Drainage Service Department

Monthly Environmental Monitoring & Auditing report for

Contract No.DC/2006/11
Drainage Improvement in Southern Lantau

February 2011

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EXECUTIVE SUMMARY

This is the thirtieth monthly environmental Monitoring and audit (EM&A) report for "Drainage Improvement in Southern Lantau Investigation". The environmental permit number is "EP-237/2005/B". The report concludes the impact monitoring for the activities undertaken during the period of 1 February 2011 to 28 February 2011. Reconstruction of EVA on top of the PNH Box Culvert, landscaping works and railing installation were major site activities being carried out within this reporting month.

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. Total 25 non-compliance events of water quality criteria were recorded in this reporting period. The non-compliances of turbidity and suspended solids recorded at M2 on 21 February 2011 were plausibly attributed by the construction of gabion wall between bottleneck A and B at Tai Tei Tong River by other government department. For other non-compliance events, no particular observation of defective site activities were found causing water contamination and such conditions were believed to be mainly attributed by natural fluctuation.

During ecological monitoring survey, no White-shouldered Starling was recorded breeding in the watch tower. There was no sign of disturbance from the Project to the watch tower. The watch tower may not be suitable for birds as nesting habitat. In addition, no disturbance on the flora and fauna in the river channels were observed during the ecological monitoring.

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

Future site activities to be carried out will be mainly Reconstruction of EVA on top of the PNH and Landscaping works. It is expected that environmental impact in different aspects 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 ET will continue to implement the environmental monitoring & audit programme in accordance with the EM&A Manual and Environmental Permit requirement.

1. Introduction

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

2. Project Information

2.1 Construction program

The "Drainage Improvement in Southern Lantau Investigation" project will be completed by March 2011. 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 (TTT) River

Appendix A 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 and Ecosystems Limited as the Environmental Team, which comprises the environmental team leader, the ecologists 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.

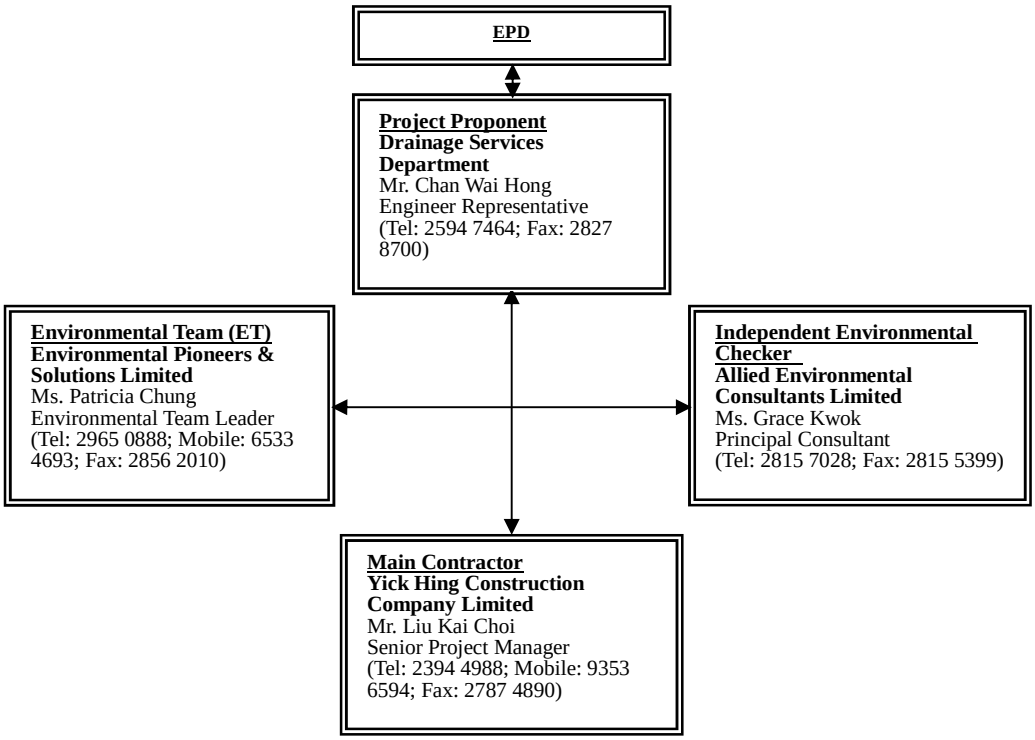


Figure. 2.2.1 Environmental Management structure for the project

2.3 Key personal contact information chart

Detailed contact of key persons involved in environmental aspect of the project is shown in Appendix B.

3. Construction Stage

3.1 Construction activities in the reporting month

Major activities in the reporting month included the followings:

1. Landscaping works.
2. Reconstruction of EVA on top of the PNH Box Culvert.
3. Installation of railing

3.2 Construction activities for the coming month

Proposed key construction works in the coming month will include:

1. Installation of railing.
2. Site clearance works for completion.

3.3 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 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 E) 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	ACO Japan, model 6224 Svantek 949	IEC 651 Type 1 IEC 804 Type 1	2
Windscreen	Microtech gefell model W2	N/A	1
Acoustical calibrator	Castle GA607 Svantek SV30A	IEC 942 Type 1	2
Wind speed indicator	Kestrel K1000	N/A	1
Remarks: Calibration details for the sound level meter is given in Appendix C for reference			

4.3 Monitoring Locations

According to the Baseline Monitoring Report issued in May 2008 for the captioned project, four locations where are 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.

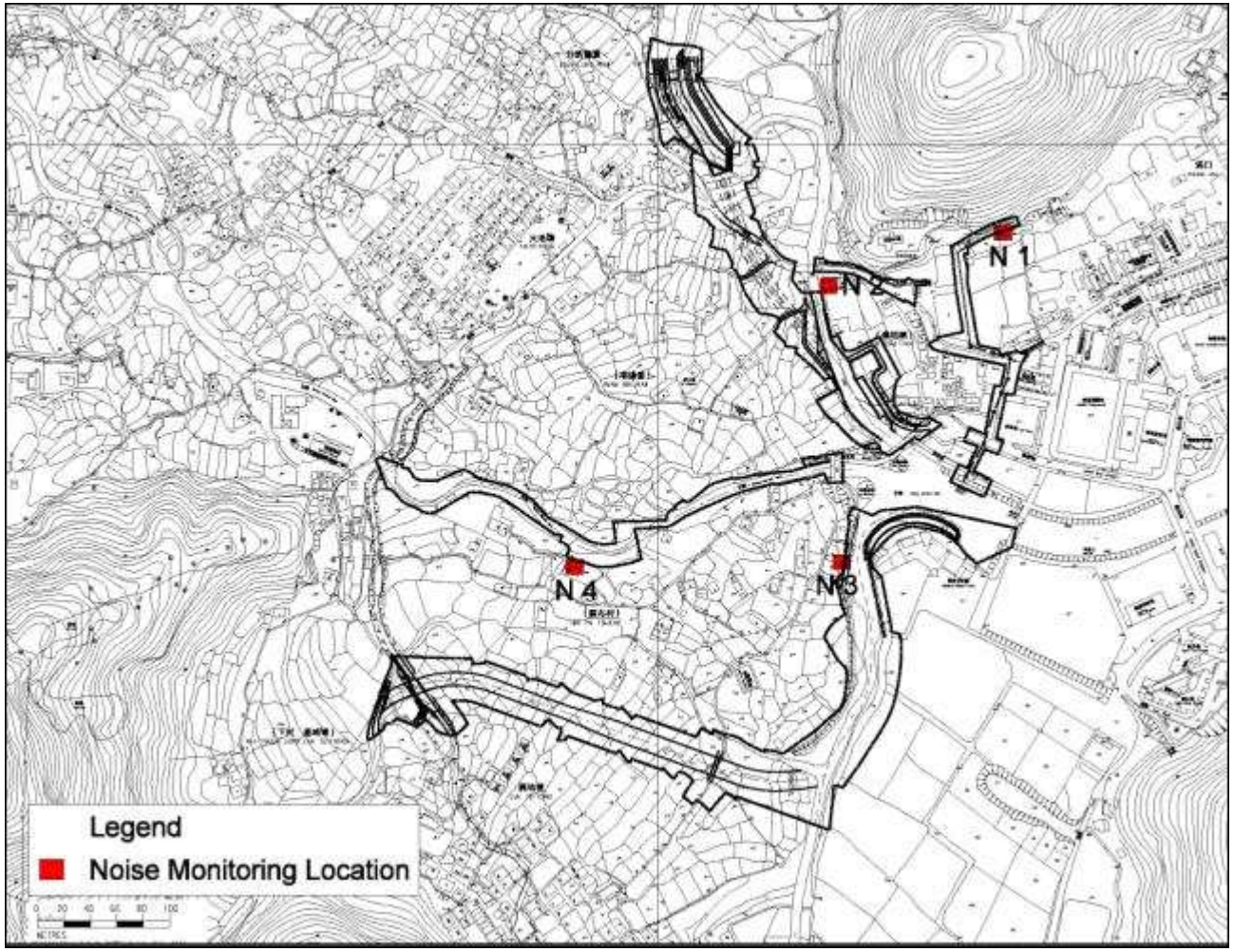


Figure 4.3.1 Impact noise monitoring locations

4.4 Monitoring Results and Interpretation

Relevant details of the noise monitoring results are presented in Table 4.4.1. The results, ranged between 44.4 dB(A) and 60.7 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_{Aeq} dB(A)	Limit dB(A)	Exceedance	Weather
N1	Leq30min	09-Feb-11	12:45	47.5	75	N	Sunny
N1	Leq30min	16-Feb-11	12:45	60.7	75	N	Cloudy
N1	Leq30min	23-Feb-11	12:30	54.3	75	N	Sunny
N2	Leq30min	09-Feb-11	12:10	45.4	75	N	Sunny
N2	Leq30min	16-Feb-11	12:10	51.1	75	N	Cloudy
N2	Leq30min	23-Feb-11	11:50	42.0	75	N	Sunny
N3*	Leq30min	09-Feb-11	11:35	55.4	75	N	Sunny
N3*	Leq30min	16-Feb-11	11:25	46.1	75	N	Cloudy
N3*	Leq30min	23-Feb-11	11:15	59.3	75	N	Sunny
N4	Leq30min	09-Feb-11	11:00	45.6	75	N	Sunny
N4	Leq30min	16-Feb-11	10:50	45.8	75	N	Cloudy
N4	Leq30min	23-Feb-11	10:40	44.4	75	N	Sunny

Remarks: Raw datasheet for noise monitoring are attached in Appendix E 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 exceedance recorded in the reporting month.

Table 4.5.1 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.		

Table 4.5.2 Event / Action Plan for Construction Noise

EVENT	**ACTION**			
	ET	**IC(E)**	**ER**	**Contractor**
Action Level	1. Notify IC(E) and Contractor; 2. Carry out investigation; 3. Report the results of investigation to the IC(E), ER and Contractor; 4. Discuss with the Contractor and formulate remedial measures; 5. Increase monitoring frequency to check mitigation effectiveness.	1. Review the analysed results submitted by the ET; 2. Review the proposed remedial measures by the Contractor and advise ER accordingly; 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analysed noise problem; 4. Ensure remedial measures are properly implemented.	1. Submit noise mitigation proposals to IC(E); 2. Implement Noise mitigation proposals.
Limit Level	1. Identify source; 2. Inform IC(E), ER, EPD and Contractor; 3. Repeat measurements to confirm findings; 4. Increase monitoring frequency; 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 6. Inform IC(E), ER and EPD the causes and actions taken for the exceedances; 7. Assess effectiveness of Contractor's remedial actions and keep IC(E), EPD and ER informed of the results 8. If exceedance stops, cease additional monitoring	1. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 2. Review Contractors remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly; 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analysed noise problem; 4. Ensure remedial measures properly implemented; 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IC(E) within 3 working days of notification; 3. Implement the agreed proposals; 4. Resubmit proposals if problem still not under control; 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated

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 noise sensitive receivers as possible; and
  - 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^{o}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^{o}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.

Detailed calibration records of the multimeter were shown in Appendix C for reference.

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.

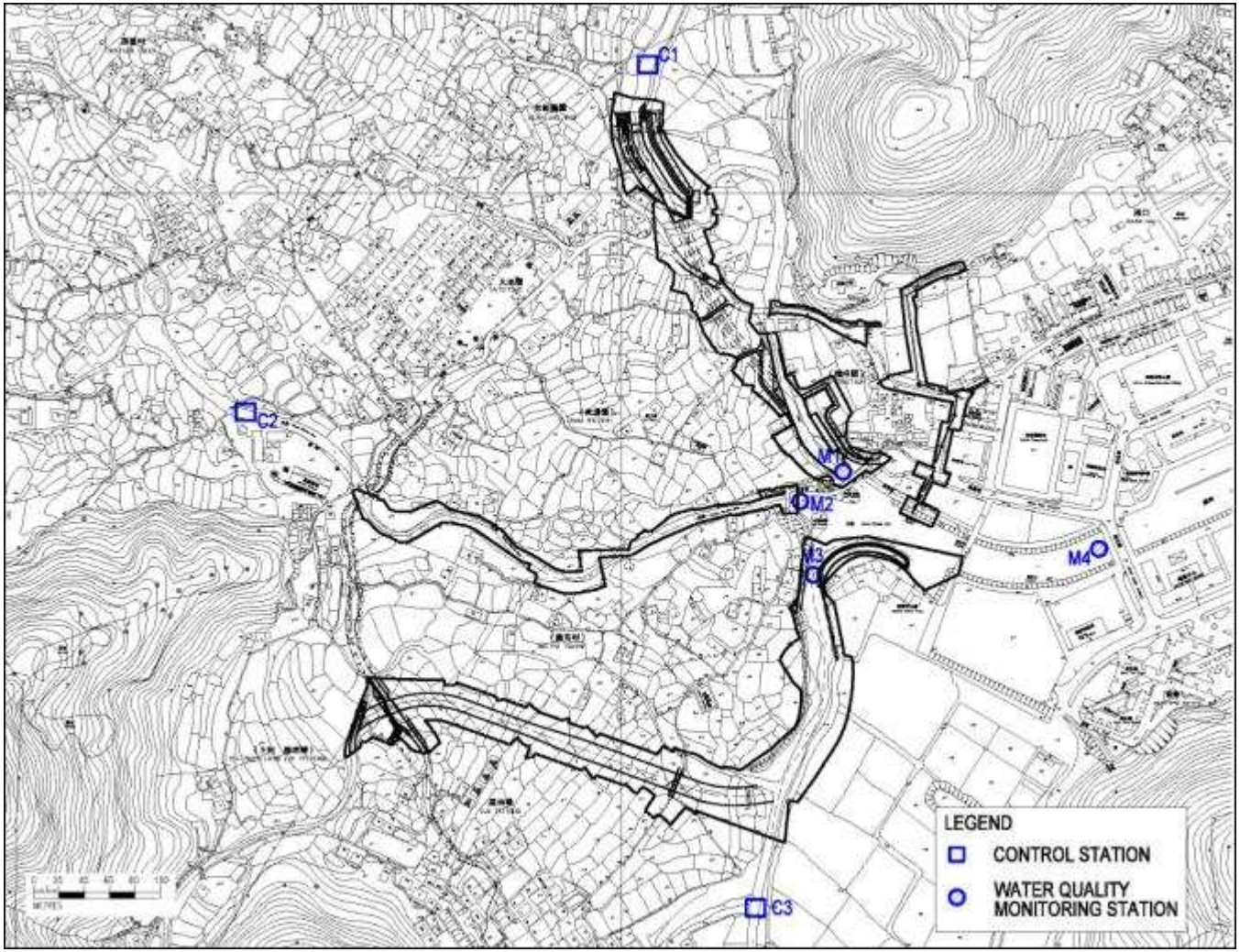


Figure 5.3.1 Water Quality Monitoring Locations

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 nine times in this reporting month. Detailed on-site measurements and laboratory analysis reports including QA/QC results are shown in Appendix F1 and F2 respectively, while Table 5.5.1 presents consolidated results throughout the reporting month.

Total 25 non-compliance events of water quality limits (Turbidity and Suspended Solids) were recorded in this reporting month according to the established level. ET has arranged site investigations for the exceedance events and observed that the non-compliances of turbidity and suspended solids recorded at M2 on 21 February 2011 were plausibly attributed by the construction of gabion wall between bottleneck A and B at Tai Tei Tong River by other government department.

For other non-compliance events, no particular observations of defective site activities were found causing the exceedance and such conditions were believed to be attributed by natural fluctuation.

Detailed information of the exceedance events and action taken were presented in Section 7.

Table 5.5.1 Water quality monitoring results in February 2011

	M1			M2			M3			M4		
	MIN	MAX	Ave	MIN	MAX	Ave	MIN	MAX	Ave	MIN	MAX	Ave
Turbidity (NTU)	0.0	7.8	2.7	0.0	5.6	1.4	0.0	12.0	5.1	0.0	13.7	5.6
DO (mg/L)	7.7	10.7	9.5	7.3	9.9	9.1	6.6	9.8	8.5	7.5	10.3	8.7
Suspended Solid (mg/L)	1.2	8.5	3.6	0.6	5.6	2.1	1.6	16.0	6.6	3.2	14.6	7.0

	C1			C2			C3		
	MIN	MAX	Ave	MIN	MAX	Ave	MIN	MAX	Ave
Turbidity (NTU)	0.0	2.2	0.3	0.0	0.9	0.1	3.4	10.9	7.2
DO (mg/L)	7.5	10.2	9.5	7.0	9.8	8.3	6.9	10.5	8.6
Suspended Solid (mg/L)	0.7	2.0	1.3	0.3	1.8	1.2	4.9	10.7	7.7

* 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 criteria stipulated in EM&A manual Section 4.8 and baseline water quality monitoring data obtained, the A/L levels are shown in Table 5.6.1 and Table 5.6.2. 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 5.6.3 should be taken.

Table 5.6.1 Water quality criteria for monitoring

Parameters	Action	Limit
DO in mg/L (mid-depth)	- 5%-ile of baseline data	- 4mg/L
SS in mg/L (mid-depth)	- 95%-ile of baseline data; or - 120% of control station's SS on the same day of measurement	- 99%-ile of baseline; or - 130% of control station's SS on the same day of measurement
Turbidity in NTU (mid-depth)	- 95%-ile of baseline data; or - 120% of control station's turbidity on the same day of measurement	- 99%-ile of baseline; or - 130% of control station's turbidity on the same day of measurement

Table 5.6.2 Action and Limit Levels established according to baseline data

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 5.6.3 Event and action Plan for Water Quality

EVENT	ACTION			
	ET	**IC(E)**	**ER**	**Contractor**
Action Level being exceed by one sampling day	1. Repeat in *situ* measurement to confirm findings; 2. Identify reasons for non-compliance and source(s) of impact; 3. Inform IC(E) and Contractor; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IC(E) and Contractor; 6. Repeat measurement on next day of exceedance.	1. Discuss with ET and Contractor on the mitigation measures; 2. Review proposals in mitigation measures submitted by Contractor and advise the ER accordingly; 3. Assess the effectiveness of the implemented mitigation measures.	1. Discuss with IC(E) on the proposed mitigation measures; 2. make agreement on the mitigation measures to be implemented; 3. Assess the effectiveness of the implemented mitigation measures.	1. Inform the ER and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of working methods; 5. Discuss with ET and IC(E) and propose mitigation measures to IC(E) and ER; 6. Implement the agreed mitigation measures.
Action level being exceed by more than two consecutive sampling days	1. Repeat in *situ* measurement to confirm findings; 2. Identify reasons for non-compliance and source(s) of impact; 3. Inform IC(E) and Contractor; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IC(E) and Contractor; 6. Ensure mitigation measures are implemented; prepare to increase the monitoring frequency to daily 7. Repeat measurement on next day of exceedance	1. Discuss with ET and Contractor on the mitigation measures; 2. Review proposals in mitigation measures submitted by Contractor and advise the ER accordingly; 3. Assess the effectiveness of the implemented mitigation measures.	1. Discuss with IC(E) on the proposed mitigation measures; 2. make agreement on the mitigation measures to be implemented; 3. Assess the effectiveness of the implemented mitigation measures.	1. Inform the ER and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of working methods; 5. Discuss with ET and IC(E) and propose mitigation measures to IC(E) and ER within three working days; 6. Implement the agreed mitigation measures.
Limit level being exceeded by one sampling day	1. Repeat in *situ* measurement to confirm findings; 2. Identify reasons for non-compliance and source(s) of impact; 3. Inform IC(E) and Contractor; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IC(E) and Contractor; 6. Ensure mitigation measures are implemented; 7. Increase the monitoring frequency to daily until no exceedance of Limit Level	1. Discuss with ET and Contractor on the mitigation measures; 2. Review proposals in mitigation measures submitted by Contractor and advise the ER accordingly; 3. Assess the effectiveness of the implemented mitigation measures.	1. Discuss with IC(E) on the proposed mitigation measures; 2. make agreement on the mitigation measures to be implemented; 3. Assess the effectiveness of the implemented mitigation measures.	1. Inform the ER and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of working methods; 5. Discuss with ET and IC(E) and propose mitigation measures to IC(E) and ER; 6. Implement the agreed mitigation measures.

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 especially construction run-off and drainage, general construction activities, sewage discharged from construction workforce and river channel excavation works.

Contractor was recommended to provide sufficient water treatment facilities for accumulated site water and excavation activities carried out nearby river channel. Earth bunds should be provided to the construction site in / next to the river channel to form an enclosed, dry environment to minimize water quality impact.

5.8 Water Monitoring Schedule for the Next reporting period

Water quality monitoring schedule is proposed to be carried out on 2, 3, 7, 9, 11, 16, 17, 18, 21, 23, 24, 29 and 30 March 2011.

As major construction activities, especially cleaning works has been carried out on January and February 2011. ET proposed to commence the post-construction phase water quality monitoring to confirm the restoration of water quality for the rivers according to requirement stated in the EM&A manual. The post-construction phase monitoring will commence in April 2011 and cover for 4 weeks. The schedule for post-construction phase monitoring is subject to be confirmed.

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, 20th 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^{o}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 $4^{o}C$ 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.

