

**Drainage Service Department**

**Monthly Environmental Monitoring & Auditing report for**

**Contract No.DC/2009/22**

**Drainage Improvement in Shuen Wan, Tai Po – Contract 1**

**November 2013**

**Environmental Pioneers & Solutions Limited**

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## APPROVAL SHEET

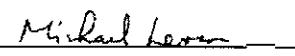
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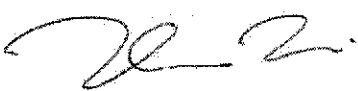
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## **EXECUTIVE SUMMARY**

This is the thirty third monthly Environmental Monitoring and Audit (EM&A) Report for the drainage improvement works in Shuen Wan, Tai Po under Drainage Services Department Contract No. DC/2009/22 entitled “Drainage Improvement Works in Shuen Wan, Tai Po – Contract 1”. This report concludes the impact monitoring for the activities undertaken during the period from 1<sup>st</sup> November 2013 to 30<sup>th</sup> November 2013. The major site activities in this reporting period were mainly installation of minor E&M equipment, E&M testing, planting on green roof, construction of road & drain in pumping station, construction of boundary wall/granite finishing & painting, installation of cladding and reinstatement in Tung Tsz Nursery.

The Environmental Team (ET) is responsible for the EM&A works required in the EM&A manual (revision 3). Site inspections were carried out on weekly basis to investigate and audit the equipment and work methodologies with respect to pollution control and environmental mitigation. The weekly inspections records and photos taken were kept.

In general, waste management was satisfactory during the reporting period.

Impact monitoring for construction noise was conducted in the reporting period. No exceedance of A/L level was reported.

Furthermore, impact monitoring for water quality was conducted. Total 9 abnormal incidents of water quality criteria were recorded in this reporting month. During the reporting period, no construction activities were conducted near the Wai Ha River. Proper mitigation measures were implemented by contractor to avoid site water releasing to the Wai Ha river and no particular observation of defective site activities were found causing water contamination. The exceedances of Turbidity and SS were believed to be mainly attributed by natural fluctuation. And, since the recorded levels of Turbidity and SS at control station had also exceeded its baseline action or limit level, the exceedances recorded at W2 were unlikely to be related to the Project.

No exceedance of A/L level was reported for the monitoring of hydrological

characteristics in the reporting period.

The ECA was handed over to AFCD on 16<sup>th</sup> October 2012. And, the monitoring for *Pavetta hongkongensis* was completed.

Visual and landscape monitoring has been conducted for the project. Details of the observations are referred to sections 7.

There was no complaint, notification of any summons and successful prosecutions against the project received during the reporting period.

Site works proposed to be carried out in the upcoming month at Area A & B are refer to section 2.2.

It is expected that noise, air and water quality impacts will be resulted from the works. ET has reminded the contractor to provide environmental pollution control measures wherever necessary and to keep a good environmental management at site practice. The recommended mitigation measures proposed for the project as well as implementation status are refer to section 12.3.

The ET will continue to implement the environmental monitoring & audit programme in accordance with the EM&A Manual (revision 3) and Environmental Permit requirement.

## **1 Introduction**

This is the thirty third monthly Environmental Monitoring and Audit (EM&A) Report for the drainage improvement works in Shuen Wan, Tai Po under Drainage Services Department Contract No. DC/2009/22 entitled “Drainage Improvement Works in Shuen Wan, Tai Po – Contract 1”. The site layout plan is shown in **Appendix A**. The Environmental Team, Environmental Pioneers & Solutions Limited was appointed by Kwan Lee – Kuly Joint Venture to prepare the report. The report is to be submitted to the Contractor, the Engineer and the IEC.

This report presents the results of the environmental monitoring of the project activities conducted within the reporting period from 1<sup>st</sup> November 2013 to 30<sup>th</sup> November 2013. This report included the noise monitoring, water quality monitoring, hydrological characteristics monitoring, visual and landscape monitoring, and regular site inspections once per week for verification of implementation of the mitigation measures as recommended in the Environmental Permit (EP-303/2008) (EP), EM&A Manual (revision 3) and the Contractor’s Environmental Management Plan (EMP).

## **2 Construction Stage**

### **2.1 Construction activities in the reporting period**

Major activities in the reporting period included the followings:

Area A.:

- Installation of E&M equipment
- E&M Testing
- Planting on Green Roof
- Construction of Road & Drain in Pumping Station
- Construction of Boundary Wall / Granite Finishing & Painting
- Installation of Cladding

Area B.:

- Reinstatement in Tung Tsz Nursery (Footpath)

### **2.2 Construction activities for the coming month**

Proposed key construction works in the coming months will include:

Area A (Pumping Station)

1. Planting on Man-made slope
2. Construction of Boundary Fencing
3. Road in Pumping Station
4. Installation of Minor E&M equipment
5. Planting and landscape soft work
6. Installation of Cladding
7. Rectification works at Ting Kok Road
8. Remaining works at Intake Structure

Area B (Tung Tsz Nursery)



1. Reinstatement in Tung Tsz Nursery

**2.3 Environmental Status**

**Appendix A** shows the drawing of the project area.

Locations of the monitoring and control stations with environmental sensitive receivers are presented in Section 3.3, 4.3, and 5.3 for noise, water quality, and hydrological characteristics respectively.

### 3 Noise Monitoring

#### 3.1 Monitoring Parameters and Methodology

The construction noise level was measured in terms of the A-weighted equivalent continuous sound pressure level ( $L_{eq}$ ).  $L_{eq(30minutes)}$  was used as the monitoring parameter for the impact monitoring in the time period between 0700 to 1900 hours on normal weekdays. For all other time period,  $L_{eq(5minutes)}$  was employed for comparison with the Noise Control Ordinance (NCO) criteria.

Noise measurement results obtained from each monitoring location were recorded in the Construction Noise Monitoring Data Sheet (**Appendix D**) immediately after the measurement. As supplementary information for data auditing, statistical results  $L_{10}$  and  $L_{90}$  were also be recorded for reference.

In case of non-compliance with the construction noise criteria, more frequent monitoring, as specified in the Action plan in Table 3.5.2, shall be carried out. This additional monitoring shall be carried out until the recorded noise levels are rectified or proved to be irrelevant to the construction activities.

#### 3.2 Monitoring Equipment

The sound level meters and calibrators comply with the International Electrotechnical Commission Publications 651:1979 (Type 1) and 804:1985 (Type 1) specifications as referred to in the Technical Memorandum (TM) to the Noise Control Ordinance was deployed as monitoring equipment for noise measurement.

Noise measurement was not be made in the presence of fog, rain, wind with a steady speed exceeding  $5\text{ms}^{-1}$  or wind with gust exceeding  $10\text{ms}^{-1}$ . Thus wind speed was checked by the portable wind speed indicator capable of measuring the wind speed in m/s. Table 3.2.1 summarizes the equipment list for noise monitoring

Table 3.2.1 Equipment List for Noise Monitoring

Equipment	Manufacturer & Model No.	Precision Grade	Qty
Integrated sound level meter	Svantek 955	IEC 61672 Type 1 IEC 1260 Type 1	1
Windscreen	Microtech gefell model W2	N/A	1
Acoustical calibrator	Svantek SV30A	IEC 942 Type 1	1
Wind speed indicator	Kestrel K1000	N/A	1
Remarks: Calibration details of the sound level meter is given in <b>Appendix C</b> for reference			

### 3.3 Monitoring Locations

According to the Environmental Monitoring and Audit manual, impact noise monitoring for contract 1 was undertaken at two locations during the construction phase of the project. The proposed monitoring locations are summarized in Table 3.3.1. Figure 3.3.1 shows the Noise Monitoring Locations.

Noise measurement at each monitoring location was taken at a point 1m from the exterior of the selected premises and at a height of 1.2m above ground with no disturbance to the dweller and least obstructed view.

Table 3.3.1 Noise Monitoring Locations during Construction Phase

Noise Monitoring Station	Location
M1	14, Shuen Wan Chim Uk
AL1	Joint Village Office for Villages in Shuen Wan, Tai Po

In accordance with the requirements in the EM&A manual (revision 3), weekly impact monitoring was conducted. For the time period between 0700 and 1900 hours on normal weekdays, and noise parameter of  $L_{eq(30minutes)}$  was measured. As if the construction works were carried out during restricted period (i.e. 1900-2300, 2300-0700 of next day and Sundays / general holiday), impact monitoring that comprises 3 consecutive  $L_{eq(5minutes)}$  would be carried out.

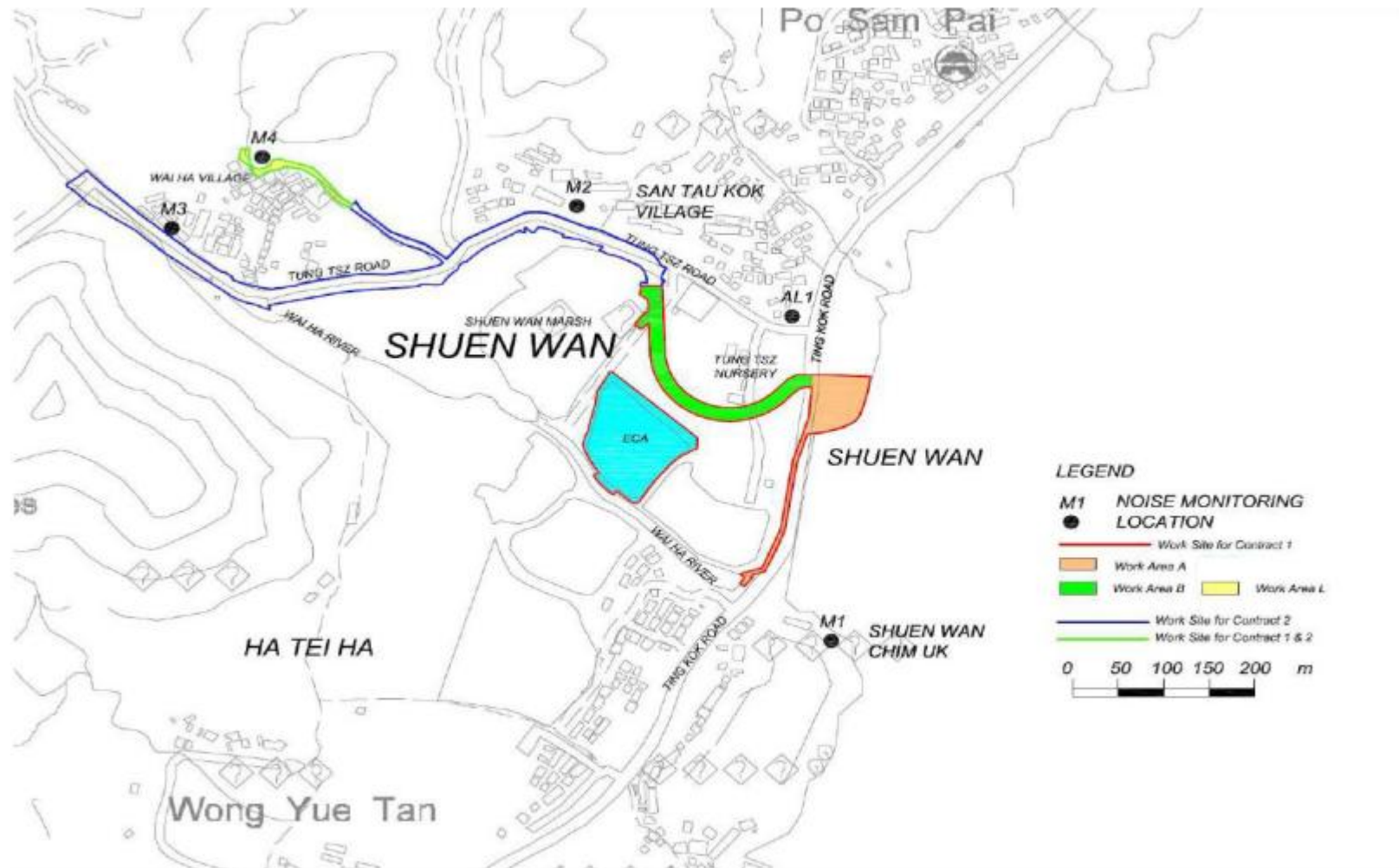


Figure 3.3.1 Impact noise monitoring locations

### 3.4 Monitoring Results and Interpretation

Relevant details of the noise monitoring results are presented in Table 3.4.1. The results of M1 ranged between 61.5dB (A) and 68.4dB (A), and AL1 ranged between 66.5dB (A) and 70.1dB (A), were within the limit levels and therefore, no exceedance was found.

Table 3.4.1 Noise Monitoring Results for the reporting period							
Location	Parameter	Date*	Time	L <sub>Aeq</sub> dB(A)	Limit dB(A)	Exceedance	Weather
M1	L <sub>eq</sub> 30mins	6-Nov-13	13:15	68.4	75	N	Cloudy
M1	L <sub>eq</sub> 30mins	13-Nov-13	11:00	66.9	75	N	Cloudy
M1	L <sub>eq</sub> 30mins	20-Nov-13	12:40	61.5	75	N	Cloudy
M1	L <sub>eq</sub> 30mins	27-Nov-13	11:25	63.5	75	N	Cloudy
AL1	L <sub>eq</sub> 30mins	6-Nov-13	13:55	66.8	75	N	Cloudy
AL1	L <sub>eq</sub> 30mins	13-Nov-13	11:45	70.1	75	N	Cloudy
AL1	L <sub>eq</sub> 30mins	20-Nov-13	13:20	66.5	75	N	Cloudy
AL1	L <sub>eq</sub> 30mins	27-Nov-13	12:10	68.9	75	N	Cloudy

Remarks: Raw datasheet for noise monitoring are attached in **Appendix D** for reference.

### 3.5 Action and Limit level for Construction Noise

The Action and Limit (A/L) levels for construction noise are defined in Table 3.5.1. Should non-compliance of the criteria occur, action in accordance with the Action Plan in Table 3.5.2 should be carried out.

There was no exceedance recorded in the reporting period.

Table 3.5.1 Action and Limit Levels for Construction noise

Time Period	Action Level	Limit Level
0700 – 1900 hours on normal weekdays	When one documented complaint is received	75dB(A)
Remarks: If works are to be carried out during restricted hours, the conditions stipulated in the construction noise permit issued by the Noise Control Authority have to be followed.		

### 3.6 Monitoring Schedule for the next reporting period

Noise monitoring schedule is proposed to be carried out on 4<sup>th</sup>, 11<sup>th</sup>, 18<sup>th</sup> and 30<sup>th</sup> of December 2013.

Table 3.5.2 Event / Action Plan for Construction Noise

EVENT				
	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	1. Review the analysed 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 analysed noise problem; 4. Check remedial measures	1. Submit noise mitigation proposals to IEC. 2. Implement noise mitigation proposals.

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

### **4.1 Water Quality Monitoring Parameters and Methodology**

Turbidity in Nephelometric Turbidity Unit (NTU), and Dissolved Oxygen (DO) in mg/L, temperature, and pH measurements were in-situ measurements and suspended solids measurements were performed by a HOKLAS accredited laboratory using recommended reference method APHA 2540D.

### **4.2 Monitoring Equipment**

Turbidity, DO, Salinity, pH and temperature was measured by an instrument complied with the following requirements:

The instrument is a portable as well as weatherproof multimeter complete with cable and uses a DC power source. It is capable of measuring:

- A turbidity between 0-800NTU;
- A dissolved Oxygen level in the range of 0-20mg/L and 0-200% saturation;
- A temperature of 0-50°C;
- Salinity in the range of 0-40ppt;
- pH in the range of 0-14.

The measurements were performed by a portable and weatherproof multi-meter, model TOA-DKK WQC-24. The equipment was calibrated and verified by certified laboratory every 3 months to ensure they perform to the same level of accuracy as stated in the manufacturer's specification. Detailed calibration records of the multi-meter were shown in **Appendix C** for reference

Suspended solids were determined by the water samples collected from the monitoring locations for further analysis in accredited HOKLAS laboratory. Water samples were contained by polythene bottles, packed in ice (cooled in 4°C without frozen) and delivered to the laboratory for analysis as soon as possible after collection.



### 4.3 Monitoring Locations

In accordance with the EM&A Manual (revision 3), monitoring stations for contract 1 were established at two locations, which are summarized in Table 4.3.1.

**Table 4.3.1 – Water Quality Monitoring Stations**

<b>Monitoring Station</b>	<b>Location</b>	<b>Coordinates</b>
W1	Between the Shuen Wan Marsh and ECA	E:839301 N:836386
W2	Between Tolo Harbour and Proposed Penstock	E:839542 N:836184

As illustrated in Figure 4.3.1, W1 served as the control station while W2 was the monitoring location of water quality.

According to the approved proposal of revision for Action/Limit Level Criteria of Water Quality Monitoring, two reference points (C1 & C2) were added.

Should the water quality parameters monitoring results at the monitoring station W2 exceed the water quality criteria, the water quality monitoring data of two reference points (C1 and C2) will be used as the supplementary information. The monitoring data of C1 should be used for comparison with the monitoring data of W2 that taken at flood tide; and the monitoring data of C2 should be used for comparison with the monitoring data of W2 that taken at ebb tide. The comparison of water quality between W2 and C1 at flood tide and between W2 and C2 at ebb tide is to prove whether influence of water quality is caused by the construction activities. The details of C1 and C2 are referred to the previous submission.

In accordance with the EM&A Manual (revision 3), measurements shall be taken at 3 water depths, namely, 1m below water surface, mid-depth and 1m above river bed, except where the water depth less than 6m, the mid-depth station may be omitted. Should the water depth be less than 3m, only the mid-depth station will be monitored.

As the depth of water was less than 3m, water samples were collected at mid-depth of each proposed monitoring stations for measurements and sample collection.

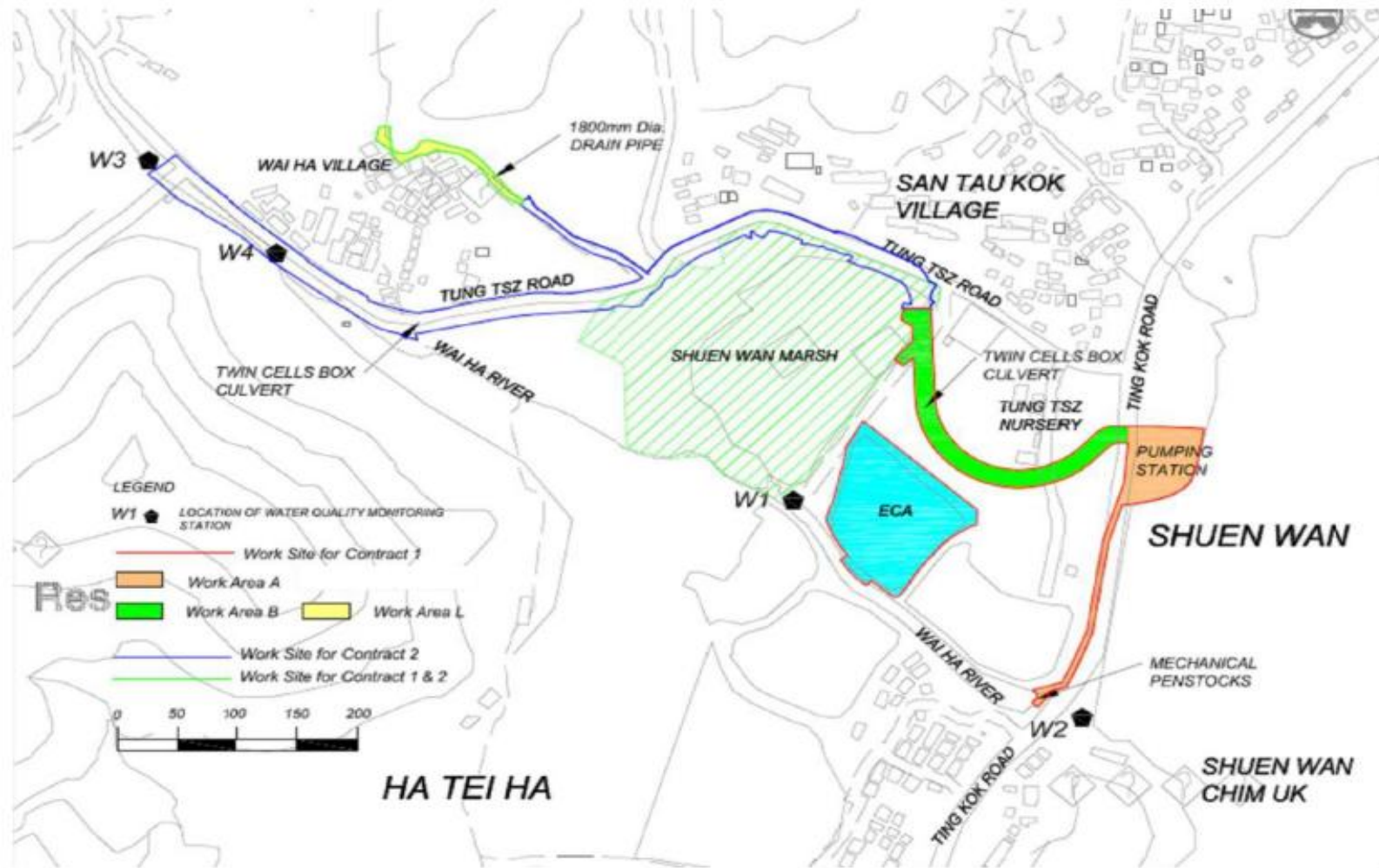


Figure 4.3.1 Water Quality Monitoring Locations

#### **4.4 Monitoring Frequency**

Impact water quality monitoring for each monitoring station were performed at mid-flood or mid-ebb tides for 3 days per week during the course of the construction river works.

Monitoring were carried out on 1<sup>st</sup>, 4<sup>th</sup>, 6<sup>th</sup>, 8<sup>th</sup>, 11<sup>th</sup>, 13<sup>th</sup>, 15<sup>th</sup>, 18<sup>th</sup>, 20<sup>th</sup>, 22<sup>nd</sup>, 25<sup>th</sup>, 27<sup>th</sup> and 29<sup>th</sup> of November 2013.

#### **4.5 Monitoring Results and Interpretation**

Water quality monitoring was carried out thirteen times in this reporting month. Detailed on-site measurements are shown in **Appendix E**. Table 4.5.1 presents consolidated results throughout the reporting month.

There were 9 abnormal incidents of water quality limits (Turbidity) were recorded in this reporting month according to the established action and limit levels. ET has arranged site investigations for the abnormal incidents. No construction activities were carried out at the river bed. During the reporting period, no construction activities were conducted near the Wai Ha River. Proper mitigation measures were implemented by contractor to avoid site water releasing to the Wai Ha river and no particular observation of defective site activities were found causing water contamination. The exceedances of Turbidity and SS were believed to be mainly attributed by natural fluctuation. And, since the recorded levels of Turbidity and SS at control station had also exceeded its baseline action or limit level, the exceedances recorded at W2 were unlikely to be related to the Project.

The water condition of Wai Ha River is presented in photo attached in **Appendix M**.

Table 4.5.1 Summary of Water Quality Monitoring Results of this reporting month

	<b>Average of Monitoring Results</b>					
	<i>Temperature</i> (°C)	<i>Turbidity</i> (NTU)	<i>pH</i>	<i>Dissolved</i> <i>Oxygen</i> (mg/L)	<i>Dissolved</i> <i>Oxygen</i> (%)	<i>Suspended</i> <i>Solids</i> (mg/L)
W1	24.0	10.0	7.36	7.62	86.8	9.3
W2	24.1	4.0	7.99	7.43	76.0	3.8
C1	24.3	2.5	8.13	8.15	85.0	2.4
C2	24.1	8.0	8.33	7.97	91.1	4.6

Table 4.5.2 Interpretations of abnormal incidents recorded in the reporting month

<b>Date</b>	<b>Tide</b>	<b>Parameter</b>	<b>Interpretations</b>
1/11/2013	Ebb	Turbidity	Exceedance was caused by natural fluctuation
6/11/2013	Ebb	Turbidity	Exceedance was caused by natural fluctuation
8/11/2013	Ebb	Turbidity	Exceedance was caused by natural fluctuation
11/11/2013	Ebb	Turbidity	Exceedance was caused by natural fluctuation
13/11/2013	Ebb	Turbidity SS	Exceedance was caused by natural fluctuation
18/11/2013	Ebb	Turbidity	Exceedance was caused by natural fluctuation
20/11/2013	Ebb	Turbidity	Exceedance was caused by natural fluctuation
22/11/2013	Ebb	Turbidity	Exceedance was caused by natural fluctuation
27/11/2013	Ebb	Turbidity	Exceedance was caused by natural fluctuation

#### 4.6 Action and limit level for Water Quality

Based on the criteria stipulated in EM&A manual (revision 3) and baseline water quality monitoring data obtained, the A/L levels are shown in Table 4.6.1, Table 4.6.2. The A/L levels for W1 were ignored since W1 functions as the

control station for contract 1. If the water quality monitoring results at any impact stations exceeded the criteria, the actions in accordance with the Event and Action Plan in Table 4.6.3 should be taken.

Table 4.6.1 Action and Limit Levels for Water Quality at All Monitoring Stations

Parameters	Action	Limit
DO in mg/L	5 percentile of baseline data	4 mg/L
pH	N/A	6.0 – 9.0
SS in mg/L	95 percentile of baseline data or 120% of upstream control station's SS	99 percentile of baseline data or 130% of upstream control station's SS
Turbidity in NTU	95 percentile of baseline data or 120% of upstream control station's Turbidity	99 percentile of baseline data or 130% of upstream control station's Turbidity

Table 4.6.2 Action and Limit Levels for Water Quality at All Monitoring Stations

Parameters	Monitoring Stations (Flood Tide)				Monitoring Stations (Ebb Tide)			
	W1		W2		W1		W2	
	Action Level	Limit Level	Action Level	Limit Level	Action Level	Limit Level	Action Level	Limit Level
DO (mg/L)	8.07	8.07	7.81	7.69	7.12	7.02	6.77	6.31
pH	N/A	6.0-9.0	N/A	6.0-9.0	N/A	6.0-9.0	N/A	6.0-9.0
SS (mg/L)	7.7	8.1	7.7	8.6	10.5	10.9	9.4	9.9
Turbidity (NTU)	4.9	5.3	1.7	1.8	4.2	4.7	3.0	3.5

Remarks:

For DO, non-compliance of the water quality limits occurs when monitoring result is lower than the limits

For SS and turbidity, non-compliance of the water quality limits occurs when monitoring result is higher than the limits.

