

PROJECT No.: TCS/00280/05

ISSUE No.: 1

**DRAINAGE SERVICES DEPARTMENT (DSD)
CONTRACT No. DC/2004/08**



**PENG CHAU SEWAGE TREATMENT WORKS
UPGRADE**

**MONTHLY ENVIRONMENTAL MONITORING AND
AUDIT (EM&A) REPORT – DECEMBER 2006**

PREPARED FOR

Acciona-ATAL Joint Venture (AAJV)

Quality Index

Date	Reference No.	Prepared by	Certified By
02 January 2006	TCS/00280/05/600/R0196	Ben Tam (Project Supervisor) 	Ken Wong (Project Environmental Team Leader) 

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BMT Asia Pacific Limited

09 January 2007
Our Ref: 8261/0331

By Post/email

CDM International Inc.,
4305-12 Metroplaza Tower 1,
223 Hing Fong Road, Kwai Fong,
Hong Kong

For the attention of Mr. Alfred Cheung

Dear Alfred,

RE: EM&A MONTHLY REPORT - DECEMBER 2006
Contract No. DC/2004/08 Upgrading of Peng Chau Sewage
Treatment Works

With reference to the final version of the EM&A monthly report for December 2006 received on 8th January 2006 (ET's ref.: TCS/00280/05/600/R0196 Issue 1), we have no critical comments on the mentioned report.

Thank you for your kind attention and should you require any further information, please do not hesitate to contact the undersigned at 2241 9807.

Yours sincerely

Antony Wong
Project Independent Environmental Checker
RBR/anw

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Executive Summary

Acciona-ATAL Joint Venture (AAJV) has been awarded the DSD Contract DC/2004/08 (Project) for the Peng Chau Sewage Treatment Works Upgrade in May 2005. The Project requires an Environmental Monitoring & Audit (EM&A) program to be implemented by an Environmental Team (ET) throughout the contract period in compliance with the requirements as stated in the project Environmental Permit (EP-203/2004) and the Project EM&A manual.

Action-United Environmental Services and Consulting (AUES) has been commissioned by AAJV to be an independent environmental team (ET) to implement the EM&A program in compliance with the EP and the project EM&A Manual.

This report presents the results of the project EM&A program for the reporting month **December 2006** during the period from 26 November to 25 December 2006.

EM&A Activities in the Reporting Period

A summary of the monitoring activities in this reporting period is listed below:

- | | |
|-------------------------|-----------|
| • 1-Hr TSP Monitoring | 15 Events |
| • 24-Hr TSP Monitoring | 5 Events |
| • Noise Monitoring | 5 Events |
| • Site Inspection Audit | 4 Times |

Air Quality

No exceedance in 1-Hr TSP and 24-Hr TSP measurements was recorded in this reporting period.

Construction Noise

No exceedance in construction noise measurements was recorded and no noise complaint was received in this reporting period.

Water Quality

Since all the marine based construction activities had been completed on 1 August 2006, post water monitoring was commenced on 2 August 2006 and completed on 1 September 2006 in accordance with Clause 4.32 of the EM&A Manual. All the measurement results at the control/impact stations were within the baseline range. The monitoring results were presented in the previous Monthly EM&A Report (September 2006)

Summary of Monitoring Exceedances

A summary of monitoring exceedances in the reporting period of air, noise and water quality monitoring are presented below:

Env. Quality	Parameters	Compliance %	Investigation & Corrective Actions
Air Quality	1-hour TSP	100	Not Required for 100% Compliance
	24-hour TSP	100	Not Required for 100% Compliance
Noise	Leq (30min) Daytime	100	Not Required for 100% Compliance
Water Quality*	-	-	-

Note: *No impact water quality monitoring was required since all marine based construction activities were completed on 01 August 2006.

Environmental Complaints

No environmental complaint was received in this reporting period.

Environmental Summon

No environmental summon was received in this reporting period.

Future Key Issues

The potential environmental impacts for this project generally include air quality, noise, water quality and construction waste. The contractor is to properly implement the required environmental mitigation measures as per the Implementation Schedule in the EM&A manual to ensure no significant adverse environmental impact arises from the construction works. The contractor was reminded to maintain good house-keeping throughout the construction period.

1.0 INTRODUCTION

- 1.01 Acciona-ATAL Joint Venture (AAJV) has been awarded the DSD Contract DC/2004/08 (Project) for the upgrading of Peng Chau Sewage Treatment Works in May 2005. The Project requires an Environmental Monitoring & Audit (EM&A) program to be implemented by an Environmental Team (ET) throughout the contract period in compliance with the requirements as stated in the project Environmental Permit (EP-203/2004) and the project EM&A manual. The location of the project site is presented in **Appendix A**.
- 1.02 The works to be executed under this project mainly comprise the following:
- Upgrade and reconstruct the existing Peng Chau Sewage Treatment Works (STW);
 - Construct an emergency overflow, storm tanks and submarine outfall;
 - Provide de-odourization facilities and associated sludge treatment facilities, and extend inlet pumping mains and construct an equalization tank;
 - Demolish the existing treatment facilities;
 - Construct sludge drying bed; and
 - Construct remaining works.
- 1.03 Action-United Environmental Services and Consulting (AUES) has been commissioned by AAJV to be the independent environmental team (ET) for implementation of the EM&A program in accordance with the requirements as set out in the EP and the project EM&A manual.
- 1.04 This report presents the results of the project EM&A program for the reporting month **December 2006** during the period from 26 November to 25 December 2006.

Report Structure

- 1.05 The EM&A report is structured into the following sections:
- Section 1** Introduction
 - Section 2** Project Organization and Construction Progress
 - Section 3** Summary of Monitoring Requirements
 - Section 4** Monitoring Methodology
 - Section 5** Monitoring Results
 - Section 6** Waste Management
 - Section 7** Site Inspection
 - Section 8** Environmental Complaint and Non-Compliance
 - Section 9** Implementation Status of Mitigation Measures
 - Section 10** Impact Forecast and Monitoring Schedule
 - Section 11** Conclusions

2.0 PROJECT ORGANIZATION AND CONSTRUCTION PROGRESS

2.1 Project Organization and Management Structure

The organization chart and lines of communication with respect to the on-site environmental management and monitoring program are shown in **Appendix B**.

2.2 Construction Progress

A summary of the major construction activities undertaken in this reporting period is shown in **Table 2-1**.

Table 2-1 Major Construction Activities in the Reporting Period

Location	Description of Construction Activities
Portion P	<ul style="list-style-type: none"> Trench excavation for the pumping main; and Backfilling for the Trial Pit TP 01.
Portion Q	Nil
Portion R	<ul style="list-style-type: none"> Excavating for the footing of NSTC and deliver excavated material to PCTF; Pour blinding concrete for NSTC; Cable draw pit construction; Cast-in pipes, drainages installation for the NSTC; Erecting formwork, scaffolding and bar fixing for NSTC; Concreting of the base slab, wall and roof slab of NSTC; Applying concrete protective coating to the internal wall of SBR Tank; Trench excavation and pipelaying for the pumping main; and Watertightness Test for the SBR Tank No.2.
Area A	Nil
Area B	<ul style="list-style-type: none"> Reinforcement bar bending for NSTC.
Area C	Nil

2.3 Summary of Environmental Submissions

A summary of the relevant permits, licences, and/or notifications on environmental protection for this Project in this reporting period is presented in **Table 2-2**.

Table 2-2 Status of Environmental Licenses and Permits

Item	Item Description	Permit Status
1	Environmental Permit No. : EP-203/2004	Issued at 30 Nov 2004
2	Air Pollution Control (Construction Dust)	Notified EPD on 17 Jun 2005
3	Water Pollution Control (Discharge Licence) EP890/W2/XE005	Valid to 30 Sep 2010
4	Chemical Waste Producer Registration WPN:5213-976-N2449-01	Registration on 03 Jun 2005
5	Construction Noise Permit(No. GW-RS0783-06)	From 01 Jan to 30 Jun 2007 (0000 to 2400 on general holidays, 0000 to 0700 and 1900 to 2400 on any days not being a general holiday)
6	Marine Dumping Permit (No. EP/MD/06-021)	Expired
7	Exemption for site concrete batching plant licence	Issued at 21 Oct 2005
8	Exemption Account for Disposal of Construction Waste (Account Number : 5000577)	Valid until 27 Sep 2008

3.0 SUMMARY OF IMPACT MONITORING REQUIREMENTS

- 3.01 Environmental monitoring and audit requirements are set out in the project EM&A manual. Air, marine water and construction noise have been identified to be the key environmental issues during the construction phase of the project.
- 3.02 A summary of the EM&A requirements for air quality, marine water quality and construction noise monitoring are shown in **Table 3-1**. The designated locations of the air quality, noise and marine water monitoring stations are shown in **Appendix C**.