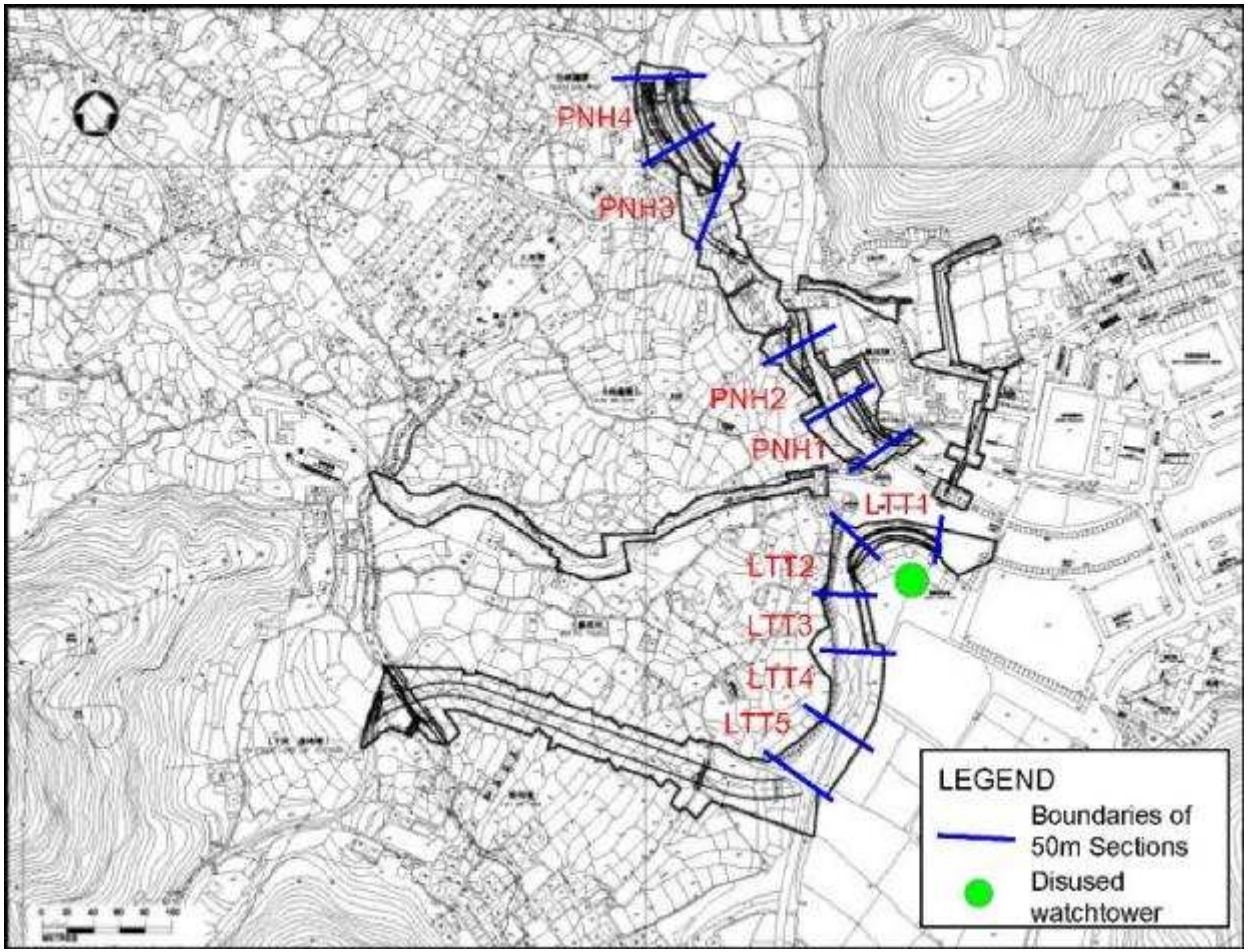


Figure 6.1 Ecological Monitoring Locations

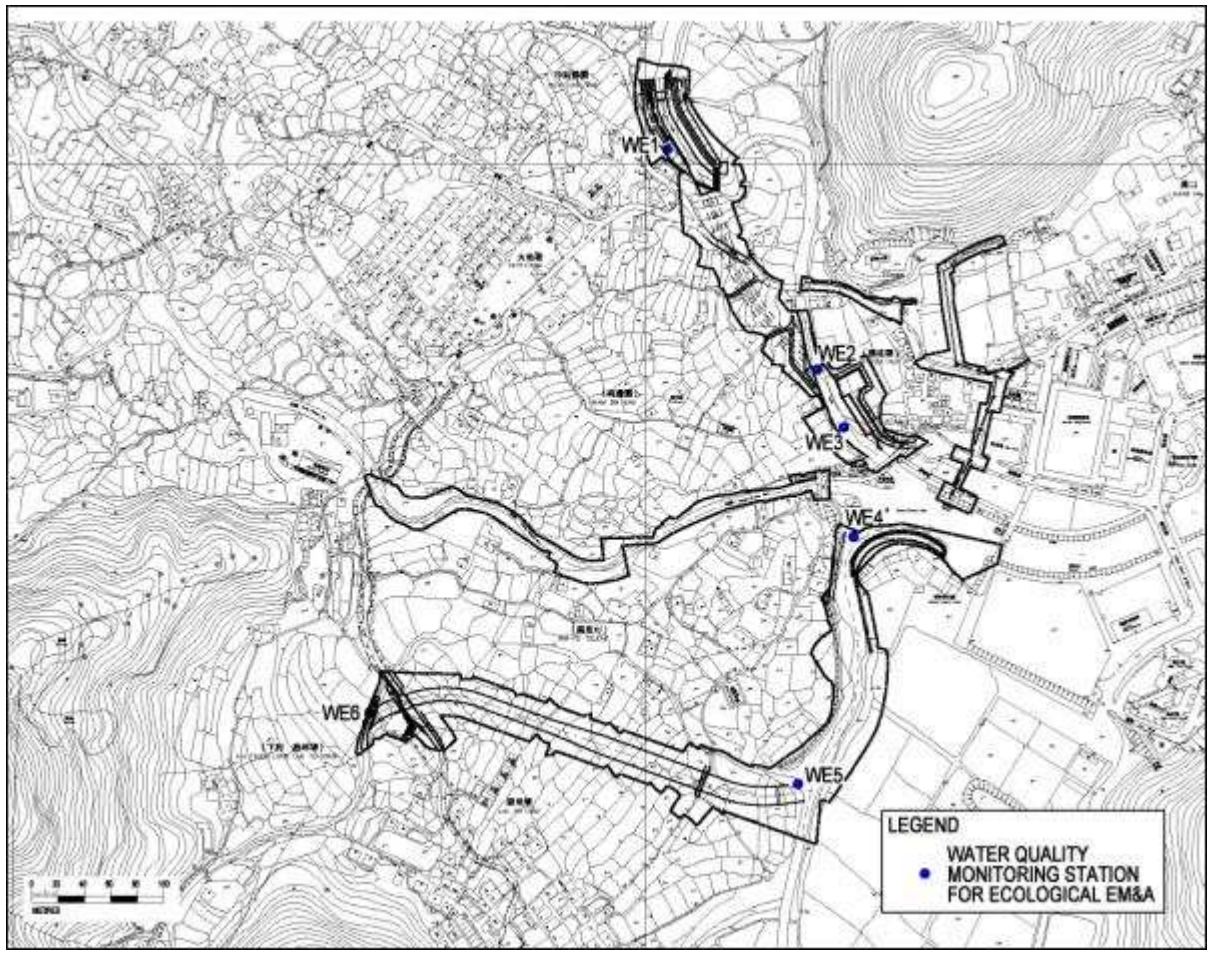


Figure 6.2 Ecological Water Quality monitoring locations

6.4 Monitoring Frequency

As proposed, ecological impact 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 10 February 2011. During the current monitoring session, construction of new rock gabion wall was completed, and soft landscape works are underway. The understorey of the existing tree canopy along PNH4 was cleared and temporary works areas beyond both sides of gabions were planted with tree and shrub seedlings.

The walk through survey recorded a total of 51 species, including 16 tree, 3 shrub, 22 herb and 3 grass species (Appendix D1) on PNH N section. 43 of the species recorded are natives, while 8 were exotics. Remnants of vegetation including native trees (e.g. *Macaranga tanarius)* and grasses species (e.g. *Microstegium ciliatum*) were still seen along the east stream bank. A number of ruderal species colonised the sandy substrate occasionally deposited among stream bed rocks and gabions. These include *Mikania micrantha, Bidens pilosa* and *Emilia sonchifolia*. No species of conservation interest was recorded. No quantitative surveys were carried out on both PNH3 and PNH4 due to vegetation clearance and construction works on stream banks as part of the site clearance works under the project.

Vegetation was only found on remnants of the old concrete bank along PNH S section. A total of 5 species recorded, 3 of which were native and 2 were exotic. It was composed of isolated individuals of mangrove (*Kandelia obovata*), exotic shrub (*Lantana camara*) and native trees (*Ficus supbera*) (Appendix D2). No species of conservation interest was recorded.

Terrestrial Fauna

Surveys were conducted on 18 February 2011.

Two species of birds were recorded in the proposed work area of the Pak Ngan Heung River (Table 6.5.2). Both 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**
Chinese Bulbul	*Pycnonotus sinensis*			1		CW
Japanese White-eye	*Zosterops japonica*				1	CW

CW = common and widespread

No dragonfly was recorded in the proposed work area of the Pak Ngan Heung River (Table 6.5.3) in February 2011.

Aquatic fauna and fish

The construction works for the fish ladder inside PNH3 have been finished, and the flow in this section was restored. 6 species of fish and 1 crustacean were recorded in the 4 sections at PNH. All are common and widespread in Hong Kong. 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. The flow in the stream was very low during the survey, and thus aquatic fauna was sparse in the recently finished fish ladder section and freshwater algae were found in this section. While the presence of freshwater algae is common in freshwater waterbodies during spring, especially in locations with slow flow rate, it is anticipated that the abundance of aquatic fauna inside the fish ladder will restore during the later wet season.

Table 6.5.4 Aquatic Invertebrates and fish in Pak Ngan Heung

Common names	**Scientific names**	**PNH 1**	**PNH 2**	**PNH3**	**PNH4**
Invertebrates					
Atyid shrimp	*Caridina elongata*				

Palaemond shrimp	*Macrobrachium hainanensis*			+	+
Crab	*Varuna litterata*				
Mitten Crab	*Eriocheir japonica*				
Fish					
Mosquito fish	*Gamusia affinis*				
Goby	*Rhinogobius duospilus*				+
Barcheek Goby	*Rhinogobius giurinus*				
Swordtail	*Xiphophorus hellerii*				++
Six-banded Barb	*Puntius semifasciolatus*				
Unidentified Cichlid fish					
Tilapia		+	++		
Predaceous Chub	*Parazacco spilurus*			+	
Jarbua Terapon	*Terapon jarbua*	++	+		
Common Silver-biddy	*Gerres oyena*				
Mullet	*Mugil cephalus*	+	+++		
Broken-band Hillstream Loach	*Liniparhomaloptera disparis*				

+ = 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 10 February 2011. During the current survey, construction of concrete channel bank and rock gabions are completed, and soft landscape works are underway. Some renmants of vegetation and mangroves remained at both LLT1 and LLT2 respectively.

The walk through survey recorded a total of 20 species, including 8 tree, 4 herb and and 6 grass species (Appendix D3). 13 species recorded are natives, while 7 were exotics. No quantitative survey was carried out due to vegetation clearance on stream banks as part of the site clearance works under the project.

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 18 February 2011.

A total of nine species of birds were recorded in these sections (Table 6.5.6). All are common 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	*Egretta garzetta*	2	2	1			CW
Great Egret	*Casmerodius alba*	2	1				CL
Chinese Pond Heron	*Ardeola bacchus*	1					CW
Grey Heron	*Ardea cinerea*	1					CL
Black-crowned Night Heron	*Nycticorax nycticorax*	1					CL
Common Sandpiper	*Actitis hypoleucos*	1					CW
White-breasted	*Amaurornis*	1					CW

Waterhen	*phoenicurus*						
White Wagtail	*Motacilla alba*	1					CW
Rufous-backed Shrike	*Lanius schach*				1		CW

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

No species of dragonfly were recorded in the Luk Tei Tong River in February 2011 (Table 6.5.7).

Aquatic invertebrates and fish

4 species of fish, and 4 species of mollusks were recorded in the 5 sections at LTT. All are common and widespread in Hong Kong. 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 present monitoring as well as the baseline monitoring survey.

Table 6.5.8 Aquatic invertebrates and fish in Luk Tei Tong River

Common names	Scientific names	LTT1	LTT2	LTT3	LTT4	LTT5
Invertebrates						
Mangrove clam	*Geloina erosa*					
Rock oyster	*Saccostrea cuculata*	++	++			
Snail	*Melanoides tuberculata*				+	
Snail	*Terebralia* sp.					
Snail	*Nerita* sp.	+++	+++		+	
Snail	*Littoraria articulata*				+	
Crab	*Varuna litterata*					
Fiddler crab	*Uca lactea*					
Fiddler crab	*Uca arcuata*					
Fiddler crab	*Uca crassipes*					
Crab	*Perisesarma bidens*					
Mangrove mud crab	*Scylla paramamosain*					
Mitten crab	*Eriocheir japonica*					
Fish						

Common mudskipper	*Periophthalmus cantonensis*					
Tilapia		++	+	+		
Jarbua terapon	*Terapon jarbua*		+			
Mullet	*Mugil cephalus*	++	++	+++		
Common Silver-biddy	*Gerres oyena*					
Barcheek Goby	*Rhinogobius giurinus*				+	

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

Disused Watchtowers

Surveys were conducted on 18 February 2011.

There was no sign (e.g., adults carrying food or nesting materials) of use of the watchtower as nesting habitat by White-shouldered Starling.

White-shouldered Starling was not observed during the February 2011 monitoring. No bird of other species was observed entering the watchtower.

Since the monitoring surveys commenced in August 2008, no bird was observed entering the watchtower. It seems the birds do not prefer the watchtower as nesting habitat.

Ecological Water Quality Monitoring (EWQM)

EWQM was conducted on 16 February 2011. Monitoring results are summarized in table 6.9. Detailed on-site measurements and laboratory report are presented in appendix D4 and D5.

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, data obtained in the monitoring stations were similar to the results from the previous month.

Table 6.9 Summarized Ecological water quality monitoring results (16 February 2011)

Parameters	Limit of detection	WE1	WE2	WE3	WE4	WE5	WE6
Suspended Solid (mg/l)	1	1.10	4.55	1.55	1.60	5.15	1.50
Nitrogen (Ammonia) (mg/l)	0.01	0.07	0.12	0.49	0.56	1.57	0.08
Nitrogen (Nitrate) (mg/l)	0.01	0.11	0.18	0.45	0.37	0.16	0.07
Phosphorous (mg/l)	0.01	0.08	0.06	0.11	0.15	0.21	0.06
BOD_5 (mg/l)	1	1.00	1.00	2.00	1.00	2.00	1.00
DO (mg/l)	0.01	9.48	8.91	8.50	6.57	7.13	10.52
Turbidity (NTU)	0.1	0.00	4.40	0.00	0.00	3.10	0.00
Temperature (oC)	0.1	13.6	14.0	14.4	17.0	14.3	14.2
pH	0.01	7.8	7.8	8.1	6.7	7.2	7.4
Salinity (ppt)	0.1	0.3	0.2	1.4	15.0	6.9	0.1
Conductivity (s/m)	0.1	66.0	58.0	0.3	2.5	1.3	24.1
Water Flow (m/s)	N/A	0.1	0.1	0.1	0.1	0.1	0.1

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_5 (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 surveys are scheduled on 11, 22 March 2011, while ecological water quality monitoring is scheduled on 16 March 2011.

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, ecological measurements recorded; therefore no actions were taken.

Total 24 non-compliance events of water quality limits (Turbidity and Suspended Solids) were recorded in this reporting month according to the established level. ET has arranged site investigations for the exceedance events and observed that the non-compliances of turbidity and suspended solids recorded at M2 on 21 February 2011 were plausibly attributed by the construction of gabion wall between bottleneck A and B at Tai Tei Tong River by other government department.

For other non-compliance events, no particular observations of defective site activities were found causing the exceedance and such conditions were believed to be attributed by natural fluctuation.

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 figures of the construction wastes disposal provided by Contractor.

Table 8.1 Summary of Construction Waste Disposal

	Amount of Construction Waste disposed		
Month	**Inert Waste (to Public Fill)**	**Non-inert Waste (to Landfill)**	**Chemical Waste (to treatment plant)**
1st to 28th Feb 11	771.40 (ton)	Nil	Nil
Total	36152.56 (ton)	247.43 (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 2007	--	Issued
Varied Environmental Permit	EP-237/2005/B	23 April 2009	--	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.

Table 10.1 Summary of Formal Complaints received

	Noise	Water	Ecology	Cultural	Others
February 2011	0	0	0	0	0
Total	0	1	0	0	0

11. Site Environmental Audits

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 9, 15 and 28 February 2011

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

Table 11.1 Summary of site inspection

Date	Observations	Advice from ET	Action taken	Closing Date
Nov 10 & 31 Dec 10	Open stockpile of earth material was observed at PNH fish ladder site	Contractor was advised to provide tarpaulin covering to earthy stockpile to prevent erosion and dust generation	Still outstanding. To be followed during the next reporting period	Ongoing
27 Jan 11	Concrete debris has been tipped at private land where was rented by Contractor	Contractor was remind illegal dumping at private land is not allowed and they should assign licensed waste collector to collect and dispose observed wastes as soon as possible	Follow up action was taken as reported by Contractor	15 Feb 11
3, 14, 17 & 27 Jan 11; 9, 15 & 28 Feb 11	C&D wastes, site materials and general wastes were observed within site area	Contractor should remove wastes and site materials from the concerned area as soon as possible as works finished	Still outstanding. To be followed during the next reporting period	Ongoing
14, 17 & 27 Jan 11; 9 Feb 11	Site surface was observed to be dry and dusty	Contractor was advised to provide regular water spraying to dusty static area for dust suppression	Follow up action was unsatisfactory and to be followed with the improvement during next reporting period	Ongoing

11.2 Compliance with legal and Contractual requirement

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

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.

Findings of monthly survey was still pending therefore relevant was not provided in this reporting month.

12. Future key issues

Landscaping and reconstruction of EVA on top of the PNH Box Culvert would be major site activities to be carried out in the upcoming month. Although environmental impact arisen from those activities would be expected to be minimal, Contractor was still reminded to pay serious attention to the following key issues:

- Dust generation due to handling of earthy material and dusty site surface.
- Housekeeping of site, such as stockpiling of C&D waste and earthy material.
- Removal of wastes as part of site clearance and evacuation.

Contractor was recommended to provide tarpaulin coverings to all earthy stockpiles on site. Dusty static area should be dampened regularly to avoid dust generation.

Contractor should also prevent excessive storage of wastes on site. Wastes should be collected and disposed to designated public fill.

13. Conclusions

Reconstruction of EVA on top of the PNH Box Culvert, landscaping works and railing installation were major site activities being carried out within this reporting period.

Regular site meetings and inspection audits led by the seniors for discussing site environmental matters were held among Project Proponent, Contractor and the ET on weekly basis. Also monthly site meeting and inspection audits with the above parties and IEC were carried out on 28 February 2011.

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

For water quality monitoring, total 25 non-compliance events of water quality limits (Turbidity and Suspended Solids) were recorded in this reporting month according to the established level. ET has arranged site investigations for the exceedance events and observed that the non-compliances of turbidity and suspended solids recorded at M2 on 21 February 2011 were plausibly attributed by the construction of gabion wall between bottleneck A and B at Tai Tei Tong River by other government department. For other non-compliance events, no particular observations of defective site activities were found causing the exceedance and such conditions were believed to be attributed by natural fluctuation.

During ecological monitoring survey, no White-shouldered Starling was recorded breeding in the watch tower. The breeding season of White-shouldered Starling in this year has not begun. The absence of nesting of White-shouldered Starling in the watch tower did not seem to be related to construction works in Luk Tei Tong River. A bird species nests in village houses should be to certain extent disturbance tolerant.

No bird was observed entering the watchtower since the monitoring surveys commenced in August 2008. Also, no breeding was recorded in the baseline survey in September 2007. It appears that the birds do not prefer to roost or nest in the watch tower.

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 and Environmental Permit requirement.

Appendix A

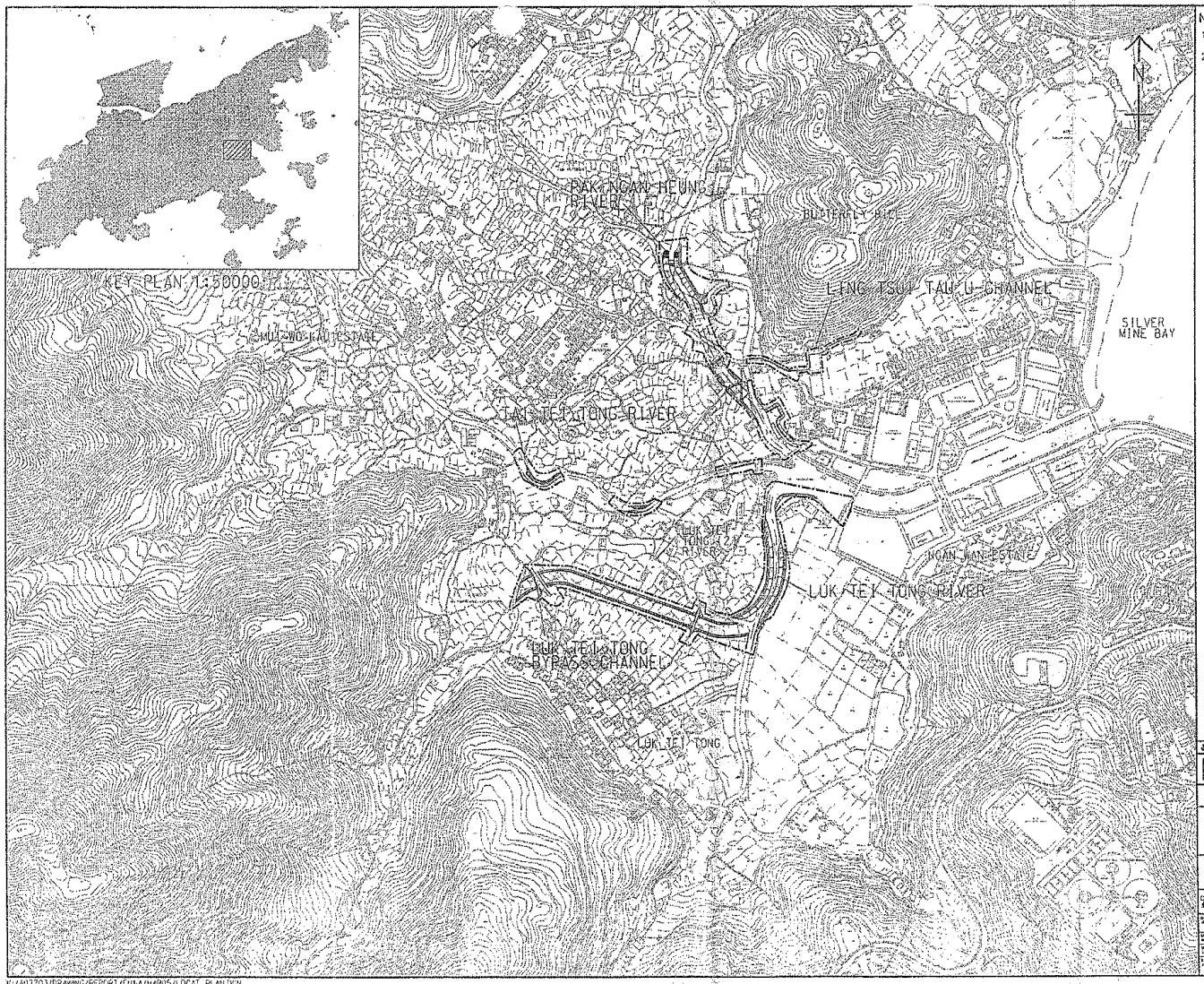
Construction Programmer and Location plan

Contract No.: DC/2006/11

Contract Name.: Drainage Improvement Works In Southern Lantau and Construction of Mui Wo Village Sewerage Phase I