Table 4.6.3 Event and action Plan for Water Quality

Event	ET Leader	IEC	ER	Contractor
<b>ACTION LEVEL</b>				
Action level being exceeded by one sampling day	<ol style="list-style-type: none"> <li>1. Repeat in-situ measurements to confirm findings;</li> <li>2. Identify reasons for non-compliance and source(s) of impact;</li> <li>3. Inform IEC, Contractor and Engineer;</li> <li>4. Check monitoring data, all plant, equipment and Contractor's working methods;</li> <li>5. Discuss mitigation measures with IEC, Engineer and Contractor;</li> <li>6. Ensure mitigation measures are implemented.</li> </ol> <p>Repeat measurement on next day of</p>	<ol style="list-style-type: none"> <li>1. Discuss mitigation measures with ET, Engineer and Contractor;</li> <li>2. Review proposals on mitigation measures submitted by Contractor and advise the Engineer accordingly;</li> <li>3. Assess effectiveness of implemented mitigation measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss proposed mitigation measures with IEC, ET and Contractor;</li> <li>2. Make agreement on mitigation measures to be implemented;</li> <li>3. Assess effectiveness of implemented mitigation measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Inform Engineer and confirm in writing notification of the non-compliance;</li> <li>2. Rectify unacceptable practice;</li> <li>3. Check all plant and equipment;</li> <li>4. Consider changes in working methods;</li> <li>5. Discuss with ET, IEC and Engineer and propose mitigation measures to IEC and Engineer within three working days;</li> <li>6. Implement agreed mitigation measures.</li> </ol>

	exceedance.			
Action level being exceeded by more than two consecutive sampling days	<ol style="list-style-type: none"> <li>1. Repeat in-situ measurements to confirm findings;</li> <li>2. Identify reasons for non-compliance and source(s) of impact;</li> <li>3. Inform IEC, Contractor and Engineer;</li> <li>4. Check monitoring data, all plant, equipment and Contractor's working methods;</li> <li>5. Discuss mitigation measures with IEC, Engineer and Contractor;</li> <li>6. Ensure mitigation measures are implemented.</li> <li>7. Prepare to increase the monitoring frequency to daily;</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss mitigation measures with ET, Engineer and Contractor;</li> <li>2. Review proposals on mitigation measures submitted by Contractor and advise the Engineer accordingly;</li> <li>3. Assess effectiveness of implemented mitigation measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss proposed mitigation measures with IEC, ET and Contractor;</li> <li>2. Make agreement on mitigation measures to be implemented;</li> <li>3. Assess effectiveness of implemented mitigation measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Inform Engineer and confirm in writing notification of the non-compliance;</li> <li>2. Rectify unacceptable practice;</li> <li>3. Check all plant and equipment;</li> <li>4. Consider changes in working methods;</li> <li>5. Discuss with ET, IEC and Engineer and propose mitigation measures to IEC and Engineer within three working days;</li> <li>6. Implement agreed mitigation measures.</li> </ol>



	8. Repeat measurement on next day of exceedance.			
<b>LIMIT LEVEL</b>				
Limit level being exceeded by one sampling day	<ol style="list-style-type: none"> <li>1. Repeat in-situ measurements to confirm findings;</li> <li>2. Identify reasons for non-compliance and source(s) of impact;</li> <li>3. Inform EPD, IEC, Contractor and Engineer;</li> <li>4. Check monitoring data, all plant, equipment and Contractor's working methods;</li> <li>5. Discuss mitigation measures with IEC, Engineer and Contractor;</li> <li>6. Ensure mitigation measures are implemented;</li> <li>7. Increase the monitoring</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss mitigation measures with ET, Engineer and Contractor;</li> <li>2. Review proposals on mitigation measures submitted by Contractor and advise the Engineer accordingly;</li> <li>3. Assess effectiveness of implemented mitigation measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss proposed mitigation measures with IEC, ET and Contractor;</li> <li>2. Request Contractor to critically review the working methods;</li> <li>3. Make agreement on mitigation measures to be implemented;</li> <li>4. Assess effectiveness of implemented mitigation measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Inform Engineer and confirm in writing notification of the non-compliance;</li> <li>2. Rectify unacceptable practice;</li> <li>3. Check all plant and equipment;</li> <li>4. Consider changes in working methods;</li> <li>5. Discuss with ET, IEC and Engineer and propose mitigation measures to IEC and Engineer within three working days;</li> <li>6. Implement agreed mitigation</li> </ol>

	frequency to daily until no exceedance of Limit level.			measures.
Limit level being exceeded by more than two consecutive sampling days	<ol style="list-style-type: none"> <li>1. Repeat in-situ measurements to confirm findings;</li> <li>2. Identify reasons for non-compliance and source(s) of impact;</li> <li>3. Inform EPD, IEC, Contractor and Engineer;</li> <li>4. Check monitoring data, all plant, equipment and Contractor's working methods;</li> <li>5. Discuss mitigation measures with IEC, Engineer and Contractor;</li> <li>6. Ensure mitigation measures are implemented.</li> <li>7. Increase the monitoring frequency to daily until no exceedance of</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss mitigation measures with ET, Engineer and Contractor;</li> <li>2. Review proposals on mitigation measures submitted by Contractor and advise the Engineer accordingly;</li> <li>3. Assess effectiveness of implemented mitigation measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss proposed mitigation measures with IEC, ET and Contractor ;</li> <li>2. Request Contractor to critically review the working methods;</li> <li>3. Make agreement on mitigation measures to be implemented;</li> <li>4. Assess effectiveness of implemented mitigation measures;</li> <li>5. Consider and if necessary</li> </ol>	<ol style="list-style-type: none"> <li>1. Inform Engineer and confirm in writing notification of the non-compliance;</li> <li>2. Rectify unacceptable practice;</li> <li>3. Check all plant and equipment;</li> <li>4. Consider changes in working methods;</li> <li>5. Discuss with ET, IEC and Engineer and propose mitigation measures to IEC and Engineer within three working days;</li> <li>6. Implement agreed mitigation measures;</li> </ol>

	Limit level for two consecutive days.		instruct Contractor to slow down or to stop all or part of the construction activities until no exceedance of Limit Level.	7. As directed by the Engineer, slow down or stop all or part of the construction activities until no exceedance of Limit level.
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#### 4.7 Monitoring Schedule for the next reporting period

Water quality monitoring schedule is proposed to be carried out on 2<sup>nd</sup>, 4<sup>th</sup>, 6<sup>th</sup>, 9<sup>th</sup>, 11<sup>th</sup>, 13<sup>th</sup>, 16<sup>th</sup>, 18<sup>th</sup>, 20<sup>th</sup>, 23<sup>rd</sup>, 27<sup>th</sup> and 30<sup>th</sup> of December 2013.

## 5 Hydrological Characteristics Monitoring

### 5.1 Hydrological Characteristics Monitoring Parameters and Methodology

Impact monitoring of hydrological characteristics was undertaken to establish hydrological characteristics of sections of Wai Ha River adjacent to Drainage Improvement Works in Shuen Wan, Tai Po.

The hydrological characteristics of sections of Wai Ha River were measured by water flow rate and depth.

### 5.2 Monitoring Equipment

Monitoring performed by a portable echo-sounder, model Greyline Stingray. The equipment was calibrated and verified by certified laboratory or manufacturer every year to ensure they perform to the same level of accuracy as stated in the manufacturer's specification.

Calibration Certificate of the multi-meter is given in **Appendix C**.

### 5.3 Monitoring Locations

In accordance with the EM&A Manual (revision 3), monitoring stations for contract 1 were established at two locations and summarized in Table 5.3.1.

**Table 5.3.1 – Water Quality Monitoring Stations**

<b>Monitoring Station</b>	<b>Location</b>	<b>Coordinates</b>
H1	Between the Shuen Wan Marsh and ECA	E:839301 N:836386
H2	Route to Sam Kung Temple	E:839163 N:836433

As illustrated in Figure 5.3.1, H2 served as the control station while H1 was the monitoring location of hydrological characteristics.

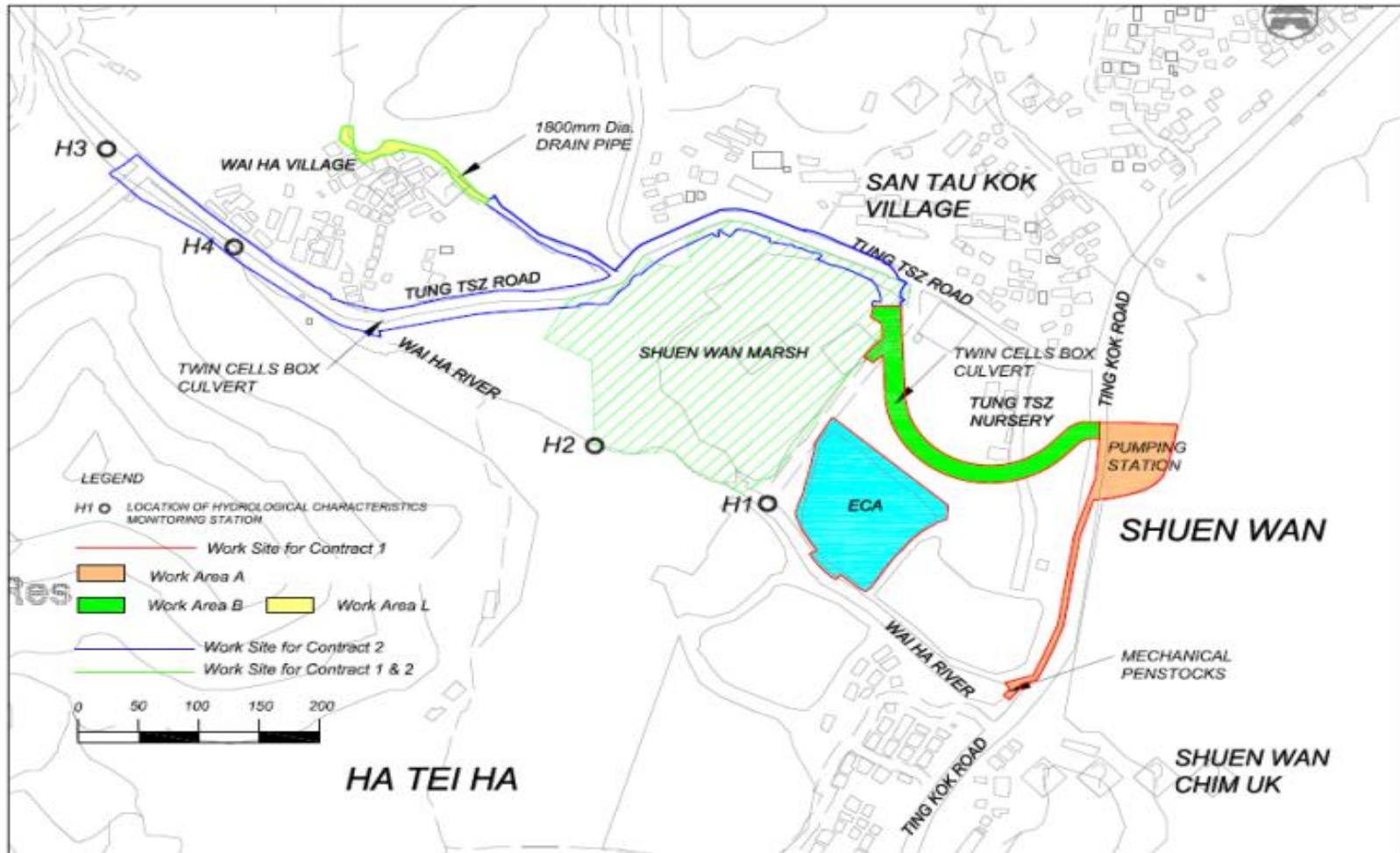


Figure 5.3.1 Hydrological Characteristics Monitoring Locations

## 5.4 Monitoring Frequency

Hydrological characteristics monitoring for each monitoring station were performed at mid-flood and mid-ebb tides for once per week during the course of the construction river works.

Monitoring was carried out on 1<sup>st</sup>, 8<sup>th</sup>, 15<sup>th</sup>, 22<sup>nd</sup> and 29<sup>th</sup> of November 2013.

## 5.5 Monitoring Results and Interpretation

Hydrological characteristics monitoring was carried out five times in this reporting period. The monitoring results are summarized in Table 5.5. All results were within the action and limit levels, therefore, no exceedance was found.

Table 5.5 Summary of Water Quality Monitoring Results

	Average of Monitoring Results	
	Water Depth (m)	Water Flow Rate (m <sup>3</sup> /s)
H1(Flood)	~0.312	~0.180
H1(Ebb)	~0.216	~0.195
H2(Flood)	~0.312	~1.130
H2(Ebb)	~0.216	~1.055

Details of the monitoring data were presented in **Appendix F**.

## 5.6 Action and limit level for Hydrological Characteristics

The Action and Limit levels for all monitoring stations are summarized in Table 5.6.1, which would be applied for compliance assessment of hydrological characteristics for this project. If the hydrological characteristics monitoring results at any impact stations exceeded the criteria, the actions in accordance with the Event and Action Plan in Table 5.6.2 should be taken.

Table 5.6.1 Action and Limit Levels for Hydrological Characteristics at All Monitoring Stations

Parameters	Action	Limit
Water Depth at Mid-flood (m)	0.08	0.06
Water Depth at Mid-ebb (m)	0.08	0.06
Water Flow Rate (m <sup>3</sup> /s)	120% 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

Table 5.6.2 Event and action Plan for Hydrological Characteristics

Event	ET Leader	IEC	ER	Contractor
<b>ACTION LEVEL</b>				
Action level being exceeded by one sampling day	<ol style="list-style-type: none"> <li>1. Repeat in-situ measurements to confirm findings;</li> <li>2. Identify reasons for non-compliance and source(s) of impact;</li> <li>3. Inform IEC, Contractor and Engineer;</li> <li>4. Check monitoring data, Contractor's working methods and any excavation works or dewatering processes;</li> <li>5. Discuss mitigation measures with IEC, Engineer and Contractor;</li> <li>6. Ensure mitigation measures are implemented.</li> <li>7. Repeat measurement on next day of exceedance.</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss mitigation measures with ET, Engineer and Contractor;</li> <li>2. Review proposals on mitigation measures submitted by Contractor and advise the Engineer accordingly;</li> <li>3. Assess effectiveness of implemented mitigation measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss proposed mitigation measures with IEC, ET and Contractor;</li> <li>2. Make agreement on mitigation measures to be implemented;</li> <li>3. Assess effectiveness of implemented mitigation measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Inform Engineer and confirm in writing notification of the non-compliance;</li> <li>2. Rectify unacceptable practice;</li> <li>3. Check working methods and any excavation works or dewatering processes;</li> <li>4. Consider changes in working methods and plans;</li> <li>5. Discuss with ET, IEC and Engineer and propose mitigation measures to IEC and Engineer within three working days;</li> <li>6. Implement agreed mitigation measures.</li> </ol>
Action level being exceeded by more than two consecutive sampling days	<ol style="list-style-type: none"> <li>1. Repeat in-situ measurements to confirm findings;</li> <li>2. Identify reasons for non-compliance and source(s) of impact;</li> <li>3. Inform IEC,</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss mitigation measures with ET, Engineer and Contractor;</li> <li>2. Review proposals on mitigation</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss proposed mitigation measures with IEC, ET and Contractor;</li> <li>2. Make agreement</li> </ol>	<ol style="list-style-type: none"> <li>1. Inform Engineer and confirm in writing notification of the non-compliance;</li> <li>2. Rectify</li> </ol>

	<p>Contractor and Engineer;</p> <p>4. Check monitoring data, Contractor's working methods and any excavation works or dewatering processes;</p> <p>5. Discuss mitigation measures with IEC, Engineer and Contractor;</p> <p>6. Ensure mitigation measures are implemented.</p> <p>7. Prepare to increase the monitoring frequency to daily;</p> <p>8. Repeat measurement on next day of exceedance.</p>	<p>measures submitted by Contractor and advise the Engineer accordingly;</p> <p>3. Assess effectiveness of implemented mitigation measures.</p>	<p>on mitigation measures to be implemented;</p> <p>3. Assess effectiveness of implemented mitigation measures.</p>	<p>unacceptable practice;</p> <p>3. Check working methods and any excavation works or dewatering processes;</p> <p>4. Consider changes in working methods and plans;</p> <p>5. Discuss with ET, IEC and Engineer and propose mitigation measures to IEC and Engineer within three working days;</p> <p>6. Implement agreed mitigation measures.</p>
<b>LIMIT LEVEL</b>				
<p>Limit level being exceeded by one sampling day</p>	<p>1. Repeat in-situ measurements to confirm findings;</p> <p>2. Identify reasons for non-compliance and source(s) of impact;</p> <p>3. Inform AFCD, IEC, Contractor and Engineer;</p> <p>4. Check monitoring data, and Contractor's working methods and any excavation works or dewatering processes;</p> <p>5. Discuss</p>	<p>1. Discuss mitigation measures with ET, Engineer and Contractor;</p> <p>2. Review proposals on mitigation measures submitted by Contractor and advise the Engineer accordingly;</p> <p>3. Assess effectiveness of implemented mitigation</p>	<p>1. Discuss proposed mitigation measures with IEC, ET and Contractor;</p> <p>2. Request Contractor to critically review the working methods;</p> <p>3. Make agreement on mitigation measures to be implemente</p>	<p>1. Inform Engineer and confirm in writing notification of the non-compliance ;</p> <p>2. Rectify unacceptable practice;</p> <p>3. Check working methods and any excavation works or dewatering processes;</p> <p>4. Consider changes in working</p>



	<p>mitigation measures with IEC, Engineer and Contractor;</p> <p>6. Ensure mitigation measures are implemented;</p> <p>7. Increase the monitoring frequency to daily until no exceedance of Limit level.</p>	<p>measures.</p>	<p>d;</p> <p>4. Assess effectiveness of implemented mitigation measures.</p>	<p>methods and plans;</p> <p>5. Discuss with ET, IEC and Engineer and propose mitigation measures to IEC and Engineer within three working days;</p> <p>6. Implement agreed mitigation measures.</p>
<p>Limit level being exceeded by more than two consecutive sampling days</p>	<p>1. Repeat in-situ measurements to confirm findings;</p> <p>2. Identify reasons for non-compliance and source(s) of impact;</p> <p>3. Inform AFCD, IEC, Contractor and Engineer;</p> <p>4. Check monitoring data, and Contractor's working methods and any excavation works or dewatering processes;</p> <p>5. Discuss mitigation measures with IEC, Engineer and Contractor;</p> <p>6. Ensure mitigation measures are implemented.</p> <p>7. Increase the monitoring frequency to daily until no exceedance of Limit level for two consecutive days.</p>	<p>1. Discuss mitigation measures with ET, Engineer and Contractor;</p> <p>2. Review proposals on mitigation measures submitted by Contractor and advise the Engineer accordingly;</p> <p>3. Assess effectiveness of implemented mitigation measures.</p>	<p>1. Discuss proposed mitigation measures with IEC, ET and Contractor;</p> <p>2. Request Contractor to critically review the working methods;</p> <p>3. Make agreement on mitigation measures to be implemented;</p> <p>4. Assess effectiveness of implemented mitigation measures;</p> <p>5. Consider and if necessary instruct Contractor to slow down or to</p>	<p>1. Inform Engineer and confirm in writing notification of the non-compliance ;</p> <p>2. Rectify unacceptable practice;</p> <p>3. Check working methods and any excavation works or dewatering processes;</p> <p>4. Consider changes in working methods and plans;</p> <p>5. Discuss with ET, IEC and Engineer and propose mitigation measures to IEC and Engineer within three working days;</p> <p>6. Implement agreed mitigation</p>

			stop all or part of the construction activities until no exceedance of Limit Level.	7. measures; As directed by the Engineer, slow down or stop all or part of the construction activities until no exceedance of Limit level.
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**5.7 Monitoring Schedule for the next reporting period**

Hydrological characteristics monitoring schedule is proposed to be carried out on 6<sup>th</sup>, 13<sup>th</sup>, 20<sup>th</sup> and 27<sup>th</sup> of December 2013.

## **6 Ecological Monitoring of ECA**

### **6.1 Ecological Monitoring of ECA**

#### **6.1.1 Scope of Monitoring**

The ECA was formally handed over to AFCD on 16th October 2012. The wire mesh fences and gate at the northwestern part of the ECA were fixed and reinstated by the Main Contractor. No site visit and ecological monitoring by the Wetland Specialist from the Main Contractor and the Ecologist from the IEC respectively were carried out in November 2012. The post-establishment phase monitoring and management of the ECA have commenced and to be undertaken by the AFCD in accordance with the monitoring and management items stipulated in the latest approved EM&A Manual of the Project

### **6.2 Monitoring Results**

According to Table 6.17 of the EM&A Manual, ecological monitoring of the ECA will be carried out by qualified ecologists during the 1-year wetland establishment period of the ECA before handing over to AFCD for their post establishment monitoring. Establishment phase of the ECA began in September 2011, ecological monitoring programme was conducted and monitoring data was presented in respective monthly EM&A reports. Ecological monitoring programme ended in September 2012 and hence there will be no ECA report attached in EM&A reports.

#### **6.2.1 Description of monitoring of transplanted *Pavetta hongkongensis* in Ecological Compensatory Area**

According to the latest Transplantation Proposal, monitoring of the transplanted individual of *Pavetta hongkongensis* will cover a period of 12 months after the transplanting exercise. The monitoring will be conducted once a week in the first 3 months and once in each subsequent month in the remaining monitoring period. Health condition and growth of each transplanted individuals will be assessed and photographic records will be undertaken for each inspection.

### **6.2.2 Description of transplanted *Pavetta hongkongensis* and remarks**

The monitoring of the transplanted individual of *Pavetta hongkongensis* has been covered a period of 12 months. Therefore, the monitoring for *Pavetta hongkongensis* was not carried out in this reporting period.

## **7 Landscape and Visual**

### **7.1 Introduction**

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 31<sup>st</sup> 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 14<sup>th</sup> February 2011.

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.

### **7.2 Scope of Monitoring**

#### **7.2.1 Monitoring Objectives**

Landscape and Visual Monitoring of the Project should be conducted in 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.

#### **7.2.2 Monitoring during Construction Phase**

The following landscape and visual mitigation measure 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.

### **7.2.3 Monitoring during Operational Phase**

The following landscape and visual mitigation measure 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.

## 7.3 Landscape and Visual Monitoring Results

### 7.3.1 Monitoring Date(s)

This monthly Landscape and Visual Monitoring (November 2013) was conducted to cover only Areas A, B and C of Contract 1 of the Project. The bi-weekly monitoring was conducted on 15<sup>th</sup> and 28<sup>th</sup> November 2013.

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

All photos stated in this section are recorded in **Appendix G**.

### 7.3.2 Visual Screen

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

#### Observation

Construction hoardings were once erected along the entire site boundary of Area A. Temporary construction hoardings have been erected around Wai Ha River estuary since the building of an automatic mechanical penstock at the area (**Photo 1**). As observed in November 2013, construction hoarding at the northern and southern side of Area A was removed and boundary walls along the western and part of the northern sides of Area A were under construction (**Photos 2-3**). Since January 2013, the site hoardings along the eastern boundary of Area A have been removed due to the active construction works for the installation of drainage pipes and the associated structures.

A section of temporary hoarding has been erected from northwest to southwest parts (i.e. Phase 1 construction works) of Tung Tsz Nursery in Area B (approximately along the works boundary from Trees U42 to U62). Another section of temporary hoarding has been erected from southwest to eastern parts (i.e. Phase 2 construction works) of the Nursery

since May 2012 and connected with Phase I construction works area. An open section with no construction work has been maintained as a major road access inside Tung Tsz Nursery for their daily operations, and the construction site in Phase 2 was demarcated by temporary construction hoardings which were screened by canvas sheets (**Photo 4**). As observed in November 2013, the hoarding along the eastern boundary of Phase 2 in Area B (i.e. the section just next to Ting Kok Road) was permanently reinstated with the original chain-link fence. Canvas sheets were put on the reinstated fence to screen off the existing construction site from the pedestrian path (**Photo 5**).

Due to the excavation and reinstatement works of irrigation system, a small section of the temporary hoarding at the southwestern side of Phase 1 works area of Area B was removed and covered by canvas sheets (**Photo 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

No specific recommendation is required.

### **7.3.3 Contaminant/ Sediment Control**

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

#### Observation

##### *Area A*

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.

According to the Main Contractor, no groundwater or used water was pumped from the excavated sites or built box culvert in November 2013.



### *Area B*

Dust control measure (such as wheel washing facilities) has been provided since October 2012. The construction vehicles could be washed at the entrance of the access road leading towards the works area at northwestern part of Tung Tsz Nursery. As observed, since the major excavation and construction works in Area B were almost finished in November 2013, no significant discharge of groundwater or used water from Area B was noted during the inspections in November 2013. As observed on 28<sup>th</sup> November 2013, occasional discharge of rain water from the built box culvert into the nearby Marsh was noted. The discharge was generally clear.

### *Area C*

Area C was formally handed over to AFCD on 16<sup>th</sup> 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

The Contractor should 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.

## **7.3.4 Pollution Control**

All used water for washing vehicular wheel and construction works was filtered and drained to the manholes and drainage points, as following the recommendation stated in *Monthly EM&A Report for October 2013*.

### Observation

#### *Area A*

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. According to the Main Contractor, no groundwater or used water was pumped from the excavated sites or built box culvert during November 2013.

No direct discharge of water into the adjacent Wai Ha River was observed from the works area for building the automatic mechanical penstock at Wai Ha River estuary as only minor civil works were carried out.

#### Area B

Since the major excavation and construction works in Area B were almost finished in November 2013, no significant discharge of groundwater or used water from Area B was noted during the inspections in November 2013. As observed on 28<sup>th</sup> November 2013, occasional discharge of rain water from the built box culvert into the nearby Marsh was noted. The discharge was generally clear.

#### Area C

Area C was formally handed over to AFCD on 16<sup>th</sup> 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 (**Photo 7**).

#### Recommendation

The Contractor should 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.

### 7.3.5 Liaison with Nursery

Active construction works within Tung Tsz Nursery has been extended to the east of the nursery in connection with Ting Kok Road since May 2012. All of these active construction works area were demarcated with construction hoardings.

The works practice and maintenance of trees within the nursery generally follow the recommendation as stated in *Monthly EM&A Report for October 2013*. Any observed issues related to the liaison with the nursery are highlighted in this section.

### Observation

The temporary hoardings have been erected from northwest to southwest parts of Tung Tsz Nursery in Area B since April 2011. Phase 2 construction works have continued and temporary hoardings have been erected since May 2012. The major road access within the Nursery has been maintained to minimize the impact on the nursery's daily operation resulting from the construction works. As mentioned before in Section 3.2.3, temporary construction hoardings had been established along the eastern end of Phase 1 with an entrance and the western end of Phase 2 works area (**Photo 4**). The hoarding along the eastern boundary of Phase 2 of Area B was permanently reinstated with the original chain-link fence, which was further screened by canvas sheets (**Photo 5**).

Regular monitoring for all transplanted and retained trees within the nursery was conducted on a bi-weekly basis. As agreed by the operator of the Nursery, the dead, transplanted tree *Grevillea robusta* (U58) was removed by the Contractor in October 2013 and its stump was still left in the planter.

As reported in the previous *Monthly EM&A Reports*, the retained tree U68 (*Gmelina arborea*) was found fallen after the severe typhoon in July 2012, with its leaning trunk being pruned and removed in August 2012 (as reported in *Monthly EM&A Report for August 2012*). Regular removal of generated watersprouts was sometimes noted throughout the monitoring period. As observed in November 2013, the regenerated watersprouts still remained.

According to the information provided by the Main Contractor, minor excavation works

were undertaken in Phases 1 and 2 to reinstate the irrigation pipes for future horticultural practice in the Nursery. As observed in November 2013, small part of the construction hoarding located at the southwestern side of Phase 1 area was removed and covered by canvas sheets for screening the restoration work of the pipes (**Photo 6**).

#### Recommendation

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

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 should prevent forming waterlogged areas or leakage of used water from the active construction works area into the Nursery. This is to prevent causing any nuisance to the nursery's daily operation. In addition, the Contractor is recommended to replace the broken bamboo stakes for the transplanted trees.

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.

### **7.3.6 Existing Trees within Works Areas**

Maintenance of the existing trees within the works areas generally follows the recommendations as stated in *Monthly EM&A Report for October 2013*, except the observations as highlighted in the following sections.

#### Observation

##### **Area A**

Construction of the slanting component of the proposed green roof and pumping house (including excavation and site formation works) has been continued since October 2013.

Temporary construction barriers were used to demarcate the tree protection zone for the existing retained and relocated trees. However, as observed in November 2013, site formation and soil excavation works were operated quite close to the canopies of these retained and relocated trees and the temporary construction barriers, which are used to demarcate the tree protection zone, are not always in proper position in protecting the tree part within the tree dripline (e.g. E16 in **Photo 8**).

E38 (*Melaleuca cajuputi* subsp. *cumingiana*) was found to be relocated by the contractor from the northern corner to the northern part next to the temporary site office in Area A in late August 2013. As observed on 15<sup>th</sup> November 2013, this tree was removed by the Contractor and a planter was built at the same location in accordance with the approved Landscape Plan. Four new trees of *Cinnamomum burmannii* were planted in this planter (**Photo 9**).

The tree to be transplanted E16 (*Bombax ceiba*) has been relocated to the southern side of Area A next to the site hoarding since July 2012. The tree was in fair condition in November 2013 (**Photo 8**) but its tree protection zone was not properly maintained. However, the tree was very close to the construction work as mentioned in Section 3.6.2. Given its close proximity to the active construction work, the tree protection zone could not cover the tree dripline.

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.

The leaning trunk of E61 (*Macaranga tanarius* var. *tomentosa*) has been burlapped and supported by two steel poles since May 2013. The regenerated leaves along the leaning trunk were weak and this tree is still in poor health condition and under physiological stress (**Photo 10**). Its structural condition is poor.

Damaged tree trunk on E55 (*Macaranga tanarius* var. *tomentosa*) was reported in *Monthly EM&A Report for April 2013*. The wound on the trunk of E55 has been burlapped since May 2013. The upper section of the tree trunk has broken since June 2013. The tree was still in poor condition with most of its foliage as watersprouts only (**Photo 11**). The tree was located just next to some on-going construction works and lots of

construction materials have been stored next to this tree.

E44 (*Celtis sinensis*), which was proposed to be felled in the approved Tree Felling Application Report, has been remained on-site and protected within a small tree protection zone from the nearby active construction work (**Photo 12**). A few wounds were noted on its trunk since October 2013.

No other significant damages on the crowns, trunks and roots of the remaining trees resulting from the construction machinery were observed during the monitoring in November 2013 in Area A. Herbaceous creeper *Arachis duranensis* were planted on the green roof of the pump house in accordance with the approved Landscape Plan (**Photo 13**)

#### *Area B*

As highlighted in the Section “Liaison with Nursery”, the transplanted tree *Grevillea robusta* (U58) was considered to be a dead specimen as no sign of regenerated leaves was observed along the trunk and the remaining branches. The decayed tree trunk was removed in October 2013 and its stump was left in the tree planter (**Photo 14**).

