



PROJECT NO.: TCS/00553/11

**CONTRACT NO. DC/2010/02 –
DRAINAGE IMPROVEMENT IN SHUEN WAN AND
SHEK WU WAI**

**MONTHLY ENVIRONMENTAL MONITORING AND
AUDIT REPORT (NO.23) – MAY 2013**

PREPARED FOR
KWAN LEE-KULY JOINT VENTURE

Quality Index

Date	Reference No.	Prepared By	Certified by
21 June 2013	TCS00553/11/600/R0269v1	 Nicola Hon (Environmental Consultant)	 T.W. Tam (Environmental Team Leader)

Ver.	Date	Description
1	21 June 2013	First submission

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5 July 2013

Ref.: DSDSHUWNEM00_0_0587L.12

Drainage Services Department
Drainage Projects Division
44 & 45/F., Revenue Tower
5 Gloucester Road,
Wan Chai, Hong Kong

By Fax (2827 8700) and Post

Attention: Mr. H.K.Chan and Mr. So Chi Ho

Dear Sirs,

Re: Agreement No. DP 01/2010
Services as Independent Environmental Checker for the Drainage Improvement
Works in Sha Tin and Tai Po under Contract No. DC/2010/02
Monthly Environmental Monitoring and Audit Report for May 2013

Reference is made to Environment Team's submission of the Monthly Environmental Monitoring and Audit Report for May 2013 by Email on 21 June 2013 (entitled "DC/2010/22 - Monthly Impact EM&A Report (Contract 2) No.23 - May 2013").

Please be informed that we have no comment on the captioned revised report. We write to verify the captioned submission in accordance with Condition 5.4 of EP-303/2008.

Thank you very much for your kind attention and please do not hesitate to contact Mr. Max Lee (3465 - 2809) or the undersigned should you have any queries.

Yours sincerely,



Tony Cheng
Independent Environmental Checker

c.c. AUES
Kwan Lee-Kuly JV

Attn: Mr. T. W. Tam
Attn: Mr. W. K. Chan

By Fax: 2959 6079
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EXECUTIVE SUMMARY

ES.01. This is the 23rd Monthly Environmental Monitoring and Audit (EM&A) Report for designated works of *DSD Contract No. DC/2010/02 - Drainage Improvement in Shuen Wan and Shek Wu Wai* (hereafter “Contract 2”) under Environmental Permit No.EP-303/2008, covering a period from **1 to 31 May 2013** (hereinafter ‘the Reporting Period’).

ENVIRONMENTAL MONITORING AND AUDIT ACTIVITIES

ES.02. Environmental monitoring activities under the EM&A programme in this Reporting Period are summarized in the following table.

Issues	Environmental Monitoring Parameters / Inspection	Occasions
Construction Noise	L _{eq (30min)} Daytime – M2, M3 & M4	15
	L _{eq (30min)} Daytime – M1 & AL1	8
Water Quality	Local Stream Water Sampling - W1, W3 and W4	13
	Local Stream Water Sampling – W2	13
	Hydrological characteristics measurement – H1 and H2	5
	Hydrological characteristics measurement – H3 and H4	5
Inspection / Audit	Monthly Environmental Site Inspection and audit by IEC	1
	Regular weekly Environmental inspection by the Contractor, ET and Site Representative Engineer	5
Ecological	Bi- monthly Ecological Monitoring	1
Landscape & Visual	Bi-weekly Inspection by a registered Landscape Architect	2

ES.03. In this Reporting Period, bi-monthly ecological monitoring in Area under Contract 2 was performed on **30 May 2013**.

ES.04. Landscape and visual inspection was carried on **15 and 30 May 2013** and the monthly Landscape & Visual Report (**May 2013**) has been signed by the registered Landscape Architect.

BREACH OF ACTION AND LIMIT (A/L) LEVELS

ES.05. No exceedance in construction noise monitoring is recorded in this Reporting Period. For water quality monitoring, a total of 97 Action/ Limit Level exceedances, namely 44 exceedances in dissolved oxygen, 28 exceedances in turbidity and 25 exceedances in suspended solids were recorded in this Reporting Period. NOEs were issued to notify EPD, IEC, the Contractor and RE upon confirmation of the results. The statistics of environmental exceedance, NOE issued and investigation result are summarized in the following table.

Environmental Issues	Monitoring Parameters	Action Level	Limit Level	Event & Action		
				NOE Issued	Investigation	Corrective Actions
Construction Noise	L _{eq(30min)} Daytime	0	0	0	N.A.	N.A.
Water Quality	DO	44	0	44	Exceedances at W4 were partially due to works under project	Cover all exposed slope to prevent surface runoff
	Turbidity	8	20	28		
	SS	0	25	25		
Hydrological Characteristics	Water Flow	0	0	0	N.A.	N.A.
	Water Depth	0	0	0	N.A.	N.A.

Note: NOE – Notification of Exceedance

Station	DO		Turbidity		SS		Total Exceedance	
	Action	Limit	Action	Limit	Action	Limit	Action	Limit
W1	26	0	0	8	0	11	26	19
W2	5	0	8	4	0	6	13	10
W4	13	0	0	8	0	8	13	16
No. of Exceedance	44	0	8	20	0	25	42	45

SITE INSPECTION

ES.06. Weekly environmental site inspections had been carried out by the Contractor, ET and the RE on **2, 8, 15, 23 and 27 May 2013**. Furthermore, joint site inspection with the IEC was carried out on **27 May 2013**. In this Reporting Period, **3** observations were recorded but no non-compliance was noted during the site inspection.

ENVIRONMENTAL COMPLAINT

ES.07. No written or verbal complaint was recorded in this Reporting Period.

NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

ES.08. No environmental summons or successful prosecutions were recorded in this Reporting Period.

REPORTING CHANGE

ES.09. No report changes were made in this Reporting Period.

FUTURE KEY ISSUES

ES.10. During wet season, muddy water and other water quality pollutants via site surface water runoff into the local stream Wah Ha River would be the key issue in the forth-coming month. Mitigation measures for water quality should be fully implemented.

ES.11. On the other hand, construction noise should be other key environmental issue during sheet-piling process. The noise mitigation measures should be necessary to implement in accordance with EM&A Manual stipulation. Dust mitigation measures to avoid fugitive dust emissions from loose soil surface or haul road is also reminded.

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1.0 INTRODUCTION

PROJECT BACKGROUND

- 1.01 *Kwan Lee-Kuly Joint Venture* (hereinafter ‘KLKJV’) has been awarded by Drainage Services Department (hereinafter ‘DSD’) of the Contract No. DC/2010/02 - Drainage Improvement in Shuen Wan and Shek Wu Wai (hereinafter ‘the Project’). The Project is scheduled to commence in May 2011 and complete in March 2014 for about 35 months.
- 1.02 The works to be executed under the Project are located in Shuen Wan and Shek Wu Wai. The works mainly comprise construction of about 735 metres long single-cell box culvert along Tung Tsz Road in Shuen Wan, Tai Po and construction of about 15 m long three-cell box culvert in Shek Wu Wai, San Tin .
- 1.03 For the Project, the construction work at Tung Tsz Road Shuen Wan (hereinafter ‘the Contract 2’) is part of the Drainage Improvement works amongst Shatin and Tai Po and it is defined as a “Designated Project” which controlled under Environmental Permit EP-303/2008. Currently, DSD has another Contract DC/2009/22 (hereinafter ‘the Contract 1’) ongoing for construction at Shuen Wan working area which under the same Environmental Permit and the updated Environmental Monitoring and Audit Manual (hereinafter ‘the Updated EM&A Manual’). Both DSD contract’s site boundary at Shuen Wan are shown in *Appendix A*. On the other hand, Shek Wu Wai San Tin is a non-designated project work and no environmental monitoring and audit is request to carry out.
- 1.04 In order to effectively implement the environmental protection measures stipulated in the Project Profile (hereinafter ‘the PP’), Environmental Impact Assessment Report (hereinafter “the EIAR”), Environmental Permit EP303/2008, a corresponding EM&A Manual have been prepared to outline the environmental monitoring and auditing (hereinafter ‘the EM&A’) programme undertake for the Contracts 1 and 2.
- 1.05 KLKJV has commissioned Action-United Environmental Services and Consulting (AUES) as an independent environmental team (hereinafter ‘the ET’) to implement the EM&A program for the environmental protection of the Project. Due to the construction of Contracts 1 and 2 carry out is just about the time, a Proposal Environmental Monitoring Programme and Methodology (hereinafter the “PEMPM”) was prepared and submitted to describe EM&A programme would be undertaken during construction period of the Contract 2.
- 1.06 The baseline monitoring of EM&A program has been performed by the Contract 1 ET. Although Action and Limit levels of environmental performance criteria have established by the Contract 1 ET, the Action/Limit levels re-establishment to use the Contract 2 was conducted by the Contract 2 ET. The re-established environment performance criteria has accepted by the IEC and also submitted to the EPD seek for endorsement.
- 1.07 This is the 23rd Monthly EM&A Report for Contract 2 presenting the monitoring results and inspection findings for the reporting period from **1 to 31 May 2013**.

REPORT STRUCTURE

- 1.08 The Monthly Environmental Monitoring and Audit (EM&A) Report is structured into the following sections:-

SECTION 1	INTRODUCTION
SECTION 2	PROJECT ORGANIZATION AND CONSTRUCTION PROGRESS AND SUBMISSION
SECTION 3	EM&A PROGRAM REQUIREMENT FOR THE PROJECT
SECTION 4	IMPACT MONITORING RESULTS
SECTION 5	WASTE MANAGEMENT
SECTION 6	SITE INSPECTIONS
SECTION 7	ENVIRONMENTAL COMPLAINTS AND NON-COMPLIANCE
SECTION 8	IMPLEMENTATION STATUES OF MITIGATION MEASURES
SECTION 9	IMPACT FORECAST
SECTION 10	CONCLUSIONS AND RECOMMENDATION

2.0 PROJECT ORGANIZATION AND CONSTRUCTION PROGRESS AND SUBMISSION

PROJECT ORGANIZATION AND MANAGEMENT STRUCTURE

2.01 Organization structure and contact details of relevant parties with respect to on-site environmental management are shown in *Appendix B*.

CONSTRUCTION PROGRESS

2.02 The master construction programs are enclosed in *Appendix C* and the major construction activities undertaken at Tung Tsz Road, Shuen Wan in this Report Period are listed below:-

Tung Tze Road

- Driving sheetpile at bay 10, 11
- Construction of intake structure, Water Diversion Water

Wai Ha Road

- Fixing steel reinforcement at bay 1, 2
- Erection of formwork at bay 1, 2
- Concreting at bay 1
- Removal of formwork at bay 1

SUMMARY OF ENVIRONMENTAL SUBMISSIONS

2.03 Summary of the relevant permits, licences, and/or notifications on environmental protection for this Project in this Reporting Period is presented in *Table 2-1*.

Table 2-1 Status of Environmental Licenses and Permits

Item	Description	License/Permit Status
1	Air Pollution Control (Construction Dust)	Notified EPD on 17 October 2011
2	Chemical Waste Producer Registration (WPN5213-727-K2972-02)	Approved on 28 October 2011
3	Water Pollution Control Ordinance (Discharge License) WT00009528-2011	Valid to 31 July 2016
4	Billing Account for Disposal of Construction Waste (Account No.: 7012838)	Effective

2.04 The “Proposal Environmental Monitoring Programme and Methodology (R0006 Version 2)” was set out in accordance with the Updated Environmental Monitoring and Audit Manual. It was approved by the ER and agreed with the Independent Environmental Checker (IEC) and submitted to the EPD for endorsement.

2.05 For Contract 2 of the Project, no Baseline Monitoring Report was issued by the ETL. However, a new set of the Action/ Limit levels as used to Contract 2 were proposed by ET. It had been accepted by the IEC and also submitted to the EPD seek for endorsement.

3.0 EM&A PROGRAM REQUIREMENT FOR THE CONTRACT 2

3.01 The EM&A requirements set out in the PP, EIAR, Environmental Permit EP303/2008 (hereinafter ‘the EP’), and the associated updated EM&A Manual, are presented below sub-section.

MONITORING PARAMETERS

3.02 According to the EIAR and the updated EM&A Manual, The monitoring parameters of each environmental aspect summarized in **Table 3-1** will be performed as under the Project.

Table 3-1 Summary of Monitoring Parameters

Environmental Aspect	Parameters	
Construction Noise	<ul style="list-style-type: none"> A-weighted equivalent continuous sound pressure level (30min) (hereinafter ‘Leq(30min)’ during the normal working hours; and A-weighted equivalent continuous sound pressure level (5min) (hereinafter ‘Leq(5min)’ for construction work during the restricted hours. 	
Water Quality	In Situ Measurement	Temperature, Dissolved Oxygen, Dissolved Oxygen Saturation, pH and Turbidity
	Laboratory Analysis	Suspended Solids (hereinafter ‘SS’)
Hydrological Characteristics	The water flow and depth measurement onsite	
*Ecology	Monitor and audit the proper implementation of mitigation measures stipulated in EIA report and the updated EM&A Manual	
Landscape & Visual	Inspect and audit the implementation and maintenance of landscape and visual mitigation measures	

Remarks: * the monitoring is carried out by IEC

MONITORING LOCATIONS

3.03 Monitoring locations have been proposed in the updated EM&A Manual. Graphic plot to show in **Appendix D** and summarized in **Table 3-2**.

Table 3-2 Designated Monitoring Locations of the EM&A Programme

Aspect	Location ID	Address
Construction Noise	M1	14, Shuen Wan Chim Uk
	AL1	Joint Village Office for Villages in Shuen Wan, Tai PO
	M2	150, San Tau Kok
	M3	31, Wai Ha
	M4	Block 15, Treasure Spot Garden
Water Quality	(#) W1	Between the Shuen Wan Marsh and ECA <ul style="list-style-type: none"> Co-ordinates: E839301, N836386 Existing River Bed Level: +1.75mPD).
	W2	Between Tolo Harbour and Proposed Penstock <ul style="list-style-type: none"> Co-ordinates: E839542, N836184 Existing River Bed Level: +1.48mPD)
	(*) W3	Upstream of Tung Tze Shan Road <ul style="list-style-type: none"> Co-ordinates: E838760, N836714 Existing River Bed Level: +5.08mPD)
	W4	Wai Ha Village 29D <ul style="list-style-type: none"> Co-ordinates: E838865, N836621 Existing River Bed Level: +4.05mPD)
Hydrological	H1	Between the Shuen Wan Marsh and ECA <ul style="list-style-type: none"> Coordinates: E839306, N836379)
	H2	Route 10 Sam Kung Temple <ul style="list-style-type: none"> Coordinates: E839163, N836433

Aspect	Location ID	Address
	H3	Upstream of Tung Tze Shan Road • Coordinates: E838760, N836714
	H4	Wai Ha Village 29D • Coordinates: E838865, N836621
Ecology	Areas within 100m of the works boundary under Contract 2	
Landscape & Visual	As within and adjacent to the construction sites and works areas under the Contract 2,	

Remarks:

(#) Control Station of Contract 1, however impact station of Contract 2

(*) Control Station of Contract 2

MONITORING FREQUENCY

- 3.04 The monitoring frequency and duration as specified in the updated EM&A Manual are summarized below.

Construction Noise

Frequency: Once a week during 0700-1900 on normal weekdays for $L_{eq(30min)}$

If the construction work is undertaken at restricted hour, the monitoring frequency of construction noise will be conducted in accordance with the related Construction Noise Permit requirement issued by EPD as follows

- 3 consecutive $L_{eq(5min)}$ at restricted hour from 1700 – 2300;
- 3 consecutive $L_{eq(5min)}$ for restricted hour from 2300 – 0700 next day;
- 3 consecutive $L_{eq(5min)}$ for Sunday or public holiday from 0700 – 1900;

Duration: Throughout the construction period when the major construction activities are undertaken

Water Quality

Frequency: Three times a week. The interval between 2 sets of monitoring are not less than 36 hours

Duration: During the construction phase of Contract 2 to undertake (in accordance with the Updated EM&A Manual Section 4.27).

Hydrological Characteristics

Frequency: Once per week at mid-flood and mid-ebb tides

Duration: During the construction phase of Contract 2 to undertake; and one year after the construction is complete as operation phase monitoring (in accordance with the Updated EM&A Manual Section 4.32).

Ecology

- 3.05 In accordance with Section 6.17 of the Updated EM&A Manual, ecological monitoring should be conducted by the Independent Environmental Checker (hereinafter 'IEC'). Monitoring programme details should be agreed with the Agriculture, Fisheries and Conservation Department (AFCD). Moreover, the IEC should submit reports on the findings of each monitoring trip, and a final report summarizing the monitoring results over the entire monitoring period to AFCD and Environmental Protection Department (EPD). Hence, no monitoring or surveying should be carried out by ET of the Project.

Landscape & Visual

- 3.06 According to Section 7.4 of the Updated EM&A Manual, site inspection bi-weekly should be performed to check the implementation and maintenance of landscape and visual mitigation measures whether to fully realize.

MONITORING EQUIPMENT

Noise Monitoring

- 3.07 Sound level meter in compliance with the *International Electrotechnical Commission Publications 651: 1979 (Type 1) and 804: 1985 (Type 1)* specifications shall be used for noise monitoring. The sound level meter shall be checked with an acoustic calibrator. The wind speed shall be checked with a portable wind speed meter, which capable to measure wind speed in m/s.

Water Quality Monitoring

- 3.08 **Dissolved Oxygen and Temperature Measuring Equipment** – The instrument should be a portable and weatherproof dissolved oxygen (DO) measuring instrument complete with cable and sensor, and use a DC power source. The equipment should be capable of measuring DO level in the range of 0 – 20mg L-1 and 0 – 200% saturation; and temperature of 0 – 45 degree Celsius.
- 3.09 **pH Meter** – The instrument shall consist of a potentiometer, a glass electrode, a reference electrode and a temperature-compensating device. It shall be readable to 0.1 pH in arrange of 0 to 14.
- 3.10 **Turbidity (NTU) Measuring Equipment** – The instrument should be a portable and weatherproof turbidity measuring instrument using a DC power source. It should have a photoelectric sensor capable of measuring turbidity between 0 - 1000 NTU.
- 3.11 **Water Sampling Equipment** – A water sampler should comprise a transparent PVC cylinder, with a capacity of not less than 2 litres, which can be effectively sealed with latex cups at both ends. The sampler should have a positive latching system to keep it open and prevent premature closure until released by a messenger when the sampler is at the selected water depth.
- 3.12 **Water Depth Detector** – A portable, battery-operated echo sounder should be used for the determination of water depth at each designated monitoring station. The unit can either be hand held or affixed to the bottom of the work boat.
- 3.13 **Sample Containers and Storage** – Water samples for SS should be stored in high density polythene bottles with no preservative added, packed in ice (cooled to 4°C without being frozen).
- 3.14 **Suspended Solids Analysis** – Analysis of suspended solids shall be carried out in a HOKLAS or other international accredited laboratory.

Hydrological Characteristics

- 3.15 **Water Depth Detector** - A portable, battery-operated echo sounder shall be used for the determination of water depth at each designated monitoring station.
- 3.16 **Stream water flow Equipment** –A portable, battery-operated flow meter should be used for the determination of water flow rate at each designated monitoring location and record in m³/s.
- 3.17 The monitoring equipment using for the Project’s EM&A program were proposed by the ET and verified by the IEC prior commencement of the monitoring. Details of the equipment used for impact monitoring are listed in **Table 3-3**.

Table 3-3 Monitoring Equipment Used in EM&A Program

Equipment	Model
<i>Construction Noise</i>	
Integrating Sound Level Meter	B&K Type 2238
Calibrator	B&K Type 4231
Portable Wind Speed Indicator	Testo Anemometer
<i>Water quality</i>	
Water Depth Detector	Eagle Sonar
Water Sampler	A transparent PVC cylinder / bucket

Equipment	Model
Thermometer & DO meter	YSI DO Meter 550A or YSI Professional Plus or YSI Sonde6820 / 650MDS
pH meter	YSI pH10N or YSI Professional Plus or YSI Sonde 6820 / 650MDS
Turbidimeter	Hach 2100Q or YSI Sonde 6820 / 650MDS
Sample Container	High density polythene bottles (provided by laboratory)
Storage Container	'Willow' 33-litre plastic cool box
Suspended Solids	HOKLAS-accredited laboratory (ALS Technichem (HK) Pty Ltd)
Hydrological Characteristics	
Water flow meter	GLOBAL WATER model FP211
Water Depth Detector	Eagle Sonar or an appropriate steel ruler or rope with appropriate weight

MONITORING METHODOLOGY

Noise Monitoring

- 3.18 Noise measurements were taken in terms of the A-weighted equivalent sound pressure level (L_{eq}) measured in decibels (dB). Supplementary statistical results (L_{10} and L_{90}) were also obtained for reference.
- 3.19 Sound level meter as listed in **Table 3-3** are complied 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)*.
- 3.20 During the monitoring, all noise measurements were performed with the meter set to FAST response and on the A-weighted equivalent continuous sound pressure level (L_{eq}). $Leq_{(30min)}$ in six consecutive $Leq_{(5min)}$ measurements were used as the monitoring parameter for the time period between 0700-1900 hours on weekdays; and also $Leq_{(15min)}$ in three consecutive $Leq_{(5min)}$ measurements is used as monitoring parameter for other time periods (e.g. during restricted hours), if necessary.
- 3.21 During the course of measurement, the sound level meter is mounted on a tripod with a height of 1.2m above ground 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. The assessment point is normally set as free-field situation for the measurement.
- 3.22 Prior to noise measurement, the accuracy of the sound level meter is checked by an acoustic calibrator which generated a known sound pressure level at a known frequency. The checking was performed before and after the noise measurement.

Water Quality

- 3.23 Water quality monitoring are conducted at the depth below:-
- Three depths: 1m below water surface, 1m above river bed and at mid-depth when the water depth exceeds 6m, or
 - If the water depth is between 3m and 6m, two depths: 1m below water surface and 1m above river bed, and or
 - If the water depth is less than 3m, 1 sample at mid-depth is taken
- 3.24 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. If the depth between 1.5 meter and 1 meter, plastic tape measurement tied with appropriate weight are used the depth estimation. For the depth well below 1 meter, an appropriate steel ruler or rope with appropriate weight are used for the depth measurement.

- 3.25 A transparent PVC cylinder, with a capacity of not less than 2 litres, is used for water sampling. The water sampler is lowered into the water body at a predetermined depth. The trigger system of the sampler is activated with a messenger and opening ends of the sampler are closed accordingly then the sample of water is collected. If the water depth is less than 500mm, a water bucket is be used as a water sampler to minimize the possibility of the latching system disturbing sediment during water sampling
- 3.26 A portable YSI DO Meter 550A or YSI Professional Plus is 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^oC for ease of comparison of the data under the changing reality, the temperature readings of the DO Meter are be recorded in the field data sheets. The equipment calibration is performed on quarterly basis.
- 3.27 A portable YSI pH10N Meter or or YSI Professional Plus is used for in-situ pH measurement. The pH meter is capable of measuring pH in the range of 0 – 14 and readable to 0.1. Standard buffer solutions of pH 7 and pH 10 are used for calibration of the instrument before and after measurement. The equipment calibration is performed on quarterly basis.
- 3.28 A portable Hach 2100Q Turbidity Meter is be used for in-situ turbidity measurement. The turbidity meter is capable of measuring turbidity in the range of 0 – 1000 NTU. The equipment calibration is performed on quarterly basis.
- 3.29 Water samples are contained in screw-cap PE (Poly-Ethylene) bottles, which are provided and pretreated and ‘PE’ (Poly-Ethylene) sampling bottles provided and pre-treated according to corresponding analytical requirements. Where appropriate, the sampling bottles are rinsed with the water to be contained. Water sample is then transferred from the sampler to the sample bottles.
- 3.30 One liter or 500 mL water sample are collected from each depth for SS determination. The collected samples are stored in a cool box maintained at 4^oC and delivered to laboratory upon completion of the sampling by end of each sampling day.
- 3.31 All water samples are analyzed with Suspended Solids (SS) as specified in the updated *EM&A Manual* by a local HOKLAS-accredited testing laboratory (ALS Technichem (HK) Pty Ltd HOKLAS registration no. 66). SS are determined by the laboratory upon receipt of the water samples using HOKLAS accredited analytical method. The detection limits and testing method are shown below in **Table 3-4**. The certificate of ALS Technichem (HK) Pty Ltd is provided in **Appendix E**.

Table 3-4 Testing Method and Detection limit of Suspended Solids

Determinant	Testing Method	Detection Limit
Suspended solid	Determination use HOKLAS accredited analytical methods namely ALS Method EA-025 (based on APHA 2540 D)	2mg/L

Hydrological Characteristics

- 3.32 A portable, water flow meter, brand named “*GLOBAL WATER model FP211*” are used to determine the water current flow at the designated monitoring stations. A water flow velocity is measured at mid depth of current water body or 0.5m below water level.
- 3.33 Water depths are determined prior to measurement, using a portable battery operated depth detector, brand named ‘Eagle Sonar’, if the depths exceed 1.5 meter. If the depth between 1.5 meter and 1 meter, plastic tape measurement tied with appropriate weight are used the depth estimation. For the depths well below 1 meter, an appropriate steel ruler or rope with appropriate weight are used for the depth measurement.

DATA MANAGEMENT AND DATA QA/QC CONTROL

- 3.34 The impact monitoring data are handled by the ET's systematic data recording and management, which complies with in-house Quality Management System. Standard Field Data Sheets (FDS) are used in the impact monitoring program.
- 3.35 The monitoring data recorded in the equipment e.g. noise meter and Multi-parameter Water Quality Monitoring System are downloaded directly from the equipment at the end of each monitoring day. The downloaded monitoring data are input into a computerized database properly maintained by the ET. The laboratory results are input directly into the computerized database and QA/QC checked by personnel other than those who input the data. For monitoring activities require laboratory analysis, the local laboratory follows the QA/QC requirements as set out under the HOKLAS scheme for all laboratory testing.

OTHERS MONITORING IMPLEMENTATION FOR THE CONTRACT

Ecology

- 3.36 Ecological monitoring and reporting should be performed by IEC. No equipment and procedure are presented in the EM&A Monthly Report.

Landscape and Visual

- 3.37 A registered Landscape Architect as member of the ET is employed by the Contractor to undertake site inspection. Site inspection will undertake at least once every two weeks throughout the construction period to ensure compliance with the intended aims of the mitigation measures are proposed in the EIA and the updated EM&A Manual, implemented by the Contractor.

DETERMINATION OF ACTION/LIMIT (A/L) LEVELS

- 3.38 The re-established performance criteria for construction noise, water quality and hydrological, namely Action and Limit levels is used for Contract 2 are listed in **Tables 3-5, 3-6, and 3-7.**

Table 3-5 Action and Limit Levels for Construction Noise

Location	Time Period	Action Level in dB(A)	Limit Level in dB(A)
M1, AL1, M2, M3, M4	Daytime 0700 – 1900 hrs on normal weekdays	When one documented complaint is received	75* dB(A)
	1900 – 2300 on all days and 0700 – 2300 on general holidays (including Sundays)		60/65/70 dB(A)**
	2300 – 0700 on all days		45/50/55 dB(A)**

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

** To be selected based on the Area Sensitivity Rating of A/B/C, and the conditions of the applicable CNP(s) must be followed

Table 3-6 Action and Limit Levels for Water Quality

Parameter	Performance Criteria	Impact Station		
		W1	W2	W4
DO Concentration (mg/L)	Action Level	7.27	7.26	9.27
	Limit Level	4.00	4.00	4.00
pH	Action Level	NA	NA	NA
	Limit Level	6 - 9	6 - 9	6 - 9
Turbidity (NTU)	Action Level	4.77	2.46	3.32
	Limit Level	5.26	3.42	4.52
Suspended Solids (mg/L)	Action Level	9.73	8.89	6.98
	Limit Level	10.77	9.75	7.66

Notes:

- The proposed Action/Limit Levels of DO are established to be used 5%-ile/1%-ile of all the baseline data;
- The proposed Action/Limit Levels of Turbidity and SS are established to be used 95%-ile/99%-ile of all the baseline data;
- For DO, non-compliance of the water quality limits occur is when monitoring result lower than the action/limit levels;
- For turbidity and SS, non-compliance of the water quality limits occurs is when monitoring result higher than the limits; and
- For pH, non-compliance of the quality limit occur is when monitoring result lower than 6 and higher than 9; and
- All the figures given in the table are used for reference only and the EPD may amend the figures whenever it is considered necessary

Table 3-7 Action and Limit Levels for Hydrological Characteristics

Parameter	Acceptance Criteria	Monitoring Station	
		H1	H2
Water Depth (m)	Action Level	0.08 (80% of baseline water depth)	0.40 (80% of baseline water depth)
	Limit Level	0.06 (60% of baseline water depth)	0.30 (60% of baseline water depth)
Volumetric Flow Rate (Q), m ³ /s	Action Level	120% of control station's water flow rate on the same day of measurement	120% of control station's water flow rate on the same day of measurement
	Limit Level	140% of control station's water flow rate on the same day of measurement	140% of control station's water flow rate on the same day of measurement

3.39 The locations H3 and H4 are a reference measurement point in order to monitor any changes in the hydrological characteristics of Wai Ha River arising from the work Contract 2 to affect the Shuen Wan Marsh.

3.40 Should non-compliance of the environmental quality criteria occurs, remedial actions will be triggered according to the Event and Action Plan enclosed in **Appendix F**.

EQUIPMENT CALIBRATION

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

3.42 All the water quality monitoring equipment such as the DO, pH and Turbidity meters are calibrated by HOKLAS accredited laboratory of three month intervals.

3.43 A portable, water flow meter, brand named “GLOBAL WATER model FP211” is calibrated in yearly basis.

3.44 All updated calibration certificates of the monitoring equipment used for the impact monitoring program in this Reporting Period are attached in **Appendix E**.

METEOROLOGICAL INFORMATION

3.45 The meteorological information during the construction phase is obtained from Tai Po and Shatin Stations of the Hong Kong Observatory (HKO). The meteorological data during the impact monitoring days are summarized in **Appendix H**

4.0 IMPACT MONITORING RESULTS

4.01 The monitoring schedule had been issued to relevant parties before each Reporting Period which presented in **Appendix G**. The works undertaken during the Reporting Period are illustrated in **Appendix C**. The monitoring results are presented in the following sub-sections.

