



PROJECT NO.: TCS/00408/08

DSD CONTRACT NO. DC/2007/17  
DRAINAGE IMPROVEMENT WORKS IN CHEUNG PO,  
MA ON KONG, YUEN KONG SAN TSUEN AND TIN SAM  
TSUEN OF YUEN LONG DISTRICT AND SEWERAGE AT  
TSENG TAU CHUNG TSUEN, TUEN MUN

MONTHLY EM&A REPORT FOR KT14A  
(MARCH 2009)

PREPARED FOR  
CHINA ROAD & BRIDGE CORPORATION

Quality Index

Date	Reference No.	Prepared By	Certified by
7 April 2009	TCS00408/08/600/R0930	 Nicola Hon Environmental Consultant	 Andrew Lau Environmental Team Leader

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1	3 April 2009	Nicola Hon	Andrew Lau	First submission
2	7 April 2009	Nicola Hon	Andrew Lau	Amended against IEC's comment that received on 6 April 2009

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Ove Arup & Partners  
奧雅納工程顧問

Our ref 25211/L108/CN/cl

Date 15 April 2009

Level 5, Festival Walk  
80 Tat Chee Avenue  
Kowloon Tong, Kowloon  
Hong Kong  
Tel +852 2528 3031  
Fax +852 2268 3950  
Direct Tel +852 2268 3097  
colemang@arup.com

**By Fax and Post**

www.arup.com

Black & Veatch Hong Kong Limited  
25/F, Millennium City 6  
392 Kwun Tong Road  
Kowloon  
Hong Kong

Attention: Mr. Clive Cheng

ARUP

Dear Mr. Cheng,

**Contract No. DC/2007/17 Drainage Improvement Works in Cheung Po, Ma On Kong, Yuen King San and Tin Sam Tsuen of Yuen Long District and Sewerage at Tseng Tau Chung Tsuen, Tuen Mun**  
**Monthly EM&A Report for KT14A (March 2009) – Revision 2**

We refer to the captioned submission (letter ref.: TCS00408/08/600/R0930r2) and advise that we have no further comment on the captioned report.

We hereby endorse the captioned report for your onward submission.

If you require any further information, please do not hesitate to contact the undersigned.

Yours sincerely,



Coleman Ng  
Independent Environmental Consultant

cc: China Road and Bridge Corporation (Mr. Raymond Mau) (Fax: 2478 9612)  
AUES (Mr. TW Tam / Mr. Andrew Lau) (Fax: 2959 6079)

Executive Summary

ES01 This is the 6th monthly EM&A report for Channel KT14A, covering the construction period from 26 February 2009 to 25 March 2009 (the Reporting Period).

Breaches of Action and Limit Levels

ES02 Monitoring results demonstrated no exceedances of environmental quality criteria for air quality and construction noise during the Reporting Period.

ES04 For water quality, a total of fourteen exceedances of the existing Action and Limit Levels were recorded: nine for dissolved oxygen (DO), one for turbidity and four for suspended solids (SS). All were recorded at Location W8B downstream of the works area. No exceedance was recorded for the other station in the upstream. Other parameters of the 14 samples with exceedances are shown below:

Location	Exceedance	DO	Turbidity	pH	SS	NH4+-N	Zn	Total
W8B	Action Level	9	0	0	0	0	0	9
	Limit Level	0	1	0	4	0	0	5

ES05 Investigations of the cause of exceedances are in progress. In general, the exceedances were within the values monitored during the baseline study and therefore could be due to natural variations. To minimize fault alarms of this nature, a proposal for the revision of existing Action Limit Levels has been agreed by the Engineer's Representative (ER) and the Independent Environmental Checker (IEC) and submission to formal approval from EPD is in process.

Environmental Complaint, Notification of Summons and Prosecution

ES06 No documented complaint, notification of summons and successful prosecution was received during the Reporting Period. No adverse environmental impacts were observed during the weekly site inspections and environmental audit, which indicated that the implemented mitigation measures for air quality, construction noise and ecology were effective. Minor deficiencies found in the weekly site inspection were in general rectified within the specified deadlines. The environmental performance of the Project was, therefore, considered satisfactory.

Reporting Changes

ES07 No reporting changes were made during the Reporting Period.

Future Key Issues

ES08 As wet season is approaching, water quality mitigation measures to avoid ingress of runoff into Channel KT14A should be properly installed and maintained, as appropriate. In particular, open stockpiles and exposed slope should be covered thoroughly with tarpaulin sheet or treated with hydroseeding, as appropriate.

ES10 Special attention should also be paid to construction noise and other environmental issues identified in the EM&A Manual. Mitigation measures recommended in the EIA and summarized in Mitigation Measure Implementation Schedule should be fully implemented.

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## 1 ENVIRONMENTAL STATUS

This is the sixth monthly EM&A report for Channel KT14A, covering the construction period from 26 February 2009 to 25 March 2009 (the Reporting Period).

### 1.1 PROJECT AREA AND CONSTRUCTION PROGRAMME

Drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations are enclosed in **Appendix A**, while CRBC's construction program is enclosed in **Appendix B**.

### 1.2 WORKS UNDERTAKEN DURING THE REPORTING PERIOD

Apart from general works of tree survey, structural survey and environmental monitoring and audit, works undertaken during the Reporting Period with fine tuning of construction activities showing the inter-relationship with environmental protection/mitigation measures for the month are summarized as follows:

- (a) Excavation of Channel Formation;
- (b) Construction of rectangular channel structure;
- (c) Construction of manholes and catchpits; and
- (d) Installation of type 2 railing

### 1.3 ENVIRONMENTAL MANAGEMENT ORGANIZATION

Management structure and key personnel contact names and telephone numbers of the environmental management organization, where DSD is the Project Proponent; CRBC is the main Contractor of the Project; EPD and AFCD are the supervisory departments for environmental protection of the Project; BVHKL is the Engineer's Representative of DSD (the ER); ARUP is the Independent Environmental Checker (IEC) and Action-United Environmental Services and Consulting (AUES) is the environmental team (ET), are presented in **Appendix C**.

### 1.4 LICENSING STATUS

#### 1.4.1 Air Pollution Control (Construction Dust) Regulation

Pursuant to the **Air Pollution Control (Construction Dust) Regulation**, CRBC has notified EPD, via submission of Form NA dated 14 February 2008, of the scope and nature of the works to be carried out under the Project, including construction activities such as stockpiling, loading and unloading, transfer of dusty material, use of vehicles and debris handling, etc. CRBC will continuously review the status of the environmental licenses and apply the required licenses/permits prior to the commencement of construction work.

#### 1.4.2 Noise Control Ordinance

No **Construction Noise Permit** (CNP) is required for the Project pursuant to the **Noise Control Ordinance** (NCO) and the associated applicable subsidiary regulations of **Noise Control (General) Regulation**, **Noise Control (Hand-held Percussive Breaker) Regulation** and **Noise Control (Air Compressor) Regulation**, as the use of powered mechanical equipment, or conducting construction work in during Restricted Hours, i.e. 1900 to 0700 hours on normal weekdays and any time on general holidays including Sundays is not anticipated during the whole construction period. CRBC will continuously review the status of the environmental licenses under the NCO and apply the required licenses/permits prior to the commencement of construction work.

#### 1.4.3 Waste Disposal (Charges for Disposal of Construction Waste) Regulation

CRBC has applied for a Billing Account (Construction Work Contract with Value of \$1million or above), under the **Waste Disposal (Charges for Disposal of Construction Waste) Regulation**. The account number 7006524 has been assigned on 9 Jan 2008.

1.4.4 Water Pollution Control Ordinance

CRBC has applied for a discharge license under Section 20 of the **Water Pollution Control Ordinance**, and the license No. 1U461/1 has been issued.

1.4.5 Waste Disposal (Chemical Waste) (General) Regulation

CRBC has registered as a Chemical Waste Producer with EPD under the **Waste Disposal (Chemical Waste) (General) Regulation** and the Waste Producer Number assigned is WPN: 5611-531-C3124-28 dated 2 May 08.

1.5 ENVIRONMENTAL PROTECTION AND POLLUTION CONTROL MITIGATION MEASURES

CRBC has committed to implement environmental protection and pollution control and mitigation measures as recommended in the PP, EP and the EM&A Manual. Continuous up-dating of the Mitigation Measures Implementation Schedules attached in the EM&A Manual is required under the PS. The updated Environmental Mitigation Measures Schedule will be enclosed in **Appendix I** if any amendment is made during the Reporting Period. No amendment was in February 2009 and **Appendix I** is not used. The implemented mitigation measures include:

- (a) Watering of exposed dry and dusty surface, including stock piles of dusty materials;
- (b) Covering of the loose soil to minimize water quality impacts;
- (c) Hard pavement of haul road leading to public roads;
- (d) Wheel washing facility at to avoid construction dust impacts on the public roads; and
- (e) Construction of noise barriers.
- (f) During construction works nearby the seasonal wetland, mitigation measures of Ecology will be followed in accordance with EM&A Manual Annex A ECO.1 and ECO.3;

## 2 MONITORING METHODOLOGY

### 2.1 MONITORING PARAMETERS

According to the EM&A requirements set out in the EIA, Environmental Permits No. EP231/2005A (EP) and the associated EM&A Manual, monitoring parameters are summarized as follows.

Table 2-1 Summary of Monitoring Parameters

Environmental Aspect	Monitoring Parameters	
Air Quality	(a) 1-hour Total Suspended Particulate (1-hour TSP); and (b) 24-hour Total Suspended Particulate (24-hour TSP).	
Construction Noise	(a) A-weighted equivalent continuous sound pressure level (30min) (Leq(30min)) during the normal working hours; and (b) A-weighted equivalent continuous sound pressure level (5min) (Leq(5min)) for construction work during the Restricted Hours.	
Water Quality	(a) In Situ Measurement	temperature, dissolved oxygen (DO), pH & turbidity
	(b) Laboratory Analysis	suspended solids (SS), ammonia nitrogen (NH <sub>3</sub> -N) and zinc (Zn)

### 2.2 MONITORING LOCATIONS

Details of the monitoring locations are summarized in **Table 2-2** and shown in **Appendix A**. For ease of reference, monitoring locations denoted with “(a)” are relocated locations to differentiate them from the original ‘EM&A Manual’ locations.



Table 2-2 Summary of Monitoring Locations

Issues	Monitoring Location ID	Identified Address / Co-ordinates
Air	A8(a)	Entrance of Strong Sing Garden
Noise	N8	Ground floor of Strong Sing Garden H502
Water	W8A	E825274 / N831712
	W8B	E825143 / N831786

## 2.3 MONITORING FREQUENCY, DURATION AND SCHEDULE

### 2.3.1 Monitoring Frequency and Duration

Environmental monitoring is conducted upon commencement of the construction activities and throughout the whole construction period to detect and minimize any adverse environmental impacts generated from the construction activities of the Project. The monitoring frequency and duration for air quality, construction noise, water quality, ecology and other parameters are summarized below.

#### Air Quality

Frequency: Once every 6 days for 24-hour TSP and three times every 6 days for 1-hour TSP, when the highest construction dust impacts are anticipated.

Duration: Throughout the construction period

#### Construction Noise

Frequency: Measurement of Leq(30min): Once a week during 0700-1900 hours on normal weekdays for Leq(30min).

If the construction work is undertaken at Restricted Hours, the frequency of noise monitoring will be conducted in accordance with the requirements under the related Construction Noise Permit issued by EPD as follows:

- 3 consecutive Leq(5min) during Restricted Hours from 1700 – 2300 hours;
- 3 consecutive Leq(5min) during Restricted Hours from 2300 – 0700 next day;
- 3 consecutive Leq(5min) during Sunday or public holiday from 0700 – 1900 hours;

Duration: Throughout the construction period

#### Water Quality

Frequency: Three times a week with at least 36 hour intervals between any two consecutive monitoring events

Depths: As the water columns in the stream water within KT14A is generally less than 3 m, measurement is performed at the mid-depths of the monitoring locations. In case the water columns are deeper than 6 m, measurement shall be carried out at three water depths, namely, 1 m below water surface, mid-depth, and 1 m above river bed. If the water depths are between 3 to 6 m, the mid-depth measurement is omitted.

Duration: Throughout the construction period.

### 2.3.2 Environmental Monitoring Schedule

The monitoring schedules for the Reporting Period and forthcoming month are presented in **Appendix D**.

## 2.4 MONITORING EQUIPMENT AND PROCEDURE

The monitoring equipment and procedures are summarized below. Calibration certificates of the equipment and the related laboratories are presented in **Appendix E**.

### 2.4.1 Weather Conditions during the Reporting Period

All meteorological information is sourced from the Hong Kong Observatory (Lau Fau Shan Station). The meteorological data include wind direction, wind speed, humidity, rainfall, air pressure and temperature etc., that in general are required for evaluating the environmental impact arising from the construction activities. The meteorological data are presented in

## 2.4.2 Air Quality

### **Monitoring Equipment**

A list of air quality monitoring equipment is shown below.

Table 2-4-1 Air Quality Monitoring Equipment

Equipment	Model	Serial Number
<b>24-hour TSP</b>		
High Volume Air Sampler	Grasby Anderson GMWS 2310 HVS	-
Calibration Kit	TISCH Model TE-5028A	-
<b>1-hour TSP</b>		
Portable Dust Meter	TSI DustTrak Model 8520	21060

### **Monitoring Procedure**

#### **1-hour TSP**

The 1-hour TSP measurement follows manufacturer's Operation and Service Manual, using a 1-hour TSP monitor brand named TSI Dust Track Aerosol Monitor Model 8520 or Sibata LD-3 Laser Dust Meter, which is a portable, battery-operated laser photometer to record the real time 1-hour TSP based on 900 light scattering. The 1-hour TSP monitor consists of the following:

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

The 1-hour TSP meter to be used will be within the valid period, calibrated by the manufacturer prior to purchasing. Zero response of the instrument will be checked before and after each monitoring event.

#### **24-hour TSP**

The equipment used for 24-hour TSP measurement is the high volume air sampling system (HVS) brand named Thermo Andersen, Model GS2310 TSP. The HVS complies with US EPA Code of Federal Regulation, Appendix B to Part 50. The HVS consists of the following:

- (a) An anodized aluminum shelter;
- (b) A 8"x10" stainless steel filter holder;
- (c) A blower motor assembly;
- (d) A continuous flow/pressure recorder;
- (e) A motor speed-voltage control/elapsed time indicator;
- (f) A 6-day mechanical timer, and
- (g) A power supply of 220v/50 Hz

The HVS is operated and calibrated on a regular basis following the manufacturer's instruction using the NIST-certified standard calibrator brand named TISCH Calibration Kit Model TE-5025A. Regular HVS operation and maintenance as well as filter paper installation and collection is performed by the ET's competent technicians, whereas laboratory analyses are conducted in a local HOKLAS accredited laboratory, ALS Technichem (HK) Pty Ltd (ALS). The 24-hour TSP filters of the 24-hour TSP will be kept in ALS for six months prior to disposal.

All 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 are recorded in details.

## 2.4.3 Construction Noise

### **Monitoring Equipment**

A list of construction noise monitoring equipment is shown below.

Table 2-4-2 Construction Noise Monitoring Equipment

Equipment	Model	Serial Number
Integrating Sound Level Meter	B&K Type 2238	2285762
Calibrator	B&K Type 4231	2292167
Portable Wind Speed Indicator	Testo Anemometer	-

**Monitoring Procedure**

Sound level meters listed above comply with the International Electrotechnical Commission Publications 651: 1979 (Type 1) and 804: 1985 (Type 1) specifications, as recommended in Technical Memorandum (TM) issued under the Noise Control Ordinance (NCO).

All noise measurements will be performed with the meter set to FAST response and on the A-weighted equivalent continuous sound pressure level (Leq). Leq(30min) in six consecutive Leq(5min) measurements will be used as the monitoring parameter for the time period between 0700-1900 hours on weekdays throughout the construction period. Leq(15min) in three consecutive Leq(5 min) measurements for other time periods (e.g. during Restricted Hours) will only be conducted for monitoring the construction noise during Restricted Hours as necessary.

The sound level meter is mounted on a tripod at a height of 1.2 m and placed at the assessment point and oriented such that the microphone is pointed to the site with the microphone facing perpendicular to the line of sight. The windshield is fitted for all measurements. Where a measurement is to be carried out at a building, the assessment point is normally at a position 1 m from the exterior of the building façade. Where a measurement is to be made for noise being received at a place other than a building, the assessment point is at a position 1.2 m above the ground in a free-field situation, i.e. at least 3.5 m away from reflective surfaces such as adjacent buildings or walls.

Immediately prior to and following each noise measurement the accuracy of the sound level meter is checked using an acoustic calibrator generating a known sound pressure level at a known frequency. Measurements will be accepted as valid only if the calibration levels from before and after the noise measurement agree to within 1.0dB. No noise measurement will be made in the present of significant fog, rain, wind with a steady speed exceeding 5m/s or wind with gusts exceeding 10m/s. The wind speed is checked with a portable wind speed meter capable of measuring the wind speed in m/s.

2.4.4 Water Quality

**Monitoring Equipment**

Monitoring Equipment for water quality is listed below.

Table 2-4-3 Water Quality Monitoring Equipment

Equipment	Model / Description	Serial Number
Water Depth Detector	Eagle Sonar	-
Water Sampler	Teflon bailer / bucket	-
Thermometer & DO meter	YSI 550A DO Meter	05F2063AZ
pH meter	Hanna HI 98128	S229924
Turbidimeter	Hach 2100p	95090008735
Hand Refractometer	ATAGO	289468
Sample Container	High density polythene bottles (provided by	-
Storage Container	'Willow' 33-litter plastic cool box	-

**Monitoring Procedure**

**Water Depth**

As the water columns in the stream water within KT14A is generally less than 3 m, measurement is performed at the mid-depths of the monitoring locations. In case the water columns are deeper than 6 m, measurement shall be carried out at three water depths, namely, 1 m below water surface,

mid-depth, and 1 m above river bed. If the water depths are between 3 to 6 m, the mid-depth measurement is omitted.

Water depths are determined prior to measurement and sampling, using a portable battery operated depth detector, brand named 'Eagle Sonar', if the depths exceed 1.5 meter. For the depths well below 1 meter, the depths of water columns are measured with a steel ruler with appropriate weight.

#### Dissolved Oxygen (DO)

A portable YSI 550A DO Meter will be used for in-situ DO measurement. The DO meter is capable of measuring DO in the range of 0 - 20 mg/L and 0 - 200 % saturation and checked against water saturated ambient air on each monitoring day prior to monitoring. Although the DO Meter automatically compensates ambient water temperature to a standard temperature of 20°C for ease of comparison of the data under the changing reality, the temperature readings of the DO Meter will be recorded in the field data sheets. Calibration of the equipment will be performed by ALS on quarterly basis.

#### pH

A portable Hanna pH Meter will be used for in-situ pH measurement. The pH meter is capable of measuring pH in the range of 0 – 14 and readable to 0.1. Standard buffer solutions of pH 7 and pH 10 are used for calibration of the instrument before and after measurement. Quarterly calibration of the equipment will be performed by ALS.

#### Turbidity

A portable Hach 2100p turbidity Meter will be used for in-situ turbidity measurement. The turbidity meter is capable of measuring turbidity in the range of 0 – 1000 NTU. Calibration of the equipment will be performed by ALS on quarterly basis.

#### Salinity

A portable hand Refractometer AGATO will be used for in-situ salinity measurement. The refractometer is capable of measuring salinity in the range of 0-70ppt with accuracy  $\pm 1\%$  reading. Calibration of the equipment will be performed by ALS on quarterly basis.

#### Suspended Solids (SS)

SS will be determined by ALS upon receipt of the water samples using the HOKLAS accredited analytical method - ALS Method EA-025.

#### Ammonia Nitrogen(NH<sub>3</sub>-N)

NH<sub>3</sub>-N will be examined by ALS upon receipt of the water samples using the HOKLAS accredited analytical methods - ALS Method EK-055A.

#### Zinc(Zn)

Zn will be analyzed by ALS upon receipt of the water samples using the HOKLAS accredited analytical methods - ALS Method EG-020.

