PROJECT NO.: TCS/00553/11

CONTRACT NO. DC/2009/22
DRAINAGE IMPROVEMENT WORKS IN SHUEN WAN

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

MONTHLY ENVIRONMENTAL MONITORING AND AUDIT REPORT (NO.41) – NOVEMBER 2014

PREPARED FOR
KWAN LEE-KULY JOINT VENTURE

Quality Index

Date	Reference No.	Prepared By	Certified by
25 March 2014	TCS00553/11/600/R0402v2	Ben Tam (Environmental Consultant)	T.W. Tam (Environmental Team Leader)

Ver.	Date	Description
1	15 December 2014	First submission
2	25 March 2015	Updated against EPD comment on 18 March 2015

Ref.: DSDSHUWNEM00_0_0697L.15 31 March 2015

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. Max Tai

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/2009/22 & DC/2010/02
Revised Monthly Environmental Monitoring and Audit Report for November 2014

Reference is made to Environment Team's submission of the Revised Monthly Environmental Monitoring and Audit Report for November 2014 by Email on 31 March 2015 (entitled "DC/2010/02 – Joint site inspection with EPD on 24.3.2015 (EP-303/2008)").

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. Tony Cheng (3465 - 2822) should you have any queries.

Yours sincerely,

Tony Cheng
Independent Environmental Checker

c.c.	AUES	Attn: Mr. T. W. Tam	By Fax: 2959 6079
	Kwan Lee-Kuly JV	Attn: Mr. W. K. Chan	By Fax: 2674 6688

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EXECUTIVE SUMMARY

ES.01. This is the **41th** 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 30 November 2014** (hereinafter 'the Reporting Period').

ES.02. As informed by the Main Contractor and Resident Engineers (RE), the major construction activities of Contracts 1 and 2 have been substantially completed in end-October 2014. A letter for termination of Construction Phase EM&A Programme, which verified by IEC, has been submitted to the EPD on 3 November 2014. Moreover, the ET of Contract 2 took over all the relevant EM&A programme of Shuen Wan drainage improvement works under Environmental Permit No.EP-303/2008 since November 2014.

ES.03. Joint site inspection by the EPD, DSD, IEC, the Contractor and ET was carried out on 4 December 2014. In view of the work progress under both Contracts, EPD accepted that the EM&A programme of DC/2009/22 would be changed to operation phase in December 2014. However, for contract DC/2010/02, impact monitoring of construction phase should be continued until further approval from the EPD.

ENVIRONMENTAL MONITORING AND AUDIT ACTIVITIES

ES.04. During discussion amongst the parties of the RE, Main Contractor, IEC and ET on SSEMC on 23 October 2014, in view of the work progress and past monitoring results, it was considered that the environment impact arising from the remaining works was insignificant, therefore, impact monitoring for construction noise and water quality monitoring has been ceased in November 2014. Moreover, regular environmental site inspection by ET was changed to once per month. Environmental monitoring activities in this Reporting Period are summarized in the following table.

Issues	Environmental Monitoring Parameters / Inspection	Occasions
Water Quality	Hydrological characteristics measurement – H1, H2, H3 and H4	4
Inspection / Audit	Monthly Environmental Site Inspection and audit by the ET and IEC	1
	Regular weekly Environmental inspection by the Contractor and Site Representative Engineer	4
Ecological	Ecological Monitoring	1
Landscape & Visual	Bi-weekly Inspection by a registered Landscape Architect	2

ES.05. In this Reporting Period, ecological monitoring in Area under the Project was performed by IEC on **28 November 2014**.

ES.06. Landscape and visual inspection was carried on **14** and **25 November 2014** and the monthly Landscape & Visual Report (**November 2014**) has been signed by the registered Landscape Architect.

SITE INSPECTION

ES.07. Joint site inspection with the IEC was carried out on **20 November 2014.** No construction activity was conducted at Tung Tsz Road Shuen Wan and non-compliance was noted. However, Wai Ha Tsuen pathway reinstatement and Wai Ha River minor defects rectify work under the Project were observed during site inspection. It was considered that the environment impact arising from the remaining works are insignificant.

ENVIRONMENTAL COMPLAINT

ES.08. No written or verbal complaint was recorded in this Reporting Period.

NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

ES.09. No environmental summons or successful prosecutions were recorded in this Reporting Period.

REPORTING CHANGE

ES.10. In November 2014, the ET of Contract 2 took over all the relevant EM&A programme of Shuen Wan drainage improvement works under Environmental Permit No.EP-303/2008. Therefore monitoring results and findings for Contracts 1 and 2 were combined and presented in this EM&A Monthly Report. Since water quality and construction noise monitoring was ceased in this Reporting Period, no monitoring results of both parameters would be presented in this EM&A Monthly Report.

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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'). For the Project, construction works at Tung Tsz Road Shuen Wan 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. On the other hand, Shek Wu Wai San Tin is a non-designated project work.

1.02 The Works at Tung Tsz Road Shuen Wan was divided two DSD Contracts i.e. the Contract 1 and the Contract 2. The Contract 1 and the Contract 2 were respectively commencement in ***August 2010*** and ***May 2011***. The site location plan for both contracts is shown in ***Appendix A***.

1.03 As informed by the Main Contractor and Resident Engineers (RE), the major construction activities of Contracts 1 and 2 have been substantially completed in end-October 2014. A letter for termination of Construction Phase EM&A Programme, which verified by IEC, has been submitted to the EPD on 3 November 2014.

1.04 Joint site inspection by the EPD, DSD, IEC, the Contractor and ET was carried out on 4 December 2014. In view of the work progress under both Contracts, EPD accepted that the EM&A programme of DC/2009/22 would be changed to operation phase in December 2014. However, for contract DC/2010/02, impact monitoring of construction phase should be continued until further approval from the EPD.

1.05 During discussion amongst the parties of the RE, Main Contractor, IEC and ET on SSEMC on 23 October 2014, in view of the work progress and past monitoring results, it was considered that the environment impact arising from the remaining works was insignificant, therefore, impact monitoring for construction noise and water quality monitoring has been ceased in November 2014.

1.06 Action-United Environmental Services and Consulting (AUES) is an Environmental Team (ET) to implement the EM&A programme of Contract 2. In November 2014, the ET of Contract 2 took over all the relevant EM&A programme (Water Quality and Construction Noise monitoring) of Shuen Wan drainage improvement works under Environmental Permit No.EP-303/2008. Moreover, regular environmental site inspection by ET was changed to once per month.

1.07 This is the **41st** Monthly EM&A Report presenting the relevant monitoring results and inspection findings for the reporting period from **1** to **30 November 2014**.

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 WORKS PROGRESS AND SUBMISSION
SECTION 3	EM&A PROGRAM REQUIREMENT FOR THE PROJECT
SECTION 4	IMPACT MONITORING RESULTS
SECTION 5	SITE INSPECTIONS
SECTION 6	ENVIRONMENTAL COMPLAINTS AND NON-COMPLIANCE
SECTION 7	IMPLEMENTATION STATUES OF MITIGATION MEASURES
SECTION 8	CONCLUSIONS AND RECOMMENDATION

2.0 PROJECT ORGANIZATION AND WORKS 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***.

WORKS PROGRESS

2.02 For the Contracts 1, no construction activity was conducted at Tung Tsz Road Shuen Wan. For Contract 2, pathway reinstatement at Wai Ha Tsuen and minor defects rectify of Box Culverts was conducted in this Report Period. The master construction programs of Contract 2 enclosed in ***Appendix C***.

SUMMARY OF ENVIRONMENTAL SUBMISSIONS

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

Table 2-1 Status of Environmental Licenses and Permits for Contract 2

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.

2.06 A letter for "Termination of Construction Phase EM&A Programme" was verified by the Independent Environmental Checker (IEC) and a formal letter has been sent to the EPD on 3 November 2014 for approval.

3.0 EM&A PROGRAM REQUIREMENT FOR THE PROJECT

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 of Contract 1 and Contract 2

Environmental Aspect	Parameters	
Construction Noise	• 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
(#) The monitoring is carried out by the registered Landscape Architect

MONITORING LOCATIONS

3.03 Monitoring locations of the Project including Contracts 1 and 2 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 • Co-ordinates: E839301, N836386 • Existing River Bed Level: +1.75mPD).
	W2	Between Tolo Harbour and Proposed Penstock • Co-ordinates: E839542, N836184 • Exiting River Bed Level: +1.48mPD)
	(*) W3	Upstream of Tung Tze Shan Road • Co-ordinates: E838760, N836714 • Exiting River Bed Level: +5.08mPD)
	W4	Wai Ha Village 29D • Co-ordinates: E838865, N836621 • Exiting River Bed Level: +4.05mPD)
Hydrological	H1	Between the Shuen Wan Marsh and ECA • Coordinates: E839306, N836379)

Aspect	Location ID	Address
	H2	Route 10 Sam Kung Temple • Coordinates: E839163, N836433
	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 undertake 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 follow

- 3 consecutive $L_{eq(5min)}$ at restrict hour from 1700 – 2300;
- 3 consecutive $L_{eq(5min)}$ for restrict 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 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 according 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 full realize.

EQUIPMENT USED FOR EM&A PROGRAM

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 check 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 m^3/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
Construction Noise	
Integrating Sound Level Meter	B&K Type 2238
Calibrator	B&K Type 4231
Portable Wind Speed Indicator	Testo Anemometer
Water quality	
Water Depth Detector	Eagle Sonar
Water Sampler	A transparent PVC cylinder / bucket
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 /

Equipment	Model
	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 20^0C 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 4^0C 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 PROJECT

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***.

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 has presented in ***Section 2.02*** of this report. The monitoring results are presented in the following sub-sections.

MONITORING RESULTS SHARING OF THE CONTRACTS 1 AND 2

4.02 In November 2014, the ET of Contract 2 took over the relevant EM&A programme for the Project including Water Quality, Construction Noise and Hydrological Characteristics monitoring.

RESULTS OF CONSTRUCTION NOISE MONITORING

4.03 In view of the construction activities of Contracts 1 and 2 were substantially completed and the past monitoring results and findings for construction noise monitoring, it was considered that the noise impact arising from the remaining works should be insignificant in coming months.

4.04 In this Reporting Period, no construction noise monitoring was performed at all designated monitoring locations. Furthermore, no noise complaint (which is an Action Level exceedance) was received in this Reporting Period.

RESULTS OF LOCAL STREAM WATER QUALITY MONITORING

4.05 In view of the construction activities of Contracts 1 and 2 were substantially completed and the remaining works for Contract 2 such as pathway reinstatement at Wai Ha Tsuen and minor defects rectify of Box Culverts shall not impact the local stream water quality.

4.06 In this Reporting Period, no water quality of the in-situ measurement and sampling therefore were conducted.

RESULTS OF HYDROLOGICAL CHARACTERISTICS MONITORING

4.07 In this Reporting Period, hydrological characteristics measurements were carried out at all designated measurement points on **8, 14, 22 and 28 November 2014**. The detailed measurement results in this Reporting Period are presented in ***Tables 4-1***. Graphical Plots of Hydrological Characteristics shows in ***Appendix J***.

Table 4-1 Detailed monitoring results of hydrological characteristics

Measurement			River Width (m)	Water Depth (m)	Cut Section (m^2)	Velocity Flow Rate (m/s)	Average Volumetric Flow Rate (Q), m^3/s
Date	**Time**	**Tide**					
Measurement Point: H1							
08 Nov 2014	09:22	Flood	7.45	0.52	3.8740	0.9	3.487
	13:28	Ebb	7.45	0.46	3.4270	0.8	2.742
14 Nov 2014	13:50	Flood	7.45	0.60	4.4700	0.9	4.023
	09:03	Ebb	7.45	0.54	4.0230	0.8	3.218
22 Nov 2014	17:05	Flood	7.45	0.51	3.7995	0.7	2.660
	11:45	Ebb	7.45	0.59	4.3955	0.7	3.077
28 Nov 2014	11:54	Flood	7.45	0.69	5.1405	0.7	3.598
	17:39	Ebb	7.45	0.61	4.5445	0.6	2.727
Measurement Point: H2							
08 Nov 2014	09:51	Flood	2.74	0.43	1.1782	0.2	0.236
	13:52	Ebb	2.74	0.4	1.0960	0.1	0.110
14 Nov 2014	14:17	Flood	2.74	0.4	1.0960	0.1	0.110
	09:28	Ebb	2.74	0.32	0.8768	0.2	0.175
22 Nov 2014	18:02	Flood	2.74	0.31	0.8494	0.1	0.085
	12:44	Ebb	2.74	0.34	0.9316	***<0.1***	***<0.093***
28 Nov 2014	11:21	Flood	2.74	0.35	0.9590	0.1	0.096
	17:11	Ebb	2.74	0.35	0.9590	***<0.1***	***<0.096***

Measurement			River Width (m)	Water Depth (m)	Cut Section (m^2)	Velocity Flow Rate (m/s)	Average Volumetric Flow Rate (Q), m^3/s
Date	Time	Tide					
Measurement Point: H3							
08 Nov 2014	10:09	Flood	7.45	0.31	2.3095	0.5	1.155
	14:11	Ebb	7.45	0.28	2.0860	0.4	0.834
14 Nov 2014	14:42	Flood	7.45	0.3	2.2350	0.4	0.894
	09:49	Ebb	7.45	0.37	2.7565	0.3	0.827
22 Nov 2014	17:32	Flood	7.45	0.4	2.9800	0.6	1.788
	12:26	Ebb	7.45	0.42	3.1290	0.5	1.565
28 Nov 2014	11:00	Flood	7.45	0.34	2.5330	0.4	1.013
	16:44	Ebb	7.45	0.31	2.3095	0.5	1.155
Measurement Point: H4							
08 Nov 2014	10:17	Flood	2.74	0.38	1.0412	0.6	0.625
	14:30	Ebb	2.74	0.36	0.9864	0.4	0.395
14 Nov 2014	14:57	Flood	2.74	0.4	1.0960	0.5	0.548
	10:02	Ebb	2.74	0.37	1.0138	0.4	0.406
22 Nov 2014	17:46	Flood	2.74	0.33	0.9042	0.8	0.723
	12:15	Ebb	2.74	0.34	0.9316	0.6	0.559
28 Nov 2014	10:16	Flood	2.74	0.22	0.6028	0.5	0.301
	17:01	Ebb	2.74	0.21	0.5754	0.6	0.345

4.08 To compare the monitoring data between the Reporting Period and baseline monitoring period, the currently water depth and volumetric flow rate has insignificant change.

RESULTS OF ECOLOGICAL MONITORING

4.09 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.

4.10 In this Reporting Period, ecological monitoring in Area of the Contract 1 and Contract 2 was performed on **28 November 2014 by** the IEC. The detailed monitoring report is presented in ***Appendix M***.

METEOROLOGICAL INFORMATION

4.11 Meteorological information of reporting month is extracted from Tai Po and Shatin Stations of the Hong Kong Observatory (HKO) and summarized in ***Appendix H***.

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)	0	-

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)	90	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 is not required. However, one joint site inspection and auditing event was undertaken by the Main Contractor, RE, IEC and ET on **20 November 2014**. During the joint site inspection finding, Wai Ha Tsuen pathway reinstatement and Wai Ha River minor defects rectify work under the Project was not yet completed. However, no non-compliance was noted during inspection.

6.02 The Contractor was reminded to maintain the work area clean and tidy.

LANDSCAPE AND VISUAL INSPECTION

6.03 In this Reporting Period, landscape and visual inspection was carried on **14** and **25 November 2014.** The stand-alone of monthly Landscape & Visual Report signed by the registered Landscape Architect is enclosed in ***Appendix L***.

6.04 The next bi-weekly Landscape & Visual Monitoring in **December** is scheduled to be conducted in the week of **11** and **23 December 2014**.

7.0 ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE

ENVIRONMENTAL COMPLAINT, SUMMONS AND PROSECUTION

7.01 For the Project, no environmental complaint, summons and prosecution was received in this Reporting Period. The statistical summary table of environmental complaint for the Contract 2 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 –October 2014	1	1	Air Quality (1)
November 2014	0	1	Air Quality (1)

Table 7-2 Statistical Summary of Environmental Summons

Reporting Period	Environmental Summons Statistics		
	Frequency	Cumulative	Complaint Nature
July 2011 –October 2014	0	0	NA
November 2014	0	0	NA

Table 7-3 Statistical Summary of Environmental Prosecution

Reporting Period	Environmental Prosecution Statistics		
	Frequency	Cumulative	Complaint Nature
July 2011 –October 2014	0	0	NA
November 2014	0	0	NA

8.0 IMPLEMENTATION STATUS OF MITIGATION MEASURES

8.01 According to the Updated Environmental Monitoring and Audit Manual, mitigation measures recommended for the Operation Phase are summarized as follows:

Ecology

- To minimize sedimentation, de-silting should be limited to the dry season
- Waste material produced during de-silting should be disposed of in a timely and appropriate manner

Landscape and visual

- 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
- Landscape design of pump house by providing sufficient planting around its boundary fence
- 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
- Reinstatement of affected area should be carried out to check that the works areas are properly reinstated

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:-

- Rectification of minor defects of all Box Culverts
- Public Road reinstatement

KEY ISSUES FOR THE COMING MONTH

9.02 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 **41st** monthly EM&A report as combined the Contract 1 and Contract 2, presenting the construction phase monitoring results and inspection findings for the Reporting Period of **1 to 30 November 2014**.

10.02 As informed by the Main Contractor and Resident Engineers (RE), the major construction activities of Contracts 1 and 2 have been substantially completed in end-October 2014. A letter for termination of Construction Phase EM&A Programme, which verified by IEC, has been submitted to the EPD on 3 November 2014. Moreover, the ET of Contract 2 took over all the relevant EM&A programme of Shuen Wan drainage improvement works under Environmental Permit No.EP-303/2008 since November 2014.

10.03 Joint site inspection by the EPD, DSD, IEC, the Contractor and ET was carried out on 4 December 2014. In view of the work progress under both Contracts, EPD accepted that the EM&A programme of DC/2009/22 would be changed to operation phase in December 2014. However, for contract DC/2010/02, impact monitoring of construction phase should be continued until further approval from the EPD.

10.04 No noise complaint (which is an Action Level exceedance) was received in this Reporting Period.

10.05 For hydrological characteristics, the water depth and water flow rate as compared baseline monitoring period have no significant changes.

10.06 In this Reporting Period, ecological monitoring in Area of the Contracts 1 and 2 was performed by IEC on **28 November 2014**. Furthermore, landscape and visual inspection was carried out on **14** and **25 November 2014**. The monthly Landscape & Visual Report (**November 2014**) has been signed by the registered Landscape Architect

10.07 One joint site inspection and auditing event was undertaken by the Main Contractor, RE, IEC and ET on **20 November 2014**. During the joint site inspection finding, pathway reinstatement in Wai Ha Tsuen and minor defects rectify work Wai Ha River under the Project have not yet completed. However, it was considered that the environment impact arising from the remaining works should be insignificant. No non-compliance was observed during the inspection.

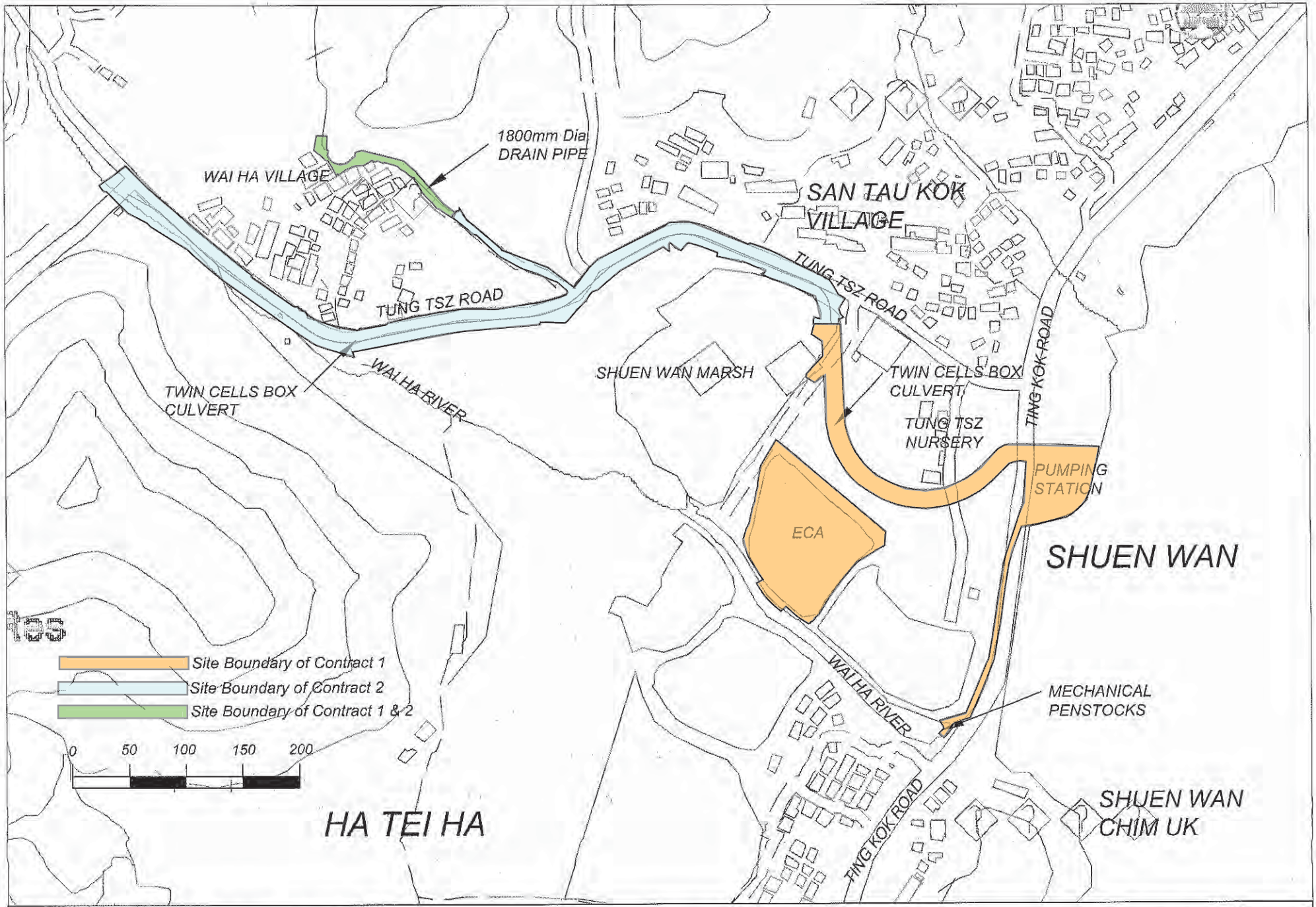
10.08 No documented complaint, notification of summons or successful prosecution was received.

RECOMMENDATIONS

10.09 Since pathway reinstatement and Wai Ha River minor defects rectify work in Wai Ha Tsuen under the Project still not yet completed, mitigation measures of construction dust, noise and wastewater discharge shall be properly maintained until the works under the project are all completed.

