PROJECT NO.: TCS/00553/11

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

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

PREPARED FOR
KWAN LEE-KULY JOINT VENTURE

Quality Index

Date	Reference No.	Prepared By	Certified by
15 December 2014	TCS00553/11/600/R0402v1	 Ben Tam (Environmental Consultant)	 T.W. Tam (Environmental Team Leader)

Ver.	Date	Description
1	15 December 2014	First submission

Ref.: DSDSHUWNEM00_0_0684L.15 4 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. So Chi Ho

Dear Sirs,

Re: Agreement No. DP 01/2010
Services as Independent Environmental Checker for the Drainage Improvement Works in Sha Tin and Tai Po under Contract No. DC/2010/02
Monthly Environmental Monitoring and Audit Report for November 2014

Reference is made to Environment Team's submission of the Monthly Environmental Monitoring and Audit Report for November 2014 by Email on 26 January 2015 (entitled "DC/2010/22 - Monthly Impact EM&A Report (Contract 2) No.41 - November 2014").

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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ENVIRON Hong Kong Limited 英環香港有限公司
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www.environcorp.com

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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 Both Contracts were completion in ***October 2014***. The Project site boundary is shown in ***Appendix A***.

1.03 As informed by the Main Contractors and Resident Engineers, the works of Contracts 1 and 2 has been completed on **31 October 2014**. As agreed by the IEC, EM&A programme in November 2014 would be changed to operation phase and a formal letter has been submitted to the EPD for such change on 3 November 2014. Moreover, the ET of Contract 2 has been taken over all relevant EM&A programme of the operation phase.

1.04 In construction phase of the Contract 2, Action-United Environmental Services and Consulting (AUES) is an Environmental Team (ET) to implement the EM&A programmes. AUES would also perform the Operation Phase EM&A programme.

1.05 This is the **41st** Monthly EM&A Report as presented the Operation Phase relevant monitoring results and inspection findings for the reporting period from **1** to **30 November 2014**.

REPORT STRUCTURE

1.06 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

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 Contractors and Resident Engineers, the works of Contracts 1 and 2 has been completed on **31 October 2014**. As agreed by the IEC, EM&A programme in November 2014 would be changed to operation phase and a formal letter has been submitted to the EPD for such change on 3 November 2014. Moreover, the ET of Contract 2 has been taken over all relevant EM&A programme of the operation phase.

ENVIRONMENTAL MONITORING AND AUDIT ACTIVITIES

ES.03. Environmental monitoring activities for the Project under the Operation Phase of EM&A programme 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.04. In this Reporting Period, ecological monitoring in Area under the Project was performed by IEC on **28 November 2014**.

ES.05. 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.06. Joint site inspection with the IEC was carried out on **20 November 2014.** No construction activity was observed to conduct at Wai Ha River 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.

ENVIRONMENTAL COMPLAINT

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

NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

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

REPORTING CHANGE

ES.09. Since the Project has changed to operation phase, the operation phase EM&A programme undertaken in the Reporting Period was complied with the updated EM&A Manual.

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. However, pathway reinstatement at Wai Ha Tsuen and minor defects rectify of Box Culverts was conducted by the Contract 2 during site inspection observed.

SUMMARY OF ENVIRONMENTAL SUBMISSIONS

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

Table 2-1 Status of Environmental Licenses and Permits

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

2.04 Operation Phase Monitoring Notification was submitted to the Independent Environmental Checker (IEC) for agreement. A formal letter was sent to the EPD for endorsement.

3.0 EM&A PROGRAM REQUIREMENT FOR THE OPERATION PHASE

3.01 The Operation Phase EM&A requirements to according the PP, EIAR, Environmental Permit EP303/2008 (hereinafter 'the EP'), and the associated updated EM&A Manual, is presented in below sub-section.

MONITORING PARAMETERS

3.02 According to the updated EM&A Manual of the Project, the Operation Phase monitoring requirement has showed in ***Table 3-1***.

Table 3-1 Summary of Monitoring Parameters

Environmental Aspect	Requirement / Parameter
Hydrological Characteristics	In-situ measurement including water flow and depth
*Ecology	Monitor and inspect including the vegetation, fauna (includes avifauna, herpetofauna, odonate and butterfly) and Stream (includes fish and macroinvertebrates)
#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 have been proposed in the updated EM&A Manual. Graphic plot to show in ***Appendix C*** and summarized in ***Table 3-2***.

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

Aspect	Location ID	Address
Hydrological	H1	Between the Shuen Wan Marsh and ECA • Coordinates: E839306, N836379
	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 Project boundary	
Landscape & Visual	As within and adjacent to the Project completion areas	

MONITORING FREQUENCY

3.04 According to the updated EM&A Manual, frequency and duration of the Operational Phase monitoring are summarized below.

Hydrological Characteristics

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

Duration: 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, the Operation Phase ecological

monitoring would be to conduct by the Independent Environmental Checker (hereinafter 'IEC'). Regular checking and monitoring by quarter month would be performed for one year duration

Landscape & Visual

3.06 According to Section 7.5 of the Updated EM&A Manual, all landscape and visual mitigation measures would be monitored quarterly during the first year of the Operation Phase to check on the effectiveness of the mitigations.

MONITORING EQUIPMENT USED FOR THE OPERATION PHASE

Hydrological Characteristics

3.07 **Water Depth Detector** - A portable, battery-operated echo sounder should be used for the determination of water depth at each designated monitoring station.

