

# **Entrusted Portion of Widening of Tolo Highway / Fanling Highway between Island House Interchange and Fanling Stage 2**

Monthly EM&A Report

April 2014

**Submitted to**

Environmental Protection Department

**Prepared By**

Meinhardt Infrastructure and Environment Ltd

Meinhardt Infrastructure and Environment Limited

**Entrusted Portion of Widening of Tolo  
Highway / Fanling Highway between Island  
House Interchange and Fanling Stage 2**

Monthly EM&A Report

(April 2014)

Certified by: Fredrick Leong 

Position: Environmental Team Leader

Date: 12 May 2014

Our ref AFK/TK/jn/T329380/22.05/L-0023  
T 2828 5919  
E terence.kong@mottmac.com.hk  
Your ref

Hyder-Arup-Black & Veatch Joint Venture  
c/o Hyder Consulting Limited  
47/F Hopewell Centre  
183 Queen's Road East  
Wanchai, Hong Kong

Dear Sir,

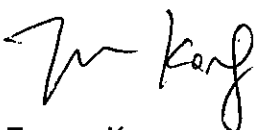
12 May 2014  
By Fax (2805 5028) & Post

**Attn: Mr. James Penny**

**Environmental Monitoring and Audit (EM&A) for Widening of Tolo Highway/Fanling Highway between Island House Interchange and Fanling  
Stage 2 (between Tai Hang to Wo Hop Shek Interchange) – Entrusted Works  
Environmental Permit No. EP-324/2008/B  
Condition 3.3 – Submission of Monthly EM&A Report – April 2014 for the portion of Stage 2 works entrusted to Civil Engineering and Development Department (CEDD) under Contract No. CV/2012/09**

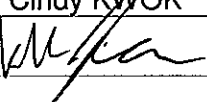
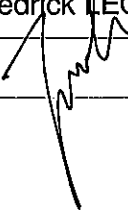
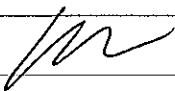
We refer to the revised Monthly EM&A Report – April 2014 received on 9 and 12 May 2014 submitted by the Environmental Team via email. Pursuant to Environmental Permit Condition 3.3, I hereby verify the Monthly EM&A Report – April 2014 (Rev. 0) for the portion of works under Stage 2 of the captioned Project which is entrusted to CEDD under Contract No. CV/2012/09.

Yours faithfully  
for MOTT MACDONALD HONG KONG LIMITED



Terence Kong  
Independent Environmental Checker

c.c. HyD – Mr. Chung Lok Chin (Fax: 2714 5198) / Ms. Jackei Yin (Fax: 2761 4864)  
CEDD/BCP – Mr. Chris Wong / Mr. Desmond Lam (Fax: 2714 0103)  
AECOM – Mr. Alan Lee (Fax: 3922 9797)  
Meinhardt Infrastructure and Environment Limited – Mr. Fredrick Leong (Fax: 2540 1580)

Date	Revision	Prepared By	Checked By	Approved By
12 May 2014	0	Ivan TING Cindy KWOK	Fredrick LEONG	Helen COCHRANE
				

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## EXECUTIVE SUMMARY

The Entrusted Portion of Widening of Tolo Highway / Fanling Highway between Island House Interchange and Fanling Stage 2 (hereafter called “the Project”) covers part of the construction of the widening of Tolo Highway / Fanling Highway between Island House Interchange and Fanling which aimed to widen Tolo Highway and Fanling Highway to dual 4-lane carriageway in order to alleviate the current traffic congestion problems and to cope with the increasing transport demands to and from the urban areas and also cross boundary traffic. The Project covers construction activities at Yuen Leng along the existing Fanling Highway.

The impact EM&A for the Project includes air quality, noise and water quality monitoring. The EM&A programme commenced on 5 November 2013.

This report documents the findings of EM&A works conducted in April 2014. As informed by the Contractor, the major activities in the reporting period were:

- Cable detection and trial trenches;
- Tree Felling Works;
- Pre-drilling works and piling works;
- Extension of box culvert ID04, ID05 & BC01;
- Bored pile and bored pile wall construction;
- Construction of haul road and temporary soil platform for geotechnical works;
- Slope upgrading works;
- Noise barrier installation; and
- Waterworks

### *Breach of Action and Limit Levels for Air Quality*

No exceedance of Action and Limit Level was recorded for 24-hour TSP monitoring at the monitoring location AM1(SR77) in the reporting month.

No exceedance of Action and Limit Level was recorded for 1-hour TSP monitoring at the monitoring location AM1(SR77) in the reporting month.

### *Breach of Action and Limit Levels for Noise*

No noise complaint was received in the reporting month, so no Action Level exceedance was recorded. Also, no Limit Level exceedance of noise monitoring was recorded in the reporting month.

### *Breach of Action and Limit Levels for Water Quality*

One (1) exceedance of Limit Level of Suspended Solids was recorded at the monitoring location I5 on 2 April 2014 in the reporting month. Investigation for the exceedance was conducted which concluded that the exceedance was not related to the project works. The investigation reports are presented in **Appendix M**.



The box culvert works has been partially completed by the end of March 2014 except the last construction activity, installation of a base slab at Box Culvert ID4. Due to the loading requirement of a fresh water main under the box culvert, installation of the base slab at Box Culvert ID4 has to be scheduled to be carried out in November 2015 after the utilities diversions complete. The construction works are temporary suspended until the utilities diversion works complete.

As such, water quality monitoring has been conducted for the first week of April 2014 only to cover the temporary suspension of the construction work. The 4-week post construction water quality monitoring will be commenced after the installation of the base slab finishes, hence the completion of the box culvert works.

#### *Complaint, Notification of Summons and Successful Prosecution*

No complaint, notification of summons and successful prosecution was received in the reporting month.

#### *Future Key Issues*

The major construction works in the coming reporting month are anticipated to include:

- Cable detection and trial trenches;
- Pre-drilling works and piling works;
- Tree felling & Transplanting works;
- Pile cap works;
- Waterworks;
- Slope upgrading works;
- Noise barrier footing;
- Laying of concrete pipe works;
- Bored pile and bored pile wall construction;
- Pier Construction;
- Piling works for Bridge E;
- Site formation;
- Demolition; and
- Diversion of DN600 & DN1400.

Potential environmental impacts arising from the above construction activities are anticipated to be mainly associated with construction dust, noise, water quality and waste management.

## **1 INTRODUCTION**

1.1.1 Chun Wo Construction & Engineering Co Ltd (Chun Wo) was commissioned by the Civil Engineering and Development Department (CEDD) as the Civil Contractor for the Entrusted Portion of Widening of Tolo Highway / Fanling Highway between Island House Interchange and Fanling Stage 2. Meinhardt Infrastructure & Environment Ltd (MIEL) has been appointed by Chun Wo as the Environmental Team (ET) to fulfill the corresponding EM&A requirements pursuant to Environmental Permit No. EP-324/2008/B in accordance with the Updated EM&A Manual (dated October 2013) for Widening of Tolo Highway/Fanling Highway between Island House Interchange and Fanling Stage 2. The EM&A programme commenced in 5 November 2013.

### **1.2 Purpose of the Report**

1.2.1 This is the monthly EM&A Report which summaries the impact monitoring results and audit findings for the Project during the reporting month of April 2014.

### **1.3 Report Structure**

1.3.1 This monthly EM&A Report comprises the following sections:

- Section 1: Introduction
- Section 2: Project Information
- Section 3: Status of Environmental Licenses, Notifications and Permits
- Section 4: Air Quality Monitoring
- Section 5: Noise Monitoring
- Section 6: Water Monitoring
- Section 7: Waste Management
- Section 8: Environmental Site Inspection and Audit
- Section 9: Implementation Status of Environmental Mitigation Measures
- Section 10: Environmental Non-conformance
- Section 11: Future Key Issues
- Section 12: Conclusions and Recommendations

## 2 PROJECT INFORMATION

### 2.1 Background

- 2.1.1 Tolo Highway and Fanling Highway are expressways in the North East New Territories connecting Sha Tin, Tai Po and Fanling. These highways form a vital part of the strategic Route 1, which links Hong Kong Island to Shenzhen. At present, this section of Route 1 is a dual 3-lane carriageway. However, at several major interchanges along this section of Route 1, the highway is only dual-2 lane. Severe congestion is a frequent occurrence during peak periods, particularly in the Kowloon bound direction.
- 2.1.2 The objective of the Widening of Tolo Highway / Fanling Highway between Island House Interchange and Fanling is to widen Tolo Highway and Fanling Highway to dual 4-lane carriageway in order to alleviate the current traffic congestion problems and to cope with the increasing transport demands to and from the urban areas and also cross boundary traffic.
- 2.1.3 The construction works for the Widening of Tolo Highway / Fanling Highway between Island House Interchange and Fanling are to be delivered in 2 stages:
- Stage 1 – Construction works between Island House Interchange and Tai Hang; and
  - Stage 2 – Construction works between Tai Hang and Wo Hop Shek Interchange.
- 2.1.4 The construction works of Stage 1 under the EP commenced in November 2009 and was planned to be completed in December 2013 tentatively. The works of Stage 2 was planned to commence in November 2013 and complete by end of 2016. Hyder-Arup-Black and Veatch Joint Venture (HABVJV) was appointed by the Highways Department (HyD) as the consultants for the design and construction assignment for the Project. Mott MacDonald Hong Kong Ltd is the Independent Environmental Checker (IEC) of both Stage 1 and Stage 2 works.
- 2.1.5 A portion of Stage 2 works of Widening of Tolo Highway / Fanling Highway between Island House Interchange and Fanling (hereafter called “the Project”) is entrusted to the contractor of Contract No. CV/2012/09 Liantang / Heung Yuen Wai Boundary Control Point Site Formation and Infrastructure Works Contract 3, i.e. Chun Wo. AECOM Asia Co Ltd was appointed by the CEDD as the consultant for the design and construction assignment for the Liantang development.
- 2.1.6 The Project is a Designated Project under the Environmental Impact Assessment Ordinance (EIAO) (Cap. 499). An Environmental Impact Assessment (EIA) Report together with an Environmental Monitoring and Audit (EM&A) Manual were approved on 14 July 2000 (Register Number: EIA-043/2000). The Project is governed by an Environmental Permit (EP) (EP-324/2008) which was granted on 23 December 2008. A variation of EP (VEP) was applied and the VEP (EP-324/2008/A) was subsequently granted on 31 January 2012. An additional VEP has been applied on 24 February 2014 and the VEP (EP-324/2008/B) was subsequently granted on 17 March 2014.

### 2.2 Site Description

- 2.2.1 The major construction activities under the Entrusted Portion of Widening of Tolo Highway / Fanling Highway between Island House Interchange and Fanling Stage 2 include:

- At-Grade Road Works – Temporary and permanent road formation, pipe laying, road drainage, footpath and noise barrier construction;
- Demolition of existing Kiu Tau Footbridge and Footbridge Re-provision; and
- Box Culvert Extension – Flow diversion of existing stream, excavation, sub-base and blinding, base, wall and top slab construction.

2.2.2 **Figure 1** shows the works areas for the Entrusted Portion of Widening of Tolo Highway / Fanling Highway between Island House Interchange and Fanling Stage 2.

## 2.3 Construction Programme and Activities

2.3.1 The major construction activities undertaken in the reporting month are summarized below:

- Cable detection and trial trenches;
- Tree Felling Works;
- Pre-drilling works and piling works;
- Extension of box culvert ID04, ID05 & BC01;
- Bored pile and bored pile wall construction;
- Construction of haul road and temporary soil platform for geotechnical works;
- Slope upgrading works;
- Noise barrier installation; and
- Waterworks

2.3.2 The construction programme is presented in **Appendix A**.

## 2.4 Project Organisation

2.4.1 The project organization structure is shown in **Appendix B**. The key personnel contact names and numbers for the Project are summarised in **Table 2.1**.

**Table 2.1 Contact Information of Key Personnel**

Party	Role	Position	Name	Telephone	Fax
AECOM	Engineer's Representative	Senior Resident Engineer	Mr. Alan Lee	2472 7228	2472 0132
		Resident Engineer (Environmental)	Mr. Perry Yam	2674 2273	--
Mott MacDonald	Independent Environmental Checker (IEC)	IEC	Mr. Terence Kong	2828 5919	2827 1823

<b>Party</b>	<b>Role</b>	<b>Position</b>	<b>Name</b>	<b>Telephone</b>	<b>Fax</b>
Chun Wo	Contractor	Site Agent	Mr. Daniel Ho	2638 6144	2638 7077
		Environmental Officer	Mr. Victor Huang	2638 6181	
		Environmental Officer	Mr. Sam Lam	2638 6147	
Meinhardt	Environmental Team (ET)	ET Leader	Mr. Fredrick Leong	2859 1739	2540 1580

### 3 STATUS OF ENVIRONMENTAL LICENSES, NOTIFICATION AND PERMITS

3.1.1 The relevant environmental licenses, permits and/or notifications on environmental protection for this Project and valid in the reporting month are summarized in **Table 3.1**.

**Table 3.1 Status of Environmental Licenses, Notifications and Permits**

Permit / License No. / Notification/ Reference No.	Valid Period		Status	Remarks
	From	To		
<b><i>Environmental Permit</i></b>				
EP-324/2008/A	31 Jan 2012	--	Superseded by EP-324/2008/B	--
EP-324/2008/B	17 Mar 2014	--	Granted on 17/03/2014	--
<b><i>Construction Noise Permit</i></b>				
GW-RN0109-14	25 Feb 2014	17 May 2014	Valid	For erection of catch fence in the night time
GW-RN0136-14	9 Mar 2014	22 Jun 2014	Valid	For tree felling / transplanting works
<b><i>Wastewater Discharge License</i></b>				
WT00016832-2013	28 Aug 2013	31 Aug 2018	Valid	--
<b><i>Chemical Waste Producer Registration</i></b>				
5113-634-C3817-01	7 Oct 2013	--	Valid	--
<b><i>Billing Account for Construction Waste Disposal</i></b>				
7017914	2 Aug 2013	--	Account Active	--
<b><i>Notification Under Air Pollution Control (Construction Dust) Regulation</i></b>				
--	31 Jul 2013	30 Jul 2019	Notified	--

## 4 AIR QUALITY MONITORING

### 4.1 Monitoring Requirement

4.1.1 In accordance with the Updated EM&A Manual, 1-hr and 24-hr total suspended particulate (TSP) levels at the designated air quality monitoring station are required. Impact 24-hour TSP monitoring should be carried out for at least once every 6 days. For the 1-hr TSP impact monitoring, the sampling frequency of at least three times in every 6 days should be undertaken when the highest dust impact occurs.

### 4.2 Monitoring Equipment

4.2.1 The 24-hr TSP air quality monitoring was performed using a High Volume Sampler (HVS), of which its location and operation satisfy, as far as practicable, all the requirements as specified in the Updated EM&A Manual. A portable direct reading dust meter, which was proven to be capable of achieving comparable results as that of the HVS, was used to carry out the 1-hr TSP monitoring. The brand and model of the equipment are given in **Table 4.1**.

**Table 4.1 Air Quality Monitoring Equipment**

Equipment	Brand and Model	Quantity	Serial Number
Handheld TSP meter (1-hr TSP)	TSI (Model No. AM 510)	1	11008019
High Volume Sampler (24-hr TSP)	Tisch Total Suspended Particulate Mass Flow Controlled High Volume Air Sampler (Model No. TE-5170 MFC)	1	2359

4.2.2 The HVS and its accessories were maintained in good working condition, such as replacing motor brushes routinely and checking electrical wiring to ensure a continuous power supply.

4.2.3 Calibration of the HVS (five point calibration) using Calibration Kit was carried out every two months. The HVS calibration orifice and the handheld TSP meter will be calibrated annually. Calibration certificate of the TE-5025A Calibration Kit, the handheld TSP meter and the HVS are provided in **Appendix C**.

### 4.3 Monitoring Location

4.3.1 Air quality monitoring was conducted at the location specified in the Updated EM&A Manual. **Table 4.2** describes the details of the air quality monitoring station with its location as shown in **Figure 2**.

**Table 4.2 Location of Air Quality Monitoring**

Air Monitoring Station ID	Monitoring Location	Description
AM1(SR77) *	Yuen Leng 2 *	Residential, Ground floor

Remark:

\* Location and Station / ASR ID as identified in Updated EM&A Manual / EIA Report for Widening of Tolo Highway/Fanling Highway between Island House Interchange and Fanling

#### 4.4 Monitoring Parameters, Frequency and Duration

4.4.1 **Table 4.3** summarizes the monitoring parameters, frequency and duration of impact TSP monitoring.

**Table 4.3 Air Quality Monitoring Parameters, Frequency and Duration**

Parameter	Frequency and Duration
1-hour TSP	At least three times in every 6 days should be undertaken when the highest dust impact occur
24-hour TSP	Once every 6 days

#### 4.5 Monitoring Methodology

##### *24-hr TSP Monitoring*

- 4.5.1 With the consideration of criteria stated in the Updated EM&A Manual, the HVS was installed in the vicinity of the air sensitive receivers.
- 4.5.2 The relevant data including temperature, pressure, weather conditions, elapsed-time meter reading for the start and stop of the sampler, identification and weight of the filter paper, and any special phenomena observed were recorded. The weather information was referenced from Hong Kong Observatory (<http://www.weather.gov.hk/wxinfo/pastwx/extractc.htm>).
- 4.5.3 A HOKLAS accredited laboratory, Enviro Labs Ltd. (HOKLAS no.: 128), with constant temperature and humidity control, and equipped with necessary measuring and conditioning instruments, to handle the 24-hr TSP samples, was employed for sample analysis.
- 4.5.4 Filter papers of size 8"x10" were labelled before sampling. They were inspected to be clean with no pin holes and conditioned in a humidity controlled chamber for over 24-hr and were pre-weighed before use for the sampling.
- 4.5.5 The 24-hr TSP levels were measured by following the standard high volume sampling method for TSP as set out in the Title 40 of the United States Code of Federal Regulations, Chapter 1 (Part 50), Appendix B. TSP was sampled by drawing air through a conditioned, pre-weighted filter paper inside the HVS at a controlled air flow rate. After 24-hr sampling, the filter papers loaded with dust were kept in a clean and tightly sealed plastic bag, and then returned to the laboratory for reconditioning in the humidity controlled chamber followed by accurate weighing by an electronic balance with a readout down to 0.1 mg.
- 4.5.6 All the collected samples were kept in a good condition for 6 months before disposal.

##### *1-hr TSP Monitoring*

- 4.5.7 The 1-hr TSP measurement followed manufacturer's instruction manual. Before initiating a measurement, zeroing the portable dust monitor was carried out to ensure maximum accuracy of concentration measurements.
- 4.5.8 The 1-hr TSP was sampled by drawing air into the portable dust monitor where particular concentrations were measured instantaneously with an in-built silicon



detector sensing light scattered by the particulates in the sampled air. Continuous TSP levels were indicated and logged by a built-in data logger compatible with Windows based program to facilitate data collection, analysis and reporting.

#### 4.6 Monitoring Schedule for the Reporting month

4.6.1 The schedule for environmental monitoring for the reporting month is provided in **Appendix D**. Meteorological data extracted from Hong Kong Observatory for the reporting month is provided in **Appendix E**.

#### 4.7 Monitoring Results

4.7.1 The monitoring results for 1-hr and 24-hr TSP are summarised in **Table 4.4** and **Table 4.5** respectively. Detailed air quality monitoring results and the graphical presentation of air quality monitoring data for the current and past three reporting months are presented in **Appendix F**.

**Table 4.4 Summary of 1-hr TSP Monitoring Results**

ASR ID	Average ( $\mu\text{g}/\text{m}^3$ )	Range ( $\mu\text{g}/\text{m}^3$ )	Action Level ( $\mu\text{g}/\text{m}^3$ )	Limit Level ( $\mu\text{g}/\text{m}^3$ )
AM1(SR77) *	160.0	129.0 – 203.0	292.7	500

Remark:

\* Station / ASR ID as identified in Updated EM&A Manual / EIA Report for Widening of Tolo Highway/Fanling Highway between Island House Interchange and Fanling

**Table 4.5 Summary of 24-hr TSP Monitoring Results**

ASR ID	Average ( $\mu\text{g}/\text{m}^3$ )	Range ( $\mu\text{g}/\text{m}^3$ )	Action Level ( $\mu\text{g}/\text{m}^3$ )	Limit Level ( $\mu\text{g}/\text{m}^3$ )
AM1(SR77) *	107.4	87.6 – 145.4	170.3	260

Remark:

\* Station / ASR ID as identified in Updated EM&A Manual / EIA Report for Widening of Tolo Highway/Fanling Highway between Island House Interchange and Fanling

4.7.2 No exceedance of Action and Limit Level was recorded for 24-hour TSP monitoring at the monitoring location AM1(SR77) in the reporting month.

4.7.3 No exceedance of Action and Limit Level was recorded for 1-hour TSP monitoring at the monitoring location AM1(SR77) in the reporting month.

4.7.4 The Event and Action Plan for the occurrence of non-compliance of the air quality criteria is annexed in **Appendix G**.

4.7.5 Details of monitoring conditions including influencing factors such as weather conditions and site observation are presented in **Appendix E**.

## 5 NOISE MONITORING

### 5.1 Monitoring Requirements

5.1.1 In accordance with the Updated EM&A Manual, the impact noise monitoring frequency shall depend on the scale of the construction activities. An initial guide on the regular monitoring frequency should be at least once per week when noise generating activities are underway.

### 5.2 Monitoring Equipment

5.2.1 Noise monitoring was performed using a sound level meter at the monitoring station. The sound level meter deployed complies with the International Electrotechnical Commission Publications 651:1979 (Type 1) and 804:1985 (Type 1) specifications. An acoustic calibrator was deployed to check the sound level meter at a known sound pressure level. The brand and model of the equipment is given in **Table 5.1**.

**Table 5.1 Noise Monitoring Equipment**

Equipment	Brand and Model	Quantity	Serial Number
Sound Level Calibrator	B&K (Model No. 4231)	1	2685684
Sound Level Meter	Rion (Model No. NL-52)	1	00220553

5.2.2 The sound level calibrator and sound level meter were verified by the certified laboratory once every two years. Calibration certificates of the sound level meter and acoustic calibrator are provided in **Appendix C**.

### 5.3 Monitoring Locations

5.3.1 Impact noise monitoring was conducted at the location specified in the Updated EM&A Manual. **Table 5.2** describes the details of the noise monitoring station with its location as shown in **Figure 2**.

**Table 5.2 Location of Noise Monitoring**

NSR ID	Monitoring Location	Description
M1(SR77) *	Yuen Leng 2 *	Residential, Ground floor

Remark:

\* Location and Station / NSR ID as identified in Updated EM&A Manual / EIA Report for Widening of Tolo Highway/Fanling Highway between Island House Interchange and Fanling

### 5.4 Monitoring Parameters, Frequency and Duration

5.4.1 **Table 5.3** summarizes the monitoring parameters, frequency and duration of impact noise monitoring.

**Table 5.3 Noise Monitoring Parameters, Frequency and Duration**

Parameter and Duration	Frequency
30-mins measurement at between 0700 and 1900 on normal weekdays. Leq, L10 and L90 would be recorded.	At least once per week

## 5.5 Monitoring Methodology

5.5.1 The monitoring procedures are summarised as below:

- The microphone head of the sound level meter was positioned 1m exterior of the noise sensitive facade and lowered sufficiently so that the building's external wall acts as a reflecting surface.
- The battery condition was checked to ensure good functioning of the meter.
- Parameters such as frequency weighting, the time weighting and the measurement time were set as follows:
  - frequency weighting: A
  - time weighting: Fast
  - parameters: Leq, L10 and L90
  - time measurement: Leq(30-minutes) during non-restricted hours i.e. 07:00 – 1900 hrs on normal weekdays; Leq(5-minutes) during restricted hours i.e. 19:00 – 23:00 hrs and 23:00 – 07:00 hrs of normal weekdays, whole day of Sundays and Public Holidays
- Prior to and after each noise measurement, the meter was calibrated using the acoustic calibrator for 94dB(A) at 1000 Hz. If the difference in the calibration level before and after measurement was more than 1dB(A), the measurement would be considered invalid and repeat of noise measurement would be required after re-calibration or repair of the equipment.
- At the end of the monitoring period, the Leq, L10 and L90 were recorded. In addition, site conditions and noise sources were recorded on a standard record sheet.
- A façade correction of +3dB (A) shall be made to the noise parameter obtained by free field measurement.

## 5.6 Monitoring Schedule for the Reporting Month

5.6.1 The schedule for environmental monitoring for the reporting month is provided in **Appendix D**. Meteorological data extracted from Hong Kong Observatory for the reporting month is provided in **Appendix E**.

## 5.7 Monitoring Results

5.7.1 The monitoring results for noise are summarized in **Table 5.4** and the monitoring results and the graphical presentation of noise level for the current and past three reporting months are presented in **Appendix H**.

**Table 5.4 Summary of Noise Monitoring Results**

Noise Monitoring Station ID	Average, dB(A), Leq (30min) <sup>(2)</sup>	Range, dB(A), Leq (30min) <sup>(2)</sup>	Action Level	Limit Level, dB(A)
M1(SR77) <sup>(1)</sup>	61.7	60.2 – 63.5	When one documented valid complaint is received	75

Remark:

(1) Station / NSR ID as identified in Updated EM&A Manual / EIA Report for Widening of Tolo Highway/Fanling Highway between Island House Interchange and Fanling

(2) +3dB(A) façade correction included

- 5.7.2 Major noise sources during the noise monitoring included construction activities of the Project and that along Tai Wo Service Road East, and nearby traffic noise.
- 5.7.3 No noise complaint was received in the reporting month, so no Action Level exceedance was recorded. Also, no Limit Level exceedance of noise monitoring was recorded in the reporting month.
- 5.7.4 The Event and Action Plan for the occurrence of non-compliance of the noise criteria is annexed in **Appendix G**.

## 6 WATER MONITORING

### 6.1 Monitoring Requirements

6.1.1 In accordance with the Updated EM&A Manual, during the course of the culvert extension works, monitoring shall be undertaken on three occasions per week. The interval between two sets of monitoring shall not be less than 36 hours except where there are exceedances of Action and/or Limit levels.

### 6.2 Monitoring Equipment

6.2.1 The equipment used in the water quality monitoring programme is summarised in **Table 6.1**.

**Table 6.1 Water Quality Monitoring Equipment**

Equipment	Model and Make
Turbidity meter	HACH Model 2100Q is (Serial No. 11050C001264)
Multimeter (Scope of Test: Conductivity, Dissolved Oxygen, pH, Salinity and Temperature)	YSI Proplus (Serial No. 10D101565)

6.2.2 The monitoring instruments were checked, calibrated and certified by a laboratory accredited under HOKLAS before use and subsequently re-calibrated at 3-monthly intervals throughout all stages of the water quality monitoring. Copies of the calibration certificates for the water quality monitoring equipment are attached in **Appendix C**.

### 6.3 Monitoring Parameters, Frequency and Duration

6.3.1 Measurements for each monitoring station were conducted 3 days per week for the reporting month. **Table 6.2** summarises the monitoring parameters, frequency and duration of the baseline water quality monitoring.

**Table 6.2 Water Quality Monitoring Parameters, Frequency and Duration**

Monitoring Stations	Parameter, unit	Frequency
Control Stations: C3a and C3b Impact Station: I5	- Depth, m - Temperature, °C - Salinity, ppt - pH - DO, mg/L - DO Saturation, % - Turbidity, NTU - SS, mg/L	3 days per week

### 6.4 Monitoring Locations

6.4.1 According to the Updated EM&A Manual, measurements were taken at all impact and control stations as summarised in **Table 6.3**. The locations of the monitoring stations are shown in **Figure 3**.

**Table 6.3 Locations of Water Quality Monitoring**

Station	Description	Easting	Northing
I5	Downstream of Ma Wat River (Yuen Leng)	833931	837859
C3a	Upstream of Ma Wat River (Nam Wa Po)	833816	837644
C3b	Upstream of Ma Wat River (Yuen Leng)	833931	837736

## 6.5 Monitoring Methodology

### *Instrumentation*

- 6.5.1 The parameters of in-situ measurements included water depth, dissolved oxygen (DO), dissolved oxygen saturation (DOS), turbidity level, pH value and water temperature.