Working Schedule of Outstanding Works for February 2011

		Jan 2011 *Month 1*				Feb 2011 *Month 2*				March 2011 *Month 3*				April 2011 *Month 4*			
a)	*LTT River*	w1	w2	w3	w4	w5	w6	w7	w8	w9	w10	w11	w12	w13	w14	w15	w16
	Major Item																
1	Box A - Footpaths	■	■	■													
2	Box A - Landscaping			■	■												
	Minor Item																
4	VO 25 - Addition u-channel & gabion walls							■	■	■	■	■	■				
5	VO 23 - LTT river banks improvement								■	■	■	■	■				
6	Seawall u-channel + landscaping									■	■	■	■				
b)	*TTT River*																
	Major works was completed including all Vos.																
	Minor Item																
6	Remove suplurs boulders in river bank			■	■												
7	Landscaping			■	■												
c)	*PNH River*																
	Major Works																
8	Footpaths	■	■														
9	Landscaping Box Culvert Area		■	■	■												
10	Ngan Shui Street - road surface				■			■	■								
11	VO reconstruction of EVA							■	■								
12	Landscaping - EVA Area									■	■						
d)	*Lo Uk Tsuen*																
13	Catchpit 2	<<	CLP diversion works					CLP diversion works >>		■	■						
14	Outlet B		■	■	■												
e)	*Ham Tin*																
15	Park - railing				■												
f)	*Sewerage*																
16	Chung Hau - Ngan Shek St		■	■	■			■	■								
17	Chung Hau - Glass House (VO)		■	■	■												
18	Chung Hau - Wood Shop (VO)							■	■	■							
19	Chung Hau - Eletrical Shop (VO)									■	■	■					
20	PNH Village - VO 35 Main Pipe	■	■	■	■												
21	PNH Village - other connection pipes							■	■	■	■	■	■	■	■	■	■



NOTES:

1. GRID LINES ARE HONG KONG GRID 1980
2. ALL LEVELS ARE IN METERS AND REFERRED TO H.K.P.D.

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

STORMWATER IMPROVEMENT IN SOUTHERN KOWLOON INVESTIGATION

LOCATION PLAN OF THE PROJECT

Metcalf & Eddy Ltd 美地工程顧問有限公司

ORIGINAL SIZE: A3

1.1

SEP 2004

PREPARED BY: JLFL

SCALE: 1:50000

PRELIMINARY

DRAWING NO. IN METRES

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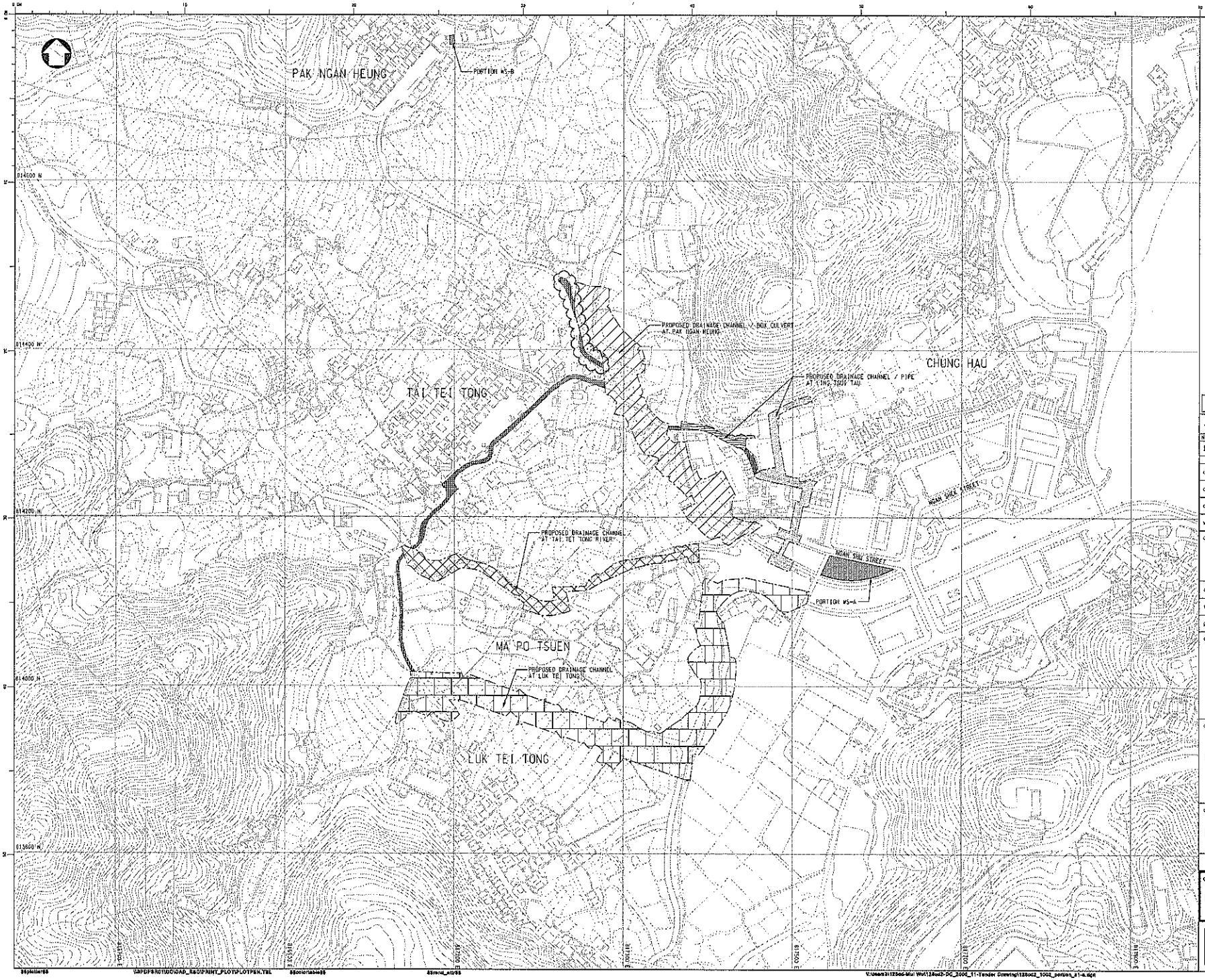

NOTES :

1. ALL LEVELS ARE IN METRES ABOVE P.D.H.K..
2. ALL GRIDS REFER TO HONG KONG 1980 GRID.

LEGENDS :

- SITE BOUNDARIES
- PORTION D1 - PAK NGAN HEUNG
- PORTION D2 - LING TSUI TAU (A)
- PORTION D3 - LING TSUI TAU (B)
- PORTION D4 - TAI TEI TONG RIVER
- PORTION D5 - LUK TEI TONG
- PORTION D6 - PUI O
- PORTION D7 - LO UK TSUEN
- PORTION D8 - CHEUNG SHA SHEUNG TSUEN
- PORTION D9 - EMERGENCY VEHICULAR ACCESS (EVA) AT HUI WO

FOR TENDER PURPOSES ONLY

No.	date	description	initial
A	16 MAY 2007	GENERAL REVISION	SIGNED H. Y. CHOW for

REVISION

	name		date
designed	SIGNED	H. Y. CHOW	12 FEB 2006
drawn	SIGNED	B. D. CHAN	23 MAR 2007
checked	SIGNED	W. H. CHAN	10 MAY 2007
vetted	SIGNED	T. Y. CHAN	11 MAY 2007

approved

SIGNED K. K. CHAN, Chief Engineer, 14 MAY 2007 Date

contract no. DC/2006/11

file no. DP/6/4128CD

project no. 128CD

contract

DRAINAGE IMPROVEMENT IN SOUTHERN LANTAU

drawing title

PORTIONS OF SITE - SOUTHERN LANTAU

(SHEET 1 OF 2)

drawing no.	scale
DDN/128CD2/1002A	1 : 2000

office

DRAINAGE PROJECTS DIVISION

DRAINAGE SERVICES DEPARTMENT
GOVERNMENT OF THE
HONG KONG
SPECIAL ADMINISTRATIVE REGION

A1 841x594

Appendix B Key Personal Contact information chart

Organization Name	Role	Title	Name	Telephone	Fax Number
Drainage Service Department	Project Proponent	Engineering Representative	Mr. Chan Wai Hong	2594 7464	2827 8700
Allied Environmental Consultants Limited	Independent Environmental Checker (IEC)	Principal Consultant	Ms. Grace Kwok	2815 7028	2815 5399
Yick-Hing Construction Company Limited	Main Contractor	Senior Project Manager	Mr. Liu Kai Choi	2394 4988	2787 4890
Environmental Pioneers & Solutions Limited	Environmental Team (ET)	Environmental Team Leader	Ms. Patricia Chung	2965 0888	2856 2010

Appendix C

Calibration Certificates for Measuring Equipments

Hong Kong Calibration Ltd.
香港校正有限公司

Calibration Certificate

Certificate No. **01100** Page 1 of 2 Pages

Customer : Environmental Pioneers and Solutions Limited

Address : Flat A, 8 Floor, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, Hong Kong.

Order No. : Q00196 **Date of receipt :** 5-Mar-10

Item Tested

Description : Sound Level Calibrator

Manufacturer : Svantek

Model : SV30A **Serial No.** : 7908

Test Conditions

Date of Test : 5-Mar-10 **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:

Equipment No.	Description	Cert. No.	Due Date	Traceable to
S014	Spectrum Analyzer	93091	18-Jun-10	NIM-PRC & SCL-HKSAR
S024	Sound Level Calibrator	93758	16-Jul-10	NIM-PRC & SCL-HKSAR
S041	Universal Counter	94005	6-Aug-10	SCL-HKSAR
S206	Sound Level Meter	93966	5-Aug-10	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: 5-Mar-10

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

Hong Kong Calibration Ltd.
香 港 校 正 有限公司

Calibration Certificate

Results :

1. Level Accuracy

UUT Nominal Value (dB)	Measured Value (dB)	IEC 942 Class 1 Spec.
94	94.09	± 0.3 dB
114	114.21	

Uncertainty : ± 0.2 dB

2. Frequency

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

Uncertainty : $\pm 3.6 \times 10^{-6}$

3. Level Stability : 0.0 dB
IEC 942 Class 1 Spec. : ± 0.1 dB
Uncertainty : ± 0.01 dB

4. Total Harmonic Distortion : < 1.6 %
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 : 1 005 hPa.

---------- END ----------

綜合試驗有限公司
SOILS & MATERIALS ENGINEERING CO., LTD.
G/F., 9/F., 12/F., 13/F. & 20/F., Leader Centre, 37 Wong Chuk Hang Road, Aberdeen, Hong Kong.
香港黃竹坑道37號利達中心地下，9樓，12樓，13樓及20樓
E-mail: smec@cigismec.com Website: www.cigismec.com
Tel : (852) 2873 6860
Fax : (852) 2555 7533
HOKLAS 028

CERTIFICATE OF CALIBRATION

Certificate No.: 11CA0117 01-02 **Page:** 1 of 2

Item tested

Description:	Acoustical Calibrator (Class 1)
Manufacturer:	Castle
Type/Model No.:	GA607
Serial/Equipment No.:	039543
Adaptors used:	-

Item submitted by

Curstomer:	Geotechnics & Concrete Engineering (H.K.) Ltd.
Address of Customer:	6 Ko Shan Rd., Ground FL., Hung Hom, Kowloon, Hong Kong
Request No.:	RS/11/010-PO
Date of request:	17-Jan-2011

Date of test: 20-Jan-2011

Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Lab standard microphone	B&K 4180	2412857	02-Jul-2011	SCL
Preamplifier	B&K 2673	2239857	14-Dec-2011	CEPREI
Measuring amplifier	B&K 2610	2346941	15-Dec-2011	CEPREI
Signal generator	DS 360	61227	24-Jun-2011	CEPREI
Digital multi-meter	34401A	US36087050	09-Dec-2011	CEPREI
Audio analyzer	8903B	GB41300350	28-Jun-2011	CEPREI
Universal counter	53132A	MY40003662	05-Jul-2011	CEPREI

Ambient conditions

Temperature:	22 ± 1 °C
Relative humidity:	60 ± 10 %
Air pressure:	1000 ± 5 hPa

Test specifications

1, The Sound Calibrator has been calibrated in accordance with the requirements as specified in IEC 60942 1997 Annex B and the lab calibration procedure SMTP004-CA-156.

2, The calibrator was tested with its axis vertical facing downwards at the specific frequency using insert voltage technique.

3, The results are rounded to the nearest 0.01 dB and 0.1 Hz and have not been corrected for variations from a reference pressure of 1013.25 hectoPascals as the maker's information indicates that the instrument is insensitive to pressure changes.

Test results

Details of the performed measurements are presented on page 2 of this certificate.

Approved Signatory: Huang Jian Min/Feng Jun Qi **Date:** 21-Jan-2011 **Company Chop:**

SOILS AND MATERIALS ENGINEERING COMPANY LTD. 綜合試驗有限公司

Comments: The results reported in this certificate refer to the conditon of the instrument on the date of calibration and carry no implication regarding the long-term stability of the instrument.

綜合試驗有限公司
SOILS & MATERIALS ENGINEERING CO., LTD.
G/F., 9/F., 12/F., 13/F. & 20/F., Leader Centre, 37 Wong Chuk Hang Road, Aberdeen, Hong Kong.
香港黃竹坑道37號利達中心地下，9樓，12樓，13樓及20樓
E-mail: smec@cigismec.com Website: www.cigismec.com
Tel : (852) 2873 6860
Fax : (852) 2555 7533
HOKLAS 028

CERTIFICATE OF CALIBRATION

(Continuation Page)

1, Measured Sound Pressure Level

The output Sound Pressure Level in the calibrator head was measured at the setting and frequency shown using a calibrated laboratory standard microphone and insert voltage technique. The results are given in below with the estimated uncertainties.

(Output level in dB re 20 μPa)

Frequency Shown Hz	Output Sound Pressure Level Setting dB	Measured Output Sound Pressure Level dB	Estimated Uncertainty dB
1000	94.00	94.31	0.10

2, Sound Pressure Level Stability - Short Term Fluctuations

The Short Term Fluctuations was determined by measuring the maximum and minimum of the fast weighted DC output of the B&K 2610 measuring amplifier over a 20 second time interval as required in the standard. The Short Term Fluctuation was found to be:

At 1000 Hz **STF = 0.001 dB**

Estimated uncertainty 0.005 dB

3, Actual Output Frequency

The determination of actual output frequency was made using a B&K 4180 microphone together with a B&K 2673 preamplifier connected to a B&K 2610 measuring amplifier. The AC output of the B&K 2610 was taken to an universal counter which was used to determine the frequency averaged over 20 second of operation as required by the standard. The actual output frequency at 1 KHz was:

At 1000 Hz **Actual Frequency = 1000.1 Hz**

Estimated uncertainty 0.1 Hz Coverage factor k = 2.2

4, Total Noise and Distortion

For the Total Noise and Distortion measurement, the unfiltered AC output of the B&K 2610 measuring amplifier was connected to an Agilent Type 8903 B distortion analyser. The TND result at 1 KHz was:

At 1000 Hz **TND = 3.2%**

Estimated uncertainty 0.7%

The uncertainties have been calculated in accordance with the ISO Publication "Guide to the expression of uncertainty in measurement", and gives an interval estimated to have a level of confidence of 95 %. A coverage factor of 2 is assumed unless explicitly stated.

- End -

Calibrated by: C.Y. Fung **Checked by:**
Date: 20-Jan-2011 **Date:** 21-Jan-2011

The standard(s) and equipment used in the calibration are traceable to national or international recognised standards and are calibrated on a schedule to maintain the required accuracy level.

綜合試驗有限公司
SOILS & MATERIALS ENGINEERING CO., LTD.
G/F., 9/F., 12/F., 13/F. & 20/F., Leader Centre, 37 Wong Chuk Hang Road, Aberdeen, Hong Kong. Tel : (852) 2873 6860
香港黃竹坑道37號利達中心地下，9樓，12樓，13樓及20樓 Fax : (852) 2555 7533
E-mail: smec@cigismec.com Website: www.cigismec.com
HOKLAS 028

CERTIFICATE OF CALIBRATION

Certificate No.: 11CA0117 01-01

Item tested

Description:	Sound Level Meter (Type 1)	,	Microphone
Manufacturer:	ACO, Japan	,	ACO, Japan
Type/Model No.:	6224	,	7146
Serial/Equipment No.:	100104	,	39967
Adaptors used:	-	,	-

Item submitted by

Customer Name:	Geotechnics & Concrete Engineering (H.K.) Ltd.
Address of Customer:	6 Ko Shan Rd., Ground FL., Hung Hom, Kowloon, Hong Kong
Request No.:	RS/11/010-PO
Date of request:	17-Jan-2011

Date of test: 20-Jan-2011

Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Multi function sound calibrator	B&K 4226	2288444	10-Jan-2012	CIGISMEC
Signal generator	DS 360	33873	28-Jun-2011	CEPREI
Signal generator	DS 360	61227	24-Jun-2011	CEPREI

Ambient conditions

Temperature:	22 ± 1 °C
Relative humidity:	60 ± 10 %
Air pressure:	1000 ± 5 hPa

Test specifications

1, The Sound Level Meter has been calibrated in accordance with the requirements as specified in BS 7580: Part 1: 1997 and the lab calibration procedure SMTP004-CA-152.
2, The electrical tests were performed using an electrical signal substituted for the microphone which was removed and replaced by an equivalent capacitance within a tolerance of ±20%.
3, The acoustic calibration was performed using an B&K 4226 sound calibrator and corrections was applied for the difference between the free-field and pressure responsess of the Sound Level Meter.

Test results

This is to certify that the Sound Level Meter conforms to BS 7580: Part 1: 1997 for the conditions under which the test was performed.

Details of the performed measurements are presented on page 2 of this certificate.

Actual Measurement data are documented on worksheets.

Approved Signatory: Huang Jian Min/Feng Jun Qi **Date:** 21-Jan-2011 **Company Chop:** SOILS AND MATERIALS ENGINEERING COMPANY LTD. 綜合試驗有限公司

Comments: The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of the instrument.

綜合試驗有限公司
SOILS & MATERIALS ENGINEERING CO., LTD.
G/F., 9/F., 12/F., 13/F. & 20/F., Leader Centre, 37 Wong Chuk Hang Road, Aberdeen, Hong Kong.
香港黃竹坑道37號利達中心地下，9樓，12樓，13樓及20樓
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Fax : (852) 2555 7533
HKLAS 028

CERTIFICATE OF CALIBRATION

(Continuation Page)

Certificate No.: 11CA0117 01-01 **Page** 2 **of** 2

1, Electrical Tests

The electrical tests were perfomed using an equivalent capacitance substituted for the microphone. The results are given in below with test status and the estimated uncertainties. The "Pass" means the result of the test is inside the tolerances stated in the test specifications. The "-" means the result of test is outside these tolerances.

Test:	Subtest:	Status:	Uncertainty (dB) / Coverage Factor	
Self-generated noise	A	Pass	0.3	
	C	Pass	1.0	2.1
	Lin	Pass	1.5	2.2
Linearity range for Leq	At reference range , Step 5 dB at 4 kHz	Pass	0.3	
	Reference SPL on all other ranges	Pass	0.3	
	2 dB below upper limit of each range	Pass	0.3	
	2 dB above lower limit of each range	Pass	0.3	
Linearity range for SPL	At reference range , Step 5 dB at 4 kHz	Pass	0.3	
Frequency weightings	A	Pass	0.3	
	C	Pass	0.3	
	Lin	Pass	0.3	
Time weightings	Single Burst Fast	Pass	0.3	
	Single Burst Slow	Pass	0.3	
Peak response	Single 100μs rectangular pulse	N/A	N/A	
R.M.S. accuracy	Crest factor of 3	Pass	0.3	
Time weighting I	Single burst 5 ms at 2000 Hz	Pass	0.3	
	Repeated at frequency of 100 Hz	Pass	0.3	
Time averaging	1 ms burst duty factor $1/10^3$ at 4kHz	Pass	0.3	
	1 ms burst duty factor $1/10^4$ at 4kHz	Pass	0.3	
Pulse range	Single burst 10 ms at 4 kHz	Pass	0.4	
Sound exposure level	Single burst 10 ms at 4 kHz	Pass	0.4	
Overload indication	SPL	Pass	0.3	
	Leq	Pass	0.4	

2, Acoustic tests

The complete sound level meter was calibrated on the reference range using a B&K 4226 acoustic calibrator with 1000Hz and SPL 94 dB. The sensitivity of the sound level meter was adjusted. The test result at 125 Hz and 8000 Hz are given in below with test status and the estimated uncertainties.

Test:	Subtest	Status	Uncertainty (dB) / Coverage Factor
Acoustic response	Weighting A at 125 Hz	Pass	0.3
	Weighting A at 8000 Hz	Pass	0.5

3, Response to associated sound calibrator

N/A

The uncertainties have been calculated in accordance with the ISO Publication "Guide to the expression of uncertainty in measurement", and gives an interval estimated to have a level of confidence of 95 %. A coverage factor of 2 is assumed unless explicitly stated.

- End -

Calibrated by: C.Y. Fung **Checked by:**
Date: 20-Jan-2011 **Date:** 21-Jan-2011

The standard(s) and equipment used in the calibration are traceable to national or international recognised standards and are calibrated on a schedule to maintain the required accuracy level.

Hong Kong Calibration Ltd.
香港校正有限公司

Calibration Certificate

Certificate No. **00987** Page 1 of 3 Pages

Customer : Environmental Pioneers and Solutions Limited

Address : Flat A, 8 Floor, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, Hong Kong.

Order No. : Q00196 **Date of receipt :** 1-Mar-10

Item Tested

Description : Digital Sound Level Meter

Manufacturer : SVAN

Model : 949 **Serial No. :** 8569

Test Conditions

Date of Test : 5-Mar-10 **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:

Equipment No.	Description	Cert. No.	Due Date	Traceable to
S017	Multi-Function Generator	C081456	18-Mar-10	SCL-HKSAR
S024	Sound Level Calibrator	93758	16-Jul-10	NIM-PRC & SCL-HKSAR

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

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

Calibrated by : P.F. Wong

Approved by : Dorothy Cheuk

Date: 8-Mar-10

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

Results :

1. SPL Accuracy

UUT Setting				Applied Value (dB)	UUT Reading (dB)
Level Range	Octave Filter	Weight	Response		
105 dB	OFF	A	Fast	94.03	94.0
			Slow		94.0
		C	Fast		94.0
130 dB	OFF	A	Fast	94.03	94.1
			Slow		94.1
		C	Fast		94.1
	OFF	A	Fast	113.97	113.9
			Slow		113.9
		C	Fast		113.9

IEC 651 Type 1 Spec. : ± 0.7 dB
Uncertainty : ± 0.1 dB

2. Level Stability : 0.0 dB

IEC 651 Type 1 Spec. : ± 0.3 dB
Uncertainty : ± 0.01 dB

3. Linearity

3.1 Level Linearity

UUT Range	Applied Value (dB)	UUT Rdg (dB)	Variation (dB)	IEC 651 Type 1 Spec. (inside Primary)
130	114.0	114.0	-0.1	± 0.7 dB
	104.0	104.0	-0.1	
	94.0	94.1 (Ref.)	--	
105	84.0	84.0	-0.1	
	74.0	74.0	-0.1	
	64.0	64.0	-0.1	
	54.0	54.0	-0.1	

Uncertainty : ± 0.1 dB

Calibration Certificate

3.2 Differential level linearity

UUT Range	Applied Value (dB)	UUT Rdg (dB)	Variation (dB)	IEC 651 Type 1 Spec.
130	84.0	83.9	-0.2	± 0.4 dB
	94.0	94.1(Ref.)	--	
	95.0	95.2	+0.1	± 0.2 dB
	104.0	104.0	-0.1	± 0.4 dB
	105.0	105.0	-0.1	
	114.0	114.0	-0.1	± 1.0 dB

Uncertainty : ± 0. 1 dB

4. Frequency Weighting

A weighting

Frequency	Attenuation (dB)	IEC 651 Type 1 Spec.
31.5 Hz	-40.6	- 39.4 dB, ± 1.5 dB
63 Hz	-27.4	- 26.2 dB, ± 1.5 dB
125 Hz	-17.0	- 16.1 dB, ± 1 dB
250 Hz	-9.7	- 8.6 dB, ± 1 dB
500 Hz	-4.0	- 3.2 dB, ± 1 dB
1 kHz	0.0 (Ref)	0 dB, ± 1 dB
2 kHz	+1.8	+ 1.2 dB, ± 1 dB
4 kHz	+1.8	+ 1.0 dB, ± 1 dB
8 kHz	-0.2	- 1.1 dB, + 1.5 dB ~ -3 dB
16 kHz	-6.1	- 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	49.9	± 0.5 dB
$1/10^2$	50.0	49.9	
$1/10^3$	50.0	50.0	± 1.0 dB
$1/10^4$	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 : 1 005 hPa.

