



PROJECT NO.: TCS/00553/11

**CONTRACT NO. DC/2010/02 –
DRAINAGE IMPROVEMENT IN SHUEN WAN AND
SHEK WU WAI**

**QUARTERLY ENVIRONMENTAL MONITORING AND
AUDIT (EM&A) SUMMARY REPORT (NO. 3) –
JANUARY TO MARCH 2012**

PREPARED FOR
KWAN LEE-KULY JOINT VENTURE

Quality Index

Date	Reference No.	Prepared By	Certified by
		(Environmental Consultant)	(Environmental Team Leader)
23 May 2012	TCS00553/11/600/R0124v2		
		Nicola Hon	T.W. Tam

Ver.	Date	Description
1	9 May 2012	First submission
2	23 May 2012	Amended against IEC's comments on 21 May 2012

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ENVIRON

Ref.: DSDSHUWNEM00_0_0391L.12

24th May 2012

Drainage Services Department
Projects and Development Branch
Drainage Projects Division
44 & 45/F., Revenue Tower
5 Gloucester Road,
Wan Chai, Hong Kong

By Post and Fax (2827 8700)

Attention : Mr. H.K.Chan

Dear Mr. Chan,

**Re: Agreement No. DP 01/2010
Services as Independent Environmental Checker for the Drainage Improvement
Works in Sha Tin and Tai Po under Contract No. DC/2010/02
Quarterly Environmental Monitoring and Audit Report for Jan to Mar 2012**

Reference is made to Environment Team's submission of the Quarterly Environmental Monitoring and Audit Report for Jan to Mar 2012 by Email on 9th May 2012 (entitled "DC/2010/22 - Quarterly EM&A Summary Report (No.3) - January to March 2012") and the subsequent revision of the report by Email on 24th May 2012.

Please be informed that we have no further comment on the captioned revised report. We write to verify the captioned submission in accordance with Section 9.9 of EM&A Manual under EP-303/2008.

Thank you very much for your kind attention and please do not hesitate to contact the undersigned should you have any queries.

Yours sincerely,



Tony Cheng
Independent Environmental Checker

c.c. AUES
Kwan Lee-Kuly JV

Attn: Mr. T. W. Tam
Attn: Mr. W. K. Chan

By Fax: 2959 6079
By Fax: 2674 6688

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EXECUTIVE SUMMARY

ES.01. This is the 3rd Quarterly EM&A Summary Report under Environmental Permit No.EP-303/2008 (hereinafter “the EP”) for the Contract No. DC/2010/02 - Drainage Improvement in Shuen Wan and Shek Wu Wai (hereinafter “the Project”), covering the period from **1 January to 31 March 2012** (hereinafter “Reporting Quarter”).

ES.02. Environmental monitoring activities under the EM&A programme in the Reporting Quarter are summarized in the following table.

Aspects	Environmental Monitoring Parameters / Inspection	Occasions
Construction Noise	Leq (30min) Daytime – M2, M3 & M4	39
	Leq (30min) Daytime – M1 & AL1	24
Water Quality	Local Stream Water Sampling - W1 and W2	36
	Local Stream Water Sampling - W3 and W4	38
	Hydrological characteristics measurement – H1 and H2	12
	Hydrological characteristics measurement – H3 and H4	13
Inspection / Audit	Monthly Environmental Site Inspection and audit by Environmental Team and IEC	3
	Regular weekly Environmental inspection by the Contractor and Site Representative Engineer	13
Landscape & Visual	Bi-weekly Inspection by a registered Landscape	6

ES.03. Monitoring results demonstrated that no exceedance of environmental quality criteria of construction noise and hydrological characteristics.

ES.04. However, 126 Action/Limit Levels exceedances, namely 64 dissolved oxygen, 51 turbidity and 11 suspended solids were recorded in water quality monitoring in this Reporting Quarter. Investigation reports concluded that all registered exceedances were not related to the work under the Project. 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
Construction Noise	Leq _{30min} Daytime	0	0	0	0	0
Water Quality	Dissolved Oxygen	38	26	64	Not related Contract 2	Not required
	Turbidity	4	47	51		
	Suspended Solids	1	10	11		
Hydrological Characteristics	Water Flow	0	0	0	0	0
	Water Depth	0	0	0	0	0

ES.05. No documented complaint, notification of summons and successful prosecution was received during the Reporting Quarter.

ES.06. No major environmental impacts were observed during the weekly site inspection which indicated that the implemented mitigation measures for construction noise and water quality were effective. Minor deficiencies found in the weekly site inspection were in general rectified within the specified deadlines. The environmental performance of the Project was therefore considered satisfactory.

ES.07. No site inspection was undertaken by external parties i.e. EPD or AFCD within the Reporting Quarter.

ES.08. No reporting changes were made during the Reporting Quarter.

ES.09. As wet season is approaching, muddy water and other water quality pollutants via site surface water runoff into the local stream Wah Ha River would be the key issue in the forth-coming

month. Mitigation measures for water quality should be fully implemented.

- ES.10. On the other hand, construction noise should be other key environmental issue during sheet-piling process. The noise mitigation measures should be necessary to implement in accordance with EM&A Manual stipulation. Dust mitigation measures to avoid fugitive dust emissions from loose soil surface or haul road is also reminded.

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1.0 INTRODUCTION

PROJECT BACKGROUND

- 1.01 Kwan Lee-Kuly Joint Venture (hereinafter ‘KLKJV’) has been awarded by Drainage Services Department (hereinafter ‘DSD’) of the Contract No. DC/2010/02 - Drainage Improvement in Shuen Wan and Shek Wu Wai. The Project is scheduled to commence in May 2011 and complete in March 2014 for about 35 months.
- 1.02 The works to be executed under the Project are located in Shuen Wan and Shek Wu Wai. The works mainly comprise construction of about 735 metres long single-cell box culvert along Tung Tsz Road in Shuen Wan, Tai Po and construction of about 15 m long three-cell box culvert in Shek Wu Wai, Shatin.
- 1.03 This Project (hereinafter ‘the Contract 2’) is part of the Drainage Improvement works amongst Shatin and Tai Po and it is defined as a “Designated Project” which controlled under Environmental Permit EP-303/2008. Currently, DSD has another Contract DC/2009/22 (hereinafter ‘the Contract 1’) ongoing for construction at Shuen Wan working area which under the same Environmental Permit and the updated Environmental Monitoring and Audit Manual (hereinafter ‘the Updated EM&A Manual’). Both DSD contract’s site boundary at Shuen Wan are shown in *Appendix A*. On the other hand, Shek Wu Wai San Tin is a non-designated project work and no environmental monitoring and audit is requested to carry out.
- 1.04 In order to effectively implement the environmental protection measures stipulated in the Project Profile (hereinafter ‘the PP’), Environmental Impact Assessment Report (hereinafter “the EIAR”), Environmental Permit EP303/2008, a corresponding EM&A Manual have been prepared to outline the environmental monitoring and auditing (hereinafter ‘the EM&A’) programme undertake for the Contracts 1 and 2.
- 1.05 KLKJV has commissioned Action-United Environmental Services and Consulting (AUES) as an independent environmental team (hereinafter ‘the ET’) to implement the EM&A programme for the environmental protection of the Project. Due to the construction of Contracts 1 and 2 carry out is just about the time, a Proposal Environmental Monitoring Programme and Methodology (hereinafter the “PEMPM”) was prepared and submitted to describe EM&A programme would be undertaken during construction period of the Contract 2.
- 1.06 The baseline monitoring of EM&A programme has been performed by the Contract 1 ET. The Action and Limit Levels environmental performance criteria have also been established by the Contract 1. Therefore, no baseline monitoring was performed for the Contract 2 of Project. However, a new set of the Action/ Limit levels as used to Contract 2 were proposed by ET, it had been accepted by the IEC and also submitted to the EPD seek for endorsement.
- 1.07 This is the 3rd Quarterly EM&A Summary Report under Environmental Permit No.EP-303/2008 for the Contract No. DC/2010/02 - Drainage Improvement in Shuen Wan and Shek Wu Wai, covering the period from **1 January to 31 March 2012**.

REPORT STRUCTURE

- 1.08 The Monthly Environmental Monitoring and Audit (EM&A) Report is structured into the following sections:-
- | | |
|------------------|--|
| SECTION 1 | INTRODUCTION |
| SECTION 2 | PROJECT ORGANIZATION AND CONSTRUCTION PROGRESS AND SUBMISSION |
| SECTION 3 | EM&A PROGRAMME REQUIREMENT FOR THE PROJECT |
| SECTION 4 | IMPACT MONITORING RESULTS |
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2.0 PROJECT ORGANIZATION AND CONSTRUCTION PROGRESS AND SUBMISSION

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 *Appendix B*.

CONSTRUCTION PROGRESS

- 2.02 The master and three month rolling construction programme are enclosed in *Appendix C* and the major construction activities undertaken in this report period are listed below:-

Reporting Month	Construction activities
January 2012	<ul style="list-style-type: none"> Concrete casting of top slab and wall and backfill at Bay 23 Erection & Removal of formwork for wall; fixing of reinforcement for top slab; concrete casting of top slab and wall and backfill at Bay 24 Fixing of reinforcement for top slab; erection and Removal of formwork for wall; concrete casting of top slab and wall and backfill at Bay 25 Fixing of reinforcement for wall; erection of formwork for top slab and wall; concrete casting of base slab and backfill at Bay 26 Driving sheetpiles; fixing of reinforcement for wall; erection of formwork for wall; concrete casting of top slab and wall and backfill at Bay 27
February 2012	<ul style="list-style-type: none"> Backfilling, removal of lateral shoring system and withdrawal of steel sheet piles at Bays 23 to 27 Driving sheetpiles at Bays 36 to 37
March 2012	<ul style="list-style-type: none"> Excavation and installation of sheet piles at Bays 35 to 39 Installation of lateral shoring system at Bays 35 to 38

SUMMARY OF ENVIRONMENTAL SUBMISSIONS

- 2.03 Summary of the relevant permits, licences, and/or notifications on environmental protection for this Project in this Reporting Quarter 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 EPD on 17 October 2011
2	Chemical Waste Producer Registration (WPN5213-727-K2972-02)	Approved on 28 October 2011
3	Water Pollution Control Ordinance (Discharge License) WT00009528-2011	Valid to 31 July 2016
4	Billing Account for Disposal of Construction Waste (Account No.: 7012838)	Effective

- 2.04 The “Proposal Environmental Monitoring Programme and Methodology (R0006 Version 2)” was set out in accordance with the Updated Environmental Monitoring and Audit Manual. It was approved by the ER and agreed with the Independent Environmental Checker (IEC) and submitted to the EPD for endorsement.
- 2.05 For Contract 2 of the Project, no Baseline Monitoring Report was issued by the ETL. However, a new set of the Action/ Limit levels as used to Contract 2 were proposed by ET, it had been accepted by the IEC and also submitted to the EPD seek for endorsement.

3.0 EM&A PROGRAMME REQUIREMENT FOR THE PROJECT

3.01 The EM&A requirements set out in the PP, EIAR, Environmental Permit EP303/2008 (hereinafter ‘the EP’), and the associated updated EM&A Manual, are presented below sub-section.

MONITORING PARAMETERS

3.02 According to the EIAR and the updated EM&A Manual, the monitoring parameters of each environmental aspect summarized in *Table 3-1* will be performed as under the Project.

Table 3-1 Summary of Monitoring Parameters

Environmental Aspect	Parameters	
Construction Noise	<ul style="list-style-type: none"> A-weighted equivalent continuous sound pressure level (30min) (hereinafter ‘Leq(30min)’ during the normal working hours; and A-weighted equivalent continuous sound pressure level (5min) (hereinafter ‘Leq(5min)’ for construction work during the restricted hours. 	
Water Quality	In Situ Measurement	Temperature, Dissolved Oxygen, Dissolved Oxygen Saturation, pH and Turbidity
	Laboratory Analysis	Suspended Solids (hereinafter ‘SS’)
Hydrological	The water flow and depth measurement onsite	
*Ecology	Monitor and audit the proper implementation of mitigation measures stipulated in EIA report and the updated EM&A Manual	
Landscape & Visual	Inspect and audit the implementation and maintenance of landscape and visual mitigation measures	

Remarks: * the monitoring is carried out by IEC

MONITORING LOCATIONS

3.03 Monitoring locations have been proposed in the updated EM&A Manual and the location map is shown show in *Appendix D* and summarized in *Table 3-2*.

Table 3-2 Designated Monitoring Locations of the EM&A Programme

Aspect	Location ID	Address
Construction Noise	M1	14, Shuen Wan Chim Uk
	AL1	Joint Village Office for Villages in Shuen Wan, Tai PO
	M2	150, San Tau Kok
	M3	31, Wai Ha
	M4	Block 15, Treasure Spot Garden
Water Quality	(#) W1	Between the Shuen Wan Marsh and ECA (Co-ordinates: E 839301, N 836386; and Existing River Bed Level: +1.75mPD).
	W2	Between Tolo Harbour and Proposed Penstock (Co-ordinates: E839542, N 836184; and Existing River Bed Level: +1.48mPD)
	(*) W3	Upstream of Tung Tze Shan Road (Co-ordinates: E 838760, N 836714; and Existing River Bed Level: +5.08mPD)
	W4	Wai Ha Village 29D (Co-ordinates: E 838865, N 836621; and Existing River Bed Level: +4.05mPD)
Hydrological	H1	Between the Shuen Wan Marsh and ECA (Coordinates: E 839306, N 836379)
	H2	Route 10 Sam Kung Temple (Coordinates: E 839163, N 836433)
	H3	Upstream of Tung Tze Shan Road (Coordinates: E 838760, N 836714)
	H4	Wai Ha Village 29D (Coordinates: E 838865, N 836621)
Ecology	Areas within 100m of the works boundary under Contract 2	
Landscape & Visual	As within and adjacent to the construction sites and works areas under the Contract 2,	

Remarks:

(#) Control Station of Contract 1, however impact station of Contract 2

(*) Control Station of Contract 2

MONITORING FREQUENCY

- 3.04 The monitoring frequency and duration as specified in the updated EM&A Manual are summarized below.

Construction Noise

Frequency: Once a week during 0700-1900 on normal weekdays for Leq30min

If the construction work is undertaken at restricted hour, the monitoring frequency of construction noise will be conducted in accordance with the related Construction Noise Permit requirement issued by EPD as follow

- 3 consecutive Leq5min at restricted hour from 1700 – 2300;
- 3 consecutive Leq5min for restricted hour from 2300 – 0700 next day;
- 3 consecutive Leq5min for Sunday or public holiday from 0700 – 1900;

Duration: Throughout the construction period when the major construction activities are undertaken

Water Quality

Frequency: Three times a week. The interval between 2 sets monitoring are not less than 36 hours

Duration: During the construction phase of Contract 2 to undertake (in accordance with the Updated EM&A Manual Section 4.27).

Hydrological Characteristics

Frequency: Once per week at mid-flood and mid-ebb tides

Duration: During the construction phase of Contract 2 to undertake; and one year after the construction is complete as operation phase monitoring (in accordance with the Updated EM&A Manual Section 4.32).

Ecology

- 3.05 In accordance with Section 6.17 of the Updated EM&A Manual, ecological monitoring should be conducted by the Independent Environmental Checker (hereinafter 'IEC'). Monitoring programme details should be agreed with the Agriculture, Fisheries and Conservation Department (AFCD). Moreover, the IEC should submit reports on the findings of each monitoring trip, and a final report summarizing the monitoring results over the entire monitoring period to AFCD and Environmental Protection Department (EPD). Hence, no monitoring or surveying should be carried out by ET of the Project.

Landscape & Visual

- 3.06 According to Section 7.4 of the Updated EM&A Manual, site inspection bi-weekly should be performed to check the implementation and maintenance of landscape and visual mitigation measures whether to fully realize.