### *Operating/Analytical Procedures*

- 6.5.2 Since water depths for all monitoring stations were less than 1m throughout the whole baseline measurement period, only mid-depth level was monitored.
- 6.5.3 At each monitoring station, at least duplicate readings of dissolved oxygen content and turbidity were taken. The probes were retrieved out of the water after the first measurement and then re-deployed for the second measurement.
- 6.5.4 Water samples were collected by the water sampler and filled into polyethylene bottles for laboratory determination of suspended solids. Sampling bottles were pre-rinsed with the same water samples, and filled up to the rim, capped tightly and labeled immediately. The sample bottles were then packed into a cool-box kept at 4°C, and delivered to a HOKLAS accredited laboratory, Enviro Labs Ltd. (HOKLAS no.: 128) for analysis. The results for laboratory analysis of suspended solids are presented in **Appendix I**.

## 6.6 Monitoring Schedule for the Reporting Month

- 6.6.1 The schedule for environmental monitoring for the reporting month is provided in **Appendix D**. Meteorological data extracted from Hong Kong Observatory for the reporting month is provided in **Appendix E**.

### *Temporary Suspension of Box Culvert Works and Temporary of Water Quality Monitoring*

- 6.6.2 The box culvert works has been partially completed by the end of March 2014 except the last construction activity, installation of a base slab at Box Culvert ID4. Due to the loading requirement of a fresh water main under the box culvert, installation of the base slab at Box Culvert ID4 has to be scheduled to be carried out in November 2015 after the utilities diversions complete. The construction works are temporary suspended until the utilities diversion works complete.
- 6.6.3 As such, water quality monitoring has been conducted for the first week of April 2014 only to cover the temporary suspension of the construction work. The 4-week post construction water quality monitoring will be commenced after the installation of the base slab finishes, hence the completion of the box culvert works.

## 6.7 Monitoring Results

6.7.1 The water quality criteria, namely Action and Limit Levels, as specified in the Updated EM&A Manual are shown in **Table 6.4**.

**Table 6.4 Action and Limit Levels for Water Quality Monitoring**

Parameters	Action	Limit
DO in mg/L	6.7 mg/L	4 mg/L or 40% saturation at 15 degree Celsius
SS in mg/L	42.6 mg/L or 120% of upstream control station's SS of the same day	46.8 mg/L or 130% of upstream station's SS of the same day and specific sensitive receiver water quality requirements
Turbidity (Tby) in NTU	81.9NTU or 120% of upstream control station's Tby of the same day	91.9NTU or 130% of upstream control station's Tby of the same day

Notes:

For DO, non-compliance of the water quality limits occurs when monitoring result is lower than the limits.

For SS and Tby, non-compliance of the water quality limits occurs when monitoring result is higher than the limits.

6.7.2 The detailed water quality monitoring results and the graphical presentation of water quality monitoring data for the current and past three reporting months are presented in **Appendix J**.

6.7.3 The possible influences in monitoring results were suspected to be natural variation.

6.7.4 One (1) exceedance of Limit Level of Suspended Solids was recorded at the monitoring location I5 on 2 April 2014 in the reporting month. Investigation for the exceedance was conducted which concluded that the exceedance was not related to the project works. The investigation reports are presented in **Appendix M**.

6.7.5 The Event and Action Plan for the occurrence of non-compliance of the water quality criteria is annexed in **Appendix G**.

## 7 WASTE MANAGEMENT

- 7.1.1 The Contractor has registered as a chemical waste producer of the Project. The C&D materials and waste sorting were carried out on-site. Receptacles were provided for general refuse collection.
- 7.1.2 As advised by the Contractor, a total of 1,654m<sup>3</sup> of excavated material has been generated. 928m<sup>3</sup> of inert C&D materials was disposed of at public fill to Tuen Mun Area 38. 672m<sup>3</sup> of inert C&D materials was reused on site. 135m<sup>3</sup> of general refuse was disposed of at North East New Territories (NENT) Landfill. No plastics, paper/cardboard packaging was collected, and no metals were collected by recycling contractor in the reporting month. 20m<sup>3</sup> of chemical waste was collected by licensed contractor in the reporting period. Details of the waste management data are presented in **Appendix K**.
- 7.1.3 In the reporting month, the Contractor was reminded to properly maintain the site tidiness and dispose of wastes accumulated site regularly and properly.



## 8 ENVIRONMENTAL SITE INSPECTION AND AUDIT

### 8.1 Site Inspection

8.1.1 Site inspections were carried out on a weekly basis to monitor the implementation of proper environmental pollution control and mitigation measures for the Project. A summary of the site inspection is provided in **Appendix L**.

8.1.2 In the reporting month, 4 site inspections were carried out on 7, 16, 22 and 28 April 2014. The one held on 28 April 2014 was a joint inspection with the IEC, ER, ET and Contractor. No site inspection was conducted by the EPD during the reporting month. No non-compliance was recorded during the site inspection. A summary of the reminders and observations recorded during the site inspections are presented in **Table 8.1**.

**Table 8.1 Observations and Recommendations of Site Audit**

Parameters	Date	Observations and Recommendations	Follow-up
Water Quality	28 Apr 2014	Reminder: The contractor is reminded to implement proper measures to avoid surface runoff before rainstorm at box culvert ID4	The edge of construction road near section at box culvert ID4 has been blocked by a low level rock barriers to prevent surface run-off from entering the river stream.
Air Quality	N/A	N/A	N/A
Noise	N/A	N/A	N/A
Waste / Chemical Management	22 Apr 2014	<u>Observation:</u> Debris was observed being swept to the river stream at the slope works near culvert ID5 by the site worker. The Contractor should ensure the debris being properly cleaned up.	The debris has been removed as observed during the ET site inspection on 28 Apr 2014.
	28 Apr 2014	<u>Observation:</u> A rubbish bag is observed in the outfall of box culvert ID4. The contractor is reminded to properly clean up the general refuse.	The rubbish has been removed by the Contractor.
Landscape & Visual	N/A	N/A	N/A
Permits / Licenses	N/A	N/A	N/A

## 9 IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURES

9.1.1 The Contractor has implemented the relevant environmental mitigation measures as specified in the EIA Reports, EPs and updated EM&A Manual. The implementation status of environmental mitigation measures during the reporting period is summarized in **Appendix L**. The status of the required submissions under the EP during the reporting period is summarized in **Table 9.1**.

**Table 9.1 Status of Required Submission under Environmental Permit**

EP Condition	Submission	Submission Date
Condition 3.3	Monthly EM&A Report	11 April 2014

## 10 ENVIRONMENTAL NON-CONFORMANCE

### 10.1 Summary of Monitoring Exceedances

- 10.1.1 No exceedance of Action and Limit Level was recorded for 24-hour TSP monitoring at the monitoring location AM1(SR77) in the reporting month.
- 10.1.2 No exceedance of Action and Limit Level was recorded for 1-hour TSP monitoring at the monitoring location AM1(SR77) in the reporting month.
- 10.1.3 No noise complaint was received in the reporting month, so no Action Level exceedance was recorded. Also, no Limit Level exceedance of noise monitoring was recorded in the reporting month.
- 10.1.4 One (1) exceedance of Limit Level of Suspended Solids was recorded at the monitoring location I5 on 2 April 2014 in the reporting month. Investigation for the exceedance was conducted which concluded that the exceedance was not related to the project works. The investigation reports are presented in **Appendix M**.

### 10.2 Summary of Environmental Non-Compliance

- 10.2.1 No environmental non-compliance was recorded in the reporting month. The cumulative statistics are provided in **Appendix N**.

### 10.3 Summary of Environmental Complaints

- 10.3.1 No environmental complaint was received in the reporting month. The cumulative statistics are provided in **Appendix N**.

### 10.4 Summary of Environmental Summon and Successful Prosecutions

- 10.4.1 No environmental related prosecution or notification of summons was received in the reporting month. The cumulative statistics are provided in **Appendix N**.

## **11 FUTURE KEY ISSUES**

### **11.1 Construction Programme for the Next Month**

11.1.1 The major construction works in the coming reporting month are anticipated to include:

- Cable detection and trial trenches;
- Pre-drilling works and piling works;
- Tree felling & Transplanting works;
- Pile cap works;
- Waterworks;
- Slope upgrading works;
- Noise barrier footing;
- Laying of concrete pipe works;
- Bored pile and bored pile wall construction;
- Pier Construction;
- Piling works for Bridge E;
- Site formation;
- Demolition; and
- Diversion of DN600 & DN1400.

### **11.2 Key Issues for the Coming Month**

11.2.1 Key issues to be considered in the coming month are anticipated to include:

- Site runoff should be properly collected and treated prior to discharge;
- Properly maintain all drainage facilities and wheel washing facilities on site;
- Chemical, chemical waste and waste management;
- Tree protective measures for all retained trees should be well maintained;
- Expose slopes and dusty stockpile should be covered up properly if no temporary work will be conducted; and
- Operation of construction plant should be sequenced where practicable.

### **11.3 Monitoring Schedule for the Next Month**

- 11.3.1 The tentative schedule for environmental monitoring for the coming month is provided in **Appendix D**.

## 12 CONCLUSIONS AND RECOMMENDATIONS

### 12.1 Conclusions

- 12.1.1 The construction phase EM&A programme of the Project commenced on 5 November 2013.
- 12.1.2 The 1-hr TSP, 24-hr TSP, noise and water monitoring were carried out in the reporting period.
- 12.1.3 No exceedance of Action and Limit Level was recorded for 24-hour TSP monitoring at the monitoring location AM1(SR77) in the reporting month.
- 12.1.4 No exceedance of Action and Limit Level was recorded for 1-hour TSP monitoring at the monitoring location AM1(SR77) in the reporting month.
- 12.1.5 No noise complaint was received in the reporting month, so no Action Level exceedance was recorded. Also, no Limit Level exceedance of noise monitoring was recorded in the reporting month.
- 12.1.6 One (1) exceedance of Limit Level of Suspended Solids was recorded at the monitoring location I5 on 2 April 2014 in the reporting month. Investigation for the exceedance was conducted which concluded that the exceedance was not related to the project works. The investigation reports are presented in **Appendix M**.
- 12.1.7 Four (4) environmental site inspections were carried out in the reporting month. Recommendations on remedial actions were given to the Contractors for the deficiencies identified during the site audit.

#### *Temporary Suspension of Box Culvert Works and Temporary of Water Quality Monitoring*

- 12.1.8 The box culvert works has been partially completed by the end of March 2014 except the last construction activity, installation of a base slab at Box Culvert ID4. Due to the loading requirement of a fresh water main under the box culvert, installation of the base slab at Box Culvert ID4 has to be scheduled to be carried out in November 2015 after the utilities diversions complete. The construction works are temporary suspended until the utilities diversion works complete.
- 12.1.9 As such, water quality monitoring has been conducted for the first week of April 2014 only to cover the temporary suspension of the construction work. The 4-week post construction water quality monitoring will be commenced after the installation of the base slab finishes, hence the completion of the box culvert works.

### 12.2 Recommendations

- 12.2.1 According to the environmental site inspections performed in the reporting month, the following recommendations were provided:

#### *Air Quality*

- Water spraying should be properly implemented whenever necessary for the unpaved roads, access roads and construction areas..

### *Water Quality*

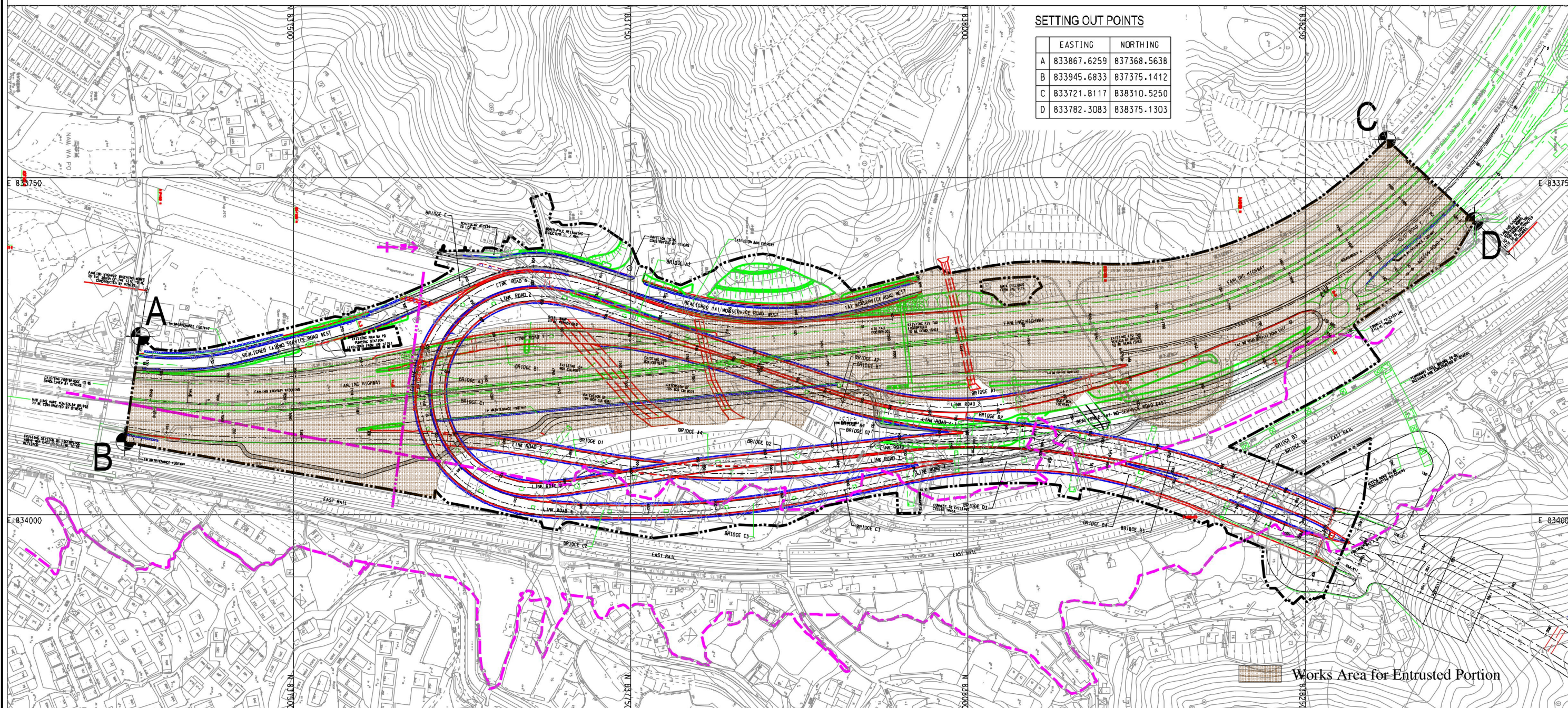
- Channels or earth bunds or sand bag barriers should be provided on site to prevent surface runoff and properly direct stormwater to silt removal facilities.
- Silty effluent should be treated/desilted before discharged. Untreated effluent should be prevented from entering public drain channel.

### *Chemical and Waste Management*

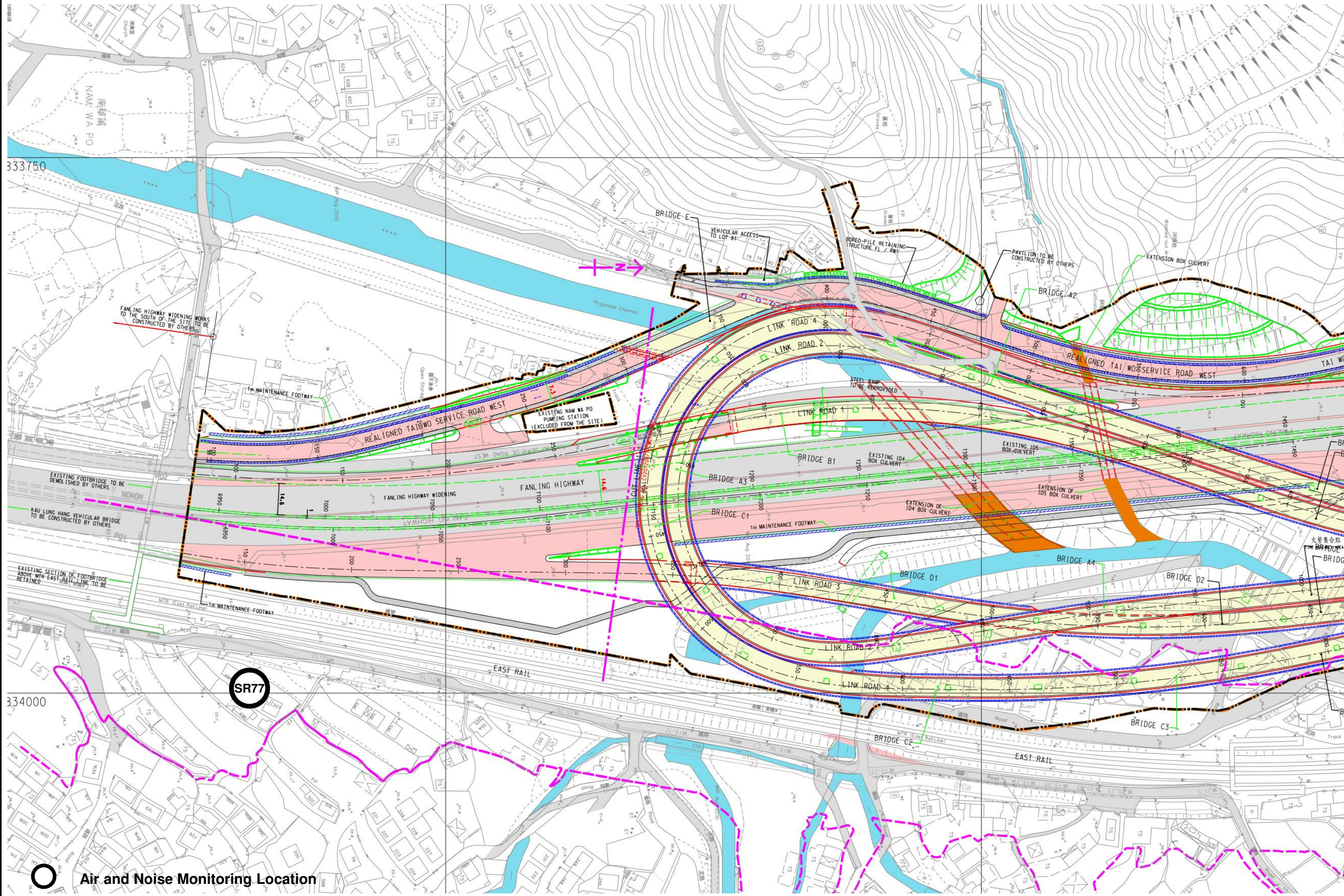
- All types of wastes, both on land and floating in the river stream, should be collected and sorted properly, and also be disposed timely and properly.

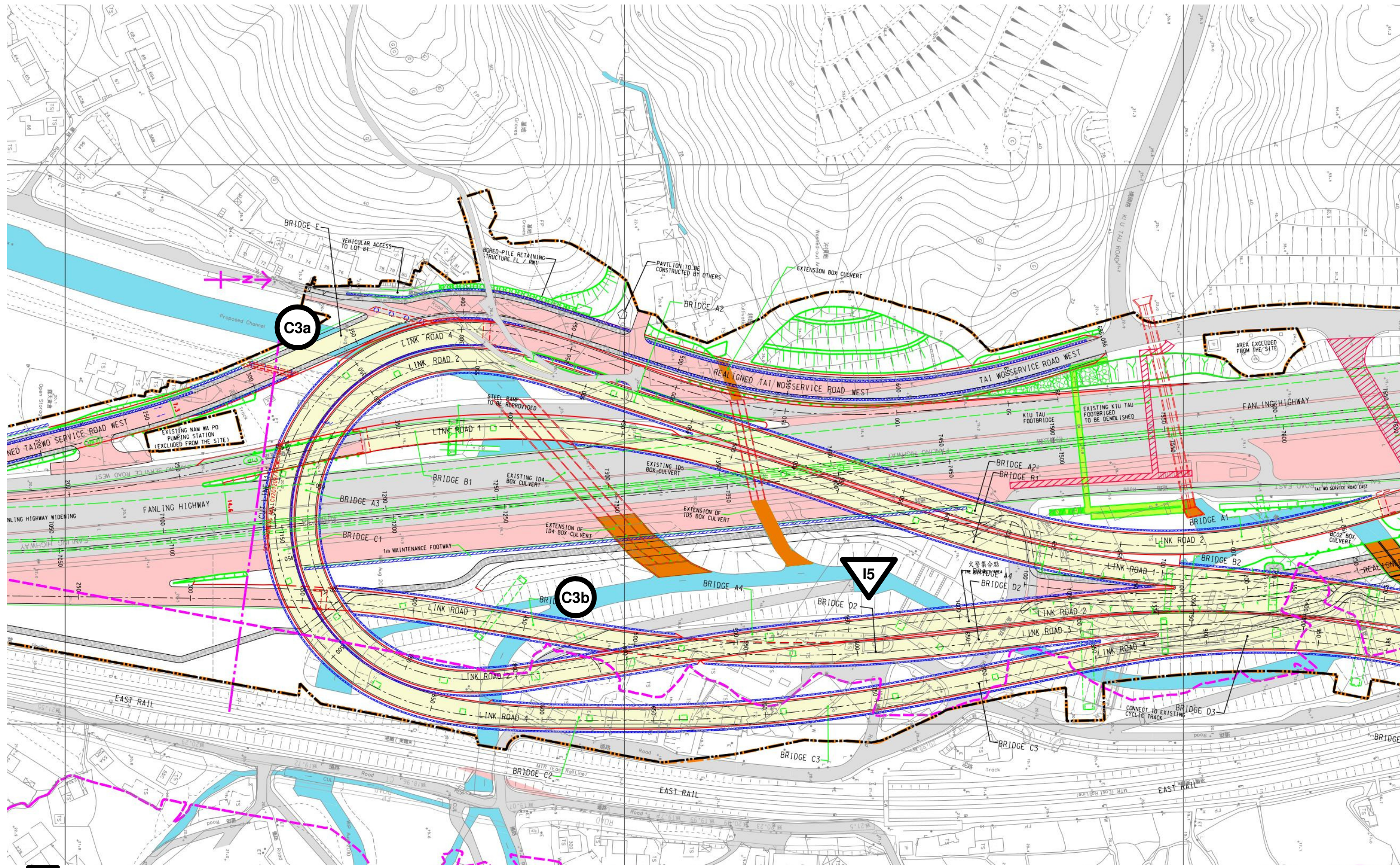
## Figure





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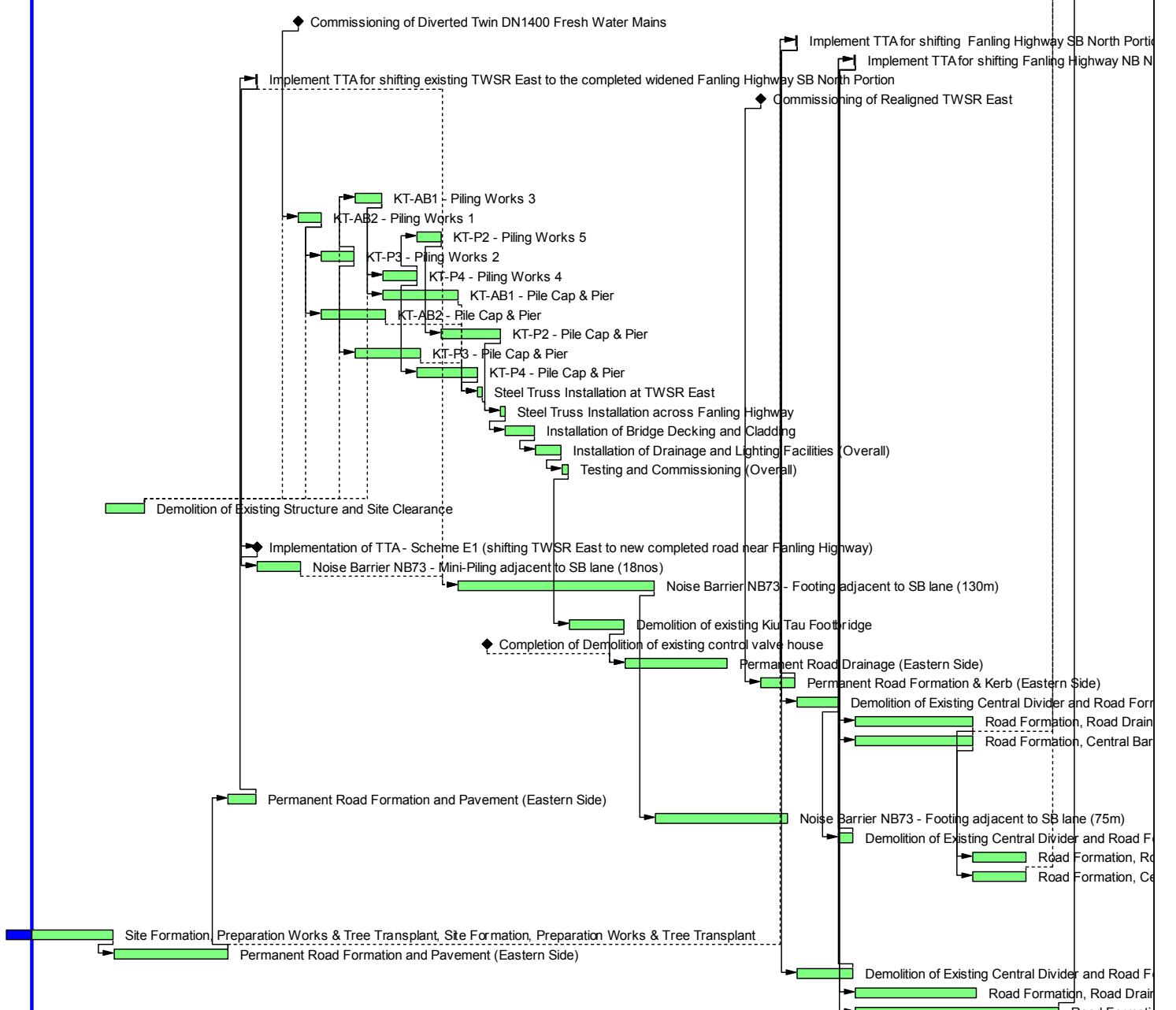




