



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 KT13  
(DECEMBER 2010)

PREPARED FOR  
CHINA ROAD & BRIDGE CORPORATION

### Quality Index

Date	Reference No.	Prepared By	Certified by
13 January 2011	TCS00408/08/600/R1549v2	 Nicola Hon Environmental Consultant	 T.W. Tam Environmental Team Leader

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1	11 January 2011	Nicola Hon	T.W. Tam	First submission
2	13 January 2011	Nicola Hon	T.W. Tam	Amended against IEC's comments on 13 January 2011

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By Fax & Post

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14 January 2011

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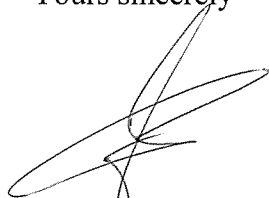
Contract No. DC/2007/17 Drainage Improvement Works in Cheung Po, Ma On Kong, Yuen King San and Tin Sam Tsuen of Yuen Long District and Sewerage at Tseng Tau Chung Tsuen, Tuen Mun  
Monthly EM&A Report for KT13 (December 2010) – Version 2

We refer to the captioned report (ref.: TCS00408/08/600/R1549v2) and advise that we have no further comments on the captioned submission.

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  
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## Executive Summary

- ES01 This is the 27<sup>th</sup> monthly EM&A report for the Channel KT13, covering the construction period from 26 November to 25 December 2010 (the Reporting Period).

## Breaches of Action and Limit Levels

- ES02 Monitoring results of the Reporting Period demonstrated no exceedances of environmental quality criteria for air quality, construction noise and ecology monitoring.
- ES03 For stream water quality monitoring, a total of 16 Limit Level exceedances were recorded in the stream water quality monitoring, namely 8 exceedances at upstream Location W2 and 8 at downstream Location W6. According to the information provided by the Contractor, no site activities were conducted during the exceedance days at near Location W2 and W6 but pigsty discharge was observed near monitoring location W2. Investigation report concluded that the exceedances were not project related.
- ES04 Four (4) events of weekly settlement monitoring for the historic grave were undertaken in this reporting month and a condition survey was conducted on 18 December 2010. The monitoring results demonstrated no exceedance was recorded in both survey.
- ES05 Landscape inspections were conducted on 7 and 22 December 2010. No significant changes were observed for the identified landscape resources and visual sensitive receivers, except for minor changes due to channel excavation, site clearance and preparation work at the identified landscape resources including LR1, LR2.1, LR2.2, LCA1, LCA3 and LCA4.

## Environmental Complaint, Notification of Summons and Prosecution

- ES06 No documented complaint, notification of summons or successful prosecution was received during the Reporting Period. Environmental audit of the Reporting Period 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 There is no reporting change in this reporting month.

## Future Key Issues

- ES08 During dry season, special attention should be paid to the dust mitigation measures to avoid fugitive dust emissions from loose soil surface or haul road. Nevertheless, mitigation measures implemented for control the surface runoff including wheel wash facilities, covering of the loose soil surface or stockpile with tarpaulin sheet, etc., should be properly maintained to prevent any muddy or sandy runoff from the loose soil surface overflow on the site boundary.
- ES09 Special attention should be paid on construction noise and other environmental issues identified in the EM&A Manual as recommended in the EIA and summarized in Mitigation Measure Implementation Schedule. CRBC was reminded to implement the required mitigation measures during construction as far as possible.

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## 1 ENVIRONMENTAL STATUS

This is the 27<sup>th</sup> monthly EM&A report for KT13, covering the construction period from **26 November to 25 December 2010** (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 presented in **Appendix A**, and the construction program in **Appendix B**.

### 1.2 WORKS UNDERTAKEN DURING THE REPORTING PERIOD

Apart from general works of tree survey, structural survey and environmental monitoring & 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:

- Excavation of channel formation
- Construction of channel structure (dry flow channel and new box culvert)
- Construction of access road
- Backfilling
- Laying of Gabion Block/Granite Block

### 1.3 ENVIRONMENTAL MANAGEMENT ORGANIZATION

Management structure and key personnel contact names and telephone numbers of the environmental management organization are presented in Appendix C, where DSD is the Project Proponent; CRBC is the main Contractor; 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 (the IEC) and Action-United Environmental Services and Consulting (AUES) is the environmental team (the ET).

### 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.

1.4.6 Dumping at Sea Permit

CRBC has been granted by the Environmental Protection Department a Permit Issued under the **Dumping at Sea Ordinance** (Permit no. EP/I4D/08-095, dated 18 September 2008, permit validity period of six months from 18 September 2008 to 17 March 2009) for disposal of 18,469 m<sup>3</sup> sediment, requiring Type 1 – open sea disposal at East Sha Chau Contaminated Mud Disposal Site – Pit IV b, to be capped as directed by the Management Team of the Civil Engineering and Development Department. Note that this permit has expired. As there is no need for further sea disposal, no further permits will be required in the future.

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 EIA, EP, EM&A Manuals, and summarized in the Mitigation Measures Implementation Schedules. The implemented mitigation measures include

- (a) Watering of stockpiles of rip-rap at KT13;
- (b) Covering of the loose soil at KT13 to minimize water quality impacts;
- (c) Hard pavement of haul road leading to public roads at KT13;
- (d) Classification and disposal of illegally dumped construction and demolition materials at KT13;
- (e) Construction of noise barriers; and
- (f) Erection of dams with sand bags downstream the excavation site within the water course of KT13 to enhance sedimentation of turbidity and suspended solids (SS).



## 2 MONITORING METHODOLOGY

### 2.1 MONITORING PARAMETERS

According to the EM&A requirements set out in the EIA, Environmental Permit No. EP-263/2007/A (the EP) and the associated EM&A Manual, the required monitoring parameters are summarized as follows.

**Table 2-1 Summary of Monitoring Parameters**

Environmental Issue	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)
Ecology	Vegetation, all bird species of wetland, Ho Pui Egret, Ma On Hong Egret and Flight Line Survey	
Waste Management	Inspection and the document audit	
Cultural Heritage	Condition survey for a historical grave	
Landscape & Visual	To audit the implementation of the proposed construction phase mitigation measure stipulated in EIA.	

### 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**

Environmental Issues	Monitoring Location	Identified Address / Co-ordinates	Status of Monitoring Locations / Rationale for Recommended Replacement
Air	A1(a)	No.68 Ho Pui Village	The original location of EM&A Manuals A1 has permanently been abandoned. No access can be acquired in the vicinity of A1. Taken into consideration that Ho Pui Village is one of the most important sensitive receivers near KT-13 without monitoring, the most fronting house, No. 68 Ho Pui Village, is therefore recommended as the replacement location A1(a).
	A2	No.1 Ma On Kong Village	Original location of the EM&A Manual; access granted.
Noise	N1(a)	168-169 Kam Ho Road, Ma On Kong Village,	Original location of N1 identified in the EM&A Manual was relocated to proposed area as recommended by IEC.
	N2(a)	No. 68 Ho Pui Village,	The original location of EM&A Manuals N2 has permanently been abandoned. No access can be acquired in the vicinity of N2. Taken into consideration that Ho Pui Village is one of the most important sensitive receivers near KT-13 without monitoring, the most fronting house, No. 68 Ho Pui Village, is therefore recommended as the replacement location N2(a).
	N3	No.1 Ma On Kong Village	Original locations of the EM&A Manual; access granted.
Water	W1	E824539 / N830283	Original locations of the EM&A Manual; access resolved.



Environmental Issues	Monitoring Location	Identified Address / Co-ordinates	Status of Monitoring Locations / Rationale for Recommended Replacement
	W2	E824693 / N830258	Original locations of the EM&A Manual; access resolved.
	W3(a)	E824833 / N830374	The W3 is proposed to be relocated about 55 m down stream to W3(a) for safety reason as there is no any discharge point observed between W3 and the proposed W3(a).
	W4	E824936 / N830618	Original locations of the EM&A Manual; access resolved.
	W5	E825008 / N830812	Original locations of the EM&A Manual; access resolved.
	W6	E825100 / N830987	Original locations of the EM&A Manual; access resolved.
Ecology	Monthly monitoring along the boundary of the works area to confirm that there are no adverse impacts on habitats outside the site in particular the Conservation Area (CA) zone and Ho Pui Egretty. Photographic records at six-month intervals; Monthly monitoring of all bird numbers including wetland species and species identified as being of conservation importance; Monitoring of Ho Pui egretty during March to August. The Ma On Kong egretty is also surveyed to provide reference information on the breeding egrets nearby; and Flight line surveys twice per month during April to June.		
Waste Management	Whole construction site and document		
Cultural Heritage	Ma On Kong	Refer to EM&A Manual (KT13) Figure 7.1.	
Landscape & Visual	Refer to EIA Section 10		

## 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. If the construction work is undertake 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) at restrict hour from 1700 – 2300 hours;
- 3 consecutive Leq(5min) for restrict hour from 2300 – 0700 hours next day;
- 3 consecutive Leq(5min) for 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

As the water columns in the stream water within KT13 is generally less than 3m, measurement is performed at the mid-depths of the monitoring locations. In case the water columns are deeper than 6m, measurement shall be carried out at three water depths, namely, 1m below water surface, mid-depth, and 1m above river bed. If the water depths are between 3 to 6m, the mid-depth measurement is omitted.

**Depths:** As the water columns in the stream water within KT13 is generally less than 3m, measurement is performed at the mid-depths of the monitoring locations. In case the water columns are deeper than 6m, measurement shall be carried out at three water depths, namely, 1m below water surface, mid-depth, and 1m above river bed. If the water depths are between 3 to 6m, the mid-depth measurement is omitted.

**Duration:** Throughout the construction period.

### **Ecology**

The Ecology Monitoring is required in accordance with the EM&A Manual.

**Parameters:** Vegetation, All bird species including wetland birds, Ho Pui and Ma On Hong Egrettries and Flight line survey

**Frequency:** Vegetation – Impact monitoring – monthly;  
Photographic records/checks against baseline records– six monthly  
Wetland Bird survey – Monthly of half-day survey;  
Ma On Kong egrettry – Monthly between March to August; and  
Ho Pui egrettry – Bi-weekly between March and August;  
Flight line Survey – twice per Month during the period from April to June

**Duration:** Throughout the whole construction period

### **Waste Management Audit**

**Frequency:** Once per month

**Duration:** Throughout the construction period.

### **Cultural Heritage**

**Scope:** Condition survey and settlement monitoring of a Qing Dynasty Grave.

**Frequency:** Condition survey - Bi-monthly  
Settlement monitoring - Bi-weekly

**Duration:** Throughout the construction phase period. (When construction work entered the 100m of the cultural heritage site)

### **Landscape & Visual**

**Frequency:** Bi-weekly

**Duration:** Throughout the construction phase period.

#### 2.3.2 Environmental Monitoring Schedule

The monitoring schedules for the Reporting Period and next 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 extracted 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 are generally required for evaluating the environmental impact arising from the construction activities. The meteorological data are presented in **Appendix D**.

2.4.2 Air Quality

**Monitoring Equipment**

A list of air quality monitoring equipment is shown below.

**Table 2-4-2 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-5025A	1483
<b>1-hour TSP</b>		
Portable Dust Meter	TSI DustTrak Model 8520	21060 / 23080 / 23079

**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 90° light scattering. The 1-hour TSP monitor consists of the following:

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

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 (hereinafter '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 (herein after '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 2-4-3 Construction Noise Monitoring Equipment**

Equipment	Model	Serial Number
Integrating Sound Level Meter	Bruel & Kjaer 2238	2285721
Calibrator	Bruel & Kjaer 4231	2326408
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(30 min) in six consecutive Leq(5 min) 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 2-4-4 Water Quality Monitoring Equipment**

Equipment	Model	Serial Number
Water Depth Detector	Eagle Sonar	-
Water Sampler	Teflon bailer / bucket	-
Thermometer & DO meter	YSI 550A	05F2063AZ
pH meter	Extech pH Meter EC500	CE133298
Turbidimeter	Hach 2100p	950900008735
Hand Refractometer	ATAGO	289468
Sample Container	High density polythene bottles (provided by laboratory)	-
Storage Container	'Willow' 33-litter plastic cool box	-

**Monitoring Procedure**

**Water Depth**

As the water columns in the stream water within KT13 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 Extech 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 ±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 KT13 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

### 2.4.5 Ecology

Monthly walk through survey will be conducted along the boundary of work area for KT13. Bird monitoring will be conducted in the study areas monthly for KT13. Monitoring on the Ho Pui egretty and Ma On Kong egretty will be conducted between March to August. Flight line surveys to record the feeding areas and the habitat use of breeding egrets will be conducted between April to June. Photographic record should be made at six month intervals.

#### Monitoring Equipment

The following equipment will be used for monitoring:-

Standard portable field survey equipment was used for ecological monitoring, including

- (a) Binoculars of 10 x 40 magnifications;
- (b) Digital camera; and
- (c) Notebook.

#### Study Area

The areas for the ecological monitoring programme would cover 60 m on either side of the existing channel as well as the proposed bypass culvert, as shown in Figure 6.1 of the EM&A Manual. Within these, emphasis will be given to the area around the Ho Pui and Ma On Kong egretties and habitats of at least moderate ecological value. In addition, monitoring would also be undertaken at the Ho Pui egretty and Ma On Kong egretty (The Ma On Kong egretty is outside the demarcated monitoring area but is also monitored to identify any adverse effects on the breeding egrets).

#### Survey Method

Monthly monitoring will be conducted by means of walk through survey, along the boundary of work area for KT13. Any adverse impacts to the habitats outside the site,

in particular the Conservation Area (CA) zone and Ho Pui Egret, will be checked and reported.

Photographic records will be made every six months on the fixed photo record points selected during the baseline survey. The photos from the construction phase ecological monitoring will be compared with those taken during the baseline, which are used as the baseline conditions.

Bird monitoring will be conducted in the study areas monthly for KT13. Attention should be paid on wetland species and species identified as being of conservation importance, and the habitats utilized should also be recorded. Bird surveys should commence no later than 2 hours after dawn.

Monitoring on the Ho Pui egret and Ma On Kong egret will be conducted between March to August. The frequency would be twice per month during March to May. Depending upon the nesting conditions at Ho Pui egret, the frequency could be reduced to monthly between June and August if no egret nest found by the end of May, or maintained at twice per month till the end of August if there are egret nests. Number of active nests, species and number of birds present and breeding stage should be recorded.

Flight line surveys to record the feeding areas and the habitat use of breeding egrets will be conducted twice per month between April to June. The number and species of flying egrets, and their landing habitats and locations should be recorded.

#### 2.4.6 Waste Management, Cultural Heritage and Landscape & Visual

Waste Management, Cultural Heritage and Landscape & Visual monitoring is required for KT13 as stipulated in the EM&A manual [382047/E/EMA/Issue 5] **Section 5**, **Section 7** and **Section 8** accordingly.

##### **Waste Management**

During the monthly audit, ETL will pay attention to the issues relating to waste management, and check whether the Contractor has followed the relevant contract Specifications and the procedures specified under the law of HKSAR.

##### **Cultural Heritage**

Condition survey by a qualified archaeologist is required for the historical grave near Ma On Kong before and during the construction phase. The method statement of condition survey of Ma On Kong Historic Grave (KT13-02-02) was issued to EPD and endorsed on 27 July 2008, the frequency of the condition survey during the construction phase and given the open cut method would be adopted for the construction of the proposed bypass box culvert under KT13 project, subject to the result of the condition survey carried out before the construction stage, it is recommended that bi-monthly condition survey be undertaken during the construction work within 100m area from the grave.

##### **Landscape and Visual**

In accordance with the EM&A manual [382047/E/EMA/Issue5] **Section 8** landscape and visual mitigation measures are required during construction and operation phase. Site inspection will be undertaken at least once every two weeks throughout the construction period to ensure compliance with the intended aims of the proposed mitigation measures.

## 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, which will be signed and dated by the respective environmental technician prior to submission to the ETL for validation and endorsement at the end of the monitoring day.

### 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>• No specific requirement, proposed three weeks after endorsement of the 3<sup>rd</sup> monthly EM&amp;A report within a particular quarter.</li> </ul>
Final EM&A Summary Report	<ul style="list-style-type: none"> <li>• No specific requirement, proposed one month upon completion of entire EM&amp;A program</li> </ul>

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

It was 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 obtaining laboratory analysis results, the cutoff day for each month is the 25<sup>th</sup> i.e. the first day of each report is the 26<sup>th</sup> of the last month and the end day, 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 and statutory criteria. In case the measured data exceed the environmental quality criteria, remedial actions will be triggered according to the Event and Action Plan enclosed in **Appendix F**. The environmental monitoring results are tabulated below and the details of 24-hour TSP data and graphical plots of trends of monitored parameters at key stations over the past four Reporting Periods are presented in **Appendices G** and **H**.

#### 3.1 AIR QUALITY

##### 3.1.1 Action and Limit Levels

According to the Baseline Monitoring Report for KT13, the Action and Limit Levels for 24-hour and 1-hour TSP are established as follows:

**Table 3-1-1 Air Quality Action and Limit Levels**

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
KT13(A1(a))	309	144	500	260
KT13(A2)	307	141	500	260

##### 3.1.2 Results

Results of air quality monitoring at the identified locations during the Reporting Period are summarized in **Tables 3-1-3-1** and **3-1-3-2** below.

**Table 3-1-2-1 Summary of Air Quality Monitoring Results at KT13-A1(a)**

1-hour TSP ( $\mu\text{g}/\text{m}^3$ )						24-hour TSP ( $\mu\text{g}/\text{m}^3$ )	
Date	Start Time	1 <sup>st</sup> hour	2 <sup>nd</sup> hour	3 <sup>rd</sup> hour	Average	Date	Results
1-Dec-10	9:14	62	67	59	63	30-Nov-10	39
7-Dec-10	9:11	75	81	85	80	7-Dec-10	117
13-Dec-10	9:47	47	53	59	53	11-Dec-10	121
18-Dec-10	9:50	54	61	67	61	17-Dec-10	95
24-Dec-10	9:42	51	57	63	57	23-Dec-10	103
Average (range)		63 (47-85)				Average (range) 95 (39-121)	

**Table 3-1-2-2 Summary of Air Quality Monitoring Results at KT13-A2**

1-hour TSP ( $\mu\text{g}/\text{m}^3$ )						24-hour TSP ( $\mu\text{g}/\text{m}^3$ )	
Date	Start Time	1 <sup>st</sup> hour	2 <sup>nd</sup> hour	3 <sup>rd</sup> hour	Average	Date	Results
1-Dec-10	13:12	63	68	59	63	30-Nov-10	33
7-Dec-10	13:17	73	80	86	80	7-Dec-10	*Power failure
13-Dec-10	13:14	45	51	58	51	11-Dec-10	*Power failure
18-Dec-10	13:10	57	63	68	63	17-Dec-10	85
24-Dec-10	13:24	55	61	67	61	23-Dec-10	*Power failure
Average (range)		64 (45-86)				Average (range) 58 (33-85)	

\* Power failure of the HVS occurred.

##### 3.1.3 Discussion

As shown in **Tables 3-1-2-1** and **3-1-2-2**, 1-hour TSP and 24-hour TSP results fluctuated well below the Action Level. No exceedance of Action or Limit Levels was recorded during the Reporting Period. Neither Notification of Exceedance (hereinafter 'NOE') of air quality criteria or corrective action was required. Due to the power failure of high volume sampler at KT13 A2 on 7, 11 and 23 December 2010, three monitoring data was absent in this reporting month. We have liaised with the Contractor and it is advised that only

channel excavation, construction of channel structure and laying of gabion block were conducted at Channel KT-13 in the entire December. Those activities would not cause excessive dust problem. Moreover, air pollution mitigation measures such as regular watering on haul roads and cover for the stockpile of excavated soil were provided to prevent fugitive dust generation due to construction work. It is also noted that no adverse change of 1-hour TSP levels during the power failure incident. As the majority of works were almost the same before and after the HVS power failure, we consider the 24-hour TSP monitoring results during HVS power failure would not have big variation in comparing with before.

### 3.2 CONSTRUCTION NOISE

#### 3.2.1 Action and Limit Levels

The Action and Limit Levels for construction noise are illustrated in **Table 3-2-1**.

**Table 3-2-1 Construction Noise Action and Limit Levels**

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

Results of construction noise monitoring at the identified locations N1(a), N2(a) and N3 during the Reporting Period are summarized in **Tables 3-2-2-1 to 3-2-2-3**.

The baseline monitoring for N1(a) and N2(a) was performed on the 1st floor of the bedroom of 168-169 Kam Ho Road, Ma On Kong Village and No. 68 Ho Pui Village respectively. The impact noise monitoring, however, was performed on the ground floor of the same house due to denial of access to the 1st floor. The change of noise monitoring from 1st floor to ground floor will negate the need for a 3dB(A) façade correction but will not introduce any significant difference in detection and minimization of the of construction noise impacts, or alteration of the established A/L Levels. The ET has obtained the approval from EPD with consultation with the ER and IEC.

**Table 3-2-2-1 Summary of Construction Noise Monitoring Results – N1(a)**

Date	Start Time	1 <sup>st</sup> set Leq5	2 <sup>nd</sup> set Leq5	3 <sup>rd</sup> set Leq5	4 <sup>th</sup> set Leq5	5 <sup>th</sup> set Leq5	6 <sup>th</sup> set Leq5	Leq30
1-Dec-10	9:24	59.7	54.0	58.1	55.7	56.6	57.5	57.3
7-Dec-10	9:42	62.7	62.9	63.4	63.4	63.1	62.8	63.1
13-Dec-10	9:46	66.6	66.4	66.5	66.5	66.5	66.5	66.5
18-Dec-10	9:44	63.4	63.9	64.7	64.9	64.1	63.2	64.1
24-Dec-10	9:45	73.2	69.1	71.5	71.7	67.0	70.4	70.9
<b>Limit Level</b>								<b>75</b>

**Table 3-2-2-2 Summary of Construction Noise Monitoring Results – N2(a)**

Date	Start Time	1 <sup>st</sup> set Leq5	2 <sup>nd</sup> set Leq5	3 <sup>rd</sup> set Leq5	4 <sup>th</sup> set Leq5	5 <sup>th</sup> set Leq5	6 <sup>th</sup> set Leq5	Leq30
1-Dec-10	10:17	57.7	64.0	66.4	66.9	66.7	66.5	65.5
7-Dec-10	13:04	63.8	64.1	64.8	64.7	64.1	63.7	64.2
13-Dec-10	13:28	64.0	64.2	64.2	64.2	64.3	64.6	64.3
18-Dec-10	13:04	63.4	64.0	59.8	64.8	66.0	66.3	64.5
24-Dec-10	11:17	65.6	67.7	67.0	67.2	66.6	63.9	66.5
<b>Limit Level</b>								<b>75</b>

**Table 3-2-2-3 Summary of Construction Noise Monitoring Results – N3**

Date	Start Time	1 <sup>st</sup> set Leq5	2 <sup>nd</sup> set Leq5	3 <sup>rd</sup> set Leq5	4 <sup>th</sup> set Leq5	5 <sup>th</sup> set Leq5	6 <sup>th</sup> set Leq5	Leq30
1-Dec-10	11:04	67.3	68.9	68.4	67.9	67.1	66.9	67.8
7-Dec-10	10:31	63.1	63.7	64.2	64.3	64.1	63.5	63.8
13-Dec-10	11:08	66.6	66.3	66.3	66.4	66.6	66.5	66.5
18-Dec-10	10:30	65.4	64.9	66.9	66.9	67.1	66.7	66.4
24-Dec-10	10:35	66.7	66.4	66.5	67.1	66.8	66.4	66.7
<b>Limit Level</b>								<b>75</b>

3.2.3 Discussion

It is confirmed that no raining during the course of noise monitoring as fulfill EM&A manual requirements. As shown in **Tables 3-2-2-1, Table 3-2-2-2 and Table 3-2-2-3**, all the construction noise results fluctuated well below the Limit Level. No exceedance of Limit Level or documented construction complaint was recorded during the Reporting Period. No NOE or corrective action was therefore required.

3.3 WATER QUALITY

3.3.1 Action and Limit Levels

The Action and Limit Levels for water quality are illustrated in **Table 3-3-1**.

**Table 3-3-1 Action and Limit Levels for Water Quality Monitoring**

Monitoring Location	DO (mg/L)		Turbidity (NTU)		pH		SS (mg/L)		Ammonia (µg/L)		Zinc (µg/L)	
	Action Level	Limit Level	Action Level	Limit Level	Action Level	Limit Level	Action Level	Limit Level	Action Level	Limit Level	Action Level	Limit Level
W1 (Upstream) Control Station	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
W2 (Downstream) Impact Station	1.04	1.00	36.81	37.16	8.65	8.69	79.0	86.2	16.85	16.89	234.95	266.19
W3(a) (Upstream) Control Station	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
W4 (Upstream) Control Station	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
W5 (Upstream) Control Station	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
W6 (Downstream) Impact Station	0.93	0.91	27.88	30.02	8.7	8.7	73.40	78.68	51.62	54.56	191.90	201.58

3.3.2 Results

Water quality monitoring results measured at W1, W2, W3(a), W4, W5 and W6 during the Reporting Period are presented in tabulation and graphical plots in **Appendix G**.

3.3.2 Discussion

In this Reporting Period, the exceedances registered at impact station W2 and W6 as shown in **Table 3-3-2**.

**Table 3-3-2 Summary of Water Quality Exceedances**

Location	Exceedance	DO	Turbidity	pH	SS	NH <sub>4</sub> <sup>+</sup> N	Zn	Total
W2	Action Level	0	0	0	0	0	0	0
	Limit Level	0	1	0	3	4	0	8
W6	Action Level	0	0	0	0	0	0	0
	Limit Level	0	3	0	4	1	0	8
Total	Action Level	0	0	0	0	0	0	0
	Limit Level	0	4	0	7	5	0	16

DO, pH and Zinc

No exceedances of Action and Limit Levels were recorded during the Reporting Period. No Notifications of Environmental Quality Limit Exceedances (NOE) or corrective actions were therefore required for these parameters.