Table 3-1 Summary of EM&A Requirements

Environmental Aspect	Monitoring Parameters	
Air Quality	1-Hr TSP	
	24-Hr TSP	
Construction Noise	Leq _(30min) during normal working hours	
	Supplementary L ₁₀ and L ₉₀ for reference.	
Marine Water Quality	<ul style="list-style-type: none"> • Dissolved Oxygen (DO); • Temperature; • Turbidity; • pH; 	<ul style="list-style-type: none"> • Salinity; • Suspended Solids (SS); • Ammonia Nitrogen; and • Total Inorganic Nitrogen.

- 3.03 Air monitoring is carried out once every six days for 24-Hr TSP and 3 times every six days for 1-Hr TSP at the designated monitoring station.
- 3.04 Noise monitoring is conducted once every six days at the designated monitoring station. Measurements of Leq_(30min) shall be taken between 0700 and 1900 with supplementary L₁₀ and L₉₀ data will be collected.
- 3.05 Marine water monitoring is carried out 3 times every week at 4 designated monitoring stations (2 Control stations and 2 Impact stations) in the course of marine work.
- 3.06 The impact water quality monitoring program shall be conducted during the course of marine based construction activities of the Project.
- 3.07 A summary of the Action/Limit (A/L) Levels for air quality, marine water quality and construction noise is shown in **Tables 3-2, 3-3 and 3-4**.

Table 3-2 Action and Limit Levels for Air Quality

Monitoring Location	Action Level ($\mu\text{g}/\text{m}^3$)		Limit Level ($\mu\text{g}/\text{m}^3$)	
	1-Hr TSP	24-Hr TSP	1-Hr TSP	24-Hr TSP
AN1	346	163	500	260

Table 3-3 Action and Limit Levels for Construction Noise

Parameter	Action Level in dB(A)	Limit Level in dB(A)
0700-1900 hrs on normal weekdays	When one or more documented complaints are received	> 75 dB(A)

Table 3-4 Action and Limit Levels for Marine Water Quality

Parameter		Action	Limit
DO mg/L	Surface & Mid-depth	4.1	3.9
	Bottom	3.3	2.0
Turbidity, NTU		6.2 or 120% of upstream control station's SS at the same tide of the same day.	7.5 or 130% of upstream control station's SS at the same tide of the same day.
SS, mg/L		17.6 or 120% of upstream control station's SS at the same tide of the same day.	20.2 or 130% of upstream control station's SS at the same tide of the same day.
NH3-N, mg/L		0.16	0.22
TIN, mg/L		0.91	0.94
E.Coli, cfu/100mL		374	610

3.08 The Event Action Plan of air, noise and water quality has been implemented for this project. Details of the Event Action Plan was presented in the First Impact EM&A report.

4.0 IMPACT MONITORING METHDOLOGY

MONITORING LOCATIONS

4.01 There is one designated air and noise monitoring location and four (4) designated water quality monitoring stations. Their locations are shown in **Tables 4-1** and **4-2** and geographically in **Appendix C**.

4.02 Owing to the residents' refusal of providing access to the designated air and noise locations, an alternative air and noise monitoring station was proposed and was approved by EPD (Ref: (2) EP2/N9/F/93 IV) on 14 July 2005. The approved alternative air and noise station is located at the abutment (Portion P) within the site boundary next to the sensitive receiver Sea Crest Villa.

Table 4-1 Location of Air Quality and Noise Monitoring Station

Station ID	Description
AN1	Abutment at Portion P next to Sea Crest Villa

Table 4-2 Locations of Water Quality Monitoring Stations

Station	Description	Easting	Northing
W1	Predicted Dredging Non-Impact Zone	821279.0	816452.1
W2	Live Coral Area	821573.2	816769.7
C1	Control Station	821919.0	817155.0
C2	Control Station	821443.2	816257.4

4.03 The installation of a wind monitoring station at the sensitive receivers or site offices was confirmed impractical. Use of meteorological data provided by the Peng Chau Station of the Hong Kong Observatory (HKO) has been adopted in this project since September 2005.

MONITORING FREQUENCY AND PERIOD

1-Hr TSP Monitoring

4.04 All 1-Hr TSP monitoring was conducted at the EPD-approved alternative station three times every 6 days. A total of 15 monitoring events were carried out in this reporting period.

24-Hr TSP Monitoring

4.05 All 24-Hr TSP monitoring was conducted at the EPD-approved alternative station once every six days. Total 5 monitoring events were carried out in this reporting period.

Noise Monitoring

4.06 Impact noise monitoring was undertaken at the EPD-approved alternative station weekly. A total of 5 monitoring events were carried out in this reporting period.

Marine Water Quality Monitoring

4.07 Since the submarine work was completed on 01 August 2006, therefore no impact water quality monitoring had been undertaken in this reporting period. According to the EM&A Clause 4.32, post water quality monitoring had been conducted from 02 August 2006 to 01 September 2006. All the measurement results at the control/impact stations were within the baseline range. The monitoring results were presented in the pervious Monthly EM&A Report (September 2006).

MONITORING EQUIPMENT

4.08 The monitoring equipment used by the ET in the EM&A program is presented in the following table:

Table 4-3 Monitoring Equipment Used in EM&A Program

Parameters	Monitoring Equipment	
Marine Quality	Dissolved Oxygen	YSI 85
	Temperature	YSI 85
	Turbidity	HACH 2100P
Air Quality	1-Hr TSP	Sibata LD-3
	24-Hr TSP	Tisch High Volume Sampler 515N
Noise	Leq30	B&K Type 2238
	On-site Calibration	B&K Type 4231

24-Hr TSP Monitoring

- 4.09 24-Hr TSP monitoring was carried out by a High Volume Sampler (HVS) in compliance with the project EM&A Manual. The HVS employed complied with the PS specifications including.
- Power supply of 220v/50 hz for 24-hour continuous operation;
 - 0.6-1.7 m³/min (20-60 SCFM) adjustable flow rate;
 - A 7-day mechanical timer for 24-hour operation;
 - An elapsed time indicator with ± 2 minutes accuracy for 24-Hr operation;
 - Minimum exposed area of 63 in²;
 - Flow control accuracy of $\pm 2.5\%$ deviation over 24-Hr operation;
 - An anodized aluminum shelter to protect the filter and sampler;
 - A motor speed-voltage control to control mass flow rate with accuracy of $\pm 2.5\%$ deviation over 24-hr sampling period;
 - Provision of a flow recorder for continuous monitoring;
 - Provision of a peaked roof inlet;
 - Incorporation with a manometer; and
 - An 8"x10" stainless steel filter holder to hold, seal and easy to change the filter paper.
- 4.10 The filter papers used in 24-Hr TSP monitoring were of size 8"x10" and provided by a local HOKLAS-accredited laboratory, ALS Techichem Pty (HK) Limited (HOKLAS No. 66). The filters papers after measurements were returned to the laboratory for the required treatment and analysis.

1-Hr TSP Monitoring

- 4.11 Measurements of 1-Hr TSP monitoring were taken by a Sibata LD-3 Laser Dust Meter that is a portable and battery-operated laser photometer capable of performing real time 1-Hr TSP measurements. A comparison test with HVS was carried out prior to baseline monitoring in compliance with the EM&A requirements and a conversion factor for direct reading of the dust meter has been established.

WIND DATA MONITORING

- 4.12 The installation of a wind monitoring station at the sensitive receivers or site offices was confirmed impractical. The meteorological data for this project has been provided by the Hong Kong Observatory (HKO) Peng Chau Station upon IEC & EPD approval.

Noise Monitoring

- 4.13 Noise measurements were taken in terms of the A-weighted equivalent sound pressure level (Leq) measured in decibels (dB). Supplementary statistical results such as L₁₀ and L₉₀ were also obtained for reference.

- 4.14 Hand-held sound level meters (B&K Model 2238) and associated acoustical calibrators in compliance with the International Electrotechnical Commission (IEC) Publication 651:1979 (Type 1) and 804:1985 (Type 1) specification were used for taking the impact noise measurements.
- 4.15 Windshield was fitted in all measurements. All noise measurements were made with the meter set to FAST response and on the A-weighted equivalent continuous sound pressure level (Leq).
- 4.16 No noise measurement was carried out in the presence of fog, rain, wind with a steady speed exceeding 5 m/s or wind with gusts exceeding 10 m/s.

Marine Water Quality Monitoring

- 4.17 The marine water quality monitoring was carried out in compliance with the project EM&A requirements. Monitored parameters include Dissolved Oxygen (DO), Temperature, Turbidity, Salinity, pH, Suspended Solids (SS) and Total Inorganic Nitrogen (TIN).
- 4.18 DO, temperature, turbidity, pH and salinity were measured in-situ whereas SS and TIN were determined in a HOKLAS accredited laboratory.
- 4.19 Marine water quality monitoring was conducted during mid-ebb and mid-flood at specified depths in compliance with the project EM&A Manual. Duplicate in-situ measurements were taken and duplicate samples were collected in accordance with HOKLAS requirements for QA/QC purposes.