 Impact Water Monitoring Location  
 Control Water Monitoring Location

# Appendix A Construction Programme

Activity ID	Activity Name	OD	Start	Finish	Total Float	2014												2015												2016												2017												2018											
						A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J
<b>CWP - Under Development (Postpone Pipe Jacking)</b>																																																																	
<b>Key Dates (Forecast)</b>																																																																	
<b>Major Works</b>																																																																	
KD-0105	KD1: Complete Section 1A - all HyD's entrustment works in Zone3 and SBZ2 except for landscaping works	0		07-Dec-17	53																																																												
KD-0205	KD2: Complete Section 1B - all HyD's entrustment works in NBZ1 except for landscaping works	0		09-Jan-18	234																																																												
<b>Major Milestones and Events</b>																																																																	
MS-0220	Commissioning of Diverted Twin DN1400 Fresh Water Mains	0		14-Nov-14	132																																																												
MS-1000A	Implement TTA for shifting Fanling Highway SB North Portion (CH7470-7925) eastward to the completed road near TWSI	2	07-Dec-16	08-Dec-16	3																																																												
MS-1000B	Implement TTA for shifting Fanling Highway NB North Portion (CH7470-7925) eastward to the designed alignment	2	06-Mar-17	07-Mar-17	3																																																												
MS-3000	Implement TTA for shifting existing TWSR East to the completed widened Fanling Highway SB North Portion	2	11-Sep-14	12-Sep-14	7																																																												
MS-3010	Commissioning of Realigned TWSR East	0	15-Oct-16		3																																																												
<b>Section IA &amp; IB - Fanling Highway Widening (KD-1 &amp; KD-2)</b>																																																																	
<b>Fanling Highway North Portion between CH7470 and CH7925</b>																																																																	
<b>Fanling Highway Zone 6 between CH7470 and CH7600 (Provision of Kiu Tau Footbridge)</b>																																																																	
<b>Kiu Tau Footbridge Re-provision (East)</b>																																																																	
FHW-5000A	KT-AB1 - Piling Works 3	30	09-Feb-15	21-Mar-15	612																																																												
FHW-5000B	KT-AB2 - Piling Works 1	30	15-Nov-14	19-Dec-14	132																																																												
FHW-5000C	KT-P2 - Piling Works 5	30	14-May-15	18-Jun-15	612																																																												
FHW-5000D	KT-P3 - Piling Works 2	40	20-Dec-14	07-Feb-15	612																																																												
FHW-5000E	KT-P4 - Piling Works 4	40	23-Mar-15	13-May-15	612																																																												
FHW-5010A	KT-AB1 - Pile Cap & Pier	90	23-Mar-15	14-Jul-15	660																																																												
FHW-5010B	KT-AB2 - Pile Cap & Pier	75	20-Dec-14	27-Mar-15	745																																																												
FHW-5010C	KT-P2 - Pile Cap & Pier	75	19-Jun-15	16-Sep-15	612																																																												
FHW-5010D	KT-P3 - Pile Cap & Pier	75	09-Feb-15	19-May-15	705																																																												
FHW-5010E	KT-P4 - Pile Cap & Pier	75	14-May-15	12-Aug-15	635																																																												
FHW-5020	Steel Truss Installation at TWSR East	7	13-Aug-15	20-Aug-15	635																																																												
FHW-5030	Steel Truss Installation across Fanling Highway	7	17-Sep-15	24-Sep-15	612																																																												
FHW-5040	Installation of Bridge Decking and Cladding	35	25-Sep-15	07-Nov-15	612																																																												
FHW-5050	Installation of Drainage and Lighting Facilities (Overall)	35	09-Nov-15	18-Dec-15	612																																																												
FHW-5060	Testing and Commissioning (Overall)	7	19-Dec-15	29-Dec-15	612																																																												
<b>At-Grade Road Works (130m)</b>																																																																	
FHW-5100	Demolition of Existing Structure and Site Clearance	45	27-Jan-14	26-Mar-14	135																																																												
FHW-5110*	Pipe Laying & Connection - Twin DN1400 Watermains (CHE & CHG) adjacent to existing TWSRE (90m, 9m depth)	186	31-Mar-14	14-Nov-14	132																																																												
FHW-5120	Implementation of TTA - Scheme E1 (shifting TWSR East to new completed road near Fanling Highway)	0	13-Sep-14		573																																																												
FHW-5130	Noise Barrier NB73 - Mini-Piling adjacent to SB lane (18nos)	54	13-Sep-14	17-Nov-14	573																																																												
FHW-5140	Noise Barrier NB73 - Footing adjacent to SB lane (130m)	240	14-Jul-15	07-May-16	332																																																												
FHW-5150*	Pipe Laying - DN1200 & DN600 Watermains (CHB & CHC) along existing TWSRE (120m long, 3m depth)	240	04-Sep-15	02-Jul-16	373																																																												
FHW-5160	Demolition of existing Kiu Tau Footbridge	65	30-Dec-15	22-Mar-16	885																																																												
FHW-5170	Completion of Demolition of existing control valve house	0		28-Aug-15	1050																																																												
FHW-5180	Permanent Road Drainage (Eastern Side)	125	23-Mar-16	24-Aug-16	885																																																												
FHW-5190	Permanent Road Formation & Kerb (Eastern Side)	45	15-Oct-16	06-Dec-16	3																																																												
FHW-5200	Demolition of Existing Central Divider and Road Formation (Middle Part, Pavement Only)	45	09-Dec-16	09-Feb-17	3																																																												
FHW-5300	Road Formation, Road Drainage, Kerb, Noise Barrier (Western Side)	145	08-Mar-17	01-Sep-17	520																																																												
FHW-5400	Road Formation, Central Barrier (Remaining Works at Middle Part)	145	08-Mar-17	01-Sep-17	57																																																												
<b>Fanling Highway Zone 7 between CH7600 and CH7660 (Existing Vehicular Bridge)</b>																																																																	
<b>At-Grade Roadworks (60m)</b>																																																																	
FHW-6100	Permanent Road Formation and Pavement (Eastern Side)	35	31-Jul-14	10-Sep-14	7																																																												
FHW-6110	Noise Barrier NB73 - Footing adjacent to SB lane (75m)	166	09-May-16	24-Nov-16	332																																																												
FHW-6200	Demolition of Existing Central Divider and Road Formation (Middle Part, Pavement Only)	20	10-Feb-17	04-Mar-17	3																																																												
FHW-6300	Road Formation, Road Drainage, Kerb (Western Side)	65	02-Sep-17	20-Nov-17	520																																																												
FHW-6400	Road Formation, Central Barrier (Remaining Works at Middle Part)	65	02-Sep-17	20-Nov-17	57																																																												
<b>Fanling Highway Zone 8 between CH7660 and CH7925</b>																																																																	
<b>At-Grade Roadworks (265m)</b>																																																																	
FHW-7100	Site Formation, Preparation Works & Tree Transplant	127	30-Aug-13 A	07-Feb-14	7																																																												
FHW-7110	Permanent Road Formation and Pavement (Eastern Side)	140	08-Feb-14	30-Jul-14	7																																																												
FHW-7200	Demolition of Existing Central Divider and Road Formation (Middle Part, Pavement Only)	65	09-Dec-16	04-Mar-17	3																																																												
FHW-7300	Road Formation, Road Drainage, Kerb (Western Side)	150	08-Mar-17	07-Sep-17	3																																																												
FHW-7400	Road Formation, Central Barrier (Remaining Works at Middle Part)	250	08-Mar-17	09-Jan-18	187																																																												



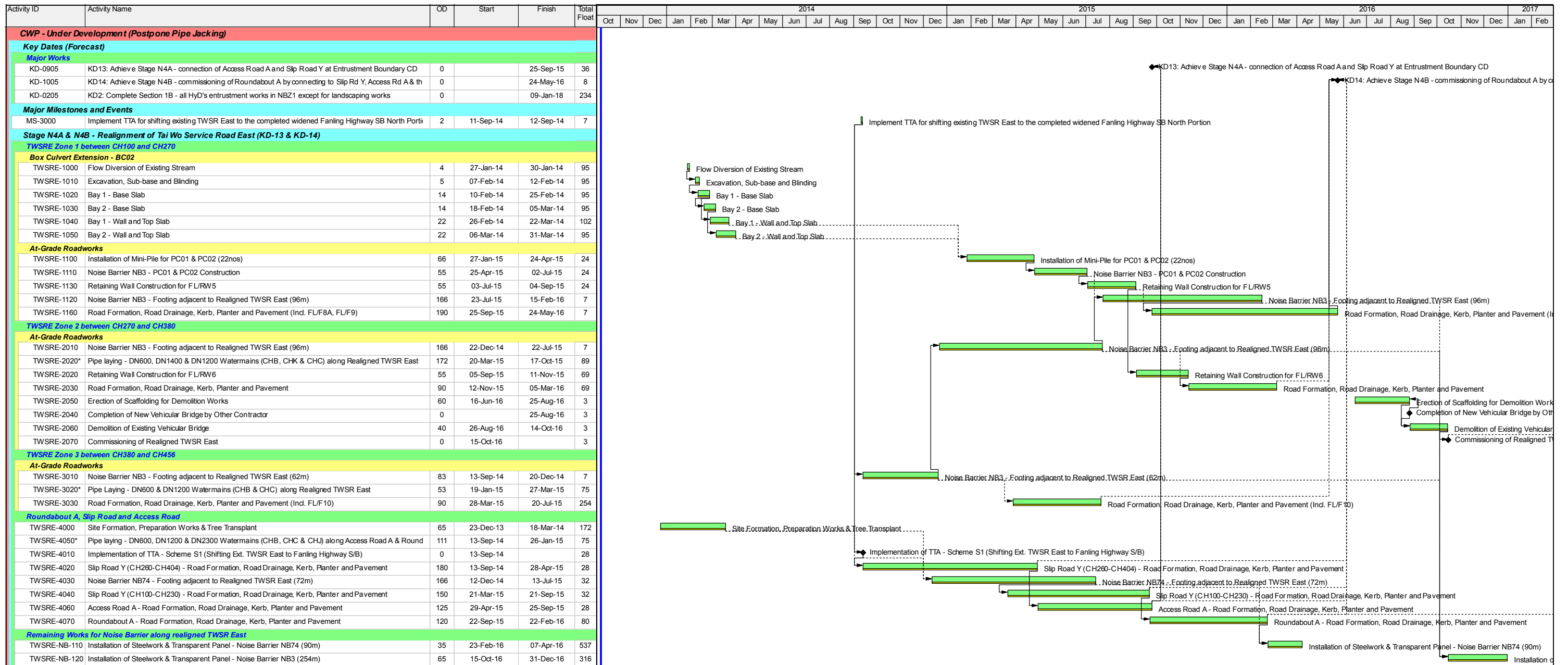
- █ Actual Work
- █ Remaining Work
- █ Critical Remaining Work
- ◆ Milestone

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

**Works Sequence for Fanling Highway North Portion**

Date	Revision	Checked	Approved
11-Oct-13		SL	





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

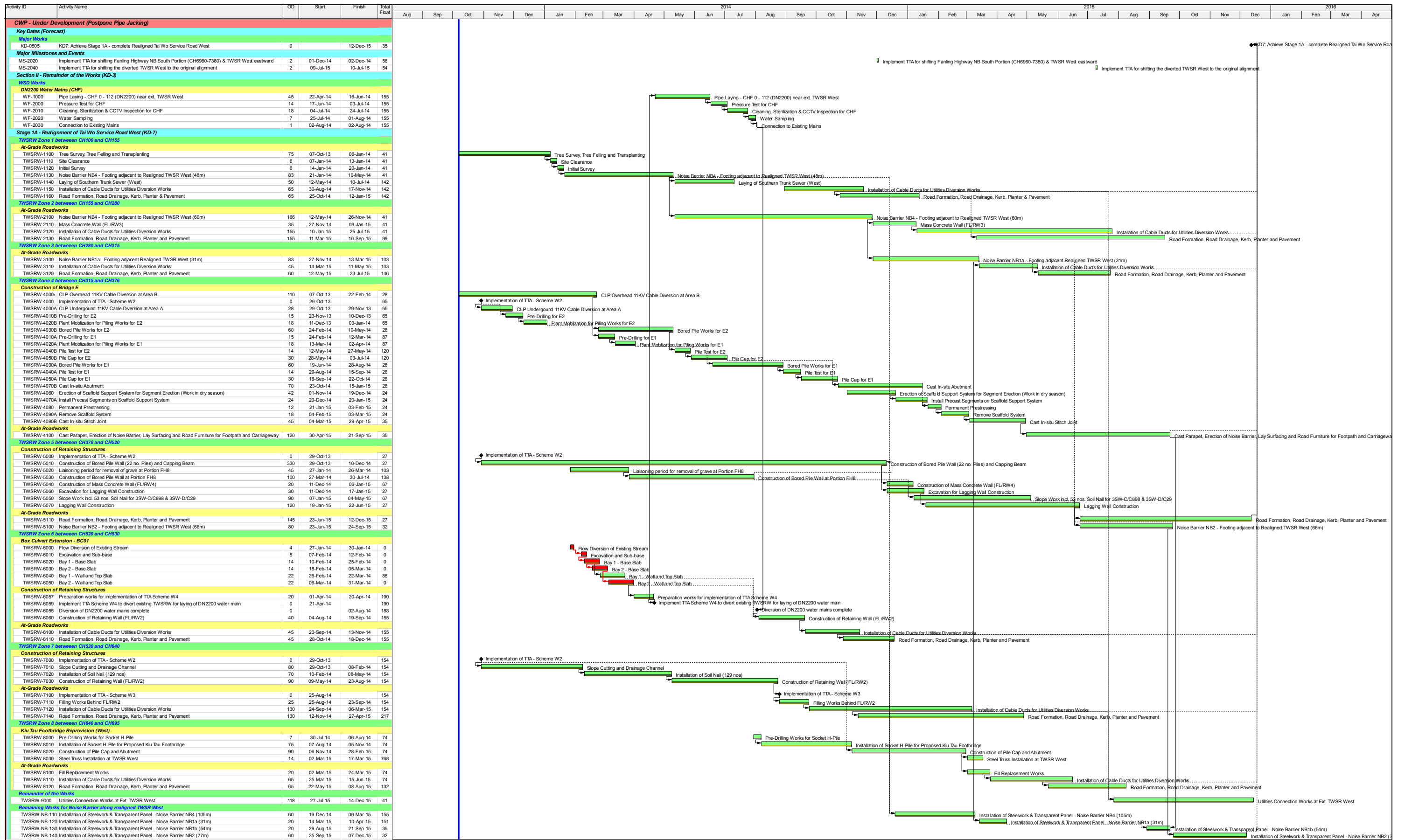
**CEDD Contract No. CV/2012/09**

**Liantang / Heung Yuen Wai BCP - Site Formation & Infrastructure Works, Contract 3**

**Works Sequence for TWSRE**

CWP004-1 \_\_\_\_\_ Page 1 of 1 \_\_\_\_\_ 11-Oct-13

Date	Revision	Checked	Approved
11-Oct-13		SL	




**俊和建築工程有限公司**  
**CHUN WO CONSTRUCTION & ENGINEERING CO., LTD.**

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

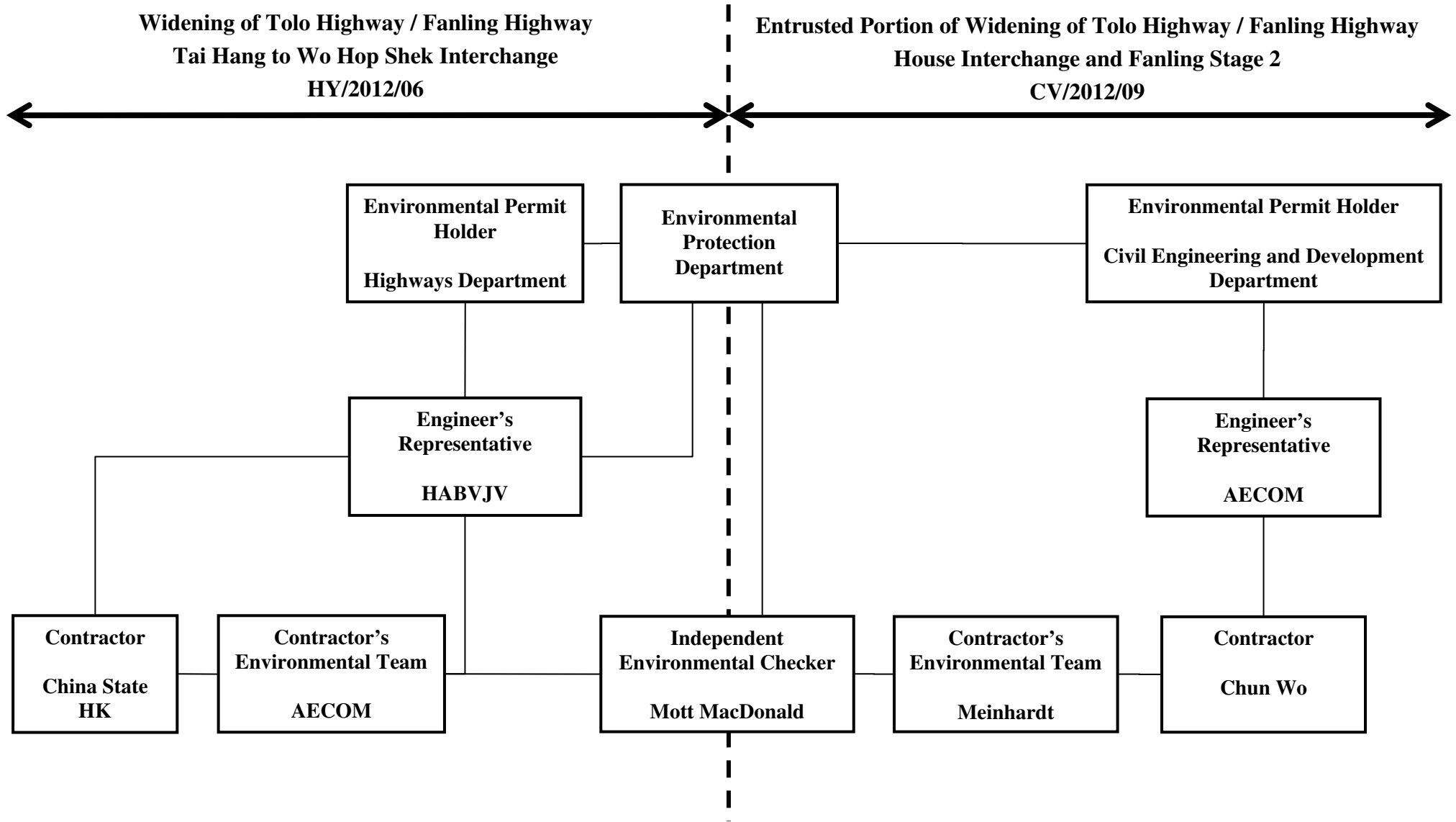
**CEDD Contract No. CV/2012/09**  
**Liantang / Heung Yuen Wai BCP - Site Formation & Infrastructure Works, Contract 3**  
**Works Sequence for TWSRW**

Date	Revision	Checked	Approved
11-Sep-13		SL	



# Appendix B

## Project Organization Structure



# **Appendix C Calibration Certificates of Monitoring Equipment**



**REPORT OF EQUIPMENT CALIBRATION**

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**INSTRUMENT DESCRIPTION**

It is certified that the item under calibration has been calibrated by corresponding calibrated High Volume Sampler and the filter paper is weighted by HOKLAS laboratory.

Instrument: Handheld TSP meter  
Brand Name: TSI  
Model No.: AM510  
Serial No.: 11008019  
Date Received: 16/10/2013  
Date of Issue: 27/10/2013  
Date of Calibration: 22/10/2013  
Date of Next Calibration : 22/10/2014

**ISSUING ORGANISATION**

**Address**

Enovative Environmental Service Limited  
Flat 6, 3/F, Block E, Wah Lok Industrial Centre  
31-35 Shan Mei Street  
Shatin, N.T.  
Hong Kong

**Phone:** 852-2242 1020  
**Fax:** 852-3691 9240  
**Email:** [info@eno.com.hk](mailto:info@eno.com.hk)



*Thomas*

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Mr Wong Siu Ho, Thomas  
Manager

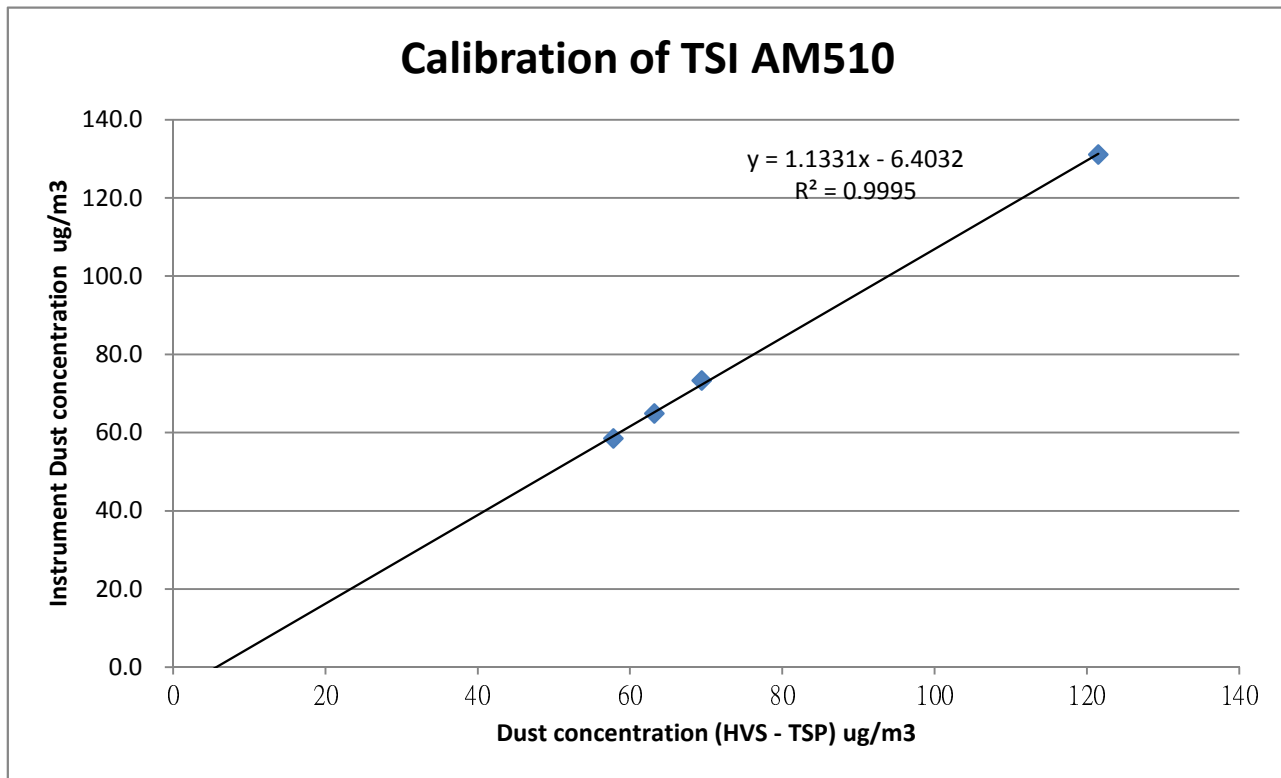


# Enovative Environmental Service Limited

Brand Name: TSI  
Model No.: AM510  
Serial No.: 11008019  
HVS No.: A12-TSP-102  
HVS Calibration Kit No.: Tisch 1941  
Date of Calibration: 22/10/2013  
Date of next Calibration: 22/10/2014

### Calibration Record

HVS - TSP ug/m3	121.5	57.8	63.2	69.4
TSI AM510	131.1	58.5	64.9	73.3



\*\*\* Filter paper being used in the calibrator 205472, 205476, 205480, 205483  
Those filter papers are weighted by HOKLAS laboratory (ALS Technichem (HK) Pty Ltd.)



*Thomas*

Mr Wong Siu Ho, Thomas  
Manager



TISCH ENVIRONMENTAL, INC.  
 145 SOUTH MIAMI AVE.  
 VILLAGE OF CLEVELAND, OH 45002  
 513.467.9000  
 877.263.7610 TOLL FREE  
 513.467.9009 FAX  
 WWW.TISCH-ENV.COM

AIR POLLUTION MONITORING EQUIPMENT  
 ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - Apr 09, 2013 Rootsmeter S/N 0438320 Ta (K) - 296  
 Operator Tisch Orifice I.D. - 1941 Pa (mm) - 751.84

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	1.4710	3.3	2.00
2	NA	NA	1.00	1.0370	6.4	4.00
3	NA	NA	1.00	0.9270	7.9	5.00
4	NA	NA	1.00	0.8840	8.8	5.50
5	NA	NA	1.00	0.7300	12.8	8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)	Va	(x axis) Qa	(y axis)
0.9916	0.6741	1.4113	0.9956	0.6768	0.8874
0.9874	0.9521	1.9959	0.9914	0.9560	1.2549
0.9854	1.0630	2.2315	0.9894	1.0673	1.4030
0.9843	1.1134	2.3405	0.9883	1.1180	1.4715
0.9790	1.3410	2.8227	0.9829	1.3465	1.7747
Qstd slope (m) = 2.11662			Qa slope (m) = 1.32539		
intercept (b) = -0.01714			intercept (b) = -0.01078		
coefficient (r) = 0.99999			coefficient (r) = 0.99999		
y axis = SQRT[H2O(Pa/760)(298/Ta)]			y axis = SQRT[H2O(Ta/Pa)]		

CALCULATIONS

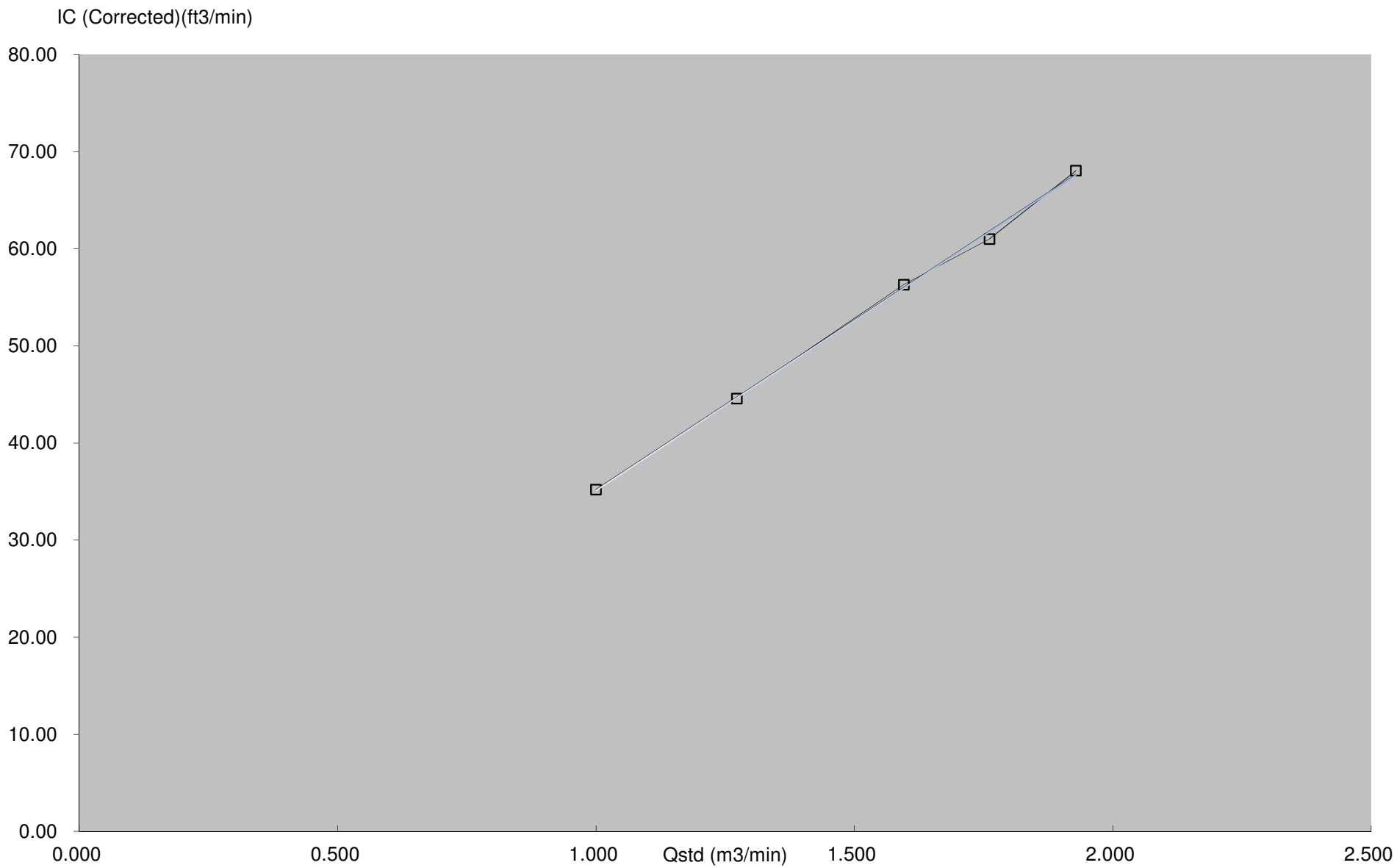
Vstd = Diff. Vol [(Pa-Diff. Hg)/760] (298/Ta)  
 Qstd = Vstd/Time

Va = Diff Vol [(Pa-Diff Hg)/Pa]  
 Qa = Va/Time

For subsequent flow rate calculations:

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









# Calibration Certificate

Certificate No. 37521

Page 1 of 2 Pages

**Customer :** Enovative Environmental Service Limited

**Address :** Room 3, 12/F., New City Centre, 2 Lei Yue Mun Road, Kwun Tong, Kowloon, H.K.

**Order No. :** Q32432

**Date of receipt :** 16-Oct-13

## Item Tested

**Description :** Sound Level Calibrator

**Manufacturer :** B&K

**Model :** Type 4231

**Serial No. :** 2685684

## Test Conditions

**Date of Test :** 31-Oct-13

**Supply Voltage :** --

**Ambient Temperature :** (23 ± 3)°C

**Relative Humidity :** (50 ± 25) %

## Test Specifications

Calibration check.

