

**Drainage Service Department**

**Monthly Environmental Monitoring & Auditing report for**

**Contract No.DC/2006/11**

**Drainage Improvement in Southern Lantau**

**December 2008**

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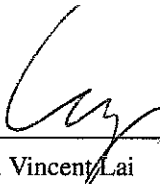
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## **EXECUTIVE SUMMARY**

This is the fifth monthly environmental Monitoring and audit (EM&A report for “Drainage Improvement in Southern Lantau Investigation”. The environmental permit number is “EP-237/2005/A”. The report concludes the impact monitoring for the activities undertaken during the period of 1st December 2008 to 31st December 2008. The major activities in this reporting month include construction work of box culvert at Pak Ngan Heung River (PNHR), finishing works for U-channel at Ling Tsui Tau, excavation works and installation of gabion blocks for Luk Tei Tong (LTT) bypass channel.

Noise, water quality and ecological monitoring were performed. Results obtained were checked against the previously established Action / Limit (A/L) levels. Additionally, the implementation status of environmental mitigation measures, event/ action plan and environmental complaint handling procedures were inspected during weekly site environmental audit.

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

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. Most of the monitoring results were within established A/L level hence no exceedance was reported.

During ecological monitoring survey, no White-shouldered Starling was recorded breeding in the watch tower. And there was no sign of disturbance from the Project to the watch tower as no construction work of the Project were conducted near the tower in December 2008. The breeding season of White-shouldered Starling is over in this time of the year. In addition, no disturbance on the flora and fauna in the river channels were observed during the ecological monitoring.

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

Key construction activity in the coming month will be construction of box culvert at PNRH, U-channel at Ling Tsui Tau, and construction of gabion wall at Luk Tei Tong. It is expected that noise, air and water quality impacts will be resulted from the works. With reference to the EM&A manual and mitigation measure report, mitigation measures are proposed to be taken, if necessary.

The environmental performance of the project was generally satisfactory.

## **1. Introduction**

This is the fifth monthly Environmental Monitoring and Audit (EM&A) Report for “Drainage Improvement in Southern Lantau Investigation” project (Environmental Permit No. EP-237/2005/A)

## **2. Project Information**

### **2.1 Construction program**

The “Drainage Improvement in Southern Lantau Investigation” project will be completed by June 2009. The project comprises the following:

- Construction of approximately 80m long gabion with natural bed in Pak Ngan Heung River, approximately 180m of three cells 3m x 2m box culvert and approximately 100m of rectangular channel at Pak Ngan Heung River;
- Construction of approximately 250m of 0.75m wide U-Channel at Ling Tsui Tau Village in Mui Wo;
- Construction of bypass channel of about 350m and 240m long of gabion channels at Luk Tei Tong River respectively; and Widening three existing bottlenecks with gabion lined at Tai Tei Tong River

Appendix G shows the construction program and location plan of the project.

### **2.2 Project Organization**

The Main Contractor, Yick Hing Construction Company Limited, has commissioned Environmental Pioneers & Solutions Limited as the Environmental Team, which comprises the environmental team leader and the environmental technicians to undertake the environmental monitoring and audit work for this project.

The environmental management structure and is shown in Fig 2.2.1.

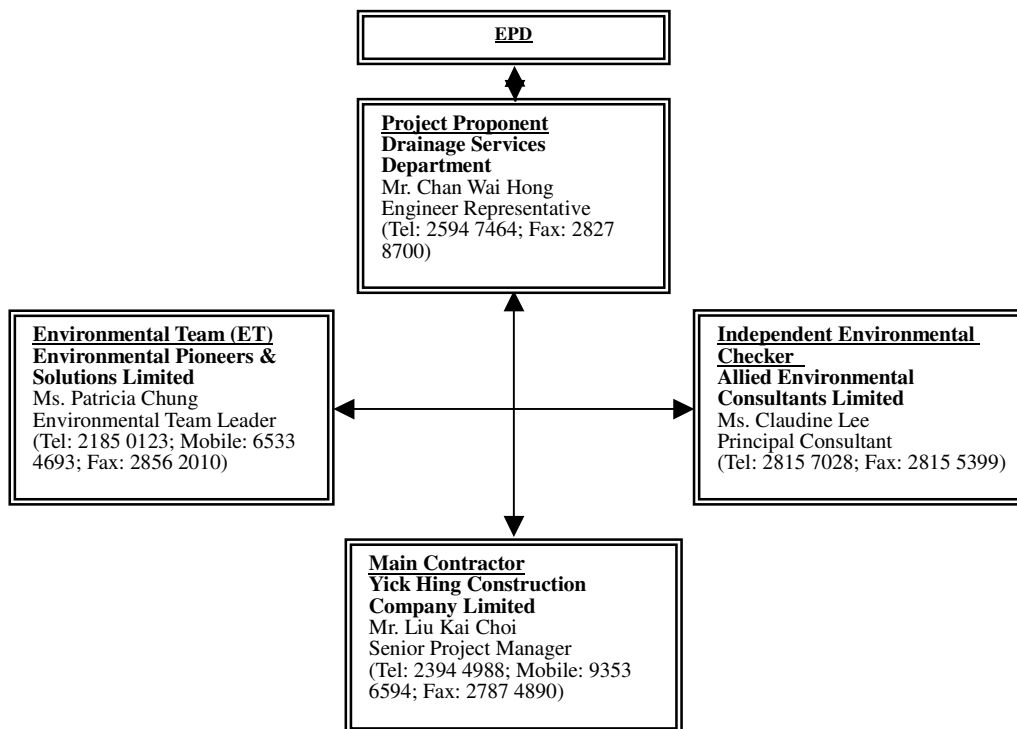


Figure. 2.2.1 Environmental Management structure for the project

### 2.3 Key Personal Contact information chart

Detailed contact of key persons involved in environmental aspect of the project is shown in appendix A.



### **3. Construction Stage**

#### **3.1 Construction Activities in the reporting month**

Major activities in the reporting month included the followings:

1. Formation and concreting works for box culvert bay no.2 & 3 at PNHR;
2. Finishing works for box culvert bay no.9 & 10;
3. Finishing works for the U-channel at Ling Tsui Tau;
4. Site clearance works for LTT marsh;
5. Excavation works for LTT bypass channel (chainage 99 to 250 & chainage 280 to 325); and
6. Installation of gabion blocks for LTT bypass channel (chainage 99 to 250).

#### **3.2 Construction Activities for the coming month**

Key Construction works in the coming month will include:

1. Formation and concreting works for box culvert bay no.2 & 3 at PNHR;
2. Finishing works of U-channel at Ling Tsui Tau;
3. Excavation works for LTT bypass channel; and
4. Installation of gabion blocks at LTT marsh.

#### **3.3 Environmental Status**

Appendix G shows the drawing of the project area.

Locations of the monitoring and control stations with environmental sensitive receivers are presented in Section 4.3, 5.3 and 6.3 for noise, water and ecological monitoring respectively.

## 4. Noise Monitoring

### 4.1 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 4.5.2, 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.

### 4.2 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 4.2.1 summarizes the equipment list for noise monitoring

Table 4.2.1 Equipment List for Noise Monitoring

Equipment	Manufacturer & Model No.	Precision Grade	Qty
Integrated sound level meter	SVAN Model 949	IEC 651 Type 1 IEC 804 Type 1	1
Windscreen	Microtech gefell model W2	N/A	1
Acoustical calibrator	SVAN SV-30A	IEC 942 Type 1	1
Wind speed indicator	Kestrel K1000	N/A	1
Remarks: Calibration details for the sound level meter is given in Appendix B for reference			

### 4.3 Monitoring Locations

According to the Baseline Monitoring Report issued in May 2008 for the captioned project, four locations were alternative from the locations proposed in EM&A manual, were designated for baseline noise monitoring. For the data validation, impact noise monitoring was undertaken in the same locations during the construction phase of the project. The proposed monitoring locations are summarized in Table 4.3.1. Figure 4.3.1 shows the Noise Monitoring Locations

Noise measurement in each monitoring locations were taken at a point 1m from the exterior of the selected premises and at a height with no disturbance to the dweller and least obstructed view.

