



PROJECT No.: TCS/00512/09

**DSD CONTRACT NO. DC/2009/13
CONSTRUCTION OF SEWAGE TREATMENT WORKS AT
YUNG SHUE WAN AND SOK KWU WAN**

**YUNG SHUE WAN PORTION AREA
Quarterly Environmental Monitoring and Audit
(EM&A) Summary Report No.Q3
(March to May 2011)**

PREPARED FOR
**LEADER CIVIL ENGINEERING CORPORATION
LIMITED**

Quality Index Date	Reference No.	Prepared By	Certified By
25 July 2011	TCS00512/09/600/R0272v3		
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Version	Date	Description
1	18 July 2011	First submission
2	21 July 2011	Amended against IEC's comments on 20 July 2011
3	25 July 2011	Amended against IEC's comments on 22 July 2011

Scott Wilson CDM Joint Venture

Chief Engineer/Harbour Area Treatment Scheme Your reference:
Drainage Services Department
5/F Western Magistracy
2A Pok Fu Lam Road
Hong Kong

Our reference: 05117/6/16/378754

Date: 25 July 2011

Attention: Mr. C K Au

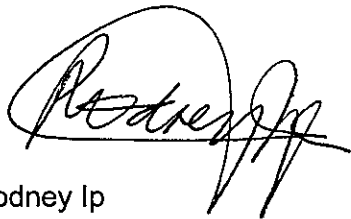
BY FAX ONLY

Dear Sirs,

Contract No. DC/2009/13
Construction of Sewage Treatment Works at Yung Shue Wan and Sok Kwu Wan
Yung Shue Wan Portion Area
Quarterly EM&A Summary Report No.Q3 (March 2011 to May 2011)

We refer to the Environmental Permit (EP-282/2007) and the email from the Environmental Team, Action-United Environmental Services and Consulting (AUES) with the revised report for the captioned project, dated 25 July 2011. We do not have further comment and have verified the captioned report.

Yours faithfully
SCOTT WILSON CDM JOINT VENTURE



Rodney Ip

ICWR/STKW/ecwc

cc	Leader Civil Engineering	(Attn: Mr Vincent Chan)
	AUES	(Attn: Mr T.W. Tam)
	ER/LAMMA	(Attn: Mr Neil Wong)
	CDM	(Attn: Mr Mark Sin)

EXECUTIVE SUMMARY

ES.01 The Leader Civil Engineering Corporation Limited (Leader) has been awarded the *Contract DC/2009/13 - Construction of Sewage Treatment Works at Yung Shue Wan and Sok Kwu Wan* (the Project) by the Drainage Services Department (DSD) on 4 May 2010.

ES.02 This is the 3rd Quarterly EM&A summary report for Yung Shue Wan under the Project, covering the construction period from **1 March to 31 May 2011**.

ENVIRONMENTAL MONITORING AND AUDIT ACTIVITIES

ES.03 Environmental monitoring activities under the EM&A program in this Reporting Period are summarized in the following table.

Issues	Environmental Monitoring Parameters / Inspection	Occasions
Air Quality	1-hour TSP	96
	24-hour TSP	34
Construction Noise	Leq (30min) Daytime	16
Water Quality	Marine Water Sampling	7
Ecology	Coral Monitoring	2
Inspection / Audit	ET Regular Environmental Site Inspection	14

ES.04 As informed by the Contractor, the marine work of outfall construction has been commenced on 9 May 2011, therefore, water quality and coral monitoring were performed in this Reporting Period.

BREACH OF ACTION AND LIMIT (A/L) LEVELS

ES.05 In this Reporting Quarter, no exceedance was recorded in construction noise monitoring, air quality monitoring and marine water quality monitoring in this Reporting Period. The statistics of environmental exceedance, NOE issued and investigation of exceedance are summarized in the following table.

Environmental Issues	Monitoring Parameters	Action Level	Limit Level	Event & Action		
				NOE Issued	Investigation	Corrective Actions
Air Quality	1-hour TSP	0	0	0	--	--
	24-hour TSP	0	0	0	--	--
Construction Noise	Leq _{30min} Daytime	0	0	0	--	--
Water Quality	DO	0	0	0	--	--
	Turbidity	0	0	0	--	--
	SS	0	0	0	--	--
Ecology (Coral)	Sediment Cover (%)	0	0	0	--	--
	Bleaching (%)	0	0	0	--	--
	Mortality (%)	0	0	0	--	--

Note: NOE – Notification of Exceedance

ENVIRONMENTAL COMPLAINT

ES.06 No environmental complaint was recorded or received in this Reporting Period. The statistics of environmental complaint are summarized in the following table.

Reporting Period	Environmental Complaint Statistics		
	Frequency	Cumulative	Complaint Nature
1 - 31 March 2011	0	0	NA
1 - 30 April 2011	0	0	NA
1 - 31 May 2011	0	0	NA

NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

ES.07 No environmental summons or successful prosecutions were recorded in this Reporting Period. The statistics of environmental complaint are summarized in the following tables.

Reporting Period	Environmental Summons Statistics		
	Frequency	Cumulative	Complaint Nature
1 - 31 March 2011	0	0	NA
1 - 30 April 2011	0	0	NA
1 - 31 May 2011	0	0	NA

Reporting Period	Environmental Prosecution Statistics		
	Frequency	Cumulative	Complaint Nature
1 - 31 March 2011	0	0	NA
1 - 30 April 2011	0	0	NA
1 - 31 May 2011	0	0	NA

REPORTING CHANGE

ES.08 There are no reporting changes in this Reporting Period.

SITE INSPECTION BY EXTERNAL PARTIES

ES.09 No site inspection was undertaken by external parties i.e. EPD or AFCD within the Reporting Period.

FUTURE KEY ISSUES

ES.10 As wet season is approaching, the Contractor shall pay attention on the potential water impact as the construction site is adjacent to the coastline. Muddy water and other water quality pollutants via site surface water runoff into the coral zones of Yung Shue Wan seawall, Shek Kok Tsui and O Tsai should be avoided. Therefore, mitigation measures for water quality should be fully implemented also.

ES.11 Moreover, the construction dust mitigation measures identified at the EM&A Manual such as watering at haul road and covering of dusty material should also be implemented and properly maintained during wet season.

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1 INTRODUCTION

1.1 PROJECT BACKGROUND

- 1.01 The Leader Civil Engineering Corporation Limited (Leader) has been awarded the *Contract DC/2009/13 - Construction of Sewage Treatment Works at Yung Shue Wan and Sok Kwu Wan* (the Project) by the Drainage Services Department (DSD) on 4 May 2010. The Project is part of an overall plan approved under a statutory EIA for Outlying Islands Sewerage Stage 1 Phase 2 Package J – Sok Kwu Wan Sewage Collection and Treatment (Register No. AEIAR-075/2003) and Disposal Facilities and Outlying Islands Sewerage Stage 1 Phase 1 Package C – Yung Shue Wan Sewage Treatment Works and Outfall (Register No. EIA-124/BC). The Environmental Permit No. EP-281/2007 and EP-282/2007 for the Project have been obtained by the DSD on 29 June 2007 for the relevant works. After July 2009, EP-281/2007/A instead EP-281/2007 is EP for Sok Kwu Wan relevant Works.
- 1.02 The Project involves construction of sewage treatment works at Sok Kwu Wan and Yung She Wan with a capacity of 1,430m³/day and 2,850m³/day to provide secondary treatment. The majority of works include construction of pumping stations, construction of submarine outfall from the coastline and laying of underground sewerage pipeline. The site layout plan for the captioned work under the Project is showing in *Annex A*.
- 1.03 According to the Particular Specification (PS) and *Appendix 25* of the Project, Leader should establish an Environmental Team to implement the environmental monitoring and auditing works to fulfill the requirements as stipulated in the Environmental Monitoring and Audit (EM&A) Manuals.
- 1.04 Action-United Environmental Services and Consulting (AUES) has been commissioned by Leader as the ET to implement the relevant EM&A program. Organization chart of the Environmental Team for the Project is shown in *Annex B*. For ease of reporting, the proposed EM&A programme for baseline and impact monitoring is split to two copies:
- (a) Proposed EM&A Programme for Baseline and Impact Monitoring – Sok Kwu Wan (under EP No. 281/2007/A, varied on 23 September 2009)
 - (b) Proposed EM&A Programme for Baseline and Impact Monitoring – Yung Shue Wan (under EP No. 282/2007)
- 1.05 According to the EM&A Manuals of Sok Kwu Wan and Yung Shue Wan, baseline water quality monitoring should be carried out for consecutive six months before commencement of the marine work. Therefore, the baseline reports of Sok Kwu Wan and Yung Shue Wan are divided to two volumes, i.e. the Volume 1 for air quality and noise monitoring; and the Volume II for water quality monitoring for separate submission.
- 1.06 This is the 3rd Quarterly EM&A Summary report for Yung Shue Wan Portion Area presenting the monitoring results and inspection findings for the Reporting Period from **1 March to 31 May 2011**.

1.2 REPORT STRUCTURE

The Quarterly Environmental Monitoring and Audit (EM&A) Summary Report is structured by following sections:-

SECTION 1	INTRODUCTION
SECTION 2	PROJECT ORGANIZATION AND CONSTRUCTION PROGRESS
SECTION 3	SUMMARY OF MONITORING REQUIREMENTS
SECTION 4	IMPACT MONITORING RESULTS
SECTION 5	WASTE MANAGEMENT
SECTION 6	SITE INSPECTION
SECTION 7	ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE
SECTION 8	IMPLEMENTATION STATUS OF MITIGATION MEASURES
SECTION 9	CONCLUSIONS AND RECOMMENDATIONS

2 PROJECT ORGANIZATION AND CONSTRUCTION PROGRESS

2.1 PROJECT ORGANIZATION AND MANAGEMENT STRUCTURE

2.01 Organization structure and contact details of relevant parties with respect to on-site environmental management are shown in [Annex B](#).

2.2 CONSTRUCTION PROGRESS

2.02 The master and three month rolling construction programs are enclosed in [Annex C](#) and the major construction activities undertaken in this quarter are listed below:-

Reporting Period	Major Construction Activities
March 2011	<ul style="list-style-type: none"> • Excavation; • Rebar bending & fixing; • Sheetpiling; • Erection of formwork; and • Concreting
April 2011	<ul style="list-style-type: none"> • Excavation; • Rebar bending & fixing; • Sheetpiling; • Erection of formwork; • Concreting; • Backfilling
May 2011	<ul style="list-style-type: none"> • Excavation; • Rebar bending & fixing; • Erection of formwork and falsework; • Concreting; • Backfilling; and • Horizontal directional drilling

2.3 SUMMARY OF ENVIRONMENTAL SUBMISSIONS

2.03 Summary of the relevant permits, licences, and/or notifications on environmental protection for this Project in this Reporting Period is presented in [Table 2-1](#).

Table 2-1 Status of Environmental Licenses and Permits

Item	Description	License/Permit Status
1	Air pollution Control (Construction Dust)	Notified 19/5/2010 Case No: 317486
2	Chemical waste Producer Registration	Issued on 8/6/2010 WPN 5213-912-L2720-01
3	Water Pollution Control Ordinance	Issued on 22/9/2010 WT00007566-2010
4	Billing Account for Disposal of Construction Waste	Issued on 26 May 2010 A/C No: 7010815
5	Construction Noise Permit (no. GW-RS1141-10)	Issued on 29 December 2010 Valid to 28 May 2011
6	Construction Noise Permit (no. GW-RS0084-11)	Issued on 1 Feb 2011 Valid from 21 Feb 2011 until 20 Aug 2011

3 SUMMARY OF MONITORING REQUIREMENTS

3.1 ENVIRONMENTAL ASPECT

- 3.01 The EM&A baseline monitoring program cover the following environmental issues:
- Air quality;
 - Construction noise;
 - Marine Water quality; and
 - Ecological (coral)
- 3.02 The ET implements the EM&A programme in accordance with the aforementioned requirements. Detailed air quality, construction noise, water quality and coral monitoring of the EM&A program are presented in the following sub-sections.
- 3.03 A summary of the air, noise, marine water and coral monitoring parameters is presented in **Table 3-1**:

Table 3-1 Summary of EM&A Requirements

Environmental Issue	Parameters
Air Quality	<ul style="list-style-type: none"> • 1-hour TSP Monitoring by Real-Time Portable Dust Meter; and • 24-hour TSP Monitoring by High Volume Air Sampler.
Noise	<ul style="list-style-type: none"> • Leq (30min) during normal working hours; and • Leq (15min) during Restricted Hours.
Marine Water Quality	<p><i>In-situ Measurements</i></p> <ul style="list-style-type: none"> • Dissolved Oxygen Concentration (mg/L); • Dissolved Oxygen Saturation (%); • Turbidity (NTU); • pH unit; • Salinity (ppt); • Water depth (m); and • Temperature (°C). <p><i>Laboratory Analysis</i></p> <ul style="list-style-type: none"> • Suspended Solids (mg/L)
Ecology	<ul style="list-style-type: none"> • Coral Monitoring

3.2 MONITORING LOCATIONS

Air Quality

- 3.04 Two designated monitoring stations, AC02a located at Yung Shue Wan Refuse Transfer Station and AC04 located at residential area nearby Yung Shue Wan football pitch, were recommended in the *EM&A Manual Section 2.5*. In order to identify and seek for the access of the air monitoring locations designated in the EM&A Manual, site visit was conducted by Leader and ET.
- 3.05 At the site visit, all designated monitoring locations were identified, however the premises for high volume sampler installation were objected by the owner or the residents of nearby. Therefore, an alternative air monitoring locations were proposed in accordance with the criteria set out in *EM&A manual Section 2.5.2 and 2.5.3*. The proposed alternative air monitoring stations was accepted by the ER and IEC, and EPD endorsed. Details of renewal air monitoring stations are described in **Table 3-2**. The graphical of air monitoring stations is shown in **Annex D**.

Table 3-2 Locations of Air Quality Monitoring Station

Sensitive Receiver	Location
AC02b	The entrance of RE's site office
AC04c	Next to a power transformer station TP208 Yung Shue Wan and adjacent to the road direct to the construction site

Construction Noise

- 3.06 According to *EM&A Manual Section 3.4*, one noise sensitive receivers (NC05) designated for the construction noise monitoring was recommended at Yung Shue Wan Portion Area of the Project. The designated monitoring station is identified and successfully granted the premises. The detailed construction noise monitoring station is described in **Table 3-3** and graphical is shown in **Annex D**.

Table 3-3 Location of Construction Noise Monitoring Station

Sensitive Receiver	Location
NC05	Roof of North Lamma Clinic

Marine Water Quality

- 3.07 Two control stations (CY1 and CY2) and three impact stations (WY1-WY3) were recommended in the *EM&A Manual Section 4.5*. Impact stations WY1-WY3 were identified close to the sensitive receivers (the coral colonies in the vicinity of Yung Shue Wan, and secondary contact recreation subzone). It is proposed to monitor the impacts from the construction of the submarine outfall as well as the effluent discharge from the proposed STW on water quality. Two control stations: CY1 and CY2 were recommended at locations representative of the project site in its undisturbed condition and located at upstream and downstream of the works area. The marine water quality monitoring stations to be performed under the Project is described in **Table 3-4** and shown in **Annex D**.

