Drainage Service Department

Monthly Environmental Monitoring & Auditing report for

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

April 2013

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EXECUTIVE SUMMARY

This is the twenty-sixth 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 April 2013 to 30th April 2013. The major site activities in this reporting period were mainly laying of E&M ducting for the proposed store room, concreting for outfall structure of tidal measuring system, installation of E&M equipment, laying of DM2100 storm relief drain (CH10 to CH30) at Ting Kok Road and construction of green roof.

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, construction of intake structure was conducted near Wai Ha River. Proper mitigation measures were implemented by contractor to avoid site water releasing into the Wai Ha River and no particular observation of defective site activities were found causing water contamination. The exceedances of Turbidity and SS were believed to be mainly attributed by adverse weather and 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 monitoring for Pavetta hongkongensis was completed.

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-sixth 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 April 2013 to 30th April 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 of Tidal Measuring System
- Installation of E&M equipment
- Laying of DN2100 storm relief drain (CH10 to CH30) at Ting Kok Road.
- Construction of Green Roof

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. Green Roof of Pumping Station
4. Construction of Boundary Wall
5. Road & Drain in Pumping Station
6. Installation of E&M equipment
7. Planting and landscape soft work

Area B (Tung Tsz Nursery)

1. Construction of box culvert bay 2, 3, 16, 17 & 18
2. Reinstatement

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.

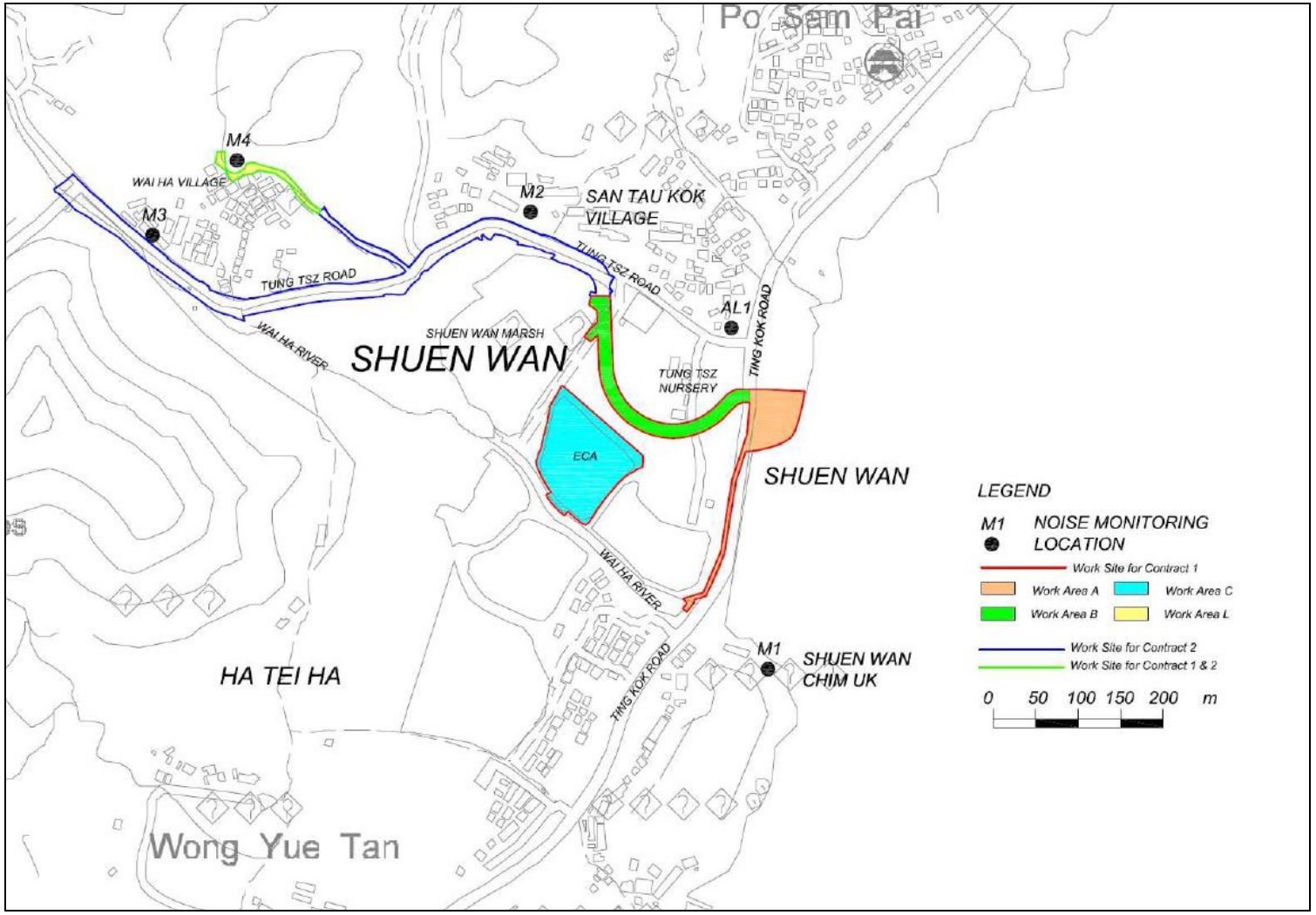


Figure 3.3.1 Impact noise monitoring locations

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 61.8dB (A) and 66.9dB (A), and AL1 ranged between 62.1dB (A) and 68.3dB (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	$L_{eq\ 30mins}$	3-Apr-13	10:15	64.3	75	N	Cloudy
M1	$L_{eq\ 30mins}$	10-Apr-13	13:50	63.6	75	N	Sunny
M1	$L_{eq\ 30mins}$	17-Apr-13	9:00	66.9	75	N	Overcast
M1	$L_{eq\ 30mins}$	24-Apr-13	12:40	61.8	75	N	Overcast
AL1	$L_{eq\ 30mins}$	3-Apr-13	10:50	66.1	75	N	Cloudy
AL1	$L_{eq\ 30mins}$	10-Apr-13	14:25	63.2	75	N	Sunny
AL1	$L_{eq\ 30mins}$	17-Apr-13	9:40	68.3	75	N	Overcast
AL1	$L_{eq\ 30mins}$	24-Apr-13	13;15	62.1	75	N	Overcast

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 3rd, 8th, 15th, 22nd and 29th of May 2013.

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 referred to the previous submission.

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.

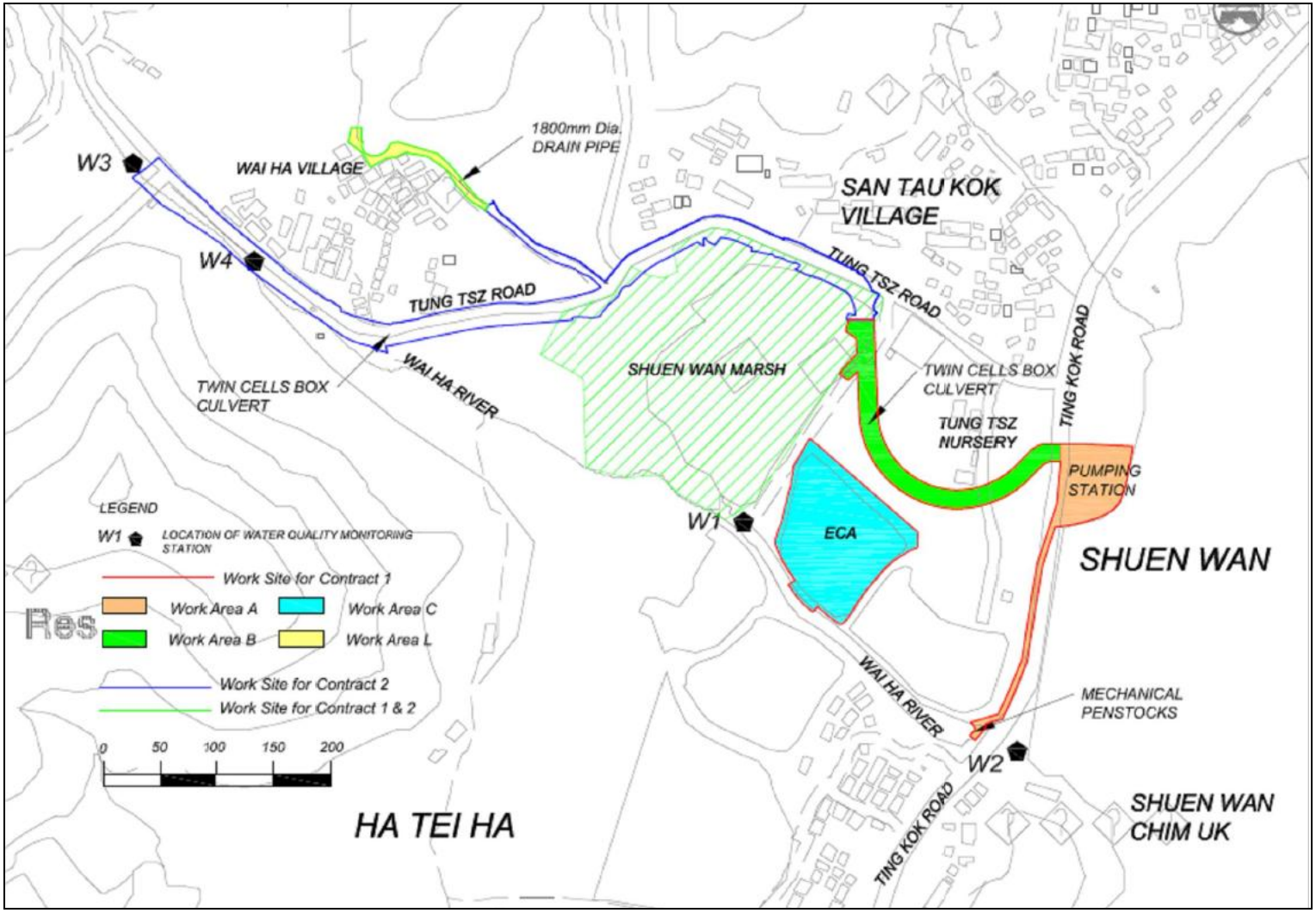


Figure 4.3.1 Water Quality Monitoring Locations

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 3rd, 6th, 8th, 10th, 12th, 15th, 17th, 19th, 22nd, 24th, 25th, 26th and 29th of April 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, construction of intake structure was conducted near Wai Ha River. Proper mitigation measures were implemented by contractor to avoid site water releasing into the Wai Ha river and no particular observation of defective site activities were found causing water contamination. The exceedances of Turbidity and SS were believed to be mainly attributed by adverse weather and 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	24.0	8.4	8.02	6.02	71.9	18.2
W2	21.6	3.7	7.71	7.42	83.5	5.7
C1	19.8	2.4	7.87	7.56	88.0	6.6
C2	23.9	5.9	8.05	6.03	74.1	18.2

Table 4.5.2 Interpretations of abnormal incidents recorded in the reporting month

Date	**Tide**	**Parameter**	**Interpretations**
3/4/2013	Flood	Turbidity	Exceedance was caused by natural fluctuation
8/4/2013	Ebb	Turbidity	Exceedance was caused by natural fluctuation
10/4/2013	Ebb	Turbidity	Exceedance was caused by natural fluctuation
		SS	
12/4/2013	Ebb	Turbidity	Exceedance was caused by natural fluctuation
17/4/2013	Ebb	Turbidity	Exceedance was caused by adverse weather
27/4/2013	Ebb	Turbidity	Exceedance was caused by adverse weather
		SS	
29/4/2013	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
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 3rd, 6th, 8th, 10th, 13th, 15th, 20th, 22nd, 24th, 27th and 29th of May 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.

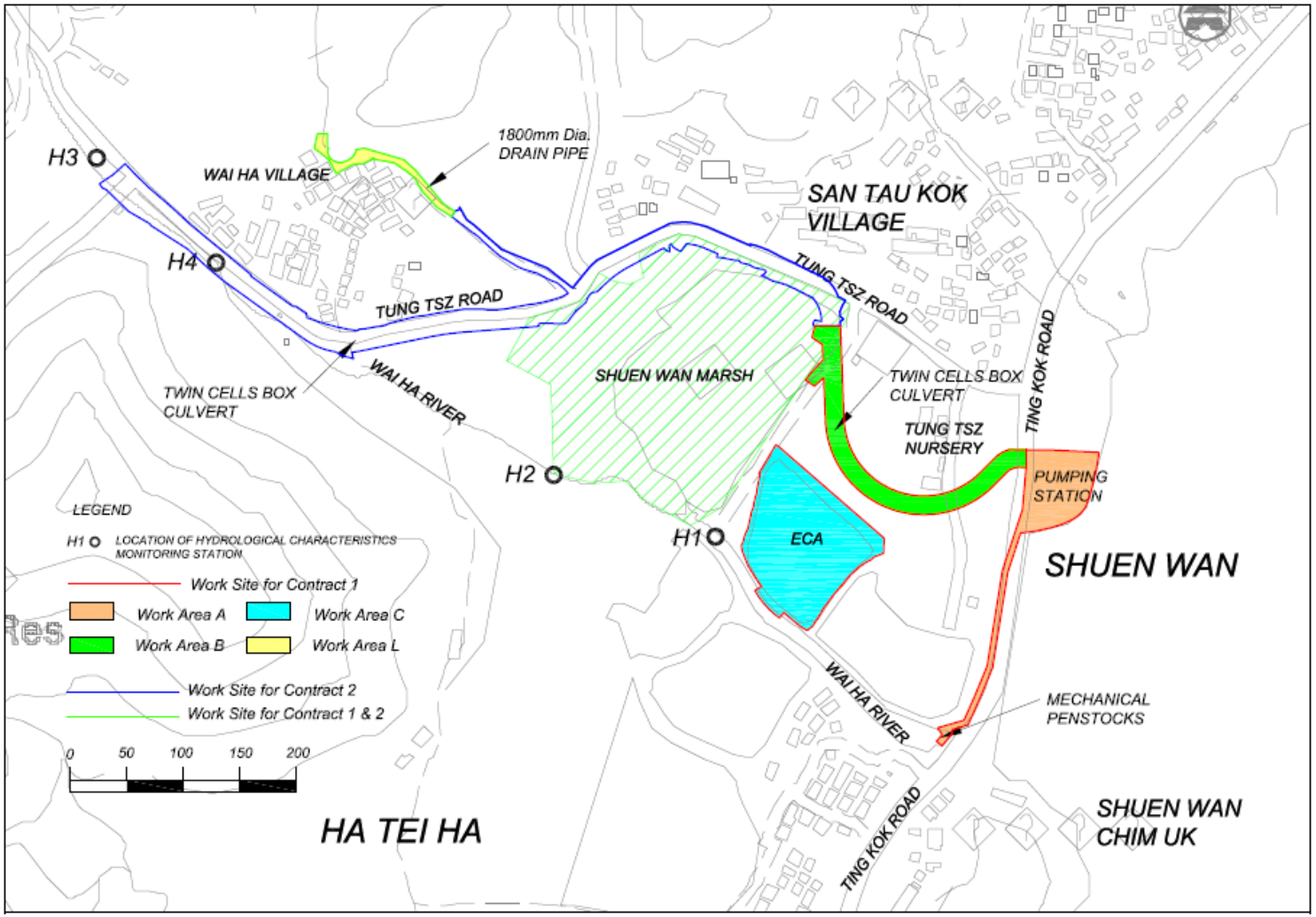


Figure 5.3.1 Hydrological Characteristics Monitoring Locations

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 6th, 12th, 19th and 26th of April 2013.

5.5 Monitoring Results and Interpretation

Hydrological characteristics monitoring was carried out four 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)	~0.480	~0.075
H1(Ebb)	~0.195	~0.150
H2(Flood)	~0.240	~03754
H2(Ebb)	~0.180	~1.1225

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 3rd, 10th, 15th, 24th and 26th of May 2013.

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 (March 2013) was conducted to cover only Areas A, B and C of Contract 1 of the Project. The bi-weekly monitoring was conducted on 7th and 21st March 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 5th, 18th and 30th April 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 February 2013*.

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 (**Photo 1**). Sections of the road have been surrounded with temporary barriers next to the main entrance of Area A to the southwest of Area A along Ting Kok Road for another phase of the construction work since February 2013 (**Photo 2**). The works have been continued in April 2013. Since

January 2013, the site hoardings along the eastern boundary of Area A were removed due to the active construction works for the installation of drainage pipe and the associated structure.

A section of temporary hoarding has been erected from northwest to southwest parts (i.e. Phase 1 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 (i.e. Phase 2 construction works) 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. During the monitoring on 30th April 2013, it was found that part of the temporary hoardings at the eastern end of Phase 1 and western end of Phase 2 works area were replaced by about 1.8m high transparent hoardings (**Photos 3-4**).