MONITORING RESULTS SHARING

4.02 Environmental Permit EP-203/2008 was issued on 25 February 2008 by EPD which adopted for both Contracts 1 and 2 of DSD construction at Shuen Wan. Also, the EM&A programme of both contracts are undertaken in accordance with the same updated EM&A Manual which has to be carried out during construction period. According to the updated EM&A manual, designated monitoring Locations M1 and AL1 for noise monitoring stations, Locations W1 and W2 for water quality monitoring stations, and Locations H1 and H2 for hydrological measurement are requested to perform at both Contracts 1 and 2. Since Contract 1 has already commenced in January 2011, those results measured by Contract 1 would be shared for the Contract 2. This recommendation has been accepted by IEC and submitted to EPD.

RESULTS OF CONSTRUCTION NOISE MONITORING

4.03 In this Reporting Period, the noise monitoring results at the designated locations M1, AL1, M2, M3 and M4 are summarized in **Table 4-1**. The detail monitoring data are presented in **Appendix I**. The graphical plot is shown in **Appendix J**.

Table 4-1 Summary of Construction Noise Monitoring Results, dB(A)

Date	L _{eq(30min)} (dB(A))		Date	L _{eq(30min)} (dB(A))		
	M1 ^(#)	AL1 ^(#)		M2 ^(*)	M3 ^(*)	M4 ^(*)
8-May-13	63.3	65.1	3-May-13	64.2	63.9	55.2
15-May-13	64.6	65.8	6-May-13	68.7	64.5	56.1
22-May-13	70.4	69.3	13-May-13	69.7	69.1	55.8
29-May-13	63.8	61.1	24-May-13	66.4	65.8	61.4
			29-May-13	63.9	72.4	57.7
Limit Level	75 dB(A)					

Remarks:

- (#) *The monitoring is undertaken under façade situation. No façade correction is added according to acoustical principles and EPD guidelines.*
- (*) *The monitoring is undertaken under free field situation. A façade correction of +3 dB(A) has been added according to acoustical principles and EPD guidelines*

4.04 The sound meter was set in a free field situation at the designated monitoring locations M2, M3 and M4, therefore, a façade correction of +3 dB(A) has been added according to acoustical principles and EPD guidelines. For Location A1 and AN1, the monitoring is undertaken under façade situation. No façade correction is added according to acoustical principles and EPD guidelines.

4.05 No noise complaint (which is an Action Level exceedance) was received in this Reporting Period. As shown in **Table 4-1**, all the noise monitoring result are well below 75dB(A) and no Action or Limit Level exceedance was triggered during this Reporting Period. The graphical plot is shown in **Appendix J**.

RESULTS OF LOCAL STREAM WATER QUALITY MONITORING

4.06 In this Reporting Period, 13 sampling days were performed at designated measurement Points W1 W2, W3 & W4 for local stream water quality monitoring. The monitoring results including in-situ measurements and laboratory testing results are provided in **Appendix I**. The graphical plots are shown in **Appendix J**.

4.07 Monitoring results of 3 key parameters: dissolved oxygen (DO), turbidity and suspended solids in this Reporting Period, are summarized in **Tables 4-2 and 4-3**.

Table 4-2 Water Quality Results Summary for W1 & W2

Sampling date	DO (mg/L)			Turbidity (NTU)			SS (mg/L)		
	W1 (ebb)	W1 (flood)	W2	W1 (ebb)	W1 (flood)	W2	W1 (ebb)	W1 (flood)	W2
3-May-13	<i>5.44</i>	<i>5.49</i>	8.58	3.4	4.7	2.8	7.00	7.00	<u>10.00</u>
6-May-13	<i>5.42</i>	<i>5.00</i>	7.89	2.8	2.2	3	8.00	8.00	<u>12.00</u>
8-May-13	<i>5.76</i>	<i>5.16</i>	<i>7.19</i>	3.7	2.1	2.5	7.00	2.00	1.60
10-May-13	<i>5.82</i>	<i>6.16</i>	<i>6.98</i>	1.3	1.2	<i>3.4</i>	6.00	6.00	2.40
13-May-13	<i>5.58</i>	<i>5.83</i>	<i>7.13</i>	3.0	1.6	<u>3.7</u>	4.00	4.00	5.80
15-May-13	<i>4.82</i>	<i>4.02</i>	7.56	4.2	4.0	<u>3.3</u>	8.00	7.00	7.40
18-May-13	<i>5.25</i>	<i>5.41</i>	#	4.6	4.4	#	7.00	5.00	#
20-May-13	<i>4.65</i>	<i>4.80</i>	7.86	2.3	1.7	<u>4.9</u>	<u>12.00</u>	<u>14.00</u>	5.60
22-May-13	<i>4.84</i>	<i>5.53</i>	8.89	<u>75.3</u>	<u>73.7</u>	<u>134.7</u>	<u>39.00</u>	<u>39.00</u>	<u>59.00</u>
24-May-13	<i>6.32</i>	<i>5.39</i>	7.79	<u>18.6</u>	<u>17.6</u>	2.9	<u>23.00</u>	<u>12.00</u>	<u>13.00</u>
27-May-13	<i>5.64</i>	<i>5.72</i>	7.56	<u>14.2</u>	<u>16.2</u>	2.8	<u>91.00</u>	<u>24.00</u>	<u>11.00</u>
29-May-13	<i>6.23</i>	<i>5.27</i>	<i>6.78</i>	<u>42.1</u>	<u>11.3</u>	2.8	<u>60.00</u>	<u>32.00</u>	<u>11.00</u>
31-May-13	<i>6.49</i>	<i>6.23</i>	<i>6.87</i>	2.2	2.6	<u>3.6</u>	<u>12.00</u>	7.00	1.80

- *Bold and Italic is indicated exceeded Action Level; Bold with underline is indicated exceeded Limit Level*
- # No data was provided by Contract 1.

Table 4-3 Water Quality Results Summary for W3 & W4

Sampling date	DO (mg/L)		Turbidity (NTU)		SS (mg/L)	
	W3	W4	W3	W4	W3	W4
3-May-13	6.09	<i>5.45</i>	1.46	<u>17.65</u>	12.00	<u>13.00</u>
6-May-13	5.22	<i>6.32</i>	0.25	<u>14.05</u>	10.00	<u>10.00</u>
8-May-13	5.28	<i>6.14</i>	2.26	<u>29.95</u>	2.00	<u>16.00</u>
10-May-13	6.27	<i>6.70</i>	1.46	2.47	7.00	6.00
13-May-13	5.51	<i>5.36</i>	2.24	2.57	5.00	6.00
15-May-13	6.04	<i>5.78</i>	3.61	2.54	9.00	5.00
18-May-13	5.58	<i>5.15</i>	1.01	3.17	2.00	4.00
20-May-13	4.93	<i>5.35</i>	2.06	<u>15.55</u>	6.00	<u>10.00</u>
22-May-13	5.46	<i>5.44</i>	79.60	<u>75.25</u>	38.00	<u>48.00</u>
24-May-13	5.76	<i>5.36</i>	7.53	<u>11.57</u>	11.00	<u>42.00</u>
27-May-13	5.97	<i>5.60</i>	11.55	<u>10.20</u>	8.00	<u>9.00</u>
29-May-13	5.93	<i>5.80</i>	23.25	<u>45.65</u>	44.00	<u>154.00</u>
31-May-13	6.27	<i>5.89</i>	3.28	0.14	32.00	6.00

- *Bold and Italic is indicated exceeded Action Level; Bold with underline is indicated exceeded Limit Level*

4.08 During the Reporting Period, field measurements showed that stream water temperatures were within 22.30°C to 27.35°C and pH values within 6.35 to 8.21.

4.09 A statistics of exceedances for the three parameters: dissolved oxygen (DO), turbidity and suspended solids are shown in **Table 4-4**.

Table 4-4 Statistics Water Quality Exceedance

Station	DO		Turbidity		SS		Total Exceedance	
	Action	Limit	Action	Limit	Action	Limit	Action	Limit
W1	26	0	0	8	0	11	26	19
W2	5	0	8	4	0	6	13	10
W4	13	0	0	8	0	8	13	16
No. of Exceedance	44	0	8	20	0	25	52	45

4.10 As shown in **Table 4-4**, a total of 97 Action/ Limit Level exceedances, namely 44 exceedances in dissolved oxygen, 28 exceedances in turbidity and 25 exceedances in suspended solids were recorded in this Reporting Period. NOEs were issued to notify EPD, IEC, the Contractor and RE upon confirmation of the results.

- 4.11 According to site information provided by the Contractor, the site activities undertaken on site included laying geotextile and rockfill; concreting blinding layer; fixing steel reinforcement; erection of formwork; removal of sheetpile and backfilling.
- 4.12 In the Reporting Period, no excavation work was carried out at the channel, however, heavy rainstorm was occurred on 3, 8, 10, 18, 22 and 24 May 2013 which increased the turbidity and suspended solids levels of the stream course by washed out from exposed slope and surface. To minimize the impact to the existing stream, precautionary measures such as earth bund to isolate the working area has been implemented on-site. The investigation results for the exceedances are summarized as follows:
- For the DO exceedances, the construction activities comprised none of DO depleting characteristics. Therefore, it is considered that all the DO exceedances were due to natural variation of the stream and not related to the works under the Project.
 - During the water quality monitoring on 3, 8, 10, 18, 22 and 24 May 2013, muddy water was observed at W4 which caused by soil runoff from the site during rainstorm. It is concluded that the exceedances at W4 were partially due to the project. The Contractor should enhance the water quality mitigation measures such as covering all exposed slopes with geotextile to prevent surface runoff during inclement weather.
 - For monitoring points W1, it is noted that the water quality at W1 was affected by marine water that comes from the Tolo Harbour during flood tide. Therefore, it is considered that the exceedances in W1 were not related to the works under the Project.
- 4.13 During wet season, KLKJV is reminded to fully implement the required water quality mitigation measures in accordance with the updated EM&A Manual stipulation during construction under the Project. In particular when excavation and the associated box culvert construction works are undertaken near Wai Ha River, all construction wastewater or runoff generated from work area should be treated and drained to the designated discharge point. Moreover, as an effective water quality mitigation measure, the rock bund in the de-silting channel should be repaired regularly and ensure the de-silting performance.

RESULTS OF HYDROLOGICAL CHARACTERISTICS MONITORING

- 4.14 In this Reporting Period, hydrological characteristics measurement at were carried out on **3, 10, 18, 24 and 31 May 2013**. The monitoring data of H1 and H2 provided by DC/2009/22 is showed *Appendix I*. The detailed H3 and H4 measurement results in this Reporting Period are presented in *Tables 4-5*.

Table 4-5 Detailed monitoring results of hydrological characteristics at H3 and H4

Date	Measurement Time	Tide Condition	River Width (m)	Water Depth (m)	Cut Section (m ²)	Velocity Flow Rate (m/s)	Average Volumetric Flow Rate (Q), m ³ /s
Measurement Point: H3							
3-May-13	12:30	Flood	7.45	0.3	2.2350	0.1	0.224
	8:45	Ebb	7.45	0.25	1.8625	0.2	0.373
10-May-13	12:36	Flood	7.45	0.25	1.8625	0.2	0.373
	8:45	Ebb	7.45	0.3	2.2350	0.2	0.447
18-May-13	10:57	Flood	7.45	0.3	2.2350	0.2	0.447
	17:08	Ebb	7.45	0.5	3.7250	0.2	0.745
24-May-13	16:42	Flood	7.45	0.2	1.4900	0.1	0.149
	11:45	Ebb	7.45	0.2	1.4900	0.1	0.149
31-May-13	10:15	Flood	7.45	0.4	2.9800	0.2	0.596
	16:49	Ebb	7.45	0.3	2.2350	0.2	0.447
Measurement Point: H4							
3-May-13	12:35	Flood	2.74	0.15	0.4110	0.2	0.082

Date	Measurement Time	Tide Condition	River Width (m)	Water Depth (m)	Cut Section (m ²)	Velocity Flow Rate (m/s)	Average Volumetric Flow Rate (Q), m ³ /s
10-May-13	8:30	Ebb	2.74	0.15	0.4110	0.3	0.123
	12:41	Flood	2.74	0.15	0.4110	0.3	0.123
	8:40	Ebb	2.74	0.2	0.5480	0.2	0.110
18-May-13	11:06	Flood	2.74	0.15	0.4110	0.2	0.082
	16:51	Ebb	2.74	0.2	0.5480	0.3	0.164
24-May-13	16:49	Flood	2.74	0.25	0.6850	0.2	0.137
	12:00	Ebb	2.74	0.3	0.8220	0.3	0.247
31-May-13	10:00	Flood	2.74	0.2	0.5480	0.3	0.164
	16:53	Ebb	2.74	0.15	0.4110	0.3	0.123

4.15 Hydrological characteristics results of the all measurement points are summarized in *Tables 4-6* and *4-7*.

Table 4-6 Summarized Hydrological Characteristics of Water Depth, m

Date	Mid-Flood				Mid-Ebb			
	H1	H2	H3	H4	H1	H2	H3	H4
3-May-13	0.36	0.24	0.30	0.20	#	#	0.25	0.30
10-May-13	#	#	0.25	0.30	0.18	0.24	0.30	0.20
18-May-13	#	#	0.30	0.20	#	#	0.50	0.30
24-May-13	#	#	0.20	0.20	0.12	0.12	0.20	0.30
31-May-13	0.48	0.36	0.40	0.30	0.18	0.24	0.30	0.30

No data was provided by Contract 1.

Table 4-7 Summarized Hydrological Characteristics of Average Volumetric flow rate (Q), m³/s

Date	Mid-Flood				Mid-Ebb			
	H1	H2	H3	H4	H1	H2	H3	H4
3-May-13	0.15	0.377	0.22	0.08	#	#	0.37	0.12
10-May-13	#	#	0.37	0.12	0.15	1.13	0.45	0.11
18-May-13	#	#	0.45	0.08	#	#	0.75	0.16
24-May-13	#	#	0.15	0.14	0.15	0.377	0.15	0.25
31-May-13	0.15	0.754	0.60	0.16	0.075	0.754	0.45	0.12

No data was provided by Contract 1.

4.16 To compare the monitoring data between the Reporting Period (rainy season) and baseline monitoring period, the currently water depth and volumetric flow rate has insignificant changed. Furthermore, water depth and water flow rate were found no exceedance in this Reporting Period.

RESULTS OF ECOLOGICAL MONITORING

4.17 According to updated EM&A Manual Section 6.17, bi-monthly ecological monitoring is conducted by the IEC – ENVIRON Hong Kong Limited. In brief, the monitoring tasks include regular check on the retained and transplanted trees and shrubs, monitoring on fauna groups and aquatic fauna within the works area and any ecologically sensitive area within 100 m of the works boundary.

4.18 In this Reporting Period, the ecological monitoring in Area under Contract 2 is performed on **30 May 2013**. The details monitoring report is presented in *Appendix N*.

5.0 WASTE MANAGEMENT

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

RECORDS OF WASTE QUANTITIES

5.02 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.

5.03 The quantities of waste for disposal in this Reporting Period are summarized in *Table 5-1* and *5-2* and the Monthly Summary Waste Flow Table is shown in *Appendix K*. Whenever possible, materials were reused on-site as far as practicable.

Table 5-1 Summary of Quantities of Inert C&D Materials

Type of Waste	Quantity	Disposal Location
C&D Materials (Inert) (m ³)	0	-
Reused in this Contract (Inert) (m ³)	0	-
Reused in other Projects (Inert) (m ³)	0	-
Disposal as Public Fill (Inert) (m ³)	40	Tuen Mun Area 38

Table 5-2 Summary of Quantities of C&D Wastes

Type of Waste	Quantity	Disposal Location
Recycled Metal (kg)	0	-
Recycled Paper / Cardboard Packing (kg)	0	-
Recycled Plastic (kg)	0	-
Chemical Wastes (kg)	0	-
General Refuses (m ³)	35	Local refuse station

5.04 To control over the site performance on waste management, the Contractor shall ensure that all solid and liquid waste management works are in full compliance with the relevant license/permit requirements, such as the effluent discharge license and the chemical waste producer registration. The Contractor is also reminded to implement the recommended environmental mitigation measures according to the EM&A Manual based on actual site conditions.

6.0 SITE INSPECTION

REGULAR SITE INSPECTION AND MONTHLY AUDIT

- 6.01 According to the Updated Environmental Monitoring and Audit Manual, regular site inspection to evaluate the project environmental performance should be carried out during construction phase. Weekly environmental site inspections had been carried out by the Contractor, ET and RE on **2, 8, 15, 23 and 27 May 2013**. Also, joint site inspection with the IEC was carried out on **27 May 2013**. In this Reporting period, **3** observations were recorded but no non-compliance was noted.
- 6.02 Observations for the site inspection and monthly audit within this Reporting Period are summarized in **Table 6-1**.

Table 6-1 Site Inspection of Observations – Findings and Deficiencies

Date	Findings / Deficiencies	Follow-Up Status
2 May 2013	<ul style="list-style-type: none"> No adverse environmental issue was observed during site inspection. 	N.A.
8 May 2013	<ul style="list-style-type: none"> Ponding water was observed after rainfall, the Contractor was reminded to implement the mosquito control on the site. 	Not required for reminder.
15 May 2013	<ul style="list-style-type: none"> A breaker tip was observed without acoustic insulating material wrapping around the tip. The Contractor was reminded to provide a proper wrap around the break tip as a noise mitigation measures. 	Rectified on 23 May 2013.
23 May 2013	<ul style="list-style-type: none"> No adverse environmental issue was observed during site inspection. 	N.A.
27 May 2013	<ul style="list-style-type: none"> Chemical containers without drip tray were observed at the upstream area, the contractor was reminded to provide drip tray for all chemical containers in the site area to prevent leakage. An exposed slope was observed above the river course, the Contractor should cover the slope with impervious sheet or repair it to prevent generation of runoff during rainstorm. 	To be followed in June 2013.

LANDSCAPE AND VISUAL INSPECTION

- 6.03 In this Reporting Period, landscape and visual inspection was carried on **15 and 30 May 2013**.
- 6.04 The stand-alone of monthly Landscape & Visual Report signed by the registered Landscape Architect. Mitigation measures implemented in this Reporting Period are presented in the monthly Landscape & Visual Report (**May 2013**) which enclosed in **Appendix L**.
- 6.05 The next bi-weekly Landscape & Visual Monitoring in **June 2013** is scheduled to be conducted in the week of **10 and 24 June 2013**.

7.0 ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE

ENVIRONMENTAL COMPLAINT, SUMMONS AND PROSECUTION

7.01 No environmental complaint, summons and prosecution was received in this Reporting Period. The statistical summary table of environmental complaint is presented in *Tables 7-1, 7-2 and 7-3*.

Table 7-1 Statistical Summary of Environmental Complaints

Reporting Period	Environmental Complaint Statistics		
	Frequency	Cumulative	Complaint Nature
July 2011 –April 2013	0	0	NA
May 2013	0	0	NA

Table 7-2 Statistical Summary of Environmental Summons

Reporting Period	Environmental Summons Statistics		
	Frequency	Cumulative	Complaint Nature
July 2011 –April 2013	0	0	NA
May 2013	0	0	NA

Table 7-3 Statistical Summary of Environmental Prosecution

Reporting Period	Environmental Prosecution Statistics		
	Frequency	Cumulative	Complaint Nature
July 2011 –April 2013	0	0	NA
May 2013	0	0	NA

8.0 IMPLEMENTATION STATUS OF MITIGATION MEASURES

8.01 The environmental mitigation measures that recommended in the Updated Environmental Monitoring and Audit Manual covered the issues of dust, noise and waste and they are summarized as follows:

Noise Mitigation Measure

- (a) Only well-maintained plant should be operated on-site and plant shall be serviced regularly during the construction program;
- (b) Silencers or mufflers on construction equipment should be utilized and shall be properly maintained during the construction program;
- (c) Mobile plant, if any, should be sited as far from NSRs as possible;
- (d) Machines and plant (such as trucks) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum;
- (e) Plant known to emit noise strongly in one direction should, wherever possible, be orientated so that the noise is directed away from the nearby NSRs;
- (f) Material stockpiles and other structures should be effectively utilized, wherever practicable, in screening noise from on-site construction activities;
- (g) Use of quieter plants to carry out the construction tasks proposed for the Project;
- (h) Use about 3.5m high of temporary noise barriers as screened the noisy PMEs to carry out construction of box culvert and site clearance.
- (i) Low Impact Method, such as using PMEs smaller in size and to be enclosed by noise enclosure, should be adopted for the construction of box culvert and pipe laying in Wai Ha; and
- (j) Use of noise enclosure during the works area for pipe laying in Wai Ha.

Dust Mitigation Measure

8.02 Implementation of mitigation measures stipulated in the Air Pollution Control (Construction Dust) Regulation and good site practices including but not limited to the following:

- (a) Use of regular watering to reduce dust emissions from exposed site surfaces and unpaved road, with complete coverage, particularly during dry weather;
- (b) Use of frequent watering for particularly dusty static construction areas and areas close to ASRs;
- (c) Tarpaulin covering of all dusty vehicle loads transported to, from and between site location;
- (d) Establishment and use of vehicle wheel and body washing facilities at the exit points of the site;
- (e) Routing of vehicles and positioning of construction plant should be at the maximum possible distance from ASRs;
- (f) Stockpiled excavated materials should be covered with tarpaulin and should be removed offsite within 24 hours to avoid any odour nuisance arising.

Local Stream Water Quality Mitigation Measure

- (a) Before commencing any site formation work, all sewer and drainage connections shall be sealed to prevent debris, soil, sand etc. from entering public sewers/drains;
- (b) Temporary ditches shall be provided to facilitate run-off discharge into appropriate watercourses, via a silt retention pond. No site run-off shall enter the fishponds at Shuen Wan;
- (c) Sand/silt removal facilities such as sand traps, silt traps and sediment basins shall be provided to remove sand/silt particles from runoff to meet the requirements of the Technical Memorandum standard under the Water Pollution Control Ordinance. The design of silt removal facilities shall be based on the guidelines provided in ProPECC PN 1/94. All drainage facilities and erosion and sediment control structures shall be inspected monthly and maintained to ensure proper and efficient operation at all times and particularly during rainstorms
- (d) Water pumped out from excavated pits shall be discharged into silt removal facilities;

- (e) During rainstorms, exposed slope/soil surfaces shall be covered by a tarpaulin or other means. Other measures that need to be implemented before, during, and after rainstorms as summarized in ProPECC PN 1/94 shall be followed
- (f) Exposed soil areas shall be minimized to reduce potential for increased siltation and contamination of runoff
- (g) Earthwork final surfaces shall be well compacted and subsequent permanent work or surface protection shall be immediately performed to reduce the potential of soil erosion;
- (h) Open stockpiles of construction materials or construction wastes on-site shall be covered with tarpaulin or similar fabric during rainstorms;
- (i) For the construction of the box culvert next to the existing channel of the Wai Ha River, sand bags should be deployed around the boundary of the works trench to prevent muddy water ingress into the adjacent CA or Wai Ha River. Sand bags should also be used to surround the excavated trench. Generally, the sand bags will be placed up to a height of 300mm to provide adequate allowance for the built-up water level during rainstorm event. With sand bags in place surface runoff will be intercepted and flow to Wai Ha River or collected by the existing drainage system as usual;
- (j) For the construction of the box culvert in the extreme northeast corner of Shuen Wan Marsh Conservation Area sand bags should be deployed along the limit of the works area to prevent muddy water ingress into the CA. Sand bags should be placed to a height of 0.1m at least 300mm from ground level and +2.5 mPD (whichever is greater) to provide adequate allowance for the built-up water level during rainstorm events. Unpolluted surface runoff within the works area should then be collected and directed into the existing drainage system;
- (k) Sheet-piles, which would be installed around the works trench near the Conservation Area, would be extended above ground level for about 2m to serve as hoardings to isolate the works site;
- (l) Tarpaulin sheets would be used to cover the excavation areas during heavy rainstorms. This would prevent the ingress of rainwater into the trench minimizing the risk of muddy water getting into Wai Ha River and the adjacent Conservation Area;
- (m) Any concrete washing water would be contained inside the works site surrounded by the extended sheet piles. A pump sump at the bottom of the trench would be provided to pump any excess water during concrete washing;
- (n) Stockpiling the excavated materials adjacent to the Conservation Area would not be allowed. The excavated materials would be either removed off site immediately after excavation, or stockpiled at location(s) away from the Conservation Area. The stockpile locations shall be approved by the site engineer;
- (o) Debris and refuse generated on-site should be collected, handled and disposed of properly to avoid entering the Wai Ha River and fish ponds at Shuen Wan. Stockpiles of cement and other construction materials should be kept covered when not being used.
- (p) Oils and fuels should only be used and stored in designated areas which have pollution prevention facilities to prevent spillage of fuels and solvents to nearby water bodies, all fuel tanks and storage areas should be provided with locks and be sited on sealed areas, within bunds of a capacity equal to 110% of the storage capacity of the largest tank. The bund should be drained of rainwater after a rain event
- (q) Temporary sanitary facilities, such as portable chemical toilets, should be employed on-site. A licensed contractor would be responsible for appropriate disposal and maintenance of these facilities;
- (r) The excavation works within the upstream end of the existing river channel of the Wai Ha River for the construction of the proposed box culvert should be carried out in dry condition. Containment measures such as bunds and barriers shall be used within the affected length of the river channel and the excavation works restricted to within an enclosed dry section of the channel. The excavation works within Wai Ha River shall be restricted to the period from October to April.

Waste Mitigation Measures

- (a) The Contractor shall observe and comply with the Waste Disposal Ordinance (WDO) and its subsidiary regulations.
- (b) The Contractor shall submit to the Engineer for approval a Waste Management Plan with appropriate mitigation measures including the allocation of an area for waste segregation and shall ensure that the day-to-day site operations comply with the approved waste management plan.
- (c) The Contractor shall minimize the generation of waste from his work. Avoidance and minimization of waste generation can be achieved through changing or improving design and practices, careful planning and good site management.
- (d) The reuse and recycling of waste shall be practised as far as possible. The recycling materials shall include paper/cardboard, timber and metal etc.
- (e) The Contractor shall ensure that Construction and Demolition (C&D) materials are sorted into public fill (inert portion) and C&D waste (non-inert portion). The public fill which comprises soil, rock, concrete, brick, cement plaster/mortar, inert building debris, aggregates and asphalt shall be reused in earth filling, reclamation or site formation works. The C&D waste which comprises metal, timber, paper, glass, junk and general garbage shall be reused or recycled where possible and, as the last resort, disposal of at landfills.
- (f) The Contractor shall record the amount of wastes generated, recycled and disposed of (including the disposal sites). The Contractor shall use a trip ticket system for the disposal of C&D materials to any designated public filling facility and/or landfill.
- (g) In order to avoid dust or odour impacts, any vehicles leaving a works area carrying construction waste or public fill shall have their load covered.
- (h) To avoid the excessive use of wood, reusable steel shutters shall be used as a preferred alternative to formwork and falsework where possible.
- (i) The Contractor shall observe and comply with the Waste Disposal (Chemical Waste) (General) Regulation. The Contractor shall apply for registration as chemical waste producer under the Waste Disposal (Chemical Waste) (General) Regulation when chemical waste is produced. All chemical waste shall be properly stored, labeled, packaged and collected in accordance with the Regulation.

8.03 KLKJV had been implementing the required environmental mitigation measures according to the Updated Environmental Monitoring and Audit Manual subject to the site condition. Environmental mitigation measures generally implemented by KLKJV in this Reporting Period are summarized in *Table 8-1*.

Table 8-1 Environmental Mitigation Measures

Issues	Environmental Mitigation Measures
Water Quality	<ul style="list-style-type: none"> • Wastewater were appropriately treated by treatment facilities; • Drainage channels were provided to convey run-off into the treatment facilities; and • Drainage systems were regularly and adequately maintained.
Air Quality	<ul style="list-style-type: none"> • Regular watering to reduce dust emissions from all exposed site surface, particularly during dry weather; • Frequent watering for particularly dusty construction areas and areas close to air sensitive receivers; • Cover all excavated or stockpile of dusty material by impervious sheeting or sprayed with water to maintain the entire surface wet; • Public roads around the site entrance/exit had been kept clean and free from dust; and • Tarpaulin covering of any dusty materials on a vehicle leaving the site.
Noise	<ul style="list-style-type: none"> • Good site practices to limit noise emissions at the sources; • Use of quiet plant and working methods; • Use of site hoarding or other mass materials as noise barrier to screen noise at ground level of NSRs; • Use of shrouds/temporary noise barriers to screen noise from relatively static PMEs; • Scheduling of construction works nearly Tung Tsz Road; and • Alternative use of plant items within one worksite, where practicable.

Issues	Environmental Mitigation Measures
Waste and Chemical Management	<ul style="list-style-type: none">• Excavated material should be reused on site as far as possible to minimize off-site disposal. Scrap metals or abandoned equipment should be recycled if possible;• Waste arising should be kept to a minimum and be handled, transported and disposed of in a suitable manner;• The Contractor should adopt a trip ticket system for the disposal of C&D materials to any designed public filling facility and/or landfill; and• Chemical waste shall be handled in accordance with the Code of Practice on the Packaging, Handling and Storage of Chemical Wastes.
General	<ul style="list-style-type: none">• The site was generally kept tidy and clean.

9.0 IMPACT FORCAST

CONSTRUCTION ACTIVITIES FOR THE FORTH-COMING MONTH

9.01 Construction activities planned to be carried out next month at Shuen Wan is listed as below:-

- Construction of Box Culvert Bay 44-50 (Backfill & Compaction)
- Construction of Intake Structure
- Construction of Wai Ha Box Culvert Bay 1, 2

9.02 Three months Rolling Construction Program is attached in *Appendix C*

KEY ISSUES FOR THE COMING MONTH

9.03 According to construction activities carry out in coming months, key issues to be considered include:

- Implementation of dust suppression measures at all times;
- Ensure dust suppression measures are implemented properly;
- Disposal of empty engine oil containers within site area;
- Sediment catch-pits and silt removal facilities should be regularly maintained;
- Management of chemical wastes;
- Discharge of site effluent to the nearby local stream or storm drainage, stockpiling or disposal of materials, and any dredging or construction area at this area are prohibited;
- Follow-up of improvement on general waste management issues; and
- Implementation of construction noise preventative control measures.

