

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 September 2009

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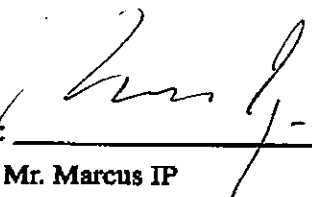
The Contents of this report have been

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Executive summary

This is the thirteenth 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 September 2009 to 30th September 2009. The major construction activity was ceased in this reporting month.

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 performed by the Ecologist Dr. Mark Shea was carried out on 21st and 22nd July 2009. Details of the ecological monitoring report please refer to 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 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 no reporting change for this month.

In accordance with the contractual requirements, no excavation works in river is allowed to be carried out during the present wet season. Site works proposed to be carried out in the upcoming month will be mainly construction of haul access, installation of noise barriers and river reinstatement works.

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 thirteenth 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 September 2009. 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

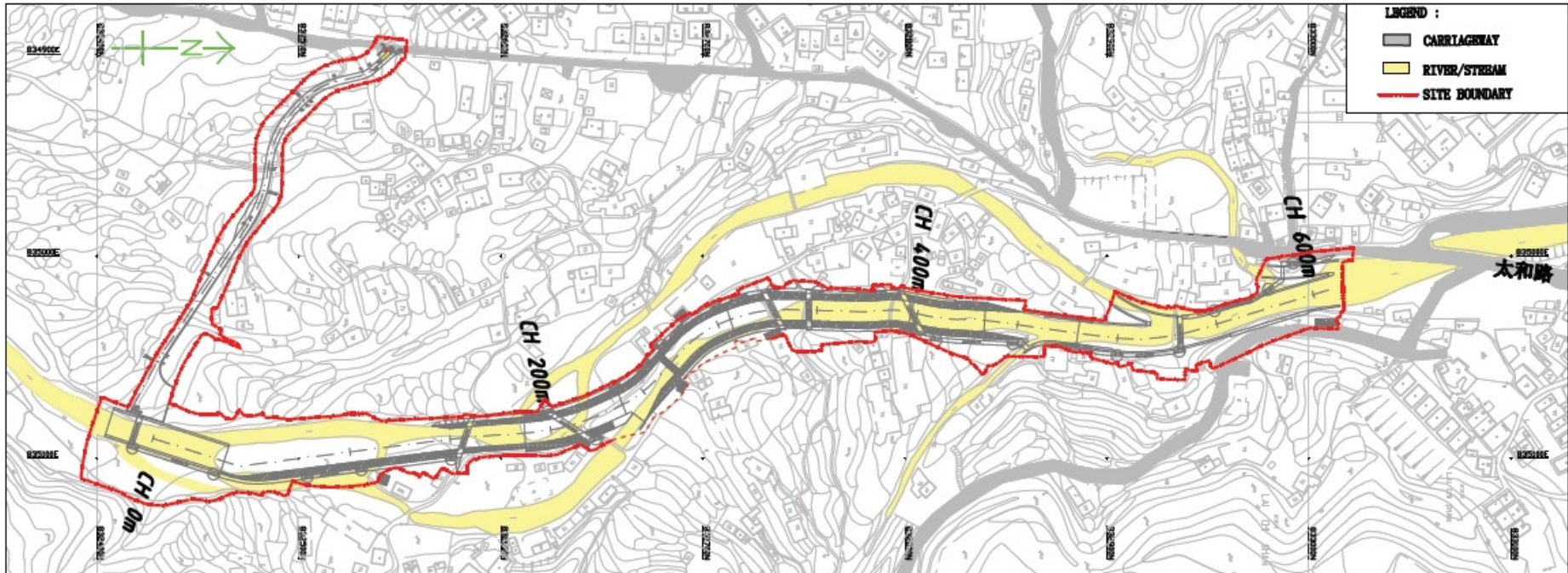
The construction of the proposed improvement works for Upper Tai Po River has been commenced on September 15th 2008 and anticipated to complete in April 2011.

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 were ceased in the reporting period since no excavation works in river is allowed during wet season due to contractual requirements.

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) Installation of noise barrier

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 no formal complaint received in the reporting month. Totally, four 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 21st and 22nd July 2009 by the Ecologist Dr. Mark Shea. Details of the revised monitoring report please refer to Appendix J. The Capture survey conducted by the Ecologist was scheduled within October and November 2009.

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 4th, 10th, 17th and 24th September 2009. Monitoring programme carried out on 30th September 2009 was cancelled due to adverse rainy weather. L_{eq} (30min) results ranged from 44.4dB(A) to 67.2dB(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 starts in Upper Tai Po River.

6.0 Environmental issues and actions

6.1 Site inspections and key environmental issues

As mentioned in Section 8.1 of the EM&A manual, 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 2nd, 9th, 16th, 23rd and 30th September 2009. 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 2nd, 9th, 16th, 23rd and 30th September 2009. 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 Sept 09	No major findings for this inspection	N/A	N/A	N/A	N/A	N/A
09 Sept 09	No major findings for this inspection	N/A	N/A	N/A	N/A	N/A
16 Sept 09	No major findings for this inspection	N/A	N/A	N/A	N/A	N/A
23 Sept 09	No major findings for this inspection	N/A	N/A	N/A	N/A	N/A
30 Sept 09	No major findings for this inspection	N/A	N/A	N/A	N/A	N/A

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
02 Sept 2009	No Major findings for this inspection	No Advice is required	No Action is required to be taken	N/A
09 Sept 2009	No Major findings for this inspection	No Advice is required	No Action is required to be taken	N/A
16 Sept 2009	No Major findings for this inspection	No Advice is required	No Action is required to be taken	N/A
23 Sept 2009	No Major findings for this inspection	No Advice is required	No Action is required to be taken	N/A
30 Sept 2009	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 August 2009.

6.3 Recommendations

As major site activities were ceased, environmental impacts to the vicinity due to construction works were minimized and there were no major findings during this reporting month.

However, contractor was reminded to maintain good housekeeping practices for site equipments and materials storage, in order to minimize mosquito breeding in site area.

6.4 Implementation status and effectiveness of the mitigation measures

According to the findings from the inspections, there was no major defect recorded in this reporting month. Necessary environmental mitigation measures were mostly implemented and considered as effective to minimize negative impact to the environment. Ongoing investigation will be carried out to observe performance and effectiveness of those measures.

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
September 2009	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	Issued
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 and installation of noise barriers. 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 may generate dust impact to the vicinity of sensitive receivers. Contractor is advised to provide regular water spraying for the dusty static area. Stockpiling may be found on site and those should be covered by tarpaulin 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 construction activities, 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 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

The major construction activity was ceased in this reporting month.

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 21st and 22nd July 2009. The Revised ecological impact monitoring report was attached in Appendix J.

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

There was no complaint recorded in this reporting month.

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	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	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	1. Ensure Remedial measures are properly implemented	1. Amend working methods 2. Rectify damage and undertake any necessary replacement
Repeated Non conformity	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	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	1. Ensure Remedial measures are properly implemented	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	57.3	67.8	66.8	4-Sep-09	13:37-14:07	Noise generated from site clearance and vegetation removal works	Noise from innovation activities of the village house & background noise from traffic	Sunny	Façade
UTP 2	55.3	62.2	65.1	4-Sep-09	13:02-13:32	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location as no construction activity was carried out at the project site	Noise from innovation activities of the village house & background noise from traffic	Sunny	Façade
UTP 3	44.2	48.7	51.9	4-Sep-09	15:14-15:44	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location as no construction activity was carried out at the project site	N/A	Sunny	Façade
UTP 4	60.1	61.9	61.5	4-Sep-09	14:10-14:40	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location as no construction activity was carried out at the project site	Background noise from public	Sunny	Façade
UTP 5	60.8	65.4	61.7	4-Sep-09	14:42-15:12	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location as no construction activity was carried out at the project site	Background noise from public	Sunny	Façade
UTP 6	44.0	49.6	48.2	4-Sep-09	15:50-16:20	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location as no construction activity was carried out at the project site	N/A	Sunny	Façade
UTP 7	48.0	50.1	52.9	4-Sep-09	16:23-16:53	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location as no construction activity was carried out at the project site	N/A	Sunny	Façade
UTP 8	49.3	53.4	51.8	4-Sep-09	09:30-10:00	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location as no construction activity was carried out at the project site	N/A	Sunny	Façade
UTP 9	41.1	47.5	46.7	4-Sep-09	11:28-11:58	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location as no construction activity was carried out at the project site	N/A	Sunny	Façade
UTP 10	42.5	47.1	48.0	4-Sep-09	10:48-11:18	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location as no construction activity was carried out at the project site	N/A	Sunny	Façade
UTP 11	43.2	48.6	47.4	4-Sep-09	10:15-10:45	Noise generated from house keeping activities	N/A	Sunny	*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	56.5	67.2	66.1	10-Sep-09	13:34-14:04	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location as no construction activity was carried out at the project site	Background noise from traffic	Cloudy	Façade
UTP 2	56.6	60.9	60.9	10-Sep-09	13:00-13:30	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location as no construction activity was carried out at the project site	Background noise from traffic	Cloudy	Façade
UTP 3	58.2	61.9	62.0	10-Sep-09	14:09-14:39	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location as no construction activity was carried out at the project site	N/A	Cloudy	Façade
UTP 4	55.8	58.3	59.6	10-Sep-09	14:40-15:10	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location as no construction activity was carried out at the project site	N/A	Cloudy	Façade
UTP 5	51.7	56.3	53.4	10-Sep-09	15:13-15:43	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location as no construction activity was carried out at the project site	N/A	Cloudy	Façade
UTP 6	46.0	50.7	53.9	10-Sep-09	15:46-16:16	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location as no construction activity was carried out at the project site	N/A	Cloudy	Façade
UTP 7	45.3	50.8	53.3	10-Sep-09	16:17-16:47	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location as no construction activity was carried out at the project site	N/A	Cloudy	Façade
UTP 8	51.2	53.8	52.9	10-Sep-09	11:29-11:59	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location as no construction activity was carried out at the project site	N/A	Cloudy	Façade
UTP 9	45.4	56.1	56.6	10-Sep-09	10:56-11:26	Noise generated from house keeping activities	N/A	Cloudy	Façade
UTP 10	43.7	48.5	48.2	10-Sep-09	10:22-10:52	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location as no construction activity was carried out at the project site	N/A	Cloudy	Façade
UTP 11	46.5	51.8	55.3	10-Sep-09	09:50-10:20	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location as no construction activity was carried out at the project site	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	56.9	65.7	63.6	17-Sep-09	13:34-14:04	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location as no construction activity was carried out at the project site	Background noise from traffic and public	Sunny	Façade
UTP 2	56.2	62.9	64.1	17-Sep-09	13:00-13:30	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location as no construction activity was carried out at the project site	Background noise from traffic	Sunny	Façade
UTP 3	44.4	50.0	48.3	17-Sep-09	15:13-15:43	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location as no construction activity was carried out at the project site	N/A	Sunny	Façade
UTP 4	57.4	58.3	55.4	17-Sep-09	14:10-14:40	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location as no construction activity was carried out at the project site	Background noise from traffic and public	Sunny	Façade
UTP 5	53.5	58.8	60.3	17-Sep-09	14:41-15:11	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location as no construction activity was carried out at the project site	N/A	Sunny	Façade
UTP 6	46.3	51.6	49.2	17-Sep-09	15:45-16:15	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location as no construction activity was carried out at the project site	N/A	Sunny	Façade
UTP 7	46.3	52.4	51.8	17-Sep-09	11:30-12:00	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location as no construction activity was carried out at the project site	N/A	Cloudy	Façade
UTP 8	49.5	53.7	53.0	17-Sep-09	10:58-11:28	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location as no construction activity was carried out at the project site	Background noise from public	Sunny	Façade
UTP 9	44.1	47.7	47.7	17-Sep-09	10:26-10:56	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location as no construction activity was carried out at the project site	N/A	Sunny	Façade
UTP 10	42.2	45.7	44.4	17-Sep-09	09:50-10:20	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location as no construction activity was carried out at the project site	N/A	Sunny	Façade
UTP 11	54.8	56.6	55.2	17-Sep-09	09:18-09:48	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location as no construction activity was carried out at the project site	N/A	Sunny	*Free field