Table 3-4 Locations of Marine Water Quality Monitoring Station

Station	Description	Coordinates	
		Easting	Northing
WY1	Coral colonies on seawall at STW site	829 170	809 550
WY2	Coral colonies at Shek kok Tsui	829 000	810 400
WY3	Coral colonies at O Tsai (headland N at SW ferry pier)	829 200	809 850
CY1 (flood)	Control Station	828 400	810 800
CY2 (ebb)	Control Station	828 000	808 800

Coral Monitoring

- 3.08 One control station at North Beaufort Island and one impact stations at boulder seawall at TSW SWT site were recommended in the *EM&A Manual Section 7.2*. These sites represent the coral site where uncommon coral species were recorded from the coral surveys carried out as part of the Review Report on the EIA Study. However, change of Monitoring Location was recommended by the Ecologist based on the experience. The rationale for the re-location is summarised as below:-
- ◆ Sham Wan is located at the southeast part of Lamma Island which is less exposed and more transition water than that in Beaufort Island in which it is quite similar to Yung Shue Wan;
 - ◆ Recent EIA surveys showed that the coral diversity is higher in Sham Wan;
 - ◆ Same coral monitoring had been carried out at both Yung Shue Wan and Sham Wan in 2007 for the project of “Construction of Helipads at Peng Chau and Yung Shu Wan, Lamma Island, Agreement No. CE 18/2002).
- 3.09 It is concluded that Sham Wan is more suitable as a control site than Beaufort Island. The proposal for relocation of control station was submitted to IEC and AFCD and both parties have no comment on the proposal. The coral monitoring stations to be performed under the Project is described in **Table 3-5** and shown in **Annex D**.

Table 3-5 Location of Coral Monitoring

Dive Site	Number	Coordinates	
		Easting	Northing
Yung Shu Wan, Lamma Island	1	829170E	809550N
Sham Wan, Lamma Island	2	832425E	805478N

3.3 MONITORING FREQUENCY AND PERIOD

3.10 The Impact monitoring carried out in the EM&A programme is basically in accordance with the requirements in *EM&A Manual Sections 2.7, 3.6, 4.7 and 4.8*. The monitoring requirements are listed as follows:

Air Quality Monitoring

Parameters: 1-hour TSP and 24-hour TSP.

Frequency: Once in every six days for 24-hour TSP and three times in every six days for 1-hour TSP.

Duration: Throughout the construction period.

Noise Monitoring

Parameters: Leq (30min) & Leq (5min), L10 and L90.
Leq (15min) & Leq (5min), L10 and L90 during the construction undertaken during Restricted Hours (19:00 to 07:00 hours next of normal working day and full day of public holiday and Sunday).

Frequency: Once per week during 0700-1900 hours on normal weekdays. Restricted Hour monitoring should depend on conditions stipulated in Construction Noise Permit.

Duration: Throughout the construction period.

Marine Water Quality Monitoring

Parameters: Duplicate in-situ measurements: water depth, temperature, Dissolved Oxygen, pH, turbidity and salinity;
HOKLAS-accredited laboratory analysis: Suspended Solids

Frequency: Three days a week, at mid ebb and mid flood tides. The interval between 2 sets of monitoring will be more than 36 hours.

Sampling Depth

- (i.) Three depths: 1m below water surface, 1m above sea bottom and at mid-depth when the water depth exceeds 6m.
- (ii.) If the water depth is between 3m and 6m, two depths: 1m below water surface and 1m above sea bottom.
- (iii.) If the water depth is less than 3m, 1 sample at mid-depth is taken

Duration: During the course of marine works

Coral Monitoring

Parameters: Presence and coverage of hard and soft corals such as diversity, abundance and health status of the corals in the general area, plus other physical and biological condition at the underwater environment.

Frequency: One per week for the first three months of the marine works;
If no exceedances are reported during the first three months, the frequency may be reduced to twice every month

Duration: During the course of marine works

Post-Construction Monitoring – Marine Water

- 3.11 Upon the marine works (dredging and HDD pipe installation) completion, 4 weeks of post-construction monitoring would be undertaken in accordance with the *Section 4.8 of EM&A Manual*. The requirements of post-construction monitoring such as the parameter, frequency, location and sampling depth is same as the impact monitoring.

3.4 MONITORING EQUIPMENT

Air Quality Monitoring

- 3.12 The 24-hour and 1-hour TSP levels shall be measured by following the standard high volume sampling method as set out in the *Title 40 of the Code of Federal Regulations, Chapter 1 (Part 50), Appendix B*. If the ET proposes to use a direct reading dust meter to measure 1-hour TSP levels, it shall submit sufficient information to the IEC to approve. The filter paper of 24-hour TSP measurement shall be determined by HOKLAS accredited laboratory.

Noise Monitoring

- 3.13 Sound level meter in compliance with the *International Electrotechnical Commission Publications 651: 1979 (Type 1) and 804: 1985 (Type 1)* specifications shall be used for carrying out the noise monitoring. The sound level meter shall be checked using an acoustic calibrator. The wind speed shall be checked with a portable wind speed meter capable of measuring the wind speed in m s⁻¹.

Water Quality Monitoring

- 3.14 ***Dissolved Oxygen and Temperature Measuring Equipment*** – The instrument should be a portable and weatherproof dissolved oxygen (DO) measuring instrument complete with cable and sensor, and use a DC power source. The equipment should be capable of measuring as included a DO level in the range of 0 – 20mg L⁻¹ and 0 – 200% saturation; and a temperature of 0 – 45 degree Celsius.
- 3.15 ***pH Meter*** – The instrument shall consist of a potentiometer, a glass electrode, a reference electrode and a temperature-compensating device. It shall be readable to 0.1 pH in arrange of 0 to 14.
- 3.16 ***Turbidity (NTU) Measuring Equipment*** – The instrument should be a portable and weatherproof turbidity measuring instrument using a DC power source. It should have a photoelectric sensor capable of measuring turbidity between 0 - 1000 NTU.
- 3.17 ***Water Sampling Equipment*** – A water sampler should comprise a transparent PVC cylinder, with a capacity of not less than 2 litres, which can be effectively sealed with latex cups at both ends. The sampler should have a positive latching system to keep it open and prevent premature closure until released by a messenger when the sampler is at the selected water depth.
- 3.18 ***Water Depth Detector*** – A portable, battery-operated echo sounder should be used for the determination of water depth at each designated monitoring station. This unit can either be hand held or affixed to the bottom of the work boat.
- 3.19 ***Salinity Measuring Equipment*** – A portable salinometer capable of measuring salinity in the range of 0 - 40 parts per thousand (ppt) should be provided for measuring salinity of the water at each monitoring location.
- 3.20 ***Sample Containers and Storage*** – Water samples for SS should be stored in high density polythene bottles with no preservative added, packed in ice (cooled to 4°C without being frozen).

- 3.21 **Monitoring Position Equipment** - A hand-held or boat-fixed type digital Differential Global Positioning System (DGPS) with way point bearing indication and Radio Technical Commission for maritime (RTCM) Type 16 error message ‘screen pop-up’ facilities (for real-time auto-display of error messages and DGPS corrections from the Hong Kong Hydrographic Office), or other equipment instrument of similar accuracy, should be provided and used during marine water monitoring to ensure the monitoring vessel is at the correct location before taking measurements.
- 3.22 **Suspended Solids Analysis** – Analysis of suspended solids shall be carried out in a HOKLAS or other international accredited laboratory.

Coral Monitoring

- 3.23 The monitoring equipment used for the coral monitoring are listed below:-

Equipment	Model
A4 size underwater slates	Handmade A4 size underwater slates
Coral Photos	Laminated Tagged Coral Photos
Quadrat	50 cm x 50 cm plastic quadrat (with 10 cm x 10 cm grid)
Underwater Camera	Canon G10 digital camera
Scuba Diving Equipment	Scubapro regulator, BCD and fins
Diving Boat	33 feet long diving boat with two 200hp outboard engines, registration #128328

3.5 EQUIPMENT CALIBRATION

- 3.24 Calibration of the HVS is performed upon installation in accordance with the manufacturer’s instruction using the NIST-certified standard calibrator (Tisch Calibration Kit Model TE-5025A). The calibration data are properly documented and the records are maintained by ET for future reference.
- 3.25 The 1-hour TSP meter was calibrated by the supplier prior to purchase. Zero response of the equipment was checked before and after each monitoring event. In-house calibration with the High Volume Sampler (HVS) in same condition was undertaken in yearly basis.
- 3.26 The sound level meter and calibrator are calibrated and certified by a laboratory accredited under HOKLAS or any other international accreditation scheme at yearly basis.
- 3.27 The Water Quality Monitoring equipment such as Dissolved Oxygen meter, pH Meter, Turbidity Measuring Instrument and Salinometer, are calibrated by HOKLAS accredited laboratory of three month intervals.
- 3.28 All updated calibration certificates of the monitoring equipment used for the impact monitoring program in the relevant Monthly EM&A Report.

3.6 METEOROLOGICAL INFORMATION

- 3.29 The meteorological information during the construction phase is obtained from the Wong Chuk Hang Station of the Hong Kong Observatory (HKO) which near the Project site. The meteorological information in this Reporting Period is presented in [Appendix F](#).

3.7 DATA MANAGEMENT AND DATA QA/QC CONTROL

- 3.30 The impact monitoring data are handled by the ET’s systematic data recording and management, which complies with in-house Quality Management System. Standard Field Data Sheets (FDS) are used in the impact monitoring program.

3.31 The monitoring data recorded in the equipment e.g. 1-hour TSP meter, noise meter and Multi-parameter Water Quality Monitoring System, are downloaded directly from the equipments at the end of each monitoring day. The downloaded monitoring data are input into a computerized database properly maintained by the ET. The laboratory results are input directly into the computerized database and QA/QC checked by personnel other than those who input the data. For monitoring activities require laboratory analysis, the local laboratory follows the QA/QC requirements as set out under the HOKLAS scheme for all laboratory testing.

3.8 DETERMINATION OF ACTION/LIMIT (A/L) LEVELS

3.32 According to the Yung Shue Wan Environmental Monitoring and Audit Manual, the air quality, construction noise, marine water quality and coral monitoring were established, namely Action and Limit levels are listed in *Tables 3-5, 3-6, 3-7 and 3-8* as below.

Table 3-5 Action and Limit Levels for Air Quality Monitoring

Monitoring Station	Action Level ($\mu\text{g}/\text{m}^3$)		Limit Level ($\mu\text{g}/\text{m}^3$)	
	1-hour TSP	24-hour TSP	1-hour TSP	24-hour TSP
AC02b	288	161	500	260
AC04c	290	176	500	260

Table 3-6 Action and Limit Levels for Construction Noise Monitoring

Recommended Action & Limit Levels of Construction Noise		
Monitoring Location	Action Level	Limit Level
	0700-1900 hours on normal weekdays	
NC05	When one or more documented complaints are received	75 dB(A)*

Note: * Reduces to 70dB(A) for schools and 65dB(A) during the school examination periods.

Table 3-7 Action and Limit Levels for Marine Water Quality Monitoring

Parameter	Performance Criteria	Impact Station		
		WY1	WY2	WY3
DO Concentration (Surface and Middle) (mg/L)	Action Level	3.63	3.53	3.61
	Limit Level	3.32	3.47	3.42
DO Concentration (Bottom) (mg/L)	Action Level	3.33	2.92	3.36
	Limit Level	3.23	2.63	3.14
Turbidity (Depth-Average) (NTU)	Action Level	10.94	14.16	14.99
	Limit Level	17.35	15.20	16.21
Suspended Solids (Depth-Average) (mg/L)	Action Level	17.52	14.04	14.52
	Limit Level	25.62	16.51	16.88

Table 3-8 Action and Limit Levels for Coral Monitoring

Step	Action
1	Commence tagged coral monitoring at the impact site. If no increase in sedimentation cover/bleaching/partial mortality is observed on the hard corals or partial mortality on the soft/black corals, no action is required. If an increase in sedimentation cover/bleaching/partial mortality is observed on the hard corals or partial mortality on the soft/black corals at one or more impact monitoring stations Step 3 should be enacted, if not, Step 2.
2	If non actions are triggered a formal report should be issued along with evidentiary photographs following completion of the survey. Meanwhile monitoring work and construction works should continue uninterrupted.

Step	Action
3	If during the impact monitoring a 15% increase in the percentage of sedimentation on the hard corals occurs at more than 20% of the tagged coral colonies at the Impact Monitoring Station that is not reported at the Control Monitoring Station, then the Action Level is exceeded (Step 4).
4	If the Action Level is exceeded the IC(E) should inform all parties. The data from the water quality monitoring should also be reviewed. If the water quality monitoring shows no attributable effects of the installation works, then the Action Level is not triggered. If the water quality data indicate exceedances (for SS and/or turbidity) the IC(E) should discuss with the Contractor the most appropriate method of reducing suspended solids during construction (e.g. reduce rate of dredging). The water quality data reviewed should then be enacted on the next working day.
5	Monitoring should proceed the following day as per Step 1. If during the Impact Monitoring a 25% increase in the percentage of sedimentation on the hard corals at more than 20% of the tagged coral colonies at the Impact Monitoring Station that is not reported at the Control Monitoring Station, then the Limit Level is exceeded (Step 6). If the Limit Level is not exceeded Step 2 is enacted and work continues according to the mitigated method.
6	If the Limit Level is exceeded the Inspector Officer should inform all parties immediately. Should the Limit Level be exceeded, the Contractor should stop works immediately and work out a solution to the satisfaction of the IC(E), EPD and AFCD. The IC(E) should inform the Contractor to suspend marine construction works until an effective solution is identified. Once the solution has identified and agreed with all parties, backfilling works may re-commence.

4 IMPACT MONITORING RESULTS

4.01 The environmental monitoring results will be compared against the Action and Limit Levels established based on the baseline monitoring results and statutory criteria. In case the measured data exceed the environmental quality criteria, remedial actions will be triggered according to the Event and Action Plan. In the Reporting Period, the graphical plots of the trends of monitored parameter over the past four months are presented in *Annex E*.

4.1 RESULTS OF AIR QUALITY MONITORING

4.02 The monitoring results of air quality monitoring at the identified locations during the Reporting Period are summarized in *Tables 4-1*. In this quarterly period, a total of **96** events of 1-hour TSP and **34** successful events of 24-hour TSP measurements were performed.

4.01 The 1-hour and 24-hour TSP monitoring values fluctuated well below the Action Level during the Reporting Period. No Notification of Exceedance (NOE) of air quality criteria or corrective action was therefore required.