LABORATORY MEASUREMENT/ANALYSIS

- 4.20 Analyses of SS, TIN and ammonia nitrogen were carried out by a local HOKLAS-accredited laboratory, ALS Techichem Pty (HK) Limited (HOKLAS No. 066). The specified testing services provided by ALS as shown in **Table 4-4** are accredited under the HOKLAS Scheme.

Table 4-4 Analytical Methods Applied to Marine Water Quality Samples

Determinant	Standard Method	Detection Limit
Suspended Solids (mg/L)	ALS Method EA-025	2.0 mg/L
Total Inorganic Nitrogen (mg/L)	ALS Method EK-055A	0.01 mg/L
Ammonia Nitrogen (mg/L)	ALS Method EK-055A	0.01 mg/L

EQUIPMENT CALIBRATION

- 4.21 Initial calibration of the HVS was performed upon installation and thereafter at bi-monthly intervals in accordance with the manufacturer's instruction using the NIST-certified standard calibrator. The calibration data are properly documented and the records are maintained by ET for future reference.

- 4.22 The 1-Hr TSP meter was calibrated by the supplier prior to purchase. Zero response of the equipment is checked before and after each monitoring event. A comparison test was carried out with a HVS. A conversion factor (K) of 4.0 was generated in accordance with the equipment manufacturer's instruction. The meter counts in minutes multiplied by the conversion factor will generate the equivalent dust concentration by HVS.
- 4.23 The sound level meters are calibrated using an acoustic calibrator prior to and after measurements. The meters are regularly calibrated in accordance with the manufacturer's instructions. Prior to and following each noise measurement, the accuracy of the sound level meter was checked using an acoustic calibrator generating a known sound pressure level at a known frequency. Measurements are considered valid only if the calibration levels before and after the noise measurement agree to within 1.0 dB.
- 4.24 All in-situ water monitoring instruments are checked, calibrated and certified by a HOKLAS accredited laboratory before use and subsequently re-calibrated at 3-monthly intervals. Responses of sensors and electrodes are checked with standard solutions before each use.
- 4.25 The calibration certificates of the monitoring equipment used during the impact monitoring program are attached in **Appendix D**.

DATA MANAGEMENT AND DATA QA/QC CONTROL

- 4.26 The impact monitoring data are handled by the ET's systematic data recording and management, which complies with in-house certified (ISO 9001:2000) Quality Management System. Standard Field Data Sheets (FDS) are used in the impact monitoring program.
- 4.27 The monitoring data recorded in the equipment e.g. 1-Hr TSP meters and noise meters 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.
- 4.28 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.

5.0 IMPACT MONITORING RESULTS

5.01 The impact EM&A program was carried out by the ET in compliance with the project EM&A Manual in this reporting period. The impact monitoring schedules are presented in **Appendix E** and the monitoring results are detailed in the following sub-sections.

AIR QUALITY

5.02 The impact air quality monitoring data is summarized in **Tables 5-1**. Graphical plots of the 24-Hr TSP and 1-Hr TSP results are shown in **Appendix F** respectively.

Table 5-1 Summary of 24-Hr and 1-Hr TSP Monitoring Results

Monitoring Date	24-Hr TSP ($\mu\text{g}/\text{m}^3$)	1-Hr TSP Monitoring Results ($\mu\text{g}/\text{m}^3$)				
		Monitoring Date	Start Time	1 st Result	2 nd Result	3 rd Result
27-Nov-06	84	27-Nov-06	9:47	194	202	187
2-Dec-06	83	2-Dec-06	9:48	102	98	115
8-Dec-06	78	8-Dec-06	10:01	36	32	41
14-Dec-06	33	14-Dec-06	13:52	37	40	52
20-Dec-06	78	20-Dec-06	13:04	51	48	55
Action Level	163	-		346		
Limit Level	260	-		500		

Note: * Exceedances are in bold.

5.03 No exceedance in 1-Hr TSP and 24-Hr TSP measurements was recorded in this reporting period.

5.04 The meteorological data during the monitoring period are summarized in **Appendix G**.

NOISE

5.05 The impact noise monitoring results are summarized in **Table 5-2**. Graphical plots of the monitoring data are presented in **Appendix F**.

Table 5-2 Summary of Noise Monitoring Results

Date	Start Time	1st Leq5	2nd Leq5	3rd Leq5	4th Leq5	5th Leq5	6th Leq5	Leq30	Corrected* Leq30	
27-Nov-0	9:46	73.6	64.1	72.4	70.1	71.6	69.4	71.0	74	
2-Dec-06	9:49	71.4	72.4	72.7	70.8	71.4	72.6	71.9	75	
8-Dec-06	10:00	71.9	68.9	71.7	71.0	71.9	73.1	71.6	75	
14-Dec-06	13:54	58.4	59.4	50.8	62.7	59.9	60.8	59.8	63	
20-Dec-06	11:17	55.1	57.2	59.0	54.5	58.7	56.6	57.2	60	
Limit Level		-						-	> 75 dB(A)	

Note: * A façade correction of +3 dB(A) has been added according to acoustical principles and EPD guidelines.

MARINE WATER QUALITY

5.06 No impact water quality monitoring was required in this reporting period since all marine based construction works had been completed on 01 August 2006.

5.07 Based on the Project EM&A Manual Clause 4.32 requirement, the post water quality monitoring had been conducted from 02 August 2006 to 01 September 2006. All the measurement results at the control/impact stations were within the baseline range. The monitoring results were presented in the pervious Monthly EM&A Report (September 2006).

6.0 WASTE MANAGEMENT

6.01 The waste management carried by ET was performed on 20 December 2006 in this reporting period, no observation was recorded.

RECORDS OF WASTE QUANTITIES

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

- Excavated material;
- Construction & demolition (C&D) material;
- Chemical waste; and
- General refuse.

6.03 The quantities of waste for disposal in this reporting period are summarized in **Tables 6-1** and **6-2**. Whenever possible, materials were reused on-site as far as practicable.

Table 6-1 Summary of Quantities of Waste for Disposal

Type of Waste	Quantity	Disposal Location
Excavated Material (Spent lube oil) (Liters)	-	N/A
Empty Site Vehicle Batteries (Nos.)	-	N/A
Excavated material (Uncontaminated) (m ³)	5.86 m ³	Peng Chau Transfer Facility
Broken Rock (m ³)	-	Peng Chau Transfer Facility
Construction & Demolition Material (Inert) (tons)	15.53 tons	Peng Chau Transfer Facility
Construction & Demolition Material (Non-Inert) (tons)	-	N/A
Asbestos C&D Materials (m ³)	-	N/A
Chemical Waste (Liters)	-	N/A
Wastewater Collected for Off-site Treatment (m ³)	-	N/A
General Refuse (tons)	-	Peng Chau Transfer Facility
Dredged Materials (m ³)	-	N/A

Table 6-2 Summary of Quantities of Recycling Materials

Type of Waste	Quantity	Disposal Location
Recycled Metal (kg)	-	NA
Recycled Paper (kg)	-	NA
Recycled Plastic (kg)	-	NA

7.0 SITE INSPECTION

- 7.01 Representatives of the Engineer and the Contractor carried out joint site inspection every week to evaluate the site environmental performance. The monthly IEC site audit was carried out on 29 December 2006. No non-compliance was noted and some observations were made on general site housekeeping.
- 7.02 Details of the observations and recommendations were recorded during the joint site inspection as follows:
- The latest environmental training was Aug 2006. The Contractor was suggested to provide updated environmental training to their staff and sub-contractors such as spillage drill and dust control;
 - The Contractor was reminded to cover dusty stockpiles/materials including cement and sand after used;
 - The Contractor had installed shelters for the concrete mixers;
 - The Contractor was suggested to further improve the house keeping of the iron bending area;
 - The Contractor was reminded to properly treat the wastewater satisfying the discharge standards before discharging; and
 - As advised by the Contractor, no truck would go outside the site boundary and the trucks would be well washed before running on the paved road on-site.

8.0 ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE

ENVIRONMENTAL COMPLAINT AND PROSECUTION

- 8.01 No environmental complaint was received in this reporting period. The statistical summary table of environmental complaint is presented in **Table 8-1**.
- 8.02 No environmental prosecution and summon was received in this reporting period.

Table 8-1 Statistical Summary of Environmental Complaints

Reporting Month	Complaint Statistics		
	Frequency	Cumulative	Complaint Nature
August – December 2005	0	0	NA
January 2006	0	0	NA
February 2006	0	0	NA
March 2006	0	0	NA
April 2006	0	0	NA
May 2006	0	0	NA
June 2006	0	0	NA
July 2006	0	0	NA
August 2006	0	0	NA
September 2006	0	0	NA
October 2006	0	0	NA
November 2006	0	0	NA
December 2006	0	0	NA

9.0 IMPLEMENTATION STATUS OF MITIGATION MEASURES

9.01 AAJV has been implementing the required environmental mitigation measures according to the project Mitigation Implementation Schedule. The implementation schedule with mitigation measures is presented in the First Impact EM&A report.