Appendix A

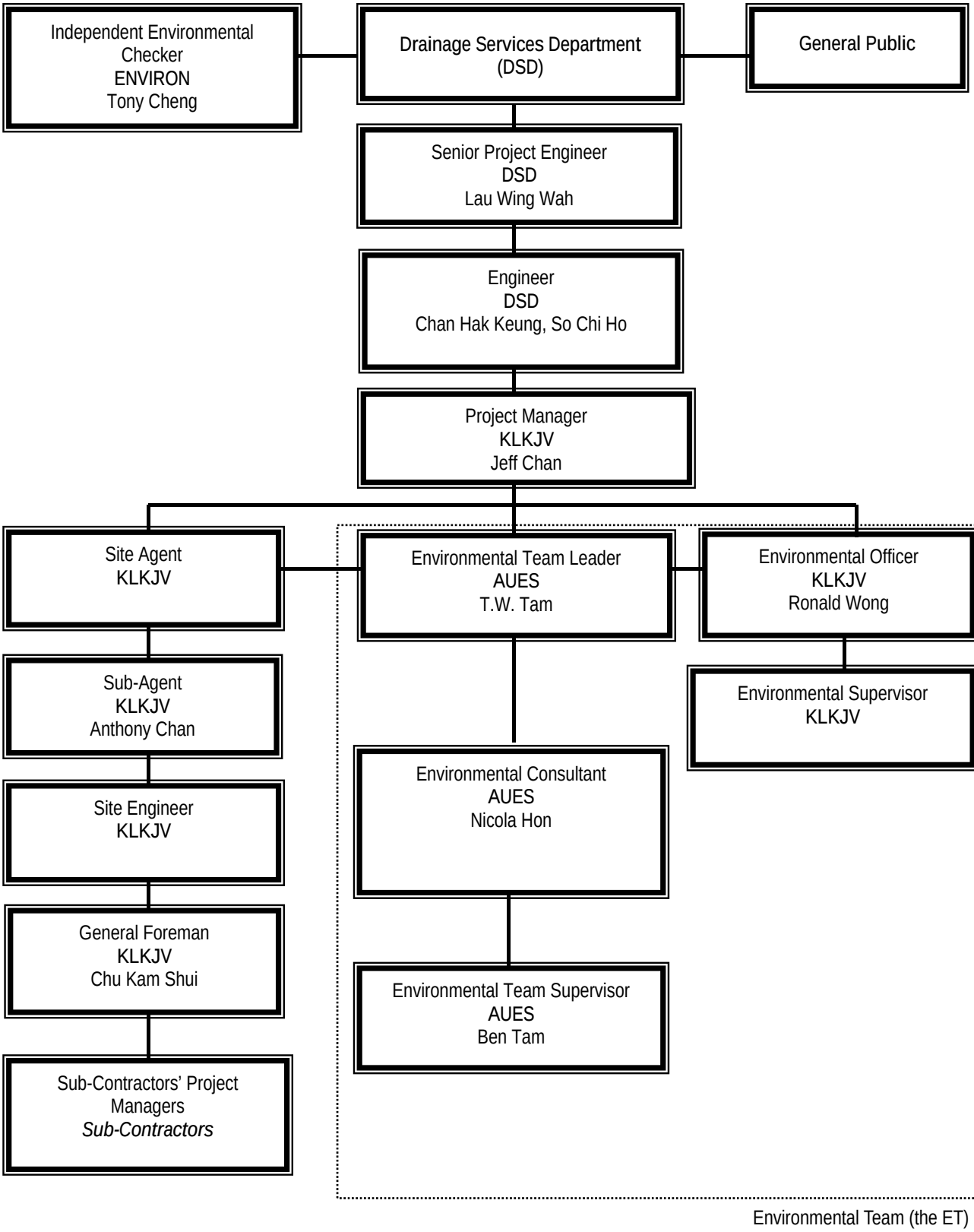
Project Location at Shuen Wan



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

Appendix B

Organization Chart and the Key Contact Person of Contract 2



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. Jeff Chan	2674 3888	2674 9988
KLKJV	Sub- Agent	Mr. Anthony Chan	2674 3888	2674 9988
KLKJV	Site Forman	Mr. Chu Kam Shui	2674 3888	2674 9988
KLKJV	Environmental Officer	Mr. Ronald Wong	2674 3888	2674 9988
AUES	Environmental Team Leader	Mr. T.W. Tam	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

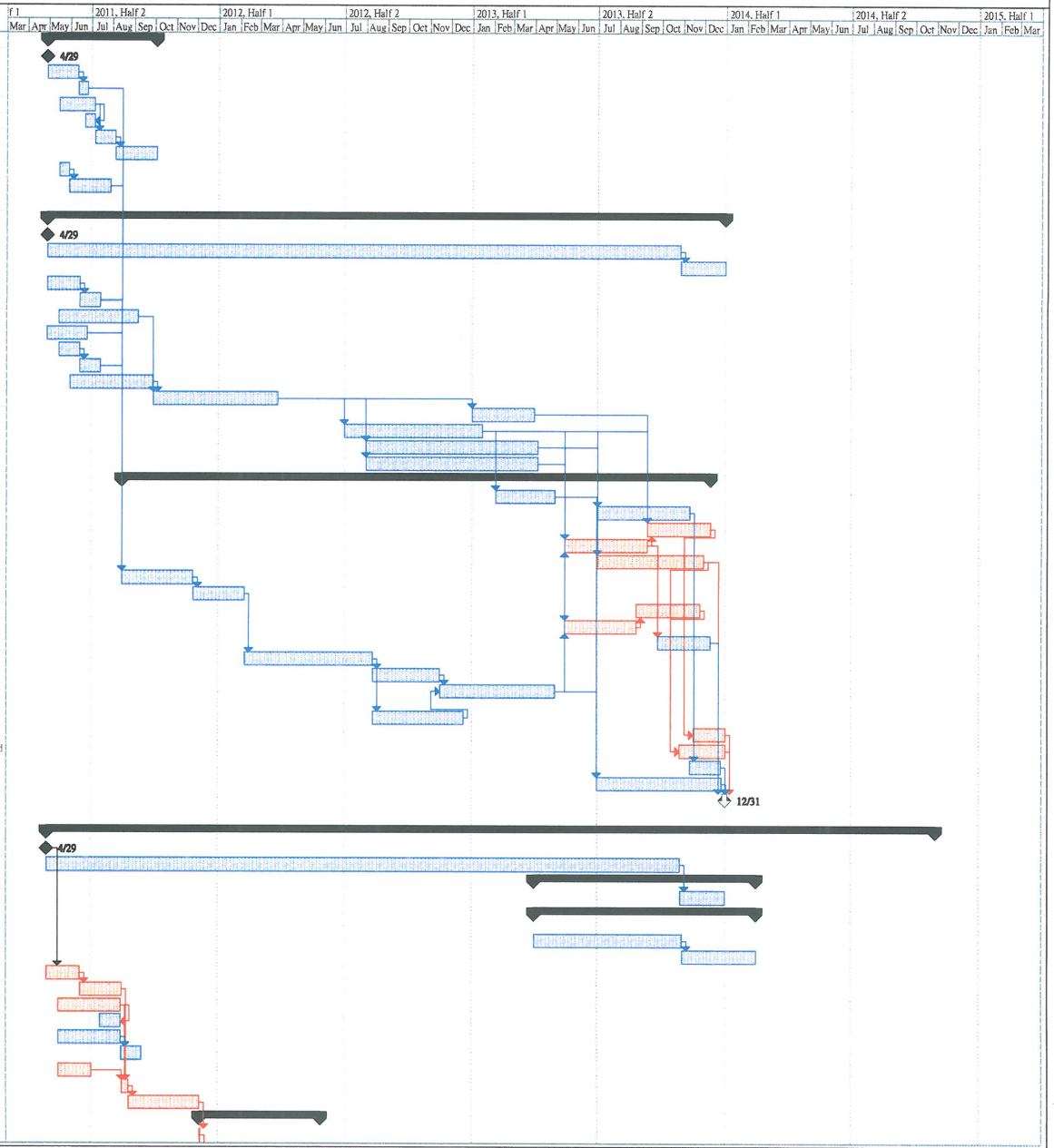
AUES (ET) – Action-United Environmental Services & Consulting

Appendix C

Master Construction Programs of Contract 2

Contract No.: DC/2010/02
Contract Title: Drainage Improvement Works in Shuen Wan and Shek Wu Wai
Updated Programme (No. 6)

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	Sun 11 Jun 12	Sat 11 Jun 25	3
5	Design & Construction of Hoarding	51 days	Mon 11 May 16	Tue 11 Jul 5	
6	Signboard (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 Jul 6	Thu 11 Aug 4	5
8	Construction of Engineer's Site Office	60 days	Fri 11 Aug 5	Mon 11 Oct 3	7
9	Pre-construction Condition Survey	14 days	Mon 11 May 16	Sun 11 May 29	
10	Relocation of Existing Shrines (2 Nos.)	60 days	Mon 11 May 30	Thu 11 Jul 28	9
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 Inclement Weather**	65 days	Mon 13 Oct 28	Tue 13 Dec 31	14
16	Design of TTA	47 days	Fri 11 Apr 29	Tue 11 Jun 14	
17	Submission of TTA to TMLG for Approval	30 days	Wed 11 Jun 15	Thu 11 Jul 14	16
18	Excavation Permit	115 days	Mon 11 May 16	Wed 11 Sep 7	
19	Submission & approval of caluclation & MS for BC (including trench ELS/slope)	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	20
22	Utility detection and diversion programme	120 days	Wed 11 Jun 1	Wed 11 Sep 28	
23	Utilities corordination	180 days	Thu 11 Sep 29	Mon 12 Mar 26	18,22
24	Tempory disconnection of fire hydrant (Bay 7)	90 days	Tue 13 Jan 1	Sun 13 Mar 31	23
25	CLP's overhead pole diversion (bay 1 to Bay 15)	199 days	Sun 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. 724m)**	**849 days**	**Mon 11 Aug 15**	**Tue 13 Dec 10**	
29	**Intake of Box Culvert - in progress**	86 days	Mon 13 Feb 4	Tue 13 Apr 30	25
30	from CH67 to CH127 (Bay 1,2,3,4,5)	133 days	Mon 13 Jul 1	Sun 13 Nov 10	25
31	from CH127 to CH152 (Bay 6,7)	91 days	Wed 13 Sep 11	Tue 13 Dec 10	32,24,25
32	from CH152 to CH200 (Bay 8,9,10,11)	119 days	Wed 13 May 15	Tue 13 Sep 10	41,25
33	from CH200 to CH297 (Bay 12,13,14,15,16,17,18,19)	153 days	Mon 13 Jul 1	Sat 13 Nov 30	26,25
34	**from CH297 to CH334 (Bay 20,21,22) completed**	**103 days**	**Mon 11 Aug 15**	**Fri 11 Nov 25**	**17,19,21,10,4**
35	**from CH334 TO CH395 (Bay 23,24,25,26,27) completed**	**74 days**	**Sat 11 Nov 26**	**Tue 12 Feb 7**	**34**
36	from CH395 to CH419 (Bay 28,29)	92 days	Mon 13 Aug 26	Mon 13 Nov 25	37
37	From CH419 to CH455 (Bay 30,31,32)	103 days	Wed 13 May 15	Sun 13 Aug 25	41,27
38	from CH455 to CH480 (Bay 33,34)	76 days	Thu 13 Sep 26	Tue 13 Dec 10	32FS+15 days
39	**from CH480 to CH541 (Bay 35,36,37,38,39) completed**	**185 days**	**Wed 12 Feb 8**	**Fri 12 Aug 10**	**35**
40	**from CH541 to CH577 (Bay 40,41,42) completed**	97 days	Sat 12 Aug 11	Thu 12 Nov 15	39
41	**from CH577 to CH674 (Bay 43,44,45,46,47,48,49,50) in progress**	166 days	Fri 12 Nov 16	Tue 13 Apr 30	40,42FS-44 days
42	**from CH674 to CH732 (Bay 51,52,53,54,55) completed**	131 days	Sat 12 Aug 11	Wed 12 Dec 19	39
43	RCP (above Bay 6)	46 days	Sat 13 Nov 16	Tue 13 Dec 31	31FS-25 days
44	CCTV Inspection	66 days	Sun 13 Oct 27	Tue 13 Dec 31	36FS-30 days,33FS-35 d
45	Installation of Type 2 Railing at Upstream (CH67 to CH240)	45 days	Mon 13 Nov 11	Wed 13 Dec 25	30
46	Landscape Softwork	180 days	Sun 13 Jan 30	Thu 13 Dec 26	29,41FS+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	Commence 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	EOT due to inclement weather	65 days	Mon 13 Oct 28	Tue 13 Dec 31	51
54	**Utilities in conflict with Construction of Box Culvert at downstream**	**320 days**	**Mon 13 Apr 1**	**Fri 14 Feb 14**	
55	utilities diversions	213 days	Mon 13 Apr 1	Wed 13 Oct 30	
56	construction of remaining 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	50
58	Submission of TTA to TMLG for Approval	60 days	Thu 11 Jun 16	Sun 11 Aug 14	57
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	Sun 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	Thu 11 Aug 25	Sun 11 Dec 4	64
66	**Box Culvert Construction**	**175 days**	**Mon 11 Dec 5**	**Sun 12 May 27**	
67	Implement Stage 2 of TTA	1 day	Mon 11 Dec 5	Mon 11 Dec 5	65

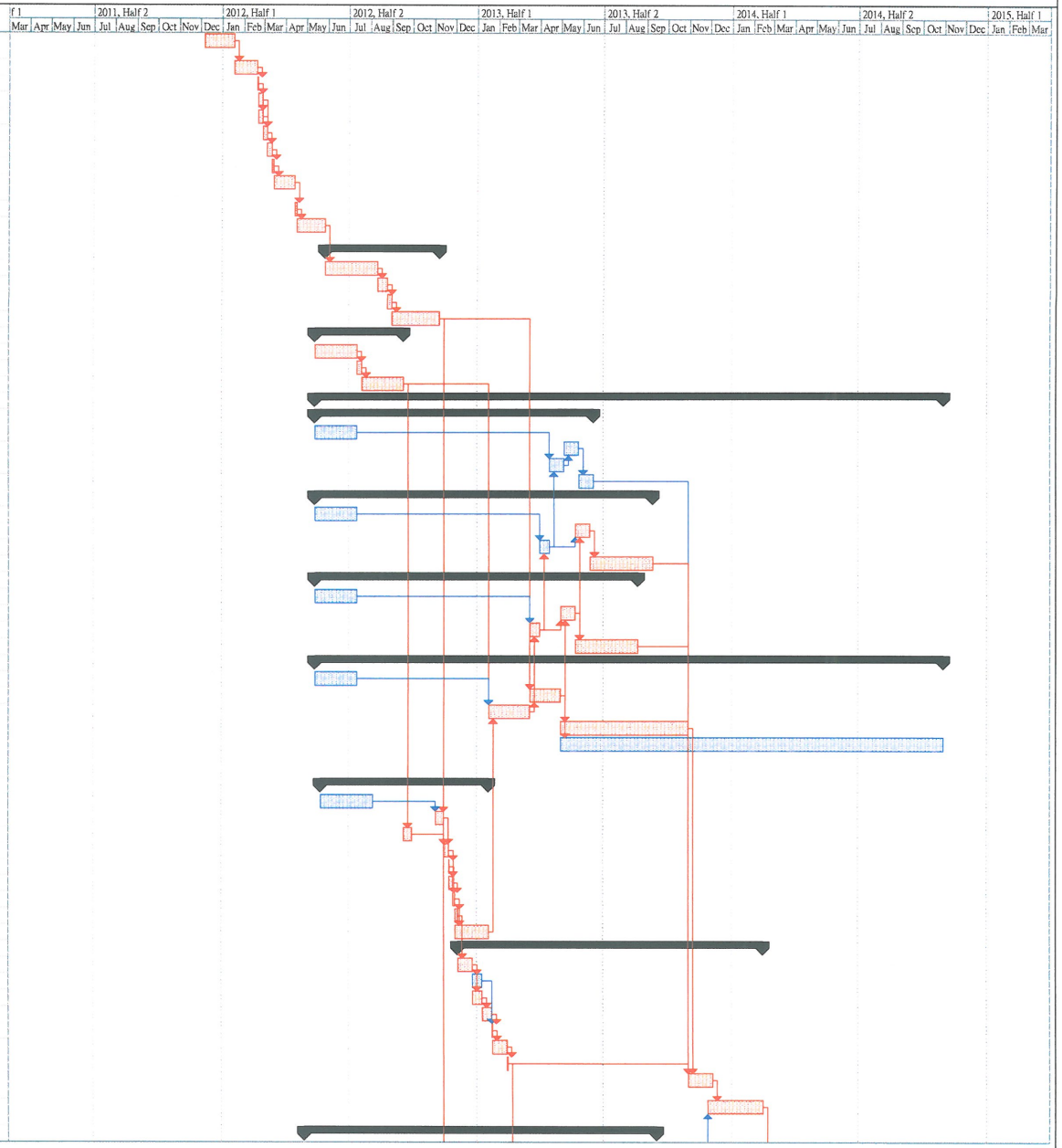


Data Date: 09 Jan 2013
Printed on : 30 March 2013

Task | Milestone | Rolled Up Task | Rolled Up Milestone | Split | Project Summary | Inactive Task | Deadline
Critical Task | Summary | Rolled Up Critical Task | Rolled Up Progress | External Tasks | Group By Summary | Progress

Contract No.: DC/2010/02
Contract Title: Drainage Improvement Works in Shuen Wan and Shek Wu Wai
Updated Programme (No. 6)

ID	Task Name	Duration	Start	Finish	Predecessors
68	Construction of Box Culvert along Castle Peak Road (West Bound) including demolition of ex. BC	43 days	Tue 11 Dec 6	Tue 12 Jan 17	67
69	Temporary carriageway for stage 3 TTA	33 days	Wed 12 Jan 18	Sun 12 Feb 19	68
70	Implement Stage 3 of TTA	1 day	Mon 12 Feb 20	Mon 12 Feb 20	69
71	Trial pit for utilities	7 days	Tue 12 Feb 21	Mon 12 Feb 27	70
72	Construction of steel footbridge	7 days	Tue 12 Feb 21	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 Exisiting Box Culvert (East Bound)	3 days	Mon 12 Mar 12	Wed 12 Mar 14	74
76	Construction of Base Slab & Wall of Box Culvert along Castle Peak Road (East Bound)	30 days	Thu 12 Mar 15	Fri 12 Apr 13	75
77	Remove Temporary flow diversion	3 days	Sat 12 Apr 14	Mon 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 17	Sun 12 May 27	77
79	**Construction of RW1 wing wall portion**	**164 days**	**Mon 12 May 28**	**Wed 12 Nov 7**	
80	CLP (overhead pole) - cable laying	75 days	Mon 12 May 28	Fri 12 Aug 10	78
81	CLP (overhead pole) - changing over	14 days	Sat 12 Aug 11	Fri 12 Aug 24	80
82	*CLP (overhead pole) - removal of overhead pole*	*7 days*	*Sat 12 Aug 25*	*Fri 12 Aug 31*	*81*
83	Retaining wall RW1 - wing wall portion	68 days	Sat 12 Sep 1	Wed 12 Nov 7	82
84	**Construction of RW2 (wing wall)**	**127 days**	**Mon 12 May 14**	**Mon 12 Sep 17**	
85	PCCW - XP application	60 days	Mon 12 May 14	Thu 12 Jul 12	
86	PCCW - demolition of existing joint box/ cable drawpit	7 days	Fri 12 Jul 13	Thu 12 Jul 19	85
87	Retaining wall RW2 (wing wall)	60 days	Fri 12 Jul 20	Mon 12 Sep 17	86
88	**Utilities Diversion by UU**	**900 days**	**Mon 12 May 14**	**Thu 14 Oct 30**	
89	**CLP (2no. 11kV cables)**	**399 days**	**Mon 12 May 14**	**Sun 13 Jun 16**	
90	CLP (2 no. 11kV cables) - XP application	60 days	Mon 12 May 14	Thu 12 Jul 12	
91	CLP (2 no. 11kV cables) - ducting & cable works (near RW1)	21 days	Mon 13 May 6	Sun 13 May 26	92
92	CLP (2 no. 11kV cables) - ducting & cable works (near RW2)	21 days	Mon 13 Apr 15	Sun 13 May 5	90,97
93	CLP (2 no. 11kV cables) - changing over	21 days	Mon 13 May 27	Sun 13 Jun 16	91
94	**NWT**	**484 days**	**Mon 12 May 14**	**Mon 13 Sep 9**	
95	NWT - XP application	60 days	Mon 12 May 14	Thu 12 Jul 12	
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 Jun 12	Mon 13 Sep 9	96
99	**HGC**	**463 days**	**Mon 12 May 14**	**Mon 13 Aug 19**	
100	HGC - XP application	60 days	Mon 12 May 14	Thu 12 Jul 12	
101	HGC - manholes & ducting construction works (near RW1)	21 days	Wed 13 May 1	Tue 13 May 21	102,106
102	HGC - manholes & ducting construction works (near RW2)	14 days	Mon 13 Mar 18	Sun 13 Mar 31	100,107
103	HGC - diversion & changing over	90 days	Wed 13 May 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	Thu 12 Jul 12	
106	PCCW - manholes & ducting construction works (near RW1)	44 days	Mon 13 Mar 18	Tue 13 Apr 30	83,107
107	PCCW - manholes & ducting construction works (near RW2)	59 days	Fri 13 Jan 18	Sun 13 Mar 17	87,105,119
108	PCCW - diversion & changing over (local cables)	183 days	Wed 13 May 1	Wed 13 Oct 30	106
109	PCCW - diversion & changing over (overseas cables - about 4 nos.) - to be hanged up for construction of remaining Box Culvert	548 days	Wed 13 May 1	Thu 14 Oct 30	106
110	**WSD**	**241 days**	**Tue 12 May 22**	**Thu 13 Jan 17**	
111	WSD - material delivery	75 days	Tue 12 May 22	Sat 12 Aug 4	
112	WSD - pipes frabrication, installation & laying (near RW1)	12 days	Sat 12 Nov 3	Wed 12 Nov 14	83FS-5 days,111
113	WSD - pipes frabrication, installation & laying (near RW2)	12 days	Tue 12 Sep 18	Sat 12 Sep 29	87
114	WSD - excavation of connection points	7 days	Thu 12 Nov 15	Wed 12 Nov 21	112,113
115	WSD - inspection of connection points with WSD	1 day	Thu 12 Nov 22	Thu 12 Nov 22	114
116	WSD - swabling/ flushing/ sterilization	6 days	Thu 12 Nov 22	Tue 12 Nov 27	114
117	WSD - shutdown & commissioning by WSD	3 days	Wed 12 Nov 28	Fri 12 Nov 30	116,115
118	WSD - removal of disused pipes/ reinstatement	4 days	Sat 12 Dec 1	Tue 12 Dec 4	117
119	WSD - diversion of 3 nos. dia.25 pipes	48 days	Sat 12 Dec 1	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. footway at downstream	14 days	Wed 12 Dec 26	Tue 13 Jan 8	121
123	Backfilling and removal of temporary works	14 days	Wed 12 Dec 26	Tue 13 Jan 8	121
124	Temporary road surface for East Bound	14 days	Wed 13 Jan 9	Tue 13 Jan 22	123
125	Resume the east bound traffic	1 day	Wed 13 Jan 23	Wed 13 Jan 23	122,124
126	Temporary road surface for West Bound	21 days	Thu 13 Jan 24	Wed 13 Feb 13	125
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	127,108,93,98,103
129	Implementation of TTA, Permanent road surface & Paving block for footpath and associated works	79 days	Thu 13 Nov 28	Fri 14 Feb 14	128FS-7 days,136
130	**Retaining Wall RW1 & Access Ramp**	**505 days**	**Sun 12 Apr 29**	**Sun 13 Sep 15**	

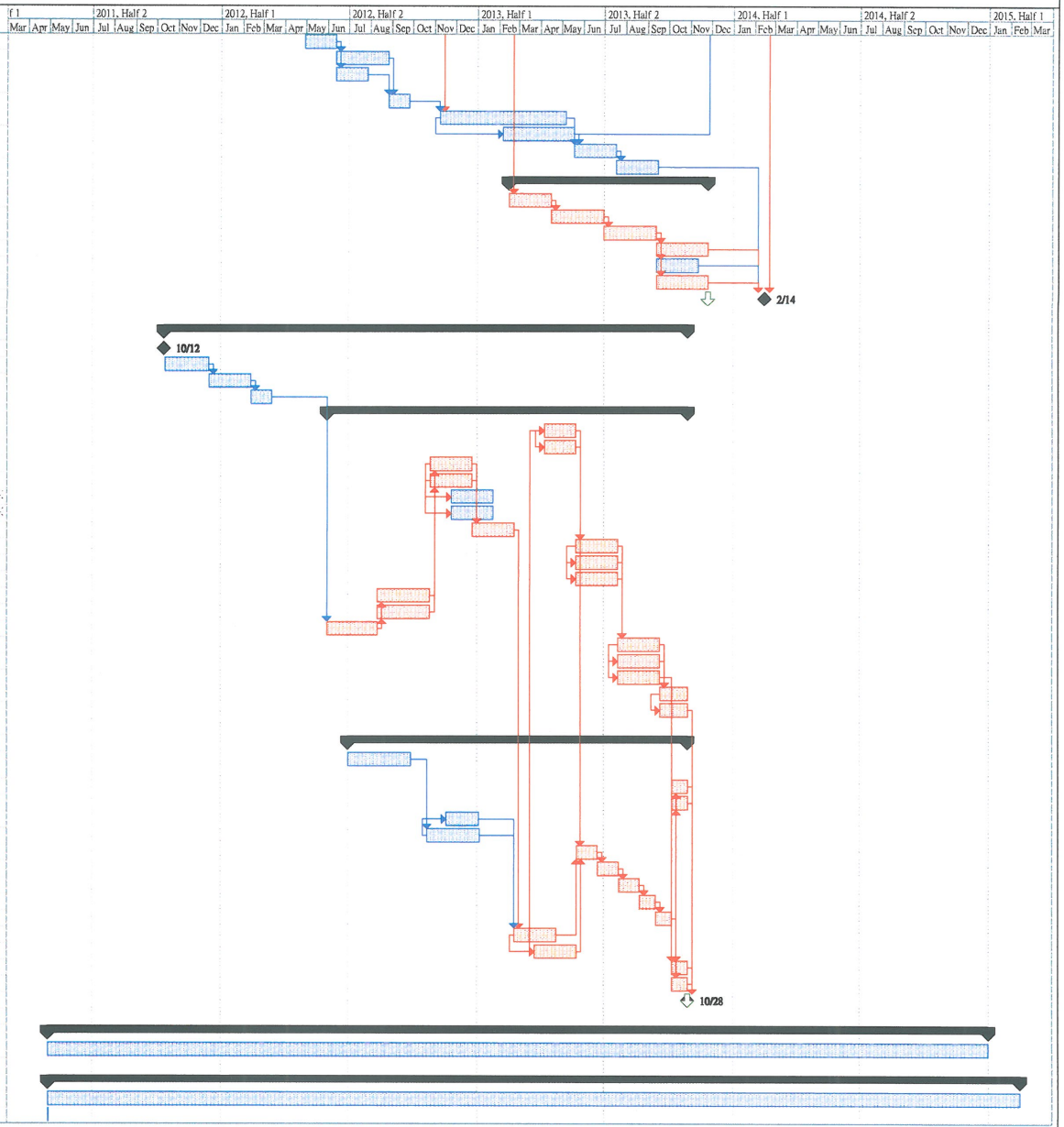


Data Date: 09 Jan 2013
Printed on : 30 March 2013

Task | Milestone | Rolled Up Task | Rolled Up Milestone | Split | Project Summary | Inactive Task | Deadline
Critical Task | Summary | Rolled Up Critical Task | Rolled Up Progress | External Tasks | Group By Summary | Progress