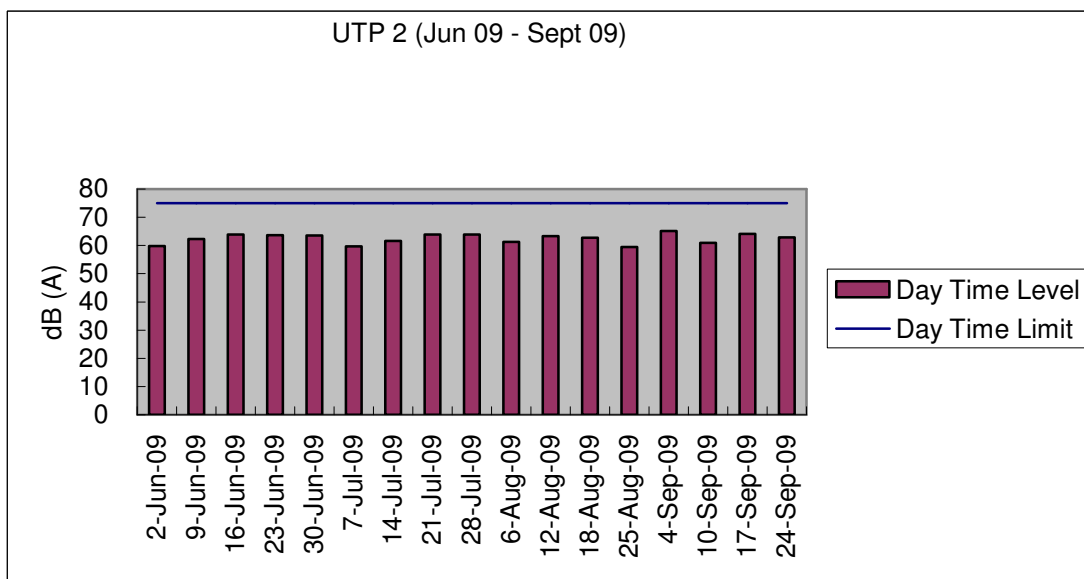
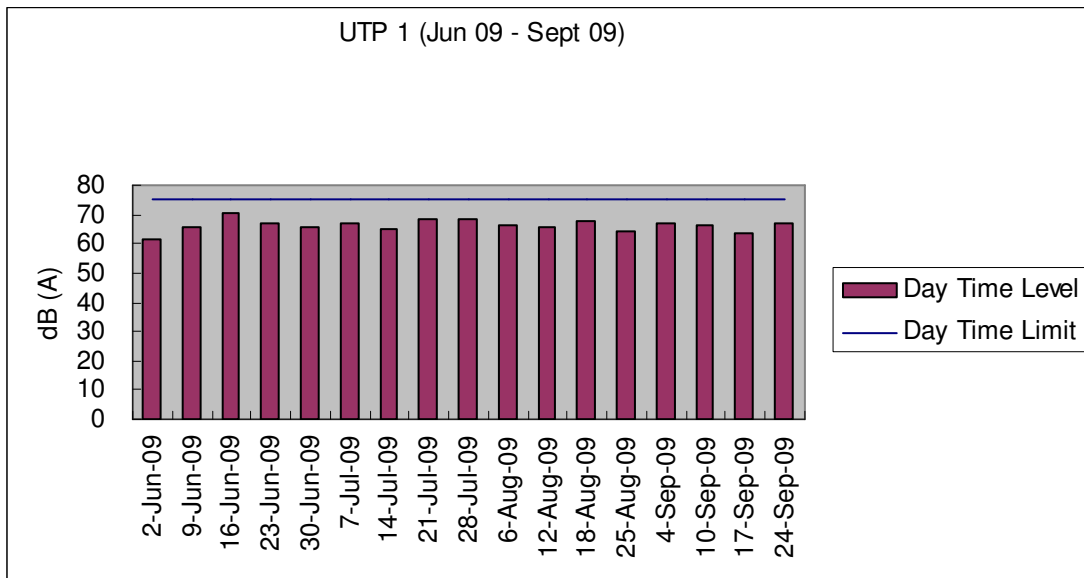
Note* An Additional of 3dB(A) had been added to the measurement result due to Free Field Correction

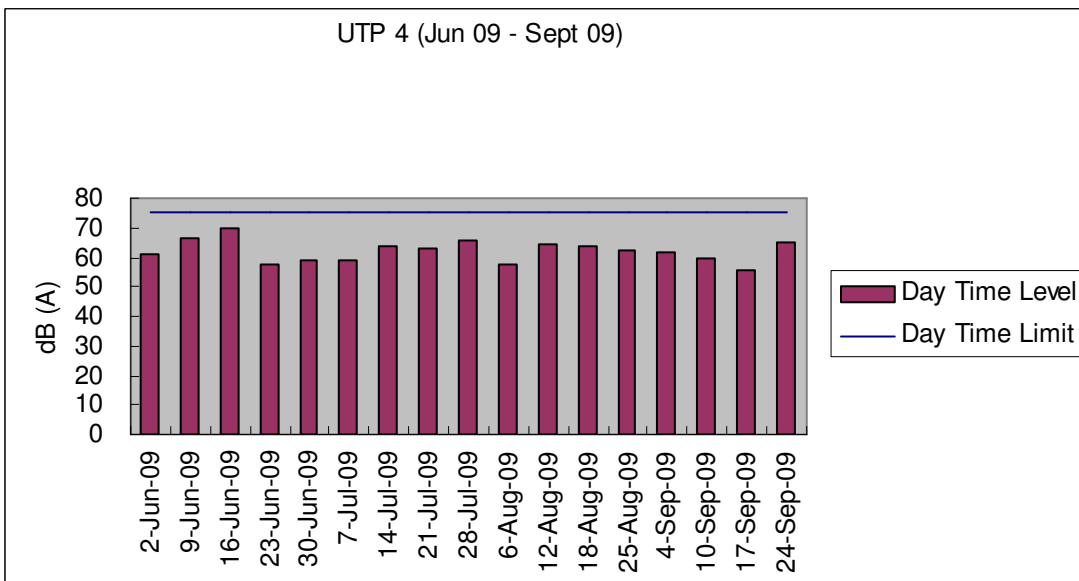
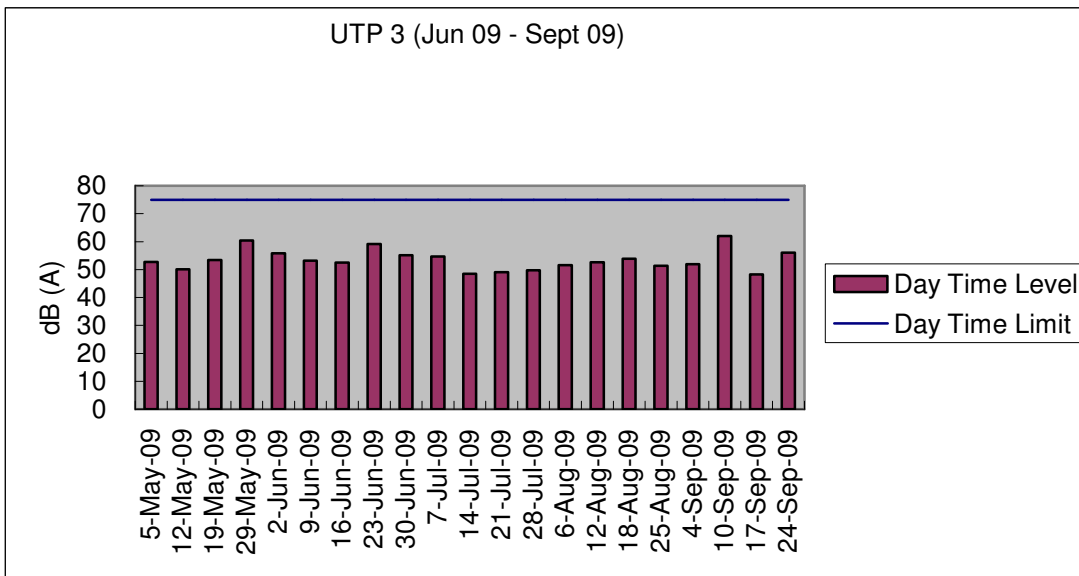
Location	L ₉₀ 30min	L ₁₀ 30min	Leq 30min	Date	Time Duration	Major Construction Noise	Other Noise source	Weather	Location description
UTP 1	56.4	68.0	67.2	24-Sep-09	13:33-14:03	Noise generated from excavator for site clearance	Background noise from traffic and public	Sunny	Façade
UTP 2	55.7	63.4	62.9	24-Sep-09	13:00-13:30	Noise generated from excavator for site clearance	Background noise from traffic and innovation works of village house	Sunny	Façade
UTP 3	54.0	60.4	56.1	24-Sep-09	15:13-15:43	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location as no construction activity was carried out at the project site	N/A	Sunny	Façade
UTP 4	56.6	66.3	65.2	24-Sep-09	14:07-14:37	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location as no construction activity was carried out at the project site	Background noise from traffic and innovation works of village house	Sunny	Façade
UTP 5	49.3	55.0	53.4	24-Sep-09	14:39-15:09	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location as no construction activity was carried out at the project site	N/A	Sunny	Façade
UTP 6	47.3	56.1	55.3	24-Sep-09	11:22-15:52	Noise from re-location works of lamp posts	Background noise from innovation works of village house	Sunny	Façade
UTP 7	48.9	58.5	55.5	24-Sep-09	10:17-10:47	Noise from re-location works of lamp posts	Background noise from innovation works of village house	Sunny	Façade
UTP 8	49.3	52.4	51.5	24-Sep-09	10:49-11:19	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location as no construction activity was carried out at the project site	N/A	Sunny	Façade
UTP 9	44.7	53.6	51.8	24-Sep-09	09:43-10:13	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location as no construction activity was carried out at the project site	N/A	Sunny	Façade
UTP 10	46.6	55.7	54.0	24-Sep-09	09:06-09:36	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location as no construction activity was carried out at the project site	N/A	Sunny	Façade
UTP 11	50.1	58.4	54.6	24-Sep-09	08:33-09:03	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location as no construction activity was carried out at the project site	N/A	Sunny	*Free field

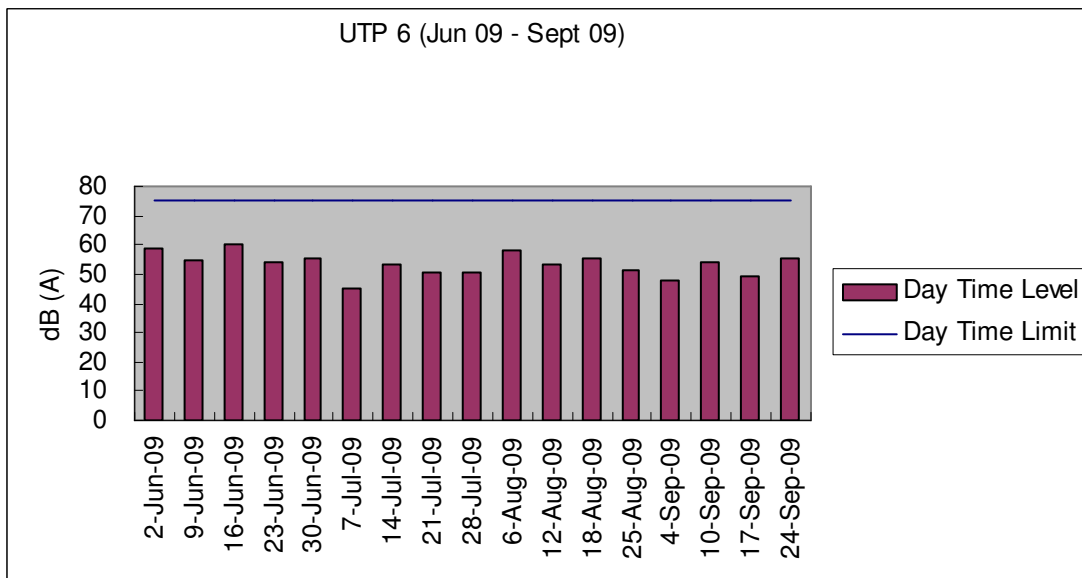
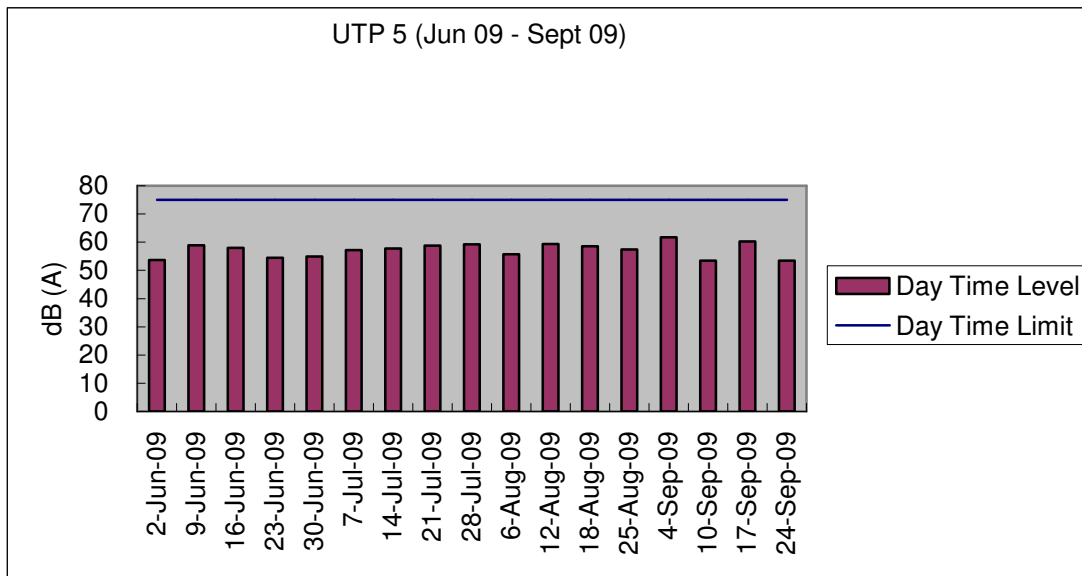
Note* An Additional of 3dB(A) had been added to the measurement result due to Free Field Correction