Table 4.3.1 Noise Monitoring Locations during Construction Phase

Identification No.	Noise Monitoring Locations
N1	No. 73, Village House, Ling Tsui Tau Tsuen (ground level)
N2	No. 31, Village House, Ling Tsui Tau Tsuen (ground level)
N3	Fence wall outside No. 5 village house adjacent to Luk Tei Tong River Outlet (ground level)
N4	No. 23, Village House, Tai Tei Tong River (ground level)

In accordance with the requirements in the EM&A manual, 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 (ie. 1900-2300, 2300-0700 of next day and Sundays / general holiday), impact monitoring that comprises 3 consecutive  $L_{eq(5minutes)}$  would be carried out.

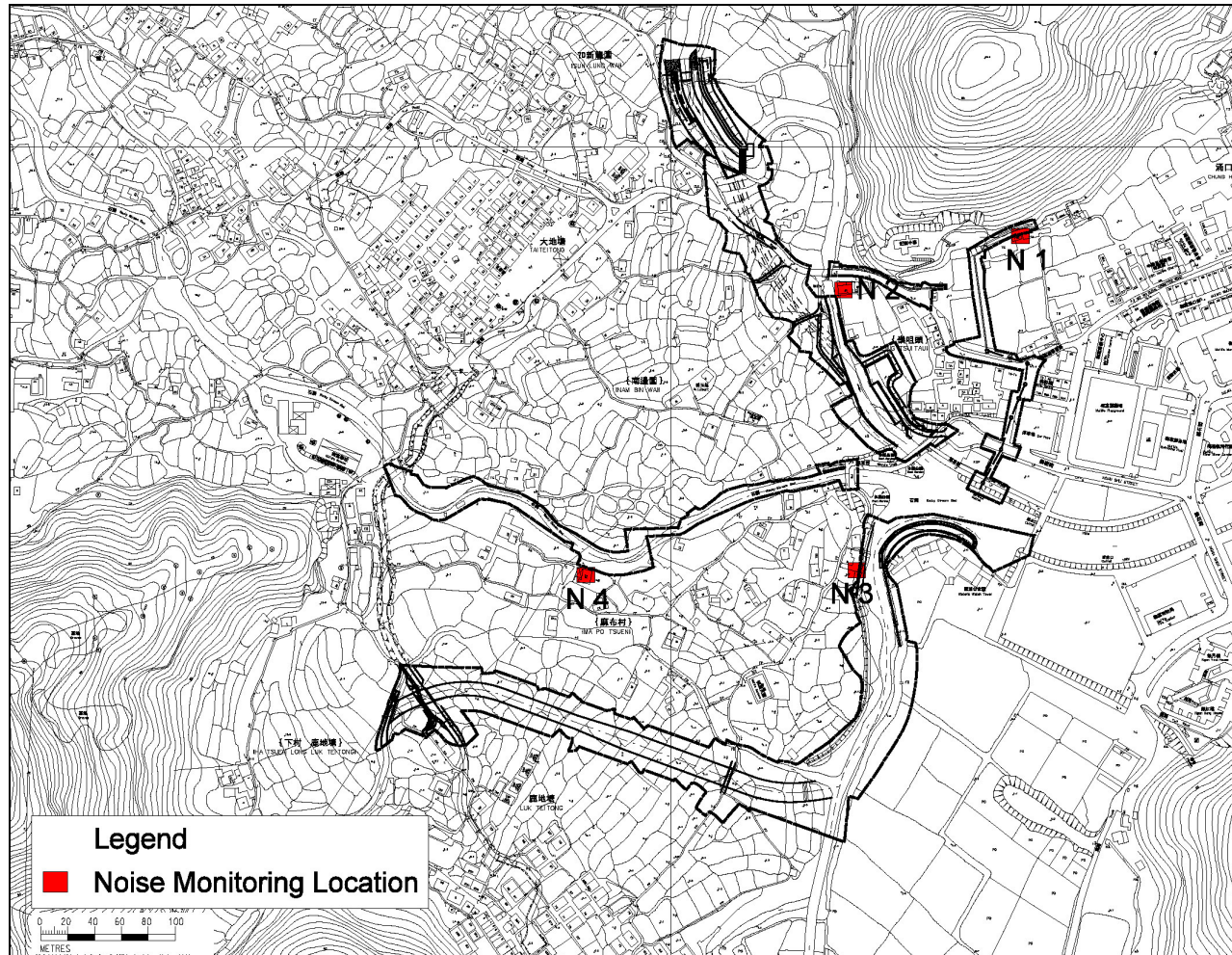


Figure 4.3.1 Impact noise monitoring locations

#### 4.4 Monitoring Results and Interpretation

Relevant details of the noise monitoring results are presented in table 4.4.1. The results, ranged between 40.7 dB (A) and 62.1 dB (A), were within the limit levels and therefore, no exceedance was found.

Table 4.4.1 Noise monitoring results

Table 4.4.1 Noise Monitoring Results for the reporting month							
Location	Parameter	Date	Time	L <sub>Aeq</sub> dB(A)	Limit dB(A)	Exceedance	Weather
N1	L <sub>eq</sub> 30mins	01/12/08	13:40	42.5	75	N	Sunny
N1	L <sub>eq</sub> 30mins	08/12/08	14:20	56.4	75	N	Sunny
N1	L <sub>eq</sub> 30mins	15/12/08	14:25	57.3	75	N	Sunny
N1	L <sub>eq</sub> 30mins	22/12/08	14:50	40.7	75	N	Sunny
N1	L <sub>eq</sub> 30mins	29/12/08	14:40	44.7	75	N	Sunny
N2	L <sub>eq</sub> 30mins	01/12/08	13:00	57.1	75	N	Sunny
N2	L <sub>eq</sub> 30mins	08/12/08	13:40	52.5	75	N	Sunny
N2	L <sub>eq</sub> 30mins	15/12/08	13:00	52.0	75	N	Sunny
N2	L <sub>eq</sub> 30mins	22/12/08	15:25	49.6	75	N	Sunny
N2	L <sub>eq</sub> 30mins	29/12/08	15:20	50.3	75	N	Sunny
N3*	L <sub>eq</sub> 30mins	01/12/08	11:30	54.6	75	N	Sunny
N3*	L <sub>eq</sub> 30mins	08/12/08	13:05	53.8	75	N	Sunny
N3*	L <sub>eq</sub> 30mins	15/12/08	11:20	59.1	75	N	Sunny
N3*	L <sub>eq</sub> 30mins	22/12/08	14:10	57.1	75	N	Sunny
N3*	L <sub>eq</sub> 30mins	29/12/08	11:15	62.1	75	N	Sunny
N4	L <sub>eq</sub> 30mins	01/12/08	10:45	47.9	75	N	Sunny
N4	L <sub>eq</sub> 30mins	08/12/08	11:10	51.3	75	N	Sunny
N4	L <sub>eq</sub> 30mins	15/12/08	10:45	50.5	75	N	Sunny
N4	L <sub>eq</sub> 30mins	22/12/08	11:10	51.7	75	N	Sunny
N4	L <sub>eq</sub> 30mins	29/12/08	10:40	51.5	75	N	Sunny

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

Remark\*: The equivalent noise level of N3 is corrected by +3 dB from the raw data result due to the fact that free field measurement was carried out in the location.

#### 4.5 Action and Limit level for Construction noise

The Action and Limit (A/L) levels for construction noise are defined in Table 4.5.1. Should non-compliance of the criteria occur, action in accordance with the Action Plan in Table 4.5.2 should be carried out.

