Drainage Service Department

Monthly Environmental Monitoring & Auditing report for

Contract No.DC/2009/22
Drainage Improvement in Shuen Wan, Tai Po – Contract 1

January 2013

Environmental Pioneers & Solutions Limited
Flat A, 19/F, Chaiwan Industrial Building,
20 Lee Chung Street, Chai Wan, Hong Kong
Tel: 2556 9172 Fax: 2856 2010

APPROVAL SHEET

The Contents of this report have been

Certified by:

Signature: _____ Date: 21 Feb 2013

Miss. Goldie Fung
(Environmental Team Leader)

Ecologist (Asia Ecological Consultants Ltd.)

Signature: _____ Date: 21 February 2013

Dr. Michael Leven
(Ecologist)

RLA (Environmental Resources Management)

Signature: _____ Date: 20/2/2013

Miss. Christina Ip
(RLA)

and Verified by:

IEC (ENVIRON Hong Kong Limited)

Signature: _____ Date: 22 Feb 2013

Mr. Tony Cheng
(IEC)

TABLE OF CONTENT

EXECUTIVE SUMMARY v
1 Introduction 1
2 Construction Stage 2
2.1 Construction activities in the reporting period 2
2.2 Construction activities for the coming month 2
2.3 Environmental Status 3
3 Noise Monitoring 4
3.1 Monitoring Parameters and Methodology 4
3.2 Monitoring Equipment 4
3.3 Monitoring Locations 5
3.4 Monitoring Results and Interpretation 7
3.5 Action and Limit level for Construction Noise 7
3.6 Monitoring Schedule for the next reporting period 8
4 Water Monitoring 10
4.1 Water Quality Monitoring Parameters and Methodology 10
4.2 Monitoring Equipment 10
4.3 Monitoring Locations 11
4.4 Monitoring Frequency 14
4.5 Monitoring Results and Interpretation 14
4.6 Action and limit level for Water Quality 15
4.7 Monitoring Schedule for the next reporting period 20
5 Hydrological Characteristics Monitoring 21
5.1 Hydrological Characteristics Monitoring Parameters and Methodology 21
5.2 Monitoring Equipment 21
5.3 Monitoring Locations 21
5.4 Monitoring Frequency 23
5.5 Monitoring Results and Interpretation 23
5.6 Action and limit level for Hydrological Characteristics 23
5.7 Monitoring Schedule for the next reporting period 26
6 Ecological Monitoring of ECA 27
6.1 Ecological Monitoring of ECA 27
6.2 Monitoring Results 27
7 Landscape and Visual 28
7.1 Introduction 28
7.2 Scope of Monitoring 29

7.3 Landscape and Visual Monitoring Results.....30
7.4 Audit Schedule.....40
8 Action taken in Event of Exceedance.....41
9 Construction waste disposal.....42
10 Status of Permits and Licenses obtained.....44
11 Compliant Log.....45
12 Site Environmental Audits.....46
12.1 Site Inspection.....46
12.2 Compliance with legal and Contractual requirement.....48
12.3 Implementation status and effectiveness of the mitigation measures 48
13 Future Key issues and recommendations.....49
14 Conclusions.....50

LIST OF APPENDIXES

Appendix A: Site Location
Appendix B: Key Personal Contact information chart
Appendix C: Calibration Certificates for measuring instruments
Appendix D: Construction Noise Monitoring Data
Appendix E: Water Quality Monitoring Data
Appendix F: Hydrological Characteristics Monitoring Data
Appendix G: Landscape and Visual Monitoring Photos
Appendix H: Implementation status of environmental protection and mitigation measures
Appendix I: Construction programme
Appendix J: Three month rolling programme
Appendix K: Graphical plots of trends of monitored parameters
Appendix L: Ecological monitoring report
Appendix M: Photo of Wai Ha River in January 2013
Appendix N: Approved Proposal of Revision for Action/Limit Level Criteria of Water Quality Monitoring

EXECUTIVE SUMMARY

This is the twenty-third monthly Environmental Monitoring and Audit (EM&A) Report for the drainage improvement works in Shuen Wan, Tai Po under Drainage Services Department Contract No. DC/2009/22 entitled "Drainage Improvement Works in Shuen Wan, Tai Po – Contract 1". This report concludes the impact monitoring for the activities undertaken during the period from 1st of January 2013 to 31st January 2013. The major site activities in this reporting period were mainly laying of E&M ducting for the proposal store room, concreting for outfall structure, construction for CLP's draw pit & cables ducting, installation of overhead traveling crane pump hall, installation of swithchroom, laying of DN2100 storm relief drain (Ch20 to CH70) at Ting Kok Road, construction of the proposed box culvert bay 2, 3, 8A, 15 & 16 and construction of jacking pit for cross road DN2800 twin pipe.

The Environmental Team (ET) is responsible for the EM&A works required in the EM&A manual (revision 3). Site inspections were carried out on weekly basis to investigate and audit the equipment and work methodologies with respect to pollution control and environmental mitigation. The weekly inspections records and photos taken were kept.

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

Impact monitoring for construction noise was conducted in the reporting period. No exceedance of A/L level was reported.

Furthermore, impact monitoring for water quality was conducted. Total 7 abnormal incidents of water quality criteria were recorded in this reporting month. During the reporting period, no construction works were carried out at the river bed. Proper mitigation measures were implemented by contractor to avoid site water release to the Wai Ha river and no particular observation of defective site activities were found causing water contamination. The exceedances of Turbidity were believed to be mainly attributed by natural fluctuation. And, since the recorded levels of Turbidity at control station had also exceeded its baseline action level, the exceedances recorded at W2 were unlikely to be related to the Project.

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

The ECA was handed over to AFCD on 16th October 2012 and the post-establishment phase monitoring has then commenced and undertaken by AFCD. Therefore, no site visit and ecological monitoring by the Wetland Specialist from the Main Contractor and the Ecologist from the IEC respectively were carried out in the reporting month.

According to Table 6.17 of the EM&A Manual, ecological monitoring of the ECA will be carried out by qualified ecologists during the 1-year wetland establishment period of the ECA before handing over to AFCD for their post establishment monitoring. Establishment phase of the ECA began in September 2011, ecological monitoring programme was conducted and monitoring data was presented in respective monthly EM&A reports. Ecological monitoring programme ended in September 2012 and hence there will be no ECA report attached in EM&A reports.

According to the condition of Section 6.11 of the EM&A Manual, monitoring of the transplanted sapling has been covered a period of 12 months after the transplant. Therefore, the monitoring for Pavetta hongkongensis was not carried out in this reporting period.

Visual and landscape monitoring has been conducted for the project. Details of the observations are referred to sections 7.

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

Site works proposed to be carried out in the upcoming month at Area A & B are refer to section 2.2.

It is expected that noise, air and water quality impacts will be resulted from the works. ET has reminded the contractor to provide environmental pollution control measures wherever necessary and to keep a good environmental management at site practice. The recommended mitigation measures proposed for the project as well as implementation status are refer to section 12.3.

The ET will continue to implement the environmental monitoring & audit programme in accordance with the EM&A Manual (revision 3) and Environmental Permit requirement.

1 Introduction

This is the twenty-third monthly Environmental Monitoring and Audit (EM&A) Report for the drainage improvement works in Shuen Wan, Tai Po under Drainage Services Department Contract No. DC/2009/22 entitled "Drainage Improvement Works in Shuen Wan, Tai Po – Contract 1". The site layout plan is shown in Appendix A. The Environmental Team, Environmental Pioneers & Solutions Limited was appointed by Kwan Lee – Kuly Joint Venture to prepare the report. The report is to be submitted to the Contractor, the Engineer and the IEC.

This report presents the results of the environmental monitoring of the project activities conducted within the reporting period from 1st January 2013 to 31st January 2013. This report included the noise monitoring, water quality monitoring, hydrological characteristics monitoring, visual and landscape monitoring, and regular site inspections once per week for verification of implementation of the mitigation measures as recommended in the Environmental Permit (EP-303/2008) (EP), EM&A Manual (revision 3) and the Contractor's Environmental Management Plan (EMP).

2 Construction Stage

2.1 Construction activities in the reporting period

Major activities in the reporting period included the followings:

Area A.:

- Laying of E&M ducting for the proposed store room.
- Concreting for outfall Structure.
- Construction for CLP's draw pit & cables ducting.
- Installation of overhead traveling crane pump hall.
- Installation of switchboard for switchroom.
- Laying of DN2100 storm relief drain (CH20 to CH70) at Ting Kok Road.

Area B.:

- Construction of the proposed box culvert bay 2, 3, 8A, 15 & 16
- Construction of jacking pit for cross road DN2800 twin pipe.

2.2 Construction activities for the coming month

Proposed key construction works in the coming month will include:

Area A (Pumping Station)

1. Construction of DN2100 Storm relief drain at Ting Kok Road.
2. Construction of the proposed DN1800 concrete pipe.
3. Construction of the proposed outfall structure and box culvert.
4. Water tightness test for Pumping Station
5. Green Roof of Pumping Station
6. Construction of Tidal Measurement Chamber

Area B (Tung Tsz Nursery)

1. Construction of box culvert bay 2, 3, 8A, 15 & 16
2. Construction of jacking pit for cross road DN2800 twin pipe.

2.3 Environmental Status

Appendix A shows the drawing of the project area.

Locations of the monitoring and control stations with environmental sensitive receivers are presented in Section 3.3, 4.3, and 5.3 for noise, water quality, and hydrological characteristics respectively.

3 Noise Monitoring

3.1 Monitoring Parameters and Methodology

The construction noise level was measured in terms of the A-weighted equivalent continuous sound pressure level (L_{eq}). $L_{eq\ (30minutes)}$ was used as the monitoring parameter for the impact monitoring in the time period between 0700 to 1900 hours on normal weekdays. For all other time period, $L_{eq\ (5minutes)}$ was employed for comparison with the Noise Control Ordinance (NCO) criteria.

Noise measurement results obtained from each monitoring location were recorded in the Construction Noise Monitoring Data Sheet (**Appendix D**) immediately after the measurement. As supplementary information for data auditing, statistical results L_{10} and L_{90} were also be recorded for reference.

In case of non-compliance with the construction noise criteria, more frequent monitoring, as specified in the Action plan in Table 3.5.2, shall be carried out. This additional monitoring shall be carried out until the recorded noise levels are rectified or proved to be irrelevant to the construction activities.

3.2 Monitoring Equipment

The sound level meters and calibrators comply with the International Electrotechnical Commission Publications 651:1979 (Type 1) and 804:1985 (Type 1) specifications as referred to in the Technical Memorandum (TM) to the Noise Control Ordinance was deployed as monitoring equipment for noise measurement.

Noise measurement was not be made in the presence of fog, rain, wind with a steady speed exceeding $5ms^{-1}$ or wind with gust exceeding $10ms^{-1}$. Thus wind speed was checked by the portable wind speed indicator capable of measuring the wind speed in m/s. Table 3.2.1 summarizes the equipment list for noise monitoring

Table 3.2.1 Equipment List for Noise Monitoring

Equipment	Manufacturer & Model No.	Precision Grade	Qty
Integrated sound level meter	Svantek 949	IEC 651 Type 1 IEC 804 Type 1	1
Windscreen	Microtech gefell model W2	N/A	1
Acoustical calibrator	Svantek SV30A	IEC 942 Type 1	1
Wind speed indicator	Kestrel K1000	N/A	1
Remarks: Calibration details of the sound level meter is given in **Appendix C** for reference			

3.3 Monitoring Locations

According to the Environmental Monitoring and Audit manual, impact noise monitoring for contract 1 was undertaken at two locations during the construction phase of the project. The proposed monitoring locations are summarized in Table 3.3.1. Figure 3.3.1 shows the Noise Monitoring Locations.

Noise measurement at each monitoring location was taken at a point 1m from the exterior of the selected premises and at a height of 1.2m above ground with no disturbance to the dweller and least obstructed view.

Table 3.3.1 Noise Monitoring Locations during Construction Phase

Noise Monitoring Station	Location
M1	14, Shuen Wan Chim Uk
AL1	Joint Village Office for Villages in Shuen Wan, Tai Po

In accordance with the requirements in the EM&A manual (revision 3), weekly impact monitoring was conducted. For the time period between 0700 and 1900 hours on normal weekdays, and noise parameter of $L_{eq\ (30minutes)}$ was measured. As if the construction works were carried out during restricted period (i.e. 1900-2300, 2300-0700 of next day and Sundays / general holiday), impact monitoring that comprises 3 consecutive $L_{eq\ (5minutes)}$ would be carried out.

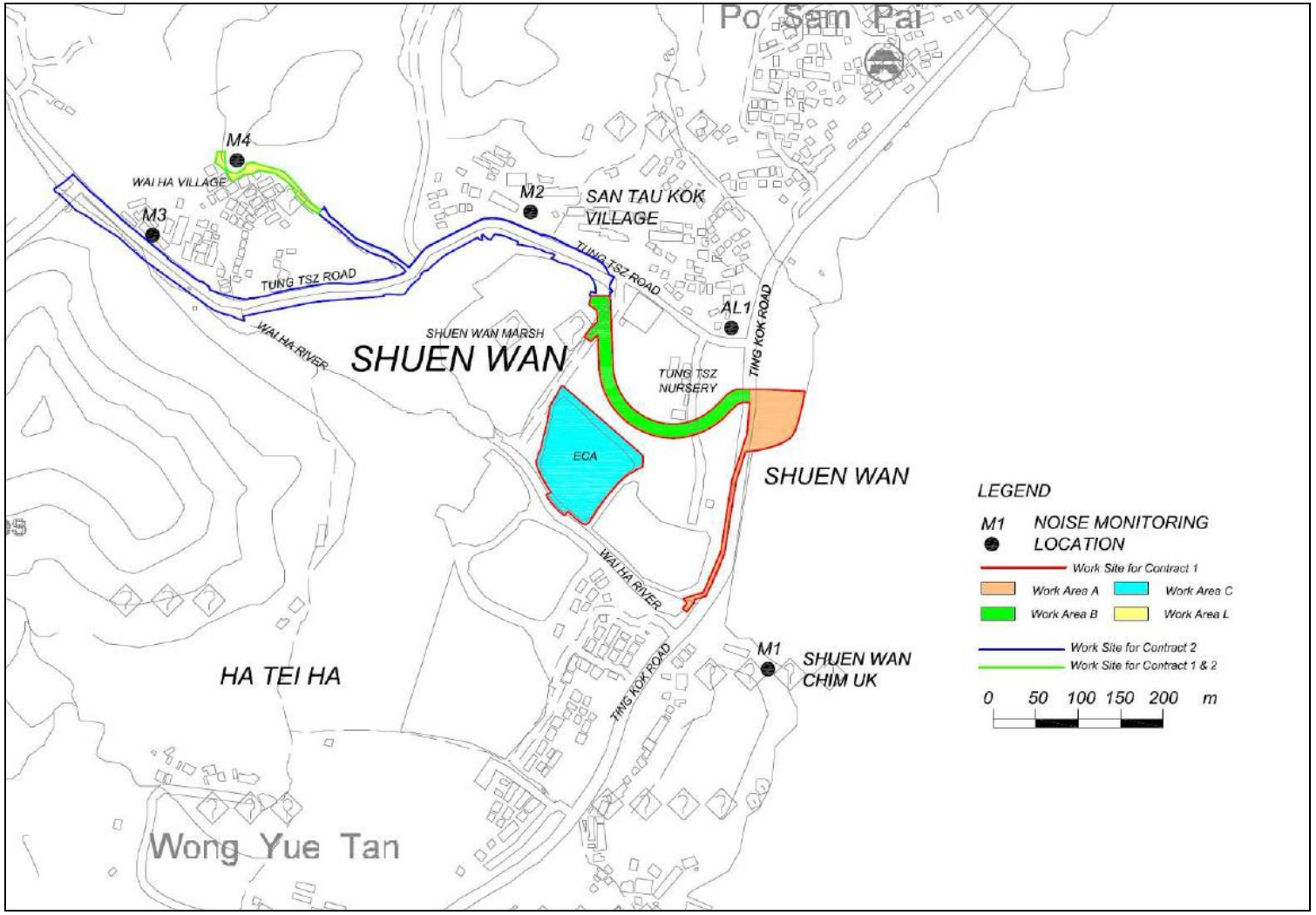


Figure 3.3.1 Impact noise monitoring locations

3.4 Monitoring Results and Interpretation

Relevant details of the noise monitoring results are presented in Table 3.4.1. The results of M1 ranged between 60.9dB (A) and 64.8dB (A), and AL1 ranged between 63.2dB (A) and 68.1dB (A), were within the limit levels and therefore, no exceedance was found.

Table 3.4.1 Noise Monitoring Results for the reporting period

Location	Parameter	Date*	Time	L_{Aeq} dB(A)	Limit dB(A)	Exceedance	Weather
M1	$L_{eq\ 30mins}$	2-Jan-13	10:25	62.1	75	N	Sunny
M1	$L_{eq\ 30mins}$	9-Jan-13	10:10	61.5	75	N	Overcast
M1	$L_{eq\ 30mins}$	16-Jan-13	11:10	61.1	75	N	Overcast
M1	$L_{eq\ 30mins}$	23-Jan-13	11:10	60.9	75	N	Cloudy
M1	$L_{eq\ 30mins}$	30-Jan-13	10:05	64.8	75	N	
AL1	$L_{eq\ 30mins}$	2-Jan-13	11:10	68.1	75	N	Sunny
AL1	$L_{eq\ 30mins}$	9-Jan-13	10:50	63.2	75	N	Overcast
AL1	$L_{eq\ 30mins}$	16-Jan-13	11:45	66.3	75	N	Overcast
AL1	$L_{eq\ 30mins}$	23-Jan-13	11:45	67.8	75	N	Cloudy
AL1	$L_{eq\ 30mins}$	30-Jan-13	10:45	65.3	75		

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

3.5 Action and Limit level for Construction Noise

The Action and Limit (A/L) levels for construction noise are defined in Table 3.5.1. Should non-compliance of the criteria occur, action in accordance with the Action Plan in Table 3.5.2 should be carried out.

There was no exceedance recorded in the reporting period.

Table 3.5.1 Action and Limit Levels for Construction noise

Time Period	Action Level	Limit Level
0700 – 1900 hours on normal weekdays	When one documented complaint is received	75dB(A)
Remarks: If works are to be carried out during restricted hours, the conditions stipulated in the construction noise permit issued by the Noise Control Authority have to be followed.		

3.6 Monitoring Schedule for the next reporting period

Noise monitoring schedule is proposed to be carried out on 6th, 20th and 27th of February 2012.

Table 3.5.2 Event / Action Plan for Construction Noise

EVENT	ET Leader	IEC	ER	CONTRACTOR
Action Level	1. Notify IEC and Contractor. 2. Carry out investigation. 3. Report the results of investigation to the IEC, ER and Contractor. 4. Discuss with the Contractor and formulate remedial measures. 5. Increase monitoring frequency to check mitigation effectiveness.	1. Review the analysed results submitted by the ET. 2. Review the proposed remedial measures by the Contractor and advise the ER accordingly. 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing. 2. Notify Contractor. 3. Require Contractor to propose remedial measures for the analysed noise problem; 4. Check remedial measures are properly implemented.	1. Submit noise mitigation proposals to IEC. 2. Implement noise mitigation proposals.

Limit Level	1. Notify IEC, ER, EPD and Contractor. 2. Identify source. 3. Repeat measurements to confirm findings. 4. Increase monitoring frequency. 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented. 6. Inform IEC, ER and EPD the causes and actions taken for the exceedances. 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results. 8. If exceedance stops, cease additional monitoring.	1. Discuss amongst ER, ET, and Contractor on the potential remedial actions. 2. Review Contractor's' remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly. 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of 2. Notify Contractor. 3. Require Contractor 4. Check remedial measures properly implemented. 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated.	1. Take immediate action to avoid f urther exceedance. 2. Submit proposals for remedial actions to IEC within 3 working days of notification. 3. Implement the agreed proposals. 4. Resubmit proposals if problem still not under control. 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated.

4 Water Monitoring

4.1 Water Quality Monitoring Parameters and Methodology

Turbidity in Nephelometric Turbidity Unit (NTU), and Dissolved Oxygen (DO) in mg/L, temperature, and pH measurements were in-situ measurements and suspended solids measurements were performed by a HOKLAS accredited laboratory using recommended reference method APHA 2540D.

4.2 Monitoring Equipment

Turbidity, DO, Salinity, pH and temperature was measured by an instrument complied with the following requirements:

The instrument is a portable as well as weatherproof multimeter complete with cable and uses a DC power source. It is capable of measuring:

- A turbidity between 0-800NTU;
- A dissolved Oxygen level in the range of 0-20mg/L and 0-200% saturation;
- A temperature of 0-50^{o}C;
- Salinity in the range of 0-40ppt;
- pH in the range of 0-14.

The measurements were performed by a portable and weatherproof multi-meter, model TOA-DKK WQC-24. The equipment was calibrated and verified by certified laboratory every 3 months to ensure they perform to the same level of accuracy as stated in the manufacturer's specification. Detailed calibration records of the multi-meter were shown in **Appendix C** for reference

Suspended solids were determined by the water samples collected from the monitoring locations for further analysis in accredited HOKLAS laboratory. Water samples were contained by polythene bottles, packed in ice (cooled in 4^{o}C without frozen) and delivered to the laboratory for analysis as soon as possible after collection.

4.3 Monitoring Locations

In accordance with the EM&A Manual (revision 3), monitoring stations for contract 1 were established at two locations, which are summarized in Table 4.3.1.

Table 4.3.1 – Water Quality Monitoring Stations

Monitoring Station	**Location**	**Coordinates**
W1	Between the Shuen Wan Marsh and ECA	E:839301 N:836386
W2	Between Tolo Harbour and Proposed Penstock	E:839542 N:836184

As illustrated in Figure 4.3.1, W1 served as the control station while W2 was the monitoring location of water quality.

According to the approved proposal of revision for Action/Limit Level Criteria of Water Quality Monitoring, two reference points (C1 & C2) were added.

Should the water quality parameters monitoring results at the monitoring station W2 exceed the water quality criteria, the water quality monitoring data of two reference points (C1 and C2) will be used as the supplementary information. The monitoring data of C1 should be used for comparison with the monitoring data of W2 that taken at flood tide; and the monitoring data of C2 should be used for comparison with the monitoring data of W2 that taken at ebb tide. The comparison of water quality between W2 and C1 at flood tide and between W2 and C2 at ebb tide is to prove whether influence of water quality is caused by the construction activities. The details of C1 and C2 are presented in **Appendix N**.

In accordance with the EM&A Manual (revision 3), measurements shall be taken at 3 water depths, namely, 1m below water surface, mid-depth and 1m above river bed, except where the water depth less than 6m, the mid-depth station may be omitted. Should the water depth be less than 3m, only the mid-depth station will be monitored.

As the depth of water was less than 3m, water samples were collected at mid-depth of each proposed monitoring stations for measurements and sample collection.

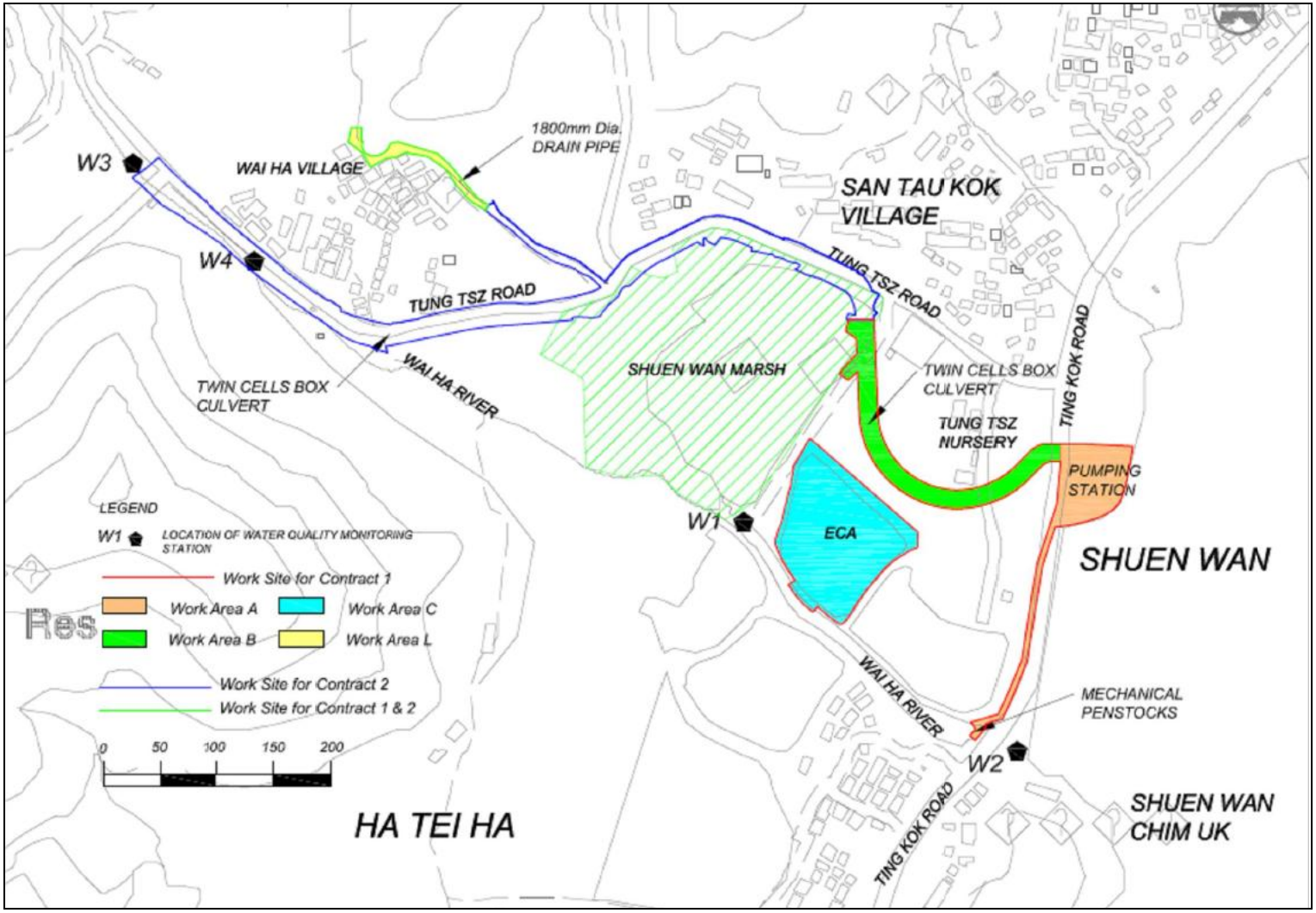


Figure 4.3.1 Water Quality Monitoring Locations

4.4 Monitoring Frequency

Impact water quality monitoring for each monitoring station were performed at mid-flood or mid-ebb tides for 3 days per week during the course of the construction river works.

Monitoring were carried out on 2nd, 4th, 7th, 9th, 11th, 14th, 16th, 18th, 21st, 23rd, 25th, 28th and 30th of January 2013.

4.5 Monitoring Results and Interpretation

Water quality monitoring was carried out thirteen times in this reporting month. Detailed on-site measurements are shown in **Appendix E**. Table 4.5.1 presents consolidated results throughout the reporting month.

There were 7 abnormal incidents of water quality limits (Turbidity) were recorded in this reporting month according to the established action and limit levels. ET has arranged site investigations for the abnormal incidents. No construction activities were carried out at the river bed during the reporting period. Proper mitigation measures were implemented by contractor to avoid site water release to the Wai Ha river and no particular observation of defective site activities were found causing water contamination; The exceedances of Turbidity were believed to be mainly attributed by natural fluctuation, since the recorded levels of Turbidity at control station had also exceeded its baseline action level, the exceedances recorded at W2 were unlikely to be related to the Project.

The water condition of Wai Ha River is presented in photo attached in **Appendix M.**

Table 4.5.1 Summary of Water Quality Monitoring Results of this reporting month

	Average of Monitoring Results					
	Temperature (°C)	*Turbidity (NTU)*	*pH*	*Dissolved Oxygen (mg/L)*	*Dissolved Oxygen (%)*	*Suspended Solids (mg/L)*
W1	22.4	4.7	7.91	6.79	77.9	12.5
W2	21.1	3.4	7.82	8.48	105.5	2.4
C1	21.5	3.15	8.21	8.19	100.5	1.6
C2	22.0	2.2	8.45	7.2	82.4	3.1

Table 4.5.2 Interpretations of abnormal incidents recorded in the reporting month

Date	**Tide**	**Parameter**	**Interpretations**
2/1/2013	Ebb	Turbidity	Exceedance was caused by natural fluctuation
7/1/2013	Flood	Turbidity	Exceedance was caused by natural fluctuation
14/1/2013	Ebb	Turbidity	Exceedance was caused by natural fluctuation
21/1/2013	Flood	Turbidity	Exceedance was caused by natural fluctuation
23/1/2013	Ebb	Turbidity	Exceedance was caused by natural fluctuation
25/1/2013	Ebb	Turbidity	Exceedance was caused by natural fluctuation
2781/2013	Ebb	Turbidity	Exceedance was caused by natural fluctuation

4.6 Action and limit level for Water Quality

Based on the criteria stipulated in EM&A manual (revision 3) and baseline water quality monitoring data obtained, the A/L levels are shown in Table 4.6.1, Table 4.6.2. The A/L levels for W1 were ignored since W1 functions as the control station for contract 1. If the water quality monitoring results at any impact stations exceeded the criteria, the actions in accordance with the Event and Action Plan in Table 4.6.3 should be taken.

Table 4.6.1 Action and Limit Levels for Water Quality at All Monitoring Stations

Parameters	**Action**	**Limit**
DO in mg/L	5 percentile of baseline data	4 mg/L or 1 percentile of baseline data
pH	N/A	6.0 – 9.0
SS in mg/L	95 percentile of baseline data or 120% of upstream control station's SS	99 percentile of baseline data or 130% of upstream control station's SS
Turbidity in NTU	95 percentile of baseline data or 120% of upstream control station's Turbidity	99 percentile of baseline data or 130% of upstream control station's Turbidity

Table 4.6.2 Action and Limit Levels for Water Quality at All Monitoring Stations

Parameters	**Monitoring Stations (Flood Tide)**				**Monitoring Stations (Ebb Tide)**			
	W1		**W2**		**W1**		**W2**	
	Action Level	**Limit Level**	**Action Level**	**Limit Level**	**Action Level**	**Limit Level**	**Action Level**	**Limit Level**
DO (mg/L)	8.07	8.07	7.81	7.69	7.12	7.02	6.77	6.31
pH	N/A	6.0-9.0	N/A	6.0-9.0	N/A	6.0-9.0	N/A	6.0-9.0
SS (mg/L)	7.7	8.1	7.7	8.6	10.5	10.9	9.4	9.9
Turbidity (NTU)	4.9	5.3	1.7	1.8	4.2	4.7	3.0	3.5

Remarks:

For DO, non-compliance of the water quality limits occurs when monitoring result is lower than the limits

For SS and turbidity, non-compliance of the water quality limits occurs when monitoring result is higher than the limits.

Table 4.6.3 Event and action Plan for Water Quality

Event	ET Leader	IEC	ER	Contractor
ACTION LEVEL				
Action level being exceeded by one sampling day	1. Repeat in-situ measurements to confirm findings; 2. Identify reasons for non-compliance and source(s) of impact; 3. Inform IEC, Contractor and Engineer; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, Engineer and Contractor; 6. Ensure mitigation measures are implemented. 7. Repeat measurement on next day of exceedance.	1. Discuss mitigation measures with ET, Engineer and Contractor; 2. Review proposals on mitigation measures submitted by Contractor and advise the Engineer accordingly; 3. Assess effectiveness of implemented mitigation measures.	1. Discuss proposed mitigation measures with IEC, ET and Contractor; 2. Make agreement on mitigation measures to be implemented; 3. Assess effectiveness of implemented mitigation measures.	1. Inform Engineer and confirm in writing notification of the non-compliance; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes in working methods; 5. Discuss with ET, IEC and Engineer and propose mitigation measures to IEC and Engineer within three working days; 6. Implement agreed mitigation measures.

Action level being exceeded by more than two consecutive sampling days	1. Repeat in-situ measurements to confirm findings; 2. Identify reasons for non-compliance and source(s) of impact; 3. Inform IEC, Contractor and Engineer; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, Engineer and Contractor; 6. Ensure mitigation measures are implemented. 7. Prepare to increase the monitoring frequency to daily; 8. Repeat measurement on next day of exeedance.	1. Discuss mitigation measures with ET, Engineer and Contractor; 2. Review proposals on mitigation measures submitted by Contractor and advise the Engineer accordingly; 3. Assess effectiveness of implemented mitigation measures.	1. Discuss proposed mitigation measures with IEC, ET and Contractor; 2. Make agreement on mitigation measures to be implemented; 3. Assess effectiveness of implemented mitigation measures.	1. Inform Engineer and confirm in writing notification of the non-compliance; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes in working methods; 5. Discuss with ET, IEC and Engineer and propose mitigation measures to IEC and Engineer within three working days; 6. Implement agreed mitigation measures.
LIMIT LEVEL				
Limit level being exceeded by one sampling day	1. Repeat in-situ measurements to confirm findings; 2. Identify reasons for non-compliance and source(s) of	1. Discuss mitigation measures with ET, Engineer and Contractor; 2. Review	1. Discuss proposed mitigation measures with IEC, ET and Contractor;	1. Inform Engineer and confirm in writing notification of the non-compliance; 2. Rectify

	impact; 3. Inform EPD, IEC, Contractor and Engineer; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, Engineer and Contractor; 6. Ensure mitigation measures are implemented; 7. Increase the monitoring frequency to daily until no exceedance of Limit level.	proposals on mitigation measures submitted by Contractor and advise the Engineer accordingly; 3. Assess effectiveness of implemented mitigation measures.	2. Request Contractor to critically review the working methods; 3. Make agreement on mitigation measures to be implemented; 4. Assess effectiveness of implemented mitigation measures.	unacceptable practice; 3. Check all plant and equipment; 4. Consider changes in working methods; 5. Discuss with ET, IEC and Engineer and propose mitigation measures to IEC and Engineer within three working days; 6. Implement agreed mitigation measures.
Limit level being exceeded by more than two consecutive sampling days	1. Repeat in-situ measurements to confirm findings; 2. Identify reasons for non-compliance and source(s) of impact; 3. Inform EPD, IEC, Contractor and Engineer; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC,	1. Discuss mitigation measures with ET, Engineer and Contractor; 2. Review proposals on mitigation measures submitted by Contractor and advise the Engineer accordingly; 3. Assess effectiveness of	1. Discuss proposed mitigation measures with IEC, ET and Contractor; 2. Request Contractor to critically review the working methods; 3. Make agreement on mitigation measures to	1. Inform Engineer and confirm in writing notification of the non-compliance; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes in working methods; 5. Discuss with ET, IEC and Engineer and propose

	Engineer and Contractor; 6. Ensure mitigation measures are implemented. 7. Increase the monitoring frequency to daily until no exceedance of Limit level for two consecutive days.	implemented mitigation measures.	be implemented; 4. Assess effectiveness of implemented mitigation measures; 5. Consider and if necessary instruct Contractor to slow down or to stop all or part of the construction activities until no exceedance of Limit Level.	mitigation measures to IEC and Engineer within three working days; 6. Implement agreed mitigation measures; 7. As directed by the Engineer, slow down or stop all or part of the construction activities until no exceedance of Limit level.

4.7 Monitoring Schedule for the next reporting period

Water quality monitoring schedule is proposed to be carried out on 1st, 4th, 6th, 8th, 18th, 20th, 22nd, 25th and 27th of February 2013.

5 Hydrological Characteristics Monitoring

5.1 Hydrological Characteristics Monitoring Parameters and Methodology

Impact monitoring of hydrological characteristics was undertaken to establish hydrological characteristics of sections of Wai Ha River adjacent to Drainage Improvement Works in Shuen Wan, Tai Po.

The hydrological characteristics of sections of Wai Ha River were measured by water flow rate and depth.

5.2 Monitoring Equipment

Monitoring performed by a portable echo-sounder, model Greyline Stingray. The equipment was calibrated and verified by certified laboratory or manufacturer every year to ensure they perform to the same level of accuracy as stated in the manufacturer's specification.

Calibration Certificate of the multi-meter is given in **Appendix C**.

5.3 Monitoring Locations

In accordance with the EM&A Manual (revision 3), monitoring stations for contract 1 were established at two locations and summarized in Table 5.3.1.

Table 5.3.1 – Water Quality Monitoring Stations

Monitoring Station	**Location**	**Coordinates**
H1	Between the Shuen Wan Marsh and ECA	E:839301 N:836386
H2	Route to Sam Kung Temple	E:839163 N:836433

As illustrated in Figure 5.3.1, H2 served as the control station while H1 was the monitoring location of hydrological characteristics.

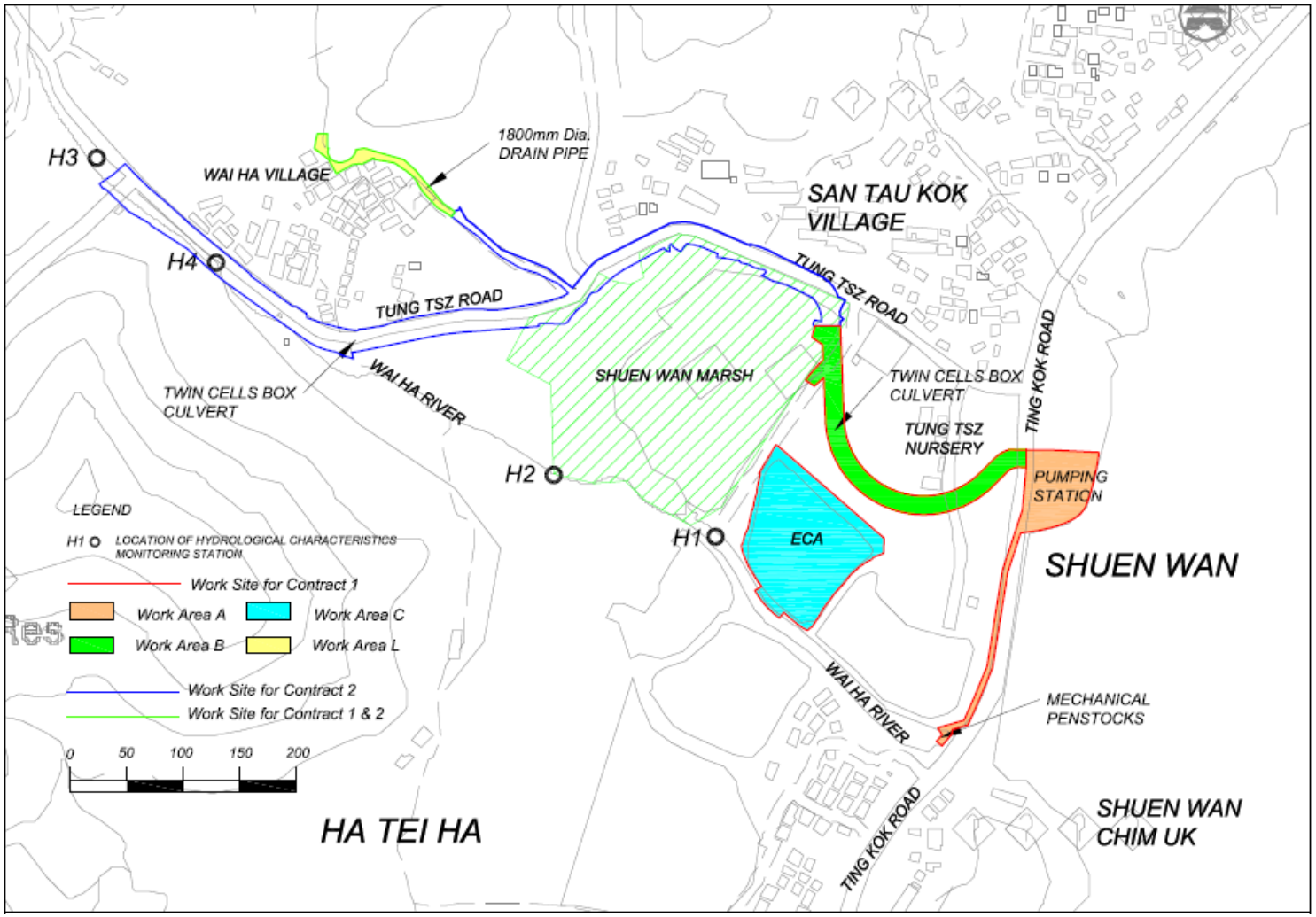


Figure 5.3.1 Hydrological Characteristics Monitoring Locations

5.4 Monitoring Frequency

Hydrological characteristics monitoring for each monitoring station were performed at mid-flood and mid-ebb tides for once per week during the course of the construction river works.

Monitoring was carried out on 2th, 9th, 16st, 23rd and 30th of January 2013.

5.5 Monitoring Results and Interpretation

Hydrological characteristics monitoring was carried out five times in this reporting period. The monitoring results are summarized in Table 5.5. All results were within the action and limit levels, therefore, no exceedance was found.

Table 5.5 Summary of Water Quality Monitoring Results

	Average of Monitoring Results	
	Water Depth (m)	Water Flow Rate (m^3/s)
H1(Flood)	~0.340	0.103
H1(Ebb)	~0.225	0.188
H2(Flood)	~0.320	0.659
H2(Ebb)	~0.165	0.754

Details of the monitoring data were presented in **Appendix F**.

5.6 Action and limit level for Hydrological Characteristics

The Action and Limit levels for all monitoring stations are summarized in Table 5.6.1, which would be applied for compliance assessment of hydrological characteristics for this project. If the hydrological characteristics monitoring results at any impact stations exceeded the criteria, the actions in accordance with the Event and Action Plan in Table 5.6.2 should be taken.

Table 5.6.1 Action and Limit Levels for Hydrological Characteristics at All Monitoring Stations

Parameters	**Action**	**Limit**
Water Depth at Mid-flood (m)	0.08	0.06
Water Depth at Mid-ebb (m)	0.08	0.06
Water Flow Rate (m^3/s)	120% of control station's water flow rate on the same day of measurement	140% of control station's water flow rate on the same day of measurement

Table 5.6.2 Event and action Plan for Hydrological Characteristics

Event	ET Leader	IEC	ER	Contractor
ACTION LEVEL				
Action level being exceeded by one sampling day	1. Repeat in-situ measurements to confirm findings; 2. Identify reasons for non-compliance and source(s) of impact; 3. Inform IEC, Contractor and Engineer; 4. Check monitoring data, Contractor's working methods and any excavation works or dewatering processes; 5. Discuss mitigation measures with IEC, Engineer and Contractor; 6. Ensure mitigation measures are implemented. 7. Repeat measurement on next day of exceedance.	1. Discuss mitigation measures with ET, Engineer and Contractor; 2. Review proposals on mitigation measures submitted by Contractor and advise the Engineer accordingly; 3. Assess effectiveness of implemented mitigation measures.	1. Discuss proposed mitigation measures with IEC, ET and Contractor; 2. Make agreement on mitigation measures to be implemented; 3. Assess effectiveness of implemented mitigation measures.	1. Inform Engineer and confirm in writing notification of the non-compliance; 2. Rectify unacceptable practice; 3. Check working methods and any excavation works or dewatering processes; 4. Consider changes in working methods and plans; 5. Discuss with ET, IEC and Engineer and propose mitigation measures to IEC and Engineer within three working days; 6. Implement agreed mitigation measures.
Action level being exceeded by more than two consecutive sampling days	1. Repeat in-situ measurements to confirm findings; 2. Identify reasons for non-compliance and source(s) of impact; 3. Inform IEC, Contractor and Engineer; 4. Check monitoring data, Contractor's working methods and any excavation works or dewatering	1. Discuss mitigation measures with ET, Engineer and Contractor; 2. Review proposals on mitigation measures submitted by Contractor and advise the Engineer accordingly;	1. Discuss proposed mitigation measures with IEC, ET and Contractor; 2. Make agreement on mitigation measures to be implemented; 3. Assess	1. Inform Engineer and confirm in writing notification of the non-compliance; 2. Rectify unacceptable practice; 3. Check working methods and any excavation works or dewatering

	processes; 5. Discuss mitigation measures with IEC, Engineer and Contractor; 6. Ensure mitigation measures are implemented. 7. Prepare to increase the monitoring frequency to daily; 8. Repeat measurement on next day of exeedance.	3. Assess effectiveness of implemented mitigation measures.	effectiveness of implemented mitigation measures.	processes; 4. Consider changes in working methods and plans; 5. Discuss with ET, IEC and Engineer and propose mitigation measures to IEC and Engineer within three working days; 6. Implement agreed mitigation measures.
LIMIT LEVEL				
Limit level being exceeded by one sampling day	1. Repeat in-situ measurements to confirm findings; 2. Identify reasons for non-compliance and source(s) of impact; 3. Inform AFCD, IEC, Contractor and Engineer; 4. Check monitoring data, and Contractor's working methods and any excavation works or dewatering processes; 5. Discuss mitigation measures with IEC, Engineer and Contractor; 6. Ensure mitigation measures are implemented; 7. Increase the monitoring frequency to daily until no exceedance of Limit level.	1. Discuss mitigation measures with ET, Engineer and Contractor; 2. Review proposals on mitigation measures submitted by Contractor and advise the Engineer accordingly; 3. Assess effectiveness of implemented mitigation measures.	1. Discuss proposed mitigation measures with IEC, ET and Contractor; 2. Request Contractor to critically review the working methods; 3. Make agreement on mitigation measures to be implemented; 4. Assess effectiveness of implemented mitigation measures.	1. Inform Engineer and confirm in writing notification of the non-compliance; 2. Rectify unacceptable practice; 3. Check working methods and any excavation works or dewatering processes; 4. Consider changes in working methods and plans; 5. Discuss with ET, IEC and Engineer and propose mitigation measures to IEC and Engineer within three working days; 6. Implement agreed mitigation measures.
Limit level being	1. Repeat in-situ measurements to	1. Discuss mitigation	1. Discuss proposed	1. Inform Engineer and confirm in

exceeded by more than two consecutive sampling days	confirm findings; 2. Identify reasons for non-compliance and source(s) of impact; 3. Inform AFCD, IEC, Contractor and Engineer; 4. Check monitoring data, and Contractor's working methods and any excavation works or dewatering processes; 5. Discuss mitigation measures with IEC, Engineer and Contractor; 6. Ensure mitigation measures are implemented. 7. Increase the monitoring frequency to daily until no exceedance of Limit level for two consecutive days.	measures with ET, Engineer and Contractor; 2. Review proposals on mitigation measures submitted by Contractor and advise the Engineer accordingly; 3. Assess effectiveness of implemented mitigation measures.	mitigation measures with IEC, ET and Contractor; 2. Request Contractor to critically review the working methods; 3. Make agreement on mitigation measures to be implemented; 4. Assess effectiveness of implemented mitigation measures; 5. Consider and if necessary instruct Contractor to slow down or to stop all or part of the construction activities until no exceedance of Limit Level.	writing notification of the non-compliance; 2. Rectify unacceptable practice; 3. Check working methods and any excavation works or dewatering processes; 4. Consider changes in working methods and plans; 5. Discuss with ET, IEC and Engineer and propose mitigation measures to IEC and Engineer within three working days; 6. Implement agreed mitigation measures; 7. As directed by the Engineer, slow down or stop all or part of the construction activities until no exceedance of Limit level.

5.7 Monitoring Schedule for the next reporting period

Hydrological characteristics monitoring schedule is proposed to be carried out on 1st, 8th and 22th of February 2012.

6 Ecological Monitoring of ECA

6.1 Ecological Monitoring of ECA

6.1.1 Scope of Monitoring

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

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

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

The ECA was formally handed over to AFCD on 16th October 2012. The wire mesh fences and gate at the northwestern part of the ECA were fixed and reinstated by the Main Contractor. No site visit and ecological monitoring by the Wetland Specialist from the Main Contractor and the Ecologist from the IEC respectively were carried out in November 2012. The post-establishment phase monitoring and management of the ECA have commenced and to be undertaken by the AFCD in accordance with the monitoring and management items stipulated in the latest approved EM&A Manual of the Project

6.2 Monitoring Results

According to Table 6.17 of the EM&A Manual, ecological monitoring of the ECA will be

carried out by qualified ecologists during the 1-year wetland establishment period of the ECA before handing over to AFCD for their post establishment monitoring. Establishment phase of the ECA began in September 2011, ecological monitoring programme was conducted and monitoring data was presented in respective monthly EM&A reports. Ecological monitoring programme ended in September 2012 and hence there will be no ECA report attached in EM&A reports.