Contract No.: DC/2010/02
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 29	Tue 12 Jun 12	
132	Relocation of fire hydrant	75 days	Wed 12 Jun 13	Sun 12 Aug 26	131
133	Coordination with RMO & TD to finalize the implementation date of TTA at San Tin Tsuen Road	45 days	Wed 12 Jun 13	Fri 12 Jul 27	131
134	Implementation of TTA at San Tin Tsuen Road	30 days	Mon 12 Aug 27	Tue 12 Sep 25	132,133
135	Construction of RW1	180 days	Thu 12 Nov 8	Mon 13 May 6	83,134
136	Construction of access ramp	102 days	Wed 13 Feb 6	Sat 13 May 18	135SS+90 days
137	Construction of concrete parapet	60 days	Sun 13 May 19	Wed 13 Jul 17	136,135
138	Installation of railing and vehicular gate	60 days	Thu 13 Jul 18	Sun 13 Sep 15	137
139	**Retaining Wall RW3 & RW4**	**284 days**	**Fri 13 Feb 15**	**Mon 13 Nov 25**	
140	Removal of steel road bridge at upstream	60 days	Fri 13 Feb 15	Mon 13 Apr 15	127
141	Construction of RW4	75 days	Tue 13 Apr 16	Sat 13 Jun 29	140
142	Construction of RW3	75 days	Sun 13 Jun 30	Thu 13 Sep 12	141
143	UU diversion/ permanent works	74 days	Fri 13 Sep 13	Mon 13 Nov 25	142
144	Installation of Type 2 railing and construction of flood wall	60 days	Fri 13 Sep 13	Mon 13 Nov 11	142
145	Reinstatement of footpath and planter areas	74 days	Fri 13 Sep 13	Mon 13 Nov 25	142
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)**	**748 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	63 days	Thu 11 Oct 13	Wed 11 Dec 14	
151	Submission of design & works proposal for Approval	60 days	Thu 11 Dec 15	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 Jun 1**	**Mon 13 Oct 28**	
154	Bay 1	45 days	Sun 13 Apr 7	Tue 13 May 21	185SS+14 days
155	Bay 2	45 days	Sun 13 Apr 7	Tue 13 May 21	154SS
156	Bay 3	60 days	Fri 12 Oct 26	Mon 12 Dec 24	164,165
157	Bay 4	60 days	Fri 12 Oct 26	Mon 12 Dec 24	164,165
158	Bay 5	60 days	Sun 12 Nov 25	Wed 13 Jan 23	156SS+30 days,157SS+.
159	Bay 6	60 days	Sun 12 Nov 25	Wed 13 Jan 23	156SS+30 days,157SS+.
160	Bay 7	60 days	Tue 12 Dec 25	Fri 13 Feb 22	156,157
161	Bay 8	60 days	Wed 13 May 22	Sat 13 Jul 20	154,155
162	Bay 9	60 days	Wed 13 May 22	Sat 13 Jul 20	161SS
163	Bay 10	60 days	Wed 13 May 22	Sat 13 Jul 20	161SS
164	Bay 11	75 days	Sun 12 Aug 12	Thu 12 Oct 25	166
165	Bay 12	75 days	Sun 12 Aug 12	Thu 12 Oct 25	166
166	Bay 13	72 days	Fri 12 Jun 1	Sat 12 Aug 11	152
167	Bay 14	60 days	Sun 13 Jul 21	Wed 13 Sep 18	161,162,163
168	Bay 15	60 days	Sun 13 Jul 21	Wed 13 Sep 18	167SS
169	Bay 16	60 days	Sun 13 Jul 21	Wed 13 Sep 18	167SS
170	Bay 17	40 days	Thu 13 Sep 19	Mon 13 Oct 28	167,168,169
171	Bay 18 and Outfall	40 days	Thu 13 Sep 19	Mon 13 Oct 28	170SS
172					
173	**Construction of box culvert (1m x 1m) Bay 1 to Bay 8 (approx. 95m)**	**485 days**	**Sun 12 Jul 1**	**Mon 13 Oct 28**	
174	Notification to villagers regarding traffic arrangement for construction of 1m x 1m 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	183
176	Bay 1	23 days	Sun 13 Oct 6	Mon 13 Oct 28	183
177	Bay 2	47 days	Sun 12 Nov 18	Thu 13 Jan 3	178SS+27 days
178	Bay 3	75 days	Mon 12 Oct 22	Fri 13 Jan 4	174
179	Bay 4	30 days	Thu 13 May 23	Fri 13 Jun 21	154,155,184,185
180	Bay 5	30 days	Sat 13 Jun 22	Sun 13 Jul 21	179
181	Bay 6	30 days	Mon 13 Jul 22	Tue 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	Sat 13 Feb 23	Tue 13 Apr 23	177,178,160
185	Bay 10	60 days	Sun 13 Mar 24	Wed 13 May 22	184SS+29 days
186	CCTV inspection of box culvert	23 days	Sun 13 Oct 6	Mon 13 Oct 28	183,169
187	Grouting of existing 900mm storm drain	23 days	Sun 13 Oct 6	Mon 13 Oct 28	183
188	**Completion of Section III**	0 days	Mon 13 Oct 28	Mon 13 Oct 28	171,175,176,186,187
189					
190	**Section IV (Portion A1 and A2, Shuen Wan)**	**1343 days**	**Fri 11 Apr 29**	**Wed 14 Dec 31**	
191	Landscape Establishment Works and preservation & protection of trees	1343 days	Fri 11 Apr 29	Wed 14 Dec 31	
192					
193	**Section V (Portion B, Sheck 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		1 day?	Fri 11 Apr 29	Fri 11 Apr 29	



Data Date: 09 Jan 2013
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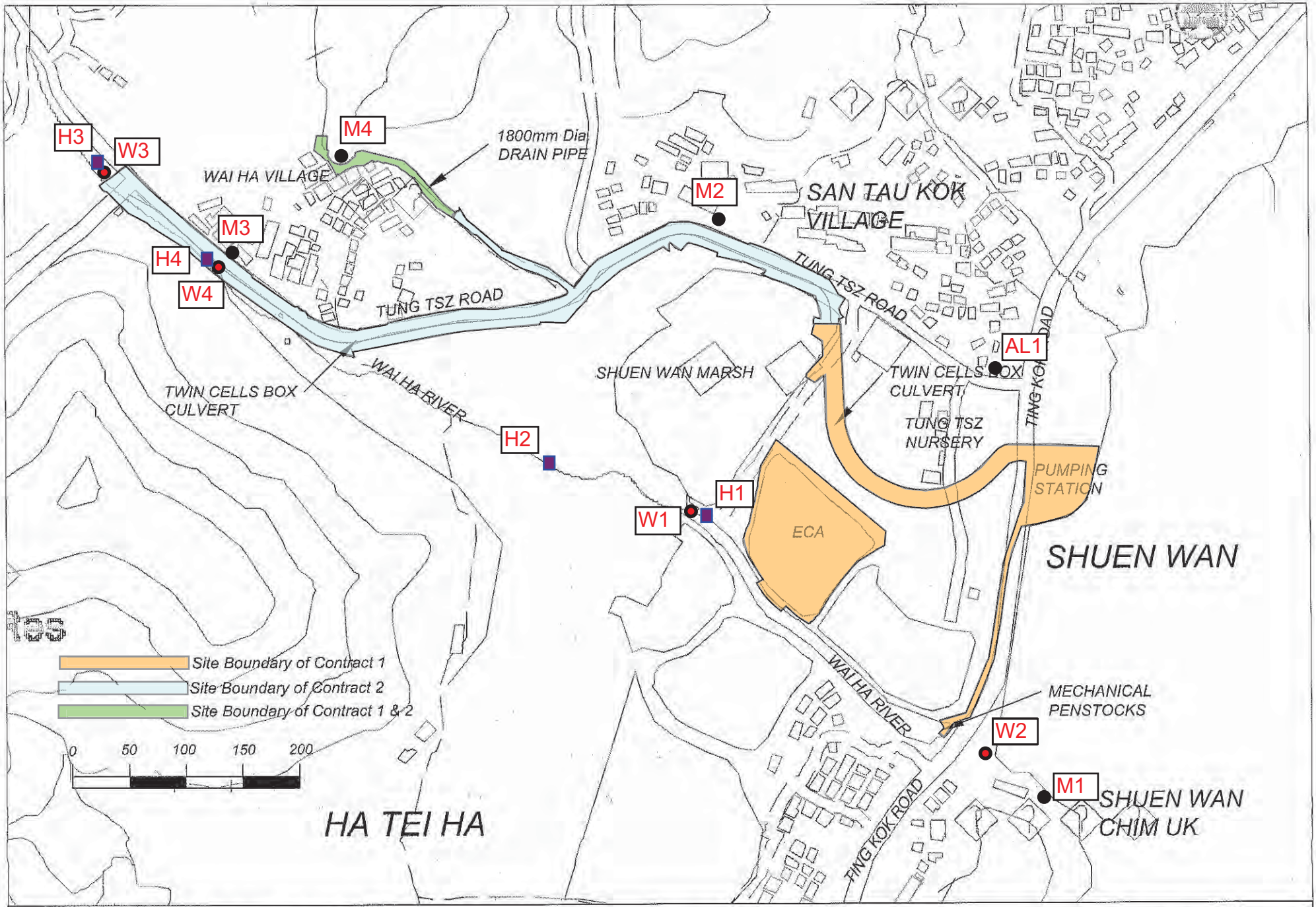
Task | Milestone | Rolled Up Task | Rolled Up Milestone | Split | Project Summary | Inactive Task | Deadline
Critical Task | Summary | Rolled Up Critical Task | Rolled Up Progress | External Tasks | Group By Summary | Progress

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

NOT APPLICABLE

Appendix F

Event and Action Plan

Event Action Plan for Construction Noise

EVENT	ACTION			
	ET Leader	IEC	ER	Contractor
Action Level	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.	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	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.	1. Submit noise mitigation proposals to IEC 2. Implement noise mitigation proposals
Limit Level	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.	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	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	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	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, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, Engineer and Contractor; 6. Ensure mitigation measures are implemented. 7. Repeat measurement on next day of exceedance.	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.	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.	1. Inform Engineer and confirm in writing notification of the non-compliance; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes in working methods; 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	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, all plant, equipment and Contractor's working methods; 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 exeedance.	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.	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.	1. Inform Engineer and confirm in writing notification of the non-compliance; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes in working methods; 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	1. Repeat in-situ measurements to confirm findings; 2. Identify reasons for non-compliance and source(s) of impact; 3. Inform EPD, IEC, Contractor and Engineer; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 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.	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.	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.	1. Inform Engineer and confirm in writing notification of the non-compliance; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes in working methods; 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	1. Repeat in-situ measurements to confirm findings; 2. Identify reasons for non-compliance and source(s) of impact; 3. Inform EPD, IEC, Contractor and Engineer; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 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.	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.	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.	1. Inform Engineer and confirm in writing notification of the non-compliance; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes in working methods; 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.

Event and action Plan for Hydrological Characteristics

Event	ET Leader	IEC	ER	Contractor
ACTION LEVEL				
Action level being exceeded by one sampling day	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.	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.	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.	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	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 exeedance.	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.	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.	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	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.	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.	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.	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	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.	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.	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.	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 – November 2014

Date		Stream Monitoring		Noise Monitoring
		Water Sampling	Flow Monitoring	
Sat	1-Nov-14			
Sun	2-Nov-14			
Mon	3-Nov-14			
Tue	4-Nov-14			
Wed	5-Nov-14			
Thu	6-Nov-14			
Fri	7-Nov-14		**H1, H2, H3, H4**	
Sat	8-Nov-14			
Sun	9-Nov-14			
Mon	10-Nov-14			
Tue	11-Nov-14			
Wed	12-Nov-14			
Thu	13-Nov-14			
Fri	14-Nov-14			
Sat	15-Nov-14	***Suspension***	**H1, H2, H3, H4**	***Suspension***
Sun	16-Nov-14			
Mon	17-Nov-14			
Tue	18-Nov-14			
Wed	19-Nov-14			
Thu	20-Nov-14			
Fri	21-Nov-14		**H1, H2, H3, H4**	
Sat	22-Nov-14			
Sun	23-Nov-14			
Mon	24-Nov-14			
Tue	25-Nov-14			
Wed	26-Nov-14			
Thu	27-Nov-14			
Fri	28-Nov-14			
Sat	29-Nov-14		**H1, H2, H3, H4**	
Sun	30-Nov-14			

Note:

ET of the Contract 2 undertaken Monitoring Location including

Water Quality – W1, W2, W3 and W4

Flow Measurement – H1, H2, H3 and H4

Construction Noise –M1, AL1, M2, M3 and M4

	Monitoring Day
	Sunday or Public Holiday

Monitoring Schedule for next Reporting Period – December 2014

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

Note:

ET of the Contract 2 undertaken Monitoring Location including

Water Quality – W1, W2, W3 and W4
Flow Measurement – H1, H2, H3 and H4
Construction Noise –M1, AL1, M2, M3 and M4

Remarks

- *The water quality and construction noise monitoring will be resumed on 5 December 2014*
- *Estimate time of Flow monitoring on 11 Dec 2014 (Mid-Flood) will be around 10:15 and on 27 Dec 2014 (Mid-ebb) will be around 17:00.*

	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-Nov-14	Sat	Mainly cloudy. Moderate to fresh easterly winds.	0	25	78.7	4.5	N/NE
2-Nov-14	Sun	Mainly cloudy. Moderate to fresh easterly winds.	Trace	24.5	73	9	N/NE
3-Nov-14	Mon	Cloudy with a few rain patches. Moderate to fresh easterly winds.	Trace	20.9	60	8.2	N/NW
4-Nov-14	Tue	Cloudy with a few rain patches. Moderate to fresh easterly winds.	Trace	22	72.5	5.5	E
5-Nov-14	Wed	Mainly cloudy. Moderate to fresh easterly winds.	Trace	23.7	77	8	E/NE
6-Nov-14	Thu	Mainly cloudy. Moderate to fresh easterly winds.	0.1	23.7	77.5	5	N/NE
7-Nov-14	Fri	Cloudy with a few rain patches. Moderate to fresh easterly winds.	11.8	22.4	88.5	7.2	E/NE
8-Nov-14	Sat	Mainly cloudy. Visibility relatively low in some areas. Moderate northeasterly winds.	18	20	92.2	8.2	N/NE
9-Nov-14	Sun	Mainly cloudy. Visibility relatively low in some areas. Moderate northeasterly winds.	Trace	20.8	83.7	6.5	N
10-Nov-14	Mon	Mainly cloudy. Visibility relatively low in some areas. Moderate northeasterly winds.	Trace	22.6	79.2	7.7	E
11-Nov-14	Tue	Mainly cloudy. Moderate north to northeasterly winds.	0	23.1	80	5.8	E/NE
12-Nov-14	Wed	Mainly cloudy. Moderate north to northeasterly winds.	Trace	20	79.7	6.5	N/NE
13-Nov-14	Thu	Fine and dry. Moderate north to northeasterly winds, fresh at times.	Trace	19	82	9.3	N/NE
14-Nov-14	Fri	Mainly cloudy. Moderate north to northeasterly winds.	Trace	19.6	76.5	6.1	N/NE
15-Nov-14	Sat	Fine and dry. Moderate north to northeasterly winds, fresh at times.	0.4	22.2	73	8.2	E/NE
16-Nov-14	Sun	Fine and dry. Moderate north to northeasterly winds, fresh at times.	0	21.7	74.2	7.5	N/NE
17-Nov-14	Mon	Fine and dry. Moderate to fresh north to northeasterly winds.	0	20.5	65.2	9.1	N/NE
18-Nov-14	Tue	Mainly fine and dry. Moderate northeasterly winds, fresh at times.	Trace	19.6	65	8.1	N
19-Nov-14	Wed	Mainly fine and dry. Moderate northeasterly winds, fresh at times.	Trace	20.2	67.5	5	N/NE
20-Nov-14	Thu	Mainly fine. Moderate easterly winds.	0	21.3	70	7.5	E/SE
21-Nov-14	Fri	Mainly fine. Moderate easterly winds.	0	22	70	6.5	N/NE
22-Nov-14	Sat	Mainly fine. Moderate easterly winds.	0	22.1	75.7	7	E/SE
23-Nov-14	Sun	Mainly fine. Moderate easterly winds.	0	23.2	75	8.1	E/NE
24-Nov-14	Mon	Mainly fine. Moderate easterly winds.	0	23.6	55.5	6.5	E/SE
25-Nov-14	Tue	Fine. Light winds.	0	23.5	77.5	6	E/SE
26-Nov-14	Wed	Cloudy. A few rain patches tomorrow. Fresh easterly winds.	0	22.2	80.7	7.8	E/SE
27-Nov-14	Thu	Mainly cloudy. Sunny intervals in the afternoon. Moderate easterly winds, fresh at times.	0.4	22.2	79.2	7.4	E/NE
28-Nov-14	Fri	Fine. Light winds.	Trace	23.1	83.2	4.6	E/NE
29-Nov-14	Sat	Cloudy. A few rain patches tomorrow. Fresh easterly winds.	0.2	23.4	85	6.6	E/NE
30-Nov-14	Sun	Mainly fine. Moderate easterly winds.	0.2	24.3	88.5	6	N/NE

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

Appendix I

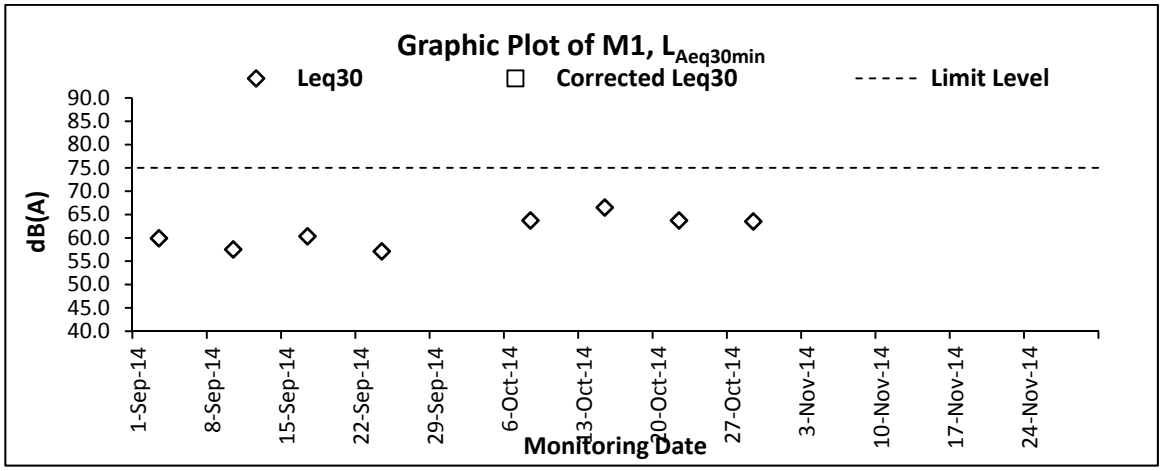
Data Base of Monitoring Results

Not Applicable

Appendix J

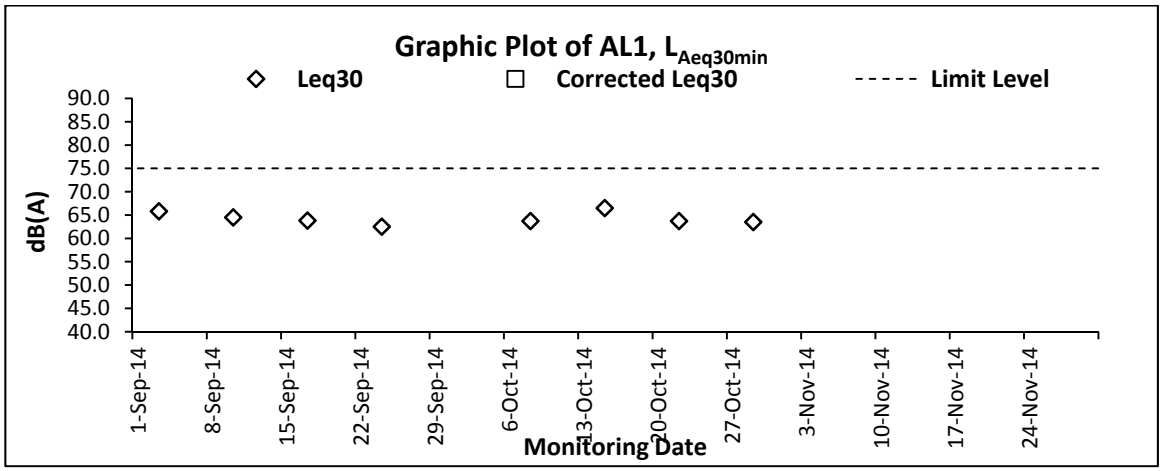
Graphical Plots of Impact Monitoring – Noise, Water Quality and Hydrological Characteristics

Graphic Plot – Construction Noise



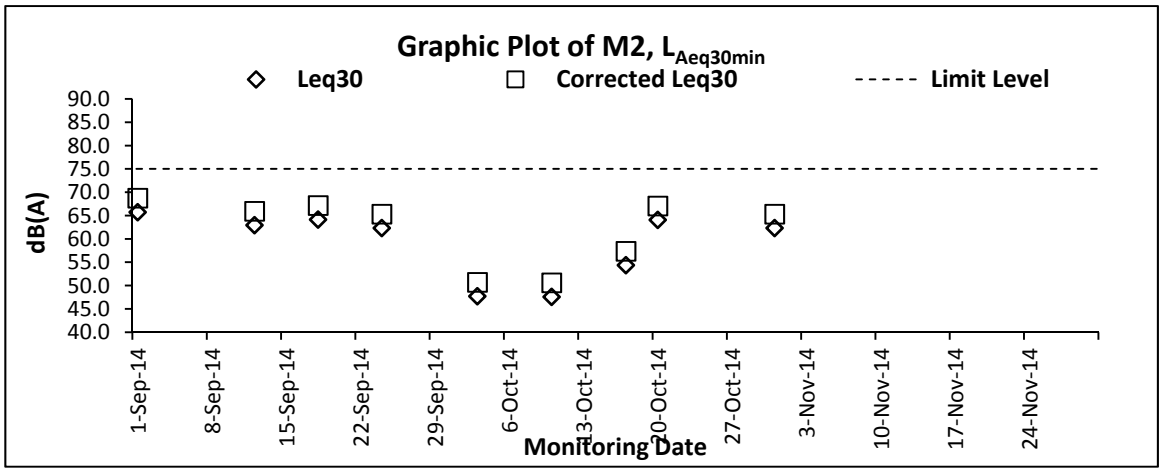
Remarks:

1. *No Noise monitoring conducted in November 2014*
2. *The monitoring is undertaken under façade situation. No façade correction is added according to acoustical principles and EPD guidelines*



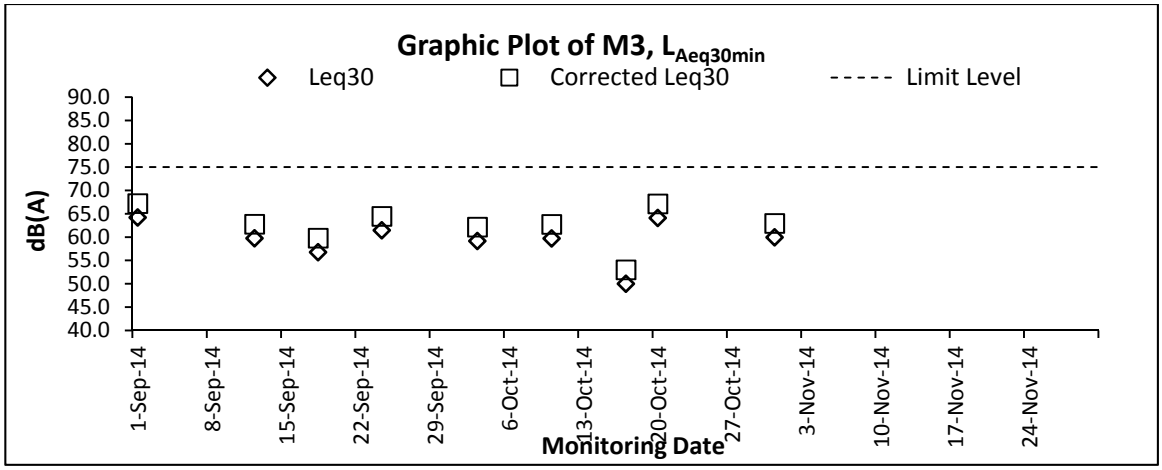
Remarks:

1. *No Noise monitoring conducted in November 2014*
2. *The monitoring is undertaken under façade situation. No façade correction is added according to acoustical principles and EPD guidelines*



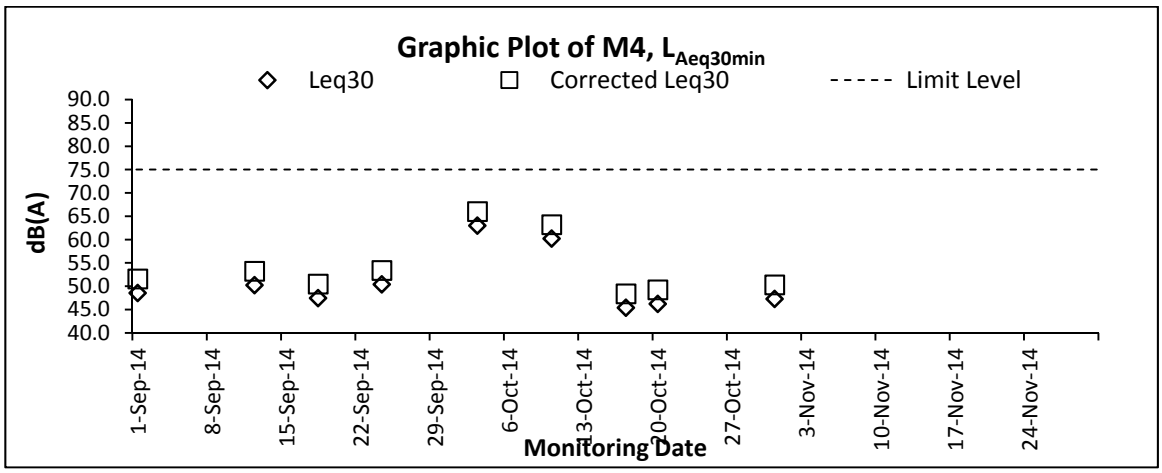
Remarks:

1. *No Noise monitoring conducted in November 2014*
2. *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.*



Remarks:

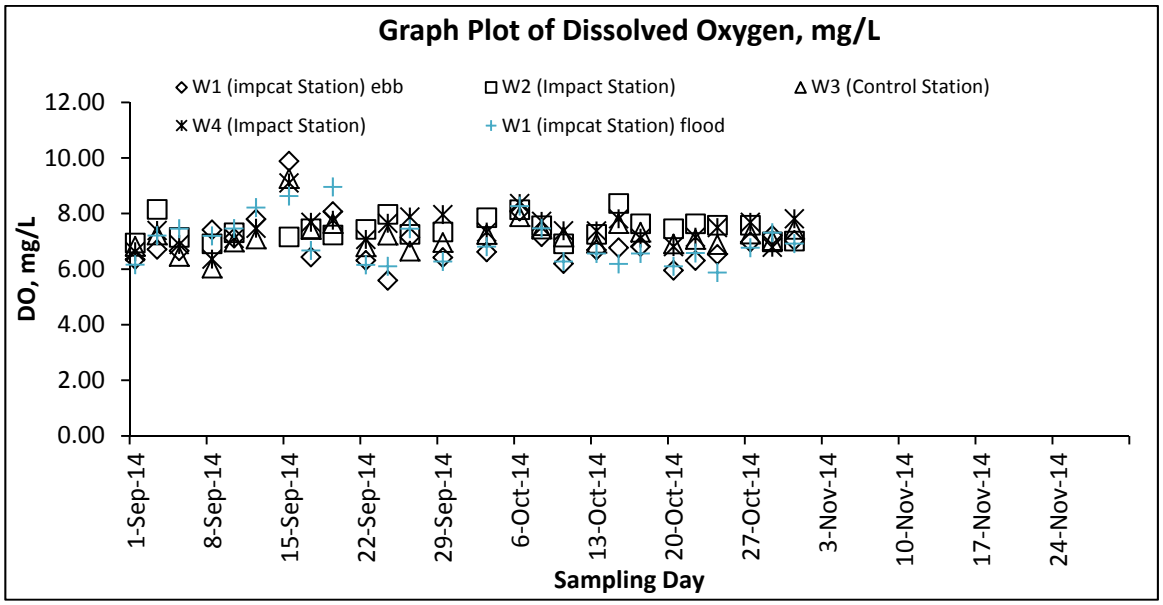
1. *No Noise monitoring conducted in November 2014*
2. *The monitoring is undertaken under free field situation. A façade correction of +3 dB(A) has been added according to acoustical principles and EPD guidelines.*



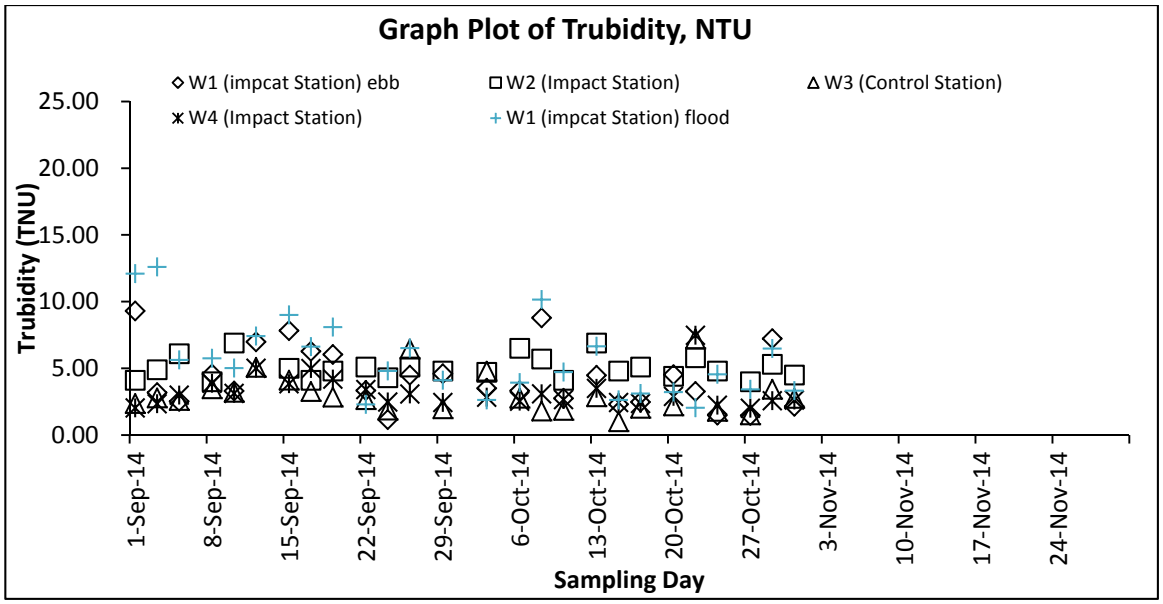
Remarks:

1. *No Noise monitoring conducted in November 2014*
2. *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.*

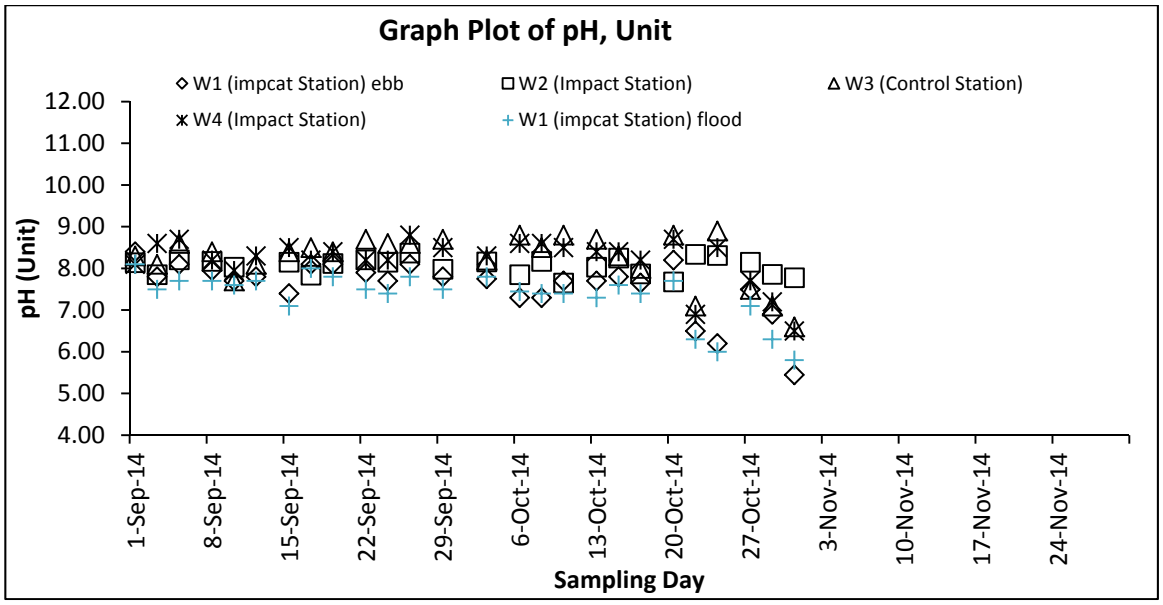
Graphic Plot – Water Quality



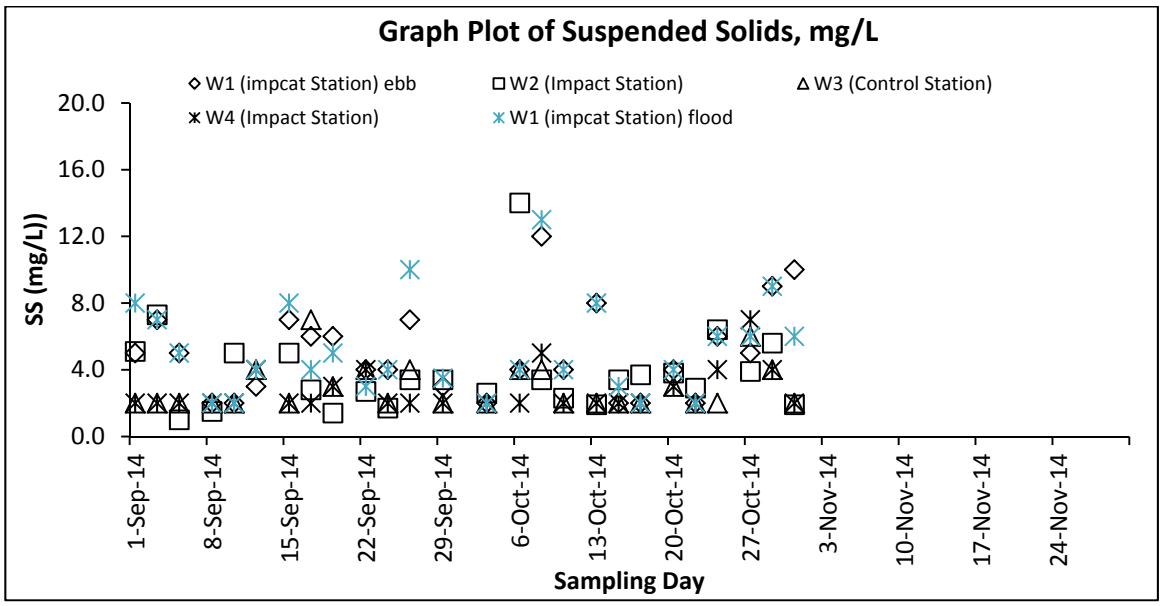
Remarks: No Water Quality monitoring conducted in November 2014



Remarks: No Water Quality monitoring conducted in November 2014

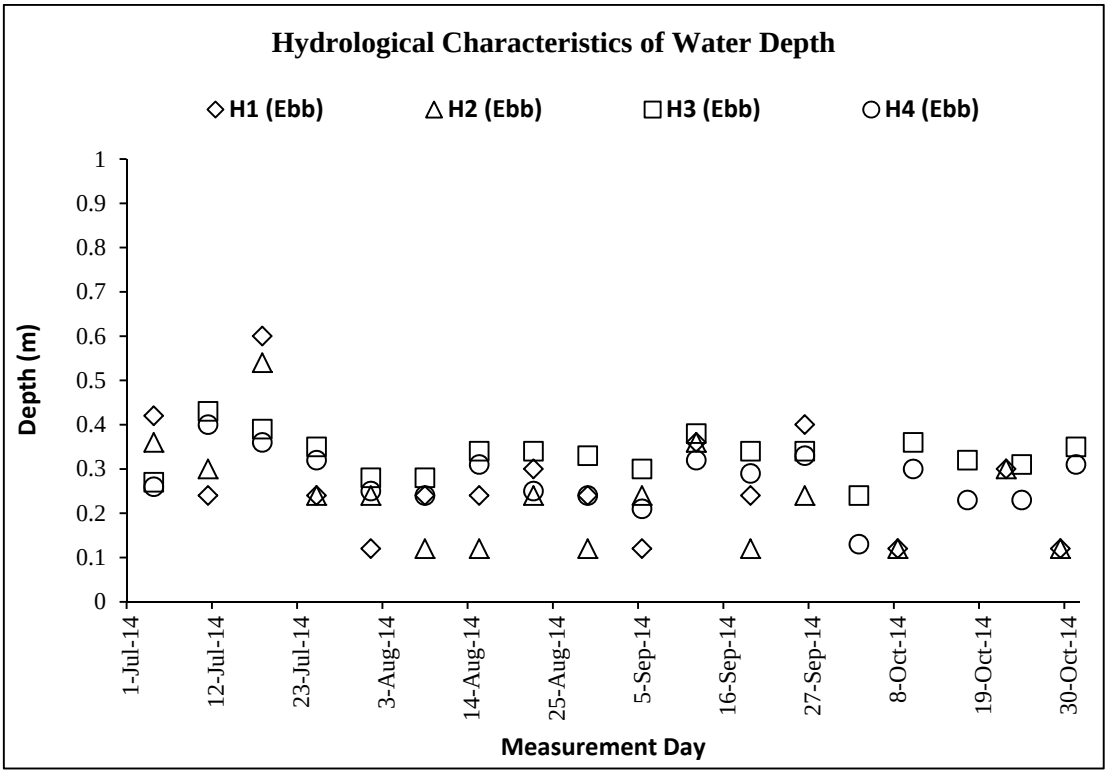


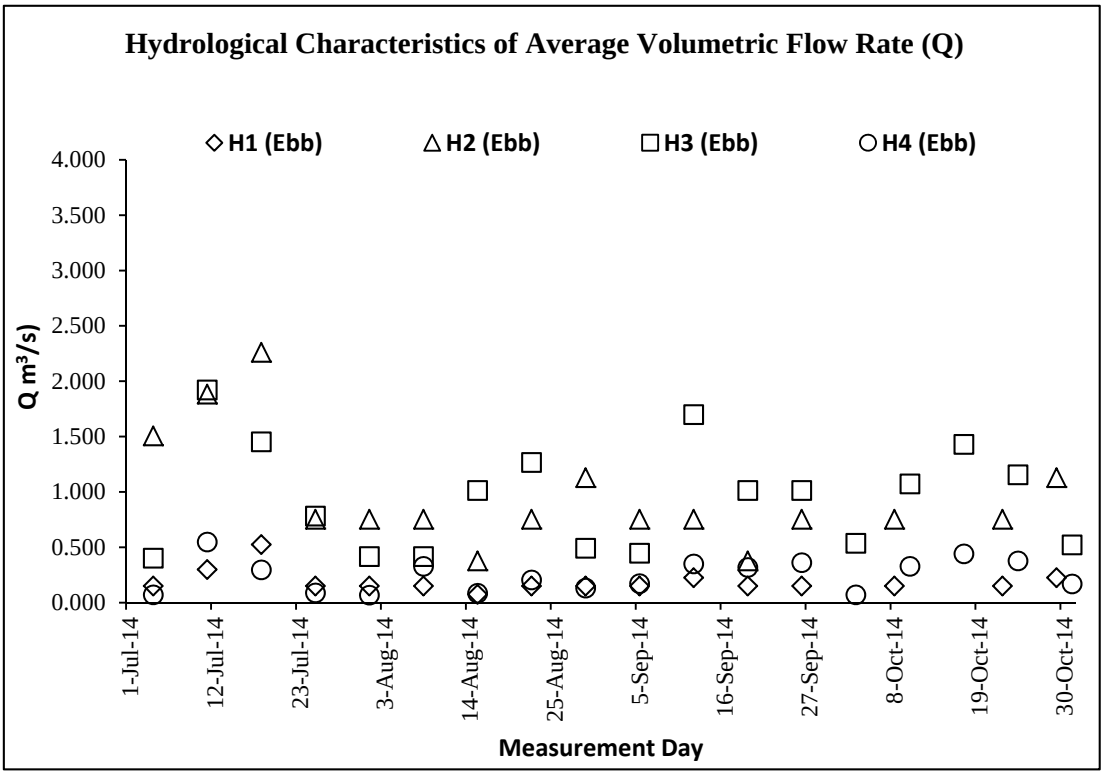
Remarks: No Water Quality monitoring conducted in November 2014



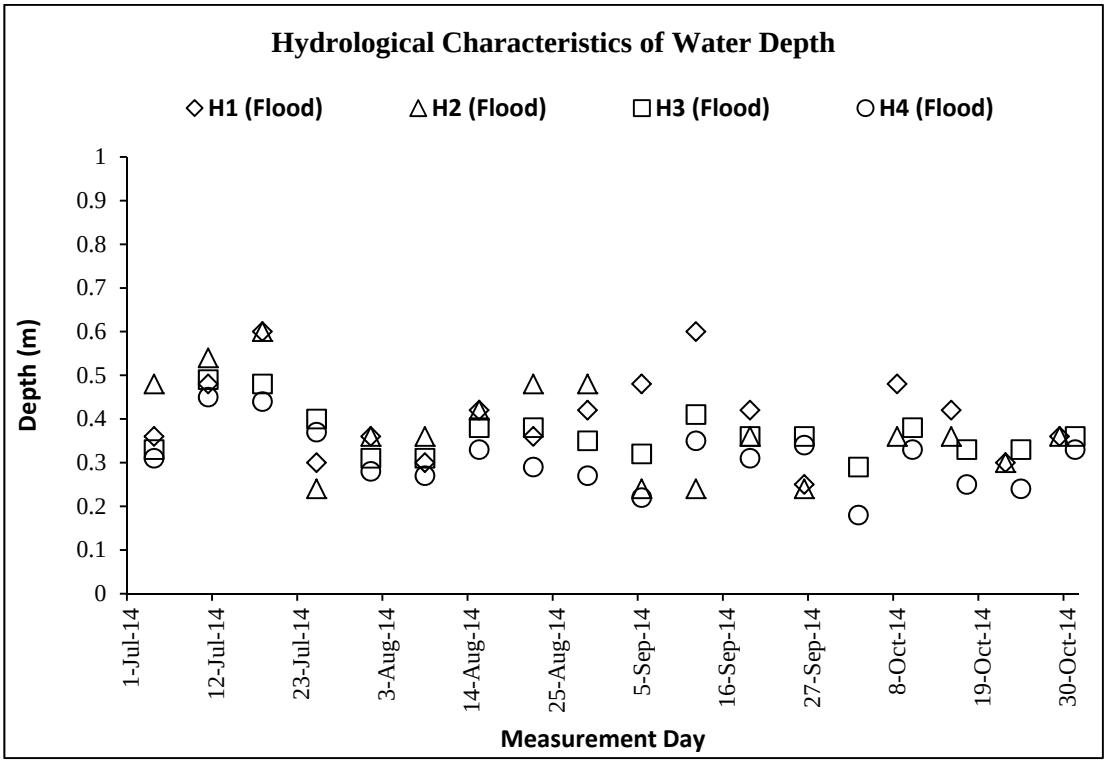
Remarks: No Water Quality monitoring conducted in November 2014

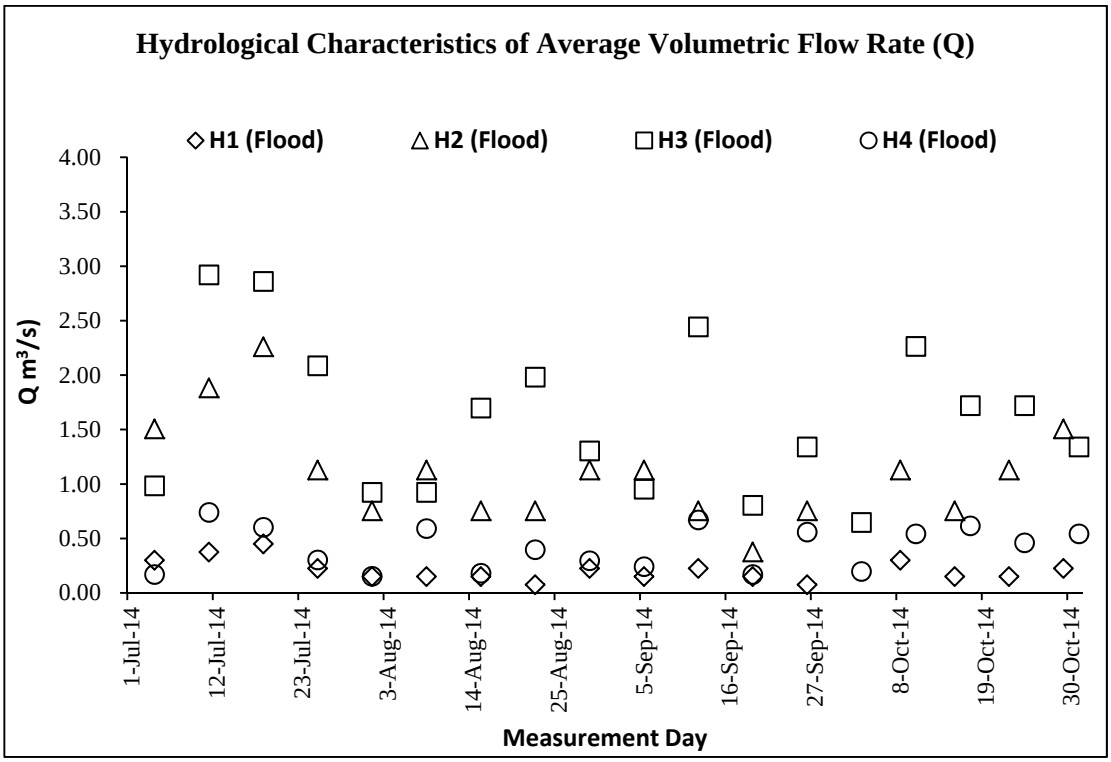
Graphic Plot – Hydrological Characteristics (Ebb Tide)





Graphic Plot – Hydrological Characteristics (Flood Tide)





Appendix K

Monthly Summary Waste Flow Table

Kwan Lee - Kuly Joint Venture
Environmental Management Plan for Contract No. DC/2010/02
Drainage Improvement Works in Shuen Wan and Shek Wu Wai

Name of Department: DSD

Monthly Summary Waste Flow Table

Month	Actual Quantities of Inert C & D Materials Generated Monthly						Actual Quantities of C & D Wastes Generated Monthly				
	Total Quantity Generated	Hard Rock and Large Broken Concrete	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'000kg)	(in'000kg)	(in'000kg)	(in'000kg)	(in'000m^3)
Jan-14	0.435	-	-	-	0.435	-	-	-	-	-	0.015
Feb-14	0.215	-	-	-	0.215	-	-	-	-	-	0
Mar-14	0.036	-	-	-	0.036	-	-	-	-	-	0
Apr-14	0.333	-	-	-	0.333	-	-	-	-	-	0
May-14	0.333	-	-	-	0.333	-	-	-	-	-	0
Jun-14	1.776				1.776						0
Jul-14	0.461				0.461						0
Aug-14	2.187				2.187						0
Sep-14	0.000				0.000						0
Oct-14	0.680				0.680						0
Nov-14											0.09
Dec-14											- - - -
Total	6.456	-	-	-	6.456	-	-	-	-	-	0.12

Forecast of Total Quantities of C & D Materials to be Generated from the Contract											
	Total Quantity Generated	Hand 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'000kg)	(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 PS Clause 26.23(14).
(2) The waste flow table shall also include C & D materials that are specified in the Contract to be imported for used at the Sites.
(3) Plastics refer to plastics bottles/containers, plastic sheets/foam from packaging materials.
(4) The summary table shall be submitted to the Engineer's Representative monthly together with the Waste Flow Table for review and monitoring in accordance with the PS Clause 25.20A(4)

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 (m^3)	Actual Quantities used (m^3)	Remarks
1	Formwork for concreting	Easy handle by manpower	2	1.1	
2					
3					
4					
5					
6					
7					
		Total estimated Quantity of timber Used	2		

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 Engineer's Representative monthly together with the Waste Flow Table for review and monitoring in accordance with the PS Clause 25.20A(5)

Appendix L

Monthly Landscape & Visual Inspection Report

Contract No. DC/2009/22
Drainage Improvement Works in Shuen Wan, Tai Po, Contract 1
Bi-weekly Landscape & Visual Monitoring

EM&A (Landscape & Visual) Report (November 2014) (Issue 1)

Job Ref.: 09/317/161A KLKJV-SW
Date: December 2014

Environmental Resources Management

16/F
Berkshire House
25 Westlands Road
Quarry Bay
Hong Kong

Telephone: (852) 2271 3000
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http://www.erm.com

10 December 2014

Kwan Lee - Kuly Joint Venture
Unit 6, 16/F, Yuen Long Trading Centre
33 Wang Yip Street West
Yuen Long, Hong Kong

Attn.: Nicola Hon

Our ref: 0125606_Cert00_20141210

Dear Shan,

Contract No. DC/2009/22 -
Drainage Improvement in Shuen Wan, Tai Po - Contract 1
Monthly EM&A (Landscape & Visual) Report

Reference is made to the Monthly EM&A (Landscape & Visual) Report - Contract 1 for the month of November 2014, please kindly note that we have no adverse comment on the report.

