



JOB No.: TCS00670/13

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

MONTHLY ENVIRONMENTAL MONITORING AND AUDIT
REPORT (NO.25) – AUGUST 2015

PREPARED FOR
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT
(CEDD)

Date	Reference No.	Prepared By	Certified By
11 September 2015	TCS00670/13/600/R0478v2	 Nicola Hon (Environmental Consultant)	 Tam Tak Wing (Environmental Team Leader)

Version	Date	Remarks
1	9 September 2015	First Submission
2	11 September 2015	Amended against the IEC's comments on 10 September 2015

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14 September 2015

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By Email & Post

Attention: Mr Simon LEUNG

Dear Sirs

Agreement No. CE 45/2008 (CE)
Liantang/Heung Yuen Wai Boundary Control Point and Associated Works
Independent Environmental Checker – Investigation
Monthly EM&A Report (No. 25) – August 2015

With reference to the Monthly EM&A Report No. 25 for August 2015 (Version 2) certified by the ET Leader provided to us on 11 September 2015, please be noted that we have no adverse comments on the captioned submission. We herewith verify the captioned submission in accordance with Condition 5.4 of the Environmental Permit No. EP-404/2011/C.

Thank you for your attention and please do not hesitate to contact the undersigned on tel. 3995 8120 or by email to antony.wong@smec.com; or our Mr Francis LEE on tel. 3995 8144 or by email to francis.lee@smec.com.

Yours faithfully
for and on behalf of
SMEC Asia Limited



Antony WONG

Independent Environmental Checker

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EXECUTIVE SUMMARY

ES01 This is the 25th monthly EM&A report presenting the monitoring results and inspection findings for the reporting period from **1 to 31 August 2015** (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 six CEDD contracts including Contract 2 (CV/2012/08), Contract 3 (CV/2012/09), Contract 4 (TCCS), Contract 5 (CV/2013/03), Contract 6 (CV/2013/08) and Contract 7 (NE/2014/03) and one ArshSD contract (Contract SS C505).

ES03 Currently, the construction works have been undertaking for Contract 2, Contract 3 and Contract 5. 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	6	90
	24-hour TSP	6	30 (#)
Construction Noise	L _{eq(30min)} Daytime	8	40
Water Quality	Water sampling	3 (Contract 2&3)	14 ^(*)
		2 (Contract 5)	14 ^(*)
Joint Site Inspection / Audit	IEC, ET, the Contractor and RE joint site Environmental Inspection and Auditing	Contract 2	4
		Contract 3	5
		Contract 5	4

^(*) Monitoring day

(#) 2 events were incomplete due to power issue

BREACH OF ACTION AND LIMIT (A/L) LEVELS

ES04 In the Reporting Period, no air quality and noise exceedance was registered for the Project. For water quality, a total of six (6) Limit Level exceedances, namely four (4) exceedances recorded at WM1 and two (2) exceedances at WM4. 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	--	--
Construction Noise	L _{eq(30min)} Daytime	0	0	0	--	--
Water Quality	DO	0	0	0	--	--
	Turbidity	0	3	3	- Exceedances at WM4 were not project related	N/A
	SS	0	3	3	- Exceedance at WM1 is under investigation	

ENVIRONMENTAL COMPLAINT

- ES05 In this Reporting Period, no environmental complaints were received related to the EM&A programme.

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 **7, 14, 21 and 28 August 2015**. 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 **3, 12, 17, 24 and 31 August 2015**. 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 **6, 13, 20 and 27 August 2015**. No non-compliance was noted.

FUTURE KEY ISSUES

- ES11 During raining season, muddy water or other water pollutants from site surface flow to local stream such as Kong Yiu Channel and Ma Wat Channel or public area will be key environment issue. Water quality mitigation measures to prevent surface runoff into nearby water bodies or public areas should paid attention and fully implement.
- ES12 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.
- ES13 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 **25th** monthly EM&A report presenting the monitoring results and inspection findings for reporting period from **1** to **31 August 2015**.

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 Waste Management

- Section 8* *Site Inspections*
- Section 9* *Environmental Complaints and Non-Compliance*
- Section 10* *Implementation Status of Mitigation Measures*
- Section 11* *Conclusions and Recommendations*

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 not yet been awarded. The work of the Contract 4 includes provision and installation of Traffic Control and Surveillance System and the associated electrical and mechanical works for the Project.

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 expected to be commenced on 1 November 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 not yet been awarded. 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 expected to be 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's, ET's and IEC's compliance with the requirements in the Environmental Permit (EP) and EM&A Manual
- Facilitate ET's implementation of the EM&A programme
- Participate in joint site inspection by the ET and IEC
- Oversee the implementation of the agreed Event / Action Plan in the event of any exceedance
- Adhere to the procedures for carrying out complaint investigation
- Liaison with DSD, Engineer/Engineer's Representative, ET, IEC and the Contractor of the "Construction of the DSD's Regulation of Shenzhen River Stage 4 (RSR 4)" Project discussing regarding the cumulative impact issues.

The Contractor(s)

- 2.2.7 There will be one contractor for each individual works contract. Once the contractors are

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

Environmental Team (ET)

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

Independent Environmental Checker (IEC)

- 2.2.11 One IEC will be employed for this Project. Once the IEC is appointed, EPD, ER, the Architect and ET will be notified the details of the IEC.

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

2.3 CONCURRENT PROJECTS

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

2.4 CONSTRUCTION PROGRESS

- 2.4.1 In the Reporting Period, the major construction activity conducted under the Project is located in Contracts 2, 3 and 5 and they are summarized in below. Moreover, the 3-month rolling construction program of the Contracts 2, 3 and 5 is enclosed in **Appendix C**.

Contract 2 (CV/2012/08)

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

- | | |
|-----------------|--|
| Mid-Vent Portal | <ul style="list-style-type: none">• Cavern excavation• Adit invert slab |
| North Portal | <ul style="list-style-type: none">• Permanent slope and composite wall• Tunnel Boring Machine (TBM) onsite assembly and cradle construction• Southbound bench excavation• Associated PME installation for operation of TBM (mortar plant, |

- cooling system etc.)
- | | |
|----------------|--|
| South Portal | <ul style="list-style-type: none">• Rock Excavation to Vent. Bldg. Formation• Southbound excavation and foundation works• Northbound excavation and bored piles works• Drill and Blast Set Up + Site installation |
| Admin Building | <ul style="list-style-type: none">• Backfilling for surcharge• Drainage works |

Contract 3 (CV/2012/09)

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

- Cable detection and trial trenches
- Decking construction for Bridge E
- E&M work for new valve control & Telemetry House
- Filling works at Tong Hang
- Storm drain laying
- Noise barrier construction
- Pier / pier table construction
- Pile cap works
- Piling works
- Portal beam erection
- Pre-drilling
- Road works at Fanling Highway
- Retaining Wall construction
- Socket H-pile installation
- Tree felling works
- Utilities duct laying
- Viaduct segment erection
- Portal beam construction
- Slope works
- Construction of temporary steel ramp for Kiu Tau Footbridge

Contract 4 (Contract number to be assigned)

2.4.4 The contract has not yet been awarded.

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:

- Diversion of UU at existing LMH Road
- Construction of secondary boundary fencing
- Construction of Depressed Road at BCP3
- Additional works (Access Works) for Village House at RS4
- Drainage works at existing/proposed LMH Road
- Drainage works (Connection to Box 3) at BCP Area
- Brick laying at footpath of proposed LMH road
- Water works at proposed LMH Road
- Formation works at BCPB Area
- Installation of Underground utilities at proposed and existing LMH road
- Road works (kerb laying) for proposed and existing LMH road
- Bituminous laying at existing & proposed LMH road

Contract 6 (CV/2013/08)

2.4.6 Contract 6 has awarded in June 2015 and construction work was expected to be commenced on 1 November 2015.

Contract 7 (NE/2014/03)

2.4.7 Contract 7 has not yet awarded.

Contract SS C505

2.4.8 Contract SS C505 has awarded in July 2015 and construction work was expected to be commenced on 1 September 2015.

2.5 SUMMARY OF ENVIRONMENTAL SUBMISSIONS

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

- Project Layout Plans of Contracts 2, 3, 5 and Contract 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 and 5
- Contamination Assessment Plan (CAP) for Po Kat Tsai, Loi Tung and the workshops in Fanling
- 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

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	
Contract 2			
1	Air pollution Control (Construction Dust) Regulation	Ref No.: 368864	31 Dec 2013
2	Chemical Waste Producer Registration	North Portal Waste Producers Number: No. 5213-652-D2523-01	Valid from 25 Mar 2014
		Mid-Vent Portal Waste Producers Number: No. 5213-634-D2524-01	Valid from 25 Mar 2014
		South Portal Waste Producers Number: No. 5213-634-D2526-01	Valid from 9 Apr 2014
3	Water Pollution Control Ordinance - Discharge License	No.WT00018374-2014	Valid from 3 Mar 2014 to 28 Feb 2019
		No.: W5/1I389	Valid from 28 Mar 2014 to 31 Mar 2019
		No.: W5/1I390	Valid from 24 Mar 2014

Item	Description	License/Permit Status	
			to 31 Mar 2019 Surrendered, effective 19 June 2014
		No.: W5/1I391	Valid from 28 Mar 2014 to 31 Mar 2019
		No.: W5/1I392	Valid from 28 Mar 2014 to 31 Mar 2019
4	Waste Disposal Regulation - Billing Account for Disposal of Construction Waste	Account No. 7019105	Valid from 8 Jan 2014
5	Construction Noise Permit	GW-RN0279-15	Valid 12 May 2015 - 29 Aug 2015
		GW-RN0305-15	Valid 19 May 2015 - 18 Aug 2015
		GW-RN0304-15	Valid 19 May 2015 - 14 Nov 2015
		GW-RN0298-15	Valid 30 May 2015 - 29 Aug 2015
		GW-RN0299-15	Valid 23 May 2015 - 22 Aug 2015
		GW-RN0479-15	Valid 31 Jul 2015 - 29 Jan 2016
		GW-RN0468-15	Valid 29 Aug 2015 - 28 Nov 2015
		GW-RN0467-15	Valid 23 Aug 2015 - 22 Nov 2015
		GW-RN0477-15	Valid 14 Aug 2015 - 31 Oct 2015
		GW-RN0479-15	Valid 31 Jul 2015 - 29 Jan 2016
Contract 3			
1	Air pollution Control (Construction Dust) Regulation	Ref. No: 362101	Notification received by EPD on 17 Jul 2013
2	Chemical Waste Producer Registration	Waste Producers Number: No.:5113-634-C3817-01	Valid form 7 Oct 2013 till the end of Contract
3	Water Pollution Control Ordinance - Discharge License	No.:WT00016832 – 2013	Valid from 28 Aug 13 to 31 Aug 2018
4	Waste Disposal Regulation - Billing Account for Disposal of Construction Waste	Account No. 7017914	Valid form 2 Aug 13 till the end of Contract
5	Construction Noise Permit	GW-RN0230-15	Valid on 15 Apr 2015 till 14 Oct 2015
		GW-RN0334-15	Valid on 8 Jun 2015 till 7 Dec 2015
		GW-RN0428-15	Valid on 9 Ju1 2015 till 31 Dec 2015

Item	Description	License/Permit Status	
		GW-RN0275-15	Valid on 7 May 2015 till 15 Aug 2015
		GW-RN0295-15	Valid on 31 May 2015 till 30 Aug 2015
		GW-RN0326-15	Valid on 2 Jun 2015 till 29 Aug 2015
		GW-RN0430-15	Valid on 9 Jul 2015 till 22 Aug 2015
		GW-RN0466-15	Valid on 3 Aug 2015 till 30 Sep 2015
		GW-RN0492-15	Valid on 11 Aug 2015 till 30 Sep 2015
		GW-RN0473-15	Valid on 29 Jul 2015 till 17 Dec 2015
		GW-RN0461-15	Valid on 5 Aug 2015 till 8 Jan 2016
		GW-RN0495-15	Valid on 12 Aug 2015 till 11 Feb 2016
		GW-RN0497-15	Valid on 14 Aug 2015 till 13 Feb 2016
		GW-RN0488-15	Valid on 6 Sep 2015 till 22 Nov 2015
		GW-RN0525-15	Valid on 29 Aug 2015 till 13 Feb 2016
		GW-RN0542-15	Valid on 1 Sep 2015 till 25 Feb 2016
		GW-RN0548-15	Valid on 1 Sep 2015 till 30 Sep 2015
Contract 5			
1	Air pollution Control (Construction Dust) Regulation	Ref. No: 359338	Notified EPD on 13 May 2013
2	Chemical Waste Producer Registration	Waste Producers Number No.: 5213-642-S3735-01	Valid from 8 Jun 2013 till the end of Contract
3	Water Pollution Control Ordinance - Discharge License	No.: W5/1G44/1	Valid from 8 Jun 13 to 30 Jun 2018
4	Waste Disposal Regulation - Billing Account for Disposal of Construction Waste	Account No. 7017351	Valid from 29 Apr 13 till the end of Contract
5	Construction Noise Permit	NA	NA
Contract SS C505			
1	Air pollution Control (Construction Dust) Regulation	Ref. No: 390974	Notified EPD on 13 Jul 2015
2	Chemical Waste Producer Registration	In progress	In progress
3	Water Pollution Control Ordinance - Discharge License	In progress	In progress

Item	Description	License/Permit Status	
4	Waste Disposal Regulation - Billing Account for Disposal of Construction Waste	Account No. 7022831	Valid from 23 Jul 2015 till the end of Contract
5	Construction Noise Permit	GW-RN0518-15	Valid on 22 Aug 2015 till 20 Feb 2016
		PP-RN0020-15	Valid on 17 Aug 2015 till 27 Aug 2015
		PP-RN0023-15	Valid on 28 Aug 2015 till 27 Feb 2016

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
AM1a*	Garden Farm, Tsung Yuen Ha Village	BCP	ArchSD SS C505 Contract 5
AM2	Village House near Lin Ma Hang Road	LMH to Frontier Closed Area	Contract 5, Contract 6
AM3	Ta Kwu Ling Fire Service Station of Ta	LMH to Frontier	Contract 5,

Station ID	Description	Works Area	Related to the Work Contract
	Kwu Ling Village.	Closed Area	Contract 6
AM4a	A village house located at about 160m east side of the original point AM4	LMH to Frontier Closed Area	Contract 6
AM5	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).

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	ArchSD SS C505 Contract 5
NM2	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

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	ArchSD SS C505 Contract 5
WM1-Control	Upstream of Kong Yiu Channel	834 185	845 917	NA	ArchSD SS C505 Contract 5
WM2A	Downstream	834 204	844 471	Alternative location located	Contract 6

Station ID	Description	Coordinates of Designated / Alternative Location		Nature of the location	Related to the Work Contract
	of River Ganges			at downstream 81m of the designated location	
WM2A-Control	Upstream of River Ganges	835 270	844 243	Alternative location located at upstream 78m 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
WM3	Downstream of River Indus	836 324	842 407	NA	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

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 6820/ 650MDS*
pH meter	YSI Professional Plus* / AZ8685 pH pen-style meter w/ serial no. 212632*/ YSI 6820/ 650MDS*
Turbidimeter	Hach 2100Q*/ YSI 6820/ 650MDS*
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 locations. The sampling produce 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 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 4⁰C 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 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 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 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
AM1a	265	143	500	260
AM2	268	149		
AM3	269	145		
AM4a	267	148		
AM5	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, NM2, 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
	Limit Level	AND 120% of upstream control station of the same day				
SS (mg/L)	Action Level	67.6	33.8	12.3	14.0	38.4
	Limit Level	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
	Limit Level	AND 120% of upstream control station of the same day				
		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 and 5 and air quality monitoring was performed at **6** relevant designated locations as below:

- AM1a - Garden Farm, Tsung Yuen Ha Village;
- AM2 - Village House near Lin Ma Hang Road;
- AM3 - Ta Kwu Ling Fire Service Station of Ta Kwu Ling Village;
- AM7b – Loi Tung Village;
- AM8 - Po Kat Tsai Village;
- AM9b - Nam Wa Po Village House No. 80

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 **90** events of 1-hour TSP and **30** events (in which 2 event were incomplete due to power issue) 24-hours TSP monitoring were carried out and the monitoring results are summarized in *Tables 4-1 to 4-6*. 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 – AM1a

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
5-Aug-15	45	3-Aug-15	10:31	19	16	13
11-Aug-15	41	8-Aug-15	11:00	104	85	94
17-Aug-15	46	14-Aug-15	11:03	32	26	28
22-Aug-15	68	20-Aug-15	11:07	163	225	172
28-Aug-15	27	26-Aug-15	10:27	158	129	113
Average (Range)	45 (27-68)	Average (Range)		92 (13 – 225)		

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
5-Aug-15	84	3-Aug-15	10:17	29	29	23
11-Aug-15	68	8-Aug-15	10:56	132	107	128
17-Aug-15	68	14-Aug-15	10:55	38	35	32
22-Aug-15	106	20-Aug-15	10:59	153	246	178
28-Aug-15	69	26-Aug-15	10:15	197	240	121
Average (Range)	79 (68-106)	Average (Range)		113 (23 – 246)		

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
5-Aug-15	58	3-Aug-15	10:13	26	21	14
11-Aug-15	76	8-Aug-15	10:50	121	102	105
19-Aug-15#	52	14-Aug-15	10:53	34	32	24
22-Aug-15	59 (*)	20-Aug-15	10:50	16	121	78
28-Aug-15	54	26-Aug-15	10:09	175	186	159

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
Average (Range)	60 (52-76)	Average (Range)		81 (14 – 186)		

Remark:

(#) monitoring was rescheduled from 17 August 2015 to 19 August 2015 due to power failure.

(*) 24-hour TSP monitoring on 22 August was over run and the result was invalidated.

Table 4-4 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
5-Aug-15	75	6-Jul-15	9:36	63	60	75
11-Aug-15	76	12-Aug-15	9:20	34	40	32
19-Aug-15	64	18-Aug-15	9:12	37	33	36
22-Aug-15	97	24-Aug-15	9:18	151	113	125
28-Aug-15	36	29-Aug-15	13:04	40	32	27
Average (Range)	70 (36-97)	Average (Range)		60 (27 – 151)		

Table 4-5 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
5-Aug-15	41	6-Aug-15	10:57	76	60	65
11-Aug-15	32	12-Aug-15	11:01	45	25	26
19-Aug-15	40	18-Aug-15	10:20	32	26	24
22-Aug-15	76	24-Aug-15	10:59	115	127	127
28-Aug-15	24	29-Aug-15	13:19	45	64	61
Average (Range)	43 (24-76)	Average (Range)		61 (24 – 127)		

Table 4-6 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
5-Aug-15	78 (*)	3-Aug-15	13:04	30	31	38
11-Aug-15	45	8-Aug-15	10:33	160	90	127
19-Aug-15	52	14-Aug-15	13:01	23	32	33
22-Aug-15	108	20-Aug-15	10:13	79	107	125
28-Aug-15	39	26-Aug-15	11:45	83	97	100
Average (Range)	61 (39-108)	Average (Range)		77 (23 – 160)		

Remark:

(*)24-hour TSP monitoring on 5 August 2015 was run less than 24 hours due to power failure and the result was invalidated.

4.2.2 As shown in *Tables 4-1 to 4-6*, 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 and 5 and noise monitoring was performed at 8 relevant designated locations as below:

- NM1 - Tsung Yuen Ha Village House No. 63;
- NM2 - Village House near Lin Ma Hang Road;
- NM5 - Village House, Loi Tung
- NM6 - Tai Tong Wu Village House 2
- NM7 - Po Kat Tsai Village
- NM8 - Village House, Tong Hang;
- NM9 - Village House, Kiu Tau Village; and
- NM10 - Nam Wa Po Village House No. 80

5.1.2 The noise monitoring schedule is presented in *Appendix H* and the monitoring results are summarized in the following sub-sections.

5.2 NOISE MONITORING RESULTS IN REPORTING MONTH

5.2.1 In the Reporting Period, a total of 40 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, NM2, 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 was performed at NM10. So, 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 *Table 5-1*. 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	NM2	NM8	NM9	NM10 ^(*)	Date	NM5	NM6	NM7
3-Aug-15	53	52	59	60	69	6-Aug-15	54	62	60
8-Aug-15	59	58	62	58	65	12-Aug-15	61	59	57
14-Aug-15	58	60	59	59	64	18-Aug-15	51	59	61
20-Aug-15	50	56	58	61	60	24-Aug-15	52	59	64
26-Aug-15	57	56	60	58	64	29-Aug-15	52	48	62
Limit Level	75 dB(A)								

Remarks

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

5.2.2 As shown in *Table 5-1*, the noise level measured at the designated monitoring locations NM1, NM2, NM5, NM6, NM7, NM8, NM9 and NM10, were below 75dB(A). Furthermore, there was no noise complaints (Action Level exceedance) received by the RE, Contractors or CEDD in the Reporting Period. Therefore, no Action or Limit Level exceedance was triggered and no corrective action was required.

6 WATER QUALITY MONITORING

6.1 GENERAL

6.1.1 In the Reporting Period, construction works under the project has been commenced in Contracts 3 and 5 and water quality monitoring was performed at 5 relevant designated locations as below:

- WM1 – Contract 5 working site downstream at Kong Yiu Channel;
- WM1 – Control – Contract 5 working site upstream at Kong Yiu Channel;
- WM4 – South Portal of Contract 2 and Contract 3 working site downstream of Ma Wat Channel
- WM4 – Control A - Contract 3 working site Kau Lung Hang Stream
- WM4 – Control B - Contract 3 working site Upstream of Ma Wat Channel

6.1.2 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, there were **fourteen (14)** sampling days of water quality monitoring conducted at the designated water monitoring location.

6.2.2 The key monitoring parameters including Dissolved Oxygen, Turbidity and Suspended Solids are summarized in *Tables 6-1 and 6-2*. Breaches of water quality monitoring criteria are shown in *Table 6-3*. 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 Summary of Water Quality Monitoring Results for 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
1-Aug-15	7.31	7.06	6.79	12.4	6.1	10.4	9.0	3.0	7.0
3-Aug-15	7.44	7.27	7.11	11.3	4.2	7.6	8.5	2.0	5.5
5-Aug-15	7.61	7.33	7.32	10.4	4.7	13.4	8.0	2.0	11.5
8-Aug-15	8.40	7.52	7.40	9.7	4.2	8.7	7.0	4.0	8.0
10-Aug-15	7.60	7.62	6.55	25.0	4.4	10.6	21.5	4.0	10.0
12-Aug-15	6.96	7.27	4.53	<u>51.2</u>	5.2	15.7	<u>51.5</u>	4.0	14.5
14-Aug-15	6.10	6.97	5.64	10.2	2.2	9.4	13.5	3.5	14.5
18-Aug-15	6.51	6.45	6.57	18.7	6.1	14.0	11.5	6.0	9.5
20-Aug-15	6.34	6.66	4.80	31.6	7.7	15.1	19.5	6.0	8.5
22-Aug-15	7.04	6.86	7.18	17.3	5.7	13.8	14.5	3.5	14.0
24-Aug-15	7.34	6.88	6.64	14.3	6.1	7.2	7.5	4.0	10.0
26-Aug-15	6.28	6.80	4.89	12.7	4.3	13.8	9.0	5.5	12.0
28-Aug-15	5.41	6.38	3.08	13.3	4.5	7.5	14.5	4.0	9.0
31-Aug-15	7.39	7.26	6.84	20.6	9.1	16.2	12.5	7.5	14.0

Remark:

- i. *bold and underlined indicated Limit Level exceedance.*

Table 6-2 Summary of Water Quality Monitoring Results for Contract 5

Date	Dissolved Oxygen (mg/L)		Turbidity (NTU)		Suspended Solids (mg/L)	
	WM1	WM1-Control	WM1	WM1-Control	WM1	WM1-Control
1-Aug-15#	6.66	6.87	38.2	37.6	42.0	30.5
3-Aug-15#	6.31	5.81	28.9	7.1	28.0	3.0
5-Aug-15#	6.64	8.31	25.9	7.5	22.0	3.5
8-Aug-15#	7.79	8.52	21.9	8.0	20.0	2.0
10-Aug-15#	6.76	7.80	65.3	17.4	51.0	10.5
12-Aug-15#	6.27	7.75	119.0	8.2	111.5	9.0
14-Aug-15	6.88	6.39	150.3	578.8	137.5	454.0

Date	Dissolved Oxygen (mg/L)		Turbidity (NTU)		Suspended Solids (mg/L)	
	WM1	WM1-Control	WM1	WM1-Control	WM1	WM1-Control
18-Aug-15	5.64	5.43	40.5	17.2	50.0	13.5
20-Aug-15	6.64	6.51	<u>241.0</u>	140.5	<u>190.0</u>	71.5
22-Aug-15	6.21	6.28	<u>74.5</u>	14.2	<u>90.5</u>	4.0
24-Aug-15	6.33	7.24	33.5	13.5	34.0	7.5
26-Aug-15	7.07	7.09	40.6	27.5	48.5	20.5
28-Aug-15	6.55	7.64	35.9	11.9	35.5	5.5
31-Aug-15	6.26	6.83	over range	over range	1330.0	1305.0

Remark:

i bold and underlined indicated Limit Level exceedance.

water sampling was not able to carry out due to shallow water and water monitoring was conducted at box culvert 2 downstream for reference

Table 6-3 Breaches of Water Quality Monitoring Criteria in Reporting Period

Location	Dissolved Oxygen (mg/L)		Turbidity (NTU)		Suspended Solids (mg/L)		Total Exceedance	
	Action	Limit	Action	Limit	Action	Limit	Action	Limit
WM1	0	0	0	2	0	2	0	3
WM4	0	0	0	1	0	1	0	3
No of Exceedance	0	0	0	3	0	3	0	6

6.2.3 During water monitoring on 1, 3, 5, 8, 10 and 12 August 2015, very shallow water was observed at the proposed water monitoring location and water sampling at WM1 was unable to carry out. Water sampling was then carried out near the box culvert 2 at close downstream and the data is served as reference only.

6.2.4 In this Reporting Period, total of six (6) Limit Level exceedances, namely two (2) exceedances of turbidity and two (2) exceedances of suspended solids recorded at WM1 and one (1) exceedance of turbidity and one (1) exceedance of suspended solids recorded at WM4.

6.2.5 NOE was issued to relevant parties upon confirmation of the monitoring result. The investigation for the cause of exceedance is presented in below.

Investigation Result for SS Exceedance at WM4 on 25 July 2015 (Contract 2) (follow up of last Reporting Period)

6.2.6 According to the site information provided from the Contractor of C2 (DHK), construction activities carried out on 25 July 2015 at South Portal included tunnel excavation and ventilation building formation and piling works which undertaken away from the Ma Wat River.

6.2.7 According to the site record from the monitoring team, no abnormality was observed at both control station WM4-CA and WM4-CB. However, muddy water was observed at impact station WM4. During the course of monitoring, there were no observable water impacts such as muddy water discharge from the site, therefore, the Contractor and ET carried out a visit at the upstream area to trace the source of muddy water.

6.2.8 As shown in the photo record, muddy water has been flowed from other upstream location which was not under monitored by the Contract. This situation was also frequently recorded during weekly joint site inspection by the RE, IEC, Contractor and ET since the contract commencement. In conclusion, it is considered that the exceedance was due to the external muddy water from upstream and not related to the works under the Contract.

Investigation Result for SS Exceedance at WM4 on 25 July 2015 (Contract 3) (follow up of last Reporting Period)

- 6.2.9 According to the site diary provided by the Contractor, construction works carried out on 25 July 2015 included erection of formwork. The works were carried out away from the watercourse and no wastewater was generated. Surface runoff of the site was all diverted to the wastewater treatment facilities for de-silting prior to discharge.
- 6.2.10 According to the site record from the monitoring team, no abnormality was observed at both control station WM4-CA and WM4-CB. However, muddy water was observed at impact station WM4. During the course of monitoring, there were no observable water impacts such as muddy water discharge from the site, therefore, the Contractor and ET carried out a visit at the upstream area to trace the source of muddy water.
- 6.2.11 As shown in the photo record, muddy water has been flowed from other upstream location which was not under monitored by the Contract. This situation was also frequently recorded during weekly joint site inspection by the RE, IEC, Contractor and ET since the contract commencement. In conclusion, it is considered that the exceedance was due to the external muddy water from upstream and not related to the works under the Contract.

Investigation Result for Turbidity and SS Exceedance at WM4 on 12 August 2015 (Contract 3)

- 6.2.12 According to the site diary provided by the Contractor, construction works carried out on 12 August 2015 included shotcrete, erection of formwork and watermain works. The works were carried out away from the watercourse. Surface runoff and wastewater generated from site was all diverted and treated by wastewater treatment facilities prior to discharge.
- 6.2.13 According to the site record from the monitoring team, no abnormality was observed at both control station WM4-CA and WM4-CB but muddy water was observed at impact station WM4.
- 6.2.14 Joint site inspection was carried out by the RE, IEC, Contractor and ET on 12 August 2015. It was observed that muddy water has been flowing from an upstream location which was not under monitored by the Contract. Turbid water was also observed at Bridge D2 and it was considered that the stream water was affected by the muddy water from upstream location.
- 6.2.15 Inspection was also conducted near the box culvert (Location AB3) which received water from the works area of Bridge E. The water quality in the box culvert was clear which revealed that no water impact was raised due to the construction near Bridge E. In conclusion, it is considered that the exceedance was due to the external muddy water from upstream and not related to the works under the Contract.

Investigation Result for Turbidity and SS Exceedance at WM4 on 12 August 2015 (Contract 2)

- 6.2.16 According to the site information provided from the Contractor of C2 (DHK), construction activities carried out on 12 August 2015 at South Portal included tunnel excavation and ventilation building formation and piling works which undertaken away from the Ma Wat River.
- 6.2.17 According to the site record from the monitoring team, no abnormality was observed at both control station WM4-CA and WM4-CB but muddy water was observed at impact station WM4. Moreover, no muddy discharge from Contract 2 was observed.
- 6.2.18 Joint site inspection was carried out by the RE, IEC, Contractor and ET on 12 August 2015. It was observed that muddy water has been flowing from an upstream location which was not under monitored by the Contract. Turbid water was also observed at Bridge D2 and it was considered that the stream water was affected by the muddy water from upstream location.
- 6.2.19 In conclusion, it is considered that the exceedance was due to the external muddy water from

upstream and not related to the works under the Contract.

Investigation Result for Turbidity and SS Exceedance at WM1 on 20 and 22 August 2015

6.2.20 To be reported in next Reporting Period.

7 WASTE MANAGEMENT

7.1 GENERAL WASTE MANAGEMENT

7.1.1 Waste management was carried out by an on-site Environmental Officer or an Environmental Supervisor from time to time.

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		Total Quantity
	Quantity	Disposal Location	Quantity	Disposal Location	Quantity	Disposal Location	
C&D Materials (Inert) (in '000m ³)	47.1885	--	1.966	--	0	--	20.7614
Reused in this Project (Inert) (in '000 m ³)	0.4526	--	0.294	--	0	--	0.8681
Reused in other Projects (Inert) (in '000 m ³)	46.4710	C5	0	--	0	--	18.2752
Disposal as Public Fill (Inert) (in '000 m ³)	0.2650	Tuen Mun 38	1.672	Tuen Mun 38	0	--	1.6182

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

Type of Waste	Contract 2		Contract 3		Contract 5		Total Quantity
	Quantity	Disposal Location	Quantity	Disposal Location	Quantity	Disposal Location	
Recycled Metal ('000kg) #	0	-	0.0002	Licensed collector	0	--	0.2m ³
Recycled Paper / Cardboard Packing ('000kg) #	0.4500	Licensed collector	0	-	0	--	0.2500
Recycled Plastic ('000kg) #	0.6000	Licensed collector	0.0001	Licensed collector	0	--	600kg+0.1m ³
Chemical Wastes ('000kg) #	0.7040	Licensed collector	0	-	0	--	0.8800
General Refuses ('000m ³)	0.1021	NENT	0.130	NENT	0.43	NENT	0.1346

Remark #: Unit of recycled metal, recycled paper/ cardboard packing, recycled plastic and chemical waste for Contractor 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

The 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 **7, 14, 21 and 28 August 2015**. 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
7 August 2015	<ul style="list-style-type: none"> No adverse environmental were observed. 	<ul style="list-style-type: none"> NA
14 August 2015	<ul style="list-style-type: none"> Stagnant water cumulated inside the drip tray should be cleaned after the rain storm. (South Portal) It was reminded that mosquito control record should update properly. (South Portal & Mid-Vent). 	<ul style="list-style-type: none"> Stagnant water cumulated inside the drip tray was removed. Not required for reminder.
21 August 2015	<ul style="list-style-type: none"> No adverse environmental were observed. 	<ul style="list-style-type: none"> NA
28 August 2015	<ul style="list-style-type: none"> No adverse environmental were observed. 	<ul style="list-style-type: none"> NA

The 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 **3, 12, 17, 24 and 31 August 2015**. 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
3 August 2015	<ul style="list-style-type: none"> No adverse environmental were observed. 	<ul style="list-style-type: none"> NA
12 August 2015	<ul style="list-style-type: none"> Stockpile of C&D waste was observed near Bridge E, the Contractor should provide on-site sorting and fence off the C&D waste sorting area properly. Stockpile of C&D waste was observed near Bridge E, the Contractor should provide on-site sorting and fence off the C&D waste sorting area properly. The Contractor was reminded to cover the rock fill slope near the Pier AC5 to prevent water pollution. 	<ul style="list-style-type: none"> The C&D waste has been disposed of. The open cut works area near AB3 was hard paved. Not required for reminder.

Date	Findings / Deficiencies	Follow-Up Status
	<ul style="list-style-type: none"> The Contractor was reminded to remove any stagnant water after rain to prevent mosquito breeding. (all areas) 	<ul style="list-style-type: none"> Not required for reminder.
17 August 2015	<ul style="list-style-type: none"> The pH reading shown on Wetsep was out of 6-9, the Contractor should monitor the pH reading and repair the Wetsep if necessary. Oil stain on bare ground was observed at Pier AB6, the Contractor should clean the stain in accordance with the chemical waste ordinance. Oil drum without drip tray was observed at Pier AB6, the Contractor should provide drip tray underneath. 	<ul style="list-style-type: none"> The pH reading is in normal range. The oil stain has been cleaned and temporary stored in a proper chemical waste container before collected by the licence collector. Drip tray has been provided for the oil drums.
24 August 2015	<ul style="list-style-type: none"> Muddy trail was observed at an exit near Bridge E, the Contractor should clean the muddy trail regularly. Dark smoke emitted from an excavator was observed near Bridge E, the Contractor should check the condition of the excavator and repair if required. Dry and dusty haul road was observed near Bridge E, the Contractor should provide water spraying on the haul road to minimize dust impact. 	<ul style="list-style-type: none"> Muddy trail at exit near Bridge E was cleaned. The excavator has been removed. Water spraying was provided on the haul road.
31 August 2015	<ul style="list-style-type: none"> Chemical container without drip tray was observed near Bridge E, the Contractor should provide drip tray underneath. Continuous white smoke emitted from a generator was observed near the exit of SA14, the Contractor should check the condition of the generator and maintenance if required. 	<ul style="list-style-type: none"> The chemical container was removed. To be followed.

The 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 **6, 13, 20 and 27 August 2015**. 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
6 August 2015	<ul style="list-style-type: none"> Black exhaust smoke from a construction plant was observed, the Contractor should provide regular maintenance. 	<ul style="list-style-type: none"> Plant maintenance was provided to avoid dark smoke emission.
13 August	<ul style="list-style-type: none"> The Contractor was reminded to maintain cleanliness on public road near 	<ul style="list-style-type: none"> Not required for reminder.

Date	Findings / Deficiencies	Follow-Up Status
2015	1500 pipe. • The Contractor was reminded to improve the mitigation measures on dust control and surface run-off for the construction works adjacent to public road at 1500 pipe.	• Not required for reminder.
20 August 2015	• No adverse environmental were observed.	• NA
27 August 2015	• The Contractor was reminded to cut the grass and trim the bushes to prevent mosquito breeding.	• Not required for reminder.

8.2.7 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

8.2.8 Since the construction works at the Contract 4, Contract 6, Contract 7 and Contract SS C505 have not yet been commenced, no site inspection is performed for these Contracts.

9 ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE

9.1 ENVIRONMENTAL COMPLAINT, SUMMONS AND PROSECUTION

9.1.1 In the Reporting Period, no environmental complaints, summons and prosecution under the EM&A Programme was lodged.

9.1.2 The statistical summary table of environmental complaint is presented in *Tables 9-1, 9-2 and 9-3*.

Table 9-1 Statistical Summary of Environmental Complaints

Reporting Period	Contract No	Environmental Complaint Statistics		
		Frequency	Cumulative	Complaint Nature
19 May 2014 – 31 Jul 2015	Contract 2	0	13	<ul style="list-style-type: none"> • (6) Water Quality • (5) Construction Dust • (2) Noise
06 Nov 2013 – 31 Jul 2015	Contract 3	0	3	<ul style="list-style-type: none"> • (1) Construction Dust • (2) Water quality
16 Aug 2013 – 31 Jul 2015	Contract 5	0	2	<ul style="list-style-type: none"> • (2) Construction Dust
1 – 31 Aug 2015	Contract 2	0	13	<ul style="list-style-type: none"> • (6) Water Quality • (5) Construction Dust • (2) Noise
	Contract 3	0	3	<ul style="list-style-type: none"> • (1) Construction Dust • (2) Water quality
	Contract 5	0	2	<ul style="list-style-type: none"> • (2) Construction Dust

Table 9-2 Statistical Summary of Environmental Summons

Reporting Period	Contract No	Environmental Summons Statistics		
		Frequency	Cumulative	Complaint Nature
19 May 2014 – 31 Jul 2015	Contract 2	0	0	NA
06 Nov 2013 – 31 Jul 2015	Contract 3	0	0	NA
16 Aug 2013 – 31 Jul 2015	Contract 5	0	0	NA
1 – 31 Aug 2015	Contract 2	0	0	NA
	Contract 3	0	0	NA
	Contract 5	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 Jul 2015	Contract 2	0	0	NA
06 Nov 2013 – 31 Jul 2015	Contract 3	0	0	NA
16 Aug 2013 – 31 Jul 2015	Contract 5	0	0	NA
1 – 31 Aug 2015	Contract 2	0	0	NA
	Contract 3	0	0	NA
	Contract 5	0	0	NA

The Other Contracts

9.1.3 Since the construction works at the Contract 4, Contract 6, Contract 7 and Contract SS C505 have 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 and 5 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 AquaSed before discharge.
Air Quality	<ul style="list-style-type: none"> Maintain damp / wet surface on access road Keep slow speed in the sites 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
 - Adit invert slab
 - Cavern excavation
- North Portal
 - Permanent slope
 - South Bound invert grouting
 - North Bound blast door installation
 - North Bound top heading canopies
 - TBM sliding to face
 - Associated equipment installation for operation of TBM (mortar plant, cooling system etc.)
 - TBM initial drive
- South Portal
 - Rock Excavation to Vent. Bldg. Formation
 - Southbound foundation works
 - Northbound bored piles works & pile tests
 - Drill and blast set up and site installation
 - Installation of blast door for Southbound tunnel
- Admin Building
 - Backfilling for surcharge

Contract 3

- Cable detection and trial trenches
- Decking construction for Bridge E
- E&M work for new valve control & Telemetry House
- Filling works at Tong Hang East
- Storm Drains Laying
- Noise barrier construction
- Pier / Pier Table construction
- Pile cap works
- Portal beam erection
- Pre-drilling works and piling works for viaduct
- Retaining Wall construction
- Road works at Fanling Highway
- Slope works
- Socket H-pile installation
- Tree felling works
- Utilities duct laying
- Viaduct segment erection
- Construction of temporary steel ramp for Kiu Tau Footbridge

Contract 5

- Laying of additional rising main at LMH road
- Bituminous laying at proposed and existing LMH road.
- Construction of secondary boundary fencing
- Brick laying at footpath of proposed LMH road
- Road works (kerb laying) for proposed LMH road and existing LMH road
- Formation works at BCP area
- Construction of superstructure at Footbridge (RS4)
- Construction of Depressed Road at BCP3
- Filling work for ArchSD permanent office
- Drainage works at exiting LMH Road
- Water works at proposed LMH Road
- Irrigation system at proposed and existing LMH Road
- Drainage works at BCP area
- Installation of Underground utilities at proposed and existing LMH Road

Contract SS C505

- Site clearance
- Pre-drilling
- Piling

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 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 Contract 4, Contract 6, Contract 7 and Contract SS C505 have not yet commenced and no environmental issue is presented.