Ref. Document/Procedure : F21, Z02.

## Test Results

All results were within the IEC 942 Class 1 specification.

The results are shown in the attached page(s).

Main Test equipment used:

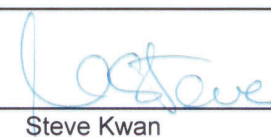
<u>Equipment No.</u>	<u>Description</u>	<u>Cert. No.</u>	<u>Traceable to</u>
S014	Spectrum Analyzer	35730	NIM-PRC & SCL-HKSAR
S205	Ref. Sound Level Calibrator	PHCO40002	SCL-HKSAR
S041	Universal Counter	34621	SCL-HKSAR
S206	Sound Level Meter	36203	SCL-HKSAR
S031	6½ dgt. Multimeter	30128	NIM-PRC

The values given in this Calibration 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 environmental changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Hong Kong Calibration Ltd. 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 International System of Units (SI).

The test results apply to the above Unit-Under-Test only

**Calibrated by :**   
Dorothy Cheuk

**Approved by :**   
Steve Kwan

This Certificate is issued by:

Hong Kong Calibration Ltd.

Unit 8B, 24/F., Well Fung Industrial Centre, No. 58-76, Ta Chuen Ping Street, Kwai Chung, NT, Hong Kong.

Tel: 2425 8801 Fax: 2425 8646

Date: 31-Oct-13



# Calibration Certificate

Certificate No. 37521

Page 2 of 2 Pages

Results :

## 1. Level Accuracy

UUT Nominal Value (dB)	Measured Value (dB)	IEC 942 Class 1 Spec.
94	94.08	± 0.3 dB
114	114.07	

Uncertainty : ± 0.1 dB

## 2. Frequency

UUT Nominal Value	Measured Value	IEC 942 Class 1 Spec.
1 kHz	1.002 kHz	± 2 %

Uncertainty : ± 3.6 x 10<sup>-6</sup>

- 3. Level Stability** : 0.0 dB  
IEC 942 Class 1 Spec. : ± 0.1 dB  
Uncertainty : ± 0.01 dB

- 4. Total Harmonic Distortion** : < 0.7 %  
IEC 942 Class 1 Spec. : < 3 %  
Uncertainty : ± 2.3 % of reading

Remark : 1. UUT : Unit-Under-Test  
2. The uncertainty claimed is for a confidence probability of not less than 95%.  
3. Atmospheric Pressure : 1014 hPa.

----- END -----



# Calibration Certificate

Certificate No. **36604**

Page 1 of 4 Pages

**Customer :** Enovative Environmental Service Limited

**Address :** Room 3, 12/F., New City Centre, 2 Lei Yue Mun Road, Kwun Tong, Kowloon, H.K.

**Order No. :** Q32395

**Date of receipt :** 4-Sep-13

## Item Tested

**Description :** Sound Level Meter (N12-RION-004)

**Manufacturer :** Rion

**Model :** NL-52

**Serial No. :** 00220553

## Test Conditions

**Date of Test :** 10-Sep-13

**Supply Voltage :** --

**Ambient Temperature :** (23 ± 3)°C

**Relative Humidity :** (50 ± 25) %

## Test Specifications

Calibration check.

Ref. Document/Procedure: Z01.

## Test Results

All results were within the IEC 61672 Type1 specification.

The results are shown in the attached page(s).

Main Test equipment used:

<u>Equipment No.</u>	<u>Description</u>	<u>Cert. No.</u>	<u>Traceable to</u>
S017	Multi-Function Generator	C127181	SCL-HKSAR
S205	Ref. Sound Level Calibrator	PHCO40002	SCL-HKSAR

The values given in this Calibration 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 environmental changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Hong Kong Calibration Ltd. 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 International System of Units (SI).

The test results apply to the above Unit-Under-Test only

**Calibrated by :**   
Dorothy Cheuk

**Approved by :**   
Steve Kwan

**Date:** 16-Sep-13

This Certificate is issued by:  
Hong Kong Calibration Ltd.  
Unit 8B, 24/F., Well Fung Industrial Centre, No. 58-76, Ta Chuen Ping Street, Kwai Chung, NT, Hong Kong.  
Tel: 2425 8801 Fax: 2425 8646



# Calibration Certificate

Certificate No. 36604

Page 2 of 4 Pages

Results :

1. Self-generated noise: 16.4 dBA ( Mfr's Spec  $\leq 17$  dBA )
2. Acoustical signal test

UUT Setting			Applied Value (dB)	UUT Reading (dB)
Level Range (dB)	Weight	Response		
30 – 130	L <sub>A</sub>	Fast	94.0	94.0
		Slow		94.0
	L <sub>C</sub>	Fast		94.0
	L <sub>Z</sub>	Fast		94.0
	L <sub>A</sub>	Fast	114.0	114.0
		Slow		114.0
	L <sub>C</sub>	Fast		114.0
	L <sub>Z</sub>	Fast		114.0

IEC 61672 Type 1 Spec. :  $\pm 1.1$  dB

Uncertainty :  $\pm 0.1$  dB

### 3 Electrical signal tests of frequency weightings (A weighting)

Frequency	Attenuation (dB)	IEC 61672 Type 1 Spec.
31.5 Hz	-39.8	- 39.4 dB, $\pm 2$ dB
63 Hz	-26.4	- 26.2 dB, $\pm 1.5$ dB
125 Hz	-16.3	- 16.1 dB, $\pm 1.5$ dB
250 Hz	-8.7	- 8.6 dB, $\pm 1$ dB
500 Hz	-3.3	- 3.2 dB, $\pm 1.4$ dB
1 kHz	0.0 (Ref)	0 dB, $\pm 1.1$ dB
2 kHz	+1.2	+ 1.2 dB, $\pm 1.6$ dB
4 kHz	+0.9	+ 1.0 dB, $\pm 1.6$ dB
8 kHz	-1.1	- 1.1 dB, + 2.1 dB ~ -3.1 dB
16 kHz	-8.0	- 6.6 dB, + 3.5 dB ~ - 17.0 dB

Uncertainty :  $\pm 0.1$  dB



# Calibration Certificate

Certificate No. 36604

Page 3 of 4 Pages

## 4. Frequency & Time weightings at 1 kHz

### 4.1 Frequency Weighting (Fast)

UUT Setting	Applied Value (dB)	UUT Reading (dB)	Difference (dB)	IEC 61672 Type 1 Spec.
A	94.0	94.0 (Ref.)	--	± 0.4 dB
C	94.0	94.0	0.0	
Z	94.0	94.0	0.0	

### 4.2 Time Weighting (A-weighted)

UUT Setting	Applied Value (dB)	UUT Reading (dB)	Difference (dB)	IEC 61672 Type 1 Spec.
Fast	94.0	94.0 (Ref.)	--	± 0.3 dB
Slow	94.0	94.0	0.0	
Time-averaging	94.0	94.0	0.0	

Uncertainty : ± 0.1 dB

## 5. Level linearity on the reference level range

UUT Range	Applied Value (dB)	UUT Reading (dB)	Difference (dB)	IEC 61672 Type 1 Spec.
130 dB (Ref Level)	129.0	129.0	0.0	± 1.1 dB
	124.0	124.0	0.0	
	119.0	119.0	0.0	
	114.0	114.0	0.0	
	109.0	109.0	0.0	
	104.0	104.0	0.0	
	99.0	99.0	0.0	
	94.0	94.0 (Ref)	--	
	89.0	89.0	0.0	
	84.0	84.0	0.0	
	79.0	79.0	0.0	
	74.0	74.0	0.0	
	69.0	69.0	0.0	
	64.0	64.0	0.0	
	59.0	59.0	0.0	
	54.0	54.0	0.0	
	49.0	49.0	0.0	
44.0	44.0	0.0		

Uncertainty : ± 0.1 dB



# Calibration Certificate

Certificate No. **36604**

Page 4 of 4 Pages

## 6. Toneburst response (4kHz)

UUT Setting	Tone Burst Duration(ms)	UUT Reading(dB)	Difference (dB)	IEC 61672 Type 1 Spec.
Fast	Steady	127.0(Ref)	--	--
	200	126.0	-1.0	-1.0 ± 0.8dB
	2	108.9	-18.1	-18.0, +1.3 dB ~ -1.8 dB
	0.25	99.9	-27.1	-27.0, +1.3 dB ~ -3.3 dB
Slow	Steady	127.0(Ref)	--	--
	200	120.2	-6.8	-7.4 ± 0.8dB
	2	100.6	-26.4	-27.0, +1.3 dB ~ -3.3 dB
Time averaging	Steady	127.0(Ref)	--	--
	200	120.1	-6.9	-7.0±0.8dB
	2	99.5	-27.5	-27.0, +1.3 dB ~ -1.8 dB
	0.25	91.7	-35.3	-36.0, +1.3 dB ~ -3.3 dB

Uncertainty : ± 0.1 dB

## 7. Overload indication (130 dB range, A-weighted, Time-average, 4kHz)

UUT Reading at overload (dB)		Difference (dB)	IEC 61672 Type 1 Spec.
+ ve one half cycle	- ve one half cycle		
138.4	138.2	0.2	< 1.8 dB

The overload indicator latched on until reset

Uncertainty : ± 0.1 dB

Remarks : 1. UUT : Unit-Under-Test

2. The uncertainty claimed is for a confidence probability of not less than 95%.

3. Atmospheric Pressure : 996 hPa.

4. Preamplifier model : NH-25 , S/N : 10553

5. Firmware Version: 1.2

6. Power Supply Check: OK

7. The UUT was adjusted with the laboratory's sound calibrator at the reference sound pressure level before the calibration.

----- END -----



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

## REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

**CONTACT:** MR THOMAS WONG  
**CLIENT:** ENOVATIVE ENVIRONMENTAL SERVICE LTD  
**ADDRESS:** RM811, HIN PUI HOUSE,  
HIN KENG ESTATE,  
TAI WAI,  
N.T., HONG KONG

**WORK ORDER:** HK1403404  
**LABORATORY:** HONG KONG  
**DATE RECEIVED:** 04/02/2014  
**DATE OF ISSUE:** 20/02/2014

**PROJECT:**

### COMMENTS

It is certified that the item under calibration/checking has been calibrated/checked by corresponding calibrated equipment in the laboratory.  
Maximum Tolerance and calibration frequency stated in the report, unless otherwise stated, the internal acceptance criteria of ALS will be followed.

Scope of Test: Turbidity  
Description: Turbidimeter  
Brand Name: HACH  
Model No.: 2100Q is  
Serial No.: 11050C001264  
Equipment No.: --  
Date of Calibration: 04 February, 2014

### 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: HK1403404  
Date of Issue: 20/02/2014  
Client: ENOVATIVE ENVIRONMENTAL SERVICE LTD



Description: Turbidimeter  
Brand Name: HACH  
Model No.: 2100Q is  
Serial No.: 11050C001264  
Equipment No.: --  
Date of Calibration: 04 February, 2014

## Parameters:

### Turbidity

Method Ref: APHA 21st Ed. 2130B

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.18	--
4	4.09	2.3
40	38.0	-5.0
80	87.4	9.3
400	364	-9.0
800	823	2.9
	Tolerance Limit ( $\pm\%$ )	10.0

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

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





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

## REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

**CONTACT:** MR THOMAS WONG  
**CLIENT:** ENOVATIVE ENVIRONMENTAL SERVICE LTD  
**ADDRESS:** RM811, HIN PUI HOUSE,  
HIN KENG ESTATE,  
TAI WAI,  
N.T., HONG KONG  
**PROJECT:** --

**WORK ORDER:** HK1407571  
**LABORATORY:** HONG KONG  
**DATE RECEIVED:** 01/03/2014  
**DATE OF ISSUE:** 19/03/2014

---

### COMMENTS

It is certified that the item under calibration/checking has been calibrated/checked by corresponding calibrated equipment in the laboratory.  
Maximum Tolerance and calibration frequency stated in the report, unless otherwise stated, the internal acceptance criteria of ALS will be followed.

Scope of Test: Dissolved Oxygen, pH, Salinity and Temperature  
Equipment Type: Multimeter  
Brand Name: YSI  
Model No.: Proplus  
Serial No.: 10D101565  
Equipment No.: --  
Date of Calibration: 01 March, 2014

---

### 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:** HK1407571  
**Date of Issue:** 01/03/2014  
**Client:** ENOVATIVE ENVIRONMENTAL SERVICE LTD

**Description:** Multimeter  
**Brand Name:** YSI  
**Model No.:** Proplus  
**Serial No.:** 10D101565  
**Equipment No.:** --

**Date of Calibration:** 01 March, 2014                      **Date of next Calibration:** 01 June, 2014

**Parameters:**

**Dissolved Oxygen**

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

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
3.66	3.80	0.14
6.43	6.28	-0.15
8.65	8.49	-0.16
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	4.05	0.05
7.0	7.15	0.15
10.0	9.93	-0.07
Tolerance Limit (±pH unit)		0.20

**Salinity**

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

Expected Reading (ppt)	Displayed Reading (ppt)	Tolerance (%)
0	0.00	--
10	9.06	-9.4
20	18.31	-8.5
30	27.84	-7.2
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)
11.0	10.7	-0.3
23.5	23.6	0.1
35.0	36.0	1.0
Tolerance Limit (±°C)		2.0

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

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

# Appendix D

## EM&A Monitoring Schedules

**Entrusted Portion of Widening of Tolo Highway / Fanling Highway between Island House Interchange and Fanling Stage 2  
Impact Monitoring & Site Auditing Schedule for April 2014**

April 2014						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	2 Water (I5, C3a, C3b)	3	4 Water (I5, C3a, C3b) 24-hour TSP + 3 x 1-hour TSP, Noise (SR77)	5 Ching Ming Festival
6	7 ET Site Walk(09:30 – 11:00) with Liantang Project-wide ET and IEC	8	9	10 24-hour TSP + 3 x 1-hour TSP, Noise (SR77)	11	12
13	14	15	16 24-hour TSP + 3 x 1-hour TSP, Noise (SR77) ET Site Walk(09:30 – 11:00) with Liantang Project-wide ET and IEC + SSEMC	17	18 Good Friday	19 The day following Good Friday
20	21 Easter Monday	22 24-hour TSP + 3 x 1-hour TSP, Noise (SR77) ET Site Walk(09:30 – 11:00) with Liantang Project-wide ET and IEC	23	24	25	26
27	28 24-hour TSP + 3 x 1-hour TSP, Noise (SR77) ET Site Walk(09:30 – 11:00) with Fanling Stage 2 IEC & Liantang Project- wide ET and IEC	29	30			

**Entrusted Portion of Widening of Tolo Highway / Fanling Highway between Island House Interchange and Fanling Stage 2  
Impact Monitoring & Site Auditing Schedule for May 2014**

May 2014						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
				<b>1</b> Labour Day	<b>2</b>	<b>3</b> 24-hour TSP + 3 x 1-hour TSP
<b>4</b>	<b>5</b>	<b>6</b> The Birthday of the Buddha	<b>7</b>	<b>8</b>	<b>9</b> ET Site Walk(15:00 – 16:30) with Liantang Project-wide ET and IEC 24-hour TSP + 3 x 1-hour TSP, Noise (SR77)	<b>10</b>
<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b> ET Site Walk(09:30 – 11:00) with Liantang Project-wide ET and IEC + SSEMC	<b>15</b> 24-hour TSP + 3 x 1-hour TSP, Noise (SR77)	<b>16</b>	<b>17</b>
<b>18</b>	<b>19</b> ET Site Walk(09:30 – 11:00) with Liantang Project-wide ET and IEC	<b>20</b>	<b>21</b> 24-hour TSP + 3 x 1-hour TSP, Noise (SR77)	<b>22</b>	<b>23</b>	<b>24</b>
<b>25</b>	<b>26</b> ET Site Walk(09:30 – 11:00) with Fanling Stage 2 IEC & Liantang Project-wide ET and IEC	<b>27</b> 24-hour TSP + 3 x 1-hour TSP, Noise (SR77)	<b>28</b>	<b>29</b>	<b>30</b>	<b>31</b> 24-hour TSP + 3 x 1-hour TSP

# **Appendix E Meteorological Data Extracted from Hong Kong Observatory**

Climatological Information Services > Extracts of Climatological Data > Extract of Automatic Weather Station > Station: Sheung Shui Automatic Weather Station, Year: 2014, Month: April

### Extract of Meteorological Observations for Sheung Shui Automatic Weather Station, April 2014 (Table 1)

Date	Mean Pressure at M.S.L. (hPa)	Air Temperature			Mean Dew Point Temperature (deg C)	Relative Humidity		
		Max. (deg C)	Mean (deg C)	Min. (deg C)		Max. (%)	Mean (%)	Min. (%)
Apr 1	1011.0	22.0	20.2	19.3	19.2	99	94	82
Apr 2	1011.6	21.5	19.7	18.3	18.4	96	92	83
Apr 3	1013.4	21.1	19.8	18.7	18.7	98	94	86
Apr 4	1016.4	24.8	20.5	17.6	15.9	98	77	50
Apr 5	1016.2	28.2	21.9	17.1	13.1	90	61	30
Apr 6	1017.1	23.0	19.4	17.6	16.5	97	84	57
Apr 7	1016.3	21.5	19.9	18.0	16.5	93	81	72
Apr 8	1014.5	23.0	20.7	19.4	18.9	97	89	80
Apr 9	1013.8	30.4	23.6	19.0	19.7	98	80	53
Apr 10	1014.9	27.3	23.3	21.7	18.2	89	74	53
Apr 11	1013.4	28.7	24.0	21.1	19.5	88	77	61
Apr 12	1011.9	31.9	25.3	21.9	20.3	90	75	50
Apr 13	1011.7	32.1	26.3	21.7	21.7	93	78	53
Apr 14	1014.5	25.0	23.4	22.0	19.3	95	78	62
Apr 15	1015.4	26.5	22.8	20.7	16.2	82	67	47
Apr 16	1013.0	26.2	23.1	21.6	19.1	85	78	66
Apr 17	1011.7	30.6	25.0	21.3	20.7	94	79	55
Apr 18	1011.8	29.1	24.5	20.1	20.6	95	80	60
Apr 19	1011.4	30.7	24.8	20.5	21.3	96	82	59
Apr 20	1010.8	29.8	25.7	22.5	22.3	94	82	63
Apr 21	1012.3	26.5	24.3	23.1	21.6	94	85	75
Apr 22	1012.4	28.9	25.1	22.5	22.1	93	84	66
Apr 23	1012.0	24.8	23.1	22.0	20.5	92	85	79
Apr 24	1011.2	23.1	22.4	21.5	20.0	91	86	83
Apr 25	1011.8	26.6	23.9	22.3	21.4	93	86	76
Apr 26	1012.8	27.2	23.3	21.9	21.1	94	87	73
Apr 27	1013.3	31.4	25.9	20.5	20.5	96	74	48
Apr 28	1013.5	31.2	26.0	23.6	17.7	80	61	41
Apr 29	1012.9	27.6	24.4	22.7	19.6	85	75	59
Apr 30	1011.6	25.5	23.0	20.9	20.3	97	85	74
<b>Mean</b>	1013.2	26.9	23.2	20.7	19.4	93	80	63
<b>Maximum</b>	1017.1	32.1	26.3	23.6	22.3	99	94	86
<b>Minimum</b>	1010.8	21.1	19.4	17.1	13.1	80	61	30

## Extract of Meteorological Observations for Sheung Shui Automatic Weather Station, April 2014 (Table 2)

Date	Total Rainfall (mm)	Prevailing Wind Direction (degrees)	Mean Wind Speed (km/h)
Apr 1	16.0	***	*****
Apr 2	39.5	***	*****
Apr 3	47.0	***	*****
Apr 4	0.0	***	*****
Apr 5	0.0	***	*****
Apr 6	14.0	***	*****
Apr 7	0.5	***	*****
Apr 8	6.0	***	*****
Apr 9	0.0	***	*****
Apr 10	0.0	***	*****
Apr 11	0.0	***	*****
Apr 12	0.0	***	*****
Apr 13	0.0	***	*****
Apr 14	0.0	***	*****
Apr 15	0.0	***	*****
Apr 16	0.0	***	*****
Apr 17	0.0	***	*****
Apr 18	0.0	***	*****
Apr 19	0.0	***	*****
Apr 20	0.0	***	*****
Apr 21	0.0	***	*****
Apr 22	0.0	***	*****
Apr 23	0.0	***	*****
Apr 24	0.0	***	*****
Apr 25	0.0	***	*****
Apr 26	3.5	***	*****
Apr 27	0.0	***	*****
Apr 28	0.0	***	*****
Apr 29	0.0	***	*****
Apr 30	9.0	***	*****
<b>Mean</b>	-----	***	*****
<b>Total</b>	135.5	---	-----
<b>Maximum</b>	47.0	---	*****
<b>Minimum</b>	0.0	---	*****

\*\*\* unavailable

# missing (less than 24 hourly observations a day)

Rainfall measured in increment of 0.5 mm. Amount of < 0.5 mm cannot be detected



# **Appendix F Air Quality Monitoring Results and their Graphical Presentation**

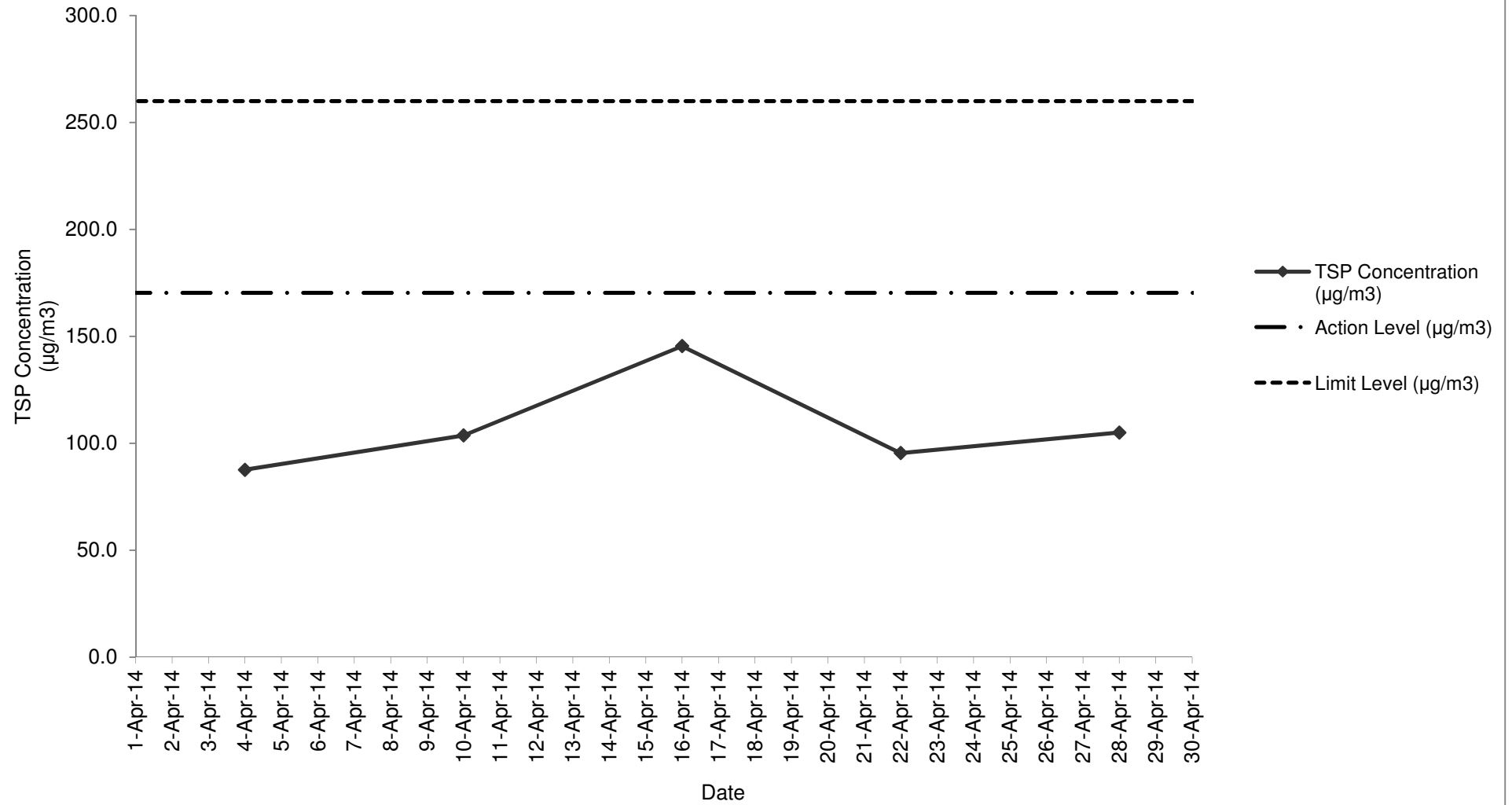
Appendix F  
Air Quality Monitoring Results and their Graphical Presentation

