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DRAINAGE SERVICES DEPARTMENT (DSD)

CONTRACT No. DC/2004/08



**PENG CHAU SEWAGE TREATMENT WORKS
UPGRADE**

**MONTHLY ENVIRONMENTAL MONITORING AND
AUDIT (EM&A) REPORT FOR MAY 2008**

PREPARED FOR

ACCIONA-ATAL JOINT VENTURE (AAJV)

Quality Index

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EXECUTIVE SUMMARY

- ES01. 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.
- ES02. Action-United Environmental Services and Consulting (AUES) had 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.
- ES03. This report presents the monitoring results and audit findings under the EM&A program during the reporting month for **May 2008**.

EM&A ACTIVITIES IN THE REPORTING MONTH

ES04. A summary of the monitoring activities in this reporting month is listed below:

- 1-Hour TSP Monitoring 15 Events
- 24-Hour TSP Monitoring 5 Events
- Construction Noise Monitoring 5 Events
- Marine Water Quality Monitoring 0 Event
- Site Inspection Audit 5 Times

AIR QUALITY

ES05. No exceedances of 1-Hour and 24-Hour TSP measurements were recorded in this reporting month.

CONSTRUCTION NOISE

ES06. No Limit Level exceedance in construction noise measurements was recorded and no noise complaint (Action Level) was received in this reporting month.

MARINE WATER QUALITY

ES07. The marine based construction activities had been completed on 1 August 2006, post marine water quality 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

ES08. A summary of monitoring exceedances in this reporting month for air quality, construction noise and marine 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
Marine Water Quality*	-	-	-

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

ENVIRONMENTAL COMPLAINTS

ES09. No environmental complaint was received in this reporting month.

ENVIRONMENTAL SUMMONS

ES10. No environmental summons was received in this reporting month.

FUTURE KEY ISSUES

ES11. 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) had 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 monitoring results and audit findings under the EM&A program during the reporting month for **May 2008**.

REPORT STRUCTURE

- 1.05 The Monthly EM&A report is structured into the following sections:-

SECTION 1	INTRODUCTION
SECTION 2	PROJECT ORGANIZATION AND CONSTRUCTION PROGRESS
SECTION 3	SUMMARY OF IMPACT MONITORING REQUIREMENTS
SECTION 4	IMPACT MONITORING METHODOLOGIES
SECTION 5	IMPACT MONITORING RESULTS
SECTION 6	WASTE MANAGEMENT
SECTION 7	SITE INSPECTION
SECTION 8	ENVIRONMENTAL COMPLAINTS AND NON-COMPLIANCE
SECTION 9	IMPLEMENTATION STATUSES OF MITIGATION MEASURES
SECTION 10	IMPACT FORECAST
SECTION 11	CONCLUSIONS

2.0 PROJECT ORGANIZATION AND CONSTRUCTION PROGRESS

PROJECT ORGANIZATION AND MANAGEMENT STRUCTURE

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

CONSTRUCTION PROGRESS

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

Table 2-1 Major Construction Activities in the Reporting Month

Locations	Description of Construction Activities
Portion P	-
Portion Q	-
Portion R	<ul style="list-style-type: none"> Construction of superstructure of Drying Bed House including internal concrete protection coating; Road and drainage works including E&M U/G pipe ducts; and Defect rectification at NSTC.
Portion S	-
Area A	-
Area B	-
Area C	-

SUMMARY OF ENVIRONMENTAL SUBMISSIONS

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

Table 2-2 Status of Environmental Licenses and Permits

Items	Item Description	License/Permit Status
1	Environmental Permit No. : EP-203/2004	Issued at 30 November 2004
2	Air Pollution Control (Construction Dust)	Notified EPD on 17 June 2005
3	Water Pollution Control (Discharge Licence) No.: EP890/W2/XE005	Valid to 30 September 2010
4	Chemical Waste Producer Registration No.: WPN:5213-976-N2449-01	Registration on 03 June 2005
5	Exemption for site concrete batching plant licence	Issued at 21 October 2005
6	Exemption Account for Disposal of Construction Waste (Account Number : 5000577)	Valid until 27 September 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 quality, construction noise and marine water quality have been identified as the key environmental issues under this project during the construction phase.
- 3.02 A summary of the EM&A requirements for air quality, construction noise and marine water quality monitoring are shown in **Table 3-1**. The designated station/locations for air quality, construction noise and marine water quality monitoring are shown in **Appendix C**.

Table 3-1 Summary of EM&A Requirements

Environmental Aspect	Monitoring Parameters	
Air Quality	1-Hour TSP	
	24-Hour 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.

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- 3.03 Air quality monitoring is carried out once in every six days for 24-Hour TSP and 3 times every six days for 1-Hour TSP at the designated monitoring station.
- 3.04 Construction noise monitoring is conducted once in every six days at the designated monitoring station. Measurements of $Leq_{(30min)}$ shall be taken between 0700 and 1900 with supplementary L_{10} and L_{90} data will be collected.
- 3.05 Marine water quality monitoring is carried out 3 times every week at 4 designated monitoring locations (2 Control stations and 2 Impact stations).
- 3.06 The impact marine 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, construction noise and marine water quality are 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-Hour TSP	24-Hour TSP	1-Hour TSP	24-Hour TSP
AN1	> or = 346	> or = 163	> or = 500	> or = 260

Table 3-3 Action and Limit Levels for Construction Noise

Monitoring Period	Action Level in dB(A)	Limit Level in dB(A)
0700-1900 hours on normal weekdays	When one or more documented complaint was received	> 75 dB(A)

