sha Tau Kok Road -Wo Keng Shan was suspected from the construction site.

Contract 2 (Dragages)

9.1.22 On 2 June 2016, ET, IEC and RE carried out joint site inspection. It was observed that no muddy trails or loosen mud was found on Sha Tau Kok Road- Wo Keng Shan.

- 9.1.23 During weekly joint site inspection with RE, IEC, ET and Contractor (Dragages) on 3 June 2016, the observations are summarized below:
- (a) wheel washing facilities were provided at the site exit of North Portal within the site area. Vehicles were thoroughly washed before leaving construction site.
 - (b) cleanliness condition of the exit of North Portal within the site area was satisfactory. Also, the site exit is clear of mud.
 - (c) Water browser for haul road cleaning within the construction site was provided.
 - (d) The footing of the administration building site was completed and hard paved.
 - (e) Wheel washing facilities was provided for administration building site.
- 9.1.24 As advised by the Contractor, public road cleaning was provided on Sha Tau Kok Road by Contractor 2 (Dragages).
- 9.1.25 Since there were many other heavy vehicles using the Sha Tau Kok Road - Wo Keng Shan, it is considered that the mud on Sha Tau Kok Road - Wo Keng Shan is unlikely due to the Contract 2. Nevertheless, ET will continue to inspect the cleanliness of site exit and adjacent roads.

Contract 6 (CCKJV)

- 9.1.26 During weekly joint site inspection with RE, IEC, ET and Contractor (CCKJV) on 2 June 2016, the observations are summarized below.
- 9.1.27 no muddy trails or loosen mud was found on Sha Tau Kok - Wo Keng Shan Road
- 9.1.28 wheel washing facilities were provided at the site exit.
- 9.1.29 cleanliness condition of the exit of North Portal and adjoined Sha Tau Kok Road were satisfactory. Also, the site exit is hard paved in concrete.
- 9.1.30 As advised by the Contractor, public road cleaning was provided on Sha Tau Kok Road by the Contractor.
- 9.1.31 During joint site inspection with RE, IEC, ET and Contractor on 26 May 2016, it was observed that wheel washing facilities was provided at site exit located at Sha Tau Kok Interchange. Also, the site exit is clear of mud.
- 9.1.32 Since there were many other heavy vehicles using the Sha Tau Kok -Wo Keng Shan Road, it is considered that the mud on Sha Tau Kok -Wo Keng Shan Road is unlikely due to the Contract 6. Nevertheless, ET will continue to inspect the cleanliness of site exit and adjacent roads.

Investigation Result for the Documented Complaints received by CEDD on 26 May 2016

- 9.1.33 A complaint was received from CEDD on 26 May 2016, regarding noise nuisance from the construction site of Contract 2 (North Portal). Loi Tung Villagers complained that noise was made at midnight from the construction site. Also, early in the morning at 5, dump trucks were suspected to operate in the construction site, making noise thus affecting the daily lives of villagers
- 9.1.34 In view of (1) the complaint location which is North Portal of Construction Site of Contract 2 (2) Loi Tung Villagers complained that noise was made at midnight from the construction site. The construction noise permit applicable for the use of Powered Mechanical Equipment from 23:00 – 7:00 for this complaint is GW-RN0359-16.
- 9.1.35 Regarding the complaint of noise from dump trucks, the Contractor advised that the noise source may come from the dump trucks queuing outside the site on Sha Tau Kok Road early in the morning at around 5 to 6, waiting to enter the construction site at around 7 am on working days (not included on Sunday or public holidays). To address public concern, the Contractor has requested the dump trucks' drivers to arrive after 6:30am on working days (not included on Sunday or public holidays).

Administrative procedure of managing the use of Powered Mechanical Equipment (PME)

- 9.1.36 As advised by the Contractor (DHK), the DHK's environmental team (Appointed Environmental Officer - Simon Wong, Appointed Environmental Supervisor - Tony Tsoi) review the content of a construction work reporting form before the start of the work on every working day. The respective working area, powered mechanical equipment (PME) grouping, CNP number and restricted hour sections are clearly written. The night shift foreman have to sign to ensure the operations of PME according to the listed groupings.

Observations on 27 May 2016

- 9.1.37 Based on the photos provided by RE on 30 May 2016 and the report from the night shift team from

AECOM, the observations on 27 May 2016 are summarized below:

- (a) The operators of powered mechanical equipment (tracked excavator and loader) were stopped immediately from starting the machine outside tunnel by Resident Supervisory Staff. No machine was operating outside the tunnel. Hence, there was no non-compliance of construction noise permit conditions
- (b) Two tunnel doors were kept partly opened through the night while the work activities inside the tunnel were uncertain based on the photos. As advised by DHK, TBM was broken down on 27 May 2016. Under the circumstances, TBM's operation was ceased. Hence, there was no non-compliance of construction noise permit conditions.

Site investigation by ET

9.1.38 During site inspection by ET at around 1 :00 am on 31 May 2016, the findings are summarized below:

- (a) No powered mechanical equipment was observed to be operated at any works areas including working areas C, E, F, H and I of the CNP outside the tunnel.
- (b) Two tunnel doors were completely closed.
- (c) No dump trucks queuing on Sha Tau Kok Road could be observed.
- (d) No particular noise with low or high frequency could be noted.

Based on the site findings, no non-compliance of CNP conditions could be found.

9.1.39 As advised by the Contractor, specific refresh trainings on this particular CNP are provided by competent person (Appointed Environmental Officer - Simon Wong or Appointed Environmental Supervisor - Tony Tsoi) to the frontline staff. Besides, simple pictorial illustrations are displayed in the site for easy understanding of the grouping of PME to be used under restricted hours. Also, random spot checks at different time of night will be carried out to ensure compliance with CNP. The Contractor is advised to strengthen the administrative procedures in managing the use of PME such as preparing copies of the reporting form to frontline staff to remind them the operations of proper PME on restricted hour. The Contractor (DHK) is reminded to fully follow the conditions under the construction noise permit

Investigation Result for the Documented Complaints received by 1823 on 31 May 2016

9.1.40 A complaint was received from 1823, regarding water spraying over dump trucks was suspected to be carried out outside site area. The above action resulted in muddy water on Sha Tau Kok Road - Wo Hang and Sha Tau Kok Road - Ma Mei Ha, affecting other road users.

9.1.41 As advised by Contractor (Dragages), vehicles were thoroughly washed in the wheel washing facilities within the site area.

9.1.42 On 2 June 2016, ET, IEC and RE carried out joint site inspection. It was observed that no muddy trails or loosen mud was found on Sha Tau Kok Road - Ma Mei Ha. The cleanliness condition of the site exit connecting Sha Tau Kok Road was satisfactory. The site exit is hard paved. Also, no water spraying activities at the site exit connecting Sha Tau Kok Road was observed.

9.1.43 During weekly joint site inspection with RE, IEC, ET and Contractor (Dragages) on 3 June 2016, the observations are summarized below.

- (a) wheel washing facilities were provided at the site exit of North Portal which is inside the site area. Vehicles were thoroughly washed before leaving construction site.
- (b) cleanliness condition of the site exit of North Portal within the site area was satisfactory. Also, the site exit is hard paved.

9.1.44 According to the site inspections on 2 and 3 June 2016, no water spraying activities outside the work area by Contract 2 (Dragages) could be observed. While the complaint regarding water spraying to dump trucks outside the work area is not evidenced based on the site observations, the Contractor is reminded to fully implement the mitigation measures as specified in the implementation schedule of the EM&A manual.

Investigation Result for the Documented Complaints received by 1823 on 10 June 2016

9.1.45 A complaint was received from 1823, regarding to the mud found on Lin Ma Hang Road was suspected from the construction site.

9.1.46 Considering the site areas located along Lin Ma Hang Road, four contracts which under the Project may involve in this complaint, are included Contract 5 (SRJV), Contract 6 (CCKJV), Contract 7 (KRSJV) and SS C505 (Leighton). These four Contracts were all under our investigation and presented in this investigation report.

9.1.47 Site investigation had been carried out by ET, RE and the Contractor of C6 (CCKJV) on 14 June 2016, the observations are summarized below.

In General:

9.1.48 Having reviewed the complaint locations and the photo records provided by complainant, the condition of Lin Ma Hang Road was considered as satisfactory and no muddy trails or loosen mud was observed during the investigation on 14th June 2016.

9.1.49 Contract 5 (SRJV)

- (a) No muddy trails or loosen mud was found at the site exit of C5 and on Lin Ma Hang Road. Cleanliness condition of the Lin Ma Hang Road was satisfactory.
- (b) The most active construction works under C5 are located near Tai Kwu Ling Fire Station and Tai Kwu Ling Sub-division Police Station in Lin Ma Hang Road. No surface run-off or muddy trails were observed during the investigation and weekly joint site inspection on 14th June 2016.
- (c) Footpath paving, U-channel and tree & shrub planting had been completed, no surface runoff through the site area entering the public road was observed.
- (d) Less use of the site exit due the inactive construction activities at site exit in Lin Ma Hang Road. However, wheel washing facilities were provided at the site exit and the exit was hard paved in metal plate and stone.
- (e) It was concluded that the major and active construction works were located far from the complaint's location and the condition of site exit in Lin Ma Hang Road was considered as satisfactory.

9.1.50 Contract 6 (CCKJV)

- (c) Generally, no muddy trails or loosen mud was found on Lin Ma Hang Road and the site exits of C6.
- (d) Regard to C6, there were three site exits located in Lin Ma Hang Road, and only one site exit was located within the complaint's area.
- (e) Having investigated the complaint's area along the Lin Ma Hang Road, the cleanliness condition of the road was generally satisfactory. The site exit (SA22) was provided with wheel washing facility and the exit road was hard paved in concrete.
- (f) Apart from complaint's location, the cleanliness condition at the site exit of piling portion was considered as under average and needed further improvement. It was found that the water accumulated in the Lin Ma Hang Road was due to the uneven ground surface at the site exit of piling portion. The cause of the muddy water accumulated in the uneven ground surface was due to road watering, street washing and rain. However, the condition of other section of Lin Ma Hang Road was satisfactory.
- (g) Furthermore, the site exit of Bridge Y was provided with high pressure water jet and labour for wheel washing. The cleanliness condition at the site exit of Bridge Y was clean and no muddy trails was found.
- (h) During the investigation, it was observed that water truck for road pressure washing carried by C6 for the purpose of dust suspension and road cleaning in regular basis.
- (i) Preventive measures for the surface run-off were provided for the construction activities along Lin Ma Hang Road. It was found that sheet pile, sandbag bund and pit were constructed to retain and avoid surface or storm water run-off.
- (j) It was concluded that the cleanliness condition of Lin Ma Hang Road, wheel washing facility at site exits and the preventive measures of run-off were generally satisfactory.

- 9.1.51 Contract 7 (KRSJV)
- (a) During the investigation, the cleanliness condition of the Lin Ma Hang Road at the site exit was satisfactory. No muddy trails or loosen mud was found on Lin Ma Hang Road and the site exit.
 - (b) High pressure water jet and labour were provided at the site exit for vehicle washing.
 - (c) It was concluded that construction works are located far from the complaint's location and the condition of site exit of C7 and the adjacent public road were considered as satisfactory.
- 9.1.52 SS C505 (Leighton)
- (a) During the investigation, the cleanliness condition of the Lin Ma Hang Road at the Portion of BCP area was satisfactory. No muddy trails or loosen mud was found on Lin Ma Hang Road and the site exit of SS C505.
 - (b) Automatic wheel washing facilities were provided at the site exit and labour was also provided at the site exit to maintain cleanliness.
 - (c) It was concluded that construction works are located far from the complaint's location and the condition of site exit of SS C505 and the adjacent public road were considered as satisfactory.
- 9.1.53 As advised by the Contractors, public road cleaning was provided on Lin Ma Hang Road by the Contractor of Contract 5 and Contract 6.
- 9.1.54 As informed by C6, muddy water leakage via the bored pile area entering the Lin Ma Hang Road was accidentally occurred at 11 am on 10th June 2016. Immediate corrective actions had promptly taken to stop the leakage and the muddy water on the public road was also cleaned up by 12:15 noon.
- 9.1.55 As reported by C5, a private trailer driving through a muddy ground to Lin Ma Hang Road was recorded in the afternoon on 10th June 2016. Afterward muddy trails were found on road where is within the complaint's location in Lin Ma Hang Road.
- 9.1.56 According to the Hong Kong Observatory record, about 20mm ~ 30mm rainfall was recorded in North District at 12 noon to 2 p.m. on 10 June 2016. As one of the considerations, the rainwater could cumulate in the uneven ground surface on Lin Ma Hang Road and cause puddle.
- 9.1.57 In conclusion, firstly immediate corrective actions for the incident of leakage to stop the leakage and to clean up muddy water on the road were taken by C6 within an hour. Furthermore, the location of leakage was not within the complaint's area. Secondly, rainwater accumulated in the uneven ground surface in Lin Ma Hang Road could possibly happened during and after the rainfall. Thirdly, private trailer causing muddy trails within the complaint's area was recorded and the puddle could lead to the occurrence of muddy water. Finally, based on our observations from the investigation on 14th June 2016, it is considered that the mud on Lin Ma Hang Road is unlikely due to the Contract 5 (SRJV), Contract 6 (CCKJV), Contract 7 (KRSJV) and SS C505 (Leighton). Nevertheless, ET will continue to inspect the cleanliness of site exits and adjacent roads.
- 9.1.58 In view of the incident of leakage by C6, the Contractor of C6 is recommended to improve the preventive measures of surface run-off and improve the condition of uneven ground surface in Lin Ma Hang Road, such as 1.) Improve cut-off drain at site exits for the water diversion and prevention of surface run-off. 2.) Enhance the preventive measures such as sandbag bund, earth bund and U-channel at construction activities area. 3.) Improve the condition of uneven ground surface to minimize puddle in Lin Ma Hand Road.

Investigation Result for the Documented Complaints received by 1823 on 20 June 2016

- 9.1.59 A complaint received from 1823 on 20 June 2016 regarding noise nuisance from Lain Tang Construction work. After identifying the date, time as well as the exact location with the complainant, the complainant advised that the concerned construction work was not carried out by CEDD's Contractors. The complainant complained that piling works carried out by (SSC 505) Leighton subcontractor Kwan Shing at BCP site recently generated high noise level. Also, during the piling works, the complainant queried why no noise abatement measures such as fabric cover being available. The complaint was transferred to ArchSD on 8 July 2016. This complaint is still

under investigation and the result will be presented in the next monthly report.

Investigation Result for the Documented Complaints received by ICC on 20 June 2016

- 9.1.60 A complaint was received from ICC, regarding uneven ground and muddy water found on Lin Ma Hang Road.
- 9.1.61 During weekly joint site inspection by RE, IEC, ET and Contractor (CCKJV) on 30 June 2016, uneven ground was found near the site exit of piling portion of Contract 6 on Lin Ma Hang Road. It was observed that muddy water was cumulated in the puddles created from the uneven ground after road cleaning by water truck and rainfall.
- 9.1.62 Since Lin Ma Hang Road is a public road and frequent used by heavy vehicles, it is believed that the uneven ground was due to over usage and not created by construction of Contract 6.
- 9.1.63 Regarding to the muddy water issue, there were three site exits located on Lin Ma Hang Road and the condition of the site exits were inspected during regular site inspection. Our observations are summarized in below.
- 9.1.64 (a) The site exit (SA22) was provided with wheel washing facility and the exit road was hard paved in concrete. No muddy water getting into Lin Ma Hang Road was observed.
- 9.1.65 (b) The site exit of piling portion was provided with high pressure water jet and labour for wheel washing. Also, cut off drain was provided at site exit for collecting water from vehicles' washing. No muddy water getting into Lin Ma Hang Road was observed.
- 9.1.66 (c) The site exit of Bridge Y was provided with high pressure water jet and labour for wheel washing. No muddy water getting into Lin Ma Hang Road was observed.
- 9.1.67 According to the findings during site inspection, the muddy water found on Lin Ma Hang Road was unlikely caused by the works of CCKJV. To address public concern, C6 has repaired the uneven ground by paving asphalt on 8 July 2016 to minimize the impact to the public. The ET will closely inspect the cleanliness of the Lin Ma Hang Road in forthcoming site inspections.

Table 9-1 Statistical Summary of Environmental Complaints

Reporting Period	Contract No	Environmental Complaint Statistics		
		Frequency	Cumulative	Complaint Nature
19 May 2014 – 31 May 2016	Contract 2	0	17	<ul style="list-style-type: none"> • (7) Water Quality • (7) Dust • (3) Noise
06 Nov 2013 – 31 May 2016	Contract 3	0	4	<ul style="list-style-type: none"> • (1) Dust • (2) Water quality • (1) Noise
16 Aug 2013 – 31 May 2016	Contract 5	0	2	<ul style="list-style-type: none"> • (2) Dust
16 Aug 2013 – 31 May 2016	Contract 6	0	14	<ul style="list-style-type: none"> • (11) Water Quality • (3) Dust
15 Feb 2016 – 31 May 2016	Contract 7	0	0	N/A
16 Aug 2013 – 31 May 2016	SS C505	0	0	N/A
1 – 30 June 2016	Contract 2	0	17	<ul style="list-style-type: none"> • (7)Water Quality • (7) Dust • (3) Noise
	Contract 3	0	4	<ul style="list-style-type: none"> • (1) Dust • (2) Water quality • (1) Noise
	Contract 5	2	4	<ul style="list-style-type: none"> • (3) Dust • (1) Noise
	Contract 6	3	17	<ul style="list-style-type: none"> • (12) Water Quality • (4) Dust • (1) Noise

Reporting Period	Contract No	Environmental Complaint Statistics		
		Frequency	Cumulative	Complaint Nature
	Contract 7	2	2	<ul style="list-style-type: none"> • (1) Dust • (1) Noise
	SS C505	2	2	<ul style="list-style-type: none"> • (1) Dust • (1) Noise

Table 9-2 Statistical Summary of Environmental Summons

Reporting Period	Contract No	Environmental Summons Statistics		
		Frequency	Cumulative	Complaint Nature
19 May 2014 – 31 May 2016	Contract 2	0	0	NA
06 Nov 2013 – 31 May 2016	Contract 3	0	0	NA
16 Aug 2013 – 31 May 2016	Contract 5	0	0	NA
16 Aug 2013 – 31 May 2016	Contract 6	0	0	NA
15 Feb 2016 – 31 May 2016	Contract 7	0	0	NA
16 Aug 2013 – 31 May 2016	SS C505	0	0	NA
1 – 30 June 2016	Contract 2	0	0	NA
	Contract 3	0	0	NA
	Contract 5	0	0	NA
	Contract 6	0	0	NA
	Contract 7	0	0	NA
	SS C505	0	0	NA

Table 9-3 Statistical Summary of Environmental Prosecution

Reporting Period	Contract No	Environmental Prosecution Statistics		
		Frequency	Cumulative	Complaint Nature
19 May 2014 – 31 May 2016	Contract 2	0	0	NA
06 Nov 2013 – 31 May 2016	Contract 3	0	0	NA
16 Aug 2013 – 31 May 2016	Contract 5	0	0	NA
16 Aug 2013 – 31 May 2016	Contract 6	0	0	NA
15 Feb 2016 – 31 May 2016	Contract 7	0	0	NA
16 Aug 2013 – 31 May 2016	SS C505	0	0	NA
1 – 30 June 2016	Contract 2	0	0	NA
	Contract 3	0	0	NA
	Contract 5	0	0	NA
	Contract 6	0	0	NA
	Contract 7	0	0	NA
	SS C505	0	0	NA

The Other Contracts

- 9.1.68 Since the construction works at the Contract 4 has not yet commenced, no environmental complaint, summons and prosecution under the EM&A Programme are registered in the Reporting Period.

10 IMPLEMENTATION STATUS OF MITIGATION MEASURES

10.1 GENERAL REQUIREMENTS

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

10.1.2 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, 5, 6, 7 and Contract SS C505 in this Reporting Period are summarized in *Table 10-1*.

Table 10-1 Environmental Mitigation Measures

Issues	Environmental Mitigation Measures
Water Quality	<ul style="list-style-type: none"> Wastewater to be treated by the wastewater treatment facilities i.e. sedimentation tank or similar facility before discharge.
Air Quality	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> The site was generally kept tidy and clean.

10.2 TENTATIVE CONSTRUCTION ACTIVITIES IN THE COMING MONTH

10.2.1 Construction activities as undertaken in the coming month for the Project lists below:

Contract 2

- | | |
|-----------------|--|
| Mid-Vent Portal | <ul style="list-style-type: none"> Tube excavation (NB+SB) Adit waterproofing, lining and post-excavation grouting Ventilation building superstructure |
| North Portal | <ul style="list-style-type: none"> Southbound TBM excavation Northbound bottom bench excavation and tunnel enlargement Ventilation building superstructure Retaining walls and slope stabilization |
| South Portal | <ul style="list-style-type: none"> Southbound and Northbound D&B excavation South ventilation building superstructure |
| Admin Building | <ul style="list-style-type: none"> Building superstructure |

Contract 3

- Cable detection and trial trenches
- Filling works at Tong Hang East
- Storm Drains Laying
- Noise barrier construction

- Pier / Pier Table construction
- Pile cap works
- Portal beam construction
- Pre-drilling works and piling works for viaduct
- Pre-drilling works for noise barrier and piling works for noise barrier
- Retaining Wall construction
- Road works
- Sewer works
- Slope works
- Socket H-pile installation
- Tree felling works
- Utilities duct laying
- Viaduct segment erection
- Water works

Contract 5

- Testing and commissioning of rising main (VO061) at LMH road
- Bituminous laying at existing LMH road.
- Brick laying at footpath of LMH road
- Road works (kerb and bituminous laying) at existing LMH road
- Irrigation system at existing LMH Road
- Installation of underground utilities at existing LMH road
- Planting works at proposed & existing LMH road

Contract 6

- Slope Works
- Bored Piling
- Abutment and Pier Construction
- Tunnel Works
- Segment Installation
- Road Works
- Sewage Treatment Plant Construction

Contract 7

- Piling Works at Bridge A,C,E
- Pile caps construction at Bridge B,C,D
- Column construction at Bridge C

Contract SS C505

- General Site Setup
- CLP temporally sub-station works
- Building number 4, 5, 6, 9, 11 and 36 construction
- Excavation waterproofing works for Building number 4, 6 and 11
- H-pile works and load test
- Disassembly of crawler crane
- Grouting and full core to completed bored piles
- Underground drainage works
- Erection of Welfare Shelter
- Prototype “A” Construction works
- Formwork and falsework for PTB’s slab construction
- Construction PTB M/F flat slab
- Steel beam works for maintenance platform for PTB
- Pile cap construction for PTB, including excavation and backfilling works
- Bridge deck construction for Bridges 1, 2 & 3

- Mock up for south entrance double curve cladding
- Tower Crane Operation and erection
- Pile Cap construction for building number 4, 6 and 7
- Bridge construction works including construction of bridge column, retaining wall, pile cap and pier

10.3 KEY ISSUES FOR THE COMING MONTH

10.3.1 Key issues to be considered in the coming month for Contracts 2, 3, 5, 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

10.3.2 Since the construction work of Contract 4 has not commenced, no environmental issue is presented.

11 CONCLUSIONS AND RECOMMENDATIONS

11.1 CONCLUSIONS

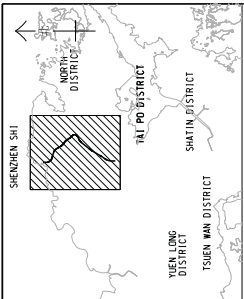
- 11.1.1 This is the 35th monthly EM&A report presenting the monitoring results and inspection findings for the Reporting Period from 1 to 30 June 2016.
- 11.1.2 For air quality monitoring, no 1-hour and 24-hour TSP monitoring results triggered the Action or Limit Levels were recorded. No NOEs or the associated corrective actions were therefore issued.
- 11.1.3 One noise complaint (which is an Action Level exceedance) was received and no construction noise measurement results that exceeded the Limit Level were recorded in the Reporting Period. The associated investigation report was submitted to relevant parties. No NOEs or the associated corrective actions were issued.
- 11.1.4 For water quality monitoring, a total of thirty-two (32) Action/ Limit Levels (AL/LL) exceedances, namely fifteen (15) LL exceedances and one (1) AL exceedance of turbidity and sixteen (16) LL exceedances of Suspended Solids. The investigations for the cause of exceedances have been conducted by the ET and the associated investigation reports were submitted to relevant parties.
- 11.1.5 No environmental summons or successful prosecutions were recorded in the Reporting Period.
- 11.1.6 In this Reporting Period, a total three (3) documented environmental complaint were received in the reporting month regarding to water, dust and noise issue. Upon receipt of the complaints, RE, IEC and ET with the relevant Contractors has immediately undertaken investigation. In the Reporting Period, one complaint is under investigation, the investigation result will be presented in the coming monthly report.
- 11.1.7 During the Reporting Period, weekly joint site inspection by the RE, IEC, ET with the relevant Main-contractor were carried out for Contracts 2, 3, 5, 6, 7 and SS C505 in accordance with the EM&A Manual stipulation. No non-compliance observed during the site inspection.

11.2 RECOMMENDATIONS

- 11.2.1 As wet season has come, 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 or public area would be the key issue. The Contractors should paid special attention on water quality mitigation measures and fully implement according ISEMM of the EM&A Manual, in particular for working areas near Ma Wat Channel and Ping Yuen River. Moreover, 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.
- 11.2.2 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.
- 11.2.3 Since most of construction sites under the Project are located adjacent to villages, the Contractors should fully implement air quality mitigation measures to reduce construction dust emission.
- 11.2.4 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

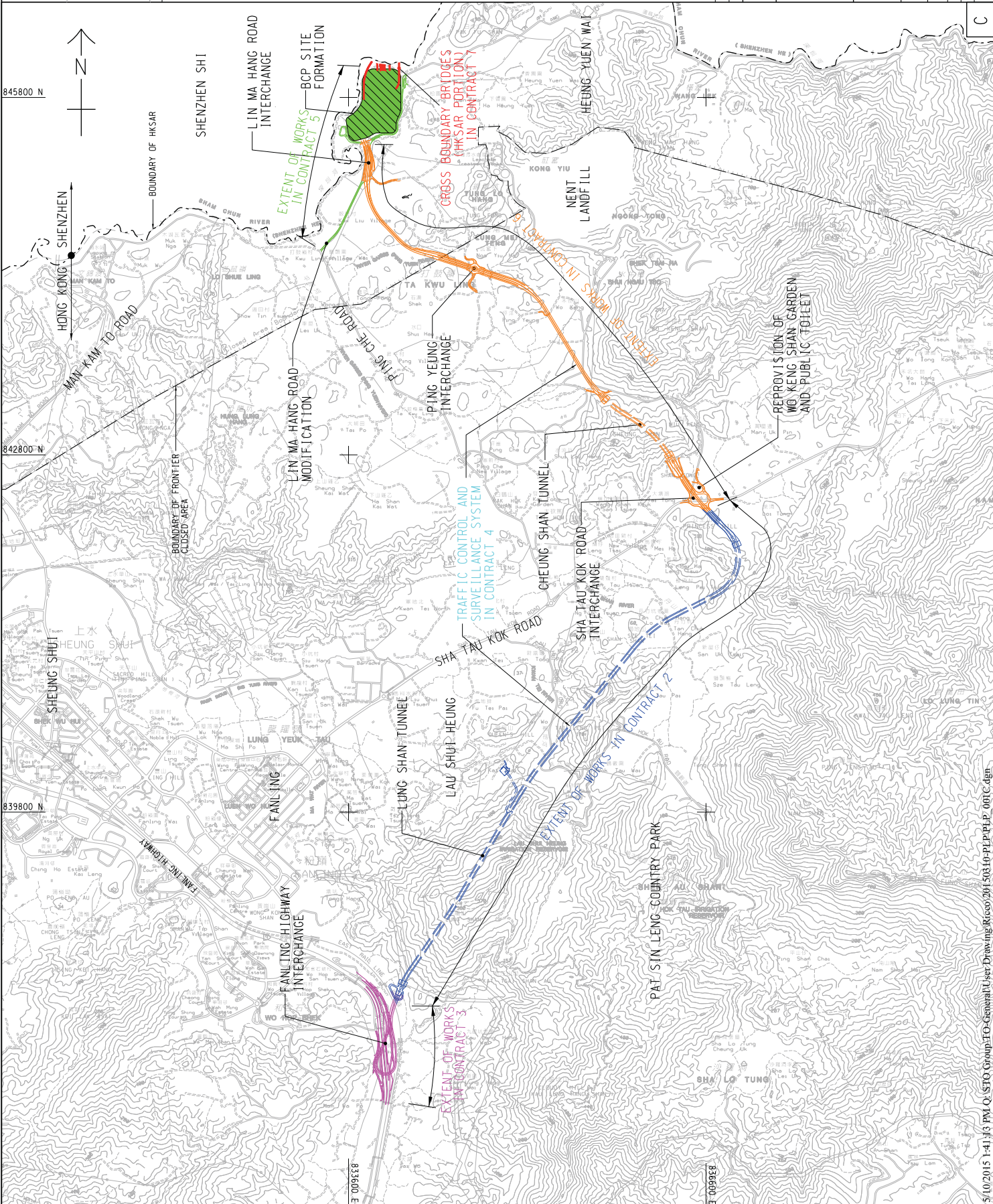


LOCATION PLAN
SCALE 1 : 3000

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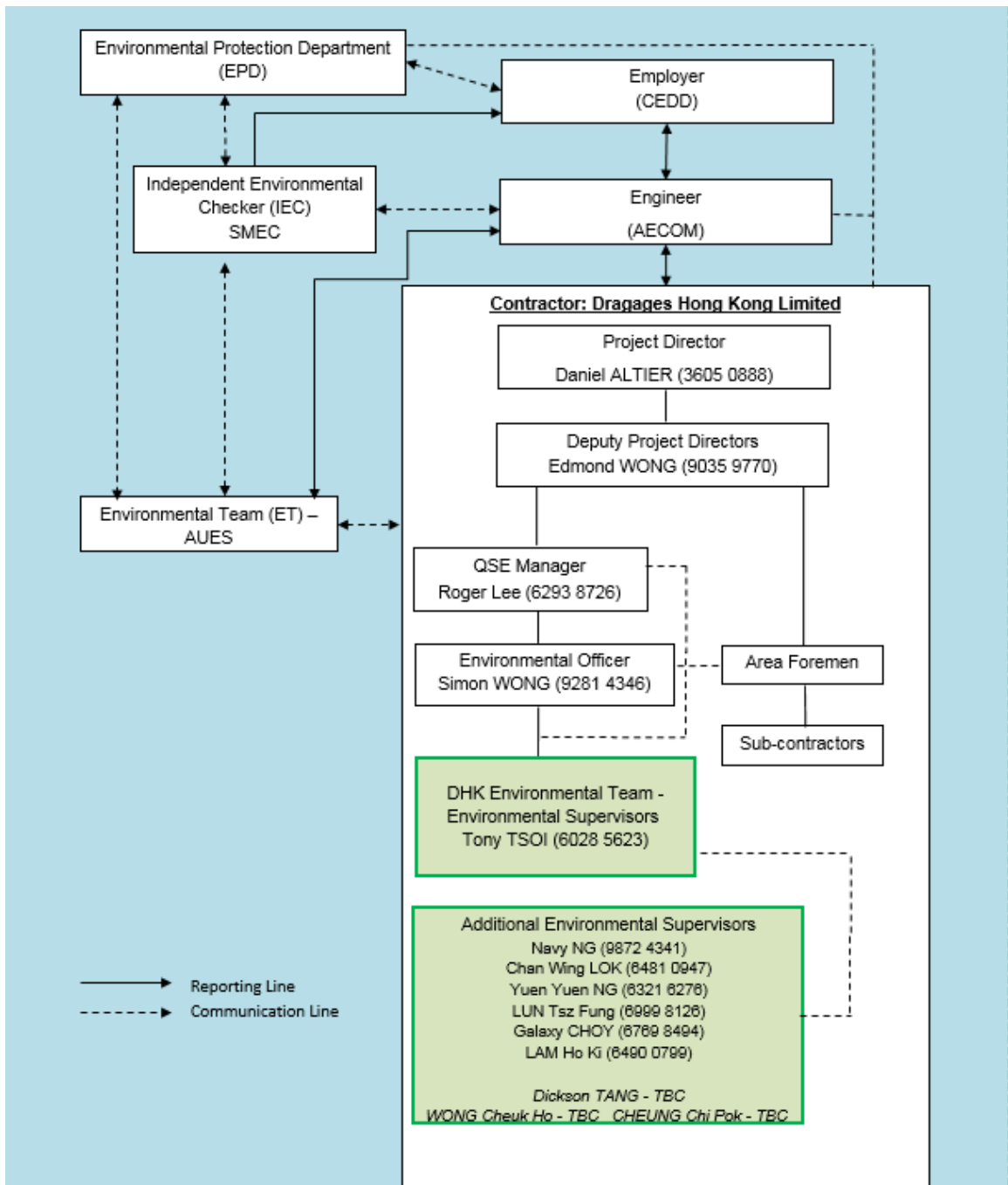
--- UNDERGROUND WORKS

DESIGN NO.	60212563/PLP/001
DATE	2/1/2015
SCALE	1:3000
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DESIGNER	CECC Civil Engineering and Development Department
CLIENT	LIANJIAN/HEUNG YUEN WAI BOUNDARY CROSS BRIDGES (HKSAR PORTION) (SITE FORMATION AND INFRASTRUCTURES) DESIGN AND CONSTRUCTION
PROJECT LAYOUT PLAN	AECOM
DRGNO.	60212563/PLP/001
DATE	2/1/2015
SCALE	1:3000
PROJECT	PROJECT LAYOUT PLAN
DESIGNER	CECC Civil Engineering and Development Department
CLIENT	LIANJIAN/HEUNG YUEN WAI BOUNDARY CROSS BRIDGES (HKSAR PORTION) (SITE FORMATION AND INFRASTRUCTURES) DESIGN AND CONSTRUCTION
PROJECT LAYOUT PLAN	AECOM



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	Gregory Lo	2171 3300	2171 3498
SMEC	Independent Environmental Checker	Antony Wong	3995 8120	3995 8101
DHK	Project Director	Daniel Altier	2171 3004	2171 3299
DHK	Deputy Project Manager	Edmond Wong	2171 3004	2171 3299
DHK	QSE Manager	Roger Lee	6293 8726	2171 3299
DHK	Environmental Officer	Simon Wong	2171 3004	2171 3299
DHK	Environmental Supervisor	Tony Tsoi	6028 5623	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

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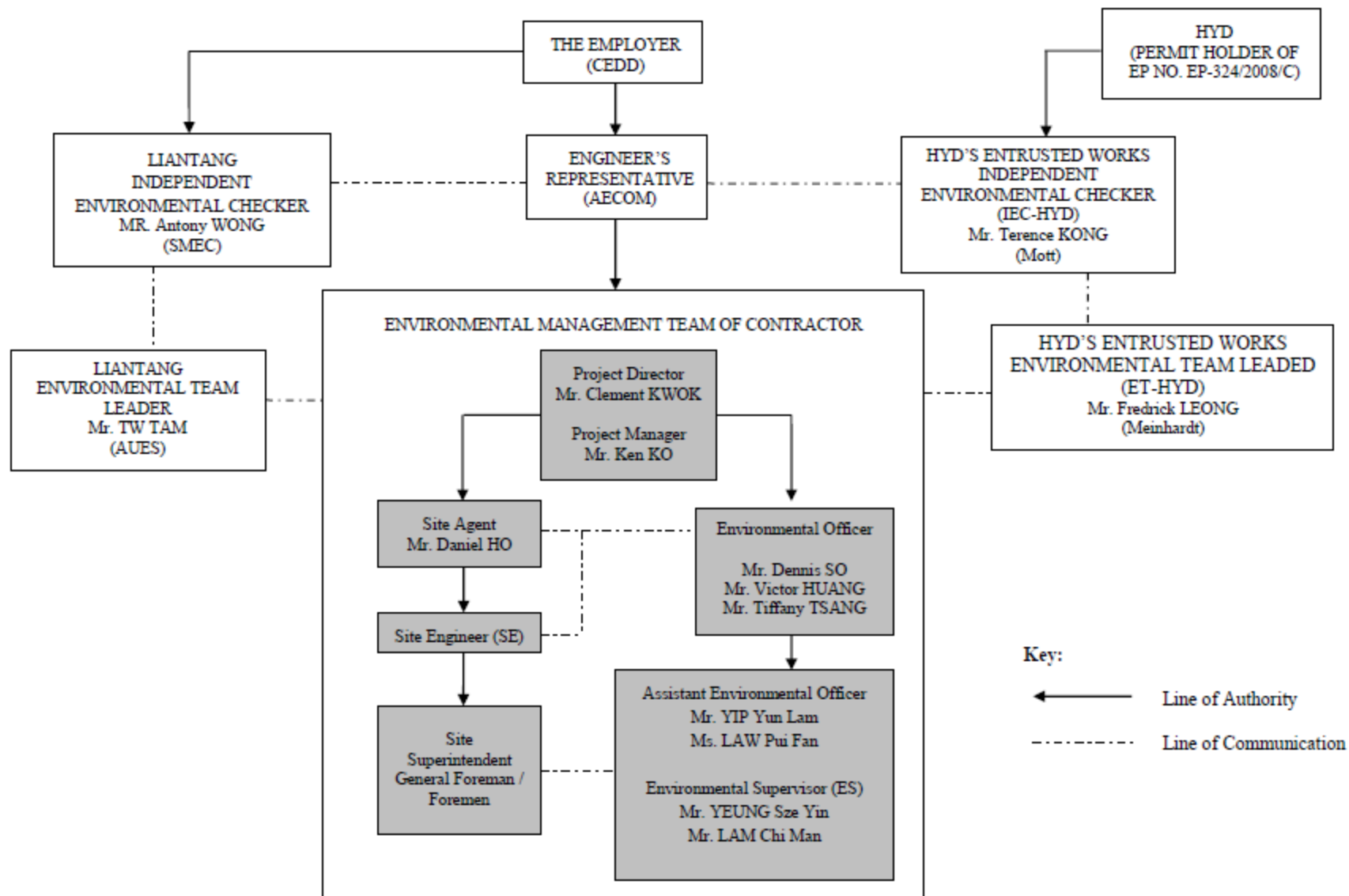
CEDD (Employer) – Civil Engineering and Development Department

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 3300	2171 3498
SMEC	Independent Environmental Checker	Antony Wong	3995 8120	3995 8101
Chun Wo	Project Director	Clement Kwok	3758 8735	2638 7077
Chun Wo	Project Manager	Ken Ko	2638 6136	2638 7077
Chun Wo	Site Agent	Daniel Ho	2638 6144	2638 7077
Chun Wo	Environmental Officer	Victor Huang Tiffany Tsang Dennis So	2638 6115	2638 7077
Chun Wo	Assistant Environmental Officer	Yip Yun Lam Law Pui Fan	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

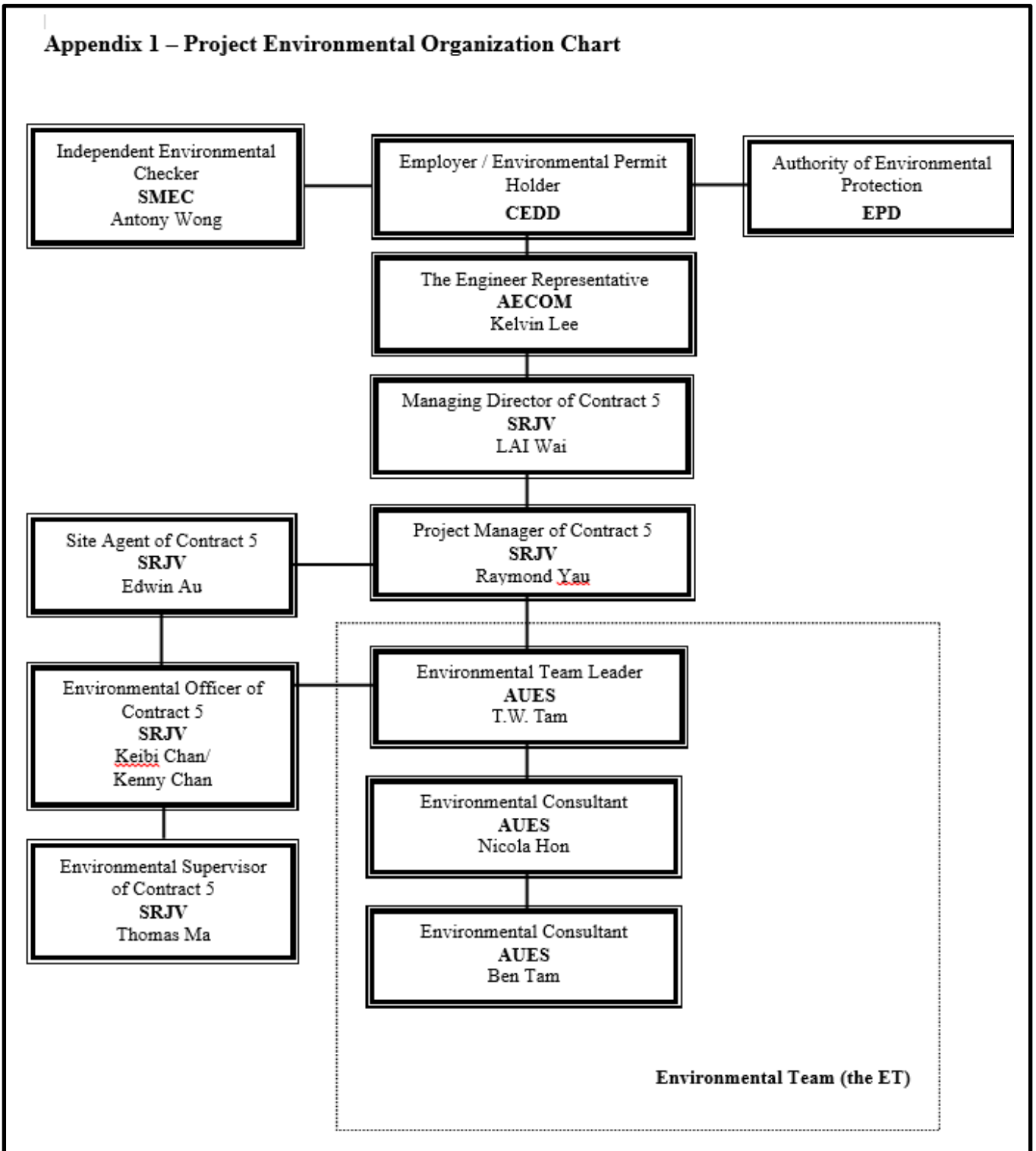
AECOM (Engineer) – AECOM Asia Co. Ltd.

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

SMEC (IEC) – SMEC Asia Limited

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

Appendix 1 – Project Environmental Organization Chart

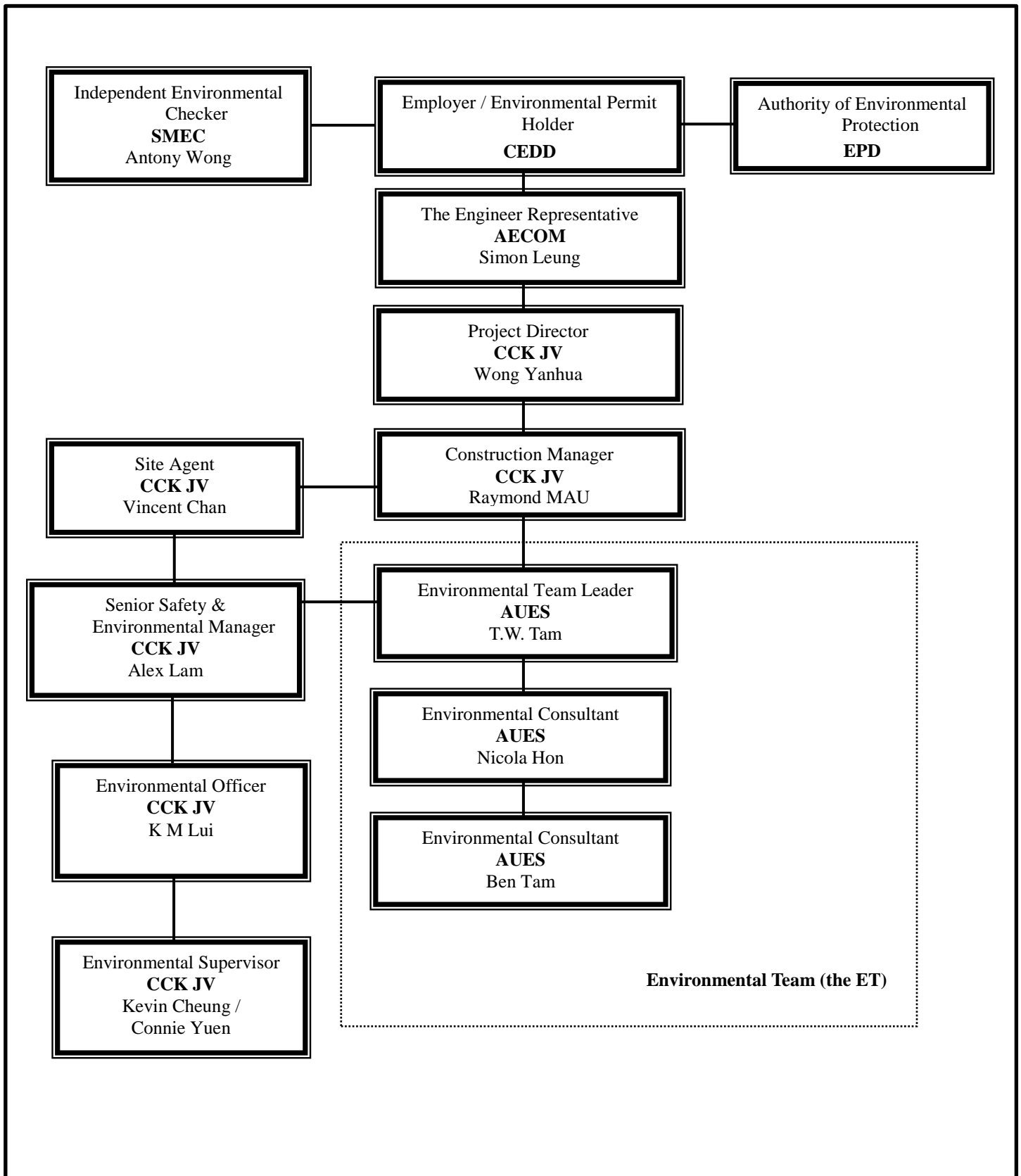


Environmental Management Organization – CV/2013/03

Contact Details of Key Personnel for Contract 5 - CV/2013/03

Organization	Project Role	Name of Key Staff	Tel No.	Fax No.
AECOM	Engineer's Representative	Kelvin Lee	2674 2273	2674 7732
SMEC	Independent Environmental Checker	Antony Wong	3995 8120	3995 8101
SRJV	Project Director	LAI Wai	--	2403 1162
SRJV	Contract Manager	Raymond Yu	9041 1620	2403 1162
SRJV	Project Manager	Aaron Mak	9464 7095	2403 1162
SRJV	Site Agent	Edwin Au	9208 7329	2403 1162
SRJV	Environmental Officer	Chan Ng jhon-keibi / Kenny Chan	6090 0183	2403 1162
SRJV	Environmental Supervisor	Thomas Ma	-	2403 1162
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.**SRJV (Main Contractor) – Sang Hing Civil – Richwell Machinery JV**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/2013/03

Organization	Project Role	Name of Key Staff	Tel No.	Fax No.
AECOM	Engineer's Representative	Simon Leung	2674 2273	2674 7732
SMEC	Independent Environmental Checker	Antony Wong	3995 8120	3995 8101
CCK JV	Project Director	Wang Yanhua	6190 4212	--
CCK JV	Construction Manager	Raymond Mau Sai-Wai	9011 5340	--
CCK JV	Site Agent	Vincent Chan	9655 9404	--
CCK JV	Senior Safety & Environmental Manager	Alex Lam	5547 0181	--
CCK JV	Environmental Officer	K M Lui	51138223	--
CCK JV	Environmental Supervisor	Kevin Cheung/ Connie Yeun	6316 6931 6117 1344	--
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:

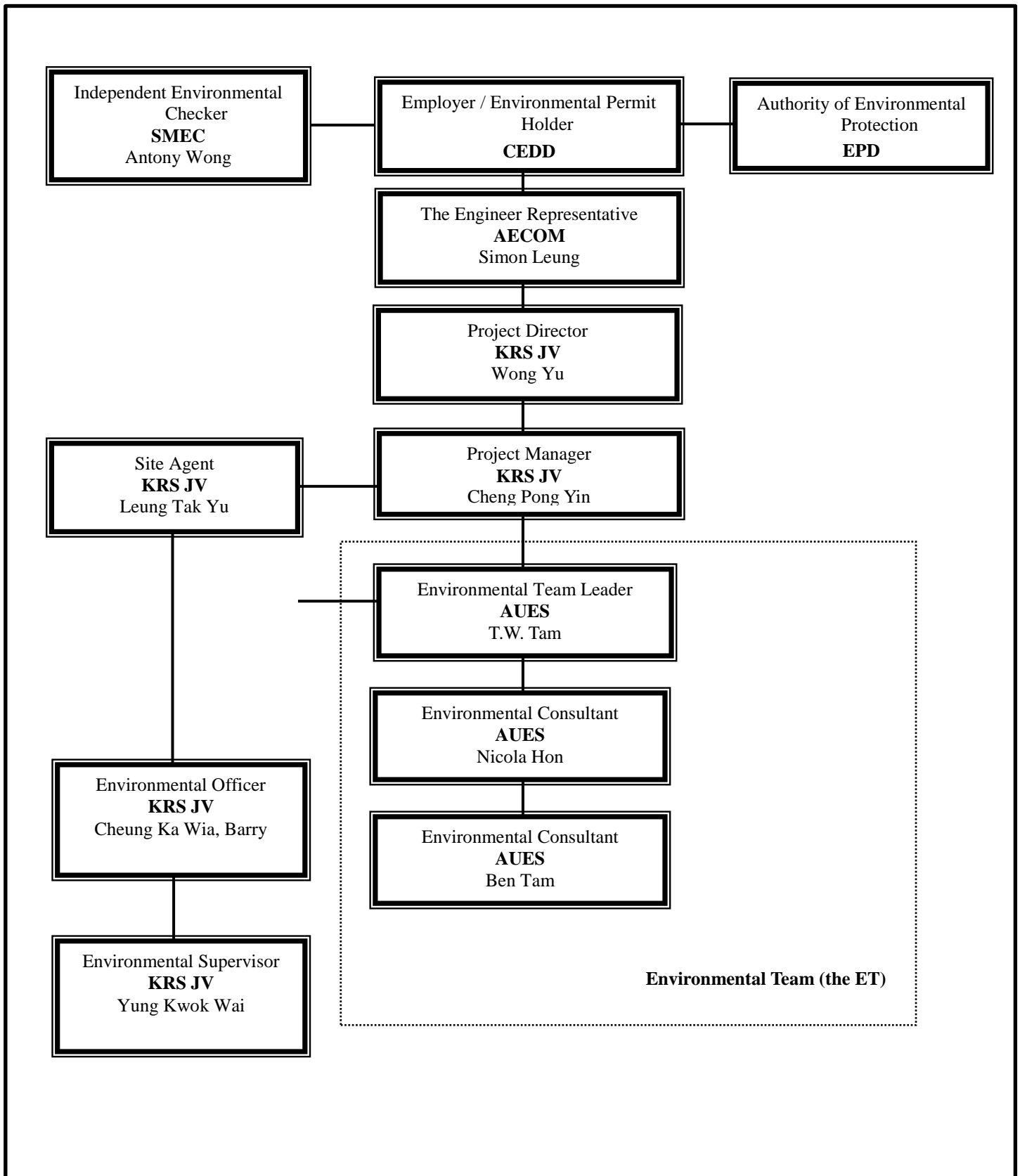
CEDD (Employer) – Civil Engineering and Development Department

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	Simon Leung	2674 2273	2674 7732
SMEC	Independent Environmental Checker	Antony Wong	3995 8120	3995 8101
CCK JV	Project Director	Wong Yu	2682 6691	2682 2783
CCK JV	Project Manager	Cheng Pong Yin	9023 4821	2682 2783
CCK JV	Site Agent	Leung Tak Yu	9705 7536	2682 2783
CCK JV	Environmental Officer	Cheung Ka Wia, Barry	6117 2339	2682 2783
CCK JV	Environmental Supervisor	Yung Kwok Wai	6592 3084	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

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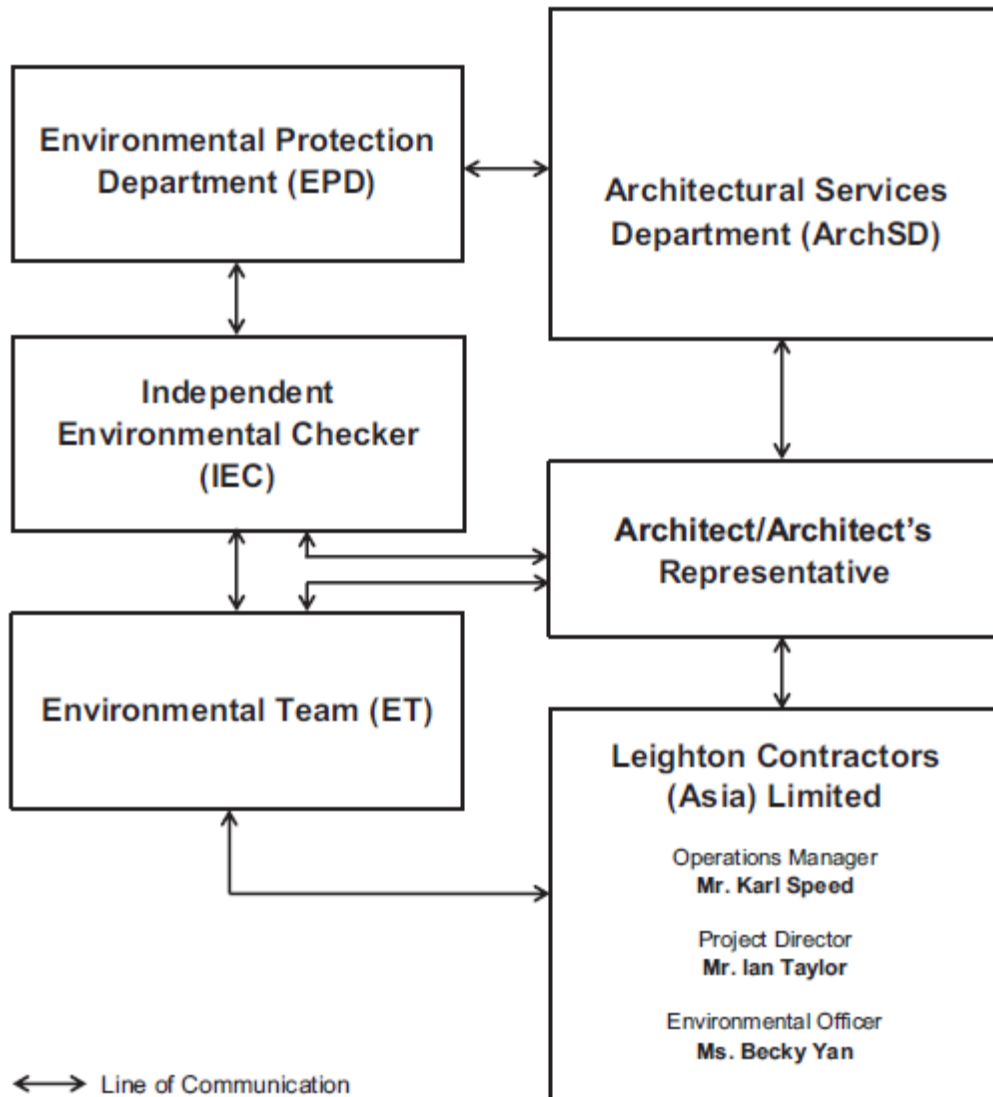
CEDD (Employer) – Civil Engineering and Development Department

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

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. Karl Speed	2823 1433	25298784
Leighton	Project Director	Mr. Ian Taylor	2858 1519	2858 1899
Leighton	Environmental Officer	Ms. Becky Yan	3973 1069	-
Leighton	Assistant Environmental Officer	Ms. Penny Yiu	3973 0818	-
AUES	Environmental Team Leader	Mr. T. W. Tam	2959 6059	2959 6079
AUES	Environmental Consultant	Ms. Nicola Hon	2959 6059	2959 6079
AUES	Environmental Consultant	Mr. Ben Tam	2959 6059	2959 6079

Legend:

ArchSD (Project Proponent) – Architectural Services Department

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

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

SMEC (IEC) – SMEC Asia Limited

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

Appendix C

3-month rolling construction program

Contract 2



Tentative Three Months (June, July and August 2016) Construction Rolling Program

Item	Construction Activities
1	Admin Bldg - Building foundation and superstructure works
2	Mid Vent Portal - Adit invert slab, waterproofing and lining
3	Mid Vent Portal - Adit Post-excavation grouting
4	Mid Vent Portal - Stud tunnel D&B excavation
5	Mid Vent Portal - Ventilation building superstructure works
6	North Portal - Northbound tunnel bench mechanical excavation
7	North Portal - Southbound tunnel excavation by TBM
8	North Portal - Southbound tunnel enlargement
9	North Portal - Retaining walls and slope stabilizations
10	North Portal - North ventilation building foundations
11	South Portal - Northbound and Southbound tunnel D&B excavation
12	South Portal - South ventilation building superstructure works

Contract 3

Contract 5

Contract 6

Contract 7

Contract SS C505

Tentative Three Months(June, July and August 2016) Construction Rolling Program

Item	Construction Activites
1	Establishment Mobilisation & Advance Works
2	Setup Tower Cranes
3	Passenger Terminal Building - Foundation Works
4	Passenger Terminal Building - Substructure Works
5	Passenger Terminal Building - RC Structures
6	HKPF Building - Install Driven H-piles, proof drilling & loading Test, excavation, construct pilecaps, ELS, construct columns, walls & slab
7	Fire Station - Install Driven H-piles, proof drilling & loading Test, excavation and construct pilecaps and RC structure
8	Drill Tower - Install Driven H-piles, proof drilling & loading test, excavation and construct pilecaps and RC structure
9	Cargo Examination Building (Inbound) - Foundation, Pilecaps and RC Structure
10	Cargo Examination Building (Outbound) - Pilecaps and RC Structure
11	Fixed X-ray Vehicle Inspection System (FXRVIS) Buildings (Inbound) - Foundations and Structural Works
12	Fixed X-ray Vehicle Inspection System (FXRVIS) Buildings (Outbound) - Foundations and Structural Works
13	GV Kiosk (Inbound) - Foundations and RC structures
14	GV Kiosk (Outbound) - Foundations and RC structures
15	MXRVSS (Outbound) - Structures and ABWF works
16	Fire Hydrant Tank & Pump Room - Site Formation and Structural Works
17	Elevated Walkway - Foundation Works
18	Vehicular bridges - Foundation works, Pilecaps / Piers / abutment / retaining walls / portal
19	External Works in Portion 1 - laying utilities & pile ducts & CLP cable ducts
20	External Works in Portion 2 - Site formation

