

Contract No. : DC/2007/06
**River Improvement Works in Upper Lam Tsuen, She
Shan River and Upper Tai Po River**

ENVIRONMENTAL MONITORING AND AUDIT

MONTHLY EM&A REPORT of

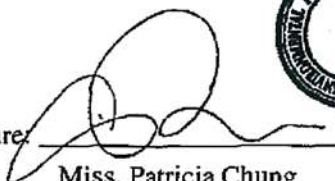
UPPER TAI PO RIVER

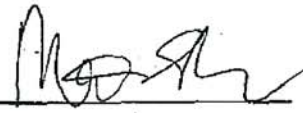
for February 2010

Environmental Pioneers & Solutions Limited
8/F, Chaiwan Industrial Centre Building
20 Lee Chung Street, Chaiwan, Hong Kong
Tel: 28890569 Fax: 2856 2010

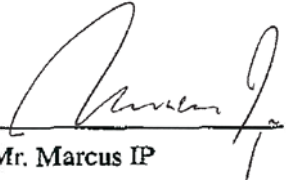
The Contents of this report have been

Certified by:

Signature:   Date: 24-03-10
Miss. Patricia Chung
(Environmental Team Leader)

Signature:  Date: 7 April 2010
Dr. Mark Shea
(Ecologist)

and Verified by:

Signature:  Date: 08 April 2010
Mr. Marcus IP
(Independent Environment Checker)

Report submission and revision:

First submission on 08th March 2010

Second submission on 20th March 2010

TABLE OF CONTENTS

TABLE OF CONTENTS	3
Executive summary	4
1.0 Introduction	6
2.0 Environmental status	6
2.1 Project area	6
2.2 Construction programme	6
2.3 Proposed construction sequences	7
2.4 Construction activities for the reporting period	9
2.5 Construction activities for the next reporting period	9
2.6 Non-compliance with the environmental performance limits	9
2.7 Summary of complaints	9
3.0 Ecological monitoring results	9
4.0 Noise monitoring results	10
5.0 Vibration monitoring results	11
6.0 Environmental issues and actions	11
6.1 Site inspections and key environmental issues	11
6.2 Non-compliance	13
6.3 Recommendations	13
6.4 Implementation status and effectiveness of the mitigation measures	13
7.0 Waste management status	14
8.0 Status of environmental licensing and permit	14
9.0 Future key issues	15
10.0 Conclusion	16
Appendix A: Event and action plan for ecology	17
Appendix B: Action and limit level for construction noise	20
Appendix C: Reference standards for vibration	22
Appendix D: Noise monitoring results, graphical plots and location plan	24
Appendix E: Monitoring schedule for the present and next reporting period	36
Appendix F: Cumulative complaint log	39
Appendix G: Implementation status of environmental protection and mitigation measures	40
Appendix H: Cumulative waste flow table	44
Appendix I: Construction programme	45
Appendix J: Complaint Log and Investigation Report	60
Appendix K: Ecological Impact Monitoring Report	67

Executive summary

This is the eighteenth monthly Environmental Monitoring and Audit (EM&A) Report for the river improvement works at Upper Tai Po River under Drainage Services Department Contract No. DC/2007/06 entitled “River Improvement Works in Upper Lam Tsuen River, She Shan River and Tai Po River”. This report concludes the impact monitoring for the activities undertaken during the period from 1st February 2010 to 28th February 2010. The major site activities in this reporting month were mainly site access formation, boulder breaking works, construction of footbridges and provision of drain-off pipes for the boulder trap.

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

Ecological impact monitoring was conducted on 27th January 2010 by the ecologist Dr. Mark Shea. For details of the findings please refer to the ecological impact monitoring report shown in Appendix J. The summary of ecological site inspection findings and implementation status of environmental protection and mitigation for ecology, prepared by the Ecologist, are provided in table 6.2 and Appendix G respectively.

Environmental Team had carried out construction noise monitoring on weekly basis and no exceedance was found. Noise monitoring records for the reporting month and the data is presented in Section 4. The location plan and the graphical plots presenting the data are provided in Appendix D.

Piling works were not scheduled for this month. Therefore, no vibration monitoring was conducted by ET during the reporting month.

There was no non-compliance recorded for this reporting month.

There was no breach of action and limit levels for this month.

There was a formal complaint recorded on 6th February 2010 regarding the

construction noise generated from late works in Upper Tai Po River. For further details of the complaint please refer to Section 2.7 and Appendix J.

There was no reporting change for this month.

Site works proposed to be carried out in the upcoming month will include formation of haul access, construction of footbridge, retaining wall, gabion wall and provision of drain-off pipes in the boulder trap.

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

1.0 Introduction

This is the eighteenth monthly Environmental Monitoring and Audit (EM&A) Report for the river improvement works at Upper Tai Po River under Drainage Services Department Contract No. DC/2007/06 entitled “River Improvement Works in Upper Lam Tsuen River, She Shan River and Upper Tai Po River”. The site layout plan is shown in Figure 2.1. The Environmental Team, Environmental Pioneers & Solutions Limited appointed by Chiu Hing Construction and Transportation Company Limited, prepares the report. The report is to be submitted to the Contractor, the Engineer and the IEC.

This report presents the results of the environmental monitoring of the project activities for Upper Tai Po River conducted during the month of February 2010. This included regular site inspections once per week for verification of implementation of the mitigation measures as recommended in the Environmental Permit (EP-223/2005/A) (EP), EM&A Manual and the Contractor’s Environmental Management Plan (EMP).

2.0 Environmental status

2.1 Project area

The location of the project site – Upper Tai Po River starting from Ta Tit Yan of Yai Mo Shan, the Upper Tai Po River flows from southeast to northeast alongside Wilson Trail, turning northward before joining the Lam Tsuen River and then runs towards Tai Po Market. To the east of the river, there are active and abandoned cultivated lands. While the village settlements are mainly located on the west and northeast side of the river bank, where the San Uk Ka and Lai Chi Shan establishment also lie. The Project site is indicated in **Figure 2.1**.

2.2 Construction programme

Approximately 0.6km of Upper Tai Po River will be improved to enhance the hydraulic performance of the river. The improvement works comprise the following:

- (1) Re-profiling and realignment of the Channel;
- (2) Inclusion of gabions and retaining wall for bank protection whilst providing a natural channel bed; and
- (3) Re-provisioning of footbridges and footpaths along the channel

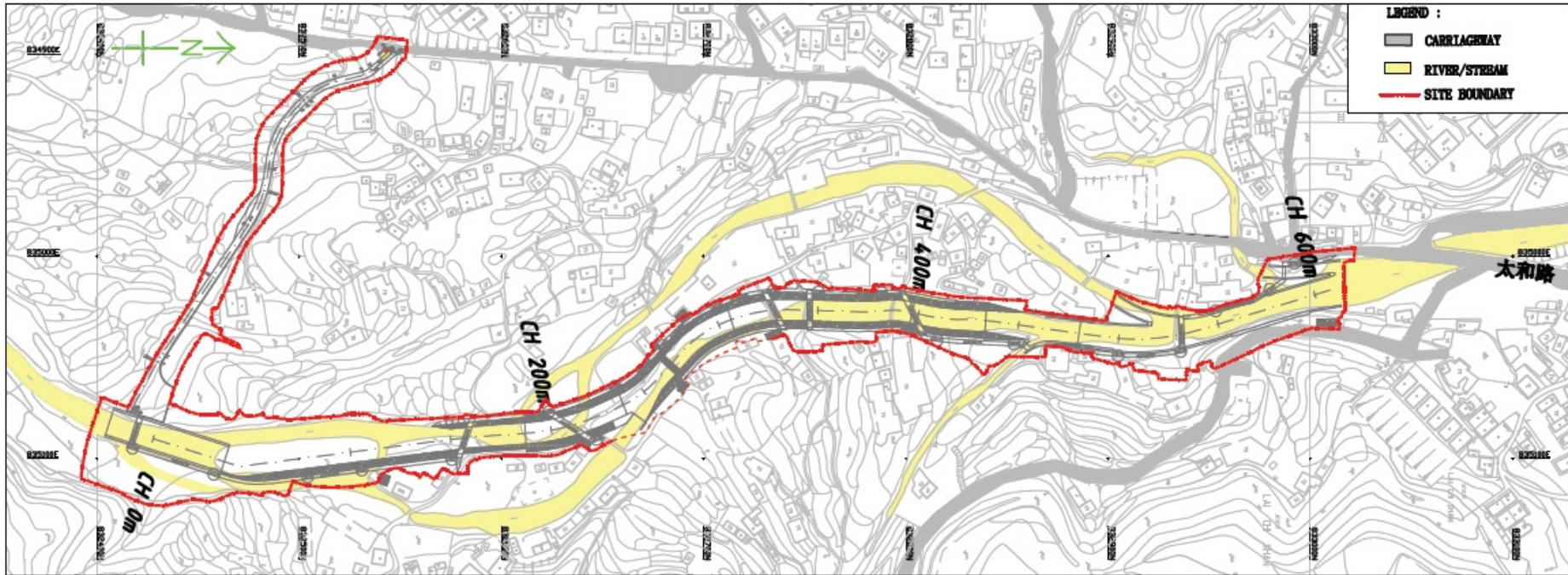
The construction of the proposed improvement works for Upper Tai Po River has been commenced on September 15th 2008 and anticipated to complete in April 2011.

2.3 Proposed construction sequences

The proposed construction sequence is shown in the following sequences:

- (1) Site clearance and preparation works
- (2) Construction of the maintenance access which involves the construction of retaining walls
- (3) River channel construction and excavation, involving the excavation works, construction of retaining walls and gabion walls
- (4) Re-provisioning of footbridges
- (5) Construction of footpaths
- (6) Landscaping works

Fig 2.1 Layout of construction area



Upper Tai Po River

2.4 Construction activities for the reporting period

Major construction activities carried out by the contractor during the reporting month include:

- (1) Haul access formation
- (2) Boulder breaking works
- (3) Construction of footbridges
- (4) Provision of drain-off pipes in the boulder trap

2.5 Construction activities for the next reporting period

Major construction activities carried out by the contractor anticipated for the coming month include:

- (1) Haul access formation
- (2) Provision of drain-off pipes in the boulder trap
- (3) Construction of footbridge and retaining wall
- (4) Construction of gabion wall at upstream

2.6 Non-compliance with the environmental performance limits

There was no non-compliance with the environmental performance limits for this reporting month. The event and action plan for Ecology is shown in Appendix A. The action and limit level for Noise is shown in Appendix B. The reference standards for vibration are shown in Appendix C.

2.7 Summary of complaints

There was a formal complaint received from ICC on 6th February 2010 regarding the construction noise generated from late works in Upper Tai Po River. ET has prepared a complaint log and report and those are attached in Appendix J for information. Totally, five complaints had been received since the commencement of the contract. The cumulative complaint log is shown in Appendix F.

3.0 Ecological monitoring results

Ecological impact monitoring was conducted on 27th January 2010. Details of findings please refer to the ecological impact monitoring report shown in the Appendix J.

4.0 Noise monitoring results

In accordance with the EM&A Manual, monitoring locations were established at 11 N.S.R. locations. The description of all 11 N.S.R. are shown in Table 4.1.

TABLE 4.1 Description of Noise Sensitive Receivers

Sensitive Receiver No.	Location and Description
UTP1	54B, Sheung Wun Yiu
UTP2	Village House in Lai Chi Shan
UTP3	Village House near Upper Tai Po River
UTP4	Village House near Upper Tai Po River
UTP5	Village House near Upper Tai Po River
UTP6	Village House near Upper Tai Po River
UTP7	Village House near Upper Tai Po River
UTP8	Village House near Upper Tai Po River
UTP9	49A, Pun Shan Chau
UTP10	Village House near the proposed access road
UTP11	49G, San Uk Ka

Noise monitoring was carried out by the Environmental Team on weekly basis for this reporting month on 5th, 12th, 19th and 26th February 2010. Measured $L_{eq(30min)}$ results ranged from 50.3dB(A) to 74.2dB(A), and therefore, no exceedance of action or limit level was recorded in this reporting month. For further details of the monitoring results, graphical plots and the location plan, please refer to Appendix D.

5.0 Vibration monitoring results

There was no vibration monitoring results for this reporting month. Vibration monitoring will be started once the piling works start in Upper Tai Po River.

6.0 Environmental issues and actions

6.1 Site inspections and key environmental issues

Site inspections were undertaken routinely to inspect the construction activities in Upper Tai Po River to ensure that appropriate environmental protection and pollution control mitigation measures are properly implemented. Implementation status of environmental protection and mitigation measures is shown in Appendix G.

Within this reporting month, site inspections were conducted on 3rd, 10th, 17th and 22nd February 2010. A detailed checklist of each site inspection together with comments and relevant photos have been filed and kept. The findings from inspection were summarized in Table 6.1.

Ecological inspections by the Ecologist Dr. Mark Shea were carried out on 3rd, 10th, 17th and 22nd February 2010. Details of findings were summarized in Table 6.2.

Table 6.1 Summary results of site inspections findings

Date	Findings	Identification	Advice from ET	Action taken	Closing date	Remarks
02 Dec 09	Damaged backhoe was located at haul access D. Also, functional site equipments were found to be leaking oil	Observation	Contractor was advised to remove the concerned site equipment to prevent oil leakage to the surrounding area and provide maintenance to prevent potential oil leakage	The damaged backhoe has been removed from site prior to the inspection on 10 Feb	10 Feb 2010	--
03 Feb 10	Oil spillage due to fuelling to the backhoe stained the soil of haul access at ch.50	Observation	Contractor was advised to implement proper preventive measures to avoid oil spillage from fuelling. Also, contaminated soil should be collected and handled as chemical waste for storage and disposal	Contractor took the advice and collect the contaminated soil prior to the inspection on 10 Feb	10 Feb 2010	--
10 Feb 2010	No particular observation	N/A	N/A	N/A	N/A	N/A
17 Feb 2010	No particular observation	N/A	N/A	N/A	N/A	N/A
22 Feb 2010	Site water discharged from de-silting tank at ch.50 was observed to be turbid	Observation	To maintain treatment effectiveness, Contractor was advised to clean up the de-silting tank regularly.	To be followed in the next period	Ongoing	--

The summary of ecological inspection prepared by the Ecologist, Dr. Mark Shea is shown in Table 6.2.

Table 6.2 Summary results of ecological site inspection findings					
Date	Observations	Advice from Ecologist	Action Taken	Closing Date	
03 Feb 2010	No Major findings for this inspection	No Advice is required	No Action is required to be taken	N/A	
10 Feb 2010	No Major findings for this inspection	No Advice is required	No Action is required to be taken	N/A	
17 Feb 2010	No Major findings for this inspection	No Advice is required	No Action is required to be taken	N/A	
22 Feb 2010	No Major findings for this inspection	No Advice is required	No Action is required to be taken	N/A	

6.2 Non-compliance

There was no non-compliance recorded for the month of February 2010.

6.3 Recommendations

Contractor was reminded for the issue of oil and chemical spillage on site. In order to prevent oil leakage from causing contamination to the surrounding area, on-site maintenance should be prevented as far as practicable. Protective measures such as drip pan and/or absorbing materials should be provided for refueling to the equipments. On-site storage of fuels and chemicals should be prevented otherwise secondary containment of drip pan should be provide to avoid chemical spillage to the site ground and/or water bodies.

Advice on site water treatment was also to the Contractor. Regular maintenance and cleaning should be provided to all site water treatment facilities as to maintain their effectiveness. Also, contractor should be cautious on the amount of site water generated as to ensure sufficient treatment facilities were provided.

6.4 Implementation status and effectiveness of the mitigation measures

Refer the previous table 6.1, contractor has implemented mitigation measures to address those problems as advised by ER, IEC and ET. Some of the measures taken by the contractor were considered as effective to minimize negative impact to the environment. Ongoing investigation will be carried out to observe performance and effectiveness of those measures. Outstanding environmental items will be inspected in the follow month.

As there were some ongoing follow up practices, contractor was reminded to regularly review and rectify the discrepancy once found and maintain good site condition.

7.0 Waste management status

It is the contractor's responsibility to ensure that all wastes produced during 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 general reuse are recommended to be audited to ensure that proper storage, transportation and disposal practices are being implemented.

Table 7.1 is the Waste Disposal recorded by the Contractor in this month.

Table 7.1 Summary of Waste Disposal for the reporting month

Type of waste	Inert Waste	Non-Inert Waste	Chemical Waste
February 2010	0	0	0

The cumulative waste flow table is shown in Appendix H.

8.0 Status of environmental licensing and permit

This project requires different permits and licenses to be run legally. **Table 8.1** is the summary of permits/ licenses for this project.

Table 8.1 Summary of Environmental Licensing and Permit Status

Description	License / Permit No.	Date of Issue	Date of Expiry	Remarks
Environmental Permit	EP-223/2005	31 st Aug, 2005	N/A	Superseded
Amended Environmental Permit	EP-223/2005/A	18 th Nov, 2008	N/A	Issued
Construction Noise Permit	N/A	N/A	N/A	N/A
Effluent Discharge License	3678	14 th Mar, 2008	31 st Mar, 2013	Issued
Registration as a Chemical Waste Producer	5213-724-C3251-03	19 th Dec, 2007	Not applicable	Issued
Billing Account for Disposal of Construction Waste	7006101	N/A	N/A	N/A

9.0 Future key issues

As informed by contractor, major construction activities in the upcoming month will include formation of haul access, construction of footbridge, retaining wall, gabion wall and provision of drain-off pipes in the boulder trap. The construction activities for these items will generate several environmental impacts. These include air, noise, water and waste management.

Construction activities such as backfilling, earth movement and boulder breaking may generate dust impact to the vicinity of sensitive receivers. Contractor is advised to provide sufficient water spraying for the dusty static area. Stockpiling may be found on site and those should be covered with tarpaulin sheets to prevent erosion.

Formation of haul access in the stream course may generate water quality impact. Contractor was recommended to provide proper bunds and barriers as forming well enclosed area for construction activities carried out in the river course. Site water treatment facilities should be used whenever necessary.

For the proposed boulder breaking works, during the course of construction of retaining wall and gabion wall, heavy plants and vehicles may be deployed and those would generate certain noise impacts to the sensitive receivers. Noisy activities should be well planned and scheduled to avoid parallel operation of multiple plants, so as to minimize noise impacts to the nearby sensitive receivers.

Construction activities may generate wastes on site. Contractor is advised to assign a site area for temporary waste storage and segregation. Wastes accumulation should be prevented on site; licensed waste collection and disposal should be implemented regularly for hygiene issues.

10.0 Conclusion

Site preparation works including site access formation, boulder breaking, construction of footbridges and drain-off pipes were carried out during the reporting period.

Regular site meetings and inspection audits led by the seniors for discussing environmental issues were held among project proponent, Contractor and the ET on weekly basis.

Environmental Team had carried out construction noise monitoring on weekly basis. All results obtained were within limit and therefore no exceedance was recorded in this reporting month.

Piling works were not scheduled for this month. Therefore, no vibration monitoring was conducted during the reporting month.