11 CONCLUSIONS AND RECOMMENDATIONS

11.1 CONCLUSIONS

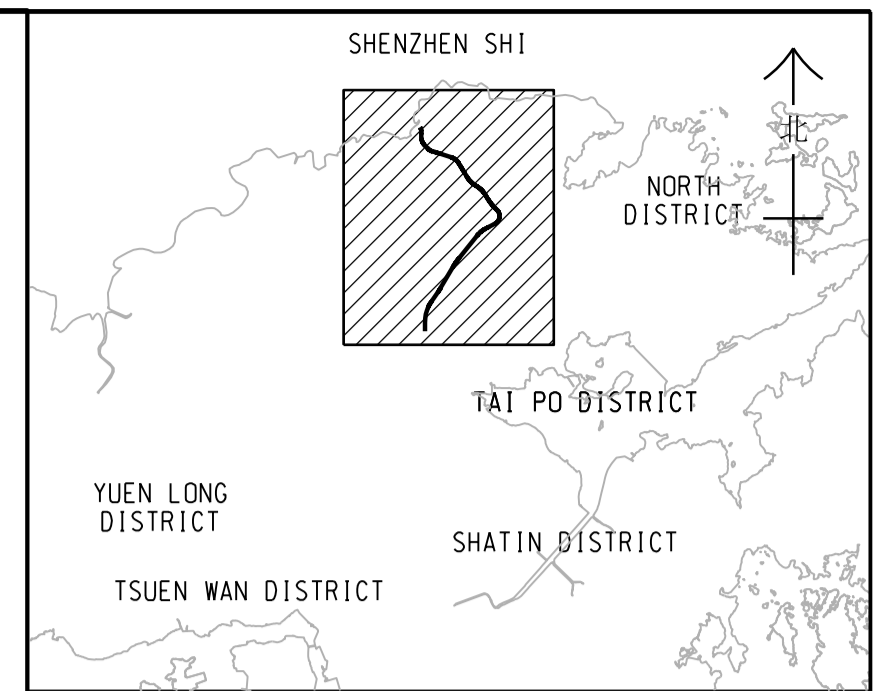
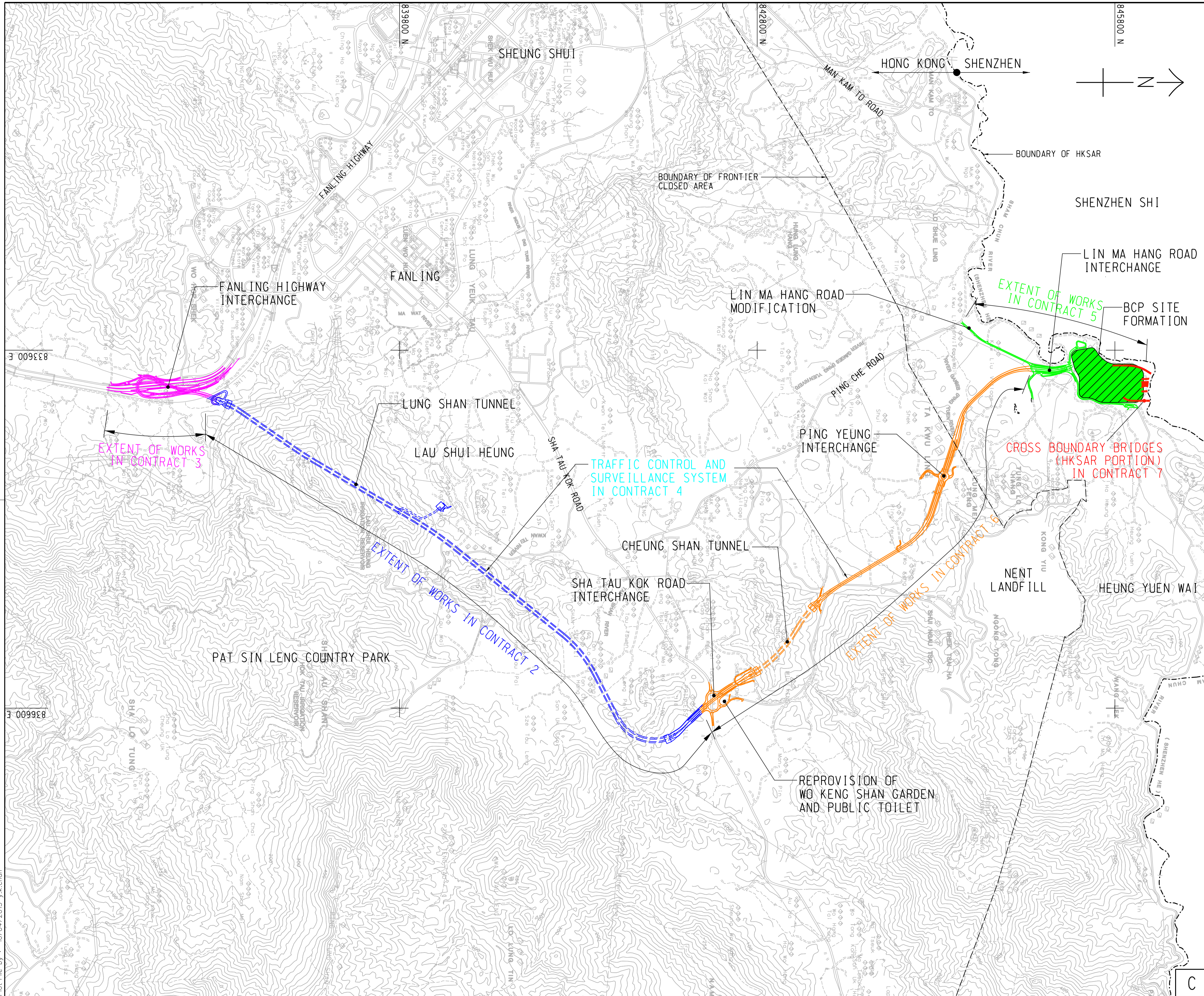
- 11.1.1 This is 25th monthly EM&A report presenting the monitoring results and inspection findings for the Reporting Period from 1 to 31 August 2015.
- 11.1.2 For air quality monitoring, no 1-hour and 24-hour TSP monitoring results triggered the Action or Limit Levels were recorded. No NOEs or the associated corrective actions were therefore issued.
- 11.1.3 No 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. No NOEs or the associated corrective actions were therefore issued.
- 11.1.4 For water quality monitoring, a total of six (6) Limit Level exceedances were recorded, namely four (4) exceedances at WM1 and two (2) exceedances at WM4. It was concluded that the exceedances at WM4 were all not project related whereas investigation for WM1 is in progress.
- 11.1.5 No notification of summons or successful prosecution under the EM&A Programme of the Project was received in the reporting period for Contract 2, 3 and 5.
- 11.1.6 No environmental complaint under the EM&A Programme of the Project was received in the reporting period for Contract 2, 3 and 5.
- 11.1.7 During the Reporting Period, four (4), five (5) and four (4) events of joint site inspection by the RE, IEC, ET with the relevant Main-contractor were carried out for Contracts 2, 3 and 5 respectively in accordance with the EM&A Manual stipulation. No non-compliance observed during the site inspection.

11.2 RECOMMENDATIONS

- 11.2.1 During wet season, muddy water or other water pollutants from site surface runoff into Kong Yiu Channel and Ma Wat Channel will be key environment issue. Water quality mitigation measures to prevent surface runoff into nearby water bodies and public areas should be paid on special attention. The Contractors should fully implement the water quality mitigation measures.
- 11.2.2 Construction noise should be a key environmental impact during the works. The noise mitigation measures such as use of quiet plants or temporary noise barrier installation at the construction noise predominate area should be implemented as accordance with the EM&A requirement.
- 11.2.3 Since most of construction sites under the Project are adjacent to villages, the contractors should be paid attention on the construction dust emission. The Contractor should fully implement the construction dust mitigation measures properly.
- 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



REV. 修訂	DESCRIPTION 內容摘要	D.C. 校核	C.K. 查核	DATE 日期

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

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

PROJECT LAYOUT PLAN

AECOM

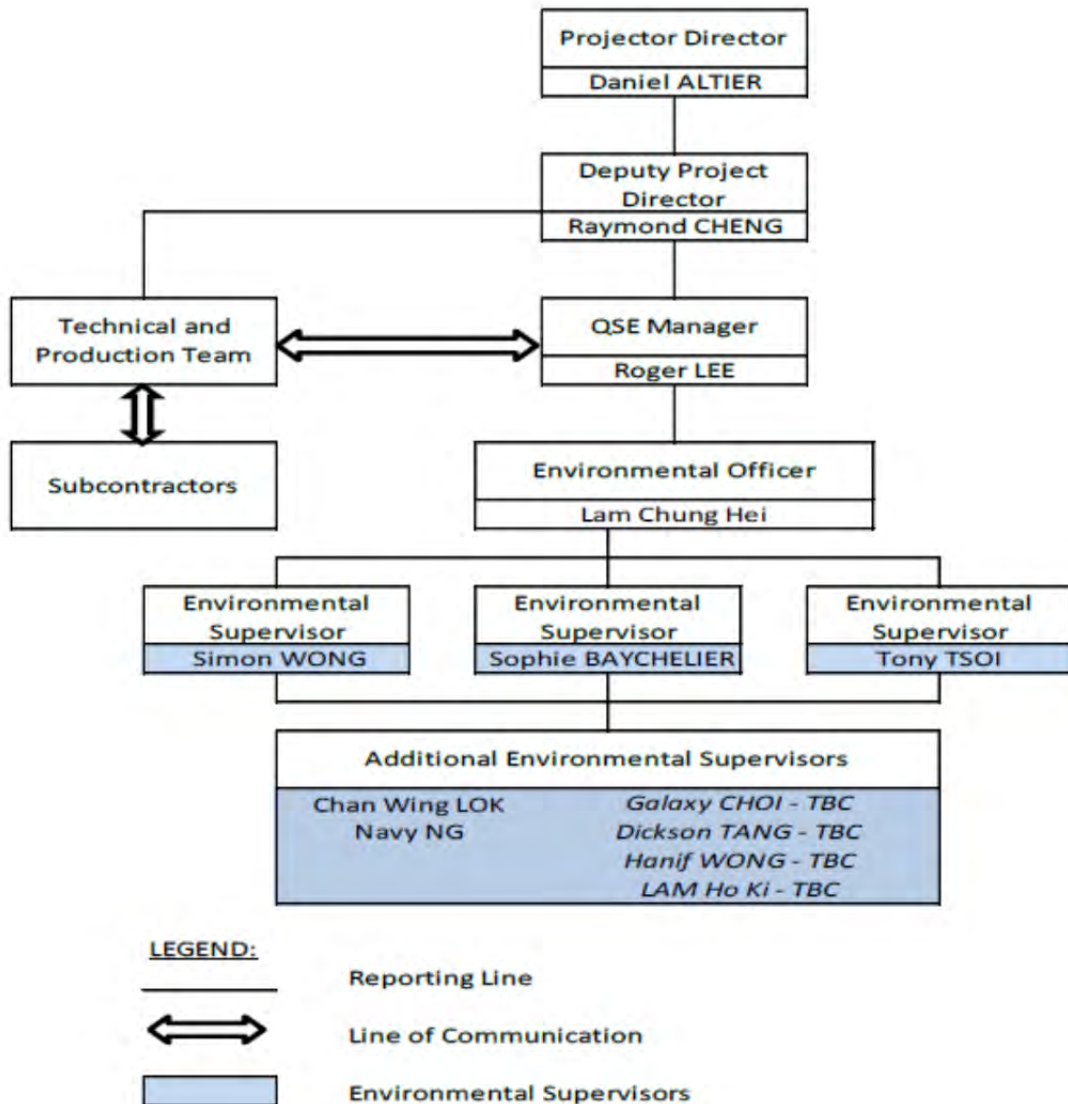
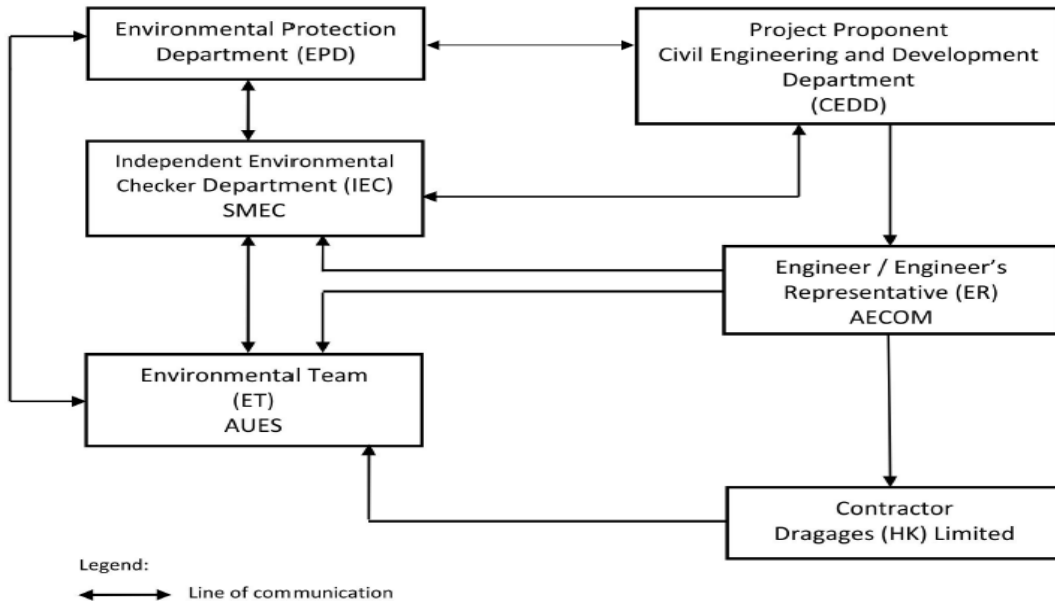
DRG. NO. 圖紙編號	60212563/PLP/001		
DESIGNED BY 設計	CONTRACT NO. 合約編號	P. D.C. APPROVED 審核人	
DRAWN BY 繪圖	STATUS 階段		
SCALE 比例	A1 1 : 15000 A3 1 : 30000		
DIMENSIONS ARE IN 尺寸單位	METRES 公尺		

Plot File by : 10/04/2015 y.k.chan

Appendix B

Organization Chart

Project Organization Structure



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	Raymond Cheng / Pierre Pascual	2171 3004	2171 3299
DHK	QSE Manager	Roger Lee	6293 8726	2171 3299
DHK	Environmental Officer	Lam Chung Hei	2171 3004	2171 3299
DHK	QSE Officer (Environmental)	Simon Wong	9281 4346	2171 3299
DHK	QSE Officer (Environmental)	Sophie Baycheuer	6321 5001	2171 3299
DHK	QSE Officer (Environmental)	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

Legend:

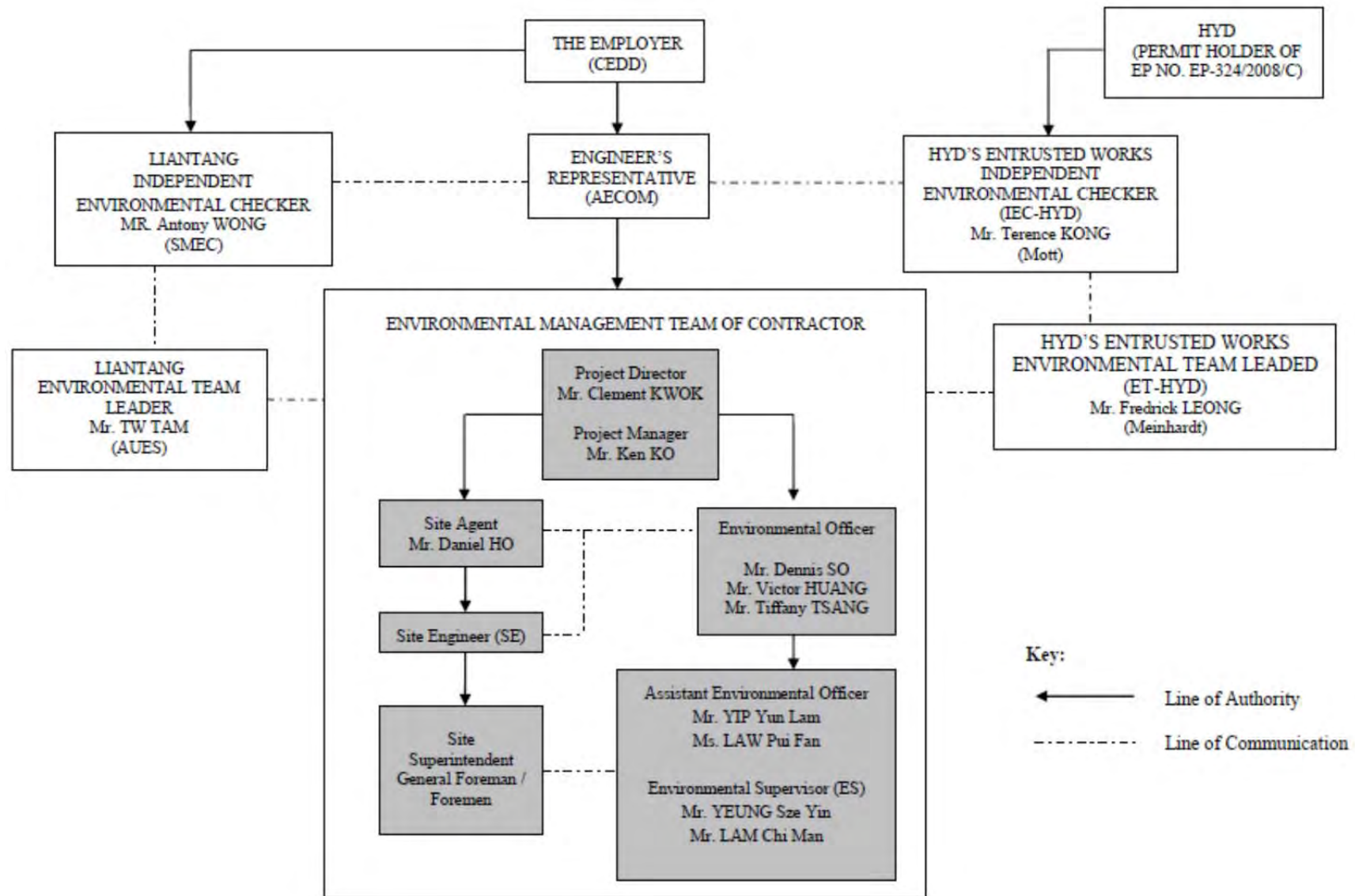
CEDD (Employer) – Civil Engineering and Development Department

AECOM (Engineer) – AECOM Asia Co. Ltd.

DHK(Main Contractor) –Dragages Hong Kong Ltd.

SMEC (IEC) – SMEC Asia Limited

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



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

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

Organization	Project Role	Name of Key Staff	Tel No	Fax No.
AECOM	Engineer's Representative	Alan Lee	2171 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:

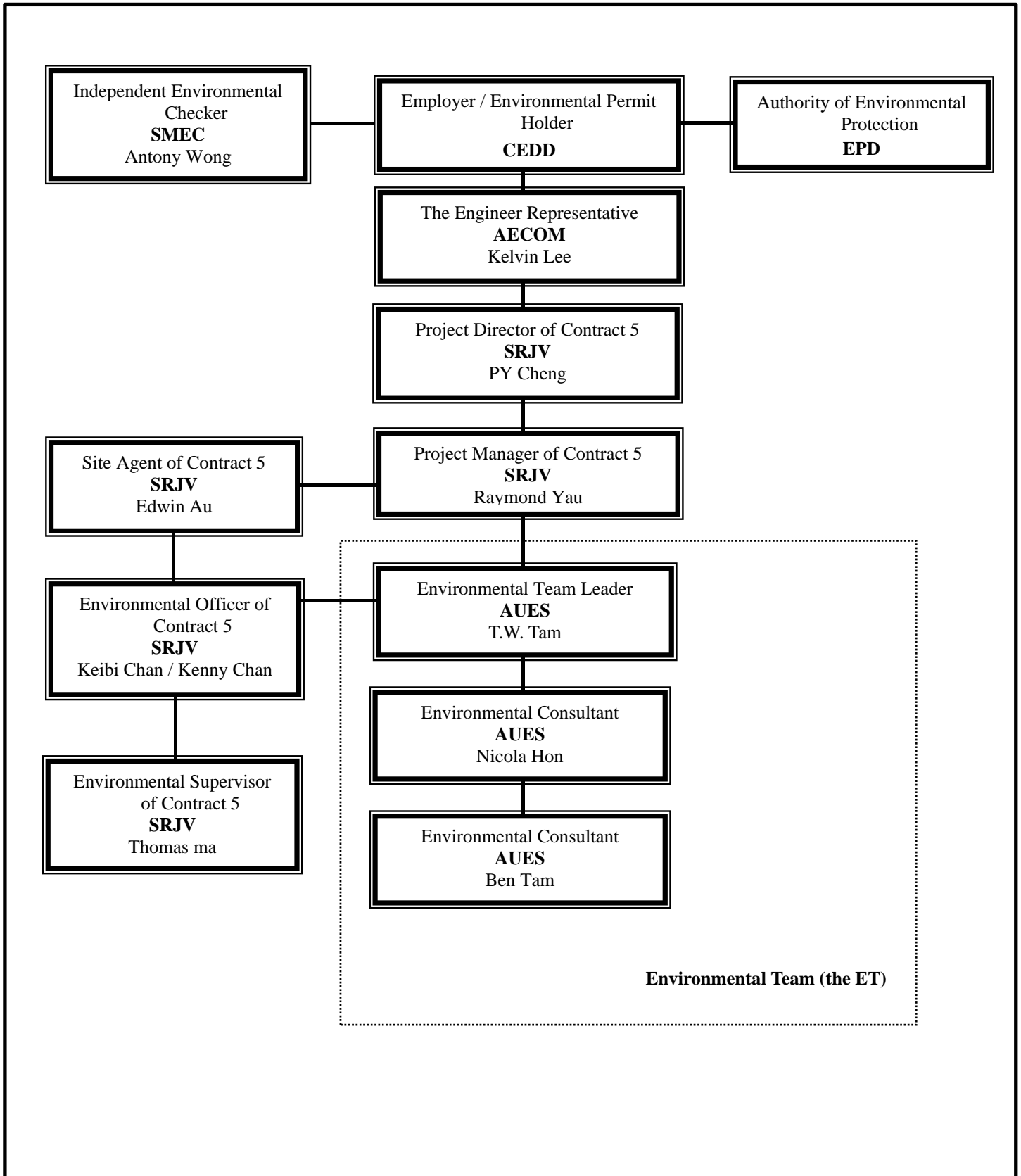
CEDD (Employer) – Civil Engineering and Development Department

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



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	PY Cheng	9023 4821	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

Appendix C

3-month rolling construction program

Contract 2

Activity ID	Activity Name	Working Duration	BL Project Start	BL Project Finish	2015			
					Aug	Sep	Oct	Nov
Total		1001.0	17-Apr-14	14-Jun-17				
HKLTH Works Programme update 20-August-2015 [wpd]		1001.0	17-Apr-14	14-Jun-17				
2 General		1001.0	17-Apr-14	14-Jun-17				
Noise Barriers		122.0	03-Jul-15	01-Dec-15				
DDA Submission		122.0	03-Jul-15	01-Dec-15				
CONTDS1090	Preparation of DDA for formal submission to ER/ICE/IP	45.0	03-Jul-15	28-Aug-15	[Gantt bar]			
CONTDS1100	IPs/ ER's Review	28.0	29-Aug-15	03-Oct-15	[Gantt bar]			
CONTDS1110	Preparation of DDA with ICE Certification for resubmission to ER/ICE/IP	21.0	05-Oct-15	29-Oct-15	[Gantt bar]			
CONTDS1120	ER/IP's Approval	28.0	30-Oct-15	01-Dec-15	[Gantt bar]			
Project Wide E&M		1001.0	17-Apr-14	14-Jun-17				
E&M Design & Engineering Works		460.0	17-Apr-14	29-Aug-15				
Engineering Design Submission		340.0	17-Apr-14	12-Jun-15				
PD.EC.DS	Tunnel Ventilation System Submission and Approval by the Engineer	340.0	17-Apr-14	12-Jun-15	[Gantt bar]			
Shop Drawing & Builder's Drawing Submission		179.0	17-Dec-14	29-Aug-15				
PD.DW.1000	Shop Drawings & Builder's Drawings Preparation	176.0	17-Dec-14	27-Jul-15	[Gantt bar]			
PD.DW.1010	Shop Drawings & Builder's Drawings Submission & Approval	177.0	22-Jan-15	29-Aug-15	[Gantt bar]			
Equipment Selection & Submission		409.0	01-Aug-14	14-Dec-15				
PD.PQ.1080	Electrical Services System Submission and Approval by the Engineer	338.0	27-Oct-14	14-Dec-15	[Gantt bar]			
PD.PQ.1150	Tunnel Ventilation System Submission and Approval by the Engineer	228.0	07-Nov-14	15-Aug-15	[Gantt bar]			
PD.PQ.1480	ELV System Submission and Approval by the Engineer	294.0	01-Aug-14	29-Jul-15	[Gantt bar]			
PD.PQ.2010	FS System Submission and Approval by the Engineer	278.0	01-Nov-14	09-Oct-15	[Gantt bar]			
Manufacturing & Delivery of Major Equipment		581.0	29-Jun-15	14-Jun-17				
PD.PQ.1070	Manufacturing and Delivery of Tunnel Ventilation System	581.0	29-Jun-15	14-Jun-17	[Gantt bar]			
3 South Portal Area		303.6	17-Apr-15	25-Feb-16				
3.1 South Portal Subcontract & Procurement		256.0	17-Apr-15	16-Jan-16				
SPS&P0070	Subcontract : Retaining Wall Structure Works	60.0	17-Apr-15	29-Jun-15	[Gantt bar]			
SPS&P0080	Subcontract : Ventilation Building Structure Works	60.0	30-Jun-15	08-Sep-15	[Gantt bar]			
SPS&P0090	Subcontract : Tunnel Lining Works	60.0	13-Jul-15	19-Sep-15	[Gantt bar]			
SPS&P0100	Subcontract : Tunnel Lining Form works (Design, Fabrication, Delivery, & On-Site Assembly)	150.0	13-Jul-15	09-Jan-16	[Gantt bar]			
SPS&P0110	Subcontract : Tunnel Concreting Works	60.0	24-Aug-15	04-Nov-15	[Gantt bar]			
SPS&P0120	Subcontract : Tunnel Finishing Works	60.0	05-Nov-15	16-Jan-16	[Gantt bar]			
3.2 South Portal Design Submission		195.6	07-May-15	27-Dec-15				
South Tunnel Permanent Lining		56.5	22-May-15	11-Jul-15				
DDA Submission		56.5	22-May-15	11-Jul-15				
STPL1023590	Preparation for resubmission to ER/ICE/IP with ICE Certification	19.0	22-May-15	13-Jun-15	[Gantt bar]			
STPL1023690	ER/IP's Approval	28.0	14-Jun-15	11-Jul-15	[Gantt bar]			
South Tunnel Internal Structures		70.5	28-May-15	22-Aug-15				
DDA Submission		70.5	28-May-15	22-Aug-15				
STIS1L1023570	IPs/ ER's Review	24.0	28-May-15	25-Jun-15	[Gantt bar]			
STIS1L1023590	Preparation for resubmission to ER/ICE/IP with ICE Certification	25.0	26-Jun-15	25-Jul-15	[Gantt bar]			
STIS1L1023690	ER/IP's Approval	28.0	26-Jul-15	22-Aug-15	[Gantt bar]			
Cross Passages -Temp Works D&B Tunnel - Soft Ground		51.0	07-May-15	06-Jul-15				
DDA Submission		51.0	07-May-15	06-Jul-15				
DSN27000	Preparation for resubmission to ER/ICE/IP with ICE Certification	27.0	07-May-15	08-Jun-15	[Gantt bar]			
DSN27100	ER/IP's Approval	28.0	09-Jun-15	06-Jul-15	[Gantt bar]			
Cross Passages -Temp Works D&B Tunnel - Rock		55.0	15-Jun-15	07-Oct-15				

MAIN CONTRACTOR 					CLIENT 					THE ENGINEER  CONTRACTOR'S DESIGNER 			PROJECT Contract No. CV/2012/08 Liantang/Heung Yuen Wai Boundary Control Point Site Formation and Infrastructure Works Contract 2			DOCUMENT NO. LTH/DHK/PGR/PW/PLP/00075/A		
A Monthly Report No.20 20/08/2015 RAN RBS/SJO DAL					TITLE Monthly Report No.20 3-Months Rolling Programme (Approved Works Programme Rev. D)			DOC. STATUS FOR INFO.	CREATION DATE 20/08/2015	REVISION A	PAPER SIZE A3	SCALE N/A	PAGE 1 of 5					
REV	DESCRIPTION	DATE	PREPARED	CHECKED	APPROVED													

Activity ID	Activity Name	Working Duration	BL Project Start	BL Project Finish	2015					
					Aug	Sep	Oct	Nov		
DDA Submission										
FL326930	Preparation for formal submission to ER/ICE/IP	18.0	15-Jun-15	07-Oct-15						
FL326980	IPs/ ER's Review	28.0	08-Jul-15	08-Aug-15	■					
FL327000	Preparation for resubmission to ER/ICE/IP with ICE Certification	27.0	10-Aug-15	09-Sep-15		■				
FL327100	ER/IP's Approval	28.0	10-Sep-15	07-Oct-15			■			
As-Built Drawings [Contractor's Design/ Contractor's Alternative Design]										
SC1650	As-Built Drawings Submission - South Portal Ventilation Bldg Foundation	60.0	29-Oct-15	27-Dec-15					■	
3.3 South Portal Method Statement Submission										
South Portal: Tunnel Mechanical Excavation										
FL2022096	Engineer's Approval	28.0	01-Jun-15	04-Jul-15						
South Portal: Bored Piling Works										
A25488	Engineer's Approval	28.0	01-Jun-15	04-Jul-15						
3.5 South Portal Works										
South Portal: Slopeworks										
SV2710	Rock Excavation to Vert. Bldg. Formation	36.0	19-May-15	06-Jul-15						
South Portal: Foundation & Substructure										
SV2180	South Bound Foundation	54.0	29-Jun-15	04-Sep-15	■					
SV2190	Handover to SB Tunneling	1.0	04-Sep-15	04-Sep-15						
SV2210	N/B Bored Piles 4nos & Pile Test	48.0	07-Jul-15	04-Sep-15	■					
SV2740	N/B Pile Caps & Tie Beams	36.0	05-Sep-15	20-Oct-15			■			
SV2745	N/B Backfilling	6.0	22-Oct-15	28-Oct-15				■		
SV2750	Handover to NB Tunneling	1.0	28-Oct-15	28-Oct-15					■	
South Portal: Superstructure										
SV2325	Retaining Walls (LSTSP/ RW3 & LSTSP/ RW4 & S1,S2 & S3)	74.0	22-Oct-15	19-Jan-16					■	
South Tunnels: Southbound Tunnel										
DB6300	D&B Setup / Site Installation	101.0	06-May-15	04-Sep-15	■					
DB6310	Top Heading Excavation (Canopies) (CRP: Ch1,751>Ch1,787) 36m	57.0	05-Sep-15	11-Nov-15			■			
DB6320	Bottom Bench Excavation (CRP:Ch1,751>Ch1,787)	34.0	12-Nov-15	21-Dec-15					■	
South Tunnels: Northbound Tunnel										
DB6340dwp1	Top Heading Excavation (Canopies) (P20/NB Ch: 139 to 178); 39m; (CRP: Ch1,750>Ch1,789)	67.0	30-Oct-15	18-Jan-16					■	
DB6350	Bottom Bench Excavation (P20/NB - 139>200); 61m; (CRP: Ch1,750>Ch1,811)	62.0	14-Dec-15	25-Feb-16						■
4 Middle Portal Area										
4.1 Middle Portal Subcontract & Procurement										
MPS&P0050	Subcontract : Tunnel Lining Form works (Design, Fabrication, Delivery, & On-Site Assembly)	150.0	05-Feb-15	11-Aug-15	■					
MPS&P0070	Subcontract : Ventilation Building Structure Works	60.0	02-May-15	14-Jul-15						
MPS&P0080	Subcontract : Ventilation Building ABWF Works	60.0	15-Jul-15	22-Sep-15		■				
MPS&P0090	Subcontract : Tunnel Concreting Works for Internal Structures	60.0	31-Aug-15	11-Nov-15			■			
MPS&P0100	Subcontract : External Works and Landscaping Works	60.0	23-Sep-15	04-Dec-15				■		
4.2 Middle Portal Design Submission										
Mid Vent Adit Internal Structure										
DDA Submission										
DSN29082	Preparation for formal submission to ER/ICE/IP	49.0	16-Apr-15	25-Sep-15						
DSN29083	IPs/ ER's Review	28.0	15-Jun-15	18-Jul-15						
DSN29084	Preparation for resubmission to ER/ICE/IP with ICE Certification	35.0	20-Jul-15	28-Aug-15	■					
DSN29085	ER/IP's Approval	28.0	29-Aug-15	25-Sep-15			■			
Mid Vent Adit/Junction Permanent Lining & Backfill										
DDA Submission										
DSN29096	Preparation for resubmission to ER/ICE/IP with ICE Certification	26.0	30-May-15	30-Jun-15						
DSN29097	ER/IP's Approval	28.0	01-Jul-15	28-Jul-15	■					

					MAIN CONTRACTOR 		CLIENT 		THE ENGINEER  CONTRACTOR'S DESIGNER 		PROJECT Contract No. CV/2012/08 Liantang/Heung Yuen Wai Boundary Control Point Site Formation and Infrastructure Works Contract 2		DOCUMENT NO. LTH/DHK/PGR/PW/PLP/00075/A		
Monthly Report No.20 20/08/2015 RAN RBS/SJO DAL											DOC. STATUS FOR INFO.	CREATION DATE 20/08/2015	REVISION A		
REV DESCRIPTION DATE PREPARED CHECKED APPROVED											PAPER SIZE A3	SCALE N/A	PAGE 2 of 5		

Activity ID	Activity Name	Working Duration	BL Project Start	BL Project Finish	2015					
					Aug	Sep	Oct	Nov		
Mid Vent Junction Internal Structure										
DDA Submission										
DSN29102	Preparation for formal submission to ER/ICE/IP	49.0	21-Apr-15	18-Jun-15						
DSN29103	IPs/ ER's Review	28.0	19-Jun-15	23-Jul-15						
DSN29104	Preparation for resubmission to ER/ICE/IP with ICE Certification	32.0	24-Jul-15	29-Aug-15						
DSN29105	ER/IP's Approval	28.0	30-Aug-15	26-Sep-15						
4.3 Middle Portal Method Statement Submission										
Middle Ventilation Adit Lining Works										
A25515	Re-submission Method Statement	24.0	14-May-15	11-Jun-15						
A25516	Engineer's Approval	28.0	12-Jun-15	16-Jul-15						
Cavern Permanent Lining										
A25521	Prepare Method Statement	48.0	01-Jun-15	28-Jul-15						
A25522	Engineer's Comment	28.0	29-Jul-15	29-Aug-15						
A25523	Re-submission Method Statement	24.0	31-Aug-15	26-Sep-15						
A25524	Engineer's Approval	28.0	29-Sep-15	02-Nov-15						
Middle Ventilation Adit Tunnel Concreting Works (Internal Structures)										
A25517	Prepare Method Statement	48.0	31-Aug-15	28-Oct-15						
A25518	Engineer's Comment	28.0	29-Oct-15	30-Nov-15						
Mid Vent Bldg. Foundation - ELS										
A25511	Re-submission Method Statement	24.0	21-May-15	18-Jun-15						
A25512	Engineer's Approval	28.0	19-Jun-15	23-Jul-15						
Mid Vent Building Construction										
FL5930	Engineer's Approval	28.0	20-May-15	23-Jun-15						
4.5 Middle Portal Works										
Adit Construction - Mid Portal										
MV2490dwp5	D&B Full Face Ch133>Ch302 169m	70.0	24-Apr-15	17-Jul-15						
MV2530	Cavern Excavation Ch302>Ch371; 69m	70.0	18-Jul-15	10-Oct-15						
MV2710	D&B UT Tunneling Ch3,436 to Ch3,586 (NB) - towards North	70.0	12-Oct-15	02-Jan-16						
MV2720	D&B DT Tunneling Ch3,433 to Ch3,561 (SB) - towards North	60.0	23-Oct-15	02-Jan-16						
5 North Portal Area										
5.0 North Portal Site Possession Contract Dates										
A1920	LS7 (near North Vent Slope)	0.0	19-Aug-15	19-Aug-15						
5.1 North Portal Subcontract & Procurement										
NPS&P0070	Subcontract : Tunnel Lining Works	60.0	05-Jun-15	15-Aug-15						
NPS&P0080	Subcontract : Tunnel Concreting Works	60.0	05-Jun-15	15-Aug-15						
NPS&P0090	Subcontract : Tunnel Lining Form works (Design, Fabrication, Delivery, & On-Site Assembly)	150.0	05-Jun-15	02-Dec-15						
NPS&P0110	Subcontract : Ventilation Building Structure Works	60.0	12-Aug-15	23-Oct-15						
NPS&P0120	Subcontract : Ventilation Building Pile Cap Works	60.0	23-Sep-15	04-Dec-15						
NPS&P0130	Subcontract : Ventilation Building ABWF Works	60.0	24-Oct-15	05-Jan-16						
5.2 North Portal Design Submission										
Bored Tunnel OHVD Slab										
DDA Submission										
FL2022168	ER/IP's Approval	28.0	08-May-15	04-Jun-15						
Bored Tunnel Internal Structure (except OHVD Slab)										
DDA Submission										
FL2022176	ER/IP's Approval	28.0	08-May-15	04-Jun-15						
Bored Tunnel/ D&B Tunnel Transition - Headwall Structure (N/B & S/B)										
DDA Submission										
FL2022181	Preparation for formal submission to ER/ICE/IP	95.0	17-Mar-15	14-Jul-15						

					MAIN CONTRACTOR  香港寶嘉 Dragages Hong Kong <small>A member of the Bouygues Construction group</small>		CLIENT  土木工程拓展署 Civil Engineering and Development Department		THE ENGINEER  CONTRACTOR'S DESIGNER 		PROJECT Contract No. CV/2012/08 Liantang/Heung Yuen Wai Boundary Control Point Site Formation and Infrastructure Works Contract 2		DOCUMENT NO. LTH/DHK/PGR/PW/PLP/00075/A		
Monthly Report No.20 20/08/2015 RAN RBS/SJO DAL									TITLE Monthly Report No.20 3-Months Rolling Programme (Approved Works Programme Rev. D)		DOC. STATUS FOR INFO.	CREATION DATE 20/08/2015	REVISION A		
REV	DESCRIPTION	DATE	PREPARED	CHECKED	APPROVED					PAPER SIZE A3	SCALE N/A	PAGE 3 of 5			