No recovery signs have been observed on the relocated trees U34, U35 and U37 and they are regarded as dead specimens (**Photos 15-17**); the dead tree trunks of U34 and U35 have collapsed since August 2013. Excavated soil was piled close to the relocated trees along both sides of Phase 1 works area in November 2013 (**Photo 18**).

Half of the planter of U47 (*Terminalia catappa*) has broken since August 2013, and some of its roots and planter soil were exposed in the air. As inspected in November 2013, the planter was not yet repaired and soil excavated from the adjacent reinstatement work of irrigation system was piled on the trunk flare and planter (**Photo 19**).

U55 (*Pterocarpus indicus*) has also 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 20**), however, long branches with wounds and dieback twigs were observed in the canopy (**Photo 21**). Close monitoring on this tree is

still required.

Sign of suspected termite infestation has been observed at the lower trunk of the retained tree U67 (*Cassia fistula*) (**Photo 22**). The tree was still in fair health and structural condition as observed in November 2013, but close monitoring should be undertaken.

As reported in the submitted *Monthly EM&A Report for October 2013*, the relocated tree U77 (*Terminalia catappa*) in Phase 2 of Area B was dead and removed. Other relocated trees U76 and U78 (*Terminalia catappa*) have remained in marginally fair condition with regenerated leaves concentrated in the upper canopy (**Photos 23-24**). Cracked tree bark was observed at the lower trunk of these trees (e.g. lower trunk of U78 in **Photo 25**).

A wooden plate was found discarded among the overgrown climbers and canopy of the relocated tree U74 (*Delonix regia*) (**Photo 26**).

The relocated U79 (*Terminalia catappa*) has remained in condition similar to that observed in October 2013, with cracked tree bark on a topped scaffold limb (**Photos 27**). The main trunk of U79 was still covered by overgrown climbers (*Mikania micrantha*). Similar growth of excessive climbers was also found on the canopies of other relocated trees (**Photo 28**).

For the retained tree A40 (*Terminalia catappa*) at the entrance of Phase 2 construction areas, the excavated area close to its planter has not yet refilled with soil and some of the tree roots growing underneath the tree planter are still under a risk of being damaged by any future minor civil works (**Photo 29**). The tree may have a risk of leaning if its underground roots are further damaged.

The excavated holes have still existed next to the relocated trees (including A36, A43, U48, U53, U54, U69 and U70) in Phase 1 (e.g. **Photo 30**). According to the information provided by the Main Contractor, the ground was excavated to reinstate the irrigation pipes for future horticultural practice in the Nursery. Trees which were previously relocated or retained within the planters may not be affected significantly. However, given the close proximity of the trees to the excavated area and the potential influence on the soil ground underneath the planters resulting from the excavation works, the trees may

pose a risk of leaning or show deterioration in health condition if their roots are damaged by the excavation works.

Many relocated trees in Phases 1 and 2 works area within the Nursery were in fairly poor to fair condition due to the poor transplantation skills and poor site condition (e.g. tree root zones have been disturbed by used, turbid liquid or grease). Proper tree protection (e.g. guying and temporary TPZ) and removal of surplus soils (esp. those related to the reinstatement of irrigation system) and construction materials should be implemented to maintain the existing trees.

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 2013.

#### *Area C*

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

#### *Recommendations*

##### *Area A*

Maintenance of proper TPZs covering the tree driplines with no temporarily stored construction materials, excessive stockpiled soil and waterlogged condition around the tree trunk flares have been the major tree management issues in Areas A and B. The Contractor should continue notifying the on-site workers not to stockpile soil/construction materials or place construction equipment within and close to the TPZs or lower trunk/trunk flare. 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 and retained trees nearby their works (e.g. for the case of the retained trees in the eastern part of Area A), and prevent accidental damage on these trees as far as practical. In particular, the Contractor should establish proper tree protection zone around the retained trees at the southern side of Area A in order to minimize the potential mechanical damage from the on-going excavation and site



formation works. Meanwhile, the Contractor and sub-contractor should carefully design the civil works. Common civil works, such as excavation and sheet piling 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.

The Contractor is advised checking the condition of the orange construction nets in both Areas A and B, which have been used to demarcate the tree protection zone, and repair the damaged nets as soon as possible. The site workers should not remove the tree protection zone during the construction phase.

The Contractor should continue the maintenance of proper tagging system for all trees within and outside the hoarded 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.

All retained trees or trees to be transplanted should be watered regularly (e.g. at least every two days) 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 the newly planted trees (*Cinnamomum burmannii* in the planter) and creepers (*Arachis duranensis* on the green roof) throughout the maintenance period.

#### *Area B*

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 as a result of the transplantation shock. Regular check of the tree health should be conducted. Proper protective measures such as guying and TPZs are recommended especially for the newly

transplanted/ relocated trees. Waterlogged areas should be avoided and all used water/ temporary storage of construction materials or surplus soil around the tree trunk flares (for U47) and close to the tree root zones should be drained out or removed immediately. To prevent accidental drainage of used water into the tree root zones of the relocated trees, the Contractor is recommended to establish a proper separation (e.g. sandbags barriers or wooden plates) between the trees and the ground of the active construction works. If in such circumstance that there is direct conflict between certain tree parts of the retained, transplanted or relocated tree(s) and the construction works/ machinery, the pruning works should be carried out in accordance with any local, national or international standards related to tree remedial works.

Regular inspection of the tree health of a number of trees (i.e. U55, U76, U77, U79 and A40) should be undertaken to update their health condition and any deterioration of tree defects. The Contractor is advised to check the condition of all bamboo stakes used for staking transplanted trees, and replace any damaged stakes as soon as possible. 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.

The Contractor is advised repairing the broken planter of the tree U47 (located in Phase 1 of the works area) and removing the piled soil from the trunk flare as soon as possible.

The Contractor is advised removing the wooden plate discarded next to the canopy of U74

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

The Contractor is advised to programme the excavation works appropriately in Phases I and 2 of Area B. The Contractor should establish a buffer zone and tree protection zone between the excavated ground and the relocated/ retained trees wherever practical

### *Area C*

As Area C was handed over to AFCD for management and maintenance, no further

recommendation is given.

### **7.3.7 Construction Lights**

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

#### Observation

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

No specific recommendation is required.

### **7.4 Audit Schedule**

The next bi-weekly Landscape & Visual Monitoring in December 2013 is scheduled to be conducted in the weeks of 9<sup>th</sup> and 23<sup>rd</sup> December 2013.

## **8 Action taken in Event of Exceedance**

If the measurements (Noise, Water, Hydrological Characteristics, and Ecology) exceed the action / limit level, exceedance details will be reported and follow-up actions will be taken by relevant parties involved.

During the reporting month there was no exceedance for noise, hydrological characteristics, and ecological measurements recorded; therefore, no actions were taken.

There were 6 abnormal incidents of water quality limits (Turbidity) were recorded in this reporting month according to the established action and limit levels. ET has arranged site investigations for the abnormal incidents. No construction activities were carried out at the river bed. During the reporting period, construction of intake structure was conducted near Wai Ha River. Proper mitigation measures were implemented by contractor to avoid site water release to the Wai Ha river and no particular observation of defective site activities were found causing water contamination. The exceedances of Turbidity and SS were believed to be mainly attributed by adverse weather and natural fluctuation, since the recorded levels of Turbidity and SS at control station had also exceeded its baseline action or limit level, the exceedances recorded at W2 were unlikely to be related to the Project.

The water condition of Wai Ha River is presented in photo attached in **Appendix M**.

## **9 Construction waste disposal**

It is the contractor's responsibility to ensure that all wastes produced during the construction phase for the drainage improvement works are handled, stored and disposed of in accordance with good waste management practices and EPD's regulation and requirement. Waste materials generated during construction activities, such as construction and demolition (C&D) material, chemical wastes and general refuse, are recommended to be audited at regular intervals to ensure that proper storage, transportation and disposal practices are being implemented.

Table 9.1 is a summary of figures of the construction wastes disposal provided by Contractor.

Table 9.1 Summary of Construction Waste Disposal

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	Chemical Waste	Others, e.g. general refuse
	( in'000m3)	( in'000m3)	( in'000m3)	( in'000m3)	( in'000m3)	( in'000m3)	(in'000kg)	(in'000kg)	(in'000kg)	(in'000kg)	(in'000kg)
Year2011	11.758	0.00	9.703	0.665	0.750	0.556	0.00	0.00	0.00	0.00	0.165
Year 2012	10.737	0.00	9.884	1.185	0.05	0.00	2.37	0.00	0.00	0.00	0.192
Jan 13	0.290	0.00	0.24	0.00	0.05	0.01	0.00	0.00	0.00	0.00	0.00
Feb 13	0.190	0.00	0.16	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.035
Mar 13	1.14	0.00	1.13	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Apr 13	1.540	0.00	1.52	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00
May 13	0.85	0.00	0.82	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00
Jun 13	0.33	0.00	0.33	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00
Jul 13	0.255	0.00	0.24	0.00	0.015	0.00	0.00	0.00	0.00	0.00	0.00
Aug 13	0.08	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sep 13	0.04	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
Oct 13	0.04	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
Nov-13	0.04	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	27.29	0.00	24.227	1.85	0.895	0.566	2.37	0.00	0.00	0.00	0.45
Forecast of Total Quantities of C & D Materials to be Generated from the Contract											
	Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/cardboard packaging	Plastics (see note3)	Chemical Waste	Others, e.g. general refuse
	( in'000m3)	( in'000m3)	( in'000m3)	( in'000m3)	( in'000m3)	( in'000m3)	(in'000kg)	(in'000kg)	(in'000kg)	(in'000kg)	(in'000kg)
	0.04	0	0.04	0.0	0.00	0.00	0	0.01	0.00	0.1	0.02

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)

## 10 Status of Permits and Licenses obtained

Table 10.1 is the updated status of environmental related permits/ license obtained for the construction activities.

Table 10.1 Status of Permits and Licenses Obtained

Description	License / Permit No.#	Date of Issue	Site	Date of expiry	Status
Environmental Permit	EP-303/2008	2008/2/25	Area A, B & C	not applicable	Valid
Discharge License	WT00006448-2010	2010/6/15	Area A, B & C	30/6/2015	Valid
Registration as a Chemical Waste Producer	316597	2010/4/26	Area A, B & C	not applicable	Valid
Waste Disposal	7010348	2010/3/2	Area A, B & C	not applicable	Valid

## 11 Compliant Log

There was no formal complaint received during the reporting period. Therefore, follow up actions for the environmental complaint is not required.

Table 11.1 Summary of Formal Complaints received

	Noise	Water	Ecology	Others
Year 2011	0	0	0	0
Year 2012	0	0	0	0
January 2013	0	0	0	0
February 2013	0	0	0	0
March 2013	0	0	0	0
April 2013	0	0	0	0
May 2013	0	0	0	0
June 2013	0	0	0	0
July 2013	0	0	0	0
August 2013	0	0	0	0
September 2013	0	0	0	0
October 2013	0	0	0	0
November 2013	0	0	0	0
Total	0	0	0	0



## 12 Site Environmental Audits

### 12.1 Site Inspection

Site inspections were undertaken weekly to inspect the construction activities in active site areas to ensure that appropriate environmental protection and pollution control mitigation measures are properly implemented.

Within this reporting period, site inspections were conducted on 1<sup>st</sup>, 8<sup>th</sup>, 16<sup>th</sup>, 22<sup>nd</sup> and 29<sup>th</sup> of November 2013. A detailed checklist of each site inspection together with comments and relevant photos have been filed and kept. The findings from inspection were summarized in Table 12.1.

Table 12.1 Summary results of site inspections findings

Date	Findings	Identification	Advice from ET	Action taken	Closing date
25 Oct 13 1, 8, 16, 22 Nov 13	Open stockpiles was observed at Area A.	Observation	Contractor was reminded that dusty materials should be covered with tarpaulin sheets for dust suppression.	To be followed during next reporting period.	N/A
16 Nov 13	Accumulative construction waste was observed at Area A.	Observation	Contractor was reminded that routine removal of construction waste should be implemented to maintain good housekeeping in the site area.	Accumulative construction waste was removed by contractor.	22 Nov 13
29 Nov 13	Inadequate tree protection was observed at Area A.	Observation	Contractor was reminded that the tree protection zone with enough space should be provided.	To be followed during next reporting period.	N/A

## **12.2 Compliance with legal and Contractual requirement**

There was no non-compliance recorded for the month of November 2013.

## **12.3 Implementation status and effectiveness of the mitigation measures**

Contractor has implemented mitigation measures to address those problems as advised by ER and ET. Some of the measures taken by the contractor were considered as effective to minimize negative impact to the environment. Ongoing investigation will be carried out to observe performance and effectiveness of those measures. Outstanding environmental items will be inspected in next month.

As there were some ongoing follow up practices, contractor was reminded to regularly review and rectify the discrepancy once found and maintain good site condition. The contractor implemented various environmental mitigation measures as recommended in the Environmental Permit and Final Mitigation Measures Report.

The recommend mitigation measures of EM&A manual (revision 3) are presented in **Appendix H (A)**.

The implemented statuses of mitigation measures are presented in **Appendix H (B)**

## **13 Future Key issues and recommendations**

According to the forecasted site activities, key environmental issued to be considered should at least include:

- Site water control and relevant protective measures.
- Quality of effluent discharge from Area A.
- Control and disposal for construction wastes generated from works.

Tree protective measure for tree planting and transplanting, should be implemented, such as tree protection zone and regular watering.

## 14 Conclusions

Installation of minor E&M equipment, E&M testing, planting on green roof, construction of road & drain in pumping station, construction of boundary wall/granite finishing & painting, installation of cladding and reinstatement in Tung Tsz Nursery were major site activities being carried out within this reporting period.

Regular site meetings and inspection audits led by the seniors for discussing site environmental matters were held among Project Proponent, Contractor and the ET on weekly basis. Also monthly site meeting and inspection audits with the above parties and IEC were carried out on 8<sup>th</sup> of November 2013.

For noise level monitoring, all results were within the established A/L limits.

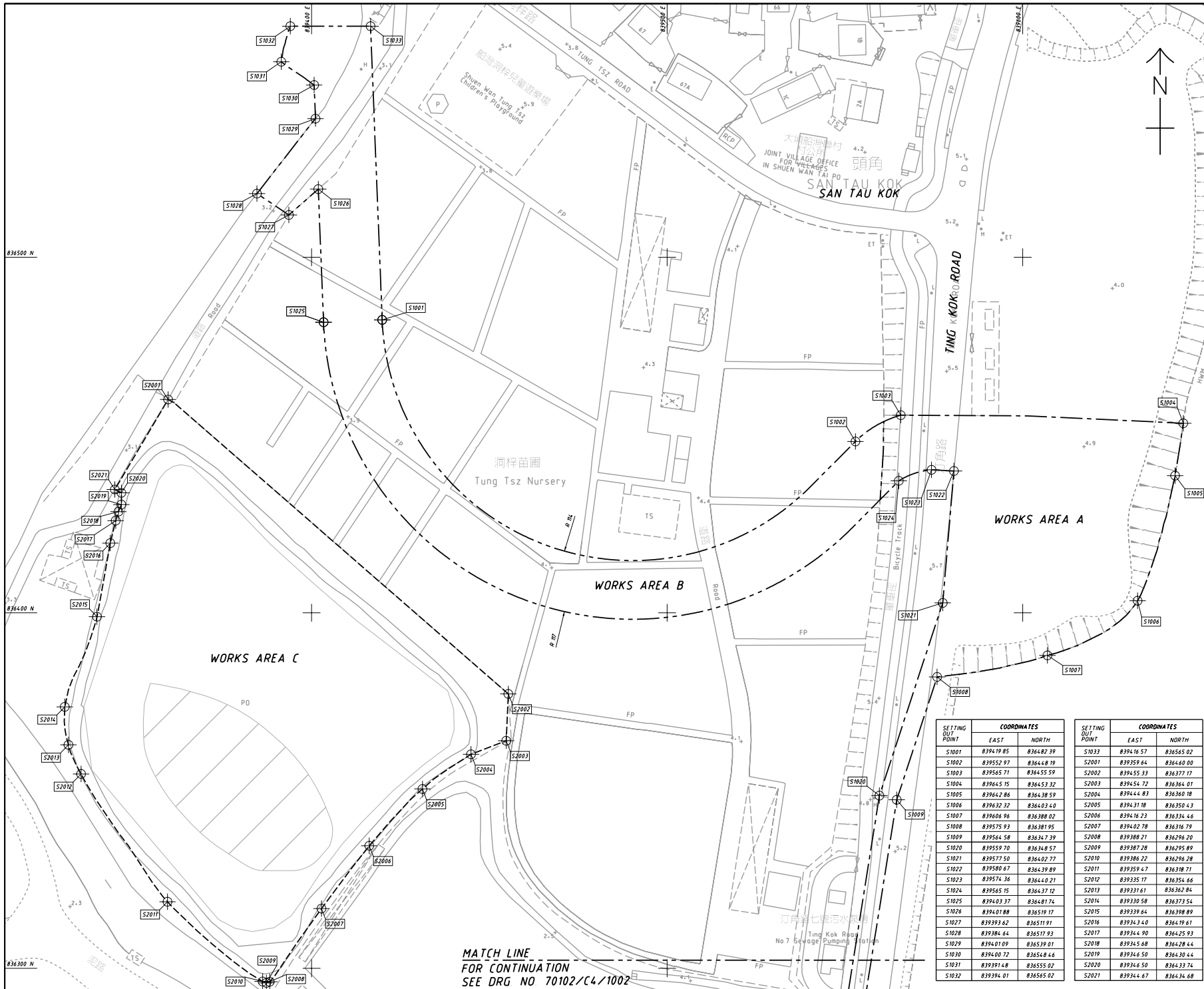
For water quality monitoring, total 9 abnormal incidents of water quality criteria were recorded in this reporting month. During the reporting period, no construction activities were conducted near the Wai Ha River. Proper mitigation measures were implemented by contractor to avoid site water releasing to the Wai Ha river and no particular observation of defective site activities were found causing water contamination. The exceedances of Turbidity and SS were believed to be mainly attributed by natural fluctuation. And, since the recorded levels of Turbidity and SS at control station had also exceeded its baseline action or limit level, the exceedances recorded at W2 were unlikely to be related to the Project.

Also, there were not any notifications of summons recorded during the reporting period. Furthermore, there were not any formal prosecution and complaints recorded.

ET has reminded the contractor to provide environmental pollution control measures wherever necessary, and to keep a good environmental management at site practice.

The ET will continue to implement the environmental monitoring & audit programme in accordance with the EM&A Manual (revision 3) and Environmental Permit requirement.

Appendix A: Site Location Plan



**NOTES**

- 1 ALL LEVELS ARE IN METRE ABOVE PRINCIPAL DATUM
- 2 ALL CO-ORDINATES GIVEN ARE IN METRE AND ARE IN ACCORDANCE WITH HK1980 COORDINATES SYSTEM
- 3 ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SPECIFIED
- 4 THE PUBLIC CLEANING AREA SHALL BE THE AREAS WITHIN 2.50 BEYOND THE LIMIT OF WORKS AREAS EXCLUDING PRIVATE AREAS

**LEGEND**

- LIMIT OF WORKS AREA A
- LIMIT OF WORKS AREA B
- LIMIT OF WORKS AREA C
- ⊕ S1001 SETTING OUT POINT

A	TENDER ADDENDUM NO 2	ECYPREYM	10-09
-	TENDER DRAWING	ECYPREYM	09-09

**D** DRAINAGE SERVICES DEPARTMENT,  
THE GOVERNMENT OF THE HONG KONG  
SPECIAL ADMINISTRATIVE REGION

DRAINAGE IMPROVEMENT  
WORKS IN SHUEN WAN TAI PO - CONTRACT 1

SETTING OUT PLAN FOR  
WORKS AREA A, B AND C

SHEET 1 OF 2

**AECOM**

DRGNQ. 70102/C4/1001A  
圖紙編號

DESIGNED BY CPWU	CONTRACT NO. DC/2009/22	DR. APPROVED DML
DRAWN BY LWL	STATUS 1/10	
SCALE A1 : 1 500	DIMENSIONS ARE IN METRES	

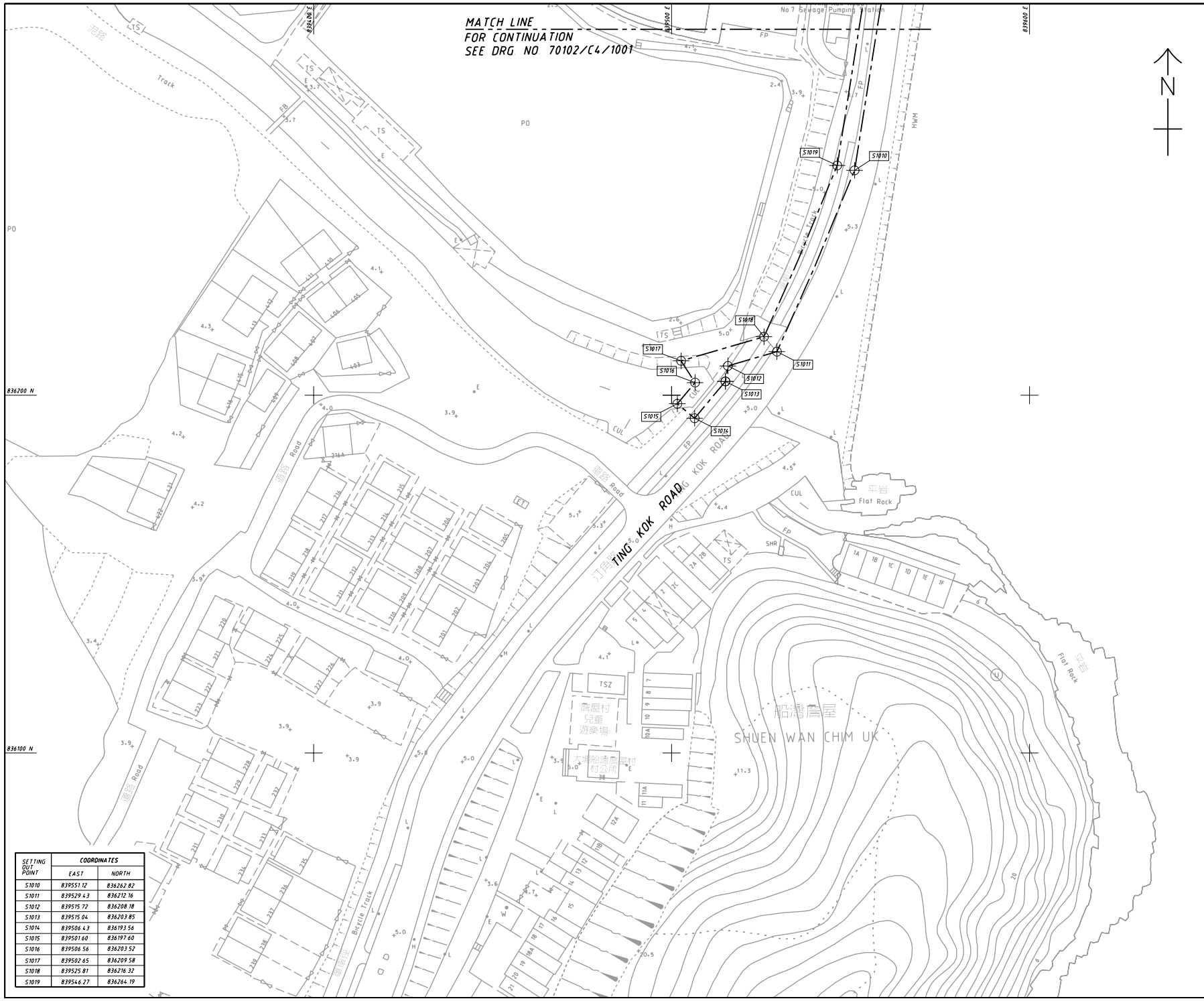
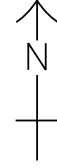
SETTING OUT POINT	COORDINATES		SETTING OUT POINT	COORDINATES	
	EAST	NORTH		EAST	NORTH
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S1002	839552.87	836448.19	S2001	839359.64	836440.00
S1003	839565.71	836455.59	S2002	839455.33	836377.17
S1004	839645.15	836453.32	S2003	839454.72	836364.01
S1005	839642.86	836438.59	S2004	839444.83	836360.18
S1006	839632.32	836403.40	S2005	839431.18	836350.43
S1007	839606.96	836388.02	S2006	839416.23	836334.46
S1008	839575.93	836381.95	S2007	839402.78	836316.79
S1009	839564.58	836347.39	S2008	839388.21	836294.20
S1020	839559.70	836348.57	S2009	839387.28	836295.89
S1021	839577.50	836402.77	S2010	839386.22	836296.28
S1022	839580.67	836439.89	S2011	839359.47	836318.71
S1023	839574.36	836440.21	S2012	839335.17	836354.66
S1024	839565.15	836437.12	S2013	839331.61	836362.84
S1025	839403.37	836481.74	S2014	839330.58	836373.54
S1026	839401.88	836519.17	S2015	839339.64	836398.89
S1027	839393.62	836517.93	S2016	839343.40	836419.61
S1028	839384.64	836517.93	S2017	839344.90	836425.93
S1029	839401.09	836539.01	S2018	839345.68	836428.44
S1030	839400.72	836540.44	S2019	839346.50	836430.44
S1031	839391.48	836555.02	S2020	839346.50	836433.74
S1032	839394.01	836565.02	S2021	839347.67	836434.68

MATCH LINE  
FOR CONTINUATION  
SEE DRG NO 70102/C4/1002

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836300 N  
2010-2-5 11:54:09  
p:\projects\70102\1000\TENDER ADDENDUM NO 2\1001A.dgn

MATCH LINE  
FOR CONTINUATION  
SEE DRG. NO 70102/C4/1001

NOTE  
1. FOR NOTES AND LEGEND SEE DRAWING  
NO. 70102/C4/1001



SETTING OUT POINT	COORDINATES	
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S1011	839529.43	836212.16
S1012	839515.72	836208.18
S1013	839515.04	836203.85
S1014	839506.43	836193.56
S1015	839501.60	836197.60
S1016	839506.56	836203.52
S1017	839502.65	836209.58
S1018	839525.81	836216.32
S1019	839546.27	836264.19

TENDER DRAWING	ECYPRC14	09-09
NO.	DATE	BY

**D** DRAINAGE SERVICES DEPARTMENT,  
THE GOVERNMENT OF THE HONG KONG  
SPECIAL ADMINISTRATIVE REGION

DRAINAGE IMPROVEMENT  
WORKS IN SHUEN WAN, TAI PO - CONTRACT 1

SETTING OUT PLAN FOR  
WORKS AREA A, B AND C  
SHEET 2 OF 2

**AECOM**

DRG. NO. 70102/C4/1002  
圖紙編號

DESIGNED BY 設計	CP/WU	CONTRACT NO. 合約編號	DC/2009/22	APPROVED BY 核准人	DML
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DRAWN BY 繪圖	LWL	STATUS 狀態	
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SCALE 1:1 500  
圖則比例尺  
DIMENSIONS ARE IN METRES  
尺寸單位為公尺

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2010-2-5 13:32:23

**Appendix B: Key Personal Contact information chart**

<b>Post</b>	<b>Name</b>	<b>Contact No.</b>	<b>Contact Fax</b>	<b>e-mail</b>
Project Manager	Mr. W. K. Chan	6821 1136	2674 6688	dc200922jv_pmcwk@yahoo.com.hk
Site Agent	Mr. K. M. Ma	9552 1734	2674 6688	dc200922jv_suba@yahoo.com.hk
Environmental Officer	Mr. W. K. Chan	N/A	2674 6688	dc200922jv_pmcwk@yahoo.com.hk
Environmental Supervisor	Mr. Anthony Chan	9179 2092	2674 6688	anthony277@hotmail.com
Asia Ecological Consultants Ltd. (Wetland Specialist)	Dr. Mike Leven	2486 2885	2471 8389	mrleven@asiaecol.com.hk
Environmental Pioneers & Solutions Limited (Environmental Team)	Mr. Johnny Lee	2889 0569	2856 2010	johnnylee@epsl.com.hk



## Appendix C: Calibration Certificates for Measuring Instruments



# Calibration Certificate

Certificate No. **28553**

Page 1 of 5 Pages

**Customer :** Environmental Pioneers and Solutions Limited

**Address :** Flat A, 19/F., Chai Wan Industrial Centre Building, 21 Lee Chung Street, Chai Wan, HK.

**Order No. :** Q23300

**Date of receipt :** 11-Dec-12

## Item Tested

**Description :** Sound Level Meter

**Manufacturer :** SVAN

**Model :** 955

**Serial No. :** 27302

## Test Conditions

**Date of Test :** 8-Jan-13

**Supply Voltage :** --

**Ambient Temperature :** (23 ± 3)°C

**Relative Humidity :** (50 ± 25) %

## Test Specifications

Calibration check.