3.08 **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.

3.09 The monitoring equipment using for the Project Operation Phase EM&A program were proposed by the ET and verified by the IEC prior commencement of the monitoring. ***Table 3-3*** is listed equipment using Hydrological measurement.

Table 3-3 Equipment Use for Hydrological Monitoring

Equipment	Model
Water flow meter	GLOBAL WATER model FP211
Water Depth Detector	Eagle Sonar or an appropriate steel ruler or rope with appropriate weight

HYDROLOGICAL MONITORING METHODOLOGY

3.10 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.

3.11 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.

OTHERS MONITORING IMPLEMENTATION FOR THE PROJECT

Ecology

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

Landscape and Visual

3.13 A registered Landscape Architect as member of the ET is employed by the Contractor to undertake site inspection. Site inspection will undertake once every three months during the first year of the Operation Phase to check on the effectiveness of the mitigations.

DETERMINATION OF ACTION/LIMIT (A/L) LEVELS

3.14 No performance criteria i.e. Action and Limit levels of hydrological is used for the Operational Phase.

3.15 The location H3 is a reference measurement point in order to monitor any changes in the hydrological characteristics of Wai Ha River arising from the Project works to affect the Shuen Wan Marsh.

4.0 HYDROLOGICAL MONITORING RESULTS

4.01 The Operation Phase monitoring schedule has issued to relevant parties before the Reporting Period and attached in ***Appendix G***. The monitoring results are presented in the following sub-sections.

RESULTS OF HYDROLOGICAL CHARACTERISTICS MONITORING

4.02 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 D***

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	0.6	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 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

4.03 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

4.04 According to updated EM&A Manual Section 6.20, quarterly month 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.

4.05 In this Reporting Period, ecological monitoring in Area under the Project of Operation Phase was performed on **28 November 2014**. The details monitoring report is presented in ***Appendix E***.

METEOROLOGICAL INFORMATION

4.06 The meteorological information during the measurement day of Operation Phase would be extracted from Tai Po and Shatin Stations of the Hong Kong Observatory (HKO). The meteorological data during the measurement days are presented in ***Table 4-2***

Table 4-2 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
8-Nov-14	Sat	Mainly cloudy. Visibility relatively low in some areas. Moderate northeasterly winds.	18	20	92.2	8.2	N/NE
14-Nov-14	Fri	Mainly cloudy. Moderate north to northeasterly winds.	Trace	19.6	76.5	6.1	N/NE
22-Nov-14	Sat	Mainly fine. Moderate easterly winds.	0	22.1	75.7	7.0	E/SE
28-Nov-14	Fri	Fine. Light winds.	Trace	23.1	83.2	4.6	E/NE

5.0 SITE INSPECTION

REGULAR SITE INSPECTION AND MONTHLY AUDIT

5.01 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.

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

LANDSCAPE AND VISUAL INSPECTION

5.03 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 F***.

5.04 Quarterly Landscape & Visual Operation Phase Monitoring is tentatively to be conducted in **February 2015**.

6.0 ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE

ENVIRONMENTAL COMPLAINT, SUMMONS AND PROSECUTION

6.01 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 6-1, 6-2*** and ***6-3***.

Table 6-1 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 6-2 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 6-3 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

7.0 IMPLEMENTATION STATUS OF MITIGATION MEASURES

7.01 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

8.0 CONCLUSIONS AND RECOMMENTATIONS

CONCLUSIONS

8.01 This is the **41st** monthly EM&A report for the Contract 2 as presented the operation phase monitoring results and inspection findings for the Reporting Period of **1 to 30 November 2014**.

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

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

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

8.05 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 have not yet completed. No non-compliance was observed during the inspection.