Activity ID	Activity Name	Working Duration	BL Project Start	BL Project Finish	2015				
					Aug	Sep	Oct	Nov	
FL2022182	IPs/ ER's Review	28.0	15-Jul-15	15-Aug-15	[Bar]				
FL2022183	Preparation for resubmission to ER/ICE/IP with ICE Certification	30.0	17-Aug-15	19-Sep-15	[Bar]				
FL2022184	ER/IP's Approval	28.0	20-Sep-15	17-Oct-15	[Bar]				
North Tunnel Curved Section Cross Passages - Temp Works		123.0	29-May-15	24-Oct-15					
DDA Submission		123.0	29-May-15	24-Oct-15					
FL2022189	Preparation for formal submission to ER/ICE/IP	42.0	29-May-15	18-Jul-15	[Bar]				
FL2022190	IPs/ ER's Review	28.0	20-Jul-15	20-Aug-15	[Bar]				
FL2022191	Preparation for resubmission to ER/ICE/IP with ICE Certification	32.0	21-Aug-15	26-Sep-15	[Bar]				
FL2022192	ER/IP's Approval	28.0	27-Sep-15	24-Oct-15	[Bar]				
Bored Tunnel Cross Passages Temp Works (Soft Ground)		51.0	07-May-15	06-Jul-15					
DDA Submission		51.0	07-May-15	06-Jul-15					
FL2022199	Preparation for resubmission to ER/ICE/IP with ICE Certification	27.0	07-May-15	08-Jun-15	[Bar]				
FL2022200	ER/IP's Approval	28.0	09-Jun-15	06-Jul-15	[Bar]				
Bored Tunnel Cross Passages Temp Works (Rock)		51.0	07-May-15	06-Jul-15					
DDA Submission		51.0	07-May-15	06-Jul-15					
FL2022203	Preparation for resubmission to ER/ICE/IP with ICE Certification	27.0	07-May-15	08-Jun-15	[Bar]				
FL2022204	ER/IP's Approval	28.0	09-Jun-15	06-Jul-15	[Bar]				
Bored Tunnel Cross Passages Permanent Lining (Soft Ground)		234.6	24-Mar-15	13-Oct-15					
DDA Submission		234.6	24-Mar-15	13-Oct-15					
FL2022209	Preparation for formal submission to ER/ICE/IP	72.0	24-Mar-15	23-Jun-15	[Bar]				
FL2022210	IPs/ ER's Review	28.0	24-Jun-15	27-Jul-15	[Bar]				
FL2022211	Preparation for resubmission to ER/ICE/IP with ICE Certification	43.0	28-Jul-15	15-Sep-15	[Bar]				
FL2022212	ER/IP's Approval	28.0	16-Sep-15	13-Oct-15	[Bar]				
Bored Tunnel Cross Passages Permanent Lining (Rock)		270.6	24-Mar-15	13-Oct-15					
DDA Submission		270.6	24-Mar-15	13-Oct-15					
FL2022217	Preparation for formal submission to ER/ICE/IP	92.0	24-Mar-15	17-Jul-15	[Bar]				
FL2022218	IPs/ ER's Review	28.0	18-Jul-15	19-Aug-15	[Bar]				
FL2022219	Preparation for resubmission to ER/ICE/IP with ICE Certification	23.0	20-Aug-15	15-Sep-15	[Bar]				
FL2022220	ER/IP's Approval	28.0	16-Sep-15	13-Oct-15	[Bar]				
Bored Tunnel Cross Passages Internal Structures		165.0	18-May-15	16-Nov-15					
DDA Submission		165.0	18-May-15	16-Nov-15					
FL2022225	Preparation for formal submission to ER/ICE/IP	75.0	18-May-15	15-Aug-15	[Bar]				
FL2022226	IPs/ ER's Review	28.0	17-Aug-15	17-Sep-15	[Bar]				
FL2022227	Preparation for resubmission to ER/ICE/IP with ICE Certification	25.0	18-Sep-15	19-Oct-15	[Bar]				
FL2022228	ER/IP's Approval	28.0	20-Oct-15	16-Nov-15	[Bar]				
5.3 North Portal Method Statement Submission		296.3	04-May-15	31-Dec-15					
North Tunnel (Cross Passages) Blasting Method Statement		95.0	01-Jun-15	21-Sep-15					
FL2022111	Preparation and Submission of Blasting Method Statement	70.0	01-Jun-15	22-Aug-15	[Bar]				
FL2022112	Engineer's/IP's Review & Approval	60.0	14-Jul-15	21-Sep-15	[Bar]				
MS for TBM Break-out		96.5	17-Sep-15	05-Dec-15					
FL2022544	Prepare & Submit Method Statement	24.0	17-Sep-15	16-Oct-15	[Bar]				
FL2022554	ER's Comment for Method Statement	30.0	17-Oct-15	15-Nov-15	[Bar]				
FL2022564	Prepare & Re-submit Method Statement	18.0	16-Nov-15	05-Dec-15	[Bar]				
MS for TBM Turn		143.7	17-Oct-15	14-Dec-15					
FL3875	Prepare & Submit Method Statement	24.0	17-Oct-15	14-Nov-15	[Bar]				
FL3880	ER's Comment for Method Statement	30.0	15-Nov-15	14-Dec-15	[Bar]				
MS for Removal of Left-in HDC Drill Rods within N/B TBM Excavation		40.0	13-Nov-15	31-Dec-15					
FL2022584	Prepare & Submit Method Statement	40.0	13-Nov-15	31-Dec-15	[Bar]				
North Portal: MS for Cross Passage Ground Treatment		189.0	04-May-15	07-Sep-15					
FL2022065	Prepare & Submit Method Statement	40.0	04-May-15	19-Jun-15	[Bar]				

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North Portal: MS for Cross Passage Ground Treatment											PAPER SIZE A3	SCALE N/A	PAGE 4 of 5		

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Activity ID	Activity Name	Working Duration	BL Project Start	BL Project Finish	2015				
					Aug	Sep	Oct	Nov	
FL2022066	ER's Comment for Method Statement	30.0	20-Jun-15	19-Jul-15					
FL2022067	Prepare & Re-submit Method Statement	18.0	20-Jul-15	08-Aug-15	█				
FL2022068	ER's Approval for Method Statement	30.0	09-Aug-15	07-Sep-15		█			
North Portal: MS for Cross Passage Excavation in Rock		64.0	12-Sep-15	30-Nov-15					
FL2022069	Prepare & Submit Method Statement	40.0	12-Sep-15	31-Oct-15		█			
FL2022070	ER's Comment for Method Statement	30.0	01-Nov-15	30-Nov-15				█	
North Portal: MS for Cross Passage Excavation in Soft		64.0	12-Sep-15	30-Nov-15					
FL2022073	Prepare & Submit Method Statement	40.0	12-Sep-15	31-Oct-15		█			
FL2022074	ER's Comment for Method Statement	30.0	01-Nov-15	30-Nov-15				█	
5.5 North Portal Works		504.7	08-Nov-14	22-Feb-16					
North Portal: Site Formation		366.0	08-Nov-14	30-Oct-15					
N20505	Permanent Slope Formation (Remaining)	200.0	08-Nov-14	25-Jul-15	█				
N20655	NB: Stage 3 Permanent Slope from +75mPD to +30mPD	192.0	21-Jan-15	30-Sep-15	█				
N20665	NB: Stage 4 Excavation from +18mPD to +9.5mPD w/4 rows Soil Nail	24.0	02-Oct-15	30-Oct-15			█		
Southbound Tunnel (Mined Excavation) inc Enlargement		137.0	23-Jul-15	04-Jan-16					
TD0910	SB - Invert Grouting	60.0	23-Jul-15	03-Oct-15	█				
TD0920	SB - Gallery	60.0	21-Aug-15	31-Oct-15		█			
TD0930	SB - Crown Grouting	60.0	19-Sep-15	28-Nov-15			█		
TD0940a	Top Heading Enlargement (Ch6355>Ch6268); 87m; [P21: 4755 to 4668]	47.0	09-Nov-15	04-Jan-16				█	
Northbound Tunnel (Mined Excavation)		176.0	04-May-15	30-Nov-15					
DB6400a1	Blast door installation + Noise Measurement and 24Hr permit approval	30.0	04-May-15	08-Jun-15	█				
DB6400a2	Top Heading Canopies (Ch6410>Ch6350); 60m; [P20: 4788 to 4728]	70.0	09-Jun-15	31-Aug-15	█				
DB6400a3	Top Heading Canopies (Ch6350>Ch6284); 66m; [P20: 4728 to 4662]	76.0	01-Sep-15	30-Nov-15		█			
Southbound Tunnel (TBM Tunneling)		219.0	26-May-15	12-Feb-16					
TD0995a	Erection of Thrust Frame / Preparation to Start TBM Launch	12.0	26-May-15	09-Jun-15	█				
TD1000a	TBM DT (Ch6,355>Ch6,077) 278m	82.0	10-Jun-15	16-Sep-15	█				
TD1000a10	TBM DT (Ch6,355>Ch6,268) 87m	26.0	10-Jun-15	10-Jul-15	█				
TD1000a20	TBM DT (Ch6,268>Ch6,148) 120m - WSD Restriction Zone	35.0	11-Jul-15	21-Aug-15	█				
TD1000a30	TBM DT (Ch6,148>Ch6,077) 71m	21.0	22-Aug-15	16-Sep-15		█			
TD1010a	TBM DT (Ch6,077>Ch5,950) 127m	17.0	17-Sep-15	07-Oct-15			█		
TD1010b	TBM DT (Ch5,950>Ch5,713) 237m	31.0	08-Oct-15	12-Nov-15				█	
TD1050	TBM DT (Ch5,713>Ch4,904) 809m	77.0	13-Nov-15	12-Feb-16					█
Bored Tunnel (S/B & N/B) Internal Works & Finishes		99.0	28-Oct-15	22-Feb-16					
Southbound Tunnel Internal Works & Finishes		99.0	28-Oct-15	22-Feb-16					
TD1470a	Tunnel Backfilling (Ch5,950 >Ch5,153) 797m- (Stage 1)	85.0	28-Oct-15	05-Feb-16				█	
TD1480a	Bottom Drilling for Cross Passage (fr. Ch5953)	70.0	14-Nov-15	05-Feb-16					█
TD1490a	Tunnel Backfilling (Ch5,950 >Ch5,153) 797m- (Stage 2)	80.0	19-Nov-15	22-Feb-16					█
TD1500a	Drilling for Cross Passage (Remaining) (Ch5,950 >Ch5,153) 797m	80.0	19-Nov-15	22-Feb-16					█
North Portal: Retaining Wall & Site Formation		102.0	03-Aug-15	05-Dec-15					
N20930	*Retaining Wall & Site Formation (STK/RW1)	57.0	03-Aug-15	13-Oct-15		█			
N20940	Retaining Wall & Site Formation (STK/RW3)	45.0	14-Oct-15	05-Dec-15				█	
5.6 Administration Building:		106.0	01-Jun-15	05-Jan-16					
5.65 Administration Building: Works		106.0	01-Jun-15	05-Jan-16					
Administration Building: Demolition		38.0	01-Jun-15	15-Aug-15					
SV2925	Precautionary Measures	24.0	01-Jun-15	02-Jul-15	█				
SV2940	Demolish Existing Building (AB1 - GLL T11742)	18.0	03-Jul-15	23-Jul-15	█				
SV2945	Demolish Existing Building (AB3 - GLL 36508)	18.0	24-Jul-15	15-Aug-15	█				
Administration Building: Site Formation		67.0	17-Aug-15	05-Jan-16					
AD2070	Backfilling for Surcharge	66.0	17-Aug-15	06-Nov-15		█			
AD2080	Surcharge (2 months Consolidation)	60.0	07-Nov-15	05-Jan-16				█	

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A Monthly Report No.20					20/08/2015		RAN		RBS/SJO		DAL		DOC. STATUS FOR INFO.	CREATION DATE 20/08/2015	REVISION A	
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Contract 3

Activity ID	Activity Name	OD	RD	Start	Finish	TF	2015				
							Aug	Sep	Oct	Nov	Dec
3-Month Rolling Programme 2015-08-21											
Key Dates (Contractual)											
KD-1500	KD13: Stage N4A - Connection of Access Road A and Slip Road Y at Entrustment Boundary CD	0	0		31-Oct-15*	0					◆ KD13: Stage N4A - Connection of Access Rd
Key Dates (Forecast)											
KD-1505	KD13: Stage N4A - Connection of Access Road A and Slip Road Y at Entrustment Boundary CD	0	0		31-Oct-15	0					◆ KD13: Stage N4A - Connection of Access Rd
Major Procurement & Delivery											
Water Supply Pipeworks											
MM-1060	E&M equipment for the re-provisioned WSD Valve Control House	60	0	27-Apr-15 A	21-Jul-15 A	52	E&M equipment for the re-provisioned WSD Valve Control House				
Footbridge Steel Truss											
MM-3050	Fabrication of footbridge steel truss (Kiu Tau Footbridge)	108	108	04-Nov-15	18-Mar-16	52					
Design and Submissions											
Statutory Approval											
PRE-1050	Submission & approval of CDIA report for construction of temporary platform for segment erection works	185	59	27-Nov-14 A	31-Oct-15	56	Submission & approval of CDIA report for				
PRE-1200	Consent for Dong Jiang watermain connection for DN2200, DN2300 - WSD	0	0		01-Sep-15*	0	◆ Consent for Dong Jiang watermain connection for DN2200, DN2300 - WSD				
Design Confirmation											
PRE-1220	Confirmation of Noise Barrier Footing Design (NB1a) near WSD Tau Pass Restricted Zone	45	5	09-Apr-14 A	26-Aug-15	62	Confirmation of Noise Barrier Footing Design (NB1a) near WSD Tau Pass Restricted Zone, Confirmation of Noise Bar				
Method Statement and Design (Major) Approved by AECOM											
PRE-2020	Submission of noise barrier design for absorptive panels, transparent panels and associated fixing details	60	0	11-Mar-14 A	27-Jul-15 A	52	Submission of noise barrier design for absorptive panels, transparent panels and associated fixing details				
PRE-2030	Submission of E&M design for lighting of Kiu Tau Footbridge	60	60	21-Aug-15	02-Nov-15	228	Submission of E&M design for lighting of K				
PRE-2050	Submission of Shop Drawing for fabrication of Kiu Tau Footbridge Steelworks	60	60	21-Aug-15	02-Nov-15	53	Submission of Shop Drawing for fabricatio				
Section IA & IB - Fanling Highway Widening (KD-1 & KD-2)											
Fanling Highway South Portion between CH6935 and CH7470											
Fanling Highway Zone 1 between CH6935 and CH7130 (within SBZ2)											
At-Grade Roadworks (195m)											
FHW-1130*	Pipe Laying - DN1200 Watermain (CHC) along Fanling Highway (80m long, 4m depth)	182	59	20-Feb-14 A	31-Oct-15	154	Pipe Laying - DN1200 Watermain (CHC) al				
Fanling Highway Zone 2 between CH7130 and CH7290											
At-Grade Roadworks (160m)											
FHW-2110B	Noise Barrier NB71 - Footing adjacent to SB lane (96m) (under VO.79)	341	53	26-Jul-14 A	24-Oct-15	0	Noise Barrier NB71 - Footing adjacent to				
FHW-2130*	Pipe Laying - DN1200 & DN600 Watermain (CHB & CHC) along Fanling Highway (183m long, 4m depth)	95	113	13-Jul-15 A	06-Jan-16	100					



- Actual Work
- Remaining Work
- Summary Bar
- Critical Remaining Work
- ◆ Milestone
- Project Baseline Bar

CEDD Contract No. CV/2012/09
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3-Month Rolling Programme
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3-Month Rolling Programme updated to 2015-08-20			
Date	Revision	Checked	Appr...
20-Aug-15	Rev.0	SL	

Activity ID	Activity Name	OD	RD	Start	Finish	TF	2015						
							Aug	Sep	Oct	Nov	Dec		
FHW-2140	Road Formation, Kerb and Pavement (Eastern Side: FLH SB Slow lane and hard should)	79	79	27-Aug-15	30-Nov-15	0							
Fanling Highway Zone 3 between CH7290 and CH7380													
Box Culvert Extension - ID4													
ID4-3090	Bay 1 - Remaining Base Slab (To be carried out after diversion of DN1400 water mains)	45	45	02-Nov-15	23-Dec-15	268							
At-Grade Roadworks (130m)													
FHW-3130	Noise Barrier NB71 - Footing adjacent to SB lane (130m) Including pile cap	324	5	23-May-14 A	26-Aug-15	0							
FHW-3150*	Pipe Laying - DN600, DN1200 Watermains (CHB &CHC) along Fanling Highway (90m long, 3m depth)	150	48	07-Jun-14 A	17-Oct-15	165							
FHW-3160	Road Formation, Kerb and Pavement (Eastern Side: FLH SB Slow lane and hard should)	79	79	27-Aug-15	30-Nov-15	0							
Fanling Highway North Portion between CH7470 and CH7925													
Fanling Highway Zone 5 between CH7470 and CH7600 (Provision of Kiu Tau Footbridge)													
Kiu Tau Footbridge Re-provision (East)													
FHW-5000E	KT-P4 - Piling Works (8 out of 8 nos of Pile) - Phase 2, conflict with temp cycle track/ existing tree	40	40	10-Oct-15	26-Nov-15	0							
At-Grade Road Works (130m)													
FHW-5120C	Preparation Works for Implementation of TTA Scheme E3A	78	78	14-Sep-15	16-Dec-15	8							
Fanling Highway Zone 7 between CH7660 and CH7925													
At-Grade Roadworks (265m)													
FHW-7100	Site Formation, Preparation Works & Tree Transplant	127	62	30-Aug-13 A	04-Nov-15	2							
Section II - Remainder of the Works (KD-3)													
At Grade Link Road at Fanling Highway Interchange													
Link Road 3 (near Abutment AD1)													
FHI-LR3-3000	Completion of WSD works incl. DN600, DN1200 & DN1400	0	0		31-Oct-15	525							
WSD Works													
DN450 Fire Mains (CHA)													
WA-1050	Pipe Laying - CHA 420 - 520 (DN450) near Realigned TWSR West (Re-TWSRW: CH530 - 640), 100m long & 2m depth	70	7	29-May-15 A	28-Aug-15	21							
DN600 Water Mains (CHB)													
WB-1030A	Pipe Laying - CHB 335 - 350 (DN600) near crossing TWSRE 15m long & 3m depth	30	20	09-Jun-15 A	12-Sep-15	8							
WB-1080	Pipe Laying - CHB 700 - 756 (DN600) near Realigned TWSR East (along Roundabout), 56m long & GL	66	20	17-Jun-15 A	12-Sep-15	39							
WB-1000	Pipe Laying - CHB 100 - 153 (DN600) near Fanling Highway S/B (FHW: CH7130-7290), 53m long (common trench with NB)	45	96	13-Jul-15 A	06-Jan-16	100							
WB-1070	Pipe Laying - CHB 635 - 700 (DN600) near Realigned TWSR East (TWSRE: CH380-456), 65m long & GL	78	32	18-Jul-15 A	26-Sep-15	30							



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WB-1010	Pipe Laying - CHB 153 - 245 (DN600) near Fanling Highway S/B (FHW: CH7290-7380), 92m long (common trench with NB)	43	43	27-Aug-15	17-Oct-15	165										
WB-1030C	Pipe Laying - CHB 350 - 450 (DN600) from Portal AB7/AD9/AC12 to Portal AB8	85	85	14-Sep-15	24-Dec-15	578										
WB-1060	Pipe Laying - CHB 538 - 635 (DN600) near Realigned TWSR East (TWSRE: CH270-380), 97m long & GL	68	68	29-Sep-15	18-Dec-15	67										
DN1200 Water Mains (CHC)																
WC-1050A	Pipe Laying - CHC 155 - 200 (DN1200) near Fanling Highway S/B (FHW: CH6935-7130), 45m long, 4m depth	120	59	15-Oct-14 A	31-Oct-15	154										
WC-1090A	Pipe Laying - CHC 600 - 615 (DN1200) near crossing TWSRE 15m long & 3m depth	30	20	09-Jun-15 A	12-Sep-15	8										
WC-1140	Pipe Laying - CHC 980 - 1030 (DN1200) near Realigned TWSR East (along Roundabout), 50m long & GL	66	20	17-Jun-15 A	12-Sep-15	39										
WC-1130	Pipe Laying - CHC 910 - 980 (DN1200) near Realigned TWSR East (TWSRE: CH380-456), 70m long & GL	78	32	07-Jul-15 A	26-Sep-15	30										
WC-1060	Pipe Laying - CHC 235 - 420 (DN1200) near Fanling Highway S/B (FHW: CH7130-7290), 185m long (common trench with NB)	95	95	21-Aug-15	12-Dec-15	118										
WC-1090C	Pipe Laying - CHC 615 - 720 (DN1200) from Portal AB7/AD9/AC12 to Portal AB8	85	85	14-Sep-15	24-Dec-15	219										
WC-1120	Pipe Laying - CHC 810 - 910 (DN1200) near Realigned TWSR East (TWSRE: CH270-380), 100m long & GL	85	85	29-Sep-15	11-Jan-16	50										
Twin DN1400 Water Mains (CHE & CHG)																
WE-1030	Pipe Laying - CHE & CHG 225 - 240 (Twins DN1400) near crossing TWSRE 15m long & 3m depth	30	20	09-Jun-15 A	12-Sep-15	8										
DN2300 Water Mains and Leakage Collection System (CHJ & CHKA/CHK)																
WJ-1010C	Pipe Laying - CHJ 50 - 100 (DN2200) near existing TWSR East, 50m long & 6m depth	75	32	08-Jun-15 A	26-Sep-15	39										
WJ-1000	Implementation of TTA - Scheme E2 (Shifting TWSRE toward newly formation area beside Fanling Highway)	17	0	29-Jun-15 A	27-Jul-15 A											
WJ-1010B	Pipe Laying - CHJ 10 - 50 (DN2200) crossing existing TWSR East, 40m long & 6m depth	78	57	28-Jul-15 A	29-Oct-15	14										
WJ-1020B	Pipe Laying - CHKA 0 - 73 (DN1400) near Realigned TWSR East, 73m long & 4m depth	46	46	28-Aug-15	12-Oct-15	46										
WJ-1020A	Pipe Laying - CHK 0 - 80 (DN1400) near Realigned TWSR East, 80m long & 4m depth	55	55	13-Oct-15	16-Dec-15	39										
WJ-2000B	Pressure Test for CHJ	7	7	30-Oct-15	06-Nov-15	14										
WJ-2010A	Cleaning & CCTV Inspection for CHJ	14	14	07-Nov-15	23-Nov-15	14										
WJ-2020	Installation of Connecting Pipe for Connection to Existing Mains	20	20	07-Nov-15	30-Nov-15	14										
Kau Lung Hang Valve Control & Telemetry House Reprovision																
VCTH-1010	BS and E&M Works	30	24	15-Jul-15 A	17-Sep-15	28										
VCTH-1020	Testing and Commissioning	60	60	02-Sep-15	13-Nov-15	28										
VCTH-1030	Demolition of Existing KLH Valve Control & Telemetry House	90	90	14-Nov-15	08-Mar-16	227										
Stage 1A - Realignment of Tai Wo Service Road West (KD-7)																
TWSRW Zone 1 between CH100 and CH155																
At-Grade Roadworks																



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							Aug	Sep	Oct	Nov	Dec
TWSRW-1160	Road Formation, Road Drainage, DN150 watermain, Kerb, Planter & Pavement	286	89	15-Nov-14 A	05-Dec-15	33					
TWSRW Zone 2 between CH155 and CH280											
At-Grade Roadworks											
TWSRW-2120	Road Formation, Road Drainage, DN150 watermain, Kerb, Planter & Pavement	165	89	16-Oct-14 A	05-Dec-15	33					
TWSRW Zone 3 between CH280 and CH315											
At-Grade Roadworks											
TWSRW-3120	Road Formation, Road Drainage, Kerb, Planter and Pavement	181	116	22-Jun-15 A	16-Jan-16	0					
TWSRW-3130	Retaining Structure RW3 (to be covered by VO)	85	67	18-Jul-15 A	10-Nov-15	0					
TWSRW-3110	Installation of Cable Ducts for Utilities Diversion Works at Zone 2 (Approx. 120m) (by utilities undertakers)	111	107	21-Jul-15 A	05-Dec-15	5					
TWSRW-3100	Noise Barrier NB1a - Footing adjacent Realigned TWSR West	25	25	11-Nov-15	09-Dec-15	0					
TWSRW Zone 4 between CH315 and CH376											
Construction of Bridge E											
TWSRW-4070	Bridge Segment (North Bay & Middle Bay)	80	8	01-Apr-15 A	29-Aug-15	26	Bridge Segment (North Bay & Middle Bay), Bridge Segment (North Bay & Middle Bay)				
TWSRW-4080	Bridge Segment (South Bay)	40	34	14-Aug-15 A	30-Sep-15	0	Bridge Segment (South Bay), Bridge Segment (South Bay)				
TWSRW-4090	Permanent Prestressing & Abutment Wall	24	24	02-Oct-15	30-Oct-15	0	Permanent Prestressing & Abutment Wall				
TWSRW-4100	Remove Scaffold System and Temporary Work together with Slope Reinstatement	110	110	02-Nov-15*	18-Mar-16*	8					
At-Grade Roadworks											
TWSRW-4200	Cast Parapet, Lay Surfacing and Road Furniture for Footpath and Carriageway	60	60	31-Oct-15	12-Jan-16	4					
TWSRW Zone 5 between CH376 and CH520											
Construction of Retaining Structures											
TWSRW-5070	Construction of Mass Concrete Wall (FL/RW4)	70	14	15-Jun-15 A	05-Sep-15	78	Construction of Mass Concrete Wall (FL/RW4), Construction of Mass Concrete V				
TWSRW-5080	Retaining Structure along Slope no. 3SW-C/C898 (to be covered by VO. 78)	50	43	29-Jun-15 A	12-Oct-15	49	Retaining Structure along Slope				
At-Grade Roadworks											
TWSRW-5110B	Road Drainage SMH800-SMH802 (to be covered by VO)	24	18	14-Aug-15 A	10-Sep-15	0	Road Drainage SMH800-SMH802 (to be covered by VO), Road Drainage SMH800-SMH802 (to be c				
TWSRW-5100	Noise Barrier NB2 - Footing and Retaining Structure adjacent to Realigned TWSR West (66m)	98	98	11-Sep-15	09-Jan-16	0					
TWSRW Zone 6 between CH520 and CH530											
At-Grade Roadworks											
TWSRW-6110	Slope Upgrading Works for unregistered feature beside Slope 3SW-D/C80 (to be Covered by VO. 68)	65	26	22-May-15 A	19-Sep-15	2	Slope Upgrading Works for unregistered feature beside Slope 3SW-D/C80 (to be Covered				
TWSRW-6100	Preparation Works for Implementation of TTA (shifting TWSRW traffic towards the edge of extended box culvert)	19	19	23-Sep-15	16-Oct-15	0	Preparation Works for Implementation of TTA (shifting TWSRW				



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TWSRW Zone 7 between CH530 and CH640											
At-Grade Roadworks											
TWSRW-7140	Installation of Cable Ducts for Utilities Diversion Works at Area 4 (Approx. 150m) (by utilities undertakers)	233	33	28-Jan-15 A	22-Sep-15	0	Installation of Cable Ducts for Utilities Diversion Works at Area 4 (Ap				
TWSRW-7120*	Pipe Laying - DN450 Watermains (CHA)	70	7	29-May-15 A	28-Aug-15	21	Pipe Laying - DN450 Watermains (CHA)				
TWSRW-7160	Pipe Laying - DN150	25	19	13-Jul-15 A	11-Sep-15	9	Pipe Laying - DN150, Pipe Laying - DN150				
TWSRW-7100	Preparation Works for Implementation of TTA (shifting TWSRW traffic towards the cut-slope)	18	18	23-Sep-15	15-Oct-15	0	Preparation Works for Implementation of TTA (shifting TWSRW				
TWSRW-7110	Implementation of TTA - Scheme W3	0	0	17-Oct-15		0	◆ Implementation of TTA - Scheme W3				
TWSRW-7150	Remaining Road Drainage, Road Formation, Kerb, Planter and Pavement (incl. Zone 6 & Zone 7)	75	75	17-Oct-15	16-Jan-16	0					
TWSRW Zone 8 between CH640 and CH695											
Kiu Tau Footbridge Reprvision (West)											
TWSRW-8010B	Installation of Socket H-Pile for Proposed Kiu Tau Footbridge (13 nos of Pile)	75	34	07-Jul-15 A	30-Sep-15	0	Installation of Socket H-Pile for Proposed Kiu Tau Footbridge				
TWSRW-8020	Construction of Pile Cap and Abutment	45	45	02-Oct-15	24-Nov-15	0	Construction of P				
At-Grade Roadworks											
TWSRW-8100	Fill Replacement Works	60	60	27-Oct-15	07-Jan-16	0					
Remainder of the Works											
TWSRW-9040*	Utilities Diversion in Area 4 (along Re-aligned TWSRW CH530 - CH640)	233	33	28-Jan-15 A	22-Sep-15	0	Utilities Diversion in Area 4 (along Re-aligned TWSRW CH530 - CH640)				
TWSRW-9020*	Utilities Diversion in Area 2 (along Re-aligned TWSRW CH 280 - CH315)	111	107	21-Jul-15 A	05-Dec-15	5	Utilities				
TWSRW-9030	Utilities Diversion in Area 3 (along existing TWSRW, Approx. 150m) (by utilities undertakers)	157	157	21-Aug-15	24-Jan-16	-20					
Remaining Works for Noise Barrier along realigned TWSR West											
TWSRW-NB-110	Noise Barrier Steelworks & Panel for NB4 at Zones 1 & 2	30	30	06-Nov-15	10-Dec-15	166					
Stage N4A & N4B - Realignment of Tai Wo Service Road East (KD-13 & KD-14)											
TWSRE Zone 1 between CH100 and CH270											
At-Grade Roadworks											
TWSRE-1120	Noise Barrier NB3 - Footing adjacent to Realigned TWSR East (96m)	110	8	29-Dec-14 A	29-Aug-15	361	Noise Barrier				
TWSRE-1150	Construct no fine concrete, U-channel and filling to required level for pipe laying works	30	6	06-Jan-15 A	27-Aug-15	37	Construct no fine concrete, U-channel and filling to required level for pipe laying works, Construct no fine concrete, U-				
TWSRE-1140*	Pipe laying - DN1400 Watermains (CHKA) along Realigned TWSR East	46	46	28-Aug-15	12-Oct-15	46	Pipe laying - DN1400 Watermains (CHKA) along Realigned TWSR				
TWSRE Zone 2 between CH270 and CH380											
At-Grade Roadworks											
TWSRE-2030A*	Pipe laying - DN600 & DN1200 Watermains (CHB & CHC) along Realigned TWSR East	85	85	29-Sep-15	11-Jan-16	50					



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TWSRE-2030B*	Pipe laying - DN1400 Watermains (CHK) along Realigned TWSR East	55	55	13-Oct-15	16-Dec-15	39					
TWSRE Zone 3 between CH380 and CH456											
At-Grade Roadworks											
TWSRE-3010	Noise Barrier NB3 - Footing adjacent to Realigned TWSR East (75.6m)	85	8	19-Mar-15 A	29-Aug-15	361					
TWSRE-3020A*	Pipe Laying - DN600 & DN1200 Watermains (CHB & CHC) along Realigned TWSR East	78	32	07-Jul-15 A	26-Sep-15	30					
TWSRE-3040	Road Formation, Kerb, Footpath, Cycle Track, Planter and Pavement (Incl. FL/F10)	165	165	29-Sep-15	25-Apr-16	30					
Roundabout A, Slip Road and Access Road											
TWSRE-4040B*	Pipe laying - DN600 & DN1200 Watermains (CHB & CHC) along Roundabout A	66	20	17-Jun-15 A	12-Sep-15	39					
TWSRE-4060B	Access Road A - Road Formation, Kerb, Planter and Pavement	44	59	22-Jun-15 A	31-Oct-15	0					
TWSRE-4080	Preparation Works for Implementation of TTA Scheme E1	42	24	24-Jun-15 A	31-Oct-15	0					
TWSRE-4100A	Dwarf Wall DW 1 (ch.53-66) at Access Road A (covered by VO 83)	40	5	02-Jul-15 A	26-Aug-15	0					
TWSRE-4100B	Dwarf Wall DW 1 (ch.44-53) at Access Road A (covered by VO 83)	40	40	27-Aug-15	14-Oct-15	0					
TWSRE-4090	Implementation of TTA - Scheme E1 (Drawing No. CW/009/015)	0	0	02-Nov-15		0					
TWSRE-4070	Roundabout A - Road Formation, Kerb, Planter and Pavement	90	90	02-Nov-15	24-Feb-16	0					
TWSRE-4110	Preparation Works for Implementation of TTA Scheme E1A	30	30	02-Nov-15	05-Dec-15	195					
Stage 1C - Viaduct Structure & TCSS Civil Provisions (KD-9)											
Foundation & Pier Construction											
Bridge A											
BA-05-1030	Pier AA5 - Pier Construction (Twin Pier)	27	52	29-Oct-14 A	23-Oct-15	83					
BA-16-1030	Pier AA16 - Pier Construction	35	0	29-Apr-15 A	17-Aug-15 A						
BA-02-1020A	Pier AA2E - Pile Cap	30	8	04-May-15 A	29-Aug-15	41					
BA-18-1030	Pier AA18 - Pier Construction	56	14	08-May-15 A	05-Sep-15	98					
BA-04-1030	Pier AA4 - Pier Construction	14	0	29-Jun-15 A	07-Aug-15 A						
BA-09-1010	Pier AA9 - Pile Test	7	0	09-Jul-15 A	22-Jul-15 A						
BA-11-1000A	Pier AA11 - Piling Works (P1)	12	0	25-Jul-15 A	01-Aug-15 A						
BA-03-1030	Pier AA3 - Pier Construction	14	12	17-Aug-15 A	03-Sep-15	120					
BA-12-1030	Pier AA12 - Pier Construction	42	42	21-Aug-15	10-Oct-15	80					
BA-07-1000	Pier AA7 - Piling Works	24	24	07-Sep-15	06-Oct-15	36					
BA-09-1020	Pier AA9 - Pile Cap	30	30	14-Sep-15	20-Oct-15	82					



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BA-11-1000B	Pier AA11 - Piling Works (P2)	12	12	07-Oct-15	20-Oct-15	36														
BA-09-1030	Pier AA9 - Pier Construction (Twin Pier)	49	49	22-Oct-15	17-Dec-15	82														
BA-11-1010	Pier AA11 - Pile Test	7	7	22-Oct-15	29-Oct-15	52														
BA-07-1010	Pier AA7 - Pile Test	7	7	24-Oct-15	31-Oct-15	109														
BA-11-1020	Pier AA11 - Pile Cap	30	30	12-Nov-15	16-Dec-15	41														
BA-10-1000	Pier AA10 - Piling Works	24	24	19-Nov-15	16-Dec-15	36														
Bridge B																				
BB-05-1030	Pier AB5 - Pier Construction	35	0	29-Apr-15 A	28-Jul-15 A															
BB-08-1050	Portal AB8 - Portal Beam Construction together with Kicker	26	8	13-Jun-15 A	29-Aug-15	3														
BB-10-1030	Pier AB10 - Pier Construction	25	8	22-Jun-15 A	29-Aug-15	16														
BB-09-1030	Pier AB9 - Pier Construction	24	14	17-Jul-15 A	05-Sep-15	374														
BB-11-1010	Pier AB11 - Pile Test	7	0	10-Aug-15 A	14-Aug-15 A															
BB-03-1000	Pier AB3 - Piling Works	24	14	10-Aug-15 A	05-Sep-15	36														
BB-06-1040	Pier AB6W - Pier Construction	48	48	14-Sep-15	11-Nov-15	63														
BB-11-1020	Pier AB11 - Pile Cap	30	30	15-Sep-15	22-Oct-15	7														
BB-03-1010	Pier AB3 - Pile Test	7	7	23-Sep-15	02-Oct-15	103														
BB-06-1030	Pier AB6E - Pier Construction	48	48	14-Oct-15	09-Dec-15	63														
BB-03-1020	Pier AB3 - Pile Cap	30	30	22-Oct-15	25-Nov-15	88														
BB-11-1030	Pier AB11 - Pier Construction	24	24	23-Oct-15	19-Nov-15	7														
Bridge C																				
BC-05-1030	Pier AC5 - Pier Construction (Twin Pier)	38	21	22-Dec-14 A	14-Sep-15	62														
BC-09-1030	Pier AC9 - Pier Construction	28	0	02-Mar-15 A	19-Aug-15 A															
BC-11-1030	Pier AC11 - Pier Construction (Twin Pier)	55	38	27-May-15 A	06-Oct-15	70														
BC-12-1030	Pier AC12 - Pier Construction	28	20	10-Jun-15 A	12-Sep-15	40														
BC-01-1020	Abutment AC1 - Pile Cap	30	20	31-Jul-15 A	12-Sep-15	82														
BC-01-1030	Abutment AC1 - Abutment Construction	50	50	14-Sep-15	13-Nov-15	338														
BC-02-1020	Pier AC2 - Pile Cap	30	30	07-Oct-15	11-Nov-15	41														
BC-04-1030	Pier AC4 - Pier Construction	28	28	12-Oct-15	13-Nov-15	80														
BC-03-1000	Pier AC3 - Piling Works	24	24	22-Oct-15	18-Nov-15	36														

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BC-02-1030	Pier AC2 - Pier Construction	21	21	12-Nov-15	05-Dec-15	119									
Bridge D															
BD-07-1030	Pier AD7 - Pier Construction	32	0	04-Feb-15 A	31-Jul-15 A										
BD-09-1030	Pier AD9 - Pier Construction	49	0	05-May-15 A	21-Aug-15 A										
BD-08-1030	Pier AD8 - Pier Construction (Twin Pier)	55	0	13-May-15 A	05-Aug-15 A										
BD-10-1030	Pier AD10 - Pier Construction	24	6	28-May-15 A	27-Aug-15	0									
BD-12-1000	Pier AD12 - Piling Works	24	0	11-Jun-15 A	31-Jul-15 A										
BD-12-1010	Pier AD12 - Pile Test	7	0	10-Aug-15 A	20-Aug-15 A										
BD-13-1020	Pier AD13 - Pile Cap	30	21	11-Aug-15 A	14-Sep-15	7									
BD-01-1020	Abutment AD1 - Pile Cap	30	30	31-Aug-15	06-Oct-15	41									
BD-11-1040	Pier AD11W - Pier Construction	28	28	01-Sep-15*	05-Oct-15	171									
BD-09-1040	Portal AB7/AD9/AC12 - Portal Beam Construction together with Kicker	45	45	22-Sep-15	16-Nov-15	40									
BD-01-1030	Abutment AD1 - Abutment Construction	50	50	07-Oct-15	04-Dec-15	273									
BD-12-1020	Pier AD12 - Pile Cap	30	30	23-Oct-15	26-Nov-15	24									
BD-08-1040	Portal AC11/AD8 - Portal Beam Construction together with Kicker	45	45	02-Nov-15	23-Dec-15	56									
BD-13-1030	Pier AD13 - Pier Construction	21	21	20-Nov-15	14-Dec-15	7									
Pier Table Construction															
Bridge A															
PA-1130	Pier Table Construction at Pier AA13 (4 nos.)	30	13	25-Jul-15 A	04-Sep-15	11									
PA-1150	Pier Table Construction at Pier AA15 (3 nos.)	30	30	28-Aug-15	03-Oct-15	11									
PA-1160	Pier Table Construction at Pier AA16 (3 nos.)	30	30	24-Sep-15	31-Oct-15	11									
PA-1170	Pier Table Construction at Pier AA17 (3 nos.)	30	30	24-Sep-15	31-Oct-15	35									
PA-1180	Pier Table Construction at Pier AA18 (4 nos.)	30	30	20-Nov-15	24-Dec-15	44									
Bridge B															
PB-1100	Pier Table Construction at Pier AB10 (4 nos.) incl. in-situ cross head	30	30	08-Sep-15	14-Oct-15	16									
PB-1090	Pier Table Construction at Pier AB9 (4 nos.)	30	30	15-Sep-15	22-Oct-15	374									
Bridge C															
PC-1060	Pier Table Construction at Pier AC6 (3 nos.)	30	0	26-May-15 A	11-Aug-15 A										
PC-1090	Pier Table Construction at Pier AC9 (3 nos.)	30	30	24-Oct-15	27-Nov-15	15									



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CHUN WO CONSTRUCTION & ENGINEERING CO., LTD.