24-Hour TSP Monitoring Result at station: SR77

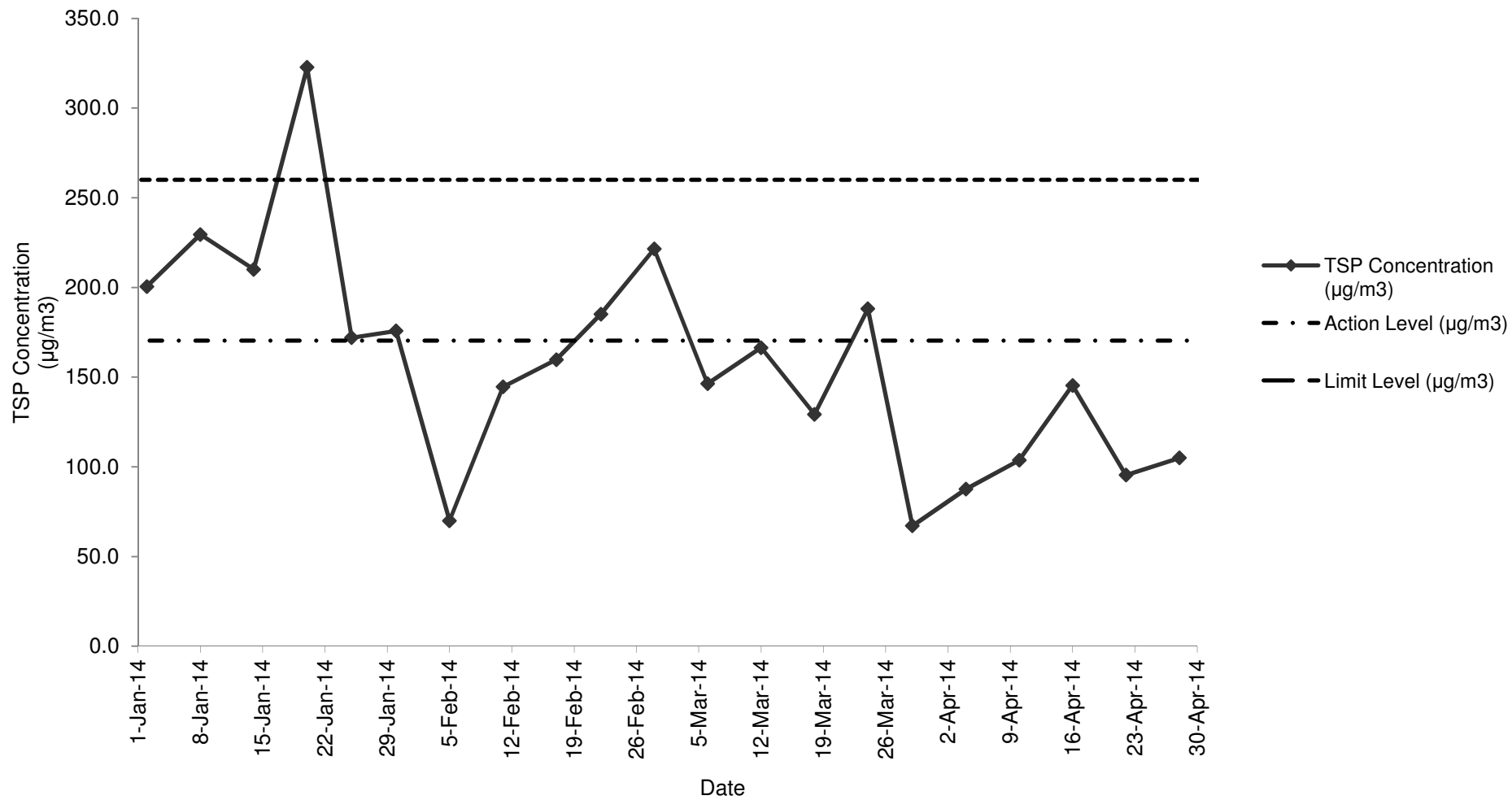
Sampling Date	Weather Condition	Paper No.	Wt. of paper (g)			Elapse Time			Flow Rate (CFM)			Flow Rate (m <sup>3</sup> /min)			Total Volume (m <sup>3</sup> )	TSP Concentration (µg/m <sup>3</sup> )	Action Level (µg/m <sup>3</sup> )	Limit Level (µg/m <sup>3</sup> )	Wind speed m/s	Wind direction
			Initial Wt.	Final Wt.	Wt. of Dust	Initial	Final	Sampling Hour	Initial	Final	Avg Flow Rate	Initial	Final	Avg Flow Rate						
4-Apr-14	Cloudy	10	2.6869	2.8690	0.1821	0.00	24.00	24.00	51	51	51.0	1.44	1.44	1.44	2079.59	87.6	170.3	260.0	<5	N
10-Apr-14	Fine	11	2.6915	2.9070	0.2155	0.00	24.00	24.00	51	51	51.0	1.44	1.44	1.44	2079.59	103.6	170.3	260.0	<5	N
16-Apr-14	Sunny	12	2.7313	3.0336	0.3023	0.00	24.00	24.00	51	51	51.0	1.44	1.44	1.44	2079.59	145.4	170.3	260.0	<5	N
22-Apr-14	Sunny	13	2.7088	2.9072	0.1984	0.00	24.00	24.00	51	51	51.0	1.44	1.44	1.44	2079.59	95.4	170.3	260.0	<5	N
28-Apr-14	Sunny	14	2.6694	2.8877	0.2183	0.00	24.00	24.00	51	51	51.0	1.44	1.44	1.44	2079.59	105.0	170.3	260.0	<5	N
																<b>Average</b>	107.4			
																<b>Min</b>	87.6			
																<b>Max</b>	145.4			

Note: No major dust source observed during the monitoring period  
 Data in **Bold** denotes exceedance of respective Action Level  
 Data in **Bold Underline** denotes exceedance of respective Limit Level

### 24-Hour TSP Monitoring Result at Station: SR77



### 24-Hour TSP Monitoring Result at Station: SR77 (January - April 2014)



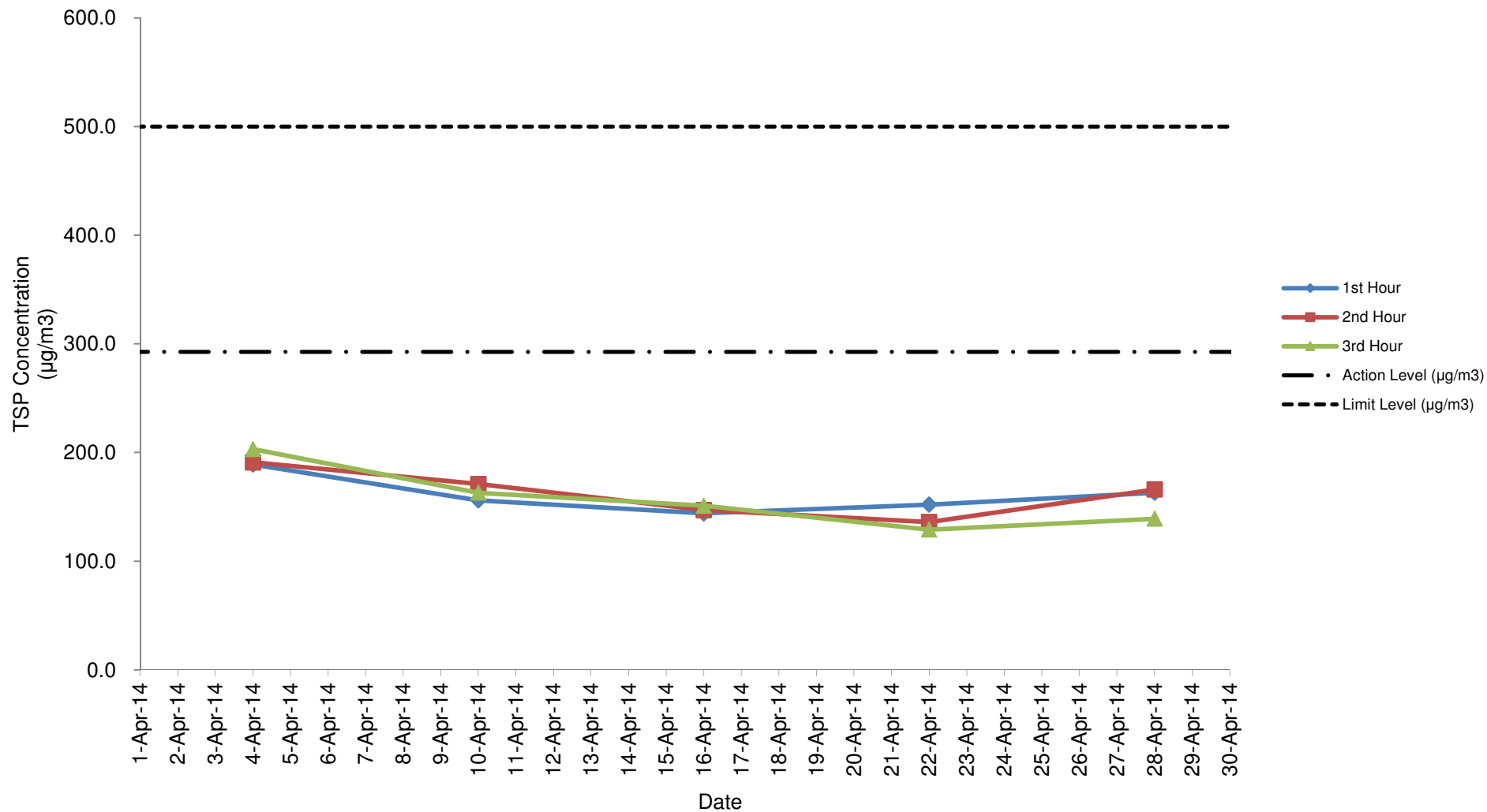
**Appendix E**  
**Air Quality Monitoring Results and their Graphical Presentation**

**1-Hour TSP Monitoring Result at station: SR77**

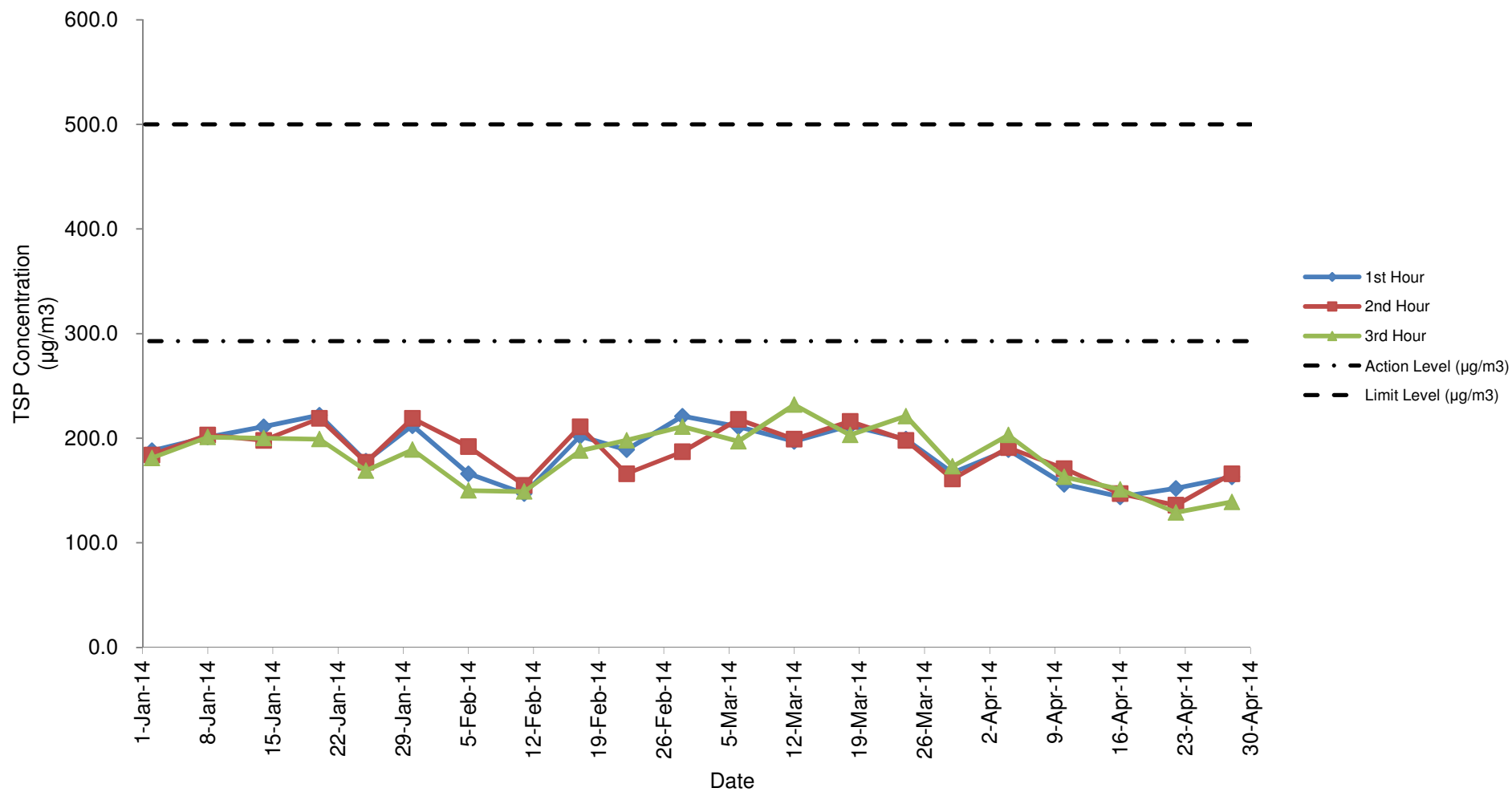
Date	Weather Condition	Time	Conc.(µg/m <sup>3</sup> )			Action Level (µg/m <sup>3</sup> )	Limit Level (µg/m <sup>3</sup> )
			1 <sup>st</sup> Hour	2 <sup>nd</sup> Hour	3 <sup>rd</sup> Hour		
4-Apr-14	Cloudy	8:00 - 11:04	189.0	191.0	203.0	292.7	500.0
10-Apr-14	Fine	10:30 - 13:34	156.0	171.0	163.0	292.7	500.0
16-Apr-14	Sunny	11:01 - 14:05	144.0	147.0	151.0	292.7	500.0
22-Apr-14	Sunny	11:30 - 14:34	152.0	136.0	129.0	292.7	500.0
28-Apr-14	Sunny	11:00 - 14:04	163.0	166.0	139.0	292.7	500.0
					<b>Average</b>	160.0	
					<b>Min</b>	129.0	
					<b>Max</b>	203.0	

Note: No major dust source observed during the monitoring period

### 1-Hour TSP Monitoring Result at station: SR77



### 1-Hour TSP Monitoring Result at station: SR77 (January - April 2014)



# Appendix G

## Summary of Event and Action Plan



**Event and Action Plan for Air Quality**

Event	Action			
	ET Leader	IEC	ER	Contractor
Action level being exceeded by one sampling day	<ol style="list-style-type: none"> <li>1. Identify source;</li> <li>2. Inform IEC and ER;</li> <li>3. Repeat measurement to confirm finding;</li> <li>4. Increase monitoring frequency to daily.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check monitoring data submitted by ET;</li> <li>2. Check Contractor's working method.</li> </ol>	<ol style="list-style-type: none"> <li>1. Notify Contractor.</li> </ol>	<ol style="list-style-type: none"> <li>1. Rectify any unacceptable practice;</li> <li>2. Amend working methods if appropriate.</li> </ol>
Action level being exceeded by two or more consecutive sampling days	<ol style="list-style-type: none"> <li>1. Identify source;</li> <li>2. Inform IEC and ER;</li> <li>3. Repeat measurements to confirm findings;</li> <li>4. Increase monitoring frequency to daily;</li> <li>5. Discuss with IEC and Contractor on remedial actions required;</li> <li>6. If exceedance continues, arrange meeting with IEC and ER;</li> <li>7. If exceedance stops, cease additional monitoring.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check monitoring data submitted by ET;</li> <li>2. Check Contractor's working method;</li> <li>3. Discuss with ET and Contractor on possible remedial measures;</li> <li>4. Advise the ER on the effectiveness of the proposed remedial measures;</li> <li>5. Supervise Implementation of remedial measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of failure in writing;</li> <li>2. Notify Contractor;</li> <li>3. Ensure remedial measures properly implemented.</li> </ol>	<ol style="list-style-type: none"> <li>1. Submit proposals for remedial actions to IEC within 3 working days of notification;</li> <li>2. Implement the agreed proposals;</li> <li>3. Amend proposal if appropriate.</li> </ol>

Event	Action			
	ET Leader	IEC	ER	Contractor
Limit level being exceeded by one sampling day	<ol style="list-style-type: none"> <li>1. Identify source;</li> <li>2. Inform IEC, ER, Contractor and EPD;</li> <li>3. Repeat measurement to confirm finding;</li> <li>4. Increase monitoring frequency to daily;</li> <li>5. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check monitoring data submitted by ET;</li> <li>2. Check Contractor's working method;</li> <li>3. Discuss with ET and Contractor on possible remedial measures;</li> <li>4. Advise ER on the effectiveness of the proposed remedial measures;</li> <li>5. Supervise implementation of remedial measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of exceedance in writing;</li> <li>2. Notify Contractor;</li> <li>3. Ensure remedial measures properly implemented.</li> </ol>	<ol style="list-style-type: none"> <li>1. Take immediate action to avoid further exceedance;</li> <li>2. Submit proposals for remedial actions to IEC within 3 working days of notification;</li> <li>3. Implement the agreed proposals;</li> <li>4. Amend proposal if appropriate.</li> </ol>
Limit level being exceeded by two or more consecutive sampling days	<ol style="list-style-type: none"> <li>1. Notify IEC, ER, Contractor, and EPD;</li> <li>2. Identify source;</li> <li>3. Repeat measurement to confirm findings;</li> <li>4. Increase frequency to daily;</li> <li>5. Analyse Contractor's working procedures to determine possible mitigation to be;</li> <li>6. Arrange meeting with IEC and ER to discuss the remedial actions to be taken;</li> <li>7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results;</li> <li>8. If exceedance stops, cease additional monitoring.</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss amongst ER, ET, and Contractor on the potential remedial actions;</li> <li>2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise ER accordingly;</li> <li>3. Supervise the implementation of remedial measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of exceedance in writing;</li> <li>2. Notify Contractor;</li> <li>3. In consultation with the IEC, agree with the Contractor on the remedial measures to be implemented;</li> <li>4. Ensure remedial measures properly implemented;</li> <li>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.</li> </ol>	<ol style="list-style-type: none"> <li>1. Take immediate action to avoid further exceedance;</li> <li>2. Submit proposals for remedial actions to IEC within 3 working days of notification;</li> <li>3. Implement the agreed proposals;</li> <li>4. Resubmit proposals if problem still not under control;</li> <li>5. Stop the relevant portion of works as determined by ER until the exceedance is abated.</li> </ol>

**Event and Action Plan for Noise Quality**

Event	Action			
	ET Leader	IEC	ER	Contractor
Action Level	<ol style="list-style-type: none"> <li>1. Notify IEC and the Contractor.</li> <li>2. Carry out investigation.</li> <li>3. Report the results of investigation to IEC and the Contractor.</li> <li>4. Discuss with the Contractor and formulate remedial measures.</li> <li>5. Increase monitoring frequency to check mitigation effectiveness.</li> </ol>	<ol style="list-style-type: none"> <li>1. Review with analysed results submitted by ET.</li> <li>2. Review the proposed remedial measures by the Contractor and advise ER accordingly.</li> <li>3. Supervise the implement of remedial measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of failure in writing.</li> <li>2. Notify the Contractor.</li> <li>3. Require the Contractor to propose remedial measures for the analysed noise problem.</li> <li>4. Ensure remedial measures are properly implemented.</li> </ol>	<ol style="list-style-type: none"> <li>1. Submit noise mitigation proposals to IEC.</li> <li>2. Implement noise mitigation proposals.</li> </ol>
Limit Level	<ol style="list-style-type: none"> <li>1. Notify IEC, ER, EPD and the Contractor.</li> <li>2. Identify the source.</li> <li>3. Repeat measurement to confirm findings.</li> <li>4. Increase monitoring frequency.</li> <li>5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented.</li> <li>6. Inform IEC, ER, and EPD the causes &amp; actions taken for the exceedances.</li> <li>7. Assess effectiveness of the Contractor's remedial actions and keep IEC, EPD and ER informed of the results.</li> <li>8. If exceedance stops, cease additional monitoring.</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss amongst ER, ET Leader and the Contractor on the potential remedial actions.</li> <li>2. Review the Contractor's remedial actions whenever necessary to assure their effectiveness and advise ER accordingly.</li> <li>3. Supervise the implementation of remedial measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of failure in writing.</li> <li>2. Notify the Contractor.</li> <li>3. Require the Contractor to propose remedial measures for the analysed noise problem.</li> <li>4. Ensure remedial measures are properly implemented.</li> <li>5. If exceedance continues, consider what activity of the work is responsible and instruct the Contractor to stop that activity of work until the exceedance is abated.</li> </ol>	<ol style="list-style-type: none"> <li>1. Take immediate action to avoid further exceedance.</li> <li>2. Submit proposals for remedial actions to IEC within 3 working days of notification.</li> <li>3. Implement the agreed proposals.</li> <li>4. Resubmit proposals if problem still not under control.</li> <li>5. Stop the relevant activity of works as determined by the ER until the exceedance is abated.</li> </ol>

**Event and Action Plan for Water Quality**

Event	Action			
	ET Leader	IEC	ER	Contractor
Action level being exceeded by one sampling day	<ol style="list-style-type: none"> <li>1. Repeat in-situ measurement on next day of exceedance to confirm findings;</li> <li>2. Identify source(s) of impact;</li> <li>3. Inform IEC, Contractor &amp; ER;</li> <li>4. Check monitoring data, all plant, equipment &amp; contractor's working methods;</li> </ol>	<ol style="list-style-type: none"> <li>1. Check monitoring data submitted by ET &amp; Contractor's working methods;</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of failure in writing; Notify, Contractor</li> </ol>	<ol style="list-style-type: none"> <li>1. Inform the ER &amp; confirm notification of the non-compliance in writing;</li> <li>2. Rectify unacceptable practice;</li> <li>3. Amend working methods if appropriate.</li> </ol>
Action level being exceeded by two or more consecutive sampling days	<ol style="list-style-type: none"> <li>1. Repeat measurement on next day of exceedance to confirm findings;</li> <li>2. Identify source(s) of impact;</li> <li>3. Inform IEC, Contractor, ER &amp; EPD;</li> <li>4. Check monitoring data, all plant, equipment &amp; Contractor's working methods;</li> <li>5. Discuss mitigation measures with IEC, ER &amp; Contractor;</li> <li>6. Ensure mitigation measures are implemented;</li> <li>7. Increase monitoring to daily until no exceedance of Action level.</li> </ol>	<ol style="list-style-type: none"> <li>1. Checking monitoring data submitted by ET &amp; Contractor's working method;</li> <li>2. Discuss with ET &amp; Contractor on possible remedial actions;</li> <li>3. Review the proposed mitigation measures submitted by Contractor &amp; advise the ER accordingly;</li> <li>4. Supervise the implementation of mitigation measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss with IEC on the proposed mitigation measures;</li> <li>2. Ensure mitigation measures properly implemented;</li> <li>3. Assess the effectiveness of the implemented mitigation measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Inform the Engineer &amp; confirm notification of the non-compliance in writing;</li> <li>2. Rectify unacceptable practice;</li> <li>3. Check all plant &amp; equipment &amp; consider changes of working methods;</li> <li>4. Submit proposal of mitigation measures to ER within 3 working days of notification &amp; discuss with ET, IEC &amp; ER;</li> <li>5. Implement the agreed mitigation measures.</li> </ol>

Event	Action			
	ET Leader	IEC	ER	Contractor
Limit level being exceeded by one sampling day	<ol style="list-style-type: none"> <li>1. Repeat measurement on next day of exceedance to confirm findings;</li> <li>2. Identify source(s) of impact;</li> <li>3. Inform IEC, contractor, ER &amp; EPD;</li> <li>4. Check monitoring data, all plant, equipment &amp; contractor's working methods;</li> <li>5. Discuss mitigation measures with IEC, Contractor &amp; ER.</li> </ol>	<ol style="list-style-type: none"> <li>1. Checking monitoring data submitted by ET &amp; Contractor's working method;</li> <li>2. Discuss with ET &amp; Contractor on the possible mitigation measures;</li> <li>3. Review the proposed mitigation measures submitted by Contractor &amp; advise the ER accordingly.</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of failure in writing;</li> <li>2. Discuss with IEC, ET &amp; Contractor on the proposed mitigation measures;</li> <li>3. Request Contractor to review the working methods.</li> </ol>	<ol style="list-style-type: none"> <li>1. Inform the ER &amp; confirm notification of the non-compliance in writing;</li> <li>2. Rectify unacceptable practice;</li> <li>3. Check all plant &amp; equipment &amp; consider changes of working methods;</li> <li>4. Submit proposal of mitigation measures to ER within 3 working days of notification &amp; discuss with ET, IEC &amp; ER.</li> </ol>
Limit level being exceeded by two or more consecutive sampling days	<ol style="list-style-type: none"> <li>1. Repeat measurement on the next day of exceedance to confirm findings;</li> <li>2. Identify source(s) of impact;</li> <li>3. Inform IEC, Contractor, ER &amp; EPD;</li> <li>4. Check monitoring data, all plant, equipment &amp; Contractor's working methods;</li> <li>5. Discuss mitigation measures within IEC, Contractor &amp; ER;</li> <li>6. Ensure mitigation measures are implemented;</li> <li>7. Increase the monitoring frequency to daily until no exceedance of Limit level for two consecutive days.</li> </ol>	<ol style="list-style-type: none"> <li>1. Checking monitoring data submitted by ET &amp; Contractor's working method;</li> <li>2. Discuss with ET &amp; Contractor on potential remedial actions;</li> <li>3. Review Contractor's mitigation measures whenever necessary to assure their effectiveness &amp; advise the ER accordingly;</li> <li>4. Supervise the implementation of mitigation measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss with IEC, ET &amp; Contractor on the proposed mitigation measures;</li> <li>2. Request Contractor to critically review the working methods;</li> <li>3. Make agreement on the mitigation measures to be implemented;</li> <li>4. Ensure mitigation measures are properly implemented;</li> <li>5. Consider &amp; instruct, if necessary, the Contractor to slow down or to stop all or part of the construction activities until no exceedance of Limit level.</li> </ol>	<ol style="list-style-type: none"> <li>1. Take immediate action to avoid further exceedance;</li> <li>2. Submit proposal of mitigation measures to ER within 3 working days of notification &amp; discuss with ET, IEC &amp; ER;</li> <li>3. Implement the agreed mitigation measures;</li> <li>4. Resubmit proposals of mitigation measures if problem still not under control;</li> <li>5. As directed by the Engineer, to slow down or to stop all or part of the construction activities until no exceedance of Limit level.</li> </ol>

# **Appendix H Noise Monitoring Results and their Graphical Presentation**

Project Name:

**Contract No. CV/2012/09 Liantang / Heung Yuen Wai Boundary Control Point Site Formation and Infrastructure works - Contract 3**  
**Entrusted Portion of Widening of Tolo Highway / Fanling Highway between Island House Interchange and Fanling - Stage 2**

Noise Monitoring Result at SR77

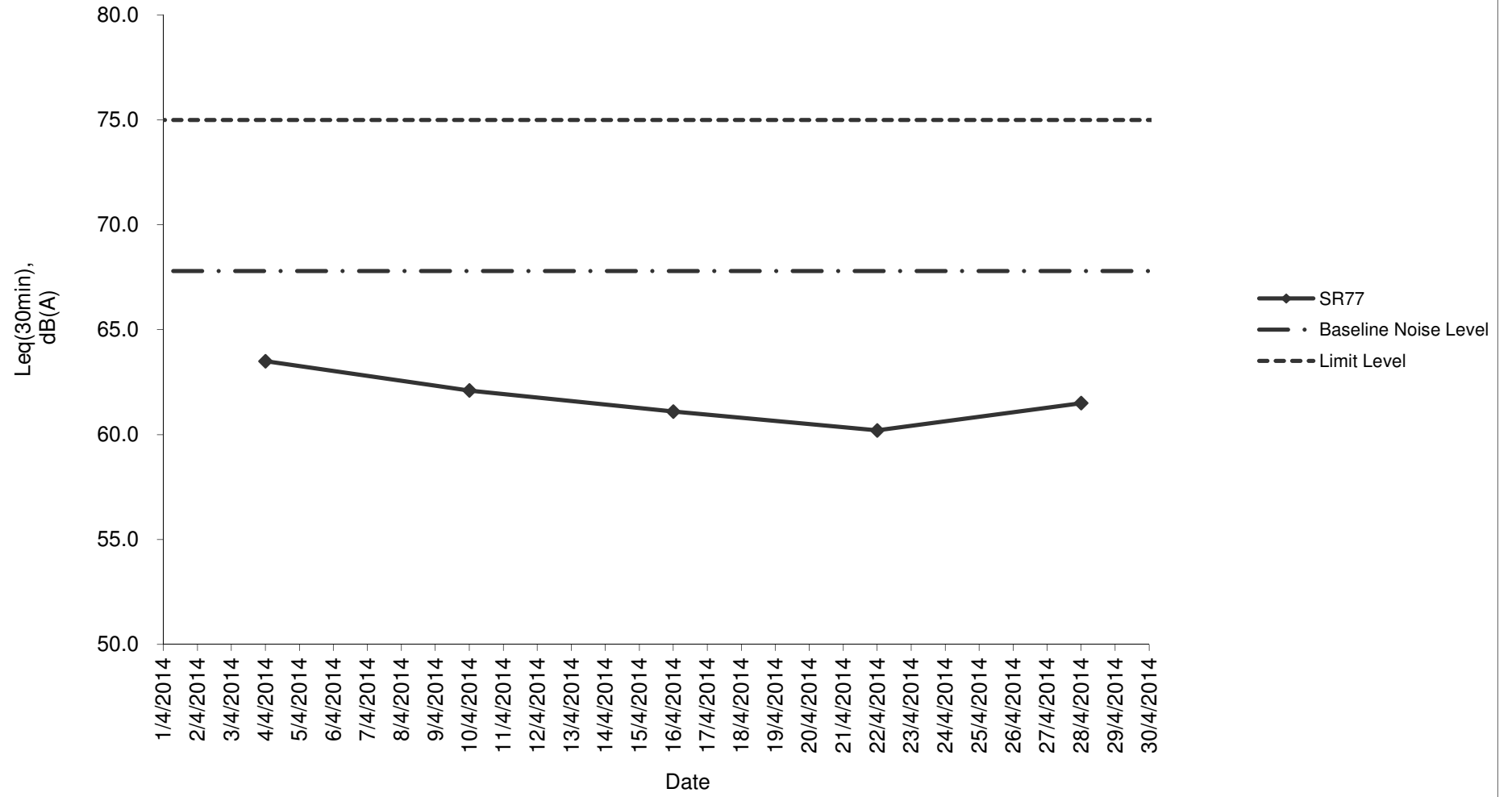
Date	Weather Condition	Start Time	End Time	Measured Noise Level (dB(A))*			Baseline Corrected Level, dB(A)**	Baseline Noise Level (dB(A)), Leq(30min)	Limit Level dB(A)	Exceedance (Y / N)
				L10(30min)	L90(30min)	Leq(30min)				
2014/04/04	Cloudy	8:00	8:30	70.5	72.5	63.5	-	67.8	75.0	N
2014/04/10	Fine	10:30	11:00	68.5	71.3	62.1	-	67.8	75.0	N
2014/04/16	Sunny	11:01	11:31	69.3	71.9	61.1	-	67.8	75.0	N
2014/04/22	Sunny	11:30	12:00	70.1	71.8	60.2	-	67.8	75.0	N
2014/04/28	Sunny	11:00	11:30	69.9	72.4	61.5	-	67.8	75.0	N
				<b>Average</b>	61.7					
				<b>Minimum</b>	60.2					
				<b>Maximum</b>	63.5					