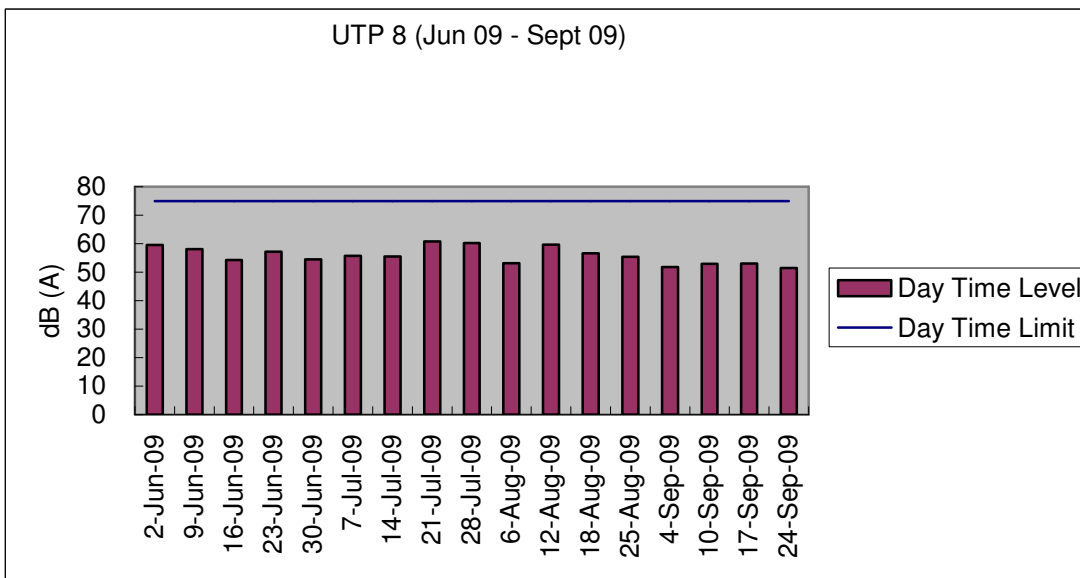
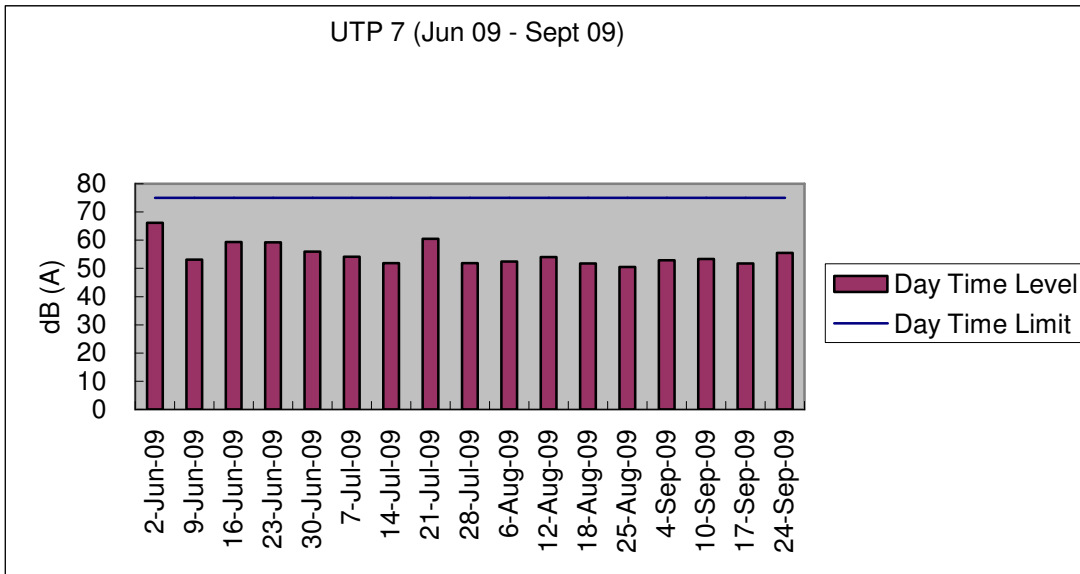
Graphical plot for noise measurements

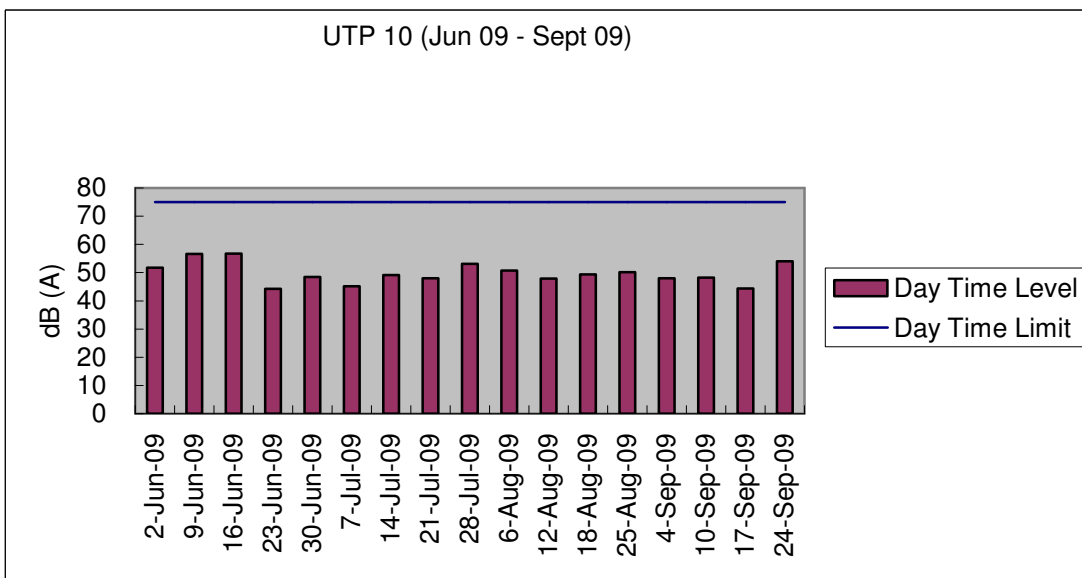
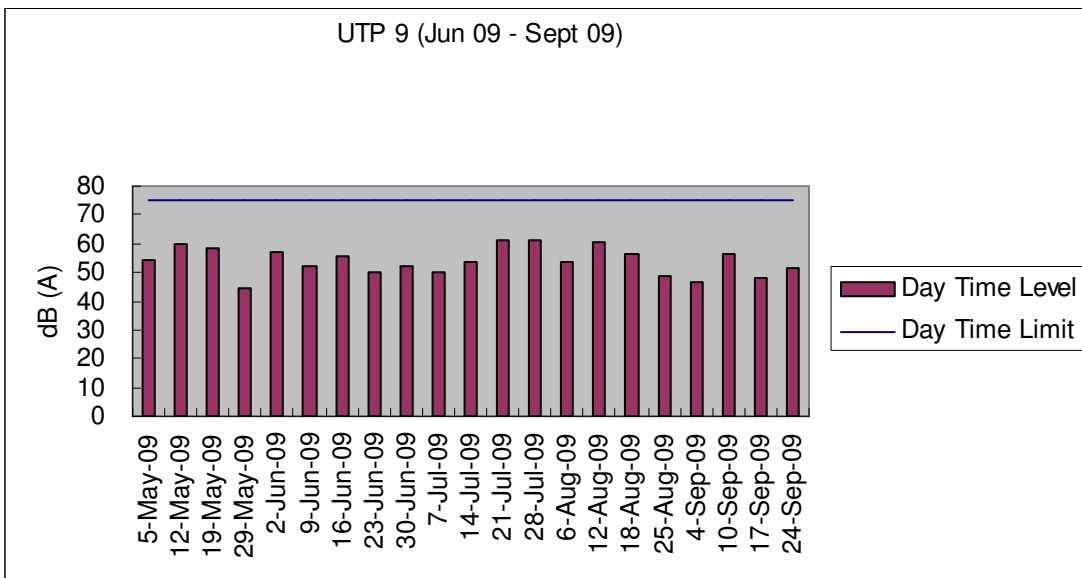
The following plots were the graphical plots for the 11 monitoring locations. Each plot showed the day time limit 75 dB(A), daytime level, date and the measured dB(A) results as in Leq 30min for each location. The graph contains the data recorded from June 2009 to September 2009.

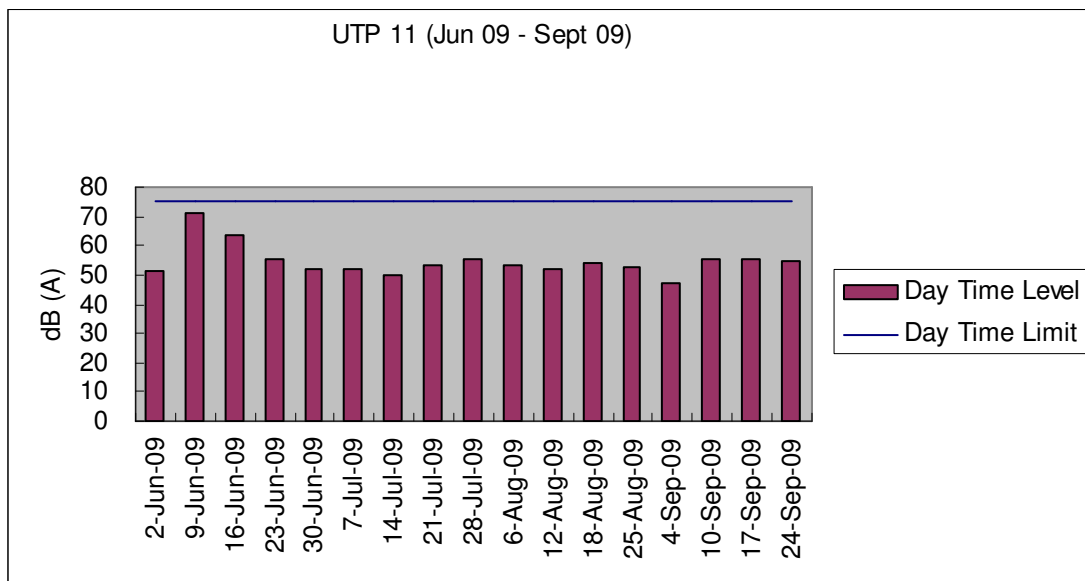


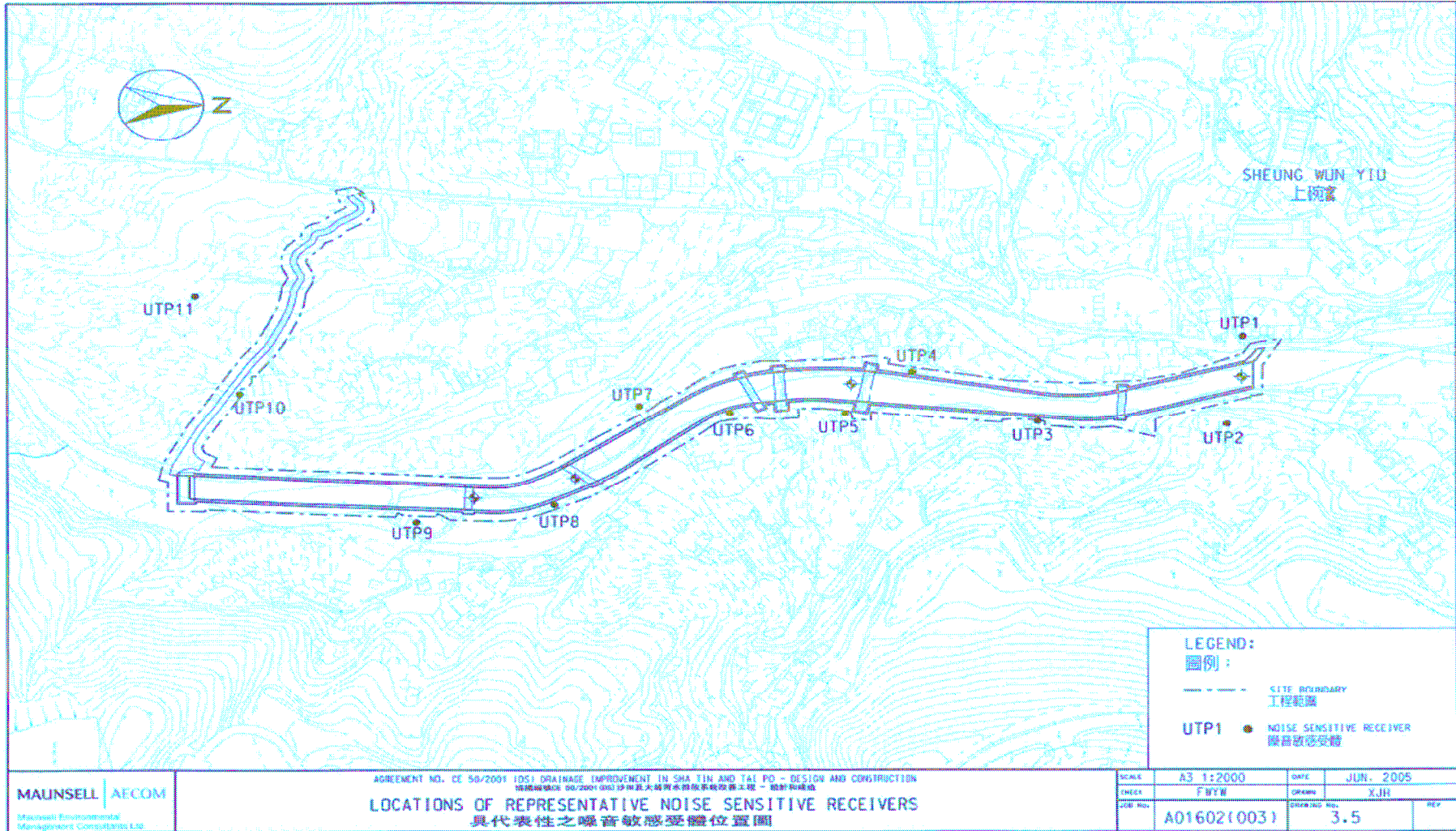












Appendix E: Monitoring schedule for the present and next reporting period

Master Schedule of EM&A works in September 2009

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1/9	2/9	3/9	4/9	5/9
			Site inspection at afternoon		Noise monitoring	
6/9	7/9	8/9	9/9	10/9	11/9	12/9
			Site inspection at afternoon	Noise monitoring		
13/9	14/9	15/9	16/9	17/9	18/9	19/9
			Site inspection at afternoon	Noise monitoring		
20/9	21/9	22/9	23/9	24/9	25/9	26/9
			Site inspection and SSEMC at morning	Noise monitoring		
27/9	28/9	29/9	30/9			
			Site inspection at afternoon			