9.02 A summary of environmental mitigation measures generally implemented by AAJV in this reporting period is presented as follows;

Water Quality

- Wastewater were appropriately treated by treatment facilities;
- Drainage channels were provided to convey run-off into the treatment facilities;
- Drainage systems were regularly and adequately maintained.

Landscaping

- Tree protection measures were provided to existing trees;
- No tree was unnecessarily lopped or felled.

Air Quality

- Vehicles were cleaned of mud and debris before leaving the site;
- Site vehicles were limited to within 15 km/hr;
- Public roads around the site entrance/exit had been kept clean and free from dust;
- Dust suppression measures were properly provided to reduce dust emission from stockpile.

Noise

- Works and equipment were located to minimise noise nuisance from the nearest sensitive receiver;
- Idle equipments were either turned off or throttled down;
- Some of the Powered Mechanical Equipments were covered or shielded by appropriate acoustic materials if practicable.

Waste and Chemical Management

- Wastes were properly segregated into inert and non-inert in appropriate containers/areas;
- Excavated materials were reused where practicable.
- A chemical waste storage area had been provided on site;

General

- The site was generally kept tidy and clean.

10.0 IMPACT FORECAST

KEY ISSUES FOR THE COMING MONTH

10.01 Key issues to be considered in the coming month include:

- Implementation of dust suppression measures at all times;
- Potential marine water quality impact due to construction works near the seafront;
- Potential fugitive dust quality impact due to dry/windy season (November to March) from the dry/loose/exposure soil surface/dusty material;
- Disposal of empty engine oil containers within site area;
- Ensure dust suppression measures are implemented properly;
- Sediment catch-pits and silt removal facilities should be regularly maintained;
- Management of chemical wastes;
- Follow-up of improvement on general waste management issues; and
- Implementation of construction noise preventative control measures.

10.02 The tentative 3-month rolling program is presented in **Appendix H**.

11.0 CONCLUSION

11.01 The EM&A program in December 2006 was undertaken in compliance with the EM&A manual for the Peng Chau Sewage Treatment Works Upgrade. A summary of environmental compliance of air, noise and water quality in this reporting period are presented as follows:

Summary of the Exceedances for Impact Monitoring

Env. Quality	Parameters	Compliance %	Investigation & Corrective Actions
Air Quality	1-hour TSP	100	Not Required for 100% Compliance
	24-hour TSP	100	Not Required for 100% Compliance
Noise	Leq (30min) Daytime	100	Not Required for 100% Compliance
Water Quality*	-	-	-

Note: *No impact water quality monitoring was required since all marine based construction activities were completed on 01 August 2006.

11.02 No exceedance in 1-Hr TSP and 24-Hr TSP measurements was recorded in this reporting period.

11.03 All noise levels measured at AN1 were below the Limit level and no complaint was received in this reporting period.

11.04 No impact water quality monitoring was required in this reporting period during the course of marine works completed on 01 August 2006.

11.05 Based on the EM&A Manual Clause 4.32, the post water quality monitoring was carried out from 02 August 2006 to 01 September 2006. All the monitoring results in the control/impact stations were within the baseline range. The monitoring results and graphical plot were present in pervious Monthly EM&A Report (September 2006).