MONITORING EQUIPMENT

Noise Monitoring

- 3.07 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 noise monitoring. The sound level meter shall be checked with an acoustic calibrator. The wind speed shall be checked with a portable wind speed meter which is capable to measure wind speed in m/s.

Water Quality Monitoring

- 3.08 **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 DO level in the range of 0 – 20mg L⁻¹ and 0 – 200% saturation; and temperature of 0 – 45 degree Celsius.
- 3.09 **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.
- 3.10 **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.
- 3.11 **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.
- 3.12 **Water Depth Detector** – A portable, battery-operated echo sounder should be used for the determination of water depth at each designated monitoring station. The unit can either be hand held or affixed to the bottom of the work boat.
- 3.13 **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).
- 3.14 **Suspended Solids Analysis** – Analysis of suspended solids shall be carried out in a HOKLAS or other international accredited laboratory.

Hydrological Characteristics

- 3.15 **Water Depth Detector** - A portable, battery-operated echo sounder shall be used for the determination of water depth at each designated monitoring station.
- 3.16 **Stream water flow Equipment** –A portable, battery-operated flow meter should be used for the determination of water flow rate at each designated monitoring location and record in m³/s.
- 3.17 The monitoring equipment using for the Project’s EM&A programme were proposed by the ET and verified by the IEC prior commencement of the monitoring. Details of the equipment used for impact monitoring are listed in **Table 3-3**.

Table 3-3 Monitoring Equipment Used in EM&A Programme

Equipment	Model
<i>Construction Noise</i>	
Integrating Sound Level Meter	B&K Type 2238
Calibrator	B&K Type 4231
Portable Wind Speed Indicator	Testo Anemometer
<i>Water quality</i>	
Water Depth Detector	Eagle Sonar
Water Sampler	A transparent PVC cylinder / bucket
Thermometer & DO meter	DO Meter YSI 55
pH meter	Extech EC500
Turbidimeter	Hach 2100Q
Sample Container	High density polythene bottles (provided by laboratory)
Storage Container	‘Willow’ 33-litre plastic cool box
Suspended Solids	HOKLAS-accredited laboratory (ALS Technichem (HK) Pty Ltd)
<i>Hydrological Characteristics</i>	
Water flow meter	GLOBAL WATER model FP211
Water Depth Detector	Eagle Sonar or an appropriate steel ruler or rope with appropriate weight

MONITORING METHODOLOGY

Noise Monitoring

- 3.18 Noise measurements were taken in terms of the A-weighted equivalent sound pressure level (L_{eq}) measured in decibels (dB). Supplementary statistical results (L₁₀ and L₉₀) were also obtained for reference.
- 3.19 Sound level meter as listed in **Table 3-3** are complied with the *International Electrotechnical*

Commission Publications 651: 1979 (Type 1) and 804: 1985 (Type 1) specifications, as recommended in Technical Memorandum (TM) issued under the Noise Control Ordinance (NCO).

- 3.20 During the monitoring, all noise measurements were performed with the meter set to FAST response and on the A-weighted equivalent continuous sound pressure level (L_{eq}). $L_{eq(30min)}$ in six consecutive $L_{eq(5min)}$ measurements were used as the monitoring parameter for the time period between 0700-1900 hours on weekdays; and also $L_{eq(15min)}$ in three consecutive $L_{eq(5min)}$ measurements is used as monitoring parameter for other time periods (e.g. during restricted hours), if necessary.
- 3.21 During the course of measurement, the sound level meter is mounted on a tripod with a height of 1.2m above ground and placed at the assessment point and oriented such that the microphone is pointed to the site with the microphone facing perpendicular to the line of sight. The windshield is fitted for all measurements. The assessment point is normally set as free-field situation for the measurement.
- 3.22 Prior to noise measurement, the accuracy of the sound level meter is checked by an acoustic calibrator which generated a known sound pressure level at a known frequency. The checking was performed before and after the noise measurement.

Water Quality

- 3.23 Water quality monitoring are conducted at the depth below:-
- Three depths: 1m below water surface, 1m above river bed and at mid-depth when the water depth exceeds 6m, or
 - If the water depth is between 3m and 6m, two depths: 1m below water surface and 1m above river bed, and or
 - If the water depth is less than 3m, 1 sample at mid-depth is taken
- 3.24 Water depths are determined prior to measurement and sampling, using a portable battery operated depth detector, brand named 'Eagle Sonar', if the depths exceed 1.5 meter. If the depth between 1.5 meter and 1 meter, plastic tape measurement tied with appropriate weight are used the depth estimation. For the depth well below 1 meter, an appropriate steel ruler or rope with appropriate weight are used for the depth measurement.
- 3.25 A transparent PVC cylinder, with a capacity of not less than 2 litres, is used for water sampling. The water sampler is lowered into the water body at a predetermined depth. The trigger system of the sampler is activated with a messenger and opening ends of the sampler are closed accordingly then the sample of water is collected. If the water depth is less than 500mm, a water bucket is be used as a water sampler to minimize the possibility of the latching system disturbing sediment during water sampling
- 3.26 A portable YSI 55 DO Meter is used for in-situ DO measurement. The DO meter is capable of measuring DO in the range of 0 - 20 mg/L and 0 - 200 % saturation and checked against water saturated ambient air on each monitoring day prior to monitoring. Although the DO Meter automatically compensates ambient water temperature to a standard temperature of 20⁰C for ease of comparison of the data under the changing reality, the temperature readings of the DO Meter are be recorded in the field data sheets. The equipment calibration is performed on quarterly basis.
- 3.27 A portable Extech EC500 pH Meter is used for in-situ pH measurement. The pH meter is capable of measuring pH in the range of 0 – 14 and readable to 0.1. Standard buffer solutions of pH 7 and pH 10 are used for calibration of the instrument before and after measurement. The equipment calibration is performed on quarterly basis.
- 3.28 A portable Hach 2100Q Turbidity Meter is be used for in-situ turbidity measurement. The turbidity meter is capable of measuring turbidity in the range of 0 – 1000 NTU. The equipment calibration is performed on quarterly basis.

- 3.29 Water samples are contained in screw-cap PE (Poly-Ethylene) bottles, which are provided and pretreated and ‘PE’ (Poly-Ethylene) sampling bottles provided and pre-treated according to corresponding analytical requirements. Where appropriate, the sampling bottles are rinsed with the water to be contained. Water sample is then transferred from the sampler to the sample bottles.
- 3.30 One liter or 500 mL water sample are collected from each depth for SS determination. The collected samples are stored in a cool box maintained at 4⁰C and delivered to laboratory upon completion of the sampling by end of each sampling day.
- 3.31 All water samples are analyzed with Suspended Solids (SS) as specified in the updated *EM&A Manual* by a local HOKLAS-accredited testing laboratory (ALS Technichem (HK) Pty Ltd HOKLAS registration no. 66). SS are determined by the laboratory upon receipt of the water samples using HOKLAS accredited analytical method. The detection limits and testing method are shown below in *Table 3-4*. The certificate of ALS Technichem (HK) Pty Ltd is provided in the relevant Monthly EM&A Reports .

Table 3-4 Testing Method and Detection limit of SS to be provided by the Laboratory

Determinant	Testing Method	Detection Limit
Suspended solid	Determination use HOKLAS accredited analytical methods namely ALS Method EA-025 (based on APHA 2540 D)	2mg/L

Hydrological Characteristics

- 3.32 A portable, water flow meter, brand named “*GLOBAL WATER model FP211*” are used to determine the water current flow at the designated monitoring stations. A water flow velocity is measured at mid depth of current water body or 0.5m below water level.
- 3.33 Water depths are determined prior to measurement, using a portable battery operated depth detector, brand named ‘Eagle Sonar’, if the depths exceed 1.5 meter. If the depth between 1.5 meter and 1 meter, plastic tape measurement tied with appropriate weight are used the depth estimation. For the depths well below 1 meter, an appropriate steel ruler or rope with appropriate weight are used for the depth measurement.

DATA MANAGEMENT AND DATA QA/QC CONTROL

- 3.34 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 programme.
- 3.35 The monitoring data recorded in the equipment e.g. noise meter and Multi-parameter Water Quality Monitoring System are downloaded directly from the equipment 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.

OTHERS MONITORING IMPLEMENTATION FOR THE CONTRACT

Ecology

- 3.36 Ecological monitoring and reporting should be performed by IEC. No equipment and procedure are presented in the EM&A Monthly Report.

Landscape and Visual

- 3.37 A registered Landscape Architect as member of the ET is employed by the Contractor to undertake site inspection. Site inspection will undertake at least once every two weeks throughout the construction period to ensure compliance with the intended aims of the mitigation measures are proposed in the EIA and the updated EM&A Manual, implemented by the Contractor.

DETERMINATION OF ACTION/LIMIT (A/L) LEVELS

3.38 According to the Updated Environmental Monitoring and Audit Manual, the performance criteria for construction noise, water quality and hydrological, namely Action and Limit levels were established by Contract DC/2009/22. The Action/Limit Levels proposed by DC/2009/22 are listed in *Tables 3-5, 3-6, and 3-7*.

Table 3-5 Action and Limit Levels for Construction Noise

Location	Time Period	Action Level in dB(A)	Limit Level in dB(A)
M1, AL1, M2, M3, M4	Daytime 0700 – 1900 hrs on normal weekdays	When one documented complaint is received	> 75* dB(A)
	1900 – 2300 on all days and 0700 – 2300 on general holidays (including Sundays)		60/65/70 dB(A)**
	2300 – 0700 on all days		45/50/55 dB(A)**

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

** To be selected based on the Area Sensitivity Rating of A/B/C, and the conditions of the applicable CNP(s) must be followed

Table 3-6 Action and Limit Levels for Water Quality

Parameter	Performance Criteria	Impact Station		
		W1	W2	W4
DO Concentration (mg/L)	Action Level	7.27	7.26	9.27
	Limit Level	7.05	6.44	7.98
pH	Action Level	NA	NA	NA
	Limit Level	6 - 9	6 - 9	6 - 9
Turbidity (NTU)	Action Level	4.77	2.46	3.32
	Limit Level	5.26	3.42	4.52
Suspended Solids (mg/L)	Action Level	9.73	8.89	6.98
	Limit Level	10.77	9.75	7.66

Notes:

- The proposed Action/Limit Levels of DO are established to be used 5%-ile/1%-ile of all the baseline data;
- The proposed Action/Limit Levels of Turbidity and SS are established to be used 95%-ile/99%-ile of all the baseline data;
- For DO, non-compliance of the water quality limits occur is when monitoring result lower than the action/limit levels;
- For turbidity and SS, non-compliance of the water quality limits occurs is when monitoring result higher than the limits; and
- For pH, non-compliance of the quality limit occur is when monitoring result lower than 6 and higher than 9; and
- All the figures given in the table are used for reference only and the EPD may amend the figures whenever it is considered necessary

Table 3-7 Action and Limit Levels for Hydrological Characteristics

Parameter	Acceptance Criteria	Monitoring Station			
		H1	H2	H3	H4
Water Depth (m)	Action Level	0.08 (80% of baseline water depth)	0.40 (80% of baseline water depth)	0.40 (80% of baseline water depth)	0.24 (80% of baseline water depth)
	Limit Level	0.06 (60% of baseline water depth)	0.30 (60% of baseline water depth)	0.30 (60% of baseline water depth)	0.18 (60% of baseline water depth)
Water Flow Rate (m3/s)	Action Level	120% of control station's water flow rate on the same day of measurement	120% of control station's water flow rate on the same day of measurement	120% of control station's water flow rate on the same day of measurement	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	140% 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	140% of control station's water flow rate on the same day of measurement
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- 3.39 The locations H3 and H4 are a reference measurement point in order to monitor any changes in the hydrological characteristics of Wai Ha River arising from the work Contract 2 to affect the Shuen Wan Marsh.
- 3.40 Should non-compliance of the environmental quality criteria occurs, remedial actions will be triggered according to the Event and Action Plan enclosed in **Appendix F**.

EQUIPMENT CALIBRATION

- 3.41 The sound level meter and calibrator are calibrated and certified by a laboratory accredited under HOKLAS or any other international accreditation scheme in yearly basis.
- 3.42 All the water quality monitoring equipment such as the DO, pH and Turbidity meters are calibrated by HOKLAS accredited laboratory of three month intervals.
- 3.43 A portable, water flow meter, brand named “GLOBAL WATER model FP211” is calibrated in yearly basis.
- 3.44 All updated calibration certificates of the monitoring equipment used for the impact monitoring programme in this Reporting Quarter are attached in the relevant Monthly EM&A Reports.

METEOROLOGICAL INFORMATION

- 3.45 The meteorological information during the construction phase is obtained from Tai Po and Shatin Stations of the Hong Kong Observatory (HKO). The meteorological data during the impact monitoring days are summarized in the relevant Monthly EM&A Reports.

4.0 IMPACT MONITORING RESULTS

RESULTS OF CONSTRUCTION NOISE MONITORING

4.01 Summary of construction noise monitoring at the identified locations during the Reporting Quarter are summarized in **Table 4-1** and the summary of breaches of A/L Level are presented in **Table 4-2**. In this Reporting Quarter, a total of **63** events of construction noise measurement were conducted and the graphic plots in are presented in **Appendix E**.

Table 4-1 Summary of Construction Noise Monitoring Results, dB(A)

Station	Leq30min (dB(A))				
	M1 ^(#)	AL1 ^(#)	M2 ^(*)	M3 ^(*)	M4 ^(*)
Minimum	51.4	51.8	68.1	61.0	51.1
Min. recorded date	7-Mar-12	29-Feb-12	19-Jan-12	17-Feb-12	17-Feb-12
Maximum	59.8	63.5	74.9	72.6	68.4
Max. recorded date	21-Mar-12	28-Mar-12	19-Mar-12	5-Jan-12	5-Jan-12

Remarks:

(#) The monitoring is undertaken under façade situation. No façade correction is added according to acoustical principles and EPD guidelines.

(*) The monitoring is undertaken under free field situation. A façade correction of +3 dB(A) has been added according to acoustical principles and EPD guidelines

Table 4-2 Summaries of Breaches of Construction Noise A/L Levels

Station	Exceedance of Environmental Quality Criteria	
	Action Level	Limit Level
M1	0	0
AL1	0	0
M2	0	0
M3	0	0
M4	0	0

4.02 No noise complaint (which is an Action Level exceedance) was received in this Reporting Quarter. All the noise monitoring result are well below 75dB(A) and no Action or Limit Level exceedance was triggered.

RESULTS OF LOCAL STREAM WATER QUALITY MONITORING

4.03 In this Reporting Quarter, **36** sampling days at Locations W1 to W2 and **38** sampling days at Locations W3 to W4 have been carried out for local steam water quality monitoring. Breaches of water quality A/L Levels and statistics of the compliance status during the Reporting Quarter are summarized in **Tables 4-3** and **4-4** and graphical plots are shown in **Appendix E**.

4.04 During the Reporting Quarter, field measurements showed that stream water temperatures were within 15.5°C to 29.4°C and pH values within 6.80 to 8.70. Furthermore, salinity measured at Locations W1 and W2 were detected between 0.1 – 31.0 ppt and 4.0 – 27.3 ppt.