10.0 CONCLUSIONS AND RECOMMENTATIONS

CONCLUSIONS

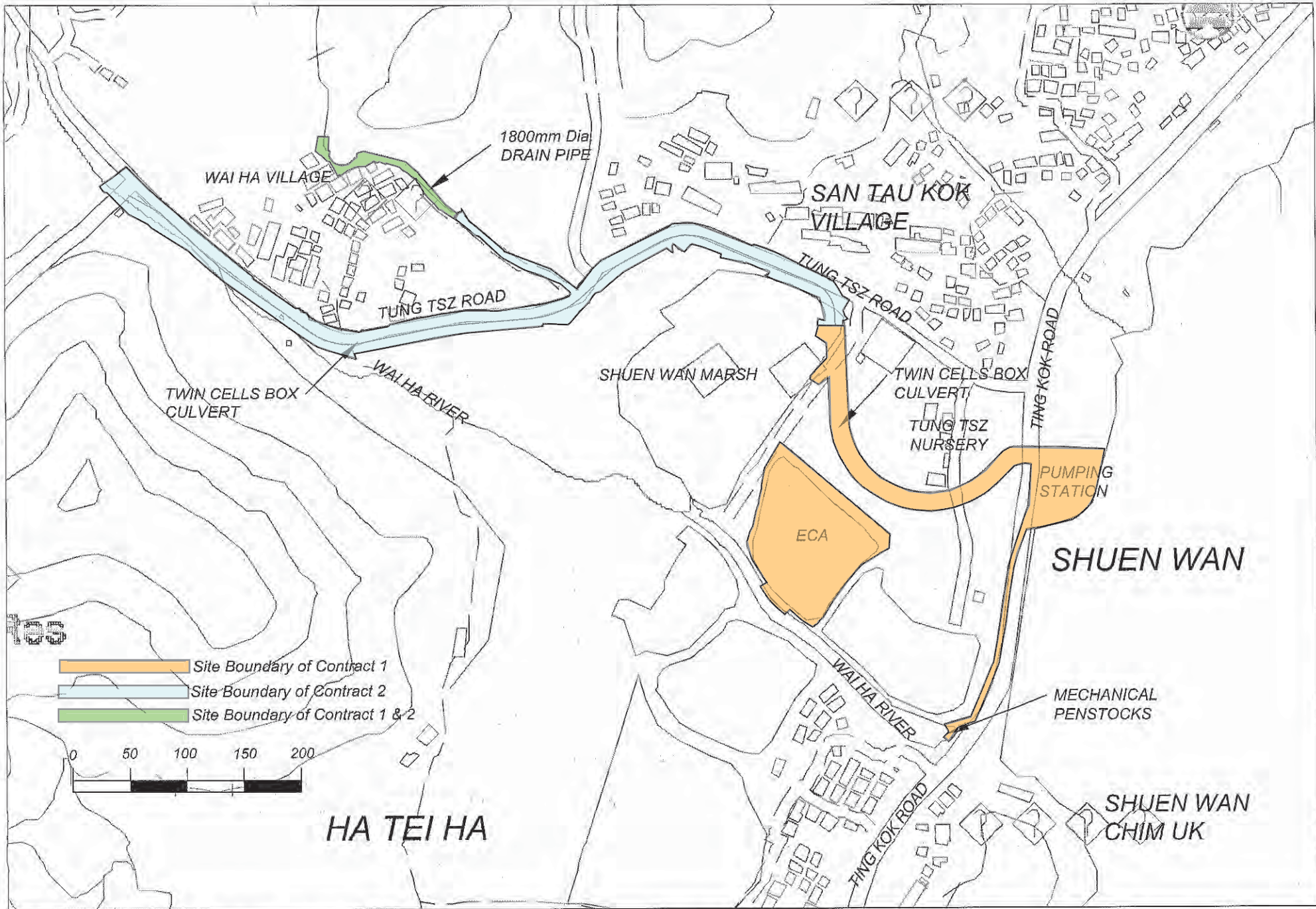
- 10.01 This is the 23rd monthly EM&A report for Contract 2 presenting the monitoring results and inspection findings for the Reporting Period from **1 to 31 May 2013**.
- 10.02 No noise complaint (which is an Action Level exceedance) was received and no construction noise measurement results that exceeded the Limit Level were recorded in this Reporting Period. No NOE or the associated corrective actions were therefore issued.
- 10.03 For water quality monitoring, a total of 97 Action/ Limit Level exceedances, namely 44 exceedances in dissolved oxygen, 28 exceedances in turbidity and 25 exceedances in suspended solids were recorded in this Reporting Period. NOEs were issued to notify EPD, IEC, the Contractor and RE upon confirmation of the results. It is concluded that the exceedances at W4 were partially due to the project. The Contractor should enhance the water quality mitigation measures such as covering all exposed slopes to prevent surface runoff in case of inclement weather.
- 10.04 The hydrological characteristics of water depth and water flow rate were found no exceedance in this Reporting Period.
- 10.05 In this Reporting Period, ecological monitoring in Area under Contract 2 was performed on **30 May 2013**.
- 10.06 No documented complaint, notification of summons or successful prosecution was received.
- 10.07 Weekly environmental site inspections had been carried out by the Contractor, ET and the RE on **2, 8, 15, 23 and 27 May 2013**. Furthermore, joint site inspection with the IEC was carried out on **27 May 2013**. In this Reporting Period, **3** observations were recorded but no non-compliance was noted during the site inspection.
- 10.08 In this Reporting Period, landscape and visual inspection was carried on **15 and 30 May 2013** and the monthly Landscape & Visual Report (**May 2013**) has been signed by the registered Landscape Architect.

RECOMMENDATIONS

- 10.09 As river works is in progress, surface runoff or water discharge to local stream course should be key environment aspect issue. The Contractor is reminded that mitigation measures for water quality and ecology should be fully implemented. As an effective water quality mitigation measure, the rock bund in the de-silting channel should be repaired regularly and ensure the de-silting performance.
- 10.10 During wet season, muddy water and other water quality pollutants via site surface water runoff into the local stream Wah Ha River would be the key issue in the forth-coming month. On the other hand, construction noise should be other key environmental issue during sheet-piling process. The noise mitigation measures should be necessary to implement in accordance with EM&A Manual stipulation. Dust mitigation measures to avoid fugitive dust emissions from loose soil surface or haul road is also reminded.
- 10.11 To control the site performance on waste management, the KLKJV shall ensure that all solid and liquid waste management works are fully in compliance with the relevant license/permit requirements, such as the effluent discharge licence and the chemical waste producer registration. KLKJV is also reminded to implement the recommended environmental mitigation measures according to the Updated Environmental Monitoring and Audit Manual.

Appendix A

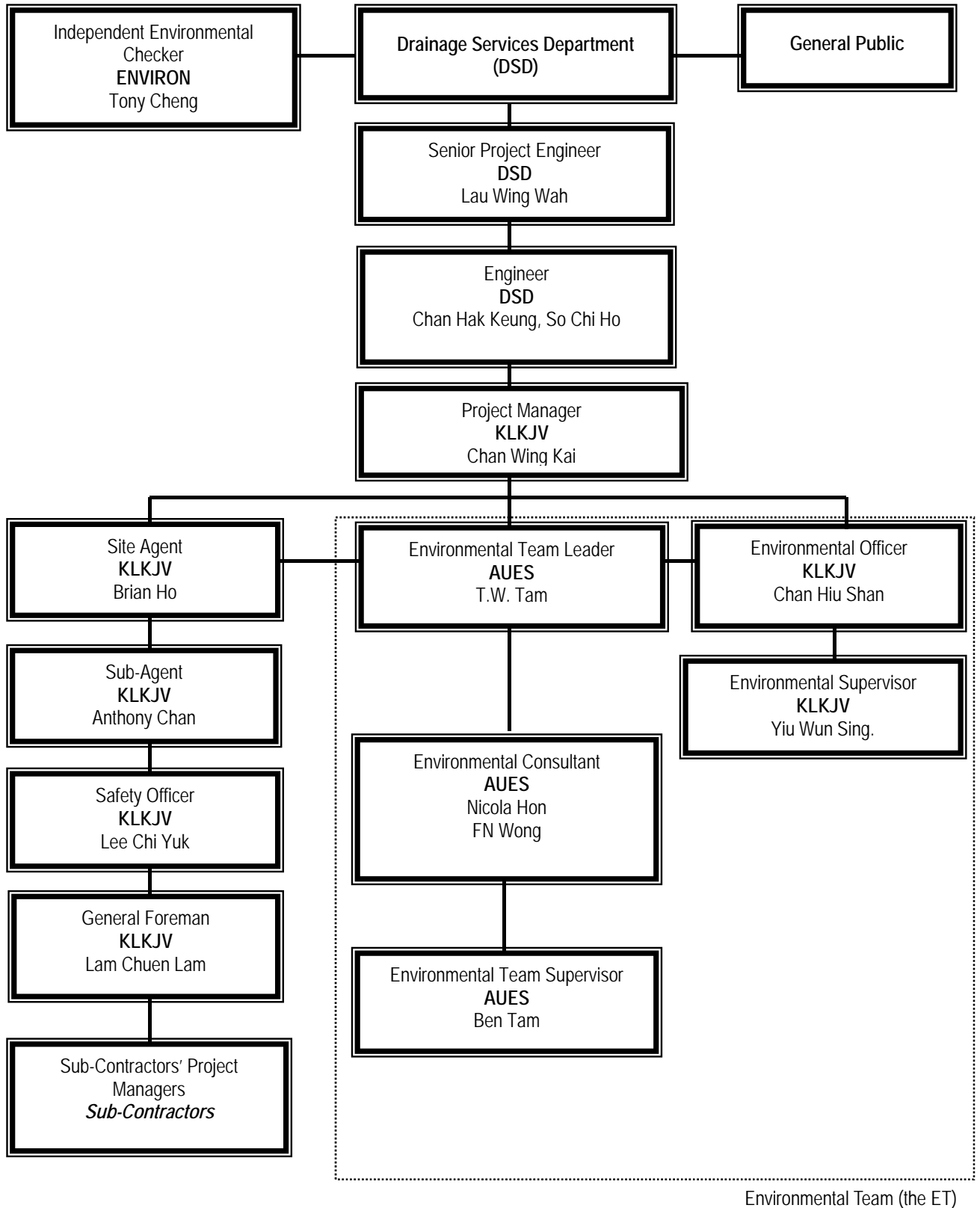
Site Location Plan
(DSD Contract 1 and Contract 2 at Shuen Wan)



Site Location Plan of DSD Contract 1 and Contract at Shuen Wan

Appendix B

Organization Chart and the Key Contact Person



Environmental Management Organization

Contact Details of Key Personnel

Organization	Project Role	Name of Key Staff	Tel No.	Fax No.
DSD	Employer	Mr. Luk Wai Hung	2594 7400	2827 8700
DSD	Senior Engineer	Mr. Lau Wing Wah	2594 7402	2827 8700
DSD	Engineer	Mr. Chan Hak Keung	2594 7596	2827 8700
DSD	Engineer	Mr. So Chi Ho	2594 7356	2827 8700
DSD	Senior Inspector	Mr. Tso Si On	6778 2708	2827 8700
ENVIRON	Independent Environmental Checker	Mr. Tong Cheng	3465-2888	3465-2899
KLKJV	Project Director	Mr. Poon Chi Yeung Francis	2674 3888	2674 9988
KLKJV	Project Manager	Mr. Chan Wing Kai	2674 3888	2674 9988
KLKJV	Site Agent	Mr. Brian Ho	2674 3888	2674 9988
KLKJV	Sub- Agent	Mr. Anthony Chan	2674 3888	2674 9988
KLKJV	Technical Manager	Mr. Yeung Tai Yung	9674 9712	2674 9988
KLKJV	Site Forman	Mr. Lam Chuen Lam	2674 3888	2674 9988
KLKJV	Environmental Officer	Miss. Chan Hiu Shan	2674 3888	2674 9988
KLKJV	Environmental Supervisor	Mr. Yiu Wun Sing	2674 3888	2674 9988
AUES	Environmental Team Leader	Mr. T.W. Tam	2959-6059	2959-6079
AUES	Senior Environmental Consultant	Mr. Wong Fu Nam	2959-6059	2959-6079
AUES	Environmental Consultant	Miss. Nicola Hon	2959-6059	2959-6079
AUES	Environmental Supervisor	Mr. Ben Tam	2959-6059	2959-6079

Legends:

DSD (Employer) – Drainage Services Department

DSD (Engineer) – Drainage Services Department

KLKJV (Main Contractor) – Kwan Lee-Kuly Joint Venture

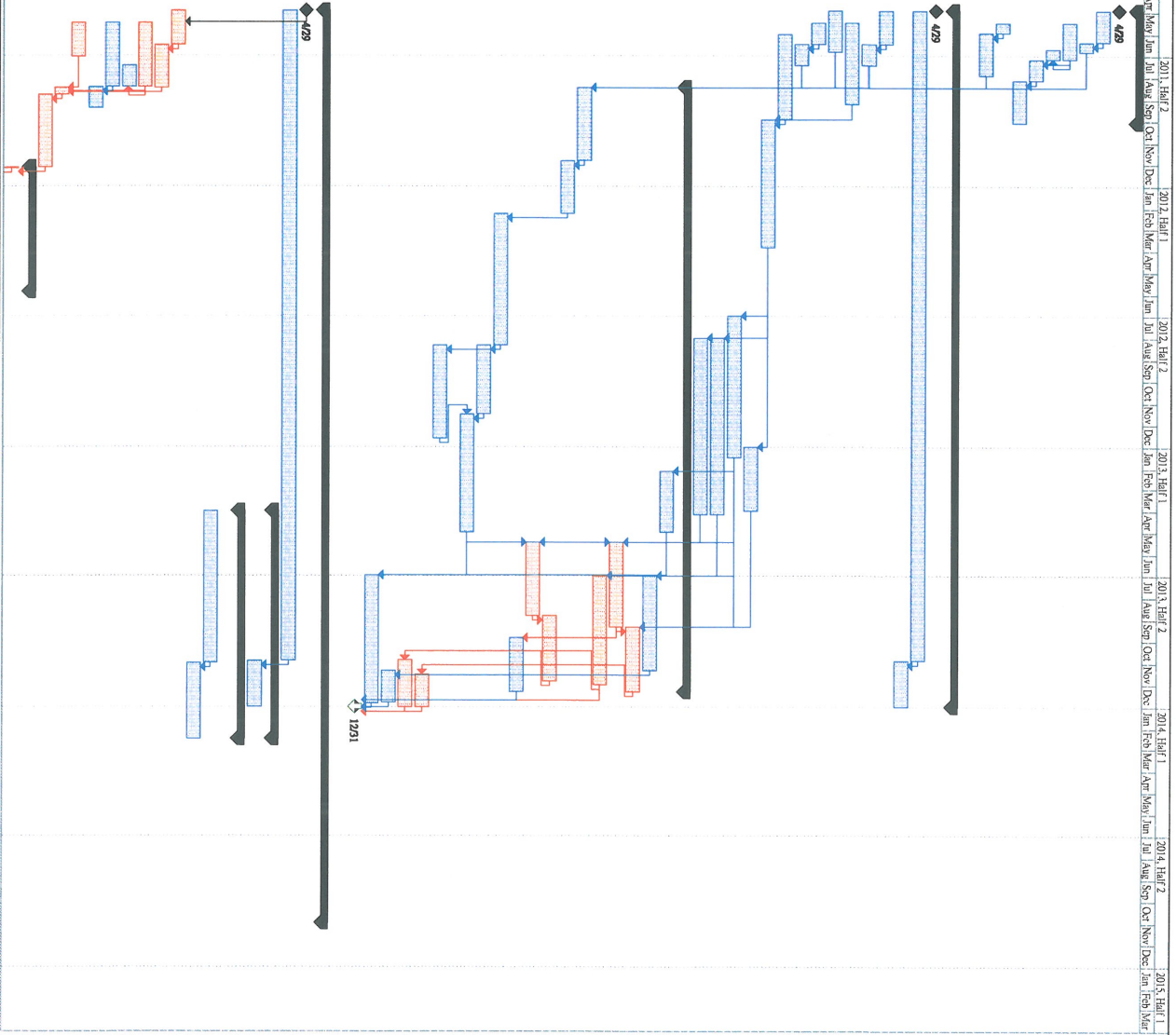
ENVIRON (IEC) – ENVIRON Hong Kong Limited

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

Appendix C

Master Construction Programs

ID	Task Name	Duration	Start	Finish	Predecessors
1	Preliminary Works	158 days	Fri 11 Apr 29	Mon 11 Oct 3	
2	Commencement of Works	0 days	Fri 11 Apr 29	Fri 11 Apr 29	
3	Site Clearance	44 days	Fri 11 Apr 29	Sat 11 Jun 11	
4	Record Survey	14 days	Sat 11 Jun 12	Sat 11 Jun 25	
5	Design & Construction of Hoarding	51 days	Mon 11 May 16	Tue 11 Jul 5	
6	Sitebound (Type B)	14 days	Wed 11 Jun 22	Tue 11 Jul 5	5FF
7	Design & Approval of Engineer's Site Office	30 days	Wed 11 Jun 6	Thu 11 Aug 4	
8	Construction of Engineer's Site Office	60 days	Fri 11 Aug 5	Mon 11 Oct 3	
9	Pre-construction Condition Survey	14 days	Mon 11 May 16	Sat 11 May 29	
10	Reduction of Existing Shires (2 Nos)	60 days	Mon 11 May 30	Tue 11 Jul 26	
11					
12	Section I (Construction Works in Shuen Wan)	978 days	Fri 11 Apr 29	Tue 13 Dec 31	
13	Commencement of Works	0 days	Fri 11 Apr 29	Fri 11 Apr 29	
14	Original Contract Period	913 days	Fri 11 Apr 29	Sun 13 Oct 27	
15	Extension of Time - due to Judgment Waiver	65 days	Mon 13 Oct 28	Tue 13 Dec 31	
16	Design of TTA	47 days	Fri 11 Apr 29	Tue 11 Jun 14	
17	Submission of TTA to TM/CG (for Approval)	30 days	Fri 11 Apr 29	Fri 11 Jul 16	
18	Excavation Permit	115 days	Mon 11 May 16	Wed 11 Sep 7	
19	Submission & approval of calculation & MS for BC (including trench ELS/Share)	58 days	Fri 11 Apr 29	Sat 11 Jun 25	
20	Notify EPD on commencement (one month advance notice)	30 days	Mon 11 May 16	Tue 11 Jun 14	
21	Tree Felling	30 days	Wed 11 Jun 15	Thu 11 Jul 14	
22	Utility diversion and diversion programme	120 days	Wed 11 Jun 15	Wed 11 Sep 28	
23	Utilities coordination	180 days	Thu 11 Sep 29	Mon 12 Nov 26	18,22
24	Temporary disconnection of the hydrant (Bay 7)	90 days	Tue 13 Jan 1	Sun 13 Mar 21	23
25	CI-2's overhead pole diversion (Bay 1 to Bay 15)	199 days	Mon 12 Jul 1	Tue 13 Jan 15	23
26	Relocation diversion of light post (near Bay 13)	248 days	Wed 12 Aug 1	Fri 13 Apr 5	23
27	Relocation diversion of light post (near Bay 32)	248 days	Wed 12 Aug 1	Fri 13 Apr 5	23
28	Construction of Single Cell (approx. 72m)	869 days	Mon 11 Aug 15	Tue 13 Dec 10	
29	Inlet for Box Culvert - in progress	86 days	Mon 13 Feb 4	Tue 13 Apr 25	
30	from CI167 to CI127 (Bay 12,3,4,5)	133 days	Mon 13 Jul 1	Sat 13 Nov 10	25
31	from CI127 to CI151 (Bay 6,7)	91 days	Wed 13 Sep 11	Tue 13 Dec 10	22,24,25
32	from CI152 to CI207 (Bay 8,9,10,11)	159 days	Wed 13 Sep 15	Tue 13 Sep 10	4,25
33	from CI207 to CI297 (Bay 12,13,14,15,16,17,18,19)	179 days	Mon 13 Jul 1	Tue 13 Nov 20	26,25
34	from CI297 to CI334 (Bay 20,21,22) completed	104 days	Mon 11 Aug 15	Fri 11 Nov 5	17,19,21,110,4
35	from CI334 to CI395 (Bay 23,24,25,26,27) completed	74 days	Sat 11 Nov 26	Tue 12 Feb 7	34
36	from CI395 to CI419 (Bay 28,29)	92 days	Mon 13 Aug 28	Mon 13 Nov 27	
37	from CI419 to CI435 (Bay 30,31,32)	101 days	Wed 13 May 15	Sun 13 Aug 25	41,27
38	from CI435 to CI480 (Bay 33,34)	76 days	Tue 13 Sep 26	Mon 13 May 15	41,27
39	from CI480 to CI541 (Bay 35,36,37,38,39) completed	185 days	Wed 12 Aug 1	Fri 12 Aug 10	
40	from CI541 to CI577 (Bay 40,41,42) completed	97 days	Sat 12 Aug 11	Tue 12 Nov 15	
41	from CI577 to CI674 (Bay 43,44,45,46,47,48,49,50) in progress	166 days	Fri 12 Nov 16	Tue 13 Apr 30	40,29,35,44 days
42	RCP above Bay 6)	171 days	Sat 12 Aug 11	Wed 12 Dec 19	39
43	CCTV inspection	46 days	Sat 13 Nov 16	Tue 13 Dec 11	31,35,25 days
44	Installation of Type 2 Railing at Upstream (CI167 to CI194)	66 days	Sat 13 Oct 27	Tue 13 Dec 31	36,35,30 days,33FF,35,4
45	Landscape Schematic	45 days	Mon 13 Nov 11	Wed 13 Dec 25	30
46		180 days	Sun 13 Jan 30	Tue 13 Dec 26	29,4,135,60 days
47	Completion of Section I	0 days	Tue 13 Dec 31	Tue 13 Dec 31	46,45,43,44,33,38
48					
49	Section II (Construction Works in Shek Wu Wai)	1281 days	Fri 11 Apr 29	Thu 14 Oct 30	
50	Commencement of Works	0 days	Fri 11 Apr 29	Fri 11 Apr 29	
51	Original Contract Period	913 days	Fri 11 Apr 29	Sun 13 Oct 27	
52	Extension of Time	320 days	Mon 13 Apr 1	Fri 14 Feb 14	
53	UOT due to inclement weather	65 days	Mon 13 Oct 28	Tue 13 Dec 31	
54	UOT in conflict with Construction of Box Culvert at downstream	320 days	Mon 13 Apr 1	Fri 14 Feb 14	
55	utilites diversions	213 days	Mon 13 Apr 1	Wed 13 Oct 30	
56	construction of retaining works	107 days	Thu 13 Oct 31	Fri 14 Feb 14	55
57	Design of TTA	48 days	Fri 11 Apr 29	Wed 11 Jun 15	
58	Submission of TTA to TM/CG for approval	60 days	Tue 11 Jun 16	Mon 11 Aug 14	
59	Excavation Permit	90 days	Mon 11 May 16	Sat 11 Aug 13	
60	Temp Work Design	30 days	Fri 11 Jul 15	Sat 11 Aug 13	59FF
61	Site Investigation for Utilities	90 days	Mon 11 May 16	Sat 11 Aug 13	
62	Submit Program for Utilities Diversion	30 days	Sat 11 Aug 14	Mon 11 Sep 12	61
63	Site Clearance and Tree Felling	48 days	Mon 11 May 16	Sat 11 Jul 2	
64	Implement Stage 1 of TTA	10 days	Mon 11 Aug 15	Wed 11 Aug 24	58,59,63
65	Temp, Steel Decking and temporary carriageway	102 days	Mon 11 Aug 25	Sat 11 Dec 4	64
66	Box Culvert Construction	175 days	Mon 11 Dec 5	Sun 12 Mar 27	
67	Implement Stage 2 of TTA	189 days	Mon 11 Dec 5	Mon 11 Dec 5	65



Data Date: 09 Jun 2015
 Printed on: 30 Mar 2015

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 Critical Task: [Legend]
 Milestone: [Legend]
 Summary: [Legend]

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 Roll Up Progress: [Legend]

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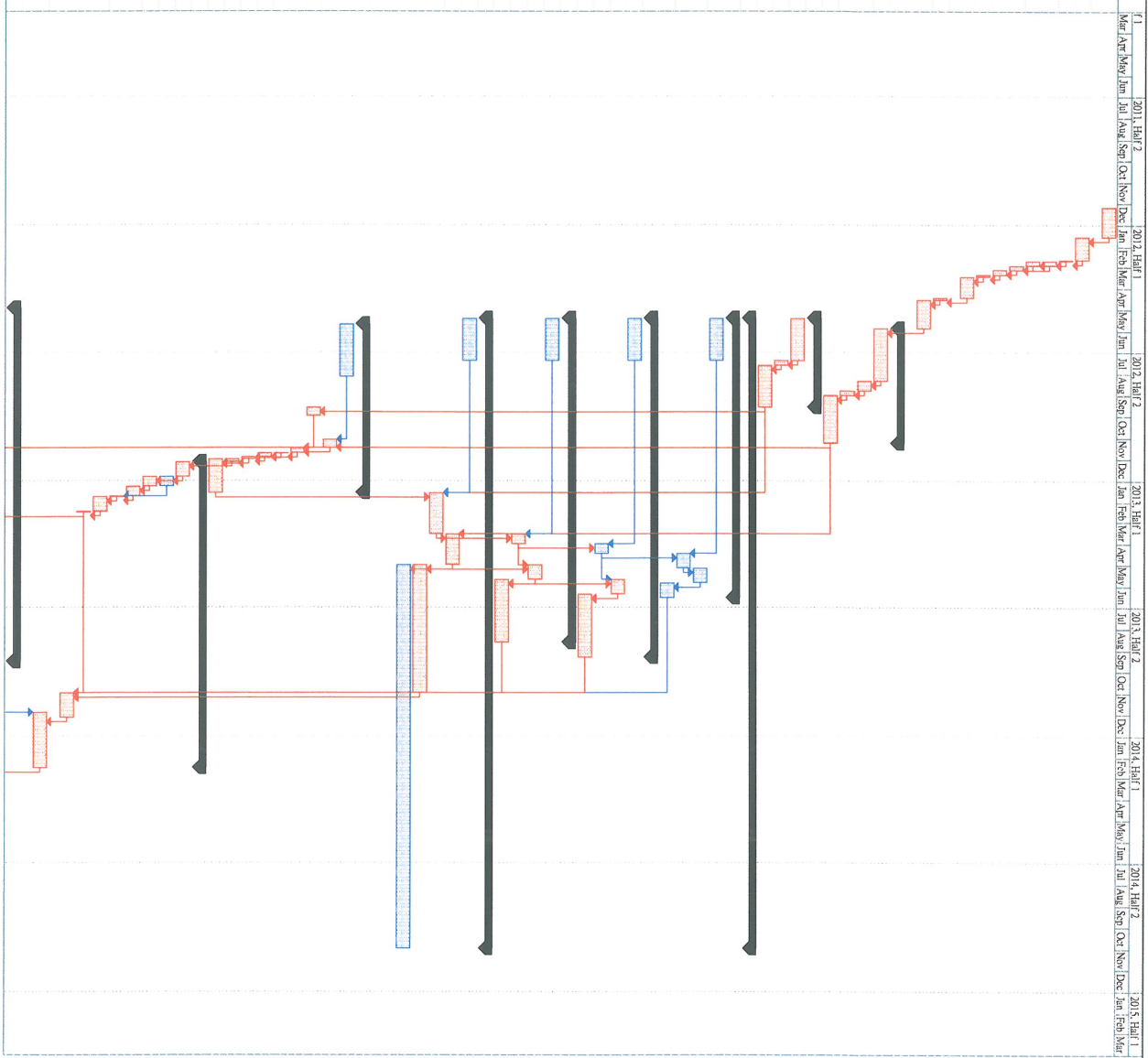
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 Group By Summary: [Legend]

Inactive Task: [Legend]
 Progress: [Legend]

Deadline: [Legend]