Should you have any queries, please feel free to contact Mr. Jon Binalay at 2271 3212.

Yours sincerely,
For ERM-Hong Kong, Limited

Kenneth Ng
Landscape Architect

Registered Office
ERM-Hong Kong, Ltd
16/F Berkshire House
25 Westlands Road
Quarry Bay
Hong Kong

Offices worldwide

Contract No. DC/2009/22
Drainage Improvement Works in Shuen Wan, Tai Po, Contract 1
Bi-weekly Landscape & Visual Monitoring

EM&A (Landscape & Visual) Report (November 2014)

(Issue 1)

December 2014

	Name	Signature
Prepared by:	**Henry TO**	
Reviewed by:	**Ida YU**	
Date:	**8th December 2014**	

127 Commercial Centre, Palm Springs, Yuen Long, New Territories, Hong Kong
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CONTENTS

LIST OF APPENDICES

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 recommendations and advice on proper implementation of the landscape mitigation measures in the works areas under Contract 1 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 – 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;
- Landscape design of pump house by providing sufficient planting around its boundary fence;
- 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 (November 2014) was conducted to cover only Areas A, B and C of Contract 1 of the Project. The bi-weekly monitoring was conducted on 14th and 26th November 2014.

3.1.2 Area C (i.e. Ecological Compensatory Area (ECA)) was formally handed over to AFCD on 16th October 2012 for management and maintenance. No access into the ECA is allowed after the handover.

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

3.1.4 The bi-weekly monitoring for Contract 2 was also undertaken on 14th and 25th November 2014. The monitoring findings and recommendation will be submitted in a separate Monthly EM&A Report under Contract No. DC/2010/02.

3.2 Visual Screen

3.2.1 No follow-up action by the Contractor is required as from the *Monthly EM&A Report for October 2014*. No new construction hoarding was erected in November 2014 as almost all civil works within the project boundary of Contract No. DC/2009/22 were completed.

Observations

3.2.2 As inspected since October 2014, temporary construction hoardings have been removed around Wai Ha River estuary and a newly built chain-link fence and a new gate were built to demarcate the river area (**Photo 1**). Since February 2014, the construction hoardings surrounding Area A (i.e. the proposed pump house station) have been replaced by the built

boundary walls along the western and part of the northern sides of Area A (**Photo 2**), with chain-link fences erected along the rest of the boundary sides of Area A. As observed since May 2014, all the planting works and major civil works were completed. As informed by the Main Contractor in June 2014, the pumping house area of Area A was handed over to DSD in early June 2014.

3.2.3 Construction of the proposed roadside planters along Ting Kok Road was completed in July 2014 (**Photo 3**) and the planters were hydroseeded and the proposed shrubs were already planted in the planters as observed in November 2014. No temporary construction barriers were erected around the built planters.

3.2.4 The temporary hoardings established for demarcating the construction site boundary of Phases 1 and 2 construction works areas of Area B in Tung Tsz Nursery have been removed since January 2014. The reinstatement work in Phase 2 works area was completed (**Photo 4**), while that for Phase 1 works area has been under progress and nearly finished, leaving only minor reinstatement work for covering the ground with shade nets (**Photo 5**). Barrier tapes in Phase 2 work area were removed in October 2014 while Phase 1 work area was still demarcated with loosened barrier tapes in localized parts. The open section and other reinstated access path connecting between Phases 1 and 2 works areas have been resumed during the current reinstatement work period, providing an access path for the daily operation of the nursery. Since November 2013, the hoarding along the eastern boundary of Phase 2 in Area B (i.e. the section next to Ting Kok Road) was permanently reinstated with the original chain-link fence. The canvas sheet covered on reinstated fence before was removed as reported in September 2014 (**Photo 6**).

3.2.5 The main entrance of Phase 1 construction area has been permanently reinstated with chain-link fence since October 2014 (**Photo 7**).

3.2.6 The gate of the adjacent housing area near the previous main entrance of Area C has been reinstated at its original location by the Contractor since November 2012.

Recommendation

3.2.7 No specific recommendation is required.

3.3 Contaminant/ Sediment Control

3.3.1 No follow-up action by the Contractor is required as from the *Monthly EM&A Report for October 2014*.

Observations

Area A

3.3.2 As reported in *Monthly EM&A Report for June 2014*, all major civil and building works at Area A were already completed and the pumping house was handed over to DSD in early June 2014. Since no earthwork using heavy machinery was carried out and the ground surface in Area A was turned into concrete road, the wheel washing facility at the entrance of Area A was removed. No groundwater or used water was pumped from the built box culvert in November 2014.

Area B

3.3.3 The major excavation and construction works in Area B were completed and reinstatement work for irrigation pipes and lamp posts were completed in Phase 1 area within Tung Tsz Nursery, leaving minor reinstatement work for the nursery beds at the northwestern part of the nursery. The wheel washing facility at the entrance of the access road leading towards the works area at northwestern part of Tung Tsz Nursery was removed. Reinstatement of the nursery ground in Phase 2 construction works area was completed (**Photo 4**). No significant discharge of groundwater or used water from Area B was noted during the inspection in November 2014.

Area C

3.3.4 Area C was formally handed over to AFCD on 16th October 2012 for management and maintenance. The pond of the ECA has connected with the Wai Ha River directly. No water resulting from normal wetland maintenance practice was pumped out from the ECA.

Recommendation

3.3.5 Though all major construction works were completed in Areas A and B, the Contractor is reminded to regularly check the site condition and locations of the drainage pipes and ensure that all used water should be appropriately filtered and discharged to the manholes/other discharge points agreed by the Engineer and EPD.

3.4 Pollution Control

3.4.1 No follow-up action by the Contractor is required as from the *Monthly EM&A Report for October 2014* since almost all major construction works and planting work in Areas A, B and C were completed.

Observations

Area A

3.4.2 The wheel washing facilities at the entrance of Area A was removed as the major earthwork was completed and most of the ground surface in Area A has been turned into concrete road. No groundwater or used water was pumped from the excavated sites or built box culvert in November 2014.

3.4.3 No direct discharge of water into the adjacent Wai Ha River was observed from the works area for the built automatic mechanical penstock at Wai Ha River estuary as the construction work at the estuary was completed and a main gate and chain-link fence were installed.

Area B

3.4.4 The major excavation and construction works in Area B were almost completed and reinstatement work for irrigation pipes and lamp posts were completed in Phase 1 area within Tung Tsz Nursery, leaving minor reinstatement work for the nursery beds at the northwestern part of the nursery. The wheel washing facility at the entrance of the access road leading towards the works area at northwestern part of Tung Tsz Nursery was removed. No significant discharge of groundwater or used water from Area B was noted during the inspection in November 2014.

Area C

3.4.5 Area C was formally handed over to AFCD on 16th October 2012 for management and maintenance. The pond of the ECA has been connected to Wai Ha River directly as following the scheme design of Habitat Compensatory Plan. No direct discharge of turbid water into the adjacent Wai Ha River was observed through the fence of Tung Tsz Nursery.

Recommendations

3.4.6 Though all major construction works in Areas A and B were completed, the Contractor is reminded to regularly check the condition and locations of the drainage pipes and ensure that all used water should be appropriately filtered and discharged to the manholes/other discharge points agreed by the Engineer and EPD. This is to avoid any potential contamination to the vegetation in Shuen Wan marsh and other vegetated/marinated areas adjacent to the active works area.

3.5 Liaison with Nursery

3.5.1 No additional works areas were noted in Tung Tsz Nursery and all works have been restricted within Phases 1 and 2 areas of the Area B boundary. As mentioned above in Section 3.2, all temporary hoardings established for demarcating the construction site boundary in Tung Tsz Nursery were removed in January 2014 and replaced by barrier tapes, which were loosened in the recent monitoring months.

3.5.2 The works practice and maintenance of trees within the nursery generally follow the recommendation as stated in *Monthly EM&A Report for October 2014*. Any observed issues related to the liaison with the nursery are highlighted in this section.

Observations

3.5.3 The temporary hoardings were erected from northwest to southwest parts of Tung Tsz Nursery in Area B in April 2011, while those boundary hoardings around Phase 2 construction works were erected in May 2012. As mentioned above in Section 3.2, these temporary hoardings were removed in January 2014, and the site boundary was subsequently demarcated with barrier tapes. In addition, the hoarding along the eastern boundary of Phase 2 in Area B was permanently reinstated with the original chain-link fence.

3.5.4 Major excavation works were completed in Phases 1 and 2. The reinstatement works for the original access paths, ground of the nursery beds and basic nursery utility (such as irrigation pipes and lamp posts) were finished in Phase 2 area, and such minor reinstatement works were almost completed in Phase 1 area as observed in November 2014. Installation of shelters for potted plants was almost finished as inspected on 26th November 2014 (**Photo 8**). The old and damaged planters surrounding the relocated trees (e.g. U54 and two untagged trees nearby U54, A22, A36, A43 and U69) were already repaired in July 2014. These planters were either backfilled with soil or aggregates.

3.5.5 As reported in *Monthly EM&A Report for September 2014*, the built catchpits and manholes in Phase 1 were sealed by cement and the temporary construction hoarding surrounding these catchpits and manholes before were also removed (**Photo 9**).

3.5.6 As reported in June 2014, a total of eight mature trees (including *Celtis sinensis* and *Melaleuca cajuputi* subsp. *cumingiana*) of around 8-10m tall were transplanted to Phase 1 construction works area. These trees were transplanted from other LCSD-related project and Tung Tsz Nursery was selected as the receptor site for these trees. Three of these *Celtis sinensis* trees

were removed by the nursery in October 2014 and the stumps were removed from ground as inspected on 14th November 2014 (**Photos 10-11**).

Recommendations

3.5.7 The works area and the construction works should be properly managed and implemented throughout the construction phase, without influencing the daily operation of the nursery (i.e. provide enough access paths and works area for the nursery operation).

3.5.8 All transplanted trees should be watered regularly (e.g. at least every two days during the dry season) by the appointed landscape contractor. Meanwhile, the Contractor is reminded to prevent the formation of waterlogged areas or leakage of used water from the works area into the Nursery. This is to prevent causing any nuisance to the nursery's daily operation.

3.5.9 The Contractor is reminded to remove non-planting substrate (such as stones and construction materials) from the planters in the remaining construction months. For those trees that were planted directly on ground but surrounded by the newly built planters, the Contractor is recommended to design suitable drainage holes at the planter bases so as to prevent waterlogged within the planters after irrigation or rain.

3.5.10 The Contractor is also recommended to replace or remove the broken bamboo stakes for the transplanted trees, as well as removal the climbers and weedy plants found in the tree canopies and planters of these transplanted trees prior to handing over the site back to the Nursery Operator.

3.5.11 The appointed landscape contractor and the Contractor should closely monitor the health conditions of all transplanted/relocated and retained trees throughout the construction period of the Project.

3.5.12 Any reinstatement work nearby the recently transplanted trees from LCSD-related project should be carefully programmed. The on-site workers and operator of any movable heavy machinery should avoid damaging these tree parts during the re-instatement work. If necessary, a buffer zone is recommended to separate the reinstatement work areas from these transplanted trees.

3.6 Existing Trees within Works Areas

3.6.1 Maintenance of the existing trees within the works areas generally follows the recommendations as stated in *Monthly EM&A Report for October 2014*, except that the tied strings on a few trees have not yet removed and the presence of minor non-planting substrate within the newly built planters. The observations recorded in November 2014 are highlighted in the following sections.

Observations

Area A

3.6.2 Construction of the sloping green roof and pumping house was completed by end of January 2014. The proposed green roof on the pumping house was vegetated with herbaceous ground cover *Arachis duranensis* in accordance with the approved Landscape Plan. The rectified sub-base, installed soil erosion control mat and the replanted ground cover (all works finished by early August 2014) have functioned well in these monitoring months (**Photo 12** shows the latest view of the green roof in November 2014).

3.6.3 The planted ground cover *Arachis duranensis* on the green roof was in fair condition as observed in November 2014 (**Photo 13**). The installed bamboo sticks facilitated the planted creeping climbers *Ficus pumila* and *Parthenocissus dalzielii* to colonize the vertical wall of the pump house (**Photo 14**). Other planted vegetation, including ground cover *Iris tectorum*, shrubs *Ficus microcarpa* (Golden Leaf) and trees *Cinnamomum burmannii*, were also in fair condition (**Photos 15**).

3.6.4 As observed in November 2014, the existing retained, relocated and compensatory trees in Area A were generally protected within the built planting areas or fenced outside the boundary fence.

3.6.5 The tree to be transplanted E16 (*Bombax ceiba*) was relocated to the southern side of Area A next to the site hoarding in July 2012. The tree was in fair condition since this wet season (**Photo 16**). However, it was separated outside the proposed chain-link fence along the boundary sides of Area A. Soil grade change was observed and reported previously in January 2014. The stability of the tree may be affected but the tree has showed no significant deterioration of structural stability after its translocation. Though this tree is fenced outside the chain-link fence, the condition and stability of this tree should be regularly monitored throughout the construction period. Another replacement tree *Bomax ceiba* tagged as E16 had been planted since January 2014 in the built planter at the southeastern corner of Area A.

3.6.6 The relocated tree E38 (*Melaleuca cajuputi* subsp. *cumingiana*) was found dead after its relocation in August 2013, and it was removed by the Contractor in November 2013 (reported in *Monthly EM&A Report for November 2013*). A planter was built at the same location in accordance with the approved Landscape Plan. The four newly planted *Cinnamomum burmannii* and the ground cover *Iris tectorum* appeared in fair condition (**Photo 15**).

3.6.7 Two trees (*Melaleuca cajuputi* subsp. *cumingiana*) have been found in the northeastern part of Area A since February 2013 and they have remained in fair condition.

3.6.8 Damaged tree trunk on E55 (*Macaranga tanarius* var. *tomentosa*) has been reported in the submitted *Monthly EM&A Reports* since May 2013. This tree was regarded as a dead specimen. It was separated outside the proposed chain-link fence along the southern boundary side of Area A.

3.6.9 As reported in the submitted *Monthly EM&A Report for June 2014*, a retained tree T253 (*Bridelia tomentosa*), which had been in poor condition and with dry, peeled bark, was removed. Resprouts have generated from the remaining stump of T253 as observed since August 2014.

3.6.10 No other significant damages on the crowns, trunks and roots of the remaining trees resulting from the construction machinery were observed in November 2014 in Area A. A number of new trees (including one *Bridelia tomentosa*, two *Bombax ceiba*, eight *Macaranga tanarius* var. *tomentosa* and nine *Melaleuca cajuputi* subsp. *cumingiana*) have been planted along the eastern and southern parts, and at southwestern corner since January 2014. As observed in November 2014, these planted trees, which were planted for replacing those in poor performance or tree loss resulting from the severe typhoons during the construction phase, were generally in fair condition (**Photos 17-18**). However, one replaced tree *Bridelia tomentosa* was found dead and removed, and its replacement tree has not yet been planted back to the eastern boundary of Area A (**Photo 19**).

Area B

3.6.11 As reported in the submitted reports, the transplanted tree *Grevillea robusta* (U58) was removed in October 2013 as it was certified as dead specimen. The entire planter of this removed tree was removed since February 2014. Similarly, U68 (*Gmelina arborea*), which was fallen after typhoon in July 2012, and its planter were all removed in March 2014.

3.6.12 The relocated tree U37 was certified as a dead specimen and the whole standing dead wood was found collapsed as inspected on 6th August 2014. The dead trunk was removed as observed on 5th September 2014.

3.6.13 The Contractor had repaired the broken planters (including U47, A22, A36, A43, U51, U69, U54 and two untagged *Terminalia catappa* next to U54) in July 2014. The repaired planter of U51, which was much lower than the soil surface of the root ball of this tree before, had been built up to the soil grade level as inspected on 14th November 2014 (**Photo 20**). Most of the newly built planters are slightly larger than the root balls of the relocated trees, and obvious gaps were observed between the root ball and the inner surface of these planters (**Photo 21**). These gaps have not yet been refilled by the Contractor.

3.6.14 U55 (*Pterocarpus indicus*) has been transplanted to its final receptor site in 2011 and pest control was applied on this tree in early 2013 due to the sign of termite infestation. Its health condition has been improved (**Photo 22**), but long branches with decayed wood and wounds were still observed in the canopy. Except this comparatively minor tree defect, U55 was in fair health and structural condition.

3.6.15 As reported in July 2014, the southern and northern excavated areas around the retained tree A40 (*Terminalia catappa*) at the entrance of Phase 2 construction areas were refilled with soil and the reinstatement work in the nearby Phase 2 works area was completed. This leaning tree was also replanted upright with its planter and it was in fair condition as observed in November 2014 (**Photo 23**).

3.6.16 Some fungi fruiting bodies (probably from Family Cortinariaceae) were found in the soil within the planter of A38 (*Terminalia catappa*) and covered by a canvas sheet as reported in September 2014. Since October 2014, the fungal fruiting bodies and canvas sheet were removed by the Contractor or nursery worker as a routine maintenance practice. Non-planting materials previously found in the planter were also removed in October 2014 (**Photo 24**). The tree was in fair health and structural condition.

3.6.17 As reported in October 2014, newly developed watersprouts and small twigs found on trees A36, A42, U36, U53 and U65 were pruned by the nursery workers as a routine maintenance practice.

3.6.18 As inspected in October and November 2014, the nylon cables previously noted on tree trunks or branches of relocated trees U53, U57, A22 and A42 were removed, but trees A36 and A41 were still tied tightly by nylon cable ties and/or torn hessian wrapping was still left on the tree trunk after the transplantation of these trees in the early stage of the construction phase (**Photos 25-26**). As the ties were tied tightly on the trunks, they may girdle the tree and hence affect the tree health and its structure in the long term.

3.6.19 Certain relocated trees in Phases 1 and 2 works areas within the Nursery were in fairly poor to fair condition due to the poor transplantation skills and poor site condition. Their health conditions were progressively improved in the recent monitoring months. Proper tree protection (e.g. guying and maintenance of the tree planters), removal of nylon cables on the tree trunks or branches, and construction materials and removal of climbers and weedy herbs

in the planters of the relocated trees should be implemented as proper maintenance of the existing trees.

3.6.20 As mentioned in Section 3.5.6, a total of eight mature trees of *Celtis sinensis* and *Melaleuca cajuputi* subsp. *cumingiana*) were transplanted to Phase 1 construction works area from other LCSD-related project (**Photos 10 and 27**). Stockpiling of construction materials or rubbish close to the transplanted *Melaleuca cajuputi* subsp. *cumingiana* next to the main entrance of Phase 1 construction area were removed in October 2014. (**Photo 27**).

3.6.21 The remaining trees, including retained and transplanted specimens, within the nursery were maintained generally in fair condition, with no significant damage on tree crowns, trunks and roots observed during the monitoring in November 2014.

Area C

3.6.22 Area C was formally handed over to AFCD on 16th October 2012 for management and maintenance. The area was fenced off and no access was allowed.

Recommendations

Area A

3.6.23 Maintenance of proper TPZs covering the tree driplines with no temporarily stored construction materials was the major tree management issue in Areas A and B during the previous active construction period. Even only minor reinstatement works are left in this period, the Contractor is still reminded to continue notifying the on-site workers not to stockpile soil/construction materials or place construction equipment within and close to the TPZs or lower trunks/trunk flares of retained/ relocated/ new trees. Any temporarily stored construction materials/ equipment and excessive water around the trunk flares should be removed or drained immediately. The Contractor should remind the operators of the construction machines and on-site workers to be aware of the presence of these relocated, retained or newly planted trees nearby their works, and prevent accidental damage on these trees as far as practical. Meanwhile, the Contractor and sub-contractor should carefully design the civil works. If any civil works have to be undertaken during this construction period, a proper tree buffer zone should be designed to minimize the damage on the tree canopy and other tree parts. The works should avoid affecting the tree canopy, trunk and underground root zone with regard to tree dripline as far as possible.

3.6.24 The Contractor should continue the maintenance of proper tagging system for all trees within and outside the hoarded/fenced site in order to facilitate the monitoring of their existing condition. In addition, the Contractor should maintain regular monitoring of the tree protection system and condition of the retained and transplanted trees.

3.6.25 All retained trees or transplanted trees should be watered regularly (e.g. at least every two days in dry season) by the landscape contractor or on-site workers. The Contractor should conduct regular inspection on the health condition and protection measures of each existing trees within the Area A. In particular, regular watering should be applied on those relocated trees with regard to their poor health condition. If these trees or other transplanted/ relocated trees are found to be dead specimens in the wet season, the Contractor should replace these specimens. In addition, the appointed landscape construction should provide regular watering on all newly planted trees, shrubs, climbers and ground cover throughout the maintenance period.

Area B

3.6.26 All transplanted trees should be watered regularly (e.g. at least every two days during the dry season) by the landscape contractor. This is a necessary maintenance practice to improve the survival rates and growth for trees showing poor health condition. Regular check of the tree health should be conducted. Proper protective measures such as guying and maintenance of the newly built or existing tree planters are recommended especially for the newly transplanted/ relocated trees (if any). Waterlogged areas should be avoided and all used water/ temporary storage of construction materials or surplus soil around the tree trunk flares and close to the tree root zones should be drained out or removed immediately.

3.6.27 Any reinstatement work nearby the recently transplanted trees from LCSD-related project should be carefully programmed. The on-site workers and operator of any movable heavy machinery should avoid damaging these tree parts during the re-instatement work. If necessary, a buffer zone is recommended to separate the reinstatement work areas from these transplanted trees. The Contractor is recommended to remove all stockpiled construction materials and rubbish from these transplanted trees.

3.6.28 The Contractor is advised checking the condition of the built tree planters in Area B. The site workers should not damage the built planters during the construction phase, and all site workers should be reminded to protect the existing/ relocated trees with appropriate tree protection measures.

3.6.29 Regular inspection of the tree health of a number of trees (i.e. U47 and U55) should be undertaken to update their health condition and any deterioration of tree defects. The Contractor is advised checking the condition of any left bamboo stakes used for staking transplanted trees, and replace any damaged stakes as soon as possible. If the transplanted trees are stable in the planters, the Contractor could remove the bamboo stakes. If these trees or other transplanted/ relocated trees are found to be dead specimens in the wet season after the assessment by the arborist of the appointed landscape contractor, the Contractor should replace these specimens.

3.6.30 The Contractor is recommended to remove all the wrapping and nylon cable ties tied on the transplanted tree, especially for A36 and A41, in order to prevent them from girdling the tree and influencing the tree health and structure.

3.6.31 The Contractor is reminded to remove non-planting substrate (such as stones, construction materials and soft drink cans) from these planters in the remaining construction months. For those trees that were planted directly on ground but surrounded by the newly built planters, the Contractor is recommended to design suitable drainage holes at the planter bases so as to prevent waterlogged within the planters after irrigation or rain.

3.6.32 All tree tags on the trees should be managed properly by the Contractor throughout the construction and establishment phases.

3.6.33 The Contractor is advised to programme the remaining reinstatement works appropriately in Phase I of Area B. The Contractor should establish a buffer zone and tree protection zone between the civil works and the relocated/ retained trees wherever practical.

Area C

3.6.34 As Area C was handed over to AFCD for management and maintenance, no further recommendation is given.

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 October 2014*.

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 December 2014 is scheduled to be conducted in the weeks of 8th and 22nd December 2014.

Appendix A

Photographs

	
Photo 1 – Temporary construction hoardings have been removed around the works area at Wai Ha River estuary and a new gate and chain-link fence were erected to demarcate the area.	**Photo 2** – The built boundary wall along the western boundary of Area A.
	
Photo 3 – The roadside planters along Ting Kok Road were hydroseeded and shrubs were planted in the planters.	**Photo 4** – The reinstatement work of the nursery ground in Phase 2 of Area B was completed.
	
Photo 5 – The reinstatement work of the nursery in Phase 1 of Area B was under progress and almost completed.	**Photo 6** – Chain-link fence was reinstated at the eastern end of Phase 2 works area and the canvas sheet previously found on the fence was removed.

	
Photo 7 – Main entrance of Phase 1 construction work area was reinstated with chain-link fence and the nearby area was hydroseeded.	**Photo 8** –Installation of shelters for potted plants was almost finished.
	
Photo 9 –The manhole was closed and the temporary construction hoardings surrounding the manholes were removed.	**Photo 10** – Three of the trees *Celtis sinensis* transplanted from other LCSD-related project were removed by the nursery workers, leaving only three *Celtis sinensis* still at the receptor site in Phase 1 works area.
	