---------- END ----------

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
6 KO SHAN RD., GROUND FL., HUNG HOM, KOWLOON, HONG KONG.
TEL.: 852-2365 9123 FAX NO.: 852-2765 8034

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

Calibration Reference No. : GCE/CHE/WQC/2011-1

Client : ENVIRONMENTAL PIONEER AND SOLUTION LIMITED

Equipment No. : WQC-24 Location : Mui Wo Site

Manufacturer : DKK-TOA Serial No.: 640274

Calibration Date : 01 to 04-03-2011 Due Date : 01-06-2011

Criterion: (Repeatabilty, Linearity)

pH	:	Both within ±0.05pH
Dissolved oxygen	:	Both within ±0.1mg/L
Electric conductivity	:	Both within ±1%FS
Turbidity	:	Repeatability : within ±3%FS
Temperature	:	Repeatability ±0.25°C; Linearity ±0.5°C; (Ambient 5~45°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	15.3 mS/m	
0.005	71.8 mS/m	72.3 mS/m	Acceptance Criterion
0.01	0.141 S/m	0.145 S/m	$R^2 > 0.995$ Within ± 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	0.671 S/m	
0.1	1.29 S/m	1.30 S/m	
0.5	5.87 S/m	5.89 S/m	
Repeatability	1st time	0.00 , 5.89 S/m	Within ± 1% F.S. against average value
	2nd time	0.00 , 5.89 S/m	
	3rd time	0.00 , 5.89 S/m	
	0.00 , 5.87 S/m	Ave.: 0.00 , 5.89	

* 1 S/m = 10^4 μmhos/cm = 10^3 mS/m

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

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
6 KO SHAN RD., GROUND FL., HUNG HOM, KOWLOON, HONG KONG.
TEL.: 852-2365 9123 FAX NO.: 852-2765 8034

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^2)
0.00		0.00	0.9999
2.95		3.02	
5.42		5.50	Acceptance Criterion
8.62		8.68	$R^2 > 0.995$ Within ± 0.1 mg/L against standard value
10.27		10.35	
13.12		13.06	
Repeatability	1st time	0.00 , 8.70	Within ± 0.1 mg/L against average value
	2nd time	0.00 , 8.65	
	3rd time	0.00 , 8.68	
	0.00 , 8.62	Ave.: 0.00 , 8.68	

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

pH Value:

(Reference : APHA 20ed 4500-H^+ 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^2)
pH = 4.00	1.67	1.71	0.9999
pH = 6.88	4.00	4.03	Acceptance Criterion
pH = 7.00	6.88	6.89	$R^2 > 0.995$ Within ± 0.05 pH against standard value
pH = 9.22	7.00	7.02	
pH = 10.00	7.43	7.45	
	9.22	9.19	
	10.00	9.96	
	12.64	12.67	
Repeatability	1st time	4.03 , 9.97	Within ± 0.05 pH against average value
	2nd time	4.03 , 9.96	
	3rd time	4.02 , 9.95	
	pH 4.00 , 10.00	Ave.: 4.03 , 9.96	

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

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
6 KO SHAN RD., GROUND FL., HUNG HOM, KOWLOON, HONG KONG.
TEL.: 852-2365 9123 FAX NO.: 852-2765 8034

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^2)
5.0	4.6		0.9997
15.0	15.2		
25.0	25.4		Acceptance Criterion
35.0	34.7		$R^2 > 0.995$ Within ± 0.5°C against standard value
45.0	45.3		
55.0	55.3		
Repeatability	1st time	15.3 , 45.4	Within ± 0.25°C against average value
	2nd time	15.1 , 45.3	
	3rd time	15.2 , 45.2	
	15.0 , 45.0	Ave.: 15.2 , 45.3	

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^2)
0.0	0.0		1.0000
20.0	20.7		Acceptance Criterion
100.0	102.2		$R^2 > 0.995$ Within ± 3% F.S. against span calibration value 100, 400 and 800 NTU
400.0	401.7		
800.0	802.1		
Repeatability	1st time	0.0 , 801.9	
	2nd time	0.0 , 802.1	Within ± 3% F.S. against average value
	3rd time	0.0 , 802.4	
	0.0 , 800.0	Ave.: 0.0 , 802.1	

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

Comments : Pass, (comply with the criteria)

Tested by : Fong Ka Lun Certified by : Gu Chin
Chemist

Checked by : Gu Chin Date : 4-3-2011

Appendix D1 Plant species recorded at Pak Ngan Heung River (N)

			Relative	Occurrence	
Species	Habit	Native	Abundance	PNH3	PNH4
Acacia confusa	tree	no	occasional		+
Achyranthes aspera	herb	yes	scarce		+
Alangium chinensis	tree	yes	scarce		+
Alocasia macrorrhiza	herb	yes	occasional		+
Amaranthus viridus	herb	yes	scarce		+
Annona squamosa	tree	no	scarce		+
Bidens pilosa	herb	no	occasional		+
Bridelia tomentosa	tree	yes	scarce		+
Celosia argentea	herb	yes	scarce		+
Cleistocalyx operculata	tree	yes	scarce		+
Cyperus sp.	herb	yes	scarce		+
Desmos chinensis	shrub	yes	scarce		+
Dimocarpus longan	tree	no	occasional		+
Echinochloa crus-galli	grass	yes	scarce		+
Eclipta prostrata	herb	yes	scarce		+
Eleusine indica	grass	yes	scarce		+
Emilia sonchifolia	herb	yes	scarce		+
Eupatorium catarium	herb	no	scarce		+
Ficus hispida	tree	yes	scarce		+
Ficus microcarpa	tree	yes	scarce		+
Ficus superba	tree	yes	occasional		+
Gardenia jasminoides	shrub	yes	occasional		+
Hedychium coronarium	herb	no	occasional		+
Hedyotis tenelliflora	herb	yes	scarce		+
Kyllinga monocephala	herb	yes	scarce		+
Liquidambar formosana	tree	yes	occasional		+
Litsea glutinosa	tree	yes	scarce		+
Ludwigia perennis	herb	yes	scarce		+
Lygodium japonicum	fern	yes	scarce		+
Macaranga tanarius	tree	yes	occasional		+
Mallotus paniculatus	tree	yes	occasional		+
Microcos paniculata	tree	yes	scarce		+
Microstegium ciliatum	grass	yes	common		+

			Relative	Occurrence	
Species	Habit	Native	Abundance	PNH3	PNH4
Mikania micrantha	climber	no	occasional	+	+
Oxalis corymbosa	herb	yes	scarce		+
Panicum maximum	grass	no	scarce		+
Phyllanthus urinaria	shrub	yes	scarce		+
Polygonum hydropiper	herb	yes	scarce		+
Pteris vittata	fern	yes	scarce		+
Pterocypsela indica	herb	yes	scarce		+
Pueraria phaseoloides	climber	yes	scarce		+
Pycreus flavidus	herb	yes	scarce		+
Rhus succedanea	tree	yes	scarce		+
Rorippa indica	herb	yes	scarce		+
Scleria sp.	herb	yes	scarce		+
Sida rhombifolia	herb	yes	scarce		+
Spilanthes paniculata	herb	yes	scarce		+
Sporobolus fertilis	grass	yes	scarce		+
Stephania longa	climber	yes	scarce		+
Sterculia lanceolata	tree	yes	scarce		+
Urena lobata	herb	yes	scarce		+

Appendix D2 Plant species recorded at Pak Ngan Heung River (S)

			Relative	Occurrence	
Species	Habit	Native	Abundance	PNH1	PNH2
Ficus superba	tree	yes	occasional		+
Ipomoea cairica	climber	yes	occasional		+
Kandelia obovata	tree	yes	scarce	+	
Lantana camara	shrub	no	scarce		+
Panicum maximum	grass	no	common		+

Appendix D3 Plant species recorded at Luk Tei Tong River

Species	Habit	Native	Relative Abundance	Occurrence				
				LLT1	LLT2	LLT3	LLT4	LLT5
Acanthus ilicifolius	shrub	yes	scarce		+			
Achyranthes aspera	herb	yes	scarce		+			
Apluda mutica	grass	yes	scarce		+			
Bidens pilosa	herb	no	scarce	+				
Celtis sinensis	tree	yes	scarce	+				
Eleusine indica	grass	yes	scarce		+			
Ficus superba	tree	yes	scarce	+				
Mikania micrantha	climber	no	scarce	+				
Ficus microcarpa	tree	yes	scarce	+				
Ficus hispida	tree	yes	scarce	+				
Mimosa pudica	herb	yes	scarce		+			
Wollastonia biflora	herb	yes	scarce		+			
Hibiscus tiliaceus	tree	yes	scarce	+				
Kandelia obovata	tree	yes	occasional		+			
Leucaena leucocephala	tree	no	scarce	+				
Macaranga tanarius	tree	yes	scarce	+				
Neyraudia reynaudiana	grass	yes	scarce		+			
Panicum maximum	grass	no	scarce	+	+			
Rhynchelytrum repens	grass	no	scarce	+				
Saccharum arundinaceum	grass	yes	scarce	+				

Appendix D4

Ecological Water Monitoring Results (on-site measurements)

Environmental Pioneers & Solutions Limited

Ecological Water Quality Monitoring - Summary of On-site measurement results

Date of Sampling: 16/2/2011 **Weather Condition: Cloudy**

Monitoring Location	**WE1**			**WE2**			**WE3**			**WE4**			**WE5**			**WE6**		
Time (hhmm)	1140			1150			1050			1110			1120			1210		
Tide Mode	ebb			ebb			ebb			ebb			ebb			ebb		
River Condition	Normal			Normal			Normal			Normal			Normal			Normal		
Water Depth (m)	< 1.0			< 1.0			< 1.0			< 1.0			< 1.0			< 1.0		
pH value	7.75			7.77			8.07			6.65			7.18			7.41		
Temperature (oC)	13.6			14.0			14.4			17.0			14.3			14.2		
Salinity (ppt)	0.3			0.2			1.4			15.0			6.9			0.1		
Conductivity (s/m)	66.0			58.0			0.3			2.5			1.3			24.1		
Water flow (m/s)	0.100			0.100			0.100			0.100			0.100			0.100		
Turbidity (NTU)	0.0	0.0	Average 0.00	4.4	4.4	Average 4.40	0.0	0.0	Average 0.00	0.0	0.0	Average 0.0	3.1	3.1	Average 3.10	0.0	0.0	Average 0.0
DO (mg/l)	9.47	9.49	Average 9.48	8.90	8.91	Average 8.91	8.51	8.48	Average 8.50	6.57	6.57	Average 6.57	7.13	7.13	Average 7.13	10.52	10.51	Average 10.52
DO Saturation (%)	94	94	Average 94	87	87	Average 87	87	87	Average 87	70	70	Average 70	70	70	Average 70	105	105	Average 105

Name	**Signature**	**Date**
Prepared By: Jimmy Cheng		16/2/2011

remark or observation:

Appendix D5

Ecological Water Monitoring Results (lab report)

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
6 KO SHAN RD., GROUND FL., HUNG HOM, KOWLOON, HONG KONG.
TEL.: 852-2365 9123 FAX NO.: 852-2765 8034

TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER

Report No. : GCC110200166 Date of Issue : 04-03-2011

Client* : Environmental Pioneers & Solutions Limited Order Received : 08-09-2008

Client Address* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

Project* : DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon. Date Started : 16-02-2011

W.O. No.* : -- Contract No.* : -- Date Completed : 25-02-2011

GCE Serial No. : WQM022011 Sampling Date* : 16-02-2011/11:40 Sample Type* : River Water

GCE Reg. No. : GCE 081096 Test Unit No. : CH 08258 Sample I.D.* : WE1

Descripption : River Water

DESCRIPTION		TEST REFERENCE (In-House Method based on)	TEST RESULT
Appearance		APHA 20ed 2110	--
Odour		APHA 20ed 2150 B	Odour Characteristics : --
			Threshold Odour Number (TON) : --
pH Value at temperature [ ] °C		APHA 20ed 4500-H^+ B	--
Colour	TCU	APHA 20ed 2120 B	--
Turbidity	NTU	APHA 20ed 2130 B	--
Conductivity at 25°C	µS/cm	APHA 20ed 2510 B	--
Salinity	g/L	APHA 20ed 2520 B	--
Nitrogen (Ammonia)	mg/L	APHA 20ed 4500-NH_3 D	0.07
		APHA 20ed 4500-NH_3 E	--
		APHA 18ed 4500-NH_3 C	--
Nitrogen (Nitrate)	mg/L	APHA 20ed 4500-NO_3^- E	0.10
Phosphorus	mg/L	APHA 20ed 4500-P D	0.08
Biochemical Oxygen Demand (BOD_5)	mg/L	APHA 20ed 5210 B	1
Chemical Oxygen Demand (COD)	mg/L	APHA 20ed 5220 D	--
Total Suspended Solid	mg/L	APHA 20ed 2540 D	--

* : Information provided by client

Note : This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

Sample received on 16 Feb. 2011.

REMARKS : Sample Location WE1.

----- End -----

Tested By : K.L. Fong, C.S. Chan Certified By : 

Name : Gu Chin

Checked By : Gu Chin Post : Chemist

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
6 KO SHAN RD., GROUND FL., HUNG HOM, KOWLOON, HONG KONG.
TEL.: 852-2365 9123 FAX NO.: 852-2765 8034

TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER

Report No. : GCC110200174 Date of Issue : 04-03-2011

Client* : Environmental Pioneers & Solutions Limited Order Received : 08-09-2008

Client Address* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

Project* : DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon. Date Started : 16-02-2011

W.O. No.* : -- Contract No.* : -- Date Completed : 25-02-2011

GCE Serial No. : WQM022011 Sampling Date* : 16-02-2011/11:40 Sample Type* : River Water

GCE Reg. No. : GCE 081096 Test Unit No. : CH 08258 Sample I.D.* : WE1 Duplicate

Descripption : River Water

DESCRIPTION		TEST REFERENCE (In-House Method based on)	TEST RESULT
Appearance		APHA 20ed 2110	--
Odour		APHA 20ed 2150 B	Odour Characteristics : --
			Threshold Odour Number (TON) : --
pH Value at temperature [	] °C	APHA 20ed 4500-H^+ B	--
Colour	TCU	APHA 20ed 2120 B	--
Turbidity	NTU	APHA 20ed 2130 B	--
Conductivity at 25°C	µS/cm	APHA 20ed 2510 B	--
Salinity	g/L	APHA 20ed 2520 B	--
Nitrogen (Ammonia)	mg/L	APHA 20ed 4500-NH_3 D	0.07
		APHA 20ed 4500-NH_3 E	--
		APHA 18ed 4500-NH_3 C	--
Nitrogen (Nitrate)	mg/L	APHA 20ed 4500-NO_3^- E	0.11
Phosphorus	mg/L	APHA 20ed 4500-P D	0.08
Biochemical Oxygen Demand (BOD_5)	mg/L	APHA 20ed 5210 B	1
Chemical Oxygen Demand (COD)	mg/L	APHA 20ed 5220 D	--
Total Suspended Solid	mg/L	APHA 20ed 2540 D	--

* : Information provided by client

Note : This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

Sample received on 16 Feb. 2011.

REMARKS : Sample Location WE1.

----- End -----

Tested By : K.L. Fong, C.S. Chan Certified By :

Name : Gu Chin

Checked By : Gu Chin Post : Chemist

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
6 KO SHAN RD., GROUND FL., HUNG HOM, KOWLOON, HONG KONG.
TEL.: 852-2365 9123 FAX NO.: 852-2765 8034

TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER

Report No. : GCC110200182 Date of Issue : 04-03-2011

Client* : Environmental Pioneers & Solutions Limited Order Received : 08-09-2008

Client Address* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

Project* : DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon. Date Started : 16-02-2011

W.O. No.* : -- Contract No.* : -- Date Completed : 25-02-2011

GCE Serial No. : WQM022011 Sampling Date* : 16-02-2011 / 11:50 Sample Type* : River Water

GCE Reg. No. : GCE 081096 Test Unit No. : CH 08258 Sample I.D.* : WE2

Descripption : River Water

DESCRIPTION		TEST REFERENCE (In-House Method based on)	TEST RESULT
Appearance		APHA 20ed 2110	--
Odour		APHA 20ed 2150 B	Odour Characteristics : --
			Threshold Odour Number (TON) : --
pH Value at temperature [ ] °C		APHA 20ed 4500-H^+ B	--
Colour	TCU	APHA 20ed 2120 B	--
Turbidity	NTU	APHA 20ed 2130 B	--
Conductivity at 25°C	µS/cm	APHA 20ed 2510 B	--
Salinity	g/L	APHA 20ed 2520 B	--
Nitrogen (Ammonia)	mg/L	APHA 20ed 4500-NH_3 D	0.12
		APHA 20ed 4500-NH_3 E	--
		APHA 18ed 4500-NH_3 C	--
Nitrogen (Nitrate)	mg/L	APHA 20ed 4500-NO_3^- E	0.18
Phosphorus	mg/L	APHA 20ed 4500-P D	0.06
Biochemical Oxygen Demand (BOD_5)	mg/L	APHA 20ed 5210 B	< 1
Chemical Oxygen Demand (COD)	mg/L	APHA 20ed 5220 D	--
Total Suspended Solid	mg/L	APHA 20ed 2540 D	--

* : Information provided by client

Note : This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

Sample received on 16 Feb. 2011.

REMARKS : Sample Location WE2.

----- End -----

Tested By : K.L. Fong, C.S. Chan Certified By : 

Name : Gu Chin

Checked By : Gu Chin Post : Chemist

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
6 KO SHAN RD., GROUND FL., HUNG HOM, KOWLOON, HONG KONG.
TEL.: 852-2365 9123 FAX NO.: 852-2765 8034

TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER

Report No. : GCC110200190 Date of Issue : 04-03-2011

Client* : Environmental Pioneers & Solutions Limited Order Received : 08-09-2008

Client Address* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

Project* : DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon. Date Started : 16-02-2011

W.O. No.* : -- Contract No.* : -- Date Completed : 25-02-2011

GCE Serial No. : WQM022011 Sampling Date* : 16-02-2011 / 11:50 Sample Type* : River Water

GCE Reg. No. : GCE 081096 Test Unit No. : CH 08258 Sample I.D.* : WE2 Duplicate

Descripption : River Water

DESCRIPTION		TEST REFERENCE (In-House Method based on)	TEST RESULT
Appearance		APHA 20ed 2110	--
Odour		APHA 20ed 2150 B	Odour Characteristics : --
			Threshold Odour Number (TON) : --
pH Value at temperature [	] °C	APHA 20ed 4500-H^+ B	--
Colour	TCU	APHA 20ed 2120 B	--
Turbidity	NTU	APHA 20ed 2130 B	--
Conductivity at 25°C	µS/cm	APHA 20ed 2510 B	--
Salinity	g/L	APHA 20ed 2520 B	--
Nitrogen (Ammonia)	mg/L	APHA 20ed 4500-NH_3 D	0.12
		APHA 20ed 4500-NH_3 E	--
		APHA 18ed 4500-NH_3 C	--
Nitrogen (Nitrate)	mg/L	APHA 20ed 4500-NO_3^- E	0.17
Phosphorus	mg/L	APHA 20ed 4500-P D	0.05
Biochemical Oxygen Demand (BOD_5)	mg/L	APHA 20ed 5210 B	< 1
Chemical Oxygen Demand (COD)	mg/L	APHA 20ed 5220 D	--
Total Suspended Solid	mg/L	APHA 20ed 2540 D	--

* : Information provided by client

Note : This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

Sample received on 16 Feb. 2011.

REMARKS : Sample Location WE2.

----- End -----

Tested By : K.L. Fong, C.S. Chan Certified By :

Name : Gu Chin

Checked By : Gu Chin Post : Chemist

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
6 KO SHAN RD., GROUND FL., HUNG HOM, KOWLOON, HONG KONG.
TEL.: 852-2365 9123 FAX NO.: 852-2765 8034

TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER

Report No. : GCC110200205 Date of Issue : 04-03-2011

Client* : Environmental Pioneers & Solutions Limited Order Received : 08-09-2008

Client Address* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

Project* : DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon. Date Started : 16-02-2011

W.O. No.* : -- Contract No.* : -- Date Completed : 25-02-2011

GCE Serial No. : WQM022011 Sampling Date* : 16-02-2011 / 10:50 Sample Type* : River Water

GCE Reg. No. : GCE 081096 Test Unit No. : CH 08258 Sample I.D.* : WE3

Descripption : River Water

DESCRIPTION		TEST REFERENCE (In-House Method based on)	TEST RESULT
Appearance		APHA 20ed 2110	--
Odour		APHA 20ed 2150 B	Odour Characteristics : --
			Threshold Odour Number (TON) : --
pH Value at temperature [ ] °C		APHA 20ed 4500-H^+ B	--
Colour	TCU	APHA 20ed 2120 B	--
Turbidity	NTU	APHA 20ed 2130 B	--
Conductivity at 25°C	µS/cm	APHA 20ed 2510 B	--
Salinity	g/L	APHA 20ed 2520 B	--
Nitrogen (Ammonia)	mg/L	APHA 20ed 4500-NH_3 D	0.48
		APHA 20ed 4500-NH_3 E	--
		APHA 18ed 4500-NH_3 C	--
Nitrogen (Nitrate)	mg/L	APHA 20ed 4500-NO_3^- E	0.44
Phosphorus	mg/L	APHA 20ed 4500-P D	0.10
Biochemical Oxygen Demand (BOD_5)	mg/L	APHA 20ed 5210 B	2
Chemical Oxygen Demand (COD)	mg/L	APHA 20ed 5220 D	--
Total Suspended Solid	mg/L	APHA 20ed 2540 D	--

* : Information provided by client

Note : This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

Sample received on 16 Feb. 2011.

REMARKS : Sample Location WE3.

----- End -----

Tested By : K.L. Fong, C.S. Chan Certified By :

Name : Gu Chin

Checked By : Gu Chin Post : Chemist

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
6 KO SHAN RD., GROUND FL., HUNG HOM, KOWLOON, HONG KONG.
TEL.: 852-2365 9123 FAX NO.: 852-2765 8034

TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER

Report No. : GCC110200213 Date of Issue : 04-03-2011

Client* : Environmental Pioneers & Solutions Limited Order Received : 08-09-2008

Client Address* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

Project* : DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon. Date Started : 16-02-2011

W.O. No.* : -- Contract No.* : -- Date Completed : 25-02-2011

GCE Serial No. : WQM022011 Sampling Date* : 16-02-2011 / 10:50 Sample Type* : River Water

GCE Reg. No. : GCE 081096 Test Unit No. : CH 08258 Sample I.D.* : WE3 Duplicate

Descripption : River Water

DESCRIPTION		TEST REFERENCE (In-House Method based on)	TEST RESULT
Appearance		APHA 20ed 2110	--
Odour		APHA 20ed 2150 B	Odour Characteristics : --
			Threshold Odour Number (TON) : --
pH Value at temperature [ ] °C		APHA 20ed 4500-H^+ B	--
Colour	TCU	APHA 20ed 2120 B	--
Turbidity	NTU	APHA 20ed 2130 B	--
Conductivity at 25°C	µS/cm	APHA 20ed 2510 B	--
Salinity	g/L	APHA 20ed 2520 B	--
Nitrogen (Ammonia)	mg/L	APHA 20ed 4500-NH_3 D	0.50
		APHA 20ed 4500-NH_3 E	--
		APHA 18ed 4500-NH_3 C	--
Nitrogen (Nitrate)	mg/L	APHA 20ed 4500-NO_3^- E	0.45
Phosphorus	mg/L	APHA 20ed 4500-P D	0.11
Biochemical Oxygen Demand (BOD_5)	mg/L	APHA 20ed 5210 B	2
Chemical Oxygen Demand (COD)	mg/L	APHA 20ed 5220 D	--
Total Suspended Solid	mg/L	APHA 20ed 2540 D	--

* : Information provided by client

Note : This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

Sample received on 16 Feb. 2011.