There was no recorded exceedance in the reporting month.

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.		

Table 4.5.2 Event / Action Plan for Construction Noise

EVENT	ACTION			
	ET	IC(E)	ER	Contractor
Action Level	<ol style="list-style-type: none"> <li>1. Notify IC(E) and Contractor;</li> <li>2. Carry out investigation;</li> <li>3. Report the results of investigation to the IC(E), 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 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. Ensure remedial measures are properly implemented.</li> </ol>	<ol style="list-style-type: none"> <li>1. Submit noise mitigation proposals to IC(E);</li> <li>2. Implement Noise mitigation proposals.</li> </ol>
Limit Level	<ol style="list-style-type: none"> <li>1. Identify source;</li> <li>2. Inform IC(E), ER, EPD and Contractor;</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 IC(E), ER and EPD the causes and actions taken for the exceedances;</li> <li>7. Assess effectiveness of Contractor's remedial actions and keep IC(E), 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 Contractors 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. Ensure 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 IC(E) 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>



#### **4.6 Noise Mitigation Measures**

The following mitigation measures were observed from the weekly site inspection in the reporting month:

- Use of quiet powered mechanical equipment (PME)
- Implementation of the following good site practices:
  - Only well-maintained and regularly serviced plant should be operated on site
  - Silencers or mufflers on construction equipment
  - Mobile plant, if any, should be sited as far from NSRs as possible;
  - Machines and plant (such as trucks) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum;

## **5. Water Monitoring**

### **5.1 Water Quality Monitoring Parameters and methodology**

Turbidity in Nephelometric Turbidity Unit (NTU), Dissolved Oxygen (DO) in mg/L and Suspended Solids (SS) in mg/L are required to measure in this project. Turbidity, DO was measured in-situ while water samples were delivered to Accredited HOKLAS Laboratory for analysis of SS.

Other relevant data such as monitoring location, time, water depth, temperature, salinity, weather conditions and any other special phenomena and work underway at the construction site were recorded during sampling.

According to the requirement of the EM&A manual, two consecutive measurements for parameters of DO concentration, DO saturation and Turbidity are required to be taken at each monitoring location. When the difference in value between the first and second reading of DO or Turbidity is more than 25%, the reading would be discarded and further reading would be taken.

### **5.2 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.

Suspended solid 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. Duplicate samples from each independent sampling event were undertaken during impact monitoring.



### **5.3 Monitoring Locations**

Seven locations included a control station in upstream of each stream/ river, a monitoring station at the end of each stream/ river of the works area and a monitoring station at Silver River were proposed for the impact water quality monitoring. Water samples were collected at mid-depth of each proposed monitoring stations for measurements and sample collection. The Location Plan is shown in Figure 5.3.1 for reference.

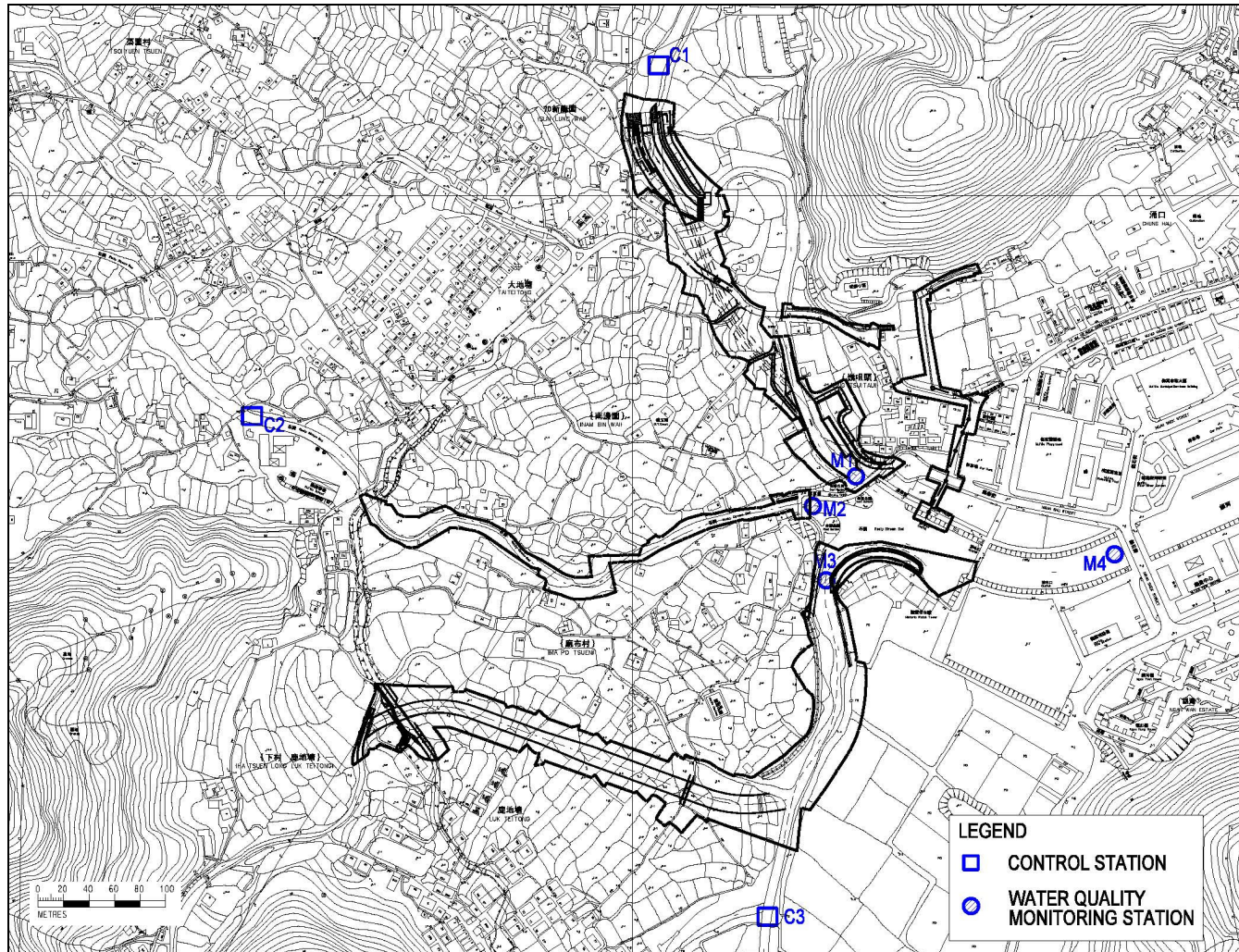


Figure 5.3.1 Water Quality Monitoring Locations

## 5.4 Monitoring Frequency

Impact water quality monitoring was undertaken three days per week and at ebb tides during the course of the construction river works. Upon the completion of the construction works, the monitoring exercises at the designated monitoring stations will be continued for four weeks in the same manner as the impact monitoring.

## 5.5 Monitoring Results and Interpretation

Water quality monitoring was carried out fourteen times during December. Detailed on-site measurements and laboratory analysis reports including QA/QC results are shown in appendix E1 and E2 respectively, while Table 5.5.1 presents consolidated results throughout the reporting month.

Based on the on site monitoring and lab testing results, no exceedance was found in the reporting month.