#### Water Sampler

Water samples will be collected using a plastic sampler to prevent metal contamination. As the water depths in the stream water within KT14A are generally less than 0.5 m, a plastic bucket with a rope of appropriate length is used for water sampling. The sampler is rinsed before collection with the sample to be taken. For water depths deeper than 0.5 meter, a cleaned plastic bailer bucket will be used for sample collection. 1000 mL water sample is collected from each depth for SS determination. The samples collected are stored in a cool box maintained at 4°C and delivered to ALS upon completion of the sampling by end of each sampling day.

#### Sample Container

Water samples are contained in screw-cap PE (Poly-Ethylene) bottles, which are provided and pretreated according to corresponding HOKLAS and ALS analytical requirements. Where appropriate, the sampling bottles are rinsed with the water to be contained. Water samples are

then transferred from the water sampler to the sampling bottles to 95% bottle capacity to allow possible volume expansion during delivery and storage.

#### Sample Storage

A 'Willow' 33-litter plastic cool box packed with ice will be used to preserve the collected water samples prior to arrival at ALS. The water temperature of the cool box will be maintained at a temperature as close to 4°C as possible without being frozen. Samples collected will be delivered to the laboratory upon collection within the maximum storage time required under the HOKLAS and ALS analytical requirements

### 2.4.6 Waste Management

Waste management requirements for KT14A are stipulated in the EM&A Manual [382047/E/EMA/Issue 5]. During the monthly audit, waste management issued will be checked to see if the relevant contract specifications and relevant statutory provisions have been followed..

## 2.5 QUALITY ASSURANCE PROCEDURES AND DATA MANAGEMENT

### 2.5.1 Documentation of the Environmental Monitoring

Field data including in-situ monitoring results, weather conditions and water sampling information and observation will be recorded in corresponding Field Data Sheets.

### 2.5.2 Data Management and Analysis

All impact monitoring data will be processed by the AUES data recording and management system, which complies with in-house Quality (*ISO 9001:2000*) Management System. Monitoring results recorded in the monitoring equipment e.g. 1-hour TSP Meters and Noise Meters will be downloaded directly from the equipment at the end of the monitoring period and input into a computerized database maintained by the ET. Laboratory results will be input directly into the computerized database and checked by personnel other than those who input the data.

### 2.5.3 Quality Assurance Procedures

Appropriate and standard QA/QC measures will be adopted for the environmental monitoring to ensure the scientific integrity of the data produced. Sources of error in the impact monitoring will be properly controlled with the following QA/QC procedures:

- (a) Appropriate field monitoring and sampling techniques, including monitoring equipment, storage and delivery of samples;
- (b) Well organized systematic field-data system e.g. all baseline monitoring information, field observation, results, weather conditions and water sampling information, etc. will be recorded in the field monitoring record sheets. The laboratory analysis records will be maintained by the HOKLAS following HOKLAS requirements;
- (c) HOKLAS requirements for QA/QC of all laboratory testing to ensure acceptable accuracy and reproducibility of the laboratory analysis indicated by consistent agreement between duplicate samples, validity of the analytical results by compliance with the required blanks and recovery of standard addition.

### 2.5.4 Records

All impact monitoring data will be clearly and systematically documented in both hardware and software format and the software copy will be available for inspection upon request. All the document and data will be kept for at least one year after completion of the Project. Field Data Sheets used to record the impact monitoring information, field observation, results, weather conditions and water sampling information, etc., will be properly maintained and kept by the ET. The copies of laboratory analysis records from ALS will be kept by the ET throughout the at least one year after completion of the EM&A program of the Project.

## 2.6 REPORTING

### 2.6.1 General Requirements for Report Submission

General requirements for Monthly EM&A report submission as stipulated in the EIA, EP and EM&A Manual are summarized below.

Table 2-6 Requirements for Report Submission

Report	Submission
Monthly EM&A Report	<ul style="list-style-type: none"><li>• Within 10 working days of the end of each reporting month.</li></ul>
Quarterly EM&A Summary Report	<ul style="list-style-type: none"><li>• Within 10 working days of the end of each reporting quarter.</li></ul>
Final EM&A Summary Report	<ul style="list-style-type: none"><li>• One month after completion of post project monitoring</li></ul>

### 2.6.2 Cut-Off Day of the Reporting Month

It is also agreed among the ER, IEC, CRBC, ET and EPD that, in order to streamline the EM&A report submission and to cater for the occasional delay in receiving laboratory analysis results, the cutoff day is 25<sup>th</sup> of each month i.e. the first day in each report is the 26<sup>th</sup> of the previous month and the last day is the 25<sup>th</sup> of that month.



### 3 MONITORING RESULTS

The environmental monitoring results will be compared against the Action and Limit Levels established based on the baseline monitoring results. Should non-compliance of the environmental quality criteria occurs, remedial actions will be triggered according to the Event and Action Plan enclosed in **Appendix F**. The environmental monitoring results are presented in tabulation below and graphical plots in **Appendix G**.

#### 3.1 AIR QUALITY

##### 3.1.1 Action and Limit Levels

According to the Baseline Monitoring Report for KT14A, the Action and Limit Levels for 24-hour and 1-hour TSP are summarized in **Table 3-1-1**.

Table 3-1-1 Summary of Air Quality Monitoring Results at KT14A-A8(a)

Monitoring Station	Action Level ( $\mu\text{g}/\text{m}^3$ )		Limit Level ( $\mu\text{g}/\text{m}^3$ )	
	1-hour TSP	24-hour TSP	1-hour TSP	24-hour TSP
KT14A - A8(a)	310	144	500	260

##### 3.1.2 Results

Results of air quality monitoring at KT14A-A8(a) during the Reporting Period are summarized in **Tables 3-1-2**. Details of 24-hour TSP data and graphical plots of trends of monitored parameters at KT14A-A8(a) over the past four reporting periods are presented in **Appendix G**.

Table 3-1-2 Summary of Air Quality Monitoring Results at KT14A-A8(a)

1-hour TSP ( $\mu\text{g}/\text{m}^3$ )						24-hour TSP ( $\mu\text{g}/\text{m}^3$ )		
Date	Start Time	1st hour	2nd hour	3rd hour	Average	Date	Results	
2-Mar-09	09:04	184	192	189	188	28-Feb-09	25	
7-Mar-09	09:00	73	81	79	78	9-Mar-09	105	
13-Mar-09	09:00	86	90	89	88	12-Mar-09	56	
19-Mar-09	09:00	113	119	115	116	18-Mar-09	37	
25-Mar-09	09:00	105	111	107	108	24-Mar-09	21	
Average		116				Average		49
Range		73-192				Range		21-105

##### 3.1.4 Discussion

As shown in **Tables 3-1-2**, the 1-hour and 24-hour TSP results fluctuated well below the Action Level during the Reporting Period. Neither Notification of Exceedance (NOE) of air quality criteria nor corrective action was required.

#### 3.2 CONSTRUCTION NOISE

##### 3.2.1 Action and Limit Levels

The Action and Limit Levels for construction noise at KT14A-N8 are summarized in **Table 3-2-1**.

Table 3-2-1 Action and Limit Levels of Construction Noise Monitoring

Time Period	Action Level in dB(A)	Limit Level in dB(A)
0700-1900 hours on normal weekdays	When one documented complaint is received	75* dB(A)

Note: \* Reduces to 70dB(A) for schools and 65dB(A) during the school examination periods.

##### 3.2.2 Results

Construction noise monitoring results during the Reporting Period are summarized in **Table 3-2-2**. The noise monitoring data of L10 and L90 have been recorded and are available for reference or inspection upon request. Graphical plots of trends of monitored parameters at KT14A-N8 over the past four months are presented in **Appendix G**.

Although the baseline monitoring was performed in a free-field situation, impact monitoring, is

performed in a non-free-field situation at the same sensitive receiver as stipulated in the EM&A Manual due to denial of access by the owner. After the change, it no longer requires a 3dB(A) façade correction and it will not introduce any significant change in detection of construction noise impact; nor would that alter the existing construction noise A/L Levels. Nonetheless, the ET has written to inform and get formal approval from EPD upon agreement with the ER and IEC.

Table 3-2-2 Summary of Construction Noise Monitoring Results at KT14A-N8

Date	Start Time	1 <sup>st</sup> Leq5	2 <sup>nd</sup> Leq5	3 <sup>rd</sup> Leq5	4 <sup>th</sup> Leq5	5 <sup>th</sup> Leq5	6 <sup>th</sup> Leq5	Leq30
2-Mar-09	09:05	59.4	58.7	60.4	60.9	57.2	58.3	59.3
7-Mar-09	09:00	54.9	56.7	55.2	56.3	58.7	60.1	57.4
13-Mar-09	09:00	49.4	49.7	57.2	64.2	56.3	49.1	58.1
19-Mar-09	10:47	71.0	64.0	70.7	69.4	66.8	70.1	69.3
25-Mar-09	09:00	54.7	56.2	55.5	54.1	53.7	54.2	54.8
Limit Level								75 dB(A)

### 3.2.3 Discussion

As shown in **Tables 3-2-2**, all the construction noise results fluctuated below the Limit Level. No exceedance of Limit Levels or documented construction complaints were recorded during the Reporting Period. Neither NOE of construction noise nor corrective action was, therefore, required for the parameter.

## 3.3 WATER QUALITY

### 3.3.1 Action and Limit Levels

#### **Existing Water Quality Action and Limit Levels**

The existing water quality Action and Limit Levels were established using one of the approaches stipulated in the EM&A Manual - up-stream control station approach. They are summarized in **Table 3-3-1**.

Table 3-3-1 Existing Water Quality Action/Limit Levels Using Up-stream Control Station Approach

Parameter	Monitoring Location	Type of Station	Action Level	Limit Level
DO (mg/L)	W8A	Control	NA	NA
	W8B	Impact	6.378	4.00
Turbidity (NTU)	W8A	Control	NA	NA
	W8B	Impact	120% of the results of upstream control station's of the same day	130% of the results of upstream control station's of the same day
pH	W8A	Control	NA	NA
	W8B	Impact	9.2 (95%-ile of baseline results)	9.3 (99%-ile of baseline results)
SS (mg/L)	W8A	Control	NA	NA
	W8B	Impact	120% of the results of upstream control station's of the same day	130% of the results of upstream control station's of the same day
Ammonia (µg/L)	W8A	Control	NA	NA
	W8B	Impact	120% of the results of upstream control station's of the same day	130% of the results of upstream control station's of the same day
Zinc (µg/L)	W8A	Control	NA	NA
	W8B	Impact	120% of the results of upstream control station's of the same day	130% of the results of upstream control station's of the same day



**Changes of Baseline Conditions**

It is noted that abnormally high frequency of exceedance of the existing water quality criteria has occurred even when no construction activities were commenced during 26 August to 2 October 2008. A proposal has been submitted for agreement of the ER and IEC prior to seek formal approval from EPD on the revision of the A/L Levels. A percentile approach as recommended in the EM&A Manual is applied to the baseline monitoring data with replenishment of the most recent monitoring data obtained under zero construction impacts. The recommended refined A/L Levels are presented in **Table 3-3-2**.

Table 3-3-2 Proposed Water Quality Action and Limit Levels for KT14A

Parameter	Monitoring Location	Type of Station	Action Level	Limit Level
DO* (mg/L)	W8A	Impact Monitoring Station	2.22	1.80
	W8B	Impact Monitoring Station	4.06	4.04
Turbidity (NTU)	W8A	Impact Monitoring Station	36.5	39.6
	W8B	Impact Monitoring Station	18.6	52.0
pH+	W8A	Impact Monitoring Station	6.5 – 8.5	6.0 – 9.0
	W8B	Impact Monitoring Station	6.5 – 8.5	6.0 – 9.0
SS (mg/L)	W8A	Impact Monitoring Station	70	95
	W8B	Impact Monitoring Station	29	39
Ammonia (mg/L)	W8A	Impact Monitoring Station	40.8	43.7
	W8B	Impact Monitoring Station	3.46	4.44
Zinc (µg/L)	W8A	Impact Monitoring Station	136	166
	W8B	Impact Monitoring Station	54	63

- \* A/L Levels of DO are respectively set at 5%-ile and 1%-ile of baseline level
- + A/L Levels of pH are respectively set at out side the ranges of 6.5 - 8.5 and 6 – 9 as generally used for environmental water quality standards.
- # Zn obtained at W8A on 18 March (458 ug/L) and 2 September 2008 (228 ug/L), as well as Turbidity, SS and Zn obtained at W8B on 2 September 2008 (161.5 NTU, 473mg/L and 492ug/L respectively) and SS and Zn obtained at W8B on 24 September 2008 (492mg/L and 107ug/L respectively) are considered as outliers and excluded from A/L Level calculation

3.3.2 Results and Discussion

**Results**

Water quality monitoring results at KT14A-W8A and KT14A-W8B during the Reporting Period are tabulated in **Appendix G**, where graphical plots of trends of the monitored parameters over the past four months are also presented.

According to the existing A/L Levels, a total of fourteen exceedances of environmental quality criteria (A/L/Levels), namely nine DO Action Level exceedances, one turbidity and four SS Limit Level exceedances, were recorded during the Reporting Period. They are summarized in **Table 3-3-3**.

Table 3-3-3 Summary of Exceedances of Existing Action and Limit Levels

Location	Exceedance	DO	Turbidity	pH	SS	NH4+-N	Zn	Total
W8A	Action Level	N.A	N.A	N.A	N.A	N.A	N.A	N.A
	Limit Level	N.A	N.A	N.A	N.A	N.A	N.A	N.A
W8B	Action Level	9	0	0	0	0	0	9
	Limit Level	0	1	0	4	0	0	5

## Discussion

### DO

A total of nine exceedances of DO Action Level were recorded during the Reporting Period. Notices of Exceedance of environmental quality criteria (NOE) were issued upon confirmation of the monitoring results, and investigations of the NOE were conducted upon receipt of the information of construction activities and the implemented mitigation measures provided by CRBC. The exceedances were concluded not to be related to the works under the Project but due to changes of the ambient conditions and up-stream control station as discussed previously in **Section 3.3.1**. As a matter of fact, the DO levels during the Reporting Period fluctuated within a range of 4.55 to 6.45 with an average of 5.33 mg/L, which is considered not too bad.

### pH

pH fluctuated within a range of 6.9 to 7.2 with an average of 7.0, which significantly within from the existing Action Level of 9.2 and Limit Level of 9.3. All the pH results are considered acceptable. No NOE or remedial actions were needed for the parameter.

### Turbidity and SS

According to the existing A/L Levels, a total of one and four Limit Level exceedances of Turbidity and SS respectively were registered during the Reporting Period. NOE were issued upon confirmation of the monitoring results, and investigations of the NOE were conducted upon receipt of the information of construction activities and the implemented mitigation measures provided by CRBC. It is noted that there were series of rainstorm recorded at the exceedance days which affected the turbidity and SS levels in the stream water. It was concluded that the exceedances were unlikely to be due to the project. Moreover, changes of the ambient conditions have been determined as discussed previously in **Section 3.3.1** and these are believed to be the cause of the exceedances than the works of this Project. No remedial actions were therefore required for the exceedances. Nevertheless, CRBC is reminded to fully implement the required water quality mitigation measures during construction under the Project, in particular when excavation and the associated channel works are undertaken and construction wastewater is generated and discharged to the Channel KT14A.

### NH<sub>4</sub><sup>+</sup>-N and Zinc

No exceedances of Zinc A/L Levels were recorded during the Reporting Period. Neither NOE nor remedial actions were required for the parameter.

## 3.4 WASTE MANAGEMENT

In order to comply with the waste management requirements, CRBC has

- (a) Been assigned, since 9 Jan 2008, a Billing Account (account number 7006524) under the **Waste Disposal (Charges for Disposal of Construction Waste) Regulation**;
- (b) Been issued Discharge License No. 1U461/1 under Section 20 of the **Water Pollution Control Ordinance** has been issued; and
- (c) Been register as a Chemical Waste Producer under the **Waste Disposal (Chemical Waste) (General) Regulation** (the Waste Producer Number assigned is WPN: 5611-531-C3124-28 dated 2 May 08).

4 NON-COMPLIANCE, COMPLAINT, NOTIFICATIONS OF SUMMONS, SUCCESSFUL PROSECUTION AND OTHERS

4.1 NON-COMPLIANCE

Apart from the exceedances of water quality A/L Levels summarized in **Table 3-3-3**, no non-compliance or deficiency was identified during regular site inspections and environmental audits. Exceedances of environmental quality criteria have been discussed in **Sections 3.1 to 3.4**. No other non-compliance or deficiency was identified during regular the site inspections and environmental audits. No remedial actions were required.

4.2 ENVIRONMENTAL COMPLAINTS

No written or verbal complaints were received for each environmental issue during the Reporting Period. No associated remedial actions were recommended.

4.3 NOTIFICATIONS OF SUMMONS AND SUCCESSFUL PROSECUTIONS

No notifications of summons and successful prosecutions were recorded during the Reporting Period. No associated remedial actions were recommended.

4.4 OTHERS

4.4.1 Waste Management Status

All types of waste arising from the construction work are classified into the following:

- Construction & Demolition (C&D) Material;
- Chemical Waste;
- General Refuse; and
- Excavated Soil and sediment

Waste generated, re-used, recycled and disposed of during the Reporting Period is shown in **Appendix I: Monthly Summary Waste Flow Table**.

4.4.2 Site Inspection and Environmental Audit

In this month, four occasions of weekly environmental site inspection and audit were conducted jointly by the ER, EO and ET. No adverse environmental impacts were registered which indicated that the mitigation measures implemented were effective for the construction activities or preparation work and site clearance undertaken. Minor deficiencies found in the site inspection and audit were in general rectified within the specified deadlines. Findings are summarized below.

Table 4-4 Summary of Findings of Site Inspection and Environmental Audit

Date	Findings / Deficiencies	Follow-Up Status
26 Feb 2009	Exposed slope surface next to the existing stream was observed. The contractor is reminded to cover the open slope with tarpaulin sheet to minimize the dust generation or prevent surface runoff during rainstorm.	Reminded measures based on the observation were observed on 4 Mar 2009.
4 Mar 2009	Construction waste was observed scattered within the site. Good site practice is reminded to avoid excessive accumulation of the waste.	Reminded measures based on the observation were observed on 12 Mar 2009.
12 Mar 2009	No adverse environmental impacts were observed during the site inspection. However, further improvement of house keeping is reminded to contractor as general waste was observed on site.	Reminded measures based on the observation were observed on 17 Mar 2009.
17 Mar 2009	Free standing chemical container was observed at KT13, the contractor was reminded to provide drip tray for all chemical or oil container.	Reminded measures based on the observation to be followed-up on the forth coming site inspection.

4.4.3 Works to be Undertaken in the Forth-Coming Month

Works to be undertaken next month are shown in the construction program in **Appendix B**. Apart from general works of tree survey, structural survey and environmental monitoring and audit, works to be undertaken during the forth-coming month are summarized as follows:

- (a) Excavation for channel formation;
- (b) Construction of rectangular channel;
- (c) Installation of type 2 railing; and
- (d) Construction of manholes and catchpits

#### 4.4.4 Future Key Issues and Mitigation Measures for Next Month

As wet season is approaching, water quality mitigation measures to avoid ingress of turbidity and other water quality pollutants via site surface water runoff into the river within KT14A should be properly maintained or improved. In particular open stockpiles and exposed slope should be covered thoroughly with tarpaulin sheet and hydroseeding on the filled slope surface should be applied as appropriate.

In addition, special attention should also be paid to construction noise, water quality, ecology and other environmental issues identified in the EM&A Manual. Mitigation measures recommended in the EIA and summarized in Mitigation Measure Implementation Schedule (EMIS) should also be fully implemented.