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 March 2013.*

Observation

Area A

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

According to the Main Contractor, groundwater or used water from the excavated sites or box culvert were pumped into the silt/sand removal facilities connected with the pollution

control system stored in Area B. The filtered water was then drained to the sedimentation tank placed adjacent to the fenced Area C and subsequently discharged into the manhole adjacent to Area C. As inspected on 30th April 2013, unclear and muddy water was leaking from a pipe at the northeastern part of Area A. The Main Contractor was immediately informed and the pipe was then fixed and re-aligned.

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

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.

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 March 2013.*

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. According to the Main Contractor, groundwater or used water from the excavated sites or box culvert were pumped into the silt/sand removal facilitates connected with the pollution control system stored in Area B. The filtered water was then drained to the sedimentation tank placed adjacent to the fenced Area C and subsequently discharged into the manhole adjacent to Area C.

As inspected on 30th April 2013, unclear and muddy water was leaking from a pipe at the northeastern part of Area A. The Main Contractor was immediately informed and the pipe was then fixed and re-aligned.

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 only minor civil works were carried out during the inspection

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 5**).

Recommendation

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. Watersprouts were still observed along the trunk and branches.

The works practice and maintenance of trees within the nursery generally follow the recommendation as stated in *Monthly EM&A Report for March 2013*. 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 works have 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. Part of the temporary hoardings at the eastern end of Phase 1 and western end of Phase 2 works area were replaced by transparent hoarding as inspected on 30th April 2013.

Regular monitoring for all transplanted trees within the nursery was conducted on a bi-weekly basis. For tree U58 (*Grevillea robusta*) (**Photo 6**), leaves as watersprouts were

observed along the branches and lower trunk. Dead branches were observed at the eastern canopy. U58 has remained in fairly poor physiological condition in April 2013. Regular monitoring has to be continued to update its health and structural condition.

As reported in the previous *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 since the *Monthly EM&A Report for November 2012*, development of watersprouts at the remained stump was recorded. The watersprouts were removed as inspected in December 2012 while it has resprouted as observed since January 2013. Watersprouts were still observed in April 2013 (**Photo 7**).

The transplanted tree U64 (*Bauhinia purpurea*) was observed to have abnormal leaves shed and lots of climbers at its lower trunk. During the monitoring on 30th April 2013, the climbers on the trunk and planter were removed and other tree maintenance practice was noted (**Photo 8**). As confirmed by the Main Contractor, such tree maintenance practice was carried out by the workers of Tung Tsz Nursery.

U61 (*Lysidice rhodostegia*) was found to be replanted with upright trunk as inspected on 30th April 2013 (**Photo 9**).

U75 (*Dolichandrone cauda-felina*) showed abnormal yellowish-leave in April 2013 (**Photo 10**).

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), *Bauhinia purpurea* (U64) and *Dolichandrone cauda-felina* (U75) are 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/relocated 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 March 2013*, except the observations as highlighted in the following sections.

Observation

Area A

Since October 2012, E18 (*Melaleuca cajuputi* subsp. *cumingiana*) originally located within the TPZs nearby the main gate have been relocated to the northeastern part of Area A and subsequently relocated to the northeastern part of Area A in November 2012 due to its direct conflict with the works. As observed in March 2013, the tree was found in poor condition due to transplantation shock and poor planting skills (**Photo 11**).

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. An orange construction net was noted to be used as a temporary TPZ. The tree was in fair condition during the monitoring in April 2013 but broken branches were found hanging in the canopy (**Photo 12**).

Two untagged trees (*Melaleuca cajuputi* subsp. *cumingiana*) were found in the northeastern part of Area A in February 2013. New foliage was found regenerated in the

canopy of one of them during the monitoring in April 2013.

E97 (*Celtis sinensis*) has been relocated at the northeastern part of Area A since December 2012. It showed improvement in health condition as new foliage was observed in the canopy in April 2013 (**Photo 13**).

Wound was found at the trunk base of E61 (*Macaranga tanarius* var. *tomentosa*) as inspected on 18th April 2013, with leaning tree trunk and cracked lower trunk (**Photo 14**). No improvement on tree health was observed on 30th April 2013. The Main Contractor was informed immediately, and according to the Main Contractor, the tree was propped and protected from the construction works.

U55 (*Macaranga tanarius* var. *tomentosa*) was also found recently damaged with wounds observed on the tree trunk (**Photos 15-16**). The Main Contractor was informed immediately, and according to the Main Contractor, the tree was protected from the construction works.

No other significant damages on the crowns, trunks and roots of the remaining trees resulting from the construction machinery were observed during the monitoring in March 2013 in Area A.

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 transplanted tree U61 (*Lysidice rhodostegia*) was found to be replanted with upright trunk as inspected on 30th April 2013 (**Photo 9**).

The physiological condition of the transplanted tree U55 (*Pterocarpus indicus*) has been improved as inspected in April 2013. New foliage was observed in the canopy (**Photo 17**).

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 18**). The tree still appeared in very poor condition as no green leaves were noted in the canopy in April 2013.

No recovery signs have been observed on the relocated trees U34 (**Photo 19**), U35 (**Photo 20**) and U37 (**Photo 21**) and they are regarded as dead specimens**.**

Waterlogging problem was found in the areas around the trunk bases of three relocated trees (U76, U77 and U78) before. The relocated tree U77 (*Terminalia catappa*) was suspected to be dead as no leaves was observed in the canopy (**Photo 22**). Soil was deposited close to the tree and even on the trunk of U77 as inspected in April 2013. U76 and U78 (*Terminalia catappa*) were found with regenerated foliage in April 2013 (**Photos 23-24**).

Another relocated tree U79 (*Terminalia catappa*) on the southwest of U76 was found with improved physiological condition with regenerated foliage in April 2013 (**Photo 25**).

The transplanted tree A36 (*Archontophoenix alexandrae*) was noted in marginally fair condition in April 2013, with some dry and brown fronds at the bud (**Photo 26**).

Many relocated trees in Phases 1 and 2 works area within the Nursery were in fairly poor to fair condition due to the poor transplantation skills and poor site condition (e.g. tree root zones have been disturbed by used, turbid liquid or grease). Proper tree protection (e.g. guying and temporary TPZ) and draining/ removal of turbid liquid or grease should be implemented to maintain the existing trees.

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 April 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 should continue the maintenance of proper tagging system for all trees within and outside the hoarded site in order to facilitate the monitoring of their existing condition. In addition, the Contractor should maintain regular monitoring of the tree protection system and condition of the retained and transplanted trees.

All retained trees or trees to be transplanted should be watered regularly (e.g. at least every two days) by the landscape contractor or on-site workers. 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 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. If in such circumstance that there is direct conflict between certain tree parts of the retained, transplanted or relocated tree(s) and the construction works/ machinery, the pruning works should be carried out in accordance with any local, national or international standards related to tree remedial works.

Regular inspection of the tree health of A36, U55, U58 and U75 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 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 March 2013.*

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 May 2013 is scheduled to be conducted in the weeks of 13th and 27th May 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.

There were 4 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, construction of intake structure was conducted. 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 and SS 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	0.290	0.00	0.24	0.00	0.05	0.01	0.00	0.00	0.00	0.00	0.00
Feb 13	0.190	0.00	0.16	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.035
Mar 13	1.14	0.00	1.13	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Apr 13	1.540	0.00	1.52	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00
Total	25.655	0.00	22637	1.85	0.82	0.566	2.37	0.00	0.00	0.00	0.41

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
February 2013	0	0	0	0
March 2013	0	0	0	0
April 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 5th, 11th, 18th and 24th of April 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
17, 24 & 28 Jan 13 6, 15 & 21 Feb 13 7, 14, 21 & 25 Mar 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.	Construction materials were removed by contractor	5 Apr 13	
14 , 21 & 25 Mar 13 5, 11, 18 Apr 13	Damaged tree protective fencing was observed at Area A.	Observation	Contractor was reminded to replace the tree protective fencing as soon as possible.	Outstanding	N/A	
25 Mar 13	Power generator was not placed into the drip tray at Area B.	Observation	Contractor was reminded that the drip tray should be provided for all the power generators.	Drip tray was provided by contractor.	5 Apr 13	
25 Mar 13	Drip tray was not provided for the chemical	Observation	Contractor was reminded to provide the drip tray as soon	Drip tray was provided by contractor.	5 Apr 13	

Date	Findings	Identification	Advice from ET	Action taken	Closing date	Remarks
	material at Area B.		as possible.			
25 Mar 13 5, 11, 18 Apr 13	The public U-channel was blocked by the construction materials at Area B.	Observation	Contractor was reminded to clear the construction materials as soon as possible.	Outstanding	N/A	
11 &18 Apr 13	Chemical materials were not placed inside the drip tray.	Observation	Contractor was reminded that all the chemical materials should be placed inside the drip tray.	Chemical materials were removed by contractor.	24 Apr 13	
24 Apr 13	Construction materials were observed at the public access at Area B.	Observation	Contractor was reminded that the construction materials should be cleaned as soon as possible.	Outstanding	N/A	
24 Apr 13	Construction materials were observed near the trees.	Observation	Contractor was reminded that the tree protective fencing should be provided and the construction materials should be stored properly.	Outstanding	N/A	
24 Apr 13	Damaged tree was observed at Area A.	Observation	Contractor was reminded that the construction materials should be stored properly.	Outstanding	N/A	
24 Apr 13	Muddy water was observed at Area B.	Observation	Contractor was reminded to avoid the muddy water	Outstanding	N/A	

Date	Findings	Identification	Advice from ET	Action taken	Closing date	Remarks
			entering into the public drainage.			

12.2 Compliance with legal and Contractual requirement

There was no non-compliance recorded for the month of April 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 proposed store room, concreting for outfall structure of tidal measuring system, installation of E&M equipment, laying of DM2100 storm relief drain (CH10 to CH30) at Ting Kok Road and construction of green roof 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 24th of April 2013.

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

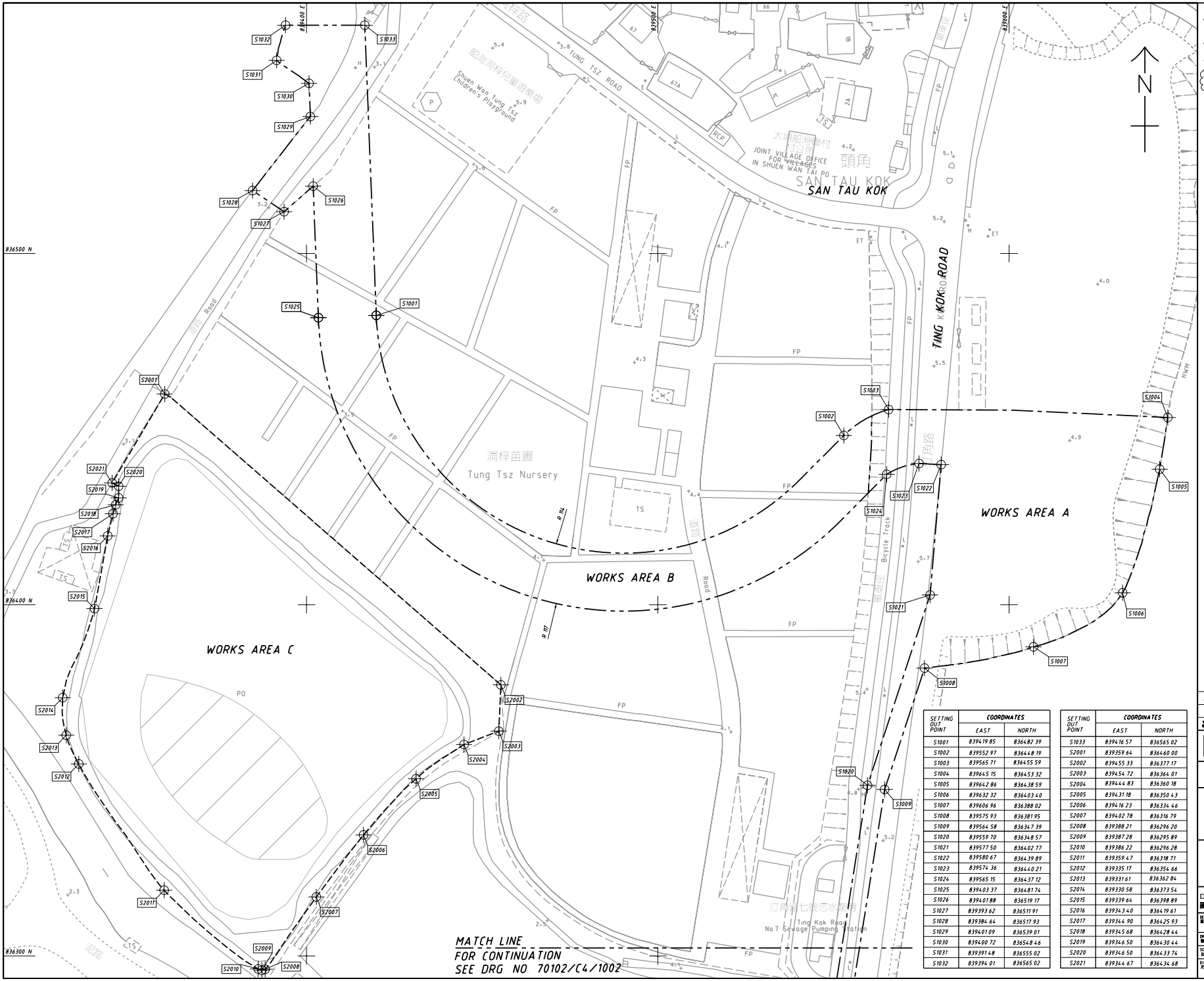
For water quality monitoring, total 7 abnormal incidents of water quality criteria were recorded in this reporting month. During the reporting period, construction of intake structure was conducted near Wai Ha River. Proper mitigation measures were implemented by contractor to avoid site water releasing into the Wai Ha river and no particular observation of defective site activities were found causing water contamination. The exceedances of Turbidity and SS were believed to be mainly attributed by adverse weather and 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.

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

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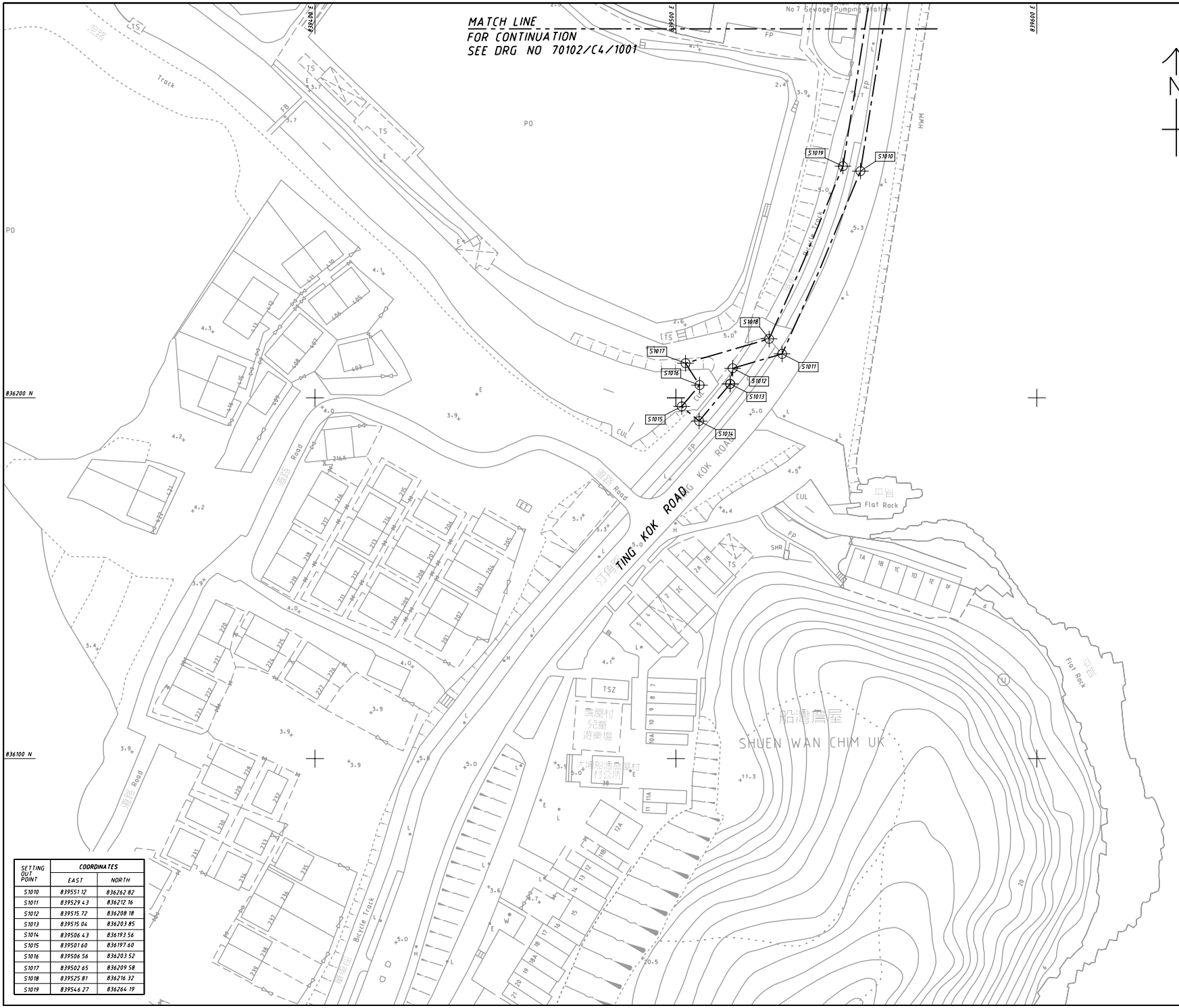

SETTING OUT POINT	COORDINATES	
	EAST	NORTH
S1010	839551.12	836262.82
S1011	839529.43	836212.16
S1012	839515.72	836208.18
S1013	839515.04	836203.85
S1014	839506.43	836193.56
S1015	839501.60	836197.60
S1016	839506.56	836203.52
S1017	839502.65	836209.58
S1018	839525.81	836216.32
S1019	839546.27	836264.19

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

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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. **28553** Page 1 of 5 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. : Q23300 **Date of receipt :** 11-Dec-12

Item Tested

Description : Sound Level Meter

Manufacturer : SVAN

Model : 955 **Serial No.** : 27302

Test Conditions

Date of Test : 8-Jan-13 **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 61672 Type1, IEC 1260 Class1 and manufacturer's specification.