Table 5.51 Water quality monitoring results in December 2008

	M1			M2			M3			M4		
	MIN	MAX	Ave	MIN	MAX	Ave	MIN	MAX	Ave	MIN	MAX	Ave
Turbidity (NTU)	1.3	9.2	5.0	0.0	4.9	3.0	2.5	10.3	6.7	6.9	14.9	10.0
DO (mg/l)	8.6	10.4	9.7	8.7	9.9	9.3	6.1	9.6	8.3	6.0	8.5	6.9
Suspended Solid (mg/l)	0.1	5.4	2.4	1.0	2.4	1.2	2.3	9.7	5.7	5.0	11.9	8.3

	C1			C2			C3		
	MIN	MAX	Ave	MIN	MAX	Ave	MIN	MAX	Ave
Turbidity (NTU)	0.0	7.7	2.8	0.0	4.0	2.3	3.5	52.4	12.1
DO (mg/l)	8.4	9.8	8.9	7.8	9.4	8.8	3.4	8.4	4.9
Suspended Solid (mg/l)	1.0	1.1	1.0	1.0	1.3	1.0	3.2	45.1	12.1

\* Remarks: Detection limit for Turbidity, DO and SS are 1 NTU, 0.1 mg/L and 1 mg/L respectively.

## 5.6 Action and limit level for Water Quality

Based on the baseline water quality monitoring data obtained, the A/L levels are shown in Table 5.6.1. 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 5.6.2 should be taken.

There was no exceedance recorded hence no further actions were taken in this reporting month.

Table 5.6.1 Action and Limit Levels for water quality monitoring

Parameters	Monitoring locations							
	M1		M2		M3		M4	
	Action Level	Limit Level	Action Level	Limit Level	Action Level	Limit Level	Action Level	Limit Level
Turbidity (NTU)	15.2	16.9	5.3	6.5	16.8	26.0	16.2	18.0
DO (mg/L)	5.7	4.0	6.2	4.0	5.9	4.0	5.9	4.0
SS (mg/L)	12.2	12.8	3.1	4.2	12.4	17.7	13.9	15.2

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 5.6.2 Event and action Plan for Water Quality

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

## **5.7 Water Quality Mitigation Measures**

### **Construction Run-off and Drainage**

The site practices outlined in ProPECC PN 1/94 ‘Construction Site Drainage’ should be followed as far as practicable during both construction and operation phase of the drainage improvement works in order to minimize surface runoff and the chance of erosion, and also to retain and reduce any suspended solids prior to discharge.

As recommended in the final EM&A manual, attention would be paid specially construction run-off and drainage, general construction activities, sewage discharged from construction workforce and river channel excavation works.

From the current observation, contractor installed the wheel washing facilities and desilting tank as implementation of water quality mitigation measures.

### **5.8 Water Monitoring Schedule for the Next reporting period**

Water monitoring in the next reporting period is scheduled for 2,7,8,9,12,14,16,19 and 20 January



## **6. Ecology Monitoring**

### **6.1 Ecological Monitoring Parameters**

According to the Final EM&A Manual, a specific ecological monitoring programme of the improved section of PNH and LTT Rivers is recommended. The monitoring parameters required to measure in this project and survey methodology are described below:

(1) Avifauna species and abundance: Birds will be surveyed quantitatively using transect count method. Birds within the river channel and on the riverbank will be identified and their abundance will be recorded.

(2) Aquatic macroinvertebrate community species composition and abundance: Survey on aquatic fauna will focus on determination of the diversity and abundance of stream aquatic communities. Sampling methods, such as active searching, direct observation, netting, and kick sampling, will be determined according to the site conditions during field survey.

(3) Fish community species composition and abundance: Sampling methods, such as active searching, direct observation, and hand netting, will be determined according to the site conditions during field survey.

(4) Adult odonate community species composition and abundance: Adult dragonfly will be surveyed quantitatively using transect count method. Adult dragonflies within the river channel and on the riverbank will be identified and their abundance will be recorded. Species requiring close examination will be netted.

(5) Aquatic, emergent and riparian vegetation community species composition and abundance: The area will be walked through. Plant species composition and their relative abundance will be recorded.

(6) Surveys of White-shouldered Starling *Sturnus sinensis* will be conducted at the disused watchtowers next to LTT river. Breeding of the White-shouldered Starlings will be determined by checking signs of attempt to breed or sign of breeding which include carrying nesting materials, to-and-fro movement of adults carrying food, presence of recently fledged juveniles, etc. The number of breeding pairs and the site observation will be recorded whenever possible.

Water Quality Monitoring along LTT and PNH River as well as LTT bypass channel was carried out. Water quality monitoring will include Turbidity in Nephelometric Turbidity Unit (NTU), Dissolved Oxygen (DO) in mg/L and Suspended Solids (SS) in mg/L are required to measure in this project. Moreover, additional water monitoring parameters will be taken for the purposes of ecological monitoring of water quality in this project. The added information will include: BOD, Ammonia, Nitrate and Phosphate concentrations. Turbidity, DO, pH and water flow will be measured in-situ while water samples will be delivered to Accredited HOKLAS Laboratory accredited laboratory and the analyses followed the standard methods according to APHA Standard Methods for the Examination of Water and Wastewater, 20<sup>th</sup> Edition, or equivalent for analysis of SS, BOD, Ammonia, Nitrate and Phosphate concentrations.

Other relevant data such as monitoring location, time, water depth, temperature, salinity, weather conditions and any other special phenomena and work underway at the construction site will be recorded during sampling.

According to the requirement of the EM&A manual, two consecutive measurements for parameters of DO concentration, DO saturation and Turbidity are required to be taken at each monitoring. When the difference in value between the first and second reading of DO or Turbidity is more than 25%, the reading will be discarded and further reading will be taken.

## **6.2 Monitoring Equipment and Methodology**

Turbidity, DO, Salinity, pH and Temperature will be measured by a 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.

Suspended solid 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. Duplicate samples from each independent sampling event were undertaken during impact monitoring.

### **6.3 Monitoring Locations**

According to the Final EM&A Manual, the improved section of the river channels will be divided into 50m long sections, and ecological survey will be carried out in each of the 50m sections. A total of nine sections will be divided for the two rivers which include:

- Two sections for existing upstream of PNH river (i.e. the proposed 80m long trapezoidal channel)
- Two sections for existing downstream of PNH river (i.e. the proposed 100m long rectangular channel)
- Five sections for existing Luk Tei Tong River (i.e. the proposed 240m long trapezoidal channel)

The disused watchtowers are located at the confluence of the three rivers and next to LTT river.

The Location Plan for ecological is shown in Figure 6.1 for reference.

The improved sections of the river channels require to carrying out water quality monitoring for the ecological purpose. The sampling points for impact monitoring was undertaken in the same place as the baseline monitoring proposed, where include:

- Three points for existing of PNH river
- Three points for existing of Luk Tei Tong River

The Location Plan for ecological water monitoring is shown in Figure 6.2 for reference.