5 CONCLUSIONS AND RECOMMENDATIONS

- 5.1 This is the 6th monthly EM&A report for Channel KT14A, covering the construction period from 26 February 2009 to 25 March 2009 (the Reporting Period).
- 5.2 Monitoring results of the Reporting Period demonstrated no exceedance of environmental quality criteria for air quality and construction noise.
- 5.4 For water quality however, a total of fourteen exceedances of environmental quality criteria: nine for dissolved oxygen, one for turbidity and four for suspended solids were recorded during the Reporting Period.
- 5.5 Investigations of the cause of exceedances are in progress. It is noted that a series of rainstorm were recorded during the exceedance days which contributed muddy water to the existing streams. In general, the exceedances were within the values monitored during the baseline study and therefore could be due to natural variations. To minimize false alarms of this nature, a proposal for the revision of existing Action Limit Levels has been agreed by the Engineer's Representative (ER) and the Independent Environmental Checker (IEC) and submission to formal approval from EPD is in process.
- 5.6 No documented complaint, notification of summons and successful prosecution was received during the Reporting Period.
- 5.7 As wet season is approaching, water quality mitigation measures to avoid ingress of runoff into Channel KT14A should be properly installed and maintained, as appropriate. In particular, open stockpiles and exposed slope should be covered thoroughly with tarpaulin sheet or treated with hydroseeding, as appropriate.
- 5.8 No adverse environmental impacts were observed during the weekly site inspections. In general it is reminded that good house keeping practice shall be maintained. Minor deficiencies found in the weekly site inspections were in general rectified within the specified deadlines. The environmental performance of the Project was therefore considered satisfactory.
- 5.9 In addition, special attention should also be paid to construction noise and other environmental issues identified in the EM&A Manual. Mitigation measures recommended in the EIA and summarized in Mitigation Measure Implementation Schedule should be fully implemented.

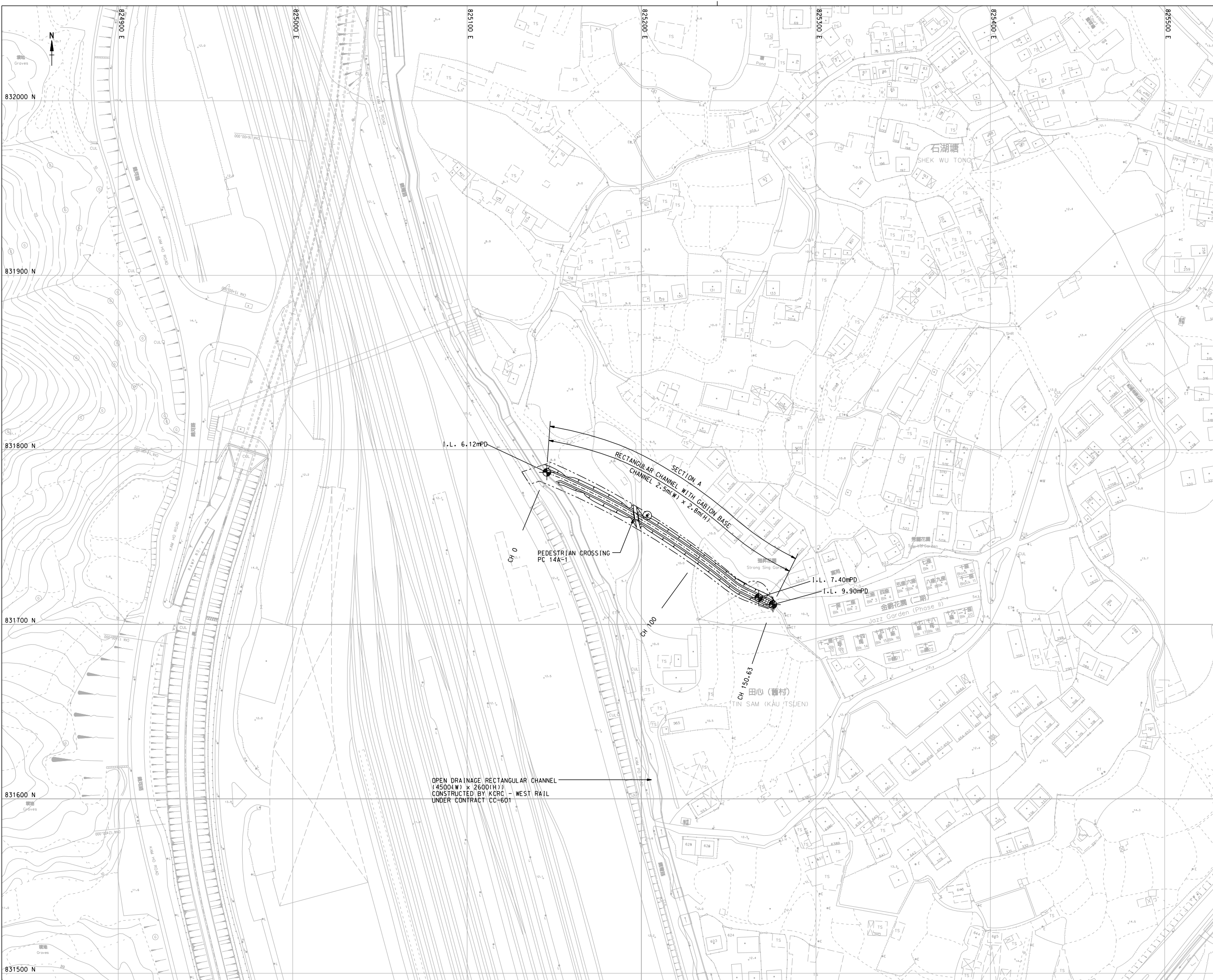
**END OF TEXT**

**Appendix A**

**Location Plan and  
Environmental Monitoring Locations**



NOTES :  
1. FOR NOTES AND LEGEND REFER TO DRAWING NO. 021.



Revision	Date	Description	Initial
	Designed	Checked	Drawn
	Verified		
Initial	BW	WLC	LWL
Date	09/07	09/07	09/07
Approved			

CONTRACT NO. DC /2007 /17

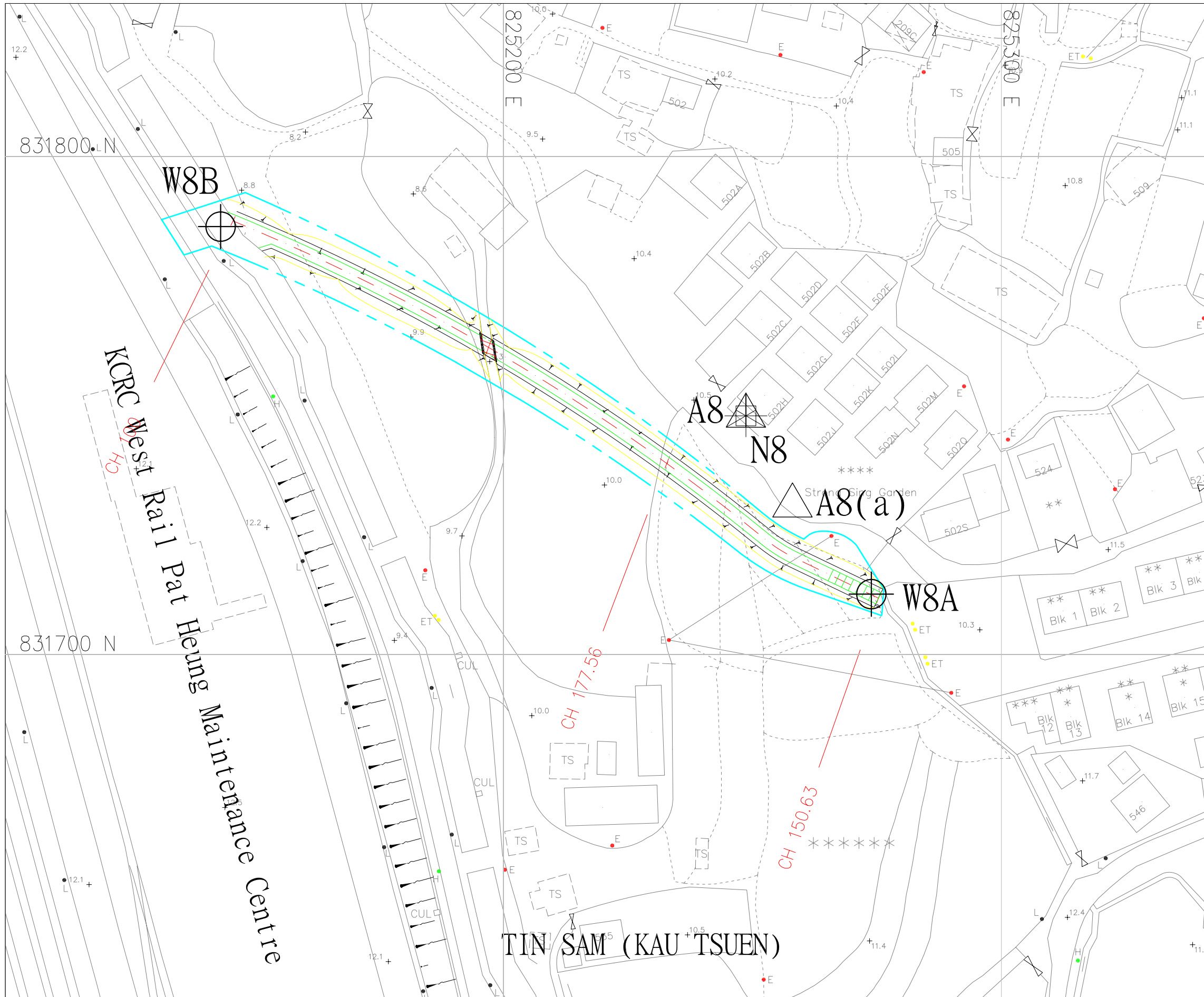
Contract title  
DRAINAGE IMPROVEMENT WORKS  
IN CHEUNG PO, MA ON KONG,  
YUEN KONG SAN TSUEN AND TIN SAM  
TSUEN OF YUEN LONG DISTRICT AND  
SEWERAGE AT TSENG TAU CHUNG TSUEN,  
TUEN MUN





Drawing title  
CHANNEL KT14  
GENERAL LAYOUT PLAN  
(SHEET 1 OF 2)

Drawing no.	Scale
024	1:1000 A1 1:2000 A3



Plot Date : 9/25/2007



- Legends**
-  Construction Noise Monitoring Location
  -  Air Quality Monitoring Location
  -  Water Quality Monitoring Location
  -  Monitoring Location access is not allow (Air or Noise or Water) for measurement

**Table**

Monitoring Parameter	Location ID	Address	Remarks
Water	W8A	E825274 / N831712	
Water	W8B	E825143 / N831786	
Air	A8		Replaced by A8(a)
Air	A8(a)	Entrance of Strong Sing Garden	Recommended Location
Noise	N8	No. 205H of Strong Sing Garden	

**Note:**  
 Air Monitoring Location A8 are proposed to relocate at the entrance of Strong Sing Garden A8(a) due to request of the property management. The relocated monitoring point is considered suitable as representative sensitive receiver for Strong Sing Garden.

Drawing:  
 Air, Noise and Stream Water Monitoring Location at KT-14A

Contract No. DC/2007/17-  
 Drainage Improvement Works in Cheung Po, Ma On Kong, Yuen Kong San Tsuen and Tin Sam Tsuen of Yuen Long District and Sewerage at Tseng Tau Chung Tsuen, Tuen Mun





## **Appendix B**

### **Construction Program**

Three Months Rolling Programme - May 2009 to July 2009

ID	Task Name	Duration	Start	Finish	May 2009				Jun 2009				Jul 2009							
					26/4	3/5	10/5	17/5	24/5	31/5	7/6	14/6	21/6	28/6	5/7	12/7	19/7	26/7	2/8	
1	Section I (Channel KT12 - Cheung Po Tsuen)	75 days	2009/5/4	2009/7/31																
6																				
7	Section II (Channel KT13)	75 days	2009/5/4	2009/7/31																
137																				
138	Section III (Channel KT14A - Tin Sam Tsuen)	75 days	2009/5/4	2009/7/31																
139	Regular Environmental Impact Monitoring	75 days	2009/5/4	2009/7/31																
140	Regular Tree Survey	75 days	2009/5/4	2009/7/31																
141	Regular Structural Condition Survey	75 days	2009/5/4	2009/7/31																
142	Construction of rectangular channel 2.5m(W) x 2.8m(H) Type RC1 (CH0.00 - CH150.00)	75 days	2009/5/4	2009/7/31																
143	Excavation to channel formation (CH0.00 - CH150.00)	2 days	2009/5/4	2009/5/5																
144	Bay A15 (CH140.00 - CH147.00)	2 days	2009/5/4	2009/5/5																
145	Construction of channel structure (CH0.00 - CH150.00)	32 days	2009/5/4	2009/6/10																
146	Bay A12 (CH113.00 - CH125.00)	5 days	2009/5/4	2009/5/8																
147	Bay A13 (CH125.00 - CH132.00)	9 days	2009/5/9	2009/5/19																
148	Bay A14 (CH132.00 - CH140.00)	9 days	2009/5/20	2009/5/30																
149	Bay A15 (CH140.00 - CH147.00)	9 days	2009/6/1	2009/6/10																
150	Backfilling along the sides of the channel structure	18 days	2009/6/1	2009/6/20																
151	Bay A10 (CH89.00 - CH101.00)	3 days	2009/6/1	2009/6/3																
152	Bay A11 (CH101.00 - CH113.00)	3 days	2009/6/4	2009/6/6																
153	Bay A12 (CH113.00 - CH125.00)	3 days	2009/6/8	2009/6/10																
154	Bay A13 (CH125.00 - CH132.00)	3 days	2009/6/11	2009/6/13																
155	Bay A14 (CH132.00 - CH140.00)	3 days	2009/6/15	2009/6/17																
156	Bay A15 (CH140.00 - CH147.00)	3 days	2009/6/18	2009/6/20																
157	Laying of gabion block inside the channel structure	36 days	2009/6/11	2009/7/23																
158	Bay A7 (CH57.00 - CH65.00)	4 days	2009/6/11	2009/6/15																
159	Bay A8 (CH65.00 - CH77.00)	4 days	2009/6/16	2009/6/19																
160	Bay A9 (CH77.00 - CH89.00)	4 days	2009/6/20	2009/6/24																
161	Bay A10 (CH89.00 - CH101.00)	4 days	2009/6/25	2009/6/29																
162	Bay A11 (CH101.00 - CH113.00)	4 days	2009/6/30	2009/7/4																

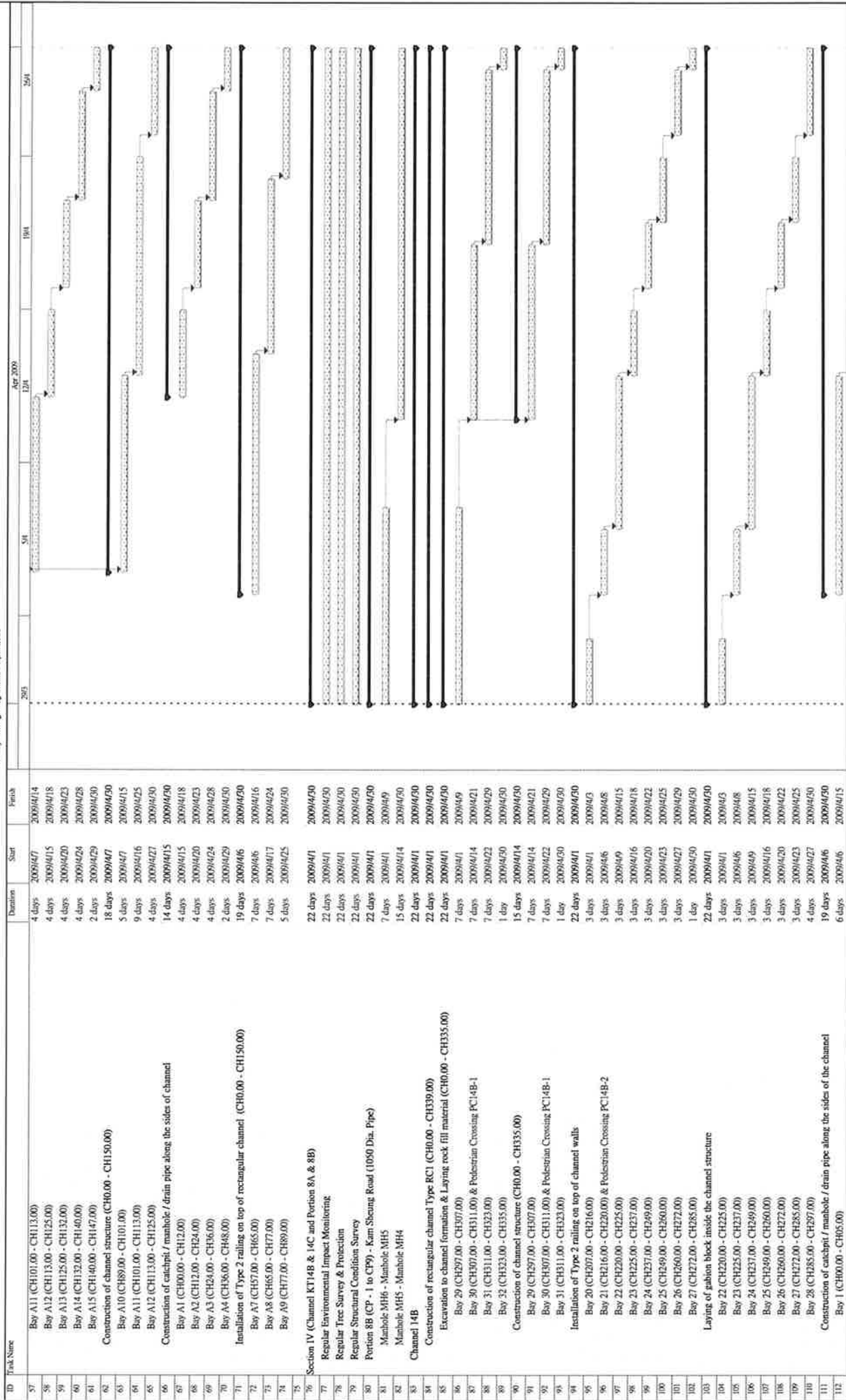
Task Progress Summary External Tasks Split  
 Split Milestone Project Summary External MileTask