6.2.1 Description of monitoring of transplanted Pavetta hongkongensis in Ecological Compensatory Area

According to the latest Transplantation Proposal, monitoring of the transplanted individual of *Pavetta hongkongensis* will cover a period of 12 months after the transplanting exercise. The monitoring will be conducted once a week in the first 3 months and once in each subsequent month in the remaining monitoring period. Health condition and growth of each transplanted individuals will be assessed and photographic records will be undertaken for each inspection.

6.2.2 Description of transplanted Pavetta hongkongensis and remarks

The monitoring of the transplanted individual of Pavetta hongkongensis has been covered a period of 12 months. Therefore, the monitoring for Pavetta hongkongensis was not carried out in this reporting period.

7 Landscape and Visual

7.1 Introduction

The Landscape and Visual Monitoring of the Project is conducted to fulfill Clauses 5.2 and 5.4 of EP-303/2008 and the monitoring requirements in accordance with Section 7 of the approved updated EM&A Manual (approved by EPD on 31st May 2012) of the Project. A Baseline Review on updating the landscape and visual condition, and the mitigation measures of the Project (including Contracts 1 and 2 of the Project) was undertaken before the commencement of the Project. The review findings were updated in the Baseline Environmental Monitoring Report submitted to the EPD on 14th February 2011.

This monthly monitoring report will detail the scope of landscape and visual monitoring work, monitoring findings and observations, and any recommendations and advice on proper implementation of the landscape mitigation measures in the works areas under Contract 1 of the Project.

7.2 Scope of Monitoring

7.2.1 Monitoring Objectives

Landscape and Visual Monitoring of the Project should be conducted in a bi-weekly basis for checking the design, implementation and maintenance of the landscape and visual mitigation measures throughout the construction phase and in a quarterly basis during operational phase of the Project. Observations of any potential conflicts between the proposed mitigation measures and the project works carried out by the Contractors should be recorded. Recommendation and advice on proper implementation of the landscape mitigation measures should be provided to the Contractor for minimizing any potential impacts on the landscape and visual elements.

7.2.2 Monitoring during Construction Phase

The following landscape and visual mitigation measure should be implemented during the construction phase of the project to minimize the potential impacts:

- Visual Screen – Use of hoardings as visual screens for the construction in the works areas;
- Contaminant/ Sediment Control – Use of temporary barriers, covers and drainage provision around the construction works as contaminant/ sediment control to prevent the contaminants and sediments from entering the sensitive water-based habitats;
- Pollution Control – Implementation of pollution control measures to minimize any adverse environmental impacts to the surrounding habitats;
- Liaison with Nursery – Liaison with the nursery operator as necessary to minimize any adverse impact to the daily operation and plant holding capacity of the nursery;
- Existing Trees within Works Area – Maintenance and protection of the existing trees, especially their crowns, trunks and roots, within work sites; and

- Construction Light – Provision of construction light should be controlled at night to avoid excessive glare to the surrounding villages and to Plover Cove.

7.2.3 Monitoring during Operational Phase

The following landscape and visual mitigation measure should be implemented during the operational phase of the project to minimize the potential impacts:

- Viewing area formation by planting with shrubs, grasses and benches along the area;
- Architectural design of the pump house will help it fit into the existing suburban, natural to semi-natural surroundings;
- Landscape design of pump house by providing sufficient planting around its boundary fence;
- Enhancement planting along Tung Tsz Road with shrubs/ trees of suitable species to help protect the stream and marshes;
- Construction of box culvert should be with at least 1.0m soil depth for enhancement planting;
- Transplanting of existing affected trees to adjacent locations should be carried out;
- Preparation for transplanting is needed to allow sufficient time for root pruning and rootball preparation prior to transplanting; and
- Reinstatement of affected area should be carried out to check that the works areas are properly reinstated.

7.3 Landscape and Visual Monitoring Results

7.3.1 Monitoring Date(s)

This monthly Landscape and Visual Monitoring (January 2013) was conducted to cover only Areas A, B and C of Contract 1 of the Project. The bi-weekly monitoring was conducted on 11th and 25th January 2013.

Area C (i.e. Ecological Compensatory Area (ECA)) was formally handed over to AFCD on 16th October 2012 for management and maintenance. No access into the ECA is allowed after the handover.

All photos stated in this section are recorded in **Appendix G**.

The bi-weekly monitoring for Contract 2 was also undertaken on 11th and 25th January 2013. The monitoring findings and recommendation will be submitted in a separate Monthly EM&A Report under Contract DC/2010/02.

7.3.2 Visual Screen

No follow-up action by the Contractor is required as from the *Monthly EM&A Report for December 2012*.

Observation

Construction hoardings have been erected in Area A along the entire site boundary. Temporary construction hoardings have been erected around Wai Ha River estuary since the building of an automatic mechanical penstock at the area. Since February 2012, temporary construction hoardings have also been erected to surround the works area for constructing a drain pipe along Ting Kok Road. Active construction works for the installation of drainage pipe were noticed at the eastern part of Area A with the removal of site hoarding along the eastern boundary of Area A (**Photo 1**).

A section of temporary hoarding has been erected from northwest to southwest parts (i.e. Phase I construction works) of Tung Tsz Nursery in Area B (approximately along the works boundary from Trees U42 to U62). Another section of temporary hoarding has been erected from southwest to eastern parts of the Nursery since May 2012 and connected with the Phase I construction works area. An open section with no construction work has been maintained as a major road access inside Tung Tsz Nursery for their daily operations.

The gate of the adjacent housing area near the previous main entrance of Area C has been reinstated at its original location by the Contractor since November 2012.

Recommendation

No specific recommendation is required.

7.3.3 Contaminant/ Sediment Control

No follow-up action by the Contractor is required as from the *Monthly EM&A Report for December 2012.*

Observation

Area A

Provision of dust control measure (such as wheel washing facilities) has been maintained at the exit point of Area A.

Used water for washing vehicular wheel and groundwater from the excavated sites were pumped into the silt/sand removal facilities for filtration before discharging into the manhole adjacent to Area A.

Area B

Dust control measure (such as wheel washing facilities) has been resumed since October 2012. The construction vehicles were washed at the entrance of the access road leading towards the works area at northwestern part of Tung Tsz Nursery. Used water and groundwater from the built box culvert and the construction site within the Nursery were collected and drained directly to the sedimentation tanks placed adjacent to the fenced Area C. The water was further filtered through the silt/sand removal facilities in the tank before discharging into the manhole adjacent to Area C..

Area C

Area C was formally handed over to AFCD on 16th October 2012 for management and maintenance. The pond of the ECA has connected with the Wai Ha River directly. No water resulting from normal wetland maintenance practice was pumped out from the ECA.

Recommendation

No specific recommendation is required.

7.3.4 Pollution Control

All used water for washing vehicular wheel and construction works was filtered and drained to the manholes and drainage points, as following the recommendation stated in *Monthly EM&A Report for December2012.*

Observation

Area A

Provision of vehicular wheel washing facilities was observed at the exit point of Area A to reduce the contamination to the surrounding habitats in Plover Cove. Used water for washing vehicular wheel and groundwater from the excavated sites were pumped into the silt/sand removal facilities for filtration before discharging into the manhole and drainage points adjacent to Area A. The drainage pipes were maintained to discharge the used water to the manhole. No direct discharge of water into the adjacent Wai Ha River was observed from the works area for building the automatic mechanical penstock at Wai Ha River estuary as active civil works were ceased.

Area B

All used water was collected and drained directly to the sedimentation tank placed adjacent to the fenced Area C. This water was further filtered through the silt/sand removal facilities in the tank before discharging into the manhole adjacent to Area C.

Area C

Area C was formally handed over to AFCD on 16th October 2012 for management and maintenance. The pond of the ECA has been connected to Wai Ha River directly as following the scheme design of Habitat Compensatory Plan. No direct discharge of turbid water into the adjacent Wai Ha River was observed through the fence of Tung Tsz Nursery (**Photo 2**).

Recommendation

No specific recommendation is required for Areas A, B and C. As a reminder, the

Contractor should regularly check the condition and locations of the drainage pipes and ensure that all used water should be appropriately filtered and discharged to the manholes/other discharge points agreed by the Engineer and EPD. This is to avoid any potential contamination to the vegetation in Shuen Wan marsh and other vegetated/marinated areas adjacent to the active works area.

7.3.5 Liaison with Nursery

Active construction works within Tung Tsz Nursery has been extended to the east of the nursery in connection with Ting Kok Road since May 2012. All of these active construction works area were demarcated with construction hoardings.

The health condition and stability of the tree *Grevillea robusta* (U58) has been closely monitored on a bi-weekly basis. Leaves as watersprouts were still observed along the trunk.

The works practice and maintenance of trees within the nursery generally follow the recommendation as stated in *Monthly EM&A Report for December 2012*. Any observed issues related to the liaison with the nursery are highlighted in this section.

Observation

The temporary hoarding has been erected from northwest to southwest parts of Tung Tsz Nursery in Area B since April 2011. Phase 2 construction work (i.e. from the eastern part of the nursery in connection with Ting Kok Road and finally connects with Phase 1 construction area at the southwest part) has continued and temporary hoardings have been erected since May 2012. The major road access within the Nursery has been maintained to minimize the impact on the nursery's daily operation resulting from the construction works.

Regular monitoring for all transplanted trees within the nursery was conducted on a bi-weekly basis. For tree U58 (*Grevillea robusta*) (**Photo 3**), leaves as watersprouts were observed along the branches and the trunk. The physiological condition of U58 has remained fairly poor in January 2013 and close monitoring has to be continued to update

its health and structural conditions.

As reported in the past *Monthly EM&A Reports*, the retained tree U68 (*Gmelina arborea*) was found fallen after the severe typhoon in July 2012 with its leaning trunk being pruned and removed in August 2012 (as reported in *Monthly EM&A Report for August 2012*). As reported in the *Monthly EM&A Report for November 2012*, the developed watersprouts at the remained stump was recorded. The watersprouts were removed as inspected in December 2012 while it has resprouted as observed in January 2013 (**Photo 4**).

No muddy water was found leaking out through the temporary hoarding into the nursery.

Recommendation

The works area and the construction works should be properly managed and implemented without influencing the daily operation of the nursery (i.e. provide enough access road and works area for the nursery operation).

All transplanted trees should be watered regularly (e.g. at least every two days during the dry season) by the appointed landscape contractor. Meanwhile, the Contractor should prevent forming waterlogged areas or leakage of used water from the active construction works area into the Nursery. This is to prevent causing any nuisance to the nursery's daily operation.

Regular monitoring and watering of *Grevillea robusta* (U58) are still recommended to be the major treatment to the tree. The appointed landscape contractor and the Contractor should closely monitor the health conditions of all transplanted and retained trees throughout the construction period of the Project.

7.3.6 Existing Trees within Works Areas

Maintenance of the existing trees within the works areas generally follows the recommendations as stated in *Monthly EM&A Report for December 2012*, except the observations as highlighted in the following sections.

Observation

Area A

The trees to be transplanted E19 and E20 (*Melaleuca cajuputi* subsp. *cumingiana*) originally located next to the main gate of Area A were found to be relocated to the eastern part of Area A during the monitoring on 11th January 2012 (**Photo 5**). E19 was relocated again to the eastern end of Area A on 25th January 2012 (**Photo 6**). Both of them were in fairly poor condition due to transplantation shock and poor planting skills.

Since October 2012, two trees to be transplanted E17 (*Bombax ceiba*) and E18 (*Melaleuca cajuputi* subsp. *cumingiana*) originally located within the TPZs nearby the main gate have been relocated to the northeastern part of Area A. However, these trees were relocated again in November 2012 due to the direct conflict with the adjacent excavation work at the northeastern part. As observed in January 2012, these two trees were found in poor condition due to transplantation shock and poor planting skills (**Photos 7-8**). For E18, living foliage was only observed at the lower canopy.

The tree to be transplanted E16 (*Bombax ceiba*) has been relocated to the southern side of Area A next to the site hoarding since July 2012. A TPZ was set up at the base with orange construction nets. The tree was in fair condition during the monitoring in January 2013 (**Photo 9**).

E97 (*Celtis sinensis*) and an untagged tree have been relocated at the northeastern part of Area A since December 2012 and were suspected to be dead due to transplantation shock and poor planting skills (**Photo 10**).

Removal of trees (proposed to be felled) located at the eastern end of Area A was observed during the monitoring on 25th January 2013.

Mechanical injuries were observed on the trunks of two retained trees E61 and E68 (**Photos 11-12**).

No other significant damages on the crowns, trunks and roots of the remaining trees were observed during the monitoring in January 2013 in Area A. Most of the trees within or closed to the hoarded areas were re-tagged as inspected in January 2013.

Area B

As highlighted in the Section "Liaison with Nursery", watersprouts and new leaves were observed on the trunk and branches of the transplanted tree U58 (*Grevillea robusta*) but its physiological condition has still remained fairly poor after the transplant.

The broken planter for U75 (*Dolichandrone cauda-felina*) was repaired (**Photo 13**). The transplanted tree U61 (*Lysidice rhodostegia*) was still found leaning severely with its propping uplifted (**Photo 14**). The Contractor informed that this tree will be replanted in February 2013.

The transplanted tree U55 (*Pterocarpus indicus*) was planted directly into the ground as permitted by the nursery (**Photo 15**). Decayed wood was found along the tree trunk and such decay may due to wood borers. The Contractor informed that the appointed landscape contractor will have further pest control and detailed assessment for the tree in February 2013.

The tree to be transplanted T102 (*Melaleuca cajuputi* subsp. *cumingiana*) has been relocated to the southern part within the Phase 2 construction area of Area B next to the hoarding since November 2012 (**Photo 16**). The tree still appeared in poor condition as only a few leaves left in the canopy.

No recovery signs have been observed on the relocated trees U34 **(Photo 17**), U35 **(Photo 18**) and U37 **(Photo 19**) and they are regarded as dead specimens**.**

Waterlogging was found in the areas around the trunk bases of three relocated trees (U76, U77 and U78) before. U76 and U78 (*Terminalia catappa*) were observed in poor condition with sparse foliage in January 2013 (**Photos 20-21**). In particular, the relocated tree U77 (*Terminalia catappa*) was suspected to be dead as no leaves was observed in the

canopy (**Photo 22)**. Another relocated tree U79 (*Terminalia catappa*) on the southwest of U76 was also observed in poor condition with sparse foliage in January 2013 (**Photo 23**)..

All of the relocated trees were not guyed and only a few of these trees were protected within orange construction nets established as temporary TPZs.

Broken planters for three trees (U54 and two existing trees with no tag next to U54) were observed at their temporary receptor sites within the Phase 1 works area to the northwest of the nursery. All of them have been generally surrounded by the orange construction nets to prevent further damage to the remained planters.

The remaining trees, including retained and transplanted specimens, within the nursery were maintained generally in fair condition, with no significant damage on tree crowns, trunks and roots observed during the monitoring in January 2013.

Area C

Area C was formally handed over to AFCD on 16th October 2012 for management and maintenance. The area was fenced off and no access was allowed.

Recommendations

Area A

Maintenance of proper TPZs with no temporarily stored construction materials, excessive stockpiled soil and waterlogged condition around the tree trunk flares have been the major tree management issues in Areas A and B. The Contractor should continue notifying the on-site workers not to stockpile soil/construction materials or place construction equipment within and close to the TPZs or lower trunk/trunk flare. Any temporarily stored construction materials/ equipment and excessive water around the trunk flares should be removed or drained immediately. The Contractor should remind the operators of the construction machines and on-site workers to be aware of the presence of these relocated and retained trees nearby their works, and prevent the accidental damage on these trees as far as practical.

The Contractor is reminded to maintain proper tagging system for all trees within and outside the hoarded site in order to facilitate the monitoring of their existing condition.

All retained trees or trees to be transplanted should be watered regularly (e.g. at least every two days) by the landscape contractor. The Contractor should conduct regular inspection on the health condition and protection measures of each existing trees within the Area A. In particular, regular watering should be applied on those recently relocated trees with regard to their poor health condition. If these trees or other transplanted/ relocated trees are found to be dead specimens in the wet season, the Contractor should replace these specimens.

Area B

All transplanted trees should be watered regularly (e.g. at least every two days during the dry season) by the landscape contractor. This is a necessary maintenance practice to improve the survival rates and growth for trees showing poor health condition as a result of the transplantation shock. Regular check of the tree health should be conducted. Proper protective measures such as guying and TPZs are recommended especially for the newly transplanted/ relocated trees. Waterlogged areas (e.g. around trunk bases of U76, U77 and U78) should be avoided and all used water around the tree trunk flares and close to the tree root zones should be drained out immediately. To prevent accidental drainage of used water into the tree root zones of the relocated trees, the Contractor is recommended to establish a proper separation (e.g. sandbags barriers or wooden plates) between the trees (especially U76, T77 and U78) and the ground of the active construction work.

Regular inspection of the tree health of U55 and U58 should be undertaken to update their health condition and any tree defects. If these trees or other transplanted/ relocated trees are found to be dead specimens in the wet season, the Contractor should replace these specimens.

The Contractor has to repair the planters or establish proper TPZs for the tree U54 and the two untagged trees adjacent to U54 as soon as possible. In addition, the Contractor should ensure that all planters have been properly maintained.

The Contractor is recommended to re-tag the translocated trees and regularly check the condition of the tags. All tree tags on the trees should be managed properly by the Contractor throughout the construction and establishment phases.

Area C

As Area C was handed over to AFCD for management and maintenance, no further recommendation is given.

7.3.7 Construction Lights

No follow-up action on maintenance of construction light is required as from the *Monthly EM&A Report for December 2012.*

Observation

No construction light impact to the surrounding villages and to Plover Cove as all construction activities and construction sites are halted at 1800. No construction light at night is provided by the Contractor.

Recommendation

No specific recommendation is required.

7.4 Audit Schedule

The next bi-weekly Landscape & Visual Monitoring in February 2013 is scheduled to be conducted in the weeks of 4th and 18th February 2013.

8 Action taken in Event of Exceedance

If the measurements (Noise, Water, Hydrological Characteristics, and Ecology) exceed the action / limit level, exceedance details will be reported and follow-up actions will be taken by relevant parties involved.

During the reporting month there was no exceedance for noise, hydrological characteristics, and ecological measurements recorded; therefore, no actions were taken.

For water quality monitoring, total 7 abnormal incidents of water quality limits were recorded in this reporting month according to the established level. ET has arranged site investigations for the abnormal incidents. No construction activities were carried out at the river bed during the reporting period. Proper mitigation measures were implemented by contractor to avoid site water release to the Wai Ha river and no particular observation of defective site activities were found causing water contamination. The exceedances of Turbidity were believed to be mainly attributed by natural fluctuation, since the recorded levels of Turbidity at control station had also exceeded its baseline action level, the exceedances recorded at W2 were unlikely to be related to the Project.

The water condition of Wai Ha River is presented in photo attached in **Appendix M**.

9 Construction waste disposal

It is the contractor's responsibility to ensure that all wastes produced during the construction phase for the drainage improvement works are handled, stored and disposed of in accordance with good waste management practices and EPD's regulation and requirement. Waste materials generated during construction activities, such as construction and demolition (C&D) material, chemical wastes and general refuse, are recommended to be audited at regular intervals to ensure that proper storage, transportation and disposal practices are being implemented.

Table 9.1 is a summary of figures of the construction wastes disposal provided by Contractor.

Table 9.1 Summary of Construction Waste Disposal

Month	Actual Quantities of Inert C & D Materials Generated Monthly						Actual Quantities of C & D Wastes Generated Monthly				
	Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/cardboard packaging	Plastics (see note3)	Chemical Waste	Others, e.g. general refuse
	(in'000m3)	(in'000m3)	(in'000m3)	(in'000m3)	(in'000m3)	(in'000m3)	(in'000kg)	(in'000kg)	(in'000kg)	(in'000kg)	(in'000kg)
Year2011	11.758	0.00	9.703	0.665	0.750	0.556	0.00	0.00	0.00	0.00	0.165
Year 2012	10.737	0.00	9.884	1.185	0.05	0.00	2.37	0.00	0.00	0.00	0.192
Jan 13	0.291	0.00	0.24	0.00	0.05	0.01	0.00	0.00	0.00	0.00	0.00
Total	22.786	0.00	19.827	1.85	0.76	0.566	2.37	0.00	0.00	0.00	0.375

Forecast of Total Quantities of C & D Materials to be Generated from the Contract											
	Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/cardboard packaging	Plastics (see note3)	Chemical Waste	Others, e.g. general refuse
	(in'000m3)	(in'000m3)	(in'000m3)	(in'000m3)	(in'000m3)	(in'000m3)	(in'000kg)	(in'000kg)	(in'000kg)	(in'000kg)	(in'000kg)
	0.05	0	0.1	0.1	0.05	0.01	0	1	0.05	0.1	0.05

Notes (1) The Performance targets are given in PS Clause 26.23 (14)

(2) The waste flow table shall also include C & D materials that are specified in the Contract to be imported for used at the sites

(3) Plastics refer to plastics bottles/containers, plastic sheets/foam from packaging materials.

(4) The summary table shall be submitted to the Engineer's Representative monthly together with the Waste Flow Table for review and monitoring in accordance with the PS Clause 25.20A(4)

10 Status of Permits and Licenses obtained

Table 10.1 is the updated status of environmental related permits/ license obtained for the construction activities.

Table 10.1 Status of Permits and Licenses Obtained

Description	**License / Permit No.#**	**Date of Issue**	**Site**	**Date of expiry**	**Status**
Environmental Permit	EP-303/2008	2008/2/25	Area A, B & C	not applicable	Valid
Discharge License	WT00006448-2010	2010/6/15	Area A, B & C	30/6/2015	Valid
Registration as a Chemical Waste Producer	316597	2010/4/26	Area A, B & C	not applicable	Valid
Waste Disposal	7010348	2010/3/2	Area A, B & C	not applicable	Valid

11 Compliant Log

There was no formal complaint received during the reporting period. Therefore, follow up actions for the environmental complaint is not required.

Table 11.1 Summary of Formal Complaints received

	Noise	Water	Ecology	Others
Year 2011	0	0	0	0
Year 2012	0	0	0	0
January 2013	0	0	0	0
Total	0	0	0	0

12 Site Environmental Audits

12.1 Site Inspection

Site inspections were undertaken weekly to inspect the construction activities in active site areas to ensure that appropriate environmental protection and pollution control mitigation measures are properly implemented.

Within this reporting period, site inspections were conducted on 4th, 10th, 17th, 24th and 28th of January 2013. A detailed checklist of each site inspection together with comments and relevant photos have been filed and kept. The findings from inspection were summarized in Table 12.1.

Table 12.1 Summary results of site inspections findings

Date	Findings	Identification	Advice from ET	Action taken	Closing date	Remarks
21 & 27 Dec 12 4 Jan 13	Drip tray was not provided for the chemical materials.	Observation	Contractor was reminded that chemical materials should be place inside the drip trays.	Chemical materials were removed by contractor.	10 Jan 13	
27 Dec 12	Open Stockpile was observed at Area B	Observation	Contractor was reminded to cover the open stockpile with tarpaulin sheets.	Open stockpile was covered with tarpaulin by contractor.	4 Jan 13	
4 & 10 Jan 13	General waste was observed at Area B.	Observation	Contractor was reminded to clean the waste and maintain a good hygiene environment within the site area.	General waste was cleaned by contractor at Area B	17 Jan 13	
4 Jan 13	Construction materials were observed inside the public gully at Area B.	Observation	Contractor was reminded to remove the construction materials as soon as possible and prevent	Construction materials inside public gully were removed by contractor.	10 Jan 13	

Date	Findings	Identification	Advice from ET	Action taken	Closing date	Remarks
			the sand entering into the public gully.			
10 Jan 13	Haul road was dry and dusty at Area B.	Observation	Contractor was reminded that routine water spraying should be implemented for dust suppression.	Routine water spraying was implemented by contractor at Area B.	17 Jan 13	
10, 17, 24 & 28 Jan 13	Chemical materials were observed at Area A.	Observation	Contractor was reminded that all the chemical materials should be placed inside the drip tray.	Outstanding	N/A	
10, 17, 24 & 28 Jan 13	Damaged tree protective fencing was observed at Area A.	Observation	Contractor was reminded that damaged tree protective fencing should be replaced as soon as possible.	Outstanding	N/A	
17, 24 & 28 Jan 13	Construction materials inside the tree protection zone were observed at Area B.	Observation	Contractor was reminded that construction materials inside the tree protection zone should be removed as soon as possible.	Outstanding	N/A	
28 Jan 13	3-sides shelter coverage was not observed at Area A.	Observation	Contractor was reminded that 3-side shelter coverage should be provided during the cement mixing works.	Outstanding	N/A	
28 Jan 13	Open stockpile was observed at Area B.	Observation	Contractor was reminded that dusty materials should be	Outstanding	N/A	

Date	Findings	Identification	Advice from ET	Action taken	Closing date	Remarks
			covered with tarpaulin sheets for dust suppression.			
28 Jan 13	Free flow of ground water was observed at Area B	Observation	Contractor was reminded that the ground water should not be pumped to public access and the water pipe should be extended connecting to next box culvert.	Outstanding	N/A	

12.2 Compliance with legal and Contractual requirement

There was no non-compliance recorded for the month of January 2013.

12.3 Implementation status and effectiveness of the mitigation measures

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

As there were some ongoing follow up practices, contractor was reminded to regularly review and rectify the discrepancy once found and maintain good site condition. The contractor implemented various environmental mitigation measures as recommended in the Environmental Permit and Final Mitigation Measures Report.

The recommend mitigation measures of EM&A manual (revision 3) are presented in **Appendix H (A)**.

The implemented statues of mitigation measures are presented in

Appendix H (B)

13 Future Key issues and recommendations

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

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

Tree protective measure for tree planting and transplanting, such as tree protection zone and regular watering.

14 Conclusions

Laying of E&M ducting for the proposal store room, concreting for outfall structure, construction for CLP's draw pit & cables ducting, installation of overhead traveling crane pump hall, installation of swithchroom, laying of DN2100 storm relief drain (Ch20 to CH70) at Ting Kok Road, construction of the proposed box culvert bay 2, 3, 8A, 15 & 16 and construction of jacking pit for cross road DN2800 twin pipe were major site activities being carried out within this reporting period.

Regular site meetings and inspection audits led by the seniors for discussing site environmental matters were held among Project Proponent, Contractor and the ET on weekly basis. Also monthly site meeting and inspection audits with the above parties and IEC were carried out on 28th of January 2013.

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

For water quality monitoring, total 7 abnormal accidents of water quality limits were recorded in this reporting month in accordance with the established level. ET has arranged site investigations for the abnormal incidents. No construction activities were carried out at the river bed during the reporting period. Proper mitigation measures was implemented by contractor to avoid site water release to the Wai Ha river. No particular observation of defective site activities were found causing water contamination. The exceedances of Turbidity were believed to be mainly attributed natural fluctuation, since the recorded levels of Turbidity at control station had also exceeded its baseline action level, the exceedances recorded at W2 were unlikely to be related to the Project.

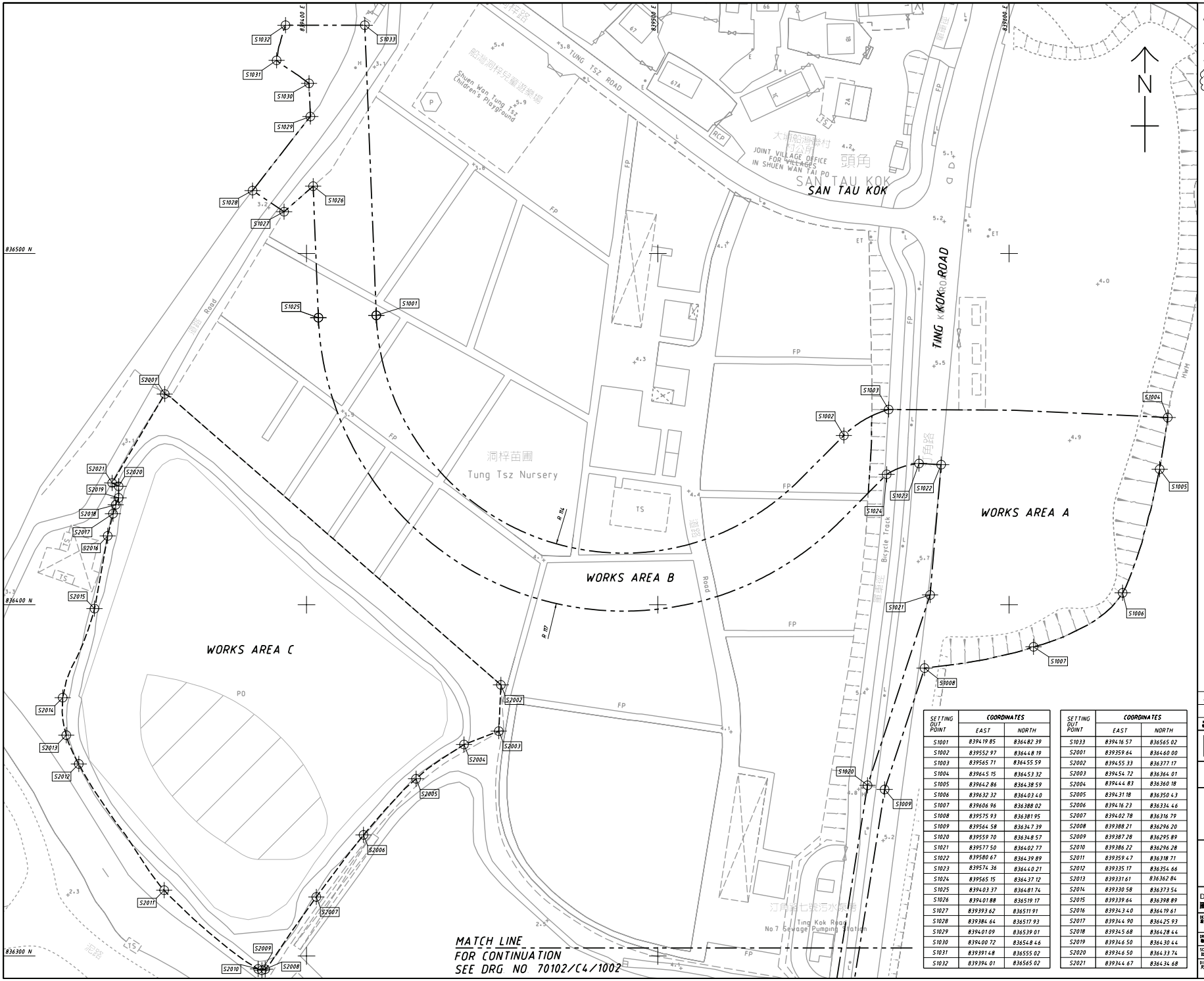
Also, there were not any notifications of summons recorded during the reporting period. Furthermore, there were not any formal prosecution and complaints recorded.

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

The ET will continue to implement the environmental monitoring & audit

programme in accordance with the EM&A Manual (revision 3) and Environmental Permit requirement.

Appendix A: Site Location Plan



NOTES

1. ALL LEVELS ARE IN METRE ABOVE PRINCIPAL DATUM
2. ALL CO-ORDINATES GIVEN ARE IN METRE AND ARE IN ACCORDANCE WITH HK(1980) COORDINATES SYSTEM
3. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SPECIFIED
4. THE PUBLIC CLEANING AREA SHALL BE THE AREAS WITHIN 2.5m BEYOND THE LIMIT OF WORKS AREAS EXCLUDING PRIVATE AREAS △A

LEGEND

- LIMIT OF WORKS AREA A
- LIMIT OF WORKS AREA B
- LIMIT OF WORKS AREA C
- S1001 SETTING OUT POINT

SETTING OUT POINT	COORDINATES EAST	NORTH
S1001	839419.85	836482.39
S1002	839552.97	836448.19
S1003	839565.71	836455.59
S1004	839645.15	836453.32
S1005	839642.86	836438.59
S1006	839632.32	836403.40
S1007	839606.96	836388.02
S1008	839575.93	836381.95
S1009	839564.58	836347.39
S1020	839559.70	836348.57
S1021	839577.50	836402.77
S1022	839580.67	836439.89
S1023	839574.36	836440.21
S1024	839565.15	836437.12
S1025	839403.37	836481.74
S1026	839401.88	836519.17
S1027	839393.62	836511.91
S1028	839386.64	836517.93
S1029	839401.09	836539.01
S1030	839400.72	836548.46
S1031	839391.48	836555.02
S1032	839394.01	836565.02

SETTING OUT POINT	COORDINATES EAST	NORTH
S1033	839416.57	836565.02
S2001	839359.64	836440.00
S2002	839455.33	836377.17
S2003	839454.72	836364.01
S2004	839444.83	836360.18
S2005	839431.18	836350.43
S2006	839416.23	836334.46
S2007	839402.78	836316.79
S2008	839388.21	836296.20
S2009	839387.28	836295.89
S2010	839386.22	836296.28
S2011	839359.47	836318.71
S2012	839335.17	836354.66
S2013	839331.61	836362.84
S2014	839330.58	836373.54
S2015	839339.64	836398.89
S2016	839343.40	836419.61
S2017	839344.90	836425.93
S2018	839345.68	836428.44
S2019	839346.50	836430.44
S2020	839346.50	836433.74
S2021	839344.67	836434.68

A	TENDER ADDENDUM NO.2	ECYP	RCYK	10-09
-	TENDER DRAWING	ECYP	RCYK	09-09
REV. 修訂	DESCRIPTION 內容摘要	BY 修訂者	CHECKED 核准	DATE 日期

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

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

SETTING OUT PLAN FOR WORKS AREA A, B AND C

SHEET 1 OF 2

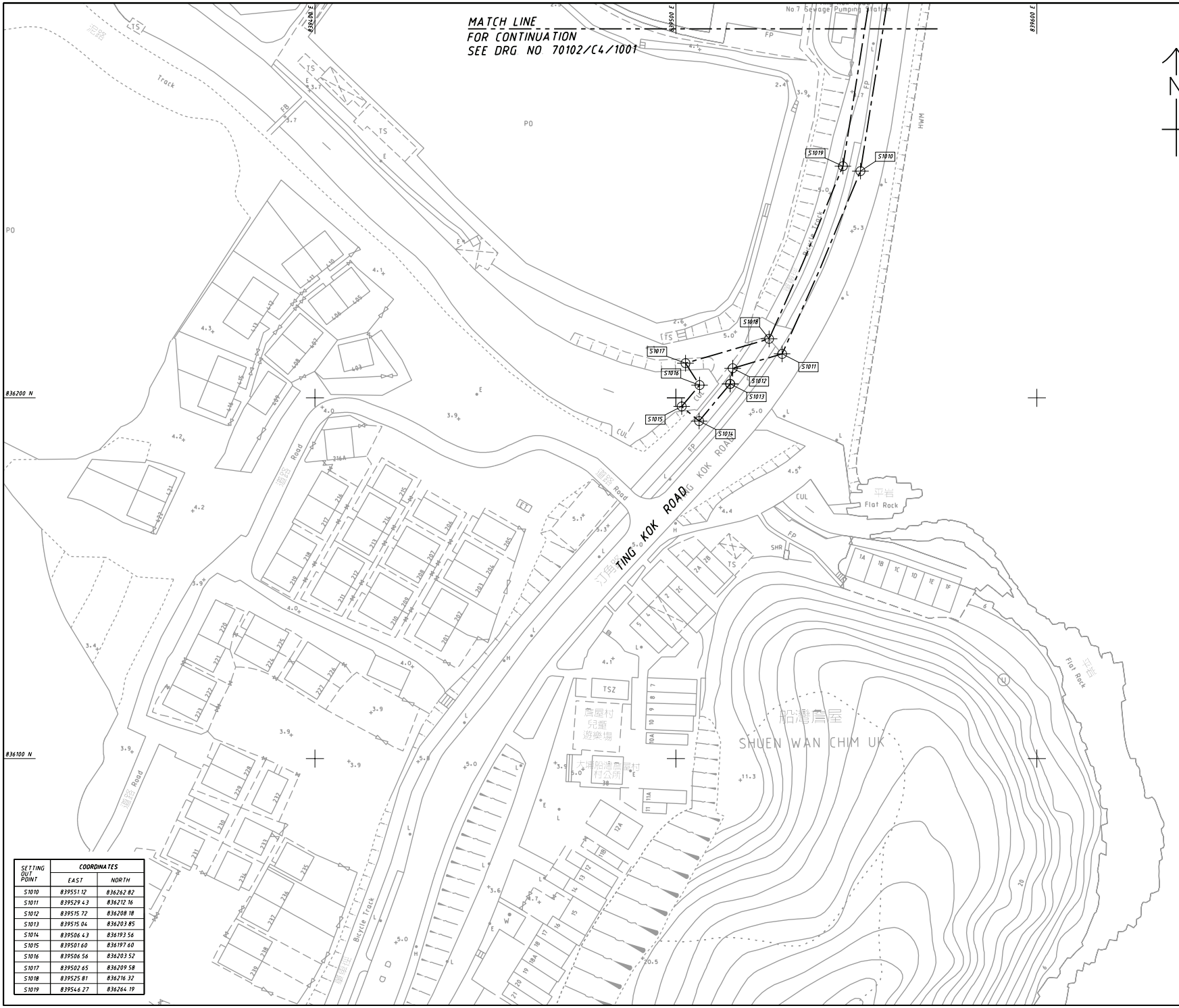
AECOM

DRG.NO. 圖紙編號 70102/C4/1001A

DESIGNED BY 設計	CPWU	CONTRACT NO. 合約編號	DC/2009/22
DRAWN BY 繪圖	LWL	P. DIV.- APPROVED 負責人	DML
SCALE 比例	A1 1 500	STATUS 類別	
DIMENSIONS ARE IN 尺寸單位	METRES	© COPYRIGHT RESERVED 版權所有	

2010-2-5 11:54:09

p:\projects\70102\1000\TENDER ADDENDUM NO 2\1001A.dgn



SETTING OUT POINT	COORDINATES	
	EAST	NORTH
S1010	839551.12	836262.82
S1011	839529.43	836212.16
S1012	839515.72	836208.18
S1013	839515.04	836203.85
S1014	839506.43	836193.56
S1015	839501.60	836197.60
S1016	839506.56	836203.52
S1017	839502.65	836209.58
S1018	839525.81	836216.32
S1019	839546.27	836264.19

NOTE

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

NO. 號碼	DESCRIPTION 內容說明	BY 繪製	CHECKED 檢查	DATE 日期
-	TENDER DRAWING	ECY	PRC	YK 09-09

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

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

SETTING OUT PLAN FOR WORKS AREA A, B AND C

SHEET 2 OF 2

AECOM

DRG.NO. 圖紙編號 70102/C4/1002

DESIGNED BY 設計	CPWU	CONTRACT NO. 合約編號	DC/2009/22
DRAWN BY 繪圖	LWL	P. DIV.- APPROVED 負責人	DML
SCALE 比例	A1 1 500	STATUS 類別	
DIMENSIONS ARE IN 尺寸單位	METRES	© COPYRIGHT RESERVED 版權所有	

2010-2-5 13 32 23

p:\projects\70102\1000\TENDER DRAWING\1002.dgn

Appendix B: Key Personal Contact Information Table

Post	Name	Contact No.	Contact Fax	e-mail
Project Manager	Mr. W. K. Chan	6821 1136	2674 6688	dc200922jv_pmcwk @yahoo.com.hk
Site Agent	Mr. C. L. Wong	9280 0166	2674 6688	dc200922jv_sa@yaho o.com.hk
Environmental Officer / Sub-agent	Mr. K. M. Ma	9552 1734	2674 6688	dc200922jv_suba@ya hoo.com.hk
Environmental Supervisor	Mr. Anthony Chan	9179 2092	2674 6688	anthony277@hotmail. com
Asia Ecological Consultants Ltd. (Wetland Specialist)	Dr. Mike Leven	2486 2885	2471 8389	mrleven@asiaecol.co m.hk
Environmental Pioneers & Solutions Limited (Environmental Team)	Miss Goldie Fung	2556 9172	2856 2010	goldiefung@fseng.co m.hk

Appendix C: Calibration Certificates for Measuring Instruments

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

Calibration Certificate

Certificate No. **21289** Page 1 of 3 Pages

Customer : Environmental Pioneers and Solutions Limited

Address : Flat A, 19/F., Chai Wan Industrial Centre Building, 21 Lee Chung Street, Chai Wan, HK.

Order No. : Q20468 **Date of receipt :** 2-Mar-12

Item Tested

Description : Digital Sound Level Meter
Manufacturer : SVAN
Model : 949 **Serial No.** : 8571

Test Conditions

Date of Test : 5-Mar-12 **Supply Voltage** : --
Ambient Temperature : (23 ± 3)°C **Relative Humidity :** (50 ± 25) %

Test Specifications

Calibration check.
Ref. Document/Procedure: Z01.

Test Results

All results were within the IEC 651 Type 1 & IEC 804 Type 1 specification after adjustment.
The results are shown in the attached page(s).

Main Test equipment used:

Equipment No.	Description	Cert. No.	Traceable to
S017A	Multi-Function Generator	07279	SCL-HKSAR
S024	Sound Level Calibrator	15136	NIM-PRC & SCL-HKSAR

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

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

Calibrated by : P. F. Wong

Approved by : Dorothy Cheuk

Date: 7-Mar-12

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

Calibration Certificate

Results :

1. SPL Accuracy

UUT Setting				Applied Value (dB)	UUT Reading (dB)	
Level Range	Octave Filter	Weight	Response		Before adjust	After adjust
105 dB	OFF	A	Fast	94.0	*92.0	94.0
			Slow		--	94.0
		C	Fast		--	94.0
130 dB	OFF	A	Fast	94.0	--	94.0
			Slow		--	94.0
		C	Fast		--	94.0
	OFF	A	Fast	114.0	--	114.1
			Slow		--	114.1
		C	Fast		--	114.1

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

2. Level Stability : 0.0 dB

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

3. Linearity

3.1 Level Linearity

UUT Range (dB)	Applied Value (dB)	UUT Reading (dB)	Variation (dB)	IEC 651 Type 1 Spec. (inside Primary)
130	114.0	114.0	0.0	± 0.7 dB
	104.0	104.0	0.0	
	94.0	94.0 (Ref.)	- -	
105	84.0	84.0	0.0	
	74.0	74.0	0.0	
	64.0	64.0	0.0	
	54.0	54.0	0.0	

Uncertainty : ± 0.1 dB

Calibration Certificate

3.2 Differential level linearity

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

Uncertainty : ± 0. 1 dB

4. Frequency Weighting

A weighting

Frequency	Attenuation (dB)	IEC 651 Type 1 Spec.
31.5 Hz	-40.4	- 39.4 dB, ± 1.5 dB
63 Hz	-27.2	- 26.2 dB, ± 1.5 dB
125 Hz	-17.0	- 16.1 dB, ± 1 dB
250 Hz	-9.4	- 8.6 dB, ± 1 dB
500 Hz	-2.6	- 3.2 dB, ± 1 dB
1 kHz	0.0 (Ref)	0 dB, ± 1 dB
2 kHz	+1.8	+ 1.2 dB, ± 1 dB
4 kHz	+1.8	+ 1.0 dB, ± 1 dB
8 kHz	-0.4	- 1.1 dB, + 1.5 dB ~ -3 dB
16 kHz	-6.3	- 6.6 dB, + 3 dB ~ - ∞

Uncertainty : ± 0.1 dB

5. Time Averaging

Applied Burst duty Factor	Applied Leq. Value (dB)	UUT Reading (dB)	IEC 804 Type 1 Spec.
continuous	50.0	- -	--
1/10	50.0	50.2	± 0.5 dB
$1/10^2$	50.0	49.8	
$1/10^3$	50.0	50.1	± 1.0 dB
$1/10^4$	50.0	49.9	

Uncertainty : ± 0.1 dB

Remarks : 1. UUT : Unit-Under-Test
2. The uncertainty claimed is for a confidence probability of not less than 95%.
3. Atmospheric Pressure : 1 001 hPa.
4. *Out of specification.

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

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

Calibration Certificate

Certificate No. **21290** Page 1 of 2 Pages

Customer : Environmental Pioneers and Solutions Limited

Address : Flat A, 19/F., Chai Wan Industrial Centre Building, 21 Lee Chung Street, Chai Wan, HK.

Order No. : Q20468 **Date of receipt :** 2-Mar-12

Item Tested

Description : Sound Level Calibrator

Manufacturer : Svantek

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

Test Conditions

Date of Test : 5-Mar-12 **Supply Voltage :** --

Ambient Temperature : (23 ± 3)°C **Relative Humidity :** (50 ± 25) %

Test Specifications

Calibration check.

Ref. Document/Procedure : F21, Z02.

Test Results

All results were within the IEC 942 Class 1 specification.

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

Main Test equipment used:

Equipment No.	Description	Cert. No.	Traceable to
S014	Spectrum Analyzer	13535	NIM-PRC & SCL-HKSAR
S024	Sound Level Calibrator	15136	NIM-PRC & SCL-HKSAR
S041	Universal Counter	15610	SCL-HKSAR
S206	Sound Level Meter	16338	SCL-HKSAR

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

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

Calibrated by : P. F. Wong

Approved by : Dorothy Cheuk

Date: 7-Mar-12

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

Calibration Certificate

Certificate No. 21290

Results :

1. Level Accuracy

UUT Nominal Value (dB)	Measured Value (dB)	IEC 942 Class 1 Spec.
94	94.10	± 0.3 dB
114	114.18	

Uncertainty : ± 0.1 dB

2. Frequency

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

Uncertainty : ± 3.6 x 10^{-6}

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

4. Total Harmonic Distortion : < 0.8 %
IEC 942 Class 1 Spec. : < 3 %
Uncertainty : ± 2.3 % of reading

Remark : 1. UUT : Unit-Under-Test
2. The above measured values are the mean of 3 measurements.
3. The uncertainty claimed is for a confidence probability of not less than 95%.
4. Atmospheric Pressure : 1001 hPa.

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

ALS Technichem (HK) Pty Ltd

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT:	MR ALLEN CHAN	**WORK ORDER:**	HK1230632
CLIENT:	ENVIRONMENTAL PIONEERS & SOLUTIONS LTD	**LABORATORY:**	HONG KONG
ADDRESS:	FLAT 19A, CHAI WAN INDUSTRIAL CENTRE BUILDING, 20 LEE CHUNG STREET, CHAI WAN, HONG KONG.	**DATE RECEIVED:**	19/11/2012
		DATE OF ISSUE:	20/11/2012
PROJECT:	--		

COMMENTS

It is certified that the item under calibration/checking has been calibrated/checked by corresponding calibrated equipment in the laboratory.
Maximum Tolerance and calibration frequency stated in the report, unless otherwise stated, the internal aceptance criteria of ALS will be followed.

Scope of Test:	Conductivity, Dissolved Oxygen, pH, Temperature and Turbidity
Description:	Multi-meter
Brand Name:	TOA-DKK
Model No.:	WMS-24
Serial No.:	682337
Equipment No.:	--
Date of Calibration:	20 November, 2012

NOTES

This is the Final Report and supersedes any preliminary report with this batch number.
Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

ISSUING LABORATORY: HONG KONG

Address

ALS Technichem (HK) Pty Ltd

11/F Chung Shun Knitting Centre
1-3 Wing Yip Street
Kwai Chung
HONG KONG

Phone: 852-2610 1044
Fax: 852-2610 2021
Email: hongkong@alsglobal.com

Mr Chan Kwok Fai, Godfrey
Laboratory Manager - Hong Kong

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1230632
Date of Issue: 20/11/2012
Client: ENVIRONMENTAL PIONEERS & SOLUTIONS LTD

Description: Multi-meter
Brand Name: TOA-DKK
Model No.: WMS-24
Serial No.: 682337
Equipment No.: --
Date of Calibration: 20 November, 2012 Date of next Calibration: 20 February, 2013

Parameters:

Conductivity

Method Ref: APHA (21st edition), 2510B

Expected Reading (uS/cm)	Displayed Reading (uS/cm)	Tolerance (%)
146.9	152.0	3.5
6667	7030	5.4
12890	13600	5.5
58670	60400	2.9
	Tolerance Limit (%)	10.0

Dissolved Oxygen

Method Ref: APHA (21st edition), 4500O: G

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
4.83	4.82	-0.01
6.76	6.65	-0.11
8.89	8.79	-0.10
	Tolerance Limit (±mg/L)	0.20

pH Value

Method Ref: APHA (21st edition), 4500H:B

Expected Reading (pH Unit)	Displayed Reading (pH Unit)	Tolerance (pH unit)
4.0	4.01	0.01
7.0	7.02	0.02
10.0	10.07	0.07
	Tolerance Limit (±unit)	0.20

Temperature

Method Ref: Section 6 of International Accreditation New Zealand Technical Guide No. 3 Second edition March 2008: Working Thermometer Calibration Procedure.