Table 4-3 Summaries of Breaches of the Existing Water Quality A/L Levels

Location	Dissolve Oxygen		Turbidity		Suspended Solids		Total Exceedance	
	Action	Limit	Action	Limit	Action	Limit	Action	Limit
January 2012								
W1	2	2	1	3	0	0	3	5
W2	5	0	0	8	0	3	5	11
W4	3	9	0	0	0	0	3	9
February 2012								

Location	Dissolve Oxygen		Turbidity		Suspended Solids		Total Exceedance	
	Action	Limit	Action	Limit	Action	Limit	Action	Limit
W1	1	1	0	5	0	1	1	7
W2	1	0	0	12	0	5	1	17
W4	1	12	0	1	0	0	1	13
March 2012								
W1	4	2	0	7	0	1	4	10
W2	8	0	2	9	1	0	11	9
W4	13	0	1	2	0	0	14	2
Total	38	26	4	47	1	10	43	83

Table 4-4 Statistics Water Quality Exceedance in the Reporting Quarter

Parameter	Statistics		
	Number of Monitoring Event (W1, W2 & W4)	No. of Exceedances	Compliance %
Dissolve Oxygen	110	64	41.8%
Turbidity	110	51	50.9%
Suspended Solids	110	11	90.0%

Exceedances in January 2012

4.05 In January 2012, 21, 12 and 3 Action/Limit levels exceedances are recorded for DO, Turbidity and SS respectively. According to site activity and precautionary measures provided by KLKJVJ, investigation report concluded that all the exceedances were not related to the works under the Project.

Exceedances in February 2012

4.06 In February 2012, 16, 18 and 6 Action/Limit levels exceedances are recorded for DO, Turbidity and SS respectively. According to site activity and precautionary measures provided by KLKJVJ, investigation report concluded that all the exceedances were not related to the works under the Project.

Exceedances in March 2012

4.07 In March 2012, 27, 21 and 2 Action/Limit levels exceedances are recorded for DO, Turbidity and SS respectively. According to site activity and precautionary measures provided by KLKJVJ, investigation report concluded that all the exceedances were not related to the works under the Project.

RESULTS OF HYDROLOGICAL CHARACTERISTICS MONITORING

4.08 In this Reporting Quarter, 14 sampling days of hydrological characteristics monitoring were carried out at designated measurement points H1 to H4. Hydrological characteristics results of the all measurement points are summarized in *Tables 4-5* and *4-6*.

Table 4-5 Summarized Hydrological Characteristics of Water Depth, m

Date	Mid-Flood				Mid-Ebb			
	H1	H2	H3	H4	H1	H2	H3	H4
7-Jan-12	0.37	0.06	0.30	0.40	0.37	0.06	0.30	0.40
14-Jan-12	0.37	0.24	0.30	0.40	0.24	0.18	0.30	0.40
21-Jan-12	1.03	0.12	0.30	0.40	0.43	0.18	0.30	0.40
28-Jan-12	*	*	0.30	0.40	*	*	0.30	0.40
3-Feb-12	0.85	0.12	-	-	#	#	-	-
4-Feb-12	-	-	0.30	0.40	-	-	0.30	0.40
10-Feb-12	0.55	0.3	0.30	0.40	0.49	0.3	0.30	0.40
17-Feb-12	0.6	0.36	0.30	0.40	0.36	0.36	0.30	0.30
24-Feb-12	0.43	0.12	0.30	0.40	0.43	0.24	0.30	0.40
2-Mar-12	0.6	0.18	0.30	0.30	#	#	0.30	0.30
9-Mar-12	#	#	0.30	0.50	0.24	0.06	0.30	0.20

16-Mar-12	#	#	0.30	0.20	0.36	0.06	0.30	0.20
23-Mar-12	#	#	0.30	0.20	0.24	0.06	0.30	0.20
30-Mar-12	0.6	0.12	0.30	0.20	0.67	0.12	0.30	0.30

* No monitoring was carried out by ET of Contract 1 due to site closure during Chinese New Year (22-28 Jan 2012)

No data was provided by ET of Contract 1.

- No monitoring event was conducted.

Table 4-6 Summarized Hydrological Characteristics of Average Volumetric flow rate (Q), m³/s

Date	Mid-Flood				Mid-Ebb			
	H1	H2	H3	H4	H1	H2	H3	H4
7-Jan-12	0.375	0.12	0.89	0.22	0.377	0.06	0.89	0.22
14-Jan-12	0.075	0.06	0.67	0.22	0.377	0.06	0.67	0.22
21-Jan-12	0.075	0.16	0.89	0.22	0.377	0.12	0.89	0.22
28-Jan-12	*	*	1.01	0.27	*	*	0.89	0.22
3-Feb-12	0.075	0.754	-	-	#	#	-	-
4-Feb-12	-	-	1.12	0.22	-	-	1.68	0.27
10-Feb-12	0.075	0.377	0.67	0.22	0.075	0.377	0.67	0.33
17-Feb-12	0.075	0.377	0.67	0.22	0.075	0.377	0.67	0.16
24-Feb-12	0.075	0.377	0.67	0.33	0.075	0.377	0.67	0.33
2-Mar-12	0.228	0.377	0.67	0.33	#	#	0.67	0.33
9-Mar-12	#	#	0.67	0.55	0.45	1.13	1.12	0.22
16-Mar-12	#	#	0.89	0.22	0.225	0.754	0.89	0.22
23-Mar-12	#	#	0.45	0.16	0.075	1.13	0.45	0.22
30-Mar-12	0.075	0.377	0.67	0.22	0.375	0.377	0.67	0.33

* No monitoring was carried out by ET of Contract 1 due to site closure during Chinese New Year (22-28 Jan 2012)

No data was provided by ET of Contract 1.

- No monitoring event was conducted.

- 4.09 To compare the monitoring data between the Reporting Quarter and baseline monitoring period, the current water depth and volumetric flow rate has insignificant changed. Furthermore, water depth and water flow rate were found no exceedance in this Reporting Quarter.

RESULTS OF ECOLOGICAL MONITORING

- 4.10 According to updated EM&A Manual Section 6.17, ecological monitoring is conducted by the IEC – ENVIRON Hong Kong Limited. In brief, the monitoring tasks include regular check on the retained and transplanted trees and shrubs, monitoring on fauna groups and aquatic fauna within the works area and any ecologically sensitive area within 100 m of the works boundary.

In this Reporting Quarter, bi-monthly ecological monitoring is conducted by the IEC – ENVIRON Hong Kong Limited on **19 January** and **18 March 2012**. The detailed reports are presented in the Monthly EM&A Report (**January 2012** and **March 2012**).

5.0 WASTE MANAGEMENT

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

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 Quarter are summarized in *Table 5-1* and *5-2* and the Monthly Summary Waste Flow Table is shown in *Appendix 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
	Jan 12	Feb 12	Mar 12	
C&D Materials (Inert) (m ³)	0	0	0	-
Reused in this Contract (Inert) (m ³)	0	0	0	-
Reused in other Projects (Inert) (m ³)	0	0	0	-
Disposal as Public Fill (Inert) (m ³)	0	10	405	Tuen Mum Area 38

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

Type of Waste	Quantity			Disposal Location
	Jan 12	Feb 12	Mar 12	
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 (m ³)	10	30	0	-

5.04 To control over the site performance on waste management, the Contractor shall ensure that all solid and liquid waste management works are in full compliance with the relevant license/permit requirements, such as the effluent discharge licence and the chemical waste producer registration. The Contractor is also reminded to implement the recommended environmental mitigation measures according to the EM&A Manual based on actual site conditions.

6.0 SITE INSPECTION

- 6.01 According to the Updated Environmental Monitoring and Audit Manual, regular site inspection to evaluate the project environmental performance should be carried out during construction phase. Weekly environmental site inspections had been carried out by the Contractor and the RE on **5, 11, 19, 30 January, 2, 6, 15, 22, 29 February and 7, 14, 21, 28 March 2012**. Furthermore, the RE, IEC, the Contractor and ET of joint site inspection were carried out on **11 January, 6 February and 7 March 2012**. In this Reporting Quarter, no non-compliance were recorded but **12** observations and **3** reminders were noted.
- 6.02 Observations for the site inspection and monthly audit within this Reporting Quarter are summarized in *Table 6-1*.

Table 6-1 Site Observations during this Reporting Quarter

Date	Findings / Deficiencies	Follow-Up Status
5 Jan 12	No adverse environmental impact was observed during site inspection.	N.A.
11 Jan 12	1) The algae and mud accumulated in the sedimentation tanks should be cleaned regularly in order to maintain its functioning. 2) Chemical container should be stored in proper area with drip tray provided. As a reminder, the Contractor should properly implement the air quality mitigation measure such as covering of soil stockpile and cleaning of exit of the site before public holiday.	Item 1 has been followed on 30 Jan 2012. Item 2 has been follow on 19 Jan 2012
19 Jan 12	1) The algae and mud accumulated in the sedimentation system should be cleaned regularly in order to maintain its functioning.	The observations have been rectified before the site inspection on 30 Jan 2012.
30 Jan 12	1) Free chemical container was found standing on bare ground, the Contractor should store them in proper area with drip tray provided to avoid chemical leakage. 2) Stagnant water accumulated in the trip tray was observed after rainfall, the Contractor should clean it to avoid mosquito breeding.	The observation has been rectified before the site inspection on 2 Feb 2012.
2 Feb 12	No adverse environmental impact was observed during site inspection.	N.A.
6 Feb 12	1) Mud tail at site entrance is observed. The Contractor should implement wheel washing facility before vehicle leaving the site. 2) Exposed slope on channel at road junction should be well covered with tarpaulin sheet to prevent generation of soil run off.	Item 1 has been followed on 15 Feb 2012. Item 2 has been followed on 15 Feb 2012.
15 Feb 12	No adverse environmental impact was observed during site inspection.	N.A.
22 Feb 12	Reminder: The Contractor is reminded to remove any stagnant water after rainfall.	Not required for reminder.
29 Feb 12	1) The gravel placed in the existing stream	The observation has been

	course for filtration purpose as water quality mitigation measure was found to be damaged possibly after rainfall, the Contractor should repair it regularly and maintain the desilting system.	rectified before the site inspection on 7 Mar 2012.
7 Mar 12	<p>1) Muddy water discharged from the de-silting channel was observed, the Contractor should improve the de-silting system and repair it regularly.</p> <p>2) Tree protection fencing was broken, the contractor was reminded to provide proper protection to the tree within the site area.</p> <p>As a reminder, stockpile within the site should provide mitigation measure to prevent dust generation.</p>	Items 1 and 2 have been followed on 14 Mar 2012.
14 Mar 12	1) To avoid washing out of loose soil to the existing stream, fully covering of the exposed slopes by tarpaulin sheet should properly maintain.	Item 1 has been followed on 21 Mar 2012.
21 Mar 12	1) To improve the desilting facility, more gravel should be placed in the of temporary artificial precipitation stream.	Item 1 has been followed on 28 Mar 2012.
28 Mar 12	No adverse environmental impact was observed during site inspection.	N.A

LANDSCAPE AND VISUAL INSPECTION

6.03 In this Reporting Quarter, **6** events of landscape and visual inspection were carried out by the landscape sub-contractor. The detailed reports are presented in the Monthly EM&A Report (**January 2012, February 2012 and March 2012**).

7.0 ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE

ENVIRONMENTAL COMPLAINT, SUMMONS AND PROSECUTION

7.01 No environmental complaint, summons and prosecution was received in this Reporting Quarter. 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
July–December 2011	0	0	NA
January 2012	0	0	NA
February 2012	0	0	NA
March 2012	0	0	NA

Table 7-2 Statistical Summary of Environmental Summons

Reporting Period	Environmental Summons Statistics		
	Frequency	Cumulative	Complaint Nature
July–December 2011	0	0	NA
January 2012	0	0	NA
February 2012	0	0	NA
March 2012	0	0	NA

Table 7-3 Statistical Summary of Environmental Prosecution

Reporting Period	Environmental Prosecution Statistics		
	Frequency	Cumulative	Complaint Nature
July–December 2011	0	0	NA
January 2012	0	0	NA
February 2012	0	0	NA
March 2012	0	0	NA

8.0 IMPLEMENTATION STATUS OF MITIGATION MEASURES

8.01 The environmental mitigation measures that recommended in the Updated Environmental Monitoring and Audit Manual covered the issues of dust, noise and waste and they are summarized as follows:

Noise Mitigation Measure

- (a) Only well-maintained plant should be operated on-site and plant shall be serviced regularly during the construction programme;
- (b) Silencers or mufflers on construction equipment should be utilized and shall be properly maintained during the construction programme;
- (c) Mobile plant, if any, should be sited as far from NSRs as possible;
- (d) 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;
- (e) 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;
- (f) Material stockpiles and other structures should be effectively utilized, wherever practicable, in screening noise from on-site construction activities;
- (g) Use of quieter plants to carry out the construction tasks proposed for the Project;
- (h) Use about 3.5m high of temporary noise barriers as screened the noisy PMEs to carry out construction of box culvert and site clearance.
- (i) Low Impact Method, such as using PMEs smaller in size and to be enclosed by noise enclosure, should be adopted for the construction of box culvert and pipe laying in Wai Ha; and
- (j) Use of noise enclosure during the works area for pipe laying in Wai Ha.

Dust Mitigation Measure

8.02 Implementation of mitigation measures stipulated in the Air Pollution Control (Construction Dust) Regulation and good site practices including but not limited to the following:

- (a) Use of regular watering to reduce dust emissions from exposed site surfaces and unpaved road, with complete coverage, particularly during dry weather;
- (b) Use of frequent watering for particularly dusty static construction areas and areas close to ASRs;
- (c) Tarpaulin covering of all dusty vehicle loads transported to, from and between site location;
- (d) Establishment and use of vehicle wheel and body washing facilities at the exit points of the site;
- (e) Routing of vehicles and positioning of construction plant should be at the maximum possible distance from ASRs;
- (f) Stockpiled excavated materials should be covered with tarpaulin and should be removed offsite within 24 hours to avoid any odour nuisance arising.

Local Stream Water Quality Mitigation Measure

- (a) Before commencing any site formation work, all sewer and drainage connections shall be sealed to prevent debris, soil, sand etc. from entering public sewers/drains;
- (b) 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;
- (c) 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 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
- (d) Water pumped out from excavated pits shall be discharged into silt removal facilities;

- (e) 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
- (f) Exposed soil areas shall be minimized to reduce potential for increased siltation and contamination of runoff
- (g) 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;
- (h) Open stockpiles of construction materials or construction wastes on-site shall be covered with tarpaulin or similar fabric during rainstorms;
- (i) 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 01 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;
- (j) 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 0.1 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;
- (k) 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;
- (l) Tarpaulin sheets would be used to cover the excavation areas during heavy rainstorms. This would prevent the ingress of rainwater into the trench minimizing the risk of muddy water getting into Wai Ha River and the adjacent Conservation Area;
- (m) 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;
- (n) 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;
- (o) Debris and refuse generated on-site should be collected, handled and disposed of properly to avoid entering the Wai Ha River and fish ponds at Shuen Wan. Stockpiles of cement and other construction materials should be kept covered when not being used.
- (p) 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
- (q) Temporary sanitary facilities, such as portable chemical toilets, should be employed on-site. A licensed contractor would be responsible for appropriate disposal and maintenance of these facilities;
- (r) 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 should 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 April

Waste Mitigation Measures

- (a) The Contractor shall observe and comply with the Waste Disposal Ordinance (WDO) and its subsidiary regulations.
- (b) The Contractor shall submit to the Engineer for approval a Waste Management Plan with appropriate mitigation measures including the allocation of an area for waste segregation and shall ensure that the day-to-day site operations comply with the approved waste management plan.
- (c) The Contractor shall minimise the generation of waste from his work. Avoidance and minimisation of waste generation can be achieved through changing or improving design and practices, careful planning and good site management.
- (d) The reuse and recycling of waste shall be practised as far as possible. The recycled materials shall include paper/cardboard, timber and metal etc.
- (e) The Contractor shall ensure that Construction and Demolition (C&D) materials are sorted into public fill (inert portion) and C&D waste (non-inert portion). The public fill which comprises soil, rock, concrete, brick, cement plaster/mortar, inert building debris, aggregates and asphalt shall be reused in earth filling, reclamation or site formation works. The C&D waste which comprises metal, timber, paper, glass, junk and general garbage shall be reused or recycled where possible and, as the last resort, disposal of at landfills.
- (f) The Contractor shall record the amount of wastes generated, recycled and disposed of (including the disposal sites). The Contractor shall use a trip ticket system for the disposal of C&D materials to any designated public filling facility and/or landfill.
- (g) In order to avoid dust or odour impacts, any vehicles leaving a works area carrying construction waste or public fill shall have their load covered.
- (h) To avoid the excessive use of wood, reusable steel shutters shall be used as a preferred alternative to formwork and falsework where possible.
- (i) The Contractor shall observe and comply with the Waste Disposal (Chemical Waste) (General) Regulation. The Contractor shall apply for registration as chemical waste producer under the Waste Disposal (Chemical Waste) (General) Regulation when chemical waste is produced. All chemical waste shall be properly stored, labeled, packaged and collected in accordance with the Regulation.