Turbidity, Suspended solids and NH<sub>4</sub><sup>+</sup>-N

A total of 16 Limit Level exceedances were recorded in the stream water quality monitoring, namely 8 exceedances at upstream Location W2 and 8 at downstream Location W6. According to the information provided by the Contractor, no site activities were conducted during the exceedance days at near Location W2 and W6 but pigsty discharge was observed near monitoring location W2. Since high levels of Turbidity, Suspended solids and NH<sub>4</sub><sup>+</sup>-N were also recorded at upstream and control station, it is believed that the exceedances were likely due to the discharge from the agriculture farm and livestock at the vicinity as water quality throughout the channel was affected. Therefore, it is concluded that the exceedances were not related to the works under the Project.

3.4 ECOLOGY

3.4.1 Action and Limit Levels

The Action and Limit Levels for Construction Ecology Monitoring are shown in **Table 3-4-1** to according with the EM&A manual.

**Table 3-4-1 Ecological Action and Limit Levels**

Parameters	Action Level	Limit Level
Decrease in number of breeding egrets since previous year	>20%	> 40%

3.4.2 Results

**Fifty-one (51)** individuals of birds from **twenty (20)** species were recorded during the survey on **18 December 2010**. Among the birds recorded, **seven (7)** individuals of wetland dependent birds (from **2 species**) were recorded. The summary of KT13 ecology bird survey can be referred to **Table 3-4-2**.

It is stated in the EP for KT13 that the monitoring of the Ho Pui egretty shall be carried out during the period from 1st March to 31st August as specified in the EM&A Manual. If no egret nest is found at the egretty during the period from 1st March to 31st May, the Permit Holder can start the construction works within 100m of the ecological buffer area upon obtaining the Director's approval until February in the next year. If egret nests are found during the period from 1st March to 31st August, no construction shall take place within 100m of the ecological buffer area before 1st October.

Previously the monitoring during March 2010 to May 2010 did not record any nest in Ho

Pui Egret, and thus the construction works could be conducted within 100m of the ecological buffer area until February 2011. And the egret monitoring frequency from June to August this year can be downgraded to Monthly. No nest was found at the Ho Pui egret during these surveys. Even though, as there had been no nest recorded at Ho Pui egret in 2009, the action/limit level for ecology is complied.

Ma On Kong egret was also surveyed between March to August 2010 to provide reference information on the breeding. No nest was found at Ma On Kong egret neither. Flight line surveys are required between April to June which is not required in this reporting month.

During the walk through survey on 18 December 2010, other than the bamboo trees which are within Ho Pui Egret boundary as shown in the EM&A manual and had been found to be cleared by villagers during site inspection on 11 July 2009, no further adverse impacts on habitats outside the boundary of the works area including the Conservation Area and the remaining Ho Pui Egret was found. Ecological impact monitoring results are presented in the **Table 3-4-2**.

Photo records of trees are required in six-month interval and it is not required in this reporting month.

**Table 3-4-2 Summary of KT13 Ecology Impact Monitoring Bird Survey**

Scientific Name	Common Name	Reported in the project profile	Abundance recorded in the present survey (18 December 2010)	Habitat utilized
<b>Birds</b>				
Little Egret	<i>Egretta garzetta</i>	✓	4	Stream
Cattle Egret	<i>Bubulcus ibis</i>	✓		
Chinese Pond Heron	<i>Ardeola bacchus</i>	✓	3	Stream
Crested Serpent Eagle	<i>Spilornis cheela</i>	✓		
Bonelli's Eagle	<i>Hieraetus fasciatus</i>	✓		
Eurasian Hobby	<i>Falco subbuteo</i>	✓		
White-breasted Waterhen	<i>Amaunornis phoenicurus</i>	✓		
Spotted Dove	<i>Streptopelia chinensis</i>	✓	4	Woodland, bare ground
Common Koel	<i>Eudynamis scolopacea</i>	✓		
Greater Coucal	<i>Centropus sinensis</i>	✓		
Little Swift	<i>Apus affinis</i>	✓		
White-Throated Kingfisher	<i>Halcyon smyrnenensis</i>	✓		
Barn Swallow	<i>Hirundo rustica</i>	✓		
Red-Whiskered Bulbul	<i>Pycnonotus jocosus</i>	✓	4	Woodland,
Chinese Bulbul	<i>Pycnonotus sinensis</i>	✓	4	Woodland
Long-Tailed Shrike	<i>Lanius schach</i>	✓	2	Low lying grassland
Oriental Magpie Robin	<i>Copsychus saularis</i>	✓	2	Agricultural land, bare ground
Masked Laughingthrush	<i>Garrulax perspicillatus</i>	✓	1	Bare ground,
Yellow-Bellied Prinia	<i>Prinia flaviventris</i>	✓	2	Low lying grassland
Common Tailorbird	<i>Orthotomus sutorius</i>	✓	1	Low lying grassland
Great Tit	<i>Parus major</i>	✓		Woodland
Japanese White-Eye	<i>Zosterops japonicus</i>	✓	2	Woodland
White-Rumped Munia	<i>Lonchura striata</i>	✓		
Eurasian Tree Sparrow	<i>Passer montanus</i>	✓	5	Agricultural land, bare ground
Black-Collared Starling	<i>Sturnus nigricollis</i>	✓	4	bare ground,
Common Myna	<i>Acridotheres tristis</i>	✓		
Crested Myna	<i>Acridotheres cristatellus</i>	✓	4	Agricultural land, bare ground



Scientific Name	Common Name	Reported in the project profile	Abundance recorded in the present survey (18 December 2010)	Habitat utilized
Black Kite	<i>Milvus migrans</i>	\		
White Wagtail	<i>Motacilla alba</i>	\	1	Stream
Plain Prinia	<i>Prinia inornata</i>	\	3	Low lying grassland
Common Mapiie	<i>Pica pica</i>	\	2	Bare ground
Green Sandpiper	<i>Tringa ochropus</i>	\	1	Stream
Common Blackbird	<i>Turdus merula</i>	\	1	Woodland
Grey Wagtail	<i>Motacilla cinerea</i>	\	1	Stream
<b>Species Number</b>		27	<b>20</b>	
<b>Individual Number</b>		NA	<b>51</b>	

\*Wetland dependent species recorded with abundance during the baseline study with the names bolded

### 3.5 WASTE MANAGEMENT, CULTURAL HERITAGE AND LANDSCAPE & VISUAL

#### 3.5.1 Waste Management

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

- Assigned, since 9 Jan 2008, a Billing Account (account number 7006524) under the **Waste Disposal (Charges for Disposal of Construction Waste) Regulation**;
- Issued a Discharge License No. 1U461/1 under Section 20 of the **Water Pollution Control Ordinance**;
- Registered 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); and
- Granted by the Environmental Protection Department a Permit Issued under the **Dumping at Sea Ordinance** (Permit no. EP/I4D/08-095, dated 18 September 2008, permit validity period of six months from 18 September 2008 to 17 March 2009) for 18, 469 m<sup>3</sup> sediment requiring Type 1 – open sea disposal at East Sha Chau Contaminated Mud Disposal Site – Pit IV b to be capped as directed by the management Team of the CEDD.

#### 3.5.2 Cultural Heritage

The Action and Limit Levels for Cultural Heritage are shown in **Table 3-5-2** according to the EM&A Manual.

**Table 3-5-2 Cultural Heritage Resources Action and Limit Levels**

Action Level	Limit Level
When damage or structural instability is first detected	Signs of deterioration and structural instability continues on subsequent visits after Action Level is triggered

The historical grave KT13-02-02 was identified during the EIA stage of the project. A pre-construction condition survey report was issued in **July 2008** and already agreed by AMO. The details of the grave could be referred to in a report entitled "*Pre-construction condition survey on July 2008*".

During the Reporting Period, construction work at Channel KT13 had entered the area within 100m of the cultural heritage site (the grave) since 21 October 2009. To update the condition of the grave, supplementary information of condition survey was undertaken on 31 August 2009 (when no construction activities were carried out within 100m areas from the grave). The monitoring result of the supplementary survey would be adopted as the updated initial reading of the settlement level as agreed by ET and



IEC.

Under the current EM&A programme and approved monitoring methodology, the condition survey would be conducted by ERM Limited on a bi-monthly basis and the settlement monitoring will be conducted by CRBC, again bi-weekly. Should any exceedance was recorded, the frequency of the settlement monitoring shall be increased to weekly and the condition survey shall be increased to bi-weekly. In the settlement monitoring, five settlement marker points (13GS01 to 13GS05) were established to record the coordinates and elevation of the grave in order to monitor any ground movement or settlement during the construction works.

In this reporting period, weekly settlement monitoring was taken on **27 November, 8, 14 and 18 December 2010** to compare with the initial readings to determine if there is any significant tilting or settlement of the grave. Monitoring result demonstrated no exceedance was triggered and the settlement monitoring results are shown in **Table 3-5-3**. Besides, a condition survey of the grave was carried out by ERM Limited on 18 December 2010, it was reported that no new crack was found and the grave was kept in good condition. The condition survey report of the grave is presented in **Appendix I**.

**Table 3-5-3 Record of Five Settlement Marker Points of the Qing Dynasty Grave**

Monitoring Point Date	Level (mpd)	Diff. (mm)	Level (mpd)	Diff. (mm)	Level (mpd)	Diff. (mm)	Level (mpd)	Diff. (mm)	Level (mpd)	Diff. (mm)
	13GS01		13GS02		13GS03		13GS04		13GS05	
<b>31/08/09 (Initial reading)</b>	19.222	0	19.985	0	20.644	0	19.943	0	19.211	0
27/11/10	19.223	+1	19.985	0	20.644	0	19.944	+1	19.211	0
8/12/10	19.223	+1	19.985	0	20.644	0	19.944	+1	19.211	0
14/12/10	19.222	0	19.985	0	20.644	0	19.943	0	19.211	0
18/12/10	19.223	+1	19.985	0	20.644	0	19.944	+1	19.211	0
Breach of A/L Level	-		-		-		-		-	

Note: Action level exceedance would be triggered when the settlement difference is  $\pm 2\text{mm}$ .

Limit level exceedance would be triggered when the settlement difference is  $\pm 5\text{mm}$ .

### 3.5.3 Landscape and Visual

Landscape and visual inspections were conducted on **7 and 22 December 2010**. Current situation of the identified landscape resources remained the same as those of the baseline, except minor changes of river/stream/fish pond landscape character area at LR1, LR2.1, LR2.2, LCA1, LCA3 and LCA4 due to site clearance, soil stockpiling and preparation work within KT13. Updated landscape and visual status is presented in **Appendix J**.

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

4.1 NON-COMPLIANCE

Exceedances in water quality monitoring were recorded but it concluded that all the exceedances were not project related in this reporting month as discussed in **Section 3.1 to 3.5**. No other non-compliance or deficiency was identified during regular site inspection and environmental audit. No associated remedial action was necessary.

4.2 ENVIRONMENTAL COMPLAINT

No written or verbal complaint was received for each environmental issue during the Reporting Period. No associated remedial action was necessary.

4.3 NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTION

No notifications of summons and successful prosecutions were recorded during the Reporting Period. No associated remedial action was necessary.

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 K: Monthly Summary Waste Flow Table**. No Type I or Type II excavated soil were recorded in this Reporting Period.

4.4.2 Site Inspection and Environmental Audit

In this Reporting Period, **four** occasions of weekly environmental site inspection and audit were conducted during the Reporting Period jointly by the ER, EO and ET. No adverse environmental impacts were registered, indicating that the mitigation measures implemented were effective and sufficient for the construction activities undertaken. Minor deficiencies found in the site inspection and audit were in general rectified within the specified deadlines. Findings of the site inspection and environmental audit are summarized below.

**Table 4-4-1 Summary of Findings of Site Inspection and Environmental Audit**

Date	Findings / Deficiencies	Follow-Up Status
30 November 2010	The Contractor is reminded to remove unwanted construction materials.	Recommendation based on the observation on 5 October 2010 was followed.
7 December 2010	The Contractor is reminded to minimize dust disturbance from the dusty materials.	Recommendations based on the observations on 5 October 2010 were followed.
14 December 2010	The Contractor is reminded to remove the unused timber and formwork.	Recommendations based on the observations on 5 October 2010 were followed.
20 December 2010	The Contractor is encouraged to keep up the good site management practice.	N.A

#### 4.4.3 Works to be Undertaken Next Month

Works to be undertaken next month are shown in the construction program enclosed in **Appendix B**. The construction activities undertaken in the Reporting Period including:

- Excavation of channel formation
- Construction of channel structure (dry flow channel and new box culvert)
- Construction of access road
- Backfilling
- Laying of Gabion Block/Granite Block

#### 4.4.4 Future Key Issues and Mitigation Measures for the Forth-Coming Month

During dry season, special attention should be paid to the dust mitigation measures to avoid fugitive dust emissions from loose soil surface or haul road. Nevertheless, mitigation measures implemented for control the surface runoff including wheel wash facilities, covering of the loose soil surface or stockpile with tarpaulin sheet, etc., should be properly maintained to prevent any muddy or sandy runoff from the loose soil surface overflow on the site boundary.

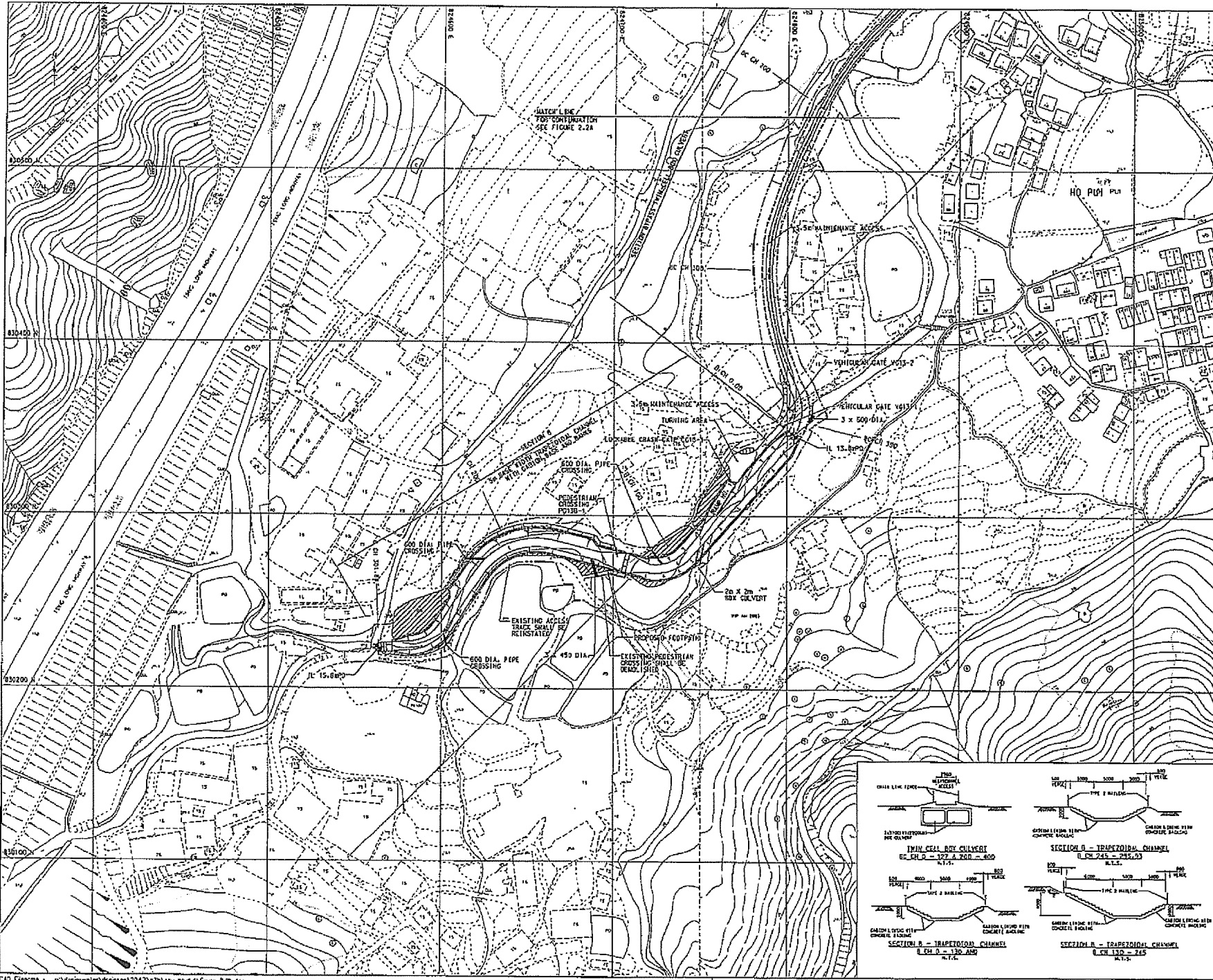
Special attention should be paid on construction noise and other environmental issues identified in the EM&A Manual as recommended in the EIA and summarized in Mitigation Measure Implementation Schedule. CRBC was reminded to implement the required mitigation measures during construction as far as possible.

## 5 CONCLUSIONS AND RECOMMENDATIONS

- i) This is the **27<sup>th</sup>** monthly EM&A report for Channel KT13, covering the construction period from **26 November to 25 December 2010** (the Reporting Period).
- ii) Monitoring results of the Reporting Period demonstrated no exceedances of environmental quality criteria for air quality, construction noise and ecology monitoring.
- iii) For stream water quality monitoring, a total of 16 Limit Level exceedances were recorded in the stream water quality monitoring, namely 8 exceedances at upstream Location W2 and 8 at downstream Location W6. According to the information provided by the Contractor, no site activities were conducted during the exceedance days at near Location W2 and W6 but pigsty discharge was observed near monitoring location W2. Investigation report concluded that the exceedances were not project related.
- iv) Four (4) events of weekly settlement monitoring for the historic grave were undertaken in this reporting month and a condition survey was conducted on 18 December 2010. The monitoring results demonstrated no exceedance was recorded in both survey.
- v) Landscape inspections were conducted on **7 and 22 December 2010**. No significant changes were observed for identified landscape resources and visual sensitive receivers, except for minor changes due to channel excavation, site clearance and preparation work at the identified landscape resources including LR1, LR2.1, LR2.2, LCA1, LCA3 and LCA4.
- vi) No documented complaints, notifications of summons or successful prosecutions were received during the Reporting Period. No adverse environmental impacts were observed during the weekly site inspection and environmental audit of the Reporting Period, which suggested 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.
- vii) During dry season, special attention should be paid to the dust mitigation measures to avoid fugitive dust emissions from loose soil surface or haul road. Nevertheless, mitigation measures implemented for control the surface runoff including wheel wash facilities, covering of the loose soil surface or stockpile with tarpaulin sheet, etc., should be properly maintained to prevent any muddy or sandy runoff from the loose soil surface overflow on the site boundary.

**END OF TEXT**

**Appendix A**  
**Location Plan and**  
**Environmental Monitoring Locations**  
**Under the Project**



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- NOTES :
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS STATED OTHERWISE.
  2. GRID LINES ARE HONG KONG METRIC GRID 1560.
  3. TYPE 2 RAILING WITH DEBRIS TRAP BAR AND GENERAL WEAR PILES SHALL BE PROVIDED AT BOTH SIDES OF THE CHANNEL BANKS.

- LEGEND :
- SITE BOUNDARY
  - PROPOSED CHANNEL
  - PROPOSED SLOPE
  - ▨ AREA TO BE FILLED TO ADJACENT GROUND LEVEL
  - I.L. THWENT LEVEL
  - PROPOSED RETAINING WALL

C	05/06	AMENDMENT TO	BY-PASS CULVERT	K.I.L.
B	10/05	MINOR AMENDMENT TO	CHANNEL LAYOUT	K.I.L.
A	05/05	MINOR AMENDMENTS TO	SITE BOUNDARY	K.I.L.

REVISION	Date	Description	By	Checked	Drawn	Permitted
Initial	By	K.I.L.	AK	X.I.L.		
Date	04/04	04/04	04/04	04/04		

AGREEMENT NO. CE 62/93

Contract Title

YUEN LONG, KAM TIN, NGAU TAM MEI AND TIN SHUI WAI DRAINAGE IMPROVEMENT, STAGE 1, PHASE 2B - KAM TIN

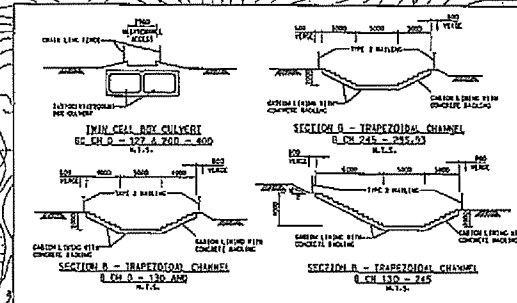
Drawing Title

MA ON KONG CHANNEL KT13 PROPOSED LAYOUT PLAN (SHEET 2 OF 2)

FIGURE 1.3b

Scale

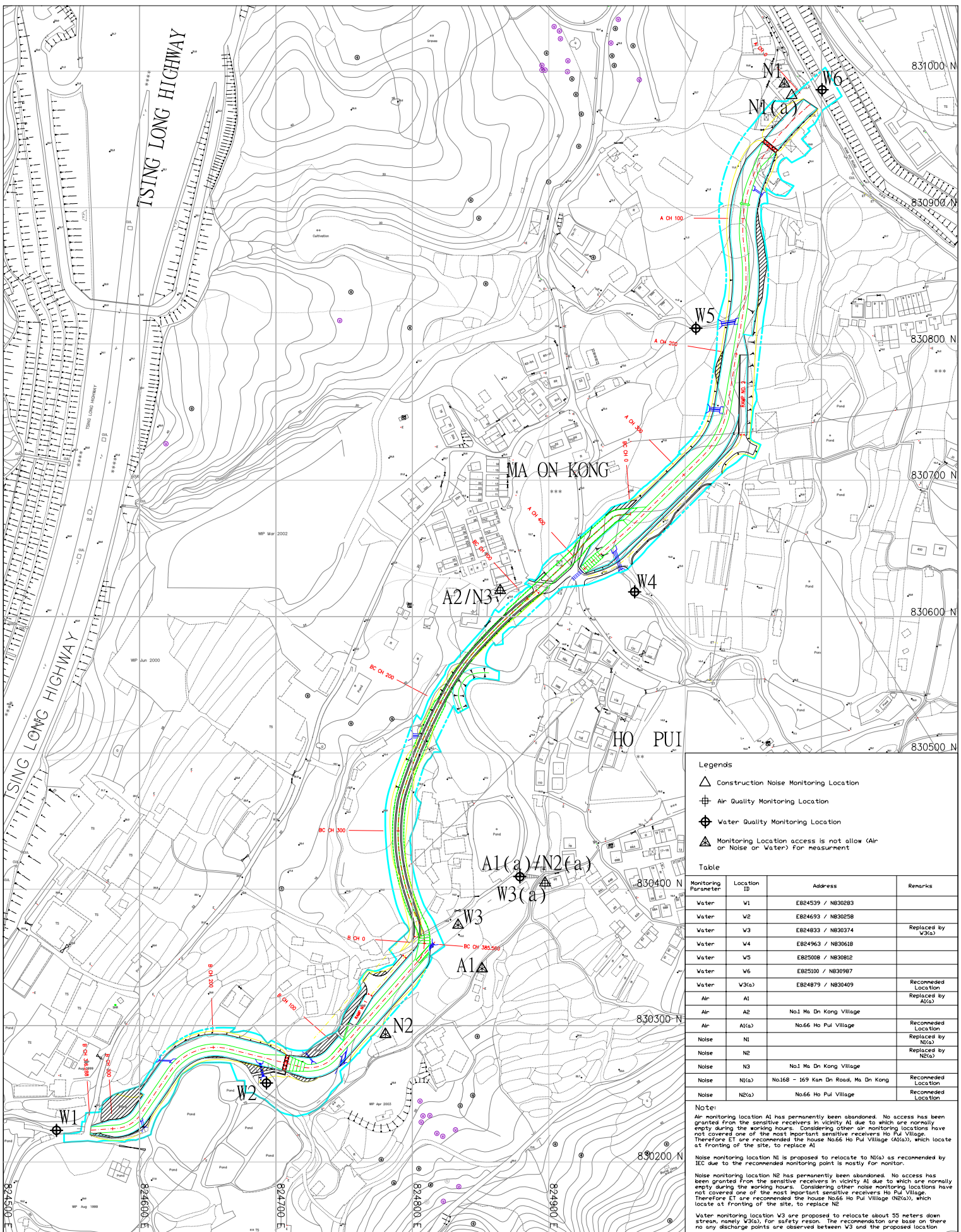
1:2000 A1  
1:2000 A3



香港特別行政區政府渠務署  
THE GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION  
DRAINAGE SERVICES DEPARTMENT

SLACK & VEATCH HONG KONG LIMITED  
博斯工程顧問有限公司





- 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	W1	E824539 / N830283	
Water	W2	E824693 / N830258	
Water	W3	E824833 / N830374	Replaced by W3(a)
Water	W4	E824963 / N830618	
Water	W5	E825008 / N830812	
Water	W6	E825100 / N830987	
Water	W3(a)	E824879 / N830409	Recommended Location
Air	A1		Replaced by A1(a)
Air	A2	No.1 Ma Dn Kong Village	
Air	A1(a)	No.66 Ho Pul Village	Recommended Location
Noise	N1		Replaced by NI(a)
Noise	N2		Replaced by N2(a)
Noise	N3	No.1 Ma Dn Kong Village	
Noise	NI(a)	No.168 - 169 Kan Dn Road, Ma Dn Kong	Recommended Location
Noise	N2(a)	No.66 Ho Pul Village	Recommended Location

**Note:**

Air monitoring location A1 has permanently been abandoned. No access has been granted from the sensitive receivers in vicinity A1 due to which are normally empty during the working hours. Considering other air monitoring locations have not covered one of the most important sensitive receivers Ho Pul Village. Therefore ET are recommended the house No.66 Ho Pul Village (A1(a)), which locate at fronting of the site, to replace A1

Noise monitoring location N1 is proposed to relocate to NI(a) as recommended by IEC due to the recommended monitoring point is mostly for monitor.