Expected Reading (°C)	Displayed Reading (°C)	Tolerance (°C)
15.5	15.7	0.2
24.0	24.2	0.2
42.0	40.0	-2.0
	Tolerance Limit (°C)	2.0

Mr Chan Kwok Fai, Godfrey
Laboratory Manager - Hong Kong

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1230632
Date of Issue: 20/11/2012
Client: ENVIRONMENTAL PIONEERS & SOLUTIONS LTD

Description: Multi-meter
Brand Name: TOA-DKK
Model No.: WMS-24
Serial No.: 682337
Equipment No.: --
Date of Calibration: 20 November, 2012 Date of next Calibration: 20 February, 2013

Parameters:

Turbidity **Method Ref: APHA (21st edition), 2130B**

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.0	--
4	3.8	-5.0
40	40.1	0.3
80	76.7	-4.1
400	392.6	-1.8
800	732.7	-8.4
	Tolerance Limit (±%)	10.0

Mr Chan Kwok Fai, Godfrey
Laboratory Manager - Hong Kong

Hong Kong Calibration Ltd.
香港校正有限公司

Calibration Certificate

Certificate No. **27765** Page 1 of 2 Pages

Customer : Environmental Pioneers and Solutions Limited

Address : Flat A, 19/F., Chai Wan Industrial Centre Building, 20 Lee Chung Street, Chai Wan, HK.

Order No. : Q22905 **Date of receipt :** 9-Nov-12

Item Tested

Description : Protable Level-Velocity Logger

Manufacturer : Greyline

Model : Stingray **Serial No. :** 45525

Test Conditions

Date of Test : 10-Dec-12 **Supply Voltage :** --

Ambient Temperature : (23 ± 3)°C **Relative Humidity :** (50 ± 25) %

Test Specifications

Calibration check.

Ref. Document/Procedure: V12, T03, M07.

Test Results

All results were within the tolerance(s).

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

Main Test equipment used:

Equipment No.	Description	Cert. No.	Traceable to
S179	Std. Tape	20976	NIM-PRC
S136A	Stop Watch	26076	SCL-HKSAR
S214A	Std. Thermo-Hygrometer	21518	SCS-SWISS, NIM-PRC

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

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

Calibrated by : S. K. Tang

Approved by : Alan Chu

Date: 10-Dec-12

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

Calibration Certificate

Certificate No. 27765

Results :

1. Flow Rate

Applied Value (Ft/s)	UUT Reading (Ft/s)	Tolerance	Uncertainty
1.34	1.4	± 5 % f.s	± 1 %

2. Level

Applied Value (Ft)	UUT Reading (Ft)	Tolerance	Uncertainty
1.00	1.0	± 5 % f.s.	± 0.1 %
2.00	2.0		
3.00	3.0		
4.00	4.0		

3. Temperature

Applied Value (℃)	UUT Reading (℃)	Tolerance	Uncertainty
23.0	22	± 2 ℃	± 0.2 ℃

Remarks : 1. UUT : Unit-Under-Test
2. The uncertainty claimed is for a confidence probability of not less than 95%.
3. Sensor Used : Model : QZ02L-UT-01-PS
S/N : 10D18289

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

Appendix D: Construction Noise Monitoring Data

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

Noise Monitoring Data Sheet

Monitoring Location		M1	AL1
Monitoring Method		Façade	Façade
Date of Monitoring		2/1/2013	2/1/2013
Weather Condition		Sunny	Sunny
Measurement Start Time (hh:mm)		10:25	11:10
Measurement Time Length (mins)		30 mins	
SLM Model & S/N		SVAN 955	
Wind Speed (m/s)		0.2	0.2
Measurement Results	L_{eq} (dB(A))	62.1	68.1
	L_{10} (dB(A))	64.3	68.4
	L_{90} (dB(A))	50.3	60.2
Major Construction Noise Source(s) During Monitoring		The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location due to its large distance from the construction activities	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location due to its large distance from the construction activities
Other Noise Source(s) During Monitoring		– Background Noise – Traffic Noise	– Background Noise – Traffic Noise

	Name	Signature	Date
Perpared by:	Lau Kai Chung	**Lau Kai Chung**	2/1/2013

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

Noise Monitoring Data Sheet

Monitoring Location		M1	AL1
Monitoring Method		Façade	Façade
Date of Monitoring		9/1/2013	9/1/2013
Weather Condition		Sunny	Sunny
Measurement Start Time (hh:mm)		10:10	10:50
Measurement Time Length (mins)		30 mins	
SLM Model & S/N		SVAN 955	
Wind Speed (m/s)		0.2	0.2
Measurement Results	L_{eq} (dB(A))	61.5	63.2
	L_{10} (dB(A))	62.3	64.9
	L_{90} (dB(A))	47.9	55.2
Major Construction Noise Source(s) During Monitoring		The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location due to its large distance from the construction activities	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location due to its large distance from the construction activities
Other Noise Source(s) During Monitoring		– Background Noise – Traffic Noise	– Background Noise – Traffic Noise

	Name	Signature	Date
Perpared by:	Lau Kai Chung	**Lau Kai Chung**	9/1/2013

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

Noise Monitoring Data Sheet

Monitoring Location		M1	AL1
Monitoring Method		Façade	Façade
Date of Monitoring		16/1/2013	16/1/2013
Weather Condition		Sunny	Sunny
Measurement Start Time (hh:mm)		11:10	11:45
Measurement Time Length (mins)		30 mins	
SLM Model & S/N		SVAN 955	
Wind Speed (m/s)		0.4	0.4
Measurement Results	L_{eq} (dB(A))	61.1	66.3
	L_{10} (dB(A))	63.4	67.2
	L_{90} (dB(A))	48.5	49.4
Major Construction Noise Source(s) During Monitoring		The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location due to its large distance from the construction activities	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location due to its large distance from the construction activities
Other Noise Source(s) During Monitoring		– Background Noise – Traffic Noise	– Background Noise – Traffic Noise

	Name	Signature	Date
Perpared by:	Lau Kai Chung	**Lau Kai Chung**	16/1/2013

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

Noise Monitoring Data Sheet

Monitoring Location		M1	AL1
Monitoring Method		Façade	Façade
Date of Monitoring		23/1/2013	23/1/2013
Weather Condition		Sunny	Sunny
Measurement Start Time (hh:mm)		11:10	11:45
Measurement Time Length (mins)		30 mins	
SLM Model & S/N		SVAN 955	
Wind Speed (m/s)		0.6	0.6
Measurement Results	L_{eq} (dB(A))	60.9	67.8
	L_{10} (dB(A))	62.4	68.7
	L_{90} (dB(A))	49.6	50.8
Major Construction Noise Source(s) During Monitoring		The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location due to its large distance from the construction activities	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location due to its large distance from the construction activities
Other Noise Source(s) During Monitoring		– Background Noise – Traffic Noise	– Background Noise – Traffic Noise

	Name	Signature	Date
Perpared by:	Lau Kai Chung	**Lau Kai Chung**	23/1/2013

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

Noise Monitoring Data Sheet

Monitoring Location		M1	AL1
Monitoring Method		Façade	Façade
Date of Monitoring		30/1/2013	30/1/2013
Weather Condition		Sunny	Sunny
Measurement Start Time (hh:mm)		10:05	10:45
Measurement Time Length (mins)		30 mins	
SLM Model & S/N		SVAN 955	
Wind Speed (m/s)		0.2	0.2
Measurement Results	L_{eq} (dB(A))	64.8	65.3
	L_{10} (dB(A))	65.1	66.1
	L_{90} (dB(A))	46.4	51.4
Major Construction Noise Source(s) During Monitoring		The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location due to its large distance from the construction activities	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location due to its large distance from the construction activities
Other Noise Source(s) During Monitoring		– Background Noise – Traffic Noise	– Background Noise – Traffic Noise

	Name	Signature	Date
Perpared by:	Lai Chi Hang	**Lau Kai Chung**	30/1/2013

Appendix E: Water Quality Monitoring Data

Remark:

Red highlighting: The value is exceeding limit level

Yellow highlighting: The value is exceeding action levele

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

Date of Sampling： 2/1/2013

Weather： Sunny

Monitoring Location	W1	W2	C2
Time (hhmm)	16:00	16:00	10:50
Tide Mode	Mid-ebb		N/A
Water Depth (m)	<1	<1	<1
pH value	7.80	7.69	8.90
Temperature (^{o}C)	21.6	19.8	21.7
Turbidity (NTU)	4.4	8.1	1.4
DO (mg/L)	6.10	7.73	6.90
DO Saturation (%)	69%	84%	78.50
Suspended Solids (mg/L)	3.0	2.6	2.0

Remark or Observation：

	Name	Signature	Date
Prepared By：	Lau kai chung	**Lau kai chung**	2/1/2013

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

Date of Sampling : 4/1/2013

Weather : Sunny

Monitoring Location	**W1**	**W2**	**C2**
Time (hhmm)	16:15	16:05	11:15
Tide Mode	Mid-ebb		N/A
Water Depth (m)	<1	<1	<1
pH value	8.20	7.61	8.80
Temperature (^{o}C)	17.6	19.8	16.9
Turbidity (NTU)	1.4	2.8	1.5
DO (mg/L)	8.30	6.79	8.50
DO Saturation (%)	84%	75%	87%
Suspended Solids (mg/L)	3.0	2.6	2.0

Remark or Observation :

	Name	**Signature**	**Date**
Prepared By :	Lau kai chung	**Lau kai chung**	4/1/2013

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

Date of Sampling : 7/1/2013

Weather : Sunny

Monitoring Location	W1	W2	C1
Time (hhmm)	13:00	14:00	14:10
Tide Mode	Mid-flood		
Water Depth (m)	<1	<1	<1
pH value	7.90	8.35	8.36
Temperature (^{o}C)	22.5	19.3	19.4
Turbidity (NTU)	3.40	6.5	4.30
DO (mg/L)	5.50	9.92	9.88
DO Saturation (%)	6..7%	111%	111%
Suspended Solids (mg/L)	11.0	2.6	2.2

Remark or Observation :

	Name	Signature	Date
Prepared By :	Lau kai chung	**Lau kai chung**	7/1/2013

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

Date of Sampling : 9/1/2013

Weather : Sunny

Monitoring Location	**W1**	**W2**	**C2**
Time (hhmm)	10:50	09:50	10:30
Tide Mode	Mid-ebb		N/A
Water Depth (m)	<1	<1	<1
pH value	8.20	7.78	8.60
Temperature (^{o}C)	21.4	18.8	20.9
Turbidity (NTU)	4.7	2.5	1.6
DO (mg/L)	7.00	7.56	7.00
DO Saturation (%)	78%	85%	78%
Suspended Solids (mg/L)	4.0	1.0	2.0

Remark or Observation :

	Name	**Signature**	**Date**
Prepared By :	Lau kai chung	**Lau kai chung**	9/1/2013

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

Date of Sampling : 11/1/2013

Weather : Sunny

Monitoring Location	**W1**	**W2**	**C2**
Time (hhmm)	12;45	13:00	12:30
Tide Mode	Mid-ebb		N/A
Water Depth (m)	<1	<1	<1
pH value	8.20	8.06	8.40
Temperature (^{o}C)	23.3	21.44	22.9
Turbidity (NTU)	2.1	2.7	3.9
DO (mg/L)	6.50	8.86	6.60
DO Saturation (%)	76%	113%	77%
Suspended Solids (mg/L)	5.0	1.4	2.0

Remark or Observation :

	Name	**Signature**	**Date**
Prepared By :	Lau kai chung	**Lau kai chung**	11/1/2013

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

Date of Sampling : 14/1/2013

Weather : Sunny

Monitoring Location	W1	W2	C2
Time (hhmm)	15:32	15:30	12:30
Tide Mode	Mid-ebb		N/A
Water Depth (m)	<1	<1	<1
pH value	8.10	7.36	8.40
Temperature (^{o}C)	22.6	20.3	22.9
Turbidity (NTU)	21.9	3.2	3.9
DO (mg/L)	8.20	7.89	6.60
DO Saturation (%)	92%	83%	77%
Suspended Solids (mg/L)	107.0	3.6	2.0

Remark or Observation :

	Name	Signature	Date
Prepared By :	Lau kai chung	**Lau kai chung**	14/1/2013

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

Date of Sampling : 16/1/2013

Weather : Sunny

Monitoring Location	**W1**	**W2**	**C2**
Time (hhmm)	15:00	16:00	12:00
Tide Mode	Mid-ebb		N/A
Water Depth (m)	<1	<1	<1
pH value	8.20	7.81	8.90
Temperature (^{o}C)	23	22.3	22.8
Turbidity (NTU)	3.0	2.5	2.1
DO (mg/L)	6.50	9.77	7.60
DO Saturation (%)	75%	127%	88%
Suspended Solids (mg/L)	2.0	1.0	2.0

Remark or Observation :

	Name	**Signature**	**Date**
Prepared By :	Lau kai chung	**Lau kai chung**	16/1/2013

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

Date of Sampling : 18/1/2013

Weather : Sunny

Monitoring Location	**W1**	**W2**	**C2**
Time (hhmm)	17:00	17:00	12:30
Tide Mode	Mid-ebb		N/A
Water Depth (m)	<1	<1	<1
pH value	8.10	8.09	8.40
Temperature (^{o}C)	22.0	20.4	21
Turbidity (NTU)	4.6	2.1	1.4
DO (mg/L)	5.20	13.22	7.00
DO Saturation (%)	59%	182%	79%
Suspended Solids (mg/L)	8.0	2.4	2.0

Remark or Observation :

	Name	**Signature**	**Date**
Prepared By :	Lau kai chung	**Lau kai chung**	18/1/2013

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

Date of Sampling : 21/1/2013

Weather : Sunny

Monitoring Location	W1	W2	C1
Time (hhmm)	10:45	14:30	14:35
Tide Mode	Mid-flood		
Water Depth (m)	<1	<1	<1
pH value	6.80	7.98	8.05
Temperature (^{o}C)	23.7	23.3	23.6
Turbidity (NTU)	3.2	2.8	2.0
DO (mg/L)	6.00	8.26	6.49
DO Saturation (%)	70%	114%	90%
Suspended Solids (mg/L)	4.0	2.8	1.0

Remark or Observation :

	Name	Signature	Date
Prepared By :	Lau kai chung	**Lau kai chung**	21/1/2013

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

Date of Sampling : 23/1/2013

Weather : Sunny

Monitoring Location	W1	W2	C2
Time (hhmm)	16:30	11:10	9:45
Tide Mode	Mid-ebb		N/A
Water Depth (m)	<1	<1	<1
pH value	7.50	7.56	8.10
Temperature (^{o}C)	24	21.98	23.9
Turbidity (NTU)	4.5	2.8	2.4
DO (mg/L)	6.60	6.81	7.60
DO Saturation (%)	80%	95%	90%
Suspended Solids (mg/L)	2.0	4.8	2.0

Remark or Observation :

	Name	Signature	Date
Prepared By :	Lau kai chung	**Lau kai chung**	23/1/2013

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

Date of Sampling : 25/1/2013

Weather : Sunny

Monitoring Location	W1	W2	C2
Time (hhmm)	12:30	12:20	12:35
Tide Mode	Mid-ebb		N/A
Water Depth (m)	<1	<1	<1
pH value	8.40	7.86	8.00
Temperature (^{o}C)	24.2	21.7	23.7
Turbidity (NTU)	2.6	2.5	1.8
DO (mg/L)	7.30	7.71	8.00
DO Saturation (%)	86%	99%	91%
Suspended Solids (mg/L)	4.0	2.0	2.0

Remark or Observation :

	Name	Signature	Date
Prepared By :	Lau kai chung	**Lau kai chung**	25/1/2013

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

Date of Sampling : 28/1/2013

Weather : Sunny

Monitoring Location	W1	W2	C2
Time (hhmm)	13:15	13:45	13:35
Tide Mode	Mid-ebb		N/A
Water Depth (m)	<1	<1	<1
pH value	7.80	7.71	8.40
Temperature (^{o}C)	22.3	22	22
Turbidity (NTU)	3.5	3.4	2.7
DO (mg/L)	6.90	8.77	7.10
DO Saturation (%)	79%	113%	81%
Suspended Solids (mg/L)	5.0	2.4	2.0

Remark or Observation :

	Name	Signature	Date
Prepared By :	Lau kai chung	**Lau kai chung**	28/1/2013

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

Date of Sampling : 30/1/2013

Weather : Sunny

Monitoring Location	**W1**	**W2**	**C2**
Time (hhmm)	13:18	14:30	10:08
Tide Mode	Mid-ebb		N/A
Water Depth (m)	<1	<1	<1
pH value	7.90	7.79	8.00
Temperature (^{o}C)	23.6	23.31	23.6
Turbidity (NTU)	2.3	1.9	1.8
DO (mg/L)	6.90	6.94	6.30
DO Saturation (%)	86%	91%	74%
Suspended Solids (mg/L)	4.0	2.2	9.0

Remark or Observation :

	Name	**Signature**	**Date**
Prepared By :	Lau kai chung	**Lau kai chung**	30/1/2013

Appendix F: Hydrological Characteristics Monitoring Data

Location	Position	Tide	Date	Time	Weather	Water Depth (m)*	Water Flow (m/s)	Water Flow (m^3/s)
H1	Mid	Flood	4-Jan-2013	12:10	Sunny	0.48	0.18	0.225
H1	Mid	Flood	11-Jan-2013					
H1	Mid	Flood	18-Jan-2013	10:45	Sunny	0.3	0.06	0.075
H1	Mid	Flood	25-Jan-2013	15:45	Sunny	0.24	0.09	0.113
H2	Mid	Flood	4-Jan-2013	11:45	Sunny	0.36	0.12	0.754
H2	Mid	Flood	11-Jan-2013					
H2	Mid	Flood	18-Jan-2013	10:15	Sunny	0.24	0.12	0.754
H2	Mid	Flood	25-Jan-2013	15:15	Sunny	0.36	0.18	1.130
H1	Mid	Ebb	4-Jan-2013	15:50	Sunny	0.24	0.12	0.150
H1	Mid	Ebb	11-Jan-2013	12:50	Sunny	0.24	0.24	0.300
H1	Mid	Ebb	18-Jan-2013	16:50	Sunny	0.12	0.12	0.150
H1	Mid	Ebb	25-Jan-2013	12:10	Sunny	0.3	0.12	0.150
H2	Mid	Ebb	4-Jan-2013	15:30	Sunny	0.18	0.24	1.507
H2	Mid	Ebb	11-Jan-2013	12:20	Sunny	0.12	0.12	0.754
H2	Mid	Ebb	18-Jan-2013	16:10	Sunny	0.12	0.06	0.377
H2	Mid	Ebb	25-Jan-2013	11:45	Sunny	0.24	0.06	0.377

*Only one mid-tide is within working hours on 11 Jan 2013.

Appendix G: Landscape and Visual Monitoring Photos

	
Photo 1 – Removal of site hoarding along the eastern boundary of Area A.	Photo 2 – No discharge of muddy water was observed in Area C.
	
Photo 3 – Overall view of the transplanted tree U58 *Grevillea robusta*.	Photo 4 – Resprouts from the remained stump of U68.

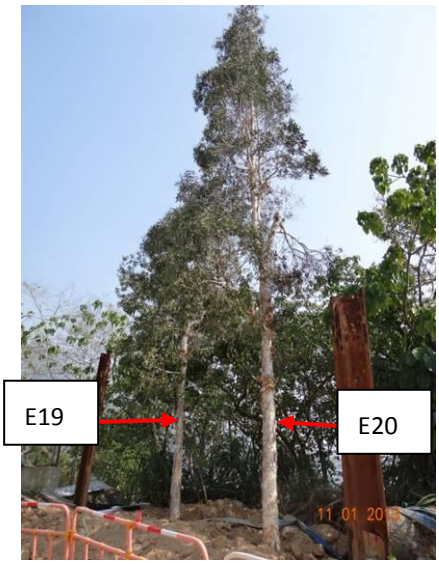
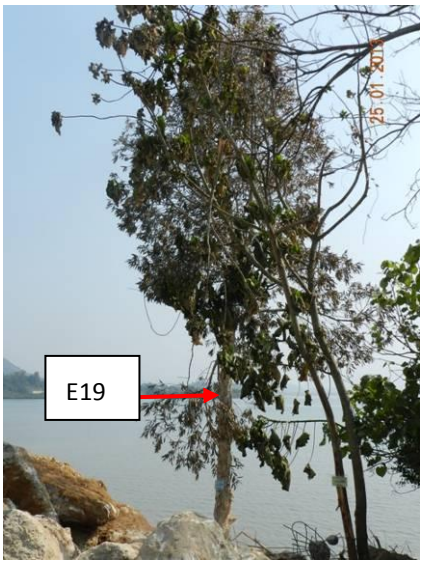

	

Photo 5 – Translocated tree E19 and E20 (*Melaleuca cajuputi* subsp. *cumingiana*) during the monitoring on 11th January 2013.	Photo 6 – E19 (*Melaleuca cajuputi* subsp. *cumingiana*) was relocated again during the monitoring on 25th January 2013.

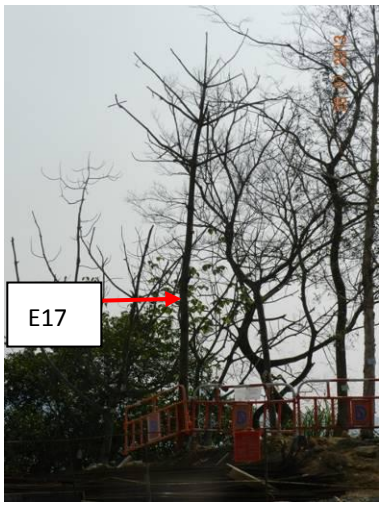
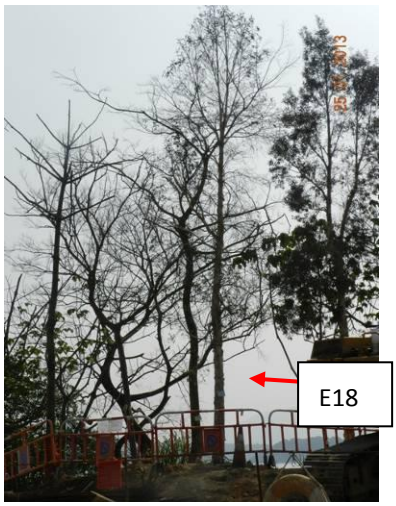
	

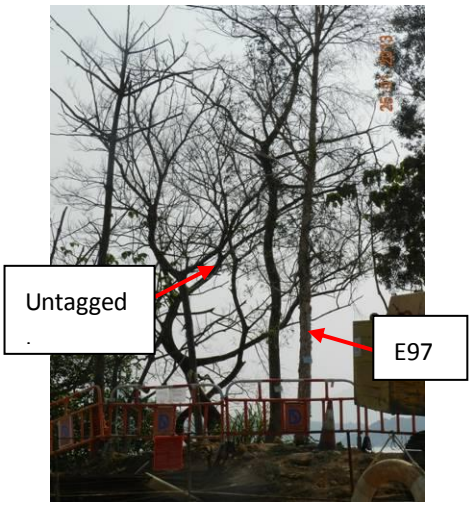
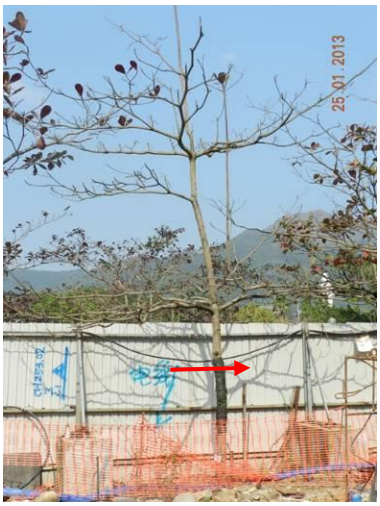
Photo 7 – Poor condition of relocated tree E17 (*Bombax ceiba*).	Photo 8 – Poor condition of relocated tree and E18 (*Melaleuca cajuputi* subsp. *cumingiana*). Living foliage was observed at the lower canopy of E18 (*Melaleuca cajuputi* subsp. *cumingiana*).
	
Photo 9 – Fair condition of relocated tree E16 (*Bombax ceiba*).	Photo 10 – E97 and an untagged trees relocated in the northeastern part of Area A were in poor condition.
	
Photo 11 –Mechanical injuries were observed on the trunk of the retained trees E61.	Photo 12 – Mechanical injuries were observed on the trunks of the retained trees E68.

	
Photo 13 – The broken planter of U75 was repaired in Area B.	Photo 14 – Severe leaning tree trunk of the transplanted tree U61 was observed in Area B.
	
Photo 15 – Fairly poor condition of tree U55 in Area B.	Photo 16 – The tree T102 relocated to the southern part within the Phase 2 works area of Area B was in poor condition.
	
Photo 17 – Declining health condition of U34 in Area B.	Photo 18 – Declining health condition of U35 in Area B.

	
Photo 19 – Declining health condition of U37 in Area B.	Photo 20 – Poor health condition was observed in the canopy of the relocated trees U76 in Area B.
	
Photo 21 – Poor health condition was observed in the canopy of the relocated trees U78 in Area B.	Photo 22 –The relocated tree U77 in Area B was suspected dead as no foliage was found in the canopy.
	
Photo 23 – Poor health condition was observed in the canopy of the relocated trees U79 in Area B.	

Appendix H:

A)

The recommended mitigation measures of EM&A manual (revision 3)

B)

Implementation status of environmental protection and mitigation measures

A) The recommended mitigation measures of EM&A manual (revision 3)

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
A		***Noise Impact***					
S 3.30	2.18	Good Site Practice: ▪ Only well-maintained plant shall be operated on-site and plant shall be serviced regularly during the construction program ▪ Silencers or mufflers on construction equipment shall be utilized and shall be properly maintained during the construction program ▪ Mobile plant, if any, shall be sited as far from NSRs as possible ▪ Machines and plant (such as	To minimize construction noise impacts	Contractor	Works areas	Construction phase	EIAO-TM NCO

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		trucks) that may be in intermittent use shall be shut down between work periods or shall be throttled down to a minimum ▪ Plant known to emit noise strongly in one direction shall, wherever possible, be orientated so that the noise is directed away from the nearby NSRs ▪ Material stockpiles and other structures shall be effectively utilized, wherever practicable, in screening noise from on-site construction activities.					
S 3.31 - 3.32	2.19	Use of quieter PME	To minimize construction noise impacts	Contractor	Works areas	Construction phase	EIAO-TM NCO
S 3.33 – 3.34	2.20-2. 21	Use of temporary noise barrier	To minimize construction noise impacts	Contractor	Works areas as shown in Figure	Construction phase	EIAO-TM NCO

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
3.36-3.38	2.23-2.24				3.5		
S 3.35 and Table 3.6	2.22	Use of alternative quieter construction method (the Low Impact Method)	To minimize construction noise impacts	Contractor	Part of the works area for pipe laying in Wai Ha (refer to Figure 3.5)	Construction phase	EIAO-TM NCO
3.36 -3.38	2.23-2.24	Use of noise enclosure	To minimize construction noise impacts	Contractor	Part of the works area for pipe laying in Wai Ha (refer to Figure 3.5)	Construction phase	EIAO-TM NCO
B		***Air Quality Impact***					
S4.16	3.5	Implementation of mitigation measures stipulated in the Air Pollution Control (Construction Dust) Regulation and good site practices including but not limited to the following:	To minimize construction dust impacts	Contractor	Construction Sites	Construction Phase	EIAO-TM

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		▪ Use of regular watering to reduce dust emissions from exposed site surfaces and unpaved road, with complete coverage, particularly during dry weather; ▪ Use of frequent watering for particularly dusty static construction areas and areas close to ASRs; ▪ Tarpaulin covering of all dusty vehicle loads transported to, from and between site location; ▪ Establishment and use of vehicle wheel and body washing facilities at the exit points of the site; ▪ Routing of vehicles and					

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		positioning of construction plant should be at the maximum possible distance from ASRs. ▪ Stockpiled excavated materials should be covered with tarpaulin, and should be removed off-site within 24 hours to avoid any odour nuisance arising.					
C		***Water Quality Impact***					
S5.29	4.5	Construction Site Run-off and Drainage: ▪ Before commencing any site formation work, all sewer and drainage connections shall be sealed to prevent debris, soil, sand etc. from entering public	To minimize water quality impacts	Contractor	Works sites	Construction phase	ProPECC PN 1/94 Construction Site Drainage

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		sewers/drains. ▪ Temporary ditches shall be provided to facilitate run-off discharge into appropriate watercourses, via a silt retention pond. No site run-off shall enter the fishponds at Shuen Wan. ▪ Sand/silt removal facilities such as sand traps, silt traps and sediment basins shall be provided to remove sand/silt particles from runoff to meet the requirements of the Technical Memorandum standard under the Water Pollution Control Ordinance. The design of silt removal facilities shall be based on the guidelines provided in ProPECC PN 1/94. All drainage					

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		facilities and erosion and sediment control structures shall be inspected monthly and maintained to ensure proper and efficient operation at all times and particularly during rainstorms. ▪ Water pumped out from excavated pits shall be discharged into silt removal facilities. ▪ During rainstorms, exposed slope/soil surfaces shall be covered by a tarpaulin or other means. Other measures that need to be implemented before, during, and after rainstorms as summarized in ProPECC PN 1/94 shall be followed.					

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		▪ Exposed soil areas shall be minimized to reduce potential for increased siltation and contamination of runoff. ▪ Earthwork final surfaces shall be well compacted and subsequent permanent work or surface protection shall be immediately performed to reduce the potential of soil erosion. ▪ Open stockpiles of construction materials or construction wastes on-site shall be covered with tarpaulin or similar fabric during rainstorms.					
S5.30	4.7	Further precautionary measures during rainy season:	To minimize water quality impacts to the designated Conservation Area	Contractor	Works areas near the Conservation Area	Rainy seasons during construction	EIAO-TM Water Pollution Control Ordinance

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		▪ For the construction of the box culvert next to the existing channel of the Wai Ha River, sand bags should be deployed around the boundary of the works trench to prevent muddy water ingress into the adjacent CA or Wai Ha River. Sand bags should also be used to surround the excavated trench. Generally, the sand bags will be placed up to a height of 300mm to provide adequate allowance for the built-up water level during rainstorm event. With sand bags in place, surface runoff will be intercepted and flow to Wai Ha River or collected by the existing drainage system as usual. ▪ For the construction of the box				phase	(WPCO)

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		culvert in the extreme northeast corner of Shuen Wan Marsh Conservation Area sand bags should be deployed along the limit of the works area to prevent muddy water ingress into the CA. Sand bags should be placed to a height of at least 300mm from ground level and +2.5 mPD (whichever is greater) to provide adequate allowance for the built-up water level during rainstorm events. Unpolluted surface runoff within the works area should then be collected and directed into the existing drainage system. ▪ Sheet-piles, which would be installed around the works trench near the Conservation Area, would					

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		be extended above ground level for about 2m to serve as hoardings to isolate the works site. ▪ Tarpulin sheets would be used to cover the excavation areas during heavy rainstorms. This would prevent the ingress of rainwater into the trench minimising the risk of muddy water getting into Wai Ha River and the adjacent Conservation Area. ▪ Any concrete washing water would be contained inside the works site surrounded by the extended sheet piles. A pump sump at the bottom of the trench would be provided to pump any excess water during concrete washing.					

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		▪ Stockpiling the excavated materials adjacent to the Conservation Area would not be allowed. The excavated materials would be either removed off site immediately after excavation, or stockpile at location(s) away from the Conservation Area. The stockpile locations shall be approved by the site engineer.					
S5.31-S 5.32	4.8-4.9	General Construction Activities: ▪ Debris and refuse generated on-site should be collected, handled and disposed of properly to avoid entering the Wa Ha River and fish ponds at Shuen Wan. Stockpiles of cement and other construction materials should be kept covered	To minimize water quality impacts	Contractor	Works sites	Construction phase	EIAO-TM WPCO

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		when not being used. ▪ Oils and fuels should only be used and stored in designated areas which have pollution prevention facilities. To prevent spillage of fuels and solvents to nearby water bodies, all fuel tanks and storage areas should be provided with locks and be sited on sealed areas, within bunds of a capacity equal to 110% of the storage capacity of the largest tank. The bund should be drained of rainwater after a rain event.					
S5.33	4.10	Sewage from Construction workforce: ▪ Temporary sanitary facilities, such as portable chemical toilets, should be employed on-site. A	To minimize water quality impacts	Contractor	Works sites	Construction phase	EIAO-TM WPCO

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		licensed contractor would be responsible for appropriate disposal and maintenance of these facilities.					
S5.34	4.11	River Channel Excavation Works: ▪ The excavation works within the upstream end of the existing river channel of the Wai Ha River for the construction of the proposed box culvert shall be carried out in dry condition. Containment measures such as bunds and barriers shall be used within the affected length of the river channel and the excavation works restricted to within an enclosed dry section of the channel. The excavation works within Wai Ha River shall be restricted to the period from October	To minimize water quality impacts	Contractor	Works sites	Construction phase	EIAO-TM WPCO

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		to April.					
D		***Waste Management Implications***					
S6.20 – 6.22	5.5	Good site practices: ▪ Nomination of approved personnel, such as a site manager, to be responsible for good site practices and making arrangements for collection of all wastes generated at the site and effective disposal to an appropriate facility. ▪ Training of site personnel in proper waste management and chemical waste handling procedures. ▪ Provision of sufficient waste disposal points and regular	To reduce waste management impacts	Contractor	Works sites	Construction phase	ETWB TCW No.19/2005 ETWB TCW No.31/2004

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		collection for disposal. ▪ Appropriate measures to minimise windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers. ▪ Separation of chemical waste for special handling and appropriate treatment at the Chemical Waste Treatment Facility. ▪ Regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors. ▪ A Waste Management Plan					

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		should be prepared and submitted to the Engineer for approval. One may make reference to ETWB TCW No. 15/2003 for details. ▪ A recording system for the amount of wastes generated, recycled and disposed (including the disposal sites) should be proposed.					
S6.23-6.24	5.7	Waste reduction measures: ▪ Segregation and storage of different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal. ▪ To encourage collection of aluminium cans by individual collectors, separate labelled bins	To achieve waste reduction	Contractor	Works sites	Construction phase	EIAO-TM

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		shall be provided to segregate this waste from other general refuse generated by the work force. ▪ Any unused chemicals or those with remaining functional capacity shall be recycled. ▪ Maximising the use of reusable steel formwork to reduce the amount of C&D material. ▪ Proper storage and site practices to minimise the potential for damage or contamination of construction materials. ▪ Plan and stock construction materials carefully to minimise amount of waste generated and					

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		avoid unnecessary generation of waste.					
S6.25-6.26		Construction & Demolition (C&D) Material: ▪ Excavated material with suitable characteristics/size should be reused on-site as fill material as far as practicable, such as for backfilling of the box culvert and drainage pipe works. ▪ Suitable areas should be designated within the works site boundaries for temporary stockpiling of C&D material. ▪ Within stockpile areas, the following measures should be taken to control potential environmental	To minimize off-site disposal of C&D material To minimize environmental impacts during the handling of C&D material	Contractor	Works sites	Construction phase	EIAO-TM

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		impacts or nuisance: - covering material during heavy rainfall; - locating stockpiles to minimize potential visual impacts; and - minimizing land intake of stockpile areas as far as possible. ▪ When disposing C&D material at a public filling area, the material shall only consist of soil, rock, concrete, brick, cement plaster/mortar, inert building debris, aggregates and asphalt. The material shall be free from marine mud, household refuse, plastic, metals, industrial and chemical waste, animal and vegetable matter, and other material considered to be					

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		unsuitable by the Filling Supervisor.					
S6.27		Chemical waste: ▪ Contractor should register with the EPD as a Chemical Waste Producer and to follow the guidelines stated in the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. ▪ Good quality containers compatible with the chemical wastes should be used, and incompatible chemicals should be stored separately. ▪ Appropriate labels should be securely attached on each chemical waste container indicating the	To minimize environmental impacts during the handling, transportation and disposal of chemical waste	Contractor	Works sites	Construction phase	EIAO-TM Waste Disposal (Chemical Waste) (General) Regulation

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		corresponding chemical characteristics of the chemical waste, such as explosives, flammable, oxidizing, irritant, toxic, harmful, corrosive, etc. ▪ The Contractor should use a licensed collector to transport and dispose of the chemical wastes generated at the Chemical Waste Treatment Centre at Tsing Yi, or other licenced facility, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.					
S6.28		General refuse: ▪ It should be stored in enclosed bins or compaction units separate from C&D material. ▪ A reputable waste collector	To minimize environmental impacts during the handling and transportation of general refuse	Contractor	Works sites	Construction phase	EIAO-TM

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		should be employed by the contractor to remove general refuse from the site, separately from C&D material. ▪ An enclosed and covered area is preferred to reduce the occurrence of 'wind blown' light material.					
E		***Ecological Impact***					
S. 7.95	6.6	▪ Sheet-pilings, which will be installed around the trench of excavation, should be extended above ground level for ~2m to act as hoarding to isolate the works site. ▪ The trenching works for the construction of the proposed box culvert should be carried out in phases, with a trench length of not	To minimize the impacts on the stream and natural river bank	Contractor	Whole site	Construction Phase	EIAO-TM

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		more than 120m in each phase. The trench should be backfilled and compacted with suitable materials upon completion of each phase of the construction works.					
S7.117	6.6	▪ The construction of intercept point of twin cell box culvert at the upstream of Wai Ha River should be confined to only one side of the river bank. ▪ To restore and enhance the ecological value of the stream, the affected river bank should be reinstated to its original condition or lined with rock-filled gabion. ▪ Planting pits should be provided in the gabion bank to allow the re-establishment of riparian vegetation.	To minimize the impacts on the stream and natural river bank	Contractor	Whole site	Construction Phase	EIAO-TM

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		▪ The existing natural riverbed and substrates should be retained and the natural pool-riffle sequence should be re-created in the new channel bed.					
S 7.118	6.7	▪ All works carried out within the the river channel of Wai Ha River should be carried out from October to April, with construction carried out by land-based plant. ▪ Works within river/stream channels should be restricted to an enclosed dry section of the river, with containment measures such as bunds and barriers used within the river to minimize the impacts upon the downstream water body.	To minimise sedimentation/ water quality impacts	Contractor	Whole Site	Construction Phase	EIAO-TM

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		▪ Site runoff should be directed towards regularly cleaned and maintained silt traps and oil/grease separators to minimize the risk of sedimentation and pollution of river water. ▪ The silt and oil/grease separators should be appropriately designed for the local drainage and ground conditions. ▪ To minimize leakage and loss of sediments during excavation in narrow channels, tightly sealed closed grab excavators should be deployed where material to be handled is wet.					
S 7.119	6.8	▪ The construction of the proposed box-culvert would have the potential to directly impact a few	To protect plant species of conservation interest	Contractor/ qualified botanist/horticu	Whole site	Construction Phase	EIAO-TM

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		individual of a plant species of conservation interest (Hong Kong Pavetta, *Pavetta hongkongensis*). The affected individuals should be transplanted to a suitable nearby habitats prior to the construction phase. ▪ A detailed vegetation survey of the affected species of conservation interest should be conducted by a suitably qualified botanist/ecologist to identify the affected individuals in order to provide details for transplantation scheme. ▪ Transplantation should be supervised by a suitably qualified botanist/horticulturalist. A detailed transplantation methodology should be formulated during the detailed design stage of this Project.		lturalist			

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
S 7.120	6.9	▪ Noise mitigation measures such as the use of quieter construction plant and temporary noise barriers should be implemented to minimize disturbance to habitats adjacent to the works areas. ▪ Temporary noise barriers should be used during the construction of the box-culvert along Tung Tsz Road, the floodwater pumping station, the mechanical gate, and drainage pipe to minimize potential construction phase disturbance to ardeids and avifauna foraging in marsh habitat. ▪ Noise generating construction works near the Shuen Wan Egretry SSSI should be avoided as far as practicable during the breeding season (March to June) of the	To minimise disturbance impacts.	Contractor	Whole site	Construction Phase	EIAO-TM

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		ardeids. ▪ Works near the SSSI (i.e. installation of mechanical gate) should be restricted to be executed outside the breeding season by provision of special conditions in the contract document. ▪ Hoardings with minimum height of 2m should be set up along the south side of the proposed box culvert works area adjacent to the marsh, extending at least 20m at both ends, throughout the construction period.					
S 7.121	6.10	▪ Placement of equipment or stockpile in designated works areas and access routes selected on existing disturbed land to minimise disturbance to natural or	To minimise disturbance to habitats.	Contractor	Whole site	Construction Phase	EIAO-TM

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		moderate-high ecological value habitats.					
S 7.121	6.10	▪ Construction activities should be restricted to work areas that would be clearly demarcated. The work areas should be reinstated after completion of the works.	To minimise disturbance to natural habitats outside works area.	Contractor	Whole site	Construction Phase	EIAO-TM
S 7.121	6.10	▪ Waste skips should be provided to collect general refuse and construction wastes. The wastes would be disposed of timely and properly off-site.	To minimise disturbance to habitats.	Contractor	Whole site	Construction Phase	EIAO-TM
S 7.121	6.10	▪ General drainage arrangements should include sediment and oil traps to collect and control construction site run-off.	To minimise sedimentation/ water quality impacts	Contractor	Whole site	Construction Phase	EIAO-TM
S 7.121	6.10	▪ Open burning on works sites is illegal, and should be strictly prohibited.	To prevent accidental hill-fires.	Contractor	Whole site	Construction Phase	EIAO-TM

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
S 7.122	6.11	▪ De-silting should be limited to the dry season.	To minimise sedimentation/ water quality impacts	Maintenance parties of the channel	Whole site	Operation Phase	EIAO-TM
S 7.122	6.11	▪ Waste material produced during de-silting should be disposed of in a timely and appropriate manner.	To minimise sedimentation/ water quality impacts	Maintenance parties of the channel	Whole site	Operation Phase	EIAO-TM
S 7.123	6.12	▪ Planting of trees should be provided within the project area to compensate for the unavoidable loss of approximately 0.08ha secondary woodland habitat due to the Project. ▪ Planting of trees and other vegetation within project area along the banks of Wai Ha River and Tung Tsz Road should be carried out to provide compensation for unavoidable tree-felling and loss of riparian vegetation resulting from the	To compensate the loss of vegetation	Contractor	Whole site	Construction Phase	EIAO-TM

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		Project. ▪ The compensatory planting should make use of native plant species with flowers/fruits attractive to wildlife.					
S 7.124	6.13	▪ Compensation would be required for the loss of a small area of marsh habitat (about 0.30ha) within the CA resulting from the construction of the box-culvert. ▪ An existing low ecological value recreational fishpond on government land adjacent to the marsh would be used as a proposed area (about 0.8ha) for the compensation for the marsh as well as secondary woodland habitats loss (0.08ha). ▪ The pond should be enhanced by removing boardwalks around the	To compensate the loss of marsh habitat and enhance the quality compensatory habitat	Contractor / qualified ecologist	The recreational fish pond located to the southwest of the existing Tung Tsz Nursery	Construction Phase	EIAO-TM

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		existing pond, and restoring vegetation along the pond bunds, and it would be re-profiled to provide areas of shallow water (approximately 15-50cm deep), creating a suitable foraging habitat for avifauna, particularly ardeids and other waders. ▪ Screen planting of shrubs and trees along the south-eastern bund of the pond should be implemented to minimise disturbance to avifauna and other wildlife from the adjacent recreational fishpond. The enhanced pond is expected to provide a moderate-high ecological value wetland habitat.					