8.03 KLKJV had been implementing the required environmental mitigation measures according to the Updated Environmental Monitoring and Audit Manual subject to the site condition. Environmental mitigation measures generally implemented by KLKJV in this Reporting Quarter are summarized in **Table 8-1**.

Table 8-1 Environmental Mitigation Measures

Issues	Environmental Mitigation Measures
Water Quality	<ul style="list-style-type: none"> • Wastewater were appropriately treated by treatment facilities; • 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"> • Regular watering to reduce dust emissions from all exposed site surface, particularly during dry weather; • Frequent watering for particularly dusty construction areas and areas close to air sensitive receivers; • 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; • Use of shrouds/temporary noise barriers to screen noise from relatively static PMEs; • Scheduling of construction works nearly Tung Tsz Road; and • Alternative use of plant items within one worksite, where practicable.

Issues	Environmental Mitigation Measures
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.

9.0 CONCLUSIONS AND RECOMMENTATIONS

CONCLUSIONS

- 9.01 This is the 3rd Quarterly EM&A Summary Report under Environmental Permit No.EP-303/2008 for the Contract No. DC/2010/02 - Drainage Improvement in Shuen Wan and Shek Wu Wai, covering the period from **1 January to 31 March 2012**.
- 9.02 No noise complaint (which is an Action Level exceedance) was received and no construction noise measurement results and hydrological characteristics results that exceeded the Limit Level were recorded in this Reporting Quarter.
- 9.03 A total of 126 Action/Limit Levels exceedances, namely 64 dissolved oxygen, 51 turbidity and 11 suspended solids were recorded for water quality monitoring in this Reporting Quarter. Investigation reports concluded that all registered exceedances were not related to the work under the Project.
- 9.04 No documented complaint, notification of summons or successful prosecution was received.
- 9.05 Weekly environmental site inspections had been carried out by the Contractor and the RE on **5, 11, 19, 30 January, 2, 6, 15, 22, 29 February and 7, 14, 21, 28 March 2012**. Furthermore, the RE, IEC, the Contractor and ET of joint site inspection were carried out on **11 January, 6 February and 7 March 2012**. No non-compliance were recorded but **12** observations and **3** reminders were noted. The environmental performance of the Project was therefore considered satisfactory.
- 9.06 During this Reporting Quarter, **6** events of landscape and visual inspection were carried out by a landscape sub-contractor.
- 9.07 No site visit was undertaken by any external party in this Reporting Quarter.

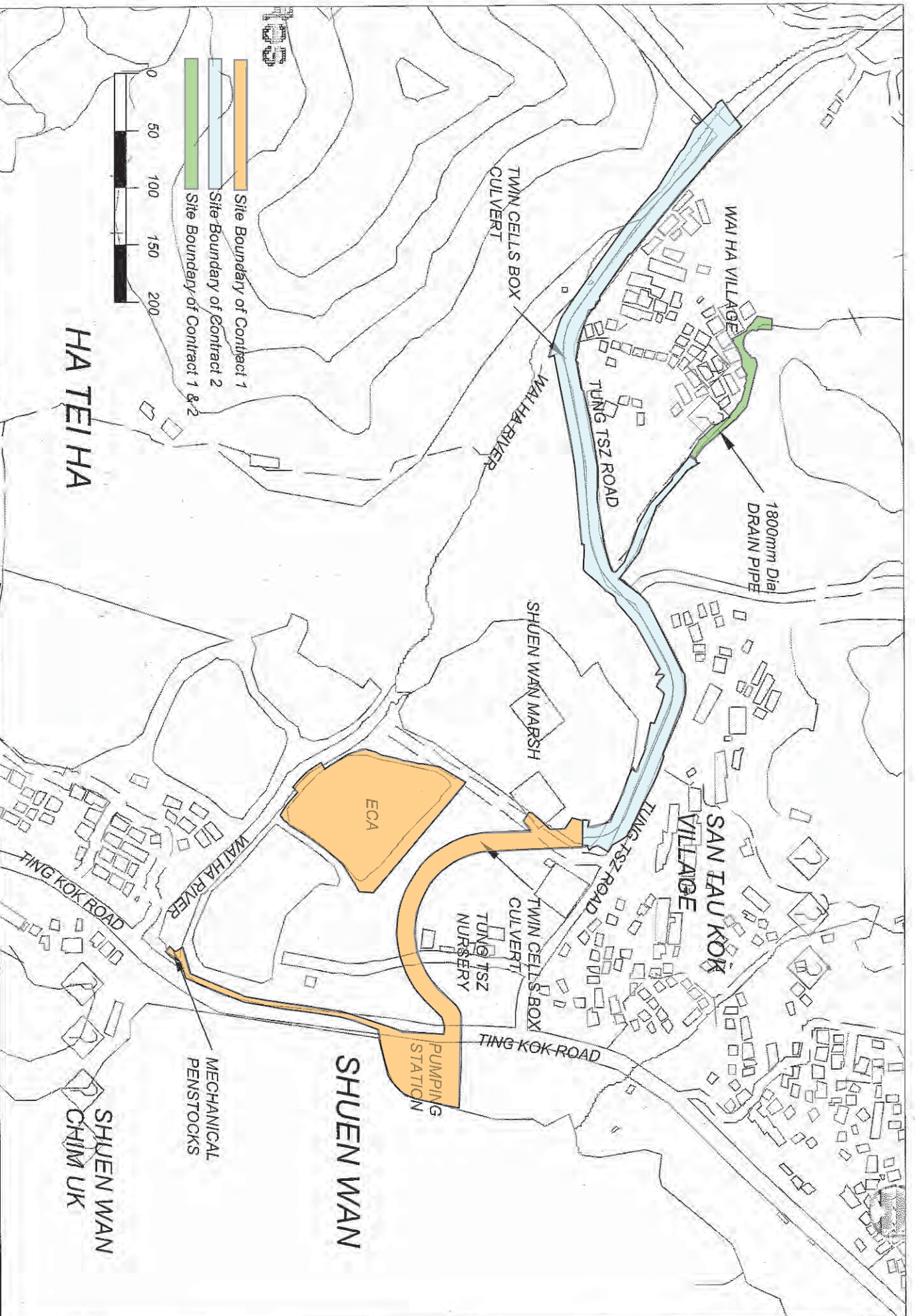
RECOMMENDATIONS

- 9.08 The mitigation measures recommended in the EM&A Manual were implemented properly during the Reporting Quarter. Although breaches of water quality criteria were frequently recorded, all the exceedances were concluded that not related to works under the Project and a revision of A/L Limit is under reviewed by IEC. Therefore, the implemented mitigation measures recommended in the EM&A Manual effectively minimize the environmental impact arise from the works on the Project.
- 10.01 Since wet season is approaching, muddy water and other water quality pollutants via site surface water runoff into the local stream Wah Ha River would be the key issue in the forth-coming month. On the other hand, construction noise should be other key environmental issue during sheet-piling process. The noise mitigation measures should be necessary to implement in accordance with EM&A Manual stipulation. Dust mitigation measures to avoid fugitive dust emissions from loose soil surface or haul road is also reminded.
- 9.09 To control the site performance on waste management, the KLKJV shall ensure that all solid and liquid waste management works are fully in compliance with the relevant license/permit requirements, such as the effluent discharge licence and the chemical waste producer registration. KLKJV is also reminded to implement the recommended environmental mitigation measures according to the Updated Environmental Monitoring and Audit Manual.
- 9.10 Baseline monitoring of water quality was conducted during typical Hong Kong dry season. It is important that influence of the seasonal changes is taken into account when interpreting monitoring data of water quality obtained in the coming wet season. Review of the baseline conditions may need to be conducted regularly in particular during times of seasonal changes. If the baseline changes are evident, the environmental performance criteria should be re-established under agreement of the ER and IEC and submitted to the EPD for endorsement.

END OF TEXT

Appendix A

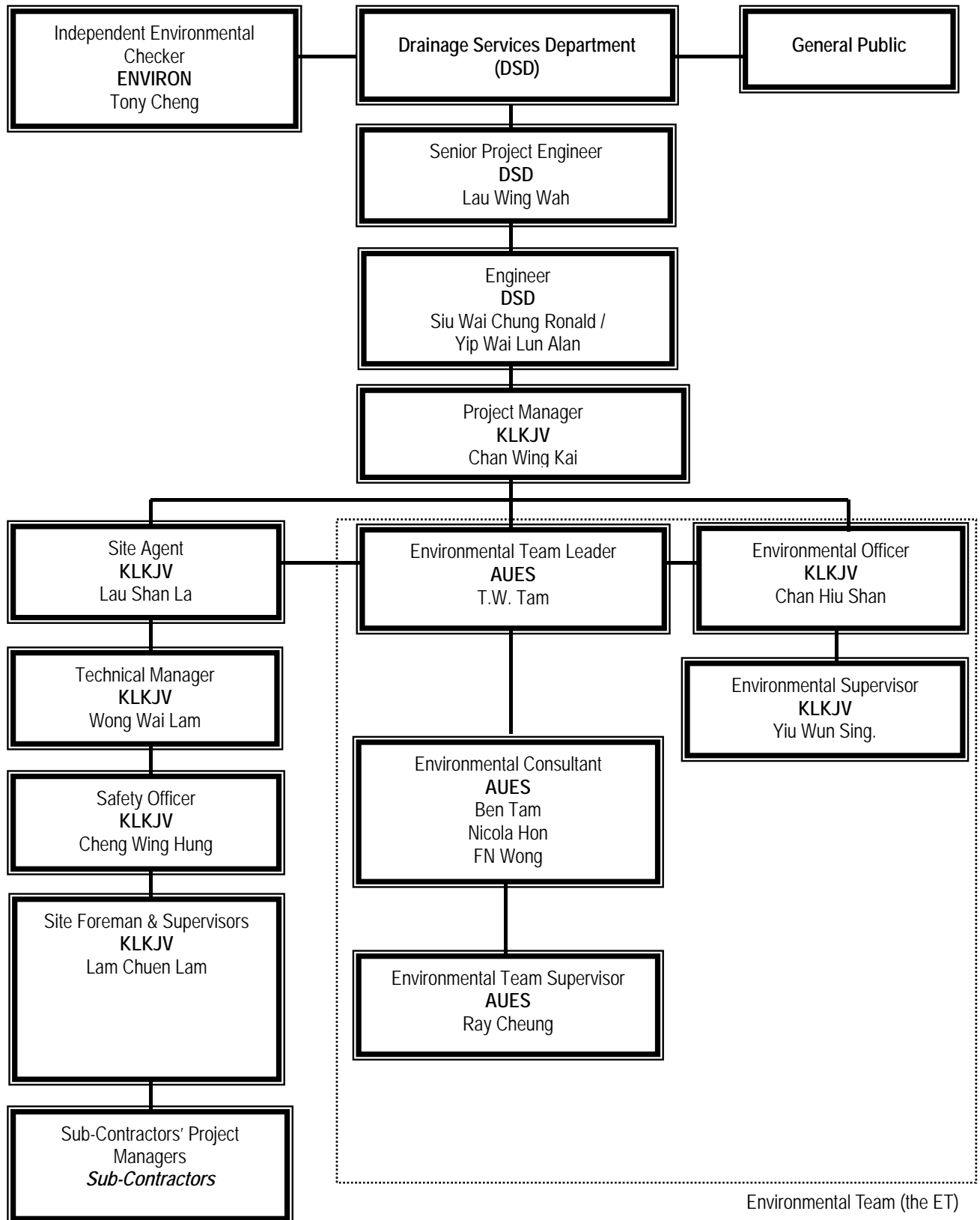
Site Location Plan (DSD Contract 1 and Contract 2 at Shuen Wan)



Site Location Plan of DSD Contract 1 and Contract 2 at Shuen Wan

Appendix B

Organization Chart and the Key Contact Person



Environmental Team (the ET)

Environmental Management Organization

Contact Details of Key Personnel

Organization	Project Role	Name of Key Staff	Tel No.	Fax No.
DSD	Employer	Mr. Luk Wai Hung	2594 7400	2827 8700
DSD	Senior Engineer	Mr. Lau Wing Wah	2594 7402	2827 8700
DSD	Engineer	Mr. Siu Wai Chung, Ronald	2594 7595	2827 8700
DSD	Engineer	Mr. Yip Wai Lun	2594 7359	2827 8700
DSD	Senior Inspector	Mr. Tso Si On	6778 2708	2827 8700
ENVIRON	Independent Environmental Checker	Mr. Tong Cheng	3743-0788	3548-6988
KLKJV	Project Director	Mr. Poon Chi Yeung Francis	2674 3888	2674 9988
KLKJV	Project Manager	Mr. Chan Wing Kai	2674 3888	2674 9988
KLKJV	Site Agent	Mr. Lau Shan La	2674 3888	2674 9988
KLKJV	Sub- Agent	Mr. Wong Wai Lam,	2674 3888	2674 9988
KLKJV	Technical Manager	Mr. Yeung Tai Yung	9674 9712	2674 9988
KLKJV	Site Forman	Mr. Lam Chuen Lam	2674 3888	2674 9988
KLKJV	Environmental Officer	Miss. Chan Hiu Shan	2674 3888	2674 9988
KLKJV	Environmental Supervisor	Mr. Yiu Wun Sing	2674 3888	2674 9988
AUES	Environmental Team Leader	Mr. T.W. Tam	2959-6059	2959-6079
AUES	Senior Environmental Consultant	Mr. Wong Fu Nam	2959-6059	2959-6079
AUES	Environmental Consultant	Miss. Nicola Hon	2959-6059	2959-6079
AUES	Environmental Consultant	Mr. Ben Tam	2959-6059	2959-6079
AUES	Environmental Team Supervisor	Mr. Ray Cheung	2959-6059	2959-6079

Legends:

DSD (Employer) – Drainage Services Department

DSD (Engineer) – Drainage Services Department

KLKJV (Main Contractor) – Kwan Lee-Kuly Joint Venture

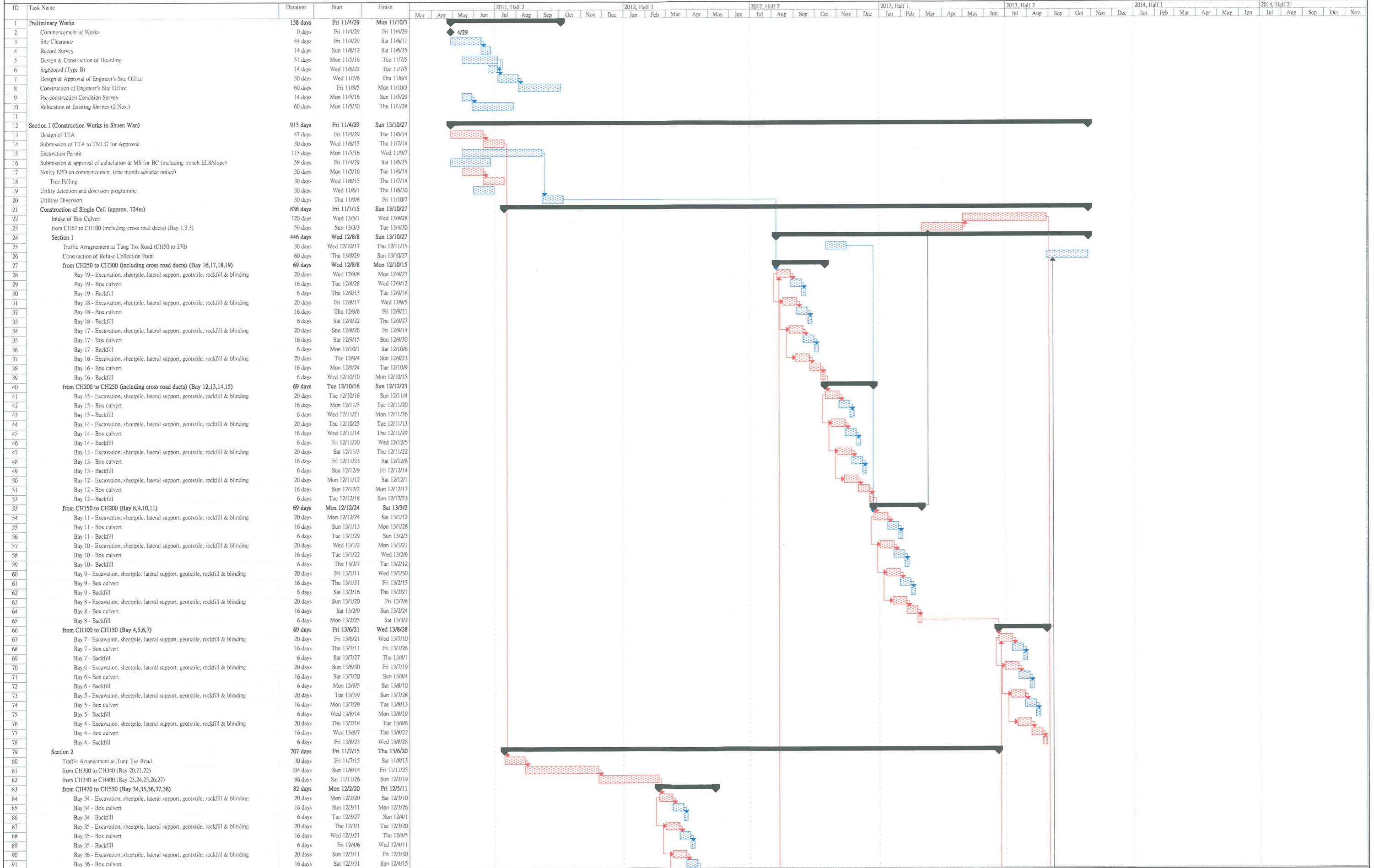
ENVIRON (IEC) – ENVIRON Hong Kong Limited

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

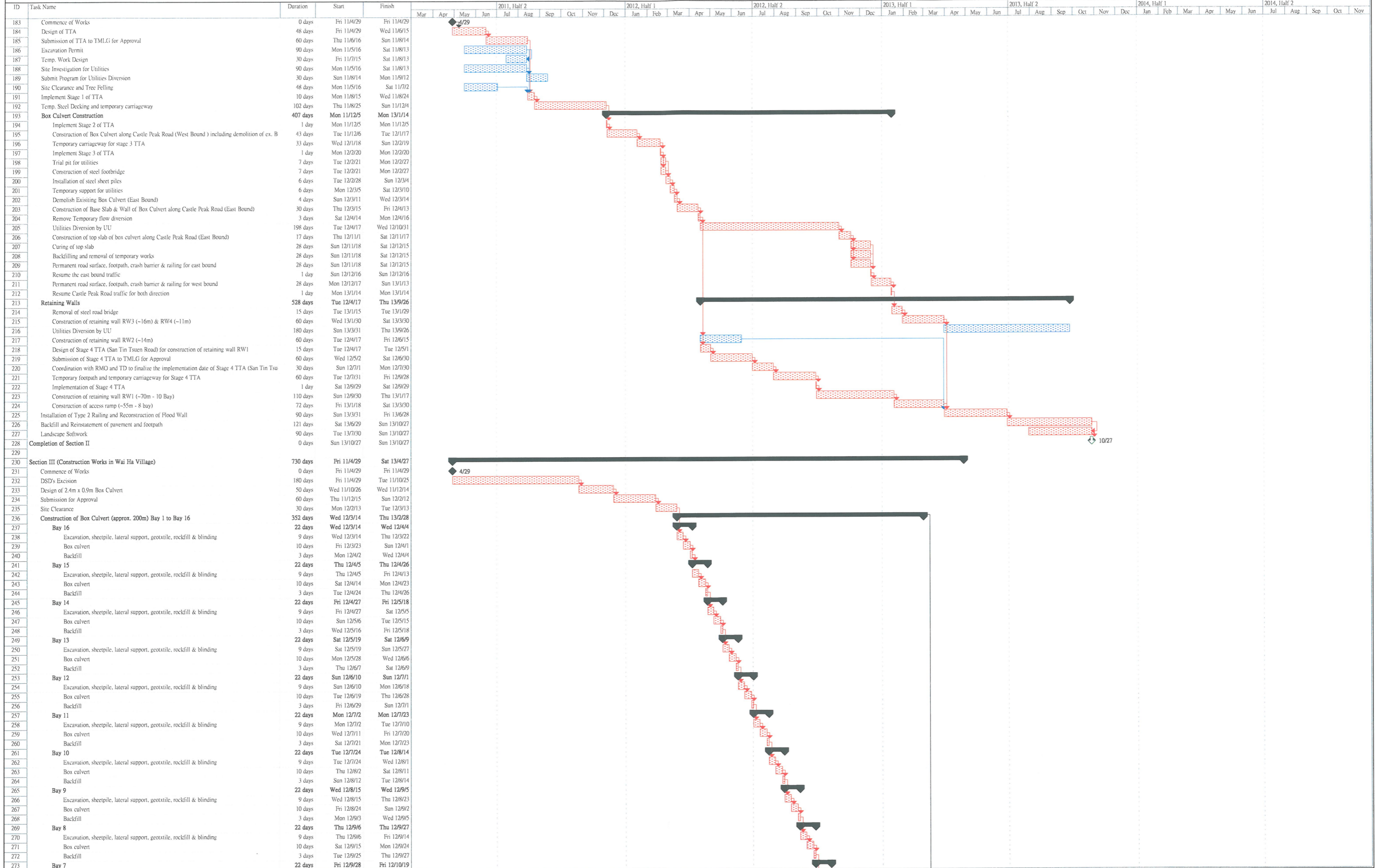
Appendix C

Master and Three Months Rolling Construction Programme

UPDATED PROGRAMME (No. 3)



UPDATED PROGRAMME (No. 3)












UPDATED PROGRAMME (No. 3)

ID	Task Name	Duration	Start	Finish	2011, Half 2												2012, Half 1												2012, Half 2												2013, Half 1												2013, Half 2												2014, Half 1												2014, Half 2											
					Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec																										
274	Excavation, sheetpile, lateral support, geotextile, rockfill & blinding	9 days	Fri 12/9/28	Sat 12/10/6																																																																																				
275	Box culvert	10 days	Sun 12/10/7	Tue 12/10/16																																																																																				
276	Backfill	3 days	Wed 12/10/17	Fri 12/10/19																																																																																				
277	Bay 6	22 days	Sat 12/10/20	Sat 12/11/10																																																																																				
278	Excavation, sheetpile, lateral support, geotextile, rockfill & blinding	9 days	Sat 12/10/20	Sun 12/10/28																																																																																				
279	Box culvert	10 days	Mon 12/10/29	Wed 12/11/7																																																																																				
280	Backfill	3 days	Thu 12/11/8	Sat 12/11/10																																																																																				
281	Bay 5	22 days	Sun 12/11/11	Sun 12/12/2																																																																																				
282	Excavation, sheetpile, lateral support, geotextile, rockfill & blinding	9 days	Sun 12/11/11	Mon 12/11/19																																																																																				
283	Box culvert	10 days	Tue 12/11/20	Thu 12/11/29																																																																																				
284	Backfill	3 days	Fri 12/11/30	Sun 12/12/2																																																																																				
285	Bay 4	22 days	Mon 12/12/3	Mon 12/12/24																																																																																				
286	Excavation, sheetpile, lateral support, geotextile, rockfill & blinding	9 days	Mon 12/12/3	Tue 12/12/11																																																																																				
287	Box culvert	10 days	Wed 12/12/12	Fri 12/12/21																																																																																				
288	Backfill	3 days	Sat 12/12/22	Mon 12/12/24																																																																																				
289	Bay 3	22 days	Tue 12/12/25	Tue 13/1/15																																																																																				
290	Excavation, sheetpile, lateral support, geotextile, rockfill & blinding	9 days	Tue 12/12/25	Wed 13/1/2																																																																																				
291	Box culvert	10 days	Thu 13/1/3	Sat 13/1/12																																																																																				
292	Backfill	3 days	Sun 13/1/13	Tue 13/1/15																																																																																				
293	Bay 2	22 days	Wed 13/1/16	Wed 13/2/6																																																																																				
294	Excavation, sheetpile, lateral support, geotextile, rockfill & blinding	9 days	Wed 13/1/16	Thu 13/1/24																																																																																				
295	Box culvert	10 days	Fri 13/1/25	Sun 13/2/3																																																																																				
296	Backfill	3 days	Mon 13/2/4	Wed 13/2/6																																																																																				
297	Bay 1	22 days	Thu 13/2/7	Thu 13/2/28																																																																																				
298	Excavation, sheetpile, lateral support, geotextile, rockfill & blinding	9 days	Thu 13/2/7	Fri 13/2/15																																																																																				
299	Box culvert	10 days	Sat 13/2/16	Mon 13/2/25																																																																																				
300	Backfill	3 days	Tue 13/2/26	Thu 13/2/28																																																																																				
301	Notification to villagers regarding traffic arrangement for construction of 1500mm dia concrete pipe	180 days	Tue 12/5/1	Sat 12/10/27																																																																																				
302	1500mm dia precast concrete pipe (-95m)	100 days	Thu 12/11/29	Fri 13/3/8																																																																																				
303	CCTV inspection of Concrete Pipe	20 days	Sat 13/3/9	Thu 13/3/28																																																																																				
304	Grouting of existing 900mm storm drain	30 days	Fri 13/3/29	Sat 13/4/27																																																																																				
305	Completion of Section III	0 days	Sat 13/4/27	Sat 13/4/27																																																																																				
306																																																																																								
307	Section IV (Portion A1 and A2, Shuen Wan)	1278 days	Fri 11/4/29	Mon 14/10/27																																																																																				
308	Landscape Establishment Works and preservation & protection of trees	1278 days	Fri 11/4/29	Mon 14/10/27																																																																																				
309																																																																																								
310	Section V (Portion B, Shek Wu Wai)	1278 days	Fri 11/4/29	Mon 14/10/27																																																																																				
311	Landscape Establishment Works and preservation & protection of trees	1278 days	Fri 11/4/29	Mon 14/10/27																																																																																				

Rolling Programme for Tung Tsz Road (dated 17 Jan 2012)

ID	Task Name	Duration	Start	Finish	Predecessors	2012												2013																			
						Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	
1	Contract Period	913 days	Fri 11/4/29	Sun 13/10/27		[Gantt bar for Contract Period]																															
2	Bay 20, 21, 22	6 days	Sun 11/11/20	Fri 11/11/25		[Gantt bar for Bay 20, 21, 22]																															
3	Backfill & removal sheetpile	6 days	Sun 11/11/20	Fri 11/11/25		[Gantt bar for Backfill & removal sheetpile]																															
4	Bay 23, 24, 25, 26, 27	74 days	Sat 11/11/26	Tue 12/2/7		[Gantt bar for Bay 23, 24, 25, 26, 27]																															
5	Bay 23	42 days	Sat 11/11/26	Fri 12/1/6		[Gantt bar for Bay 23]																															
26	Bay 24	42 days	Sun 11/12/4	Sat 12/1/14		[Gantt bar for Bay 24]																															
47	Bay 25	42 days	Mon 11/12/12	Sun 12/1/22		[Gantt bar for Bay 25]																															
68	Bay 26	42 days	Tue 11/12/20	Mon 12/1/30		[Gantt bar for Bay 26]																															
89	Bay 27	42 days	Wed 11/12/28	Tue 12/2/7		[Gantt bar for Bay 27]																															
110	Bay 34, 35, 36, 37, 38	74 days	Wed 12/2/8	Sat 12/4/21		[Gantt bar for Bay 34, 35, 36, 37, 38]																															
111	Bay 34	42 days	Wed 12/2/8	Tue 12/3/20		[Gantt bar for Bay 34]																															
132	Bay 35	42 days	Thu 12/2/16	Wed 12/3/28		[Gantt bar for Bay 35]																															
153	Bay 36	42 days	Fri 12/2/24	Thu 12/4/5		[Gantt bar for Bay 36]																															
174	Bay 37	42 days	Sat 12/3/3	Fri 12/4/13		[Gantt bar for Bay 37]																															
195	Bay 38	42 days	Sun 12/3/11	Sat 12/4/21		[Gantt bar for Bay 38]																															
216	Bay 39, 40, 41, 42, 43, 44	82 days	Sun 12/4/22	Thu 12/7/12		[Gantt bar for Bay 39, 40, 41, 42, 43, 44]																															
217	Bay 39	42 days	Sun 12/4/22	Sat 12/6/2		[Gantt bar for Bay 39]																															
238	Bay 40	42 days	Mon 12/4/30	Sun 12/6/10		[Gantt bar for Bay 40]																															
259	Bay 41	42 days	Tue 12/5/8	Mon 12/6/18		[Gantt bar for Bay 41]																															
280	Bay 42	42 days	Wed 12/5/16	Tue 12/6/26		[Gantt bar for Bay 42]																															
301	Bay 43	41 days	Thu 12/5/24	Tue 12/7/3		[Gantt bar for Bay 43]																															
322	Bay 44	42 days	Fri 12/6/1	Thu 12/7/12		[Gantt bar for Bay 44]																															
343	Bay 45, 46, 47, 48	66 days	Fri 12/7/13	Sun 12/9/16		[Gantt bar for Bay 45, 46, 47, 48]																															
344	Bay 45	42 days	Fri 12/7/13	Thu 12/8/23		[Gantt bar for Bay 45]																															
365	Bay 46	42 days	Sat 12/7/21	Fri 12/8/31		[Gantt bar for Bay 46]																															
386	Bay 47	42 days	Sun 12/7/29	Sat 12/9/8		[Gantt bar for Bay 47]																															
407	Bay 48	42 days	Mon 12/8/6	Sun 12/9/16		[Gantt bar for Bay 48]																															
428	Bay 49, 50, 51, 52	66 days	Mon 12/9/17	Wed 12/11/21		[Gantt bar for Bay 49, 50, 51, 52]																															
429	Bay 49	42 days	Mon 12/9/17	Sun 12/10/28		[Gantt bar for Bay 49]																															
450	Bay 50	42 days	Tue 12/9/25	Mon 12/11/5		[Gantt bar for Bay 50]																															
471	Bay 51	42 days	Wed 12/10/3	Tue 12/11/13		[Gantt bar for Bay 51]																															
492	Bay 52	42 days	Thu 12/10/11	Wed 12/11/21		[Gantt bar for Bay 52]																															
513	Bay 53, 54, 55	58 days	Thu 12/11/22	Fri 13/1/18		[Gantt bar for Bay 53, 54, 55]																															
514	Bay 53	42 days	Thu 12/11/22	Wed 13/1/2		[Gantt bar for Bay 53]																															
535	Bay 54	42 days	Fri 12/11/30	Thu 13/1/10		[Gantt bar for Bay 54]																															
556	Bay 55	42 days	Sat 12/12/8	Fri 13/1/18		[Gantt bar for Bay 55]																															
577	Bay 30, 31, 32, 33	66 days	Sat 13/1/19	Mon 13/3/25		[Gantt bar for Bay 30, 31, 32, 33]																															
578	Bay 30	42 days	Sat 13/1/19	Fri 13/3/1		[Gantt bar for Bay 30]																															
599	Bay 31	42 days	Sun 13/1/27	Sat 13/3/9		[Gantt bar for Bay 31]																															
620	Bay 32	42 days	Mon 13/2/4	Sun 13/3/17		[Gantt bar for Bay 32]																															
641	Bay 33	42 days	Tue 13/2/12	Mon 13/3/25		[Gantt bar for Bay 33]																															
662	Bay 28, 29	50 days	Tue 13/3/26	Tue 13/5/14		[Gantt bar for Bay 28, 29]																															
663	Bay 28	42 days	Tue 13/3/26	Mon 13/5/6		[Gantt bar for Bay 28]																															
684	Bay 29	42 days	Wed 13/4/3	Tue 13/5/14		[Gantt bar for Bay 29]																															
705	Bay 16, 17, 18, 19	66 days	Fri 12/7/13	Sun 12/9/16		[Gantt bar for Bay 16, 17, 18, 19]																															
706	Bay 19	42 days	Fri 12/7/13	Thu 12/8/23		[Gantt bar for Bay 19]																															
727	Bay 18	42 days	Sat 12/7/21	Fri 12/8/31		[Gantt bar for Bay 18]																															