Noise monitoring location N2 has permanently been abandoned. No access has been granted from the sensitive receivers in vicinity N2 due to which are normally empty during the working hours. Considering other noise monitoring locations have not covered one of the most important sensitive receivers Ho Pul Village. Therefore ET are recommended the house No.66 Ho Pul Village (N2(a)), which locate at fronting of the site, to replace N2

Water monitoring location W3 are proposed to relocate about 55 meters down stream, namely W3(a), for safety reason. The recommendation are base on there no any discharge points are observed between W3 and the proposed location

Drawing: Air, Noise and Stream Water Monitoring Location at KT-13



Contract No. IC/2007/17-  
 Bridge Improvement Works in Cheung Po  
 Koi, Yuen, Tuen King, Sai Tsuen and San  
 San Tsuen of Tuen Long District and Sewerage  
 at Tseung Tsuen Tsuen, Tuen Mun





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NOTES:  
1. GRID LINES ARE HONG KONG METRIC GRID 1980.

- LEGEND:
- MA ON KONG AND HO PUT ECRETIES
  - PROPOSED COMPENSATORY TREE PLANTING
  - CONSERVATION AREA DENOED ON OUTLINE ZONING PLAN
  - WDRAS BOLDARY OF CHANNEL X113
  - ECOLOGY MONITORING AREAS

Revision	Date	Description			Initial
		Designed	Checked	Drawn	
Initial		MC	KIL	YLL	KIL
Date	09/05	09/05	09/05	09/05	09/05

Approved

AGREEMENT NO. CE 67/98

Contract title  
YUEN LONG, KAM TIN,  
NGAU TAM MEI AND TIN SHUI WAI  
DRAINAGE IMPROVEMENT, STAGE 1,  
PHASE 2B - KAM TIN

Drawing title  
ECOLOGY MONITORING AREAS  
RECOMMENDED FOR  
CONSTRUCTION PHASE AND  
OPERATION PHASE

Drawing no.	Scale
Figure 6.1	1:2000 A1 1:4000 A3

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DRAINAGE SERVICES DEPARTMENT

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Plot Date: 25 APR 2006  
CAD Filename: p:\dbs\water\10\map\1047\1029\env\1047\1019-1.dwg



## **Appendix B**

### **Construction Program**

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

Three Months Rolling Programme - January 2011 to March 2011

ID	Task Name	Duration	Start	Finish	Jan 2011					Feb 2011				Mar 2011								
					26/12	2/1	9/1	16/1	23/1	30/1	6/2	13/2	20/2	27/2	6/3	13/3	20/3	27/3				
1	<u>EOT was granted up to 30 September 2010</u>	1 day	2011/1/3	2011/1/3																		
2																						
3	<b>Section II (Channel KT13)</b>	<b>73 days</b>	<b>2011/1/3</b>	<b>2011/3/31</b>	▶																	
4	Regular Environmental Impact Monitoring	73 days	2011/1/3	2011/3/31	▬																	
5	Regular Tree Survey & Protection	73 days	2011/1/3	2011/3/31	▬																	
6	Regular Structural Condition Survey	73 days	2011/1/3	2011/3/31	▬																	
7	<b>Section A</b>	<b>73 days</b>	<b>2011/1/3</b>	<b>2011/3/31</b>	▶																	
8	<b>Construction of Dry Weather Flow Channel</b>	<b>73 days</b>	<b>2011/1/3</b>	<b>2011/3/31</b>	▶																	
9	Break Up the Existing Base Slab of Transition & Crossing	20 days	2011/1/3	2011/1/25	▬																	
10	Removal of Existing Gabion Lining at Section A	25 days	2011/1/26	2011/2/26	▬																	
11	Construction of Dry Flow Channel along Gabion Lining	35 days	2011/2/1	2011/3/16	▬																	
12	Construction of Dry Flow Channel (Transition & Crossing)	11 days	2011/3/17	2011/3/29	▬																	
13	Re-installation of Gabion Lining along Dry Flow Channel	27 days	2011/3/1	2011/3/31	▬																	
14	Construction of Ramp No.2	15 days	2011/3/15	2011/3/31	▬																	
15	<b>Section of Box Culvert BC13-1</b>	<b>73 days</b>	<b>2011/1/3</b>	<b>2011/3/31</b>	▶																	
16	<b>Construction of catchpit / manhole / drain pipe along channel sides</b>	<b>30 days</b>	<b>2011/1/3</b>	<b>2011/2/9</b>	▶																	
17	Bay BC7 (BC CH88.68 - BC CH73.68)	5 days	2011/1/3	2011/1/7	▬																	
18	Bay BC6 (BC CH73.68 - BC CH58.95)	5 days	2011/1/8	2011/1/13	▬																	
19	Bay BC5 (BC CH58.95 - BC CH46.95)	5 days	2011/1/14	2011/1/19	▬																	
20	Bay BC4 (BC CH46.95 - BC CH32.25)	5 days	2011/1/20	2011/1/25	▬																	
21	Bay BC3 (BC CH32.25 - BC CH17.23)	5 days	2011/1/26	2011/1/31	▬																	
22	Bay BC2 (BC CH17.23 - BC CH00.00)	5 days	2011/2/1	2011/2/9	▬																	
23	<b>Construction of 3.5m access road on top of box culvert (BC CH0.00 - BC CH384.00)</b>	<b>60 days</b>	<b>2011/1/3</b>	<b>2011/3/16</b>	▶																	
24	Bay 3 (BC CH200.00 - BC CH300.00)	20 days	2011/1/3	2011/1/25	▬																	
25	Bay 2 (BC CH100.00 - BC CH200.00)	20 days	2011/1/26	2011/2/21	▬																	
26	Bay 1 (BC CH0.00 - BC CH100.00)	20 days	2011/2/22	2011/3/16	▬																	
27	<b>Installation of chain link fence on top of box culvert (BC CH0.00 - BC CH384.00)</b>	<b>28 days</b>	<b>2011/2/22</b>	<b>2011/3/25</b>	▶																	
28	BC CH300.00 - BC CH384.00	7 days	2011/2/22	2011/3/1	▬																	
29	BC CH200.00 - BC CH300.00	7 days	2011/3/2	2011/3/9	▬																	
30	BC CH100.00 - BC CH200.00	7 days	2011/3/10	2011/3/17	▬																	
31	BC CH0.00 - BC CH100.00	7 days	2011/3/18	2011/3/25	▬																	
32	Reprovision of playground (BC CH60.00 - BC CH80.00)	25 days	2011/1/3	2011/1/31	▬																	

Task  Split  Progress  Milestone  Summary



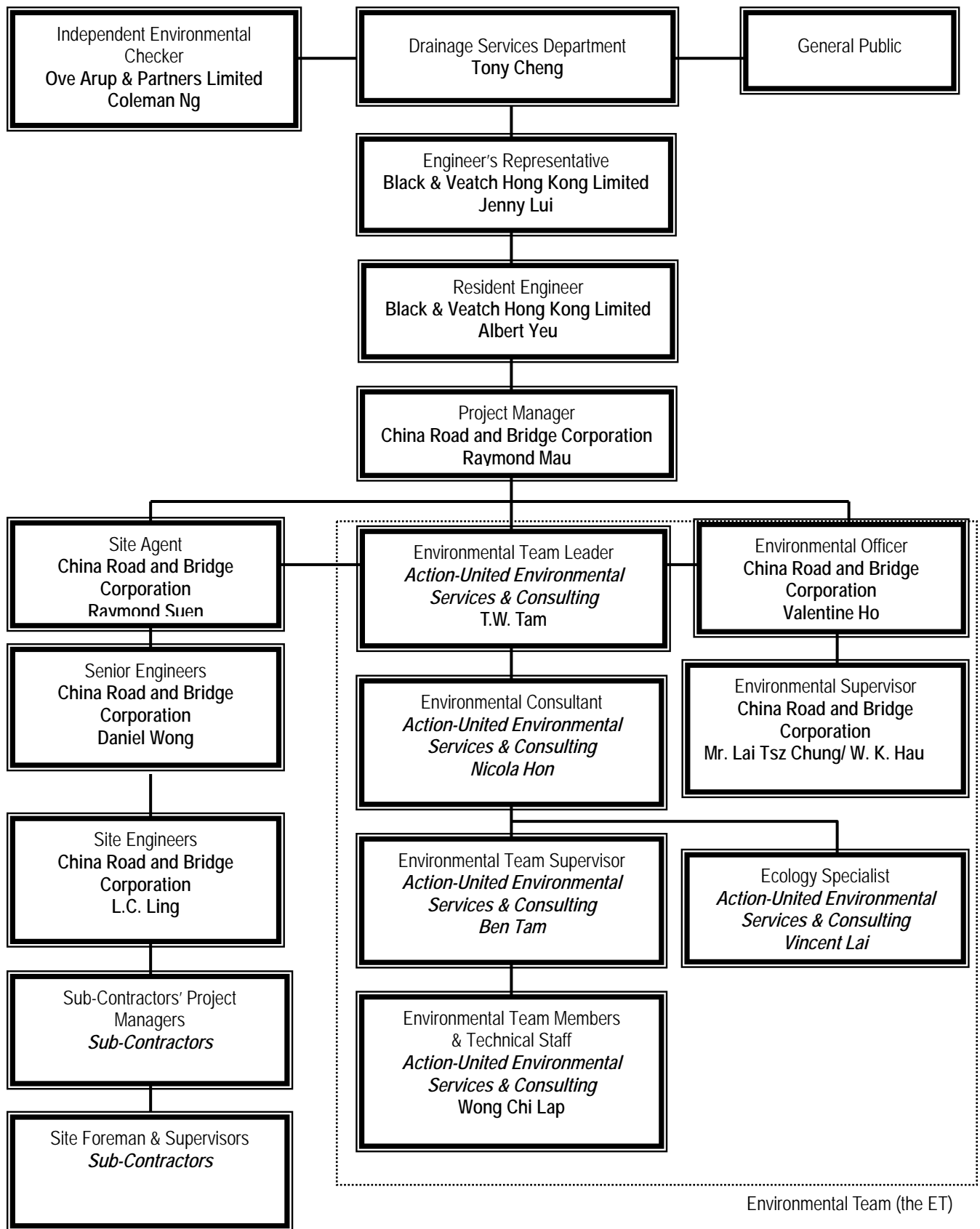
Contract No. : DC/2007/17  
 Drainage Improvement Works in Cheung Po, Ma On Kong, Yuen Kong San Tsuen and Tin Sam Tsuen of Yuen Long District and Sewerage at Tseng Tau Chung Tsuen, Tuen Mun

Three Months Rolling Programme - January 2011 to March 2011

ID	Task Name	Duration	Start	Finish	Jan 2011					Feb 2011			Mar 2011							
					26/12	2/1	9/1	16/1	23/1	30/1	6/2	13/2	20/2	27/2	6/3	13/3	20/3	27/3		
65	Bay B16 (B CH147.00 - B CH154.00) - Transition	2 days	2011/3/7	2011/3/8																
66	Bay B15 (B CH144.00 - B CH147.00) - Transition & Pedestrian Crossing	2 days	2011/3/9	2011/3/10																
67	Bay B14 (B CH137.00 - B CH144.00) - Transition	2 days	2011/3/11	2011/3/12																
68	Bay B13 (B CH129.00 - B CH137.00) - Transition	2 days	2011/3/14	2011/3/15																
69	Bay B12 (B CH119.00 - B CH129.00) - TG3	2 days	2011/3/16	2011/3/17																
70	Bay B11 (B CH107.00 - B CH119.00) - TG3	2 days	2011/3/18	2011/3/19																
71	Bay B10 (B CH94.00 - B CH107.00) - TG3	2 days	2011/3/21	2011/3/22																
72	Bay B9 (B CH80.00 - B CH94.00) - TG3	2 days	2011/3/23	2011/3/24																
73	Bay B8 (B CH68.00 - B CH80.00) - TG3	2 days	2011/3/25	2011/3/26																
74	Bay B7 (B CH57.00 - B CH68.00) - TG3	2 days	2011/3/28	2011/3/29																
75	Bay B6 (B CH46.00 - B CH57.00) - TG3	2 days	2011/3/30	2011/3/31																
76	Construction of Ramp No.1	20 days	2011/3/1	2011/3/23																
77	Construct 3.5m access road at B CH14.00 - B CH94.00 (North Bank)	7 days	2011/3/24	2011/3/31																
78	Installation of traffic sign plate / Street furniture	7 days	2011/3/24	2011/3/31																
79																				
80	<b>Section V</b>	<b>73 days</b>	<b>2011/1/3</b>	<b>2011/3/31</b>	◆															
81	Preservation and protection of tree for Section II and IV	73 days	2011/1/3	2011/3/31	■															
82																				
83	<b>Section VI - Portion 9A &amp; 9B (Tuen Mun Sewerage Work)</b>	<b>26 days</b>	<b>2011/1/3</b>	<b>2011/2/1</b>	◆															
84	Structural Survey and Monitoring	26 days	2011/1/3	2011/2/1	■															
85	Construction of Manhole, Timber Box and Trench Excavation	26 days	2011/1/3	2011/2/1	■															

Task  Split  Progress  Milestone ◆ Summary

**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	Ms. Jenny Lui	2478-9161	2478-9369
B&V	Resident Engineer	Mr. Albert Yeu	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. Daniel Wong	9858-3176	2283-1689
CRBC	Site Engineer (Tuen Mun Site)	Mr. L.C. Ling	6770-4010	2283-1689
CRBC	Environmental Officer	Mr. Valentine Ho	6474-6975	2283-1689
CRBC	Environmental / Construction Supervisor (Tuen Mun and Yuen Long site)	Mr. Lai Tsz Chung	6283-9696	2283-1689
CRBC	Environmental / Construction Supervisor (Yuen Long site)	Mr. W. K. Hau	9401-6296	2283-1689
CRBC	Safety Officer	Mr. Alexis Wong	9374-8954	2283-1689
AUES	Environmental Team Leader	Mr. T.W. Tam	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**

**Monitoring Schedule for KT 13 for Reporting Period – December 2010**

Date		Air Quality		Noise Leq 30min	Water Quality	Ecology Surveys
		1-hour TSP	24-hour TSP			
Fri	26-Nov-10					
Sat	27-Nov-10				W1, W2, W3(a), W4, W5 & W6	
Sun	28-Nov-10					
Mon	29-Nov-10				W1, W2, W3(a), W4, W5 & W6	
Tue	30-Nov-10		A1(a), A2			
Wed	1-Dec-10	A1(a), A2		N1(a), N2(a) & N3	W1, W2, W3(a), W4, W5 & W6	
Thu	2-Dec-10					
Fri	3-Dec-10				W1, W2, W3(a), W4, W5 & W6	
Sat	4-Dec-10					
Sun	5-Dec-10					
Mon	6-Dec-10		A1(a), A2			
Tue	7-Dec-10	A1(a), A2		N1(a), N2(a) & N3	W1, W2, W3(a), W4, W5 & W6	
Wed	8-Dec-10					
Thu	9-Dec-10				W1, W2, W3(a), W4, W5 & W6	
Fri	10-Dec-10					
Sat	11-Dec-10		A1(a), A2		W1, W2, W3(a), W4, W5 & W6	
Sun	12-Dec-10					
Mon	13-Dec-10	A1(a), A2		N1(a), N2(a) & N3	W1, W2, W3(a), W4, W5 & W6	
Tue	14-Dec-10					
Wed	15-Dec-10					
Thu	16-Dec-10				W1, W2, W3(a), W4, W5 & W6	
Fri	17-Dec-10		A1(a), A2			
Sat	18-Dec-10	A1(a), A2		N1(a), N2(a) & N3	W1, W2, W3(a), W4, W5 & W6	
Sun	19-Dec-10					
Mon	20-Dec-10				W1, W2, W3(a), W4, W5 & W6	
Tue	21-Dec-10					
Wed	22-Dec-10				W1, W2, W3(a), W4, W5 & W6	
Thu	23-Dec-10		A1(a), A2			
Fri	24-Dec-10	A1(a), A2		N1(a), N2(a) & N3	W1, W2, W3(a), W4, W5 & W6	
Sat	25-Dec-10					

**Cultural Heritage**

Frequency: Condition survey - Bi-monthly  
Settlement monitoring - Bi-weekly

**Landscape & Visual**

Frequency: Bi-weekly

	Monitoring Day
	Sunday or Public Holiday

**Monitoring Schedule of KT 13 for next reporting month – January 2011**

Date		Air Quality		Noise Leq 30min	Water Quality	Ecology Surveys
		1-hour TSP	24-hour TSP			
Sat	1-Jan-11					
Sun	2-Jan-11					
Mon	3-Jan-11					
Tue	4-Jan-11				W1,W2, W3(a), W4, W5 & W6	
Wed	5-Jan-11		A1(a), A2			
Thu	6-Jan-11	A1(a), A2		N1(a), N2(a) & N3	W1,W2, W3(a), W4, W5 & W6	
Fri	7-Jan-11					
Sat	8-Jan-11				W1,W2, W3(a), W4, W5 & W6	
Sun	9-Jan-11					
Mon	10-Jan-11				W1,W2, W3(a), W4, W5 & W6	
Tue	11-Jan-11		A1(a), A2			
Wed	12-Jan-11	A1(a), A2		N1(a), N2(a) & N3	W1,W2, W3(a), W4, W5 & W6	
Thu	13-Jan-11					
Fri	14-Jan-11					
Sat	15-Jan-11				W1,W2, W3(a), W4, W5 & W6	
Sun	16-Jan-11					
Mon	17-Jan-11		A1(a), A2			
Tue	18-Jan-11	A1(a), A2		N1(a), N2(a) & N3	W1,W2, W3(a), W4, W5 & W6	
Wed	19-Jan-11					
Thu	20-Jan-11				W1,W2, W3(a), W4, W5 & W6	
Fri	21-Jan-11					
Sat	22-Jan-11		A1(a), A2		W1,W2, W3(a), W4, W5 & W6	
Sun	23-Jan-11					
Mon	24-Jan-11	A1(a), A2		N1(a), N2(a) & N3	W1,W2, W3(a), W4, W5 & W6	
Tue	25-Jan-11					
Wed	26-Jan-11					
Thu	27-Jan-11				W1,W2, W3(a), W4, W5 & W6	
Fri	28-Jan-11		A1(a), A2			
Sat	29-Jan-11	A1(a), A2		N1(a), N2(a) & N3	W1,W2, W3(a), W4, W5 & W6	
Sun	30-Jan-11					
Mon	31-Jan-11				W1,W2, W3(a), W4, W5 & W6	

**Cultural Heritage**

Frequency: Condition survey - Bi-monthly  
Settlement monitoring - Bi-weekly

**Landscape & Visual**

Frequency: Bi-weekly

	Monitoring Day
	Sunday or Public Holiday

Meteorological Data Extracted from HKO during the Reporting Period

Date		Weather	Lau Fau Shan Weather Station				
			Total Rainfall (mm)	Mean Air Temp. (°C)	Wind Speed (km/h)	Mean Relative Humidity (%)	Wind Direction
26-Nov-10	Fri	Fine and dry.	0	19.2	7.7	54	E
27-Nov-10	Sat	Fine apart from some haze.	0	19.9	8.2	72	E/NE
28-Nov-10	Sun	Moderate east to northeasterly winds.	0	21.7	9.5	66	E/NE
29-Nov-10	Mon	Mainly fine but hazy.	0	20.5	11.5	76.7	SE
30-Nov-10	Tue	Moderate northeasterly winds.	0	21	11.5	76.5	N/NW
1-Dec-10	Wed	Light to moderate northeasterly winds.	0	19.9	10.2	67.5	E/NE
2-Dec-10	Thu	Mainly fine apart from some haze.	0	20.7	8	74	E/SE
3-Dec-10	Fri	Fine and dry apart from some haze.	0	20.1	13.5	58.5	E/NE
4-Dec-10	Sat	Light winds	0	20.7	11.2	58.5	E
5-Dec-10	Sun	Hazy with sunny periods.	0	21.5	8.5	62.5	E/SE
6-Dec-10	Mon	Fresh northerly winds	0	23.1	12.8	65	N/NE
7-Dec-10	Tue	Fine and very dry.	0	17.8	28.5	49.5	NE
8-Dec-10	Wed	Moderate to fresh northerly winds	0	16.2	17	33.7	N
9-Dec-10	Thu	Mainly cloudy with mist.	0	17	10.7	28.2	E/SE
10-Dec-10	Fri	Moderate northeasterly winds	0	19.7	11.2	68.7	E/NE
11-Dec-10	Sat	There will be coastal fog.	0	19.9	10.6	70	E
12-Dec-10	Sun	Light to moderate northeasterly winds	Trace	20.7	14.5	79.5	E
13-Dec-10	Mon	Fresh easterly winds, strong over offshore waters.	Trace	22.5	8.2	83	E/NE
14-Dec-10	Tue	Cloudy with a few rain patches later.	Trace	21.7	9.1	79.7	E/NE
15-Dec-10	Wed	Cloudy with occasional rain.	12.9	14.8	18.5	86	E
16-Dec-10	Thu	Moderate to fresh northerly winds.	5.3	7.8	38.5	74	N/NE
17-Dec-10	Fri	Fine and <b>very dry</b> .	0	8.3	14.7	47.2	N/NE
18-Dec-10	Sat	Light winds	0	12	11	57	E/SE
19-Dec-10	Sun	Fine and dry apart from some haze.	0	17.1	10.1	68.7	W/SW
20-Dec-10	Mon	Fine and dry but hazy.	0	20	9.7	73.5	W/SW
21-Dec-10	Tue	Fine but hazy. Light winds.	0	20.1	9.7	70.5	W/SW
22-Dec-10	Wed	Fine and dry.	0	18.9	12.7	62	E/NE
23-Dec-10	Thu	Mainly fine and dry apart from some haze.	0	17.1	9.5	62	E/SE
24-Dec-10	Fri	Mainly fine and dry.	0	19.4	12.1	67	E
25-Dec-10	Sat	Holiday					

**Appendix E**  
**Calibration Certificates and**  
**HOKLAS-Accreditation Certificate**



**Equipment Calibration List for 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**

<b>Item</b>	<b>Issue</b>	<b>Description of Equipment</b>	<b>Date of Calibration</b>	<b>Date of Next Calibration</b>
1 <sup>(4)</sup>	Air	Tisch Calibration Kit Model TE-5025A (Serial No. 1483)	2 Jun 10	2 Jun 11
2 <sup>(*)</sup>		TSP Sampler Calibration Spreadsheet for KT13-A1a	4 Dec 10	4 Feb 11
3 <sup>(*)</sup>		TSP Sampler Calibration Spreadsheet for KT13-A2	4 Dec 10	4 Feb 11
4 <sup>(2)</sup>		TSI DustTrak Model 8520 (Serial No. 23079)	5 May 10	5 May 11
5 <sup>(3)</sup>	Noise	Bruel & Kjaer Integrating Sound Level Meter 2238 (Serial No. 2285721)	19 Apr 10	19 Apr 11
6 <sup>(3)</sup>		Bruel & Kjaer Acoustical Calibrator 4231 (Serial No. 2326408)	27 Apr 10	27 Apr 11
7 <sup>(1)</sup>	Water	YSI 550A (Serial No. 05F2063AZ)	19 Oct 10	19 Jan 11
8 <sup>(1)</sup>		Extech pH Meter EC500 (Serial No. CE133298)	19 Oct 10	19 Jan 11
9 <sup>(1)</sup>		Turbidimeter HACH 2100p (Serial No. 950900008735)	19 Oct 10	19 Jan 11
10 <sup>(1)</sup>		Hand Refractometer ATAGO EQ114 (Serial No. 289468)	19 Oct 10	19 Jan 11

Note: \* Calibration certificates will only provide when monitoring equipment is re-calibrate or new.