From the summary of ecological site inspection findings and implementation status of environmental protection and mitigation for ecology, prepared by the Ecologist Dr. Mark Shea, there is no abnormal finding observed in the reporting month. The ecologist has no further advice and no action suggested to the contractor. Impact ecological monitoring was carried out on 27th January 2010 and the ecological impact monitoring report was attached in Appendix J.

There was no non-compliance recorded for the reporting month.

A formal complaint regarding noise pollution was recorded in this reporting month. The complaint was logged and detailed complaint log and investigation report were shown in Appendix K.

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: Event and action plan for ecology

Event and action plan for ecology

In the event of non-compliance, the Event / Action plan prepared by the ecologist shall be followed. Detailed Event/ Action plan was shown in **Appendix Table 1** for reference.

It is not proposed to set population size of the three species (i.e. Three-lined Chinese Stream Catfish, Predaceous and the Hong Kong Newt) or other faunal species for the Action Level and Limit Level in the revised EM&A manual in considering the following reasons:

- I. The schedule capture surveys would let to decrease in the populations of the target species; and
- II. The planned drainage works would also temporally de-fauna the stream habitat.

It is considered logical and appropriate to audit non-compliance events in relation with ecological mitigation measures, which were specified in the EP and the PS of the project.

APPENDIX TABLE 1 Event / Action plan table for Ecology

Event	Action			
	ET	ER	IEC	Contractor
Non-conformity on one occasion	<ol style="list-style-type: none"> 1. Identify Source 2. Inform the IEC and the ER 3. Discuss remedial actions with the IEC, the ER and the Contractor 4. Monitor remedial actions until rectification has been completed 	<ol style="list-style-type: none"> 1. Check report 2. Check the Contractor's working method 3. Discuss with the ET and the Contractor on possible remedial measures, 4. Advise the Contractor on effectiveness of proposed remedial measures 5. Check implementation of remedial measures 	<ol style="list-style-type: none"> 1. Ensure Remedial measures are properly implemented 	<ol style="list-style-type: none"> 1. Amend working methods 2. Rectify damage and undertake any necessary replacement
Repeated Non conformity	<ol style="list-style-type: none"> 1. Identify Source 2. Inform the IEC and the ER 3. Increase monitoring frequency 4. Discuss remedial actions with the IEC, the ER and the Contractor 5. Monitor remedial actions until rectification has been completed 6. If exceedance stops, cease additional monitoring 	<ol style="list-style-type: none"> 1. Check monitoring report 2. Check the Contractor's working method 3. Discuss with the ET and the Contractor on possible remedial measures 4. Advise the Contractor on effectiveness of proposed remedial measures 5. Check implementation of remedial measures 	<ol style="list-style-type: none"> 1. Ensure Remedial measures are properly implemented 	<ol style="list-style-type: none"> 1. Amend working methods 2. Rectify damage and undertake any necessary replacement

Appendix B: Action and limit level for construction noise

The Action and Limit levels for construction noise are defined in **Appendix Table 2**

Appendix Table 2: Action and Limit Levels for Construction Noise

Time Period	Action	Limit
0700 – 1900 hrs on normal weekdays	When one documented complaint is received	75 dB(A)*
0700 – 2300hrs on holidays; and 1900 – 2300 hrs on all other days		Subject to the control of Noise Control Ordinance
2300 – 0700 hrs of next day		Subject to the control of Noise Control Ordinance

*Limit level set in accordance with Particular Specification Section 26

Appendix C: Reference standards for vibration

Guidance regarding vibration limits is provided by the following British Standards (or their equivalent ISO standards):

BS 7385 - Measurement and evaluation of vibration in buildings. Part 2: Guide to damage levels from ground borne vibration.

BS 7385 suggests vibration levels, below which damage is unlikely to occur in 95% of buildings. For cosmetic damage, the level is 15 mm/s at 4 Hz, increasing to 20 mm/s at 15 Hz, increasing to 50 mm/s at 40 Hz and above. Minor structural damage is possible at vibration levels twice those given above, major damage at four times the levels given.

Appendix Table 3: Transient vibration guide values for cosmetic building damage (BS7385:Part 2 1993)

	Type of Building	Peak component particle velocity (mm/s) in frequency range of predominant pulse
1	Reinforced or framed structures	50 at 4 Hz and above
2	Un-reinforced or light framed structures	15 at 4 Hz, increasing to 20 at 15 Hz, increasing to 50 at 40 Hz and above.

The vibration magnitudes and frequencies refer to Peak Particle Velocities (PPV) occurring in any single direction, measured on the ground level of the building concerned.

Appendix D: Noise monitoring results, graphical plots and location plan

Location	L ₉₀ 30min	L ₁₀ 30min	Leq 30min	Date	Time Duration	Major Construction Noise	Other Noise source	Weather	Location description
UTP 1	50.8	64.3	61.5	5-Feb-10	10:56-11:26	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location due to its large distance from the construction activities	Background noise from traffic	Cloudy	Façade
UTP 2	50.4	59.6	57.9	5-Feb-10	11:30-12:00	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location due to its large distance from the construction activities	Background noise from traffic	Cloudy	Façade
UTP 3	49.5	60.3	57.0	5-Feb-10	15:45-16:15	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location due to its large distance from the construction activities	N/A	Cloudy	Façade
UTP 4	49.2	62.2	58.9	5-Feb-10	15:12-15:42	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location due to its large distance from the construction activities	N/A	Cloudy	Façade
UTP 5	50.5	59.5	57.5	5-Feb-10	14:38-15:08	Boulder movement works by Backhoe	N/A	Cloudy	Façade
UTP 6	51.5	62.1	60.4	5-Feb-10	14:04-14:34	Boulder movement works by Backhoe	N/A	Cloudy	Façade
UTP 7	44.5	63.9	63.9	5-Feb-10	13:32-14:02	Noise from equipment installation	N/A	Cloudy	Façade
UTP 8	46.8	51.3	52.5	5-Feb-10	13:00-13:30	No construction was being carried out during measurement	N/A	Cloudy	Façade
UTP 9	46.4	59.5	58.6	5-Feb-10	10:15-10:45	No construction was being carried out during measurement	N/A	Cloudy	Façade
UTP 10	41.6	53.2	51.7	5-Feb-10	09:38-10:08	Removal of broken backhoe at haul access D	N/A	Cloudy	Façade
UTP 11	46.1	57.3	56.6	5-Feb-10	09:05-09:35	Removal of broken backhoe at haul access D	N/A	Cloudy	*Free field

Note* An Additional of 3dB(A) had been added to the measurement result due to Free Field Correction

Location	L ₉₀ 30min	L ₁₀ 30min	Leq 30min	Date	Time Duration	Major Construction Noise	Other Noise source	Weather	Location description
UTP 1	48.8	69.0	66.3	12-Feb-10	09:26-09:56	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location due to its large distance from the construction activities	N/A	Cloudy	Façade
UTP 2	46.4	64.0	61.2	12-Feb-10	08:50-09:20	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location due to its large distance from the construction activities	N/A	Cloudy	Façade
UTP 3	42.8	54.6	53.7	12-Feb-10	10:02-10:32	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location due to its large distance from the construction activities	N/A	Cloudy	Façade
UTP 4	44.8	57.0	55.3	12-Feb-10	10:36-11:06	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location due to its large distance from the construction activities	N/A	Cloudy	Façade
UTP 5	46.9	55.2	55.1	12-Feb-10	11:11-11:41	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location due to its large distance from the construction activities	N/A	Cloudy	Façade
UTP 6	44.1	50.8	50.8	12-Feb-10	13:00-13:30	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location due to its large distance from the construction activities	N/A	Cloudy	Façade
UTP 7	45.0	51.9	51.0	12-Feb-10	13:32-14:02	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location due to its large distance from the construction activities	N/A	Cloudy	Façade
UTP 8	49.1	55.0	54.0	12-Feb-10	14:05-14:35	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location due to its large distance from the construction activities	N/A	Cloudy	Façade
UTP 9	48.3	59.4	57.3	12-Feb-10	14:40-15:10	Operation of backhoe at boulder trap	N/A	Cloudy	Façade
UTP 10	47.3	61.3	59.4	12-Feb-10	15:13-15:43	Operation of backhoe at boulder trap	N/A	Cloudy	Façade
UTP 11	45.0	56.6	56.9	12-Feb-10	15:46-16:16	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location due to its large distance from the construction activities	N/A	Cloudy	*Free field

Note* An Additional of 3dB(A) had been added to the measurement result due to Free Field Correction

Location	L ₉₀ 30min	L ₁₀ 30min	Leq 30min	Date	Time Duration	Major Construction Noise	Other Noise source	Weather	Location description
UTP 1	44.0	61.4	58.8	19-Feb-10	10:50-11:20	The measured noise level was dominated by the background noise as no construction activity was being carried out during measurement	Background noise from traffic	Cloudy	Façade
UTP 2	41.4	52.9	52.7	19-Feb-10	15:44-16:14	The measured noise level was dominated by the background noise as no construction activity was being carried out during measurement	N/A	Cloudy	Façade
UTP 3	42.3	51.4	50.8	19-Feb-10	16:18-16:48	The measured noise level was dominated by the background noise as no construction activity was being carried out during measurement	N/A	Cloudy	Façade
UTP 4	44.3	57.0	56.7	19-Feb-10	15:10-15:40	The measured noise level was dominated by the background noise as no construction activity was being carried out during measurement	N/A	Cloudy	Façade
UTP 5	43.4	58.9	57.4	19-Feb-10	14:38-15:08	The measured noise level was dominated by the background noise as no construction activity was being carried out during measurement	N/A	Cloudy	Façade
UTP 6	42.4	53.5	53.8	19-Feb-10	14:06-14:36	The measured noise level was dominated by the background noise as no construction activity was being carried out during measurement	N/A	Cloudy	Façade
UTP 7	49.2	51.0	51.1	19-Feb-10	13:33-14:03	The measured noise level was dominated by the background noise as no construction activity was being carried out during measurement	N/A	Cloudy	Façade
UTP 8	43.5	54.2	54.0	19-Feb-10	13:00-13:30	The measured noise level was dominated by the background noise as no construction activity was being carried out during measurement	N/A	Cloudy	Façade
UTP 9	41.7	51.3	50.6	19-Feb-10	09:24-09:54	The measured noise level was dominated by the background noise as no construction activity was being carried out during measurement	N/A	Cloudy	Façade
UTP 10	46.0	60.4	60.7	19-Feb-10	08:50-09:20	The measured noise level was dominated by the background noise as no construction activity was being carried out during measurement	N/A	Cloudy	Façade
UTP 11	44.0	61.4	58.8	19-Feb-10	10:50-11:20	The measured noise level was dominated by the background noise as no construction activity was being carried out during measurement	Background noise from traffic	Cloudy	*Free field

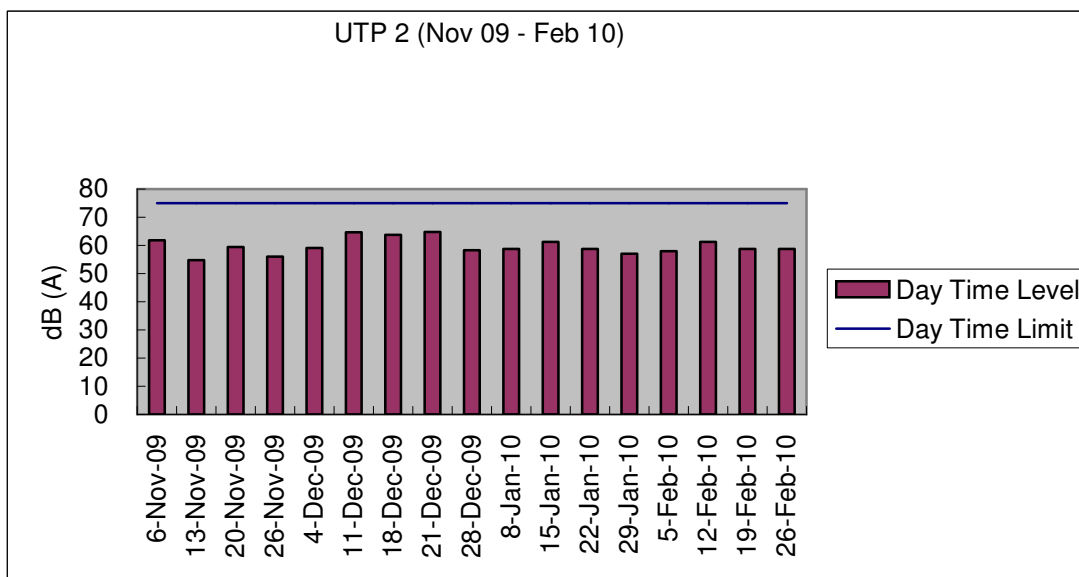
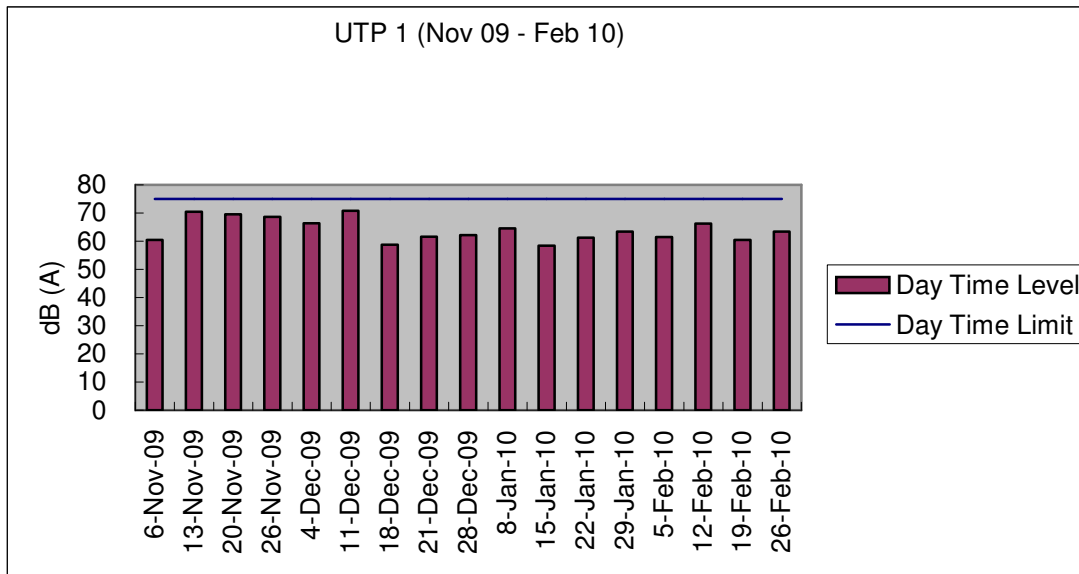
Note* An Additional of 3dB(A) had been added to the measurement result due to Free Field Correction

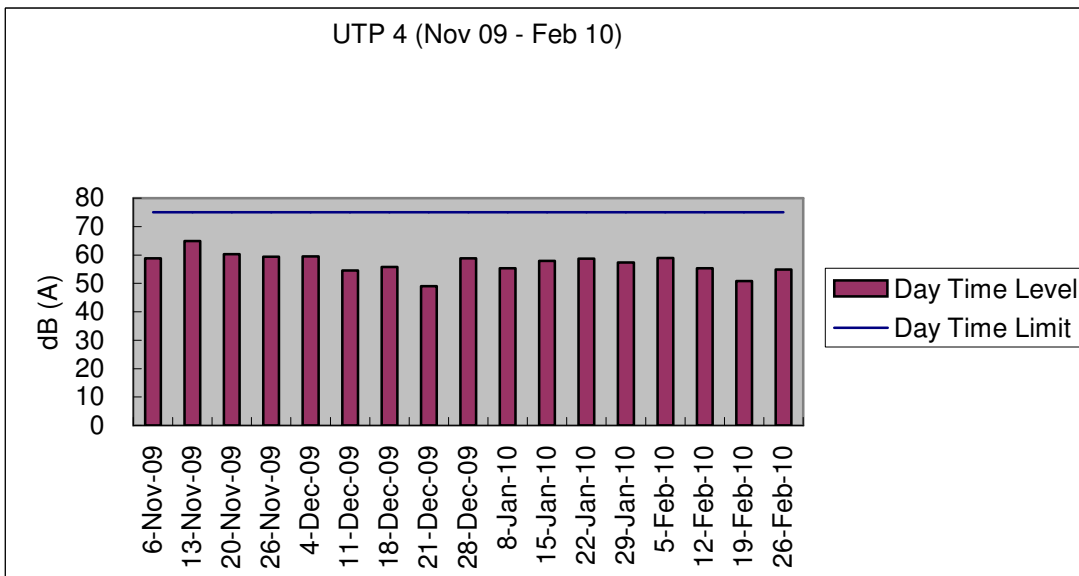
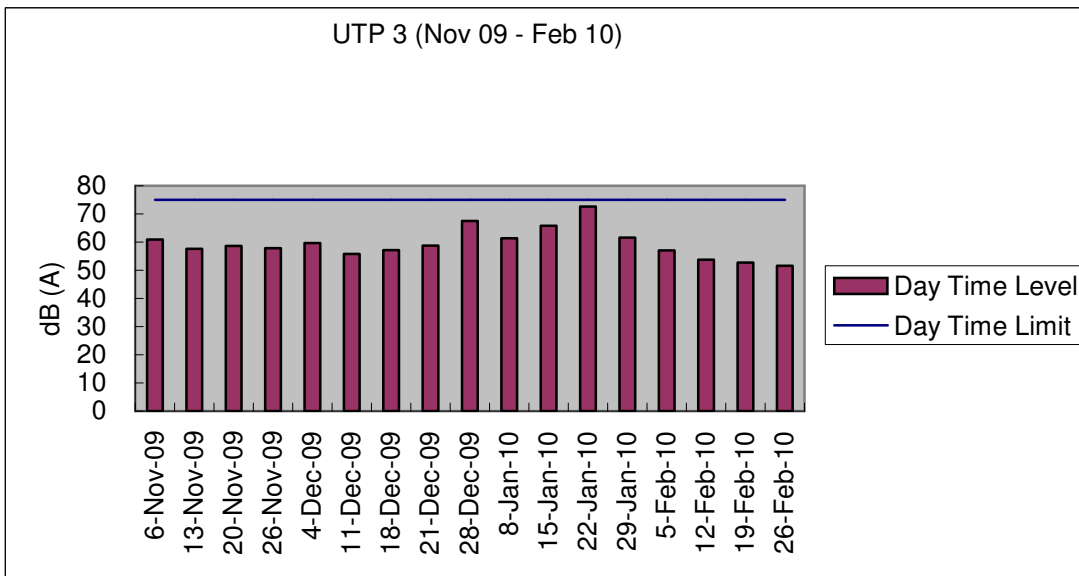
Location	L ₉₀ 30min	L ₁₀ 30min	Leq 30min	Date	Time Duration	Major Construction Noise	Other Noise source	Weather	Location description
UTP 1	46.3	64.5	63.4	26-Feb-10	11:23-11:53	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location due to its large distance from the construction activities	Background noise from traffic	Sunny	Façade
UTP 2	40.3	59.4	58.7	26-Feb-10	10:48-11:18	The measured noise level was dominated by the background noise as no construction activity was being carried out during measurement	Background noise from traffic	Sunny	Façade
UTP 3	42.6	53.0	51.6	26-Feb-10	15:44-16:14	Boulder breaking	N/A	Sunny	Façade
UTP 4	50.9	56.7	54.9	26-Feb-10	15:11-15:41	Boulder breaking	N/A	Sunny	Façade
UTP 5	50.5	79.0	74.2	26-Feb-10	14:39-15:09	Boulder breaking	N/A	Sunny	Façade
UTP 6	41.7	60.2	60.8	26-Feb-10	14:05-14:35	Boulder breaking	N/A	Sunny	Façade
UTP 7	42.2	53.8	53.4	26-Feb-10	13:32-14:02	Boulder breaking	N/A	Sunny	Façade
UTP 8	47.3	52.9	50.3	26-Feb-10	13:00-13:30	Boulder breaking	N/A	Sunny	Façade
UTP 9	41.6	53.5	51.2	26-Feb-10	10:10-10:40	The measured noise level was dominated by the background noise as no construction activity was being carried out during measurement	N/A	Sunny	Façade
UTP 10	43.3	51.6	51.4	26-Feb-10	09:33-10:03	The measured noise level was dominated by the background noise as no construction activity was being carried out during measurement	N/A	Sunny	Façade
UTP 11	44.1	55.8	56.0	26-Feb-10	09:00-09:30	The measured noise level was dominated by the background noise as no construction activity was being carried out during measurement	N/A	Sunny	*Free field