REMARKS : Sample Location WE3.

----- End -----

Tested By : K.L. Fong, C.S. Chan Certified By :

Name : Gu Chin

Checked By : Gu Chin Post : Chemist

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
6 KO SHAN RD., GROUND FL., HUNG HOM, KOWLOON, HONG KONG.
TEL.: 852-2365 9123 FAX NO.: 852-2765 8034

TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER

Report No. : GCC110200221 Date of Issue : 04-03-2011

Client* : Environmental Pioneers & Solutions Limited Order Received : 08-09-2008

Client Address* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

Project* : DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon. Date Started : 16-02-2011

W.O. No.* : -- Contract No.* : -- Date Completed : 25-02-2011

GCE Serial No. : WQM022011 Sampling Date* : 16-02-2011 / 11:10 Sample Type* : River Water

GCE Reg. No. : GCE 081096 Test Unit No. : CH 08258 Sample I.D.* : WE4

Descripption : River Water

DESCRIPTION		TEST REFERENCE (In-House Method based on)	TEST RESULT
Appearance		APHA 20ed 2110	--
Odour		APHA 20ed 2150 B	Odour Characteristics : --
			Threshold Odour Number (TON) : --
pH Value at temperature [	] °C	APHA 20ed 4500-H^+ B	--
Colour	TCU	APHA 20ed 2120 B	--
Turbidity	NTU	APHA 20ed 2130 B	--
Conductivity at 25°C	µS/cm	APHA 20ed 2510 B	--
Salinity	g/L	APHA 20ed 2520 B	--
Nitrogen (Ammonia)	mg/L	APHA 20ed 4500-NH_3 D	0.56
		APHA 20ed 4500-NH_3 E	--
		APHA 18ed 4500-NH_3 C	--
Nitrogen (Nitrate)	mg/L	APHA 20ed 4500-NO_3^- E	0.36
Phosphorus	mg/L	APHA 20ed 4500-P D	0.15
Biochemical Oxygen Demand (BOD_5)	mg/L	APHA 20ed 5210 B	< 1
Chemical Oxygen Demand (COD)	mg/L	APHA 20ed 5220 D	--
Total Suspended Solid	mg/L	APHA 20ed 2540 D	--

* : Information provided by client

Note : This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

Sample received on 16 Feb. 2011.

REMARKS : Sample Location WE4.

----- End -----

Tested By : K.L. Fong, C.S. Chan Certified By : 

Name : Gu Chin

Checked By : Gu Chin Post : Chemist

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
6 KO SHAN RD., GROUND FL., HUNG HOM, KOWLOON, HONG KONG.
TEL.: 852-2365 9123 FAX NO.: 852-2765 8034

TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER

Report No. : GCC110200239 Date of Issue : 04-03-2011

Client* : Environmental Pioneers & Solutions Limited Order Received : 08-09-2008

Client Address* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

Project* : DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon. Date Started : 16-02-2011

W.O. No.* : -- Contract No.* : -- Date Completed : 25-02-2011

GCE Serial No. : WQM022011 Sampling Date* : 16-02-2011 / 11:10 Sample Type* : River Water

GCE Reg. No. : GCE 081096 Test Unit No. : CH 08258 Sample I.D.* : WE4 Duplicate

Descripption : River Water

DESCRIPTION		TEST REFERENCE (In-House Method based on)	TEST RESULT
Appearance		APHA 20ed 2110	--
Odour		APHA 20ed 2150 B	Odour Characteristics : --
			Threshold Odour Number (TON) : --
pH Value at temperature [ ] °C		APHA 20ed 4500-H^+ B	--
Colour	TCU	APHA 20ed 2120 B	--
Turbidity	NTU	APHA 20ed 2130 B	--
Conductivity at 25°C	µS/cm	APHA 20ed 2510 B	--
Salinity	g/L	APHA 20ed 2520 B	--
Nitrogen (Ammonia)	mg/L	APHA 20ed 4500-NH_3 D	0.55
		APHA 20ed 4500-NH_3 E	
		APHA 18ed 4500-NH_3 C	
Nitrogen (Nitrate)	mg/L	APHA 20ed 4500-NO_3^- E	0.37
Phosphorus	mg/L	APHA 20ed 4500-P D	0.15
Biochemical Oxygen Demand (BOD_5)	mg/L	APHA 20ed 5210 B	< 1
Chemical Oxygen Demand (COD)	mg/L	APHA 20ed 5220 D	--
Total Suspended Solid	mg/L	APHA 20ed 2540 D	--

* : Information provided by client

Note : This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

Sample received on 16 Feb. 2011.

REMARKS : Sample Location WE4.

----- End -----

Tested By : K.L. Fong, C.S. Chan Certified By : 

Name : Gu Chin

Checked By : Gu Chin Post : Chemist

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
6 KO SHAN RD., GROUND FL., HUNG HOM, KOWLOON, HONG KONG.
TEL.: 852-2365 9123 FAX NO.: 852-2765 8034

TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER

Report No. : GCC110200247 Date of Issue : 04-03-2011

Client* : Environmental Pioneers & Solutions Limited Order Received : 08-09-2008

Client Address* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

Project* : DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon. Date Started : 16-02-2011

W.O. No.* : -- Contract No.* : -- Date Completed : 25-02-2011

GCE Serial No. : WQM022011 Sampling Date* : 16-02-2011 / 11:20 Sample Type* : River Water

GCE Reg. No. : GCE 081096 Test Unit No. : CH 08258 Sample I.D.* : WE5

Descripption : River Water

DESCRIPTION		TEST REFERENCE (In-House Method based on)	TEST RESULT
Appearance		APHA 20ed 2110	--
Odour		APHA 20ed 2150 B	Odour Characteristics : --
			Threshold Odour Number (TON) : --
pH Value at temperature [ ] °C		APHA 20ed 4500-H^+ B	--
Colour	TCU	APHA 20ed 2120 B	--
Turbidity	NTU	APHA 20ed 2130 B	--
Conductivity at 25°C	µS/cm	APHA 20ed 2510 B	--
Salinity	g/L	APHA 20ed 2520 B	--
Nitrogen (Ammonia)	mg/L	APHA 20ed 4500-NH_3 D	1.55
		APHA 20ed 4500-NH_3 E	--
		APHA 18ed 4500-NH_3 C	--
Nitrogen (Nitrate)	mg/L	APHA 20ed 4500-NO_3^- E	0.16
Phosphorus	mg/L	APHA 20ed 4500-P D	0.21
Biochemical Oxygen Demand (BOD_5)	mg/L	APHA 20ed 5210 B	2
Chemical Oxygen Demand (COD)	mg/L	APHA 20ed 5220 D	--
Total Suspended Solid	mg/L	APHA 20ed 2540 D	--

* : Information provided by client

Note : This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

Sample received on 16 Feb. 2011.

REMARKS : Sample Location WE5.

----- End -----

Tested By : K.L. Fong, C.S. Chan Certified By : 

Name : Gu Chin

Checked By : Gu Chin Post : Chemist

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
6 KO SHAN RD., GROUND FL., HUNG HOM, KOWLOON, HONG KONG.
TEL.: 852-2365 9123 FAX NO.: 852-2765 8034

TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER

Report No. : GCC110200255 Date of Issue : 04-03-2011

Client* : Environmental Pioneers & Solutions Limited Order Received : 08-09-2008

Client Address* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

Project* : DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon. Date Started : 16-02-2011

W.O. No.* : -- Contract No.* : -- Date Completed : 25-02-2011

GCE Serial No. : WQM022011 Sampling Date* : 16-02-2011 / 11:20 Sample Type* : River Water

GCE Reg. No. : GCE 081096 Test Unit No. : CH 08258 Sample I.D.* : WE5 Duplicate

Descripption : River Water

DESCRIPTION		TEST REFERENCE (In-House Method based on)	TEST RESULT
Appearance		APHA 20ed 2110	--
Odour		APHA 20ed 2150 B	Odour Characteristics : --
			Threshold Odour Number (TON) : --
pH Value at temperature [ ]	°C	APHA 20ed 4500-H^+ B	--
Colour	TCU	APHA 20ed 2120 B	--
Turbidity	NTU	APHA 20ed 2130 B	--
Conductivity at 25°C	µS/cm	APHA 20ed 2510 B	--
Salinity	g/L	APHA 20ed 2520 B	--
Nitrogen (Ammonia)	mg/L	APHA 20ed 4500-NH_3 D	1.59
		APHA 20ed 4500-NH_3 E	--
		APHA 18ed 4500-NH_3 C	--
Nitrogen (Nitrate)	mg/L	APHA 20ed 4500-NO_3^- E	0.16
Phosphorus	mg/L	APHA 20ed 4500-P D	0.21
Biochemical Oxygen Demand (BOD_5)	mg/L	APHA 20ed 5210 B	2
Chemical Oxygen Demand (COD)	mg/L	APHA 20ed 5220 D	--
Total Suspended Solid	mg/L	APHA 20ed 2540 D	--

* : Information provided by client

Note : This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

Sample received on 16 Feb. 2011.

REMARKS : Sample Location WE5.

----- End -----

Tested By : K.L. Fong, C.S. Chan Certified By :

Name : Gu Chin

Checked By : Gu Chin Post : Chemist

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
6 KO SHAN RD., GROUND FL., HUNG HOM, KOWLOON, HONG KONG.
TEL.: 852-2365 9123 FAX NO.: 852-2765 8034

TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER

Report No. : GCC110200263 Date of Issue : 04-03-2011

Client* : Environmental Pioneers & Solutions Limited Order Received : 08-09-2008

Client Address* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

Project* : DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon. Date Started : 16-02-2011

W.O. No.* : -- Contract No.* : -- Date Completed : 25-02-2011

GCE Serial No. : WQM022011 Sampling Date* : 16-02-2011 / 12:10 Sample Type* : River Water

GCE Reg. No. : GCE 081096 Test Unit No. : CH 08258 Sample I.D.* : WE6

Descripption : River Water

DESCRIPTION		TEST REFERENCE (In-House Method based on)	TEST RESULT
Appearance		APHA 20ed 2110	--
Odour		APHA 20ed 2150 B	Odour Characteristics : --
			Threshold Odour Number (TON) : --
pH Value at temperature [ ] °C		APHA 20ed 4500-H^+ B	--
Colour	TCU	APHA 20ed 2120 B	--
Turbidity	NTU	APHA 20ed 2130 B	--
Conductivity at 25°C	µS/cm	APHA 20ed 2510 B	--
Salinity	g/L	APHA 20ed 2520 B	--
Nitrogen (Ammonia)	mg/L	APHA 20ed 4500-NH_3 D	0.08
		APHA 20ed 4500-NH_3 E	--
		APHA 18ed 4500-NH_3 C	--
Nitrogen (Nitrate)	mg/L	APHA 20ed 4500-NO_3^- E	0.07
Phosphorus	mg/L	APHA 20ed 4500-P D	0.06
Biochemical Oxygen Demand (BOD_5)	mg/L	APHA 20ed 5210 B	< 1
Chemical Oxygen Demand (COD)	mg/L	APHA 20ed 5220 D	--
Total Suspended Solid	mg/L	APHA 20ed 2540 D	--

* : Information provided by client

Note : This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

Sample received on 16 Feb. 2011.

REMARKS : Sample Location WE6.

----- End -----

Tested By : K.L. Fong, C.S. Chan Certified By :

Name : Gu Chin

Checked By : Gu Chin Post : Chemist

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
6 KO SHAN RD., GROUND FL., HUNG HOM, KOWLOON, HONG KONG.
TEL.: 852-2365 9123 FAX NO.: 852-2765 8034

TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER

Report No. : GCC110200271 Date of Issue : 04-03-2011

Client* : Environmental Pioneers & Solutions Limited Order Received : 08-09-2008

Client Address* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

Project* : DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon. Date Started : 16-02-2011

W.O. No.* : -- Contract No.* : -- Date Completed : 25-02-2011

GCE Serial No. : WQM022011 Sampling Date* : 16-02-2011 / 12:10 Sample Type* : River Water

GCE Reg. No. : GCE 081096 Test Unit No. : CH 08258 Sample I.D.* : WE6 Duplicate

Descripption : River Water

DESCRIPTION		TEST REFERENCE (In-House Method based on)	TEST RESULT
Appearance		APHA 20ed 2110	--
Odour		APHA 20ed 2150 B	Odour Characteristics : --
			Threshold Odour Number (TON) : --
pH Value at temperature [ ] °C		APHA 20ed 4500-H^+ B	--
Colour	TCU	APHA 20ed 2120 B	--
Turbidity	NTU	APHA 20ed 2130 B	--
Conductivity at 25°C	µS/cm	APHA 20ed 2510 B	--
Salinity	g/L	APHA 20ed 2520 B	--
Nitrogen (Ammonia)	mg/L	APHA 20ed 4500-NH_3 D	0.08
		APHA 20ed 4500-NH_3 E	--
		APHA 18ed 4500-NH_3 C	--
Nitrogen (Nitrate)	mg/L	APHA 20ed 4500-NO_3^- E	0.06
Phosphorus	mg/L	APHA 20ed 4500-P D	0.06
Biochemical Oxygen Demand (BOD_5)	mg/L	APHA 20ed 5210 B	< 1
Chemical Oxygen Demand (COD)	mg/L	APHA 20ed 5220 D	--
Total Suspended Solid	mg/L	APHA 20ed 2540 D	--

* : Information provided by client

Note : This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

Sample received on 16 Feb. 2011.

REMARKS : Sample Location WE6.

----- End -----

Tested By : K.L. Fong, C.S. Chan Certified By :

Name : Gu Chin

Checked By : Gu Chin Post : Chemist

Appendix E

Construction Noise Monitoring Data Sheet

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

Construction Noise Monitoring Data Sheet

Monitoring Location		N1	N2
Description of Location		Façade	Façade
Date of Monitoring		9/2/2011	
Measurement Start Time (hhmm)		12:45	12:10
Measurement Time Length (mins.)		30 mins	
Noise Meter Model/ Identification		ACO Japan, model 6224	
Calibrator Model/ Identification		Castle Group, GA607	
Wind Speed (m/s)		0.2	0.2
Measurement Results	L_{90} (dB(A))	39.9	36.4
	L_{10} (dB(A))	50.1	47.9
	Leq (dB(A))	47.5	45.4
Weather condition:		Sunny	
Major Construction Noise Sourse(s) During Monitoring		No construction works are being carried out during measurement.	No construction works are being carried out during measurement.
Other Noise Source(s) During Monitoring		1. Public noise 2. Traffic noise	1. Public noise 2. Traffic noise
Remarks			

	Name & Designation	Signature	Date:
Prepared by:	Jimmy Cheng		9/2/2011

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

Construction Noise Monitoring Data Sheet

Monitoring Location		N3	N4
Description of Location		Freefield	Facede
Date of Monitoring		9/2/2011	
Measurement Start Time (hhmm)		11:35	11:00
Measurement Time Length (mins.)		30 mins	
Noise Meter Model/ Identification		ACO Japan, model 6224	
Calibrator Model/ Identification		Castle Group, GA607	
Wind Speed (m/s)		0.2	0.2
Measurement Results	L_{90} (dB(A))	39.3	39.7
	L_{10} (dB(A))	55.9	47.6
	Leq (dB(A))	55.4	45.6
Weather condition:		Sunny	
Major Construction Noise Sourse(s) During Monitoring		No construction works are being carried out during measurement.	No construction works are being carried out during measurement.
Other Noise Source(s) During Monitoring		1. Public noise 2. Traffic noise	1. Public noise
Remarks			

	Name & Designation	Signature	Date:
Prepared by:	Jimmy Cheng		9/2/2011

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

Construction Noise Monitoring Data Sheet

Monitoring Location		N1	N2
Description of Location		Façade	Façade
Date of Monitoring		16/2/2011	
Measurement Start Time (hhmm)		12:45	12:10
Measurement Time Length (mins.)		30 mins	
Noise Meter Model/ Identification		ACO Japan, model 6224	
Calibrator Model/ Identification		Castle Group, GA607	
Wind Speed (m/s)		0.1	0.1
Measurement Results	L_{90} (dB(A))	40.7	35.6
	L_{10} (dB(A))	61.4	51.9
	Leq (dB(A))	60.7	51.1
Weather condition:		Cloudy	
Major Construction Noise Sourse(s) During Monitoring		No construction works are being carried out during measurement.	No construction works are being carried out during measurement.
Other Noise Source(s) During Monitoring		1. Public noise 2. Traffic noise	1. Public noise 2. Traffic noise
Remarks			

	Name & Designation	Signature	Date:
Prepared by:	Jimmy Cheng		16/2/2011

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

Construction Noise Monitoring Data Sheet

Monitoring Location		N3	N4
Description of Location		Freefield	Facede
Date of Monitoring		16/2/2011	
Measurement Start Time (hhmm)		11:25	10:50
Measurement Time Length (mins.)		30 mins	
Noise Meter Model/ Identification		ACO Japan, model 6224	
Calibrator Model/ Identification		Castle Group, GA607	
Wind Speed (m/s)		0.1	0.1
Measurement Results	L_{90} (dB(A))	38.0	41.4
	L_{10} (dB(A))	48.9	47.2
	Leq (dB(A))	46.1	45.8
Weather condition:		Cloudy	
Major Construction Noise Sourse(s) During Monitoring		No construction works are being carried out during measurement.	No construction works are being carried out during measurement.
Other Noise Source(s) During Monitoring		1. Public noise 2. Traffic noise	1. Public noise
Remarks			

	Name & Designation	Signature	Date:
Prepared by:	Jimmy Cheng		16/2/2011

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

Construction Noise Monitoring Data Sheet

Monitoring Location		N1	N2
Description of Location		Façade	Façade
Date of Monitoring		23/2/2011	
Measurement Start Time (hhmm)		12:30	11:50
Measurement Time Length (mins.)		30 mins	
Noise Meter Model/ Identification		ACO Japan, model 6224	
Calibrator Model/ Identification		Castle Group, GA607	
Wind Speed (m/s)		0.2	0.2
Measurement Results	L_{90} (dB(A))	41.8	36.1
	L_{10} (dB(A))	56.4	43.4
	Leq (dB(A))	54.3	42.0
Weather condition:		Sunny	
Major Construction Noise Sourse(s) During Monitoring		No construction works are being carried out during measurement.	No construction works are being carried out during measurement.
Other Noise Source(s) During Monitoring		1. Public noise 2. Traffic noise	1. Public noise 2. Traffic noise
Remarks			

	Name & Designation	Signature	Date:
Prepared by:	Jimmy Cheng		23/2/2011

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

Construction Noise Monitoring Data Sheet

Monitoring Location		N3	N4
Description of Location		Freefield	Facede
Date of Monitoring		23/2/2011	
Measurement Start Time (hhmm)		11:15	10:40
Measurement Time Length (mins.)		30 mins	
Noise Meter Model/ Identification		ACO Japan, model 6224	
Calibrator Model/ Identification		Castle Group, GA607	
Wind Speed (m/s)		0.2	0.2
Measurement Results	L_{90} (dB(A))	40.6	39.5
	L_{10} (dB(A))	61.0	45.9
	Leq (dB(A))	59.3	44.4
Weather condition:		Sunny	
Major Construction Noise Sourse(s) During Monitoring		No construction works are being carried out during measurement.	No construction works are being carried out during measurement.
Other Noise Source(s) During Monitoring		1. Public noise 2. Traffic noise	1. Public noise
Remarks			

	Name & Designation	Signature	Date:
Prepared by:	Jimmy Cheng		23/2/2011

Appendix F1

Water Quality
Monitoring Data Sheet

Environmental Pioneers & Solutions Limited

Water Quality Monitoring - Summary of On-Site Measurement Results

Date of Sampling: 9/2/2011 Sunny

Monitoring Location	**M1**			**M2**			**M3**			**M4**			**C1**			**C2**			**C3**		
Time (hhmm)	1515			1525			1535			1505			1430			1440			1450		
Tide Mode	mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb		
River Condition	normal			normal			normal			normal			normal			normal			normal		
Water Depth (m)	<1			< 1			< 1			1.3			< 1			< 1			< 1		
pH value	8.30			7.83			7.40			7.81			7.51			7.05			7.15		
Temperature (oC)	24.8			23.6			24.9			23.9			20.5			21.8			25.4		
Salinity (ppt)	1.1			0.5			10.7			23.7			0.0			0.0			0.9		
Turbidity (NTU)	**0.0**	**0.0**	Average **0.0**	**0.0**	**0.0**	Average **0.0**	2.4	2.4	Average 2.4	4.0	4.0	Average 4.0	0.0	0.0	Average 0.0	0.0	0.0	Average 0.0	8.6	8.6	Average 8.6
DO (mg/l)	9.89	9.88	Average 9.89	9.89	9.89	Average 9.89	8.38	8.42	Average 8.40	9.09	9.11	Average 9.10	10.18	10.16	Average 10.17	9.83	9.80	Average 9.82	7.95	7.96	Average 7.96
DO Saturation (%)	120	120	Average 120	115	115	Average 115	103	103	Average 103	108	108	Average 108	115	115	Average 115	112	112	Average 112	98	98	Average 98

	Name	**Signature**	**Date**
Prepared By:	**Jimmy Cheng**		9/2/2011

remark or observation: _____

Environmental Pioneers & Solutions Limited

Water Quality Monitoring - Summary of On-Site Measurement Results

Date of Sampling: 11/2/2011 Cloudy

Monitoring Location	**M1**			**M2**			**M3**			**M4**			**C1**			**C2**			**C3**		
Time (hhmm)	1610			1620			1630			1600			1510			1520			1530		
Tide Mode	mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb		
River Condition	normal			normal			normal			normal			normal			normal			normal		
Water Depth (m)	<1			< 1			< 1			1.2			< 1			< 1			< 1		
pH value	7.86			7.58			7.24			7.46			7.45			7.32			7.12		
Temperature (oC)	16.9			16.5			17.1			26.6			16.4			17.3			17.1		
Salinity (ppt)	1.9			1.3			12.3			17.6			0.0			0.0			2.0		
Turbidity (NTU)	**0.0**	**0.0**	Average **0.0**	**0.0**	**0.0**	Average **0.0**	3.1	3.1	Average 3.1	5.5	5.5	Average 5.5	0.0	0.0	Average 0.0	0.0	0.0	Average 0.0	5.6	5.6	Average 5.6
DO (mg/l)	9.95	9.95	Average 9.95	9.71	9.75	Average 9.73	9.65	9.61	Average 9.63	7.54	7.54	Average 7.54	9.66	9.66	Average 9.66	7.57	7.59	Average 7.58	10.12	10.12	Average 10.12
DO Saturation (%)	101	101	Average 101	99	99	Average 99	97	97	Average 97	80	80	Average 80	100	100	Average 100	80	80	Average 80	104	104	Average 104

