

**Drainage Service Department**

**Monthly Environmental Monitoring & Auditing report for**

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

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

**June 2011**

**Environmental Pioneers & Solutions Limited**

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## APPROVAL SHEET

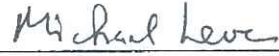
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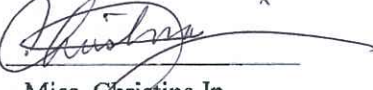
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## **EXECUTIVE SUMMARY**

This is the Fourth 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> of June 2011 to 30<sup>th</sup> June 2011. The major site activities in this reporting period were mainly transplanting, piling construction and excavation works.

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 13 abnormal incidents of water quality criteria were recorded in this reporting month. No particular observation of defective site activities were found causing water contamination and such conditions were believed to be mainly attributed by natural fluctuation.

No exceedance of A/L level was reported for the monitoring of hydrological characteristics in the reporting period.

The ecological monitoring of the Ecological Compensatory Area (ECA) of the project is conducted. Details of the findings are referred to sections 6.2.

Visual and landscape monitoring has been conducted for the project. Details of

the observations are referred to sections 7.3.

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 & C 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 Fourth 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 appointed by Kwan Lee – Kuly Joint Venture, prepares 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> June 2011 to 30<sup>th</sup> June 2011. This included the noise monitoring, water quality monitoring, hydrological characteristics monitoring, ecological 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 – Excavation & Construction for Box Culvert
- Area A – Sheetpiling for pumping station
- Area A & B – Tree Transplanting
- Area B – Site formation
- Area B – Sheetpiling for Box Culvert Construction
- Area C – Retouring of Existing fish pond, Tree Planting

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

Proposed key construction works in the coming month will include:

#### Area A

1. Construction of Box Culvert & Backfilling
2. Excavation for the construction of pumping station
3. Construction of Base Slab of Pumping Station

#### Area B (Tung Tsz Nursery)

1. Excavation for the construction of box culvert in Tung Tsz Nursery
2. Construction of box culvert
3. Backfilling

#### Area C (ECA)

1. Dewatering of existing fish pond.
2. Retouring of Existing fish pond
3. Tree Transplanting
4. Planting
5. Remove existing temporary hoarding and erect fencing

Appendix J shows the three month rolling programme.

### **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  $5ms^{-1}$  or wind with gust exceeding  $10ms^{-1}$ . 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 949	IEC 651 Type 1 IEC 804 Type 1	2
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 Appendix C 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.

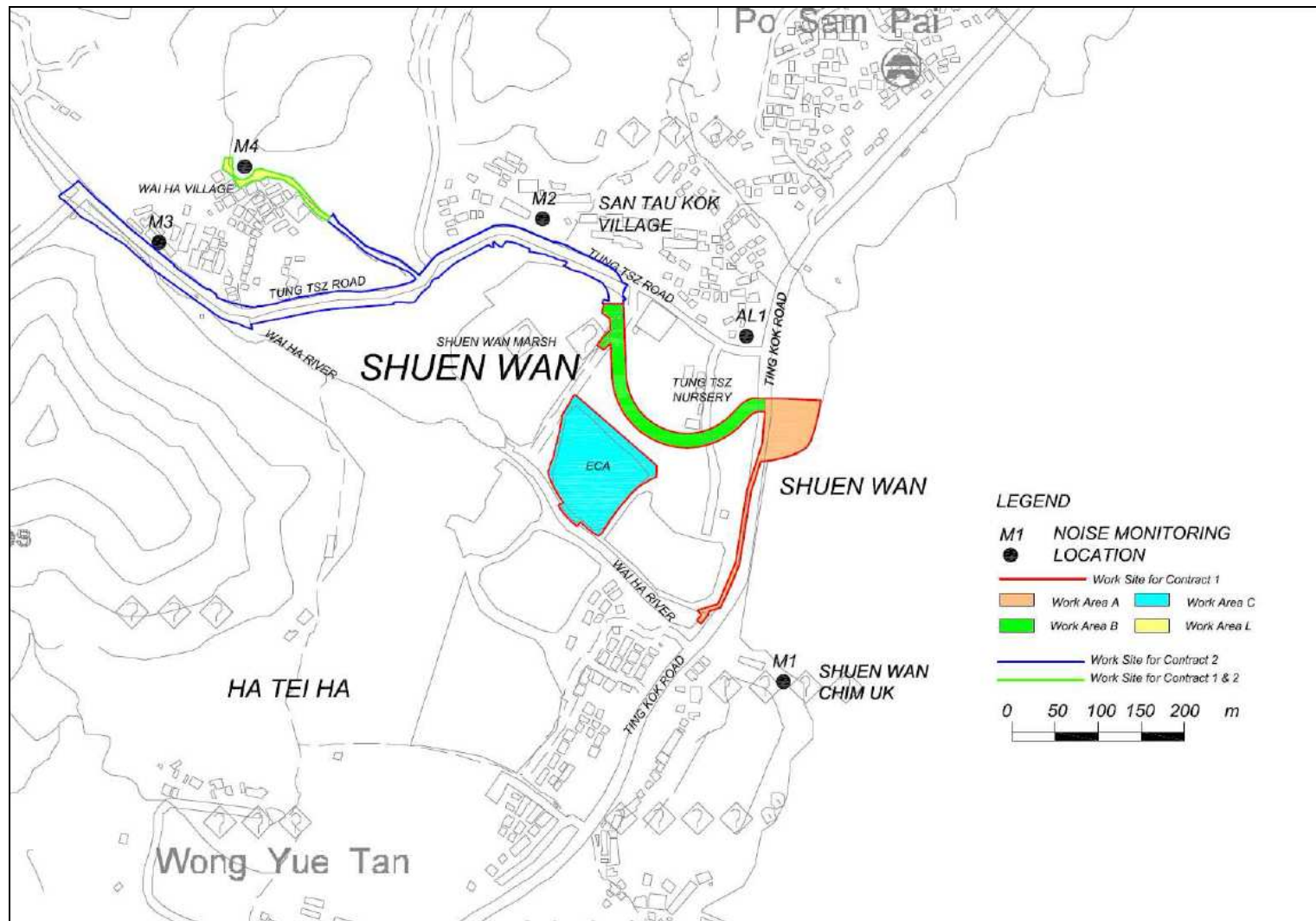


Figure 3.3.1 Impact noise monitoring locations

### 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 61.3dB (A) and 62.0B (A), and AL1, ranged between 65.8dB (A) and 68.5dB (A), were within the limit levels and therefore, no exceedance was found.

Location	Parameter	Date	Time	L <sub>Aeq</sub> dB(A)	Limit dB(A)	Exceedance	Weather
M1	L <sub>eq 30mins</sub>	2-June-11	10:45	61.3	75	N	Cloudy
M1	L <sub>eq 30mins</sub>	9-June-11	11:45	61.4	75	N	Sunny
M1	L <sub>eq 30mins</sub>	16-June-11	13:05	62.0	75	N	Sunny
M1	L <sub>eq 30mins</sub>	23-June-11	11:36	63.2	75	N	Cloudy
*M1	L <sub>eq 30mins</sub>	30-June-11	-	-	75	N	Rainy
AL1	L <sub>eq 30mins</sub>	2-June-11	11:20	68.5	75	N	Cloudy
AL1	L <sub>eq 30mins</sub>	9-June-11	12:50	65.8	75	N	Sunny
AL1	L <sub>eq 30mins</sub>	16-June-11	14:00	66.2	75	N	Sunny
AL1	L <sub>eq 30mins</sub>	23-June-11	10:58	69.7	75	N	Cloudy
*AL1	L <sub>eq 30mins</sub>	30-June-11	-	-	75	N	Rainy

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

\*Noise monitoring was cancelled due to rainfall on 30-June-11. Supplementary monitoring is re-arranged on 2-July-11. Result will be shown in next monthly report.

### 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 2<sup>th</sup>, 7<sup>th</sup>, 14<sup>th</sup>, 21<sup>st</sup> and 28<sup>th</sup> of July 2011.

Table 3.5.2 Event / Action Plan for Construction Noise

EVENT	ACTION			
	ET Leader	IEC	ER	CONTRACTOR
Action Level	<ol style="list-style-type: none"> <li>1. Notify IEC and Contractor.</li> <li>2. Carry out investigation.</li> <li>3. Report the results of investigation to the IEC, ER and Contractor.</li> <li>4. Discuss with the Contractor and formulate remedial measures.</li> <li>5. Increase monitoring frequency to check mitigation effectiveness.</li> </ol>	<ol style="list-style-type: none"> <li>1. Review the analysed results submitted by the ET.</li> <li>2. Review the proposed remedial measures by the Contractor and advise the ER accordingly.</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 are properly implemented.</li> </ol>	<ol style="list-style-type: none"> <li>1. Submit noise mitigation proposals to IEC.</li> <li>2. Implement noise mitigation proposals.</li> </ol>
Limit Level	<ol style="list-style-type: none"> <li>1. Notify IEC, ER, EPD and Contractor.</li> <li>2. Identify source.</li> <li>3. Repeat 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, EPD and ER informed of the results.</li> <li>8. If exceedance stops, cease additional monitoring.</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss amongst ER, 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 ER accordingly.</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 continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated.</li> </ol>	<ol style="list-style-type: none"> <li>1. Take immediate action to avoid further exceedance.</li> <li>2. Submit proposals for remedial actions to 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>

## **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 was 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.

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.



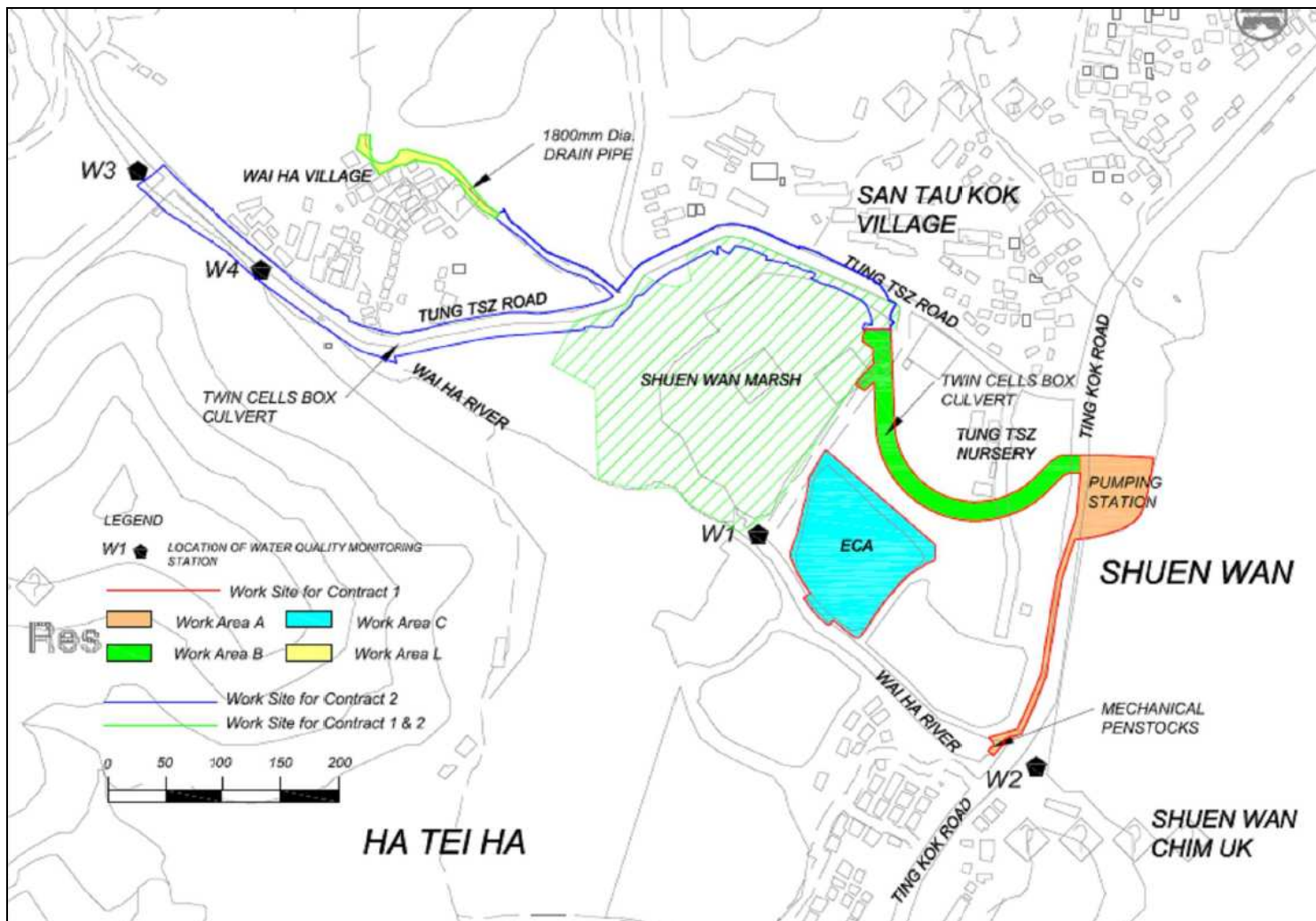


Figure 4.3.1 Water Quality Monitoring Locations

#### **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 2<sup>nd</sup>, 4<sup>th</sup>, 7<sup>th</sup>, 9<sup>th</sup>, 11<sup>th</sup>, 14<sup>th</sup>, 16<sup>th</sup>, 18<sup>th</sup>, 21<sup>st</sup>, 23<sup>rd</sup>, 25<sup>th</sup>, 28<sup>th</sup> and 30<sup>th</sup> of June 2011.

#### **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 13 abnormal incidents of water quality limits (Dissolved Oxygen, Suspended Solids and Turbidity) were recorded in this reporting month according to the established action and limit levels. ET has arranged site investigations for the abnormal incidents and finding from the investigations showed no particular observations of defective site activities were found. Therefore, such conditions were believed to be attributed by natural fluctuation and are not considered as non-compliance events.

Details information of these incidents was presented in Section 8.

Table 4.5.1 Summary of Water Quality Monitoring Results of June 2011

	Average of Monitoring Results					
	Temperature (°C)	Turbidity (NTU)	pH	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)	Suspended Solids (mg/L)
W1	28.7	14.2	7.23	5.66	75	6.0
W2	28.9	10.0	7.19	5.71	71	6.7

Table 4.5.2 Interpretations of abnormal incidents recorded in the reporting month

Date	Tide	Parameter	Interpretations
2011/6/2	Ebb	DO	Incident was regarded as natural fluctuation since no particular site practice deficiency was observed.
		Turbidity	
2011/6/4	Ebb	Turbidity	Incident was regarded as natural fluctuation since no particular site practice deficiency was observed.
2011/6/7	Ebb	DO	Incident was regarded as natural fluctuation since no particular site practice deficiency was observed.
2011/6/9	Flood	DO	Incident was regarded as natural fluctuation since no particular site practice deficiency was observed.
		SS	
2011/6/11	Ebb	DO	Incident was regarded as natural fluctuation since no particular site practice deficiency was observed.
2011/6/14	Flood	DO	Incident was regarded as natural fluctuation since no particular site practice deficiency was observed.
2011/6/16	Ebb	DO	Incident was regarded as natural fluctuation since no particular site practice deficiency was observed.
		SS	
2011/6/18	Flood	DO	Incident was regarded as natural fluctuation since no particular site practice deficiency was observed.
2011/6/21	Flood	DO	Incident was regarded as natural fluctuation since no particular site practice deficiency was observed.
2011/6/23	Flood	DO	Incident was regarded as natural fluctuation since no particular site practice deficiency was observed.
		Turbidity	
2011/6/25	Flood	DO	Incident was regarded as natural fluctuation since no particular site practice deficiency was observed.
2011/6/28	Ebb	DO	Incident was regarded as natural fluctuation since no particular site practice deficiency was observed.
		Turbidity	
2011/6/30	Flood	DO	Incident was regarded as natural fluctuation since no particular site practice deficiency was observed.
		Turbidity	

Table 4.5.3 Construction work conducted during abnormal incidents period

Date	Area	Construction works conducted
2011/6/2	A	Loading test of preliminary pile TP1. Excavating for box culvert, fabricating I beam walings for sheetpile shoring and temporary handrailing around box culvert trench at bay 21,22 & 23
	B	Laying geotextile cover at existing planter and general housekeeping.
	C	Laying hardcore to form wheel washing bay.
2011/6/4	A	Loading test of pre-bored H-pile PD 11. Excavating for box culvert, fabricating I beam walings and struts for sheetpile shoring at bay 21,22 & 23
	B & C	No activity
2011/6/7	A	Loading test of pre-bored H-pile PD 11. Excavating for box culvert, fabricating I beam walings and struts for sheetpile shoring at bay 21,22 & 23
	B	Excavating to expose existing watermain and laying 800HDPE pipe for re-routing.
	C	No activity
2011/6/9	A & B & C	No activity
2011/6/11	A	Driving sheeting shoring for pump station. Trimming and leveling working platform for sheetpiling works. Excavating for box culvert, fabricating I-beam walings and struts for sheetpile shoring of box culvert trench at bay 21, 22 & 23.
	B	No activity
	C	Excavation of wetland soil for recontouring of compensatory area. Forming access and working platform with the imported fills from Area A.
2011/6/14	A	Driving sheetpiles for shoring of pump station. Trimming and leveling working platform for sheetpiling works. Excavating for box culvert and fabricating lower layer of waling for shoring at bay 21,22 & 23.
	B	Laying HDPE pipe for diversion of irrigation pipe.
	C	Excavation of wetland soil for recontouring of compensatory area. Forming access and working platform with the imported fills from Area A.
2011/6/16	A	Trimming and leveling working platform for sheetpiling works. Excavating trench to remove boulders and driving sheet piles for shoring of pump station. Excavating for box culvert and fabricating lower layer of walings for shoring at bay 21,22 & 23. Backfilling and compacting trial pit TP04, concerting to reinstate footpath.
	B	No activity
	C	Excavation of wetland soil for re-contouring of compensatory area. Disposal of soil material on site to backfilling temporary site access and working platforms from Area A.
2011/6/18	A	Excavating trench to remove boulders and driving sheet piles for shoring of pump station. Trimming and leveling the working platform for sheeting works. Excavating of box culvert and fabricating the lower layers of waling for shoring at bay 21, 22 & 23.
	B	No activity
	C	Excavation of wetland soil for re-contouring of compensatory area. Forming site access and working platforms from Area A.
2011/6/21	A	Excavating trench to remove boulders and driving sheet piles for shoring of pump station. Bulk excavation to lower the soil level and form platform for sheeting works. Excavating of box culvert and fabricating the lower layers of waling for shoring at bay 21, 22 & 23.
	B & C	No activity
2011/6/23	A	Excavating trench to remove boulders and driving sheet piles for shoring of pump station. Bulk excavation to lower the soil level of pumpstation. Excavating of box culvert and fabricating the lower layers of waling for shoring at bay 21, 22 & 23.
	B	No activity
	C	Excavation of wetland soil for re-contouring of compensatory area. Backfilling to from access and working area imported fill form Area A

Date	Area	Construction works conducted
2011/6/25	A	Excavating to remove boulders and then driving for shoring of pump station. Bulk excavation to lower the soil level of pump station area. General housekeeping. Excavating of box culvert and fabricating the lower layer of waling and struts for shoring at bay 21,22 & 23.
	B	Breaking up the existing footpath
	C	Excavation of wetland soil for re-contouring of compensatory area. Identity tree labelk and tree felling for site area.
2011/6/28	A	Driving sheet piles for shoring of pump station. Excavation of trench and preparation works top layer of working at pump station. Bulk excavation to formation of box culvert trench at bay 21.
	B	Breaking up the existing footpath. Concretng to widen the access slab at entrance.
	C	No activity
2011/6/30	A	Driving sheetpiles and fabricating top layer of waling for shoring of pump station. Laying geotextile and G200 rockfills on box culvert trench formation at bay 21. Concreting the blinding layer for box culvert at bay 21. Excavation of box culvert trench at bay 21 & 22.
	B	No activity
	C	Forming access and working platform with imported fill from Area A. General site cleaning.