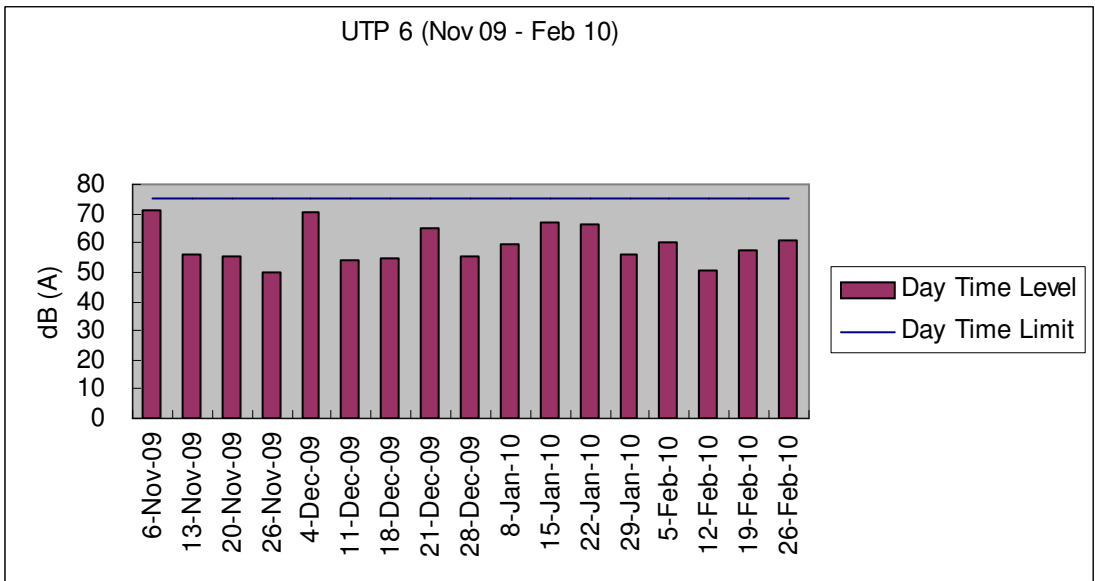
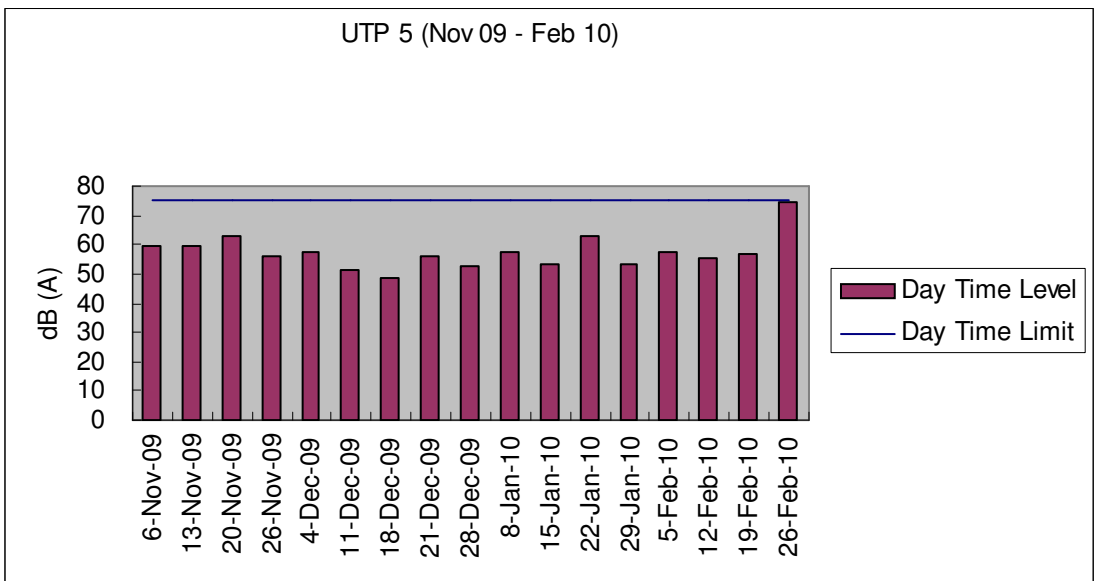
Note* An Additional of 3dB(A) had been added to the measurement result due to Free Field Correction

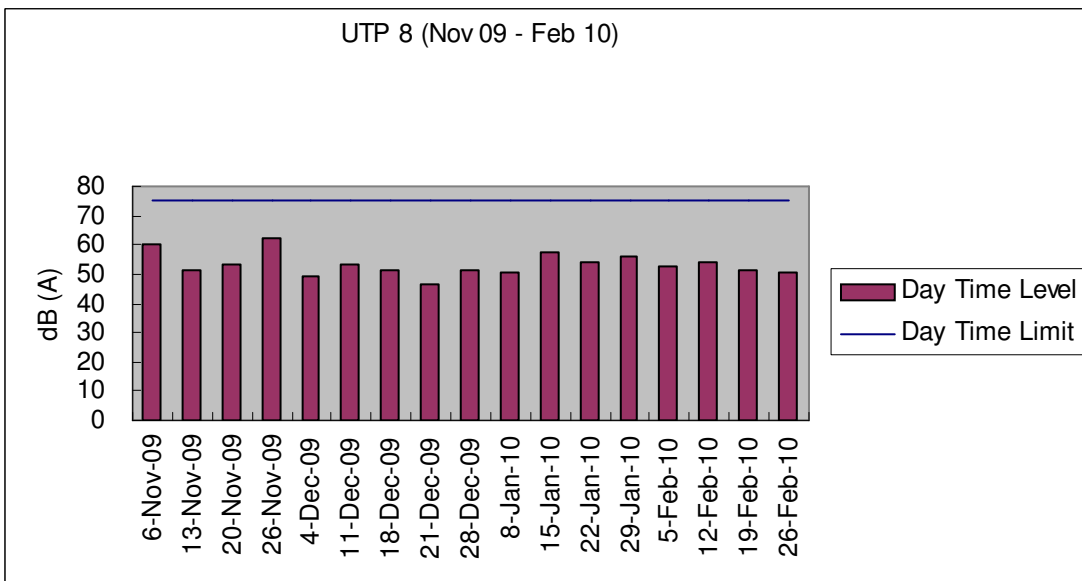
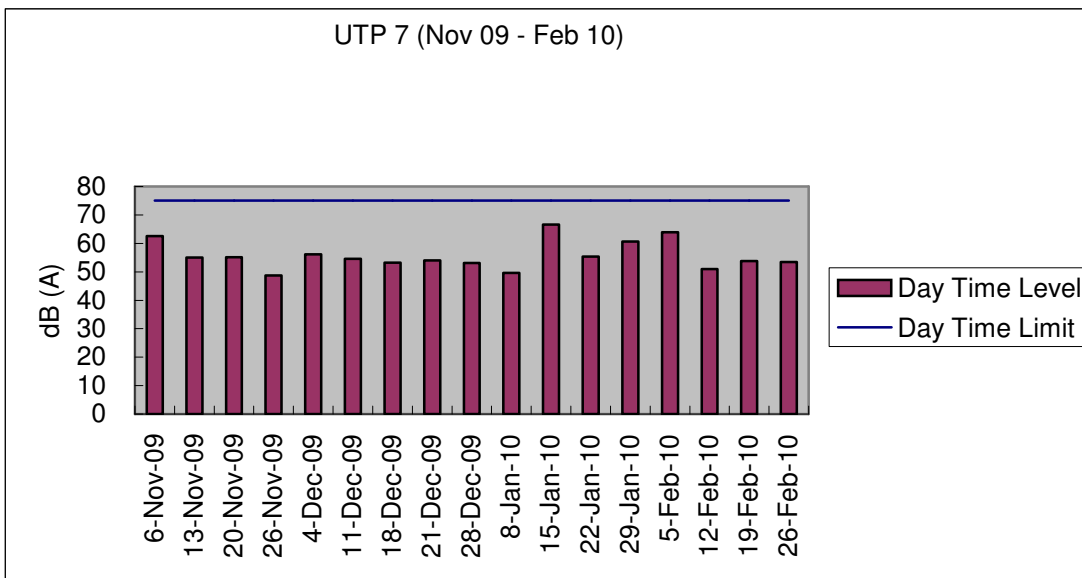
Graphical plot for noise measurements

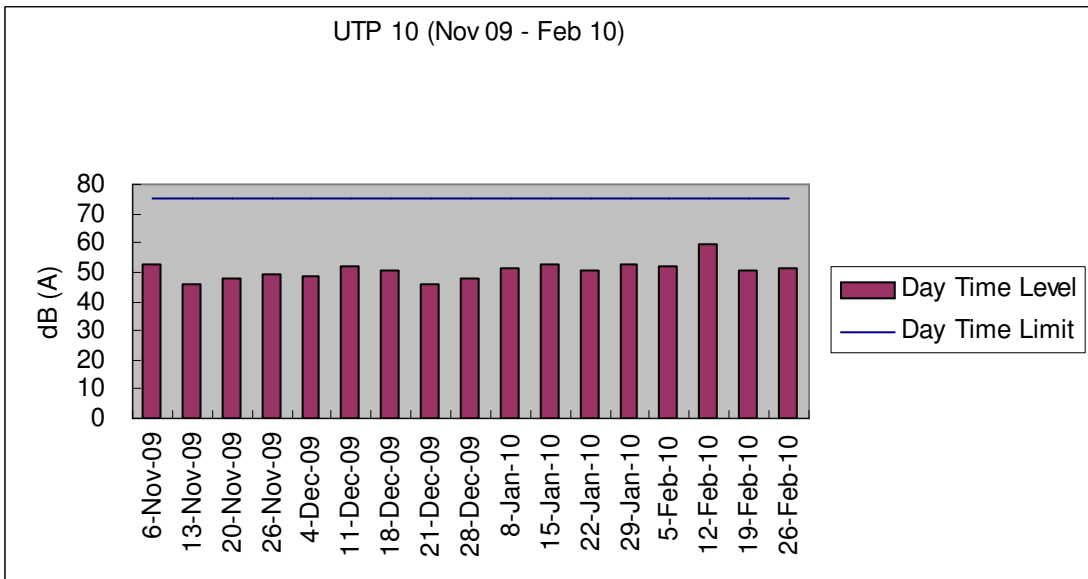
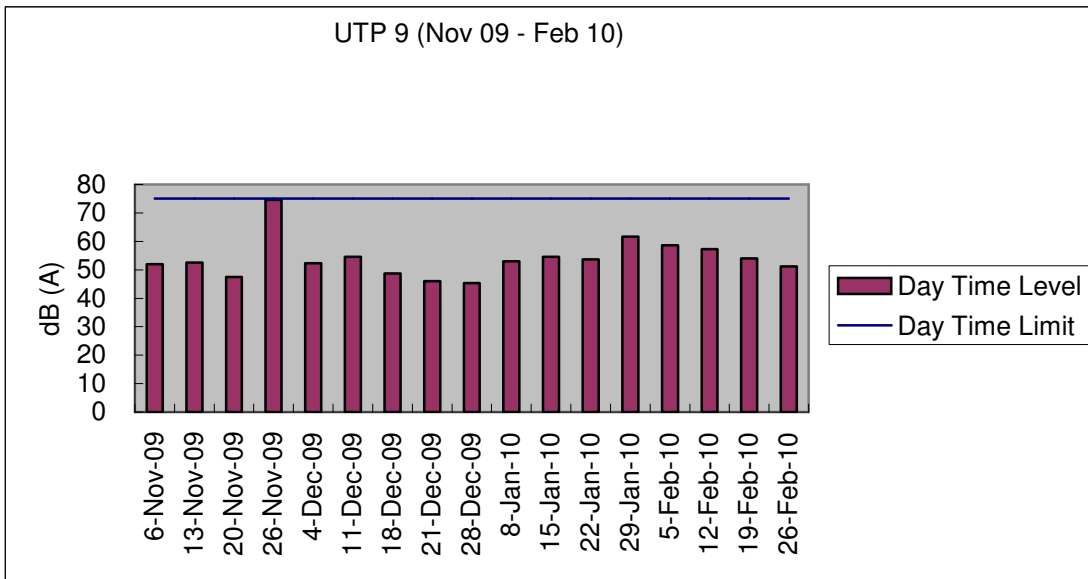
The followings were the graphical plots for the 11 monitoring locations. Each plot showed the date of measurement taken, day time limit of 75 dB(A) as well as the measured daytime level for each location. The graphs contain the data recorded from November 2009 to February 2010.

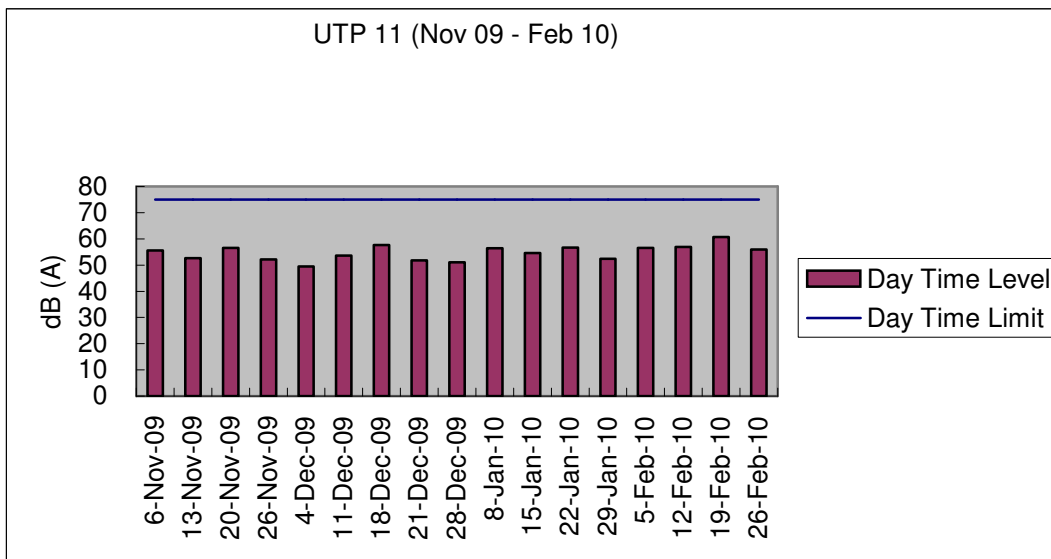


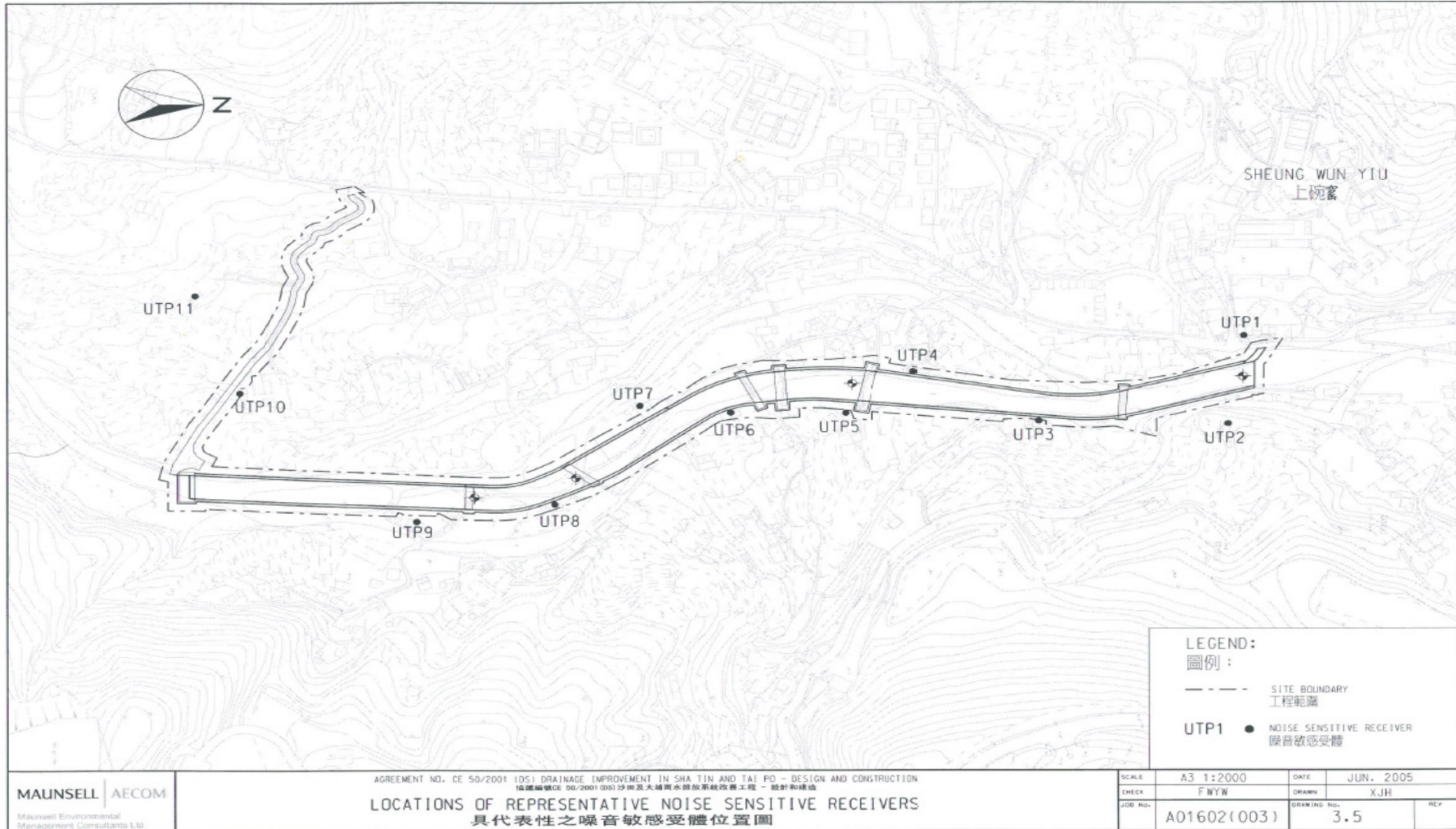












Appendix E: Monitoring schedule for the present and next reporting period

Master Schedule of EM&A works in February 2010

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	01/02	02/02	03/02	04/02	05/02	06/02
			Site inspection at afternoon		Noise monitoring	
07/02	08/02	09/02	10/02	11/02	12/02	13/02
			Site inspection at afternoon		Noise monitoring	
14/02	15/02	16/02	17/02	18/02	19/02	20/02
			Site inspection at afternoon		Noise monitoring	
21/02	22/02	23/02	24/02	25/02	26/02	27/02
	Site inspection and SSEMC at morning				Noise monitoring	
28/02						

Master Schedule of EM&A works in March 2010

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	01/03	02/03	03/03	04/03	05/03	06/03
			Site inspection at afternoon		Noise monitoring	
07/03	08/03	09/03	10/03	11/03	12/03	13/03
			Site inspection at afternoon		Noise monitoring	
14/03	15/03	16/03	17/03	18/03	19/03	20/03
			Site inspection at afternoon		Noise monitoring	
21/03	22/03	23/03	24/03	25/03	26/03	27/03
			Site inspection and SSEMC at morning		Noise monitoring	
28/03	29/03	30/03	31/03			
			Site inspection at afternoon			

Appendix F: Cumulative complaint log

Environmental Parameters	Cumulative no. Brought forward	No. of complaint February 2010	Overall Total
Air/Dust	1	0	1
Noise	1	1	2
Water	2	0	2
House Keeping Hygiene	0	0	0
Chemical waste	0	0	0
Total	4	1	5

* ET received a public enquiry referred by EPD, regarding river water quality and loss of vegetation within construction site, on 3rd July 2009.