	Name	**Signature**	**Date**
Prepared By:	**Jimmy Cheng**		11/2/2011

remark or observation: _____

Environmental Pioneers & Solutions Limited

Water Quality Monitoring - Summary of On-Site Measurement Results

Date of Sampling: **15/2/2011** Cloudy

Monitoring Location	**M1**			**M2**			**M3**			**M4**			**C1**			**C2**			**C3**		
Time (hhmm)	1110			1120			1130			1100			1150			1200			1210		
Tide Mode	mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb		
River Condition	normal			normal			normal			normal			normal			normal			normal		
Water Depth (m)	<1			< 1			< 1			1.3			< 1			< 1			< 1		
pH value	7.86			7.30			7.18			7.45			8.02			7.45			7.29		
Temperature (oC)	13.4			13.6			13.7			14.4			12.6			15.3			13.4		
Salinity (ppt)	0.6			1.4			16.8			22.9			0.0			0.0			1.4		
Turbidity (NTU)	**2.6**	**2.6**	Average **2.6**	**4.6**	**4.6**	Average **4.6**	**11.9**	**11.9**	Average **11.9**	13.7	13.7	Average 13.7	0.0	0.0	Average 0.0	0.0	0.0	Average 0.0	3.4	3.4	Average 3.4
DO (mg/l)	8.67	8.68	Average 8.68	8.82	8.80	Average 8.81	8.32	8.36	Average 8.34	7.48	7.42	Average 7.45	9.04	9.05	Average 9.05	6.99	7.03	Average 7.01	7.28	7.29	Average 7.29
DO Saturation (%)	83	83	Average 83	85	85	Average 85	81	81	Average 81	75	75	Average 75	86	86	Average 86	70	70	Average 70	73	73	Average 73

	Name	**Signature**	**Date**
Prepared By:	**Jimmy Cheng**		15/2/2011

remark or observation: _____

Environmental Pioneers & Solutions Limited

Water Quality Monitoring - Summary of On-Site Measurement Results

Date of Sampling: 16/2/2011 Cloudy

Monitoring Location	**M1**			**M2**			**M3**			**M4**			**C1**			**C2**			**C3**		
Time (hhmm)	1050			1100			1110			1040			1140			1200			1125		
Tide Mode	mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb		
River Condition	normal			normal			normal			normal			normal			normal			normal		
Water Depth (m)	<1			< 1			< 1			1.3			< 1			< 1			< 1		
pH value	8.07			7.43			6.65			7.61			7.75			7.22			7.21		
Temperature (oC)	14.4			14.9			17.0			14.3			13.6			16.3			14.4		
Salinity (ppt)	1.4			2.3			15.0			20.0			0.3			0.0			6.9		
Turbidity (NTU)	**0.0**	**0.0**	Average **0.0**	**0.0**	**0.0**	Average **0.0**	0.0	0.0	Average 0.0	0.0	0.0	Average 0.0	0.0	0.0	Average 0.0	0.0	0.0	Average 0.0	7.0	7.0	Average 7.0
DO (mg/l)	8.50	8.48	Average 8.49	8.34	8.34	Average 8.34	6.57	6.57	Average 6.57	7.79	7.79	Average 7.79	9.47	9.49	Average 9.48	7.19	7.17	Average 7.18	7.12	7.14	Average 7.13
DO Saturation (%)	87	87	Average 87	85	85	Average 85	70	70	Average 70	79	79	Average 79	94	94	Average 94	73	73	Average 73	70	70	Average 70

	Name	**Signature**	**Date**
Prepared By:	**Jimmy Cheng**		16/2/2011

remark or observation: _____

Environmental Pioneers & Solutions Limited

Water Quality Monitoring - Summary of On-Site Measurement Results

Date of Sampling: 18/2/2011 Cloudy

Monitoring Location	**M1**			**M2**			**M3**			**M4**			**C1**			**C2**			**C3**		
Time (hhmm)	1200			1210			1220			1150			1040			1050			1100		
Tide Mode	mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb		
River Condition	normal			normal			normal			normal			normal			normal			normal		
Water Depth (m)	<1			< 1			< 1			1.3			< 1			< 1			< 1		
pH value	7.62			7.34			6.90			7.29			6.89			6.59			6.77		
Temperature (oC)	16.4			16.6			16.8			16.0			14.7			16.4			16.4		
Salinity (ppt)	1.2			1.1			18.2			20.4			0.0			0.0			0.9		
Turbidity (NTU)	**0.0**	**0.0**	Average **0.0**	**0.0**	**0.0**	Average **0.0**	2.0	2.0	Average 2.0	3.0	3.0	Average 3.0	0.0	0.0	Average 0.0	0.0	0.0	Average 0.0	3.8	3.8	Average 3.8
DO (mg/l)	9.67	9.67	Average 9.67	9.16	9.18	Average 9.17	8.11	8.14	Average 8.13	8.07	8.09	Average 8.08	9.45	9.45	Average 9.45	7.76	7.76	Average 7.76	7.79	7.79	Average 7.79
DO Saturation (%)	99	99	Average 99	94	94	Average 94	84	84	Average 84	82	82	Average 82	96	96	Average 96	80	80	Average 80	80	80	Average 80

	Name	**Signature**	**Date**
Prepared By:	**Jimmy Cheng**		18/2/2011

remark or observation: _____

Environmental Pioneers & Solutions Limited

Water Quality Monitoring - Summary of On-Site Measurement Results

Date of Sampling: **21/2/2011** Cloudy

Monitoring Location	**M1**			**M2**			**M3**			**M4**			**C1**			**C2**			**C3**		
Time (hhmm)	1500			1510			1520			1450			1340			1350			1400		
Tide Mode	mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb		
River Condition	normal			normal			normal			normal			normal			normal			normal		
Water Depth (m)	<1			< 1			< 1			1.3			< 1			< 1			< 1		
pH value	8.08			7.67			7.43			7.47			7.40			6.96			7.05		
Temperature (oC)	17.1			17.2			17.0			16.8			16.1			17.9			17.4		
Salinity (ppt)	2.5			5.8			17.5			20.0			0.0			0.0			6.4		
Turbidity (NTU)	**2.2**	**2.2**	Average **2.2**	**5.6**	**5.6**	Average 5.6	5.1	5.1	Average 5.1	8.4	8.4	Average 8.4	0.7	0.7	Average 0.7	0.0	0.0	Average 0.0	5.4	5.4	Average 5.4
DO (mg/l)	10.75	10.74	Average 10.75	9.86	9.88	Average 9.87	9.60	9.57	Average 9.59	10.16	10.17	Average 10.17	10.23	10.20	Average 10.22	9.05	9.05	Average 9.05	9.65	9.65	Average 9.65
DO Saturation (%)	112	112	Average 112	103	103	Average 103	100	100	Average 100	105	105	Average 105	103	103	Average 103	96	96	Average 96	101	101	Average 101

	Name	**Signature**	**Date**
Prepared By:	**Jimmy Cheng**		21/2/2011

remark or observation: Location M2 turbidity over action level because of the other construction works between location C2 and M2.

Environmental Pioneers & Solutions Limited

Water Quality Monitoring - Summary of On-Site Measurement Results

Date of Sampling: **23/2/2011** Sunny

Monitoring Location	**M1**			**M2**			**M3**			**M4**			**C1**			**C2**			**C3**		
Time (hhmm)	1510			1520			1530			1500			1420			1430			1440		
Tide Mode	mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb		
River Condition	normal			normal			normal			normal			normal			normal			normal		
Water Depth (m)	<1			< 1			< 1			1.4			< 1			< 1			< 1		
pH value	7.93			7.64			7.53			7.61			6.98			6.82			7.04		
Temperature (oC)	19.6			19.3			19.3			19.2			17.6			19.4			19.9		
Salinity (ppt)	15.8			15.9			20.8			22.3			0.0			0.0			13.4		
Turbidity (NTU)	**7.8**	**7.8**	Average **7.8**	**1.3**	**1.3**	Average **1.3**	4.3	4.3	Average 4.3	6.8	6.8	Average 6.8	0.0	0.0	Average 0.0	0.0	0.0	Average 0.0	9.4	9.4	Average 9.4
DO (mg/l)	9.62	9.61	Average 9.62	9.43	9.43	Average 9.43	9.73	9.71	Average 9.72	10.31	10.29	Average 10.30	9.99	9.97	Average 9.98	9.36	9.35	Average 9.36	10.46	10.46	Average 10.46
DO Saturation (%)	108	108	Average 108	105	105	Average 105	110	110	Average 110	112	112	Average 112	105	105	Average 105	103	103	Average 103	115	115	Average 115

	Name	**Signature**	**Date**
Prepared By:	**Jimmy Cheng**		23/2/2011

remark or observation: _____

Environmental Pioneers & Solutions Limited

Water Quality Monitoring - Summary of On-Site Measurement Results

Date of Sampling: 24/2/2011 Sunny

Monitoring Location	**M1**			**M2**			**M3**			**M4**			**C1**			**C2**			**C3**		
Time (hhmm)	1610			1620			1630			1600			1510			1520			1530		
Tide Mode	mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb		
River Condition	normal			normal			normal			normal			normal			normal			normal		
Water Depth (m)	<1			< 1			< 1			1.3			< 1			< 1			< 1		
pH value	7.83			7.43			7.96			7.61			7.38			6.88			6.90		
Temperature (oC)	20.3			20.2			20.2			20.1			19.4			19.9			21.5		
Salinity (ppt)	12.8			13.0			21.0			22.4			0.0			0.0			8.6		
Turbidity (NTU)	**6.4**	**6.4**	Average **6.4**	**0.4**	**0.4**	Average **0.4**	4.9	4.9	Average 4.9	4.7	4.7	Average 4.7	0.0	0.0	Average 0.0	0.0	0.0	Average 0.0	10.9	10.9	Average 10.9
DO (mg/l)	10.43	10.44	Average 10.44	9.78	9.74	Average 9.76	9.82	9.82	Average 9.82	10.18	10.16	Average 10.17	9.95	9.95	Average 9.95	9.34	9.30	Average 9.32	9.78	9.78	Average 9.78
DO Saturation (%)	114	114	Average 114	109	109	Average 109	108	108	Average 108	113	113	Average 113	106	106	Average 106	102	102	Average 102	112	112	Average 112

	Name	**Signature**	**Date**
Prepared By:	**Jimmy Cheng**		24/2/2011

remark or observation: _____

Environmental Pioneers & Solutions Limited

Water Quality Monitoring - Summary of On-Site Measurement Results

Date of Sampling: **28/2/2011** Sunny

Monitoring Location	**M1**			**M2**			**M3**			**M4**			**C1**			**C2**			**C3**		
Time (hhmm)	1100			1110			1120			1050			1140			1150			1200		
Tide Mode	mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb		
River Condition	normal			normal			normal			normal			normal			normal			normal		
Water Depth (m)	<1			< 1			< 1			1.3			< 1			< 1			< 1		
pH value	7.82			7.30			7.16			7.69			7.12			6.73			7.24		
Temperature (oC)	20.9			20.8			20.4			20.5			20.9			20.6			20.9		
Salinity (ppt)	1.2			0.8			16.4			21.5			0.0			0.0			0.0		
Turbidity (NTU)	**5.6**	**5.6**	Average **5.6**	1.0	1.0	Average 1.0	12.0	12.0	Average 12.0	4.1	4.1	Average 4.1	2.2	2.2	Average 2.2	0.9	0.9	Average 0.9	10.9	10.9	Average 10.9
DO (mg/l)	7.65	7.67	Average 7.66	7.28	7.29	Average 7.29	6.70	6.74	Average 6.72	7.48	7.44	Average 7.46	7.47	7.48	Average 7.48	7.56	7.57	Average 7.57	6.90	6.91	Average 6.91
DO Saturation (%)	85	85	Average 85	80	80	Average 80	76	76	Average 76	84	84	Average 84	83	83	Average 83	85	85	Average 85	75	75	Average 75

	Name	**Signature**	**Date**
Prepared By:	**Jimmy Cheng**		28/2/2011

remark or observation: _____

Appendix F2

Water Quality
Monitoring Lab report

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
6 KO SHAN RD., GROUND FL., HUNG HOM, KOWLOON, HONG KONG.
TEL.: 852-2365 9123 FAX NO.: 852-2765 8034

TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER AND WASTEWATER

Report No. : GCC110200019 Date of Issue : 21-02-2011

Client* : Environmental Pioneers & Solutions Limited Date Received : 08-09-2008

Client Address* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

Project* : DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon. Date Started : 09-02-2011

W.O. No.* : -- Sample Type* : River Water Date Completed : 10-02-2011

GCE Serial No. : WQM022011 GCE Reg. No. : GCE 081096 Test Unit No. : CH 08258

Analysis Description	Test Method	Units	Quality Control Results				
			Method Blank	QC 500 mg/L	QC Duplicate	RPD%	Spike 25 mg/L
Suspended Solids (SS)	APHA 20ed 2540 D	mg/L	< 1.0	498	494	0.8	26.0
		Acceptance Criteria	<2.5 mg/L	475 ≤ Control Limit ≤ 514		≤ ±5%	21 ≤ R ≤ 29

TEST RESULTS	Sample ID		C1	C1 Duplicate	C2	C2 Duplicate	C3	C3 Duplicate		
	Sampling Date/Time		09 Feb 2011 / 14:30		09 Feb 2011 / 14:40		09 Feb 2011 / 14:50			
	LOD	Units								
Suspended Solids (SS)	1	mg/L	1.6	1.2	1.6	1.6	10.4	10.9		

TEST RESULTS	Sample ID		M1	M1 Duplicate	M2	M2 Duplicate	M3	M3 Duplicate	M4	M4 Duplicate
	Sampling Date/Time		09 Feb 2011 / 15:15		09 Feb 2011 / 15:25		09 Feb 2011 / 15:35		09 Feb 2011 / 15:05	
	LOD	Units								
Suspended Solids (SS)	1	mg/L	1.9	2.0	1.0	1.0	4.8	4.2	6.6	6.3

* : Information provided by client

Note : This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

Remarks : --

----- End -----

Tested By : C.S. CHAN Approved Signatory :

Name : GU CHIN

Checked By : GU CHIN Post : Chemist

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
6 KO SHAN RD., GROUND FL., HUNG HOM, KOWLOON, HONG KONG.
TEL.: 852-2365 9123 FAX NO.: 852-2765 8034

TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER AND WASTEWATER

Report No. : GCC110200027 Date of Issue : 21-02-2011

Client* : Environmental Pioneers & Solutions Limited Date Received : 08-09-2008

Client Address* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

Project* : DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon. Date Started : 11-02-2011

W.O. No.* : -- Sample Type* : River Water Date Completed : 12-02-2011

GCE Serial No. : WQM022011 GCE Reg. No. : GCE 081096 Test Unit No. : CH 08258

Analysis Description	Test Method	Units	Quality Control Results				
			Method Blank	QC 500 mg/L	QC Duplicate	RPD%	Spike 25 mg/L
Suspended Solids (SS)	APHA 20ed 2540 D	mg/L	< 1.0	496	496	0.0	27.0
		Acceptance Criteria	<2.5 mg/L	475 ≤ Control Limit ≤ 514		≤ ±5%	21 ≤ R ≤ 29

TEST RESULTS	Sample ID		C1	C1 Duplicate	C2	C2 Duplicate	C3	C3 Duplicate		
	Sampling Date/Time		11 Feb 2011 / 15:10		11 Feb 2011 / 15:20		11 Feb 2011 / 15:30			
	LOD	Units								
Suspended Solids (SS)	1	mg/L	<1.0	<1.0	<1.0	<1.0	8.5	8.7		

TEST RESULTS	Sample ID		M1	M1 Duplicate	M2	M2 Duplicate	M3	M3 Duplicate	M4	M4 Duplicate
	Sampling Date/Time		11 Feb 2011 / 16:10		11 Feb 2011 / 16:20		11 Feb 2011 / 16:30		11 Feb 2011 / 16:00	
	LOD	Units								
Suspended Solids (SS)	1	mg/L	1.2	1.2	1.1	1.2	3.6	3.2	3.2	3.2

* : Information provided by client

Note : This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

Remarks : --

----- End -----

Tested By : C.S. CHAN

Checked By : GU CHIN

Approved Signatory :

Name : GU CHIN

Post : Chemist

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
6 KO SHAN RD., GROUND FL., HUNG HOM, KOWLOON, HONG KONG.
TEL.: 852-2365 9123 FAX NO.: 852-2765 8034

TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER AND WASTEWATER

Report No. : GCC110200035 Date of Issue : 21-02-2011

Client* : Environmental Pioneers & Solutions Limited Date Received : 08-09-2008

Client Address* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

Project* : DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon. Date Started : 15-02-2011

W.O. No.* : -- Sample Type* : River Water Date Completed : 16-02-2011

GCE Serial No. : WQM022011 GCE Reg. No. : GCE 081096 Test Unit No. : CH 08258

Analysis Description	Test Method	Units	Quality Control Results				
			Method Blank	QC 500 mg/L	QC Duplicate	RPD%	Spike 25 mg/L
Suspended Solids (SS)	APHA 20ed 2540 D	mg/L	< 1.0	498	494	0.8	26.8
		Acceptance Criteria	<2.5 mg/L	475 ≤ Control Limit ≤ 514		≤ ±5%	21 ≤ R ≤ 29

TEST RESULTS	Sample ID		C1	C1 Duplicate	C2	C2 Duplicate	C3	C3 Duplicate		
	Sampling Date/Time		15 Feb 2011 / 11:50		15 Feb 2011 / 12:00		15 Feb 2011 / 12:10			
	LOD	Units								
Suspended Solids (SS)	1	mg/L	1.5	1.1	1.1	1.0	4.8	4.9		

TEST RESULTS	Sample ID		M1	M1 Duplicate	M2	M2 Duplicate	M3	M3 Duplicate	M4	M4 Duplicate
	Sampling Date/Time		15 Feb 2011 / 11:10		15 Feb 2011 / 11:20		15 Feb 2011 / 11:30		15 Feb 2011 / 11:00	
	LOD	Units								
Suspended Solids (SS)	1	mg/L	2.9	3.2	5.4	5.8	16.0	15.9	14.4	14.7

* : Information provided by client

Note : This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

Remarks : --

----- End -----

Tested By : C.S. CHAN

Checked By : GU CHIN

Approved Signatory :

Name : GU CHIN

Post : Chemist

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
6 KO SHAN RD., GROUND FL., HUNG HOM, KOWLOON, HONG KONG.
TEL.: 852-2365 9123 FAX NO.: 852-2765 8034

TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER AND WASTEWATER

Report No. : GCC110200043 Date of Issue : 21-02-2011

Client* : Environmental Pioneers & Solutions Limited P.O. Received : 08-09-2008

Client Address* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

Project* : DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon. Date Started : 16-02-2011

W.O. No.* : -- Sample Type* : River Water Date Completed : 16-02-2011

GCE Serial No. : WQM022011 GCE Reg. No. : GCE 081096 Test Unit No. : CH 08258

Analysis Description	Test Method	Units	Quality Control Results				
			Method Blank	QC 500 mg/L	QC Duplicate	RPD%	Spike 25 mg/L
Suspended Solids (SS)	APHA 20ed 2540 D	mg/L	< 1.0	496	495	0.2	26.8
		Acceptance Criteria	<2.5 mg/L	475 ≤ Control Limit ≤ 514		≤ ±5%	21 ≤ R ≤ 29

TEST RESULTS	Sample ID		C1	C1 Duplicate	C2	C2 Duplicate	C3	C3 Duplicate		
	Sampling Date/Time		16 Feb 2011 / 11:40		16 Feb 2011 / 12:00		16 Feb 2011 / 11:25			
	LOD	Units								
Suspended Solids (SS)	1	mg/L	1.5	1.2	<1.0	<1.0	7.5	8.1		

TEST RESULTS	Sample ID		M1	M1 Duplicate	M2	M2 Duplicate	M3	M3 Duplicate	M4	M4 Duplicate
	Sampling Date/Time		16 Feb 2011 / 10:50		16 Feb 2011 / 11:00		16 Feb 2011 / 11:10		16 Feb 2011 / 10:40	
	LOD	Units								
Suspended Solids (SS)	1	mg/L	1.5	1.6	1.7	1.5	1.8	1.4	4.0	4.3

* : Information provided by client

Note : This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

Remarks : Location M1 & WE3 and Location M3 & WE4 are the same location.