Photo 11 –The stumps of all three removed *Celtis sinensis* was removed from ground as inspected on 14th November 2014, and the ground was covered by shade net.	**Photo 12** –The ground cover was replanted on the sloping green roof in early August 2014 and it was in fair condition.

Photo 13 –The green roof was vegetated with ground cover *Arachis duranensis*.

Photo 14 –Bamboo sticks were installed in the planting area to facilitate the climbers to colonize the wall of the pumping house.

Photo 15 – The planted trees *Cinnamomum burmannii* in the northern side of Area A were in fair condition.

Photo 16 – The tree E16 (*Bombax ceiba*) was relocated to the southern side and now outside the boundary fence. It was in fair condition.

Photo 17 – Fair condition of the trees *Melaleuca cajuputi* subsp. *cumingiana* and *Bombax ceiba*, which were planted as replacement trees, in the planter at the southeastern side of Area A.

Photo 18 – Overall view of the planted trees in the eastern side of Area A.

Photo 19 – Replacement tree of *Bridelia tomentosa* has not yet been planted back to the eastern boundary of Area A

Photo 20 – The planter of U51 was repaired and built up to the soil surface of the tree.

Photo 21 – Example of gap between the root ball and the inner surface of the new planter.

Photo 22 – The relocated tree U55 (*Pterocarpus indicus*) was in fair condition.

Photo 23 –Tree A40 at the entrance of Phase 2 was in fair condition.

Photo 24 – Fungi fruiting bodies and the canvas sheet found in the soil within the planter of A38 were removed.

	
Photo 25 –The trunk of the transplanted tree A36 was still tied tightly by nylon cable ties and hessian wrapping.	**Photo 26** – The trunk of the transplanted tree A41 was still tied tightly by nylon cable ties.
	
Photo 27 – Two trees of *Melaleuca cajuputi* subsp. *cumingiana* were transplanted by LCSD. Stockpiling of construction materials and rubbish was removed.	

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 (November 2014) (Issue 1)

Job Ref.: 09/317/161D KLKJV-SW
Date: December 2014

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10 December 2014

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Our ref: 0125606_Cert01_20141210

Dear Shan,

Contract No. DC/2010/02 –
Drainage Improvement in Shuen Wan, Tai Po – Contract 2
Monthly EM&A (Landscape & Visual) Report

Reference is made to the Monthly EM&A (Landscape & Visual) Report – Contract 2 for the month of November 2014, please kindly note that we have no adverse comment on the report.

Should you have any queries, please feel free to contact Mr. Jon Binalay at 2271 3212.

Yours sincerely,
For ERM-Hong Kong, Limited

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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 (November 2014)

(Issue 1)

December 2014

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CONTENTS

LIST OF APPENDICES

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 (November 2014) 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 14th and 25th November 2014.

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 October 2014*. The recommendations listed in Report for October 2014 are reminders for good site practices to be implemented by the Contractor throughout the construction phase.

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 site along the access road from Tung Tsz Road towards Treasure Spot Garden II has also been demarcated with temporary construction barriers. Another section of temporary hoardings previously erected next to the path outside Treasure Spot Garden II was removed with the completion of the drainage work in October 2014. **Photos 1-2** show the views of the erected hoardings along the works area under Contract 2.

3.2.3 Almost all construction works for building the box culverts in the works area along Tung Tsz Road opposite to Wai Ha, next to Wai Ha River and next to the rehabilitation wetland have

been completed **(Photos 3-5)**, leaving comparatively minor excavation and other civil work continued along the path leading from Tung Tsz Road to Treasure Spot Garden II, and building a refuse collection point opposite to Wai Ha area (**Photos 6-7**). Hydroseeding was applied in the works area along Tung Tsz Road, and planting of compensatory trees was completed in October 2014 **(Photos 8-9)**.

3.2.4 The temporary parking area was still maintained at the end of the access path to Treasure Spot Garden Phase II **(Photo 10)**. The untagged leaning tree was still guyed at the edge of the area within a Tree Protection Zone (TPZ) **(Photo 11)**.

3.2.5 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. In October 2013, the path to Treasure Spot Garden II was expanded towards the Taro field due to the reprovision of vehicular access road as requested by the villagers during the works at the entrance of the Treasure Spot Garden.

3.2.6 Construction works have been stopped at the end of the Treasure Spot Garden II near the retained tree T103 and the works area was surrounded by temporary construction barriers and chain-link fence **(Photo 12)**.

3.2.7 As reported in the previous submitted Monthly EM&A Reports, a fenced area has been seen on the field next to the construction site along the access to Treasure Spot Garden since March 2014 **(Photo 13)**. The area was still surrounded by chain-link fence and a sign on the gate stated that it was a private land. This area was not fenced by the construction works related to the current project as reported by the Contractor.

3.2.8 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.

Recommendations

3.2.9 No specific recommendation is required in regard to the observations made in August 2014. 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 within the project boundary throughout the construction phase.

3.2.10 For good site practices, the Contractor should also make sure there are no piled rocks, construction materials or programmed construction works influencing the existing trees within the Project Area or the wetland rehabilitation area throughout the construction phase. Otherwise, the Contractor should request the on-site workers to remove those piled rocks or construction materials. As a reminder, the Contractor should keep all construction works within the Project Boundary. The Contractor is also recommended to check the condition of the temporary construction barriers surrounding the works areas, and replace the broken barriers with new barriers.

3.3 Contaminant/ Sediment Control

3.3.1 No follow-up action by the Contractor is required as from the *Monthly EM&A Report for October 2014*. The recommendations listed in Report for October 2014 are reminders for good site practices to be implemented by the Contractor throughout the construction phase.

Observation

3.3.2 Major construction works in Contract 2 works area were completed in October 2014, leaving minor civil works in areas close to Treasure Spot Garden II and some next to Wai Ha. No used water was released from the works area next to Wai Ha River. The river water was clear **(Photos 14-17)**.

3.3.3 As inspected on 14th November 2014, water used to clean the underground box culvert and the associated drainage pipes was discharged through the drainage outfall to the tidal marsh area **(Photo 18)**. As informed by the Contractor, such discharge was a temporary work only and similar observation was not noted on 25th November 2014. Besides, no water from the nearby box culvert and the works area opposite to Wai Ha was released to the area near the expanded works area next to the previous collapsed tree T190 (*Ficus hispida*).

Recommendations

3.3.4 For good site practice, the Contractor is suggested to conduct regular checking 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.

3.3.5 If any construction works were resumed, the Contractor should have *ad hoc* inspection and emergency measures for any accidental spillage of polluted fluid, contaminants or grease from the construction sites. 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 even some parts of the construction works may be completed at this stage.

3.4 Pollution Control

3.4.1 No follow-up action by the Contractor is required as from the *Monthly EM&A Report for October 2014*. The recommendations listed in Report for October 2014 are reminders for good site practices to be implemented by the Contractor throughout the construction phase.

Observation

3.4.2 Major construction works in Contract 2 works area were completed, leaving comparatively minor civil works conducted in area near Treasure Spot Garden II and some next to Wai Ha. No used water has been released from the works area nearby Wai Ha River. The river water was clear **(Photos 14-16)**.

3.4.3 As noted in Section 3.3, water used to clean the underground box culvert and the associated drainage pipes was discharged through the drainage outfall to the marsh area. As informed by the Contractor, such discharge was a temporary work only and similar observation was not noted on 25th November 2014.

3.4.4 No direct water discharge into the upper stream of Wai Ha River was observed as all major construction works in Contract 2 works area have been completed **(Photo 17)**.

Recommendations

3.4.5 For good site practice, the Contractor should prevent any contaminant and sediment 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 throughout the construction phase. 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. Muddy water pumped from the works area should be filtered appropriately through sedimentation beds, or other filtration system prior to the discharge.

3.4.6 The Contractor should have *ad hoc* inspection and emergency measures for any accidental spillage of polluted fluid, contaminants or grease from the construction sites. It is also recommended to overlay PVC liners along the site edge and remove any surplus sand and gravels deposited in the beds and tank so as to prevent the impact of the unclear discharge on the nearby vegetated area.

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 TPZs. The protection measures (such as the establishment of TPZs) generally follow the recommendations stated in the *Monthly EM&A Report for October 2014*. Particular observations are highlighted in the following paragraphs.

Observation

3.6.2 Most trees which are proposed to be retained within the Project Area were recorded generally in fair health condition and some of the retained trees and their canopies have been naturally covered by invasive climbers spreading from the adjacent natural habitats outside the project boundary.

3.6.3 As stated in Section 3.2, a TPZ was set up with orange construction nets to protect the untagged leaning tree from the newly formed temporary parking area at Treasure Spot Garden Phase II **(Photo 10)**.

3.6.4 As reported in the submitted Reports, the retained trees T167 (*Litsea monopetala*) and T168 (*Celtis sinensis*) were topped after the vegetation clearance in the surrounding works area in November 2013. Both of them have been monitored since the topping incident, and both were in fairly poor health condition with vigorous development of epicormics along trunks or branches **(Photo 19)**. Tree canopies of T167 and T168 were only formed by these watersprouts.

3.6.5 Temporary storage of construction materials close to the trunk flares of T093 and T094 (both *Litsea cubeba*) was removed in June 2014 in accordance with the recommendation listed in the submitted *Monthly EM&A Reports*. The previously discharged cement mortar on the soil has been covered by ground vegetation as inspected since August 2014 **(Photo 20)**. The tree health of T093 has been declining since June 2014. No foliage has been observed on the main tree canopy since October 2014, and the previously developed watersprouts found on the tree trunk were very weak. Cracked tree bark was noted along the tree trunk and branches of

one co-dominant trunk of T093, with sign of termite infestation noted along the lower tree trunk of this co-dominant trunk (**Photos 21-22**). The Contractor would remove the hazardous tree trunk and its canopy in early December 2014, leaving the relatively healthy co-dominant trunk of T093 pointing towards the forested area.

3.6.6 Construction works at the end of the Treasure Spot Garden have been stopped since July 2014 and minor civil work would be resumed in the coming months based on the information from the Contractor. As observed in November 2014, no additional piling of excavated soil and rocks was noted at the trunk flare of T103 **(Photo 23)**, but a few wooden plates were still found close to the root flare. According to the information from the Contractor, the construction materials would be removed soon, while any stockpiled stones nearby the trunk flare of T103 would be removed once the civil work to be completed a few months later.

3.6.7 Sheet piling works were conducted within the tree root zone of a retained tree T025 (*Celtis sinensis*) in June 2013. Due to the close proximity of the erected sheet piles to the tree, root damage by previous sheet piling works was anticipated. The tree was also over-pruned in June 2013. It had been temporarily guyed by strings so as to provide additional support to the tree until September 2014. As observed in November 2014, the tree was quite stable at its location and it was in fair health condition **(Photo 24)**.

3.6.8 Concrete pavement, which was applied for additional parking area for the villagers, was still observed close to the root flare of the tree group T089-091, and the trees were in fair condition **(Photo 25)**.

3.6.9 One broken branch was noted hanging within the tree canopies of tree group T099-T102 at the end of the access path towards Treasure Spot Garden II **(Photos 26-27)**. Since there is no target under this broken branch, removal of this broken branch is not required.

3.6.10 Excavation work was previously noted between T153 and T155. No further excavation work around these two trees was noted after April 2014, and the surrounding soil ground has been subsequently covered by herbaceous vegetation **(Photo 28)**. Both trees were stable when inspected in November 2014.

3.6.11 Excavation work was noted close to the tree group T181-T183 in May 2014. According to the information by the Contractor, such excavation work was carried out by a third party to extend the access path adjacent to this tree group. Excavated soil was noted piling around their trunk flares, while the orange construction nets protecting the three trees were removed by the third party. These trees have been surrounded by some stones to demarcate the tree group area since May 2014 **(Photo 29)**.

3.6.12 Another two untagged trees (*Cleistocalyx nervosum* and *Macaranga tanarius* var. *tomentosa*) near the tree group T181-T183 but outside the Project boundary were also affected by the excavation work previously conducted by a party other than the Contractor of this Project. Such observation was reported in the submitted reports.

3.6.13 All compensatory trees were planted in October 2014 **(Photos 8-9)**, leaving replacement of individual trees of poor condition to be conducted in the wet season. Transplantation stock and poor health condition were noted on some trees (such as *Litsea glutinosa* and *Sapium sebiferum*), but planted trees *Hibiscus tiliaceus*, *Celtis sinensis* and *Ficus virens* were in generally fair condition.

3.6.14 No significant signs of damage on other existing tree crowns, trunks and roots resulting from the construction works were observed in this monthly monitoring.

3.6.15 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. Two transplanted shrubs of *Pavetta hongkongensis* (PH-01 and PH-03) were inspected through the fence of Tung Tsz Nursery. PH01 has remained in satisfactory condition **(Photo 30)**. The previously cut PH03 (cut during grass cutting by a third party who maintain the ECA) was cut again as observed in November 2014 **(Photo 31)**.

Recommendations

3.6.16 Within the active works area, maintenance of TPZs for the retained trees and recently planted compensatory trees should be maintained. Trunk bases of all retained trees and planted compensatory 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, while all planted compensatory trees should be watered regularly by the appointed landscape contractor (e.g. at least three times per week during dry season). 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.

3.6.17 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.

3.6.18 For the retained tree T103, if practical, it is recommended to remove the overgrown climbers on the tree canopy so as to reduce the crown load supported by this tree. The Contractor should have close monitoring of the stability and health condition of this tree. In addition, the Contractor should remove the remaining stones or construction materials that have been piled close to the trunk flare as soon as possible, and all stockpiled materials should be removed away from the tree once the civil work would be completed in a few months later.

3.6.19 With regard to the previous tree topping incident on the retained trees (such as T088, T089, T167 and T168), as well as T118 and T093 in which the construction work was undertaken close to the tree trunks or other tree parts as reported previously, and potentially damage the tree roots, the Contractor is reminded to monitor all trees protected within the project boundary regularly. The Contractor should also be aware of any potential damage on the trees by other contractor(s) undertaking construction work concurrently. In addition, the Contractor should design and programme the civil works by taking into consideration of providing adequate buffer zone between the tree dripline and the civil work. These routine tree inspection and site maintenance should be carried out throughout the construction phase.

3.6.20 Tree topping (like the case for T025, T167 and T168 reported previously) should be prohibited and the Contractor should appoint qualified landscape contractor to perform appropriate pruning practice. The pruning works should follow any local, national or international standards for pruning works and relevant tree remedial works. Given that the tree roots of T025 could be damaged by previous sheet piling works and the topped tree exists with unbalanced tree form, the long-term tree stability and health condition should be checked after the removal of the guying in October 2014. The Contractor should have close monitoring of tree stability with regard to its unbalanced tree form and health condition. Meanwhile, the Contractor and sub-contractor should carefully design the civil works. Any coming civil works

should be programmed and designed carefully by taking tree buffer zone into consideration. The works should avoid affecting the tree canopy, trunk and underground root zone with regard to tree dripline as far as possible.

3.6.21 With regard to poor health and structural condition of a tree T093 and its tree fall zone may influence the public using the access path leading to Treasure Spot Garden II, the Contractor is recommended to remove the whole hazardous co-dominant trunk and its canopy of T093 as soon as possible so as to remove the risk of whole tree failure influencing the targets. As informed by the Contractor, this tree part would be removed in early December 2014.

3.6.22 As the concrete paved temporary parking area at Treasure Spot Garden Phase II was close to the untagged tree, the roots may be damaged and hence the stability of the tree would be affected. The tree may also be damaged by the parking vehicles. Therefore, the Contractor is advised to maintain the tree protection measures and establish a warning sign to remind the driver to beware of the presence of tree within the tree protection zone. The health and stability of the tree should also be monitored by the Contractor regularly throughout the construction phase.

3.6.23 As temporary storage of construction materials were once noted within the dripline areas of T103 and T119-122, the Contractor is advised to establish proper Tree Protection Zone (e.g. an area of at least 1m from tree trunks) and prohibit any construction works and storage of construction materials within and close to the zone throughout the construction phase.

3.6.24 As there were excavation works (either by the Project or by the third party) close to T118 as observed in February 2014, between T153 and T155 as observed in April 2014, close to T181, T182, T183 and two untagged trees as observed in May 2014, the Contractor should have close inspection of the stability and health condition of these trees. In addition, for the previous excavation work around tree group of T181-T183 conducted by the third party, the Contractor should regularly check the status of these trees and have close liaison with the third party for maintaining appropriate tree protection during the works.

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 October 2014*.

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 December 2014 is scheduled to be conducted in the weeks of 8th and 22nd December 2014.

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 – No active construction works was carried out in the built box culvert and its associated structure.	**Photo 4** – No construction work was conducted in an extensive area opposite to Treasure Spot Garden II, and the area was naturally vegetated with grass and a tidal pond was maintained.
	
Photo 5 – No construction work was conducted in area opposite to Wai Ha.	**Photo 6** – Minor civil work was continued along the access path leading from Tung Tsz Road to Treasure Spot Garden II.

Photo 7 – Minor civil work was conducted for building a refuse collection point opposite to Wai Ha area.

Photo 8 – Compensatory trees were planted in area opposite to Wai Ha.

Photo 9 – Compensatory trees were planted in area opposite to Treasure Spot Garden II.

Photo 10 – Temporary parking area has still been maintained at the end of the access path to Treasure Spot Garden Phase II.

Photo 11 – The untagged tree (indicated by Red arrow) was guyed at the edge of the parking area within a Tree Protection Zone.

Photo 12 – Construction works have been stopped at the end of the Treasure Spot Garden II near the retained tree T103 and it was surrounded by temporary construction barriers.

	
Photo 13 – A fenced area has been seen on the field next to the construction site along the access to Treasure Spot Garden II since March 2014.	**Photo 14 -** The river water was clear in the upper stream section of Wai Ha River.
	
Photo 15 – The river water in the upper stream was clear near the tree group T138-T141.	**Photo 16** – No direct water discharge into the upper stream of Wai Ha River was observed.

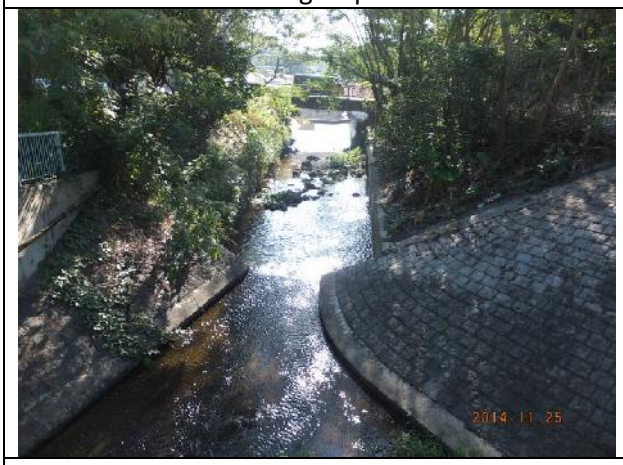



Photo 17 – No direct water discharge into the upper stream of Wai Ha River was observed as all major construction works in Contract 2 works area have been completed.	**Photo 18** – Water used to clean the underground box culvert was discharged through the drainage outfall to the tidal marsh area.

Photo 19 – Topped trees T167 (indicated by Red arrow) and T168 (indicated by Blue arrow) were in poor health condition with vigorous development of epicormics.

Photo 20 – T093 (Red arrow) and T094 (Blue arrow) on the slope. One of the co-dominant trunks of T093 showed significant defoliation and poor health condition.

Photo 21 – Close up view of the co-dominant tree trunk of T093 with poor condition.

Photo 22 – Close up view of the cracked tree bark along the lower tree trunk of T093.

Photo 23 – No additional piling of excavated soil and rock was noted at the trunk flare of T103.

Photo 24 – The guying on the retained tree T025 was removed after mid-October 2014, and the tree was in fair condition.

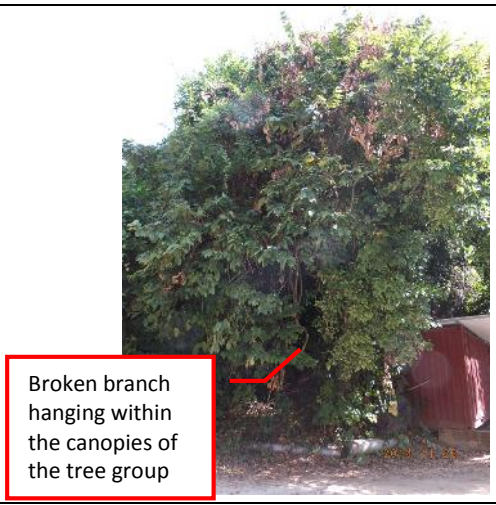
<table>
<tr><td>  </td><td> 
</td></tr>
<tr><td>Photo 25 – Concrete pavement maintained for parking area for the villagers was still observed around the tree group T089-T091.</td><td>Photo 26 – One broken branch was noted hanging within the tree canopies of tree group T099-T102.</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Photo 27 – Close-up view of the broken branch hanging within the canopies of the tree group T099-T102.</td><td>Photo 28 – Excavation work was noted previously between T153 and T155. The surrounding ground was covered by vegetation.</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Photo 29 – Excavation work was noted very close to the tree group T181-T183 in May 2014. These trees have been surrounded by some stones to demarcate the tree group area by the villagers.</td><td>Photo 30 – The transplanted shrub of Pavetta hongkongensis (PH01) in Area C under Contract 1 has remained in satisfactory condition.</td></tr>
</table>

Photo 31 – The transplanted shrub of *Pavetta hongkongensis* (PH03) was cut by the third party during the recent grass cutting work within Area C.

Appendix M

Ecological Monitoring Report in Area of the Contracts 1 and 2

Agreement No. DP/01/2010
Drainage Improvement Works in Shatin and Tai Po: Ecological Monitoring in area under Contract 1
(Report 23a for November 2014)

Prepared for:

Drainage Services Department

Prepared by:

ENVIRON Hong Kong Limited

Date:

December 2014

Reference Number:

R4306_V1.0

ENVIRON

Agreement No. DP/01/2010
Drainage Improvement Works in Shatin and Tai Po:
Ecological Monitoring in area under Contract 1
(Report 23a for November 2014)

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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 100m 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 areas under Contract 1 starting from March 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. 23a ecological monitoring conducted on 28th November 2014 within the works boundary under Contract 1 and area within 100m from the works boundary.

2. Highlights of this report

- Field survey was conducted on 28th November 2014
- Construction activities of Contract 1 was observed to be substantially completed during reporting month
- Lower number of species was observed within the works area under Contract 1 due to urbanized area in nature.
- Habitats in the 100m buffer area retain its natural condition.

3. Summary of construction activities for the month

Major construction activities carried out in Contract 1 by the contractor during the present monitoring period (November 2014) includes:

Area A (Pumping Station) and Area B (Tung Tsz Nursery)

- Rectification of minor defects inside the pumping station.

Area C (ECA)

- Handovered to AFCD.

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. Moreover, as the Ecological Monitoring for Ecological Compensatory Area (ECA) was completed and the ECA was handover to AFCD on January 2013 already, thus the monitoring survey and photo taking on SEMP 2 was not applicable also. 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 100m buffer area of Contract 1 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 1 (i.e. SEPM 1; Figure 2) 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 groups are considered to be inactive during dry season (November to March), thus detailed herpetofauna monitoring was not conducted. However, any sign/calling of reptiles or amphibians encountered during the in situ survey was recorded.

4.4 Butterflies and Odonata

Odonates and butterfly are considered to be inactive during dry season (November to March), thus detailed monitoring was not conducted.

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 stream ecological monitoring point under Contract 1 (i.e. SEMP 1). This point was selected for covering representative sections of Wai Ha River and is 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 1 are marine, recreational fish pond, 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 vegetations at SEMP 1 were commonly recorded with *Bidens alba, Pennisetum alopecuroides* major with average coverage of 10% (Table 1). A list of plant species recorded from different habitats within the assessment area under Contract 1 is presented on Table 2. A total of 125 species were recorded within the assessment boundary of Contract 1 in which 125 species were recorded within the buffer area, while 43 species recorded within the work areas under Contract 1. No protected species were recorded.

5.2 Avifauna

A total of 15 bird species were recorded in the current survey under Contract 1(Table 3). In the work area under Contract 1, only 4 common bird species were recorded in which none of them were with conservation interest. A total of 14 bird species were recorded in the 100m buffer area and two species *Ardeola bacchus* and *Milvus lineatus* is recognized as being regional conservation concern, though it is common in suitable habitats in Hong Kong. (Viney et al., 2005).

5.3 Herpetofauna

No amphibian or reptile was recorded within the assessment area during dry season.

5.4 Butterflies

No butterfly was recorded within the assessment area during dry season.

5.5 Odonata

No Odonata was recorded within the assessment area during dry season.

5.6 Mammal

A few Short-nosed Fruit Bats *Cynopterus sphinx* were observed nesting in a few palm trees at the playground near Ting Kok Nursery Community Garden within Contract 1 boundary. No other mammals or trace of mammals was observed within the assessment area.

5.7 Aquatic fauna

Under Contract 1 (i.e. SEMP 1), a total of 7 fish species, 1 bivalve and 1 snail were recorded and most of them were residing in brackish environments (Table 4). Some river works were carried out in SEMP 1 as showed in Figure 2. Overall, no protected or rare species were recorded.