Appendix G: Implementation status of environmental protection and mitigation measures

Implementation status of environmental protection and mitigation

Environmental Aspect	Protection / Mitigation Measures	Implementation status	Follow-up action
Construction Noise	No percussive piling shall be carried out	Implemented	Not required
	-Use well maintained construction plant	Implemented	Not required
	-Shut down plants between work periods	Implemented	Not required
	-Install silencers on construction equipment	Implemented	Not required
	-Locate mobile plant far away from NSRs	Implemented	Not required
	-Quiet plants should be used	Implemented	Not required
	-2m high temporary noise barriers, as stipulated in EP condition 2.9, shall be installed	Implemented	Not required
Fugitive Dust Emission	-Implement regular watering and vehicle washing facilities	Implemented	Not required
	-Cover excavated or stockpile of dusty material by impervious sheeting or sprayed with water	Implemented	Not required
	-Use tarpaulin to cover dusty materials on vehicles	Implemented	Not required
Water Quality	Excavation works within the Tai Po River within the Project shall be carried out in stages and excavation area for each stage shall be limited to section of half width of the channel and less than 100m long at any one time in order to maintain water flow within the river during construction stage	Not applicable at this stage	Not required
	Land-based plant shall be employed and site run-off shall be directed towards regularly cleaned and maintained silt traps and oil / grease separators to minimize leakage and loss of sediments during excavation	Implemented	Not required
	Large boulders removed from the Tai Po River within the Project during excavation shall be re-instated upon completion of works A section of 150m long natural riverbank on the western side of the river channel (Ch0 –Ch150) shall be retained	Implemented	Not required
	The excavation area shall be enclosed with bunds or barriers and dewatered prior to excavation to minimize the impacts upon the downstream of the Tai Po River	Implemented	Rectified

	Provide silt trap and oil interceptor to remove the oil, lubricants, grease, silt, grit and debris from the wastewater before pumped to the public storm water drainage system	Implemented	Not required
	Provide site toilet facilities	Implemented	Not required
Waste Management	Reuse excavated material as far as possible	Implemented	Not required
	Recycle scrap metals or abandoned equipment	Implemented	Not required
	Adopt a trip ticket system for the disposal of C&D materials	Implemented	Not required
	All general refuse should be segregated and stored in enclosed bins or compaction units	Implemented	Not required
Vibration	Percussive piling is to be replaced by bore-hole piling to minimize vibration impacts to the two identified Declared monuments	Not applicable at this stage	Not required
	Carrying out of vibration monitoring to ensure that vibration associated with the construction phase do not exceed the threshold limit otherwise contractor have to review the work method and construction activities have to be slow down or rescheduled to reduce the impacts	Not applicable at this stage	Not required
	Close monitoring and measurement on the cracks of the external wall of Fan Sin Temple during construction works will be carried out. Any changes on the cracks will be recorded for the contractor to slow down the construction activities accordingly; and to review the work methods and equipments immediately	Not Applicable at this stage	Not required

Implementation status of environmental protection and mitigation for ecology,
 prepared by the Ecologist, Dr. Mark Shea.

Environmental Aspect	Protection / Mitigation Measures	Implementation status	Follow-up action
Ecology	Large boulders will be returned to the riverbed following the excavation works.	Not applicable	Not required
	Construction works from Ch. 0.0m – Ch. 150m would be along one side of the river only	Not applicable	Not required
	Approximately 150m of the existing natural riverbank on the western side of the river would be retained.	Implemented	Not required
	Excavation works within the river channel should be restricted to an enclosed dewater section of the river, and would be limited to sections 50-100m long at any one time.	Implemented	Not required
	Flows to the area downstream shall be maintained at all times during the construction phase	Implemented	Not required
	Capture survey shall be conducted within the Tai Po River before commencement of works. The captured target species shall be relocated to areas of the watercourse upstream of the watercourse upstream of the Tai Po River	Capture surveys had been conducted at the beginning of the Contract, during the wet season July/August 2008, 4 th November 2008 and 27 th , 28 th October 2009	Not required
	Temporary noise barriers should be constructed to control noise impacts to habitats and associated wildlife within and adjacent to the proposed works area	Implemented	Not required
	Excavation works shall be carried out by land based plant within enclosed dry section of river channel.	Implemented	Not required
	Compensatory planting of trees and other vegetation along the banks of the newly improved drainage channel should be provided to compensate for the loss of riparian vegetation.	Not applicable	Not required
Operation phase activities in the improved drainage channel would be limited to periodic channel maintenance such as de-silting.	Not applicable	Not required	

Appendix H: Cumulative waste flow tableCumulative waste flow table since 15th September 2008

Type of waste	Inert Waste	Non-Inert Waste	Chemical Waste
September 2008	0	0	0
October 2008	0	2 tonnes	0
November 2008	36m ³	0	0
December 2008	0	0	0
January 2009	0	0	0
February 2009	0	0	0
March 2009	0	0	0
April 2009	0	0	0
May 2009	0	0	20kg*
June 2009	0	0	0
July 2009	0	0	0
August 2009	0	0	0
September 2009	0	0	0
October 2009	0.9m ³	0	0
November 2009	0	0	0
December 2009	0	0	0
January 2010	0	0	0
February 2010	0	0	0
Total	36.9m ³	2 tonnes	20kg

Remark*: Chemical wastes generated from the project sites including Upper Tai Po River, Lam Tsuen River and She Shan River were centralized for disposal.

Appendix I: Construction programme

Drainage Services Department

River Improvement Works in Upper Lam Tsuen River, She Shan River and Upper Tai Po River Revised Master Programme (Rev. 08)

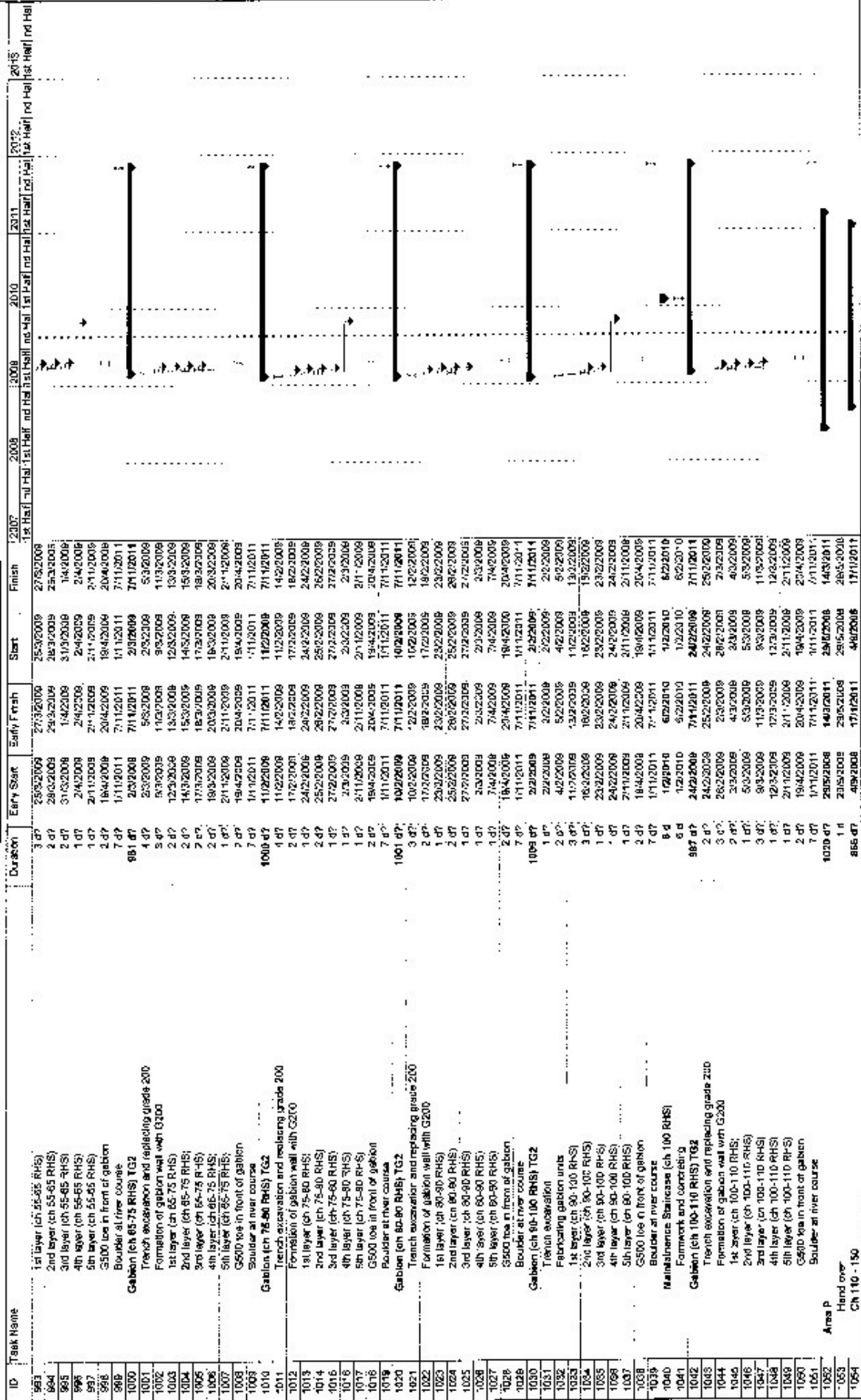
Contract No. DC/2007/06

ID	Task Name	Duration	Early Start	Early Finish	Start	Finish	2007	2008	2009	2010	2011	2012	2013
985	Formation	20 d	20122010	20122010	20122010	20122010							
986	Concreting	5 d	20122010	20122010	20122010	20122010							
987	Ch-23 - 45	81d 07	28/02/07	23/12/2009	28/02/07	23/12/2009							
988	Site Clearance	9 d 07	28/02/07	06/03/07	28/02/07	06/03/07							
989	Haarroad formation	29 d 07	28/02/07	16/03/07	28/02/07	16/03/07							
990	Water diversion	5 d 07	30/10/2008	04/11/2008	30/10/2008	04/11/2008							
991	Boulder Trap (Bay 7-8) (Ch-23 - 45)	134 d 07	27/11/2006	04/12/2008	27/11/2006	04/12/2008							
992	Bulk excavation	15 d 07	27/11/2006	11/12/2006	27/11/2006	11/12/2006							
993	Formwork (base slab, bay 7)	5 d 07	19/12/2006	19/12/2006	19/12/2006	19/12/2006							
994	Rebar fixing (base slab, bay 7)	3 d 07	22/12/2006	24/12/2006	22/12/2006	24/12/2006							
995	Concreting (base slab, bay 7)	1 d	31/12/2006	31/12/2006	31/12/2006	31/12/2006							
996	Stripping off formwork (base slab, bay 7)	1 d 07	01/01/2007	01/01/2007	01/01/2007	01/01/2007							
997	Formwork (wall stem, bay 7 RHS)	4 d 07	01/01/2007	05/01/2007	01/01/2007	05/01/2007							
998	Rebar fixing (wall stem, bay 7 RHS)	2 d 07	03/01/2007	05/01/2007	03/01/2007	05/01/2007							
999	Concreting (wall stem, bay 7 RHS)	2 d 07	05/01/2007	07/01/2007	05/01/2007	07/01/2007							
1000	Stripping off formwork (wall stem, bay 7 RHS)	1 d 07	08/01/2007	09/01/2007	08/01/2007	09/01/2007							
1001	Formwork (base slab, bay 8)	1 d 07	12/01/2007	13/01/2007	12/01/2007	13/01/2007							
1002	Rebar fixing (base slab, bay 8)	1 d 07	13/01/2007	14/01/2007	13/01/2007	14/01/2007							
1003	Concreting (base slab, bay 8)	1 d 07	15/01/2007	16/01/2007	15/01/2007	16/01/2007							
1004	Stripping off formwork (wall stem, bay 8 LHS)	2 d 07	24/01/2007	26/01/2007	24/01/2007	26/01/2007							
1005	Shuttering formwork (wall stem, bay 8 LHS)	2 d 07	28/01/2007	30/01/2007	28/01/2007	30/01/2007							
1006	Rebar fixing (wall stem, bay 8 LHS)	1 d 07	30/01/2007	31/01/2007	30/01/2007	31/01/2007							
1007	Concreting (wall stem, bay 8 LHS)	1 d 07	31/01/2007	01/02/2007	31/01/2007	01/02/2007							
1008	Stripping off formwork (wall stem, bay 8 LHS)	1 d 07	02/02/2007	03/02/2007	02/02/2007	03/02/2007							
1009	Formwork (base slab, bay 9)	1 d 07	05/02/2007	06/02/2007	05/02/2007	06/02/2007							
1010	Rebar fixing (base slab, bay 9)	4 d 07	06/02/2007	10/02/2007	06/02/2007	10/02/2007							
1011	Concreting (base slab, bay 9)	3 d 07	24/02/2007	27/02/2007	24/02/2007	27/02/2007							
1012	Rebar fixing (base slab, bay 9)	1 d 07	28/02/2007	29/02/2007	28/02/2007	29/02/2007							
1013	Concreting (wall stem, bay 9)	1 d 07	12/02/2009	13/02/2009	12/02/2009	13/02/2009							
1014	Formwork (wall stem, bay 9)	1 d 07	13/02/2009	14/02/2009	13/02/2009	14/02/2009							
1015	Shuttering formwork (wall stem, bay 9)	1 d 07	14/02/2009	15/02/2009	14/02/2009	15/02/2009							
1016	Rebar fixing (wall stem, bay 9)	1 d 07	20/02/2009	21/02/2009	20/02/2009	21/02/2009							
1017	Concreting (wall stem, bay 9)	1 d 07	21/02/2009	22/02/2009	21/02/2009	22/02/2009							
1018	Formwork (wall stem, bay 9)	1 d 07	28/02/2009	29/02/2009	28/02/2009	29/02/2009							
1019	Shuttering formwork (wall stem, bay 9)	1 d 07	30/02/2009	01/03/2009	30/02/2009	01/03/2009							
1020	Rebar fixing (wall stem, bay 9)	1 d 07	02/03/2009	03/03/2009	02/03/2009	03/03/2009							
1021	Concreting (wall stem, bay 9)	2 d 07	03/03/2009	05/03/2009	03/03/2009	05/03/2009							
1022	Stripping off formwork (wall stem, bay 9)	1 d 07	05/03/2009	06/03/2009	05/03/2009	06/03/2009							
1023	Formwork (wall stem, bay 4 LHS)	1 d 07	09/03/2009	10/03/2009	09/03/2009	10/03/2009							
1024	Rebar fixing (wall stem, bay 4 LHS)	4 d 07	10/03/2009	14/03/2009	10/03/2009	14/03/2009							
1025	Concreting (wall stem, bay 4 LHS)	1 d 07	17/03/2009	18/03/2009	17/03/2009	18/03/2009							
1026	Shuttering formwork (wall stem, bay 4 LHS)	2 d 07	18/03/2009	20/03/2009	18/03/2009	20/03/2009							
1027	Rebar fixing (wall stem, bay 4 LHS)	2 d 07	18/03/2009	20/03/2009	18/03/2009	20/03/2009							
1028	Shuttering formwork (wall stem, bay 4 LHS)	5 d 07	20/03/2009	25/03/2009	20/03/2009	25/03/2009							
1029	Rebar fixing (wall stem, bay 4 LHS)	1 d 07	26/03/2009	27/03/2009	26/03/2009	27/03/2009							
1030	Concreting (wall stem, bay 4 LHS)	5 d 07	27/03/2009	31/03/2009	27/03/2009	31/03/2009							

Drainage Services Department

River Improvement Works in Upper Lam Tsuen River, She Shan River and Upper Tai Po River Revised Master Programme (Rev. 08)