Ref. Document/Procedure: Z01.

## Test Results


All results were within the IEC 61672 Type1, IEC 1260 Class1 and manufacturer's specification.  
The results are shown in the attached page(s).


Main Test equipment used:

<u>Equipment No.</u>	<u>Description</u>	<u>Cert. No.</u>	<u>Traceable to</u>
S017	Multi-Function Generator	C127181	SCL-HKSAR
S024	Sound Level Calibrator	28588	NIM-PRC & SCL-HKSAR

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

The test equipment used for calibration are traceable to International System of Units (SI).  
The test results apply to the above Unit-Under-Test only

**Calibrated by :**   
P. F. Wong

**Approved by :**   
Dorothy Cheuk

**Date:** 8-Jan-13



# Calibration Certificate

Certificate No. 28553

Page 2 of 5 Pages

Results :

1. Self-generated noise: 2.0 dBA (Mfr's Spec (Electrical)  $\leq 14$  dBA)

2. Acoustical signal test

UUT Setting				Applied Value (dB)	UUT Reading (dB)	
Range (dB)	Frequency Weighting	Time Weighting	1/1 Octave Filter		Before adjust	After adjust
25-120	A	F	OFF	94.0	--	93.5
		S	OFF		--	93.5
	C	F	OFF	--	93.5	
	A	F	OFF	114.0	--	113.9
		S	OFF		--	113.9
	C	F	OFF	--	113.9	
	A	F	ON	94.0	--	93.5
	A	F	ON	114.0	--	113.9
45-139	A	F	OFF	94.0	*91.6	93.5
		S	OFF		--	93.5
	C	F	OFF	--	93.5	
	A	F	OFF	114.0	--	113.9
		S	OFF		--	113.9
	C	F	OFF	--	113.9	
	A	F	ON	94.0	--	93.5
	A	F	ON	114.0	--	113.9

Mfr's Spec. :  $\pm 0.7$  dB

Uncertainty :  $\pm 0.1$  dB

3 Electrical signal tests of frequency weightings (A weighting)

Frequency	Attenuation (dB)	IEC 61672 Type 1 Spec.
31.5 Hz	-39.5	- 39.4 dB, $\pm 2$ dB
63 Hz	-26.5	- 26.2 dB, $\pm 1.5$ dB
125 Hz	-16.2	- 16.1 dB, $\pm 1.5$ dB
250 Hz	-8.7	- 8.6 dB, $\pm 1$ dB
500 Hz	-3.3	- 3.2 dB, $\pm 1.4$ dB
1 kHz	0.0 (Ref)	0 dB, $\pm 1.1$ dB
2 kHz	+1.2	+ 1.2 dB, $\pm 1.6$ dB
4 kHz	+1.0	+ 1.0 dB, $\pm 1.6$ dB
8 kHz	-1.1	- 1.1 dB, + 2.1 dB $\sim$ -3.1 dB
16 kHz	-6.9	- 6.6 dB, + 3.5 dB $\sim$ -17.0 dB

Uncertainty :  $\pm 0.1$  dB



# Calibration Certificate

Certificate No. 28553

Page 3 of 5 Pages

## 4. Frequency & Time weightings at 1 kHz

### 4.1 Frequency Weighting (Fast)

UUT Setting	Applied Value (dB)	UUT Reading (dB)	Difference (dB)	IEC 61672 Type 1 Spec.
A	94.0	93.5 (Ref.)	--	± 0.4 dB
C	94.0	93.5	0.0	

### 4.2 Time Weighting (A-weighted)

UUT Setting	Applied Value (dB)	UUT Reading (dB)	Difference (dB)	IEC 61672 Type 1 Spec.
Fast	94.0	93.5 (Ref.)	--	± 0.3 dB
Slow	94.0	93.5	0.0	
Time-averaging	94.0	93.5	0.0	

Uncertainty : ± 0.1 dB

## 5. Level linearity on the reference level range

UUT Range	Applied Value (dB)	UUT Reading (dB)	Difference (dB)	IEC 61672 Type 1 Spec.
140 dB (Ref Level)	137.0	136.5	0.0	± 1.1 dB
	136.0	135.5	0.0	
	135.0	134.5	0.0	
	134.0	133.5	0.0	
	129.0	128.5	0.0	
	124.0	123.5	0.0	
	119.0	118.5	0.0	
	114.0	113.5	0.0	
	109.0	108.5	0.0	
	104.0	103.5	0.0	
	99.0	98.5	0.0	
	94.0	93.5 (Ref)	--	
	89.0	88.5	0.0	
	84.0	83.5	0.0	
	79.0	78.5	0.0	
	74.0	73.5	0.0	
	69.0	68.5	0.0	
	64.0	63.5	0.0	
	59.0	58.5	0.0	
	54.0	53.5	0.0	
49.0	48.4	0.1		
48.0	47.4	0.1		

Uncertainty : ± 0.1 dB



# Calibration Certificate

Certificate No. **28553**

Page 4 of 5 Pages

## 6. Toneburst response (4kHz)

UUT Setting	Tone Burst Duration(ms)	UUT Reading(dB)	Difference (dB)	IEC 61672 Type 1 Spec.
Fast	Steady	137.0(Ref)	--	--
	200	136.0	-1.0	-1.0 ± 0.8dB
	2	118.9	-18.1	-18.0, +1.3 dB ~ -1.8 dB
	0.25	109.9	-27.1	-27.0, +1.3 dB ~ -3.3 dB
Slow	Steady	137.0(Ref)	--	--
	200	129.5	-7.5	-7.4 ± 0.8dB
	2	109.9	-27.1	-27.0, +1.3 dB ~ -3.3 dB
Time averaging	Steady	137.0(Ref)	--	--
	200	130.0	-7.0	-7.0±0.8dB
	2	110.8	-26.2	-27.0, +1.3 dB ~ -1.8 dB
	0.25	102.0	-35.0	-36.0, +1.3 dB ~ -3.3 dB

Uncertainty : ± 0.1 dB

## 7. Peak C sound level (140 dB Range, C-weighted, Fast)

Freq(Hz)	Signal Type	Indication of overload	UUT reading (dB)	Difference (dB)	IEC 61672 Type 1 Spec.
8000	Steady	--	132.0	--	3.2 ± 2.4 dB
	Complete-cycle	No	135.3	3.3 dB	
500	Steady	--	132.0	--	2.4 ± 1.4 dB
	+ve half-cycle	No	129.3	2.7 dB	
	-ve half-cycle	No	129.1	2.9 dB	

Uncertainty : ± 0.1 dB



# Calibration Certificate

Certificate No. **28553**

Page 5 of 5 Pages

## 8. Overload indication (140 dB range, A-weighted, Time-average, 4kHz)

UUT Reading at overload (dB)		Difference (dB)	IEC 61672 Type 1 Spec.
+ ve one half cycle	- ve one half cycle		
137.0	138.5	1.5	< 1.8 dB

The overload indicator latched on until reset

Uncertainty :  $\pm 0.1$  dB

## 9. Filter Characteristics

### 9.1 1/1 – Octave Filter

Frequency	Attenuation (dB)	IEC 1260 Class 1 (dB)
125 Hz	-76.4	< - 61
250 Hz	-70.5	< - 42
500 Hz	-36.3	< - 17.5
707 Hz	-4.3	- 2 ~ - 5
1 kHz (Ref)	--	--
1.414 kHz	-2.1	- 2 ~ - 5
2 kHz	-50.6	< - 17.5
4 kHz	-82.3	< - 42
8 kHz	-82.5	< - 61

Uncertainty :  $\pm 0.25$  dB

### Remarks : 1. UUT : Unit-Under-Test

2. The uncertainty claimed is for a confidence probability of not less than 95%.
3. Atmospheric Pressure : 1010 hPa.
4. Preamplifier model : SV 12L , S/N : 25732
5. Firmware Version: 6.12.4
6. Power Supply Check: OK
7. The UUT was adjusted with the supplied sound calibrator at the reference sound pressure level before the calibration.
8. \*Out of specification.

----- END -----



# Calibration Certificate

Certificate No. **28554**

Page 1 of 2 Pages

**Customer :** Environmental Pioneers and Solutions Limited

**Address :** Flat A, 19/F., Chai Wan Industrial Centre Building, 21 Lee Chung Street, Chai Wan, HK.

**Order No. :** Q23300

**Date of receipt :** 11-Dec-12

## Item Tested

**Description :** Sound Level Calibrator

**Manufacturer :** Svantek

**Model :** SV30A

**Serial No. :** 29085

## Test Conditions

**Date of Test :** 3-Jan-13

**Supply Voltage :** --

**Ambient Temperature :** (23 ± 3)°C

**Relative Humidity :** (50 ± 25) %

## Test Specifications

Calibration check.

Ref. Document/Procedure : F21, Z02.

## Test Results

All results were within the IEC 942 Class1 specification.


The results are shown in the attached page(s).


Main Test equipment used:

<u>Equipment No.</u>	<u>Description</u>	<u>Cert. No.</u>	<u>Traceable to</u>
S014	Spectrum Analyzer	13535	NIM-PRC & SCL-HKSAR
S024	Sound Level Calibrator	28588	NIM-PRC & SCL-HKSAR
S041	Universal Counter	28347	SCL-HKSAR
S206	Sound Level Meter	16338	SCL-HKSAR

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

The test equipment used for calibration are traceable to International System of Units (SI).  
The test results apply to the above Unit-Under-Test only

**Calibrated by :**   
P. F. Wong

**Approved by :**   
Dorothy Cheuk

**Date:** 3-Jan-13



# Calibration Certificate

Certificate No. 28554

Page 2 of 2 Pages

Results :

## 1. Level Accuracy

UUT Nominal Value (dB)	Measured Value (dB)	IEC 942 Class 1 Spec.
94	94.03	± 0.3 dB
114	114.02	

Uncertainty : ± 0.2 dB

## 2. Frequency

UUT Nominal Value	Measured Value	IEC 942 Class 1 Spec.
1 kHz	1.000 kHz	± 2 %

Uncertainty : ± 3.6 x 10<sup>-6</sup>

## 3. Level Stability : 0.0 dB

IEC 942 Class 1 Spec. : ± 0.1 dB

Uncertainty : ± 0.01 dB

## 4. Total Harmonic Distortion : < 0.1 %

IEC 942 Class 1 Spec. : < 3 %

Uncertainty : ± 2.3 % of reading

Remark : 1. UUT : Unit-Under-Test

2. The above measured values are the mean of 3 measurements.

3. The uncertainty claimed is for a confidence probability of not less than 95%.

4. Atmospheric Pressure : 1010 hPa.

----- END -----





# ALS Technichem (HK) Pty Ltd

## REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

**CONTACT:** MR ALLEN CHAN  
**CLIENT:** ENVIRONMENTAL PIONEERS & SOLUTIONS LIMITED  
**ADDRESS:** FLAT A, 19/F, CHAI WAN INDUSTRIAL BUILDING,  
20 LEE CHUNG STREET,  
CHAI WAN,  
HONG KONG

**WORK ORDER:** HK1328496  
**LABORATORY:** HONG KONG  
**DATE RECEIVED:** 16/10/2013  
**DATE OF ISSUE:** 24/10/2013

### COMMENTS

It is certified that the item under calibration/checking has been calibrated/checked by corresponding calibrated equipment in the laboratory.

Maximum Tolerance and calibration frequency stated in the report, unless otherwise stated, the internal acceptance criteria of ALS will be followed.

Scope of Test: Conductivity, Dissolved Oxygen, pH, Temperature and Turbidity  
Equipment Type: WATER QUALITY MULTI-METER  
Brand Name: TOA DKK  
Model No.: WMS-24  
Serial No.: 685940  
Equipment No.: --  
Date of Calibration: 23 October, 2013

### NOTES

This is the Final Report and supersedes any preliminary report with this batch number.

Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

### ISSUING LABORATORY: HONG KONG

#### Address

ALS Technichem (HK) Pty Ltd  
11/F Chung Shun Knitting Centre  
1-3 Wing Yip Street  
Kwai Chung  
HONG KONG

**Phone:** 852-2610 1044  
**Fax:** 852-2610 2021  
**Email:** [hongkong@alsglobal.com](mailto:hongkong@alsglobal.com)

Mr. Fung Lim Chee, Richard  
General Manager -  
Greater China & Hong Kong

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Page 1 of 2

# REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



**Work Order:** HK1328496  
**Date of Issue:** 24/10/2013  
**Client:** ENVIRONMENTAL PIONEERS & SOLUTIONS LIMITED

**Description:** WATER QUALITY MULTI-METER  
**Brand Name:** TOA DKK  
**Model No.:** WMS-24  
**Serial No.:** 685940  
**Equipment No.:** --  
**Date of Calibration:** 23 October, 2013

**Date of next Calibration:** 23 January, 2014

**Parameters:**

**Conductivity**

**Method Ref: APHA (21st edition), 2510B**

Expected Reading (uS/cm)	Displayed Reading (uS/cm )	Tolerance (%)
146.9	138.0	-6.1
6667	6530	-2.1
12890	12800	-0.7
58670	56900	-3.0
Tolerance Limit (±%)		10.0

**Dissolved Oxygen**

**Method Ref: APHA (21st edition), 4500: G**

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
3.67	3.77	0.10
5.15	5.29	0.14
7.25	7.09	-0.16
Tolerance Limit (±mg/L)		0.20

**pH Value**

**Method Ref: APHA 21st Ed. 4500H:B**

Expected Reading (pH Unit)	Displayed Reading (pH Unit)	Tolerance (pH unit)
4.0	4.03	0.03
7.0	6.99	-0.01
10.0	9.92	-0.08
Tolerance Limit (±pH unit)		0.20

**Temperature**

**Method Ref: Section 6 of International Accreditation New Zealand Technical Guide No. 3 Second edition March 2008: Working Thermometer Calibration Procedure.**

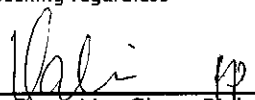
Expected Reading (°C)	Displayed Reading (°C)	Tolerance (°C)
11.0	10.6	-0.4
25.0	24.0	-1.0
32.0	31.0	-1.0
Tolerance Limit (±°C)		2.0

**Turbidity**

**Method Ref: APHA (21st edition), 2130B**

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.0	--
4	3.9	-2.5
40	39.4	-1.5
80	79.4	-0.7
400	383.6	-4.1
800	799.8	0.0
Tolerance Limit (±%)		10.0

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

  
 Mr. Pung Lim Chee, Richard  
 General Manager -  
 Greater China & Hong Kong



# Calibration Certificate

Certificate No. **27765**

Page 1 of 2 Pages

**Customer :** Environmental Pioneers and Solutions Limited

**Address :** Flat A, 19/F., Chai Wan Industrial Centre Building, 20 Lee Chung Street, Chai Wan, HK.

**Order No. :** Q22905

**Date of receipt :** 9-Nov-12

## Item Tested

**Description :** Portable Level-Velocity Logger

**Manufacturer :** Greyline

**Model :** Stingray

**Serial No. :** 45525

## Test Conditions

**Date of Test :** 10-Dec-12

**Supply Voltage :** --

**Ambient Temperature :** (23 ± 3)°C

**Relative Humidity :** (50 ± 25) %

## Test Specifications

Calibration check.

Ref. Document/Procedure: V12, T03, M07.

## Test Results

All results were within the tolerance(s).

The results are shown in the attached page(s).

Main Test equipment used:

<u>Equipment No.</u>	<u>Description</u>	<u>Cert. No.</u>	<u>Traceable to</u>
S179	Std. Tape	20976	NIM-PRC
S136A	Stop Watch	26076	SCL-HKSAR
S214A	Std. Thermo-Hygrometer	21518	SCS-SWISS, NIM-PRC


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

The test equipment used for calibration are traceable to international System of Units (SI).  
The test results apply to the above Unit-Under-Test only

**Calibrated by :**

  
S. K. Tang

**Approved by :**

  
Alan Chu

**Date:** 10-Dec-12



# Calibration Certificate

Certificate No. 27765

Page 2 of 2 Pages

Results :

## 1. Flow Rate

Applied Value (Ft/s)	UUT Reading (Ft/s)	Tolerance	Uncertainty
1.34	1.4	$\pm 5\%$ f.s	$\pm 1\%$

## 2. Level

Applied Value ( Ft)	UUT Reading ( Ft)	Tolerance	Uncertainty
1.00	1.0	$\pm 5\%$ f.s.	$\pm 0.1\%$
2.00	2.0		
3.00	3.0		
4.00	4.0		

## 3. Temperature

Applied Value (°C)	UUT Reading (°C)	Tolerance	Uncertainty
23.0	22	$\pm 2\text{ }^{\circ}\text{C}$	$\pm 0.2\text{ }^{\circ}\text{C}$

Remarks : 1. UUT : Unit-Under-Test

2. The uncertainty claimed is for a confidence probability of not less than 95%.

3. Sensor Used : Model : QZ02L-UT-01-PS

S/N : 10D18289

----- END -----

## Appendix D: Construction Noise Monitoring Data

**大成環境科技拓展有限公司**  
**Environmental Pioneers and Solutions Limited**

**Noise Monitoring Data Sheet**

Monitoring Location		M1	AL1
Monitoring Method		Façade	Façade
Date of Monitoring		6/11/2013	6/11/2013
Weather Condition		Cloudy	Cloudy
Measurement Start Time (hh:mm)		9:45	10:20
Measurement Time Length (mins)		30 mins	
SLM Model & S/N		SVAN 955	
Wind Speed (m/s)		0.2	0.2
Measurement Results	L <sub>eq</sub> (dB(A))	68.4	66.8
	L <sub>10</sub> (dB(A))	69.6	67.9
	L <sub>90</sub> (dB(A))	51.2	48.8
Major Construction Noise Source(s) During Monitoring		The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location due to its large distance from the construction activities	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location due to its large distance from the construction activities
Other Noise Source(s) During Monitoring		– Background Noise – Traffic Noise	– Background Noise – Traffic Noise

Name

Signature

Date

Perpared by: Lau Kai Chung

Lau Kai Chung

6/11/2013

**大成環境科技拓展有限公司**  
**Environmental Pioneers and Solutions Limited**

**Noise Monitoring Data Sheet**

Monitoring Location		M1	AL1
Monitoring Method		Façade	Façade
Date of Monitoring		13/11/2013	13/11/2013
Weather Condition		Cloudy	Cloudy
Measurement Start Time (hh:mm)		10:00	10:35
Measurement Time Length (mins)		30 mins	
SLM Model & S/N		SVAN 955	
Wind Speed (m/s)		0.2	0.2
Measurement Results	L <sub>eq</sub> (dB(A))	66.9	70.1
	L <sub>10</sub> (dB(A))	68.5	71.5
	L <sub>90</sub> (dB(A))	48.5	52.2
Major Construction Noise Source(s) During Monitoring		The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location due to its large distance from the construction activities	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location due to its large distance from the construction activities
Other Noise Source(s) During Monitoring		– Background Noise – Traffic Noise	– Background Noise – Traffic Noise

Name

Signature

Date

Prepared by: Lau Kai Chung

Lau Kai Chung

13/11/2013

**大成環境科技拓展有限公司**  
**Environmental Pioneers and Solutions Limited**

**Noise Monitoring Data Sheet**

Monitoring Location		M1	AL1
Monitoring Method		Façade	Façade
Date of Monitoring		20/11/2013	20/11/2013
Weather Condition		Cloudy	Cloudy
Measurement Start Time (hh:mm)		14:40	15:30
Measurement Time Length (mins)		30 mins	
SLM Model & S/N		SVAN 955	
Wind Speed (m/s)		0.2	0.2
Measurement Results	L <sub>eq</sub> (dB(A))	61.5	66.5
	L <sub>10</sub> (dB(A))	63.8	67.8
	L <sub>90</sub> (dB(A))	48.5	54.1
Major Construction Noise Source(s) During Monitoring		The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location due to its large distance from the construction activities	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location due to its large distance from the construction activities
Other Noise Source(s) During Monitoring		– Background Noise – Traffic Noise	– Background Noise – Traffic Noise

Name

Signature

Date

Prepared by: Lau Kai Chung

Lau Kai Chung

20/11/2013



**大成環境科技拓展有限公司**  
**Environmental Pioneers and Solutions Limited**

**Noise Monitoring Data Sheet**

Monitoring Location		M1	AL1
Monitoring Method		Façade	Façade
Date of Monitoring		27/11/2013	27/11/2013
Weather Condition		Cloudy	Cloudy
Measurement Start Time (hh:mm)		15:00	15:35
Measurement Time Length (mins)		30 mins	
SLM Model & S/N		SVAN 955	
Wind Speed (m/s)		0.4	0.4
Measurement Results	L <sub>eq</sub> (dB(A))	63.5	68.9
	L <sub>10</sub> (dB(A))	64.8	70.5
	L <sub>90</sub> (dB(A))	45.3	58.9
Major Construction Noise Source(s) During Monitoring		The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location due to its large distance from the construction activities	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location due to its large distance from the construction activities
Other Noise Source(s) During Monitoring		– Background Noise – Traffic Noise	– Background Noise – Traffic Noise

Name

Signature

Date

Prepared by: Lau Kai Chung

Lau Kai Chung

27/11/2013

## Appendix E: Water Quality Monitoring Data

Remark:

Red highlighting: The value is exceeding limit level

Yellow highlighting: The value is exceeding action levele

**Environmental Pioneers & Solutions Limited**  
**Water Quality Monitoring - Summary of On-Site Measurement Results**

Date of Sampling : 1/11/2013

Weather : Sunny

Monitoring Location	W1	W2	C2
Time (hhmm)	10:54	12:05	16:15
Tide Mode	Mid-ebb		N/A
Water Depth (m)	<1	<1	<1
pH value	7.50	7.73	8.50
Temperature (°C)	30.4	26.8	33.7
Turbidity (NTU)	4.4	3.5	5.1
DO (mg/L)	7.60	7.23	7.90
DO Saturation (%)	105%	75%	109%
Suspended Solids (mg/L)	4.0	3.4	5.0

Remark or Observation : \_\_\_\_\_  
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**Name**

**Signature**

**Date**

Prepared By : Lau kai chung

Lau kai chung

1/11/2013

**Environmental Pioneers & Solutions Limited**  
**Water Quality Monitoring - Summary of On-Site Measurement Results**

Date of Sampling : 4/11/2013

Weather : Cloudy

Monitoring Location	W1	W2	C2
Time (hhmm)	12:40	14:00	14:27
Tide Mode	Mid-ebb		N/A
Water Depth (m)	<1	<1	<1
pH value	6.60	8.01	8.20
Temperature (°C)	24	24.1	24.2
Turbidity (NTU)	4.3	2.9	2.8
DO (mg/L)	7.50	7.56	7.70
DO Saturation (%)	89%	78%	75%
Suspended Solids (mg/L)	6.0	3.6	2.0

Remark or Observation : \_\_\_\_\_  
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**Name**

**Signature**

**Date**

Prepared By : Lau kai chung

Lau kai chung

4/11/2013

**Environmental Pioneers & Solutions Limited**  
**Water Quality Monitoring - Summary of On-Site Measurement Results**

Date of Sampling : 6/11/2013

Weather : Cloudy

Monitoring Location	W1	W2	C2
Time (hhmm)	13:08	15:20	13:24
Tide Mode	Mid-ebb		N/A
Water Depth (m)	<1	<1	<1
pH value	6.80	7.85	8.00
Temperature (°C)	24.6	26.6	25.2
Turbidity (NTU)	4.10	4.1	1.80
DO (mg/L)	7.60	7.33	6.10
DO Saturation (%)	86%	78%	74%
Suspended Solids (mg/L)	4.0	6.4	3.0

Remark or Observation : \_\_\_\_\_  
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**Name**

**Signature**

**Date**

Prepared By : Lau kai chung

Lau kai chung

6/11/2013

**Environmental Pioneers & Solutions Limited**  
**Water Quality Monitoring - Summary of On-Site Measurement Results**

Date of Sampling : 8/11/2013

Weather : Cloudy

Monitoring Location	W1	W2	C2
Time (hhmm)	15:50	16:00	15:35
Tide Mode	Mid-ebb		N/A
Water Depth (m)	<1	<1	<1
pH value	7.10	7.80	8.30
Temperature (°C)	31.2	25.7	30.7
Turbidity (NTU)	45.7	3.6	3.2
DO (mg/L)	7.80	6.89	6.60
DO Saturation (%)	99%	68%	86%
Suspended Solids (mg/L)	27.0	6.2	3.0

Remark or Observation : \_\_\_\_\_  
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Name

Signature

Date

Prepared By : Lau kai chung

Lau kai chung

8/11/2013

**Environmental Pioneers & Solutions Limited**  
**Water Quality Monitoring - Summary of On-Site Measurement Results**

Date of Sampling : 11/11/2013

Weather : Sunny

Monitoring Location	W1	W2	C2
Time (hhmm)	9:00	8:05	16:35
Tide Mode	Mid-ebb		N/A
Water Depth (m)	<1	<1	<1
pH value	6.60	7.87	7.80
Temperature (°C)	22.9	25.3	24.1
Turbidity (NTU)	19.3	3.8	2.6
DO (mg/L)	6.60	6.98	9.30
DO Saturation (%)	78%	70%	109%
Suspended Solids (mg/L)	17.0	3.2	2.0

Remark or Observation : \_\_\_\_\_  
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Name

Signature

Date

Prepared By : Lau kai chung

Lau kai chung

11/11/2013

**Environmental Pioneers & Solutions Limited**  
**Water Quality Monitoring - Summary of On-Site Measurement Results**

Date of Sampling : 13/11/2013

Weather : Cloudy

Monitoring Location	W1	W2	C2
Time (hhmm)	9:43	10:00	11:56
Tide Mode	Mid-ebb		N/A
Water Depth (m)	<1	<1	<1
pH value	7.20	7.87	8.80
Temperature (°C)	22.2	22.9	21.5
Turbidity (NTU)	4.3	5.3	2.3
DO (mg/L)	8.30	7.65	7.50
DO Saturation (%)	92%	78%	84%
Suspended Solids (mg/L)	5.0	12.0	2.0

Remark or Observation : \_\_\_\_\_  
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**Name**

**Signature**

**Date**

Prepared By : Lau kai chung

Lau kai chung

13/11/2013



**Environmental Pioneers & Solutions Limited**  
**Water Quality Monitoring - Summary of On-Site Measurement Results**

Date of Sampling : 15/11/2013

Weather : Sunny

Monitoring Location	W1	W2	C2
Time (hhmm)	10:53	12:00	14:37
Tide Mode	Mid-ebb		N/A
Water Depth (m)	<1	<1	<1
pH value	7.30	7.84	8.30
Temperature (°C)	26.1	24.4	25.3
Turbidity (NTU)	4.6	3.0	2.5
DO (mg/L)	6.9	7.67	8.70
DO Saturation (%)	84%	75%	104%
Suspended Solids (mg/L)	6.0	2.0	2.0

Remark or Observation : \_\_\_\_\_  
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**Name**

**Signature**

**Date**

Prepared By : Lau kai chung

Lau kai chung

15/11/2013

**Environmental Pioneers & Solutions Limited**  
**Water Quality Monitoring - Summary of On-Site Measurement Results**

Date of Sampling : 18/11/2013

Weather : Sunny

Monitoring Location	W1	W2	C2
Time (hhmm)	12:54	14:00	17:00
Tide Mode	Mid-ebb		N/A
Water Depth (m)	<1	<1	<1
pH value	7.40	8.13	8.70
Temperature (°C)	21.6	23.8	21.7
Turbidity (NTU)	4.2	5.0	1.6
DO (mg/L)	8.50	7.23	9.50
DO Saturation (%)	92%	75%	102%
Suspended Solids (mg/L)	9.0	1.8	3.0

Remark or Observation : \_\_\_\_\_  
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**Name**

**Signature**

**Date**

Prepared By : Lau kai chung

Lau kai chung

18/11/2013

**Environmental Pioneers & Solutions Limited**  
**Water Quality Monitoring - Summary of On-Site Measurement Results**

Date of Sampling : 20/11/2013

Weather : Cloudy

Monitoring Location	W1	W2	C2
Time (hhmm)	13:58	14:40	12:37
Tide Mode	Mid-ebb		N/A
Water Depth (m)	<1	<1	<1
pH value	7.80	8.16	8.50
Temperature (°C)	21.9	22.5	20.3
Turbidity (NTU)	8.2	3.3	1.5
DO (mg/L)	7.50	7.31	8.40
DO Saturation (%)	83%	73%	91%
Suspended Solids (mg/L)	10.0	2.4	2.0

Remark or Observation : \_\_\_\_\_  
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**Name**