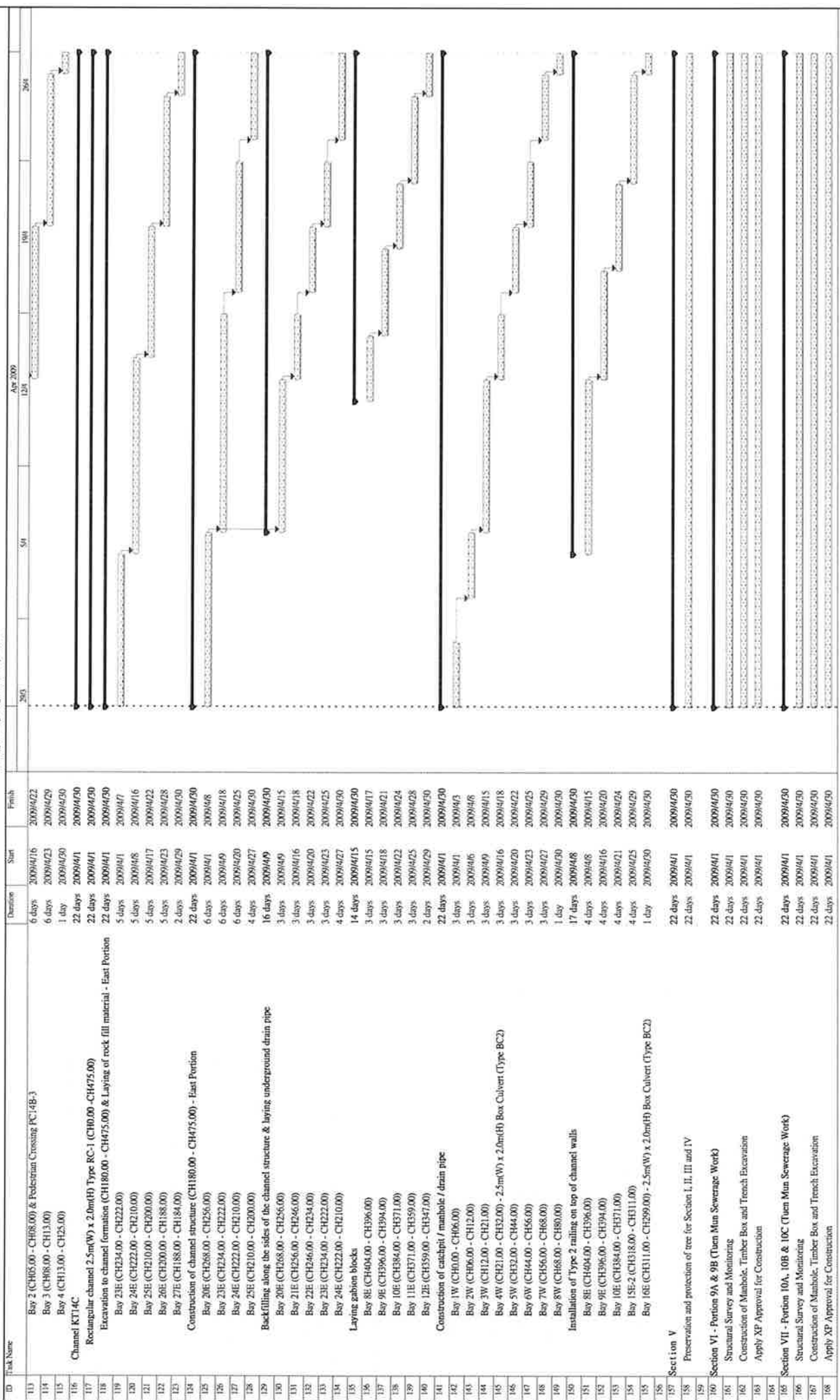


ID	Task Name	Duration	Start	Finish
1	Section I (Channel KT12 - Cheung Po Tsuen)	22 days	2009/4/1	2009/4/30
2	Regular Environmental Impact Monitoring	22 days	2009/4/1	2009/4/30
3	Regular Tree Survey	22 days	2009/4/1	2009/4/30
4	Regular Structural Condition Survey	22 days	2009/4/1	2009/4/30
5	Hydroseeding	22 days	2009/4/1	2009/4/30
6				
7	Section II (Channel KT13)	22 days	2009/4/1	2009/4/30
8	Regular Environmental Impact Monitoring	22 days	2009/4/1	2009/4/30
9	Regular Tree Survey & Protection	22 days	2009/4/1	2009/4/30
10	Regular Structural Condition Survey	22 days	2009/4/1	2009/4/30
11	Section A	22 days	2009/4/1	2009/4/30
12	Excavation to channel formation & laying of rock fill material (A CH0.00 - A CH402.00)	5 days	2009/4/1	2009/4/7
13	Bay A1 (A CH0.00 - A CH9.00) - RC2	5 days	2009/4/8	2009/4/16
14	Bay A2 (A CH9.00 - A CH18.00) - RC2	5 days	2009/4/17	2009/4/22
15	Bay A3 (A CH18.00 - A CH26.00) - RC2	5 days	2009/4/23	2009/4/28
16	Bay A4 (A CH26.00 - A CH34.00) - Transition	2 days	2009/4/29	2009/4/30
17	Bay A5 (A CH34.00 - A CH41.00) - Transition	17 days	2009/4/8	2009/4/30
18	Construction of channel structure (RC2, Transition, and TG2)	8 days	2009/4/8	2009/4/20
19	Bay A1 (A CH0.00 - A CH9.00) - RC2	8 days	2009/4/21	2009/4/29
20	Bay A2 (A CH9.00 - A CH18.00) - RC2	1 day	2009/4/30	2009/4/30
21	Bay A3 (A CH18.00 - A CH26.00) - RC2	22 days	2009/4/1	2009/4/30
22	Section B	22 days	2009/4/1	2009/4/30
23	Excavation for channel formation & laying of rock fill material (B CH0.00 - B CH316.00)	3 days	2009/4/1	2009/4/3
24	Bay B0 (B CH302.00 - B CH312.00) - Transition	3 days	2009/4/6	2009/4/8
25	Bay B1 (B CH144.00 - B CH147.00) - Transition & Pedestrian Crossing	3 days	2009/4/9	2009/4/15
26	Bay B14 (B CH137.00 - B CH144.00) - Transition	3 days	2009/4/16	2009/4/18
27	Bay B13 (B CH129.00 - B CH137.00) - Transition	3 days	2009/4/20	2009/4/22
28	Bay B12 (B CH119.00 - B CH129.00) - TG3	3 days	2009/4/23	2009/4/25
29	Bay B11 (B CH107.00 - B CH119.00) - TG3	3 days	2009/4/27	2009/4/29
30	Bay B10 (B CH94.00 - B CH107.00) - TG3	1 day	2009/4/30	2009/4/30
31	Bay B9 (B CH80.00 - B CH94.00) - TG3	22 days	2009/4/1	2009/4/30
32	Construction of channel structure (Transition, TG3, TG4, TG5, and TG8)	2 days	2009/4/1	2009/4/2
33	Bay B17 (B CH154.00 - B CH162.00) - Transition	5 days	2009/4/5	2009/4/9
34	Bay B16 (B CH147.00 - B CH154.00) - Transition	5 days	2009/4/14	2009/4/18
35	Bay B0 (B CH302.00 - B CH312.00) - Transition	5 days	2009/4/20	2009/4/24
36	Bay B15 (B CH144.00 - B CH147.00) - Transition & Pedestrian Crossing	5 days	2009/4/25	2009/4/30
37	Bay B14 (B CH137.00 - B CH144.00) - Transition	19 days	2009/4/6	2009/4/30
38	Backfilling along the sides of channel & laying of underground drain	4 days	2009/4/6	2009/4/9
39	Bay B28 (B CH282.00 - B CH294.00) - TG4	4 days	2009/4/14	2009/4/17
40	Bay B27 (B CH270.00 - B CH282.00) - TG4	4 days	2009/4/18	2009/4/22
41	Bay B26 (B CH260.00 - B CH270.00) - TG4	4 days	2009/4/23	2009/4/27
42	Bay B25 (B CH248.00 - B CH260.00) - TG5	3 days	2009/4/28	2009/4/30
43	Bay B24 (B CH236.00 - B CH248.00) - TG5	7 days	2009/4/23	2009/4/30
44	Installation of Type 2 railing on top of channel wall	2 days	2009/4/23	2009/4/30
45	Bay B28 (B CH282.00 - B CH294.00) - TG4	2 days	2009/4/25	2009/4/27
46	Bay B27 (B CH270.00 - B CH282.00) - TG4	2 days	2009/4/28	2009/4/29
47	Bay B26 (B CH260.00 - B CH270.00) - TG4	1 day	2009/4/30	2009/4/30
48	Bay B25 (B CH248.00 - B CH260.00) - TG5	22 days	2009/4/1	2009/4/30
49		22 days	2009/4/1	2009/4/30
50	Section III (Channel KT14A - Tin Sam Tsuen)	22 days	2009/4/1	2009/4/30
51	Regular Environmental Impact Monitoring	22 days	2009/4/1	2009/4/30
52	Regular Tree Survey	22 days	2009/4/1	2009/4/30
53	Regular Structural Condition Survey	22 days	2009/4/1	2009/4/30
54	Construction of rectangular channel 2.5m(W) x 2.8m(H) Type RC1 (CH0.00 - CH150.00)	22 days	2009/4/1	2009/4/30
55	Excavation to channel formation (CH0.00 - CH150.00)	22 days	2009/4/1	2009/4/30
56	Bay A10 (CH89.00 - CH101.00)	4 days	2009/4/1	2009/4/6

Task:  Progress  Milestone  Summary  Project Summary  External Tasks  Split  External MileTask

Page 1 of 3

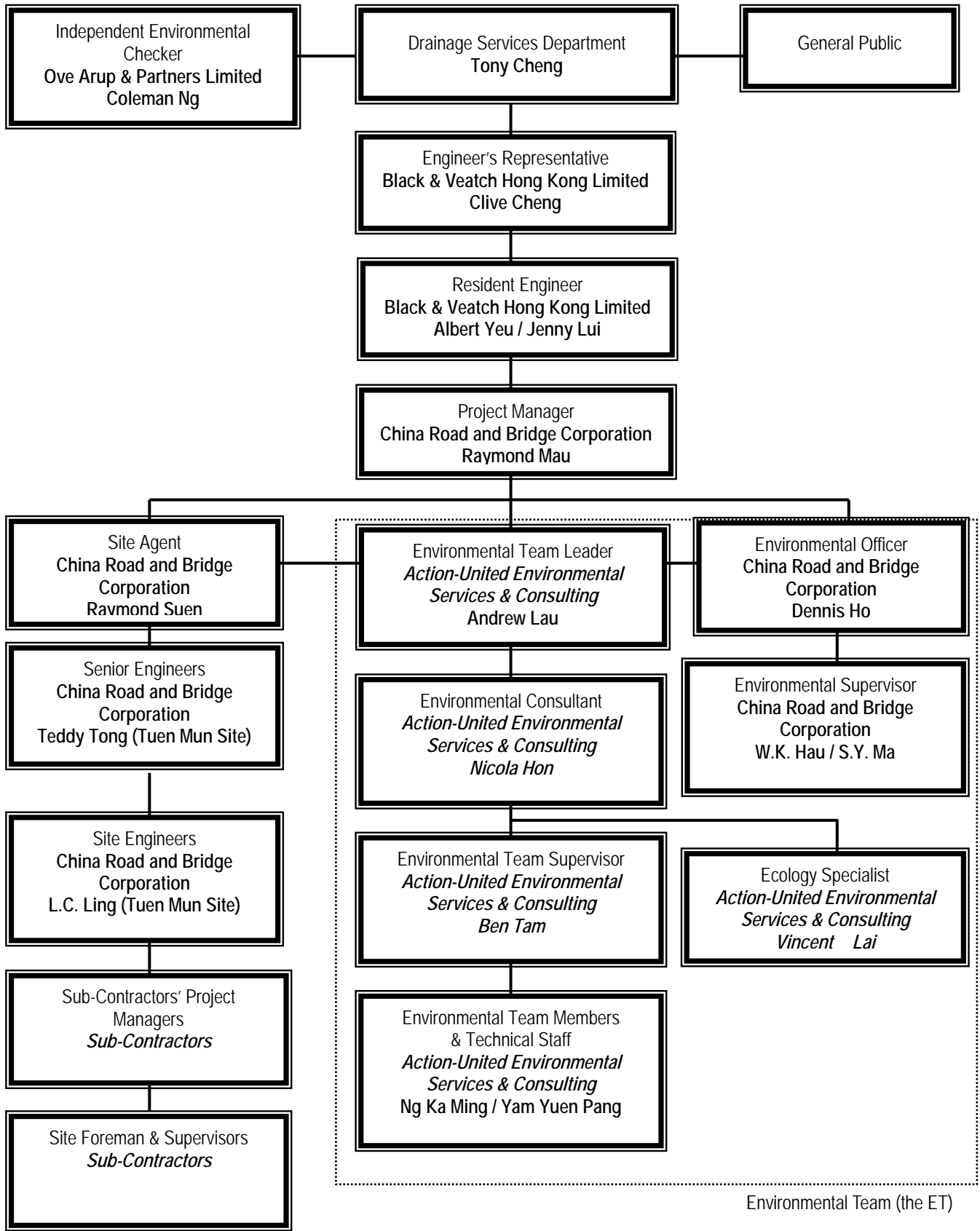




ID	Task Name	Description	Start	Finish
113	Bay 2 (CH05.00 - CH08.00) & Pedestrian Crossing PC1 (B-3)	6 days	2009/4/16	2009/4/22
114	Bay 3 (CH08.00 - CH13.00)	6 days	2009/4/23	2009/4/29
115	Bay 4 (CH13.00 - CH25.00)	1 day	2009/4/30	2009/4/30
116	Channel K114C	22 days	2009/4/1	2009/4/30
117	Rectangular channel 2.5m(W) x 2.0m(H) Type RC-1 (CH10.00 - CH1475.00)	22 days	2009/4/1	2009/4/30
118	Excavation to channel formation (CH180.00 - CH1475.00) & Laying of rock fill material - East Portion	22 days	2009/4/1	2009/4/30
119	Bay 23E (CH234.00 - CH222.00)	5 days	2009/4/1	2009/4/7
120	Bay 24E (CH222.00 - CH210.00)	5 days	2009/4/8	2009/4/16
121	Bay 25E (CH210.00 - CH200.00)	5 days	2009/4/17	2009/4/22
122	Bay 26E (CH200.00 - CH188.00)	5 days	2009/4/23	2009/4/28
123	Bay 27E (CH188.00 - CH184.00)	2 days	2009/4/29	2009/4/30
124	Construction of channel structure (CH180.00 - CH1475.00) - East Portion	22 days	2009/4/1	2009/4/30
125	Bay 20E (CH268.00 - CH256.00)	6 days	2009/4/1	2009/4/8
126	Bay 23E (CH234.00 - CH222.00)	6 days	2009/4/9	2009/4/18
127	Bay 24E (CH222.00 - CH210.00)	6 days	2009/4/20	2009/4/25
128	Bay 25E (CH210.00 - CH200.00)	4 days	2009/4/27	2009/4/30
129	Backfilling along the sides of the channel structure & laying underground drain pipe	16 days	2009/4/9	2009/4/30
130	Bay 20E (CH268.00 - CH256.00)	3 days	2009/4/9	2009/4/15
131	Bay 21E (CH256.00 - CH246.00)	3 days	2009/4/16	2009/4/18
132	Bay 22E (CH246.00 - CH234.00)	3 days	2009/4/20	2009/4/22
133	Bay 23E (CH234.00 - CH222.00)	3 days	2009/4/23	2009/4/25
134	Bay 24E (CH222.00 - CH210.00)	4 days	2009/4/27	2009/4/30
135	Laying gabion blocks	14 days	2009/4/15	2009/4/30
136	Bay 8E (CH404.00 - CH396.00)	3 days	2009/4/15	2009/4/17
137	Bay 9E (CH396.00 - CH394.00)	3 days	2009/4/18	2009/4/21
138	Bay 10E (CH384.00 - CH371.00)	3 days	2009/4/22	2009/4/24
139	Bay 11E (CH371.00 - CH359.00)	3 days	2009/4/25	2009/4/28
140	Bay 12E (CH359.00 - CH347.00)	2 days	2009/4/29	2009/4/30
141	Construction of catchpit / manhole / drain pipe	22 days	2009/4/1	2009/4/30
142	Bay 1W (CH0.00 - CH06.00)	3 days	2009/4/1	2009/4/3
143	Bay 2W (CH06.00 - CH12.00)	3 days	2009/4/6	2009/4/8
144	Bay 3W (CH12.00 - CH21.00)	3 days	2009/4/9	2009/4/15
145	Bay 4W (CH21.00 - CH32.00) - 2.5m(W) x 2.0m(H) Box Culvert (Type BC2)	3 days	2009/4/16	2009/4/18
146	Bay 5W (CH32.00 - CH44.00)	3 days	2009/4/20	2009/4/22
147	Bay 6W (CH44.00 - CH56.00)	3 days	2009/4/23	2009/4/25
148	Bay 7W (CH56.00 - CH68.00)	3 days	2009/4/27	2009/4/29
149	Bay 8W (CH68.00 - CH80.00)	1 day	2009/4/30	2009/4/30
150	Installation of Type 2 railing on top of channel walls	17 days	2009/4/8	2009/4/30
151	Bay 8E (CH404.00 - CH396.00)	4 days	2009/4/6	2009/4/15
152	Bay 9E (CH396.00 - CH394.00)	4 days	2009/4/16	2009/4/20
153	Bay 10E (CH384.00 - CH371.00)	4 days	2009/4/21	2009/4/24
154	Bay 15E-2 (CH318.00 - CH311.00)	4 days	2009/4/25	2009/4/29
155	Bay 16E (CH311.00 - CH299.00) - 2.5m(W) x 2.0m(H) Box Culvert (Type BC2)	1 day	2009/4/30	2009/4/30
156	Section V			
157	Preservation and protection of trees for Section I, II, III and IV	22 days	2009/4/1	2009/4/30
158		22 days	2009/4/1	2009/4/30
159	Section VI - Portion 9A & 9B (Tuen Mun Sewerage Work)			
160	Structural Survey and Monitoring	22 days	2009/4/1	2009/4/30
161	Construction of Manhole, Timber Box and Trench Excavation	22 days	2009/4/1	2009/4/30
162	Apply XP Approval for Construction	22 days	2009/4/1	2009/4/30
163		22 days	2009/4/1	2009/4/30
164		22 days	2009/4/1	2009/4/30
165	Section VII - Portion 10A, 10B & 10C (Tuen Mun Sewerage Work)			
166	Structural Survey and Monitoring	22 days	2009/4/1	2009/4/30
167	Construction of Manhole, Timber Box and Trench Excavation	22 days	2009/4/1	2009/4/30
168	Apply XP Approval for Construction	22 days	2009/4/1	2009/4/30

**Appendix C**

**Environmental Management Organization and  
Contacts of Key Personnel**



**Environmental Management Organization**



**Contact Details of Key Personnel**

<b>Organization</b>	<b>Project Role</b>	<b>Name of Key Staff</b>	<b>Tel No.</b>	<b>Fax No.</b>
DSD	Employer	Mr. Tony Cheng	2594-7264	2827-8526
B&V	Engineer's Representative	Mr. Clive Cheng	2478-9161	2478-9369
B&V	Resident Engineer	Mr. Albert Yeu	2478-9161	2478-9369
B&V	Resident Engineer	Mr. Jenny Lui	2478-9161	2478-9369
OAP	Independent Environmental Checker	Mr. Coleman Ng	2268-3097	2268 3950
CRBC	Project Director	Mr. Wang Yanhua	2283-1688	2283-1689
CRBC	Project Manager	Mr. Raymond Mau	9048-3669	2283-1689
CRBC	Site Agent	Mr. Raymond Suen	9779-8871	2283-1689
CRBC	Senior Engineer (Tuen Mun Site)	Mr. Teddy Tong	6283-9684	2283-1689
CRBC	Site Engineer (Tuen Mun Site)	Mr. L.C. Ling	6770-4010	2283-1689
CRBC	Environmental Officer	Mr. Dennis Ho	6474-6975	2283-1689
CRBC	Environmental / Construction Supervisor (Tuen Mun and Yuen Long site)	Mr. W.K. Hau	6283--9696	2283-1689
CRBC	Environmental / Construction Supervisor (Yuen Long site)	Mr. S.Y. Ma	9401-6296-	2283-1689
CRBC	Safety Officer	Kenny Sze	9374-8954	2283-1689
AUES	Environmental Team Leader	Mr. Andrew Lau	2959-6059	2959-6079
AUES	Environmental Consultant	Miss Nicola Hon	2959-6059	2959-6079
AUES	Environmental Site Inspector	Mr. Ben Tam	2959-6059	2959-6079
AUES	Ecologist	Mr. Vincent Lai	2959-6059	2959-6079

**Legend:**

*DSD (Employer) – Drainage Services Department*

*B&V (Engineer) – Black & Veatch Hong Kong Limited*

*CRBC (Main Contractor) – China Road and Bridge Corporation*

*OAP (IEC) – Ove Arup & Partners Ltd*

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

## **Appendix D**

- (a) Monitoring Schedules**
- (b) Meteorological Data**

A(1) Monitoring Schedule for the reporting period

Date		Air Quality		NOISE LEQ 30MIN	WATER QUALITY
		1-hour TSP	24-hour TSP		
26-Feb-09	Thu				
27-Feb-09	Fri				W8A & W8B
28-Feb-09	Sat		A8(a)		
1-Mar-09	Sun				
2-Mar-09	Mon	A8(a)		N8	W8A & W8B
3-Mar-09	Tue				
4-Mar-09	Wed				
5-Mar-09	Thu				W8A & W8B
6-Mar-09	Fri				
7-Mar-09	Sat	A8(a)		N8	W8A & W8B
8-Mar-09	Sun				
9-Mar-09	Mon		A8(a)		W8A & W8B
10-Mar-09	Tue				
11-Mar-09	Wed				
12-Mar-09	Thu		A8(a)		W8A & W8B
13-Mar-09	Fri	A8(a)		N8	
14-Mar-09	Sat				W8A & W8B
15-Mar-09	Sun				
16-Mar-09	Mon				W8A & W8B
17-Mar-09	Tue				
18-Mar-09	Wed		A8(a)		
19-Mar-09	Thu	A8(a)		N8	W8A & W8B
20-Mar-09	Fri				
21-Mar-09	Sat				W8A & W8B
22-Mar-09	Sun				
23-Mar-09	Mon				W8A & W8B
24-Mar-09	Tue		A8(a)		
25-Mar-09	Wed	A8(a)		N8	
26-Mar-09	Thu				W8A & W8B
27-Mar-09	Fri				
28-Mar-09	Sat				W8A & W8B
29-Mar-09	Sun				
30-Mar-09	Mon		A8(a)		W8A & W8B
31-Mar-09	Tue	A8(a)		N8	