- Actual Work
- Remaining Work
- Summary Bar
- Critical Remaining Work
- Milestone
- Project Baseline Bar

CEDD Contract No. CV/2012/09
Liantang / Heung Yuen Wai BCP - Site Formation & Infrastructure Works, Contract 3

3-Month Rolling Programme
Programme ID: 3MPR025 (Data Date: 21-Aug-15) __Print Date:25-Aug-15
Page 8 of 9

3-Month Rolling Programme updated to 2015-08-20			
Date	Revision	Checked	Appr...
20-Aug-15	Rev.0	SL	

Activity ID	Activity Name	OD	RD	Start	Finish	TF	2015							
							Aug	Sep	Oct	Nov	Dec			
PC-1050	Pier Table Construction at Pier AC5 (4 nos.)	30	30	20-Nov-15	24-Dec-15	15								
Bridge D														
PD-1050	Pier Table Construction at Pier AD5 (4 nos.)	30	13	28-Jul-15 A	04-Sep-15	35								
PD-1060	Pier Table Construction at Pier AD6 (3 nos.)	30	30	28-Aug-15	03-Oct-15	35								
PD-1100	Pier Table Construction at Pier AD10 (4 nos.) incl. in-situ cross head	35	35	02-Sep-15	14-Oct-15	0								
PD-1040	Pier Table Construction at Pier AD4 (3 nos.)	30	30	07-Oct-15	11-Nov-15	38								
PD-1070	Pier Table Construction at Pier AD7 (3 nos.)	30	30	24-Oct-15	27-Nov-15	44								
Viaduct Bridge Segment Erection														
Bridge A														
EA-1140	Bridge Deck Construction at Pier AA14 by Typical Lifting Frame (17 nos)	12	12	22-Aug-15	04-Sep-15	7								
EA-1130	Bridge Deck Construction at Pier AA13 by Typical Lifting Frame (23 nos)	15	15	26-Sep-15	15-Oct-15	7								
EA-1150	Bridge Deck Construction at Pier AA15 by Typical Lifting Frame (17 nos)	11	11	16-Oct-15	29-Oct-15	7								
EA-1160	Bridge Deck Construction at Pier AA16 by Typical Lifting Frame (25 nos)	13	13	11-Nov-15	25-Nov-15	7								
Bridge B														
EB-1080	Bridge Deck Construction at Portal AB8 by Special Lifting Frame (26 nos)	20	20	21-Sep-15	15-Oct-15	3								
EB-1100	Bridge Deck Construction at Pier AB10 by Special Lifting Frame (54 nos in which 13 nos above MTRCL Railway)	76	76	09-Nov-15	15-Feb-16	0								
Bridge C														
EC-1080	Bridge Deck Construction at Pier AC8 by Typical Lifting Frame (18 nos)	25	0	08-May-15 A	25-Jul-15 A									
EC-1070	Bridge Deck Construction at Pier AC7 by Typical Lifting Frame (25 nos)	12	1	06-Jun-15 A	21-Aug-15	7								
EC-1060	Bridge Deck Construction at Pier AC6 by Typical Lifting Frame (15 nos)	18	18	05-Sep-15	25-Sep-15	7								
Bridge D														
ED-1100	Bridge Deck Construction at Portal AD10 by Special Lifting Frame (56 nos)	16	16	20-Oct-15	07-Nov-15	0								
ED-1050	Bridge Deck Construction at Pier AD5 by Typical Lifting Frame (12 nos)	10	10	30-Oct-15	10-Nov-15	7								
Section VI - Works in Portion FH9 (KD-6A)														
Major Works														
S6-2000*	Construction of Abutment AB12/AD14 (including Piling, Pile Cap & Abutment construction)	276	221	06-Feb-15 A	25-May-16	155								



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- Actual Work
- Remaining Work
- Summary Bar
- Critical Remaining Work
- Milestone
- Project Baseline Bar

CEDD Contract No. CV/2012/09
Liantang / Heung Yuen Wai BCP - Site Formation & Infrastructure Works, Contract 3

3-Month Rolling Programme
Programme ID: 3MPR025 (Data Date: 21-Aug-15) __Print Date: 25-Aug-15
Page 9 of 9

3-Month Rolling Programme updated to 2015-08-20			
Date	Revision	Checked	Appr...
20-Aug-15	Rev.0	SL	

Contract 5

ID	WBS	Task Name	Duration	Start	Finish	Predecessors	Gantt Chart (Jan, Mar, May, Jul, Sep, Nov, Jan, Mar)											
1	1	Key Dates	1110 days	Thu 28/3/13	Sun 10/4/16		[Gantt bar]											
47	2	Preliminaries and Statuary / Contractual Submissions	424 days	Thu 11/4/13	Mon 9/6/14	4	[Gantt bar]											
48	2.1	Site Establishment	399 days	Thu 11/4/13	Thu 15/5/14		[Gantt bar]											
53	2.2	Applications to Government Department	89 days	Fri 12/4/13	Tue 9/7/13		[Gantt bar]											
58	2.3	Temporary Traffic Arrangement (TTA) Scheme for temp. LMH Rd	131 days	Fri 12/4/13	Tue 20/8/13		[Gantt bar]											
63	2.4	Liaison with Utility Undertakers	363 days	Fri 12/4/13	Wed 9/4/14		[Gantt bar]											
66	2.5	Environmental Baseline & Impact Monitoring	132 days	Thu 11/4/13	Wed 21/8/13		[Gantt bar]											
77	2.6	General Site Clearance	424 days	Fri 12/4/13	Mon 9/6/14	5SS	[Gantt bar]											
78	3	Stage of the Works	180 days	Thu 11/4/13	Mon 7/10/13		[Gantt bar]											
79	3.1	Stage I of the Works - Temporary vehicular bridge B and temporary Lin Ma Hang Road	179 days	Fri 12/4/13	Mon 7/10/13	4	[Gantt bar]											
90	3.2	Stage II of the Works - Temporary ArchSD Depot (LMH2)	78 days	Thu 11/4/13	Thu 27/6/13		[Gantt bar]											
94	4	Section of the Works	1511 days	Fri 12/4/13	Wed 31/5/17		[Gantt bar]											
95	4.1	Section I of the Works - Ground Investigation field works (Drg. 7101A-7111A)	251 days	Thu 30/5/13	Tue 4/2/14	74SS+13 days	[Gantt bar]											
100	4.2	Section II of the Works - All laboratory tests for Section I	188 days	Sat 31/8/13	Thu 6/3/14	97	[Gantt bar]											
105	4.3	Section III of the Works - Site formation works for Portions RS1, RS2 & RS3 (seek for certificate of completion in letter ref. SRJV/W47/SO/J5/1308/00416 dated 23/8/2013)	89 days	Sun 12/5/13	Thu 8/8/13	24,25,26	[Gantt bar]											
111	4.4	Section IV of the Works - Village house within portion RS4 - EOT3 completion 15/5/2014	399 days	Fri 12/4/13	Thu 15/5/14	4	[Gantt bar]											
123	4.5	Section V of the Works-All works within portion RS4 exclude Section IV - EOT8 completion 28/4/2015	747 days	Fri 12/4/13	Tue 28/4/15	4	[Gantt bar]											
140	4.6	Section VII of the Works - All works within Area CRD	249 days	Mon 9/9/13	Thu 15/5/14	8	[Gantt bar]											
177	4.7	Section VIII of the Works - All works within Area BCPA - EOT6 completion 2/1/2015	571 days	Tue 11/6/13	Fri 2/1/15	6,7,18	[Gantt bar]											
211	4.8	Section IX of the Works - All works within Area BCPB - EOTO7 completion 19 October 2015	669 days	Fri 20/12/13	Mon 19/10/15	7	[Gantt bar]											
212	4.8.1	Claim No. 009 - Delays due to Delayed Possession of Portion BCP4 of the Site - Original 7/3/2014 and possessed on 25/9/2014	0 days	Fri 26/9/14	Fri 26/9/14	181	[Gantt bar]											
213	4.8.2	Submission for demolition of existing building structures	37 days	Fri 20/12/13	Sat 25/1/14		[Gantt bar]											
214	4.8.3	Approval of submission for demolish existing building structures	41 days	Sun 26/1/14	Fri 7/3/14	213	[Gantt bar]											
215	4.8.4	Demolition of existing building structures UPON instruction (included Asbestos Investigation, Report & Asbestos Abatement Plan)	76 days	Fri 3/10/14	Wed 17/12/14	212FS+7 days,214	[Gantt bar]											
216	4.8.5	Tree felling/removal works and tree transplanting works at BCP4 (include tree survey etc)	139 days	Fri 26/9/14	Wed 11/2/15	738SS	[Gantt bar]											
217	4.8.6	Claim No. 007 - Delay due to Non-Possession of Parts of Portion BCP3 due to Resistant by Local Resident (NOT YET)	0 days	Wed 14/1/15	Wed 14/1/15	181	[Gantt bar]											
218	4.8.7	Site formation works	330 days	Sun 2/11/14	Sun 27/9/15		[Gantt bar]											
219	4.8.7.1	site formation works (surrounding areas B1-3,B5-6, B9)	200 days	Sat 7/3/15	Tue 22/9/15	217FS+52 days,215SS+45 days	[Gantt bar]											
220	4.8.7.2	site formation works (area BCP4 - B4,7,8,10-B17)	330 days	Sun 2/11/14	Sun 27/9/15	215FS-46 days	[Gantt bar]											
221	4.8.7.3	site formation works (B18-B22)	200 days	Sat 7/3/15	Tue 22/9/15	219SS	[Gantt bar]											
222	4.8.8	chain link fence (Drg.1002C, 1032B, 1033B)	27 days	Wed 23/9/15	Mon 19/10/15	221	[Gantt bar]											
223	4.9	Section X of the Works - All works within Area BCPC - (Outstanding Works for SBF)	454 days	Thu 5/6/14	Tue 1/9/15	8	[Gantt bar]											
224	4.9.1	ISSUED EOT5	125 days	Thu 5/6/14	Tue 7/10/14		[Gantt bar]											
225	4.9.2	Claim No. 013 - VO No. 028 - Site Possession from DC/2011/06 (Portion A) (from Area C8 to D2)	0 days	Tue 16/9/14	Tue 16/9/14	180	[Gantt bar]											
226	4.9.3	Received Variation Order No. 035 for CLP Substation	0 days	Mon 21/7/14	Mon 21/7/14		[Gantt bar]											
227	4.9.4	Filling Works, Drainage & Irrigation System	21 days	Tue 16/9/14	Mon 6/10/14		[Gantt bar]											
229	4.9.5	South West Works for CLP Sub-Station (VO No. 035) (Area C1, C3, C4, C5, C6)	64 days	Mon 4/8/14	Mon 6/10/14		[Gantt bar]											
233	4.9.6	Handing over CLP Substation Area	0 days	Tue 7/10/14	Tue 7/10/14	228FS+1 day	[Gantt bar]											
234	4.9.7	VO 073 for Secondary Boundary Fencing extend to BCPC	125 days	Thu 30/4/15	Tue 1/9/15		[Gantt bar]											
235	4.9.7.1	Handing over from CLP for the extended area	0 days	Thu 30/4/15	Thu 30/4/15		[Gantt bar]											
236	4.9.7.2	Construction of Retaining Wall 2A	41 days	Sat 2/5/15	Thu 11/6/15	235FS+2 days	[Gantt bar]											
237	4.9.7.3	Construction of soil cement / general fill slope adjacent to CLP Substation	90 days	Sat 2/5/15	Thu 30/7/15	235FS+2 days	[Gantt bar]											
238	4.9.7.4	Secondary Boundary Fencing ChA+125 to ChA+250 (Bay 17 to 32)	33 days	Fri 31/7/15	Tue 1/9/15	237	[Gantt bar]											
239	4.10	Section XI of the Works - All works within Area BCPD	514 days	Mon 14/7/14	Wed 9/12/15		[Gantt bar]											
240	4.10.1	South West Works for additional 132kV (at Areas D1 & D2) at BCPD	439 days	Fri 15/8/14	Tue 27/10/15		[Gantt bar]											
241	4.10.1.1	fill platform for CLP (132kV) from +12.8 to +15.3	47 days	Fri 15/8/14	Tue 30/9/14		[Gantt bar]											
242	4.10.1.2	UU for erection of overhead post & termination of electricity by CLP(132kV)(Area D2)	28 days	Tue 14/10/14	Mon 10/11/14	241FS+13 days	[Gantt bar]											
243	4.10.1.3	Claim No. 007 - Delay due to Non-Possession of Parts of Portion BCP3 due to Resistant by Local Resident - confirmed to possess on 14/1/2015	1 day	Wed 14/1/15	Wed 14/1/15	217	[Gantt bar]											
244	4.10.1.4	site clearance, take initial survey	10 days	Thu 15/1/15	Sat 24/1/15	243	[Gantt bar]											
245	4.10.1.5	tree felling / transplant	14 days	Sun 25/1/15	Sat 7/2/15	244	[Gantt bar]											
246	4.10.1.6	assume filling partly areas D1 & D2 to +13.5 for drain	20 days	Sun 8/2/15	Fri 27/2/15	245	[Gantt bar]											
247	4.10.1.7	PVO, Construct Special Manhole No.9937	60 days	Sat 28/2/15	Tue 28/4/15	246	[Gantt bar]											
248	4.10.1.8	lay sewer FHM511 to 515	45 days	Wed 29/4/15	Fri 12/6/15	247	[Gantt bar]											

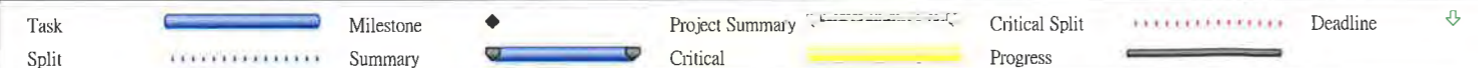
Revision 1 Fri 28/8/15

Task [Blue bar] Milestone [Diamond] Project Summary [Light blue bar] Critical Split [Red bar] Deadline [Down arrow]

Split [Dotted bar] Summary [Blue bar] Critical [Yellow bar] Progress [Dark blue bar]

Table with columns: ID, WBS, Task Name, Duration, Start, Finish, Predecessors. It lists construction tasks such as sewer laying, trench filling, drainage formation, and boundary fencing with specific dates and durations. Includes summary rows for Section XII and XIII of the works.

Revision 1
Fri 28/8/15



Appendix D

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

LEGEND:

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

PA	REV TO	REV	FIRST ISSUE	DC	WT

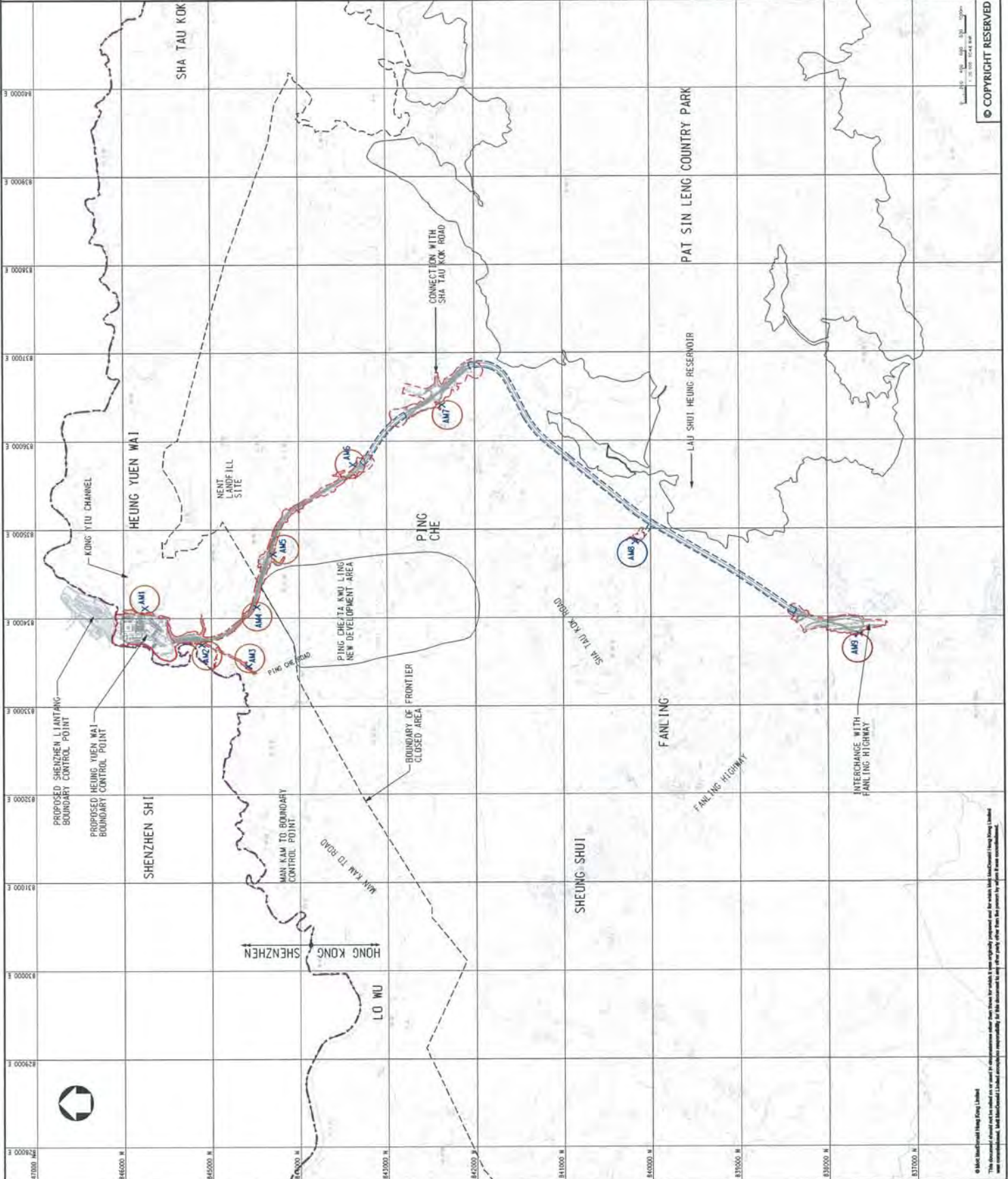


CIVIL ENGINEERING
AND DEVELOPMENT
DEPARTMENT

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

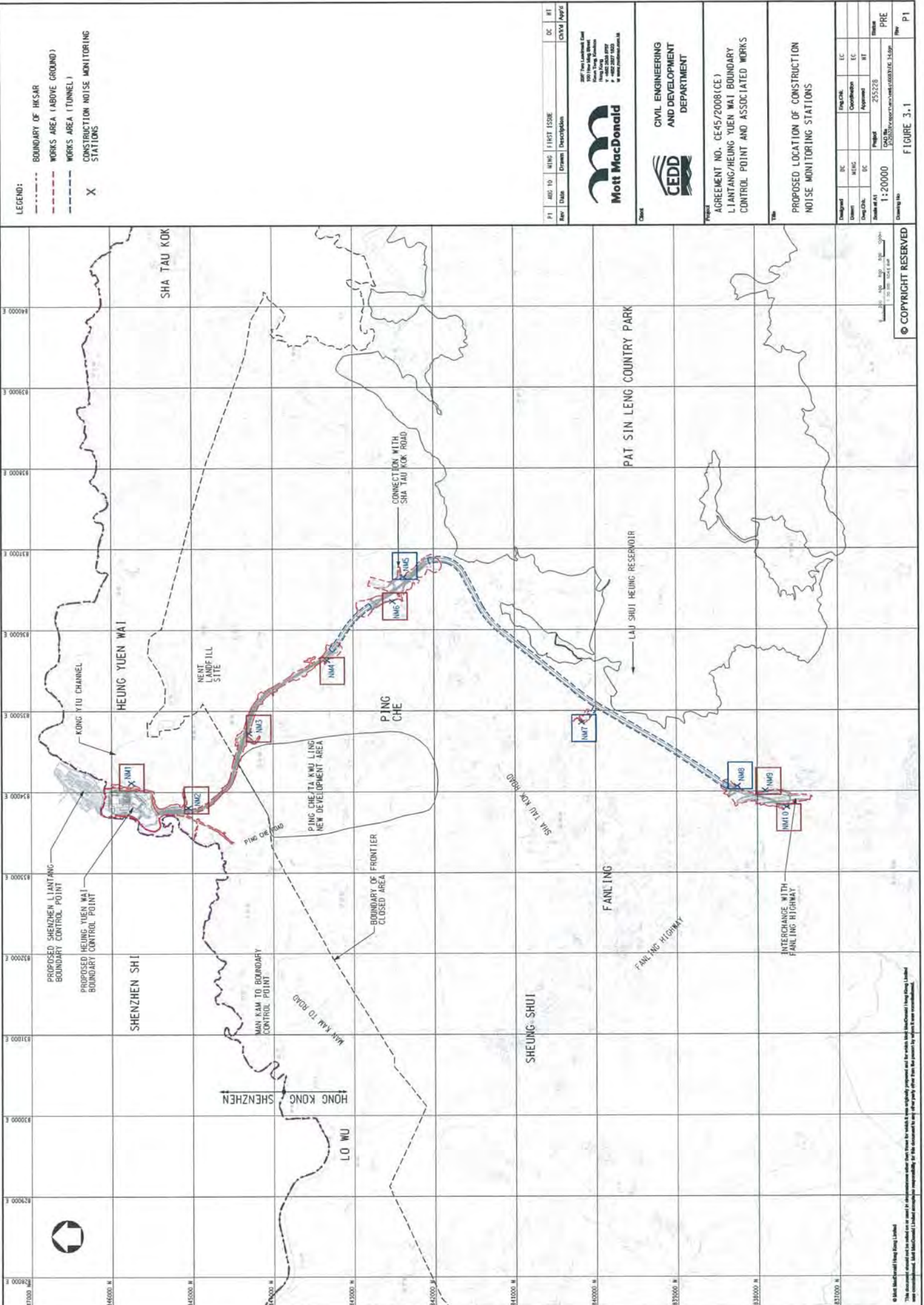
PROPOSED LOCATION OF CONSTRUCTION
AIR QUALITY MONITORING STATIONS

Drawn	DC	Eng. CHK.	EC
Checked	HT/EC	Coordination	EC
Scale at A1	DC	Approval	HT
1:20000		25/2/28	
Project	NO.	Date	Sheet
CE-45/2008(CE)		25/2/28	PRE
Drawing No.	FIGURE 2-1		
	P.1		



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LEGEND:

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

PI	ADD TO	DATE	BY	DESCRIPTION	DC	RT

Mott MacDonald
 200 The Landmark East
 100 The Hong Kong
 100 The Hong Kong
 100 The Hong Kong
 100 The Hong Kong
 100 The Hong Kong

CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT
CEDD

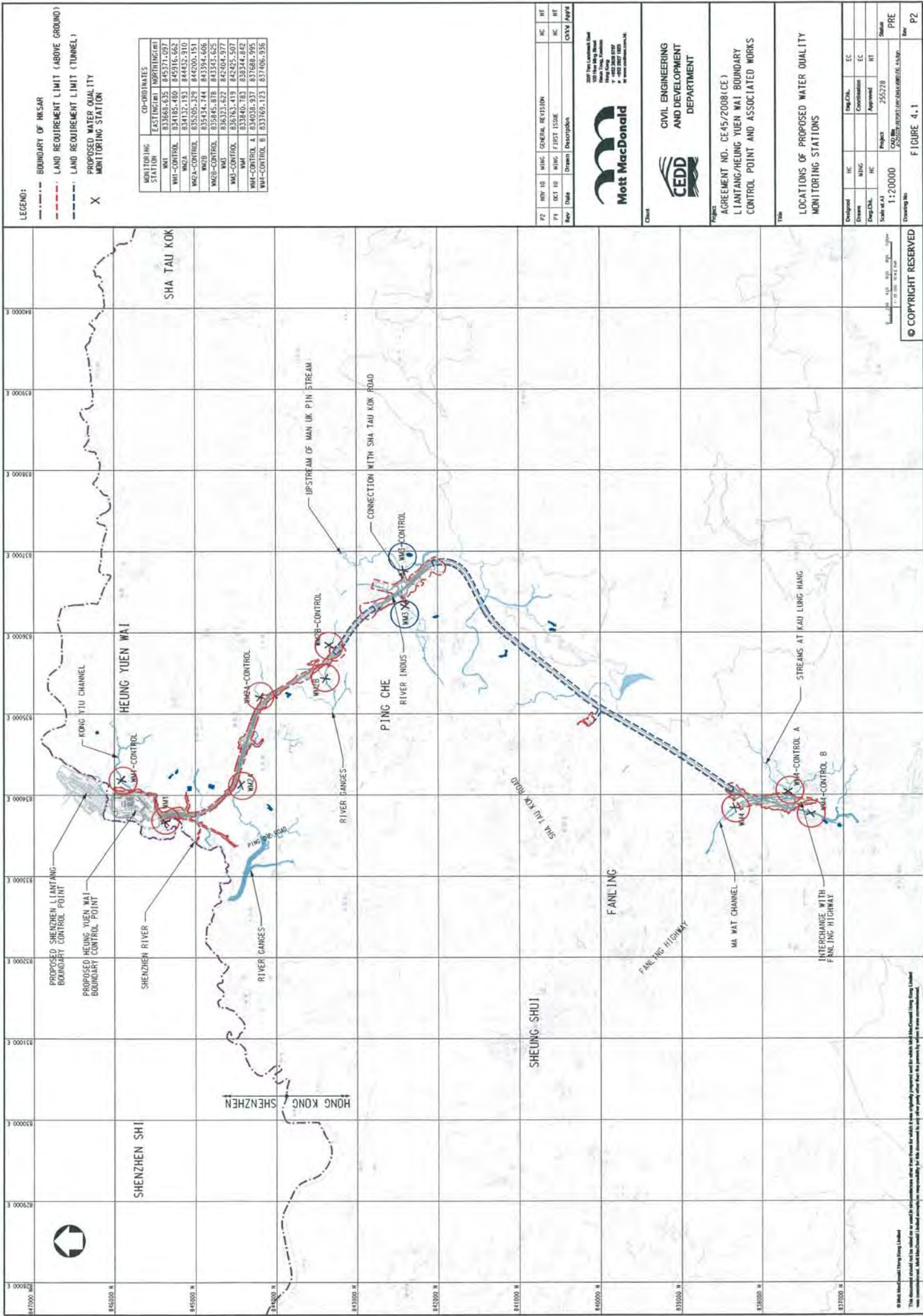
AGREEMENT NO. CE-45/2008(CE)
 LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS

PROPOSED LOCATION OF CONSTRUCTION NOISE MONITORING STATIONS

Designated Station	DC	M/DC	DC	Project	EC
				255228	

FIGURE 3-1

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LEGEND:

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

MONITORING STATION	CO-ORDINATES	
	EASTING (M)	NORTHING (M)
WMA	837683.635	845721.097
WMA-CONTROL 1	834185.460	845916.662
WMA-CONTROL 2	834132.193	844432.910
WMA-CONTROL 3	835205.329	844200.151
WMA-CONTROL 4	835134.744	843394.605
WMA-CONTROL 5	835945.878	843343.625
WMA-CONTROL 6	836323.622	842404.977
WMA-CONTROL 7	836763.419	842425.507
WMA-CONTROL 8	834038.937	837688.995

REV	DATE	BY	CHKD	DESCRIPTION
P2	NOV 10	MHC	GENERAL REVISION	HC
P1	OCT 10	MHC	FIRST ISSUE	HC
				CCNY/Agpt



CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

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

TITLE: LOCATIONS OF PROPOSED WATER QUALITY MONITORING STATIONS

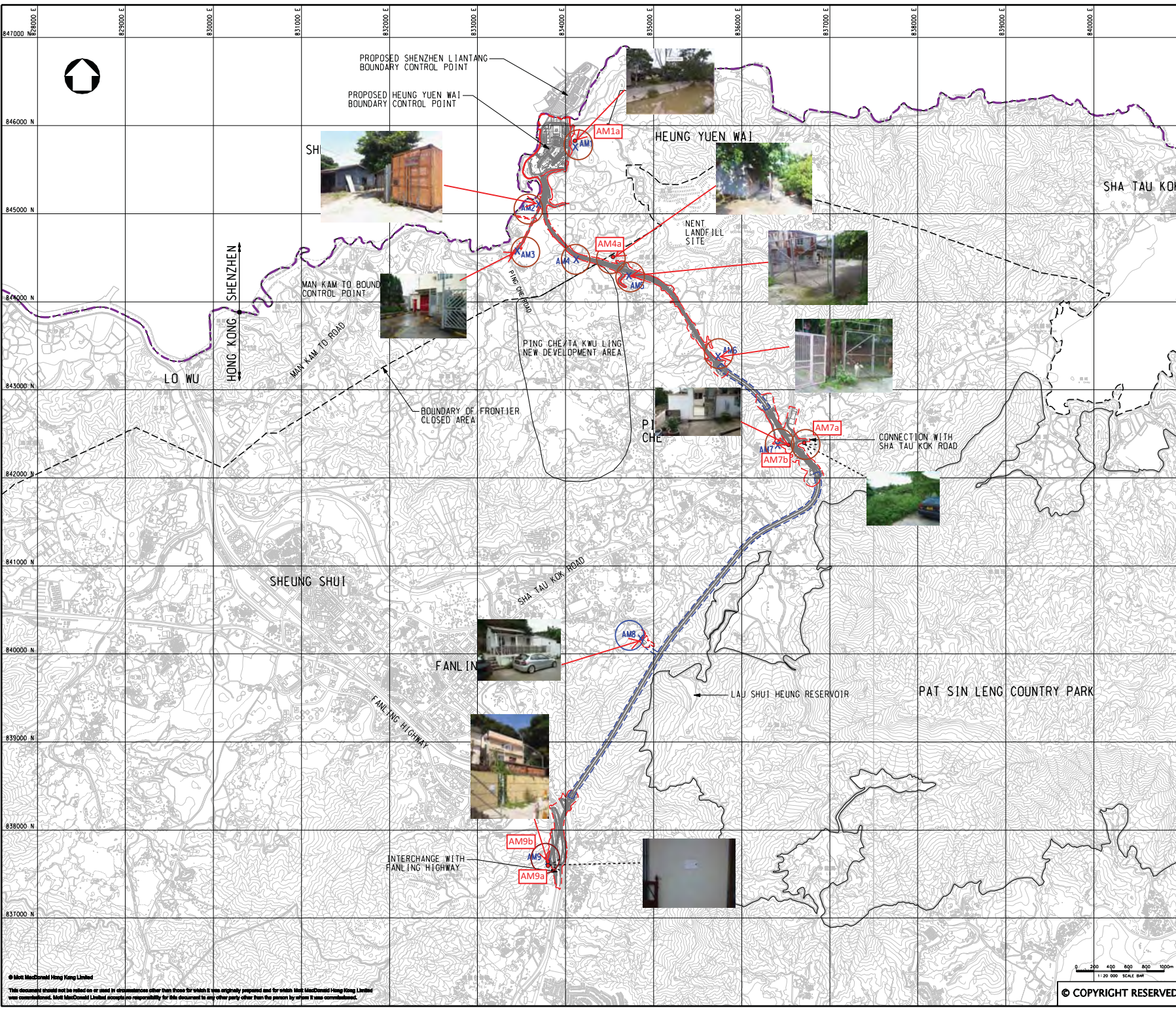
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Drawn	MHC	Coordination	EC
Eng. Chk.	HC	Approved	HT
Scale at A3	1:20000	Project	255228
Scale at A4	1:20000	CAU No.	255228
Drawing No.		PREPARED BY	PRE
		DATE	11/03/2011
		REV	P2

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Appendix E

Monitoring Locations for Impact Monitoring



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

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



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W www.mottmac.com.hk

Client



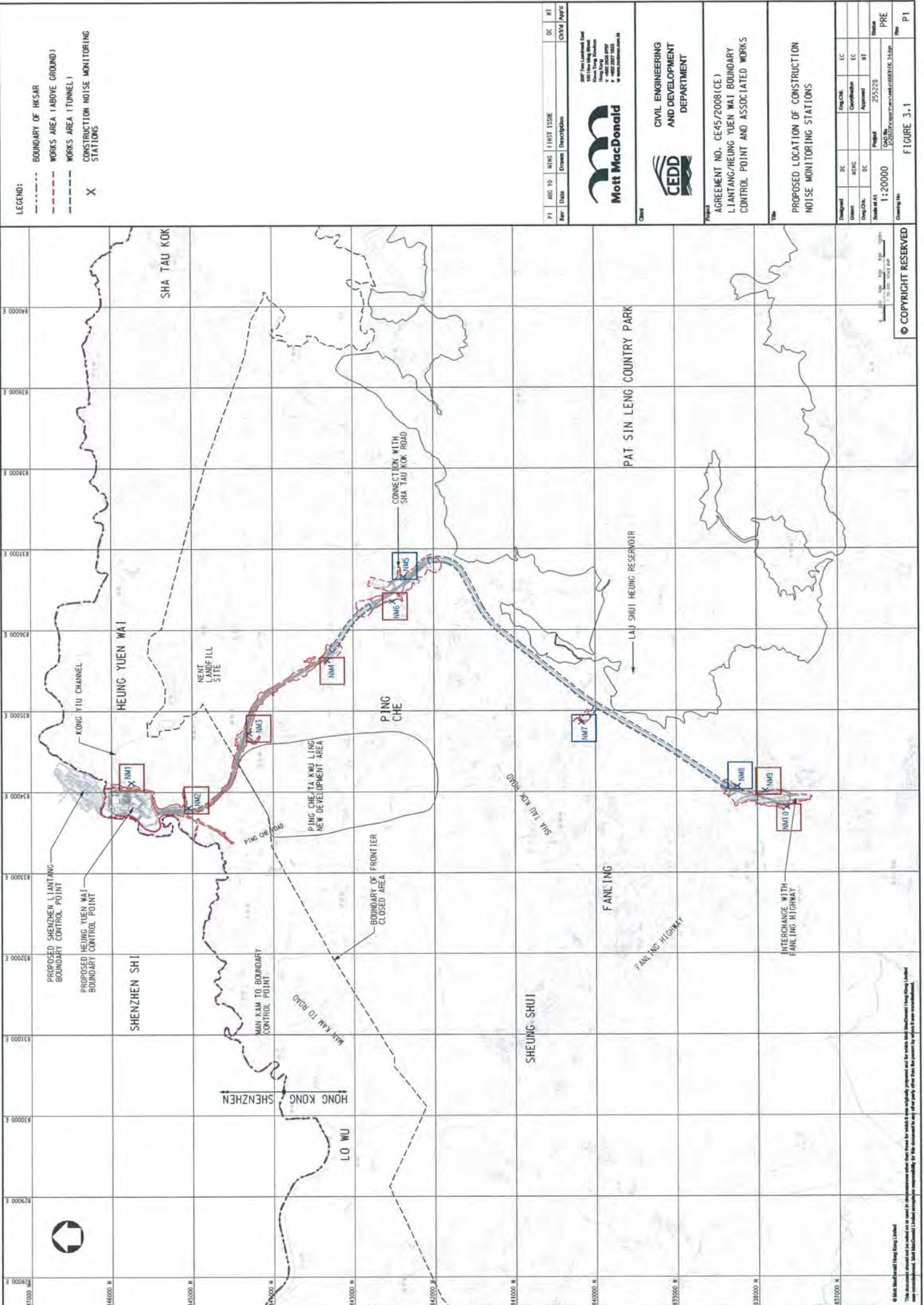
**CIVIL ENGINEERING
AND DEVELOPMENT
DEPARTMENT**

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

Title
 PROPOSED LOCATION OF CONSTRUCTION
 AIR QUALITY MONITORING STATIONS

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

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LEGEND:

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

PI	ADD TO	DATE	BY	DESCRIPTION	DC	RT



CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

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

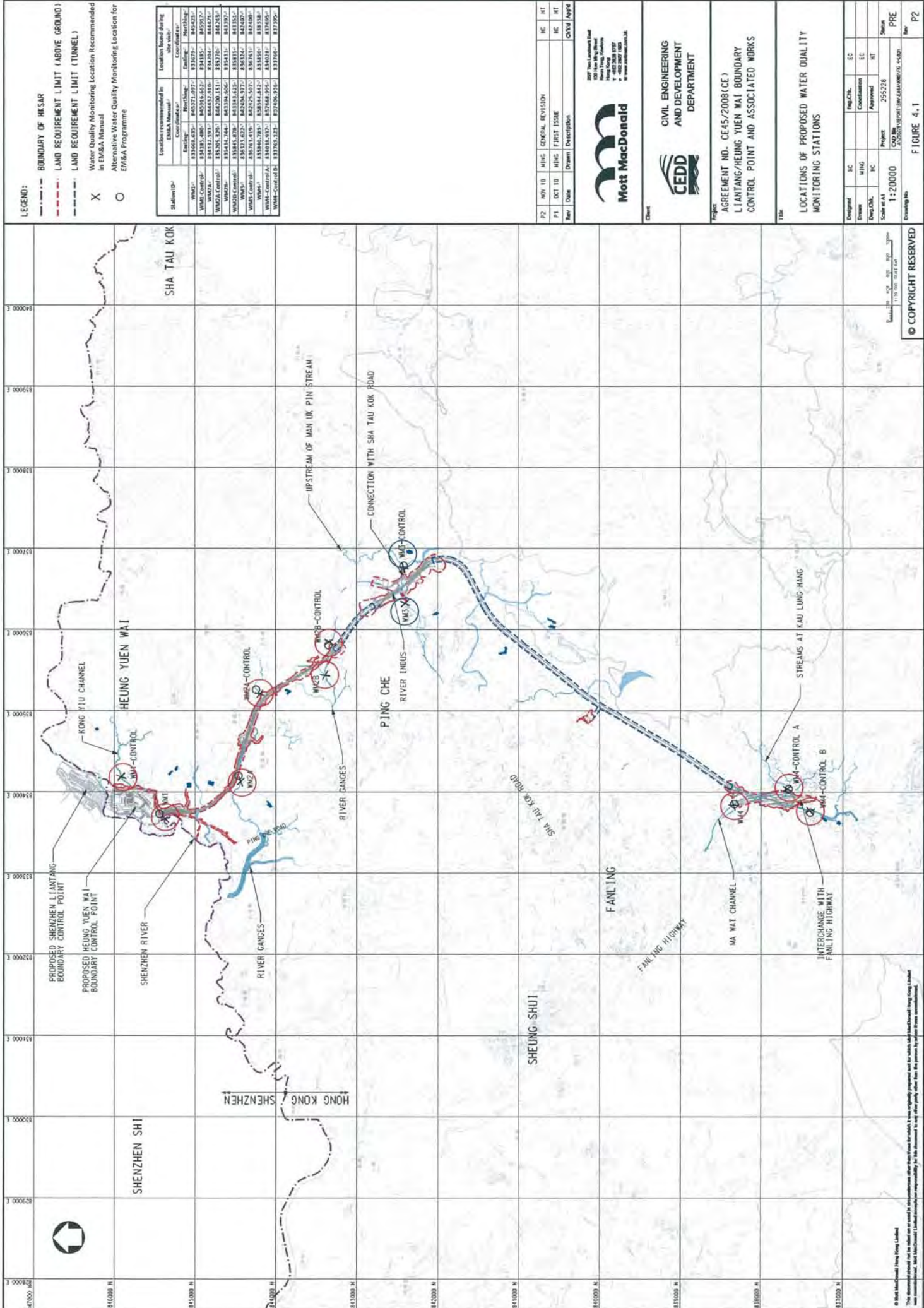
PROPOSED LOCATION OF CONSTRUCTION NOISE MONITORING STATIONS

Designated	DC	ME/CE	DC	DC	DC	DC	DC	DC	DC	DC	DC

Scale at A1: 1:20000
Project: 255228
Drawing No: CE45/2008(CE)001/01E/14/01
Date: PRE
Rev: P1

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LEGEND:

- BOUNDARY OF HK SAR
- - - 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

Station ID	Location recommended in EM&A Manual		Location based on the site visit	
	Easting	Northing	Easting	Northing
WMA1	837668.435	915772.097	833879	915473
WMA2	841312.183	914452.816	841384	914471
WMA3	852051.326	914200.151	852720	914243
WMA4	837434.744	913358.606	835431	913377
WMA5	835845.878	913348.625	835835	913351
WMA6	837625.415	914252.507	837683	914260
WMA7	837846.783	913144.842	835850	913158
WMA8	834038.937	917668.995	834038	917669
WMA9	837765.427	917606.916	837760	917607

P2	REV 10	HWG	GENERAL REVISION	HC	HT
P1	10/1	HWG	FIRST ISSUE	HC	HT
Rev	Date	Drawn	Description	CHKD	Appd

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CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

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

Scale at A1: 1:20000
Project No.: CE45/2008(CE) LANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS

Drawn No.: F10000
Sheet: PRE
Rev: P2

FIGURE 4.1

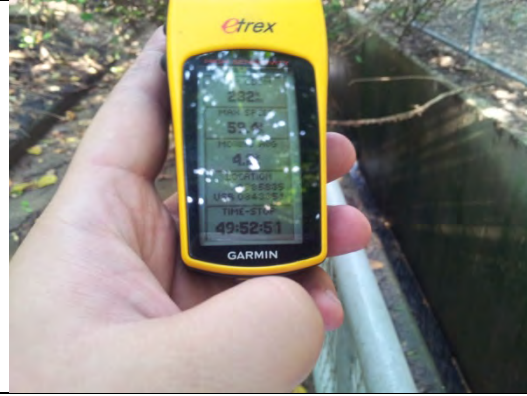
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Photographic Records for Water Quality Monitoring Location

	
<p>Alternative Location of WM1</p>	<p>Co-ordinates of Alternative Location of WM1</p>
	
<p>Alternative Location of WM1 - Control</p>	<p>Co-ordinates of Alternative Location of WM1 - Control</p>
	
<p>Alternative Location of WM2A</p>	<p>Co-ordinates of Alternative Location of WM2A</p>
	
<p>Alternative Location of WM2-Control A</p>	<p>Co-ordinates of Alternative Location of WM2 - Control</p>



Location of WM2B-Control



Co-ordinates of WM2B-Control



Location of WM2B



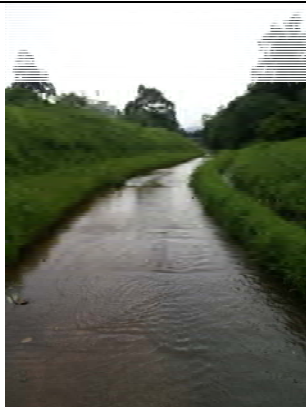
Co-ordinates of WM2B



Location of WM3-Control



Co-ordinates of WM3-Control



Location of WM3



Co-ordinates of WM3



Location of WM4-Control A



Co-ordinates of WM4-Control A



Location of WM4-Control B



Co-ordinates of WM4-Control B



Location of WM4



Co-ordinates 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
 Location ID : AM1a

Date of Calibration: 24/6/2015
 Next Calibration Date: 24/8/2015
 Technician: Keung Chi Young

CONDITIONS

Sea Level Pressure (hPa) 1005.3
 Temperature (°C) 28.3

Corrected Pressure (mm Hg) 753.975
 Temperature (K) 301

CALIBRATION ORIFICE

Make-> TISCH
 Model-> 5025A
 Serial # -> 1941

Qstd Slope -> 2.10265
 Qstd Intercept -> -0.00335

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	6	12.0	1.634	49	48.54	Slope =	34.5987	
13	4.9	4.9	9.8	1.476	45	44.58	Intercept =	-7.5049	
10	3.9	3.9	7.8	1.317	38	37.64	Corr. coeff. =	0.9984	
7	2.5	2.5	5.0	1.055	29	28.73			
5	1.7	1.7	3.4	0.870	23	22.78			

Calculations :