**Signature**

**Date**

Prepared By : Lau kai chung

Lau kai chung

20/11/2013

**Environmental Pioneers & Solutions Limited**  
**Water Quality Monitoring - Summary of On-Site Measurement Results**

Date of Sampling : 22/11/2013

Weather : Sunny

Monitoring Location	W1	W2	C1
Time (hhmm)	14:42	16:00	17:31
Tide Mode	Mid-ebb		N/A
Water Depth (m)	<1	<1	<1
pH value	7.50	8.23	8.50
Temperature (°C)	24.1	23.6	22.3
Turbidity (NTU)	3.7	3.8	7.8
DO (mg/L)	7.40	7.89	7.90
DO Saturation (%)	85%	80%	88%
Suspended Solids (mg/L)	6.0	1.8	16.0

Remark or Observation : \_\_\_\_\_  
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**Name**

**Signature**

**Date**

Prepared By : Lau kai chung

Lau kai chung

22/11/2013

**Environmental Pioneers & Solutions Limited**  
**Water Quality Monitoring - Summary of On-Site Measurement Results**

Date of Sampling : 25/11/2013

Weather : Cloudy

Monitoring Location	W1	W2	C1
Time (hhmm)	18:00	16:00	15:20
Tide Mode	Mid-ebb		N/A
Water Depth (m)	<1	<1	<1
pH value	8.20	8.16	8.20
Temperature (°C)	22.6	22.8	22.2
Turbidity (NTU)	21.2	2.7	5.8
DO (mg/L)	7.20	7.25	8.2
DO Saturation (%)	82%	75%	92%
Suspended Solids (mg/L)	17.0	4.0	12.0

Remark or Observation : \_\_\_\_\_  
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**Name**

**Signature**

**Date**

Prepared By : Lau kai chung

Lau kai chung

25/11/2013

**Environmental Pioneers & Solutions Limited**  
**Water Quality Monitoring - Summary of On-Site Measurement Results**

Date of Sampling : 27/11/2013

Weather : Cloudy

Monitoring Location	C1	W2	C2
Time (hhmm)	14:20	14:00	13:00
Tide Mode	Mid-flood		
Water Depth (m)	<1	<1	<1
pH value	8.13	8.26	8.10
Temperature (°C)	24.3	23.8	21.4
Turbidity (NTU)	2.5	2.9	3.2
DO (mg/L)	8.15	8.10	9.50
DO Saturation (%)	85%	85%	101%
Suspended Solids (mg/L)	2.4	2.0	2.0

Remark or Observation : \_\_\_\_\_  
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**Name**

**Signature**

**Date**

Prepared By : Lau kai chung

Lau kai chung

27/11/2013

**Environmental Pioneers & Solutions Limited**  
**Water Quality Monitoring - Summary of On-Site Measurement Results**

Date of Sampling : 29/11/2013

Weather : Cloudy

Monitoring Location	C1	W2	C2
Time (hhmm)	9:00	10:20	16:15
Tide Mode	Mid-ebb		N/A
Water Depth (m)	<1	<1	<1
pH value	7.50	7.94	8.10
Temperature (°C)	16.4	21.3	18.2
Turbidity (NTU)	4.0	2.5	1.6
DO (mg/L)	8.00	7.50	7.80
DO Saturation (%)	69%	78%	80%
Suspended Solids (mg/L)	8.0	2.0	3.0

Remark or Observation : \_\_\_\_\_  
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**Name**

**Signature**

**Date**

Prepared By : Lau kai chung

Lau kai chung

29/11/2013

## Appendix F: Hydrological Characteristics Monitoring Data



Location	Position	Tide	Date	Time	Weather	Water Depth (m)	Water Flow (m/s)	Water Flow (m <sup>3</sup> /s)
H1	Mid	Flood	1/11/13	15:05	Cloudy	0.36	0.12	0.150
H1	Mid	Flood	8/11/13	09:25	Sunny	0.36	0.18	0.225
H1	Mid	Flood	15/11/13	15:15	Cloudy	0.24	0.12	0.150
H1	Mid	Flood	22/11/13	09:05	Cloudy	0.3	0.12	0.150
H1	Mid	Flood	29/11/13	14:15	Sunny	0.3	0.18	0.225
H2	Mid	Flood	1/11/13	15:40	Cloudy	0.42	0.12	0.754
H2	Mid	Flood	8/11/13	10:05	Sunny	0.36	0.24	1.507
H2	Mid	Flood	15/11/13	15:45	Cloudy	0.24	0.18	1.130
H2	Mid	Flood	22/11/13	09:35	Cloudy	0.24	0.18	1.130
H2	Mid	Flood	29/11/13	14:45	Sunny	0.3	0.18	1.130
H1	Mid	Ebb	1/11/13	10:00	Cloudy	0.3	0.24	0.300
H1	Mid	Ebb	8/11/13	15:00	Sunny	0.12	0.12	0.150
H1	Mid	Ebb	15/11/13	10:00	Cloudy	0.12	0.18	0.225
H1	Mid	Ebb	22/11/13	14:05	Cloudy	0.24	0.12	0.150
H1	Mid	Ebb	29/11/13	08:30	Sunny	0.3	0.12	0.150
H2	Mid	Ebb	1/11/13	10:35	Cloudy	0.24	0.24	1.507
H2	Mid	Ebb	8/11/13	15:35	Sunny	0.18	0.12	0.754
H2	Mid	Ebb	15/11/13	10:30	Cloudy	0.12	0.12	0.754
H2	Mid	Ebb	22/11/13	14:35	Cloudy	0.24	0.18	1.130
H2	Mid	Ebb	29/11/13	09:00	Sunny	0.3	0.18	1.130

Appendix G: Landscape and Visual Monitoring Photos



**Photo 1** – Temporary hoardings have been established around the works area at Wai Ha River estuary.



**Photo 2** – The permanent boundary wall has been established along the western side of Area A.



**Photo 3** – The proposed boundary wall along part of the northern side of Area A was under construction.



**Photo 4** – The western end of Phase 2 of Area B was demarcated with temporary construction barriers and covered by canvas sheets.



**Photo 5** – Chain-link fence was reinstated at the eastern end of Phase 2 works area and covered by canvas sheets.



**Photo 6** – A small section of the temporary hoarding at the southwestern side of Phase 1 works area of Area B was removed and covered by canvas sheets.



**Photo 7** – No discharge of muddy water was observed in Area C.



**Photo 8** – The relocated tree E16 was in fair condition but its tree protection zone was not maintained properly.



**Photo 9** – The dead, relocated tree E38 was removed, and the planter was planted with four new trees *Cinnamomum burmannii*.



**Photo 10** – The wound at the trunk flare of E61 was burlapped and the leaning tree trunk was supported by two steel poles.



**Photo 11** – E55 with burlapped broken trunk was still in poor condition.



**Photo 12** – E44 was retained *in-situ* and wounds were noted on its trunk.



**Photo 13** – Herbaceous creeper *Arachis duranensis* were planted on the green roof of the pump house.



**Photo 14** – The decayed trunk of U58 was removed, leaving a stump in the planter.



**Photo 15** – The dead tree U34 was collapsed in previous month.



**Photo 16** – The dead tree U35 was collapsed in previous month.



**Photo 17** – The dead tree U37 was still standing in Area B.



**Photo 18** – Excavated soil was piled close to the relocated trees along both sides of Phase 1 area.



**Photo 19** – The broken planter of U47 was not yet repaired and its trunk flare was piled with soil.



**Photo 20** – The health condition of the transplanted U55 was improved.



**Photo 21** – Long branches with wounds and dieback twigs were observed on U55.



**Photo 22** – Sign of suspected termite infestation was observed at the lower trunk of U67.



**Photo 23** – U76 has remained in marginally fair condition only.



**Photo 24** – U78 has remained in marginally fair condition only.



**Photo 25** – Cracked tree bark was observed along the lower trunk of U78.



**Photo 26** – A wooden plate was discarded among the overgrown climbers and canopy of U74.



**Photo 27** – Condition of the relocated U79, with cracked bark on the topped scaffold limb.



**Photo 28** – Overgrown climbers were found on the canopy of U52.



**Photo 29** – Civil works close to the planter of A40 (indicated) were still on-going.



**Photo 30** – Excavated holes have still existed next to the relocated trees.

**Appendix H:**

**A)**

**The recommended mitigation measures of EM&A manual (revision 3)**

**B)**

**Implementation status of environmental protection and mitigation measures**



A) The recommended mitigation measures of EM&A manual (revision 3)

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
<b>A</b> <i>Noise Impact</i>							
S 3.30	2.18	Good Site Practice: <ul style="list-style-type: none"> <li>▪ Only well-maintained plant shall be operated on-site and plant shall be serviced regularly during the construction program</li> <li>▪ Silencers or mufflers on construction equipment shall be utilized and shall be properly maintained during the construction program</li> <li>▪ Mobile plant, if any, shall be sited as far from NSRs as possible</li> <li>▪ Machines and plant (such as</li> </ul>	To minimize construction noise impacts	Contractor	Works areas	Construction phase	EIAO-TM NCO

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		<p>trucks) that may be in intermittent use shall be shut down between work periods or shall be throttled down to a minimum</p> <ul style="list-style-type: none"> <li>▪ Plant known to emit noise strongly in one direction shall, wherever possible, be orientated so that the noise is directed away from the nearby NSRs</li> <li>▪ Material stockpiles and other structures shall be effectively utilized, wherever practicable, in screening noise from on-site construction activities.</li> </ul>					
S 3.31 - 3.32	2.19	Use of quieter PME	To minimize construction noise impacts	Contractor	Works areas	Construction phase	EIAO-TM NCO
S 3.33 – 3.34	2.20-2.21	Use of temporary noise barrier	To minimize construction noise impacts	Contractor	Works areas as shown in Figure	Construction phase	EIAO-TM NCO

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
3.36-3.38	2.23-2.24				3.5		
S 3.35 and Table 3.6	2.22	Use of alternative quieter construction method (the Low Impact Method)	To minimize construction noise impacts	Contractor	Part of the works area for pipe laying in Wai Ha (refer to Figure 3.5)	Construction phase	EIAO-TM NCO
3.36-3.38	2.23-2.24	Use of noise enclosure	To minimize construction noise impacts	Contractor	Part of the works area for pipe laying in Wai Ha (refer to Figure 3.5)	Construction phase	EIAO-TM NCO
<b>B Air Quality Impact</b>							
S4.16	3.5	Implementation of mitigation measures stipulated in the Air Pollution Control (Construction Dust) Regulation and good site practices including but not limited to the following:	To minimize construction dust impacts	Contractor	Construction Sites	Construction Phase	EIAO-TM

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		<ul style="list-style-type: none"> <li>▪ Use of regular watering to reduce dust emissions from exposed site surfaces and unpaved road, with complete coverage, particularly during dry weather;</li> <li>▪ Use of frequent watering for particularly dusty static construction areas and areas close to ASRs;</li> <li>▪ Tarpaulin covering of all dusty vehicle loads transported to, from and between site location;</li> <li>▪ Establishment and use of vehicle wheel and body washing facilities at the exit points of the site;</li> <li>▪ Routing of vehicles and</li> </ul>					

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		positioning of construction plant should be at the maximum possible distance from ASRs.  <ul style="list-style-type: none"> <li>▪ Stockpiled excavated materials should be covered with tarpaulin, and should be removed off-site within 24 hours to avoid any odour nuisance arising.</li> </ul>					
<b>C</b> <i>Water Quality Impact</i>							
S5.29	4.5	Construction Site Run-off and Drainage:  <ul style="list-style-type: none"> <li>▪ Before commencing any site formation work, all sewer and drainage connections shall be sealed to prevent debris, soil, sand etc. from entering public</li> </ul>	To minimize water quality impacts	Contractor	Works sites	Construction phase	ProPECC PN 1/94 Construction Site Drainage

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		<p>sewers/drains.</p> <ul style="list-style-type: none"> <li>▪ Temporary ditches shall be provided to facilitate run-off discharge into appropriate watercourses, via a silt retention pond. No site run-off shall enter the fishponds at Shuen Wan.</li> <li>▪ Sand/silt removal facilities such as sand traps, silt traps and sediment basins shall be provided to remove sand/silt particles from runoff to meet the requirements of the Technical Memorandum standard under the Water Pollution Control Ordinance. The design of silt removal facilities shall be based on the guidelines provided in ProPECC PN 1/94. All drainage</li> </ul>					

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		<p>facilities and erosion and sediment control structures shall be inspected monthly and maintained to ensure proper and efficient operation at all times and particularly during rainstorms.</p> <ul style="list-style-type: none"> <li>▪ Water pumped out from excavated pits shall be discharged into silt removal facilities.</li> <li>▪ During rainstorms, exposed slope/soil surfaces shall be covered by a tarpaulin or other means.</li> </ul> <p>Other measures that need to be implemented before, during, and after rainstorms as summarized in ProPECC PN 1/94 shall be followed.</p>					

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		<ul style="list-style-type: none"> <li>▪ Exposed soil areas shall be minimized to reduce potential for increased siltation and contamination of runoff.</li> <li>▪ Earthwork final surfaces shall be well compacted and subsequent permanent work or surface protection shall be immediately performed to reduce the potential of soil erosion.</li> <li>▪ Open stockpiles of construction materials or construction wastes on-site shall be covered with tarpaulin or similar fabric during rainstorms.</li> </ul>					
S5.30	4.7	Further precautionary measures during rainy season:	To minimize water quality impacts to the designated Conservation Area	Contractor	Works areas near the Conservation Area	Rainy seasons during construction	EIAO-TM Water Pollution Control Ordinance



EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		<ul style="list-style-type: none"> <li>▪ For the construction of the box culvert next to the existing channel of the Wai Ha River, sand bags should be deployed around the boundary of the works trench to prevent muddy water ingress into the adjacent CA or Wai Ha River. Sand bags should also be used to surround the excavated trench. Generally, the sand bags will be placed up to a height of 300mm to provide adequate allowance for the built-up water level during rainstorm event. With sand bags in place, surface runoff will be intercepted and flow to Wai Ha River or collected by the existing drainage system as usual.</li> <li>▪ For the construction of the box</li> </ul>				phase	(WPCO)

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		<p>culvert in the extreme northeast corner of Shuen Wan Marsh</p> <p>Conservation Area sand bags should be deployed along the limit of the works area to prevent muddy water ingress into the CA. Sand bags should be placed to a height of at least 300mm from ground level and +2.5 mPD (whichever is greater) to provide adequate allowance for the built-up water level during rainstorm events.</p> <p>Unpolluted surface runoff within the works area should then be collected and directed into the existing drainage system.</p> <ul style="list-style-type: none"> <li>▪ Sheet-piles, which would be installed around the works trench near the Conservation Area, would</li> </ul>					

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		<p>be extended above ground level for about 2m to serve as hoardings to isolate the works site.</p> <ul style="list-style-type: none"> <li>▪ Tarpulin sheets would be used to cover the excavation areas during heavy rainstorms. This would prevent the ingress of rainwater into the trench minimising the risk of muddy water getting into Wai Ha River and the adjacent Conservation Area.</li> <li>▪ Any concrete washing water would be contained inside the works site surrounded by the extended sheet piles. A pump sump at the bottom of the trench would be provided to pump any excess water during concrete washing.</li> </ul>					

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		<ul style="list-style-type: none"> <li>▪ Stockpiling the excavated materials adjacent to the Conservation Area would not be allowed. The excavated materials would be either removed off site immediately after excavation, or stockpile at location(s) away from the Conservation Area. The stockpile locations shall be approved by the site engineer.</li> </ul>					
S5.31-S5.32	4.8-4.9	<p>General Construction Activities:</p> <ul style="list-style-type: none"> <li>▪ Debris and refuse generated on-site should be collected, handled and disposed of properly to avoid entering the Wa Ha River and fish ponds at Shuen Wan. Stockpiles of cement and other construction materials should be kept covered</li> </ul>	To minimize water quality impacts	Contractor	Works sites	Construction phase	EIAO-TM WPCO

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		<p>when not being used.</p> <ul style="list-style-type: none"> <li>▪ Oils and fuels should only be used and stored in designated areas which have pollution prevention facilities. To prevent spillage of fuels and solvents to nearby water bodies, all fuel tanks and storage areas should be provided with locks and be sited on sealed areas, within bunds of a capacity equal to 110% of the storage capacity of the largest tank. The bund should be drained of rainwater after a rain event.</li> </ul>					
S5.33	4.10	<p>Sewage from Construction workforce:</p> <ul style="list-style-type: none"> <li>▪ Temporary sanitary facilities, such as portable chemical toilets, should be employed on-site. A</li> </ul>	To minimize water quality impacts	Contractor	Works sites	Construction phase	EIAO-TM WPCO

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		licensed contractor would be responsible for appropriate disposal and maintenance of these facilities.					
S5.34	4.11	<p>River Channel Excavation Works:</p> <ul style="list-style-type: none"> <li>▪ The excavation works within the upstream end of the existing river channel of the Wai Ha River for the construction of the proposed box culvert shall be carried out in dry condition. Containment measures such as bunds and barriers shall be used within the affected length of the river channel and the excavation works restricted to within an enclosed dry section of the channel. The excavation works within Wai Ha River shall be restricted to the period from October</li> </ul>	To minimize water quality impacts	Contractor	Works sites	Construction phase	EIAO-TM WPCO

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		to April.					
<b>D Waste Management Implications</b>							
S6.20 – 6.22	5.5	<p>Good site practices:</p> <ul style="list-style-type: none"> <li>▪ Nomination of approved personnel, such as a site manager, to be responsible for good site practices and making arrangements for collection of all wastes generated at the site and effective disposal to an appropriate facility.</li> <li>▪ Training of site personnel in proper waste management and chemical waste handling procedures.</li> <li>▪ Provision of sufficient waste disposal points and regular</li> </ul>	To reduce waste management impacts	Contractor	Works sites	Construction phase	ETWB TCW No.19/2005 ETWB TCW No.31/2004

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		<p>collection for disposal.</p> <ul style="list-style-type: none"> <li>▪ Appropriate measures to minimise windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers.</li> <li>▪ Separation of chemical waste for special handling and appropriate treatment at the Chemical Waste Treatment Facility.</li> <li>▪ Regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors.</li> <li>▪ A Waste Management Plan</li> </ul>					



EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		<p>should be prepared and submitted to the Engineer for approval. One may make reference to ETWB TCW No. 15/2003 for details.</p> <ul style="list-style-type: none"> <li>▪ A recording system for the amount of wastes generated, recycled and disposed (including the disposal sites) should be proposed.</li> </ul>					
S6.23-6.24	5.7	<p>Waste reduction measures:</p> <ul style="list-style-type: none"> <li>▪ Segregation and storage of different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal.</li> <li>▪ To encourage collection of aluminium cans by individual collectors, separate labelled bins</li> </ul>	To achieve waste reduction	Contractor	Works sites	Construction phase	EIAO-TM

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		<p>shall be provided to segregate this waste from other general refuse generated by the work force.</p> <ul style="list-style-type: none"> <li>▪ Any unused chemicals or those with remaining functional capacity shall be recycled.</li> <li>▪ Maximising the use of reusable steel formwork to reduce the amount of C&amp;D material.</li> <li>▪ Proper storage and site practices to minimise the potential for damage or contamination of construction materials.</li> <li>▪ Plan and stock construction materials carefully to minimise amount of waste generated and</li> </ul>					

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		avoid unnecessary generation of waste.					
S6.25-6.26		<p>Construction &amp; Demolition (C&amp;D) Material:</p> <ul style="list-style-type: none"> <li>▪ Excavated material with suitable characteristics/size should be reused on-site as fill material as far as practicable, such as for backfilling of the box culvert and drainage pipe works.</li> <li>▪ Suitable areas should be designated within the works site boundaries for temporary stockpiling of C&amp;D material.</li> <li>▪ Within stockpile areas, the following measures should be taken to control potential environmental</li> </ul>	<p>To minimize off-site disposal of C&amp;D material</p> <p>To minimize environmental impacts during the handling of C&amp;D material</p>	Contractor	Works sites	Construction phase	EIAO-TM

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		<p>impacts or nuisance:</p> <ul style="list-style-type: none"> <li>- covering material during heavy rainfall;</li> <li>- locating stockpiles to minimize potential visual impacts; and</li> <li>- minimizing land intake of stockpile areas as far as possible.</li> </ul> <ul style="list-style-type: none"> <li>▪ When disposing C&amp;D material at a public filling area, the material shall only consist of soil, rock, concrete, brick, cement plaster/mortar, inert building debris, aggregates and asphalt. The material shall be free from marine mud, household refuse, plastic, metals, industrial and chemical waste, animal and vegetable matter, and other material considered to be</li> </ul>					

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		unsuitable by the Filling Supervisor.					
S6.27		<p>Chemical waste:</p> <ul style="list-style-type: none"> <li>▪ Contractor should register with the EPD as a Chemical Waste Producer and to follow the guidelines stated in the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes.</li> <li>▪ Good quality containers compatible with the chemical wastes should be used, and incompatible chemicals should be stored separately.</li> <li>▪ Appropriate labels should be securely attached on each chemical waste container indicating the</li> </ul>	To minimize environmental impacts during the handling, transportation and disposal of chemical waste	Contractor	Works sites	Construction phase	EIAO-TM Waste Disposal (Chemical Waste) (General) Regulation

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		<p>corresponding chemical characteristics of the chemical waste, such as explosives, flammable, oxidizing, irritant, toxic, harmful, corrosive, etc.</p> <ul style="list-style-type: none"> <li>▪ The Contractor should use a licensed collector to transport and dispose of the chemical wastes generated at the Chemical Waste Treatment Centre at Tsing Yi, or other licenced facility, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.</li> </ul>					
S6.28		<p>General refuse:</p> <ul style="list-style-type: none"> <li>▪ It should be stored in enclosed bins or compaction units separate from C&amp;D material.</li> <li>▪ A reputable waste collector</li> </ul>	To minimize environmental impacts during the handling and transportation of general refuse	Contractor	Works sites	Construction phase	EIAO-TM

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		<p>should be employed by the contractor to remove general refuse from the site, separately from C&amp;D material.</p> <ul style="list-style-type: none"> <li>▪ An enclosed and covered area is preferred to reduce the occurrence of 'wind blown' light material.</li> </ul>					
<b>E Ecological Impact</b>							
S. 7.95	6.6	<ul style="list-style-type: none"> <li>▪ Sheet-pilings, which will be installed around the trench of excavation, should be extended above ground level for ~2m to act as hoarding to isolate the works site.</li> <li>▪ The trenching works for the construction of the proposed box culvert should be carried out in phases, with a trench length of not</li> </ul>	To minimize the impacts on the stream and natural river bank	Contractor	Whole site	Construction Phase	EIAO-TM

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		<p>more than 120m in each phase.</p> <p>The trench should be backfilled and compacted with suitable materials upon completion of each phase of the construction works.</p>					
S7.117	6.6	<ul style="list-style-type: none"> <li>▪ The construction of intercept point of twin cell box culvert at the upstream of Wai Ha River should be confined to only one side of the river bank.</li> <li>▪ To restore and enhance the ecological value of the stream, the affected river bank should be reinstated to its original condition or lined with rock-filled gabion.</li> <li>▪ Planting pits should be provided in the gabion bank to allow the re-establishment of riparian vegetation.</li> </ul>	To minimize the impacts on the stream and natural river bank	Contractor	Whole site	Construction Phase	EIAO-TM



EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		<ul style="list-style-type: none"> <li>▪ The existing natural riverbed and substrates should be retained and the natural pool-riffle sequence should be re-created in the new channel bed.</li> </ul>					
S 7.118	6.7	<ul style="list-style-type: none"> <li>▪ All works carried out within the the river channel of Wai Ha River should be carried out from October to April, with construction carried out by land-based plant.</li> <li>▪ Works within river/stream channels should be restricted to an enclosed dry section of the river, with containment measures such as bunds and barriers used within the river to minimize the impacts upon the downstream water body.</li> </ul>	To minimise sedimentation/ water quality impacts	Contractor	Whole Site	Construction Phase	EIAO-TM

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		<ul style="list-style-type: none"> <li>▪ Site runoff should be directed towards regularly cleaned and maintained silt traps and oil/grease separators to minimize the risk of sedimentation and pollution of river water.</li> <li>▪ The silt and oil/grease separators should be appropriately designed for the local drainage and ground conditions.</li> <li>▪ To minimize leakage and loss of sediments during excavation in narrow channels, tightly sealed closed grab excavators should be deployed where material to be handled is wet.</li> </ul>					
S 7.119	6.8	<ul style="list-style-type: none"> <li>▪ The construction of the proposed box-culvert would have the potential to directly impact a few</li> </ul>	To protect plant species of conservation interest	Contractor/ qualified botanist/horticu	Whole site	Construction Phase	EIAO-TM

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		<p>individual of a plant species of conservation interest (Hong Kong Pavetta, <i>Pavetta hongkongensis</i>). The affected individuals should be transplanted to a suitable nearby habitats prior to the construction phase.</p> <ul style="list-style-type: none"> <li>▪ A detailed vegetation survey of the affected species of conservation interest should be conducted by a suitably qualified botanist/ecologist to identify the affected individuals in order to provide details for transplantation scheme.</li> <li>▪ Transplantation should be supervised by a suitably qualified botanist/horticulturalist. A detailed transplantation methodology should be formulated during the detailed design stage of this Project.</li> </ul>		Horticulturalist			

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
S 7.120	6.9	<ul style="list-style-type: none"> <li>▪ Noise mitigation measures such as the use of quieter construction plant and temporary noise barriers should be implemented to minimize disturbance to habitats adjacent to the works areas.</li> <li>▪ Temporary noise barriers should be used during the construction of the box-culvert along Tung Tsz Road, the floodwater pumping station, the mechanical gate, and drainage pipe to minimize potential construction phase disturbance to ardeids and avifauna foraging in marsh habitat.</li> <li>▪ Noise generating construction works near the Shuen Wan Egrettry SSSI should be avoided as far as practicable during the breeding season (March to June) of the</li> </ul>	To minimise disturbance impacts.	Contractor	Whole site	Construction Phase	EIAO-TM

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		<p>ardeids.</p> <ul style="list-style-type: none"> <li>▪ Works near the SSSI (i.e. installation of mechanical gate) should be restricted to be executed outside the breeding season by provision of special conditions in the contract document.</li> <li>▪ Hoardings with minimum height of 2m should be set up along the south side of the proposed box culvert works area adjacent to the marsh, extending at least 20m at both ends, throughout the construction period.</li> </ul>					
S 7.121	6.10	<ul style="list-style-type: none"> <li>▪ Placement of equipment or stockpile in designated works areas and access routes selected on existing disturbed land to minimise disturbance to natural or</li> </ul>	To minimise disturbance to habitats.	Contractor	Whole site	Construction Phase	EIAO-TM

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		moderate-high ecological value habitats.					
S 7.121	6.10	<ul style="list-style-type: none"> <li>▪ Construction activities should be restricted to work areas that would be clearly demarcated. The work areas should be reinstated after completion of the works.</li> </ul>	To minimise disturbance to natural habitats outside works area.	Contractor	Whole site	Construction Phase	EIAO-TM
S 7.121	6.10	<ul style="list-style-type: none"> <li>▪ Waste skips should be provided to collect general refuse and construction wastes. The wastes would be disposed of timely and properly off-site.</li> </ul>	To minimise disturbance to habitats.	Contractor	Whole site	Construction Phase	EIAO-TM
S 7.121	6.10	<ul style="list-style-type: none"> <li>▪ General drainage arrangements should include sediment and oil traps to collect and control construction site run-off.</li> </ul>	To minimise sedimentation/ water quality impacts	Contractor	Whole site	Construction Phase	EIAO-TM
S 7.121	6.10	<ul style="list-style-type: none"> <li>▪ Open burning on works sites is illegal, and should be strictly prohibited.</li> </ul>	To prevent accidental hill-fires.	Contractor	Whole site	Construction Phase	EIAO-TM

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
S 7.122	6.11	<ul style="list-style-type: none"> <li>▪ De-silting should be limited to the dry season.</li> </ul>	To minimise sedimentation/ water quality impacts	Maintenance parties of the channel	Whole site	Operation Phase	EIAO-TM
S 7.122	6.11	<ul style="list-style-type: none"> <li>▪ Waste material produced during de-silting should be disposed of in a timely and appropriate manner.</li> </ul>	To minimise sedimentation/ water quality impacts	Maintenance parties of the channel	Whole site	Operation Phase	EIAO-TM
S 7.123	6.12	<ul style="list-style-type: none"> <li>▪ Planting of trees should be provided within the project area to compensate for the unavoidable loss of approximately 0.08ha secondary woodland habitat due to the Project.</li> <li>▪ Planting of trees and other vegetation within project area along the banks of Wai Ha River and Tung Tsz Road should be carried out to provide compensation for unavoidable tree-felling and loss of riparian vegetation resulting from the</li> </ul>	To compensate the loss of vegetation	Contractor	Whole site	Construction Phase	EIAO-TM