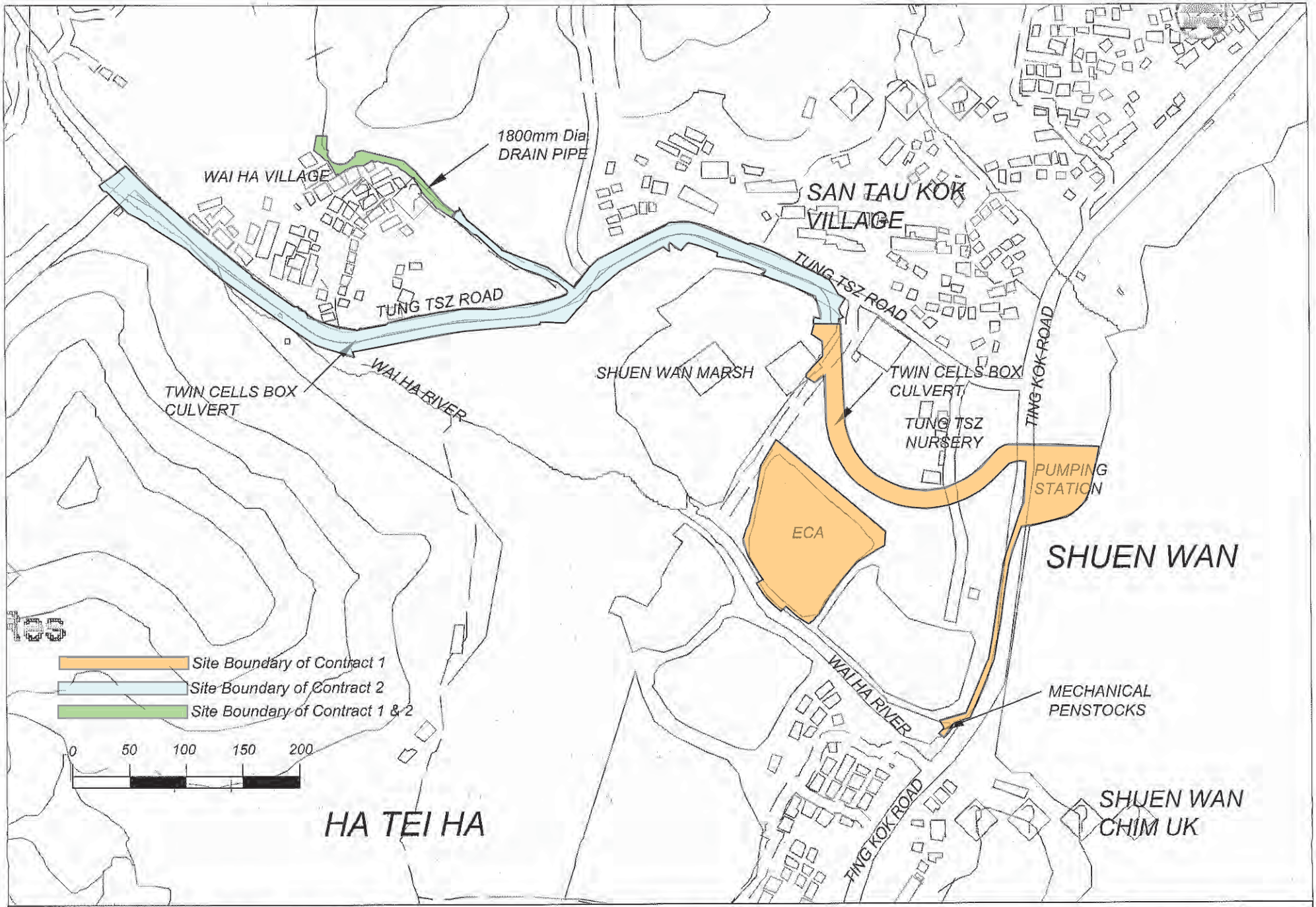
8.06 No documented complaint, notification of summons or successful prosecution was received.