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

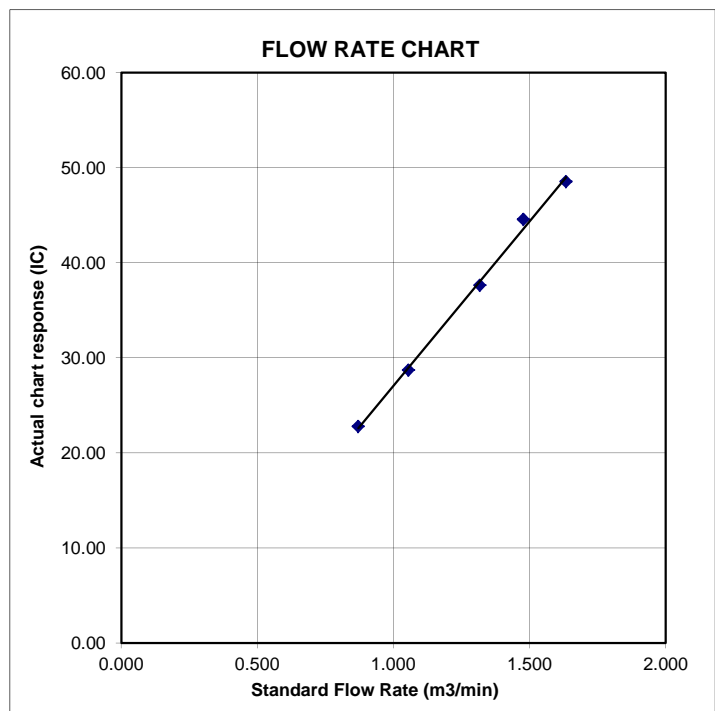
$$IC = I[\text{Sqrt}(Pa/P_{std})(T_{std}/T_a)]$$

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

For subsequent calculation of sampler flow:

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

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



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

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

Date of Calibration: 24/6/2015
 Next Calibration Date: 24/8/2015
 Technician: Keung Chi Young

CONDITIONS

Sea Level Pressure (hPa)	1005.3	Corrected Pressure (mm Hg)	753.975
Temperature (°C)	28.3	Temperature (K)	301

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.10265
Model->	5025A	Qstd Intercept ->	-0.00335
Serial # ->	1941		

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.6	5.6	11.2	1.578	53	52.50	Slope = 34.3296 Intercept = -2.2451 Corr. coeff. = 0.9981
13	4.4	4.4	8.8	1.399	46	45.57	
10	3.5	3.5	7.0	1.248	40	39.62	
7	2.1	2.1	4.2	0.967	32	31.70	
5	1.3	1.3	2.6	0.761	24	23.77	

Calculations :

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

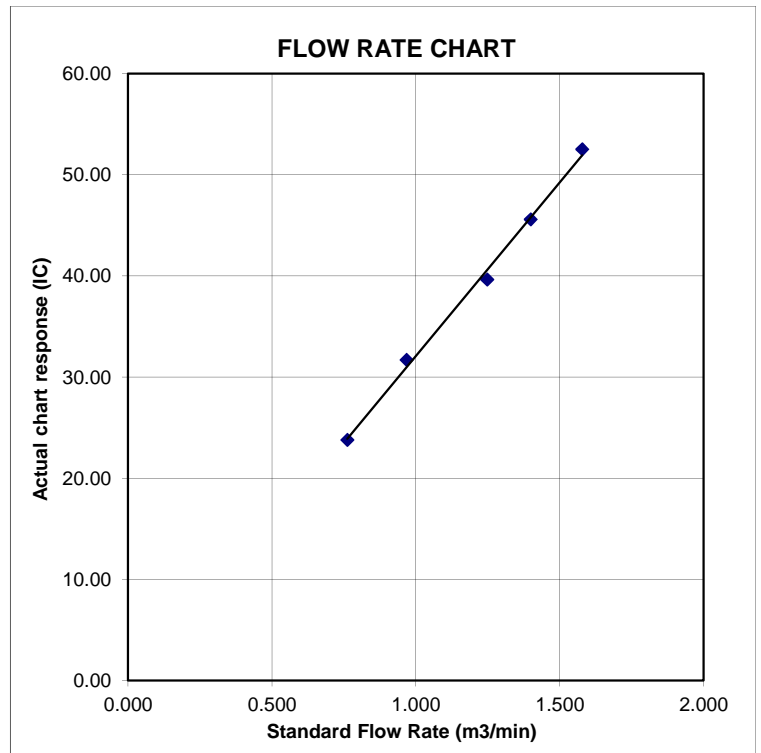
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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

For subsequent calculation of sampler flow:

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

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



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

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

Date of Calibration: 24/6/2015
 Next Calibration Date: 24/8/2015
 Technician: Keung Chi Young

CONDITIONS

Sea Level Pressure (hPa)	1005.3	Corrected Pressure (mm Hg)	753.975
Temperature (°C)	28.3	Temperature (K)	301

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.10265
Model->	5025A	Qstd Intercept ->	-0.00335
Serial # ->	1941		

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	1.713	55	54.48	Slope = 30.7637 Intercept = 1.7281 Corr. coeff. = 0.9972
13	5.2	5.2	10.4	1.521	50	49.53	
10	4	4	8.0	1.334	42	41.60	
7	2.5	2.5	5.0	1.055	34	33.68	
5	1.3	1.3	2.6	0.761	26	25.75	

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:

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

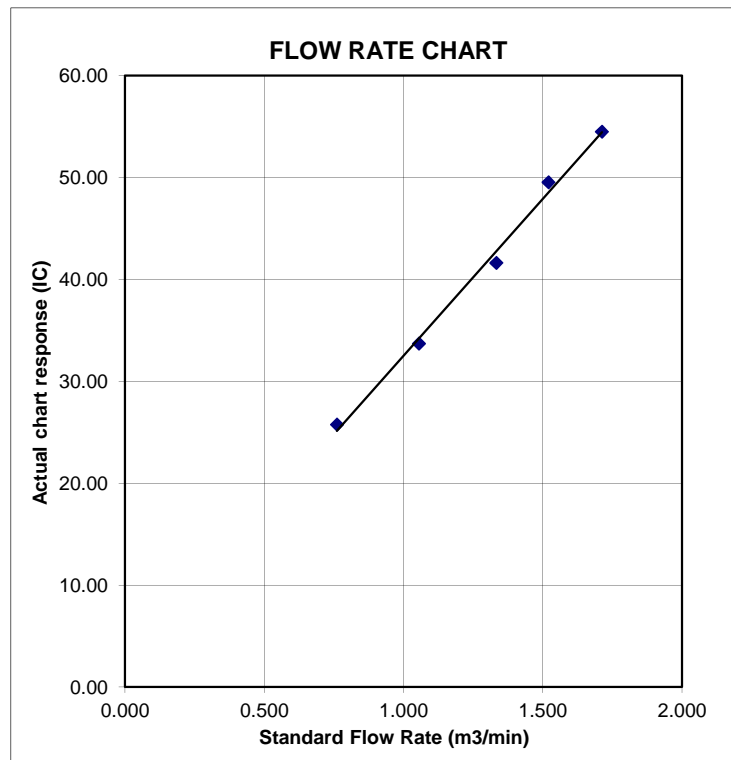
m = sampler slope

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: 24/6/2015

Location ID : AM7b

Next Calibration Date: 24/8/2015

Technician: C Y Keung

CONDITIONS

Sea Level Pressure (hPa) 1005.3
 Temperature (°C) 28.3

Corrected Pressure (mm Hg) 753.975
 Temperature (K) 301

CALIBRATION ORIFICE

Make-> TISCH
 Model-> 5025A
 Serial # -> 1941

Qstd Slope -> 2.10265
 Qstd Intercept -> -0.00335

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	4.3	4.3	8.6	1.383	56	55.47	Slope = 34.6832 Intercept = 7.0968 Corr. coeff. = 0.9968
13	3.4	3.4	6.8	1.230	50	49.53	
10	2.6	2.6	5.2	1.076	44	43.58	
7	1.5	1.5	3.0	0.818	37	36.65	
5	1.0	1.0	2.0	0.668	30	29.72	

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

m = sampler slope

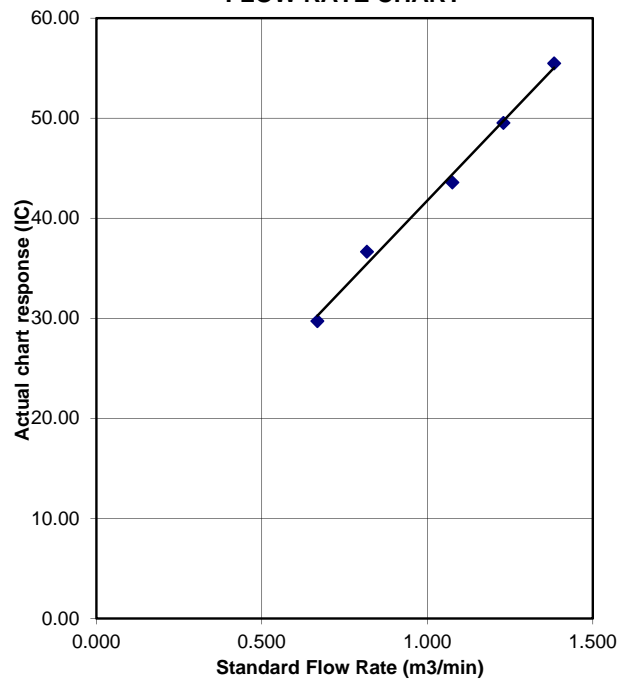
b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

FLOW RATE CHART



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

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

Date of Calibration: 24/6/2015
 Next Calibration Date: 24/8/2015
 Technician: C Y Keung

CONDITIONS

Sea Level Pressure (hPa)	1005.3	Corrected Pressure (mm Hg)	753.975
Temperature (°C)	28.3	Temperature (K)	301

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.10265
Model->	5025A	Qstd Intercept ->	-0.00335
Serial # ->	1941		

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	6.5	6.5	13.0	1.700	61	60.42	Slope = 34.7670 Intercept = 1.4600 Corr. coeff. = 0.9970		
13	5.3	5.3	10.6	1.535	55	54.48			
10	4.1	4.1	8.2	1.351	49	48.54			
7	2.5	2.5	5.0	1.055	40	39.62			
5	1.6	1.6	3.2	0.844	30	29.72			

Calculations :

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

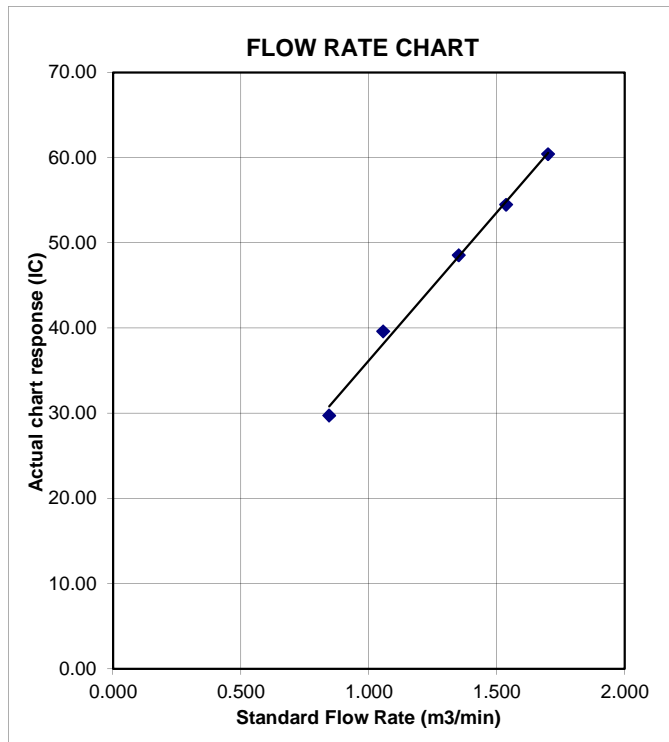
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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: 24/6/2015
 Next Calibration Date: 24/8/2015
 Technician: Keung Chi Young

CONDITIONS

Sea Level Pressure (hPa)	1005.3	Corrected Pressure (mm Hg)	753.975
Temperature (°C)	28.3	Temperature (K)	301

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.10265
Model->	5025A	Qstd Intercept ->	-0.00335
Serial # ->	1941		

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	1.700	56	55.47	Slope = 31.6602 Intercept = 1.1022 Corr. coeff. = 0.9971
13	5	5	10.0	1.491	48	47.55	
10	3.7	3.7	7.4	1.283	43	42.59	
7	2.7	2.7	5.4	1.096	35	34.67	
5	1.2	1.2	2.4	0.731	25	24.76	

Calculations :

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

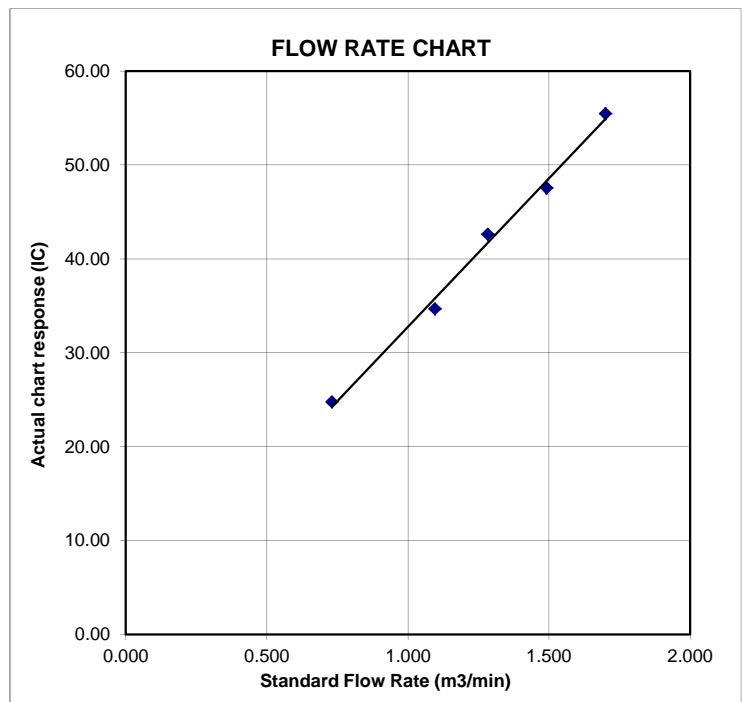
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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
 Location ID : AM1a

Date of Calibration: 24/8/2015
 Next Calibration Date: 24/10/2015
 Technician: Keung Chi Young

CONDITIONS

Sea Level Pressure (hPa) 1002.4
 Temperature (°C) 30.7

Corrected Pressure (mm Hg) 751.8
 Temperature (K) 304

CALIBRATION ORIFICE

Make-> TISCH
 Model-> 5025A
 Serial # -> 1941

Qstd Slope -> 2.10265
 Qstd Intercept -> -0.00335

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION		
							Slope =	Intercept =	Corr. coeff. =
18	6.1	6.1	12.2	1.638	50	49.26	Slope =	35.4741	
13	4.9	4.9	9.8	1.468	45	44.33	Intercept =	-8.7079	
10	3.8	3.8	7.6	1.293	37	36.45	Corr. coeff. =	0.9978	
7	2.6	2.6	5.2	1.070	29	28.57			
5	1.6	1.6	3.2	0.840	22	21.67			

Calculations :

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

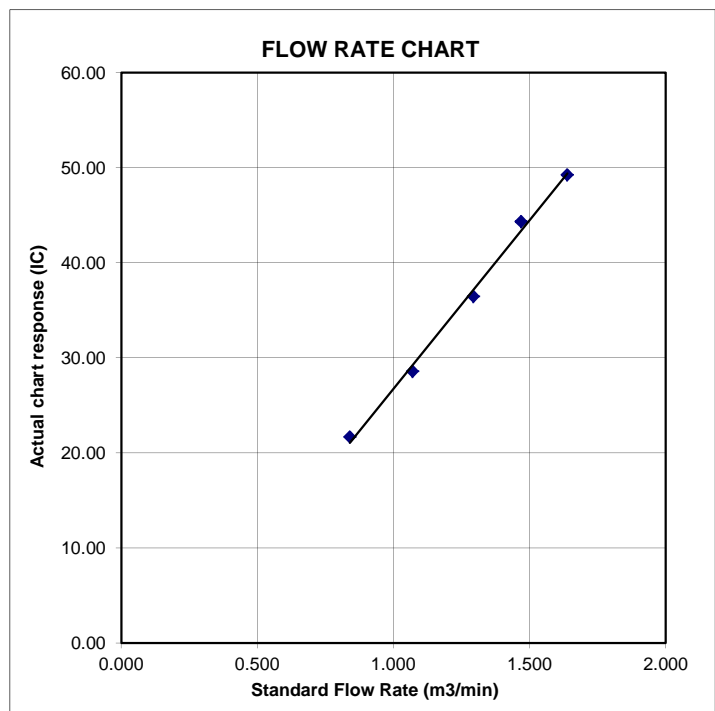
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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

Date of Calibration: 24/8/2015
 Next Calibration Date: 24/10/2015
 Technician: Keung Chi Young

CONDITIONS

Sea Level Pressure (hPa)	1002.4	Corrected Pressure (mm Hg)	751.8
Temperature (°C)	30.7	Temperature (K)	304

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.10265
Model->	5025A	Qstd Intercept ->	-0.00335
Serial # ->	1941		

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	1.678	54	53.20	Slope = 29.4287 Intercept = 2.2328 Corr. coeff. = 0.9941
13	5.6	5.6	11.2	1.570	48	47.29	
10	4.2	4.2	8.4	1.360	42	41.38	
7	2.6	2.6	5.2	1.070	34	33.50	
5	1.6	1.6	3.2	0.840	28	27.59	

Calculations :

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

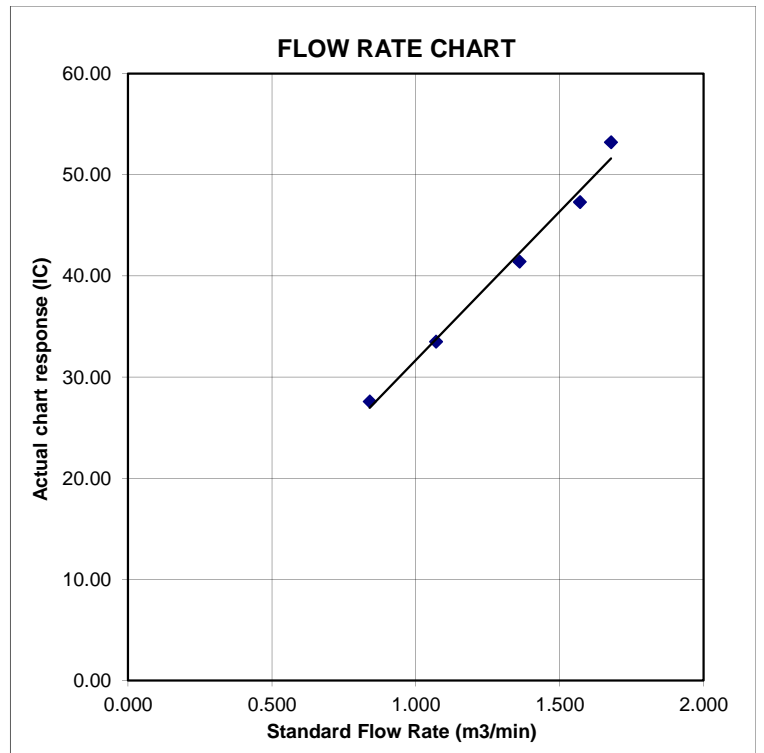
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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 : Ta Kwu Ling Fire Service Station
 Location ID : AM3

Date of Calibration: 24/8/2015
 Next Calibration Date: 24/10/2015
 Technician: Keung Chi Young

CONDITIONS

Sea Level Pressure (hPa)	1002.4	Corrected Pressure (mm Hg)	751.8
Temperature (°C)	30.7	Temperature (K)	304

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.10265
Model->	5025A	Qstd Intercept ->	-0.00335
Serial # ->	1941		

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	1.678	53	52.22	Slope = 29.0506 Intercept = 4.1295 Corr. coeff. = 0.9967
13	5	5	10.0	1.483	48	47.29	
10	4	4	8.0	1.327	44	43.35	
7	2.5	2.5	5.0	1.049	36	35.47	
5	1.6	1.6	3.2	0.840	28	27.59	

Calculations :

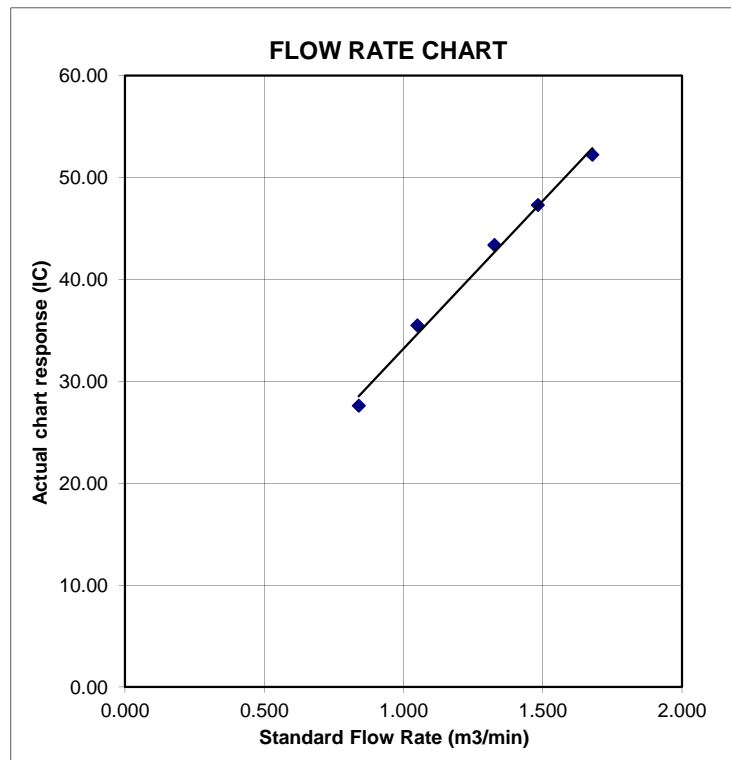
$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$
 $IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$

 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 : Village House of Loi Tung Village

Date of Calibration: 24/8/2015

Location ID : AM7b

Next Calibration Date: 24/10/2015

Technician: C Y Keung

CONDITIONS

Sea Level Pressure (hPa) 1002.4
 Temperature (°C) 30.7

Corrected Pressure (mm Hg) 751.8
 Temperature (K) 304

CALIBRATION ORIFICE

Make-> TISCH
 Model-> 5025A
 Serial # -> 1941

Qstd Slope -> 2.10265
 Qstd Intercept -> -0.00335

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	1.678	58	57.14	Slope = 36.4399 Intercept = -2.8849 Corr. coeff. = 0.9970
13	5	5	10.0	1.483	53	52.22	
10	4	4	8.0	1.327	47	46.31	
7	2.6	2.6	5.2	1.070	36	35.47	
5	1.6	1.6	3.2	0.840	28	27.59	

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

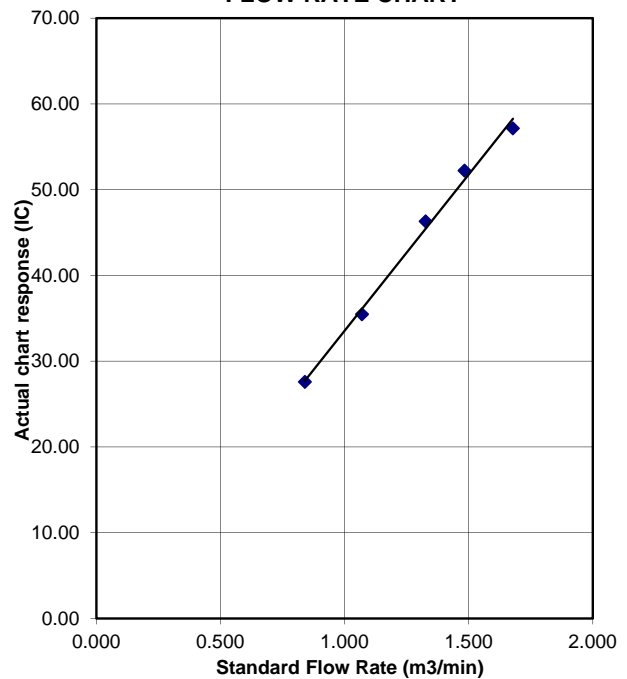
b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

FLOW RATE CHART



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

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

Date of Calibration: 24/8/2015
 Next Calibration Date: 24/10/2015
 Technician: C Y Keung

CONDITIONS

Sea Level Pressure (hPa)	1002.4	Corrected Pressure (mm Hg)	751.8
Temperature (°C)	30.7	Temperature (K)	304

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.10265
Model->	5025A	Qstd Intercept ->	-0.00335
Serial # ->	1941		

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	6.2	6.2	12.4	1.652	60	59.11	Slope = 34.7536 Intercept = 2.1501 Corr. coeff. = 0.9975		
13	5	5	10.0	1.483	54	53.20			
10	4	4	8.0	1.327	50	49.26			
7	2.5	2.5	5.0	1.049	40	39.41			
5	1.5	1.5	3.0	0.813	30	29.56			

Calculations :

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

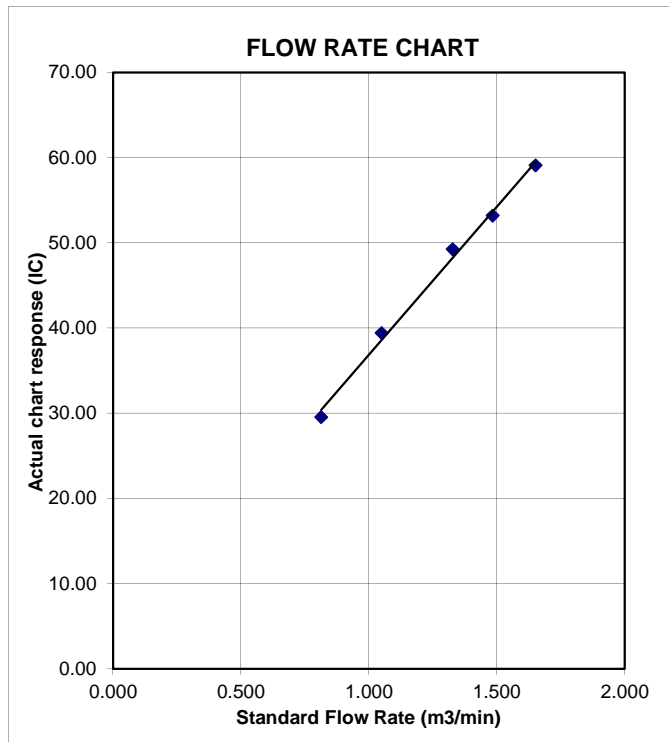
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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: 24/8/2015
 Next Calibration Date: 24/10/2015
 Technician: Keung Chi Young

CONDITIONS

Sea Level Pressure (hPa)	1002.4	Corrected Pressure (mm Hg)	751.8
Temperature (°C)	30.7	Temperature (K)	304

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.10265
Model->	5025A	Qstd Intercept ->	-0.00335
Serial # ->	1941		

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	1.691	54	53.20	Slope = 31.6768 Intercept = -1.1273 Corr. coeff. = 0.9984
13	5.3	5.3	10.6	1.527	47	46.31	
10	4.1	4.1	8.2	1.343	42	41.38	
7	2.7	2.7	5.4	1.090	34	33.50	
5	1.6	1.6	3.2	0.840	26	25.62	

Calculations :

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

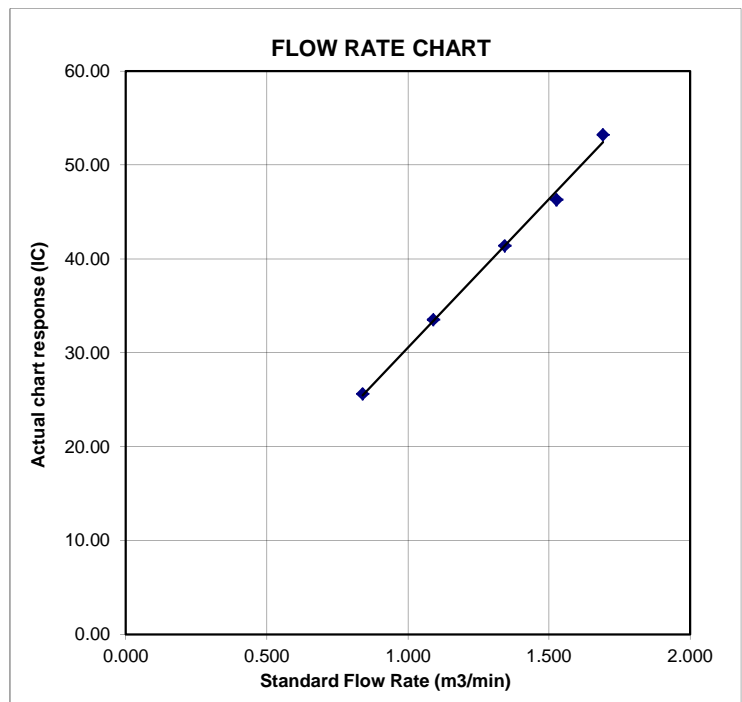
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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





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ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - Mar 24, 2015 Rootmeter S/N 0438320 Ta (K) - 292
 Operator Tisch Orifice I.D. - 1941 Pa (mm) - 756.92

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	1.4880	3.2	2.00
2	NA	NA	1.00	1.0510	6.4	4.00
3	NA	NA	1.00	0.9360	7.9	5.00
4	NA	NA	1.00	0.8920	8.8	5.50
5	NA	NA	1.00	0.7360	12.7	8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)	Va	(x axis) Qa	(y axis)
1.0121	0.6802	1.4258	0.9958	0.6692	0.8784
1.0078	0.9589	2.0163	0.9916	0.9434	1.2422
1.0057	1.0745	2.2543	0.9895	1.0571	1.3888
1.0046	1.1262	2.3644	0.9884	1.1080	1.4566
0.9993	1.3578	2.8515	0.9832	1.3358	1.7568
Qstd slope (m) = 2.10265			Qa slope (m) = 1.31664		
intercept (b) = -0.00335			intercept (b) = -0.00206		
coefficient (r) = 0.99999			coefficient (r) = 0.99999		
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 Calibration Record

Equipment Calibrated:

Type: Laser Dust monitor
 Manufacturer: Sibata LD-3B
 Serial No. 2X6146
 Equipment Ref: EQ 106
 Job Order HK1500837

Standard Equipment:

Standard Equipment: Higher Volume Sampler
 Location & Location ID: AUES office (calibration room)
 Equipment Ref: HVS 018
 Last Calibration Date: 10 Nov 2014

Equipment Calibration Results:

Calibration Date: 4 January 2015

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m ³ (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
1hr19min	10:00 ~ 11:19	17.3	1017.0	0.076	2677	33.8
2hr15min	11:25 ~ 13:40	17.3	1017.0	0.111	6875	50.9
2hr06min	15:40 ~ 17:46	17.3	1017.0	0.047	2399	19.0

Sensitivity Adjustment Scale Setting (Before Calibration) 594 (CPM)

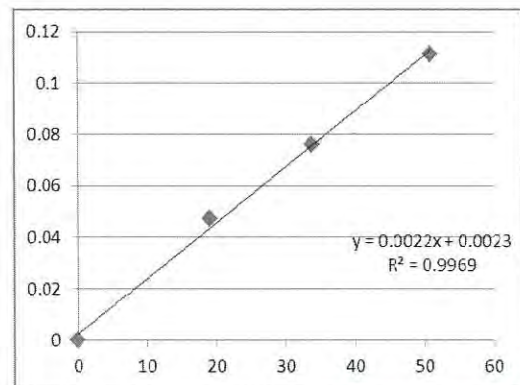
Sensitivity Adjustment Scale Setting (After Calibration) 588 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022

Correlation Coefficient 0.9969

Date of Issue 6 January 2015



Operator: Donald Kwok Signature: [Signature] Date: 6 January 2015

QC Reviewer: Ben Tam Signature: [Signature] Date: 6 January 2015

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Gold King Industrial Building, Kwai Chung Date of Calibration: 10-Nov-14
 Location ID : Calibration Room Next Calibration Date: 10-Feb-15

CONDITIONS

Sea Level Pressure (hPa)	1017.3	Corrected Pressure (mm Hg)	762.975
Temperature (°C)	23.3	Temperature (K)	296

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.00757
Model->	5025A	Qstd Intercept ->	-0.01628
Calibration Date->	7-Apr-14	Expiry Date->	7-Apr-15

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	3.6	3.6	7.2	1.351	58	58.28	33.8083	12.9642	0.9976
13	2.8	2.8	5.6	1.193	54	54.26			
10	2.2	2.2	4.4	1.058	48	48.23			
8	1.5	1.5	3.0	0.875	42	42.20			
5	0.9	0.9	1.8	0.680	36	36.17			

Calculations :

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

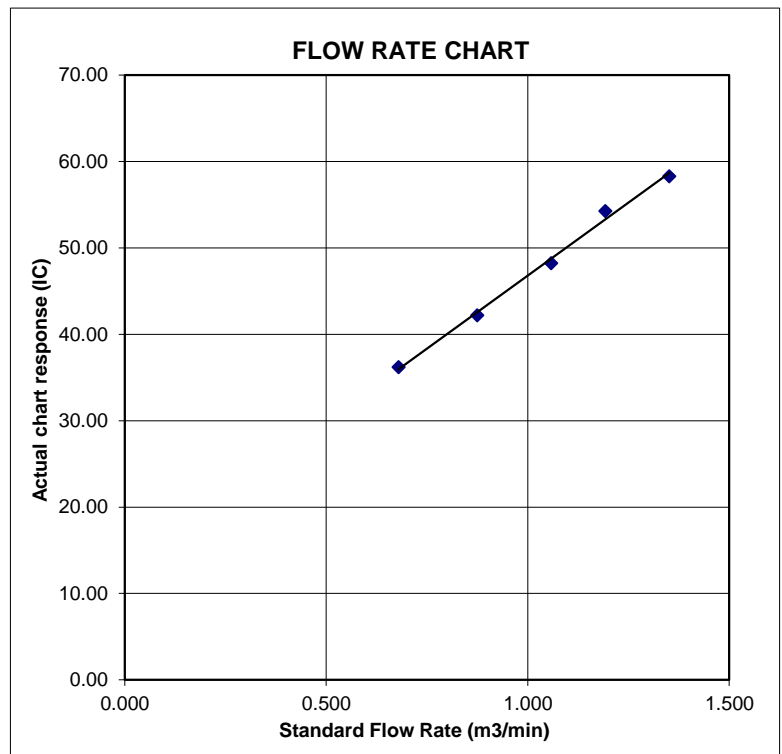
$$IC = I[\text{Sqrt}(P_a/P_{std})(T_{std}/T_a)]$$

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



Equipment Calibration Record

Equipment Calibrated:

Type: Laser Dust monitor
 Manufacturer: Sibata LD-3B
 Serial No. 366409
 Equipment Ref: EQ 109
 Job Order HK1500973

Standard Equipment:

Standard Equipment: Higher Volume Sampler
 Location & Location ID: AUES office (calibration room)
 Equipment Ref: HVS 018
 Last Calibration Date: 10 Nov 2014

Equipment Calibration Results:

Calibration Date: 4 January 2015

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m ³ (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
1hr19min	10:00 ~ 11:19	17.3	1017.0	0.076	2615	33.0
2hr15min	11:25 ~ 13:40	17.3	1017.0	0.111	6854	50.8
2hr06min	15:40 ~ 17:46	17.3	1017.0	0.047	2319	18.4

Sensitivity Adjustment Scale Setting (Before Calibration) 538 (CPM)

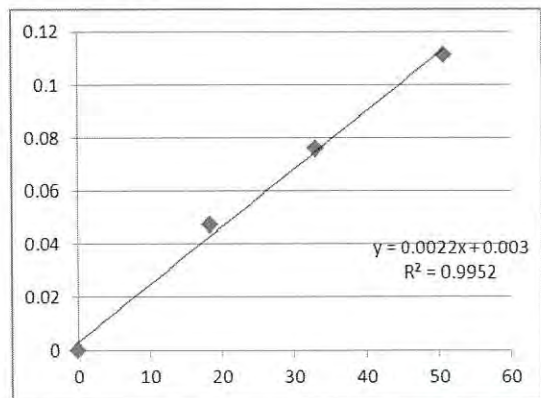
Sensitivity Adjustment Scale Setting (After Calibration) 533 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022

Correlation Coefficient 0.9952

Date of Issue 6 January 2015



Operator: Donald Kwok Signature: [Signature] Date: 6 January 2015

QC Reviewer: Ben Tam Signature: [Signature] Date: 6 January 2015

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Gold King Industrial Building, Kwai Chung Date of Calibration: 10-Nov-14
 Location ID : Calibration Room Next Calibration Date: 10-Feb-15

CONDITIONS

Sea Level Pressure (hPa)	1017.3	Corrected Pressure (mm Hg)	762.975
Temperature (°C)	23.3	Temperature (K)	296

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.00757
Model->	5025A	Qstd Intercept ->	-0.01628
Calibration Date->	7-Apr-14	Expiry Date->	7-Apr-15

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	3.6	3.6	7.2	1.351	58	58.28	33.8083	12.9642	0.9976
13	2.8	2.8	5.6	1.193	54	54.26			
10	2.2	2.2	4.4	1.058	48	48.23			
8	1.5	1.5	3.0	0.875	42	42.20			
5	0.9	0.9	1.8	0.680	36	36.17			

Calculations :

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

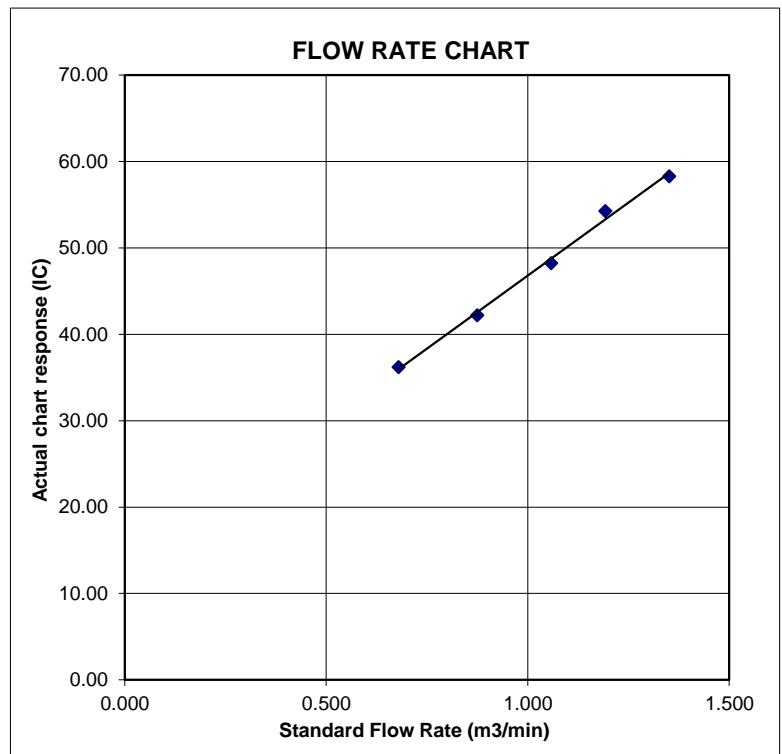
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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. 456660
 Equipment Ref: EQ117
 Job Order _____

Standard Equipment:

Standard Equipment: Higher Volume Sampler
 Location & Location ID: AUES office (calibration room)
 Equipment Ref: HVS 018
 Last Calibration Date: 6 February 2015

Equipment Verification Results:

Testing Date: 5 April 2015

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m ³ (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr11min	10:00 ~ 12:11	26.0	1011.3	0.041	2344	17.9
2hr21min	12:20 ~ 14:41	26.0	1011.3	0.038	2104	14.9
2hr17min	14:50 ~ 17:07	26.0	1011.3	0.057	3514	25.7

Sensitivity Adjustment Scale Setting (Before Calibration) 607 (CPM)

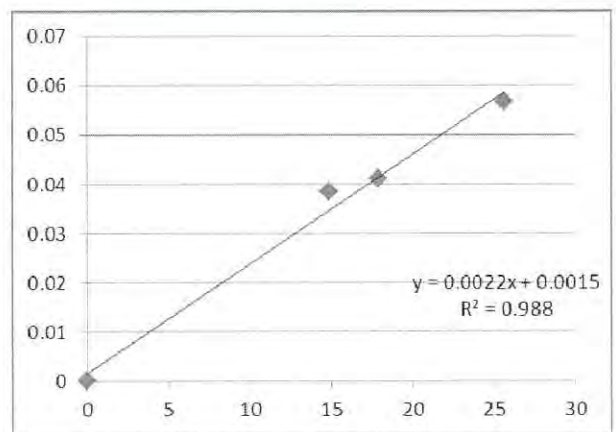
Sensitivity Adjustment Scale Setting (After Calibration) 602 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022

Correlation Coefficient 0.9940

Date of Issue 20 April 2015



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 : 20 April 2015

QC Reviewer : Ben Tam Signature : [Signature] Date : 20 April 2015

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Gold King Industrial Building, Kwai Chung
 Location ID : Calibration Room