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

Main Test equipment used:

Equipment No.	Description	Cert. No.	Traceable to
S017	Multi-Function Generator	C127181	SCL-HKSAR
S024	Sound Level Calibrator	28588	NIM-PRC & SCL-HKSAR

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

The test equipment used for calibration are traceable to International System of Units (SI).

The test results apply to the above Unit-Under-Test only

Calibrated by : P. F. Wong

Approved by : Dorothy Cheuk

Date: 8-Jan-13

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. **Self-generated noise:** 2.0 dBA (Mfr's Spec (Electrical) ≤14 dBA)

2. **Acoustical signal test**

UUT Setting				Applied Value (dB)	UUT Reading (dB)	
Range (dB)	Frequency Weighting	Time Weighting	1/1 Octave Filter		Before adjust	After adjust
25-120	A	F	OFF	94.0	--	93.5
		S	OFF		--	93.5
	C	F	OFF		--	93.5
	A	F	OFF	114.0	--	113.9
		S	OFF		--	113.9
	C	F	OFF		--	113.9
	A	F	ON	94.0	--	93.5
	A	F	ON	114.0	--	113.9
45-139	A	F	OFF	94.0	*91.6	93.5
		S	OFF		--	93.5
	C	F	OFF		--	93.5
	A	F	OFF	114.0	--	113.9
		S	OFF		--	113.9
	C	F	OFF		--	113.9
	A	F	ON	94.0	--	93.5
	A	F	ON	114.0	--	113.9

Mfr's Spec. : ± 0.7 dB
Uncertainty : ± 0.1 dB

3 **Electrical signal tests of frequency weightings** (A weighting)

Frequency	Attenuation (dB)	IEC 61672 Type 1 Spec.
31.5 Hz	-39.5	- 39.4 dB, ± 2 dB
63 Hz	-26.5	- 26.2 dB, ± 1.5 dB
125 Hz	-16.2	- 16.1 dB, ± 1.5 dB
250 Hz	-8.7	- 8.6 dB, ± 1 dB
500 Hz	-3.3	- 3.2 dB, ± 1.4 dB
1 kHz	0.0 (Ref)	0 dB, ± 1.1 dB
2 kHz	+1.2	+ 1.2 dB, ± 1.6 dB
4 kHz	+1.0	+ 1.0 dB, ± 1.6 dB
8 kHz	-1.1	- 1.1 dB, + 2.1 dB ~ -3.1 dB
16 kHz	-6.9	- 6.6 dB, + 3.5 dB ~ - 17.0 dB

Uncertainty : ± 0.1 dB

Calibration Certificate

4. Frequency & Time weightings at 1 kHz

4.1 Frequency Weighting (Fast)

UUT Setting	Applied Value (dB)	UUT Reading (dB)	Difference (dB)	IEC 61672 Type 1 Spec.
A	94.0	93.5 (Ref.)	- -	± 0.4 dB
C	94.0	93.5	0.0	

4.2 Time Weighting (A-weighted)

UUT Setting	Applied Value (dB)	UUT Reading (dB)	Difference (dB)	IEC 61672 Type 1 Spec.
Fast	94.0	93.5 (Ref.)	- -	± 0.3 dB
Slow	94.0	93.5	0.0	
Time-averaging	94.0	93.5	0.0	

Uncertainty : ± 0.1 dB

5. Level linearity on the reference level range

UUT Range	Applied Value (dB)	UUT Reading (dB)	Difference (dB)	IEC 61672 Type 1 Spec.
140 dB (Ref Level)	137.0	136.5	0.0	± 1.1 dB
	136.0	135.5	0.0	
	135.0	134.5	0.0	
	134.0	133.5	0.0	
	129.0	128.5	0.0	
	124.0	123.5	0.0	
	119.0	118.5	0.0	
	114.0	113.5	0.0	
	109.0	108.5	0.0	
	104.0	103.5	0.0	
	99.0	98.5	0.0	
	94.0	93.5 (Ref)	--	
	89.0	88.5	0.0	
	84.0	83.5	0.0	
	79.0	78.5	0.0	
	74.0	73.5	0.0	
	69.0	68.5	0.0	
	64.0	63.5	0.0	
	59.0	58.5	0.0	
	54.0	53.5	0.0	
	49.0	48.4	0.1	
	48.0	47.4	0.1	

Uncertainty : ± 0.1 dB

Calibration Certificate

6. Toneburst response (4kHz)

UUT Setting	Tone Burst Duration(ms)	UUT Reading(dB)	Difference (dB)	IEC 61672 Type 1 Spec.
Fast	Steady	137.0(Ref)	--	--
	200	136.0	-1.0	-1.0 ± 0.8dB
	2	118.9	-18.1	-18.0, +1.3 dB ~ -1.8 dB
	0.25	109.9	-27.1	-27.0, +1.3 dB ~ -3.3 dB
Slow	Steady	137.0(Ref)	--	--
	200	129.5	-7.5	-7.4 ± 0.8dB
	2	109.9	-27.1	-27.0, +1.3 dB ~ -3.3 dB
Time averaging	Steady	137.0(Ref)	--	--
	200	130.0	-7.0	-7.0±0.8dB
	2	110.8	-26.2	-27.0, +1.3 dB ~ -1.8 dB
	0.25	102.0	-35.0	-36.0, +1.3 dB ~ -3.3 dB

Uncertainty : ± 0.1 dB

7. Peak C sound level (140 dB Range, C-weighted, Fast)

Freq(Hz)	Signal Type	Indication of overload	UUT reading (dB)	Difference (dB)	IEC 61672 Type 1 Spec.
8000	Steady	--	132.0	--	3.2 ± 2.4 dB
	Complete-cycle	No	135.3	3.3 dB	
500	Steady	--	132.0	--	2.4 ± 1.4 dB
	+ve half-cycle	No	129.3	2.7 dB	
	-ve half-cycle	No	129.1	2.9 dB	

Uncertainty : ± 0.1 dB

Calibration Certificate

8. Overload indication (140 dB range, A-weighted, Time-average, 4kHz)

UUT Reading at overload (dB)		Difference (dB)	IEC 61672 Type 1 Spec.
+ ve one half cycle	- ve one half cycle		
137.0	138.5	1.5	< 1.8 dB

The overload indicator latched on until reset

Uncertainty : ± 0.1 dB

9. Filter Characteristics

9.1 1/1 – Octave Filter

Frequency	Attenuation (dB)	IEC 1260 Class 1 (dB)
125 Hz	-76.4	< - 61
250 Hz	-70.5	< - 42
500 Hz	-36.3	< - 17.5
707 Hz	-4.3	- 2 ~ - 5
1 kHz (Ref)	--	--
1.414 kHz	-2.1	- 2 ~ - 5
2 kHz	-50.6	< - 17.5
4 kHz	-82.3	< - 42
8 kHz	-82.5	< - 61

Uncertainty : ± 0.25 dB

Remarks : 1. UUT : Unit-Under-Test
2. The uncertainty claimed is for a confidence probability of not less than 95%.
3. Atmospheric Pressure : 1010 hPa.
4. Preamplifier model : SV 12L , S/N : 25732
5. Firmware Version: 6.12.4
6. Power Supply Check: OK
7. The UUT was adjusted with the supplied sound calibrator at the reference sound pressure level before the calibration.
8. *Out of specification.

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

Hong Kong Calibration Ltd.
香港校正有限公司

Calibration Certificate

Certificate No. **28554** 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. : Q23300 **Date of receipt :** 11-Dec-12

Item Tested

Description : Sound Level Calibrator

Manufacturer : Svantek

Model : SV30A **Serial No.** : 29085

Test Conditions

Date of Test : 3-Jan-13 **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 Class1 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	28588	NIM-PRC & SCL-HKSAR
S041	Universal Counter	28347	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: 3-Jan-13

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

E

Calibration Certificate

Certificate No. 28554

Results :

1. Level Accuracy

UUT Nominal Value (dB)	Measured Value (dB)	IEC 942 Class 1 Spec.
94	94.03	± 0.3 dB
114	114.02	

Uncertainty : ± 0.2 dB

2. Frequency

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

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

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

4. Total Harmonic Distortion : < 0.1 %
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 : 1010 hPa.

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

ALS Technichem (HK) Pty Ltd

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT:	MR ALLEN CHAN	**WORK ORDER:**	HK1302895
CLIENT:	ENVIRONMENTAL PIONEERS & SOLUTIONS LIMITED	**LABORATORY:**	HONG KONG
ADDRESS:	FLAT A, 19/F, CHAI WAN INDUSTRIAL BUILDING, 20 LEE CHUNG STREET, CHAI WAN, HONG KONG	**DATE RECEIVED:**	01/02/2013
		DATE OF ISSUE:	15/02/2013

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:	WATER QUALITY MULTI-METER
Brand Name:	TOA DKK
Model No.:	WMS-24
Serial No.:	685940
Equipment No.:	--
Date of Calibration:	08 February, 2013

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: HK1302895
Date of Issue: 15/02/2013
Client: ENVIRONMENTAL PIONEERS & SOLUTIONS LIMITED

Description: WATER QUALITY MULTI-METER
Brand Name: TOA DKK
Model No.: WMS-24
Serial No.: 685940
Equipment No.: --
Date of Calibration: 08 February, 2013 Date of next Calibration: 08 May, 2013

Parameters:

Conductivity

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

Expected Reading (uS/cm)	Displayed Reading (uS/cm)	Tolerance (%)
146.9	143.0	-2.7
6667	7100	6.5
12890	13100	1.6
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)
3.14	3.07	-0.07
6.20	6.29	0.09
8.54	8.60	0.06
	Tolerance Limit (±mg/L)	0.20

pH Value

Method Ref: APHA 21st Ed. 4500H:B

Expected Reading (pH Unit)	Displayed Reading (pH Unit)	Tolerance (pH unit)
4.0	4.00	0.00
7.0	6.89	-0.11
10.0	9.91	-0.09
	Tolerance Limit (±pH 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)
10.0	10.3	0.3
22.0	21.3	-0.7
38.0	37.9	-0.1
	Tolerance Limit (±°C)	2.0

Turbidity

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

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.0	--
4	4.3	7.5
40	38.9	-2.8
80	84.4	5.5
400	391.0	-2.3
800	782.5	-2.2
	Tolerance Limit (±%)	10.0

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

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		3/4/2013	3/4/2013
Weather Condition		Cloudy	Cloudy
Measurement Start Time (hh:mm)		10:15	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))	64.3	66.1
	L_{10} (dB(A))	65.4	67.6
	L_{90} (dB(A))	49.1	52.3
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**	3/4/2013

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		10/4/2013	10/4/2013
Weather Condition		Sunny	Sunny
Measurement Start Time (hh:mm)		13:50	14:25
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))	63.6	63.2
	L_{10} (dB(A))	65.8	64.7
	L_{90} (dB(A))	52.9	48.1
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**	10/4/2013

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		17/4/2013	17/4/2013
Weather Condition		Overcast	Overcast
Measurement Start Time (hh:mm)		9:00	9:40
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))	66.9	68.3
	L_{10} (dB(A))	67.7	69.2
	L_{90} (dB(A))	52.3	56.6
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**	17/4/2013

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		24/4/2013	24/4/2013
Weather Condition		Overcast	Overcast
Measurement Start Time (hh:mm)		12:40	13:15
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))	61.8	62.1
	L_{10} (dB(A))	62.7	63.8
	L_{90} (dB(A))	47.7	50.1
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**	24/4/2013

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 : 3/4/2013

Weather : Cloudy

Monitoring Location	W1	W2	C1
Time (hhmm)	11:00	10:15	10:20
Tide Mode	Mid-flood		
Water Depth (m)	<1	<1	<1
pH value	8.70	7.96	7.87
Temperature (^{o}C)	23.4	19.8	19.8
Turbidity (NTU)	5.9	2.1	2.4
DO (mg/L)	6.90	7.18	7.56
DO Saturation (%)	82%	84%	88%
Suspended Solids (mg/L)	10.0	1.2	6.6

Remark or Observation :

	Name	Signature	Date
Prepared By :	Lau kai chung	**Lau kai chung**	3/4/2013

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

Date of Sampling : 6/4/2013

Weather : Sunny

Monitoring Location	**W1**	**W2**	**C2**
Time (hhmm)	9:00	10:40	9:25
Tide Mode	Mid-ebb		N/A
Water Depth (m)	<1	<1	<1
pH value	8.80	7.56	8.20
Temperature (^{o}C)	22.4	21.3	22.5
Turbidity (NTU)	4.4	2.8	6.8
DO (mg/L)	6.80	7.88	7.40
DO Saturation (%)	79%	95%	86%
Suspended Solids (mg/L)	26.0	2.0	4.0

Remark or Observation :

	Name	**Signature**	**Date**
Prepared By :	Lau kai chung	**Lau kai chung**	6/4/2013

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

Date of Sampling : 8/4/2013

Weather : Sunny

Monitoring Location	**W1**	**W2**	**C2**
Time (hhmm)	11:18	12:30	11:08
Tide Mode	Mid-ebb		N/A
Water Depth (m)	<1	<1	<1
pH value	7.70	7.46	8.50
Temperature (^{o}C)	22.8	19.5	21.5
Turbidity (NTU)	10.00	3.2	12.60
DO (mg/L)	6.80	7.89	6.70
DO Saturation (%)	75%	88%	75%
Suspended Solids (mg/L)	34.0	1.0	80.0

Remark or Observation :

	Name	**Signature**	**Date**
Prepared By :	Lau kai chung	**Lau kai chung**	8/4/2013

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

Date of Sampling : 10/4/2013

Weather : Sunny

Monitoring Location	W1	W2	C2
Time (hhmm)	12:30	13:50	16:30
Tide Mode	Mid-ebb		N/A
Water Depth (m)	<1	<1	<1
pH value	7.70	7.48	8.30
Temperature (^{o}C)	23.9	21.3	23.4
Turbidity (NTU)	19.1	7.9	1.9
DO (mg/L)	5.30	7.48	5.40
DO Saturation (%)	63%	85%	63%
Suspended Solids (mg/L)	11.0	15.0	2.0

Remark or Observation :

	Name	Signature	Date
Prepared By :	Lau kai chung	**Lau kai chung**	10/4/2013

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

Date of Sampling : 12/4/2013

Weather : Sunny

Monitoring Location	W1	W2	C2
Time (hhmm)	13:00	15:10	13:30
Tide Mode	Mid-ebb		N/A
Water Depth (m)	<1	<1	<1
pH value	7.90	7.66	8.30
Temperature (^{o}C)	21.6	21.8	21.5
Turbidity (NTU)	4.3	3.3	6.1
DO (mg/L)	5.80	8.06	6.50
DO Saturation (%)	66%	100%	74%
Suspended Solids (mg/L)	5.0	4.8	10.0

Remark or Observation :