	Monitoring Day
	Sunday or Public Holiday

A (2) Monitoring Schedule for April 2009

Date		Air Quality		NOISE LEQ 30MIN	WATER QUALITY
		1-hour TSP	24-hour TSP		
1-Apr-09	Wed				W8A & W8B
2-Apr-09	Thu				
3-Apr-09	Fri				W8A & W8B
4-Apr-09	Sat				
5-Apr-09	Sun				
6-Apr-09	Mon		A8(a)		W8A & W8B
7-Apr-09	Tue	A8(a)		N8	
8-Apr-09	Wed				W8A & W8B
9-Apr-09	Thu				
10-Apr-09	Fri				
11-Apr-09	Sat				
12-Apr-09	Sun				
13-Apr-09	Mon				
14-Apr-09	Tue				W8A & W8B
15-Apr-09	Wed		A8(a)		
16-Apr-09	Thu	A8(a)		N8	W8A & W8B
17-Apr-09	Fri				
18-Apr-09	Sat				W8A & W8B
19-Apr-09	Sun				
20-Apr-09	Mon				W8A & W8B
21-Apr-09	Tue		A8(a)		
22-Apr-09	Wed	A8(a)		N8	W8A & W8B
23-Apr-09	Thu				
24-Apr-09	Fri				W8A & W8B
25-Apr-09	Sat				
26-Apr-09	Sun				
27-Apr-09	Mon		A8(a)		W8A & W8B
28-Apr-09	Tue	A8(a)		N8	
29-Apr-09	Wed				W8A & W8B
30-Apr-09	Thu				

	Monitoring Day
	Sunday or Public Holiday

**(B) Meteorological Data Extracted from HKO in the Reporting Period**

Date		Weather	Lau Fau Shan Weather Station				
			Total Rainfall (mm)	Mean Air Temperature (°C)	Wind Speed (km/h)	Mean Relative Humidity (%)	Wind Direction
26-Feb-09	Thu	cloudy/foggy/drizzle/moderate/fresh	0.3	24.8	11.7	73.5	E/SE
27-Feb-09	Fri	cloudy/mist/moderate	Trace	24.1	15.5	72	E
28-Feb-09	Sat	cloudy/rain/moderate/fresh	Trace	22.6	12.7	73.7	E/NE
1-Mar-09	Sun	cloudy/rain/moderate/fresh	0.8	18.6	8.7	74.5	E/NE
2-Mar-09	Mon	cloudy/rain/moderate/fresh	Trace	18.1	10	80.5	E/NE
3-Mar-09	Tue	cloudy/sunny intervals/moderate	Trace	18.6	9.2	67	E/NE
4-Mar-09	Wed	cloudy/rain/mist/moderate/fresh	0.4	19.7	9.5	72.5	E/NE
5-Mar-09	Thu	foggy/rain/moderate/fresh	28.5	23.3	21.5	78	E/NE
6-Mar-09	Fri	cloudy/rain/squally	11.6	15.4	27	84.5	E/NE
7-Mar-09	Sat	cool/rain/moderate/fresh	0.2	12.9	17	85.7	N/NE
8-Mar-09	Sun	cloudy/moderate/sunny intervals	0.1	13.7	8.5	90	E/NE
9-Mar-09	Mon	sunny intervals/cloudy/moderate/warm	0.4	16.1	10.2	77.7	N/NE
10-Mar-09	Tue	cloudy/fresh/strong	0	19.2	10.5	67.7	E/SE
11-Mar-09	Wed	cloudy/sunny intervals/fresh/strong	Trace	22.4	11.5	69.5	E
12-Mar-09	Thu	cloudy/sunny intervals/misty/fresh/strong	Trace	23.2	19.5	71	E/SE
13-Mar-09	Fri	cloudy/rain/fog/light winds	Trace	19.1	19	75.5	E/NE
14-Mar-09	Sat	fine/dry/moderate/fresh	Trace	16.4	34	58.5	N/NE
15-Mar-09	Sun	fine/moderate	0	17.4	9	52	S/SE
16-Mar-09	Mon	fine/moderate	0	19.4	7.7	72	E/NE
17-Mar-09	Tue	fine/moderate	0	22.3	12	74.5	W/SW
18-Mar-09	Wed	fine/warm/cloudy/light winds	0	23	11.5	66.5	S/SE
19-Mar-09	Thu	mist/sunny periods/cloudy/light winds	0	22	14.5	80	S/SE
20-Mar-09	Fri	fog/sunny periods/cloudy/light winds	0	24.1	8.5	84.5	W/SW
21-Mar-09	Sat	cloudy/fog/rain/moderate/fresh	0.1	25.1	12.2	78.7	S/SE
22-Mar-09	Sun	fog/light winds/rain	Trace	26.4	15.2	78	SW
23-Mar-09	Mon	foggy/rain/moderate	Trace	26.7	9.7	80.7	S/SE
24-Mar-09	Tue	cloudy/rain/moderate/fresh	27.1	20.8	18	76.5	E/NE
25-Mar-09	Wed	cloudy/rain/squally	27.9	18.1	13	83.2	E/NE

**Appendix E**

**Calibration Certificates and  
HOKLAS-Accreditation Certificate**

# CERTIFICATE OF ANALYSIS




Batch: HK0901066  
Date of Issue: 19/01/2009  
Client: ACTION UNITED ENVIRO SERVICES  
Client Reference:

## Calibration of Thermometer

Item : YSI Multimeter  
Model No. : YSI 550A  
Serial No. : 05F2063AZ  
Equipment No.: - -  
Calibration Method : In-house Method  
Date of Calibration : 19 January, 2009

### Testing Results :

Reference Temperature (°C)	Recorded Temperature (°C)
20.3 °C	20.5 °C
29.1 °C	29.5 °C
Allowing Deviation	±2.0 °C

  
Ms Wong Wai Man, Alice  
Laboratory Manager - Hong Kong

# CERTIFICATE OF ANALYSIS



Batch: HK0901066  
Date of Issue: 19/01/2009  
Client: ACTION UNITED ENVIRO SERVICES  
Client Reference:

## Calibration of DO System

Item : YSI Multimeter  
Model No. : YSI 550A  
Serial No. : 05F2063AZ  
Equipment No. : --

Calibration Method : This meter was calibrated in accordance with standard method APHA (18th Ed.) 4500-0C & G

Date of Calibration : 19 January, 2009

## Testing Results :

Expected Reading	Recording Reading
3.80 mg/L	3.90 mg/L
5.81 mg/L	5.90 mg/L
9.12 mg/L	9.08 mg/L
Allowing Deviation	±0.2 mg/L

  
Ms Wong Wai Man, Alice  
Laboratory Manager - Hong Kong



# CERTIFICATE OF ANALYSIS



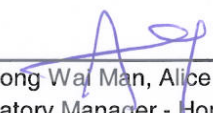
**Batch:** HK0901067  
**Date of Issue:** 19/01/2009  
**Client:** ACTION UNITED ENVIRO SERVICES  
**Client Reference:**

## Calibration of Salinity System

**Item :** HAND REFRACTOMETER  
**Model No. :** ATAGO  
**Serial No. :** 289468  
**Equipment No. :** EQ114  
**Calibration Method :** This meter was calibrated in accordance with standard method APHA (19th Ed.) 2520 A and B  
**Date of Calibration :** 19 January, 2009

## Testing Results :

Expected Reading	Recording Reading
0 g/L	0 g/L
10 g/L	9 g/L
20 g/L	18 g/L
30 g/L	27 g/L
40 g/L	37 g/L
Allowing Deviation	±10%

  
Ms Wong Wa Man, Alice  
Laboratory Manager - Hong Kong

# CERTIFICATE OF ANALYSIS




Batch: HK0822563  
Date of Issue: 08/12/2008  
Client: ACTION UNITED ENVIRO SERVICES  
Client Reference:

## Calibration of Turbidiv System

Item : HACH Turbidimeter  
Model No. : HACH 2100P  
Serial No. : 950900008735  
Equipment No. : EQ091  
Calibration Method : This meter was calibrated in accordance with standard method APHA (19th Ed.) 2130B  
Date of Calibration : 01 December, 2008

## Testing Results:

Expected Reading	Recording Reading
0.00 NTU	0.14 NTU
1.00 NTU	1.03 NTU
2.00 NTU	2.13 NTU
4.00 NTU	4.28 NTU
16.0 NTU	15.7 NTU
40.0 NTU	41.3 NTU
80.0 NTU	82.7 NTU
160 NTU	174 NTU
400 NTU	413 NTU
Allowing Deviation	±10%

  
Ms Wong Wai Man, Alice  
Laboratory Manager - Hong Kong

# CERTIFICATE OF ANALYSIS



Batch: HK0822565  
Date of Issue: 08/12/2008  
Client: ACTION UNITED ENVIRO SERVICES  
Client Reference:

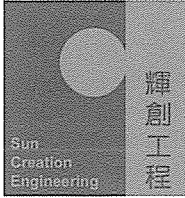
## Calibration of pH System

Item : HANNA pH Meter  
Model No. : HI98128  
Serial No. : S229924  
Equipment No. : --  
Calibration Method : This meter was calibrated in accordance with standard method APHA (19th Ed.) 4500-H<sup>+</sup>B  
Date of Calibration : 08 December, 2008

### Testing Results :

Expected Reading	Recording Reading
4.00	3.97
7.00	6.93
10.0	9.84
Allowing Deviation	± 0.2

  
Ms Wong Wai Man, Alice  
Laboratory Manager - Hong Kong



輝創工程有限公司

Sun Creation Engineering Limited Calibration and Testing Laboratory

Certificate No. : C082016

## Certificate of Calibration

*This is to certify that the equipment*

*Description : Integrating Sound Level Meter (EQ006)*

*Manufacturer : Bruel & Kjaer*

*Model No. : 2238*

*Serial No. : 2285762*

*has been calibrated for the specific items and ranges.  
The results are shown in the Calibration Report No. C082016.*

*The equipment is supplied by*

*Co. Name : Action-United Environmental Services and Consulting*

*Address : Unit A, 20/F., Gold King Industrial Building,  
35-41 Tai Lin Pai Road, Kwai Chung, N.T.*

*Date of Issue : 22 April 2008*

*Certified by :*

*K C Lee*

The test equipment used for testing are traceable to the National Standards as specified in this report.  
This report shall not be reproduced except in full and with prior written approval from this laboratory.

Calibration and Testing Laboratory of Sun Creation Engineering Limited

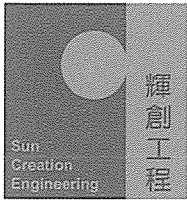
c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

Tel: 2927 2606

Fax: 2744 8986

E-mail: callab@suncreation.com

Website: www.suncreation.com



輝創工程有限公司

Sun Creation Engineering Limited Calibration and Testing Laboratory

Report No. : C082016

## Calibration Report

### ITEM TESTED

DESCRIPTION : Integrating Sound Level Meter (EQ006)  
MANUFACTURER : Bruel & Kjaer  
MODEL NO. : 2238  
SERIAL NO. : 2285762

### TEST CONDITIONS

AMBIENT TEMPERATURE :  $(23 \pm 2)^{\circ}\text{C}$  RELATIVE HUMIDITY :  $(55 \pm 20)\%$   
LINE VOLTAGE : ---

### TEST SPECIFICATIONS

Calibration check

DATE OF TEST : 21 April 2008

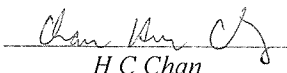
JOB NO. : IC08-0992

### TEST RESULTS

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

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

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory

Tested by :   
H C Chan

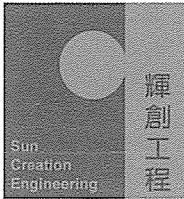
Date : 22 April 2008

The test equipment used for testing are traceable to the National Standards as specified in this report.  
This report shall not be reproduced except in full and with prior written approval from this laboratory.

Calibration and Testing Laboratory of Sun Creation Engineering Limited

c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong  
Tel: 2927 2606 Fax: 2744 8986 E-mail: callab@suncreation.com Website: www.suncreation.com

Page 1 of 4



# Calibration Report

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 24 hours, and switched on to warm up for over 10 minutes before the commencement of the test.
2. Self-calibration using the B&K acoustic calibrator 4231, S/N 2326408 was performed before the test.
3. The results presented are the mean of 3 measurements at each calibration point.
4. Test equipment :

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C080037
CL281	Multifunction Acoustic Calibrator	DC080007

5. Test procedure : MA101N.

6. Results :

6.1 Sound Pressure Level

6.1.1 Reference Sound Pressure Level

Range (dB)	UUT Setting			Applied Value		UUT Reading (dB)	IEC 651 Type 1 Spec. (dB)
	Parameter	Freq. Weight	Time Weight	Level (dB)	Freq. (kHz)		
20 - 100	L <sub>AFP</sub>	A	F	94.00	1	93.9	± 0.7

6.1.2 Linearity

Range (dB)	UUT Setting			Applied Value		UUT Reading (dB)
	Parameter	Freq. Weight	Time Weight	Level (dB)	Freq. (kHz)	
40 - 120	L <sub>AFP</sub>	A	F	94.00	1	94.0 (Ref.)
				104.00		104.0
				114.00		113.9

IEC 651 Type 1 Spec. : ± 0.4 dB per 10 dB step and ± 0.7 dB for overall different.

6.2 Time Weighting

6.2.1 Continuous Signal

Range (dB)	UUT Setting			Applied Value		UUT Reading (dB)	IEC 651 Type 1 Spec. (dB)
	Parameter	Freq. Weight	Time Weight	Level (dB)	Freq. (kHz)		
20 - 100	L <sub>AFP</sub>	A	F	94.00	1	94.0	Ref.
	L <sub>ASP</sub>		S			94.0	± 0.1
	L <sub>AIP</sub>		I			94.0	± 0.1

The test equipment used for testing are traceable to the National Standards as specified in this report. This report shall not be reproduced except in full and with prior written approval from this laboratory.

## Calibration Report

### 6.2.2 Tone Burst Signal (2 kHz)

UUT Setting				Applied Value		UUT Reading (dB)	IEC 651 Type 1 Spec. (dB)
Range (dB)	Parameter	Freq. Weight	Time Weight	Level (dB)	Burst Duration		
30 - 110	L <sub>AFP</sub>	A	F	106.00	Continuous	106.0	Ref.
	L <sub>AFMax</sub>				200 ms	104.9	-1.0 ± 1.0
	L <sub>ASP</sub>	S	Continuous		106.0	Ref.	
	L <sub>ASMax</sub>		500 ms		101.9	-4.1 ± 1.0	

### 6.3 Frequency Weighting

#### 6.3.1 A-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 651 Type 1 Spec. (dB)
Range (dB)	Parameter	Freq. Weight	Time Weight	Level (dB)	Freq.		
20 - 100	L <sub>AFP</sub>	A	F	94.00	31.5 Hz	54.8	-39.4 ± 1.5
					63 Hz	67.6	-26.2 ± 1.5
					125 Hz	77.6	-16.1 ± 1.0
					500 Hz	90.6	-3.2 ± 1.0
					1 kHz	93.9	Ref.
					2 kHz	95.0	+1.2 ± 1.0
					4 kHz	94.8	+1.0 ± 1.0
					8 kHz	92.6	-1.1 (+1.5 ; -3.0)
					12.5 kHz	88.8	-4.3 (+3.0 ; -6.0)

#### 6.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 651 Type 1 Spec. (dB)
Range (dB)	Parameter	Freq. Weight	Time Weight	Level (dB)	Freq.		
20 - 100	L <sub>CFP</sub>	C	F	94.00	31.5 Hz	91.0	-3.0 ± 1.5
					63 Hz	93.0	-0.8 ± 1.5
					125 Hz	93.5	-0.2 ± 1.0
					500 Hz	93.8	0.0 ± 1.0
					1 kHz	93.9	Ref.
					2 kHz	93.7	-0.2 ± 1.0
					4 kHz	93.1	-0.8 ± 1.0
					8 kHz	90.7	-3.0 (+1.5 ; -3.0)
					12.5 kHz	86.9	-6.2 (+3.0 ; -6.0)

The test equipment used for testing are traceable to the National Standards as specified in this report.  
This report shall not be reproduced except in full and with prior written approval from this laboratory.

# Calibration Report

## 6.4 Time Averaging

UUT Setting				Applied Value					UUT	IEC 60804	
Range (dB)	Mode	Freq. Weight	Integrating Time	Freq. (kHz)	Burst Duration (ms)	Burst Duty Factor	Burst Level (dB)	Equivalent Level (dB)	Reading (dB)	Type I Spec. (dB)	
30 - 110	Leq	A	10 sec.	4	1	1/10	110.0	100	100.2	± 0.5	
								1/10 <sup>2</sup>	90	90.2	± 0.5
			60 sec.					1/10 <sup>3</sup>	80	79.8	± 1.0
			5 min.					1/10 <sup>4</sup>	70	69.5	± 1.0

Remarks : - Mfr's Spec. : IEC 651 & IEC 60804 Type 1

- Uncertainties of Applied Value :

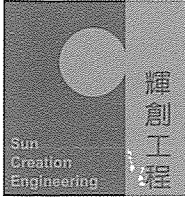
94 dB : 31.5 Hz - 125 Hz	: ± 0.40 dB
500 Hz	: ± 0.30 dB
1 kHz	: ± 0.20 dB
2 kHz	: ± 0.40 dB
4 kHz	: ± 0.50 dB
8 kHz	: ± 0.70 dB
12.5 kHz	: ± 1.20 dB
104 dB : 1 kHz	: ± 0.10 dB (Ref. 94 dB)
114 dB : 1 kHz	: ± 0.10 dB (Ref. 94 dB)
Burst equivalent level	: ± 0.2 dB (Ref. 110 dB continuous sound level)

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

### Note :

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





輝創工程有限公司

Sun Creation Engineering Limited Calibration and Testing Laboratory

Certificate No. : C082026

## Certificate of Calibration

*This is to certify that the equipment*

*Description : Acoustical Calibrator (EQ016)*

*Manufacturer : Bruel & Kjaer*

*Model No. : 4231*

*Serial No. : 2292167*

*has been calibrated for the specific items and ranges.  
The results are shown in the Calibration Report No. C082026.*

*The equipment is supplied by*

*Co. Name : Action-United Environmental Services and Consulting*

*Address : Unit A, 20/F., Gold King Industrial Building,  
35-41 Tai Lin Pai Road, Kwai Chung, N.T.*

*Date of Issue : 22 April 2008*

*Certified by :*

*K/C Lee*

The test equipment used for testing are traceable to the National Standards as specified in this report.  
This report shall not be reproduced except in full and with prior written approval from this laboratory.