----- End -----

Tested By : K.L. FONG

Checked By : GU CHIN

Approved Signatory :

Name : GU CHIN

Post : Chemist

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
6 KO SHAN RD., GROUND FL., HUNG HOM, KOWLOON, HONG KONG.
TEL.: 852-2365 9123 FAX NO.: 852-2765 8034

TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER AND WASTEWATER

Report No. : GCC110200069 Date of Issue : 21-02-2011

Client* : Environmental Pioneers & Solutions Limited Date Received : 08-09-2008

Client Address* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

Project* : DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon. Date Started : 18-02-2011

W.O. No.* : -- Sample Type* : River Water Date Completed : 18-02-2011

GCE Serial No. : WQM022011 GCE Reg. No. : GCE 081096 Test Unit No. : CH 08258

Analysis Description	Test Method	Units	Quality Control Results				
			Method Blank	QC 500 mg/L	QC Duplicate	RPD%	Spike 25 mg/L
Suspended Solids (SS)	APHA 20ed 2540 D	mg/L	< 1.0	498	497	0.2	27.4
		Acceptance Criteria	<2.5 mg/L	475 ≤ Control Limit ≤ 514		≤ ±5%	21 ≤ R ≤ 29

TEST RESULTS	Sample ID		C1	C1 Duplicate	C2	C2 Duplicate	C3	C3 Duplicate		
	Sampling Date/Time		18 Feb 2011 / 10:40		18 Feb 2011 / 10:50		18 Feb 2011 / 10:00			
	LOD	Units								
Suspended Solids (SS)	1	mg/L	<1.0	<1.0	<1.0	<1.0	7.6	7.1		

TEST RESULTS	Sample ID		M1	M1 Duplicate	M2	M2 Duplicate	M3	M3 Duplicate	M4	M4 Duplicate
	Sampling Date/Time		18 Feb 2011 / 12:00		18 Feb 2011 / 12:10		18 Feb 2011 / 12:20		18 Feb 2011 / 11:50	
	LOD	Units								
Suspended Solids (SS)	1	mg/L	2.2	2.0	1.0	1.0	5.4	5.0	6.3	6.3

* : Information provided by client

Note : This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

Remarks : --

----- End -----

Tested By : C.S. CHAN

Checked By : GU CHIN

Approved Signatory :

Name : GU CHIN

Post : Chemist

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
6 KO SHAN RD., GROUND FL., HUNG HOM, KOWLOON, HONG KONG.
TEL.: 852-2365 9123 FAX NO.: 852-2765 8034

TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER AND WASTEWATER

Report No. : GCC110200124 Date of Issue : 28-02-2011

Client* : Environmental Pioneers & Solutions Limited Date Received : 08-09-2008

Client Address* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

Project* : DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon. Date Started : 21-02-2011

W.O. No.* : -- Sample Type* : River Water Date Completed : 21-02-2011

GCE Serial No. : WQM022011 GCE Reg. No. : GCE 081096 Test Unit No. : CH 08258

Analysis Description	Test Method	Units	Quality Control Results				
			Method Blank	QC 500 mg/L	QC Duplicate	RPD%	Spike 25 mg/L
Suspended Solids (SS)	APHA 20ed 2540 D	mg/L	< 1.0	498	494	0.8	26.8
		Acceptance Criteria	<2.5 mg/L	475 ≤ Control Limit ≤ 514		≤ ±5%	21 ≤ R ≤ 29

TEST RESULTS	Sample ID		C1	C1 Duplicate	C2	C2 Duplicate	C3	C3 Duplicate		
	Sampling Date/Time		21 Feb 2011 / 13:40		21 Feb 2011 / 13:50		21 Feb 2011 / 14:00			
	LOD	Units								
Suspended Solids (SS)	1	mg/L	1.6	1.9	1.8	1.8	7.2	6.8		

TEST RESULTS	Sample ID		M1	M1 Duplicate	M2	M2 Duplicate	M3	M3 Duplicate	M4	M4 Duplicate
	Sampling Date/Time		21 Feb 2011 / 15:00		21 Feb 2011 / 15:10		21 Feb 2011 / 15:20		21 Feb 2011 / 14:50	
	LOD	Units								
Suspended Solids (SS)	1	mg/L	2.8	2.7	5.4	4.9	5.7	5.5	7.0	6.8

* : Information provided by client

Note : This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

Remarks : --

----- End -----

Tested By : C.S. CHAN

Checked By : GU CHIN

Approved Signatory :

Name : GU CHIN

Post : Chemist

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
6 KO SHAN RD., GROUND FL., HUNG HOM, KOWLOON, HONG KONG.
TEL.: 852-2365 9123 FAX NO.: 852-2765 8034

TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER AND WASTEWATER

Report No. : GCC110200132 Date of Issue : 28-02-2011

Client* : Environmental Pioneers & Solutions Limited Date Received : 08-09-2008

Client Address* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

Project* : DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon. Date Started : 23-02-2011

W.O. No.* : -- Sample Type* : River Water Date Completed : 24-02-2011

GCE Serial No. : WQM022011 GCE Reg. No. : GCE 081096 Test Unit No. : CH 08258

Analysis Description	Test Method	Units	Quality Control Results				
			Method Blank	QC 500 mg/L	QC Duplicate	RPD%	Spike 25 mg/L
Suspended Solids (SS)	APHA 20ed 2540 D	mg/L	< 1.0	498	495	0.6	26.6
		Acceptance Criteria	<2.5 mg/L	475 ≤ Control Limit ≤ 514		≤ ±5%	21 ≤ R ≤ 29

TEST RESULTS	Sample ID		C1	C1 Duplicate	C2	C2 Duplicate	C3	C3 Duplicate		
	Sampling Date/Time		23 Feb 2011 / 14:20		23 Feb 2011 / 14:30		23 Feb 2011 / 14:40			
	LOD	Units								
Suspended Solids (SS)	1	mg/L	1.1	1.2	1.4	1.5	6.3	6.1		

TEST RESULTS	Sample ID		M1	M1 Duplicate	M2	M2 Duplicate	M3	M3 Duplicate	M4	M4 Duplicate
	Sampling Date/Time		23 Feb 2011 / 15:10		23 Feb 2011 / 15:20		23 Feb 2011 / 15:30		23 Feb 2011 / 15:00	
	LOD	Units								
Suspended Solids (SS)	1	mg/L	7.5	7.6	1.6	1.6	5.1	5.3	7.8	7.8

* : Information provided by client

Note : This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

Remarks : --

----- End -----

Tested By : C.S. CHAN

Checked By : GU CHIN

Approved Signatory :

Name : GU CHIN

Post : Chemist

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
6 KO SHAN RD., GROUND FL., HUNG HOM, KOWLOON, HONG KONG.
TEL.: 852-2365 9123 FAX NO.: 852-2765 8034

TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER AND WASTEWATER

Report No. : GCC110200140 Date of Issue : 28-02-2011

Client* : Environmental Pioneers & Solutions Limited Date Received : 08-09-2008

Client Address* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

Project* : DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon. Date Started : 24-02-2011

W.O. No.* : -- Sample Type* : River Water Date Completed : 25-02-2011

GCE Serial No. : WQM022011 GCE Reg. No. : GCE 081096 Test Unit No. : CH 08258

Analysis Description	Test Method	Units	Quality Control Results				
			Method Blank	QC 500 mg/L	QC Duplicate	RPD%	Spike 25 mg/L
Suspended Solids (SS)	APHA 20ed 2540 D	mg/L	< 1.0	497	498	-0.2	27.7
		Acceptance Criteria	<2.5 mg/L	475 ≤ Control Limit ≤ 514		≤ ±5%	21 ≤ R ≤ 29

TEST RESULTS	Sample ID		C1	C1 Duplicate	C2	C2 Duplicate	C3	C3 Duplicate		
	Sampling Date/Time		24 Feb 2011 / 15:10		24 Feb 2011 / 15:20		24 Feb 2011 / 15:30			
	LOD	Units								
Suspended Solids (SS)	1	mg/L	2.0	2.0	1.7	1.9	8.9	8.1		

TEST RESULTS	Sample ID		M1	M1 Duplicate	M2	M2 Duplicate	M3	M3 Duplicate	M4	M4 Duplicate
	Sampling Date/Time		24 Feb 2011 / 16:10		24 Feb 2011 / 16:20		24 Feb 2011 / 16:30		24 Feb 2011 / 16:00	
	LOD	Units								
Suspended Solids (SS)	1	mg/L	8.7	8.3	0.4	0.8	6.8	7.4	6.7	7.1

* : Information provided by client

Note : This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

Remarks : --

----- End -----

Tested By : C.S. CHAN

Checked By : GU CHIN

Approved Signatory :

Name : GU CHIN

Post : Chemist

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
6 KO SHAN RD., GROUND FL., HUNG HOM, KOWLOON, HONG KONG.
TEL.: 852-2365 9123 FAX NO.: 852-2765 8034

TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER AND WASTEWATER

Report No. : GCC110200158 Date of Issue : 28-02-2011

Client* : Environmental Pioneers & Solutions Limited Date Received : 08-09-2008

Client Address* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

Project* : DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon. Date Started : 28-02-2011

W.O. No.* : -- Sample Type* : River Water Date Completed : 28-02-2011

GCE Serial No. : WQM022011 GCE Reg. No. : GCE 081096 Test Unit No. : CH 08258

Analysis Description	Test Method	Units	Quality Control Results				
			Method Blank	QC 500 mg/L	QC Duplicate	RPD%	Spike 25 mg/L
Suspended Solids (SS)	APHA 20ed 2540 D	mg/L	< 1.0	497	496	0.2	26.8
		Acceptance Criteria	<2.5 mg/L	475 ≤ Control Limit ≤ 514		≤ ±5%	21 ≤ R ≤ 29

TEST RESULTS	Sample ID		C1	C1 Duplicate	C2	C2 Duplicate	C3	C3 Duplicate		
	Sampling Date/Time		28 Feb 2011 / 11:40		28 Feb 2011 / 11:50		28 Feb 2011 / 12:00			
	LOD	Units								
Suspended Solids (SS)	1	mg/L	0.5	0.9	0.3	0.3	8.8	8.4		

TEST RESULTS	Sample ID		M1	M1 Duplicate	M2	M2 Duplicate	M3	M3 Duplicate	M4	M4 Duplicate
	Sampling Date/Time		28 Feb 2011 / 11:00		28 Feb 2011 / 11:10		28 Feb 2011 / 11:20		28 Feb 2011 / 10:50	
	LOD	Units								
Suspended Solids (SS)	1	mg/L	3.7	3.4	0.8	0.7	10.4	10.6	6.6	6.5

* : Information provided by client

Note : This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

Remarks : --

----- End -----

Tested By : C.S. CHAN

Checked By : GU CHIN

Approved Signatory :

Name : GU CHIN

Post : Chemist

Appendix G

Monitoring Schedule

for February 2011

Environmental Pioneers and Solutions Limited

DC/2006/11 - DRAINAGE IMPROVEMENT IN SOUTHERN LANTAU

Master Schedule of EM&A works in February and March 2011

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1/30	1/31	2/1	2/2	2/3	2/4	2/5
		Site Closed	Site Closed	Lunar New Year Holiday	Lunar New Year Holiday	Lunar New Year Holiday
2/6	2/7	2/8	2/9	2/10	2/11	2/12
	Site Closed	Site Closed	WQM at: 15:46 Noise monitoring		WQM at: 16:40	
2/13	2/14	2/15	2/16	2/17	2/18	2/19
		WQM at: 10:18	WQM & EWQM at: 11:10 Noise monitoring		WQM at: 12:22	
2/20	2/21	2/22	2/23	2/24	2/25	2/26
	WQM at: 14:25		WQM at: 15:58 Noise monitoring	WQM at: 16:40		
2/27	2/28	3/1	3/2	3/3	3/4	3/5
	WQM at: 10:20		WQM at: 11:43 Noise monitoring		WQM at: 12:37	
3/6	3/7					
	WQM at: 13:53					

Noise Monitoring Locations: Total 4 Locations as N1, N2, N3 and N4

Water Quality Monitoring (WQM) Locations: Total 7 Locations as M1, M2, M3, M4, C1, C2 and C3

Ecological Water Quality Monitoring (EWQM) Locations: Total 6 Locations as WE1, WE2, WE3, WE4, WE5 and WE6

Appendix H Implementation Status of environmental protection / mitigation measures

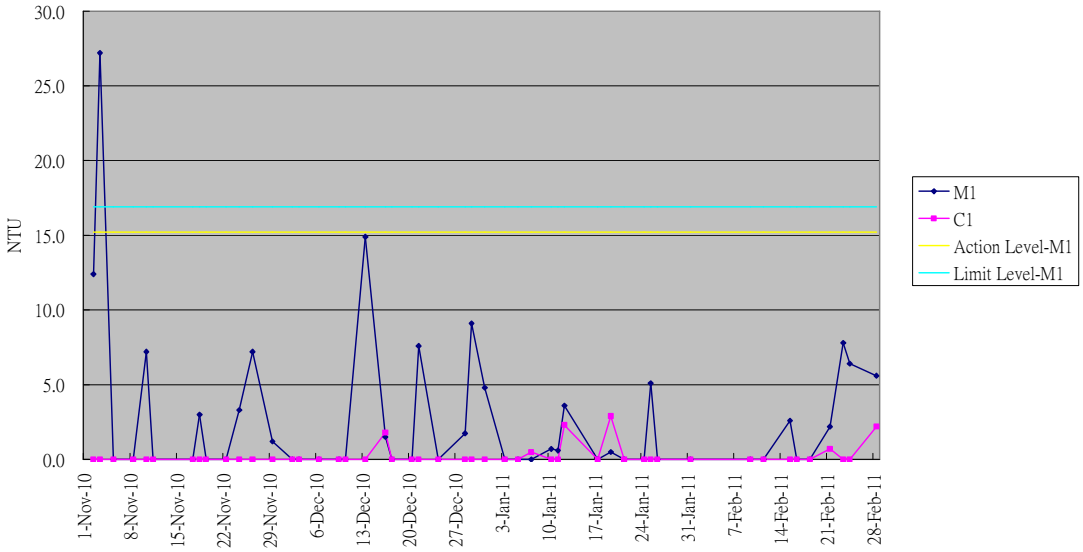
Environmental Aspect	Protection / Mitigation Measures	Implementation status	Follow-up action
Air Quality	Use of regular watering to reduce dust emissions from exposed site surfaces and unpaved road, with complete coverage.	Implemented	-
	Use of frequent watering for particular dusty static construction areas and areas close to ASRs.	Implemented	-
	Tarpaulin covering of all dusty vehicle loads transported to and from and between site location;	Deficiency found on 9 Feb 11	-
	Establishment and use of vehicle wheel and body washing facilities at the exit points of the site.	Implemented	-
	Routing of vehicles and positioning of construction plant should be at the maximum possible distance from ASRs.	Implemented	-
Noise	Use of quiet powered mechanical equipment (PME)	Implemented	-
	Adoption of movable noise barriers and temporary noise barriers	Implemented	-
	Application of good site practices mentioned in EM&A manual Clause 3.8.1	Implemented	-
Water Quality	Before commencing any site formation works, all sewer and drainage connections should be sealed to prevent debris, soil, sand etc. from entering public sewers/drains.	Implemented	-
	Temporary ditches should be provided to facilitate run-off discharge into appropriate watercourses, via a silt retention pond. No site run-off should enter the freshwater marshes at Luk Tei Tong.	Implemented	-
	Sand/ silt removal facilities such as sand traps, silt traps and sediment basins should be provided to remove sand/ silt particles from runoff to meet the requirements of the Technical Memorandum standard under the Water Pollution Control Ordinance.	Implemented	-
	Water pumped out from foundation excavations should be discharged into silt removal facilities.	Implemented	-
	During rainstorms, exposed slope surface should be covered by a tarpaulin or the means.	Implemented	-
	Exposed soil areas should be minimized to reduce potential for increased siltation and contamination of runoff.	Implemented	-
	Exposed soil surfaces should be protected by paving or fill material as soon as possible to reduce potential of soil erosion.	Implemented	-
	Open stockpiles of construction materials or construction wastes on-site of more than $50m^3$ should be covered with tarpaulin or similar fabric during rainstorms.	Implemented	-
	Oils and fuels should only be used and stored on designated areas which have pollution prevention facilities.	Implemented	-
	Temporary sanitary facilities, such as portable chemical toilets, should be employed on-site.	Not available	-
	The excavation and widening works for the drainage improvements to the Pak Ngan Heung River, Tai Tei Tong River, Luk Tei Tong River and Luk Tei Tong By-pass Channel should be carried out in sections (approximately 300–400 m in length) and in dry condition.	Implemented	-

Environmental Aspect	Protection / Mitigation Measures	Implementation status	Follow-up action
	Maintenance desiltng of the re-profiled river channels of the Pak Ngan Heung River, Tai Tei Tong River, Luk Tei tong River and Luk Tei Tong By-pass Channel, temporary barrier walls should be used to provide a dry zone for desiltng work.	Not applicable at this stage	-
Ecology	Existing natural habitats should be retained as far as practicable	Implemented	-
	Boundary of working areas should be identified to prevent loss of vegetation	Implemented	-
	All existing trees / plant should be well protected within the site or transplanted properly	Implemented	-
	Turf removal from the Luk Tei Tong marsh due to the construction of Luk Tei Tong Bypass Channel shall be minimized	Implemented	-
	Turf from the Luk Tei Tong marsh shall be properly removed, stored, maintained and reused for lining the riverbed of the Luk Tei Tong Bypass Channel	Implemented	-
Chemical and Solid Waste	Chemical wastes should be properly stored in a proper store as per statutory requirements (i.e. on a hard standing, within an enclosed and locked area)	Implemented	-
	Chemical waste stores should be provided with fire precaution facilities (i.e. fire extinguisher, no smoking warning etc).	Implemented	-
	Chemical wastes should be properly stored in corrosion resistant containers placed inside the store and labelled with warning signs in English and Chinese.	Implemented	-
	Chemical wastes should be disposed of by licensed chemical waste collector with supporting delivery records.	Implemented	-
	All containers for fuel, diesel and fluid chemical (in use) and oil filled stationery plants located with proper drip pans.	Implemented	-
	Construction wastes should be managed and disposed to the designated public fill and landfill areas in acceptable manner.	Deficiencies found	
	All waste disposals managed in a proper manner i.e. trip ticket system implementation.	Implemented	-

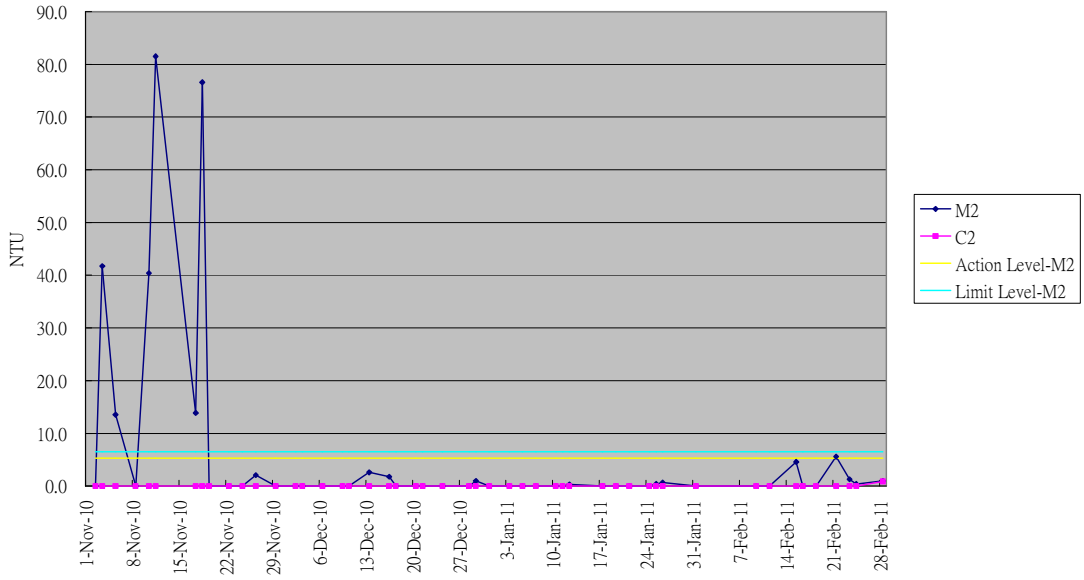
Appendix I

Graphical plot of water quality monitoring results (SS, DO, turbidity)

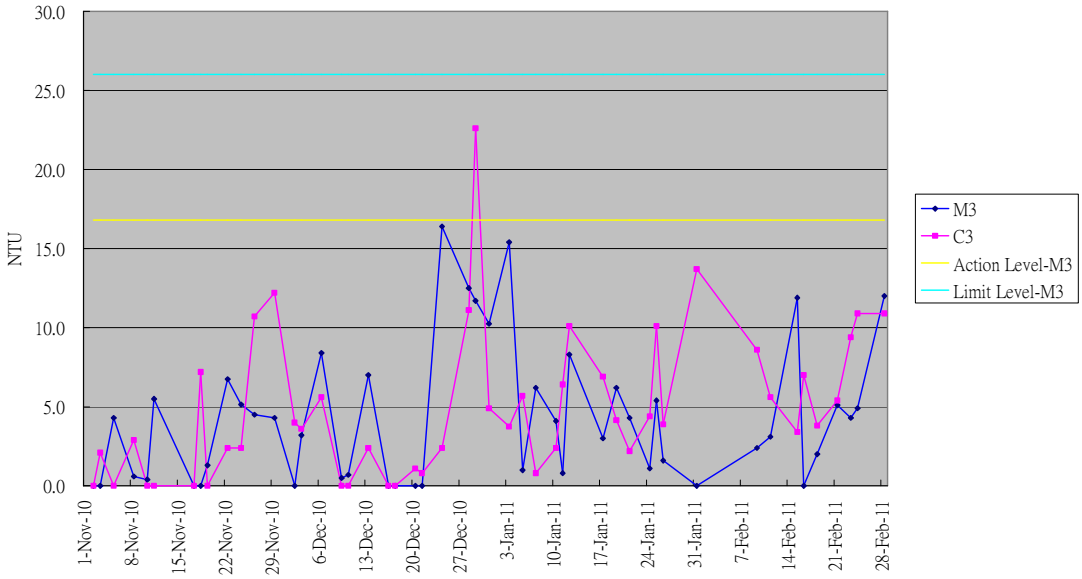
Graphical Plot of Turbidity Trend M1&C1(Nov 10 - Feb 11)



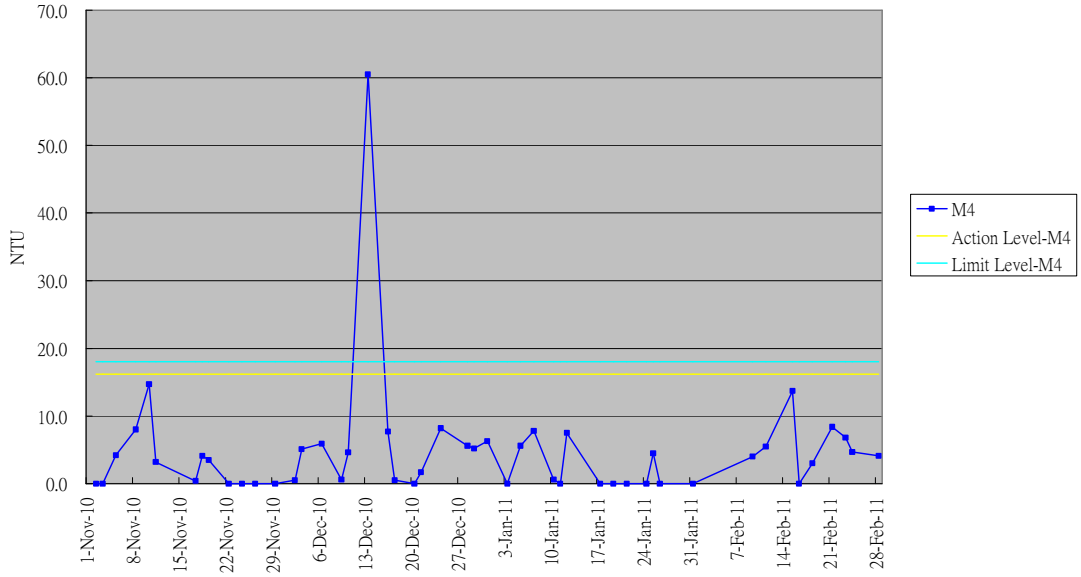
Graphical Plot of Turbidity Trend M2&C2 (Nov 10 - Feb 11)



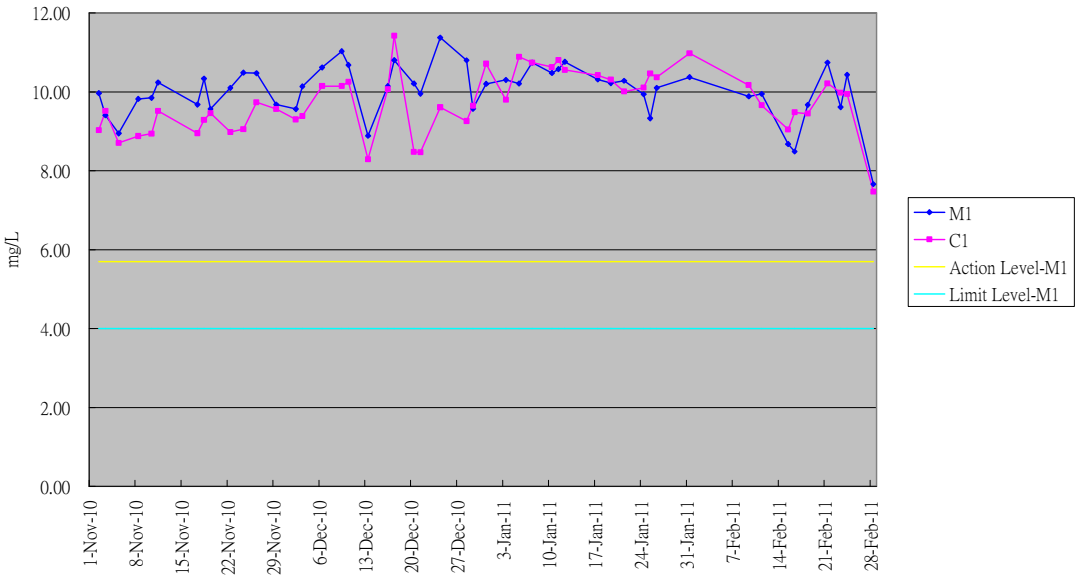
Graphical Plot of Turbidity Trend M3&C3 (Nov 10 - Feb 11)