#### 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 or 1 percentile of baseline data
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> <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 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>
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> <li>8. 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 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>
<b>LIMIT LEVEL</b>				

<p>Limit level being exceeded by one sampling day</p>	<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 Limit level.</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 measures.</li> </ol>
<p>Limit level being exceeded by more than two consecutive sampling days</p>	<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 Limit level for two consecutive days.</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 instruct Contractor to slow down or to stop all or part of the construction activities until no exceedance of Limit Level.</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> <li>7. As directed by the Engineer, slow down or stop all or part of the construction activities until no exceedance of Limit level.</li> </ol>



#### **4.7 Monitoring Schedule for the next reporting period**

Water quality monitoring schedule is proposed to be carried out on 2<sup>nd</sup>, 5<sup>th</sup>, 7<sup>th</sup>, 9<sup>th</sup>, 12<sup>th</sup>, 14<sup>th</sup>, 16<sup>th</sup>, 19<sup>th</sup>, 21<sup>st</sup>, 23<sup>rd</sup>, 26<sup>th</sup>, 28<sup>th</sup> and 30<sup>th</sup> of July 2011.

## 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.

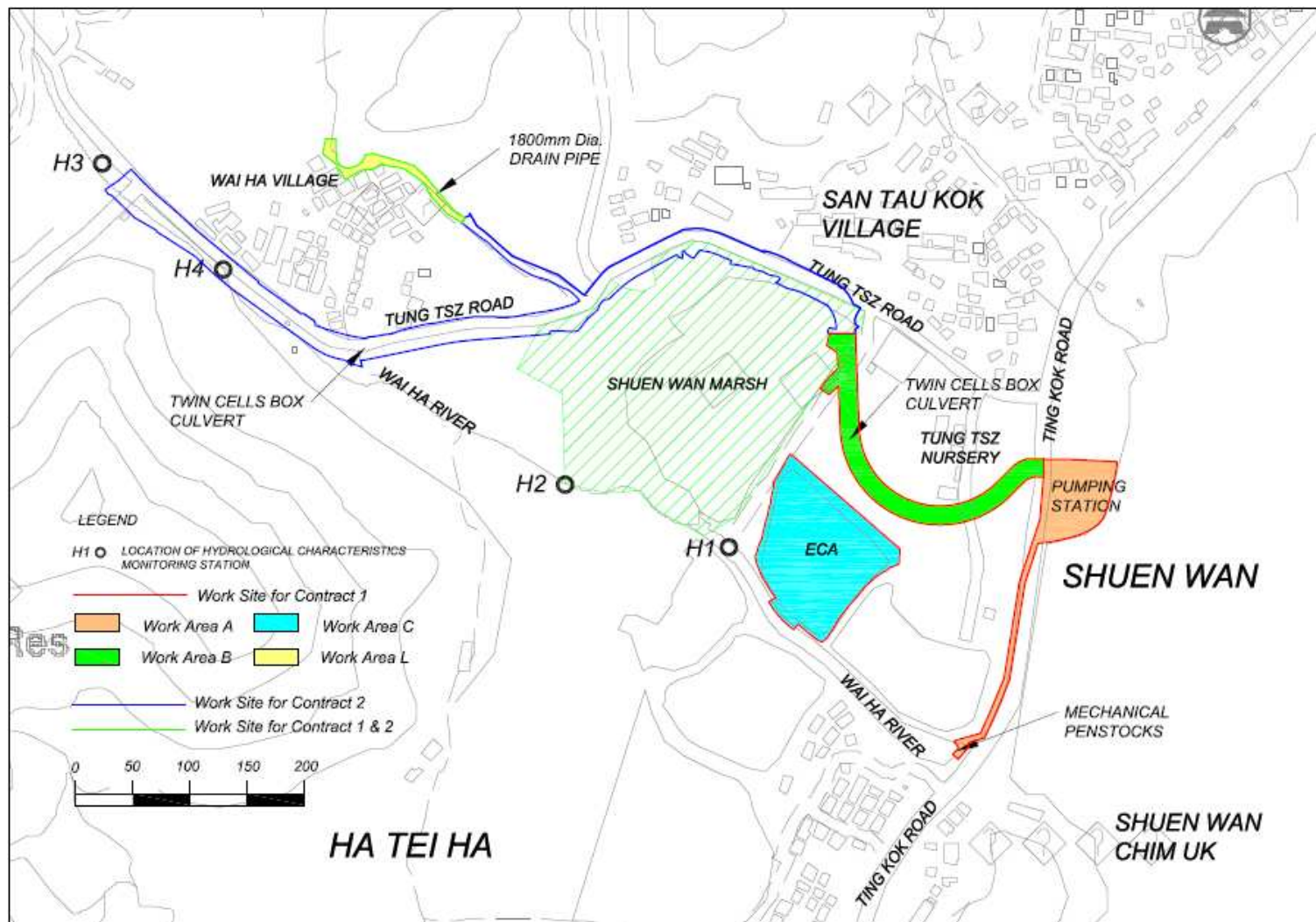


Figure 5.3.1 Hydrological Characteristics Monitoring Locations

## 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 4<sup>th</sup>, 11<sup>th</sup>, 18<sup>th</sup> and 25<sup>th</sup> of June 2011.

## 5.5 Monitoring Results and Interpretation

Hydrological characteristics monitoring was carried out four 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	~0.3*	0.152
H2	~0.6*	0.711

\*: Since the water levels were too low for the depth detector to determine, tape measure was instead adopted for estimation.

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>Repeat in-situ measurements to confirm findings;</li> <li>Identify reasons for non-compliance and source(s) of impact;</li> <li>Inform IEC, Contractor and Engineer;</li> <li>Check monitoring data, Contractor's working methods and any excavation works or dewatering processes;</li> <li>Discuss mitigation measures with IEC, Engineer and Contractor;</li> <li>Ensure mitigation measures are implemented.</li> <li>Repeat measurement on next day of exceedance.</li> </ol>	<ol style="list-style-type: none"> <li>Discuss mitigation measures with ET, Engineer and Contractor;</li> <li>Review proposals on mitigation measures submitted by Contractor and advise the Engineer accordingly;</li> <li>Assess effectiveness of implemented mitigation measures.</li> </ol>	<ol style="list-style-type: none"> <li>Discuss proposed mitigation measures with IEC, ET and Contractor;</li> <li>Make agreement on mitigation measures to be implemented;</li> <li>Assess effectiveness of implemented mitigation measures.</li> </ol>	<ol style="list-style-type: none"> <li>Inform Engineer and confirm in writing notification of the non-compliance;</li> <li>Rectify unacceptable practice;</li> <li>Check working methods and any excavation works or dewatering processes;</li> <li>Consider changes in working methods and plans;</li> <li>Discuss with ET, IEC and Engineer and propose mitigation measures to IEC and Engineer within three working days;</li> <li>Implement agreed</li> </ol>

				mitigation measures.
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, 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. Prepare to increase the monitoring frequency to daily;</li> <li>8. 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>
<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 AFCD, IEC, Contractor and Engineer;</li> <li>4. Check monitoring data, and 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</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 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</li> </ol>

	implemented; 7. Increase the monitoring frequency to daily until no exceedance of Limit level.			mitigation 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 AFCD, IEC, Contractor and Engineer;</li> <li>4. Check monitoring data, and 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. Increase the monitoring frequency to daily until no exceedance of Limit level for two consecutive days.</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 instruct Contractor to slow down or to stop all or part of the construction activities until no exceedance of Limit Level.</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> <li>7. As directed by the Engineer, slow down or stop all or part of the construction activities until no exceedance of Limit level.</li> </ol>

### 5.7 Monitoring Schedule for the next reporting period

Hydrological characteristics monitoring schedule is proposed to be carried out on 2<sup>nd</sup>, 9<sup>th</sup>, 16<sup>th</sup>, 23<sup>th</sup> and 30<sup>th</sup> of July 2011.

## **6. Ecology Monitoring**

### **6.1 Introduction**

The Ecological Monitoring of the Ecological Compensatory Area (ECA) 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 6 of the approved updated EM&A Manual (approved by EPD on 21st December 2010) and the approved Habitat Creation Plan (HCP) (approved by EPD on 24th September 2010) of the Project.

This report documents monitoring findings on vegetation health and site inspections in the ECA undertaken in June 2011.

### **6.2 Ecological Monitoring of ECA**

#### **6.2.1 Scope of Monitoring**

A specific ecological monitoring programme and ecological monitoring requirements of the ECA are detailed in Section 7 of the approved Habitat Creation Plan (HCP) and Section 6.18 of the approved updated Environmental Monitoring & Audit (EM&A) Manual of the Project.

During the construction phase of the ECA, monthly monitoring of vegetation health (including the planted, retained and transplanted trees and shrub, and the proposed planting) and weekly site inspections should be undertaken. Monthly monitoring of in situ water quality check will be carried out once the ECA is filled with water from the nearby Wai Ha River.

During the 12-month establishment phase of the ECA, monitoring on habitat types, vegetation cover, intertidal fauna and other fauna (including avifauna, herpetofauna, fish, odonates and butterflies) will be undertaken on a six-monthly basis, while the vegetation health and in situ water quality check will be monitored monthly. Site inspections will be conducted twice per month.

#### **6.2.2 Monitoring Methodology during the construction phase**

##### *Monitoring of vegetation health*

Monthly monitoring on the health condition of the retained and transplanted trees and vegetation will be conducted. Once the proposed vegetation are planted in the ECA, monitoring on the growth and health conditions of these planted vegetation in various created habitats (i.e. brackish marsh, mangrove, woodland areas of planted trees and shrubs, and wooded areas with retained and (trans)planted trees) within the ECA will be conducted during the construction



and establishment phases. General health and growth status of the retained trees within the ECA are recorded and recommendation of appropriate tree care will be made to the maintenance party.

All planted, retained and transplanted trees and shrubs will be surveyed to update their growth and health. Any signs of pests and/ or poor growth of planted, retained and transplanted trees and shrubs will be recorded. Appropriate treatment or removal of pest will be implemented if necessary. Supplemental planting will be arranged if needed.

A fixed transect line will be run through the wetland habitats (including intertidal mudflat, brackish marsh and mangrove) and the general growth and health of the planted vegetation along both sides of the transect will be inspected and evaluated. Any adverse plant health, such as dieback of planted species, will be noted and supplemental planting will be arranged. Any signs of pests which cause adverse health problems to the plants will be identified and recorded.

#### *Monitoring of water quality*

Since there will be free movement of brackish river water in and out of the ECA, water quality in the ECA will be largely dependent on water quality in the river. In this open system it is not appropriate to set specific targets for water quality parameters. Nevertheless, baseline data on water quality, in particular seasonal patterns, would potentially be useful long term management of the ECA. Once the ECA is filled with water during construction phase of the ECA, in-situ water quality will be measured once per month during both Construction and Establishment Phases. Parameters, including temperature, pH, salinity, turbidity and dissolved oxygen, will be monitored. Additional measurements of these parameters should also be made by the ecologist in response to unexpected events (e.g. algal blooms or fish die-offs) in order to inform remedial management measures.

#### *Site inspection*

Weekly site inspection will be carried out by the Wetland Specialist to update the status and monitor the progress of the construction of the ECA. Any adverse ecological impact resulting from the construction should be identified and remedial action should be recommended.

### **6.2.3 Monitoring Methodology during the establishment phase**

#### *Monitoring of vegetation health*

Same monitoring methodology as in Section 7.2.2.

#### *Monitoring of water quality*

Same monitoring methodology as in Section 7.2.2.

### *Site inspection*

Site inspection during the establishment phase of the ECA will be conducted twice per month for monitoring the health and condition of the wetland during the establishment period. Any unsatisfied health and habitat criteria of the wetland will be identified and remedial action should be recommended.

### *Monitoring of habitat types and vegetation cover*

Monitoring of habitat types and vegetation cover will be conducted twice during the 12 month Establishment Phase of the ECA; specifically at the end of the dry season and the end of the subsequent wet season after completion of the planting work. The monitoring aims to determine the exact extent of the wetland habitats and vegetation cover (i.e. open water, intertidal mudflat, brackish marsh and mangrove) during the establishment period and control any excessive colonization of unwanted vegetation specific habitats.

### *Monitoring of intertidal fauna*

As the ECA would largely comprise an intertidal mudflat, monitoring for intertidal fauna will be conducted. Recolonisation will take time: accordingly monitoring will be tentatively conducted in February 2012 and August 2012. As the important aim of monitoring of intertidal fauna in the ECA is to examine the diversity of the colonising community, a qualitative manner by walk-through survey (i.e. walk through the site with species and relative abundance recorded) will be conducted. Core sampling will also be conducted at different levels to record infauna. Three samples at each level (low, middle and high) will be collected during each monitoring event and the monitoring will be conducted at low tide.

### *Monitoring of other fauna*

Monitoring of other faunal groups, including birds, herpetofauna, fish, odonate and butterflies, will be conducted. Monitoring of any aquatic invertebrates will be covered by the intertidal surveys. Since the site will be intertidal, it is considered no suitable for local amphibian species. Therefore, no nighttime survey for detecting mating calls of amphibians is necessary and only daytime surveys are needed. Monitoring of these faunal groups will be conducted on a walk-through survey basis. The surveyor will walk through the site, recording and counting the fauna observed. Microhabitats for herpetofauna will be actively searched. This monitoring will be conducted twice within the establishment period (once in the dry season (tentatively in February 2012) and once in the wet season (tentatively in August 2012)).

Monitoring of wild mammals is not necessary in this case; however, if signs of wild mammals are observed (such as footprints) during any field surveys, these will be recorded.

## **6.2.4 Monitoring time and weather condition**

Site inspection and monitoring of vegetation, fauna groups and water quality should be carried out during day-time with calm weather. Monitoring of birds should commence within one hour of sunrise, when is the peak activity period for birds. Other fauna groups shall be undertaken during the warmer part of the monitoring day.

## 6.3 Monitoring Results

### Monitoring of Vegetation Health

#### Description of vegetation monitoring

**The vegetation monitoring during the construction period was conducted on a monthly basis in the Ecological Compensatory Area (ECA) during the construction period in May 2011. The growth and health of the recorded vegetation was inspected and detail vegetation information was shown in Appendix L.**

All trees surveyed were evaluated according to the following criteria (Webb 1991).

- Trees of good form, moderate to large size and in good health are classified as **good**;
- Trees of reasonable form, with few or no visible defects or health problems are classified as being **fair**;
- Trees that are of poor form, badly damaged or clearly suffering from decay die back or the effects of very heavy vine growth are classified as **poor**.

#### Description of vegetation and remarks

Vegetation monitoring in the ECA was carried out on site and growth/health conditions were recorded.

A total of 19 plant species were monitored and recorded in which 7 of them were retained species including *Terminalia catappa*, *Coccolus orbiculatus*, *Lantana camara*, *Mangifera indica*, *Dimocarpus longan*, *Michelia x alba* and *Macaranga tanarius*. Detailed information of the recorded vegetation *in situ* was given in Appendix L.

No tree transplantation was undertaken in ECA during the report month.

Except *Terminalia catappa*, the general growth/health of the recorded vegetations was in fair condition.

The condition of *Terminalia catappa* was degrading with only few leaves attached on the tree crown. Regular watering, applying organic soil and close monitoring are recommended. Relevant mitigation measured will be proposed when necessary

There is no sign of pest outbreak or dieback took place in the current monitoring.

## **Summary**

In total, 19 trees, shrubs, climbers and herbs were recorded in the ECA during the construction period in June 2011. Generally, all vegetations recorded were in fair condition, except *Terminalia catappa* which is slightly under stress. Although there is no sign of pest outbreak or dieback, regular watering and close monitoring will still be recommended.

## **Monitoring of Water Quality**




No water quality check was conducted in June 2011 since the ECA has not yet filled with water from Wai Ha River. Water in the pond has been filled with groundwater and rainwater.

### Site Inspections

Five regular site inspections were carried out on 3rd, 9th, 15th, 21st and 30th June 2011. Table 7-1 summarizes the observations and recommendations for each site inspection.

Table 6-1. Observation and recommendation for each site inspection, June 2011.

Inspection Date	Observation	Recommendation
03 June 2011	<p>Site formation work was in progress. Major recontouring work concentrated along the southeastern boundary of the ECA.</p> <p>Tree felling in accordance with the tree recommendation stated in the approved Landscape Plan of the Project was completed before this weekly site inspection.</p>	Not required.
09 June 2011	Recontouring work along the southeastern boundary of the ECA continued. Major site formation work focused along the northeastern side of the wetland. <b>(Photos 1 and 2).</b>	Not required.
15 June 2011	<p>Recontouring work continued along the southeastern boundary and northeastern side of the ECA.</p> <p>Nine trees (Tree tag no.: T154, T155, T156, T157, T158, T159, T160, T161 and T162) were transplanted from Area A to the ECA on 14 June 2011. Some of the transplanted tree locations are deviate slightly from the proposed tree recommendation plan in the approved Landscape Plan due to the existing site constraints (including the limited space for the transplant due to the canopy spread from the existing trees and the presence of the temporary construction hoarding along northeastern boundary of the ECA) <b>(Photo 3).</b></p>	<p>The contractor should maintain adequate watering of the transplanted trees in the ECA during the construction and establishment phases.</p> <p>Proper tree protection zones are recommended to avoid any mechanical damage from the construction vehicles.</p>
21 June 2011	<p>Recontouring work continued along the southeastern boundary of the ECA. Large rubble stones were observed on site; however as informed by the contractor, this rubble will be removed and used in other construction areas of the same Project.</p> <p>Locations for trees to be transplanted from Area A were marked along the northeastern part of the ECA.</p> <p>The water pumping system for draining the pond of the ECA was out of action during this week.</p>	The main contractor should repair the water pumping system immediately.
30 June 2011	The water pumping system was repaired and the pond was drained continuously. Limited works progress at the time of weekly site inspection due to the heavy rain.	Not required.

	
<p>Photo 1- Recontouring works along the southeastern boundary of the ECA.</p>	<p>Photo 2 - Recontouring works along the northeastern part of the ECA.</p>
	
<p>Photo 3 – Trees transplanted from Area A to the ECA on 14 June 2011.</p>	

## 6.4 Management Activities

### 6.4.1 Ecological Issues/ Management Activities

No significant ecological issues were identified.

As observed from the routine weekly site inspection and close liaison with the Main Contractor, the recontouring and site formation works should not fall behind the construction schedule.

## 6.5 Implication of the Survey Findings

### 6.5.1 Implication to the Wetland design of the ECA

There were no implications to the wetland design from the weekly site inspection.

The percolation test, as mentioned in the Monthly EM&A Report (May 2011), was conducted by the Main Contractor between 26th to 31 May 2011. The findings reveal that percolation from ground has occurred steadily in the ECA.

Together with the wetland design of creating a connection with Wai Ha River to the southwestern part of the ECA, the designed open pond and mudflat should not dry up, due to the combined effect of tidal water entering from the river and existing groundwater percolation.

## **6.6 Recommendations**

All existing trees to be retained within the ECA should be maintained with acceptable health condition. These trees should be protected appropriately in accordance with the specification for landscape softworks stipulated in the approved Landscape Plan.