Date of Calibration: 6-Feb-15
 Next Calibration Date: 6-May-15

CONDITIONS

Sea Level Pressure (hPa)	1024.5	Corrected Pressure (mm Hg)	768.375
Temperature (°C)	13.4	Temperature (K)	286

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.00757
Model->	5025A	Qstd Intercept ->	-0.01628
Calibration Date->	7-Apr-14	Expiry Date->	7-Apr-15

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	3.8	3.8	7.6	1.417	56	57.44	Slope = 30.5075 Intercept = 14.6821 Corr. coeff. = 0.9974
13	3	3	6.0	1.260	52	53.33	
10	2.3	2.3	4.6	1.104	48	49.23	
8	1.7	1.7	3.4	0.950	42	43.08	
5	1.0	1.0	2.0	0.731	36	36.92	

Calculations :

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

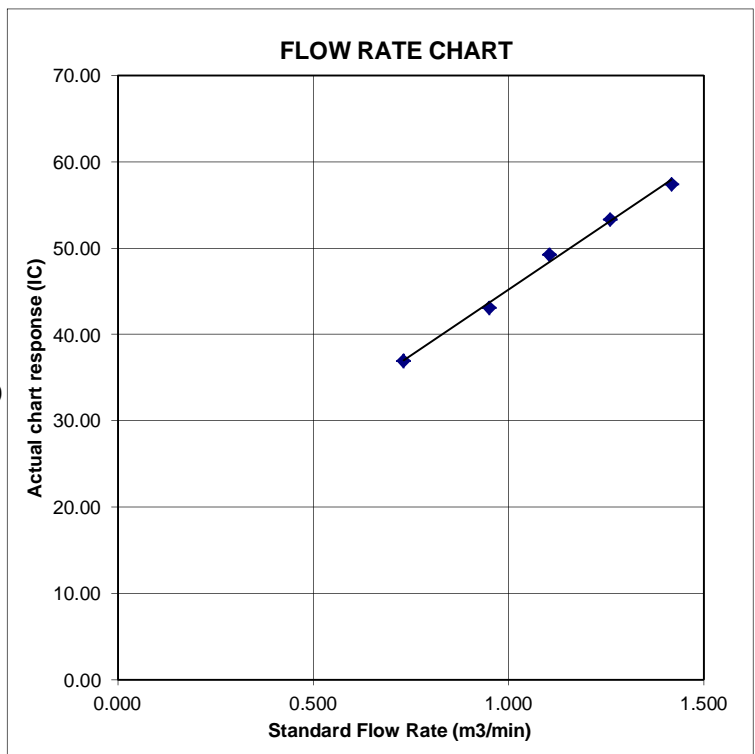
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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



Equipment Verification Report (TSP)

Equipment Calibrated:

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

Standard Equipment:

Standard Equipment: Higher Volume Sampler
 Location & Location ID: AUES office (calibration room)
 Equipment Ref: HVS 018
 Last Calibration Date: 6 February 2015

Equipment Verification Results:

Testing Date: 5 April 2015

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m ³ (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr11min	10:00 ~ 12:11	26.0	1011.3	0.041	2407	18.4
2hr21min	12:20 ~ 14:41	26.0	1011.3	0.038	2219	15.7
2hr17min	14:50 ~ 17:07	26.0	1011.3	0.057	3644	26.6

Sensitivity Adjustment Scale Setting (Before Calibration) 698 (CPM)

Sensitivity Adjustment Scale Setting (After Calibration) 701 (CPM)

Linear Regression of Y or X

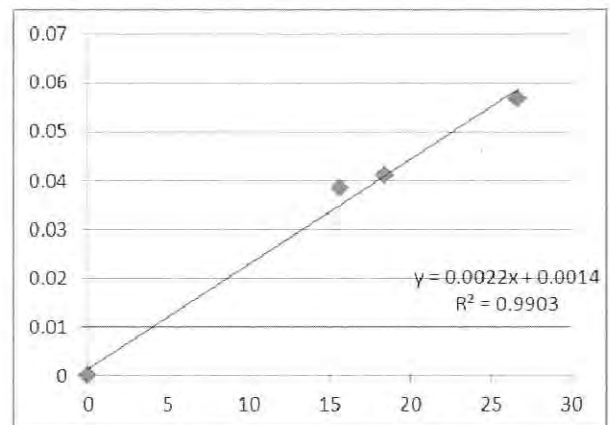
Slope (K-factor): 0.0022

Correlation Coefficient 0.9951

Date of Issue 20 April 2015

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: 20 April 2015

QC Reviewer: Ben Tam Signature: _____ Date: 20 April 2015

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Gold King Industrial Building, Kwai Chung	Date of Calibration: 6-Feb-15
Location ID :	Calibration Room	Next Calibration Date: 6-May-15

CONDITIONS

Sea Level Pressure (hPa)	1024.5	Corrected Pressure (mm Hg)	768.375
Temperature (°C)	13.4	Temperature (K)	286

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.00757
Model->	5025A	Qstd Intercept ->	-0.01628
Calibration Date->	7-Apr-14	Expiry Date->	7-Apr-15

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	3.8	3.8	7.6	1.417	56	57.44	Slope = 30.5075 Intercept = 14.6821 Corr. coeff. = 0.9974
13	3	3	6.0	1.260	52	53.33	
10	2.3	2.3	4.6	1.104	48	49.23	
8	1.7	1.7	3.4	0.950	42	43.08	
5	1.0	1.0	2.0	0.731	36	36.92	

Calculations :

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

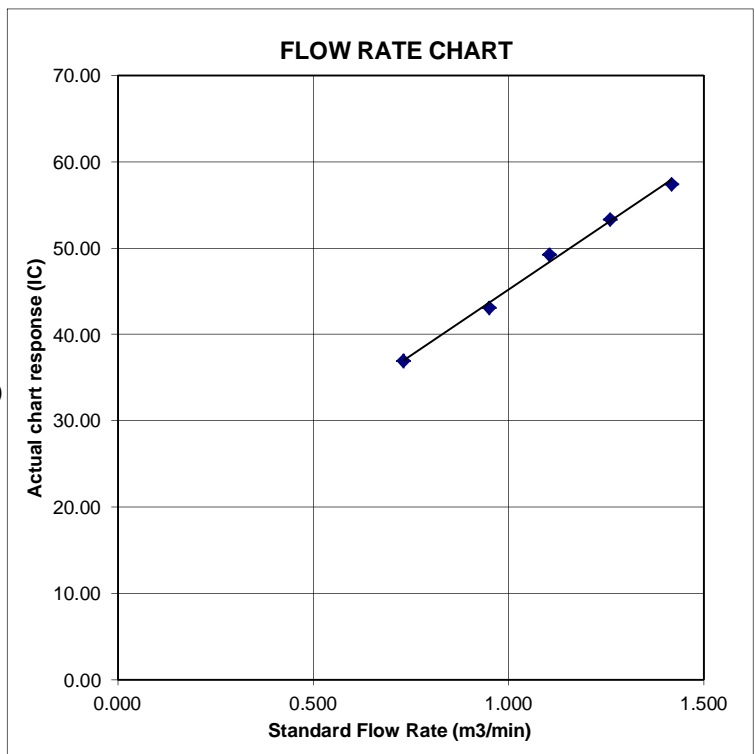
$$IC = I[\sqrt{P_a/P_{std}}(T_{std}/T_a)]$$

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



SIBATA SCIENTIFIC TECHNOLOGY LTD.

1-1-62, Nakane, Soka, Saitama, 340-0005 Japan

TEL : 048-933-1582 FAX : 048-933-1591

CALIBRATION CERTIFICATE

Date: May 11, 2015

Equipment Name	:	Digital Dust Indicator, Model LD-3B
Code No.	:	080000-42
Quantity	:	1 unit
Serial No.	:	3Y6501
Sensitivity	:	0.001 mg/m ³
Sensitivity Adjustment	:	656CPM
Scale Setting	:	April 24, 2015

We hereby certify that the above mentioned instrument has been calibrated satisfactorily.

Sincerely

SIBATA SCIENTIFIC TECHNOLOGY LTD.

Hong

For Kentaro Togo
Overseas Sales Division



Certificate of Calibration 校正證書

Certificate No. : C151969
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 : 24 March 2015
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 ± 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 : 11 April 2015

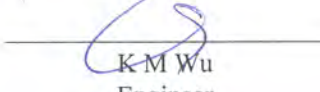
TEST RESULTS / 測試結果

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 : 14 April 2015
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. : C151969

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	C150014
CL281	Multifunction Acoustic Calibrator	DC130171

- 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	94.3

6.1.1.2 After Self-calibration

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
50 - 130	L _{AFP}	A	F	94.00	1	94.1	± 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	94.1 (Ref.)
				104.00		104.0
				114.00		114.0

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

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

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. : C151969

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	94.1	Ref.
	L _{ASP}		S			94.1	± 0.1
	L _{AIP}		I			94.1	± 0.1

6.2.2 Tone Burst Signal (2 kHz)

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Burst Duration		
30 - 110	L _{AFP}	A	F	106.0	Continuous	106.0	Ref.
	L _{AFMax}				200 ms	104.9	-1.0 ± 1.0
	L _{ASP}		S		Continuous	106.0	Ref.
	L _{ASMax}				500 ms	101.9	-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	68.0	-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	94.1	Ref.
					2 kHz	95.3	+1.2 ± 1.0
					4 kHz	95.1	+1.0 ± 1.0
					8 kHz	93.0	-1.1 (+1.5 ; -3.0)
					12.5 kHz	89.9	-4.3 (+3.0 ; -6.0)

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

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

Certificate of Calibration

校正證書

Certificate No. : C151969
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	91.4	-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	93.3	-0.8 ± 1.0
					8 kHz	91.1	-3.0 (+1.5 ; -3.0)
					12.5 kHz	88.0	-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
			60 sec.					90	90.1	± 0.5
			5 min.					80	79.4	± 1.0
								70	69.2	± 1.0

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. : 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 : 5 June 2015
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. : 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.

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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 _{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	

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 _{AFP}	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. : C152552
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 : 17 April 2015
Description / 儀器名稱 : Sound Level Meter (EQ011)
Manufacturer / 製造商 : Rion
Model No. / 型號 : NL-52
Serial No. / 編號 : 01121362
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 : 8 May 2015

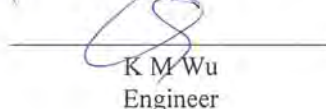
TEST RESULTS / 測試結果

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 : 12 May 2015
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. : C152552
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 was performed before 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 :

6.1 Sound Pressure Level

6.1.1 Reference Sound Pressure Level

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 130	L _A	A	Fast	94.00	1	93.6	± 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	93.6 (Ref.)
				104.00		103.6
				114.00		113.6

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

6.2 Time Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 130	L _A	A	Fast	94.00	1	93.6	Ref.
			Slow				± 0.3

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

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Certificate of Calibration

校正證書

Certificate No. : C152552
證書編號

6.3 Frequency Weighting

6.3.1 A-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 130	L _A	A	Fast	94.00	63 Hz	67.3	-26.2 ± 1.5
					125 Hz	77.4	-16.1 ± 1.5
					250 Hz	84.9	-8.6 ± 1.4
					500 Hz	90.3	-3.2 ± 1.4
					1 kHz	93.6	Ref.
					2 kHz	94.8	+1.2 ± 1.6
					4 kHz	94.6	+1.0 ± 1.6
					8 kHz	92.6	-1.1 (+2.1 ; -3.1)
					12.5 kHz	89.2	-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	92.7	-0.8 ± 1.5
					125 Hz	93.4	-0.2 ± 1.5
					250 Hz	93.6	0.0 ± 1.4
					500 Hz	93.6	0.0 ± 1.4
					1 kHz	93.6	Ref.
					2 kHz	93.4	-0.2 ± 1.6
					4 kHz	92.8	-0.8 ± 1.6
					8 kHz	90.7	-3.0 (+2.1 ; -3.1)
					12.5 kHz	87.2	-6.2 (+3.0 ; -6.0)

Remarks : - UUT Microphone Model No. : UC-59 & S/N : 07459

- 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.

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. : C151967
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 : 24 March 2015
Description / 儀器名稱 : Sound Level Calibrator (EQ084)
Manufacturer / 製造商 : Cesva
Model No. / 型號 : CB-5
Serial No. / 編號 : 030023
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 : 11 April 2015

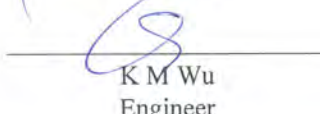
TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.
All results are within 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 K C Lee
Project Engineer

Certified By : 
核證 K M Wu
Engineer

Date of Issue : 14 April 2015
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. : C151967

證書編號

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

Equipment ID	Description	Certificate No.
CL130	Universal Counter	C143868
CL281	Multifunction Acoustic Calibrator	DC130171
TST150A	Measuring Amplifier	C141558

4. Test procedure : MA100N.

5. Results :

5.1 Sound Level Accuracy

5.1.1 Before Adjustment

UUT Nominal Value	Measured Value (dB)	Mfr's Spec. (dB)	Uncertainty of Measured Value (dB)
94 dB, 1 kHz	* 94.4	± 0.3	± 0.2
104 dB, 1 kHz	* 104.4		± 0.3

Out of Mfr's Spec.

5.1.2 After Adjustment

UUT Nominal Value	Measured Value (dB)	Mfr's Spec. (dB)	Uncertainty of Measured Value (dB)
94 dB, 1 kHz	94.0	± 0.3	± 0.2
104 dB, 1 kHz	104.0		± 0.3

5.2 Frequency Accuracy

5.2.1 Before Adjustment

UUT Nominal Value (kHz)	Measured Value (kHz)	Mfr's Spec.	Uncertainty of Measured Value (Hz)
1	1.002	1 kHz ± 1.5 %	± 1

5.2.2 After Adjustment

UUT Nominal Value (kHz)	Measured Value (kHz)	Mfr's Spec.	Uncertainty of Measured Value (Hz)
1	1.001	1 kHz ± 1.5 %	± 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.

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Certificate of Calibration 校正證書

Certificate No. : C151967
證書編號

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. : C152550
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 : 16 April 2015
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 : $(23 \pm 2)^{\circ}\text{C}$ 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 : 7 May 2015

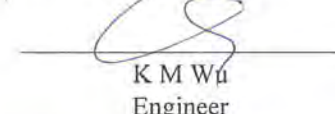
TEST RESULTS / 測試結果

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 : 12 May 2015
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. : C152550
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	C143868
CL281	Multifunction Acoustic Calibrator	DC130171
TST150A	Measuring Amplifier	C141558

- 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.



Certificate of Calibration 校正證書

Certificate No. : C151968
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 : 24 March 2015

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

TEST CONDITIONS / 測試條件

Temperature / 溫度 : (23 ± 2)°C Relative Humidity / 相對濕度 : (55 ± 20)%
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check


DATE OF TEST / 測試日期 : 11 April 2015

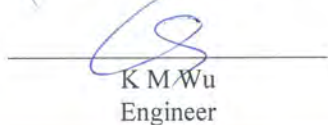
TEST RESULTS / 測試結果

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 : 14 April 2015
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. : C151968

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	C143868
CL281	Multifunction Acoustic Calibrator	DC130171
TST150A	Measuring Amplifier	C141558

- Test procedure : MA100N.

- Results :

5.1 Sound Level Accuracy

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

5.2 Frequency Accuracy

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

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

Note :

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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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: HK1516748
SUB-BATCH: 0
LABORATORY: HONG KONG
DATE RECEIVED: 19/05/2015
DATE OF ISSUE: 28/05/2015

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.

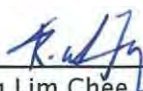
The "Next Calibration Date" is recommended according to best practice principals as practised by the ALS Hong Kong laboratory or quoted from relevant international standards.

Scope of Test: Dissolved Oxygen, pH, Salinity and Temperature
Equipment Type: Multifunctional Meter
Brand Name: YSI
Model No.: Professional Plus
Serial No.: 10G101946
Equipment No.: --
Date of Calibration: 27 May, 2015

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: HK1516748
Sub-Batch: 0
Date of Issue: 28/05/2015
Client: ACTION UNITED ENVIRO SERVICES

Equipment Type: Multifunctional Meter
Brand Name: YSI
Model No.: Professional Plus
Serial No.: 10G101946
Equipment No.: --
Date of Calibration: 27 May, 2015 **Date of next Calibration:** 27 August, 2015

Parameters:

Dissolved Oxygen

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

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
3.51	3.53	+0.02
5.02	5.10	+0.08
8.80	8.84	+0.04
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	3.98	-0.02
7.0	6.96	-0.04
10.0	9.86	-0.14
Tolerance Limit (pH unit)		±0.20

Salinity

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

Expected Reading (ppt)	Displayed Reading (ppt)	Tolerance (%)
0	0.00	--
10	9.32	-6.8
20	19.11	-4.5
30	28.90	-3.7
Tolerance Limit (%)		±10.0

Temperature

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

Expected Reading (°C)	Displayed Reading (°C)	Tolerance (°C)
10.0	9.6	-0.4
20.0	19.2	-0.8
37.0	36.9	-0.1
Tolerance Limit (°C)		±2.0

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



 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: HK1529672
SUB-BATCH: 0
LABORATORY: HONG KONG
DATE RECEIVED: 12/08/2015
DATE OF ISSUE: 20/08/2015

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.: Pro 20
Serial No.: 12C100570
Equipment No.: --
Date of Calibration: 19 August, 2015

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: HK1529672
Sub-Batch: 0
Date of Issue: 20/08/2015
Client: ACTION UNITED ENVIRO SERVICES



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

Date of Calibration: 19 August, 2015 **Date of next Calibration:** 19 November, 2015

Parameters:

Dissolved Oxygen

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

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
3.08	3.14	+0.06
5.60	5.71	+0.11
7.82	7.79	-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)
12	13.2	+1.2
18	18.9	+0.9
35	34.1	-0.9
Tolerance Limit (°C)		±2.0

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



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REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

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

WORK ORDER: HK1529670
SUB-BATCH: 0
LABORATORY: HONG KONG
DATE RECEIVED: 12/08/2015
DATE OF ISSUE: 20/08/2015

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.: 8685
Serial No.: 1064457
Equipment No.: --
Date of Calibration: 19 August, 2015

NOTES

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

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



Work Order: HK1529670
Sub-batch: 0
Date of Issue: 20/08/2015
Client: ACTION UNITED ENVIRO SERVICES

Description: pH Meter
Brand Name: AZ
Model No.: 8685
Serial No.: 1064457
Equipment No.: --

Date of Calibration: 19 August, 2015

Date of next Calibration:

19 November, 2015

Parameters:

pH Value

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

Expected Reading (pH Unit)	Displayed Reading (pH Unit)	Tolerance (pH unit)
4.0	4.1	+0.10
7.0	6.9	-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)
12	11.5	-0.5
19	18.5	-0.5
38	37.5	-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.


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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,
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WORK ORDER: HK1514895
SUB-BATCH: 0
LABORATORY: HONG KONG
DATE RECEIVED: 06/05/2015
DATE OF ISSUE: 13/05/2015

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: 07 May, 2015

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: HK1514895
Sub-batch: 0
Date of Issue: 13/05/2015
Client: ACTION UNITED ENVIRO SERVICES

Equipment Type: Turbidimeter
Brand Name: HACH
Model No.: 2100Q
Serial No.: 12060C018266
Equipment No.: --
Date of Calibration: 07 May, 2015 Date of next Calibration: 07 August, 2015


Parameters:

Turbidity

Method Ref: APHA 21st Ed. 2130B

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.08	--
4	4.37	+9.3
40	43.7	+9.3
80	85.9	+7.4
400	427	+6.8
800	870	+8.8
	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
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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,
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N.T., HONG KONG

WORK ORDER: HK1529917
SUB-BATCH: 0
LABORATORY: HONG KONG
DATE RECEIVED: 13/08/2015
DATE OF ISSUE: 19/08/2015

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.: 11030C008499
Equipment No.: --
Date of Calibration: 17 August, 2015

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: HK1529917
Sub-batch: 0
Date of Issue: 19/08/2015
Client: ACTION UNITED ENVIRO SERVICES

Equipment Type: Turbidimeter
Brand Name: HACH
Model No.: 2100Q
Serial No.: 11030C008499
Equipment No.: --

Date of Calibration: 17 August, 2015 **Date of next Calibration:** 17 November, 2015

Parameters:

Turbidity

Method Ref: APHA 21st Ed. 2130B

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.00	--
4	4.27	+6.7
40	38.7	-3.2
80	73.8	-7.8
400	377	-5.8
800	759	-5.1
	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 -
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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: HK1521789
SUB-BATCH: 0
LABORATORY: HONG KONG
DATE RECEIVED: 25/06/2015
DATE OF ISSUE: 02/07/2015

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.: YSI 6820 / 650MDS
Serial No.: 02J0912/02K0788 AA
Equipment No.: --
Date of Calibration: 02 July, 2015

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: HK1521789
Sub-Batch: 0
Date of Issue: 02/07/2015
Client: ACTION UNITED ENVIRO SERVICES

Equipment Type: Multifunctional Meter
Brand Name: YSI
Model No.: YSI 6820 / 650MDS
Serial No.: 02J0912/02K0788 AA
Equipment No.: --

Date of Calibration: 02 July, 2015 **Date of next Calibration:** 02 October, 2015

Parameters:

Conductivity

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

Expected Reading (uS/cm)	Displayed Reading (uS/cm)	Tolerance (%)
146.9	150.1	+2.2
6667	6552	-1.7
12890	13060	+1.3
58670	58070	-1.0
Tolerance Limit (%)		±10.0

Dissolved Oxygen

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

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
2.98	2.99	+0.01
5.00	5.07	+0.07
7.80	7.88	+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	7.09	+0.09
10.0	9.97	-0.03
Tolerance Limit (pH unit)		±0.20

Salinity

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

Expected Reading (ppt)	Displayed Reading (ppt)	Tolerance (%)
0	0.00	--
10	9.69	-3.1
20	19.71	-1.5
30	30.03	+0.1
Tolerance Limit (%)		±10.0

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


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

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



Work Order: HK1521789
Sub-Batch: 0
Date of Issue: 02/07/2015
Client: ACTION UNITED ENVIRO SERVICES

Equipment Type: Multifunctional Meter
Brand Name: YSI
Model No.: YSI 6820 / 650MDS
Serial No.: 02J0912/02K0788 AA
Equipment No.: --
Date of Calibration: 02 July, 2015

Date of next Calibration: 02 October, 2015

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)
11.0	11.4	+0.4
20.0	19.8	-0.2
31.0	30.2	-0.8
	Tolerance Limit (°C)	±2.0

Turbidity

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

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.2	--
4	4.0	+0.0
40	39.4	-1.5
80	81.3	+1.6
400	414.8	+3.7
800	833.6	+4.2
	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

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	CONTRACTOR			ACTION CONTRACTOR
	ET	IEC	ER	
Action level being exceeded by one sampling day	<ol style="list-style-type: none"> 1. Repeat in-situ measurement to confirm findings; 2. Identify reasons for non-compliance and sources of impact; 3. Inform IEC and Contractor; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC and Contractor; 6. Repeat measurement on next day of exceedance. 	<ol style="list-style-type: none"> 1. Discuss with ET and Contractor on the mitigation measures; 2. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; 3. Assess the effectiveness of the implemented mitigation measures 	<ol style="list-style-type: none"> 1. Discuss with IEC on the proposed mitigation measures; 2. Make agreement on the mitigation measures to be implemented; 3. Assess the effectiveness of the implemented mitigation measures 	<ol style="list-style-type: none"> 1. Inform the ER and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of working methods; 5. Discuss with ET and IEC and propose mitigation measures to IEC and ER; 6. Implement the agreed mitigation measures.
Action Level being exceeded by more than two consecutive sampling days	<ol style="list-style-type: none"> 1. Repeat in-situ measurement to confirm findings; 2. Identify reasons for non-compliance and sources of impact; 3. Inform IEC and Contractor; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC and Contractor; 6. Ensure mitigation measures are implemented; 7. Prepare to increase the monitoring frequency to daily; 8. Repeat measurement on next day of exceedance. 	<ol style="list-style-type: none"> 1. Discuss with ET and Contractor on the mitigation measures; 2. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; 3. Assess the effectiveness of the implemented mitigation measures 	<ol style="list-style-type: none"> 1. Discuss with IEC on the proposed mitigation measures; 2. Make agreement on the mitigation measures to be implemented; 3. Assess the effectiveness of the implemented mitigation measures 	<ol style="list-style-type: none"> 1. Inform the ER and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of working methods; 5. Discuss with ET and IEC and propose mitigation measures to IEC and ER within 3 working days; 6. Implement the agreed mitigation measures.
Limit Level being exceeded by one sampling day	<ol style="list-style-type: none"> 1. Repeat in-situ measurement to confirm findings; 2. Identify reasons for non-compliance and sources of impact; 3. Inform IEC, Contractor and EPD; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, ER and Contractor; 6. Ensure mitigation measures are implemented; 7. Increase the monitoring frequency to daily until no exceedance of Limit Level. 	<ol style="list-style-type: none"> 1. Discuss with ET and Contractor on the mitigation measures; 2. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; 3. Assess the effectiveness of the implemented mitigation measures 	<ol style="list-style-type: none"> 1. Discuss with IEC, ET and Contractor on the proposed mitigation measures; 2. Request Contractor to critically review the working methods; 3. Make agreement on the mitigation measures to be implemented; 4. Assess the effectiveness of the implemented mitigation measures 	<ol style="list-style-type: none"> 1. Inform the ER and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of working methods; 5. Discuss with ET, IEC and ER and propose mitigation measures to IEC and ER within 3 working days; 6. Implement the agreed mitigation measures.
Limit level being exceeded by more than one consecutive sampling days	<ol style="list-style-type: none"> 1. Repeat in-situ measurement to confirm findings; 2. Identify reasons for non-compliance and sources of impact; 3. Inform IEC, Contractor and EPD; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, ER and Contractor; 6. Ensure mitigation measures are implemented; 7. Increase the monitoring frequency to daily until no exceedance of Limit Level for two consecutive days. 	<ol style="list-style-type: none"> 1. Discuss with ET and Contractor on the mitigation measures; 2. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; 3. Assess the effectiveness of the implemented mitigation measures. 	<ol style="list-style-type: none"> 1. Discuss with IEC, ET and Contractor on the proposed mitigation measures; 2. Request Contractor to critically review the working methods; 3. Make agreement on the mitigation measures to be implemented; 4. Assess the effectiveness of the implemented mitigation measures; 5. Consider and instruct, if necessary, the Contractor to slow down or to stop all or part of the construction activities until no exceedance of Limit Level. 	<ol style="list-style-type: none"> 1. Inform the ER and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of working methods; 5. Discuss with ET, IEC and ER and propose mitigation measures to IEC and ER within 3 working days; 6. Implement the agreed mitigation measures; 7. As directed by the ER, to slow down or to stop all or part of the construction activities.

Appendix H

Impact Monitoring Schedule

Impact Monitoring Schedule for the Reporting Period – August 2015

Date		Dust Monitoring		Noise Monitoring	Water Quality
		1-hour TSP	24-hour TSP		
SAT	1-AUG-15				C2& C3 & C5
SUN	2-AUG-15				
MON	3-AUG-15	C3&C5		C3&C5	C2& C3 & C5
TUE	4-AUG-15				
WED	5-AUG-15		C2&C3 & C5		C2& C3 & C5
THU	6-AUG-15	C2		C2	
FRI	7-AUG-15				
SAT	8-AUG-15	C3&C5		C3&C5	C2& C3 & C5
SUN	9-AUG-15				
MON	10-AUG-15				C2& C3 & C5
TUE	11-AUG-15		C2&C3 & C5		
WED	12-AUG-15	C2		C2	C2& C3 & C5
THU	13-AUG-15				
FRI	14-AUG-15	C3&C5		C3&C5	C2& C3 & C5
SAT	15-AUG-15				
SUN	16-AUG-15				
MON	17-AUG-15		C2&C3 & C5		
TUE	18-AUG-15	C2		C2	C2& C3 & C5
WED	19-AUG-15				
THU	20-AUG-15	C3&C5		C3&C5	C2& C3 & C5
FRI	21-AUG-15				
SAT	22-AUG-15		C2&C3 & C5		C2& C3 & C5
SUN	23-AUG-15				
MON	24-AUG-15	C2		C2	C2& C3 & C5
TUE	25-AUG-15				
WED	26-AUG-15	C3&C5		C3&C5	C2& C3 & C5
THU	27-AUG-15				
FRI	28-AUG-15		C2&C3 & C5		C2& C3 & C5
SAT	29-AUG-15	C2		C2	
SUN	30-AUG-15				
MON	31-AUG-15				C2& C3 & C5

Remark:

(a) 24-hr TSP monitoring at AM3 was rescheduled from 17 Aug 2015 to 19 Aug 2015 due to power failure

	Monitoring Day
	Sunday or Public Holiday

Monitoring Location

Contract 2 (C2)	Air Quality	AM7b & AM8
	Construction Noise	NM5, NM6, NM7
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	AM1a, AM2 & AM3
	Construction Noise	NM1, NM2
	Water Quality	WM1 & WM1-Control

Impact Monitoring Schedule for next Reporting Period – September 2015

Date		Dust Monitoring		Noise Monitoring	Water Quality
		1-hour TSP	24-hour TSP		
TUE	1-SEP-15	C3&C5 & SSC505		C3&C5 & SSC505	
WED	2-SEP-15		C2&C3&C5 & SSC505		C2&C3&C5 & SSC505
THU	3-SEP-15				
FRI	4-SEP-15	C2		C2	C2&C3&C5 & SSC505
SAT	5-SEP-15				
SUN	6-SEP-15				
MON	7-SEP-15	C3&C5 & SSC505		C3&C5 & SSC505	C2&C3&C5 & SSC505
TUE	8-SEP-15		C2&C3&C5 & SSC505		
WED	9-SEP-15	C2		C2	C2&C3&C5 & SSC505
THU	10-SEP-15				
FRI	11-SEP-15				
SAT	12-SEP-15	C3&C5 & SSC505		C3&C5 & SSC505	C2&C3&C5 & SSC505
SUN	13-SEP-15				
MON	14-SEP-15		C2&C3&C5 & SSC505		C2&C3&C5 & SSC505
TUE	15-SEP-15	C2		C2	
WED	16-SEP-15				C2&C3&C5 & SSC505
THU	17-SEP-15				
FRI	18-SEP-15	C3&C5 & SSC505		C3&C5 & SSC505	C2&C3&C5 & SSC505
SAT	19-SEP-15		C2&C3&C5 & SSC505		
SUN	20-SEP-15				
MON	21-SEP-15	C2		C2	C2&C3&C5 & SSC505
TUE	22-SEP-15				
WED	23-SEP-15				
THU	24-SEP-15	C3&C5 & SSC505		C3&C5 & SSC505	C2&C3&C5 & SSC505
FRI	25-SEP-15		C2&C3&C5 & SSC505		
SAT	26-SEP-15	C2		C2	C2&C3&C5 & SSC505
SUN	27-SEP-15				
MON	28-SEP-15				
TUE	29-SEP-15				
WED	30-SEP-15	C3&C5 & SSC505	C2&C3&C5 & SSC505	C3&C5 & SSC505	C2&C3&C5 & SSC505

	Monitoring Day
	Sunday or Public Holiday

Monitoring Location

Contract 2 (C2)	Air Quality	AM7b & AM8
	Construction Noise	NM5, NM6, NM7

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	AM1a, AM2 & AM3
	Construction Noise	NM1, NM2
	Water Quality	WM1 & WM1-Control

Contract SS C505	Air Quality	AM1a
	Construction Noise	NM1, NM2
	Water Quality	WM1 & WM1-Control

Appendix I

Database of Monitoring Result

24-hour TSP Monitoring Data

DATE	SAMPLE NUMBE R	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		
AM1a - Garden Farm, Tsung Yuen Ha Village															
5-Aug-15	28203	10312.79	10336.51	1423.20	34	35	34.5	29.9	1008.7	1.20	1713	2.8444	2.9214	0.0770	45
11-Aug-15	28234	10336.51	10360.18	1420.20	34	36	35.0	29.2	1007.3	1.22	1730	2.8052	2.8756	0.0704	41
17-Aug-15	28251	10360.18	10383.91	1423.80	34	35	34.5	28.4	1005.4	1.20	1715	2.8289	2.9070	0.0781	46
22-Aug-15	28267	10383.91	10407.63	1423.20	35	35	35.0	30.2	1000.1	1.21	1727	2.8368	2.9537	0.1169	68
28-Aug-15	28281	10407.63	10431.22	1415.40	34	34	34.0	28.3	1006.5	1.20	1692	2.8131	2.8590	0.0459	27
AM2 - Village House near Lin Ma Hang Road															
5-Aug-15	28204	5856.95	5880.77	1429.20	32	33	32.5	29.9	1008.7	1.00	1432	2.8592	2.9800	0.1208	84
11-Aug-15	28235	5880.77	5904.64	1432.20	34	35	34.5	29.2	1007.3	1.06	1519	2.8005	2.9045	0.1040	68
17-Aug-15	28252	5904.64	5928.46	1429.20	32	33	32.5	28.4	1005.4	1.00	1434	2.8295	2.9276	0.0981	68
22-Aug-15	28266	5928.46	5952.23	1426.20	35	35	35.0	30.2	1000.1	1.07	1525	2.8033	2.9651	0.1618	106
28-Aug-15	28282	5952.23	5976.06	1429.80	33	35	34.0	28.3	1006.5	1.07	1529	2.8033	2.9081	0.1048	69
AM3 - Ta Kwu Ling Fire Service Station of Ta Kwu Ling Village															
5-Aug-15	28219	6947.51	6971.51	1440.00	42	42	42.0	29.9	1008.7	1.29	1865	2.8223	2.9307	0.1084	58
11-Aug-15	28236	6971.51	6995.51	1440.00	40	40	40.0	29.2	1007.3	1.23	1773	2.8252	2.9608	0.1356	76
19-Aug-15 (a)	28253	6995.51	7019.51	1440.00	40	41	40.5	28.4	1005.4	1.25	1797	2.8236	2.9168	0.0932	52
22-Aug-15	28268	7019.51	7050.18	1840.20	36	37	36.5	30.2	1000.1	1.11	2047	2.8200	2.9486	0.1286	63 (b)
28-Aug-15	28283	7062.38	7086.38	1440.00	34	35	34.5	28.3	1006.5	1.03	1490	2.7941	2.8745	0.0804	54
AM7b - Loi Tung Village House															
5-Aug-15	28221	14388.95	14412.95	1440.00	44	44	44.0	29.9	1008.7	1.05	1513	2.8086	2.9215	0.1129	75
11-Aug-15	28237	14412.95	14436.95	1440.00	43	44	43.5	29.2	1007.3	1.04	1493	2.8491	2.9627	0.1136	76
17-Aug-15	28240	14436.95	14460.95	1440.00	44	44	44.0	28.4	1005.4	1.05	1515	2.8273	2.9248	0.0975	64
22-Aug-15	28265	14460.95	14484.95	1440.00	44	44	44.0	30.2	1000.1	1.04	1505	2.8183	2.9645	0.1462	97
28-Aug-15	28284	14484.95	14508.95	1440.00	44	44	44.0	28.3	1006.5	1.28	1837	2.7888	2.8546	0.0658	36
AM8 - Po Kat Tsai Village No. 4															
5-Aug-15	28222	8259.30	8283.30	1440.00	48	48	48.0	29.9	1008.7	1.32	1907	2.7958	2.8746	0.0788	41
11-Aug-15	28224	8283.30	8307.30	1440.00	48	48	48.0	29.2	1007.3	1.32	1908	2.7866	2.8486	0.0620	32
17-Aug-15	28254	8307.30	8331.30	1440.00	48	48	48.0	28.4	1005.4	1.33	1909	2.8154	2.8910	0.0756	40
22-Aug-15	28263	8331.30	8355.30	1440.00	48	49	48.5	30.2	1000.1	1.33	1918	2.8104	2.9570	0.1466	76
28-Aug-15	28269	8355.30	8379.30	1440.00	49	49	49.0	28.3	1006.5	1.34	1923	2.8293	2.8747	0.0454	24
AM9b - Nam Wa Po Village House No. 80															
5-Aug-15	28223	15737.01	15753.98	1018.20	34	34	34.0	29.9	1008.9	1.03	1047	2.8037	2.8853	0.0816	78 (c)
11-Aug-15	28225	15754.03	15778.03	1440.00	32	34	33.0	29.2	1007.3	1.00	1436	2.8084	2.8737	0.0653	45
17-Aug-15	28239	15778.03	15802.03	1440.00	32	33	32.5	28.4	1005.4	0.98	1414	2.8310	2.9046	0.0736	52

DATE	SAMPLE NUMBER	ELAPSED TIME			CHART READING			AVG TEMP	AVG AIR PRESS	STANDARD FLOW RATE	AIR VOLUME	FILTER WEIGHT (g)		DUST WEIGHT COLLECTED	24-HR TSP ($\mu\text{g}/\text{m}^3$)
		INITIAL	FINAL	(min)	MIN	MAX	AVG	($^{\circ}\text{C}$)	(hPa)	(m^3/min)	(std m^3)	INITIAL	FINAL	(g)	
22-Aug-15	28264	15802.03	15826.03	1440.00	33	34	33.5	30.2	1000.1	1.01	1451	2.8037	2.9604	0.1567	108
28-Aug-15	28256	15826.03	15850.03	1440.00	33	34	33.5	28.3	1006.5	1.08	1561	2.8157	2.8753	0.0596	39

Remark:

- (a) *24-hr TSP monitoring at AM3 was rescheduled from 17 August 2015 to 19 August 2015 due to power failure*
- (b) *24-hour TSP monitoring at AM3 on 22 August was over run and the result was invalidated.*
- (c) *24-hour TSP monitoring at AM9b on 5 August 2015 was ran less than 24 hours due to power failure and the result was invalidated.*

Date	Start Time	1 st Leq _{5mi} n	L10	L90	2 nd Leq _{5mi} n	L10	L90	3 rd Leq _{5mi} n	L10	L90	4 th Leq _{5mi} n	L10	L90	5 th Leq _{5mi} n	L10	L90	6 th Leq _{5mi} n	L10	L90	Leq30	façade correctio n
8-Aug-15	12:54	58.1	64.1	49.2	57.6	64.2	48.2	56.3	56.4	50.2	58.4	63.3	51.8	68.4	66.5	51.3	57.0	61.2	49.3	62	NA
14-Aug-15	10:19	59.8	61.2	54.3	59.5	60.1	53.7	55.7	59.5	52.0	58.5	62.0	52.6	57.4	59.5	52.4	59.0	60.0	52.7	59	NA
20-Aug-15	15:57	58.9	62.7	50.9	57.9	60.3	51.4	58.1	63	50.9	57.9	64.1	49.3	58.6	64.1	50.8	57.5	65	50.4	58	NA
26-Aug-15	9:45	59.8	61.2	54.3	60.5	61.1	54.7	60.5	62.4	54.9	61.5	61.9	54.7	59.4	61.4	54.6	58.1	59.7	54.7	60	NA
NM9 - Village House, Kiu Tau Village																					
2-Aug-15	11:01	63.6	63.9	57.6	60.0	64.2	53.5	60.3	66.0	54.0	59.6	63.1	52.7	58.4	60.4	53.1	58.8	61.9	54.9	60	NA
8-Aug-15	11:22	57.6	61.6	52.5	57.1	61.1	52.2	60.3	63.6	53.4	56.9	59.0	53.0	59.3	63.3	55.7	58.4	62.6	53.5	58	NA
14-Aug-15	11:10	60.4	63.2	53.4	59.6	62.8	53.7	59.9	63.2	53.5	59.1	58.4	49.9	59.1	60.4	50.6	58.0	59.0	51.7	59	NA
20-Aug-15	16:39	58.7	61.7	54.2	60.3	63.2	55.0	61.3	64.4	54.8	59.8	63.1	54.0	65.0	68.8	55.9	60.4	64.6	55.9	61	NA
26-Aug-15	10:45	59.6	60.8	56.7	58.0	60.3	54.6	60.1	62.3	56.1	57.4	59.6	53.8	56.7	60.5	53.0	56.6	58.0	54.7	58	NA
NM10 - Nam Wa Po Village House No. 80																					
3-Aug-15	13:15	69.0	72.0	63.1	63.9	65.8	61.3	65.2	67.9	60.9	65.3	67.6	60.5	64.8	66.6	61.1	65.0	67.2	61.7	66	69
8-Aug-15	10:41	63.1	65.9	58.7	63.3	66.3	59.0	60.5	62.2	58.8	60.0	62.1	57.9	62.3	65.8	57.5	58.5	60.2	54.8	62	65
14-Aug-15	13:09	61.7	62.5	58.9	63.5	63.1	58.6	58.6	59.9	57.0	60.0	61.2	57.5	61.4	63.3	58.2	60.3	61.3	57.6	61	64
20-Aug-15	16:40	56.5	58.1	54.7	57.2	59.1	55.0	59.0	61.8	54.8	56.6	58.5	54.1	55.8	57.4	53.8	55.1	57.1	52.6	57	60
26-Aug-15	13:18	60.4	61.9	57.6	61.3	62.9	56.9	59.3	61.1	57.2	60.7	61.9	58.3	61.5	62.9	59.3	62.6	64.9	59.0	61	64

Water Quality Monitoring Data for Contract 5

Date	1-Aug-15													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	11:54	0.44	30.3	30.3	6.85	6.9	91.1	91.4	37.6	37.6	8	8.0	31	30.5
			30.3		6.89		91.7		37.5		8		30	
WM1*	12:24	0.21	29.7	29.7	6.68	6.7	81.8	84.5	38.9	38.2	7.4	7.4	43	42.0
			29.7		6.63		87.1		37.4		7.4		41	

Date	3-Aug-15													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	14:09	0.38	30.6	30.6	5.82	5.8	77.7	77.6	7.1	7.1	7.1	7.1	<2	3.0
			30.6		5.79		77.5		7.2		7.1		3	
WM1*	14:57	0.21	30.9	30.9	6.28	6.3	84.6	85.0	28.7	28.9	7.1	7.1	28	28.0
			30.9		6.34		85.3		29.1		7.1		28	

Date	5-Aug-15													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	13:06	0.41	30.8	30.8	8.29	8.3	111.0	111.4	7.5	7.5	7	7.0	4	3.5
			30.8		8.32		111.7		7.6		7		3	
WM1*	13:29	0.20	30.3	30.3	6.62	6.6	87.9	88.2	25.7	25.9	6.8	6.8	21	22.0
			30.3		6.66		88.5		26.1		6.8		23	

Date	8-Aug-15													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	11:24	0.42	29.9	29.9	8.52	8.5	112.5	112.4	8.1	8.0	8	8.0	<2	2.0
			29.9		8.51		112.3		7.9		8		<2	
WM1*	12:11	0.22	31.8	31.8	7.75	7.8	105.9	106.4	21.4	21.9	7.6	7.6	20	20.0
			31.8		7.82		106.8		22.3		7.6		20	

Date	10-Aug-15													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	13:11	0.41	29.6	29.6	7.81	7.8	102.9	102.6	17.0	17.4	7.5	7.5	11	10.5
			29.6		7.78		102.3		17.7		7.5		10	
WM1*	13:36	0.21	30.2	30.2	6.82	6.8	90.5	89.9	65.2	65.3	7.2	7.2	51	51.0
			30.2		6.7		89.2		65.4		7.2		51	

Date	12-Aug-15													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	15:10	0.40	32	32.0	7.73	7.7	105.9	106.1	8.1	8.2	6.9	6.9	8	9.0
			32		7.76		106.2		8.2		6.9		10	
WM1*	15:26	0.23	31.5	31.5	6.25	6.3	84.7	85.0	117.0	119.0	6.7	6.7	109	111.5
			31.5		6.29		85.2		121.0		6.7		114	

Date	14-Aug-15													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	14:13	0.45	28.9	28.9	6.43	6.4	82.9	82.4	578.5	578.8	7.5	7.5	447	454.0
			28.9		6.35		81.8		579.1		7.5		461	
WM1	13:46	0.33	28	28.0	6.85	6.9	87.4	87.7	149.9	150.3	7.4	7.4	138	137.5
			28		6.9		88.0		150.7		7.4		137	

Date	18-Aug-15													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	15:49	0.44	32.4	32.4	5.45	5.4	75.1	74.7	17.3	17.2	7.2	7.2	14	13.5
			32.4		5.4		74.3		17.1		7.2		13	
WM1	16:09	0.26	33.4	33.4	5.64	5.6	79.7	79.4	40.3	40.5	7.1	7.1	44	50.0
			33.4		5.64		79.0		40.7		7.1		56	

Date	20-Aug-15													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	14:28	0.88	28.5	28.5	6.49	6.5	83.8	84.1	140.0	140.5	7.3	7.3	72	71.5
			28.5		6.52		84.3		141.0		7.3		71	
WM1	15:01	0.73	28.2	28.2	6.63	6.6	85.2	85.5	242.0	241.0	7.1	7.1	190	190.0
			28.2		6.64		85.7		240.0		7.1		190	

Date	22-Aug-15													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	11:40	0.47	29.7	29.7	6.24	6.3	81.7	82.1	14.0	14.2	6.9	6.9	3	4.0
			29.7		6.31		82.5		14.3		6.9		5	
WM1	12:05	0.31	30.6	30.6	6.28	6.2	84.1	82.8	74.3	74.5	6.6	6.6	91	90.5
			30.6		6.14		81.4		74.6		6.6		90	

Date	24-Aug-15													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	12:20	0.42	3.8	17.3	7.2	7.2	96.9	97.3	13.3	13.5	7.4	7.4	7	7.5
			30.8		7.28		97.7		13.7		7.4		8	
WM1	12:48	0.27	31.1	31.1	6.37	6.3	85.8	85.3	33.3	33.5	8	8.0	34	34.0
			31.1		6.29		84.7		33.7		8		34	

Date	26-Aug-15													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	11:03	0.41	31.1	31.1	7.1	7.1	94.5	94.9	27.2	27.5	7.8	7.8	21	20.5
			31.1		7.08		95.3		27.8		7.8		20	
WM1	11:28	0.26	30.1	30.1	7.05	7.1	92.8	93.0	40.4	40.6	7.5	7.5	47	48.5
			30.1		7.08		93.2		40.7		7.5		50	

Date	28-Aug-15													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	14:47	0.42	29.9	29.9	7.61	7.6	100.5	100.8	12.1	11.9	7.4	7.4	6	5.5
			29.9		7.67		101.1		11.6		7.4		5	
WM1	15:06	0.25	29.8	29.8	6.6	6.6	87.0	86.6	35.7	35.9	7.5	7.5	36	35.5
			29.8		6.5		86.2		36.0		7.5		35	

Date	31-Aug-15													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	12:56	0.89	28.4	28.4	6.8	6.8	87.3	87.6	overrange	overrange	7.6	7.6	1320	1305.0
			28.4		6.85		87.9		overrange		7.6		1290	
WM1	13:27	0.41	28.3	28.3	6.2	6.3	79.5	80.3	overrange	overrange	7.8	7.8	1320	1330.0
			28.3		6.32		81.1		overrange		7.8		1340	

Remark: * monitoring was conducted at box culvert 2 for reference.