Master Schedule of EM&A works in October 2009

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1/10	2/10	3/10
4/10	5/10	6/10	7/10	8/10	9/10	10/10
			Site inspection at afternoon		Noise monitoring	
11/10	12/10	13/10	14/10	15/10	16/10	17/10
			Site inspection at afternoon		Noise monitoring	
18/10	19/10	20/10	21/10	22/10	23/10	24/10
			Site inspection and SSEMC at morning		Noise monitoring	
25/10	26/10	27/10	28/10	29/10	30/10	31/10
			Site inspection at afternoon		Noise monitoring	

Appendix F: Cumulative complaint log

Environmental Parameters	Cumulative no. Brought forward	No. of complaint September 2009	Overall Total
Air/Dust	1	0	1
Noise	1	0	1
Water	2	0	2
House Keeping Hygiene	0	0	0
Chemical waste	0	0	0
Total	4	0	4

* 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	Not applicable	Not required
	-Use well maintained construction plant	Not applicable at this stage	Not required
	-Shut down plants between work periods	Not applicable at this stage	Not required
	-Install silencers on construction equipment	Not applicable at this stage	Not required
	-Locate mobile plant far away from NSRs	Not applicable at this stage	Not required
	-Quiet plants should be used	Not applicable at this stage	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	Not applicable at this stage	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	Not applicable at this stage	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	Not applicable at this stage	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	Not applicable at this stage	Not required
	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	Not applicable at this stage	Not required
	Provide site toilet facilities	Implemented	Not required
Waste Management	Reuse excavated material as far as possible	Not applicable at this stage	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 and 4 th November 2008	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 September 15th 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
Total	36m 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

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	Start	Finish
806	Site Clearance	20 d	24/03/2008	12/04/2008	24/03/2008	12/04/2008
807	Charmark Setting Work	30 d	13/03/2008	12/05/2008	13/03/2008	12/05/2008
808	Initial Survey	30 d	15/03/2008	13/05/2008	15/03/2008	13/05/2008
809	Condition Surveys / Set up markers	30 d	15/03/2008	13/05/2008	15/03/2008	13/05/2008
810	Preparation of Temporary Works Design	60 d	25/03/2008	25/05/2008	25/03/2008	25/05/2008
811	Approval of Temporary Works Design	14 d	17/03/2008	17/03/2008	17/03/2008	17/03/2008
812	SI Works	38 d	24/03/2008	27/05/2008	24/03/2008	27/05/2008
813	Submission of Archaeological Monitoring	96 d	05/03/2008	30/05/2008	05/03/2008	30/05/2008
814	Approval of Archaeological Monitoring	0 d	18/03/2008	18/03/2008	18/03/2008	18/03/2008
815	Chainage from CHL 1850 to CHL 1850	114 d	14/02/2008	19/05/2011	14/02/2008	19/05/2011
816	Chainage from CHL 1850 to CHL 1700	354 d	14/02/2008	30/03/2009	14/02/2008	30/03/2009
817	Wet Season (April to Oct 2008)	2-4 d	14/02/2008	14/02/2008	14/02/2008	14/02/2008
818	Excavation	80 d	11/12/2008	19/11/2009	11/12/2008	19/11/2009
819	Rockfill & Blinding	40 d	16/11/2008	25/12/2008	16/11/2008	25/12/2008
820	Reaming Well	50 d	28/12/2008	17/01/2009	28/12/2008	17/01/2009
821	Cabin Wall	40 d	14/01/2009	23/02/2009	14/01/2009	23/02/2009
822	Install Doors/Fencing/Rainings/Drainage	5 d	28/02/2009	02/03/2009	28/02/2009	02/03/2009
823	From CHL 1700 to CHL 1550	364 d	14/02/2008	30/03/2010	14/02/2008	30/03/2010
824	Wet Season (April to Oct 2009)	214 d	14/02/2008	14/02/2009	14/02/2008	14/02/2009
825	Excavation	90 d	11/12/2008	29/12/2009	11/12/2008	29/12/2009
826	Rockfill & Blinding	40 d	16/11/2008	25/12/2008	16/11/2008	25/12/2008
827	Reaming Well	50 d	28/12/2008	17/01/2009	28/12/2008	17/01/2009
828	Dipion Wall	40 d	14/02/2009	23/03/2009	14/02/2009	23/03/2009
829	Install Doors/Fencing/Rainings/Coverage	5 d	28/03/2009	02/03/2009	28/03/2009	02/03/2009
830	From CHL 1550 to CHL 1550	384 d	14/02/2009	19/05/2011	14/02/2009	19/05/2011
831	Wet Season (April to Oct 2010)	214 d	14/02/2009	14/02/2010	14/02/2009	14/02/2010
832	Excavation	90 d	11/12/2009	29/12/2010	11/12/2009	29/12/2010
833	Preparation of Temp. footbridge	5 d	01/12/2010	06/12/2010	01/12/2010	06/12/2010
834	Footing for footbridge	25 d	01/12/2010	26/12/2010	01/12/2010	26/12/2010
835	Down Wall	30 d	01/12/2010	30/12/2010	01/12/2010	30/12/2010
836	Footbridge	56 d	31/12/2010	26/02/2011	31/12/2010	26/02/2011
837	Distribution of existing footbridge	5 d	24/02/2011	29/02/2011	24/02/2011	29/02/2011
838	Box Culvert	25 d	13/02/2011	07/03/2011	13/02/2011	07/03/2011
839	Footpaths Maintenance (Railway)	25 d	28/03/2011	19/04/2011	28/03/2011	19/04/2011
840	Completion of Area K	0 d	19/04/2011	19/04/2011	19/04/2011	19/04/2011
841	Completion of Work at Section 2	0 d	4/11/2012	4/11/2012	4/11/2012	4/11/2012
842						
843						
844						
845						
846	Section 3 - Upper Tai Po River (Area L, M, P)					
847	Area L	1503 d	24/02/2007	01/11/2011	24/02/2007	01/11/2011
848	Handover	31 d	04/02/2008	24/02/2008	04/02/2008	24/02/2008
849	Access Road D	959 d	14/02/2008	25/11/2010	14/02/2008	25/11/2010
850	Site Clearance for Inlet survey	3 d	17/02/2008	20/02/2008	17/02/2008	20/02/2008
851	Site Clearance	34 d	28/02/2008	29/02/2008	28/02/2008	29/02/2008
852	Project Site Board	4 d	22/02/2008	26/02/2008	22/02/2008	26/02/2008
853	Pail (800) formation	15 d	11/01/2008	25/01/2008	11/01/2008	25/01/2008
854	Noise Barriers	15 d	11/01/2008	25/01/2008	11/01/2008	25/01/2008
855	Access D Ch 2+25-3+10	15 d	11/01/2008	25/01/2008	11/01/2008	25/01/2008
856	Utilities	1 d	17/02/2008	17/02/2008	17/02/2008	17/02/2008
857	PCDW	1 d	17/02/2008	17/02/2008	17/02/2008	17/02/2008
858	Trial pits	1 d	17/02/2008	17/02/2008	17/02/2008	17/02/2008
859	Retaining Wall (ch 3+00)	40 d	16/02/2010	26/03/2010	16/02/2010	26/03/2010
860	Bulk excavation	15 d	16/02/2010	31/02/2010	16/02/2010	31/02/2010
861	Formation	4 d	18/02/2010	22/02/2010	18/02/2010	22/02/2010
862	Formwork and rebar fairing (base slab)	5 d	21/02/2010	26/02/2010	21/02/2010	26/02/2010
863	Concreting (base slab)	2 d	28/02/2010	30/02/2010	28/02/2010	30/02/2010
864	Stripping off formwork (base slab)	3 d	28/02/2010	01/03/2010	28/02/2010	01/03/2010
865	Formwork and rebar fairing (wall stem)	5 d	31/02/2010	05/03/2010	31/02/2010	05/03/2010
866	Concreting (wall stem)	2 d	04/03/2010	06/03/2010	04/03/2010	06/03/2010
867	Stripping off formwork (wall stem)	3 d	06/03/2010	09/03/2010	06/03/2010	09/03/2010
868	Canalway	25 d	11/03/2010	26/03/2010	11/03/2010	26/03/2010



Project: Revised M. Prog (Rev.08)
 Date: 04 Aug 2009
 Consultant: AECOM

Task Progress:
 Critical Task Progress:
 Milestone:
 Summary:

Rotted Up Progress:
 Rotted Up Critical Task:
 Rotted Up Milestone:

Split:
 External Tasks:

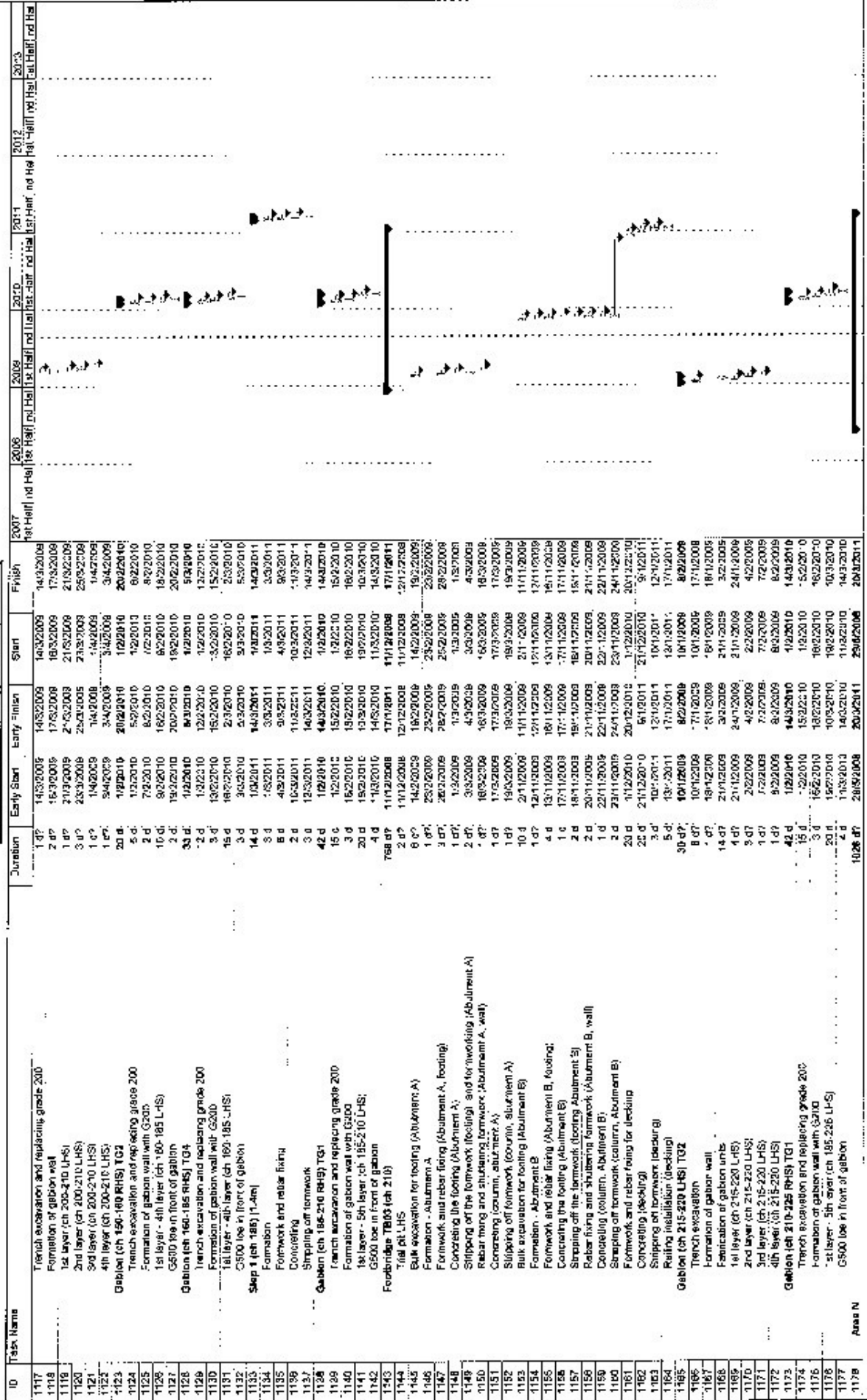
Task:
 Task Progress:
 Critical Task:

Chiu Hing Construction & Transportation Co., Ltd

Drainage Services Department

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

Contract No. DC/2007/08



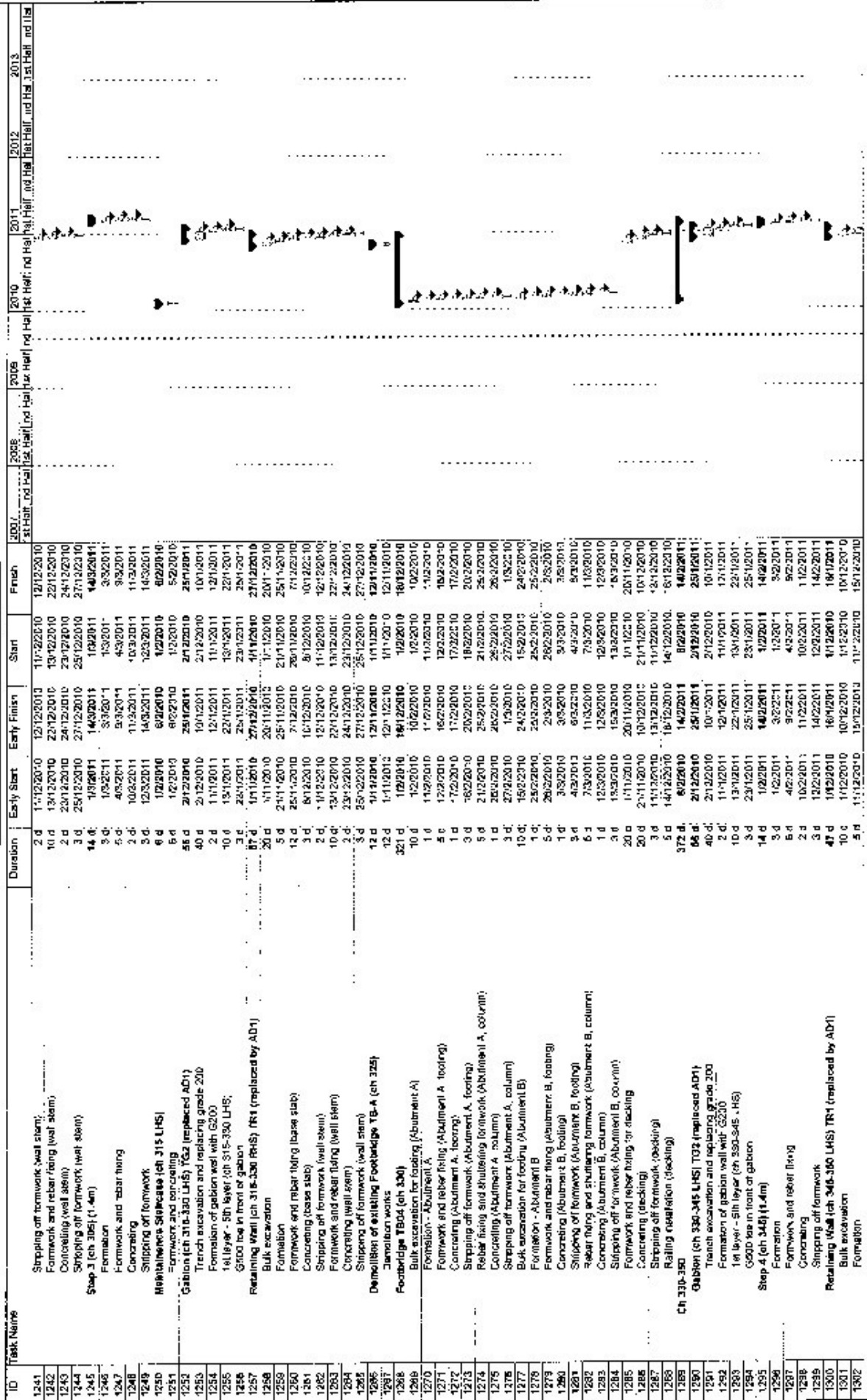
ID	Task Name	Duration	Early Start	Early Finish	Start	Finish
1117	Trench excavation and replacing grade 200	1d 0h	14/02/2009	14/02/2009	14/02/2009	14/02/2009
1118	Formation of gabion wall	2d 0h	15/02/2009	17/02/2009	15/02/2009	17/02/2009
1119	1st layer (ch 200-210 LHS)	1d 0h	21/02/2009	21/02/2009	21/02/2009	21/02/2009
1120	2nd layer (ch 200-210 LHS)	3d 0h	23/02/2009	26/02/2009	23/02/2009	25/02/2009
1121	3rd layer (ch 200-210 LHS)	1d 0h	14/02/2009	14/02/2009	14/02/2009	14/02/2009
1122	4th layer (ch 200-210 LHS)	1d 0h	14/02/2009	14/02/2009	14/02/2009	14/02/2009
1123	Gabion (ch 190-195 RHS) TQ1	2d 0h	14/02/2009	16/02/2009	14/02/2009	16/02/2009
1124	Trench excavation and replacing grade 200	5d 0h	15/02/2009	20/02/2009	15/02/2009	20/02/2009
1125	Formation of gabion wall with G200	2d 0h	17/02/2009	19/02/2009	17/02/2009	19/02/2009
1126	1st layer - 4th layer (ch 180-185 LHS)	10d 0h	18/02/2009	28/02/2009	18/02/2009	28/02/2009
1127	G500 toe in front of gabion	2d 0h	20/02/2009	22/02/2009	20/02/2009	22/02/2009
1128	Gabion (ch 160-165 RHS) TQ4	3d 0h	14/02/2009	17/02/2009	14/02/2009	17/02/2009
1129	Trench excavation and replacing grade 200	2d 0h	13/02/2009	15/02/2009	13/02/2009	15/02/2009
1130	Formation of gabion wall with G200	3d 0h	15/02/2009	18/02/2009	15/02/2009	18/02/2009
1131	1st layer - 4th layer (ch 190-195 LHS)	15d 0h	16/02/2009	31/02/2009	16/02/2009	31/02/2009
1132	G500 toe in front of gabion	3d 0h	23/02/2009	26/02/2009	23/02/2009	26/02/2009
1133	Step 1 (ch 180) (LHS)	14d 0h	10/02/2011	24/02/2011	10/02/2011	24/02/2011
1134	Formwork	3d 0h	15/02/2011	18/02/2011	15/02/2011	18/02/2011
1135	Formwork and rebar fixing	5d 0h	18/02/2011	23/02/2011	18/02/2011	23/02/2011
1136	Concreting	2d 0h	15/02/2011	17/02/2011	15/02/2011	17/02/2011
1137	Stripping off formwork	3d 0h	18/02/2011	21/02/2011	18/02/2011	21/02/2011
1138	Trench excavation and replacing grade 200	4d 0h	16/02/2010	20/02/2010	16/02/2010	20/02/2010
1139	Formation of gabion wall with G200	15d 0h	16/02/2010	31/02/2010	16/02/2010	31/02/2010
1140	1st layer - 5th layer (ch 165-210 LHS)	3d 0h	16/02/2010	19/02/2010	16/02/2010	19/02/2010
1141	G500 toe in front of gabion	2d 0h	19/02/2010	21/02/2010	19/02/2010	21/02/2010
1142	Footbridge T803 (ch 210)	4d 0h	11/02/2010	15/02/2010	11/02/2010	15/02/2010
1143	Final pt. LHS	78d 0h	11/02/2008	17/02/2011	11/02/2008	17/02/2011
1144	Bulk excavation for footing (Abutment A)	2d 0h	11/02/2008	13/02/2008	11/02/2008	13/02/2008
1145	Formation - Abutment A	6d 0h	14/02/2008	20/02/2008	14/02/2008	20/02/2008
1146	Formwork and rebar fixing (Abutment A, footing)	1d 0h	25/02/2008	26/02/2008	25/02/2008	26/02/2008
1147	Concreting the footing (Abutment A)	3d 0h	28/02/2008	31/02/2008	28/02/2008	31/02/2008
1148	Stripping off the formwork (footing) and rebar fixing (Abutment A)	1d 0h	13/02/2009	14/02/2009	13/02/2009	14/02/2009
1149	Rebar fixing and shuttering formwork (Abutment A, wall)	2d 0h	30/02/2009	02/03/2009	30/02/2009	02/03/2009
1150	Concreting column, abutment A)	1d 0h	03/03/2009	04/03/2009	03/03/2009	04/03/2009
1151	Stripping off formwork (column, abutment A)	1d 0h	17/03/2009	18/03/2009	17/03/2009	18/03/2009
1152	Bulk excavation for footing (Abutment B)	10d 0h	21/02/2009	31/02/2009	21/02/2009	31/02/2009
1153	Formwork - Abutment B	4d 0h	13/02/2009	17/02/2009	13/02/2009	17/02/2009
1154	Formwork and rebar fixing (Abutment B, footing)	1d 0h	13/02/2009	14/02/2009	13/02/2009	14/02/2009
1155	Concreting the footing (Abutment B)	1d 0h	17/02/2009	18/02/2009	17/02/2009	18/02/2009
1156	Stripping off the formwork (footing Abutment B)	2d 0h	18/02/2009	20/02/2009	18/02/2009	20/02/2009
1157	Rebar fixing and shuttering formwork (Abutment B, wall)	2d 0h	18/02/2009	20/02/2009	18/02/2009	20/02/2009
1158	Concreting column, Abutment B)	1d 0h	20/02/2009	21/02/2009	20/02/2009	21/02/2009
1159	Stripping off formwork (column, Abutment B)	1d 0h	23/02/2009	24/02/2009	23/02/2009	24/02/2009
1160	Formwork and rebar fixing for decking	2d 0h	11/02/2010	13/02/2010	11/02/2010	13/02/2010
1161	Concreting decking	2d 0h	13/02/2010	15/02/2010	13/02/2010	15/02/2010
1162	Stripping off formwork (decking)	3d 0h	16/02/2010	19/02/2010	16/02/2010	19/02/2010
1163	Railing installation (decking)	5d 0h	18/02/2010	23/02/2010	18/02/2010	23/02/2010
1164	Gabion (ch 215-220 LHS) TQ2	30d 0h	13/02/2011	17/02/2011	13/02/2011	17/02/2011
1165	Trench excavation	8d 0h	10/02/2009	18/02/2009	10/02/2009	18/02/2009
1166	Formation of gabion wall	8d 0h	17/02/2009	25/02/2009	17/02/2009	25/02/2009
1167	Fabrication of gabion units	14d 0h	21/02/2009	05/03/2009	21/02/2009	05/03/2009
1168	1st layer (ch 215-220 LHS)	1d 0h	21/02/2009	22/02/2009	21/02/2009	22/02/2009
1169	2nd layer (ch 215-220 LHS)	3d 0h	24/02/2009	27/02/2009	24/02/2009	27/02/2009
1170	3rd layer (ch 215-220 LHS)	3d 0h	28/02/2009	03/03/2009	28/02/2009	03/03/2009
1171	4th layer (ch 215-220 LHS)	1d 0h	03/03/2009	04/03/2009	03/03/2009	04/03/2009
1172	Trench excavation and replacing grade 200	4d 0h	10/02/2010	14/02/2010	10/02/2010	14/02/2010
1173	Formation of gabion wall with G200	15d 0h	15/02/2010	30/02/2010	15/02/2010	30/02/2010
1174	1st layer - 5th layer (ch 185-235 LHS)	3d 0h	16/02/2010	19/02/2010	16/02/2010	19/02/2010
1175	G500 toe in front of gabion	2d 0h	19/02/2010	21/02/2010	19/02/2010	21/02/2010
1176	Area N	102d 0h	28/02/2008	20/02/2011	28/02/2008	20/02/2011

Project: Revised M. Prog (Rev.08) Rollled Up Progress
 Date: Aug 2008 Rollled Up Critical Task
 Consultant: AECOM Rollled Up Milestone