- (1) The calibration certificates could be referred to the previous EM&A monthly report – October 2010
- (2) The calibration certificates could be referred to the previous EM&A monthly report – June 2010
- (3) The calibration certificates could be referred to the previous EM&A monthly report – May 2010
- (4) The calibration certificates could be referred to the previous EM&A monthly report – August 2010

## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	No.1 Ma On Kong Village	Date of Calibration: 4-Dec-10
Location ID :	ASR15 (A2)	Next Calibration Date: 4-Feb-11
Technician: Mr. Ben Tam		

### CONDITIONS

Sea Level Pressure (hPa)	1017.4	Corrected Pressure (mm Hg)	763.05
Temperature (°C)	20.2	Temperature (K)	293

### CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.00279
Model->	5025A	Qstd Intercept ->	-0.00494
Serial # ->	1483		

### CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.2	5.2	10.4	1.629	50	50.92	Slope = 41.7217 Intercept = -16.3113 Corr. coeff. = 0.9985
13	4.2	4.2	8.4	1.464	45	45.83	
10	3.4	3.4	6.8	1.318	38	38.70	
7	2.5	2.5	5.0	1.130	30	30.55	
5	1.6	1.6	3.2	0.905	21	21.39	

#### 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 ]

Pstd = actual pressure during calibration ( mm Hg

#### For subsequent calculation of sampler flow:

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

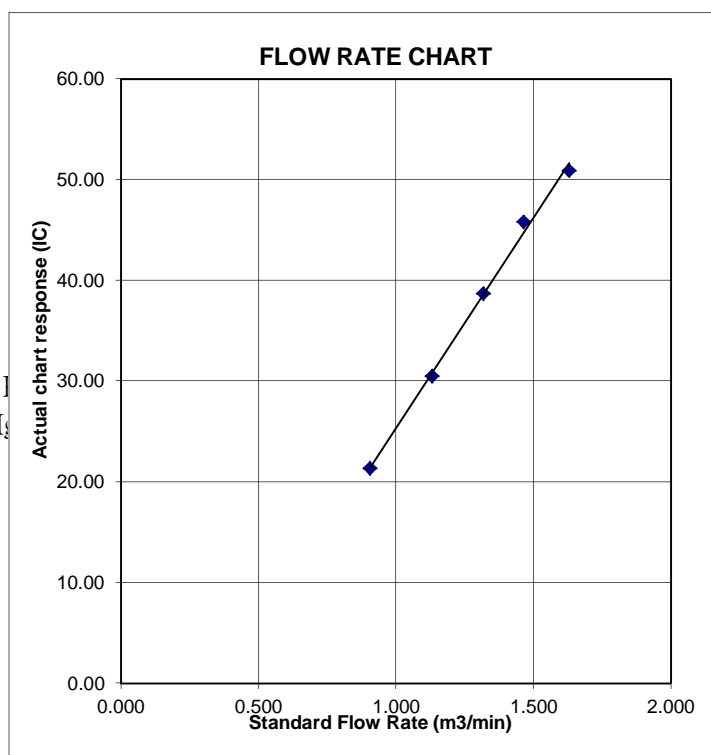
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	No.68 Ho Pui Village	Date of Calibration: 4-Dec-10
Location ID :	ASR14 (A1(a))	Next Calibration Date: 4-Feb-11
		Technician: Mr. Ben Tam

### CONDITIONS

Sea Level Pressure (hPa)	1017.4	Corrected Pressure (mm Hg)	763.05
Temperature (°C)	20.2	Temperature (K)	293

### CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.00279
Model->	5025A	Qstd Intercept ->	-0.00494
Serial # ->	1483		

### CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.3	5.3	10.6	1.645	49	49.90	Slope = 39.3756 Intercept = -14.9643 Corr. coeff. = 0.9964
13	4.2	4.2	8.4	1.464	43	43.79	
10	3.5	3.5	7	1.337	36	36.66	
7	2.5	2.5	5	1.130	28	28.52	
5	1.5	1.5	3	0.876	20	20.37	

#### 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:

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

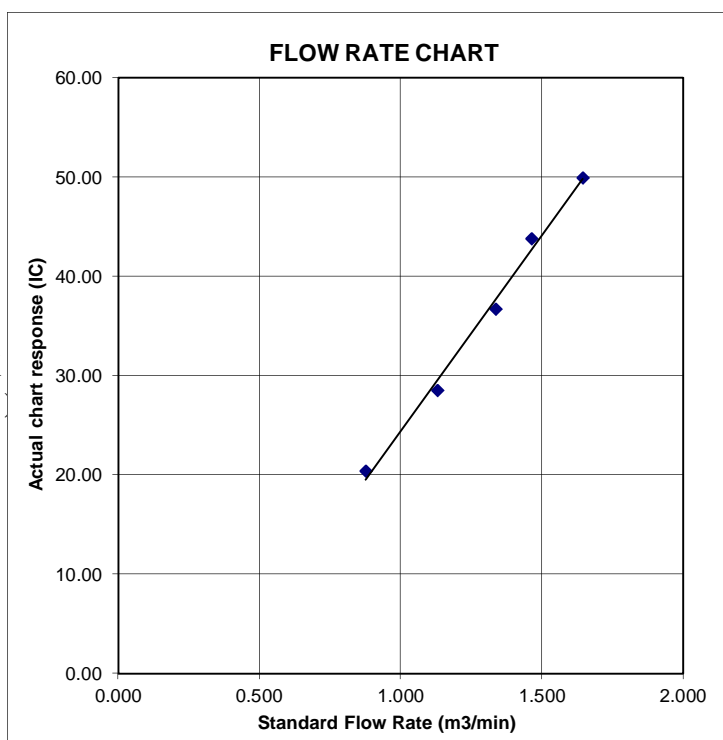
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



## **Appendix F**

### **Event and Action Plan**

**Event/Action Plan for Air Quality**

EVENT	ACTION			
	Contractor's ET leader	IEC	ER	Contractor
1. Exceedance for one sample	<ol style="list-style-type: none"> <li>Identify source</li> <li>Inform IEC, ER and Contractor</li> <li>Repeat measurement to confirm findings</li> <li>Increase monitoring frequency to daily</li> </ol>	<ol style="list-style-type: none"> <li>Check monitoring data submitted by Contractor's ET leader</li> <li>Check Contractor's working method</li> </ol>	<ol style="list-style-type: none"> <li>Notify Contractor</li> </ol>	<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, ER and Contractor</li> <li>Repeat measurement to confirm findings</li> <li>Increase monitoring frequency to daily</li> <li>Discuss with IEC, Contractor and ER on remedial actions required</li> <li>If exceedance continue, arrange meeting with IEC, ER and Contractor</li> <li>If exceedance stops, cease additional monitoring</li> </ol>	<ol style="list-style-type: none"> <li>Checking monitoring data submitted by Contractor's ET leader.</li> <li>Check Contractor's working method</li> <li>Discuss with Contractor's ET leader and Contractor on possible remedial measures</li> <li>Advise the ER 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 and ER 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 IEC, ER, EPD and Contractor</li> <li>Repeat measurement to confirm findings</li> <li>Increase monitoring frequency to daily</li> <li>Assess effectiveness of Contractor's remedial actions and kept IEC, EPD and ER informed of the results</li> </ol>	<ol style="list-style-type: none"> <li>Check monitoring data submitted by Contractor's ET leader</li> <li>Check Contractor's working method</li> <li>Discuss with Contractor's ET leader and Contractor on possible remedial measures</li> <li>Advise the ER on the effectiveness of the proposed remedial measures</li> <li>Audit 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 for the exceedance</li> <li>Submit proposals for remedial actions to IEC and ER 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, ER, Contractor 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, Contractor and ER to discuss the remedial actions to be taken</li> <li>Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results</li> <li>If exceedance stops, cease additional monitoring</li> </ol>	<ol style="list-style-type: none"> <li>Discuss amongst ER, Contractor's ET leader and Contractor on the potential remedial actions</li> <li>Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly</li> <li>Audit the 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 IEC, agree with the Contractor on the remedial measures to be implemented</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 for the exceedance</li> <li>Submit proposals for remedial actions to IEC and ER 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 ER until the exceedance is abate.</li> </ol>

**Event and Action Plan for Water Quality**

<b>Event</b>	<b>ET Leader</b>	<b>IEC</b>	<b>ER</b>	<b>Contractor</b>
Action level being exceeded by one sampling day	Repeat in-situ measurement to confirm findings: Identify Source(s) of impact; Inform IEC an Contractor; Check monitoring data, all plant, equipment and Contractor's working methods; Discuss mitigation measures with IEC and Contractor; Repeat measurement on next day of exceedance	Discuss with ET and Contractor on the mitigation measures Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly Assess the effectiveness of the implemented mitigation measures.	Discuss with IEC on the proposed mitigation measures; Make agreement on the mitigation measures to be implemented;	Inform the ER and confirm notification of the non-compliance in writing; Rectify unacceptable practice; Check all plant and equipment; Consider changes of working methods; Discuss with ET and IEC and propose mitigation measures to IEC and ER; Implement the agreed mitigation measures.
Action level being exceeded by more than one consecutive sampling days	Repeat in-situ measurement to confirm findings: Identify source(s) of impact; Inform IEC and Contractor; Check monitoring data, all plant, equipment and Contractor's working methods; Discuss mitigation measures with IEC and Contractor; Ensure mitigation measures are implemented; Prepare to increase the monitoring frequency to daily; Repeat measurement on next day of exceedance.	Discuss with ET and Contractor on the mitigation measures Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly Assess the effectiveness of the implemented mitigation measures.	Discuss with IEC, ET and Contractor on the proposed mitigation measures; Request Contract to critically review the working methods; Made agreement on the mitigation measures to be implemented; Assess the effectiveness of the implemented mitigation measures.	Inform the Engineer and confirm notification of the non-compliance in writing; Rectify unacceptable practice; Check all plant and equipment; consider changes of working methods; Discuss with ET, IEC and ER and propose mitigation measures to IEC and ER within 3 working days; Implement the agreed mitigation measures.
Limit level being exceeded by one sampling day	Repeat in-situ measurement to confirm findings: Identify source(s) of impact; Inform IEC, contractor and EPD; Check monitoring data, all plant, equipment and Contractor's working methods; Discuss mitigation measures with IEC, ER and Contractor; Ensure mitigation measures are implemented; Increase the monitoring frequency to daily until no exceedance of Limit level.	Discuss with ET and Contractor on the mitigation measures Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly Assess the effectiveness of the implemented mitigation measures.	Discuss with IEC, ET and Contractor on the proposed mitigation measures; Request Contractor to critically review the working methods; Make agreement on the mitigation measures to be implemented; Assess the effectiveness of the implemented mitigation measures; Consider and instruct, if necessary, the Contractor to slow down or to stop all or part of the marine work until no exceedance of Limit level.	Inform the ER and confirm notification of the non-compliance in writing; Rectify unacceptable practice; Check all plant and equipment; Consider changes of working methods; Discuss with ET, IEC and ER and propose mitigation measures to IEC and ER within 3 working days; Implement the agreed mitigation measures; As directed by the Engineer, to slow down or to stop all or part of the marine work or construction activities.



**Event/Action Plan for Construction Noise Monitoring**

EVENT	ACTION			
	CONTRACTOR'S ET LEADER	IEC	ER	Contractor
Action Level	<ol style="list-style-type: none"> <li>1. Notify IEC, Contractor and ER</li> <li>2. Carry out investigation</li> <li>3. Report the results of investigation to the IEC, Contractor and ER</li> <li>4. Discuss with the Contractor and formulate remedial measures</li> <li>5. Double monitoring frequency</li> <li>6. Check compliance to Action/Limit Levels after application of mitigation measures</li> </ol>	<ol style="list-style-type: none"> <li>1. Review the analysed results submitted by the Contract's ET leader</li> <li>2. Review the proposed remedial measures by the Contractor and advise the ER accordingly</li> <li>3. Review the implementation of remedial measures</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of complaint 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 are properly implemented</li> </ol>	<ol style="list-style-type: none"> <li>1. Submit noise mitigation proposals to ER and IEC</li> <li>2. Implement noise mitigation proposals</li> </ol>
Limit Level	<ol style="list-style-type: none"> <li>1. Notify IEC, ER, EPD and 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, ER 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 ER informed of the results</li> <li>8. If exceedance stops, cease additional monitoring</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss amongst ER, Contractor's ET leader and Contractor on the potential remedial actions</li> <li>2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly</li> <li>3. Audit the implementation of remedial measures</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of failure in writing</li> <li>2. Notify Contractor</li> <li>3. Require Contractor to propose remedial measures for the analysed noise problem</li> <li>4. Ensure remedial measures are properly implemented</li> <li>5. If exceedance continues, consider what 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 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 ER until the exceedance is abated</li> </ol>

**Event/Action Plan for Ecology**

EVENT	ACTION			
	ET Leader	IEC	Engineer	Contractor
ACTION REACHED LEVEL	<ol style="list-style-type: none"> <li>1. Carry out investigation</li> <li>2. Review results and assess whether amendment to action level is appropriate</li> <li>3. Report the results of investigation to the IEC</li> <li>4. Notify Contractor and Engineer</li> <li>5. Discuss with the Contractor and formulate remedial measures</li> <li>6. Repeat survey to confirm results</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 problem</li> <li>4. Ensure remedial measures properly implemented</li> </ol>	<ol style="list-style-type: none"> <li>1. Take immediate action to avoid further problem</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> </ol>
LIMIT REACHED LEVEL	<ol style="list-style-type: none"> <li>1. Carry out investigation</li> <li>2. Review results and assess whether amendment to limit level is appropriate</li> <li>3. Report the results of investigation to the IEC</li> <li>4. Notify Contractor and Engineer</li> <li>5. Discuss with the Contractor and formulate remedial measures</li> <li>6. Repeat survey to confirm results</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 problem</li> <li>4. Ensure remedial measures properly implemented</li> <li>5. Issue instruction to stop the relevant portion of the works until the problem is abated (construction period only).</li> </ol>	<ol style="list-style-type: none"> <li>1. Take immediate action to avoid further problem</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 problem is abated (construction period only)</li> </ol>

**Event and Action Plan for Cultural Heritage**

EVENT	ACTION			
	ET Leader	IEC	ER	Contractor
Action Level	<p>Notify IEC and Contractor to carry out investigation</p> <p>Report reasons of structural damage or instability to the IEC and Contractor Discuss with the Contractor and formulate remedial measures</p> <p>Increase monitoring frequency to once per week to check mitigation effectiveness</p>	<p>Review report of structural damage or instability by the ET.</p> <p>Review proposed remedial measures by the Contractor and advise the ER and Antiquities and Monuments Office (AMO) accordingly</p> <p>Supervise the implementation of remedial measures, with approval from AMO.</p>	<p>Confirm receipt of notification of failure in writing</p> <p>Notify Contractor</p> <p>Require Contractor to propose remedial measures and to notify and seek approval from AMO.</p> <p>Ensure remedial measures are properly implemented.</p>	<p>Notify AMO concerning the damage or structural instability of the cultural heritage resources</p> <p>Submit proposals for repair of damage to cultural heritage resources to AMO for approval and to implement approved measures.</p>
Limit Level	<p>Notify IEC and Contractor to carry out investigation and to stop construction work within 100m of cultural heritage resource to avoid further impact until AMO are satisfied that the relevant structure has been repaired or stabilized to an acceptable level.</p> <p>Report reasons of continued structural damage or instability to the IEC and Contractor Discuss with the Contractor and formulate remedial measures</p> <p>Increase monitoring frequency to daily to check mitigation effectiveness</p>	<p>Review report of structural damage or instability by the ET.</p> <p>Review proposed remedial measures by the Contractor and advise the ER and Antiquities and Monuments Office (AMO) accordingly.</p> <p>Supervise the implementation of remedial measures, with approval from AMO.</p>	<p>Confirm receipt of notification of failure in writing</p> <p>Notify Contractor</p> <p>Require Contractor to propose remedial measures and to notify and seek approval from AMO.</p> <p>Ensure remedial measures are properly implemented.</p>	<p>To carry out investigation and to stop construction work within 100m of cultural heritage resource to avoid further impact until AMO are satisfied that the relevant structure has been repaired or stabilized to an acceptable level.</p> <p>Propose remedial measures for the repair and stabilization of cultural heritage resources, up to liaison of moving and rebuilding the relevant structure with the approval of owner (usually the clan members) and AMO.</p>

**Event and Action Plan for Landscape and Visual Impact - Construction Phase**

Action Level	Environmental Team Leader (ETL)	Independent Environmental Checker (IEC)	Engineer's Representative (ER)	Contractor
Non-conformity on one occasion	<ol style="list-style-type: none"> <li>1. Identify source</li> <li>2. Inform the IEC and the ER</li> <li>3. Discuss remedial actions with the IEC, the ER and the Contractor</li> <li>4. Monitor remedial actions until rectification has been completed</li> </ol>	<ol style="list-style-type: none"> <li>1. Check report</li> <li>2. Check the Contractor's working method</li> <li>3. Discuss with the ER and the Contractor on possible remedial measures</li> <li>4. Advise the ER on effectiveness of proposed remedial measures</li> </ol>	<ol style="list-style-type: none"> <li>1. Notify the Contractor</li> <li>2. Ensure remedial measures are properly implemented</li> </ol>	<ol style="list-style-type: none"> <li>1. Amend working methods</li> <li>2. Rectify damage and undertake remedial measures or any necessary replacement</li> </ol>
Repeated Non-conformity	<ol style="list-style-type: none"> <li>1. Identify source</li> <li>2. Inform the IEC and the ER</li> <li>3. Increase monitoring (site audit) frequency</li> <li>4. Discuss remedial actions with the IEC, the ER and the Contractor</li> <li>5. Monitor remedial actions until rectification has been completed</li> <li>6. If exceedance stops, cease additional monitoring (site audit)</li> </ol>	<ol style="list-style-type: none"> <li>1. Check report</li> <li>2. Check the Contractor's working method</li> <li>3. Discuss with the ER and the Contractor on possible remedial measures</li> <li>4. Advise the ER on effectiveness of proposed remedial measures</li> <li>5. Supervise implementation of remedial measures</li> </ol>	<ol style="list-style-type: none"> <li>1. Notify the Contractor</li> <li>2. Ensure remedial measures are properly implemented</li> </ol>	<ol style="list-style-type: none"> <li>1. Amend working methods</li> <li>2. Rectify damage and undertake remedial measures or any necessary replacement</li> </ol>

## **Appendix G**

### **(a) Impact 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 (std $\text{m}^3$ )		INITIAL	FINAL	DIFF	INITIAL	FINAL				DUST COLLECTION
<b>KT13(A1(a))</b>																					
<b>Date of Calibration: 4-Oct-2010 Next Calibration Date: 4-Dec-2010 Cal Graph Slope = 40.3298 Intercept = -16.6610</b>																					
<b>Date of Calibration: 4-Dec-2010 Next Calibration Date: 4-Jan-2011 Cal Graph Slope = 39.3756 Intercept = -14.9643</b>																					
30-Nov-10	22898	3295.65	3319.88	1453.80	22	24	23.0	21.7	1015.4	0.99	1435	NA	2.8396	2.8391	-0.0005	2.8680	2.9237	0.0557	39	144	260
7-Dec-10	22963	3319.88	3344.11	1453.80	22	24	23.0	18.9	1020.0	0.97	1413	NA	2.8391	2.8398	0.0007	2.7903	2.9559	0.1656	117	144	260
11-Dec-10	22998	3344.11	3368.34	1453.80	22	24	23.0	20.2	1012.3	0.97	1408	NA	2.8684	2.868	-0.0004	2.7983	2.9685	0.1702	121	144	260
17-Dec-10	23082	3368.34	3392.08	1424.40	22	24	23.0	17.7	1020.9	0.97	1387	NA	2.867	2.8663	-0.0007	2.7889	2.9198	0.1309	95	144	260
23-Dec-10	23007	3392.08	3415.84	1425.60	22	24	23.0	16.9	1020.8	0.97	1389	NA	2.8663	2.8656	-0.0007	2.8011	2.944	0.1429	103	144	260
<b>KT13(A2)</b>																					
<b>Date of Calibration: 4-Oct-2010 Next Calibration Date: 4-Dec-2010 Cal Graph Slope = 39.8607 Intercept = -14.4045</b>																					
<b>Date of Calibration: 4-Dec-2010 Next Calibration Date: 4-Jan-2011 Cal Graph Slope = 41.7217 Intercept = -16.3113</b>																					
30-Nov-10	22894	3313.40	3337.39	1439.40	22	24	23.0	21.7	1015.4	0.94	1356	NA	2.8396	2.8391	-0.0005	2.8917	2.9359	0.0442	33	141	260
7-Dec-10	power failure																			141	260
11-Dec-10	power failure																			141	260
17-Dec-10	23018	3337.39	3361.52	1447.80	23	25	24.0	10.4	1020.5	0.98	1423	NA	2.8396	2.8391	-0.0005	2.7976	2.9183	0.1207	85	141	260
23-Dec-10	power failure																			141	260



Summary of Water Quality Monitoring Results - KT13

Date 27-Nov-10																		
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DOS (%)		Turbidity (NTU)		pH		SS		Ammonia N		Zinc	
W1	10:42	0.10	18.2	18.3	6.27	6.3	72.6	73.5	7.3	7.2	8	8.1	25	25.0	10.9	10.90	17	17.0
			18.3		6.4		74.3		7.0		8.1		25		10.9		17	
W2	11:02	0.10	18.2	18.1	5.87	5.7	68.4	67.4	6.4	6.4	8	8.1	26	26.0	11.8	11.80	19	19.0
			18.0		5.62		66.3		6.3		8.1		26		11.8		19	
W3	11:08	0.10	18.2	18.3	3.25	3.4	43.1	44.1	5.2	5.6	8.3	8.2	26	26.0	10.9	10.90	19	19.0
			18.3		3.46		45.1		5.9		8.1		26		10.9		19	
W4	11:20	0.10	17.9	18.0	6.17	6.3	71.4	73.3	6.4	6.4	8.1	8.2	28	28.0	11.4	11.40	19	19.0
			18.0		6.51		75.2		6.3		8.3		28		11.4		19	
W5	11:25	0.20	18.1	18.1	2.48	2.6	35.1	36.0	8.9	9.3	8.1	8.1	24	24.0	11.7	11.70	20	20.0
			18.1		2.62		36.8		9.6		8.1		24		11.7		20	
W6	11:38	0.20	18.3	18.2	2.17	2.1	31.9	31.5	9.7	9.6	8	8.0	25	25.0	10.9	10.90	19	19.0
			18.1		2.08		31.1		9.4		7.9		25		10.9		19	

Date 29-Nov-10																		
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DOS (%)		Turbidity (NTU)		pH		SS		Ammonia N		Zinc	
W1	10:07	0.10	20.2	20.1	5.49	5.4	67.1	66.2	6.2	6.5	7.8	7.8	16	16.0	9.65	9.65	18	18.0
			20.0		5.31		65.2		6.7		7.7		16		9.65		18	
W2	10:15	0.10	20.2	20.2	5.61	5.5	68.3	66.8	6.1	6.0	7.7	7.8	15	15.0	9.9	9.90	13	13.0
			20.1		5.33		65.2		5.8		7.9		15		9.9		13	
W3	10:20	0.10	19.9	20.0	5.47	5.4	66.8	65.6	4.6	4.7	7.7	7.8	15	15.0	9.99	9.99	13	13.0
			20.0		5.24		64.3		4.8		7.9		15		9.99		13	
W4	10:32	0.10	19.8	20.0	5.62	5.7	68.3	69.3	7.1	7.5	7.7	7.8	15	15.0	9.81	9.81	14	14.0
			20.1		5.87		70.2		7.9		7.8		15		9.81		14	
W5	10:38	0.20	20.2	20.2	6.17	6.3	73.4	74.8	10.4	9.9	7.7	7.8	12	12.0	9.75	9.75	17	17.0
			20.1		6.42		76.2		9.3		7.9		12		9.75		17	
W6	10:50	0.20	20.0	20.0	5.27	5.4	64.9	66.5	8.2	8.5	7.7	7.8	14	14.0	10.2	10.20	14	14.0
			20.0		5.61		68.1		8.7		7.9		14		10.2		14	

Date 1-Dec-10																		
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DOS (%)		Turbidity (NTU)		pH		SS		Ammonia N		Zinc	
W1	9:09	0.20	21.4	21.3	4.99	4.9	64.9	64.0	4.4	4.2	8.4	8.4	6	6.0	2.62	2.62	13	13.0
			21.2		4.74		63.1		3.9		8.3		6		2.62		13	
W2	9:19	0.20	21.3	21.3	4.86	4.8	62.9	62.0	4.7	4.5	8.2	8.2	12	12.0	3.69	3.69	15	15.0
			21.2		4.79		61.1		4.2		8.2		12		3.69		15	
W3	9:34	0.20	21.7	21.7	2.42	2.3	39.9	38.6	5.9	5.9	8.4	8.4	6	6.0	3.51	3.51	13	13.0
			21.6		2.14		37.2		5.8		8.4		6		3.51		13	
W4	9:52	0.20	21.4	21.5	3.97	3.8	50.9	50.0	4.9	4.8	8.1	8.1	6	6.0	2.98	2.98	12	12.0
			21.5		3.64		49.1		4.7		8.1		6		2.98		12	
W5	10:14	0.20	21.4	21.3	2.43	2.3	35.7	34.9	7.2	7.2	8.2	8.2	11	11.0	5.29	5.29	13	13.0
			21.2		2.19		34.1		7.1		8.1		11		5.29		13	
W6	10:29	0.20	21.3	21.3	2.89	2.8	45.8	42.6	9.9	9.8	8.3	8.3	4	4.0	2.84	2.84	<10	10.0
			21.2		2.74		39.4		9.7		8.3		4		2.84		<10	