**Remarks**

\* +3dB(A) Façade effect correction included

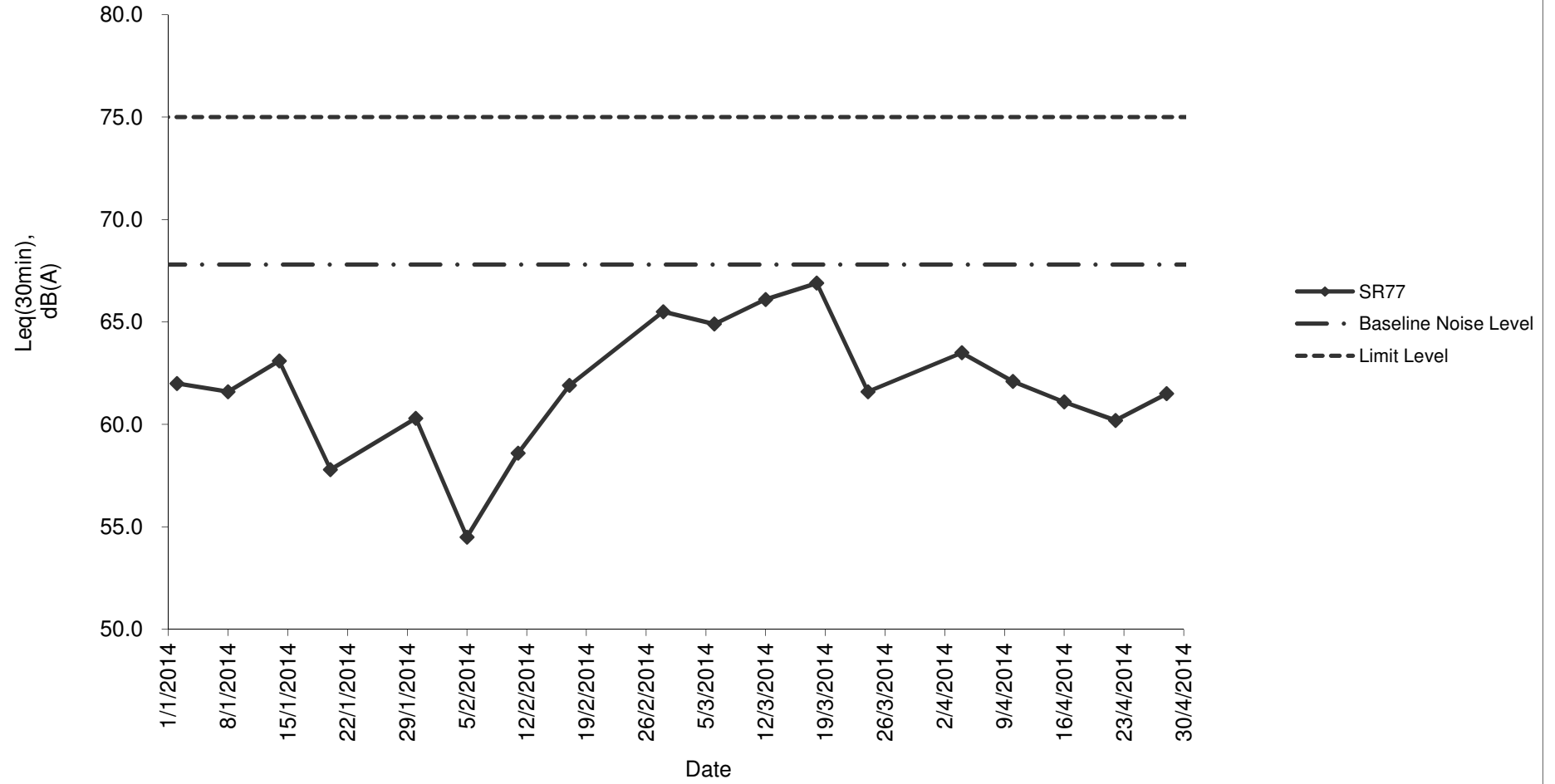
\*\* Baseline corrected level is only calculated when measured noise level (Leq) > limit level.

### Noise monitoring result: SR77





**Noise monitoring result: SR77  
(January - April 2014)**



# Appendix I

## Laboratory Results for Water Quality



# ENVIRO LABS LIMITED

Rm 611-612, Hong Leong Plaza, 33 Lok Yip Rd, Fanling, NT, HK

Tel: (852) 2676 2983 Fax: (852) 2676 2860

e-mail: [ell@envirolabs.com.hk](mailto:ell@envirolabs.com.hk) website: <http://www.envirolabs.com.hk>

## TEST REPORT

JOB NO. : 14040027  
DATE OF ISSUE : 04 April 2014  
PAGE : Page 1 of 1

### 1. Customer

Enovative Environmental Service Limited  
Flat 6, 3/F., Block E,  
Wah Lok Industrial Centre,  
31-35 Shan Mei Street, Shatin, N.T.  
Attn: Mr. Thomas Wong

### 2. Sample Identification

Sample Description : Six batch(es) of water sample(s) were submitted by the customer and received at the laboratory in cool condition.  
Sampling : Conducted by the customer  
Sampling Date<sup>a</sup> : 02 Apr 2014  
Received Date : 02 Apr 2014  
Testing Period : 02 Apr 2014 to 03 Apr 2014

### 3. Test Methods

Parameters	Reference Methods	LOD <sup>b</sup>
Total Suspended Solids (TSS)	APHA <sup>c</sup> 17e 2540 D	2.5 mg/L

### 4. Test Results<sup>d</sup>

Sample I.D. marked by the customer	Sample No.	Parameters	Test Results	Units
C3a-1, 02-04-2014	001	TSS	41	mg/L
C3a-2, 02-04-2014	002	TSS	37	mg/L
C3b-1, 02-04-2014	003	TSS	41	mg/L
C3b-2, 02-04-2014	004	TSS	44	mg/L
IS-1, 02-04-2014	005	TSS	46	mg/L
IS-2, 02-04-2014	006	TSS	49	mg/L

--- END OF REPORT ---


<sup>a</sup> Information provided by the customer

<sup>b</sup> LOD denotes Limit of detection

<sup>c</sup> APHA Standard Methods for the Examination of Water and Wastewater

<sup>d</sup> Test results relate only to the items received

APPROVED SIGNATORY:

  
Kenneth, Kar-kin LAM  
Senior Lab. Manager



# ENVIRO LABS LIMITED

Rm 611-612, Hong Leong Plaza, 33 Lok Yip Rd, Fanling, NT, HK

Tel: (852) 2676 2983 Fax: (852) 2676 2860

e-mail: [ell@envirolabs.com.hk](mailto:ell@envirolabs.com.hk) website: <http://www.envirolabs.com.hk>

## TEST REPORT

JOB NO. : 14040160  
DATE OF ISSUE : 10 April 2014  
PAGE : Page 1 of 1

### 1. Customer

Enovative Environmental Service Limited  
Flat 6, 3/F., Block E,  
Wah Lok Industrial Centre,  
31-35 Shan Mei Street, Shatin, N.T.  
Attn: Mr. Thomas Wong

### 2. Sample Identification

Sample Description : Six batch(es) of water sample(s) were submitted by the customer and received at the laboratory in cool condition.  
Sampling : Conducted by the customer  
Sampling Date<sup>a</sup> : 04 Apr 2014  
Received Date : 04 Apr 2014  
Testing Period : 04 Apr 2014 to 08 Apr 2014

### 3. Test Methods

Parameters	Reference Methods	LOD <sup>b</sup>
Total Suspended Solids (TSS)	APHA <sup>c</sup> 17e 2540 D	2.5 mg/L

### 4. Test Results<sup>d</sup>

Sample I.D. marked by the customer	Sample No.	Parameters	Test Results	Units
C3a-1, 04-04-2014	001	TSS	9.0	mg/L
C3a-2, 04-04-2014	002	TSS	9.0	mg/L
C3b-1, 04-04-2014	003	TSS	5.0	mg/L
C3b-2, 04-04-2014	004	TSS	5.0	mg/L
IS-1, 04-04-2014	005	TSS	5.8	mg/L
IS-2, 04-04-2014	006	TSS	5.8	mg/L

--- END OF REPORT ---

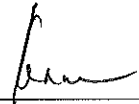
<sup>a</sup> Information provided by the customer

<sup>b</sup> LOD denotes Limit of detection

<sup>c</sup> APHA Standard Methods for the Examination of Water and Wastewater

<sup>d</sup> Test results relate only to the items received

APPROVED SIGNATORY:

  
Kenneth, Kar-kin LAM  
Senior Lab. Manager

# **Appendix J Water Quality Monitoring Results and their Graphical Presentation**

Project Name: Contract No. CV/2012/09 Liantang / Heung Yuen Wai Boundary Control Point Site Formation and Infrastructure works - Contract 3  
 Entrusted Portion of Widening of Tolo Highway / Fanling Highway between Island House Interchange and Fanling - Stage 2

Date of Monitoring 2/4/2014 Weather : Rainy

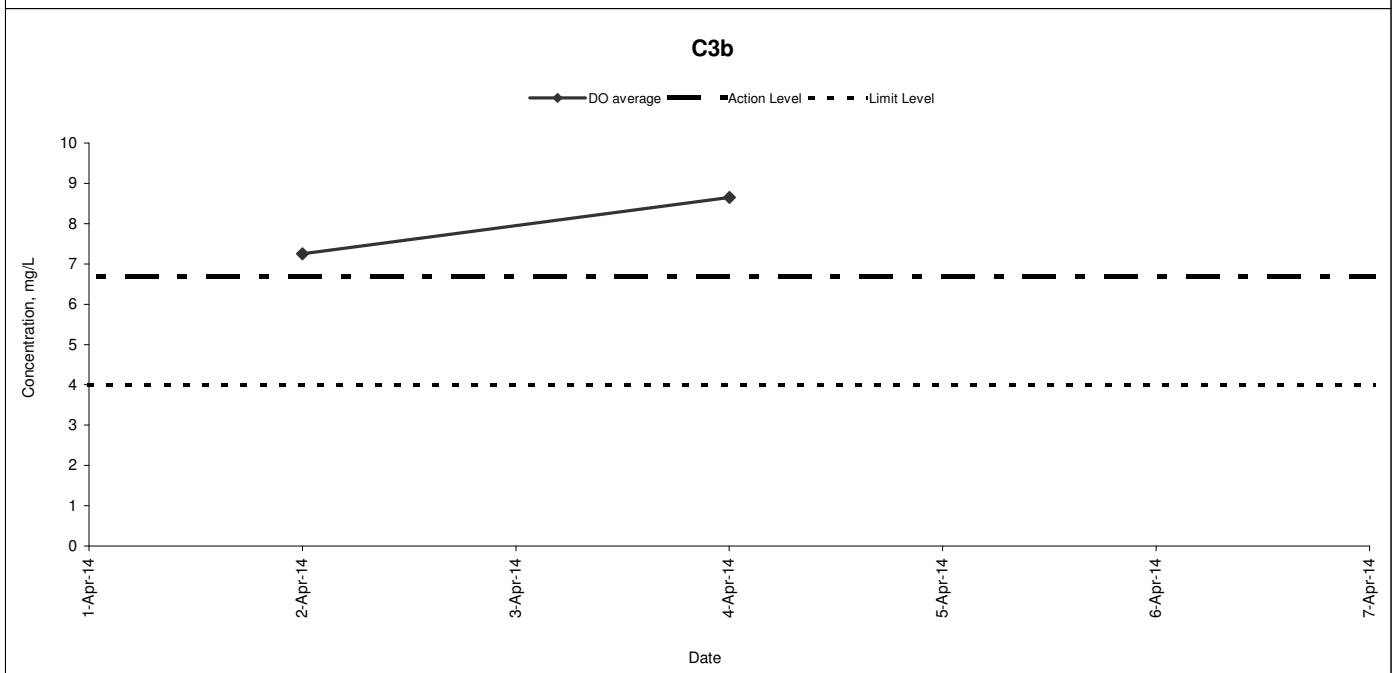
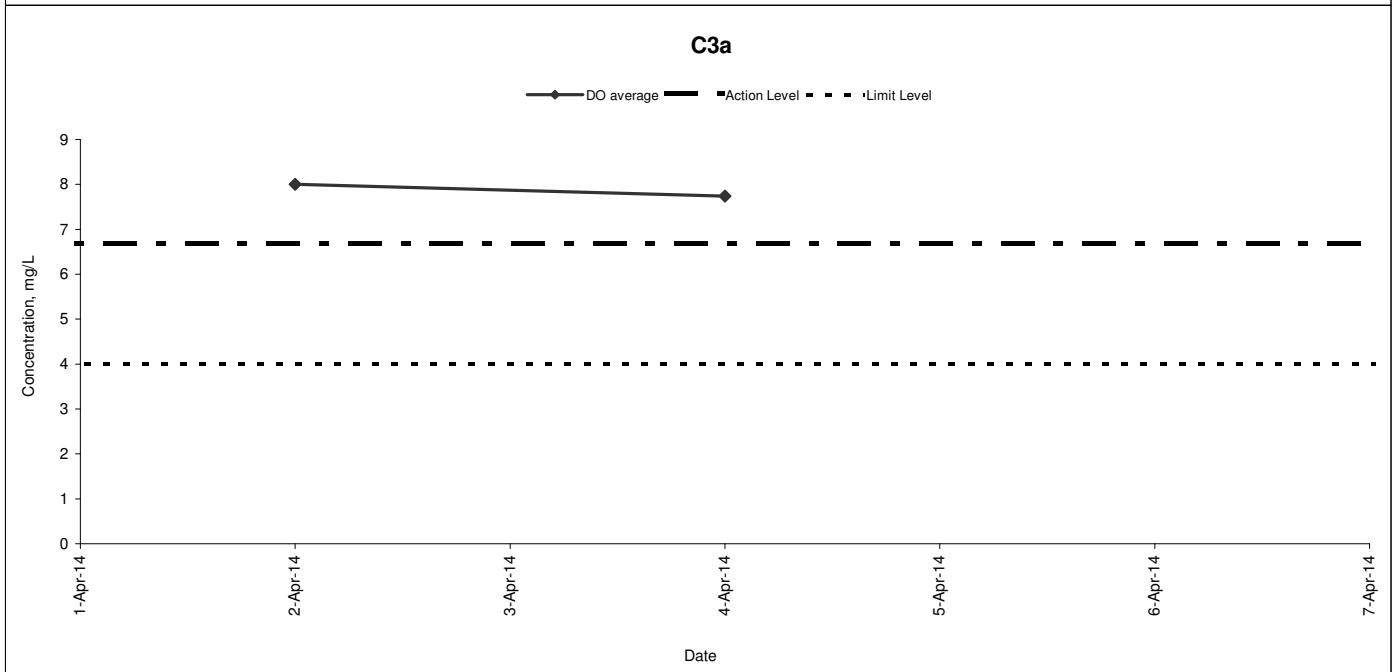
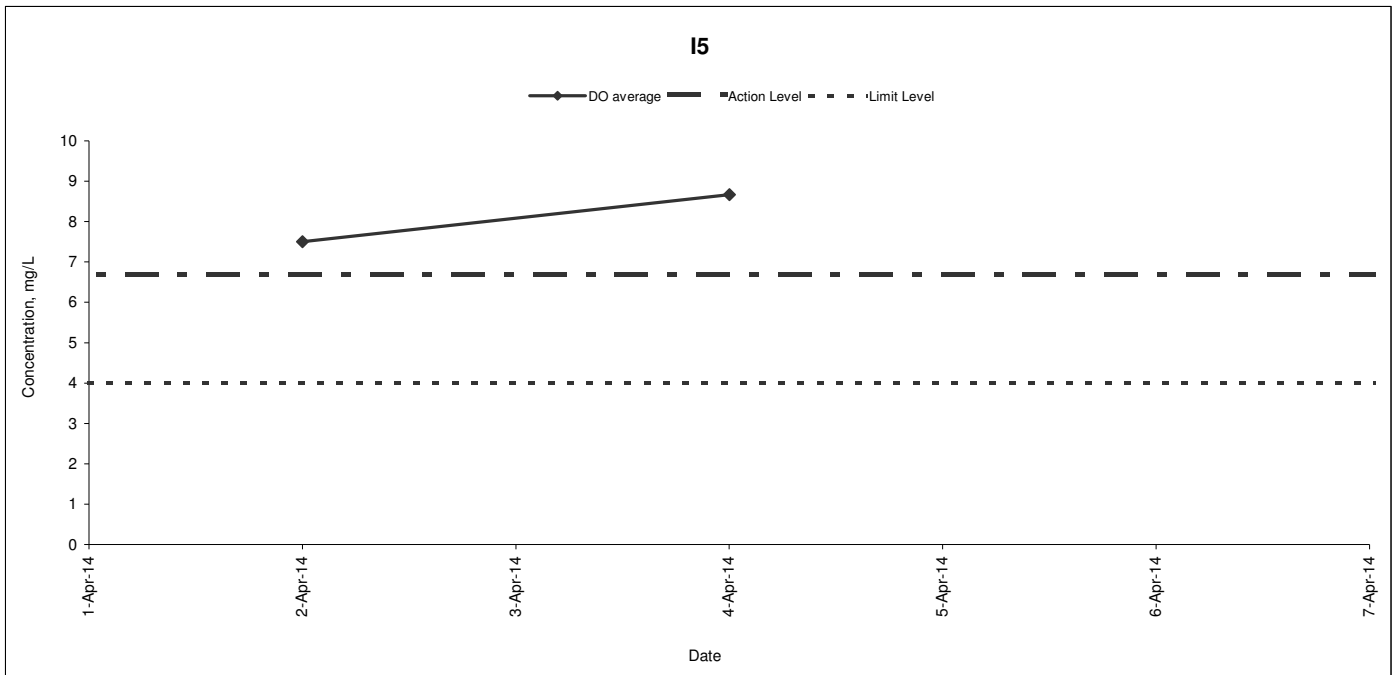
Monitoring Location	Time	Water Depth (m)	Temperature (oC)		pH		DO (mg/L)		DO (% saturation)		Turbidity (NTU)		Salinity (g/L)		SS (mg/L)	
			Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average
C3a	11:13	<0.5	20.0	20.0	7.2	7.2	8.0	8.0	88.5	88.5	63.2	63.0	<0.1	<0.1	41.0	39.0
			20.0		7.2		8.0		88.5		62.8		<0.1		37.0	
			19.8		7.3		7.2		78.9		65.0		<0.1		41.0	
C3b	11:35	<0.5	19.8	19.8	7.3	7.3	7.2	7.3	79.6	79.6	64.1	64.6	<0.1	<0.1	44.0	42.5
			19.8		7.3		7.3		80.2		64.1		<0.1		44.0	
			19.8		7.5		7.5		82.3		73.1		<0.1		46.0	
I5	10:55	<0.5	19.8	19.8	7.5	7.5	7.5	7.5	82.3	82.3	73.1	72.0	<0.1	<0.1	46.0	<b>47.5</b>
			19.8		7.5		7.5		82.3		70.8		<0.1		49.0	

Date of Monitoring 4/4/2014 Weather : Cloudy

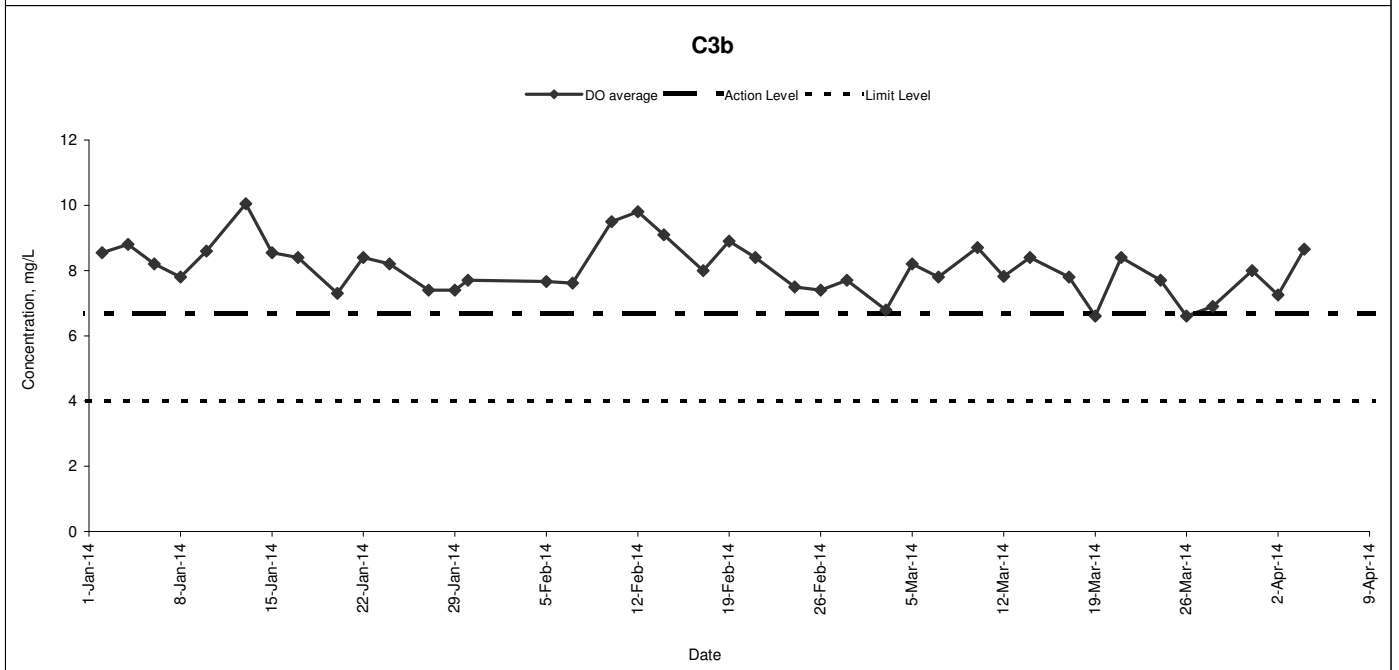
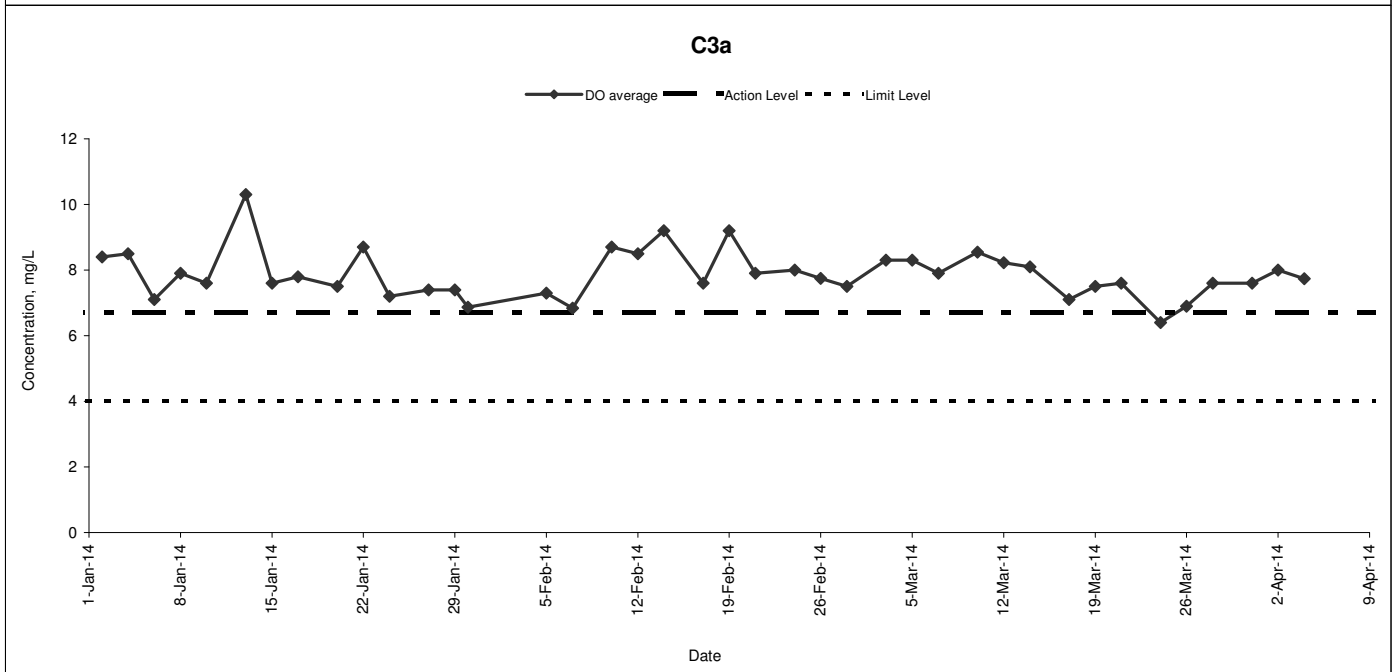
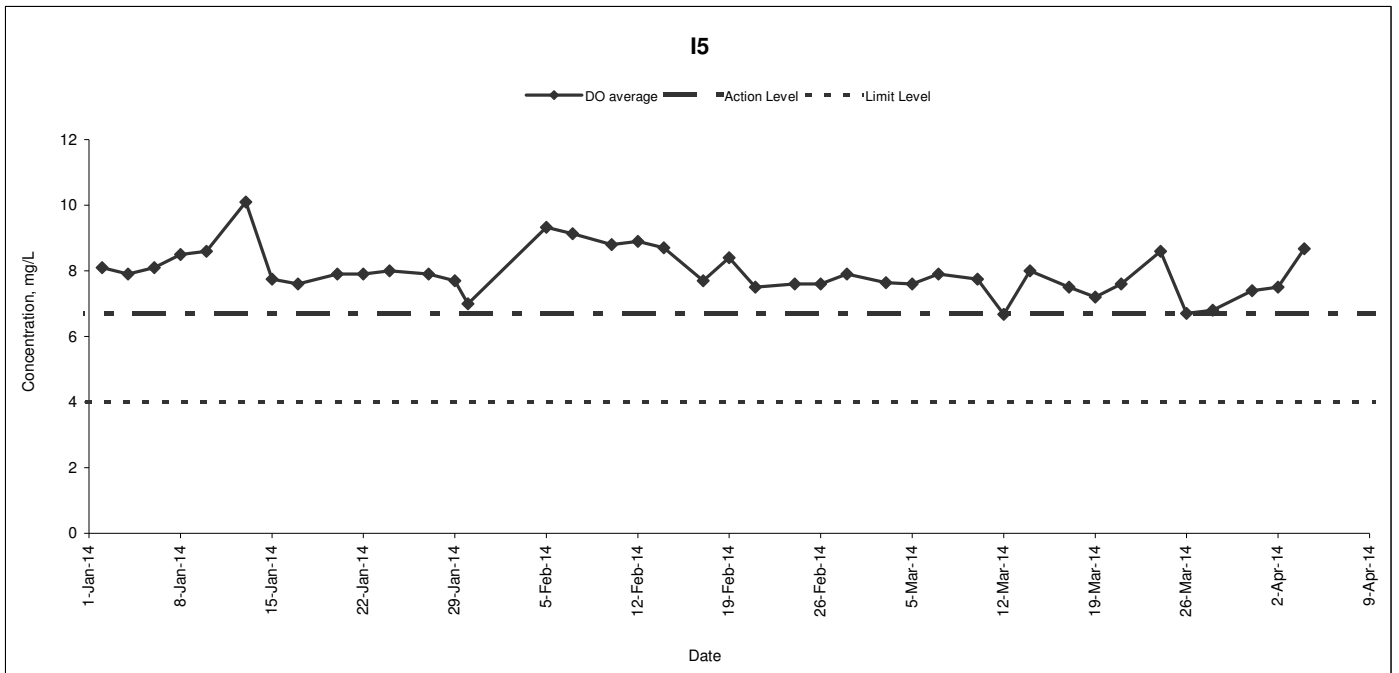
Monitoring Location	Time	Water Depth (m)	Temperature (oC)		pH		DO (mg/L)		DO (% saturation)		Turbidity (NTU)		Salinity (g/L)		SS (mg/L)	
			Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average
C3a	8:58	<0.5	20.1	20.1	7.6	7.6	7.7	7.7	85.4	85.4	13.8	13.8	<0.1	<0.1	9.0	9.0
			20.1		7.6		7.7		85.4		13.7		<0.1		9.0	
			19.3		7.8		8.7		93.9		14.8		<0.1		5.0	
C3b	8:41	<0.5	19.3	19.3	7.8	7.8	8.7	8.7	93.9	93.9	14.8	14.8	<0.1	<0.1	5.0	5.0
			19.3		7.8		8.7		93.9		14.8		<0.1		5.0	
			19.6		8.1		8.7		94.4		14.3		<0.1		5.6	
I5	8:35	<0.5	19.6	19.6	8.1	8.1	8.7	8.7	94.4	94.4	14.3	14.3	<0.1	<0.1	5.6	5.7
			19.6		8.1		8.7		94.4		14.3		<0.1		5.8	