Appendix D

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

LEGEND:

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

PI	REV	NO	DATE	DESCRIPTION	BY	CHKD

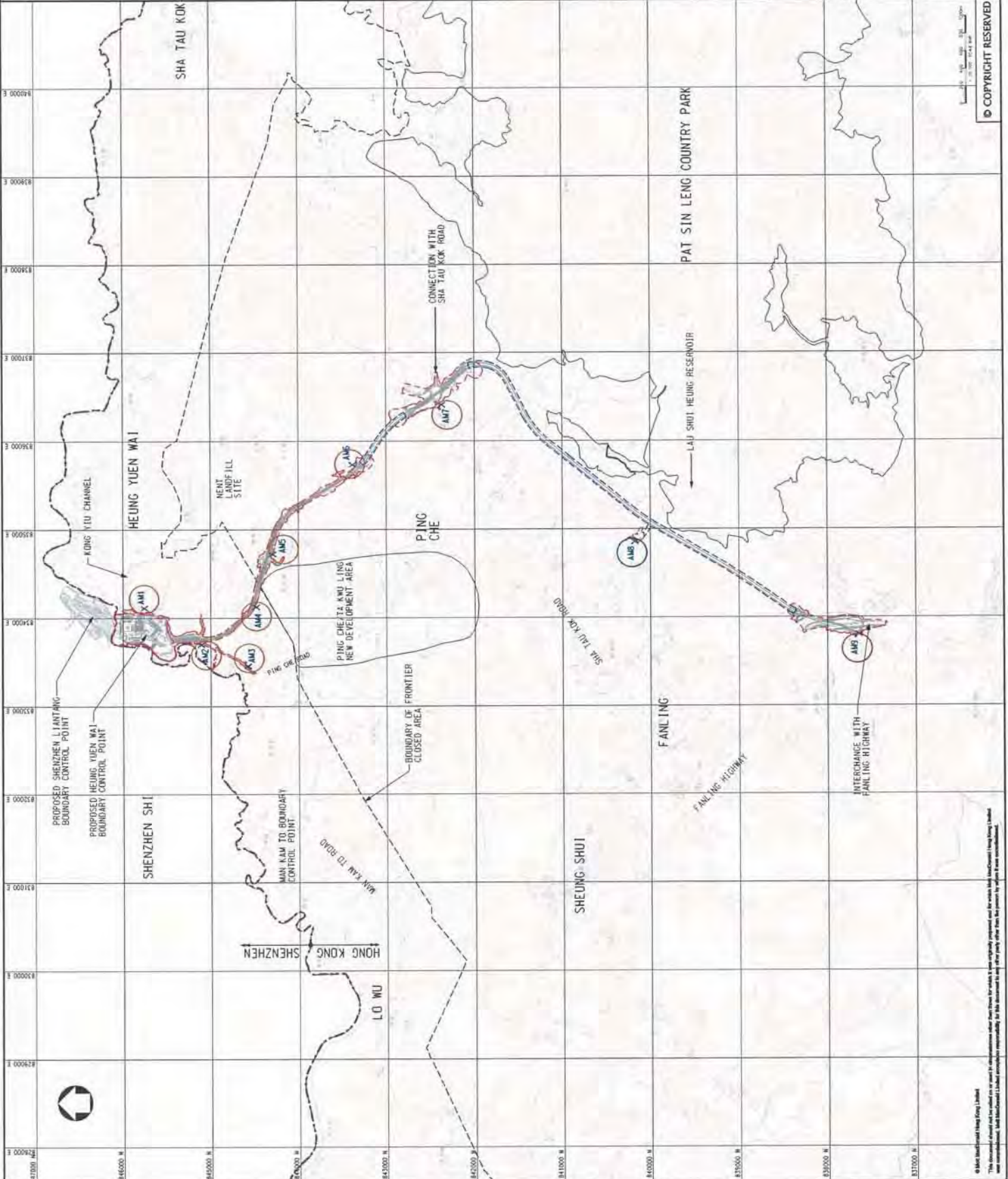


CIVIL ENGINEERING
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DEPARTMENT

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

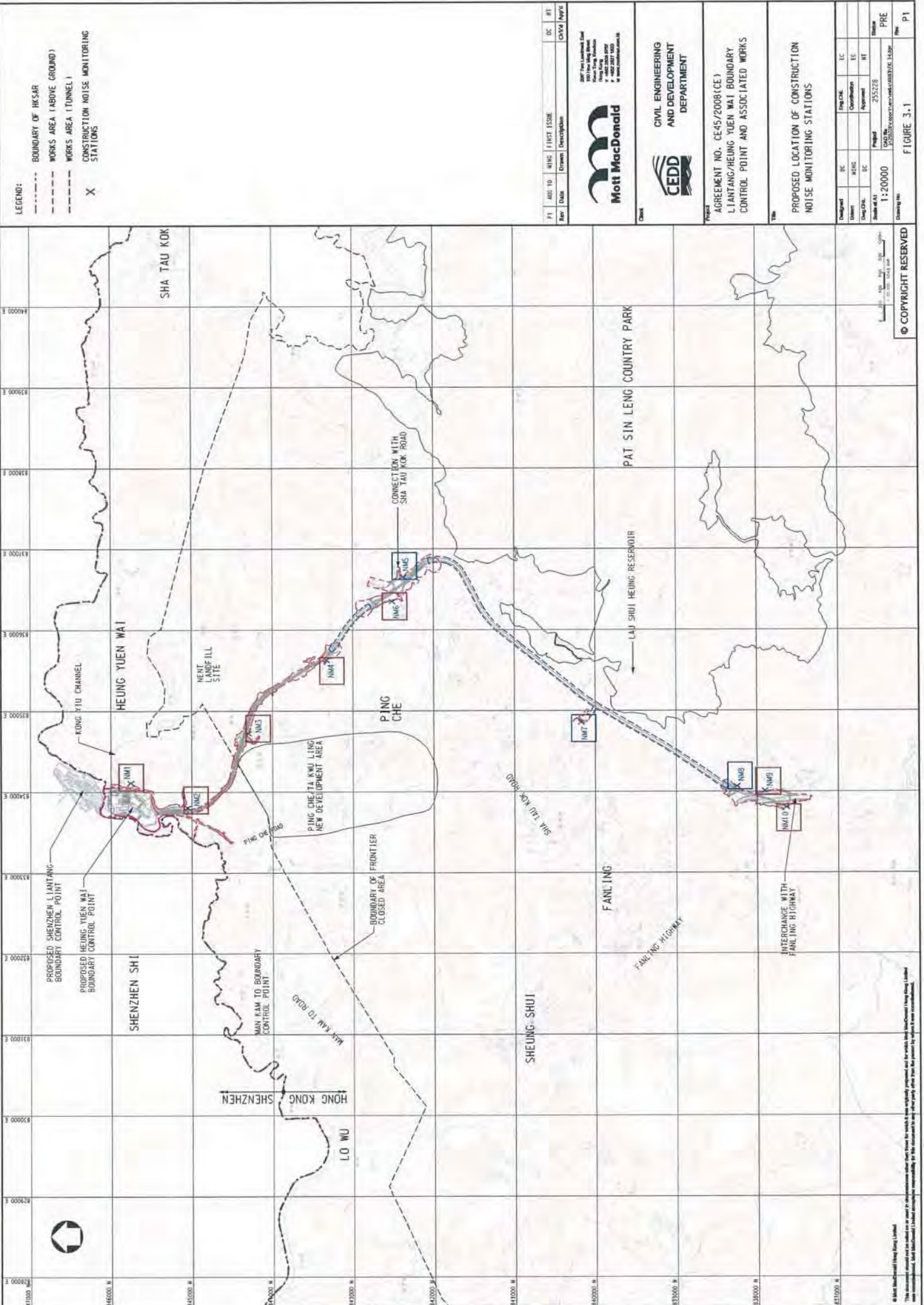
PROPOSED LOCATION OF CONSTRUCTION
AIR QUALITY MONITORING STATIONS

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Eng. CHK.	DC	Approval	WT
Scale of A1	25:1/28		
Scale of A2	1:20000		
Drawing No.	CE-45/2008(CE)-A1		
Project	LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS		
Sheet	PRE		
Page	P1		



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LEGEND:

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

PI	ADD TO	NING	FIRST ISSUE	DC	RE
Rev	Date	Drawn	Description	Checked	Appr'd



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100 The Landmark West
Hong Kong, China
Tel: +852 2500 8222
Fax: +852 2500 8223
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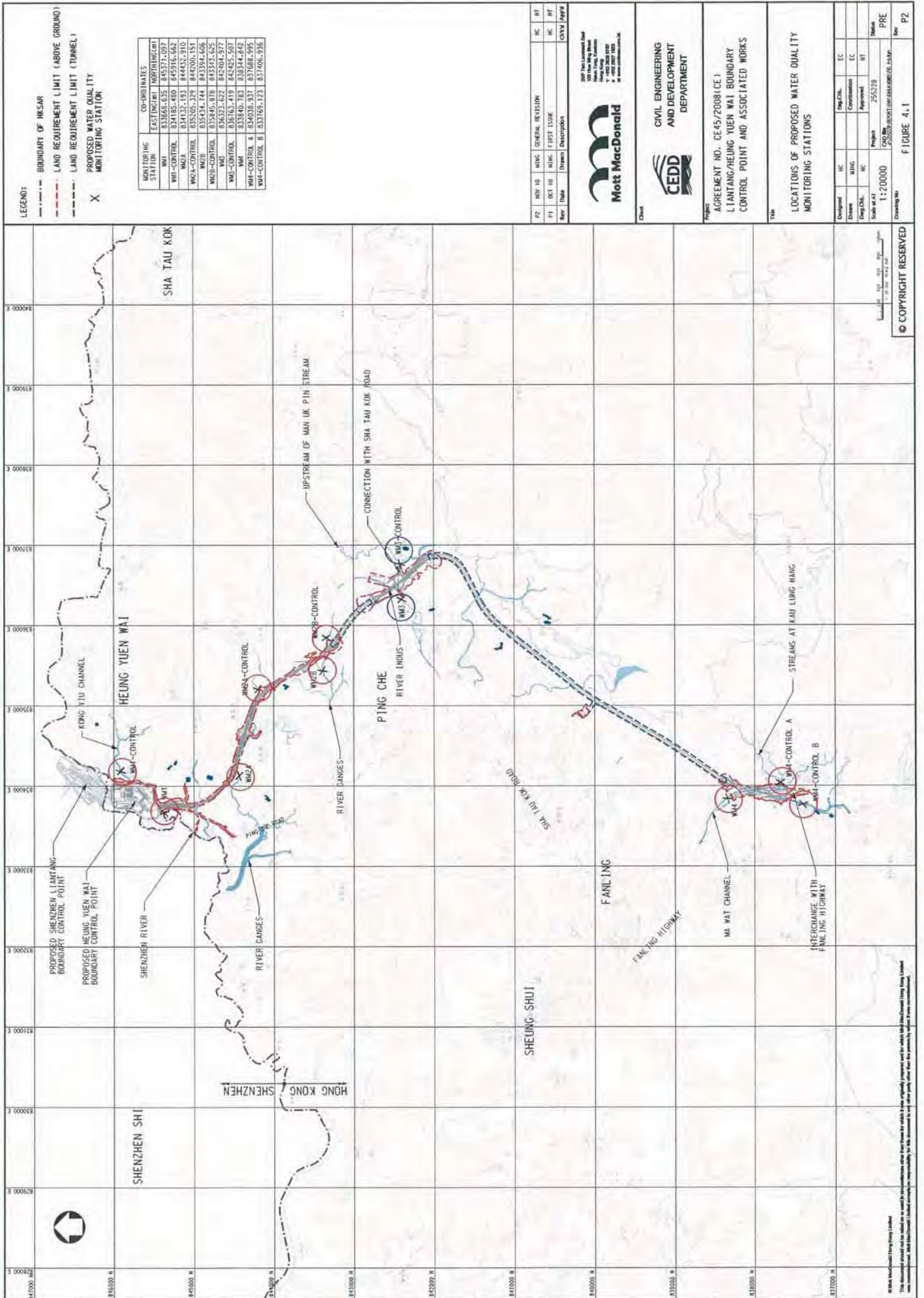
Project
AGREEMENT NO. CE-45/2008(CE)
LIANTANG/HEUNG YUEN WAI BOUNDARY
CONTROL POINT AND ASSOCIATED WORKS

Proposed
CONSTRUCTION NOISE MONITORING STATIONS

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Drawing No.	CE-45/2008(CE)-005/016-1509		Sheet No.	PRE	
Drawing Date	2008/05/16		Revision	P1	

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LEGEND:

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

MONITORING STATION	CO-ORDINATES	
	EASTING (E)	NORTHING (N)
WMA	837668.635	845371.097
WMA-COMB	834185.460	845916.662
WMA-A	834132.193	844832.910
WMA-COMB-A	835205.329	844200.151
WMA-B	835334.744	843384.606
WMA-COMB-B	835845.878	843323.625
WMA-COMB-C	836323.622	842404.977
WMA-COMB-D	836163.419	842425.507
WMA-COMB-E	833940.763	838344.842
WMA-COMB-F	834038.937	837688.995
WMA-COMB-G	833769.123	837406.936

REV	NOY	NO	DATE	DESCRIPTION	BY	CHK
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2	1	1		FIRST ISSUE		HC
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CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

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

LOCATIONS OF PROPOSED WATER QUALITY MONITORING STATIONS

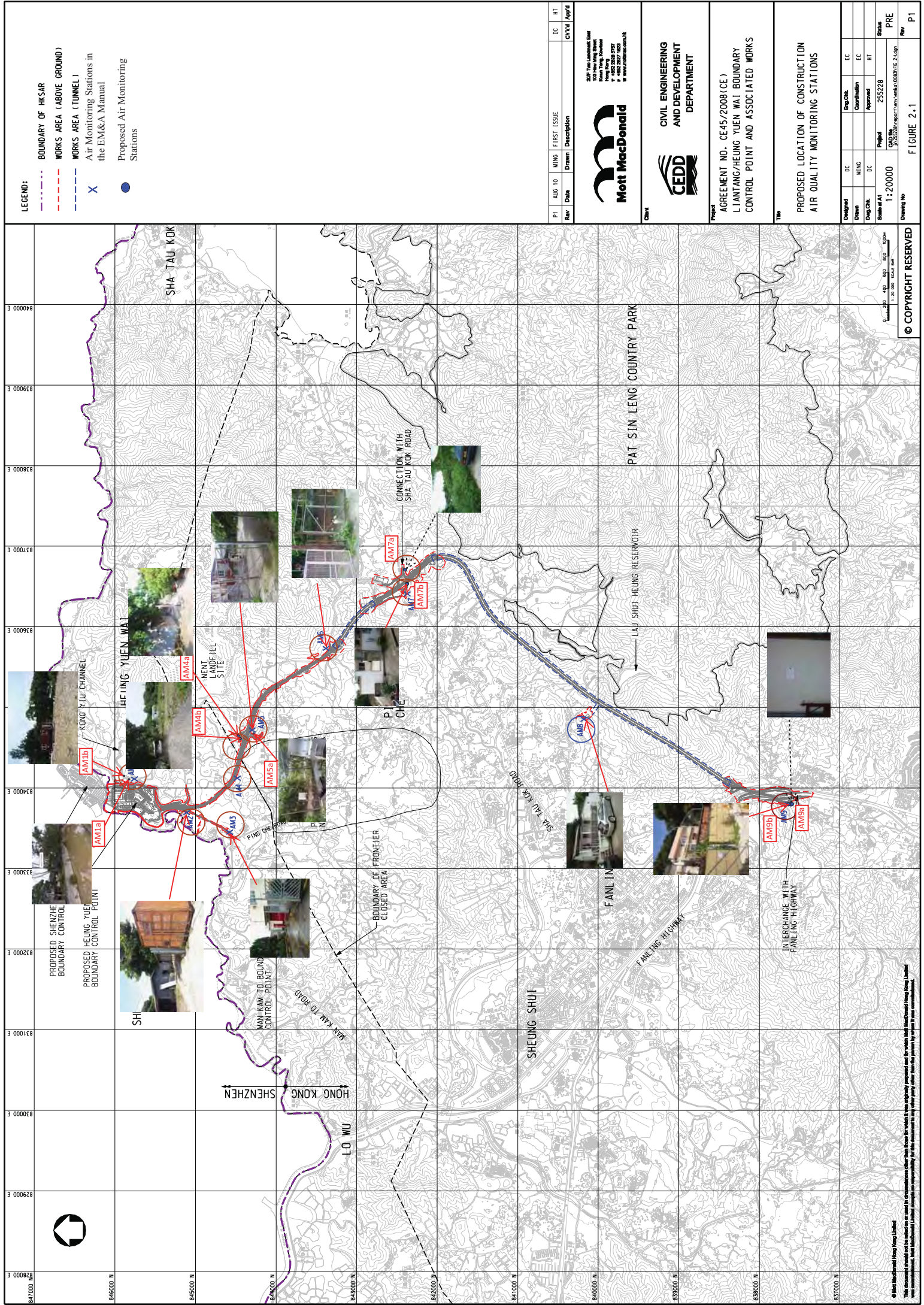
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Drawn			
Eng. Chk.			
Scale at A1			
Scale at A2			
Project			
CDU No.			
ASST/CDU/ENR/04/08/03/14/97			
Drawings No.			
FIGURE 4.1			
Rev			
P2			

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Appendix E

Monitoring Locations for Impact Monitoring



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

Rev	Date	Drawn	Description	DC	HT
P1	AUG 10	MING	FIRST ISSUE	DC	HT

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CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

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

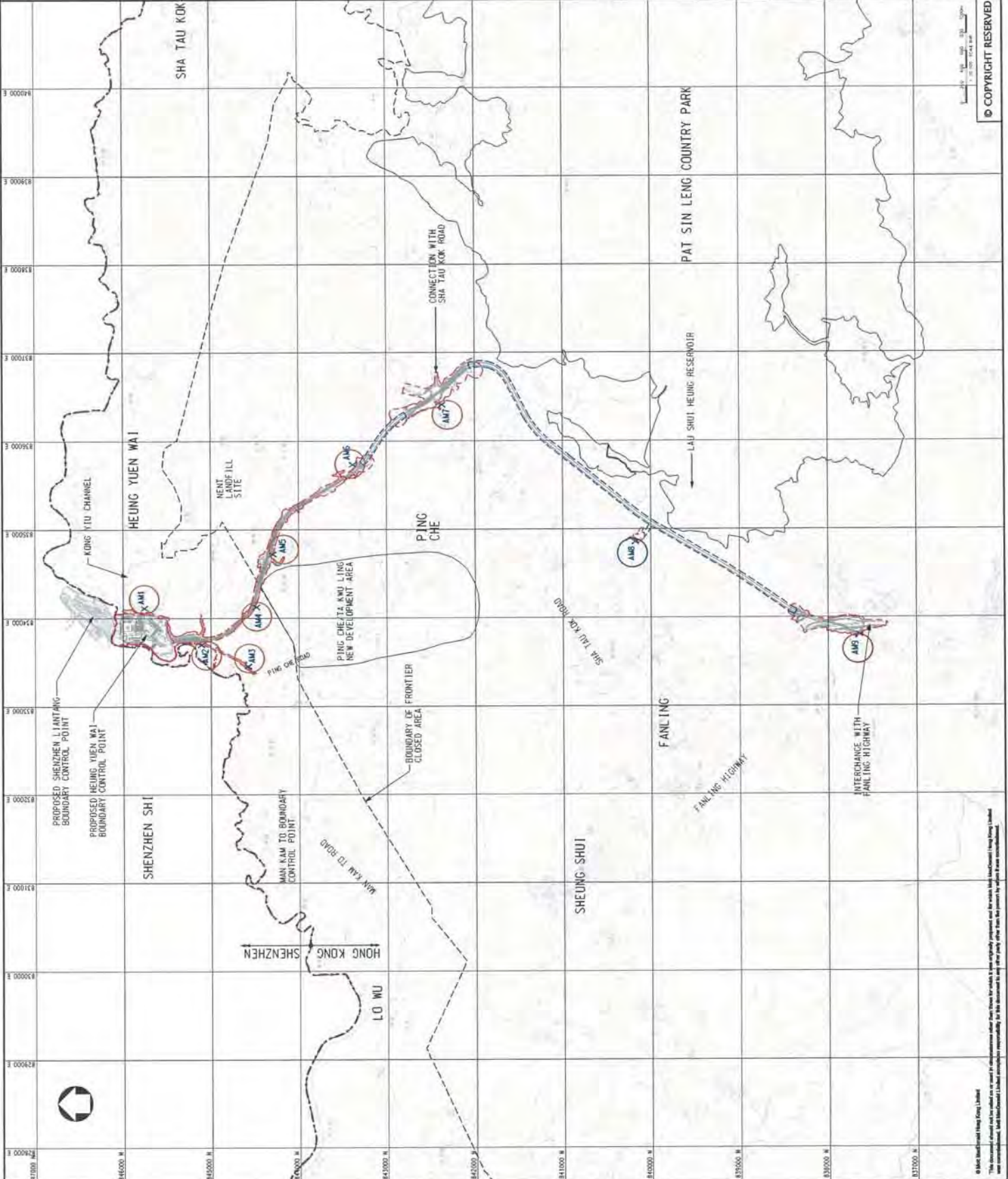
Title: PROPOSED LOCATION OF CONSTRUCTION AIR QUALITY MONITORING STATIONS

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Drawn	MING	EC
Check/Chk.	DC	HT
Scale at A1	1:20000	Project No. 253228
Drawing No.	CE45/2008/Agree/1/Rev.001/009/01/25.05.09	Sheet No. PRE
		Rev. P1

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- LEGEND:
- BOUNDARY OF HSAR
 - - - WORKS AREA (ABOVE GROUND)
 - - - WORKS AREA (TUNNEL)
 - X AIR MONITORING STATIONS



PI	REV	DATE	DESCRIPTION	BY	CHKD	APP'D

100% Project Completion Date
 100% Project Completion Date
 100% Project Completion Date
 100% Project Completion Date
 100% Project Completion Date
 100% Project Completion Date



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

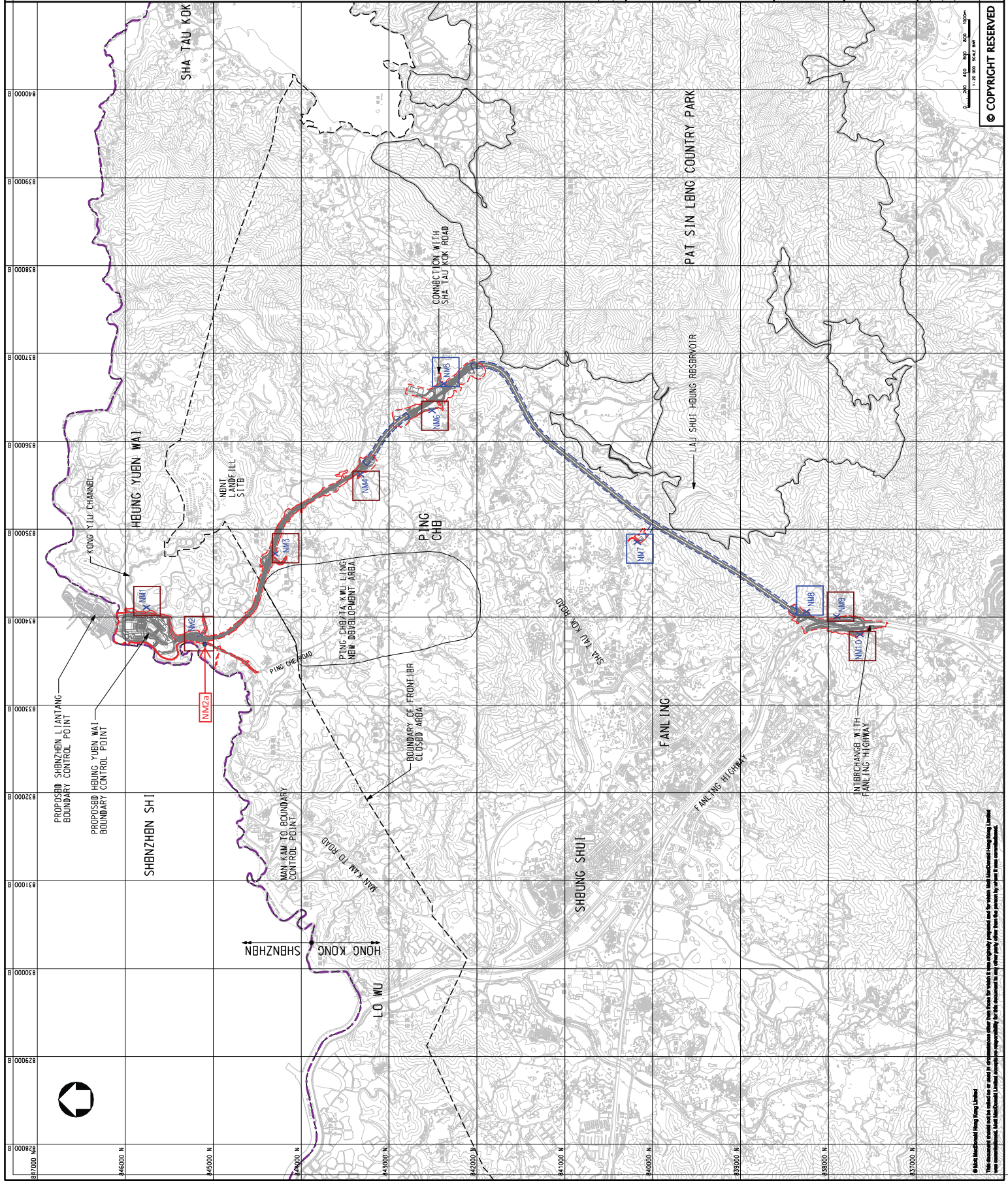
PROPOSED LOCATION OF CONSTRUCTION
 AIR QUALITY MONITORING STATIONS

Drawn by	Checked by	Scale	Project No.	Revision	Date
		1:20000		PRE	

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 FIGURE 2.1

LEGEND:

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



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Rev	Date	Drawn	Description	Checked	Appr'd

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CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

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

PROPOSED LOCATION OF CONSTRUCTION NOISE MONITORING STATIONS

Designed	BC	Eng. Chk.	BC
Drawn	MING	Coordination	BC
App. Chk.	BC	Approved	HT
Scale at A1	1:20000	Project	253228
Scale at A2	1:20000	Client No.	005253228
Drawing No		Project Name	LIANTANG/HUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS

FIGURE 3.1

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LEGEND:

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

Station ID	Location recommended in EM&A Manual	Location found during site visit	
EM&A	EM&A	EM&A	
Easting	Northing	Easting	Northing
WM2A	84485.480	84485.480	84485.480
WM2B	84485.480	84485.480	84485.480
WM2C	84485.480	84485.480	84485.480
WM2D	84485.480	84485.480	84485.480
WM2E	84485.480	84485.480	84485.480
WM2F	84485.480	84485.480	84485.480
WM2G	84485.480	84485.480	84485.480
WM2H	84485.480	84485.480	84485.480
WM2I	84485.480	84485.480	84485.480
WM2J	84485.480	84485.480	84485.480
WM2K	84485.480	84485.480	84485.480
WM2L	84485.480	84485.480	84485.480
WM2M	84485.480	84485.480	84485.480
WM2N	84485.480	84485.480	84485.480
WM2O	84485.480	84485.480	84485.480
WM2P	84485.480	84485.480	84485.480
WM2Q	84485.480	84485.480	84485.480
WM2R	84485.480	84485.480	84485.480
WM2S	84485.480	84485.480	84485.480
WM2T	84485.480	84485.480	84485.480
WM2U	84485.480	84485.480	84485.480
WM2V	84485.480	84485.480	84485.480
WM2W	84485.480	84485.480	84485.480
WM2X	84485.480	84485.480	84485.480
WM2Y	84485.480	84485.480	84485.480
WM2Z	84485.480	84485.480	84485.480

New Proposed Water Quality Monitoring Location in November 2015

Location ID	Easting	Northing
WM2A-C (Original)	083570	084243
WM2A-Ca (Proposed)	083577	084188
WM2A-Cb (Original)	083624	084207
WM2A-Cc (Proposed)	083626	084270

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

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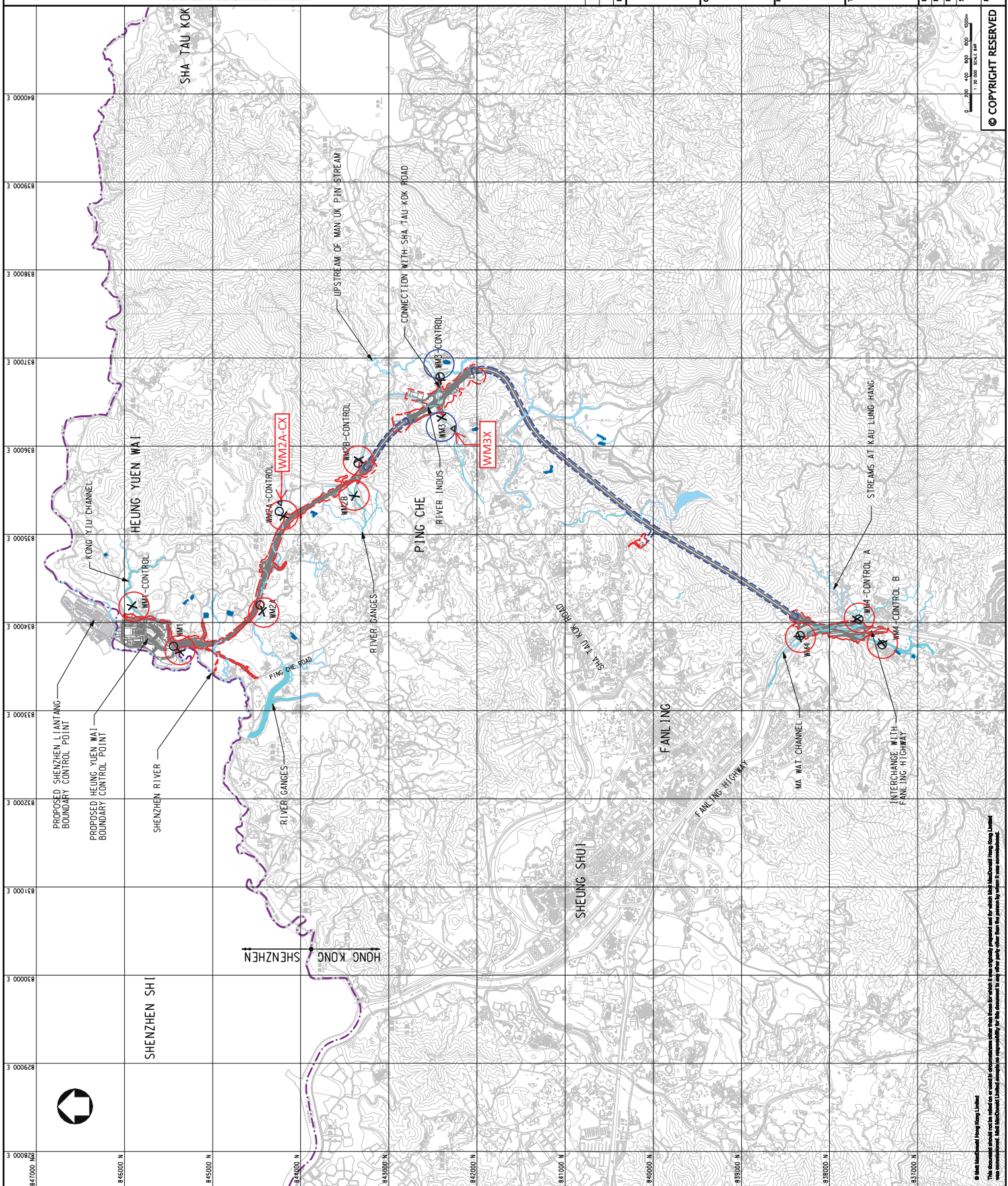
Civil Engineering and Development Department

Client: CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

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

Locations of Proposed Water Quality Monitoring Stations

Designed	HC	EC
Drawn	MING	EC
Drawn	HC	HT
Scale at AI	1:20000	255228
Scale at P2	1:20000	255228
Status	PRE	PRE



Photographic Records for Water Quality Monitoring Location



Alternative Location of WM1



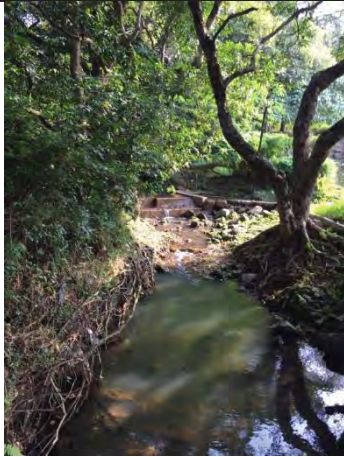
Alternative Location of WM1 – Control (WM1-C)



Alternative Location of WM2A



Alternative Location of WM2-Control (WM2-C)



Alternative Location of WM2- Control X (WM2-CX)



Location of WM2B-Control (WM2B-C)



Location of WM2B



Location of WM3-Control (WM3-C)



Location of WM3



Alternative Location of WM3X



Location of WM4-Control A (WM4-CA)



Location of WM4-Control B (WM4-CB)



Location of WM4

Appendix F

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

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Garden Farm, Tsung Yuen Ha Village	Date of Calibration: 26/4/2016
Location ID : AM1b	Next Calibration Date: 26/6/2016
	Technician: Fai So

CONDITIONS

Sea Level Pressure (hPa)	1009.5	Corrected Pressure (mm Hg)	757.125
Temperature (°C)	27.2	Temperature (K)	300

CALIBRATION ORIFICE

Make-> TISCH	Qstd Slope -> 2.00411
Model-> 5025A	Qstd Intercept -> -0.03059
Serial # -> 1612	

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION		
							Slope =	Intercept =	Corr. coeff. =
18	6.8	6.8	13.6	1.845	53	52.71	Slope = 32.4196 Intercept = -6.5421 Corr. coeff. = 0.9984		
13	5.1	5.1	10.2	1.600	46	45.74			
10	3.9	3.9	7.8	1.401	40	39.78			
7	2.6	2.6	5.2	1.147	30	29.83			
5	1.5	1.5	3.0	0.875	22	21.88			

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

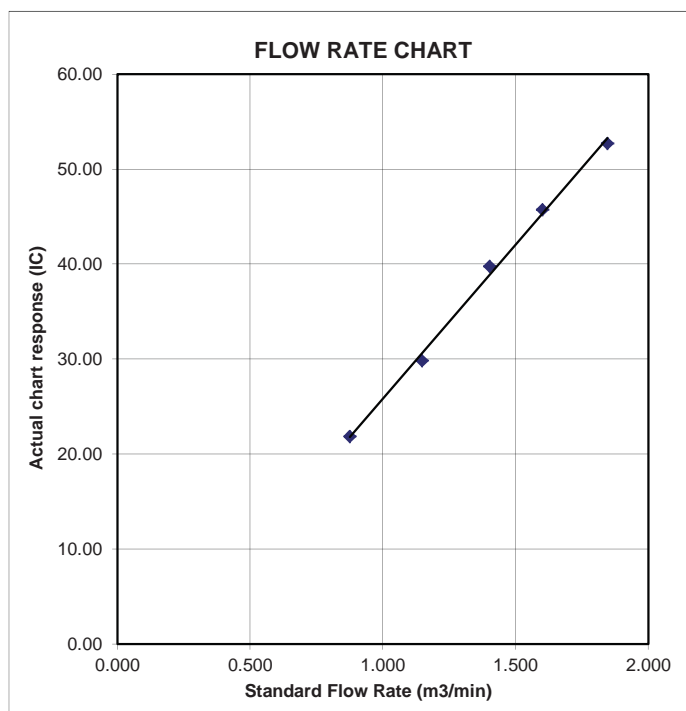
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Garden Farm, Tsung Yuen Ha Village	Date of Calibration:	25/6/2016
Location ID : AM1b	Next Calibration Date:	25/8/2016
	Technician:	Fai So

CONDITIONS

Sea Level Pressure (hPa)	1008.9	Corrected Pressure (mm Hg)	756.675
Temperature (°C)	31.4	Temperature (K)	304

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.00411
Model->	5025A	Qstd Intercept ->	-0.03059
Serial # ->	1612		

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION		
							Slope =	Intercept =	Corr. coeff. =
18	6.8	6.8	13.6	1.832	54	53.31	Slope =	33.5108	
13	5.1	5.1	10.2	1.589	46	45.41	Intercept =	-7.7352	
10	3.9	3.9	7.8	1.391	41	40.48	Corr. coeff. =	0.9959	
7	2.7	2.7	5.4	1.160	30	29.62			
5	1.5	1.5	3.0	0.869	22	21.72			

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

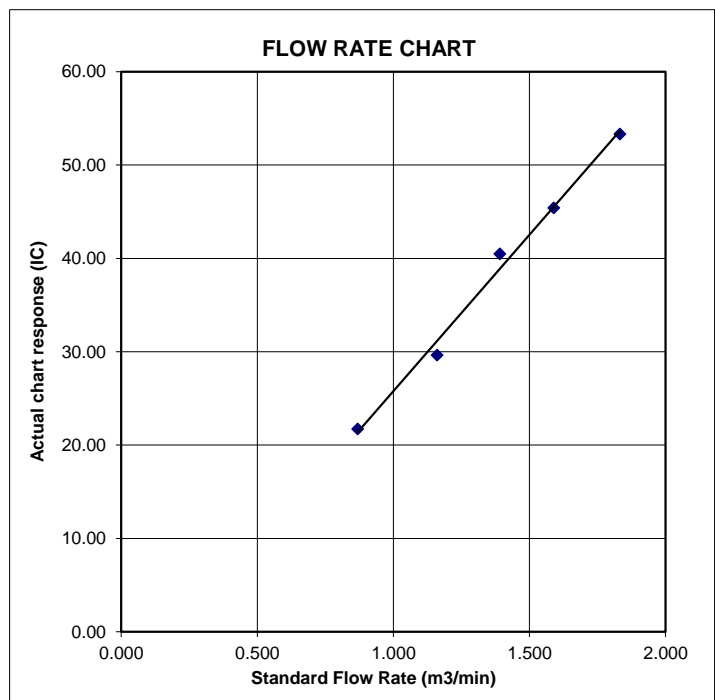
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

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

Date of Calibration: 26/4/2016
 Next Calibration Date: 26/6/2016
 Technician: Fai So

CONDITIONS

Sea Level Pressure (hPa)	1009.5	Corrected Pressure (mm Hg)	757.125
Temperature (°C)	27.2	Temperature (K)	300

CALIBRATION ORIFICE

Make-> TISCH	Qstd Slope ->	2.00411
Model-> 5025A	Qstd Intercept ->	-0.03059
Serial # -> 1612		

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.2	6.2	12.4	1.763	53	52.71	Slope = 31.5538 Intercept = -2.8452 Corr. coeff. = 0.9987
13	5.0	5.0	10.0	1.584	47	46.74	
10	3.8	3.8	7.6	1.383	42	41.77	
7	2.6	2.6	5.2	1.147	33	32.82	
5	1.4	1.4	2.8	0.846	24	23.87	

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

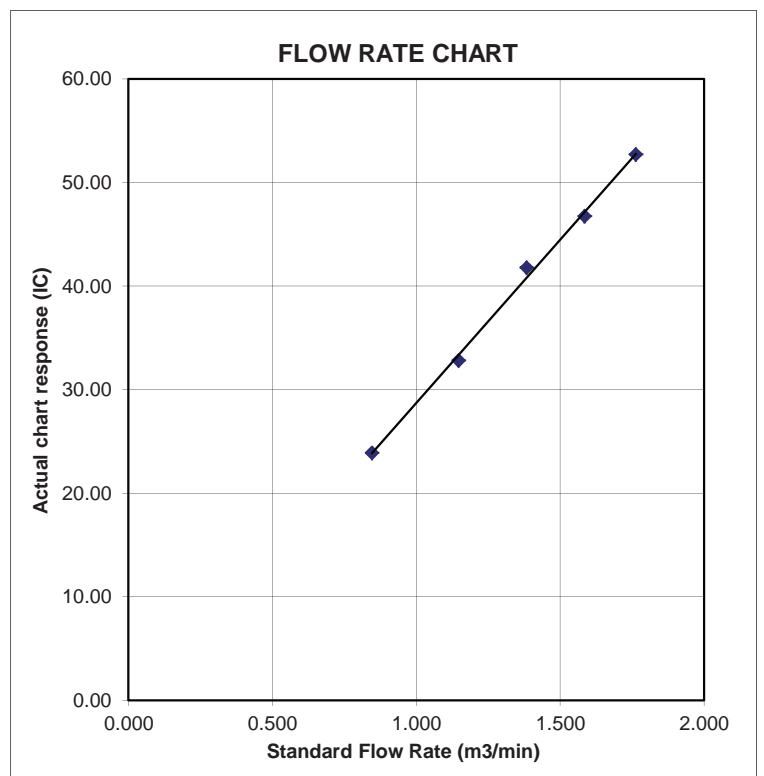
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

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

Date of Calibration: 25/6/2016
 Next Calibration Date: 25/8/2016
 Technician: Fai So

CONDITIONS

Sea Level Pressure (hPa)	1008.9	Corrected Pressure (mm Hg)	756.675
Temperature (°C)	31.4	Temperature (K)	304

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.00411
Model->	5025A	Qstd Intercept ->	-0.03059
Serial # ->	1612		

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION Slope = 30.6197 Intercept = -1.7753 Corr. coeff. = 0.9968
18	6.3	6.3	12.6	1.764	53	52.33	
13	5.0	5.0	10.0	1.573	47	46.40	
10	3.9	3.9	7.8	1.391	42	41.47	
7	2.6	2.6	5.2	1.139	32	31.59	
5	1.4	1.4	2.8	0.840	25	24.68	

Calculations :

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

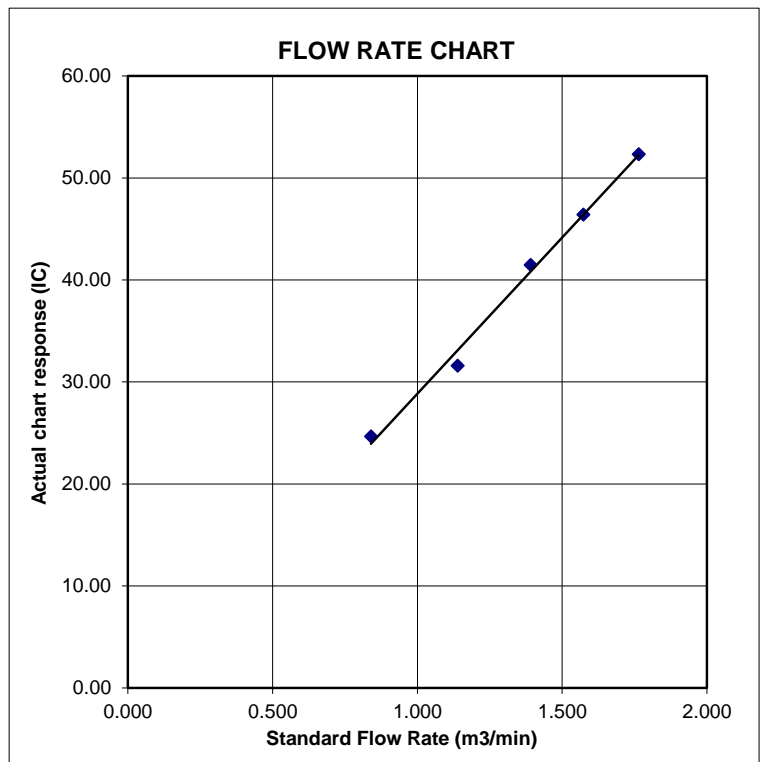
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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

For subsequent calculation of sampler flow:

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

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



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Ta Kwu Ling Fire Service Station	Date of Calibration:	26/4/2016
Location ID : AM3	Next Calibration Date:	26/6/2016
	Technician:	Fai So

CONDITIONS

Sea Level Pressure (hPa)	1009.5	Corrected Pressure (mm Hg)	757.125
Temperature (°C)	27.2	Temperature (K)	300

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.00411
Model->	5025A	Qstd Intercept ->	-0.03059
Serial # ->	1612		

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.0	6.0	12.0	1.734	57	56.68	Slope = 29.5137 Intercept = 3.8880 Corr. coeff. = 0.9909
13	4.9	4.9	9.8	1.569	49	48.73	
10	3.7	3.7	7.4	1.365	43	42.76	
7	2.4	2.4	4.8	1.102	38	37.79	
5	1.3	1.3	2.6	0.815	28	27.84	

Calculations :

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

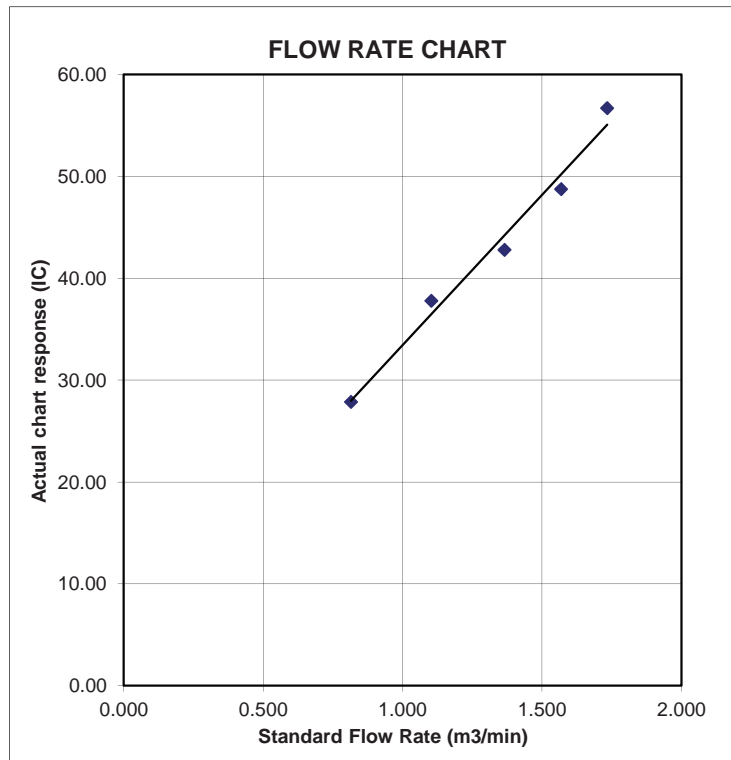
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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

For subsequent calculation of sampler flow:

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

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



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Ta Kwu Ling Fire Service Station	Date of Calibration:	25/6/2016
Location ID : AM3	Next Calibration Date:	25/8/2016
	Technician:	Fai So

CONDITIONS

Sea Level Pressure (hPa)	1008.9	Corrected Pressure (mm Hg)	756.675
Temperature (°C)	31.4	Temperature (K)	304

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.00411
Model->	5025A	Qstd Intercept ->	-0.03059
Serial # ->	1612		

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.1	6.1	12.2	1.736	57	56.27	Slope = 31.8284 Intercept = 0.5420 Corr. coeff. = 0.9982
13	4.9	4.9	9.8	1.557	51	50.35	
10	3.7	3.7	7.4	1.355	43	42.45	
7	2.4	2.4	4.8	1.095	36	35.54	
5	1.3	1.3	2.6	0.810	27	26.66	

Calculations :

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

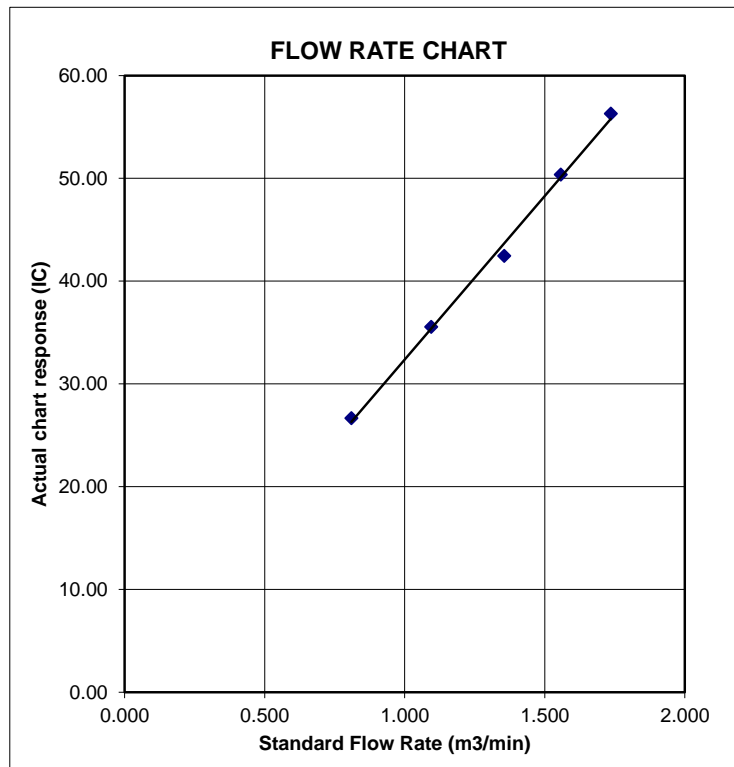
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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

For subsequent calculation of sampler flow:

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

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



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Ping Yeung Village House
 Location ID : AM4a

Date of Calibration: 28/4/2016
 Next Calibration Date: 28/6/2016
 Technician: Fai So

CONDITIONS

Sea Level Pressure (hPa)	1010.4	Corrected Pressure (mm Hg)	757.8
Temperature (°C)	26.0	Temperature (K)	299

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.00411
Model->	5025A	Qstd Intercept ->	-0.03059
Serial # ->	1612		

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.4	6.4	12.8	1.795	57	56.82	Slope = 31.6136 Intercept = -0.1984 Corr. coeff. = 0.9994
13	5.2	5.2	10.4	1.619	51	50.84	
10	4	4	8.0	1.422	45	44.86	
7	2.8	2.8	5.6	1.192	37	36.88	
5	1.5	1.5	3.0	0.877	28	27.91	

Calculations :

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

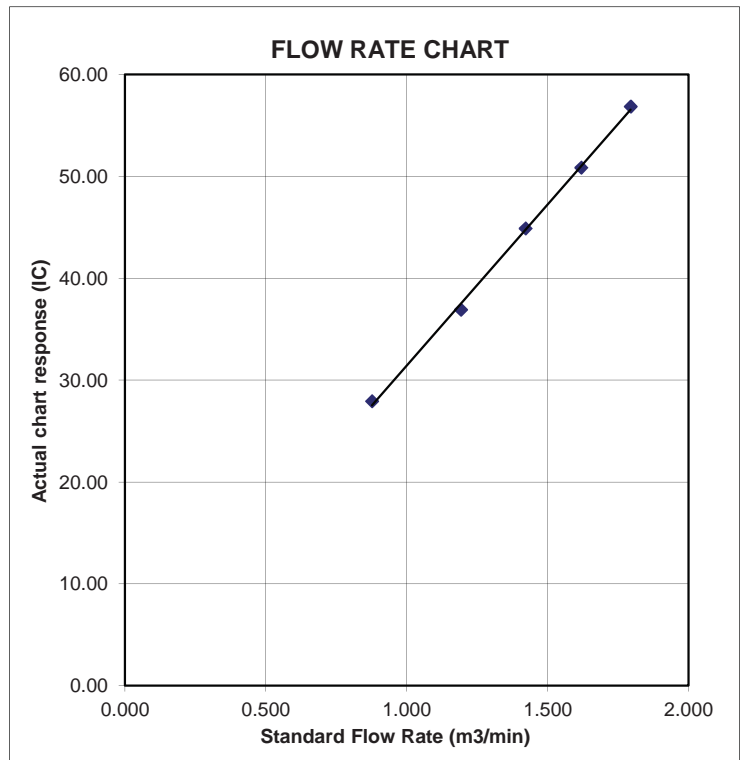
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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

For subsequent calculation of sampler flow:

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

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



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Ping Yeung Village House
 Location ID : AM4a

Date of Calibration: 25/6/2016
 Next Calibration Date: 25/8/2016
 Technician: Fai So

CONDITIONS

Sea Level Pressure (hPa)	1008.9	Corrected Pressure (mm Hg)	756.675
Temperature (°C)	31.4	Temperature (K)	304

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.00411
Model->	5025A	Qstd Intercept ->	-0.03059
Serial # ->	1612		

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION Slope = 31.7024 Intercept = -0.4967 Corr. coeff. = 0.9976
18	6.3	6.3	12.6	1.764	56	55.29	
13	5.2	5.2	10.4	1.604	52	51.34	
10	4	4	8.0	1.409	44	43.44	
7	2.7	2.7	5.4	1.160	36	35.54	
5	1.5	1.5	3.0	0.869	28	27.64	

Calculations :

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

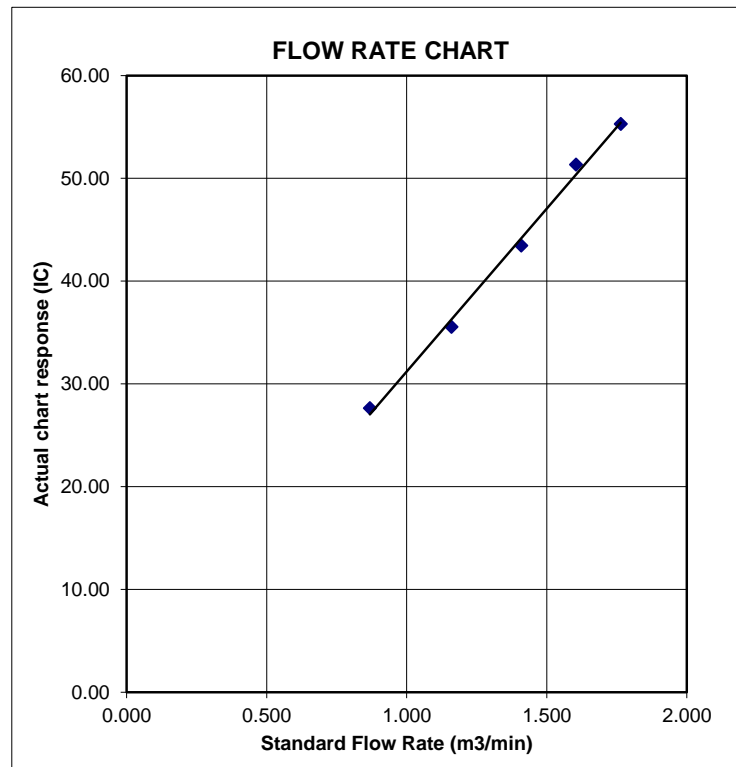
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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

For subsequent calculation of sampler flow:

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

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



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Ping Yeung Village House
 Location ID : AM5

Date of Calibration: 28/4/2016
 Next Calibration Date: 28/6/2016
 Technician: Fai So

CONDITIONS

Sea Level Pressure (hPa)	1010.4	Corrected Pressure (mm Hg)	757.8
Temperature (°C)	26.0	Temperature (K)	299

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.00411
Model->	5025A	Qstd Intercept ->	-0.03059
Serial # ->	1612		

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.6	6.6	13.2	1.822	55	54.83	Slope = 31.0094 Intercept = -1.2784 Corr. coeff. = 0.9997
13	5.3	5.3	10.6	1.635	50	49.84	
10	3.8	3.8	7.6	1.387	42	41.87	
7	2.4	2.4	4.8	1.105	33	32.90	
5	1.4	1.4	2.8	0.848	25	24.92	

Calculations :

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

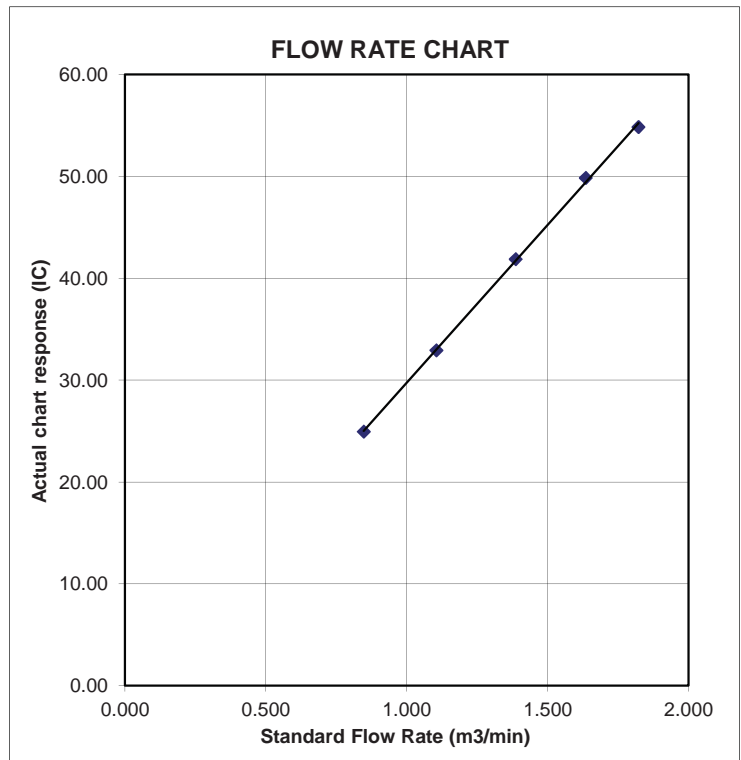
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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

For subsequent calculation of sampler flow:

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

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



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Ping Yeung Village House
 Location ID : AM5

Date of Calibration: 25/6/2016
 Next Calibration Date: 25/8/2016
 Technician: Fai So

CONDITIONS

Sea Level Pressure (hPa)	1008.9	Corrected Pressure (mm Hg)	756.675
Temperature (°C)	31.4	Temperature (K)	304

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.00411
Model->	5025A	Qstd Intercept ->	-0.03059
Serial # ->	1612		

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.6	6.6	13.2	1.805	56	55.29	Slope = 31.4362 Intercept = -1.5367 Corr. coeff. = 0.9982
13	5.2	5.2	10.4	1.604	50	49.36	
10	3.8	3.8	7.6	1.373	41	40.48	
7	2.4	2.4	4.8	1.095	34	33.57	
5	1.5	1.5	3.0	0.869	26	25.67	

Calculations :