Date 3-Dec-10																		
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DOS (%)		Turbidity (NTU)		pH		SS		Ammonia N		Zinc	
W1	11:13	0.10	20.4	20.5	6.76	5.9	72.8	69.0	30.8	33.8	7.9	8.0	78	78.0	2.68	2.68	58	58.0
			20.6		4.98		65.2		36.7		8		78		2.68		58	
W2	11:16	0.10	20.4	20.5	7.23	7.1	87.6	81.0	30.9	30.2	7.9	7.9	90	90.0	3.75	3.75	44	44.0
			20.5		6.97		74.3		29.5		7.9		90		3.75		44	
W3	11:27	0.10	19.8	19.9	4.36	4.5	58.5	59.7	40.6	46.8	7.8	7.9	131	131.0	5.35	5.35	58	58.0
			20.0		4.58		60.9		52.9		7.9		131		5.35		58	
W4	11:31	0.10	20.2	20.2	6.36	6.2	78.4	76.5	30.7	31.7	8	8.0	46	46.0	1.46	1.46	31	31.0
			20.2		5.97		74.6		32.6		7.9		46		1.46		31	
W5	11:39	0.20	20.0	20.0	4.22	4.4	57.3	59.4	60.7	55.6	8.1	8.0	119	119.0	4.98	4.98	52	52.0
			20.0		4.63		61.4		50.4		7.9		119		4.98		52	
W6	11:52	0.20	19.9	20.0	5.81	5.3	73.3	68.3	61.2	61.8	7.9	8.0	147	147.0	6.07	6.07	75	75.0
			20.1		4.81		63.2		62.4		8		147		6.07		75	

m w/vr

Date 7-Dec-10																		
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DOS (%)		Turbidity (NTU)		pH		SS		Ammonia N		Zinc	
W1	9:12	0.30	19.3	19.3	4.9	4.8	65.1	64.9	4.7	4.6	8.2	8.2	34	34.0	43.7	43.70	46	46.0
			19.2		4.69		62.7		4.5		8.1		34		43.7		46	
W2	9:31	0.20	19.7	19.6	4.72	4.7	62.6	62.0	5.2	5.2	8.3	8.3	27	27.0	43.1	43.10	41	41.0
			19.4		4.61		61.4		5.1		8.2		27		43.1		41	
W3	9:47	0.20	19.6	19.5	2.47	2.3	39.7	38.5	6.2	6.1	8.2	8.3	24	24.0	44.7	44.70	35	35.0
			19.3		2.12		37.2		5.9		8.4		24		44.7		35	
W4	9:59	0.20	19.9	19.5	3.99	3.8	50.4	50.1	5.4	5.3	8.1	8.2	50	50.0	44	44.00	57	57.0
			19.1		3.61		49.7		5.2		8.2		50		44		57	
W5	10:17	0.20	19.4	19.5	2.47	2.4	35.6	35.0	8.9	8.8	8.2	8.2	170	170.0	42.4	42.40	125	125.0
			19.6		2.38		34.4		10.7		8.1		170		42.4		125	
W6	10:34	0.10	19.6	19.6	2.94	2.8	45.7	43.4	8.4	10.3	8.2	8.2	62	62.0	43	43.00	64	64.0
			19.6		2.73		41.1		10.1		8.1		62		43		64	

Date 9-Dec-10																		
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DOS (%)		Turbidity (NTU)		pH		SS		Ammonia N		Zinc	
W1	17:00	0.10	17.0	18.5	16.73	16.3	155.9	160.6	10.3	9.9	8.86	8.8	14	14.0	19.6	19.60	16	16.0
			19.4		15.79		165.3		9.5		8.79		14		19.6		16	
W2	17:05	0.10	18.6	18.5	15.8	15.6	164.2	161.4	11.4	11.0	8.56	8.5	26	26.0	16.3	16.30	33	33.0
			18.3		15.43		158.6		10.6		8.43		26		16.3		33	
W3	17:10	0.10	18.3	18.2	16.32	16.5	169.2	170.3	11.2	11.0	9.03	8.9	24	24.0	21.1	21.10	26	26.0
			18.1		16.58		171.3		10.8		8.78		24		21.1		26	
W4	17:23	0.10	18.1	17.9	19.4	19.0	196.1	190.8	13.6	14.2	8.99	8.9	32	32.0	17.8	17.80	37	37.0
			17.6		18.52		185.4		14.8		8.86		32		17.8		37	
W5	17:32	0.15	17.6	17.6	19.62	19.6	179.8	181.5	12.4	13.0	8.48	8.6	30	30.0	20	20.00	25	25.0
			17.5		19.48		183.1		13.6		8.66		30		20		25	
W6	17:39	0.20	17.5	17.5	19.67	19.1	184.2	185.2	13.9	14.1	8.56	8.6	23	23.0	21	21.00	22	22.0
			17.4		18.59		186.1		14.3		8.56		23		21		22	

Summary of Water Quality Monitoring Results - KT13

Date 13-Dec-10																		
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DOS (%)		Turbidity (NTU)		pH		SS	Ammonia N		Zinc		
W1	9:17	0.10	22.7	22.6	4.78	4.7	65.7	65.3	5.2	5.2	8.3	8.2	59	59.0	58.8	58.80	50	50.0
			22.4		4.62		64.9		5.1		8.1		59		58.8		50	
W2	9:29	0.10	22.9	22.8	4.59	4.5	62.7	62.4	5.6	5.6	8.2	8.2	36	36.0	59.8	59.80	26	26.0
			22.6		4.41		62.1		5.5		8.2		36		59.8		26	
W3	9:54	0.20	22.4	22.4	2.48	2.3	39.4	38.6	6.4	6.2	8.1	8.1	37	37.0	57	57.00	32	32.0
			22.4		2.12		37.8		5.9		8.1		37		57		32	
W4	10:11	0.10	22.7	22.5	3.94	3.8	50.6	50.3	5.5	5.6	8.3	8.3	49	49.0	57.9	57.90	46	46.0
			22.3		3.62		49.9		5.7		8.3		49		57.9		46	
W5	10:37	0.20	22.9	22.5	2.44	2.4	35.7	35.2	8.7	8.8	8.2	8.2	28	28.0	59.5	59.50	28	28.0
			22.1		2.37		34.6		8.8		8.2		28		59.5		28	
W6	10:49	0.20	22.3	22.3	2.99	2.9	45.8	43.8	10.2	10.2	8.1	8.1	27	27.0	60.5	60.50	25	25.0
			22.2		2.72		41.7		10.1		8.1		27		60.5		25	

Date 16-Dec-10																		
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DOS (%)		Turbidity (NTU)		pH		SS	Ammonia N		Zinc		
W1	9:19	0.20	11.4	11.2	4.86	4.8	65.9	65.3	4.9	4.8	8.4	8.4	53	53.0	<0.01	0.01	12	12.0
			10.9		4.79		64.7		4.7		8.3		53		<0.01		12	
W2	9:27	0.20	11.2	11.2	4.74	4.7	62.7	61.9	5.3	5.2	8.1	8.1	193	193.0	0.2	0.20	24	24.0
			11.1		4.71		61.1		5.1		8.1		193		0.2		24	
W3	9:41	0.20	11.4	11.3	2.64	2.5	39.9	38.5	6.4	6.2	8.2	8.2	188	188.0	0.31	0.31	41	41.0
			11.1		2.39		37.1		5.9		8.1		188		0.31		41	
W4	10:02	0.10	11.2	11.3	3.47	3.3	50.6	49.9	8.7	8.5	8.3	8.3	168	168.0	0.25	0.25	30	30.0
			11.3		3.21		49.2		8.2		8.2		168		0.25		30	
W5	10:21	0.20	11.4	11.3	2.56	2.5	35.7	34.9	10.1	10.1	8.2	8.2	37	37.0	0.05	0.05	13	13.0
			11.2		2.34		34.1		10.1		8.1		37		0.05		13	
W6	10:42	0.20	11.7	11.7	2.97	2.8	45.9	43.6	11.1	11.3	8.4	8.4	191	191.0	0.24	0.24	26	26.0
			11.6		2.71		41.2		11.4		8.4		191		0.24		26	

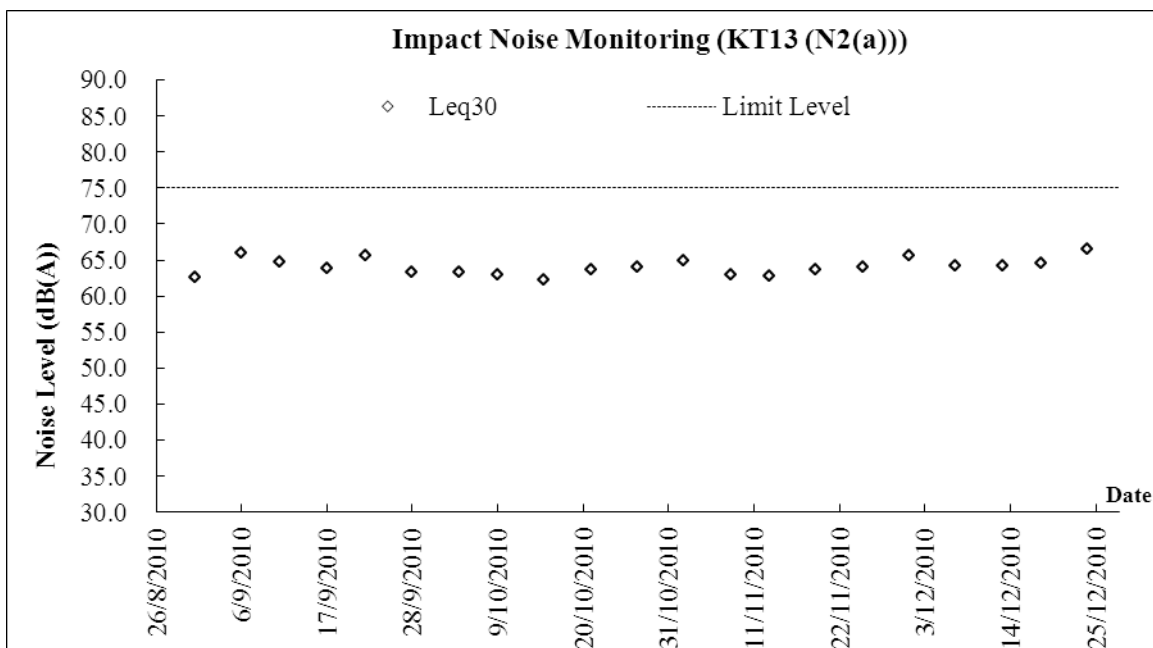
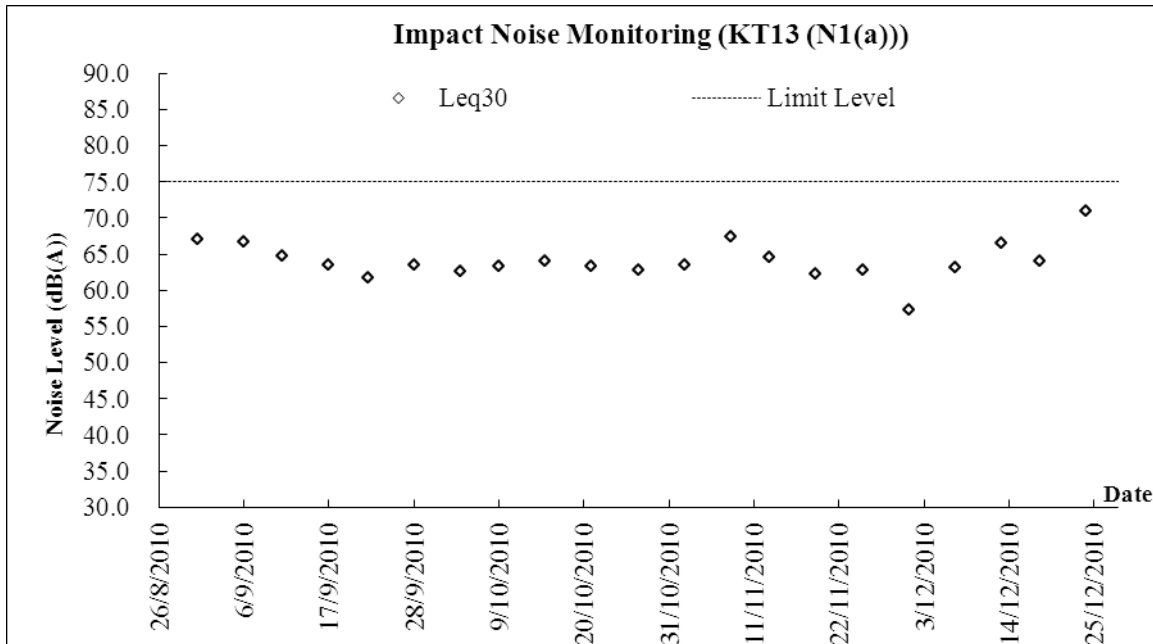
Date 18-Dec-10																		
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DOS (%)		Turbidity (NTU)		pH		SS	Ammonia N		Zinc		
W1	9:50	0.30	#DIV/0!		5.22	5.1	62.1	61.5	4.5	4.4	8.3	8.2	13	13.0	22.6	22.60	<10	10.0
					5.04		60.9		4.3		8.1		13		22.6		<10	
W2	10:09	0.30	#DIV/0!		5.01	5.0	62.4	51.0	5.2	5.2	8.2	8.3	13	13.0	24	24.00	14	14.0
					4.92		49.6		5.1		8.3		13		24		14	
W3	10:31	0.20	#DIV/0!		4.71	4.7	48.2	47.8	5.7	5.9	8.2	8.3	15	15.0	23.8	23.80	13	13.0
					4.62		47.4		6.1		8.4		15		23.8		13	
W4	10:43	0.20	#DIV/0!		4.22	4.1	46.4	44.3	6.4	6.6	8.1	8.2	12	12.0	22.4	22.40	21	21.0
					4.01		42.1		6.8		8.3		12		22.4		21	
W5	11:02	0.20	#DIV/0!		3.47	3.4	50.2	49.4	8.1	8.5	8.2	8.1	14	14.0	22.4	22.40	17	17.0
					3.32		48.6		8.9		8		14		22.4		17	
W6	11:20	0.20	#DIV/0!		2.94	2.8	35.6	34.9	9.4	9.7	8.2	8.2	14	14.0	23.3	23.30	18	18.0
					2.71		34.1		9.9		8.1		14		23.3		18	

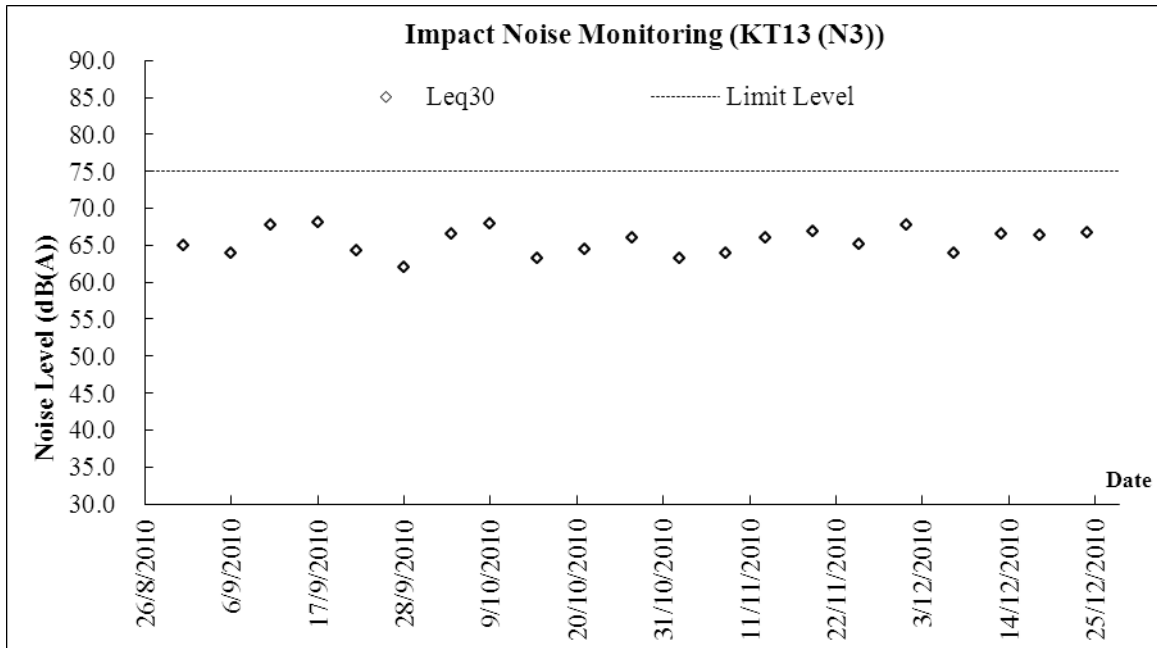
Date 20-Dec-10																		
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DOS (%)		Turbidity (NTU)		pH		SS	Ammonia N		Zinc		
W1	16:11	0.20	19.2	19.3	5.27	5.2	62.7	62.1	7.3	7.4	7.9	7.9	14	14.0	16.6	16.60	23	23.0
			19.3		5.13		61.4		7.4		7.9		14		16.6		23	
W2	16:21	0.20	19.3	19.4	5.02	4.9	60.3	58.6	8.1	7.9	8.1	8.0	11	11.0	16.1	16.10	26	26.0
			19.4		4.69		59.9		7.6		7.9		11		16.1		26	
W3	16:42	0.20	19.6	19.5	2.87	2.7	39.1	37.5	12.1	12.0	8	8.0	13	13.0	17.4	17.40	23	23.0
			19.4		2.54		35.8		11.8		7.9		13		17.4		23	
W4	16:45	0.20	19.4	19.4	5.17	5.2	61.6	61.9	8.5	8.6	7.8	7.8	13	13.0	16.7	16.70	20	20.0
			19.3		5.23		62.2		8.2		7.7		13		16.7		20	
W5	16:56	0.30	19.5	19.5	2.94	3.0	39.5	40.1	14.2	14.0	7.9	7.9	14	14.0	17.5	17.50	19	19.0
			19.4		3.03		40.7		13.7		7.9		14		17.5		19	
W6	17:02	0.30	19.3	19.4	3.21	3.4	42.2	44.3	10.6	11.5	7.8	7.8	15	15.0	17.1	17.10	23	23.0
			19.5		3.61		46.3		12.3		7.7		15		17.1		23	

Date 22-Dec-10																		
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DOS (%)		Turbidity (NTU)		pH		SS	Ammonia N		Zinc		
W1	15:23	0.10	18.6	18.7	4.56	4.7	50.2	51.8	18.3	18.1	7.7	7.8	30	30.0	2.59	2.59	13	13.0
			18.7		4.87		53.4		17.9		7.9		30		2.59		13	
W2	15:29	0.20	18.6	18.6	5.13	4.9	56.2	53.8	16.2	16.9	7.7	7.7	26	26.0	2.13	2.13	20	20.0
			18.6		4.6		51.3		17.6		7.7		26		2.13		20	
W3	15:40	0.10	18.8	18.7	2.87	2.7	33.4	32.4	49.3	53.7	7.8	7.8	117	117.0	9.02	9.02	52	52.0
			18.6		2.61		31.3		58.0		7.7		117		9.02		52	
W4	15:50	0.20	18.5	18.6	4.32	4.3	48.3	47.8	19.8	20.3	7.5	7.5	46	46.0	3.29	3.29	27	27.0
			18.6		4.19		47.2		20.7		7.5		46		3.29		27	
W5	15:58	0.30	18.7	18.7	1.96	2.2	24.7	27.2	56.9	58.7	7.6	7.6	110	110.0	8.83	8.83	58	58.0
			18.6		2.45		29.6		60.4		7.5		110		8.83		58	
W6	16:11	0.30	18.6	18.7	2.62	2.8	31.4	32.7	71.2	70.0	7.6	7.6	106	106.0	8.83	8.83	61	61.0
			18.8		2.88		33.9		68.7		7.5		106		8.83		61	

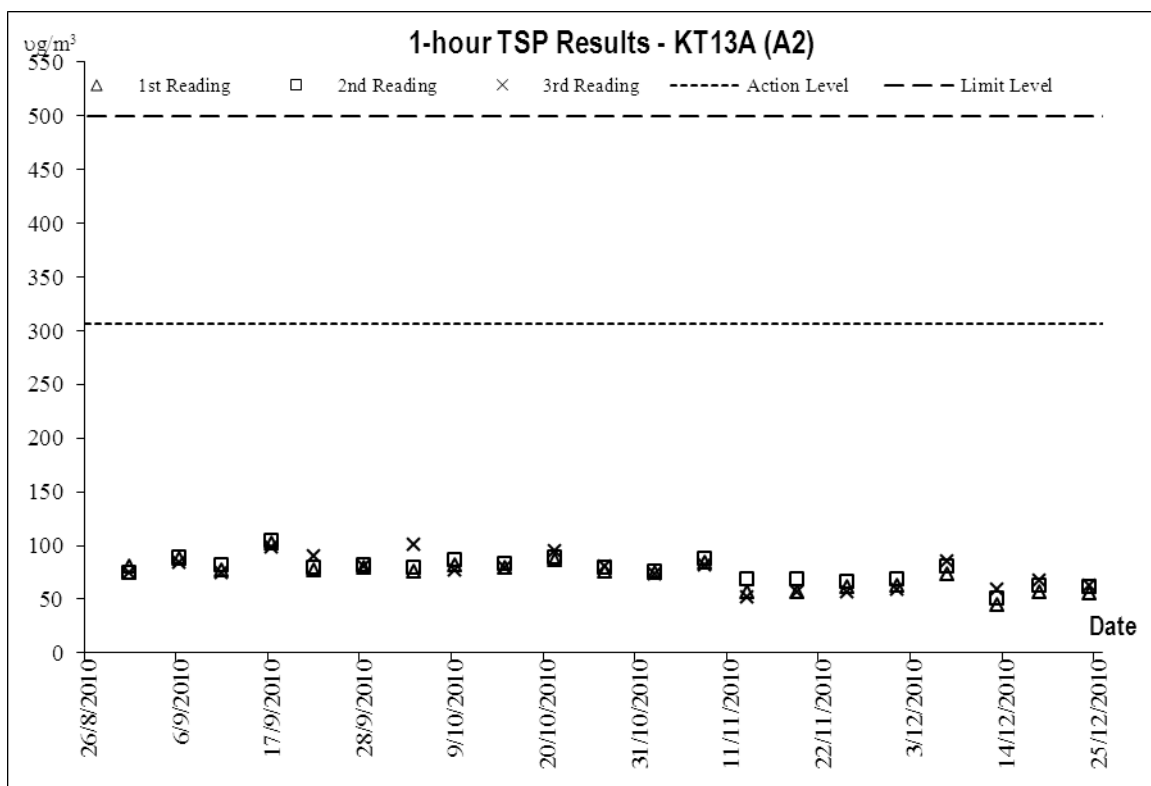
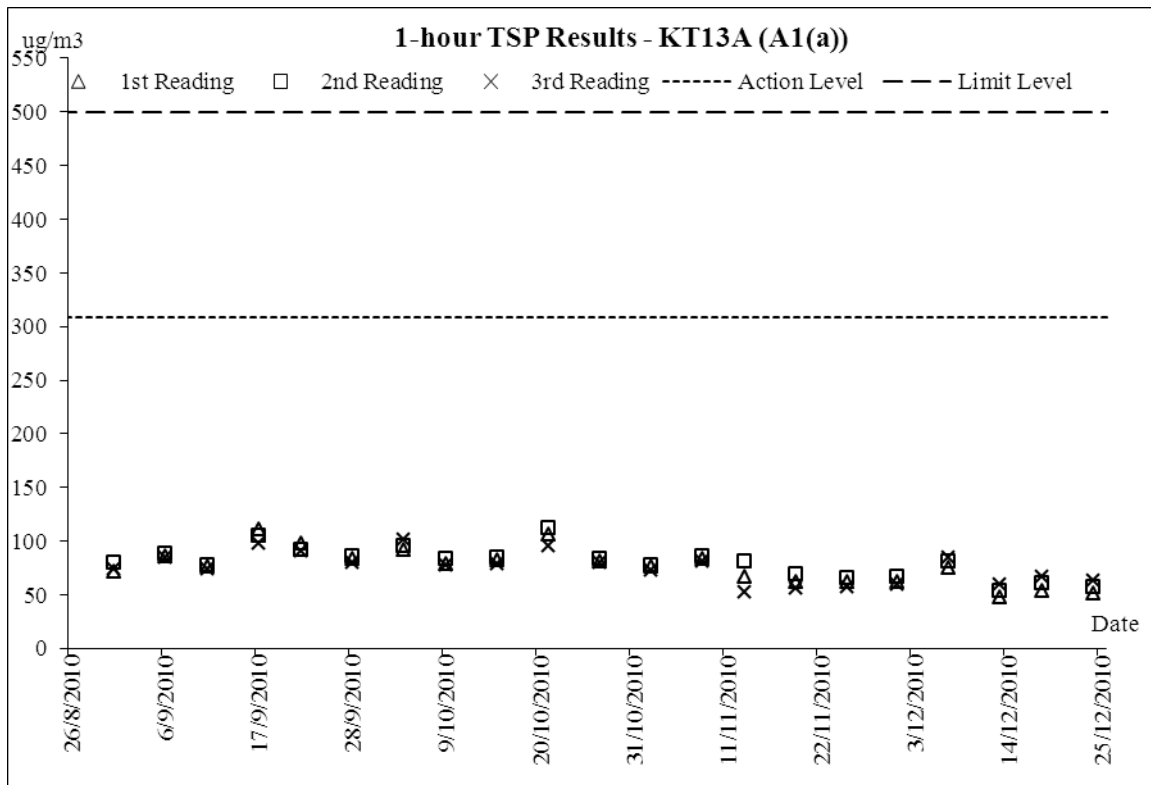
Date 24-Dec-10																		
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DOS (%)		Turbidity (NTU)		pH		SS	Ammonia N		Zinc		
W1	10:12	0.20	23.1	23.1	7.28	7.2	75.3	75.1	160.0	161.0	7.4	7.6	141	141.0	23.7	23.70	78	78.0
			23.1		7.16		74.9		162.0		7.84		141		23.7		78	
W2	10:55	0.10	23.3	23.3	6.02	6.1	80.2	79.0	141.0	141.5	7.67	7.9	125	125.0	25.1	25.10	66	66.0
			23.3		6.21		77.7		142.0		8.15		125		25.1		66	
W3	9:45	0.30	23.2	23.2	6.19	6.3	71.0	70.5	166.0	165.5	8.14	8.1	161	161.0	24.3	24.30	85	85.0
			23.2		6.31		70.0		165.0		8.01		161		24.3		85	
W4	10:40	0.10	23.1	23.1	7.24	6.8	61.6	61.2	190.0	192.0	8.12	8.1	153	153.0	23.7	23.70	70	70.0
			23.1		6.3		60.8		194.0		8.03		153		23.7		70	
W5	10:00	0.30	22.8	22.8	5.93	5.9	75.3	73.1	164.0	164.0	7.88	7.9	169	169.0	24.4	24.40	72	72.0
			22.8		5.82		70.8		164.0		7.94		169		24.4		72	
W6	10:26	0.20	23.3	23.3	5.12	5.1	76.3	74.9	128.0	128.0	8.13	8.2	119	119.0	25.4	25.40	60	60.0
			23.3		5.08		73.5		128.0		8.23		119		25.4		60	