	Name	Signature	Date
Prepared By :	Lau kai chung	**Lau kai chung**	12/4/2013

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

Date of Sampling : 15/4/2013

Weather : Sunny

Monitoring Location	**W1**	**W2**	**C2**
Time (hhmm)	15:00	15:10	15:30
Tide Mode	Mid-ebb		N/A
Water Depth (m)	<1	<1	<1
pH value	8.30	7.36	8.10
Temperature (^{o}C)	25.1	23.1	24.7
Turbidity (NTU)	1.9	2.5	2.1
DO (mg/L)	5.60	7.13	5.50
DO Saturation (%)	68%	80%	67%
Suspended Solids (mg/L)	6.0	8.4	3.0

Remark or Observation :

	Name	**Signature**	**Date**
Prepared By :	Lau kai chung	**Lau kai chung**	15/4/2013

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

Date of Sampling : 17/4/2013

Weather : Rainy

Monitoring Location	W1	W2	C2
Time (hhmm)	9:30	16:00	9:00
Tide Mode	Mid-ebb		N/A
Water Depth (m)	<1	<1	<1
pH value	7.70	8.10	7.40
Temperature (^{o}C)	24.2	21.1	24.1
Turbidity (NTU)	6.0	5.6	4.3
DO (mg/L)	4.90	6.86	6.00
DO Saturation (%)	59%	70%	73%
Suspended Solids (mg/L)	12.0	3.4	4.0

Remark or Observation :

	Name	Signature	Date
Prepared By :	Lau kai chung	**Lau kai chung**	17/4/2013

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

Date of Sampling : 19/4/2013

Weather : Sunny

Monitoring Location	**W1**	**W2**	**C2**
Time (hhmm)	17:30	15:50	17:00
Tide Mode	Mid-ebb		N/A
Water Depth (m)	<1	<1	<1
pH value	8.00	7.35	7.90
Temperature (^{o}C)	25.6	22.3	25.4
Turbidity (NTU)	20.3	2.0	6.6
DO (mg/L)	6.10	6.89	5.70
DO Saturation (%)	74%	75%	70%
Suspended Solids (mg/L)	17.0	2.6	13.0

Remark or Observation :

	Name	**Signature**	**Date**
Prepared By :	Lau kai chung	**Lau kai chung**	19/4/2013

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

Date of Sampling : 22/4/2013

Weather : Sunny

Monitoring Location	**W1**	**W2**	**C2**
Time (hhmm)	10:00	11:10	10:15
Tide Mode	Mid-ebb		N/A
Water Depth (m)	<1	<1	<1
pH value	7.70	7.89	7.90
Temperature (^{o}C)	23.5	21.3	23.6
Turbidity (NTU)	6.2	2.9	4.3
DO (mg/L)	4.80	6.79	5.60
DO Saturation (%)	58%	70%	67%
Suspended Solids (mg/L)	8.0	6.2	2.0

Remark or Observation :

	Name	**Signature**	**Date**
Prepared By :	Lau kai chung	**Lau kai chung**	22/4/2013

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

Date of Sampling : 24/4/2013

Weather : Overcast

Monitoring Location	W1	W2	C2
Time (hhmm)	11:10	12:40	10:50
Tide Mode	Mid-ebb		N/A
Water Depth (m)	<1	<1	<1
pH value	8.00	7.88	8.10
Temperature (^{o}C)	25.1	23.1	26.5
Turbidity (NTU)	7.0	6.9	12.8
DO (mg/L)	8.30	7.34	7.30
DO Saturation (%)	104%	85%	89%
Suspended Solids (mg/L)	25.0	13.0	51.0

Remark or Observation :

	Name	Signature	Date
Prepared By :	Lau kai chung	**Lau kai chung**	24/4/2013

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

Date of Sampling : 26/4/2013

Weather : Sunny

Monitoring Location	**W1**	**W2**	**C2**
Time (hhmm)	12:00	14:00	12:30
Tide Mode	Mid-ebb		N/A
Water Depth (m)	<1	<1	<1
pH value	7.50	7.88	7.40
Temperature (^{o}C)	25.4	21.9	24
Turbidity (NTU)	10.9	2.0	13.0
DO (mg/L)	4.80	7.78	5.50
DO Saturation (%)	58%	85%	67%
Suspended Solids (mg/L)	51.0	4.8	29.0

Remark or Observation :

	Name	**Signature**	**Date**
Prepared By :	Lau kai chung	**Lau kai chung**	26/4/2013

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

Date of Sampling : 29/4/2013

Weather : Sunny

Monitoring Location	W1	W2	C2
Time (hhmm)	14:00	16:10	09:15
Tide Mode	Mid-ebb		N/A
Water Depth (m)	<1	<1	<1
pH value	8.20	7.98	8.50
Temperature (^{o}C)	24.5	22.3	25.7
Turbidity (NTU)	4.3	3.0	0.3
DO (mg/L)	6.10	7.71	4.70
DO Saturation (%)	75%	85%	59%
Suspended Solids (mg/L)	13.0	5.6	2.0

Remark or Observation :

	Name	Signature	Date
Prepared By :	Lau kai chung	**Lau kai chung**	29/4/2013

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	6-Apr-2013	16:00	Sunny	0.48	0.06	0.075
H1	Mid	Flood						
H1	Mid	Flood						
H1	Mid	Flood						
H2	Mid	Flood	6-Apr-2013	15:40	Sunny	0.24	0.12	0.754
H2	Mid	Flood						
H2	Mid	Flood						
H2	Mid	Flood						
H1	Mid	Ebb	6-Apr-2013	10:25	Sunny	0.18	0.18	0.225
H1	Mid	Ebb	*12/4/2013	15:00	Sunny	0.12	0.06	0.075
H1	Mid	Ebb	*19/4/2013	15:30	Sunny	0.24	0.12	0.150
H1	Mid	Ebb	*26/4/2013	13:45	Sunny	0.24	0.12	0.150
H2	Mid	Ebb	6-Apr-2013	10:00	Sunny	0.12	0.24	1.507
H2	Mid	Ebb	*12/4/2013	14:30	Sunny	0.24	0.12	0.754
H2	Mid	Ebb	*19/4/2013	15:00	Sunny	0.18	0.18	1.130
H2	Mid	Ebb	*26/4/2013	13:20	Sunny	0.18	0.24	1.507

*Only one mid-tide is within working hours on 12,19 & 26 Apr 2013.

Appendix G: Landscape and Visual Monitoring Photos

	
Photo 1 – Temporary hoardings have been established to surround the works area at Wai Ha River estuary.	**Photo 2** – Temporary barriers along a section of Ting Kok Road next to the main entrance of Area A.
	
Photo 3 – The temporary hoardings at the western end of Phase 2 works area were replaced by transparent hoardings.	**Photo 4** – The temporary hoardings at the eastern end of Phase 1 in the Nursery were replaced by temporary construction barriers.
	
Photo 5 – No discharge of muddy water was observed in Area C.	**Photo 6** – Overall view of the transplanted tree U58.

	
Photo 7 – Resprouts from the remained stump of U68.	**Photo 8** – Overall view of the transplanted tree U64. Climbers at the lower trunk and in the planter were removed.
	
Photo 9 – The transplanted tree U61 was replanted in Area B.	**Photo 10** – Overall view of the transplanted tree U75.

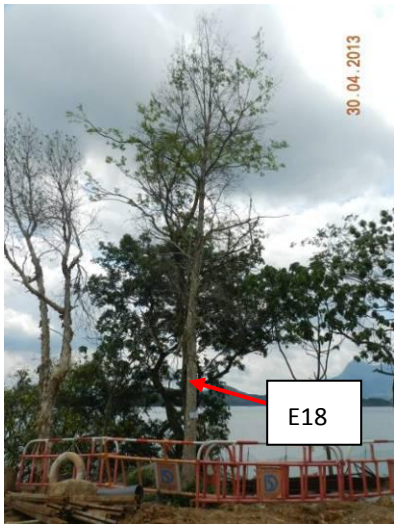



Photo 11 – Poor condition of relocated tree E18.	**Photo 12** – Fair health condition of relocated tree E16.

	
Photo 13 – E97 relocated in the northeastern part of Area A was found with new foliage in the canopy.	**Photo 14** – Wound was found at the trunk base of E61 as inspected on 18th April 2013, with leaning tree trunk and cracked lower trunk.
	
Photo 15 – U55 was also found recently damaged with wounds on the trunk.	**Photo 16** – Close view of the wound on the trunk of U55.
	
Photo 17 – The physiological condition of U55 has been improved and new foliage was observed in the canopy.	**Photo 18** – Poor condition of the relocated tree T102 as observed within the Phase 2 works area of Area B.

	
Photo 19 – No recovery sign of the relocated tree U34 in Area B was observed.	**Photo 20** – No recovery sign of the relocated tree U35 was observed.
	
Photo 21 – No recovery sign of the relocated tree U37 was observed.	**Photo 22** – The relocated tree U77 in Area B was suspected dead as no foliage was found in the canopy.
	
Photo 23 – New leaves were found on the canopy of the relocated tree U76.	**Photo 24** – New leaves were found on the canopy of the relocated tree U78.

	
Photo 25 – The relocated tree U79 was found with improved physiological condition with regenerated foliage observed in April 2013.	**Photo 26** –The transplanted tree A36 was noted in marginally fair condition in April 2013, with some dry and brown fronds at the bud.

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

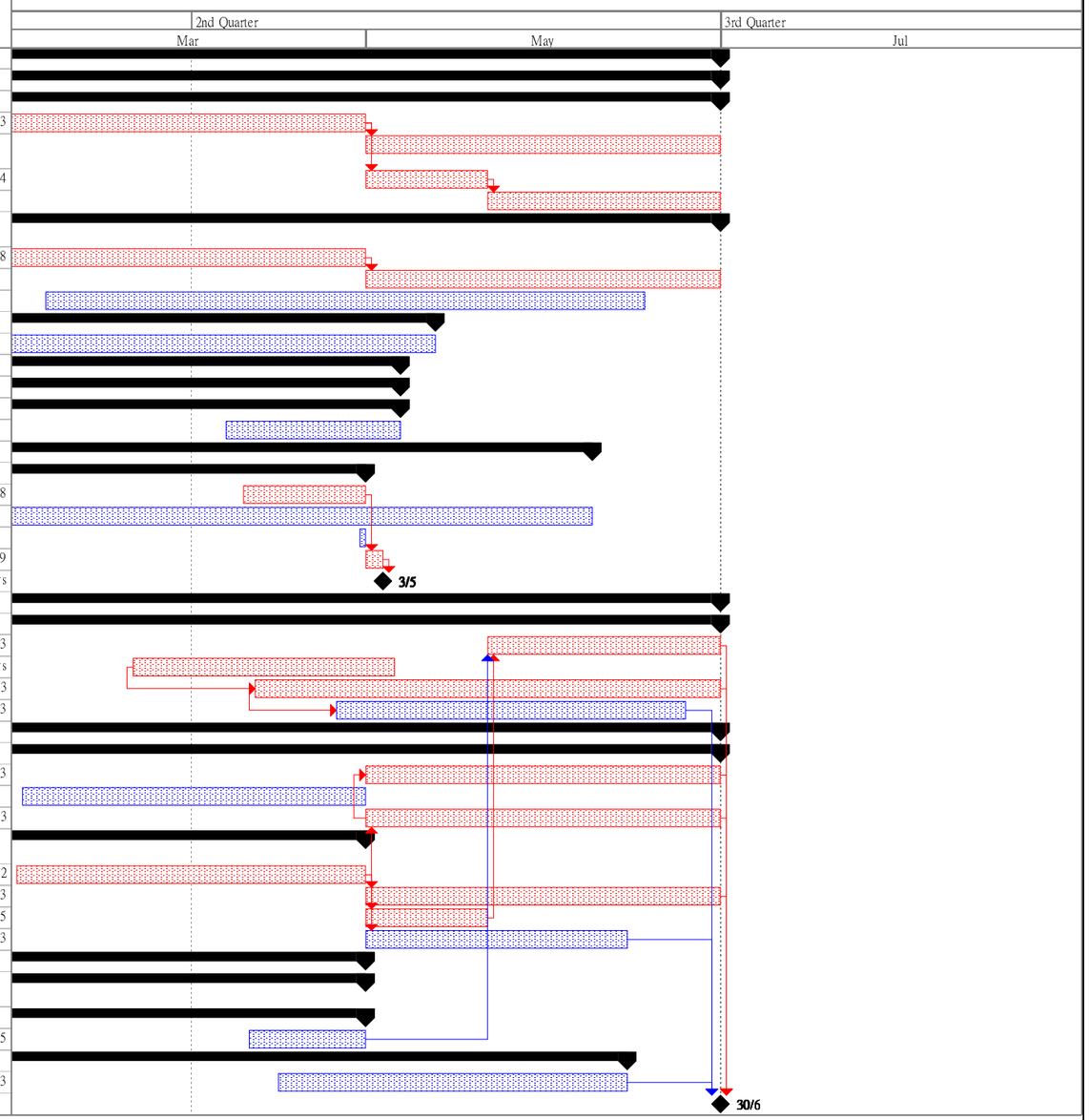
Kwan Lee - Kuly Joint Venture

Contract No.: DC/2009/22

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

3 Months Rolling Programme (May 2013 to July 2013)

ID	Task Name	Duration	Start	Finish	Predecessors	Successors
14	**Section I (Area A,B - Shuen Wan)**	**1221 days**	**Fri 26/2/10**	**Sun 30/6/13**		
17	**Extension of Time**	**306 days**	**Wed 29/8/12**	**Sun 30/6/13**		
19	**Claim no. 20 - DN2800 twin pipes crossing Ting Kok Road**	**180 days**	**Wed 2/1/13**	**Sun 30/6/13**		
21	excavation & pipe jacking	119 days	Wed 2/1/13	Tue 30/4/13		22,23
22	construction of Box Culvert - Bay no. 17, 18, 8A & transition at Jacking Pit	61 days	Wed 1/5/13	Sun 30/6/13	21	
23	construction of Box Culvert - transition at Receiving Pit	21 days	Wed 1/5/13	Tue 21/5/13	21	24
24	boundary wall / pavement near Receiving Pit	40 days	Wed 22/5/13	Sun 30/6/13	23	
25	**Utilities in conflict with DN2100 pipe - uncharted watermain (/ DN450 rising main & thrust block**	**180 days**	**Wed 2/1/13**	**Sun 30/6/13**		
27	CH 180~215 / CH 215~230	119 days	Wed 2/1/13	Tue 30/4/13		28
28	Boundary Wall / Pavement / Planter in PS	61 days	Wed 1/5/13	Sun 30/6/13	27	
29	EOT claims due to Inclement Weather	103 days	Thu 7/3/13	Mon 17/6/13	18	
30	**Delay by CLP Power Supply**	**157 days**	**Fri 7/12/12**	**Sun 12/5/13**		
32	E & M Works - Testing & Commissioing	119 days	Mon 14/1/13	Sun 12/5/13	31	
52	**Pumping Station**	**1166 days**	**Fri 26/2/10**	**Mon 6/5/13**		
64	**Main Structure of Pumping Station**	**1066 days**	**Sun 6/6/10**	**Mon 6/5/13**		
76	**Other Works**	**359 days**	**Sun 13/5/12**	**Mon 6/5/13**		
77	Manmade Slope/roofing	30 days	Sun 7/4/13	Mon 6/5/13	285	
84	**E&M Works**	**1105 days**	**Mon 31/5/10**	**Sat 8/6/13**		
135	**Testing & Commissioning**	**275 days**	**Mon 30/7/12**	**Tue 30/4/13**		
140	System Commissioning	21 days	Wed 10/4/13	Tue 30/4/13	139	148
143	Submission of Revised O&M Manual	609 days	Sun 9/10/11	Sat 8/6/13		
145	2nd Session of Training	1 day	Tue 30/4/13	Tue 30/4/13	144FS+6 days	
148	Plant Handover to Client	3 days	Wed 1/5/13	Fri 3/5/13	140	149
149	Anticipated Completion Date	0 days	Fri 3/5/13	Fri 3/5/13	148	144FF-10 days
151	**External Structure**	**181 days**	**Tue 1/1/13**	**Sun 30/6/13**		
163	**External Misc. Works**	**143 days**	**Fri 8/2/13**	**Sun 30/6/13**		
165	Boundary Wall & Fencing	40 days	Wed 22/5/13	Sun 30/6/13	219,280,167	333
168	Backfiling for Road Work, Surface Drainage System & Catchpits	45 days	Fri 22/3/13	Sun 5/5/13	166,161,222	169SS+21 days
169	Road work / Concrete Pavement	80 days	Fri 12/4/13	Sun 30/6/13	168SS+21 days	170SS+14 days,333
170	Planter/Landscaping Works	60 days	Fri 26/4/13	Mon 24/6/13	169SS+14 days	333
172	**Box Culvert**	**1221 days**	**Fri 26/2/10**	**Sun 30/6/13**		
185	**Single Cell Box Culvert**	**784 days**	**Mon 9/5/11**	**Sun 30/6/13**		
198	Box Culvert at Chainage 128 to 141.5 (Bay 8A)	61 days	Wed 1/5/13	Sun 30/6/13	202SS	333
200	Box Culvert at Chainage 214 to 228 (Bay 14)	59 days	Sun 3/3/13	Tue 30/4/13	201	
202	Box Culvert at Chainage 250 - 274 (Bay 17, 18)	61 days	Wed 1/5/13	Sun 30/6/13	201,217	198SS,333
203	**Pipes Laying by Trenchless Method from Chainage 285 to 305**	**399 days**	**Wed 28/3/12**	**Tue 30/4/13**		
217	Grouting, excavation & Pipe Installation (2nd Pipeline)	60 days	Sat 2/3/13	Tue 30/4/13	216	219,224,218,202
218	Box Culvert at Chainage 274 to 285 (transition -JP)	61 days	Wed 1/5/13	Sun 30/6/13	201,217	333
219	Box Culvert at Chainage 305 to 310 (transition - RP)	21 days	Wed 1/5/13	Tue 21/5/13	217	165
224	Reinstatement of Planters	45 days	Wed 1/5/13	Fri 14/6/13	217	333
226	**Dia. 2100mm Drainage Pipe**	**1160 days**	**Fri 26/2/10**	**Tue 30/4/13**		
244	**Construction of 2100mm Pipe & Existing Stormwater Drain along Ting Kok Road**	**595 days**	**Wed 14/9/11**	**Tue 30/4/13**		
275	**5th Section (25m from CH180 to CH215)**	**72 days**	**Mon 18/2/13**	**Tue 30/4/13**		
280	Backfill and Reinstatement	20 days	Thu 11/4/13	Tue 30/4/13	279	165
309	**Intake (As required in Dry Season) - Section 1**	**600 days**	**Mon 24/10/11**	**Fri 14/6/13**		
332	Misc. Works & Reinstatement	60 days	Tue 16/4/13	Fri 14/6/13	316	333
333	**Completion of Section I**	0 days	Sun 30/6/13	Sun 30/6/13	218,198,202,224,165,169	