11.06 No environmental complaint or summon was received in this reporting period.

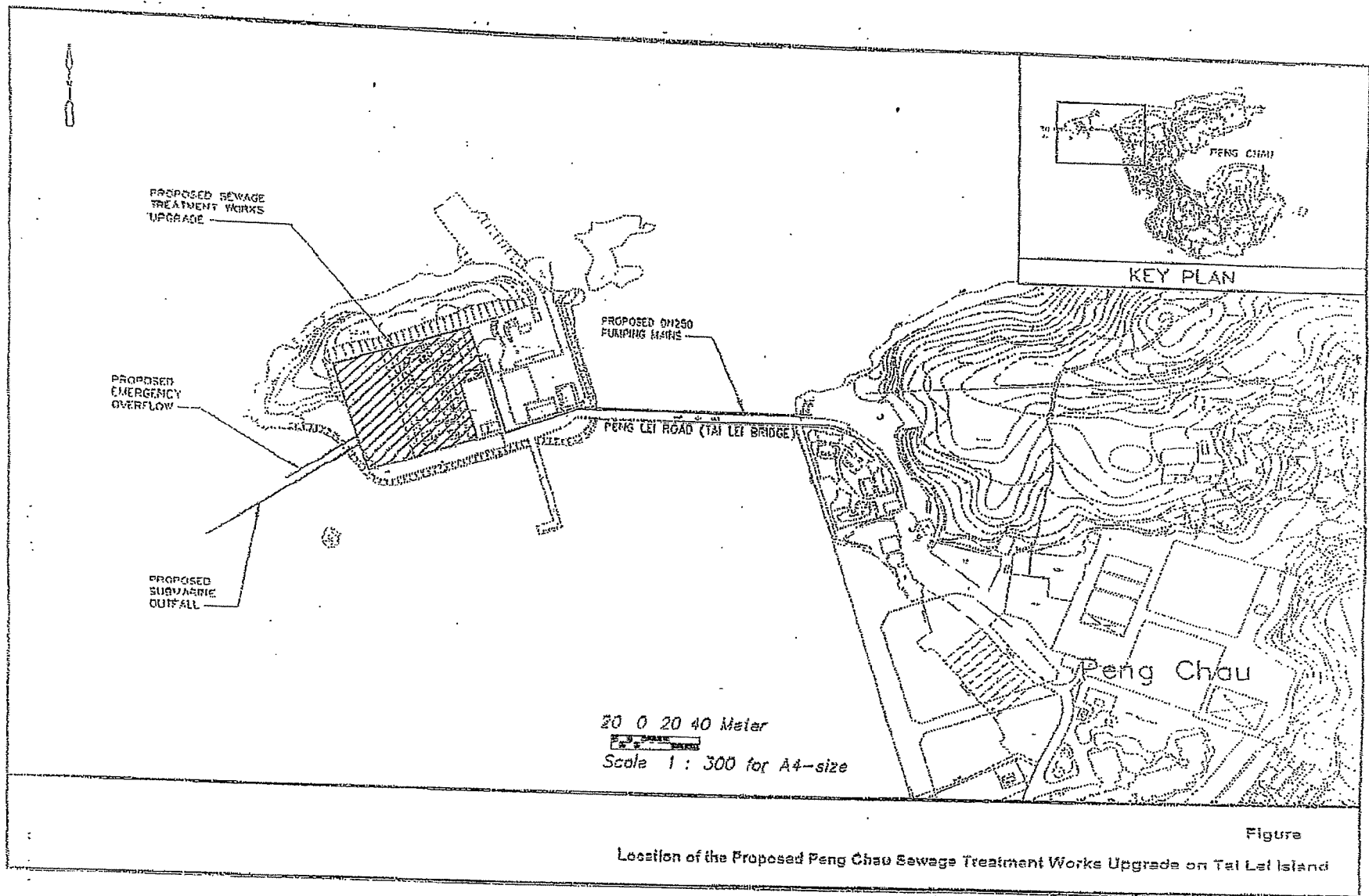
RECOMMENDATIONS

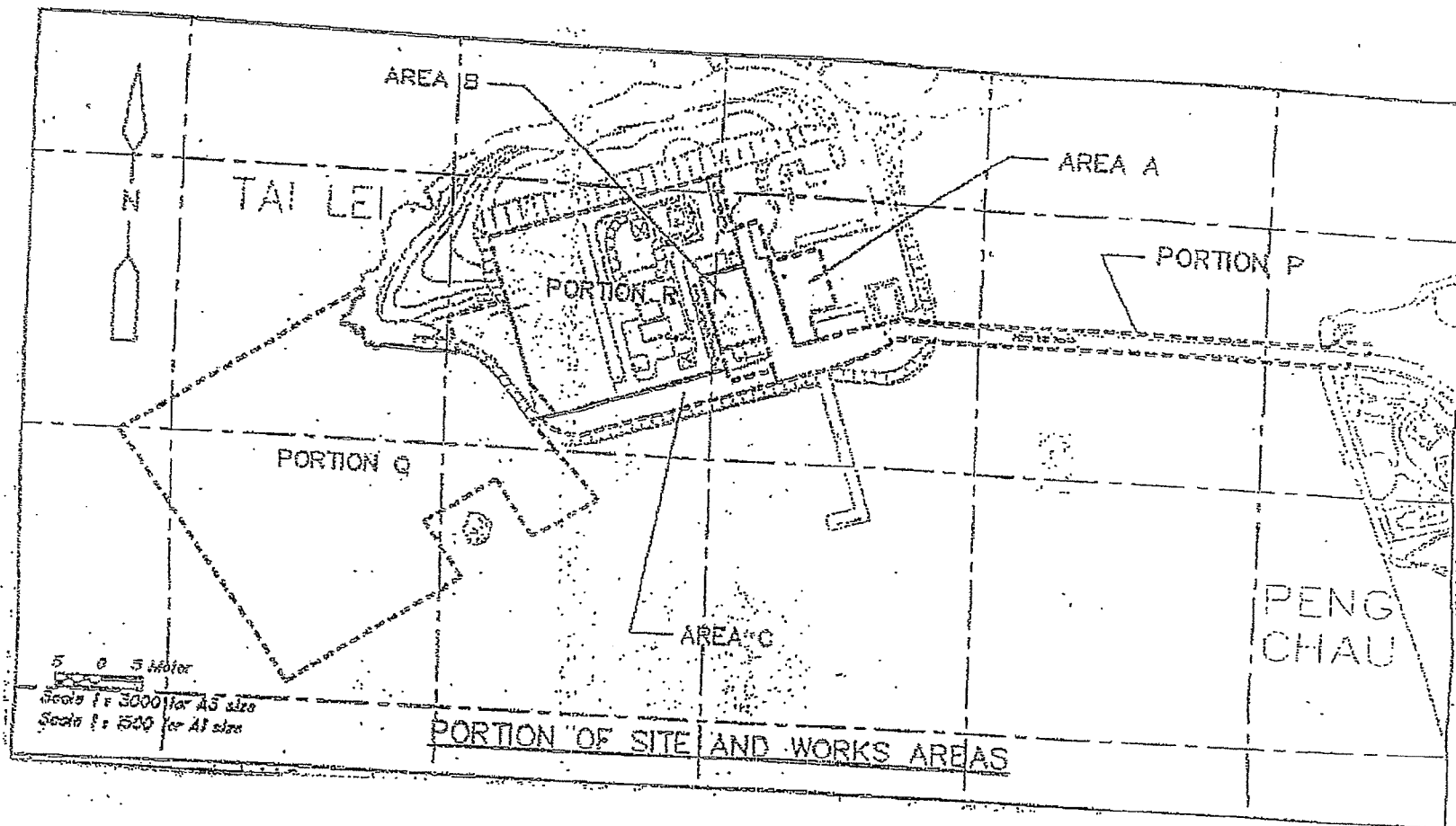
11.07 Based on the IEC site inspection records on 29 December 2006, the following key recommendations are pertinent:

- The latest environmental training was Aug 2006. The Contractor was suggested to provide updated environmental training to their staff and sub-contractors such as spillage drill and dust control;
- The Contractor was reminded to cover dusty stockpiles/materials including cement and sand after used;
- The Contractor had installed shelters for the concrete mixers;
- The Contractor was suggested to further improve the house keeping of the iron bending area;
- The Contractor was reminded to properly treat the wastewater satisfying the discharge standards before discharging; and
- As advised by the Contractor, no truck would go outside the site boundary and the trucks would be well washed before running on the paved road on-site.

11.08 The ET will continue to implement the EM&A program and audit the implementation of the environmental mitigation measures.

Appendix A
Project Site Layout





Appendix B

Environmental Organization Structure

Contact Details of Key Personnel

Organization	Project Role	Designation	Name of Key Staff	Tel No.	Fax No.
DSD	Employer	Permit Holder	Ir. David Leung	2594-7281	2827-8526
CDM	Engineer's Representative	Project Engineer	Mr. Stephen Ng	2428-2332	2424-9114
		Resident Engineer	Mr. Alfred Cheung	2983-9303	2983-9843
		ARE	Mr. Alex Yeung	2983-9303	2983-9843
BMT Asia	Independent Environmental Checker	IEC	Mr. Antony Wong	2815-2221	2815-3377
		IEC'S Representative	Mr. Benny Ng	2815-2221	2815-3377
Acciona-ATAL	Main Contractor	Project Manager	Mr. William Chan	2983-0092	2983-0381
		Site Agent	Mr. Mingo Li	2983-0092	2983-0381
AUES	Contractor's Environmental Team	Environmental Team Leader (ETL)	Mr. Ken Wong	2959-6059	2959-6079
		Project Supervisor	Mr. Benjamin Tam	2959-6059	2959-6079