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

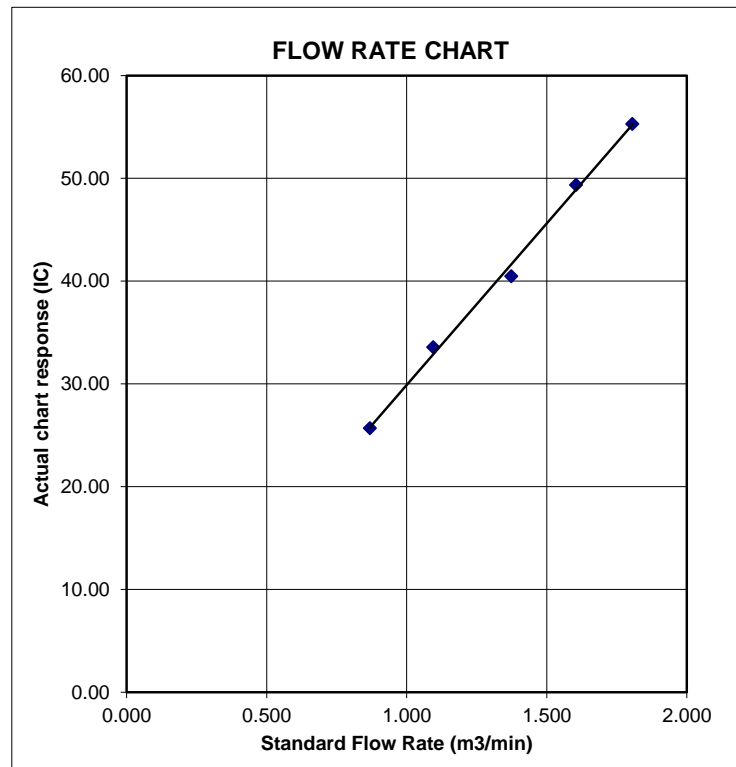
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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

For subsequent calculation of sampler flow:

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

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



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Wo Keng Shan Village House	Date of Calibration:	28/4/2016
Location ID : AM6	Next Calibration Date:	28/6/2016
	Technician:	Fai So

CONDITIONS

Sea Level Pressure (hPa)	1010.4	Corrected Pressure (mm Hg)	757.8
Temperature (°C)	26.0	Temperature (K)	299

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.00411
Model->	5025A	Qstd Intercept ->	-0.03059
Serial # ->	1612		

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.6	6.6	13.2	1.822	56	55.83	Slope = 26.5427 Intercept = 7.4260 Corr. coeff. = 0.9993
13	5.4	5.4	10.8	1.650	51	50.84	
10	3.8	3.8	7.6	1.387	45	44.86	
7	2.3	2.3	4.6	1.082	36	35.89	
5	1.4	1.4	2.8	0.848	30	29.91	

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

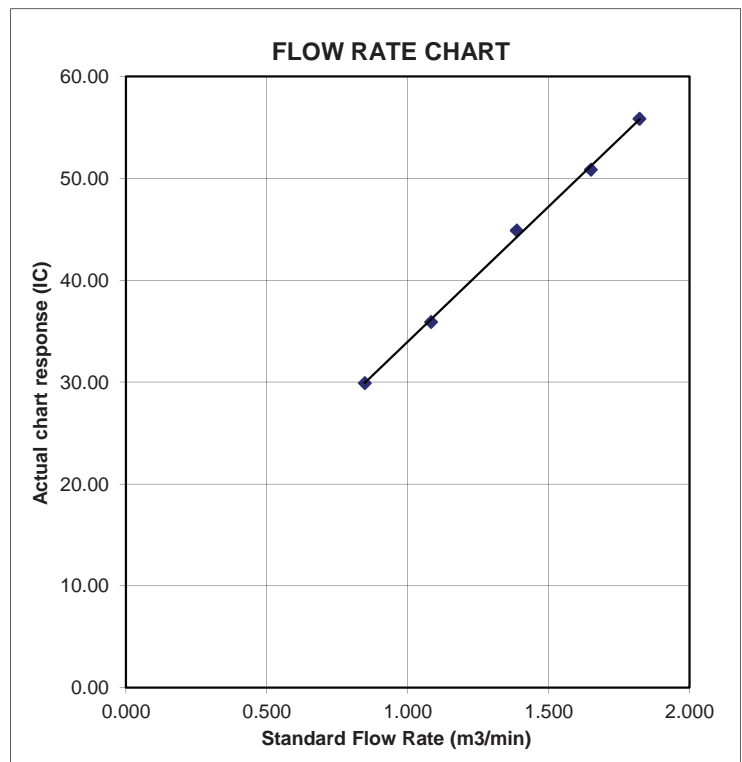
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Wo Keng Shan Village House
 Location ID : AM6

Date of Calibration: 25/6/2016
 Next Calibration Date: 25/8/2016
 Technician: Fai So

CONDITIONS

Sea Level Pressure (hPa)	1008.9	Corrected Pressure (mm Hg)	756.675
Temperature (°C)	31.4	Temperature (K)	304

CALIBRATION ORIFICE

Make-> TISCH	Qstd Slope ->	2.00411
Model-> 5025A	Qstd Intercept ->	-0.03059
Serial # -> 1612		

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION Slope = 27.6107 Intercept = 5.7658 Corr. coeff. = 0.9969
18	6.5	6.5	13.0	1.791	55	54.30	
13	5.4	5.4	10.8	1.634	52	51.34	
10	3.7	3.7	7.4	1.355	45	44.43	
7	2.4	2.4	4.8	1.095	36	35.54	
5	1.4	1.4	2.8	0.840	29	28.63	

Calculations :

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

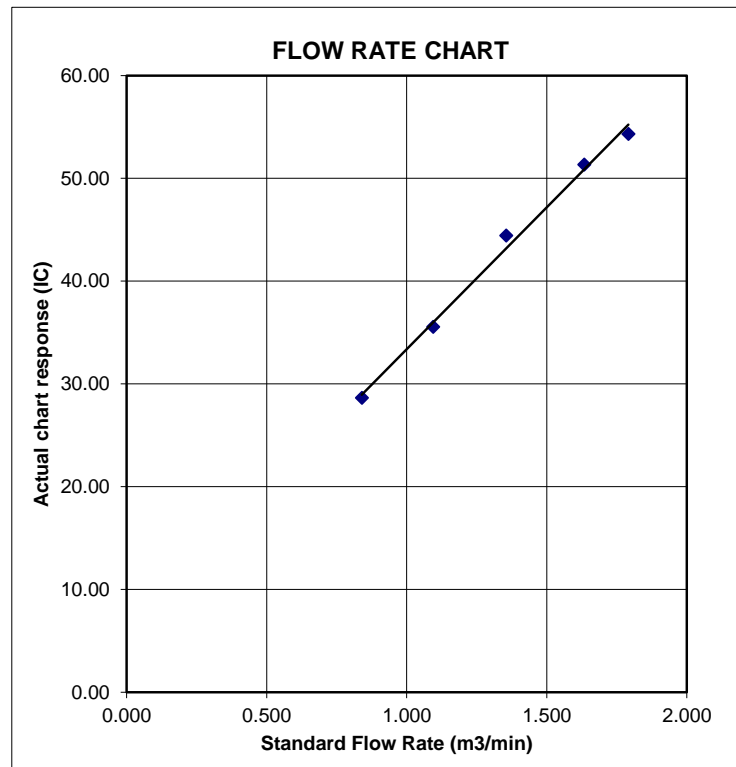
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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

For subsequent calculation of sampler flow:

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

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



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Village House of Loi Tung Village	Date of Calibration: 28/4/2016
Location ID : AM7b	Next Calibration Date: 28/6/2016
	Technician: Fai So

CONDITIONS

Sea Level Pressure (hPa)	1010.4	Corrected Pressure (mm Hg)	757.8
Temperature (°C)	26.0	Temperature (K)	299

CALIBRATION ORIFICE

Make-> TISCH	Qstd Slope -> 2.00411
Model-> 5025A	Qstd Intercept -> -0.03059
Serial # -> 1612	

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.1	5.1	10.2	1.604	54	53.83	Slope = 34.5062 Intercept = -1.4232 Corr. coeff. = 0.9997
13	4.2	4.2	8.4	1.457	49	48.85	
10	3.2	3.2	6.4	1.274	43	42.87	
7	2.1	2.1	4.2	1.035	34	33.89	
5	1.3	1.3	2.6	0.817	27	26.92	

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

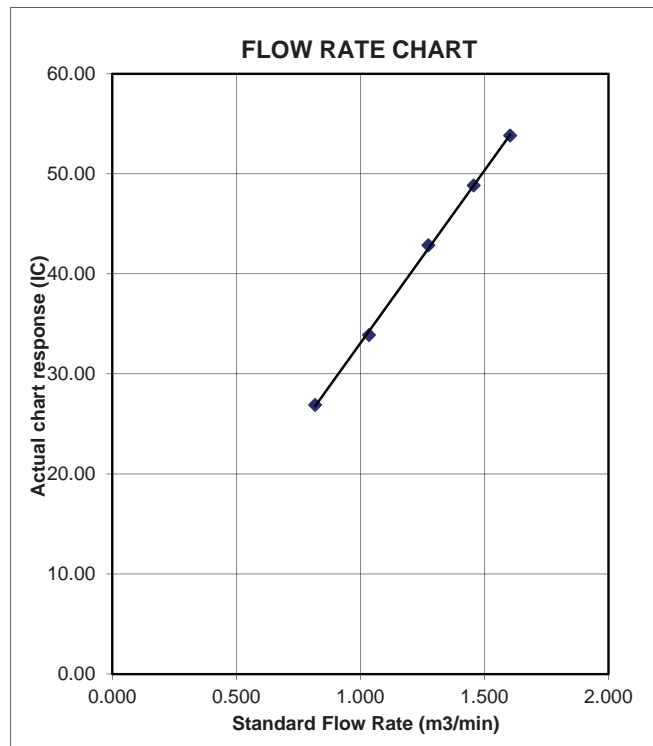
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Village House of Loi Tung Village	Date of Calibration: 25/6/2016
Location ID : AM7b	Next Calibration Date: 25/8/2016
	Technician: Fai So

CONDITIONS

Sea Level Pressure (hPa)	1008.9	Corrected Pressure (mm Hg)	756.675
Temperature (°C)	31.4	Temperature (K)	304

CALIBRATION ORIFICE

Make-> TISCH	Qstd Slope ->
Model-> 5025A	2.00411
Serial # -> 1612	Qstd Intercept ->
	-0.03059

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.2	5.2	10.4	1.604	54	53.31	Slope = 32.4478 Intercept = 0.9688 Corr. coeff. = 0.9977
13	4.2	4.2	8.4	1.443	48	47.39	
10	3.2	3.2	6.4	1.262	42	41.47	
7	2	2	4.0	1.001	35	34.55	
5	1.3	1.3	2.6	0.810	27	26.66	

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

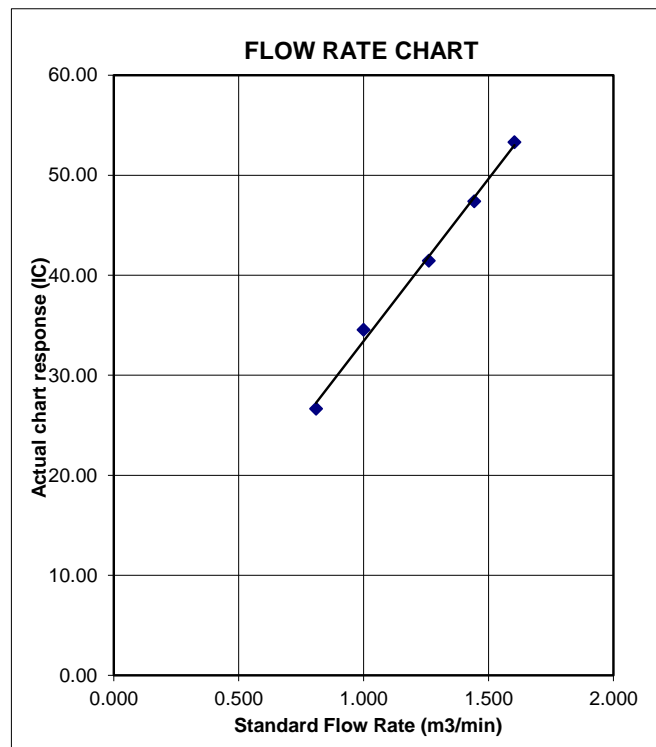
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

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

Date of Calibration: 28/4/2016
 Next Calibration Date: 28/6/2016
 Technician: Fai So

CONDITIONS

Sea Level Pressure (hPa)	1010.4	Corrected Pressure (mm Hg)	757.8
Temperature (°C)	26.0	Temperature (K)	299

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.00411
Model->	5025A	Qstd Intercept ->	-0.03059
Serial # ->	1612		

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.5	6.5	13.0	1.809	63	62.80	Slope = 30.5066 Intercept = 7.1116 Corr. coeff. = 0.9992
13	5.2	5.2	10.4	1.619	56	55.83	
10	3.9	3.9	7.8	1.404	50	49.84	
7	2.5	2.5	5.0	1.128	42	41.87	
5	1.4	1.4	2.8	0.848	33	32.90	

Calculations :

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

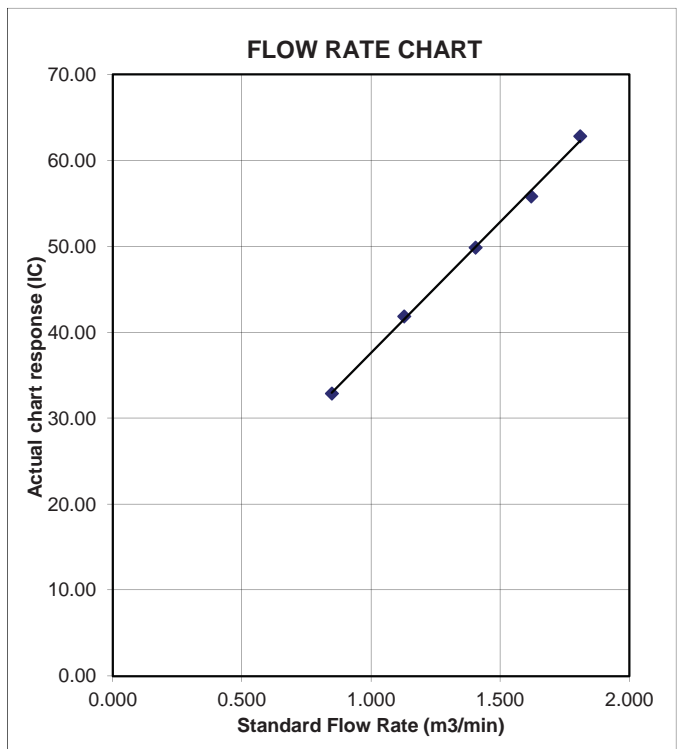
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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

For subsequent calculation of sampler flow:

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

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



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Po Kat Tsai Village No. 4	Date of Calibration: 25/6/2016
Location ID : AM8	Next Calibration Date: 25/8/2016
	Technician: Fai So

CONDITIONS

Sea Level Pressure (hPa)	1008.9	Corrected Pressure (mm Hg)	756.675
Temperature (°C)	31.4	Temperature (K)	304

CALIBRATION ORIFICE

Make-> TISCH	Qstd Slope ->
Model-> 5025A	2.00411
Serial # -> 1612	Qstd Intercept ->
	-0.03059

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.3	6.3	12.6	1.764	62	61.21	Slope = 30.3885 Intercept = 6.7184 Corr. coeff. = 0.9983
13	5.1	5.1	10.2	1.589	55	54.30	
10	3.9	3.9	7.8	1.391	49	48.38	
7	2.6	2.6	5.2	1.139	42	41.47	
5	1.3	1.3	2.6	0.810	32	31.59	

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

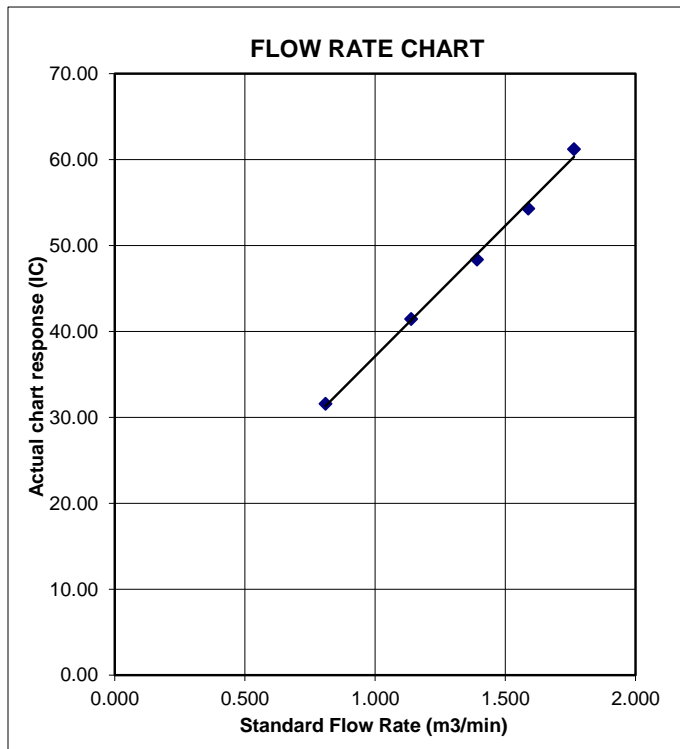
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

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

Date of Calibration: 26/4/2016
 Next Calibration Date: 26/6/2016
 Technician: Fai So

CONDITIONS

Sea Level Pressure (hPa)	1009.5	Corrected Pressure (mm Hg)	757.125
Temperature (°C)	27.2	Temperature (K)	300

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.00411
Model->	5025A	Qstd Intercept ->	-0.03059
Serial # ->	1612		

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.4	6.4	12.8	1.791	55	54.69	Slope = 27.9614 Intercept = 4.2062 Corr. coeff. = 0.9952
13	5.1	5.1	10.2	1.600	50	49.72	
10	4.0	4.0	8.0	1.419	43	42.76	
7	2.7	2.7	5.4	1.168	36	35.80	
5	1.4	1.4	2.8	0.846	29	28.84	

Calculations :

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

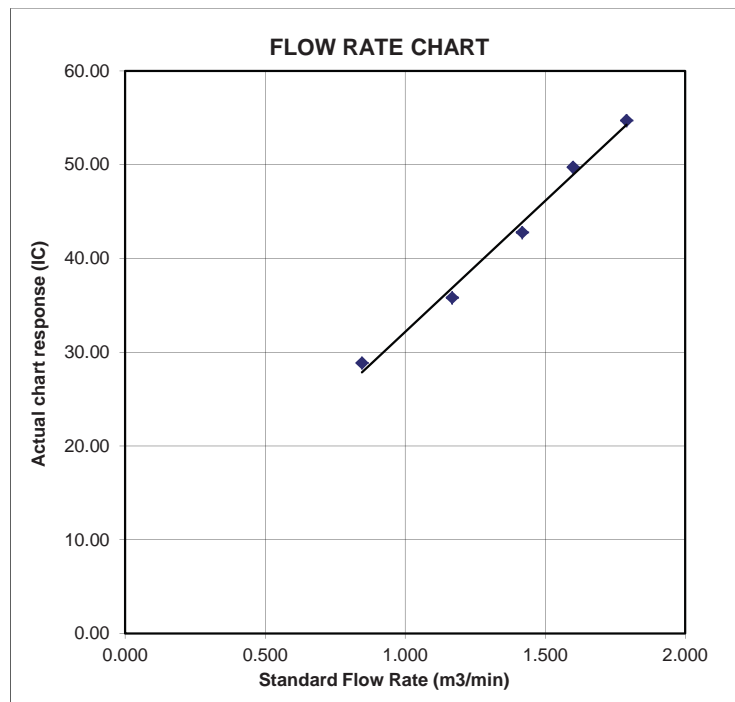
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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

For subsequent calculation of sampler flow:

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

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



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

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

Date of Calibration: 25/6/2016
 Next Calibration Date: 25/8/2016
 Technician: Fai So

CONDITIONS

Sea Level Pressure (hPa)	1008.9	Corrected Pressure (mm Hg)	756.675
Temperature (°C)	31.4	Temperature (K)	304

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.00411
Model->	5025A	Qstd Intercept ->	-0.03059
Serial # ->	1612		

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.4	6.4	12.8	1.778	54	53.31	Slope = 29.4733 Intercept = 1.1553 Corr. coeff. = 0.9955
13	4.9	4.9	9.8	1.557	49	48.38	
10	3.9	3.9	7.8	1.391	42	41.47	
7	2.6	2.6	5.2	1.139	34	33.57	
5	1.4	1.4	2.8	0.840	27	26.66	

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

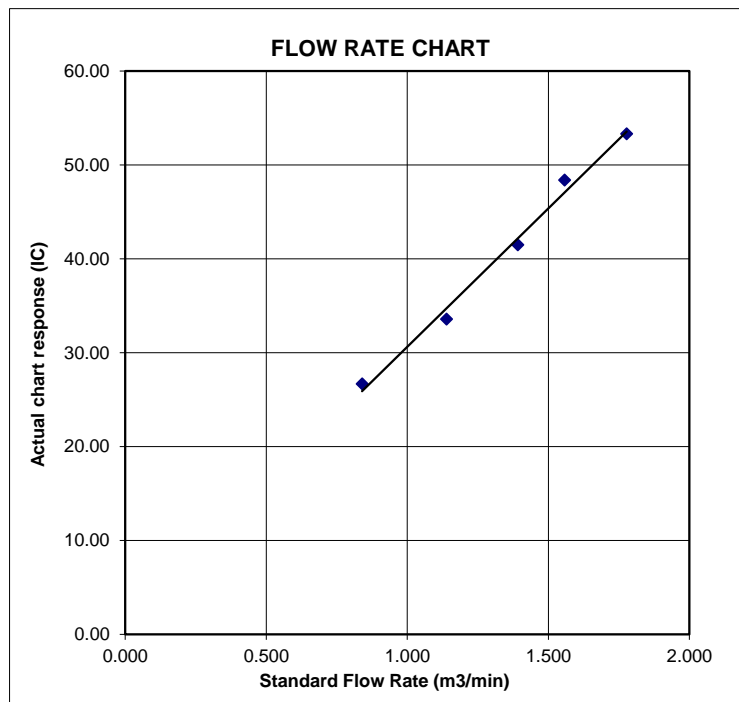
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure





TISCH ENVIRONMENTAL, INC.
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ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - Mar 14, 2016 Rootsmeter S/N 0438320 Ta (K) - 295
 Operator Tisch Orifice I.D. - 1612 Pa (mm) - 745.49

PLATE OR Run #	VOLUME START (m3)	VOLUME STOP (m3)	DIFF VOLUME (m3)	DIFF TIME (min)	METER DIFF Hg (mm)	ORFICE DIFF H2O (in.)
1	NA	NA	1.00	1.3770	3.2	2.00
2	NA	NA	1.00	0.9710	6.4	4.00
3	NA	NA	1.00	0.8710	7.8	5.00
4	NA	NA	1.00	0.8310	8.7	5.50
5	NA	NA	1.00	0.6860	12.6	8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)	Va	(x axis) Qa	(y axis)
0.9866	0.7165	1.4078	0.9957	0.7231	0.8896
0.9824	1.0117	1.9909	0.9914	1.0210	1.2581
0.9804	1.1256	2.2259	0.9894	1.1360	1.4066
0.9793	1.1785	2.3345	0.9883	1.1893	1.4753
0.9741	1.4200	2.8155	0.9830	1.4330	1.7792
Qstd slope (m) = 2.00411			Qa slope (m) = 1.25494		
intercept (b) = -0.03059			intercept (b) = -0.01933		
coefficient (r) = 0.99995			coefficient (r) = 0.99995		
y axis = SQRT[H2O(Pa/760) (298/Ta)]			y axis = SQRT[H2O(Ta/Pa)]		

CALCULATIONS

$$Vstd = \text{Diff. Vol} [(Pa - \text{Diff. Hg}) / 760] (298 / Ta)$$

$$Qstd = Vstd / \text{Time}$$

$$Va = \text{Diff Vol} [(Pa - \text{Diff Hg}) / Pa]$$

$$Qa = Va / \text{Time}$$

For subsequent flow rate calculations:

$$Qstd = 1/m \{ [\text{SQRT}(H2O(Pa/760) (298/Ta))] - b \}$$

$$Qa = 1/m \{ [\text{SQRT} H2O(Ta/Pa)] - b \}$$

Equipment Verification Report (TSP)

Equipment Calibrated:

Type: Laser Dust monitor
 Manufacturer: Sibata LD-3B
 Serial No. 2X6145
 Equipment Ref: EQ105
 Job Order HK1603558

Standard Equipment:

Standard Equipment: Higher Volume Sampler
 Location & Location ID: AUES office (calibration room)
 Equipment Ref: HVS 018
 Last Calibration Date: 2 January 2016

Equipment Verification Results:

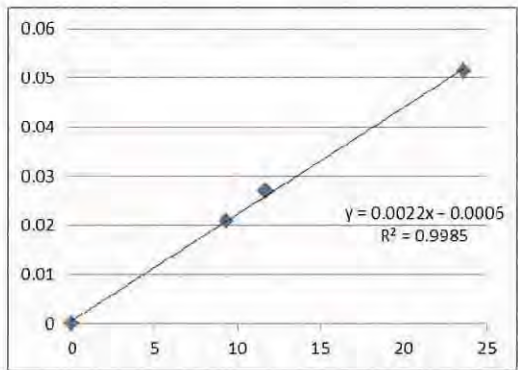
Testing Date: 4 to 6 January 2016

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m ³ (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr17min	17:30 ~ 19:47	20.6	1018.9	0.027	1602	11.7
2hr42min	17:00 ~ 19:42	20.7	1015.9	0.021	1522	9.3
2hr21min	18:00 ~ 20:21	20.9	1018.8	0.051	3347	23.6

Sensitivity Adjustment Scale Setting (Before Calibration) 593 (CPM)
 Sensitivity Adjustment Scale Setting (After Calibration) 596 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022
 Correlation Coefficient 0.9985
 Date of Issue 11 January 2016



Remarks:

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

Operator : Donald Kwok Signature : [Signature] Date : 12 January 2016

QC Reviewer : Ben Tam Signature : [Signature] Date : 12 January 2016

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Gold King Industrial Building, Kwai Chung	Date of Calibration: 2-Jan-16
Location ID :	Calibration Room	Next Calibration Date: 2-Apr-16

CONDITIONS			
Sea Level Pressure (hPa)	1022	Corrected Pressure (mm Hg)	766.5
Temperature (°C)	18.9	Temperature (K)	292

CALIBRATION ORIFICE			
Make->	TISCH	Qstd Slope ->	2.10265
Model->	5025A	Qstd Intercept ->	-0.00335
Calibration Date->	24-Mar-15	Expiry Date->	24-Mar-16

CALIBRATION							LINEAR REGRESSION
Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	
18	4.1	4.1	8.2	1.384	56	56.82	Slope = 30.1332
13	3.2	3.2	6.4	1.222	52	52.76	Intercept = 15.8637
10	2.4	2.4	4.8	1.059	48	48.71	Corr. coeff. = 0.9950
8	1.6	1.6	3.2	0.865	42	42.62	
5	1.0	1.0	2.0	0.684	35	35.51	

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

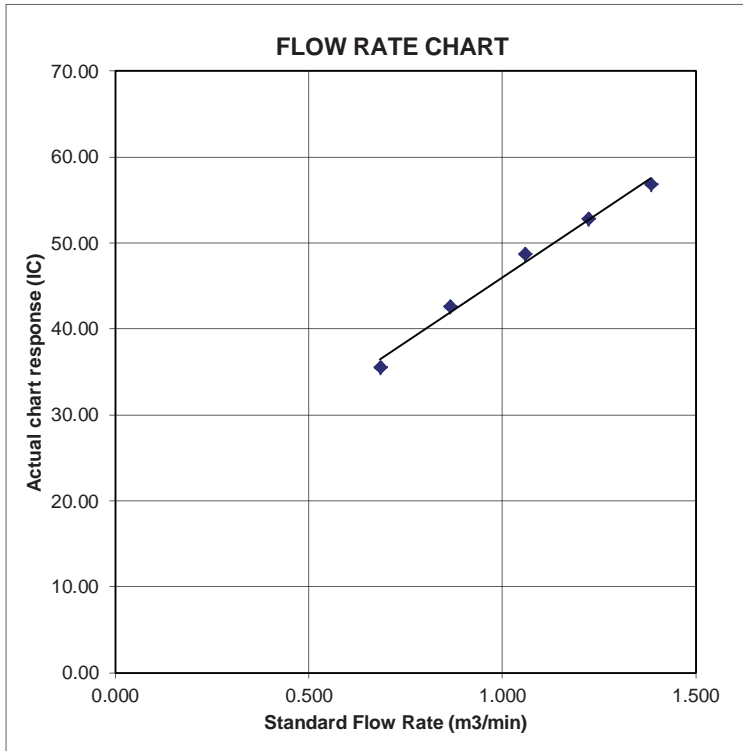
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



Equipment Verification Report (TSP)

Equipment Calibrated:

Type: Laser Dust monitor
 Manufacturer: Sibata LD-3B
 Serial No. 366409
 Equipment Ref: EQ109
 Job Order HK1603560

Standard Equipment:

Standard Equipment: Higher Volume Sampler
 Location & Location ID: AUES office (calibration room)
 Equipment Ref: HVS 018
 Last Calibration Date: 2 January 2016

Equipment Verification Results:

Testing Date: 4 to 6 January 2016

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m ³ (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr17min	17:30 ~ 19:47	20.6	1018.9	0.027	1577	11.5
2hr42min	17:00 ~ 19:42	20.7	1015.9	0.021	1433	8.8
2hr21min	18:00 ~ 20:21	20.9	1018.8	0.051	3328	23.5

Sensitivity Adjustment Scale Setting (Before Calibration) 540 (CPM)

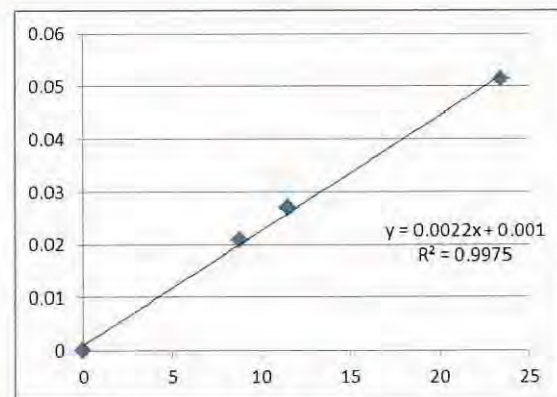
Sensitivity Adjustment Scale Setting (After Calibration) 540 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022

Correlation Coefficient 0.9975

Date of Issue 11 January 2016



Remarks:

- Strong** Correlation ($R > 0.8$)
- Factor 0.0022 should be apply for TSP monitoring

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

Operator : Donald Kwok Signature :  Date : 12 January 2016

QC Reviewer : Ben Tam Signature :  Date : 12 January 2016

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Gold King Industrial Building, Kwai Chung	Date of Calibration: 2-Jan-16
Location ID :	Calibration Room	Next Calibration Date: 2-Apr-16

CONDITIONS

Sea Level Pressure (hPa)	1022	Corrected Pressure (mm Hg)	766.5
Temperature (°C)	18.9	Temperature (K)	292

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.10265
Model->	5025A	Qstd Intercept ->	-0.00335
Calibration Date->	24-Mar-15	Expiry Date->	24-Mar-16

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	4.1	4.1	8.2	1.384	56	56.82	Slope = 30.1332 Intercept = 15.8637 Corr. coeff. = 0.9950
13	3.2	3.2	6.4	1.222	52	52.76	
10	2.4	2.4	4.8	1.059	48	48.71	
8	1.6	1.6	3.2	0.865	42	42.62	
5	1.0	1.0	2.0	0.684	35	35.51	

Calculations :

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

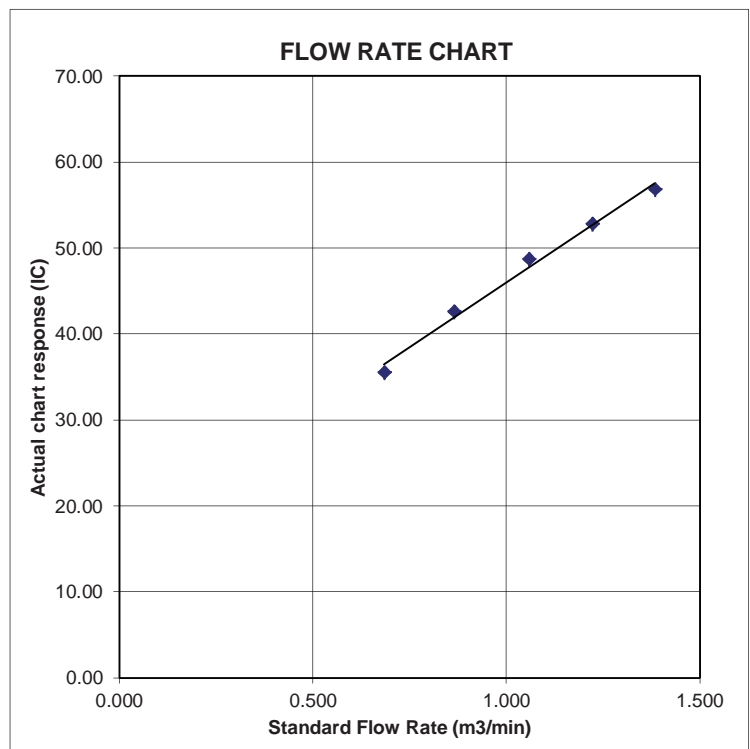
$$IC = I[\sqrt{P_a/P_{std}}(T_{std}/T_a)]$$

Q_{std} = standard flow rate
 IC = corrected chart responses
 I = actual chart response
 m = calibrator Q_{std} slope
 b = calibrator Q_{std} intercept
 T_a = actual temperature during calibration (deg K)
 P_{std} = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

m = sampler slope
 b = sampler intercept
 I = chart response
 T_{av} = daily average temperature
 P_{av} = daily average pressure



Equipment Verification Report (TSP)

Equipment Calibrated:

Type: Laser Dust monitor
 Manufacturer: Sibata LD-3B
 Serial No. 366410
 Equipment Ref: EQ110
 Job Order HK1603561

Standard Equipment:

Standard Equipment: Higher Volume Sampler
 Location & Location ID: AUES office (calibration room)
 Equipment Ref: HVS 018
 Last Calibration Date: 2 January 2016

Equipment Verification Results:

Testing Date: 4 to 6 January 2016

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m ³ (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr17min	17:30 ~ 19:47	20.6	1018.9	0.027	1566	11.4
2hr42min	17:00 ~ 19:42	20.7	1015.9	0.021	1422	8.7
2hr21min	18:00 ~ 20:21	20.9	1018.8	0.051	3318	23.4

Sensitivity Adjustment Scale Setting (Before Calibration) 660 (CPM)

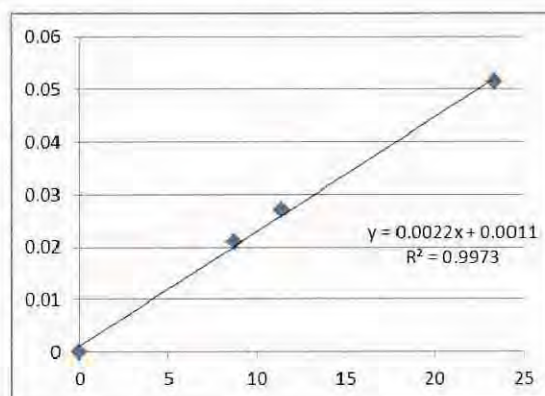
Sensitivity Adjustment Scale Setting (After Calibration) 661 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022

Correlation Coefficient 0.9973

Date of Issue 11 January 2016



Remarks:

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

Operator: Donald Kwok Signature:  Date: 12 January 2016

QC Reviewer: Ben Tam Signature:  Date: 12 January 2016

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Gold King Industrial Building, Kwai Chung	Date of Calibration: 2-Jan-16
Location ID :	Calibration Room	Next Calibration Date: 2-Apr-16

CONDITIONS			
Sea Level Pressure (hPa)	1022	Corrected Pressure (mm Hg)	766.5
Temperature (°C)	18.9	Temperature (K)	292

CALIBRATION ORIFICE			
Make->	TISCH	Qstd Slope ->	2.10265
Model->	5025A	Qstd Intercept ->	-0.00335
Calibration Date->	24-Mar-15	Expiry Date->	24-Mar-16

CALIBRATION							LINEAR REGRESSION
Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	
18	4.1	4.1	8.2	1.384	56	56.82	Slope = 30.1332
13	3.2	3.2	6.4	1.222	52	52.76	Intercept = 15.8637
10	2.4	2.4	4.8	1.059	48	48.71	Corr. coeff. = 0.9950
8	1.6	1.6	3.2	0.865	42	42.62	
5	1.0	1.0	2.0	0.684	35	35.51	

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

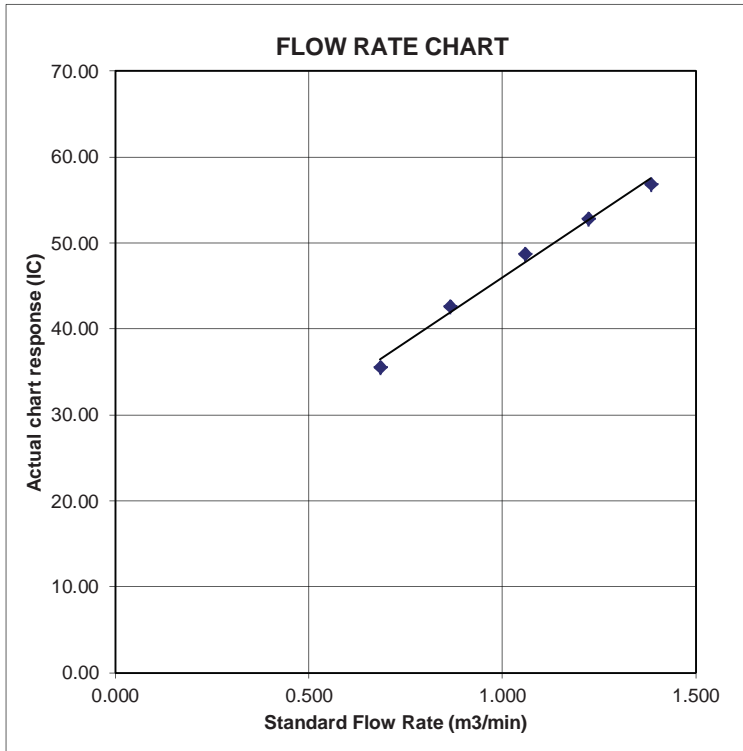
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



Equipment Verification Report (TSP)

Equipment Calibrated:

Type: Laser Dust monitor
 Manufacturer: Sibata LD-3B
 Serial No. 3Y6503
 Equipment Ref: EQ112
 Job Order HK1603553

Standard Equipment:

Standard Equipment: Higher Volume Sampler
 Location & Location ID: AUES office (calibration room)
 Equipment Ref: HVS 018
 Last Calibration Date: 2 January 2016

Equipment Verification Results:

Testing Date: 4 to 6 January 2016

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m ³ (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr17min	17:30 ~ 19:47	20.6	1018.9	0.027	1633	11.9
2hr42min	17:00 ~ 19:42	20.7	1015.9	0.021	1502	9.2
2hr21min	18:00 ~ 20:21	20.9	1018.8	0.051	3365	23.8

Sensitivity Adjustment Scale Setting (Before Calibration) 642 (CPM)

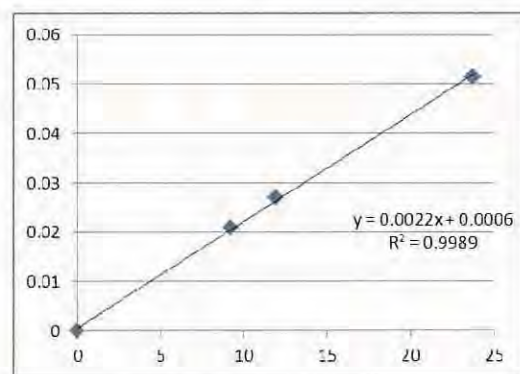
Sensitivity Adjustment Scale Setting (After Calibration) 648 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022

Correlation Coefficient 0.9989

Date of Issue 11 January 2016



Remarks:

- Strong** Correlation ($R > 0.8$)
- Factor 0.0022 should be apply for TSP monitoring

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

Operator: Donald Kwok Signature: [Signature] Date: 12 January 2016

QC Reviewer: Ben Tam Signature: [Signature] Date: 12 January 2016

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Gold King Industrial Building, Kwai Chung	Date of Calibration: 2-Jan-16
Location ID :	Calibration Room	Next Calibration Date: 2-Apr-16

CONDITIONS			
Sea Level Pressure (hPa)	1022	Corrected Pressure (mm Hg)	766.5
Temperature (°C)	18.9	Temperature (K)	292

CALIBRATION ORIFICE			
Make->	TISCH	Qstd Slope ->	2.10265
Model->	5025A	Qstd Intercept ->	-0.00335
Calibration Date->	24-Mar-15	Expiry Date->	24-Mar-16

CALIBRATION							LINEAR REGRESSION
Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	
18	4.1	4.1	8.2	1.384	56	56.82	Slope = 30.1332
13	3.2	3.2	6.4	1.222	52	52.76	Intercept = 15.8637
10	2.4	2.4	4.8	1.059	48	48.71	Corr. coeff. = 0.9950
8	1.6	1.6	3.2	0.865	42	42.62	
5	1.0	1.0	2.0	0.684	35	35.51	

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

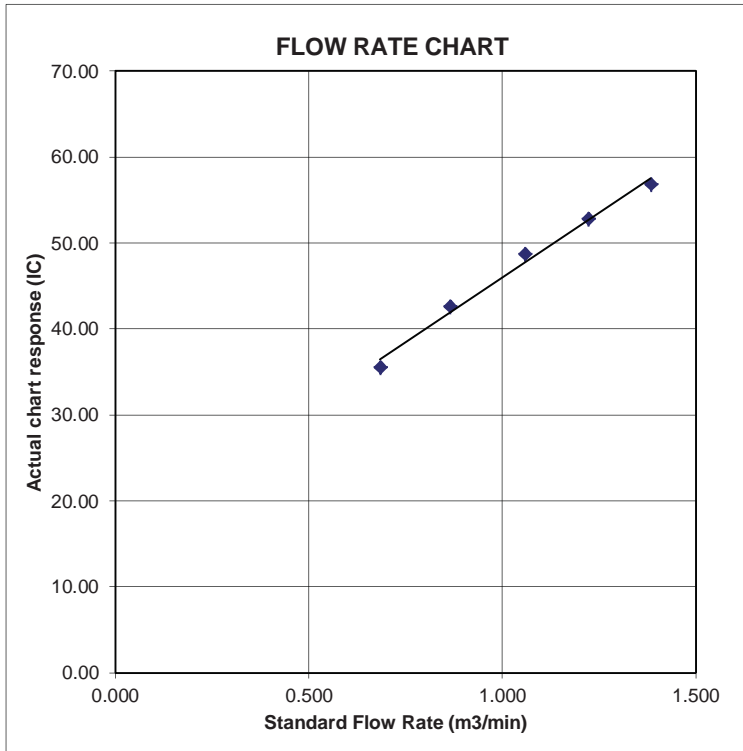
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



Equipment Verification Report (TSP)

Equipment Calibrated:

Type: Laser Dust monitor
 Manufacturer: Sibata LD-3B
 Serial No. 3Y6505
 Equipment Ref: EQ114
 Job Order HK1603562

Standard Equipment:

Standard Equipment: Higher Volume Sampler
 Location & Location ID: AUES office (calibration room)
 Equipment Ref: HVS 018
 Last Calibration Date: 2 January 2016

Equipment Verification Results:

Testing Date: 4 to 6 January 2016

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m ³ (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr17min	17:30 ~ 19:47	20.6	1018.9	0.027	1589	11.6
2hr42min	17:00 ~ 19:42	20.7	1015.9	0.021	1473	9.0
2hr21min	18:00 ~ 20:21	20.9	1018.8	0.051	3314	23.4

Sensitivity Adjustment Scale Setting (Before Calibration) 588 (CPM)

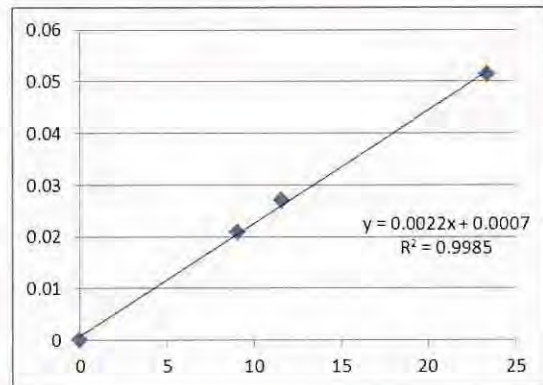
Sensitivity Adjustment Scale Setting (After Calibration) 585 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022

Correlation Coefficient 0.9985


Date of Issue 11 January 2016



Remarks:

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

Operator : Donald Kwok Signature :  Date : 12 January 2016

QC Reviewer : Ben Tam Signature :  Date : 12 January 2016

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Gold King Industrial Building, Kwai Chung	Date of Calibration: 2-Jan-16
Location ID :	Calibration Room	Next Calibration Date: 2-Apr-16

CONDITIONS

Sea Level Pressure (hPa)	1022	Corrected Pressure (mm Hg)	766.5
Temperature (°C)	18.9	Temperature (K)	292

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.10265
Model->	5025A	Qstd Intercept ->	-0.00335
Calibration Date->	24-Mar-15	Expiry Date->	24-Mar-16

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	4.1	4.1	8.2	1.384	56	56.82	Slope = 30.1332 Intercept = 15.8637 Corr. coeff. = 0.9950
13	3.2	3.2	6.4	1.222	52	52.76	
10	2.4	2.4	4.8	1.059	48	48.71	
8	1.6	1.6	3.2	0.865	42	42.62	
5	1.0	1.0	2.0	0.684	35	35.51	

Calculations :

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

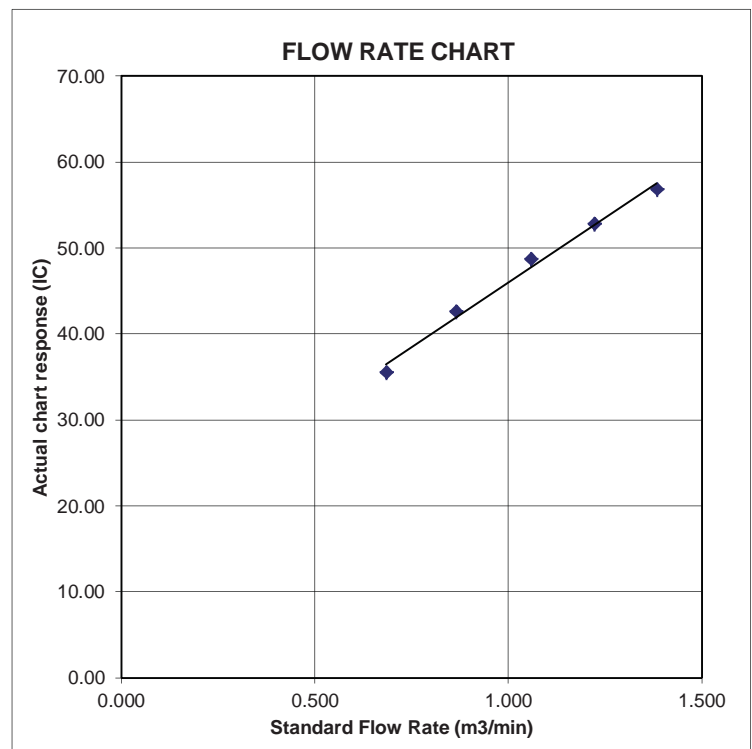
$$IC = I[\sqrt{P_a/P_{std}}(T_{std}/T_a)]$$

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

For subsequent calculation of sampler flow:

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

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





輝創工程有限公司

Sun Creation Engineering Limited

Calibration and Testing Laboratory

Certificate of Calibration

校正證書

Certificate No. : C153055
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC15-0720)

Date of Receipt / 收件日期 : 15 May 2015

Description / 儀器名稱 : Integrating Sound Level Meter (EQ065)
Manufacturer / 製造商 : Brüel & Kjær
Model No. / 型號 : 2238
Serial No. / 編號 : 2337676
Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

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

Relative Humidity / 相對濕度 : $(55 \pm 20)\%$

Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 4 June 2015


TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.
All results are within manufacturer's specification.
The results are detailed in the subsequent page(s).

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

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA

Tested By
測試


K C Lee
Project Engineer

Certified By
核證


K M Wu
Engineer

Date of Issue
簽發日期

5 June 2015

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

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

Sun Creation Engineering Limited - Calibration & Testing Laboratory

c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

輝創工程有限公司 - 校正及檢測實驗室

c/o 香港新界屯門興安里一號青山灣機樓四樓

Tel/電話: 2927 2606

Fax/傳真: 2744 8986

E-mail/電郵: callab@suncreation.com

Website/網址: www.suncreation.com

Certificate of Calibration

校正證書

Certificate No. : C153055
證書編號

- The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours, and switched on to warm up for over 10 minutes before the commencement of the test.
- The results presented are the mean of 3 measurements at each calibration point.
- Test equipment :

<u>Equipment ID</u>	<u>Description</u>	<u>Certificate No.</u>
CL280	40 MHz Arbitrary Waveform Generator	C150014
CL281	Multifunction Acoustic Calibrator	DC130171

- Test procedure : MA101N.

- Results :

5.1 Sound Pressure Level

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

5.1.2 Linearity

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

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

- Time Weighting

5.2.1 Continuous Signal

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

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

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

Certificate of Calibration

校正證書

Certificate No. : C153055
證書編號

5.2.2 Tone Burst Signal (2 kHz)

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Burst Duration		
30 - 110	L _{AFF}	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	

5.3 Frequency Weighting

5.3.1 A-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
50 - 130	L _{AFF}	A	F	94.00	31.5 Hz	54.8	-39.4 ± 1.5
					63 Hz	67.9	-26.2 ± 1.5
					125 Hz	77.8	-16.1 ± 1.0
					250 Hz	85.3	-8.6 ± 1.0
					500 Hz	90.8	-3.2 ± 1.0
					1 kHz	94.0	Ref.
					2 kHz	95.2	+1.2 ± 1.0
					4 kHz	95.0	+1.0 ± 1.0
					8 kHz	92.9	-1.1 (+1.5 ; -3.0)
					12.5 kHz	89.8	-4.3 (+3.0 ; -6.0)

5.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
50 - 130	L _{CFP}	C	F	94.00	31.5 Hz	91.1	-3.0 ± 1.5
					63 Hz	93.2	-0.8 ± 1.5
					125 Hz	93.8	-0.2 ± 1.0
					250 Hz	93.9	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	93.2	-0.8 ± 1.0
					8 kHz	91.0	-3.0 (+1.5 ; -3.0)
					12.5 kHz	87.9	-6.2 (+3.0 ; -6.0)

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

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

Certificate of Calibration

校正證書

Certificate No. : C153055
證書編號

5.4 Time Averaging

UUT Setting				Applied Value					UUT	IEC 60804
Range (dB)	Parameter	Frequency Weighting	Integrating Time	Frequency (kHz)	Burst Duration (ms)	Burst Duty Factor	Burst Level (dB)	Equivalent Level (dB)	Reading (dB)	Type 1 Spec. (dB)
30 - 110	L _{Aeq}	A	10 sec.	4	1	1/10	110.0	100	100.0	± 0.5
			60 sec.					90	89.7	± 0.5
			5 min.					80	79.8	± 1.0
								70	69.7	± 1.0

Remarks : - UUT Microphone Model No. : 4188 & S/N : 2812708

- 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 :

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.

Certificate of Calibration

校正證書

Certificate No. : C162996
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC16-0843)

Date of Receipt / 收件日期 : 26 May 2016

Description / 儀器名稱 : Integrating Sound Level Meter (EQ065)
Manufacturer / 製造商 : Brüel & Kjær
Model No. / 型號 : 2238
Serial No. / 編號 : 2337676
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 : (55 ± 20)%

Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 2 June 2016


TEST RESULTS / 測試結果

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

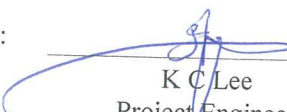
The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Fluke Everett Service Center, USA
- Rohde & Schwarz Laboratory, Germany

Tested By
測試


H T Wong
Technical Officer

Certified By
核證


K C Lee
Project Engineer

Date of Issue
簽發日期

6 June 2016

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

校正證書

Certificate No. : C162996

證書編號

6.2 Time Weighting

6.2.1 Continuous Signal

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

6.2.2 Tone Burst Signal (2 kHz)

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Burst Duration		
30 - 110	L _{AFP}	A	F	106.0	Continuous	106.0	Ref.
	L _{AFMax}				200 ms	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.		
50 - 130	L _{AFP}	A	F	94.00	31.5 Hz	54.9	-39.4 ± 1.5
					63 Hz	67.9	-26.2 ± 1.5
					125 Hz	77.9	-16.1 ± 1.0
					250 Hz	85.4	-8.6 ± 1.0
					500 Hz	90.8	-3.2 ± 1.0
					1 kHz	94.0	Ref.
					2 kHz	95.2	+1.2 ± 1.0
					4 kHz	95.0	+1.0 ± 1.0
					8 kHz	92.9	-1.1 (+1.5 ; -3.0)
					12.5 kHz	89.8	-4.3 (+3.0 ; -6.0)

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

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Certificate of Calibration

校正證書

Certificate No. : C162996
證書編號

6.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
50 - 130	L _{CFP}	C	F	94.00	31.5 Hz	91.2	-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	93.2	-0.8 ± 1.0
					8 kHz	91.0	-3.0 (+1.5 ; -3.0)
					12.5 kHz	87.9	-6.2 (+3.0 ; -6.0)

6.4 Time Averaging

UUT Setting				Applied Value					UUT Reading (dB)	IEC 60804 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Integrating Time	Frequency (kHz)	Burst Duration (ms)	Burst Duty Factor	Burst Level (dB)	Equivalent Level (dB)		
30 - 110	L _{Aeq}	A	10 sec.	4	1	1/10	110.0	100	100.2	± 0.5
			60 sec.					90	90.1	± 0.5
			5 min.					80	79.8	± 1.0
								70	69.8	± 1.0

Remarks : - UUT Microphone Model No. : 4188 & S/N : 2812708

- 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 :

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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Certificate of Calibration

校正證書

Certificate No. : C162991
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC16-0843)

Description / 儀器名稱 : Sound Calibrator (EQ083)
 Manufacturer / 製造商 : Rion
 Model No. / 型號 : NC-74
 Serial No. / 編號 : 34246492
 Supplied By / 委託者 : Action-United Environmental Services and Consulting
 Unit A, 20/F., Gold King Industrial Building,
 35-41 Tai Lin Pai Road, Kwai Chung, N.T.

Date of Receipt / 收件日期 : 24 May 2016

TEST CONDITIONS / 測試條件

Temperature / 溫度 : (23 ± 2)°C
 Line Voltage / 電壓 : ---

Relative Humidity / 相對濕度 : (55 ± 20)%

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 2 June 2016


TEST RESULTS / 測試結果

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


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

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA

Tested By
測試


H T Wong
Technical Officer

Certified By
核證


K C Lee
Project Engineer

Date of Issue
簽發日期

3 June 2016

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

Certificate No. : C161797
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC16-0662) Date of Receipt / 收件日期 : 22 March 2016
Description / 儀器名稱 : Sound Level Meter (EQ014)
Manufacturer / 製造商 : Rion
Model No. / 型號 : NL-52
Serial No. / 編號 : 00142580
Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

Temperature / 溫度 : $(23 \pm 2)^{\circ}\text{C}$ Relative Humidity / 相對濕度 : $(55 \pm 20)\%$
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration

DATE OF TEST / 測試日期 : 6 April 2016

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

Tested By : 
測試 : _____
H T Wong
Technical Officer

Certified By : 
核證 : _____
K C Lee
Project Engineer

Date of Issue : 7 April 2016
簽發日期

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

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Certificate of Calibration

校正證書

Certificate No. : C161797

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	C160077
CL281	Multifunction Acoustic Calibrator	PA160023

5. Test procedure : MA101N.

6. Results :

- 6.1 Sound Pressure Level

- 6.1.1 Reference Sound Pressure Level

- 6.1.1.1 Before 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	* 91.9	± 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.

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

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Certificate of Calibration

校正證書

Certificate No. : C161797
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	67.7	-26.2 ± 1.5
					125 Hz	77.8	-16.1 ± 1.5
					250 Hz	85.3	-8.6 ± 1.4
					500 Hz	90.7	-3.2 ± 1.4
					1 kHz	94.0	Ref.
					2 kHz	95.2	+1.2 ± 1.6
					4 kHz	95.0	+1.0 ± 1.6
					8 kHz	92.9	-1.1 (+2.1 ; -3.1)
					12.5 kHz	89.5	-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	93.1	-0.8 ± 1.5
					125 Hz	93.8	-0.2 ± 1.5
					250 Hz	94.0	0.0 ± 1.4
					500 Hz	94.0	0.0 ± 1.4
					1 kHz	94.0	Ref.
					2 kHz	93.8	-0.2 ± 1.6
					4 kHz	93.2	-0.8 ± 1.6
					8 kHz	91.0	-3.0 (+2.1 ; -3.1)
					12.5 kHz	87.6	-6.2 (+3.0 ; -6.0)

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

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Sun Creation Engineering Limited – Calibration & Testing Laboratory

c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

輝創工程有限公司 – 校正及檢測實驗室

c/o 香港新界屯門興安里一號青山灣機樓四樓

Tel/電話: 2927 2606 Fax/傳真: 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com



Certificate of Calibration

校正證書

Certificate No. : C161797
證書編號

- Remarks : - UUT Microphone Model No. : UC-59 & S/N : 07725
- 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 :

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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輝創工程有限公司 – 校正及檢測實驗室

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Tel/電話: 2927 2606 Fax/傳真: 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com



Certificate of Calibration 校正證書

Certificate No. : C162177
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC16-0843) Date of Receipt / 收件日期 : 14 April 2016
Description / 儀器名稱 : Integrating Sound Level Meter (EQ006)
Manufacturer / 製造商 : Brüel & Kjær
Model No. / 型號 : 2238
Serial No. / 編號 : 2285762
Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

Temperature / 溫度 : $(23 \pm 2)^{\circ}\text{C}$ Relative Humidity / 相對濕度 : $(55 \pm 20)\%$
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 25 April 2016

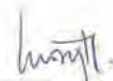
TEST RESULTS / 測試結果

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

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

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Fluke Everett Service Center, USA
- Rohde & Schwarz Laboratory, Germany

Tested By
測試



H T Wong
Technical Officer

Certified By
核證



K C Lee
Project Engineer

Date of Issue : 27 April 2016
簽發日期

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

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Certificate of Calibration

校正證書

Certificate No. : C162177
證書編號

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

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C160077
CL281	Multifunction Acoustic Calibrator	PA160023

- Test procedure : MA101N.