Table 4-1 Summary of 1-hour and 24-hour TSP Monitoring Results

Monitoring Location	1-hour TSP ($\mu\text{g}/\text{m}^3$)			24-hour TSP ($\mu\text{g}/\text{m}^3$)		
	Max	Min	Mean	Max	Min	Mean
AC02b	131	69	93	132	12	60
Record Date	13-Apr-11	9-May-11	48 events	21-Apr-11	25-Mar-11	17 events
AC04c	129	72	90	158	44	97
Record Date	13-Apr-11	9-May-11 14-May-11	48 events	14-Mar-11	9-May-11	17 events

4.2 RESULTS OF CONSTRUCTION NOISE MONITORING

4.03 Summary of construction noise monitoring at the identified locations during the Reporting Period are summarized in *Table 4-2*. In this reporting quarter, a total of **16** events of construction noise measurement were conducted while no documented construction complaint was received and all the construction noise results were below the Limit level. No NOE or corrective action was recommended for this parameter.

Table 4-2 Summary of Construction Noise Monitoring Results

Station	Leq, 30min (dB(A))	
	Max	Min
NC05	74.5	57.8
Record Date	26 Apr 11	23 Mar 11

4.3 RESULTS OF MARINE WATER QUALITY MONITORING

4.04 The construction of marine outfall works was commenced on 9 May 2011, therefore, the marine water quality monitoring has been carried out in May 2011. In this reporting period, **7** monitoring events have been carried out at the designated locations.

4.05 The statistical analysis result for the parameters of DO, turbidity and suspended solids in this reporting quarter are shown in *Tables 4-3 to 4-6*.

Table 4-3 Statistic of Monitoring Result for DO concentration (mg/L) (Surface & Mid-layers)

Station	WY1	WY2	WY3	CY1(F)	CY2(E)
Average	6.58	6.65	6.42	7.67	6.52
Min	4.82	4.27	3.92	5.17	4.40
Max	9.33	12.26	9.40	13.42	8.63

Table 4-4 Statistic of Monitoring Result for DO concentration (mg/L) (Bottom layers)

Station	WY1	WY2	WY3	CY1(F)	CY2(E)
Average	6.42	6.21	6.19	6.79	5.88
Min	4.74	4.00	3.75	4.80	4.08
Max	10.02	11.82	9.19	10.38	8.15

Table 4-5 Statistic of Monitoring Result for Turbidity (NTU)

Station	WY1	WY2	WY3	CY1(F)	CY2(E)
Average	5.44	7.10	7.21	7.34	7.77
Min	2.75	4.44	4.32	4.61	4.06
Max	10.60	14.10	14.03	13.23	12.32

Table 4-6 Statistic of Monitoring Result for Suspended Solids (mg/L)

Station	WY1	WY2	WY3	CY1(F)	CY2(E)
Average	6.29	5.96	5.86	4.58	5.41
Min	3.35	3.63	3.75	2.53	1.80
Max	13.75	11.63	10.50	10.03	14.93

4.06 A summary of exceedances for the three parameters: dissolved oxygen (DO), turbidity and suspended solids are shown in **Table 4-7**.

Table 4-7 Summary of Exceedances in Marine Water Quality

Station	DO (Ave of Surf. & mid-depth)		DO (Ave. of Bottom Layer)		Turbidity (Depth Ave.)		SS (Depth Ave)		Total Exceedance	
	Action	Limit	Action	Limit	Action	Limit	Action	Limit	Action	Limit
Mid-Ebb										
WY1	0	0	0	0	0	0	0	0	0	0
WY2	0	0	0	0	0	0	0	0	0	0
WY3	0	0	0	0	0	0	0	0	0	0
Mid-Flood										
WY1	0	0	0	0	0	0	0	0	0	0
WY2	0	0	0	0	0	0	0	0	0	0
WY3	0	0	0	0	0	0	0	0	0	0
No of Exceedance	0	0	0	0	0	0	0	0	0	0

4.07 For marine water monitoring, no exceedance of Action/Limit level was recorded in this reporting period. Therefore, no associated corrective actions were then required.

4.4 RESULTS OF ECOLOGY MONITORING

- 4.08 Since the construction of marine outfall works was commenced on 9 May 2011, impact coral monitoring were performed on **20 and 31 May 2011** at Yung Shue Wan and Sham Wan where 20 hard coral colonies were monitored at each sites.
- 4.09 No beaching or mortality were recorded on both sites during the monitoring period except one colony (#4) at Sham Wan was killed by coral feeding snail *Drupella sp.*. New coral was tagged on 3 June 2011 at Sham Wan to replace the dead coral colony. Sediment cover recorded in both Yung Shue Wan and Sham Wan is very low and does not trigger the action level and affect the health of the tagged coral. The coral coverage in both impact site (YSW) and control site (SW) are relatively low when compared with other coral communities in Hong Kong (such as Sharp Island and Hoi Ha Wan). Most of the coral colonies recorded in both site are common species in Hong Kong water.
- 4.10 No deterioration in the general condition of the coral fauna was observed. No adverse deterioration of the coral community was observed in the ecological monitoring results when compared with the baseline ecological monitoring results.

5 WASTE MANAGEMENT

5.01 Waste management was carried out by an on-site Environmental Officer or an Environmental Supervisor from time to time.

5.1 RECORDS OF WASTE QUANTITIES

5.02 All types of waste arising from the construction work are classified into the following:

- Construction & Demolition (C&D) Material;
- Chemical Waste;
- General Refuse; and
- Excavated Soil.

5.03 The quantities of waste for disposal in this Reporting Period are summarized in *Table 5-1* and *5-2* and the Monthly Summary Waste Flow Table is shown in *Annex G*. Whenever possible, materials were reused on-site as far as practicable.

Table 5-1 Summary of Quantities of Inert C&D Materials

Type of Waste	Quantity			Disposal Location
	Mar 11	Apr 11	May 11	
C&D Materials (Inert) ('000m ³)	0.002	0.017	0.03	Tuen Mun Area 38
Reused in this Contract (Inert) ('000m ³)	0.006	0.112	0.014	-
Reused in other Projects (Inert) ('000m ³)	0	0	0	-
Disposal as Public Fill (Inert) ('000m ³)	0.752	1.023	0.6	Tuen Mun Area 38

Table 5-2 Summary of Quantities of C&D Wastes

Type of Waste	Quantity			Disposal Location
	Mar 11	Apr 11	May 11	
Recycled Metal (kg)	0	0	0	-
Recycled Paper / Cardboard Packing (kg)	0	0	0	-
Recycled Plastic (kg)	0	0	0	-
Chemical Wastes (kg)	0	0	0	
General Refuses (tonne)	0	0	3.150	Yung Shue Wan RTS

5.04 There was no site effluent discharged but the estimated volume of surface runoff was less than 50m³ in this reporting quarter.

6 SITE INSPECTION

- 6.01 According to the Final Report Environmental Monitoring and Audit Manual, the environmental site inspection should be formulated by ET Leader. Regular environmental site inspections had been carried out by the ET to confirm the environmental performance. In this Reporting Period, site inspection was carried out on **1, 8, 15, 22 and 29 March 2011, 6, 14, 19 and 26 April 2011** and **3, 12, 17, 24 and 31 May 2011**. Besides, routine joint-site visit by IEC, RE, Leader and ET was carried out on **8 March 2011, 14 April 2011** and **12 May 2011**.
- 6.02 Observations for the site inspections and monthly audit within this Reporting Period are summarized in *Table 6-1*.

Table 6-1 Site Observations

Date	Findings / Deficiencies	Follow-Up Status
1 March 2011	<ul style="list-style-type: none"> No environmental issue was observed during the site inspection. 	N.A
8 March 2011	<ul style="list-style-type: none"> Stagnant water was accumulated in the drip tray. The Contractor should clear the tray to prevent mosquito breeding. 	The stagnant water was removed on 15 March 2011.
15 March 2011	<ul style="list-style-type: none"> No environmental issue was observed during the site inspection. 	N.A
22 March 2011	<ul style="list-style-type: none"> The public access was full of mud, the Contractor should clear the road or pave the road to maintain good house-keeping and dust control. Sediment in the sedimentation tank has to be removed to restore its de-silting capacity. 	<p>The mud on the access was cleared on 29 March 2011</p> <p>The tank was cleared on 29 March 2011.</p>
29 March 2011	<ul style="list-style-type: none"> No environmental issue was observed during the site inspection. 	N.A
6 April 2011	<ul style="list-style-type: none"> The geotextile sheets in the sedimentation tank should be properly installed to ensure the desilting function. 	The sheets were set up properly on 14 April 2011.
14 April 2011	<ul style="list-style-type: none"> Too much lubricant grease was observed on the plant, the Contractor should clean up excess grease to avoid any contamination to soil. 	The grease was cleaned up on 15 April 2011.
19 April 2011	<ul style="list-style-type: none"> The debris and waste in the drip tray should be cleaned up. 	The tray was cleaned up on 20 April 2011.
26 April 2011	<ul style="list-style-type: none"> No environmental issue was observed during the site inspection. 	N.A
3 May 2011	<ul style="list-style-type: none"> The Contractor should place the oil container to proper storage area after use. 	The container was taken to proper storage area on 3 May 2011.
12 May 2011	<ul style="list-style-type: none"> No environmental issue was observed during the site inspection. 	N.A
17 May 2011	<ul style="list-style-type: none"> No environmental issue was observed during the site inspection. 	N.A
24 May 2011	<ul style="list-style-type: none"> The setting of sedimentation tank need to be improved such as installing 	The de-silting effectiveness of the tank is still under review.

	proper filters inside to improve the de-silting effectiveness.	
31 May 2011	<ul style="list-style-type: none">• The sedimentation facilities need to be further modified to improve the de-silting effectiveness.• Turbid water was observed at the outfall of the site. The Contractor should carry out immediate action to avoid turbid water discharging.	The water quality in the sed-tank was improved on 4 June 2011. More silt curtains were observed setting up along the sea bank and no turbid water was observed on 4 June 2011.

7 ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE

7.1 ENVIRONMENTAL COMPLAINT, SUMMONS AND PROSECUTION

7.01 No environmental complaint, summons and prosecution was received in this Reporting Period. The statistical summary table of environmental complaint is presented in [Tables 7-1, 7-2](#) and [7-3](#).

Table 7-1 Statistical Summary of Environmental Complaints

Reporting Period	Environmental Complaint Statistics		
	Frequency	Cumulative	Complaint Nature
1 - 31 March 2011	0	0	NA
1 - 30 April 2011	0	0	NA
1 - 31 May 2011	0	0	NA

Table 7-2 Statistical Summary of Environmental Summons

Reporting Period	Environmental Summons Statistics		
	Frequency	Cumulative	Complaint Nature
1 - 31 March 2011	0	0	NA
1 - 30 April 2011	0	0	NA
1 - 31 May 2011	0	0	NA

Table 7-3 Statistical Summary of Environmental Prosecution

Reporting Period	Environmental Prosecution Statistics		
	Frequency	Cumulative	Complaint Nature
1 - 31 March 2011	0	0	NA
1 - 30 April 2011	0	0	NA
1 - 31 May 2011	0	0	NA

8 IMPLEMENTATION STATUS OF MITIGATION MEASURES

8.01 The environmental mitigation measures that recommended in the Yung Shue Wan Environmental Monitoring and Audit Manual covered the issues of dust, noise, water and waste and they are summarized as following:

Dust Mitigation Measure

8.02 Installation of 2m high solid fences around the construction site of Pumping Station P2 is recommended. Implementation of the requirements stipulated in the Air Pollution Control (Construction Dust) Regulation and the following good site practices are recommended to control dust emission from the site:

- (a) Stockpiles of imported material kept on site should be contained within hoardings, dampened and / or covered during dry and windy weather;
- (b) Material stockpiled alongside trenches should be covered with tarpaulins whenever works are close to village houses;
- (c) Water sprays should be used during the delivery and handling of cement, sands, aggregates and the like.
- (d) Any vehicle used for moving sands, aggregates and construction waste shall have properly fitting side and tail boards. Materials should not be loaded to a level higher than the side and tail boards, and should be covered by a clean tarpaulin.

Noise Mitigation Measure

8.03 As detailed in the EIA report, concreting work of the Pumping Station P1a and sewer alignment construction activities would likely cause adverse noise impacts on some of the noise sensitive receivers. Appropriate mitigation measures have therefore been recommended. The mitigation measures recommended in the EIA report are summarised below:

- (a) Use of quiet equipment for the construction activities of the Pumping Stations and sewer alignment;
- (b) Use of temporary noise barrier around the site boundary of Pumping Station P1a;
- (c) Use of kick ripper (saw and lift) method to replace the breaker for pavement removal during sewer alignment construction;
- (d) Restriction on the number of plant during sewer alignment construction;
- (e) Use of noise screening structures in the form of acoustic shed or movable barrier wherever practicable and feasible in areas with sufficient clearance and headroom during the construction of sewer alignment;
- (f) Adoption of manual working method wherever practicable and feasible in areas where the worksites of the proposed sewer alignment are located less than 20m from the residential noise sensitive receivers and less than 30m from the temple and the public library; and
- (g) Implementation of the following good site practices:
 - Only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction program.
 - Mobile plant, if any, should be sited as far away from NSRs as possible.
 - Machines and plant (such as trucks) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum.
 - Plant known to emit noise strongly in one direction should, wherever possible, be orientated so that the noise is directed away from the nearby NSRs.
 - Material stockpiles and other structures should be effectively utilised, wherever practicable, in screening noise from on-site construction activities.

Water Quality Mitigation Measure

8.04 No-dig method using Horizontal Directional Drilling (HDD) would be used for the installation of outfall pipe of about 480 m from shore to minimize the potential water quality impacts arising from the dredging works required for the submarine outfall construction. For the

remaining outfall pipe of about 240m and the diffuser section, open trench dredging would still be required.

- 8.05 During the dredging works, the Contractor should be responsible for the design and implementation of the following mitigation measures.
- Dredging should be undertaken using closed grab dredgers with a total production rate of 55m³/hr;
 - Deployment of 2-layer silt curtains with first layer enclosing the grab and the second layer at around 50, from the dredging area while dredging works are in progress;
 - all vessels should be sized such that adequate clearance (i.e. minimum clearance of 0.6m) is maintained between vessels and the sea bed at all states of the tide to ensure that undue turbidity is not generated by turbulence from vessel movement or propeller wash;
 - all pipe leakages should be repaired promptly and plant shall not be operated with leaking pipes;
 - excess material should be cleaned from the decks and exposed fittings of barges before the vessel is moved;
 - adequate freeboard (i.e. minimum of 200m) should be maintained on barges to ensure that decks are not washed by wave action;
 - all barges should be fitted with tight fitting seals to their bottom openings to prevent leakage of material; and
 - loading of barges and hoppers should be controlled to prevent splashing of dredged material to the surrounding water, and barges and hoppers should not be filled to a level which would cause the overflow of materials or sediment laden water during loading or transportation; and
 - the decks of all vessels should be kept tidy and free of oil or other substances that might be accidentally or otherwise washed overboard.