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

Parameters		Action Level	Limit Level
DO mg/L	Surface & Mid-depth	< or = 4.1	< or = 3.9
	Bottom	< or = 3.3	< or = 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.
NH ₃ -N, mg/L		> or = 0.16	> or = 0.22
TIN, mg/L		> or = 0.91	> or = 0.94
E.Coli, cfu/100mL		> or = 374	> or = 610

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

4.0 IMPACT MONITORING METHDOLOGY

MONITORING LOCATIONS

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

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- 4.02 Owing to the residents' refusal of providing access to the designated air quality and construction noise station, an alternative air and noise monitoring station was proposed and 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 Marine Water Quality Monitoring

Locations ID	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-HOUR TSP MONITORING**

- 4.04 All 1-Hour TSP monitoring was conducted at the EPD-approved alternative station three times every 6 days.

24-HOUR TSP MONITORING

- 4.05 All 24-Hour TSP monitoring was conducted at the EPD-approved alternative station once every six days.

CONSTRUCTION NOISE MONITORING

- 4.06 Impact construction noise monitoring was undertaken at the EPD-approved alternative location weekly.

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 **Table 4-3**.

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

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

1-HOUR TSP MONITORING

- 4.09 Measurement of 1-Hour TSP monitoring was taken by a Sibata LD-3 Laser Dust Meter that is a portable and battery-operated laser photometer capable of performing real time 1-Hour 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.

24-HOUR TSP MONITORING

- 4.10 The 24-Hour 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-Hour operation;
- Minimum exposed area of 63 in²;
- Flow control accuracy of $\pm 2.5\%$ deviation over 24-Hour 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-Hour 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.

- 4.11 The filter papers used in 24-Hour 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.

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.

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- 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 Laboratory 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-Hour 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.

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- 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 monitoring data recorded in the equipment e.g. 1-Hour 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.
- 4.27 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 1-Hour and 24-Hour TSP results are shown in **Appendix F** respectively.

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

Monitoring Date	24-Hour TSP ($\mu\text{g}/\text{m}^3$)	1-Hour TSP Monitoring Results ($\mu\text{g}/\text{m}^3$)				
		Monitoring Date	Start Time	1 st Result	2 nd Result	3 rd Result
05-May-08	35	05-May-08	13:12	109	89	92
10-May-08	56	10-May-08	09:07	77	79	86
17-May-08	57	17-May-08	09:02	93	101	95
23-May-08	31	23-May-08	09:12	49	56	48
29-May-08	81	29-May-08	09:37	76	85	79
Action Level	> or = 163	-	-	> or = 346		
Limit Level	> or = 260	-	-	> or = 500		

Note: * Exceedances are in bold and underline.

- 5.03 No Action/Limit Level exceedance of 1-Hour and 24-Hour TSP measurements were recorded in this reporting month.
- 5.04 The meteorological data in this reporting month are summarized in **Appendix G**.

CONSTRUCTION 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 Construction Noise Monitoring Results

Date	Start Time	1st Leq5	2nd Leq5	3rd Leq5	4th Leq5	5th Leq5	6 th Leq5	Leq30	Corrected* Leq30
05-May-08	13:48	67.2	59.7	58.3	64.4	60.6	62.8	63.2	66.2
10-May-08	09:10	58.5	57.2	58.5	55.1	57.9	54.8	57.2	60.2
17-May-08	09:05	52.5	60.1	64.9	60.3	61.8	58.0	61.0	64.0
23-May-08	09:12	54.5	54.3	52.8	56.8	51.8	58.5	55.4	58.4
29-May-08	09:38	56.9	61.1	62.8	60.5	61.8	57.6	60.6	63.6
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 marine water quality impact monitoring was required in this reporting month 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 marine 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 inspection carried by ET was performed on 29 May 2008 in this reporting month, 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 month 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 Waste Quantities for Disposal

Type of Waste	Quantity	Disposal Locations
Excavated Material (Spent lube oil) (Liters)	-	N/A
Empty Site Vehicle Batteries (Nos.)	-	N/A
Excavated material (Uncontaminated) (m ³)	111.37 m ³	Peng Chau Transfer Facility
Broken Rock (m ³)	38.12 m ³	Peng Chau Transfer Facility
Construction & Demolition Material (Inert) (tons)	149.85 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 Locations
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 May 2008. No non-compliance was noted and some observations were made on general site housekeeping and equipments maintenance.

7.02 Details of the observations and recommendations were recorded during the joint site inspection as follows:

- Contractor was requested to cover sandy stockpiles which are not in use with impervious sheeting;
- Bilingual labels (Chinese and English) and warning panel should be placed at the chemical waste storage area;
- Chemicals were recommended to be labeled with chemical name/common name;
- Contractor was reminded to conduct regular maintenance of equipments to prevent oil leakage. Contaminated sand was reminded to be handled/disposed of as chemical waste;
- Contractor was requested to cover the cement paint containers entirely with impervious sheeting;
- Contractor was reminded to apply petroleum oil and remove stagnant water daily to prevent mosquito; and
- The recycle bin for paper was recommended to be covered with an appropriate lid to prevent water from entering.

8.0 ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE

ENVIRONMENTAL COMPLAINT AND PROSECUTION

8.01 No environmental complaint was received in this reporting month. The statistical summary table of environmental complaint is presented in **Table 8-1**.