The contractor should maintain adequate watering of the transplanted trees in the ECA during the construction and establishment phases. Proper tree protection zones are recommended to avoid any mechanical damage from the construction vehicles.

## **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 December 2010) 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 February 2011.

This monthly monitoring report will detail the scope of landscape and visual monitoring work, monitoring findings and observations, and any recommendation and advice on proper implementation of the landscape mitigation measures.

### **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 (June 2011) was conducted to cover only Areas A, B and C of Contract 1 of the Project since Contract 2 (i.e. the construction of a twin-cell box culvert close to Shuen Wan Conservation Area and Wai Ha River along Tung Tsz Road, and a drainage pipe near Wai Ha Village) has not yet commenced. The bi-weekly monitoring was conducted on 4<sup>th</sup>, 15<sup>th</sup> and 30<sup>th</sup> June 2011.

#### **7.3.2 Visual Screen**

No follow-up action by the Contractor is required as from the *Monthly EM&A Report for May 2011*

##### Observation

Construction hoardings have been erected in Area A and Area C along the entire site boundary and a section of temporary hoarding has been erected from northwest to southwest parts of Tung Tsz Nursery in Area B (approximately along the works boundary from Trees U42 to U62), whilst line of hoardings have been maintained to the western part of Area B falling within the northwestern part of Tung Tsz Nursery.

##### Recommendation

No specific recommendation is required.

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

No follow-up action on contaminant/sediment control in all areas is required as from the *Monthly EM&A Report for May 2011*

##### Observation

##### *Area A*

Provision of dust control measure (such as vehicle wheel washing facilities) was observed at the exit point of Area A

Used water for washing vehicle wheel and groundwater from the excavated sites were pumped into the silt/sand removal facilities for filtration before discharging into the manhole adjacent to Area A. However, one drainage pipe, which discharged treated water, connecting to the manhole was found to be overlaid on the adjacent wasteground next to Area A. The Contractor was informed and removal of such drainage pipe was observed as a remedial measure (**Photos 1 – 2**).

#### *Area B*

No direct discharge of contaminants or any polluted fluid was observed within the active works area (i.e. the fenced northwest to southwest parts of Tung Tsz Nursery). All used water was collected and drained into the open pond in Area C, where water would be further filtrated through a sedimentation tank and sump pit before the discharge.

#### *Area C*

Water pumped out from the pond was observed to be filtrated in the silt/sand removal facilities before discharging into the manhole adjacent to Area C.

#### Recommendation

No specific recommendation is required for Areas B and C.

The Contractor was immediately notified for the observation of the drainage pipe that overlaid on the adjacent wasteground. The Contractor was advised to direct the drainage pipe back to the manhole as an immediate remedial measure. .

### **7.3.4 Pollution Control**

All used water for washing vehicle wheel has been filtrated and drained to the manholes, as following the recommendation stated in *Monthly EM&A Report for May 2011*. Any observed issues related to pollution control are highlighted in this section.

#### Observation

##### *Area A*

Provision of vehicle wheel washing facilities was observed at the exit point of Area A to reduce the contamination to the surrounding habitats in Plover Cove (**Photo 3**). Used water for washing vehicle wheel and groundwater from the excavated sites were pumped into the silt/sand removal facilities for filtration before discharging into the manhole adjacent to Area A.

As abovementioned in Section 3.3.2, one drainage pipe connecting to the manhole was found to be overlaid on the adjacent wasteground next to Area A. The Contractor was informed and removal of such drainage pipe was observed as a remedial measure (**Photos 1 – 2**).

### *Area B*

No direct discharge of contaminants or any fluid was observed within the active works area during the inspections. All used water was collected and drained into the open pond in Area C, where water would be further filtrated through a sedimentation tank and sump pit before the discharge.

### *Area C*

Drained water from the pond was observed to be pumped from the existing pond in Area C through a sump pit and to a sedimentation tank located beside Wai Ha River prior the discharge into the manhole. The filtrated site water was then discharged to Wai Ha River. No direct discharge of turbid water into the adjacent Wai Ha River was observed.

### Recommendation

Used water for washing vehicle wheel should be appropriately filtrated/drained for avoiding any potential contamination to the vegetation in Shuen Wan marsh and other vegetated/marinated areas adjacent to the active works area.

The Contractor was immediately notified for the observation of the drainage pipe that overlaid on the adjacent wasteground. The Contractor was advised to direct the drainage pipe back to the manhole as an immediate remedial measure.

### **7.3.5 Liaison with Nursery**

As observed, the works area within the nursery has been fenced and maintained not to influence the daily operation of the nursery. The retained trees and trees to be transplanted were watered regularly. The current bi-weekly landscape and visual monitoring provide routine monitoring of the health of the concerned tree *Grevillea robusta* (U58) as following the recommendation stated in *Monthly EM&A Report for May 2011*. Any observed issues related to liaison with the nursery are highlighted in this section

### Observation

Establishment of temporary hoarding and hoarding footings from northwest to southwest parts of Tung Tsz Nursery was completed in April 2011. Major construction work within temporary hoarding area was observed on 4<sup>th</sup> April 2011 and in the followed monitoring.

Decline in health condition for the transplanted tree U58 *Grevillea robusta* was reported in late April. Regular monitoring for the subject tree was conducted bi-weekly. Tree defects of defoliation and bleeding were still found. Chlorotic leaves and defoliation were further reported in June 2011. (**Photos 4 – 7**)

7 trees, including U34, U35, U36, U37, U44, U45 and U53 were found transplanted to temporary locations near the southwest part of hoarding area in Tung Tsz Nursery near the retained tree U50.

### Recommendation

The works area and the construction work 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) by the appointed landscape contractor.

Regular monitoring and watering of *Grevillea robusta* (U58) are recommended. The appointed landscape contractor and the Contractor should closely monitor the health conditions throughout the establishment period.

Final receptor locations of the transplanted trees would be subject to the on-going construction works programme and conditions. However, the receptor locations should follow the approved Landscape Plan as much as possible.

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

Tree protection zones in Areas A and B were demarcated within the construction sites, but temporary storage of construction materials was still observed in June 2011 (see details in the following section). Regular watering of the retained trees and transplanted trees was anticipated. Maintenance and protection of the existing trees generally following the recommendation stated in *Monthly EM&A Report for May 2011*. However, any additional observation related to the maintenance of existing trees within works areas are highlighted in this section

### Observation

#### *Area A*

On 4<sup>th</sup> June 2011, three untagged trees (presumed to be trees proposed to be felled and were of poor health conditions) were found relocated to new locations next to a retained tree E55 (**Photo 8**). As informed by the Contractor, relocation of the trees was undertaken to free-up space for a temporary site office. These trees were poorly transplanted with soil piling around the tree trunk bases. These trees were subsequently removed in the followed monitoring.

9 trees, including T154, T155, T156, T157, T158, T159, T160, T161 and T162 were transplanted from Area A to Area C on 14<sup>th</sup> June 2011 (**Photo 9**).

6 trees, including T150, T151, T152, T153, T165 and T250 were transplanted from Area A to Area C on 22<sup>nd</sup> June 2011. (**Photos 10**)

As reported by the Contractor, two retained trees E23 and E24 along Ting Kok Road (**Photo 11**) and three trees to be transplanted (namely E21, E28 and E32 within the active works area) were collapsed under the influence of heavy rain and Tropical Cyclone “Haima” in the week of 18<sup>th</sup> June 2011. The five hazardous trees were removed immediately for safety reason.

The transplanted tree *Melaleuca quinquenervia* (E22) remained in poor health condition as in previous monitoring period (**Photo 12**).

No proper Tree Protection Zones were still recorded for trees to be transplanted T163, E16, E17, E18, *E19 and E20* (**Photo 13**). Temporary storage of construction materials was recorded within the tree driplines.

No significant damages on the crowns, trunks and roots of the remaining trees were observed during the monitoring in June 2011.

#### *Area B*

Trees, including retained and transplanted specimens, within the nursery were maintained generally in fair condition. However, the transplanted tree U58 was in declining health condition (such as defoliation and exudation of sap from tree bark) after the transplant. These signs may be due to transplantation shock.

The temporary relocated trees U34, U35, U36 and U37 were found transplanted too deep on 15<sup>th</sup> June 2011. The grade was found lowered in the root flare and a sink was formed (**Photo 14**).

Missing tree tag was found on a retained tree U19. Dead wood of Tree U17, which was reported to be crushed by vehicle using the nearby access road in the Monthly EM&A Report (April 2011), was removed during the site clearance conducted in late May/early June 2011. Other adjacent existing retained trees were largely protected within Tree Protection Zones.

#### *Area C*

The existing trees were maintained generally in fair health condition. No branch pruning and tree felling were observed in the monitoring. No significant damages on the crowns, trunks and roots on trees within Area C were observed during the monitoring in June 2011.

9 trees, including T154, T155, T156, T157, T158, T159, T160, T161 and T162 were transplanted from Area A on 14<sup>th</sup> June 2011 (**Photo 9**).

6 trees, including T150, T151, T152, T153, T165 and T250 were transplanted from Area A on 22<sup>nd</sup> June 2011 (**Photo 10**).

The tree tag of the transplanted tree T150 was found missing.

The health condition of the transplanted tree T153 was poor with defoliation (**Photos 9 and 10**).

The tree tag of the transplanted tree T150 was found missing.

The health condition of the transplanted tree T153 was poor with defoliation (**Photos 15 and 16**).

The final receptor site for the transplanted trees was found different from that proposed in the the approved Landscape Plan. The actual receptor sites were adjusted according to the existing construction site condition, but as observed, the deviation in the receptor site locations was acceptable.

### Recommendations

#### *Area A*

Proper Tree Protection Zones should be established for the highlighted trees. All Tree Protection Zones should be maintained appropriately in accordance with the soft landscape works specification appended in the approved Landscape Plan, including but not limited to the maintenance work such as removal of any surplus soil and construction equipments around the trunk flare of the retained and transplanted trees.

With regard to the incident of collapsed trees resulting from severe weather condition, it is recommended that stable and secure guying on the root-pruned trees should be implemented before the transplant.

All retained trees or trees to be transplanted should be watered regularly (e.g. at least every two days) by the appointed landscape contractor.

As E22 remained in poor health condition, only watering the tree is recommended as a mitigation measure. Poor health condition of this tree may due to transplantation shock and its health is affected by the installation of a temporary site office that compact the soil around its root zone. Fertilization is not recommended as the poor growth of roots may not be able to absorb the nutrients from fertilizer or the use of fertilizer may damage their wounded roots.

#### *Area B*

All transplanted trees should be watered regularly (e.g. at least every two days) by the appointed landscape contractor.

Soil surrounding the tree ring of U34, U35, U36, and U37 has to be removed to level off the grade difference. A temporary drain shall be made for each of these trees to divert storm water and irrigation water to prevent accumulation of water at the root flare.

Regular check should be conducted to ensure no waterlogged soil is found within the tree rings for all transplanted trees.

The Contractor should re-tag the tree tag for the retained tree U19 to facilitate the tree protection and maintenance practices in the works area.

#### *Area C*

All transplanted trees should be watered regularly (e.g. at least every two days) by the appointed landscape contractor.

The Contractor should re-tag the tree tag for the transplanted tree T150 to facilitate the tree protection and maintenance practices in the works area.

#### **7.3.7 Construction Lights**

No follow-up action on maintenance of construction light is required as from the *Monthly EM&A Report for May 2011*.

#### 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 Main Contractor.

#### Recommendation

No specific recommendation is required.

### **7.4 AUDIT SCHEDULE**

The next bi-weekly Landscape & Visual Monitoring in July 2011 is scheduled to be conducted in the week of 11<sup>th</sup> and 25<sup>th</sup> July 2011.



## **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.

Total 13 abnormal incidents of water quality limits (Dissolved Oxygen , Suspended Solids and Turbidity) were recorded in this reporting month according to the established level. ET has arranged site investigations for the incidents. No major site activity that may affect water quality was observed and no particular observations of defective site activities were found. There were emissions of water from Area C to drainage system prior Wai Ha River within this report month. No muddy water and site runoff was observed at fish pond and Wai Ha River, water condition of fish pond and Wai Ha River are presented in photo attached in Appendix M. During the incidents occurred, Contractor had already implemented sedimentation tank and sump pit, with 2 layer of geotextile and type A and B aggregate, to prevent water quality impact. As no particular defect of site practices was observed, such conditions were believed to be attributed by natural fluctuation and are not considered as non-compliance events. No further actions for those incidents are required

## **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 (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)
Mar-11	0.330	0.00	0.00	0.00	0.33	0.00	0.00	0.00	0.00	0.00	0.055
Apr-11	0.280	0.00	0.00	0.00	0.28	0.00	0.00	0.00	0.00	0.00	0.02
May-11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
June-11	5.475	0.00	5.475	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
July-11											
<b>Total</b>	<b>6.085</b>		<b>5.475</b>		<b>0.61</b>						<b>0.079</b>
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)
	37.37	8.27	12.09	0	25.28	2.1	10	2	0.5	1	1

- 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	Date of expiry	Status
Environmental Permit	EP-303/2008	2008/2/25	not applicable	Valid
Discharge Licence	WT00006448-2010	2010/6/15	30/6/2015	Valid
Registration as a Chemical Waste Producer	316597	2010/4/26	not applicable	Valid
Waste Disposal	7010348	2010/3/2	not applicable	Valid

## 11. Complaint 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
Mar 2011	0	0	0	0
April 2011	0	0	0	0
May 2011	0	0	0	0
June 2011	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 2<sup>nd</sup>, 9<sup>th</sup>, 16<sup>th</sup>, 23<sup>rd</sup> and 29<sup>th</sup> of May 2011. 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	Remarks
1 April 2011	Storage of site materials next to preserved trees	Observation	Contractor was advised to prevent storage of site materials next to the preserved trees. Proper fencings should be erected as tree protection zone also.	Follow up action was taken as reported by Contractor	5 May 2011	-
7 April 2011	Chemical containers without secondary containment measures were observed tipped	Observation	Contractor was advised to provide proper drip pan for chemical using on site; chemicals not in use should be relocated to designated chemical store for storage.	Follow up action was taken as reported by Contractor	5 May 2011	-
14 April 2011	Stagnant water was observed on the unused drip pan	Observation	Contractor was recommended to clean up the stagnant water for the prevention of mosquito breeding.	Stagnant water and drip pans had been removed from construction site.	5 May 2011	-
20 April 2011	Construction materials were observed on the unused drip pans	Observation	Contractor was advised to relocate the construction materials for proper storage and to remove the unused drip pans from site to avoid the storage of stagnant water.	Unused drip pans had been removed from construction site.	5 May 2011	-
26 April 2011; 12 May 2011	Wheel washing facility was not provided at the entrance of Area C	Observation	Contractor was advised to set up wheel washing facility, e.g. wheel washing bay, for construction vehicles and ensure their use before leaving from site in order to prevent them from	Enhanced wheel washing facility has been provided by contractor.	23 June 2011	-

Date	Findings	Identification	Advice from ET	Action taken	Closing date	Remarks
			carrying dusty construction materials to the public.			
26 April 2011	Contractor was recommended to maintain the condition of wheel washing bay provided at the entrance of Area A by draining off accumulated water regularly as to prevent muddy water from bringing to the public area through vehicles leaving from site	Reminder	-	-	-	-
	Fencing for preserved tree numbered E55 was removed. It is also observed that the trunks of the tree E55 were damaged.	Observation	Contractor was advised to provide proper fencings as tree protection zone as soon as possible to prevent further possible damage to the preserved tree.	Fencings were erected for the preserved tree E55 as protection.	5 May 2011	-
26 April , 12 & 27 May 2011	Haul access at the entrance of Area C was observed to be dry and dusty	Observation	Contractor was advised to provide regular water spraying for dust suppression.	Contractor had provided cleaning for the access road outside Area C to prevent dust generation from construction vehicles.	2 June 2011	-
5 May 2011	Glass fragments were found scattered on the walkway at Area I.	Observation	Contractor was advised to Collect and dispose the glass fragments properly to avoid potential hazards in the storage area.	Follow up action was taken as reported by Contractor	12 May 2011	-
5 & 12 May 2011	Empty containers were found open in Area A.	Observation	Contractor was advised to remove the containers from site area, or to cover the openings of the containers to prevent storage of stagnant water and mosquito breeding.	Follow up action was taken as reported by Contractor	19 May 2011	-
12 May 2011	Empty gas were found open in Area A.	Observation	Contractor was recommended to relocate the disused equipment to a designated area for proper storage in order to maintain good housekeeping practices.	Follow up action was taken as reported by Contractor	19 May 2011	-

Date	Findings	Identification	Advice from ET	Action taken	Closing date	Remarks
12 May 2011	An ant nest was found on the hoardings in Area A.	Observation	Contractor was advised to contact AFCD or assign pest control specialist to handle and remove the ant nest from site area.	Follow up action was taken as reported by Contractor	19 May 2011	-
19 May 2011	The water condition of the wheel washing bay provided at the entrance of Area A was observed to be muddy. The wheel washing bay had also reached its maximum capacity that causes overflow of the muddy water.	Observation	Contractor was recommended to provide regular maintenance to the wheel washing bay in order to prevent muddy water and earthly materials brought to public area through vehicles leaving from site.	Contractor had provided maintenance to the wheel washing bay at Area A so that no overflow of water and muddy condition was observed.	27 May 2011	-
27 May 2011, 02 June 2011	Chemicals for sedimentation tank were found under the tank without secondary containment measures in Area A.	Observation	Contractor was recommended to provide proper drip pans for the chemicals to prevent contamination of soil caused by chemical leaks or spills.	Outstanding	-	-
09 June 2011	Improper storage construction materials were observed scattering on the exposed earthy stockpile in Area B	Observation	Contractor was recommended to provide tarpaulin covers for the stockpiles and remove the construction materials to maintain good housekeeping practices.	Stockpiles and construction materials were removed by contractors in Area B	16 June 2011	-
09 June 2011	Excavation activities were carried out near the unprotected preserved tree numbered U37at Area B	Observation	Contractor was advised to provide proper fencings as tree protection zone as soon as possible to prevent possible damage to the preserved tree.	Protective net was provided by contractors	29 June 2011	-
16 June 2011	Muddy surface run-off was observed at the entrance of Area B.	Observation	Contractor was advised to provide sandbag barrier to avoid the muddy water running out from the site. Contractor was also recommended to provide temporary area for storage of this site water.	No overflow of muddy water was observed at representative area.	23 June 2011	-
23 June 2011	Stagnant water was observed on the H pile in area A	Observation	Contractor was advised to remove the stagnant water and fill the concaved area of the cover with sand to prevent the	Mitigation measures were provided by constructor to prevent the accumulation	29 June 2011	-



Date	Findings	Identification	Advice from ET	Action taken	Closing date	Remarks
			accumulation of stagnant water.	of stagnant water on H-piles.		
23 June 2011	Improper fencing and damage of protective net around the preserved trees were observed at area A & B	Observation	Contractor was recommended to replace the protective net and provide appropriate fencing as tree protection zone as soon as possible to prevent possible damage to the preserved trees.	Protective net was provided by contractors.	29 June 2011	-
29 June 2011	Muddy water was leaking from Area B to public area	Observation	Contractor was advised to provide proper maintenance to sandbag barriers.	outstanding	-	-
29 June 2011	It was observed that one of the protective net around the preserved trees was damaged at area B	Observation	Contractor was recommended to replace the protective net immediately in order to protect the trees.	outstanding	-	-

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

There was no non-compliance recorded for the month of June 2011.

## **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 statues of mitigation measures are presented in Appendix H (B).