RECOMMENDATIONS

8.07 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

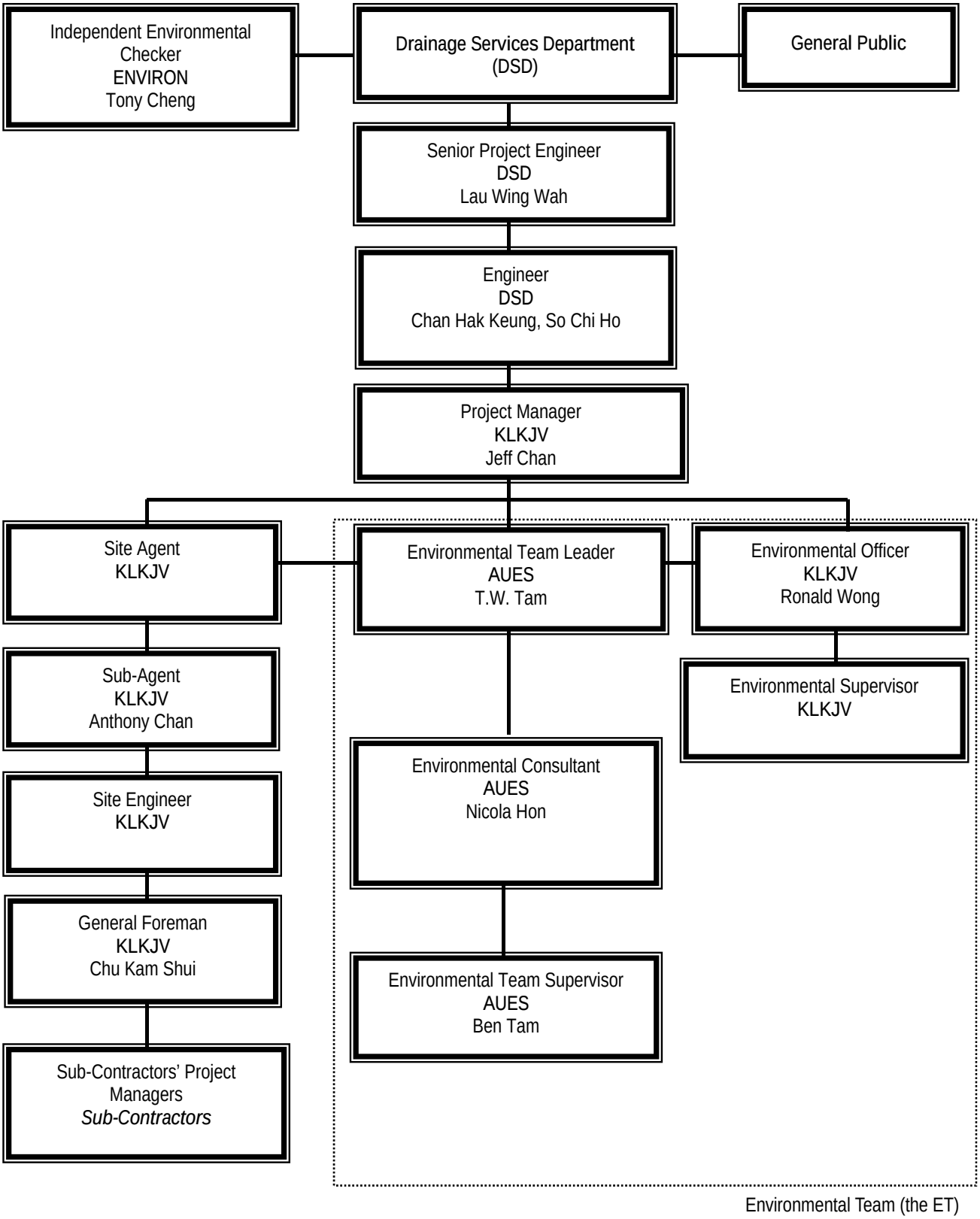
Project Location at Shuen Wan



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

Appendix B

Organization Chart and the Key Contact Person



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

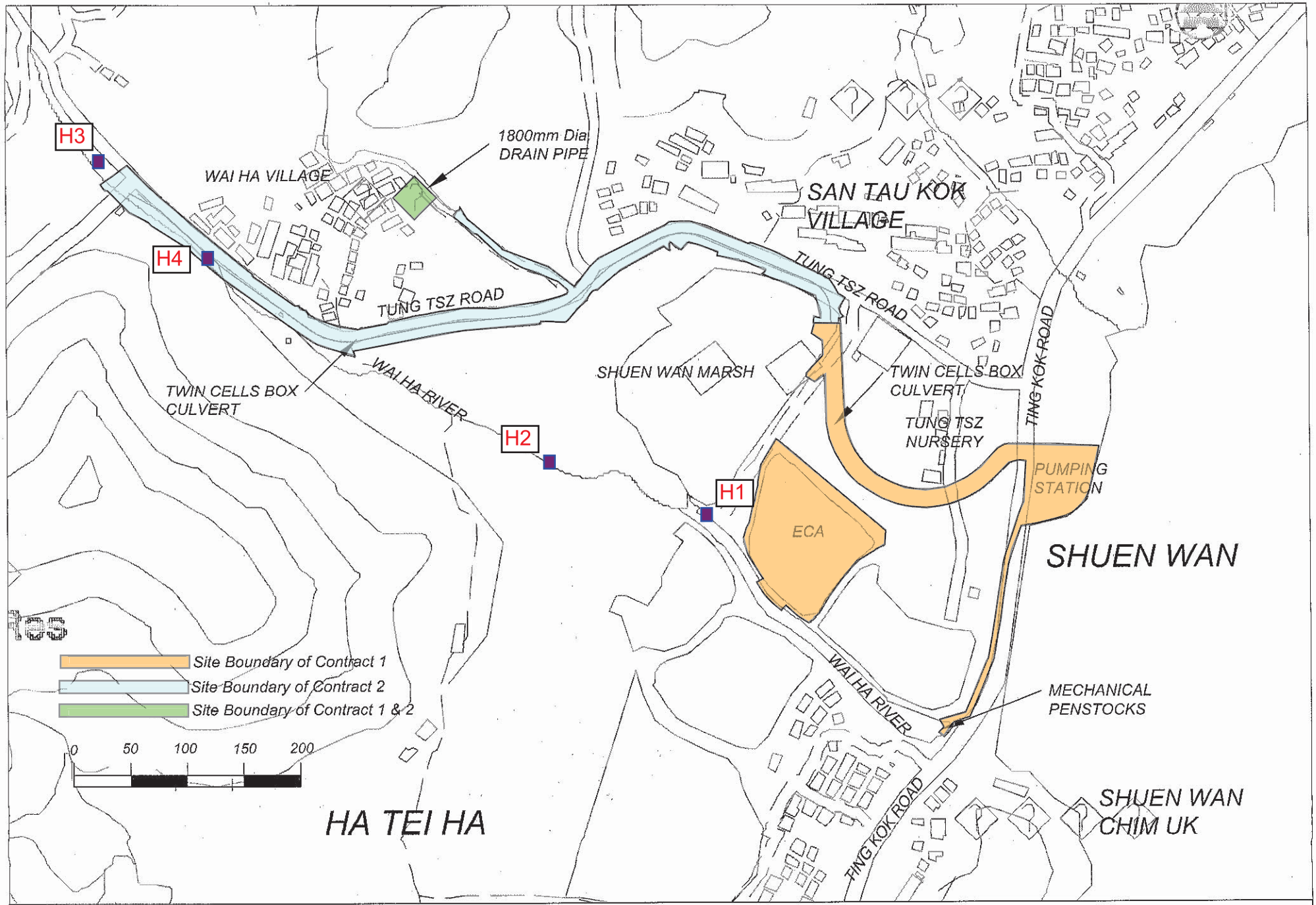
KLKJV (Main Contractor) – Kwan Lee-Kuly Joint Venture