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
F		***Landscape and Visual***					
Table 8.4	7.6	Visual screen, contaminant/ liaison with nursery, protection of existing trees with works area and construction light are used or practiced to mitigate the impacts during construction phase.	To mitigate the landscape	Contractor	Whole site	Construction	EIAO-TM
Table 8.4	7.7	Viewing area formation, architectural design for pump house, landscape design for pump house, enhancement planting along Tung Tsz Road, sufficient soil depth for enhancement planting, transplanting of trees to adjacent locations, preparation for transplanting and reinstatement of affected area are practiced to mitigate the impacts during operational phase.	To mitigate the landscape and visual impacts during the operational phase.	Contractor	Whole site	Detail Design / Operational Phase	EIAO-TM

Appendix H:

A)

The recommend mitigation measures of EM&A manual (revision 3)

B)

Implementation status of environmental protection and mitigation measures

B) Implementation status of environmental protection and mitigation

EM&A Ref.	Recommended Mitgation Measures	Objectives of the Recommended Measure & main concern to Address	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?	Implementation status
2.18	Use well maintained construction plant	To minimize construction noise impact	Works areas	Construction phase	EIAO-TM NCO	Implemented
	Shut down plants between work periods					Implemented
	Install silencers on construction equipment					Implemented
	Locate mobile plant far away from NSRs					Implemented
	Quiet plants should be used					Implemented
2.19	Use of quieter PME					Not applicable
2.20 - 2.21	Use of temporary noise barrier		Pipe laying in Wai Ha			Not applicable
2.22	Use of alternative quieter construction method		Part of the Works Pipe laying in Wai Ha			Not applicable
2.23 – 2.24	Use of noise enclosure		Pipe laying in Wai Ha			Not applicable

EM&A Ref.	Recommended Mitgation Measures	Objectives of the Recommended Measure & main concern to Address	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?	Implementation status
3.5	Implement regular watering and vehicle washing facilities	To minimize construction dust impact	Construction Site	Construction phase	EIAO-TM	Outstandinng
	Cover excavated or stockpile of dusty material by impervious sheeting or sprayed with water					Implemented
	Use tarpaulin to cover dusty materials on vehicles					Implemented
4.5	Provide silt trap and oil interceptor to remove the oil, lubricants, grease, silt, grit and debris from the wastewater before pumped to the public storm water drainage system	To minimize water quality impact	Construction Site	Construction phase	EIAO-TM WPCO	Implemented
4.5	During rainstorms, exposed slope/soil surfaces shall be covered by a tarpaulin or other means. Others measures that need to be implemented before, during, and after rainstorms as summarized in ProPECC PN 1/94 shall be followed					Not applicable

EM&A Ref.	Recommended Mitgation Measures	Objectives of the Recommended Measure & main concern to Address	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?	Implementation status
4.10	Provide site toilet facilities	To minimize water quality impact	Construction Site	Construction phase	EIAO-TM WPCO	Implemented
4.7	Further precautionary measures during rainy season: For the construction of the box culvert next to the existing channel of the Wai Ha River, sand bags should be deployed around the boundary of the works trench to prevent muddy water ingress into the adjacent CA or Wai Ha River. Sand bags should also be used to surround the excavated trench. Generally, the sand bags will be placed up to a height of 300mm to provide adequate allowance for the built-up water level during rainstorm event. With sand bags in place, surface runoff will be intercepted and flow to Wai Ha River or collected by the existing drainage system as usual. For the construction of the box culvert in the extreme northeast corner of Shuen Wan Marsh Conservation Area sand bags should be deployed along the limit of the works area to prevent muddy water ingress into the CA. Sand bags should be placed to a height of at least 300mm from round level and +2.5 mPD (whichever is greater) to provide adequate allowance	To minimize water quality impact to the designated Conservation Area	Works areas near the Conservation Area	Rainy seasons during construction	EIAO-TM WPCO	Not applicable

EM&A Ref.	Recommended Mitgation Measures	Objectives of the Recommended Measure & main concern to Address	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?	Implementation status
	for the built-up water level during rainstorm events. Unpolluted surface runoff within the works area should then be collected and directed into the existing drainage system. Sheet-piles, which would be installed around the works trench near the Conservation Area, would be extended above ground level for about 2m to serve as hoardings to isolate the works site. Tarpulin sheets would be used to cover the excavation areas during heavy rainstorms. This would prevent the ingress of rainwater into the trench minimising the risk of muddy water getting into Wai Ha River and the adjacent Conservation Area. Any concrete washing water would be contained inside the works site surrounded by the extended sheet piles. A pump sump at the bottom of the trench would be provided to pump any excess water during concrete					
5.9	Reuse excavated material as much as possible	To achieve waste reduction	Works areas	Construction phase	EIAO-TM	Implemented
5.7	Any unused chemicals or those with remaining functional capacity shall be recycled.					Not applicable
	Recycle scrap metals or abandoned equipment					Implemented

EM&A Ref.	Recommended Mitgation Measures	Objectives of the Recommended Measure & main concern to Address	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?	Implementation status
5.5	A recording system for the amount of wastes generated, recycled and disposed should be proposed	To reduce waste management impacts	Works areas	Construction phase	ETWB TCW No. 19/2005 ETWB TCW NO. 31/2004	Implemented
5.9	Adopt a trip ticket system for the disposal of C&D materials					Implemented
5.11	All general refuse should be segregated and stored in enclosed bins or compaction units					Implemented
5.10	Contractor should be a required to register with the EPD as a Chemical Waste Producer and to follow the guidelines states in the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes.	To minimize the environmental impacts associated with the handling, transportation and disposal of chemical waste.	Work site	Construction phase	EIAO-TM Waste Disposal (Chemical Waste)(General) Regulation	Implemented
	Good quality containers compatible with the chemical wastes should be used, and Incompatible chemicals should be stored separately. Appropriate labels should be securely attached on each chemical waste container indicating the corresponding chemical characteristics of the chemical waste, such as explosives, flammable, oxidizing, irritant, toxic, harmful, corrosive, etc.					Not applicable

EM&A Ref.	Recommended Mitgation Measures	Objectives of the Recommended Measure & main concern to Address	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?	Implementation status
5.5	A recording system for the amount of wastes generated, recycled and disposed should be proposed	To reduce waste management impacts	Works areas	Construction phase	ETWB TCW No. 19/2005 ETWB TCW NO. 31/2004	Implemented
6.6	Sheet-pilings, which will be installed around the trench of excavation, should be extended above ground level for ~2m to act as hoarding to isolate the works site. The trenching works for the construction of the proposed box culvert should be carried out in phases, with a trench length of not more than 120m in each phase. The trench should be backfilled and compacted with suitable materials upon completion of each phase of the construction works.	To minimize the impacts on the steam and natural river bank.	Whole site	Construction phase	EIAO-TM	Implemented
6.6	The construction of intercept oint of twin cell box culvert at the upstream of Wai Ha River should be confined to only one side of the river bank. To restore and enhance the ecological value of the stream, the affected river bank should be reinstated to its original condition or lined with rock-filled gabion. Planting pits should be provided in the gabion bank to allow the re-establishment of riparian vegetation.	To minimize the impacts on the steam and natural river bank.	Whole site	Construction phase	EIAO-TM	No applicable

EM&A Ref.	Recommended Mitgation Measures	Objectives of the Recommended Measure & main concern to Address	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?	Implementation status
	The existing natural riverbed and substrates should be retained and the natural pool-riffle sequence should be re-created in the new channel bed.					
6.7	All works carried out within the the river channel of Wai Ha River should be carried out from October to April, with construction carried out by land-based plant. Works within river/stream channels should be restricted to an enclosed dry section of the river, with containment measures such as bunds and barriers used within the river to minimize the impacts upon the downstream water body. Site runoff should be directed towards regularly cleaned and maintained silt traps and oil/grease separators to minimize the risk of sedimentation and pollution of river water. The silt and oil/grease separators should be appropriately designed for the local drainage and ground conditions. To minimize leakage and loss of sediments during excavation in narrow channels, tightly sealed closed grab excavators should be deployed where material to be handled is wet.	To minimize sedimentation/ water quality impacts	Whole site	Construction phase	EIAO-TM	No applicable

EM&A Ref.	Recommended Mitgation Measures	Objectives of the Recommended Measure & main concern to Address	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?	Implementation status
6.8	The construction of the proposed box-culvert would have the potential to directly impact a few individual of a plant species of conservation interest (Hong Kong Pavetta, Pavetta hongkongensis). The affected individuals should be transplanted to a suitable nearby habitats prior to the construction phase. A detailed vegetation survey of the affected species of conservation interest should be conducted by a suitably qualified botanist/ecologist to identify the affected individuals in order to provide details for transplantation scheme. Transplantation should be supervised by a suitably qualified botanist/horticulturalist. A detailed transplantation methodology should be formulated during the detailed design stage of this Project.	To protect plant species of conservation interest	Whole site	Construction phase	EIAO-TM	No applicable
6.9	Placement of equipment or stockpile in designated works areas and access routes selected on existing disturbed land to minimize disturbance to natural or moderate-high ecological value habitats.	To minimise disturbance to habitats.	Whole site	Construction phase	EIAO-TM	No applicable
6.13	General drainage arrangements should include sediment and oil traps to collect and control construction site run-off.	To minimise sedimentation/ water quality impacts	Whole site	Construction phase	EIAO-TM	Implemented

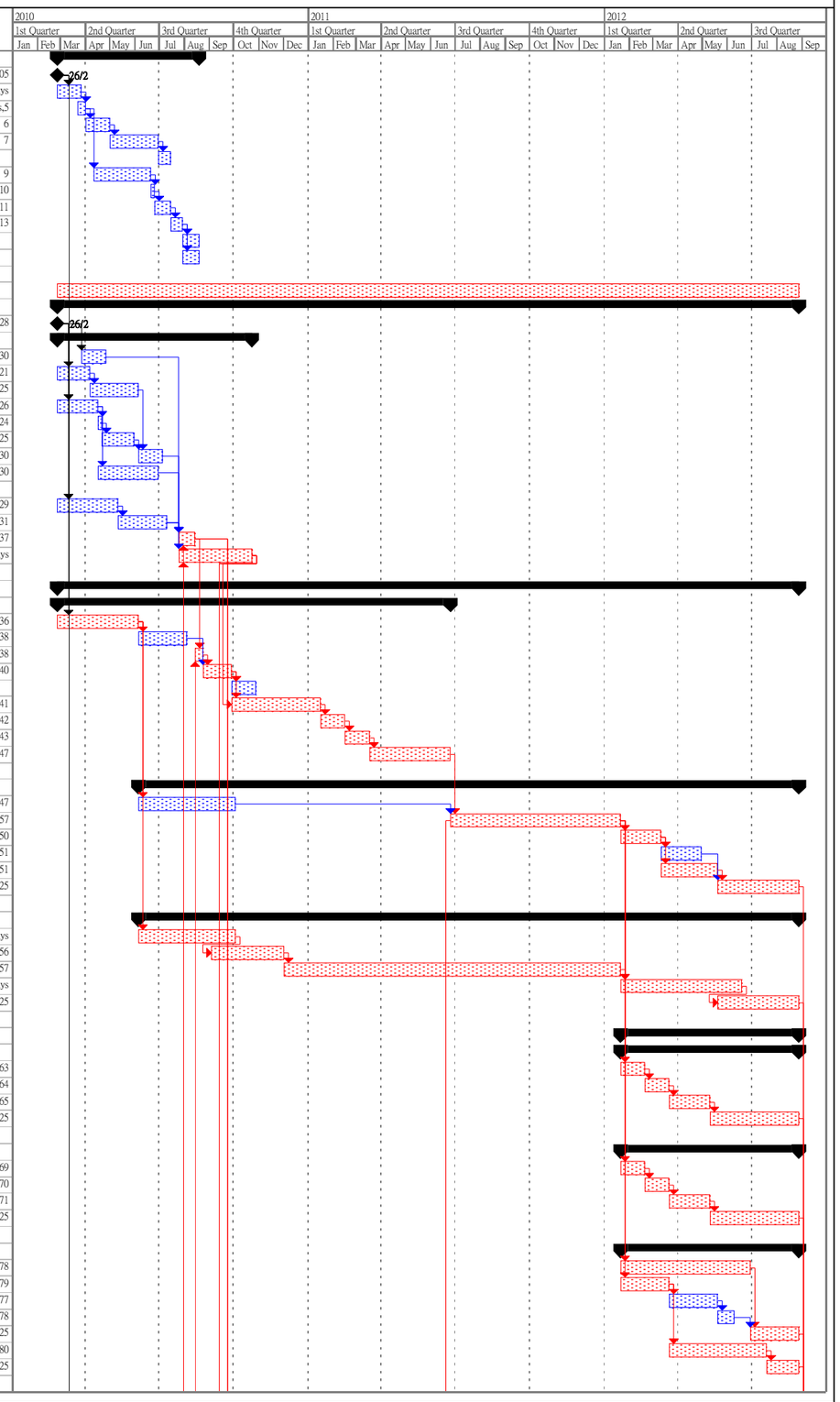
EM&A Ref.	Recommended Mitgation Measures	Objectives of the Recommended Measure & main concern to Address	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?	Implementation status
6.13	Construction activities should be restricted to work areas that would be clearly demarcated. The work areas should be reinstated after completion of the works.	To minimise disturbance to natural habitats outside works area.	Whole site	Construction phase	EIAO-TM	Implemented
6.13	Placement of equipment or stockpile in designated works areas and access routes selected on existing disturbed land to minimize disturbance to natural or moderate-high ecological value habitats.	To minimise disturbance to natural habitats	Whole site	Construction phase	EIAO-TM	Implemented
7.6	Visual screen, contaminant/ liaison with nursery, protection of existing trees with works area and construction light are used or practiced to mitigate the impacts during construction phase	To mitigate the landscape and visual impacts during the Construction phase	Whole site	Construction phase	EIAO-TM	Implemented
7.7	Viewing area formation , architectural design for pump house, landscape design for pump hose, enhancement planting along Tung Tsz Road, sufficient soil depth for enhancement planting, transplanting of trees to adjacent locations preparation for transplanting and reinstatement of affected area are practiced to mitigate the impacts during operational phase.	To mitigate the landscape and visual impacts during the operational phase	Whole site	Detail Design / Operational Phase	EIAO-TM	Not Applicable

Appendix I: Construction Pogramme

Contract No.: DC/2009/22
Contract Title: Drainage Improvement Works in Shuen Wan, Tai Po - Contract 1

Master Programme (Rev. 6)

ID	ID no. in Rev. 5	ID no. in Rev. 4	ID no. in Rev. 3	ID no. in Rev. 2	Task Name	Duration	Start	Finish	Predecessors	Successors
1	**1**	**1**	**1**	1	**Preliminary Works (Area I - Pak Shek Kok)**	**175 days**	**Fri 26/2/10**	**Thu 19/8/10**		
2	2	2	2	2	Commencement of Works	0 days	Fri 26/2/10	Fri 26/2/10		3,83,88,105
3	3	3	3	3	Design & Construction of Site Hoarding	30 days	Fri 26/2/10	Sat 27/3/10	2	4FS-5 days
4	4	4	4	4	Site Clearance	10 days	Tue 23/3/10	Thu 1/4/10	3FS-5 days	8FS+10 days,5
5	5	5	5	5	Design of Engineer's Site Office	30 days	Fri 2/4/10	Sat 1/5/10	4	6
6	6	6	6	6	Construction of Engineer's Site Office	60 days	Sun 2/5/10	Wed 30/6/10	5	7
7	7	7	7	7	Engineer's Site Office - Setup the Internal Finishing / Furniture/ Equipment	15 days	Thu 1/7/10	Thu 15/7/10	6	
8	8	8	8	8	Construction of Contractor's Accommodation	70 days	Mon 12/4/10	Sun 20/6/10	4FS+10 days	9
9	9	9	9	9	Installation of Sewerage Storage Tank	5 days	Mon 21/6/10	Fri 25/6/10	8	10
10	10	10	10	10	Contractor Accommodation - Setup the Internal Finishing / Furniture / Equipment	20 days	Sat 26/6/10	Thu 15/7/10	9	11
11	11	11	11	11	Establishment of Vehicular Gate, Storage Area	15 days	Fri 16/7/10	Fri 30/7/10	10	12,13
12	12	12	12	12	Establishment of Welfare Facilities for Workers	20 days	Sat 31/7/10	Thu 19/8/10	11	
13	13	13	13		Temporary Drainage System	20 days	Sat 31/7/10	Thu 19/8/10	11	
14										
15	15	15	15	15	**Time for Completion of Section I**	915 days	Fri 26/2/10	Tue 28/8/12		
16	**16**	**16**	**16**	16	**Section I (Area A,B - Shuen Wan)**	**915 days**	**Fri 26/2/10**	**Tue 28/8/12**		
17	17	17	17	17	Commencement of Works	0 days	Fri 26/2/10	Fri 26/2/10		19FS+30 days,35,111,22,20,28
18	**18**	**18**	**18**	18	**Preliminary Works**	**240 days**	**Fri 26/2/10**	**Sat 23/10/10**		
19	19	19	19	19	Seek clarification regarding Environmental Permit	30 days	Sun 28/3/10	Mon 26/4/10	17FS+30 days	30
20	20	20	20	20	Design of TTA Scheme for Site Access	40 days	Fri 26/2/10	Tue 6/4/10	17	21
21	21	21	21	21	Submission of TTA to TMLG for Approval	60 days	Wed 7/4/10	Sat 5/6/10	20	25
22	22	22	22	22	Site Clearance	50 days	Fri 26/2/10	Fri 16/4/10	17	23,26
23	23	23	23	23	Project Signboard	5 days	Sat 17/4/10	Wed 21/4/10	22	24
24	24	24	24	24	Hoarding Erection	40 days	Thu 22/4/10	Mon 31/5/10	23	25
25	25	25	25	25	Establish Site Access	30 days	Sun 6/6/10	Mon 5/7/10	24,21	30
26	26	26	26	26	Ground Investigation	75 days	Sat 17/4/10	Wed 30/6/10	22	30
27										
28	28	28	28	28	Tree Survey	75 days	Fri 26/2/10	Tue 11/5/10	17	29
29	29	29	29	29	Submission of Tree Survey Record	60 days	Wed 12/5/10	Sat 10/7/10	28	30,31
30	30	30	30	30	Tree Felling	20 days	Mon 26/7/10	Sat 14/8/10	29,139,25,26,19	94,99,37
31	31	31	31	31	Tree Transplanting	90 days	Mon 26/7/10	Sat 23/10/10	29,139	94FS-30 days,99FS-30 days,40FS-30 days
32										
33	**33**	**33**	**33**	33	**Pumping Station**	**915 days**	**Fri 26/2/10**	**Tue 28/8/12**		
34	**34**	**34**	**34**	34	**Piling Works**	**485 days**	**Fri 26/2/10**	**Sat 25/6/11**		
35	35	35	35	35	Submission of Method Statement	100 days	Fri 26/2/10	Sat 5/6/10	17	46,54,36
36	36	36	36		Material Ordering & Delivery to Site	60 days	Sun 6/6/10	Wed 4/8/10	35	38
37	37	37	37	36	Ground Preparation for Piling	10 days	Sun 15/8/10	Tue 24/8/10	139,30	38
38	38	38	38	37	Preliminary Pile	35 days	Wed 25/8/10	Tue 28/9/10	37,36	39,40
39	39	39	39	39	Loading Test	30 days	Wed 29/9/10	Thu 28/10/10	38	
40	40	40	40	38	Working Piles	110 days	Wed 29/9/10	Sun 16/1/11	38,31FS-30 days	41
41	41	41			Loading Test for working piles	30 days	Mon 17/1/11	Tue 15/2/11	40	42
42	42	42	41	40	Sheetpiling	30 days	Wed 16/2/11	Thu 17/3/11	41	43
43	43	43	42	41	Excavation to Pile Cut Off Level / Shoring	100 days	Fri 18/3/11	Sat 25/6/11	42	47
44										
45	**45**	**45**	**44**	43	**Main Structure of Pumping Station**	**815 days**	**Sun 6/6/10**	**Tue 28/8/12**		
46	46	46	45	44	Temporary Works Submission	120 days	Sun 6/6/10	Sun 3/10/10	35	47
47	47	47	46	45	Reinforced Concrete Works	210 days	Sun 26/6/11	Sat 21/1/12	46,43	118SS+80 days,75,48,68,62,74,57
48	48	48	47	46	Roofing	50 days	Sun 22/1/12	Sun 11/3/12	47	49,50
49	49	49	48	47	Manmade Slope	50 days	Mon 12/3/12	Mon 30/4/12	48	51
50	50	50	49	48	Internal Finishing Works	70 days	Mon 12/3/12	Sun 20/5/12	48	51
51	51	51	50	49	External Finishing Works	100 days	Mon 21/5/12	Tue 28/8/12	50,49	125
52										
53	**53**	**53**	**52**	51	**E & M**	**815 days**	**Sun 6/6/10**	**Tue 28/8/12**		
54	54	54	53	52	Submission of E & M Design	120 days	Sun 6/6/10	Sun 3/10/10	35	55FS-30 days
55	55	55	54	53	Approval of E & M Design	90 days	Sat 4/9/10	Thu 2/12/10	54FS-30 days	56
56	56	56	55	54	Fabrication & Delivery of Plant & Material	415 days	Fri 3/12/10	Sat 21/1/12	55	57
57	57	57	56	55	Plumbing & E&M works	150 days	Sun 22/1/12	Tue 19/6/12	56,47	58FS-30 days
58	58	58	57	56	Final Testing Works	100 days	Mon 21/5/12	Tue 28/8/12	57FS-30 days	125
59										
60	**60**	**60**	**59**	58	**External Structure**	**220 days**	**Sun 22/1/12**	**Tue 28/8/12**		
61	**61**	**61**	**60**	59	**Pumping Station to Outfall Structure**	**220 days**	**Sun 22/1/12**	**Tue 28/8/12**		
62	62	62	61	60	Installation of Cofferdam & Site Hoarding Phase 2	30 days	Sun 22/1/12	Mon 20/2/12	47	63
63	63	63	62	61	Excavation	30 days	Tue 21/2/12	Wed 21/3/12	62	64
64	64	64	63	62	Constrcution of 2nos. of 1500mm dia. Drainage Pipes	50 days	Thu 22/3/12	Thu 10/5/12	63	65
65	65	65	64	63	2 nos. of Outfall Structures	110 days	Fri 11/5/12	Tue 28/8/12	64	125
66										
67	**67**	**67**	**66**	65	**Tide Level Monitoring Chamber**	**220 days**	**Sun 22/1/12**	**Tue 28/8/12**		
68	68	68	67	66	Installation of Cofferdam & Site Hoarding Phase 2	30 days	Sun 22/1/12	Mon 20/2/12	47	69
69	69	69	68	67	Excavation	30 days	Tue 21/2/12	Wed 21/3/12	68	70
70	70	70	69	68	Construction of Pipe & Tide Level Monitoring Chambers	50 days	Thu 22/3/12	Thu 10/5/12	69	71
71	71	71	70	69	Outfall Structure	110 days	Fri 11/5/12	Tue 28/8/12	70	125
72										
73	**73**	**73**	**72**	71	**External Misc. Works**	**220 days**	**Sun 22/1/12**	**Tue 28/8/12**		
74	74	74	73	72	Boundary Wall & Fencing	160 days	Sun 22/1/12	Fri 29/6/12	47	78
75	75	75	74	73	3nos. of Flow Measurement chambers and Pipes	60 days	Sun 22/1/12	Wed 21/3/12	47	76,79
76	76	76	75	74	Surface Drainage System & Catchpits	60 days	Thu 22/3/12	Sun 20/5/12	75	77
77	77	77	76	76	Concrete Pavement	20 days	Mon 21/5/12	Sat 9/6/12	76	78
78	78	78	77	77	Landscaping Works	60 days	Sat 30/6/12	Tue 28/8/12	77,74	125
79	79	79	78		225mm dia. Sewer Across Ting Kok Road and Connection to Existing Manholes	120 days	Thu 22/3/12	Thu 19/7/12	75	80
80	80	80			Sewer Manhole SM1	40 days	Fri 20/7/12	Tue 28/8/12	79	125
81										



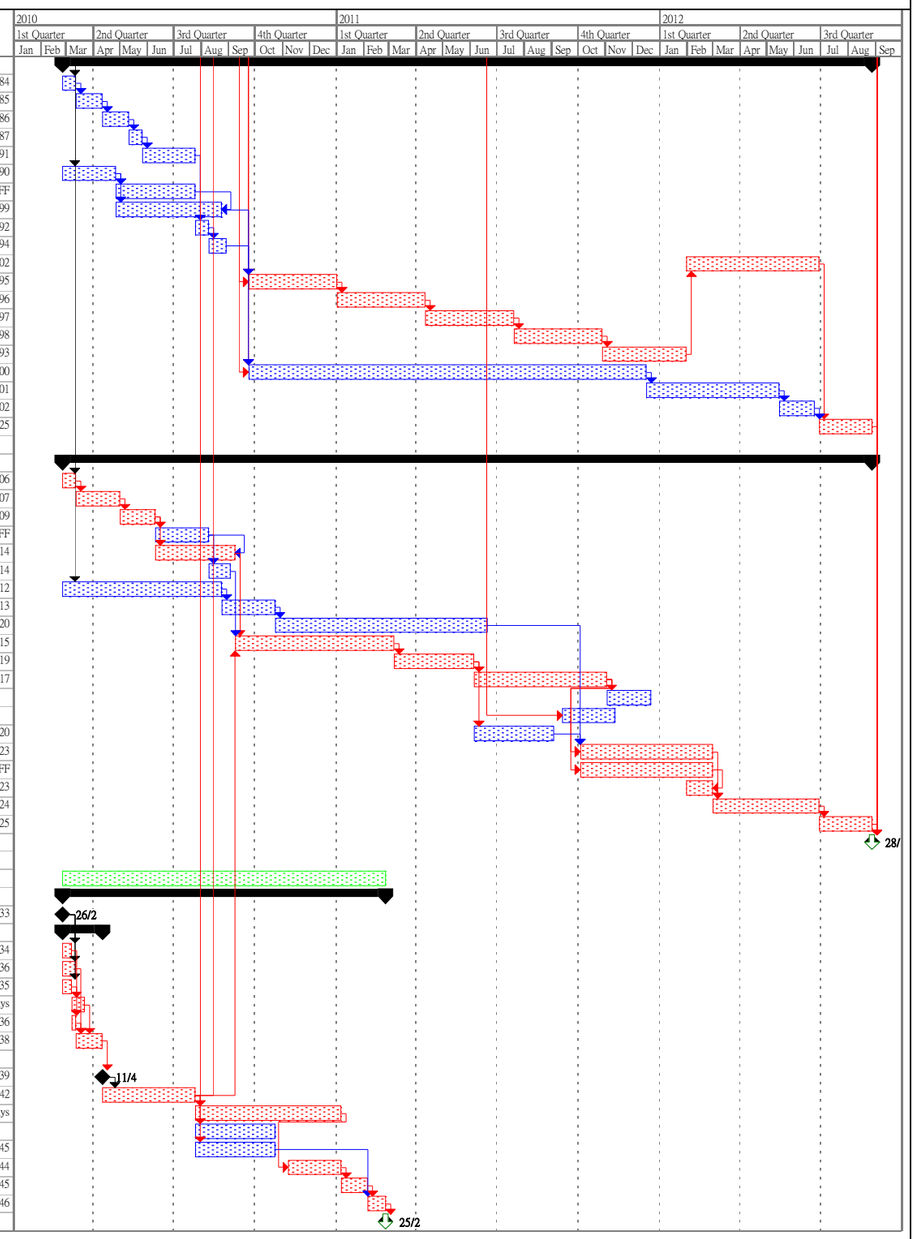
Master Programme - Rev. 6
Data Date: 2010-2-26

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

Contract No.: DC/2009/22
Contract Title: Drainage Improvement Works in Shuen Wan, Tai Po - Contract 1

Master Programme (Rev. 6)

ID	ID no. in Rev. 5	ID no. in Rev. 4	ID no. in Rev. 3	ID no. in Rev. 2	Task Name	Duration	Start	Finish	Predecessors	Successors
82	**82**	**82**	**80**	79	**Twin Cell Box Culvert**	**915 days**	**Fri 26/2/10**	**Tue 28/8/12**		
83	83	83	81	80	Liaison with LCSD	15 days	Fri 26/2/10	Fri 12/3/10	2	84
84	84	84	82	81	Determination of Box Culvert Alignment	30 days	Sat 13/3/10	Sun 11/4/10	83	85
85	85	85	83	82	Record Survey	30 days	Mon 12/4/10	Tue 11/5/10	84	86
86	86	86	84	83	Condition Survey of Existing Structure	15 days	Wed 12/5/10	Wed 26/5/10	85	87
87	87	87	85	84	Submission of Method Statement to LCSD	60 days	Thu 27/5/10	Sun 25/7/10	86	91
88	88	88	86	85	Design of Temporary Traffic Arrangement	60 days	Fri 26/2/10	Mon 26/4/10	2	89,90
89	89	89	87	86	Submission of TTA to TMLG for Approval	90 days	Tue 27/4/10	Sun 25/7/10	88	90FF
90	90	90	88	87	Excavation Permit	120 days	Tue 27/4/10	Tue 24/8/10	88,89FF	99
91	91	91	89	88	Temporary Removal of Structure and Facilities / Reprovision	15 days	Mon 26/7/10	Mon 9/8/10	87	92
92	92	92			Provision of Temporary Irrigation Pipes	20 days	Tue 10/8/10	Sun 29/8/10	91	94
93	93	93	91	89	Box Culvert at Chainage 0 - 25	150 days	Wed 1/2/12	Fri 29/6/12	98	102
94	94	94	92	90	Box Culvert at Chainage 25 - 75	100 days	Fri 24/9/10	Sat 1/1/11	31FS-30 days,30,92	95
95	95	95	93	91	Box Culvert at Chainage 75 - 125	100 days	Sun 2/1/11	Mon 11/4/11	94	96
96	96	96	94	92	Box Culvert at Chainage 125 - 175	100 days	Tue 12/4/11	Wed 20/7/11	95	97
97	97	97	95	93	Box Culvert at Chainage 175 - 225	100 days	Thu 21/7/11	Fri 28/10/11	96	98
98	98	98	96	94	Box Culvert at Chainage 225 - 275	95 days	Sat 29/10/11	Tue 31/1/12	97	93
99	99	99	97	95	Box Culvert at Chainae 275 - 300	450 days	Fri 24/9/10	Sat 17/12/11	90,31FS-30 days,30	100
100	100	100	98	96	Box Culvert at Chainage 300 - 350 (Including Outfall & Desilting Chamber)	150 days	Sun 18/12/11	Tue 15/5/12	99	101
101	101	101	99		1200mm dia. Drainage Pipe	40 days	Wed 16/5/12	Sun 24/6/12	100	102
102	102	102	100	97	Reinstallation and Reinstatement of Existing Structure, Facilities and Trees	60 days	Sat 30/6/12	Tue 28/8/12	93,101	125
103										
104	**104**	**104**	**102**	99	**Dia. 2100mm Drainage Pipe**	**915 days**	**Fri 26/2/10**	**Tue 28/8/12**		
105	105	105	103	100	Record Survey	15 days	Fri 26/2/10	Fri 12/3/10	2	106
106	106	106	104	101	Site Investigation (Trial Pit)	50 days	Sat 13/3/10	Sat 1/5/10	105	107
107	107	107	105	102	Design of Temporary Traffic Arrangement	40 days	Sun 2/5/10	Thu 10/6/10	106	108,109
108	108	108	106	103	Submission of TTA to TMLG for Approval	60 days	Fri 11/6/10	Mon 9/8/10	107	110,109FF
109	109	109	107	104	Excavation Permit	90 days	Fri 11/6/10	Wed 8/9/10	107,108FF	114
110	110	110	108		Liaison with HyD / LCSD for Planter Removal	25 days	Tue 10/8/10	Fri 3/9/10	108	114
111	111	111	109	105	E&M Design of Penstocks	180 days	Fri 26/2/10	Tue 24/8/10	17	112
112	112	112	110	106	Submission for Approval	60 days	Wed 25/8/10	Sat 23/10/10	111	113
113	113	113	111	107	Fabrication & Delivery of Penstocks	240 days	Sun 24/10/10	Mon 20/6/11	112	120
114	114	114	112	108	MH 04 to MH 05	180 days	Thu 9/9/10	Mon 7/3/11	109,139,110	115
115	115	115	113	109	MH 03 to MH 04	90 days	Tue 8/3/11	Sun 5/6/11	114	116,119
116	116	116	114	110	Intake to MH 03	150 days	Mon 6/6/11	Wed 2/11/11	115	120FS-30 days,121FS-30 days,117
117	117	117	115	115	Reinstatement of Existing Planter	50 days	Thu 3/11/11	Thu 22/12/11	116	
118	118	118	116	111	MH 05 to MH 06	60 days	Wed 14/9/11	Sat 12/11/11	47SS+80 days	
119	119	119			Temporary Drainage Management Plan	90 days	Mon 6/6/11	Sat 3/9/11	115	120
120	120	120	118	112	Intake (As required in Dry Season)	150 days	Tue 4/10/11	Thu 1/3/12	116FS-30 days,113,119	123
121	121	121	119	113	Modification of Existing Outlet Structure of Wai Ha River	150 days	Tue 4/10/11	Thu 1/3/12	116FS-30 days	122FF
122	122	122	120	114	Installation of 4 nos of Mechanical Penstocks	30 days	Wed 1/2/12	Thu 1/3/12	121FF	123
123	123	123	121		E & M Works	120 days	Fri 2/3/12	Fri 29/6/12	122,120	124
124	124	124	122		Misc. Works & Reinstatement	60 days	Sat 30/6/12	Tue 28/8/12	123	125
125	125	125	123	116	**Completion of Section I**	0 days	Tue 28/8/12	Tue 28/8/12	78,124,102,51,58,65,71,80	
126										
127	127	127	125	118	**Time for Completion of Section II**	365 days	Fri 26/2/10	Fri 25/2/11		
128	**128**	**128**	**126**	119	**Section II (Area C - Ecological Compensation Area at Shuen Wan)**	**365 days**	**Fri 26/2/10**	**Fri 25/2/11**		
129	129	129	127	120	Commencement of Works	0 days	Fri 26/2/10	Fri 26/2/10		131,132,133
130	**130**	**130**	**128**	121	**Preliminary Works**	**45 days**	**Fri 26/2/10**	**Sun 11/4/10**		
131	131	131	129	122	Site Clearance	10 days	Fri 26/2/10	Sun 7/3/10	129	134
132	132	132	130	123	Hoarding Erection	15 days	Fri 26/2/10	Fri 12/3/10	129	136
133	133	133	131	124	Pumping Water out of Pond	10 days	Fri 26/2/10	Sun 7/3/10	129	135
134	134	134	132	125	Check actual Tidal against Predicted Tidal Level	15 days	Mon 8/3/10	Mon 22/3/10	131	136FS-10 days
135	135	135	133	126	Survey Existing Pond Bed	5 days	Mon 8/3/10	Fri 12/3/10	133	136
136	136	136	134	127	Design of of Ecological Compensation Area	30 days	Sat 13/3/10	Sun 11/4/10	135,134FS-10 days,132	138
137										
138	138	138	136	129	Submission of Design of Ecological Compensation Area to EPD for Approval	0 days	Sun 11/4/10	Sun 11/4/10	136	139
139	139	139	137	130	Refer to Permit Requirement plus 15 weeks for Approval and Commencement of Works	105 days	Mon 12/4/10	Sun 25/7/10	138	140,114,30,31,37,141,142
140	140	140	138	131	Fill of Pond to Designed Level	165 days	Mon 26/7/10	Thu 6/1/11	139	143FS-60 days
141	141	141	139	132	Transplanting	90 days	Mon 26/7/10	Sat 23/10/10	139	
142	142	142			Temporary Drainage Management Plan	90 days	Mon 26/7/10	Sat 23/10/10	139	145
143	143	143	141	133	Planting Works at Upper Level	60 days	Mon 8/11/10	Thu 6/1/11	140FS-60 days	144
144	144	144	142	134	Planting Works at Lower Level	30 days	Fri 7/1/11	Sat 5/2/11	143	145
145	145	145	143	135	Setting up Water Circulation System	20 days	Sun 6/2/11	Fri 25/2/11	144,142	146
146	146	146	144	136	**Completion of Section II**	0 days	Fri 25/2/11	Fri 25/2/11	145	



Master Programme - Rev. 6
Data Date: 2010-2-26

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

Appendix J: Three month rolling programme

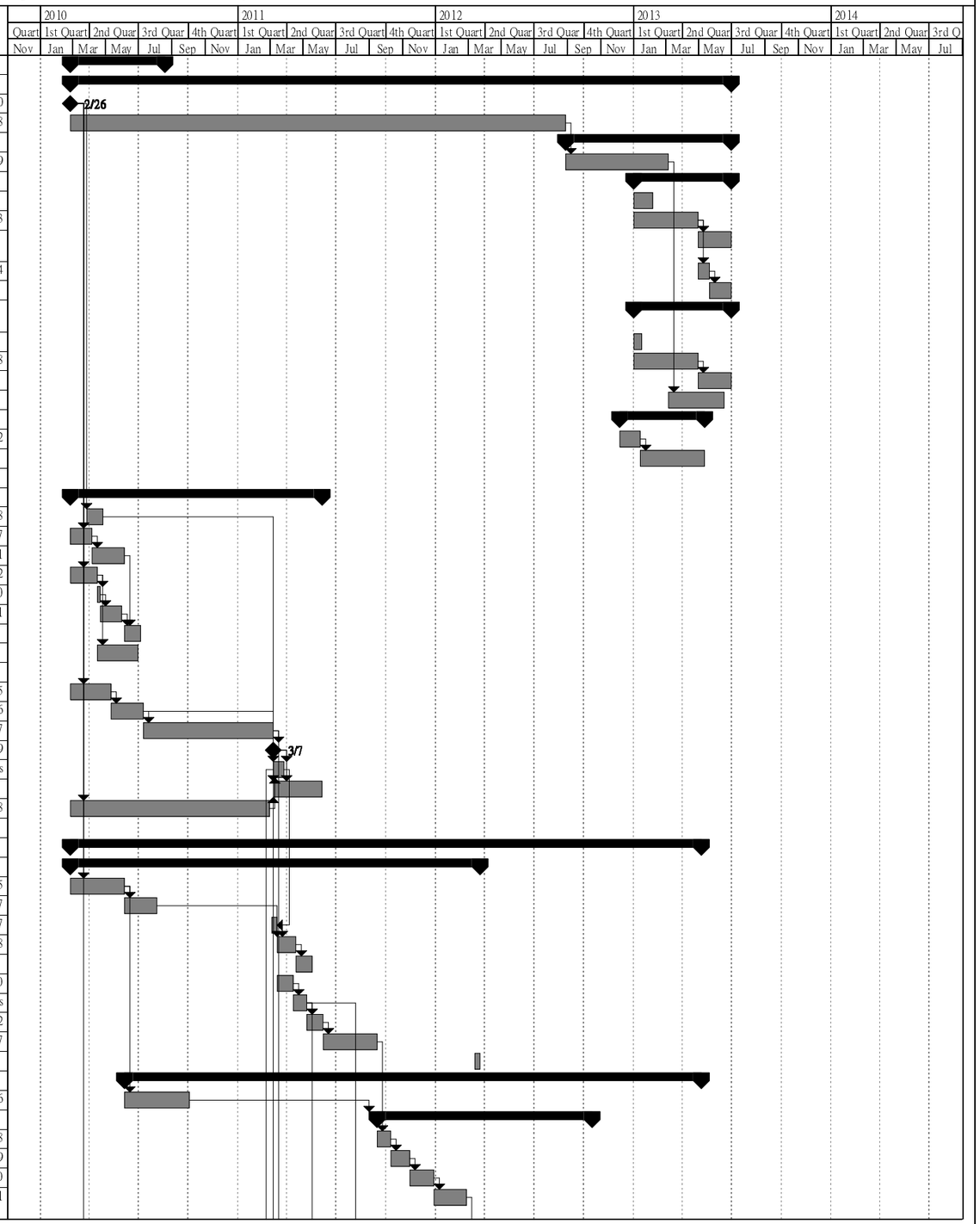
Kwan Lee - Kuly Joint Venture

Contract No.: DC/2009/22

Contract Title: Drainage Improvement Works in Shuen Wan, Tai Po - Contract 1

3 Months Rolling Programme (January 2013 to March 2013)

ID	Task Name	Duration	Start	Finish	Predecessors	Successors
1	**Preliminary Works (Area I - Pak Shek Kok)**	**175 days**	**Fri 10/2/26**	**Thu 10/8/19**		
14	**Section I (Area A,B - Shuen Wan)**	**1221 days**	**Fri 10/2/26**	**Sun 13/6/30**		
15	Commencement of Works	0 days	Fri 10/2/26	Fri 10/2/26		3+30 days,54,233,38,36,44,50
16	Original Contract Period	915 days	Fri 10/2/26	Tue 12/8/28		18
17	**Extension of Time**	**306 days**	**Wed 12/8/29**	**Sun 13/6/30**		
18	Claim No. 1, 3 & 4	190 days	Wed 12/8/29	Wed 13/3/6	16	29
19	**Claim no. 20 - DN2800 twin pipes crossing Ting Kok Road**	**180 days**	**Wed 13/1/2**	**Sun 13/6/30**		
20	grouting	35 days	Wed 13/1/2	Tue 13/2/5		
21	excavation & pipe jacking	119 days	Wed 13/1/2	Tue 13/4/30		22,23
22	construction of Box Culvert - Bay no. 17, 18, 8A & transition at Jacking Pit	61 days	Wed 13/5/1	Sun 13/6/30	21	
23	construction of Box Culvert - transition at Receiving Pit	21 days	Wed 13/5/1	Tue 13/5/21	21	24
24	boundary wall / pavement near Receiving Pit	40 days	Wed 13/5/22	Sun 13/6/30	23	
25	**Utilities in conflict with DN2100 pipe - uncharted watermain (Claim no. 14) / DN450 rising main & thrust block**	**180 days**	**Wed 13/1/2**	**Sun 13/6/30**		
26	CH 20~70	15 days	Wed 13/1/2	Wed 13/1/16		
27	CH 180~215 / CH 215~230	119 days	Wed 13/1/2	Tue 13/4/30		28
28	Boundary Wall / Pavement / Planter in PS	61 days	Wed 13/5/1	Sun 13/6/30	27	
29	EOT claims due to Inclement Weather	103 days	Thu 13/3/7	Mon 13/6/17	18	
30	**Delay by CLP Power Supply**	**157 days**	**Fri 12/12/7**	**Sun 13/5/12**		
31	Delay due to power supply	38 days	Fri 12/12/7	Sun 13/1/13		32
32	E & M Works - Testing & Commissioing	119 days	Mon 13/1/14	Sun 13/5/12	31	
33						
34	**Preliminary Works**	**465 days**	**Fri 10/2/26**	**Sun 11/6/5**		
35	Seek clarification regarding Environmental Permit	30 days	Sun 10/3/28	Mon 10/4/26	15FS+30 days	48
36	Design of TTA Scheme for Site Access	40 days	Fri 10/2/26	Tue 10/4/6	15	37
37	Submission of TTA to TMLG for Approval	60 days	Wed 10/4/7	Sat 10/6/5	36	41
38	Site Clearance	50 days	Fri 10/2/26	Fri 10/4/16	15	39,42
39	Project Signboard	5 days	Sat 10/4/17	Wed 10/4/21	38	40
40	Hoarding Erection	40 days	Thu 10/4/22	Mon 10/5/31	39	41
41	Establish Site Access	30 days	Sun 10/6/6	Mon 10/7/5	40,37	
42	Ground Investigation	75 days	Sat 10/4/17	Wed 10/6/30	38	
43						
44	Tree Survey	75 days	Fri 10/2/26	Tue 10/5/11	15	45
45	Submission of Tree Survey Record	60 days	Wed 10/5/12	Sat 10/7/10	44	49,46
46	Tree Felling Application by AECOM	240 days	Sun 10/7/11	Mon 11/3/7	45	349,47
47	Consent of Tree Felling Granted	0 days	Mon 11/3/7	Mon 11/3/7	46	48,49
48	Tree Felling	20 days	Tue 11/3/8	Sun 11/3/27	35,50,47	56FF-13 days,348SS+6 days
49	Tree Transplanting	90 days	Tue 11/3/8	Sun 11/6/5	45,347,47	
50	Environmental Permit Submission & Approval under V.O.	368 days	Fri 10/2/26	Mon 11/2/28	15	48
51						
52	**Pumping Station**	**1166 days**	**Fri 10/2/26**	**Mon 13/5/6**		
53	**Piling Works**	**757 days**	**Fri 10/2/26**	**Fri 12/3/23**		
54	Submission of Method Statement	100 days	Fri 10/2/26	Sat 10/6/5	15	65,55
55	Material Ordering & Delivery to Site	60 days	Sun 10/6/6	Wed 10/8/4	54	57
56	Ground Preparation for Piling	10 days	Sat 11/3/5	Mon 11/3/14	48FF-13 days	57
57	Preliminary Pile	35 days	Tue 11/3/15	Mon 11/4/18	56,55	58
58	Loading Test	30 days	Tue 11/4/19	Wed 11/5/18	57	
59	Working Piles	30 days	Tue 11/3/15	Wed 11/4/13		60
60	Loading Test for working piles	25 days	Thu 11/4/14	Sun 11/5/8	59	61,220,221FS+90 days
61	Sheetpiling	30 days	Mon 11/5/9	Tue 11/6/7	60	62
62	Excavation to Pile Cut Off Level / Shoring	100 days	Wed 11/6/8	Thu 11/9/15	61	67
63	Proof Drill	10 days	Wed 12/3/14	Fri 12/3/23		
64	**Main Structure of Pumping Station**	**1066 days**	**Sun 10/6/6**	**Mon 13/5/6**		
65	Temporary Works Submission	120 days	Sun 10/6/6	Sun 10/10/3	54	66
66	**Reinforced Concrete Works**	**397 days**	**Fri 11/9/16**	**Tue 12/10/16**	**65**	
67	Construction of Ground Beam	25 days	Fri 11/9/16	Mon 11/10/10	62	68
68	Construction of Base Slab at -3.0 mPD	35 days	Tue 11/10/11	Mon 11/11/14	67	69
69	Construction of Wall Stem	45 days	Tue 11/11/15	Thu 11/12/29	68	70
70	Construction of Ground Floor Slab at +5.15 mPD (Screen House & Wet Well)	60 days	Fri 11/12/30	Mon 12/2/27	69	71



Data Date: 2013-01-02
Print date : 2012-11-17

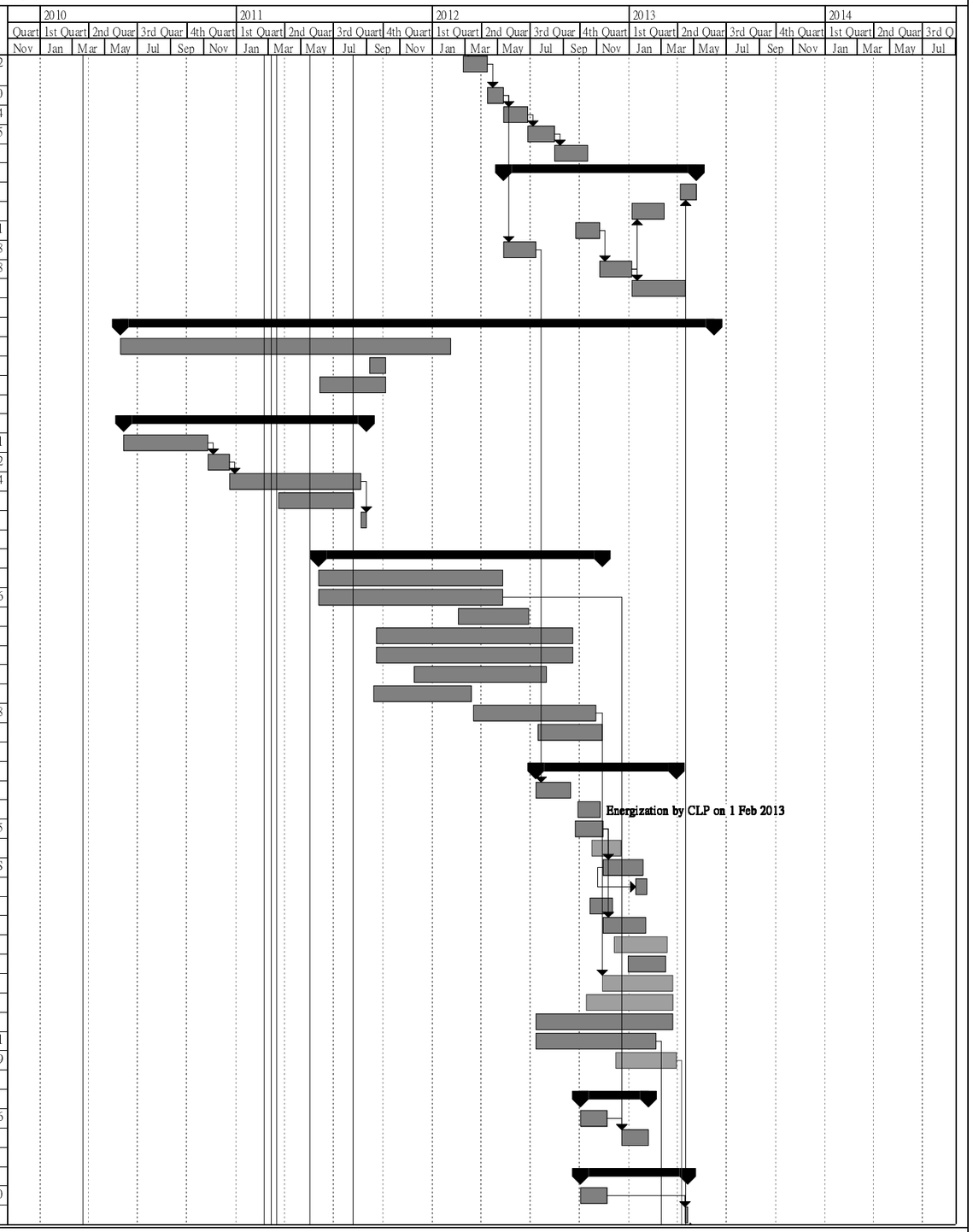
Task | Summary | Rolled Up Milestone | External Tasks | Inactive Task
Critical Task | Rolled Up Task | Rolled Up Progress | Project Summary | Progress
Milestone | Rolled Up Critical Task | Split | Group By Summary | Deadline

Contract No.: DC/2009/22

Contract Title: Drainage Improvement Works in Shuen Wan, Tai Po - Contract 1

3 Months Rolling Programme (January 2013 to March 2013)

ID	Task Name	Duration	Start	Finish	Predecessors	Successors
71	Construction of Base Slab for Transformer Room, Switch Room	45 days	Tue 12/2/28	Thu 12/4/12	70	72
72	Superstructure for Transformer Room, Switch Room	30 days	Fri 12/4/13	Sat 12/5/12	71	73,80
73	Construction for Store Room/Toilet	45 days	Sun 12/5/13	Tue 12/6/26	72	74
74	Construction for Screen House	50 days	Wed 12/6/27	Wed 12/8/15	73	75
75	Construction of Valve Chamber and Discharge Chamber	62 days	Thu 12/8/16	Tue 12/10/16	74	
76	**Other Works**	**359 days**	**Sun 12/5/13**	**Mon 13/5/6**		
77	Manmade Slope/roofing	30 days	Sun 13/4/7	Mon 13/5/6	285	
78	Roofing on structure	60 days	Mon 13/1/7	Thu 13/3/7	81	
79	Internal Finishing Works for Screen House	45 days	Mon 12/9/24	Wed 12/11/7		81
80	Internal Finishing Works for Transformer Room and Switch Room	60 days	Sun 12/5/13	Wed 12/7/11	72	108
81	Internal Finishing Works for Store Room	60 days	Thu 12/11/8	Sun 13/1/6	79	82,78
82	External Finishing Works	100 days	Mon 13/1/7	Tue 13/4/16	81	
83						
84	**E&M Works**	**1105 days**	**Mon 10/5/31**	**Sat 13/6/8**		
85	Equipment Submission & Approval	615 days	Mon 10/5/31	Sat 12/2/4		
86	Civil Requirement for Penstocks, Stoplog of Wai Ha River	30 days	Wed 11/9/7	Thu 11/10/6		
87	Civil Requirement for Stormwater Pumping Station	123 days	Mon 11/6/6	Thu 11/10/6		
88						
89	**Pump Sump Model Test**	**452 days**	**Sun 10/6/6**	**Wed 11/8/31**		
90	Methodology Preparation, Submission & Approval	157 days	Sun 10/6/6	Tue 10/11/9		91
91	Preparation & Construction of Sump Model	40 days	Wed 10/11/10	Sun 10/12/19	90	92
92	Model Test for Various Scenarios	245 days	Mon 10/12/20	Sun 11/8/21	91	94
93	Modification Works of Physical Model	140 days	Mon 11/3/21	Sun 11/8/7		
94	Preparation & Submission of Model Test Report	10 days	Mon 11/8/22	Wed 11/8/31	92	
95						
96	**Fabrication & Delivery of Major Equipment to Site**	**528 days**	**Sat 11/6/4**	**Mon 12/11/12**		
97	Motorized Penstocks	343 days	Sat 11/6/4	Fri 12/5/11		
98	Stoplogs	343 days	Sat 11/6/4	Fri 12/5/11		126
99	Motorized Bar Screens	131 days	Sun 12/2/19	Thu 12/6/28		
100	Stormwater Pumps	366 days	Mon 11/9/19	Tue 12/9/18		
101	Low Water Pumps	366 days	Mon 11/9/19	Tue 12/9/18		
102	Pipeworks	246 days	Tue 11/11/29	Tue 12/7/31		
103	Valves	182 days	Wed 11/9/14	Tue 12/3/13		
104	L.V. Switchboard	228 days	Sun 12/3/18	Wed 12/10/31		118
105	Cables & Elect Accessories	120 days	Mon 12/7/16	Mon 12/11/12		
106						
107	**Stormwater Pumping Station**	**262 days**	**Thu 12/7/12**	**Sat 13/3/30**		
108	Installation of B.S. in CLP Transformer Room	65 days	Thu 12/7/12	Fri 12/9/14	80	
109	Electrical Work by CLP in Transformer Room	42 days	Fri 12/9/28	Thu 12/11/8		
110	Installation of EOT Cranes EOT-1 in Screen House;	52 days	Sun 12/9/23	Tue 12/11/13		112,115
111	Installation of EOT Cranes EOT-2 in Pump Hall;	55 days	Wed 12/10/24	Mon 12/12/17		
112	Installation of Motorized Penstocks SG01 to SG04	75 days	Wed 12/11/14	Sun 13/1/27	110	113SS
113	Installation of Motorized Penstocks SG05	21 days	Mon 13/1/14	Sun 13/2/3	112SS	
114	Installaton of Stoplogs SL01 to SL03 in Discharge Chamber	42 days	Sun 12/10/21	Sat 12/12/1		
115	Installation of Motorized Bar Screens BS01 & BS02;	80 days	Wed 12/11/14	Fri 13/2/1	110	
116	Installation of Stormwater Pumps & Pipework	99 days	Wed 12/12/5	Wed 13/3/13		
117	Installation of Low Water Pumps & Pipework	70 days	Mon 12/12/31	Sun 13/3/10		
118	Installation of L.V. Switchboard	131 days	Tue 12/11/13	Sat 13/3/23	104	
119	Installation of Cabling & Accessories	161 days	Sun 12/10/14	Sat 13/3/23		
120	Installation of Building Services Equipment	255 days	Thu 12/7/12	Sat 13/3/23		
121	Installation of Fire Services System	224 days	Thu 12/7/12	Wed 13/2/20		141
122	Installation of MACS & PLC	113 days	Sat 12/12/8	Sat 13/3/30		139
123						
124	**Wai Ha River Outlet**	**127 days**	**Wed 12/10/3**	**Wed 13/2/6**		
125	Installation of Motorized Penstock, SG07A, SG07B, SG07C & SG07D	50 days	Wed 12/10/3	Wed 12/11/21		126
126	Installation of Stoplogs, SL06A, SL06B, SL06C & SL06D	50 days	Wed 12/12/19	Wed 13/2/6	98,125	
127						
128	**Drain Intake at Ting Kok Road**	**200 days**	**Wed 12/10/3**	**Sat 13/4/20**		
129	Installation of Stoplogs, SL07B, SL07C & SL07D	50 days	Wed 12/10/3	Wed 12/11/21		130
130	Installation of Stoplog SL07A	5 days	Tue 13/4/16	Sat 13/4/20	316,129	