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 J: Three month rolling programme

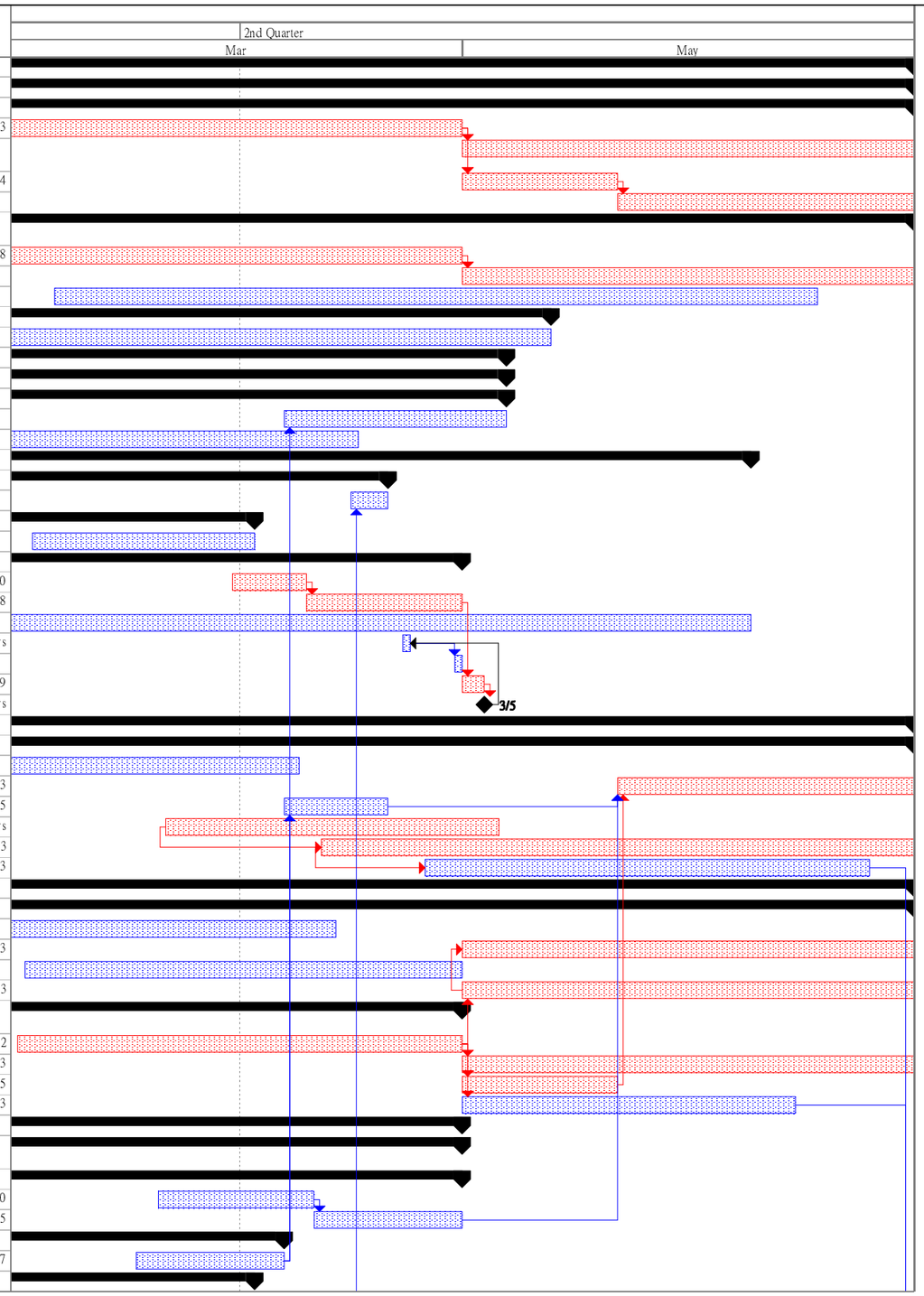
Kwan Lee - Kuly Joint Venture

Contract No.: DC/2009/22

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

3 Months Rolling Programme (April 2013 to June 2013)

ID	Task Name	Duration	Start	Finish	Predecessors	Successors
14	**Section I (Area A,B - Shuen Wan)**	**1221 days**	**Fri 26/2/10**	**Sun 30/6/13**		
17	**Extension of Time**	**306 days**	**Wed 29/8/12**	**Sun 30/6/13**		
19	**Claim no. 20 - DN2800 twin pipes crossing Ting Kok Road**	**180 days**	**Wed 2/1/13**	**Sun 30/6/13**		
21	excavation & pipe jacking	119 days	Wed 2/1/13	Tue 30/4/13		22,23
22	construction of Box Culvert - Bay no. 17, 18, 8A & transition at Jacking Pit	61 days	Wed 1/5/13	Sun 30/6/13	21	
23	construction of Box Culvert - transition at Receiving Pit	21 days	Wed 1/5/13	Tue 21/5/13	21	24
24	boundary wall / pavement near Receiving Pit	40 days	Wed 22/5/13	Sun 30/6/13	23	
25	**Utilities in conflict with DN2100 pipe - uncharted watermain (Claim no. 14) / DN450 rising main & thrust block**	**180 days**	**Wed 2/1/13**	**Sun 30/6/13**		
27	CH 180~215 / CH 215~230	119 days	Wed 2/1/13	Tue 30/4/13		28
28	Boundary Wall / Pavement / Planter in PS	61 days	Wed 1/5/13	Sun 30/6/13	27	
29	EOT claims due to Inclement Weather	103 days	Thu 7/3/13	Mon 17/6/13	18	
30	**Delay by CLP Power Supply**	**157 days**	**Fri 7/12/12**	**Sun 12/5/13**		
32	E & M Works - Testing & Commissioing	119 days	Mon 14/1/13	Sun 12/5/13	31	
52	**Pumping Station**	**1166 days**	**Fri 26/2/10**	**Mon 6/5/13**		
64	**Main Structure of Pumping Station**	**1066 days**	**Sun 6/6/10**	**Mon 6/5/13**		
76	**Other Works**	**359 days**	**Sun 13/5/12**	**Mon 6/5/13**		
77	Manmade Slope/roofing	30 days	Sun 7/4/13	Mon 6/5/13	285	
82	External Finishing Works	100 days	Mon 7/1/13	Tue 16/4/13	81	
84	**E&M Works**	**1105 days**	**Mon 31/5/10**	**Sat 8/6/13**		
128	**Drain Intake at Ting Kok Road**	**200 days**	**Wed 3/10/12**	**Sat 20/4/13**		
130	Installation of Stoplog SL07A	5 days	Tue 16/4/13	Sat 20/4/13	316,129	
131	**Box Culvert**	**65 days**	**Mon 28/1/13**	**Tue 2/4/13**		
132	Installation of Manual Penstock, SG06 at MH06	30 days	Mon 4/3/13	Tue 2/4/13	290,295	
135	**Testing & Commissioning**	**275 days**	**Mon 30/7/12**	**Tue 30/4/13**		
139	Wet Commissioning Test of Pumps	10 days	Sun 31/3/13	Tue 9/4/13	138,122	140
140	System Commissioning	21 days	Wed 10/4/13	Tue 30/4/13	139	148
143	Submission of Revised O&M Manual	609 days	Sun 9/10/11	Sat 8/6/13		
144	1st Session of Training	1 day	Tue 23/4/13	Tue 23/4/13	149FF-10 days	145FS+6 days
145	2nd Session of Training	1 day	Tue 30/4/13	Tue 30/4/13	144FS+6 days	
148	Plant Handover to Client	3 days	Wed 1/5/13	Fri 3/5/13	140	149
149	Anticipated Completion Date	0 days	Fri 3/5/13	Fri 3/5/13	148	144FF-10 days
151	**External Structure**	**181 days**	**Tue 1/1/13**	**Sun 30/6/13**		
163	**External Misc. Works**	**143 days**	**Fri 8/2/13**	**Sun 30/6/13**		
164	Plumbing Works	60 days	Fri 8/2/13	Mon 8/4/13	166SS	
165	Boundary Wall & Fencing	40 days	Wed 22/5/13	Sun 30/6/13	219,280,167	333
167	Sewer Manhole SM1	14 days	Sun 7/4/13	Sat 20/4/13	285	165
168	Backfiling for Road Work, Surface Drainage System & Catchpits	45 days	Fri 22/3/13	Sun 5/5/13	166,161,222	169SS+21 days
169	Road work / Concrete Pavement	80 days	Fri 12/4/13	Sun 30/6/13	168SS+21 days	170SS+14 days,333
170	Planter/Landscaping Works	60 days	Fri 26/4/13	Mon 24/6/13	169SS+14 days	333
172	**Box Culvert**	**1221 days**	**Fri 26/2/10**	**Sun 30/6/13**		
185	**Single Cell Box Culvert**	**784 days**	**Mon 9/5/11**	**Sun 30/6/13**		
196	Box Culvert at Chainage 12.5 to 40 (Bay 2, 3)	80 days	Thu 24/1/13	Sat 13/4/13	195,197	
198	Box Culvert at Chainage 128 to 141.5 (Bay 8A)	61 days	Wed 1/5/13	Sun 30/6/13	202SS	333
200	Box Culvert at Chainage 214 to 228 (Bay 14)	59 days	Sun 3/3/13	Tue 30/4/13	201	
202	Box Culvert at Chainage 250 - 274 (Bay 17, 18)	61 days	Wed 1/5/13	Sun 30/6/13	201,217	198SS,333
203	**Pipes Laying by Trenchless Method from Chainage 285 to 305**	**399 days**	**Wed 28/3/12**	**Tue 30/4/13**		
217	Grouting, excavation & Pipe Installation (2nd Pipeline)	60 days	Sat 2/3/13	Tue 30/4/13	216	219,224,218,202
218	Box Culvert at Chainage 274 to 285 (transition -JP)	61 days	Wed 1/5/13	Sun 30/6/13	201,217	333
219	Box Culvert at Chainage 305 to 310 (transition - RP)	21 days	Wed 1/5/13	Tue 21/5/13	217	165
224	Reinstatement of Planters	45 days	Wed 1/5/13	Fri 14/6/13	217	333
226	**Dia. 2100mm Drainage Pipe**	**1160 days**	**Fri 26/2/10**	**Tue 30/4/13**		
244	**Construction of 2100mm Pipe & Existing Stormwater Drain along Ting Kok Road**	**595 days**	**Wed 14/9/11**	**Tue 30/4/13**		
275	**5th Section (25m from CH180 to CH215)**	**72 days**	**Mon 18/2/13**	**Tue 30/4/13**		
279	Concrete Pipe Installation and Manhole Construction	21 days	Thu 21/3/13	Wed 10/4/13	278	280
280	Backfill and Reinstatement	20 days	Thu 11/4/13	Tue 30/4/13	279	165
281	**6th Section (25m from CH215 to CH230)**	**80 days**	**Thu 17/1/13**	**Sat 6/4/13**		
285	Backfill and reinstatement	20 days	Mon 18/3/13	Sat 6/4/13	284	167,77
302	**Construction of DN1800 Pipes by Trenchless Method**	**330 days**	**Tue 8/5/12**	**Tue 2/4/13**		



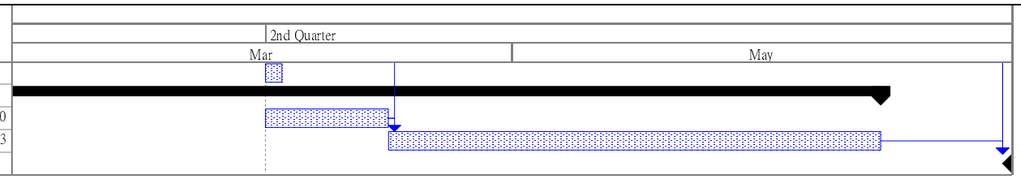
Task | Summary | Rolled Up Milestone | External Tasks | Inactive Task
Critical Task | Rolled Up Task | Rolled Up Progress | Project Summary | Progress
Milestone | Rolled Up Critical Task | Split | Group By Summary | Deadline

Contract No.: DC/2009/22

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

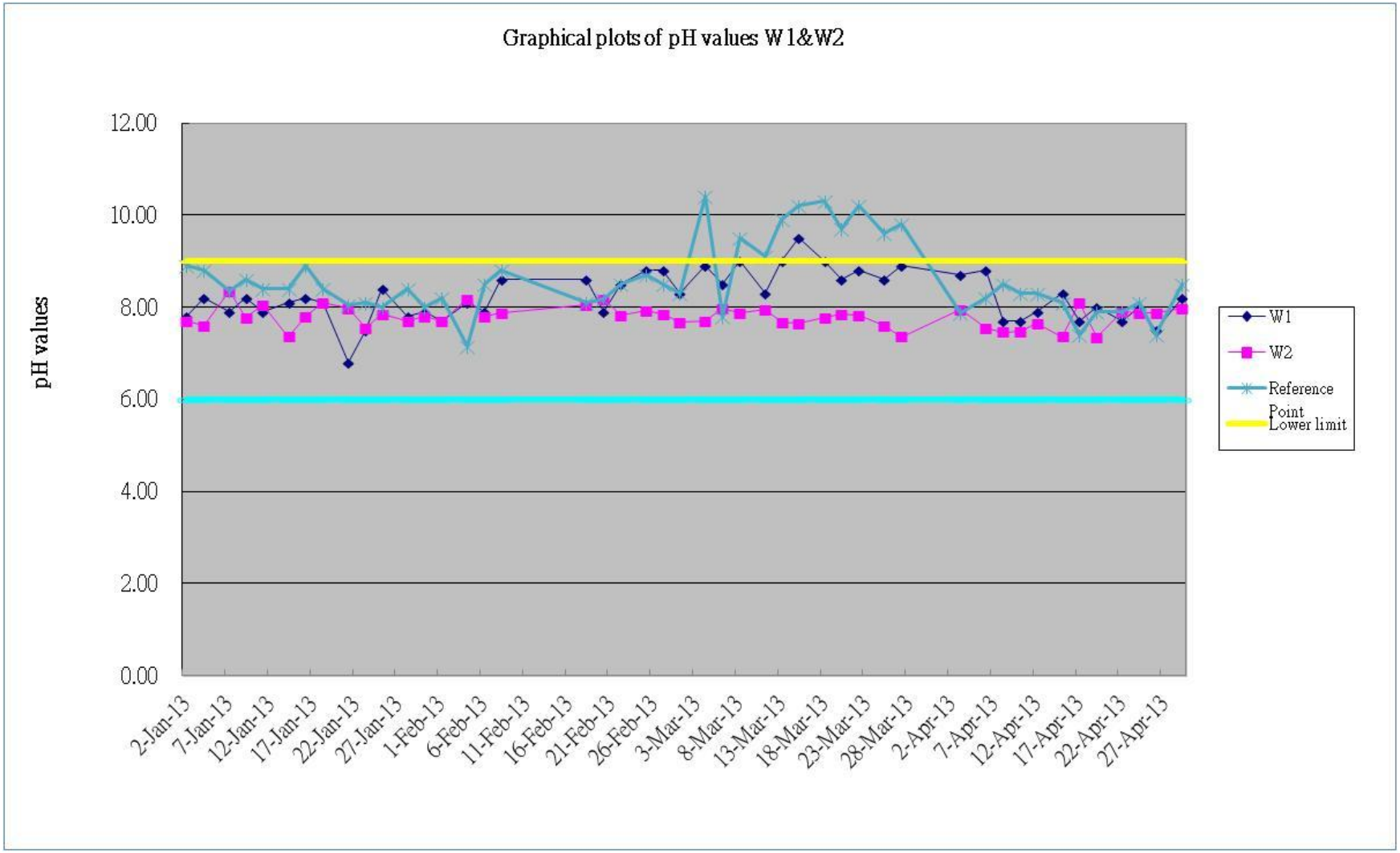
3 Months Rolling Programme (April 2013 to June 2013)