- Results :

- 6.1 Sound Pressure Level

- 6.1.1 Reference Sound Pressure Level

- 6.1.1.1 Before Self-calibration

UUT Setting				Applied Value		UUT Reading (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
50 - 130	L _{AFP}	A	F	94.00	1	94.2

- 6.1.1.2 After Self-calibration

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

- 6.1.2 Linearity

UUT Setting				Applied Value		UUT Reading (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
50 - 130	L _{AFP}	A	F	94.00	1	94.0 (Ref.)
				104.00		104.0
				114.00		113.9

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

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

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Sun Creation Engineering Limited - Calibration & Testing Laboratory

c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

輝創工程有限公司 - 校正及檢測實驗室

c/o 香港新界屯門興安里一號青山灣機樓四樓

Tel/電話: 2927 2606 Fax/傳真: 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com

Certificate of Calibration

校正證書

Certificate No. : C162177

證書編號

6.2 Time Weighting

6.2.1 Continuous Signal

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
50 - 130	L _{AFP}	A	F	94.00	1	94.0	Ref.
	L _{ASP}		S			94.0	± 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		
30 - 110	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.		
50 - 130	L _{AFP}	A	F	94.00	31.5 Hz	55.1	-39.4 ± 1.5
					63 Hz	67.9	-26.2 ± 1.5
					125 Hz	77.9	-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	95.0	+1.0 ± 1.0
					8 kHz	91.0	-1.1 (+1.5 ; -3.0)
					12.5 kHz	89.8	-4.3 (+3.0 ; -6.0)

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

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Certificate of Calibration

校正證書

Certificate No. : C162177
證書編號

6.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
50 - 130	L _{CFP}	C	F	94.00	31.5 Hz	91.5	-3.0 ± 1.5
					63 Hz	93.4	-0.8 ± 1.5
					125 Hz	93.9	-0.2 ± 1.0
					250 Hz	94.1	0.0 ± 1.0
					500 Hz	94.1	0.0 ± 1.0
					1 kHz	94.1	Ref.
					2 kHz	93.9	-0.2 ± 1.0
					4 kHz	93.2	-0.8 ± 1.0
					8 kHz	92.9	-3.0 (+1.5 ; -3.0)
					12.5 kHz	87.9	-6.2 (+3.0 ; -6.0)

6.4 Time Averaging

UUT Setting				Applied Value					UUT Reading (dB)	IEC 60804 Type 1 Spec. (dB)	
Range (dB)	Parameter	Frequency Weighting	Integrating Time	Frequency (kHz)	Burst Duration (ms)	Burst Duty Factor	Burst Level (dB)	Equivalent Level (dB)			
30 - 110	L _{Aeq}	A	10 sec.	4	1	1/10	110.0	100	100.0	± 0.5	
								1/10 ²	90	89.9	± 0.5
								1/10 ³	80	79.2	± 1.0
								1/10 ⁴	70	69.2	± 1.0
			60 sec.								
			5 min.								

Remarks : - UUT Microphone Model No. : 4188 & S/N : 2812705

- 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 :

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

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

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Certificate of Calibration 校正證書

Certificate No. : C162438
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC16-0843) Date of Receipt / 收件日期 : 5 May 2016
Description / 儀器名稱 : Acoustical Calibrator (EQ081)
Manufacturer / 製造商 : Brüel & Kjær
Model No. / 型號 : 4231
Serial No. / 編號 : 2326408
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 : (55 ± 20)%
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 10 May 2016

TEST RESULTS / 測試結果

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

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

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA

Tested By : 
測試 : _____
H T Wong
Technical Officer

Certified By : 
核證 : _____
K C Lee
Project Engineer

Date of Issue : 11 May 2016
簽發日期

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

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

Certificate of Calibration

校正證書

Certificate No. : C162438

證書編號

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

Equipment ID	Description	Certificate No.
CL130	Universal Counter	C153519
CL281	Multifunction Acoustic Calibrator	PA160023
TST150A	Measuring Amplifier	C161175

- Test procedure : MA100N.

- Results :

5.1 Sound Level Accuracy

UUT Nominal Value	Measured Value (dB)	Mfr's Spec. (dB)	Uncertainty of Measured Value (dB)
94 dB, 1 kHz	94.0	± 0.2	± 0.2
114 dB, 1 kHz	114.0		

5.2 Frequency Accuracy

UUT Nominal Value (kHz)	Measured Value (kHz)	Mfr's Spec.	Uncertainty of Measured Value (Hz)
1	1.000 0	1 kHz ± 0.1 %	± 0.1

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

Note :

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

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

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

Sun Creation Engineering Limited – Calibration & Testing Laboratory

c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

輝創工程有限公司 – 校正及檢測實驗室

c/o 香港新界屯門興安里一號青山灣機樓四樓

Tel/電話: 2927 2606

Fax/傳真: 2744 8986

E-mail/電郵: callab@suncreation.com

Website/網址: www.suncreation.com



Certificate of Calibration 校正證書

Certificate No. : C162125
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC16-0843) Date of Receipt / 收件日期 : 14 April 2016
Description / 儀器名稱 : Acoustical Calibrator (EQ082)
Manufacturer / 製造商 : Brüel & Kjær
Model No. / 型號 : 4231
Serial No. / 編號 : 2713428
Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

Temperature / 溫度 : $(23 \pm 2)^{\circ}\text{C}$ Relative Humidity / 相對濕度 : $(55 \pm 20)\%$
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 22 April 2016

TEST RESULTS / 測試結果

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

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

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA

Tested By : 
測試 : H T Wong
Technical Officer

Certified By : 
核證 : K C Lee
Project Engineer

Date of Issue : 25 April 2016
簽發日期

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

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



Certificate of Calibration

校正證書

Certificate No. : C162125
證書編號

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

<u>Equipment ID</u>	<u>Description</u>	<u>Certificate No.</u>
CL130	Universal Counter	C153519
CL281	Multifunction Acoustic Calibrator	PA160023
TST150A	Measuring Amplifier	C161175

- Test procedure : MA100N.

- Results :

5.1 Sound Level Accuracy

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

5.2 Frequency Accuracy

UUT Nominal Value (kHz)	Measured Value (kHz)	Mfr's Spec.	Uncertainty of Measured Value (Hz)
1	1.000 0	1 kHz ± 0.1 %	± 0.1

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

Note :

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

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

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



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Kwai Chung, N.T., Hong Kong
T: +852 2610 1044
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www.alsglobal.com

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT: MR BEN TAM
CLIENT: ACTION UNITED ENVIRO SERVICES
ADDRESS: RM A 20/F., GOLD KING IND BLDG,
NO. 35-41 TAI LIN PAI ROAD,
KWAI CHUNG,
N.T., HONG KONG.

WORK ORDER: HK1614299
SUB-BATCH: 0
LABORATORY: HONG KONG
DATE RECEIVED: 11/04/2016
DATE OF ISSUE: 18/04/2016

COMMENTS

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

Scope of Test: Dissolved Oxygen and Temperature
Equipment Type: Dissolved Oxygen Meter
Brand Name: YSI
Model No.: YSI Pro 20
Serial No.: 12C100570
Equipment No.: --
Date of Calibration: 18 April, 2016

NOTES

This is the Final Report and supersedes any preliminary report with this batch number.
Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.


Mr. Fung Lim Chee, Richard
General Manager -
Greater China & Hong Kong

REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION

Work Order: HK1614299
Sub-Batch: 0
Date of Issue: 18/04/2016
Client: ACTION UNITED ENVIRO SERVICES



Equipment Type: Dissolved Oxygen Meter
Brand Name: YSI
Model No.: YSI Pro 20
Serial No.: 12C100570
Equipment No.: --

Date of Calibration: 18 April, 2016 Date of next Calibration: 18 July, 2016

Parameters:

Dissolved Oxygen

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

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
3.00	3.12	+0.12
5.06	5.06	0.00
9.01	9.04	+0.03
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 (°C)	Displayed Reading (°C)	Tolerance (°C)
10	9.97	-0.0
20	19.5	-0.5
40	41.0	+1.0
Tolerance Limit (°C)		±2.0

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

A handwritten signature in black ink, appearing to read 'R. Lim Chee'.

Mr. Fung Lim Chee, Richard
General Manager -
Greater China & Hong Kong



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REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT: MR BEN TAM
CLIENT: ACTION UNITED ENVIRO SERVICES
ADDRESS: RM A 20/F., GOLD KING IND BLDG,
NO. 35-41 TAI LIN PAI ROAD,
KWAI CHUNG,
N.T., HONG KONG

WORK ORDER: HK1614295
SUB-BATCH: 0
LABORATORY: HONG KONG
DATE RECEIVED: 11/04/2016
DATE OF ISSUE: 18/04/2016

COMMENTS

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

Scope of Test: Turbidity
Equipment Type: Turbidimeter
Brand Name: HACH
Model No.: 2100Q
Serial No.: 12060C018266
Equipment No.: --
Date of Calibration: 18 April, 2016

NOTES

This is the Final Report and supersedes any preliminary report with this batch number.
Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.


Mr. Fung Lim Chee, Richard
General Manager
Greater China & Hong Kong

REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION



Work Order: HK1614295
Sub-batch: 0
Date of Issue: 18/04/2016
Client: ACTION UNITED ENVIRO SERVICES

Equipment Type: Turbidimeter
Brand Name: HACH
Model No.: 2100Q
Serial No.: 12060C018266
Equipment No.: --
Date of Calibration: 18 April, 2016

Date of next Calibration: 18 July, 2016

Parameters:

Turbidity

Method Ref: APHA 21st Ed. 2130B

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.18	--
4	4.07	+1.8
40	36.4	-9.0
80	75.6	-5.5
400	413	+3.3
800	824	+3.0
	Tolerance Limit (%)	±10.0

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

Mr. Fung Lim Chee, Richard
General Manager
Greater China & Hong Kong



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REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION

CONTACT: MR BEN TAM
CLIENT: ACTION UNITED ENVIRO SERVICES
ADDRESS: RM A 20/F., GOLDEN KING IND BLDG,
NO. 35-41 TAI LIN PAI ROAD,
KWAI CHUNG,
N.T., HONG KONG

WORK ORDER: HK1614292
SUB-BATCH: 0
LABORATORY: HONG KONG
DATE RECEIVED: 11/04/2016
DATE OF ISSUE: 18/04/2016

COMMENTS

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

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

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

Scope of Test: pH and Temperature
Description: pH Meter
Brand Name: AZ
Model No.: AZ 8685
Serial No.: 1064457
Equipment No.: --
Date of Calibration: 18 April, 2016

NOTES

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

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


Mr Fung Lim Chee, Richard
General Manager -
Greater China & Hong Kong

REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION



Work Order: HK1614292
Sub-batch: 0
Date of Issue: 18/04/2016
Client: ACTION UNITED ENVIRO SERVICES

Description: pH Meter
Brand Name: AZ
Model No.: AZ 8685
Serial No.: 1064457
Equipment No.: --
Date of Calibration: 18 April, 2016

Date of next Calibration: 18 July, 2016

Parameters:

pH Value

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

Expected Reading (pH Unit)	Displayed Reading (pH Unit)	Tolerance (pH unit)
4.0	3.9	-0.10
7.0	7.1	+0.10
10.0	10.0	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 (°C)	Displayed Reading (°C)	Tolerance (°C)
10	10.0	+0.0
20	20.5	+0.5
40	40.5	+0.5
Tolerance Limit (°C)		±2.0

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



 Mr Fung Lim Chee, Richard
 General Manager
 Greater China & Hong Kong



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REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT: MR BEN TAM
CLIENT: ACTION UNITED ENVIRO SERVICES
ADDRESS: RM A 20/F., GOLD KING IND BLDG,
NO. 35-41 TAI LIN PAI ROAD,
KWAI CHUNG,
N.T., HONG KONG.

WORK ORDER: HK1614297
SUB-BATCH: 0
LABORATORY: HONG KONG
DATE RECEIVED: 11/04/2016
DATE OF ISSUE: 18/04/2016

COMMENTS

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

Scope of Test: Conductivity, Dissolved Oxygen, pH, Salinity, Temperature and Turbidity
Equipment Type: Multifunctional Meter
Brand Name: YSI
Model No.: Professional DSS
Serial No.: 15H102620/ 15H103928
Equipment No.: EQW018
Date of Calibration: 18 April, 2016

NOTES

This is the Final Report and supersedes any preliminary report with this batch number.
Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.


Mr. Fung Lim Chee, Richard
General Manager
Greater China & Hong Kong

REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION

Work Order: HK1614297
Sub-Batch: 0
Date of Issue: 18/04/2016
Client: ACTION UNITED ENVIRO SERVICES



Equipment Type: Multifunctional Meter
Brand Name: YSI
Model No.: Professional DSS
Serial No.: 15H102620/ 15H103928
Equipment No.: EQW018
Date of Calibration: 18 April, 2016

Date of next Calibration: 18 July, 2016

Parameters:

Conductivity

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

Expected Reading (uS/cm)	Displayed Reading (uS/cm)	Tolerance (%)
146.9	141.3	-3.8
6667	6399	-4.0
12890	12596	-2.3
58670	55890	-4.7
Tolerance Limit (%)		±10.0

Dissolved Oxygen

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

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
3.00	2.98	-0.02
5.06	4.93	-0.13
9.01	8.93	-0.08
Tolerance Limit (mg/L)		±0.20

pH Value

Method Ref: APHA 21st Ed. 4500H:B

Expected Reading (pH Unit)	Displayed Reading (pH Unit)	Tolerance (pH unit)
4.0	4.08	+0.08
7.0	7.05	+0.05
10.0	10.01	+0.01
Tolerance Limit (pH unit)		±0.20

Salinity

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

Expected Reading (ppt)	Displayed Reading (ppt)	Tolerance (%)
0	0.08	--
10	9.95	-0.5
20	19.80	-1.0
30	29.89	-0.4
Tolerance Limit (%)		±10.0

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


 Mr. Fung Lim Chee, Richard
 General Manager -
 Greater China & Hong Kong

REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION

Work Order: HK1614297
Sub-Batch: 0
Date of Issue: 18/04/2016
Client: ACTION UNITED ENVIRO SERVICES



Equipment Type: Multifunctional Meter
Brand Name: YSI
Model No.: Professional DSS
Serial No.: 15H102620/ 15H103928
Equipment No.: EQW018
Date of Calibration: 18 April, 2016

Date of next Calibration: 18 July, 2016

Parameters:

Temperature

Method Ref: Section 6 of International Accreditation New Zealand Technical

Guide No. 3 Second edition March 2008: Working Thermometer Calibration Procedure.

Expected Reading (°C)	Displayed Reading (°C)	Tolerance (°C)
10	10.2	+0.2
20	21.0	+1.0
40	40.1	+0.1
	Tolerance Limit (°C)	±2.0

Turbidity

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

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.2	--
4	3.8	-5.0
40	37.0	-7.5
80	78.6	-1.8
400	377.1	-5.7
800	738.3	-7.7
	Tolerance Limit (%)	±10.0

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

Mr. Fung Lim Chee, Richard
General Manager -
Greater China & Hong Kong



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

Event and Action Plan for Construction Noise

Event		ET	IEC	ER	Action Contractor
Action Level	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 1. Submit noise mitigation proposals to IEC and ER; 2. Implement noise mitigation proposals. 	
Limit Level	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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 CONTRACTOR			
	ET	IEC	ER	
Action level being exceeded by one sampling day	<ol style="list-style-type: none"> Repeat in-situ measurement to confirm findings; Identify reasons for non-compliance and sources of impact; Inform IEC and Contractor; Check monitoring data, all plant, equipment and Contractor's working methods; Discuss mitigation measures with IEC and Contractor; Repeat measurement on next day of exceedance. 	<ol style="list-style-type: none"> Discuss with ET and Contractor on the mitigation measures; Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; Assess the effectiveness of the implemented mitigation measures 	<ol style="list-style-type: none"> Discuss with IEC on the proposed mitigation measures; Make agreement on the mitigation measures to be implemented; Assess the effectiveness of the implemented mitigation measures 	<ol style="list-style-type: none"> Inform the ER and confirm notification of the non-compliance in writing; Rectify unacceptable practice; Check all plant and equipment; Consider changes of working methods; Discuss with ET and IEC and propose mitigation measures to IEC and ER; Implement the agreed mitigation measures.
Action Level being exceeded by more than two consecutive sampling days	<ol style="list-style-type: none"> Repeat in-situ measurement to confirm findings; Identify reasons for non-compliance and sources of impact; Inform IEC and Contractor; Check monitoring data, all plant, equipment and Contractor's working methods; Discuss mitigation measures with IEC and Contractor; Ensure mitigation measures are implemented; Prepare to increase the monitoring frequency to daily; Repeat measurement on next day of exceedance. 	<ol style="list-style-type: none"> Discuss with ET and Contractor on the mitigation measures; Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; Assess the effectiveness of the implemented mitigation measures 	<ol style="list-style-type: none"> Discuss with IEC on the proposed mitigation measures; Make agreement on the mitigation measures to be implemented; Assess the effectiveness of the implemented mitigation measures 	<ol style="list-style-type: none"> Inform the ER and confirm notification of the non-compliance in writing; Rectify unacceptable practice; Check all plant and equipment; Consider changes of working methods; Discuss with ET and IEC and propose mitigation measures to IEC and ER within 2 working days; Implement the agreed mitigation measures.
Limit Level being exceeded by one sampling day	<ol style="list-style-type: none"> Repeat in-situ measurement to confirm findings; Identify reasons for non-compliance and sources of impact; Inform IEC, Contractor and EPD; Check monitoring data, all plant, equipment and Contractor's working methods; Discuss mitigation measures with IEC, ER and Contractor; Ensure mitigation measures are implemented; Increase the monitoring frequency to daily until no exceedance of Limit Level. 	<ol style="list-style-type: none"> Discuss with ET and Contractor on the mitigation measures; Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; Assess the effectiveness of the implemented mitigation measures 	<ol style="list-style-type: none"> Discuss with IEC, ET and Contractor on the proposed mitigation measures; Request Contractor to critically review the working methods; Make agreement on the mitigation measures to be implemented; Assess the effectiveness of the implemented mitigation measures 	<ol style="list-style-type: none"> Inform the ER and confirm notification of the non-compliance in writing; Rectify unacceptable practice; Check all plant and equipment; Consider changes of working methods; Discuss with ET, IEC and ER and propose mitigation measures to IEC and ER within 3 working days; Implement the agreed mitigation measures.
Limit level being exceeded by more than one consecutive sampling days	<ol style="list-style-type: none"> Repeat in-situ measurement to confirm findings; Identify reasons for non-compliance and sources of impact; Inform IEC, Contractor and EPD; Check monitoring data, all plant, equipment and Contractor's working methods; Discuss mitigation measures with IEC, ER and Contractor; Ensure mitigation measures are implemented; Increase the monitoring frequency to daily until no exceedance of Limit Level for two consecutive days. 	<ol style="list-style-type: none"> Discuss with ET and Contractor on the mitigation measures; Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; Assess the effectiveness of the implemented mitigation measures. 	<ol style="list-style-type: none"> Discuss with IEC, ET and Contractor on the proposed mitigation measures; Request Contractor to critically review the working methods; Make agreement on the mitigation measures to be implemented; Assess the effectiveness of the implemented mitigation measures; 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. 	<ol style="list-style-type: none"> Inform the ER and confirm notification of the non-compliance in writing; Rectify unacceptable practice; Check all plant and equipment; Consider changes of working methods; Discuss with ET, IEC and ER and propose mitigation measures to IEC and ER within 3 working days; Implement the agreed mitigation measures; 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 – June 2016

Date		Dust Monitoring		Noise Monitoring	Water Quality
		1-hour TSP	24-hour TSP		
Wed	1-June-16		AM4b, AM5, AM6, AM7b & AM8		
Thu	2-June-16	AM4b, AM5, AM6, AM7b & AM8		NM3, NM4, NM5, NM6 & NM7	All Water Quality Monitoring Locations
Fri	3-June-16				
Sat	4-June-16		AM1b, AM2, AM3 & AM9b		All Water Quality Monitoring Locations
Sun	5-June-16				
Mon	6-June-16	AM1b, AM2, AM3 & AM9b		NM1, NM2a, NM8, NM9 & NM10	All Water Quality Monitoring Locations
Tue	7-June-16		AM4b, AM5, AM6, AM7b & AM8		
Wed	8-June-16	AM4b, AM5, AM6, AM7b & AM8		NM3, NM4, NM5, NM6 & NM7	All Water Quality Monitoring Locations
Thu	9-June-16				
Fri	10-June-16		AM1b, AM2, AM3 & AM9b		All Water Quality Monitoring Locations
Sat	11-June-16	AM1b, AM2, AM3 & AM9b			
Sun	12-June-16				
Mon	13-June-16		AM4b, AM5, AM6, AM7b & AM8		All Water Quality Monitoring Locations
Tue	14-June-16	AM4b, AM5, AM6, AM7b & AM8		NM3, NM4, NM5, NM6 & NM7	
Wed	15-June-16				All Water Quality Monitoring Locations
Thu	16-June-16		AM1b, AM2, AM3 & AM9b		
Fri	17-June-16	AM1b, AM2, AM3 & AM9b		NM1, NM2a, NM8, NM9 & NM10	All Water Quality Monitoring Locations
Sat	18-June-16		AM4b, AM5, AM6, AM7b & AM8		
Sun	19-June-16				
Mon	20-June-16	AM4b, AM5, AM6, AM7b & AM8		NM3, NM4, NM5, NM6 & NM7	All Water Quality Monitoring Locations
Tue	21-June-16				
Wed	22-June-16		AM1b, AM2, AM3 & AM9b		All Water Quality Monitoring Locations
Thu	23-June-16	AM1b, AM2, AM3 & AM9b		NM1, NM2a, NM8, NM9 & NM10	
Fri	24-June-16		AM4b, AM5, AM6, AM7b & AM8		All Water Quality Monitoring Locations
Sat	25-June-16	AM4b, AM5, AM6, AM7b & AM8			
Sun	26-June-16				
Mon	27-June-16		AM1b, AM2, AM3 & AM9b		
Tue	28-June-16	AM1b, AM2, AM3 & AM9b		NM1, NM2a, NM8, NM9 & NM10	All Water Quality Monitoring Locations
Wed	29-June-16		AM4b, AM5, AM6, AM7b & AM8		
Thu	30-June-16	AM4b, AM5, AM6, AM7b & AM8		NM3, NM4, NM5, NM6 & NM7	All Water Quality Monitoring Locations

Monitoring Day

	Sunday or Public Holiday
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Monitoring Location

Contract 2 (C2)	Air Quality	AM7b & AM8
	Construction Noise	NM5, NM6, NM7
	Water Quality#	WM3, WM3-Control, WM4, WM4-Control A & WM4-Control B
Contract 3 (C3)	Air Quality	AM9b
	Construction Noise	NM8, NM9 & NM10
	Water Quality	WM4, WM4-Control A & WM4-Control B
Contract 5 (C5)	Air Quality	AM1b, AM2 & AM3
	Construction Noise	NM1, NM2a
	Water Quality	WM1 & WM1-Control
Contract SS C505	Air Quality	AM1b
	Construction Noise	NM1
	Water Quality	WM1 & WM1-Control
Contract 6 (C6)	Air Quality	AM2, AM3, AM4b, AM5 & AM6
	Construction Noise	NM2a, NM3, NM4, NM5 & NM6
	Water Quality	WM1, WM1C, WM2a, WM2A-C, WM2B, WM2B-C, WM3, WM3-C
Contract 7 (C7)	Air Quality	AM1b
	Construction Noise	NM1

Impact Monitoring Schedule for next Reporting Period – July 2016

Date		Dust Monitoring		Noise Monitoring	Water Quality
		1-hour TSP	24-hour TSP		
FRI	1-JULY-16				
SAT	2-JULY-16		AM1b, AM2, AM3 & AM9b		All Water Quality Monitoring Locations
SUN	3-JULY-16				
MON	4-JULY-16	AM1b, AM2, AM3 & AM9b		NM1, NM2a, NM8, NM9 & NM10	All Water Quality Monitoring Locations
TUE	5-JULY-16		AM4b, AM5, AM6, AM7b & AM8		
WED	6-JULY-16	AM4b, AM5, AM6, AM7b & AM8		NM3, NM4, NM5, NM6 & NM7	All Water Quality Monitoring Locations
THU	7-JULY-16				
FRI	8-JULY-16		AM1b, AM2, AM3 & AM9b		All Water Quality Monitoring Locations
SAT	9-JULY-16	AM1b, AM2, AM3 & AM9b			
SUN	10-JULY-16				
MON	11-JULY-16		AM4b, AM5, AM6, AM7b & AM8		
TUE	12-JULY-16	AM4b, AM5, AM6, AM7b & AM8		NM3, NM4, NM5, NM6 & NM7	All Water Quality Monitoring Locations
WED	13-JULY-16				
THU	14-JULY-16		AM1b, AM2, AM3 & AM9b		All Water Quality Monitoring Locations
FRI	15-JULY-16	AM1b, AM2, AM3 & AM9b		NM1, NM2a, NM8, NM9 & NM10	
SAT	16-JULY-16		AM4b, AM5, AM6, AM7b & AM8		All Water Quality Monitoring Locations
SUN	17-JULY-16				
MON	18-JULY-16	AM4b, AM5, AM6, AM7b & AM8		NM3, NM4, NM5, NM6 & NM7	All Water Quality Monitoring Locations
TUE	19-JULY-16				
WED	20-JULY-16		AM1b, AM2, AM3 & AM9b		All Water Quality Monitoring Locations
FRI	22-JULY-16		AM4b, AM5, AM6, AM7b & AM8		
SAT	23-JULY-16	AM4b, AM5, AM6, AM7b & AM8			All Water Quality Monitoring Locations
SUN	24-JULY-16				
MON	25-JULY-16				All Water Quality Monitoring Locations
TUE	26-JULY-16		AM1b, AM2, AM3 & AM9b		
WED	27-JULY-16	AM1b, AM2, AM3 & AM9b		NM1, NM2a, NM8, NM9 & NM10	All Water Quality Monitoring Locations
THU	28-JULY-16		AM4b, AM5, AM6, AM7b & AM8		
FRI	29-JULY-16	AM4b, AM5, AM6, AM7b & AM8		NM3, NM4, NM5, NM6 & NM7	All Water Quality Monitoring Locations
SAT	30-JULY-16				
SUN	31-JULY-16				

	Monitoring Day
	Sunday or Public Holiday

Monitoring Location

Contract 2 (C2)	Air Quality	AM7b & AM8
	Construction Noise	NM5, NM6, NM7
	Water Quality#	WM3, WM3-Control, WM4, WM4-Control A & WM4-Control B
Contract 3 (C3)	Air Quality	AM9b
	Construction Noise	NM8, NM9 & NM10
	Water Quality	WM4, WM4-Control A & WM4-Control B
Contract 5 (C5)	Air Quality	AM1b, AM2 & AM3
	Construction Noise	NM1, NM2a
	Water Quality	WM1 & WM1-Control
Contract SS C505	Air Quality	AM1b
	Construction Noise	NM1
	Water Quality	WM1 & WM1-Control
Contract 6 (C6)	Air Quality	AM2, AM3, AM4b, AM5 & AM6
	Construction Noise	NM2a, NM3, NM4, NM5 & NM6
	Water Quality	WM1, WM1C, WM2a, WM2A-C, WM2B, WM2B-C, WM3, WM3-C
Contract 7 (C7)	Air Quality	AM1b
	Construction Noise	NM1

Appendix I

Database of Monitoring Result

24-hour TSP Monitoring Data

DATE	SAMPLE NUMBER	ELAPSED TIME			CHART READING			AVG TEMP (°C)	AVG AIR PRESS (hPa)	STANDARD FLOW RATE (m ³ /min)	AIR VOLUME (std m ³)	FILTER WEIGHT (g)		DUST WEIGHT COLLECTED (g)	24-HR TSP (µg/m ³)
		INITIAL	FINAL	(min)	MIN	MAX	AVG					INITIAL	FINAL		
AM1b – Open Area, Tsung Yuen Ha Village															
4-Jun-16	29520	11601.29	11625.48	1451.40	40	42	41.0	28.7	1007.9	1.46	2112	2.8490	3.0233	0.1743	83
10-Jun-16	29532	11625.48	11649.57	1445.40	44	44	44.0	27.9	1005.7	1.55	2237	2.8460	2.9277	0.0817	37
16-Jun-16	29584	11649.57	11673.77	1452.00	42	42	42.0	29.4	1006.7	1.48	2154	2.7883	2.8986	0.1103	51
22-Jun-16	29589	11673.77	11697.92	1449.00	42	42	42.0	30.5	1009.5	1.48	2149	2.7841	2.9129	0.1288	60
27-Jun-16	29639	11697.92	11722.31	1463.40	28	28	28.0	31.1	1007.5	1.06	1545	2.7956	2.8304	0.0348	23
AM2 - Village House near Lin Ma Hang Road															
4-Jun-16	29519	7143.27	7167.12	1431.00	32	32	32.0	28.7	1007.9	1.10	1567	2.8391	2.9546	0.1155	74
10-Jun-16	29531	7167.12	7190.94	1429.20	30	30	30.0	27.9	1005.7	1.03	1476	2.8391	2.9187	0.0796	54
16-Jun-16	29579	7190.94	7214.71	1426.20	32	32	32.0	29.4	1006.7	1.09	1560	2.7858	2.8997	0.1139	73
22-Jun-16	29588	7214.71	7238.41	1422.00	32	32	32.0	30.5	1009.5	1.09	1555	2.7753	2.8640	0.0887	57
27-Jun-16	29640	7238.41	7262.23	1429.20	34	34	34.0	31.1	1007.5	1.15	1649	2.7926	2.9827	0.1901	115
AM3 - Ta Kwu Ling Fire Service Station of Ta Kwu Ling Village															
4-Jun-16	29518	8259.04	8283.04	1440.00	40	48	44.0	28.7	1007.9	1.35	1938	2.8330	3.1130	0.2800	144
10-Jun-16	29533	8283.04	8307.05	1440.60	38	38	38.0	27.9	1005.7	1.14	1649	2.8298	2.9340	0.1042	63
16-Jun-16	29578	8307.05	8331.05	1440.00	36	36	36.0	29.4	1006.7	1.08	1548	2.7900	2.9427	0.1527	99
22-Jun-16	29587	8331.05	8355.05	1440.00	46	46	46.0	30.5	1009.5	1.41	2030	2.7822	3.0225	0.2403	118
27-Jun-16	29641	8355.05	8379.05	1440.00	38	38	38.0	31.1	1007.5	1.16	1672	2.8018	2.8705	0.0687	41
AM4 - House no. 10B1 Nga Yiu Ha Village															
1-Jun-16	29517	10242.79	10266.79	1440.00	40	40	40.0	28.5	1006	1.26	1814	2.8409	2.9437	0.1028	57
7-Jun-16	29529	10266.79	10290.80	1440.60	40	40	40.0	28.1	1008.1	1.26	1818	2.8359	2.8967	0.0608	33
13-Jun-16	29577	10290.80	10314.80	1440.00	40	40	40.0	29.7	1005	1.26	1809	2.7854	2.8587	0.0733	41
18-Jun-16	29583	10314.80	10338.80	1440.00	38	38	38.0	29.3	1010.5	1.20	1725	2.7781	2.8642	0.0861	50
24-Jun-16	29593	10338.80	10362.80	1440.00	38	38	38.0	31	1008.1	1.19	1718	2.7996	2.8726	0.0730	42
29-Jun-16	29627	10362.80	10386.80	1440.00	38	40	39.0	29	1010	1.24	1779	2.7918	2.8518	0.0600	34
AM5a - Ping Yeung Village House															
1-Jun-16	29516	8104.93	8128.93	1440.00	36	40	38.0	30.1	1007.8	1.25	1804	2.8422	2.8833	0.0411	23
7-Jun-16	29527	8128.94	8152.94	1440.00	36	36	36.0	28.1	1008.1	1.19	1718	2.8402	2.8854	0.0452	26
13-Jun-16	29576	8152.94	8176.94	1440.00	36	36	36.0	29.7	1005	1.19	1711	2.7733	2.8358	0.0625	37
18-Jun-16	29582	8176.94	8200.94	1440.00	30	40	35.0	29.3	1010.5	1.16	1671	2.7873	2.8304	0.0431	26
24-Jun-16	29592	8200.94	8224.94	1440.00	28	30	29.0	31	1008.1	0.96	1389	2.8008	2.8409	0.0401	29

DATE	SAMPLE NUMBER	ELAPSED TIME			CHART READING			AVG TEMP (°C)	AVG AIR PRESS (hPa)	STANDARD FLOW RATE (m ³ /min)	AIR VOLUME (std m ³)	FILTER WEIGHT (g)		DUST WEIGHT COLLECTED (g)	24-HR TSP (µg/m ³)
		INITIAL	FINAL	(min)	MIN	MAX	AVG					INITIAL	FINAL		
29-Jun-16	29626	8224.94	8248.94	1440.00	36	36	36.0	29	1010	1.18	1706	2.7762	2.8171	0.0409	24
AM6 - Wo Keng Shan Village House															
1-Jun-16	29523	6686.33	6710.33	1440.00	33	33	33.0	30.1	1007.8	0.95	1367	2.8263	2.8859	0.0596	44
7-Jun-16	29526	6710.33	6734.33	1440.00	32	33	32.5	28.1	1008.1	0.94	1347	2.8380	2.9292	0.0912	68
13-Jun-16	29575	6734.33	6758.33	1440.00	32	32	32.0	29.7	1005.0	0.91	1313	2.7808	2.8874	0.1066	81
18-Jun-16	29581	6758.33	6782.34	1440.60	32	32	32.0	29.3	1010.5	0.92	1319	2.7780	2.9019	0.1239	94
24-Jun-16	29591	6782.34	6806.34	1440.00	22	22	22.0	31.0	1008.1	0.54	776	2.8004	2.8512	0.0508	65
29-Jun-16	29625	6806.34	6830.32	1438.80	34	34	34.0	29.0	1010.0	1.01	1457	2.7925	2.9780	0.1855	127
AM7b - Loi Tung Village House															
1-Jun-16	29522	15722.56	15746.57	1440.60	32	32	32.0	30.1	1007.8	0.96	1380	2.8482	2.9225	0.0743	54
7-Jun-16	29525	15746.58	15770.58	1440.00	36	36	36.0	28.1	1008.1	1.08	1550	2.8367	2.8869	0.0502	32
13-Jun-16	29574	15770.58	15794.58	1440.00	30	30	30.0	29.7	1005	0.90	1296	2.7935	2.8564	0.0629	49
18-Jun-16	29585	15794.58	15818.58	1440.00	32	32	32.0	29.3	1010.5	0.96	1383	2.7929	2.8533	0.0604	44
24-Jun-16	29637	15818.58	15842.58	1440.00	35	35	35.0	31	1008.1	1.04	1502	2.7929	2.8575	0.0646	43
29-Jun-16	29628	15842.58	15866.58	1440.00	33	33	33.0	29	1010	0.98	1409	2.7036	2.8788	0.1752	124
AM8 - Po Kat Tsai Village No. 4															
1-Jun-16	29521	9629.14	9653.14	1440.00	42	42	42.0	30.1	1007.8	1.13	1625	2.8493	2.9008	0.0515	32
7-Jun-16	29528	9653.14	9677.14	1440.00	40	40	40.0	28.1	1008.1	1.07	1538	2.8333	2.8785	0.0452	29
13-Jun-16	29534	9677.14	9701.15	1440.60	42	42	42.0	29.7	1005	1.13	1624	2.8512	2.9164	0.0652	40
18-Jun-16	29558	9701.15	9725.15	1440.00	42	42	42.0	29.3	1010.5	1.13	1630	2.8119	2.8605	0.0486	30
24-Jun-16	29638	9725.15	9749.15	1440.00	42	42	42.0	31	1008.1	1.13	1622	2.7981	2.8536	0.0555	34
29-Jun-16	29629	9749.15	9773.13	1438.80	42	42	42.0	29	1010	1.15	1654	2.7956	2.8322	0.0366	22
AM9b - Nam Wa Po Village House No. 80															
6-Jun-16	29524	17032.37	17056.37	1440.00	32	32	32.0	28.7	1007.9	0.98	1417	2.8232	2.9192	0.0960	68
11-Jun-16	29530	17056.37	17080.38	1440.60	20	30	25.0	27.9	1005.7	0.74	1060	2.8404	2.8959	0.0555	52
16-Jun-16	29580	17080.38	17104.38	1440.00	38	40	39.0	29.7	1006.7	1.23	1770	2.7853	2.8037	0.0184	10
22-Jun-16	29590	17104.38	17128.41	1441.80	38	38	38.0	30.5	1009.5	1.19	1721	2.7853	2.8265	0.0412	24
27-Jun-16	29642	17128.41	17152.35	1436.40	28	28	28.0	31.1	1007.5	0.90	1291	2.7990	2.8451	0.0461	36

Construction Noise Monitoring Results, dB(A)

Date	Start Time	1 st Leq _{5min}	L10	L90	2 nd Leq _{5min}	L10	L90	3 rd Leq _{5min}	L10	L90	4 th Leq _{5min}	L10	L90	5 th Leq _{5min}	L10	L90	6 th Leq _{5min}	L10	L90	Leq30	façade correction
NM1 - Tsung Yuen Ha Village House No. 63																					
6-Jun-16	15:00	65.7	70.1	54.8	61.4	65.2	53.4	58.4	61.6	52.8	63.0	67.1	57.4	65.7	69.9	54.6	61.1	64.5	53.7	63	NA
17-Jun-16	10:18	65.8	69.2	56.2	64.7	68.3	57.1	62.8	66.2	56.8	65.4	70.3	56.8	65.9	69.1	55.4	66.3	70.1	56.2	65	NA
23-Jun-16	10:05	64.1	67.7	55.1	64.0	67.4	52.6	67.8	71.9	54.0	61.2	61.0	53.4	64.1	67.5	53.0	67.7	71.7	54.1	65	NA
28-Jun-16	13:37	52.4	55.0	48.8	56.5	58.9	52.6	55.7	59.3	50.8	52.9	53.3	50.3	54.2	55.7	50.5	52.7	54.1	50.9	54	NA
NM2a - Village House near Lin Ma Hang Road																					
6-Jun-16	15:39	65.9	68.6	58.1	66.9	69.7	63.7	63.5	66.7	57.9	62.1	64.1	59.3	62.0	63.7	57.6	59.8	64.3	53.6	64	67.0
17-Jun-16	10:10	70.5	70.5	68.3	69.8	70.6	68.6	69.6	70.5	68.6	69.2	70.0	68.3	69.6	70.4	68.6	69.5	70.3	68.6	70	73.0
23-Jun-16	10:40	66.6	69.2	62.7	64.9	66.8	61.8	65.4	67.4	61.8	64.7	67.2	61.6	64.9	67.0	61.8	65.4	67.5	61.7	65	68.0
28-Jun-16	13:01	60.1	63.3	55.9	57.9	58.8	56.4	59.7	61.2	56.5	59.6	61.4	56.7	61.4	63.4	56.6	61.6	64.2	57.0	60	63.0
NM3 - Ping Yeung Village House																					
2-Jun-16	11:13	61.5	66.1	54.7	61.9	63.2	52.9	61.7	64.2	56.8	61.2	61.5	56.6	61.5	64.3	54.7	62.1	63.9	53.8	62	NA
8-Jun-16	11:07	65.2	67.7	60.4	66.1	68.5	60.9	67.0	69.3	61.3	65.7	67.9	61.0	66.7	68.6	60.7	65.5	67.8	61.0	66	NA
14-Jun-16	9:40	57.0	58.7	55.8	58.4	60.1	56.1	58.5	59.8	56.3	58.5	59.9	56.6	57.7	58.6	56.7	58.8	60.5	56.5	58	NA
20-Jun-16	10:43	58.5	59.5	51.5	54.9	56.8	51.6	56.4	56.7	51.9	54.3	55.5	50.7	56.0	56.6	51.5	55.5	58.4	50.9	56	NA
30-Jun-16	11:03	57.2	59.1	51.6	57.5	58.5	50.9	63.5	64.2	50.3	58.6	59.8	49.6	57.3	59.1	50.6	56.1	58.6	48.2	59	NA
NM4 - Wo Keng Shan Village House																					
2-Jun-16	10:28	65.4	68.4	60.7	64.3	65.0	57.2	63.5	65.5	57.9	63.9	64.8	60.3	61.3	63.0	55.6	61.2	62.2	58.0	64	NA
8-Jun-16	10:21	68.2	70.2	63.4	68.7	70.7	63.7	69.4	71.0	64.3	67.5	69.9	63.5	68.0	70.1	63.7	69.7	70.5	63.9	69	NA
14-Jun-16	10:17	58.8	59.6	56.2	60.1	62.3	56.6	61.0	63.5	56.9	59.2	60.4	56.4	58.2	59.7	56.5	59.1	61.0	56.5	59	NA
20-Jun-16	9:55	62.9	64.6	58.0	63.6	66.2	59.2	65.9	68.8	60.1	67.2	70.5	60.4	62.8	63.9	58.9	64.4	66.0	59.0	65	NA
30-Jun-16	9:59	29.7	61.6	54.5	61.5	63.7	57.5	62.2	64.6	58.3	60.1	62.6	57.1	59.2	51.2	54.9	62.9	65.2	57.3	62	NA
NM5- Ping Yeung Village House (façade facing northeast)																					
2-Jun-16	9:36	55.3	56.5	52.0	53.6	54.5	51.5	53.0	54.0	49.5	54.1	55.5	50.5	54.1	55.5	51.5	54.7	56.0	51.5	54	NA
8-Jun-16	11:01	54.8	57.1	52.6	55.6	58.1	52.9	56.1	58.3	53.8	53.2	55.8	51.9	52.9	54.3	52.4	54.8	57.3	52.6	55	NA
14-Jun-16	9:34	57.9	60.5	52.5	54.8	57.0	52.0	59.7	59.5	55.0	57.1	58.5	55.0	57.1	58.5	54.5	58.3	61.0	55.0	58	NA
20-Jun-16	9:40	54.5	55.5	52.5	56.0	56.0	52.5	56.4	58.5	52.5	54.8	55.5	53.0	54.5	55.0	52.5	53.7	54.5	52.5	55	NA
30-Jun-16	9:17	65.9	69.5	59.0	62.7	65.0	59.5	65.2	67.5	58.0	66.3	68.0	56.0	60.9	62.5	56.0	60.6	62.5	56.0	64	NA
NM6 – Tai Tong Wu Village House 2																					
2-Jun-16	10:26	56.1	55.0	46.0	49.8	52.0	46.0	50.6	53.0	46.5	52.1	54.0	46.5	49.4	51.5	46.0	48.9	50.5	46.0	52	NA
8-Jun-16	10:18	57.8	59.0	47.0	56.2	58.5	48.5	57.1	59.6	49.4	58.3	61.3	49.6	57.2	59.1	49.1	56.6	60.1	49.3	57	NA
14-Jun-16	10:21	52.7	54.5	50.0	51.5	53.5	49.0	52.8	55.0	49.5	56.4	57.5	52.0	53.7	55.5	51.0	54.7	56.0	52.0	54	NA

Date	Start Time	1 st Leq _{5min}	L10	L90	2 nd Leq _{5min}	L10	L90	3 rd Leq _{5min}	L10	L90	4 th Leq _{5min}	L10	L90	5 th Leq _{5min}	L10	L90	6 th Leq _{5min}	L10	L90	Leq30	façade correction
20-Jun-16	10:29	59.8	60.5	57.0	58.6	60.0	56.5	59.4	60.5	57.0	59.8	62.0	56.5	58.6	60.0	56.0	58.7	60.0	56.5	59.0	NA
30-Jun-16	10:01	60.4	61.5	56.5	57.7	59.0	55.5	58.9	60.5	56.0	59.4	61.5	56.0	59.2	61.0	56.5	57.8	60.0	55.0	59.0	NA
NM7 – Po Kat Tsai Village																					
2-Jun-16	13:07	64.4	68.0	48.5	56.2	59.0	49.5	55.0	58.5	48.5	70.6	74.0	49.0	74.2	78.0	49.0	51.1	53.0	48.5	68	NA
8-Jun-16	9:27	65.6	68.6	57.1	66.7	68.1	55.8	68.5	67.9	61.1	63.0	64.4	55.3	70.4	67.9	55.9	62.0	66.8	54.0	67	NA
14-Jun-16	13:02	61.9	63.5	59.0	61.9	63.5	59.0	60.8	62.0	59.0	60.4	62.0	58.5	60.0	61.5	57.0	61.0	62.5	59.0	61	NA
20-Jun-16	13:02	63.3	64.5	61.5	63.1	63.5	62.0	68.0	69.5	60.0	70.8	72.5	63.0	66.1	69.5	59.0	61.2	62.5	58.5	67.0	NA
30-Jun-16	13:06	66.4	68.0	60.5	69.3	73.0	63.5	71.4	75.0	63.0	73.8	76.5	62.0	66.8	70.5	58.5	62.2	63.5	57.5	70.0	NA
NM8 - Village House, Tong Hang																					
6-Jun-16	10:06	59.6	60.3	52.5	60.7	62.3	53	59.1	61.5	52.5	60.5	62.7	62.4	61.3	63.9	53.6	60.2	62	52.5	60	NA
17-Jun-16	10:03	59.3	64.2	51.6	58.6	63.6	50.8	59.4	63.9	51.4	58.5	62.8	50.9	59.3	63.9	51.2	59.5	64.2	51	59	NA
23-Jun-16	11:30	59.9	65.5	50.1	57.3	61.9	50.2	58.5	64.7	49.8	57.8	63	48.5	57.6	63.8	49.1	58.9	64.4	50.7	58	NA
28-Jun-16	9:57	58.6	62.2	51.4	59.6	63.3	52.4	58.7	62.5	51.7	58.5	63.5	51.5	57.9	62.6	50.6	58.5	63.5	51.5	59	NA
NM9 - Village House, Kiu Tau Village																					
6-Jun-16	10:48	60.6	63.7	58.4	62.4	64.5	59.4	60.5	63.5	58.0	62.4	64.4	60.6	61.5	63.4	59.8	59.2	63.3	59.7	61	NA
17-Jun-16	10:45	63.1	66.1	58.4	64.3	66.6	57.7	63.2	66.5	57.0	64.3	57.0	58.8	63.4	66.4	57.8	64.8	66.2	57.4	64	NA
23-Jun-16	10:46	64.8	67.4	59.9	64.2	66.7	59.9	67.6	71.3	61.3	62.1	64.7	58.5	63.7	64.3	59.8	62.3	64.8	59.2	65	NA
28-Jun-16	10:41	61.9	64.2	58.3	60.2	63.6	58.5	60.5	62.5	58.6	62.7	64.7	58.4	63.2	65.4	59.2	64.3	66.2	59.4	62	NA
NM10 - Nam Wa Po Village House No. 80																					
6-Jun-16	13:11	63.2	63.6	59.9	63.6	63.0	59.9	62.5	62.4	58.2	59.6	61.5	58.7	60.0	62.8	59.4	62.0	63.5	60.2	62	65
17-Jun-16	15:27	57.0	58.1	55.9	56.8	57.9	55.7	56.9	58.0	55.7	61.2	65.6	56.3	57.4	59.7	56.0	56.7	58.4	55.3	58	61
23-Jun-16	10:03	64.6	65.9	62.9	65.3	66.1	62.4	64.1	65.5	62.2	64.1	65.0	60.3	65.7	65.9	61.9	65.2	66.2	62.0	65	68
28-Jun-16	13:04	57.8	58.0	55.4	56.7	57.1	55.7	56.5	58.0	55.5	57.6	58.4	56.2	56.5	57.3	55.3	57.7	58.6	56.4	57	60

Water Quality Monitoring Data for Contract 5, 6 and SS C505

Date	2-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	13:05	0.34	30.2	30.2	7.44	7.4	98.2	98.1	10.4	10.3	8.6	8.6	4	3.0
			30.2		7.42		98.0		10.1		8.6		2	
WM1	12:57	0.26	29.2	29.2	7.06	7.1	92.1	92.1	14.7	14.8	8.7	8.7	16	15.5
			29.2		7.05		92.0		14.9		8.7		15	

Date	4-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	9:00	0.37	27.7	27.7	7.45	7.4	95.7	95.0	9.1	9.0	9.2	9.2	2	2.0
			27.7		7.39		94.2		8.9		9.2		2	
WM1	9:17	0.33	27.4	27.4	7.28	7.3	92.0	92.4	15.4	15.9	8.7	8.7	13	13.5
			27.4		7.33		92.7		16.3		8.7		14	

Date	6-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	15:49	0.44	25.9	25.9	7.22	7.2	88.9	88.9	228.0	229.0	8	8.0	264	259.5
			25.9		7.22		88.9		230.0		8		255	
WM1	15:37	0.59	25.8	25.9	7.34	7.4	89.5	89.8	528.0	543.5	8.1	8.1	413	409.0
			25.9		7.39		90.1		559.0		8.1		405	

Date	#7-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	10:00	0.37							8.4	8.1			11	11.0
									7.8					
WM1	10:10	0.28							18.8	18.8			34	34.0
									18.7					

Date	8-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	11:45	0.37	26	26.1	6.57	6.5	80.7	80.4	11.5	11.9	8.8	8.8	27	27.0
			26.1		6.51		80.0		12.3		8.7		27	
WM1	12:03	0.38	26.3	26.3	5.63	5.7	69.4	70.2	26.3	26.5	8.4	8.4	43	41.5
			26.3		5.7		70.9		26.6		8.4		40	

Date	10-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	10:45	0.34	27	27.0	7.43	7.4	93.3	93.3	18.0	17.3	8.9	8.9	6	6.0
			27		7.43		93.3		16.5		8.9		6	
WM1	11:00	0.26	26.8	26.8	7.2	7.2	89.9	89.9	14.9	15.1	8.7	8.7	25	25.5
			26.8		7.2		89.9		15.2		8.7		26	

Date	13-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	10:19	0.37	25.6	25.6	6.52	6.5	80.1	80.6	8.1	8.1	8.6	8.6	10	10.0
			25.6		6.57		81.1		8.2		8.6		10	
WM1	10:03	0.33	25.6	25.6	6.94	7.0	85.1	85.4	10.8	10.7	9.1	9.1	40	39.5
			25.6		6.99		85.7		10.5		9.1		39	

Date	15-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	11:50	0.34	28	28.0	7.07	7.1	90.1	90.1	11.6	11.4	8.1	8.1	5	5.5
			28		7.07		90.1		11.1		8.1		6	
WM1	11:18	0.26	27.6	27.6	7.1	7.1	90.4	90.4	21.8	21.9	8.2	8.2	19	20.0
			27.6		7.1		90.4		22.0		8.2		21	

Date	17-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	10:32	0.35	27.9	27.9	7.54	7.5	95.5	95.2	95.7	96.0	8.8	8.8	99	100.5

			27.9		7.5		94.8		96.3		8.8		102	
WM1	10:43	0.26	27.3	27.3	7.53	7.5	94.9	95.0	29.8	29.8	8.6	8.6	24	23.0
			27.3		7.53		95.0		29.7		8.6		22	

Date	20-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	13:21	0.36	31.3	31.4	7.55	7.6	102.3	102.6	21.0	21.7	8.1	8.1	5	6.0
			31.4		7.59		102.8		22.3		8.1		7	
WM1	13:07	0.31	30.4	30.5	7.33	7.4	97.6	98.0	27.0	27.6	8.7	8.7	25	25.5
			30.5		7.4		98.3		28.1		8.7		26	

Date	22-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	10:00	0.34	29	29.0	6.63	6.7	85.5	85.9	16.8	16.6	7.6	7.6	11	10.5
			29		6.67		86.2		16.3		7.6		10	
WM1	10:10	0.26	29.2	29.2	6.52	6.5	84.5	84.3	39.2	39.6	7.7	7.7	54	53.5
			29.2		6.44		84.0		39.9		7.7		53	

Date	24-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	10:15	0.34	31.3	31.3	5.92	5.9	79.9	80.0	22.0	22.5	9	9.0	12	12.5
			31.3		5.94		80.0		22.9		9		13	
WM1	10:00	0.26	31	31.0	6.09	6.1	81.8	82.0	28.5	28.2	8.8	8.8	35	35.5
			31		6.11		82.2		27.8		8.8		36	

Date	28-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	12:45	0.35	29.3	29.3	5.38	5.4	70.8	70.7	43.3	43.5	8.8	8.8	21	21.0
			29.3		5.38		70.6		43.7		8.8		21	
WM1	12:58	0.39	29.9	29.9	6.49	6.5	85.8	86.3	43.8	44.3	8.6	8.6	29	28.5
			29.8		6.53		86.7		44.7		8.6		28	

Date	30-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	14:10	0.34	30.1	30.1	6.7	6.7	88.8	88.9	21.2	21.9	8.1	8.1	16	16.5
			30.1		6.71		88.9		22.5		8.1		17	
WM1	14:00	0.26	29.9	29.9	6.59	6.6	87.0	87.1	39.0	39.7	8	8.0	51	51.0
			29.9		6.57		87.1		40.4		8		51	

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

Water Quality Monitoring Data for Contract 2 and 3

Date	2-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	14:31	0.18	30.4	30.4	7.26	7.3	96.6	96.5	7.5	7.5	8.5	8.5	6	7.0
			30.4		7.25		96.4		7.5		8.5		8	
WM4-CB	14:42	0.31	32.5	32.5	6.79	6.8	94.0	93.9	16.7	16.6	8	8.0	14	13.5
			32.5		6.77		93.7		16.4		8		13	
WM4	14:25	0.14	32.8	32.8	7.17	7.2	99.5	99.5	9.4	9.4	8.2	8.2	7	8.0
			32.8		7.16		99.4		9.4		8.2		9	

Date	4-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	12:17	0.33	28.9	28.9	7.43	7.5	96.7	97.1	6.9	6.9	9.1	9.1	2	3.0
			28.9		7.54		97.4		7.0		9.1		4	
WM4-CB	12:33	0.37	31.4	31.4	6.81	6.8	92.4	92.2	11.9	11.6	8.6	8.6	9	9.0
			31.4		6.73		91.9		11.3		8.6		9	
WM4	11:47	0.33	30	30.0	7.2	7.3	95.2	96.0	8.9	8.9	9.1	9.1	8	8.5
			30		7.31		96.7		8.9		9.1		9	

Date	6-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	

WM4-CA	11:31	0.49	24.5	24.5	8.17	8.2	98.1	98.7	339.0	336.0	9.2	9.2	362	368.5
			24.5		8.24		99.3		333.0		9.2		375	
WM4-CB	11:07	0.49	25.4	25.5	7.47	7.5	90.6	91.2	226.0	231.5	8.6	8.6	203	206.5
			25.5		7.53		91.7		237.0		8.6		210	
WM4	11:10	0.47	25.2	25.2	7.87	7.9	95.7	95.8	416.0	423.0	9.5	9.4	542	542.5
			25.2		7.9		95.8		430.0		9.3		543	

Date	#7-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	11:30	0.19							15.3	15.1			16	16.0
									14.9					
WM4-CB	11:45	0.32							17.3	16.6			20	20.0
									15.8					
WM4	11:20	0.17							28.2	28.8			18	18.0
									29.4					

Date	8-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	14:03	0.32	27.4	27.4	7.36	7.4	93.0	92.9	212.0	214.0	8.7	8.7	376	381.5
			27.4		7.34		92.7		216.0		8.7		387	
WM4-CB	14:14	0.46	27.8	27.8	6.76	6.8	86.2	86.2	148.0	148.5	8.4	8.4	163	162.0
			27.8		6.76		86.1		149.0		8.4		161	
WM4	13:50	0.47	27.7	27.7	7	7.0	89.1	89.1	255.0	253.0	8.2	8.2	312	318.5
			27.7		6.99		89.0		251.0		8.2		325	

Date	10-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	14:00	0.18	26.5	26.5	7.45	7.4	92.5	92.5	4.7	4.7	8.6	8.6	7	7.0
			26.5		7.43		92.4		4.7		8.6		7	
WM4-CB	14:12	0.31	28	28.0	5.53	5.5	71.0	70.9	15.8	15.8	8.1	8.1	24	24.0
			28		5.51		70.7		15.7		8.1		24	
WM4	13:52	0.14	28.2	28.2	6.49	6.5	83.0	83.0	26.6	26.7	8.5	8.5	35	34.5

			28.2		6.48		82.9		26.8		8.5		34	
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Date		13-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)		
WM4-CA	13:53	0.21	26.8	26.9	7.65	7.6	95.9	95.5	14.5	14.9	8.3	8.3	9	8.0	
			26.9		7.6		95.1		15.3		8.3		7		
WM4-CB	14:01	0.31	28.6	28.6	6.77	6.5	86.7	86.7	30.3	30.7	7.9	7.9	30	30.5	
			28.6		6.27		86.7		31.1		7.9		31		
WM4	13:39	0.37	28.1	28.1	7.2	7.3	92.2	92.8	33.4	34.1	8.2	8.2	22	22.0	
			28		7.33		93.3		34.7		8.2		22		

Date		15-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)		
WM4-CA	14:08	0.20	28.2	28.2	7.4	7.4	94.5	94.5	29.4	29.4	9.4	9.4	32	31.5	
			28.2		7.4		94.5		29.3		9.4		31		
WM4-CB	14:20	0.35	29.4	29.4	6.44	6.4	84.6	84.6	29.7	29.7	8.8	8.8	30	31.0	
			29.4		6.44		84.6		29.7		8.8		32		
WM4	13:55	0.15	29.7	29.7	6.91	6.9	90.8	90.8	33.6	34.0	9.5	9.5	38	38.5	
			29.7		6.91		90.8		34.4		9.5		39		

Date		17-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)		
WM4-CA	14:22	0.18	29	29.0	7.53	7.5	98.2	98.1	15.4	15.3	8.9	8.9	9	9.5	
			29		7.51		98.0		15.2		8.9		10		
WM4-CB	14:40	0.31	30.9	30.9	6.61	6.6	88.5	88.5	20.6	20.9	8.3	8.3	17	17.5	
			30.9		6.61		88.5		21.1		8.3		18		
WM4	14:16	0.14	30.7	30.7	7.16	7.2	95.9	95.8	24.8	24.8	8.5	8.5	17	17.5	
			30.7		7.15		95.7		24.7		8.5		18		

Date		20-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)		
WM4-CA	14:27	0.19	29.9	29.9	7.1	7.1	94.2	94.6	17.5	17.9	8.2	8.2	12	11.5	