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

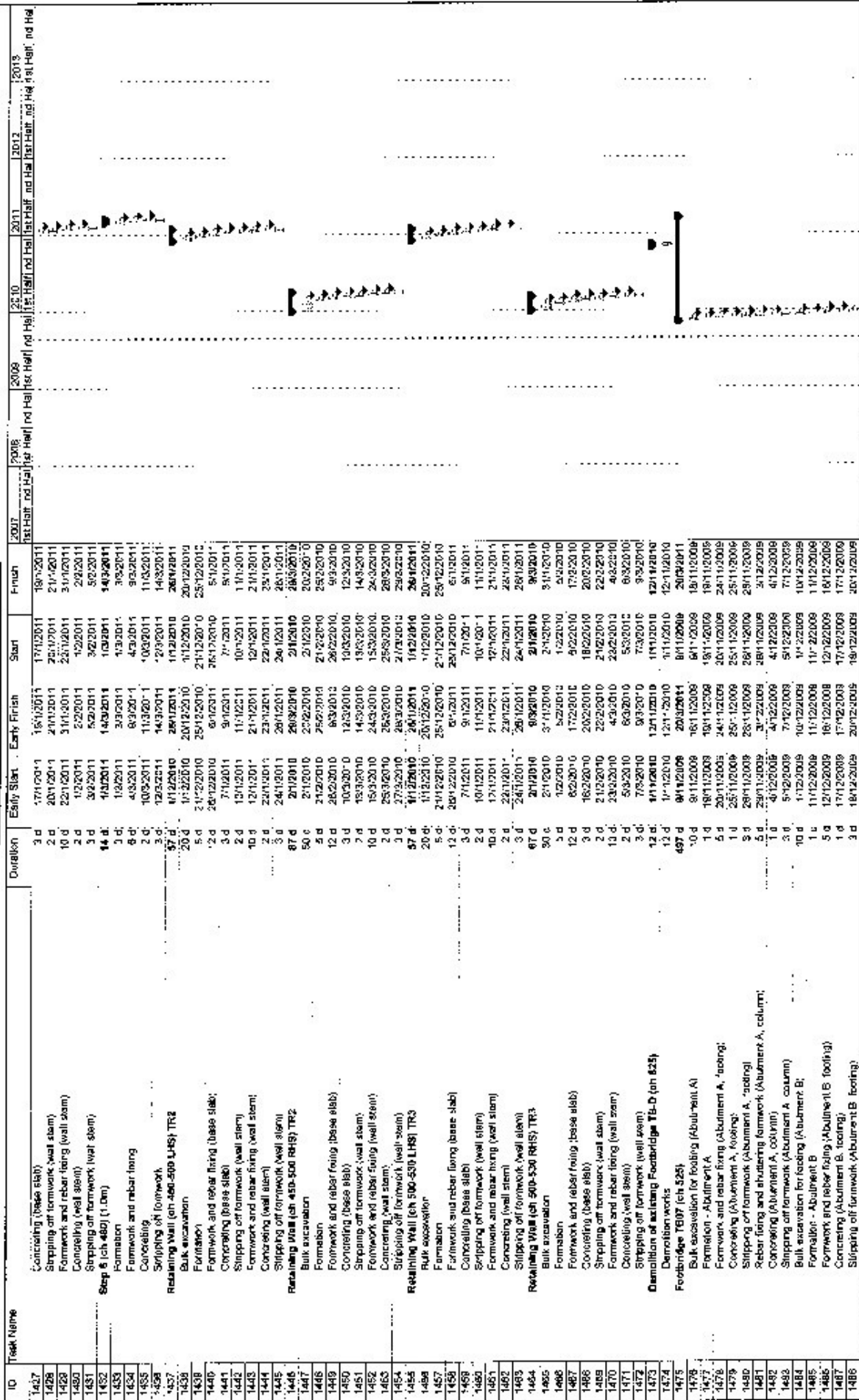


ID	Task Name	Duration	Early Start	Early Finish	Start	Finish
1241	Stripping off formwork (wall stem)	2 d	11/12/2010	12/12/2010	11/12/2010	12/12/2010
1242	Formwork and rebar tying (wall stem)	10 d	13/12/2010	23/12/2010	13/12/2010	23/12/2010
1243	Concreting (wall stem)	2 d	23/12/2010	24/12/2010	23/12/2010	24/12/2010
1244	Stripping off formwork (wall stem)	3 d	25/12/2010	27/12/2010	25/12/2010	27/12/2010
1245	Step 3 (ch 305) (1.4m)	14 d	1/1/2011	14/1/2011	1/1/2011	14/1/2011
1246	Formation	5 d	1/1/2011	6/1/2011	1/1/2011	6/1/2011
1247	Formwork and rebar tying	5 d	6/1/2011	11/1/2011	6/1/2011	11/1/2011
1248	Concreting	2 d	11/1/2011	13/1/2011	11/1/2011	13/1/2011
1249	Stripping off formwork	3 d	13/1/2011	16/1/2011	13/1/2011	16/1/2011
1250	Maintenance Sitecase (ch 315 LHS)	6 d	16/1/2011	22/1/2011	16/1/2011	22/1/2011
1251	Formwork and concreting	6 d	16/1/2011	22/1/2011	16/1/2011	22/1/2011
1252	Gabion (ch 316,330 LHS) TG2 (replaced AD1)	5 d	21/1/2011	26/1/2011	21/1/2011	26/1/2011
1253	Trench excavation and replacing grade 200	40 d	21/1/2011	10/1/2011	21/1/2011	10/1/2011
1254	Formation of gabion wall with G200	2 d	11/1/2011	12/1/2011	11/1/2011	12/1/2011
1255	1st layer - 5th layer (ch 315-330 LHS)	10 d	13/1/2011	23/1/2011	13/1/2011	23/1/2011
1256	G200 tie in front of gabion	3 d	23/1/2011	26/1/2011	23/1/2011	26/1/2011
1257	Retaining Wall (ch 316-330 RHS) TR1 (replaced by AD1)	87 d	1/1/2011	27/1/2011	1/1/2011	27/1/2011
1258	Bulk excavation	20 d	1/1/2011	21/1/2011	1/1/2011	21/1/2011
1259	Formation	5 d	21/1/2011	26/1/2011	21/1/2011	26/1/2011
1260	Formwork and rebar tying (base slab)	12 d	25/1/2011	7/2/2011	25/1/2011	7/2/2011
1261	Concreting (base slab)	3 d	6/2/2011	9/2/2011	6/2/2011	9/2/2011
1262	Stripping off formwork (wall stem)	2 d	11/2/2011	13/2/2011	11/2/2011	13/2/2011
1263	Formwork and rebar tying (wall stem)	10 d	13/2/2011	23/2/2011	13/2/2011	23/2/2011
1264	Concreting (wall stem)	2 d	23/2/2011	25/2/2011	23/2/2011	25/2/2011
1265	Stripping off formwork (wall stem)	3 d	25/2/2011	28/2/2011	25/2/2011	28/2/2011
1266	Demolition of existing Footbridge TB-A (ch 325)	12 d	1/1/2011	13/1/2011	1/1/2011	13/1/2011
1267	Demolition works	321 d	1/1/2011	13/1/2011	1/1/2011	13/1/2011
1268	Footbridge TB04 (ch 336)	10 d	1/2/2011	11/2/2011	1/2/2011	11/2/2011
1269	Bulk excavation for footing (Abutment A)	1 d	1/2/2011	2/2/2011	1/2/2011	2/2/2011
1270	Formation - Abutment A	1 d	2/2/2011	3/2/2011	2/2/2011	3/2/2011
1271	Formwork and rebar tying (Abutment A footing)	5 d	3/2/2011	8/2/2011	3/2/2011	8/2/2011
1272	Concreting (Abutment A footing)	1 d	8/2/2011	9/2/2011	8/2/2011	9/2/2011
1273	Stripping off formwork (Abutment A footing)	3 d	9/2/2011	12/2/2011	9/2/2011	12/2/2011
1274	Rebar tying and shuttering formwork (Abutment A column)	5 d	12/2/2011	17/2/2011	12/2/2011	17/2/2011
1275	Stripping off formwork (Abutment A column)	3 d	17/2/2011	20/2/2011	17/2/2011	20/2/2011
1276	Bulk excavation for footing (Abutment B)	1 d	17/2/2011	18/2/2011	17/2/2011	18/2/2011
1277	Formation - Abutment B	1 d	18/2/2011	19/2/2011	18/2/2011	19/2/2011
1278	Formwork and rebar tying (Abutment B footing)	1 d	19/2/2011	20/2/2011	19/2/2011	20/2/2011
1279	Concreting (Abutment B footing)	3 d	20/2/2011	23/2/2011	20/2/2011	23/2/2011
1280	Stripping off formwork (Abutment B footing)	1 d	23/2/2011	24/2/2011	23/2/2011	24/2/2011
1281	Rebar tying and shuttering formwork (Abutment B column)	3 d	24/2/2011	27/2/2011	24/2/2011	27/2/2011
1282	Stripping off formwork (Abutment B column)	1 d	27/2/2011	28/2/2011	27/2/2011	28/2/2011
1283	Bulk excavation for footing (Abutment B)	1 d	28/2/2011	29/2/2011	28/2/2011	29/2/2011
1284	Formation - Abutment B	1 d	29/2/2011	30/2/2011	29/2/2011	30/2/2011
1285	Formwork and rebar tying (Abutment B footing)	1 d	30/2/2011	31/2/2011	30/2/2011	31/2/2011
1286	Concreting (Abutment B footing)	3 d	31/2/2011	3/3/2011	31/2/2011	3/3/2011
1287	Stripping off formwork (Abutment B footing)	1 d	3/3/2011	4/3/2011	3/3/2011	4/3/2011
1288	Rebar tying and shuttering formwork (Abutment B column)	5 d	4/3/2011	9/3/2011	4/3/2011	9/3/2011
1289	Stripping off formwork (Abutment B column)	1 d	9/3/2011	10/3/2011	9/3/2011	10/3/2011
1290	Bulk excavation for footing (Abutment B)	3 d	10/3/2011	13/3/2011	10/3/2011	13/3/2011
1291	Formation - Abutment B	1 d	13/3/2011	14/3/2011	13/3/2011	14/3/2011
1292	Formwork and rebar tying for stacking	3 d	14/3/2011	17/3/2011	14/3/2011	17/3/2011
1293	Concreting (stacking)	20 d	17/3/2011	6/4/2011	17/3/2011	6/4/2011
1294	Stripping off formwork (stacking)	3 d	6/4/2011	9/4/2011	6/4/2011	9/4/2011
1295	Railing installation (stacking)	5 d	9/4/2011	14/4/2011	9/4/2011	14/4/2011
1296	Gabion (ch 330-345 LHS) TG3 (replaced AD1)	372 d	8/2/2011	14/2/2011	8/2/2011	14/2/2011
1297	Trench excavation and replacing grade 200	65 d	21/2/2011	25/1/2011	21/2/2011	25/1/2011
1298	Formation of gabion wall with G200	40 d	21/2/2011	10/1/2011	21/2/2011	10/1/2011
1299	1st layer - 5th layer (ch 330-345 LHS)	2 d	11/1/2011	12/1/2011	11/1/2011	12/1/2011
1300	G200 tie in front of gabion	10 d	13/1/2011	22/1/2011	13/1/2011	22/1/2011
1301	Step 4 (ch 346) (1.4m)	3 d	22/1/2011	25/1/2011	22/1/2011	25/1/2011
1302	Formation	14 d	1/2/2011	14/2/2011	1/2/2011	14/2/2011
1303	Formwork and rebar tying	3 d	14/2/2011	17/2/2011	14/2/2011	17/2/2011
1304	Concreting	5 d	17/2/2011	22/2/2011	17/2/2011	22/2/2011
1305	Stripping off formwork	2 d	22/2/2011	24/2/2011	22/2/2011	24/2/2011
1306	Retaining Wall (ch 346-360 LHS) TR1 (replaced by AD1)	47 d	1/2/2011	16/4/2011	1/2/2011	16/4/2011
1307	Bulk excavation	10 d	1/2/2011	11/2/2011	1/2/2011	11/2/2011
1308	Formation	5 d	11/2/2011	16/2/2011	11/2/2011	16/2/2011