ID	Task Name	Duration	Start	Finish	Predecessors	Successors
308	Grouting	2 days	Mon 1/4/13	Tue 2/4/13	307	
309	**Intake (As required in Dry Season) - Section 1**	**600 days**	**Mon 24/10/11**	**Fri 14/6/13**		
316	Intake - Section 2	15 days	Mon 1/4/13	Mon 15/4/13	307	332,130
332	Misc. Works & Reinstatement	60 days	Tue 16/4/13	Fri 14/6/13	316	333
333	**Completion of Section I**	0 days	Sun 30/6/13	Sun 30/6/13	218,198,202,224,165,169	



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
2-Jan-13
7-Jan-13
12-Jan-13
17-Jan-13
22-Jan-13
27-Jan-13
1-Feb-13
6-Feb-13
11-Feb-13
16-Feb-13
21-Feb-13
26-Feb-13
3-Mar-13
8-Mar-13
13-Mar-13
18-Mar-13
23-Mar-13
28-Mar-13
2-Apr-13
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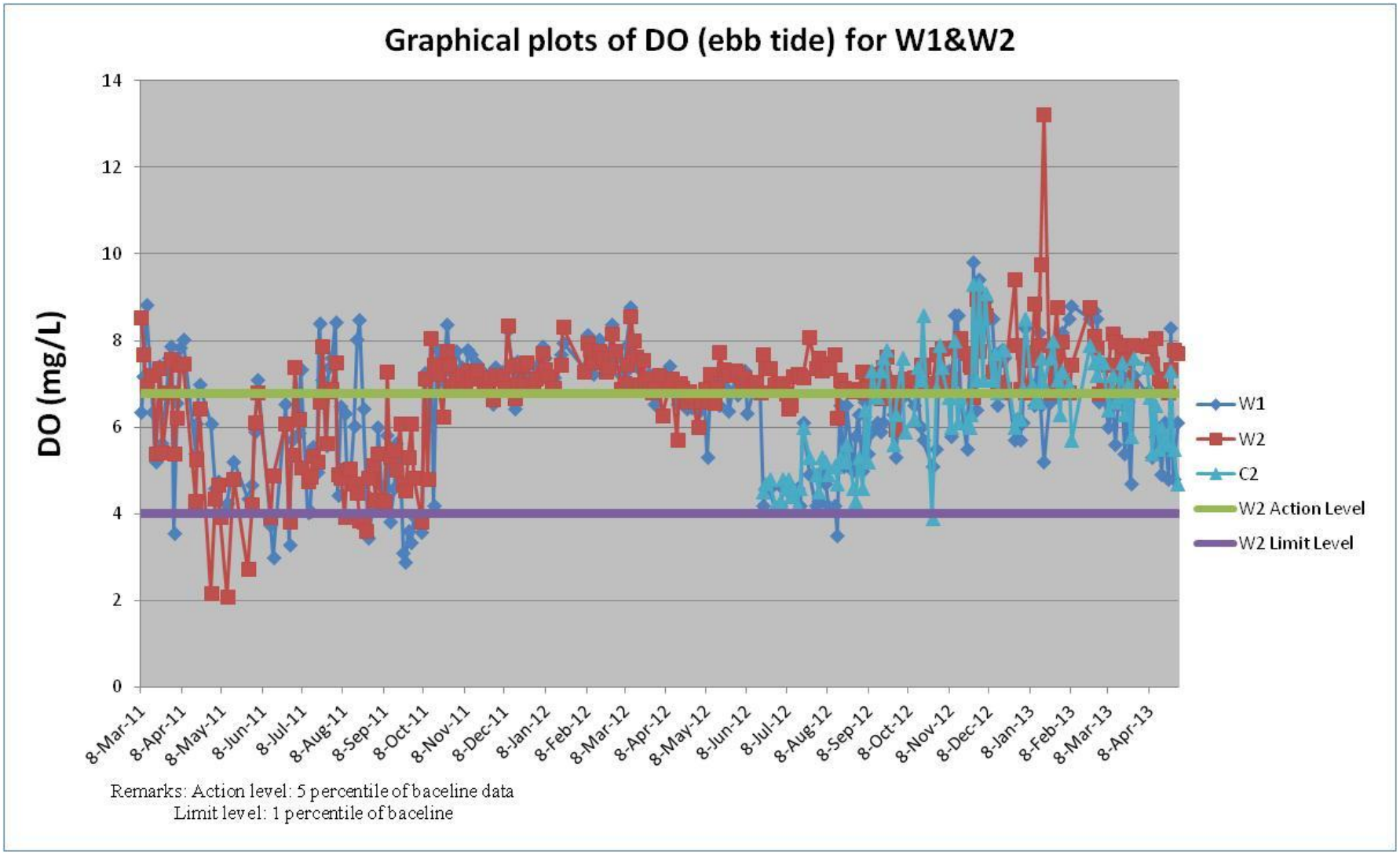
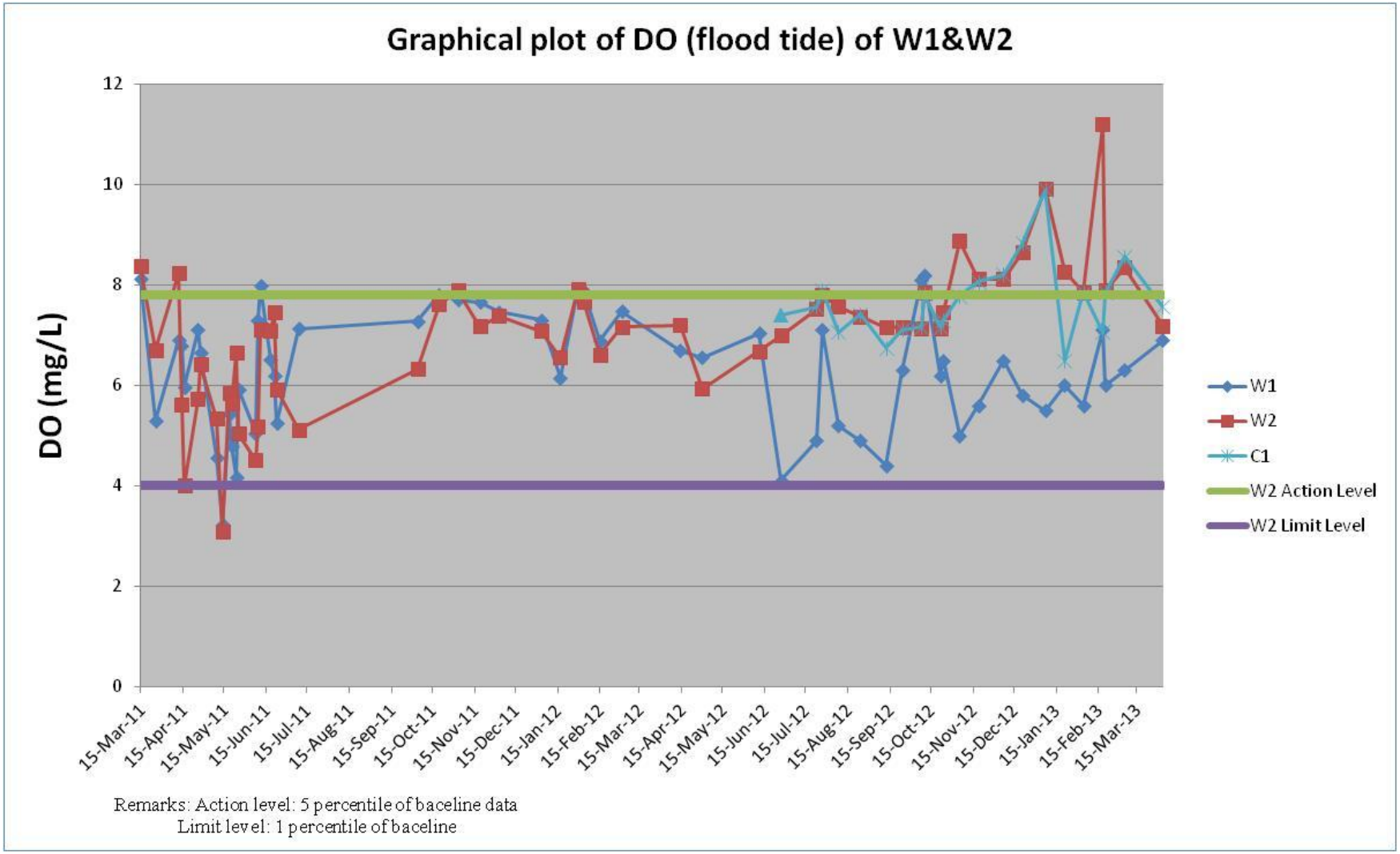
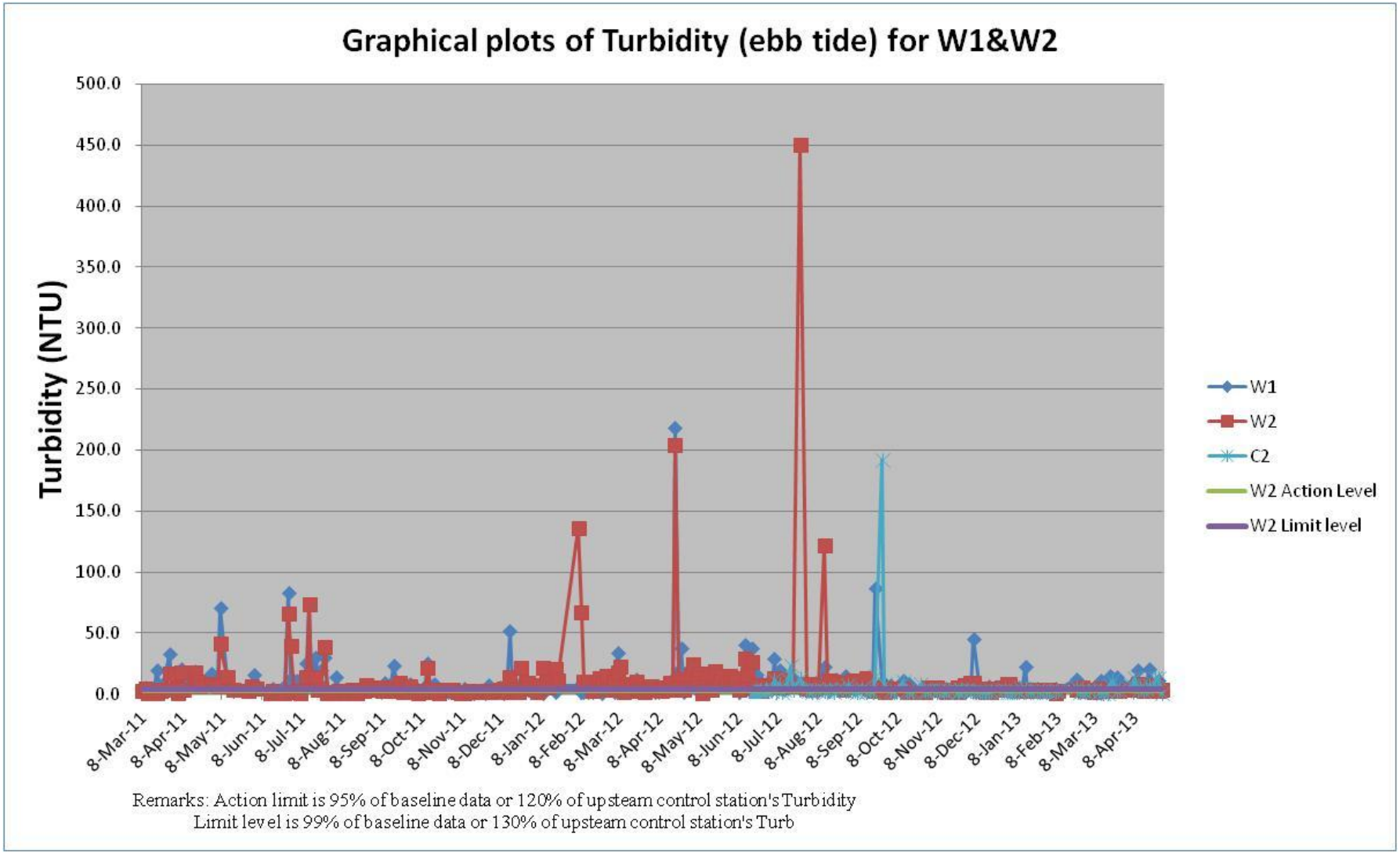
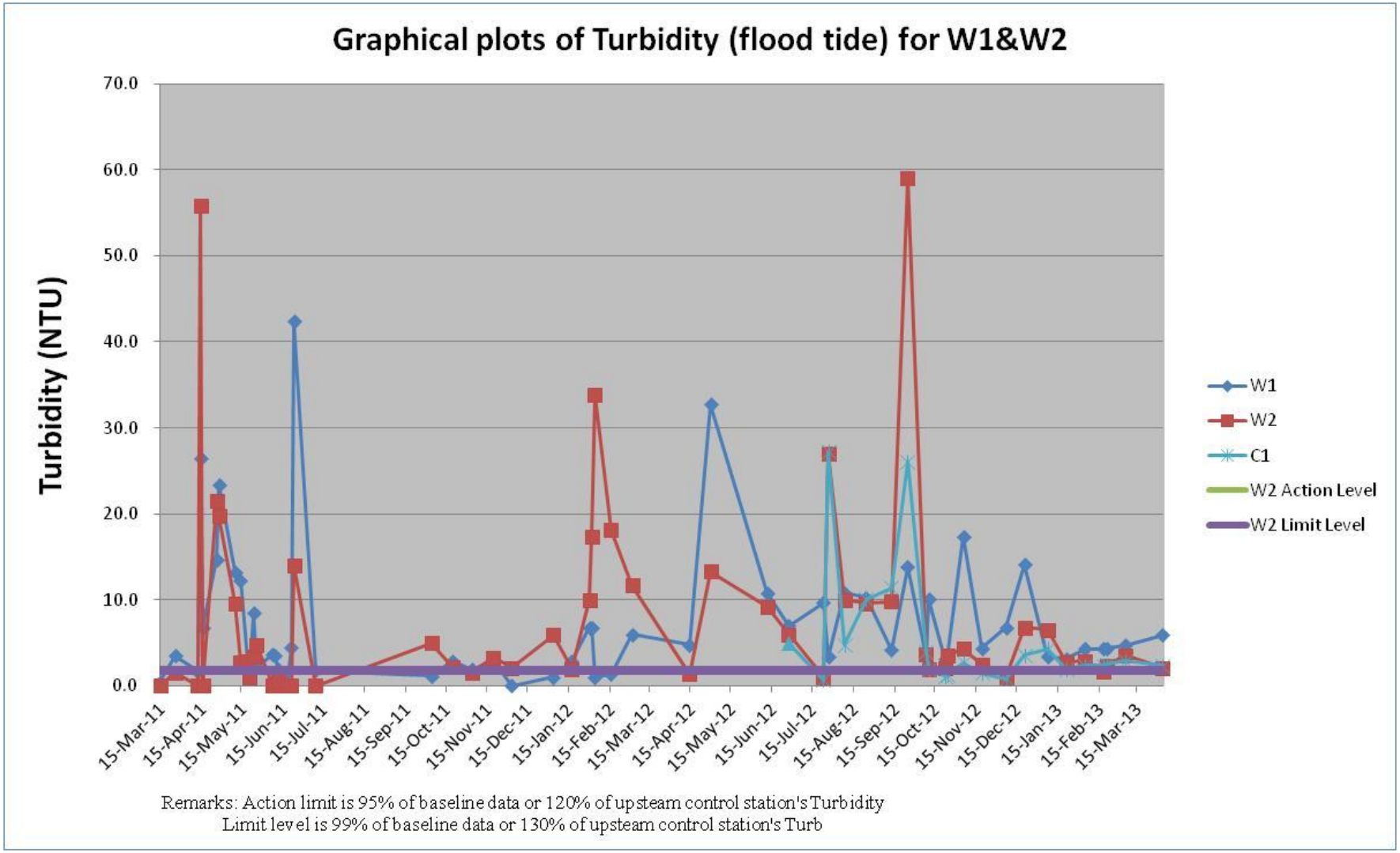
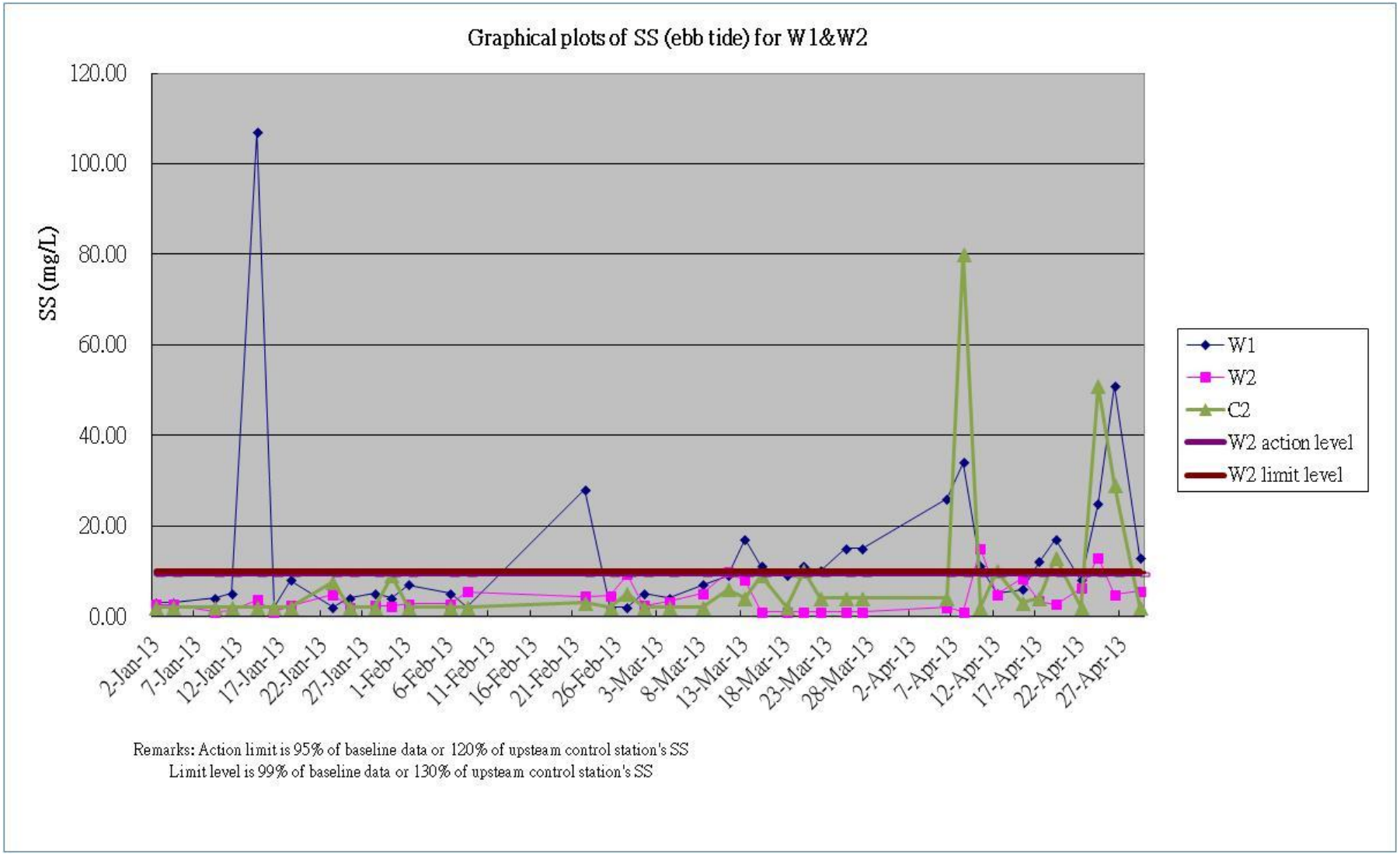
12-Apr-13
17-Apr-13
22-Apr-13
27-Apr-13
W1
W2
Reference
Point
Lower limit