Printed on: 17 Jan 2012
 Revised on: 17 Jan 2012

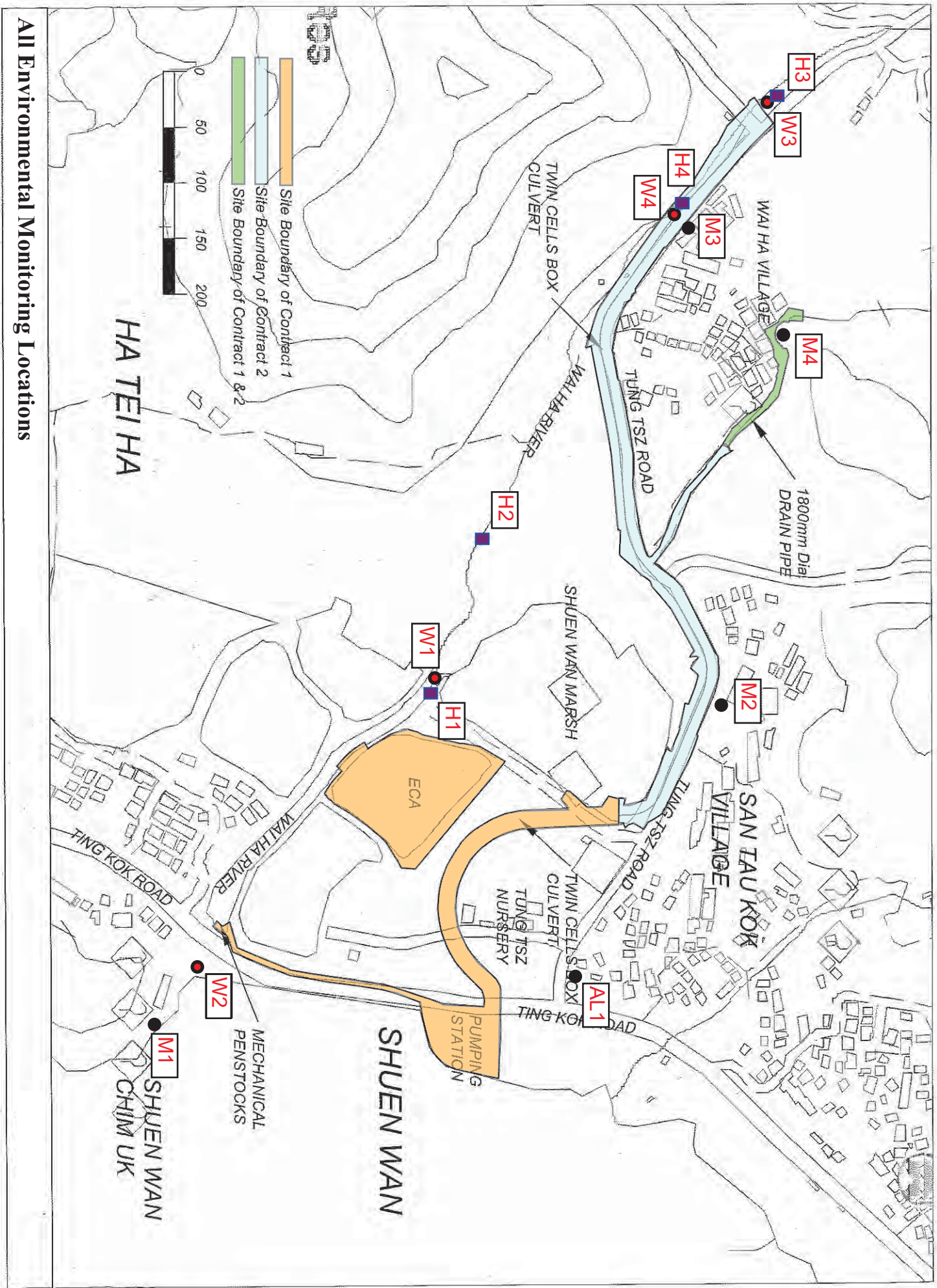
Task  Progress  Summary  External Tasks  Deadline 
 Split  Milestone  Project Summary  External Milestone 

Rolling Programme for Tung Tsz Road (dated 17 Jan 2012)

ID	Task Name	Duration	Start	Finish	Predecessors	2012												2013																					
						Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec													
748	Bay 17	42 days	Sun 12/7/29	Sat 12/9/8																																			
769	Bay 16	42 days	Mon 12/8/6	Sun 12/9/16																																			
790	Bay 12, 13, 14, 15	66 days	Mon 12/9/17	Wed 12/11/21																																			
791	Bay 15	42 days	Mon 12/9/17	Sun 12/10/28																																			
812	Bay 14	42 days	Tue 12/9/25	Mon 12/11/5																																			
833	Bay 13	42 days	Wed 12/10/3	Tue 12/11/13																																			
854	Bay 12	42 days	Thu 12/10/11	Wed 12/11/21																																			
875	Bay 8, 9, 10, 11	66 days	Thu 12/11/22	Sat 13/1/26																																			
876	Bay 11	42 days	Thu 12/11/22	Wed 13/1/2																																			
897	Bay 10	42 days	Fri 12/11/30	Thu 13/1/10																																			
918	Bay 9	42 days	Sat 12/12/8	Fri 13/1/18																																			
939	Bay 8	42 days	Sun 12/12/16	Sat 13/1/26																																			
960	Bay 4, 5, 6, 7	66 days	Sun 13/1/27	Tue 13/4/2																																			
961	Bay 7	42 days	Sun 13/1/27	Sat 13/3/9																																			
982	Bay 6	42 days	Mon 13/2/4	Sun 13/3/17																																			
1003	Bay 5	42 days	Tue 13/2/12	Mon 13/3/25																																			
1024	Bay 4	42 days	Wed 13/2/20	Tue 13/4/2																																			
1045	Bay 1, 2, 3, intake	66 days	Wed 13/4/3	Fri 13/6/7																																			
1046	Bay 3	42 days	Wed 13/4/3	Tue 13/5/14																																			
1067	Bay 2	42 days	Thu 13/4/11	Wed 13/5/22																																			
1088	Bay 1	42 days	Fri 13/4/19	Thu 13/5/30																																			
1109	Intake	42 days	Sat 13/4/27	Fri 13/6/7																																			

Appendix D

Environmental Monitoring Locations

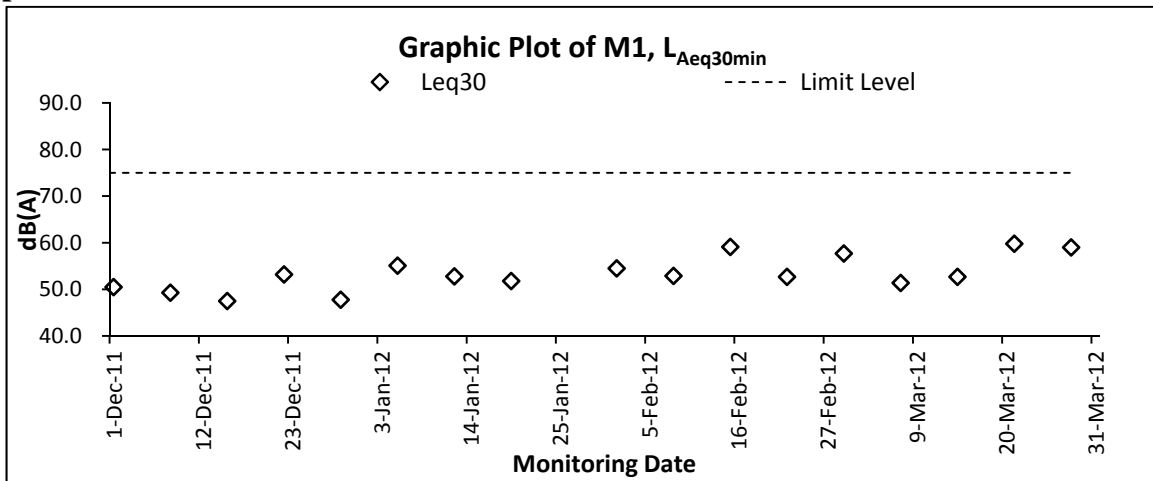


All Environmental Monitoring Locations

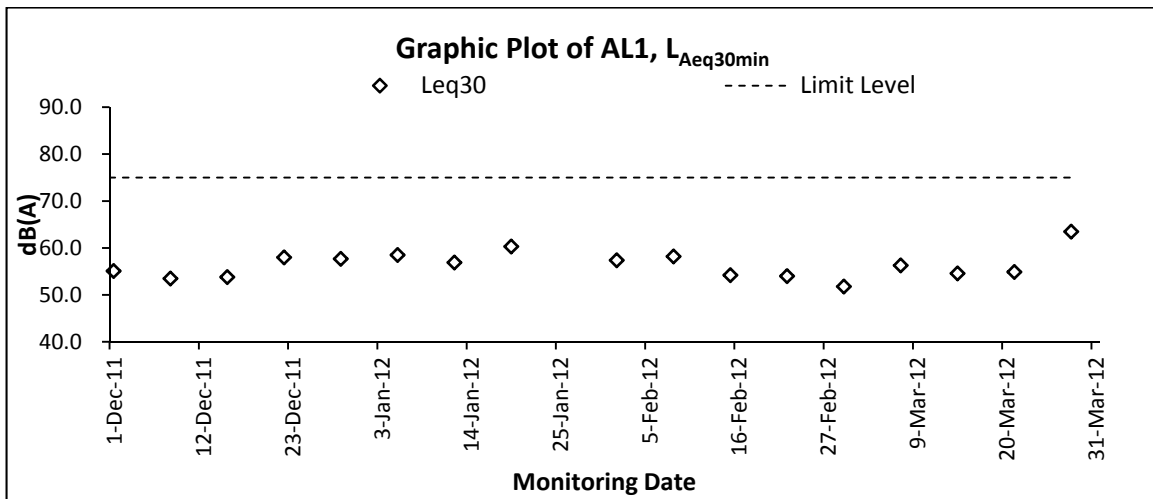
Appendix E

**Graphical Plots of Impact Monitoring –
Noise,
Water Quality
and
Hydrological Characteristics**

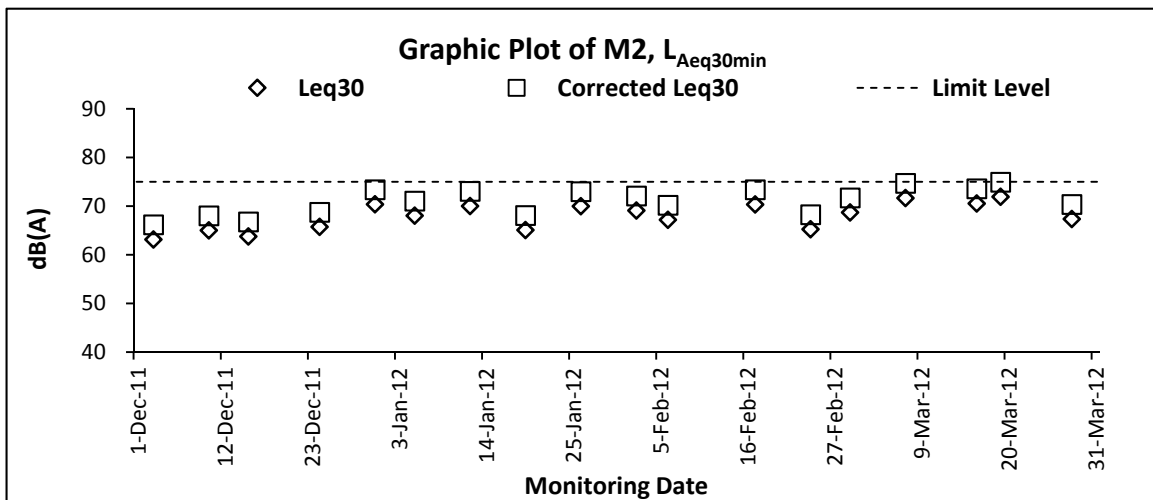
Graphic Plot – Construction Noise



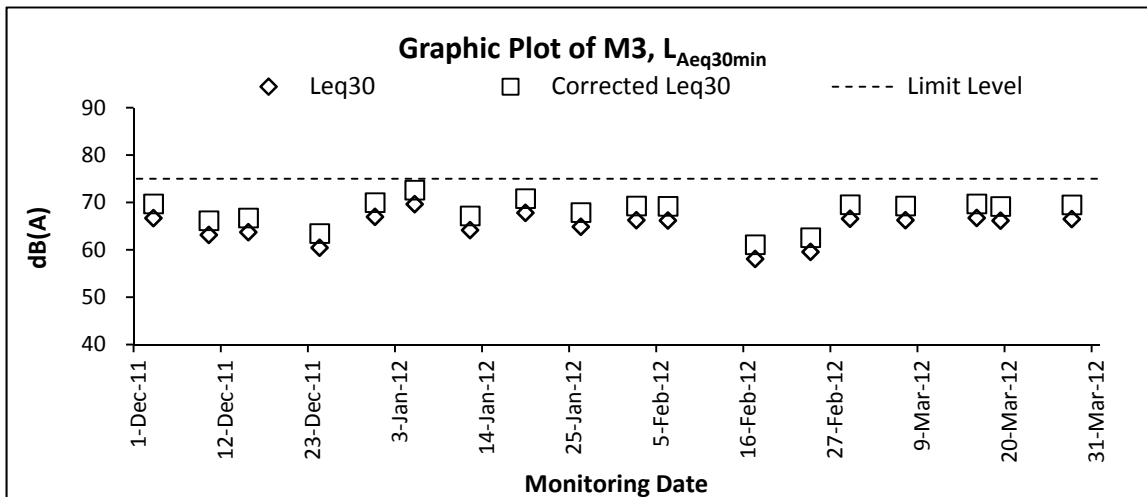
Remark: The monitoring is undertaken under façade situation. No façade correction is added according to acoustical principles and EPD guidelines.