Contract No. DC/2007/06



ID	Task Name	Duration	Early Start	Early Finish	Start	Finish
963	1st layer (ch 55-65 RHS)	3 d	25/3/2009	27/3/2009	25/3/2009	27/3/2009
964	2nd layer (ch 55-65 RHS)	2 d	28/3/2009	29/3/2009	28/3/2009	29/3/2009
965	3rd layer (ch 55-65 RHS)	2 d	1/4/2009	3/4/2009	1/4/2009	3/4/2009
966	4th layer (ch 55-65 RHS)	1 d	2/4/2009	2/4/2009	2/4/2009	2/4/2009
967	5th layer (ch 55-65 RHS)	1 d	2/4/2009	2/4/2009	2/4/2009	2/4/2009
968	5500 toe in front of gabion	1 d	2/4/2009	2/4/2009	2/4/2009	2/4/2009
969	Boulder at river course	7 d	1/11/2011	7/11/2011	1/11/2011	7/11/2011
970	Gabion (ch 65-75 RHS) TG2	851 d	2/3/2008	7/11/2011	2/3/2008	7/11/2011
1001	Trench excavation and replacing grade 200	4 d	5/3/2009	9/3/2009	5/3/2009	9/3/2009
1002	Formation of gabion wall with G200	2 d	12/3/2009	14/3/2009	12/3/2009	14/3/2009
1003	1st layer (ch 65-75 RHS)	2 d	14/3/2009	16/3/2009	14/3/2009	16/3/2009
1004	2nd layer (ch 65-75 RHS)	2 d	17/3/2009	19/3/2009	17/3/2009	19/3/2009
1005	3rd layer (ch 65-75 RHS)	2 d	19/3/2009	21/3/2009	19/3/2009	21/3/2009
1006	4th layer (ch 65-75 RHS)	1 d	21/3/2009	21/3/2009	21/3/2009	21/3/2009
1007	5th layer (ch 65-75 RHS)	2 d	22/3/2009	24/3/2009	22/3/2009	24/3/2009
1008	G500 toe in front of gabion	2 d	24/3/2009	26/3/2009	24/3/2009	26/3/2009
1009	Boulder at river course	7 d	1/11/2011	7/11/2011	1/11/2011	7/11/2011
1010	Gabion (ch 75-80 RHS) TG2	1009 d	1/11/2011	7/11/2011	1/11/2011	7/11/2011
1011	Trench excavation and replacing grade 200	4 d	14/3/2009	18/3/2009	14/3/2009	18/3/2009
1012	Formation of gabion wall with G270	2 d	17/3/2009	19/3/2009	17/3/2009	19/3/2009
1013	1st layer (ch 75-80 RHS)	1 d	20/3/2009	20/3/2009	20/3/2009	20/3/2009
1014	2nd layer (ch 75-80 RHS)	2 d	22/3/2009	24/3/2009	22/3/2009	24/3/2009
1015	3rd layer (ch 75-80 RHS)	2 d	25/3/2009	27/3/2009	25/3/2009	27/3/2009
1016	4th layer (ch 75-80 RHS)	1 d	27/3/2009	27/3/2009	27/3/2009	27/3/2009
1017	5th layer (ch 75-80 RHS)	1 d	27/3/2009	27/3/2009	27/3/2009	27/3/2009
1018	G500 toe in front of gabion	2 d	28/3/2009	30/3/2009	28/3/2009	30/3/2009
1019	Boulder at river course	2 d	19/4/2009	21/4/2009	19/4/2009	21/4/2009
1020	Gabion (ch 80-90 RHS) TG2	1001 d	19/4/2009	7/11/2011	19/4/2009	7/11/2011
1021	Trench excavation and replacing grade 200	3 d	17/3/2009	20/3/2009	17/3/2009	20/3/2009
1022	Formation of gabion wall with G270	2 d	20/3/2009	22/3/2009	20/3/2009	22/3/2009
1023	1st layer (ch 80-90 RHS)	1 d	23/3/2009	23/3/2009	23/3/2009	23/3/2009
1024	2nd layer (ch 80-90 RHS)	1 d	23/3/2009	23/3/2009	23/3/2009	23/3/2009
1025	3rd layer (ch 80-90 RHS)	1 d	23/3/2009	23/3/2009	23/3/2009	23/3/2009
1026	4th layer (ch 80-90 RHS)	1 d	23/3/2009	23/3/2009	23/3/2009	23/3/2009
1027	5th layer (ch 80-90 RHS)	1 d	23/3/2009	23/3/2009	23/3/2009	23/3/2009
1028	G500 toe in front of gabion	2 d	24/3/2009	26/3/2009	24/3/2009	26/3/2009
1029	Boulder at river course	7 d	1/11/2011	7/11/2011	1/11/2011	7/11/2011
1030	Gabion (ch 90-100 RHS) TG2	1009 d	2/3/2009	7/11/2011	2/3/2009	7/11/2011
1031	Trench excavation	1 d	2/3/2009	2/3/2009	2/3/2009	2/3/2009
1032	Fabricating gabion units	2 d	5/2/2009	7/2/2009	5/2/2009	7/2/2009
1033	1st layer (ch 90-100 RHS)	3 d	11/2/2009	14/2/2009	11/2/2009	14/2/2009
1034	2nd layer (ch 90-100 RHS)	1 d	18/2/2009	18/2/2009	18/2/2009	18/2/2009
1035	3rd layer (ch 90-100 RHS)	1 d	23/2/2009	23/2/2009	23/2/2009	23/2/2009
1036	4th layer (ch 90-100 RHS)	1 d	24/2/2009	24/2/2009	24/2/2009	24/2/2009
1037	5th layer (ch 90-100 RHS)	1 d	24/2/2009	24/2/2009	24/2/2009	24/2/2009
1038	G500 toe in front of gabion	2 d	18/4/2009	20/4/2009	18/4/2009	20/4/2009
1039	Boulder at river course	7 d	1/11/2011	7/11/2011	1/11/2011	7/11/2011
1040	Maintenance staircase (ch 100 RHS)	8 d	1/2/2010	9/2/2010	1/2/2010	9/2/2010
1041	Formwork and concrete	6 d	1/2/2010	7/2/2010	1/2/2010	7/2/2010
1042	Gabion (ch 100-110 RHS) TG3	987 d	2/3/2009	7/11/2011	2/3/2009	7/11/2011
1043	Trench excavation and replacing grade 200	2 d	2/3/2009	2/3/2009	2/3/2009	2/3/2009
1044	Formation of gabion wall with G200	3 d	2/3/2009	5/3/2009	2/3/2009	5/3/2009
1045	1st layer (ch 100-110 RHS)	2 d	3/3/2009	5/3/2009	3/3/2009	5/3/2009
1046	2nd layer (ch 100-110 RHS)	1 d	5/3/2009	5/3/2009	5/3/2009	5/3/2009
1047	3rd layer (ch 100-110 RHS)	3 d	8/3/2009	11/3/2009	8/3/2009	11/3/2009
1048	4th layer (ch 100-110 RHS)	1 d	12/3/2009	12/3/2009	12/3/2009	12/3/2009
1049	5th layer (ch 100-110 RHS)	1 d	21/3/2009	21/3/2009	21/3/2009	21/3/2009
1050	G500 toe in front of gabion	2 d	19/4/2009	21/4/2009	19/4/2009	21/4/2009
1051	Boulder at river course	7 d	1/11/2011	7/11/2011	1/11/2011	7/11/2011
1052	Arms P	1029 d	2/3/2009	7/11/2011	2/3/2009	7/11/2011
1053	Hand over	1 d	23/5/2008	23/5/2008	23/5/2008	23/5/2008
1054	Ch 110 - 150	866 d	4/9/2008	17/1/2011	4/9/2008	17/1/2011

Project: Revised M. Prog (Rev.08)
 Date: Aug 2008
 Consultant: AECOM

Task Progress: Task
 Critical Task Progress: Critical Task
 Milestone: Milestone
 Summary: Summary

Rollled Up Progress: Rollled Up Progress
 Rollled Up Critical Task: Rollled Up Critical Task
 Rollled Up Milestone: Rollled Up Milestone

Split: Split
 External Tasks: External Tasks

Chiu Ming Construction & Transportation Co., Ltd

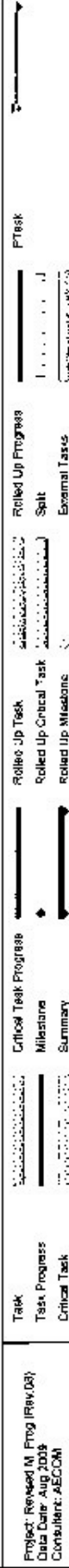
Page 17

Drainage Services Department

Contract No. DC/2007/06

River Improvement Works in Upper Lam Tsuen River, Sha Shin River and Upper Tai Po River Revised Master Programme (Rev. 08)

ID	Task Name	Duration	Early Start	Early Finish	Start	Finish
1365	Concreting (Abutment A, column)	1 d	9/2/2010	9/2/2010	9/2/2010	9/2/2010
1366	Stripping off formwork (Abutment A, column)	3 d	10/2/2010	12/2/2010	10/2/2010	12/2/2010
1367	Bulk excavation for footing (Abutment B)	10 d	2/1/2010	11/1/2010	1/1/2010	11/1/2010
1368	Formwork - Abutment B	1 d	12/1/2010	12/1/2010	12/1/2010	12/1/2010
1369	Formwork and rebar fixing (Abutment B, footing)	5 d	13/1/2010	17/1/2010	13/1/2010	17/1/2010
1370	Concreting (Abutment B, footing)	1 d	18/1/2010	18/1/2010	18/1/2010	18/1/2010
1371	Stripping off formwork (Abutment B, footing)	2 d	19/1/2010	21/1/2010	19/1/2010	21/1/2010
1372	Rebar fixing and shoring formwork (Abutment B, column)	6 d	22/1/2010	28/1/2010	22/1/2010	28/1/2010
1373	Concreting (Abutment B, column)	1 d	27/1/2010	27/1/2010	27/1/2010	27/1/2010
1374	Stripping off formwork (Abutment B, column)	3 d	28/1/2010	30/1/2010	30/1/2010	30/1/2010
1375	Formwork and rebar fixing for decking	20 d	1/1/2010	20/1/2010	1/2/2010	20/1/2010
1376	Concreting (decking)	20 d	1/1/2010	20/1/2010	2/1/2010	21/1/2010
1377	Stripping off formwork (decking)	3 d	10/1/2010	12/1/2010	10/1/2010	12/1/2010
1378	Railing installation (decking)	5 d	13/1/2010	17/1/2010	13/1/2010	17/1/2010
1379	Ch 400-525	487 d	8/11/2009	20/8/2011	8/11/2009	20/8/2011
1380	Retaining Wall (ch 400-420 LHS) TR1 (replaced by AD1)	87 d	1/11/2010	8/1/2011	1/11/2010	8/1/2011
1381	Bulk excavation	9 d	1/11/2010	10/11/2010	1/11/2010	10/11/2010
1382	Formwork	5 d	1/11/2010	6/11/2010	1/11/2010	6/11/2010
1383	Formwork and rebar fixing (base slab)	12 d	1/11/2010	13/11/2010	1/11/2010	13/11/2010
1384	Concreting (base slab)	3 d	18/11/2010	21/11/2010	18/11/2010	21/11/2010
1385	Stripping off formwork (wall stem)	2 d	21/11/2010	23/11/2010	21/11/2010	23/11/2010
1386	Formwork and rebar fixing (wall stem)	10 d	23/11/2010	3/12/2010	23/11/2010	3/12/2010
1387	Concreting (wall stem)	2 d	2/12/2010	4/12/2010	2/12/2010	4/12/2010
1388	Stripping off formwork (wall stem)	3 d	4/12/2010	7/12/2010	4/12/2010	7/12/2010
1389	Retaining Wall (ch 400-430 RHS) TR1 (replaced by AD1)	72 d	1/11/2010	1/11/2011	1/11/2010	1/11/2011
1390	Bulk excavation	35 d	1/11/2010	3/12/2010	1/11/2010	3/12/2010
1391	Formwork	5 d	6/12/2010	10/12/2010	6/12/2010	10/12/2010
1392	Formwork and rebar fixing (base slab)	12 d	11/12/2010	22/12/2010	11/12/2010	22/12/2010
1393	Concreting (base slab)	3 d	23/12/2010	26/12/2010	23/12/2010	26/12/2010
1394	Stripping off formwork (wall stem)	2 d	28/12/2010	30/12/2010	28/12/2010	30/12/2010
1395	Formwork and rebar fixing (wall stem)	10 d	29/12/2010	8/1/2011	29/12/2010	8/1/2011
1396	Concreting (wall stem)	2 d	7/1/2011	8/1/2011	7/1/2011	8/1/2011
1397	Stripping off formwork (wall stem)	3 d	8/1/2011	11/1/2011	8/1/2011	11/1/2011
1398	Maintenance Staircase (ch 420 LHS)	6 d	12/2010	18/2/2011	12/2010	18/2/2011
1399	Formwork and concreting	65 d	21/2/2011	4/2/2011	21/2/2011	4/2/2011
1400	Trench excavation and replacing grade 200	50 d	21/2/2011	20/3/2011	21/2/2011	20/3/2011
1401	Formation of 960mm well with G200	2 d	21/2/2011	21/2/2011	21/2/2011	21/2/2011
1402	1st layer - 5th layer (ch 420-430 LHS)	10 d	23/2/2011	3/3/2011	23/2/2011	3/3/2011
1403	G500 toe in front of pylon	3 d	2/3/2011	4/3/2011	2/3/2011	4/3/2011
1404	Retaining Wall (ch 430-450 RHS) TR2 (replaced by AD1)	67 d	15/1/2010	20/1/2011	15/1/2010	20/1/2011
1405	Bulk excavation	30 d	15/1/2010	14/2/2010	15/1/2010	14/2/2010
1406	Formwork	12 d	15/1/2010	26/1/2010	15/1/2010	26/1/2010
1407	Formwork and rebar fixing (base slab)	2 d	26/1/2010	28/1/2010	26/1/2010	28/1/2010
1408	Concreting (base slab)	3 d	29/1/2010	31/1/2010	29/1/2010	31/1/2010
1409	Stripping off formwork (wall stem)	10 d	4/1/2011	14/1/2011	4/1/2011	14/1/2011
1410	Formwork and rebar fixing (wall stem)	13 d	8/1/2011	21/1/2011	8/1/2011	21/1/2011
1411	Concreting (wall stem)	2 d	19/1/2011	20/1/2011	19/1/2011	20/1/2011
1412	Stripping off formwork (wall stem)	3 d	18/1/2011	20/1/2011	18/1/2011	20/1/2011
1413	Box Culvert TB01 (ch 480)	38 d	1/1/2010	8/1/2011	1/1/2010	8/1/2011
1414	Bulk excavation	10 d	1/1/2010	11/1/2010	1/1/2010	11/1/2010
1415	Formation of box culvert	3 d	1/1/2010	4/1/2010	1/1/2010	4/1/2010
1416	Formwork and rebar fixing (base slab)	5 d	4/1/2010	9/1/2010	4/1/2010	9/1/2010
1417	Concreting (base slab)	5 d	4/1/2010	9/1/2010	4/1/2010	9/1/2010
1418	Stripping off formwork (base slab)	2 d	14/1/2010	15/1/2010	14/1/2010	15/1/2010
1419	Formwork and rebar fixing (wall stem)	2 d	21/1/2010	23/1/2010	21/1/2010	23/1/2010
1420	Concreting (wall stem and foot slab)	12 d	23/1/2010	4/2/2010	23/1/2010	4/2/2010
1421	Stripping off formwork	2 d	23/1/2010	25/1/2010	23/1/2010	25/1/2010
1422	Retaining Wall (ch 450-480 LHS) TR2	30 d	1/1/2011	30/1/2011	1/1/2011	30/1/2011
1423	Bulk excavation	5 d	3/1/2011	8/1/2011	3/1/2011	8/1/2011
1424	Formwork	12 d	8/1/2011	19/1/2011	8/1/2011	19/1/2011
1425	Formwork and rebar fixing (base slab)					
1426						



Project: Revised M. Prog (Rev.03)
 Date: Aug 2008
 Consultant: AECOM

Task Progress
 Critical Task Progress
 Milestone
 Summary

Roll Up Progress
 Roll Up Critical Task
 Roll Up Milestone

Final Task
 External Task

Drainage Services Department

Contract No. DC/2007/06 River Improvement Works in Upper Lam Tsuen River, She Shan River and Upper Tai Po River Revised Master Programme (Rev. 08)

ID	Task Name	Duration	Early Start	Early Finish	Slack	Finish	2007	2008	2009	2010	2011	2012	2013	
1676	Road Remanentment (Stage 2)	18 d	16/11/2009	31/12/2009	16/11/2009	31/12/2009								
1677	Road Paving (Remaind (Stage 1))	18 d	4/11/2009	21/12/2009	4/11/2009	21/12/2009								
1678	Completion of Work at Section 4	0 d	2/11/2009	2/11/2009	2/11/2009	2/11/2009								
1680	CULP spare duct installation	21 d	22/12/2008	11/1/2010	22/12/2008	11/1/2010								
1681	1681	180 d	28/9/2008	22/2/2009	28/9/2008	22/2/2009								
1682	1682	125 d	30/4/2009	18/2/2010	30/4/2009	18/2/2010								
1683	1683	31 d	7/5/2009	6/6/2009	7/5/2009	6/6/2009								
1684	1684	105 d	9/7/2009	2/11/2009	9/7/2009	2/11/2009								
1685	1685	1360 d	23/9/2007	27/2/2013	23/9/2007	27/2/2013								
1686	1686	1695 d	28/9/2007	18/4/2012	28/9/2007	18/4/2012								
1687	1687	120 d	28/9/2007	28/9/2007	28/9/2007	28/9/2007								
1688	1688	0 d	9/2/2008	9/2/2008	9/2/2008	9/2/2008								
1689	1689	1540 d	31/1/2008	18/4/2012	31/1/2008	18/4/2012								
1690	1690	365 d	20/4/2011	18/4/2012	20/4/2011	18/4/2012								
1691	1691	400 d	29/5/2007	1/11/2008	29/5/2007	1/11/2008								
1692	1692	1678 d	2/11/2008	27/2/2013	2/11/2008	27/2/2013								
1693	1693	1579 d	2/11/2008	27/2/2013	2/11/2008	27/2/2013								
1694	1694	0 d	27/2/2013	27/2/2013	27/2/2013	27/2/2013								
1695	1695	1830 d	28/9/2007	8/1/2013	28/9/2007	8/1/2013								
1701	1701	1663 d	28/9/2007	18/4/2012	28/9/2007	18/4/2012								
1702	1702	120 d	28/9/2007	28/9/2007	28/9/2007	28/9/2007								
1703	1703	0 d	28/9/2007	28/9/2007	28/9/2007	28/9/2007								
1704	1704	0 d	9/2/2008	9/2/2008	9/2/2008	9/2/2008								
1705	1705	1181 d	14/2/2009	19/4/2012	14/2/2009	19/4/2012								
1706	1706	365 d	2/11/2008	1/11/2008	2/11/2008	1/11/2008								
1707	1707	400 d	28/9/2007	1/11/2008	28/9/2007	1/11/2008								
1708	1708	1528 d	2/11/2008	8/1/2013	2/11/2008	8/1/2013								
1709	1709	1528 d	2/11/2008	8/1/2013	2/11/2008	8/1/2013								
1710	1710	0 d	8/1/2013	8/1/2013	8/1/2013	8/1/2013								
1711	1711	0 d	8/1/2013	8/1/2013	8/1/2013	8/1/2013								
1712	1712	1668 d	28/9/2007	7/11/2012	28/9/2007	7/11/2012								
1713	1713	1665 d	28/9/2007	18/4/2012	28/9/2007	18/4/2012								
1714	1714	120 d	28/9/2007	28/9/2007	28/9/2007	28/9/2007								
1715	1715	0 d	28/9/2007	28/9/2007	28/9/2007	28/9/2007								
1716	1716	0 d	9/2/2008	9/2/2008	9/2/2008	9/2/2008								
1717	1717	1176 d	30/1/2009	18/4/2012	30/1/2009	18/4/2012								
1718	1718	365 d	2/11/2008	1/11/2008	2/11/2008	1/11/2008								
1719	1719	400 d	28/9/2007	1/11/2008	28/9/2007	1/11/2008								
1720	1720	1467 d	2/11/2008	7/11/2012	2/11/2008	7/11/2012								
1721	1721	1467 d	2/11/2008	7/11/2012	2/11/2008	7/11/2012								
1722	1722	0 d	7/11/2012	7/11/2012	7/11/2012	7/11/2012								
1723	1723	1900 d	28/9/2007	18/4/2011	28/9/2007	18/4/2011								
1724	1724	0 d	28/9/2007	28/9/2007	28/9/2007	28/9/2007								
1725	1725	1300 d	28/9/2007	18/4/2011	28/9/2007	18/4/2011								
1726	1726	0 d	18/4/2011	18/4/2011	18/4/2011	18/4/2011								
1727	1727	0 d	18/4/2011	18/4/2011	18/4/2011	18/4/2011								