8.02 No environmental summons and prosecution was received in this reporting month.

Table 8-1 Statistical Summary of Environmental Complaints

Reporting Month	Complaint Statistics		
	Frequency	Cumulative	Complaint Nature
August – December 2005	0	0	NA
January – December 2006	0	0	NA
January – December 2007	0	0	NA
January – April 2008	0	0	NA
May 2008	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 month 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.

Construction 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;
- Disposal of empty engine oil containers within site area;
- Ensure dust suppression measures are implemented properly;
- 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 **May 2008** was undertaken in compliance with the EM&A manual for the Peng Chau Sewage Treatment Works Upgrade. A summary of environmental compliance of air quality, construction noise and marine water quality in this reporting month are presented in **Table 11-1**.

Table 11-1 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
Marine Water Quality*	-	-	-

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

11.02 No Action/Limit Level exceedance of 1-Hour and 24-Hour TSP measurements were recorded in this reporting month.

11.03 All noise levels measured at AN1 were below the Limit level and no complaint (Action Level) was received in this reporting month.

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

11.05 Based on the EM&A Manual Clause 4.32, the post marine 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 summons was received in this reporting month.

RECOMMENDATIONS

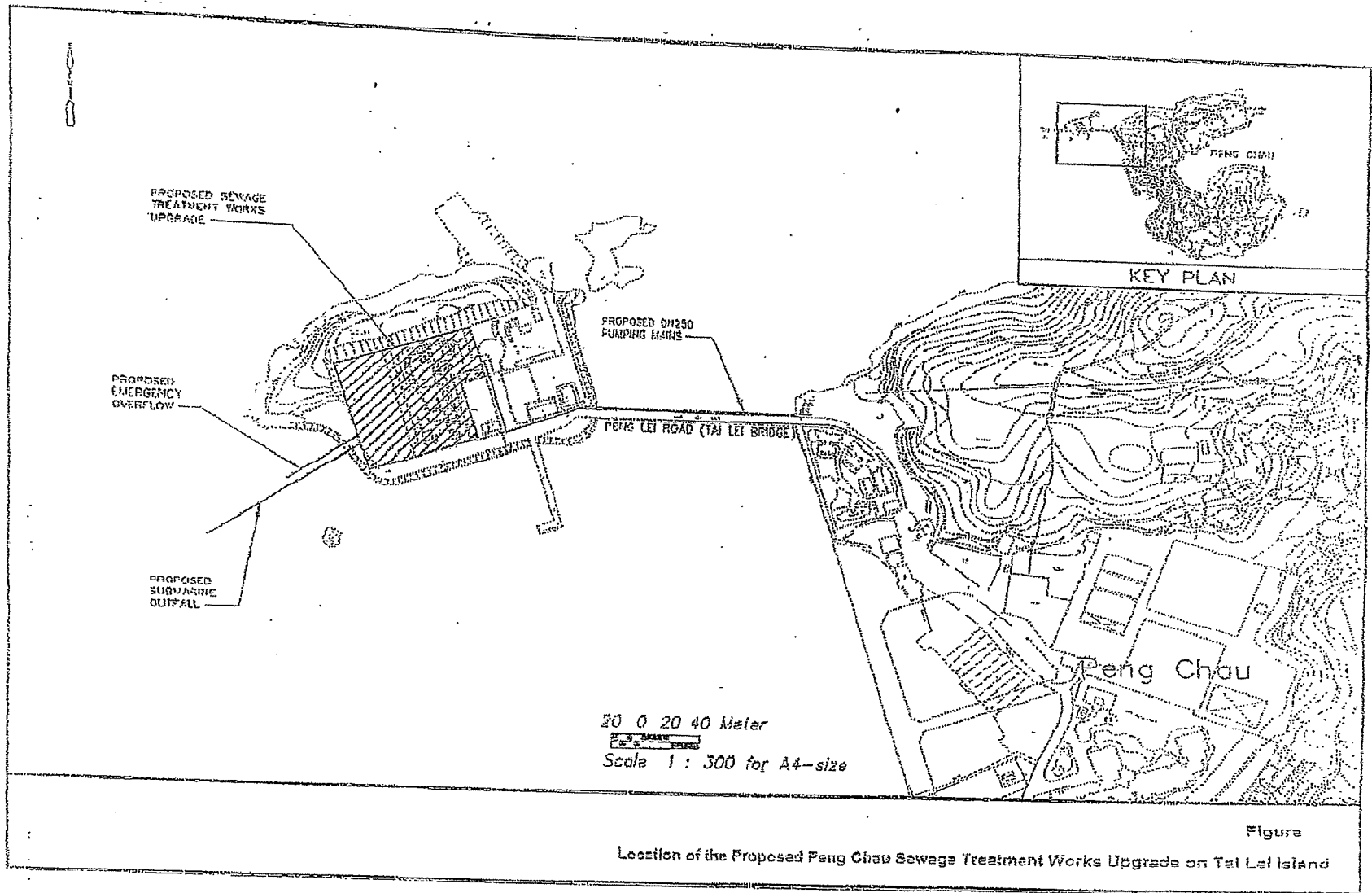
11.07 Based on the IEC site inspection records on 29 May 2008 the following key recommendations are pertinent:

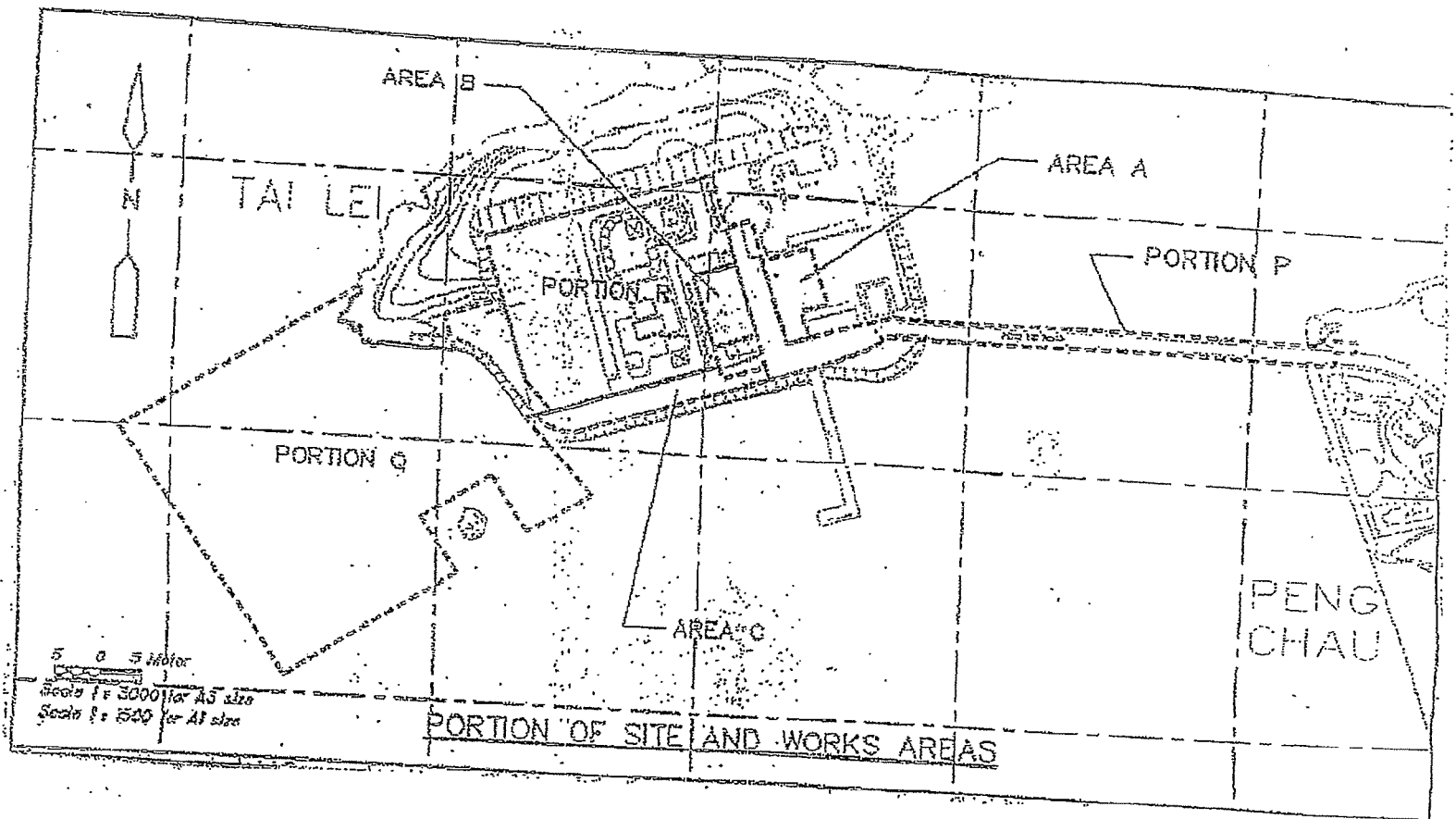
- Contractor was requested to cover sandy stockpiles which are not in use with impervious sheeting;
- Bilingual labels (Chinese and English) and warning panel should be placed at the chemical waste storage area;
- Chemicals were recommended to be labeled with chemical name/common name;
- Contractor was reminded to conduct regular maintenance of equipments to prevent oil leakage. Contaminated sand was reminded to be handled/disposed of as chemical waste;
- Contractor was requested to cover the cement paint containers entirely with impervious sheeting;
- Contractor was reminded to apply petroleum oil and remove stagnant water daily to prevent mosquito; and
- The recycle bin for paper was recommended to be covered with an appropriate lid to prevent water from entering.

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	Ms. Angela Wong	2428-2332	2424-9114
		Resident Engineer	Mr. Samuel Tam	2983-9303	2983-9843
		ARE	Mr. Alex Yeung	2983-9303	2983-9843
BMT Asia	Independent Environmental Checker	IEC	Mr. Derek Ho	2815-2221	2815-3377
		IEC's Representative	Mr. K.C.Tse	2815-2221	2815-3377
Acciona-ATAL	Main Contractor	Project Manager	Mr. William Chan	2983-0092	2983-0381
		Site Agent	Mr. William Chan	2983-0092	2983-0381
AUES	Contractor's Environmental Team	Environmental Team Leader (ETL)	Mr. Ken Wong	2959-6059	2959-6079
		ETL's Representative	Miss. Sylvie Wong	2959-6059	2959-6079