### **13. Future key issues and recommendations.**

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

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

## 14. Conclusions

Excavation & construction for box culvert, sheetpiling for pumping station, tree transplanting, site formation, sheetpiling for box culvert construction, retouring of existing fish pond, tree planting 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 29<sup>th</sup> of June 2011.

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

For water quality monitoring, total 13 abnormal accidents of water quality limits (Dissolved Oxygen, Suspended Solid and Turbidity) were recorded in this reporting month according to the established level. ET has arranged site investigations for the abnormal incidents. No particular observations of defective site activities were found causing the incidents and such conditions were believed to be attributed by natural fluctuation.

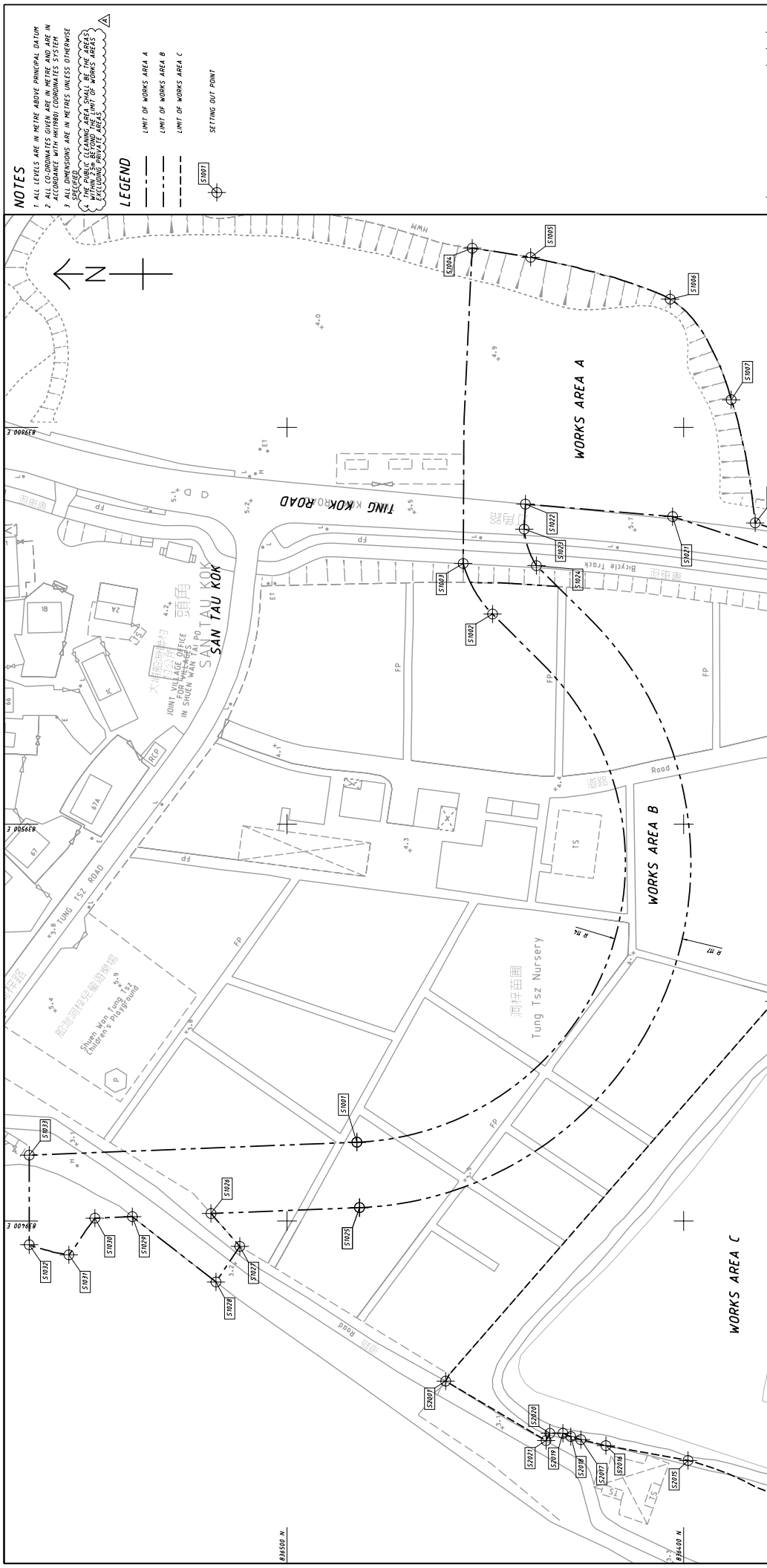
For ecological monitoring survey, all trees have been maintained in acceptable health condition, with no significance sign of health deterioration for the retained trees. In addition, there was no ecological water quality monitoring conducted in this reporting period.

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**



**NOTES**

- 1 ALL LEVELS ARE IN METRES ABOVE PRINCIPAL DATUM
- 2 ALL COORDINATES GIVEN ARE IN METRES AND ARE IN ACCORDANCE WITH HONGKONG COORDINATES SYSTEM
- 3 ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SPECIFIED
- 4 DIMENSIONS BETWEEN THE LIMIT OF WORKS AREAS EXCLUDING PRIVATE AREAS

**LEGEND**

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

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

**SETTING OUT PLAN FOR WORKS AREA A, B AND C**

SHEET 1 OF 2

DRG NO. 70102/C4/1001A

DESIGNED BY: CPWU  
 CHECKED BY: LHM  
 DATE: A1.1.500  
 PROJECT NO.: 70102/C4/1000  
 DRAWING NO.: 70102/C4/1001A

AECOM

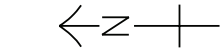
DRAINAGE SERVICES DEPARTMENT, THE GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION

DRINKING WATER SUPPLY AND SEWERAGE DEPARTMENT, THE GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION

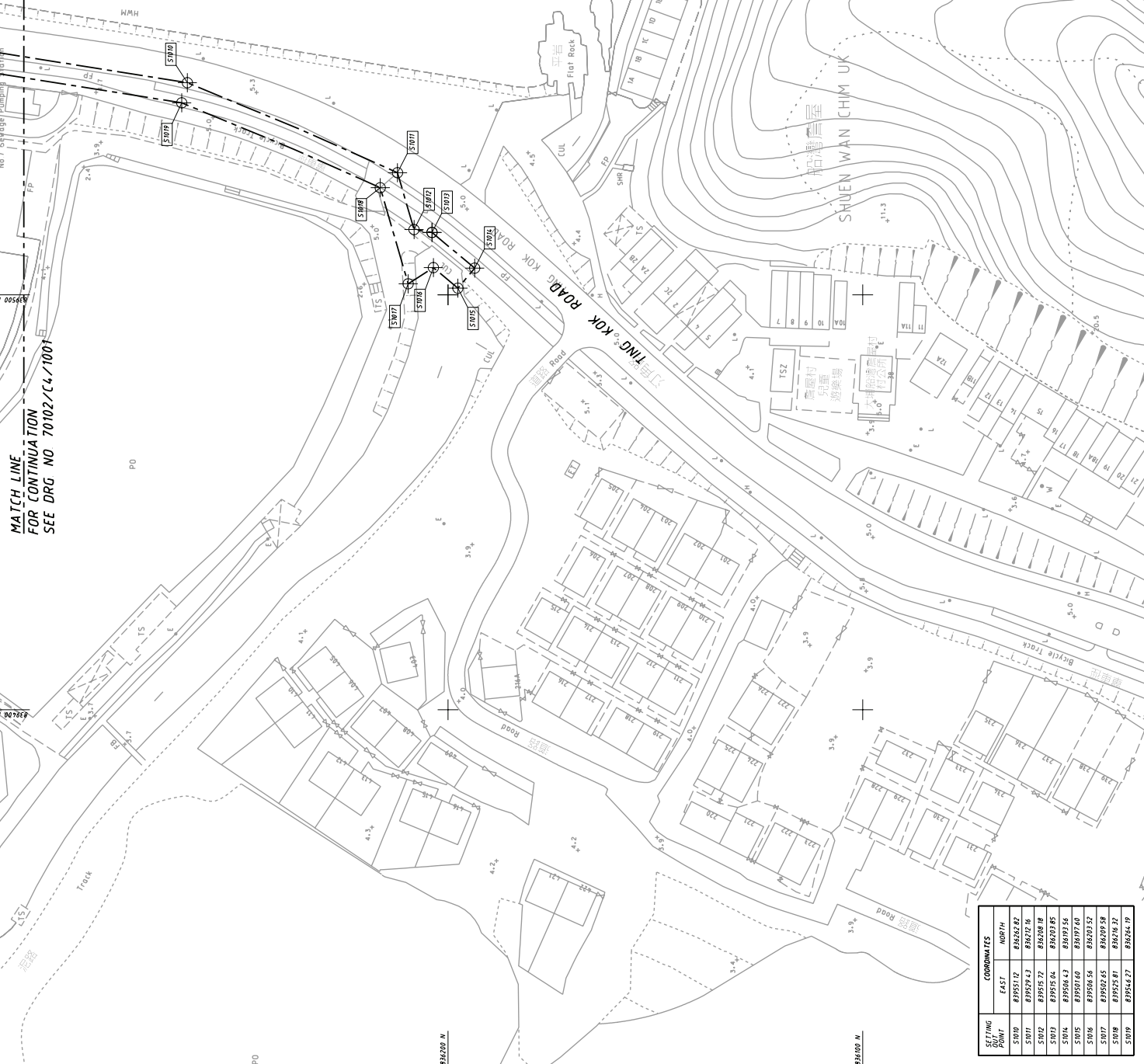
© COPYRIGHT RESERVED

SETTING OUT POINT	COORDINATES		SETTING OUT POINT	COORDINATES	
	EAST	NORTH		EAST	NORTH
S1001	83479.85	83642.39	S2001	83479.85	83642.39
S1002	83527.37	83646.18	S2002	83527.37	83646.18
S1003	83535.84	83637.77	S2003	83535.84	83637.77
S1004	83645.15	83645.32	S2004	83645.15	83645.32
S1005	83644.28	83648.59	S2005	83644.28	83648.59
S1006	83622.27	83642.42	S2006	83622.27	83642.42
S1007	83606.96	83638.02	S2007	83606.96	83638.02
S1008	83575.93	83638.05	S2008	83575.93	83638.05
S1009	83553.70	83644.57	S2009	83553.70	83644.57
S1010	83577.50	83643.89	S2010	83577.50	83643.89
S1011	83566.47	83643.89	S2011	83566.47	83643.89
S1012	83566.47	83643.89	S2012	83566.47	83643.89
S1013	83566.47	83643.89	S2013	83566.47	83643.89
S1014	83403.37	83647.76	S2014	83403.37	83647.76
S1015	83407.88	83651.91	S2015	83407.88	83651.91
S1016	83396.44	83651.91	S2016	83396.44	83651.91
S1017	83396.44	83651.91	S2017	83396.44	83651.91
S1018	83407.88	83651.91	S2018	83407.88	83651.91
S1019	83407.88	83651.91	S2019	83407.88	83651.91
S1020	83407.88	83651.91	S2020	83407.88	83651.91
S1021	83396.44	83651.91	S2021	83396.44	83651.91
S1022	83396.44	83651.91	S2022	83396.44	83651.91
S1023	83396.44	83651.91	S2023	83396.44	83651.91
S1024	83396.44	83651.91	S2024	83396.44	83651.91
S1025	83396.44	83651.91	S2025	83396.44	83651.91
S1026	83396.44	83651.91	S2026	83396.44	83651.91
S1027	83396.44	83651.91	S2027	83396.44	83651.91
S1028	83396.44	83651.91	S2028	83396.44	83651.91
S1029	83396.44	83651.91	S2029	83396.44	83651.91
S1030	83396.44	83651.91	S2030	83396.44	83651.91
S1031	83396.44	83651.91	S2031	83396.44	83651.91
S1032	83396.44	83651.91	S2032	83396.44	83651.91

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



7 0098E8



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

SETTING POINT	COORDINATES	
	EAST	NORTH
S001	839551.72	836282.82
S002	839529.43	836272.16
S003	839515.77	836205.18
S004	839515.04	836203.85
S005	839508.43	836193.56
S006	839502.00	836197.60
S007	839508.56	836203.52
S008	839502.65	836205.58
S009	839525.81	836216.32
S010	839544.27	836246.19

TENDER DRAWING	EXPIRES ON 31/03/22
DATE	DATE
REV	REV

**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



DRG NO. **70102/C4/1002**

DESIGNED BY	PROJECT NO.	SCALE
DRAWN BY	CPWU	DATE
CHECKED BY	DATE	BY
DATE	DATE	DATE

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AECOM

**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. C. L. Wong	9280 0166	2674 6688	dc200922jv_sa@yahoo.com.hk
Environmental Officer / Sub-agent	Mr. K. M. Ma	9552 1734	2674 6688	dc200922jv_suba@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)	Miss. Goldie Fung	2556 9172	2856 2010	goldiefung@fseng.com.hk

**Appendix C: Calibration Certificates for measuring instruments**



# Calibration Certificate

Certificate No. **11494**

Page 1 of 3 Pages

**Customer :** Environmental Pioneers and Solutions Limited

**Address :** Flat B, 6/F., Hop Shi Factory Building, 29 Lee Chung Street, Chai Wan, Hong Kong.

**Order No. :** Q10260

**Date of receipt :** 15-Mar-11

## Item Tested

**Description :** Digital Sound Level Meter

**Manufacturer :** SVAN

**Model :** 949

**Serial No. :** 8571

## Test Conditions

**Date of Test :** 17-Mar-11

**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 651 Type 1 & IEC 804 Type 1 specification.

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

Main Test equipment used:

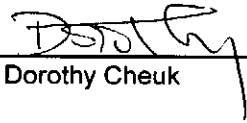
<u>Equipment No.</u>	<u>Description</u>	<u>Cert. No.</u>	<u>Traceable to</u>
S017A	Multi-Function Generator	07279	SCL-HKSAR
S024	Sound Level Calibrator	04062	NIM-PRC & SCL-HKSAR

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: 21-Mar-11

This Certificate is issued by:  
Hong Kong Calibration Ltd.

Unit 8B, 24/F., Well Fung Industrial Centre, No. 58-76, Ta Chuen Ping Street, Kwai Chung, NT, Hong Kong.  
Tel: 2425 8801 Fax: 2425 8646



# Calibration Certificate

Certificate No. 11494

Page 2 of 3 Pages

Results :

## 1. SPL Accuracy

UUT Setting				Applied Value (dB)	UUT Reading (dB)
Level Range	Octave Filter	Weight	Response		
105 dB	OFF	A	Fast	94.0	93.9
			Slow		93.9
		C	Fast		93.9
130 dB	OFF	A	Fast	94.0	94.0
			Slow		94.0
		C	Fast		94.0
	OFF	A	Fast	114.0	113.8
			Slow		113.8
		C	Fast		113.8

IEC 651 Type 1 Spec. :  $\pm 0.7$  dB

Uncertainty :  $\pm 0.1$  dB

## 2. Level Stability : 0.0 dB

IEC 651 Type 1 Spec. :  $\pm 0.3$  dB

Uncertainty :  $\pm 0.01$  dB

## 3. Linearity

### 3.1 Level Linearity

UUT Range (dB)	Applied Value (dB)	UUT Reading (dB)	Variation (dB)	IEC 651 Type 1 Spec. (inside Primary)
130	114.0	114.0	0.0	$\pm 0.7$ dB
	104.0	104.0	0.0	
	94.0	94.0 (Ref.)	--	
105	84.0	84.2	-0.2	
	74.0	74.1	-0.1	
	64.0	64.1	-0.1	
	54.0	54.2	-0.2	

Uncertainty :  $\pm 0.1$  dB



# Calibration Certificate

Certificate No. 11494

Page 3 of 3 Pages

## 3.2 Differential level linearity

UUT Range (dB)	Applied Value (dB)	UUT Reading (dB)	Variation (dB)	IEC 651 Type 1 Spec.
130	84.0	84.1	-0.1	± 0.4 dB
	94.0	94.0 (Ref.)	0.0	
	95.0	95.0	0.0	± 0.2 dB

Uncertainty : ± 0.1 dB

## 4. Frequency Weighting

A weighting

Frequency	Attenuation (dB)	IEC 651 Type 1 Spec.
31.5 Hz	-39.8	- 39.4 dB, ± 1.5 dB
63 Hz	-26.5	- 26.2 dB, ± 1.5 dB
125 Hz	-16.5	- 16.1 dB, ± 1 dB
250 Hz	-9.0	- 8.6 dB, ± 1 dB
500 Hz	-3.4	- 3.2 dB, ± 1 dB
1 kHz	0.0 (Ref)	0 dB, ± 1 dB
2 kHz	+1.6	+ 1.2 dB, ± 1 dB
4 kHz	+1.6	+ 1.0 dB, ± 1 dB
8 kHz	-0.5	- 1.1 dB, + 1.5 dB ~ -3 dB
16 kHz	-6.3	- 6.6 dB, + 3 dB ~ -∞

Uncertainty : ± 0.1 dB

## 5. Time Averaging

Applied Burst duty Factor	Applied Leq. Value (dB)	UUT Reading (dB)	IEC 804 Type 1 Spec.
continuous	50.0	--	--
1/10	50.0	50.3	± 0.5 dB
1/10 <sup>2</sup>	50.0	49.8	
1/10 <sup>3</sup>	50.0	50.0	± 1.0 dB
1/10 <sup>4</sup>	50.0	50.0	

Uncertainty : ± 0.1 dB

Remarks : 1. UUT : Unit-Under-Test

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

3. Atmospheric Pressure : 1 012 hPa.

----- END -----



# Calibration Certificate

Certificate No. **11218**

Page **1** of **3** Pages

**Customer :** Environmental Pioneers and Solutions Limited

**Address :** Flat B, 6/F., Hop Shi Factory Building, 29 Lee Chung Street, Chai Wan, Hong Kong.

**Order No. :** Q10260

**Date of receipt :** 1-Mar-11

## Item Tested

**Description :** Digital Sound Level Meter

**Manufacturer :** SVAN

**Model :** 949

**Serial No. :** 8569

## Test Conditions

**Date of Test :** 14-Mar-11

**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 651 Type 1 & IEC 804 Type 1 specification after adjustment.

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>
S017A	Multi-Function Generator	07279	SCL-HKSAR
S024	Sound Level Calibrator	04062	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:** 15-Mar-11

This Certificate is issued by:

Hong Kong Calibration Ltd.

Unit 8B, 24/F., Well Fung Industrial Centre, No. 58-76, Ta Chuen Ping Street, Kwai Chung, NT, Hong Kong.