Page 1

ID	Task Name	Duration	Start	Finish	Processors
68	Construction of Box Culvert along Castle Peak Road (West Bound) including demolition of B/C	41 days	Tue 11 Dec 6	Tue 12 Jun 17	67
69	Temporary accessways for stage 3 TTA	33 days	Wed 12 Jan 18	Sun 12 Feb 09	68
70	Implement Stage 3 of TTA	1 day	Mon 12 Feb 20	Mon 12 Feb 20	69
71	Trail pit for utilities	7 days	Tue 12 Feb 20	Mon 12 Feb 27	70
72	Construction of steel footbridge	7 days	Tue 12 Feb 20	Mon 12 Feb 27	70
73	Installation of steel sheet piles	6 days	Tue 12 Feb 28	Sun 12 Mar 4	72,71
74	Temporary support for utilities	7 days	Mon 12 Mar 5	Sun 12 Mar 11	73
75	Demolish Existing Box Culvert (East Bound)	3 days	Mon 12 Mar 5	Wed 12 Mar 14	74
76	Construction of Base Slabs & Wall of Box Culvert along Castle Peak Road (East Bound)	30 days	Tue 12 Mar 15	Fri 12 Apr 13	75
77	Remove Temporary flow diversion	3 days	Sat 12 Apr 16	Sun 12 Apr 16	76
78	Construction of 3.5m wide top slab of box culvert along Castle Peak Road (East Bound)	41 days	Tue 12 Apr 14	Sun 12 May 27	77
79	Construction of RW1 wing wall section	164 days	Mon 12 May 28	Wed 12 Nov 7	
80	C/P (overhead pole) - cable layme	75 days	Mon 12 May 28	Fri 12 Aug 28	78
81	C/P (overhead pole) - clearing over	14 days	Sat 12 Aug 11	Fri 12 Aug 24	80
82	C/P (overhead pole) - removal of overhead pole	7 days	Sat 12 Aug 25	Fri 12 Aug 31	81
83	Reclaiming wall RW1 - wing wall portion	68 days	Sat 12 Sep 1	Wed 12 Sep 17	82
84	Construction of RW2 (wing wall)	127 days	Mon 12 Sep 14	Mon 12 Sep 17	
85	PCCW - XP application	60 days	Mon 12 Sep 14	Tue 12 Jul 12	83
86	PCCW - demolition of existing joint box cable droopt	7 days	Fri 12 Jul 13	Mon 12 Sep 14	84
87	Reclaiming wall RW2 (wing wall)	60 days	Fri 12 Jul 20	Mon 12 Sep 17	85
88	Reclaiming wall RW2	60 days	Fri 12 Jul 20	Mon 12 Sep 17	86
89	Utilities Diversion by RW2	900 days	Mon 12 Sep 14	Thu 14 Oct 30	
90	C/P (2 no. 11kV cables) - XP application	60 days	Mon 12 Sep 14	Sun 13 Jan 16	87
91	C/P (2 no. 11kV cables) - ducting & cable works (near RW1)	21 days	Mon 13 May 14	Sun 13 May 26	92
92	C/P (2 no. 11kV cables) - ducting & cable works (near RW2)	21 days	Mon 13 Apr 15	Sun 13 May 5	90,97
93	C/P (2 no. 11kV cables) - changing over	21 days	Mon 13 May 27	Sun 13 Jun 16	91
94	NWT	464 days	Mon 12 May 14	Mon 13 Sep 9	
95	NWT - XP application	60 days	Mon 12 May 14	Tue 12 Jul 12	93
96	NWT - manholes & ducting construction works (near RW1)	21 days	Wed 13 May 22	Tue 13 Jun 11	97,101
97	NWT - manholes & ducting construction works (near RW2)	14 days	Mon 13 Apr 1	Sun 13 Apr 14	95,102
98	NWT - diversion & changing over	90 days	Wed 13 Sep 12	Mon 13 Sep 9	96
99	HQC	463 days	Mon 12 May 14	Mon 13 Aug 19	
100	HQC - XP application	60 days	Mon 12 May 14	Tue 12 Jul 12	94
101	HQC - manholes & ducting construction works (near RW1)	21 days	Wed 13 May 14	Tue 13 May 21	102,106
102	HQC - manholes & ducting construction works (near RW2)	14 days	Mon 13 May 18	Sun 13 May 31	100,107
103	HQC - diversion & changing over	90 days	Wed 13 Aug 22	Mon 13 Aug 19	101
104	PCCW	900 days	Mon 12 May 14	Thu 14 Oct 30	
105	PCCW - XP application	60 days	Mon 12 May 14	Tue 12 Jul 12	95
106	PCCW - manholes & ducting construction works (near RW1)	44 days	Mon 13 May 18	Tue 13 Apr 20	83,107
107	PCCW - manholes & ducting construction works (near RW2)	59 days	Fri 13 Jan 18	Sun 13 Feb 17	87,105,119
108	PCCW - diversion & changing over (oversea cables)	184 days	Wed 13 May 1	Wed 13 Oct 30	106
109	PCCW - diversion & changing over (oversea cables - about 4 nos) - to be handed up for construction of remaining Box Culvert	548 days	Wed 13 May 1	Tue 14 Oct 30	106
110	WSD	261 days	Tue 12 May 22	Thu 13 Jun 17	
111	WSD - material delivery	75 days	Tue 12 May 22	Sat 12 Aug 4	
112	WSD - pipes fabrication, installation & laying (near RW1)	12 days	Sat 12 Nov 3	Wed 12 Nov 14	83,85,5 days,11
113	WSD - pipes fabrication, installation & laying (near RW2)	12 days	Tue 12 Sep 18	Sat 12 Sep 29	87
114	WSD - occupation of connection points	7 days	Thu 12 Nov 15	Wed 12 Nov 21	112,113
115	WSD - occupation of connection points with WSD	1 day	Thu 12 Nov 22	Thu 12 Nov 22	114
116	WSD - inspection of connection points with WSD	6 days	Tue 12 Nov 22	Tue 12 Nov 29	114
117	WSD - swabbing / flushing / sterilization	3 days	Wed 12 Nov 28	Fri 12 Nov 30	116,115
118	WSD - shutdown & commissioning by WSD	4 days	Sat 12 Dec 1	Fri 12 Dec 4	117
119	WSD - removal of disused pipes/reinforcement	48 days	Sat 12 Jan 17	Thu 13 Jan 17	117
120	Remaining box culvert	437 days	Wed 12 Dec 5	Fri 14 Feb 14	
121	Construction of top slab of box culvert for East Bound	21 days	Wed 12 Dec 5	Tue 12 Dec 25	118
122	Construction of temp. forebay at downstream	14 days	Wed 12 Dec 26	Thu 13 Jan 8	121
123	Backfilling and removal of temporary works	14 days	Wed 12 Dec 26	Thu 13 Jan 8	121
124	Temporary road surface for East Bound	14 days	Wed 12 Dec 26	Tue 13 Jan 8	121
125	Resume the east bound traffic	1 day	Wed 13 Jan 9	Tue 13 Jan 9	121
126	Temporary road surface for West Bound	21 days	Wed 13 Jan 23	Wed 13 Jan 23	122,124
127	Resume Castle Peak Road traffic for both direction	1 day	Thu 13 Feb 14	Thu 13 Feb 14	126
128	Construction of remaining top slab of box culvert and footpath at downstream	35 days	Thu 13 Oct 31	Wed 13 Dec 4	127,106,93,98,103
129	Implementation of TTA, Permanent road surface & paving block for footpath and associated works	79 days	Thu 13 Nov 28	Fri 14 Feb 14	128,5,7 days,16
130	Reclaiming Wall RW1 & Access Ramp	505 days	Sun 12 Apr 29	Sun 13 Sep 15	



Data Date: 08 Jan 2015
 Printed on: 30 Jan 2015

Task Critical Task

Milestone

Roll Up Critical Task

Roll Up Milestone

Roll Up Progress

Shift

External Tasks

Project Summary

Group By Summary

Inactive Task

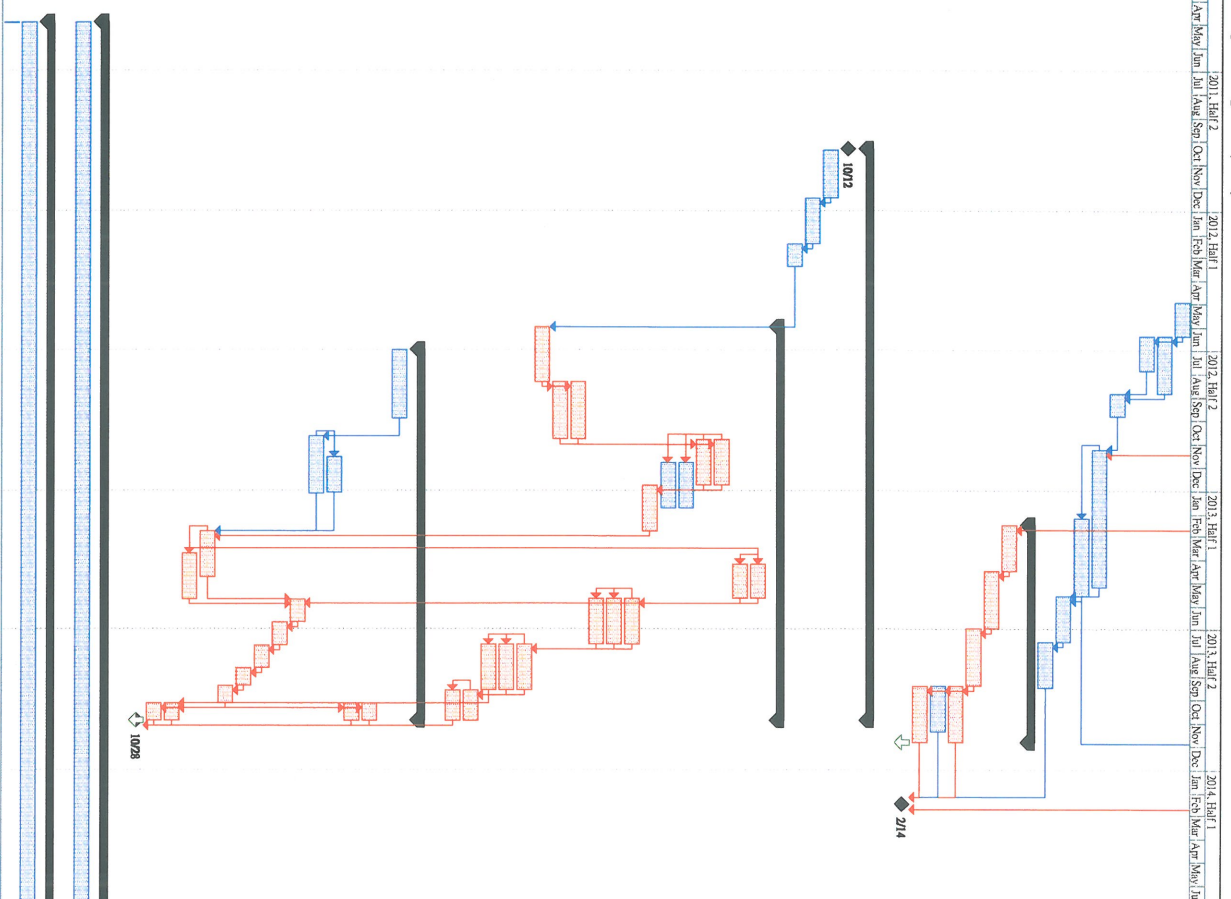
Progress

Deadline

Page 2

**Contract Title: Drainage Improvement Works in Shuen Wan and Shek Wu Wai
Updated Programme (No. 6)**

ID	Task Name	Duration	Start	Finish	Predecessors
131	Design & submission of TTA (San Tin Tsuen Road) for construction RW1	45 days	Sun 12 Apr 20	Tue 12 Jun 12	
132	Reduction of free surface	75 days	Wed 12 Jun 13	Sun 12 Aug 26	131
133	Construction with RKO & TD to finalize the implementation date of TTA at San Tin	45 days	Wed 12 Jun 13	Fri 12 Jul 21	
134	Site Road	30 days	Mon 12 Aug 27	Tue 13 Sep 25	132, 133
135	Implementation of TTA at San Tin Tsuen Road	180 days	Tue 12 Nov 8	Mon 13 May 6	134
136	Construction of access ramp	102 days	Wed 13 Feb 6	Sun 13 May 19	135
137	Construction of concrete parapet	60 days	Thu 13 Jul 18	Wed 13 Jul 17	136
138	Installation of railing and vehicular gate	60 days	Sun 13 Sep 15	Sun 13 Sep 15	137
139	Rehabilitate Wadi RW3 & RW4	264 days	Fri 13 Feb 15	Mon 13 Apr 15	137
140	Removal of steel road bridge at upstream	60 days	Fri 13 Feb 15	Mon 13 Apr 15	139
141	Construction of RW4	75 days	Tue 13 Apr 16	Sun 13 Jun 29	140
142	Construction of RW3	75 days	Thu 13 Sep 10	Thu 13 Sep 12	141
143	UU diversion permanent works	74 days	Fri 13 Sep 13	Mon 13 Nov 11	142
144	Installation of Type 2 railing and construction of flood wall	60 days	Fri 13 Sep 13	Mon 13 Nov 11	143
145	Rehabilitation of footpath and planter areas	74 days	Fri 13 Sep 13	Mon 13 Nov 11	144
146	Completion of Section II	0 days	Fri 14 Feb 14	Fri 14 Feb 14	145, 138, 143, 144, 129
147					
148	Section III (Construction Works in Wai Ha Village)	714 days	Wed 11 Oct 12	Mon 13 Oct 28	
149	Commence of Works	0 days	Wed 11 Oct 12	Wed 11 Oct 12	
150	Design of 2.4m x 0.9m Box Culvert	65 days	Thu 11 Oct 13	Wed 11 Dec 14	
151	Submission of design & works proposal for Approval	60 days	Thu 11 Oct 13	Sun 12 Feb 12	150
152	Site Clearance & trial pits	30 days	Mon 12 Feb 13	Tue 12 Mar 13	151
153	Construction of Box Culvert (approx. 200m) Bay 1 to Bay 16	515 days	Fri 12 Jan 1	Mon 13 Oct 28	152
154	Bay 1	45 days	Sun 13 Mar 21	188SS-14 days	
155	Bay 2	45 days	Sun 13 Apr 7	Mon 13 Dec 24	154
156	Bay 3	45 days	Fri 12 Oct 26	Mon 12 Dec 24	155
157	Bay 4	45 days	Fri 12 Oct 26	Mon 12 Dec 24	156
158	Bay 5	45 days	Wed 12 Nov 25	Wed 13 Jun 23	157
159	Bay 6	45 days	Sun 12 Nov 25	Wed 13 Jun 23	158
160	Bay 7	45 days	Tue 12 Dec 25	Fri 13 Feb 22	159
161	Bay 8	45 days	Wed 13 Mar 22	Sat 13 Jul 20	160
162	Bay 9	45 days	Wed 13 Mar 22	Sat 13 Jul 20	161
163	Bay 10	45 days	Wed 13 Mar 22	Sat 13 Jul 20	162
164	Bay 11	75 days	Sun 12 Aug 12	Thu 12 Oct 25	163
165	Bay 12	72 days	Sun 12 Aug 12	Thu 12 Oct 25	164
166	Bay 13	72 days	Fri 12 Aug 11	Wed 13 Sep 18	165
167	Bay 14	60 days	Sat 13 Jul 21	Wed 13 Sep 18	166
168	Bay 15	60 days	Sat 13 Jul 21	Wed 13 Sep 18	167
169	Bay 16	40 days	Thu 13 Sep 19	Mon 13 Oct 28	168
170	Bay 17	40 days	Thu 13 Sep 19	Mon 13 Oct 28	169
171	Bay 18 and Outfall	40 days	Thu 13 Sep 19	Mon 13 Oct 28	170
172					
173	Construction of box culvert (1m x 1m) Bay 1 to Bay 8 (approx. 50m)	405 days	Sun 12 Jul 1	Mon 13 Oct 28	
174	Notification to villagers regarding traffic arrangement for construction of 1 m x 1 m box culvert	90 days	Sun 12 Jul 1	Fri 12 Sep 28	
175	Intake headwall	23 days	Sun 13 Oct 6	Mon 13 Oct 28	174
176	Bay 1	23 days	Sun 13 Oct 6	Mon 13 Oct 28	175
177	Bay 2	47 days	Sun 12 Nov 18	Thu 13 Jan 3	176
178	Bay 3	75 days	Mon 12 Oct 22	Fri 13 Jan 4	177
179	Bay 4	30 days	Thu 13 Mar 22	Sun 13 Jul 21	178
180	Bay 5	30 days	Sun 13 Jun 22	Sun 13 Jul 21	179
181	Bay 6	30 days	Mon 13 Jul 22	Thu 13 Aug 20	180
182	Bay 7	23 days	Wed 13 Aug 21	Thu 13 Sep 12	181
183	Bay 8	23 days	Fri 13 Sep 13	Sat 13 Oct 5	182
184	Bay 9	60 days	Tue 13 Apr 23	177, 178, 160	
185	Bay 10	60 days	Sat 13 Mar 24	Wed 13 Mar 22	184
186	CCTV inspection of box culvert	23 days	Sun 13 Oct 6	Mon 13 Oct 28	185
187	Grouting of existing 900mm storm drain	23 days	Sun 13 Oct 6	Mon 13 Oct 28	186
188	Completion of Section III	0 days	Mon 13 Oct 28	Mon 13 Oct 28	187, 175, 176, 186, 187
189					
190	Section IV (Gradient A1 and A2, Shuen Wan)	1345 days	Fri 11 Apr 29	Wed 14 Dec 31	
191	Landscape Establishment Works and preservation & protection of trees	1345 days	Fri 11 Apr 29	Wed 14 Dec 31	
192					
193	Section V (Gradient B, Shek Wu Wai)	1388 days	Fri 11 Apr 29	Sat 15 Feb 14	
194	Landscape Establishment Works and preservation & protection of trees	1388 days	Fri 11 Apr 29	Sat 15 Feb 14	
195					



Data Date: 09 Jun 2015
Printed on: 30 Mar 2015

Task: [Blue bar] Milestone: [Diamond] Summary: [Grey bar]

Critical Task: [Red bar] Rolled Up Critical Task: [Red bar]

Roll Up Task: [Blue bar] Rolled Up Milestone: [Diamond] Shift: [Grey bar]

External Task: [Grey bar] Project Summary: [Grey bar] Group By Summary: [Grey bar]

Inactive Task: [Grey bar] Progress: [Grey bar]

Deadline: [Grey bar]

Page 9

A 4-2-2013
 D 30-4-2013

A 01-7-2013
 B 15-8-2013
 C 15-10-2013
 D 10-11-2013

A 11-9-2013
 B 16-10-2013
 C 14-11-2013
 D 10-12-2013

A 15-5-2013
 B 20-6-2013
 C 10-8-2013
 D 10-9-2013

A 26-11-2011 21-11-2011
 D 07-02-2012 03-02-2012

1. CLP's overhead pole to be diverted on 15-1-2013

1. CLP's overhead pole to be diverted on 15-1-2013
 2. Fire hydrant to be disconnected before 31-3-2013

1. CLP's overhead pole to be diverted on 15-1-2013

1. CLP's overhead pole to be diverted on 15-1-2013
 2. Light post to be relocated before 05-4-2013

A 01-7-2013
 B 25-8-2013
 C 05-11-2013
 D 30-11-2013

A 15-8-2011 08-8-2011
 D 25-11-2011 30-11-2011

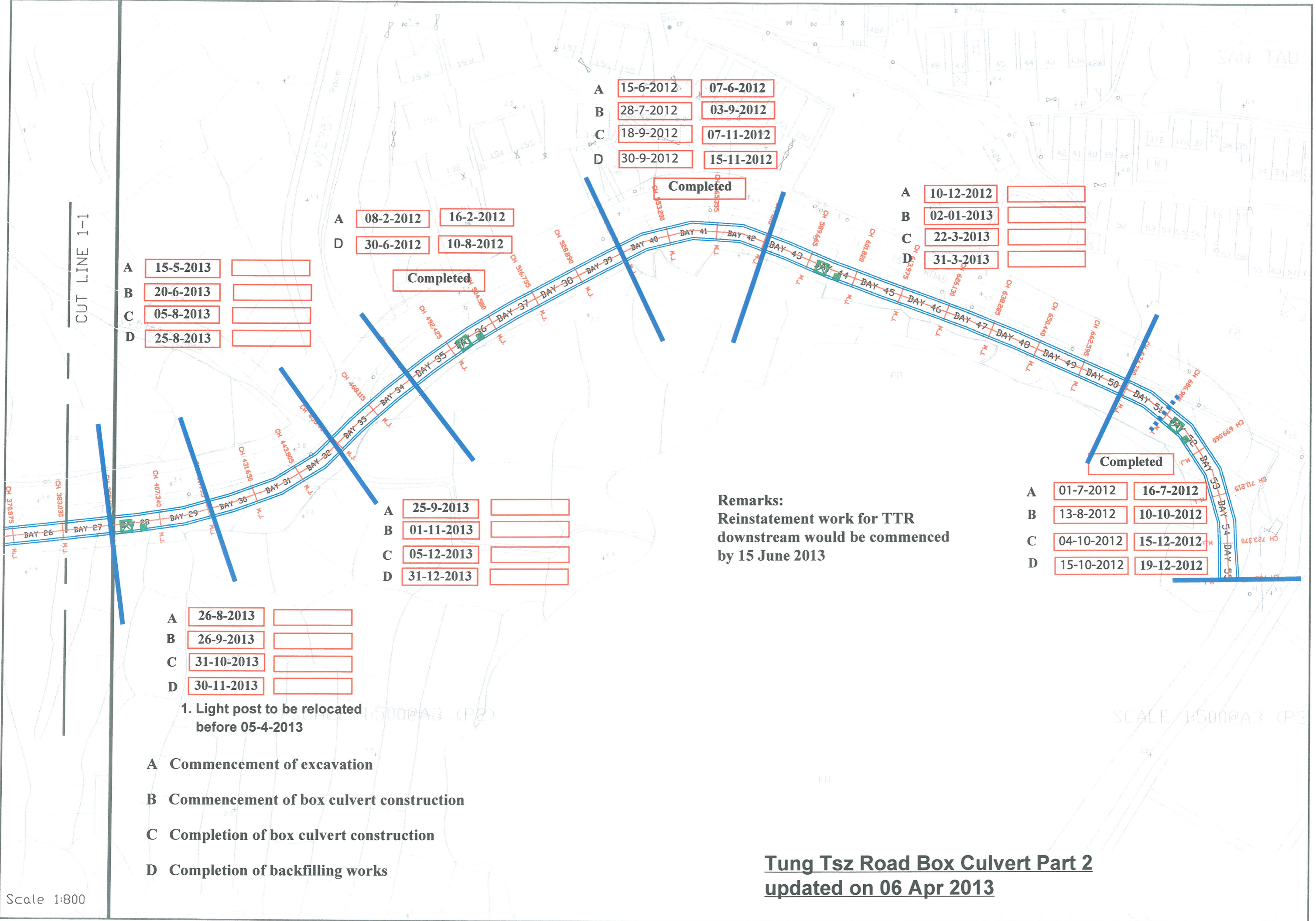
- A Commencement of excavation
- B Commencement of box culvert construction
- C Completion of box culvert construction
- D Completion of backfilling works

Completed

Completed

CUT LINE 1-1

**Tung Tsz Road Box Culvert Part 1
 (updated on 06 Apr 2013)**



A	15-6-2012	07-6-2012
B	28-7-2012	03-9-2012
C	18-9-2012	07-11-2012
D	30-9-2012	15-11-2012

A	08-2-2012	16-2-2012
D	30-6-2012	10-8-2012

A	10-12-2012	
B	02-01-2013	
C	22-3-2013	
D	31-3-2013	

A	15-5-2013	
B	20-6-2013	
C	05-8-2013	
D	25-8-2013	

A	25-9-2013	
B	01-11-2013	
C	05-12-2013	
D	31-12-2013	

A	01-7-2012	16-7-2012
B	13-8-2012	10-10-2012
C	04-10-2012	15-12-2012
D	15-10-2012	19-12-2012

A	26-8-2013	
B	26-9-2013	
C	31-10-2013	
D	30-11-2013	

1. Light post to be relocated before 05-4-2013

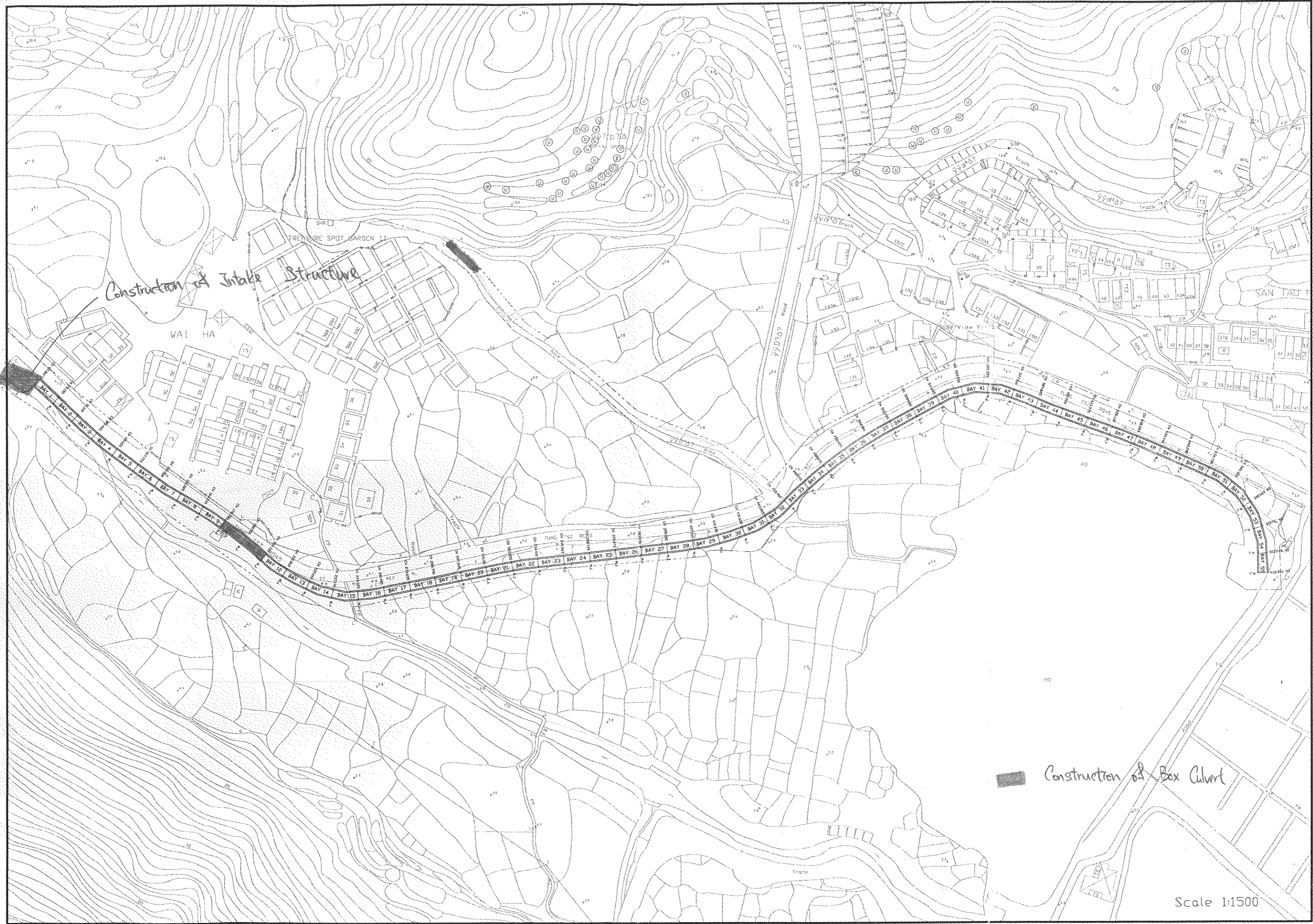
- A Commencement of excavation
- B Commencement of box culvert construction
- C Completion of box culvert construction
- D Completion of backfilling works

Remarks:
Reinstatement work for TTR downstream would be commenced by 15 June 2013

Tung Tsz Road Box Culvert Part 2
updated on 06 Apr 2013

Scale 1:800

SCALE 1:500@A3 (P2)



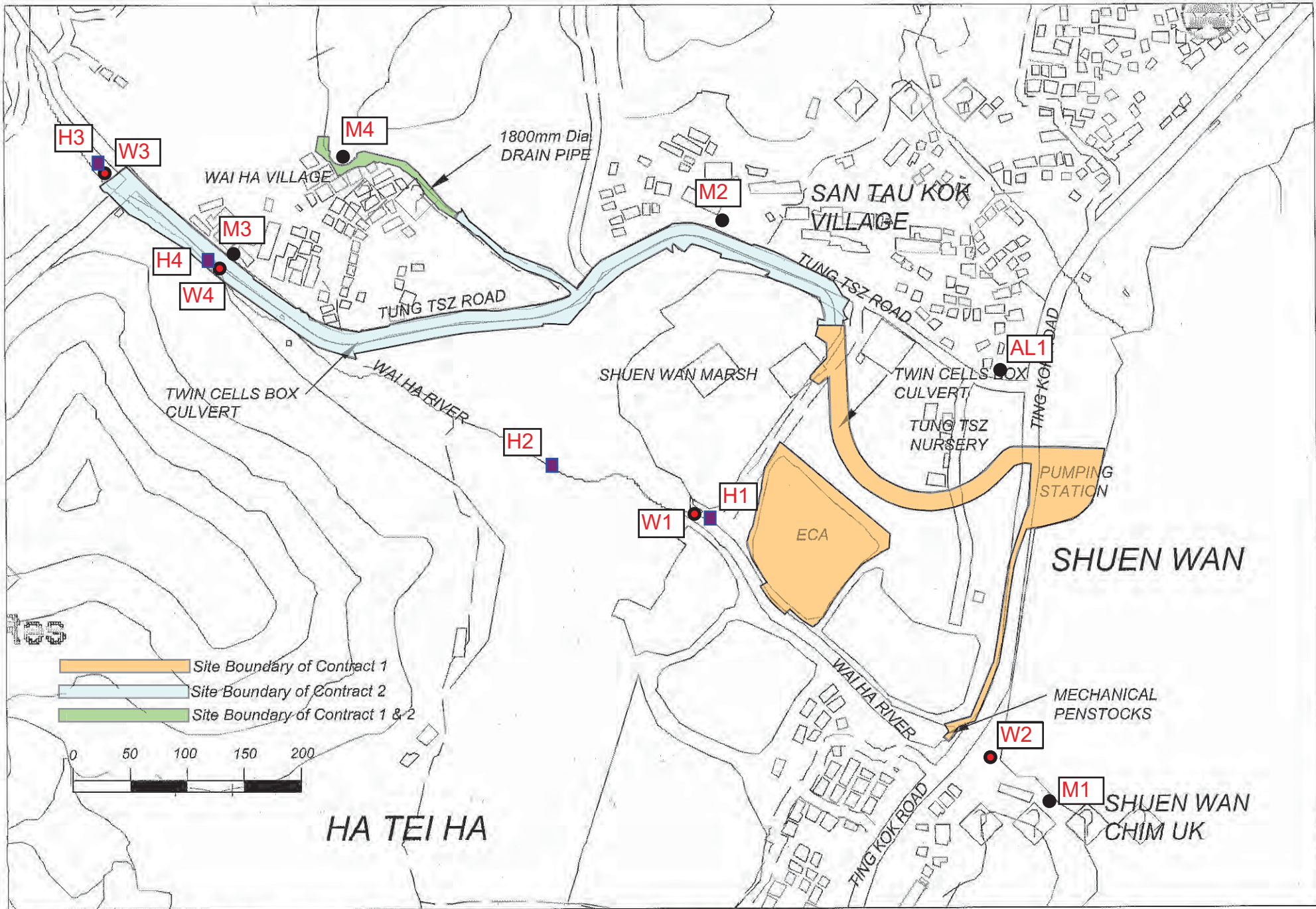
Construction of Intake Structure

Construction of Box Culvert

Scale 1:1500

Appendix D

Environmental Monitoring Locations



All Environmental Monitoring Locations

Appendix E

Calibration certificates of the monitoring equipment and Certificate of ALS Technichem (HK) Pty Ltd

Equipment Calibration List

Items	Aspect	Description of Equipment	Date of Calibration	Date of Next Calibration
1*	Noise	Bruel & Kjaer Integrating Sound Level Meter (Serial No. 2285762)	27 April 13	27 April 14
2*		Bruel & Kjaer Acoustical Calibrator (Serial No. 2326408)	15 April 13	15 April 14
3	Water	SONDA YSI 6820 (Serial No. 02J0912)	16 Apr 13	16 Jul 13

Note: *Calibration certificates will only be provided when monitoring equipment is re-calibrated or new.

Certificate of Calibration

校正證書

Certificate No. : C132228

證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC13-0878)

Description / 儀器名稱 : Acoustical Calibrator (EQ081)
Manufacturer / 製造商 : Brüel & Kjær
Model No. / 型號 : 4231
Serial No. / 編號 : 2326408
Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

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

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

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 15 April 2013

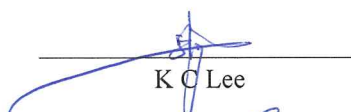
TEST RESULTS / 測試結果

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

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

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

Tested By
測試

: 
K C Lee

Certified By
核證

: 
K M Wu

Date of Issue
簽發日期

: 16 April 2013

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

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

Certificate of Calibration

校正證書

Certificate No. : C132228

證書編號

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

<u>Equipment ID</u>	<u>Description</u>	<u>Certificate No.</u>
CL130	Universal Counter	C123541
CL281	Multifunction Acoustic Calibrator	DC110233
TST150A	Measuring Amplifier	C120886

- Test procedure : MA100N.