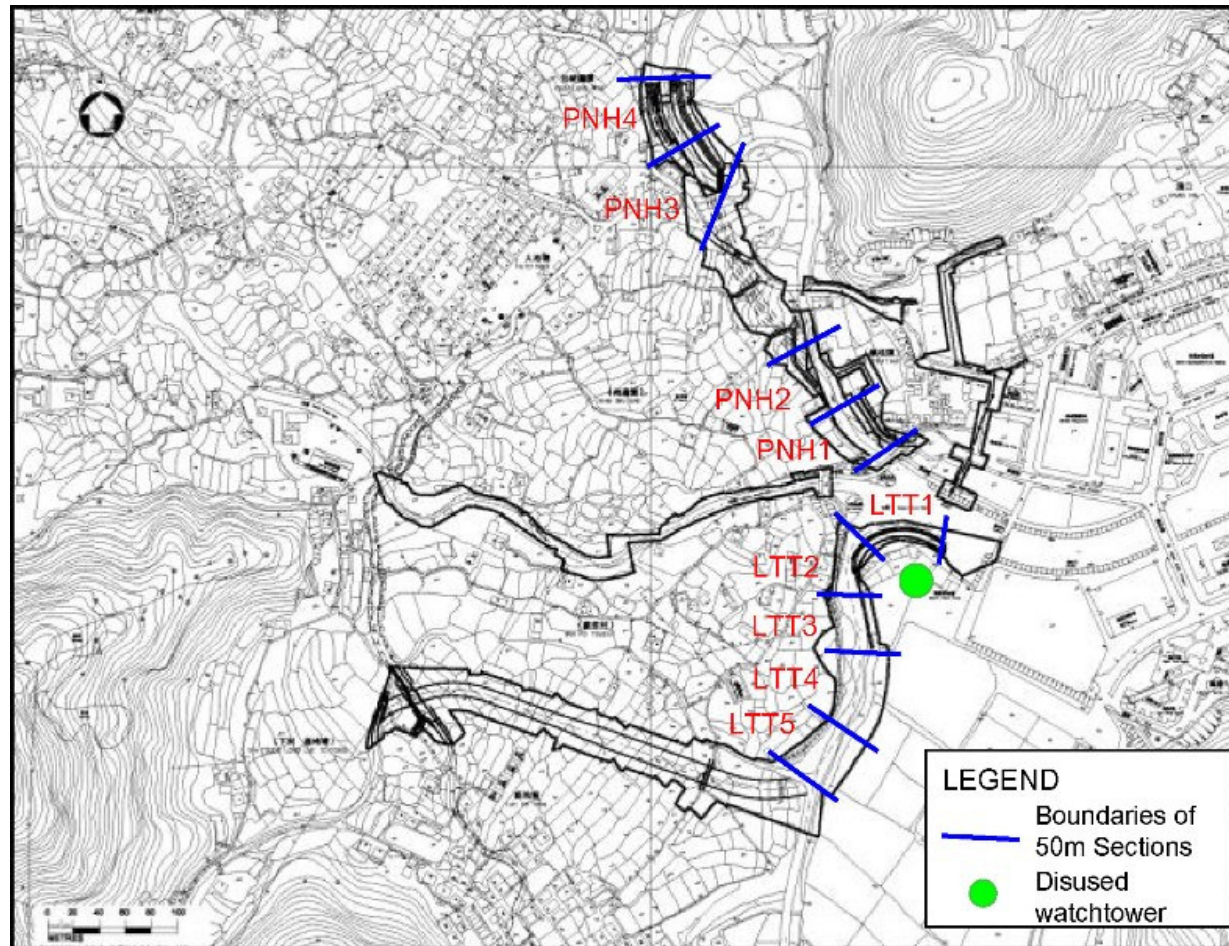


Figure 6.1 Ecological Monitoring Locations

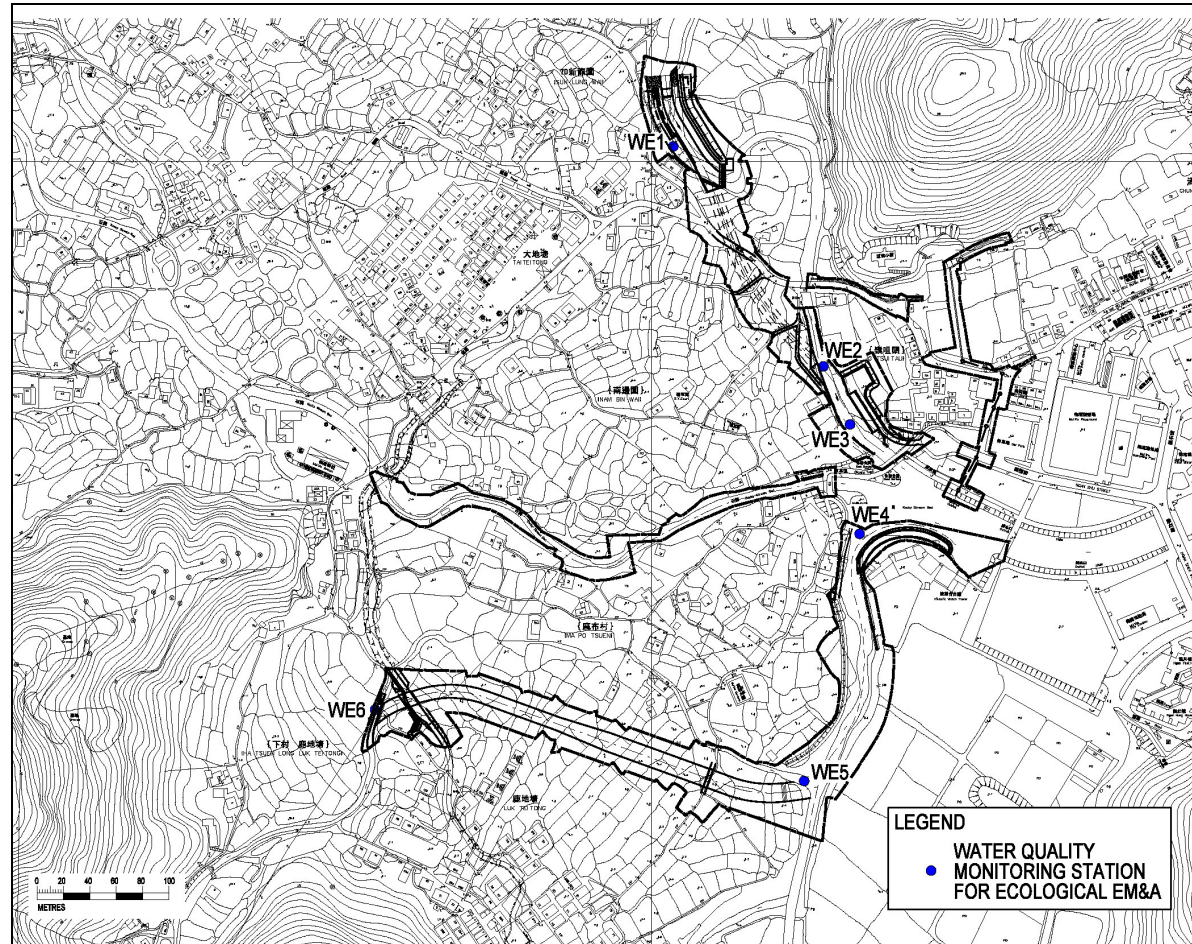


Figure 6.2 Ecological Water Quality monitoring locations

## **6.4 Monitoring Frequency**

As proposed, impact ecological monitoring was carried out once for each monitoring location in the reporting month.

## **6.5 Monitoring results**

### **Pak Ngan Heung Stream N and S sections**

#### **Vegetation**

Surveys were conducted on 16 December 2008. The north section of Pak Ngan Heung Stream was fairly modified. Part of the west bank was lined with rock gabion bank and occupied by village houses and abandoned agricultural field. The stream channel was wider than the downstream section, but the stream bank was still fairly narrow and steep in gradient. Compared to the south section, the north section was relatively shaded due to presence of more trees with larger canopy.

The walk through survey recorded a total of 61 species, including 23 trees, 10 shrub, 15 herb and 5 grass species (Appendix C1). 48 of the species recorded are natives, while 13 were exotics. The quantitative sampling recorded 23 species at the north section. Large native (e.g. *Celtis sinensis*, *Cleistocalyx operculata*, *Ficus hispida*) and exotic trees (*Acacia confusa*) dominated the transects. Other species recorded include common and typical native pioneer forest and streamside tree species and ruderal species. No species of conservation interest was recorded.