Project: Revised M. Prog (Rev 03)
Data Date: Aug 2009
Consultant: AECOM

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. 09)**

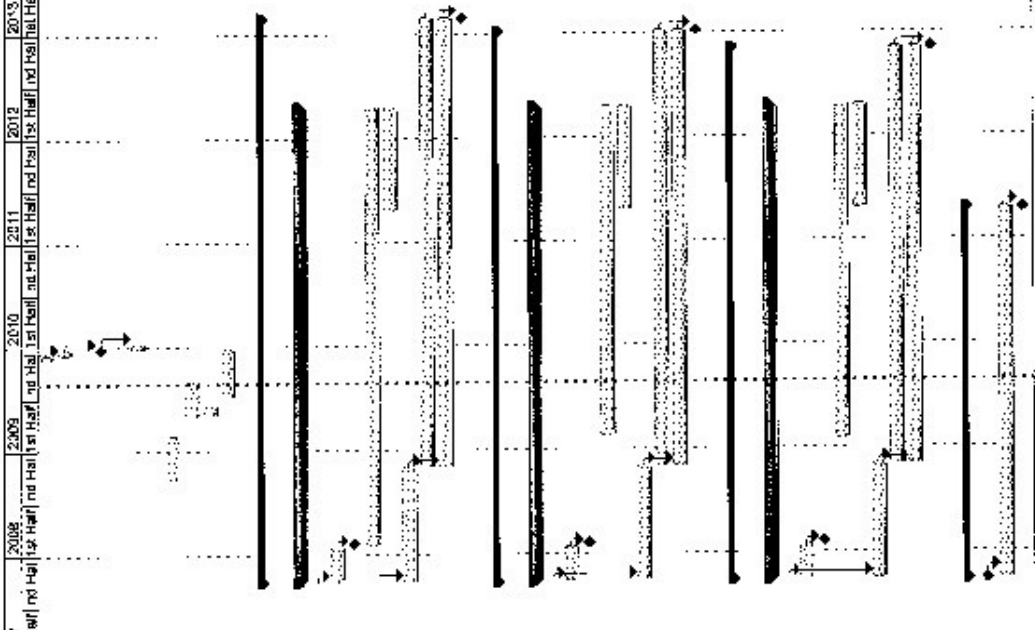


Project: Revised M. Prog (Rev.08) Roller Up Progress
 Date Draw: Aug. 2009 Roller Up Critical Task
 Consultant: AECOM Roller Up Milestone

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
							1st Half	2nd Half	1st Half	2nd Half	1st Half	2nd Half	1st Half
1678	Road Reimbursement (Stage 2)	18 d	16/11/2009	31/12/2009	18/11/2009	31/12/2009							
1677	Road Paving (Remedial (stage 1))	18 d	4/11/2009	21/11/2009	4/11/2009	21/11/2009							
1676	Completion of Work at Section 4	D.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	Variation Order No.23 Construction of 300mm dia. Ductile Iron Pipe underneath the Proposed Piling	190 d	28/9/2008	22/2/2010	28/9/2008	22/2/2010							
1682	Variation Order No. 34 Watermain Diversion Works at Ping Long	125 d	30/4/2009	1/8/2010	30/4/2009	1/8/2010							
1683	Variation Order No. 85 Clearing of Siltbank Course between Ping Long Box Culvert and Upper Le	31 d	7/5/2009	6/6/2009	7/5/2009	6/6/2009							
1684	Variation Order No. 115 Manual Vehicular Traffic Signal for TPA at Ping Long	106 d	9/7/2009	2/11/2010	9/7/2009	2/11/2010							
1687	Section 5 - Landscape Establishment Works (Portion B, C, D, E, F, G, H & I)	1360 d?	23/9/2007	27/2/2013	23/9/2007	27/2/2013							
1688	Section 5 Landscape Works	1695 d	28/9/2007	18/4/2012	28/9/2007	18/4/2012							
1689	Commencement of Works	1 d	28/9/2007	28/9/2007	28/9/2007	28/9/2007							
1691	Material Submission	120 d	25/9/2007	28/11/2008	26/9/2007	28/11/2008							
1692	Submission Approval	D.d.	9/2/2008	9/2/2008	9/2/2008	9/2/2008							
1693	Landscapeing Handworks	1540 d?	31/11/2008	18/4/2012	31/11/2008	18/4/2012							
1694	Landscapeing Softworks	365 d	20/4/2011	18/4/2012	20/4/2011	18/4/2012							
1695	Submission of Tree Survey	400 d	29/5/2007	1/11/2008	29/5/2007	1/11/2008							
1696	Preservation and Protection of Preserved Trees	1679 d	2/11/2008	27/2/2013	2/11/2008	27/2/2013							
1697	Landscape Establishment Works	1579 d	2/11/2008	27/2/2013	2/11/2008	27/2/2013							
1698	Completion of Works	D.d.	27/2/2013	27/2/2013	27/2/2013	27/2/2013							
1699	Section 6 - Landscape Establishment Works (Portion J, K & L)	1830 d?	28/9/2007	8/1/2013	28/9/2007	8/1/2013							
1700	Section 6 Landscape Works	1663 d	28/9/2007	18/4/2012	28/9/2007	18/4/2012							
1701	Commencement of Works	1 d	28/9/2007	28/9/2007	28/9/2007	28/9/2007							
1702	Material Submission	120 d	25/9/2007	28/11/2008	26/9/2007	28/11/2008							
1703	Submission Approval	D.d.	9/2/2008	9/2/2008	9/2/2008	9/2/2008							
1704	Landscapeing Handworks	1191 d?	14/2/2009	19/4/2012	14/2/2009	19/4/2012							
1705	Landscapeing Softworks	365 d	21/4/2011	19/4/2012	21/4/2011	19/4/2012							
1706	Submission of Tree Survey	400 d	28/9/2007	1/11/2008	28/9/2007	1/11/2008							
1707	Preservation and Protection of Preserved Trees	1529 d	2/11/2008	8/1/2013	2/11/2008	8/1/2013							
1708	Landscape Establishment Works	1529 d	2/11/2008	8/1/2013	2/11/2008	8/1/2013							
1709	Completion of Works	D.d.	8/1/2013	8/1/2013	8/1/2013	8/1/2013							
1710	Section 7 - Landscape Establishment Works (Portion L, N & P)	1868 d?	28/9/2007	7/1/2012	28/9/2007	7/1/2012							
1711	Section 7 Landscape Works	1695 d	28/9/2007	18/4/2012	28/9/2007	18/4/2012							
1712	Commencement of Works	1 d	28/9/2007	28/9/2007	28/9/2007	28/9/2007							
1713	Material Submission	120 d	26/9/2007	28/11/2008	26/9/2007	28/11/2008							
1714	Submission Approval	D.d.	9/2/2008	9/2/2008	9/2/2008	9/2/2008							
1715	Landscapeing Handworks	1176 d?	30/1/2009	18/4/2012	30/1/2009	18/4/2012							
1716	Landscapeing Softworks	365 d	21/4/2011	19/4/2012	21/4/2011	19/4/2012							
1717	Submission of Tree Survey	400 d	28/9/2007	1/11/2008	28/9/2007	1/11/2008							
1718	Preservation and Protection of Preserved Trees	1467 d	2/11/2008	7/1/2012	2/11/2008	7/1/2012							
1719	Landscape Establishment Works	1467 d	2/11/2008	7/1/2012	2/11/2008	7/1/2012							
1720	Completion of Works	D.d.	7/1/2012	7/1/2012	7/1/2012	7/1/2012							
1721	Section 8 - All Remaining Work at all Portions	1900 d	28/9/2007	18/4/2011	28/9/2007	18/4/2011							
1722	Commencement of Works	D.d.	28/9/2007	28/9/2007	28/9/2007	28/9/2007							
1723	All remaining works at all Areas	1900 d	28/9/2007	18/4/2011	28/9/2007	18/4/2011							
1724	Completion of Works	D.d.	18/4/2011	18/4/2011	18/4/2011	18/4/2011							



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

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

Rolled Up Progress: Rolled Up Progress
 Rolled Up Critical Task: Rolled Up Critical Task
 Rolled Up Milestone: Rolled Up Milestone

Soft: Soft
 External Tasks: External Tasks

PTask: PTask

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Chiu Hing Construction & Transportation Co., Ltd

Appendix J: 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. 2)
Upper Tai Po River**

**July 2009
(October 2009 amended)**



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. 2) Upper Tai Po River

Ecological Impact Monitoring Report (No. 2)

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2 Summary Of Major Points	1
3 Summary Of The Construction Activities For The Month	2
4 Monitoring Methodology	4
5 Monitoring Data	4
6 Comments And Conclusions	8
7 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 2 ecological impact monitoring report for the project conducted in July 2009. It contents the following subsections:
 - Summary of major points
 - Summary of the construction activities for the month
 - Monitoring methods
 - Monitoring data; and
 - Comments and conclusions

2 Summary of Major Points

- Field ecological monitoring was undertaken in mid of July 2009;
- Stream habitat at upper section of Upper Tai Po River (Photo 1) was changed due to drainage works while lower section was unchanged; and
- Abundance of one of the target stream fauna (i.e., fish, *Parazacco spilurus*) recorded in July 2009 was lower than those recorded during baseline monitoring (before fish capture/relocation took place). Low fish population of *A. hemispinus* due to the fish capture/relocation, seasonality and as well as 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

No drainage works were undertaken in the Upper Tai Po River during this monitoring period.

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 Data

5.1 Vegetation

Vegetation growing along the affected stream was surveyed at Upper Tai Po River. About 38 flora species was recorded within the survey transects along the affected stream courses. Most recorded floras were common wetland species. *Microstegium ciliatum* was the common and dominated species in the stream habitats of lower stream section. Most vegetation at upper 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 0.4m 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, 8 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, 4 species of dragonfly species were recorded during the surveys in current wet 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* and *Pomacea canaliculata* at the lower river channel. Most area of the affected upper stream section was covered with geotextile 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 baseline surveys. In total, 9 species freshwater fish were recorded. Exotic fish such as *Xiphophorus hellerii* 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 as well as 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. 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 (1.32 mg N/L and 0.22 mg N/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 at upper stream section 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 Comments and Conclusions

Ecological impact monitoring was carried out during July 2009 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 population of the fish was reduced as a result of capture survey and as well as engineering works. 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.

Aquatic and riparian vegetation at the lower stream section was similar to those recorded during baseline surveys. However, most vegetation was cleared at upper stream section due to 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 6.3, pH 7.28, Nitrate (mg N/L) 0.07, Ammonia (mg N/L) 0.01 and BOD (mg/L) <2. Water quality was become poor at lower stream section due to domestic waste discharged from villages. No significant change in water quality was detected after comparing the results with baseline monitoring data.

7 REFERENCES

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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: Fish *Schistura fasciolata*

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	Jul-09
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	+	+

Note:

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

Ecological Impact Monitoring ProgrammeTable 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)

		Stream	Oct-07				Jul-09					
		Transect	T1		T2		Control		T1		T2	
			Height (cm)	%	Height (cm)	%	Height (cm)	%	Height (cm)	%	Height (cm)	%
Family	Species	Chinese name										
Asteraceae	<i>Mikania micrantha</i>	薇甘菊	0.4	15	1	40	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					0.7	30
Euphorbiaceae	<i>Macaranga tanarius</i>	血桐	2	2			5	5	3	5	1.5	5
Araceae	<i>Alocasia odora</i>	海芋	1.5	23							2	30
Araceae	<i>Colocasia esculenta</i>	芋	0.3	<1	0.4	<1	0.3	2	0.8	5		
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	2
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	2
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		
Gramineae	<i>Eleusine indica</i>	牛筋草							0.5	5		
Bare Gound								10		78		6

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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	Oct-07			Jul-09		
					Abundance			Abundance		
					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>	白頭鸚	R	C	+	3	2	++	4	7
Chinese Pond Heron	<i>Ardeola bacchus</i>	池鷺	R	C	+			+	2	3
Common Kingfisher	<i>Alcedo atthis</i>	普通翠鳥	R	C	+					
Common Koel	<i>Eudynamys scolopacea</i>	噪鳥	R	C	+					
Common Sandpiper	<i>Actitis hypoleucos</i>	磯鷗	WV&PM	C	+					
Common Tailorbird	<i>Orthotomus sutorius</i>	長尾縫葉鶯	R	C	+		1	+		1
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>	灰鶺鴒	WV	C						
Japanese White Eye	<i>Zosterops japonica(simplex)</i>	暗綠繡眼鳥	R	C		2		+	1	4
Little Egret	<i>Egretta garzetta</i>	小白鷺	R	C	+			+		1
Rufous-backed Shrike	<i>Lanius schach</i>	棕背伯勞	R	C						
Magpie	<i>Pica pica</i>	喜鵲	R	C		1				
Magpie Robin	<i>Copsychus saularis</i>	鵲鴝	R	C	+	1	1	+	1	3
Olive Backed pipit	<i>Anthus hodgsoni</i>	樹鵲	WV	C	+					
Crested bulbul (Red-whiskered)	<i>Pycnonotus jocosus</i>	紅耳鸚	R	C	+	2		++	2	6
Spotted Dove	<i>Streptopelia chinensis</i>	珠頸斑鳩	R	C	+		2	+	1	3
Spotted Munia	<i>Lonchura punctulata</i>	斑文鳥	R	U						
Tree Sparrow	<i>Passer montanus</i>	麻鷲	R	C	+	3	2			
Violet Whistling Thrush	<i>Myiophonus caeruleus</i>	紫嘯鶇	R	C	+					
White Wagtail	<i>Motacilla alba</i>	白鶺鴒	WV	C	+		1			
White-breasted Waterhen	<i>Amaurornis phoenicurus</i>	白胸苦惡鳥	R	C	+					
Yellow Bellid Prinia	<i>Prinia flaviventris</i>	灰頭鷓鴣	R	C	+					
Yellow Wagtail	<i>Motacilla flava</i>	黃鶺鴒	WV&PM	U		1				
Little Swift	<i>Apus affinis</i>	小白腰雨燕	R, SpM	C						
Green Sandpiper	<i>Tringa ochropus</i>	白腰草鶺	WV	U						
Barn Swallow	<i>Hirundo rustica</i>	家燕	PM	C						
Great Tit	<i>Parus major (commixtus)</i>	大山雀	R	C						
Number of birds									11	28
No. of species								8	6	8

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	Oct-07	Jul-09
<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>Copera 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		Oct-07		Jul-09		
				T1	T2	Reference	T1	T2
Invertebrates								
<i>Pomacea canaliculata</i>	蘋果螺	NP	VC			+		++
<i>Melanoides tuberculata</i>	瘤擬黑螺	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	+	+	+		
Crustacea								
<i>Macrobrachium hainanense</i>	海南沼蝦	NP	VC			+		
<i>Caridina contonensis</i>	廣東米蝦	NP	VC			+		
<i>Cryptopotamon anaco</i>	總刺溪蟹	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.