Water Quality Monitoring Data for Contract 2 and 3

Date	1-Aug-15													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	13:21	0.10	30.4	30.4	7.08	7.1	94.7	94.2	6.1	6.1	7.1	7.1	3	3.0
			30.4		7.03		93.7		6.1		7.1		3	
WM4-CB	13:40	0.30	32.8	32.8	6.81	6.8	94.5	94.1	10.7	10.4	6.7	6.7	7	7.0
			32.8		6.76		93.6		10.1		6.7		7	
WM4	12:57	0.28	32.2	32.2	7.3	7.3	99.7	100.0	12.5	12.4	7.4	7.4	9	9.0
			32.2		7.32		100.3		12.2		7.4		9	

Date	3-Aug-15													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	12:03	0.10	31.4	31.4	7.29	7.3	99.0	98.7	4.3	4.2	7.2	7.2	<2	2.0
			31.4		7.25		98.4		4.2		7.2		<2	
WM4-CB	12:32	0.30	33.3	33.3	7.11	7.1	102.0	102.8	7.8	7.6	6.9	6.9	6	5.5
			33.3		7.1		103.5		7.5		6.9		5	
WM4	11:31	0.29	31.6	31.6	7.22	7.4	104.8	104.2	10.7	11.3	7.1	7.1	8	8.5
			31.6		7.65		103.6		11.9		7.1		9	

Date	5-Aug-15													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	12:02	0.10	31.3	31.3	7.37	7.3	99.7	98.8	4.6	4.7	7.1	7.2	<2	2.0
			31.3		7.28		97.9		4.8		7.2		<2	
WM4-CB	11:02	0.31	32.3	32.3	7.33	7.3	100.7	100.6	13.1	13.4	7	7.0	11	11.5
			32.3		7.3		100.4		13.7		7		12	
WM4	11:35	0.28	32	32.0	7.63	7.6	104.0	103.8	10.2	10.4	7.1	7.1	8	8.0
			32		7.58		103.6		10.5		7.1		8	

Date	8-Aug-15													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	13:49	0.11	32.6	32.6	7.53	7.5	104.0	103.9	4.3	4.2	7.4	7.4	4	4.0
			32.6		7.5		103.7		4.1		7.4		4	
WM4-CB	14:18	0.32	33.3	33.3	7.36	7.4	103.0	103.7	8.5	8.7	7.4	7.4	8	8.0

			33.3		7.44		104.3		8.8		7.4		8	
WM4	13:24	0.29	33.6	33.6	8.34	8.4	117.7	118.4	9.8	9.7	7.6	7.6	7	7.0
			33.6		8.45		119.0		9.5		7.6		7	

Date	10-Aug-15													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	14:41	0.11	29.3	29.3	7.58	7.6	99.0	99.4	4.3	4.4	7.5	7.5	4	4.0
			29.3		7.65		99.8		4.5		7.5		4	
WM4-CB	15:06	0.29	30.4	30.4	6.57	6.6	87.5	87.1	10.4	10.6	7	7.0	10	10.0
			30.4		6.53		86.7		10.8		7		10	
WM4	14:16	0.26	30	30.0	7.57	7.6	100.2	100.5	24.7	25.0	7.3	7.3	21	21.5
			30		7.62		100.8		25.2		7.3		22	

Date	12-Aug-15													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	13:07	0.11	31.1	31.1	7.25	7.3	97.7	98.0	5.1	5.2	6.9	6.9	4	4.0
			31.1		7.29		98.3		5.2		6.9		4	
WM4-CB	12:40	0.36	30.3	30.3	4.51	4.5	59.6	59.8	15.9	15.7	6.9	6.9	15	14.5
			30.3		4.54		60.0		15.4		6.9		14	
WM4	12:16	0.33	31.6	31.6	6.93	7.0	94.1	94.4	50.9	51.2	7	7.0	50	51.5
			31.6		6.99		94.7		51.4		7		53	

Date	14-Aug-15													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	10:00	0.11	27.2	27.2	6.97	7.0	87.7	87.7	2.2	2.2	8	8.0	4	3.5
			27.2		6.96		87.6		2.1		8		3	
WM4-CB	10:21	0.30	28.4	28.4	5.62	5.6	72.4	72.5	9.3	9.4	7.4	7.4	14	14.5
			28.4		5.66		72.6		9.4		7.4		15	
WM4	9:37	0.27	27.4	27.4	6.15	6.1	77.6	77.0	10.1	10.2	8	8.1	13	13.5
			27.4		6.04		76.3		10.3		8.1		14	

Date	18-Aug-15													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	

WM4-CA	13:55	0.11	32.5	32.5	6.45	6.4	89.1	89.0	6.2	6.1	7.5	7.5	6	6.0
			32.5		6.44		88.9		6.1		7.5		6	
WM4-CB	13:00	0.28	33.8	33.8	6.59	6.6	92.9	92.6	13.5	14.0	7.1	7.1	9	9.5
			33.8		6.54		92.3		14.4		7.1		10	
WM4	13:31	0.30	34	34.0	6.48	6.5	91.6	92.1	18.5	18.7	7.3	7.3	11	11.5
			34		6.53		92.6		18.8		7.3		12	

Date	20-Aug-15													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	16:49	0.13	29.9	29.9	6.65	6.7	89.4	89.5	7.7	7.7	6.7	6.7	6	6.0
			29.9		6.66		89.6		7.7		6.7		6	
WM4-CB	16:30	0.28	30.4	30.4	4.8	4.8	63.7	63.8	15.2	15.1	6.8	6.8	8	8.5
			30.4		4.8		63.8		15.0		6.8		9	
WM4	16:01	0.36	30.7	30.7	6.35	6.3	85.0	84.9	31.0	31.6	6.9	6.9	20	19.5
			30.7		6.32		84.7		32.2		6.9+		19	

Date	22-Aug-15													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	10:44	0.10	29.9	29.9	6.89	6.9	91.1	90.6	5.7	5.7	7	7.0	3	3.5
			29.9		6.83		90.0		5.7		7		4	
WM4-CB	9:45	0.28	30	30.0	7.23	7.2	95.8	95.1	13.7	13.8	7.4	7.4	15	14.0
			30		7.13		94.3		13.9		7.4		13	
WM4	10:16	0.32	29.6	29.6	7.02	7.0	92.3	92.5	17.7	17.3	7.1	7.1	14	14.5
			29.6		7.05		92.6		16.9		7.1		15	

Date	24-Aug-15													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	14:20	0.10	32.6	32.6	6.86	6.9	94.6	94.9	6.1	6.1	8.1	8.1	4	4.0
			32.6		6.9		95.2		6.1		8.1		4	
WM4-CB	14:43	0.30	33.8	33.8	6.62	6.6	93.1	93.3	7.2	7.2	8	8.0	9	10.0
			33.8		6.66		93.5		7.2		8		11	
WM4	13:49	0.32	33.7	33.7	7.34	7.3	103.2	103.2	14.8	14.3	7.6	7.6	8	7.5
			33.7		7.33		103.1		13.8		7.6		7	

Date	26-Aug-15													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	15:12	0.10	29.5	29.5	6.76	6.8	88.1	88.5	4.3	4.3	7.9	7.9	5	5.5
			29.5		6.84		88.8		4.2		7.9		6	
WM4-CB	15:40	0.28	29.5	29.5	4.85	4.9	63.1	63.6	13.9	13.8	7.8	7.8	12	12.0
			29.5		4.92		64.1		13.7		7.8		12	
WM4	14:46	0.31	30.1	30.1	6.33	6.3	84.2	83.8	12.9	12.7	7.5	7.5	9	9.0
			30.1		6.22		83.4		12.5		7.5		9	

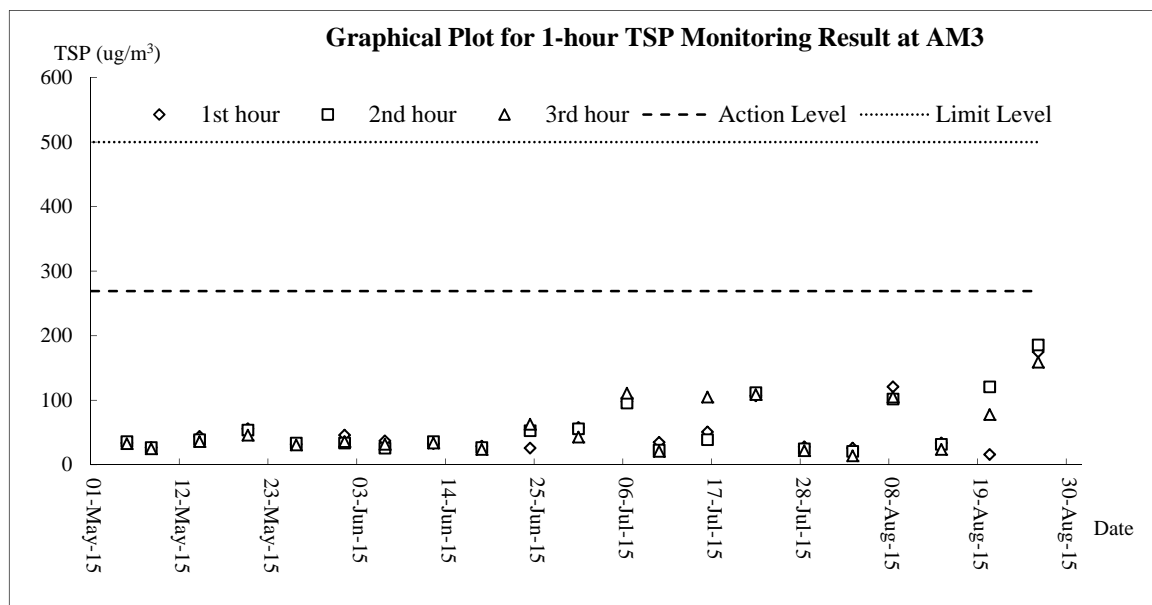
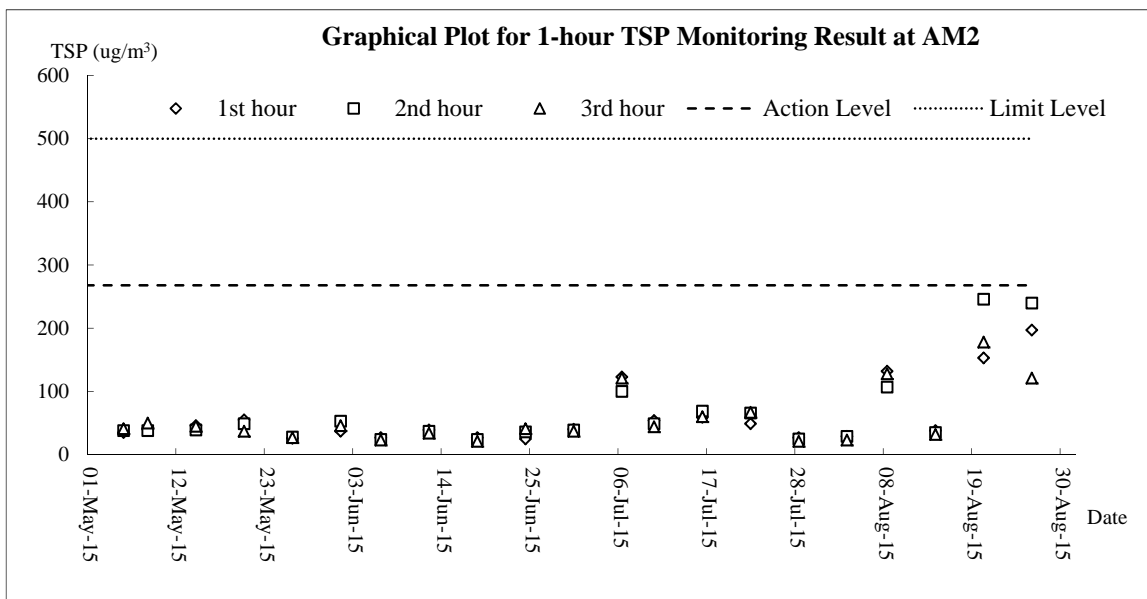
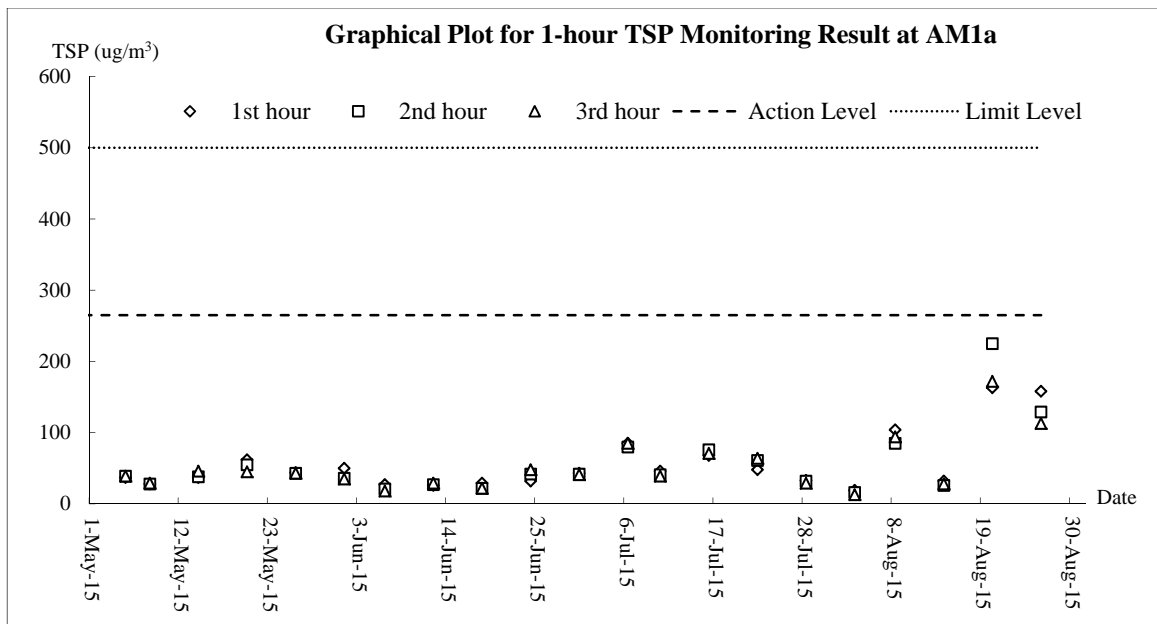
Date	28-Aug-15													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	17:22	0.10	28.6	28.6	6.37	6.4	82.2	82.3	4.6	4.5	8	8.0	4	4.0
			28.6		6.39		82.4		4.5		8		4	
WM4-CB	17:46	0.29	29	29.0	3.08	3.1	40.1	40.0	7.4	7.5	7.7	7.7	9	9.0
			29		3.07		39.9		7.5		7.7		9	
WM4	17:01	0.30	29.6	29.6	5.36	5.4	70.8	71.3	13.4	13.3	7.5	7.5	14	14.5
			29.6		5.46		71.8		13.1		7.5		15	

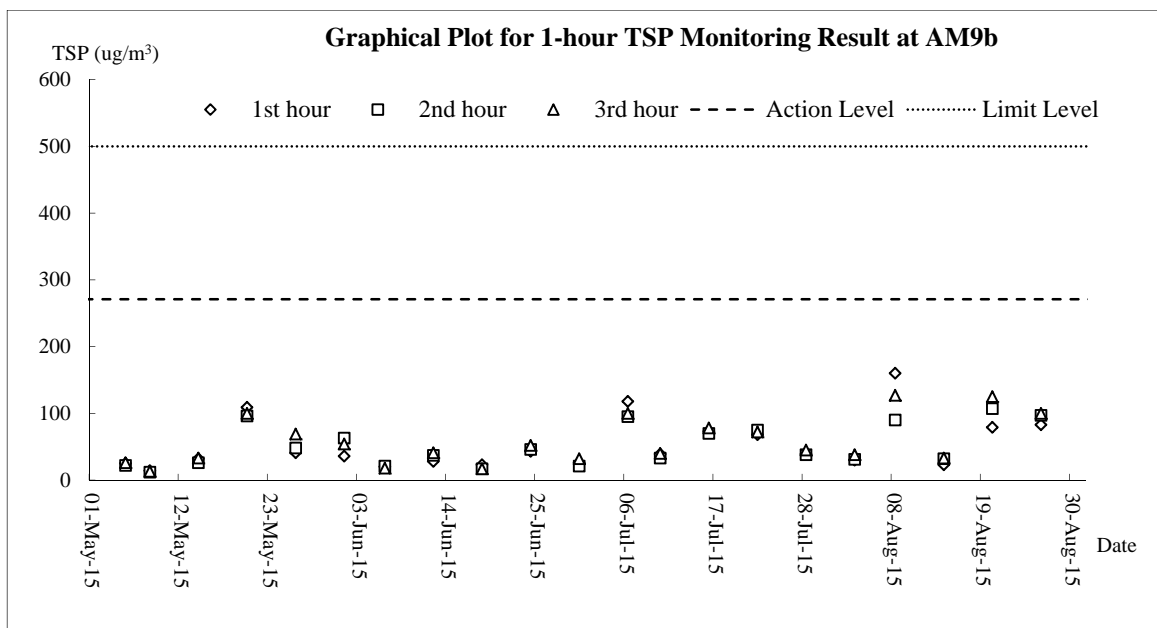
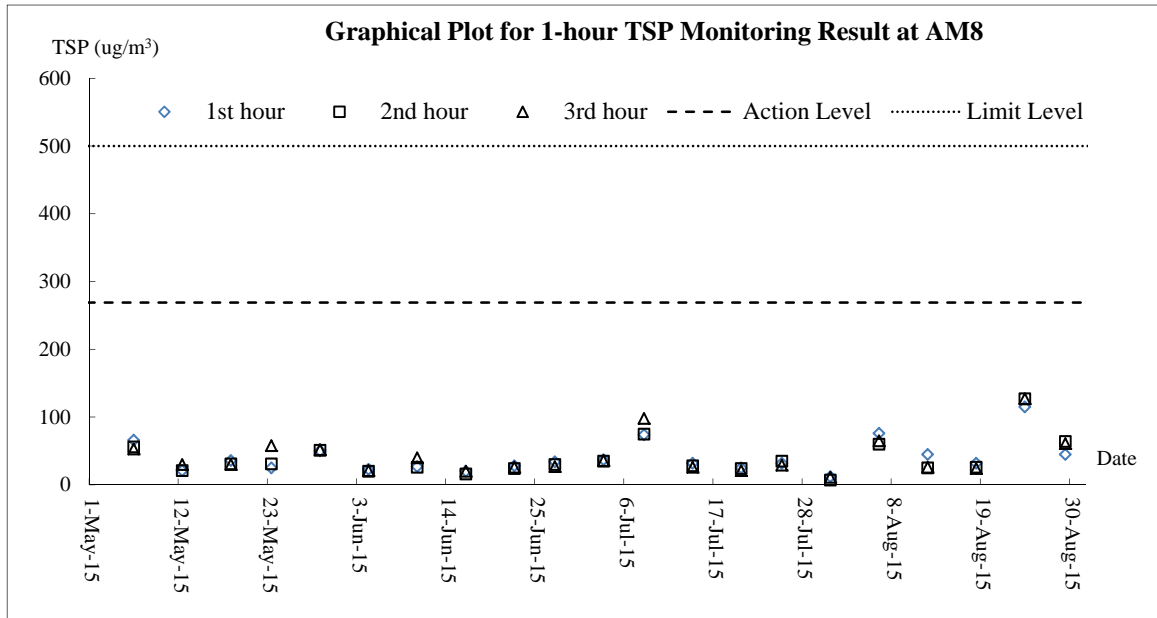
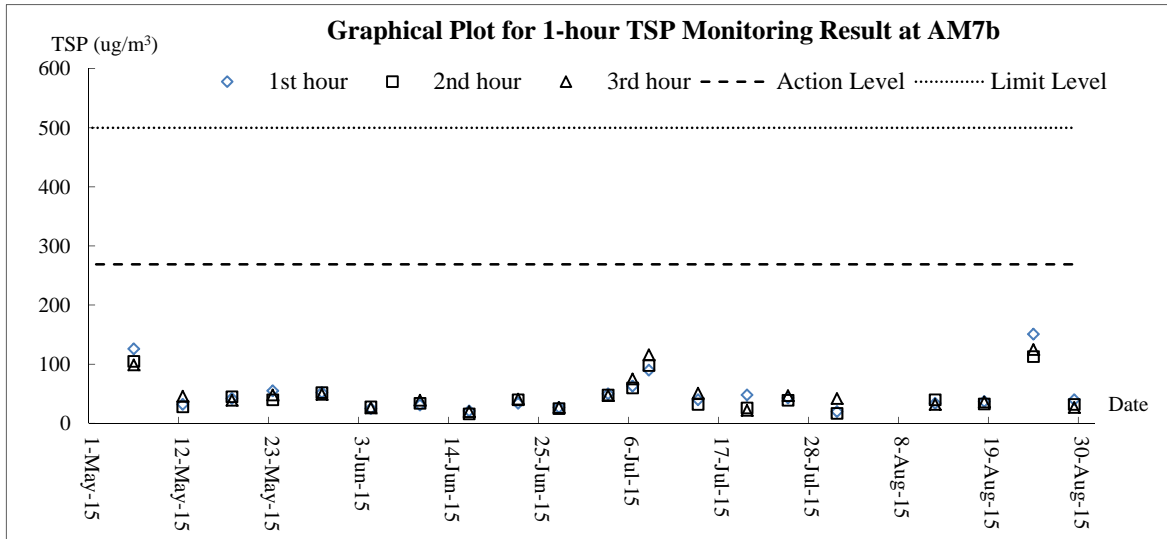
Date	31-Aug-15													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	11:40	0.09	29.1	29.1	7.24	7.3	94.4	94.4	9.2	9.1	7.8	7.8	8	7.5
			29.1		7.27		94.4		9.0		7.8		7	
WM4-CB	10:37	0.30	29.1	29.1	6.88	6.8	89.7	89.2	16.0	16.2	7.1	7.1	14	14.0
			29.1		6.8		88.6		16.4		7.1		14	
WM4	11:15	0.30	29.6	29.6	7.36	7.4	96.7	97.0	20.5	20.6	7.5	7.5	13	12.5
			29.6		7.41		97.2		20.7		7.5		12	

Appendix J

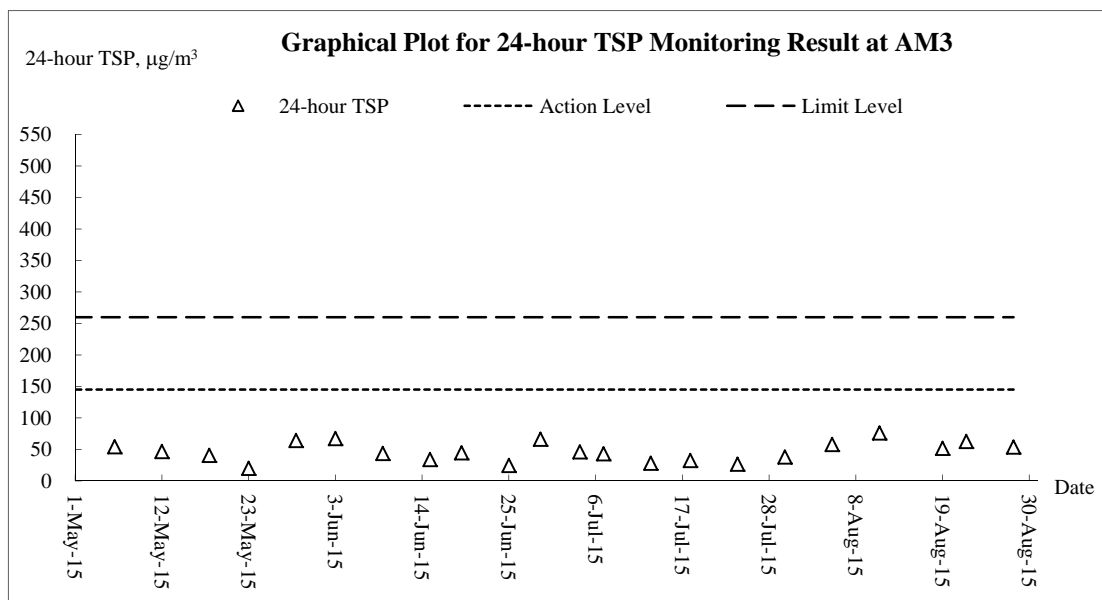
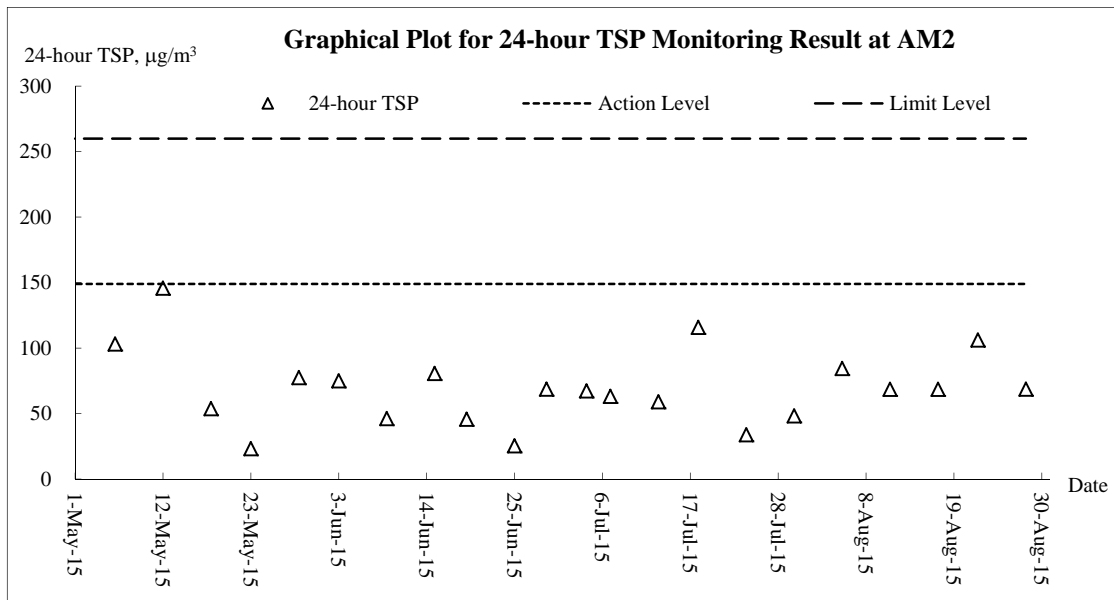
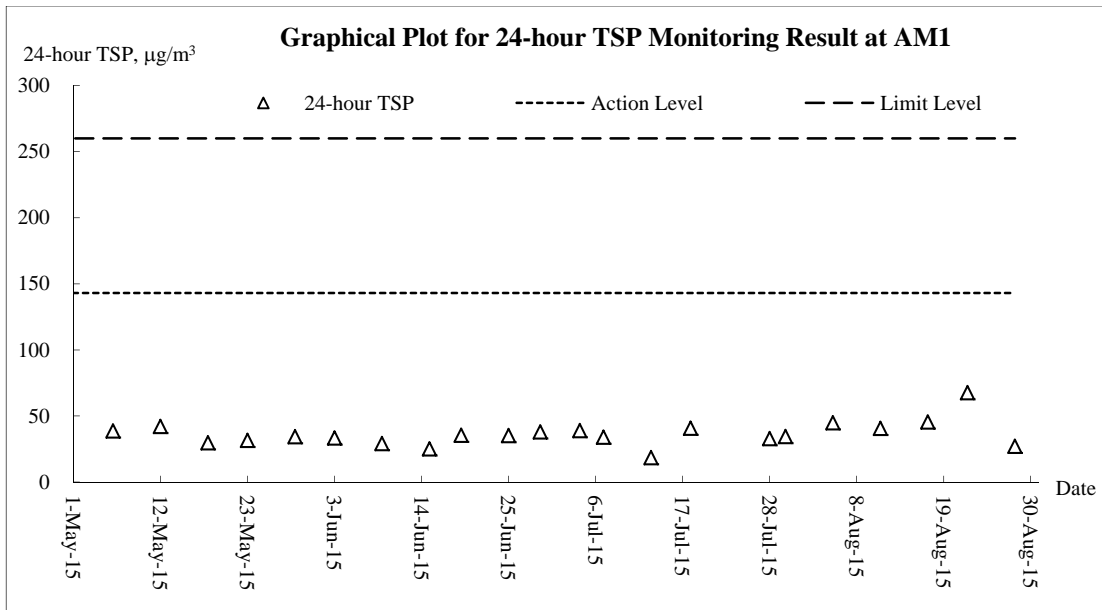
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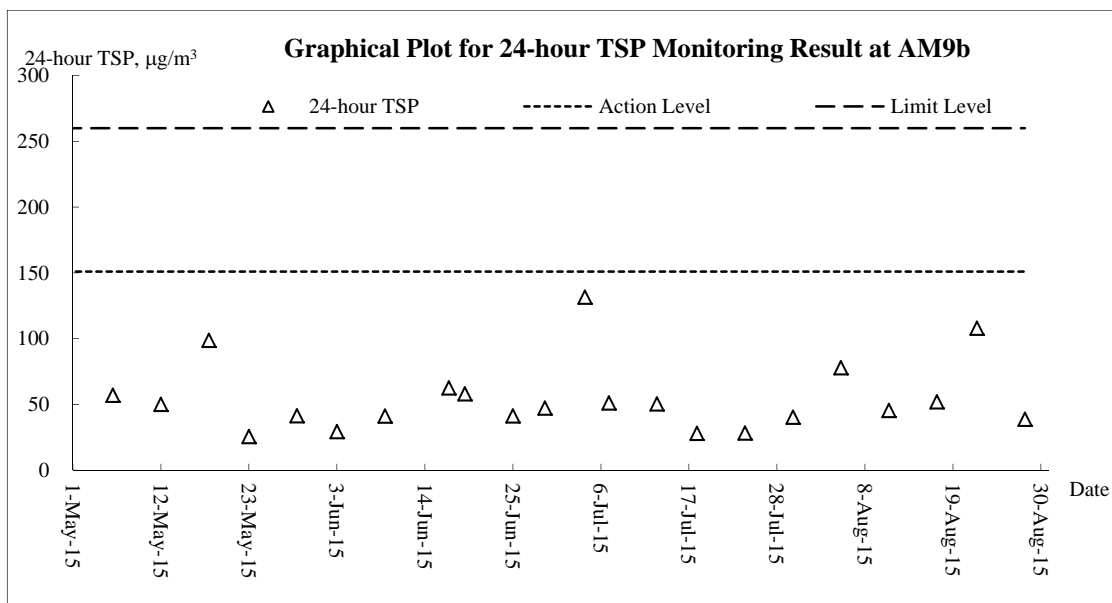
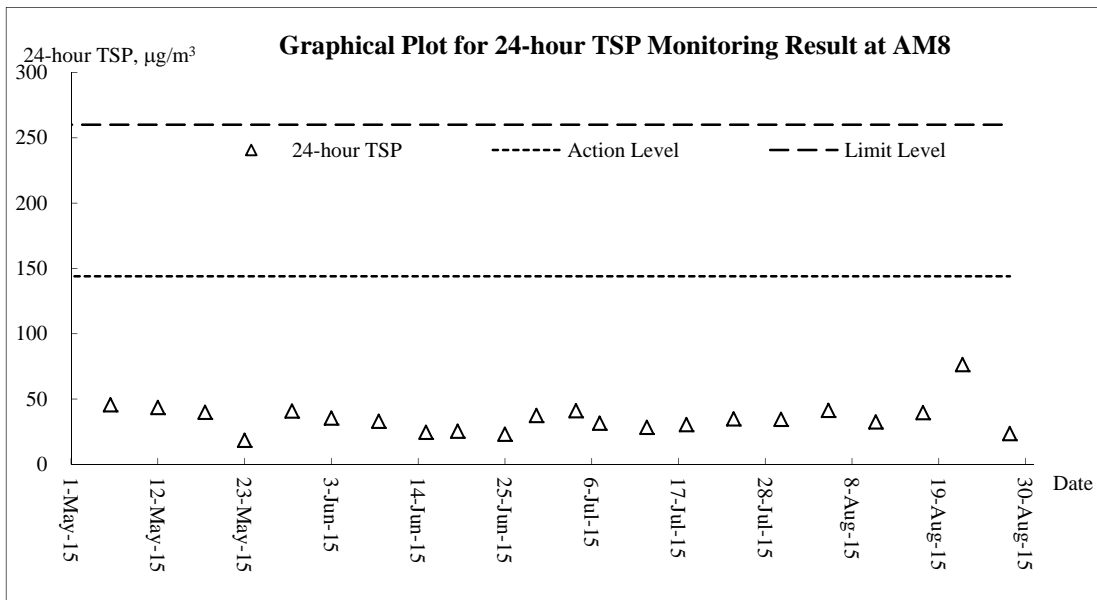
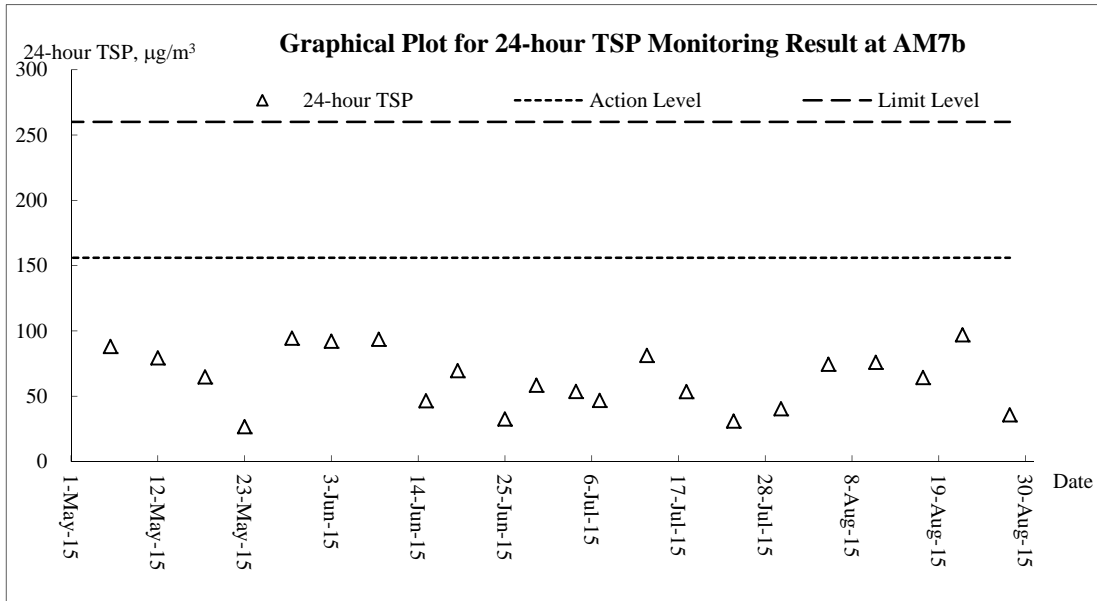
Air Quality – 1-hour TSP