Tel: 2425 8801 Fax: 2425 8646



# Calibration Certificate

Certificate No. 11218

Page 2 of 3 Pages

Results :

## 1. SPL Accuracy

UUT Setting				Applied Value (dB)	UUT Reading (dB)	
Level Range	Octave Filter	Weight	Response		Before Adjust.	After Adjust.
105 dB	OFF	A	Fast	94.0	*92.2	93.9
			Slow		--	93.9
		C	Fast		--	93.9
130 dB	OFF	A	Fast	94.0	--	93.9
			Slow		--	93.9
		C	Fast		--	93.9
	OFF	A	Fast	114.0	--	113.9
			Slow		--	113.9
		C	Fast		--	113.9

IEC 651 Type 1 Spec. :  $\pm 0.7$  dB

Uncertainty :  $\pm 0.1$  dB

## 2. Level Stability : 0.0 dB

IEC 651 Type 1 Spec. :  $\pm 0.3$  dB

Uncertainty :  $\pm 0.01$  dB

## 3. Linearity

### 3.1 Level Linearity

UUT Range	Applied Value (dB)	UUT Reading (dB)	Variation (dB)	IEC 651 Type 1 Spec. (inside Primary)
130	114.0	113.9	0.0	$\pm 0.7$ dB
	104.0	103.9	0.0	
	94.0	93.9 (Ref.)	--	
105	84.0	83.9	0.0	
	74.0	74.0	+0.1	
	64.0	64.1	-0.2	
	54.0	54.1	-0.2	

Uncertainty :  $\pm 0.1$  dB



# Calibration Certificate

Certificate No. 11218

Page 3 of 3 Pages

### 3.2 Differential level linearity

UUT Range	Applied Value (dB)	UUT Reading (dB)	Variation (dB)	IEC 651 Type 1 Spec.
130	84.0	83.9	0.0	± 0.4 dB
	94.0	93.9 (Ref.)	--	
	95.0	95.0	-0.1	± 0.2 dB

Uncertainty : ± 0.1 dB

### 4. Frequency Weighting

A weighting

Frequency	Attenuation (dB)	IEC 651 Type 1 Spec.
31.5 Hz	-39.7	- 39.4 dB, ± 1.5 dB
63 Hz	-26.5	- 26.2 dB, ± 1.5 dB
125 Hz	-16.5	- 16.1 dB, ± 1 dB
250 Hz	-9.0	- 8.6 dB, ± 1 dB
500 Hz	-3.5	- 3.2 dB, ± 1 dB
1 kHz	0.0 (Ref)	0 dB, ± 1 dB
2 kHz	+1.5	+ 1.2 dB, ± 1 dB
4 kHz	+1.4	+ 1.0 dB, ± 1 dB
8 kHz	-0.7	- 1.1 dB, + 1.5 dB ~ -3 dB
16 kHz	-6.6	- 6.6 dB, + 3 dB ~ -∞

Uncertainty : ± 0.1 dB

### 5. Time Averaging

Applied Burst duty Factor	Applied Leq. Value (dB)	UUT Reading (dB)	IEC 804 Type 1 Spec.
continuous	40.0	--	--
1/10	40.0	40.1	± 0.5 dB
1/10 <sup>2</sup>	40.0	40.0	
1/10 <sup>3</sup>	40.0	40.2	± 1.0 dB
1/10 <sup>4</sup>	40.0	40.0	

Uncertainty : ± 0.1 dB

Remarks : 1. UUT : Unit-Under-Test

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

3. Atmospheric Pressure : 1 010 hPa.

4. \*Out of Specification

----- END -----





# Calibration Certificate

Certificate No. 11495

Page 1 of 2 Pages

**Customer :** Environmental Pioneers and Solutions Limited

**Address :** Flat B, 6/F., Hop Shi Factory Building, 29 Lee Chung Street, Chai Wan, Hong Kong.

**Order No. :** Q10260

**Date of receipt :** 15-Mar-11

## Item Tested

**Description :** Sound Level Calibrator

**Manufacturer :** Svantek

**Model :** SV30A

**Serial No. :** 7908

## Test Conditions

**Date of Test :** 17-Mar-11

**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 Class 1 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	03926	NIM-PRC & SCL-HKSAR
S024	Sound Level Calibrator	04062	NIM-PRC & SCL-HKSAR
S041	Universal Counter	04461	SCL-HKSAR
S206	Sound Level Meter	04462	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:** 21-Mar-11

This Certificate is issued by:

Hong Kong Calibration Ltd.

Unit 8B, 24/F., Well Fung Industrial Centre, No. 58-76, Ta Chuen Ping Street, Kwai Chung, NT, Hong Kong.

Tel: 2425 8801 Fax: 2425 8646

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# Calibration Certificate

Certificate No. 11495

Page 2 of 2 Pages

Results :

## 1. Level Accuracy

UUT Nominal Value (dB)	Measured Value (dB)	IEC 942 Class 1 Spec.
94	94.08	± 0.3 dB
114	114.18	

Uncertainty : ± 0.1 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 : < 1.0 %

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 : 1012 hPa.

----- END -----



## QUALITY CONTROL CALIBRATION AND TEST CERTIFICATE

**Date Issued:** 10/27/2010

<b>Instrument Description</b>	<b>Model</b>	<b>Serial Number</b>
Level-Velocity Logger	Stingray	45525

Greyline's quality control calibration and testing program includes distance measurement verification using fixed, calibrated targets.

### CALIBRATION CONDITIONS

<p><b>Minimum Level = 1.00"</b> <b>Intermediate Level = 16.00 ft</b> <b>Pipe I.D. = 8.00"</b> <b>Maximum Velocity = 10 ft/s</b></p>
---

### CERTIFICATION

The above product has been tested to meet or exceed the following specifications:

Accuracy	+/- 2%
Repeatability	+/- 0.1%
Linearity	+/- 0.5%

Level / Velocity

and has also passed the following tests:

1. Functional test including output signals.
2. Adjustment of circuit variables to calibrated values
3. Reliability test (burn-in) 48 hr



**ALS Technichem (HK) Pty Ltd**

## CERTIFICATE OF ANALYSIS

**CONTACT:** MR RONAN CHAN  
**CLIENT:** ENVIRONMENTAL PIONEERS & SOLUTIONS LTD  
**ADDRESS:** FLAT B, 6/F, HOP SHI FACTORY BUILDING,  
29 LEE CHUNG STREET,  
CHAI WAN,  
HONG KONG.

**Work Order:** HK1106005  
**LABORATORY:** HONG KONG  
**DATE RECEIVED:** 14/03/2011  
**DATE OF ISSUE:** 18/03/2011  
**SAMPLE TYPE:** EQUIPMENT  
**No. of SAMPLES:** 1

### COMMENTS

The calibration procedure used for the analysis has been applied for the calibration of the above instrument.

### 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@alsenviro.com

  
Mr Chan Kwok Fai, Godfrey  
Laboratory Manager – Hong Kong

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*Abbreviations: % SPK REC denotes percentage spike recovery  
CHK denotes duplicate check sample  
LOR denotes limit of reporting  
LCS % REC denotes Laboratory Control Sample percentage recovery*

Page 1 of 2

ADDRESS 11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, N.T., Hong Kong PHONE +852 2610 1044 FAX +852 2610 2021  
ALS TECHNICHEM (HK) PTY LTD Part of the ALS Laboratory Group A Campbell Brothers Limited Company

# CERTIFICATE OF ANALYSIS



Work Order: HK1106005  
Date of Issue: 18/03/2011  
Client: ENVIRONMENTAL PIONEERS & SOLUTIONS LTD  
Client Reference:

## Calibration of Multimeter

Item : Multimeter Model No.: TOA DK WQC-24  
ALS Lab ID: HK1106005 -001 Equipment No.: --  
Date of Calibration: 18 March, 2011 Serial No.: 617892

Testing Results :

pH

Expected Reading	Recording Reading
4.00	4.03
7.00	6.96
10.0	9.99
Allowing Deviation	± 0.2 unit

**Testing Method:**

APHA (21st edition), 4500-H<sup>+</sup>B

Dissolved Oxygen

Expected Reading	Recording Reading
6.05 mg/L	5.97 mg/L
7.40 mg/L	7.45 mg/L
9.20 mg/L	9.17 mg/L
Allowing Deviation	± 0.2 mg/L

**Testing Method:**

APHA (21st edition), 4500-OC & G

Turbidity

Expected Reading	Recording Reading
0 NTU	0.00 NTU
4 NTU	4.10 NTU
40 NTU	40.2 NTU
80 NTU	80.6 NTU
400 NTU	418 NTU
800 NTU	798 NTU
Allowing Deviation	± 10%

**Testing Method:**

APHA (21st edition), 2130B



## Report for Calibration of Hand-held Water Quality Meter WQC-24

Calibration Reference No. : GCE/CHE/WQC/2011-2(A)

Client : ENVIRONMENTAL PIONEER AND SOLUTION LIMITED

Equipment No. : WQC-24 Location : --

Manufacturer : DKK-TOA Serial No.: 640274  
31-05-2011 to

Calibration Date : 03-06-2011 Due Date : 29-08-2011

### Criterion: (Repeatability, Linearity)

pH : Both within  $\pm 0.05$ pH  
 Dissolved oxygen : Both within  $\pm 0.1$ mg/L  
 Electric conductivity : Both within  $\pm 1\%$ FS  
 Turbidity : Repeatability : within  $\pm 3\%$ FS  
 Temperature : Repeatability  $\pm 0.25^\circ\text{C}$ ; Linearity  $\pm 0.5^\circ\text{C}$ ; (Ambient  $5\sim 45^\circ\text{C}$ )

### Electric Conductivity (Salinity converted from EC):

(Reference : APHA 20ed 2510 B, ISO 7888 - 1985 (E) and DKK-TOA Hand-held Water Quality Meter WQC-24 Instruction Manual)

Concentration of KCl Standard Solution (M)	Reference conductivity value at 25.0 °C	Indicated value by meter	Linearity ( $R^2$ )
0	0.0 mS/m*	0.0 mS/m	1.0000
0.001	14.7 mS/m	15.1 mS/m	
0.005	71.8 mS/m	72.0 mS/m	Acceptance Criterion
0.01	0.141 S/m	0.144 S/m	$R^2 > 0.995$ Within $\pm 1\%$ F.S. against calibration standard value 71.8 mS/m, 0.667 S/m and 5.87 S/m.
0.05	0.667 S/m	0.679 S/m	
0.1	1.29 S/m	1.30 S/m	
0.5	5.87 S/m	5.88 S/m	
Repeatability	1 <sup>st</sup> time	0.00, 5.88 S/m	Within $\pm 1\%$ F.S. against average value
	2 <sup>nd</sup> time	0.00, 5.88 S/m	
	3 <sup>rd</sup> time	0.00, 5.88 S/m	
	0.00, 5.88 S/m	Ave.: 0.00, 5.88	

\* 1 S/m =  $10^4$   $\mu\text{mhos/cm}$  =  $10^3$  mS/m

Remark: For repeatability, the maximum difference from the average value of 3 measurements was taken.



**Dissolved Oxygen:**

(Reference : APHA 20ed 4500-O B&C, ISO 5814:1990(E) and DKK-TOA Hand-held Water Quality Meter WQC-24 Instruction Manual)

DO value evaluated by Iodometric Method (mg/L)	Indicated value by meter (mg/L)	Linearity (R <sup>2</sup> )	
0.00	0.00	0.9998	
2.97	2.88		
5.25	5.18	Acceptance Criterion	
8.24	8.18	R <sup>2</sup> > 0.995 Within ± 0.1 mg/L against standard value	
9.72	9.80		
11.86	11.95		
Repeatability	1 <sup>st</sup> time	0.00 , 8.20	Within ± 0.1 mg/L against average value
	2 <sup>nd</sup> time	0.00 , 8.18	
	3 <sup>rd</sup> time	0.00 , 8.17	
	0.00 , 8.24	Ave.: 0.00 , 8.18	

Remark: For repeatability, the maximum difference from the average value of 3 measurements was taken.

**pH Value:**

(Reference : APHA 20ed 4500-H<sup>+</sup> B, ISO 10523:1994(E) and DKK-TOA Hand-held Water Quality Meter WQC-24 Instruction Manual)

pH buffer for Meter Calibration (20°C)	Input value (pH buffer) (20°C)	Indicated pH value by meter (20°C)	Linearity (R <sup>2</sup> )
pH = 4.00	4.00	3.97	1.0000
pH = 6.88	6.88	6.85	Acceptance Criterion
pH = 7.00	7.00	6.97	R <sup>2</sup> > 0.995 Within ± 0.05 pH against standard value
pH = 9.22	7.43	7.39	
pH = 10.00	9.22	9.18	
	10.00	9.96	
Repeatability	1 <sup>st</sup> time	3.97 , 9.97	Within ± 0.05 pH against average value
	2 <sup>nd</sup> time	3.97 , 9.96	
	3 <sup>rd</sup> time	3.98 , 9.96	
	pH 4.00 , 10.00	Ave.: 3.97 , 9.96	

Remark: For repeatability, the maximum difference from the average value of 3 measurements was taken.



**Temperature:**

(Reference : APHA 20ed 2550 B, In-house method and DKK-TOA Hand-held Water Quality Meter WQC-24 Instruction Manual)

Setting Temperature (°C)	Indicated value by meter (°C)		Linearity (R <sup>2</sup> )
5.0	5.3		1.0000
15.0	15.2		
25.0	25.2		Acceptance Criterion R <sup>2</sup> > 0.995 Within ± 0.5°C against standard value
35.0	35.3		
45.0	45.4		
55.0	55.4		
Repeatability	1 <sup>st</sup> time	15.2 , 45.4	Within ± 0.25°C against average value
	2 <sup>nd</sup> time	15.1 , 45.4	
	3 <sup>rd</sup> time	15.2 , 45.3	
	15.0 , 45.0	Ave.: 15.2 , 45.4	

Remark: For repeatability, the maximum difference from the average value of 3 measurements was taken.

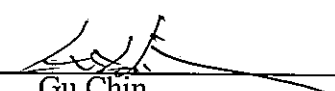
**Turbidity:**

(Reference : APHA 20ed 2130 B and DKK-TOA Hand-held Water Quality Meter WQC-24 Instruction Manual)

Formazin Standards (NTU)	Indicated value by meter (NTU)		Linearity (R <sup>2</sup> )
0.0	0.0		1.0000
20.0	19.2		Acceptance Criterion R <sup>2</sup> > 0.995 Within ± 3% F.S. against span calibration value 100, 400 and 800 NTU
100.0	98.7		
400.0	397.8		
800.0	797.2		
Repeatability	1 <sup>st</sup> time	0.0 , 796.9	Within ± 3% F.S. against average value
	2 <sup>nd</sup> time	0.0 , 797.2	
	3 <sup>rd</sup> time	0.0 , 797.4	
	0.0 , 800.0	Ave.: 0.0 , 797.2	

Remark: For repeatability, the maximum difference from the average value of 3 measurements was taken.

Comments : Pass, (comply with the criteria)

Tested by : K.L. Fong, C.S. Chan Certified by :   
 Gu Chin  
 Chemist

Checked by : Gu Chin Date : 3-6-2011



## **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		2/6/2011	2/6/2011
Weather Condition		Sunny	Sunny
Measurement Start Time (hh:mm)		10:45	11:20
Measurement Time Length (mins)		30 mins	
SLM Model & S/N		SVAN 949	
Wind Speed (m/s)		0.3	0.3
Measurement Results	L <sub>eq</sub> (dB(A))	61.3	68.5
	L <sub>10</sub> (dB(A))	68.4	73.7
	L <sub>90</sub> (dB(A))	53.8	55.7
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

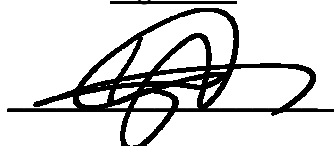
Name

Signature

Date

Prepared by:

Ronan Chan



2011/06/02

**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		9/6/2011	9/6/2011
Weather Condition		Sunny	Sunny
Measurement Start Time (hh:mm)		11:45	12:50
Measurement Time Length (mins)		30 mins	
SLM Model & S/N		SVAN 949	
Wind Speed (m/s)		0.4	0.4
Measurement Results	L <sub>eq</sub> (dB(A))	61.4	65.8
	L <sub>10</sub> (dB(A))	65.2	71.6
	L <sub>90</sub> (dB(A))	54.3	58.3
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	– Public Noise – Traffic Noise


Name

Signature

Date

Prepared by:

Ronan Chan



2011/06/09

# 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		16/6/2011	16/6/2011
Weather Condition		Cloudy	Cloudy
Measurement Start Time (hh:mm)		13:05	14:00
Measurement Time Length (mins)		30 mins	
SLM Model & S/N		SVAN 949	
Wind Speed (m/s)		0.3	0.4
Measurement Results	L <sub>eq</sub> (dB(A))	62.0	66.2
	L <sub>10</sub> (dB(A))	62.9	65.8
	L <sub>90</sub> (dB(A))	59.6	57.0
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

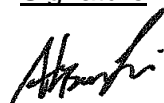
Name

Signature

Date

Prepared by:

Alisun Lai



2011/06/16

## **Appendix E: Water Quality Monitoring Data**

### **Remark:**

Red highlighting: The value is exceeding limit level.

Yellow highlighting: The value is exceeding action level but within limit level.

**Environmental Pioneers and Solutions Limited**

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

Date of Sampling : 2/6/2011

Weather : Sunny

Monitoring Location	W1	W2	
Time (hhmm)	11:55	11:03	
Tide Mode	Mid-ebb		
River Condition	Normal	Normal	
Water Depth (m)	< 1.0	1.2	
pH value	8.35	8.43	
Salinity (ppt)	17.7	19.3	
Temperature (°C)	28.6	29	
Turbidity (NTU)	15.1	4.3	4.3
DO (mg/L)	5.91	6.12	
DO Saturation (%)	78%	83%	
Suspended Solids (mg/L)	3.0	3.4	3.4

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

Name

Signature

Date

Prepared By : Ronan Chan



2/6/2011




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

Date of Sampling : 7/6/2011

Weather : Cloudy

Monitoring Location	W1	W2	
Time (hhmm)	9:20	9:00	
Tide Mode	Mid-flood		
River Condition	Slightly Turbid	Normal	
Water Depth (m)	< 1.0	< 1.0	
pH value	6.76	6.72	
Salinity (ppt)	11.7	27.8	
Temperature (°C)	29.4	29.9	
Turbidity (NTU)	3.7	0.0	0.0
DO (mg/L)	5.05	4.51	
DO Saturation (%)	77%	67%	
Suspended Solids (mg/L)	2.6	4.2	4.2

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

Name                                      Signature                                      Date  
 Prepared By : Ronan Chan                                                                            7/6/2011



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

Date of Sampling : 9/6/2011

Weather : Sunny

Monitoring Location	W1	W2	
Time (hhmm)	12:29	12:13	
Tide Mode	Mid-flood		
River Condition	Slightly Turbid	Normal	
Water Depth (m)	< 1.0	< 1.0	
pH value	7.37	6.94	
Salinity (ppt)	2.4	21.4	
Temperature (°C)	32.3	30.4	
Turbidity (NTU)	3.5	0.0	0.0
DO (mg/L)	7.30	5.18	
DO Saturation (%)	103%	70%	
Suspended Solids (mg/L)	4.0	8.8	8.8

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

Name

Signature

Date

Prepared By : Ronan Chan



9/6/2011

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

Date of Sampling : 11/6/2011

Weather : Rain

Monitoring Location	W1	W2	
Time (hhmm)	15:20	15:00	
Tide Mode	Mid-flood		
River Condition	Normal	Normal	
Water Depth (m)	< 1.0	< 1.0	
pH value	7.05	7.13	
Salinity (ppt)	7.9	12.2	
Temperature (°C)	30	31.5	
Turbidity (NTU)	2.0	0.6	0.6
DO (mg/L)	7.98	7.10	
DO Saturation (%)	88%	75%	
Suspended Solids (mg/L)	4.4	2.2	2.2

Remark or Observation : Typhoon (SARIKA) Signal No.1

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Name

Signature

Date

Prepared By : Alisun Lai



11/6/2011

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

Date of Sampling : 14/6/2011

Weather : Sunny

Monitoring Location	W1	W2	
Time (hhmm)	11:45	11:30	
Tide Mode	Mid-ebb		
River Condition	Slightly turbid	Normal	
Water Depth (m)	< 1.0	< 1.0	
pH value	7.40	7.17	
Salinity (ppt)	16.8	11.1	
Temperature (°C)	30	30.4	
Turbidity (NTU)	1.7	0.0	0.0
DO (mg/L)	3.74	3.94	
DO Saturation (%)	53%	58%	
Suspended Solids (mg/L)	6.8	8.6	8.6