			29.9		7.14		94.9		18.3		8.2		11	
WM4-CB	14:39	0.28	31.1	31.2	5.36	5.4	72.2	72.5	21.2	21.8	7.8	7.8	15	15.0
			31.2		5.39		72.7		22.3		7.8		15	
WM4	14:15	0.24	32	32.0	6.35	6.4	86.7	87.0	26.4	26.6	8.1	8.1	13	13.5
			32		6.39		87.3		26.7		8.1		14	

Date	22-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	13:15	0.18	33.8	33.8	5.82	5.8	82.2	82.2	8.0	8.0	8.9	8.9	6	6.0
			33.8		5.83		82.2		7.9		8.9		6	
WM4-CB	13:30	0.31	33.4	33.4	6.56	6.5	91.8	91.5	15.9	16.1	8.3	8.3	17	17.0
			33.4		6.51		91.2		16.2		8.3		17	
WM4	13:00	0.14	34.5	34.5	5.8	5.8	82.7	83.1	10.9	11.2	8.6	8.6	10	10.0
			34.5		5.86		83.4		11.5		8.6		10	

Date	24-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	13:15	0.18	34.6	34.6	5.44	5.5	77.7	77.8	8.6	8.5	7.5	7.5	9	8.5
			34.6		5.47		77.9		8.5		7.5		8	
WM4-CB	13:30	0.31	33.3	33.3	5.48	5.5	76.8	76.9	17.0	16.7	7.2	7.2	22	22.5
			33.3		5.49		77.0		16.4		7.2		23	
WM4	13:00	0.14	35.7	35.7	5.53	5.5	80.4	80.3	13.8	13.7	7.3	7.3	14	14.0
			35.7		5.51		80.1		13.6		7.3		14	

Date	28-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	14:37	0.18	29	29.0	6.97	7.0	90.9	91.4	14.9	14.6	8.8	8.8	9	9.0
			29		7		91.9		14.3		8.8		9	
WM4-CB	14:51	0.37	29.2	29.2	5.51	5.5	72.1	71.9	17.2	17.5	8.3	8.3	12	13.0
			29.1		5.48		71.7		17.7		8.3		14	
WM4	15:07	0.37	30.1	30.2	6.8	6.8	90.7	90.3	32.7	33.0	9.1	9.1	26	26.5
			30.2		6.71		89.8		33.2		9.1		27	

Date	30-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	12:00	0.18	30.5	30.5	6.71	6.7	89.8	89.9	61.0	58.5	8.4	8.4	40	39.5
			30.5		6.72		90.0		56.0		8.4		39	
WM4-CB	11:38	0.31	31.3	31.3	6.52	6.5	88.0	88.0	19.2	19.0	7.8	7.9	11	11.0
			31.2		6.53		87.9		18.8		7.9		11	
WM4	11:30	0.14	31.2	31.3	6.84	6.8	92.6	92.8	13.5	13.7	8.1	8.2	11	10.5
			31.3		6.85		92.9		13.9		8.2		10	

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

Water Quality Monitoring Data for Contract 6

Date	#1-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:40	0.28							5.1	4.8			6	6.0
									4.5					
WM2A	10:25	0.17							22.9	22.4			13	13.0
									21.8					

Date	2-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	13:55	0.28	27.2	27.2	7.64	7.6	95.2	95.2	8.1	8.1	8.30	8.3	4	5.0
			27.2		7.65		95.2		8.1		8.30		6	
WM2A	13:33	0.17	31	31.0	7.3	7.3	98.2	98.1	16.3	16.4	8.40	8.4	14	14.0
			31		7.28		97.9		16.4		8.40		14	

Date	4-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	9:57	0.33	26.2	26.2	7.48	7.4	93.8	93.4	9.7	9.8	8.60	8.6	12	11.5
			26.2		7.37		92.9		10.0		8.60		11	
WM2A	9:35	0.27	28.6	28.6	7.18	7.2	92.6	93.3	259.0	258.0	8.70	8.7	452	457.0
			28.6		7.27		94.0		257.0		8.70		462	

Date	6-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	15:05	0.47	24.8	24.8	8.04	8.1	97.0	97.4	95.2	96.0	8.60	8.6	87	86.5
			24.8		8.11		97.7		96.7		8.60		86	
WM2A	15:19	0.31	25.4	25.4	7.53	7.6	91.8	92.1	419.0	421.0	8.40	8.5	534	534.5
			25.4		7.59		92.4		423.0		8.50		535	

Date	#7-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	

WM2A-C	10:40	0.30							7.0	7.0			6	6.0
									6.9					
WM2A	10:20	0.20							134.0	137.0			168	168.0
									140.0					

Date	8-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:59	0.37	24.8	24.8	7.86	7.8	95.1	94.9	6.1	6.1	9.10	9.1	<2	<2
			24.8		7.83		94.6		6.2		9.10		<2	
WM2A	11:19	0.16	26.1	26.2	7.27	7.2	90.0	89.9	135.0	131.0	8.80	8.8	382	395.5
			26.2		7.21		89.7		127.0		8.80		409	

Date	10-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	11:37	0.28	25.7	25.7	7.66	7.6	93.9	93.7	8.6	8.6	8.40	8.4	3	3.5
			25.7		7.63		93.5		8.5		8.40		4	
WM2A	11:23	0.17	28.8	28.8	6.9	6.9	89.3	89.2	22.1	22.0	8.50	8.5	14	13.5
			28.8		6.88		89.0		21.9		8.50		13	

Date	13-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:57	0.39	25.1	25.1	7.74	7.8	93.9	94.2	8.6	8.7	8.30	8.3	7	6.0
			25.1		7.81		94.5		8.8		8.30		5	
WM2A	10:33	0.27	26.4	26.4	7.33	7.4	91.0	91.4	220.0	218.5	8.60	8.6	109	111.5
			26.4		7.41		91.7		217.0		8.60		114	

Date	#14-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	11:00	0.28							6.2	6.2			5	5.0
									6.2					
WM2A	10:45	0.17							203.0	212.0			203	203.0
									221.0					

Date		15-Jun-16												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:45	0.17	26.5	26.5	7.63	7.6	94.8	94.8	7.2	7.0	8.40	8.4	2	3.0
			26.5		7.63		94.8		6.8		8.40		4	
WM2A	11:03	0.17	28.6	28.6	7.11	7.1	91.8	91.8	70.0	71.2	8.20	8.2	75	73.5
			28.6		7.11		91.8		72.4		8.20		72	

Date		#16-Jun-16												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	11:50	0.28							32.4	33.3			29	29.0
							34.1							
WM2A	11:30	0.17							155.0	159.5			152	152.0
							164.0							

Date		17-Jun-16												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	11:35	0.28	26.7	26.7	7.66	7.7	95.3	95.3	44.1	44.4	8.20	8.2	7	6.5
			26.7		7.66		95.3		44.7		8.20		6	
WM2A	11:25	0.17	28.1	28.1	7.19	7.2	92.5	92.5	345.0	358.0	8.30	8.3	299	300.5
			28.1		7.19		92.5		371.0		8.30		302	

Date		#18-Jun-16												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:20	0.28							12.1	12.1			3	3.0
							12.1							
WM2A	10:02	0.17							54.8	54.7			63	63.0
							54.6							

Date		20-Jun-16												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	

WM2A-C	10:40	0.34	26.4	26.4	7.56	7.5	94.8	94.4	12.4	12.4	8.50	8.6	4	4.5
			26.3		7.5		93.9		12.3		8.60		5	
WM2A	11:03	0.20	29.7	29.7	7.25	7.3	94.9	95.6	183.0	196.0	8.10	8.1	139	141.5
			29.6		7.3		96.3		209.0		8.00		144	

Date		#21-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)		
WM2A-C	11:20	0.28							10.0	10.3			7	7.0	
									10.6						
WM2A	11:35	0.17							228.0	231.0			300	300.0	
									234.0						

Date		#22-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)		
WM2A-C	10:45	0.28	31.4	31.4	5.21	5.2	70.6	70.9	13.6	13.8	7.20	7.2	3	3.0	
			31.4		5.26		71.2		13.9		7.20		3		
WM2A	10:25	0.17	31	31.0	6.51	6.5	87.7	87.1	24.1	24.2	7.60	7.6	14	13.5	
			31		6.41		86.4		24.3		7.60		13		

Date		#23-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)		
WM2A-C	9:50	0.37							10.2	9.9			4	4.0	
									9.7						
WM2A	10:11	0.16							22.1	21.9			12	12.0	
									21.6						

Date		#24-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)		
WM2A-C	10:55	0.28	33.2	33.2	4.83	4.9	67.4	67.9	12.9	12.6	8.40	8.4	4	3.5	
			33.2		4.93		68.4		12.2		8.40		3		
WM2A	10:30	0.17	32.1	32.1	6.35	6.4	87.3	87.6	24.2	24.5	8.60	8.6	12	12.5	
			32.1		6.4		87.8		24.7		8.60		13		

Date		28-Jun-16												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:28	0.33	26.6	26.6	7.06	7.1	87.7	88.0	39.3	40.5	8.60	8.6	14	14.0
			26.6		7.11		88.3		41.6		8.60		14	
WM2A	10:48	0.31	28.2	28.2	6.55	6.6	84.7	85.0	44.4	44.2	8.90	8.9	14	14.5
			28.2		6.6		85.3		43.9		8.90		15	

Date		30-Jun-16												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	13:20	0.28	28.5	28.6	6.19	6.2	79.9	79.9	10.3	10.6	8.70	8.7	5	4.5
			28.6		6.18		79.8		10.8		8.70		4	
WM2A	13:40	0.17	32.1	32.1	5.86	5.9	80.3	80.4	127.0	130.0	7.80	7.8	115	117.5
			32.1		5.87		80.4		133.0		7.70		120	

Date		2-Jun-16												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2B-C	10:50	0.02	25.1	25.1	6.96	7.0	84.3	84.3	2.9	3.2	8.90	8.9	2	2.0
			25.1		6.96		84.3		3.6		8.90		2	
WM2B	10:40	0.02	28.2	28.2	8.12	8.1	104.1	104.1	10.9	10.7	9.20	9.2	10	10.5
			28.2		8.12		104.1		10.4		9.20		11	

Date		4-Jun-16												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2B-C	10:34	0.02	24.2	24.2	6.91	6.9	82.7	82.1	4.3	4.4	8.70	8.7	<2	<2
			24.2		6.88		81.5		4.4		8.70		<2	
WM2B	10:21	0.02	30	30.0	7.26	7.3	96.3	96.9	11.3	11.2	8.40	8.4	11	10.5
			30		7.37		97.4		11.1		8.40		10	

Date		6-Jun-16												
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Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2B-C	14:40	0.11	24.5	24.5	7.86	7.9	94.2	95.0	95.3	96.5	8.80	8.8	214	207.5
			24.5		7.93		95.7		97.6		8.80		201	
WM2B	14:51	0.10	25.1	25.1	7.89	7.9	95.7	95.3	216.0	213.5	8.60	8.6	250	256.0
			25.1		7.81		94.9		211.0		8.60		262	

Date		#7-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)		
WM2B-C	11:00	0.04							4.7	4.7			2	2.0	
							4.6								
WM2B	10:50	0.04							10.3	10.8			11	11.0	
							11.2								

Date		8-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)		
WM2B-C	10:37	0.02	23.8	23.8	6.77	6.8	80.0	79.9	6.8	6.9	10.00	10.0	<2	<2	
			23.8		6.73		79.8		7.0		10.00		<2		
WM2B	10:45	0.02	27.5	27.5	8.05	8.1	101.9	101.9	10.5	10.2	8.50	8.5	9	9.5	
			27.5		8.05		101.9		9.9		8.50		10		

Date		10-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)		
WM2B-C	12:01	0.02	24.3	24.3	6.81	6.8	81.3	81.3	2.8	2.8	8.90	8.9	<2	<2	
			24.3		6.8		81.3		2.8		8.90		<2		
WM2B	11:50	0.02	28.3	28.3	7.72	7.7	99.3	99.2	6.6	6.6	8.30	8.3	11	10.5	
			28.3		7.71		99.1		6.6		8.30		10		

Date		13-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)		

WM2B-C	12:51	0.02	24.4	24.4	6.59	6.6	78.8	79.1	9.7	9.7	8.80	8.8	<2	<2
			24.4		6.63		79.3		9.6		8.80		<2	
WM2B	13:04	0.03	26.8	26.8	7.65	7.7	96.2	96.7	10.7	10.9	8.40	8.4	9	9.0
			26.8		7.73		97.1		11.1		8.40		9	

Date		15-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)		
WM2B-C	10:30	0.02	25	25.0	6.74	6.7	80.9	80.9	4.1	4.0	9.00	9.0	<2	<2	
			25		6.74		80.9		3.9		9.00		<2		
WM2B	10:15	0.02	29.8	29.8	7.28	7.3	96.1	96.1	11.0	10.9	8.80	8.8	11	10.5	
			29.8		7.28		96.1		10.8		8.80		10		

Date		17-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)		
WM2B-C	11:53	0.02	24.4	24.4	6.53	6.5	78.3	78.2	8.3	8.2	8.40	8.4	13	13.5	
			24.4		6.52		78.1		8.2		8.40		14		
WM2B	11:43	0.02	27.8	27.8	7.94	7.9	100.9	101.0	11.0	11.1	8.10	8.1	11	10.5	
			27.8		7.94		101.0		11.1		8.10		10		

Date		20-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)		
WM2B-C	10:30	0.02	26.8	26.8	7.59	7.6	94.4	94.4	4.3	3.9	9.20	9.2	2	2.5	
			26.8		7.59		94.4		3.5		9.20		3		
WM2B	10:20	0.02	28.6	28.6	8.48	8.5	109.4	109.4	5.1	4.8	8.90	8.9	3	3.0	
			28.6		8.48		109.4		4.6		8.90		3		

Date		22-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)		

WM2B-C	10:45	0.02	30.7	30.7	4.38	4.4	58.6	58.9	3.1	3.3	8.20	8.2	2	2.0
			30.7		4.4		59.2		3.4		8.20		2	
WM2B	10:50	0.02	33.5	33.5	5.95	5.9	83.5	83.6	11.0	10.8	9.10	9.1	11	10.5
			33.5		5.94		83.6		10.5		9.10		10	

Date	24-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2B-C	11:20	0.02	31.8	31.8	3.99	4.0	54.3	54.8	4.7	4.6	9.00	9.0	<2	<2
			31.8		4.06		55.2		4.5		9.00		<2	
WM2B	11:10	0.02	32.6	32.6	6.52	6.5	90.2	90.3	10.7	10.2	8.70	8.7	11	11.5
			32.6		6.54		90.4		9.6		8.70		12	

Date	28-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2B-C	9:57	0.02	29.1	29.2	5.16	5.2	67.1	67.6	3.2	3.3	9.30	9.3	<2	<2
			29.2		5.2		68.0		3.3		9.30		<2	
WM2B	10:10	0.02	29.5	29.5	7.39	7.4	97.0	97.3	11.2	11.2	9.10	9.1	6	6.5
			29.5		7.43		97.5		11.1		9.10		7	

Date	30-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2B-C	10:25	0.02	29.3	29.3	4.81	4.8	63.1	62.9	3.5	3.4	9.10	9.2	<2	<2
			29.3		4.76		62.6		3.3		9.20		<2	
WM2B	10:10	0.02	30.3	30.3	7.01	7.0	93.1	93.6	10.3	10.0	9.10	9.1	5	5.0
			30.3		7.06		94.0		9.7		9.10		5	

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

Water Quality Monitoring Data for Contract 2 and 6

Date		2-Jun-16												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	10:12	0.03	28.9	28.9	6.9	6.9	89.4	89.3	3.5	3.4	9.40	9.4	8	7.5
			28.9		6.88		89.1		3.4		9.40		7	
WM3	9:46	0.15	27.6	27.6	7.48	7.5	94.6	94.7	7.6	7.6	8.80	8.8	9	9.5
			27.6		7.49		94.8		7.7		8.80		10	

Date		4-Jun-16												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	10:59	0.04	30.1	30.1	6.79	6.8	89.9	89.5	13.1	12.8	10.30	10.3	26	26.0
			30.1		6.71		89.0		12.5		10.30		26	
WM3	11:13	0.17	29	29.1	7.08	7.0	92.4	92.1	12.5	12.8	9.60	9.6	4	4.5
			29.1		7		91.7		13.0		9.60		5	

Date		6-Jun-16												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	14:23	0.21	24.6	24.6	7.49	7.5	90.0	90.2	overrange	overrange	8.60	8.6	1360	1350.0
			24.6		7.52		90.4		overrange		8.60		1340	
WM3	14:07	0.53	24.5	24.5	7.59	7.6	91.1	91.4	702.0	714.5	8.80	8.8	890	900.0
			24.5		7.67		91.7		727.0		8.80		910	

Date		8-Jun-16												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	10:19	0.15	26.9	26.9	7.11	7.1	89.0	89.4	overrange	overrange	10.50	10.5	1590	1560.0
			26.8		7.17		89.7		overrange		10.50		1530	
WM3	10:05	0.17	25.8	25.8	6.92	6.9	84.9	85.3	28.7	28.3	8.90	8.9	30	30.0
			25.8		6.97		85.7		27.9		8.80		30	

Date		10-Jun-16												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	12:13	0.03	29.1	29.1	6.78	6.8	88.3	88.2	6.1	6.1	10.00	10.0	58	57.0
			29.1		6.76		88.0		6.0		10.00		56	
WM3	12:24	0.15	28.1	28.1	6.65	6.6	85.0	84.7	5.5	5.5	8.90	8.9	10	10.0
			28.1		6.62		84.4		5.5		8.90		10	

Date		13-Jun-16												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	12:31	0.11	27.4	27.4	6.84	6.9	86.5	86.9	26.3	26.7	9.20	9.2	55	55.5
			27.4		6.91		87.3		27.1		9.20		56	
WM3	12:11	0.23	27.9	27.9	7	7.0	89.4	89.3	10.3	10.8	8.80	8.8	12	12.5
			27.9		6.97		89.1		11.3		8.80		13	

Date		15-Jun-16												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	13:30	0.04	29	29.0	6.87	6.9	89.6	89.6	15.8	16.1	10.40	10.4	26	26.0
			29		6.87		89.6		16.4		10.40		26	
WM3	13:15	0.16	28.4	28.4	6.37	6.4	82.1	82.1	10.5	10.4	8.10	8.1	10	10.5
			28.4		6.37		82.1		10.2		8.10		11	

Date		17-Jun-16												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	13:06	0.04	29.2	29.2	6.84	6.8	88.9	88.6	4.2	4.3	8.40	8.4	16	16.0
			29.2		6.81		88.3		4.3		8.40		16	
WM3	12:55	0.15	27.9	27.9	6.77	6.8	86.6	86.5	8.6	8.7	7.90	7.9	8	8.5
			27.9		6.76		86.4		8.7		7.90		9	

Date		20-Jun-16												
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Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	12:48	0.09	29	29.1	6.85	6.9	89.7	90.0	8.7	8.7	7.90	7.9	9	8.0
			29.1		6.91		90.2		8.8		7.90		7	
WM3	12:35	0.13	29.7	29.7	7.01	7.1	92.4	92.9	10.6	10.9	7.90	7.9	8	8.0
			29.7		7.13		93.4		11.1		7.90		8	

Date		22-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)		
WM3-C	11:10	0.03	30.3	30.3	5.94	5.9	79.1	79.0	4.3	4.3	10.10	10.1	5	4.0	
			30.3		5.91		78.8		4.3		10.10		3		
WM3	11:20	0.15	31.2	31.2	5.66	5.7	76.6	76.7	5.8	5.7	9.60	9.6	4	4.0	
			31.2		5.67		76.8		5.6		9.60		4		

Date		24-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)		
WM3-C	11:30	0.03	31.4	31.4	5.83	5.8	79.0	78.7	6.7	6.8	7.80	7.8	8	8.0	
			31.4		5.76		78.3		6.9		7.80		8		
WM3	11:40	0.15	32	32.0	5.66	5.7	77.4	77.5	6.5	6.5	8.00	8.0	7	7.0	
			32		5.67		77.6		6.5		8.00		7		

Date		28-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)		
WM3-C	11:03	0.29	28.9	28.9	6.48	6.5	84.1	84.5	16.9	17.1	9.10	9.1	6	5.5	
			28.8		6.53		84.9		17.3		9.10		5		
WM3	11:21	0.29	29.7	29.8	5.93	6.0	78.1	78.5	18.2	18.3	9.30	9.3	9	9.5	
			29.8		5.97		78.8		18.4		9.30		10		

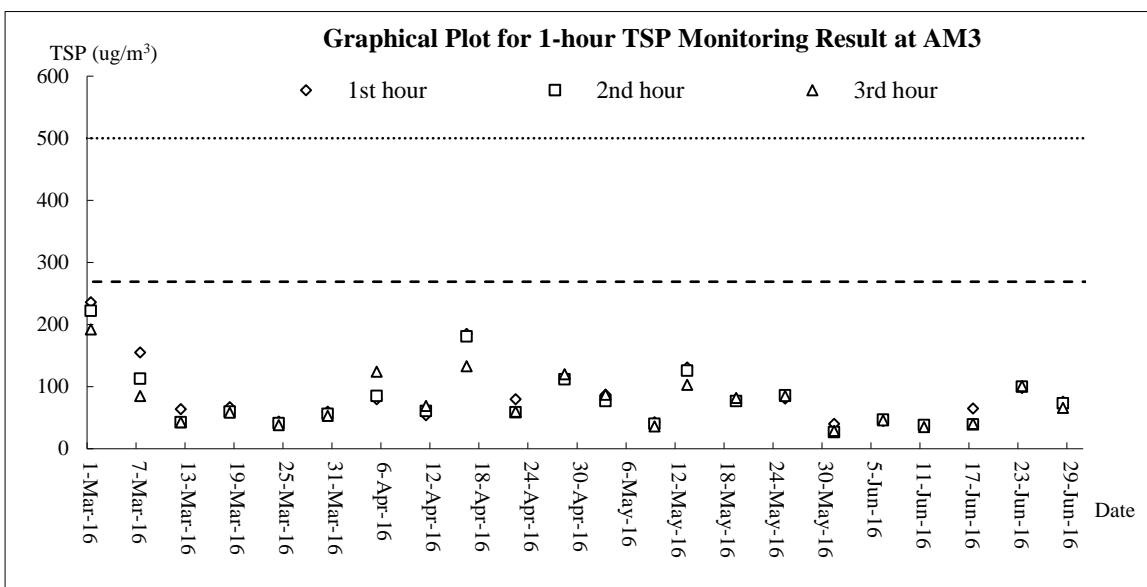
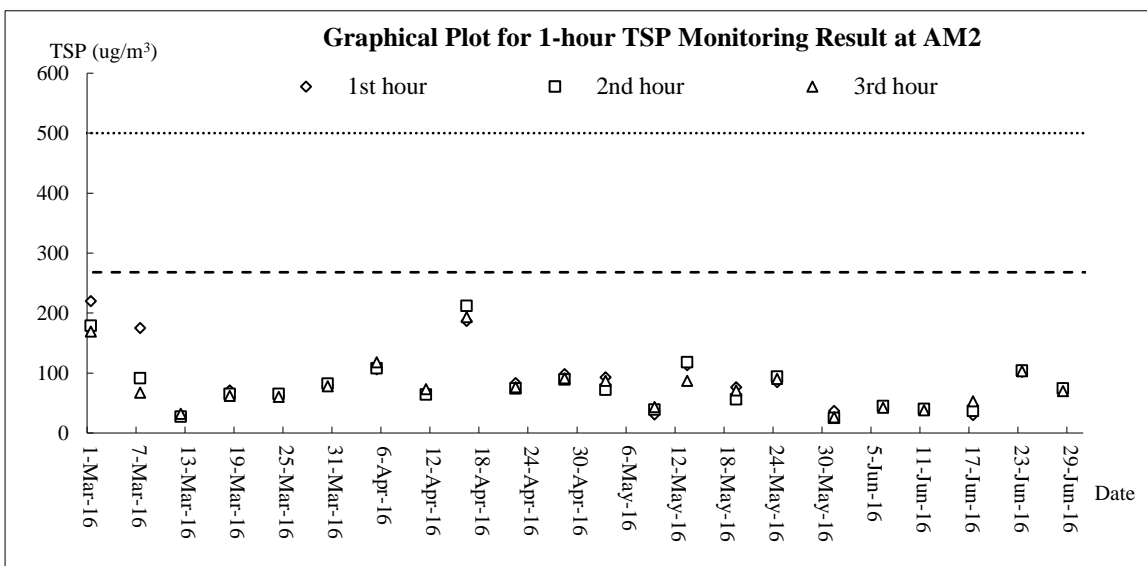
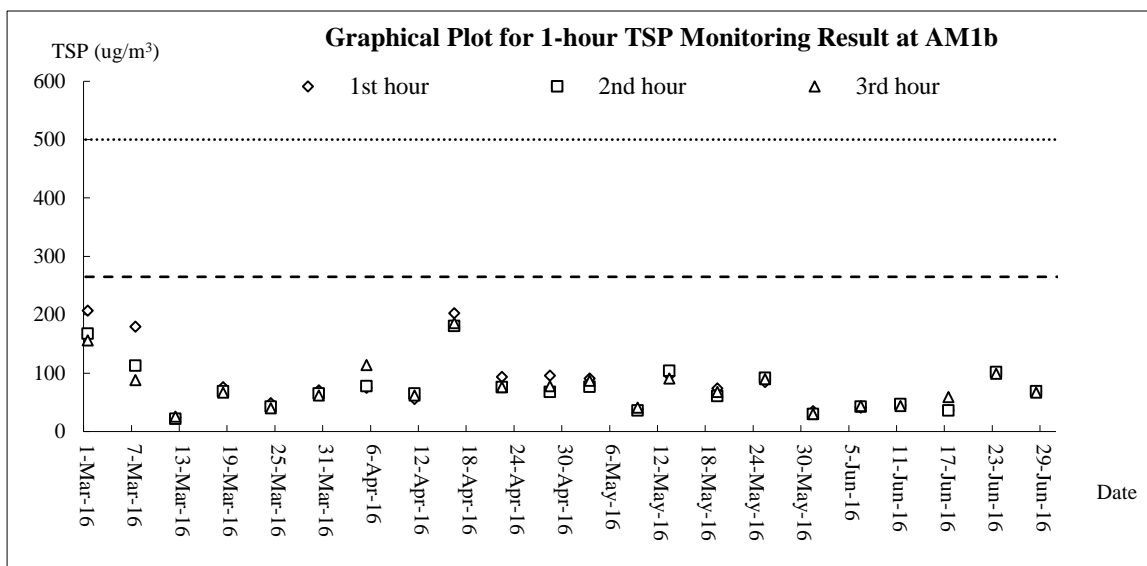
Date		30-Jun-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)		

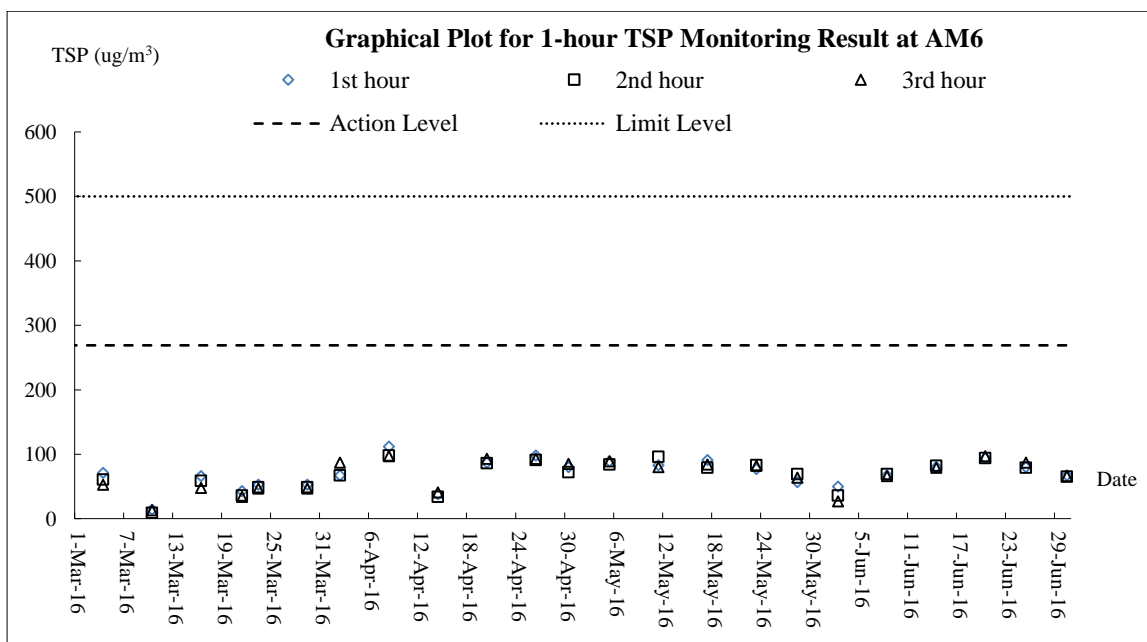
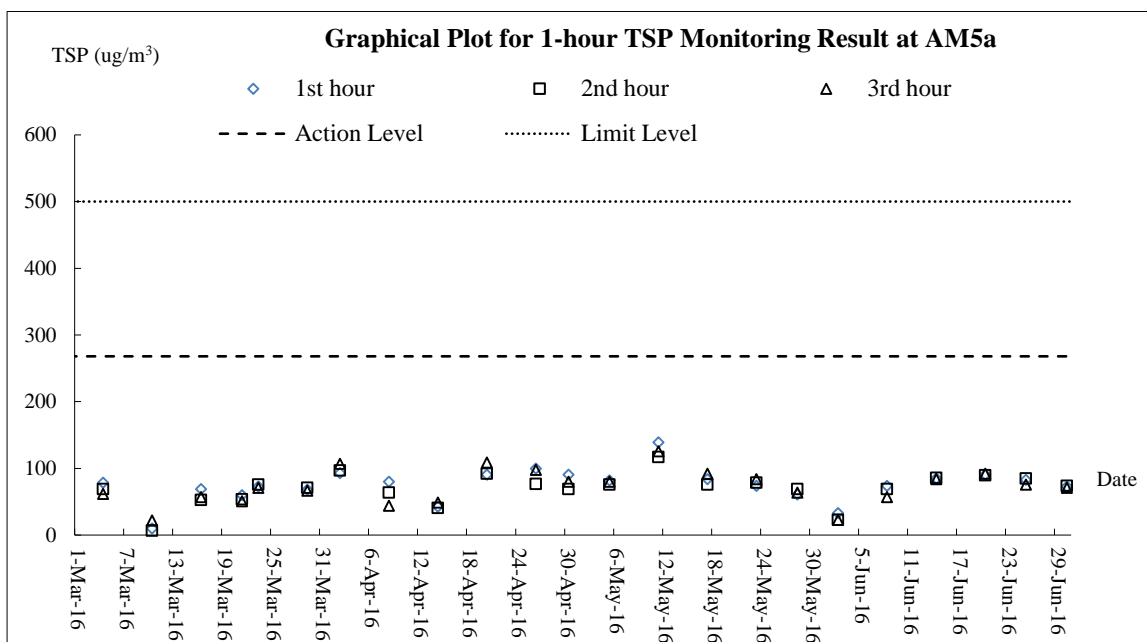
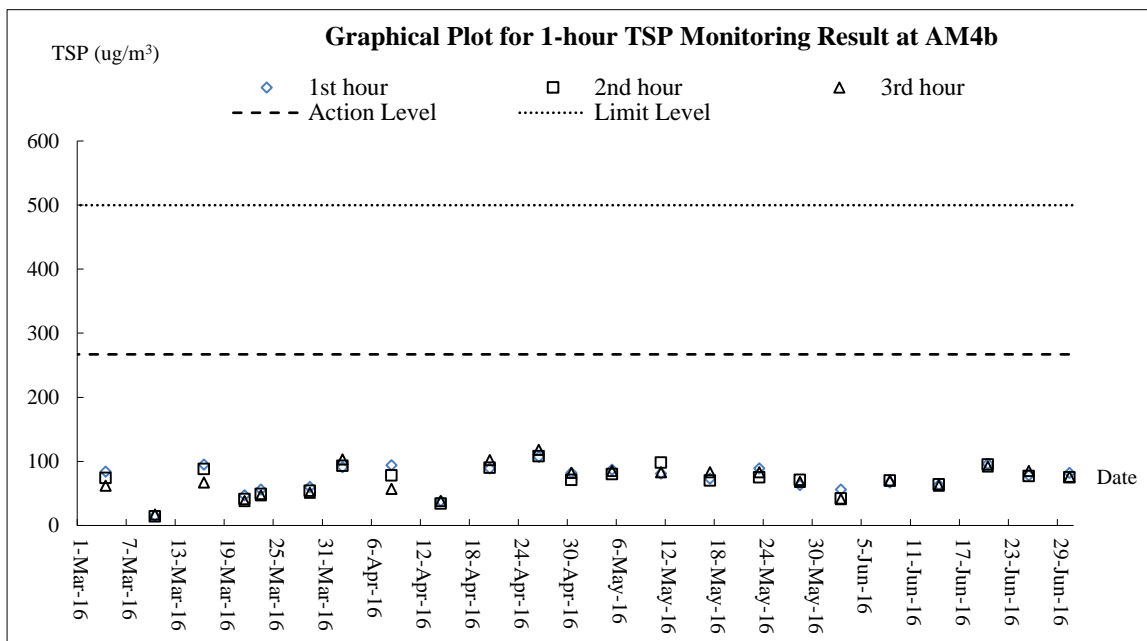
WM3-C	11:00	0.03	29.3	29.4	6.48	6.5	84.9	84.9	9.8	10.0	8.20	8.2	8	8.5
			29.4		6.47		84.8		10.3		8.20		9	
WM3	10:44	0.15	29.1	29.2	6.18	6.2	80.7	80.7	11.4	11.3	8.50	8.6	8	8.5
			29.2		6.17		80.6		11.2		8.60		9	

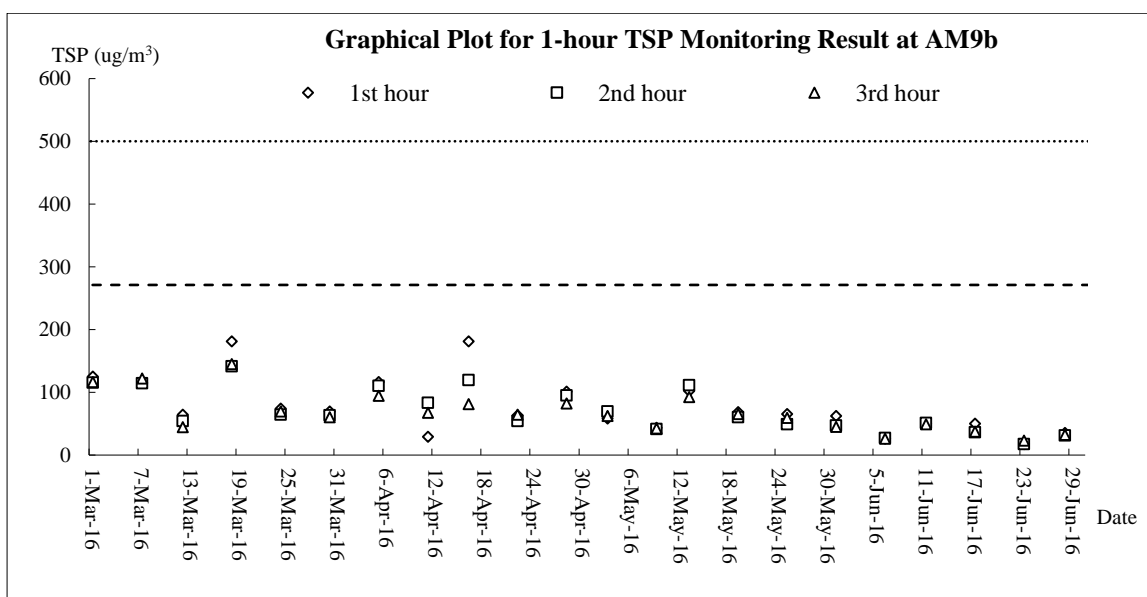
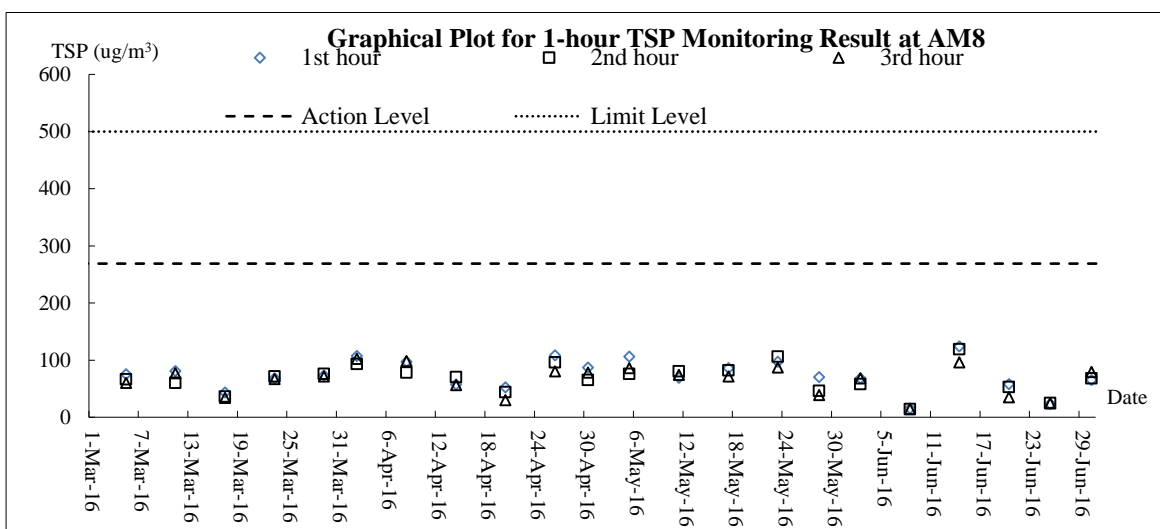
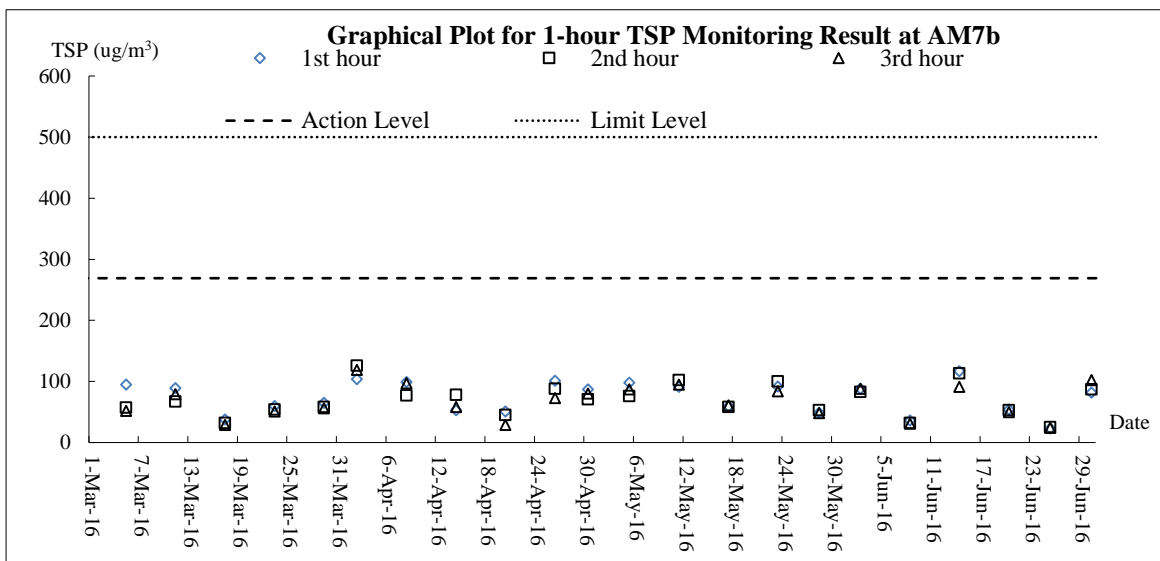
Appendix J

Graphical Plots for Monitoring Result

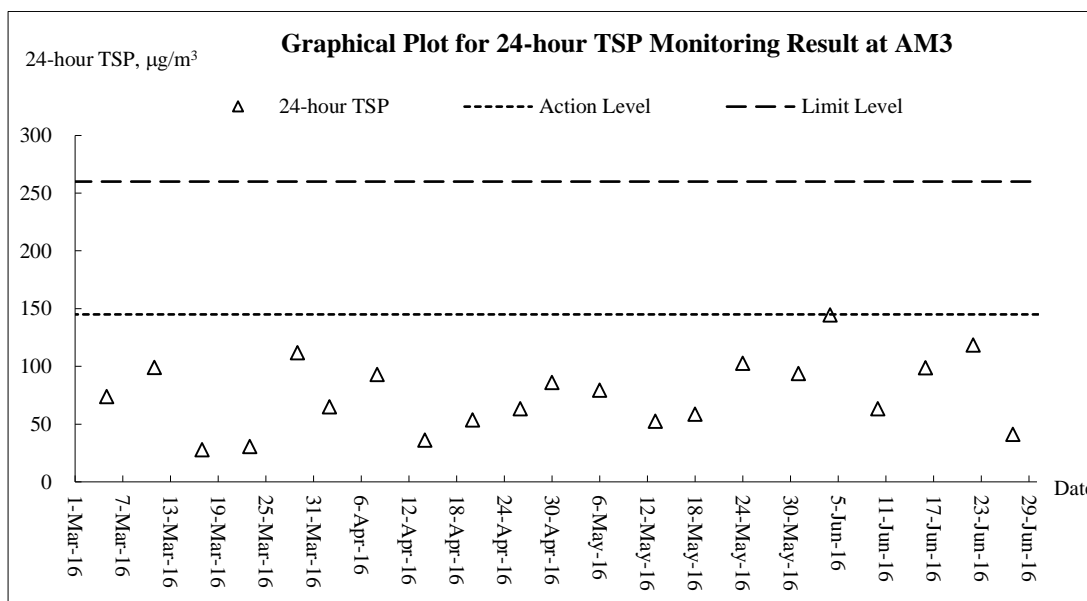
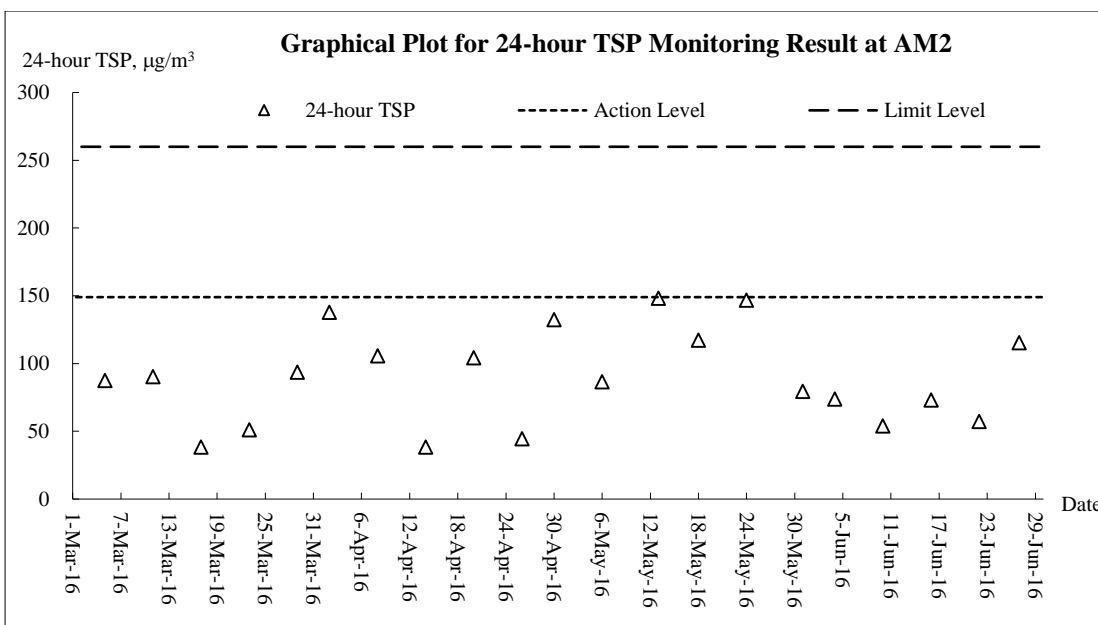
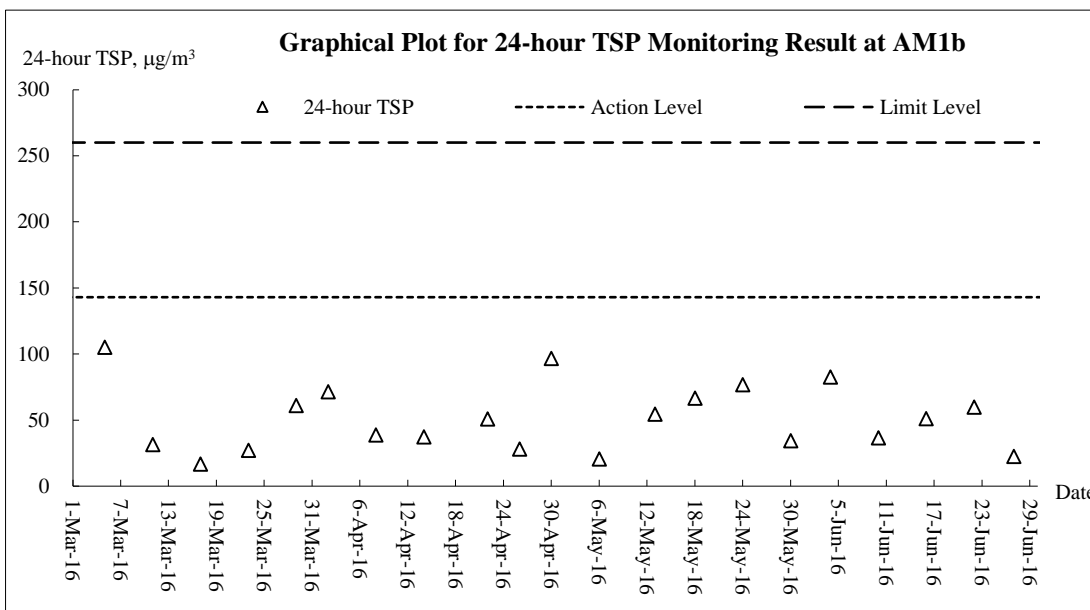
Air Quality – 1-hour TSP

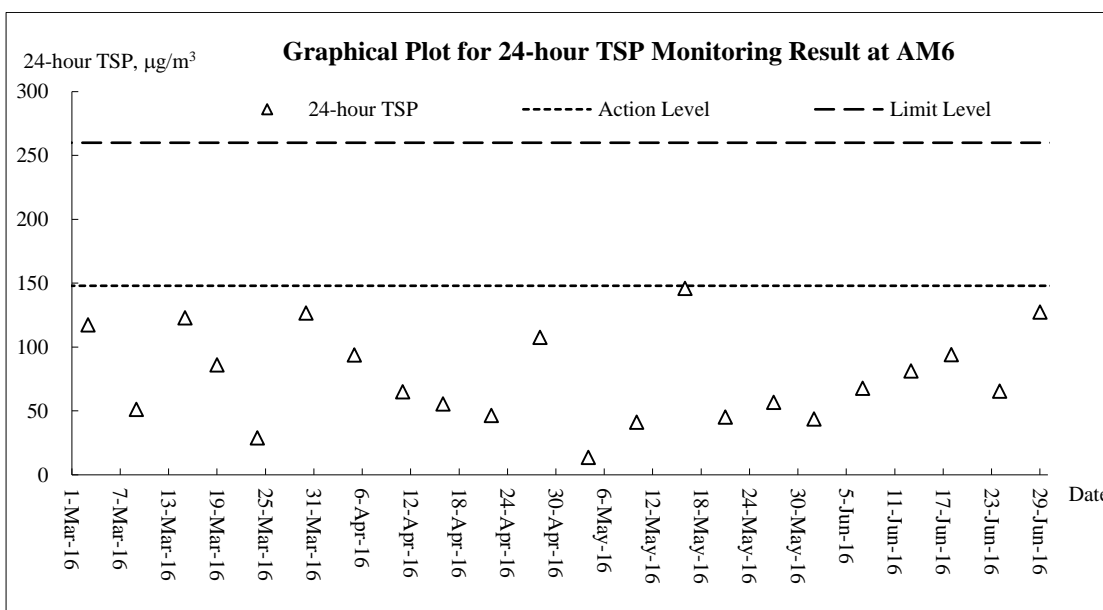
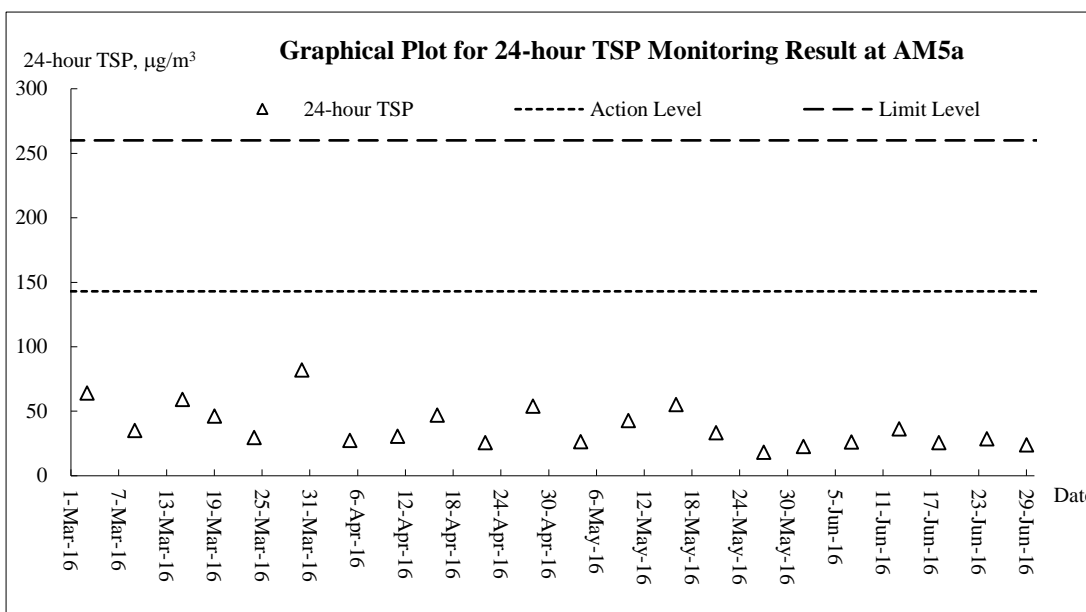
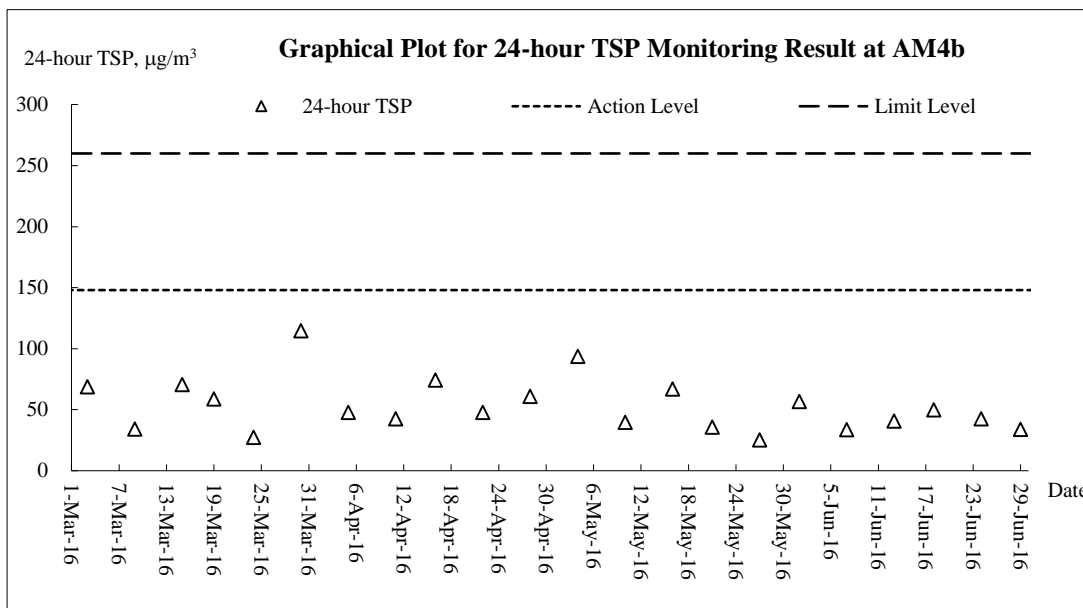


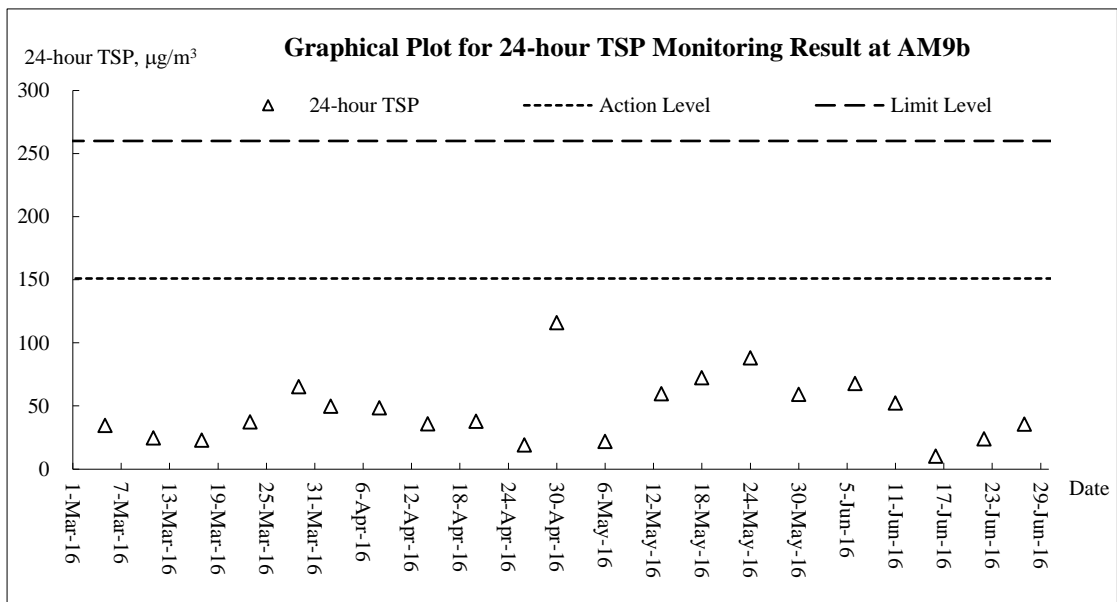
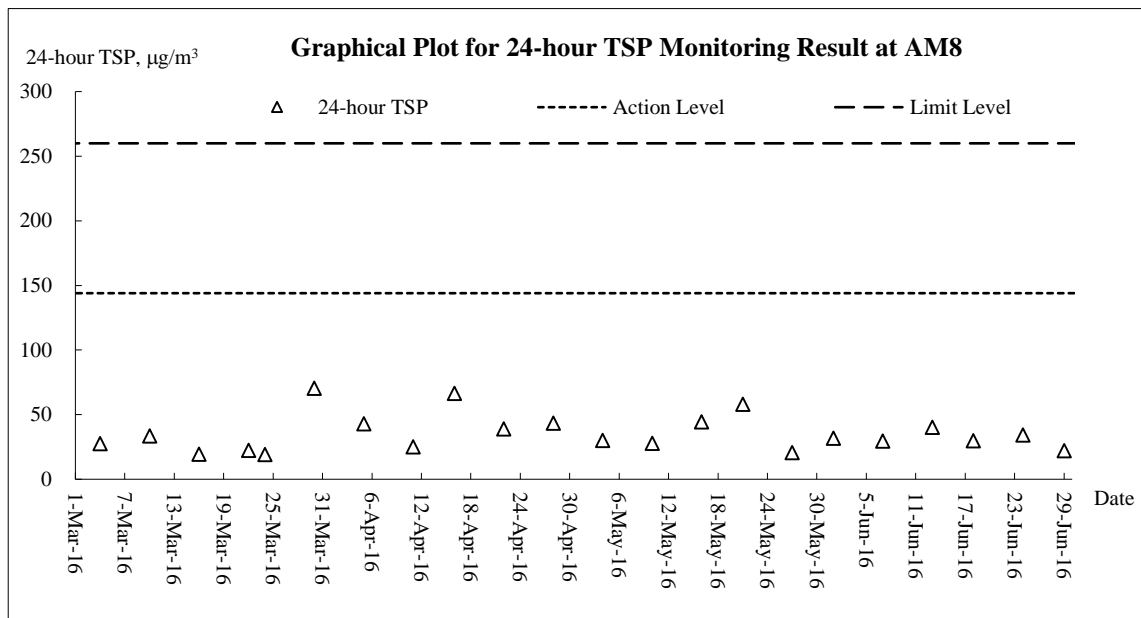
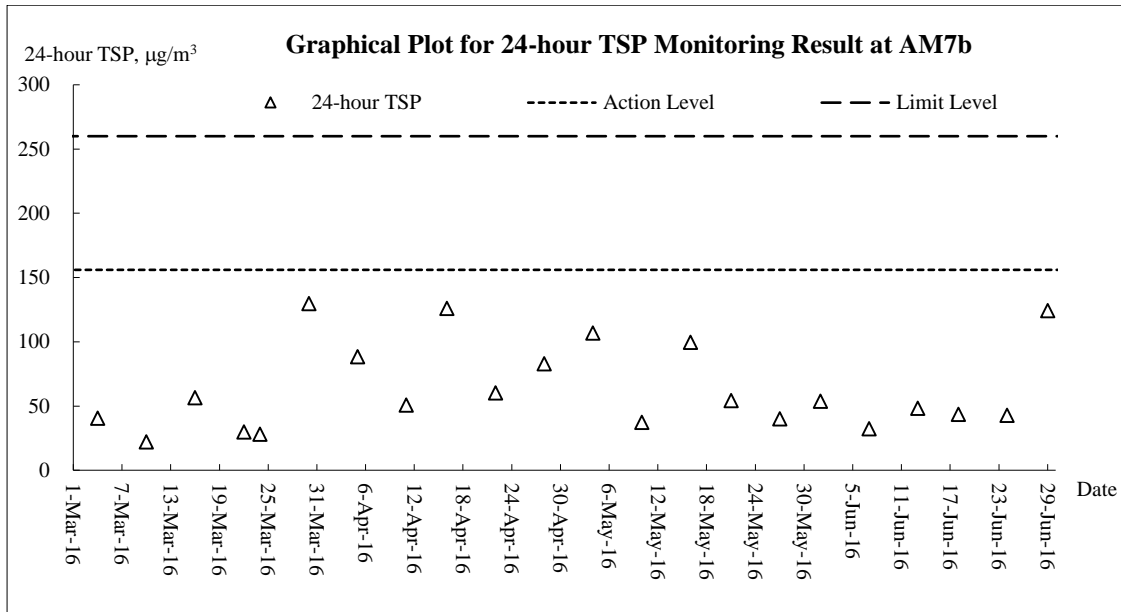