NOTE:  
 Data in **Bold** denotes exceedance of respective Action Level  
 Data in **Bold Underline** denotes exceedance of respective Limit Level

# Dissolved Oxygen

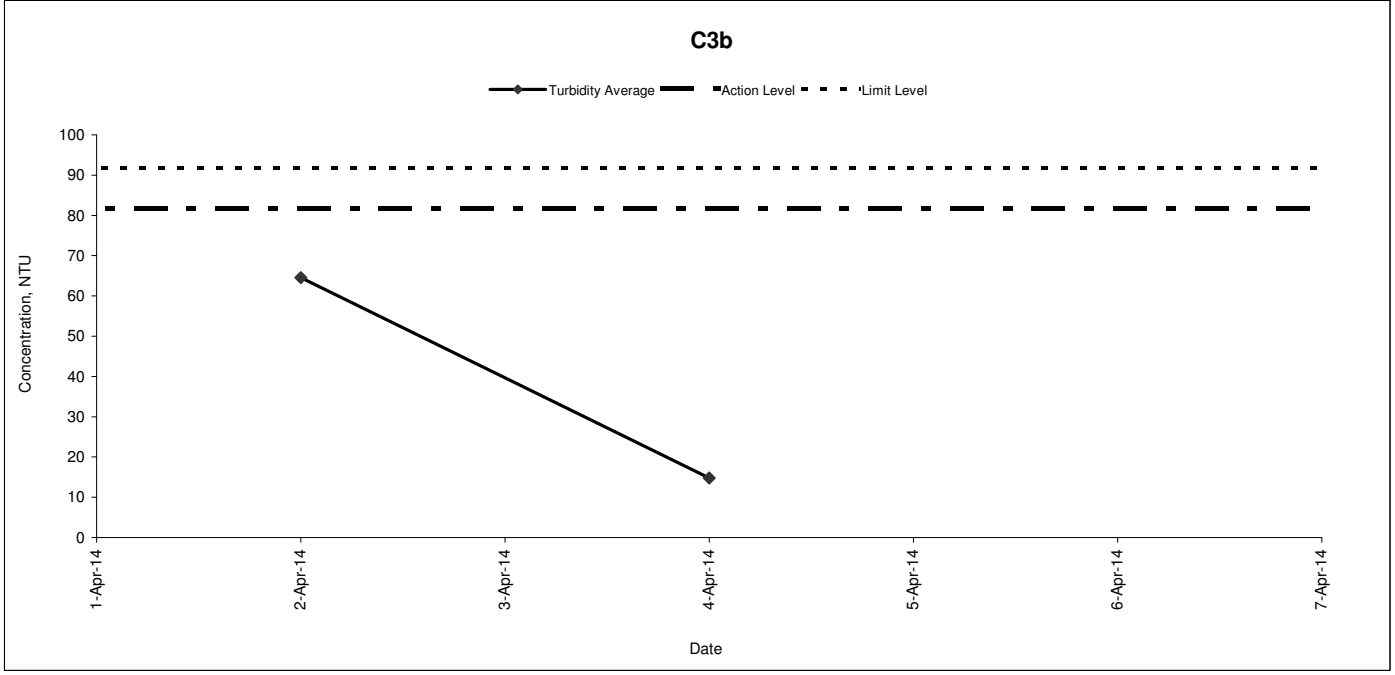
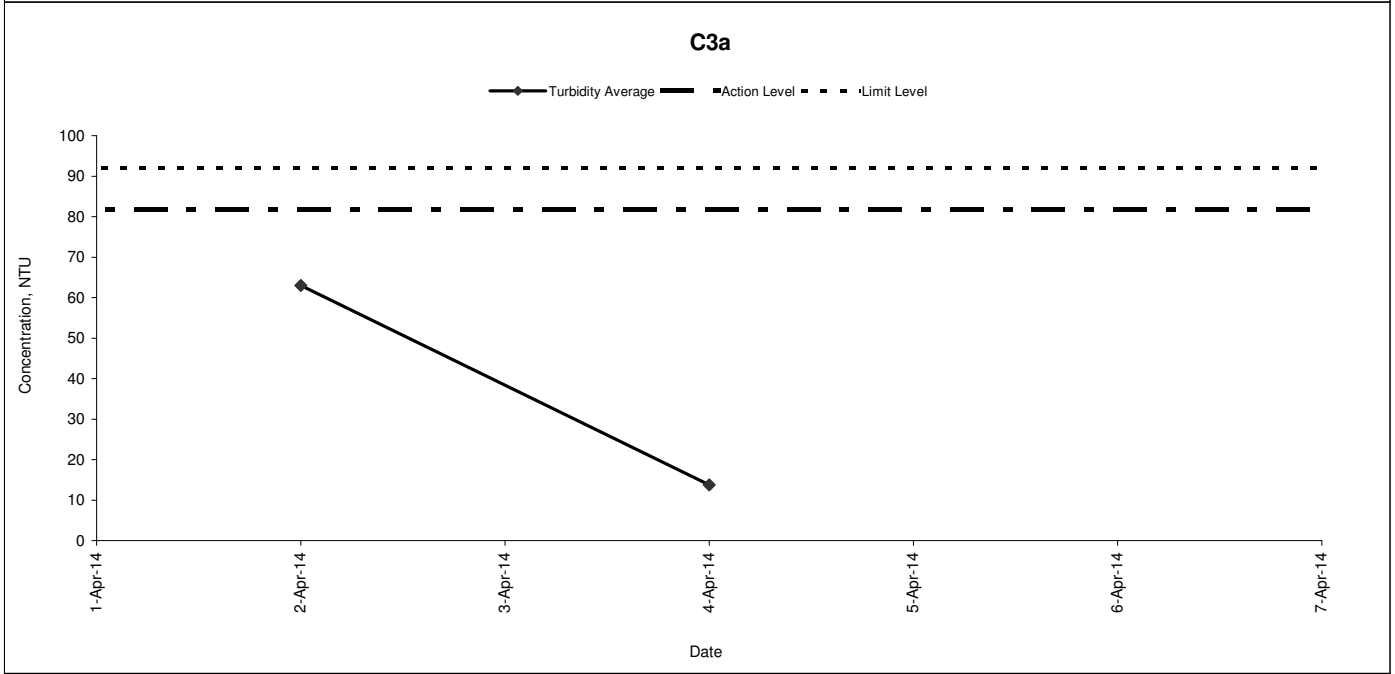
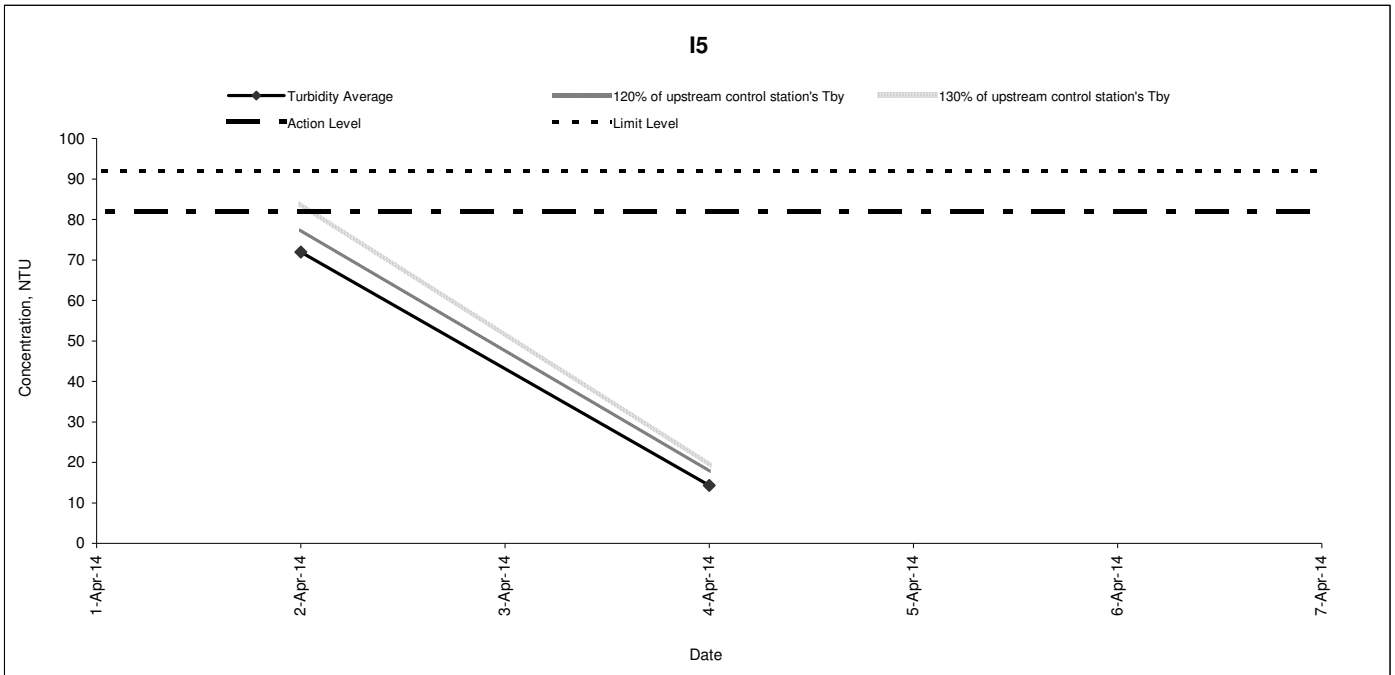


## Dissolved Oxygen (January - April 2014)

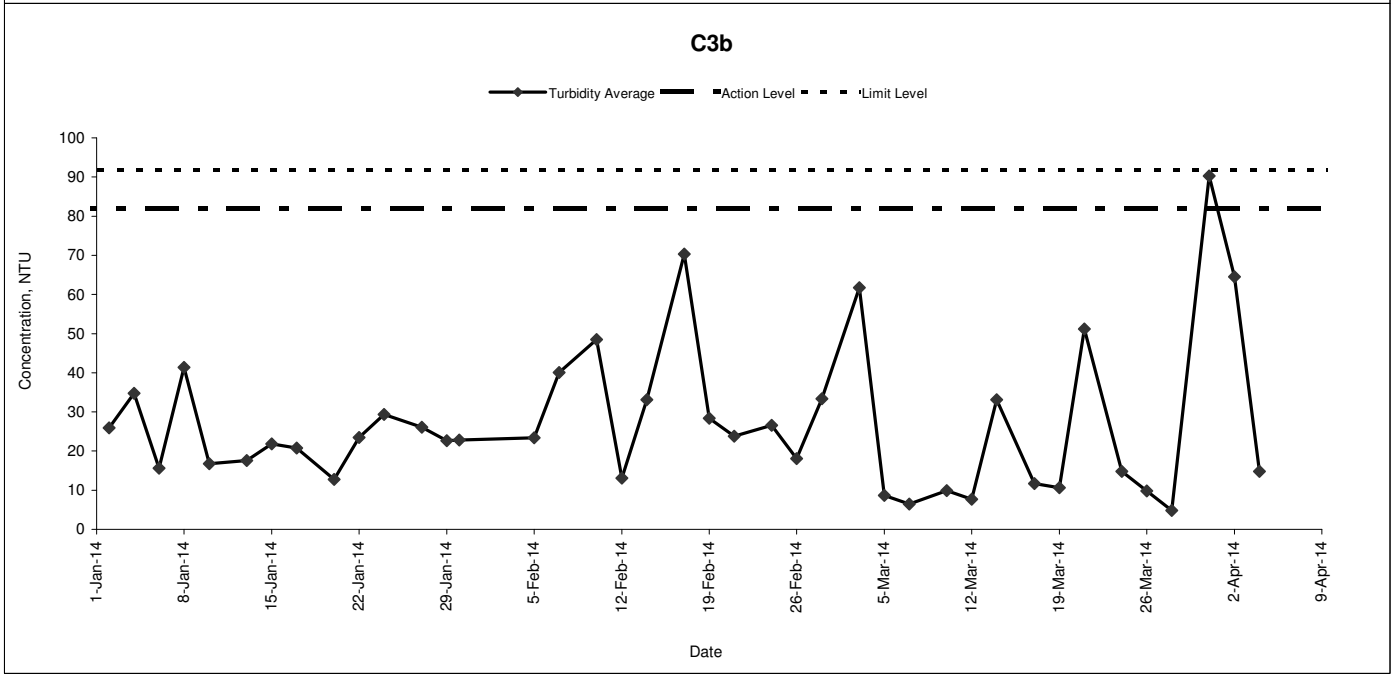
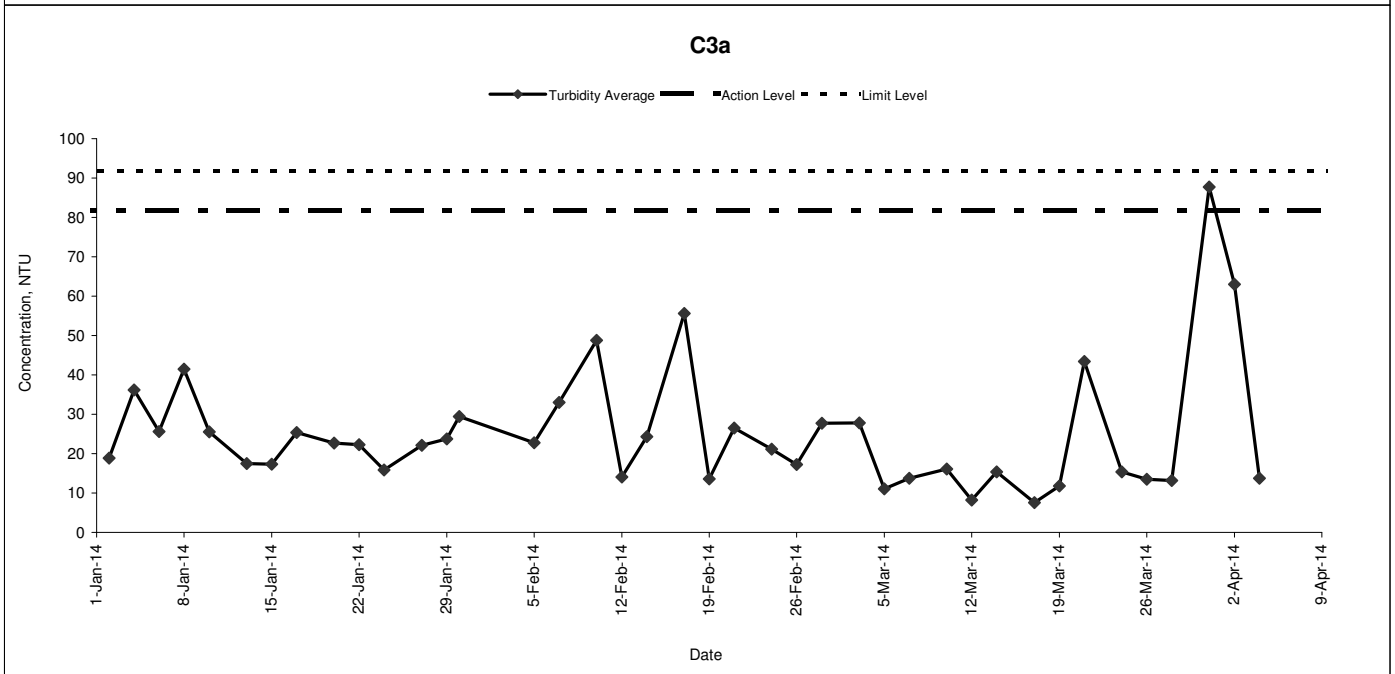
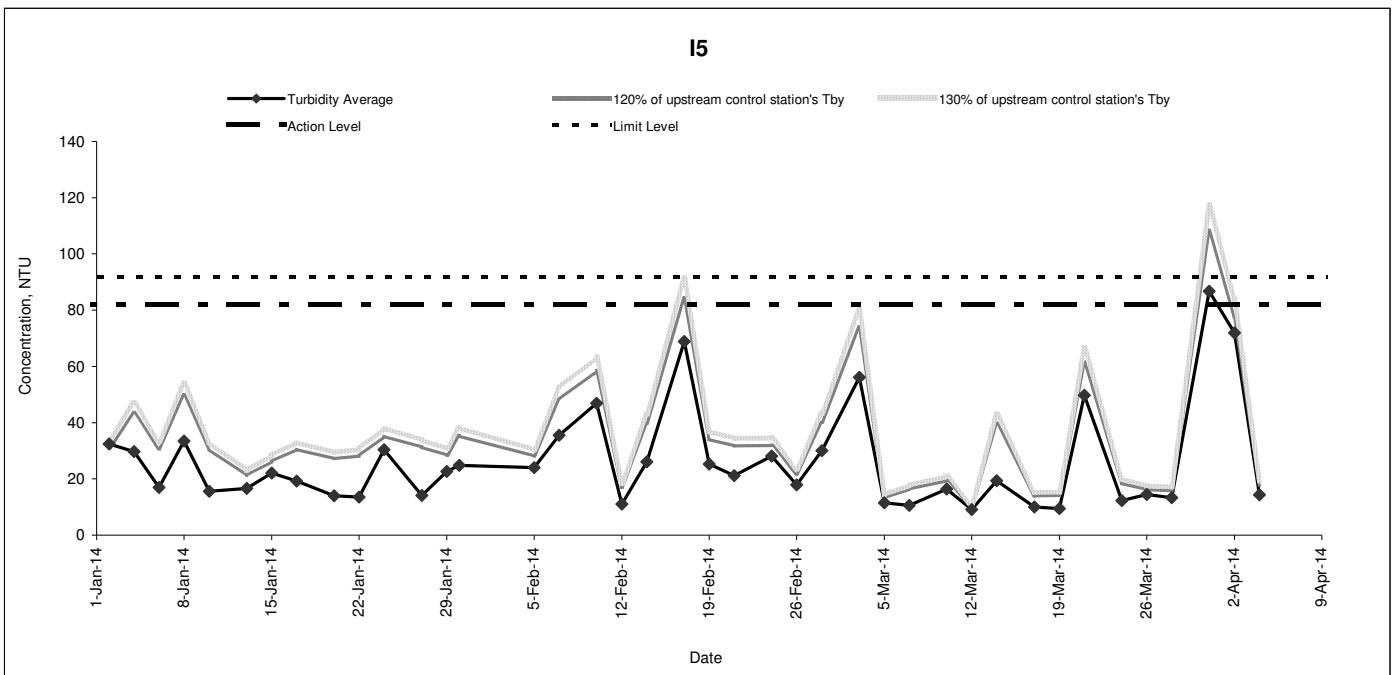




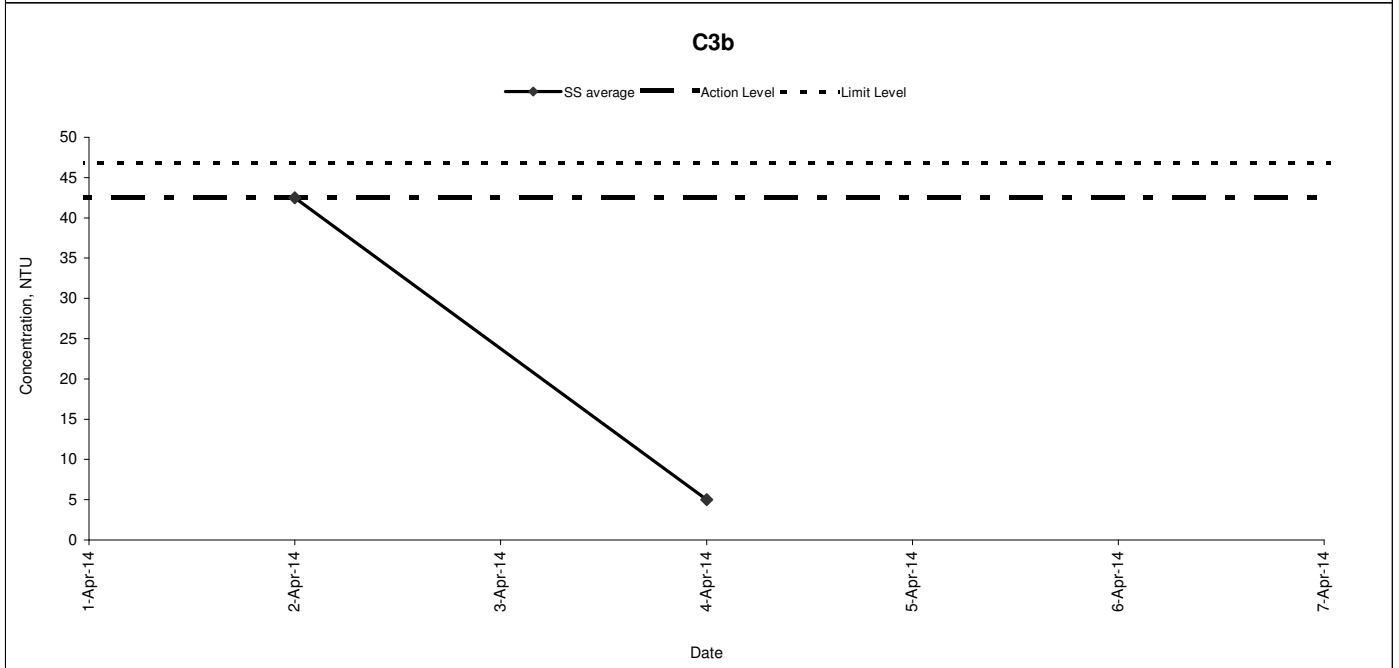
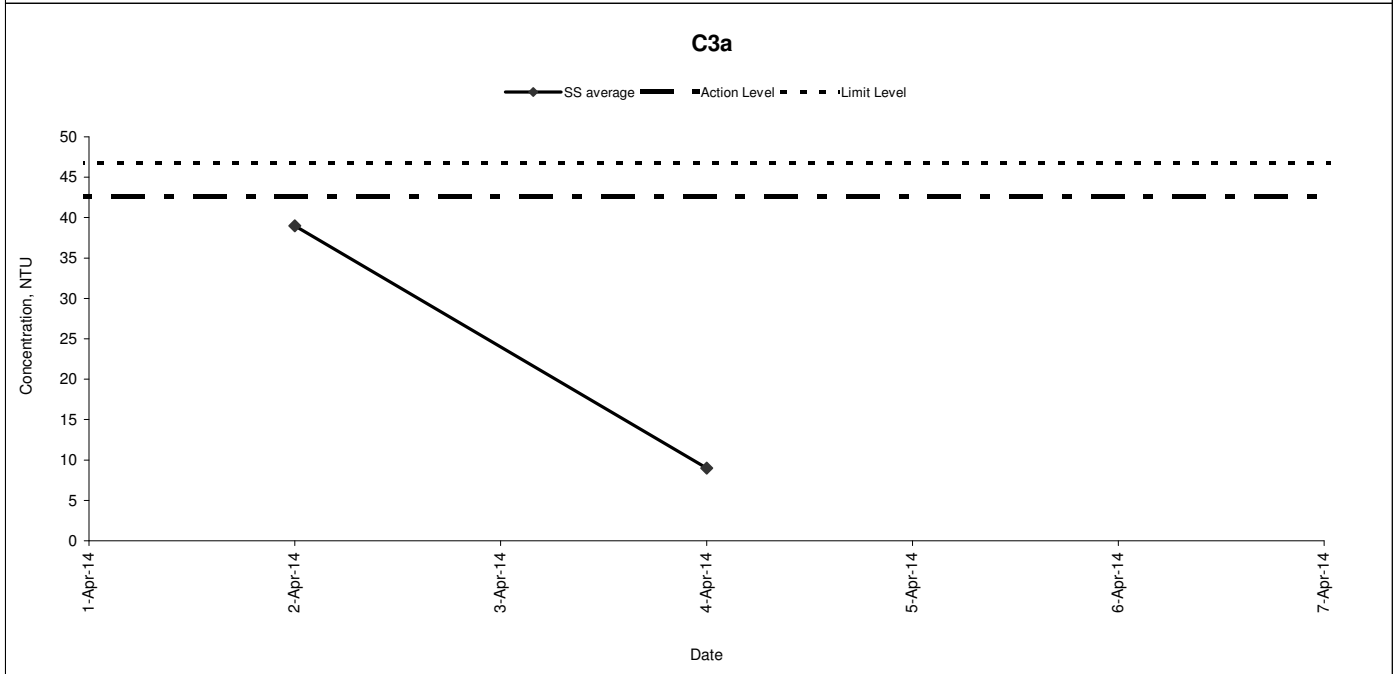
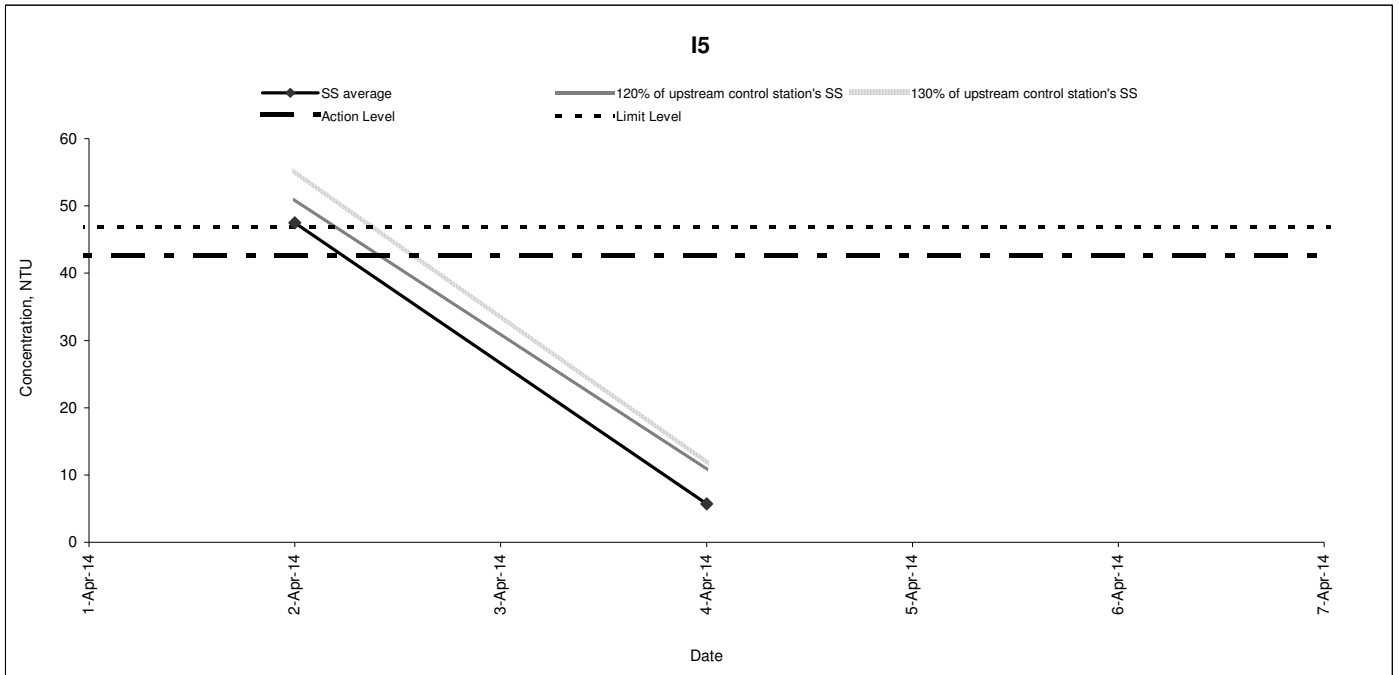
# Turbidity