Construction Run-off and Drainage

- 8.06 The Contractor should observe and comply with the Water Pollution Control Ordinance and the subsidiary regulations. The Contractor should follow the practices, and be responsible for the design, construction, operation and maintenance of all the mitigation measures as specified in ProPECC PN 1/94 “Construction Site Drainage”. The design of the mitigation measures should be submitted by the Contractor to the Engineer for approval. These mitigation measures should include the following practices to minimise site surface runoff and the chance of erosion, and also to retain and reduce any suspended solids prior to discharge:
- Provision of perimeter channels to intercept storm-runoff from outside the site. These should be constructed in advance of site formation works and earthworks.
 - Works programmes should be designed to minimize works areas at any one time, thus minimising exposed soil areas and reducing the potential for increased siltation and runoff.
 - Sand/silt removal facilities such as sand traps, silt traps and sediment basins should be provided to remove the sand/silt particles from run-off. These facilities should be properly and regularly maintained. These facilities shall be carefully planned to ensure that they would be installed at appropriate locations to capture all surface water generated on site.
 - Careful programming of the works to minimise soil excavation works during rainy seasons.
 - Exposed soil surface should be protected by paving or hydroseeding as soon as possible to reduce the potential of soil erosion.
 - Trench excavation should be avoided in the wet season, and if necessary, these should be excavated and backfilled in short sections.
 - Open stockpiles of construction materials on site should be covered with tarpaulin or similar fabric.

General Construction Activities

- 8.07 Debris and rubbish generated on-site should be collected, handled and disposed of properly to avoid entering the nearby coastal waters and stormwater drains. 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. Open drainage channels and culverts near the works areas should be covered to block the entrance of large debris and refuse.

Wastewater Arising from Workforce

- 8.08 Portable toilets shall be provided by the Contractors, where necessary, to handle sewage from the workforce. The Contractor shall also be responsible for waste disposal and maintenance practices

Sediment Contamination Mitigation Measure

- 8.09 The basic requirements and procedures for dredged mud disposal are specified under the WBTC No. 34/2002. The management of the dredging, use and disposal of marine mud is monitored by the MFC, while the licensing of marine dumping is the responsibility of the Director of Environmental Protection (DEP).
- 8.10 The uncontaminated dredged sediment will be loaded onto barges and transported to the designated marine disposal site. Appropriate dredging methods have been incorporated into the recommended water quality mitigation measures including the use of closed-grab dredgers and silt curtains. Category L sediment would be suitable for disposal at a gazetted open sea disposal ground.
- 8.11 During transportation and disposal of the dredged marine sediments, the following measures should be taken to minimize potential impacts on water quality:
- Bottom opening of barges should be fitted with tight fitting seals to prevent leakage of material. Excess material should be cleaned from the decks and exposed fittings of barges and hopper dredgers before the vessel is moved.
 - Monitoring of the barge loading should be conducted to ensure that loss of material does not take place during transportation. Transport barges or vessels should be equipped with automatic self-monitoring devices as specified by the DEP.

Construction Waste Mitigation Measure

Good Site Practices and Waste Reduction Measures

- 8.12 It is not anticipated that adverse waste management related impacts would arise, provided that good site practices are strictly followed. Recommendations for good site practices for the construction waste arising include:
- Nomination of an approved person, such as a site manager, to be responsible for the implementation of good site practices, arranging for collection and effective disposal to an appropriate facility, of all wastes generated at the site.
 - Training of site personnel in proper waste management and chemical handling procedures.
 - Appropriate measures to minimize windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers.
 - Provision of sufficient waste disposal points and regular collection for disposal.
 - Separation of chemical wastes for special handling and appropriate treatment at the Chemical Waste Treatment Facility.
 - Regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors.
 - Maintain records of the quantities of wastes generated, recycled and disposed.
- 8.13 In order to monitor the disposal of C&D waste at landfills and to control fly tipping, a

trip-ticket system should be included as one of the contractual requirements and implemented by an Environmental Team undertaking the Environmental Monitoring and Audit work. An Independent Environmental Checker should be responsible for auditing the results of the system.

- 8.14 Good management and control can prevent the generation of significant amount of waste. Waste reduction is best achieved at the planning and design stage, as well as by ensuring the implementation of good site practices. Recommendations to achieve waste reduction include:
- 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 should be provided to segregate this waste from other general refuse generated by the work force;
 - any unused chemicals or those with remaining functional capacity should be recycled;
 - use of reusable non-timber formwork to reduce the amount of C&D material;
 - prior to disposal of C&D waste, it is recommended that wood, steel and other metals should be separated for re-use and / or recycling to minimise the quantity of waste to be disposed of to landfill;
 - proper storage and site practices to minimise the potential for damage or contamination of construction materials; and
 - plan and stock construction materials carefully to minimise amount of waste generated and avoid unnecessary generation of waste.

General Site Wastes

- 8.15 A collection area should be provided where waste can be stored prior to removal from site. An enclosed and covered area is preferred for the collection of the waste to reduce 'wind blow' of light material.

Chemical Wastes

- 8.16 After use, chemical waste (eg. cleaning fluids, solvents, lubrication oil and fuel) should be handled according to the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. Any unused chemicals or those with remaining functional capacity should be recycled. Spent chemicals should be properly stored on site within suitably designed containers, and should be collected by an approved operator for disposal at the Chemical Waste Treatment Facility or other licenced facility in accordance with the Waste Disposal (Chemical Waste) (General) Regulation under the Waste Disposal Ordinance.
- 8.17 Any service shop and minor maintenance facilities should be located on hard standings within a bunded area, and sumps and oil interceptors should be provided. Maintenance of vehicles and equipment involving activities with potential for leakages and spillage should only be undertaken with the areas appropriately equipped to control these discharges.

Construction and Demolition Material

- 8.18 The C&D material should be separated on-site into three categories: (i) public fill, the inert portion of the C&D material (e.g. concrete and rubble), which should be re-used on-site or disposed of at a public filling area; (ii) C&D waste for re-use and/or recycling, the non-inert portion of the C&D material, (e.g. steel and other metals, wood, glass and plastic); (iii) C&D waste which cannot be re-used and/or recycled. The waste producers are responsible for its disposal at strategic landfills.
- 8.19 In order to minimise the impact resulting from collection and transportation of material for off-site disposal, it was recommended that inert material should be re-used on-site where possible. Prior to disposal of C&D material, it was also recommended that steel and other metals should be separated for re-use and/or recycling where practicable to minimise the

quantity of waste to be disposed of to landfill.

Ecology Mitigation Measure

- 8.20 The following general good practice measures should be adopted to mitigate ecological impacts during marine works (including dredging and HOD);
- Excess material from vessel loading should be cleaned from the decks and exposed fittings before vessels are moved to the backfilling location;
 - Dredging should cause no foam, oil, grease, scum, litter or other objectionable matter to be present on the water;
 - Adequate freeboard should be maintained to ensure that decks are not washed by wave action;
 - All pie leakages should be repaired promptly and plant Should not be operated with leaking pipes; and
 - All barges and other vessels should maintain adequate clearance between vessels and the seabed at all states of the tide and reduce operational speeds to ensure that undue turbidity is not generated by turbulence from vessel movement or propeller wash.
- 8.21 In the event of exceedances of ecological action or limit level, the Contractor will be required to revise his operations as a further mitigation measure. Revisions to the operation method may include (but not be limited to):
- Reduction in dredging rate'
 - Restriction of dredging in particular areas to specific periods in the tidal cycle
- 8.22 Should repeated non-compliances with limit level(s) occur the Contractor shall modify his working method until he is able to achieve the required compliances with the limit levels to the satisfaction of the IC(E)

Fisheries Mitigation Measure

- 8.23 Closed grab dredger, deployment of silt curtains around the immediate dredging area and low dredging rate have been recommended in Water Quality of the EIA report in order to minimise sediment release into the water column.

Landscape & Visual Mitigation Measure

- 8.24 Mitigation measures recommended in the EIA Report for landscape and visual impacts during the construction stage are summarised below.
- Screening of site construction works by use of hoarding that is appropriate to its site context;
 - Retaining existing trees and minimising damage to vegetation where possible by close co-ordination and on site alignment adjusted of rising main and gravity sewer pipelines. Tree protective measures should be implemented to ensure trees identified as to be retained are satisfactorily protected during the construction phase;
 - Careful and efficient transplanting of affected trees (1 no.) to temporary or final transplant location (the proposed tree to be transported is a semi-mature *Macaranga tanarius* and is located at the proposed Pumping Station P2 location);
 - Short excavation and immediate backfilling of sections upon completion of works to reduce active site area;
 - Conservation of top-soil for reuse.
 - Night-time light source from marine fleets should be directed away from the residential units
- 8.25 The implementation schedule of mitigation measures is presented in [Appendix L](#).

- 8.26 Leader had been implementing the required environmental mitigation measures according to

the Yung Shue Wan Environmental Monitoring and Audit Manual subject to the site condition. Environmental mitigation measures generally implemented by Leader in this Reporting Month are summarized in *Table 8-1*.

Table 8-1 Environmental Mitigation Measures

Issues	Environmental Mitigation Measures
Water Quality	<ul style="list-style-type: none"> • Drainage channels were provided to convey run-off into the treatment facilities; and • Drainage systems were regularly and adequately maintained.
Air Quality	<ul style="list-style-type: none"> • Cover all excavated or stockpile of dusty material by impervious sheeting or sprayed with water to maintain the entire surface wet; • Public roads around the site entrance/exit had been kept clean and free from dust; and • Tarpaulin covering of any dusty materials on a vehicle leaving the site.
Noise	<ul style="list-style-type: none"> • Good site practices to limit noise emissions at the sources; • Use of quiet plant and working methods; • Use of site hoarding or other mass materials as noise barrier to screen noise at ground level of NSRs; and • To minimize plant number use at the worksite.
Waste and Chemical Management	<ul style="list-style-type: none"> • Excavated material should be reused on site as far as possible to minimize off-site disposal. Scrap metals or abandoned equipment should be recycled if possible; • Waste arising should be kept to a minimum and be handled, transported and disposed of in a suitable manner; • The Contractor should adopt a trip ticket system for the disposal of C&D materials to any designed public filling facility and/or landfill; and • Chemical waste shall be handled in accordance with the Code of Practice on the Packaging, Handling and Storage of Chemical Wastes.
General	<ul style="list-style-type: none"> • The site was generally kept tidy and clean.

9 CONCLUSIONS AND RECOMMENTATIONS

9.1 CONCLUSIONS

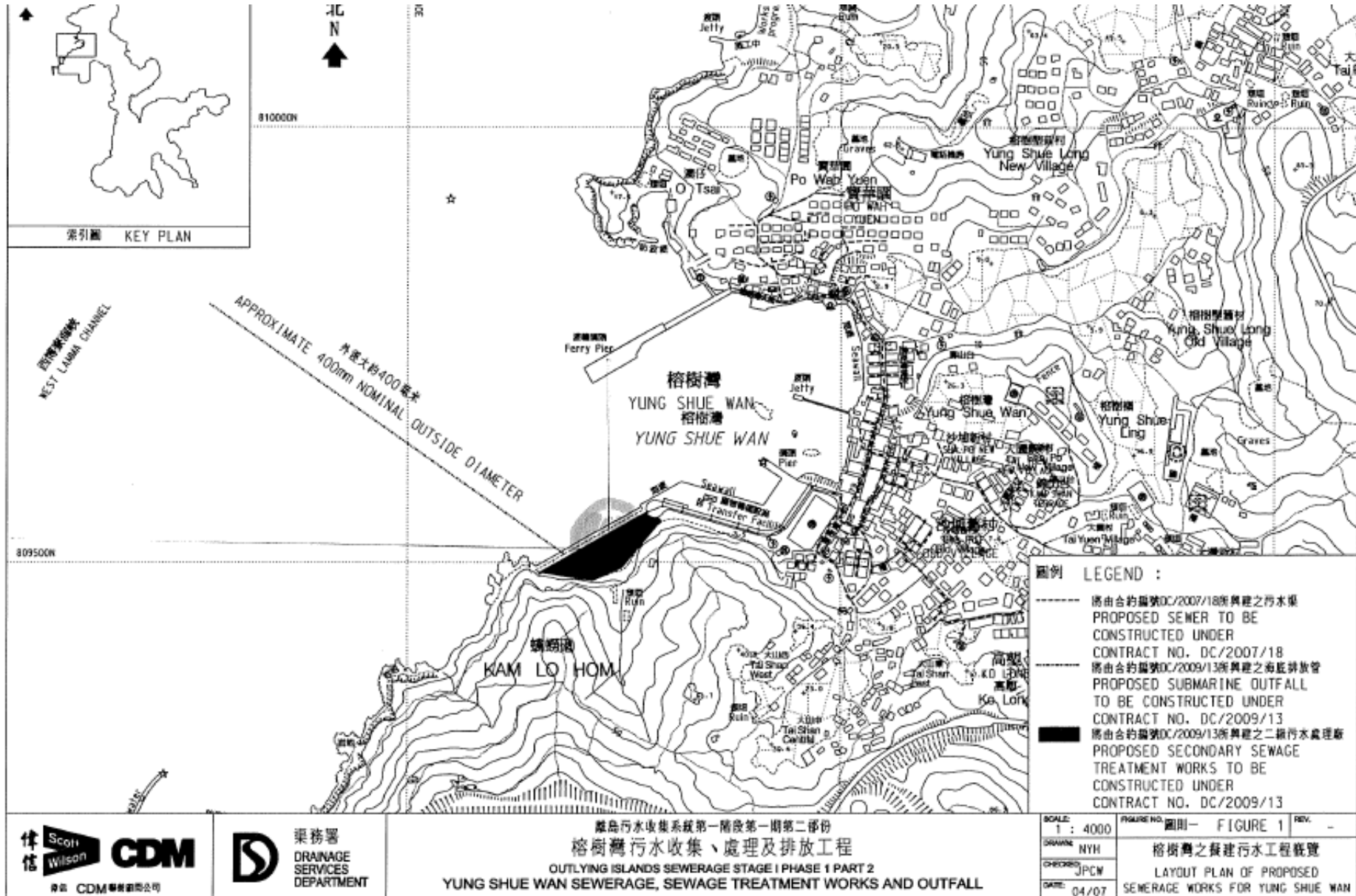
- 9.01 This is the 3rd Quarterly EM&A summary report for Yung Shue Wan under the Project covering the construction period from **1 March to 31 May 2011**.
- 9.02 No noise complaint (an Action Level exceedance) was received and no construction noise measurement results that exceeded the Limit Level were recorded in this reporting quarter. No NOE or the associated corrective actions were therefore issued.
- 9.03 In this reporting quarter, no monitoring result of 1-hour and 24-hour TSP was found to be triggered the Action or Limit Level.
- 9.04 No exceedance of Action/Limit level was recorded in marine water monitoring in this reporting period.
- 9.05 No exceedance of Action/Limit level was recorded in coral monitoring in this reporting period.
- 9.06 No documented complaint, notification of summons or successful prosecution was received.
- 9.07 **14** events of site inspection were carried out by ET in this Reporting Quarter and no non-compliance was observed during the inspection. In general, all the observation has been rectified during the next week site inspection. The environmental performance of the Project was therefore considered as satisfactory.
- 9.08 No site inspection was undertaken by external parties i.e. EPD or AFCD within the Reporting Period.