Appendix C

Locations of Designated Monitoring Stations

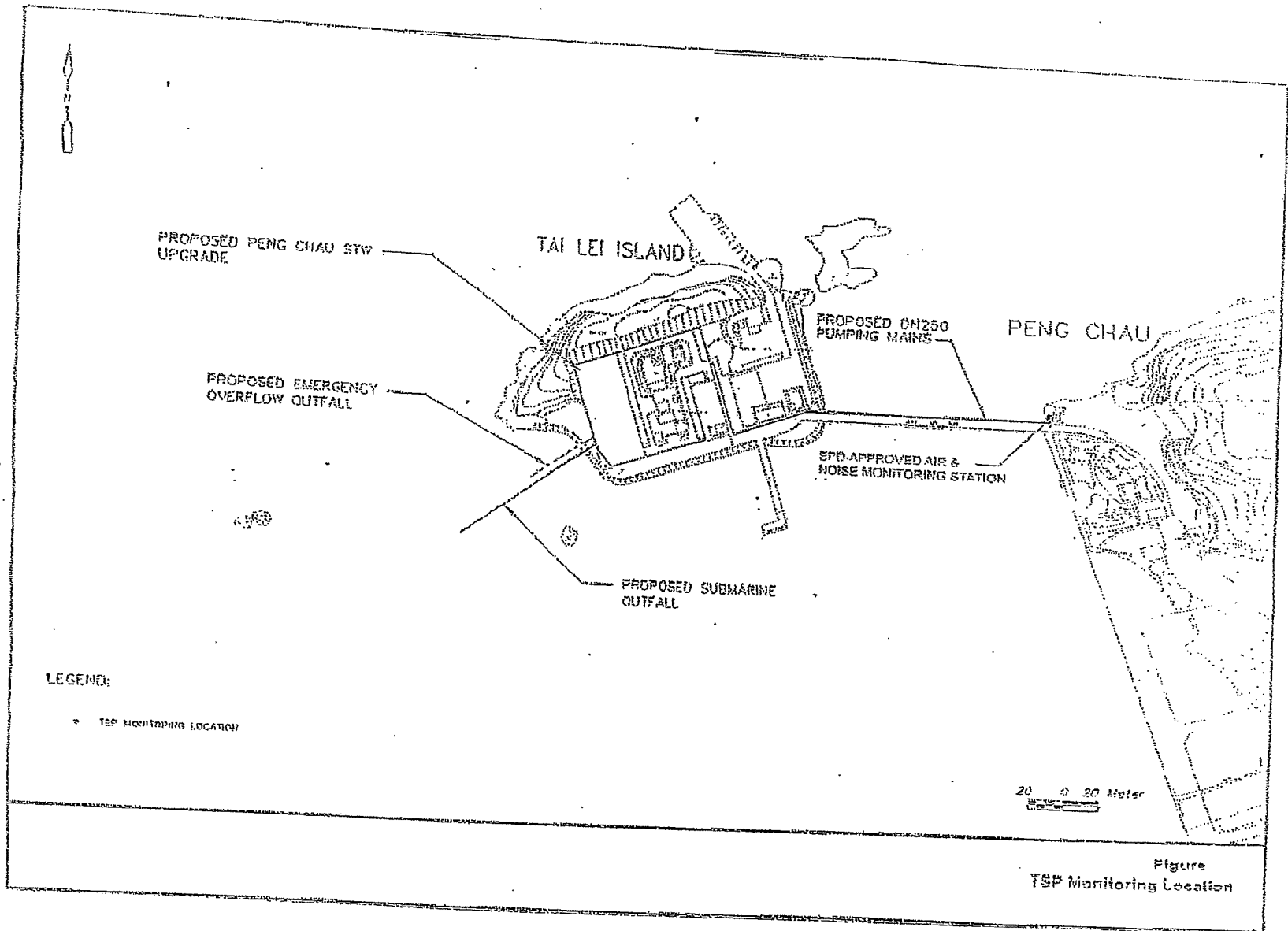


Figure
TSP Monitoring Location

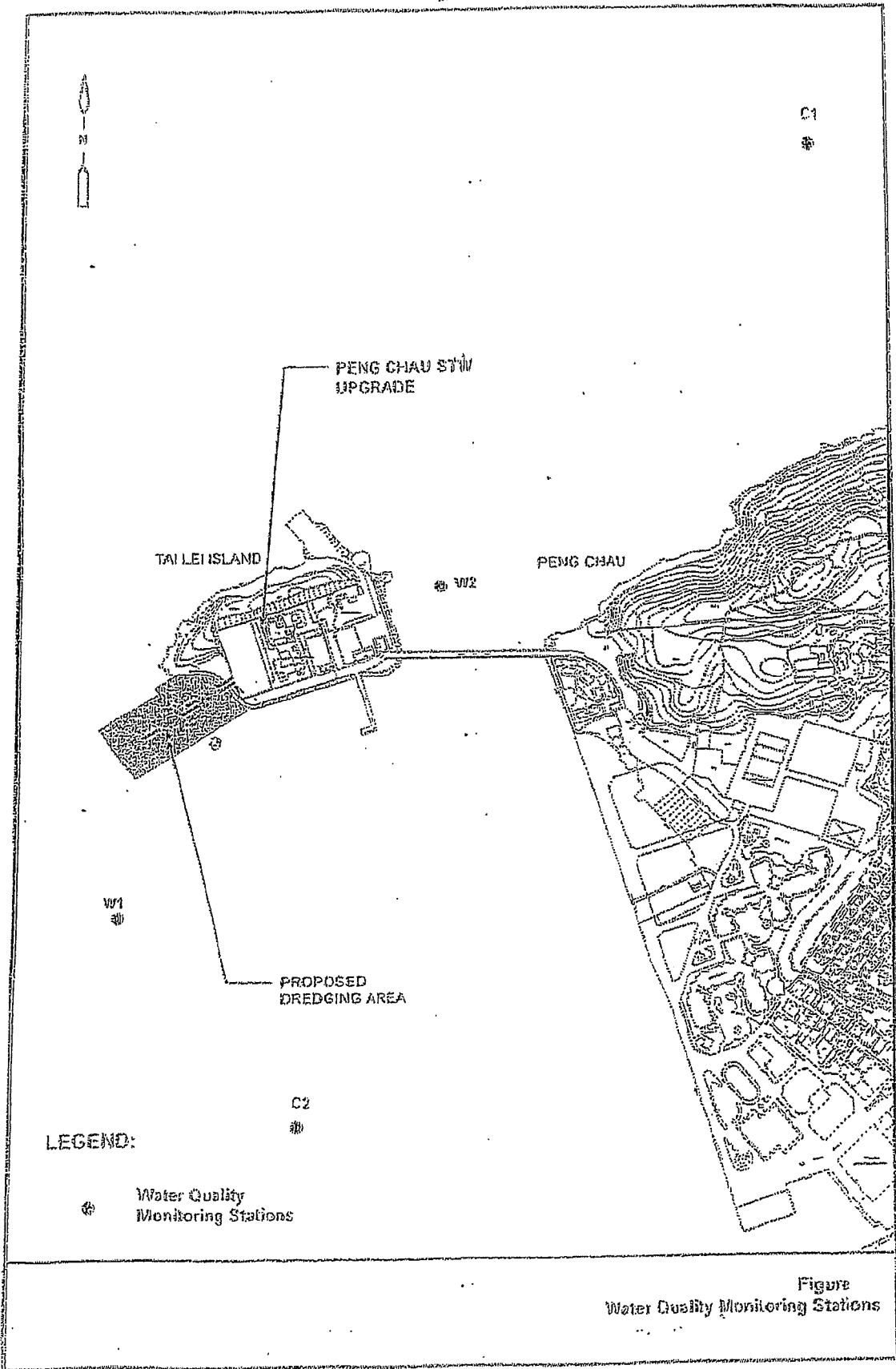


Figure
Water Quality Monitoring Stations

Appendix D

Equipment Calibration Certificates

Equipment Calibration List for Peng Chau Sewage Treatment Works Upgrade Project

Item	Aspect	Description of Equipment	Serial No.	Date of Calibration	Date of Next Calibration
1*	Air	Greasby Anderson GMWS2310 High Volume Sampler	AN1	06 Nov 06	06 Jan 07
2		Sibata LD-3	362337	22 Jun 06	22 Jun 07
3	Noise	Bruel & Kjaer 4231 Acoustical Calibrator	2292167	13 Apr 06	13 Apr 07
4		Bruel & Kjaer 2238 Integrating Sound Level Meter	2337676	13 Apr 06	13 Apr 07

Note: Calibration certificates will only be provided if monitoring equipment is re-calibrated or new.

No Water Quality Monitoring was required in this reporting period, since all marine based construction activities were completed on 01 August 2006. Post Water Quality was carried out from 02 August to 01 September 2006. Therefore, no water quality monitoring equipments calibration certificate was enclosed in this Monthly EM&A Report.

Appendix E

Impact Monitoring Schedules

Impact Monitoring Schedules in the Reporting Period

Date		Dust Monitoring		Noise Monitoring
		1-Hr TSP	24-Hr TSP	
26-Nov-06	Sun			
27-Nov-06	Mon			
28-Nov-06	Tue			
29-Nov-06	Wed			
30-Nov-06	Thu			
1-Dec-06	Fri			
2-Dec-06	Sat			
3-Dec-06	Sun			
4-Dec-06	Mon			
5-Dec-06	Tue			
6-Dec-06	Wed			
7-Dec-06	Thu			
8-Dec-06	Fri			
9-Dec-06	Sat			
10-Dec-06	Sun			
11-Dec-06	Mon			
12-Dec-06	Tue			
13-Dec-06	Wed			
14-Dec-06	Thu			
15-Dec-06	Fri			
16-Dec-06	Sat			
17-Dec-06	Sun			
18-Dec-06	Mon			
19-Dec-06	Tue			
20-Dec-06	Wed			
21-Dec-06	Thu			
22-Dec-06	Fri			
23-Dec-06	Sat			
24-Dec-06	Sun			
25-Dec-06	Mon			

No Water Quality Monitoring was required in this reporting period, since all marine based construction activities were completed on 01 August 2006. Post Water Quality was carried out from 02 August to 01 September 2006, monitoring results were presented in the previous Monthly EM&A Report (September 2006)