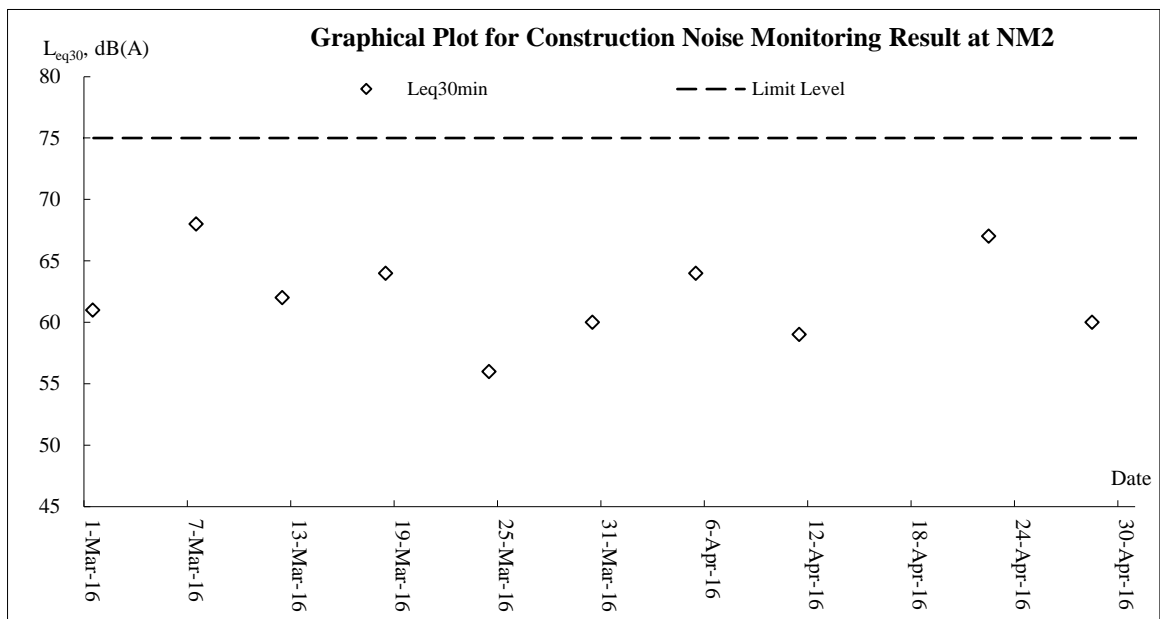
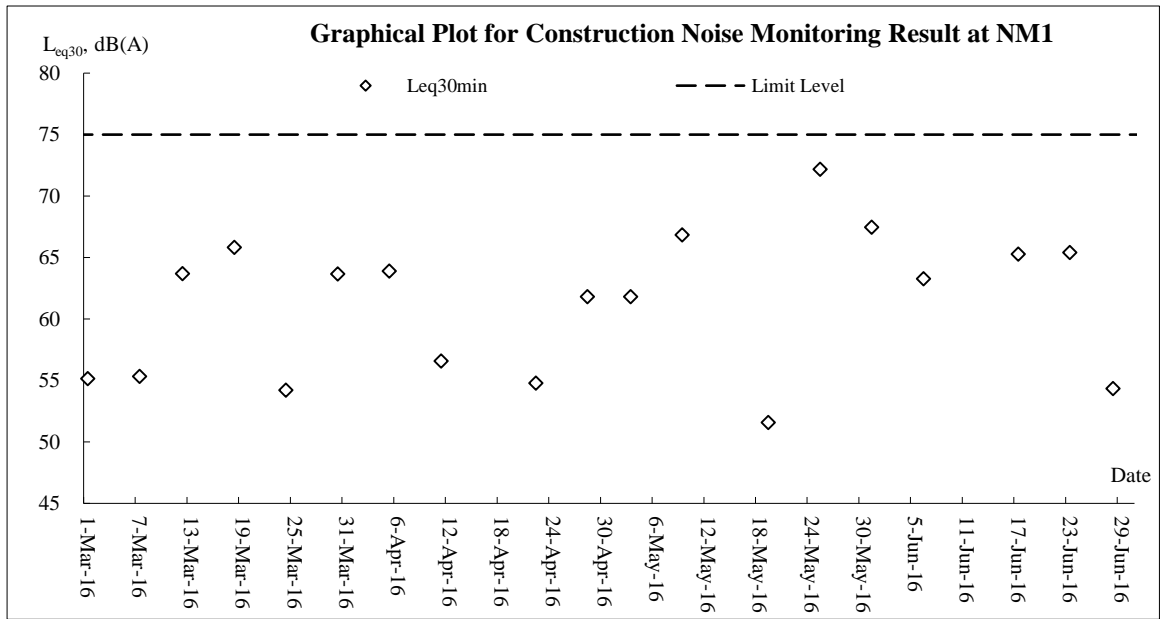
Air Quality – 24-hour TSP

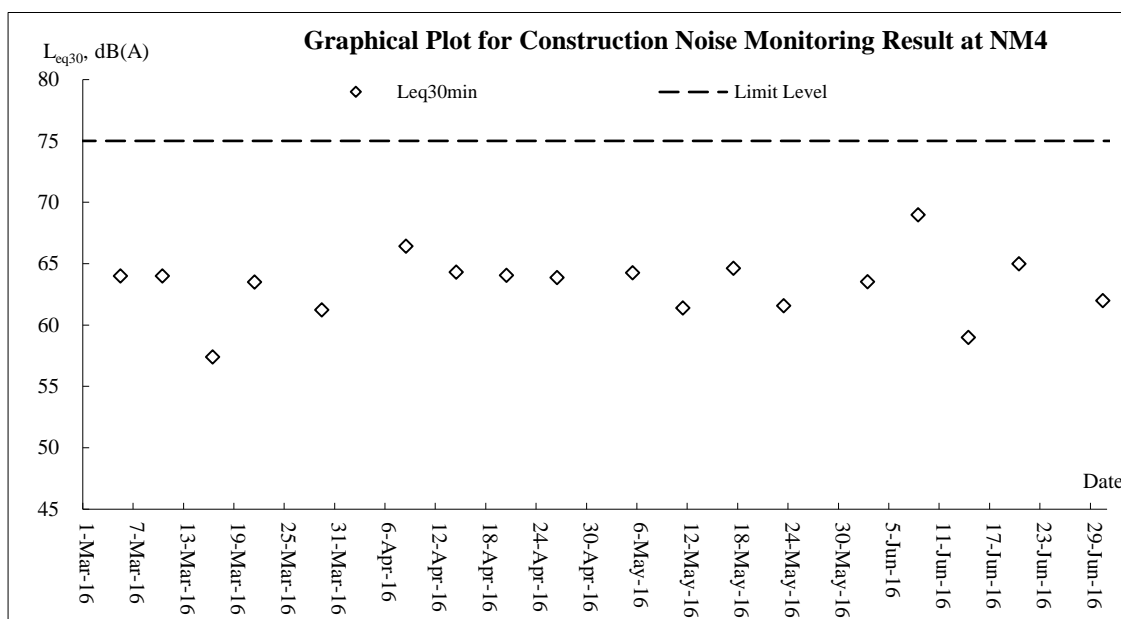
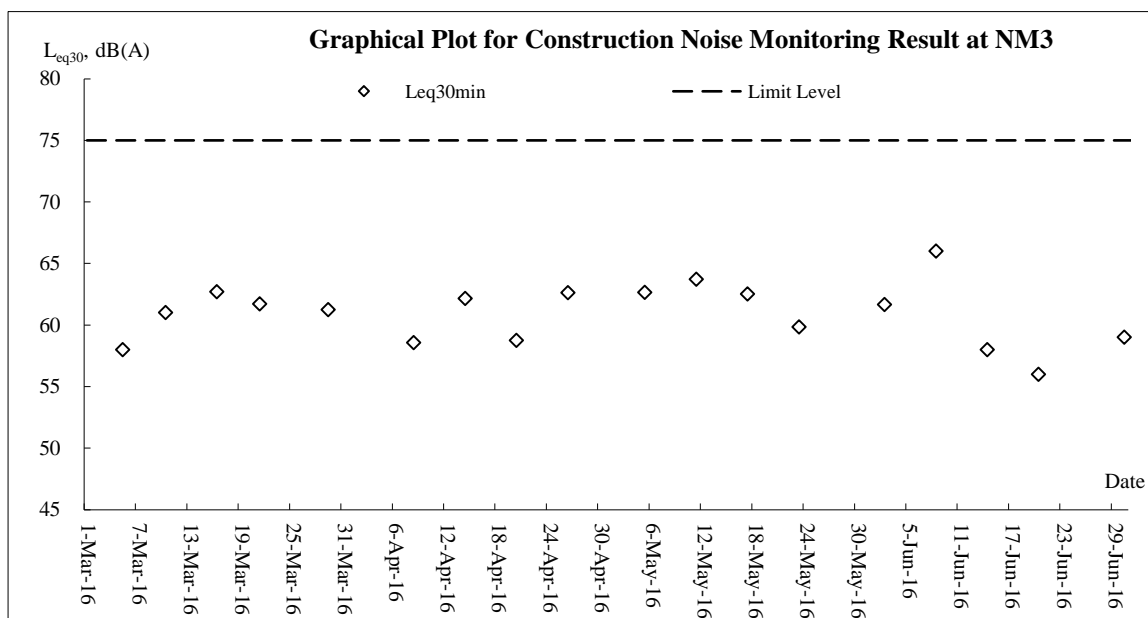
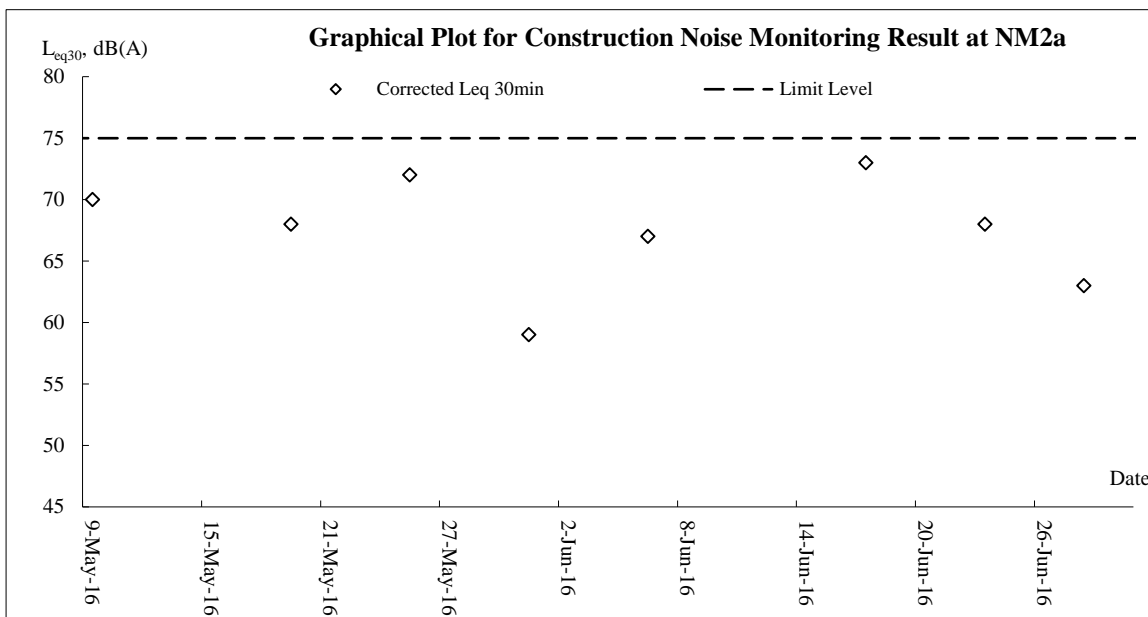


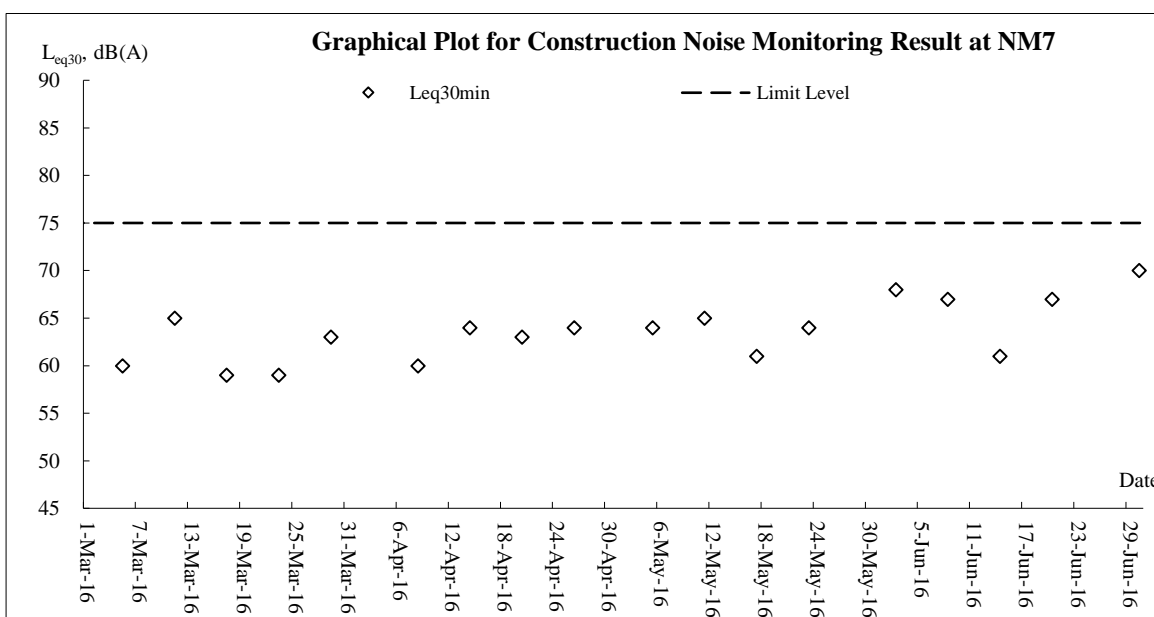
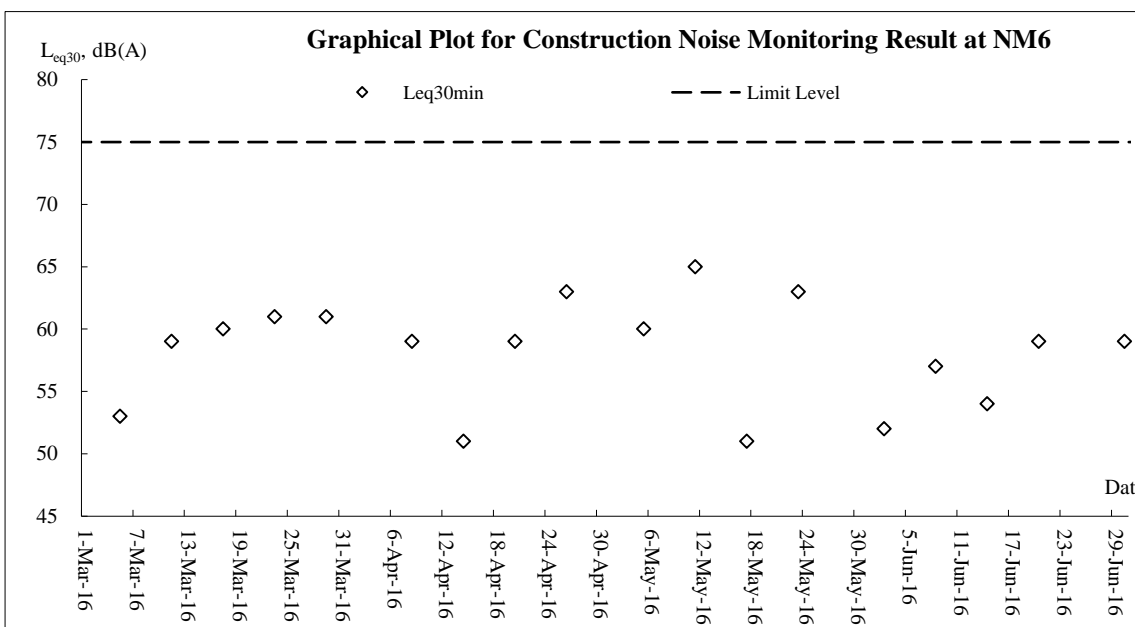
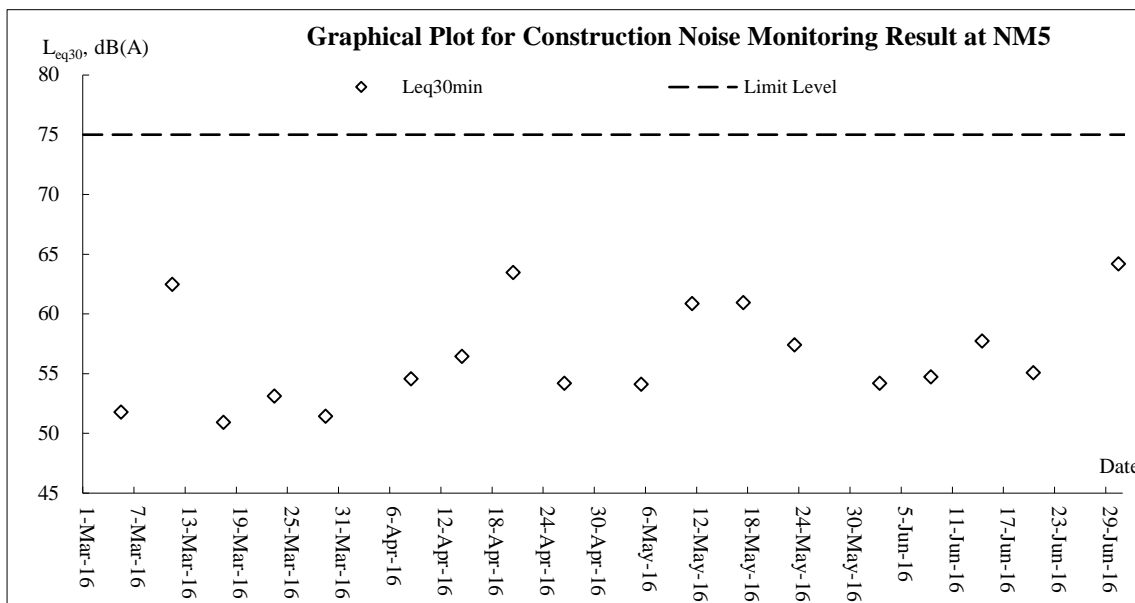


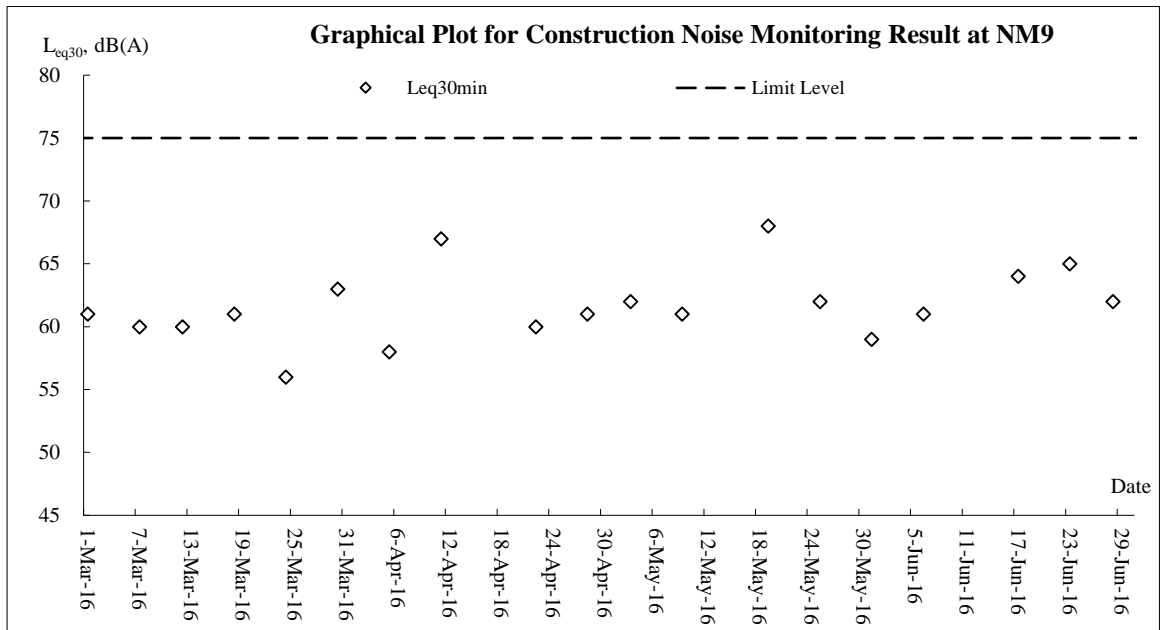
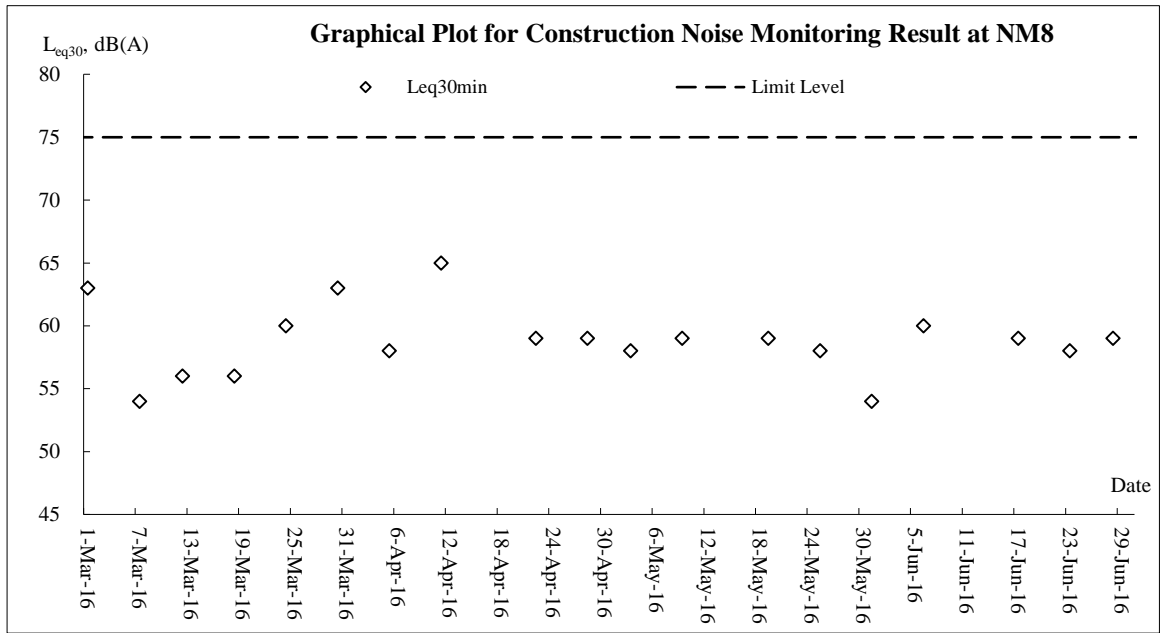


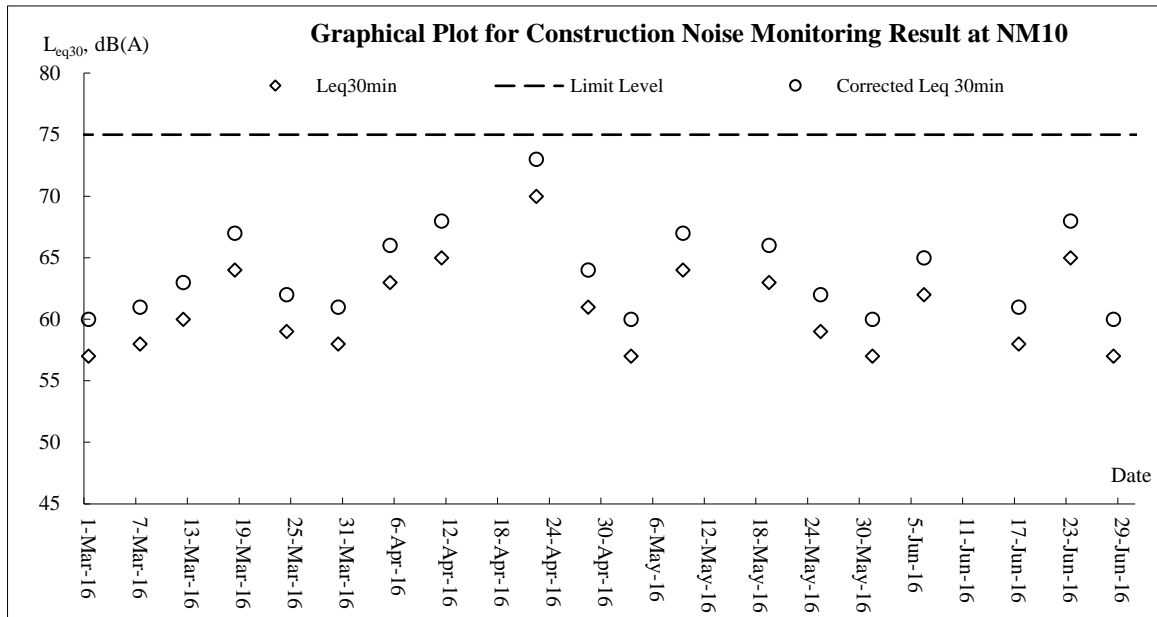
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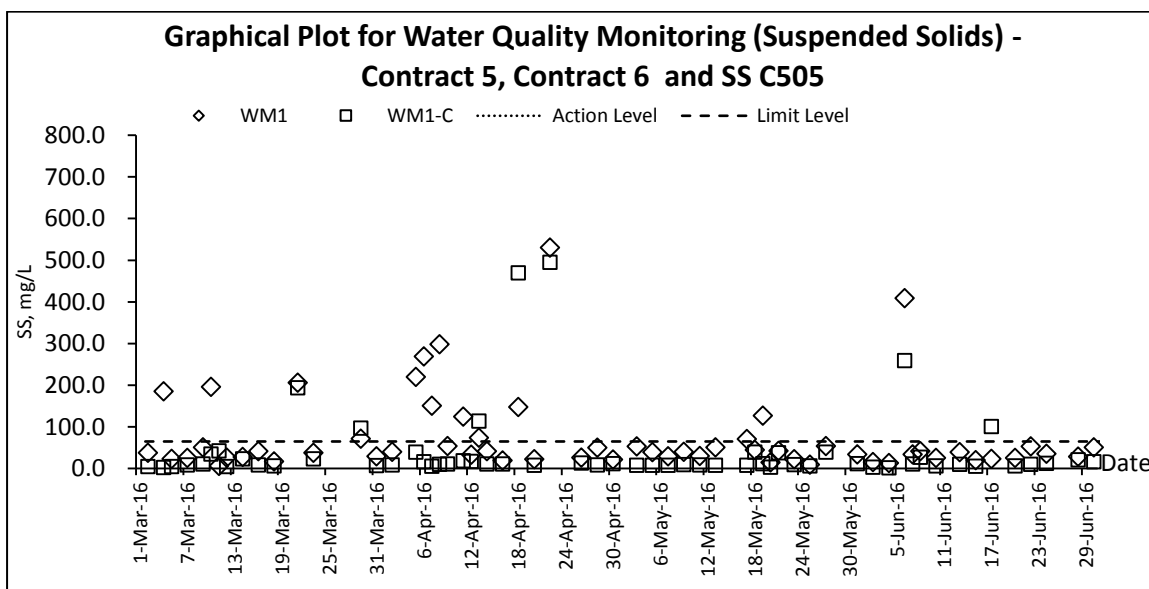
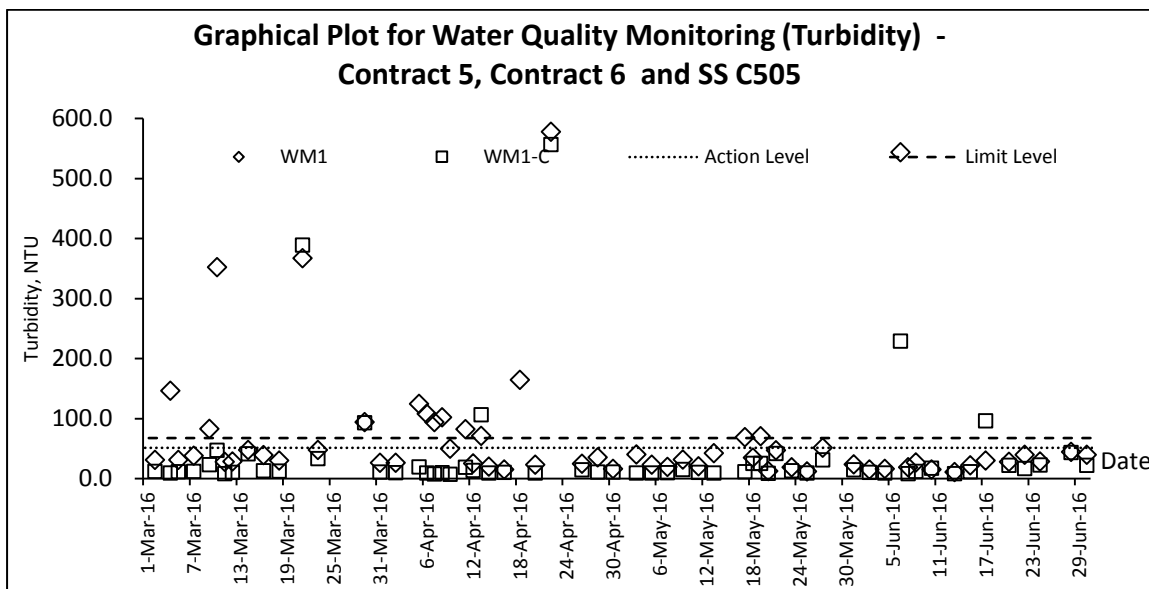
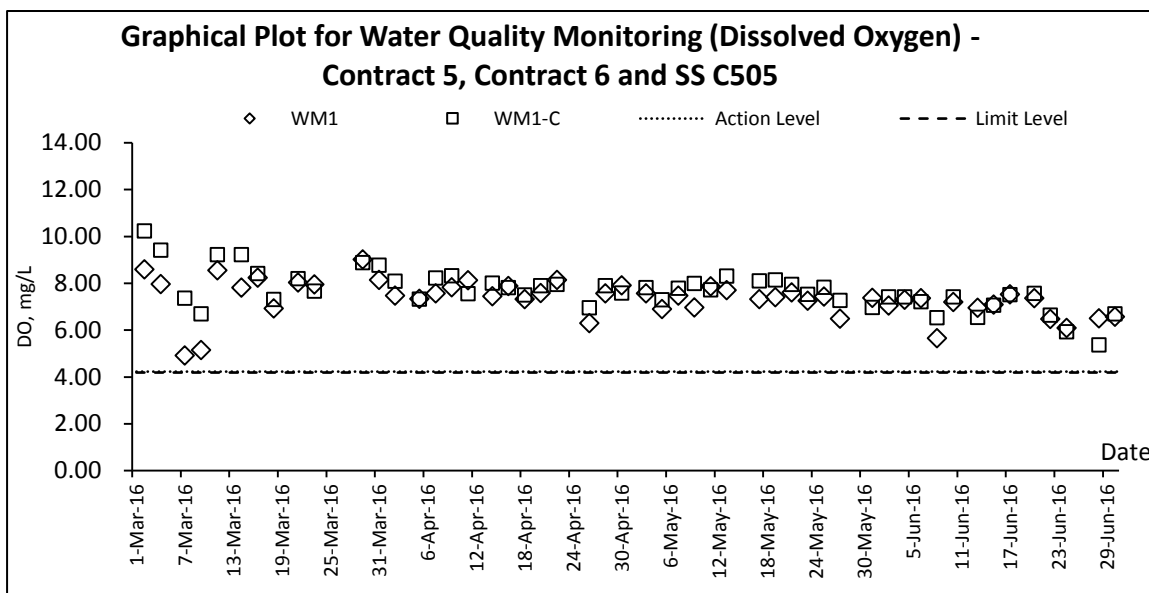


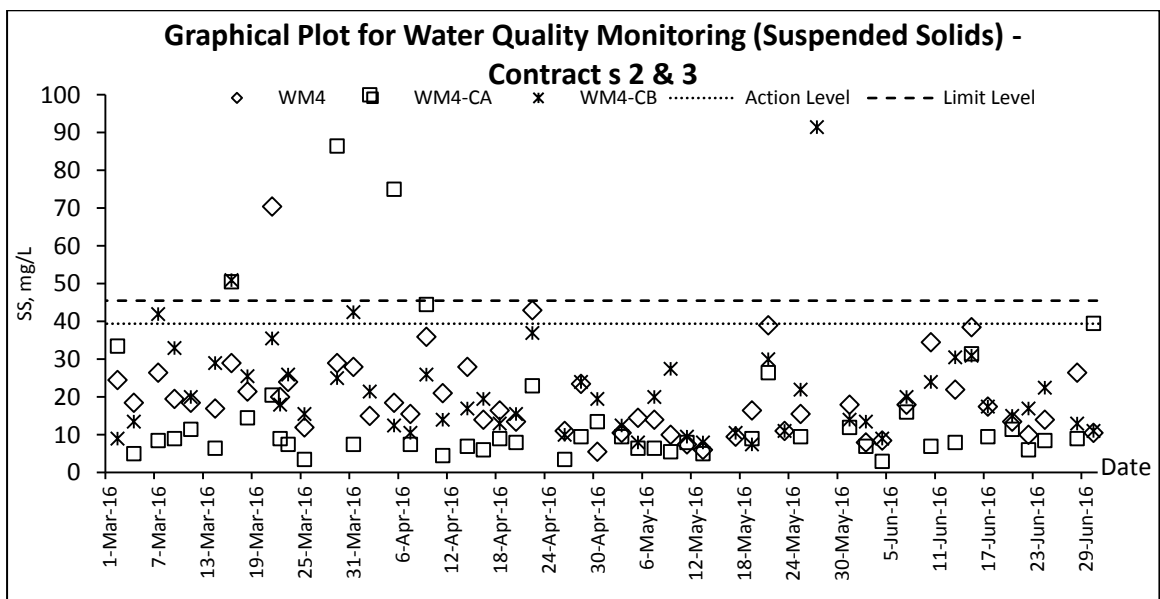
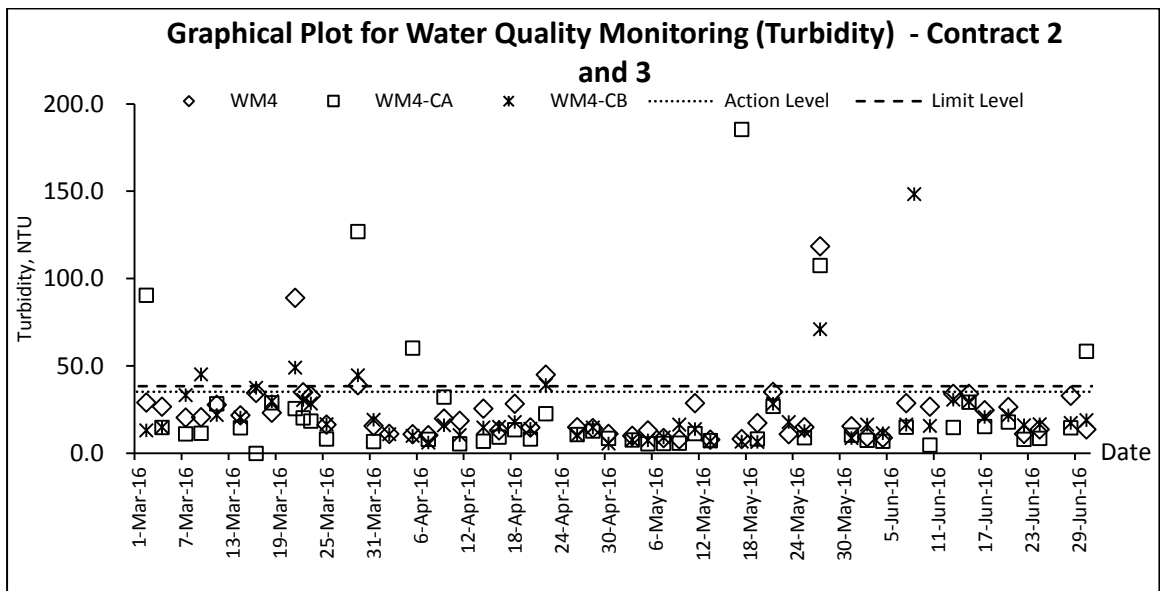
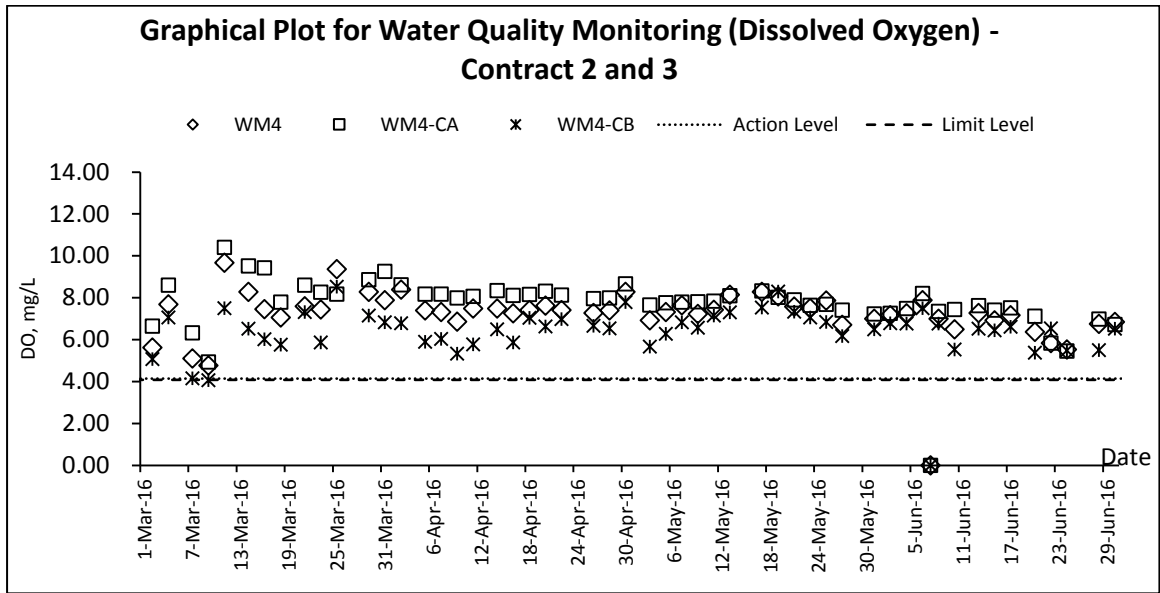


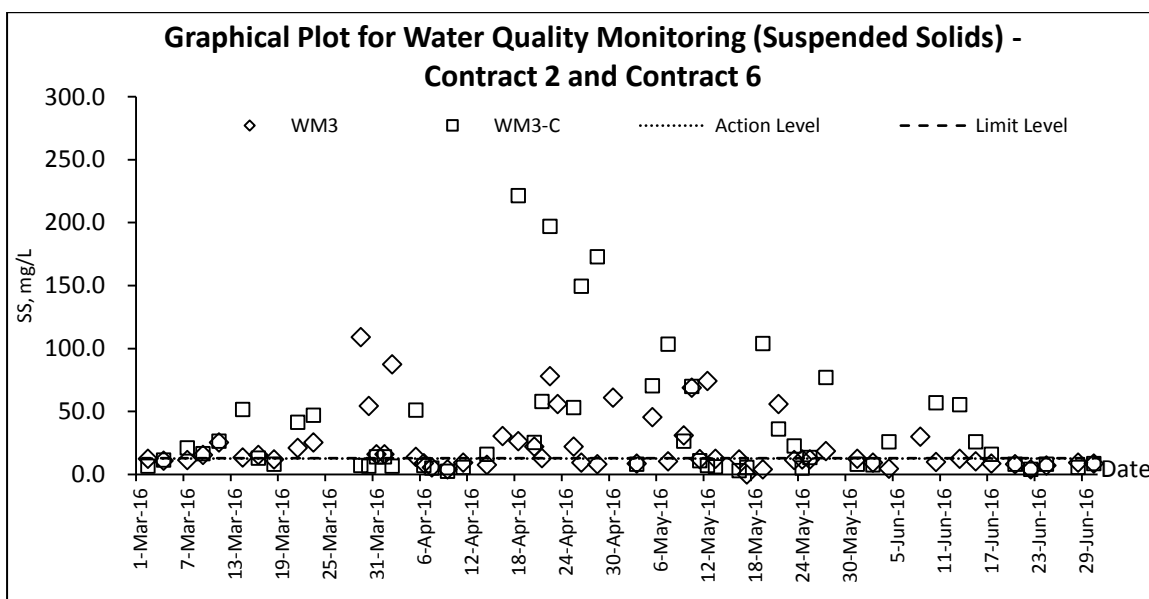
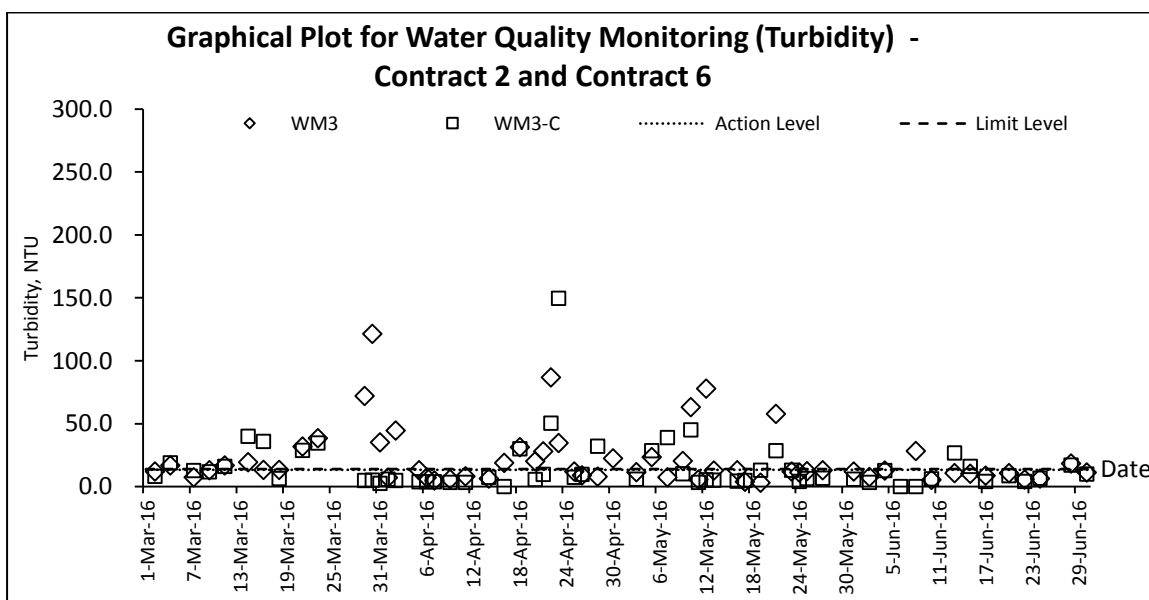
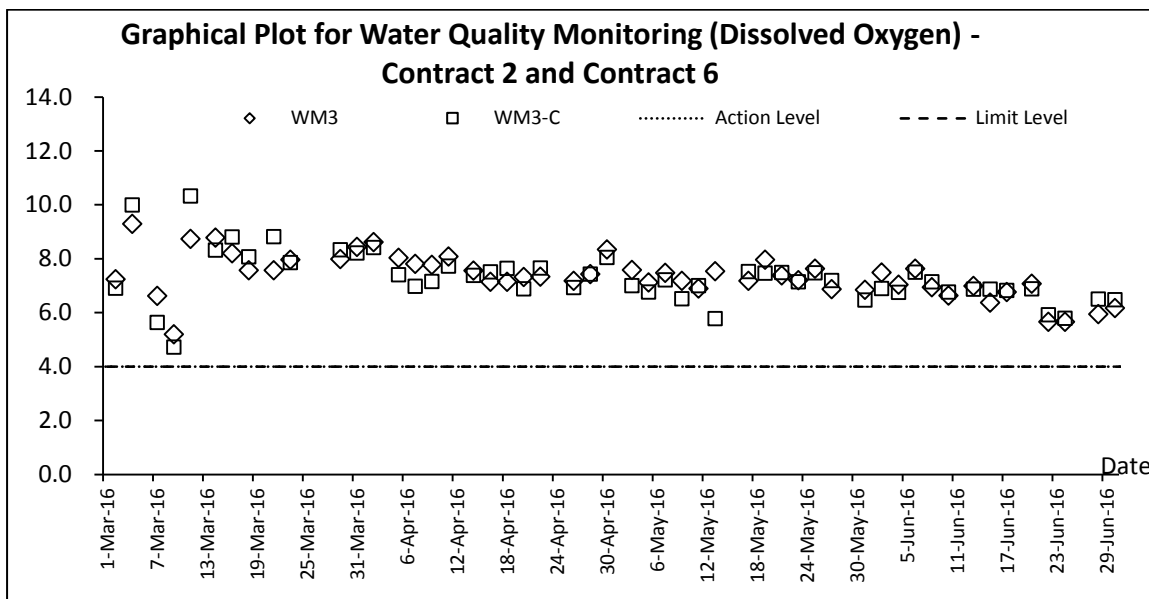


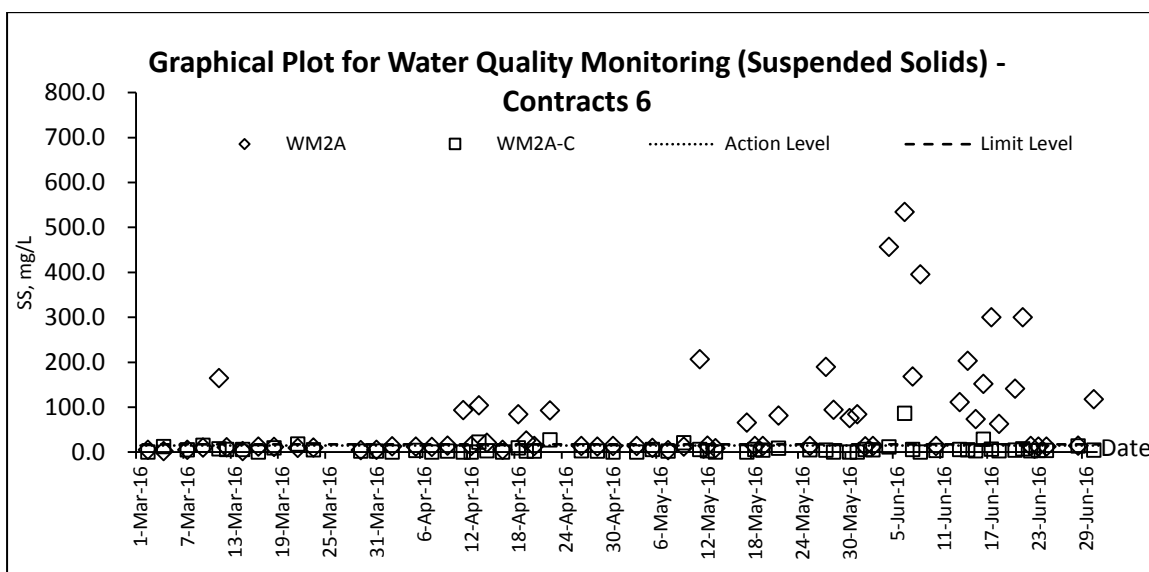
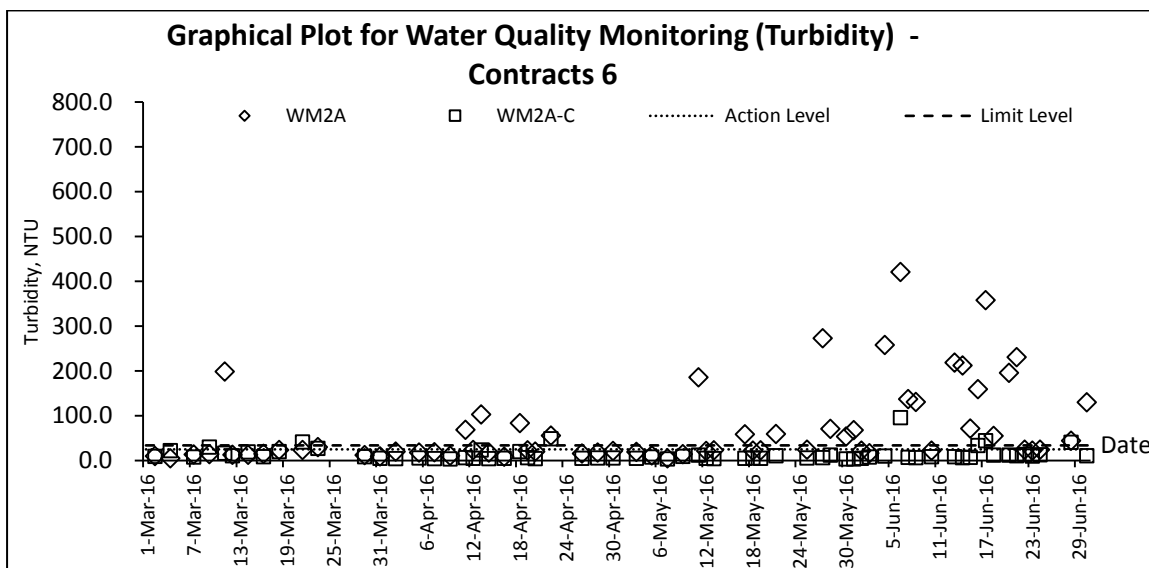
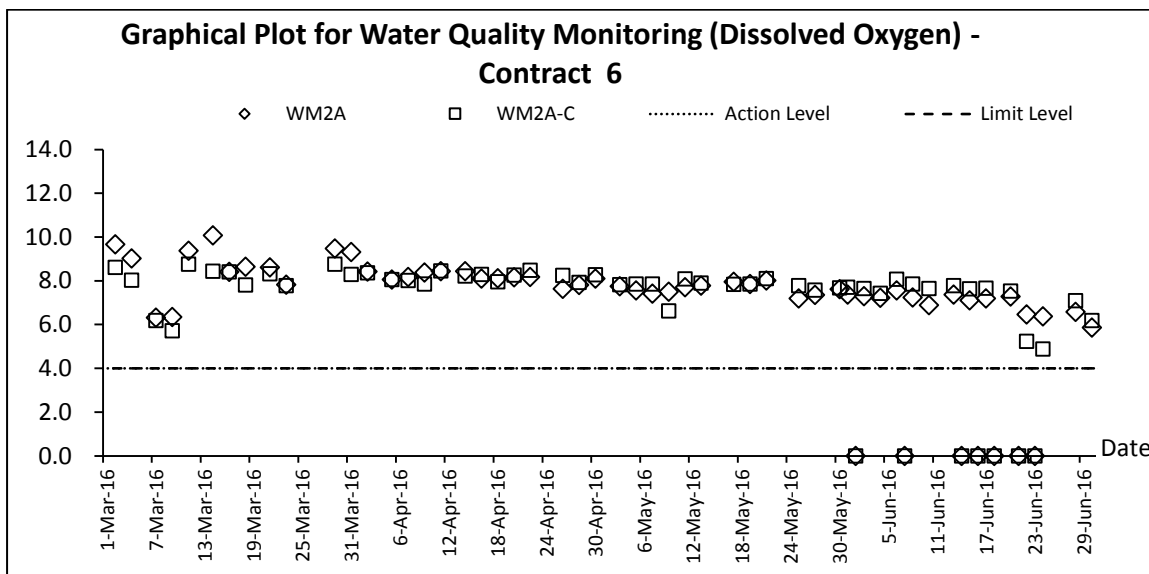


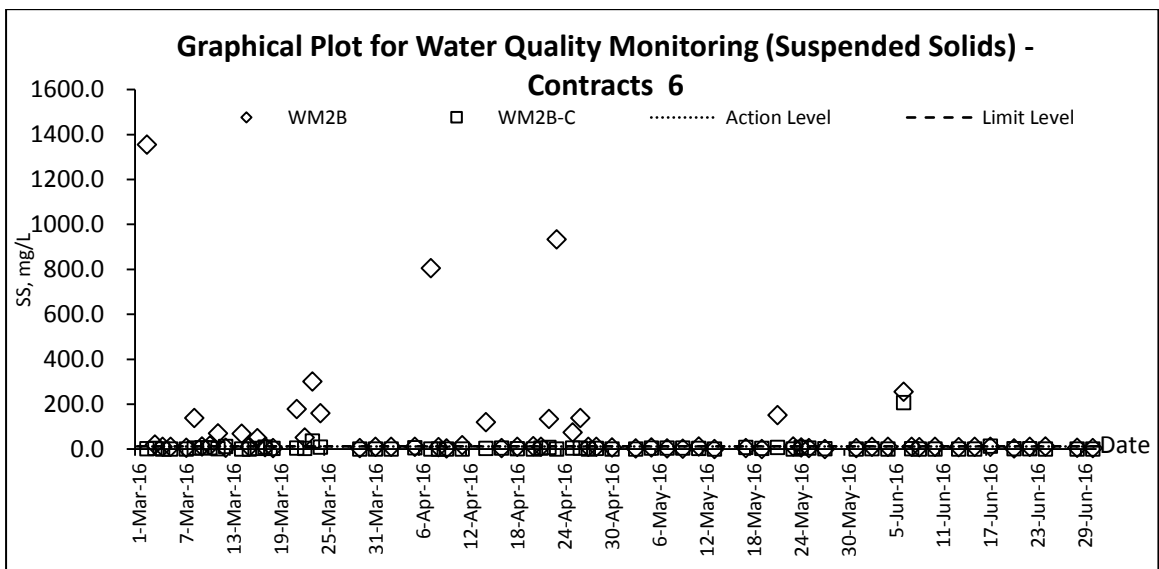
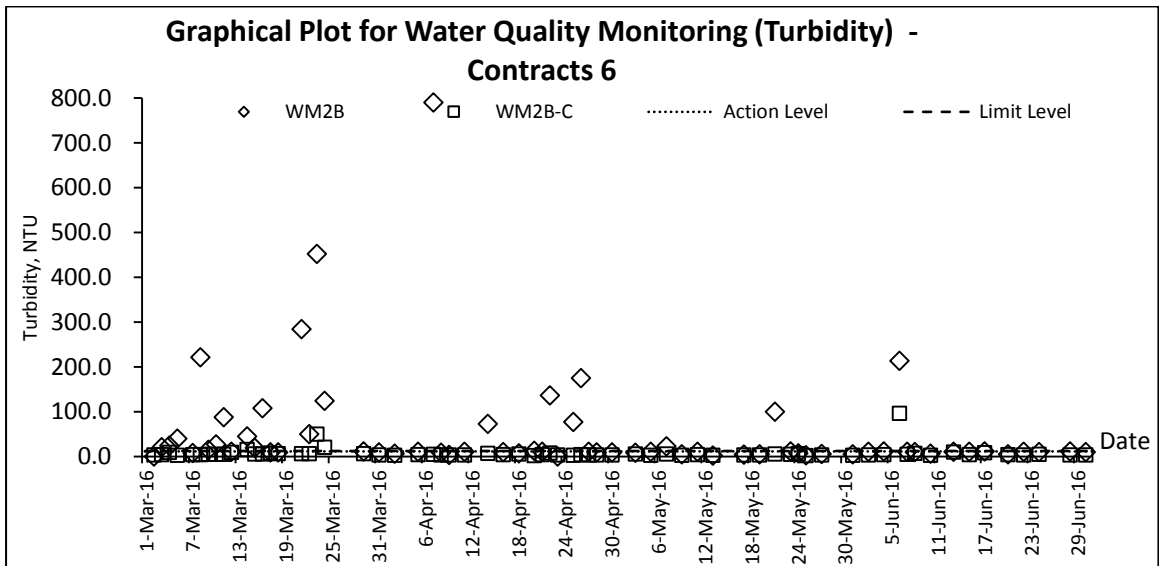
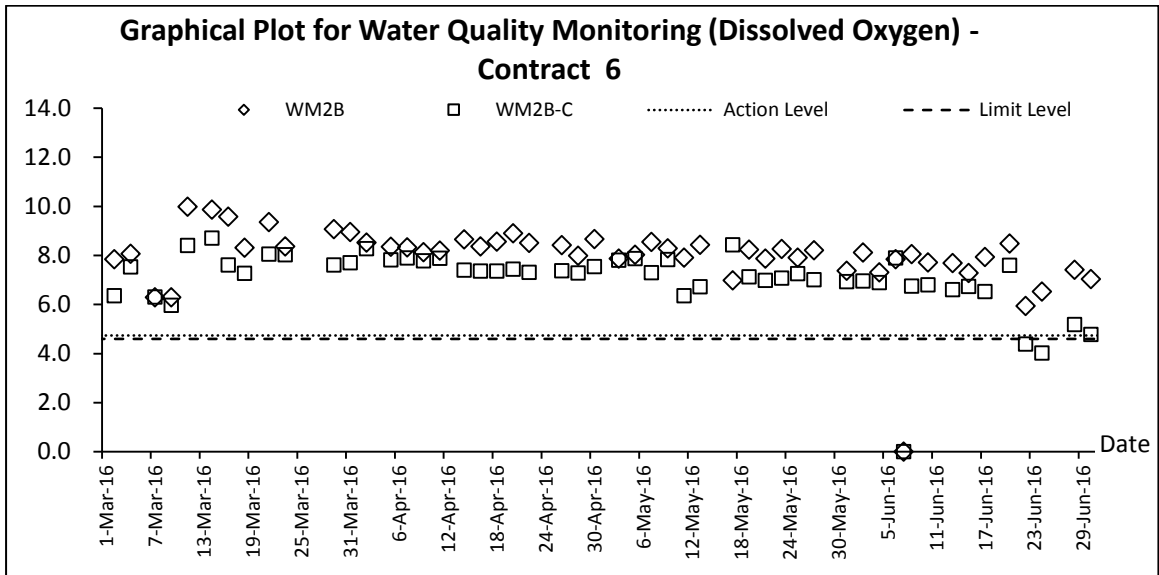
Water Quality











Appendix K

Meteorological Data

Date		Weather	Total Rainfall (mm)	Ta Kwu Ling Station			
				Mean Air Temp. (°C)	Wind Speed (km/h)	Mean Relative Humidity (%)	Wind Direction
1-Jun-16	Wed	Hot with sunny periods and a few showers	0	30	7	77	S/SW
2-Jun-16	Thu	Moderate southeasterly winds	0	30.4	7.5	76.5	S/SW
3-Jun-16	Fri	Moderate south to southwesterly winds	Trace	31.6	8	77.5	S/SW
4-Jun-16	Sat	Hot with sunny periods and a few showers	12.4	29.9			
5-Jun-16	Sun	Moderate southeasterly winds	7.6	27.5	7.5	79.5	S/SW
6-Jun-16	Mon	Moderate south to southwesterly winds	77.6	25.9	5.5	90	E/NE
7-Jun-16	Tue	Mainly cloudy with isolated heavy showers and squally thunderstorms.	0.4	28.4	6.5	91.2	SE
8-Jun-16	Wed	Cloudy with showers and a few squally thunderstorms.	46.5	27.8	7.5	Maintenance	E/SE
9-Jun-16	Thu	Moderate south to southwesterly winds	Trace	28.5	7.8	79.5	E/NE
10-Jun-16	Fri	Hot with sunny periods and a few showers	9.1	29.1	7.2	82.5	E/NE
11-Jun-16	Sat	Moderate southeasterly winds	85.5	26			
12-Jun-16	Sun	Moderate south to southwesterly winds	28.2	26.6	6.5	97	E/SE
13-Jun-16	Mon	Hot with sunny periods and a few showers	0.1	29.3	6.5	Maintenance	S
14-Jun-16	Tue	Moderate southeasterly winds	Trace	29.9	9.7	Maintenance	S/SW
15-Jun-16	Wed	Moderate south to southwesterly winds	0.6	29.8	6.5	84	S/SW
16-Jun-16	Thu	Mainly cloudy with isolated heavy showers and squally thunderstorms.	2.8	28.9	6.4	84	S/SW
17-Jun-16	Fri	Cloudy with showers and a few squally thunderstorms.	2.5	29.8	6.5	79.2	S/SW
18-Jun-16	Sat	Moderate south to southwesterly winds	13.1	29.2			
19-Jun-16	Sun	Hot with sunny periods and a few showers	0	30.1	8.1	69	E/NE
20-Jun-16	Mon	Moderate southeasterly winds	Trace	30.1	7.2	79.2	E/NE
21-Jun-16	Tue	Moderate south to southwesterly winds	0	30.1	6.9	73.5	S/SW
22-Jun-16	Wed	Hot with sunny periods and a few showers	0	29.7	6	76	S/SW
23-Jun-16	Thu	Moderate southeasterly winds	0	29.5	4.9	74.5	S/SW
24-Jun-16	Fri	Moderate south to southwesterly winds	0	30	5.6	73.5	S/SE
25-Jun-16	Sat	Mainly cloudy with isolated heavy showers and squally thunderstorms.	0	30.5			
26-Jun-16	Sun	Cloudy with showers and a few squally thunderstorms.	Trace	31	705	72	E/SE
27-Jun-16	Mon	Moderate south to southwesterly winds	1.7	30.7	7.7	76.5	E/NE
28-Jun-16	Tue	Hot with sunny periods and a few showers	37.1	29	9.2	80.5	S/SE
29-Jun-16	Wed	Hot with sunny periods and a few showers	20.4	29.8	8.2	51	E
30-Jun-16	Thu	Hot with sunny periods and a few showers	1.8	30.1	7.5	76.2	S/SW

Appendix L

Waste Flow Table

Name of Department : CEDD

Contract No./ Work Order No. : CV/2012/08

Appendix I - Monthly Summary Waste Flow Table for 2016

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

Month	Actual Quantities of Inert C&D Materials Generated / Imported (in '000 m3)						Actual Quantities of Other C&D Materials / Wastes Generated				
	Total Quantities Generated	Broken Concrete (including rock for recycling into aggregates)	Reused in the Contract	Reused in Other Projects	Disposed as Public Fill	Imported C&D Material	Metal	Paper/ Cardboard Packaging	Plastic (bottles/containers, plastic sheets/ foams from package material)	Chemical Waste	Others (e.g. General Refuse etc.)
	[a+b+c+d]	(a)	(b)	(c)	(d)		(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m3)
January	72.2029	0.0000	0.6482	31.8061	39.7486	0.9345	26.2000	0.0000	0.0000	1.2320	0.1247
February	55.6715	0.0000	1.0145	38.3484	16.3085	1.3108	8.3800	0.9800	0.0000	1.4080	0.1089
March	34.1757	0.0000	0.3241	29.3514	4.5003	1.0325	44.1700	0.0000	0.0000	11.9680	0.0732
April	86.9048	0.0000	0.7045	32.8811	53.3191	1.3786	23.6420	0.4000	0.0000	1.6456	0.1306
May	77.5386	0.0000	0.1268	38.9050	38.5068	4.4426	44.8000	0.3500	0.0000	2.7280	0.1246
June	62.4192	0.0000	0.5848	45.2952	16.5392	1.0836	67.7300	0.0000	0.0000	0.0000	0.0916
Half-year total	388.9127	0.0000	3.4030	216.5873	168.9224	10.1826	214.9220	1.7300	0.0000	18.9816	0.6536
July	0.0000										
August	0.0000										
September	0.0000										
October	0.0000										
November	0.0000										
December	0.0000										
Yearly Total	388.9127	0.0000	3.4030	216.5873	168.9224	10.1826	214.9220	1.7300	0.0000	18.9816	0.6536

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

Year	Actual Quantities of Inert C&D Materials Generated / Imported (in '000 m3)						Actual Quantities of Other C&D Materials / Wastes Generated				
	Total Quantities Generated	Broken Concrete (including rock for recycling into aggregates)	Reused in the Contract	Reused in Other Projects	Disposed as Public Fill	Imported C&D Material	Metal	Paper/ Cardboard Packaging	Plastic (bottles/containers, plastic sheets/ foams from package material)	Chemical Waste	Others (e.g. General Refuse etc.)
	[a+b+c+d]	(a)	(b)	(c)	(d)		(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m3)
2013	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2014	425.4406	0.0000	2.7362	376.3945	46.3099	5.6245	3.2100	0.4390	0.0070	10.8800	2.2609
2015	570.9459	0.0000	20.8159	543.2162	6.9138	4.5492	14.1300	3.9220	1.5000	16.1920	1.1696
2016	388.9127	0.0000	3.4030	216.5873	168.9224	10.1826	214.9220	1.7300	0.0000	18.9816	0.6536
2017											
2018											
Total	1385.2992	0.0000	26.9550	1136.1980	222.1461	20.3562	232.2620	6.0910	1.5070	46.0536	4.0841

Remark:

- 1) Density of C&D material to be 2.2 metric ton/m3
 2) Density of General Refuse to be 1.6 metric ton/m3

- 3) Density of Spent Oil to be 0.88 metric ton/m3

Monthly Summary Waste Flow Table for 2016 (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	2.683	0.253	0.030	0.000	2.400	0.799	0.001	0.000	0.000	0.000	0.115
Feb	1.877	0.651	0.020	0.000	1.205	1.141	0.000	0.000	0.000	0.000	0.110
Mar	1.501	0.417	0.000	0.000	1.084	0.831	0.000	0.000	0.001	0.000	0.090
Apr	0.472	0.046	0.018	0.000	0.408	0.647	0.000	0.000	0.000	0.000	0.135
May	0.488	0.013	0.000	0.000	0.475	2.479	0.000	0.000	0.000	0.000	0.105
Jun	0.523	0.103	0.000	0.000	0.420	0.716	0.000	0.000	0.001	0.000	0.135
Sub-total	7.544	1.483	0.068	0.000	5.993	6.613	0.001	0.000	0.002	0.000	0.690
Jul											
Aug											
Sep											
Oct											
Nov											
Dec											
Total	7.544	1.483	0.068	0.000	5.993	6.613	0.001	0.000	0.002	0.000	0.690

- Note:**
1. Assume the density of soil fill is 2 ton/m³.
 2. Assume the density of rock and broken concrete is 2.5 ton/m³.
 3. Assume each truck of C&D wastes is 5m³.
 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/m³.