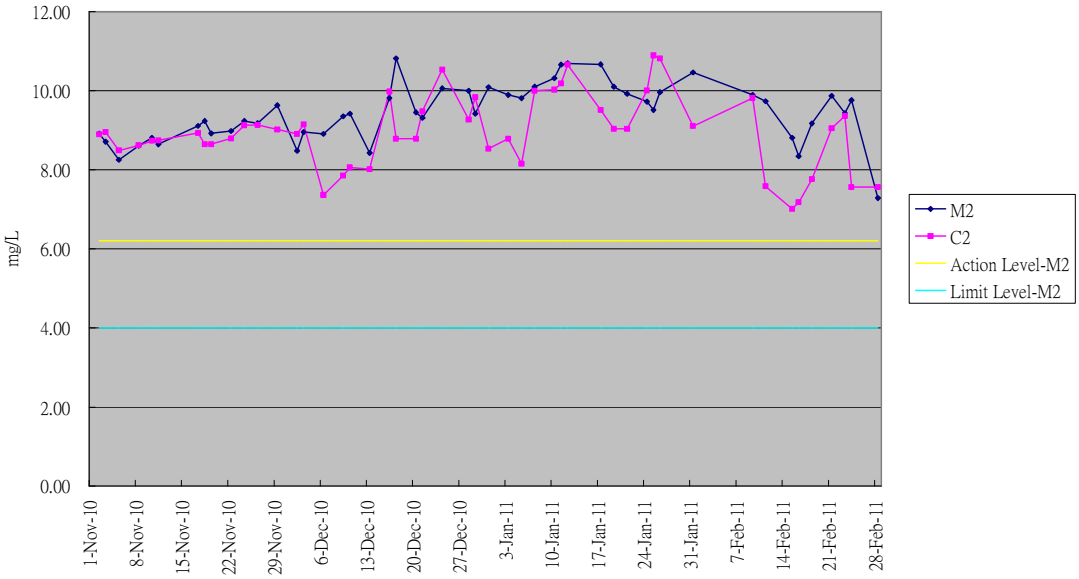
Graphical Plot of Turbidity Trend M4 (Nov 10 - Feb 11)



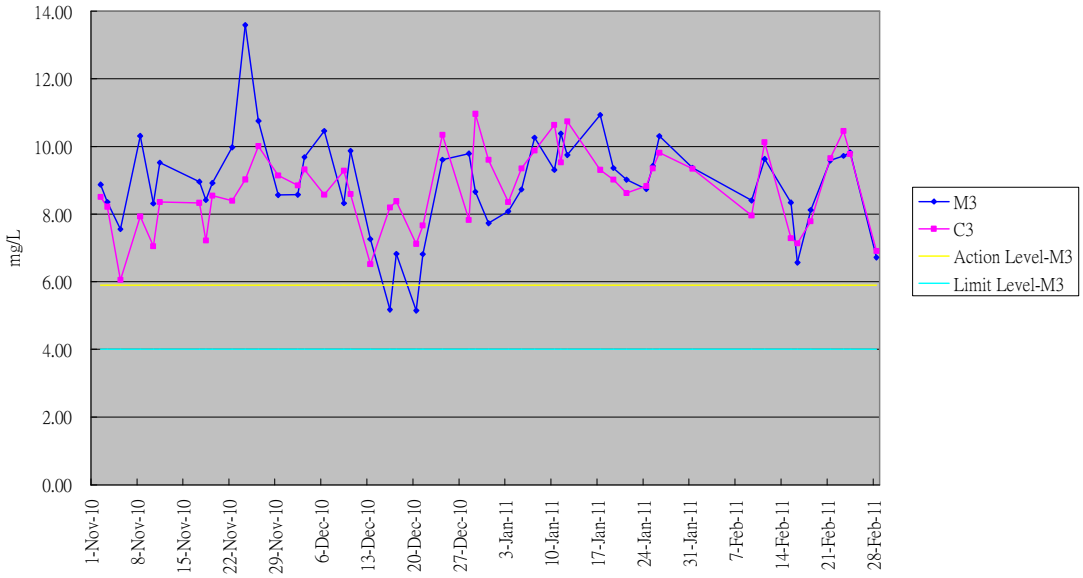
Graphical Plot of Dissolved Oxygen Trend M1&C1 (Nov 10 - Feb 11)



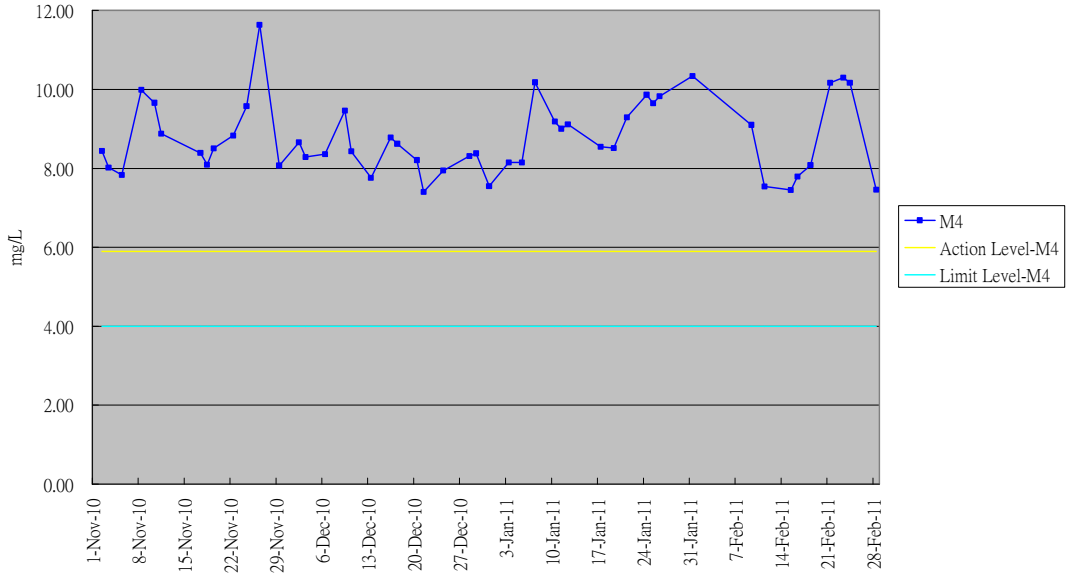
Graphical Plot of Dissolved Oxygen Trend M2&C2 (Nov 10 - Feb 11)



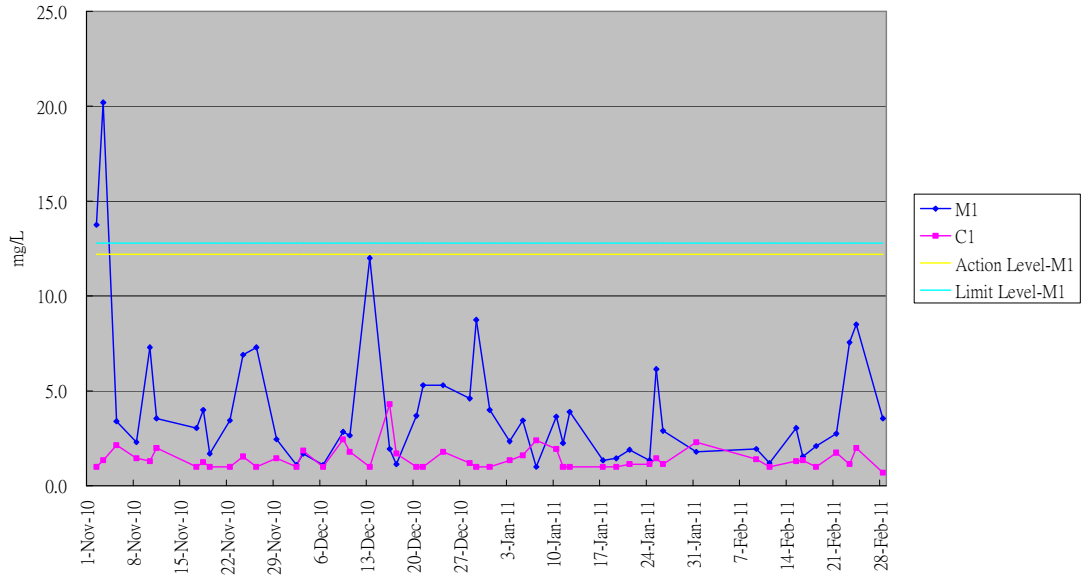
Graphical Plot of Dissolved Oxygen Trend M3&C3 (Nov 10 - Feb 11)



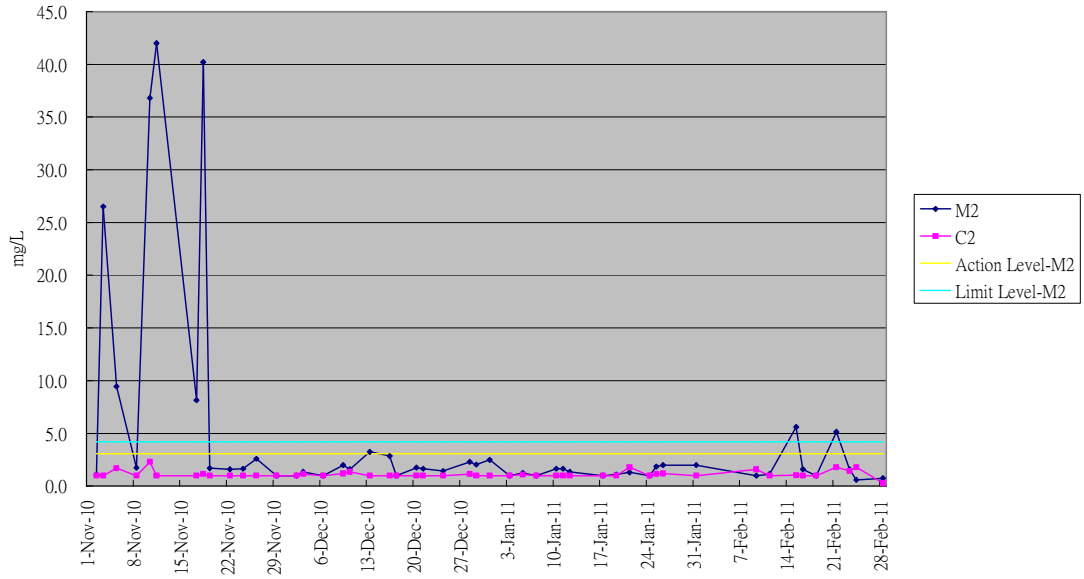
Graphical Plot of Dissolved Oxygen Trend M4 (Nov 10 - Feb 11)



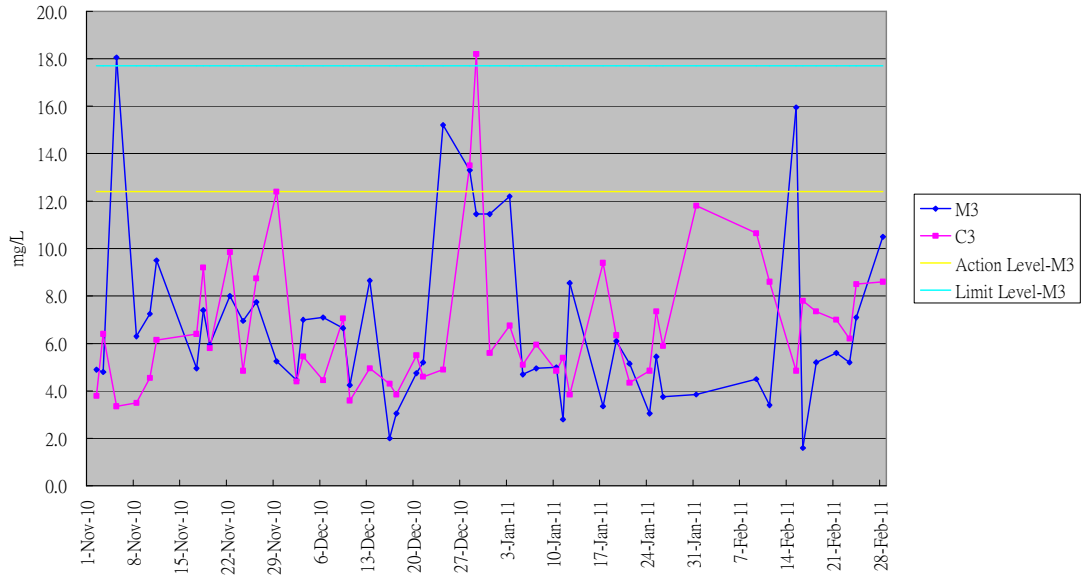
Graphical Plot of Suspended Soild M1&C1 (Nov 10 - Feb 11)



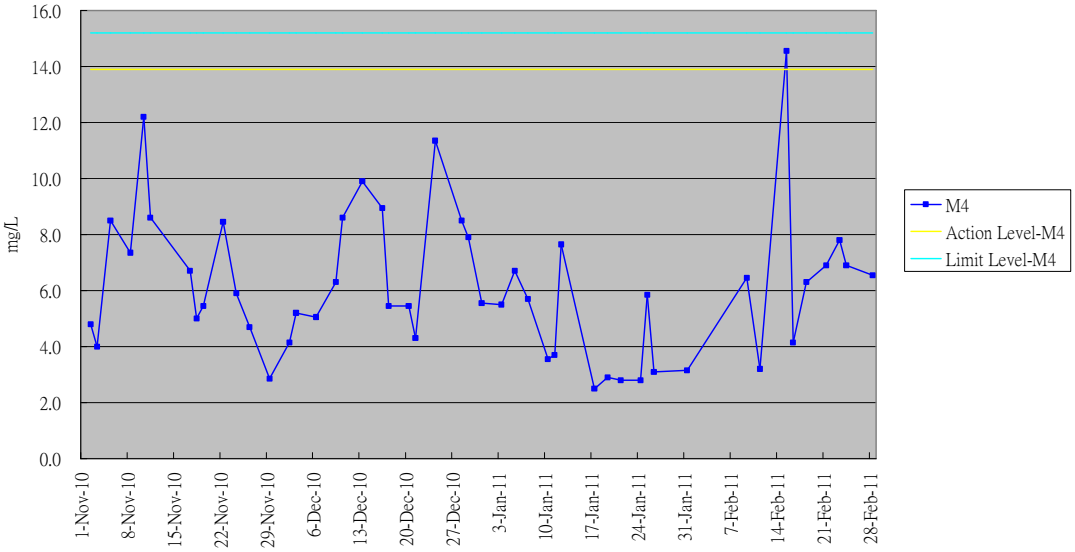
Graphical Plot of Suspended Soild M2&C2 (Nov 10 - Feb 11)



Graphical Plot of Suspended Soild M3&C3 (Nov 10 - Feb 11)

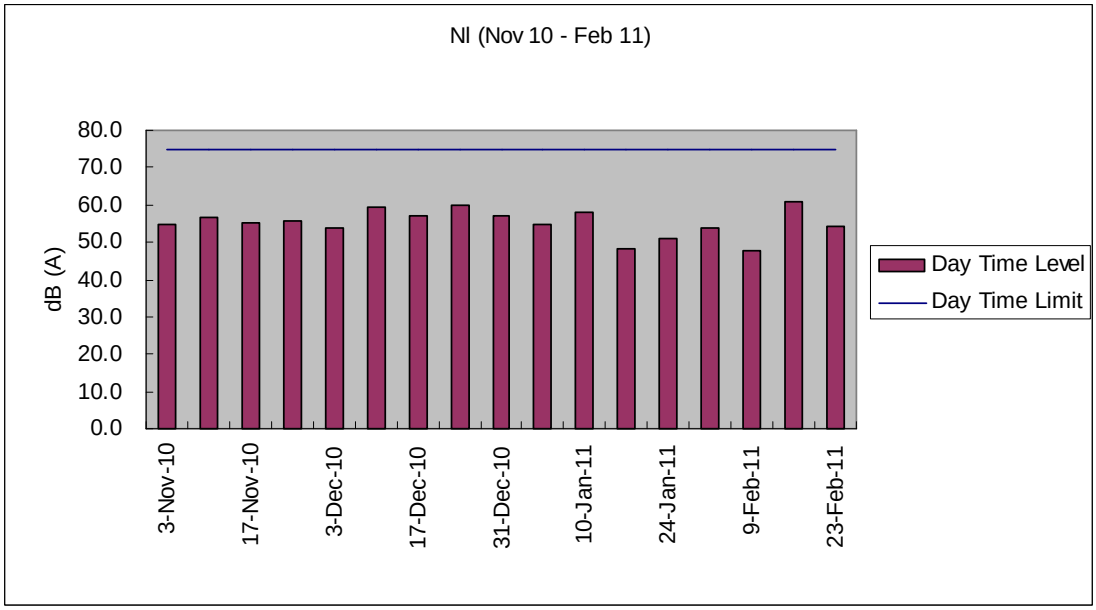


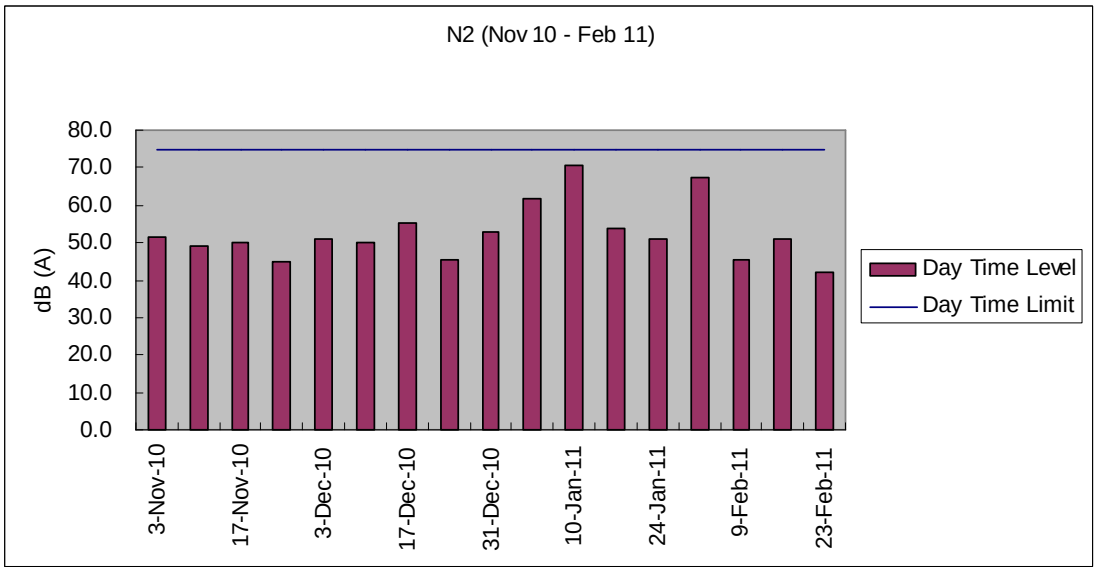
Graphical Plot of Suspended Soild M4 (Nov 10 - Feb 11)

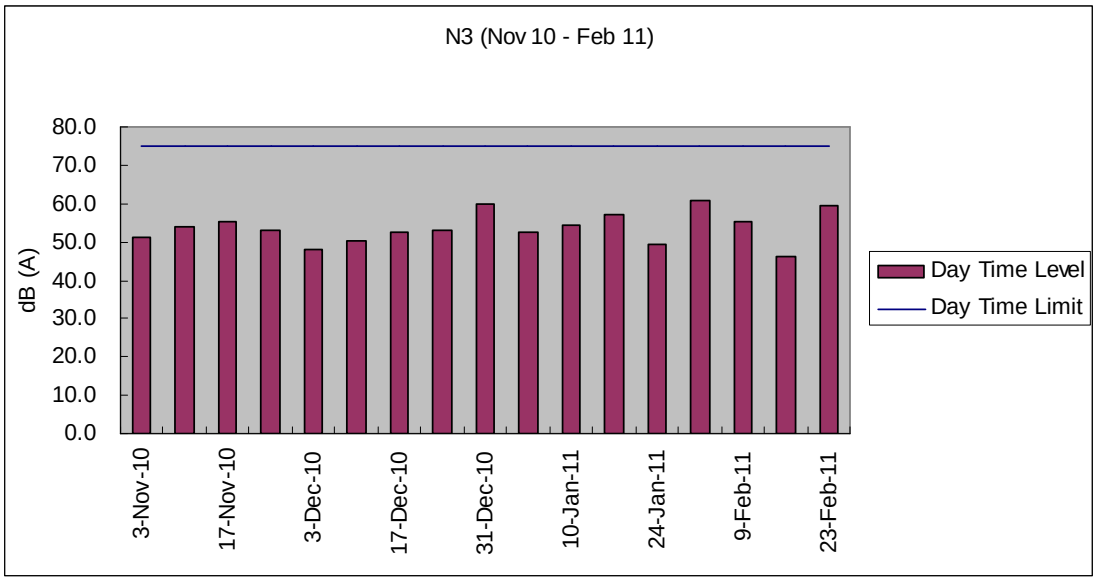


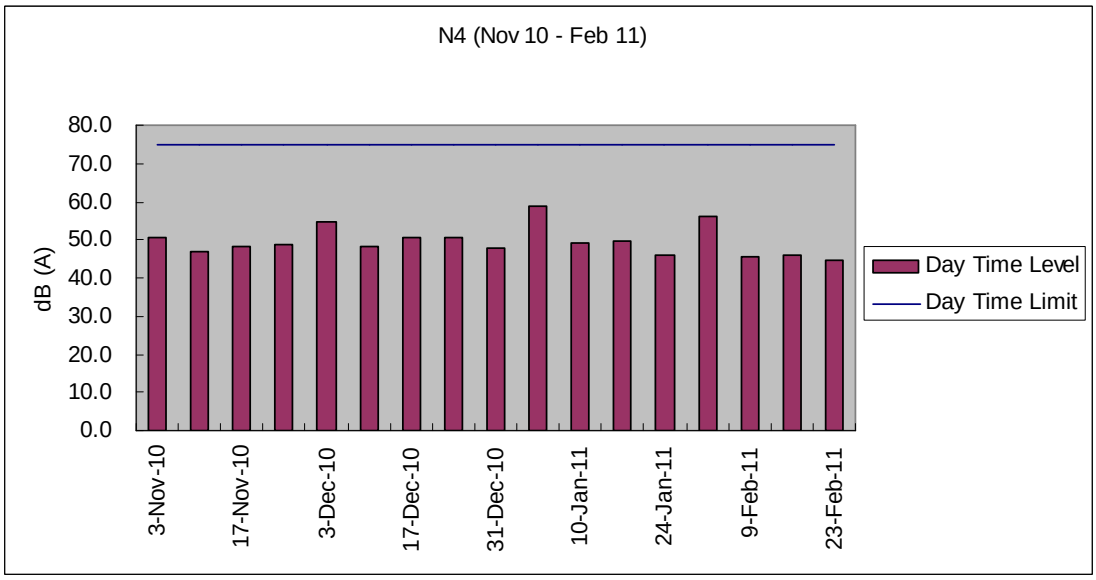
Appendix J

Graphical plot of noise monitoring results


Nl (Nov 10 - Feb 11)
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
dB (A)
3-Nov-10
17-Nov-10
3-Dec-10
17-Dec-10
31-Dec-10
10-Jan-11
24-Jan-11
9-Feb-11
23-Feb-11
Day Time Level
Day Time Limit


N2 (Nov 10 - Feb 11)
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
dB (A)
3-Nov-10
17-Nov-10
3-Dec-10
17-Dec-10
31-Dec-10
10-Jan-11
24-Jan-11
9-Feb-11
23-Feb-11
Day Time Level
Day Time Limit


N3 (Nov 10 - Feb 11)
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
dB (A)
3-Nov-10
17-Nov-10
3-Dec-10
17-Dec-10
31-Dec-10
10-Jan-11
24-Jan-11
9-Feb-11
23-Feb-11
Day Time Level
Day Time Limit


N4 (Nov 10 - Feb 11)
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
dB (A)
3-Nov-10
17-Nov-10
3-Dec-10
17-Dec-10
31-Dec-10
10-Jan-11
24-Jan-11
9-Feb-11
23-Feb-11
Day Time Level
Day Time Limit