**Table 6.5.1 Relative percentage cover of vegetation recorded at Pak Ngan Heung (N) Section**

Species	Relative % cover	
	PNH3	PNH4
<i>Acacia confusa</i>		14.82
<i>Acorus graminifolius</i>		1.01
<i>Alocasia macrorrhiza</i>	1.86	2.99
<i>Aporosa dioica</i>	1.12	1.87
Bamboo	10.76	
<i>Celtis sinensis</i>	27.32	12.95
<i>Christella parasitica</i>		2.01
<i>Cleistocalyx operculata</i>	16.56	
<i>Dimocarpus longan</i>		
<i>Embelia ribes</i>		1.15
<i>Ficus hispida</i>	5.38	23.60
<i>Litsea glutinosa</i>		15.83
<i>Macaranga tanarius</i>		11.80
<i>Mallotus paniculatus</i>	16.56	
<i>Microstegium ciliatum</i>		3.17
<i>Mikania micrantha</i>	0.99	0.86
<i>Phyllanthus urinaria</i>		0.59
<i>Pueraria phaseoloides</i>		1.88
<i>Sageretia thea</i>		3.74
<i>Sporobolus fertilis</i>		1.73
<i>Sterculia lanceolata</i>		
<i>Syzygium jambos</i>	19.45	
Total Relative % Cover	100	100
Total Transect Length (m)	13	34

The south section of Pak Ngan Heung Stream was highly modified. Both banks were lined with rock gabions and were occupied by village houses immediately beyond the channel. The stream channel was lack of riparian zone and vegetation. A total of 21 species recorded, 16 of which were native

and 5 were exotic. It was composed of isolated individuals of mangrove (*Kandelia obovata*), backshore species (*Clerodendrum inerme*), native (*Celtis sinensis*) and planted trees (*Acacia confusa*) (Appendix C2). No species of conservation interest was recorded.

### ***Terrestrial Fauna***

Surveys were conducted on 12 December 2008.

A total of nine species of birds were recorded in the proposed work area of the Pak Ngan Heung River (Table 6.5.2). All are common in Hong Kong.

**Table 6.5.2 Avifauna in Pak Ngan Heung**

Common names	Latin names	PNH 1	PNH 2	PNH 3	PNH 4	Commonness & distribution
Common Sandpiper	<i>Actitis hypoleucos</i>		1			CW
Spotted Dove	<i>Streptopelia chinensis</i>		1			CW
Common Tailorbird	<i>Orthotomus sutorius</i>	1				CW
Yellow-browed Warbler	<i>Phylloscopus inornatus</i>				1	CW
Dusky Warbler	<i>Phylloscopus fuscatus</i>		1			CL
Great Tit	<i>Parus major</i>				1	CW
Black-necked Starling	<i>Sturnus nigricollis</i>	1				CW
Magpie	<i>Pica pica</i>				1	CW
Japanese White-eye	<i>Zosterops japonica</i>		1			CW

CW = common and widespread, CL = common/uncommon and localized

Two species of dragonfly were recorded in the proposed work area of the Pak Ngan Heung River (Table 6.5.3). All are very common in Hong Kong.

**Table 6.5.3 Dragonfly in Pak Ngan Heung**

Common names	Latin names	PNH 1	PNH 2	PNH 3	PNH 4	Commonness & distribution
Wandering Glider	<i>Pantala flavescens</i>			1		A
Indigo Dropwing	<i>Trithemis festiva</i>			1		A

A = abundant

### *Aquatic fauna and fish*

10 species of fish and 3 species of crustacean were recorded in the 4 sections at PNH. All are common and widespread in Hong Kong, and were previously recorded in this location in previous monitoring. No additional fauna species was recorded in the present monitoring. Though Predaceous Chub was observed, the another one fish species of conservation concern reported in the EIA report, i.e. Flagtail Kuhlia marginata, was not recorded in PNH during the present monthly monitoring survey.

**Table 6.5.4 Aquatic Invertebrates and fish in Pak Ngan Heung**

Common names	Scientific names	PNH 1	PNH 2	PNH3	PNH4
Atyid shrimp	<i>Caridina elongata</i>				++
Palaemonid shrimp	<i>Macrobrachium hainanensis</i>	+	+	++	+
Crab	<i>Varuna litterata</i>				
Mitten Crab	<i>Eriocheir japonica</i>	+	+	+	
Mosquito fish	<i>Gambusia affinis</i>				+
Barcheek Goby	<i>Rhinogobius giurinus</i>		+		+
Goby	<i>Rhinogobius duospilus</i>		+		++
Swordtail	<i>Xiphophorus hellerii</i>				+
Six-banded Barb	<i>Puntius semifasciolatus</i>				
Unidentified Cichlid fish					+
Tilapia		++	++	+	
Predaceous Chub	<i>Parazacco spilurus</i>		++	++	
Jarboa Terapon	<i>Terapon jarbua</i>	++	+		

Common Silver-biddy	<i>Gerres oyena</i>	++	++		
Mullet	<i>Mugil cephalus</i>	+++	+++		
Broken-band Hillstream Loach	<i>Liniparhomaloptera disparis</i>				

+ = Occasional, less than 5 individuals were found; ++ = Common, 5 – 20 individuals were found; +++ = Abundant, more than 20 individuals were found.

## Luk Tei Tong Stream Section

### Vegetation

Surveys were conducted on 16 December 2008. The Luk Tei Tong Stream Section was highly modified. The stream bank from Section 1 to 4 were largely lined with rock gabions or concrete while stream bank of section 5 were fully lined with wired rock gabions and was little vegetated. Vegetation only established on isolated muddy patches at the estuary and remaining semi-natural bank which was fairly narrow and steep in gradient. The whole section appeared to be subject to tidal influence, as mangrove associated or backshore species were recorded along the whole channel.

The walk through survey recorded a total of 42 species, including 12 tree, 5 shrub, 2 herb and 7 grass species (Appendix C3). 31 of the species recorded are natives, while 7 were exotics. The quantitative sampling recorded 18 species at the middle section. Section 2 was dominated by *Terminalia catappa* and *Wollastonia biflora*, while Section 3 and 4 was dominated by *Hibiscus tiliaceus* and *Clerodendrum inerme* respectively.

Due to the patchiness of streamside vegetation, the quantitative data should be interpreted with cautions and used as a reference only.



**Table 6.5.5 Relative percentage cover of vegetation recorded at Luk Tei Tong Stream Section**

Species	Relative % cover		
	LLT2	LLT3	LLT4
<i>Acanthus ilicifolius</i>	3.69	15.60	3.13
<i>Artemesia sp.</i>			1.19
<i>Cassytha filiformis</i>			0.57
<i>Celtis sinensis</i>	27.27		
<i>Clerodendrum inerme</i>	3.61		29.01
<i>Dendrotrophe frutescens</i>			7.05
<i>Fimbristylis sp.</i>	9.20		29.01
<i>Hibiscus tiliaceus</i>		75.74	0.57
<i>Ischaemum sp.</i>			3.41
<i>Kandelia obovata</i>	2.04	8.66	
<i>Neyraudia reynaudiana</i>			14.79
<i>Papalum paspaloides</i>	6.13		7.39
<i>Pueraria phaseoloides</i>			1.14
<i>Scoparia dulcis</i>			2.28
<i>Terminalia catappa</i>	30.68		
<i>Toxocarpus wightianum</i>	0.68		
<i>Wollastonia biflora</i>	16.70		0.46
Total Relative % Cover	100	100	100
Total Transect Length (m)	11	16.0	22.0

### ***Terrestrial Fauna***

The proposed work area of Luk Tei Tong River was divided into 5 sections. All recorded avifauna and dragonfly species are common in Hong Kong

Surveys were conducted on 12 December 2008.

A total of sixteen species of birds were recorded in these sections (Table 6.5.6). All these species are common and widely distributed in Hong Kong.