Name of Department: CEDD

Monthly Summary Waste Flow Table for 2016

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 '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m ³)
JAN	0	0	0	0	0	0.235	0	0	0	0	0.06
FEB	0	0	0	0	0	0.141	0	0	0	0	0.045
MAR	0	0	0	0	0	0.1785	0	0	0	0	0.055
APRIL	0	0	0	0	0	0	0	0	0	0	0.03
MAY	0	0	0	0	0	0	0	0	0	0	0.015
JUN	0	0	0	0	0	0	0	0.062	0	0	0.01
Sub Total	0	0	0	0	0	0.5545	0	0.062	0	0	0.215
JUL											
AUG											
SEP											
OCT											
NOV											
DEC											
Total	0	0	0	0	0	0.55	0	0.062	0	0	0.215

Notes:

Name of Department: CEDD

Forecast of Total Quantities of C&D Materials to be Generated from the Contract (see Note 4)										
Total Quantity Generated	Hard Rocks and Large Broken Concrete	Reused in the Contract	Reused in Other Projects	Disposed as Public Fill	Imported Fill	Metal	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 '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m ³)
0	0	0	0	0	350	30	4	2	1	4

Notes:

- (1) The performance targets are given in PS clause 6(14) above.
- (2) The waste flow table shall also include C&D materials that are specified in the Contractor to be imported for use at the Site.
- (3) Plastic refer to plastic bottles/containers, plastic sheets/foam from packaging material.
- (4) The Contractor shall also submit the latest forecast of the total amount of C&D materials expected to be generated from the Works, together with a breakdown of the nature
 - Hard Rocks and Large Broken Concrete = Cannot be defined at this stage
 - Imported Fill = Estimated by the Contractor = 1 loading = 8m³
 - Metal = Estimated by the Contractor
 - Paper/cardboard packaging = Estimated by the Contractor
 - Plastics = Estimated by the Contractor
 - Chemical Waste = Estimated by the Contractor (Spent lubricating oil, assume density 0.9kg/L)
 - Other, e.g. general refuse = Estimated by the Contractor

Monthly Summary Waste Flow Table for 2016 (year)

Name of Person completing the record: KM 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	58.943	0	3.811	12.131	43.001	31.248	0	0	0	0	0.695
Feb	74.418	0	8.785	39.85	25.783	6.552	0	0.097	0	0	0.339
Mar	43.764	0	6.438	12.034	25.292	3.288	0	0.206	0.007	0	0.042
Apr	33.767	0	1.933	5.759	26.075	0	0	0.221	0	0	0.070
May	51.115	0	3.229	17.469	30.417	0.928	0	0.211	0	0	0.079
Jun	61.126	0	6.921	23.286	30.919	3.693	0	0.166	0	0	0.043
Sub-total	323.133	0	31.117	110.529	181.487	45.709	0	0.901	0.007	0	1.268
Jul											
Aug											
Sep											
Oct											
Nov											
Dec											
Total	492.356	0	49.651	127.313	315.392	52.958	0	1.195	0.007	32.28	4.344

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

MONTHLY SUMMARY WASTE FLOW TABLE

Name of Department: CEDD

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

Contract No.: NE/2014/03

Monthly Summary Waste Flow Table for 2016 (year)

Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of Inert C&D Wastes Generated Monthly				
	Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/cardboard packaging	Plastic (see Note 3)	Chemical Waste	Others, e.g. general refuse
	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m ³)
Jan	0	0	0	0	0	0	0	0	0	0	0
Feb	0.16	0	0	0	0.16	0	0	0	0	0	0
Mar	0.135	0	0	0	0.135	0	0	0	0	0	0.005
Apr	0.313	0	0	0	0.313	0	0	0	0	0	0.005
May	0.505	0	0	0	0.505	0	0	0	0	0	0
June	0.613	0	0	0	0.613	0	0	0.005	0.001	0	0
Sub-total	1.726	0	0	0	1.726	0	0	0.005	0.001	0	0.01
July											
Aug											
Sept											
Oct											
Nov											
Dec											
Total	1.726	0	0	0	1.726	0	0	0.005	0.001	0	0.01

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

Contract No. / Works Order No.: - SSC505**Monthly Summary Waste Flow Table for 2016** [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	0.800	0	0	0	0.800
Feb	0.858	0	0	0	0.858
Mar	0.793	0	0	0	0.793
Apr	0.1105	0	0	0	0.1105
May	1.087	0	1.074	0	0.013
Jun	8.645	0	8.541	0	0.104
Sub-total	12.293	0	9.615	0	2.678
Jul					
Aug					
Sep					
Oct					
Nov					
Dec					
Total	12.293	0	9.615	0	2.678

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	4.73	4.73	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.072
Feb	0.000	0.000	0.0004	0.0004	0.0186	0.0186	0.000	0.000	0.000	0.000	0.021	0.021	0.065
Mar	0	0	52.752	52.752	0.044	0.044	0	0	0	0	0.05	0.05	0.059
Apr	0	0	1465.5906	1465.5906	0.09	0.09	0	0	0	0	0.084	0.084	0.091
May	0	0	1587.5818	1587.5818	0	0	0.004	0.004	0	0	0.153	0.153	0.156
Jun	0	0	725.0582	725.0582	0.33	0.33	0.004	0.004	0	0	0.067	0.067	0.117
Sub-total	0	0	3818.7330	3818.7330	0.4826	0.4826	0.008	0.008	0	0	0.375	0.375	0.559
Jul													
Aug													
Sep													
Oct													
Nov													
Dec													
Total	0	0	3818.733	3818.733	0.4826	0.4826	0.008	0.008	0	0	0.375	0.375	0.559

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					
10kg of cans and 330kg of papers were sent to Wong Kei for recycling.	4kg of plastic bottles and 57kg of glass bottles were sent to Action Health for recycling	653.6782 tons of scrap metals from LCAL were sent for recycling.	71.38 tons of scrap metals from subcontractors were sent for recycling.	0	0

- 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 m³ by volume.

Appendix M

**Implementation Schedule for
Environmental Mitigation Measures**

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
Air Quality Impact (Construction)							
3.6.1.1	2.1	<p>General Dust Control Measures</p> <p>The following dust suppression measures should be implemented:</p> <ul style="list-style-type: none"> ■ 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	<p>Best Practice for Dust Control</p> <p>The relevant best practices for dust control as stipulated in the Air Pollution Control (Construction Dust) Regulation should be adopted to further reduce the construction dust impacts of the Project. These best practices include:</p> <p><i>Good site management</i></p> <ul style="list-style-type: none"> ■ 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. <p><i>Disturbed Parts of the Roads</i></p> <ul style="list-style-type: none"> ■ 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?
		<p>concrete, bituminous hardcore materials or metal plates and kept clear of dusty materials; or</p> <ul style="list-style-type: none"> Unpaved parts of the road should be sprayed with water or a dust suppression chemical so as to keep the entire road surface wet. <p><i>Exposed Earth</i></p> <ul style="list-style-type: none"> Exposed earth should be properly treated by compaction, hydroseeding, vegetation planting or seeding with latex, vinyl, bitumen within six months after the last construction activity on the site or part of the site where the exposed earth lies. <p><i>Loading, Unloading or Transfer of Dusty Materials</i></p> <ul style="list-style-type: none"> All dusty materials should be sprayed with water immediately prior to any loading or transfer operation so as to keep the dusty material wet. <p><i>Debris Handling</i></p> <ul style="list-style-type: none"> 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. <p><i>Transport of Dusty Materials</i></p> <ul style="list-style-type: none"> 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. <p><i>Wheel washing</i></p> <ul style="list-style-type: none"> 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. <p><i>Use of vehicles</i></p> <ul style="list-style-type: none"> 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?
		<p><i>Site hoarding</i></p> <ul style="list-style-type: none"> 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. <p><i>Blasting</i></p> <ul style="list-style-type: none"> The areas within 30m from the blasting area should be wetted with water prior to blasting. 					
<u>Air Quality Impact (Operation)</u>							
3.5.2.2	2.2	<p>The following odour containment and control measures will be provided for the proposed sewage treatment work at the BCP site:</p> <ul style="list-style-type: none"> 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
<u>Noise Impact (Construction)</u>							
4.4.1.4	3.1	<p>Adoption of Quieter PME</p> <p>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.</p>	To minimize the construction air-borne noise impact	Contractors	Construction Work Sites	During Construction	EIA recommendation, EIAO and Noise Control Ordinance (NCO)

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
4.4.1.4	3.1	<p>Use of Movable Noise Barrier</p> <p>The use of movable barrier for certain PME can further alleviate the construction noise impacts. In general, a 5 dB(A) reduction for movable PME and 10 dB(A) for stationary PME can be achieved depending on the actual design of the movable noise barrier. The Contractor shall be responsible for design of the movable noise barrier with due consideration given to the size of the PME and the requirement for intercepting the line of sight between the NSRs and PME. Barrier material with surface mass in excess of 7 kg/m² is recommended to achieve the predicted screening effect.</p>	To minimize the construction air-borne noise impact	Contractors	Construction Work Sites	During Construction	EIA recommendation, EIAO and NCO
4.4.1.4	3.1	<p>Use of Noise Enclosure/ Acoustic Shed</p> <p>The use of noise enclosure or acoustic shed is to cover stationary PME such as air compressor and concrete pump. With the adoption of the noise enclosure, the PME could be completely screened, and noise reduction of 15 dB(A) can be achieved according to the GW-TM.</p>	To minimize the construction air-borne noise impact	Contractors	Construction Work Sites	During Construction	EIA recommendation, EIAO and NCO
4.4.1.4	3.1	<p>Use of Noise Insulating Fabric</p> <p>Noise insulating fabric can be adopted for certain PME (e.g. drill rig, pilling auger etc). The insulating fabric should be lapped such that there are no openings or gaps on the joints. Technical data from manufacturers state that by using the Fabric, a noise reduction of over 10 dB(A) can be achieved on noise level.</p>	To minimize the construction air-borne noise impact	Contractors	Construction Work Sites	During Construction	EIA recommendation, EIAO and NCO

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
4.4.1.4	3.1	<p>Good Site Practice</p> <p>The good site practices listed below should be followed during each phase of construction:</p> <ul style="list-style-type: none"> • 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)							
<u>Road Traffic Noise</u>							
Table 4.42 and Figure 4.20.1 to 4.20.4	3.2	Erection of noise barrier/ enclosure along the viaduct section.	To minimize the road traffic noise along the connecting road of BCP	Contractor	Loi Tung and Fanling Highway Interchange	Before Operation	EIAO and NCO
<u>Fixed Plant Noise</u>							
Table 4.46	3.2	Specification of the maximum allowable sound power levels of the proposed fixed plants during daytime and night-time.	To minimize the fixed plant noise impact	Managing Authority of the buildings / Contractor	BCP, Administration Building and all ventilation buildings	Before Operation	EIA recommendation, EIAO and NCO

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
4.5.2.4	3.2	<p>The following noise reduction measures shall be considered as far as practicable during operation:</p> <ul style="list-style-type: none"> 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	<p>Construction site runoff and drainage</p> <p>The site practices outlined in ProPECC Note PN 1/94 should be followed as far as practicable in order to minimise surface runoff and the chance of erosion. The following measures are recommended to protect water quality and when properly implemented should be sufficient to adequately control site discharges so as to avoid water quality impacts:</p> <ul style="list-style-type: none"> 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?
		<p>Temporary ditches should be provided to facilitate the runoff discharge into stormwater drainage system through a sediment/silt trap. The sediment/silt traps should be incorporated in the permanent drainage channels to enhance deposition rates, if practical.</p> <ul style="list-style-type: none"> ▪ 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?
		<p>the erosive potential of surface water flows.</p> <ul style="list-style-type: none"> ▪ 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	<p>Good site practices for works within water gathering grounds</p> <p>The following conditions should be complied, if there is any works to be carried out within the water gathering grounds:</p>	To minimize water quality impacts to the water gathering grounds	Contractor	Construction Works Sites within the water gathering	Construction Phase	ProPECC Note PN 1/94

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		<ul style="list-style-type: none"> ▪ 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?
		<p>Water Supplies.</p> <ul style="list-style-type: none"> ▪ 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	<p>Good site practices of general construction activities</p> <p>Construction solid waste, debris and refuse generated on-site should be collected, handled and disposed of properly to avoid entering any nearby stormwater drain. Stockpiles of cement and other construction materials should be kept covered when not being used.</p> <p>Oils and fuels should only be stored in designated areas which have pollution prevention facilities. To prevent spillage of fuels and solvents to any nearby stormwater drain, all fuel tanks and storage areas should be provided with locks and be sited on sealed areas, within bunds of a capacity equal to 110% of the storage capacity of the largest tank. The bund should be drained of rainwater after a rain event.</p>	To minimize water quality impacts	Contractor	All construction works sites	Construction phase	EIA Recommendation
5.6.1.3	4.1	<p>Sewage effluent from construction workforce</p> <p>Temporary sanitary facilities, such as portable chemical toilets, should be employed on-site where necessary to handle sewage from the workforce. A licensed contractor should be employed to provide appropriate and adequate portable toilets and be responsible for appropriate disposal and maintenance.</p>	To minimize water quality impacts	Contractor	All construction works sites with on-site sanitary facilities	Construction phase	EIA Recommendation and Water Pollution Control Ordinance (WPCO)
5.6.1.4	4.1	<p>Hydrogeological Impact</p> <p>Grout injection works would be conducted before blasting, for sealing a limited area around the tunnel with a grout of a suitable strength for controlling the potential groundwater inflows. The pre-injection grouting method would be supplemented by post-injection grouting where necessary to further enhance the groundwater inflow control. On-site treatment for the groundwater ingress pumped out would be required to remove any contamination by grouting materials before discharge off-site.</p>	To minimize water quality impacts	Contractor	Construction works sites of the drill and blast tunnel	Construction phase	EIA Recommendation and WPCO
<u>Water Quality Impact (Operation)</u>							
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?
<u>Sewage and Sewerage Treatment Impact (Construction)</u>							
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
<u>Sewage and Sewerage Treatment Impact (Operation)</u>							
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
<u>Waste Management Implication (Construction)</u>							
7.6.1.1	6	<p>Good Site Practices</p> <p>Adverse impacts related to waste management such as potential hazard, air, odour, noise, wastewater discharge and public transport as mentioned in section 3.4.7.2 (ii)(c) of the Study Brief are not expected to arise, provided that good site practices are strictly followed. Recommendations for good site practices during the construction activities include:</p> <ul style="list-style-type: none"> ▪ 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?
		<p>such odour is not anticipated to be an issue to distant sensitive receivers</p> <ul style="list-style-type: none"> ▪ 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	<p>Waste Reduction Measures</p> <p>Good management and control can prevent the generation of a significant amount of waste. Waste reduction is best achieved at the planning and design stage, as well as by ensuring the implementation of good site practices. Recommendations to achieve waste reduction include:</p> <ul style="list-style-type: none"> ▪ 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?
		<p>of waste generated and avoid unnecessary generation of waste</p> <ul style="list-style-type: none"> 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	<p>C&D Materials</p> <p>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:</p> <ul style="list-style-type: none"> 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	<p>General refuse</p> <p>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.</p>	To minimize impacts resulting from collection and transportation of general refuse for off-site disposal	Contractor	Construction works sites (General)	Construction phase	Waste Disposal Ordinance and Public Health and Municipal Services Ordinance - Public Cleansing and Prevention of Nuisances Regulation
7.6.1.5	6	<p>Chemical waste</p> <p>If chemical wastes are produced at the construction site, the Contractor will be required to register with the EPD as a chemical waste producer and to follow the guidelines stated in the <i>Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes</i>. Good quality containers compatible with the chemical wastes should be used, and incompatible chemicals should be stored separately. Appropriate labels should be securely attached on each chemical waste container indicating the corresponding chemical characteristics of the chemical</p>	To minimize impacts resulting from collection and transportation of chemical waste for off-site disposal	Contractor	Construction works sites (General)	Construction phase	Waste Disposal (Chemical Waste) (General) Regulation and Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes

Appendix N

Investigation Report for Exceedance

Agreement No. CE 45/2008
Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works
Investigation Report on Action or Limit Level Non-compliance

Project		CE 45/2008	
Date		6 June 2016	
Location		WM1	
Time		15:37	
Parameter		Turbidity (NTU)	Suspended Solids (mg/L)
Action Level		51.3 AND 120% of upstream control station of the same day	54.5 AND 120% of upstream control station of the same day
Limit Level		67.6 AND 130% of upstream control station of the same day	64.9 AND 130% of upstream control station of the same day
Measured Levels	WM1-C	229.0	259.5
	WM1	543.5	409.0
Exceedance		Limit Level	Limit Level
Investigation Results, Recommendations & Mitigation Measures		<ol style="list-style-type: none"> 1. According to the site information provided from CCKJV, construction activities carried out on 6 June 2016 at Boundary Control Point (BCP) which upstream of WM1 was bored piling. The monitoring locations and works area are shown in Figure 1. 2. According to the site record from the monitoring team during monitoring on 6 June 2016, turbid water was observed at WM1 and WM1-C. (Photo 1, 2, 3) 3. According to the Daily Extract of Meteorological Observations from the Hong Kong Observatory, heavy rainfall was recorded on 6 June 2016. (Figure 2) Water flow rate increased vigorously under the heavy rain and the sediment at the river bed was stirred up, resulting in turbid water. 4. According to the field photos (Photo 1), accumulation of rubbish were observed at the bar screen of the box culvert near WM1 after heavy rainstorm on 6 June 2016. Water flow near WM1 was therefore retarded and turbid water was cumulated at WM1. Also, water level at the box culvert increased to a high level due to the combined effect of heavy rain and accumulation of rubbish, overflow of the Kong Yiu River occurred. 5. Hence, it is considered that the exceedance on 6 June 2016 was due to the heavy rain and accumulation of rubbish at the bar screen of the box culvert near WM1, and unlikely due to the construction activities of the Contract. 6. According to the Event and Action, the monitoring frequency at WM1 has been increased to daily due to the limit level exceedance recorded until no exceedances were triggered in consecutive days. Additional monitoring was carried out on 7 June 2016 and no exceedance was triggered. Nevertheless, CCKJV should continue fully implement the water mitigation measures as recommended in the implementation schedule for environmental mitigation measures in the EM&A Manual. 	

Prepared By : Winnie Chiu

Designation : Assistant Environmental Consultant

Signature : 

Date :

21 June 2016

Photo Record



Photo 1

On 6 June 2016, accumulation of rubbish were observed at the bar screen of the box culvert near WM1. Overflow of Kong Yiu River was observed.



Photo 2

During water sampling on 6 June 2016, the water quality at WM1-C was turbid.



Photo 3

The water samples collected at both WM1 and WM1-C on 6 June 2016 were turbid.



Photo 4

On 6 June 2016, turbid water was observed at upstream of the work area of Contract 6. (Work area of C6 is after the bridge)

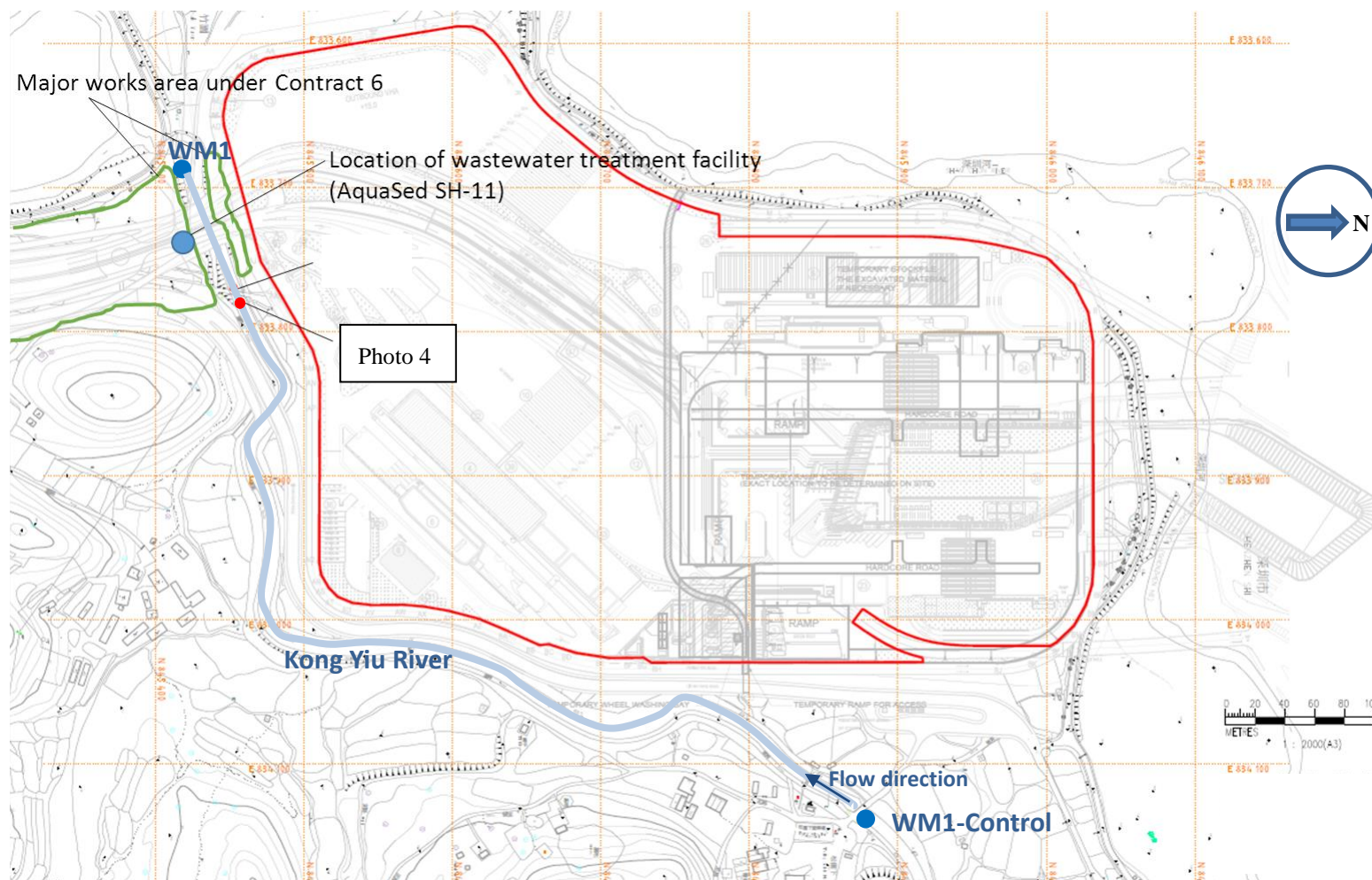


Figure 1 Location Map for Water Quality Monitoring Locations WM1 and WM1-C

Isohyet chart for 6 Jun 2016

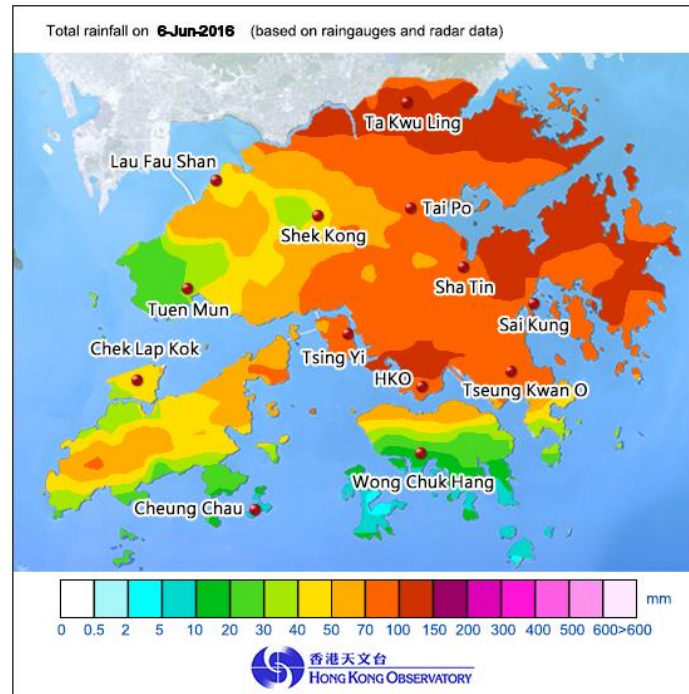


Figure 2 Rainfall distribution on 6 June 2016

To Mr. Edwin Au **Fax No** 2403 1162

Company Sang Hing Civil – Richwell Machinery JV

cc

From Winnie Chiu **Date** 21 June 2016

Our Ref TCS00694/13/300/F0412 **No of Pages** 6 (Incl. cover sheet)

RE Agreement No. CE 45/2008
Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works
Investigation Report of Exceedance of Water Quality at Location WM1 on 6 June
2016 (Contract 5)

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Dear Sir,

Further to the following Notification of Exceedance (NOE) ref.:

TCS00694/13/300/F0394 dated 7 June 2016
TCS00694/13/300/F0419 dated 15 June 2016

Please find attached the “Investigation Report on Action or Limit Level Non-compliance” referenced above 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



Winnie Chiu
Assistant Environmental Consultant

Encl.

c.c.	Mr. David Chan (EPD)	Fax:	2685 1155
	Mr. Kelvin Lee (ER, AECOM)	Fax:	2674 7732
	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 Action or Limit Level Non-compliance

Project		CE 45/2008	
Date		6 June 2016	
Location		WM1	
Time		15:37	
Parameter		Turbidity (NTU)	Suspended Solids (mg/L)
Action Level		51.3 AND 120% of upstream control station of the same day	54.5 AND 120% of upstream control station of the same day
Limit Level		67.6 AND 130% of upstream control station of the same day	64.9 AND 130% of upstream control station of the same day
Measured Levels	WM1-C	229.0	259.5
	WM1	543.5	409.0
Exceedance		Limit Level	Limit Level
Investigation Results, Recommendations & Mitigation Measures		<ol style="list-style-type: none"> 1. According to the site information provided from the SRJV, construction activities carried out on 6 June 2016 was construction of u-channel and bituminous laying at Lin Ma Hang Road. (Figure 1) No wastewater was generated from the abovementioned work and no construction activities were conducted at Boundary Control Point (BCP) which near Kong Yiu River. 2. According to the site records from the monitoring team during monitoring on 6 June 2016, turbid water was observed at WM1 and WM1-C. (Photo 1 to 3) 3. According to the Daily Extract of Meteorological Observations from the Hong Kong Observatory, heavy rainfall was recorded on 6 June 2016. (Figure 2) Water flow rate increased vigorously under the heavy rain and the sediment at the river bed was stirred up, resulting in turbid water. 4. According to the field photos (Photo 1), accumulation of rubbish were observed at the bar screen of box culvert near WM1 on 6 June 2016. Water flow near WM1 was therefore retarded and turbid water would be cumulated at WM1. Also, water level at the box culvert increased to a high level due to the combined effect of heavy rain and accumulation of rubbish, overflow of the Kong Yiu River occurred. 5. During site inspection by the RE, IEC, SRJV and ET on 7 June 2016 (Photo 4), no adverse water quality impact and surface run-off was observed. Moreover, there were no wastewater generation activities carried out and no discharge made into the river course. In our investigation, it is considered that the exceedances were unlikely due to the Contract. 6. According to the Event and Action, the monitoring frequency at WM1 has been increased to daily due to the limit level exceedance recorded until no exceedances were triggered in consecutive days. Additional monitoring was carried out 7 June 2016 and no exceedances was triggered. Nevertheless, SRJV should continue fully implement the water mitigation measures as recommended in the 	

	implementation schedule for environmental mitigation measures in the EM&A Manual.
--	---

Prepared By : Winnie Chiu

Designation : Assistant Environmental Consultant

Signature : 

Date : 21 June 2016

Photo Record



Photo 1

On 6 June 2016, accumulation of rubbish were observed at the bar screen of the box culvert near WM1. Overflow of Kong Yiu River was observed.



Photo 2

During water sampling on 6 June 2016, the water quality at WM1-C was turbid.



Photo 3

The water samples collected at both WM1 and WM1-C on 6 June 2016 were turbid.



Photo 4

Bituminous laying works was undertaking. No adverse water quality impact was noted.

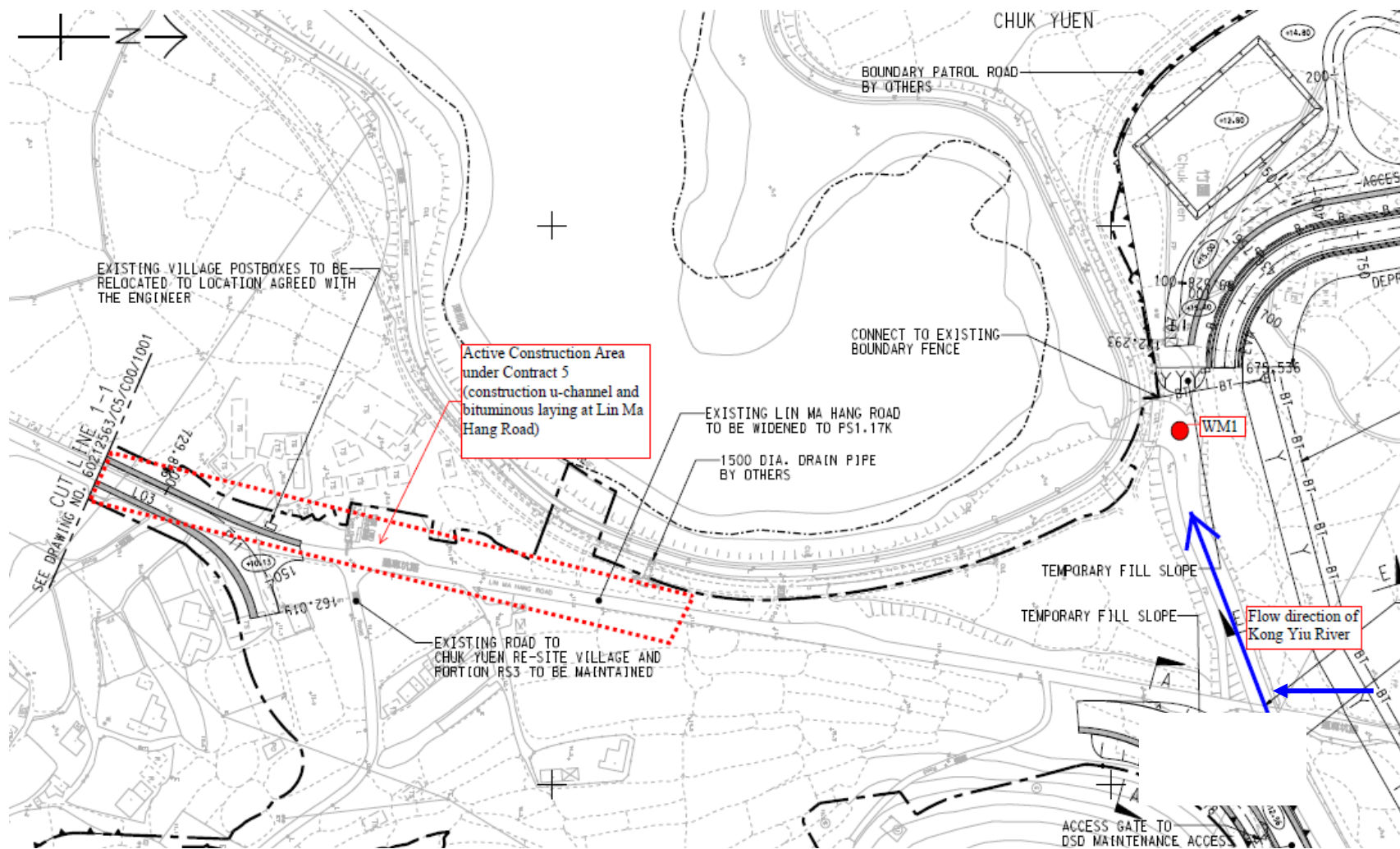


Figure 1: Location Map

Isohyet chart for 6 Jun 2016

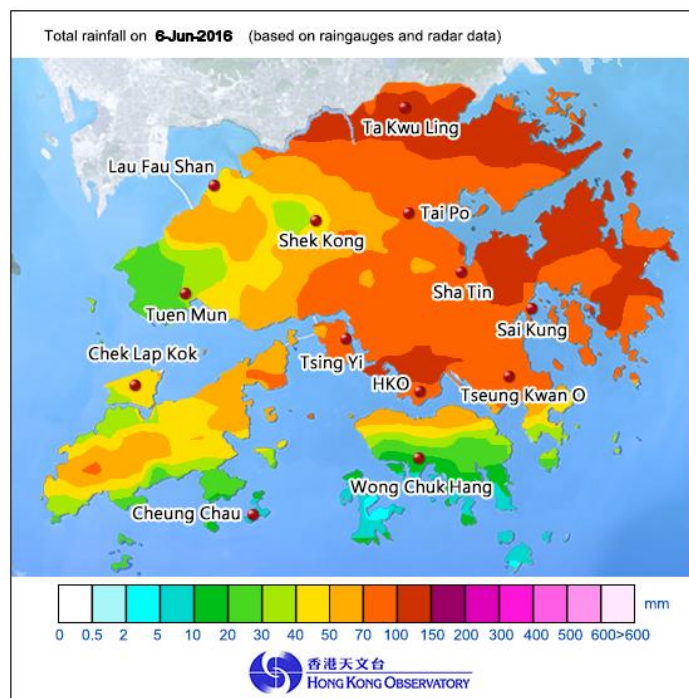


Figure 2 Rainfall distribution on 6 June 2016

Agreement No. CE 45/2008
Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works
Investigation Report on Action or Limit Level Non-compliance

Project		CE 45/2008	
Date		6 June 2016	
Location		WM2B	
Time		14:51	
Parameter		Turbidity (NTU)	Suspended Solids (mg/L)
Action Level		11.4 AND 120% of upstream control station of the same day	11.8 AND 120% of upstream control station of the same day
Limit Level		12.3 AND 130% of upstream control station of the same day	12.4 AND 130% of upstream control station of the same day
Measured Levels	WM2B-C	96.45	207.5
	WM2B	213.50	256.0
Exceedance		Limit Level	Action Level
Investigation Results, Recommendations & Mitigation Measures		<ol style="list-style-type: none"> 1. According to the site information provided from CCKJV, construction activities carried out on 6 June 2016 at North Portal (upstream of WM2B) were bored piling and slope work. The monitoring locations and works area are shown in Figure 1. 2. According to the site record from the monitoring team on 6 June 2016, it was observed that the turbid water flowing in the channel at WM2B. The water samples collected at WM2B and WM2B-C were turbid. (Photo 1 and 2) 3. According to the Daily Extract of Meteorological Observations from the Hong Kong Observatory, heavy rainfall was recorded on 6 June 2016. (Figure 2) The flow rate of the river increased vigorously, sediment and cumulated silt at the river bed was stirred up during rain, resulting in turbid water in river channel. 4. Apart from the disturbance of cumulated silt at the river bed during rain, it was observed that trails of muddy runoff from the public road surface into the existing channel under the rain. (Photo 1) Thus, it is considered that the exceedance on 6 June 2016 is due to the heavy rainfall. 5. Water monitoring was carried out on 7 June 2016 and no exceedance was triggered. Nevertheless, CCKJV should continue to fully implement the water mitigation measures as recommended in the implementation schedule for environmental mitigation measures in the EM&A Manual. 	

Prepared By : Winnie Chiu

Designation : Assistant Environmental Consultant

Signature : 

Date : 20 June 2016

Photo Record



Photo 1
During water sampling on 6 June 2016, it was observed that water at WM2B was turbid. Trails of muddy road surface runoff was observed.



Photo 2
The water samples collected at WM2B and WM2B-C on 6 June 2016 were turbid.

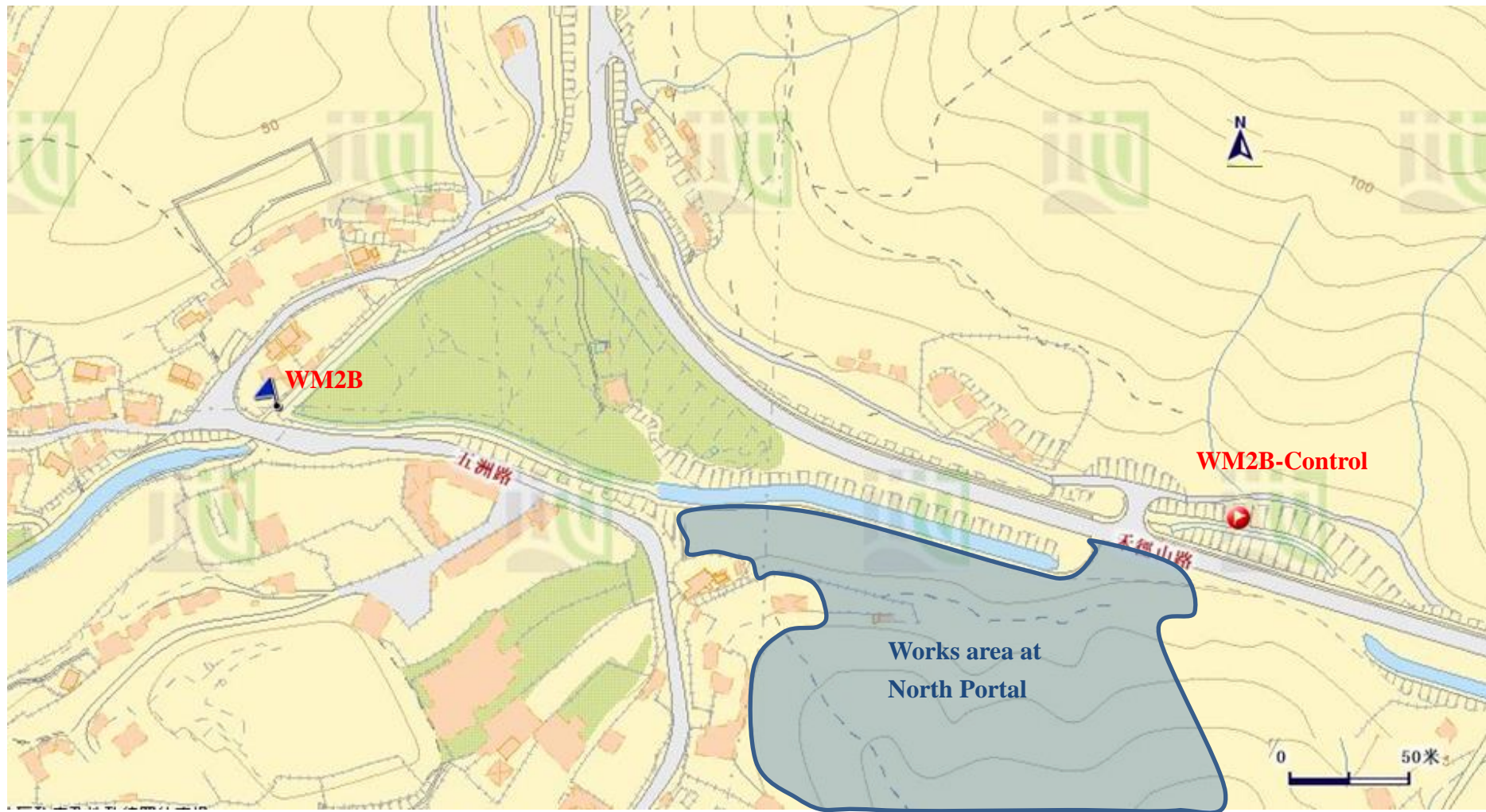


Figure 1 Location Map for Water Quality Monitoring Locations WM2B and WM2B-Control

Isohyet chart for 6 Jun 2016

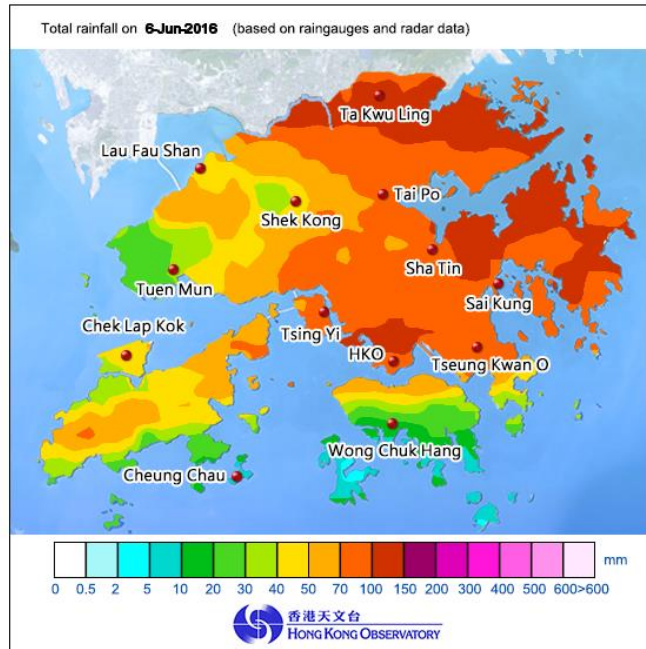


Figure 2 Rainfall distribution on 6 June 2016

To Mr. Daniel Ho **Fax No** 2638 7077

Company Chun Wo Construction Ltd

cc

From Winnie Chiu **Date** 20 June 2016

Our Ref TCS00670/13/300/F0430 **No of Pages** 5 (Incl. cover sheet)

RE Agreement No. CE 45/2008
Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works
Investigation Report of Exceedance of Water Quality at Location WM4 on 6 June
2016 (Contract 3)

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Dear Mr. Ho,

Further to the Notification of Exceedance (NOE) ref.:

TCS00694/13/300/F0397 dated 7 June 2016

TCS00694/13/300/F0421 dated 15 June 2016

Please find attached the "Investigation Report on Action or Limit Level Non-compliance" referenced above 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



Winnie Chiu
Assistant Environmental Consultant

Encl.

c.c.	Mr. David Chan (EPD)	Fax:	2685 1155
	Mr. Alan Lee (ER of C3, AECOM)	Fax:	2171 3498
	Mr. Antony Wong (IEC, SMEC)		By e-mail

Agreement No. CE 45/2008
Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works
Investigation Report on Action or Limit Level Non-compliance

Project	CE 45/2008	
Date	6 June 2016	
Location	WM4	
Time	11:10	
Parameter	Turbidity (NTU)	Suspended Solids (mg/L)
Action Level	35.2 AND 120% of upstream control station of the same day	39.4 AND 120% of upstream control station of the same day
Limit Level	38.4 AND 130% of upstream control station of the same day	45.5 AND 130% of upstream control station of the same day
Measured Level at Control Station (WM4-CA)	336.0	368.5
Measured Level at Control Station (WM4-CB)	231.5	206.5
Measured Level at WM4	423.0	542.5
Exceedance	Action Level	Limit Level
Investigation Results, Recommendations & Mitigation Measures	<ol style="list-style-type: none"> 1. According to the site record from the monitoring team during monitoring on 6 June 2016, turbid water was observed at WM4, WM4-CA and WM4- CB. (Photo 1 to 4) The location map of water monitoring points are shown in Figure 1. 2. According to the Daily Extract of Meteorological Observations from the Hong Kong Observatory, heavy rainfall was recorded on 6 June 2016. (Figure 2) Water flow rate increased vigorously under the heavy rain and the sediment at the river bed was stirred up, resulting in turbid water. 3. During weekly joint site inspection with ET, IEC, Contractor (Chun Wo) and representative from AECOM on 6 June 2016, no surface runoff was observed from the site into the river. 4. In view of the subsequent water monitoring result on 7 June 2016, no exceedances were triggered. It is considered that the exceedances were due to the heavy rainfall and unlikely related to the construction activities under the Contract. Nevertheless, The Contractor is reminded to implement the water mitigation measures as recommended in the implementation schedule for environmental mitigation measures in the EM&A Manual. 	

Prepared By : Winnie Chiu

Designation : Assistant Environmental Consultant

Signature : 

Date : 20 June 2016

Photo Record



Photo 1

Turbid water was observed at WM4 on 6 June 2016.



Photo 2

Turbid water was observed at WM4-CA on 6 June 2016.



Photo 3

Turbid water was observed at WM4-CB on 6 June 2016.



Photo 4

The water samples collected at WM4, WM4-CA, WM4-CB were turbid.

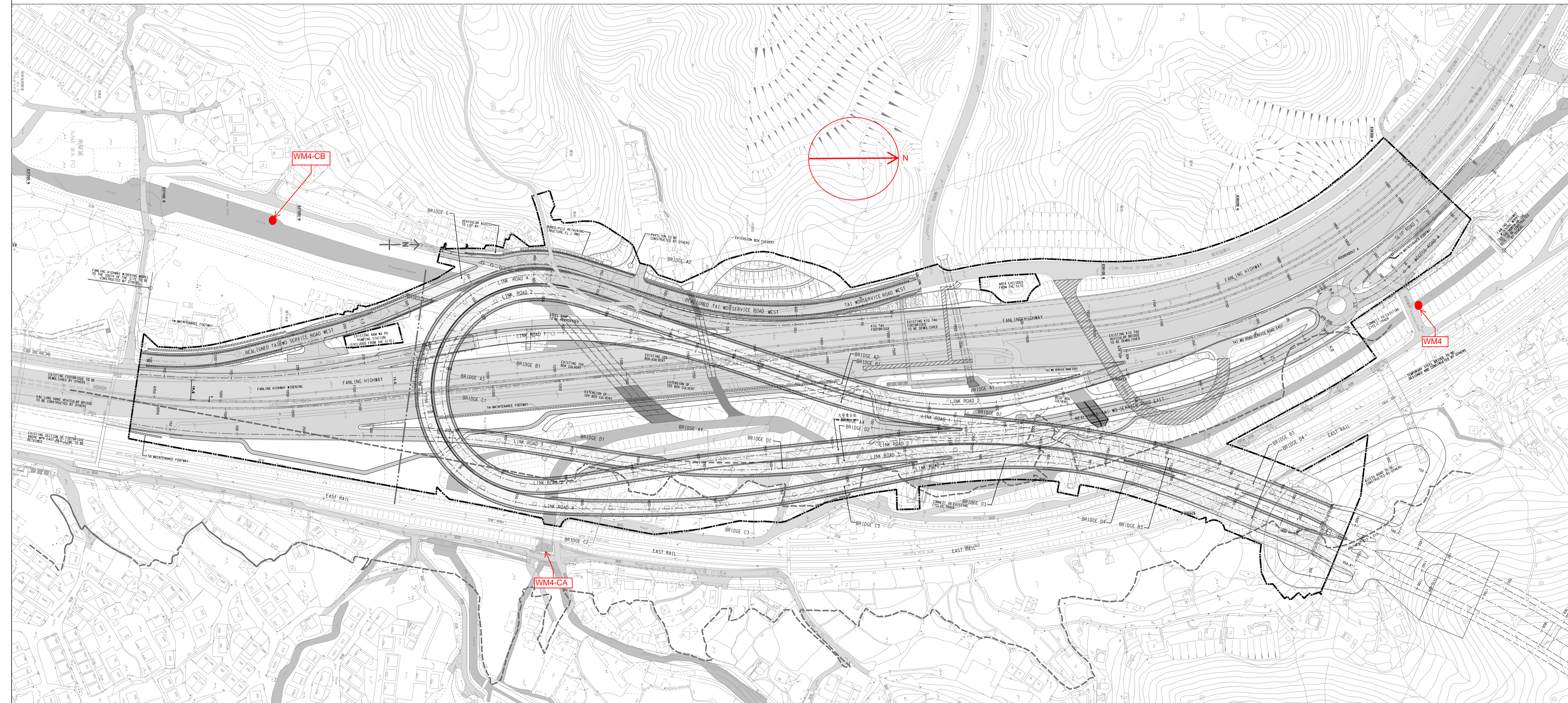


Figure 1. Location of Water Quality Monitoring Points

Isohyet chart for 6 Jun 2016

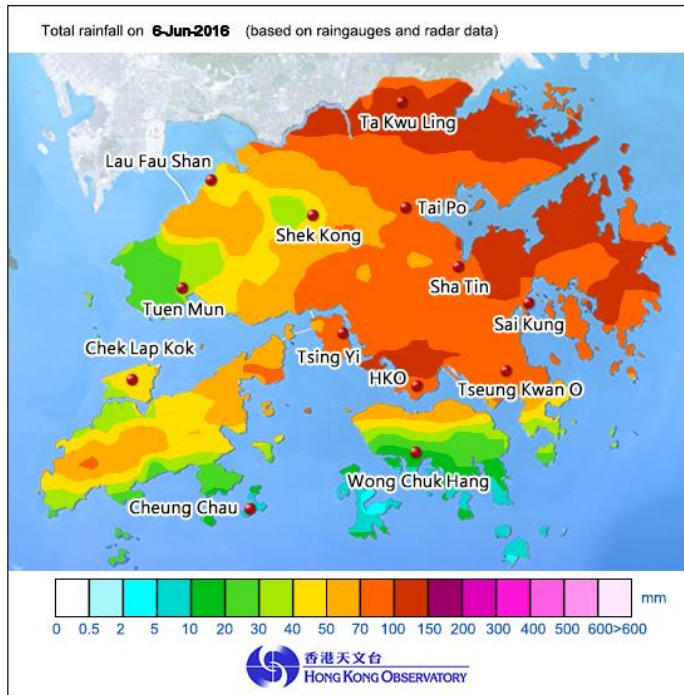


Figure 2 Rainfall distribution on 6 June 2016

Agreement No. CE 45/2008
Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works
Investigation Report on Action or Limit Level Non-compliance

Project	CE 45/2008	
Date	6 June 2016	
Location	WM4	
Time	11:10	
Parameter	Turbidity (NTU)	Suspended Solid (mg/L)
Action Level	35.2 AND 120% of upstream control station of the same day	39.4 AND 120% of upstream control station of the same day
Limit Level	38.4 AND 130% of upstream control station of the same day	45.5 AND 130% of upstream control station of the same day
Measured Level at Control Station (WM4-CA)	336.0	368.5
Measured Level at Control Station (WM4-CB)	231.5	206.5
Measured Level	423.0	542.5
Exceedance	Limit Level	Limit Level
Investigation Results, Recommendations & Mitigation Measures	<ol style="list-style-type: none"> 1. According to the site information provided by the Contractor, construction work activities carried out at South Portal on 6 June 2016 included tunnel excavation and building work superstructure. The construction activities were carried out away from the river course and no discharge was made on 6 June 2016. 2. According to the site record from the monitoring team during monitoring on 6 June 2016, turbid water was observed at WM4, WM4-CA and WM4- CB. (Photo 1 to 4) The location map of water monitoring points are shown in Figure 1. 3. According to the Daily Extract of Meteorological Observations from the Hong Kong Observatory, heavy rainfall was recorded on 6 June 2016. (Figure 2) Water flow rate increased vigorously under the heavy rain and the sediment at the river bed was stirred up, resulting in turbid water. 4. There was no exceedance recorded in the subsequent monitoring day on 7 June 2016, it is considered that the exceedance was due to heavy rainfall and unlikely related to the works under the Contract. Nevertheless, The Contractor is reminded to implement the water mitigation measures as recommended in the implementation schedule for environmental mitigation measures in the EM&A Manual. 	