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 1, while 100m buffer area remains natural. Construction activities at Tung Tsz Nursery and pumping station under Contract 1 were substantially completed. In general, lower numbers of species were recorded within the works area under Contract 1 than that of 100m buffer area because of the associated constructions and urbanized in nature, and 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 in the coming months are as follows:

Area A (Pumping Station) and Area B (Tung Tsz Nursery)

- Rectification of minor defects inside the pumping station.

Area C (ECA)

- Handovered to AFCD

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 1 (excluding the ECA) was conducted in November 2014 and relevant flora and fauna data were collected according to project specification and EM&A Manual. As indicated by the low diversity and abundance of species recorded within the work areas, habitats within the work boundary under Contracts 1 offer few ecological opportunities for inhabitation 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 100m buffer area are retained at acceptable condition, and hence the 100m buffer area has not been significantly affected by the construction works.

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Figure

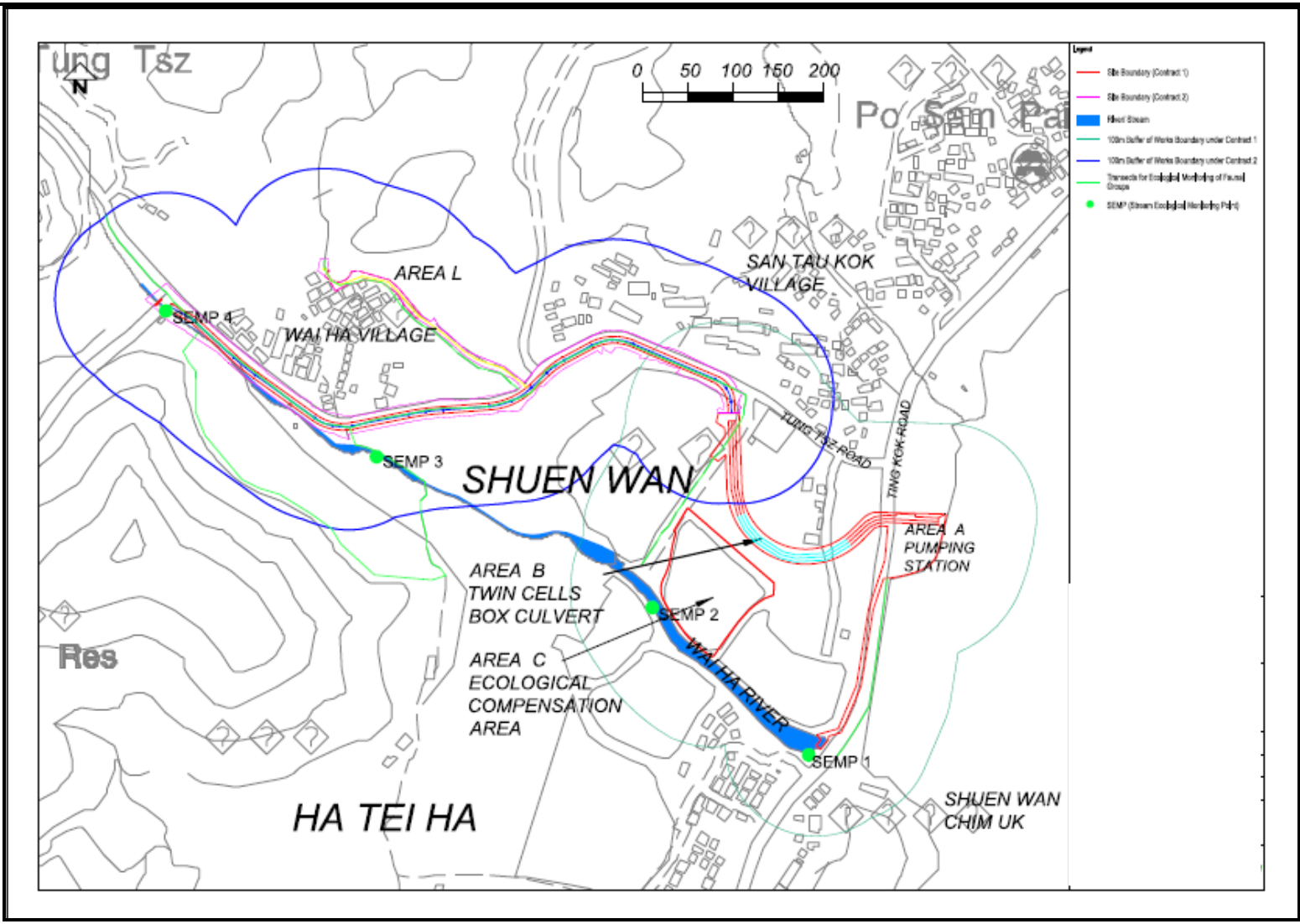

Figure: 1

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

ENVIRON

Drawn by: IT

Checked by: SL

Project: Agreement No. DP/01/2010 Drainage Improvement Works in Shatin and Tai Po: Ecological Monitoring in area under Contract 1 (November 2014, Report 23a)

Rev.: 1.0

Date: December 2014

Figure: 2	ENVIRON
Title: SEMP 1, the first sampling point of Wai Ha River under Contract 1.	Drawn by: IT
	Checked by: SL
Project: Agreement No. DP/01/2010 Drainage Improvement Works in Shatin and Tai Po: Ecological Monitoring in area under Contract 1 (November 2014, Report 23a)	Rev.: 1.0
	Date: December 2014

Table

Table 1. List of riparian vegetation and coverage (%) recorded from stream sampling point under Contract 1 (i.e. SEMP 1).

			Sampling point	**SEMP 1**	
Species	**Family**	**Growth form**	**Status in Hong Kong**	**Height (cm)**	**%**
Albizia lebbeck	MIMOSACEAE	Tree	E		
Arundinella nepalensis	POACEAE	Perennial Herb	N		
Bidens alba	ASTERACEAE	Herb	E	5	10
Celtis sinensis	ULMACEAE	Tree	N		
Eclipta prostrata	ASTERACEAE	Perennial herb	N	20	1
Ficus virens	MORACEAE	Tree	N	100	1
Kandelia obovata	RHIZOPHORACEAE	Shrub or Small Tree	N		
Leucaena leucocephala	MIMOSACEAE	Small Tree	E		
Macaranga tanarius	EUPHORBIACEAE	Tree	N		
Mikania micrantha	ASTERACEAE	Climbing Herb	E	10	3
Pennisetum alopecuroides	POACEAE	Perennial Herb	N	10	10
Plantago major	PLANTAGINACEAE	Perennial herb	N	5	2
Bare	n/a	n/a	n/a	n/a	73

***Key:**

E = Exotic

N = Native

n/a = not available

Table 2. List of vegetation recorded from works area under Contracts 1 and 100m buffer area in the impact monitoring survey. Vegetation species presents in the identified location was indicated by "V".

Family	Species name	Chinese name	*Status in Hong Kong	S	DA	P	N	Man	M	Work Area under Contract 1	100 m buffer area under Contract 1
ACANTHACEAE	*Acanthus ilicifolius*	老鼠簕	N					V	V		V
ACANTHACEAE	*Rhinacanthus nasutus*	靈枝草	E		V						V
ACROSTICHACEAE	*Acrostichum aureum*	鹵蕨	N						V		V
AGAVACEAE	*Cordyline fruticosa*	朱蕉	E		V						V
AGAVACEAE	*Dracaena draco*	龍血樹	E		V						V
AGAVACEAE	*Sansevieria trifasciata*	虎尾蘭	E		V					V	V
APOCYNACEAE	*Catharanthus roseus*	長春花	N		V						V
ARACEAE	*Alocasia odora*	海芋	N	V	V		V		V		V
ARALIACEAE	*Acanthopanax gracilistylus*	五加皮	E	V							V
ARALIACEAE	*Schefflera actinophylla*	傘樹	E		V						V
ARALIACEAE	*Schefflera heptaphylla*	鴨腳木	N		V				V	V	V
ARECACEAE	*Archontophoenix alexandrae*	假檳榔	E		V						V
ARECACEAE	*Caryota ochlandra*	魚尾葵	E		V		V				V
ARECACEAE	*Chrysalidocarpus lutescens*	散尾葵	E		V						V
ARECACEAE	*Phoenix roebelenii*	日本葵	E		V		V				V
ARECACEAE	*Rhapis excelsa*	棕竹	N		V		V				V
ASTERACEAE	*Bidens alba*	白花鬼針草	E	V	V		V			V	V
ASTERACEAE	*Emilia sonchifolia*	一點紅	N		V		V			V	V
ASTERACEAE	*Mikania micrantha*	薇甘菊	E	V	V	V	V		V	V	V

Family	Species name	Chinese name	*Status in Hong Kong	S	DA	P	N	Man	M	Work Area under Contract 1	100 m buffer area under Contract 1
ASTERACEAE	*Pterocypsela indica*	山萵苣	N		V					V	V
ASTERACEAE	*Wedelia chinensis*	蟛蜞菊	N	V		V	V			V	V
ASTERACEAE	*Youngia japonica*	黃鵪菜	N	V	V		V			V	V
BIGNONIACEAE	*Pyrostegia venusta*	炮仗花	E		V		V				V
BIGNONIACEAE	*Tabebuia chrysantha*	黃花風鈴木	E				V			V	V
BOMBACACEAE	*Bombax ceiba*	木棉	E		V		V			V	V
BRASSICACEAE	*Brassica rapa*	大頭菜	E			V					V
CAESALPINIACEAE	*Bauhinia blakeana*	洋紫荊	N		V		V			V	V
CAESALPINIACEAE	*Bauhinia purpurea*	紅花羊蹄甲	E		V		V			V	V
CAESALPINIACEAE	*Bauhinia variegata*	宮粉羊蹄甲	E		V		V			V	V
CAESALPINIACEAE	*Cassia spectabilis*	美麗決明	E		V					V	V
CAPRIFOLIACEAE	*Lonicera japonica*	忍冬	N				V			V	V
CARICACEAE	*Carica papaya*	番木瓜	E			V					V
CASUARINACEAE	*Casuarina equisetifolia*	木麻黃	E		V					V	V
CASUARINACEAE	*Citrus grandis*	柚	E		V						V
COMBRETACEAE	*Lumnitzera racemosa*	欖李	N		V					V	V
COMBRETACEAE	*Terminalia catappa*	欖仁樹	E		V					V	V
COMMELINACEAE	*Commelina diffusa*	節節草	N	V							V
COMMELINACEAE	*Tradescantia spathacea*	蚌花	E		V		V			V	V
CONVOLVULACEAE	*Ipomea cairica*	五爪金龍	E			V			V	V	V
CUPRESSACEAE	*Thuja orientalis*	側柏	E		V						V
CYPERACEAE	*Cyperus flabelliformis*	風車草	E	V							V
DILLENIACEAE	*Dillenia indica*	第倫桃	E				V				V

Family	Species name	Chinese name	*Status in Hong Kong	S	DA	P	N	Man	M	Work Area under Contract 1	100 m buffer area under Contract 1
ELAEOCARPACEAE	*Elaeocapus haminanensis*	水石榕	E		V		V				V
EUPHORBIACEAE	*Antidesma bunius*	五月茶	N			V					V
EUPHORBIACEAE	*Aporusa dioica*	銀柴	N			V					V
EUPHORBIACEAE	*Bischofia javanica*	秋風	N		V	V	V				V
EUPHORBIACEAE	*Bridelia tomentosa*	土蜜樹	N	V	V		V			V	V
EUPHORBIACEAE	*Excoecaria agallocha*	海漆	N					V			V
EUPHORBIACEAE	*Glochidion zeylanicum*	香港算盤子	N	V							V
EUPHORBIACEAE	*Macaranga tanarius*	血桐	N	V	V	V	V				V
EUPHORBIACEAE	*Mallotus apelta*	白桐	N			V					V
EUPHORBIACEAE	*Sapium discolor*	山烏桕	N	V							V
FABACEAE	*Desmodium heterocarpon*	假地豆	N		V		V				V
FABACEAE	*Pueraria lobata*	葛	N	V					V		V
FABACEAE	*Sesbania cannabina*	田菁	E		V					V	V
FABACEAE	*Wisteria sinensis*	紫藤	E				V				V
FLACOURTIACEAE	*Scolopia chinensis*	刺柊	N			V					V
GRAMINEAE	*Panicum maximum*	大黍	E		V		V		V	V	V
LAMIACEAE	*Salvia japonica*	鼠尾草	N		V						V
LAURACEAE	*Litsea monopetala*	假柿樹	N			V					V
LYGODIACEAE	*Lygodium japonicum*	海金沙	N		V					V	V
MALVACEAE	*Hibiscus rosa-sinensis*	大紅花	E		V		V			V	V
MALVACEAE	*Hibiscus tiliaceus*	黃槿	N	V					V	V	V
MALVACEAE	*Thespesia populnea*	恒春黃槿	N					V			V
MELIACEAE	*Melia azedarach*	楝	E	V							V

Family	Species name	Chinese name	*Status in Hong Kong	S	DA	P	N	Man	M	Work Area under Contract 1	100 m buffer area under Contract 1
MENISPERMACEAE	*Coculus orbiculatus*	木防己	N	V			V				V
MENISPERMACEAE	*Pericampylus glaucus*	細圓藤	N		V					V	V
MIMOSACEAE	*Acacia confusa*	台灣相思	E		V					V	V
MIMOSACEAE	*Albizia lebbeck*	大葉合歡	E	V	V		V				V
MIMOSACEAE	*Calliandra haematocephala*	朱纓花	E		V					V	V
MIMOSACEAE	*Leucaena leucocephala*	銀合歡	E	V	V	V				V	V
MORACEAE	*Artocarpus macrocarpon*	菠蘿蜜	E		V						V
MORACEAE	*Ficus benjamina*	垂葉榕	E		V		V			V	V
MORACEAE	*Ficus elastica*	印度榕樹	E		V		V				V
MORACEAE	*Ficus microcarpa*	榕樹	N		V		V				V
MORACEAE	*Ficus hispida*	對葉榕	N	V	V	V			V		V
MORACEAE	*Ficus simplicissima*	五指毛桃	N		V					V	V
MORACEAE	*Ficus variegata*	青果榕	N		V					V	V
MORACEAE	*Ficus virens*	大葉榕	N	V	V		V			V	V
MORACEAE	*Morus alba*	桑	N		V						V
MYRSINACEAE	*Aegiceras corniculatum*	蠟燭果	N					V	V		V
MYRSINACEAE	*Maesa perlarius*	鯽鱼胆	N			V					V
MYRTACEAE	*Callistemon viminalis*	串錢柳	E				V				V
MYRTACEAE	*Cleistocalyx operculatus*	水翁	N	V		V					V
MYRTACEAE	*Melaleuca quinquenervia*	白千層	E		V					V	V
MYRTACEAE	*Psidium guajava*	番石榴	E		V						V
OLEACEAE	*Ligustrum sinensis*	山指甲	N		V	V	V				V

Family	Species name	Chinese name	*Status in Hong Kong	S	DA	P	N	Man	M	Work Area under Contract 1	100 m buffer area under Contract 1
OXALIDACEAE	*Averrhoa carambola*	楊桃	E		V						V
OXALIDACEAE	*Oxalis corniculata*	酢漿草	N		V					V	V
PANDANACEAE	*Pandanus tectorius*	露兜樹	N	V				V			V
PINACEAE	*Pinus massoniana*	馬尾松	N		V						V
PIPERACEAE	*Piper hancei*	山蒟	N			V					V
PLANTAGINACEAE	*Plantago major*	車前草	N		V		V		V	V	V
POACEAE	*Arundinella nepalensis*	石珍芒	N	V							V
POACEAE	*Cynodon dactylon*	狗牙根	N		V		V			V	V
POACEAE	*Digitaria ciliaris*	升馬唐	N		V				V		V
POACEAE	*Eleusine indica*	牛筋草	N		V		V			V	V
POACEAE	*Microstegium ciliatum*	剛莠竹	N	V	V					V	V
POACEAE	*Panicum repens L.*	鋪地黍	N		V				V		V
POACEAE	*Pennisetum alopecuroides*	狼尾草	N		V				V		V
POACEAE	*Phragmites anstralis*	蘆葦	N						V		V
POACEAE	*Zoysia sp.*	結縷草	N					V	V		V
POLYGONACEAE	*Polygonum hydropiper*	水蓼	N		V						V
POLYGONACEAE	*Polygonum lapathifolium*	大馬蓼	N						V		V
RHIZOPHORACEAE	*Kandelia obovata*	秋茄樹	N					V	V		V
ROSACEAE	*Eriobotrya japonica*	枇杷	E		V						V
ROSACEAE	*Rubus reflexus*	蛇泡簕	N			V					V
RUBIACEAE	*Paederia scandens*	雞屎藤	N		V	V	V		V	V	V
RUBIACEAE	*Psychotria serpens*	蔓九節	N		V					V	V
RUTACEAE	*Citrus reticulata Blanco*	柑橘	E		V						V

Family	Species name	Chinese name	*Status in Hong Kong	S	DA	P	N	Man	M	Work Area under Contract 1	100 m buffer area under Contract 1
RUTACEAE	*Clausena lansium*	黃皮	E		V						V
RUTACEAE	*Murraya paniculata*	九里香	E	V	V						V
SAPINDACEAE	*Dimocarpus longan*	龍眼	E		V	V					V
SAPINDACEAE	*Litchi chinensis*	荔枝	E		V						V
SAPINDACEAE	*Sapindus saponaria*	無患子	N		V	V					V
SAPOTACEAE	*Manilkara zapota*	人心果	E	V							V
SOLANACEAE	*Solanum nigrum*	龍葵	N		V				V		V
SOLANACEAE	*Solanum torvum*	水茄	E						V		V
STERCULIACEAE	*Sterculia lanceolata*	假蘋婆	N	V							V
TILIACEAE	*Microcos paniculata*	布渣葉	N			V					V
ULMACEAE	*Celtis sinensis*	朴樹	N	V	V	V					V
URTICACEAE	*Boehmeria nivea*	苧麻	E	V		V					V
VERBENACEAE	*Avicennia marina*	白骨壤	N					V	V		V
VERBENACEAE	*Clerodendrum inerme*	苦郎樹	N	V							V
VERBENACEAE	*Lantana camara*	馬櫻丹	E	V	V	V	V			V	V

Note: “S” = Stream; “N” = Ting Kok Nursery Community Garden; “M” = Marsh; “Man” = Mangrove; “DA” =Developed area; “P” = Plantation

Table 3. List of avifauna species and maximum counts recorded from the impact monitoring survey at work area under Contracts 1 and 100m buffer area.

Common name	Species	Habitat	Conservation status in Hong Kong	Work area: Contract 1	100m buffer area
Black Kite	*Milvus lineatus*		RC		1
Chinese Bulbul	*Pycnonotus sinensis*	W		1	1
Chinese Pond Heron	*Ardeola bacchus*	W	RC		2
Common Tailorbird	*Orthotomus sutorius*				1
Great Egret	*Casmerodius alba*	W			3
Little Egret	*Egretta garzetta*	W			2
Grey Heron	*Ardea cinerea*	W			1
Oriental Magpie Robin	*Copsychus saularis*			1	1
Masked Laughing thrush	*Garrulax perspicillatus*				5
Red-whiskered Bulbul	*Pycnonotus jocosus*			2	2
Spotted Dove	*Streptopelia chinensis*			1	3
White Wagtail	*Motacilla alba*				2
Grey Wagtail	*Motacilla cinerea*				1
Yellow-bellied Prinia	*Prinia flaviventris*				1
Total number of species :				**4**	**14**

*** Key:**

W = Wetland dependent spices ; RC = Regional Concern

Table 4. Relative abundance of aquatic species recorded in Wai Ha River within the 100m buffer of works boundary under Contracts 1 in the impact monitoring survey.

Species	Common name	[1]Life-cycle characteristics	[2]Origin	SEMP 1
Ambassis gymnocephalus	Glassperch	M	N	+
Gerres macracanthus	Longspine Silverbiddy	M	N	+
Mugil cephalus	Flatehead Grey Mullet	M	N	+
Opsariichthys evolans	Minnow	F	N	+
Oreochromis mossambicus	Mozambique Tilapa	F	I	++
Oreochromis niloticus	Nile Tilapa	F	I	++
Tilapia zillii	Redbelly Tilapa	F	I	+
Saccostrea cucullata	Rock Oyster	M	N	+
Cerithidea cingulata	Mud snail	M	N	+
Total number of species:	**9**			**9**

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

[2]Origin:
N = Native
I = Introduced; / = not available

Key:

@-Calling heard

Table 5. Relative abundance of butterfly species recorded under Contracts 1 in impact monitoring survey during May 2014.

Species	**Common name**	**Conservation status in Hong Kong**	**Work area: Contract 1**	**100m Buffer area of Contract 1**
Artogeia canidia	Common white	Very Common	+	++
Papilio polytes	Common mormon	Very Common	+	+
Zizeeria maha	Pale Grass Blue	Very Common	+	+
Eurema hecabe	Common Grass Yellow	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 1 in impact monitoring survey during May 2014.

Species	**Common name**	**Conservation status in Hong Kong**	**Work area: Contract 1**	**100m Buffer area of Contract 1**
Pantala flavescens	Wandering Glider	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 1 in the impact monitoring survey during May 2014.

Species	**Common name**	**[1]Life-cycle characteristics**	**[2]Origin**	**SEMP 1**
Ambassis gymnocephalus	Glassperch	M	N	+
Gerres macracanthus	Longspine Silverbiddy	M	N	+
Mugil cephalus	Flatehead Grey Mullet	M	N	+
Opsariichthys evolans	Minnow	F	N	+
Oreochromis mossambicus	Mozambique Tilapa	F	I	++
Oreochromis niloticus	Nile Tilapa	F	I	++
Tilapia zillii	Redbelly Tilapa	F	I	+
Saccostrea cucullata	Rock Oyster	M	N	+
Cerithidea cingulata	Mud snail	M	N	+
Total number of species:	**9**			**9**

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

[2]Origin:
N = Native
I = Introduced; / = not available

Agreement No. DP/01/2010
Drainage Improvement Works in Shatin and Tai Po: Ecological Monitoring in area under Contract 2
(Report 23b for November 2014)

Prepared for:

Drainage Services Department

Prepared by:
ENVIRON Hong Kong Limited

Date:
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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 23b for November 2014)

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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. 23b ecological monitoring conducted on 28th Nov 2014 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 28th Nov 2014
- Construction activities of Contract 2 was observed to be substantially completed during reporting month
- 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 (Nov 2014) includes:

1. Rectification of minor defects along Box Culvert and landscape planting.

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

Hepetofauna 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. Nomenclauture 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 195 species were recorded within the assessment boundary in which 195species were recorded within the buffer area, while 71 species recorded within the work areas under Contract 2. 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. Currently, construction work was substantially completed. Some trees were planted along the construction site for landscaped purpose. Moreover, some drainage section has been restored as marsh habitat by planting wetland species such as *Juncus effuses*. In addition, regular vegetation clearance was observed at sampling point of SEMP 3 during reporting month.

5.2 Avifauna

A total of 12 bird species were recorded in the current survey (Table 3). In the work area under Contract 2, 3 bird species were recorded which are not considered to be of conservation

concern. A total of 11 bird species were recorded in the 100m buffer area in which one bird species was considered to be of conservation concern.

5.3 Herpetofauna

No amphibian or reptile was recorded within the assessment area during dry season.

5.4 Butterflies

No butterfly was recorded within the assessment area during dry season.

5.5 Odonata

No Odonata was recorded within the assessment area during dry season.

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 10 fish species, 1 crustacean, 1 gastropod and 1 arthropod were recorded and most of them were freshwater species (Table 4). *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.

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 Contact 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) was maintained at acceptable condition as indicated by the presence of *Parazacco spilurus.* In addition, most of the construction activities are restricted in the developed area with low ecological significance. Currently, construction work was substantially completed. Thus, the impact on downstream of SEMP4 is anticipated to be minor. 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. Rectification of minor defects along Box Culvert and landscape planting.

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 November 2014 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. Currently, most construction work was substantially completed. Thus, the impact on downstream of SEMP4 is anticipated to be minor.