Data Date: 2013-01-02
Print date : 2012-11-17

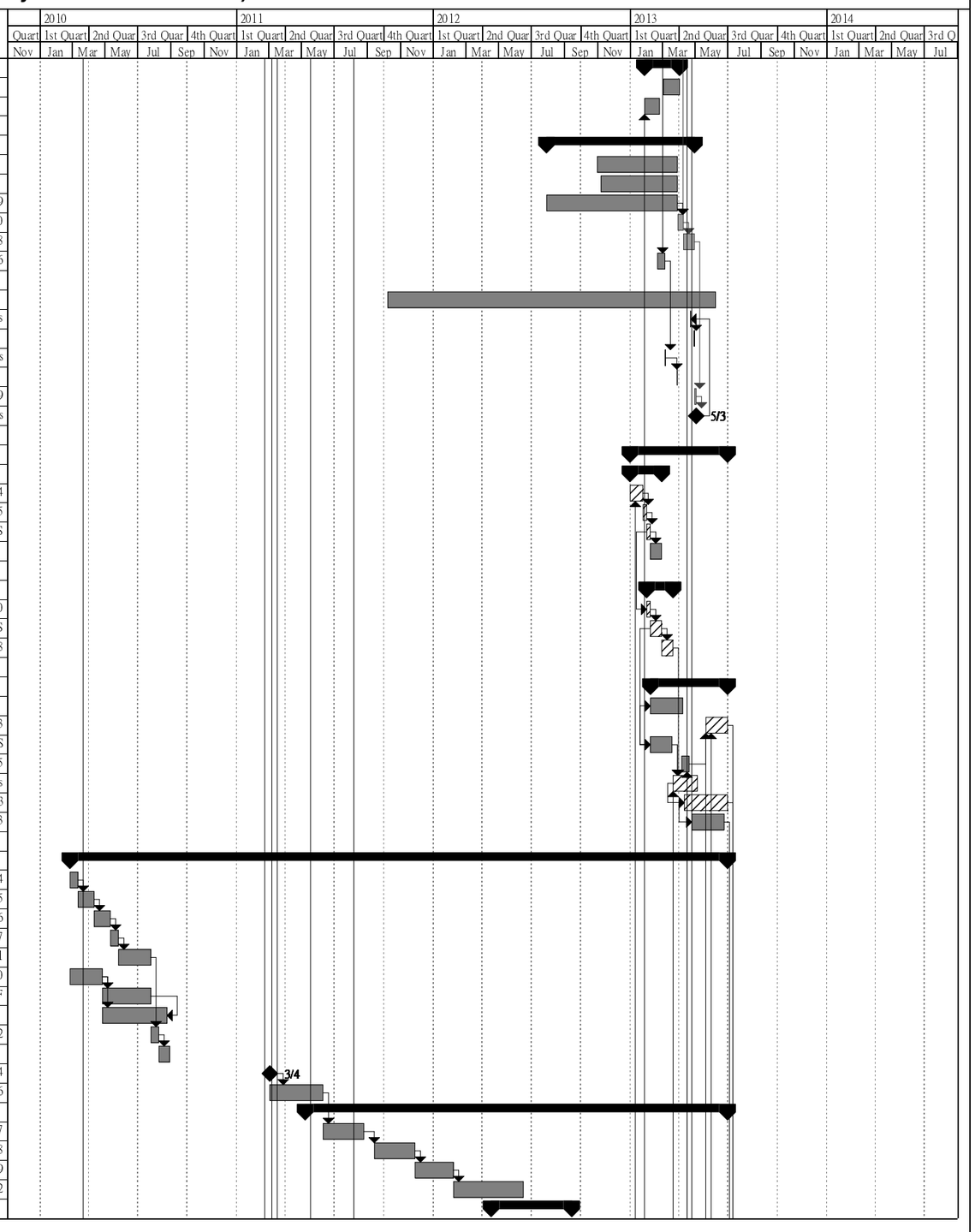
Task | Summary | Rolled Up Milestone | External Tasks | Inactive Task
Critical Task | Rolled Up Task | Rolled Up Progress | Project Summary | Progress
Milestone | Rolled Up Critical Task | Split | Group By Summary | Deadline

Contract No.: DC/2009/22

Contract Title: Drainage Improvement Works in Shuen Wan, Tai Po - Contract 1

3 Months Rolling Programme (January 2013 to March 2013)

ID	Task Name	Duration	Start	Finish	Predecessors	Successors
131	**Box Culvert**	**65 days**	**Mon 13/1/28**	**Tue 13/4/2**		
132	Installation of Manual Penstock, SG06 at MH06	30 days	Mon 13/3/4	Tue 13/4/2	290,295	
133	Installation of Stoplogs, SL05A & SL05B at Outfall	28 days	Mon 13/1/28	Sun 13/2/24	223	
134						
135	**Testing & Commissioning**	**275 days**	**Mon 12/7/30**	**Tue 13/4/30**		
136	Leakage Test of Penstocks	149 days	Thu 12/11/1	Fri 13/3/29		
137	Leakage Test of Stoplogs	142 days	Thu 12/11/8	Fri 13/3/29		
138	Functional Test of Equipment/System	243 days	Mon 12/7/30	Fri 13/3/29		139
139	Wet Commissioning Test of Pumps	10 days	Sun 13/3/31	Tue 13/4/9	138,122	140
140	System Commissioning	21 days	Wed 13/4/10	Tue 13/4/30	139	148
141	Functional Test of FSI	14 days	Thu 13/2/21	Wed 13/3/6	121	146
142						
143	Submission of Revised O&M Manual	609 days	Sun 11/10/9	Sat 13/6/8		
144	1st Session of Training	1 day	Tue 13/4/23	Tue 13/4/23	149FF-10 days	145FS+6 days
145	2nd Session of Training	1 day	Tue 13/4/30	Tue 13/4/30	144FS+6 days	
146	Submission of FSD 501 for completion	1 day	Thu 13/3/7	Thu 13/3/7	141	147FS+21 days
147	FSI Inspection	1 day	Fri 13/3/29	Fri 13/3/29	146FS+21 days	
148	Plant Handover to Client	3 days	Wed 13/5/1	Fri 13/5/3	140	149
149	Anticipated Completion Date	0 days	Fri 13/5/3	Fri 13/5/3	148	144FF-10 days
150						
151	**External Structure**	**181 days**	**Tue 13/1/1**	**Sun 13/6/30**		
152	**Pumping Station to Outfall Structure**	**59 days**	**Tue 13/1/1**	**Thu 13/2/28**		
153	Construcction of 2 nos. of 1500mm dia. Drainage Pipes	24 days	Tue 13/1/1	Thu 13/1/24	223	154
154	Set up the Temporary Shoring	7 days	Fri 13/1/25	Thu 13/1/31	153	155
155	Excavation	7 days	Fri 13/2/1	Thu 13/2/7	154	156,159SS
156	Construction of 2nos. Of Outfall Structures	21 days	Fri 13/2/8	Thu 13/2/28	155	
157						
158	**Tide Level Monitoring Chamber**	**49 days**	**Fri 13/2/1**	**Thu 13/3/21**		
159	Excavation	7 days	Fri 13/2/1	Thu 13/2/7	155SS	160
160	Construction of Pipe & Tide Level Monitoring Chambers	21 days	Fri 13/2/8	Thu 13/2/28	159	161,166SS
161	Outfall Structure	21 days	Fri 13/3/1	Thu 13/3/21	160	168
162						
163	**External Misc. Works**	**143 days**	**Fri 13/2/8**	**Sun 13/6/30**		
164	Plumbing Works	60 days	Fri 13/2/8	Mon 13/4/8	166SS	
165	Boundary Wall & Fencing	40 days	Wed 13/5/22	Sun 13/6/30	219,280,167	333
166	Flow Measurement chambers and Pipes	40 days	Fri 13/2/8	Tue 13/3/19	160SS	168,164SS
167	Sewer Manhole SM1	14 days	Sun 13/4/7	Sat 13/4/20	285	165
168	Backfiling for Road Work, Surface Drainage System & Catchpits	45 days	Fri 13/3/22	Sun 13/5/5	166,161,222	169SS+21 days
169	Road work / Concrete Pavement	80 days	Fri 13/4/12	Sun 13/6/30	168SS+21 days	170SS+14 days,333
170	Planter/Landscaping Works	60 days	Fri 13/4/26	Mon 13/6/24	169SS+14 days	333
171						
172	**Box Culvert**	**1221 days**	**Fri 10/2/26**	**Sun 13/6/30**		
173	Liaison with LCSD	15 days	Fri 10/2/26	Fri 10/3/12	2	174
174	Determination of Box Culvert Alignment	30 days	Sat 10/3/13	Sun 10/4/11	173	175
175	Record Survey	30 days	Mon 10/4/12	Tue 10/5/11	174	176
176	Condition Survey of Existing Structure	15 days	Wed 10/5/12	Wed 10/5/26	175	177
177	Submission of Method Statement to LCSD	60 days	Thu 10/5/27	Sun 10/7/25	176	181
178	Design of Temporary Traffic Arrangement	60 days	Fri 10/2/26	Mon 10/4/26	2	179,180
179	Submission of TTA to TMLG for Approval	90 days	Tue 10/4/27	Sun 10/7/25	178	180FF
180	Excavation Permit	120 days	Tue 10/4/27	Tue 10/8/24	178,179FF	
181	Temporary Removal of Structure and Facilities / Reprovision	15 days	Mon 10/7/26	Mon 10/8/9	177	182
182	Provision of Temporary Irrigation Pipes	20 days	Tue 10/8/10	Sun 10/8/29	181	
183	V.O. issued - Change of Box Culvert	0 days	Fri 11/3/4	Fri 11/3/4		184
184	Preparation and Hoarding Erection	99 days	Fri 11/3/4	Fri 11/6/10	183	186
185	**Single Cell Box Culvert**	**784 days**	**Mon 11/5/9**	**Sun 13/6/30**		
186	Box Culvert at Chainage 115 - 128 (completed)	76 days	Sat 11/6/11	Thu 11/8/25	184	187
187	Box Culvert at Chainage 100 - 115 (completed)	76 days	Wed 11/9/14	Mon 11/11/28	186	188
188	Box Culvert at Chainage 85 - 100 (completed)	71 days	Tue 11/11/29	Tue 12/2/7	187	189
189	Box Culvert at Chainage 55 - 85 (completed)	130 days	Wed 12/2/8	Sat 12/6/16	188	192
190	**Box Culvert at Chainage 156 - 214 (completed)**	**150 days**	**Wed 12/4/18**	**Fri 12/9/14**		



Data Date: 2013-01-02
Print date : 2012-11-17

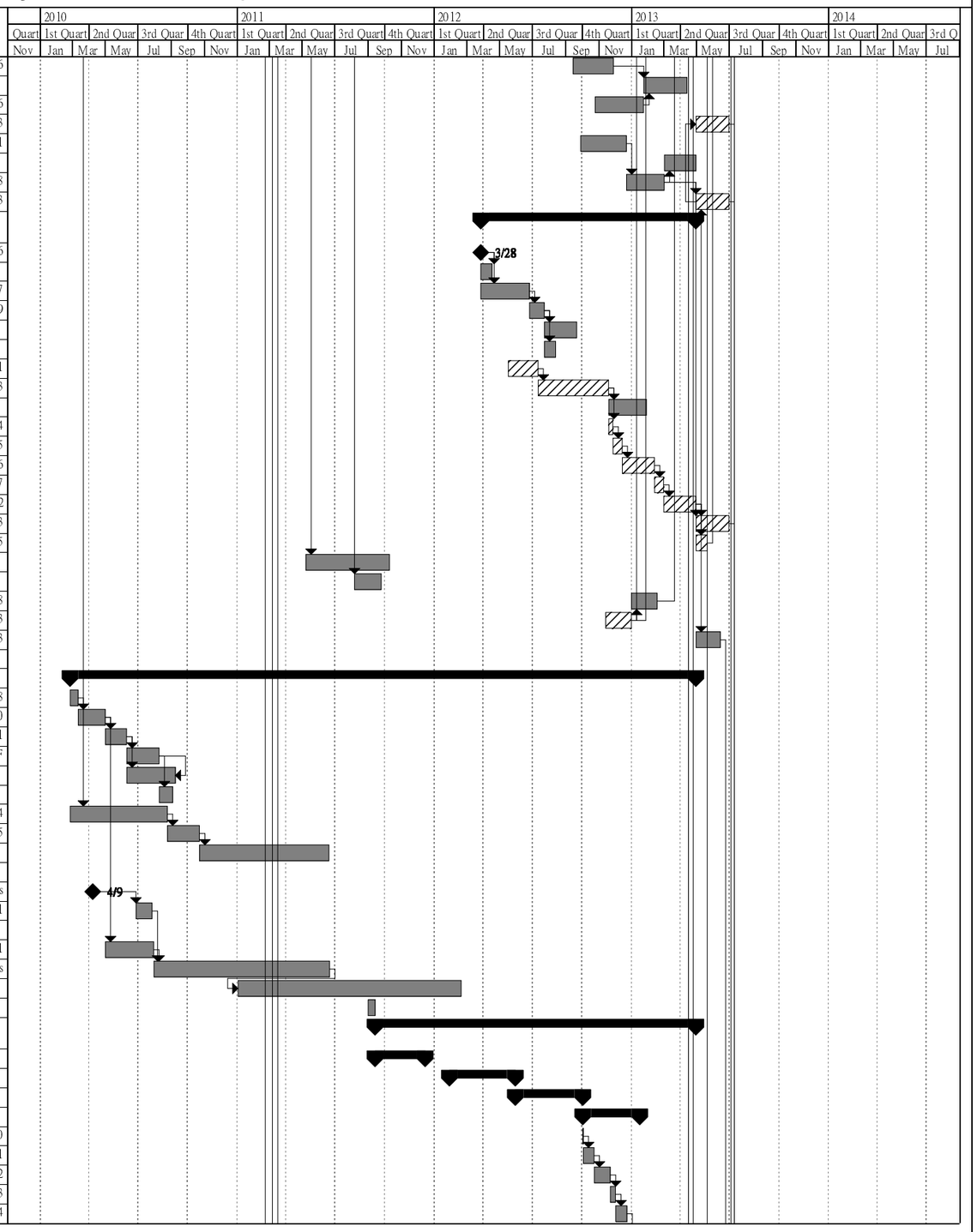
Task | Summary | Rolled Up Milestone | External Tasks | Inactive Task
Critical Task | Rolled Up Task | Rolled Up Progress | Project Summary | Progress
Milestone | Rolled Up Critical Task | Split | Group By Summary | Deadline

Contract No.: DC/2009/22

Contract Title: Drainage Improvement Works in Shuen Wan, Tai Po - Contract 1

3 Months Rolling Programme (January 2013 to March 2013)

ID	Task Name	Duration	Start	Finish	Predecessors	Successors
195	Box Culvert at Chainage 0 to 12.5 (Bay 1) - completed	75 days	Sat 12/9/15	Wed 12/11/28	194	196
196	Box Culvert at Chainage 12.5 to 40 (Bay 2, 3)	80 days	Thu 13/1/24	Sat 13/4/13	195,197	
197	Box Culvert at Chainage 40 to 55 (Bay 4)	90 days	Fri 12/10/26	Wed 13/1/23		196
198	Box Culvert at Chainage 128 to 141.5 (Bay 8A)	61 days	Wed 13/5/1	Sun 13/6/30	202SS	333
199	Box Culvert at Chainage 141.5 to 156 (Bay 9)	85 days	Sat 12/9/29	Sat 12/12/22	194	201
200	Box Culvert at Chainage 214 to 228 (Bay 14)	59 days	Sun 13/3/3	Tue 13/4/30	201	
201	Box Culvert at Chainage 228 to 250 (Bay 15, 16)	70 days	Sun 12/12/23	Sat 13/3/2	199	200,202,218
202	Box Culvert at Chainage 250 - 274 (Bay 17, 18)	61 days	Wed 13/5/1	Sun 13/6/30	201,217	198SS,333
203	**Pipes Laying by Trenchless Method from Chainage 285 to 305**	**399 days**	**Wed 12/3/28**	**Tue 13/4/30**		
204	Confirmation of Pipe Jacking Works	0 days	Wed 12/3/28	Wed 12/3/28		205,206
205	Material & Method Statement Submission/Approval	21 days	Wed 12/3/28	Tue 12/4/17	204	
206	Preparation Works for Jack Pipe Production	90 days	Wed 12/3/28	Mon 12/6/25	204	207
207	Pipe Production	28 days	Tue 12/6/26	Mon 12/7/23	206	208,209
208	Pipe Delivery	60 days	Tue 12/7/24	Fri 12/9/21	207	
209	Joint Test	21 days	Tue 12/7/24	Mon 12/8/13	207	
210	Construction of Jacking Pit	55 days	Fri 12/5/18	Wed 12/7/11	191	211
211	Grouting Works from Jacking Pit	131 days	Thu 12/7/12	Mon 12/11/19	210	212,213
212	Grouting Works from Receiving Pit	70 days	Tue 12/11/20	Mon 13/1/28	211	
213	Thrust Wall	8 days	Tue 12/11/20	Tue 12/11/27	211	214
214	Pipe Jacking Establishment for 1st Pipeline	17 days	Wed 12/11/28	Fri 12/12/14	213	215
215	Grouting, excavation & Pipe Installation (1st Pipeline)	60 days	Sat 12/12/15	Tue 13/2/12	214	216
216	Pipe Jacking Establishment for 2nd Pipeline	17 days	Wed 13/2/13	Fri 13/3/1	215	217
217	Grouting, excavation & Pipe Installation (2nd Pipeline)	60 days	Sat 13/3/2	Tue 13/4/30	216	219,224,218,202
218	Box Culvert at Chainage 274 to 285 (transition -JP)	61 days	Wed 13/5/1	Sun 13/6/30	201,217	333
219	Box Culvert at Chainage 305 to 310 (transition - RP)	21 days	Wed 13/5/1	Tue 13/5/21	217	165
220	Box Culvert at Chainage 310 to330 (completed)	155 days	Mon 11/5/9	Mon 11/10/10	60	
221	Box Culvert at Chainage 330 to343 (completed)	50 days	Sun 11/8/7	Sun 11/9/25	60FS+90 days	
222	Box Culvert at Chainage 343 to 356 (Bay 23)	48 days	Tue 13/1/1	Sun 13/2/17	223	168
223	Outfall Structure (completed)	48 days	Wed 12/11/14	Mon 12/12/31	295	222,133,153
224	Reinstatement of Planters	45 days	Wed 13/5/1	Fri 13/6/14	217	333
225						
226	**Dia. 2100mm Drainage Pipe**	**1160 days**	**Fri 10/2/26**	**Tue 13/4/30**		
227	Record Survey	15 days	Fri 10/2/26	Fri 10/3/12	2	228
228	Site Investigation (Trial Pit)	50 days	Sat 10/3/13	Sat 10/5/1	227	229,240
229	Design of Temporary Traffic Arrangement	40 days	Sun 10/5/2	Thu 10/6/10	228	230,231
230	Submission of TTA to TMLG for Approval	60 days	Fri 10/6/11	Mon 10/8/9	229	232,231FF
231	Excavation Permit	90 days	Fri 10/6/11	Wed 10/9/8	229,230FF	
232	Liaison with HyD / LCSD for Planter Removal	25 days	Tue 10/8/10	Fri 10/9/3	230	
233	E&M Design of Penstocks	180 days	Fri 10/2/26	Tue 10/8/24	15	234
234	Submission for Approval	60 days	Wed 10/8/25	Sat 10/10/23	233	235
235	Fabrication & Delivery of Penstocks	240 days	Sun 10/10/24	Mon 11/6/20	234	
236						
237	V.O for Trial Pits	0 days	Fri 10/4/9	Fri 10/4/9		238FS+80 days
238	Trial Pit Excavations	30 days	Mon 10/6/28	Tue 10/7/27	237FS+80 days	241
239						
240	Liaison with CLP, PCCW	90 days	Sun 10/5/2	Fri 10/7/30	228	241
241	CLP's Cables Diversion Works	326 days	Sat 10/7/31	Tue 11/6/21	240,238	242FS-170 days
242	PCCW 's Cables Diversion Works	414 days	Mon 11/1/3	Mon 12/2/20	241FS-170 days	
243	Excavation Permit	13 days	Thu 11/9/1	Tue 11/9/13		
244	**Construction of 2100mm Pipe & Existing Stormwater Drain along Ting Kok Road**	**595 days**	**Wed 11/9/14**	**Tue 13/4/30**		
245	**1st Section (20m from CH160 to CH180)**	**93 days**	**Wed 11/9/14**	**Thu 11/12/15**		
253	**2nd Section (40m from CH120 to CH160)**	**122 days**	**Mon 12/1/30**	**Wed 12/5/30**	**252**	
261	**3rd Section (50m from CH70 to CH120)**	**125 days**	**Thu 12/5/31**	**Tue 12/10/2**		
268	**4th Section (50m from CH20 to CH70)**	**106 days**	**Wed 12/10/3**	**Wed 13/1/16**		
269	TTA Implementation	1 day	Wed 12/10/3	Wed 12/10/3	267	270
270	Sheetpile driving	20 days	Thu 12/10/4	Tue 12/10/23	269	271
271	Excavation & Temporary Diversion of Existing Storm Drain	30 days	Wed 12/10/24	Thu 12/11/22	270	272
272	Concrete Pipe Installation	10 days	Fri 12/11/23	Sun 12/12/2	271	273
273	Reconstruct Existing Storm Drains and Manhole Construction	21 days	Mon 12/12/3	Sun 12/12/23	272	274



Data Date: 2013-01-02
Print date : 2012-11-17

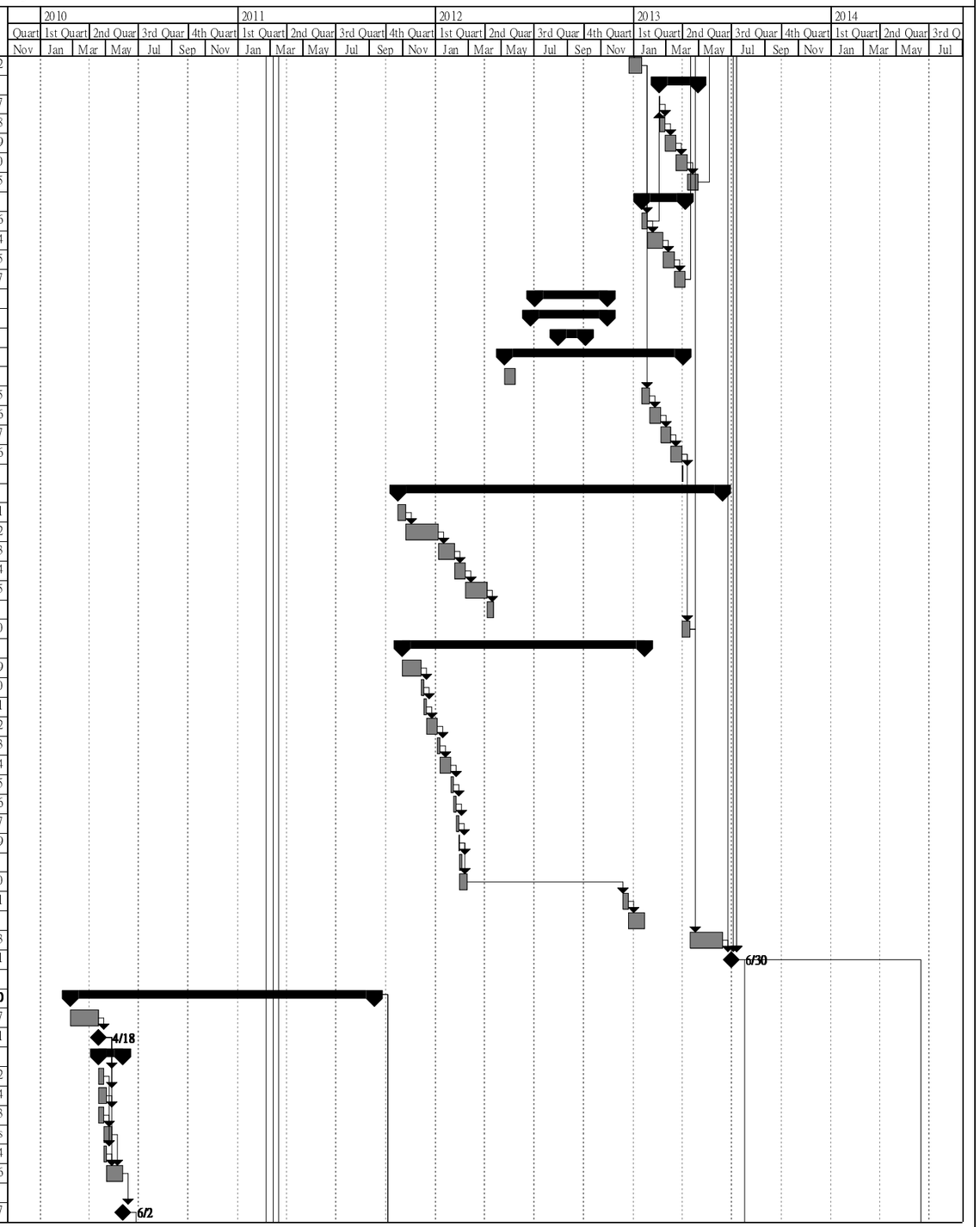
Task | Summary | Rolled Up Milestone | External Tasks | Inactive Task
Critical Task | Rolled Up Task | Rolled Up Progress | Project Summary | Progress
Milestone | Rolled Up Critical Task | Split | Group By Summary | Deadline

Contract No.: DC/2009/22

Contract Title: Drainage Improvement Works in Shuen Wan, Tai Po - Contract 1

3 Months Rolling Programme (January 2013 to March 2013)

ID	Task Name	Duration	Start	Finish	Predecessors	Successors
274	Backfill, Gully Construction and Reinstatement	24 days	Mon 12/12/24	Wed 13/1/16	273	304,282
275	**5th Section (25m from CH180 to CH215)**	**72 days**	**Mon 13/2/18**	**Tue 13/4/30**		
276	TTA Implementation	1 day	Mon 13/2/18	Mon 13/2/18	282	277
277	Sheetpile driving	10 days	Tue 13/2/19	Thu 13/2/28	276	278
278	Excavation & shoring installation	20 days	Fri 13/3/1	Wed 13/3/20	277	279
279	Concrete Pipe Installation and Manhole Construction	21 days	Thu 13/3/21	Wed 13/4/10	278	280
280	Backfill and Reinstatement	20 days	Thu 13/4/11	Tue 13/4/30	279	165
281	**6th Section (25m from CH215 to CH230)**	**80 days**	**Thu 13/1/17**	**Sat 13/4/6**		
282	Sheetpile driving	10 days	Thu 13/1/17	Sat 13/1/26	274	283,276
283	Excavation & shoring installation	29 days	Sun 13/1/27	Sun 13/2/24	282	284
284	Concrete pipe installation and manhole construction	21 days	Mon 13/2/25	Sun 13/3/17	283	285
285	Backfill and reinstatement	20 days	Mon 13/3/18	Sat 13/4/6	284	167,77
286	**7th Section (20m from CH230 to CH240)**	**134 days**	**Tue 12/7/3**	**Tue 12/11/13**		
291	**DN1200 (from MH06 to Box Culvert)**	**142 days**	**Mon 12/6/25**	**Tue 12/11/13**		
296	**DN225 Sewer Pipe across Ting Kok Road**	**51 days**	**Wed 12/8/15**	**Thu 12/10/4**		
302	**Construction of DN1800 Pipes by Trenchless Method**	**330 days**	**Tue 12/5/8**	**Tue 13/4/2**		
303	Trial Trench	20 days	Tue 12/5/8	Sun 12/5/27		
304	Sheetpile Driving	14 days	Thu 13/1/17	Wed 13/1/30	274	305
305	Excavation and Launching Pit Construction	21 days	Thu 13/1/31	Wed 13/2/20	304	306
306	Pre-Grouting	18 days	Thu 13/2/21	Sun 13/3/10	305	307
307	Excavation & Concrete Pipe Laying	21 days	Mon 13/3/11	Sun 13/3/31	306	308,316
308	Grouting	2 days	Mon 13/4/1	Tue 13/4/2	307	
309	**Intake (As required in Dry Season) - Section 1**	**600 days**	**Mon 11/10/24**	**Fri 13/6/14**		
310	Hoarding Erection	15 days	Mon 11/10/24	Mon 11/11/7		311
311	Implement TDMP	60 days	Tue 11/11/8	Fri 12/1/6	310	312
312	Surround by concrete mass and backfill the works area	30 days	Sat 12/1/7	Sun 12/2/5	311	313
313	Shoring Installation and Excavation	20 days	Mon 12/2/6	Sat 12/2/25	312	314
314	Construction of Intake	40 days	Sun 12/2/26	Thu 12/4/5	313	315
315	Reinstatement	12 days	Fri 12/4/6	Tue 12/4/17	314	
316	Intake - Section 2	15 days	Mon 13/4/1	Mon 13/4/15	307	332,130
317	**Modification of Existing Outlet Structure of Wai Ha River**	**448 days**	**Tue 11/11/1**	**Mon 13/1/21**		
318	Implement TDMP (1st stage)	35 days	Tue 11/11/1	Mon 11/12/5		319
319	Demolish Existing Bar Screen	5 days	Tue 11/12/6	Sat 11/12/10	318	320
320	Drilling for Connection	5 days	Sun 11/12/11	Thu 11/12/15	319	321
321	Steel Fixing and Formwork	20 days	Fri 11/12/16	Wed 12/1/4	320	322
322	Concreting	5 days	Thu 12/1/5	Mon 12/1/9	321	323
323	Implement TDMP (2nd stage)	20 days	Tue 12/1/10	Sun 12/1/29	322	324
324	Demolish Existing Bar Screen	5 days	Mon 12/1/30	Fri 12/2/3	323	325
325	Drilling for Connection	5 days	Sat 12/2/4	Wed 12/2/8	324	326
326	Steel Fixing and Formwork	5 days	Thu 12/2/9	Mon 12/2/13	325	327
327	Concreting	1 day	Tue 12/2/14	Tue 12/2/14	326	328,329
328	Provide Temporary Bar Screen	5 days	Wed 12/2/15	Sun 12/2/19	327	
329	Installation of 3 nos of Mechanical Penstocks and Stoplog	14 days	Wed 12/2/15	Tue 12/2/28	327	330
330	Implement TDMP (3rd stage)	10 days	Thu 12/12/13	Sat 12/12/22	329	331
331	Installation of 1 no. of Mechanical Penstocks and Stoplog	30 days	Sun 12/12/23	Mon 13/1/21	330	
332	Misc. Works & Reinstatement	60 days	Tue 13/4/16	Fri 13/6/14	316	333
333	**Completion of Section I**	0 days	Sun 13/6/30	Sun 13/6/30	218,198,202,224,165,169	532,551
334						
335	**Section II (Area C - Ecological Compensation Area at Shuen Wan)**	**562 days**	**Fri 10/2/26**	**Sat 11/9/10**		**539,537,538,540**
336	Delay Procession of Site	52 days	Fri 10/2/26	Sun 10/4/18		337
337	Commencement of Works	0 days	Sun 10/4/18	Sun 10/4/18	336	339,340,341
338	**Preliminary Works**	**45 days**	**Mon 10/4/19**	**Wed 10/6/2**		
339	Site Clearance	10 days	Mon 10/4/19	Wed 10/4/28	337	342
340	Hoarding Erection	15 days	Mon 10/4/19	Mon 10/5/3	337	344
341	Pumping Water out of Pond	10 days	Mon 10/4/19	Wed 10/4/28	337	343
342	Check actual Tidal against Predicted Tidal Level	15 days	Thu 10/4/29	Thu 10/5/13	339	344FS-10 days
343	Survey Existing Pond Bed	5 days	Thu 10/4/29	Mon 10/5/3	341	344
344	Design of of Ecological Compensation Area	30 days	Tue 10/5/4	Wed 10/6/2	343,342FS-10 days,340	346
345						
346	Submission of Design of Ecological Compensation Area to EPD for Approval	0 days	Wed 10/6/2	Wed 10/6/2	344	347



Data Date: 2013-01-02
Print date : 2012-11-17

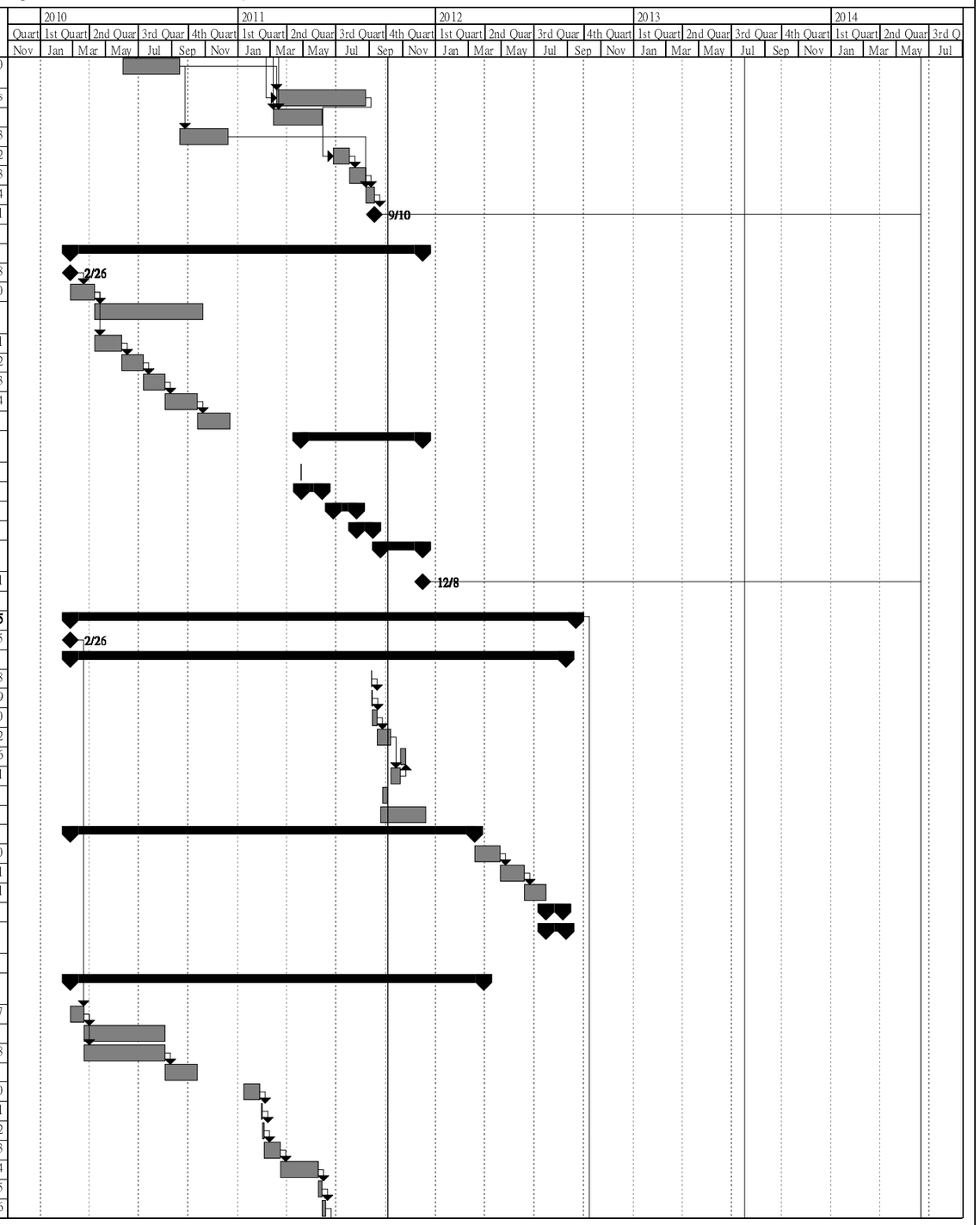
Task | Summary | Rolled Up Milestone | External Tasks | Inactive Task
Critical Task | Rolled Up Task | Rolled Up Progress | Project Summary | Progress
Milestone | Rolled Up Critical Task | Split | Group By Summary | Deadline

Contract No.: DC/2009/22

Contract Title: Drainage Improvement Works in Shuen Wan, Tai Po - Contract 1

3 Months Rolling Programme (January 2013 to March 2013)

ID	Task Name	Duration	Start	Finish	Predecessors	Successors
347	Refer to Permit Requirement plus 15 weeks for Approval and Commencement of Works	105 days	Thu 10/6/3	Wed 10/9/15	346	348,49,349,350
348	Fill of Pond to Designed Level	165 days	Mon 11/3/14	Thu 11/8/25	347,48SS+6 days	351FS-60 days
349	Transplanting	90 days	Tue 11/3/8	Sun 11/6/5	347,46	
350	Temporary Drainage Management Plan	90 days	Thu 10/9/16	Tue 10/12/14	347	353
351	Planting Works at Upper Level	30 days	Mon 11/6/27	Tue 11/7/26	348FS-60 days	352
352	Planting Works at Lower Level	30 days	Wed 11/7/27	Thu 11/8/25	351	353
353	Setting up Water Circulation System	16 days	Fri 11/8/26	Sat 11/9/10	352,350	354
354	**Completion of Section II**	0 days	Sat 11/9/10	Sat 11/9/10	353	551
355						
356	**Section III (Area D - To Lo Wan Shan)**	**651 days**	**Fri 10/2/26**	**Thu 11/12/8**		
357	Commencement of Works	0 days	Fri 10/2/26	Fri 10/2/26		358
358	Liaison with Local Villagers	45 days	Fri 10/2/26	Sun 10/4/11	357	359,360
359	Liaison with MTR & Highway Department - Submit Method Statement for Approval	200 days	Mon 10/4/12	Thu 10/10/28	358	
360	Record Survey	50 days	Mon 10/4/12	Mon 10/5/31	358	361
361	Condition Survey & Structural Monitoring	40 days	Tue 10/6/1	Sat 10/7/10	360	362
362	Design of Temporary Traffic Arrangement	40 days	Sun 10/7/11	Thu 10/8/19	361	363
363	Submission of TTA to TMLG for Approval	60 days	Fri 10/8/20	Mon 10/10/18	362	364
364	Excavation Permit and Application of additional area from LCSD	60 days	Tue 10/10/19	Fri 10/12/17	363	
365	**Variation Order No. 22 for Revised Alignment (89m of 900mm dia. Pipe and 2 manholes)**	**225 days**	**Thu 11/4/28**	**Thu 11/12/8**		
366	Implementing TTA scheme	1 day	Thu 11/4/28	Thu 11/4/28		
367	**(Stage 1)-pipe 36269505.2 (8m)**	**38 days**	**Fri 11/4/29**	**Sun 11/6/5**		
377	**(Stage 2)- Pipe 36269506.2 (25m)/Special Manhole**	**43 days**	**Mon 11/6/27**	**Mon 11/8/8**		
390	**(Stage 3)- Pipe 36269506.2 (30m)**	**30 days**	**Tue 11/8/9**	**Wed 11/9/7**	**389**	
399	**(Stage 4)- Pipe 36269505.2 (3m) pipe 36269506.2(16m) and manhole Type I**	**78 days**	**Thu 11/9/22**	**Thu 11/12/8**		
412	**Completion of Section III**	0 days	Thu 11/12/8	Thu 11/12/8	411	551
413						
414	**Section IV (Area E, F, G - Siu Lek Yuen)**	**934 days**	**Fri 10/2/26**	**Sun 12/9/16**		**545**
415	Commencement of Works	0 days	Fri 10/2/26	Fri 10/2/26		465
416	**Area E- Siu Lek Yuen Road Playground**	**916 days**	**Fri 10/2/26**	**Wed 12/8/29**		
417	Implement TTA for Site Access	1 day	Mon 11/9/5	Mon 11/9/5		418
418	Erection of Gate	1 day	Tue 11/9/6	Tue 11/9/6	417	419
419	Transplant 61 Nos. Of Chrysalidocarpus	9 days	Wed 11/9/7	Thu 11/9/15	418	420
420	Formation of temporary pedestrian walkway	25 days	Fri 11/9/16	Mon 11/10/10	419	422
421	Construction of Ramp	10 days	Sat 11/10/29	Mon 11/11/7	422	426
422	Erection of hoarding with lighting	18 days	Tue 11/10/11	Fri 11/10/28	420	421
423	Transplant 3 Nos. of small trees to temporary nursery(<95mm in trunk dia.)	9 days	Mon 11/9/26	Tue 11/10/4		
424	Transplant of 6 Nos. of trees to temporary nursery (>95mm in trunk dia.)	84 days	Thu 11/9/22	Wed 11/12/14		
425	**(Stage 1A)- Pipeline 1606.1 (5m) and outfall structure**	**747 days**	**Fri 10/2/26**	**Tue 12/3/13**		
439	(Stage 1B)- pipeline 1606.1 (2m), manhole (J)	47 days	Wed 12/3/14	Sun 12/4/29	438	440
440	(Stage 2)- Pipeline 1605.1 (6m) and manhole (Type J)	45 days	Mon 12/4/30	Wed 12/6/13	439	441
441	(Stage 3)- pipeline 1603.1 (19m)	40 days	Thu 12/6/14	Mon 12/7/23	440	443,451
442	**(Stage 4)- pipeline 1604.1 (13m) and manhole (Type J)**	**31 days**	**Tue 12/7/24**	**Thu 12/8/23**		
450	**(Stage 4)- pipeline 1603.1 (4m), 1602.1, 1602.2, 1602.3 and manhole (Type J)**	**37 days**	**Tue 12/7/24**	**Wed 12/8/29**		
463						
464	**Area F - Lek Yuen Street Rest Garden & Sha Tin Rural Committee Road**	**764 days**	**Fri 10/2/26**	**Fri 12/3/30**		
465	Initial Survey	25 days	Fri 10/2/26	Mon 10/3/22	415	466,467
466	Liaison with LCSD	150 days	Tue 10/3/23	Thu 10/8/19	465	
467	Design of Temporary Traffic Arrangement	150 days	Tue 10/3/23	Thu 10/8/19	465	468
468	Submission of TTA to TMLG for Approval	60 days	Fri 10/8/20	Mon 10/10/18	467	
469	Excavation Permit	30 days	Wed 11/1/12	Thu 11/2/10		470
470	Implement TTA Scheme inside Lek Yuen Rest Garden	2 days	Mon 11/2/14	Tue 11/2/15	469	471
471	Setting out Alignment of Pipe & Trial Pit	3 days	Wed 11/2/16	Fri 11/2/18	470	472
472	Construction of Access Pit and Erect Temporary Shoring	30 days	Sat 11/2/19	Sun 11/3/20	471	473
473	Laying of 1650mm dia. Storm Drain by Trenchless Method	70 days	Mon 11/3/21	Sun 11/5/29	472	474
474	Break through Existing Box Culvert Wall	7 days	Mon 11/5/30	Sun 11/6/5	473	475
475	Make Good Culvert Wall / Drain Connection	7 days	Mon 11/6/6	Sun 11/6/12	474	476



Data Date: 2013-01-02
Print date : 2012-11-17

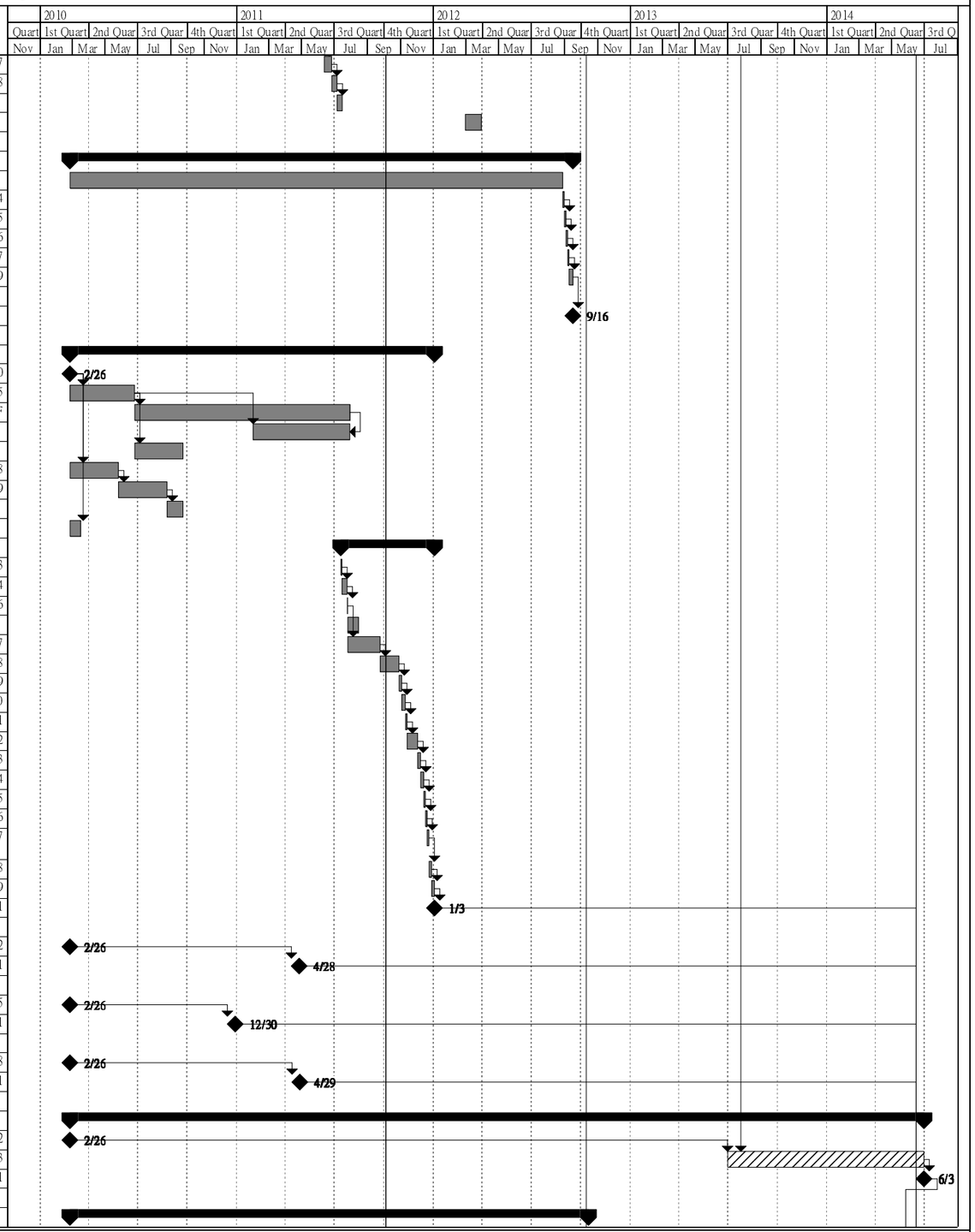
Task | Summary | Rolled Up Milestone | External Tasks | Inactive Task
Critical Task | Rolled Up Task | Rolled Up Progress | Project Summary | Progress
Milestone | Rolled Up Critical Task | Split | Group By Summary | Deadline