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

Name

Signature

Date

Prepared By : Alisun Lai



14/6/2011

## Water Quality Monitoring - Summary of On-Site Measurement Results

Date of Sampling : 16/6/2011

Weather : Cloudy

Monitoring Location	W1	W2	
Time (hhmm)	13:20	13:00	
Tide Mode	Mid-ebb		
River Condition	Normal	Normal	
Water Depth (m)	<1.0	<1.0	
pH value	6.88	6.75	
Salinity (ppt)	7.6	10.3	
Temperature (°C)	26.9	27	
Turbidity (NTU)	4.1	2.2	2.2
DO (mg/L)	2.99	4.88	
DO Saturation (%)	42%	62%	
Suspended Solids (mg/L)	12.8	18.0	18.0

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

Name

Signature

Date

Prepared By : Alisun Lai

  
 \_\_\_\_\_

16/6/2011

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

Date of Sampling : 18/6/2011

Weather : Rainy

Monitoring Location	W1	W2	
Time (hhmm)	9:00	8:45	
Tide Mode	Mid-flood		
River Condition	Normal	Normal	
Water Depth (m)	<1	<1	
pH value	6.97	7.37	
Salinity (ppt)	4.6	14.3	
Temperature (°C)	26.2	27.1	
Turbidity (NTU)	0.0	0.0	0.0
DO (mg/L)	6.51	7.08	
DO Saturation (%)	88%	99%	
Suspended Solids (mg/L)	4.2	3.6	3.6

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

Name

Signature

Date

Prepared By : Alisun Lai



18/6/2011

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

Date of Sampling : 21/6/2011

Weather : Cloudy

Monitoring Location	W1	W2	
Time (hhmm)	10:07	9:30	
Tide Mode	Mid-flood		
River Condition	Slightly turbid	Normal	
Water Depth (m)	<1	1	
pH value	7.82	7.87	
Salinity (ppt)	18	23.4	
Temperature (°C)	30.8	30.2	
Turbidity (NTU)	4.5	0.0	0.0
DO (mg/L)	6.19	7.46	
DO Saturation (%)	91%	114%	
Suspended Solids (mg/L)	3.4	3.2	3.2

Remark or Observation : Typhoon ( HAI MA) signal No.1

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Name

Signature

Date

Prepared By : Alisun Lai



21/6/2011

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

Date of Sampling : 23/6/2011

Weather : Rainy

Monitoring Location	W1	W2	
Time (hhmm)	10:41	10:18	
Tide Mode	Mid-flood		
River Condition	Slightly turbid	Normal	
Water Depth (m)	<1	<1	
pH value	7.59	7.65	
Salinity (ppt)	12.6	18	
Temperature (°C)	27.6	27.7	
Turbidity (NTU)	42.4	14.0	14.0
DO (mg/L)	5.24	5.92	
DO Saturation (%)	71%	84%	
Suspended Solids (mg/L)	8.2	7.4	7.4

Remark or Observation : Typhoon ( HAI MA) signal No.3

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Name

Signature

Date

Prepared By : Alisun Lai



23/6/2011


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

Date of Sampling : 25/6/2011

Weather : Cloudy

Monitoring Location	W1	W2	
Time (hhmm)	9:16	8:47	
Tide Mode	Mid-ebb		
River Condition	Normal	Normal	
Water Depth (m)	<1	<1	
pH value	7.28	7.05	
Salinity (ppt)	4.7	2.4	
Temperature (°C)	27.8	28.3	
Turbidity (NTU)	5.9	0.0	0.0
DO (mg/L)	6.54	6.09	
DO Saturation (%)	77%	63%	
Suspended Solids (mg/L)	5.2	4.2	4.2

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

<u>Name</u>	<u>Signature</u>	<u>Date</u>
Prepared By : <u>Alisun Lai</u>		<u>25/6/2011</u>



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

Date of Sampling : 28/6/2011

Weather : Rainy

Monitoring Location	W1	W2	
Time (hhmm)	10:35	10:15	
Tide Mode	Mid-ebb		
River Condition	Turbid	Turbid	
Water Depth (m)	<1	<1	
pH value	7.03	7.12	
Salinity (ppt)	9.8	12.2	
Temperature (°C)	27.4	27.8	
Turbidity (NTU)	82.7	66.1	66.1
DO (mg/L)	3.29	3.82	
DO Saturation (%)	45%	52%	
Suspended Solids (mg/L)	9.4	9.0	9.0

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

Name

Signature

Date

Prepared By : Alisun Lai



28/6/2011


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

Date of Sampling : 30/6/2011

Weather : Rainy

Monitoring Location	W1	W2	
Time (hhmm)	11:15	10:55	
Tide Mode	Mid-ebb		
River Condition	Turbid	Turbid	
Water Depth (m)	<1	1	
pH value	7.21	7.17	
Salinity (ppt)	8.4	8	
Temperature (°C)	26.7	27.3	
Turbidity (NTU)	12.4	39.0	39.0
DO (mg/L)	5.71	5.37	
DO Saturation (%)	93%	53%	
Suspended Solids (mg/L)	5.4	7.8	7.8

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

Name Signature Date  
 Prepared By : Alisun Lai  30/6/2011

## **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	11 June, 2011	15:20	Cloudy	~0.2	0.06	0.076
H1	Mid	Flood	18 June, 2011	9:15	Rainy	~0.4	0.15	0.191
H1	Mid	Flood	25 June, 2011	13:14	Sunny	~0.3	0.12	0.152
H2	Mid	Flood	11 June, 2011	16:00	Cloudy	~0.5	0.06	0.383
H2	Mid	Flood	18 June, 2011	9:45	Rainy	~0.7	0.18	1.148
H2	Mid	Flood	25 June, 2011	13:00	Sunny	~0.5	0.12	0.766
H1	Mid	Ebb	4 June, 2011	13:40	Cloudy	~0.2	0.12	0.152
H1	Mid	Ebb	11 June, 2011	8:45	Cloudy	~0.2	0.06	0.076
H1	Mid	Ebb	18 June, 2011	13:47	Rainy	~0.4	0.21	0.267
H1	Mid	Ebb	25 June, 2011	9:16	Sunny	~0.3	0.12	0.152
H2	Mid	Ebb	4 June, 2011	13:55	Cloudy	~0.5	0.06	0.383
H2	Mid	Ebb	11 June, 2011	9:20	Cloudy	~0.5	0.06	0.383
H2	Mid	Ebb	18 June, 2011	14:19	Rainy	~0.7	0.24	1.531
H2	Mid	Ebb	25 June, 2011	9:30	Cloudy	~0.6	0.12	0.383

\* : Since the water levels were too low for the depth detector to determine, a tape measure was used for estimation.

\*\* : Only one mid-tide is within working hours of construction activity at 04 June,2011

## **Appendix G: Landscape and Visual Monitoring Photos**



**Photo 1** - Water leakage from a drainage pipe was found on the adjacent wasteground next to Area A



**Photo 2** - The Contractor was informed and removal of such drainage pipe was observed



**Photo 3** - Vehicle wheel washing facilities in Area A



**Photo 4** - Decline in health condition for the transplanted tree U58 *Grevillea robusta*.



**Photo 5** - Suspected canker formation and exudation of sap from the tree bark of U58.



**Photo 6** - Suspected cankers with abnormal tree form of U58.



**Photo 7** - Defoliation was observed on the canopy of U58.



**Photo 8** - Three untagged trees were found relocated to new locations next to a retained tree E55.



**Photo 9** - 9 trees were transplanted from Area A to Area C on 14<sup>th</sup> June 2011.



**Photo 10** - 6 additional trees were transplanted from Area A to Area C on 22<sup>nd</sup> June 2011.



**Photo 11** - Original locations of two retained trees E23 and E 24 along Ting Kok Road.



**Photo 12** - General view of E22 in Area A.



**Photo 13** - No proper Tree Protection Zones were established for the highlighted trees in Area A.



**Photo 14** - A sink of water was formed with the grade lowered at the root flares of the relocated trees U34, U35, U36 and U37.



**Photo 15** - The transplanted tree T153 *Bomax ceiba* was in poor health with defoliation after the transplant.



**Photo 16** - Very few leaves have been developed in the canopy of the transplanted tree T153.



**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?
		trucks) that may be in intermittent use shall be shut down between work periods or shall be throttled down to a minimum <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	General Construction Activities: <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?
		when not being used. <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	Sewage from Construction workforce: <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	River Channel Excavation Works: <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	Good site practices: <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?
		should be prepared and submitted to the Engineer for approval. One may make reference to ETWB TCW No. 15/2003 for details. <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	Waste reduction measures: <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?
		impacts or nuisance: <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?
		corresponding chemical characteristics of the chemical waste, such as explosives, flammable, oxidizing, irritant, toxic, harmful, corrosive, etc. <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		General refuse: <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?
		should be employed by the contractor to remove general refuse from the site, separately from C&D material. <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?
		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.					
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?
		ardeids. <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?
		Project. <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

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

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
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

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
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 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**

Monthly E M & A Report (for June 2011)  
 Works Programme at Shuen Wan

ID	Task Name	Duration	Start	Finish	2011																																		
					June					July					August					September					October					November					December				
					29/5	5/6	12/6	19/6	26/6	3/7	10/7	17/7	24/7	31/7	7/8	14/8	21/8	28/8	4/9	11/9	18/9	25/9	2/10	9/10	16/10	23/10	30/10	6/11	13/11	20/11	27/11	4/12	11/12	18/12					
1	<b>Section I (Area A, B - Shuen Wan)</b>																																						
8	<b>Pumping Station</b>																																						
9	<b>Piling Works</b>	<b>200 days</b>	<b>Mon 28/2/11</b>	<b>Thu 15/9/11</b>																																			
14	Sheetpiling	30 days	Mon 9/5/11	Tue 7/6/11																																			
15	Excavation to Pile Cut Off Level / Shoring	100 days	Wed 8/6/11	Thu 15/9/11																																			
17	<b>Main Structure of Pumping Station</b>	<b>590 days</b>	<b>Sun 29/5/11</b>	<b>Mon 7/1/13</b>																																			
18	Temporary Works Submission	120 days	Sun 29/5/11	Sun 25/9/11																																			
25	<b>Twin Cell Box Culvert</b>																																						
31	<b>Box Culvert at Chainage 40 - 100</b>	<b>110 days</b>	<b>Mon 2/5/11</b>	<b>Fri 19/8/11</b>																																			
33	Excavation & Installation of Shoring System	40 days	Sun 22/5/11	Thu 30/6/11																																			
34	Construction of Base Slab	20 days	Fri 1/7/11	Wed 20/7/11																																			
40	<b>Box Culvert at Chainage 275 - 300</b>	<b>450 days</b>	<b>Wed 1/6/11</b>	<b>Thu 23/8/12</b>																																			
41	<b>1st Stage - on Southbound Carriageway</b>	<b>150 days</b>	<b>Wed 1/6/11</b>	<b>Fri 28/10/11</b>																																			
42	Implement TTA Scheme	5 days	Wed 1/6/11	Sun 5/6/11																																			
43	Excavation & Installation of Shoring System	40 days	Mon 6/6/11	Fri 15/7/11																																			
65	<b>Box Culvert at Chainage 300 to 356</b>	<b>100 days</b>	<b>Sun 20/3/11</b>	<b>Mon 27/6/11</b>																																			
68	Construction of Wall & Roof	20 days	Tue 24/5/11	Sun 12/6/11																																			
69	Backfilling	10 days	Mon 13/6/11	Wed 22/6/11																																			
70	Remove Shoring System	5 days	Thu 23/6/11	Mon 27/6/11																																			
71	Outfall Structure	60 days	Tue 28/6/11	Fri 26/8/11																																			
73	<b>Dia. 2100mm Drainage Pipe</b>																																						
74	Excavation Permit	90 days	Thu 3/3/11	Tue 31/5/11																																			
75	MH 04 to MH 05	180 days	Wed 1/6/11	Sun 27/11/11																																			
89	<b>Section II (Area C - Ecological Compensation Area at Shuen Wan)</b>																																						
91	<b>Filling of Pond to Designed Level</b>	<b>165 days</b>	<b>Mon 28/2/11</b>	<b>Thu 11/8/11</b>																																			
92	Below +1.0mPD	100 days	Mon 28/2/11	Tue 7/6/11																																			
93	Above +1.0mPD & Below +2.0mPD	40 days	Wed 8/6/11	Sun 17/7/11																																			
95	Transplanting	150 days	Mon 28/2/11	Wed 27/7/11																																			
97	Planting Works at Upper Level	60 days	Mon 13/6/11	Thu 11/8/11																																			

## **Appendix J: Three month rolling programme**





Three - Month Rolling Programme  
 (July 2011 to September 2011)

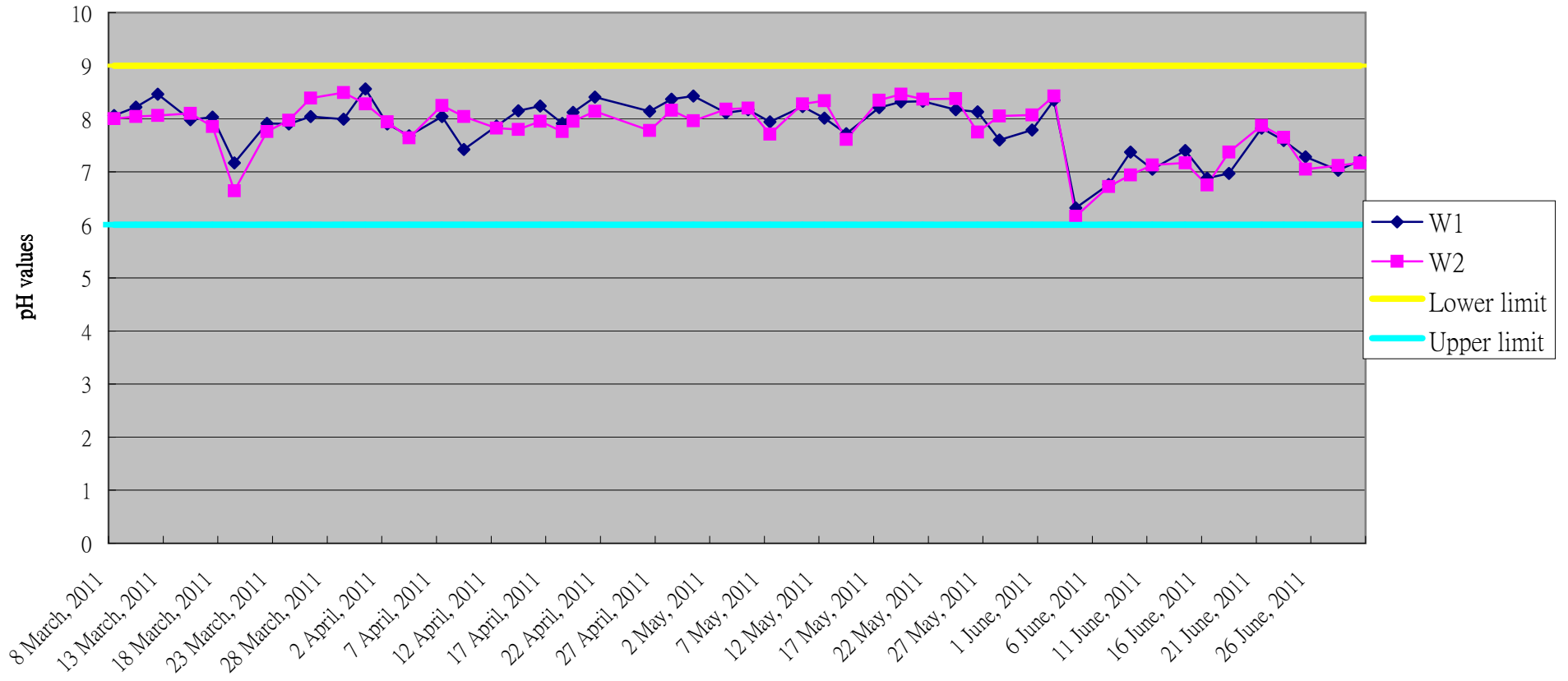
ID	Task Name	Duration	Start	Finish	Predecessors	2011																													
						July					August					September					October					November					December				
						26/6	3/7	10/7	17/7	24/7	31/7	7/8	14/8	21/8	28/8	4/9	11/9	18/9	25/9	2/10	9/10	16/10	23/10	30/10	6/11	13/11	20/11	27/11	4/12	11/12	18/12	25/12			
62	Backfilling	40 days	Sat 30/6/12	Wed 8/8/12	61																														
63	Remove Shoring System	10 days	Thu 9/8/12	Sat 18/8/12	62																														
64	Road Reinstatement	5 days	Sun 19/8/12	Thu 23/8/12	63																														
65	<b>Box Culvert at Chainage 300 to 356</b>	<b>100 days</b>	<b>Sun 20/3/11</b>	<b>Mon 27/6/11</b>																															
66	Excavation & Installation of Shoring System	35 days	Sun 20/3/11	Sat 23/4/11	5																														
67	Construction of Base Slab	30 days	Sun 24/4/11	Mon 23/5/11	66																														
68	Construction of Wall & Roof	20 days	Tue 24/5/11	Sun 12/6/11	67																														
69	Backfilling	10 days	Mon 13/6/11	Wed 22/6/11	68																														
70	Remove Shoring System	5 days	Thu 23/6/11	Mon 27/6/11	69																														
71	Outfall Structure	60 days	Tue 28/6/11	Fri 26/8/11	70																														
72	Reinstallation and Reinstatement of Existing Structure, Facilities and Trees	60 days	Sat 22/12/12	Tue 19/2/13	71,30																														
73	<b>Dia. 2100mm Drainage Pipe</b>																																		
74	Excavation Permit	90 days	Thu 3/3/11	Tue 31/5/11																															
75	MH 04 to MH 05	180 days	Wed 1/6/11	Sun 27/11/11	74																														
76	MH 03 to MH 04	90 days	Mon 28/11/11	Sat 25/2/12	75																														
77	Intake to MH 03	150 days	Sun 26/2/12	Tue 24/7/12	76																														
78	Reinstatement of Existing Planter	50 days	Wed 25/7/12	Wed 12/9/12	77																														
79	MH 05 to MH 06	60 days	Fri 13/4/12	Mon 11/6/12	19																														
80	Temporary Drainage Management Plan	90 days	Sun 26/2/12	Fri 25/5/12	76																														
81	Intake (As required in Dry Season)	150 days	Mon 25/6/12	Wed 21/11/12	77FS-30 days																														
82	Modification of Existing Outlet Structure of Wai Ha River	150 days	Mon 25/6/12	Wed 21/11/12	77FS-30 days																														
83	Installation of 4 nos of Mechanical Penstocks	30 days	Tue 23/10/12	Wed 21/11/12	82FF																														
84	E & M Works	120 days	Thu 22/11/12	Thu 21/3/13	81,83																														
85	Misc. Works & Reinstatement	60 days	Fri 22/3/13	Mon 20/5/13	84																														
86																																			
87	<b>Completion of Section I</b>	0 days	Mon 20/5/13	Mon 20/5/13	85,78,23,72																														
88																																			
89	<b>Section II (Area C - Biological Compensation Area at Shuen Wan)</b>																																		
90	Commencement of Works	0 days	Fri 26/2/10	Fri 26/2/10																															
91	<b>Filling of Pond to Designed Level</b>	<b>165 days</b>	<b>Mon 28/2/11</b>	<b>Thu 11/8/11</b>																															
92	Below +1.0mPD	100 days	Mon 28/2/11	Tue 7/6/11	3																														
93	Above +1.0mPD & Below +2.0mPD	40 days	Wed 8/6/11	Sun 17/7/11	92																														
94	Above +2.0mPD	25 days	Mon 18/7/11	Thu 11/8/11	93																														
95	Transplanting	150 days	Mon 28/2/11	Wed 27/7/11	3																														
96																																			
97	Planting Works at Upper Level	60 days	Mon 13/6/11	Thu 11/8/11	91FS-60 days																														
98	Planting Works at Lower Level	30 days	Fri 12/8/11	Sat 10/9/11	97																														
99	Setting up Water Circulation System	21 days	Sun 11/9/11	Sat 1/10/11	98																														
100	<b>Completion of Section II</b>	0 days	Sat 1/10/11	Sat 1/10/11	99																														