**Table 6.5.6 Avifauna in Luk Tei Tong River**

Common names	Latin names	LTT 1	LTT 2	LTT 3	LTT 4	LTT 5	Commonness & distribution
Little Egret	<i>Egretta garzetta</i>	1				1	CW
Great Egret	<i>Casmerodius albus</i>	1					CL
Grey Heron	<i>Ardea cinerea</i>	1					CL
Black-crowned Night Heron			3				CL
Green Sandpiper	<i>Tringa ochropus</i>	1					CL
Common Sandpiper	<i>Actitis hypoleucos</i>						CW
White-breasted Waterhen	<i>Amaurornis phoenicurus</i>					1	CW
Spotted Dove	<i>Streptopelia chinensis</i>				1		CW
White Wagtail	<i>Motacilla alba</i>	1					CW
Chinese Bulbul	<i>Pycnonotus sinensis</i>				1		CW
Crested Bulbul	<i>Pycnonotus jocosus</i>						CW
Common Blackbird	<i>Turdus merula</i>			1			
Oriental Magpie Robin	<i>Copsychus saularis</i>			1	1		CW
Yellow-bellied Prinia	<i>Prinia flaviventris</i>				1		CW
Rufous-backed Shrike	<i>Lanius schach</i>		1				CW
Crested Myna	<i>Acridotheres crisatellus</i>	2					CW

CW = common and widespread, CL = common/uncommon and localised

Two species of dragonfly were recorded in the Luk Tei Tong River (Table 6.5.7). Both these species are common in Hong Kong.

**Table 6.5.7 Dragonfly in Luk Tei Tong River**

Common names	Latin names	LTT 1	LTT 2	LTT 3	LTT 4	LTT 5	Commonness & distribution
Saddlebag Glider	<i>Tramea virginia</i>					2	C
Indigo Dropwing	<i>Trithemis festiva</i>			1			A

A = abundant, C = common

### Aquatic invertebrates and fish

5 species of fish, 3 species of crustacean and 3 species of mollusks were recorded in the 5 sections at LTT. All are common and widespread in Hong Kong, and were previously recorded in this location in previous monitoring. No additional species was recorded in the present monitoring. The two fish species of conservation concern reported in the EIA report, i.e. Flagtail *Kuhlia marginata* and Predaceous Chub *Parazacco spilurus* were not recorded in LTT during the baseline monitoring survey and the present monitoring.

**Table 6.5.8 Aquatic invertebrates and fish in Luk Tei Tong River**

Common names	Scientific names	LTT1	LTT2	LTT3	LTT4	LTT5
Rock oyster	<i>Saccostrea cucullata</i>		+	+	+	
Mangrove clam	<i>Geloina erosa</i>			+	+	
Snail	<i>Melanoides tuberculata</i>	+	+	+		
Crab	<i>Varuna litterata</i>					
Fiddler crab	<i>Uca lactea</i>					
Fiddler crab	<i>Uca arcuata</i>					
Fiddler crab	<i>Uca crassipes</i>					
Crab	<i>Perisesarma bidens</i>				+	+
Mangrove mud crab	<i>Scylla paramamosain</i>	+				
Mitten crab	<i>Eriocheir japonica</i>	+				
Common mudskipper	<i>Periophthalmus cantonensis</i>					
Tilapia	<i>Tilapia spp./ Oreochromis spp.</i>	+	+			

Jarboa terapon	<i>Terapon jarbua</i>	++	+			
Mullet	<i>Mugil cephalus</i>	+++	+++			
Common Silver-biddy	<i>Gerres oyena</i>	++	++			
Barcheek Goby	<i>Rhinogobius giurinus</i>				+	+

+ = Occasional, less than 5 individuals were found; ++ = Common, 5 – 20 individuals were found; +++ = Abundant, more than 20 individuals were found.

### Discussed Watchtowers

Surveys were conducted on 12 December 2008.

White-shouldered Starling was not observed during the December 2008 monitoring. There was no sign (e.g., adults carrying food or nesting materials) of use of the watchtower as nesting habitat by White-shouldered Starling.

### Ecological Water Quality Monitoring (EWQM)

EWQM was conducted on 10 December 2008. Monitoring results are summarized in table 6.9. Detailed on-site measurements and laboratory report are presented in appendix C4 and C5.

Table 6.10 shows the baseline results of Ecological Water Quality Monitoring, from the information given in Baseline Monitoring Report.

To review the results in table 6.9 in general, Suspended Solid (3.40 mg/l) turbidity (8.3 NTU) and salinity (8 ppt) recorded in location WE4 was higher than that of the others. However the data was similar with the baseline data of the same location. Also no river based nor land based construction activities were being carried out during monitoring, it is believed there is no direct relation to the results obtained.

**Table 6.9 Summarized Ecological water quality monitoring results (10 December 2008)**

Parameters	Limit of detection	WE1	WE2	WE3	WE4	WE5	WE6
Suspended Solid (mg/l)	1	1.00	1.05	2.60	3.40	3.40	1.00
Nitrogen (Ammonia) (mg/l)	0.01	0.18	0.28	0.39	0.36	0.85	0.17
Nitrogen (Nitrate) (mg/l)	0.01	0.11	0.17	0.20	0.37	0.15	0.07
Phosphorous (mg/l)	0.01	0.01	0.10	0.09	0.11	0.35	0.03
BOD <sub>5</sub> (mg/l)	1	2	4	4	2	3	2
DO (mg/l)	0.01	8.70	9.21	9.70	8.92	10.97	8.97
Turbidity (NTU)	0.01	1.70	3.90	4.70	3.60	8.30	2.90
Temperature (oC)	0.1	15.9	18.7	19.4	20.7	23.2	17.5
pH	0.01	7.25	7.50	7.90	6.67	6.99	6.35
Salinity (ppt)	0.1	0.1	0.8	2.6	8	1.2	0
Conductivity (ms/m)	0.1	2.5	153.0	440.0	1460.0	246.0	5.2
Water Flow (m/s)	N/A	0.9	1.2	N/A*	1.5	N/A*	N/A*

Remark\*: Water flow in the location could not be recorded due to the water depth was too shallow

**Table 6.10 Baseline Results of Ecological water quality monitoring**

Parameters	WE1	WE2	WE3	WE4	WE5	WE6
Suspended Solid (mg/l)	1.0	2.0	3.0	3.0	<1	<1
Nitrogen (Ammonia) (mg/l)	0.07	0.12	0.11	0.23	0.03	0.02
Nitrogen (Nitrate) (mg/l)	0.12	0.13	0.13	0.31	0.04	0.05
Phosphorous (mg/l)	0.04	0.06	0.06	0.09	0.06	0.05
BOD <sub>5</sub> (mg/l)	<2	<2	<2	<2	<2	<2
DO (mg/l)	6.58	6.82	6.37	7.61	6.87	5.70
Turbidity (NTU)	4.44	5.12	5.93	6.96	4.65	2.73
pH	6.4	7.1	7.0	6.8	6.6	6.1
Salinity (ppt)	<0.1	0.1	0.3	7.6	0.1	<0.1

### 6.6 Action and Limit level for Monitoring of White-shouldered Starlings

A simple Event and Action Plan is shown in Table 6.6.1. Should the Event occur, action in accordance with the Action Plan should be carried out.

There was no recorded event in the reporting month.

Table 6.6.1 Event / Action Plan for Monitoring of White-shouldered Starlings

EVENT	ACTION	
	ET Leader	Contractor
Identification of disturbance to breeding White-shouldered Starlings	1. Increase frequency of monitoring to twice weekly	1. Check all construction actions and working methods
	2. Notify Site Engineer	2. Submit proposals for remedial action to prevent abandonment of the breeding site.
	3. Review construction activities of previous week.	3. Implement remedial action.
	4. Identify any changes in construction activities in previous week	4. Liaise with ET regarding effectiveness of remedial actions.
	5. Discuss remedial actions with Site Engineer	

### 6.7 Ecological monitoring Schedule

The next ecological survey are scheduled on 9<sup>th</sup>, 15<sup>th</sup> and 23<sup>rd</sup> January, while ecological water quality monitoring is scheduled on 9<sup>th</sup> January.

## **7. Action taken in Event of Exceedence**

If the measurements (Noise, Water, 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 period there was no exceedance for noise, water quality and ecological measurements recorded; therefore no actions were taken.