Contract No.: DC/2009/22

Contract Title: Drainage Improvement Works in Shuen Wan, Tai Po - Contract 1

3 Months Rolling Programme (January 2013 to March 2013)

ID	Task Name	Duration	Start	Finish	Predecessors	Successors
476	Fill up Abandoned Drain 1200mm with Concrete	14 days	Mon 11/6/13	Sun 11/6/26	475	477
477	Backfill and Reinstatement	10 days	Mon 11/6/27	Wed 11/7/6	476	478
478	Remove Hoarding and Reinstate Removed Shrubs	10 days	Thu 11/7/7	Sat 11/7/16	477	
479	Abandonment of Existing 1200mm dia. Pipe	30 days	Thu 12/3/1	Fri 12/3/30		
480						
481	**Area G - Ngan Shing Streeet**	**934 days**	**Fri 10/2/26**	**Sun 12/9/16**		
482	Maintain Existing Drains and Manholes	915 days	Fri 10/2/26	Tue 12/8/28		
483	Implementation of TTA (Stage 1) for Remove of Temporary Plug	3 days	Wed 12/8/29	Fri 12/8/31	462	484
484	Implementation of TTA (Stage 2) for Remove of Temporary Plug	3 days	Sat 12/9/1	Mon 12/9/3	483	485
485	Implementation of TTA (Stage 3) for Remove of Temporary Plug	3 days	Tue 12/9/4	Thu 12/9/6	484	486
486	Implementation of TTA (Stage 4) for Remove of Temporary Plug	3 days	Fri 12/9/7	Sun 12/9/9	485	487
487	Fill up of Existing 750mm dia. drainage pipes	7 days	Mon 12/9/10	Sun 12/9/16	486	489
488						
489	**Completion of Section IV**	0 days	Sun 12/9/16	Sun 12/9/16	487	
490						
491	**Section V (Area H - Sai Sha Road)**	**677 days**	**Fri 10/2/26**	**Tue 12/1/3**		
492	Commencement of Works	0 days	Fri 10/2/26	Fri 10/2/26		493,497,500
493	Design of Temporary Traffic Arrangement	120 days	Fri 10/2/26	Fri 10/6/25	492	494,496,495
494	Submission of TTA to TMLG for Approval	400 days	Sat 10/6/26	Sat 11/7/30	493	495FF
495	Excavation Permit	180 days	Tue 11/2/1	Sat 11/7/30	493,494FF	
496	Temporary Drainage Management Plan	90 days	Sat 10/6/26	Thu 10/9/23	493	
497	Tree Survey	90 days	Fri 10/2/26	Wed 10/5/26	492	498
498	Submission of Tree Survey Report	90 days	Thu 10/5/27	Tue 10/8/24	497	499
499	Tree Felling	30 days	Wed 10/8/25	Thu 10/9/23	498	
500	Utilities Survey	20 days	Fri 10/2/26	Wed 10/3/17	492	
501	**Heading Works under Variation Order NO. 26**	**174 days**	**Thu 11/7/14**	**Tue 12/1/3**		
502	Implementing site access TTA	2 days	Thu 11/7/14	Fri 11/7/15		503
503	Erecting of hoarding	10 days	Sat 11/7/16	Mon 11/7/25	502	504
504	Setting out alignment of pipe & trial pit	1 day	Tue 11/7/26	Tue 11/7/26	503	506
505	Installation of settlement markers	20 days	Wed 11/7/27	Mon 11/8/15		
506	Construction of access pit and erect temporary shoring	60 days	Wed 11/7/27	Sat 11/9/24	504	507
507	Heading tunnel excavation (pipeline 100.2 (12m))	35 days	Sun 11/9/25	Sat 11/10/29	506	508
508	Drill cut existing wing wall at downstream	5 days	Sun 11/10/30	Thu 11/11/3	507	509
509	Laying of 900mm dia. storm drain pipe and grouting	7 days	Fri 11/11/4	Thu 11/11/10	508	510
510	Make good drain and wing wall connection	3 days	Fri 11/11/11	Sun 11/11/13	509	511
511	Heading tunnel excavation (pipeline 100.1 (8m))	20 days	Mon 11/11/14	Sat 11/12/3	510	512
512	Drill cut existing wing wall at upstream	5 days	Sun 11/12/4	Thu 11/12/8	511	513
513	Laying of 900mm dia. storm drain pipe and grouting	6 days	Fri 11/12/9	Wed 11/12/14	512	514
514	Make good drain and wing wall connection	3 days	Thu 11/12/15	Sat 11/12/17	513	515
515	Stage 1 concreting for manhole(formwork erection, formwork dismantle)	3 days	Sun 11/12/18	Tue 11/12/20	514	516
516	Stage 2 concreting for manhole (formwork erection, steel fixing, formwork dismantle)	4 days	Wed 11/12/21	Sat 11/12/24	515	517
517	Backfill and remove sheetpiles	5 days	Sun 11/12/25	Thu 11/12/29	516	518
518	Reinstatement and remove hoarding	5 days	Fri 11/12/30	Tue 12/1/3	517	519
519	**Completion of Section V**	0 days	Tue 12/1/3	Tue 12/1/3	518	551
520						
521	Section VI (Area J - Pak Shing Street)	0 days	Fri 10/2/26	Fri 10/2/26		522
522	**Completion of Section VI**	0 days	Thu 11/4/28	Thu 11/4/28	521	551
523						
524	Section VII (Area K - Ting Kok Road near Chung Nga Road)	0 days	Fri 10/2/26	Fri 10/2/26		525
525	**Completion of Section VII**	0 days	Thu 10/12/30	Thu 10/12/30	524	551
526						
527	Section VIII (Area L - Wai Ha Village)	0 days	Fri 10/2/26	Fri 10/2/26		528
528	**Completion of Section VIII**	0 days	Fri 11/4/29	Fri 11/4/29	527	551
529						
530	**Section IX (Area A, B, - Shuen Wan)**	**1586 days**	**Fri 10/2/26**	**Mon 14/6/30**		
531	Commencement of Works	0 days	Fri 10/2/26	Fri 10/2/26		532
532	Landscape Establishment Works in Area A & B	365 days	Mon 13/7/1	Mon 14/6/30	531,333	533
533	**Completion of Section IX**	0 days	Mon 14/6/30	Mon 14/6/30	532	551
534						
535	**Section X (Area C - Ecological Compensation Area at Shuen Wan)**	**963 days**	**Fri 10/2/26**	**Mon 12/10/15**		



Data Date: 2013-01-02
Print date : 2012-11-17

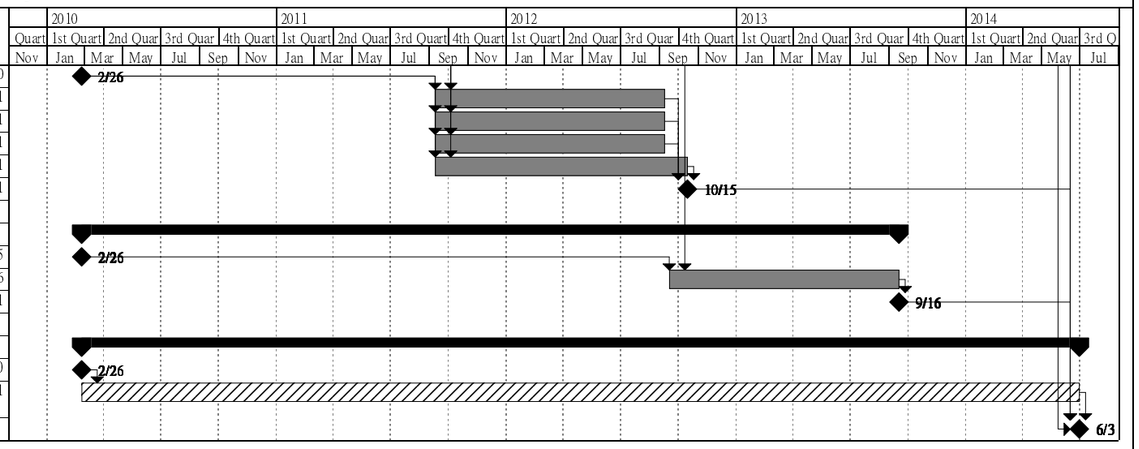
Task | Summary | Rolled Up Milestone | External Tasks | Inactive Task
Critical Task | Rolled Up Task | Rolled Up Progress | Project Summary | Progress
Milestone | Rolled Up Critical Task | Split | Group By Summary | Deadline

Contract No.: DC/2009/22

Contract Title: Drainage Improvement Works in Shuen Wan, Tai Po - Contract 1

3 Months Rolling Programme (January 2013 to March 2013)

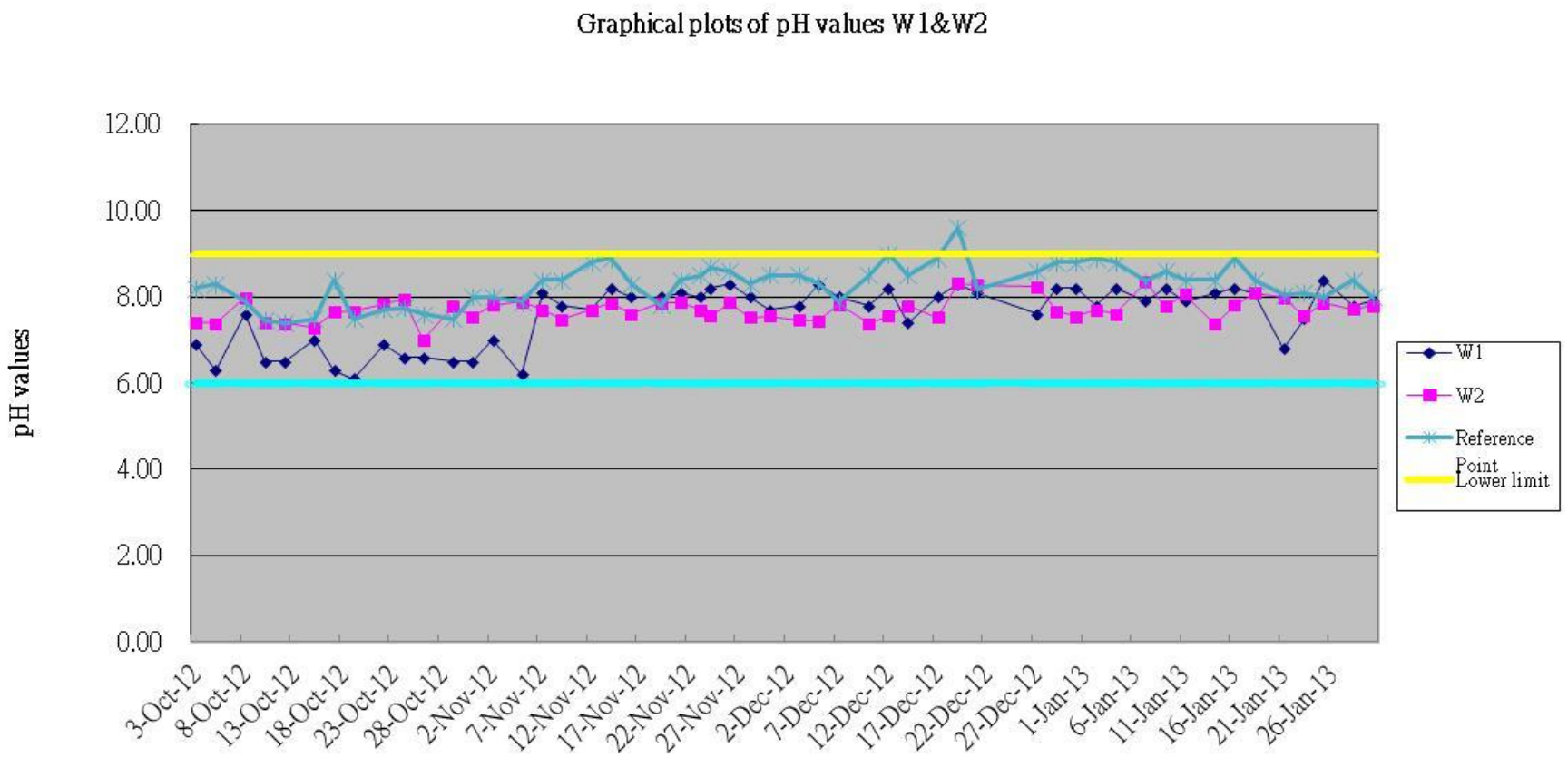
ID	Task Name	Duration	Start	Finish	Predecessors	Successors
536	Commencement of Works	0 days	Fri 10/2/26	Fri 10/2/26		537,538,539,540
537	Monitoring of Water Level	365 days	Sun 11/9/11	Sun 12/9/9	335,536	541
538	Monitoring of Water Quality	365 days	Sun 11/9/11	Sun 12/9/9	335,536	541
539	Landscape Extablishment Works in Area C	365 days	Sun 11/9/11	Sun 12/9/9	335,536	541
540	Maintenance of Ecological Compensation Area	401 days	Sun 11/9/11	Mon 12/10/15	335,536	541
541	**Completion of Section X**	0 days	Mon 12/10/15	Mon 12/10/15	539,537,538,540	551
542						
543	**Section XI**	**1299 days**	**Fri 10/2/26**	**Mon 13/9/16**		
544	Commencement of Works	0 days	Fri 10/2/26	Fri 10/2/26		545
545	Landscape Establishment works in Area E, F, G	365 days	Mon 12/9/17	Mon 13/9/16	414,544	546
546	**Completion of Section XI**	0 days	Mon 13/9/16	Mon 13/9/16	545	551
547						
548	**Section XII**	**1586 days**	**Fri 10/2/26**	**Mon 14/6/30**		
549	Commencement of Works	0 days	Fri 10/2/26	Fri 10/2/26		550
550	Preservation and Protection of Existing Trees within the Site and all remaining of the Works	1586 days	Fri 10/2/26	Mon 14/6/30	549	551
551	**Completion of Section XII**	0 days	Mon 14/6/30	Mon 14/6/30	525,522,519,412,354,333	

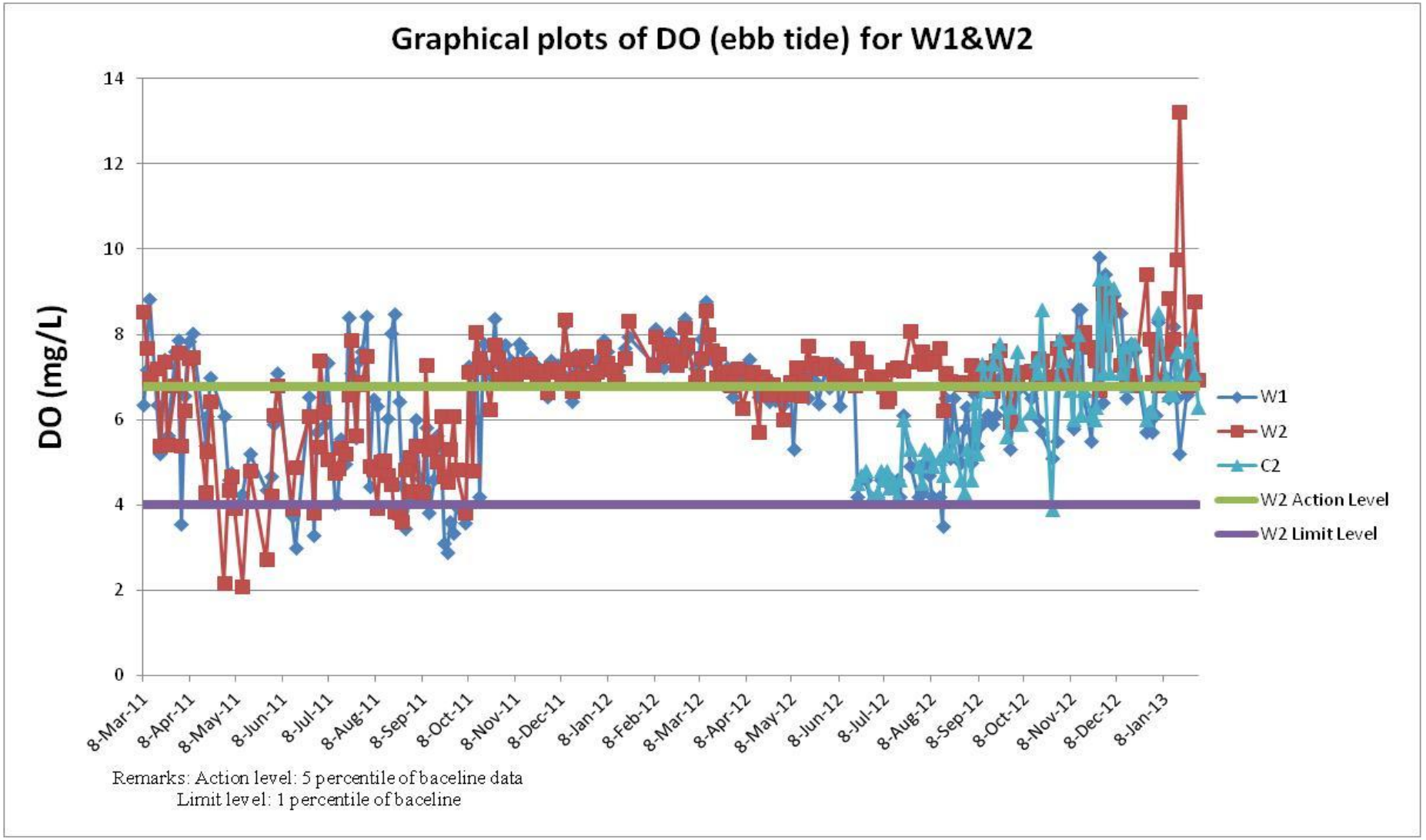


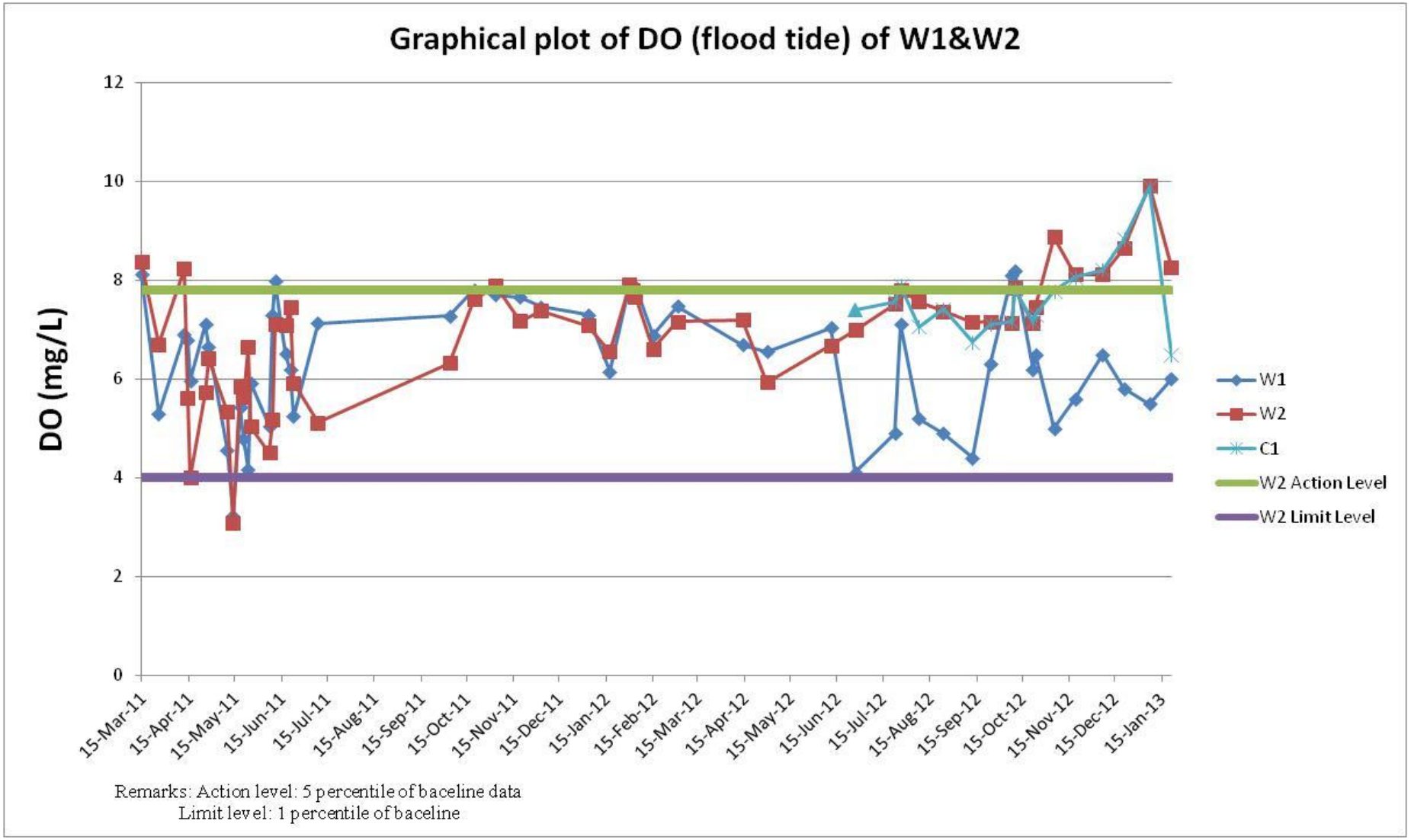
Data Date: 2013-01-02
Print date : 2012-11-17

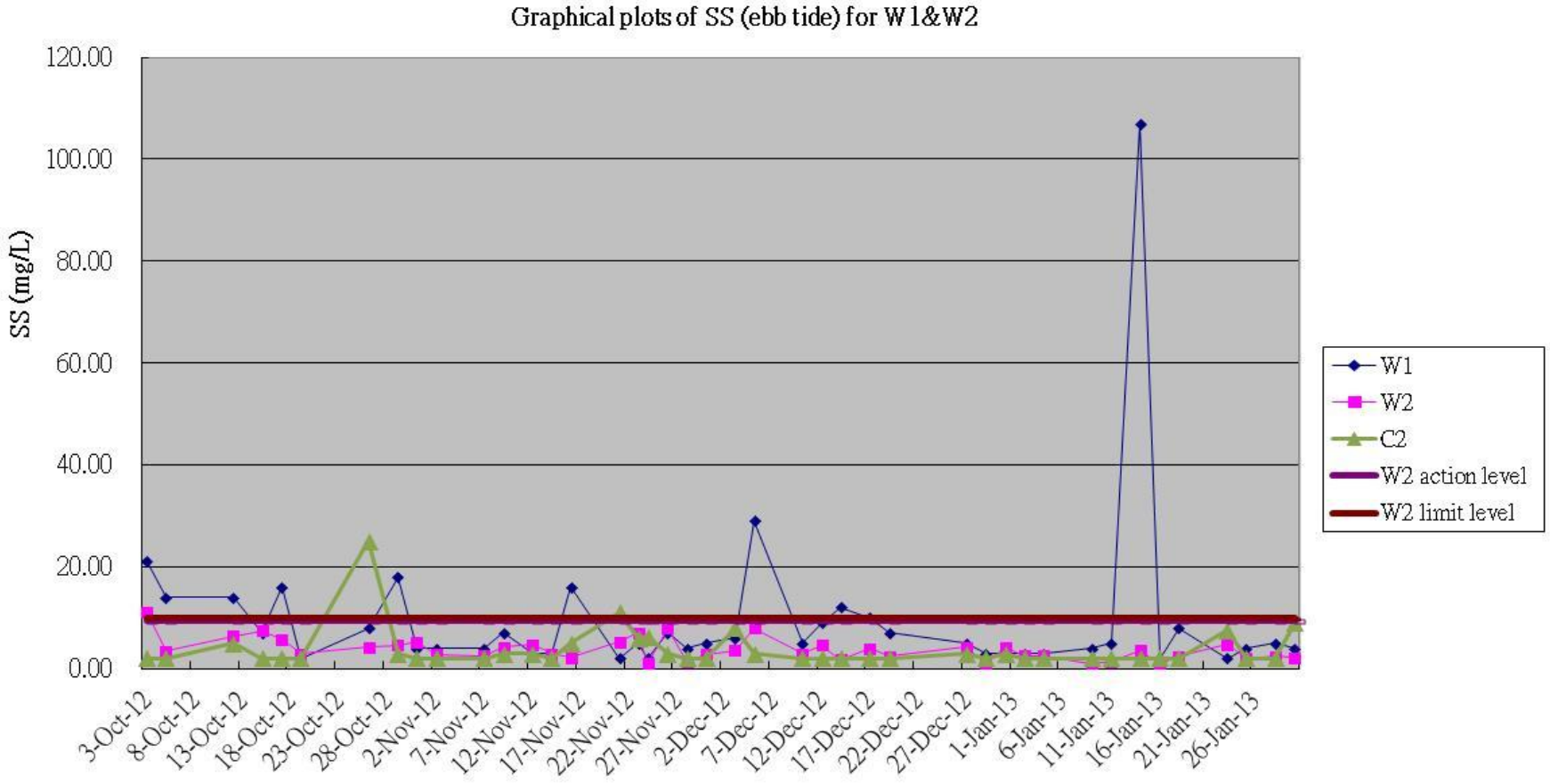
Task	Summary	Rolled Up Milestone	External Tasks	Inactive Task
Critical Task	Rolled Up Task	Rolled Up Progress	Project Summary	Progress
Milestone	Rolled Up Critical Task	Split	Group By Summary	Deadline

Appendix K: Graphical plots of trends of monitored parameter


Graphical plots of pH values W1&W2
pH values
12.00
10.00
8.00
6.00
4.00
2.00
0.00
3-Oct-12
8-Oct-12
13-Oct-12
18-Oct-12
23-Oct-12
28-Oct-12
2-Nov-12
7-Nov-12
12-Nov-12
17-Nov-12
22-Nov-12
27-Nov-12
2-Dec-12
7-Dec-12
12-Dec-12
17-Dec-12
22-Dec-12
27-Dec-12
1-Jan-13
6-Jan-13
11-Jan-13
16-Jan-13
21-Jan-13
26-Jan-13
W1
W2
Reference Point
Lower limit

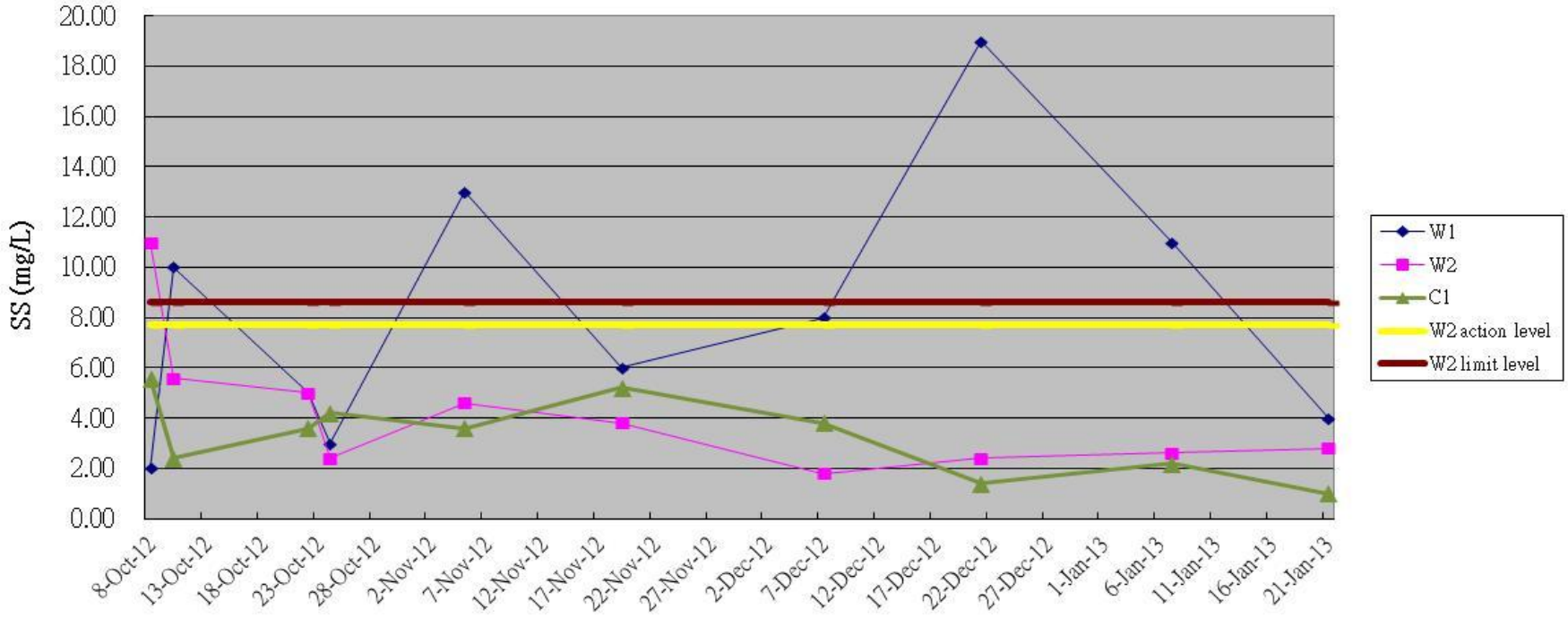

Graphical plots of DO (ebb tide) for W1&W2
DO (mg/L)
14
12
10
8
6
4
2
0
8-Mar-11
8-Apr-11
8-May-11
8-Jun-11
8-Jul-11
8-Aug-11
8-Sep-11
8-Oct-11
8-Nov-11
8-Dec-11
8-Jan-12
8-Feb-12
8-Mar-12
8-Apr-12
8-May-12
8-Jun-12
8-Jul-12
8-Aug-12
8-Sep-12
8-Oct-12
8-Nov-12
8-Dec-12
8-Jan-13
W1
W2
C2
W2 Action Level
W2 Limit Level
Remarks: Action level: 5 percentile of baceline data
Limit level: 1 percentile of baceline


Graphical plot of DO (flood tide) of W1&W2
DO (mg/L)
12
10
8
6
4
2
0
15-Mar-11
15-Apr-11
15-May-11
15-Jun-11
15-Jul-11
15-Aug-11
15-Sep-11
15-Oct-11
15-Nov-11
15-Dec-11
15-Jan-12
15-Feb-12
15-Mar-12
15-Apr-12
15-May-12
15-Jun-12
15-Jul-12
15-Aug-12
15-Sep-12
15-Oct-12
15-Nov-12
15-Dec-12
15-Jan-13
W1
W2
C1
W2 Action Level
W2 Limit Level
Remarks: Action level: 5 percentile of baceline data
Limit level: 1 percentile of baceline

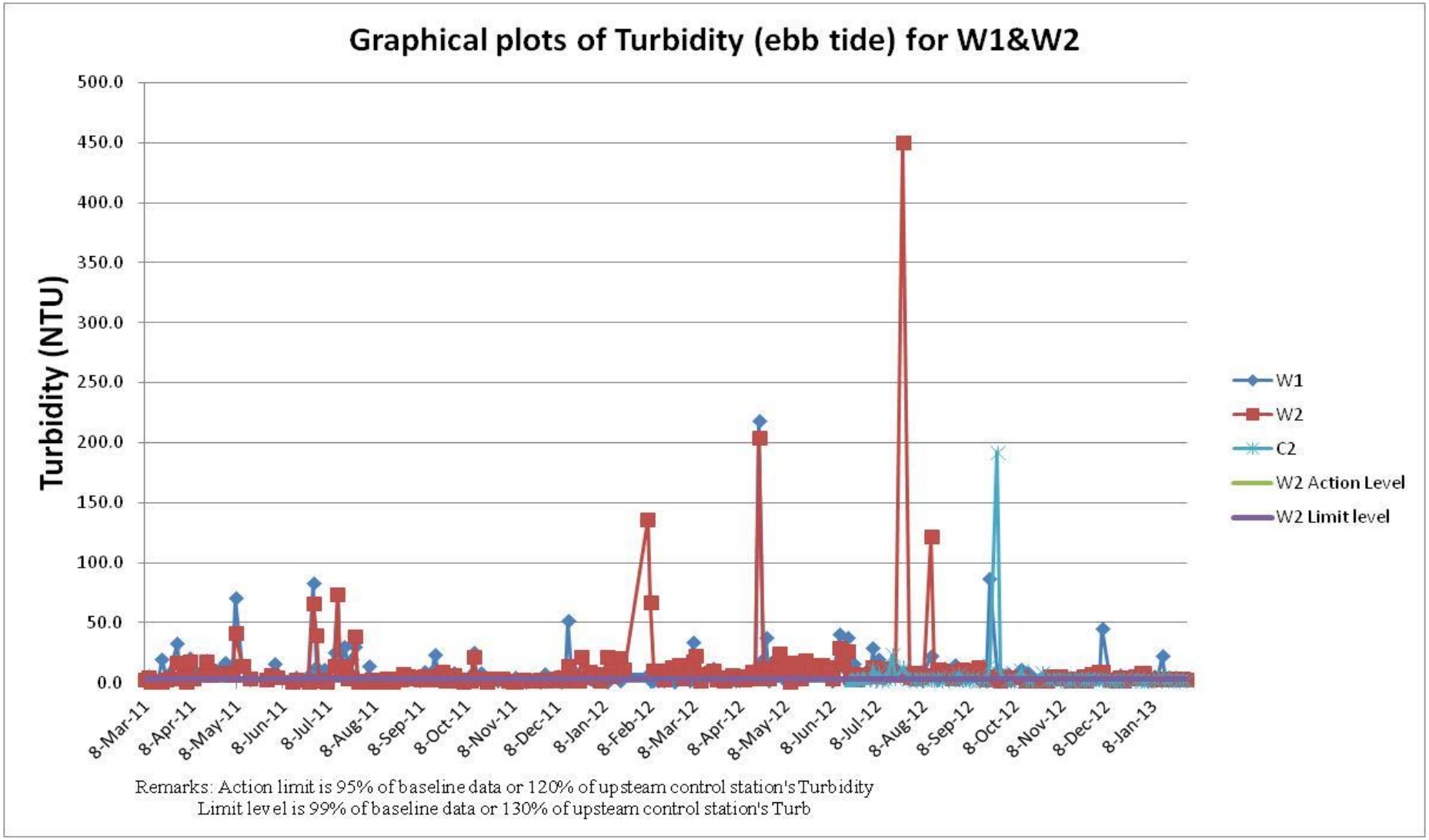


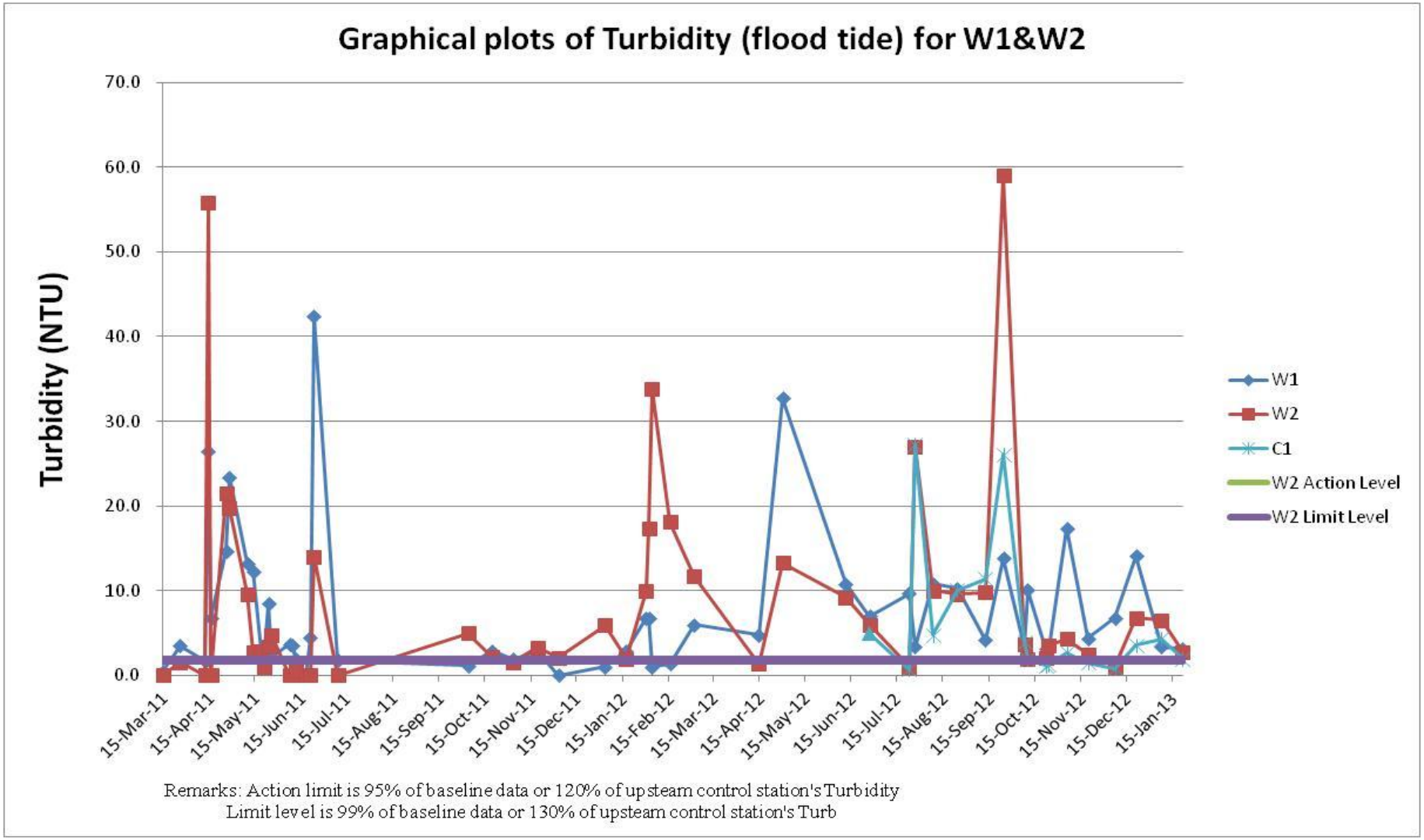
Remarks: Action limit is 95% of baseline data or 120% of upsteam control station's SS
Limit level is 99% of baseline data or 130% of upsteam control station's SS

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

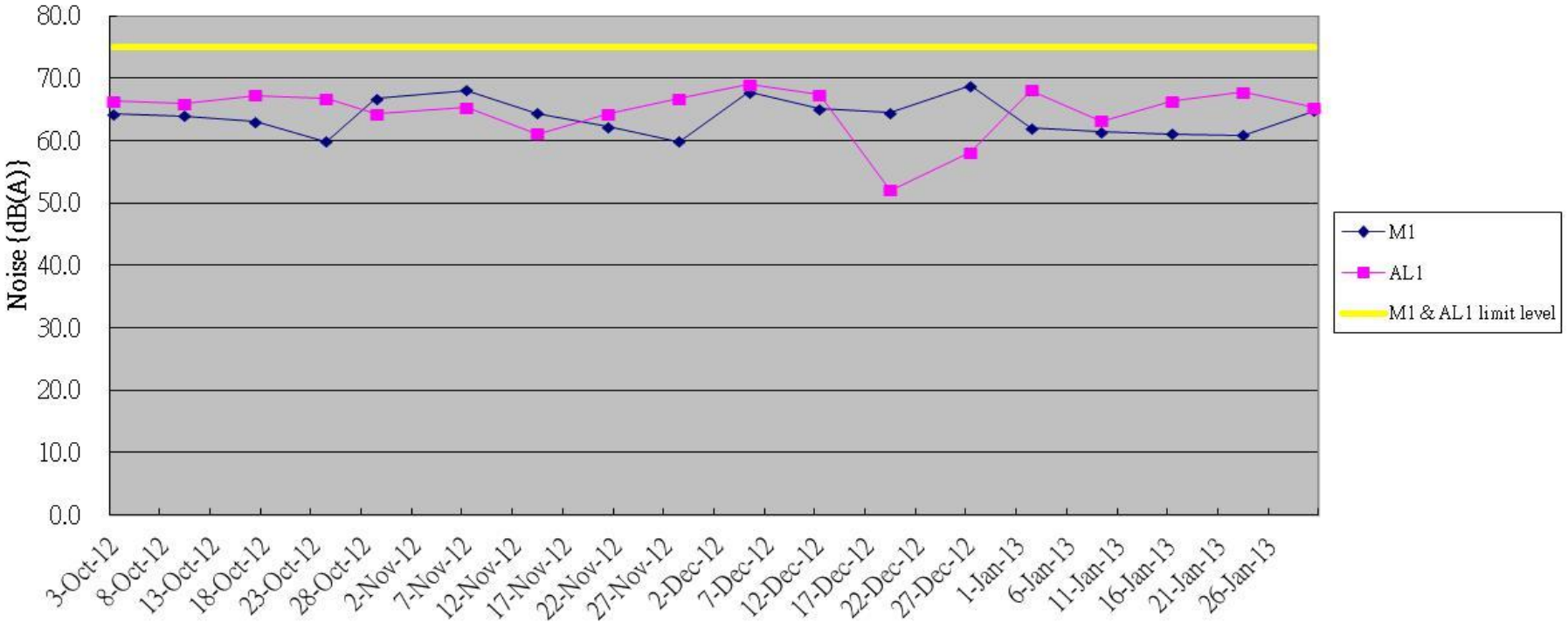


Remarks: Action limit is 95% of baseline data or 120% of upsteam control station's SS
Limit level is 99% of baseline data or 130% of upsteam control station's SS


Graphical plots of Turbidity (ebb tide) for W1&W2
Turbidity (NTU)
500.0
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
8-Mar-11
8-Apr-11
8-May-11
8-Jun-11
8-Jul-11
8-Aug-11
8-Sep-11
8-Oct-11
8-Nov-11
8-Dec-11
8-Jan-12
8-Feb-12
8-Mar-12
8-Apr-12
8-May-12
8-Jun-12
8-Jul-12
8-Aug-12
8-Sep-12
8-Oct-12
8-Nov-12
8-Dec-12
8-Jan-13
W1
W2
C2
W2 Action Level
W2 Limit level
Remarks: Action limit is 95% of baseline data or 120% of upsteam control station's Turbidity
Limit level is 99% of baseline data or 130% of upsteam control station's Turb

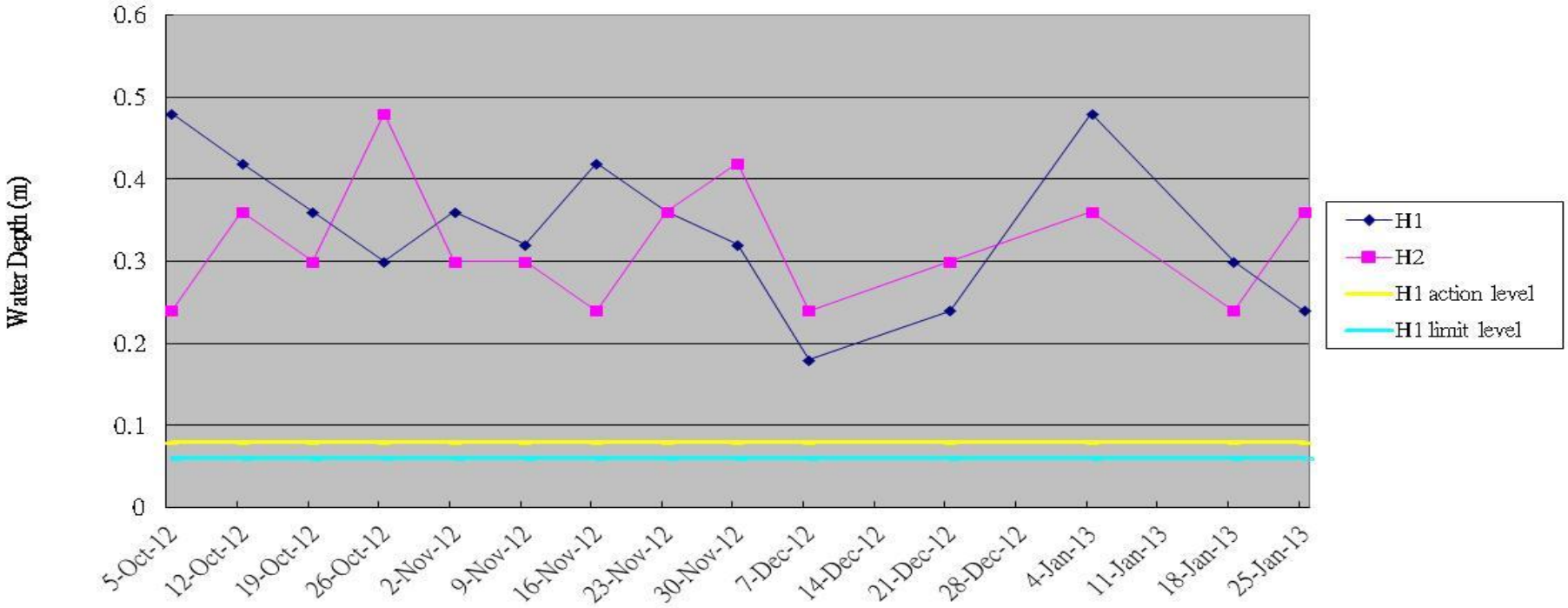

Graphical plots of Turbidity (flood tide) for W1&W2
Turbidity (NTU)
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
15-Mar-11
15-Apr-11
15-May-11
15-Jun-11
15-Jul-11
15-Aug-11
15-Sep-11
15-Oct-11
15-Nov-11
15-Dec-11
15-Jan-12
15-Feb-12
15-Mar-12
15-Apr-12
15-May-12
15-Jun-12
15-Jul-12
15-Aug-12
15-Sep-12
15-Oct-12
15-Nov-12
15-Dec-12
15-Jan-13
W1
W2
C1
W2 Action Level
W2 Limit Level
Remarks: Action limit is 95% of baseline data or 120% of upsteam control station's Turbidity
Limit level is 99% of baseline data or 130% of upsteam control station's Turb

Graphical plots of Noise for M1 & AL1



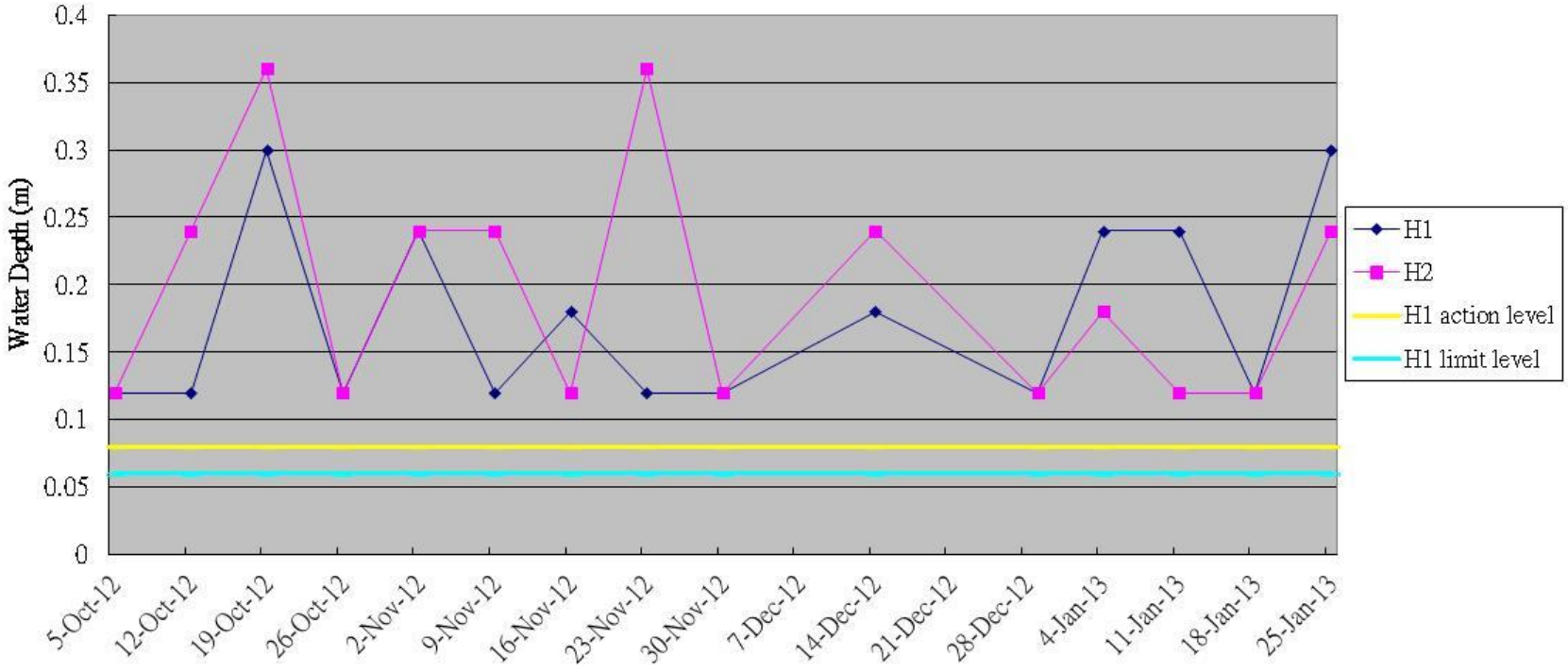
Remarks: Action limit is when one documented complaint is received

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



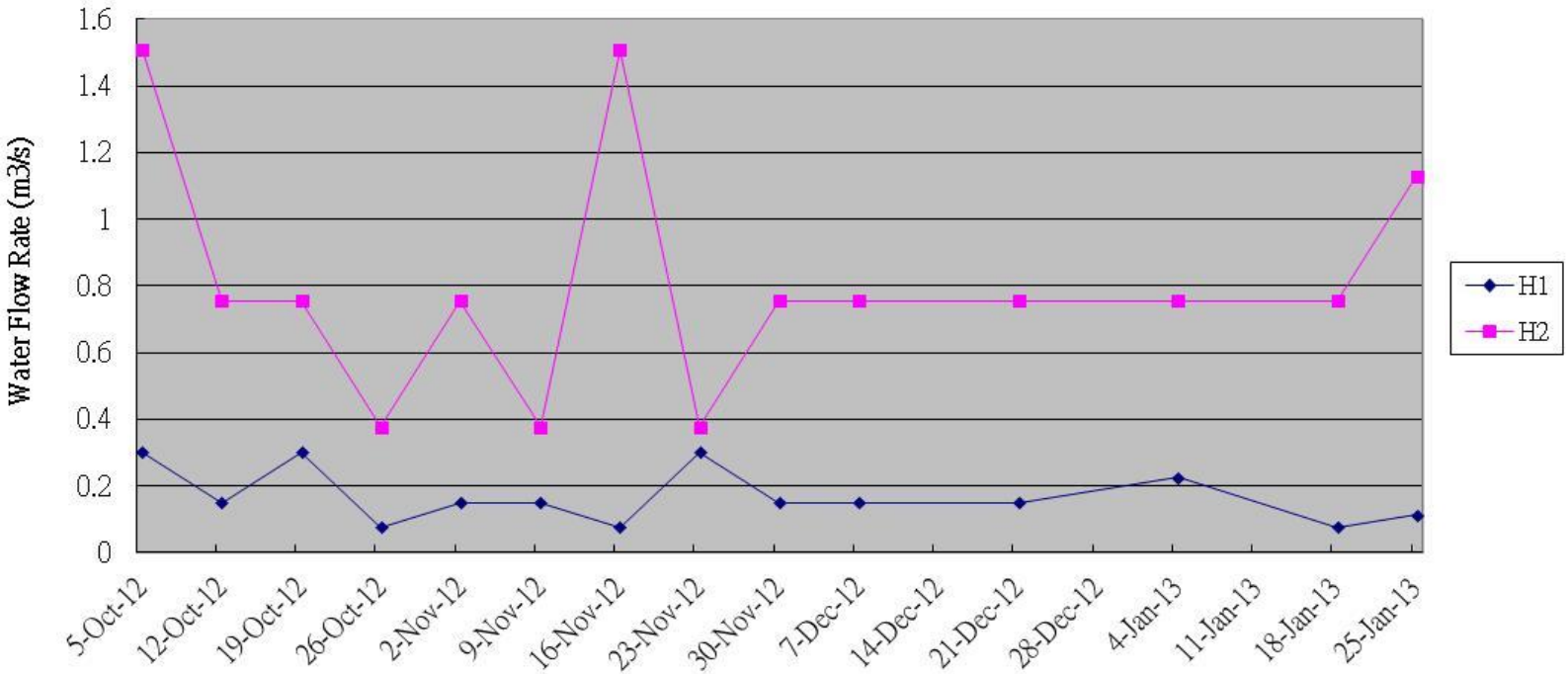
Remarks: Action level: 80% of baseline water depth.
Limit level: 60% of baseline water depth.