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		<p>Project.</p> <ul style="list-style-type: none"> <li>▪ The compensatory planting should make use of native plant species with flowers/fruits attractive to wildlife.</li> </ul>					
S 7.124	6.13	<ul style="list-style-type: none"> <li>▪ Compensation would be required for the loss of a small area of marsh habitat (about 0.30ha) within the CA resulting from the construction of the box-culvert.</li> <li>▪ An existing low ecological value recreational fishpond on government land adjacent to the marsh would be used as a proposed area (about 0.8ha) for the compensation for the marsh as well as secondary woodland habitats loss (0.08ha).</li> <li>▪ The pond should be enhanced by removing boardwalks around the</li> </ul>	To compensate the loss of marsh habitat and enhance the quality compensatory habitat	Contractor / qualified ecologist	The recreational fish pond located to the southwest of the existing Tung Tsz Nursery	Construction Phase	EIAO-TM



EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		<p>existing pond, and restoring vegetation along the pond bunds, and it would be re-profiled to provide areas of shallow water (approximately 15-50cm deep), creating a suitable foraging habitat for avifauna, particularly ardeids and other waders.</p> <ul style="list-style-type: none"> <li>▪ Screen planting of shrubs and trees along the south-eastern bund of the pond should be implemented to minimise disturbance to avifauna and other wildlife from the adjacent recreational fishpond. The enhanced pond is expected to provide a moderate-high ecological value wetland habitat.</li> </ul>					

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
<b>F</b>		<b><i>Landscape and Visual</i></b>					
Table 8.4	7.6	Visual screen, contaminant/ liaison with nursery, protection of existing trees with works area and construction light are used or practiced to mitigate the impacts during construction phase.	To mitigate the landscape	Contractor	Whole site	Construction	EIAO-TM
Table 8.4	7.7	Viewing area formation, architectural design for pump house, landscape design for pump house, enhancement planting along Tung Tsz Road, sufficient soil depth for enhancement planting, transplanting of trees to adjacent locations, preparation for transplanting and reinstatement of affected area are practiced to mitigate the impacts during operational phase.	To mitigate the landscape and visual impacts during the operational phase.	Contractor	Whole site	Detail Design / Operational Phase	EIAO-TM

**Appendix H:**

**A)**

**The recommend mitigation measures of EM&A manual (revision 3)**

**B)**

**Implementation status of environmental protection and mitigation measures**

B) Implementation status of environmental protection and mitigation

EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & main concern to Address	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?	Implementation status
2.18	Use well maintained construction plant	To minimize construction noise impact	Works areas	Construction phase	EIAO-TM NCO	Implemented
	Shut down plants between work periods					Implemented
	Install silencers on construction equipment					Implemented
	Locate mobile plant far away from NSRs					Implemented
	Quiet plants should be used					Implemented
2.19	Use of quieter PME					Not applicable
2.20 - 2.21	Use of temporary noise barrier		Pipe laying in Wai Ha			Not applicable
2.22	Use of alternative quieter construction method		Part of the Works Pipe laying in Wai Ha			Not applicable
2.23 – 2.24	Use of noise enclosure		Pipe laying in Wai Ha			Not applicable

<b>EM&amp;A Ref.</b>	<b>Recommended Mitigation Measures</b>	<b>Objectives of the Recommended Measure &amp; main concern to Address</b>	<b>Location of the measure</b>	<b>When to implement the measure?</b>	<b>What requirements or standards for the measure to achieve?</b>	<b>Implementation status</b>
3.5	Implement regular watering and vehicle washing facilities	To minimize construction dust impact	Construction Site	Construction phase	EIAO-TM	Implemented
	Cover excavated or stockpile of dusty material by impervious sheeting or sprayed with water					Implemented
	Use tarpaulin to cover dusty materials on vehicles					Implemented
4.5	Provide silt trap and oil interceptor to remove the oil, lubricants, grease, silt, grit and debris from the wastewater before pumped to the public storm water drainage system	To minimize water quality impact	Construction Site	Construction phase	EIAO-TM WPCO	Implemented
4.5	During rainstorms, exposed slope/soil surfaces shall be covered by a tarpaulin or other means. Others measures that need to be implemented before, during, and after rainstorms as summarized in ProPECC PN 1/94 shall be followed					Not applicable

<b>EM&amp;A Ref.</b>	<b>Recommended Mitigation Measures</b>	<b>Objectives of the Recommended Measure &amp; main concern to Address</b>	<b>Location of the measure</b>	<b>When to implement the measure?</b>	<b>What requirements or standards for the measure to achieve?</b>	<b>Implementation status</b>
4.10	Provide site toilet facilities	To minimize water quality impact	Construction Site	Construction phase	EIAO-TM WPCO	Implemented
4.7	<p>Further precautionary measures during rainy season:</p> <p>For the construction of the box culvert next to the existing channel of the Wai Ha River, sand bags should be deployed around the boundary of the works trench to prevent muddy water ingress into the adjacent CA or Wai Ha River. Sand bags should also be used to surround the excavated trench. Generally, the sand bags will be placed up to a height of 300mm to provide adequate allowance for the built-up water level during rainstorm event. With sand bags in place, surface runoff will be intercepted and flow to Wai Ha River or collected by the existing drainage system as usual.</p> <p>For the construction of the box culvert in the extreme northeast corner of Shuen Wan Marsh Conservation Area sand bags should be deployed along the limit of the works area to prevent muddy water ingress into the CA. Sand bags should be placed to a height of at least 300mm from round level and +2.5 mPD (whichever is greater) to provide adequate allowance</p>	To minimize water quality impact to the designated Conservation Area	Works areas near the Conservation Area	Rainy seasons during construction	EIAO-TM WPCO	Not applicable

EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & main concern to Address	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?	Implementation status
	<p>for the built-up water level during rainstorm events. Unpolluted surface runoff within the works area should then be collected and directed into the existing drainage system.</p> <p>Sheet-piles, which would be installed around the works trench near the Conservation Area, would be extended above ground level for about 2m to serve as hoardings to isolate the works site.</p> <p>Tarpulin sheets would be used to cover the excavation areas during heavy rainstorms. This would prevent the ingress of rainwater into the trench minimising the risk of muddy water getting into Wai Ha River and the adjacent Conservation Area.</p> <p>Any concrete washing water would be contained inside the works site surrounded by the extended sheet piles. A pump sump at the bottom of the trench would be provided to pump any excess water during concrete</p>					
5.9	Reuse excavated material as much as possible					Implemented
5.7	Any unused chemicals or those with remaining functional capacity shall be recycled.	To achieve waste reduction	Works areas	Construction phase	EIAO-TM	Not applicable
	Recycle scrap metals or abandoned equipment					Implemented

<b>EM&amp;A Ref.</b>	<b>Recommended Mitigation Measures</b>	<b>Objectives of the Recommended Measure &amp; main concern to Address</b>	<b>Location of the measure</b>	<b>When to implement the measure?</b>	<b>What requirements or standards for the measure to achieve?</b>	<b>Implementation status</b>
5.5	A recording system for the amount of wastes generated, recycled and disposed should be proposed	To reduce waste management impacts	Works areas	Construction phase	ETWB TCW	Implemented
5.9	Adopt a trip ticket system for the disposal of C&D materials				No. 19/2005	Implemented
5.11	All general refuse should be segregated and stored in enclosed bins or compaction units				ETWB TCW NO. 31/2004	Implemented
5.10	Contractor should be a required to register with the EPD as a Chemical Waste Producer and to follow the guidelines states in the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes.	To minimize the environmental impacts associated with the handling, transportation and disposal of chemical waste.	Work site	Construction phase	EIAO-TM Waste Disposal (Chemical Waste)(General) Regulation	Implemented
	Good quality containers compatible with the chemical wastes should be used, and Incompatible chemicals should be stored separately.  Appropriate labels should be securely attached on each chemical waste container indicating the corresponding chemical characteristics of the chemical waste, such as explosives, flammable, oxidizing, irritant, toxic, harmful, corrosive, etc.					Not applicable



<b>EM&amp;A Ref.</b>	<b>Recommended Mitigation Measures</b>	<b>Objectives of the Recommended Measure &amp; main concern to Address</b>	<b>Location of the measure</b>	<b>When to implement the measure?</b>	<b>What requirements or standards for the measure to achieve?</b>	<b>Implementation status</b>
5.5	A recording system for the amount of wastes generated, recycled and disposed should be proposed	To reduce waste management impacts	Works areas	Construction phase	ETWB TCW No. 19/2005 ETWB TCW NO. 31/2004	Implemented
6.6	<p>Sheet-pilings, which will be installed around the trench of excavation, should be extended above ground level for ~2m to act as hoarding to isolate the works site.</p> <p>The trenching works for the construction of the proposed box culvert should be carried out in phases, with a trench length of not more than 120m in each phase. The trench should be backfilled and compacted with suitable materials upon completion of each phase of the construction works.</p>	To minimize the impacts on the stream and natural river bank.	Whole site	Construction phase	EIAO-TM	Implemented
6.6	<p>The construction of intercept oint of twin cell box culvert at the upstream of Wai Ha River should be confined to only one side of the river bank.</p> <p>To restore and enhance the ecological value of the stream, the affected river bank should be reinstated to its original condition or lined with rock-filled gabion.</p> <p>Planting pits should be provided in the gabion bank to allow the re-establishment of riparian vegetation.</p>	To minimize the impacts on the stream and natural river bank.	Whole site	Construction phase	EIAO-TM	No applicable

<b>EM&amp;A Ref.</b>	<b>Recommended Mitigation Measures</b>	<b>Objectives of the Recommended Measure &amp; main concern to Address</b>	<b>Location of the measure</b>	<b>When to implement the measure?</b>	<b>What requirements or standards for the measure to achieve?</b>	<b>Implementation status</b>
	<p>The existing natural riverbed and substrates should be retained and the natural pool-riffle sequence should be re-created in the new channel bed.</p>					
6.7	<p>All works carried out within the river channel of Wai Ha River should be carried out from October to April, with construction carried out by land-based plant.</p> <p>Works within river/stream channels should be restricted to an enclosed dry section of the river, with containment measures such as bunds and barriers used within the river to minimize the impacts upon the downstream water body.</p> <p>Site runoff should be directed towards regularly cleaned and maintained silt traps and oil/grease separators to minimize the risk of sedimentation and pollution of river water.</p> <p>The silt and oil/grease separators should be appropriately designed for the local drainage and ground conditions.</p> <p>To minimize leakage and loss of sediments during excavation in narrow channels, tightly sealed closed grab excavators should be deployed where material to be handled is wet.</p>	<p>To minimize sedimentation/ water quality impacts</p>	<p>Whole site</p>	<p>Construction phase</p>	<p>EIAO-TM</p>	<p>No applicable</p>

EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & main concern to Address	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?	Implementation status
6.8	<p>The construction of the proposed box-culvert would have the potential to directly impact a few individual of a plant species of conservation interest (Hong Kong Pavetta, Pavetta hongkongensis). The affected individuals should be transplanted to a suitable nearby habitats prior to the construction phase.</p> <p>A detailed vegetation survey of the affected species of conservation interest should be conducted by a suitably qualified botanist/ecologist to identify the affected individuals in order to provide details for transplantation scheme.</p> <p>Transplantation should be supervised by a suitably qualified botanist/horticulturalist. A detailed transplantation methodology should be formulated during the detailed design stage of this Project.</p>	To protect plant species of conservation interest	Whole site	Construction phase	EIAO-TM	No applicable
6.9	Placement of equipment or stockpile in designated works areas and access routes selected on existing disturbed land to minimize disturbance to natural or moderate-high ecological value habitats.	To minimise disturbance to habitats.	Whole site	Construction phase	EIAO-TM	No applicable
6.13	General drainage arrangements should include sediment and oil traps to collect and control construction site run-off.	To minimise sedimentation/ water quality impacts	Whole site	Construction phase	EIAO-TM	Implemented

<b>EM&amp;A Ref.</b>	<b>Recommended Mitigation Measures</b>	<b>Objectives of the Recommended Measure &amp; main concern to Address</b>	<b>Location of the measure</b>	<b>When to implement the measure?</b>	<b>What requirements or standards for the measure to achieve?</b>	<b>Implementation status</b>
6.13	Construction activities should be restricted to work areas that would be clearly demarcated. The work areas should be reinstated after completion of the works.	To minimise disturbance to natural habitats outside works area.	Whole site	Construction phase	EIAO-TM	Implemented
6.13	Placement of equipment or stockpile in designated works areas and access routes selected on existing disturbed land to minimize disturbance to natural or moderate-high ecological value habitats.	To minimise disturbance to natural habitats	Whole site	Construction phase	EIAO-TM	Implemented
7.6	Visual screen, contaminant/ liaison with nursery, protection of existing trees with works area and construction light are used or practiced to mitigate the impacts during construction phase	To mitigate the landscape and visual impacts during the Construction phase	Whole site	Construction phase	EIAO-TM	Implemented
7.7	Viewing area formation , architectural design for pump house, landscape design for pump hose, enhancement planting along Tung Tsz Road, sufficient soil depth for enhancement planting, transplanting of trees to adjacent locations preparation for transplanting and reinstatement of affected area are practiced to mitigate the impacts during operational phase.	To mitigate the landscape and visual impacts during the operational phase	Whole site	Detail Design / Operational Phase	EIAO-TM	Not Applicable

## Appendix I: Construction Programme





Appendix J: Three month rolling programme



3 Months Rolling Programme ( November 2013 - February 2014)

ID	Task Name	Duration	Start	Finish	November 2013					December 2013				January 2014				February 2014				March 2014					
					27/10	3/11	10/11	17/11	24/11	1/12	8/12	15/12	22/12	29/12	5/1	12/1	19/1	26/1	2/2	9/2	16/2	23/2	2/3	9/3	16/3	23/3	
2	<b>Area A</b>	150 days	Thu 1/8/13	Sat 28/12/13																							
3	<b>Pumping Station</b>	80 days	Thu 1/8/13	Sat 19/10/13																							
4	Complete the remaining man-made slope	30 days	Thu 1/8/13	Fri 30/8/13																							
5	Road and Kerb	40 days	Thu 1/8/13	Mon 9/9/13																							
6	Fencing and Boundary Wall	80 days	Thu 1/8/13	Sat 19/10/13																							
7	Cladding	40 days	Thu 1/8/13	Mon 9/9/13																							
8	Green Roof	10 days	Tue 10/9/13	Thu 19/9/13																							
9	Landscape Works	20 days	Tue 10/9/13	Sun 29/9/13																							
10	Installation of Minor E&M Works eg. Lighting, Lightning System ...	50 days	Thu 1/8/13	Thu 19/9/13																							
12	<b>Ting Kok Road</b>	150 days	Thu 1/8/13	Sat 28/12/13																							
13	Resurfacing Existing Bicycle Track	150 days	Thu 1/8/13	Sat 28/12/13																							
14	Reinstatement of Planter	50 days	Thu 1/8/13	Thu 19/9/13																							
15	Planting	10 days	Fri 20/9/13	Sun 29/9/13																							
16	Reinstatement of Manhole	40 days	Thu 1/8/13	Mon 9/9/13																							
17	Complete the remaining section of Intake Structure	60 days	Thu 1/8/13	Sun 29/9/13																							
18	Installation of Bar Screen	20 days	Mon 30/9/13	Sat 19/10/13																							
20	<b>Area B ( Tung Tsz Nursery)</b>	240 days	Thu 1/8/13	Fri 28/3/14																							
21	Backfilling and reinstatement of Trench	30 days	Thu 1/8/13	Fri 30/8/13																							
22	Reinstatement of Footpath, Irrigation System, Removal of Temporary Hoarding	150 days	Sat 31/8/13	Mon 27/1/14																							
24	Reinstatement of Existing Storm Water Drain	50 days	Thu 1/8/13	Thu 19/9/13																							
25	Desilting Works in Constructed Box Culvert	50 days	Sat 31/8/13	Sat 19/10/13																							

Task



Split



Progress



Milestone



Summary



Project Summary



External Tasks



External Milestone

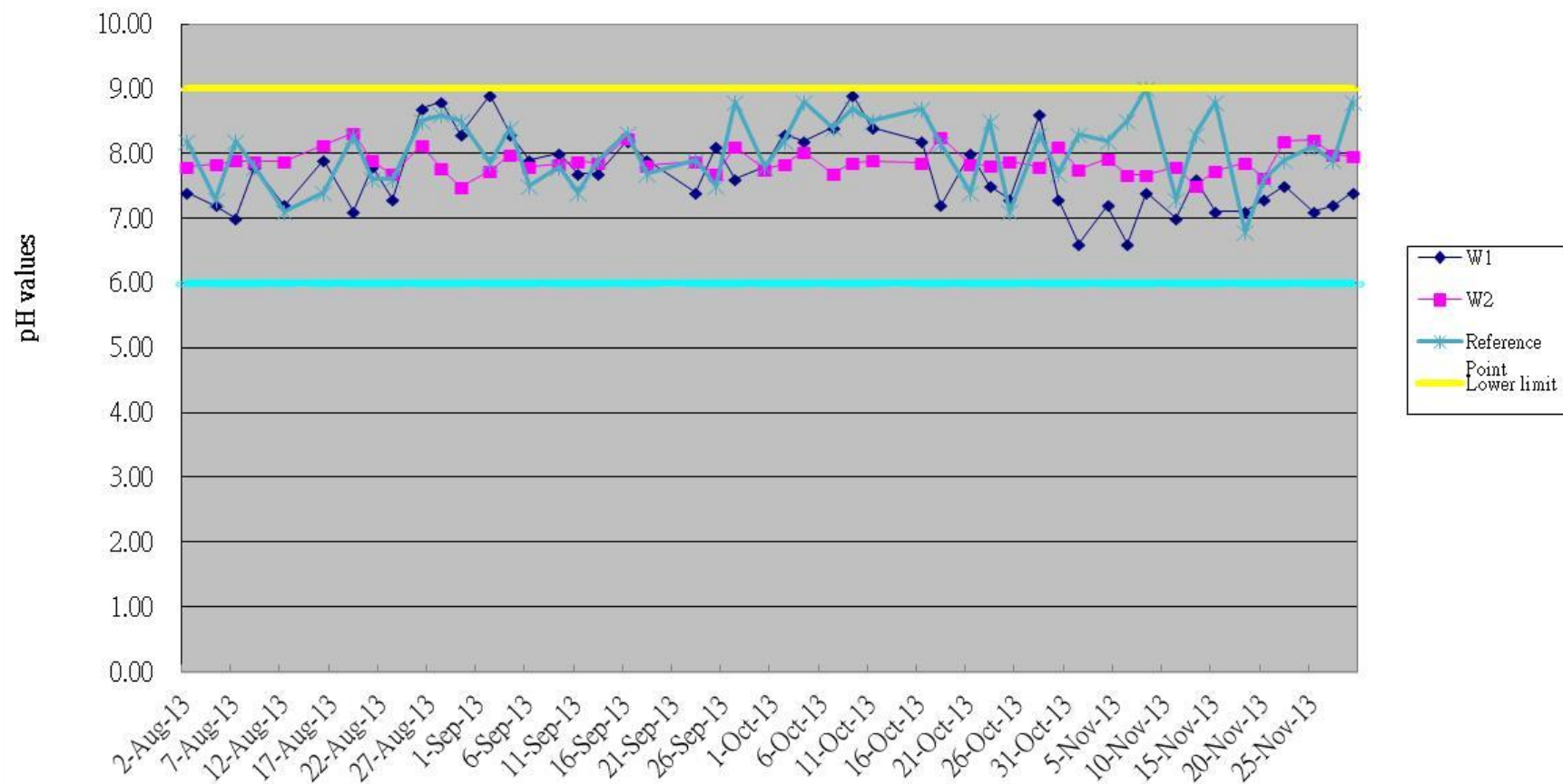


Deadline

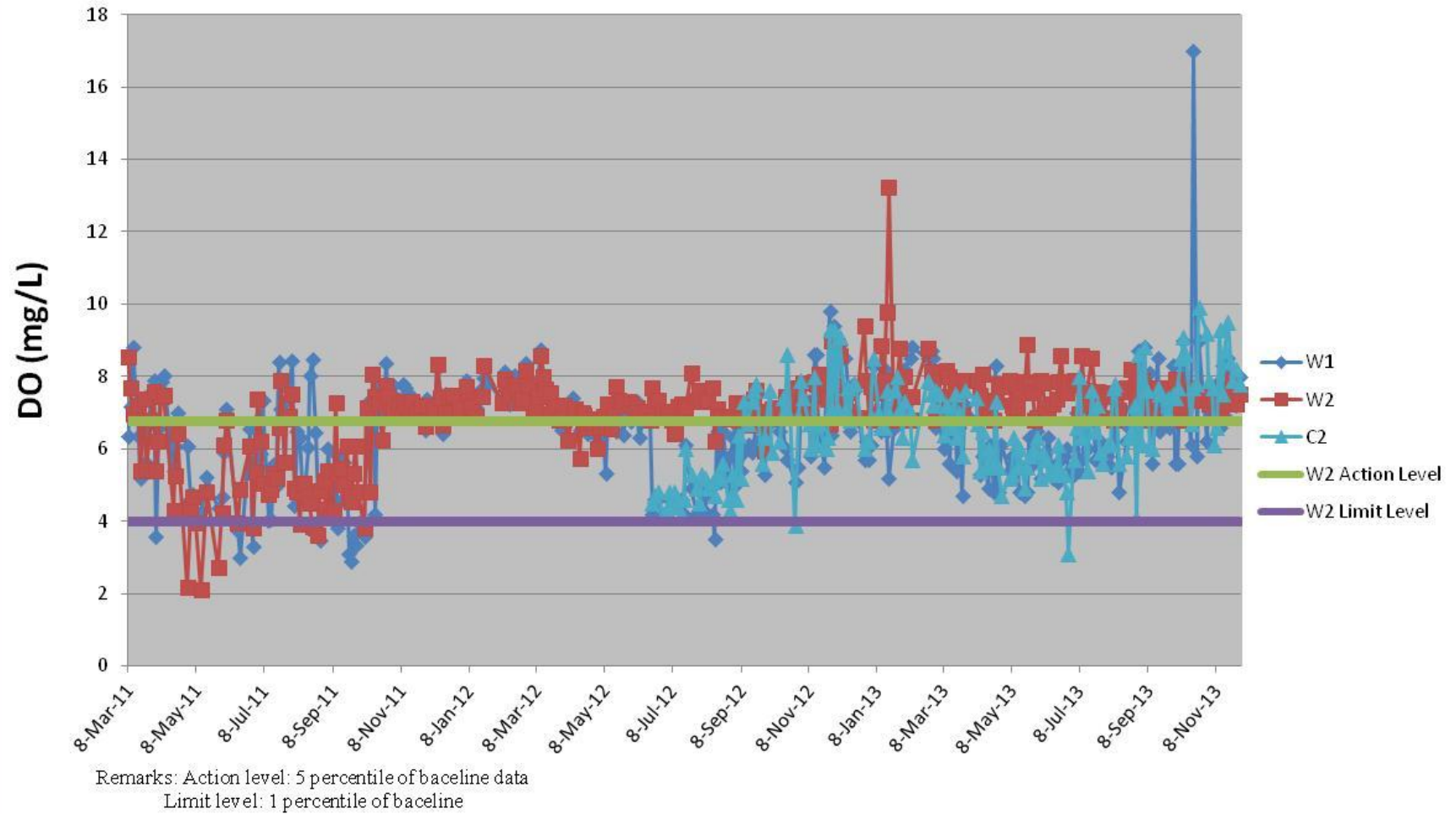


Appendix K: Graphical plots of trends of monitored parameter

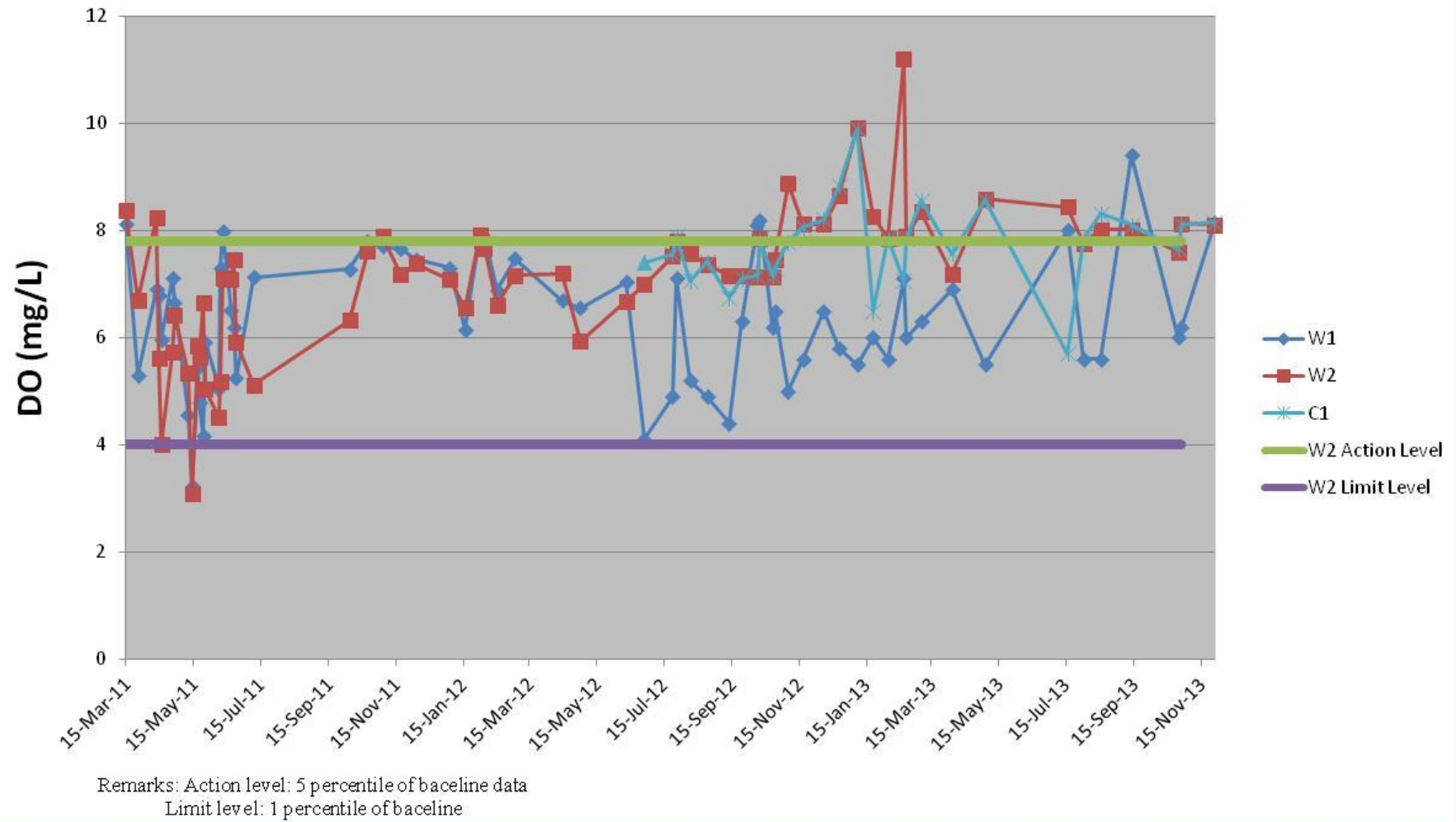
Graphical plots of pH values W1&W2



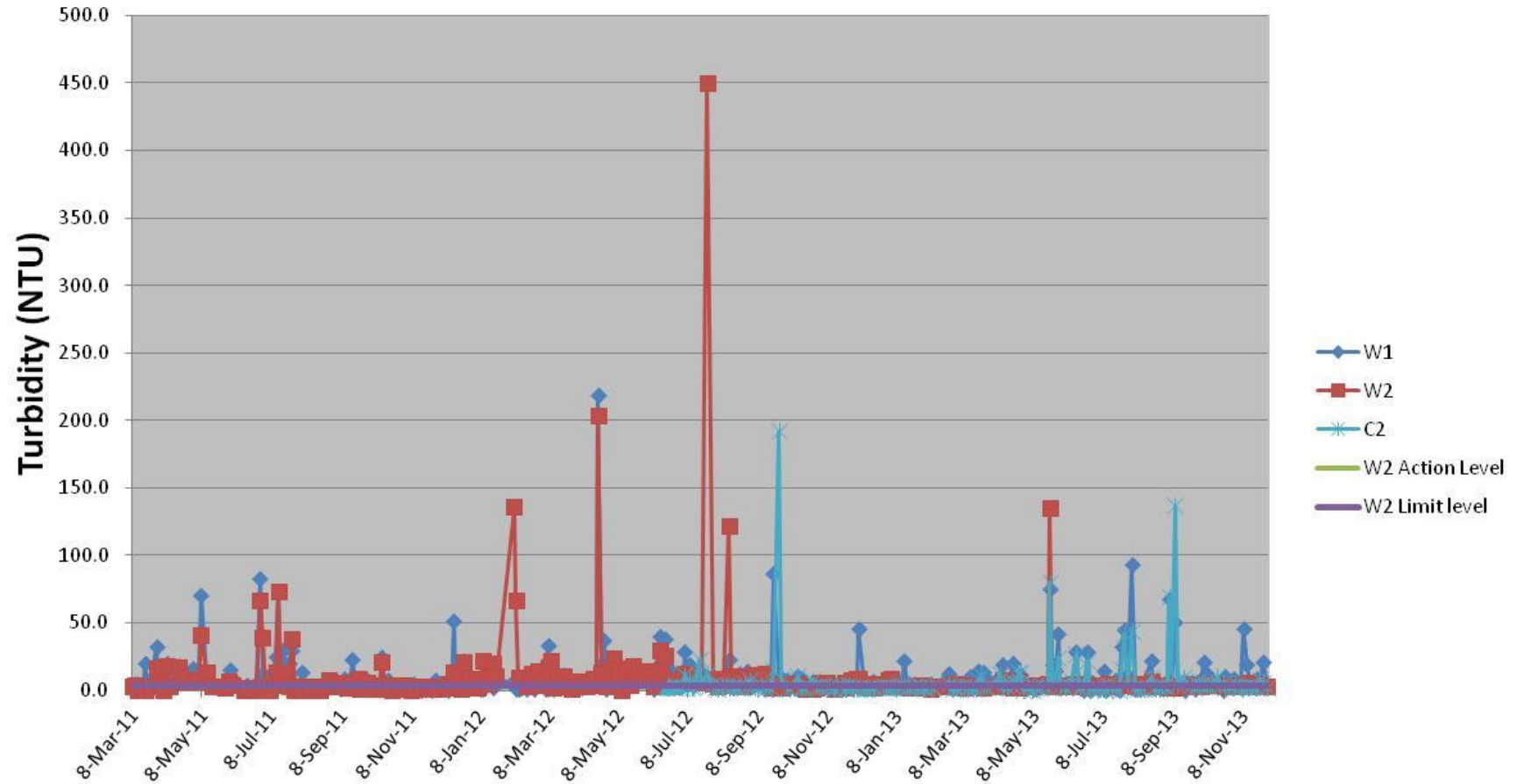
### Graphical plots of DO (ebb tide) for W1&W2