Prepared By : Winnie Chiu

Designation : Assistant Environmental Consultant

Signature : 

Date : 20 June 2016

Photo Record



Photo 1
Turbid water was observed at WM4 on 6 June 2016.



Photo 2
Turbid water was observed at WM4-CA on 6 June 2016.



Photo 3
Turbid water was observed at WM4-CB on 6 June 2016.



Photo 4
The water samples collected at WM4, WM4-CA, WM4-CB were turbid.

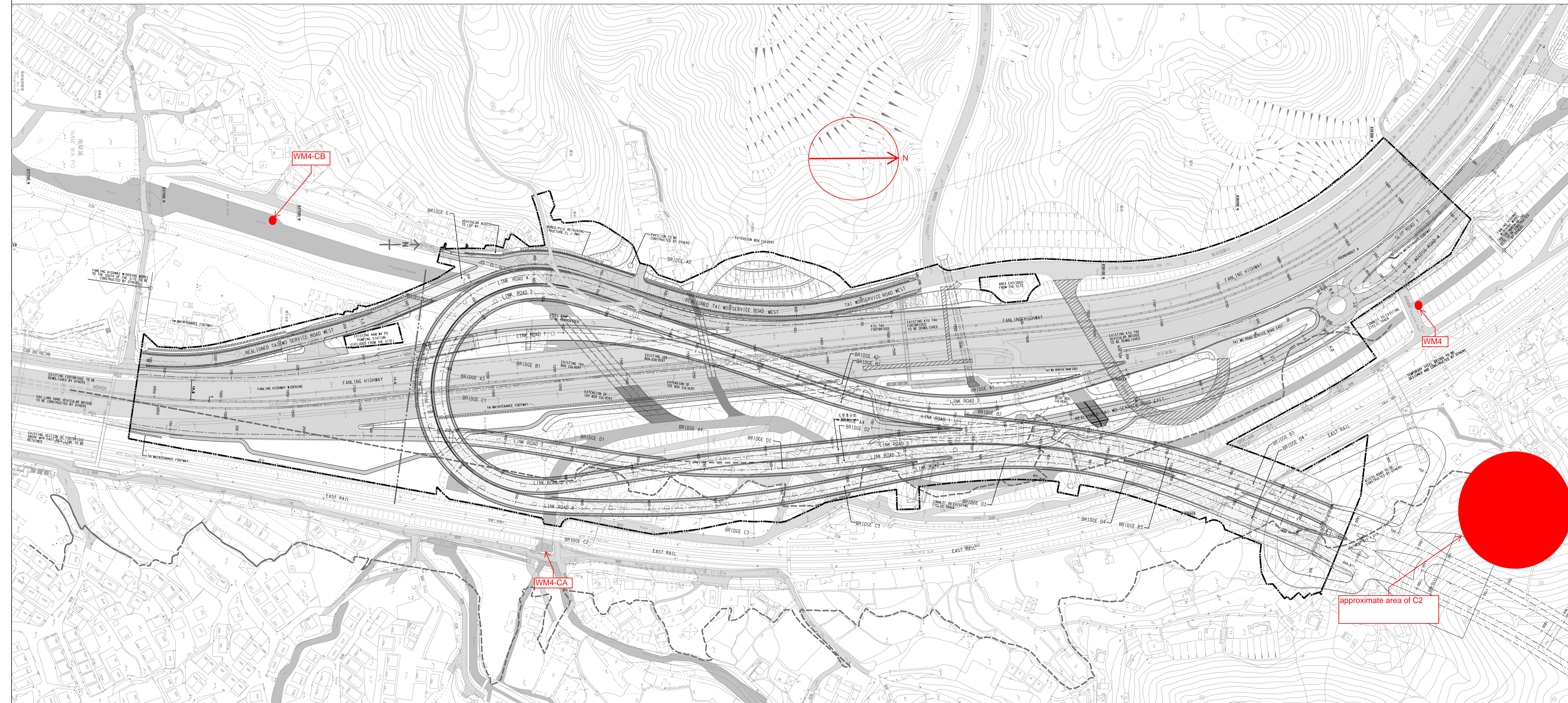


Figure 1. Location of Water Quality Monitoring Points

Isohyet chart for 6 Jun 2016

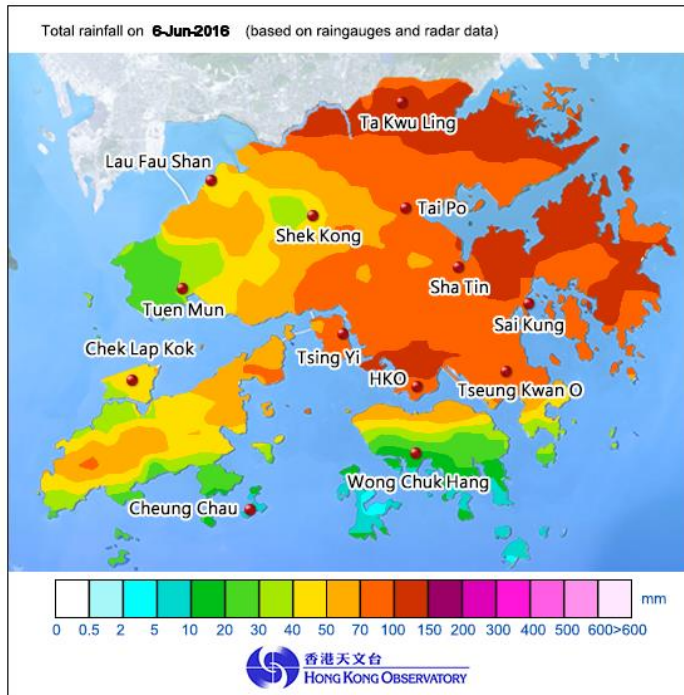


Figure 2 Rainfall distribution on 6 June 2016

To Mr. Vincent Chan **Fax No** **By e-mail**

Company CRBC-CEC-Kaden JV

cc

From Winnie Chiu **Date** 30 June 2016

Our Ref TCS00694/13/300/F0436a **No of Pages** 9 (Incl. cover sheet)

RE Agreement No. CE 45/2008
Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works
Investigation Report of Exceedance of Water Quality at Locations WM2A on 4, 6, 7,
8 June 2016

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Dear Sir,

Further to the Notification of Exceedance (NOE) ref.:

TCS00694/13/300/F0392 dated 6 June 2016
TCS00694/13/300/F0395 dated 7 June 2016
TCS00694/13/300/F0400 dated 7 June 2016
TCS00694/13/300/F0406 dated 8 June 2016
TCS00694/13/300/F0424 dated 15 June 2016
TCS00694/13/300/F0425 dated 15 June 2016
TCS00694/13/300/F0426 dated 15 June 2016
TCS00694/13/300/F0440 dated 21 June 2016

Please find attached the "Investigation Report on Action or Limit Level Non-compliance" referenced above 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



Winnie Chiu
Assistant Environmental Consultant

Encl.

c.c. Mr. David Chan (EPD)

Fax: 2685 1155

Mr. Simon Leung (ER of C6/ AECOM)
Mr. Antony Wong (IEC, SMEC)

Fax: 2251 0698
By email

Agreement No. CE 45/2008

Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works

Investigation Report on Action or Limit Level Non-compliance

Project		CE 45/2008							
Date		4 June	6 June	7 June	8 June	4 June	6 June	7 June	8 June
Location		WM2A							
Time		09:35	15:19	10:20	11:19	09:35	15:19	10:20	11:19
Parameter		Turbidity (NTU)				Suspended Solids (mg/L)			
Action Level		24.9 AND 120% of upstream control station of the same day				14.6 AND 120% of upstream control station of the same day			
Limit Level		33.8 AND 130% of upstream control station of the same day				17.3 AND 130% of upstream control station of the same day			
Measured Levels	WM2A-C	9.83	95.95	6.98	6.13	11.5	86.5	6.0	<2
	WM2A	253.0	421.0	137.0	131.0	457.0	534.5	168.0	395.5
Exceedance		Limit Level				Limit Level			
Investigation Results, Recommendations & Mitigation Measures		<ol style="list-style-type: none"> 1. According to the site information provided from the CCKJV, construction activities carried out from 4 to 8 June 2016 at Bridge D (upstream of WM2A) were mainly piling works. The monitoring locations and works area are shown in Figure 1. 2. According to the site record from the monitoring team during monitoring on 4, 7 and 8 June 2016, turbid water was observed at WM2A and the water samples collected on WM2A-C were visually clear. (Photo 1-3, 6-9) On 6 June 2016, turbid water was observed at WM2A and WM2A-C. (Photo 4, 5) 3. During joint site inspection with RE, IEC, ET and Contractor on 2 June 2016, it was observed that unknown source of turbid water was seeping out from the river bed at upstream of WM2A continuously, turning the water in the river turbid. (Photo 10) 4. From the photo taken by the Contractor on 4 June 2016, it was observed that turbid water was seeping out from the river bed at upstream of WM2A continuously. (Photo 11) Thus, it is considered that the exceedance on 4 June was likely due to the unknown source of turbid water. 5. According to the Daily Extract of Meteorological Observations from the Hong Kong Observatory, intense rainfall (100-150 mm) was recorded at Ta Kwu Ling monitoring station on 6 June 2016. Under the intense rain, water flow rate increased vigorously and the sediment at the river bed was stirred up at WM2A, resulting in turbid water. As the river bed at WM2A-C was mostly small rocks, the stirred up of sediment at WM2A-C was limited. The turbid water recorded at WM2A-C may due to runoff from upper stream or surrounding slopes. 6. According to the Daily Extract of Meteorological Observations from the Hong Kong Observatory, heavy rainfall (10-20 mm) was recorded at Ta Kwu Ling monitoring station on 7 and 8 June 2016. Water flow rate increased and the stirred up sediment could not settle down in a short period of time after intense 							

	<p>raining on 6 June 2016. The river bed at WM2A was cumulated with thick silt and sediment, while the river bed at WM2A-C was mostly small rocks. Hence, sediment stirred up more vigorous in WM2A while the stirred up of sediment at WM2A-C was limited. It is considered that the exceedances on 6, 7 and 8 June at WM2A were related to the heavy rainfall.</p> <p>7. According to the Event and Action, the monitoring frequency at WM2A has been increase to daily due to the limit level exceedance recorded until no exceedances were triggered in consecutive days. There were no exceedances triggered at WM2A for monitoring on 10 June 2016. Nevertheless, the Contractor is reminded to continue to fully implement the water mitigation measures as recommended in the implementation schedule for environmental mitigation measures in the EM&A Manual.</p>
--	---

Prepared By : Winnie Chiu

Designation : Assistant Environmental Consultant

Signature :

Chiu

Date : 30 June 2016

Photo Record



Photo 1
During water sampling on 4 June 2016, turbid water was observed at WM2A.



Photo 2
The water samples collected at WM2A on 4 June 2016 was turbid.



Photo 3
During water sampling on 4 June 2016, the water quality at WM2A-C was visually clear.



Photo 4
During water sampling on 6 June 2016, turbid water was observed at WM2A.



Photo 5
During water sampling on 6 June 2016, the water quality at WM2A-C was turbid.



Photo 6
During water sampling on 7 June 2016, turbid water was observed at WM2A.



Photo 7

During water sampling on 7 June 2016, the water quality at WM2A-C was visually clear.



Photo 8

The water samples collected on 8 June 2016 at WM2A was turbid.



Photo 9

During water sampling on 8 June 2016, visually clear water was observed at WM2A-C.



Photo 10

During weekly joint site inspection on 2 June 2016, it was observed that unknown source of turbid water was seeping out from the river bed at upstream of WM2A continuously.



Photo 11

It was observed that unknown source of turbid water was seeping out from the river bed at upstream of WM2A continuously on 4 June 2016.

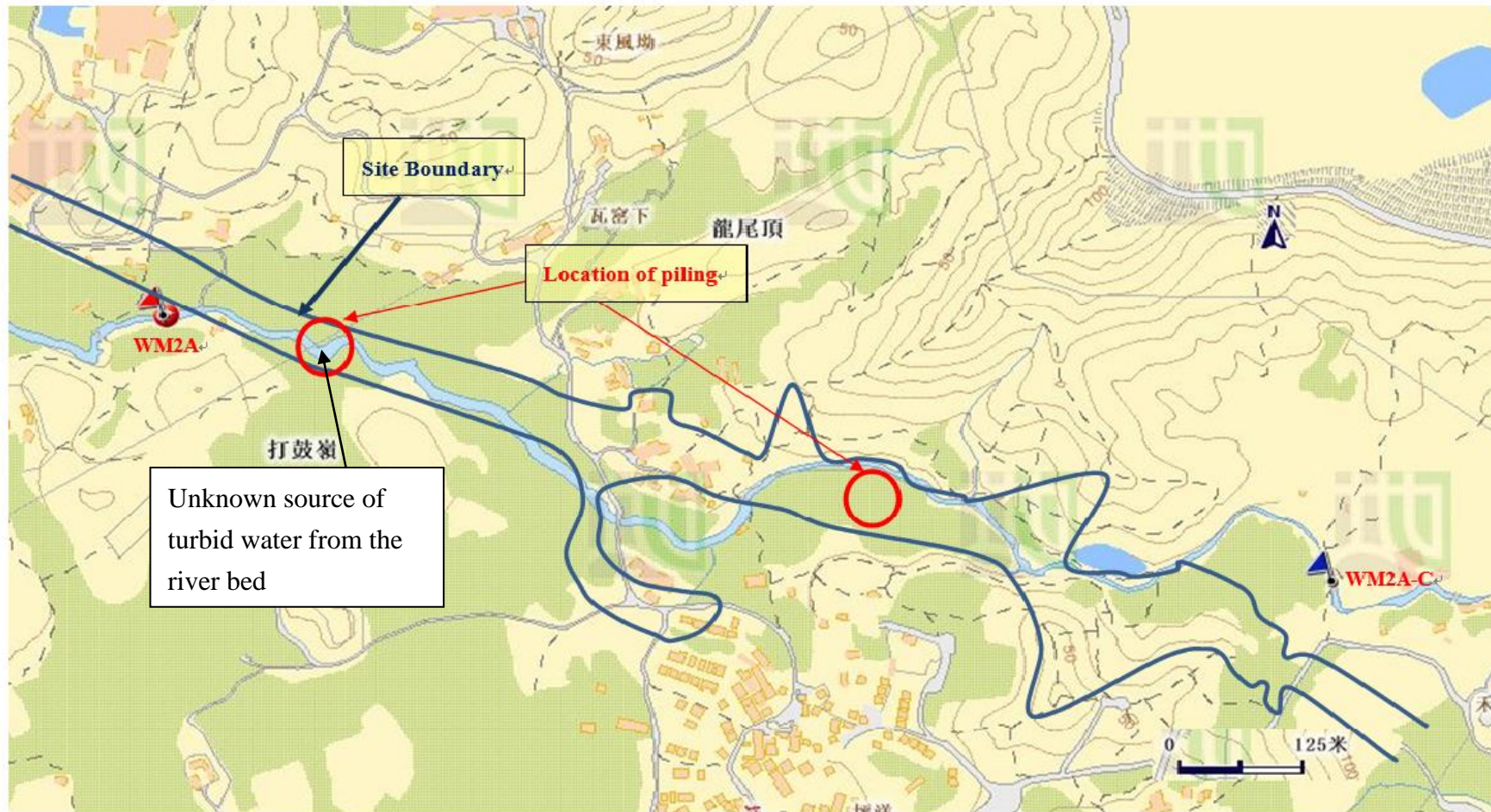


Figure 1 Location Map for Water Quality Monitoring Locations WM2A, WM2A-Control and work area under Contract 6

Isohyet chart for 6 Jun 2016

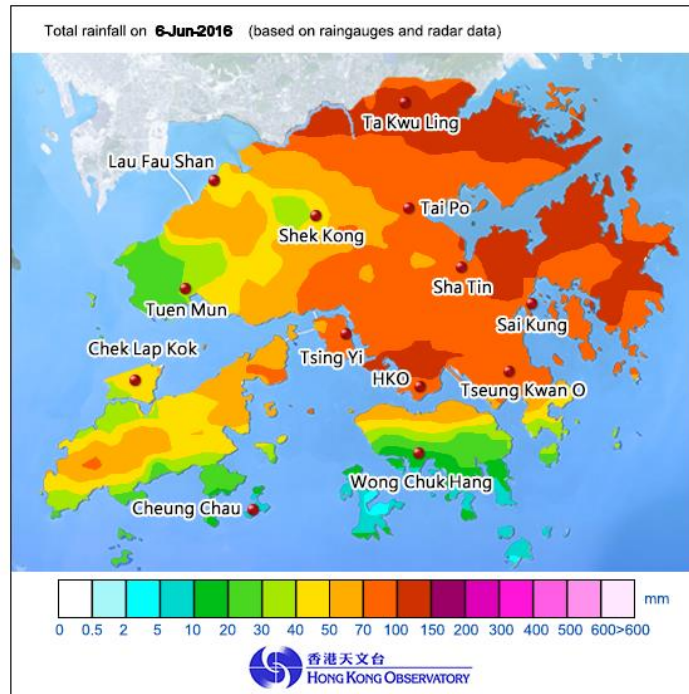


Figure 2 Rainfall distribution on 6 June 2016

Isohyet chart for 7 Jun 2016

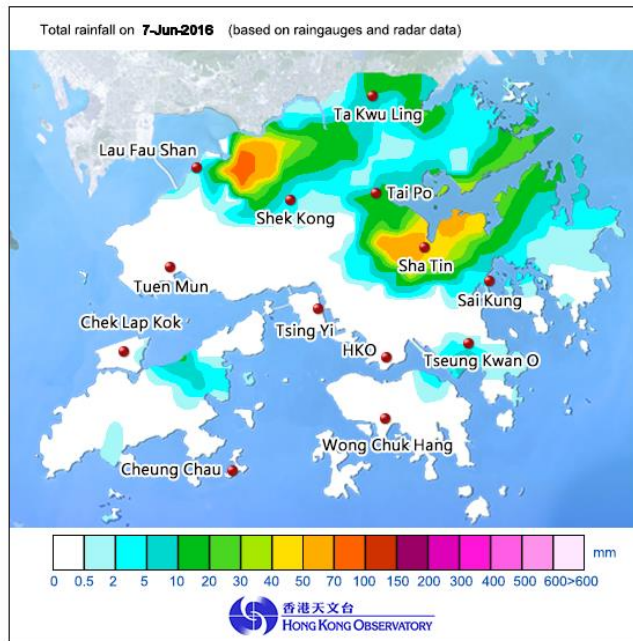


Figure 3: Rainfall distribution on 7 June 2016

Isohyet chart for 8 Jun 2016

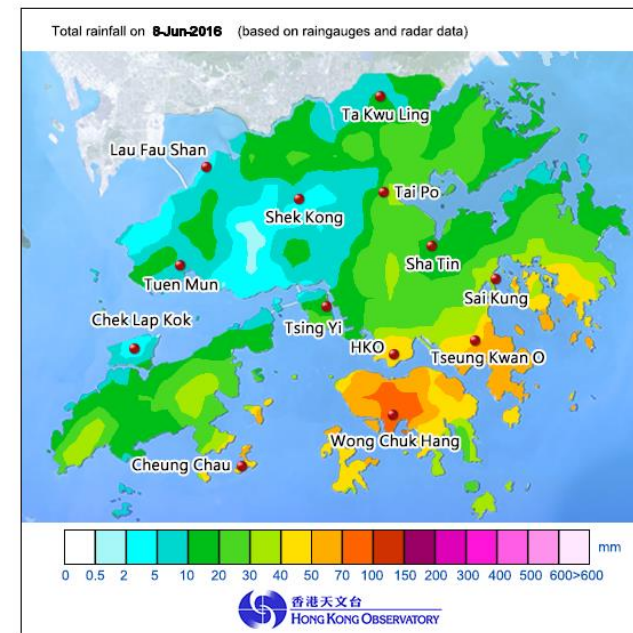


Figure 4: Rainfall distribution on 8 June 2016

To Mr. Jon Kitching **Fax No** 2752 0696

Company Leighton Contractors (Asia) Limited

cc

From Winnie Chiu **Date** 20 June 2016

Our Ref TCS00769/15/300/F0107 **No of Pages** 8 (Incl. cover sheet)

RE **Architectural Services Department (ArchSD) Contract No: SS C505**
Construction of Liantang/Heung Yuen Wai Boundary Control Point (BCP) – BCP
Buildings and Associated Facilities
Investigation Report for Exceedance of Water Quality Monitoring at Location WM1
on 6 June 2016

If you do not receive all pages, or transmission is illegible, please contact the originator on (852) 2959-6059 to re-send. Should this facsimile be sent to the wrong fax number, would receiver please destroy this copy and notify Action-United Environmental Services & Consulting immediately. Thank you.

Dear Sir,

Further to the Notification of Exceedance (NOE) ref. of following:-

TCS00769/15/300/F0106 dated 7 June 2016
TCS00769/15/300/F0108 dated 15 June 2016

Please find attached the “Investigation Report on Action or Limit Level Non-compliance” referenced above 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



Winnie Chiu
Assistant Environmental Consultant
Encl.

c.c.	Mr. David Chan (EPD)	Fax:	2685 1155
	Mr. William WL Cheng (ASD)		By e-mail
	Mr. Justin Cheung (Ronald Lu)		By e-mail
	Mr. Antony Wong (IEC, SMEC)		By e-mail
	Mr. Simon Leung (ER, AECOM)	Fax:	2674 7732

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

Investigation Report on Action or Limit Level Non-compliance

Project		CE 45/2008	
Contract		SS C505	
Monitoring Location		WM1	
Date		6 June 2016	
Time		15:37	
Parameter		Turbidity (NTU)	Suspended Solids (mg/L)
Action Level		51.3 AND 120% of upstream control station of the same day	54.5 AND 120% of upstream control station of the same day
Limit Level		67.6 AND 130% of upstream control station of the same day	64.9 AND 130% of upstream control station of the same day
Measured levels	WM1-C	229.0	259.5
	WM1	543.5	409.0
Exceedance		Limit Level	Limit Level
Investigation Results, Recommendations & Mitigation Measures		<ol style="list-style-type: none"> 1. According to the site information provided by the Contractor, the major construction activities carried out on 6 June 2016 included formwork erection, column construction, driven piling, concreting and retaining wall excavation which are illustrated in Figure 1. It is noted that the majority active construction area were not closed to Kong Yiu River. (Figure 2) 2. According to the site records from the monitoring team during monitoring on 6 June 2016, turbid water was observed at WM1 and WM1-C. (Photo 1, 2, 3) 3. According to the Daily Extract of Meteorological Observations from the Hong Kong Observatory, heavy rainfall was recorded on 6 June 2016. (Figure 4) Water flow rate increased under the heavy rain and the sediment at the river bed was stirred up, resulting in turbid water. 4. According to the field photos (Photo 1), accumulation of rubbish were observed at the bar screen of the box culvert near WM1 on 6 June 2016. Water flow near WM1 was therefore retarded and turbid water was cumulated at WM1. Also, water level at the box culvert increased to a high level due to the combined effect of heavy rain and accumulation of rubbish, overflow of the Kong Yiu River occurred. 5. In view of the construction activities on 6 June 2016 and confirmed by the Contractor, wastewater was generated during the bored piling work only and the wastewater was recirculated for the piling work used. If water discharge is required, they will follow the temporary site drainage plan in which wastewater would be diverted to the perimeter channel and then collected to the wastewater treatment plant for treatment before discharge. (Figure 3) It is noted that the discharge point connecting public drainage was located at the west of the site and the discharge water would not flow to WM1 and its upstream. (Figure 3) 6. In view of the topography of the construction site, the formation level of the site is lower than the roads bounding the site (around 2m height difference), it is considered that the wastewater generated on-site is not likely flowing out of the site boundary. (Photo 4) As advised by the Contractor, around 90% of treated water is reused on-site (water spread 	

	<p>for dust suppression) whereas the rest of the treatment wastewater would be discharge off site at the approval discharge point.</p> <p>7. There were no exceedances triggered in the subsequent monitoring result on 7 June 2016. According to the above investigation, it is considered that the exceedances were not likely related to the works under the Contract.</p>
Action to be taken	The Contractor is reminded to fully implement the water mitigation measures as recommended in the implementation schedule for environmental mitigation measures in the EM&A Manual.

Prepared By : Winnie Chiu

Designation : Assistant Environmental Consultant

Signature :



Date : 20 June 2016



Photo 1

On 6 June 2016, accumulation of rubbish were observed at the bar screen of the box culvert near WM1. Overflow of Kong Yiu River was observed.



Photo 2

During water sampling on 6 June 2016, the water quality at WM1-C was turbid.



Photo 3

The water samples collected at both WM1 and WM1-C on 6 June 2016 were turbid.



Photo 4

Temporary drainage channel has been constructing at the periphery of the site and the formation level of the site is lower than the roads bounding the site.

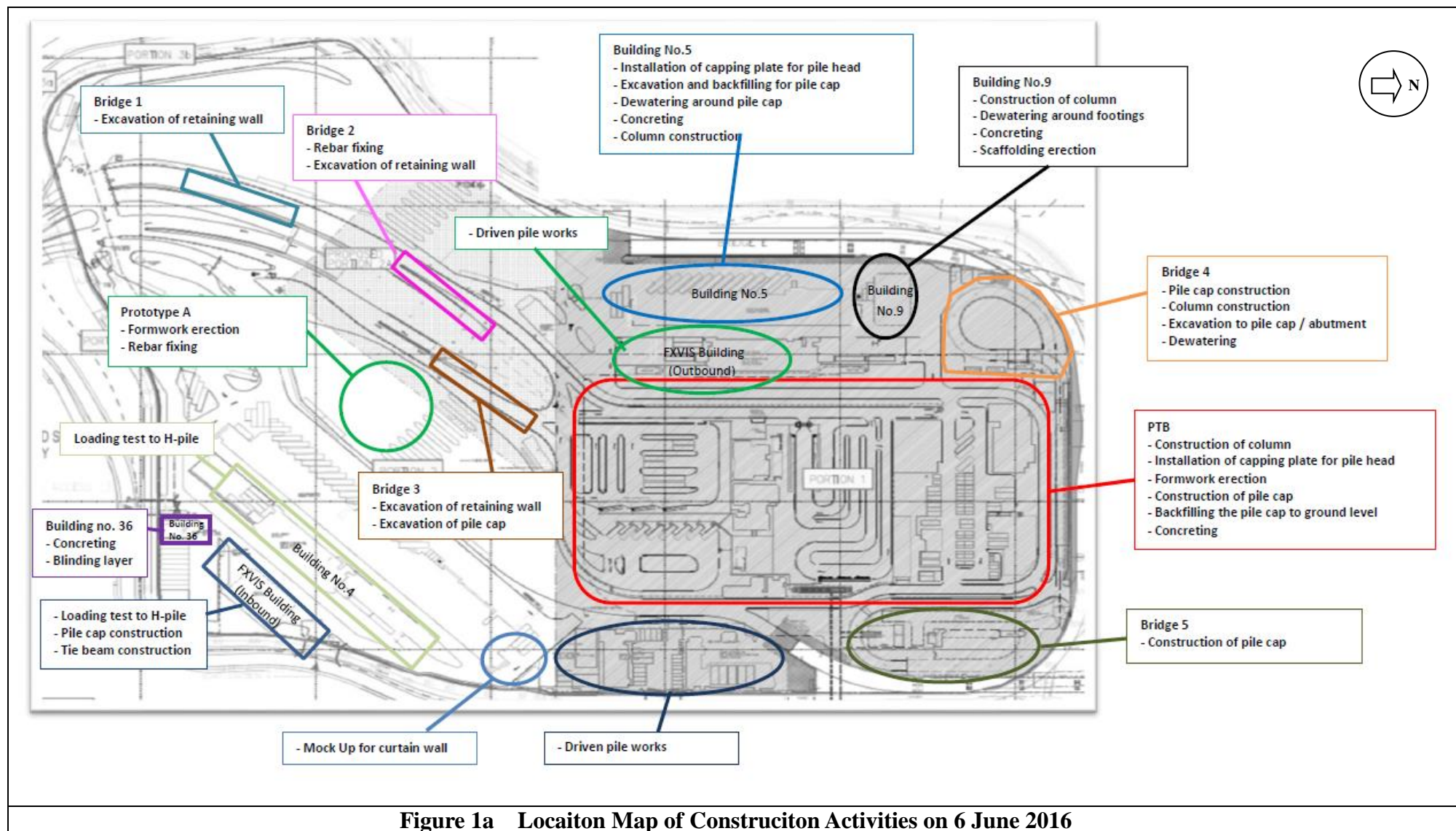


Figure 1a Location Map of Construction Activities on 6 June 2016

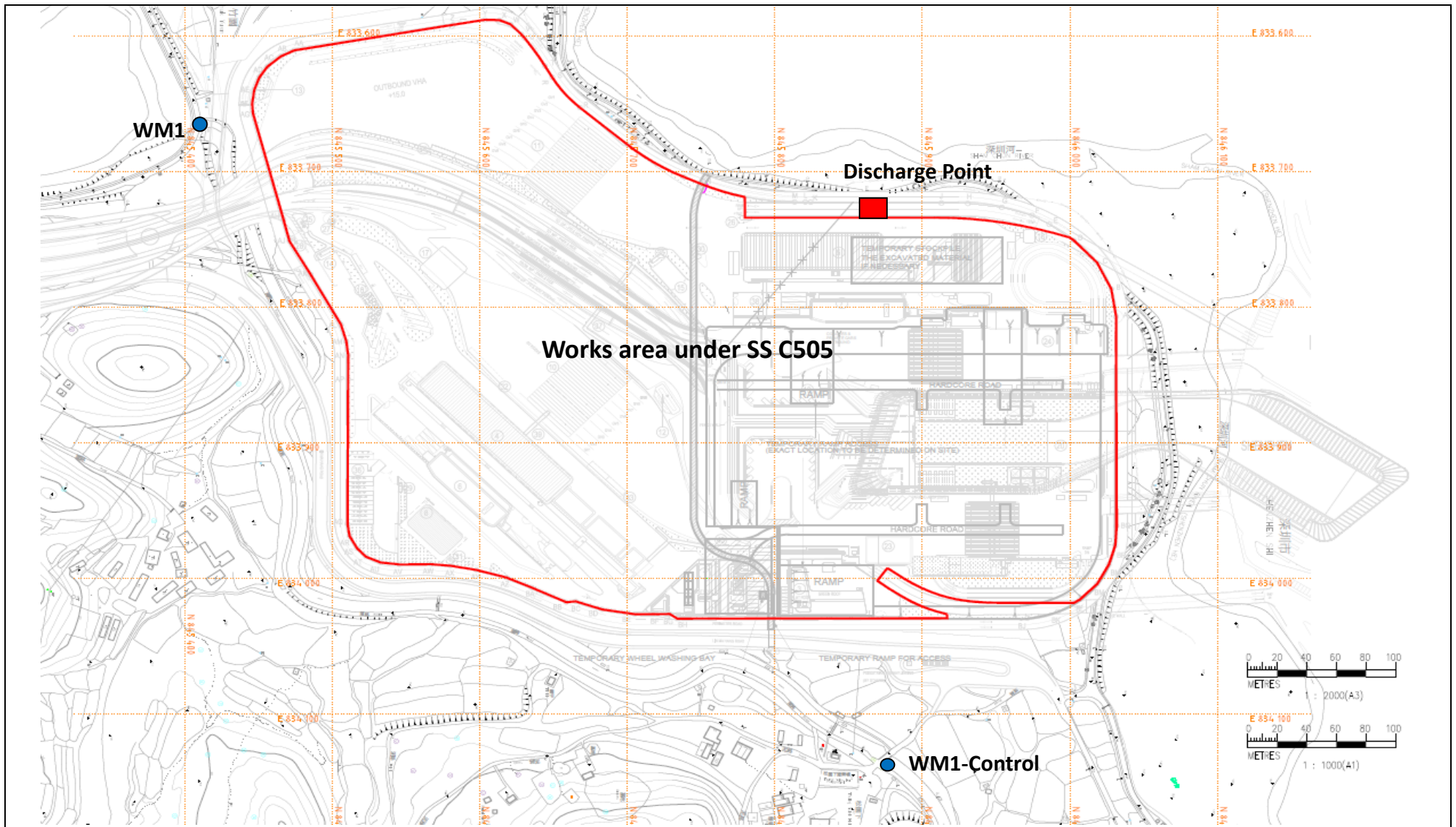


Figure 2 Locaiton Map of Water Monitoring Location

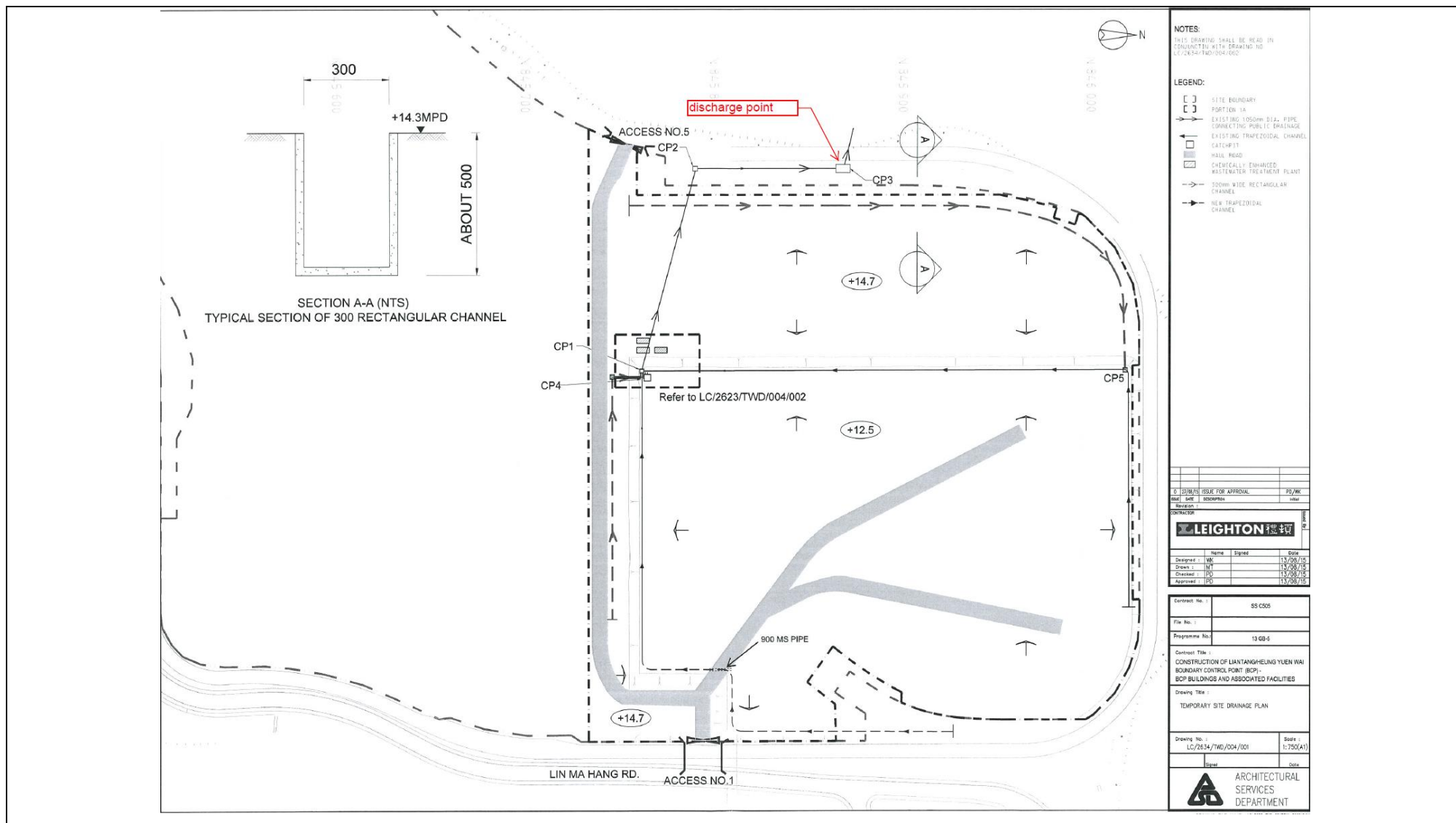


Figure 3 Temporary Site Drainage Plan

Isohyet chart for 6 Jun 2016

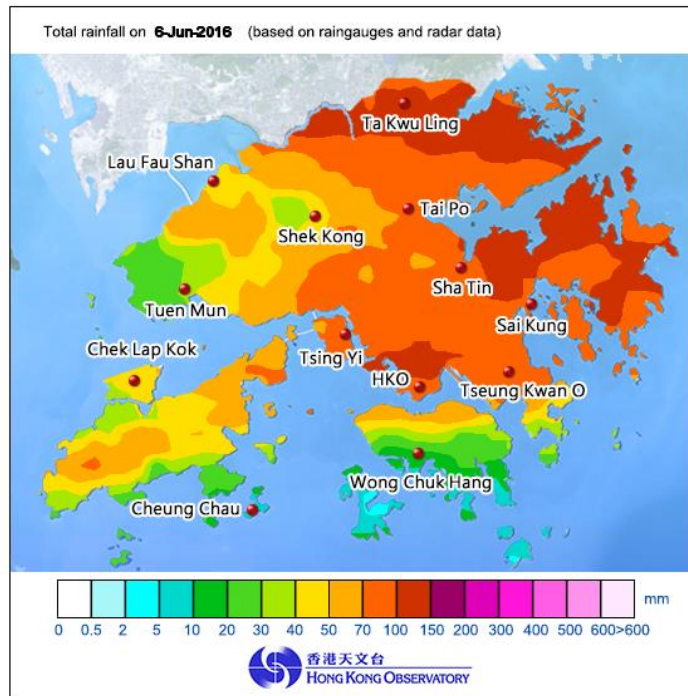


Figure 4 Rainfall distribution on 6 June 2016



Winnie Chiu
Assistant Environmental Consultant

Encl.

c.c. Mr. David Chan (EPD)
Mr. Simon Leung (ER of C6/ AECOM)
Mr. Antony Wong (IEC, SMEC)

Fax: 2685 1155

Fax: 2251 0698

By email

Agreement No. CE 45/2008

Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works

Investigation Report on Action or Limit Level Non-compliance

Project		CE 45/2008							
Date		13 June	14 June	15 June	16 June	17 June	18 June	20 June	21 June
Location		WM2A							
Time		10:33	11:00	11:03	11:30	11:25	11:03	10:02	11:35
Parameter		Turbidity (NTU)							
Action Level		24.9 AND 120% of upstream control station of the same day							
Limit Level		33.8 AND 130% of upstream control station of the same day							
Measured Levels	WM2A-C	8.7	6.17	7.01	33.3	44.4	12.1	12.4	10.3
	WM2A	218.5	212.0	71.2	159.5	358.0	54.7	196.0	231.0
Exceedance		Limit Level				Limit Level			
Parameter		Suspended Solids (mg/L)							
Action Level		14.6 AND 120% of upstream control station of the same day							
Limit Level		17.3 AND 130% of upstream control station of the same day							
Measured Levels	WM2A-C	6.0	5.0	3.0	29	6.5	3.0	4.5	7.0
	WM2A	111.5	203.0	73.5	152	300.5	63.0	141.5	300.0
Exceedance		Limit Level				Limit Level			
Investigation Results, Recommendations & Mitigation Measures		<ol style="list-style-type: none"> 1. According to the site information provided from the CCKJV, construction activities carried out from 13 to 21 June 2016 at Bridge D (upstream of WM2A) were mainly piling works. The monitoring locations and works area are shown in Figure 1. 2. According to the site record from the monitoring team during monitoring from 13, 14, 15, 16, 17, 18, 20, 21 June 2016, turbid water was observed at WM2A and the water samples collected at WM2A-C were visually clear. (Photo 1-17) 3. During joint site inspection with RE, IEC, ET and Contractor (CCKJV) on 16 June 2016, no surface runoff was observed from the site into the river. 4. As advised by the Contractor, the source of turbid water recorded at WM2A was identified. Due to continual heavy loading, uneven ground and cracks on the haul road were formed. As dust suppression measures, a series of sprinklers was installed along the haul road for continuous spraying and the excessive water was cumulated on uneven ground/ cracks. When vehicles passed the puddles, muddy water trapped on the uneven ground/ cracks was spilled from the road into a channel connecting to Ping Yuen River. (Figure 2) 5. To resolve the deficiency, the Contractor has filled the uneven ground and reduce the frequency of water spraying on that area. Also, the haul road was levelled up to avoid muddy runoff. The situation was found improved during site inspection on 7 July 2016. (Photo 18) 6. There was no exceedance recorded in the subsequent monitoring days on 22, 23 June 2016. Hence, it is considered that the 							

	rectification measures carried out by the Contractor were effective in preventing further exceedances.
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Prepared By : Winnie Chiu

Designation : Assistant Environmental Consultant

Signature : 

Date : 13 July 2016

Photo Record



Photo 1

During water sampling on 13 June 2016, turbid water was observed at WM2A.



Photo 2

Water quality at WM2A was visually clear on 13 June 2016.



Photo 3

The water samples collected at WM2A on 13 June 2016 was turbid.



Photo 4

During water sampling on 14 June 2016, turbid water was observed at WM2A.



Photo 5

During water sampling on 14 June 2016, the water quality at WM2A-C was visually clear.



Photo 6

During water sampling on 15 June 2016, turbid water was observed at WM2A.



Photo 7

During water sampling on 15 June 2016, the water quality at WM2A-C was visually clear.



Photo 8

During water sampling on 16 June 2016, turbid water was observed at WM2A.



Photo 9

During water sampling on 16 June 2016, the water quality at WM2A-C was visually clear.



Photo 10

During water sampling on 17 June 2016, turbid water was observed at WM2A.



Photo 11
Water quality at WM2A was visually clear on 17 June 2016.



Photo 12
During water sampling on 18 June 2016, turbid water was observed at WM2A.

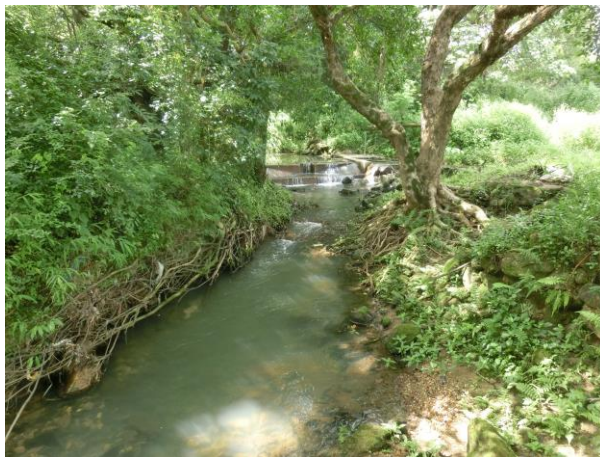


Photo 13
During water sampling on 18 June 2016, the water quality at WM2A-C was visually clear.



Photo 14
During water sampling on 20 June 2016, turbid water was observed at WM2A.

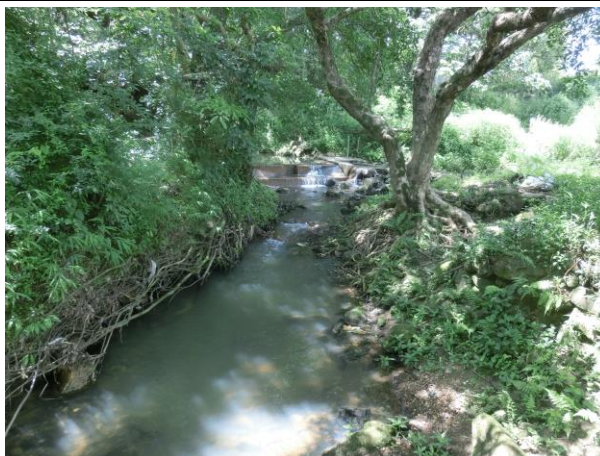


Photo 15
During water sampling on 20 June 2016, the water quality at WM2A-C was visually clear.



Photo 16
During water sampling on 21 June 2016, turbid water was observed at WM2A.



Photo 17

During water sampling on 21 June 2016, the water quality at WM2A-C was visually clear.



Photo 18

During site inspection on 7 July 2016, it was observed that haul road was filled to minimize the impact of uneven ground.

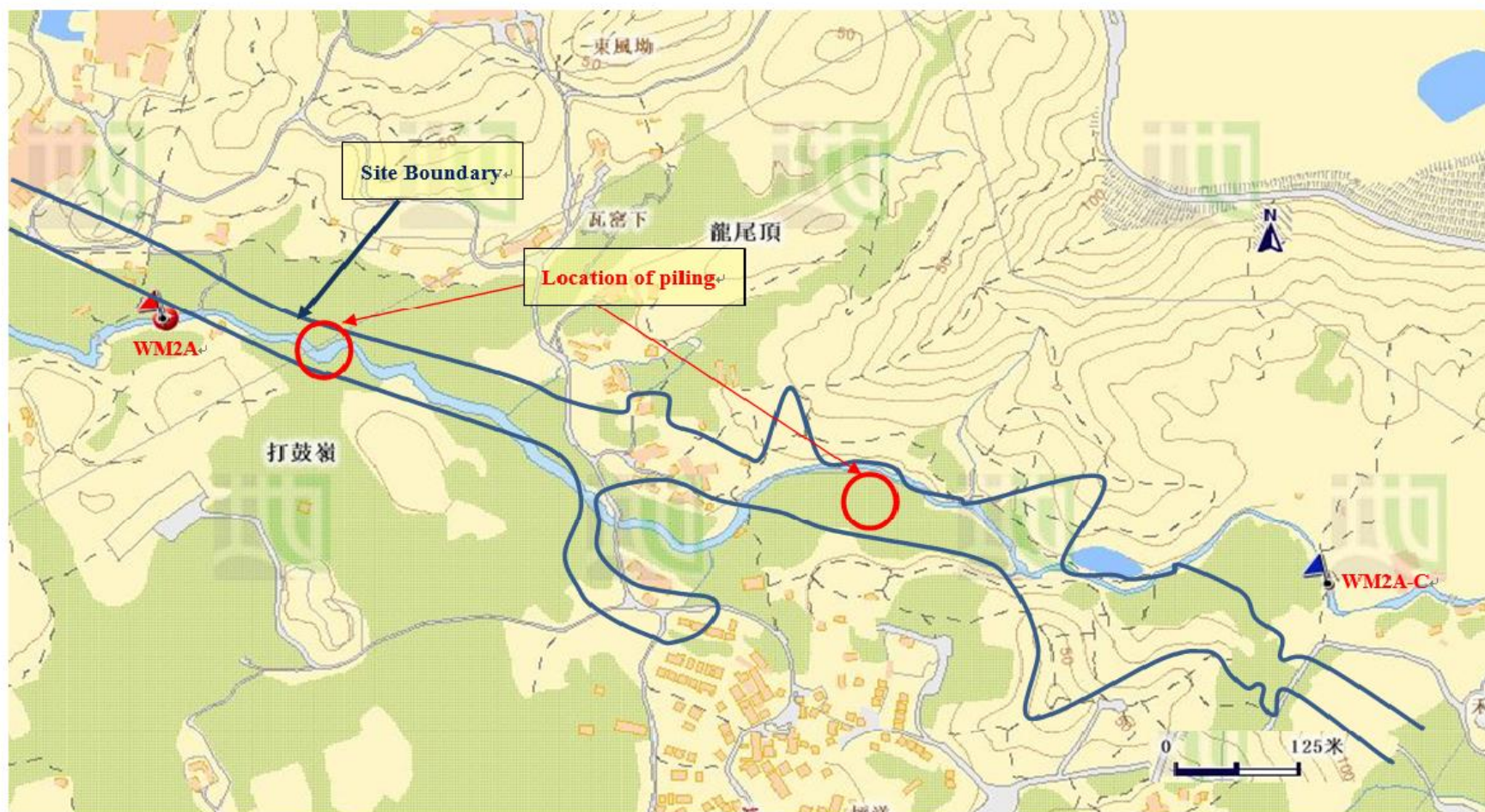


Figure 1 Location Map for Water Quality Monitoring Locations WM2A, WM2A-Control and work area under Contract 6

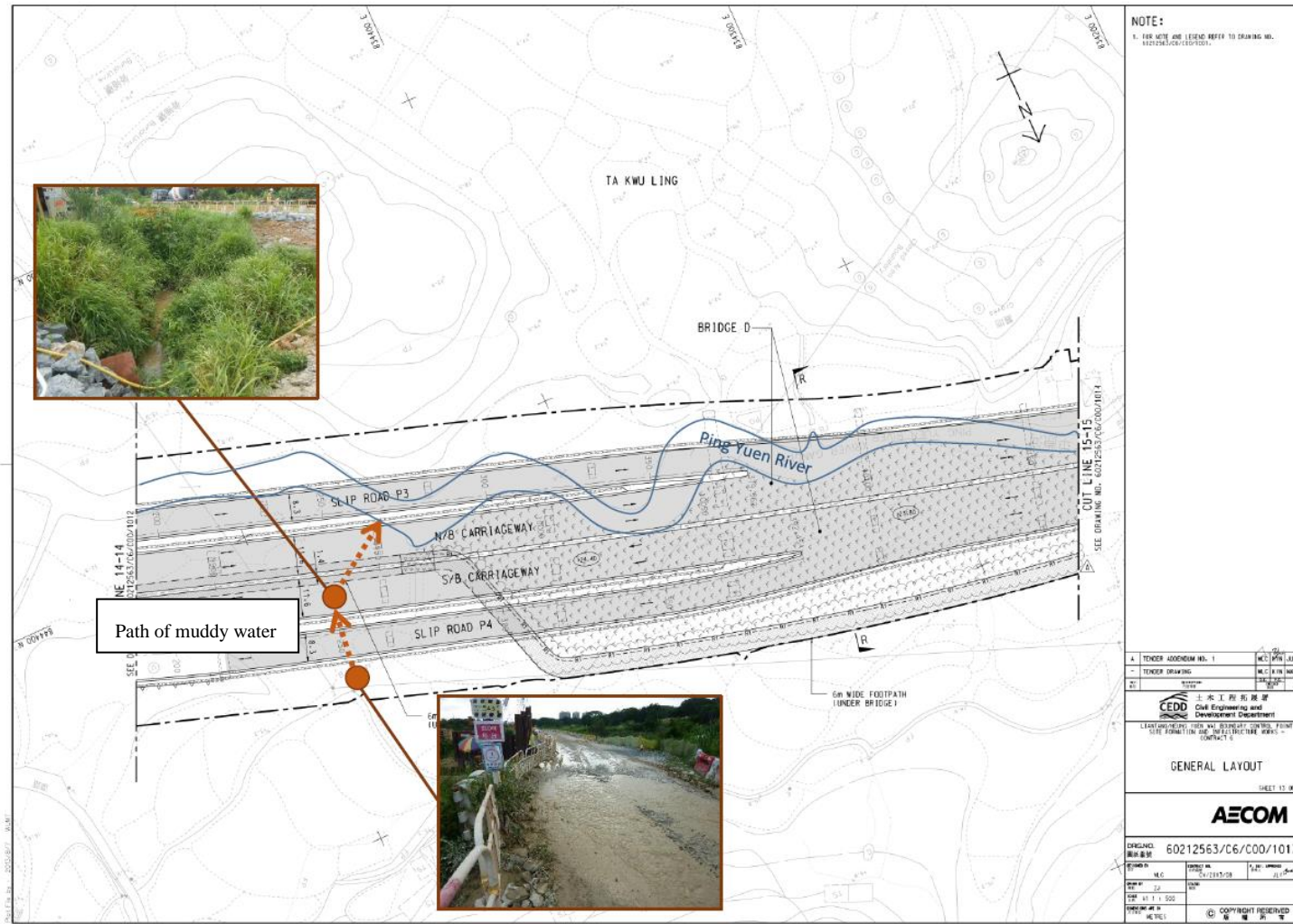


Figure 2: Location of the concerned haul road and channel

Agreement No. CE 45/2008

Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works

Investigation Report on Action or Limit Level Non-compliance

Project		CE 45/2008	
Date		30 June 2016	
Location		WM2A	
Time		13:40	
Parameter		Turbidity (NTU)	Suspended Solids (mg/L)
Action Level		24.9 AND 120% of upstream control station of the same day	14.6 AND 120% of upstream control station of the same day
Limit Level		33.8 AND 130% of upstream control station of the same day	17.3 AND 130% of upstream control station of the same day
Measured Levels	WM2A-C	10.6	4.5
	WM2A(a)	130.0	117.5
Exceedance		Limit Level	Limit Level
Investigation Results, Recommendations & Mitigation Measures		<ol style="list-style-type: none"> 1. According to the site information provided from the CCKJV, construction activities carried out on 30 June 2016 at Bridge D (upstream of WM2A) were mainly piling works. The monitoring locations and works area are shown in Figure 1. 2. According to the site record from the monitoring team during monitoring on 30 June 2016, turbid water was observed at WM2A and the water samples collected on WM2A-C were slightly turbid. (Photo 1, 2, 3) 3. During weekly joint site inspection with RE, IEC, ET and Contractor(CCKJV) on 30 June 2016, no discharge and surface runoff was observed from the site. As water mitigation measures, wastewater treatment facilities including one AquaSed and three series of sedimentation tank have been installed for piling work and most of the time the wastewater was recirculated. (Photo 4) However, it was observed that unknown source of turbid water was seeping out from the river bed. (Photo 5 and 6) Hence, it is considered that the exceedance on 30 June 2016 was due to the above event. 4. Nevertheless, the Contractor is reminded to continue to fully implement the water mitigation measures as recommended in the implementation schedule for environmental mitigation measures in the EM&A Manual. 	

Prepared By : Winnie Chiu

Designation : Assistant Environmental Consultant

Signature :

Chiu

Date : 12 July 2016

Photo Record



Photo 1
During water sampling on 30 June 2016, turbid water was observed at WM2A.



Photo 2
Water quality at WM2A was slightly turbid on 30 June 2016.



Photo 3
The water samples collected at WM2A on 30 June 2016 was turbid.



Photo 4
Wastewater treatment facilities including one AquaSed and three series of sedimentation tank have been installed for piling work.



Photo 5
During joint site inspection on 30 June 2016, it was observed that unknown source of turbid water was seeping out from the river bed.



Photo 6
During joint site inspection on 30 June 2016, it was observed that unknown source of turbid water was seeping out from the river bed.

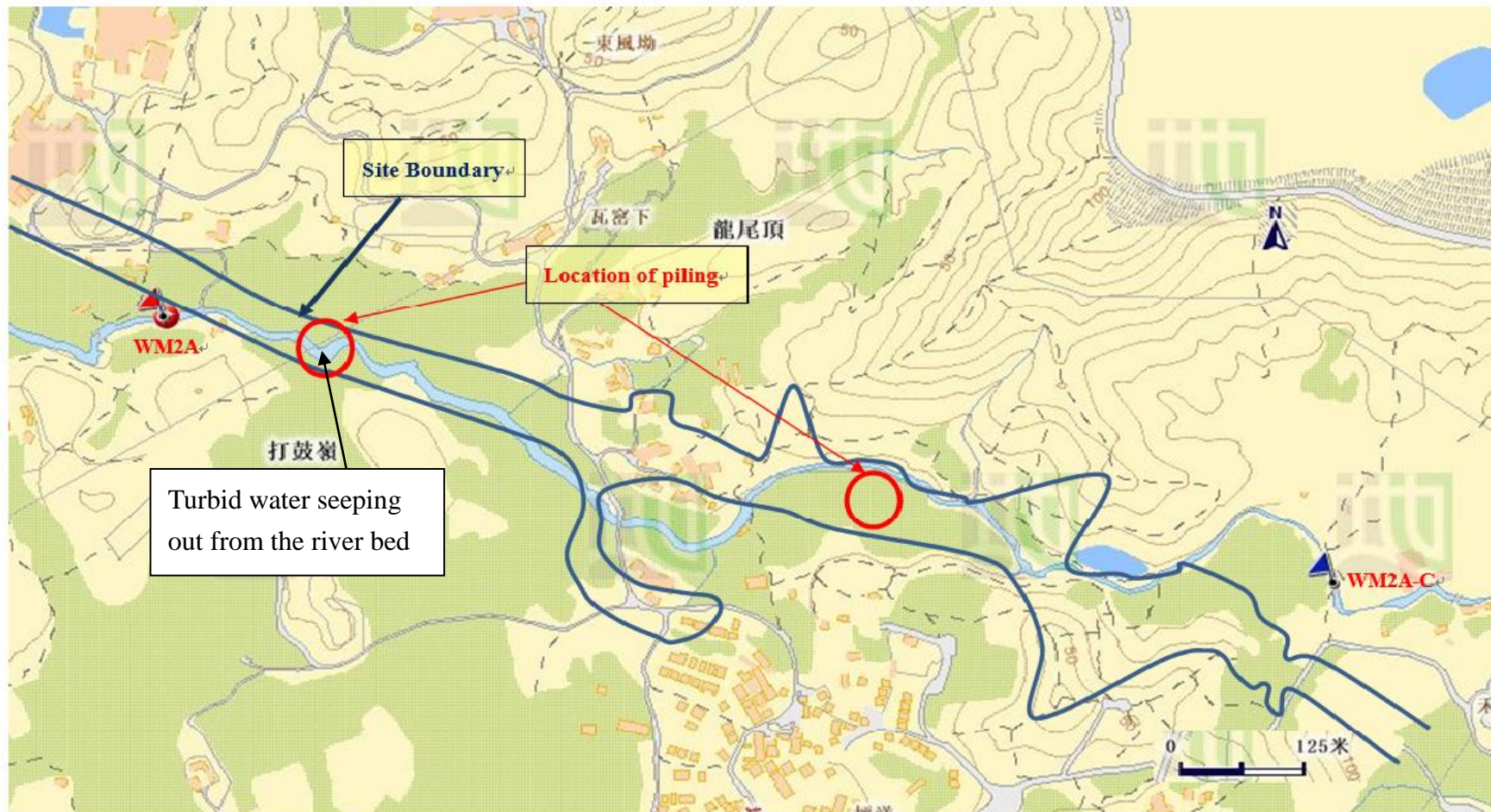


Figure 1 Location Map for Water Quality Monitoring Locations WM2A, WM2A-Control and work area under Contract 6