9.2 RECOMMENDATIONS

- 9.09 As wet season is approaching, the Contractor shall pay attention on the potential water impact as the construction site is adjacent to the coastline. Muddy water and other water quality pollutants via site surface water runoff into the coral zones of Yung Shue Wan seawall, Shek Kok Tsui and O Tsai should be avoided. Therefore, mitigation measures for water quality should be fully implemented.
- 9.10 Moreover, the construction dust mitigation measures identified at the EM&A Manuel such as watering at haul road and covering of dusty material should also be implemented and properly maintained in wet season.

Annex A

Site Layout Plan – Yung Shue Wan Portion Area



Annex B

Organization Structure and Contact Details of Relevant Parties

Contact Details of Key Personnel

Organization	Project Role	Name of Key Staff	Tel No.	Fax No.
DSD	Employer	Mr. AU Chi Kwong	-	-
SCJV	Engineer's Representative	Mr. Neil Wong	2982 0240	2982 4129
SCJV	Resident Engineer	Mr. Toby Ng	2982 0240	2982 4129
SCJV	Resident Engineer	Mr. Alfred Cheung	2982 0240	2982 4129
Scott Wilson	Independent Environmental Checker	Mr. Rodney Ip	2410 3750	2428 9922
Leader	Project Manager	Mr. Wilfred So	2982 1750	2982 1803
Leader	Site Agent/ Environmental Officer	Mr. Vincent Chan	2982 1750	2982 1803
Leader	Safety Officer	Mr. Edwin Leung	2982 1750	2982 1803
AUES	Environmental Team Leader	Mr. T. W. Tam	2959 6059	2959 6079
AUES	Environmental Consultant	Ms. Nicola Hon	2959 6059	2959 6079
AUES	Assistance Environmental Consultant	Mr. Ray Cheung	2959 6059	2959 6079
AUES	Team Supervisor	Mr. Ben Tam	2959 6059	2959 6079

Legend:

DSD (Employer) – Drainage Services Department

CDM (Engineer) – Scott Wilson CDM Joint Venture

Leader (Main Contractor) – Leader Civil Engineering Corporation Limited

Scott Wilson (IEC) – Scott Wilson Limited

AUES (ET) – Action-United Environmental Services & Consulting

Annex C

Master and Three Months Rolling Construction Programs

Activity ID	Description	Original Duration	Percent Complete	Early Start	Early Finish	Late Start	Late Finish	Total Float	Predecessors	Successors	2011												
											JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT			
SKW1151	Set up Temporary Working Platform	185	0	30/04/11	31/10/11	01/03/11	01/09/11	-60d	PRE0090, SKW1141	SKW1171													
SKW STW																							
Submission & Delivery (E&M)																							
E&M3010	Delivery of MBR M.M. - 1st shipment for Temp STP	150	0	30/04/11	26/09/11	24/04/13	20/09/13	725d	E&M0160	E&M3170													
E&M3030	Delivery of Grit Removal Equipment	180	0	27/06/11	24/12/11	31/08/11	26/02/12	65d	E&M0150	E&M3190													
E&M3060	Delivery of Fine Screens	136	0	27/06/11	10/11/11	15/08/11	28/12/11	49d	E&M0120	E&M3210													
E&M3070	Delivery of Pumps	136	0	27/06/11	10/11/11	15/08/11	28/12/11	49d	E&M0130	E&M3220													
E&M3080	Delivery of Submersible Mixers	180	0	27/06/11	24/12/11	15/09/11	12/03/12	80d	E&M0140	E&M3230													
E&M3090	Delivery of Sludge Dewatering Equipment	210	0	27/06/11	23/01/12	18/07/11	12/02/12	21d	E&M0170	E&M3240													
E&M3100	Delivery of Valves, Pipes & Fittings	180	0	27/06/11	24/12/11	05/02/13	03/08/13	589d	E&M0180	E&M3250													
E&M3110	Delivery of Penstocks	180	0	27/06/11	24/12/11	18/02/13	16/08/13	602d	E&M0190	E&M3260													
E&M3130	Delivery of instruments	180	0	27/06/11	24/12/11	04/05/13	30/10/13	677d	E&M0200	E&M3270													
E&M3140	Delivery of MCC LVSB	180	0	27/06/11	24/12/11	09/05/11	04/11/11	-50d	E&M0210	E&M3261													
E&M3150	Delivery of BS Equipment	180	0	29/06/11	25/12/11	20/02/13	18/08/13	602d	E&M0220	E&M3291													
E&M3160	Delivery of FS Equipment	180	0	29/07/11	24/01/12	14/01/12	11/07/12	169d	E&M0230	E&M0340, E&M3300													
Construction of Grid A-G																							
SKW1261	Excavate for SKW STW Structure (Grid A -G)	164	0	22/05/11	01/11/11	14/02/11	27/07/11	-97d	SKW0551	SKW1271, SKW1371													
Rising Main																							
SKW1481	Subm, Approval & Delivery of DI pipes	120	100	17/05/10 A	28/02/11 A	17/05/10 A	28/02/11 A		KD0020	SKW1501													
SKW1501	Concrete Trough (ChB0+00 - ChB1+20)	300	0	30/04/11	23/02/12	14/09/10	10/07/11	-228d	PRE0100, SKW1481	SKW1521													
Section W 8 - Landscape Softworks in All Portions																							
SKW1591	Tree Survey	21	100	17/05/10 A	06/06/10 A	17/05/10 A	06/06/10 A		KD0020	SKW1621													
SKW1611	Preservation & Protection of Trees	822	43	17/05/10 A	10/08/12	17/05/10 A	10/08/12	0	KD0020	KD0100, SKW1631													
SKW1621	Transplantation at SKW	60	100	07/06/10 A	05/10/10 A	07/06/10 A	05/10/10 A		SKW1591														

Start date	05/05/10		Early bar
Finish date	05/11/14		Progress bar
Data date	30/04/11		Critical bar
Run date	20/05/11		Summary bar
Page number	6A		Progress point
			Critical point
			Summary point
			Start milestone point
			Finish milestone point

Leader Civil Engineering Corp. Ltd.
Contract No. DC/2009/13
Construction of Sewage Treatment Works at YSW & SKW
3-month Rolling Programme (May 2011 - Jul 2011)

(Marked on 30 April 2011)

Date	Revision	Checked	Approved
30/04/11	Revision 0	StL	VC

Activity ID	Description	Original Duration	Percent Complete	Early Start	Early Finish	Late Start	Late Finish	Total Float	Predecessors	Successors	2011											
											JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT		
+Project Key Date																						
		359	0	05/05/10 A	21/05/11	05/05/10 A	13/02/11	-97d														
+Preliminary (Civil)																						
		191	100	17/05/10 A	23/11/10 A	17/05/10 A	23/11/10 A		KD0020													
Preliminary (E&M)																						
Technical Submission																						
+Process Design of SKWSTW & YSWSTW																						
		367	90	17/05/10 A	18/05/11	17/05/10 A	30/06/11	43d														
+Hydraulic Design																						
		306	88	15/07/10 A	16/05/11	15/07/10 A	30/06/11	45d														
+Equipment Submission & Approval																						
		438	48	17/05/10 A	28/07/11	17/05/10 A	07/11/11	102d														
+Drawings Submission & Approval																						
		370	75	24/06/10 A	28/06/11	24/06/10 A	30/07/11	32d														
+Statutory Submission																						
		189	0	29/07/11	02/02/12	01/07/11	14/02/14	743d														
Yung Shue Wan																						
+Preliminary																						
		229	100	17/05/10 A	31/12/10 A	17/05/10 A	31/12/10 A															
+Section W 1 - Slope Works in Portion A & C																						
		679	58	17/05/10 A	25/03/12	17/05/10 A	15/08/11	-223d														
Section W 2 - YSW STW & Submarine Outfall																						
+Civil & Structural Work																						
		520	52	17/05/10 A	19/10/11	17/05/10 A	05/01/12	79d														
+Submarine Outfall																						
		494	84	17/05/10 A	22/09/11	17/05/10 A	16/06/11	-98d														
+E&M Works - YSW STP																						
		270	0	30/04/11	24/01/12	24/10/10	05/05/12	102d														
Sok Kwu Wan																						
+Preliminary																						
		30	100	17/05/10 A	15/06/10 A	17/05/10 A	15/06/10 A															
Section W 3 - Footpath Diversion in Portion G																						
+Civil & Geotechnical Works																						
		370	92	17/05/10 A	21/05/11	17/05/10 A	28/02/11	-97d														
Section W 4 - Slope Works in Portions H & I																						
+Geotechnical Works																						
		579	34	15/06/10 A	14/01/12	15/06/10 A	15/08/11	-152d														
Section W 5 - P.S. No. 1 in Portion D																						
+Civil & Geotechnical Works																						
		319	100	17/05/10 A	31/03/11 A	17/05/10 A	31/03/11 A															
+Structural Works																						
		312	0	20/04/11 A	25/02/12	01/01/11 A	15/11/11	-102d														
E&M Works (PS1)																						
+Submission & Delivery																						
		508	59	17/05/10 A	06/10/11	17/05/10 A	01/05/11	-158d														
+Installation, T&C																						
		55	0	11/09/11	04/11/11	02/05/11	25/06/11	-132d														
Section W 6 - Sewer and PS No.2 in Portions E&H																						
+Civil & Geotechnical Works																						
		639	33	17/05/10 A	14/02/12	17/05/10 A	15/11/11	-91d														
+Structural Works																						
		104	0	02/06/11	14/09/11	04/12/10	17/03/11	-181d														
E&M Works (PS2)																						
+Submission & Delivery																						

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Finish date	05/11/14
Data date	30/04/11
Run date	20/05/11
Page number	1A
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- Progress bar
- Critical bar
- Summary bar
- ▲ Progress point
- ▲ Critical point
- ◆ Summary point
- ◆ Start milestone point
- ◆ Finish milestone point

Leader Civil Engineering Corp. Ltd.
Contract No. DC/2009/13
Construction of Sewage Treatment Works at YSW & SKW
3-month Rolling Programme (May 2011 - Jul 2011)
(Outline)

Date	Revision	Checked	Approved
30/04/11	Revision 0	StL	VC

(Marked on 30 April 2011)

Activity ID	Description	Original Duration	Percent Complete	Early Start	Early Finish	Late Start	Late Finish	Total Float	Predecessors	Successors	2011										
											JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	
		518	57	17/05/10 A	16/10/11	17/05/10 A	02/07/11	-106d													
Section W 7 - SKW STW ,Sewer and Submarine Outfall																					
+Submarine Outfall																					
		533	79	17/05/10 A	31/10/11	17/05/10 A	01/09/11	-60d													
SKW STW																					
+Submission & Delivery (E&M)																					
		270	0	30/04/11	24/01/12	09/05/11	30/10/13	645d													
+Construction of Grid A-G																					
		164	0	22/05/11	01/11/11	14/02/11	27/07/11	-97d													
+Rising Main																					
		648	29	17/05/10 A	23/02/12	17/05/10 A	10/07/11	-228d													
+Section W 8 - Landscape Softworks in All Portions																					
		817	48	17/05/10 A	10/08/12	17/05/10 A	10/08/12	0													

Start date 05/05/10
 Finish date 05/11/14
 Data date 30/04/11
 Run date 20/05/11
 Page number 2A
 Primavera Systems, Inc.

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- ▲ Critical point
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- ◆ Finish milestone point

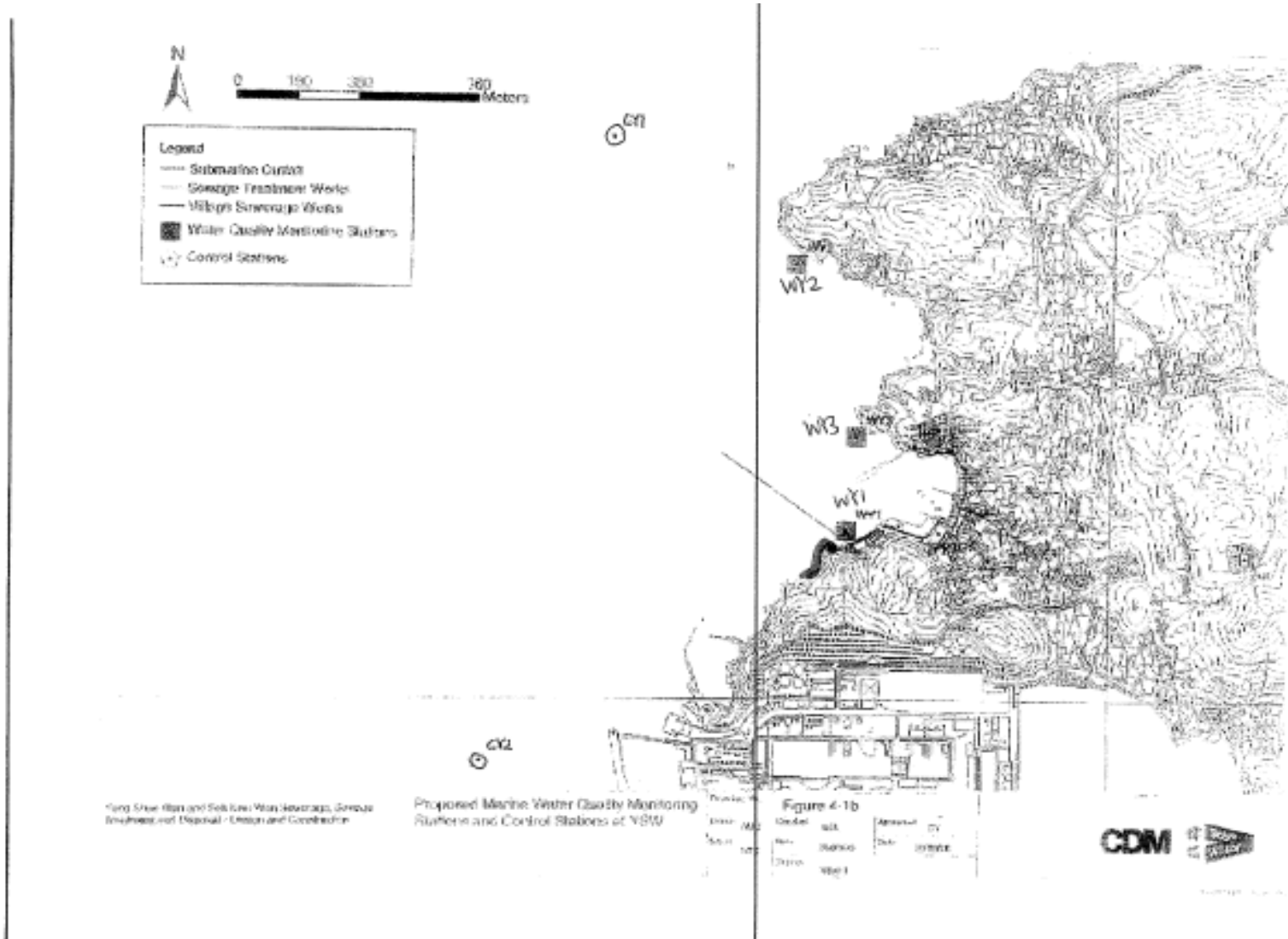
Leader Civil Engineering Corp. Ltd.
Contract No. DC/2009/13
Construction of Sewage Treatment Works at YSW & SKW
3-month Rolling Programme (May 2011 - Jul 2011)
(Outline)