Appendix C

Locations of Designated Monitoring Stations

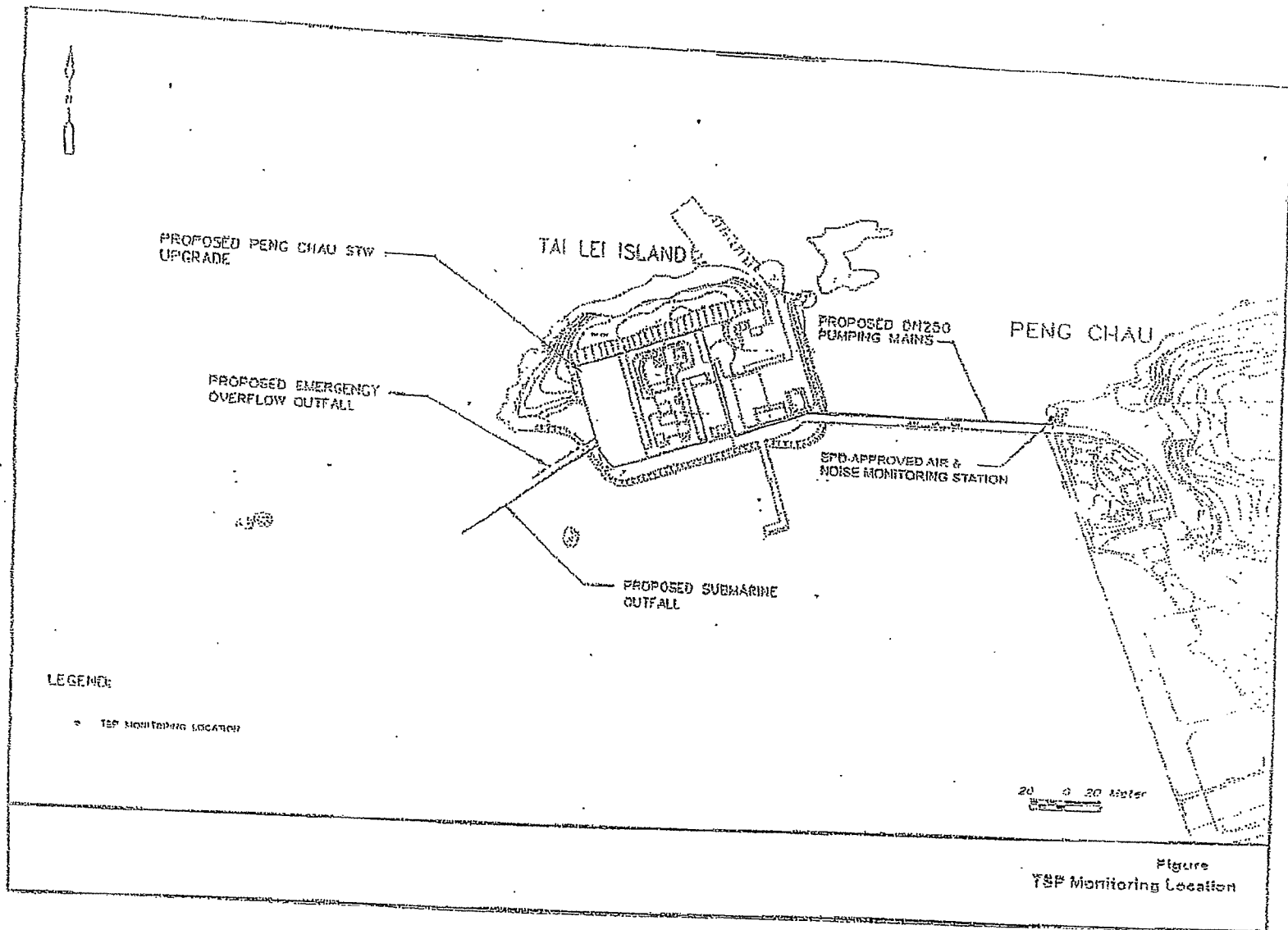


Figure
TSP Monitoring Location

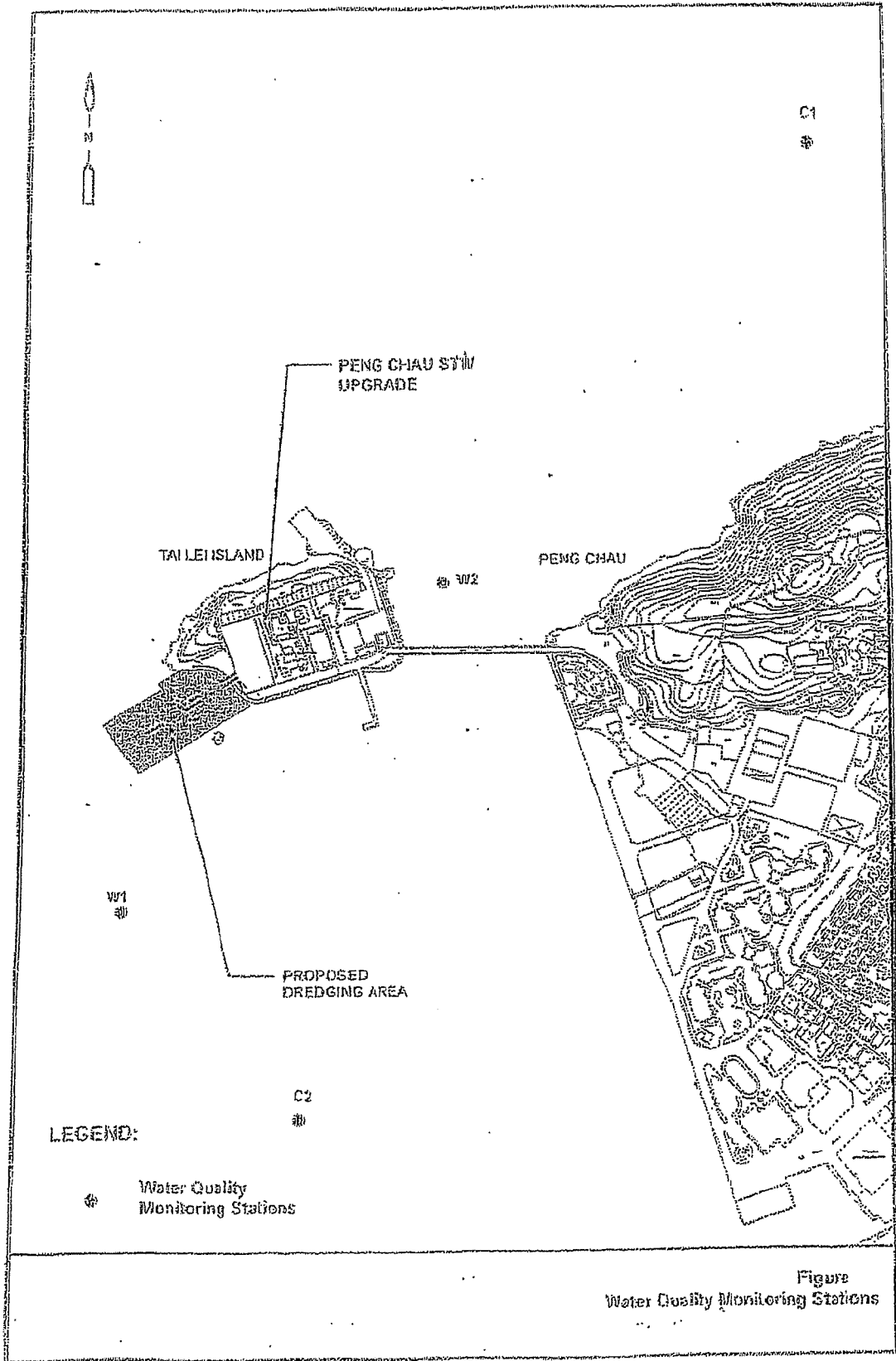


Figure
Water Quality Monitoring Stations

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 May 08	06 Aug 08
2		Sibata LD-3	362337	25 Jun 07	25 Jun 08
3	Noise	Brueel & Kjaer 4231 Acoustical Calibrator	2292167	22 Apr 08	22 Apr 09
4		Brueel & Kjaer 2238 Integrating Sound Level Meter	2285721	22 Apr 08	22 Apr 09

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

No marine water quality impact monitoring was required in this reporting period, since all marine based construction activities were completed on 01 August 2006. Post marine water quality monitoring 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.

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Peng Chau	Date of Calibration: 6-May-08
Location ID : AN1	Next Calibration Date: 6-Aug-08
	Technician: Mr. Ben Tam

CONDITIONS

Sea Level Pressure (hPa)	1010.1	Corrected Pressure (mm Hg)	757.575