Data Date: 2011-6-1

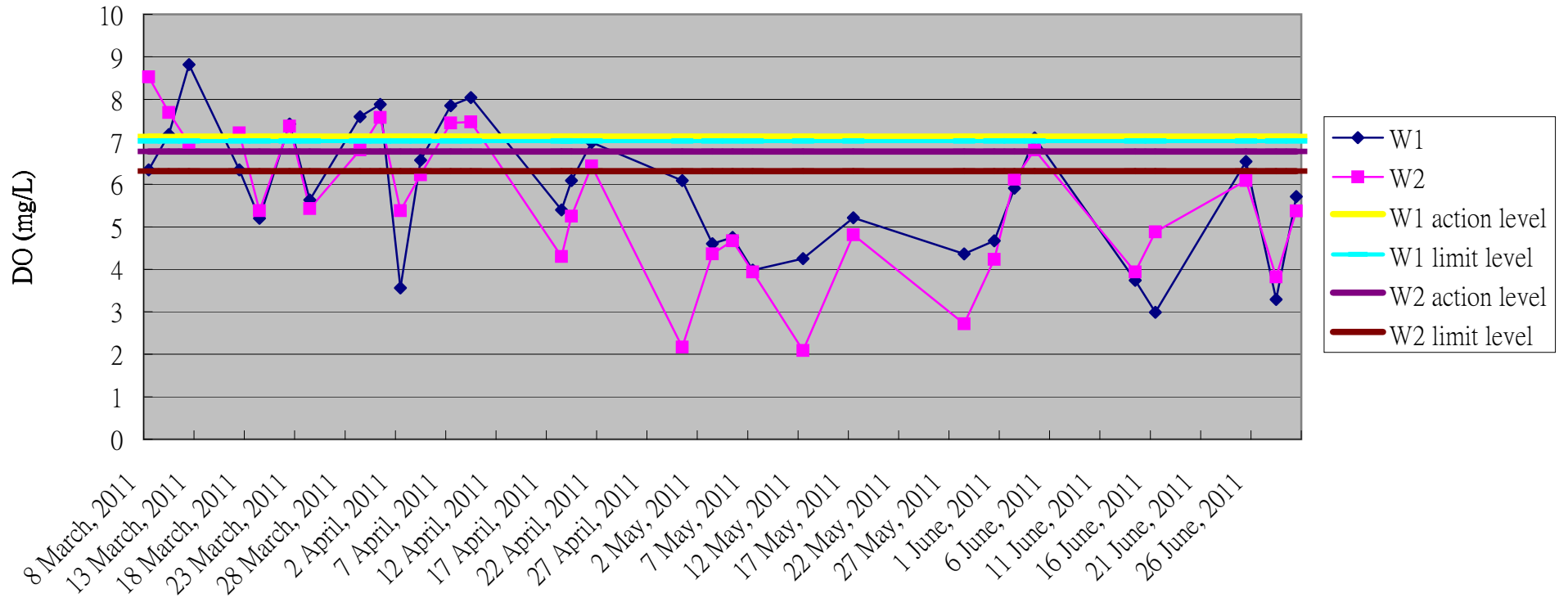
Task		Critical Task Progress		Rolled Up Task		Rolled Up Progress		Project Summary	
Task Progress		Milestone		Rolled Up Critical Task		Split		Group By Summary	
Critical Task		Summary		Rolled Up Milestone		External Tasks		Deadline	

**Appendix K. Graphical plots of trends of monitored parameter**

Graphical plots of pH values W1&W2

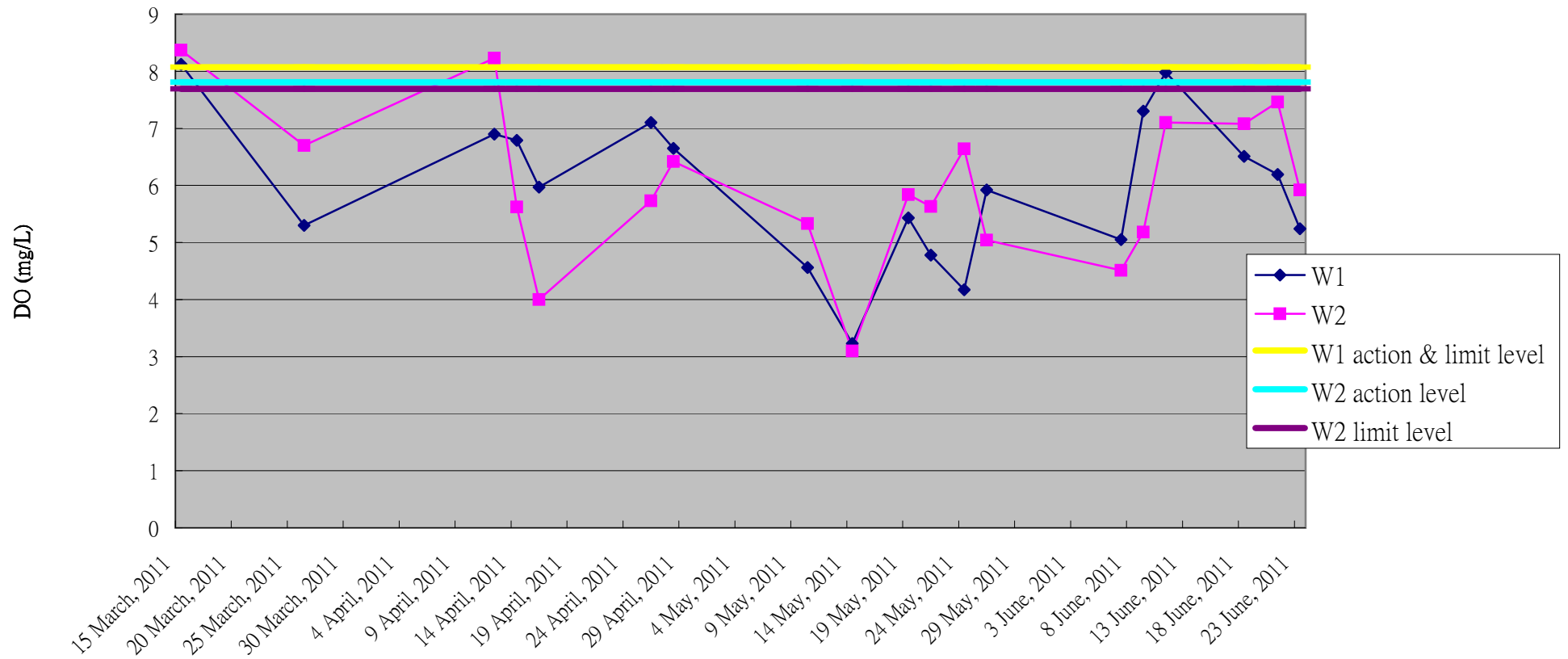


Graphical plots of DO (ebb tide) for W1&W2



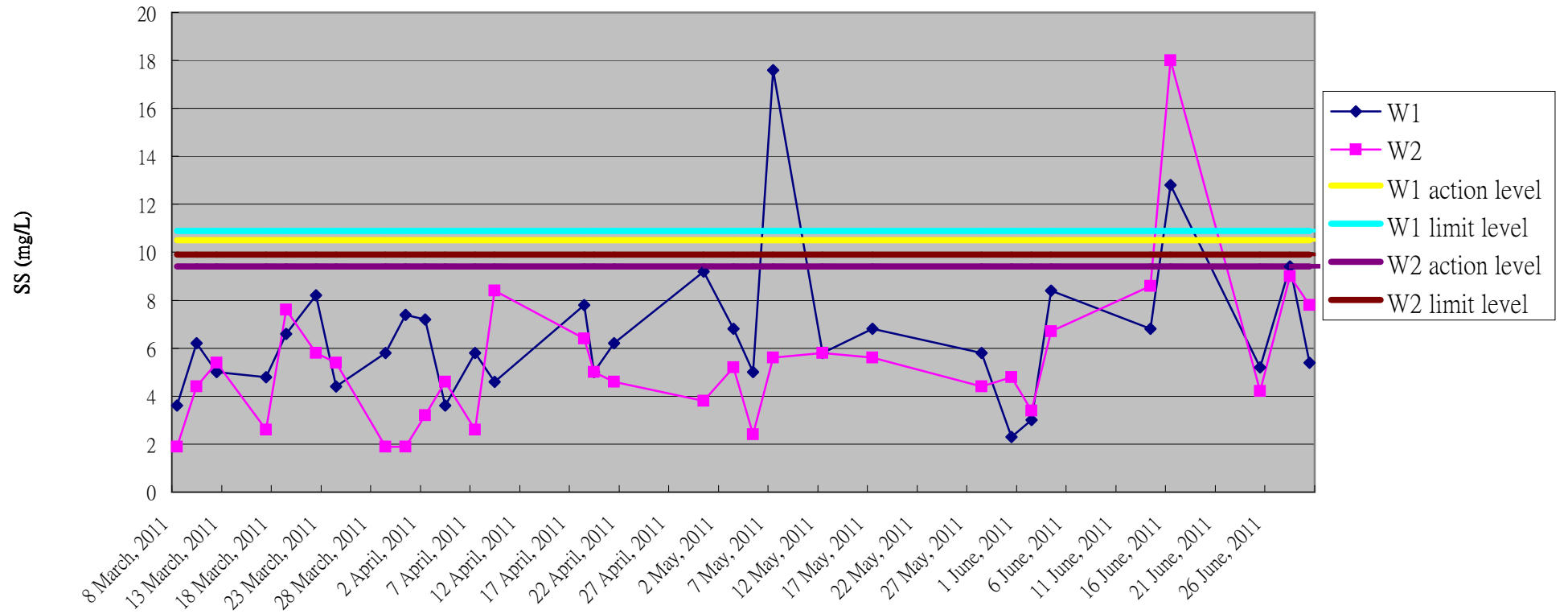
Remarks: Action level: 5 percentile of baceline data  
 Limit level: 1 percentile of baceline data

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



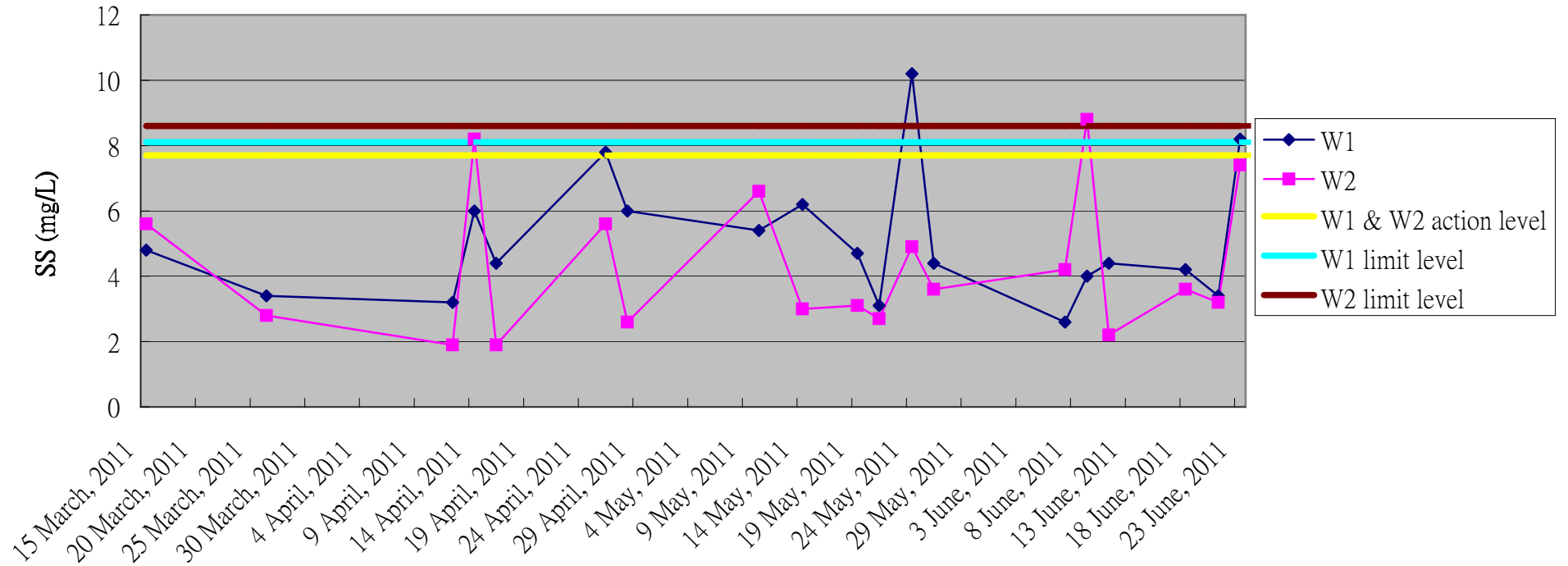
Remarks: Action level: 5 percentile of baseline data  
 Limit level: 1 percentile of baseline data

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



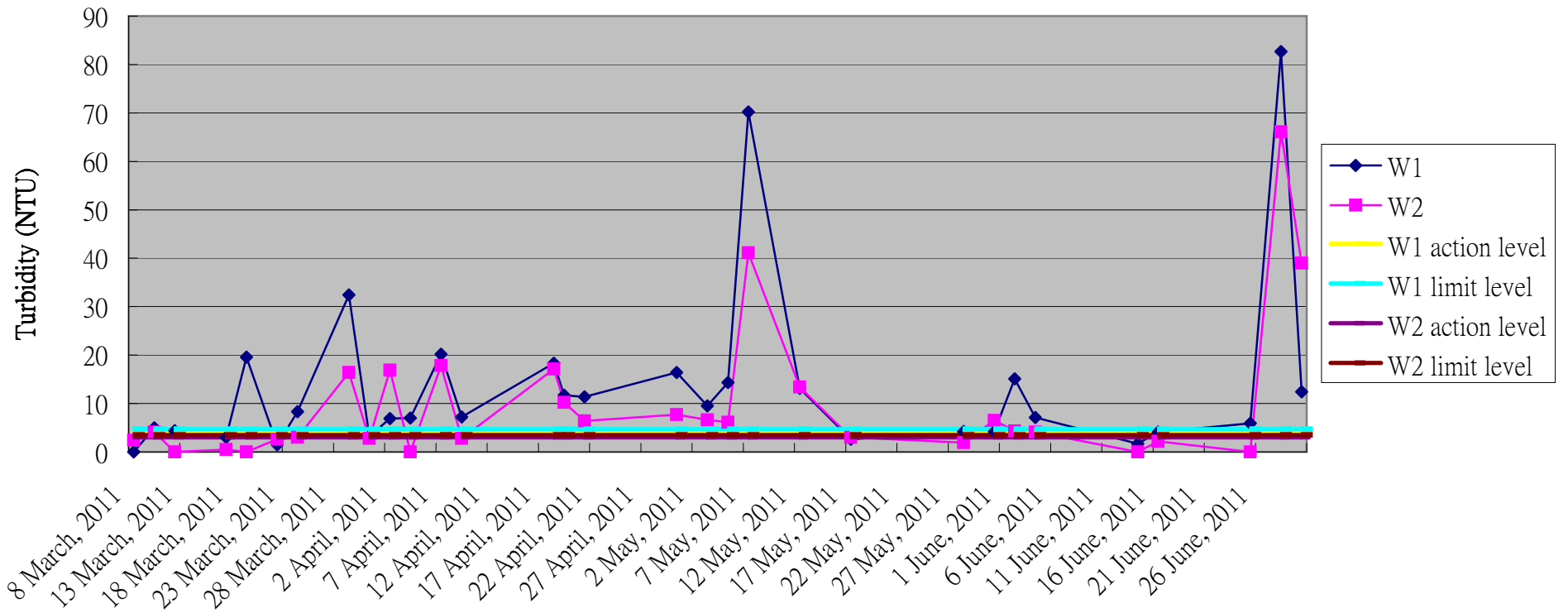
Remarks: Action limit is 95% of baseline data or 120% of upstream control station's SS  
 Limit level is 99% of baseline data or 130% of upstream control station's SS

Graphical plots of 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

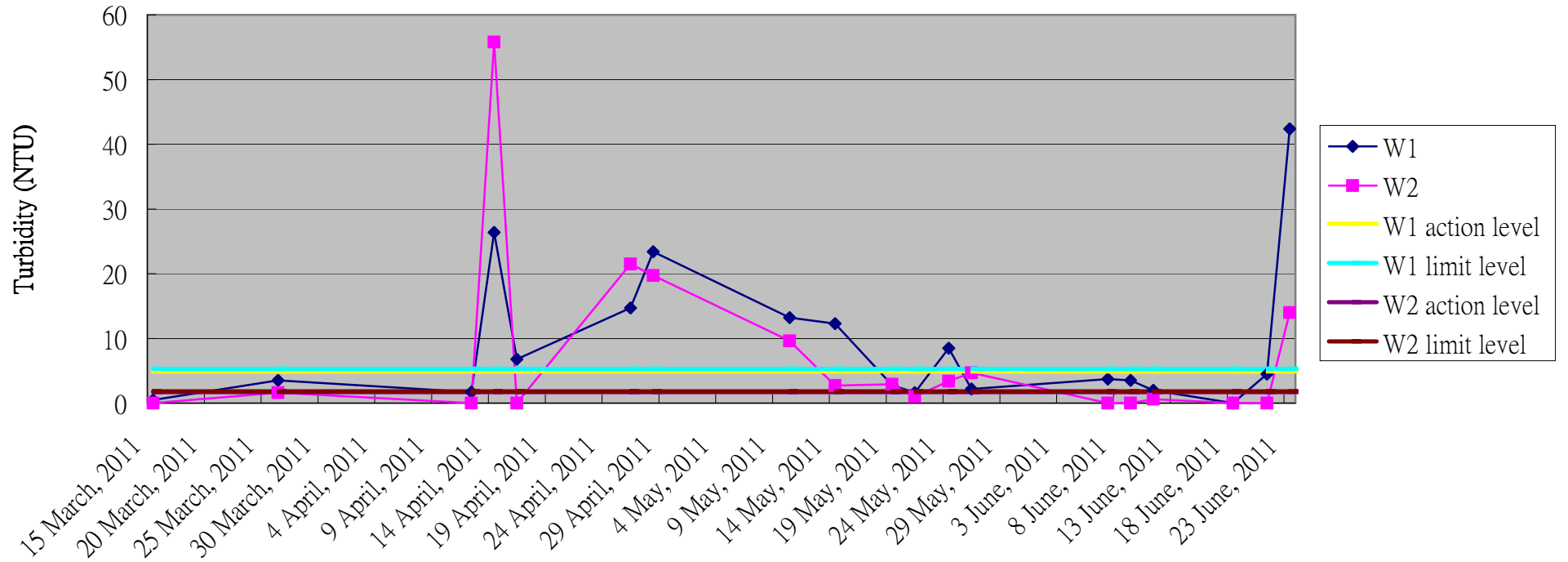
Graphical plots of Turbidity (ebb tide) for W1&W2