- Results :

5.1 Sound Level Accuracy

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

5.2 Frequency Accuracy

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

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

Note :

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



Certificate of Calibration 校正證書

Certificate No. : C132568
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC13-0878)

Description / 儀器名稱 : Integrating Sound Level Meter (EQ006)
Manufacturer / 製造商 : Brüel & Kjær
Model No. / 型號 : 2238
Serial No. / 編號 : 2285762
Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

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

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 27 April 2013

TEST RESULTS / 測試結果

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

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

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

Tested By : 
測試 : H C Chan

Certified By : 
核證 : K C Lee

Date of Issue : 30 April 2013
簽發日期

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

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

Certificate of Calibration

校正證書

Certificate No. : C132568
證書編號

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

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C130019
CL281	Multifunction Acoustic Calibrator	DC110233

- Test procedure : MA101N.

- Results :

6.1 Sound Pressure Level

6.1.1 Reference Sound Pressure Level

6.1.1.1 Before Self-calibration

UUT Setting				Applied Value		UUT Reading (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
50 - 130	L _{AFP}	A	F	94.00	1	93.6

6.1.1.2 After Self-calibration

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

6.1.2 Linearity

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

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

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

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

Certificate of Calibration

校正證書

Certificate No. : C132568
證書編號

6.2 Time Weighting

6.2.1 Continuous Signal

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

6.2.2 Tone Burst Signal (2 kHz)

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Burst Duration		
30 - 110	L _{AFP}	A	F	106.0	Continuous	106.0	Ref.
	L _{AFMax}				200 ms	104.9	-1.0 ± 1.0
	L _{ASP}	S	Continuous		106.0	Ref.	
	L _{ASMax}		500 ms		101.9	-4.1 ± 1.0	

6.3 Frequency Weighting

6.3.1 A-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
50 - 130	L _{AFP}	A	F	94.00	31.5 Hz	55.1	-39.4 ± 1.5
					63 Hz	67.9	-26.2 ± 1.5
					125 Hz	77.8	-16.1 ± 1.0
					250 Hz	85.3	-8.6 ± 1.0
					500 Hz	90.7	-3.2 ± 1.0
					1 kHz	94.0	Ref.
					2 kHz	95.2	+1.2 ± 1.0
					4 kHz	95.0	+1.0 ± 1.0
					8 kHz	92.9	-1.1 (+1.5 ; -3.0)
					12.5 kHz	89.8	-4.3 (+3.0 ; -6.0)

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

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

Certificate of Calibration

校正證書

Certificate No. : C132568
證書編號

6.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
50 - 130	L _{CFP}	C	F	94.00	31.5 Hz	91.4	-3.0 ± 1.5
					63 Hz	93.3	-0.8 ± 1.5
					125 Hz	93.8	-0.2 ± 1.0
					250 Hz	94.0	0.0 ± 1.0
					500 Hz	94.0	0.0 ± 1.0
					1 kHz	94.0	Ref.
					2 kHz	93.8	-0.2 ± 1.0
					4 kHz	93.2	-0.8 ± 1.0
					8 kHz	90.9	-3.0 (+1.5 ; -3.0)
					12.5 kHz	87.8	-6.2 (+3.0 ; -6.0)

6.4 Time Averaging

UUT Setting				Applied Value					UUT Reading (dB)	IEC 60804 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Integrating Time	Frequency (kHz)	Burst Duration (ms)	Burst Duty Factor	Burst Level (dB)	Equivalent Level (dB)		
30 - 110	L _{Aeq}	A	10 sec.	4	1	1/10	110.0	100	100.0	± 0.5
								90	89.8	± 0.5
			60 sec.					80	79.4	± 1.0
								70	69.2	± 1.0

Remarks : - Mfr's Spec. : IEC 60651 Type 1 & IEC 60804 Type 1

- Uncertainties of Applied Value :

94 dB : 31.5 Hz - 125 Hz	: ± 0.35 dB
250 Hz - 500 Hz	: ± 0.30 dB
1 kHz	: ± 0.20 dB
2 kHz - 4 kHz	: ± 0.35 dB
8 kHz	: ± 0.45 dB
12.5 kHz	: ± 0.70 dB
104 dB : 1 kHz	: ± 0.10 dB (Ref. 94 dB)
114 dB : 1 kHz	: ± 0.10 dB (Ref. 94 dB)
Burst equivalent level	: ± 0.2 dB (Ref. 110 dB continuous sound level)

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

Note :

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

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

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

Appendix F

Event and Action Plan

Event Action Plan for Construction Noise

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

Event and action Plan for Water Quality

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

Event and action Plan for Hydrological Characteristics

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

Appendix G

Monitoring Schedule in Reporting Period and the Coming Month

Monitoring Schedule in this Reporting Period – May 2013

Date		Stream Monitoring		Noise Monitoring
		Water Sampling	Flow Monitoring	
Wed	1-May-13			
Thu	2-May-13			
Fri	3-May-13	W1, W2, W3, W4	H1, H2, H3, H4	
Sat	4-May-13			
Sun	5-May-13			
Mon	6-May-13	W1, W2, W3, W4		M2, M3, M4
Tue	7-May-13			
Wed	8-May-13	W1, W2, W3, W4		M1, AL1
Thu	9-May-13			
Fri	10-May-13	W1, W2, W3, W4	H1, H2, H3, H4	
Sat	11-May-13			
Sun	12-May-13			
Mon	13-May-13	W1, W2, W3, W4	H1, H2, H3, H4	M2, M3, M4
Tue	14-May-13			
Wed	15-May-13	W1, W2, W3, W4		M1, AL1
Thu	16-May-13			
Fri	17-May-13			
Sat	18-May-13	W1, W2, W3, W4	H1, H2, H3, H4	
Sun	19-May-13			
Mon	20-May-13	W1, W2, W3, W4		M2, M3, M4
Tue	21-May-13			
Wed	22-May-13	W1, W2, W3, W4		M1, AL1
Thu	23-May-13			
Fri	24-May-13	W1, W2, W3, W4	H1, H2, H3, H4	
Sat	25-May-13			
Sun	26-May-13			
Mon	27-May-13	W1, W2, W3, W4		M2, M3, M4
Tue	28-May-13			
Wed	29-May-13	W1, W2, W3, W4		M1, AL1
Thu	30-May-13			
Fri	31-May-13	W1, W2, W3, W4	H1, H2, H3, H4	

	Monitoring Day
	Sunday or Public Holiday

Monitoring Schedule for next Reporting Period – June 2013

Date		Stream Monitoring		Noise Monitoring
		Water Sampling	Flow Monitoring	
Sat	1-Jun-13			
Sun	2-Jun-13			
Mon	3-Jun-13	W1, W2, W3, W4		M1, AL1,M2, M3, M4
Tue	4-Jun-13			
Wed	5-Jun-13	W1, W2, W3, W4		
Thu	6-Jun-13			
Fri	7-Jun-13	W1, W2, W3, W4	H1, H2, H3, H4	
Sat	8-Jun-13			
Sun	9-Jun-13			
Mon	10-Jun-13	W1, W2, W3, W4		M1, AL1,M2, M3, M4
Tue	11-Jun-13			
Wed	12-Jun-13			
Thu	13-Jun-13	W1, W2, W3, W4	H1, H2, H3, H4	
Fri	14-Jun-13			
Sat	15-Jun-13	W1, W2, W3, W4		
Sun	16-Jun-13			
Mon	17-Jun-13	W1, W2, W3, W4		M1, AL1,M2, M3, M4
Tue	18-Jun-13			
Wed	19-Jun-13	W1, W2, W3, W4		
Thu	20-Jun-13			
Fri	21-Jun-13	W1, W2, W3, W4	H1, H2, H3, H4	
Sat	22-Jun-13			
Sun	23-Jun-13			
Mon	24-Jun-13	W1, W2, W3, W4		M1, AL1,M2, M3, M4
Tue	25-Jun-13			
Wed	26-Jun-13	W1, W2, W3, W4		
Thu	27-Jun-13			
Fri	28-Jun-13	W1, W2, W3, W4	H1, H2, H3, H4	
Sat	29-Jun-13			
Sun	30-Jun-13			

	Monitoring Day
	Sunday or Public Holiday

Appendix H

Meteorological Data of Reporting Period

Meteorological Data in Reporting Period

Date		Weather	Total Rainfall (mm)	Tai Po Station		Shatin Station	
				Mean Air Temp. (°C)	Mean Relative Humidity (%)	Wind Speed (km/h)	Wind Direction
1-May-13	Wed	Cloudy, rain, fresh easterly winds, strong offshore.	1.2	22.2	76.5	13.6	E
2-May-13	Thu	Cloudy, rain, fresh easterly winds, strong offshore.	0.9	18.3	67.2	10.8	N/NE
3-May-13	Fri	Cloudy, rain, Moderate to fresh east to northeasterly winds.	33.8	19.6	84.5	9.2	N
4-May-13	Sat	Cloudy, rain, Moderate to fresh east to northeasterly winds.	Trace	20.1	83	6.6	N/NE
5-May-13	Sun	Cloudy, mist, sunny intervals, moderate easterly winds.	Trace	21.7	86.7	5.5	N/NE
6-May-13	Mon	Cloudy, mist, sunny intervals, moderate easterly winds.	Trace	22.4	91.5	7	E/SE
7-May-13	Tue	Cloudy, mist, sunny intervals, moderate easterly winds.	Trace	23.8	86.5	8.5	E/SE
8-May-13	Wed	Cloudy, rain, fog, moderate to fresh easterly winds.	29.7	22.9	88.5	8.8	E/SE
9-May-13	Thu	Cloudy, a few showers, mist, showers, moderate southerly winds.	31.3	26.8	80.2	9.5	S/SW
10-May-13	Fri	Cloudy, rain, fog, moderate to fresh easterly winds.	23.4	25.4	89.5	8.6	NE
11-May-13	Sat	Cloudy, a few showers, mist, showers, moderate southerly winds.	0.1	25.7	84	7.5	W/SW
12-May-13	Sun	Cloudy, sunny intervals, moderate east to southeasterly winds.	1.4	24.4	91.5	8	E
13-May-13	Mon	Cloudy, sunny intervals, isolated showers, mist, moderate east to southeasterly winds.	0.2	25.9	86.5	6.5	N/NE
14-May-13	Tue	Cloudy, rain, squally thunderstorms, moderate south to southwesterly winds, fresh offshore.	Trace	25.5	91	8.9	E
15-May-13	Wed	Cloudy, sunny intervals, isolated showers, mist, moderate east to southeasterly winds.	Trace	28.3	81	13.6	S/SW
16-May-13	Thu	Cloudy, rain, squally thunderstorms, moderate south to southwesterly winds, fresh offshore.	5.4	26.8	86.7	13.3	S/SW
17-May-13	Fri	Cloudy, rain, fog, moderate to fresh easterly winds.	13.9	25.2	94	8.2	S/SW
18-May-13	Sat	Cloudy, rain, squally thunderstorms, moderate south to southwesterly winds, fresh offshore.	21	28	88	16.1	S/SW
19-May-13	Sun	Cloudy, rain, fog, moderate to fresh easterly winds.	0.1	29	82.5	15	S/SW
20-May-13	Mon	Cloudy, rain, fog, moderate to fresh easterly winds.	26	28.2	82.5	16.5	S/SW
21-May-13	Tue	Cloudy, rain, squally thunderstorms, moderate south to southwesterly winds, fresh offshore.	26.3	25	93.2	7.5	N/NE
22-May-13	Wed	Cloudy, rain, squally thunderstorms, moderate south to southwesterly winds, fresh offshore.	230.8	24.5	96	8.2	S/SW
23-May-13	Thu	Cloudy, rain, squally thunderstorms, moderate south to southwesterly winds, fresh offshore.	Trace	26.2	89	7.5	N/NE
24-May-13	Fri	Cloudy, rain, squally thunderstorms, moderate south to southwesterly winds, fresh offshore.	Trace	27.8	84.7	9.7	S/SW
25-May-13	Sat	Fine, very hot, light to moderate southerly winds.	52	25.6	96	4.7	E/SE
26-May-13	Sun	Hot, sunny intervals, moderate south to southeasterly winds.	11.3	27.4	86.7	13.1	S/SW
27-May-13	Mon	Fine, very hot, light to moderate southerly winds.	0.1	28.9	85	19.7	SE
28-May-13	Tue	Fine, very hot, light to moderate southerly winds.	Trace	29.4	79.7	16.5	SE
29-May-13	Wed	Fine, very hot, light to moderate southerly winds.	0.4	29.4	80	8.5	S/SE
30-May-13	Thu	Fine, very hot, light to moderate southerly winds.	0	29.4	75.5	9.7	SW
31-May-13	Fri	Fine, very hot, light to moderate southerly winds.	0	29.3	75	9.7	N/NE

* The record was downloaded from The Hong Kong Observatory Weather Stations

Appendix I

Data Base of Monitoring Results

Construction Noise Measurement Data

Designated Monitoring Station – M1 (14, Shuen Wan Chim Uk)

Date	Start Time	1 st Leq _{5min}	2 nd Leq _{5min}	3 rd Leq _{5min}	4 th Leq _{5min}	5 th Leq _{5min}	6 th Leq _{5min}	Leq _{30min} *
8-May-13	12:55	-	-	-	-	-	-	63.3
15-May-13	15:30	-	-	-	-	-	-	64.6
22-May-13	11:25	-	-	-	-	-	-	70.4
29-May-13	10:20	-	-	-	-	-	-	63.8
Limit Level								> 75 dB(A)

(*)The monitoring is undertaken under façade situation. No façade correction is added according to acoustical principles and EPD guidelines.

Designated Monitoring Station – AL1 (Joint Village Office for Villages in Shuen Wan, Tai Po)

Date	Start Time	1st Leq _{5m} in	2nd Leq _{5m} in	3rd Leq _{5m} in	4th Leq _{5m} in	5th Leq _{5m} in	6th Leq _{5m} in	Leq _{30min} *
8-May-13	13:30	-	-	-	-	-	-	65.1
15-May-13	16:05	-	-	-	-	-	-	65.8
22-May-13	13:30	-	-	-	-	-	-	69.3
29-May-13	11:10	-	-	-	-	-	-	61.1
Limit Level								> 75 dB(A)

(*)The monitoring is undertaken under façade situation. No façade correction is added according to acoustical principles and EPD guidelines.

Designated Monitoring Station - M2 (150, San Tau Kok)

Date	Start Time	1 st Leq _{5min}	2 nd Leq _{5min}	3 rd Leq _{5min}	4 th Leq _{5min}	5 th Leq _{5min}	6 th Leq _{5min}	Leq _{30min}	Corrected* Leq _{30min}
3-May-13	9:30	61.9	63.3	56.3	62.2	57.9	61.8	61.2	64.2
6-May-13	9:30	66.7	65.2	63.9	68.9	61.2	64.8	65.7	68.7
13-May-13	10:25	55.8	72.9	62.7	66.3	62.0	58.8	66.7	69.7
24-May-13	10:25	66.9	60.8	64.6	61.4	61.4	61.3	63.4	66.4
29-May-13	10:45	61.1	61.1	59.4	60.7	60.4	62.0	60.9	63.9
Limit Level								> 75 dB(A)	

(*) A façade correction of +3 dB(A) has been added according to acoustical principles and EPD guidelines.

Designated Monitoring Station – M3 (31, Wai Ha)

Date	Start Time	1 st Leq _{5min}	2 nd Leq _{5min}	3 rd Leq _{5min}	4 th Leq _{5min}	5 th Leq _{5min}	6 th Leq _{5min}	Leq _{30min}	Corrected* Leq _{30min}
3-May-13	10:15	61.9	61.3	59.4	61.5	61.2	59.4	60.9	63.9
6-May-13	10:15	63.4	59.3	61.0	56.3	63.2	62.1	61.5	64.5
13-May-13	9:50	67.3	65.7	61.3	60.0	70.6	61.8	66.1	69.1
24-May-13	9:50	64.0	65.7	62.1	60.9	62.1	58.1	62.8	65.8
29-May-13	10:00	68.3	72.5	68.4	68.3	70.8	63.8	69.4	72.4
Limit Level								> 75 dB(A)	

(*) A façade correction of +3 dB(A) has been added according to acoustical principles and EPD guidelines.

Designated Monitoring Station – M4 (Block 15, Treasure Spot Garden)

Date	Start Time	1 st Leq _{5min}	2 nd Leq _{5min}	3 rd Leq _{5min}	4 th Leq _{5min}	5 th Leq _{5min}	6 th Leq _{5min}	Leq _{30min}	Corrected* Leq _{30min}
3-May-13	11:00	50.4	52.0	52.5	52.9	53.2	51.4	52.2	55.2
6-May-13	11:00	52.5	53.1	52.6	54.0	53.4	52.9	53.1	56.1
13-May-13	9:15	54.6	52.8	53.2	50.5	54.0	49.1	52.8	55.8
24-May-13	9:10	58.7	59.3	59.2	58.2	56.5	57.9	58.4	61.4
29-May-13	9:15	55.9	53.6	56.3	53.9	53.3	54.3	54.7	57.7
Limit Level								> 75 dB(A)	

(*) A façade correction of +3 dB(A) has been added according to acoustical principles and EPD guidelines.

Location	Action/ Limit Level				DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
					Action	Limit	Action	Limit	Action	Limit	Action	Limit	Action	Limit
W1 (impact)					7.27	4	n/a	n/a	4.77	5.26	n/a	n/a	9.73	10.77
					7.26	4	n/a	n/a	2.46	3.42	n/a	n/a	8.89	9.75
W2 (impact)					n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
W3 (control)					9.27	4	n/a	n/a	3.32	4.52	n/a	n/a	6.98	7.66
W4 (impact)					5.6	5.6	80.8	80.6	0.98	1.0	6.9	6.9	2	2.0
					5.55	5.1	80.4	75.5	1.04	3.2	6.9	6.8	2	4.0
W3 (control)	17:08	0.50	24.4	24.4	5.6	5.6	80.8	80.6	0.98	1.0	6.9	6.9	2	2.0
W4 (impact)	16:51	0.20	24.9	24.9	5.15	5.1	76	75.5	3.21	3.2	6.7	6.8	4	4.0
			24.9	24.9	5.14	5.1	74.9	75.5	3.12	3.2	6.8	6.8	4	4.0

Date	20-May-13													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
W1 - ebb (impact)	9:00	0.70	26.5	26.2	4.66	4.7	68.8	68.7	2.59	2.3	6.8	6.8	12	12.0
			25.8		4.64		68.5		1.95		6.7		12	
W1 - flood (impact)	14:00	0.80	24.8	25.1	4.82	4.8	70.7	70.4	2.14	1.7	6.6	6.6	14	14.0
			25.3		4.77		70		1.24		6.5		14	
W2 (Impact)	9:25	<1	23.3	23.3	7.86	7.9	90	90.0	4.9	4.9	8.16	8.2	5.6	5.6
			23.3		7.86		90		4.9		8.16		5.6	
W3 (control)	9:05	0.40	24.7	25.1	4.94	4.9	72.7	72.5	2.07	2.1	6.5	6.5	6	6.0
			25.5		4.91		72.2		2.05		6.5		6	
W4 (impact)	9:15	0.15	24.6	24.8	5.35	5.3	79.5	79.4	15.8	15.6	6.6	6.6	10	10.0
			25		5.34		79.3		15.3		6.5		10	

Date	22-May-13													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
W1 - ebb (impact)	10:10	1.40	22.1	23.0	4.85	4.8	70.9	70.7	75	75.3	6.4	6.5	39	39.0
			23.8		4.83		70.5		75.5		6.5		39	
W1 - flood (impact)	16:00	1.50	23	23.5	5.54	5.5	79	78.9	74.3	73.7	6.4	6.4	39	39.0
			23.9		5.51		78.7		73.1		6.3		39	
W2 (Impact)	11:25	<1	22.9	22.9	8.89	8.9	105	105.0	134.7	134.7	7.35	7.4	59	59.0
			22.9		8.89		105		134.7		7.35		59	
W3 (control)	10:00	1.20	22.9	23.0	5.47	5.5	78	77.8	79.5	79.6	6.4	6.5	38	38.0
			23		5.44		77.5		79.7		6.6		38	
W4 (impact)	9:55	0.80	22.9	23.1	5.45	5.4	77.6	77.4	74.7	75.3	6.8	6.9	48	48.0
			23.3		5.42		77.1		75.8		7		48	

Date	24-May-13													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
W1 - ebb (impact)	11:30	0.70	24.1	24.3	6.31	6.3	91.4	91.7	18.8	18.6	6.4	6.5	23	23.0
			24.5		6.33		92		18.4		6.6		23	
W1 - flood (impact)	17:00	0.90	24.6	24.7	5.45	5.4	78.2	78.0	17.6	17.6	6.5	6.5	12	12.0
			24.8		5.33		77.7		17.5		6.4		12	
W2 (Impact)	13:00	<1	23.3	23.3	7.79	7.8	80	80.0	2.9	2.9	7.57	7.6	13	13.0
			23.3		7.79		80		2.9		7.57		13	
W3 (control)	11:45	0.20	24.5	24.7	5.78	5.8	84.7	84.4	7.5	7.5	6.8	6.9	11	11.0
			24.8		5.73		84.1		7.55		6.9		11	
W4 (impact)	12:00	0.30	25.2	25.1	5.38	5.4	79.5	79.3	11.6	11.6	6.6	6.7	42	42.0
			25		5.33		79.1		11.54		6.7		42	

Date	27-May-13													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
W1 - ebb (impact)	14:47	0.30	23.5	23.5	5.66	5.6	82.6	82.3	14.3	14.2	7.1	7.1	91	91.0
			23.5		5.62		82		14.1		7		91	
W1 - flood (impact)	8:50	0.35	23.8	23.8	5.73	5.7	82.2	81.9	16.3	16.2	7.3	7.3	24	24.0
			23.8		5.71		81.5		16		7.2		24	
W2 (Impact)	15:20	<1	24.1	24.1	7.56	7.6	85	85.0	2.8	2.8	7.88	7.9	11	11.0
			24.1		7.56		85		2.8		7.88		11	
W3 (control)	9:36	0.20	23.8	23.8	6	6.0	85.6	85.5	11.7	11.6	7	7.0	8	8.0
			23.8		5.94		85.4		11.4		7		8	
W4 (impact)	9:44	0.20	23.7	23.7	5.62	5.6	80.5	80.3	10.1	10.2	6.9	6.9	9	9.0
			23.7		5.57		80.1		10.3		6.9		9	

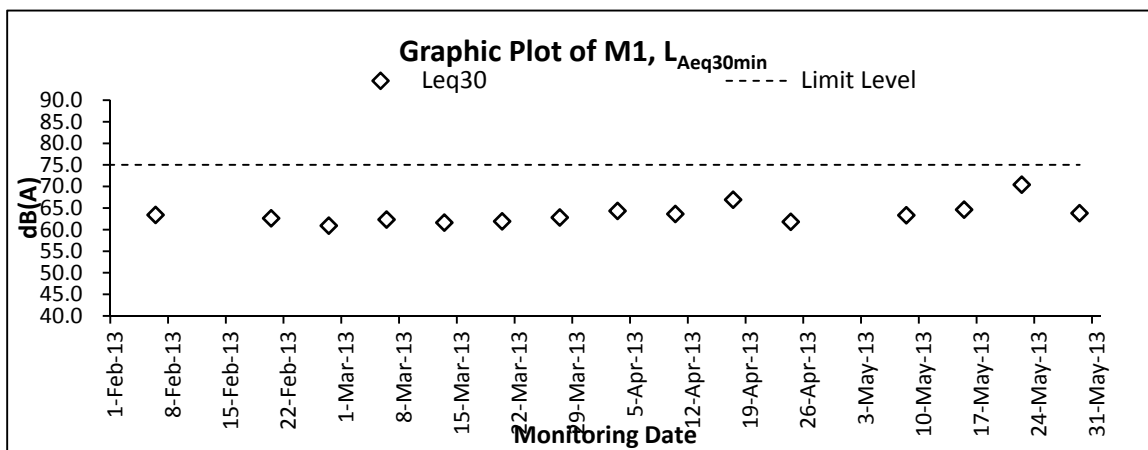
Date	29-May-13													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
W1 - ebb (impact)	15:30	0.80	25	25.3	6.25	6.2	91.7	91.5	43.2	42.1	7.8	7.8	60	60.0
			25.5		6.2		91.2		40.9		7.8		60	
W1 - flood (impact)	9:00	1.00	26.5	26.7	5.26	5.3	78	78.1	11.4	11.3	7.5	7.6	32	32.0
			26.8		5.28		78.2		11.2		7.6		32	
W2 (Impact)	16:05	<1	25.7	25.7	6.78	6.8	68	68.0	2.8	2.8	7.97	8.0	11	11.0
			25.7		6.78		68		2.8		7.97		11	
W3 (control)	9:10	0.40	24.8	25.0	5.98	5.9	85.8	85.5	23.3	23.3	7.8	7.8	44	44.0
			25.1		5.88		85.2		23.2		7.7		44	
W4 (impact)	9:05	0.20	24.5	24.6	5.82	5.8	85	84.5	47.5	45.7	7.9	8.0	154	154.0
			24.6		5.77		84		43.8		8		154	

Date	31-May-13													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
W1 - ebb (impact)	17:00	0.80	25	25.0	6.48	6.5	95.6	95.8	2.13	2.2	7.9	8.0	12	12.0
			24.9		6.49		95.9		2.33		8		12	
W1 - flood (impact)	10:30	1.00	24.7	24.8	6.26	6.2	91.7	91.2	2.56	2.6	7.9	7.9	7	7.0
			24.8		6.2		90.6		2.55		7.8		7	
W2 (Impact)	16:30	<1	24.8	24.8	6.87	6.9	76	76.0	3.6	3.6	7.68	7.7	1.8	1.8
			24.8		6.87		76		3.6		7.68		1.8	
W3 (control)	10:15	0.40	24.7	24.8	6.3	6.3	92.2	92.0	3.31	3.3	8	8.1	32	32.0
			24.9		6.24		91.8		3.25		8.1		32	
W4 (impact)	10:00	0.20	25.1	25.2	5.9	5.9	86.3	86.2	0.12	0.1	7.8	7.7	6	6.0
			25.3		5.88		86.1		0.15		7.6		6	

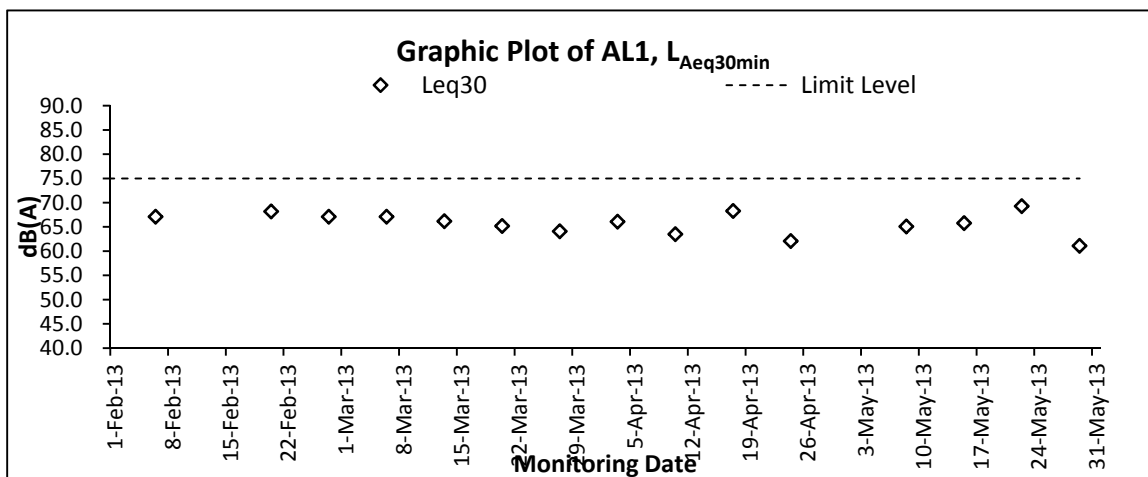
Appendix J

Graphical Plots of Impact Monitoring – Noise, Water Quality and Hydrological Characteristics

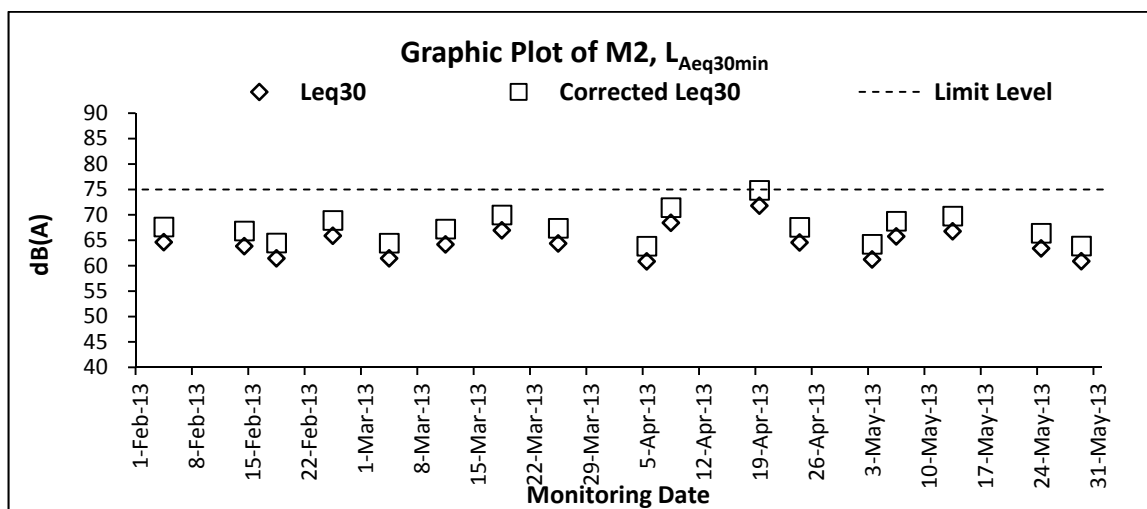
Graphic Plot – Construction Noise



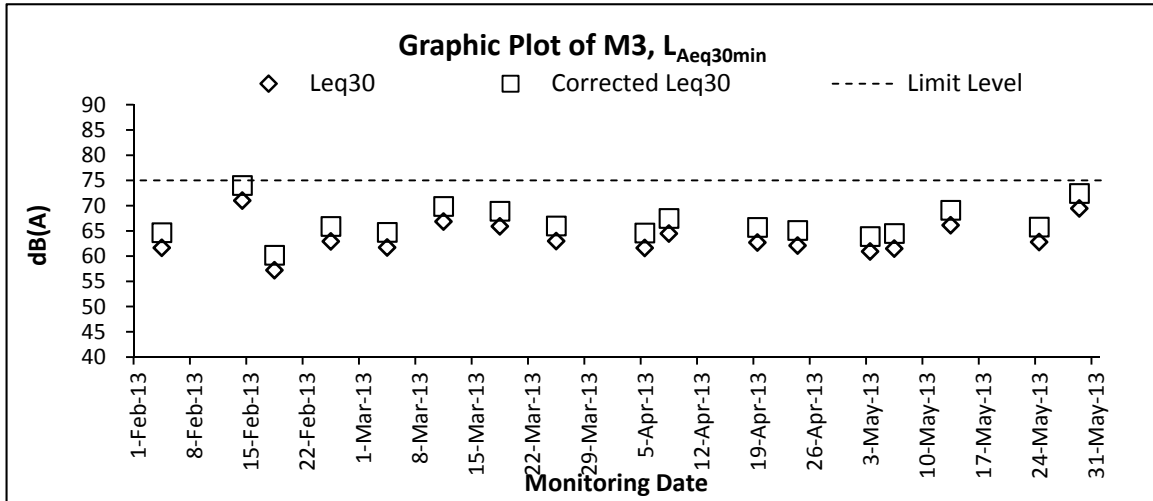
Remark: The monitoring is undertaken under façade situation. No façade correction is added according to acoustical principles and EPD guidelines.