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Figures

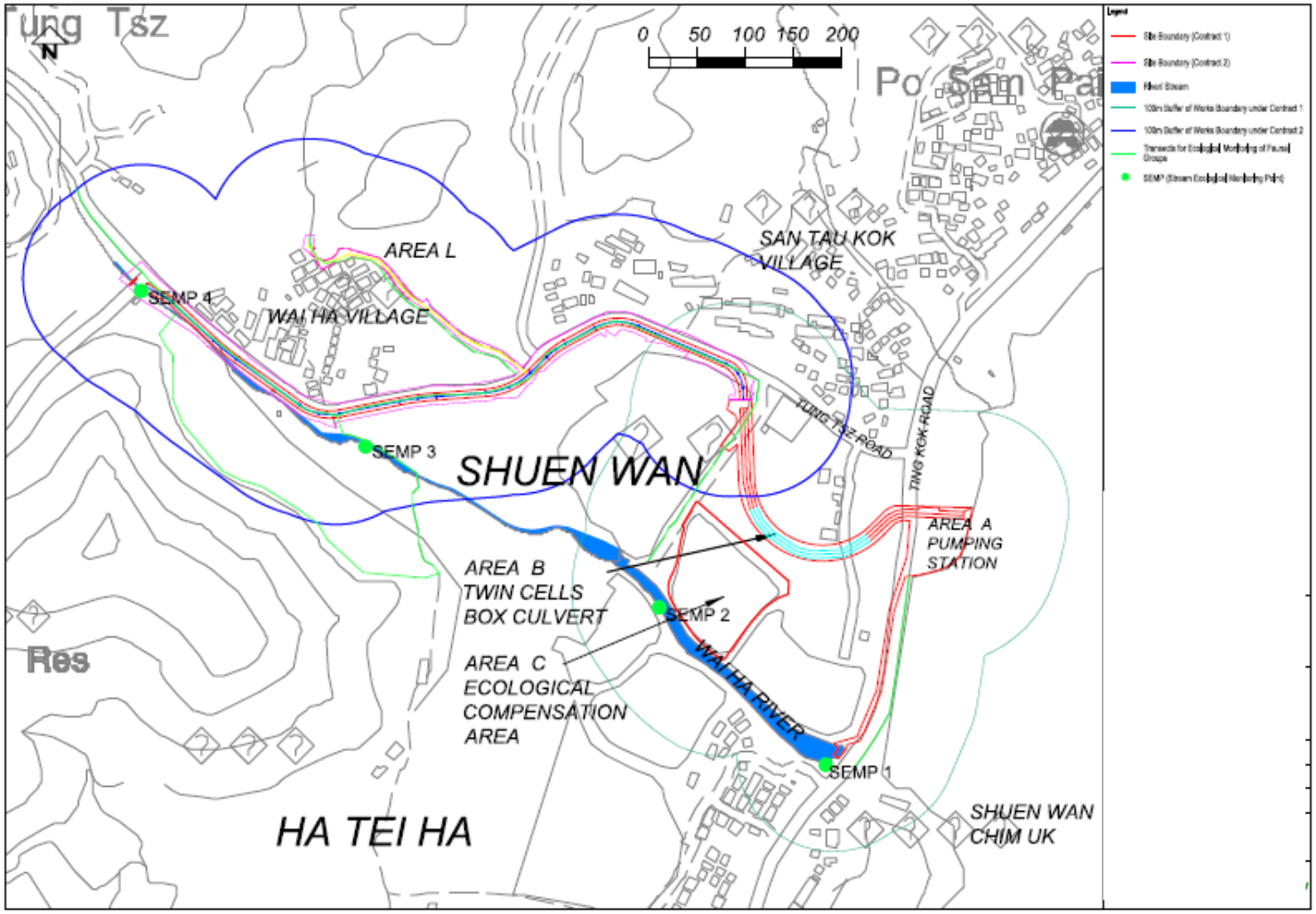

Figure: 1

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

ENVIRON

Drawn by:	IT
Checked by:	SL
Rev.:	1.0
Date:	December 2014

Project: Agreement No. DP/01/2010 Drainage Improvement Works in Shatin and Tai Po: Ecological Monitoring in area under Contract 2 (November 2014, Report 23b)

Figure: 2	ENVIRON
Title: SEMP 3, the third sampling point of Wai Ha River under Contract 2.	Drawn by: IT
	Checked SL
Project: Agreement No. DP/01/2010 Drainage Improvement Works in Shatin and Tai Po: Ecological Monitoring in area under Contract 2 (November 2014, Report 23b)	Rev.: 1.0
	Date: December 2014

Figure: 3	ENVIRON
Title: SEMP 4, the forth sampling point along Wai Ha River under Contract 2.	Drawn by: IT
	Checked SL
Project: Agreement No. DP/01/2010 Drainage Improvement Works in Shatin and Tai Po: Ecological Monitoring in area under Contract 2 (November 2014, Report 23b)	Rev.: 1.0
	Date: December 2014

Tables

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

			Sampling point	**SEMP 3**		**SEMP 4**	
Species	**Family**	**Growth form**	**Status in Hong Kong**	**Height (cm)**	**%**	**Height (cm)**	**%**
Bidens alba	ASTERACEAE	Herb	E			0.9	30
Alocasia odora	ARACEAE	Shrub	N	1	5		
Commelina communis	COMMELINACEAE	Herb	N	0.2	2		
Leucaena leucocephala	MIMOSACEAE	Small Tree	E			4	20
Microstegium ciliatum	POACEAE	Perennial Procumbent Herb	N	0.5	10		
Pistia stratiotes	ARACEAE	Floating Aquatic Herb	N				
Polygonum chinensis	POLYGONACEAE	Herb	N				
Polygonum lapathifolium	POLYGONACEAE	Herb	N				
Rhaphiolepis salicifolia	ROSACEAE	Shrub or Small Tree	N				
Spirodela polyrrhiza	LEMNACEAE	Floating Small Herb	N				
Pueraria lobata	FABACEAE	Climber	N			0.5	10
Cyclosorus parasiticus	THELYPTERIDACEAE	Herb	N	0.2	2		
Wedelia chinensis	ASTERACEAE	Perennial Herb	N				
Bare	n/a	n/a	n/a	n/a	81	n/a	40

***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. Vegetation species presents in the identified location was indicated by "V".

Family	Species name	Chinese name	*Status in Hong Kong	S	DA	M	Man	SW	CL	P	Work Area of Contract 2	100 m buffer area under Contract 2
ACANTHACEAE	*Acanthus ilicifolius*	老鼠簕	N		V	V	V					V
ACANTHACEAE	*Rhinacanthus nasutus*	靈枝草	E		V							V
ACROSTICHACEAE	*Acrostichum aureum*	鹵蕨	N		V	V						V
AGAVACEAE	*Cordyline fruticosa*	朱蕉	E		V							V
AGAVACEAE	*Dracaena draco*	龍血樹	E		V							V
AGAVACEAE	*Sansevieria trifasciata*	虎尾蘭	E		V							V
ANACARDIACEAE	*Mangifera indica*	杧果	E					V				V
ANACARDIACEAE	*Rhus hypoleuca*	白背漆	N					V				V
ANACARDIACEAE	*Rhus succedanea*	野漆樹	N					V				V
ANNONACEAE	*Desmos chinensis*	假鷹爪	N					V				V
ANNONACEAE	*Uvaria macrophylla*	紫玉盤	N					V				V
APIACEAE	*Coriandrum sativum*	芫荽	E						V			V
APOCYNACEAE	*Catharanthus roseus*	長春花	N		V						V	V
ARACEAE	*Alocasia odora*	海芋	N		V	V					V	V
ARACEAE	*Colocasia esculenta*	芋	N						V			V
ARACEAE	*Pistia stratiotes*	大薸	N	V							V	V
ARALIACEAE	*Acanthopanax gracilistylus*	五加皮	E	V							V	V
ARALIACEAE	*Schefflera actinophylla*	傘樹	E		V							V
ARALIACEAE	*Schefflera heptaphylla*	鴨腳木	N		V	V						V
ARECACEAE	*Archontophoenix alexandrae*	假檳榔	E		V							V

Family	Species name	Chinese name	*Status in Hong Kong	S	DA	M	Man	SW	CL	P	Work Area of Contract 2	100 m buffer area under Contract 2
ARECACEAE	*Caryota ochlandra*	魚尾葵	E		V							V
ARECACEAE	*Chrysalidocarpus lutescens*	散尾葵	E	V	V							V
ARECACEAE	*Phoenix roebelenii*	日本葵	E		V							V
ARECACEAE	*Rhapis excelsa*	棕竹	N		V							V
ASTERACEAE	*Bidens alba*	白花鬼針	E	V							V	V
ASTERACEAE	*Chrysanthemum coronarium*	茼蒿	E						V			V
ASTERACEAE	*Conyza canadensis*	小蓬	E		V			V	V	V	V	V
ASTERACEAE	*Emilia sonchifolia*	一點紅	N		V						V	V
ASTERACEAE	*Ageratum conyzoides*	藿香薊	E	V	V				V			V
ASTERACEAE	*Lactuca sativa*	萵苣	E						V			V
ASTERACEAE	*Mikania micrantha*	薇甘菊	E	V	V	V		V	V	V	V	V
ASTERACEAE	*Pterocypsela indica*	山萵苣	N		V						V	V
ASTERACEAE	*Wedelia chinensis*	蟛蜞菊	N		V					V	V	V
ASTERACEAE	*Youngia japonica*	黃鵪菜	N		V						V	V
ASTERACEAE	*Spilanthes paniculata*	金鈕扣	N		V						V	V
ASTERACEAE	*Artemisia indica*	五月艾	N		V				V		V	V
BIGNONIACEAE	*Pyrostegia venusta*	炮仗花	E		V							V
BRASSICACEAE	*Brassica rapa*	大頭菜	E						V			V
CAESALPINIACEAE	*Bauhinia blakeana*	洋紫荊	N		V							V
CAESALPINIACEAE	*Bauhinia variegata*	宮粉羊蹄	E		V							V
CAESALPINIACEAE	*Cassia spectabilis*	美麗決明	E		V							V
CARICACEAE	*Carica papaya*	番木瓜	E							V		V
CARYOPHYLLACEAE	*Drymaria diandra*	荷莲豆	N						V		V	V
CARYOPHYLLACEAE	*Myosoton aquaticum*	鵝腸菜	N						V		V	V

Family	Species name	Chinese name	*Status in Hong Kong	S	DA	M	Man	SW	CL	P	Work Area of Contract 2	100 m buffer area under Contract 2
CASUARINACEAE	*Casuarina equisetifolia*	木麻黃	E		V							V
CASUARINACEAE	*Citrus grandis*	柚	E		V							V
CLUSIACEAE	*Cratoxylum cochinchinense*	黃牛木	N					V				V
COMBRETACEAE	*Lumnitzera racemosa*	欖李	N			V	V				V	V
COMBRETACEAE	*Terminalia catappa*	欖仁樹	E		V							V
COMMELINACEAE	*Commelina diffusa*	節節草	N	V							V	V
COMMELINACEAE	*Tradescantia spathacea*	蚌花	E		V							V
CONNARACEAE	*Rourea microphylla*	紅葉藤	N					V				V
CONVOLVULACEAE	*Ipomoea cairica*	五爪金龍	E		V	V	V	V				V
CONVOLVULACEAE	*Merremia hederacea*	魚黃草	N		V				V	V	V	V
CONVOLVULACEAE	*Ipomoea aquatica*	蕹菜	E			V					V	V
CUPRESSACEAE	*Thuja orientalis*	側柏	E		V							V
CUSCUTACEAE	*Cuscuta chinensis*	菟絲子	N						V			V
CYPERACEAE	*Cyperus flabelliformis*	風車草	E	V							V	V
DICKSONIACEAE	*Cibotium barometz*	金毛狗	N (Cap. 586)					V				V
ELAEOCARPACEAE	*Elaeocapus haminanensis*	水石榕	E		V							V
EQUISETACEAE	*Equisetum debile*	筆管草	N	V								V
EUPHORBIACEAE	*Antidesma bunius*	五月茶	N					V		V	V	V
EUPHORBIACEAE	*Aporusa dioica*	銀柴	N					V		V		V
EUPHORBIACEAE	*Bischofia javanica*	秋風	N							V		V
EUPHORBIACEAE	*Bridelia insulana*	禾串树	N					V				V
EUPHORBIACEAE	*Bridelia tomentosa*	土蜜樹	N		V						V	V
EUPHORBIACEAE	*Excoecaria agallocha*	海漆	N				V					V
EUPHORBIACEAE	*Glochidion eriocarpum*	毛果算盘	N					V				V

Family	Species name	Chinese name	*Status in Hong Kong	S	DA	M	Man	SW	CL	P	Work Area of Contract 2	100 m buffer area under Contract 2
EUPHORBIACEAE	*Glochidion puberum*	算盘子	N		V							V
EUPHORBIACEAE	*Glochidion zeylanicum*	香港算盘	N	V							V	V
EUPHORBIACEAE	*Macaranga tanarius*	血桐	N		V	V	V					V
EUPHORBIACEAE	*Mallotus apelta*	白桐	N							V		V
EUPHORBIACEAE	*Mallotus paniculatus*	白楸	N					V				V
EUPHORBIACEAE	*Sapium discolor*	山烏桕	N	V				V				V
FABACEAE	*Mucuna championii Benth.*	港油麻藤	N					V		V		V
FABACEAE	*Pueraria lobata*	葛	N		V	V			V			V
FABACEAE	*Sesbania cannabina*	田菁	E		V						V	V
FABACEAE	*Crotalaria pallida var.obovata*	豬屎豆	E		V						V	V
FABACEAE	*Desmodium heterocarpon*	假地豆	N		V						V	V
FABACEAE	*Millettia reticulata*	雞血藤	N					V				V
FABACEAE	*Mucuna birdwoodiana*	白花油麻	N	V				V			V	V
FABACEAE	*Uraria crinita*	貓尾草	E					V				V
FABACEAE	*Pueraria lobata*	葛	N	V	V			V	V	V	V	V
FLACOURTIACEAE	*Scolopia chinensis*	刺柊	N							V		V
GLEICHENIACEAE	*Dicranopteris pedata*	芒萁	N					V				V
HALORAGACEAE	*Gonocarpus chinensis*	黃花小二	N		V				V		V	V
JUNCACEAE	*Juncus effusus*	燈心草	N			V					V	V
LAMIACEAE	*Salvia japonica*	鼠尾草	N		V							V
LAURACEAE	*Cinnamomum burmannii*	陰香	N		V			V			V	V
LAURACEAE	*Cinnamomum camphora*	樟	N					V				V
LAURACEAE	*Litsea cubeba*	山蒼樹	N					V				V
LAURACEAE	*Litsea glutinosa*	潺槁樹	N		V			V			V	V

Family	Species name	Chinese name	*Status in Hong Kong	S	DA	M	Man	SW	CL	P	Work Area of Contract 2	100 m buffer area under Contract 2
LAURACEAE	*Litsea monopetala*	假柿樹	N							V	V	V
LEMNACEAE	*Spirodela polyrrhiza*	青萍	N	V							V	V
LILIACEAE	*Allium fistulosum*	蔥	E						V			V
LILIACEAE	*Disporum cantoniense*	萬壽竹	E					V				V
LYGODIACEAE	*Lygodium japonicum*	海金沙	N		V							V
MALVACEAE	*Hibiscus rosa-sinensis*	大紅花	E		V							V
MALVACEAE	*Hibiscus tiliaceus*	黃槿	N	V		V					V	V
MALVACEAE	*Thespesia populnea*	恒春黃槿	N				V					V
MELASTOMATACEAE	*Melastoma candidum*	野牡丹	N					V				V
MELASTOMATACEAE	*Melastoma sanguineum*	毛蒽	N					V				V
MELIACEAE	*Melia azedarach*	楝	E	V							V	V
MENISPERMACEAE	*Coculus orbiculatus*	木防己	N	V	V	V		V	V	V	V	V
MENISPERMACEAE	*Pericampylus glaucus*	細圓藤	N		V						V	V
MENISPERMACEAE	*Stephania longa*	粪箕篤	N		V			V				V
MIMOSACEAE	*Acacia confusa*	台灣相思	E		V							V
MIMOSACEAE	*Albizia lebbeck*	大葉合歡	E	V								V
MIMOSACEAE	*Calliandra haematocephala*	朱纓花	E		V							V
MIMOSACEAE	*Leucaena leucocephala*	銀合歡	E	V	V						V	V
MORACEAE	*Artocarpus macrocarpon*	菠蘿蜜	E		V						V	V
MORACEAE	*Ficus benjamina*	垂葉榕	E		V						V	V
MORACEAE	*Ficus elastica*	印度榕樹	E		V							V
MORACEAE	*Ficus hispida*	對葉榕	N	V	V	V					V	V
MORACEAE	*Ficus microcarpa*	榕樹	N		V			V				V
MORACEAE	*Ficus simplicissima*	五指毛桃	N		V			V				V

Family	Species name	Chinese name	*Status in Hong Kong	S	DA	M	Man	SW	CL	P	Work Area of Contract 2	100 m buffer area under Contract 2
MORACEAE	*Ficus triangularis*	三角榕	E	V							V	V
MORACEAE	*Ficus variegata*	青果榕	N		V			V				V
MORACEAE	*Ficus virens*	大葉榕	N	V	V						V	V
MORACEAE	*Morus alba*	桑	N		V							V
MUSACEAE	*Musa x paradisiaca L.*	大蕉	E		V				V			V
MYRSINACEAE	*Aegiceras corniculatum*	蠟燭果	N		V	V	V					V
MYRSINACEAE	*Ardisia quinquegona*	羅傘樹	N					V				V
MYRSINACEAE	*Embelia ribes*	白花酸藤	N					V				V
MYRSINACEAE	*Maesa perlarius*	鯽魚胆	N		V					V		V
MYRTACEAE	*Cleistocalyx operculatus*	水翁	N	V						V	V	V
MYRTACEAE	*Melaleuca quinquenervia*	白千層	E		V							V
MYRTACEAE	*Psidium guajava*	番石榴	E		V							V
MYRTACEAE	*Syzygium jambos (L.) Alston*	蒲桃	E		V			V				V
OLEACEAE	*Ligustrum sinensis*	山指甲	N		V							V
OXALIDACEAE	*Averrhoa carambola*	楊桃	E		V							V
OXALIDACEAE	*Oxalis corniculata*	酢漿草	N		V						V	V
PANDANACEAE	*Pandanus tectorius*	露兜樹	N				V					V
PINACEAE	*Pinus massoniana*	馬尾松	N							V		V
PIPERACEAE	*Piper hancei*	山蒟	N							V		V
PLANTAGINACEAE	*Plantago major*	車前草	N		V	V					V	V
POACEAE	*Apluda mutica*	水蔗草	N		V	V					V	V
POACEAE	*Arundinella nepalensis*	石珍芒	N	V	V			V				V
POACEAE	*Bambusa sp.*	竹	/					V				V
POACEAE	*Coix lacryma-jobi*	薏苡	N	V								V

Family	Species name	Chinese name	*Status in Hong Kong	S	DA	M	Man	SW	CL	P	Work Area of Contract 2	100 m buffer area under Contract 2
POACEAE	*Cynodon dactylon*	狗牙根	N		V						V	V
POACEAE	*Digitaria ciliaris*	升馬唐	N		V	V						V
POACEAE	*Eleusine indica*	牛筋草	N		V						V	V
POACEAE	*Microstegium ciliatum*	剛莠竹	N	V							V	V
POACEAE	*Panicum maximum*	大黍	E								V	V
POACEAE	*Panicum repens L.*	鋪地黍	N		V	V						V
POACEAE	*Brachiaria mutica*	巴拉草	E			V			V		V	V
POACEAE	*Pennisetum alopecuroides*	狼尾草	N		V	V		V				V
POACEAE	*Phragmites anstralis*	蘆葦	N		V	V						V
POACEAE	*Phragmites karka*	卡開蘆	N									V
POACEAE	*Zoysia sp.*	結縷草	N			V	V				V	V
POACEAE	*Eragrostis tenella*	鯽魚草	N		V				V	V	V	V
POACEAE	*Chloris virgata*	虎尾草	N		V	V			V	V	V	V
POACEAE	*Echinochloa crusgalli*	稗	N		V	V			V		V	V
POLYGONACEAE	*Polygonum chinensis*	火炭母	N						V			V
POLYGONACEAE	*Polygonum hydropiper*	水蓼	N		V							V
POLYGONACEAE	*Polygonum lapathifolium*	大馬蓼	N			V			V			V
PTERIDACEAE	*Pteris semipinnata*	半邊旗	N					V				V
PTERIDIACEAE	*Pteridium aquilinum*	蕨	N						V			V
RHIZOPHORACEAE	*Kandelia obovata*	秋茄樹	N			V	V					V
ROSACEAE	*Eriobotrya japonica*	枇杷	E		V							V
ROSACEAE	*Rubus reflexus*	蛇泡簕	N							V	V	V
RUBIACEAE	*Canthium dicoccum*	鐵矢	N					V				V
RUBIACEAE	*Hedyotis hedyotidea*	牛白藤	N									V

Family	Species name	Chinese name	*Status in Hong Kong	S	DA	M	Man	SW	CL	P	Work Area of Contract 2	100 m buffer area under Contract 2
RUBIACEAE	*Lasianthus chinensis*	粗葉木	N					V				V
RUBIACEAE	*Paederia scandens*	雞屎藤	N		V					V		V
RUBIACEAE	*Pavetta hongkongensis*	香港大沙	N (Cap. 96)					V				V
RUBIACEAE	*Psychotria asiatica*	九節	N					V				V
RUBIACEAE	*Psychotria serpens*	蔓九節	N		V							V
RUBIACEAE	*Spermacoce stricta*	豐花草	N	V	V			V	V	V	V	V
RUBIACEAE	*Hedyotis corymbosa*	傘房花耳	N	V	V			V	V	V	V	V
RUTACEAE	*Acronychia pedunculata*	降真香	N					V			V	V
RUTACEAE	*Citrus reticulata*	柑橘	E		V							V
RUTACEAE	*Clausena lansium*	黃皮	E		V							V
RUTACEAE	*Murraya paniculata*	九里香	E	V	V						V	V
SAPINDACEAE	*Dimocarpus longan*	龍眼	E		V					V		V
SAPINDACEAE	*Litchi chinensis*	荔枝	E		V							V
SAPINDACEAE	*Sapindus saponaria*	無患子	N							V		V
SAPOTACEAE	*Manilkara zapota*	人心果	E	V								V
SCROPHULARIACEAE	*Scoparia dulcis*	野甘草	N		V				V		V	V
SELAGINELLACEAE	*Selaginella uncinata*	翠雲草	N					V				V
SOLANACEAE	*Lycopersicon esculentum*	番茄	E						V			V
SOLANACEAE	*Solanum nigrum*	龍葵	N		V	V					V	V
SOLANACEAE	*Solanum torvum*	水茄	E			V		V			V	V
STERCULIACEAE	*Byttneria aspera*	刺果藤	N					V				V
STERCULIACEAE	*Sterculia lanceolata*	假蘋婆	N	V	V						V	V
THYMELAEACEAE	*Aquilaria sinensis*	土沉香	N (Cap. 586)					V				V
TILIACEAE	*Microcos paniculata*	布渣葉	N		V					V		V

Family	Species name	Chinese name	*Status in Hong Kong	S	DA	M	Man	SW	CL	P	Work Area of Contract 2	100 m buffer area under Contract 2
THELYPTERIDACEAE	*Cyclosorus parasiticus*	華南毛蕨	N	V	V	V		V	V	V	V	V
ULMACEAE	*Celtis sinensis*	朴樹	N		V		V				V	V
URTICACEAE	*Boehmeria nivea*	苧麻	E							V	V	V
URTICACEAE	*Pouzolzia zeylanica*	霧水葛	N	V	V				V	V	V	V
VERBENACEAE	*Avicennia marina*	白骨壤	N			V	V					V
VERBENACEAE	*Clerodendrum inerme*	苦郎樹	N	V								V
VERBENACEAE	*Lantana camara*	馬櫻丹	E	V	V						V	V

Note: “S” = Stream; “SW” = Secondary Woodland; “M” = Marsh; “Man” = Mangrove; “DA” =Developed area; “CL” = Cultivated area; “P” = Plantation

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

Common name	Species	Habitat	Conservation status in Hong Kong	Work area: Contract 2	100m buffer area
Chinese Bulbul	*Pycnonotus sinensis*		--		2
Common Tailorbird	*Orthotomus sutorius*		--		1
Crested Myna	*Acridotheres*		--		3
Eurasian Tree Sparrow	*Passer montanus*		--	1	2
Great Coucal	*Centropus sinensis*		--		1
Little Egret	*Egretta garzetta*	W	--		1
Masked Laughing thrush	*Garrulax*		--		3
Oriental Magpie Robin	*Copsychus saularis*		--	1	
Red-whiskered Bulbul	*Pycnonotus jocosus*		--		1
Rufous-backed Shrike	*Lanius schach*		--		1
Spotted Dove	*Streptopelia*		--	1	2
White-breasted Water hen	*Amaurornis*		--		1
Total number of species:				**3**	**11**

***Key :**

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

Table 4. 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.

Species	**Common name**	**[1]Life-cycle characteristics**	**[2]Origin**	**SEMP 3**	**SEMP 4**
Carassius auratus	Goldfish	F	I	++	+
Cirrhinus molitorella	Mud carp	F	I	++	+
Cyprinus carpio	Common Carp	F	I	+	+
Gambusia affinis	Mosquito Fish	F	I	++	+
Oreochromis niloticus	Nile Tilapa	F	I	+	
Parazacco spilurus	Predaceaous Chub	F	N	+	
Poecilia reticulata	Guppy	F	I	+	+
Puntius semifasciolatus	Chinese Barb	F	N	+	
Rhinogobius duospilus	Goby	F	N	+	+
Xiphophorus hellerii	Swordtail	F	I	+	+
Uca arcuata	Fiddler Crab	M	N	+	
Pomacea lineata	Apple snail	F	I	+	
Gerris sp.	Water Strider	F	/	+	
Total number of species:	**13**			**13**	**7**

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

[2]Origin:
N = Native
I = Introduced; / = not available