Calibration and Testing Laboratory of Sun Creation Engineering Limited

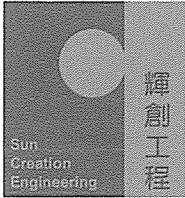
c/o 4/F, Tsing Shan Wan Exchange Building, I Hing On Lane, Tuen Mun, New Territories, Hong Kong

Tel: 2927 2606

Fax: 2744 8986

E-mail: callab@suncreation.com

Website: www.suncreation.com



輝創工程有限公司

Sun Creation Engineering Limited Calibration and Testing Laboratory

Report No. : C082026

# Calibration Report

## ITEM TESTED

DESCRIPTION : Acoustical Calibrator (EQ016)  
MANUFACTURER : Bruel & Kjaer  
MODEL NO. : 4231  
SERIAL NO. : 2292167

## TEST CONDITIONS

AMBIENT TEMPERATURE :  $(23 \pm 2)^{\circ}\text{C}$  RELATIVE HUMIDITY :  $(55 \pm 20)\%$   
LINE VOLTAGE : ---

## TEST SPECIFICATIONS

Calibration check

DATE OF TEST : 21 April 2008

JOB NO. : IC08-0992

## TEST RESULTS

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

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

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

Tested by : Chan H C Chan  
H C Chan

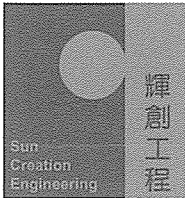
Date : 22 April 2008

The test equipment used for testing are traceable to the National Standards as specified in this report.  
This report shall not be reproduced except in full and with prior written approval from this laboratory.

Calibration and Testing Laboratory of Sun Creation Engineering Limited

c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong  
Tel: 2927 2606 Fax: 2744 8986 E-mail: callab@suncreation.com Website: www.suncreation.com

Page 1 of 2



# Calibration Report

- The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 24 hours before the commencement of the test.
- The results presented are the mean of 3 measurements at each calibration point.
- Test equipment :

<u>Equipment ID</u>	<u>Description</u>	<u>Certificate No.</u>
TST150A	Measuring Amplifier	C080751
CL129	Universal Counter	C072995
CL281	Multifunction Acoustic Calibrator	DC080007

4. Test procedure : MA100N.

5. Results :

### 5.1 Sound Level Accuracy

UUT Nominal Value	Measured Value (dB)	User's Spec. (dB)	Uncertainty of Measured Value (dB)
94 dB, 1 kHz	94.0	± 0.3	± 0.2
114 dB, 1 kHz	114.0		

### 5.2 Frequency Accuracy

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

Remarks : - The user's specified acceptance criteria (user's spec.) is a customer pre-defined operating tolerance of the UUT, suitable for one's own intended use.

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

Note :

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

The test equipment used for testing are traceable to the National Standards as specified in this report. This report shall not be reproduced except in full and with prior written approval from this laboratory.

## Equipment Calibration Record

### Equipment Calibrated:

Type: Dust Trak Model 8520  
 Manufacturer: TSI  
 Serial No. 21060  
 Equipment Ref: EQ021

### Standard Equipment:

Standard Equipment: Higher Volume Sampler  
 Location & Location ID: Village house No. 96 of Tai Po Mei (A2)  
 Equipment Ref: A-2  
 Last Calibration Date: 29-Aug-08

### Equipment Calibration Results:

Calibration Date: 30-Aug-08

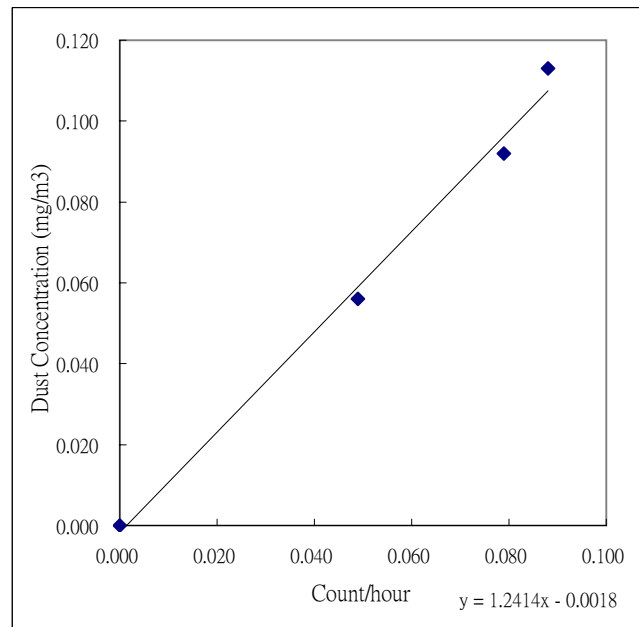
Hour	Time	Temp °C	RH %	Dust Concentration in mg/m <sup>3</sup>	
				(Standard Equipment)	(Calibrated Equipment)
1	12:15 ~ 13:15	32.7	74	0.049	0.056
1	13:20 ~ 14:20	33.5	74	0.088	0.113
1	14:28 ~ 15:28	35.8	74	0.079	0.092

Sensitivity Adjustment Zero Calibration (Before Calibration): 0 (mg/m<sup>3</sup>)

Sensitivity Adjustment Zero Calibration (After Calibration): 0 (mg/m<sup>3</sup>)

### Linear Regression of Y or X

Slope: 0.0748  
 Correlation Coefficient: 0.9958  
 Validity of Calibration Record: 30-Aug-09



Operator : Ben Tam

Signature : [Signature]

Date : 2008/8/30

QC Reviewer F.N.Wong

Signature : [Signature]

Date : 2008/8/30

## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

### Shui Mei Tsuen

Location : Strong Sing Garden	Date : 30-Dec-08
Sampler : AS-1-RSP (895-1576)	Next Calibration Date: 28-Feb-09
	Technician: Ben Tam

#### CONDITIONS

Sea Level Pressure (hPa)	1019.9	Corrected Pressure (mm Hg)	764.925
Temperature (°C)	17	Temperature (K)	290

#### CALIBRATION ORIFICE

Make-> GRASEBY	Qstd Slope ->
Model-> 25A	Qstd Intercept ->
Serial # -> 127P	Date Certified ->

#### CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION		
							Slope =	Intercept =	Corr. coeff. =
18	3.9	3.9	7.8	1.432	44	45.41	Slope =	38.1646	
13	3.1	3.1	6.2	1.278	38	39.22	Intercept =	-9.2732	
10	2.4	2.4	4.8	1.126	33	34.06	Corr. coeff. =	0.9997	
7	1.7	1.7	3.4	0.949	26	26.83			
5	1	1	2	0.730	18	18.58			

#### Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration ( deg K )

Pstd = actual pressure during calibration ( mm Hg )

#### For subsequent calculation of sampler flow:

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

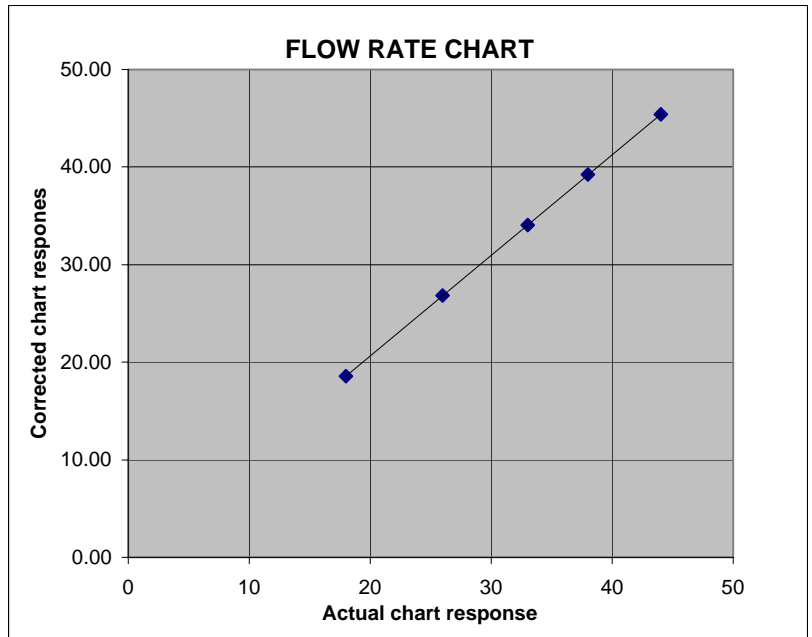
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

### Shui Mei Tsuen

Location : Strong Sing Garden	Date : 2-Mar-09
Sampler : AS-1-RSP (895-1576)	Next Calibration Date: 2-May-09
	Technician: Ben Tam

#### CONDITIONS

Sea Level Pressure (hPa)	1018.3	Corrected Pressure (mm Hg)	763.725
Temperature (°C)	19	Temperature (K)	292

#### CALIBRATION ORIFICE

Make-> GRASEBY	Qstd Slope ->
Model-> 25A	Qstd Intercept ->
Serial # -> 127P	Date Certified ->

#### CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	3.9	3.9	7.8	1.426	43	44.02	Slope = 38.6229 Intercept = -10.6743 Corr. coeff. = 0.9995
13	3.1	3.1	6.2	1.272	38	38.90	
10	2.4	2.4	4.8	1.121	32	32.76	
7	1.7	1.7	3.4	0.945	25	25.59	
5	1	1	2	0.727	17	17.40	

#### Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration ( deg K )

Pstd = actual pressure during calibration ( mm Hg )

#### For subsequent calculation of sampler flow:

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

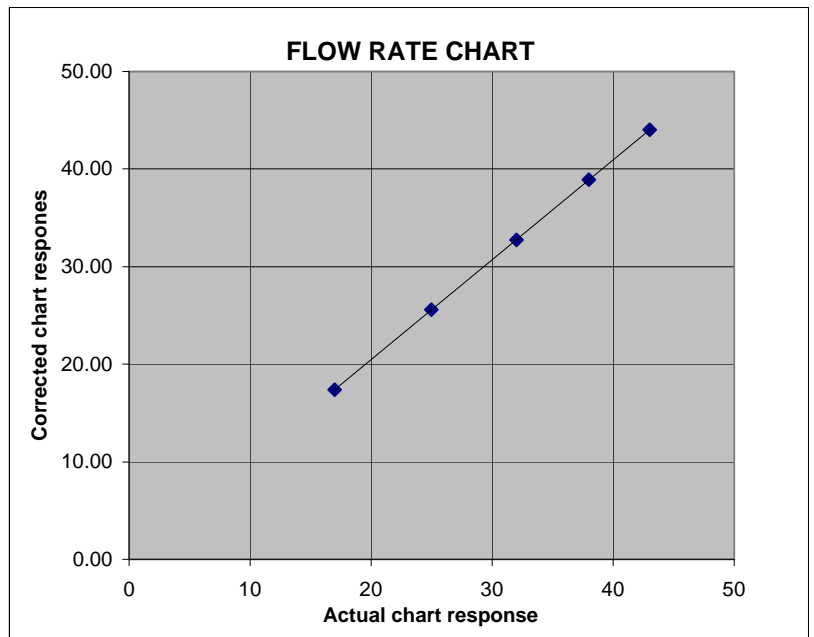
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure





Hong Kong Accreditation Service  
香港認可處

**Certificate of Accreditation**  
認可證書

*This is to certify that*  
特此證明

**ALS TECHNICHEM (HK) PTY LIMITED**

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

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

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

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

**Environmental Testing**  
環境測試

*This laboratory is accredited in accordance with the recognised International Standard ISO / IEC 17025 : 2005.  
本實驗所乃根據公認的國際標準 ISO / IEC 17025 : 2005 獲得認可。*

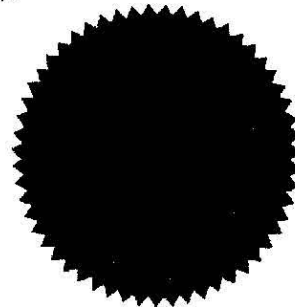
*This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory  
這項認可資格演示在指定範疇所需的技術能力及實驗所質量管理體系的運作  
quality management system (refer joint ISO-ILAC-IAF Communiqué dated 18 June 2005).  
(見國際標準化組織、國際實驗所認可合作組織及國際認可論壇於二零零五年六月十八日的聯合公報)。*

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

CHAN Sing Sing, Terence, Executive Administrator  
執行幹事 陳成城  
Issue Date : 3 May 2006  
簽發日期：二零零六年五月三日

Registration Number : **HOKLAS 066**  
註冊號碼：

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



## **Appendix F**

### **Event Action Plan**



**Event/Action Plan for Air Quality**

EVENT	ACTION			
	ET	IEC	Engineer	Contractor
<b>ACTION LEVEL</b>				
1. Exceedance for one sample	<ol style="list-style-type: none"> <li>Identify source</li> <li>Inform IEC and Engineer</li> <li>Repeat measurement to confirm finding</li> <li>Increase monitoring frequency to daily</li> </ol>	<ol style="list-style-type: none"> <li>Check monitoring data submitted by ET</li> <li>Check Contractor's working method</li> </ol>	Notify Contractor	<ol style="list-style-type: none"> <li>Rectify any unacceptable practice</li> <li>Amend working methods if appropriate</li> </ol>
2. Exceedance for two or more consecutive samples	<ol style="list-style-type: none"> <li>Identify source</li> <li>Inform IEC and Engineer</li> <li>Repeat measurements to confirm findings</li> <li>Increase monitoring frequency to daily</li> <li>Discuss with IEC and Contractor on remedial actions required</li> <li>If exceedance continues, arrange meeting with IEC and Engineer</li> <li>If exceedance stops, cease additional monitoring</li> </ol>	<ol style="list-style-type: none"> <li>Check monitoring data submitted by ET</li> <li>Check Contractor's working method</li> <li>Discuss with ET and Contractor on possible remedial measures</li> <li>Advice Engineer on the effectiveness of the proposed remedial measures</li> <li>Supervise implementation of remedial measures</li> </ol>	<ol style="list-style-type: none"> <li>Confirm receipt of notification of failure in writing</li> <li>Notify Contractor</li> <li>Ensure remedial measures properly implemented</li> </ol>	<ol style="list-style-type: none"> <li>Submit proposals for remedial actions to IEC within 3 working days of notification</li> <li>Implement the agreed proposals</li> <li>Amend proposal if appropriate</li> </ol>
<b>LIMIT LEVEL</b>				
1. Exceedance for one sample	<ol style="list-style-type: none"> <li>Identify source</li> <li>Inform Engineer and EPD</li> <li>Repeat measurement to confirm finding</li> <li>Increase monitoring frequency to daily</li> <li>Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and Engineer informed of the results</li> </ol>	<ol style="list-style-type: none"> <li>Check monitoring data submitted by ET</li> <li>Check Contractor's working method</li> <li>Discuss with ET and Contractor on possible remedial measures</li> <li>Advice Engineer on the effectiveness of the proposed remedial measures</li> <li>Supervise implementation of remedial measures</li> </ol>	<ol style="list-style-type: none"> <li>Confirm receipt of notification of failure in writing</li> <li>Notify Contractor</li> <li>Ensure remedial measures properly implemented</li> </ol>	<ol style="list-style-type: none"> <li>Take immediate action to avoid further exceedance</li> <li>Submit proposals for remedial actions to IEC within 3 working days of notification</li> <li>Implement the agreed proposals</li> <li>Amend proposal if appropriate</li> </ol>
2. Exceedance for two or more consecutive samples	<ol style="list-style-type: none"> <li>Notify IEC, Engineer and EPD</li> <li>Identify source</li> <li>Repeat measurement to confirm findings</li> <li>Increase monitoring frequency to daily</li> <li>Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented.</li> <li>Arrange meeting with IEC and Engineer to discuss the remedial actions to be taken</li> <li>Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and Engineer informed of the results</li> <li>If exceedance stops, cease additional monitoring</li> </ol>	<ol style="list-style-type: none"> <li>Discuss amongst Engineer, ET and Contractor on potential remedial actions</li> <li>Review Contractor's remedial actions whether necessary to assure their effectiveness and advice the Engineer accordingly</li> <li>Supervise implementation of remedial measures</li> </ol>	<ol style="list-style-type: none"> <li>Confirm receipt of notification of failure in writing</li> <li>Notify Contractor</li> <li>In consultation with the IEC, agree with the Contractor on the remedial measures to be implemented</li> <li>Discuss amongst Environmental Team Leader and the Contractor potential remedial actions</li> <li>Ensure remedial measures properly implemented</li> <li>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>Take immediate action to avoid further exceedance</li> <li>Submit proposals for remedial actions to IEC within 3 working days of notification</li> <li>Implement the agreed proposals</li> <li>Resubmit proposals if problem still not under control</li> <li>Stop the relevant portion of works as determined by the Engineer until the exceedance is abated</li> </ol>

**Event/Action Plan for Construction Noise**

EVENT	ACTION			
	ET Leader	IEC	Engineer	Contractor
<b>ACTION LEVEL</b>	<ol style="list-style-type: none"> <li>1. Notify Contractor and Engineer</li> <li>2. Carry out investigation</li> <li>3. Report the results of investigation to the IEC and 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 the analysed results submitted by ET</li> <li>2. Review the proposed remedial measures by the Contractor and advice the Engineer accordingly</li> <li>3. 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. Require Contractor to propose remedial measures for the analysed noise problem</li> <li>4. Ensure remedial measures properly implemented</li> </ol>	<ol style="list-style-type: none"> <li>1. Submit noise mitigation proposals for remedial actions to IEC</li> <li>2. Implement the agreed proposals</li> </ol>
<b>LIMIT LEVEL</b>	<ol style="list-style-type: none"> <li>1. Notify IEC, Engineer, EPD and Contractor</li> <li>2. Identify 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, Engineer and EPD the causes &amp; actions taken for the exceedances</li> <li>7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and Engineer 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 Engineer, ET and Contractor on potential remedial actions</li> <li>2. Review Contractor's remedial actions whether necessary to assure their effectiveness and advice the Engineer accordingly</li> <li>3. 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. Require Contractor to propose remedial measures for the analysed noise problem</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 the Engineer until the exceedance is abated</li> </ol>