Task Progress: Revised M. Prog (Rev.08)
Date: Aug. 2009
Consultant: AECOM

Task Progress Legend:
 - Critical Task Progress: Solid bar
 - Task Progress: Dotted bar
 - Critical Task: Solid bar with arrow
 - Task: Dotted bar with arrow
 - Milestone: Diamond
 - Summary: Double bar

Legend:
 - Rolled Up Progress: Solid bar
 - Rolled Up Critical Task: Dotted bar
 - Rolled Up Milestone: Diamond
 - Soft: Dashed bar
 - External Task: Solid bar with arrow

Appendix J: Complaint Log and Investigation Report

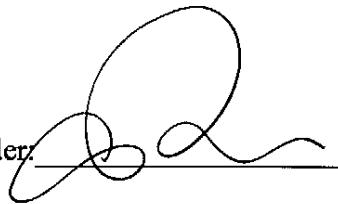
COMPLAINT / CONCERN LOG

Ref: DC0706-CL-100206 (ICC)

Log Ref	Event Date/Location	Complainant/ Date of Contact	Details of Complaint	Investigation/Mitigation Action	File Closed
<p>Our REF: DC0706-CL-100206(ICC)</p> <p>ICC Case Ref. No.: 1-219109670</p>	<p>6th February 2010, A complaint was recorded for noise pollution due to late construction works in the project site at Upper Tai Po River, nearby Sheung Wun Yiu</p>	<p>A Complaint was referred by DSD hotline 1823 at 7:40p.m. on 6th February 2010</p>	<p>A complaint was recorded regarding late construction activities in the project site at Upper Tai Po River (UTPR).</p>	<ol style="list-style-type: none"> 1. A complaint on 6th February 2010 was recorded regarding noise concern generated by river improvement works at UTPR. Environmental Team (ET) was informed by email on 10 March 2010 by the Engineer Representative with attachment of the letter issued by the Contractor. 2. From the report of Contractor, reason of late works was mainly due to the major breakdown of concrete truck and immediate follow up action of towing off. 3. ET reviewed the routine noise monitoring results recorded in February 2010 and no exceedance was found during measurement. 4. As a follow up investigation, ET conducted a site visit on 12th March 2010 and found that concreting works at the concerned spot (i.e.: Footbridge of the boulder trap at approximately ch.0 of the project site) was finished. 5. According to the letter of response issued by the Contractor. ET agree with the point that construction activities should be well managed to provide buffer zone before site closure and therefore over-time work due to accident can be minimized. 6. ET has reminded the contractor to be cautious on noise emission due to their site activities and 	<p>Yes</p>

				<p>therefore impact to the vicinity of sensitive receivers can be minimized.</p> <p>7. ET has reminded the contractor to well manage their working schedule. Should there are any over-time construction activity control noise permit should be applied from EPD.</p> <p>8. Noisy equipment and activities shall be sited by the contractor as far from close proximity sensitive receivers as is practical.</p> <p>9. Noisy activities should be scheduled to minimize exposure of nearby sensitive receivers to high levels of construction noise (E.g.: noisy activities can be scheduled for midday).</p>	
--	--	--	--	--	--

Filed by Environmental Team Leader



Date: 16th March 2010

DSD Project – River Improvement Works in Upper Lam Tsuen River, She Shan River and Upper Tai Po River

Report for Complaint/ Concern

Our Ref.: DC0706-CL-100206(ICC)

ICC Case Ref. No.: 1-219109670

Sheet: 1 of 2

RECIPIENT

Name: Chiu Hing Construction & Transportation Co., Ltd,

Details: Complaint was referred by DSD hotline 1823 that a resident complained against late construction activities and noise pollution in the project site at Upper Tai Po River (UTPR), nearby Sheung Wun Yiu.

Received Date: 6th February 2010

Received Time: 19:40

COMPLAINANT / Concern

Name: N/A

Tel: N/A

Address: N/A

COMPLAINT

Noise Air quality/Dust Water Odour Environment Traffic/Pedestrian
 Safety Others

Event Date and Time: 6th February 2010

Location: A complaint was recorded for noise pollution due to late construction works in the project site at Upper Tai Po River, nearby Sheung Wun Yiu.

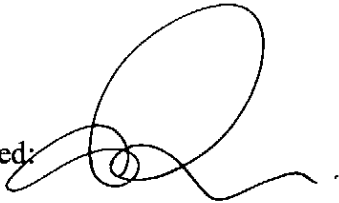
INVESTIGATION RESULTS & MITIGATION MEASURES

1. A complaint on 6th February 2010 was recorded regarding noise concern generated by river improvement works at UTPR. Environmental Team (ET) was informed by email on 10 March 2010 by the Engineer representative with attachment of the letter issued by the Contractor.
2. From the Contractor's report, reasons of late works were mainly due to the major breakdown of concrete truck and immediate follow up action of towing off.
3. ET reviewed the routine noise monitoring results recorded in February 2010 and no exceedance was found during measurement.
4. As a follow up investigation, ET conducted a site visit on 12th March 2010 and found that concreting works at the concerned spot (i.e.: Footbridge of the boulder trap at approximately ch.0 of the project site) was finished.
5. ET has reminded the contractor to be cautious on noise emission due to their site activities and therefore impact to the vicinity of sensitive receivers can be minimized.

RECOMMENDATIONS

1. According to the letter of response issued by the Contractor. ET agree with the point that construction activities should be well managed to provide buffer zone before site closure and therefore over-time work due to accident can be minimized.
2. Contractor should well manage their working schedule. Should there is any over-time construction activity control noise permit should be applied from EPD.
3. Noisy equipment and activities shall be sited by the contractor as far from close proximity sensitive receivers as is practical.
4. Noisy activities should be scheduled to minimize exposure of nearby sensitive receivers to high levels of construction noise (e.g.: noisy activities can be scheduled for midday).

Signed:

A handwritten signature in black ink, consisting of several loops and a long horizontal stroke at the end.

Date: 16-03-2010

Attachement



昭興建築運輸有限公司

Chiu Hing Construction & Transportation Co. Ltd.

Your ref: (DC/2007/06)M05/410(0079)

Our Ref.: DC0706/M1.2/CL/3317

17 February 2010

AECOM Asia Co. Ltd.

8/F., Grand Central Plaza,
138 Shatin Rural Committee Road,
Shatin, N. T., Hong Kong.

Attn.: Mr. K.Y. Chan (SRE)

Dear Sir,

Contract No. DC/2007/06

**River Improvement Works in Upper Lam Tsuen River,
She Shan River and Upper Tai Po River**

ICC Complaint Case No. 1-219109670 – Late Works in Upper Tai Po River on 6 February 2010

I7233

Contract No. DC/2007/06		
Date 22 FEB 2010		
File M05/410(0079)		
	Action	Info
SRE		
RE1		
RE2		
RE3		
ARE		
ARE		
IOW		
AIOW		
SO(O)1,2		
SO(E)1,2		
TDC		
LRO		
CO.ENG		
ACO		
Revised		

We refer to your letter dated 8 February 2010 regarding the above subject.

We have conducted an investigation regarding the complaint, our general foreman reported that we had commenced concreting of the mass concrete at inlet of boulder trap around 5:30 pm and expected to complete the concreting before 7:00 pm on the same day. Unfortunately, there was one concrete truck broken down and required towing off the spot for the concreting operation to be continued and it delayed a little time.

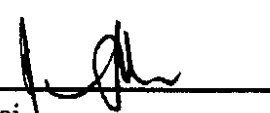
The concreting was completed around 7:10 pm due to the above incident. There was a Police investigation at 8:30 pm on site corresponding to a noise complaint which they had received earlier. No conclusion was drawn by the Police and had advised our site staff to observe the working time on site.

We have instructed immediately to our front line staff that any concreting operation should plan to be completed before 6:00 pm to provide buffer. We trust that similar incident would not be re-happened in future.

Thank you for your kind attention.

Yours faithfully,

For and on behalf of
Chiu Hing Construction & Transportation Co. Ltd.


Daniel Tai
Site Agent

c.c. AECOM – Attn.: Mr. Robert Chan



Appendix K: Ecological Impact Monitoring Report

Contract No. DC/2007/06
River Improvement Works in Upper Lam Tsuen River, She Shan
River and Upper Tai Po River

Ecological Impact Monitoring Report (No. 3)
Upper Tai Po River

January 2010



River Improvement Works in Upper Lam Tsuen River, She Shan River and Upper Tai Po River

Contract No. DC/2007/06

Ecological Impact Monitoring Report (No. 3) Upper Tai Po River

Ecological Impact Monitoring Report (No. 3)

Table of Contents	Page
1 Introduction	1
2 Summary Of Major Points	1
3 Summary Of The Construction Activities For The Month	2
4 Monitoring Methodology	4
5 Monitoring Results	4
6 Audit/review of monitoring result	7
7 Remedial measures adopted to restore the adverse condition	7
8 Record of complaints and remedial measures	7
9 Forecast of works programme and monitoring requirements	7
10 Comments And Conclusions	8
11 References	8

FIGURES

Figure 1-1 to 1-3. Transect line and sampling location within study area

TABLE

Table 5-1. Flora species recorded at the transect along the Upper Tai Po River.

Table 5-2. Flora species recorded from belt transect survey at the Upper Tai Po River

Table 5-3 Avifauna recorded along survey transects and at two selected point count locations at Upper Tai Po River.

Table 5-4. Odonate species recorded at the Upper Tai Po River

Table 5-5 Aquatic Macro invertebrates recorded at Upper Tai Po River.

Table 5-6 Fish species recorded at Upper Tai Po River.

Table 5-7 Abiotic data for Upper Tai Po River.

PHOTOS

1 Introduction

- 1.1 The project of Drainage Improvement Works in Upper Tai Po River requires to carry out an ecological impact monitoring programme when the project commenced. The collected data was used to assess ecological impact during construction period.
- 1.2 Scope of ecological impact monitoring was detailed in the Particular Specification (PS) and EM & A Manual of the project. In brief, the survey need to collect data on abiotic such as water quality, substratum characteristics, water flow, and biotic data of flora and fauna.
- 1.3 China-Hong Kong Ecology Consultants was committed by Chiu Hing Construction and Transportation Co. Limited to undertake the ecological baseline survey in Oct 2007 and impact monitoring tasks for the project starting from January 2009.
- 1.4 This is the number 3 ecological impact monitoring report for the project conducted in January 2010. It contents the following subsections:
 - Summary of major points
 - Summary of the construction activities for the month
 - Monitoring Methods and Results
 - Audit/review of monitoring results
 - Remedial measures adopted to restore the adverse condition
 - Record of complaints and remedial measures
 - Forecast of works programme and monitoring requirements; and
 - Comments and conclusions

2 Summary of Major Points

- Field ecological monitoring was undertaken on 27th January 2010;
- Stream habitat at most sections of Upper Tai Po River (Photo 1) was changed due to drainage works; and
- During the impact monitoring survey, the man power deployed was as same as pervious monitoring works (i.e. 3 field workers from China-Hong Kong Ecology Consultant and 1 environmental assistant from Chiu Hing Construction & Transportation Co. Ltd). Thus, reduced population of the stream fauna was unlikely due to the man power.
- The number of target stream fauna (i.e., fish, *Parazacco spilurus*) recorded in January 2010 was lower than those recorded during baseline monitoring (before fish capture/relocation took place). Low fish population of *Parazacco spilurus* was partially contributed to seasonality of the stream habitat and previous capture/relocation surveys. But main reason was due to habitat loss caused by drainage works. The other target species including fish (*Pseudobagrus trilineatus*) and Hong Kong Newt (*Paramesotriton hongkongensis*) were not found within works area during both baseline and impact monitoring.

3 Summary of The Construction Activities

- 3.1 Major construction activities carried out by the contractor during this reporting period include:

- 1) Re-profiling and realignment of the channel.
 - 2) Inclusion gabions and retaining wall for bank protection whilst providing a natural channel bed
 - 3) Re-provisioning of footbridges and footpaths along the channel.
- 3.2 Major construction activities carried out by the contractor anticipated for the coming month include:
- (1) Haul access formation
 - (2) Provision of drain-off pipes in the boulder trap
 - (3) Construction of footbridge and retaining wall
 - (4) Construction of gabion wall at upstream

4 Monitoring Methodology

4.1 Avifauna

Avifauna survey was conducted during the impact monitoring period. Special attention was given to those stream channel area where birds used as feeding and foraging habitat. In general, avifauna survey was taken in the morning or late afternoon when birds are more active (feeding and foraging). Numerical abundance was recorded at fixed count points within a fixed radius, e.g. 30-50m according to landscape feature and visual penetration extent. Duration of the point count of birds was standardised for 10 minutes at each location in order to collect comparable data. Transect count will also be used for the avifauna survey aimed to collect qualitative data. Binoculars and digital camera was the main instrument to be used. Nomenclature and protection status of the species followed those documented in the AFCD website (www.hkbiddiversity.net) and Carey et al (2001). The point count was conducted at two locations with one located at the lower portion of the river channel and the other located at the upper section of the river.

4.2 Fish and Newt Population

Fish community including target species (Three-lined Chinese Stream Catfish and Predaceous Chub) and Hong Kong Newt population at the specified river channel was monitored by live trapping, hand nets and direct observation methods. Active searching at night (photo 2) for *Pseudobagrus trilineatus* has also been carried out. Sampling was conducted at two proposed sampling locations, i.e. upper and lower sections of the river and covered major type of stream habitats, e.g. stream pool and riffle. The number of the captured or observed fish was estimated and recorded. Nomenclature and protection status of the species followed those documented in the AFCD website (www.hkbiddiversity.net) and Virginia et al (2004).

4.3 Aquatic Macro-invertebrates

Macro-invertebrates in the likely affected streams was surveyed. Two sampling sites within the affected stream sites was designed to collect necessary macroinvertebrate fauna for ecological impact monitoring information. Three replicates was taken at each sampling point and pool together for further sample process. Kick sampling (photo 3) and hand netting was the main survey methodologies for stream organisms. Dissection microscope, digital camera was used to aid identification and enumeration. Numerical abundance, species identity was recorded. Nomenclature and protection status of the species will follow those documented in the AFCD website (www.hkbiddiversity.net) and other literatures such as Dudgeon (1999)

4.4 Adult Odonate Survey

Adult Odonate survey was conducted within the monitoring area. Transect count was used for the survey. Binoculars, digital camera and hand net was utilized to aid identification. In general, all captured fauna was released immediately after on-site identification or taking photo. Numerical abundance, species identity and other notable behaviour was recorded. Nomenclature and protection status of the species followed those documented in the AFCD website (www.hkbiodiversity.net) and Keith (2003). Adult Odonate survey was conducted along line transects in parallel with river channel within works area where access was permitted

4.5 Riparian Vegetation

Riparian vegetation including aquatic and emergent was sampled by line a belt transects along the affected stream channel and riparian habitat. Species, relative abundance, average heights were recorded. Vegetation survey was conducted at two selected belt transects with one located at the lower portion of the river channel and the other at the upper section of the river respectively. The belt transects was run across the river channel and is aimed to collect quantitative data of vegetation. Similarly, qualitative data of plants was collected by recording plant species along line transect. Nomenclature and protection status of the species followed those documented in the AFCD website (www.hkbiodiversity.net) and Hong Kong Herbarium (2004).

4.6 Abiotic Data Collection

Water quality monitoring

Dissolved oxygen level, pH value, conductivity, salinity, BOD and nutrient level (nitrate and ammonium) was sampled and analyzed by conventional methods in situ or send to laboratory.

Sediment Characteristics

Sediment/substrate characteristics was recorded of sediment cover in percentage e.g. mud, sand, rock, boulder and cemented bottom in the stream bed at sampling sites.

Water flow

Water flow rates in river channel were measured by record of travel time of a floating material (e.g. floating ball) in a measured distance.

5 Monitoring Results

5.1 Vegetation

Vegetation growing along the affected stream was surveyed at Upper Tai Po River. About 39 flora species was recorded within the survey transects along the affected stream courses. Most recorded floras were common wetland species. Most vegetation along the stream section was cleared in order to construct temporal access road and new embankment.

Generally, the height of the dominated riparian grass and herb species were in a range from 0.2m to 7m. No rare or protected flora species was recorded. Results of vegetation survey and belt transect survey were given in **Table 5-1** and **Table 5-2**. Figure 1-1 to 1-3 shows the transect line for the flora surveys.

5.2 Fauna

5.2.1 Avifauna

Avifauna survey was undertaken along survey transects and at two selected point count locations. In total, 18 species of birds were recorded during bird surveys. Transect and Point Count locations were shown on **Figure 1-1 to 1-3**. Result of bird survey was presented in the table 5-3

5.2.2 Adult Odonate Survey

Odonate survey was performed and species recorded at Upper Tai Po River were listed in **Table 5-4**. In total, 1 species of dragonfly species were recorded during the surveys in current cold and dry season. The recorded species was common and abundant in Hong Kong (Keith, 2003). Sampling location was shown on **Figure 1-1 to 1-3**.

5.2.3 Hong Kong Newt

Survey of Hong Kong Newt was conducted at Upper Tai Po River. No Hong Kong Newt species was recorded.

5.2.4 Aquatic Macro-invertebrates

Upper Tai Po River was flowing with constant water during survey. Aquatic-net and kick sampling was performed at the stream.

The stream benthos fauna collected was mainly comprised of insects, mollusks and as well as fish. The mollusk fauna of the stream was dominated by snail species of *Sinotaia quadrata* at the lower river channel. Most area of the affected upper stream section was covered with geo-textile sheet. No benthos was collected at the upper stream section. Apparently, stream benthic fauna was temporally de-faunated as a result of engineering works. Details of recorded of stream benthic fauna refers to **Table 5-5**. Sampling location was shown on **Figure 1-1 to 1-3**.