(Marked on 30 April 2011)

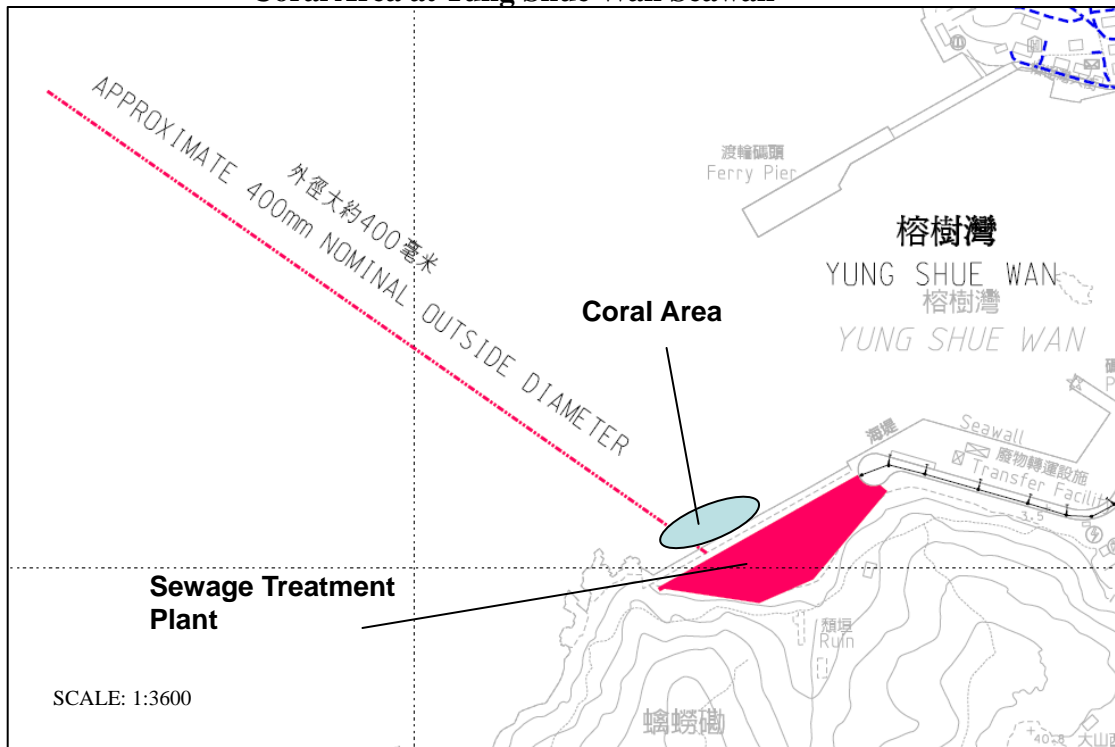
Date	Revision	Checked	Approved
30/04/11	Revision 0	StL	VC

Annex D

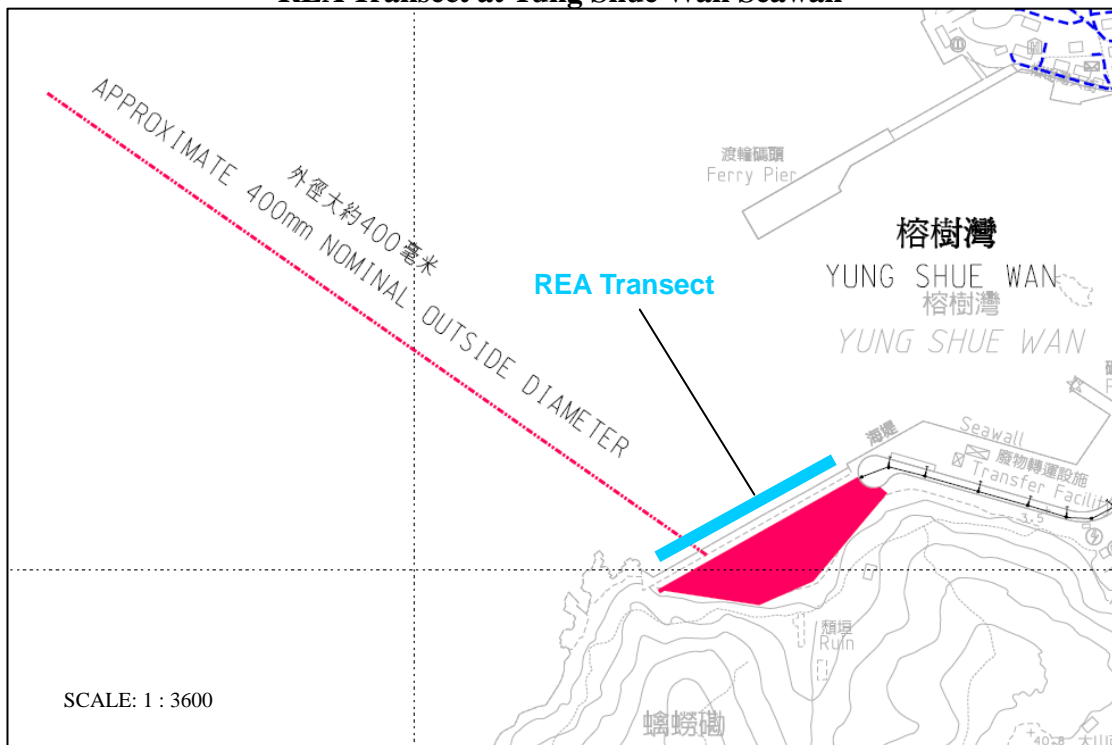
Location of Monitoring Stations (Air Quality / Construction Noise / Marine Water Quality / Ecology)



Coral Area at Yung Shue Wan Seawall



REA Transect at Yung Shue Wan Seawall



Coral Area at Sham Wan



REA Transect at Sham Wan

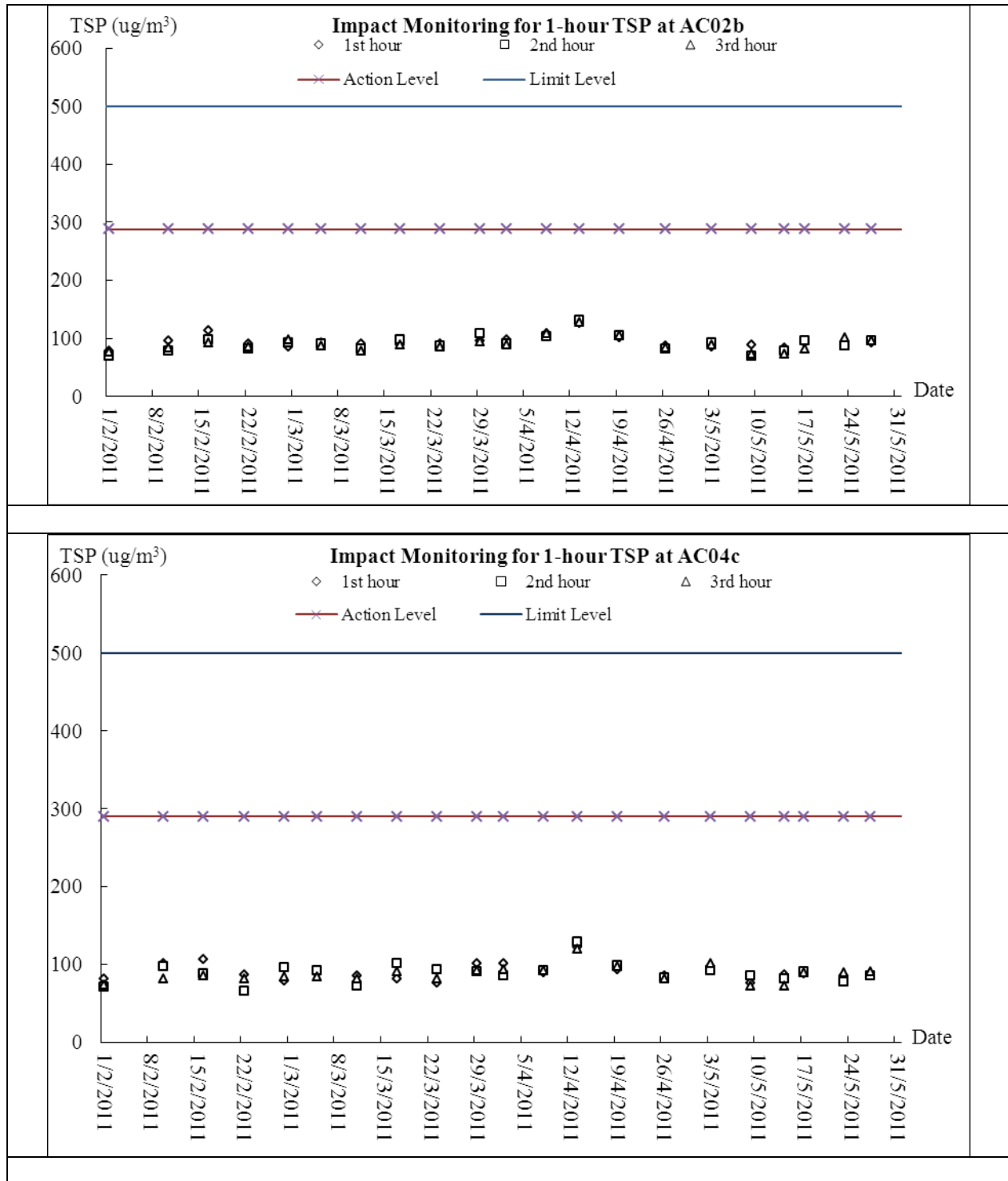


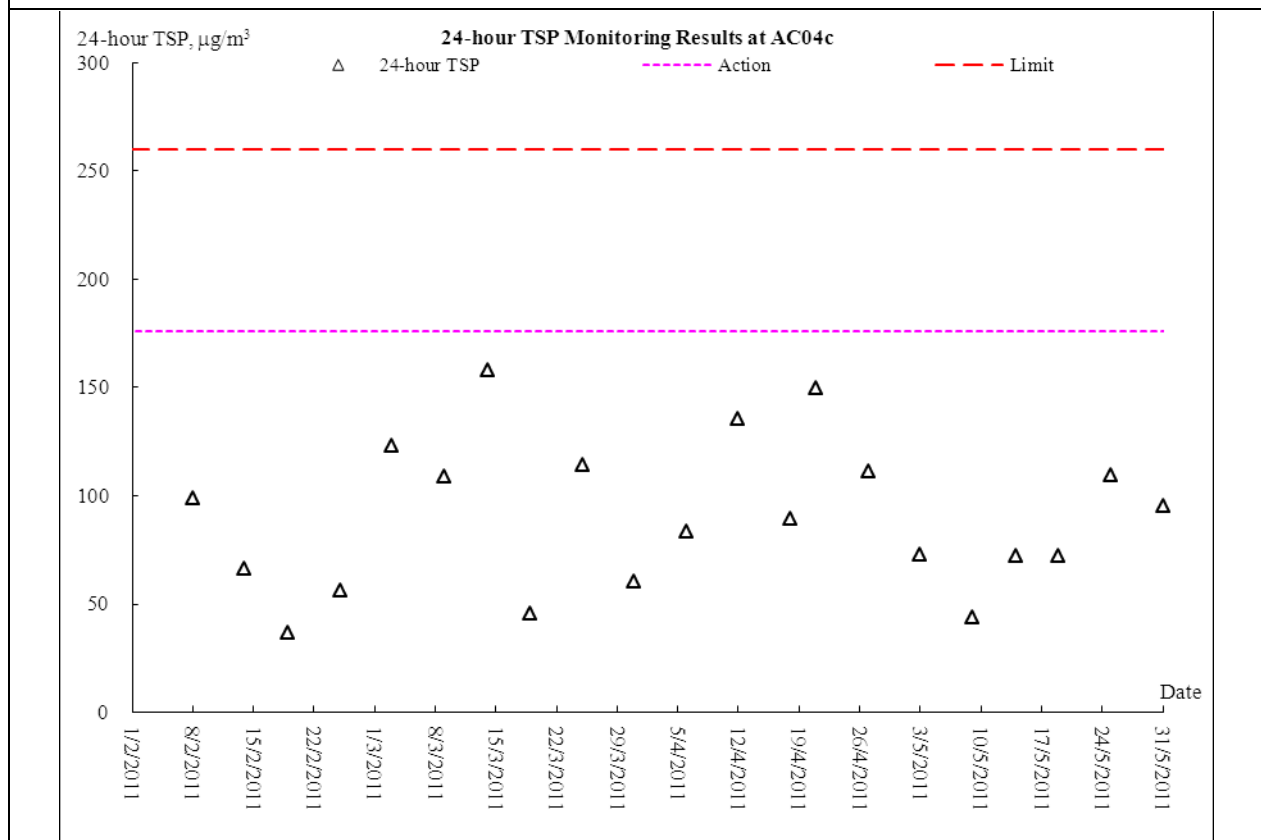
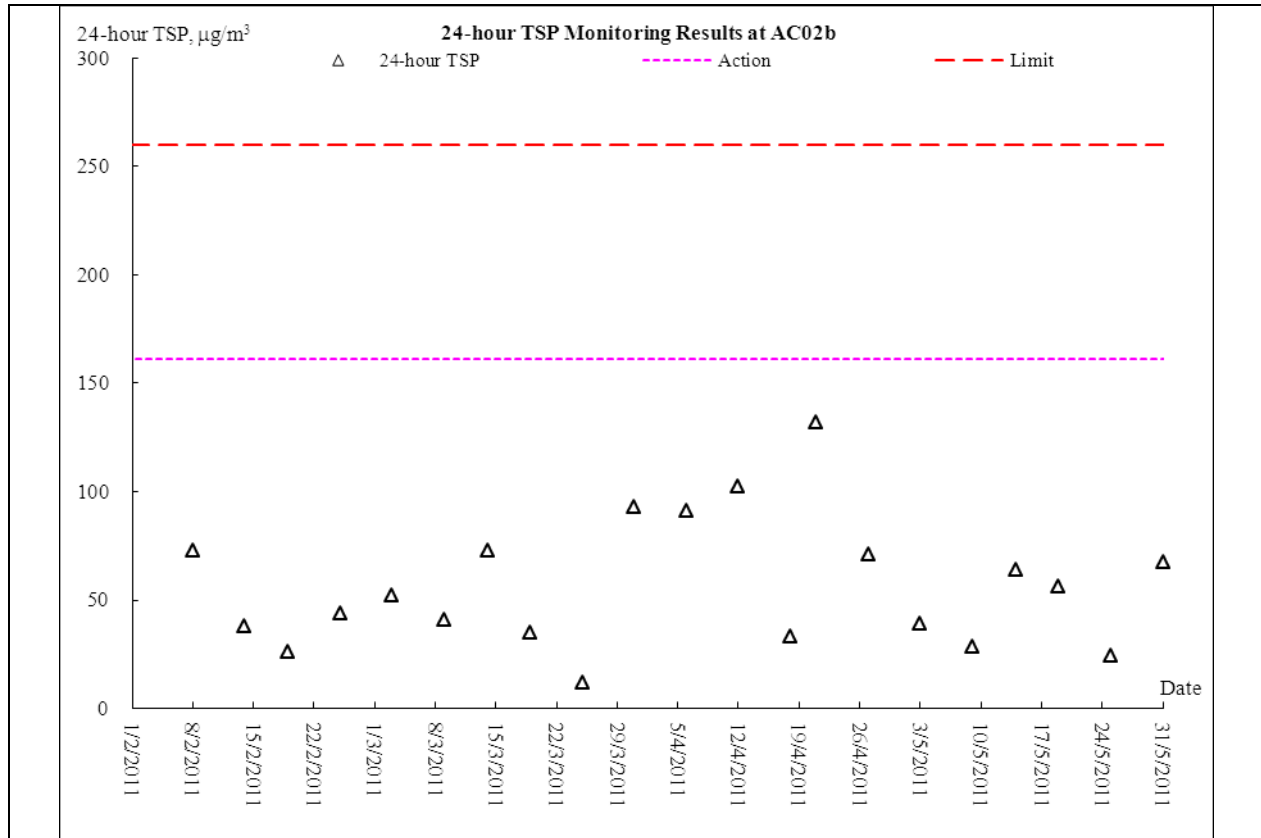
Annex E