## 8. 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.

Contractor has completed the registration of Waste Producer under the Waste Disposal (Chemical Waste)(General) Regulation. The Waste Producer Number, WPN 5213-950-Y2443-03 was assigned by EPD on 12 Aug 2008. The Contractor would be responsible for the implementation of any mitigation measure to minimize waste or redress problems arising from the waste materials.

Table 8.1 is a summary of updated figures of the construction wastes disposal provided by the Contractor.

**Table 8.1 Summary of Construction Waste Disposal**

Month	Amount of Construction Waste disposed		
	Inert Waste (to Public Fill)	Non-inert Waste (to Landfill)	Chemical Waste (to treatment plant)
December 08	1739.31 (ton)	2.42 (ton)	0
Total (from June 08 to Dec 08)	7199.4 (ton)	2.42 (ton)	0



## 9. Status of Permits and Licenses obtained

Table 9.1 is the updated status of environmental related permits/ license obtained for the construction activities

Table 9 .1 Status of Permits and Licenses Obtained

Description	License / Permit No.#	Date of Issue	Date of Expiry	Remarks
Environmental Permit	EP-237/2005/A	05 Mar 2008	--	Issued
Registration of C&D Waste Producer	7006521	--	--	Issued
Chemical Waste Producer	5213-950-Y2443-03	12 Aug 2008	--	Issued
Construction Noise Permit	N/A	N/A	N/A	N/A
Effluent Discharge License	EP890/W2/XG032 EP890/W2/XG033 EP890/W2/XG034 EP890/W2/XG035 EP890/W2/XG036 EP890/W2/XG037 EP890/W2/XG038 EP890/W2/XG039 EP890/W2/XG040 EP890/W2/XG041	23 Oct 2008	31 Oct 2013	Issued

The contractor implemented various environmental mitigation measures as recommended in the Environmental Permit and Final Mitigation Measures Report. The implemented schedule is presented in appendix H.

## 10. Complaint Log

There was no formal complaint received during the reporting month.

	Noise	Water	Ecology	Cultural	Others
Dec 2008	0	0	0	0	0
Total	0	0	0	0	0

## 11. Site Environmental Audits

### 11.1 Site Inspection

With an intention to ensure that appropriate environmental protection and pollution control mitigation measures are properly implemented, regular environmental site inspections have been scheduled.

Within the reporting month, site inspections were conducted on 5, 12, 18 and 23 of December.

A detailed checklist of each site inspection together with comments, relevant photos and maps have been filed and kept. A summary of observation and follow-up action is shown in table 11.1

Date	Observations	Advice from ET	Action taken	Closing Date
29 Nov 08 & 5 Dec 08	A mini power generator was found without proper drip tray, within the site area at PNH	A drip tray is advised to provide for the equipment to prevent oil leakage	Defective equipment without drip tray was removed from the site	12 Dec 08
29 Nov 08	Empty chemical drums were found dumping at the site area of LTT	Contractor is advised to store those drums at the chemical waste storage area assigned.	Chemical drums were removed from the site	12 Dec 08
5 Dec 08	Excavated top soil / turf from LTT marsh were found storing without proper labeling	Contractor should provide labels to avoid confusion with the dumping soil	Labels of "Retained Top Soil" were provided	12 Dec 08
5 Dec 08	Maintenance of excavated top soil / turf was concerned by ET	Contractor was reminded to provide regular watering to the excavated top soil / turfs as such to maintain their condition	Daily watering is being provided to the top soil / turf	Ongoing
5 Dec 08	River water has entered the pit at LTT marsh during flood tides	Contractor was requested by DSD representative to fill up	Pit was filled by earth materials as	12 Dec 08

**Table 11.1 Summary of site inspection**

Date	Observations	Advice from ET	Action taken	Closing Date
		the pit to prevent soil runoff	advised	
12 Dec 08	Damaged sand bags as bunds were observed at public drainage channel beside of PNH Box Culvert bay 9 and 10	New sand bags should be provided for forming bunds to protect the public drainage channel	Damage sand bags were replaced as advised	18 Dec 08
18 Dec 08	A stockpile of earth materials were found storing nearby the river channel at PNH Box Culvert Bay 1 & 2	Contractor was advised to removed the stockpile away from the river channel if practicable	Stockpile has been flattened to control height that prevent runoff to river	23 Dec 08
18 Dec 08	Stagnant water and wastes were found accumulated at the bottom of the wheel washing bay	Stagnant water and wastes should be removed for hygiene issues	Bottom pit of the wheel washing bay was cleaned	23 Dec 08
18 Dec 08	Housekeeping issues of construction materials and general wastes were mixed without proper segregation, storing at PNH Box Culvert Bay 9 & 10	Wastes should be segregated for disposal and construction materials should be storing away from wastes to avoid confusion	To be follow up	Ongoing
23 Dec 08	Stockpile of boulders was found without covering at LTT	Covering by tarpaulin or similarities should be provided for erosion issue	To be follow up	Ongoing
12, 18 and 23 Dec 08	Dusty ground was observed at site of Ling Tsui Tau U-channel, PNH box culvert bays and LTT bypass channel	Regular watering should be provided for dust suppression	To be follow up	Ongoing
12, 18 and 23 Dec 08	Stagnant water accumulated at the bottom of excavated pit at sites of LTT bypass channel, PNH box culvert bays were observed	Contractor was reminded that site water should be properly treat before discharge to storm water drainage	Stagnant water was pumped to the site surface as natural soak-away	Ongoing

## 11.2 Compliance with legal and Contractual requirement

ET leader has reviewed the progress and programme of the works to check that contractor has not violated relevant environmental laws.

### **11.3 Environmental Complaint and follow up actions**

During this reporting period, there was no documented complaint received. Therefore, follow up actions for the Environmental Complaint is not required

### **12. Future key issues**

Key construction activity in the coming month will be construction of box culvert at PNHR, excavation activities and formation works of gabion blocks at the LTT marsh. It is expected that several impacts on environmental aspects will be generated on-site. With reference to the EM&A manual, mitigation measure report as well as the environmental permit, proper mitigation measures are proposed to be taken, if necessary.

Underground water and site water may be accumulated on site. Contractor is recommended to treat the accumulated site water by proper desilting facilities before discharging to the designated stormwater drainage, also reuse of site water should be considerable.

Air impact may be resulted by boulder breaking and formation works of gabion blocks, contractor is reminded to provide regular watering to the dusty static site area and stockpile. Meanwhile, size and height of stockpiles should be controlled as such erosion issue could be minimized.

Soil excavated from sites may resulting visual and air quality impact to the vicinity, contractor should regularly dispose the inert waste, and covering should be provided for the dumping soil as short term storing.

Contractor is reminded again that topsoil and turf excavated from LTT marsh should be kept and maintained in proper condition for reinstating purpose in accordance with the requirement stated in EP.

### **13. Conclusions**

In this reporting month, Construction work of box culvert at PNH, finishing works for U-channel at Ling Tsui Tau, excavation and installation works for gabion blocks at LTT marsh were carried out.

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 at the mid of the reporting month.

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

For water quality monitoring, results of all parameters were within the established A/L levels. According to the monthly ecological water monitoring results performed on 10 December 2008, suspended solid, turbidity and salinity level recorded in location WE4 was higher than that of the other monitoring locations. However, these are similar with the baseline monitoring results.

During ecological monitoring survey, no White-shouldered Starling was recorded breeding in the watch tower. And there was no sign of disturbance from the Project to the watch tower as no construction work of the Project were conducted near the tower in December 2008. The breeding season of White-shouldered Starling is over in this time of the year. In addition, no disturbance on the flora and fauna in the river channels were observed during the ecological monitoring.

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

Minor housekeeping deficiency such as dust, management of wastes and handling of site water have been observed and appropriate actions have been taken by the contractor as advised.

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 and Environmental Permit requirement.