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	Oct-09		Reference	Jul-09		
			T1	T2		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>	異鱧	V and NP	C	++		+		
<i>Rhinogobius spp.</i>	鰕虎魚	NP	C	+		+		
<i>Schistura fasciolata</i>	橫紋南鰕	NP	C	+		+	+	
<i>Sarotherodon massambicus</i>	非洲鰱	NP	C	+				
<i>Misgurnus anguilicaudatus</i>	泥鰕	NP				+		
			2x2m fish number			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 the with the data within works area.

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

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

Stream	Oct-07	Jul-09	
Replicate	T1	T1	T2
DO (mg/L)	8.2	6.3	6
pH	6.9	7.28	6.96
Nitrate (mg N/L)	0.39	0.07	1.32
PO4-P (µg P/L)	<100	0.01	0.22
Salinity (ppt)	<0.1	0	0
Conductivity (mS/cm)	0.04	34	118
BOD (mg/L)	<2	<2	<2
Water flow at pool	0.01-0.2	0.01-0.2	
Water flow at riffle	0.2-0.5	0.2-0.5	
Sand (%)	15	15	25
Stone (%)	80	80	70
Mud (%)	5	5	5

FIGURE

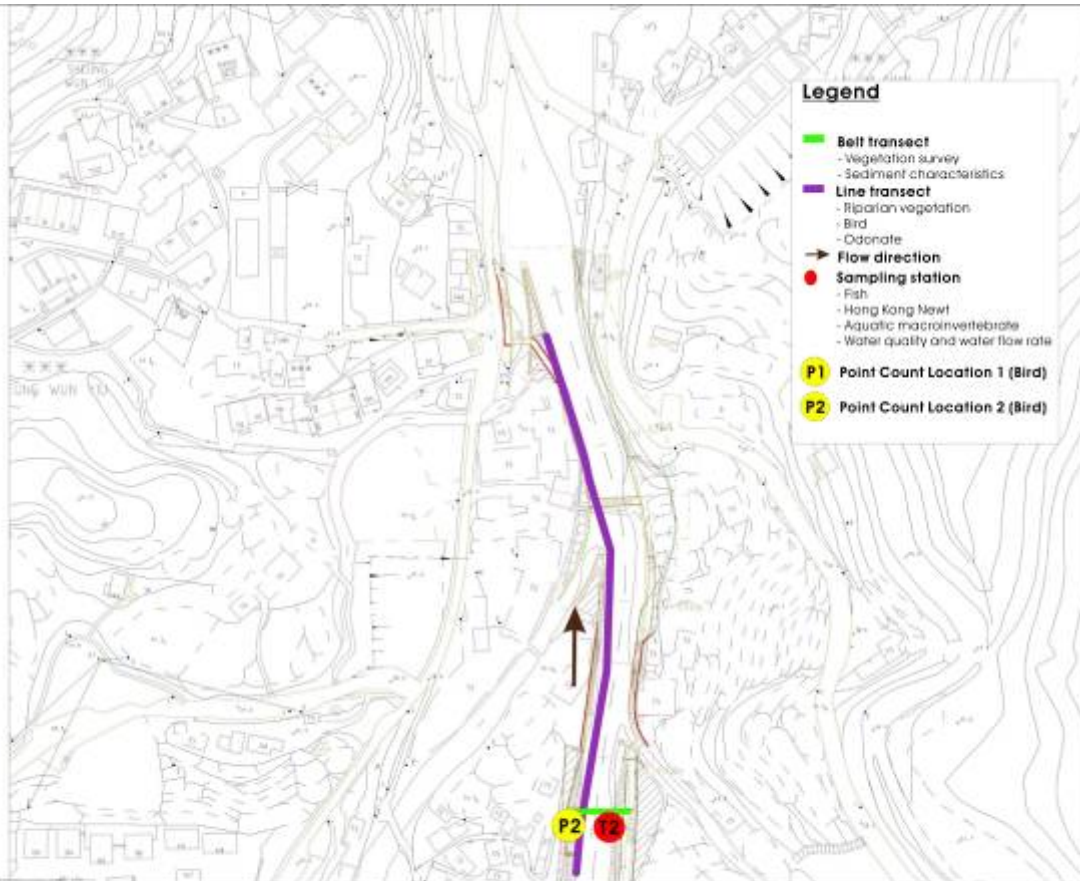


Figure 1-1. Sampling location of impact monitoring at Upper Tai Po River(Lower Section)

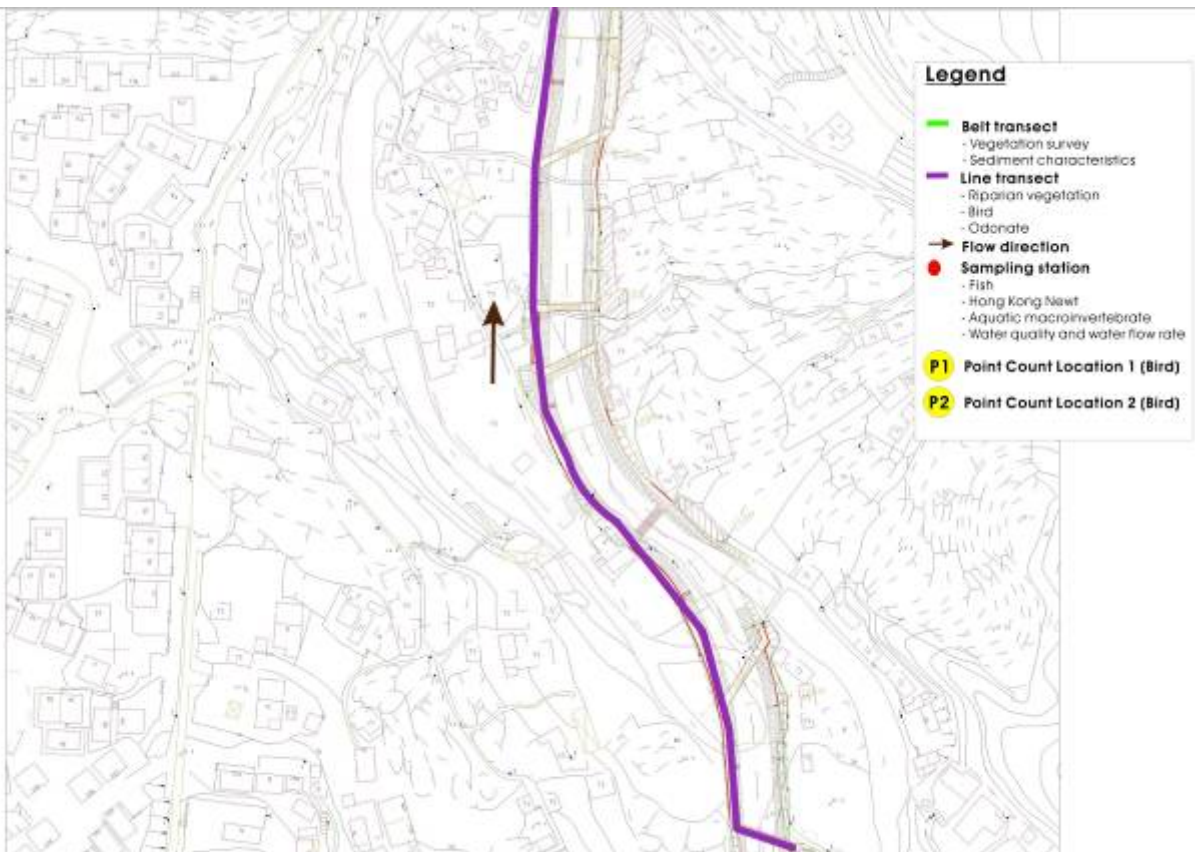


Figure 1-2. Sampling location of impact monitoring at Upper Tai Po River(Middle Section)

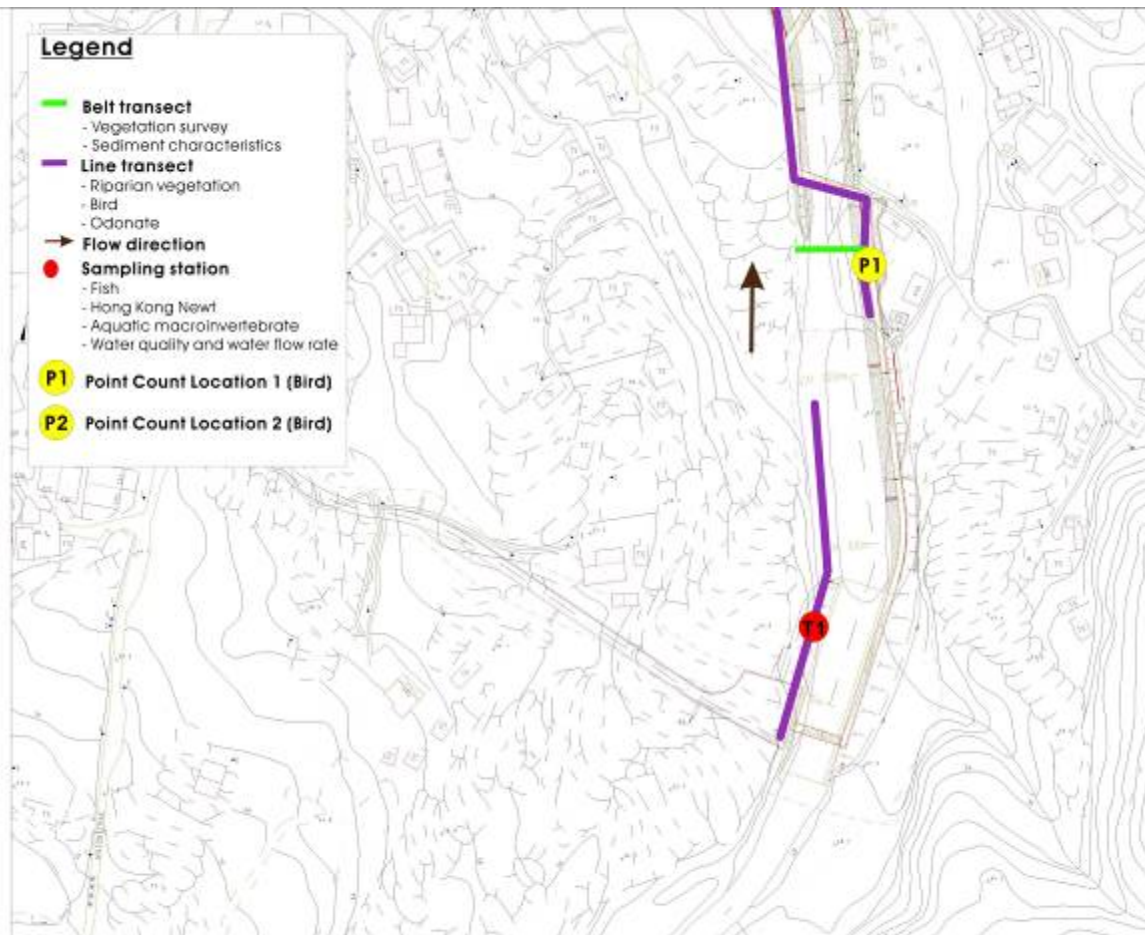


Figure 1-3. Sampling location of Impact monitoring at Upper Tai Po River(Upper Section)

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

Ecological Baseline Monitoring Report – Response to Comments
 October 2009

(Draft, by Dr. Mark Shea / China-Hong Kong Ecology Consultants)

Comments from IEC.			
No.	Report section	IEC's Comment	Responses
1.)	Appendix j, Section 3	It is stated no works was conducted during the monitoring period in section 3 of Appendix J. Yet in section 6 of Appendix J, it is reported that sediment level has increased due to works observed during field survey. As also report in section 2.5 of the main text of the report, works in river should have been suspended during the reporting month. Please ensure the sections are consistent.	The paragraph in section 6 was amended to avoid confusing.
2.)	Appendix j, Section 6	It is concluded that the concentration of sediment in water has increased in the survey stream. Please explain the basis of this conclusion, as the level of suspended solids in the water was not tested.	It was based on visual observation of the water color. The paragraph in section 6 was amended to avoid confusing.
3.)	Appendix j, table	Only monitoring data from July 2009 were presented in the tables. It is recommended to provide data from the pervious monitoring/baseline monitoring as well for easy comparison and referencing	The results of the pervious monitoring and baseline survey were included in the data for easy comparison and referencing

end