### Graphical plot of DO (flood tide) of W1&W2

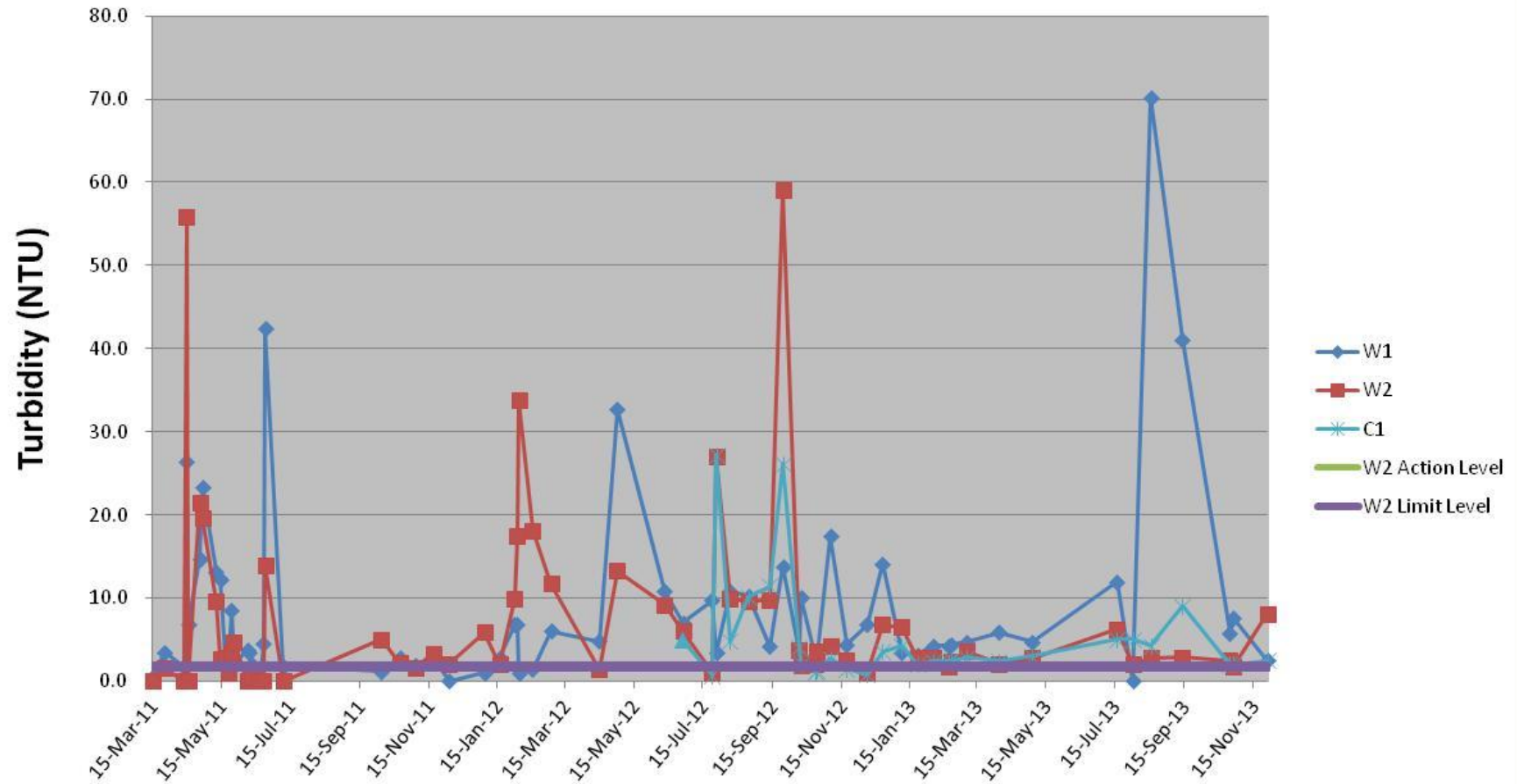


Graphical plots of Turbidity (ebb tide) for W1&W2

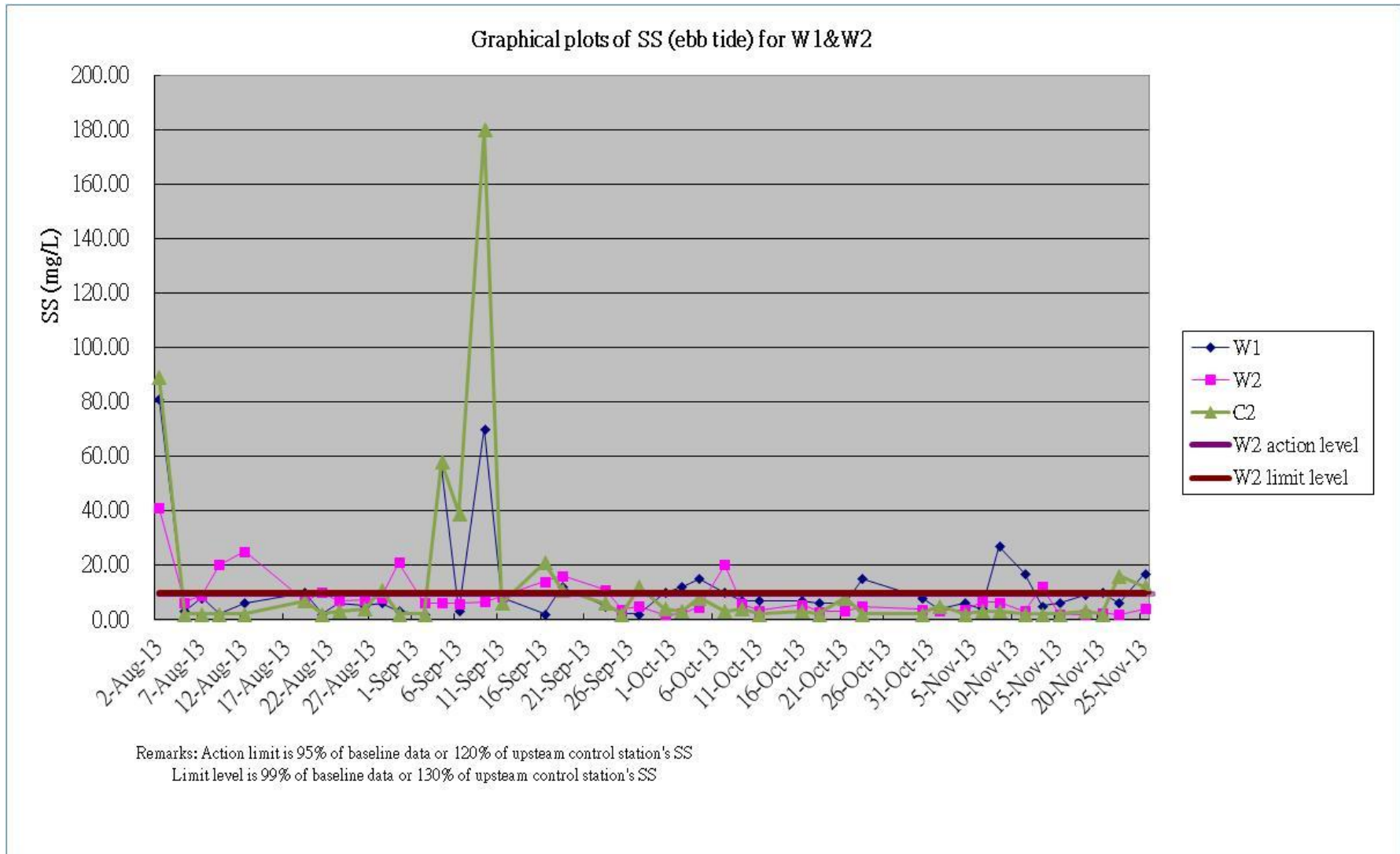


Remarks: Action limit is 95% of baseline data or 120% of upstream control station's Turbidity  
 Limit level is 99% of baseline data or 130% of upstream control station's Turb

### Graphical plots of Turbidity (flood tide) for W1&W2

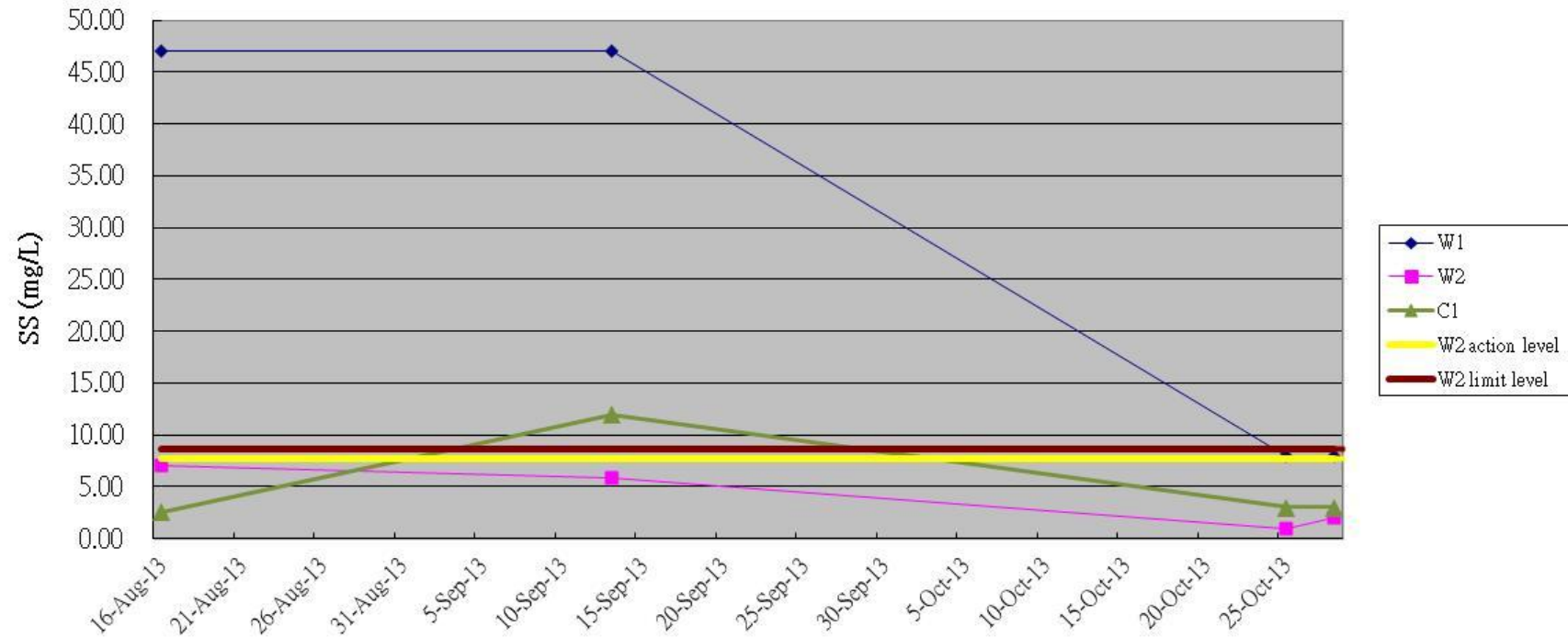


Remarks: Action limit is 95% of baseline data or 120% of upstream control station's Turbidity  
 Limit level is 99% of baseline data or 130% of upstream control station's Turb



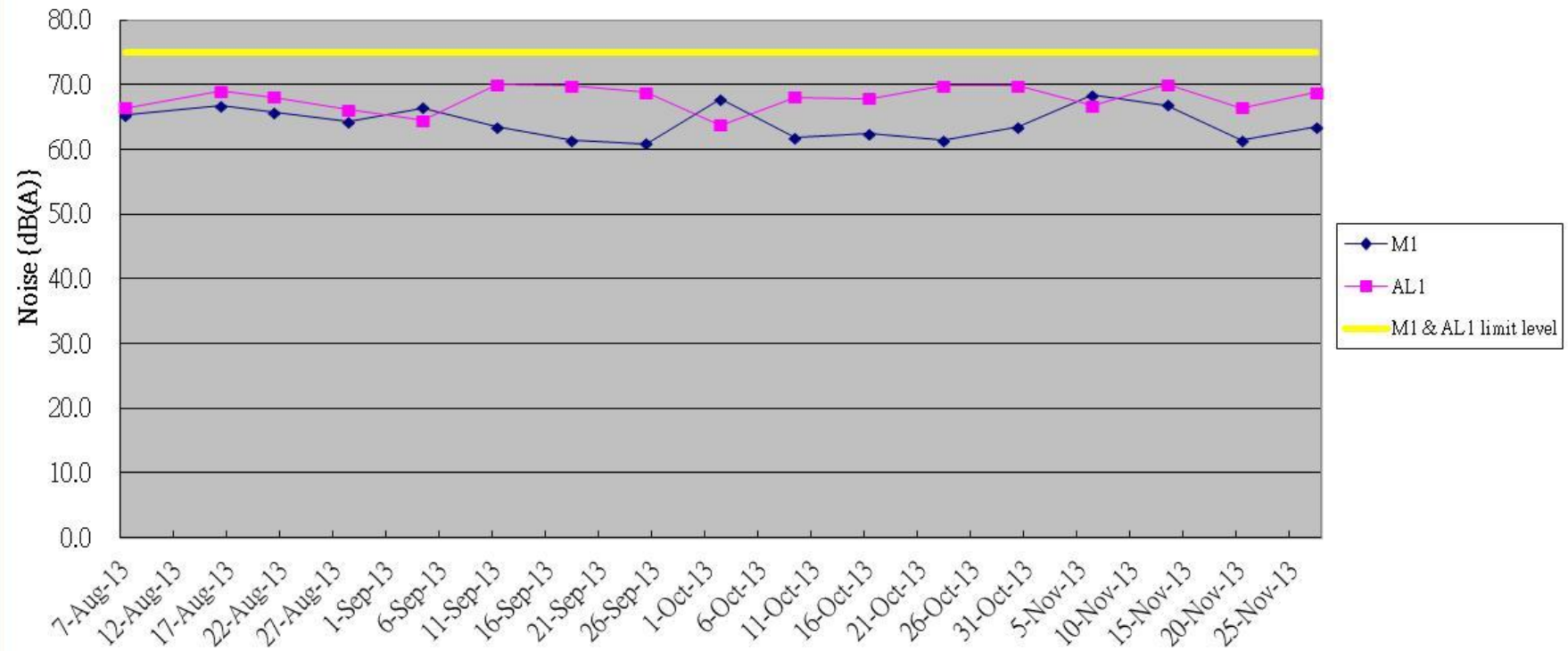


Graphical plots of SS (flood tide) for W1&W2



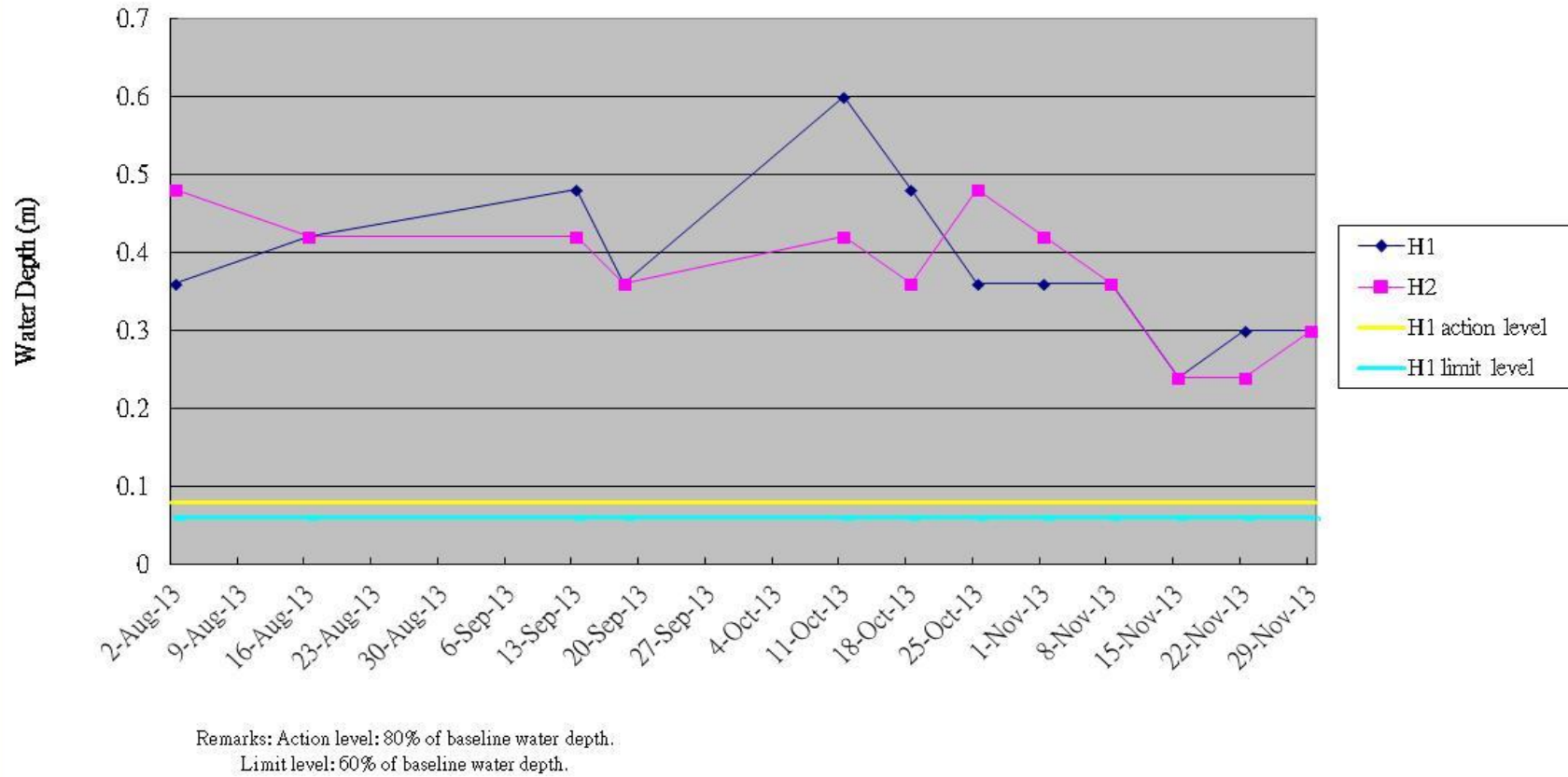
Remarks: Action limit is 95% of baseline data or 120% of upstream control station's SS  
Limit level is 99% of baseline data or 130% of upstream control station's SS

Graphical plots of Noise for M1 & AL1

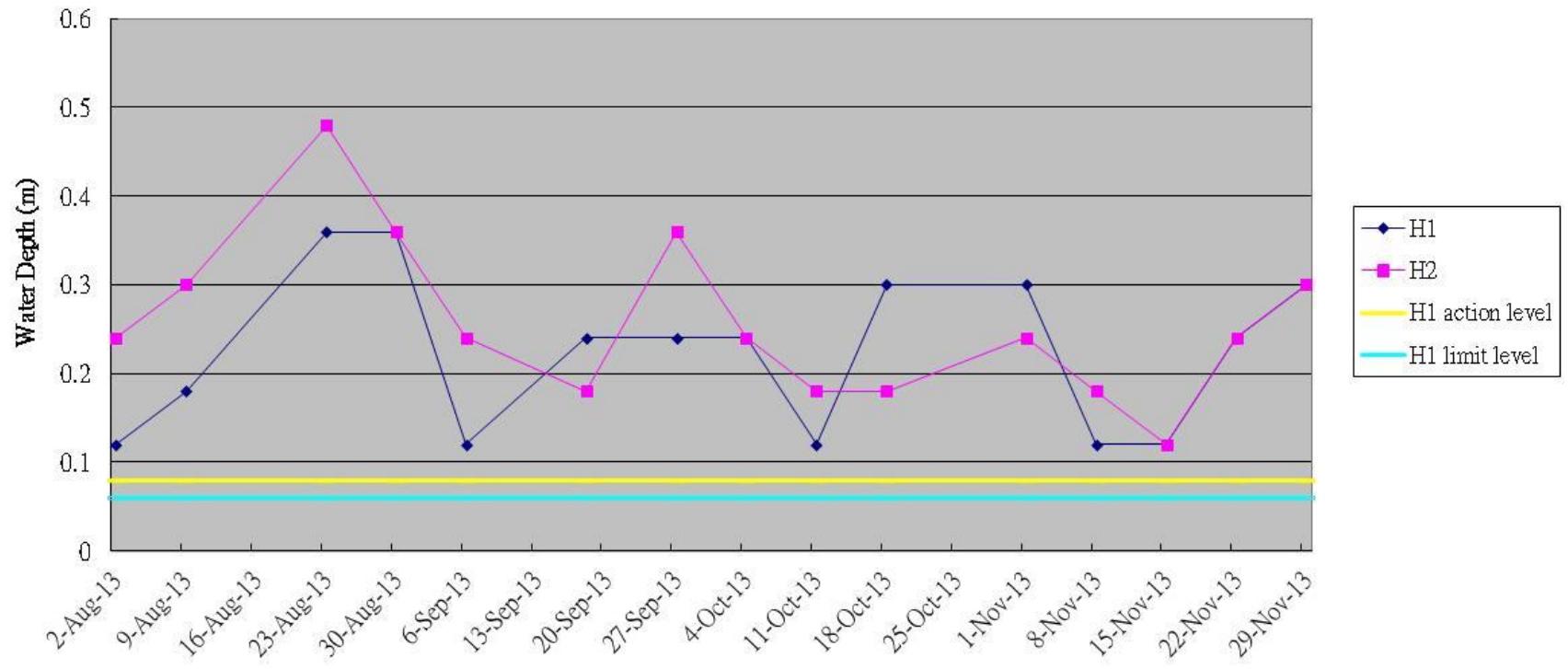


Remarks: Action limit is when one documented complaint is received

Graphical plots of Hydrological Monitoring(water depth at flood tide) for H1 & H2

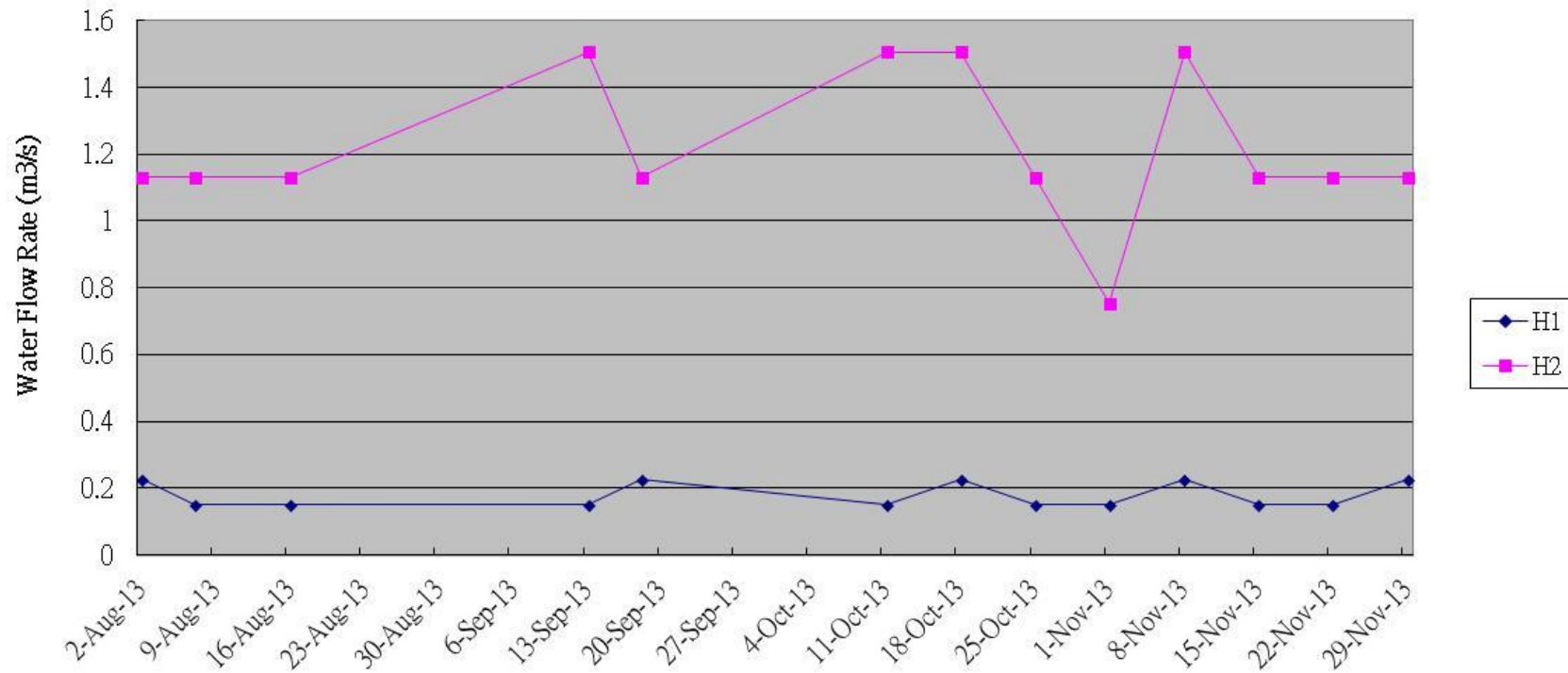


Graphical plots of Hydrological Monitoring(water depth at ebb tide) for H1 & H2



Remarks: Action level: 80% of baseline water depth.  
Limit level: 60% of baseline water depth.