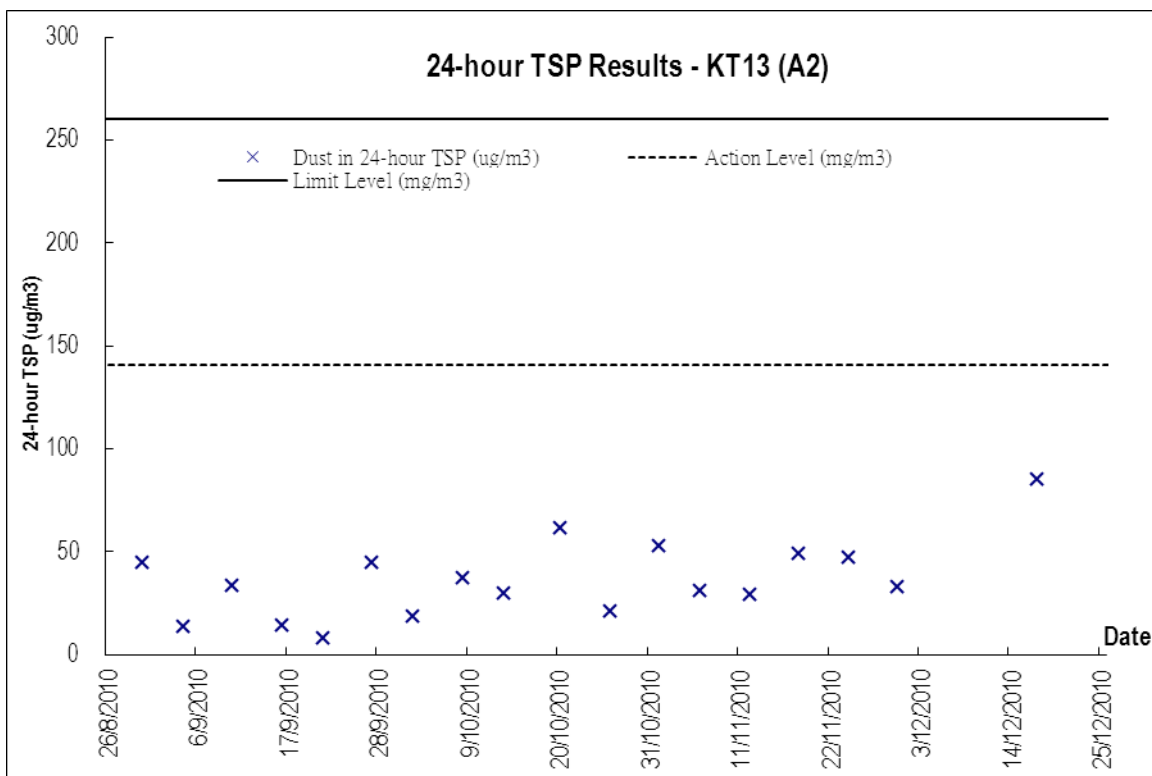
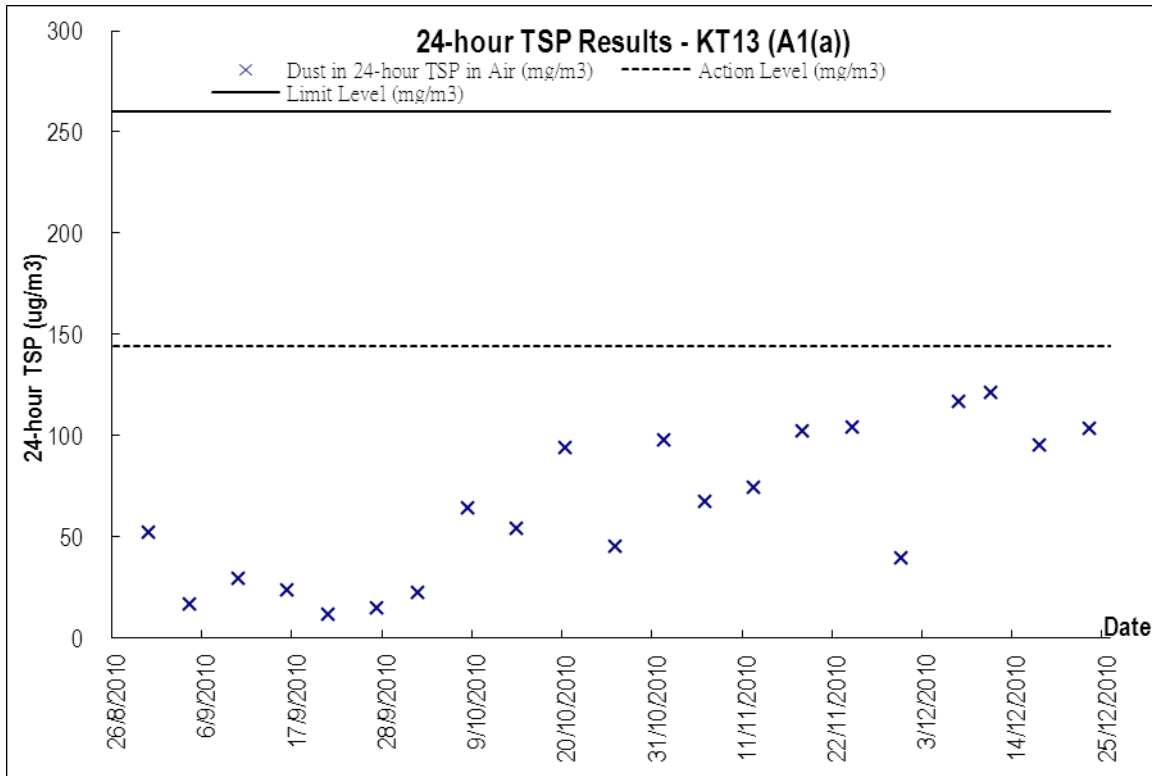
### Graphic Plot of Monitoring - Construction Noise





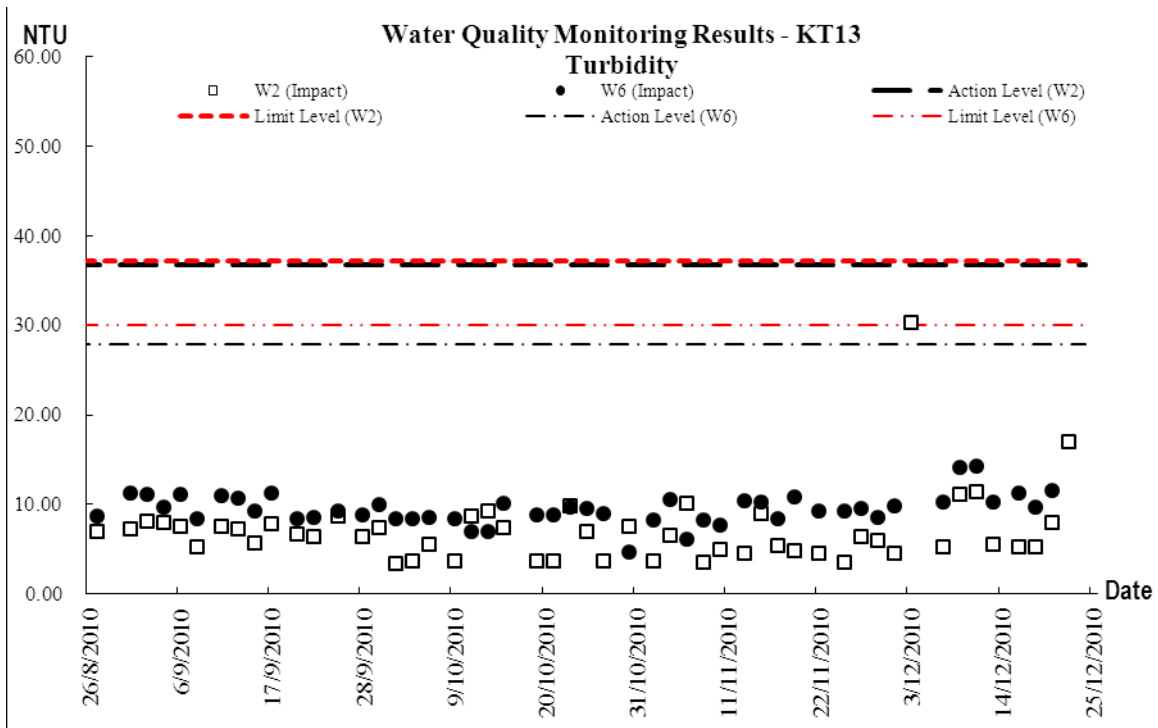
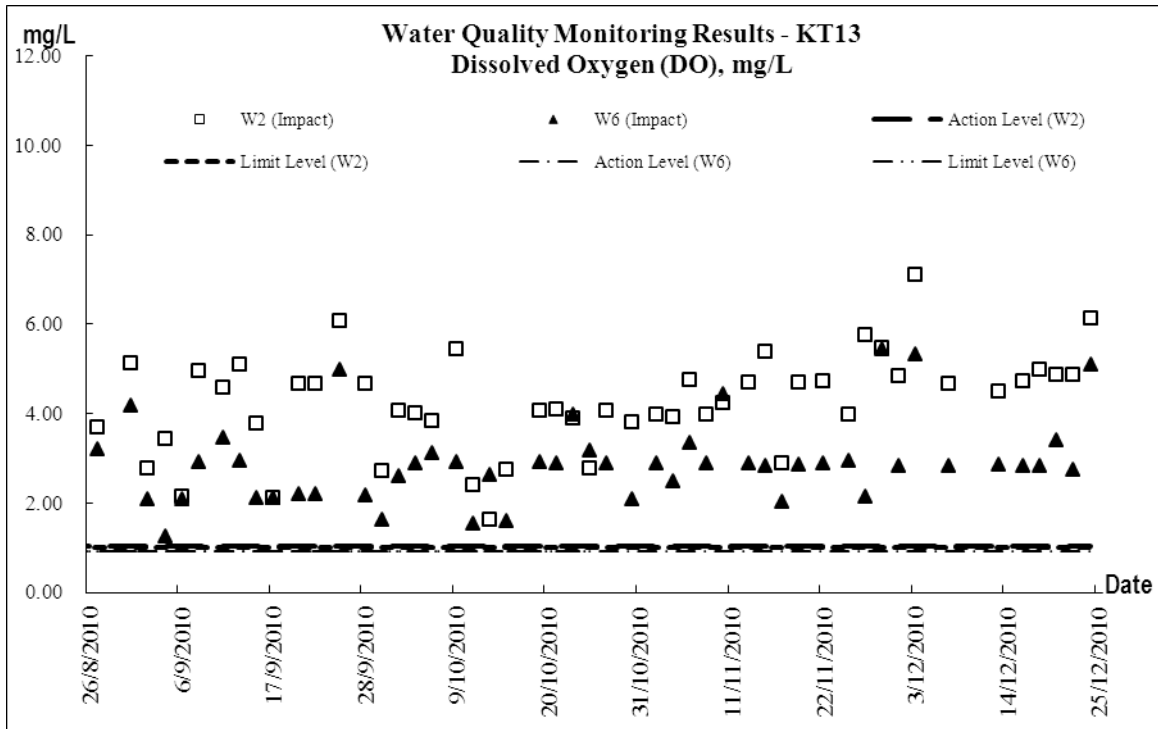
### Graphic Plot of Monitoring – Air Quality

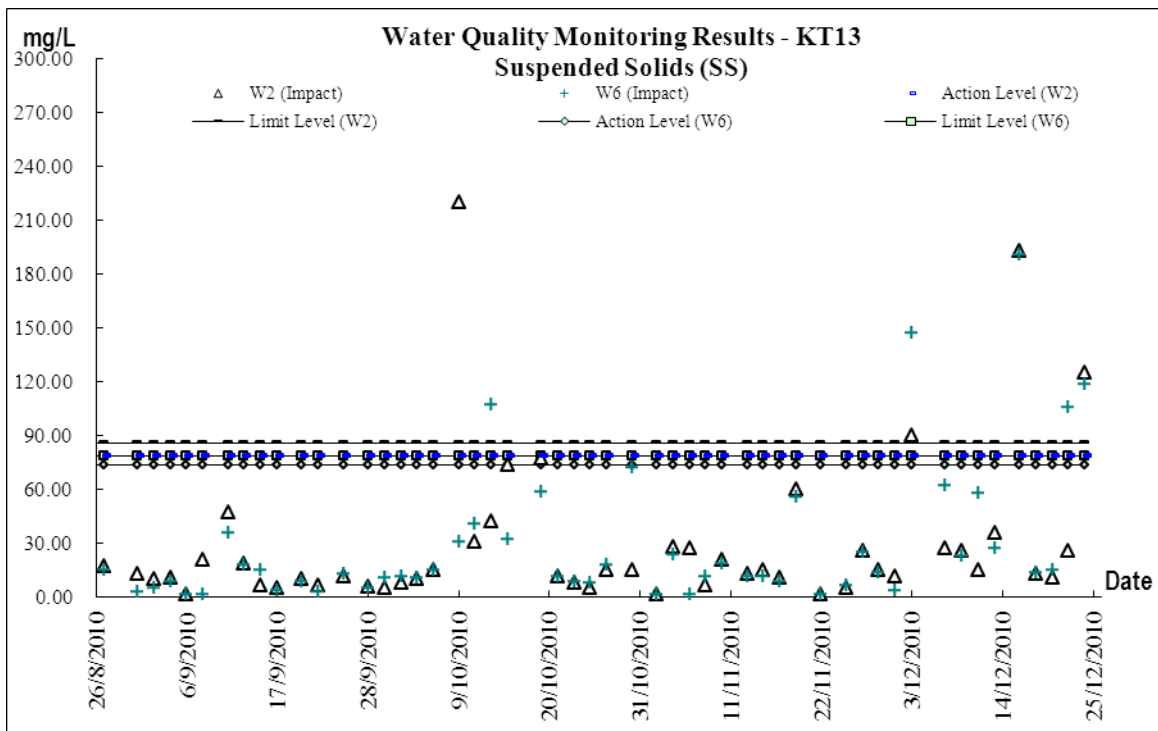
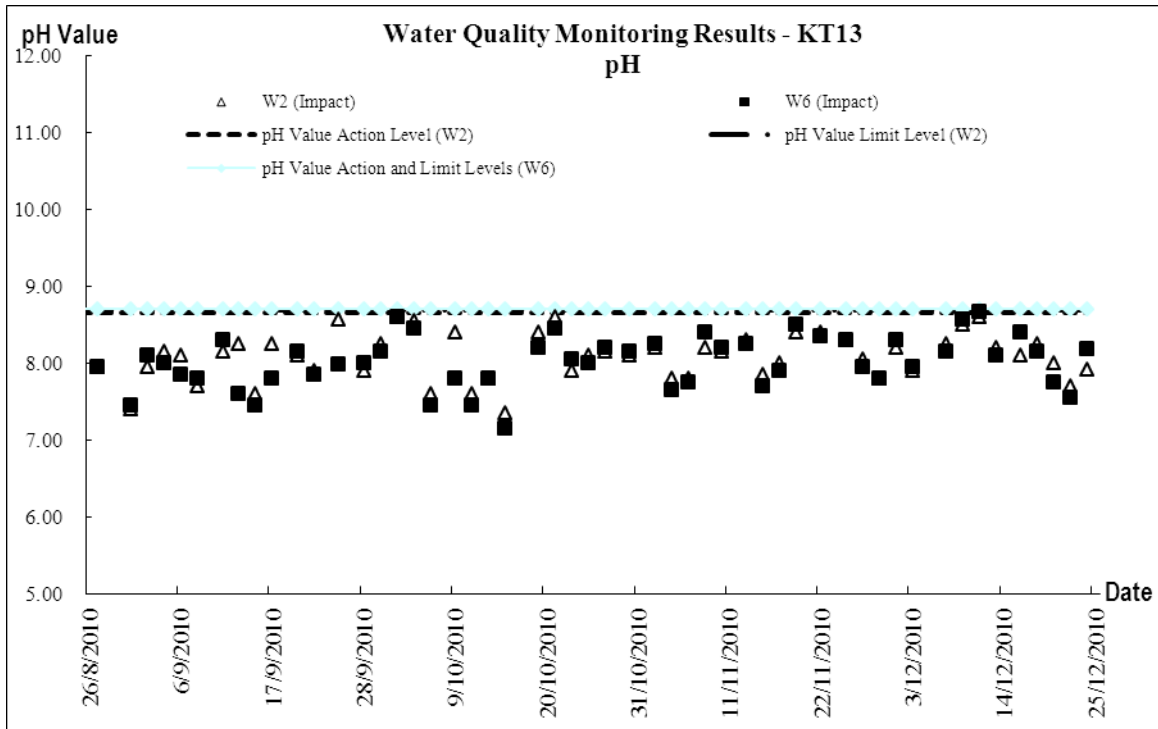


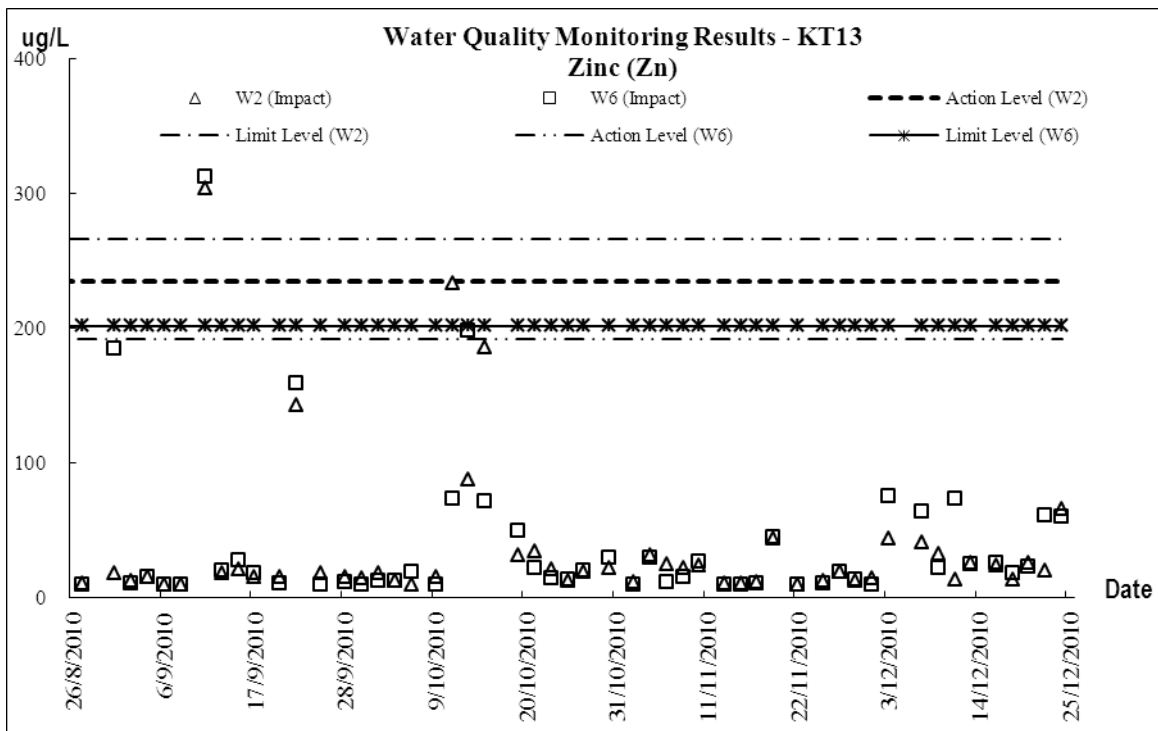
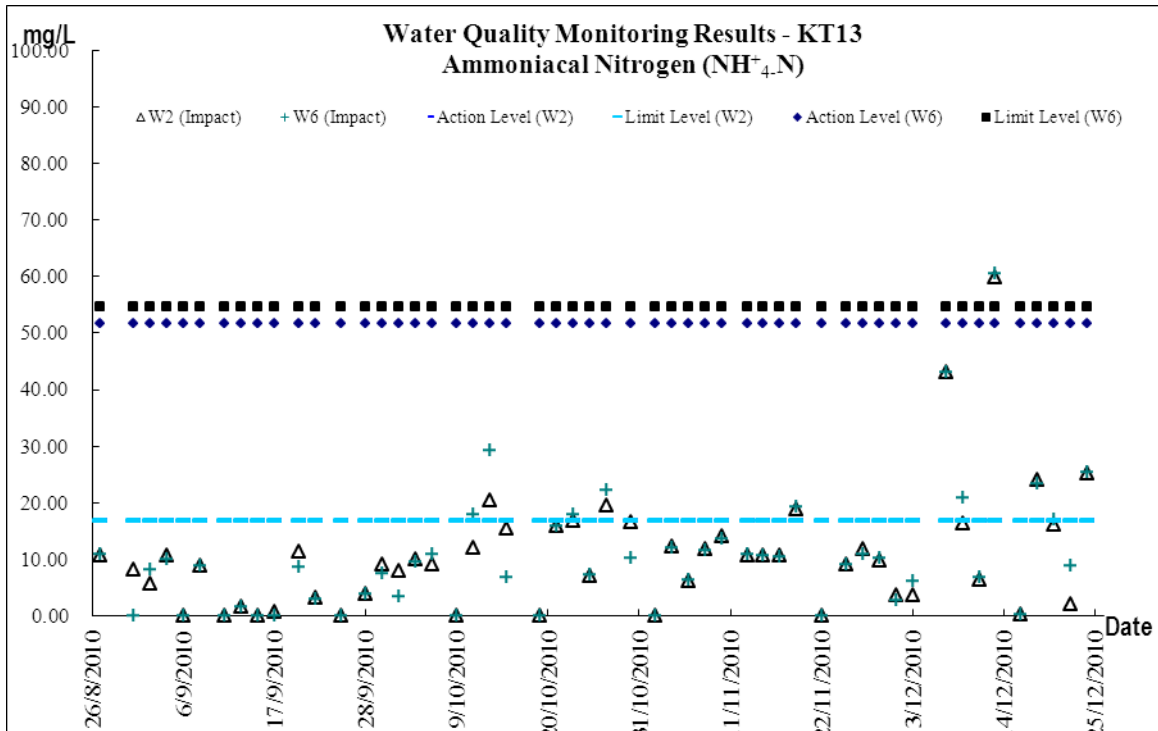




### Graphic Plot of Monitoring –Water Quality







**Appendix H**  
**Photographic Records of**  
**Ecological Monitoring of Vegetation**  
**(Not Used)**

## **Appendix I**

### **Condition Survey of the Grave during Construction Phase**

China Road and Bridge Corporation

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:  
*Condition Survey During  
Construction Phase*

January 2010

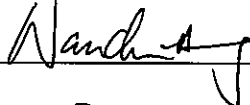
**Environmental Resources Management**

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China Road and Bridge Corporation

Contract No. DC/2007/17  
Drainage Improvement Works in  
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Tsuen of Yuen Long District and  
Sewerage at Tseng Tau Chung  
Tsuen, Tuen Mun:  
*Condition Survey During  
Construction Phase*

January 2010

For and on behalf of	
ERM-Hong Kong, Limited	
Approved by:	Frank Wan
Signed:	
Position:	Partner
Date:	11 January 2011

Reference 0082040

This report has been prepared by ERM-Hong Kong, Limited with all reasonable skill, care and diligence within the terms of the Contract with the client, incorporating our General Terms and Conditions of Business and taking account of the resources devoted to it by agreement with the client.

We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.

This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at their own risk.



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# 1 INTRODUCTION

## 1.1 BACKGROUND

The China Road and Bridge Corporation (the Contractor) has been commissioned by the Drainage Services Department (DSD) of the Hong Kong Special Administrative Region (HKSAR) Government to carry out *Drainage Improvement Works in Cheung Po, Ma On Kong, Yuen Kong San Tsuen and Tin Sam Tsuen of Yuen Long District and Sewerage at Tseung Tau Chung Tsuen in Tuen Mun* under Contract No. DC/2007/17 (the Contract).

According to the findings of the *Environmental Impact Assessment (EIA)* and *Section 7 of the Environmental Monitoring and Audit (EM&A) Manual* of the captioned Project, a condition survey is required for a historical grave (KT13-02-02) near Ma On Kong before and during construction phase of the proposed bypass culvert under KT13 project, as the project is located close (approximately 39m) to the grave (see *Figure 1.1*).

ERM-Hong Kong Limited has been commissioned by the Contractor to undertake the condition survey before and during construction phase of the Project.

Prior to the condition survey, a method statement for the work has been established and approved by the Antiquities and Monuments Office (AMO) of the Leisure and Cultural Services Department (LCSD) in accordance with *Section 7.3.1 of the EM&A Manual* for the project.