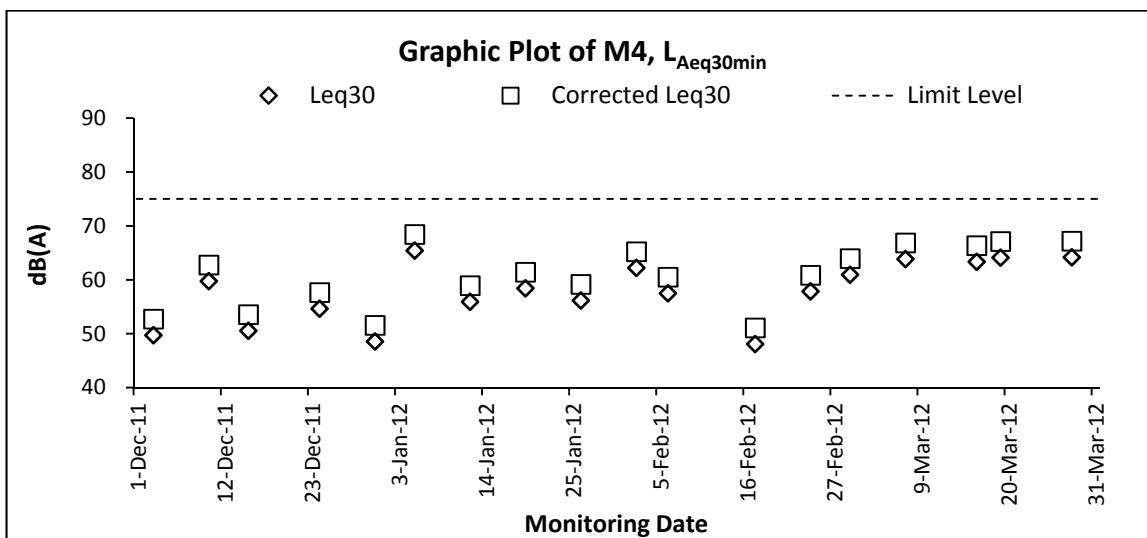
Remark: The monitoring is undertaken under façade situation. No façade correction is added according to acoustical principles and EPD guidelines.



Remark: The monitoring is undertaken under free field situation. A façade correction of +3 dB(A) has been added according to acoustical principles and EPD guidelines

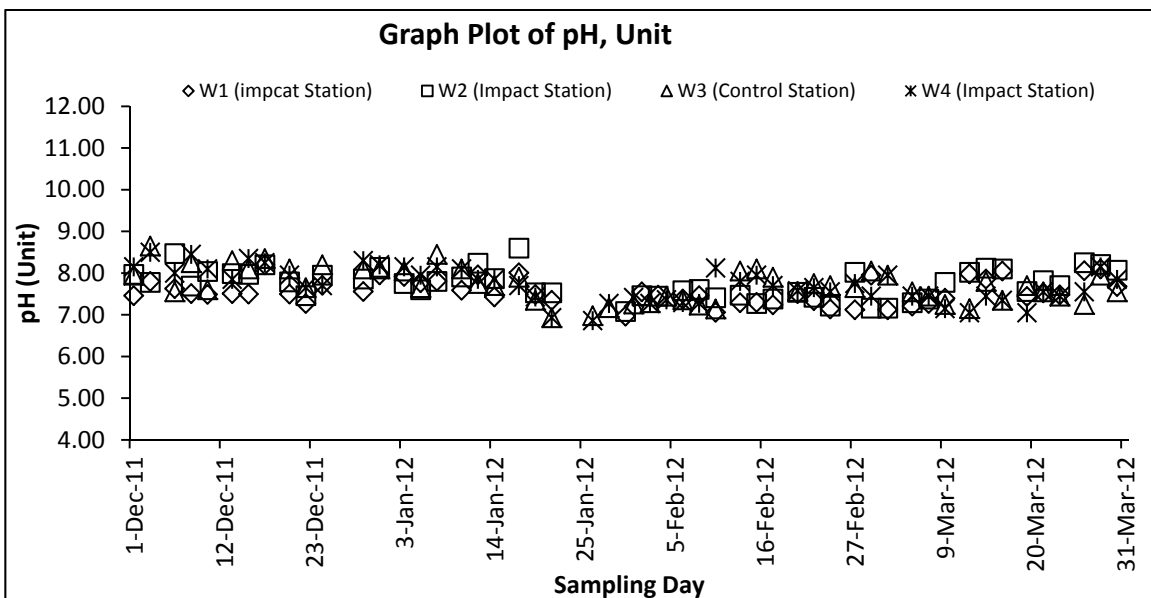
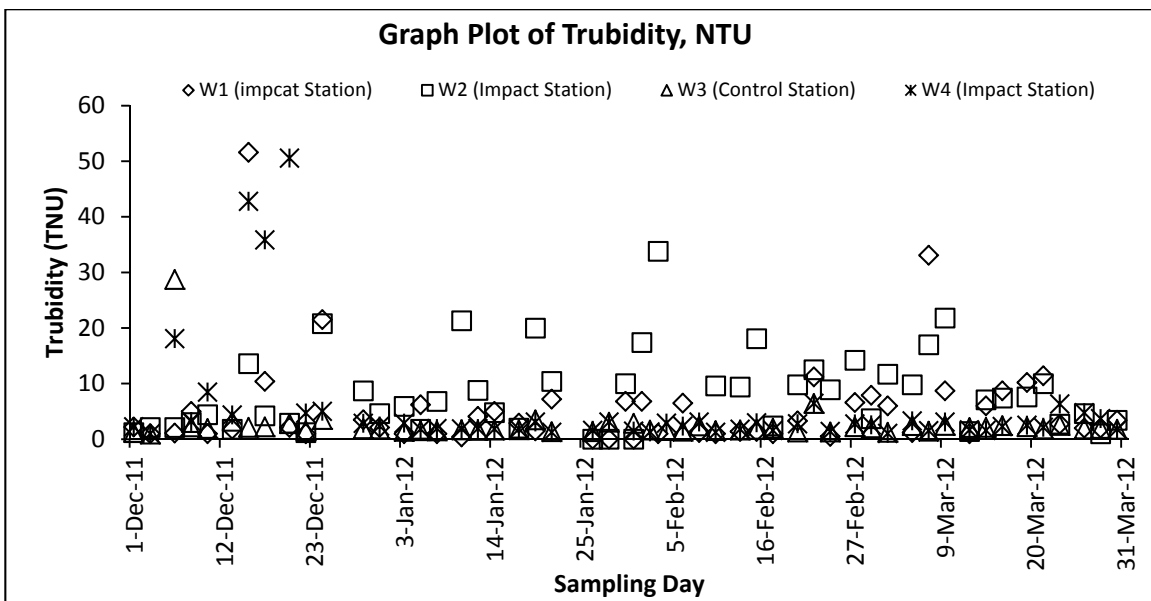
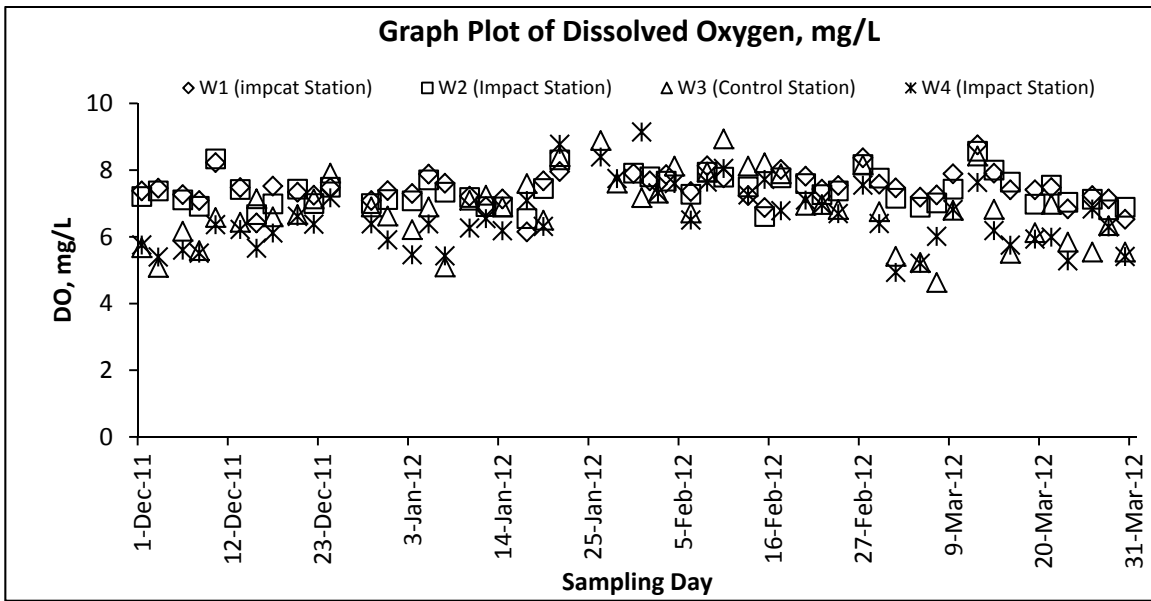


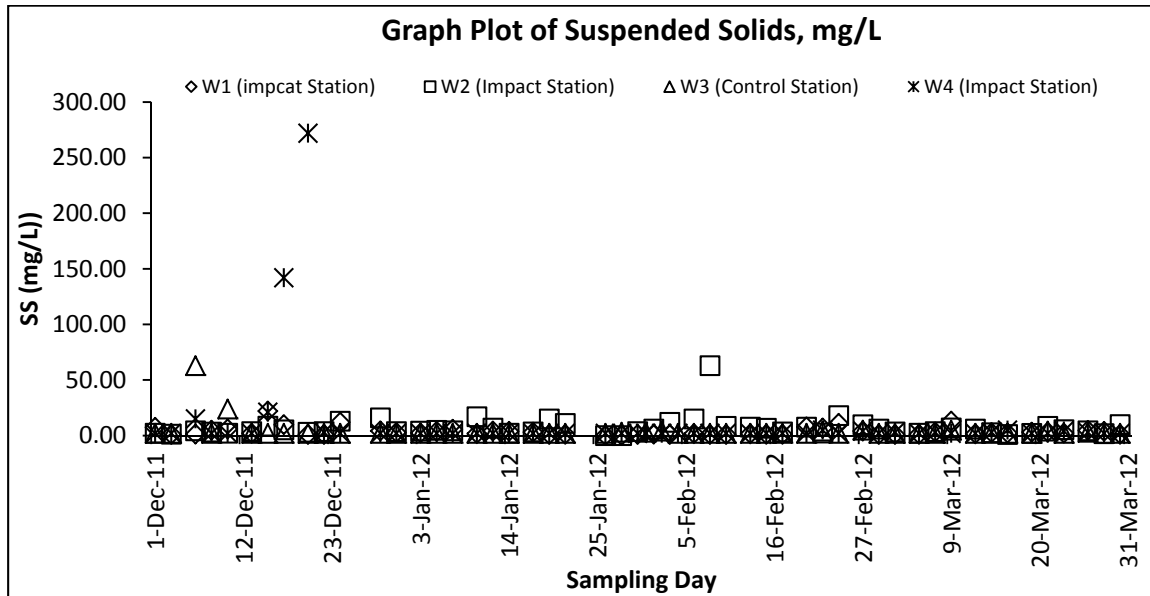
Remark: The monitoring is undertaken under free field situation. A façade correction of +3 dB(A) has been added according to acoustical principles and EPD guidelines



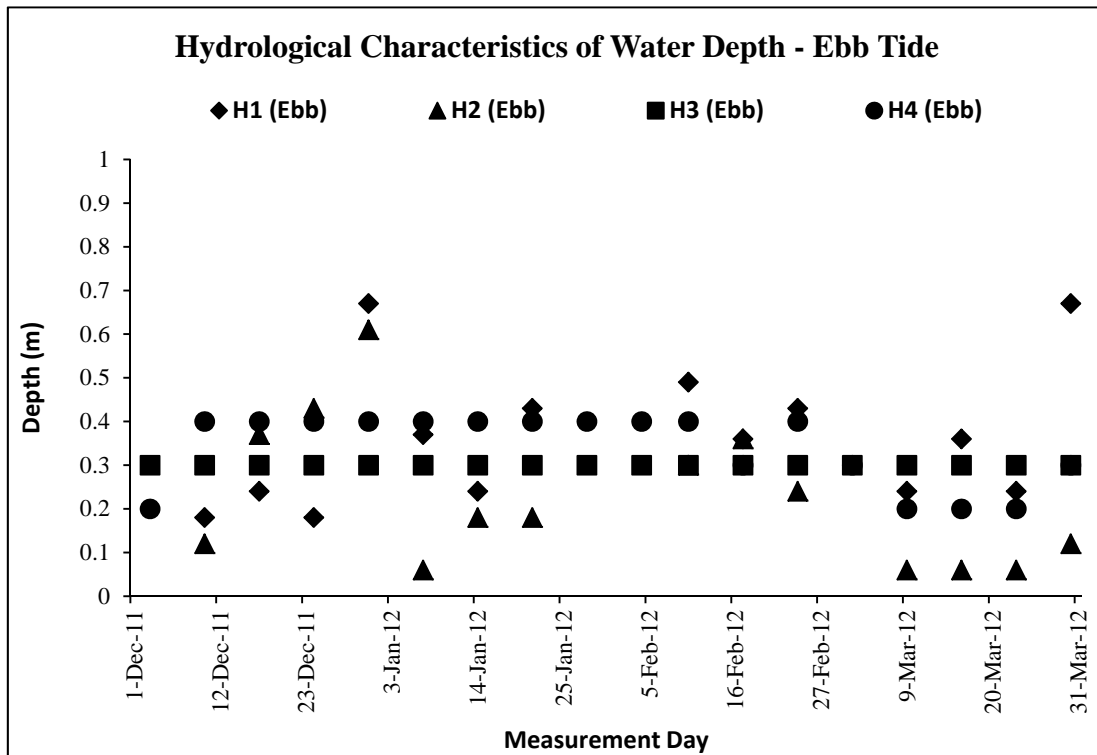
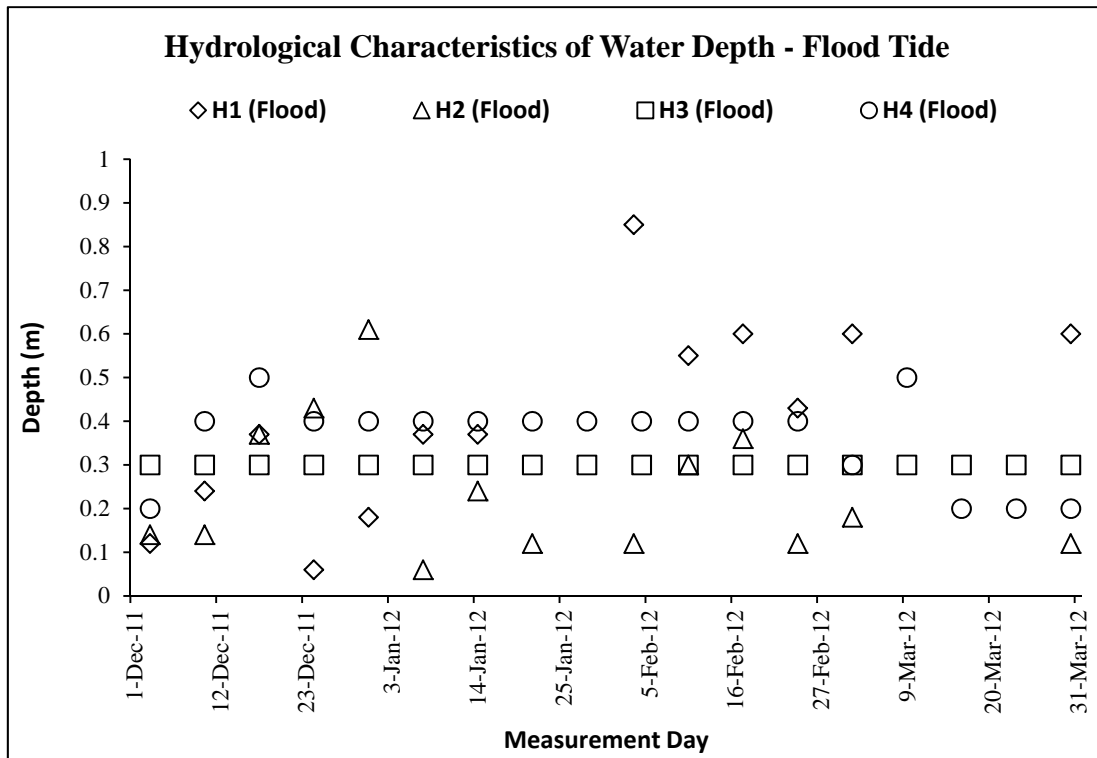
Remark: The monitoring is undertaken under free field situation. A façade correction of +3 dB(A) has been added according to acoustical principles and EPD guidelines