Temperature (°C)	22.2	Temperature (K)	295

CALIBRATION ORIFICE

Make-> TISCH	Qstd Slope -> 1.94872
Model-> 515N	Qstd Intercept -> 0.00202
Serial # -> 9833620	

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION		
							Slope =	Intercept =	Corr. coeff. =
18	4.2	4.2	8.4	1.491	44	44.35	Slope =	35.2898	
13	3.5	3.5	7	1.361	39	39.31	Intercept =	-8.8921	
10	2.7	2.7	5.4	1.195	32	32.25	Corr. coeff. =	0.9986	
7	1.4	1.4	2.8	0.860	21	21.17			
5	0.7	0.7	1.4	0.608	13	13.10			

Calculations :

$$Qstd = 1/m[\text{Sqrt}(H20(Pa/Pstd)(Tstd/Ta))-b]$$

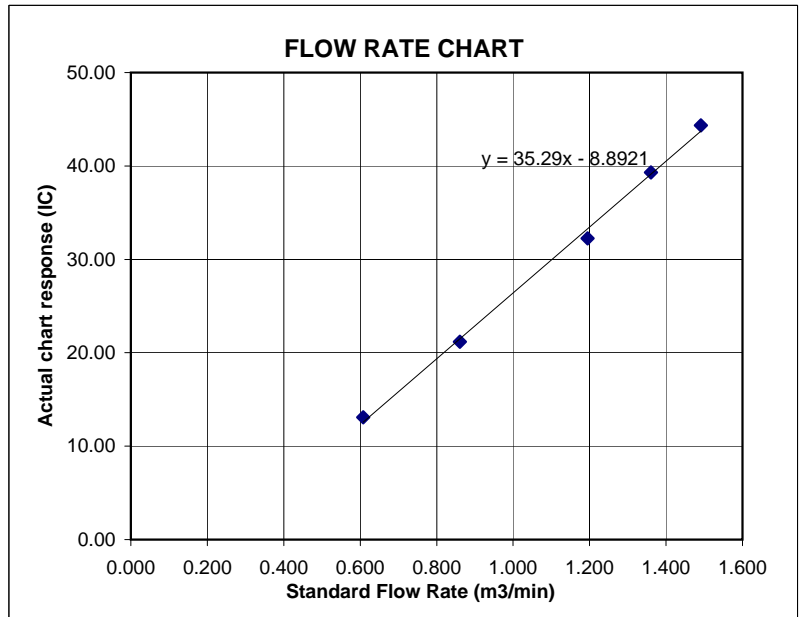
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate
 IC = corrected chart responses
 I = actual chart response
 m = calibrator Qstd slope
 b = calibrator Qstd intercept
 Ta = actual temperature during calibration (deg K)
 Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

$$1/m((I)[\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

m = sampler slope
 b = sampler intercept
 I = chart response
 Tav = daily average temperature
 Pav = daily average pressure