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



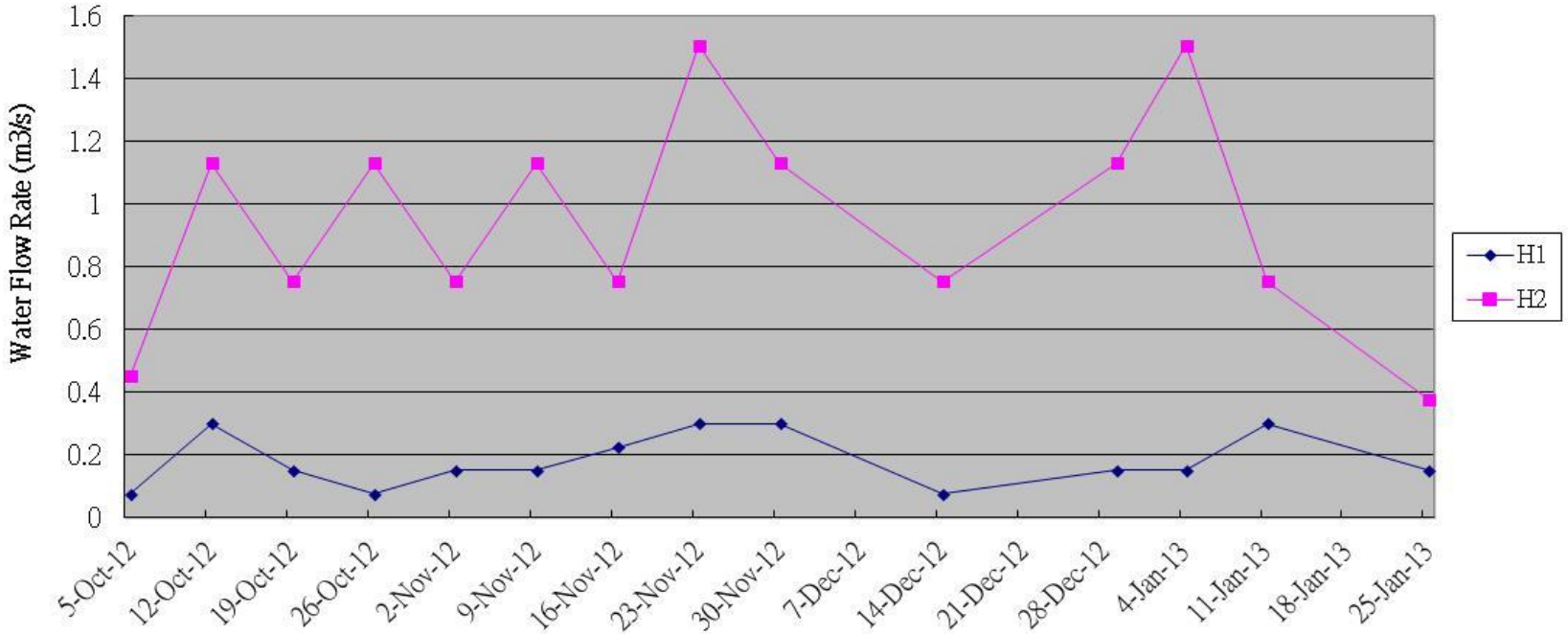
Remarks: Action level: 80% of baseline water depth.
Limit level: 60% of baseline water depth.

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



Remarks: Action level: 120% of control station's water flow rate on the same day of measurement.
Limit level: 140% of control station's water flow rate on the same day of measurement.

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



Remarks: Action level: 120% of control station's water flow rate on the same day of measurement.
Limit level: 140% of control station's water flow rate on the same day of measurement.

Appendix L: Ecological monitoring report

Agreement No. DP/01/2010
Drainage Improvement Works in Shatin and Tai Po:
Ecological Monitoring in area under Contract 1
(Report 12a for Jan 2013)

Prepared for:

Drainage Services Department

Prepared by:
ENVIRON Hong Kong Limited

Date:
Feb 2013

Reference Number:
R2938_V1.0

Agreement No. DP/01/2010
Drainage Improvement Works in Shatin and Tai Po:
Ecological Monitoring in area under Contract 1
(Report 12a for Jan 2013)

Prepared by:

Max Lee
Assistant Environmental Consultant

Approved by:

Tony Cheng
Project Manager

ENVIRON Hong Kong Limited
Room 2310, China Resources Building
26 Harbour Road, Wan Chai, Hong Kong
Tel: (852) 3743 0788
Fax: (852) 3548 6988
Email: hkinfo@environcorp.com

Q:\Projects\DSDSHUWNEM00\Report\Bi-Monthly Construction Phase Ecological Monitoring Report\201301\12a

Contents

Page

1. Introduction 1

2. Highlights of this report 1

3. Summary of construction activities for the month 2

4. Monitoring Methodology 2
4.1 Vegetation survey 2
4.2 Avifauna 3
4.3 Herpetofauna 3
4.4 Butterflies and Odonata 3
4.5 Mammals 3
4.6 Aquatic fauna 3

5. Monitoring data 4
5.1 Vegetation survey 4
5.2 Avifauna 4
5.3 Herpetofauna 4
5.4 Butterflies 4
5.5 Odonata 4
5.6 Mammal 5
5.7 Aquatic fauna 5

6. Remedial measures adopted to the adverse condition 5

7. Record of complains and remedial measures 5

8. Review of the monitoring results 5

9. Forecast of works programme and monitoring requirements 6

10. Comments and summary 6

11. References 7

List of Tables

Table 1: List of riparian vegetation and coverage (%) recorded from two stream sampling points under Contract 1 (i.e. SEMP 1, 2).

Table 2: List of vegetation recorded from works area under Contracts 1 and 100 m buffer area in the impact monitoring survey conducted in Sept 2012. Vegetation species presents in the identified location was indicated by "V".

Table 3: List of avifauna species and maximum counts recorded from the impact monitoring survey in Jan 2013 at work area under Contracts 1 and 100 m buffer area.

Table 4: List of herpetofauna and maximum counts recorded from the impact monitoring survey in Jan 2013 at work area under Contracts 1 and 100 m buffer area.

List of Figures

Figure 1: Map showing the ecological monitoring transect and the boundary of assessment area.

Figure 2: SEMP 1, the first sampling point of Wai Ha River under Contract 1.

Figure 3: SEMP 2, the second sampling point along Wai Ha River under Contract 1.

1. Introduction

1.2. Project description

The Drainage Improvement Works in Shuen Wan was undertaken to minimize the potential flooding impacts in Sha Tin and Tai Po area. Although the Ecological Impact Assessment in the EIA Report identified that ecological impacts resulting from the proposed drainage improvement works at Shuen Wan were anticipated to be very minor in scale, ecological mitigation and ecological monitoring were recommended in the EM&A Manual (http://env-shuenwan.com/pdf/review_note_em&a_rev.3.pdf) as stipulated under Environment Permit No. EP-303/2008.

1.3. Scope of ecological impact monitoring was described in the Particular Specifications and EM & A Manual of the projects. In brief, the monitoring tasks include regular check on the retained and transplanted trees and shrubs, monitoring on fauna groups and aquatic fauna within the works area and any ecologically sensitive area within 100 m of the works boundary.

1.4. China-Hong Kong Ecology Consultants Co. was commissioned by ENVIRON Hong Kong Limited to perform the ecological impact monitoring survey for areas under Contract 1 starting from March 2011.

1.5. The outline of this ecological monitoring report was as follow:

- Highlights of this report
- Summary of construction activities for the month
- Monitoring methodology
- Monitoring data
- Remedial measures adopted to the adverse condition
- Record of complains and remedial measures
- Review of monitoring results
- Forecast of works programme and monitoring requirements
- Comments and brief summary

1.6. This is the report No. 11 ecological monitoring conducted on 30th November 2012 within the works boundary under Contract 1 and area within 100 m from the works boundary.

2. Highlights of this report

- Field survey was conducted on 30th November 2012
- Construction activities of Contract 1 was continued since March 2011
- Lower number of species was observed within the works area under Contract 1, in particular stream ecological monitoring point 2 (SEMP 2) due to recent river diversion for Ecological Compensatory Area (ECA) construction.
- Habitats in the 100 m buffer area retain its natural condition.

3. Summary of construction activities for the month

Major construction activities carried out in Contract 1 by the contractor during the present monitoring period (November 2012) includes:

Area A (Pumping Station)

- Laying of E&M ducting for the proposed screen house and store room
- Excavation for outfall structure
- Steel reinforcement bars fixing for outfall structure
- Construction for CLP's draw pit & cables ducting
- Installation of overhead traveling crane & FRP cover for screen house.
- Installation of switchboard for switch room.
- Laying of DN2100 storm relif drain (CH20 to CH70) at Ting Kok Road.

Area B (Tung Tsz Nursery)

- Construction of the proposed box culvert bay 1, 4 and 9.

Area C (ECA)

- Already handed over to AFCD.

4. Monitoring Methodology

Ecological monitoring methods were generally followed those described in the baseline ecological surveys (DC/2009/22). However, sampling area maybe reduced because of habitat change, for instance, deforestation and channel modification due to drainage works, where sampling was not applicable. Survey data and evaluation are detailed in the following sections.

4.1 Vegetation survey

Vegetation survey was performed along the designated transects (**Figure 1**) for ecological monitoring as described in the project specifications to monitor the vegetation health which could be adversely influenced by any bad site practice. Qualitative data of plants within the works boundary and wetland vegetation in the 100 m buffer area of Contract 1 adjacent to construction site and wetland was recorded. Riparian vegetation including aquatic and emergent at 4 stream ecological monitoring points (hereinafter referred to as "SEMP") under Contract 1 (i.e. SEPM 1 &2; **Figure 2 & 3**) along the affected stream channel and riparian habitat was recorded in terms of species, relative abundance and average heights. Any signs of damages and adverse health problems directly caused the works were recorded and reported. Nomenclature and protection status of the species followed those documented in the AFCD website (www.hkbiodiversity.net) and Hong Kong Herbarium (2004).

4.2 Avifauna

Bird survey was conducted by following the proposed transects which cover the major ecologically sensitive areas of the Project (**Figure 1**). All bird species were recorded with special attention paid on the species of conservation importance and wetland-dependent species. List of bird species recorded and the relative abundance was provided.

4.3 Herpetofauna

Herpetofauna groups are considered to be inactive during dry season (November to March), thus detailed herpetofauna monitoring was not conducted. However, any sign/calling of reptiles or amphibians encountered during the *in situ* survey was recorded.

4.4 Butterflies and Odonata

Odonates and butterfly are considered to be inactive during dry season (November to March), thus detailed monitoring was not conducted.

4.5 Mammals

As the monitoring site was situated near traffics, plant nursery and residential buildings, mammals were unlikely inhabited at the site except rodents, domestic dogs and cats. Detailed mammal monitoring was not conducted. However, any sighting, tracks and signs of mammals encountered during survey of other faunal groups was recorded. Bat was surveyed by search for potential colony habitat, such as palm trees, which are often used by fruit bats as nesting sites.

4.6 Aquatic fauna

Monitoring of aquatic fauna was carried out mainly by bank-side observation, sometimes with the aid of binoculars, at two stream ecological monitoring points under Contract 1 (i.e. SEMP 1 & 2). These points are selected for covering representative sections of Wai Ha River and are shown in **Figure 1**. Netting and fish traps were also deployed at these points to collect supplementary data. Aquatic fauna seen/collected was identified *in situ* to the lowest possible taxon and relative abundance was presented.

5. Monitoring data

5.1 Vegetation survey

The habitats identified in area under Contract 1 are marine, recreational fish pond, river course, wooded area, mangrove, marsh and developed area (including village). Vegetation were found in wooded area, mangrove, marsh, develop area and river bank. During the current monitoring period, some riparian climbers (*Cocculus orbiculatus*) at SEMP 2 was removed due to direct conflict with the construction of ECA. The riparian vegetations were dominated by *Leucaena leucocephala* and *Plantago major* with average coverage ranged from 15% to 40% (**Table 1**). A list of plant species recorded from different habitats within the assessment area under Contract 1 is presented on **Table 2**. A total of 130 species were recorded within the assessment boundary of Contract 1 in which 121 species were recorded within the buffer area, while 52 species recorded within the work areas under Contract 1. No protected species were recorded.

5.2 Avifauna

A total of 17 bird species were recorded in the current survey under Contract 1(**Table 3**). In the work area under Contract 1, four bird species were recorded in which one wetland dependent species *Ardeola bacchus* is recognized as being regional conservation conern. A total of 17 bird species were recorded in the 100m buffer area in which two species, *Ardeola bacchus,* and *Nycticorax nycticorax*, are recognized as being regional and local conservation concern respectively. (Viney et al., 2005).

5.3 Herpetofauna

No amphibian or reptile was recorded within the assessment area during dry season.

5.4 Butterflies

No butterfly was recorded within the assessment area during dry season.

5.5 Odonata

No Odonata was recorded within the assessment area during dry season.

5.6 Mammal

A few Short-nosed Fruit Bats *Cynopterus sphinx* were observed nesting in a few palm trees at the playground near Ting Kok Nursery Community Garden within Contract 1 boundary. No other mammals or trace of mammals was observed within the assessment area.

5.7 Aquatic fauna

Under Contract 1 (i.e. SEMP 1 & 2), a total of 9 fish species, 2 crustaceans, 1 bivalve and 1 snail were recorded and most of them were residing in brackish environments (**Table 4**). Some river works were carried out in SEMP 1 as showed in **Figure 2**. Overall, no protected or rare species were recorded.

6. Remedial measures adopted to the adverse condition

There was no non-compliance event recorded within this reporting month.

7. Record of complains and remedial measures

There was no complaint in relation to environmental issue recorded in this reporting month.

8. Review of the monitoring results

During the present survey period, construction activities were carried out at works area under Contract 1, while 100 m buffer area remains natural. Much of the construction activities are carried out at Tung Tsz Nursery and pumping station under Contract 1. In general, lower numbers of species were recorded within the works area under Contract 1 than that of 100 m buffer area because of the associated constructions and urbanized in nature. It is noted that the diversity of aquatic fauna in SEMP 2 under Contract 1 is relatively lower because of the recent river works at SEMP 1 where has been regarded as the corridor for aquatic fauna to move between Wai Ha River and the marine area outside the assessment area. However, most of the construction activities are restricted in the developed area with low ecological significance. As mitigation measures recommended in the EM&A Manual were properly implemented during the current survey, and hence the residual environmental impacts would be minimized.

9. Forecast of works programme and monitoring requirements

The tentative construction activities undertaken by the contractor in the coming months are as follows:

Area A (Pumping Station)

- Construction of flowmeter chamber and DN1200 concrete pipe.
- Construction of DN2100 Storm relief drains (CH20 to CH70) at Ting Kok Road.
- Construction of the proposed DN1500 concrete pipe.
- Construction of the proposed outfall structure and box culvert.
- Installation of overhead traveling crane above pump hall.
- Laying of power cable for the proposed transformer room.

Area B (Tung Tsz Nursery)

- Construction of box culvert & CH0.0 – CH55
- Construction of jacking pit for cross road DN2800 twin pipe

Area C (ECA)

- Already handed over to AFCD

The monitoring programme described in EM&A will strictly follow to verify compliance of environmental requirements and the proper implementation of all necessary mitigation measures.

10. Comments and summary

The bi-monthly ecological impact monitoring under Contracts 1 (excluding the ECA) was conducted in November 2012 and relevant flora and fauna data were collected according to project specification and EM & A Manual. As indicated by the low diversity and abundance of species recorded within the work areas, habitats within the work boundary under Contracts 1 offer few ecological opportunities for inhabitation of fauna and flora. Given that the construction activities are restricted in the developed area with proper mitigation measures being implemented, disturbances associated with the current construction activities are largely affecting area with low ecological significance. On the other hand, the natural habitats in the 100 m buffer area are retained at acceptable condition, and hence the 100 m buffer area has not been significantly affected by the construction works.

11. References

Lo PYF & Hui WL (2005). *Hong Kong Butterflies* (2nd Edition). Friends of Country Parks. Hong Kong.

Wilson KDP (2003). *Field Guide to the Dragonflies of Hong Kong*. Agriculture, Fisheries and Conservation Department. Hong Kong.

Viney C, Philips K, Lam CY (2005). *The Birds of Hong Kong and South China* (8th Edition). Hong Kong Government Information Service. Hong Kong.

Hong Kong Herbarium (2004*). Check List of Hong Kong Plants*. Agriculture, Fisheries and Conservation Department. Hong Kong.

AFCD, Hong Kong Biodiversity Website:
http://www.afcd.gov.hk/english/conservation/hkbiodiversity/database/search.asp

Lee VLF, La, SKS, Ng FKY, Chan TKT, Young MLC (2004). *Field Guide to the freshwater fish of Hong Kong*. Agriculture, Fisheries and Conservation Department. Hong Kong.

Shek CT (2006) A *Field Guide to the Terrestrial Mammals*. Agriculture, Fisheries and Conservation Department. Hong Kong.

Fellowes, J.R., Lau, M.W.N., Dudgeon, D., Reels, G., Ades, G.W.J., Carey, G.J., Chan, B.P.L., Kendrick, R.C., Lee, K.S., Leven, M.R., Wilson, K.D.P. & Yu, Y.T. (2002). Wild animals to watch: Terrestrial and freshwater fauna of conservation concern in Hong Kong. *Memoirs of the Hong Kong Natural History Society* 25: 123-159.

Karsen SJ, Lau MWN, Bogadek A (1986) *Hong Kong Amphibians and Reptiles*. The Urban Council Hong Kong. Hong Kong.

Figure

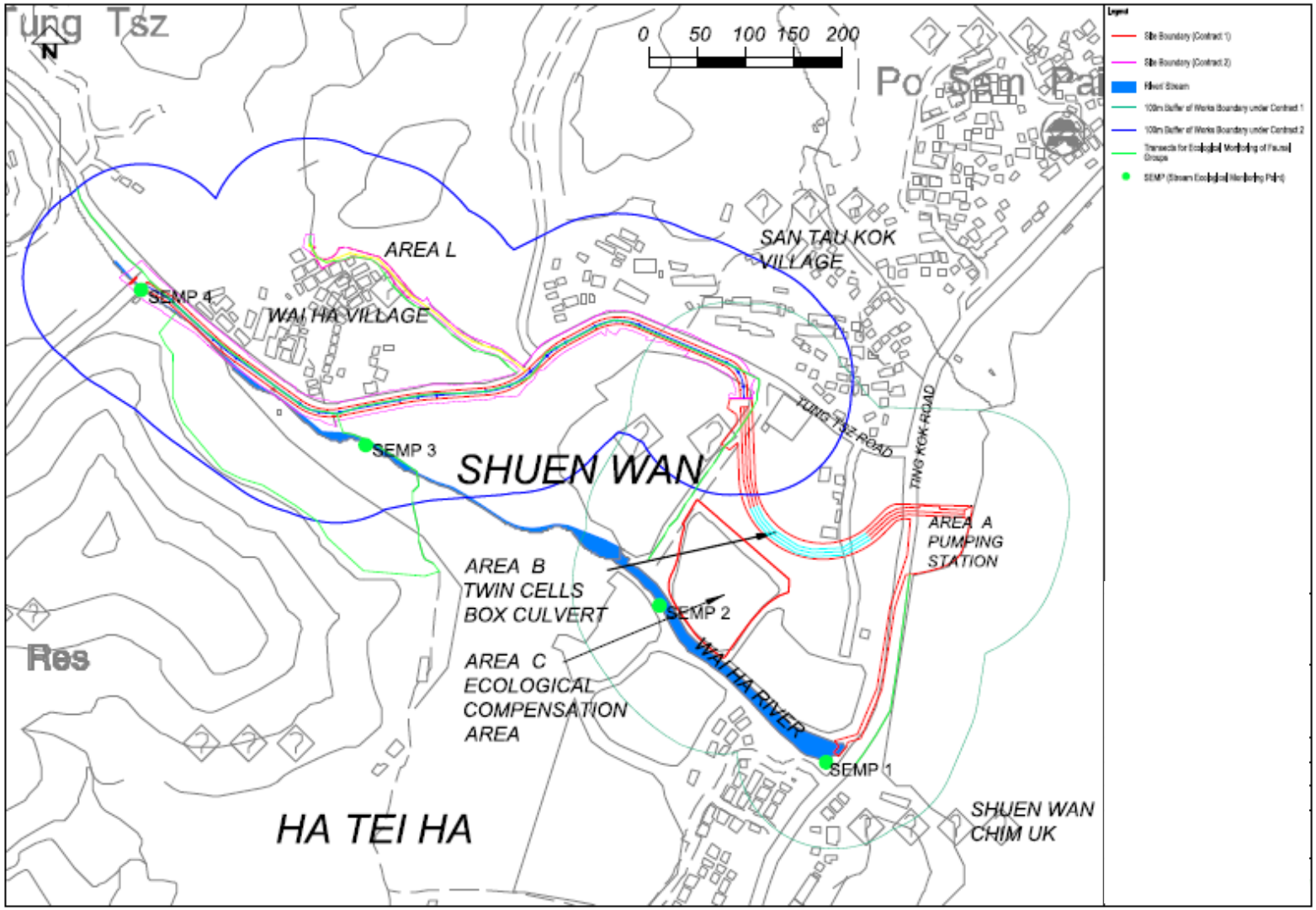


Figure: 1	ENVIRON
Title: Map showing the ecological monitoring transect and the boundary of assessment area.	Drawn by: ML
	Checked by: ML
Project: Agreement No. DP/01/2010 Drainage Improvement Works in Shatin and Tai Po: Ecological Monitoring in area under Contract 1 (Jan 2013, Report 12a)	Rev.: 1.0
	Date: Feb 2013

Figure: 2	ENVIRON
Title: SEMP 1, the first sampling point of Wai Ha River under Contract 1.	Drawn by: ML
	Checked by: ML
Project: Agreement No. DP/01/2010 Drainage Improvement Works in Shatin and Tai Po: Ecological Monitoring in area under Contract 1 (Jan 2013, Report 12a)	Rev.: 1.0
	Date: Feb 2012

Figure: 3	ENVIRON
Title: SEMP 2, the second sampling point along Wai Ha River under Contract 1.	Drawn by: ML
	Checked by: ML
Project: Agreement No. DP/01/2010 Drainage Improvement Works in Shatin and Tai Po: Ecological Monitoring in area under Contract 1 (Jan 2013, Report 12a)	Rev.: 1.0
	Date: Feb 2012

Table

Table 1. List of riparian vegetation and coverage (%) recorded from two stream sampling points under Contract 1 (i.e. SEMP 1, 2).

			Sampling point	**SEMP 1**		**SEMP 2**	
Species	**Family**	**Growth form**	**Status in Hong Kong**	**Height (cm)**	**%**	**Height (cm)**	**%**
Albizia lebbeck	MIMOSACEAE	Tree	E			400	10
Arundinella nepalensis	POACEAE	Perennial Herb	N			150	2
Bidens alba	ASTERACEAE	Herb	E	30	10		
Celtis sinensis	ULMACEAE	Tree	N			500	10
Eclipta prostrata	ASTERACEAE	Perennial herb	N	30	1		
Ficus virens	MORACEAE	Tree	N	100	1		
Kandelia obovata	RHIZOPHORACEAE	Shrub or Small Tree	N			150	4
Leucaena leucocephala	MIMOSACEAE	Small Tree	E			600	40
Macaranga tanarius	EUPHORBIACEAE	Tree	N			100	1
Mikania micrantha	ASTERACEAE	Climbing Herb	E	10	1		
Pennisetum alopecuroides	POACEAE	Perennial Herb	N	250	10		
Plantago major	PLANTAGINACEAE	Perennial herb	N	30	15		
Bare	n/a	n/a	n/a	n/a	62	n/a	33

*Key:
E = Exotic
N = Native
n/a = not available

Table 2. List of vegetation recorded from works area under Contracts 1 and 100 m buffer area in the impact monitoring survey conducted in January 2013. Vegetation species presents in the identified location was indicated by "V".

Habitat	Species name	Family	Growth form	*Status in Hong Kong	Work Area under Contract 1	100 m buffer area under Contract 1
Stream	*Chrysalidocarpus lutescens*	ARECACEAE	Shrub Palm	E		V
	Melia azedarach	MELIACEAE	Tree	E		V
	Murraya paniculata	RUTACEAE	Small Tree	E		V
	Lantana camara	VERBENACEAE	Shrub	E		V
	Ficus hispida	MORACEAE	Tree	N		V
	Ficus virens	MORACEAE	Tree	N		V
	Chrysopogon aciculatus	POACEAE	Perennial Herb	N		V
	Microstegium ciliatum	POACEAE	Perennial Procumbent Herb	N		V
	Mucuna birdwoodiana	FABACEAE (PAPILIONACEAE)	Climber: Vine	N		V
	Pistia stratiotes	ARACEAE	Floating Aquatic Herb	N		V
	Cyperus flabelliformis	CYPERACEAE	Herb	E		V
	Acanthopanax gracilistylus	ARALIACEAE	Shrub	E		V
	Ficus triangularis	MORACEAE	Tree	E		V
	Spirodela polyrrhiza	LEMNACEAE	Floating Small Herb	N		V
	Glochidion zeylanicum	EUPHORBIACEAE	Shrub or Small Tree	N		V
	Sterculia lanceolata	STERCULIACEAE	Semi-deciduous Tree	N		V
	Albizia lebbeck	MIMOSACEAE	Tree	E		V

Habitat	Species name	Family	Growth form	*Status in Hong Kong	Work Area under Contract 1	100 m buffer area under Contract 1
	Arundinella nepalensis	POACEAE	Perennial Herb	N		V
	Bidens alba	ASTERACEAE	Herb	E		V
	Clerodendrum inerme	VERBENACEAE	Shrub	N		V
	Coculus orbiculatus	MENISPERMACEAE	Climber: Vine	N		V
	Hibiscus tiliaceus	MALVACEAE	Tree or Shrub	N		V
	Leucaena leucocephala	MIMOSACEAE	Small Tree	E		V
	Manilkara zapota	SAPOTACEAE	Tree	E		V
	Sapium discolor	EUPHORBIACEAE	Tree	N		V
Developed area	*Pericampylus glaucus*	MENISPERMACEAE	Woody Vine	N		V
	Ficus variegata var. chlorocarpa	MORACEAE	Tree or Shrub	N	V	V
	Citrus reticulata Blanco	RUTACEAE	Small Tree	E		V
	Salvia japonica	LAMIACEAE (LABIATAE)	Herb	N		V
	Morus alba	MORACEAE	Tree or Shrub	N		V
	Emilia sonchifolia	ASTERACEAE	Herb	N		V
	Clausena lansium	RUTACEAE	Small Tree	E		V
	Pyrostegia venusta	BIGNONIACEAE	Climber: Vine	E		V
	Psidium guajava	MYRTACEAE	Tree	E		V
	Catharanthus roseus	APOCYNACEAE	Subshrub	N		V
	Archontophoenix alexandrae	ARECACEAE	Tree Palm	E		V
	Desmodium heterocarpon	FABACEAE (PAPILIONACEAE)	Shrub	N		V
	Rhinacanthus nasutus	ACANTHACEAE	Herb	E		V
	Acacia confusa	MIMOSACEAE	Tree	E	V	V
	Artocarpus macrocarpon	MORACEAE	Tree	E	V	V
	Averrhoa carambola	OXALIDACEAE	Small Tree	E	V	V

Habitat	Species name	Family	Growth form	*Status in Hong Kong	Work Area under Contract 1	100 m buffer area under Contract 1
	Bauhinia blakeana	CAESALPINIACEAE	Tree or Shrub	N	V	V
	Bauhinia variegata	CAESALPINIACEAE	Tree	E	V	V
	Bridelia tomentosa	EUPHORBIACEAE	Shrub or Small Tree	N	V	V
	Calliandra haematocephala	MIMOSACEAE	Shrub	E	V	V
	Caryota ochlandra	ARECACEAE	Tree palm	E	V	V
	Cassia spectabilis	CAESALPINIACEAE	Small Tree	E	V	V
	Casuarina equisetifolia	CASUARINACEAE	Tree	E	V	V
	Citrus grandis	CASUARINACEAE	Tree	E	V	V
	Cordyline fruticosa	AGAVACEAE	Shrub	E	V	V
	Cynodon dactylon	POACEAE	Perennial Herb	N	V	V
	Dracaena draco	AGAVACEAE	Tree	E	V	V
	Elaeocapus haminanensis	ELAEOCARPACEAE	Small Tree	E	V	V
	Eleusine indica	POACEAE	Herb	N	V	V
	Eriobotrya japonica	ROSACEAE	Small Tree	E	V	V
	Ficus benjamina	MORACEAE	Tree	E	V	V
	Ficus elastica	MORACEAE	Tree	E	V	V
	Ficus simplicissima	MORACEAE	Shrub	N	V	V
	Hibiscus rosa-sinensis	MALVACEAE	Shrub	E	V	V
	Lantana camara	VERBENACEAE	Shrub	E	V	V
	Litchi chinensis	SAPINDACEAE	Tree	E	V	V
	Lumnitzera racemosa	COMBRETACEAE	Shrub or Small Tree	N	V	V
	Lygodium japonicum	LYGODIACEAE	Climbing Herb	N	V	V
	Melaleuca quinquenervia	MYRTACEAE	Tree	E	V	V
	Oxalis corniculata	OXALIDACEAE	Perennial Herb	N	V	V
	Phoenix roebelenii	ARECACEAE	Small Tree Palm	E	V	V

Habitat	Species name	Family	Growth form	*Status in Hong Kong	Work Area under Contract 1	100 m buffer area under Contract 1
	Polygonum hydropiper	POLYGONACEAE	Herb	N	V	V
	Psychotria serpens	RUBIACEAE	Climber: Vine	N	V	
	Pterocypsela indica	ASTERACEAE	Herb	N	V	V
	Rhapis excelsa	ARECACEAE	Shrub Palm	N	V	V
	Sansevieria trifasciata	AGAVACEAE	Perennial Herb	E	V	V
	Schefflera actinophylla	ARALIACEAE	Climbing Shrub	E	V	V
	Schefflera heptaphylla	ARALIACEAE	Tree	N	V	V
	Sesbania cannabina	FABACEAE	Herb	E	V	V
	Terminalia catappa	COMBRETACEAE	Large Tree	E	V	V
	Thuja orientalis	CUPRESSACEAE	Tree	E	V	V
	Tradescantia spathacea	COMMELINACEAE	Herb	E	V	V
	Youngia japonica	ASTERACEAE	Herb	N	V	V
	Acanthus ilicifolius	ACANTHACEAE	Shrub	N		V
	Acrostichum aureum	ACROSTICHACEAE	Herb	N		V
	Aegiceras corniculatum	MYRSINACEAE	Shrub	N		V
	Alocasia odora	ARACEAE	Perennial Herb	N		V
	Avicennia marina	VERBENACEAE	Shrub	N		V
	Digitaria ciliaris	POACEAE	Herb	N		V
	Panicum repens L.	POACEAE	Perennial Herb	N		V
	Pennisetum alopecuroides	POACEAE	Perennial Herb	N		V
	Phragmites anstralis	POACEAE	Perennial Herb	N		V
	Plantago major	PLANTAGINACEAE	Perennial herb	N		V
	Solanum nigrum	SOLANACEAE	Herb	N		V
	Bombax ceiba	BOMBACACEAE	Tree	E	V	
	Bidens alba	ASTERACEAE	Herb	E	V	
	Panicum maximum	GRAMINEAE	Herb	E	V	
	Microstegium ciliatum	POACEAE	Perennial	N	V	

Habitat	Species name	Family	Growth form	*Status in Hong Kong	Work Area under Contract 1	100 m buffer area under Contract 1
			Procumbent Herb			
	Leucaena leucocephala	MIMOSACEAE	Small Tree	E	V	
Plantation	*Bischofia javanica*	EUPHORBIACEAE	Tree	N		V
	Scolopia chinensis	FLACOURTIACEAE	Tree or Large Shrub	N		V
	Piper hancei	PIPERACEAE	Climber: Vine	N		V
	Dimocarpus longan	SAPINDACEAE	Tree	E		V
	Paederia scandens	RUBIACEAE	Climber: Vine	N		V
	Cleistocalyx operculatus	MYRTACEAE	Tree	N		V
	Antidesma bunius	EUPHORBIACEAE	Tree	N		V
	Litsea monopetala	LAURACEAE	Small Tree	N		V
	Microcos paniculata	TILIACEAE	Shrub or Small Tree	N		V
	Maesa perlarius	MYRSINACEAE	Shrub	N		V
	Boehmeria nivea (L.) Gaudich.	URTICACEAE	Subshrub or shrub	E		V
	Mallotus apelta	EUPHORBIACEAE	Shrub or Small Tree	N		V
	Sapindus saponaria	SAPINDACEAE	Tree	N		V
	Aporusa dioica	EUPHORBIACEAE	Tree	N		V
	Wedelia chinensis	ASTERACEAE	Perennial Herb	N		V
	Carica papaya	CARICACEAE	Tree	E		V
	Rubus reflexus	ROSACEAE	Climbing Shrub	N		V
	Brassica rapa	BRASSICACEAE (CRUCIFERAE)	Biennial Herb	E		V
	Mucuna championii Benth.	FABACEAE	Climbing Vine	N		V

Habitat	Species name	Family	Growth form	*Status in Hong Kong	Work Area under Contract 1	100 m buffer area under Contract 1
	Pinus massoniana	PINACEAE	Tree	N		V
Ting Kok Nursery Community Garden	*Bauhinia purpurea*	CAESALPINIACEAE	Tree	E	V	
	Callistemon viminalis	MYRTACEAE	Tree	E	V	
	Dillenia indica	DILLENIACEAE	Tree	E	V	
	Lonicera japonica	CAPRIFOLIACEAE	Climber: Vine	N	V	
	Tabebuia chrysantha	BIGNONIACEAE	Small Tree	E	V	
	Wisteria sinensis	FABACEAE	Climber: Vine	E	V	
Wooded area	*Celtis sinensis*	ULMACEAE	Tree	N		V
	Ligustrum sinensis	OLEACEAE	Tree or Shrub	N		V
	Macaranga tanarius	EUPHORBIACEAE	Tree	N		V
	Pandanus tectorius	PANDANACEAE	Shrub or Small Tree	N		V
	Excoecaria agallocha	EUPHORBIACEAE	Tree	N		V
	Kandelia obovata	RHIZOPHORACEAE	Shrub or Small Tree	N		V
	Thespesia populnea	MALVACEAE	Tree or Shrub	N		V
	Zoysia sinica	POACEAE	Perennial Herb	N		V
Marsh	*Acanthus ilicifolius*	ACANTHACEAE	Shrub	N		V
	Acrostichum aureum	ACROSTICHACEAE	Herb	N		V
	Aegiceras corniculatum	MYRSINACEAE	Shrub	N		V
	Alocasia odora	ARACEAE	Perennial Herb	N		V
	Avicennia marina	VERBENACEAE	Shrub	N		V
	Digitaria ciliaris	POACEAE	Herb	N		V
	Ficus hispida	MORACEAE	Tree	N		V
	Hibiscus tiliaceus	MALVACEAE	Tree or Shrub	N		V
	Ipomea cairica	CONVOLVULACEAE	Climber: Twining	E		V

Habitat	Species name	Family	Growth form	*Status in Hong Kong	Work Area under Contract 1	100 m buffer area under Contract 1
			Herb			
	Kandelia obovata	RHIZOPHORACEAE	Shrub or Small Tree	N		V
	Macaranga tanarius	EUPHORBIACEAE	Tree	N		V
	Mikania micrantha	ASTERACEAE	Climbing Herb	E		V
	Panicum repens L.	POACEAE	Perennial Herb	N		V
	Pennisetum alopecuroides	POACEAE	Perennial Herb	N		V
	Phragmites anstralis	POACEAE	Perennial Herb	N		V
	Plantago major	PLANTAGINACEAE	Perennial herb	N		V
	Polygonum lapathifolium	POLYGONACEAE	Herb	N		V
	Pueraria lobata	FABACEAE	Climber: Vine	N		V
	Schefflera heptaphylla	ARALIACEAE	Tree	N		V
	Solanum nigrum	SOLANACEAE	Herb	N		V
	Solanum torvum	SOLANACEAE	Shrub	E		V

***Key:**
E = Exotic
N = Native

Table 3. List of avifauna species and maximum counts recorded from the impact monitoring survey in January 2013 at work area under Contracts 1 and 100 m buffer area.

Species	Common name	Habitat	Conservation status in Hong Kong	Work area: Contract 1	100m buffer area
Acridotheres cristatellus	Crested Myna				1
Ardea cinerea	Grey Heron	W			1
Ardeola bacchus	Chinese Pond Heron	W	RC		1
Casmerodius alba	Great Egret	W			1
Copsychus saularis	Oriental Magpie Robin			1	1
Egretta garzetta	Little Egret	W		1	2
Emberiza chrysophrys	Yellow Browed Bunting				1
Garrulax perspicillatus	Masked Laughing thrush				2
Motacilla alba	White Wagtail			1	2
Passer montanus	Eurasian Tree Sparrow				3
Phoenicurus auroreus	Daurian redstart				1
Prinia flaviventris	Yellow-bellied Prinia				1
Pycnonotus jocosus	Red-whiskered Bulbul				4
Pycnonotus sinensis	Chinese Bulbul				3
Streptopelia chinensis	Spotted Dove			1	2
Sturnus nigricollis	Black-collared Starling				2
Zosterops japonicus	Japanese White-eye			4	6

Total number of species:		5	17

*** Key:**

W = Wetland dependent spices ; RC = Regional Concern ; LC = Local Concern

Table 4. Relative abundance of aquatic species recorded in Wai Ha River within the 100 m buffer of works boundary under Contracts 1 in the impact monitoring survey during January 2013.

Species	**Common name**	**[1]Life-cycle characteristics**	**[2]Origin**	**SEMP 1**	**SEMP 2**
Ambassis gymnocephalus	Glassperch	M	N	+	
Cyprinus carpio	Common Carp	F	I		+
Gerres macracanthus	Longspine Silverbiddy	M	N	+	
Mugil cephalus	Flatehead Grey Mullet	M	N	+	
Opsariichthys evolans	Minnow	F	N	+	
Oreochromis mossambicus	Mozambique Tilapa	F	I	++	+
Oreochromis niloticus	Nile Tilapa	F	I	++	+
Poecilia reticulata	Guppy	F	I		+
Tilapia zillii	Redbelly Tilapa	F	I	+	
Sesarma (Perisesarma) bidens	Sesarmine crab	M	N		+
Uca arcuata	Fiddler Crab	M	N		+
Saccostrea cucullata	Rock Oyster	M	N	+	+
Cerithidea cingulata	Mud snail	M	N	+	
Total number of species:	**13**			**9**	**7**

Key:

Relative abundance:
+ : Species exists in the survey area
++ : Species common in the survey area
+++ : Species abundant in the survey area

[1] Life-cycle characteristics:
M = Marine vagrant
F = Freshwater species

[2]Origin:
N = Native
I = Introduced; / = not available

Appendix M. Photo of Wai Ha River in January 2013

	
Photo 1. Wai Ha River at W2	**Photo 2**. Wai Ha River at C1
	
Photo 3. Wai Ha River at W2	**Photo 4**. Wai Ha River at C1
	
Photo5. Wai Ha River at W2	**Photo6.** Wai Ha River at C1

	
Photo7. Wai Ha River at W2	**Photo8.** Wai Ha River at C1

Appendix N

Approved Proposal of Revision for Action/Limit Level Criteria of Water Quality Monitoring

本署檔號 OUR REF: (2) in Ax (1) to EP2/G/I/117 Pt.4
來函檔號 YOUR REF:
電 話 TEL. NO.: 2835 1581
圖文傳真 FAX NO.: 2802 4511
電子郵件 E-MAIL:
網 址 HOMEPAGE: http://www.epd.gov.hk

Environmental Protection Department
Branch Office
28th Floor, Southorn Centre,
130 Hennessy Road,
Wan Chai, Hong Kong.

環境保護署分處
香港灣仔
軒尼詩道
一百三十號
修頓中心廿八樓

By Post & Fax : 2827 8700

31 May 2012

Drainage Projects Division,
Drainage Services Department,
40/F, 44/F & 45/F, Revenue Tower,
5 Gloucester Road, Wan Chai, Hong Kong
(Attn: Mr. SO Chi Ho)

Dear Mr. So,

Drainage Improvement Works in Sha Tin and Tai Po
Environmental Permit No. EP-303/2008
Revised Water Quality Monitoring

I refer to the letter from Environmental Pioneers & Solution Ltd (ET Leader) of 17 May 2012 proposing changes to water quality monitoring under the EM&A Programme for the captioned project.

Based on the justifications provided and pursuant to Condition 5.1 of the Environmental Permit No. EP-303/2008, I hereby approve the proposed changes to water quality monitoring.

Yours faithfully,

(Maurice YEUNG)
Principal Environmental Protection Officer
for Director of Environmental Protection

c.c.
Internal (w/encl. proposal enclosed in the letter from Environmental Pioneers & Solutions Ltd. of 17.5.2012)
S(RN)1
EIAO Register Office

EP-303/2008

Enquiry of Revision for Action/Limit Level Criteria of Water Quality Monitoring

	Prepared By:	Verified By:	Submitted By:
Parties:	Environmental Team Leader (Environmental Pioneers & Solutions Limited)	IEC (Environ Hong Kong Limited)	Contractor (Kwan Lee – Kuly Joint Venture)
Name:	Ms. Goldie Fung	Mr. Tony Cheng	Mr. C.L. Wong
Signature:			
Date:	16-5-2012	16 May 2012	16/5/2012

Rev. 6

Submitted by: 16-May-2012

CONTENTS

1. Introduction 3

2. Water Quality Monitoring 4

2.1 Monitoring Locations 4

2.2 Reference Points for Contract No. 1 5

2.3 Data Analysis 6

3. Conclusion 9

Appendix A

Appendix B

Appendix C

Appendix D

Appendix E

Appendix F

Appendix G

Appendix H

Appendix I

1. Introduction

Environmental Pioneers and Solutions Limited (EPSL) has been appointed to work as the Environmental Team (ET) for the Contract No. DC/2009/22 Drainage Improvement Works in Shuen Wan, Tai Po (Contract no. 1) to implement the Environmental Monitoring and Audit (EM&A) programme.

The scope of the Project includes the following works:-

(1) Construction of a 1000m long, 3m x 2.5m twin-cell box culvert along Tung Tsz Road;
(2) Replacement of existing gates by automatic mechanical gates at the mouth of Wai Ha River;
(3) Construction of a 280m long, 1200 dia. Drainage pipe near Wai Ha Village;
(4) Construction of a 260m long, 2100 dia. Flood relief drain along Ting Kok Road; and
(5) Construction of a floodwater pumping station at Shuen Wan.