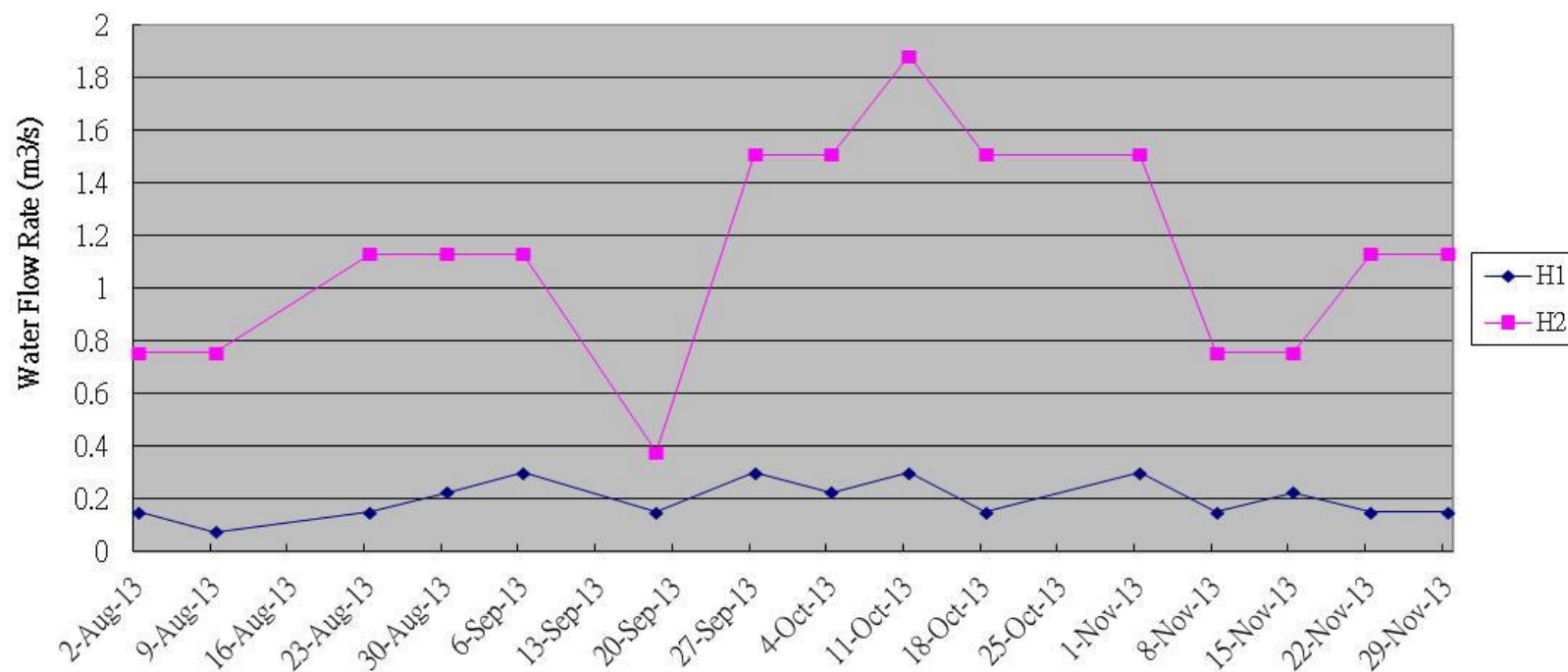
Graphical plots of Hydrological Monitoring(water flow rate at flood tide) for H1 & H2



Remarks: Action level: 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.

Graphical plots of Hydrological Monitoring(water flow rate at ebb tide) for H1 & H2



Remarks: Action level: 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.

Appendix L: Ecological monitoring report

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Agreement No. DP/01/2010  
Drainage Improvement Works in Shatin and Tai Po:  
Ecological Monitoring in area under Contract 1  
(Report 17a for November 2013)

Prepared for:  
**Drainage Services Department**

Prepared by:  
**ENVIRON Hong Kong Limited**

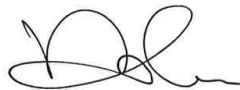
Date:  
**Dec 2013**

Reference Number:  
R3477\_V1.0



Agreement No. DP/01/2010  
Drainage Improvement Works in Shatin and Tai Po:  
Ecological Monitoring in area under Contract 1  
(Report 17a for November 2013)

Prepared by:



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Max Lee  
Assistant Environmental Consultant

Approved by:



---

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Report\201311\16a*

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- Table 2: List of vegetation recorded from works area under Contracts 1 and 100 m buffer area in the impact monitoring survey conducted in Nov 2013. Vegetation species presents in the identified location was indicated by “V”.
- Table 3: List of avifauna species and maximum counts recorded from the impact monitoring survey in Nov 2013 at work area under Contracts 1 and 100 m buffer area.
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- Figure 2: SEMP 1, the first sampling point of Wai Ha River under Contract 1.
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## 1. Introduction

### 5.1 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](http://env-shuenwan.com/pdf/review_note_em&a_rev.3.pdf)) as stipulated under Environment Permit No. EP-303/2008.

5.2 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.

5.3 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.

5.4 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

5.5 This is the report No. 17a ecological monitoring conducted on 25<sup>th</sup> Nov 2013 within the works boundary under Contract 1 and area within 100 m from the works boundary.

## 2. Highlights of this report

- Field survey was conducted on 25<sup>th</sup> Nov 2013
- Construction activities of Contract 1 was continued since March 2011
- Lower number of species was observed within the works area under Contract 1, in particular stream ecological monitoring point 2 (SEMP 2) due to recent river diversion for Ecological Compensatory Area (ECA) construction.
- 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 1 by the contractor during the present monitoring period (Nov 2013) includes:

#### **Area A (Pumping Station)**

- Installation of minor E&M equipment & Final Testing
- Construction of Road
- Planting at Green Roof
- Construction of Boundary Wall
- Installation of Cladding

#### **Area B (Tung Tsz Nursery)**

- Reinstatement in Tung Tsz Nursery

#### **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 100 m 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](http://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 two stream ecological monitoring points under Contract 1 (i.e. SEMP 1). 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 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 dominated by *Bidens alba*, *Pennisetum alopecuroides* and *Plantago major* with average coverage ranged from 10% to 15% (**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 130 species were recorded within the assessment boundary of Contract 1 in which 121 species were recorded within the buffer area, while 52 species recorded within the work areas under Contract 1. No protected species were recorded.

### 5.2 Avifauna

A total of 16 bird species were recorded in the current survey under Contract 1 (**Table 3**). In the work area under Contract 1, 5 bird species were recorded in which *Milvus migrans* is recognized as being regional conservation concern and protected by Cap. 586. A total of 13 bird species were recorded in the 100m buffer area in which one wetland dependent species *Ardeola bacchus* 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 100 m buffer area remains natural. Much of the construction activities are carried out at Tung Tsz Nursery and pumping station under Contract 1. In general, lower numbers of species were recorded within the works area under Contract 1 than that of 100 m 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)

- Installation of minor E&M equipment
- E&M Testing
- Construction of Road
- Planting
- Erection of Fencing
- Installation of Cladding

### Area B (Tung Tsz Nursery)

- Reinstatement in Tung Tsz Nursery

### 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 Nov 2013 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 100 m buffer area are retained at acceptable condition, and hence the 100 m buffer area has not been significantly affected by the construction works.

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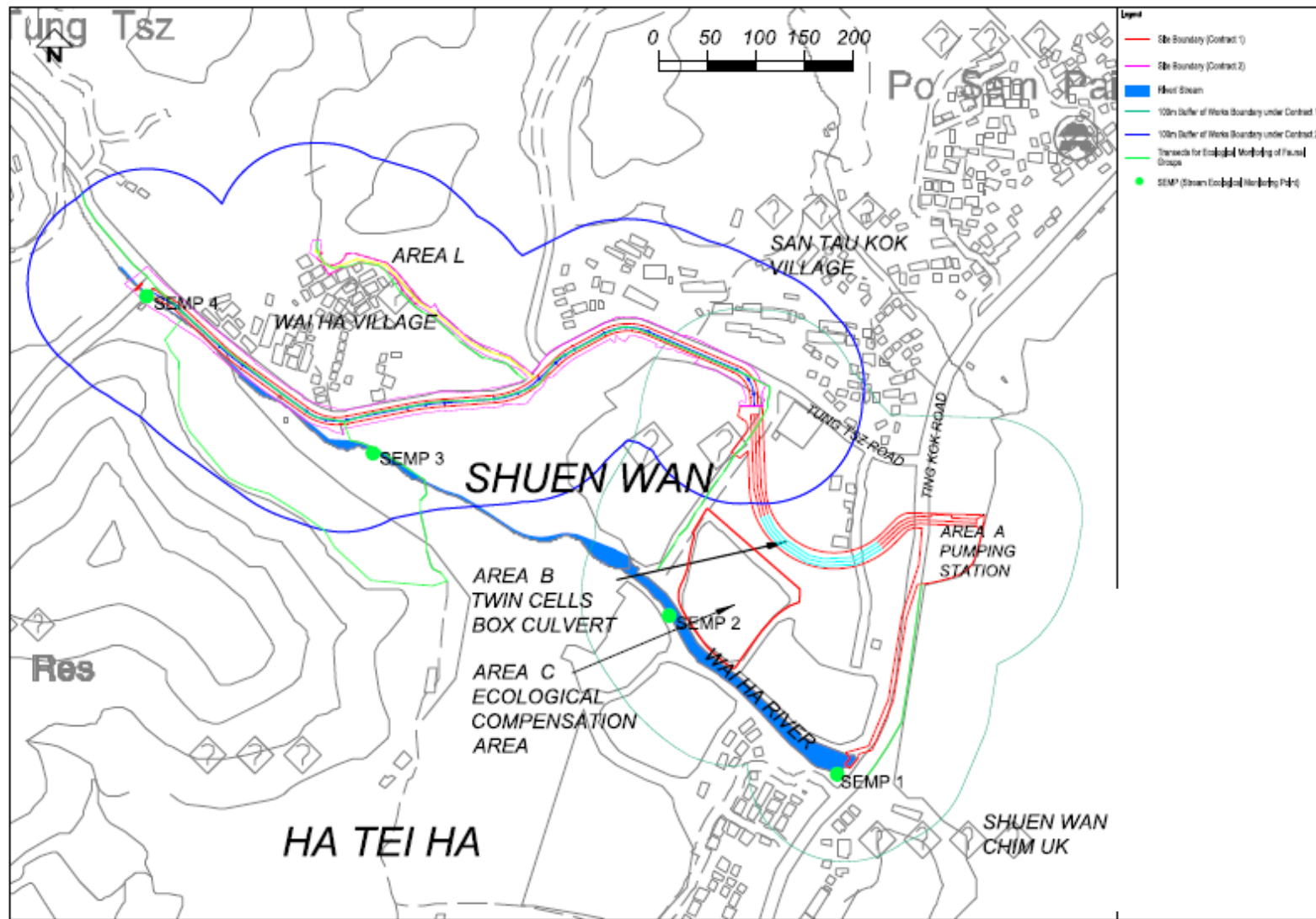
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**Figure**



**Figure:** 1

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

**Project:** Agreement No. DP/01/2010 Drainage Improvement Works in Shatin and Tai Po: Ecological Monitoring in area under Contract 1 (November 2013, Report 17a)



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Checked by: TC

Rev.: 1.0

Date: Dec 2013



**Figure:** 2

**Title:** SEMP 1, the first sampling point of Wai Ha River under Contract 1.

**Project:** Agreement No. DP/01/2010 Drainage Improvement Works in Shatin and Tai Po: Ecological Monitoring in area under Contract 1 (Nov 2013, Report 17a)



Drawn by: ML

Checked by: TC

Rev.: 1.0

Date: Dec 2013

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**Table**

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

Species	Family	Growth form	Sampling point	SEMP 1	
			Status in Hong Kong	Height (cm)	%
<i>Albizia lebeck</i>	MIMOSACEAE	Tree	E		
<i>Arundinella nepalensis</i>	POACEAE	Perennial Herb	N		
<i>Bidens alba</i>	ASTERACEAE	Herb	E	30	10
<i>Celtis sinensis</i>	ULMACEAE	Tree	N		
<i>Eclipta prostrata</i>	ASTERACEAE	Perennial herb	N	30	1
<i>Ficus virens</i>	MORACEAE	Tree	N	100	1
<i>Kandelia obovata</i>	RHIZOPHORACEAE	Shrub or Small Tree	N		
<i>Leucaena leucocephala</i>	MIMOSACEAE	Small Tree	E		
<i>Macaranga tanarius</i>	EUPHORBIACEAE	Tree	N		
<i>Mikania micrantha</i>	ASTERACEAE	Climbing Herb	E	10	1
<i>Pennisetum alopecuroides</i>	POACEAE	Perennial Herb	N	250	10
<i>Plantago major</i>	PLANTAGINACEAE	Perennial herb	N	30	15
Bare	n/a	n/a	n/a	n/a	62

\*Key:

E = Exotic

N = Native

n/a = not available

**Table 2.** List of vegetation recorded from works area under Contracts 1 and 100 m buffer area in the impact monitoring survey conducted in Nov 2013. Vegetation species presents in the identified location was indicated by “V”.

Habitat	Species name	Family	Growth form	*Status in Hong Kong	Work Area under Contract 1	100 m buffer area under Contract 1
<b>Stream</b>	<i>Chrysalidocarpus lutescens</i>	ARECACEAE	Shrub Palm	E		V
	<i>Melia azedarach</i>	MELIACEAE	Tree	E		V
	<i>Murraya paniculata</i>	RUTACEAE	Small Tree	E		V
	<i>Lantana camara</i>	VERBENACEAE	Shrub	E		V
	<i>Ficus hispida</i>	MORACEAE	Tree	N		V
	<i>Ficus virens</i>	MORACEAE	Tree	N		V
	<i>Chrysopogon aciculatus</i>	POACEAE	Perennial Herb	N		V
	<i>Microstegium ciliatum</i>	POACEAE	Perennial Procumbent Herb	N		V
	<i>Mucuna birdwoodiana</i>	FABACEAE (PAPILIONACEAE)	Climber: Vine	N		V
	<i>Pistia stratiotes</i>	ARACEAE	Floating Aquatic Herb	N		V
	<i>Cyperus flabelliformis</i>	CYPERACEAE	Herb	E		V
	<i>Acanthopanax gracilistylus</i>	ARALIACEAE	Shrub	E		V
	<i>Ficus triangularis</i>	MORACEAE	Tree	E		V
	<i>Spirodela polyrrhiza</i>	LEMNACEAE	Floating Small Herb	N		V
	<i>Glochidion zeylanicum</i>	EUPHORBIACEAE	Shrub or Small Tree	N		V
	<i>Sterculia lanceolata</i>	STERCULIACEAE	Semi-deciduous Tree	N		V
	<i>Albizia lebbek</i>	MIMOSACEAE	Tree	E		V



Habitat	Species name	Family	Growth form	*Status in Hong Kong	Work Area under Contract 1	100 m buffer area under Contract 1
	<i>Arundinella nepalensis</i>	POACEAE	Perennial Herb	N		V
	<i>Bidens alba</i>	ASTERACEAE	Herb	E		V
	<i>Clerodendrum inerme</i>	VERBENACEAE	Shrub	N		V
	<i>Coculus orbiculatus</i>	MENISPERMACEAE	Climber: Vine	N		V
	<i>Hibiscus tiliaceus</i>	MALVACEAE	Tree or Shrub	N		V
	<i>Leucaena leucocephala</i>	MIMOSACEAE	Small Tree	E		V
	<i>Manilkara zapota</i>	SAPOTACEAE	Tree	E		V
	<i>Sapium discolor</i>	EUPHORBIACEAE	Tree	N		V
<b>Developed area</b>	<i>Pericampylus glaucus</i>	MENISPERMACEAE	Woody Vine	N		V
	<i>Ficus variegata</i> var. <i>chlorocarpa</i>	MORACEAE	Tree or Shrub	N	V	V
	<i>Citrus reticulata</i> Blanco	RUTACEAE	Small Tree	E		V
	<i>Salvia japonica</i>	LAMIACEAE (LABIATAE)	Herb	N		V
	<i>Morus alba</i>	MORACEAE	Tree or Shrub	N		V
	<i>Emilia sonchifolia</i>	ASTERACEAE	Herb	N		V
	<i>Clausena lansium</i>	RUTACEAE	Small Tree	E		V
	<i>Pyrostegia venusta</i>	BIGNONIACEAE	Climber: Vine	E		V
	<i>Psidium guajava</i>	MYRTACEAE	Tree	E		V
	<i>Catharanthus roseus</i>	APOCYNACEAE	Subshrub	N		V
	<i>Archontophoenix alexandrae</i>	ARECACEAE	Tree Palm	E		V
	<i>Desmodium heterocarpon</i>	FABACEAE (PAPILIONACEAE)	Shrub	N		V
	<i>Rhinacanthus nasutus</i>	ACANTHACEAE	Herb	E		V
	<i>Acacia confusa</i>	MIMOSACEAE	Tree	E	V	V
	<i>Artocarpus macrocarpon</i>	MORACEAE	Tree	E	V	V
	<i>Averrhoa carambola</i>	OXALIDACEAE	Small Tree	E	V	V

Habitat	Species name	Family	Growth form	*Status in Hong Kong	Work Area under Contract 1	100 m buffer area under Contract 1
	<i>Bauhinia blakeana</i>	CAESALPINIACEAE	Tree or Shrub	N	V	V
	<i>Bauhinia variegata</i>	CAESALPINIACEAE	Tree	E	V	V
	<i>Bridelia tomentosa</i>	EUPHORBIACEAE	Shrub or Small Tree	N	V	V
	<i>Calliandra haematocephala</i>	MIMOSACEAE	Shrub	E	V	V
	<i>Caryota ochlandra</i>	ARECACEAE	Tree palm	E	V	V
	<i>Cassia spectabilis</i>	CAESALPINIACEAE	Small Tree	E	V	V
	<i>Casuarina equisetifolia</i>	CASUARINACEAE	Tree	E	V	V
	<i>Citrus grandis</i>	CASUARINACEAE	Tree	E	V	V
	<i>Cordyline fruticosa</i>	AGAVACEAE	Shrub	E	V	V
	<i>Cynodon dactylon</i>	POACEAE	Perennial Herb	N	V	V
	<i>Dracaena draco</i>	AGAVACEAE	Tree	E	V	V
	<i>Elaeocapus haminanensis</i>	ELAEOCARPACEAE	Small Tree	E	V	V
	<i>Eleusine indica</i>	POACEAE	Herb	N	V	V
	<i>Eriobotrya japonica</i>	ROSACEAE	Small Tree	E	V	V
	<i>Ficus benjamina</i>	MORACEAE	Tree	E	V	V
	<i>Ficus elastica</i>	MORACEAE	Tree	E	V	V
	<i>Ficus simplicissima</i>	MORACEAE	Shrub	N	V	V
	<i>Hibiscus rosa-sinensis</i>	MALVACEAE	Shrub	E	V	V
	<i>Lantana camara</i>	VERBENACEAE	Shrub	E	V	V
	<i>Litchi chinensis</i>	SAPINDACEAE	Tree	E	V	V
	<i>Lumnitzera racemosa</i>	COMBRETACEAE	Shrub or Small Tree	N	V	V
	<i>Lygodium japonicum</i>	LYGODIACEAE	Climbing Herb	N	V	V
	<i>Melaleuca quinquenervia</i>	MYRTACEAE	Tree	E	V	V
	<i>Oxalis corniculata</i>	OXALIDACEAE	Perennial Herb	N	V	V
	<i>Phoenix roebelenii</i>	ARECACEAE	Small Tree Palm	E	V	V

Habitat	Species name	Family	Growth form	*Status in Hong Kong	Work Area under Contract 1	100 m buffer area under Contract 1
	<i>Polygonum hydropiper</i>	POLYGONACEAE	Herb	N	V	V
	<i>Psychotria serpens</i>	RUBIACEAE	Climber: Vine	N	V	
	<i>Pterocypsela indica</i>	ASTERACEAE	Herb	N	V	V
	<i>Rhapis excelsa</i>	ARECACEAE	Shrub Palm	N	V	V
	<i>Sansevieria trifasciata</i>	AGAVACEAE	Perennial Herb	E	V	V
	<i>Schefflera actinophylla</i>	ARALIACEAE	Climbing Shrub	E	V	V
	<i>Schefflera heptaphylla</i>	ARALIACEAE	Tree	N	V	V
	<i>Sesbania cannabina</i>	FABACEAE	Herb	E	V	V
	<i>Terminalia catappa</i>	COMBRETACEAE	Large Tree	E	V	V
	<i>Thuja orientalis</i>	CUPRESSACEAE	Tree	E	V	V
	<i>Tradescantia spathacea</i>	COMMELINACEAE	Herb	E	V	V
	<i>Youngia japonica</i>	ASTERACEAE	Herb	N	V	V
	<i>Acanthus ilicifolius</i>	ACANTHACEAE	Shrub	N		V
	<i>Acrostichum aureum</i>	ACROSTICHACEAE	Herb	N		V
	<i>Aegiceras corniculatum</i>	MYRSINACEAE	Shrub	N		V
	<i>Alocasia odora</i>	ARACEAE	Perennial Herb	N		V
	<i>Avicennia marina</i>	VERBENACEAE	Shrub	N		V
	<i>Digitaria ciliaris</i>	POACEAE	Herb	N		V
	<i>Panicum repens L.</i>	POACEAE	Perennial Herb	N		V
	<i>Pennisetum alopecuroides</i>	POACEAE	Perennial Herb	N		V
	<i>Phragmites australis</i>	POACEAE	Perennial Herb	N		V
	<i>Plantago major</i>	PLANTAGINACEAE	Perennial herb	N		V
	<i>Solanum nigrum</i>	SOLANACEAE	Herb	N		V
	<i>Bombax ceiba</i>	BOMBACACEAE	Tree	E	V	
	<i>Bidens alba</i>	ASTERACEAE	Herb	E	V	
	<i>Panicum maximum</i>	GRAMINEAE	Herb	E	V	
	<i>Microstegium ciliatum</i>	POACEAE	Perennial	N	V	

Habitat	Species name	Family	Growth form	*Status in Hong Kong	Work Area under Contract 1	100 m buffer area under Contract 1
			Procumbent Herb			
	<i>Leucaena leucocephala</i>	MIMOSACEAE	Small Tree	E	V	
<b>Plantation</b>	<i>Bischofia javanica</i>	EUPHORBIACEAE	Tree	N		V
	<i>Scolopia chinensis</i>	FLACOURTIACEAE	Tree or Large Shrub	N		V
	<i>Piper hancei</i>	PIPERACEAE	Climber: Vine	N		V
	<i>Dimocarpus longan</i>	SAPINDACEAE	Tree	E		V
	<i>Paederia scandens</i>	RUBIACEAE	Climber: Vine	N		V
	<i>Cleistocalyx operculatus</i>	MYRTACEAE	Tree	N		V
	<i>Antidesma bunius</i>	EUPHORBIACEAE	Tree	N		V
	<i>Litsea monopetala</i>	LAURACEAE	Small Tree	N		V
	<i>Microcos paniculata</i>	TILIACEAE	Shrub or Small Tree	N		V
	<i>Maesa perlarius</i>	MYRSINACEAE	Shrub	N		V
	<i>Boehmeria nivea (L.) Gaudich.</i>	URTICACEAE	Subshrub or shrub	E		V
	<i>Mallotus apelta</i>	EUPHORBIACEAE	Shrub or Small Tree	N		V
	<i>Sapindus saponaria</i>	SAPINDACEAE	Tree	N		V
	<i>Aporosa dioica</i>	EUPHORBIACEAE	Tree	N		V
	<i>Wedelia chinensis</i>	ASTERACEAE	Perennial Herb	N		V
	<i>Carica papaya</i>	CARICACEAE	Tree	E		V
	<i>Rubus reflexus</i>	ROSACEAE	Climbing Shrub	N		V
	<i>Brassica rapa</i>	BRASSICACEAE (CRUCIFERAE)	Biennial Herb	E		V
	<i>Mucuna championii Benth.</i>	FABACEAE	Climbing Vine	N		V
	<i>Pinus massoniana</i>	PINACEAE	Tree	N		V

Habitat	Species name	Family	Growth form	*Status in Hong Kong	Work Area under Contract 1	100 m buffer area under Contract 1
<b>Ting Kok Nursery Community Garden</b>	<i>Bauhinia purpurea</i>	CAESALPINIACEAE	Tree	E	V	
	<i>Callistemon viminalis</i>	MYRTACEAE	Tree	E	V	
	<i>Dillenia indica</i>	DILLENACEAE	Tree	E	V	
	<i>Lonicera japonica</i>	CAPRIFOLIACEAE	Climber: Vine	N	V	
	<i>Tabebuia chrysantha</i>	BIGNONIACEAE	Small Tree	E	V	
	<i>Wisteria sinensis</i>	FABACEAE	Climber: Vine	E	V	
<b>Wooded area</b>	<i>Celtis sinensis</i>	ULMACEAE	Tree	N		V
	<i>Ligustrum sinensis</i>	OLEACEAE	Tree or Shrub	N		V
	<i>Macaranga tanarius</i>	EUPHORBIACEAE	Tree	N		V
	<i>Pandanus tectorius</i>	PANDANACEAE	Shrub or Small Tree	N		V
	<i>Excoecaria agallocha</i>	EUPHORBIACEAE	Tree	N		V
	<i>Kandelia obovata</i>	RHIZOPHORACEAE	Shrub or Small Tree	N		V
	<i>Thespesia populnea</i>	MALVACEAE	Tree or Shrub	N		V
	<i>Zoysia sinica</i>	POACEAE	Perennial Herb	N		V
<b>Marsh</b>	<i>Acanthus ilicifolius</i>	ACANTHACEAE	Shrub	N		V
	<i>Acrostichum aureum</i>	ACROSTICHACEAE	Herb	N		V
	<i>Aegiceras corniculatum</i>	MYRSINACEAE	Shrub	N		V
	<i>Alocasia odora</i>	ARACEAE	Perennial Herb	N		V
	<i>Avicennia marina</i>	VERBENACEAE	Shrub	N		V
	<i>Digitaria ciliaris</i>	POACEAE	Herb	N		V
	<i>Ficus hispida</i>	MORACEAE	Tree	N		V
	<i>Hibiscus tiliaceus</i>	MALVACEAE	Tree or Shrub	N		V
	<i>Ipomea cairica</i>	CONVOLVULACEAE	Climber:	E		V

Habitat	Species name	Family	Growth form	*Status in Hong Kong	Work Area under Contract 1	100 m buffer area under Contract 1
			Twining Herb			
	<i>Kandelia obovata</i>	RHIZOPHORACEAE	Shrub or Small Tree	N		V
	<i>Macaranga tanarius</i>	EUPHORBIACEAE	Tree	N		V
	<i>Mikania micrantha</i>	ASTERACEAE	Climbing Herb	E		V
	<i>Panicum repens L.</i>	POACEAE	Perennial Herb	N		V
	<i>Pennisetum alopecuroides</i>	POACEAE	Perennial Herb	N		V
	<i>Phragmites australis</i>	POACEAE	Perennial Herb	N		V
	<i>Plantago major</i>	PLANTAGINACEAE	Perennial herb	N		V
	<i>Polygonum lapathifolium</i>	POLYGONACEAE	Herb	N		V
	<i>Pueraria lobata</i>	FABACEAE	Climber: Vine	N		V
	<i>Schefflera heptaphylla</i>	ARALIACEAE	Tree	N		V
	<i>Solanum nigrum</i>	SOLANACEAE	Herb	N		V
	<i>Solanum torvum</i>	SOLANACEAE	Shrub	E		V

**\*Key:**

**E = Exotic**

**N = Native**

**Table 3.** List of avifauna species and maximum counts recorded from the impact monitoring survey in Nov 2013 at work area under Contracts 1 and 100 m buffer area.

<b>Species</b>	<b>Common name</b>	<b>Habitat</b>	<b>Conservation status in Hong Kong</b>	<b>Work area: Contract 1</b>	<b>100m buffer area</b>
<i>Aethopyga christinae</i>	Fork-tailed Sunbird				1
<i>Ardeola bacchus</i>	Chinese Pond Heron	W	RC		1
<i>Amaurornis phoenicurus</i>	White-breasted Waterhen	W			1
<i>Copsychus saularis</i>	Oriental Magpie Robin			1	2
<i>Egretta garzetta</i>	Little Egret	W			1
<i>Milvus migrans</i>	Black Kite		Cap.586 ; RC	1	
<i>Motacilla alba</i>	White Wagtail				2
<i>Orthotomus sutorius</i>	Common Tailorbird				1
<i>Phylloscopus borealis</i>	Arctic Warbler			1	
<i>Pycnonotus jocosus</i>	Red-whiskered Bulbul				2
<i>Pycnonotus sinensis</i>	Chinese Bulbul				1
<i>Prinia flaviventris</i>	Yellow-bellied Prinia			1	
<i>Streptopelia chinensis</i>	Spotted Dove			1	3
<i>Sturnus nigricolis</i>	Black-necked Starling				2
<i>Urocissa erythroryncha</i>	Blue Magpie				1
<i>Zosterops japonicus</i>	Japanese White-eye				2
<b>Total number of species :</b>				5	13

\* Key:

**W =** Wetland dependent species ; **RC =** Regional Concern



**Table 4.** 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 Nov 2013.

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

**Key:**

Relative abundance:

+ : Species exists in the survey area

++ : Species common in the survey area

+++ : Species abundant in the survey area

<sup>1</sup> Life-cycle characteristics:

M = Marine vagrant

F = Freshwater species

<sup>2</sup>Origin:

N = Native

I = Introduced; / = not available

Appendix M. Photo of Wai Ha River in November 2013



**Photo 1.** Wai Ha River at W2



**Photo 2.** Wai Ha River at C1



**Photo 3.** Wai Ha River at W2



**Photo 4.** Wai Ha River at C1



**Photo5.** Wai Ha River at W2



**Photo6.** Wai Ha River at C1



**Photo7.** Wai Ha River at W2



**Photo8.** Wai Ha River at C1