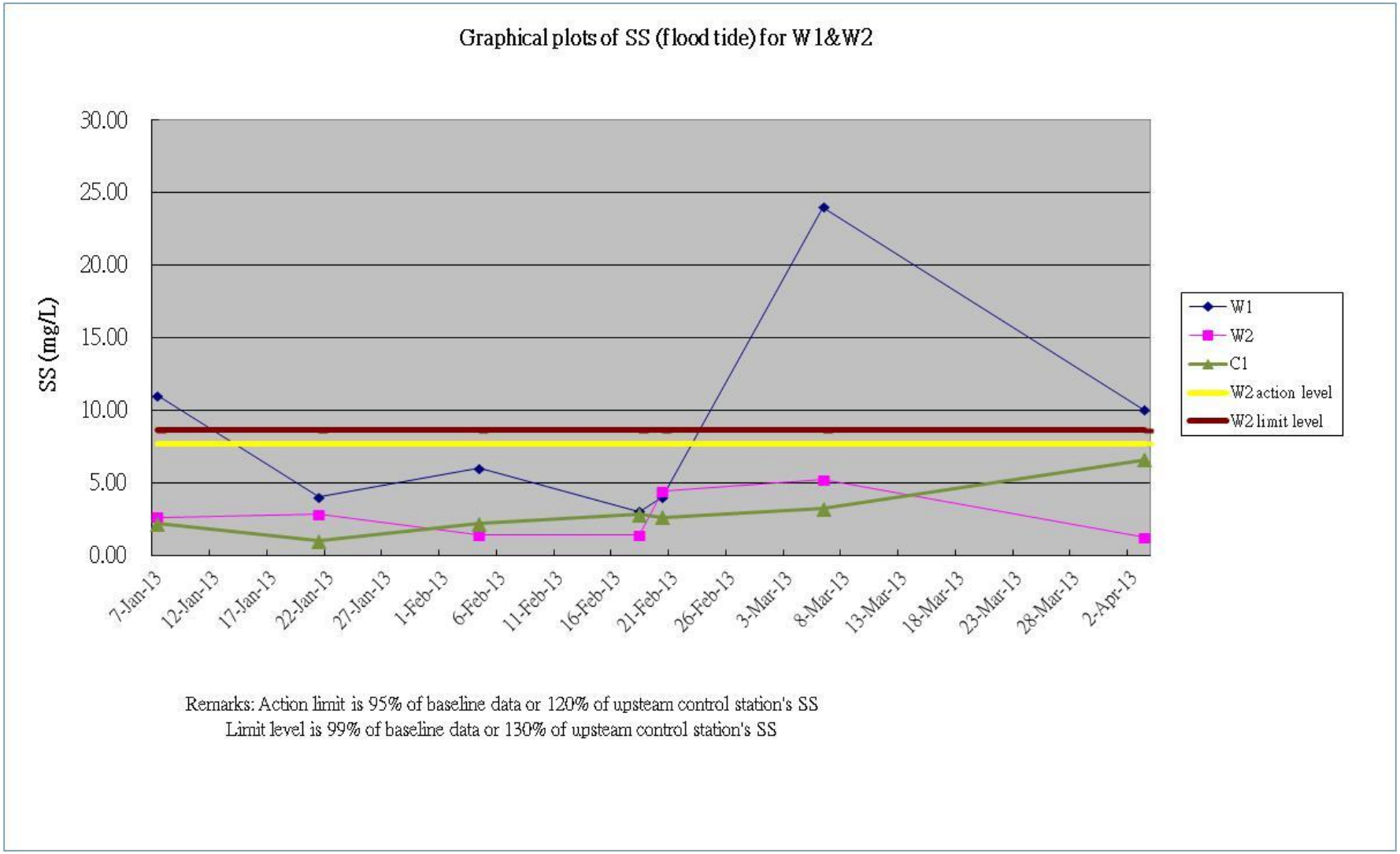

Graphical plots of DO (ebb tide) for W1&W2
DO (mg/L)
14
12
10
8
6
4
2
0
8-Mar-11
8-Apr-11
8-May-11
8-Jun-11
8-Jul-11
8-Aug-11
8-Sep-11
8-Oct-11
8-Nov-11
8-Dec-11
8-Jan-12
8-Feb-12
8-Mar-12
8-Apr-12
8-May-12
8-Jun-12
8-Jul-12
8-Aug-12
8-Sep-12
8-Oct-12
8-Nov-12
8-Dec-12
8-Jan-13
8-Feb-13
8-Mar-13
8-Apr-13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

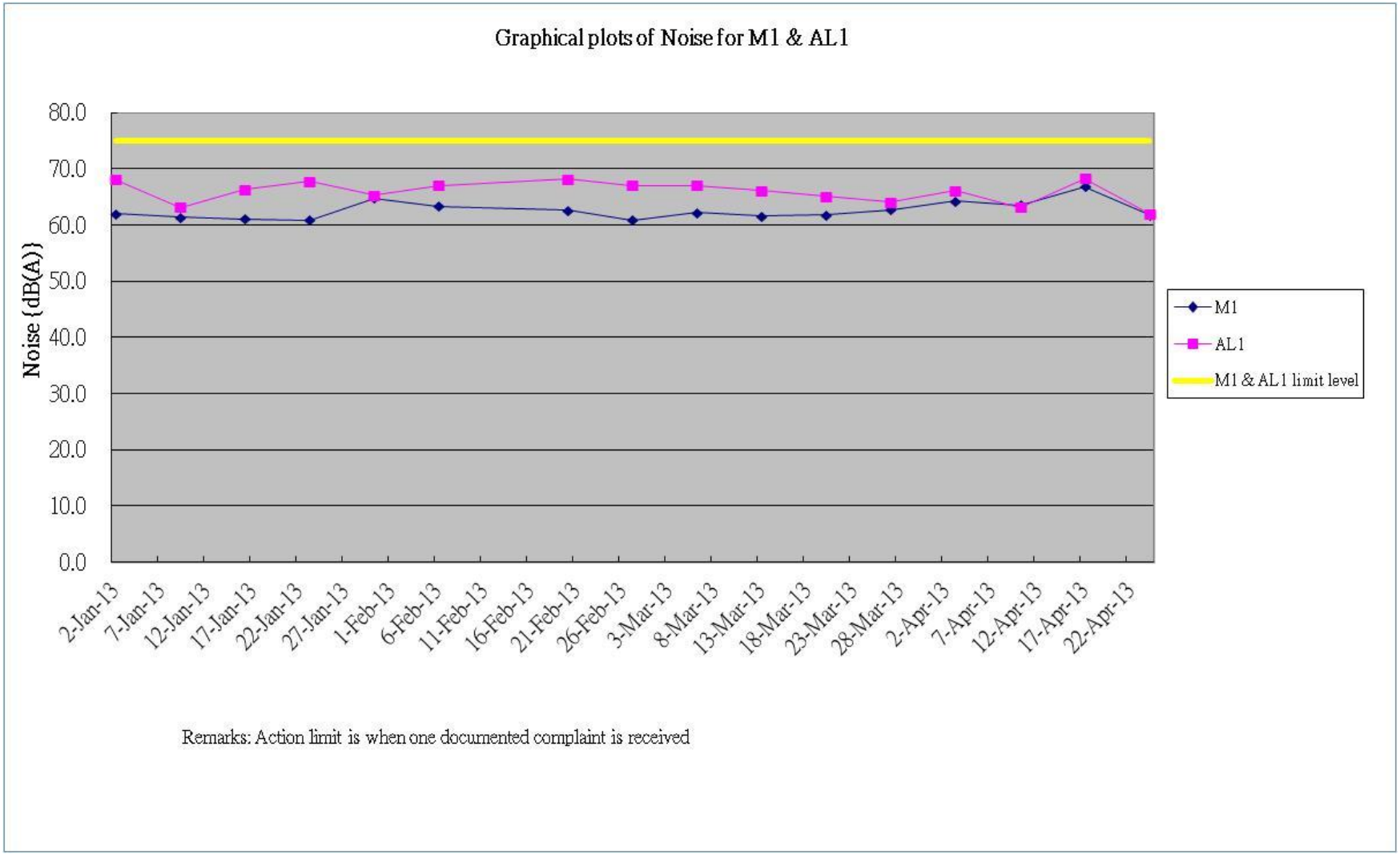

Graphical plot of DO (flood tide) of W1&W2
DO (mg/L)
12
10
8
6
4
2
0
15-Mar-11
15-Apr-11
15-May-11
15-Jun-11
15-Jul-11
15-Aug-11
15-Sep-11
15-Oct-11
15-Nov-11
15-Dec-11
15-Jan-12
15-Feb-12
15-Mar-12
15-Apr-12
15-May-12
15-Jun-12
15-Jul-12
15-Aug-12
15-Sep-12
15-Oct-12
15-Nov-12
15-Dec-12
15-Jan-13
15-Feb-13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

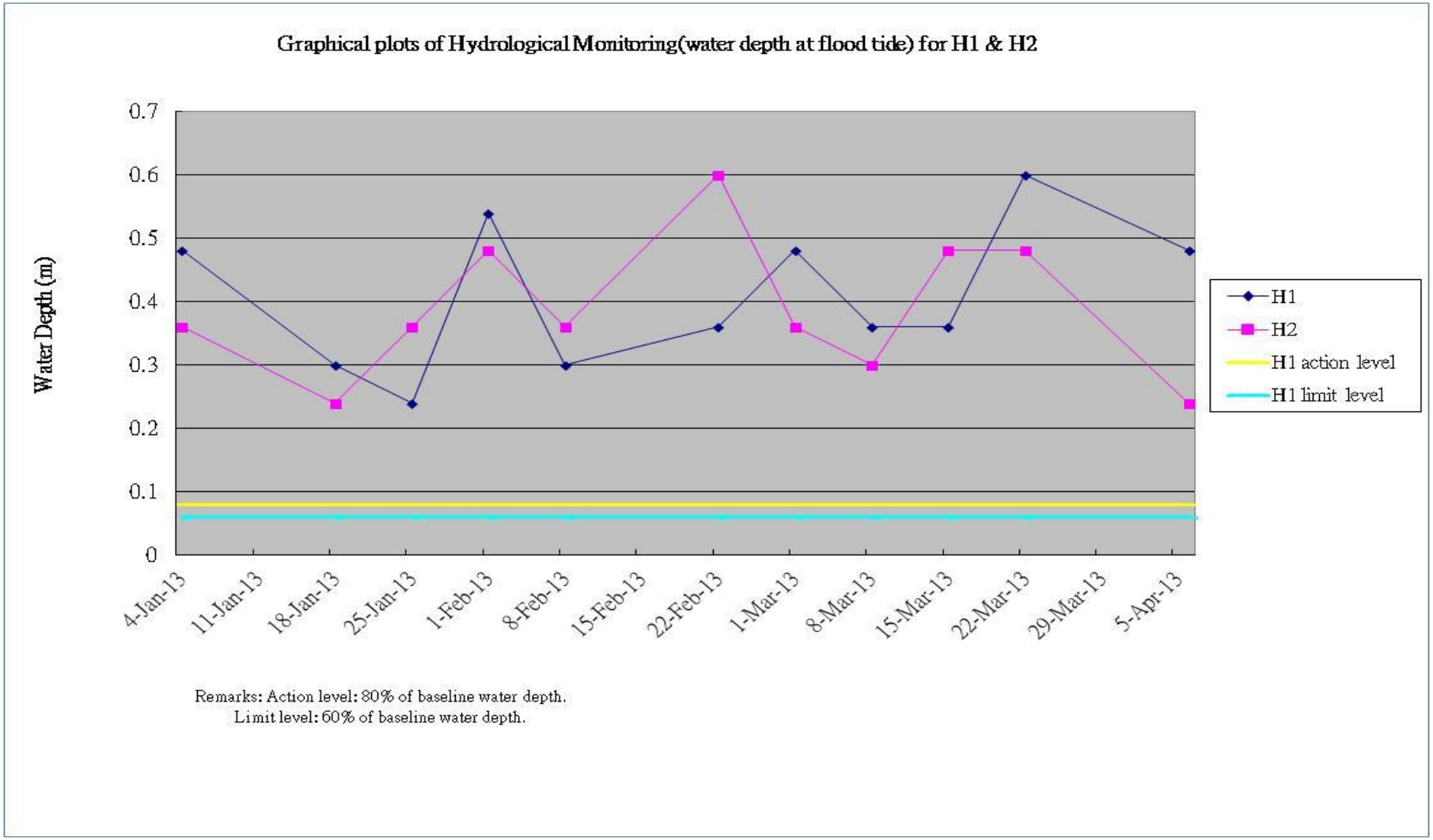

Graphical plots of Turbidity (ebb tide) for W1&W2
Turbidity (NTU)
500.0
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
8-Mar-11
8-Apr-11
8-May-11
8-Jun-11
8-Jul-11
8-Aug-11
8-Sep-11
8-Oct-11
8-Nov-11
8-Dec-11
8-Jan-12
8-Feb-12
8-Mar-12
8-Apr-12
8-May-12
8-Jun-12
8-Jul-12
8-Aug-12
8-Sep-12
8-Oct-12
8-Nov-12
8-Dec-12
8-Jan-13
8-Feb-13
8-Mar-13
8-Apr-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