Graphical Plots of Impact Monitoring

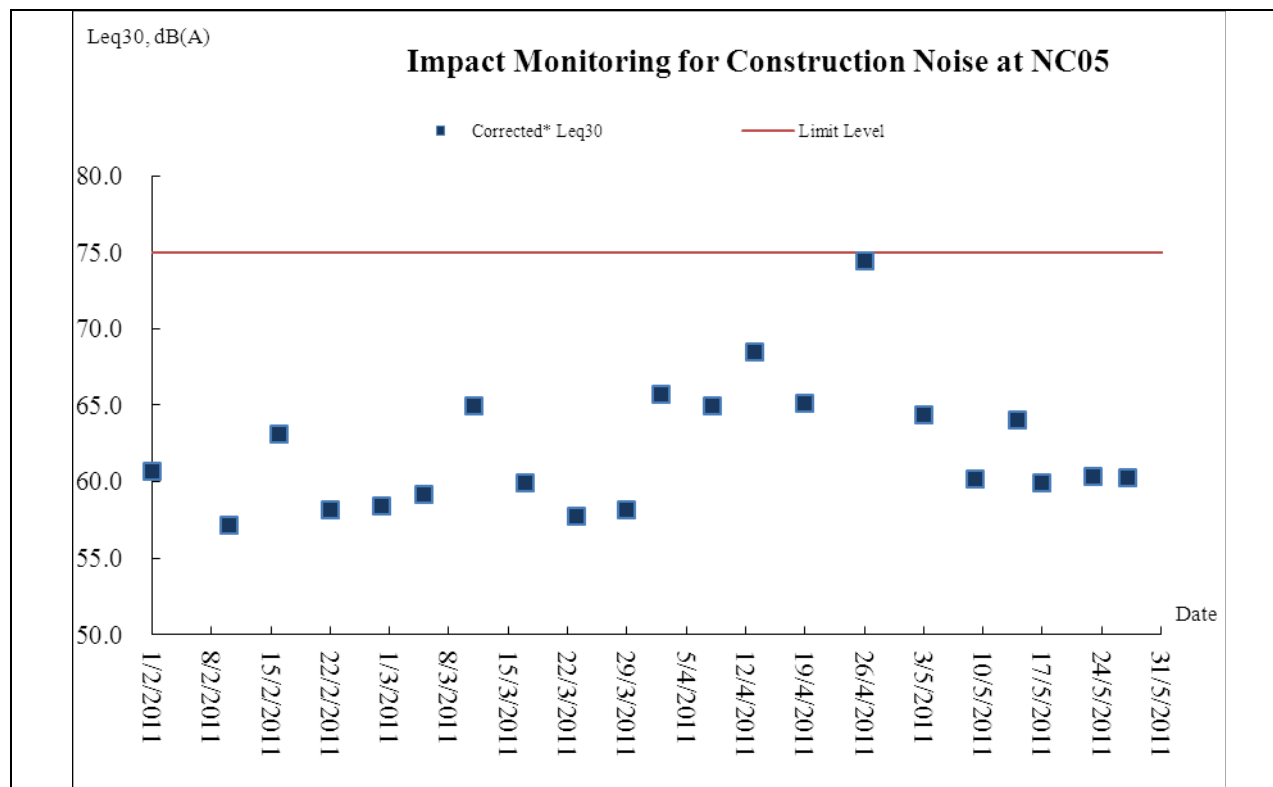
- 1. Air Quality**
- 2. Construction Noise**
- 3. Marine Water Quality**

Air Quality

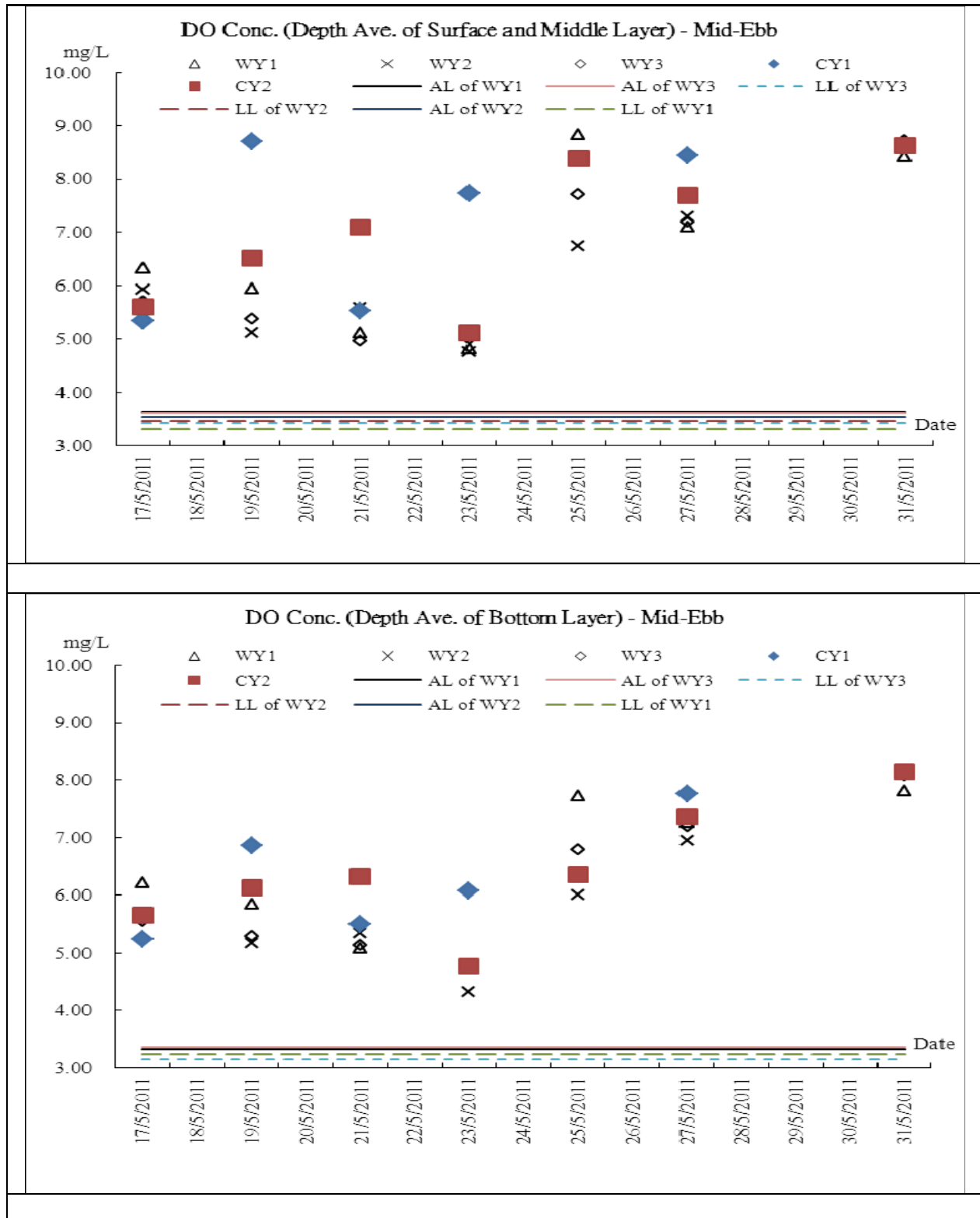


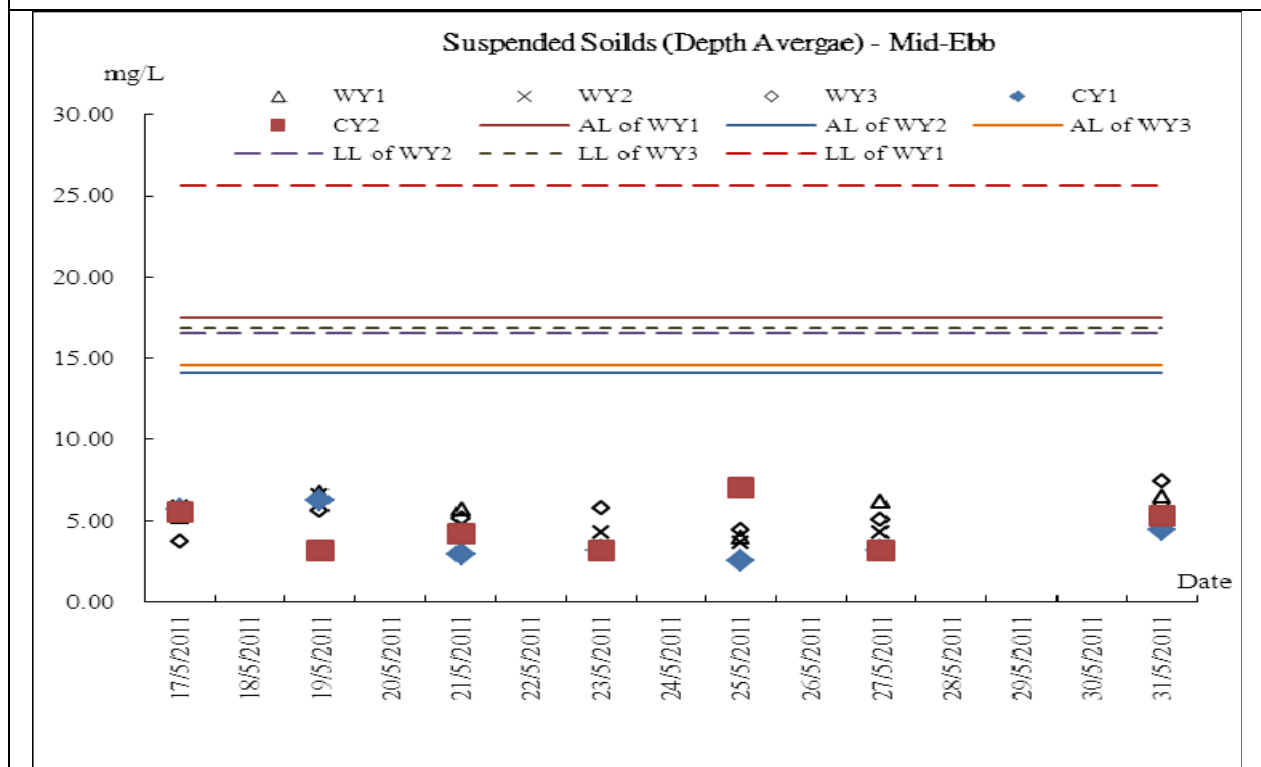
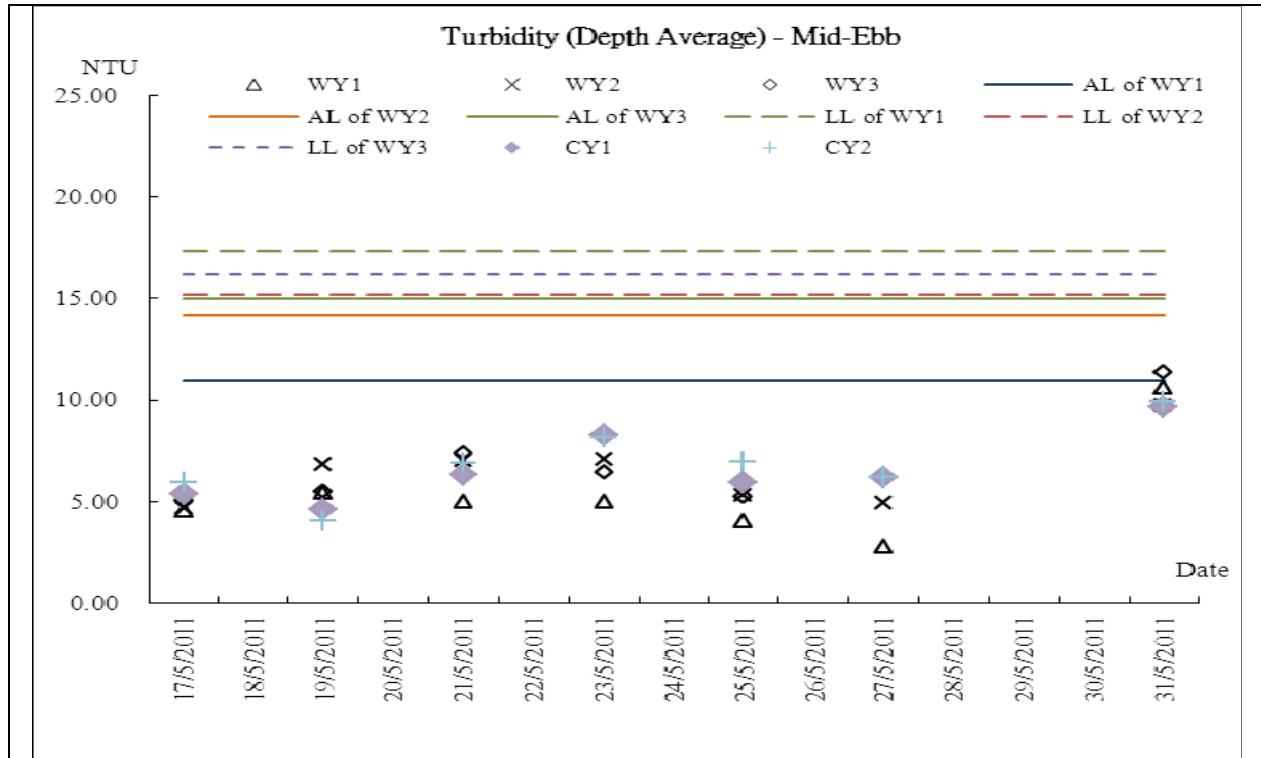