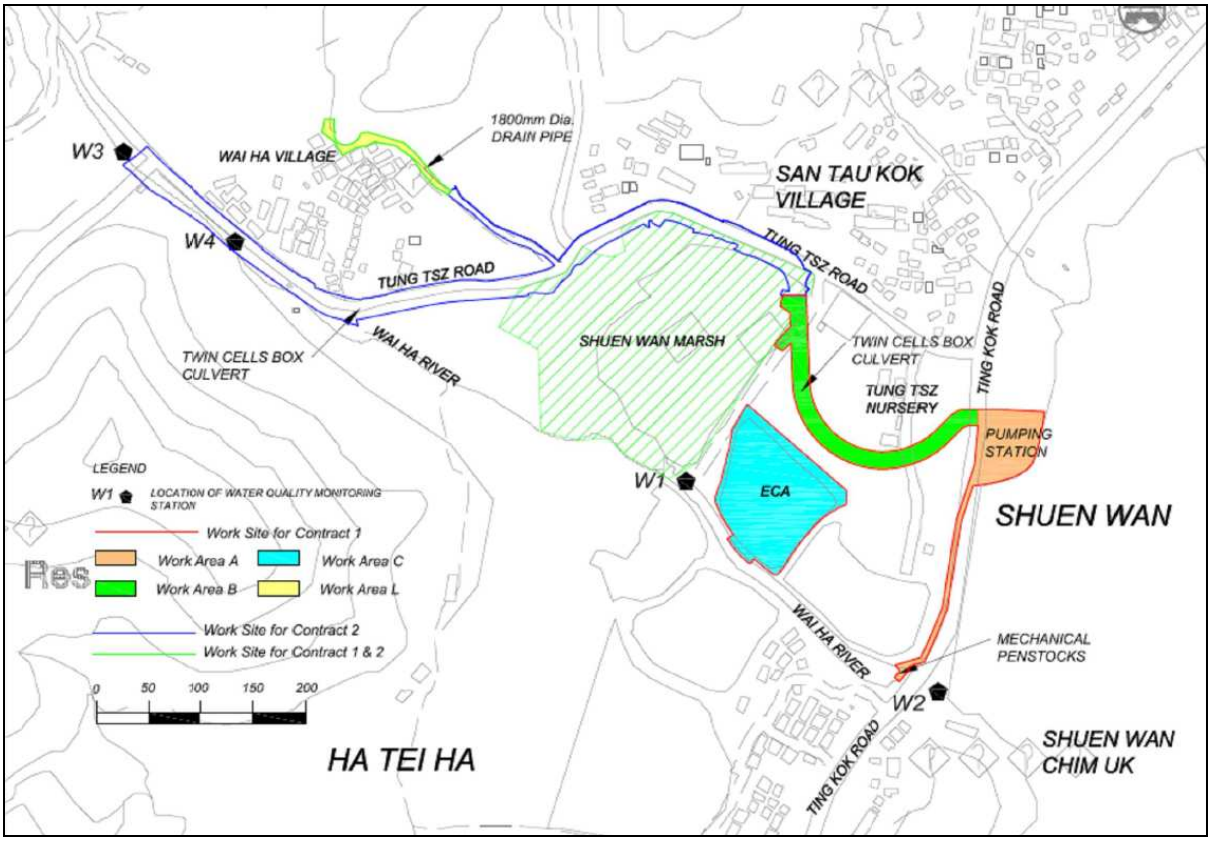
The construction period of the project was commenced on February 26th, 2010 and anticipated to complete in August 2013.

2. Water Quality Monitoring

2.1 Monitoring Locations

There are two separate contracts covered by the Environmental Permit EP-303/2008, including contract no. DC/2009/22 (contract no. 1) and contract no. DC/2010/02 (contract no. 2). There are totally 4 monitoring stations (W1, W2 and W4 for impact monitoring station and W3 for control station) selected for the water quality monitoring. With reference to the Clause 4.25 of EM&A Manual (Rev. 3), the water samples are collected at mid-depth of each proposed monitoring stations for measuring due to the water depth is less than 3m. The Location Plan is shown in Figure 2.1 for reference.

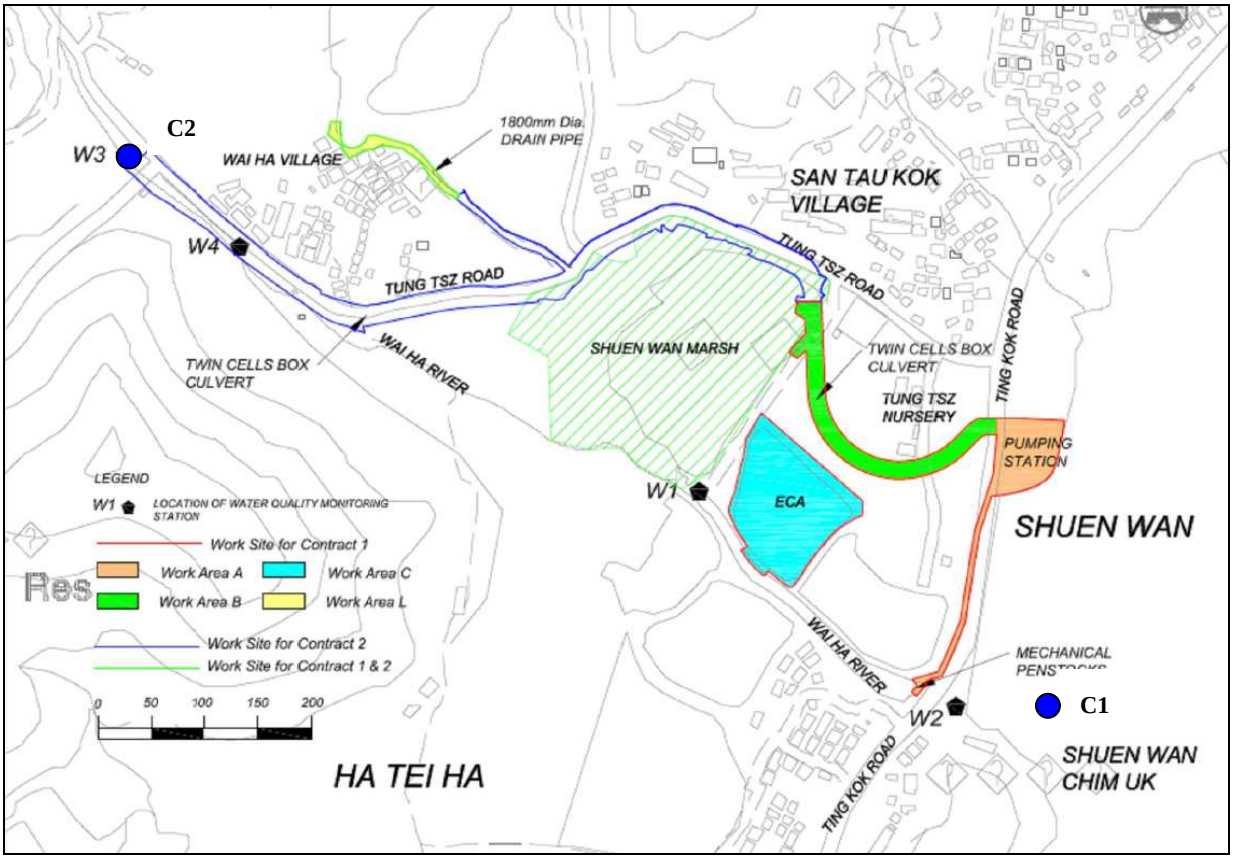
Figure 2.1 Water Quality Monitoring Locations



2.2 Reference Points for Contract No. 1

The construction activities of contract no. 1 were commenced on 9 March 2011 and anticipated to be completed in February 2013 and those of contract no. 2 were commenced on 29 April 2011 and anticipated to be completed on 27 October 2013. According to the current site situation of the project, there are construction activities carrying out for contract no. 1 and no. 2. The water quality of control station W1 may be affected by the construction activities of contract no. 2. Under this circumstance, 2 additional reference points (C1 and C2) are proposed for the water quality monitoring of contract no. 1. The water quality of both C1 and C2 will not be affected by any construction activities of this project. The location of C1 and C2 can refer to the Fig. 2.2. Reference point C1 is located at 20m apart from the estuary of Wai Ha River. The water quality of C1 will not be affected by the construction activities at flood tide and is free from contamination. The water quality parameter of C1; W1 and W2 are listed in Appendix A for reference. Reference point C2 is the same monitoring location of W3 which is approximate 70m apart from the site boundary and will not be affected by the construction activities.

Figure 2.2 Reference Points C1 and C2 Locations



The monitoring parameters of C1 and C2 are same as those of W1, and the monitoring data of C1 and C2 will be reported as the supplementary information. When the water quality of W2 exceed the Action/Limit levels criteria, the monitoring data of C1 will be used for comparison when the monitoring of W2 is taken at flood tide; and the monitoring data of C2 will be used for comparison when the monitoring of W2 is taken at ebb tide. The comparison of water quality between W2 and C1 at flood tide and between W2 and C2 at ebb tide can help to prove whether influence of water quality is caused by the construction activities. The water quality monitoring of W1 will continuously be carried out and the collected data will be submitted for reference as well.

2.3 Data Analysis

With reference to the Location Plan shown in Figure 2.1, control station W3 is at the upstream location of the Wai Ha River for this project. According to the location, the water quality of W3 can be considered to be not affected by any construction activities of the project. Besides, the level of W3 should be +5.08mPD and its water quality can be considered to be not undergone any tidal influence. Based on these criteria, the Dissolved Oxygen (DO) of control station W3 were used for the analysis in the following sections. In order to indicate the current situation of DO level of the river, the DO level of W3 measured from August 2011 to January 2012 were selected to compare with baseline data.

a. Baseline Monitoring Data

The baseline data of DO of W3 are shown in Appendix B. The baseline monitoring data were collected before the commencement of any construction activities in dry season from 7th January, 2011 to 2nd February 2011. According to the submitted Baseline Environmental Monitoring Report, the Action/Limit level for monitoring station W3 are indicated in Table 2.1.

Table 2.1 Action and Limit Levels for Water Quality at Monitoring Stations W3

Parameters	Monitoring Stations (Flood Tide)		Monitoring Stations (Ebb Tide)	
	Action Level	Limit Level	Action Level	Limit Level
DO (mg/L)	8.66	8.00	8.71	8.61

b. Impact Monitoring Data

Water quality monitoring (WQM) for control station W3 was carried out 13 times in August 2011; 14 times in September 2011; 12 times in October 2011; 13 times in November 2011; 13 times in December 2011; 12 times in January 2012. The collected DO data of W3 in these 77 times monitoring are shown in Appendix C. Average DO monitoring result of each month at W3 are summarized in Table 2.2.

Table 2.2 Water quality monitoring results of Dissolved Oxygen at W3

Month	Average Dissolved Oxygen (DO) in mg/L (Range)
August 2011	6.44 (7.31 – 4.44)
September 2011	6.08 (7.32 – 4.49)
October 2011	5.91 (6.86 – 5.09)
November 2011	5.79 (6.72 – 4.62)
December 2011	6.50 (7.91 – 5.09)
January 2012	7.14 (8.89 – 5.10)

By comparing the WQM results from August 2011 to January 2012 and Action/Limit level (Ebb Tide) of W3 in Table 2.1, it is observed that only one WQM result has not exceeded the Action/Limit level and all other WQM results have exceeded the Limit Level. The result is highlighted in Appendix D for reference. As mentioned before, the water quality of W3 will not be affected by any construction activities of the project, so that the cause of exceedance may due to the natural fluctuation such as temperature and seasonal change.

c. Variation between Dry and Wet Seasons

As the cause of exceedance may due to the seasonal change, the variation between dry and wet season is calculated as below for the compensation of seasonal change. As the water quality in the Wai Ha River (also referred to as Tung Tze Stream) is monitored under the Environmental Protection Department (EPD) routine river water quality monitoring programme. Ten years (Year 2001 to 2010) of river water quality data at station TR6 Tung Tze Stream are extracted from EPD database for the calculation of DO variation between Dry and Wet seasons. TR6 is located near the estuary of Tung

Tze Stream and the location can refer to the map in Appendix E. The raw data are listed in Appendix F for reference. After analyzed the distribution of the ten years data (refer to Appendix G), median of DO for dry and wet seasons are used to calculated the DO variation to eliminate the effect of the lowest and the highest values. The DO variation between Dry and Wet seasons variation is calculated by equation (eqt. 2-1).

$$\text{Variation} = (\text{Dry Season}_{median} - \text{Wet Season}_{median}) / \text{Dry Season}_{median} \quad \text{(eqt. 2-1)}$$

According to the condition 3.7 of the Environmental Permit EP-303/2008, dry season should be defined from October to April; and the wet season should be defined from May to September. The data from October to April are used for the calculation of Dry Season; the data from April to October are used for the calculation of Wet Season. Total 6 sets of result for 3 different time period are calculated for comparison. Both median and mean of the DO have been calculated for time periods including 1) Recent year - Year 2010; 2) Four years data – from Year 2007 to 2010; and 3) Ten years data – from Year 2001 to 2010. The results can refer to Table 2.3.

Table 2.3 DO variation between dry and wet season from 2007 to 2010 at station TR6, Tung Tze Stream

Collected Data	DO(mg/l)	Wet season	Dry season	Variation
Year 2010	Median	6.50	6.50	0%
Year 2007-2010	Median	5.65	6.55	**13.74%**
Year 2001-2010	Median	5.80	6.40	9.37%
Year 2010	Mean	6.16	6.36	3.14%
Year 2007-2010	Mean	5.81	6.28	7.48%
Year 2001-2010	Mean	5.85	6.38	8.31%

From the results in Table 2.3, the highest variation value 13.74% is used to enhance the effect of applying the variation. By applying the variation (13.74%) to the baseline data, a new set of Action/Limit level is calculated by equation (eqt. 2-2) and the result are shown in Table 2.4.

$$\text{Revised Level} = \text{Original Level} \times (1-13.74\%) \quad \text{(eqt. 2-2)}$$

Table 2.4 New set of Action/Limit Level, using the calculated variation (13.74%)

Parameters		Monitoring Stations (Flood Tide)		Monitoring Stations (Ebb Tide)	
		Action Level	**Limit Level**	**Action Level**	**Limit Level**
Original Level	DO (mg/L)	8.66	8.00	8.71	8.61
Revised level	**DO (mg/L)**	**7.47**	**6.90**	**7.51**	**7.43**

With reference to the new set of Action/Limit level in Table 2.4, the higher DO level (Ebb tide) were used to compare with the WQM results from August 2011 to January 2012, it is observed that there were only five times of WQM results have not exceeded the Action/Limit level and all other 72 times of WQM results have exceeded the Limit Level. The result is highlighted in Appendix H for reference. Since W3 functions as the control station of this project, its water quality should not be affected by the construction works of this project. From the comparison results with the original and revised Action/Limit level, it was observed that both sets of Action/Limit level cannot reflect the actual river condition.

3. Conclusion

After the consideration of seasonal change which may affect the DO of W3 in section 2.3, the DO of W3 will also exceed the Limit level in almost all the measurement day in both dry and wet seasons. After the consideration of seasonal change and applied the DO variation between wet and dry season to amend the Action/Limit level, the DO of W3 will also exceed the Limit level in both dry and wet seasons. Both the original and revised Action/Limit level could not reflect the actual condition of Wai Ha River. The Action/Limit level criteria should be revised so as to reflect the actual condition of Wai Ha River and to monitor the water quality.

With reference to other EM&A projects of river work in Hong Kong (refer to Appendix I), the limit level for DO is 4 mg/L and without the comparison of the percentile of baseline data. Suggest that the Action Level criteria remain unchanged which is DO exceedance occur when impact monitoring data is lower than 5

percentile of baseline data; and the Limit Level criteria should be revised to DO exceedance occur when impact monitoring data is lower than 4 mg/L.

Parameter	Original Limit Level	**Revised Limit Level**
DO in mg/L	4 mg/L or 1%-ile of baseline data	**4 mg/L**

Appendix A

EP-303/2008
Water Quality Baseline Monitoring of Reference Point C1 - Flood

Position	Tide	Weather	Date	Time	Location	pH value	Salinity (ppt)	Temperature (^{o}C)	Turbidity (NTU)	DO (mg/L)
Mid	Flood	Cloudy	2/3/2012	8:45	C1	8.5	28.1	18	0.1	9.21
				8:57	W2	7.16	4	18.1	11.7	7.16
				9:23	W1	7.12	0.1	19.3	6	7.47
Mid	Flood	Cloudy	5/3/2012	15:35	C1	8.59	28.3	20.8	0.1	9.5
				15:18	W2	7.14	6.6	21	7.2	6.97
				15:00	W1	7.1	0.4	21.4	3.4	6.91
Mid	Flood	Cloudy	7/3/2012	16:45	C1	8.51	29	20.5	0.1	9.32
				16:30	W2	7.78	16.4	20.8	14.4	7.51
				16:00	W1	7.3	3.8	20.4	27.3	7.39
Mid	Flood	Rainy	12/3/2012	9:40	C1	8.55	28.2	16.7	0.1	9.53
				9:55	W2	8.18	26.3	16.9	1.2	7.86
				10:25	W1	7.94	21.5	16.9	5.3	8.27

Appendix B

EP-303/2008
Water Quality Baseline Monitoring of Control Point W3 - Flood

Location	Position	Tide	Date	Time	Weather	DO (mg/L)		Average	DO (%)		Average
						Data 1	Data 2		Data 1	Data 2	
W3	Mid	Flood	7/1/2011	9:20	Cloudy	9.55	9.46	9.51	88	89	89
W3	Mid	Flood	10/1/2011	12:00	Cloudy	10.12	10.13	10.13	113	110	112
W3	Mid	Flood	12/1/2011	12:50	Cloudy	7.83	7.86	7.85	95	96	96
W3	Mid	Flood	14/1/2011	13:00	Cloudy	9.67	9.52	9.60	98	96	97
W3	Mid	Flood	17/1/2011	15:40	Cloudy	9.92	9.81	9.87	105	104	105
W3	Mid	Flood	19/1/2011	17:45	Sunny	9.25	9.41	9.33	98	101	100
W3	Mid	Flood	21/1/2011	7:40	Sunny	10.86	10.52	10.69	103	104	104
W3	Mid	Flood	24/1/2011	9:15	Cloudy	9.56	9.71	9.64	101	106	104
W3	Mid	Flood	26/1/2011	11:00	Sunny	11.10	10.69	10.90	111	108	110
W3	Mid	Flood	28/1/2011	13:05	Sunny	10.21	9.89	10.05	103	99	101
W3	Mid	Flood	31/1/2011	16:10	Sunny	10.54	10.72	10.63	116	112	114
W3	Mid	Flood	2/2/2011	7:00	Cloudy	10.78	10.66	10.72	109	103	106
5 percentile	DO Action					8.07		8.66			
1 percentile	DO Limit					7.84		8.00			

Appendix B

EP-303/2008
Water Quality Baseline Monitoring of Control Point W3 - Ebb

Location	Position	Tide	Date	Time	Weather	DO (mg/L)		Average	DO (%)		Average
						Data 1	Data 2		Data 1	Data 2	
W3	Mid	Ebb	7/1/2011	14:10	Cloudy	8.91	9.00	8.96	97	99	98
W3	Mid	Ebb	10/1/2011	17:10	Cloudy	9.00	8.85	8.93	94	91	93
W3	Mid	Ebb	12/1/2011	18:40	Cloudy	9.84	9.61	9.73	96	95	96
W3	Mid	Ebb	14/1/2011	7:50	Cloudy	9.98	9.77	9.88	101	95	98
W3	Mid	Ebb	17/1/2011	10:30	Cloudy	10.92	10.63	10.78	104	104	104
W3	Mid	Ebb	19/1/2011	11:25	Sunny	8.77	8.41	8.59	96	97	97
W3	Mid	Ebb	21/1/2011	13:10	Sunny	10.08	9.97	10.03	106	101	104
W3	Mid	Ebb	24/1/2011	15:30	Cloudy	8.93	8.67	8.80	96	94	95
W3	Mid	Ebb	26/1/2011	17:35	Sunny	10.71	10.24	10.48	109	103	106
W3	Mid	Ebb	28/1/2011	7:50	Sunny	9.58	9.55	9.57	97	84	91
W3	Mid	Ebb	31/1/2011	10:45	Sunny	11.33	10.76	11.05	113	106	110
W3	Mid	Ebb	2/2/2011	12:15	Cloudy	9.96	9.59	9.78	102	96	99
5 percentile	DO Action					8.69		8.71			
1 percentile	DO Limit					8.47		8.61			

Appendix C – W3 Monitoring data of dissolved oxygen from August 2011 to January 2012

Monitoring Date	DO mg/L	Monitoring Date	DO mg/L	Monitoring Date	DO mg/L
1-Aug-2011	6.93	30-Sep-2011	5.52	1-Dec-2011	5.68
3-Aug-2011	7.31	4-Oct-2011	5.09	3-Dec-2011	5.09
6-Aug-2011	6.89	6-Oct-2011	5.12	6-Dec-2011	6.17
8-Aug-2011	7.26	8-Oct-2011	5.89	8-Dec-2011	5.59
11-Aug-2011	6.01	11-Oct-2011	6.09	10-Dec-2011	6.58
13-Aug-2011	6.76	13-Oct-2011	6.53	13-Dec-2011	6.44
15-Aug-2011	7.03	15-Oct-2011	5.19	15-Dec-2011	7.15
17-Aug-2011	6.40	18-Oct-2011	5.21	17-Dec-2011	6.60
19-Aug-2011	6.74	20-Oct-2011	6.04	20-Dec-2011	6.68
23-Aug-2011	6.21	22-Oct-2011	6.86	22-Dec-2011	7.14
25-Aug-2011	5.07	25-Oct-2011	6.58	24-Dec-2011	7.91
27-Aug-2011	4.44	27-Oct-2011	6.39	29-Dec-2011	6.90
30-Aug-2011	6.71	29-Oct-2011	5.92	31-Dec-2011	6.63
1-Sep-2011	7.18	1-Nov-2011	5.66	3-Jan-2012	6.22
3-Sep-2011	7.32	3-Nov-2011	6.64	5-Jan-2012	6.90
6-Sep-2011	5.86	5-Nov-2011	6.58	7-Jan-2012	5.10
8-Sep-2011	5.66	8-Nov-2011	5.47	10-Jan-2012	7.10
10-Sep-2011	6.88	10-Nov-2011	6.72	12-Jan-2012	7.25
12-Sep-2011	6.44	12-Nov-2011	6.53	14-Jan-2012	6.90
15-Sep-2011	6.09	15-Nov-2011	6.51	17-Jan-2012	7.60
17-Sep-2011	5.73	17-Nov-2011	4.74	19-Jan-2012	6.50
20-Sep-2011	6.26	19-Nov-2011	4.62	21-Jan-2012	8.41
22-Sep-2011	4.49	22-Nov-2011	5.09	26-Jan-2012	8.89
24-Sep-2011	6.43	24-Nov-2011	5.70	28-Jan-2012	7.62
26-Sep-2011	5.36	26-Nov-2011	5.69	31-Jan-2012	7.18
28-Sep-2011	5.91	29-Nov-2011	5.38		

Appendix D - Exceedance records from August 2011 to January 2012 for Existing Criteria

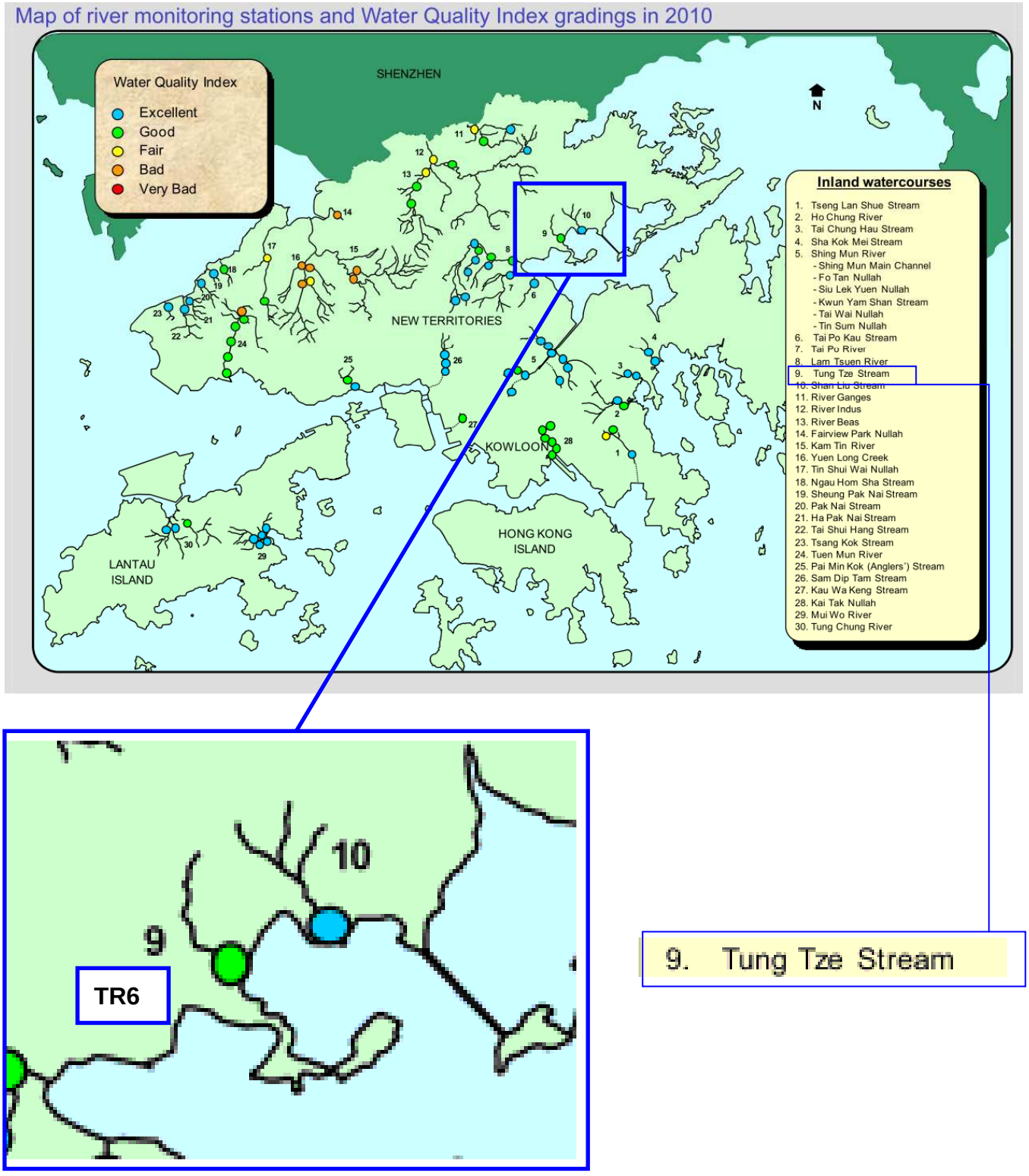
Monitoring Date	DO mg/L	Monitoring Date	DO mg/L	Monitoring Date	DO mg/L
1-Aug-2011	6.93	30-Sep-2011	5.52	1-Dec-2011	5.68
3-Aug-2011	7.31	4-Oct-2011	5.09	3-Dec-2011	5.09
6-Aug-2011	6.89	6-Oct-2011	5.12	6-Dec-2011	6.17
8-Aug-2011	7.26	8-Oct-2011	5.89	8-Dec-2011	5.59
11-Aug-2011	6.01	11-Oct-2011	6.09	10-Dec-2011	6.58
13-Aug-2011	6.76	13-Oct-2011	6.53	13-Dec-2011	6.44
15-Aug-2011	7.03	15-Oct-2011	5.19	15-Dec-2011	7.15
17-Aug-2011	6.40	18-Oct-2011	5.21	17-Dec-2011	6.60
19-Aug-2011	6.74	20-Oct-2011	6.04	20-Dec-2011	6.68
23-Aug-2011	6.21	22-Oct-2011	6.86	22-Dec-2011	7.14
25-Aug-2011	5.07	25-Oct-2011	6.58	24-Dec-2011	7.91
27-Aug-2011	4.44	27-Oct-2011	6.39	29-Dec-2011	6.90
30-Aug-2011	6.71	29-Oct-2011	5.92	31-Dec-2011	6.63
1-Sep-2011	7.18	1-Nov-2011	5.66	3-Jan-2012	6.22
3-Sep-2011	7.32	3-Nov-2011	6.64	5-Jan-2012	6.90
6-Sep-2011	5.86	5-Nov-2011	6.58	7-Jan-2012	5.10
8-Sep-2011	5.66	8-Nov-2011	5.47	10-Jan-2012	7.10
10-Sep-2011	6.88	10-Nov-2011	6.72	12-Jan-2012	7.25
12-Sep-2011	6.44	12-Nov-2011	6.53	14-Jan-2012	6.90
15-Sep-2011	6.09	15-Nov-2011	6.51	17-Jan-2012	7.60
17-Sep-2011	5.73	17-Nov-2011	4.74	19-Jan-2012	6.50
20-Sep-2011	6.26	19-Nov-2011	4.62	21-Jan-2012	8.41
22-Sep-2011	4.49	22-Nov-2011	5.09	26-Jan-2012	8.89
24-Sep-2011	6.43	24-Nov-2011	5.70	28-Jan-2012	7.62
26-Sep-2011	5.36	26-Nov-2011	5.69	31-Jan-2012	7.18
28-Sep-2011	5.91	29-Nov-2011	5.38		

Remarks:

Red highlight: The value is exceeded Limit Level (**<8.61**)

Yellow highlight: The value is exceeded Action Level (**<8.71**)

Appendix E – Location of TR6 at Tung Tze Stream



9. Tung Tze Stream

Appendix F

EP-303/2008
Dissolved Oxygen Level at Tung Tze Stream
Dry Season

				DO (mg/l)
Tolo Harbour And Channel	Tung Tze Stream	TR6	3/1/2001	8.1
Tolo Harbour And Channel	Tung Tze Stream	TR6	12/2/2001	10.2
Tolo Harbour And Channel	Tung Tze Stream	TR6	16/3/2001	5
Tolo Harbour And Channel	Tung Tze Stream	TR6	19/4/2001	6.6
Tolo Harbour And Channel	Tung Tze Stream	TR6	12/10/2001	6.1
Tolo Harbour And Channel	Tung Tze Stream	TR6	16/11/2001	7.2
Tolo Harbour And Channel	Tung Tze Stream	TR6	17/12/2001	6.2
Tolo Harbour And Channel	Tung Tze Stream	TR6	18/1/2002	6.2
Tolo Harbour And Channel	Tung Tze Stream	TR6	20/2/2002	7.3
Tolo Harbour And Channel	Tung Tze Stream	TR6	18/3/2002	6.6
Tolo Harbour And Channel	Tung Tze Stream	TR6	18/4/2002	6.8
Tolo Harbour And Channel	Tung Tze Stream	TR6	3/10/2002	4.9
Tolo Harbour And Channel	Tung Tze Stream	TR6	4/11/2002	6.9
Tolo Harbour And Channel	Tung Tze Stream	TR6	5/12/2002	5.4
Tolo Harbour And Channel	Tung Tze Stream	TR6	3/1/2003	7.3
Tolo Harbour And Channel	Tung Tze Stream	TR6	7/2/2003	7.4
Tolo Harbour And Channel	Tung Tze Stream	TR6	6/3/2003	6.4
Tolo Harbour And Channel	Tung Tze Stream	TR6	10/4/2003	7.1
Tolo Harbour And Channel	Tung Tze Stream	TR6	8/10/2003	4.8
Tolo Harbour And Channel	Tung Tze Stream	TR6	6/11/2003	5.9
Tolo Harbour And Channel	Tung Tze Stream	TR6	4/12/2003	7.5
Tolo Harbour And Channel	Tung Tze Stream	TR6	9/1/2004	6.1
Tolo Harbour And Channel	Tung Tze Stream	TR6	4/2/2004	8.3
Tolo Harbour And Channel	Tung Tze Stream	TR6	3/3/2004	6
Tolo Harbour And Channel	Tung Tze Stream	TR6	2/4/2004	7.2
Tolo Harbour And Channel	Tung Tze Stream	TR6	8/10/2004	4.9
Tolo Harbour And Channel	Tung Tze Stream	TR6	4/11/2004	5.9
Tolo Harbour And Channel	Tung Tze Stream	TR6	2/12/2004	5.1
Tolo Harbour And Channel	Tung Tze Stream	TR6	7/1/2005	7.8
Tolo Harbour And Channel	Tung Tze Stream	TR6	1/2/2005	5.2
Tolo Harbour And Channel	Tung Tze Stream	TR6	4/3/2005	8.2
Tolo Harbour And Channel	Tung Tze Stream	TR6	8/4/2005	5.1
Tolo Harbour And Channel	Tung Tze Stream	TR6	7/10/2005	5.4
Tolo Harbour And Channel	Tung Tze Stream	TR6	3/11/2005	5.7
Tolo Harbour And Channel	Tung Tze Stream	TR6	5/12/2005	5.1
Tolo Harbour And Channel	Tung Tze Stream	TR6	5/1/2006	5.3
Tolo Harbour And Channel	Tung Tze Stream	TR6	3/2/2006	6
Tolo Harbour And Channel	Tung Tze Stream	TR6	8/3/2006	5.5
Tolo Harbour And Channel	Tung Tze Stream	TR6	3/4/2006	8.4
Tolo Harbour And Channel	Tung Tze Stream	TR6	5/10/2006	6.6
Tolo Harbour And Channel	Tung Tze Stream	TR6	3/11/2006	5.5
Tolo Harbour And Channel	Tung Tze Stream	TR6	5/12/2006	7.4

Appendix F

EP-303/2008
Dissolved Oxygen Level at Tung Tze Stream
Dry Season

				DO (mg/l)
Tolo Harbour And Channel	Tung Tze Stream	TR6	5/1/2007	5.9
Tolo Harbour And Channel	Tung Tze Stream	TR6	2/2/2007	7.3
Tolo Harbour And Channel	Tung Tze Stream	TR6	2/3/2007	5.2
Tolo Harbour And Channel	Tung Tze Stream	TR6	13/4/2007	5.3
Tolo Harbour And Channel	Tung Tze Stream	TR7	4/10/2007	5.5
Tolo Harbour And Channel	Tung Tze Stream	TR6	2/11/2007	5
Tolo Harbour And Channel	Tung Tze Stream	TR6	4/12/2007	7.3
Tolo Harbour And Channel	Tung Tze Stream	TR6	7/1/2008	6.7
Tolo Harbour And Channel	Tung Tze Stream	TR6	13/2/2008	6.9
Tolo Harbour And Channel	Tung Tze Stream	TR6	6/3/2008	6.1
Tolo Harbour And Channel	Tung Tze Stream	TR6	10/4/2008	6.6
Tolo Harbour And Channel	Tung Tze Stream	TR6	20/10/2008	5.6
Tolo Harbour And Channel	Tung Tze Stream	TR6	13/11/2008	6.3
Tolo Harbour And Channel	Tung Tze Stream	TR6	2/12/2008	7
Tolo Harbour And Channel	Tung Tze Stream	TR6	7/1/2009	7.3
Tolo Harbour And Channel	Tung Tze Stream	TR6	6/2/2009	6.9
Tolo Harbour And Channel	Tung Tze Stream	TR6	5/3/2009	6.7
Tolo Harbour And Channel	Tung Tze Stream	TR6	20/4/2009	5.2
Tolo Harbour And Channel	Tung Tze Stream	TR6	16/10/2009	4.7
Tolo Harbour And Channel	Tung Tze Stream	TR6	16/11/2009	6.9
Tolo Harbour And Channel	Tung Tze Stream	TR6	16/12/2009	7
Tolo Harbour And Channel	Tung Tze Stream	TR6	6/1/2010	6.6
Tolo Harbour And Channel	Tung Tze Stream	TR6	18/2/2010	7.4
Tolo Harbour And Channel	Tung Tze Stream	TR6	3/3/2010	5.4
Tolo Harbour And Channel	Tung Tze Stream	TR6	8/4/2010	6.5
Tolo Harbour And Channel	Tung Tze Stream	TR6	20/10/2010	6.4
Tolo Harbour And Channel	Tung Tze Stream	TR6	17/11/2010	6.6
Tolo Harbour And Channel	Tung Tze Stream	TR6	15/12/2010	5.6

Appendix F

EP-303/2008
Dissolved Oxygen Level at Tung Tze Stream
Wet Season

				DO (mg/l)
Tolo Harbour And Channel	Tung Tze Stream	TR6	24/5/2001	6.1
Tolo Harbour And Channel	Tung Tze Stream	TR6	15/6/2001	5.7
Tolo Harbour And Channel	Tung Tze Stream	TR6	11/7/2001	7.9
Tolo Harbour And Channel	Tung Tze Stream	TR6	3/8/2001	6.6
Tolo Harbour And Channel	Tung Tze Stream	TR6	19/9/2001	5.2
Tolo Harbour And Channel	Tung Tze Stream	TR6	22/5/2002	4.1
Tolo Harbour And Channel	Tung Tze Stream	TR6	7/6/2002	5
Tolo Harbour And Channel	Tung Tze Stream	TR6	4/7/2002	5.4
Tolo Harbour And Channel	Tung Tze Stream	TR6	2/8/2002	5.7
Tolo Harbour And Channel	Tung Tze Stream	TR6	4/9/2002	5.8
Tolo Harbour And Channel	Tung Tze Stream	TR6	14/5/2003	5.7
Tolo Harbour And Channel	Tung Tze Stream	TR6	9/6/2003	4.9
Tolo Harbour And Channel	Tung Tze Stream	TR6	11/7/2003	6.2
Tolo Harbour And Channel	Tung Tze Stream	TR6	8/8/2003	5.8
Tolo Harbour And Channel	Tung Tze Stream	TR6	5/9/2003	5.6
Tolo Harbour And Channel	Tung Tze Stream	TR6	7/5/2004	6.5
Tolo Harbour And Channel	Tung Tze Stream	TR6	4/6/2004	5.8
Tolo Harbour And Channel	Tung Tze Stream	TR6	7/7/2004	5.2
Tolo Harbour And Channel	Tung Tze Stream	TR6	9/8/2004	6.5
Tolo Harbour And Channel	Tung Tze Stream	TR6	2/9/2004	6.7
Tolo Harbour And Channel	Tung Tze Stream	TR6	6/5/2005	6
Tolo Harbour And Channel	Tung Tze Stream	TR6	3/6/2005	5.8
Tolo Harbour And Channel	Tung Tze Stream	TR6	8/7/2005	6.4
Tolo Harbour And Channel	Tung Tze Stream	TR6	3/8/2005	5.5
Tolo Harbour And Channel	Tung Tze Stream	TR6	2/9/2005	6.5
Tolo Harbour And Channel	Tung Tze Stream	TR6	11/5/2006	5.2
Tolo Harbour And Channel	Tung Tze Stream	TR6	16/6/2006	7
Tolo Harbour And Channel	Tung Tze Stream	TR6	5/7/2006	5.6
Tolo Harbour And Channel	Tung Tze Stream	TR6	2/8/2006	6.7
Tolo Harbour And Channel	Tung Tze Stream	TR6	6/9/2006	5

Appendix F

EP-303/2008
Dissolved Oxygen Level at Tung Tze Stream
Wet Season

				DO (mg/l)
Tolo Harbour And Channel	Tung Tze Stream	TR6	3/5/2007	6.3
Tolo Harbour And Channel	Tung Tze Stream	TR6	1/6/2007	5.1
Tolo Harbour And Channel	Tung Tze Stream	TR6	5/7/2007	7.3
Tolo Harbour And Channel	Tung Tze Stream	TR6	2/8/2007	6.9
Tolo Harbour And Channel	Tung Tze Stream	TR6	10/9/2007	6.1
Tolo Harbour And Channel	Tung Tze Stream	TR6	16/5/2008	5.5
Tolo Harbour And Channel	Tung Tze Stream	TR6	18/6/2008	5.4
Tolo Harbour And Channel	Tung Tze Stream	TR6	18/7/2008	5.5
Tolo Harbour And Channel	Tung Tze Stream	TR6	25/8/2008	6.1
Tolo Harbour And Channel	Tung Tze Stream	TR6	18/9/2008	4.1
Tolo Harbour And Channel	Tung Tze Stream	TR6	7/5/2009	6
Tolo Harbour And Channel	Tung Tze Stream	TR6	3/6/2009	5.4
Tolo Harbour And Channel	Tung Tze Stream	TR6	17/7/2009	5.5
Tolo Harbour And Channel	Tung Tze Stream	TR6	7/8/2009	4.9
Tolo Harbour And Channel	Tung Tze Stream	TR6	17/9/2009	5.3
Tolo Harbour And Channel	Tung Tze Stream	TR6	27/5/2010	5.8
Tolo Harbour And Channel	Tung Tze Stream	TR6	30/6/2010	6.8
Tolo Harbour And Channel	Tung Tze Stream	TR6	19/7/2010	5
Tolo Harbour And Channel	Tung Tze Stream	TR6	13/8/2010	6.7
Tolo Harbour And Channel	Tung Tze Stream	TR6	9/9/2010	6.5

Appendix G

EP-303/2008
Dissolved Oxygen Level at Tung Tze Stream
Median of Dry Season

Date	DO(mg/l)
3/1/2001	8.1
12/2/2001	10.2
16/3/2001	5
19/4/2001	6.6
12/10/2001	6.1
16/11/2001	7.2
17/12/2001	6.2
18/1/2002	6.2
20/2/2002	7.3
18/3/2002	6.6
18/4/2002	6.8
3/10/2002	4.9
4/11/2002	6.9
5/12/2002	5.4
3/1/2003	7.3
7/2/2003	7.4
6/3/2003	6.4
10/4/2003	7.1
8/10/2003	4.8
6/11/2003	5.9
4/12/2003	7.5
9/1/2004	6.1
4/2/2004	8.3
3/3/2004	6
2/4/2004	7.2
8/10/2004	4.9
4/11/2004	5.9
2/12/2004	5.1
7/1/2005	7.8
1/2/2005	5.2
4/3/2005	8.2
8/4/2005	5.1
7/10/2005	5.4
3/11/2005	5.7
5/12/2005	5.1

For 2001 to 2010	
Minimum	4.7
Median	**6.40**
Maximum	10.2
Mean	6.38

Appendix G

EP-303/2008
Dissolved Oxygen Level at Tung Tze Stream
Median of Dry Season

Date	DO(mg/l)
5/1/2006	5.3
3/2/2006	6
8/3/2006	5.5
3/4/2006	8.4
5/10/2006	6.6
3/11/2006	5.5
5/12/2006	7.4
5/1/2007	5.9
2/2/2007	7.3
2/3/2007	5.2
13/4/2007	5.3
4/10/2007	5.5
2/11/2007	5
4/12/2007	7.3
7/1/2008	6.7
13/2/2008	6.9
6/3/2008	6.1
10/4/2008	6.6
20/10/2008	5.6
13/11/2008	6.3
2/12/2008	7
7/1/2009	7.3
6/2/2009	6.9
5/3/2009	6.7
20/4/2009	5.2
16/10/2009	4.7
16/11/2009	6.9
16/12/2009	7
6/1/2010	6.6
18/2/2010	7.4
3/3/2010	5.4
8/4/2010	6.5
20/10/2010	6.4
17/11/2010	6.6
15/12/2010	5.6

For 2007 to 2010	
Minimum	4.7
Median	**6.55**
Maximum	7.4
Mean	6.28

For 2010	
Minimum	5.4
Median	**6.50**
Maximum	7.4
Mean	6.36

Appendix G

EP-303/2008
Dissolved Oxygen Level at Tung Tze Stream
Median of Wet Season

Date	DO(mg/l)
24/5/2001	6.1
15/6/2001	5.7
11/7/2001	7.9
3/8/2001	6.6
19/9/2001	5.2
22/5/2002	4.1
7/6/2002	5
4/7/2002	5.4
2/8/2002	5.7
4/9/2002	5.8
14/5/2003	5.7
9/6/2003	4.9
11/7/2003	6.2
8/8/2003	5.8
5/9/2003	5.6
7/5/2004	6.5
4/6/2004	5.8
7/7/2004	5.2
9/8/2004	6.5
2/9/2004	6.7
6/5/2005	6
3/6/2005	5.8
8/7/2005	6.4
3/8/2005	5.5
2/9/2005	6.5
11/5/2006	5.2
16/6/2006	7
5/7/2006	5.6
2/8/2006	6.7
6/9/2006	5
3/5/2007	6.3
1/6/2007	5.1
5/7/2007	7.3
2/8/2007	6.9
10/9/2007	6.1
16/5/2008	5.5
18/6/2008	5.4
18/7/2008	5.5
25/8/2008	6.1
18/9/2008	4.1

For 2001 to 2010	
Minimum	4.1
Median	**5.80**
Maximum	7.9
Mean	5.85

For 2007 to 2010	
Minimum	4.1
Median	**5.65**
Maximum	7.3
Mean	5.81

Appendix G

EP-303/2008
Dissolved Oxygen Level at Tung Tze Stream
Median of Wet Season

Date	DO(mg/l)
7/5/2009	6
3/6/2009	5.4
17/7/2009	5.5
7/8/2009	4.9
17/9/2009	5.3
27/5/2010	5.8
30/6/2010	6.8
19/7/2010	5
13/8/2010	6.7
9/9/2010	6.5

For 2010	
Minimum	5.0
Median	**6.50**
Maximum	6.8
Mean	6.16

Appendix H – W3 Monitoring data of dissolved oxygen from August 2011 to January 2012 with applying 13.74% variation

Monitoring Date	DO mg/L	Monitoring Date	DO mg/L	Monitoring Date	DO mg/L		
1-Aug-2011	6.93	30-Sep-2011	5.52	1-Dec-2011	5.68		
3-Aug-2011	7.31	4-Oct-2011	5.09	3-Dec-2011	5.09		
6-Aug-2011	6.89	6-Oct-2011	5.12	6-Dec-2011	6.17		
8-Aug-2011	7.26	8-Oct-2011	5.89	8-Dec-2011	5.59		
11-Aug-2011	6.01	11-Oct-2011	6.09	10-Dec-2011	6.58		
13-Aug-2011	6.76	13-Oct-2011	6.53	13-Dec-2011	6.44		
15-Aug-2011	7.03	15-Oct-2011	5.19	15-Dec-2011	7.15		
17-Aug-2011	6.40	18-Oct-2011	5.21	17-Dec-2011	6.60		
19-Aug-2011	6.74	20-Oct-2011	6.04	20-Dec-2011	6.68		
23-Aug-2011	6.21	22-Oct-2011	6.86	22-Dec-2011	7.14		
25-Aug-2011	5.07	25-Oct-2011	6.58	24-Dec-2011	7.91		
27-Aug-2011	4.44	27-Oct-2011	6.39	29-Dec-2011	6.90		
30-Aug-2011	6.71	29-Oct-2011	5.92	31-Dec-2011	6.63		
1-Sep-2011	7.18	1-Nov-2011	5.66	3-Jan-2012	6.22		
3-Sep-2011	7.32	3-Nov-2011	6.64	5-Jan-2012	6.90		
6-Sep-2011	5.86	5-Nov-2011	6.58	7-Jan-2012	5.10		
8-Sep-2011	5.66	8-Nov-2011	5.47	10-Jan-2012	7.10		
10-Sep-2011	6.88	10-Nov-2011	6.72	12-Jan-2012	7.25		
12-Sep-2011	6.44	12-Nov-2011	6.53	14-Jan-2012	6.90		
15-Sep-2011	6.09	15-Nov-2011	6.51	17-Jan-2012	7.60		
17-Sep-2011	5.73	17-Nov-2011	4.74	19-Jan-2012	6.50		
20-Sep-2011	6.26	19-Nov-2011	4.62	21-Jan-2012	8.41		
22-Sep-2011	4.49	22-Nov-2011	5.09	26-Jan-2012	8.89		
24-Sep-2011	6.43	24-Nov-2011	5.70	28-Jan-2012	7.62		
26-Sep-2011	5.36	26-Nov-2011	5.69	31-Jan-2012	7.18		
28-Sep-2011	5.91	29-Nov-2011	5.38				

Remarks:

Red highlight: The value is exceeded Limit Level (**<7.43**)

Yellow highlight: The value is exceeded Action Level (**<7.51**)

Appendix I

EP-303/2008
Enquiry of Revision for Action/Limit Level Criteria of Water Quality Monitoring

Reference Cases

Case	Environmental Permit No.	Propject Title	EM&A Manual	EIA Report	Limit Level for Water Quality - DO
1.	EP-434/2012	Drainage Improvements in Southern Lantau	Section 4.8.1, Table 4.1		4mg/L
2.	EP-429/2012	Development of the Integrated Waste Management Facilities Phase 1	Section 4a.7.12, Table 4a.4		4mg/L
3.	EP-413/2011	Integration of Siu Ho Wan and Silver Mine Bay Water Treatment Works	Section 4.7.8, Table 4.2		4mg/L
4.	EP-334/2009	Sludge Treatment Facilities	Section 5.8.1.1, Table 5.3		4mg/L
5.	EP-224/2005	Proposed Extension of Public Golf Course at Kau Sai Chau, Sai Kung	Section 3.9.1, Table 3.8		4mg/L
6.	EP-217/2005	Drainage Improvements in Sai Kung		Section 4.7.3, Table 4.2	4mg/L
7.	EP-190/2004	Improvements to San Tin Interchange	Section 4.25, Table 4.1		4mg/L