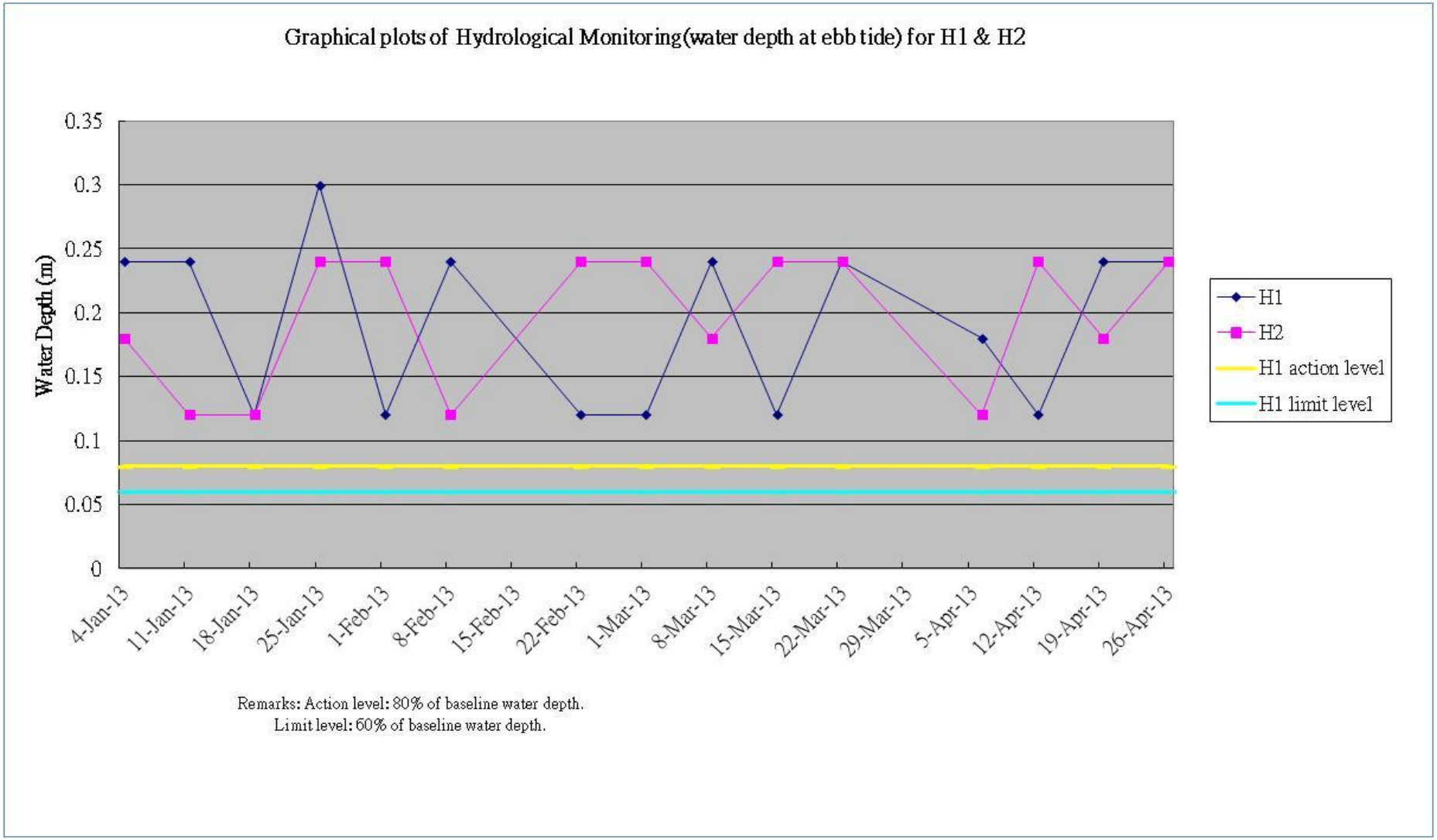

Graphical plots of Turbidity (flood tide) for W1&W2
Turbidity (NTU)
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
15-Mar-11
15-Apr-11
15-May-11
15-Jun-11
15-Jul-11
15-Aug-11
15-Sep-11
15-Oct-11
15-Nov-11
15-Dec-11
15-Jan-12
15-Feb-12
15-Mar-12
15-Apr-12
15-May-12
15-Jun-12
15-Jul-12
15-Aug-12
15-Sep-12
15-Oct-12
15-Nov-12
15-Dec-12
15-Jan-13
15-Feb-13
15-Mar-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

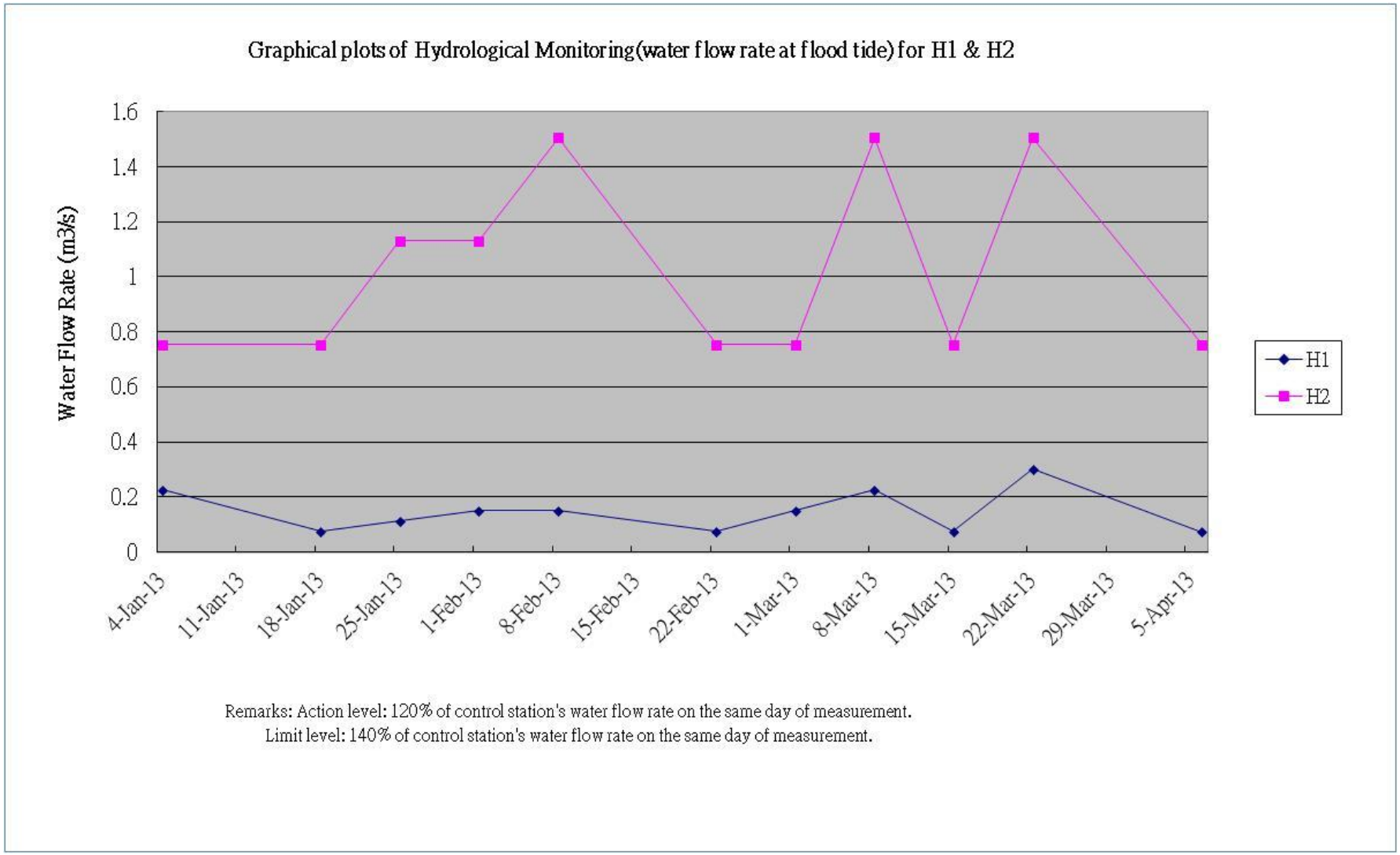

Graphical plots of SS (ebb tide) for W1&W2
SS (mg/L)
120.00
100.00
80.00
60.00
40.00
20.00
0.00
2-Jan-13
7-Jan-13
12-Jan-13
17-Jan-13
22-Jan-13
27-Jan-13
1-Feb-13
6-Feb-13
11-Feb-13
16-Feb-13
21-Feb-13
26-Feb-13
3-Mar-13
8-Mar-13
13-Mar-13
18-Mar-13
23-Mar-13
28-Mar-13
2-Apr-13
7-Apr-13
12-Apr-13
17-Apr-13
22-Apr-13
27-Apr-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 SS
Limit level is 99% of baseline data or 130% of upsteam control station's SS

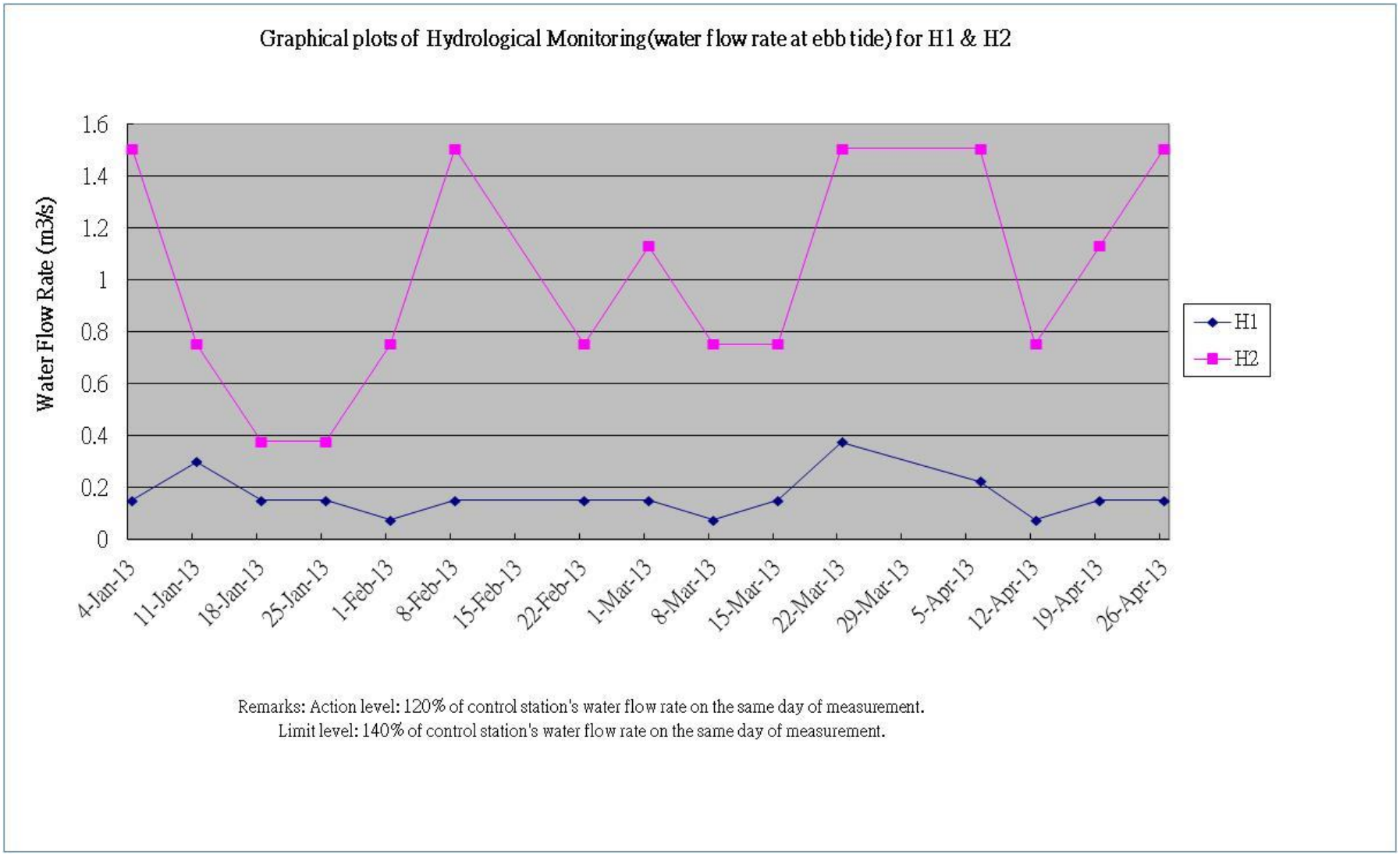

Graphical plots of SS (flood tide) for W1&W2
SS (mg/L)
30.00
25.00
20.00
15.00
10.00
5.00
0.00
7-Jan-13
12-Jan-13
17-Jan-13
22-Jan-13
27-Jan-13
1-Feb-13
6-Feb-13
11-Feb-13
16-Feb-13
21-Feb-13
26-Feb-13
3-Mar-13
8-Mar-13
13-Mar-13
18-Mar-13
23-Mar-13
28-Mar-13
2-Apr-13
W1
W2
C1
W2 action level
W2 limit level
Remarks: Action limit is 95% of baseline data or 120% of upsteam control station's SS
Limit level is 99% of baseline data or 130% of upsteam control station's SS


Graphical plots of Noise for M1 & AL1
Noise (dB(A))
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
2-Jan-13
7-Jan-13
12-Jan-13
17-Jan-13
22-Jan-13
27-Jan-13
1-Feb-13
6-Feb-13
11-Feb-13
16-Feb-13
21-Feb-13
26-Feb-13
3-Mar-13
8-Mar-13
13-Mar-13
18-Mar-13
23-Mar-13
28-Mar-13
2-Apr-13
7-Apr-13
12-Apr-13
17-Apr-13
22-Apr-13
M1
AL1
M1 & AL1 limit level
Remarks: Action limit is when one documented complaint is received


Graphical plots of Hydrological Monitoring(water depth at flood tide) for H1 & H2
Water Depth (m)
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
4-Jan-13
11-Jan-13
18-Jan-13
25-Jan-13
1-Feb-13
8-Feb-13
15-Feb-13
22-Feb-13
1-Mar-13
8-Mar-13
15-Mar-13
22-Mar-13
29-Mar-13
5-Apr-13
H1
H2
H1 action level
H1 limit level
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
Water Depth (m)
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
4-Jan-13
11-Jan-13
18-Jan-13
25-Jan-13
1-Feb-13
8-Feb-13
15-Feb-13
22-Feb-13
1-Mar-13
8-Mar-13
15-Mar-13
22-Mar-13
29-Mar-13
5-Apr-13
12-Apr-13
19-Apr-13
26-Apr-13
H1
H2
H1 action level
H1 limit level
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
Water Flow Rate (m3/s)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
4-Jan-13
11-Jan-13
18-Jan-13
25-Jan-13
1-Feb-13
8-Feb-13
15-Feb-13
22-Feb-13
1-Mar-13
8-Mar-13
15-Mar-13
22-Mar-13
29-Mar-13
5-Apr-13
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
Water Flow Rate (m3/s)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
4-Jan-13
11-Jan-13
18-Jan-13
25-Jan-13
1-Feb-13
8-Feb-13
15-Feb-13
22-Feb-13
1-Mar-13
8-Mar-13
15-Mar-13
22-Mar-13
29-Mar-13
5-Apr-13
12-Apr-13
19-Apr-13
26-Apr-13
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: Photo of Wai Ha River in April 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
	
Photo 5. Wai Ha River at W2	**Photo 6.** Wai Ha River at C1

	
Photo 7. Wai Ha River at W2	**Photo 8.** Wai Ha River at C1