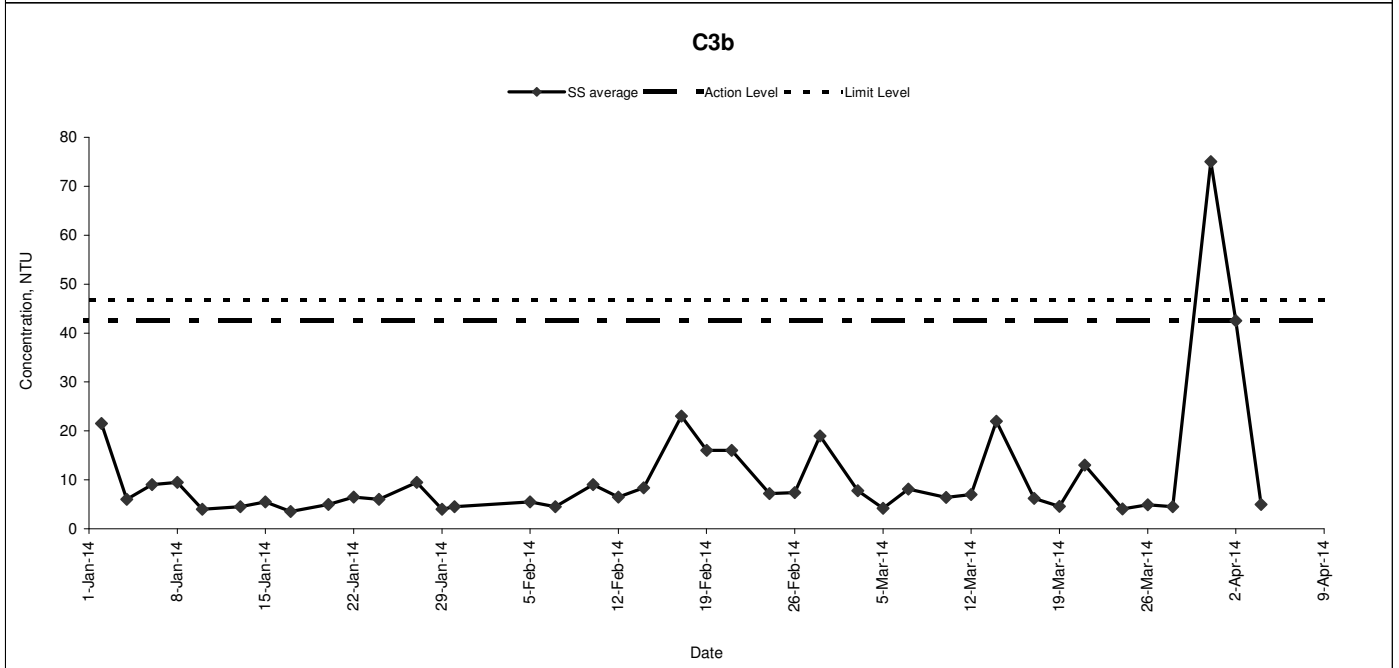
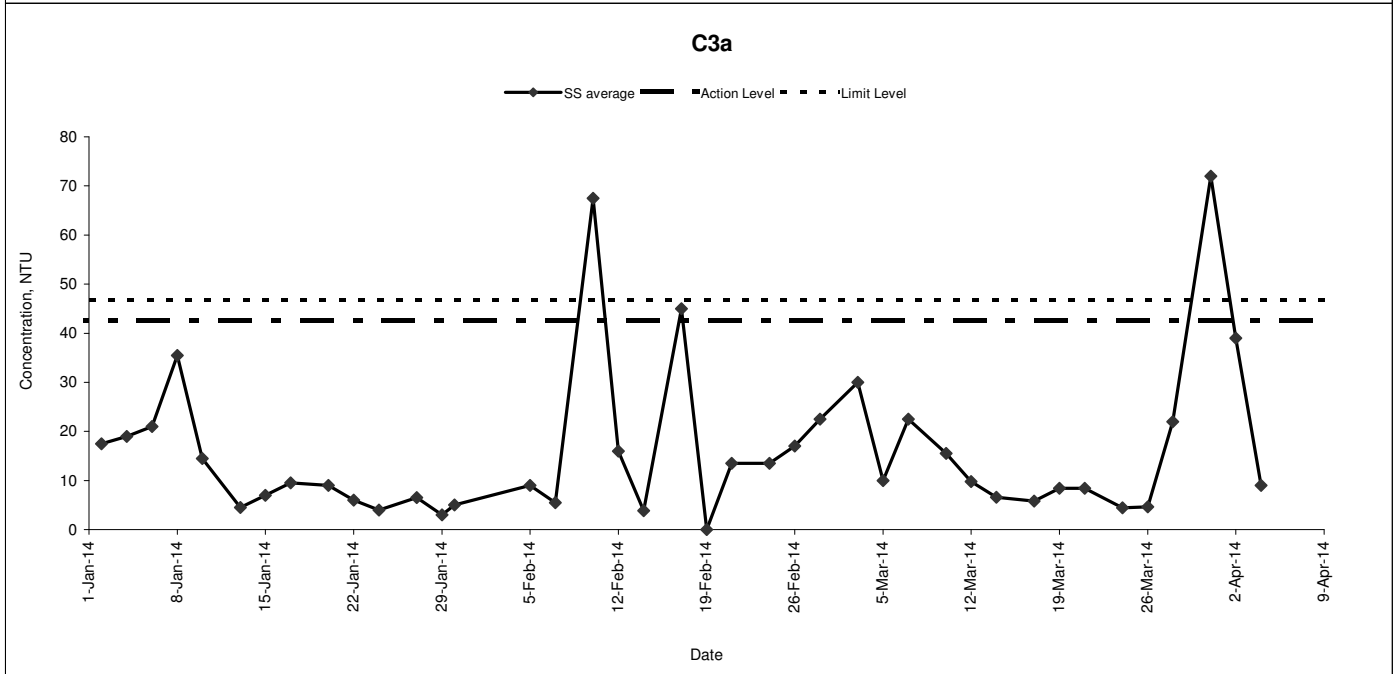
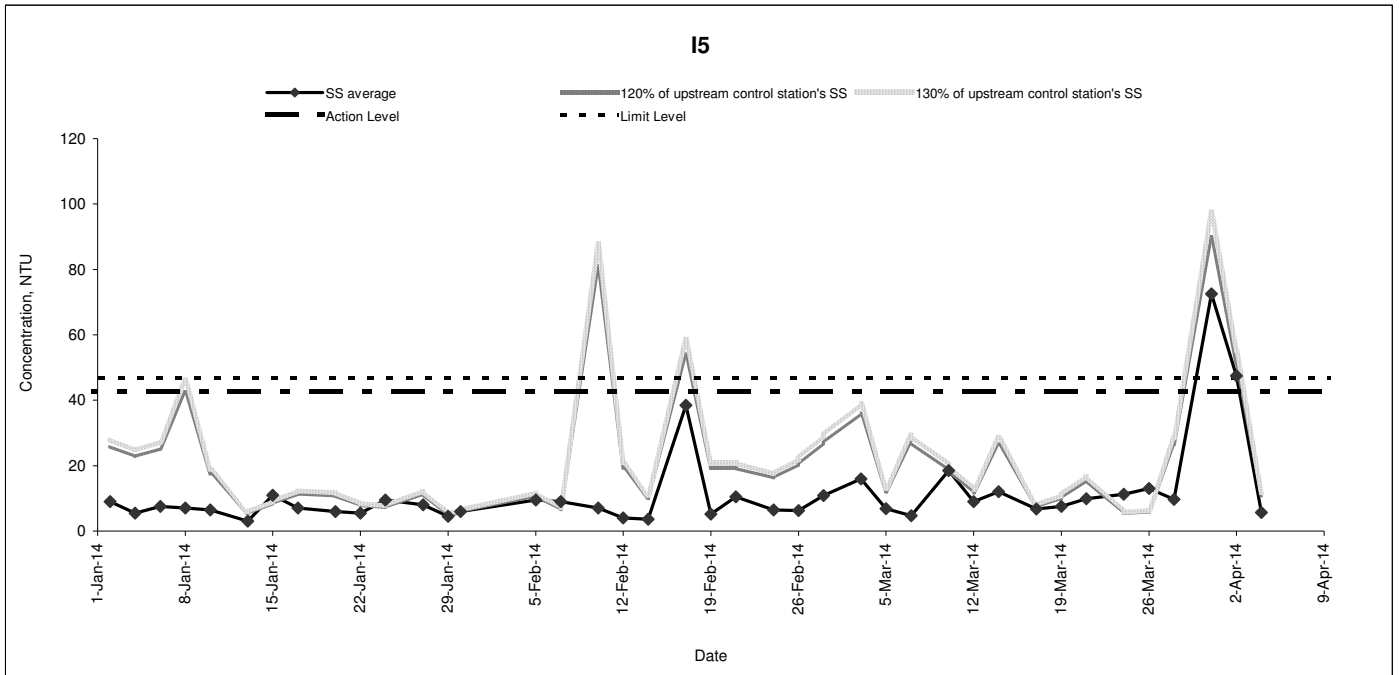
# Turbidity (January - April 2014)



# Suspended Solid



## Suspended Solid (January - April 2014)



# Appendix K Waste Flow Table

### Appendix K Monthly Summary Waste Flow Table

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	Soil	Soil Reused in the Contract	Soil Reused in other Projects	Soil Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging (Note 3)	Plastics	Chemical Waste	General Refuse (Note 2)
Unit	(in '000m3)	(in '000m3)	(in '000m3)	(in '000m3)	(in '000m3)	(in '000m3)	(in '000m3)	(in '000m3)	(in '000m3)	(in '000m3)	(in '000m3)	(in '000m3)
Jul-13	-	-	-	-	-	-	-	-	-	-	-	-
Aug-13	-	-	-	-	-	-	-	-	-	-	-	-
Sep-13	-	-	-	-	-	-	-	-	-	-	-	0.004
Oct-13	-	-	-	-	-	-	-	-	-	-	-	0.003
Nov-13	1.351	-	1.351	0.473	-	0.878	-	-	-	-	-	0.055
Dec-13	0.177	0.007	0.170	0.030	-	0.140	0.600	-	-	-	-	0.055
Sub-Total	1.528	0.007	1.521	0.503	-	1.018	0.600	-	-	-	-	0.117
Jan-14	0.493	0.084	0.409	-	-	0.409	0.200	-	-	0.010	-	0.110
Feb-14	2.209	0.356	1.853	0.380	-	1.473	-	0.002	-	-	0.019	0.040
Mar-14	4.460	0.506	3.954	1.092	-	2.862	-	-	-	-	-	0.265
Apr-14	1.654	0.054	1.600	0.672	-	0.928	0.200	-	-	-	0.020	0.135
May-14	-	-	-	-	-	-	-	-	-	-	-	-
Jun-14	-	-	-	-	-	-	-	-	-	-	-	-
Total	10.344	1.007	9.337	2.647	-	6.690	1.000	0.002	-	0.010	0.039	0.667

- 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.

# **Appendix L Implementation Schedule of Environmental Mitigation Measures (EMIS)**

Impact	Environmental Protection Measures	Timing	Responsibility	Implementation Status #
<b>Air Quality</b>				
Air Quality during Construction	<ul style="list-style-type: none"> <li>Restricting heights from which materials are dropped, as far as practicable to minimize the fugitive dust arising from unloading/loading.</li> <li>All stockpiles of excavated materials or spoil of more than 50m<sup>3</sup> shall be enclosed, covered or dampened during dry or windy conditions.</li> <li>Effective water sprays shall be used to control potential dust emission sources such as unpaved haul roads and active construction areas.</li> <li>All spraying of materials and surfaces shall avoid excessive water usage.</li> <li>Vehicles that have the potential to create dust while transporting materials shall be covered, with the cover properly secured and extended over the edges of the side and tail boards.</li> <li>Materials shall be dampened, if necessary, before transportation.</li> <li>Travelling speeds shall be controlled to reduce traffic induced dust dispersion and re-suspension within the site from the operating haul trucks.</li> <li>Vehicle washing facilities shall be provided to minimise the quantity of material deposited on public roads.</li> </ul>	During Construction	Contractor	✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓
Air Quality during Operation	Not required	N/A	N/A	N/A
<b>Noise</b>				
Noise during Construction	<ul style="list-style-type: none"> <li>Use of silenced plant or plant equipped with mufflers or dampers in substitute of ordinary plant.</li> <li>Reduce the number of equipment and their percentage on-time.</li> </ul>	During Construction	Contractor	✓ ✓
Noise during Operation	Not required	N/A	N/A	N/A
<b>Water Quality</b>				
Water Quality during Construction	<u>Road Widening Works, Earthworks and Culvert Extension Works</u> <ul style="list-style-type: none"> <li>Wastewater generated from any concrete batching washdown of equipment or similar activities should be discharged into foul sewers, after the removal of settleable solids, and pH adjustment as necessary. All sewage discharges from the study area should meet the TM standards and approval from EPD through the licensing process is required.</li> </ul>	During Construction	Contractor	✓

Notes (#): ✓ – Compliance; Rem – Reminder; Obs – Observation; N/C – Non Compliance; N/A – Not Applicable;



Impact	Environmental Protection Measures	Timing	Responsibility	Implementation Status #
	<ul style="list-style-type: none"> <li>• Sand traps, oil interceptors and other pollution prevention installations should be provided, properly cleaned and maintained.</li> <li>• Runoff from exposed working areas, unfinished slopes and from unlined temporary channels should be directed to stilling basins and/or silt traps before discharging to the drainage outfalls.</li> <li>• Regular inspections of stilling basins and/or silt traps is required to ensure that sediment is not conveyed into the existing drainage system.</li> <li>• Open stockpiles should be covered with a tarpaulin cover.</li> <li>• During the wet season, any exposed top soils should be covered with a tarpaulin, shotcreted or hydroseeded.</li> <li>• Sand and silt from wash-water from vehicle washing should be settled out before discharging into storm drains.</li> <li>• Fuels should be stored in bunded areas such that spillage can be easily collected.</li> </ul>			✓  Rem  ✓  ✓  ✓  ✓
Water Quality during Operation	Not required	N/A	N/A	N/A
<b>Waste Management</b>				
Waste Management during Construction	<u>General Waste</u> <ul style="list-style-type: none"> <li>• Transport of wastes off site as soon as possible.</li> <li>• Maintenance of accurate waste records.</li> <li>• Minimisation of waste generation for disposal (via reduction/recycling/re-use).</li> <li>• No on-site burning will be permitted.</li> <li>• Use of re-useable metal hoardings/signboards.</li> </ul> <u>Vegetation from site clearance</u> <ul style="list-style-type: none"> <li>• Segregation of materials to facilitate disposal.</li> <li>• Mulching to reduce bulk and where possible review opportunities for the possible beneficial use within landscaping areas.</li> </ul>	During Construction          During Construction	Contractor          Contractor	✓  ✓  ✓  ✓  ✓  ✓  ✓

Notes (#): ✓ – Compliance; Rem – Reminder; Obs – Observation; N/C – Non Compliance; N/A – Not Applicable;

Impact	Environmental Protection Measures	Timing	Responsibility	Implementation Status #
	<p><u>Demolition Wastes</u></p> <ul style="list-style-type: none"> <li>• Segregation of materials to facilitate disposal.</li> <li>• Appropriate stockpile management.</li> </ul> <p><u>Excavated Materials</u></p> <ul style="list-style-type: none"> <li>• Segregation of materials to facilitate disposal / reuse.</li> <li>• Appropriate stockpile management.</li> <li>• Re-use of excavated material on or off site (where possible).</li> <li>• Special handling and disposal procedures in the event that contaminated materials are excavated.</li> </ul> <p><u>Construction Wastes</u></p> <ul style="list-style-type: none"> <li>• Segregation of materials to facilitate recycling/reuse (within designated area in appropriate containers/stockpiles).</li> <li>• Appropriate stockpile management.</li> <li>• Planning to reduce over ordering and waste generation.</li> <li>• Recycling and re-use of materials where possible (e.g. metal, wood from formwork)</li> <li>• For material which cannot be re-used/recycled, collection should be carried out by an approved waste contractor for landfill disposal.</li> </ul> <p><u>Bentonite Slurries</u></p> <ul style="list-style-type: none"> <li>• Bentonite slurries should be reused as far as possible.</li> <li>• Disposal in accordance with Practice Note For Professional Persons ProPECC PN 1/94.</li> </ul> <p><u>Chemical Wastes</u></p> <ul style="list-style-type: none"> <li>• Storage within locked, covered and bunded area.</li> <li>• The storage area shall not be located adjacent to sensitive receivers e.g. drains.</li> </ul>	<p>During Construction</p> <p>During Construction</p> <p>During Construction</p> <p>During Construction</p> <p>During Construction</p> <p>During Construction</p>	<p>Contractor</p> <p>Contractor</p> <p>Contractor</p> <p>Contractor</p> <p>Contractor</p> <p>Contractor</p>	<p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>N/A</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>N/A</p> <p>N/A</p> <p>✓</p> <p>✓</p>

Notes (#): ✓ – Compliance; Rem – Reminder; Obs – Observation; N/C – Non Compliance; N/A – Not Applicable;

Impact	Environmental Protection Measures	Timing	Responsibility	Implementation Status #
	<ul style="list-style-type: none"> <li>• Minimise waste production and recycle oils/solvents where possible.</li> <li>• A spill response procedure shall be in place and absorption material available for minor spillages.</li> <li>• Use appropriate and labelled containers.</li> <li>• Educate site workers on site cleanliness/waste management procedures.</li> <li>• If chemical wastes are to be generated, the contractor must register with EPD as a chemical waste producer.</li> <li>• The chemical wastes shall be collected by a licensed chemical waste collector.</li> </ul> <p><u>Municipal Wastes</u></p> <ul style="list-style-type: none"> <li>• Waste shall be stored within a temporary refuse collection facility, in appropriate containers prior to collection and disposal.</li> <li>• Regular, daily collections are required by an approved waste collector.</li> </ul>	During Construction	Contractor	✓ ✓ ✓ Obs ✓ ✓ ✓
Waste Management during Operation	Not required.	N/A	N/A	N/A
<b>Ecology</b>				
Ecology during Construction	<p><u>Accurate Delineation of Works Area</u></p> <ul style="list-style-type: none"> <li>• Boundaries of proposed works areas shall be clearly identified and separated from external areas by a physical barrier to prevent encroachment of adjacent habitats.</li> <li>• Individual trees which fall within the works areas but which work plans show do not require removal are to be retained and fenced off to maximise protection.</li> </ul> <p><u>Dust generation</u></p> <p>There are a number of measures which shall be taken as specified in the Air Pollution Control (Construction Dust) Regulation on 'Dust Control Requirements, including the following key measures to be applied during construction:</p> <ul style="list-style-type: none"> <li>• vehicle washing facilities to be provided at every discernible or designated vehicle exit point;</li> </ul>	During Construction	Contractor	✓ ✓ ✓

Notes (#): ✓ – Compliance; Rem – Reminder; Obs – Observation; N/C – Non Compliance; N/A – Not Applicable;

Impact	Environmental Protection Measures	Timing	Responsibility	Implementation Status #
	<ul style="list-style-type: none"> <li>• all temporary site access roads shall be sprayed with water to suppress dust as necessary;</li> <li>• all dusty materials should be sprayed with water immediately prior to any handling; and</li> <li>• all debris should be covered entirely by impervious sheeting or stored in a sheltered debris collection area.</li> </ul> <p><u>Surface Run-off</u></p> <p>In general, mitigation measures shall be in accordance with ProPECC PN1/94 on 'Construction Site Drainage'. Key measures include:</p> <ul style="list-style-type: none"> <li>• Bund and cover stock piles to avoid run-off;</li> <li>• Channel any run-off through a system of oil, grease and sediment / silt traps and reuse water on site where ever practical;</li> <li>• All vehicle maintenance to be undertaken within a bunded area; and</li> <li>• Maximise vegetation retention on-site to maximise absorption (minimise transport).</li> </ul>	During Construction	Contractor	✓  ✓  ✓  ✓  N/A  ✓
Ecology during Operation	<ul style="list-style-type: none"> <li>• To conduct compensatory ecological planting as specified in the latest landscape plans approved by EPD (Clause 2.6 of the Environmental Permit refers).</li> </ul>	During Construction and operation	Contractor (during construction) / LCSD* (during operation)  (Note: * The division of vegetation planting and maintenance responsibilities shall follow the guidelines stipulated in ETWB TCW No. 2/2004.)	N/A
<b>Landscape and Visual</b>				
Landscape and Visual during Construction	<p><u>Preservation of Existing Vegetation</u></p> <ul style="list-style-type: none"> <li>• Trees identified for retention within the project limit would be protected during the works</li> <li>• The tree transplanting and planting works shall be implemented by approved Landscape Contractors</li> </ul>	During Construction	Contractor	✓  ✓

Notes (#): ✓ – Compliance; Rem – Reminder; Obs – Observation; N/C – Non Compliance; N/A – Not Applicable;

Impact	Environmental Protection Measures	Timing	Responsibility	Implementation Status #
	<p><u>Temporary Works Areas</u></p> <ul style="list-style-type: none"> <li>Where feasible the works areas would be screened using hoarding and existing vegetation would be retained where possible to reduce the landscape and visual impacts arising from the construction activity. The landscape of these works areas would be restored following the completion of the construction phase.</li> </ul> <p><u>Hoarding</u></p> <ul style="list-style-type: none"> <li>A hoarding would be erected where practicable in the most visually sensitive locations to screen the temporary construction works from the local VSRs.</li> </ul> <p><u>Top Soils</u></p> <ul style="list-style-type: none"> <li>The works will result in disturbance to extensive areas of topsoil. Topsoil worthy of retention should be stockpiled for use following completion of the civil engineering works. It should either be temporarily vegetated with hydroseeded grass or turned over on a regular basis.</li> </ul> <p><u>Protection of Important Landscape Features</u></p> <ul style="list-style-type: none"> <li>Important features such as temples, Island House and kilns within the study area, although remote from the proposed works retained and adequately protected.</li> </ul>	During Construction	Contractor	✓
		During Construction	Contractor	✓
		During Construction	Contractor	N/A
		During Construction	Contractor	N/A
Landscape and Visual during Operation	Not required.	N/A	N/A	N/A

Notes (#): ✓ – Compliance; Rem – Reminder; Obs – Observation; N/C – Non Compliance; N/A – Not Applicable;

# Appendix M Investigation Report for Exceedances

Entrusted Portion of Widening of Tolo Highway / Fanling Highway between Island House Interchange and Fanling Stage 2

**Investigation Report of Environmental Quality Exceedance(s)**

Ref. No.: W140402\_SS

<b>Date</b>	2 April 2014
<b>Time</b>	10:55am
<b>Monitoring Location</b>	I5
<b>Parameter</b>	Suspended Solids
<b>Action / Limit Levels</b>	Action Level: 42.6 mg/L or 120% of upstream control station's SS of the same day (i.e. 51.0mg/L) Limit Level: 46.8 mg/L or 130% of upstream control station's SS of the same day (i.e. 55.3mg/L)
<b>Measured Level</b>	47.5mg/L (Limit level being exceeded)
<b>Possible reason for the exceedance</b>	<p>There was a heavy rainstorm during water sampling and the river is muddy due to vigorous water flow. The elevated suspended solids was due to riverbed disturbed by the river flow.</p> <p>During the water sampling, there is no works being carried out within proximity of the river channel due to adverse weather condition.</p> <p>Both control stations also showed elevated suspended solids levels due to the adverse weather condition, and the suspended solids level at I5 did not exceed 120% of the suspended solids levels at the control stations.</p> <p>It is therefore considered that elevation of turbidity would be due to natural fluctuation.</p>
<b>Action taken / to be taken</b>	<p>As the non-compliance was non-project related, no further investigation and remedial measure(s) would be required.</p> <p>Nonetheless, contractor has been reminded to closely monitor the mitigation measures and ensure no site-runoff into the river channel.</p>
<b>Remarks</b>	-

Muddy water observed at I5 during rainstorm. (Date: 2 April 2014)



Muddy water observed at C3a during rainstorm. (Date: 2 April 2014)





# **Appendix N Cumulative Statistics on Complaints, Notifications of Summons and Successful Prosecutions**

### Cumulative Complaint Log

Complaint Log No.	Date of Complaint	Received From and Received By	Location of Complainant	Nature of Complaint	Outcome	Status
C131126	November 26, 2013	Mr. Tony Hung from WWF	Mat Wat River (works sites for box culvert extension)	Suspected unauthorised discharge of water from a construction site to Ma Wat River, Tai Wo Service Road East, Tai Po	<ol style="list-style-type: none"> <li>1) It was found that the water leaving the end of the steel pipes was the diverted water from the upstream of the existing box culverts, instead of being discharged from the construction works sites.</li> <li>2) An EM&amp;A Programme is being undertaken to monitoring the environmental performance of the construction works, and the Contractor has also implemented appropriate mitigation measures to avoid silt-laden runoff discharging from the works sites into the river.</li> <li>3) The complaint is considered an invalid complaint under this Project.</li> </ol>	Completed

**Cumulative Log for Notifications of Summons**

Log No.	Date/Location	Subject	Status	Total Received in this reporting month	Total no. Received since project commencement

**Cumulative log for Successful Prosecutions**

Log No.	Date/Location	Subject	Status	Total Received in this reporting month	Total no. Received since project commencement



**Meinhardt Infrastructure and  
Environment Ltd**  
邁進基建環保工程顧問有限公司

4/F Wah Ming Centre  
421 Queen's Road West  
Hong Kong  
香港皇后大道西421號華明中心4樓

Tel 電話: +852 2858 0738  
Fax 傳真: +852 2540 1580

[mail@meinhardt.com.hk](mailto:mail@meinhardt.com.hk)  
[www.meinhardt-china.com](http://www.meinhardt-china.com)  
[www.meinhardtgroup.com](http://www.meinhardtgroup.com)