**Event and Action Plan for Stream Water Quality**

<b>Event</b>	<b>ET Leader</b>	<b>IEC</b>	<b>Engineer</b>	<b>Contractor</b>
<b>ACTION LEVEL</b> (being exceeded by one sampling day)	<ol style="list-style-type: none"> <li>Repeat in-situ measurement to confirm findings</li> <li>Identify source(s) of impact</li> <li>Inform IEC and Contractor</li> <li>Check monitoring data, all plant, equipment and Contractor's working methods</li> <li>Discuss mitigation measures IEC and Contractor</li> <li>Repeat measurement on next day of exceedance</li> </ol>	<ol style="list-style-type: none"> <li>Discuss with ET and Contractor on the mitigation measures</li> <li>Review proposals on mitigation measures submitted by Contractor and advice Engineer accordingly</li> <li>Assess the effectiveness of the implemented mitigation measures</li> </ol>	<ol style="list-style-type: none"> <li>Discuss with IEC on the proposed mitigation measures</li> <li>Make agreement on the mitigation measures to be implemented</li> </ol>	<ol style="list-style-type: none"> <li>Inform Engineer and confirm notification of the non-compliance in writing</li> <li>Rectify unacceptable practice</li> <li>Check all plant and equipment</li> <li>Consider changes of working methods</li> <li>Discuss with ET and Contractor and propose mitigation measures to IEC and Engineer</li> <li>Implement the agreed mitigation measures</li> </ol>
<b>ACTION LEVEL</b> (being exceeded by more than one sampling day)	<ol style="list-style-type: none"> <li>Repeat in-situ measurement to confirm findings</li> <li>Identify source(s) of impact</li> <li>Inform IEC, Contractor and EPD</li> <li>Check monitoring data, all plant, equipment and Contractor's working methods</li> <li>Discuss mitigation measures IEC, Engineer and Contractor</li> <li>Repeat measurement on next day of exceedance</li> <li>Ensure mitigation measures are implemented</li> <li>Prepare to increase the monitoring frequency to daily</li> <li>Repeat measurement on next day of exceedance</li> </ol>	<ol style="list-style-type: none"> <li>Discuss with ET and Contractor on the mitigation measures</li> <li>Review proposals on mitigation measures submitted by Contractor and advice Engineer accordingly</li> <li>Assess the effectiveness of the implemented mitigation measures</li> </ol>	<ol style="list-style-type: none"> <li>Discuss with IEC on the proposed mitigation measures</li> <li>Make agreement on the mitigation measures to be implemented</li> <li>Assess the effectiveness of the implemented mitigation measures</li> </ol>	<ol style="list-style-type: none"> <li>Inform Engineer and confirm notification of the non-compliance in writing</li> <li>Rectify unacceptable practice</li> <li>Check all plant and equipment</li> <li>Consider changes of working methods</li> <li>Discuss with ET and IEC and propose mitigation measures to IEC and Engineer within 3 working days</li> <li>Implement the agreed mitigation measures</li> </ol>
<b>LIMIT LEVEL</b> (being exceeded by one sampling days)	<ol style="list-style-type: none"> <li>Repeat in-situ measurement to confirm findings</li> <li>Identify source(s) of impact</li> <li>Inform IEC, Contractor and EPD</li> <li>Check monitoring data, all plant, equipment and Contractor's working methods</li> <li>Discuss mitigation measures IEC, Engineer and Contractor</li> <li>Ensure mitigation measures are implemented</li> <li>Increase the monitoring frequency to daily until no exceedance of Limit level</li> </ol>	<ol style="list-style-type: none"> <li>Discuss with ET and Contractor on the mitigation measures</li> <li>Review proposals on mitigation measures submitted by Contractor and advice Engineer accordingly</li> <li>Assess the effectiveness of the implemented mitigation measures</li> </ol>	<ol style="list-style-type: none"> <li>Discuss with IEC, ET and Contractor on the proposed mitigation measures</li> <li>Request Contractor to critically review the working methods</li> <li>Make agreement on the mitigation measures to be implemented</li> <li>Assess the effectiveness of the implemented mitigation measures</li> </ol>	<ol style="list-style-type: none"> <li>Inform Engineer and confirm notification of the non-compliance in writing</li> <li>Rectify unacceptable practice</li> <li>Check all plant and equipment</li> <li>Consider changes of working methods</li> <li>Discuss with ET, IEC and Engineer and propose mitigation measures to IEC and Engineer within 3 working days</li> <li>Implement the agreed mitigation measures</li> </ol>
<b>LIMIT LEVEL</b> (being exceeded by more than one sampling days)	<ol style="list-style-type: none"> <li>Repeat in-situ measurement to confirm findings;</li> <li>Identify source(s) of impact;</li> <li>Inform Contractor, Engineer, IEC and EPD;</li> <li>Check monitoring data, all plant, equipment and Contractor's working methods;</li> <li>Discuss mitigation measures with IEC, Engineer and Contractor;</li> <li>Ensure mitigation measures are implemented;</li> <li>Increase the monitoring frequency to daily until no exceedance of Limit level</li> </ol>	<ol style="list-style-type: none"> <li>Discuss with ET and Contractor on the mitigation measures</li> <li>Review proposals on mitigation measures submitted by Contractor and advice Engineer accordingly</li> <li>Assess the effectiveness of the implemented mitigation measures</li> </ol>	<ol style="list-style-type: none"> <li>Discuss with IEC, ET and Contractor on the proposed mitigation measures</li> <li>Request Contractor to critically review the working methods</li> <li>Make agreement on the mitigation measures to be implemented</li> <li>Assess the effectiveness of the implemented mitigation measures</li> <li>Consider and instruct, if necessary, the Contractor to slow down or to stop all or part of the construction activities until daily until no exceedance of Limit level</li> </ol>	<ol style="list-style-type: none"> <li>Inform Engineer and confirm notification of the non-compliance in writing</li> <li>Rectify unacceptable practice</li> <li>Check all plant and equipment</li> <li>Consider changes of working methods</li> <li>Discuss with ET, IEC and Engineer and propose mitigation measures to IEC and Engineer within 3 working days</li> <li>Propose mitigation measures to Engineer within 3 working days</li> <li>Implement the agreed mitigation measures;</li> <li>As directed by Engineer, to slow down or to stop all or part of the construction activities</li> </ol>

## **Appendix G**

### **(A) Environmental Monitoring Data**

### **(B) Graphic Plot of Monitoring**

- 1. Construction Noise**
- 2. Air Quality**
- 3. Water Quality**

DSD CONTRACT NO. DC/2007/17  
 Drainage Improvement Works in Cheung Po, Ma On Kong, Yuen Kong San Tsuen and Tin Sam Tsuen of  
 Yuen Long District and Sewerage at Tseng Tau Chung Tsuen, Tuen Mun

24-Hour TSP Monitoring Results

DATE	SAMPLE NUMBER	STANDARD										BLANK			SAMPLE OF FILTER PAPER			Dust 24-Hr TSP in Air ( $\mu\text{g}/\text{m}^3$ )	Action Level ( $\mu\text{g}/\text{m}^3$ )	Limit Level ( $\mu\text{g}/\text{m}^3$ )	
		ELAPSED TIME			CHART READING		AVERAGE			FLOW	AIR	SAMPLE NUMBER	WEIGHT (g)			WEIGHT (g)					
		INITIAL	FINAL	(min)	MIN	MAX	CHART READING	TEMP ( $^{\circ}\text{C}$ )	PRESS (hPa)	RATE ( $\text{m}^3/\text{min}$ )	VOLUME ( $\text{std m}^3$ )		INITIAL	FINAL	DIFF	INITIAL	FINAL				DUST COLLECTION
<b>KT14 A8(a)</b>		Date of Calibration: 30-Dec-2008 Next Calibration Date: 28-Feb-09 Cal Graph Slope = 38.1646 Intercept = -9.2732																			
		Date of Calibration: 2-Mar-2009 Next Calibration Date: 2-May-2009 Cal Graph Slope = 38.6229 Intercept = -10.6743																			
28-Feb-09	SF44	1202.66	1226.82	1449.60	30	31	30.5	19.1	1018.3	1.05	1525	NA	3.6459	3.6419	-0.0040	3.6270	3.6616	0.0346	25	144	260
9-Mar-09	SF72	1226.82	1250.98	1449.60	33	34	33.5	17.2	1016.9	1.16	1677	NA	3.6459	3.6419	-0.0040	3.6080	3.7808	0.1728	105	144	260
12-Mar-09	SG45	1250.98	1274.12	1388.40	32	33	32.5	19.7	1015.2	1.13	1564	NA	3.6459	3.6419	-0.0040	3.7830	3.8670	0.0840	56	144	260
18-Mar-09	SG82	1274.12	1297.30	1390.80	31	32	31.5	22.4	1012.4	1.10	1523	NA	3.6459	3.6419	-0.0040	3.5972	3.6497	0.0525	37	144	260
24-Mar-09	SH23	1297.30	1321.18	1432.80	30	31	30.5	20.4	1013.3	1.07	1536	NA	3.6459	3.6419	-0.0040	3.5471	3.5749	0.0278	21	144	260

## Summary of Water Quality Monitoring Results - KT14A

Date 27-Feb-09																				
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DOS (%)		Turbidity (NTU)		Salinity		pH		SS		Ammonia N		Zinc	
W8A	13:50	0.12	23.6	23.6	3.23	3.21	33.6	33.3	13.6	13.6	0	0.0	7.1	7.1	6	6.0	2.48	2.48	16	16.0
			23.6		3.18		32.9		13.5		0		7.1		6		2.48		16	
W8B	14:00	0.09	23.7	23.7	5.65	5.69	58.0	58.7	8.7	8.7	0	0.0	7	7.0	7	7.0	2.66	2.66	14	14.0
			23.7		5.73		59.4		8.7		0		7		7		2.66		14	

Date 2-Mar-09																				
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DOS (%)		Turbidity (NTU)		Salinity		pH		SS		Ammonia N		Zinc	
W8A	09:55	0.17	23.7	23.7	2.98	2.96	33.1	32.8	42.3	42.2	0	0.0	7.2	7.2	115	115.0	21.6	21.60	82	82.0
			23.7		2.93		32.4		42.0		0		7.2		115		21.6		82	
W8B	09:45	0.11	23.4	23.4	6.03	5.98	66.4	66.1	9.5	9.3	0	0.0	7	7.0	31	31.0	0.91	0.91	31	31.0
			23.4		5.92		65.7		9.1		0		7		31		0.91		31	

Date 5-Mar-09																				
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DOS (%)		Turbidity (NTU)		Salinity		pH		SS		Ammonia N		Zinc	
W8A	15:35	0.14	22.9	22.9	4.68	4.71	48.2	48.9	8.7	8.7	0	0.0	7	7.0	8	8.0	5.8	5.80	14	14.0
			22.9		4.73		49.5		8.7		0		7		8		5.8		14	
W8B	15:45	0.12	23.0	23.0	4.55	4.62	46.8	47.2	7.7	7.5	0	0.0	7.2	7.2	12	12.0	6.38	6.38	13	13.0
			23.0		4.69		47.5		7.3		0		7.2		12		6.38		13	

Date 7-Mar-09																				
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DOS (%)		Turbidity (NTU)		Salinity		pH		SS		Ammonia N		Zinc	
W8A	10:00	0.14	18.9	18.9	5.19	5.16	55.7	55.4	18.0	18.2	0	0.0	7	7.0	8	8.0	11	11.00	74	74.0
			18.9		5.12		55.0		18.4		0		7		8		11		74	
W8B	09:50	0.13	17.0	17.0	6.97	6.95	77.3	76.9	91.5	91.4	0	0.0	6.9	6.9	55	55.0	1.52	1.52	75	75.0
			17.0		6.92		76.4		91.2		0		6.9		55		1.52		75	

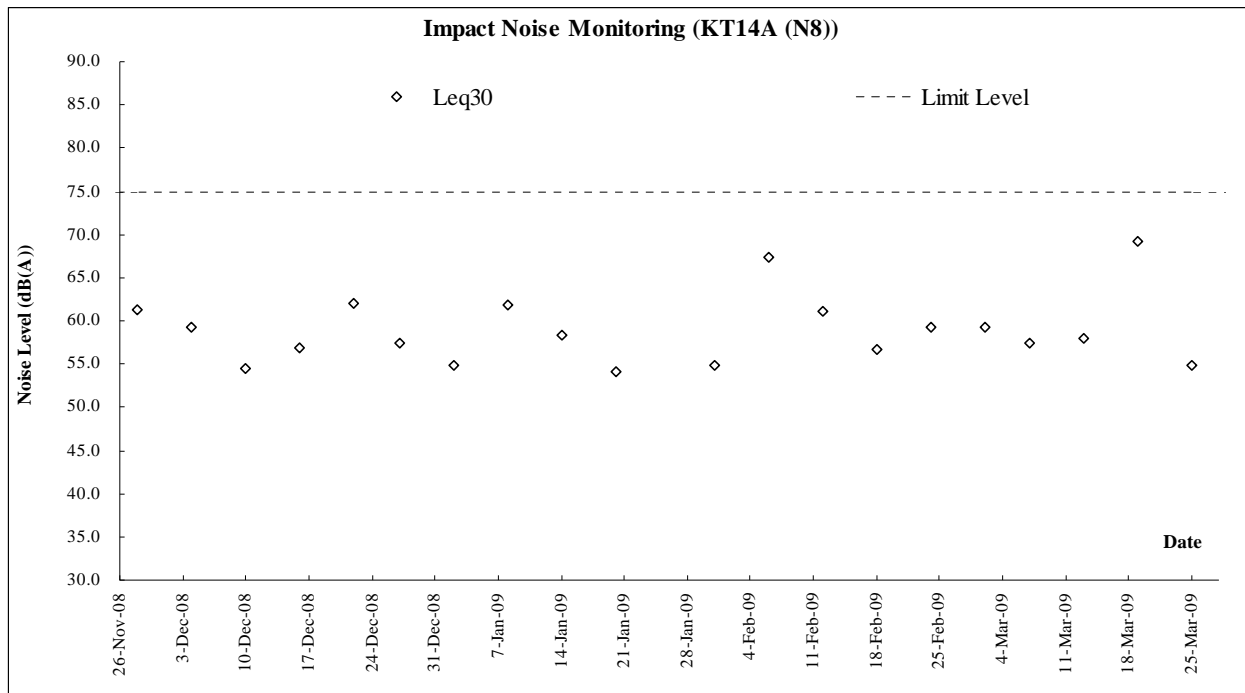
Date 9-Mar-09																				
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DOS (%)		Turbidity (NTU)		Salinity		pH		SS		Ammonia N		Zinc	
W8A	10:50	0.12	17.9	17.9	4.58	4.56	49.5	49.2	21.7	21.6	0	0.0	7.2	7.2	13	13.0	11.2	11.20	57	57.0
			17.9		4.53		48.8		21.4		0		7.2		13		11.2		57	
W8B	11:00	0.14	17.2	17.2	5.26	5.24	54.7	54.5	23.6	23.4	0	0.0	7	7.0	22	22.0	1.9	1.90	35	35.0
			17.2		5.21		54.2		23.2		0		7		22		1.9		35	

Date 12-Mar-09																				
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DOS (%)		Turbidity (NTU)		Salinity		pH		SS		Ammonia N		Zinc	
W8A	11:25	0.15	22.9	22.9	4.85	4.91	49.6	50.2	9.7	9.7	0	0.0	7.1	7.1	5	5.0	5.86	5.86	15	15.0
			22.9		4.97		50.7		9.7		0		7.1		5		5.86		15	
W8B	11:35	0.19	23.0	23.0	4.79	4.73	49.0	48.7	9.3	9.3	0	0.0	7	7.0	5	5.0	5.86	5.86	19	19.0
			23.0		4.66		48.4		9.3		0		7		5		5.86		19	

Date 14-Mar-09																				
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DOS (%)		Turbidity (NTU)		Salinity		pH		SS		Ammonia N		Zinc	
W8A	09:35	0.14	17.5	17.5	4.61	4.55	47.9	47.4	11.2	11.2	0	0.0	7	7.0	<2	2.0	<0.01	0.01	115	115.0
			17.5		4.48		46.8		11.2		0		7		<2		<0.01		115	
W8B	09:40	0.16	17.5	17.5	4.53	4.55	46.9	47.0	10.8	10.9	0	0.0	6.9	6.9	<2	2.0	<0.01	0.01	114	114.0
			17.5		4.56		47.0		10.9		0		6.9		<2		<0.01		114	

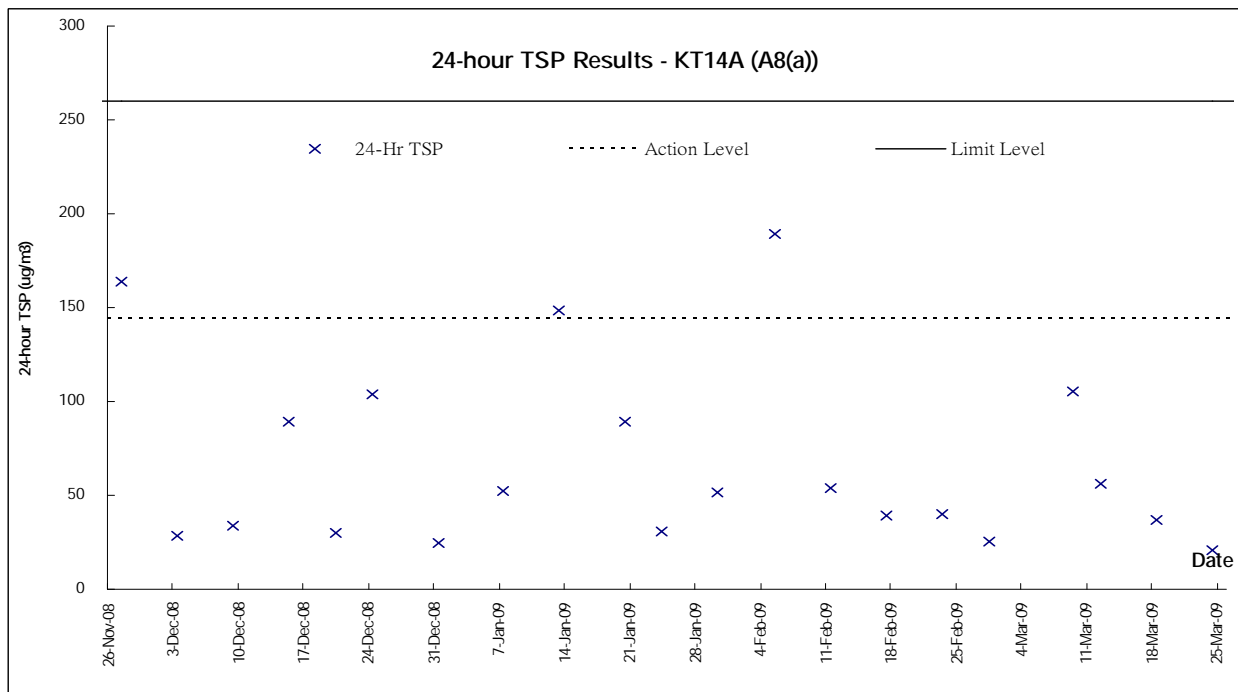
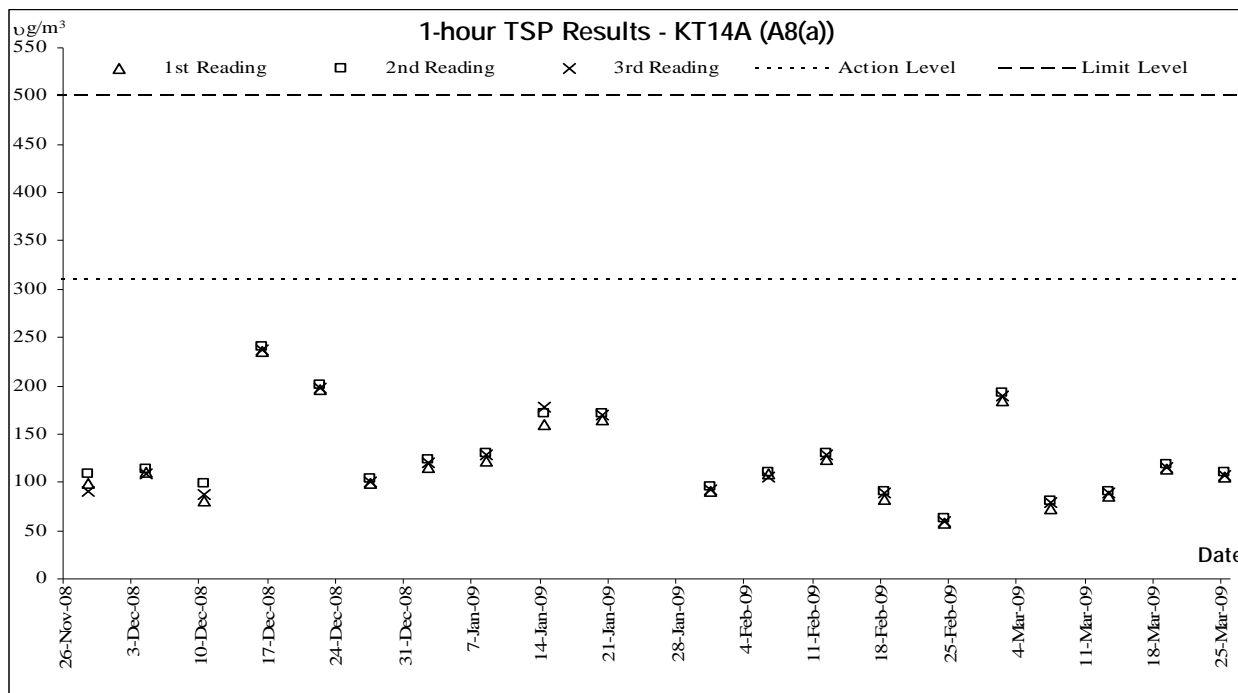