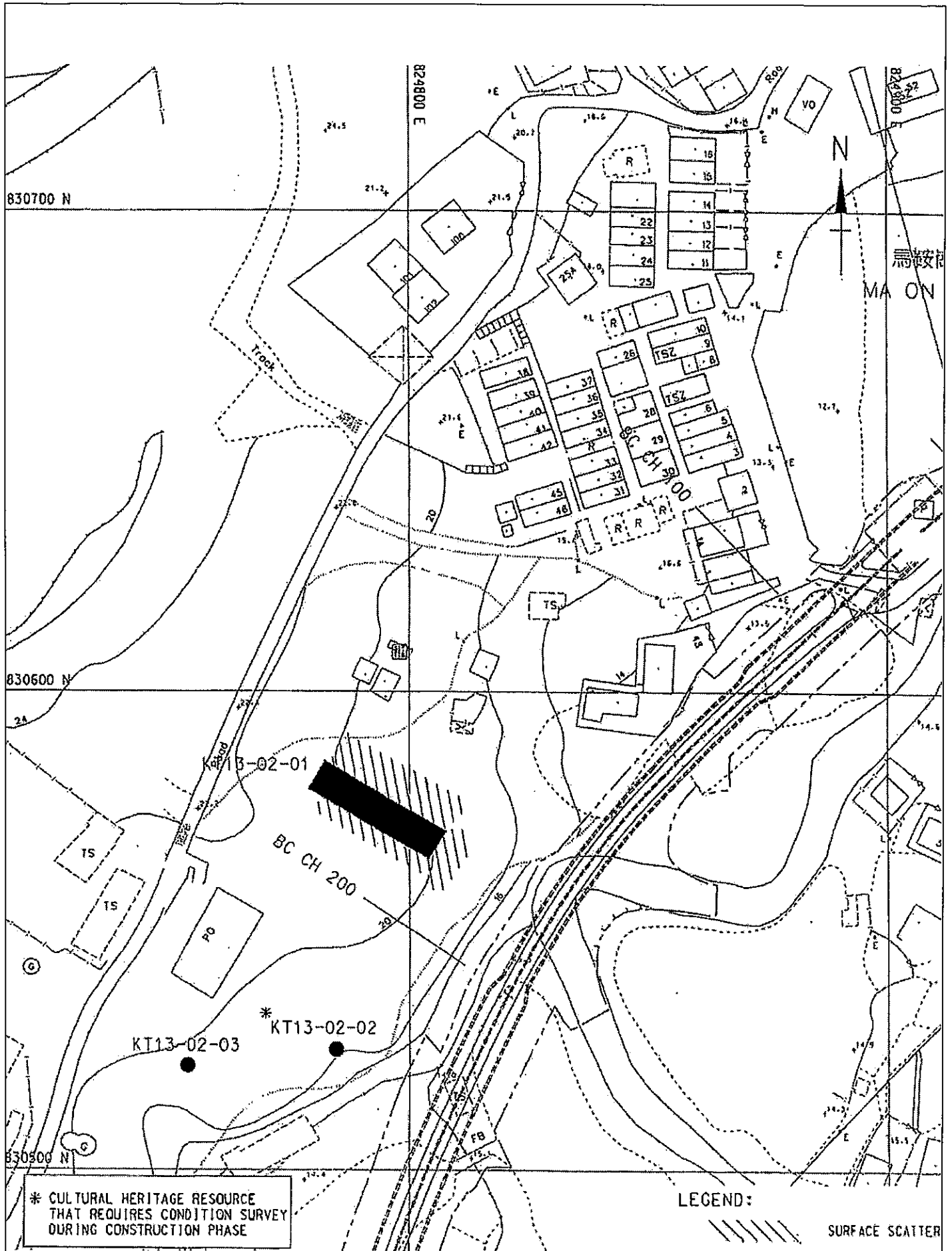
This report presents the results of the condition survey conducted on 18 December 2010.

## 1.2 STRUCTURE OF THE REPORT

Following this introductory section, the remainder of this report comprises the following sections:

- Section 2* describes the methodology for the condition survey;
- Section 3* presents the condition survey findings; and
- Section 4* presents conclusions and further actions.

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\* CULTURAL HERITAGE RESOURCE  
 THAT REQUIRES CONDITION SURVEY  
 DURING CONSTRUCTION PHASE

LEGEND:  
 [Hatched Box] SURFACE SCATTER

Figure 1.1

Location of the Historic Grave (KT13-02-02)  
 at Ma On Kong

FILE: 0082040b  
 DATE: 27/06/2008

Environmental  
 Resources  
 Management



As the proposed bypass culvert under KT13 project is located close to a historical grave (KT13-02-02), in order to preserve the integrity of the grave's structure, a condition survey before and during the construction phase of the KT13 project is required. The condition survey is divided into two stages, comprising Stage 1: pre-construction condition survey and Stage 2: condition surveys during construction phase. A pre-construction condition survey was undertaken in June 2008 and the survey report has been submitted to the Antiquities and Monuments Office (AMO) for review in July 2008. As the survey has been undertaken for more than a year, the Contractor has instructed ERM to carry out a condition survey on 31 August 2009 to update the condition of the grave. The findings obtained from that survey are regarded as the baseline information for reference for Stage 2 condition surveys during construction phase.

According to the agreed method statement, condition surveys should be carried out at bi-monthly intervals during construction phase when the construction works are carried out within 100m from the grave (referred to as the Stage 2 condition survey). The construction works within 100m from the grave commenced on 21 October 2009. Six condition surveys (on 31 October 2009, 9 January 2010, 27 February 2010, 5 June 2010, 21 August 2010 and 23 October 2010) have been conducted so far. In view of the suspension of the construction works within 100m from the grave between 1 March and 31 May 2010, no condition survey had been conducted during this period. This report presents the findings of the latest condition survey conducted on 18 December 2010.

### 2.1.1

#### *Stage 2: Condition Survey During Construction Phase*

The purpose of the Stage 2 condition survey during construction phase was to record the existing condition of the historical grave (KT13-02-02) after construction work of the proposed bypass culvert under KT13 project had started within 100m from the grave and comprised the following tasks:

1. Identification of the historical grave (KT13-02-02) near Ma On Kong;
2. Visual inspection was adopted for the condition survey;
3. Recording of the existing condition and evaluation of structural integrity of the historical grave;
4. Measurement of ground level and exact location of the historical grave by a qualified land surveyor;
5. The condition survey was undertaken by a qualified archaeologist, a cultural heritage specialist, assisted by a surveyor and a structural engineer provided by the Contractor; and

6. Submission of all records (including photographs, ground level measurements, grave locations, all detected cracks, defects and damage, if any) to the AMO of the LCSD in this report. It will form part of the EM&A Manual findings. The next condition survey to be conducted during construction stage was recommended in *Section 4.2* of this report.

### 3 *CONDITION SURVEY FINDINGS*

The condition survey was conducted on 18 December 2010 and the findings are presented below.

#### 3.1 *HISTORICAL GRAVE (KT13-02-02)*

The historical grave KT13-02-02 was identified during the EIA stage of the project. It is dated to Qing Dynasty and located south of Ma On Kong village (see *Figure 1.1*) in Kam Tin facing south/southeast. The grave is constructed with Chinese bluish bricks and masonry and rendered with cement.

#### 3.2 *EXISTING CONDITION*

At the time of the monitoring on 18 December 2010, the grave was in good condition with little weeding problem. *Figure 3.1* shows the general view of the grave.



*Figure 3.1 Front View*

A total of 26 cracks were identified on the cement rendering, mortar of bricks and headstone of the grave. Their locations are shown in *Figure 3.2*. Crack width ranged from hairline to 5.6mm. *Table 3.1* details the cracks identified on the grave photographically and compares the cracks identified during last condition survey and those in this survey.



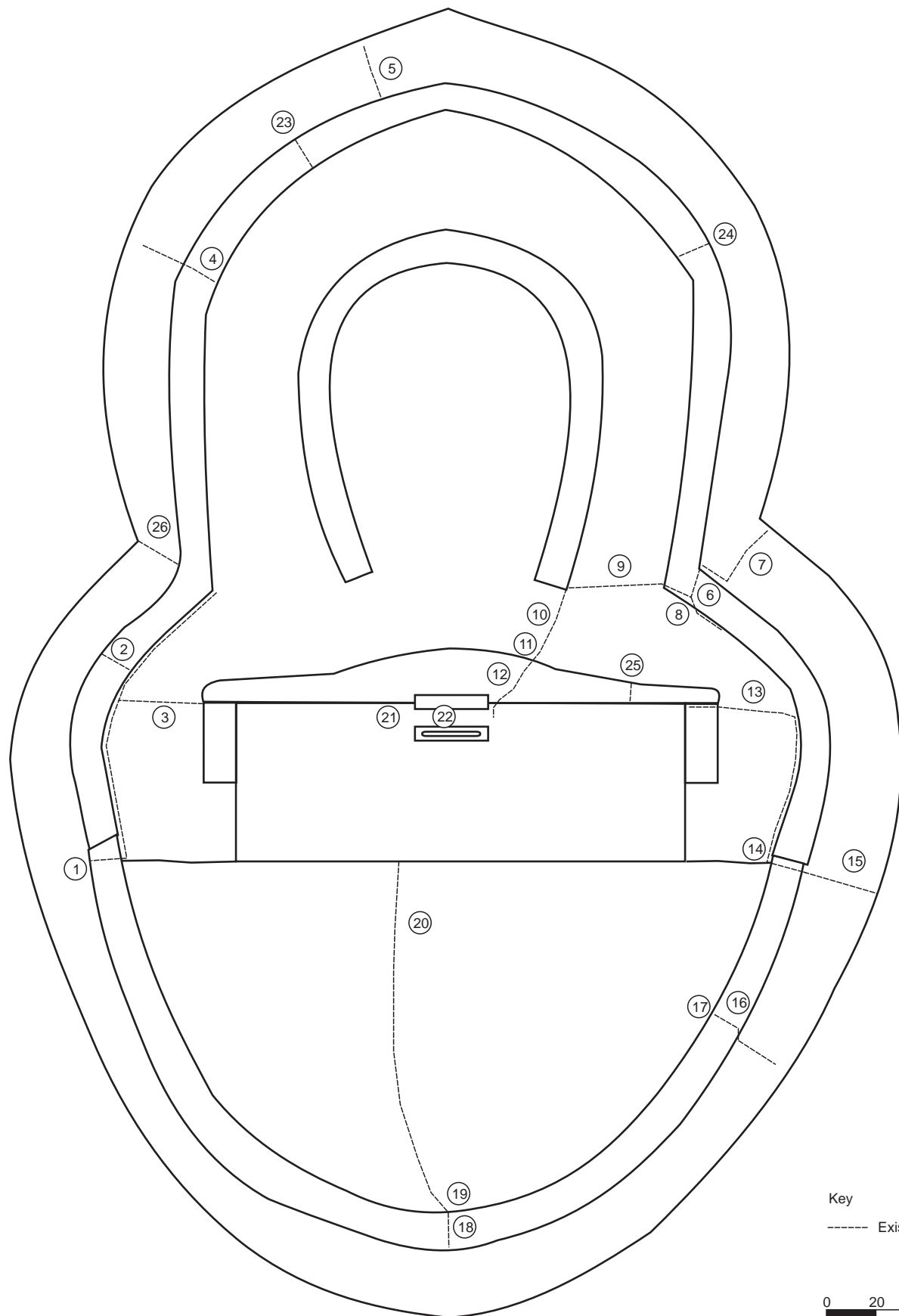


Figure 3.2







Plan of the Historic Grave Showing Existing Cracks  
(as at 18 December 2010)









FILE: 0082040e  
DATE: 18/12/2010

**Environmental  
Resources  
Management**











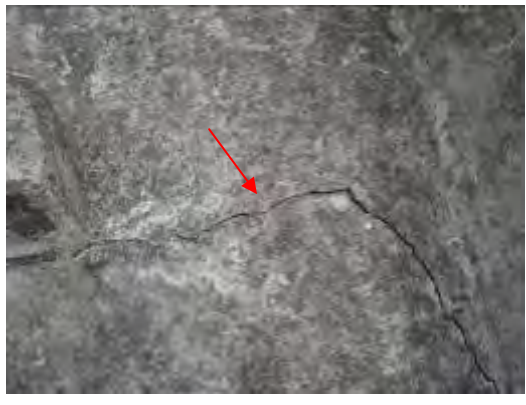







**Table 3.1 Comparison of Cracks on the Historic Grave Identified on the Two Condition Surveys**

Crack No.	Current Crack Width (mm)	Photographic Record	
		Condition Survey Undertaken on 23 October 2010	Condition Survey Undertaken on 18 December 2010
1	1		
2	2		
3	1.5		
4	1.5		







Crack No.	Current Crack Width (mm)	Photographic Record	
		Condition Survey Undertaken on 23 October 2010	Condition Survey Undertaken on 18 December 2010
5	5.6		
6	1.6		
7	1.7		
8	1.6		














Crack No.	Current Crack Width (mm)	Photographic Record	
		Condition Survey Undertaken on 23 October 2010	Condition Survey Undertaken on 18 December 2010
9	0.5	 A photograph showing a crack in a concrete surface. A red arrow points to the crack. The surface is somewhat textured and appears to be part of a larger structure.	 A photograph showing the same crack in the concrete surface as in the October 2010 survey. A red arrow points to the crack. The crack appears slightly wider or more defined.
10	1	 A photograph showing a crack in a concrete surface. A red arrow points to the crack. The surface is dark and appears to be part of a larger structure.	 A photograph showing the same crack in the concrete surface as in the October 2010 survey. A red arrow points to the crack. The crack appears slightly wider or more defined.
11	1.5	 A photograph showing a crack in a concrete surface. A red arrow points to the crack. The surface is dark and appears to be part of a larger structure.	 A photograph showing the same crack in the concrete surface as in the October 2010 survey. A red arrow points to the crack. The crack appears slightly wider or more defined.
12	1.6	 A photograph showing a crack in a concrete surface. A red arrow points to the crack. The surface is dark and appears to be part of a larger structure.	 A photograph showing the same crack in the concrete surface as in the October 2010 survey. A red arrow points to the crack. The crack appears slightly wider or more defined.

Crack No.	Current Crack Width (mm)	Photographic Record	
		Condition Survey Undertaken on 23 October 2010	Condition Survey Undertaken on 18 December 2010
13	2.9	 A photograph showing a horizontal crack in a concrete surface. A red arrow points to the crack.	 A photograph showing the same horizontal crack in the concrete surface. A red arrow points to the crack.
14	2.1	 A photograph showing a vertical crack at a joint in a concrete structure. A red arrow points to the crack.	 A photograph showing the same vertical crack at the joint. A red arrow points to the crack.
15	2.7	 A photograph showing a horizontal crack in a concrete surface. A red arrow points to the crack.	 A photograph showing the same horizontal crack in the concrete surface. A red arrow points to the crack.
16	1.7	 A photograph showing a horizontal crack in a concrete surface. A red arrow points to the crack.	 A photograph showing the same horizontal crack in the concrete surface. A red arrow points to the crack.





Crack No.	Current Crack Width (mm)	Photographic Record	
		Condition Survey Undertaken on 23 October 2010	Condition Survey Undertaken on 18 December 2010
17	1.7	 A photograph showing a vertical crack in a concrete surface. A red arrow points to the crack. The crack is located at the base of a concrete curb or edge.	 A photograph showing the same vertical crack in the concrete surface as in the October 2010 image. A red arrow points to the crack. The crack appears slightly wider and more irregular.
18	2.2	 A close-up photograph of a horizontal crack in a concrete surface. A red arrow points to the crack. The crack is located on a vertical concrete pillar or wall.	 A close-up photograph of the same horizontal crack in the concrete surface. A red arrow points to the crack. The crack appears slightly wider and more irregular.
19	0.5	 A photograph showing a horizontal crack in a concrete surface. A red arrow points to the crack. The crack is located at the base of a concrete curb or edge.	 A photograph showing the same horizontal crack in the concrete surface as in the October 2010 image. A red arrow points to the crack. The crack appears slightly wider and more irregular.

Crack No.	Current Crack Width (mm)	Photographic Record	
		Condition Survey Undertaken on 23 October 2010	Condition Survey Undertaken on 18 December 2010
20	1.1	 A photograph showing a vertical crack in a concrete surface. A red arrow points to the crack.	 A photograph showing the same vertical crack in the concrete surface. A red arrow points to the crack.
21	0.5	 A close-up photograph of a crack in a concrete structure. A red arrow points to the crack.	 A close-up photograph of the same crack in the concrete structure. A red arrow points to the crack.
22	Hair-line	 A close-up photograph of a hair-line crack in a concrete surface. A red arrow points to the crack.	 A close-up photograph of the same hair-line crack in the concrete surface. A red arrow points to the crack.

Crack No.	Current Crack Width (mm)	Photographic Record	
		Condition Survey Undertaken on 23 October 2010	Condition Survey Undertaken on 18 December 2010
23	Hair-line	 A photograph showing a hair-line crack in a concrete surface. A red arrow points to the crack.	 A photograph showing the same hair-line crack in a concrete surface. A red arrow points to the crack.
24	0.5	 A photograph showing a 0.5 mm wide crack in a concrete surface. A red arrow points to the crack.	 A photograph showing the same 0.5 mm wide crack in a concrete surface. A red arrow points to the crack.
25	0.5	 A photograph showing a 0.5 mm wide crack in a concrete surface. A red arrow points to the crack.	 A photograph showing the same 0.5 mm wide crack in a concrete surface. A red arrow points to the crack.



Crack No.	Current Crack Width (mm)	Photographic Record	
		Condition Survey Undertaken on 23 October 2010	Condition Survey Undertaken on 18 December 2010
26	2.5		

No new cracks are identified during this condition survey. The crack widths for 25 cracks out of the 26 cracks as shown in *Table 3.1* remain unchanged. However, one crack was recorded to have very slightly widened (0.1mm). The crack width change is presented in *Table 3.2*.

**Table 3.2** *Comparison of Crack Width*

Crack No.	Width of Crack Recorded on 23 October 2010 (mm)	Width of Crack Recorded on 18 December 2010 (mm)	Difference (mm)
18	2.1	2.2	+0.1

In view of the surrounding dense vegetation and the grave being exposed, existing cracks are likely to be slightly widened by weathering (such as raining, intermittent heating and cooling), root encroachment of overgrown vegetation and the platform built by an unknown third party adjacent to the grave used as a car park since November 2009. *Figures 3.3* and *3.4* show the general views of the platform on the day of monitoring on 18 December 2010.



*Figure 3.3 View of the platform and the vehicles thereupon from the grave*



*Figure 3.4 General view of the platform used as a car park*

Furthermore, as first reported in the condition survey dated 21 August 2010, the site clearance at a place approximately 67m away from the grave in its southwest direction by an unknown third party took place on 19 August 2010. After the occurrence of the site clearance activity, it was reported by the Contractor via letter dated 29 September 2010 that during their site inspection on the same day they noted the concerned area had been fenced off and a sign board had been erected by District Lands Office, Yuen Long (DLO, Yuen



Long). It is considered that the erection of the fence and sign board is to prevent people from trespassing, dumping or unlawful occupation on the concerned Government land. Figures 3.5 and 3.6 show the general view of the recently erected fence and the sign board on the day of monitoring on 18 December 2010.



*Figure 3.5 General view of the fence restricting trespassing, dumping or unlawful occupation on the concerned Government land near the grave.*



*Figure 3.6 The sign board erected by DLO, Yuen Long near the grave*

The settlement monitoring suggested that there is no settlement or differential settlement at the grave and therefore the slight increase of crack width is unlikely due to the construction works. The slight increase of the crack width will not affect the structural integrity of the grave. However, they need to be monitored closely in the next condition survey to determine if these cracks will be widened.

No major signs of settlement of the foundations or structural cracks were identified. In order to establish the baseline condition of the grave for monitoring of potential ground settlement, five settlement markers (13GS01 to 13GS05) were established (without damaging the physical grave) to record the coordinates and elevations of the grave (see *Figure 3.7*). The recorded points are presented in the *Table 3.4*.

**Table 3.4** *Record of Five Settlement Marker Points of the Historic Grave on 18 December 2010*

Point	Northing	Easting	Elevation (mPD) Initial Reading (Taken on 31 August 2009)	Elevation (mPD) Updated Reading (Taken on 18 December 2010)	Difference (mm)
13GS01	830520.25	824754.57	19.222	19.223	+1
13GS02	830521.54	824754.32	19.985	19.985	0
13GS03	830523.21	824754.54	20.644	20.644	0
13GS04	830521.79	824755.67	19.943	19.944	+1
13GS05	830520.61	824756.12	19.211	19.211	0

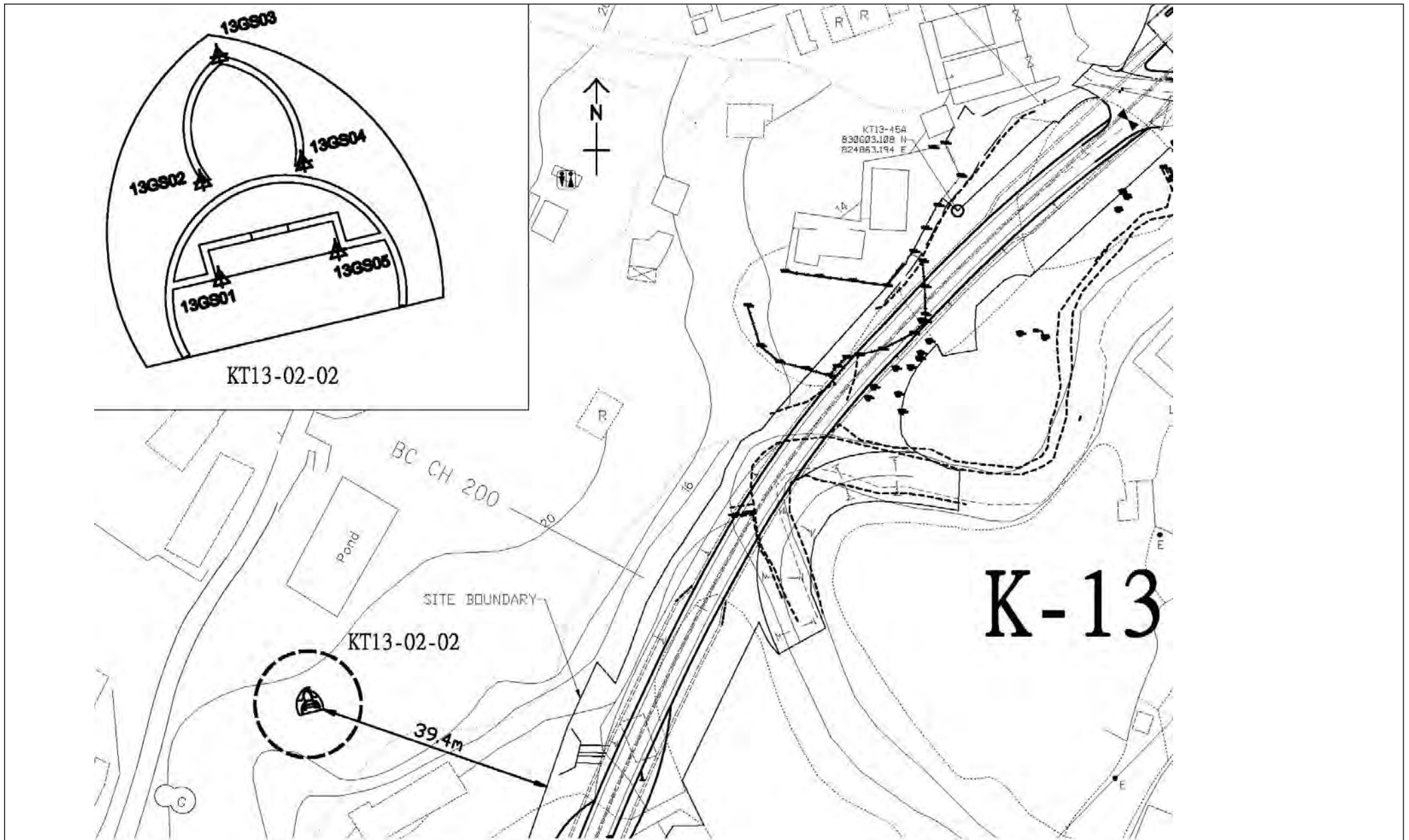


Figure 3.7

Location of Settlement Marker Points

**4.1****CONCLUSIONS**

According to the method statement agreed with AMO, condition surveys should be carried out at bi-monthly intervals during construction phase when the construction works are carried out within 100m from the historical grave (KT13-02-02) (referred to as the Stage 2 condition survey). The construction work within 100m from the grave was commenced on 21 October 2009. Six condition surveys (on 31 October 2009, 9 January 2010, 27 February 2010, 5 June 2010, 21 August 2010 and 23 October 2010) have been conducted. The construction works within 100m from the grave were suspended between 1 March and 31 May 2010, and no condition survey had been conducted during this period. A condition survey was last undertaken on 18 December 2010 by a qualified archaeologist, a cultural heritage specialist, a surveyor and a structural engineer. Comparing with the baseline information obtained on 31 August 2009 and the previous six condition surveys conducted on 31 October 2009, 9 January 2010, 27 February 2010, 5 June 2010, 21 August 2010 and 23 October 2010, except the rather severe weeding problem due to the hot and wet season at the time of site monitoring, the grave was generally considered in good condition without observable structural instability. A total of 26 minor cracks ranging from hairline to 5.6 mm in width were identified in this condition survey. There were no major signs of structural cracks. The cracks on the surface rendering are likely to be caused/intensified by the following reasons:

- (a) pressure induced by the vehicles parked on the platform;
- (b) natural weathering (such as raining, intermittent heating and cooling);
- (c) root encroachment of overgrown vegetation; and
- (d) site clearance work carried out by unknown third party.

Five settlement marker points have been established on the grave and the coordinates and elevations of the points were recorded. The settlement monitoring results taken on 18 December 2010 were compared with the baseline readings taken on 31 August 2009 to determine if there is any significant tilting or settlement of the grave. No settlement or tilting has been detected since last condition survey.

**4.2****FURTHER ACTION - NEXT CONDITION SURVEY DURING CONSTRUCTION PHASE**

As agreed in the method statement, bi-monthly condition surveys will be undertaken when construction works are within 100m from the historical grave. However, the construction works of the proposed bypass culvert under the KT13 project within 100m from the grave were suspended between



1 March and 31 May 2010 due to the restricted activities within 100m of the ecological buffer area. Therefore, no condition survey was conducted during this period. The next condition survey is scheduled to be conducted in mid/late February 2011. The survey will include the measurement of the 26 existing cracks identified to record if the cracks have been widened compared with the last condition survey and visual inspection on the presence of any additional cracks. If additional cracks are identified, they will be marked on a plan and measured. When damage to or structural instability of the grave is detected, the requirement under the approved Method Statement and action required in Event and Action Plan under the EM&A Manual will be followed.