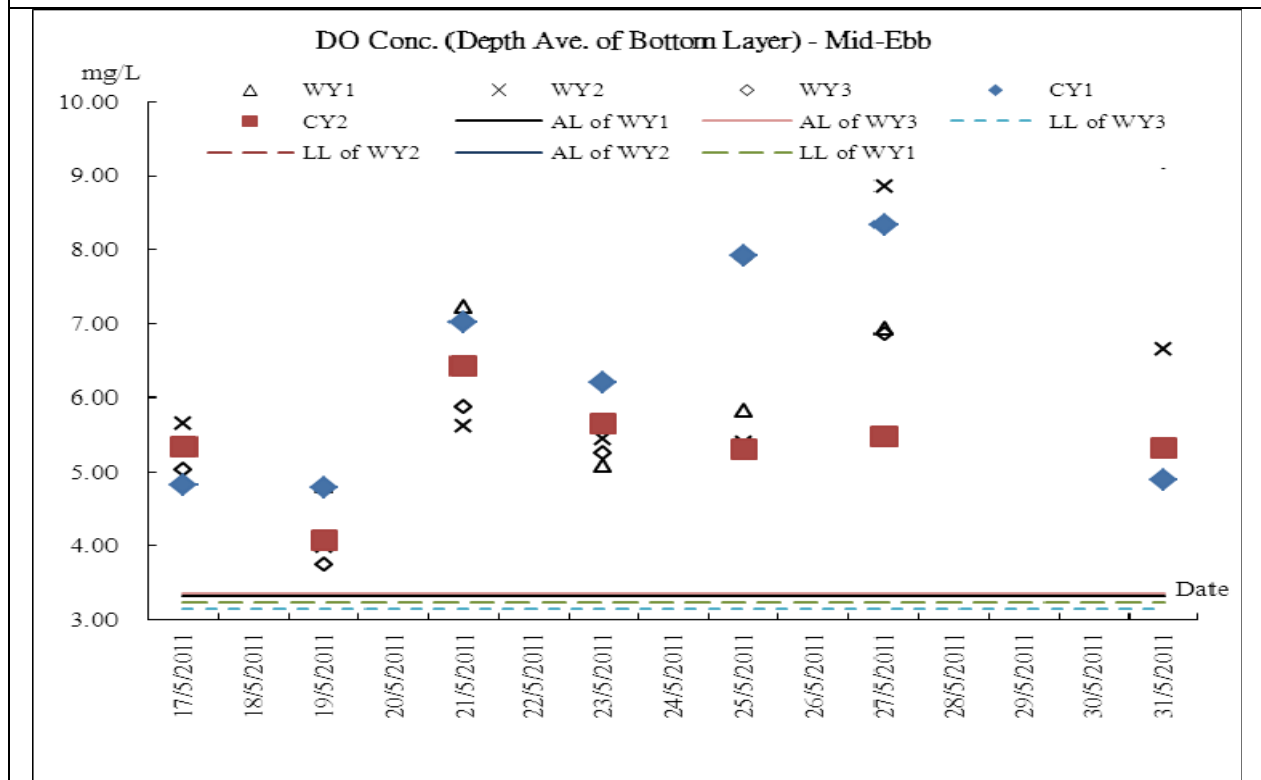
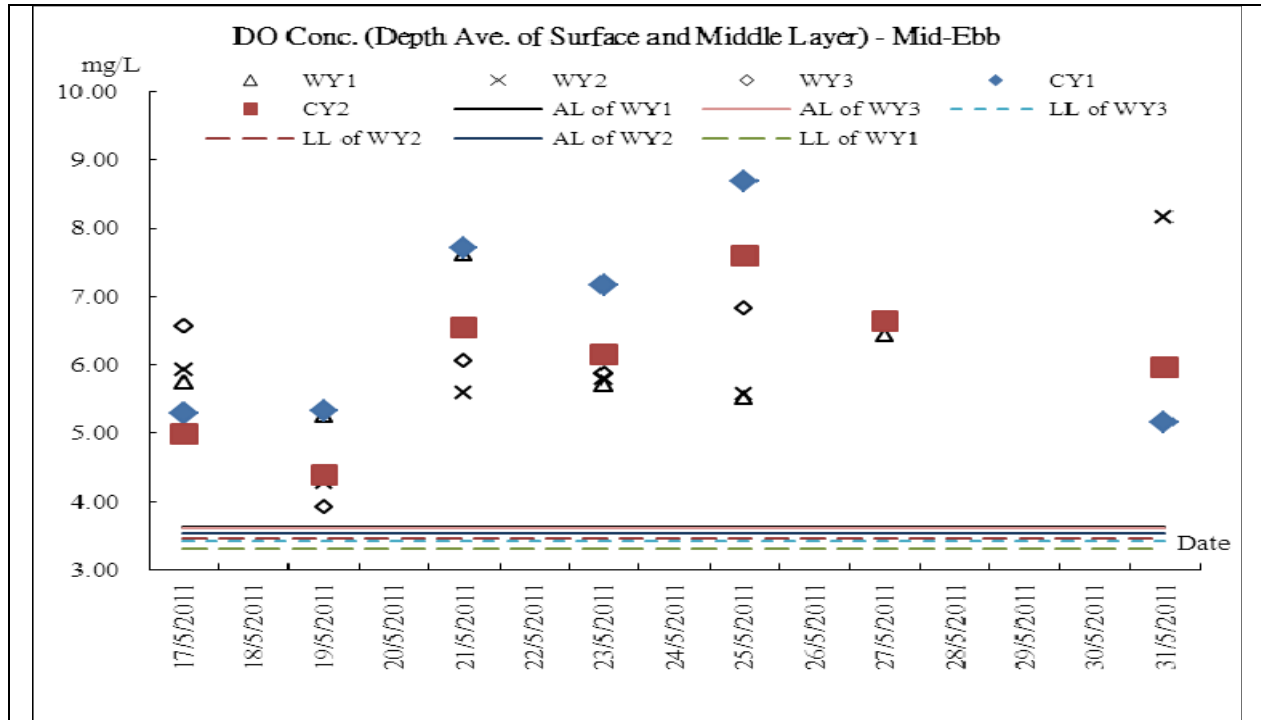
Construction Noise

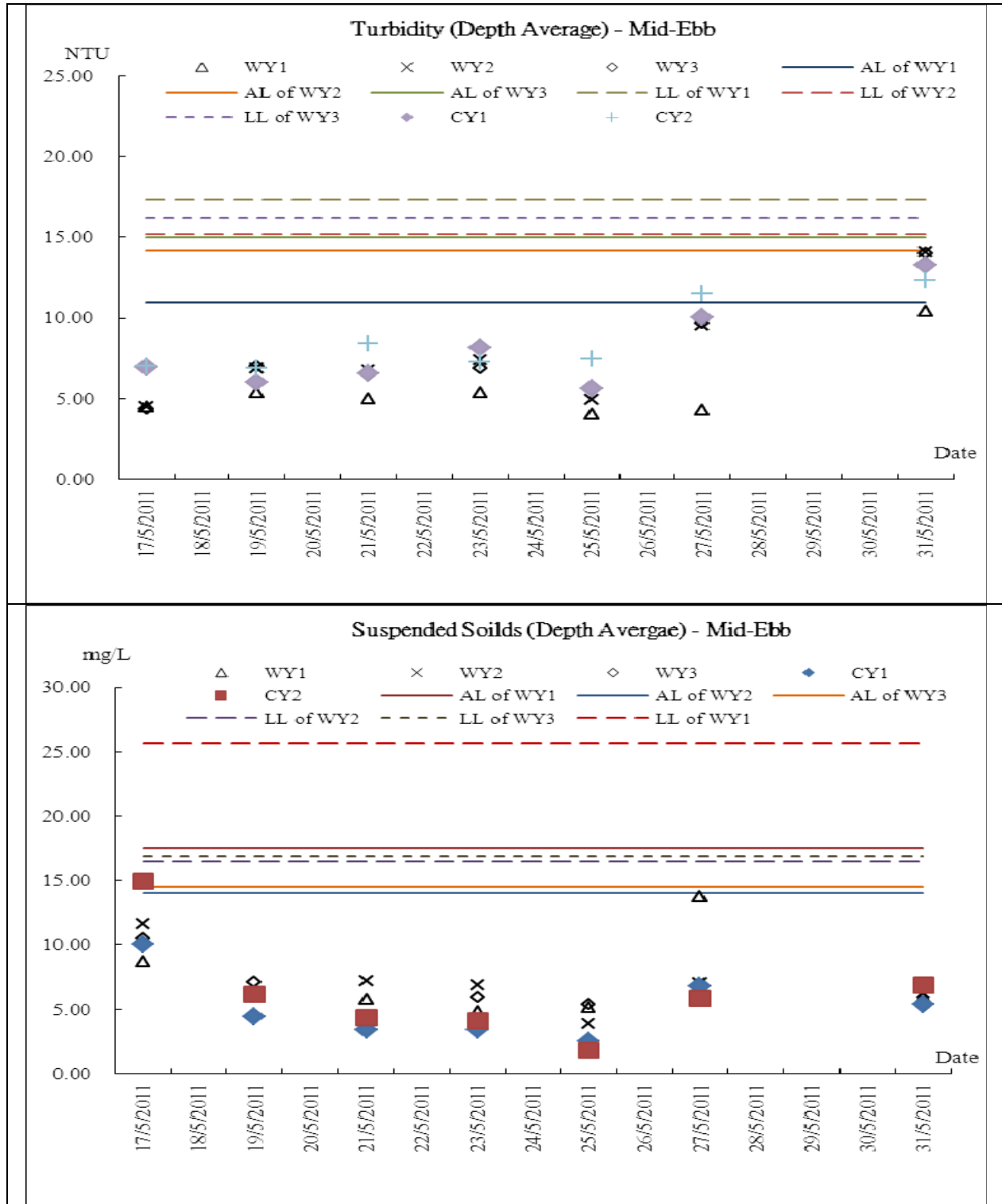


Marine Water Quality









Annex F

Meteorological Information

Meteorological condition – March 2011

Despite some foggy episodes interspersed during the middle of the month, March 2011 was drier than usual. The monthly mean relative humidity was 71 percent, 11 percent below the normal figure of 82 percent and the lowest for March on record. There was only 20.5 millimetres of rainfall recorded in the month, about 29 percent of the normal. With frequent replenishment of the northeast monsoon, the month was also cooler than usual. The monthly mean temperature was 18.0 degrees, 0.9 degrees below the normal figure of 18.9 degrees.

Meteorological condition– April 2011

Due to the stronger than normal northeast monsoon over southern China, April 2011 was sunnier and drier than usual in Hong Kong. The monthly total bright sunshine duration was 191.6 hour, 89.8 hour above normal, while the month's mean relative humidity was 76%, the lowest in April since 1970.

Meteorological condition– May 2011

Due to the frequent replenishment of continental airstream over the south China coastal areas, May 2011 was sunnier and drier than usual. The monthly total duration of bright sunshine was 150.5 hours, 11.9 hours above normal. The mean relative humidity of the month was 81 percent, 3 percent below the normal figure of 84 percent. There were two episodes of heavy rain which necessitated the issuance of two red rainstorm warnings on 22 May with the New Territories being hit hardest. Despite the rainstorms, the monthly total rainfall recorded at the Hong Kong Observatory was only 186.7 millimetres, a deficit of about 43 percent comparing with normal. The accumulated rainfall since 1 January was 272.3 millimetres, only about 41 percent of the normal figure of 666.6 millimetres for the same period.

Note: please refer to the monthly EM&A report (Mar-May) for the weather details on each successive day.

Annex G

Monthly Summary Waste Flow Table

Monthly Summary Waste Flow Table for May 2011

Month	Actual Quantities of Inert C&D Materials Generated Monthly												Actual Quantities of C&D Wastes Generated Monthly										
	Total Quantity Generated (a) = (c)+(d)+(e)		Hard Rock and Large Broken Concrete (b)		Reused in the Contract (c)		Reused in other Projects (d)		Disposed as Public Fill (e)		Imported Fill (f)		Metals		Paper/ cardboard packaging		Plastics		Chemical Waste		Others, e.g. rubbish		
	(in '000m ³)		(in '000m ³)		(in '000m ³)		(in '000m ³)		(in '000m ³)		(in '000m ³)		(in '000kg)		(in '000kg)		(in '000kg)		(in '000kg)		(in tonne)		
	YSW	SKW	YSW	SKW	YSW	SKW	YSW	SKW	YSW	SKW	YSW	SKW	YSW	SKW	YSW	SKW	YSW	SKW	YSW	SKW	YSW	SKW	
2010	4.522	0.030	0.068	0.104	0.488	0.000	0.000	0.000	0.000	4.033	0.030	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	18.460
Jan	0.985	3.110	0.003	0.013	0.120	0.484	0.000	2.626	0.865	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.240
Feb	0.377	0.000	0.000	0.043	0.000	0.000	0.000	0.000	0.377	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.350
Mar	0.758	1.430	0.002	0.106	0.006	0.255	0.000	1.175	0.752	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.360
Apr	1.135	1.249	0.017	0.025	0.112	0.090	0.000	1.159	1.023	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.830	5.160
May	0.614	1.862	0.030	0.036	0.014	0.900	0.000	0.962	0.600	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.150	0.860
Jun																							
Sub-total	8.3901	7.6813	0.1184	0.3273	0.7397	1.7290	0.0000	5.9220	7.6505	0.0303	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	5.9800	27.4300
Jul																							
Aug																							
Sep																							
Oct																							
Nov																							
Dec																							
Total	8.3901	7.6813	0.1184	0.3273	0.740	1.729	0.000	5.922	7.6505	0.0303	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.98	27.43
	16.071		0.446		2.469		5.922		7.681		0.000		0.000		0.000		0.000		0.000		33.41		

Remark: Assume 1.0 m³ vehicle dump load = 1.6 tonnes C&D materials

YSW: Yung Shue Wan

SKW: Sok Kwu Wan