Appendix E

Impact Monitoring Schedules

Impact Monitoring Schedules in this Reporting Month

Date		Air Quality		Noise Monitoring
		1-Hour TSP	24-Hour TSP	
1-May-08	Thu			
2-May-08	Fri			
3-May-08	Sat			
4-May-08	Sun			
5-May-08	Mon			
6-May-08	Tue			
7-May-08	Wed			
8-May-08	Thu			
9-May-08	Fri			
10-May-08	Sat			
11-May-08	Sun			
12-May-08	Mon			
13-May-08	Tue			
14-May-08	Wed			
15-May-08	Thu			
16-May-08	Fri			
17-May-08	Sat			
18-May-08	Sun			
19-May-08	Mon			
20-May-08	Tue			
21-May-08	Wed			
22-May-08	Thu			
23-May-08	Fri			
24-May-08	Sat			
25-May-08	Sun			
26-May-08	Mon			
27-May-08	Tue			
28-May-08	Wed			
29-May-08	Thu			
30-May-08	Fri			
31-May-08	Sat			

	Monitoring Day
	Sunday or Public Holiday

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 pervious Monthly EM&A Report (September 2006)

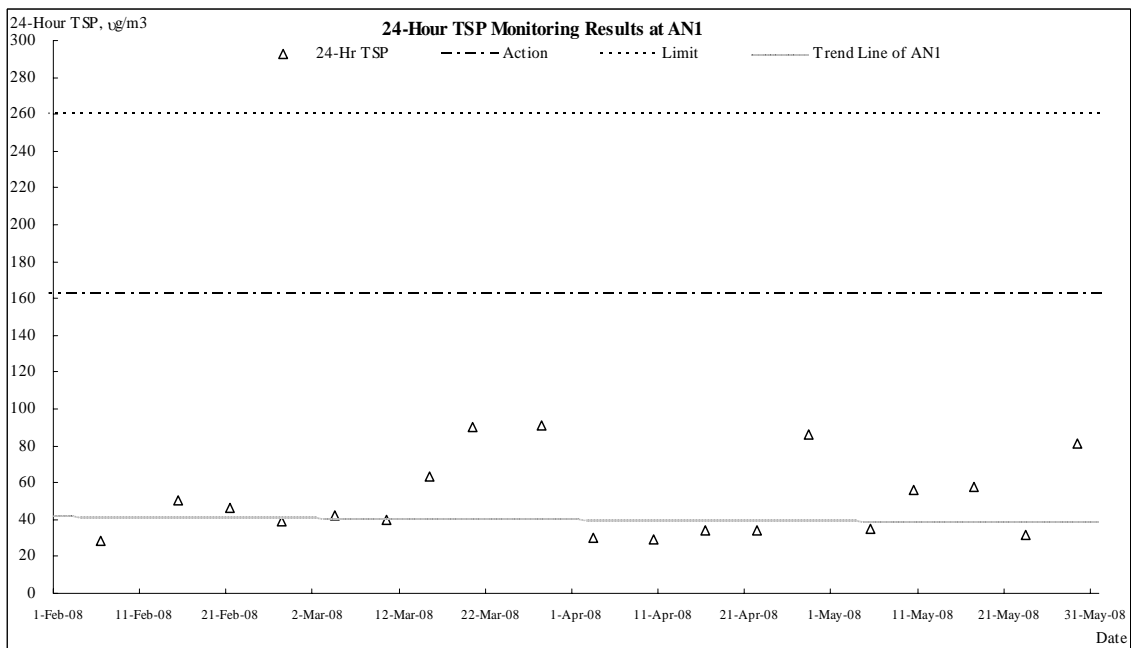
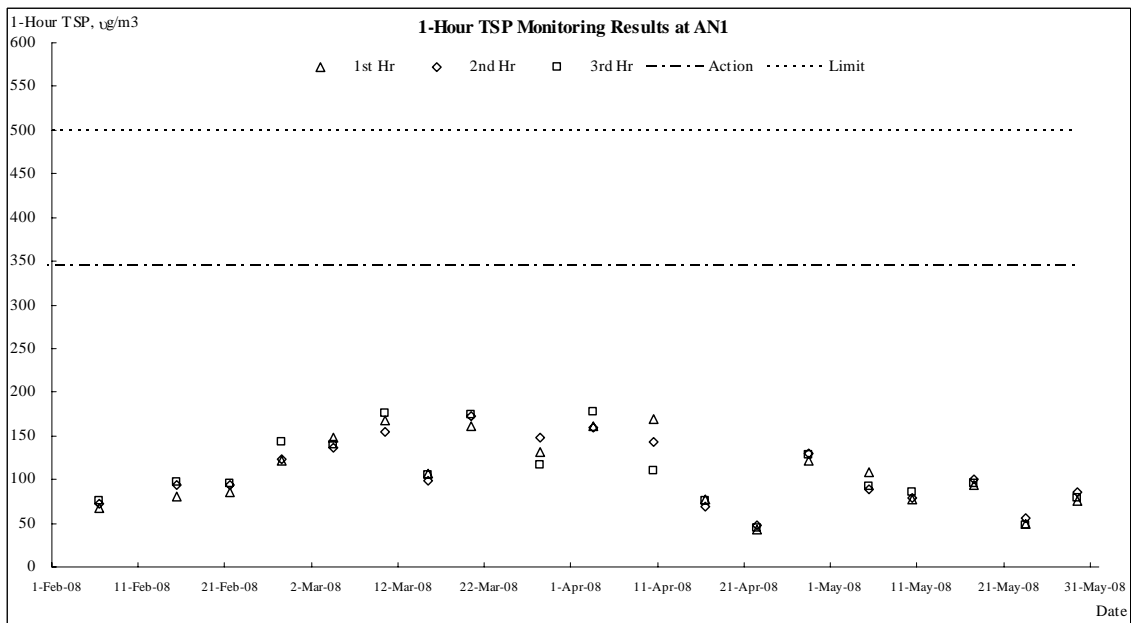
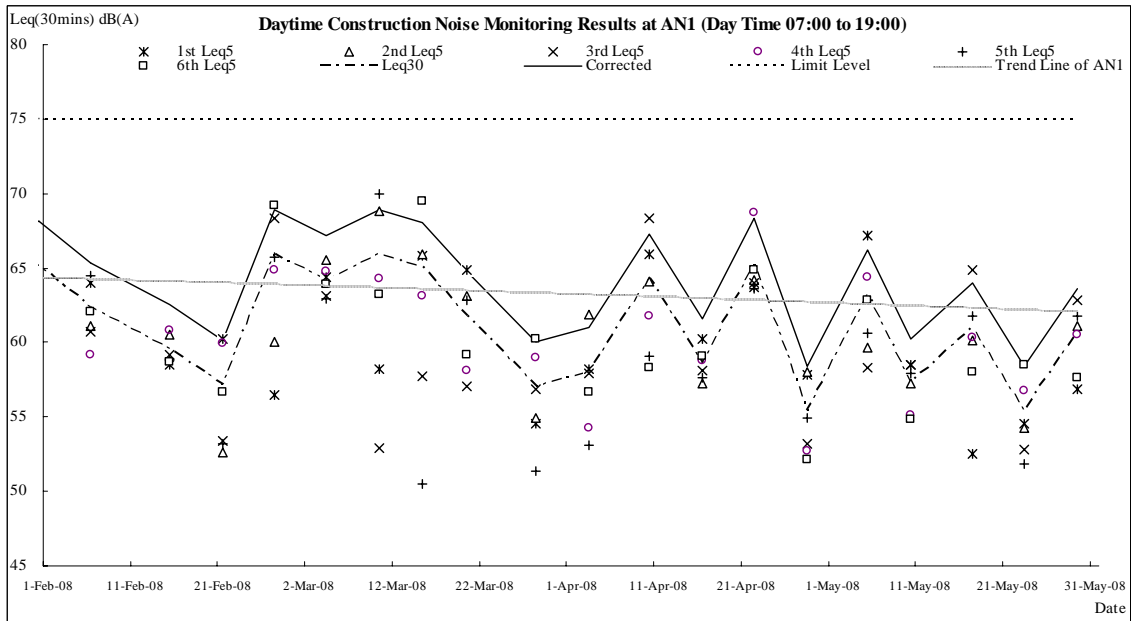
Impact Monitoring Schedules in the Next Reporting Month