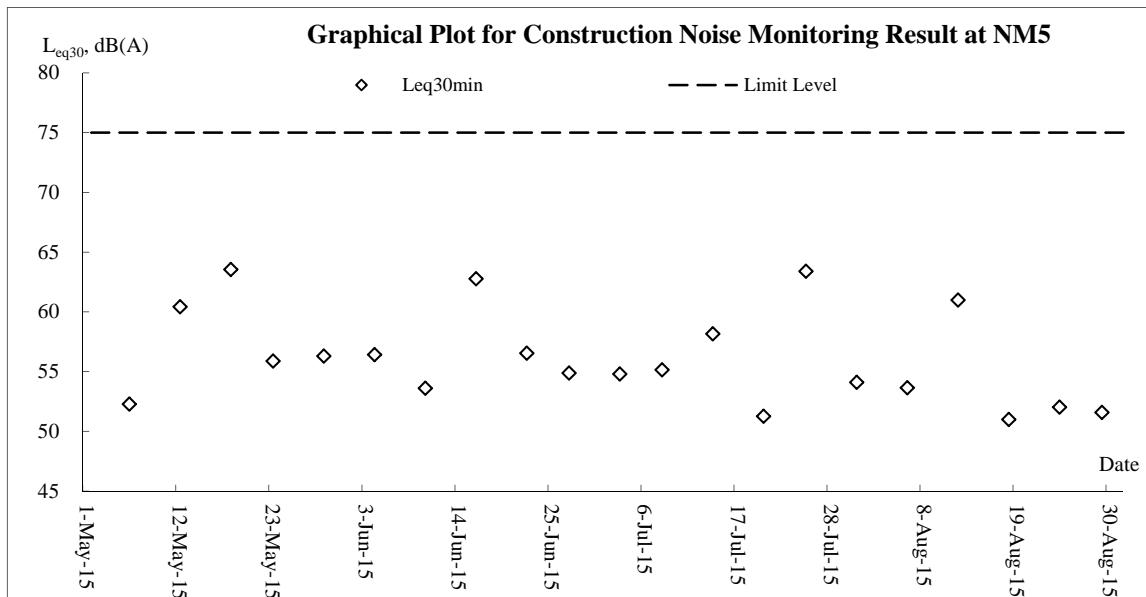
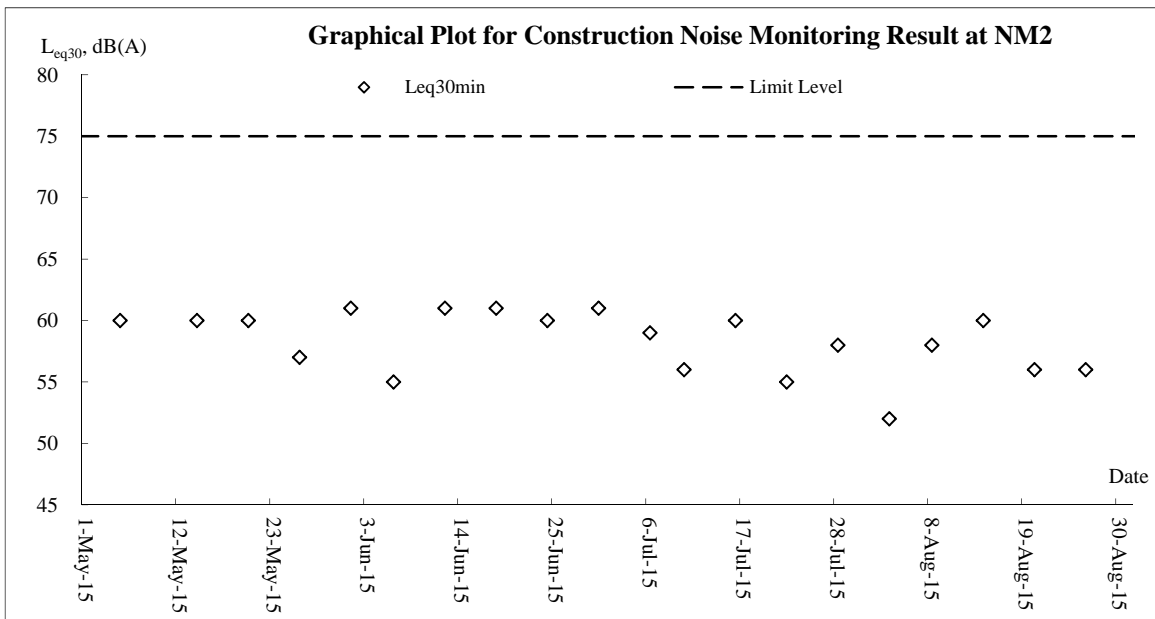
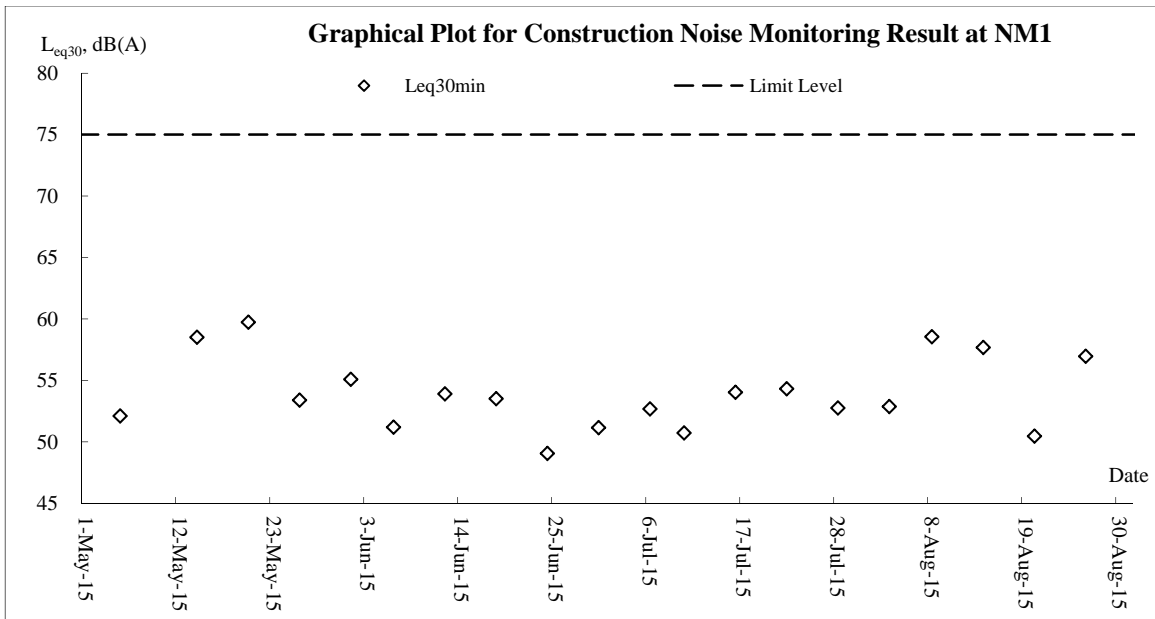


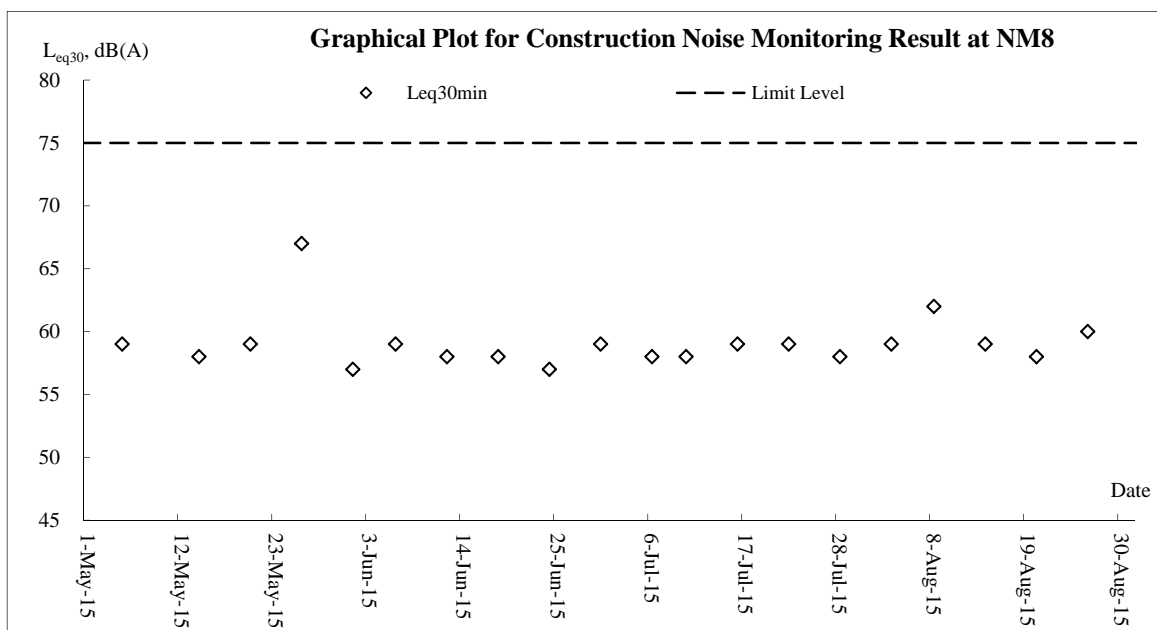
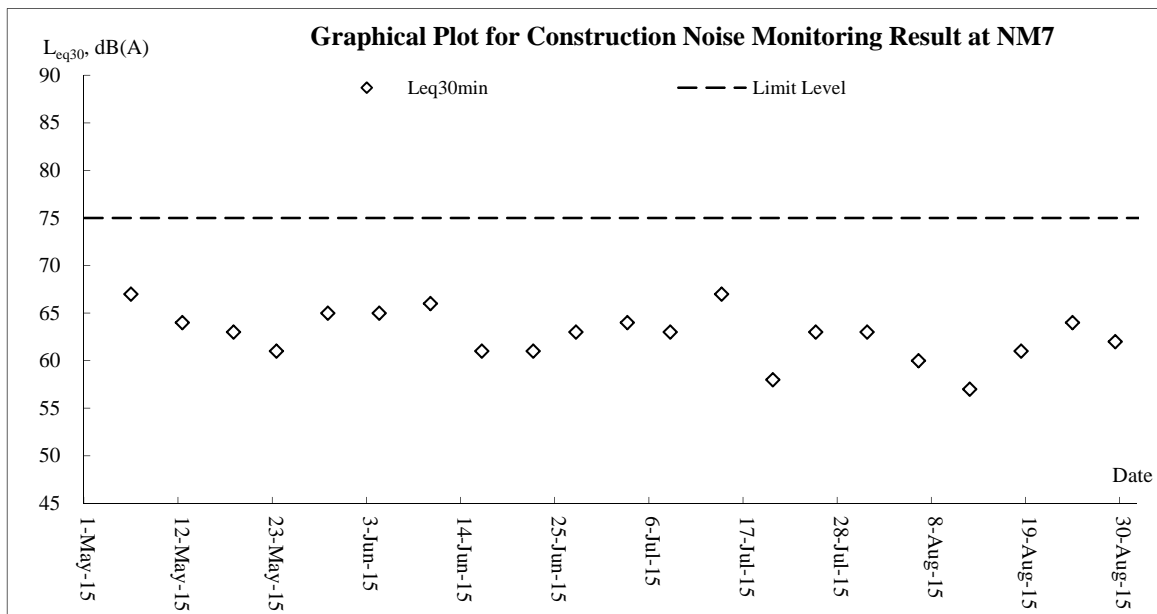
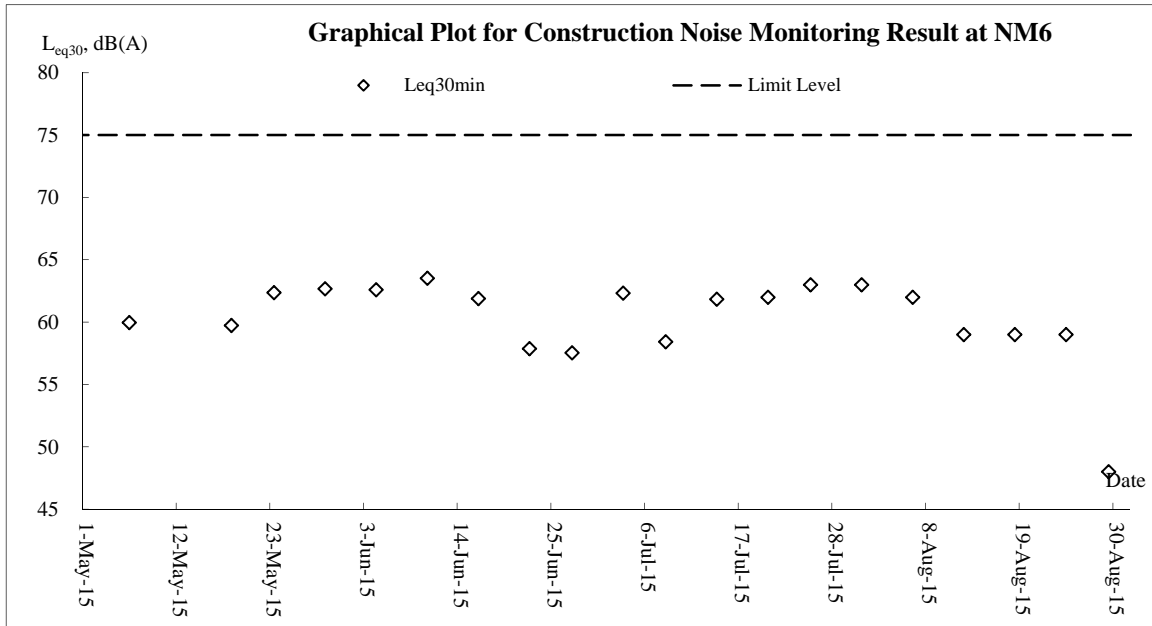
Air Quality – 24-hour TSP

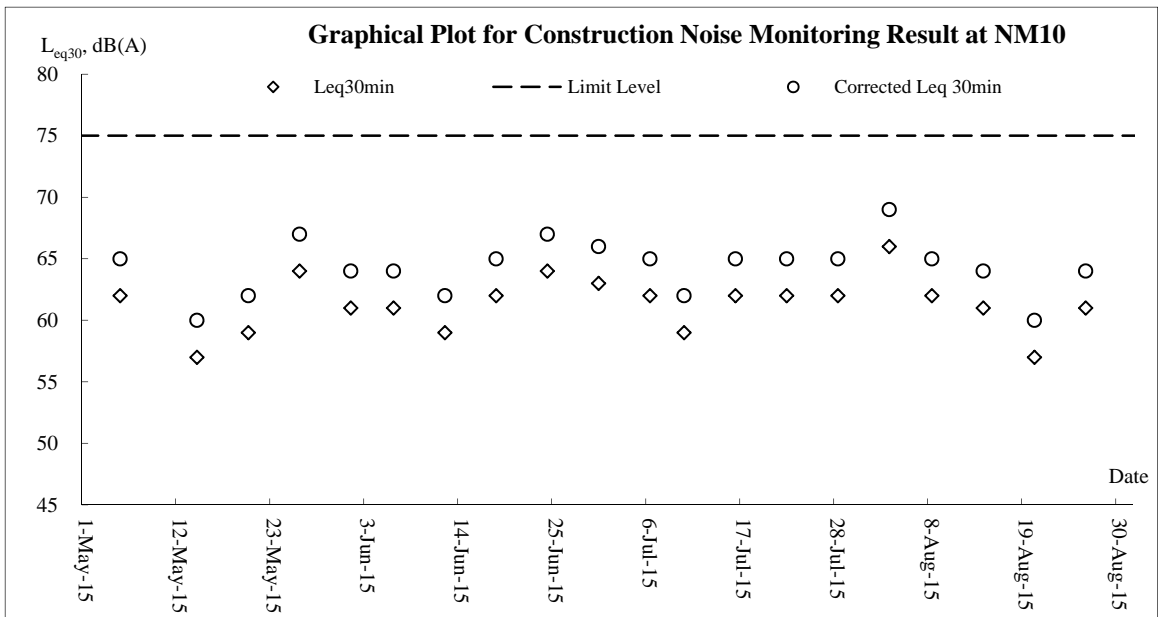
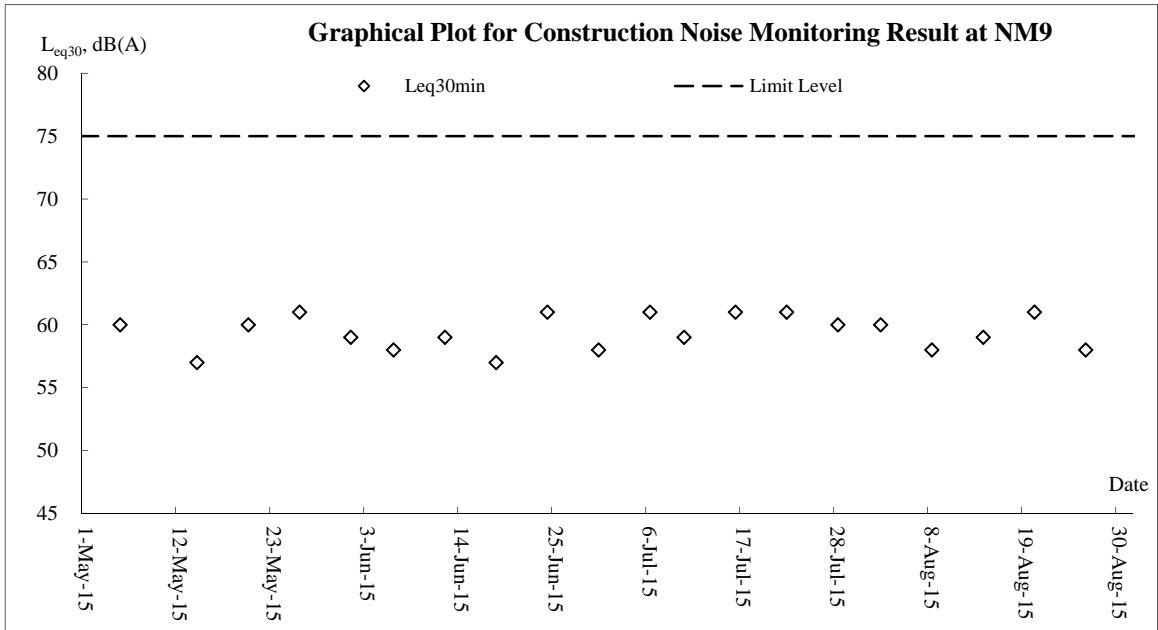




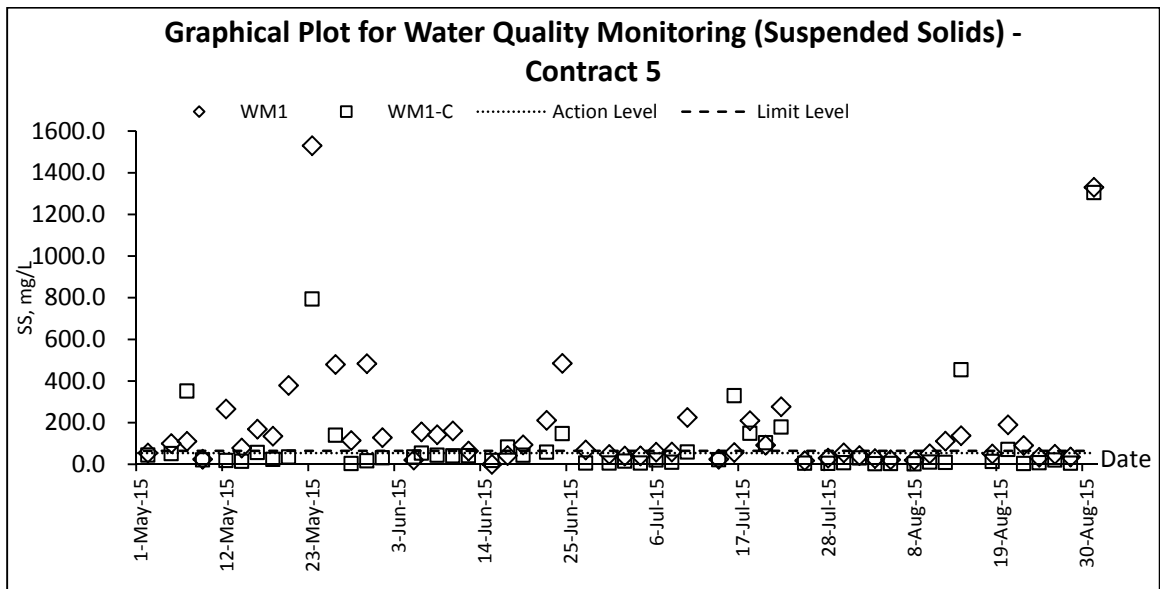
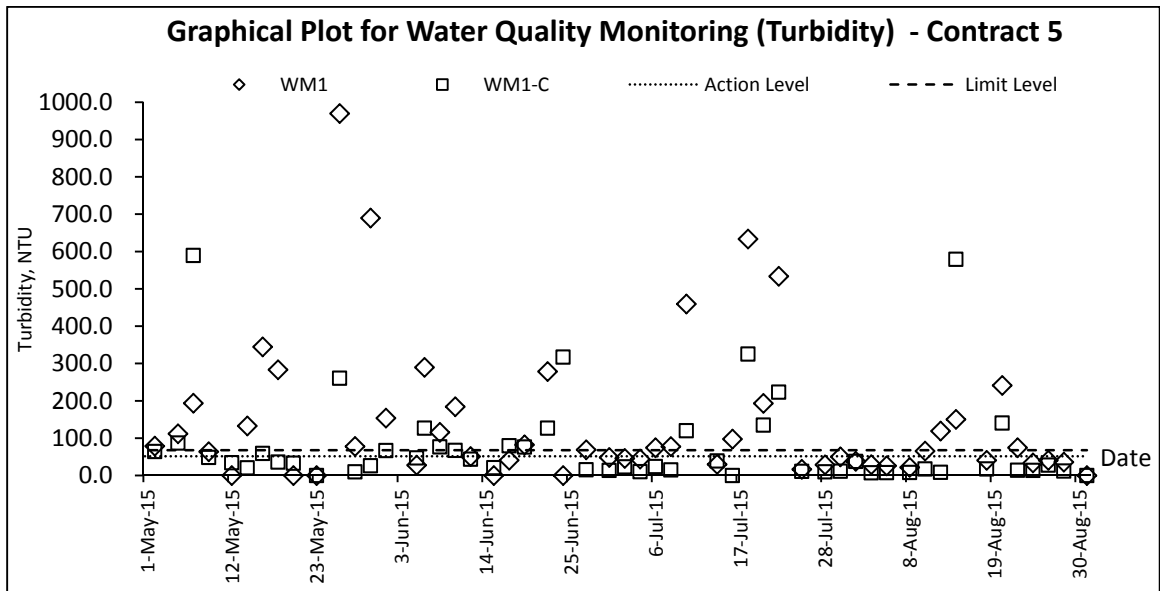
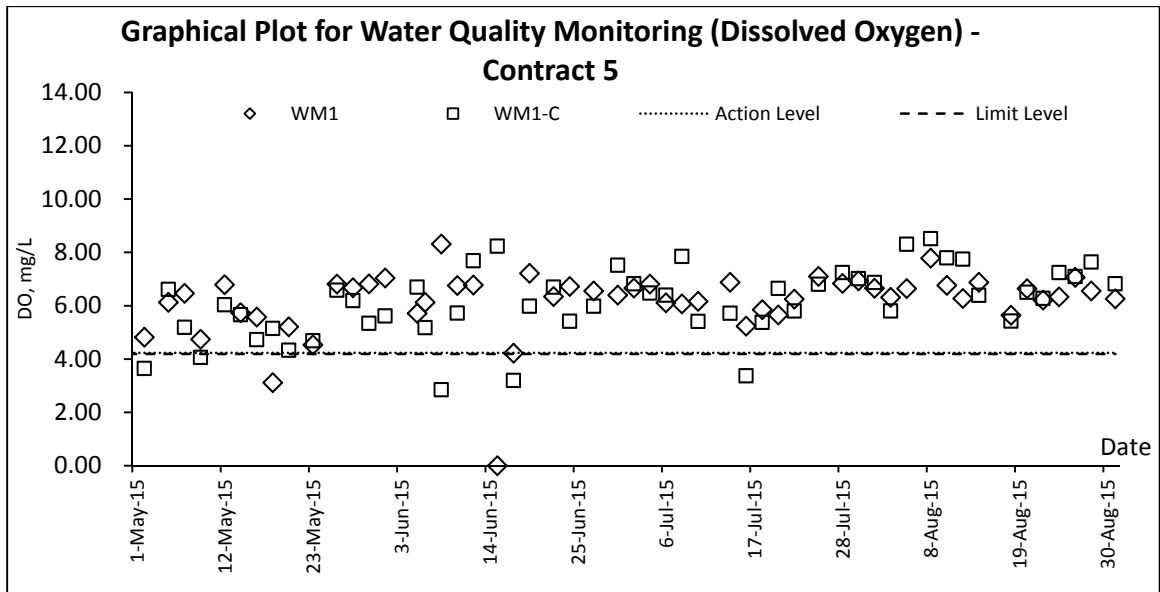
Noise

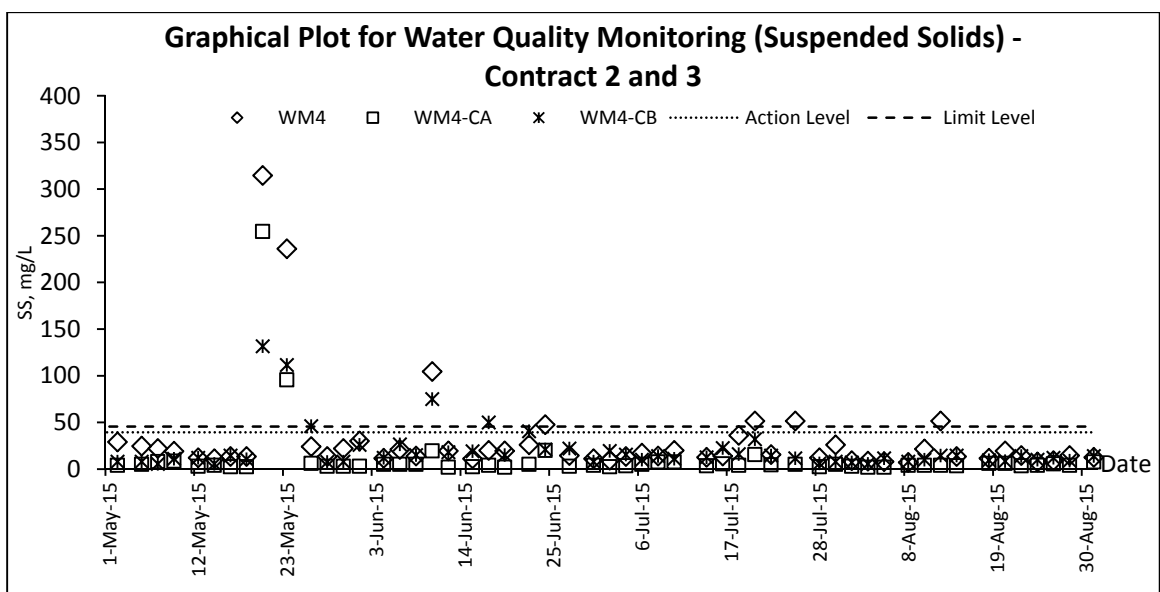
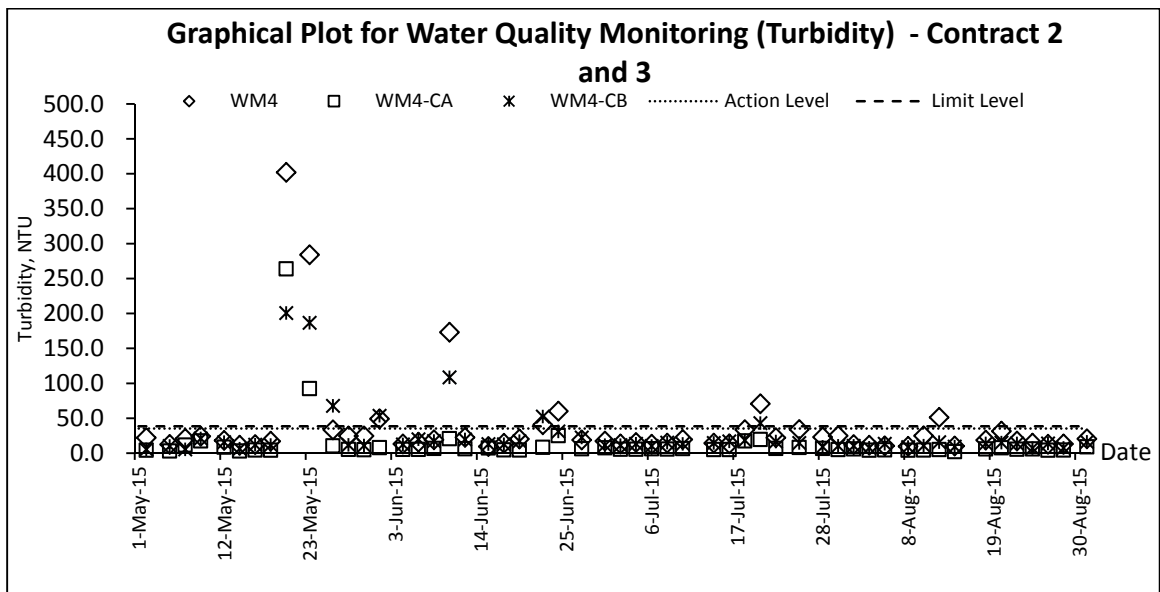
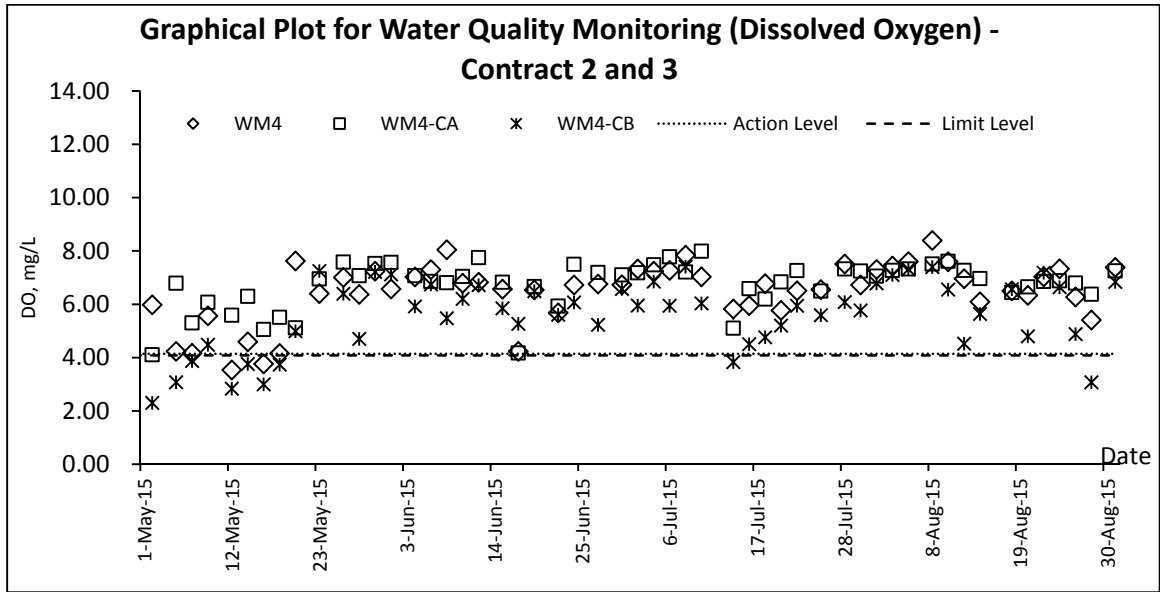






Water Quality





Appendix K

Meteorological Data

Date	Weather	Total Rainfall (mm)	Ta Kwu Ling Station				
			Mean Air Temp. (°C)	Wind Speed (km/h)	Mean Relative Humidity (%)	Wind Direction	
1-Aug-15	Sat	Mainly fine and very hot apart from isolated showers. Light winds.	0	28	7.7	77.2	E/NE
2-Aug-15	Sun	Mainly fine and very hot apart from isolated showers. Light winds.	0	28	6	75.2	E/NE
3-Aug-15	Mon	Mainly fine and very hot apart from isolated showers. Light winds.	0	28.6	5.5	74.5	E/NE
4-Aug-15	Tue	Mainly fine and very hot apart from isolated showers. Light winds.	0	28.4	5.5	72.2	S/SE
5-Aug-15	Wed	Mainly fine and very hot apart from isolated showers. Light winds.	0	28.9	4.5	72	W/SW
6-Aug-15	Thu	Mainly fine and very hot apart from isolated showers. Light winds.	0	29.9	4.5	70	N/NE
7-Aug-15	Fri	Mainly fine and very hot apart from isolated showers. Light winds.	0	31	4.5	67.5	N/NW
8-Aug-15	Sat	Mainly fine and very hot apart from isolated showers. Light winds.	0	31.5	7.5	66.2	N/NW
9-Aug-15	Sun	Cloudy with showers and isolated thunderstorms. Moderate southwesterly winds.	11.6	30.7	8.5	70	W/SW
10-Aug-15	Mon	Cloudy with showers and isolated thunderstorms. Moderate southwesterly winds.	23.5	28.4	8.2	81.2	S/SE
11-Aug-15	Tue	Mainly fine apart from isolated showers. Very hot. Moderate southwesterly winds.	16.8	29.2	8.5	77.7	W/SW
12-Aug-15	Wed	Mainly fine and very hot. Light to moderate southwesterly winds.	Trace	29.3	5	80.5	E/SE
13-Aug-15	Thu	Mainly fine and very hot. Light to moderate southwesterly winds.	27.5	28.4	8.2	83	S/SW
14-Aug-15	Fri	Mainly fine and very hot apart from isolated showers. Light winds.	18.9	26	8.5	81.2	SW
15-Aug-15	Sat	Fine and very hot. Moderate south to southwesterly winds.	24.6	26.1	9.6	85	E/SE
16-Aug-15	Sun	Fine and very hot. Moderate south to southwesterly winds.	0.1	28.1	6.5	84.2	S/SW
17-Aug-15	Mon	Mainly fine apart from isolated showers. Very hot. Moderate southwesterly winds.	Trace	28.9	6.1	77.5	W/SW
18-Aug-15	Tue	Fine and very hot. Moderate south to southwesterly winds.	Trace	29.7	5	75.7	W/SW
19-Aug-15	Wed	Mainly fine and very hot. Light to moderate southwesterly winds.	0	29.7	5.5	Maintenance	SW
20-Aug-15	Thu	Very hot with isolated showers Light winds.	6.1	28.3	4.4	Maintenance	E/SE
21-Aug-15	Fri	Very hot with isolated showers Light winds.	0	30.1	6.5	Maintenance	N/NE
22-Aug-15	Sat	Very hot with isolated showers Light winds.	Trace	29.9	8.2	Maintenance	N
23-Aug-15	Sun	Very hot with isolated showers Light winds.	3.4	30	7.7	Maintenance	N
24-Aug-15	Mon	Very hot with isolated showers Light winds.	0	30.5	5.6	Maintenance	N/NE
25-Aug-15	Tue	Fine and dry apart from some haze. It will be very hot. Light winds.	0	29.4	7	Maintenance	N/NW
26-Aug-15	Wed	Mainly cloudy with a few showers and isolated thunderstorms. Light winds.	0.2	29.2	7	Maintenance	N
27-Aug-15	Thu	Fine and dry apart from some haze. It will be very hot. Light winds.	0	29.5	8.2	Maintenance	E/SE
28-Aug-15	Fri	Fine and dry apart from some haze. It will be very hot. Light winds.	Trace	28.1	5.5	79.5	E/SE
29-Aug-15	Sat	Mainly cloudy with a few showers and isolated thunderstorms. Light winds.	0.9	28.1	7.5	82.2	E/SE
30-Aug-15	Sun	Cloudy with a few showers and squally thunderstorms. Light to moderate southeasterly winds	9.7	27.2	5.4	86.2	E/SE
31-Aug-15	Mon	Cloudy with a few showers and squally thunderstorms. Light to moderate southeasterly winds	Trace	27.9	5.5	85.5	E/NE

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 2015

(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 [a+b+c+d]	Broken Concrete (including rock for recycling into aggregates) (a)	Reused in the Contract (b)	Reused in Other Projects (c)	Disposed as Public Fill (d)	Imported C&D Material	Metal (in '000kg)	Paper/ Cardboard Packaging (in '000kg)	Plastic (bottles/containers, plastic sheets/ foams from package material) (in '000kg)	Chemical Waste (in '000kg)	Others (e.g. General Refuse etc.) (in '000m3)
January	66.2666	0.0000	0.0670	65.6529	0.5467	0.1150	0.0000	0.2500	0.0000	0.0000	0.0617
February	57.9980	0.0000	0.0000	57.3858	0.6121	0.3505	3.3200	0.3900	0.0000	0.5280	0.0908
March	66.0198	0.0000	0.3614	65.3359	0.3225	0.0729	0.0000	0.2920	0.0000	0.7040	0.1293
April	49.2562	0.0000	0.2770	48.7725	0.2066	0.1928	0.0000	0.2300	0.0000	0.0000	0.2423
May	41.7957	0.0000	8.7663	32.6095	0.4199	0.8683	0.0000	0.1300	0.0000	2.6400	0.0511
June	32.4389	0.0000	5.2132	26.7733	0.4524	0.9260	0.0000	0.5400	0.0000	0.5280	0.1703
Half-year total	313.7751	0.0000	14.6850	296.5299	2.5602	2.5255	3.3200	1.8320	0.0000	4.4000	0.7454
July	28.0854	0.0000	0.5171	26.7761	0.7922	1.0930	0.0000	0.6600	0.0000	0.8800	0.0496
August	47.1885	0.0000	0.4526	46.4710	0.2650	0.3222	0.0000	0.4500	0.6000	0.7040	0.1021
September	0.0000										
October	0.0000										
November	0.0000										
December	0.0000										
Yearly Total	389.0490	0.0000	15.6547	369.7770	3.6173	3.9407	3.3200	2.9420	0.6000	5.9840	0.8971

(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 [a+b+c+d]	Broken Concrete (including rock for recycling into aggregates) (a)	Reused in the Contract (b)	Reused in Other Projects (c)	Disposed as Public Fill (d)	Imported C&D Material	Metal (in '000kg)	Paper/ Cardboard Packaging (in '000kg)	Plastic (bottles/containers, plastic sheets/ foams from package material) (in '000kg)	Chemical Waste (in '000kg)	Others (e.g. General Refuse etc.) (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											
2016											
2017											
2018											
Total	425.4406	0.0000	2.7362	376.3945	46.3099	5.6245	3.2100	0.4390	0.0070	10.8800	2.2609

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 2015 (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	3.864	0.105	0.648	0.000	3.216	0.118	0.000	0.000	0.000	0.040	0.080
Feb	2.429	0.049	1.518	0.000	0.911	0.100	0.000	0.000	0.003	0.900	0.070
Mar	3.713	0.029	0.270	0.000	3.443	0.100	0.000	0.000	0.006	0.000	0.080
Apr	3.597	0.115	2.308	0.000	1.289	0.090	0.003	0.000	0.000	0.000	0.065
May	1.357	0.197	0.108	0.000	1.249	0.100	0.000	0.000	0.012	0.000	0.065
Jun	2.515	0.053	0.840	0.000	1.675	0.125	0.000	0.000	0.030	0.800	0.060
Sub-total	17.475	0.547	5.692	0.000	11.783	0.633	0.003	0.000	0.051	1.740	0.420
Jul	1.177	0.030	0.351	0.000	0.826	1.564	0.000	0.000	0.000	0.000	0.065
Aug	1.966	0.164	0.294	0.000	1.672	0.956	0.002	0.000	0.001	0.000	0.130
Sep											
Oct											
Nov											
Dec											
Total	20.618	0.742	6.337	0.000	14.281	3.152	0.005	0.000	0.052	1.740	0.615

- 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 2015

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	33.3285	4.16	0.24	0	0	0.42
FEB	0	0	0	0	0	11.82	0.99	0	0	0	0.18
MAR	0	0	0	0	0	8.592	0	0	0	0	0.375
APRIL	0	0	0	0	0	12.81	0	0	0	0	0.04
MAY	0	0	0	0	0	16.609	0	0.154	0	0	0
JUN	0	0	0	0	0	13.676	0	0	0	0	0.015
Sub Total	0	0	0	0	0	96.8355	5.15	0.394	0	0	1.03
JUL	0	0	0	0	0	10.285	0	0	0	0	0.02
AUG	0	0	0	0	0	9.129	0	0	0	0	0.43
SEP											
OCT											
NOV											
DEC											
Total	0	0	0	0	0	116.25	5.15	0.394	0	0	1.48

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

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

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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 					

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		<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

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		<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

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		<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