## Graphic Plot of Monitoring - Construction Noise

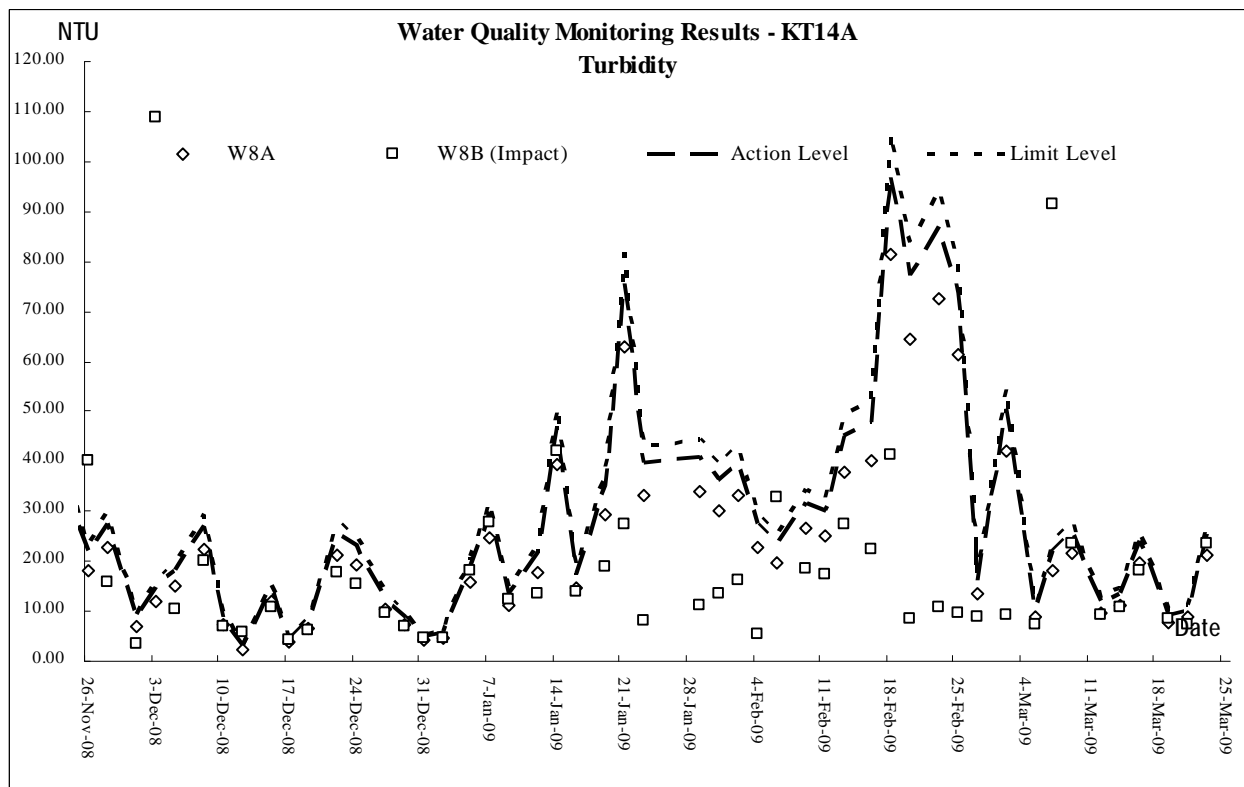
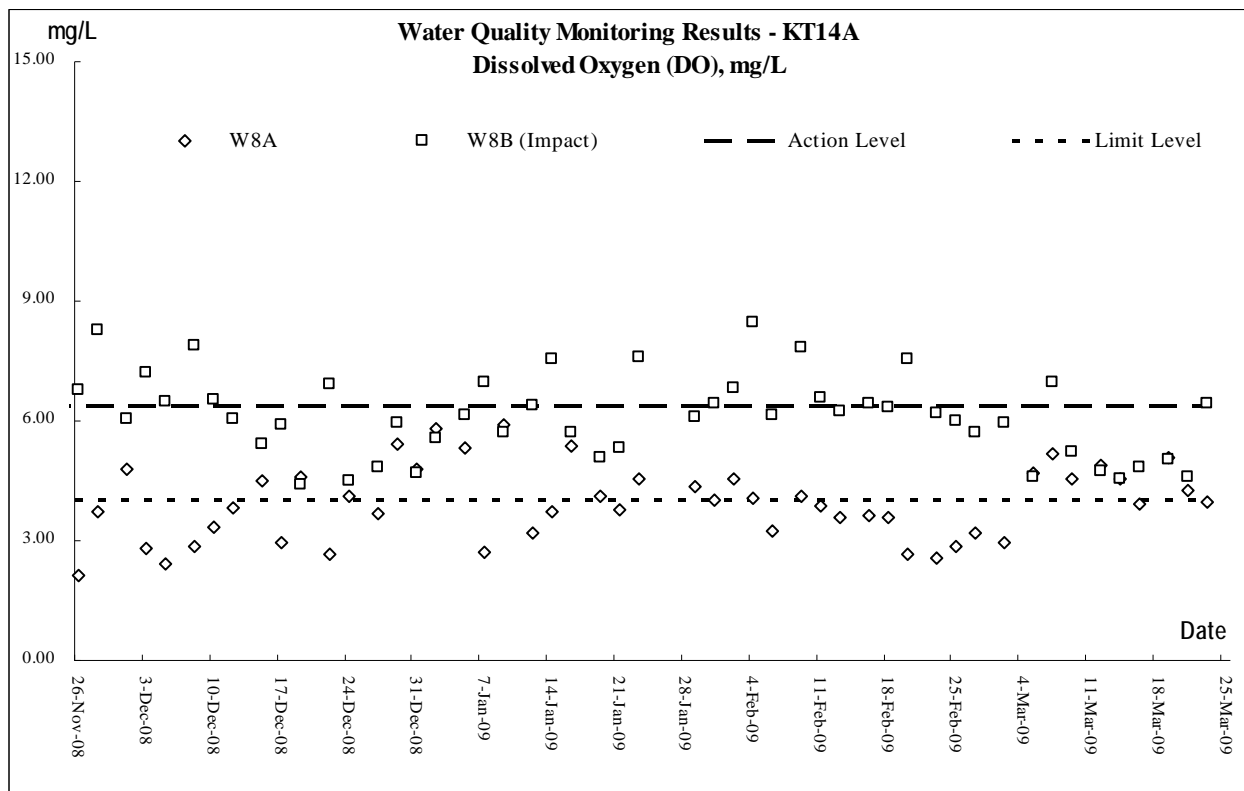


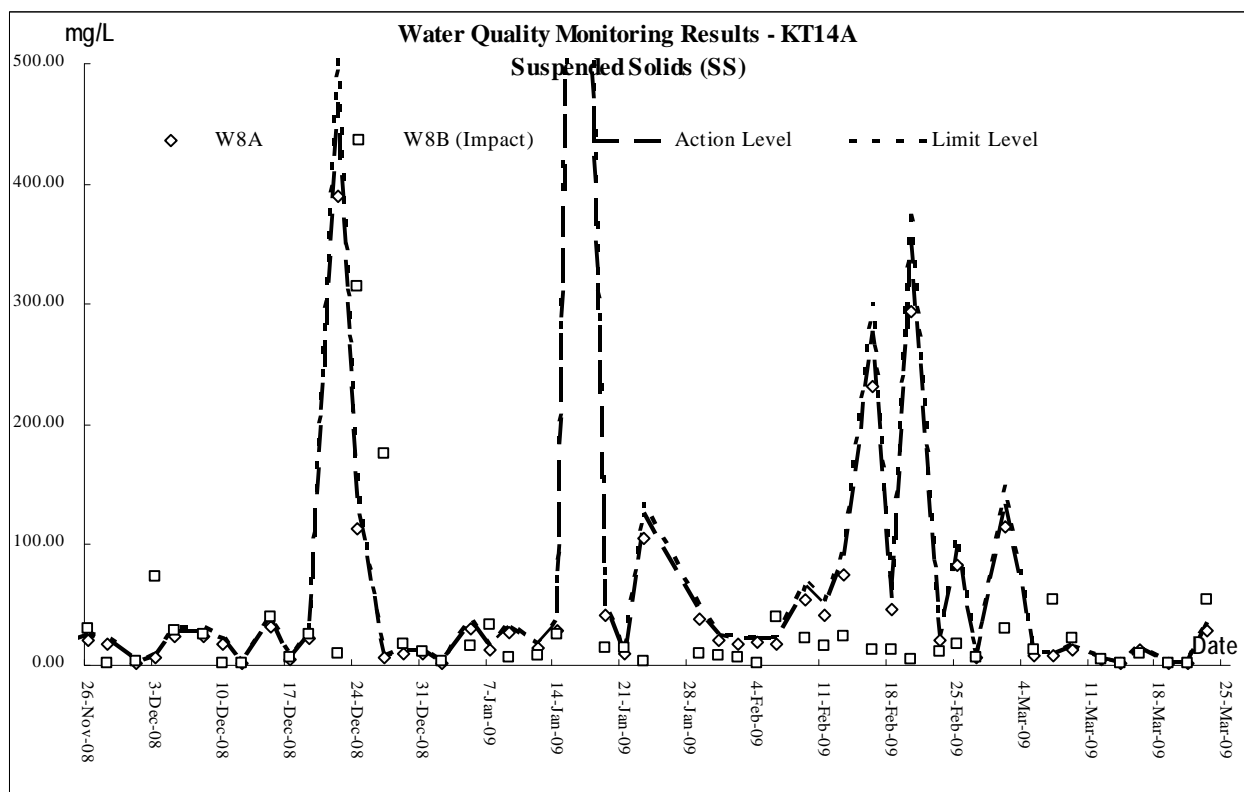
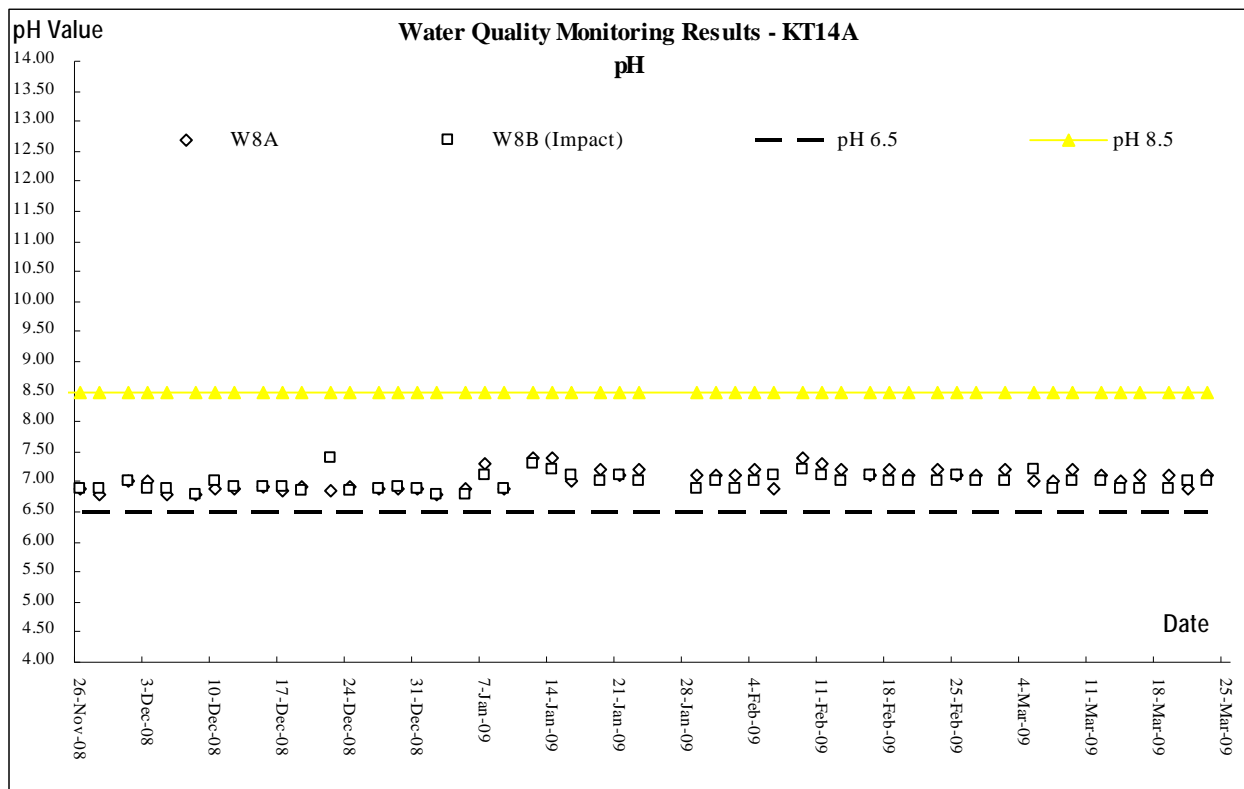


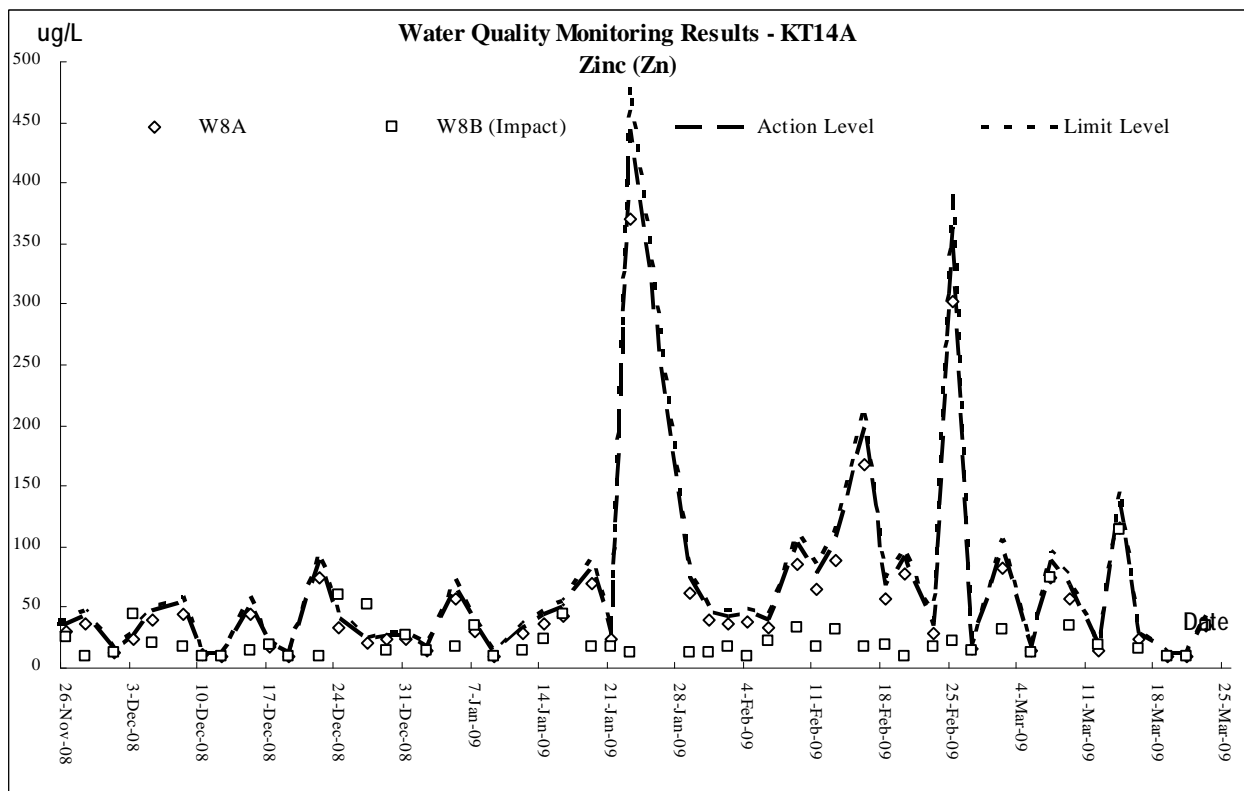
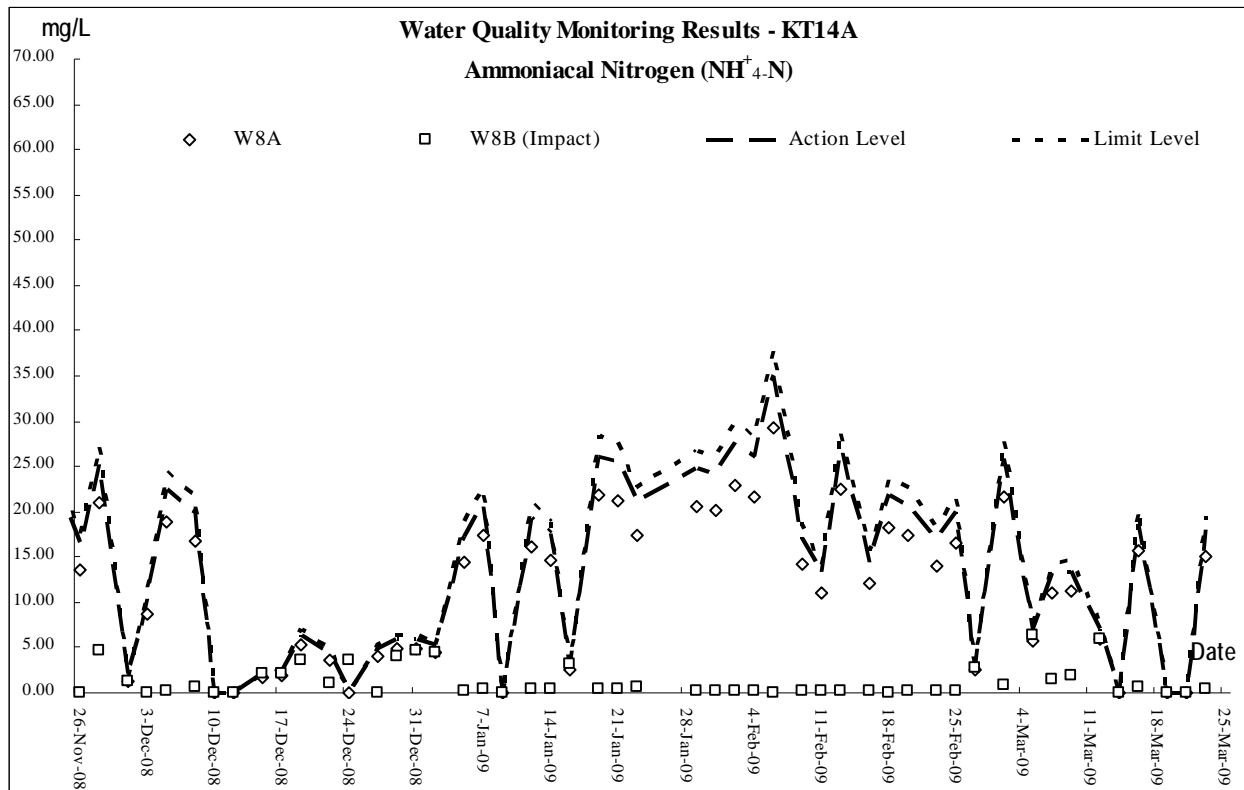
## Graphic Plot of Monitoring – Air Quality



## Graphic Plot of Monitoring – Water Quality







## **Appendix H**

### **Monthly Summary Waste Flow Table**

**Monthly Summary Waste Flow Table**

Date: 31-Mar-09  
Year/Month: Mar-09

<b>Monthly Summary Waste Flow Table for February 2009</b>										
Year	Actual Quantities of Inert C & D Materials Generated Monthly					Estimated Annual Quantities of C & D Wastes Generated Monthly				
	Total Quantity Generated	Broken Concrete (see note 4)	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Metals	Paper/ Cardboard packaging	Plastics (see note 3)	Chemical Waste	Others, e.g. General refuse
	(in '000M <sup>3</sup> )	(in '000M <sup>3</sup> )	(in '000M <sup>3</sup> )	(in '000M <sup>3</sup> )	(in '000M <sup>3</sup> )	(in '000KG)	(in '000KG)	(in '000KG)	(in '000KG)	(in '000M <sup>3</sup> )
Jan	6.716	0.008	6.708	0	0	0	0	0	0	0
Feb	8.001	0.009	7.632	0.36	0	0	0	0	0	0
Mar	5.792	0.014	5.778	0	0	0	0	0	0	0
Apr										
May										
Jun										
<b>Sub-Total</b>	<b>20.51</b>	<b>0.031</b>	<b>20.118</b>	<b>0.36</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
Jul										
Aug										
Sep										
Oct										
Nov										
Dec										
<b>Total</b>	<b>20.509</b>	<b>0.031</b>	<b>20.118</b>	<b>0.360</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>

- Notes:
- (1) The performance targets are given in PS Clause 28.10(14)
  - (2) The waste flow table shall also include C&D materials that are specified in the Contract to be imported for use at the Site.
  - (3) Plastics refer to plastic bottles/ containers, plastic sheets/ foam form packaging material
  - (4) Broken concrete for recycling into aggregates