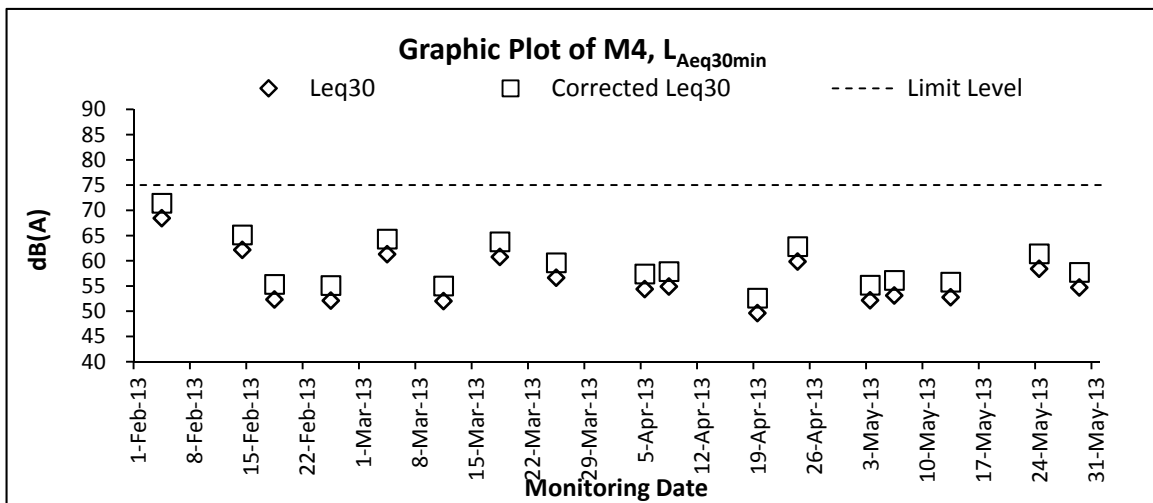
Remark: The monitoring is undertaken under façade situation. No façade correction is added according to acoustical principles and EPD guidelines.



Remark: The monitoring is undertaken under free field situation. A façade correction of +3 dB(A) has been added according to acoustical principles and EPD guidelines.

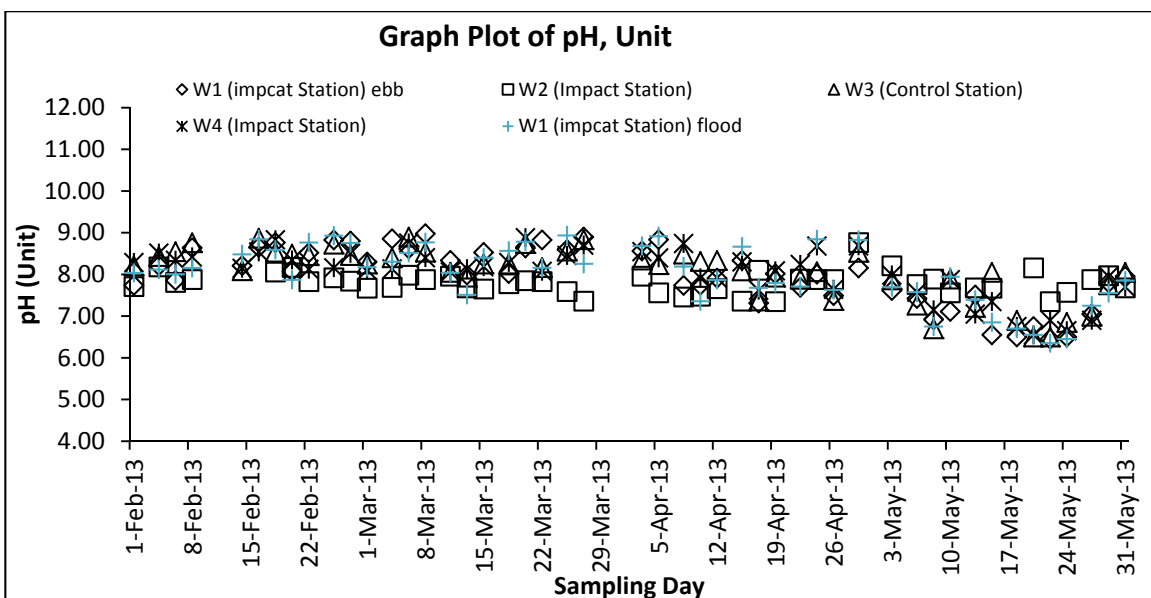
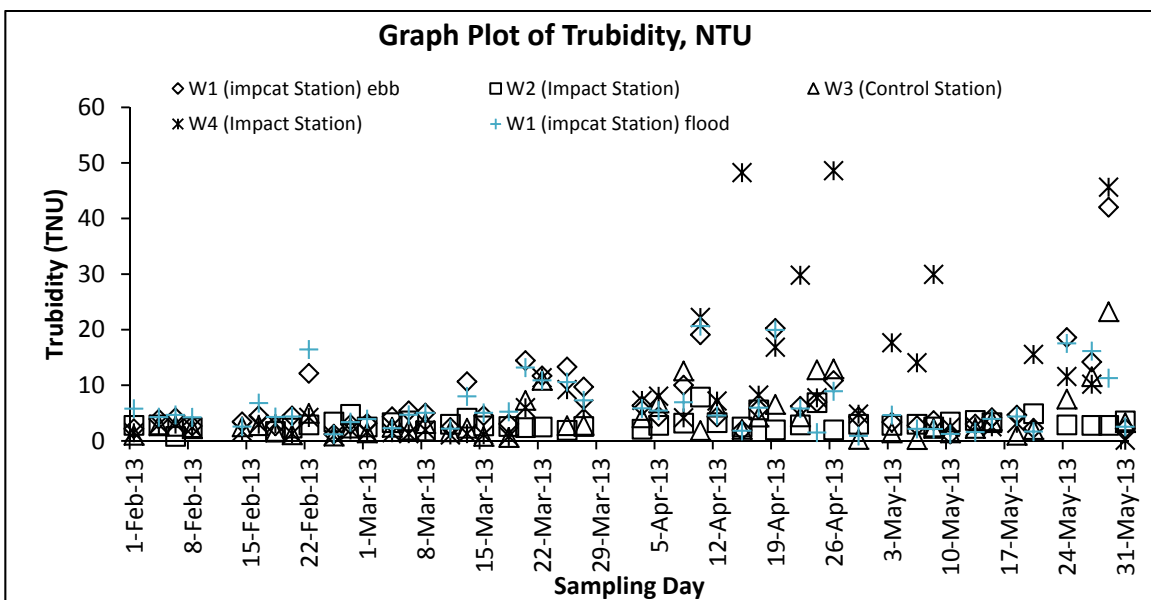
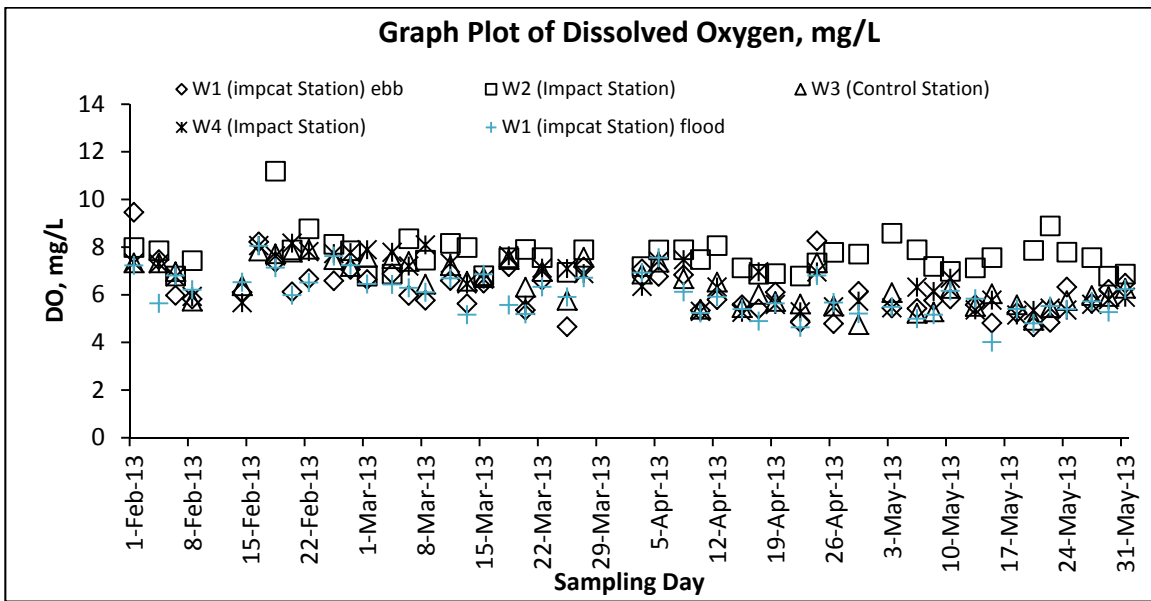


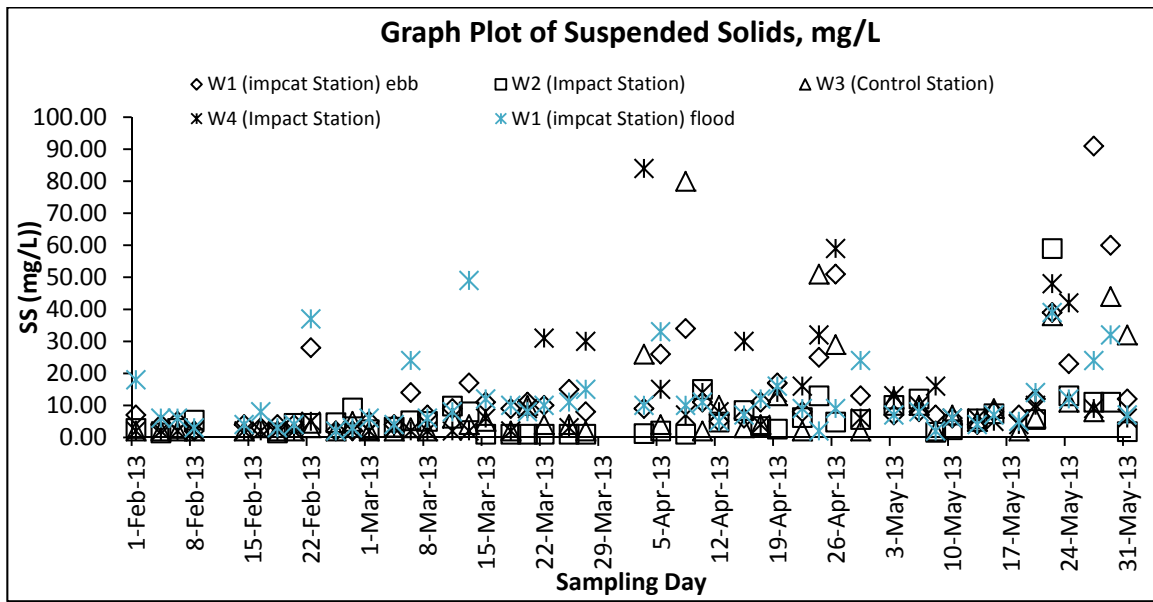
Remark: The monitoring is undertaken under free field situation. A façade correction of +3 dB(A) has been added according to acoustical principles and EPD guidelines



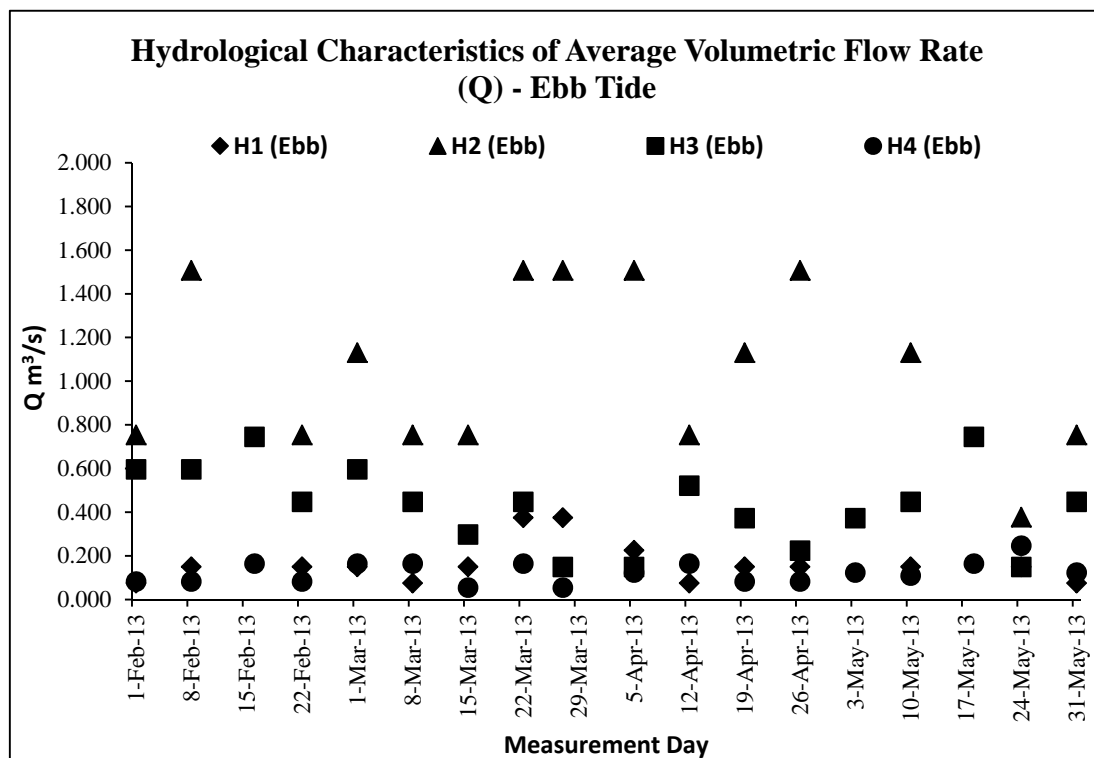
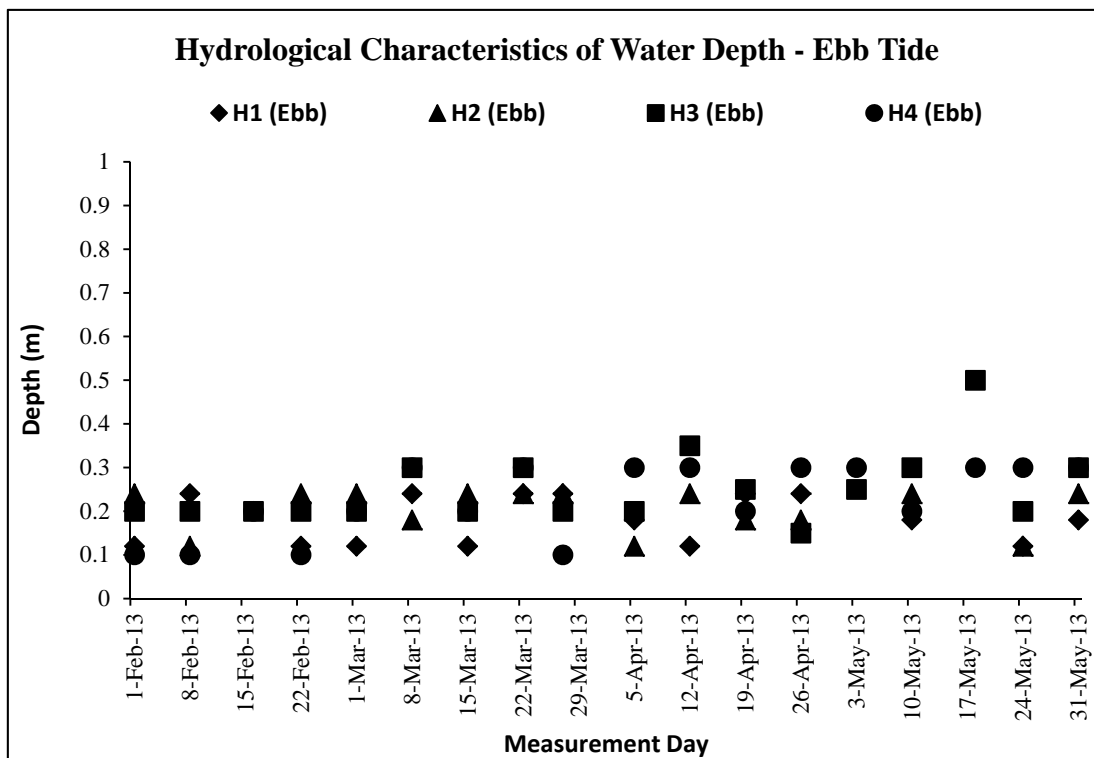
Remark: The monitoring is undertaken under free field situation. A façade correction of +3 dB(A) has been added according to acoustical principles and EPD guidelines

Graphic Plot – Water Quality

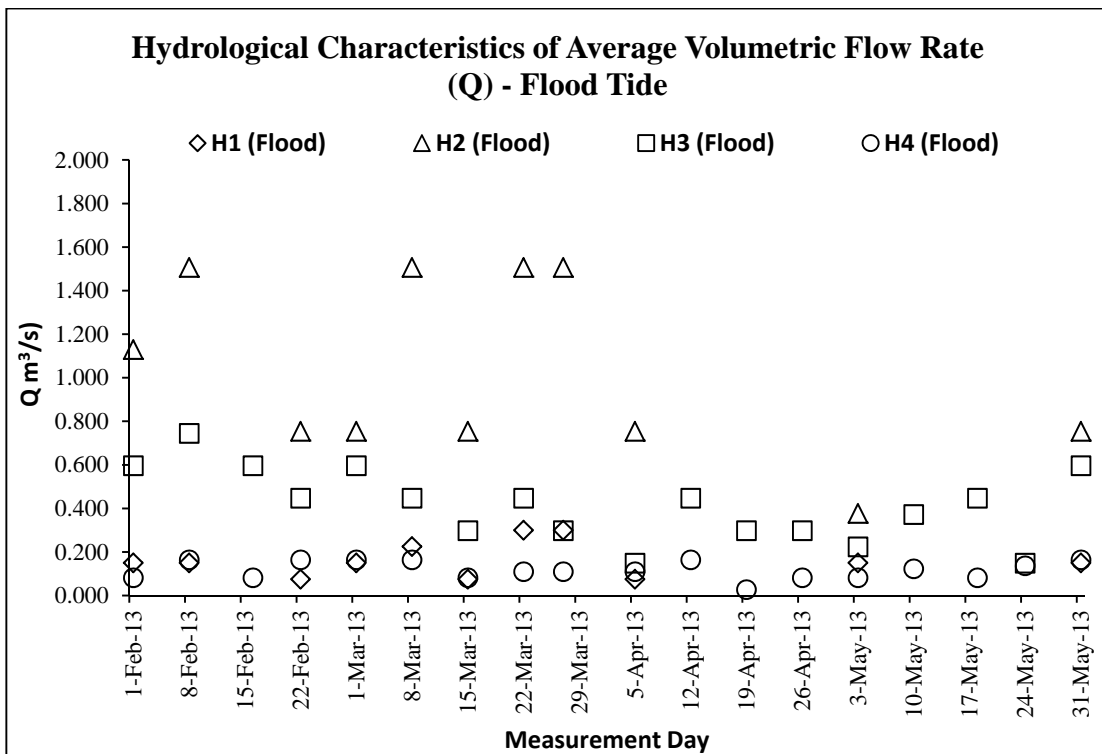
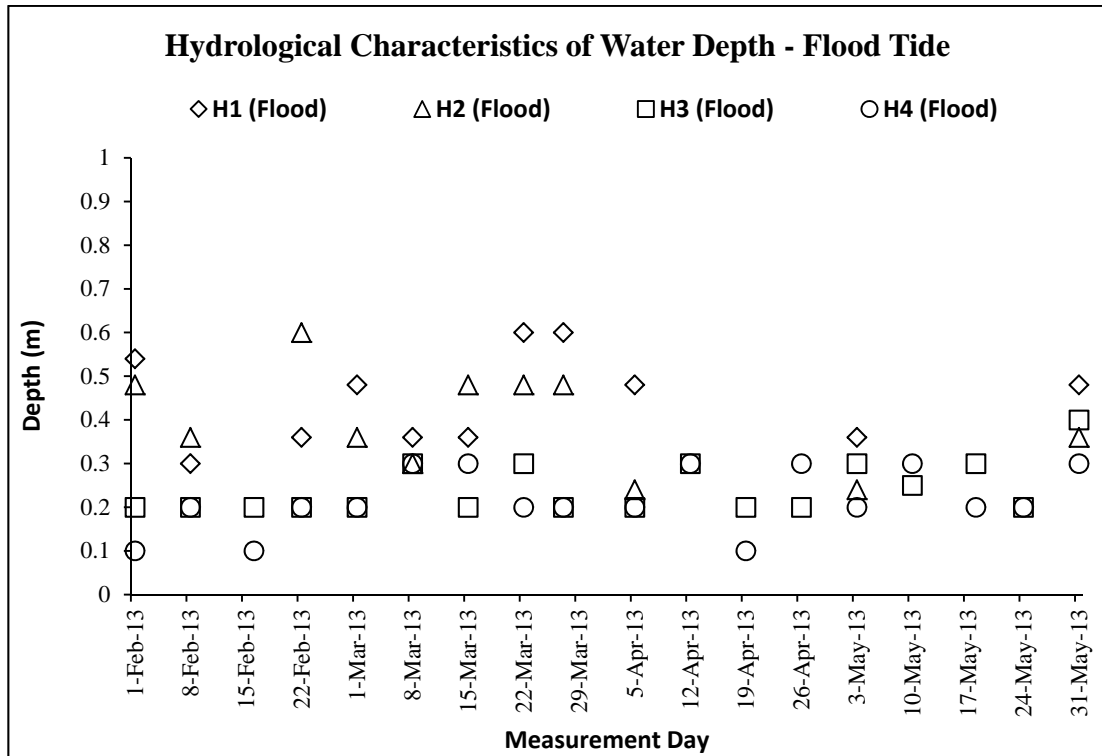




Graphic Plot – Hydrological Characteristics (Water Depth)



Graphic Plot – Hydrological Characteristics (Water Flow Rate)



Appendix K

Monthly Summary Waste Flow Table

Forecast of Total Quantities of C&D Materials to be Generated from the Contract*										
Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastics (see Note 3)	Chemical Waste	Others, e.g. general refuse
(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000 kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m ³)
23	1	10	0	10	2	5	2	1	1	3

Notes:

- (1) The performance targets are given in ETWB Technical Circular PS Clause 6(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 from packaging material
- (4) The Contractor shall also submit the latest forecast of the total amount of C&D materials expected to be generated from the Works, together with a breakdown of the nature where the total amount of C&D materials expected to be generated from the Works is equal to or exceeding 50,000 m³. (ETWB Technical Circular PS Clause 5(4)(b) refers).
 [Delete Note (4) and the table above on the forecast, where inapplicable].

Summary Table for Work Processes or Activities Requiring Timber for Temporary Works

Contract No. : DC/2010/02

Contract Title : Drainage Improvement Works in Shuen Wan and Shek Wu Wai

Item No.	Description of Works Process or Activity [see note (a) below]	Justifications for Using Timber in Temporary Construction Works	Est. Quantities of Timber Used (m3)	Actual Quantities used (m3)	Remarks
1.	Formwork for concreting	Easy handle by manpower	2.71	2.7	
2.					
3.					
4.					
5.					
6.					
7.					
8.					
Total Estimated Quantity of Timber Used			2.71		

Notes:

- a. The Contractor shall list out all the work items requiring timber for use in temporary construction works. Several minor work items may be grouped into one for ease of updating.
 - b. The summary table shall be submitted to the *Architect/Engineer's Representative monthly together with the Waste Flow Table for review and monitoring in accordance with the ETWB Technical Circular 19/2005 PS sub-clause 5(5) in Appendix C.
-

Appendix L

Monthly Landscape & Visual Inspection Report

Contract No. DC/2010/02
Drainage Improvement Works in Shuen Wan and Shek Wu Wai
Bi-weekly Landscape & Visual Monitoring

EM&A (Landscape & Visual) Report (May 2013)
(Issue 1)


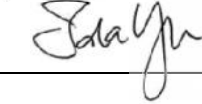
Job Ref.: 09/317/161D KLKJV-SW
Date: June 2013

Contract No. DC/2010/02
Drainage Improvement Works in Shuen Wan and
Shek Wu Wai
Bi-weekly Landscape & Visual Monitoring

EM&A (Landscape & Visual) Report (May 2013)

(Issue 1)

June 2013

	Name	Signature
Prepared by:	Sean FONG	
Reviewed by:	Ida YU	
Date:	6th June 2013	

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1	INTRODUCTION	1
2	SCOPE OF MONITORING	1
3	LANDSCAPE & VISUAL MONITORING RESULTS	2
4	AUDIT SCHEDULE.....	7

LIST OF APPENDICES

Appendix A – Photographs

1 INTRODUCTION

- 1.1.1 The Landscape and Visual Monitoring of the Project is conducted to fulfill Clauses 5.2 and 5.4 of EP-303/2008 and the monitoring requirements in accordance with Section 7 of the approved updated EM&A Manual (approved by EPD on 31st May 2012) of the Project. A Baseline Review on updating the landscape and visual condition, and the mitigation measures of the Project (including Contracts 1 and 2 of the Project) was undertaken before the commencement of the Project. The review findings were updated in the Baseline Environmental Monitoring Report submitted to the EPD on 14th February 2011.
- 1.1.2 This monthly monitoring report will detail the scope of landscape and visual monitoring work, monitoring findings and observations, and any recommendation and advice on proper implementation of the landscape mitigation measures in the works areas under Contract 2 of the Project.

2 SCOPE OF MONITORING

2.1 Monitoring objectives

- 2.1.1 Landscape and Visual Monitoring of the Project should be conducted on a bi-weekly basis for checking the design, implementation and maintenance of the landscape and visual mitigation measures throughout the construction phase and in a quarterly basis during operational phase of the Project. Observations of any potential conflicts between the proposed mitigation measures and the project works carried out by the Contractors should be recorded. Recommendation and advice on proper implementation of the landscape mitigation measures should be provided to the Contractor for minimizing any potential impacts on the landscape and visual elements.

2.2 Monitoring during Construction Phase

- 2.2.1 The following landscape and visual mitigation measures should be implemented during the construction phase of the project to minimize the potential impacts:
- *Visual Screen* – Use of hoardings as visual screens for the construction in the works areas;
 - *Contaminant/ Sediment Control* – Use of temporary barriers, covers and drainage provision around the construction works as contaminant/ sediment control to prevent the contaminants and sediments from entering the sensitive water-based habitats;
 - *Pollution Control* – Implementation of pollution control measures to minimize any adverse environmental impacts to the surrounding habitats;
 - *Liaison with Nursery* (Not relevant to Contract 2 of the Project) – Liaison with the nursery operator as necessary to minimize any adverse impact to the daily operation and plant holding capacity of the nursery;
 - Existing Trees within Works Area – Maintenance and protection of the existing trees, especially their crowns, trunks and roots, within work sites; and
 - Construction Light – Provision of construction light should be controlled at night to avoid excessive glare to the surrounding villages and to Plover Cove.

2.3 Monitoring during Operational Phase

2.3.1 The following landscape and visual mitigation measures should be implemented during the operational phase of the project to minimize the potential impacts:

- Viewing area formation by planting with shrubs, grasses and benches along the area;
- Architectural design of the pump house will help it fit into the existing suburban, natural to semi-natural surroundings (Not relevant to Contract 2 of the Project);
- Landscape design of pump house by providing sufficient planting around its boundary fence (Not relevant to Contract 2 of the Project);
- Enhancement planting along Tung Tsz Road with shrubs/ trees of suitable species to help protect the stream and marshes;
- Construction of box culvert should be with at least 1.0m soil depth for enhancement planting;
- Transplanting of existing affected trees to adjacent locations should be carried out;
- Preparation for transplanting is needed to allow sufficient time for root pruning and rootball preparation prior to transplanting; and
- Reinstatement of affected area should be carried out to check that the works areas are properly reinstated.

3 LANDSCAPE & VISUAL MONITORING RESULTS

3.1 Monitoring Date(s)

3.1.1 This monthly Landscape and Visual Monitoring (May 2013) was conducted to cover only areas of Contract 2 of the Project (i.e. the construction of a twin-cell box culvert close to Shuen Wan Conservation Area and Wai Ha River along Tung Tsz Road, and a drainage pipe near Wai Ha Village). The bi-weekly monitoring was conducted on 15th and 30th May 2013.

3.1.2 All photos stated in this section are recorded in **Appendix A**.

3.2 Visual Screen

3.2.1 No follow-up action by the Contractor is required as from the *Monthly EM&A Report for April 2013*.

Observation

3.2.2 Temporary hoardings, in the form of construction barriers, have been erected from west to east parts along Tung Tsz Road from the opposite side of Wai Ha to the opposite side of San Tau Kwok. The construction works along the access road from Tung Tsz Road towards Treasure Spot Garden II have been also demarcated with temporary construction barriers. Another section of temporary hoardings has been erected next to the path outside Treasure Spot Garden II. **Photos 1-4** show the views of the erected hoardings along the active works area under Contract 2.