5.2.5 Stream Fish Fauna

Fish surveys were performed at Upper Tai Po River during surveys. In total, 9 species freshwater fish were recorded. Exotic fish such as *Poecilia reticulata* was commonly recorded in lower river section. The pelagic fish, *Parazacco spilurus* which have conservation interest, was restricted in the upper section of the surveyed river outside the works boundary where the water was unpolluted. Small number of *Parazacco spilurus* were recorded within the works area at upper stream section as a result of capture survey and engineering works. Generally, most of the recorded fish fauna are common species in Hong Kong. *Parazacco spilurus* is a common freshwater fish species in Hong Kong but it was listed as vulnerable in China Red Data Book (hkbiodiversity website) and some of them were captures and released to an undisturbed upper stream habitat before construction works on 28th October 2009. The locally rare fish species of Three-lined Chinese Stream Catfish was not recorded at affected stream section during day and night time surveys during

both baseline and impact monitoring periods Details of recorded of fish fauna refers to **Table 5-6**. Sampling location was shown on **Figure 1-1 to 1-3**.

5.3 Abiotic data

Data on water quality and major stream hydrological feature (water flow and substratum) of the stream were collected and given in the Table 5.7.

Generally, the water quality was found polluted at lower stream section mainly due to the domestic sewage discharge from villages. Concentration of nitrate and Ammonia were high (0.71 mg/L and 0.20 mg/L respectively) in lower stream section as shown in Table 4-7. DO was generally higher at upper stream section. Salinity was low, and it was indicated that the stream was not affected by tidal effect.

The stream substratum was comprised of over 80% stones or rocks at most of the stream sections with moderate water flow (up to 0.2m/second at pool and 0.6m/second at riffle). Water margin of the lower stream sections was grown with various plants. This type of stream provides preferred habitats for stream fauna including fish and invertebrates. The stream bank along the stream was covered with geo-textile sheet to prevent the site run off as part of erosion control measures undertaken. Most vegetation was cleared and it would be planted or recolonised in late stage of the construction period.

6 Audit/review of monitoring results

Total population was decreased for the concerned Fish (*Parazacco spilurus*) population in the current monitoring period than those recorded in baseline ecology report. Reduced fish population including *Parazacco spilurus* was mainly due to the construction work of new river channel. Most of river channel was under construction during reporting period. The seasonality and the removal of fish from the previous capture/relocation exercise on 28th October 2009 were also partially causing the reduction fish population. Therefore, the total population for the concerned Fish and Hong Kong Newt was decreased.

7 Remedial measures adopted to restore the adverse condition

None

8 Record of complaints and remedial measures

There were one complaints about noise generated at construction site for the Upper Tai Po river. The complaints were followed up and settled by contractor according to mitigation measures stated in EM&A Manual.

9 Forecast of works programme and monitoring requirements

Major Construction activities carried out by the contractor anticipated for the coming month include:

- (1) Haul road formation
- (2) Installation of noise barrier
- (3) Construction of footbridge and Retaining Walls
- (4) Construction of gabion wall at upstream

10 Comments and Conclusions

Ecological impact monitoring was carried out during January 2010 and relevant biotic and abiotic data was collected according to the project specification and the EM & A Manual. One of the three target freshwater fauna species, i.e., fish *Parazacco spilurus*, was recorded at upper stream section outside the works boundary. The reduced population of the fish was partially contributed to seasonality of the stream habitat and previous capture/relocation surveys conducted on 28th October 2009. But the main reason was due to habitat loss caused by engineering work of construction of river channel. Most of river channel was under construction during reporting period. The fish was commonly seen in more upper stream courses which would be the source for late re-colonization of the newly built river channel. The locally rare fish species of Three-lined Chinese Stream Catfish and the Hong Kong Newt were not recorded at the affected stream section during day and night time surveys conducted for both baseline and impact monitoring.

Most aquatic and riparian vegetation along the stream section was cleared due to construction works. Plant plantation along newly built up river banks would be undertaken at late stage of the project.

The water quality in the surveyed stream was generally fair at upper stream section with DO (mg/L) of 9.4, pH 8.2, Nitrate (mg/L) 0.012. Water quality was become poor at lower stream section due to domestic waste discharged from villages. No significant change in water quality was detected except the increased sediments in water after comparing the results with baseline monitoring data.

11 REFERENCES

Carey, G.J., Chalmers, M.L., Diskin, D.A., Kennerley, P.R., Leader, P.J., Leven, M.R., Lewthwaite, R.W., Melville, D.S., Turnbull, M. and Yung, L.. (2001) *The Avifauna of Hong Kong*. Hong Kong Bird Watching Society.

Dudgeon, D. and Corlett, R. (1994). *Hills and Streams - An Ecology of Hong Kong*. Hong Kong University Press, Hong Kong.

Hong Kong Herbarium (2004), *Check List of Hong Kong Plants*, HKSAR

Keith D.P. Wilson (2003), *Field Guide to the Dragonflies of Hong Kong*, HKSAR.

Virginia L.F.LEE, Samuel K.S.Lam, Franco K.Y.NG, Tony K.T.CHAN and Maria L.C.YOUNG (2004), *Field Guide to the Freshwater Fish of Hong Kong*, HKSAR.

Hong Kong Biodiversity Website :

<http://www.afcd.gov.hk/english/conservation/hkbiodiversity/hkbiodiversity.html>

PHOTOS

River Improvement Works in Upper Lam Tsuen River, She Shan River and Upper Tai Po River
Ecological Impact Monitoring Report



Photo 1: General view of the works area



Photo 2: Night survey



Photo 3: Stream benthos sampling



Photo 4: Releasing captured fish at upper stream outside the construction area.

TABLE

Ecological Impact Monitoring Programme

Table 5-1. Flora species recorded at the transect along the Upper Tai Po stream including riparian habitat.

Family	Species name	Species name in Chinese	Oct-07	Jan-09	Jul-09	Jan-10
Euphorbiaceae	<i>Macaranga tanarius</i>	血桐	+	+	+	+
Musaceae	<i>Musa paradisiaca</i>	大蕉	+	+	+	+
Commelinaceae	<i>Commelina communis</i>	鴨跖草	+	+	+	+
Fabaceae	<i>Pueraria lobata</i>	野葛	+	+	+	+
Gramineae	<i>Panicum repens</i>	枯骨草	+	+	+	+
Asteraceae	<i>Bidens alba</i>	白花鬼針草	+	+	+	+
Araceae	<i>Alocasia odora</i>	海芋	+	+	+	+
Araceae	<i>Colocasia esculenta</i>	芋	+	+	+	+
Moraceae	<i>Ficus hispida</i>	對葉榕	+	+	+	+
Ulmaceae	<i>Celtis sinensis</i>	朴樹	+	+	+	+
Athyriaceae	<i>Callipteris esculenta</i>	菜蕨	+	+	+	+
Verbenaceae	<i>Lantana camara</i>	馬纓丹	+	+	+	+
Sapindaceae	<i>Dimocarpus longan</i>	龍眼	+	+	+	+
Solanaceae	<i>Solanum torvum</i>	水茄	+	+	+	+
Equisetaceae	<i>Equisetum debile</i>	筆管草	+	+	+	+
Thelypteridaceae	<i>Cyclosorus parasiticus</i>	華南毛蕨	+	+	+	+
Bombacaceae	<i>Bombax ceiba</i>	木棉	+	+	+	+
Lauraceae	<i>Cinnamomum camphora</i>	樟樹	+	+	+	+
Myrtaceae	<i>Psidium guajava</i>	番石榴	+	+	+	+
Caprifoliaceae	<i>Viburnum odoratissimum</i>	珊瑚樹	+	+	+	+
Sapindaceae	<i>Litchi chinensis</i>	荔枝	+	+	+	+
Rutaceae	<i>Clausena lansium</i>	黃皮	+	+	+	+
Lauraceae	<i>Litsea glutinosa</i>	潺槁樹	+	+	+	+
Euphorbiaceae	<i>Glochidion zeylanicum</i>	香港算盤子	+	+	+	+
Asteraceae	<i>Ageratum conyzoides</i>	勝紅薊	+	+	+	+
Urticaceae	<i>Boehmeria nivea</i>	苧麻	+	+	+	+
Convolvulaceae	<i>Ipomoea aquatica</i>	通菜	+	+	+	+
Gramineae	<i>Microstegium ciliatum</i>	剛秀竹	++	+	+	+
Asteraceae	<i>Mikania micrantha</i>	薇甘菊	++	+	+	+
Gramineae	<i>Pennisetum purpureum</i>	象草	+	+	+	+
Convolvulaceae	<i>Ipomoea cairica</i>	五爪金龍	+	+	+	+
Asteraceae	<i>Synedrella nodiflora</i>	金腰箭	+	+	+	+
Gramineae	<i>Coix lacryma-jobi</i>	薏苡	+	+	+	+
Amaranthaceae	<i>Alternanthera philoxeroides</i>	空心蓮子草	+	+	+	+
Asteraceae	<i>Wedelia chinensis</i>	蟛蜞菊	+	+	+	+
Polygonaceae	<i>Polygonum barbatum</i>	毛蓼	+	+	+	+
Myrtaceae	<i>Cleistocalyx operculatus</i>	水翁	+	+	+	+
Gramineae	<i>Phragmites karka</i>	卡開蘆	+	+	+	+
Solanaceae	<i>Solanum nigrum</i>	龍葵				+

Note:

+, occurred; ++, common; +++, abundant

Table 5-2. Flora species recorded from belt transect survey at the Upper Tai Po stream
(T1- Upper stream sampling site and T2 - Lower stream sampling site)

Family	Species	Chinese name	Baseline survey				Impact monitoring					
			Stream		Oct-07		Jan-09					
			Transect	T1	T2	Reference	T1		T2			
	Height (cm)	%	Height (cm)	%	Height (cm)	%	Height (cm)	%	Height (cm)	%		
Asteraceae	<i>Mikania micrantha</i>	薇甘菊	0.4	15	1	40	0.5	5	0.5	5		
Moraceae	<i>Ficus hispida</i>	對葉榕	1	2			5	5			2	10
Ulmaceae	<i>Celtis sinensis</i>	朴樹	5	2							6	15
Gramineae	<i>Microstegium ciliatum</i>	剛秀竹	1.2	45	1.2	30			0.8	10	0.5	12
Euphorbiaceae	<i>Macaranga tanarius</i>	血桐	2	2			5	5	3	5	1.5	4
Araceae	<i>Alocasia odora</i>	海芋	1.5	23							1.5	25
Araceae	<i>Colocasia esculenta</i>	芋	0.3	<1	0.4	<1	0.3	2				
Myrtaceae	<i>Cleistocalyx operculatus</i>	水翁					0.4	10	7	5		
Athyriaceae	<i>Callipteris esculenta</i>	菜蕨			0.6	1	0.8	10			0.4	10
Gramineae	<i>Phragmites karka</i>	卡開蘆					1.5	51				
Thelypteridaceae	<i>Cyclosorus parasiticus</i>	華南毛蕨	0.4	10							0.4	10
Equisetaceae	<i>Equisetum debile</i>	筆管草			0.6	<1	0.3	2				
Asteraceae	<i>Ageratum conyzoides</i>	勝紅薊							0.4	2		
Commelinaceae	<i>Commelina communis</i>	鴨趾草										
Solanaceae	<i>Solanum nigrum</i>	龍葵										
Euphorbiaceae	<i>Mallotus paniculatus</i>	白楸										
Gramineae	<i>Eleusine indica</i>	牛筋草										
Gramineae	<i>Pennisetum purpureum</i>	象草									3	4
Bare Gound								10		73		10

- Reference point was the sampling location outside the works area used to compare with the data within works area.

Table 5-2. Flora species recorded from belt transect survey at the Upper Tai Po stream

(T1- Upper stream sampling site and T2 - Lower stream sampling site)

Family	Species	Chinese name	Impact monitoring						Impact monitoring							
			Stream		Jul-09				Jan-10							
			Transect		Reference		T1		T2		Reference		T1		T2	
			Height (cm)	%	Height (cm)	%	Height (cm)	%	Height (cm)	%	Height (cm)	%	Height (cm)	%		
Asteraceae	<i>Mikania micrantha</i>	薇甘菊	0.5	5					0.5	3	0.2	5	0.2	2		
Moraceae	<i>Ficus hispida</i>	對葉榕	5	5			2	10	5	5						
Ulmaceae	<i>Celtis sinensis</i>	朴樹					6	15								
Gramineae	<i>Microstegium ciliatum</i>	剛秀竹					0.7	30								
Euphorbiaceae	<i>Macaranga tanarius</i>	血桐	5	5	3	5	1.5	5	5	5						
Araceae	<i>Alocasia odora</i>	海芋					2	30								
Araceae	<i>Colocasia esculenta</i>	芋	0.3	2	0.8	5			0.3	1						
Myrtaceae	<i>Cleistocalyx operculatus</i>	水翁	0.4	10	7	5			0.4	10	7	5				
Athyriaceae	<i>Callipteris esculenta</i>	菜蕨	0.8	10			0.4	2	0.8	6						
Gramineae	<i>Phragmites karka</i>	卡開蘆	1.5	51					1.5	53						
Thelypteridaceae	<i>Cyclosorus parasiticus</i>	華南毛蕨					0.4	2								
Equisetaceae	<i>Equisetum debile</i>	筆管草	0.3	2					0.3	2						
Asteraceae	<i>Ageratum conyzoides</i>	勝紅薊			0.4	2					0.2	2				
Commelinaceae	<i>Commelina communis</i>	鴨趾草							0.2	5	0.2	5	0.2	5		
Solanaceae	<i>Solanum nigrum</i>	龍葵											0.4	5		
Euphorbiaceae	<i>Mallotus paniculatus</i>	白楸									0.3	5				
Gramineae	<i>Eleusine indica</i>	牛筋草			0.5	5						5				
Gramineae	<i>Pennisetum purpureum</i>	象草														
Bare Gound				10		78		6		10		73		88		

- Reference point was the sampling location outside the works area used to compare with the data within works area.

Ecological Impact Monitoring Programme

Table 5-3 Avifauna recorded along survey transects and at two selected point count locations for Upper Tai Po River. (PC1- Upper stream section and PC2- Lower stream section)

Common Name	Species name	Species name	Status	Common-ness	Baseline survey			Impact monitoring			Impact monitoring			Impact monitoring			
					Oct-07			Jan-09			Jul-09			Jan-10			
					Abundance			Abundance			Abundance			Abundance			
					T	PC1	PC2	T	PC1	PC2	T	PC1	PC2	T	PC1	PC2	
Black Kite	<i>Milvus lineatus</i>	麻鷹	R	C	+												
Black -crown Night Heron	<i>Nycticorax nycticorax</i>	夜鷺	R	U													
Black-necked Starling	<i>Sturnus nigricollis</i>	黑領椋鳥	R	C	+	1	1								+		
Chinese Bulbul	<i>Pycnonotus sinensis</i>	白頭鶇	R	C	+	3	2	++	5	6	++	4	7	+++	7	6	
Chinese Pond Heron	<i>Ardeola bacchus</i>	池鷺	R	C	+			++	6	3	+	2	3	++	3	3	
Common Kingfisher	<i>Alcedo atthis</i>	普通翠鳥	R	C	+												
Common Koel	<i>Eudynamis scolopacea</i>	噪鳥	R	C	+												2
Common Sandpiper	<i>Actitis hypoleucos</i>	磯鶯	WV&PM	C	+												
Common Tailorbird	<i>Orthotomus sutorius</i>	長尾縫葉鶯	R	C	+		1	+	1	1	+		1	++			10
Crested Myna	<i>Acridotheres cristatellus</i>	八哥	R	C		1											
Domestic pigeon	<i>Columba sp.</i>	鴿				3											
Great Coucal	<i>Centropus sinensis</i>	褐翅鴉鵂	R	C	+	1											
Grey Wagtail	<i>Motacilla cinerea</i>	灰鶇鶯	WV	C													
Japanese White Eye	<i>Zosterops japonica(simplex)</i>	暗綠繡眼鳥	R	C		2		++	2	3	+	1	4	+++	4	6	
Little Egret	<i>Egretta garzetta</i>	小白鷺	R	C	+			+	1		+		1	+		1	
Rufous-backed Shrike	<i>Lanius schach</i>	棕背伯勞	R	C											+	1	
Magpie	<i>Pica pica</i>	喜鵲	R	C		1											
Magpie Robin	<i>Copsychus saularis</i>	鶻鶻	R	C	+	1	1				+	1	3	+	2	1	
Olive Backed pipit	<i>Anthus hodgsoni</i>	樹鶯	WV	C	+			+	1	3							
Crested bulbul (Red-whiskered)	<i>Pycnonotus jocosus</i>	紅耳鶇	R	C	+	2		+++	6	7	++	2	6	+++	4	5	
Spotted Dove	<i>Streptopelia chinensis</i>	珠頸斑鳩	R	C	+		2	+	1		+	1	3	+	1	2	
Spotted Munia	<i>Lonchura punctulata</i>	斑文鳥	R	U													
Tree Sparrow	<i>Passer montanus</i>	麻雀	R	C	+	3	2								+		
Violet Whistling Thrush	<i>Myiophonus caeruleus</i>	紫嘯鶯	R	C	+												
White Wagtail	<i>Motacilla alba</i>	白鶇鶯	WV	C	+		1								++	2	3
White-breasted Waterhen	<i>Amaurornis phoenicurus</i>	白胸苦惡鳥	R	C	+										+		1
Yellow Bellied Prinia	<i>Prinia flaviventris</i>	灰頭鷓鴣	R	C	+												
Yellow Wagtail	<i>Motacilla flava</i>	黃鶇鶯	WV&PM	U		1											
Little Swift	<i>Apus affinis</i>	小白腰雨燕	R, SpM	C													
Green Sandpiper	<i>Tringa ochropus</i>	白腰草鶯	WV	U													
Barn Swallow	<i>Hirundo rustica</i>	家燕	PM	C													
Great Tit	<i>Parus major (commixtus)</i>	大山雀	R	C											+	2	1
Blue Magpie	<i>Urocissa erythrorhyncha</i>	紅咀藍鶻	R	C											+		2
Scarlet Minivet	<i>Pericrocotus flammeus</i>	赤紅山椒鳥	R	C											+		
Scarlet-backed Flowerpecker	<i>Dicaeum cruentatum</i>	朱背啄花鳥	R	C											+		
Number of birds									23	23		11	28		26	43	
No. of species									8	8	6	8	6	8	18	9	13

Note: R – Resident; WV – Winter visitor; PM – Passage migrant; C – Common; U – Uncommon

SpM – Spring migrant; T – transect count; PC1 – Point count location 1; PC2 – Point count location 2