ENVIRON (IEC) – ENVIRON Hong Kong Limited

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

Appendix C

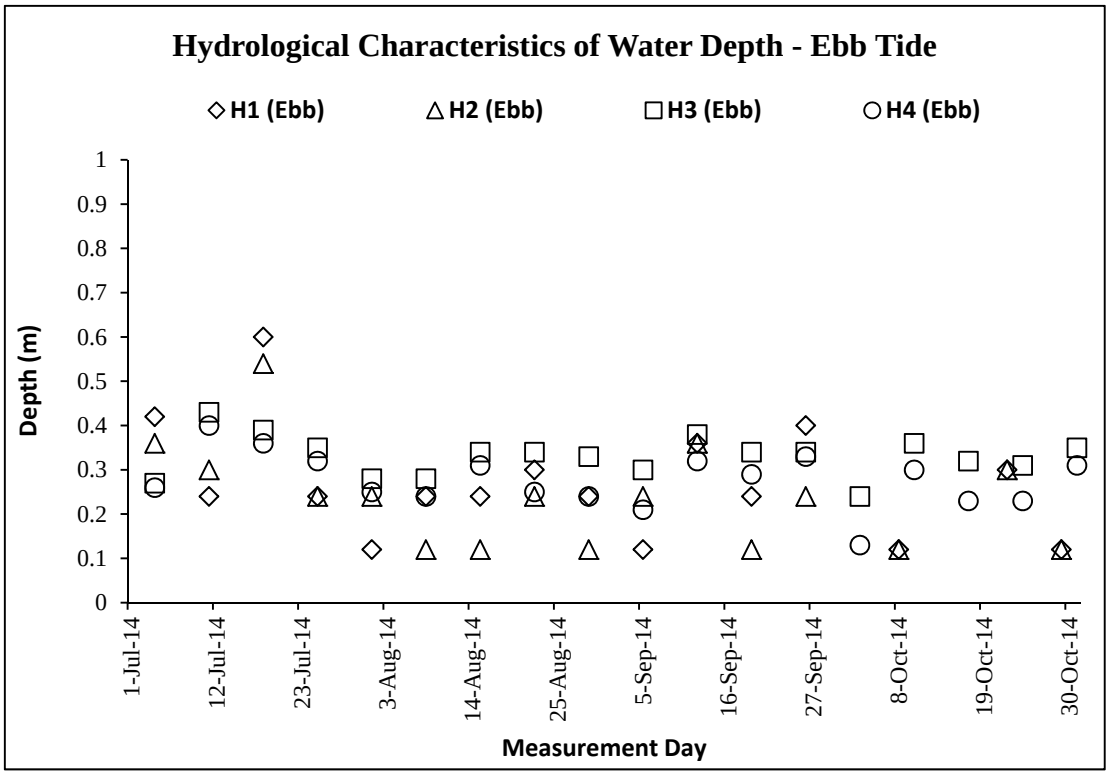
Operation Phase Environmental Monitoring Locations