3.2.3 Sheet piling was found in the construction site next to the public toilet on Tung Tsz Road on 15th May 2013 (**Photo 5**). The work was found to be finished on 30th May 2013 (**Photo 6**).

- 3.2.4 No hoardings have been erected along the rest of the proposed works area since neither construction works nor any associated preparation works have been commenced.
- 3.2.5 To the southeast of Jade View Villa and adjacent to the current active works area, a demarcated wetland rehabilitation area has been maintained by parties other than the Project Proponent, the Project's Contractor and Sub-contractors since January 2012. The wetland rehabilitation area has been surrounded by red strings since April 2012 (**Photo 7**). No vegetation clearance or any other works were observed within this wetland rehabilitation area. A rubbish bin was observed in the pond of the area during the monitoring on 30th May 2013 (**Photo 8**). Construction materials were still noted close to the wetland rehabilitation area as inspected in May 2013 (**Photo 9**).
- 3.2.6 Outside the established hoardings of the Project Area, temporary storage of construction materials was found next to the retained tree T179 as inspected on 15th May 2013 (**Photo 10**). The problem was then reported to the main contractor. The materials were still found and an additional abandoned filtration tank was found close to Wai Ha River behind the tree T179 on 30th May 2013 (**Photo 11**).
- 3.2.7 As reported in the previous *Monthly EM&A Reports*, dumping on the Taro field located along the path towards the Treasure Spot Garden was observed and a paved area created for parking next to the retained tree groups (T088 – T091) has been found since November 2012. However, no extension of the dumping area has been noted since April 2013.

Recommendations

- 3.2.8 No specific recommendation is required. However, with regard to the previous dumping incident by other parties on the Taro field near the Treasure Spot Garden, the Contractor is recommended to check the site condition regularly to avoid any extent of dumping or paving of area into the project boundary.
- 3.2.9 The Contractor should also make sure there are no piled rocks or construction materials influencing the existing trees within the Project area or the wetland rehabilitation area.

3.3 Contaminant/ Sediment Control

- 3.3.1 A series of sedimentation beds with gravels have been built along the boundary of the active works area to the south of Wai Ha and close to Tung Tsz Road in accordance with the recommendation stated in the *Monthly EM&A Report for April 2013*.

Observation

- 3.3.2 Provision of dust control measure (such as wheel washing facilities) has been maintained at two major vehicular exit points of the works area of Contract 2 (**Photo 12**).
- 3.3.3 The major construction works to the south of Tung Tsz Road was almost finished. The sedimentation beds located from north to south near the retained tree T196 (*Macaranga tanarius* var. *tomentosa*) have been established since March 2012 while another beds aligned from the area opposite to the Jade View Villa towards the marsh area at southeast have been maintained since October 2012. No muddy water was observed to be discharged into the drainage points (**Photos 13-14**).
- 3.3.4 There has been another section of sedimentation beds aligned from the area opposite to the eastern part of Jade View Villa towards the marsh area at the southeast since December 2012.

The used water was released into the sedimentation beds but no muddy water was observed to be discharged into the drainage point (**Photo 15**).

- 3.3.5 A section of sedimentation bed was observed opposite to San Tau Kok with PVC liner underlying sections of granules since April 2013. The discharge is released to the marsh area and no muddy water was observed at the drainage point (**Photo 16**).
- 3.3.6 Another section of sedimentation bed with PVC liner underlying sections of granules was found close to the area at which a filtration tank has been previously placed opposite to San Tau Kok since April 2013. However, the section of granules was partly collapsed and the discharge to the mangrove was not clean (**Photo 17**).
- 3.3.7 Works have been commenced in Wai Ha River since January 2013. The river was blocked by sand bags to separate the works area (**Photo 18**). The running stream water was pumped to the end of the works area down the stream (**Photo 19**).
- 3.3.8 The waste water from the construction site in Wai Ha River was pumped into a sedimentation tank placed at the end of the works area (**Photo 20**). The filtrate was then discharged to the river with several sections of granules for further sedimentation (**Photo 21**). Fences were established to protect the granules in the stream. The discharge was found muddy at the upper section near the works area and it became cleaner after passing through several sections of granules for the sedimentation (**Photo 22**).

Recommendations

- 3.3.9 Regular monitoring should be conducted to ensure no direct discharge or leakage of contaminants or any polluted fluid into the adjacent Wai Ha River and the nearby Shuen Wan marsh. The Contractor should maintain regular check (e.g. daily) on the sedimentation and filtration facilities and appropriate sedimentation beds and/or tanks throughout the construction phase (e.g. check the function of the sedimentation beds and remove surplus sand and gravels deposited along the beds or within the tanks) to make sure all discharged water was filtered appropriately prior to any discharge. To prevent the impact of the unclear discharge on the nearby vegetated area, it is suggested to overlay PVC liners along the site edge and remove any surplus sand and gravels deposited in the beds and tank.

3.4 Pollution Control

- 3.4.1 No follow-up action by the Contractor is required as from the *Monthly EM&A Report for April 2013*.

Observation

- 3.4.2 As mentioned in Section 3.3, works to the south of Tung Tsz Road was almost finished. The sedimentation beds located from north to south near the retained tree T196 (*Macaranga tanarius* var. *tomentosa*) have been established since March 2012 while another beds aligned from the area opposite to the Jade View Villa towards the marsh area at southeast have been maintained since October 2012. No muddy water was observed to be discharged into the drainage points (**Photos 13-14**).
- 3.4.3 There has been another section of sedimentation beds aligned from the area opposite to the eastern part of Jade View Villa towards the marsh area at the southeast since December 2012. The used water was released into the sedimentation beds but no muddy water was observed to be discharged into the drainage point (**Photo 15**).

- 3.4.4 A section of sedimentation bed has been observed opposite to San Tau Kok with PVC liner underlying sections of granules since April 2013. The discharge is released to the marsh area and no muddy water was observed at the drainage point (**Photo 16**).
- 3.4.5 Another section of sedimentation bed with PVC liner underlying sections of granules was found close to the area at which a filtration tank has been previously placed opposite to San Tau Kok since April 2013. However, the section of granules was partly collapsed and the discharge to the mangrove was not clean (**Photo 17**).
- 3.4.6 Works have been commenced in Wai Ha River since January 2013. The river was blocked by sand bags to separate the works area (**Photo 18**). The running stream water was pumped to the end of the works area down the stream (**Photo 19**).
- 3.4.7 The waste water from the construction site in Wai Ha River was pumped into a sedimentation tank placed at the end of the works area (**Photo 20**). The filtrate was then discharged to the river with several sections of granules for further sedimentation (**Photo 21**). Fences were established to protect the granules in the stream. The discharge was found muddy at the upper section near the works area and it became cleaner after passing through several sections of granules for the sedimentation (**Photo 22**).
- 3.4.8 No direct water discharge into the upper stream of Wai Ha River was observed as the active construction works have been concentrated at the lower end of Wai Ha River to the southeast of Tung Tsz Shan Road (**Photo 23**). However, tree stumps and mud were noted at the upper stream of Wai Ha River (**Photo 24**), possibly due to the heavy rainstorms in May 2013.

Recommendations

- 3.4.9 The Contractor should prevent any contaminants and sediments from entering the sensitive water-based habitats (i.e. Shuen Wan marsh and Wai Ha River) and implement pollution control measures to minimize any adverse environmental impacts to the water body. The Contractor should maintain appropriate sedimentation beds and/or tanks throughout the construction phase. The Contractor should adopt a good site practice in maintaining appropriate sedimentation beds and filtration tanks as recommended in the above Section for Contaminant/ Sediment Control.

3.5 Liaison with Nursery

- 3.5.1 The construction undertaken within Tung Tsz Nursery is restricted under Contract 1 of the Project. This monitoring item is not applicable to Contract 2 of the Project.

3.6 Existing Trees within Works Areas

- 3.6.1 Individual trees retained within the active works area have been protected within Tree Protection Zones (TPZs). The protection measures generally follow the recommendations stated in the *Monthly EM&A Report for April 2013*. Particular observations are highlighted in the following paragraphs.

Observation

- 3.6.2 No additional vegetation clearance was found in the works area.
- 3.6.3 The bamboos near the tree group (T119-121) were collapsed and the broken bamboos remained in Wai Ha River (**Photo 25**). It may be due to the heavy rainstorms in May 2013.

- 3.6.4 Most trees which are proposed to be retained within the Project Area were recorded generally in fair health conditions and some of the retained trees were naturally covered by invasive climbers.
- 3.6.5 As inspected on 15th May 2013, the climbers on the canopy of the tree group (T119-121) next to Wai Ha River were removed and broken branches were observed on the canopy (**Photo 26**). During the monitoring on 30th May 2013, soil along the bank of Wai Ha River was washed out by heavy rainstorm and exposed tree roots were observed under the tree group (T119-121) (**Photo 27**). The main contractor was informed immediately and the contractor claimed that they would re-fill the soil in this stream bank.
- 3.6.6 The leaning tree T190 was still supported by the bamboo props in May 2013 (**Photo 28**). The leaning degree increased and lots of creeping herbs (such as climber *Wedelia trilobata*) were found surrounding the trunk base of the tree. It was found that the bamboo props were not firmly supporting the leaning tree as the props were easily to be moved.
- 3.6.7 Construction works at the end of the Treasure Spot Garden have commenced since October 2012. The excavation works under the drip line of the retained tree T103 were finished in January 2013. Soil was refilled to the root zone area of the tree; however, the soil was loose and sandy, and tapes and ropes were still found tied on the trunk (**Photo 29**).
- 3.6.8 During the inspection on 15th May 2013, construction works were noted under the retained tree T074 (**Photo 30**). Temporary hoarding was aligned to surround the works area. Strings were tied on the trunk and a nail was noted on the trunk hanging a bag (**Photo 31**). It appears that the works are not related to the current project. On 30th May 2013, the construction works under the tree was finished (**Photo 32**) but strings and other construction materials were still hung on the tree trunk (**Photo 33**).
- 3.6.9 The soil level of the construction site opposite to San Tau Kok was lowered to the same soil level of the adjacent mangroves. However, some mangrove trees were damaged and some soil was noted piling at the trunk bases of the mangroves (**Photos 34-35**).
- 3.6.10 No significant signs of damage on other existing tree crowns, trunks and roots resulting from the construction works were observed in this monthly monitoring.
- 3.6.11 As Area C under Contract 1 of the Project has been formally handed over to AFCD for management and maintenance since October 2012, no access into the ECA is allowed. One transplanted shrub of *Pavetta hongkongensis* (PH-03) was inspected regularly through the fence of Tung Tsz Nursery and it has remained in satisfactory condition (**Photo 36**).

Recommendations

- 3.6.12 Within the active works area, maintenance of TPZs for the retained trees and the trees to be transplanted should be continued. Trunk bases of all retained trees should be kept clear, with no stockpiled soil, construction equipments and rubbish allowed around the trunk bases and within the TPZs. If necessary, these retained trees shall be watered regularly to maintain their health. All fallen trees or tree parts of the existing trees maintained within the works area of Contract No. DC/2010/02 should be removed if they pose imminent hazards to the people/property or cause obstruction to the traffic. Any broken tree parts still attached to the trees could be pruned appropriately to prevent their potential hazard to the public and property.

- 3.6.13 Disturbance is prohibited in all TPZs. In any practical circumstances, the contractor should follow Section 8 of Annex 4 of the approved Landscape Plan for protecting the existing trees from any potential damages resulting from the construction works. In addition, the Contractor and the Project Proponent should have routine inspection on any tree remedial works conducted by other party on the trees within the Project Area.
- 3.6.14 The bamboo props for supporting the leaning tree T190 (*Ficus hispida*) should be checked regularly to ensure its efficiency in supporting the leaning trunk and the Contractor is suggested to replace the bamboo props with more rigid wooden props. It is also suggested to remove the overgrown vegetation on the tree trunk and within the TPZ. The Contractor should have close monitoring of the stability of the tree and the props. The Contractor and the Project Proponent have to restrict any access within the tree falling zone of this tree with regard to its leaning trunk.
- 3.6.15 As there may be a risk of its overall tree stability of the retained tree T103 in the long run with regard to the potentially damaged roots and thin soil within the drip line of T103, as a reminder, the Contractor should be aware of its stability throughout the construction phase. The taped and ropes tied on the tree trunk should be removed. If necessary, it is recommended to remove the overgrown climbers on the tree canopy so as to reduce the crown load supported by this tree.
- 3.6.16 With regard to the previous tree topping incident on the retained trees T088 and T089, and the concern on the long-term tree stability of the retained tree T103, as a reminder, the Contractor is suggested to monitor the trees protected within the project boundary regularly. The Contractor should be aware of any potential damage on the trees by other contractor(s) undertaking construction work concurrently.
- 3.6.17 As the stream bank soil under the tree group (T119-T121) was washed away during the heavy rainstorms, the Contractor is suggested to re-fill the soil in this stream bank and have regular inspection of the tree stability along the stream bank.

3.7 Construction Light

- 3.7.1 No follow-up action on maintenance of construction light is required as from the *Monthly EM&A Report for April 2013*.

Observation

- 3.7.2 No construction light impact to the surrounding villages and to Plover Cove as all construction activities and construction sites are halted at 1800. No construction light at night is provided by the Contractor.

Recommendation

- 3.7.3 No specific recommendation is required.

4 AUDIT SCHEDULE

- 4.1.1 The next bi-weekly Landscape & Visual Monitoring in June 2013 is scheduled to be conducted in the weeks of 10th and 24th June 2013.

Appendix A

Photographs



Photo 1 – Temporary hoardings have been erected along Tung Tsz Road opposite to Wai Ha.



Photo 2 – Temporary hoardings have been erected along the access road from Tung Tsz Road to Treasure Spot Garden II.



Photo 3 – Temporary hoardings have been erected on the path near Treasure Spot Garden II.



Photo 4 – Temporary hoardings have been extended to the northwest of the access road to Treasure Spot Garden II.



Photo 5 – Sheet piling was found in the construction site next to the public toilet on Tung Tsz Road on 15th May 2013.



Photo 6 – No more work was found next to the public toilet on Tung Tsz Road on 30th May 2013.

	
<p>Photo 7 – The wetland rehabilitation area has been demarcated with red strings.</p>	<p>Photo 8 – A rubbish bin was observed in the pond of the wetland rehabilitation area during the monitoring on 30th May 2013.</p>
	
<p>Photo 9 – Construction materials were dumped close to the wetland rehabilitation area.</p>	<p>Photo 10 – Temporary storage of construction materials was found next to the retained tree T179 as inspected on 15th May 2013.</p>
	
<p>Photo 11 – Temporary storage of construction materials was still found next to the retained tree T179 and an additional abandoned filtration tank was found close to Wai Ha River behind the tree T179 on 30th May 2013.</p>	<p>Photo 12 – Wheel washing facilities has been provided at the vehicular exit point of the works area of Contract 2.</p>



Photo 13 – The sedimentation beds and PVC liner were aligned from north to south near the retained tree T196 (*Macaranga tanarius* var. *tomentosa*) and no muddy water was discharged.



Photo 14 – The sedimentation beds with gravels and PVC liners was aligned from the area opposite to the Jade View Villa towards the marsh area at southeast.



Photo 15 – The sedimentation beds with gravels and PVC liners were aligned from the area opposite to the eastern part of Jade View Villa towards the marsh area at southeast.









Photo 16 – A section of sedimentation bed has been aligned opposite to San Tau Kok with PVC liner underlying granules in April 2013. The discharge is released to the marsh area and no muddy water was observed at the drainage point.





Photo 17 – Another section of sedimentation bed was aligned with PVC liner underlying granules close to the area at which a filtration tank was previously placed opposite to San Tau Kok close to the marsh area. The discharge is released to the marsh area but the discharge is not clean.



Photo 18 – Sand bags have been put in Wai Ha River to separate the works area in the river. The stream water was pumped to the end of the works area.

	
<p>Photo 19 – The running stream water was pumped to the end of the works area.</p>	<p>Photo 20 – The waste water from the construction site in Wai Ha River was pumped into a sedimentation tank placed at the end of the works area. The filtrate was then discharged to the river with several sections of granules for further sedimentation.</p>
	
<p>Photo 21 – The filtrate from the sedimentation tank was then discharged to the river with several sections of granules for further sedimentation.</p>	<p>Photo 22 – The discharge was clean after passing through several sections of granules for the sedimentation.</p>
	
<p>Photo 23 – No discharge of used water was observed at the upper section of Wai Ha River (i.e. to the north of Tung Tsz Shan Road).</p>	<p>Photo 24 – Tree stumps and mud were noted at the upper stream of Wai Ha River.</p>

	
<p>Photo 25 – The bamboos near the tree group (T119-121) were collapsed and the broken bamboos remained in Wai Ha River.</p>	<p>Photo 26 – The climbers on the canopy of the tree group (T119-121) next to Wai Ha River were removed and broken branches were observed on the canopy on 15th May 2013.</p>
	
<p>Photo 27 – During the monitoring on 30th May 2013, soil along the stream bank of Wai Ha River was washed out by the heavy rainstorm and exposed roots were observed under the tree group (T119-121).</p>	<p>Photo 28 – The leaning tree T190 was still supported by the bamboo props in May 2013. The leaning degree increased and lots of creeping herbs (such as climber <i>Wedelia trilobata</i>) were found surrounding the trunk base of the tree.</p>
	
<p>Photo 29 – The refilled soil at the trunk base of the retained tree T103 was loose and sandy, and tapes and ropes were still found tied on the trunk.</p>	<p>Photo 30 – Construction works were noted under the retained tree T074 on 15th May 2013. Temporary construction barriers were aligned to surround the works area.</p>

	
<p>Photo 31 – Strings were tied on the trunk of T074 and a nail was noted on the trunk hanging a bag on 15th May 2013.</p>	<p>Photo 32 – On 30th May 2013, the construction works under the tree were finished.</p>
	
<p>Photo 33 – Strings and other construction materials were still hung on the tree trunk on 30th May 2013.</p>	<p>Photo 34 – Some mangrove trees located opposite to San Tau Kok were found to be damaged.</p>
	
<p>Photo 35 – Some soil was noted piling at the trunk base of the mangroves opposite to San Tau Kok.</p>	<p>Photo 36 – The transplanted shrub of <i>Pavetta hongkongensis</i> (PH03) has remained in satisfactory condition in Area C under Contract 1.</p>

Appendix M

**Ecological Monitoring Report in Area
under Contract 2**

Agreement No. DP/01/2010
Drainage Improvement Works in Shatin and Tai Po:
Ecological Monitoring in area under Contract 2
(Report 14b for May 2013)

Prepared for:
Drainage Services Department

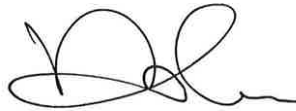
Prepared by:
ENVIRON Hong Kong Limited

Date:
June 2013

Reference Number:
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Agreement No. DP/01/2010
Drainage Improvement Works in Shatin and Tai Po:
Ecological Monitoring in area under Contract 2
(Report 14b for May 2013)

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Report\201305\14b*

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1. Introduction

1.1 Project description

The Drainage Improvement Works in Shuen Wan was undertaken to minimize the potential flooding impacts in Sha Tin and Tai Po area. Although the Ecological Impact Assessment in the EIA Report identified that ecological impacts resulting from the proposed drainage improvement works at Shuen Wan were anticipated to be very minor in scale, ecological mitigation and ecological monitoring were recommended in the EM&A Manual (http://env-shuenwan.com/pdf/review_note_em&a_rev.3.pdf) as stipulated under Environment Permit No. EP-303/2008.

1.2 Scope of ecological impact monitoring was described in the Particular Specifications and EM & A Manual of the projects. In brief, the monitoring tasks include regular check on the retained and transplanted trees and shrubs, monitoring on fauna groups and aquatic fauna within the works area and any ecologically sensitive area within 100 m of the works boundary.

1.3 China-Hong Kong Ecology Consultants Co. was commissioned by ENVIRON Hong Kong Limited to perform the ecological impact monitoring survey for the projects under Contract 2 since July 2011.

1.4 The outline of this ecological monitoring report was as follow:

- Highlights of this report
- Summary of construction activities for the month
- Monitoring methodology
- Monitoring data
- Remedial measures adopted to the adverse condition
- Record of complains and remedial measures
- Review of monitoring results
- Forecast of works programme and monitoring requirements
- Comments and brief summary

1.5 This is the report No. 14b ecological monitoring conducted on 30th May 2013 within the works boundary under Contract 2 and area within 100 m from the works boundary.

2. Highlights of this report

- Field survey was conducted on 30th May 2013
- Construction activities of Contract 2 was initiated since June 2011
- Lower number of species was observed within the works area under Contract 2, but habitats in the 100 m buffer area retain its natural condition.

3. Summary of construction activities for the month

Major construction activities carried out in Contract 2 at Wai Ha Village and Tung Tsz Road by the contractor during the present monitoring period (May 2013) includes:

- 1) Driving sheetpile at bay 10, 11.
- 2) Construction of intake structure, Water Diversion Water.
- 3) Fixing steel reinforcement at bay 1, 2.
- 4) Erection of formwork at bay 1, 2.
- 5) Concreting at bay 1.
- 6) Removal of formwork at bay 1

4. Monitoring Methodology

Ecological monitoring methods were generally followed those described in the baseline ecological surveys (DC/2009/22). However, sampling area maybe reduced because of habitat change, for instance, deforestation and channel modification due to drainage works, where sampling was not applicable. Survey data and evaluation are detailed in the following sections.

4.1 Vegetation survey

Vegetation survey was performed along the designated transects (**Figure 1**) for ecological monitoring as described in the project specifications to monitor the vegetation health which could be adversely influenced by any bad site practice. Qualitative data of plants within the works boundary and wetland vegetation in the 100 m buffer area of Contract 2 adjacent to construction site and wetland was recorded. Riparian vegetation including aquatic and emergent at 4 stream ecological monitoring points (hereinafter referred to as "SEMP") under Contract 2 (i.e. SEMP 3 & 4; **Figure 2 & 3**) along the affected stream channel and riparian habitat was recorded in terms of species, relative abundance and average heights. Any signs of damages and adverse health problems directly caused the works were recorded and reported. Nomenclature and protection status of the species followed those documented in the AFCD website (www.hkbiodiversity.net) and Hong Kong Herbarium (2004).

4.2 Avifauna

Bird survey was conducted by following the proposed transects which cover the major ecologically sensitive areas of the Project (**Figure 1**). All bird species were recorded with special attention paid on the species of conservation importance and wetland-dependent species. List of bird species recorded and the relative abundance was provided.

4.3 Herpetofauna

Herpetofauna survey was conducted via direct observation and active searching along the survey transects with a focus in the work areas (**Figure 1**). All reptiles and amphibians encountered or heard were recorded. Nomenclature and conservation status of herpetofauna species follows AFCD website (www.hkbiodiversity.net).

4.4 Butterflies and Odonata

Odonates and butterfly survey of different habitats within the Study Area was conducted along the proposed transect (**Figure 1**). All butterflies and odonata were identified and relative abundance was recorded. Nomenclature and status of conservation of butterflies follows Lo & Hui (2005) while that of odonata follows AFCD websites (www.hkbiodiversity.net).

4.5 Mammals

As the monitoring site was situated near traffics, plant nursery and residential buildings, mammals were unlikely inhabited at the site except rodents, domestic dogs and cats. Detailed mammal monitoring was not conducted. However, any sighting, tracks and signs of mammals encountered during survey of other faunal groups was recorded. Bat was surveyed by search for potential colony habitat, such as palm trees, which are often used by fruit bats as nesting sites.

4.6 Aquatic fauna

Monitoring of aquatic fauna was carried out mainly by bank-side observation, sometimes with the aid of binoculars, at two stream ecological monitoring points under Contract 2 (i.e. SEMP 3 & 4). These points are selected for covering representative sections of Wai Ha River and are shown in **Figure 1**. Netting and fish traps were also deployed at these points to collect supplementary data. Aquatic fauna seen/collected was identified *in situ* to the lowest possible taxon and relative abundance was presented.

5. Monitoring data

5.1 Vegetation survey

The habitats identified in area under Contract 2 are river course, wooded area, mangrove, marsh and developed area (including village). Vegetation were found in wooded area, mangrove, marsh, develop area and river bank. The riparian vegetation which were dominated by *Leucaena leucocephala*, *Bidens alba*, and *Rhaphiolepis salicifolias* with average coverage ranged from 15% to 30% (**Table 1**). A list of plant species recorded from different habitats within the assessment area under Contract 2 is presented on **Table 2**. A total of 180 species were recorded within the assessment boundary in which 175 species were recorded within the buffer area, while 120 species recorded within the work areas under Contract 2. About 20% of common vegetation species in the edge of marsh under Contract 2 were removed due to direct conflict with the construction activities. Most of the vegetation species were distributed in the secondary woodland area. Among them, species protected under Hong Kong ordinance were found in buffer area under Contract 2, namely *Aquilaria sinensis* (Cap. 586), *Cibotium barometz* (Cap. 586). Three individuals of protected species *Pavetta hongkongensis* located within works area of Contract 2 were transplanted to ECA on 20th Dec 2011.

5.2 Avifauna

A total of 11 bird species were recorded in the current survey (**Table 3**). In the work area under Contract 2, 4 bird species were recorded in which none are considered to be of conservation concern.. A total of 11 bird species were recorded in the 100m buffer area in which none are considered to be of conservation concern.

5.3 Herpetofauna

No reptile was recorded within the assessment area. Mating call of Gunter's Frog, Asiatic Painted Frog and Paddy Frog were heard from the water of pools, ditches and river bank within the 100m buffer zone. Common Toad was found on buffer zone of the site. The species recorded belongs to common species in Hong Kong. (**Table 4**).

5.4 Butterflies

A total of 16 butterfly species were recorded during surveys (**Table 5**). Only 3 butterfly species were recorded within the work boundary of Contract 2, while most of the butterfly species were inhabiting outside the proposed construction area in which none of the species are of the conservation concern.

5.5 Odonata

A total of 6 odonata species were recorded during the surveys (**Table 6**). Only Wandering glider (*Pantala flavescens*) and Crimson Dropwing (*Trithemis aurora*) were found within the work boundaries under Contract 2. Most of the observed odonata species were largely inhabiting along the river bank in the 100m buffer area.

5.6 Mammal

No other mammals or trace of mammals was observed within the assessment area.

5.7 Aquatic fauna

Under Contract 2 (i.e. SEMP 3 & 4), a total of 9 fish species, 1 crustacean, 1 gastropod and 1 arthropod were recorded and most of them were freshwater species (**Table 7**). *Carassius auratus* was commonly observed at SEMP 3 because of the traditional Buddhist practice from the nearby temple in which captured organisms were released back to nature. In addition, river section at SEMP 3 is relatively natural and the presence of *Parazacco spilurus* may imply that good water quality at this section is maintained. Overall, no protected or rare species were recorded.

Some excavation work on the downstream of SEMP4 was observed on survey date, it was clarified that the excavation work was started from end of January and will be last for few months, it was observed that the embankment was built by hessian bag to protect stream from pollution by excavated mud & sand, moreover, the river terrace was built by stone for sedimentation. As proper mitigation measure was implemented, the impact to stream habitat is anticipated to be minimized.

6. Remedial measures adopted to the adverse condition

There was no non-compliance event recorded within this reporting month.

7. Record of complains and remedial measures

There was no complaint in relation to environmental issue recorded in this reporting month.

8. Review of the monitoring results

During the present survey period, construction activities were carried out at works area under Contract 2, while 100 m buffer area remains natural. Much of the construction activities are carried out along Tung Tsz Road under Contract 2. In general, lower numbers of species were recorded within the works area under Contract 2 than that of 100 m buffer area because of the associated constructions and urbanized in nature. Water quality in river section of Contract 2 (i.e. SEMP 3 & 4) was maintained at acceptable condition as indicated by the presence of *Parazacco spilurus*. The impact of excavation work on downstream of SEMP4 is anticipated to be minimized as proper mitigation measure was implemented. In addition, most of the construction activities are restricted in the developed area with low ecological significance. As mitigation measures recommended in the EM&A Manual were properly implemented during the current survey, and hence the residual environmental impacts would be minimized.

9. Forecast of works programme and monitoring requirements

The tentative construction activities undertaken by the contractor at Wai Ha Village and Tung Tsz Road in the coming month are as follows:

- 1) Construction of Box Culvert Bay 44-50 (backfill & compaction)
- 2) Construction of intake structure
- 3) Construction of Wai Ha Box Culvert Bay 1 & 2

The monitoring programme described in EM&A will strictly follow to verify compliance of environmental requirements and the proper implementation of all necessary mitigation measures.

10. Comments and summary

The bi-monthly ecological impact monitoring under Contracts 2 was conducted in May 2013 and relevant flora and fauna data were collected according to project specification and EM & A Manual. As indicated by the low abundance and diversity of species within the work areas, habitats within the work boundary under Contracts 2 offer few ecological opportunities for colonization of fauna and flora. Given that the construction activities are restricted in the developed area with proper mitigation measures being implemented, disturbances associated with the current construction activities are largely affecting area with low ecological significance. On the other hand, the natural habitats in the 100 m buffer area are retained at acceptable condition, and hence the 100 m buffer area has not been significantly affected by the construction works.