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 Turbidity

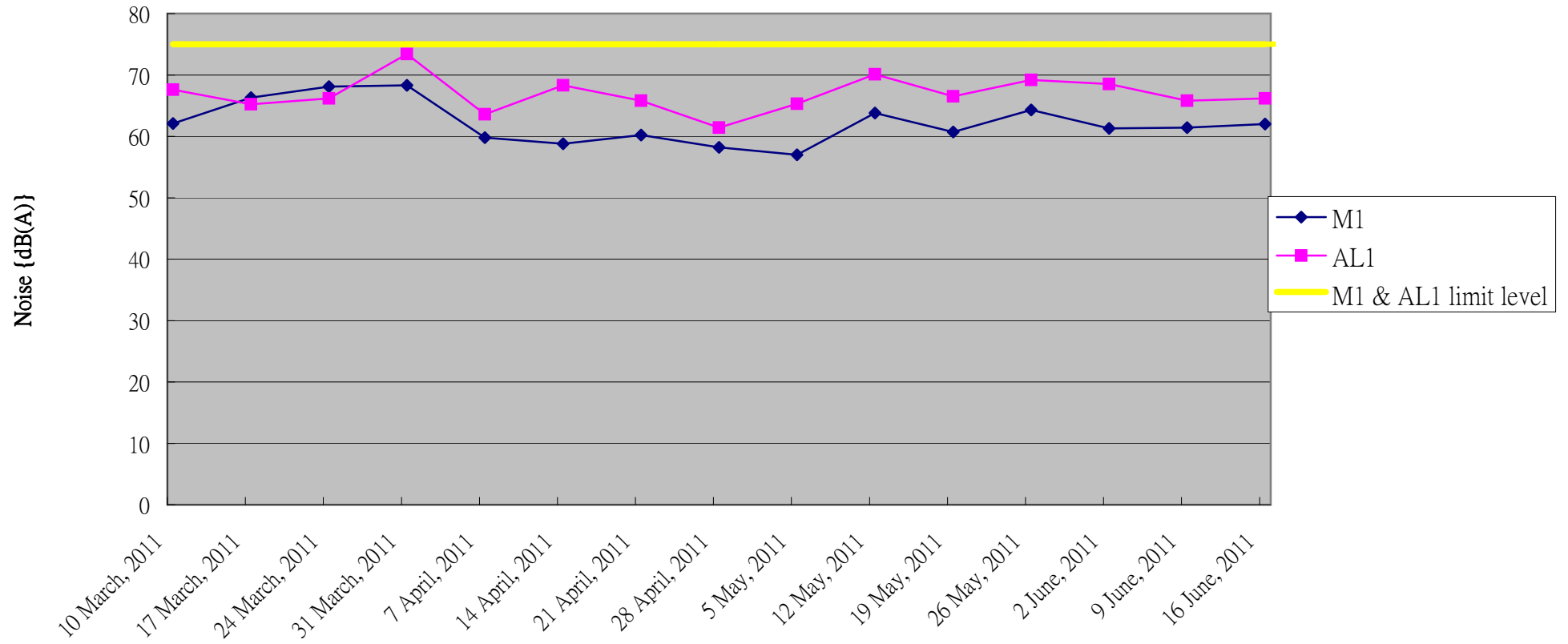


Graphical plots of Turbidity (flood tide) for W1&W2



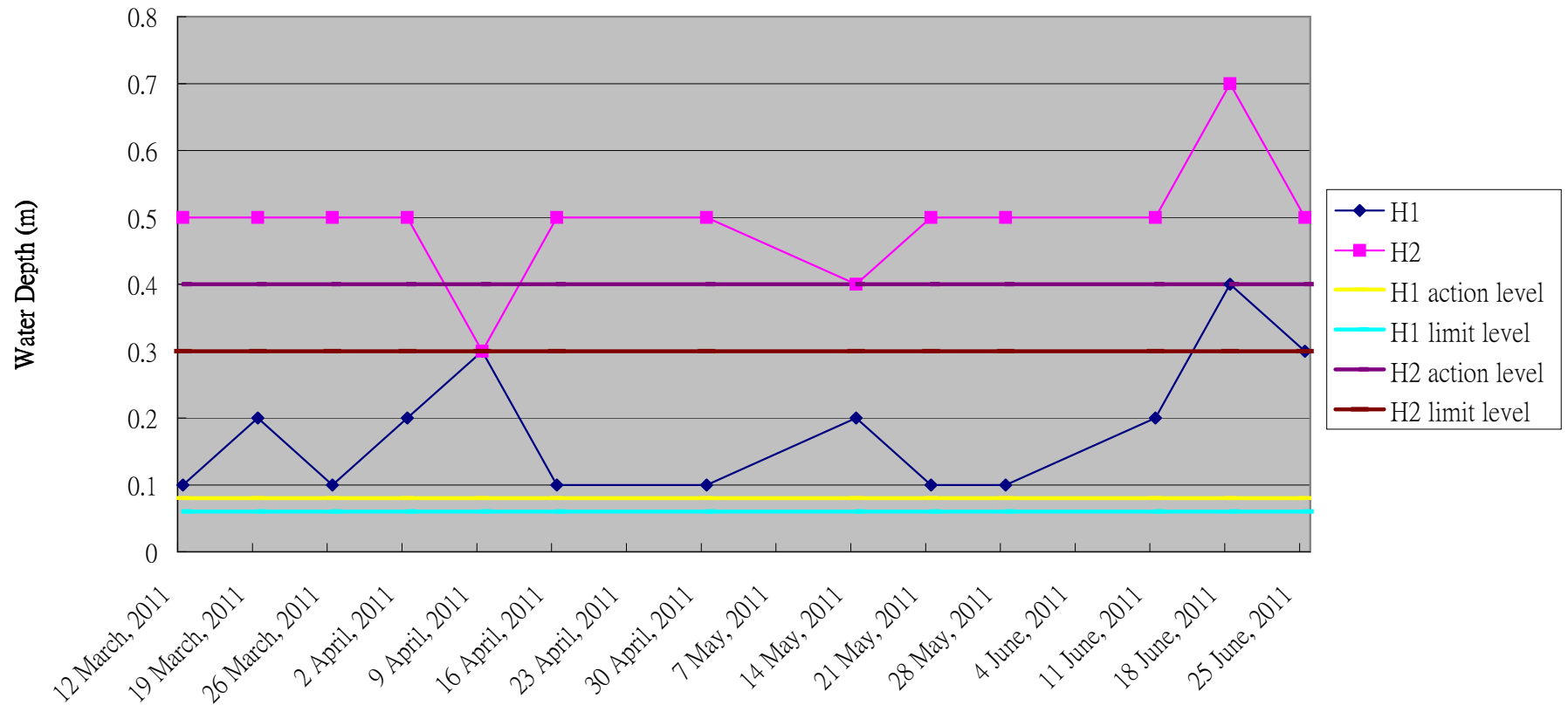
Remarks: Action limit is 95% of baseline data or 120% of upstream control station's Turbidity  
 Limit level is 99% of baseline data or 130% of upstream control station's Turbidity

Graphical plots of Noise for M1 & AL1



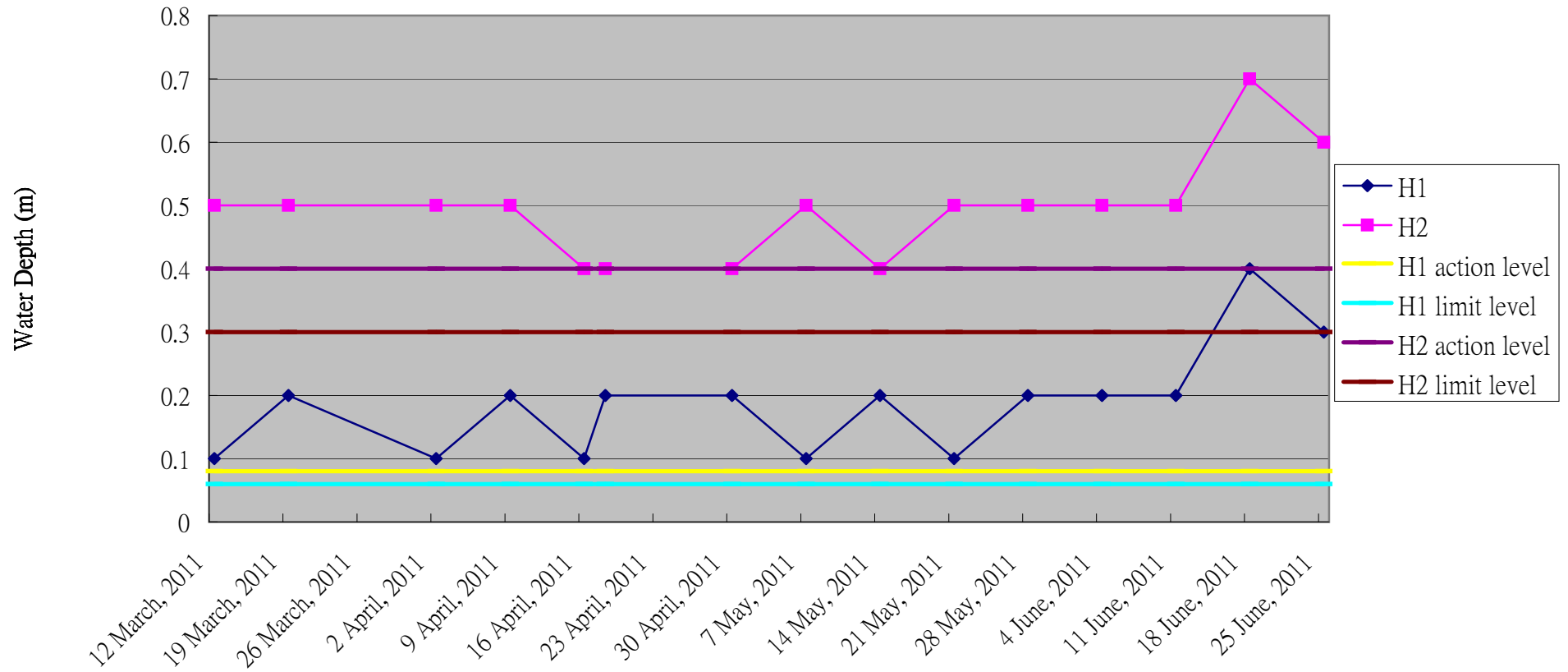
Remarks: Action limit is when one documented complaint is received

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



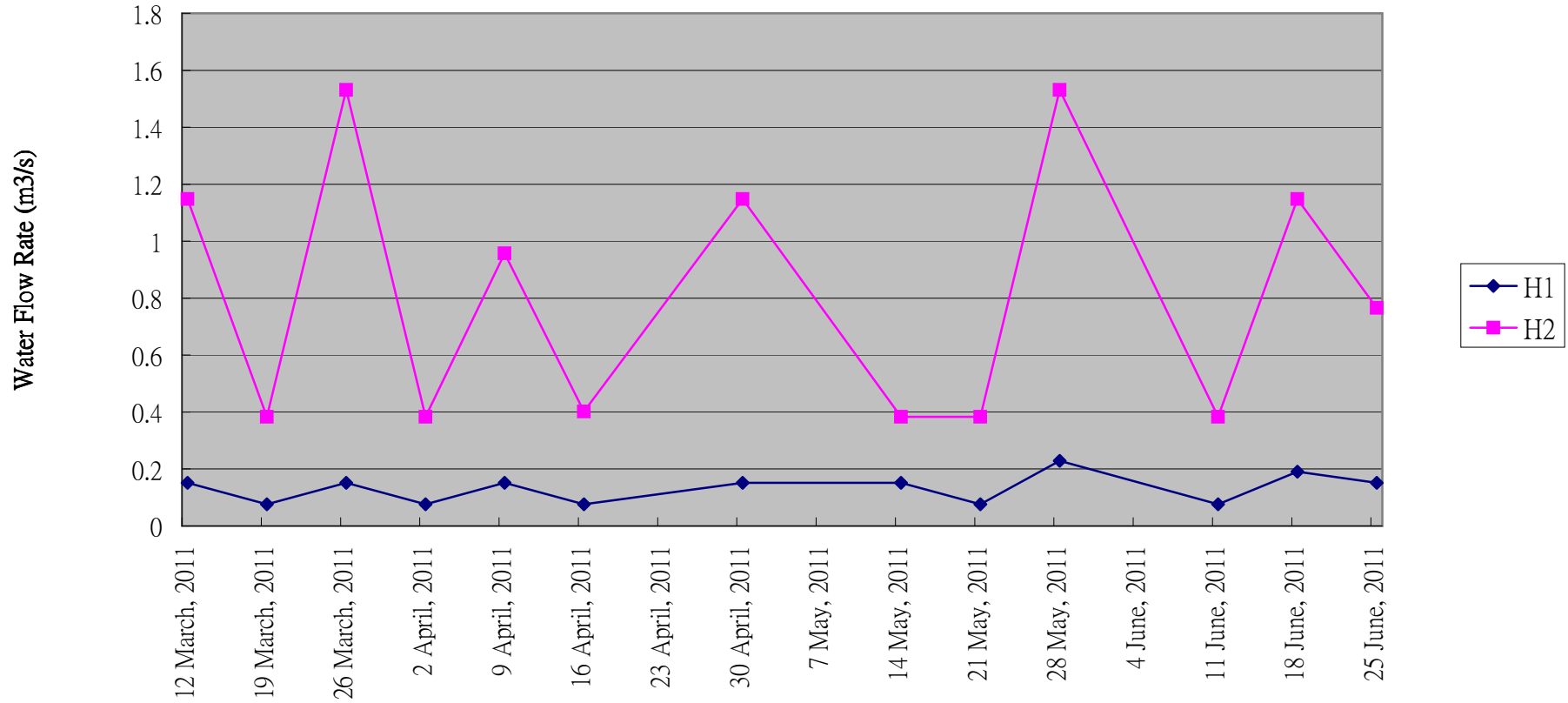
Remarks: Action level: 80% of baseline water depth.  
Limit level: 60% of baseline water depth.

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.

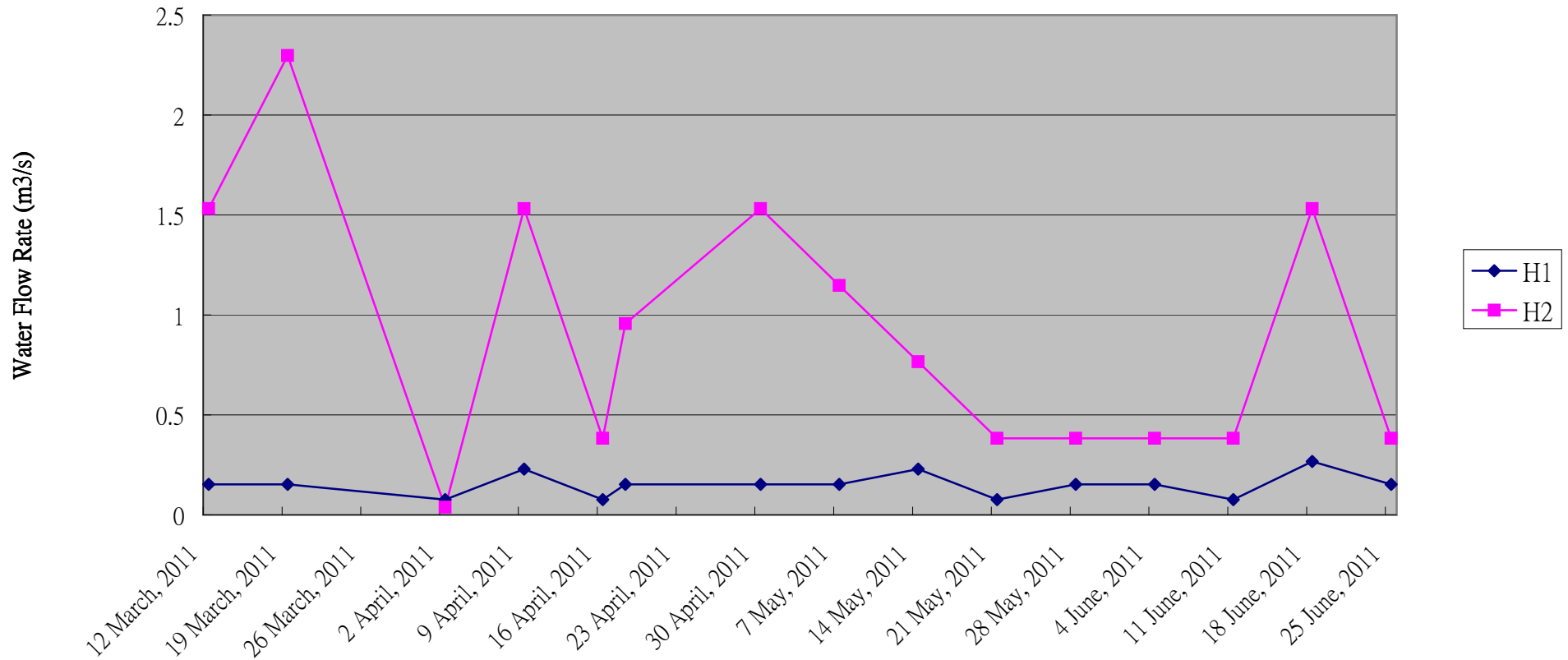
Graphical plots of Hydrological Monitoring(water flow rate at flood tide) for H1 & H2



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. Results of preliminary record of vegetation in the Ecological  
Compensatory Area (ECA) during construction phase in June 2011**

**Appendix L.** List of recorded vegetation and relative abundance in the Ecological Compensatory Area (ECA) during construction phase in June 2011.

Species	<sup>1</sup> Status in Hong Kong	Growth form	<sup>2</sup> Status in ECA	<sup>3</sup> Relative abundance	Condition
<i>Bidens bipinnata</i>	E	Herbs	S	+++	Fair
<i>Panicum maximum</i>	E	Herbs	S	++	Fair
<i>Celtis sinensis</i>	N	Trees	S	+	Fair
<i>Terminalia catappa</i>	E	Trees	R	+	Poor to Fair
<i>Cocculus orbiculatus</i>	N	Climbers	R	+	Fair
<i>Lantana camara</i>	E	Shrubs	R	+	Fair
<i>Mangifera indica</i>	E	Trees	R	+	Fair
<i>Dimocarpus longan</i>	E	Trees	R	+	Fair
<i>Michelia x alba</i>	E	Trees	R	+	Fair
<i>Oxalis corniculata</i>	N	Herbs	S	+	Fair
<i>Stephania longa</i>	N	Climbers	S	+	Fair
<i>Leucaena leucocephala</i>	E	Shrubs	S	++	Fair
<i>Amaranthus viridis</i>	N	Herbs	S	+	Fair
<i>Solanum nigrum</i>	N	Herbs	S	+	Fair
<i>Paspalum dialatum</i>	E	Perennial Herb	S	+	Fair
<i>Mikania micrantha</i>	E	Climbing Herb	S	+	Fair
<i>Mimosa pudica</i>	E	Herb	S	++	Fair
<i>Macaranga tanarius</i>	N	Tree	R	+	Fair
<i>Cassia surattensis</i>	E	Shrub or Small Tree	S	+	Fair
<i>Conyza sumatrensis</i>	E	Herb	S	+	Fair

**Key:**

<sup>1</sup>Status in Hong Kong:

E = Exotic

N = Native

<sup>2</sup>Status in ECA:

R = retained

S = newly succeed

<sup>3</sup>Relative abundance:

+

++

+++

Present

Common

Abundant



**Appendix M. Photo of fish pond at Area C and Wai Ha River at June, 2011**



Photo 1. Fish pond – Area C



Photo 2. Water intake at fish pond – Area C



Photo3. Wai Ha River at W1



Photo4. Wai Ha River at W1



Photo5. Wai Ha River at W1