	Monitoring Day
	Sunday or Public Holiday

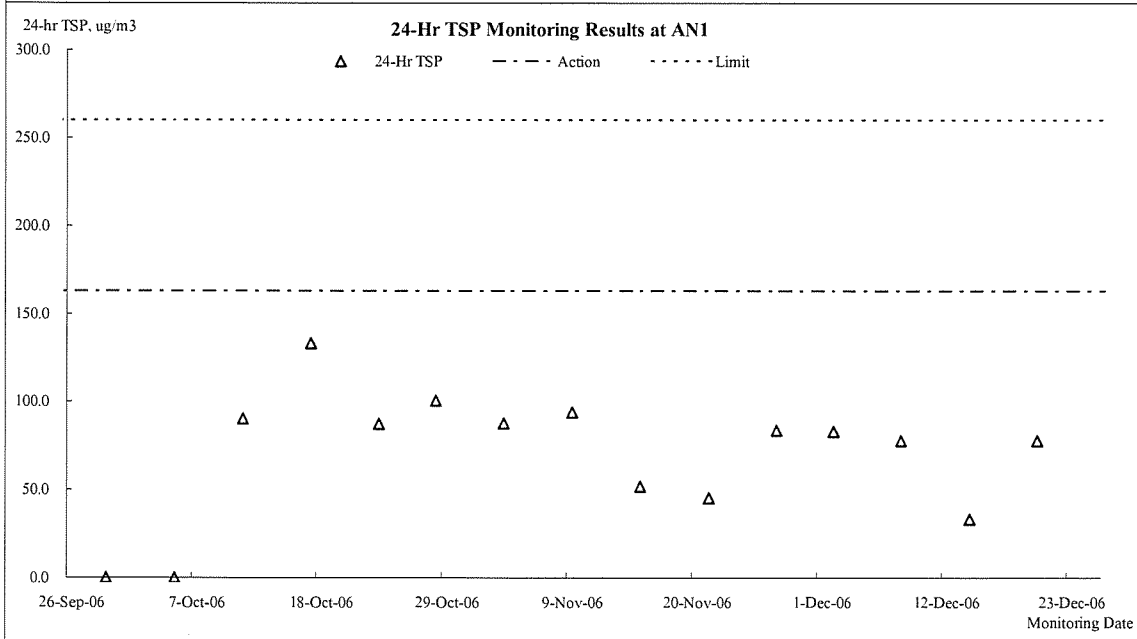
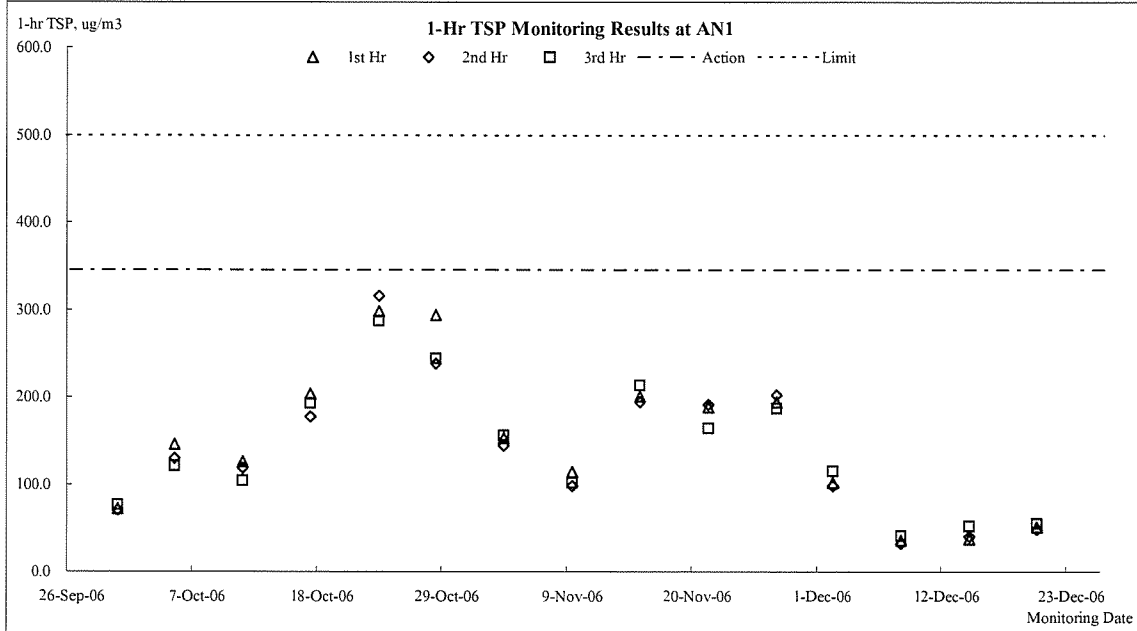
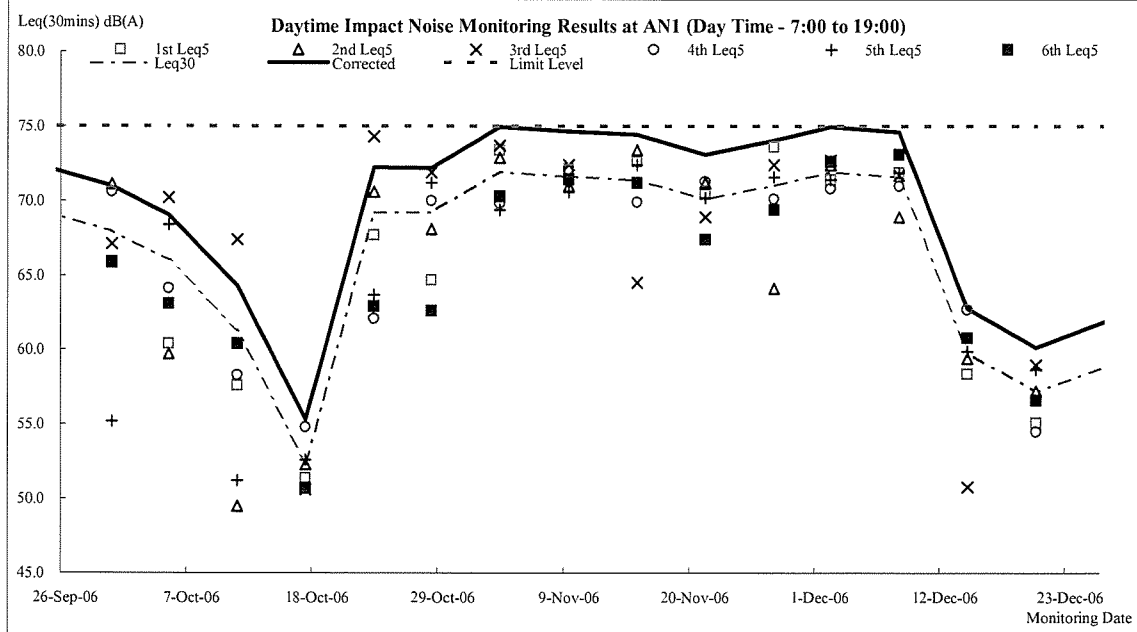
Impact Monitoring Schedules in the Next Reporting Period

Date		Dust Monitoring		Noise Monitoring
		1-Hr TSP	24-Hr TSP	
26-Dec-06	Tue			
27-Dec-06	Wed			
28-Dec-06	Thu			
29-Dec-06	Fri			
30-Dec-06	Sat			
31-Dec-06	Sun			
1-Jan-07	Mon			
2-Jan-07	Tue			
3-Jan-07	Wed			
4-Jan-07	Thu			
5-Jan-07	Fri			
6-Jan-07	Sat			
7-Jan-07	Sun			
8-Jan-07	Mon			
9-Jan-07	Tue			
10-Jan-07	Wed			
11-Jan-07	Thu			
12-Jan-07	Fri			
13-Jan-07	Sat			
14-Jan-07	Sun			
15-Jan-07	Mon			
16-Jan-07	Tue			
17-Jan-07	Wed			
18-Jan-07	Thu			
19-Jan-07	Fri			
20-Jan-07	Sat			
21-Jan-07	Sun			
22-Jan-07	Mon			
23-Jan-07	Tue			
24-Jan-07	Wed			
25-Jan-07	Thu			

	Monitoring Day
	Sunday or Public Holiday

Appendix F

Graphical Plots of Air and Noise Monitoring Results



Appendix G

Meteorological Data in the Reporting Period

Meteorological Data Extracted from HKO in the Reporting Period

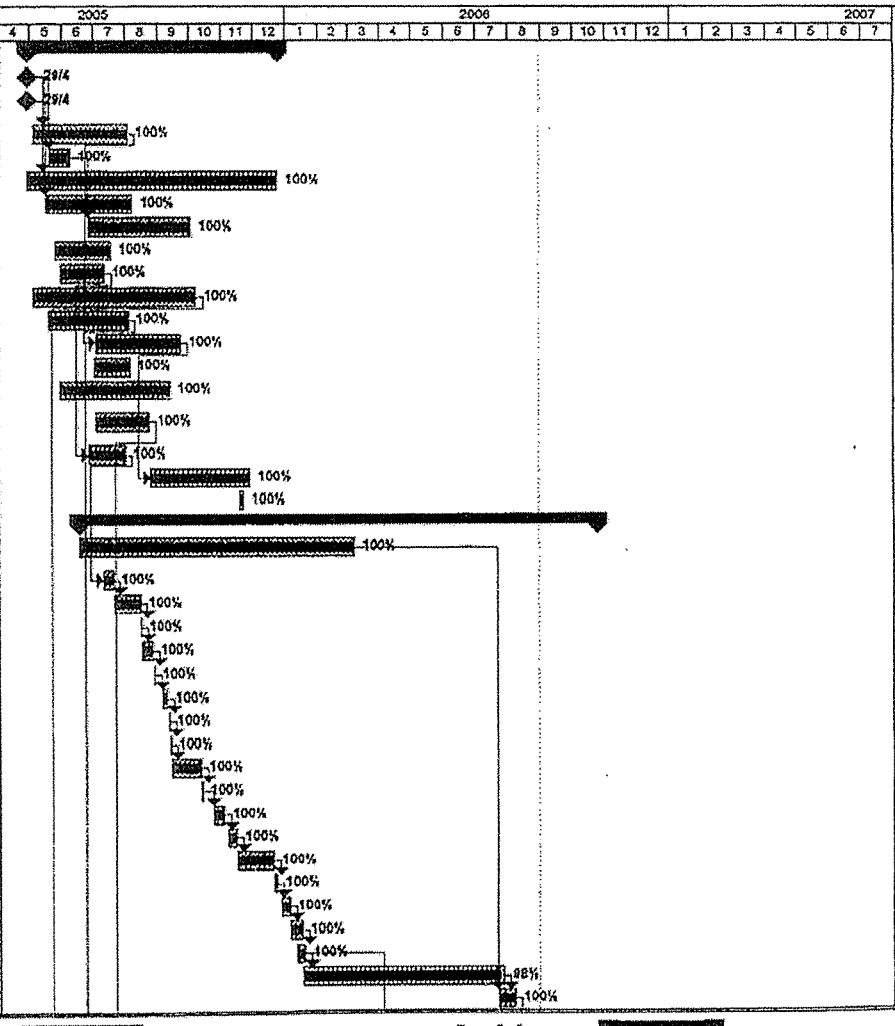
Date		Weather	Peng Chau Weather Station				
			Total Rainfall (mm)	Mean Air Temperature (°C)	Wind Speed (km/h)	Mean Relative Humidity (%)	Wind Direction
26-Nov-06	Sun	cloudy/ mist/ rain	1.2	24.4	10	90	SE/S
27-Nov-06	Mon	cloudy/ rain/ mist/ moderate	7	21.8	10	90	W/NW
28-Nov-06	Tue	cloudy/ rain/ moderate	1.1	19.6	35	75	NW
29-Nov-06	Wed	cloudy/ rain/ moderate	Trace	20.5	21	85	NE/E
30-Nov-06	Thu	cloudy/ sunny/ moderate	-	20	24	75	NW/N
1-Dec-06	Fri	fine/ dry/ moderate	-	19.4	23	65	NW/N
2-Dec-06	Sat	fine/ dry/ moderate	-	17	26	70	NW/N
3-Dec-06	Sun	fine/ dry	-	19.4	12	65	E
4-Dec-06	Mon	fine/ dry/ moderate	-	17.8	15	75	E
5-Dec-06	Tue	fine/ haze/ moderate	-	21.2	18	80	NE
6-Dec-06	Wed	fine/ moderate	-	20.4	27	80	E
7-Dec-06	Thu	sunny/ moderate	0.3	23	5	90	E
8-Dec-06	Fri	fine/ haze/ moderate	-	23.8	15	90	E
9-Dec-06	Sat	cloudy/ sunny/ hazy/ moderate	-	20.7	12	85	NW/N
10-Dec-06	Sun	sunny	-	18	18	65	NW/N
11-Dec-06	Mon	fine/ moderate	Trace	19.3	21	80	NW
12-Dec-06	Tue	sunny/ haze/ cloudy/ moderate	Trace	20.3	18	75	NW
13-Dec-06	Wed	cloudy/ rain/ moderate	13	21.1	15	75	NW/N
14-Dec-06	Thu	cloudy/ rain/ moderate	5.8	17.8	24	90	NW/N
15-Dec-06	Fri	cloudy/ cool/ rain/ moderate	9.3	14.7	21	95	NW/N
16-Dec-06	Sat	cool, very dry, fine	1.5	14.8	30	90	NW/N
17-Dec-06	Sun	fine/ very dry	-	15.1	25	35	NE/E
18-Dec-06	Mon	fine/ very dry/ moderate	-	14.9	16	45	NW/N
19-Dec-06	Tue	fine/ dry/ moderate	Trace	15.9	16	60	NW/N
20-Dec-06	Wed	fine/ dry/ moderate	-	17.3	24	55	NW/N
20-Dec-06	Wed	fine/ dry/ moderate	-	17.3	24	55	NW/N
21-Dec-06	Thu	fine/ dry/ moderate	-	17	21	55	NW/N
22-Dec-06	Fri	fine/ very dry/ moderate	-	16	15	65	NW/N
23-Dec-06	Sat	fine/ dry	-	-	-	-	-
24-Dec-06	Sun	fine/ dry	-	-	-	-	Holiday
25-Dec-06	Mon	fine	-	-	-	-	Holiday