Graphic Plot – Water Quality

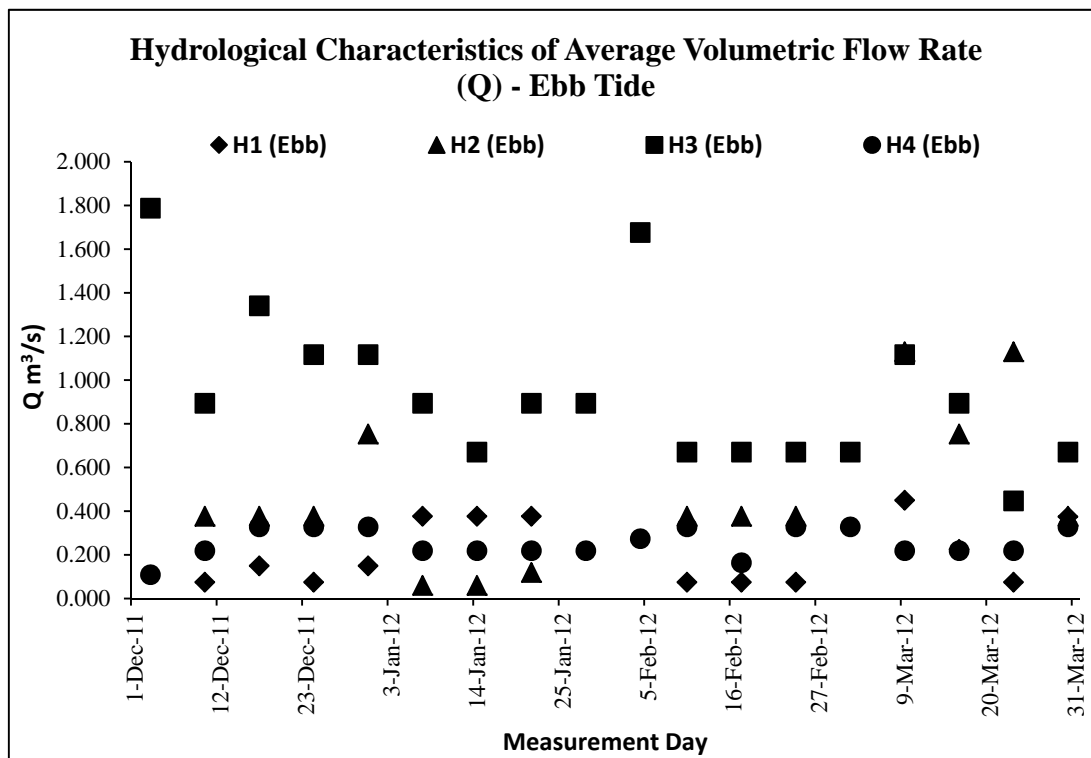
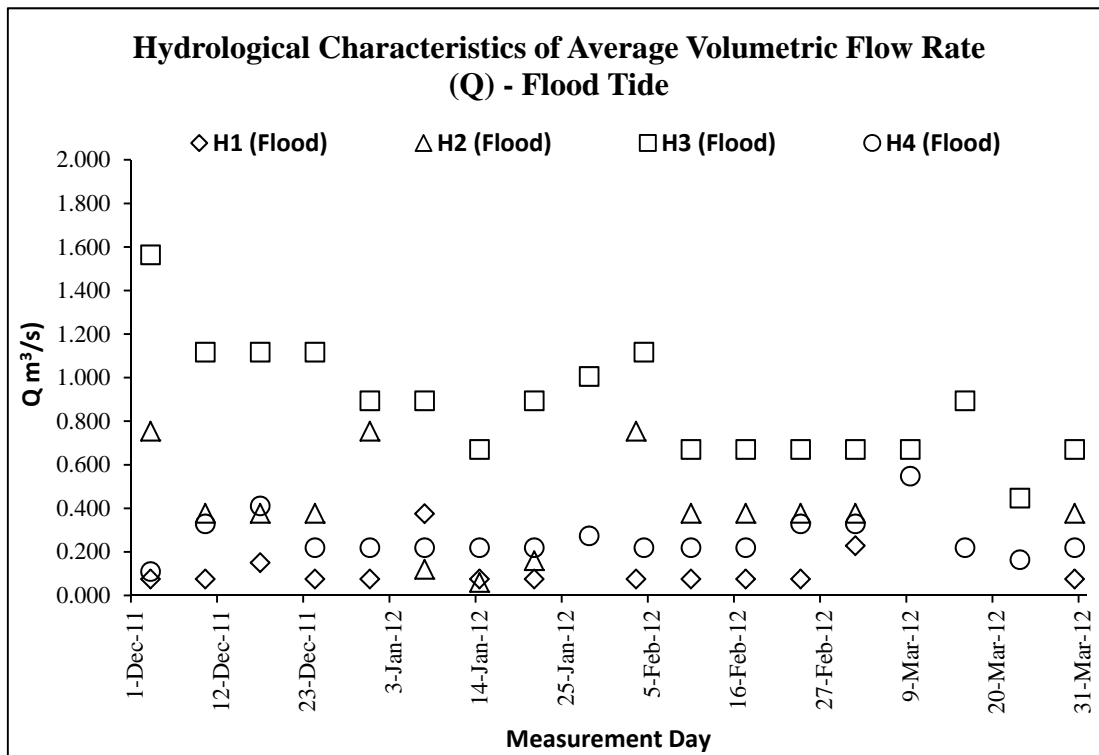




Graphic Plot – Hydrological Characteristics (Water Depth)



Graphic Plot – Hydrological Characteristics (Water Flow Rate)



Appendix F

Event and Action Plan

Event Action Plan for Construction Noise

EVENT	ACTION			
	ET Leader	IEC	ER	Contractor
Action Level	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 1. Review the analyzed 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 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing 2. Notify Contractor 3. Require Contractor to propose remedial measures for the analyzed noise problem 4. Check remedial measures are properly implemented. 	<ol style="list-style-type: none"> 1. Submit noise mitigation proposals to IEC 2. Implement noise mitigation proposals
Limit Level	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing 2. Notify Contractor 3. Require Contractor to propose remedial measures for the analyzed noise problem 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 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further 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

Event and action Plan for Water Quality

Event	ET Leader	IEC	ER	Contractor
ACTION LEVEL				
Action level being exceeded by one sampling day	<ol style="list-style-type: none"> Repeat in-situ measurements to confirm findings; Identify reasons for non-compliance and source(s) of impact; Inform IEC, Contractor and Engineer; Check monitoring data, all plant, equipment and Contractor's working methods; Discuss mitigation measures with IEC, Engineer and Contractor; Ensure mitigation measures are implemented. Repeat measurement on next day of exceedance. 	<ol style="list-style-type: none"> Discuss mitigation measures with ET, Engineer and Contractor; Review proposals on mitigation measures submitted by Contractor and advise the Engineer accordingly; Assess effectiveness of implemented mitigation measures. 	<ol style="list-style-type: none"> Discuss proposed mitigation measures with IEC, ET and Contractor; Make agreement on mitigation measures to be implemented; Assess effectiveness of implemented mitigation measures. 	<ol style="list-style-type: none"> Inform Engineer and confirm in writing notification of the non-compliance; Rectify unacceptable practice; Check all plant and equipment; Consider changes in working methods; Discuss with ET, IEC and Engineer and propose mitigation measures to IEC and Engineer within three working days; Implement agreed mitigation measures.
Action level being exceeded by more than two consecutive sampling days	<ol style="list-style-type: none"> Repeat in-situ measurements to confirm findings; Identify reasons for non-compliance and source(s) of impact; Inform IEC, Contractor and Engineer; Check monitoring data, all plant, equipment and Contractor's working methods; Discuss mitigation measures with IEC, Engineer and Contractor; Ensure mitigation measures are implemented. Prepare to increase the monitoring frequency to daily; Repeat measurement on next day of exceedance. 	<ol style="list-style-type: none"> Discuss mitigation measures with ET, Engineer and Contractor; Review proposals on mitigation measures submitted by Contractor and advise the Engineer accordingly; Assess effectiveness of implemented mitigation measures. 	<ol style="list-style-type: none"> Discuss proposed mitigation measures with IEC, ET and Contractor; Make agreement on mitigation measures to be implemented; Assess effectiveness of implemented mitigation measures. 	<ol style="list-style-type: none"> Inform Engineer and confirm in writing notification of the non-compliance; Rectify unacceptable practice; Check all plant and equipment; Consider changes in working methods; Discuss with ET, IEC and Engineer and propose mitigation measures to IEC and Engineer within three working days; Implement agreed mitigation measures
LIMIT LEVEL				
Limit level being exceeded by one sampling day	<ol style="list-style-type: none"> Repeat in-situ measurements to confirm findings; Identify reasons for non-compliance and source(s) of impact; Inform EPD, IEC, Contractor and Engineer; Check monitoring data, all plant, equipment and Contractor's working methods; Discuss mitigation measures with IEC, Engineer and Contractor; Ensure mitigation measures are implemented; Increase the monitoring frequency to daily until no exceedance of Limit Level. 	<ol style="list-style-type: none"> Discuss mitigation measures with ET, Engineer and Contractor; Review proposals on mitigation measures submitted by Contractor and advise the Engineer accordingly; Assess effectiveness of implemented mitigation measures. 	<ol style="list-style-type: none"> Discuss proposed mitigation measures with IEC, ET and Contractor; Request Contractor to critically review the working methods; Make agreement on mitigation measures to be implemented; Assess effectiveness of implemented mitigation measures. 	<ol style="list-style-type: none"> Inform Engineer and confirm in writing notification of the non-compliance; Rectify unacceptable practice; Check all plant and equipment; Consider changes in working methods; Discuss with ET, IEC and Engineer and propose mitigation measures to IEC and Engineer within three working days; Implement agreed mitigation measures.
Limit level being exceeded by more than two consecutive sampling days	<ol style="list-style-type: none"> Repeat in-situ measurements to confirm findings; Identify reasons for non-compliance and source(s) of impact; Inform EPD, IEC, Contractor and Engineer; Check monitoring data, all plant, equipment and Contractor's working methods; Discuss mitigation measures with IEC, Engineer and Contractor; Ensure mitigation measures are implemented. Increase the monitoring frequency to daily until no exceedance of Limit level for two consecutive days. 	<ol style="list-style-type: none"> Discuss mitigation measures with ET, Engineer and Contractor; Review proposals on mitigation measures submitted by Contractor and advise the Engineer accordingly; Assess effectiveness of implemented mitigation measures. 	<ol style="list-style-type: none"> Discuss proposed mitigation measures with IEC, ET and Contractor; Request Contractor to critically review the working methods; Make agreement on mitigation measures to be implemented; Assess effectiveness of implemented mitigation measures; 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. 	<ol style="list-style-type: none"> Inform Engineer and confirm in writing notification of the non-compliance; Rectify unacceptable practice; Check all plant and equipment; Consider changes in working methods; Discuss with ET, IEC and Engineer and propose mitigation measures to IEC and Engineer within three working days; Implement agreed mitigation measures; As directed by the Engineer, slow down or stop all or part of the construction activities until no exceedance of Limit level.

Event and action Plan for Hydrological Characteristics

Event	ET Leader	IEC	ER	Contractor
ACTION LEVEL				
Action level being exceeded by one sampling day	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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. Prepare to increase the monitoring frequency to daily; 8. Repeat measurement on next day of exceedance. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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				
Limit level being exceeded by one sampling day	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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 exceeded by more than two consecutive sampling days	<ol style="list-style-type: none"> 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 for two consecutive days. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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; 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. 	<ol style="list-style-type: none"> 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; 7. As directed by the Engineer, slow down or stop all or part of the construction activities until no exceedance of Limit level.

Appendix G

Monthly Summary Waste Flow Table

Name of Department: DSD

Contract No.: DC/2010/02

Monthly Summary Waste Flow Table for 2011 to 2012 (Year)

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 Note 3)	Chemical Waste	Others, e.g. general refuse
	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000 kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m ³)
Apr 2011	Nil	0	0	0	0	0	0	0	0	0	0
May 2011	Nil	0	0	0	0	0	0	0	0	0	0
June 2011	Nil	0	0	0	0	0	0	0	0	0	0
July 2011	Nil	0	0	0	0	0	0	0	0	0	0
Aug 2011	0.7855	0	0	0.7855	0	0	0	0	0	0	0
Sept 2011	Nil	0	0	0	0	0	0	0	0	0	0
Oct 2011	Nil	0	0	0	0	0	0	0	0	0	0.02
Nov 2011	Nil	0	0	0	0	0	0	0	0	0	0.045
Dec 2011	0.08	0	0	0	0.08	0	0	0	0	0	0
Jan 2012	Nil	0	0	0	0	0	0	0	0	0	0.01
Feb 2012	0.01	0	0	0	0.01	0	0	0	0	0	0.03
Mar 2012	0.405	0	0	0	0.405	0	0	0	0	0	0
Apr 2012											
June 2012											
July 2012											
Aug 2012											
Sept 2012											
Nov 2012											
Dec 2012											
Total	1.2805	0	0	0.7855	0.495	0	0	0	0	0	0.105

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 Note 3)	Chemical Waste	Others, e.g. general refuse
(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000 kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m ³)
23	1	10	0	10	2	5	2	1	1	3

Notes:

- (1) The performance targets are given in ETWB Technical Circular PS Clause 6(14).
- (2) The waste flow table shall also include C&D materials that are specified in the Contract to be imported for use at the Site.
- (3) Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material
- (4) The Contractor shall also submit the latest forecast of the total amount of C&D materials expected to be generated from the Works, together with a breakdown of the nature where the total amount of C&D materials expected to be generated from the Works is equal to or exceeding 50,000 m³. (ETWB Technical Circular PS Clause 5(4)(b) refers). [Delete Note (4) and the table above on the forecast, where inapplicable].

Summary Table for Work Processes or Activities Requiring Timber for Temporary Works

Contract No. : DC/2010/02

Contract Title : Drainage Improvement Works in Shuen Wan and Shek Wu Wai

Item No.	Description of Works Process or Activity [see note (a) below]	Justifications for Using Timber in Temporary Construction Works	Est. Quantities of Timber Used (m3)	Actual Quantities used (m3)	Remarks
1.	Formwork for concreting	Easy handle by manpower	1	0.7	
2.					
3.					
4.					
5.					
6.					
7.					
8.					
Total Estimated Quantity of Timber Used			1		

Notes:

- a. The Contractor shall list out all the work items requiring timber for use in temporary construction works. Several minor work items may be grouped into one for ease of updating.
- b. The summary table shall be submitted to the *Architect/Engineer's Representative monthly together with the Waste Flow Table for review and monitoring in accordance with the ETWB Technical Circular 19/2005 PS sub-clause 5(5) in Appendix C.