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Figure

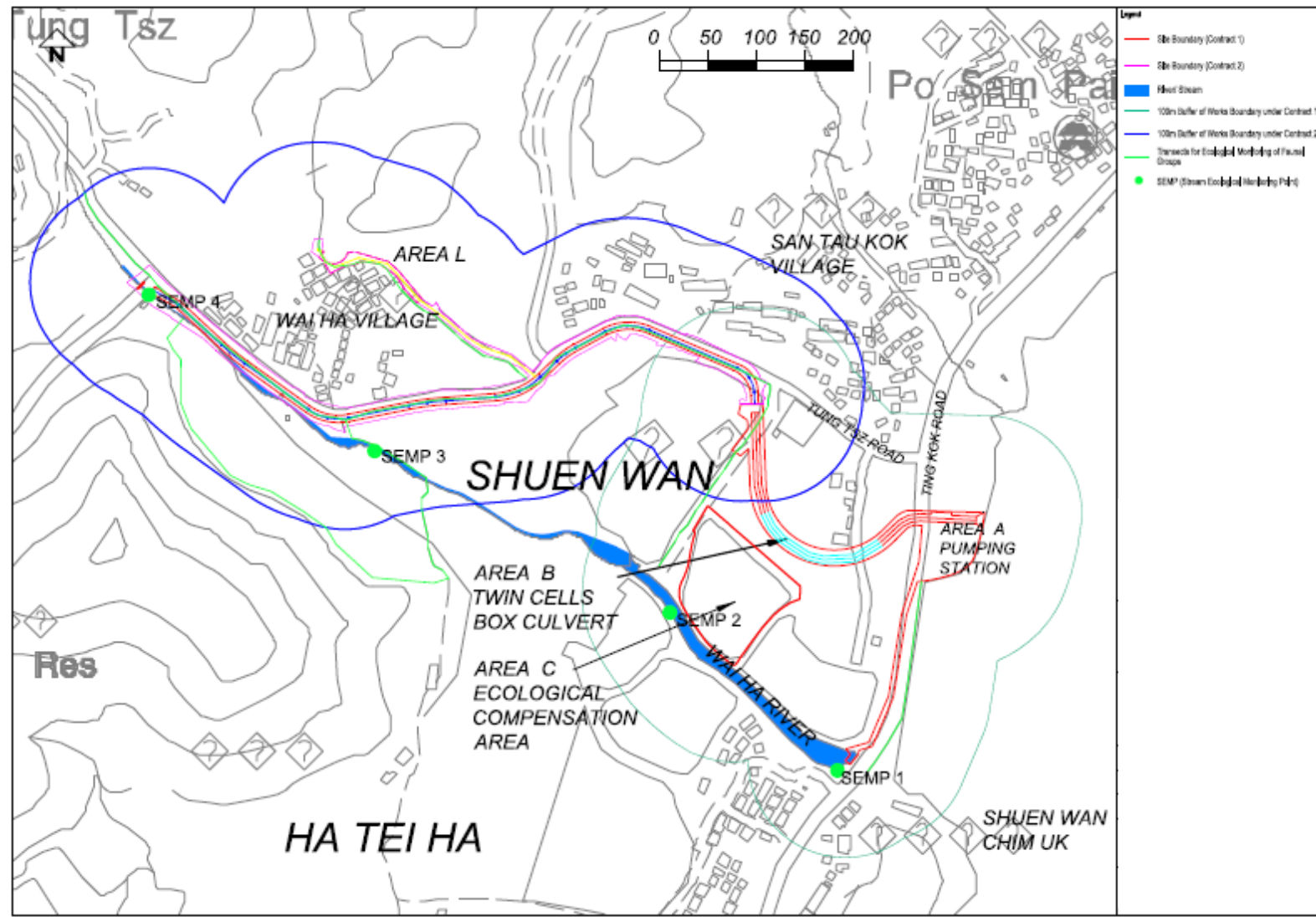


Figure: 1

Title: Map showing the ecological monitoring transect and the boundary of assessment area.

Project: Agreement No. DP/01/2010 Drainage Improvement Works in Shatin and Tai Po: Ecological Monitoring in area under Contract 2 (May 2013, Report 14b)



Drawn by: IT

Checked by: ML

Rev.: 1.0

Date: June 2013



Figure: 2

Title: SEMP 3, the third sampling point of Wai Ha River under Contract 2.

Project: Agreement No. DP/01/2010 Drainage Improvement Works in Shatin and Tai Po: Ecological Monitoring in area under Contract 2 (May 2013, Report 14b)



Drawn by: ML

Checked by: TC

Rev.: 1.0

Date: June 2013



Figure: 3

Title: SEMP 4, the second sampling point along Wai Ha River under Contract 2.

Project: Agreement No. DP/01/2010 Drainage Improvement Works in Shatin and Tai Po: Ecological Monitoring in area under Contract 2 (May 2013, Report 14b)



Drawn by: IT

Checked ML

Rev.: 1.0

Date: June 2013

Table

Table 1. List of riparian vegetation and coverage (%) recorded from two stream sampling points under Contract 2 (i.e. SEMP 3 & 4).

Species	Family	Growth form	Sampling point	SEMP 3		SEMP 4	
			Status in Hong Kong	Height (cm)	%	Height (cm)	%
<i>Bidens alba</i>	ASTERACEAE	Herb	E			0.9	30
<i>Commelina communis</i>	COMMELINACEAE	Herb	N	0.2	10		
<i>Leucaena leucocephala</i>	MIMOSACEAE	Small Tree	E			4	20
<i>Microstegium ciliatum</i>	POACEAE	Perennial Procumbent Herb	N	1.2	10		
<i>Pistia stratiotes</i>	ARACEAE	Floating Aquatic Herb	N	0.1	10		
<i>Polygonum chinensis</i>	POLYGONACEAE	Herb	N	0.8	5		
<i>Polygonum lapathifolium</i>	POLYGONACEAE	Herb	N	0.9	10		
<i>Rhaphiolepis salicifolia</i>	ROSACEAE	Shrub or Small Tree	N	1.2	10		
<i>Spirodela polyrrhiza</i>	LEMNACEAE	Floating Small Herb	N			n/a	5
<i>Wedelia chinensis</i>	ASTERACEAE	Perennial Herb	N	n/a	10		
Bare	n/a	n/a	n/a	n/a	35	n/a	45

*Key:

E = Exotic

N = Native

n/a = not available

Table 2. List of vegetation recorded from works area under Contracts 2 and 100 m buffer area in the impact monitoring survey conducted in May 2013. Vegetation species presents in the identified location was indicated by “V”.

Habitat	Species name	Family	Growth form	*Status in Hong Kong	Work Area of Contract 2	100 m buffer area under Contract 2
Stream	<i>Chrysalidocarpus lutescens</i>	ARECACEAE	Shrub Palm	E	V	V
	<i>Melia azedarach</i>	MELIACEAE	Tree	E	V	V
	<i>Murraya paniculata</i>	RUTACEAE	Small Tree	E	V	V
	<i>Lantana camara</i>	VERBENACEAE	Shrub	E	V	V
	<i>Ficus hispida</i>	MORACEAE	Tree	N	V	V
	<i>Ficus virens</i>	MORACEAE	Tree	N	V	V
	<i>Chrysopogon aciculatus</i>	POACEAE	Perennial Herb	N	V	V
	<i>Microstegium ciliatum</i>	POACEAE	Perennial Procumbent Herb	N	V	V
	<i>Mucuna birdwoodiana</i>	FABACEAE (PAPILIONACEAE)	Climber: Vine	N	V	V
	<i>Pistia stratiotes</i>	ARACEAE	Floating Aquatic Herb	N	V	V
	<i>Cyperus flabelliformis</i>	CYPERACEAE	Herb	E	V	V
	<i>Acanthopanax gracilistylus</i>	ARALIACEAE	Shrub	E	V	V
	<i>Ficus triangularis</i>	MORACEAE	Tree	E	V	V
	<i>Spirodela polyrrhiza</i>	LEMNACEAE	Floating Small Herb	N	V	V
	<i>Glochidion zeylanicum</i>	EUPHORBIACEAE	Shrub or Small Tree	N	V	V
<i>Sterculia lanceolata</i>	STERCULIACEAE	Semi-deciduous Tree	N	V	V	
<i>Albizia lebbek</i>	MIMOSACEAE	Tree	E		V	

Habitat	Species name	Family	Growth form	*Status in Hong Kong	Work Area of Contract 2	100 m buffer area under Contract 2
	<i>Arundinella nepalensis</i>	POACEAE	Perennial Herb	N		V
	<i>Bidens alba</i>	ASTERACEAE	Herb	E		V
	<i>Clerodendrum inerme</i>	VERBENACEAE	Shrub	N		V
	<i>Coculus orbiculatus</i>	MENISPERMACEAE	Climber: Vine	N		V
	<i>Hibiscus tiliaceus</i>	MALVACEAE	Tree or Shrub	N		V
	<i>Leucaena leucocephala</i>	MIMOSACEAE	Small Tree	E		V
	<i>Manilkara zapota</i>	SAPOTACEAE	Tree	E		V
	<i>Sapium discolor</i>	EUPHORBIACEAE	Tree	N		V
Developed area	<i>Pericampylus glaucus</i>	MENISPERMACEAE	Woody Vine	N	V	V
	<i>Ficus variegata</i> var. <i>chlorocarpa</i>	MORACEAE	Tree or Shrub	N	V	V
	<i>Citrus reticulata</i> Blanco	RUTACEAE	Small Tree	E	V	V
	<i>Salvia japonica</i>	LAMIACEAE (LABIATAE)	Herb	N	V	V
	<i>Morus alba</i>	MORACEAE	Tree or Shrub	N	V	V
	<i>Emilia sonchifolia</i>	ASTERACEAE	Herb	N	V	V
	<i>Clausena lansium</i>	RUTACEAE	Small Tree	E	V	V
	<i>Pyrostegia venusta</i>	BIGNONIACEAE	Climber: Vine	E	V	V
	<i>Psidium guajava</i>	MYRTACEAE	Tree	E	V	V
	<i>Catharanthus roseus</i>	APOCYNACEAE	Subshrub	N	V	V
	<i>Archontophoenix alexandrae</i>	ARECACEAE	Tree Palm	E	V	V
	<i>Desmodium heterocarpon</i>	FABACEAE (PAPILIONACEAE)	Shrub	N	V	V
	<i>Rhinacanthus nasutus</i>	ACANTHACEAE	Herb	E	V	V
	<i>Acacia confusa</i>	MIMOSACEAE	Tree	E		V

Habitat	Species name	Family	Growth form	*Status in Hong Kong	Work Area of Contract 2	100 m buffer area under Contract 2
	<i>Artocarpus macrocarpon</i>	MORACEAE	Tree	E		V
	<i>Averrhoa carambola</i>	OXALIDACEAE	Small Tree	E		V
	<i>Bauhinia blakeana</i>	CAESALPINIACEAE	Tree or Shrub	N		V
	<i>Bauhinia variegata</i>	CAESALPINIACEAE	Tree	E		V
	<i>Bridelia tomentosa</i>	EUPHORBIACEAE	Shrub or Small Tree	N		V
	<i>Calliandra haematocephala</i>	MIMOSACEAE	Shrub	E		V
	<i>Caryota ochlandra</i>	ARECACEAE	Tree palm	E		V
	<i>Cassia spectabilis</i>	CAESALPINIACEAE	Small Tree	E		V
	<i>Casuarina equisetifolia</i>	CASUARINACEAE	Tree	E		V
	<i>Citrus grandis</i>	CASUARINACEAE	Tree	E		V
	<i>Cordyline fruticosa</i>	AGAVACEAE	Shrub	E		V
	<i>Cynodon dactylon</i>	POACEAE	Perennial Herb	N		V
	<i>Dracaena draco</i>	AGAVACEAE	Tree	E		V
	<i>Elaeocarpus haminanensis</i>	ELAEOCARPACEAE	Small Tree	E		V
	<i>Eleusine indica</i>	POACEAE	Herb	N		V
	<i>Eriobotrya japonica</i>	ROSACEAE	Small Tree	E		V
	<i>Ficus benjamina</i>	MORACEAE	Tree	E		V
	<i>Ficus elastica</i>	MORACEAE	Tree	E		V
	<i>Ficus simplicissima</i>	MORACEAE	Shrub	N		V
	<i>Hibiscus rosa-sinensis</i>	MALVACEAE	Shrub	E		V
	<i>Lantana camara</i>	VERBENACEAE	Shrub	E		V
	<i>Litchi chinensis</i>	SAPINDACEAE	Tree	E		V
	<i>Lumnitzera racemosa</i>	COMBRETACEAE	Shrub or Small Tree	N		V

Habitat	Species name	Family	Growth form	*Status in Hong Kong	Work Area of Contract 2	100 m buffer area under Contract 2
	<i>Lygodium japonicum</i>	LYGODIACEAE	Climbing Herb	N		V
	<i>Melaleuca quinquenervia</i>	MYRTACEAE	Tree	E		V
	<i>Oxalis corniculata</i>	OXALIDACEAE	Perennial Herb	N		V
	<i>Phoenix roebelenii</i>	ARECACEAE	Small Tree Palm	E		V
	<i>Polygonum hydropiper</i>	POLYGONACEAE	Herb	N		V
	<i>Psychotria serpens</i>	RUBIACEAE	Climber: Vine	N		
	<i>Pterocypsela indica</i>	ASTERACEAE	Herb	N		V
	<i>Rhapis excelsa</i>	ARECACEAE	Shrub Palm	N		V
	<i>Sansevieria trifasciata</i>	AGAVACEAE	Perennial Herb	E		V
	<i>Schefflera actinophylla</i>	ARALIACEAE	Climbing Shrub	E		V
	<i>Schefflera heptaphylla</i>	ARALIACEAE	Tree	N		V
	<i>Sesbania cannabina</i>	FABACEAE	Herb	E		V
	<i>Terminalia catappa</i>	COMBRETACEAE	Large Tree	E		V
	<i>Thuja orientalis</i>	CUPRESSACEAE	Tree	E		V
	<i>Tradescantia spathacea</i>	COMMELINACEAE	Herb	E		V
	<i>Youngia japonica</i>	ASTERACEAE	Herb	N		V
	<i>Phragmites karka</i>	POACEAE	Perennial Herb	N	V	
	<i>Coix lacryma-jobi</i>	POACEAE	Herb	N	V	
	<i>Apluda mutica</i>	POACEAE	Perennial Herb	N	V	
	<i>Glochidion puberum</i>	EUPHORBIACEAE	Shrub	N	V	
	<i>Acanthus ilicifolius</i>	ACANTHACEAE	Shrub	N	V	V
	<i>Acrostichum aureum</i>	ACROSTICHACEAE	Herb	N	V	V
	<i>Aegiceras corniculatum</i>	MYRSINACEAE	Shrub	N	V	V
	<i>Alocasia odora</i>	ARACEAE	Perennial Herb	N	V	V
	<i>Avicennia marina</i>	VERBENACEAE	Shrub	N	V	V

Habitat	Species name	Family	Growth form	*Status in Hong Kong	Work Area of Contract 2	100 m buffer area under Contract 2
	<i>Digitaria ciliaris</i>	POACEAE	Herb	N	V	V
	<i>Panicum repens L.</i>	POACEAE	Perennial Herb	N	V	V
	<i>Pennisetum alopecuroides</i>	POACEAE	Perennial Herb	N	V	V
	<i>Phragmites australis</i>	POACEAE	Perennial Herb	N	V	V
	<i>Plantago major</i>	PLANTAGINACEAE	Perennial herb	N	V	V
	<i>Solanum nigrum</i>	SOLANACEAE	Herb	N	V	V
Plantation	<i>Bischofia javanica</i>	EUPHORBIACEAE	Tree	N	V	V
	<i>Scolopia chinensis</i>	FLACOURTIACEAE	Tree or Large Shrub	N	V	V
	<i>Piper hancei</i>	PIPERACEAE	Climber: Vine	N	V	V
	<i>Dimocarpus longan</i>	SAPINDACEAE	Tree	E	V	V
	<i>Paederia scandens</i>	RUBIACEAE	Climber: Vine	N	V	V
	<i>Cleistocalyx operculatus</i>	MYRTACEAE	Tree	N	V	V
	<i>Antidesma bunius</i>	EUPHORBIACEAE	Tree	N	V	V
	<i>Litsea monopetala</i>	LAURACEAE	Small Tree	N	V	V
	<i>Microcos paniculata</i>	TILIACEAE	Shrub or Small Tree	N	V	V
	<i>Maesa perlaris</i>	MYRSINACEAE	Shrub	N	V	V
	<i>Boehmeria nivea (L.) Gaudich.</i>	URTICACEAE	Subshrub or shrub	E	V	V
	<i>Mallotus apelta</i>	EUPHORBIACEAE	Shrub or Small Tree	N	V	V
	<i>Sapindus saponaria</i>	SAPINDACEAE	Tree	N	V	V
	<i>Aporosa dioica</i>	EUPHORBIACEAE	Tree	N	V	V
	<i>Wedelia chinensis</i>	ASTERACEAE	Perennial Herb	N	V	V
	<i>Carica papaya</i>	CARICACEAE	Tree	E	V	V
	<i>Rubus reflexus</i>	ROSACEAE	Climbing Shrub	N	V	V

Habitat	Species name	Family	Growth form	*Status in Hong Kong	Work Area of Contract 2	100 m buffer area under Contract 2
	<i>Brassica rapa</i>	BRASSICACEAE (CRUCIFERAE)	Biennial Herb	E	V	V
	<i>Mucuna championii</i> <i>Benth.</i>	FABACEAE	Climbing Vine	N		V
	<i>Pinus massoniana</i>	PINACEAE	Tree	N	V	V
Cultivated land	<i>Coriandrum sativum</i>	APIACEAE (UMBELLIFERAE)	Herb	E	V	V
	<i>Allium fistulosum</i>	LILIACEAE	Herb	E	V	V
	<i>Lactuca sativa</i>	ASTERACEAE	Herb	E	V	V
	<i>Musa x paradisiaca</i> L.	MUSACEAE	Perennial Herb	E	V	V
	<i>Lycopersicon esculentum</i>	SOLANACEAE	Herb	E	V	V
	<i>Chrysanthemum coronarium</i>	ASTERACEAE	Herb	E	V	V
	<i>Myosoton aquaticum</i>	CARYOPHYLLACEAE	Herb	N	V	V
	<i>Drymaria diandra</i>	CARYOPHYLLACEAE	Herb	N	V	V
	<i>Eupatorium odoratum</i>	ASTERACEAE	Perennial Herb	E	V	V
	<i>Conyza canadensis</i>	ASTERACEAE	Herb	E	V	V
	<i>Polygonum chinensis</i>	POLYGONACEAE	Herb	N	V	V
	<i>Pueraria lobata</i>	FABACEAE	Climber: Vine	N	V	V
	<i>Panicum maximum</i>	POACEAE	Perennial Herb	E	V	V
	<i>Pteridium aquilinum</i>	PTERIDIACEAE	Herb	N	V	V
	<i>Polygonum lapathifolium</i>	POLYGONACEAE	Herb	N	V	V
	<i>Colocasia esculenta</i>	ARACEAE	Herb	N	V	V
	<i>Cuscuta chinensis</i>	CUSCUTACEAE	Parasitic Herb	N	V	V

Habitat	Species name	Family	Growth form	*Status in Hong Kong	Work Area of Contract 2	100 m buffer area under Contract 2
	<i>Panicum trypheron</i>	POACEAE	Perennial Herb	E	V	V
Secondary woodland	<i>Mallotus paniculatus</i>	EUPHORBIACEAE	Tree or Shrub	N	V	V
	<i>Litsea glutinosa</i>	LAURACEAE	Tree	N	V	V
	<i>Trifolium repens</i>	FABACEAE (PAPILIONACEAE)	Herb	E	V	V
	<i>Hedyotis hedyotideia</i>	RUBIACEAE	Scandent Shrub	N	V	V
	<i>Solanum torvum</i>	SOLANACEAE	Shrub	E	V	V
	<i>Uvaria macrophylla</i>	ANNONACEAE	Climbing Shrub	N	V	V
	<i>Psychotria asiatica</i>	RUBIACEAE	Tree or Shrub	N	V	V
	<i>Glochidion eriocarpum</i>	EUPHORBIACEAE	Shrub	N	V	V
	<i>Ardisia quinquegona</i>	MYRSINACEAE	Shrub	N	V	V
	<i>Pteris semipinnata</i>	PTERIDACEAE	Herb	N	V	V
	<i>Melastoma sanguineum</i>	MELASTOMATACEAE	Shrub	N	V	V
	<i>Lasianthus chinensis</i>	RUBIACEAE	Shrub	N	V	V
	<i>Cinnamomum camphora</i>	LAURACEAE	Large Tree	N	V	V
	<i>Rhus hypoleuca</i>	ANACARDIACEAE	Shrub or Small Tree	N	V	V
	<i>Syzygium jambos</i> (L.) Alston	MYRTACEAE	Tree	E	V	V
	<i>Canthium dicoccum</i>	RUBIACEAE	Tree or Shrub	N	V	V
	<i>Stephania longa</i>	MENISPERMACEAE	Climber: Vine	N	V	V
	<i>Aquilaria sinensis</i>	THYMELAEACEAE	Tree	N (Cap. 586)		V
	<i>Bridelia insulana</i>	EUPHORBIACEAE	Shrub	N	V	V
	<i>Disporum cantoniense</i>	LILIACEAE	Herb	E	V	V
	<i>Litsea cubeba</i>	LAURACEAE	Shrub to Small Tree	N	V	V

Habitat	Species name	Family	Growth form	*Status in Hong Kong	Work Area of Contract 2	100 m buffer area under Contract 2
	<i>Cibotium barometz</i>	DICKSONIACEAE	Large Herb	N (Cap. 586)		V
	<i>Sapium discolor</i>	EUPHORBIACEAE	Tree	N	V	V
	<i>Melastoma candidum</i>	MELASTOMATACEAE	Shrub	N	V	V
	<i>Dicranopteris pedata</i>	GLEICHENIACEAE	Herb	N	V	V
	<i>Cratoxylum cochinchinense</i>	CLUSIACEAE	Tree or Shrub	N	V	V
	<i>Desmos chinensis</i>	ANNONACEAE	Shrub	N	V	V
	<i>Acronychia pedunculata</i>	RUTACEAE	Tree	N	V	V
	<i>Selaginella uncinata</i>	SELAGINELLACEAE	Herb	N	V	V
	<i>Rhus succedanea</i>	ANACARDIACEAE	Shrub or Small Tree	N	V	V
	<i>Millettia reticulata</i>	FABACEAE (PAPILIONACEAE)	Climber: Vine	N	V	V
	<i>Embelia ribes</i>	MYRSINACEAE	Climber: Vine	N	V	V
	<i>Pavetta hongkongensis</i>	RUBIACEAE	Tree or Shrub	N (Cap. 96)		V
	<i>Mangifera indica</i>	ANACARDIACEAE	Tree	E	V	V
	<i>Cinnamomum burmannii</i>	LAURACEAE	Tree or Large Shrub	N	V	V
	<i>Ficus microcarpa</i>	MORACEAE	Tree	N	V	V
	<i>Byttneria aspera</i>	STERCULIACEAE	Woody Vine	N	V	V
	<i>Equisetum debile</i>	EQUISETACEAE	Herb	N	V	V
	<i>Bambusa sp.</i>	POACEAE	Clumped Tree Bamboo	/	V	V
	<i>Rourea microphylla</i>	CONNARACEAE	Climbing Shrub	N	V	V
	<i>Pennisetum alopecuroides</i>	POACEAE	Perennial Herb	N	V	V

Habitat	Species name	Family	Growth form	*Status in Hong Kong	Work Area of Contract 2	100 m buffer area under Contract 2
	<i>Ipomea cairica</i>	CONVOLVULACEAE	Climber: Twining Herb	E	V	V
	<i>Mikania micrantha</i>	ASTERACEAE	Climbing Herb	E	V	V
Wooded area	<i>Celtis sinensis</i>	ULMACEAE	Tree	N		V
	<i>Ligustrum sinensis</i>	OLEACEAE	Tree or Shrub	N		V
	<i>Macaranga tanarius</i>	EUPHORBIACEAE	Tree	N		V
	<i>Pandanus tectorius</i>	PANDANACEAE	Shrub or Small Tree	N		V
	<i>Excoecaria agallocha</i>	EUPHORBIACEAE	Tree	N		V
	<i>Kandelia obovata</i>	RHIZOPHORACEAE	Shrub or Small Tree	N		V
	<i>Thespesia populnea</i>	MALVACEAE	Tree or Shrub	N		V
	<i>Zoysia sinica</i>	POACEAE	Perennial Herb	N		V
Marsh	<i>Acanthus ilicifolius</i>	ACANTHACEAE	Shrub	N		V
	<i>Acrostichum aureum</i>	ACROSTICHACEAE	Herb	N		V
	<i>Aegiceras corniculatum</i>	MYRSINACEAE	Shrub	N		V
	<i>Alocasia odora</i>	ARACEAE	Perennial Herb	N		V
	<i>Avicennia marina</i>	VERBENACEAE	Shrub	N		V
	<i>Digitaria ciliaris</i>	POACEAE	Herb	N		V
	<i>Ficus hispida</i>	MORACEAE	Tree	N		V
	<i>Hibiscus tiliaceus</i>	MALVACEAE	Tree or Shrub	N		V
	<i>Ipomea cairica</i>	CONVOLVULACEAE	Climber: Twining Herb	E		V
	<i>Kandelia obovata</i>	RHIZOPHORACEAE	Shrub or Small Tree	N		V
	<i>Macaranga tanarius</i>	EUPHORBIACEAE	Tree	N		V
	<i>Mikania micrantha</i>	ASTERACEAE	Climbing Herb	E		V
	<i>Panicum repens L.</i>	POACEAE	Perennial Herb	N		V
	<i>Pennisetum</i>	POACEAE	Perennial Herb	N		V

Habitat	Species name	Family	Growth form	*Status in Hong Kong	Work Area of Contract 2	100 m buffer area under Contract 2
	<i>alopecuroides</i>					
	<i>Phragmites australis</i>	POACEAE	Perennial Herb	N		V
	<i>Plantago major</i>	PLANTAGINACEAE	Perennial herb	N		V
	<i>Polygonum lapathifolium</i>	POLYGONACEAE	Herb	N		V
	<i>Pueraria lobata</i>	FABACEAE	Climber: Vine	N		V
	<i>Schefflera heptaphylla</i>	ARALIACEAE	Tree	N		V
	<i>Solanum nigrum</i>	SOLANACEAE	Herb	N		V
	<i>Solanum torvum</i>	SOLANACEAE	Shrub	E		V

*Key:

E = Exotic

N = Native

Table 3. List of avifauna species and maximum counts recorded from the impact monitoring survey in May 2013 at work area under Contracts 2 and 100 m buffer area.

Species	Common name	Habitat	Conservation status in Hong Kong	Work area: Contract 2	100m buffer area
<i>Copsychus saularis</i>	Oriental Magpie Robin			1	1
<i>Emberiza chrysophrys</i>	Yellow Browed Bunting			1	1
<i>Garrulax perspicillatus</i>	Masked Laughing thrush				3
<i>Hirundo rustica</i>	Barn Swallow			1	2
<i>Orthotomus sutorius</i>	Common Tailorbird				1
<i>Passer montanus</i>	Eurasian Tree Sparrow				5
<i>Prinia flaviventris</i>	Yellow-bellied Prinia			1	1
<i>Pycnonotus jocosus</i>	Red-whiskered Bulbul				2
<i>Pycnonotus sinensis</i>	Chinese Bulbul				3
<i>Streptopelia chinensis</i>	Spotted Dove				3
<i>Zosterops japonicus</i>	Japanese White-eye				5
Total number of species:				4	11

***Key :**

W = Wetland dependent species ; RC = Regional Concern ; LC = Local Concern

Table 4. List of herpetofauna and maximum counts recorded from the impact monitoring survey in May 2013 at work area under Contracts 2 and 100 m buffer area..

Species	Common name	Conservation status in Hong Kong	Work area: Contract 2	100m Buffer area of Contract 2
<i>Rana guentheri</i>	Gunther's Frog	Common		2@
<i>Kaloula pulchra pulchra</i>	Asiatic Painted Frog	Common		1@
<i>Bufo melanostictus</i>	Common Toad	Common		2
<i>Fejervarya limnocharis</i>	Paddy Frog	Common		2@

Key:

@-Calling heard

Table 5. Relative abundance of butterfly species recorded under Contracts 2 in impact monitoring survey during May 2013.

Species	Common name	Conservation status in Hong Kong	Work area: Contract 2	100m Buffer area of Contract 2
<i>Abisara echerius</i>	Plum judy	Very Common		+
<i>Athyma selenophora</i>	Staff Sergeant	Common		+
<i>Cupha erymanthis</i>	Rustic	Common		+
<i>Danaus genutia</i>	Common Tiger	Common		+
<i>Delias pasithoe</i>	Red-base jezebel	Very Common	+	+
<i>Eurema hecabe</i>	Common Grass Yellow	Very Common	+	++
<i>Hestina assimilis f.assimilis</i>	Red Ring Shirt	Common		+
<i>Lethe confusa</i>	Banded Tree brown	Common		+
<i>Mycalesis mineus</i>	Dark-brand Bush Brown	Very Common		++
<i>Neptis hylas</i>	Common Sailer	Common		+
<i>Papilio helenus helenus</i>	Red Helen	Common		+
<i>Papilio polytes</i>	Common mormon	Very Common		+
<i>Papilio polytes polytes</i>	Common Mormon	Common		+
<i>Pieris canidia</i>	Indian Cabbage White	Very Common	+	++
<i>Pseudaonzeeria maha</i>	Pale Grass Blue	Very Common		++
<i>Ypthima baldus</i>	Common Five-ring	Very Common		+

Key:

+ : Species exists in the survey area

++ : Species common in the survey area

+++ : Species abundant in the survey area

Table 6. Relative abundance of odonata species recorded under Contracts 2 in impact monitoring survey during May 2013.

Species	Common name	Conservation status in Hong Kong	Work area: Contract 2	100m Buffer area of Contract 2
<i>Euphaea decorata</i>	Black-banded Gossamerwing	Abundant		+
<i>Orthetrum pruinosum neglectum</i>	Common Red Skimmer	Abundant		+
<i>Pantala flavescens</i>	Wandering Glider	Abundant	+	+
<i>Prodasineura autumnalis</i>	Black Threadtail	Abundant		+
<i>Pseudagrion rubriceps rubriceps</i>	Orange-faced Sprite	Common		+
<i>Trithemis aurora</i>	Crimson Dropwing	Abundant	+	+

Key:

+ : Species exists in the survey area

++ : Species common in the survey area

+++ : Species abundant in the survey area

Table 7. Relative abundance of aquatic species recorded in Wai Ha River within the 100 m buffer of works boundary under Contracts 2 in the impact monitoring survey during May 2013.

Species	Common name	¹ Life-cycle characteristics	² Origin	SEMP 3	SEMP 4
<i>Carassius auratus</i>	Goldfish	F	I	++	
<i>Cyprinus carpio</i>	Common Carp	F	I	+	+
<i>Gambusia affinis</i>	Mosquito Fish	F	I	++	+
<i>Oreochromis niloticus</i>	Nile Tilapa	F	I	+	
<i>Parazacco spilurus</i>	Predaceous Chub	F	N	+	+
<i>Poecilia reticulata</i>	Guppy	F	I	+	+
<i>Puntius semifasciolatus</i>	Chinese Barb	F	N	+	
<i>Rhinogobius duospilus</i>	Goby	F	N	+	+
<i>Xiphophorus hellerii</i>	Swordtail	F	I	+	+
<i>Uca arcuata</i>	Fiddler Crab	M	N	+	
<i>Pomacea lineata</i>	Apple snail	F	I	+	
<i>Gerris sp.</i>	Water Strider	F	/	+	
Total number of species:	12			12	8

Key:

Relative abundance:

+ : Species exists in the survey area

++ : Species common in the survey area

+++ : Species abundant in the survey area

¹ Life-cycle characteristics:

M = Marine vagrant

F = Freshwater species

²Origin:

N = Native

I = Introduced; / = not available