Appendix H

Three-Month Rolling Program

Drainage Services Department
 Contract No. DC/2004/08
 Upgrading of Peng Chau Sewage Treatment Works
 3-Months Rolling Programme

ID	Task Name	Duration	Start	Finish	2005												2006												2007						
					4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7			
1	Site set up, Permit application and Submissions	200 days	29/4/05	24/12/05	[Gantt bar from 29/4/05 to 24/12/05]																														
2	Project Commencement	0 days	29/4/05	29/4/05	[Milestone diamond at 29/4/05]																														
3	Handover of Works Area -Portion P, Q, R, S, T, U and Area A	0 days	29/4/05	29/4/05	[Milestone diamond at 29/4/05]																														
4	Site Mobilization	75 days	5/5/05	3/8/05	[Gantt bar from 5/5/05 to 3/8/05]																														
5	Set up RE Interim Office	16 days	20/5/05	5/6/05	[Gantt bar from 20/5/05 to 5/6/05]																														
6	Civil material Submission & Procurement (Portion P, Q, R)	200 days	29/4/05	24/12/05	[Gantt bar from 29/4/05 to 24/12/05]																														
7	Set up the contractor Site Office and storage yard	70 days	17/5/05	5/8/05	[Gantt bar from 17/5/05 to 5/8/05]																														
8	Erect the Engineer's Site Accommodation	82 days	27/6/05	3/10/05	[Gantt bar from 27/6/05 to 3/10/05]																														
9	Instal Site Record Survey, tree survey and Photo Record	45 days	25/5/05	18/7/05	[Gantt bar from 25/5/05 to 18/7/05]																														
10	Submission & approval of Environmental Monitoring Plan	35 days	3/5/05	12/7/05	[Gantt bar from 3/5/05 to 12/7/05]																														
11	Submission & approval of Site Safety Plan	131 days	4/5/05	8/10/05	[Gantt bar from 4/5/05 to 8/10/05]																														
12	Submission & approval of QA Plan for structural concrete	65 days	19/5/05	4/8/05	[Gantt bar from 19/5/05 to 4/8/05]																														
13	Submission & approval of Site concrete batching plant	70 days	4/7/05	23/9/05	[Gantt bar from 4/7/05 to 23/9/05]																														
14	Submission & approval Marine Dumping Permit	30 days	2/7/05	5/8/05	[Gantt bar from 2/7/05 to 5/8/05]																														
15	Submission & approval of construction method statements (Portion P, Q, R)	90 days	30/5/05	13/9/05	[Gantt bar from 30/5/05 to 13/9/05]																														
16	Submission & approval of temporary works (Portion P, Q, R)	45 days	4/7/05	24/8/05	[Gantt bar from 4/7/05 to 24/8/05]																														
17	Environmental base line monitoring	30 days	27/6/05	1/8/05	[Gantt bar from 27/6/05 to 1/8/05]																														
18	Set up the site concrete batching plant at Area C & trial mix	79 days	26/8/05	28/11/05	[Gantt bar from 26/8/05 to 28/11/05]																														
19	Erection of tower crane at Portion R	4 days	18/11/05	22/11/05	[Gantt bar from 18/11/05 to 22/11/05]																														
20	Section I (Portion Q) -Marine Works	418 days	18/8/05	25/10/06	[Gantt bar from 18/8/05 to 25/10/06]																														
21	Procurement & delivery of PE pipe material & protection cap & diffusers, non-return valve	220 days	18/8/05	7/3/06	[Gantt bar from 18/8/05 to 7/3/06]																														
22	Instal Hydrographical survey	9 days	11/7/05	20/7/05	[Gantt bar from 11/7/05 to 20/7/05]																														
23	Mobilization	22 days	21/7/05	15/8/05	[Gantt bar from 21/7/05 to 15/8/05]																														
24	Set up the marine marking system & silt curtain	1 day	16/8/05	16/8/05	[Gantt bar from 16/8/05 to 16/8/05]																														
25	Marine dredging	10 days	17/8/05	27/8/05	[Gantt bar from 17/8/05 to 27/8/05]																														
26	Hydrographical record survey	1 day	29/8/05	29/8/05	[Gantt bar from 29/8/05 to 29/8/05]																														
27	Mobilization & re-dredge the outlet/overflow pipe trench	5 days	6/9/05	10/9/05	[Gantt bar from 6/9/05 to 10/9/05]																														
28	Hydrographical record survey	1 day	12/9/05	12/9/05	[Gantt bar from 12/9/05 to 12/9/05]																														
29	Set up the silt curtain	1 day	13/9/05	13/9/05	[Gantt bar from 13/9/05 to 13/9/05]																														
30	Landfill area/seawall trench excavation	22 days	14/9/05	12/10/05	[Gantt bar from 14/9/05 to 12/10/05]																														
31	Survey Check	1 day	13/10/05	13/10/05	[Gantt bar from 13/10/05 to 13/10/05]																														
32	Place bedding to the dredged trench & record survey	10 days	24/10/05	3/11/05	[Gantt bar from 24/10/05 to 3/11/05]																														
33	Plant mobilization, set up for PE pipe laying	8 days	7/11/05	15/11/05	[Gantt bar from 7/11/05 to 15/11/05]																														
34	Assemble, laying outlet & overflow pipes and testing	30 days	16/11/05	20/12/05	[Gantt bar from 16/11/05 to 20/12/05]																														
35	Record Survey	3 days	21/12/05	23/12/05	[Gantt bar from 21/12/05 to 23/12/05]																														
36	Stage 1 backfilling to the field outlet and overflow pipes	7 days	27/12/05	4/1/06	[Gantt bar from 27/12/05 to 4/1/06]																														
37	Stage 2 backfilling	10 days	5/1/06	16/1/06	[Gantt bar from 5/1/06 to 16/1/06]																														
38	Backfill at Landfill & Seawall area	7 days	11/1/06	18/1/06	[Gantt bar from 11/1/06 to 18/1/06]																														
39	Seawall reinstatement	165 days	17/1/06	27/7/06	[Gantt bar from 17/1/06 to 27/7/06]																														
40	Assemble, testing and instal non-return valve, protection caps	14 days	22/7/06	7/8/06	[Gantt bar from 22/7/06 to 7/8/06]																														



Project: Peng Chau-3months Date: 29/8/06	Task		Milestone		Rolled Up Critical Task		Split		Group By Summary	
	Critical Task		Summary		Rolled Up Milestone		External Tasks			
	Progress		Rolled Up Task		Rolled Up Progress		Project Summary			