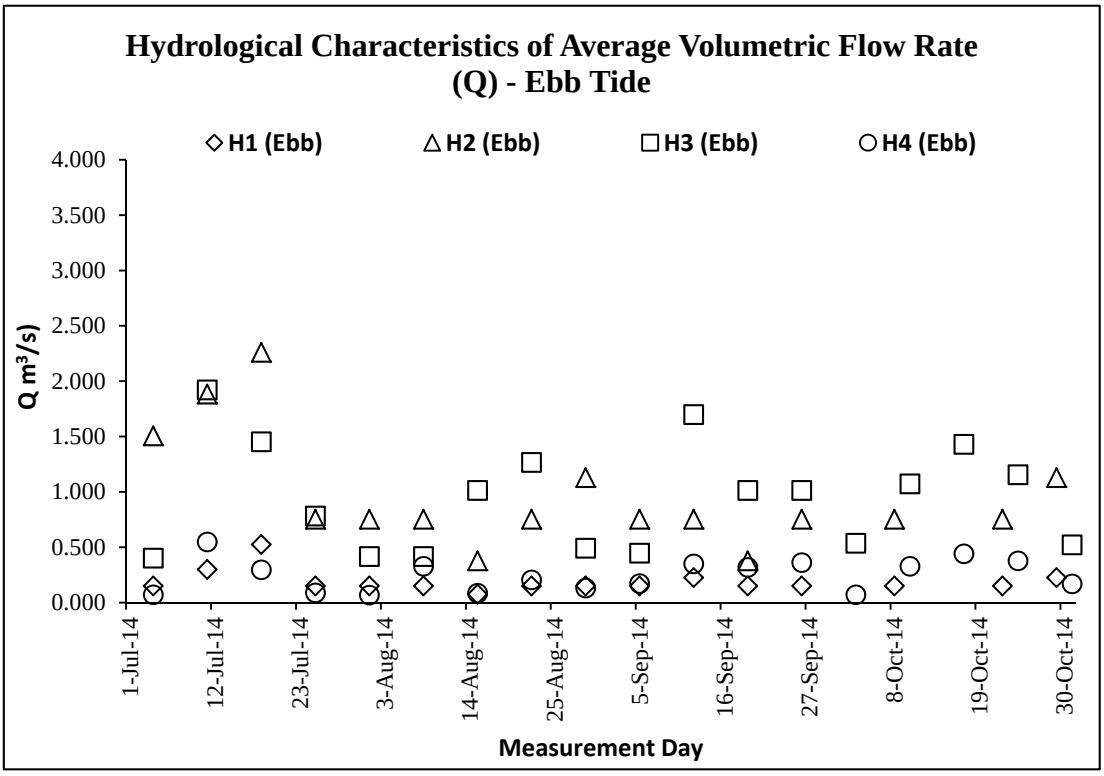


All Environmental Monitoring Locations

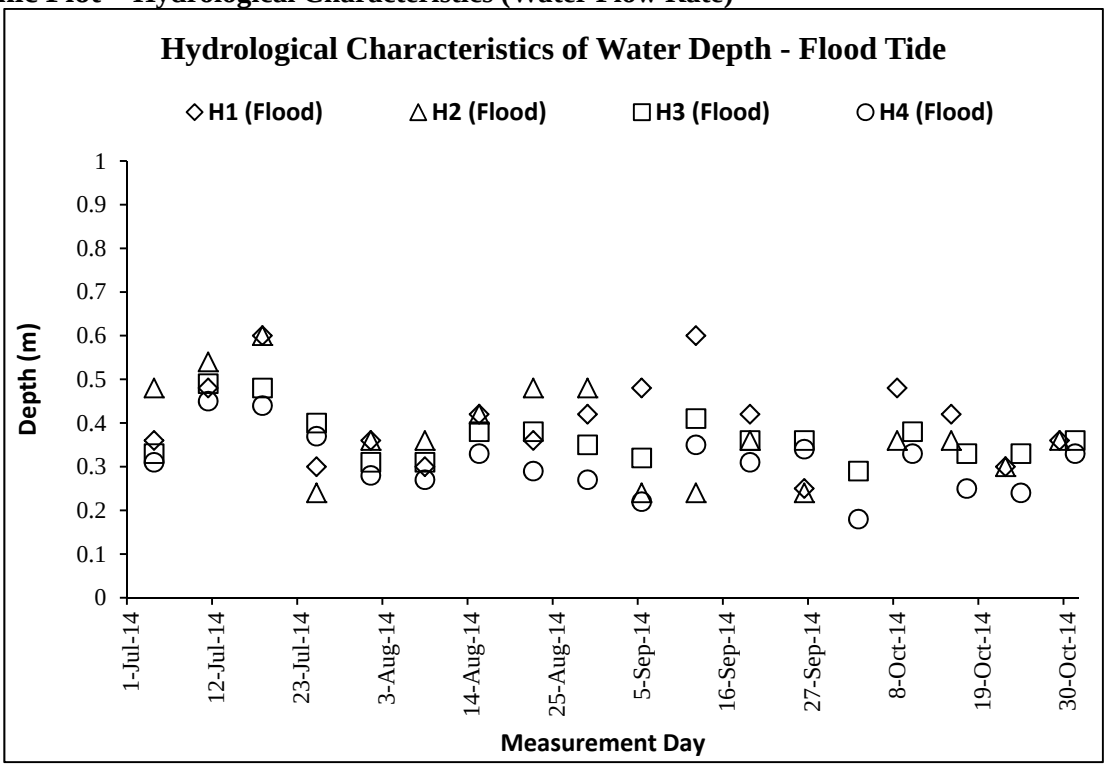
Appendix D

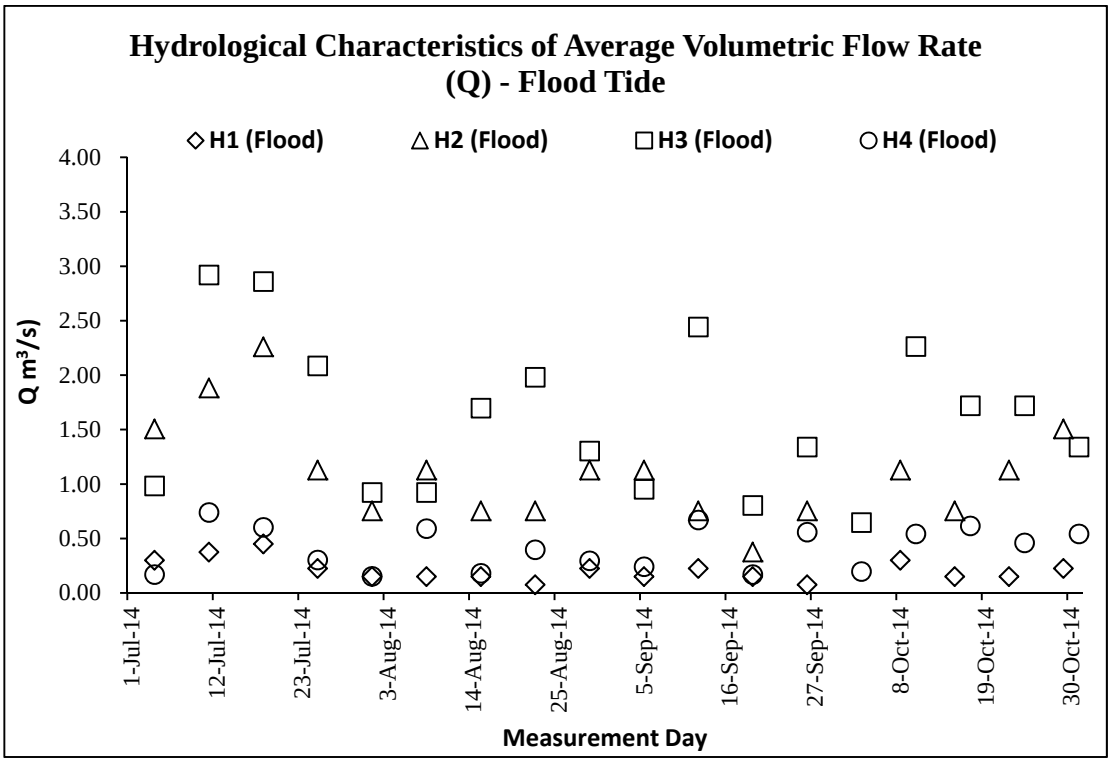
Graphical Plots of Hydrological Characteristics