Although there is no tilting or settlement measured in this reporting period, the Contractor decides to maintain the monitoring frequency of the five settlement markers (13GS01 to 13GS05) at weekly intervals. If a tilting or settlement of  $\pm 5$  mm of ground surface level of the grave is identified, the action and limit levels and action plan as stated in Sections 7.5 and 7.6 of the EM&A will be adopted (see Tables 4.1 and 4.2). The construction works should cease immediately and the AMO should be informed. Remedial action should be designed and implemented by the Contractor in consultation with the AMO of LCSD following the action plan as stated in Section 7.6 of the EM&A Manual of the project (see Table 4.2).

**Table 4.1** *Action and Limit Levels for the Historical Grave*

Action	Limit
When damage or structure instability is first detected.	Signs of deterioration and structural instability continue on subsequent visits after action level is triggered.

**Table 4.2** *Event and Action Plan for the Historical Grave*

Event	Action			
	ET Leader	IEC	ER	Contractor
Action Level	Notify IEC and Contractor to carry out investigation.	Review report of structural damage or instability by the ET.	Confirm receipt of notification failure in writing. Notify Contractor.	Notify AMO concerning the damage or structural instability of the historical grave.
	Report reasons of structural damage or instability to the IEC and Contractor.	Review proposed remedial measures by the Contractor and advise the ER and Antiquities and Monuments Office (AMO) accordingly.	Require Contractor to propose remedial measures and to notify and seek approval from AMO.	Submit proposal for repair of damage to the historical grave to AMO for approval and to implement approved measures.
	Discuss with the Contractor and formulate remedial measures.	Supervise the implementation remedial measures, with approval from AMO.	Ensure remedial measures are properly implemented.	
	Increase monitoring frequency to once per week to check			

Event	Action			
	ET Leader	IEC	ER	Contractor
	mitigation effectiveness.			
Limit Level	<p>Notify IEC and Contractor to carry out investigation and to stop construction work within 100m of cultural heritage resource to avoid further impact until AMO are satisfied that the relevant structure has been repaired or stabilized to an acceptable level.</p> <p>Report reasons of continued structural damage or instability to the IEC and Contractor</p> <p>Discuss with the Contractor and formulate remedial measures</p> <p>Increase monitoring frequency to daily to check mitigation effectiveness</p>	<p>Review report of structural damage or instability by the ET.</p> <p>Review proposed remedial measures by the Contractor and advise the ER and Antiquities and Monuments Office (AMO) accordingly.</p> <p>Supervise the implementation of remedial measures, with approval from AMO.</p>	<p>Confirm receipt of notification of failure in writing</p> <p>Notify Contractor</p> <p>Require Contractor to propose remedial measures and to notify and seek approval from AMO.</p> <p>Ensure remedial measures are properly implemented.</p>	<p>To carry out investigation and to stop construction work within 100m of cultural heritage resource to avoid further impact until AMO are satisfied that the relevant structure has been repaired or stabilized to an acceptable level.</p> <p>Propose remedial measures for the repair and stabilization of cultural heritage resources, up to liaison of moving and rebuilding the relevant structure with the approval of owner (usually the clan members) and AMO.</p>

Once the construction within 100m area from the grave is completed, a final condition survey should be reported.



## **Appendix J**

### **Physical, Human and Cultural Landscape Resources at KT13**

**Current Situation of Physical, Human and Cultural Landscape Resources at KT13, inspected on 07 and 22 December 2010**

The physical resources that will be affected during the Construction Phase and Operational Phase, together with their sensitivity to change, are described below. The locations of the baseline landscape resources are mapped in Drawing no. LR-001. The Landscape Resources in direct conflict with the Project are mapped together with their extent outside study boundary for integrity of information. Photo views illustrating the landscape resources of the study area are illustrated in Drawing Nos. PR-001 to 002 inclusive. For ease of reference and co-ordination between text, tables and figures each landscape resources is given an identity number.

Table compares the baseline study and the current situation for KT13: (Landscape Resources)

Section in EIA Report	Identify number – Landscape Resources	Photo No	Baseline Study, Environmental Impact Assessment Final Report [382047/E/EIA/Issue 9]	Current Situation
<b>Drainage</b>				
10.7.3	LR1 – River/ Stream	A1 - A5	There is a semi-natural drainage features (the Ma On Kong Channel) in the study area with untrained natural upstream and partial trained downstream with a total length of 800m. The Channel originates from the South-West of the valley and discharge to the existing Primary Channel by Kam Ho Road running through and along the site area spanning across majority of the river valley, together with the existing vegetations forming the central part of riparian landscape network. They have medium landscape value and sensitive to change.	Minor change due to construction work within the site boundary.
<b>Fish Pond</b>				
10.7.4	LR2.1 (Fish Pond) within site boundary LR2.2 (Fish Pond) outside site boundary	A6 A7	There are 4 numbers of fallowed fish ponds at the upstream of the Ma On Kong Channel. A chain of fish ponds near downstream but distant from the Channel is noted. The fish ponds cover area of in total 23,000 m2. Most of them are heavily colonized by aquatic plants, which attribute to their low visual quality as a water landscape element. They have low landscape value and sensitive to change.	Minor change due to construction of structures within site boundary. A soil platform was

				created outside site boundary due to other project was noted.
<b>Marsh</b>				
10.7.5	LR3 (Marsh)	A8	It comprises 2 marshes at the upstream channel of the Channel. They are inundated lowland heavily colonized with wetland aquatic plants. They have low landscape value and sensitive to change.	Remain the same as the baseline
<b>Vegetation</b>				
10.7.7	LR4 (Woodland/ Wooded Area)	A9 A10	It comprises two major communities of woodland/ wooded area. One is dense natural woodland stretching across the Conservation Area and area behind Ma On Kong and consists approximate 450 numbers of trees based on visual estimation. The trees are mainly native species and mature in size. It is dominated by <i>Schefflera octophylla</i> , <i>Pinus massoniana</i> , <i>Aporosa chinensis</i> , <i>Celtis sinensis</i> , <i>Bridelia tomentosa</i> , <i>Cinnamomum cmaphora</i> , <i>Rhus chinensis</i> and <i>Phus succedanes</i> . Another one is a natural more sparse riparian wooded area at upstream of the Channel and consists approximate 60 numbers of trees based on visual estimation. The trees are mainly pioneer species and poorer in form and maturity. It is dominated by <i>Ficus hispide</i> and <i>Macaranga tanarius</i> . They have high landscape value and sensitivity to change.	Remain the same as the baseline
10.7.8	LR5 (Orchard/ Horticultural Trees)	A11	It comprises two groups of trees at downstream below Ma On Kong and north of Ho Pui Amongst there are approximate 400 numbers of trees based on visual estimation. They are fruit trees and landscape plants of horticultural practices. It is dominated by <i>Dimocarpus longan</i> , <i>Delonix regian</i> , <i>Roystonea regia</i> and <i>Pachira macrocarpa</i> . For their anthropogenic and not permanent in nature, they have medium landscape value and sensitivity to change.	Remain the same as the baseline
10.7.9	LR6 (Low-Lying Agricultural Land/ Followed Land)	A12	It comprises fallowed land and agricultural land in low rate of uses. The vegetation is mainly grass and sedge with mosaics of shrubs approaching the Channel. It fills up the about half of the existing	Remain the same as the baseline.

			landscape within the study area. They have low landscape value and sensitivity to change.	
<b>Sitting-Out Area</b>				
10.7.10	LR7 (Sitting-Out Area at Ma On Kong)	A13	It is located at the Ma On Kong next to the access road. It is a small sitting-out area primarily hard-paved with only 3 amenity trees and on pavilion. It has low landscape value and sensitivity to change.	Remain the same as the baseline
<b>Landscape Character Areas</b>				
10.7.12	LCA1 (Agricultural Landscape Character Area)	B1 & B2	This comprises fallowed land & agricultural land not in active uses. This character area is flat and gentle sloping in landform and vegetated with grass of various heights. It forms the majority of the landscape character of the entire river valley and the connecting landscape element between other landscape character areas. The sensitivity to change of this area is low.	Minor change due to invasion of cows. Some of the grass on the land were consumed.
10.7.13	LCA2 (Woodland Landscape Character Area)	B3	This is natural woodland between southern Ma On Kong and the Channel extending up to the access road behind Ma On Kong. The trees are mature in size forming a close woodland landscape. It is the location of egetry of conservation importance. The sensitivity to change of this area is high.	Remain the same as the baseline
10.7.14	LCA3 (River/ Stream Landscape Character Area)	B4 – B7	This is the main stream of the Channel in associate with its riparian vegetation. It meanders through the river valley landscape. It is used as a receptor of agricultural effluent from poultry farm around upstream, which contribute to the polluted appearance of the character area around upstream. The sensitivity to change of this area is medium.	Minor change due to construction work within site boundary
10.7.15	LCA4 (Fish Pond Landscape Area)	B8	This comprises a number of fish ponds of various sizes distributed about the Channel. Most of them are abandoned or with limited uses and colonized with aquatic plants. The sensitivity to change of this area is medium.	Minor change due to construction of structures within site boundary.

Drainage Improvement Works in Cheung Po, Ma On Kong, Yuen Kong San Tsuen, Tin Sam Tsuen of Yuen Long District and Sewerage at Tseng Tau Chung Tsuen, Tuen Mun

10.7.16	LCA5 (Village Landscape Character Area)	B9 & B10	This comprises the four major village types rural settlement encompassing tai Kek, Ma On Kong, Ho Pui and north of Ho Pui. Except Tai Kek which is less revitalized and actively resided, all other three are actively resided. This area is lightly urbanized with low rise village house. The sensitivity to change of this area is low.	Remain the same as the baseline
10.7.17	LCA6 (Industrial Landscape Character Area)	B11 & B12	This comprise collection of slummy-built temporary structure and open storage uses land, which are characterized with metallic hoarding and used for poultry, recycling, vehicle repairing etc. The sensitivity to change of this area is low.	Reconstruction of hoarding was conducted by the land owner
10.7.18	LCA7 (Nullah Landscape Character Area)	B13	This is the trained nullah next to Kam Ho Road. It is the primary tributary connecting and receiving outflow from the Ma On Kong Channel. The area is man-made and with poor and monotonous riverside vegetation. The sensitivity to change of this area is low.	Remain the same as the baseline

10.7.19 Visual Character

The visual quality of the river valley of Ma On Kong Channel is semi-natural based on combination of rural landscape elements including agricultural land, village houses, woodland and pond and stream and industrial landscape elements including open storage and temporary structures. Interspersed landscape elements on general flat landform with minor undulation render numerous small enclosed views. No major vista and high quality open view identified.

10.7.20 Visual Sensitive Receiver (VSR)

Within the ZVI, a number of key Visual Sensitive Receivers (VSRs) have been identified. These VSRs are mapped in Drawing V-001. They are listed, together with their sensitivity, in Table 10/5. Photo views illustrating the VSRs are illustrated in Drawing nos. PV-001 to 002 inclusive. For the ease of reference, each VSR is given an identity number, which is used in the text, tables and figures.

Table compares the baseline study and the current situation for KT13: (Visual Sensitive Receiver)

Section in EIA Report	Identify number – VSR	Photo No.	Baseline Study, Environmental Impact Assessment Final Report [382047/E/EIA/Issue 9]	Current Situation
<b>Industrial VSRS</b>				
10.7.21	I1	C1	Open storage near junction between Kam Ho Road and Village access The VSRSs are workers of the open storage. The number of individual is very few and their sensitivity to visual impacts is low.	Remain the same as the baseline
10.7.22	I2	C2	Plant Nursery at the east of Ma On Kong Channel The VSRSs are workers of the plant nursery. The number of individual is very few and their sensitivity to visual impacts is low.	Remain the same as the baseline
10.7.23	I3	C3	Plant Nursery at the west of Ma On Kong Channel The VSRSs are workers of the plant nursery. The number of individual is very few and their sensitivity to visual impacts is low.	Temporary stockpiling was observed
10.7.24	I4	C4	Temporary Structure for poultry east to Ho Pui The VSRSs are workers of the temporary structure. The number of individual is very few and their sensitivity to visual impacts is low.	Reconstruction of hoarding was conducted by the land owner
10.7.25	I5	C5	Open Storage at the end of village access road The VSRSs are workers of the open storage. The number of individual is very few and their sensitivity to visual impacts is low.	
10.7.26	I6	C6	Temporary Structure for poultry and Open Storage at upstream of Ma On Kong Channel The VSRSs are workers of the temporary structure and open storage. The number of individual is very few and their sensitivity to visual impacts is low.	Remain the same as the baseline

<b>Open Space / Sitting – Out Area VSRs</b>			
10.7.27	O1	C7	C7
Users of Sitting-out Area at Ma On Kong The VSRs is future users of the re-provided sitting-out area during operation phase. The number of individual is few and their sensitivity to visual impacts is medium.		Remain the same as the baseline	
<b>Residential VSRs</b>			
10.7.28	R1	C8	C8
Tai Kek The VSRs is residents of the village. The number of individual is very few and their sensitivity to visual impacts is high.		Remain the same as the baseline	
10.7.29	R2	C9	C9
North of Ma On Kong The VSRs is residents of the village. The number of individual is very few and their sensitivity to visual impacts is high.		Remain the same as the baseline	
10.7.30	R3	C10	C10
Ma On Kong The VSRs is residents of the village. The number of individual is very few and their sensitivity to visual impacts is high.		Remain the same as the baseline	
10.7.31	R4	C11	C11
North of Ho Pui The VSRs is residents of the village. The number of individual is few and their sensitivity to visual impacts is high.		Remain the same as the baseline	

<b>Transport-related VSRs</b>				
10.7.32	T1	C12	<p>Motorists and Pedestrians along village access road (lower section)</p> <p>The VSRs is the road users of the road section. The number of individual is few and their sensitivity to visual impacts is low.</p>	Remain the same as the baseline
10.7.33	T2	C13	<p>Motorists and Pedestrians along village access road (high section)</p> <p>The VSRs is the road users of the road section. The number of individual is very few and their sensitivity to visual impacts is low.</p>	Remain the same as the baseline
10.7.34	T3	C14	<p>Motorists, Pedestrians and Tourists along access road toward Ho Pui Reservoir</p> <p>The VSRs is the road users of the road section, part of which are tourist to Ho Pui Reservoir. The number of individual is very few and their sensitivity to change is low.</p>	Remain the same as the baseline



DC/2007/17  
Drainage Improvement Works in Cheung Po, Ma On Kong, Yuen Kong San Tsuen, Tin Sam Tsuen of Yuen Long District and  
Sewerage at Tseng Tau Chung Tsuen, Tuen Mun

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## Physical, Human and Cultural Landscape Resources Photo record

07 December 2010



Photo No. A1 – LR1  
 River/Stream



Photo No. A4 – LR1  
 River/Stream



Photo No. A7 – LR2.2  
 River/Stream



Photo No. A2 – LR1  
 River/Stream



Photo No. A5 – LR1  
 River/Stream



Photo No. A8 – LR3  
 River/Stream



Photo No. A3 – LR1  
 River/Stream



Photo No. A6 – LR2.1  
 Fish Pond within site boundary



Photo No. A9 – LR4  
 Woodland/Wooded Area



Photo No. A10 – LR4

Woodland



Photo No. A11 – LR5

Orchard/ Horticultural Trees



Photo No. A12 – LR6

Low-Lying Agricultural Land/ Followed Land



Photo No. A13 – LR7

Sitting-Out Area at Ma On Kong





Photo No. B1 – LCA1 Agricultural Landscape Character Area



Photo No. B2 – LCA1 Agricultural Landscape Character Area



Photo No. B3– LCA2 Woodland Landscape Character Area



Photo No. B4 – LCA3 River/ Stream Landscape Character Area



Photo No. B5 – LCA3 River/ Stream Landscape Character Area



Photo No. B6 – LCA3.1 River/ Stream Landscape Character Area

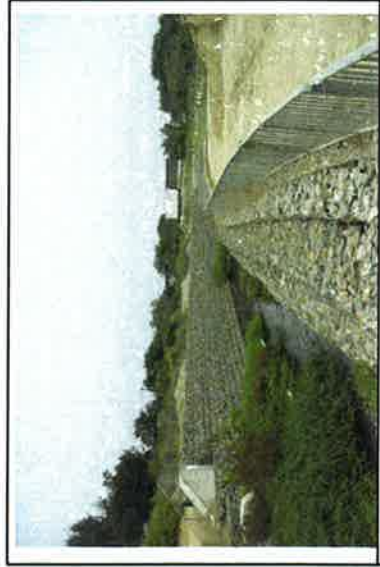


Photo No. B7 – LCA3 River/ Stream Landscape Character Area



Photo No. B8 – LCA4 Fish Pond Landscape Area



Photo No. B9– LCA5 Village Landscape Character Area



Photo No. B10—LCA 5 Village Landscape Character Area



Photo No. B11—LCA 6 Industrial Landscape Character Area



Photo No. B12—LCA 6 Industrial Landscape Character Area



Photo No. B13—LCA 7 Nullah Landscape Character Area





Photo No. C1-11 Open storage near junction between Kam Ho Road and Village access road



Photo No. C4-14 Temporary Structure for poultry east to Ho Pui



Photo No. C7-01 Sitting-out Area at Ma On Kong



Photo No. C2-12 Plant Nursery at the east of Ma On Kong Channel



Photo No. C5-15 Open Storage at the end of village access road



Photo No. C8-R1 Tei Kek



Photo No. C3-13 Plant Nursery at the east of Ma On Kong Channel



Photo No. C6-16 Temporary Structure for poultry and Open Storage at upstream of Ma On Kong Channel



Photo No. C9-R2 North of Ma On Kong



Photo No. C10—R3  
 Ma On Kong



Photo No. C11—R4  
 North of Ho Pui



Photo No. C12—T1 Motorists and Pedestrians along village access road  
 (lower section)



Photo No. C13—T2  
 Motorists and Pedestrians along village  
 access road (high section)



Photo No. C14—T3  
 Motorists, Pedestrians and Tourists along  
 access road toward Ho Pui Reservoir



DC/2007/17  
Drainage Improvement Works in Cheung Po, Ma On Kong, Yuen Kong San Tsuen, Tin Sam Tsuen of Yuen Long District and  
Sewerage at Tseng Tau Chung Tsuen, Tuen Mun

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**Physical, Human and Cultural Landscape Resources Photo record**

**22 December 2010**



Photo No. A1 – LR1

River/Stream



Photo No. A2 – LR1

River/Stream



Photo No. A3 – LR1

River/Stream



Photo No. A4 – LR1

River/Stream

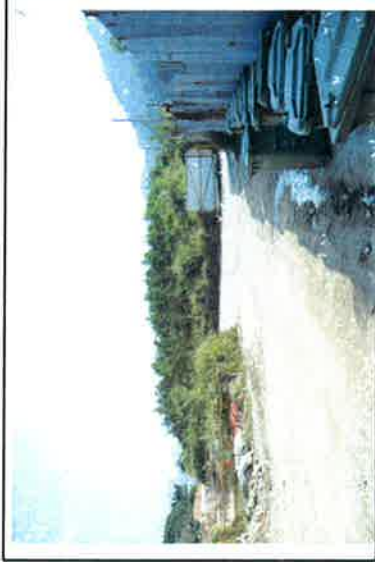


Photo No. A5 – LR1

River/Stream



Photo No. A6 – LR2.1

Fish Pond within site boundary



Photo No. A7 – LR2.2

River/Stream



Photo No. A8 – LR3

River/Stream



Photo No. A9 – LR4

Woodland/Wooded Area





Photo No. A10 – LR4

Woodland



Photo No. A11 – LRS

Orchard/ Horticultural Trees



Photo No. A12 – LR6

Low-Lying Agricultural Land/ Fallow Land



Photo No. A13 –LR7

Sitting-Out Area at Ma On Kong





Photo No. B1 – LCA1 Agricultural Landscape Character Area

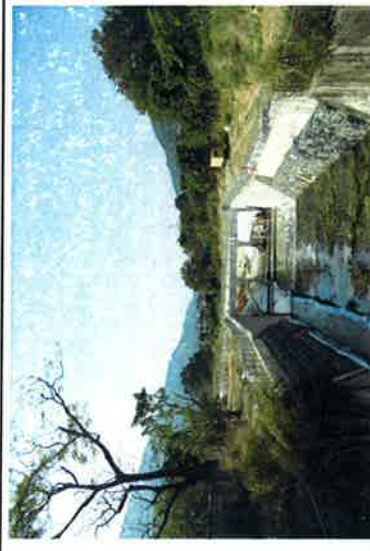


Photo No. B4 – LCA3 River/ Stream Landscape Character Area



Photo No. B7 – LCA3 River/ Stream Landscape Character Area



Photo No. B2 – LCA1 Agricultural Landscape Character Area



Photo No. B5 – LCA3 River/ Stream Landscape Character Area



Photo No. B8 – LCA4 Fish Pond Landscape Character Area



Photo No. B3– LCA2 Woodland Landscape Character Area



Photo No. B6 – LCA3.1 River/ Stream Landscape Character Area



Photo No. B9– LCA5 Village Landscape Character Area





Photo No. B10—LCA 5 Village Landscape Character Area



Photo No. B11—LCA 6 Industrial Landscape Character Area



Photo No. B12—LCA 6 Industrial Landscape Character Area



Photo No. B13—LCA 7 Nullah Landscape Character Area

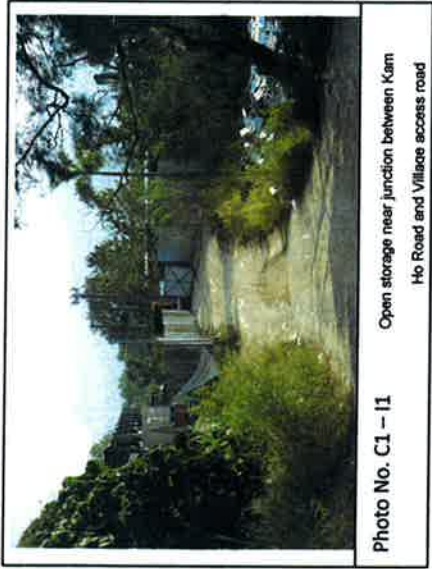


Photo No. C1-11 Open storage near junction between Kam Ho Road and Village access road



Photo No. C2-12 Plant Nursery at the east of Ma On Kong Channel



Photo No. C3-13 Plant Nursery at the east of Ma On Kong Channel



Photo No. C4-14 Temporary Structure for poultry east to Ho Pui



Photo No. C5-15 Open Storage at the end of village access road

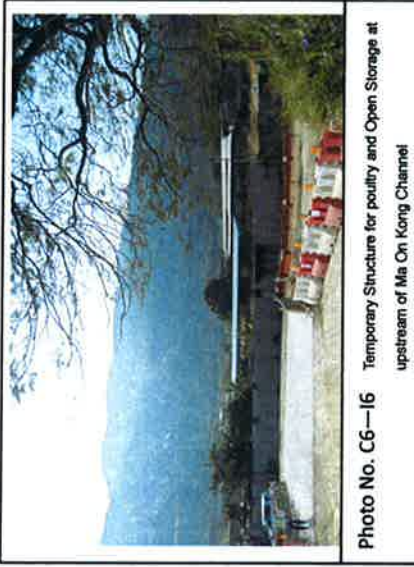


Photo No. C6-16 Temporary Structure for poultry and Open Storage at upstream of Ma On Kong Channel



Photo No. C7-01 Sitting-out Area at Ma On Kong



Photo No. C8-R1 Tei Kek



Photo No. C9-R2 North of Ma On Kong





Photo No. C10—R3  
 Ma On Kong



Photo No. C11—R4  
 North of Ho Pui



Photo No. C12—T1  
 Motorists and Pedestrians along village access road  
 (lower section)



Photo No. C13—T2  
 Motorists and Pedestrians along village  
 access road (high section)



Photo No. C14—T3  
 Motorists, Pedestrians and Tourists along  
 access road toward Ho Pui Reservoir



## **Appendix K**

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

**Monthly Summary Waste Flow Table**

Date: 31-Dec-10  
Year/Month: Dec-10

<b>Monthly Summary Waste Flow Table for December 2010</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	10.556	0.004	10.002	0.55	0	0	0	0	0	0
Feb	4.2195	0.001	4.323	-0.105	0	0	0	0	0	0
Mar	8.654	0.003	7.469	1.182	0	0	0	0	0	0
Apr	8.115	0.002	6.221	1.892	0	0	0	0	0	0
May	5.111	0.001	3.718	1.392	0	0	0	0	0	0
Jun	6.123	0.001	6.562	-0.44	0	0	0	0	0	0
<b>Sub-Total</b>	<b>42.78</b>	<b>0.012</b>	<b>38.295</b>	<b>4.4715</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
Jul	7.449	0.002	8.652	-1.2045	0	0	0	0	0	0
Aug	7.658	0.002	7.953	-0.297	0	0	0	0	0	0
Sep	5.365	0.002	5.363	0	0	0	0	0	0	0
Oct	5.177	0.001	5.176	0	0	0	0	0	0	0
Nov	5.006	0.001	5.797	-0.792	0	0	0	0	0	0
Dec	3.675	0.001	4.147	-0.473	0	0	0	0	0	0
<b>Total</b>	<b>77.107</b>	<b>0.021</b>	<b>75.381</b>	<b>1.705</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
  - (5) Negative numbers in "Reused in other Projects" indicate import of materials from other projects.