Ecological Impact Monitoring Programme

Table 5-4. Odonate species recorded at the Upper Tai Po stream

Species	Common name	Chinese name	Status	Commonness	Baseline survey	Impact monitoring		
					Oct-07	Jan-09	Ju1-09	Jan-10
<i>Orthetrum chrysis</i>	Red-faced Skimmer	華麗灰蜻	NP	VC		+	+	
<i>Crocothemis servilia servilia</i>	Crimson Darter	紅蜻	NP	VC	+		+	
<i>Coperia marginipes</i>	Yellow Featherlegs	黃狹扇蟌	NP	VC				
<i>Prodasineura autumnalis</i>	Black Threadtail	烏齒原蟌	NP	VC				
<i>Trithemis festiva</i>	Indigo Dropwing	靛褐蜻	NP	VC				
<i>Neurobasis chinensis</i>	Chinese Greenwing	華艷色蟌	NP	C				
<i>Rhinocypha perforata</i>	Common Blue Jewel	三斑鼻蟌	NP	VC				
<i>Pantala flavescens</i>	Wandering Glider	黃蜻	NP	VC	+		+	+
<i>Orthetrum glaucum</i>	Common blue skimmer	黑尾灰蜻	NP	VC	+	+	+	
<i>Trithemis Aurora</i>	Crimson dropwing	曉褐蜻	NP	VC	+			

Note: NP – Not protected in Hong Kong

“VC” – Very Common; “UC” – Uncommon; “C” - Common

“+” – Species exists in the survey site

“++” – Species common in the survey site

“+++” – Species abundance in the survey site

Ecological Impact Monitoring ProgrammeTable 5-5 Aquatic Macro invertebrates recorded at Upper Tai Po River
(T1- Upper stream sampling site and T2- Lower stream sampling site)

Species	Chinese name	Sampling point	Baseline survey		Impact monitoring			Impact monitoring			Impact monitoring		
			Oct-07		Jan-09		Jul-09			Jan-10			
			T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2
Invertebrates													
<i>Pomacea canaliculata</i>	蘋果螺	NP VC					+	+		++	+		+
<i>Melanoides tuberculata</i>	縮擬黑螺	NP VC					+	+	+	+	+		+
<i>Radix plicatulus</i>	羅白螺	NP VC		++			+			+		+	+
<i>Biomphalaria sp.</i>	--	NP VC		+			+			+		+	+
<i>Brotia hainanensis</i>	--	NP VC	++	+	++			++			++	+	
<i>Sinotaia quadrata</i>	田螺	NP VC					++		+	++			++
<i>Indobaetis sp.</i>	--	NP VC	+		+			+			+	+	
<i>Baetis sp.</i>	--	NP VC	+		+			+			+	+	
<i>Chironomus sp.</i>	蠓幼虫	NP VC	+	+	+			+			+		+
<i>Mnais sp.</i>	--	NP VC		+	+			+			+	+	
<i>Orthetrum sp.</i>	--	NP VC	+	+	+			+			+	+	
<i>Perla sp.</i>		NP VC										+	
<i>Aulocodes sp.</i>		NP VC										+	
<i>Tipulidae spp.</i>		NP VC										+	
Crustacea													
<i>Macrobrachium hainan</i>	海南沼蝦	NP VC			+			+			+	+	
<i>Caridina contonensis</i>	廣東米蝦	NP VC			+			+			+	++	
<i>Cryptopotamon anacol</i>	鰓刺溪蟹	NP C			+			+			+		
Fish													
<i>Gambusia affinis</i>	食蚊魚	NP VC	+	+			+		+	+		+	++
<i>Poecilia reticulata</i>	孔雀花魚將	NP VC	+	+			+			+		+	+++
<i>Schistura fasciolata</i>	橫紋南鰍	NP C			+			+	+		+	+	
<i>Rhinogobius spp.</i>	鰕虎魚	NP C			+		+	+		+	+	++	

Note: NP – Not protected in Hong Kong

“VC” – Very Common; “UC” – Uncommon; “C” - Common

“+” – Species exists in the survey site

“++” – Species common in the survey site

“+++” – Species abundance in the survey site

- Reference point was the sampling location outside the works area used to compare the with the data within works area.

Contract No. DC/2007/06

River Improvement Works in Upper Lam Tsuen River, She Shan River and Upper Tai Po River
Ecological Impact Monitoring Programme

Table 5-6 Fish species recorded at Upper Tai Po River

(T1- Upper stream sampling site and T2 - Lower stream sampling site)

Species	Status	Commonness	Baseline survey		Impact monitoring			Impact monitoring			
			Oct-07		Jan-09			Jul-09			
			T1	T2	Reference	T1	T2	Reference	T1	T2	
<i>Xiphophorus hellerii</i>	劍尾魚	NP	C	++		+			+	+	++
<i>Puntius semifasciolatus</i>	七星魚	NP	C	+		+	+		+	+	+
<i>Poecilia reticulata</i>	孔雀花魚將	NP	C	++	+			++			+
<i>Pseudogastromyzon myersi</i>	麥氏擬腹吸鰍	NP	C	+		+			+		
<i>Gambusia affinis</i>	食蚊魚	NP	VC	+	++			+		+	+
<i>Xiphophorus variatus</i>	雜色劍尾魚	NP	C	+							
<i>Parazacco spilurus</i>	異鱧	V and NP	C	++		+	+		+		
<i>Rhinogobius spp.</i>	鰕虎魚	NP	C	+		+	+		+		
<i>Schistura fasciolata</i>	橫紋南鰍	NP	C	+		+			+	+	
<i>Oreochromis niloticus</i>	尼羅口孵非鯽	NP	C	+							
<i>Misgurnus anguillicaudatus</i>	泥鰍	NP				+			+		
			2x2m fish number	70	60	15	8	25	10	20	100

Note: NP – Not protected in Hong Kong

“VC” – Very Common; “UC” – Uncommon; “C” - Common

“+” – Species exists in the survey site

“++” – Species common in the survey site

“+++” – Species abundance in the survey site

V – Listed as vulnerable in China Fish Red Data Book

- Reference point was the sampling location outside the works area used to compare with the data within works area.

Contract No. DC/2007/06

River Improvement Works in Upper Lam Tsuen River, She Shan River and Upper Tai Po River
Ecological Impact Monitoring Programme

Table 5-6 Fish species recorded at Upper Tai Po River

(T1- Upper stream sampling site and T2 - Lower stream sampling site)

Species		Status	Commonness	Impact monitoring			
				Reference	T1	T2	
<i>Xiphophorus hellerii</i>	劍尾魚	NP	C	+	+	++	
<i>Puntius semifasciolatus</i>	七星魚	NP	C	+	+	++	
<i>Poecilia reticulata</i>	孔雀花魚將	NP	C		+	+++	
<i>Pseudogastromyzon myersi</i>	麥氏擬腹吸鯰	NP	C	+			
<i>Gambusia affinis</i>	食蚊魚	NP	VC		+	++	
<i>Xiphophorus variatus</i>	雜色劍尾魚	NP	C				
<i>Parazacco spilurus</i>	異鱸	V and NP	C	+			
<i>Rhinogobius spp.</i>	鰕虎魚	NP	C	+	++	+	
<i>Schistura fasciolata</i>	橫紋南鯰	NP	C	+			
<i>Oreochromis niloticus</i>	尼羅口孵非鯽	NP	C				
<i>Misgurnus anguillicaudatus</i>	泥鯰	NP		+			
				2x2m fish number	10	2	8

Note: NP – Not protected in Hong Kong

“VC” – Very Common; “UC” – Uncommon; “C” - Common

“+” – Species exists in the survey site

“++” – Species common in the survey site

“+++” – Species abundance in the survey site

V – Listed as vulnerable in China Fish Red Data Book

- Reference point was the sampling location outside the works area used to compare with the data within works area.

Contract No. DC/2007/06

River Improvement Works in Upper Lam Tsuen River, She Shan River and Upper Tai Po River

Ecological Impact Monitoring Programme

Table 5-7 Abiotic data for Upper Tai Po River (T1- Upper stream sampling site and T2- Lower stream sampling site)

Stream	Oct-07 (baseline)	Jan-09		Jul-09		Jan-10	
	T1	T1	T2	T1	T2	T1	T2
Replicate	T1	T1	T2	T1	T2	T1	T2
DO (mg/L)	8.2	9	4	6.3	6	9.4	8.8
pH	6.9	7.18	6.86	7.28	6.96	8.2	8.5
Nitrate (mg N/L)	0.39	0.1	1.3	0.07	1.32	0.12	0.71
Ammonia (mg/L)	PO4-P (μ g P/L): <100	PO4-P (μ g P/L): <100		0.01	0.22	<0.01	0.2
Salinity (ppt)	<0.1	<0.1	0.1	0	0	0	0
Conductivity (mS/cm)	40	40	190	34	118	42	72
BOD (mg/L)	<2	<2	12	<2	<2	<2	2
Water flow at pool	0.01-0.2	0.01-0.2		0.01-0.2		0.01-0.2	
Water flow at riffle	0.2-0.5	0.2-0.5		0.2-0.5		0.2-0.5	
Sand (%)	15	15		15	25	15	25
Stone (%)	80	80		80	70	80	70
Mud (%)	5	5		5	5	5	5
Concrete(%)	0	0	0	0	0	0	0

FIGURE

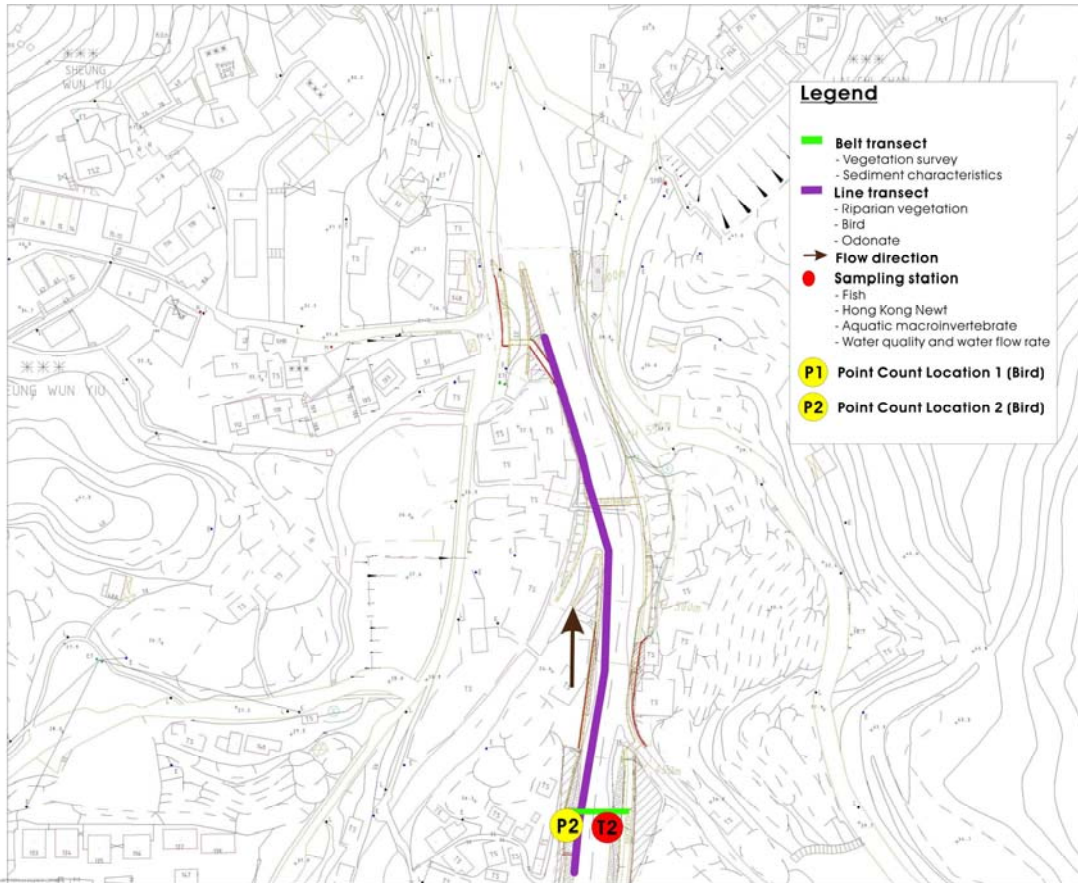


Figure 1-1. Sampling location of impact monitoring at Upper Tai Po River(Lower Section)

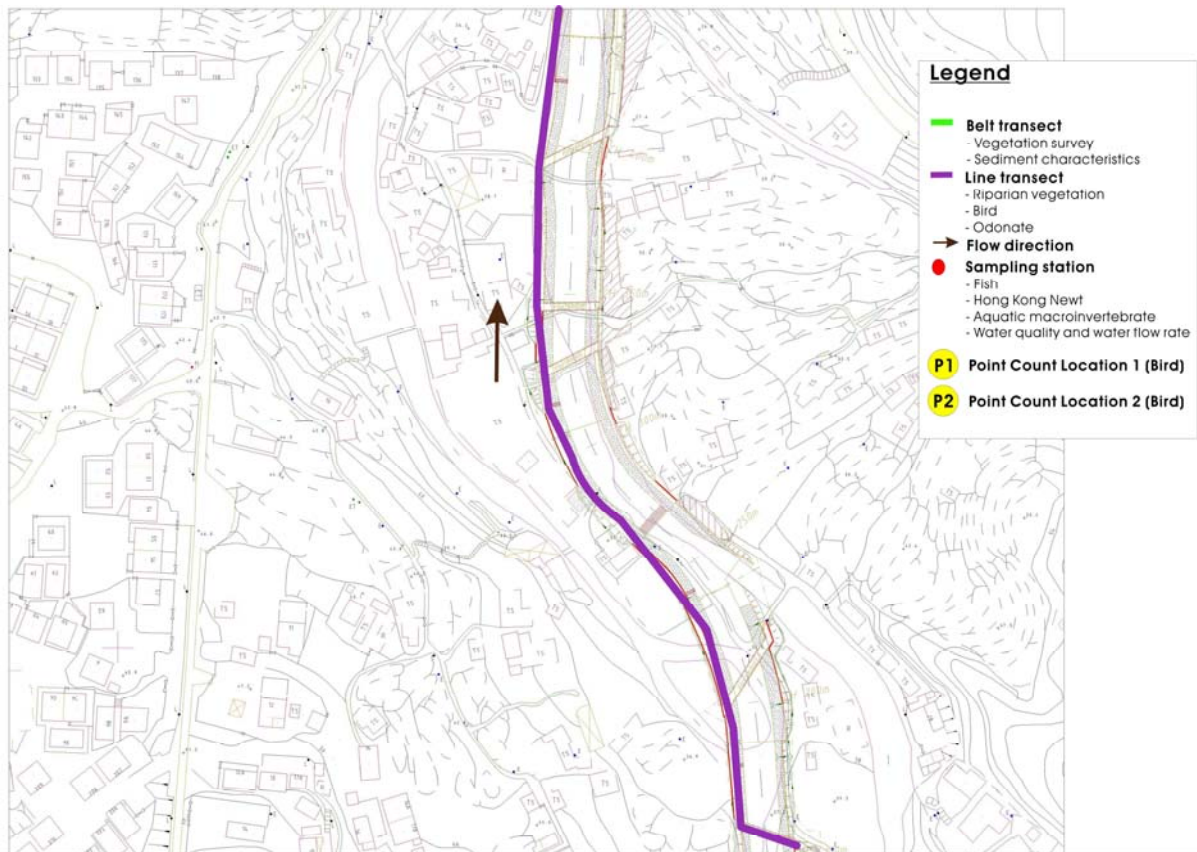


Figure 1-2. Sampling location of impact monitoring at Upper Tai Po River(Middle Section)

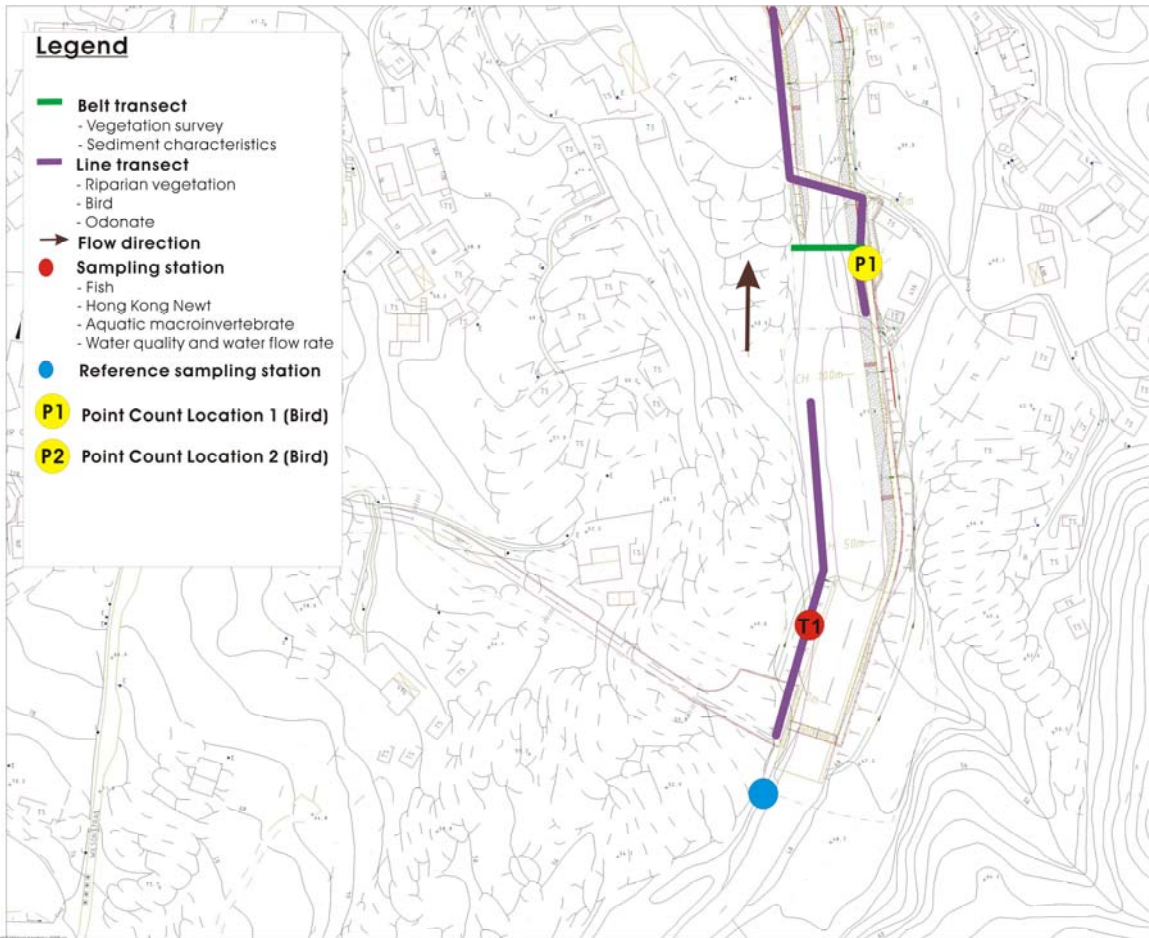


Figure 1-3. Sampling location of Impact monitoring at Upper Tai Po River(Upper Section)