Hydrological Characteristics of Water Depth - Ebb Tide
H1 (Ebb)
H2 (Ebb)
H3 (Ebb)
H4 (Ebb)
Depth (m)
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1-Jul-14
12-Jul-14
23-Jul-14
3-Aug-14
14-Aug-14
25-Aug-14
5-Sep-14
16-Sep-14
27-Sep-14
8-Oct-14
19-Oct-14
30-Oct-14
Measurement Day


Hydrological Characteristics of Average Volumetric Flow Rate (Q) - Ebb Tide
H1 (Ebb)
H2 (Ebb)
H3 (Ebb)
H4 (Ebb)
Q m³/s)
4.000
3.500
3.000
2.500
2.000
1.500
1.000
0.500
0.000
1-Jul-14
12-Jul-14
23-Jul-14
3-Aug-14
14-Aug-14
25-Aug-14
5-Sep-14
16-Sep-14
27-Sep-14
8-Oct-14
19-Oct-14
30-Oct-14
Measurement Day

Graphic Plot – Hydrological Characteristics (Water Flow Rate)





Appendix E

Ecological Monitoring Report

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:
December 2014

Reference Number:
R4304_V1.0

ENVIRON

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

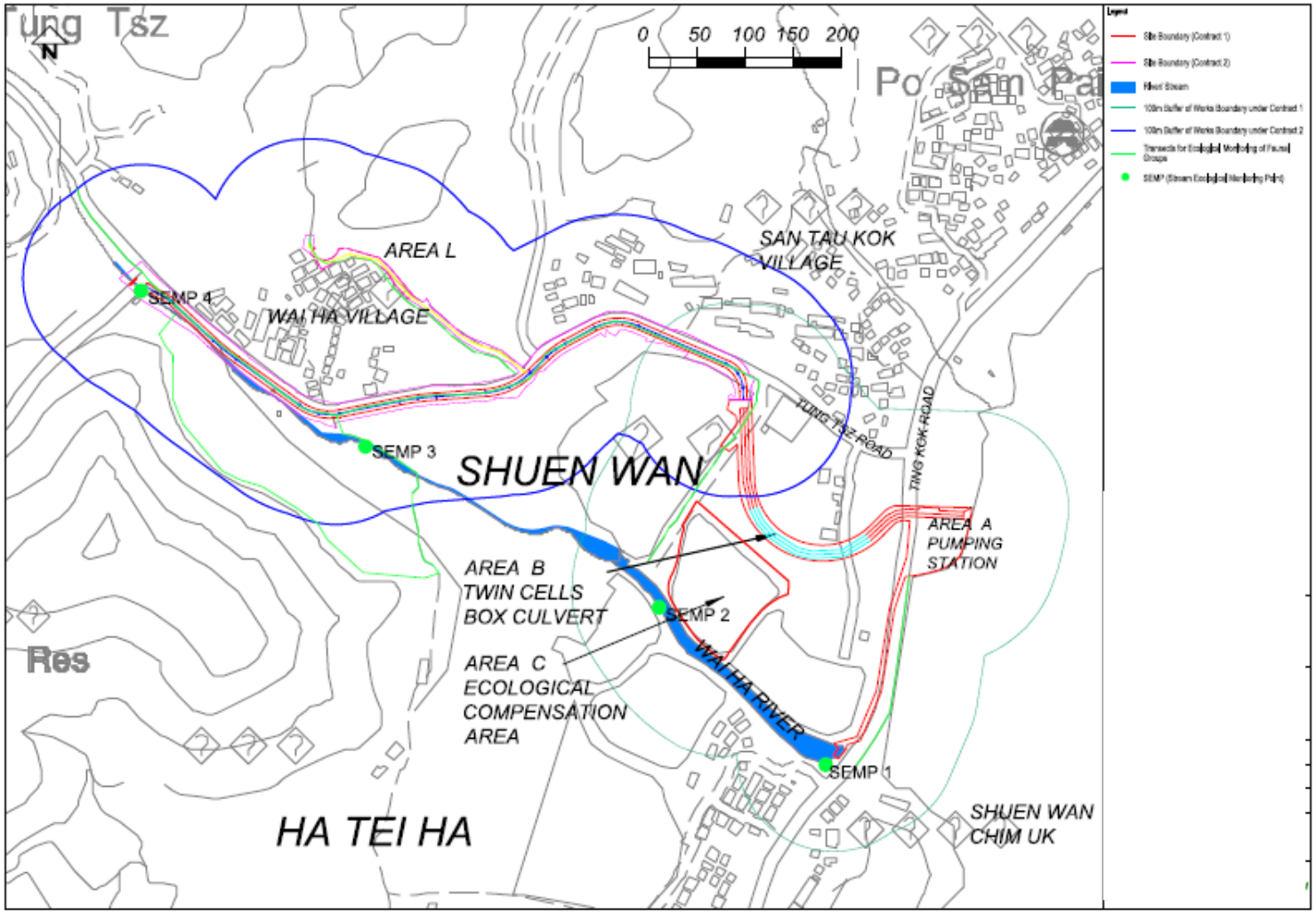

Figure: 1

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

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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

Appendix F

Landscape & Visual Inspection Report

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

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

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

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

	Name	Signature
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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.

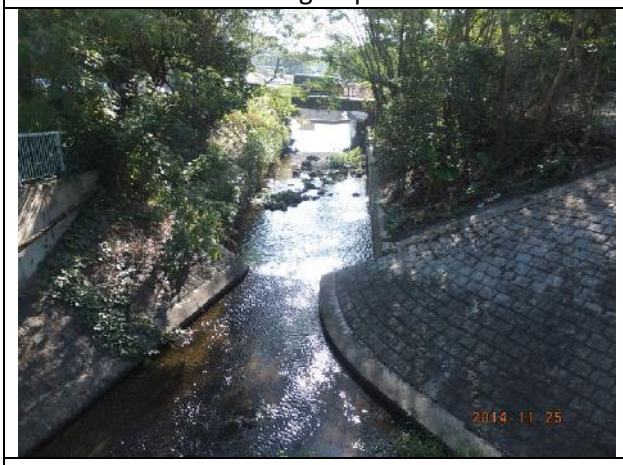



Photo 17 – No direct water discharge into the upper stream of Wai Ha River was observed as all major construction works in Contract 2 works area have been completed.	**Photo 18** – Water used to clean the underground box culvert was discharged through the drainage outfall to the tidal marsh area.

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.

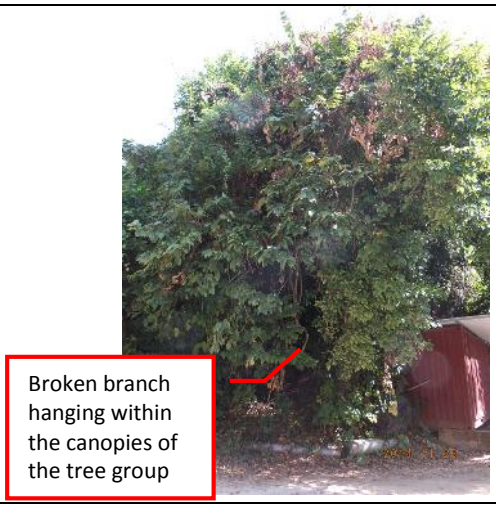
<table>
<tr><td>  </td><td> 
</td></tr>
<tr><td>Photo 25 – Concrete pavement maintained for parking area for the villagers was still observed around the tree group T089-T091.</td><td>Photo 26 – One broken branch was noted hanging within the tree canopies of tree group T099-T102.</td></tr>
<tr><td>  </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 G

Monitoring Schedule in Reporting Period and the Coming Month

Monitoring Schedule for the Reporting Period – November 2014 (Operational Phase)

Date		Hydrological – Water Flow and Depth 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	
Sat	8-Nov-14	**H1, H2, H3, H4**
Sun	9-Nov-14	
Mon	10-Nov-14	
Tue	11-Nov-14	
Wed	12-Nov-14	
Thu	13-Nov-14	
Fri	14-Nov-14	**H1, H2, H3, H4**
Sat	15-Nov-14	
Sun	16-Nov-14	
Mon	17-Nov-14	
Tue	18-Nov-14	
Wed	19-Nov-14	
Thu	20-Nov-14	
Fri	21-Nov-14	
Sat	22-Nov-14	**H1, H2, H3, H4**
Sun	23-Nov-14	
Mon	24-Nov-14	
Tue	25-Nov-14	
Wed	26-Nov-14	
Thu	27-Nov-14	
Fri	28-Nov-14	**H1, H2, H3, H4**
Sat	29-Nov-14	
Sun	30-Nov-14	

	Monitoring Day
	Sunday or Public Holiday

Monitoring Schedule for the Coming Month – December 2014 (Operational Phase)

Date		Hydrological – Water Flow and Depth Monitoring
Mon	1-Dec-14	
Tue	2-Dec-14	
Wed	3-Dec-14	
Thu	4-Dec-14	
Fri	5-Dec-14	**H1, H2, H3, H4**
Sat	6-Dec-14	
Sun	7-Dec-14	
Mon	8-Dec-14	
Tue	9-Dec-14	
Wed	10-Dec-14	
Thu	11-Dec-14	**H1, H2, H3, H4**
Fri	12-Dec-14	
Sat	13-Dec-14	
Sun	14-Dec-14	
Mon	15-Dec-14	
Tue	16-Dec-14	
Wed	17-Dec-14	
Thu	18-Dec-14	
Fri	19-Dec-14	**H1, H2, H3, H4**
Sat	20-Dec-14	
Sun	21-Dec-14	
Mon	22-Dec-14	
Tue	23-Dec-14	
Wed	24-Dec-14	
Thu	25-Dec-14	
Fri	26-Dec-14	
Sat	27-Dec-14	**H1, H2, H3, H4**
Sun	28-Dec-14	
Mon	29-Dec-14	
Tue	30-Dec-14	
Wed	31-Dec-14	

	Monitoring Day
	Sunday or Public Holiday