Date		Air Quality		Noise Monitoring
		1-Hour TSP	24-Hour TSP	
1-June-08	Sun			
2-June-08	Mon			
3-June-08	Tue			
4-June-08	Wed			
5-June-08	Thu			
6-June-08	Fri			
7-June-08	Sat			
8-June-08	Sun			
9-June-08	Mon			
10-June-08	Tue			
11-June-08	Wed			
12-June-08	Thu			
13-June-08	Fri			
14-June-08	Sat			
15-June-08	Sun			
16-June-08	Mon			
17-June-08	Tue			
18-June-08	Wed			
19-June-08	Thu			
20-June-08	Fri			
21-June-08	Sat			
22-June-08	Sun			
23-June-08	Mon			
24-June-08	Tue			
25-June-08	Wed			
26-June-08	Thu			
27-June-08	Fri			
28-June-08	Sat			
29-June-08	Sun			
30-June-08	Mon			

	Monitoring Day
	Sunday or Public Holiday

Appendix F

Graphical Plots of Air Quality and Construction Noise Monitoring Results



Appendix G

Meteorological Data in the Reporting Month

Meteorological Data Extracted from HKO in the Reporting Month

Date	Weather	Peng Chau Weather Station					
		Total Rainfall (mm)	Mean Air Temperature (°C)	Wind Speed (km/h)	Mean Relative Humidity (%)	Wind Direction	
1-May-08	Thu	Holiday					
2-May-08	Fri	cloudy/a few showers/moderate	7.1	23.5	5.5	90	S
3-May-08	Sat	misty/sunny intervals/moderate	2.2	25.2	16	91	E
4-May-08	Sun	cloudy/scattered showers/light winds/moderate	Trace	26.3	8	86	S/SE
5-May-08	Mon	sunny intervals/light winds/fresh/ scattered showers /squally thunderstorm	4.5	24.4	4.5	90	S/SE
6-May-08	Tue	cloudy/rain/moderate/fresh	21	21.5	31.5	85.5	E
7-May-08	Wed	fine/mist/moderate	Trace	24.3	26.7	84.5	E
8-May-08	Thu	fine/hot/light winds	Trace	26.9	10.5	85.5	E/SE
9-May-08	Fri	cloudy/moderate/fresh/ scattered showers	0	28.1	7	87.5	S/SE
10-May-08	Sat	cloudy/showers/sunny intervals/moderate/fresh	3.5	22.6	15	79	N/NW
11-May-08	Sun	cloudy/showers/moderate/fresh	Trace	21.2	12	71	E/NE
12-May-08	Mon	Holiday					
13-May-08	Tue	fine/very dry/moderate/fresh	Trace	21.6	16.5	62	E
14-May-08	Wed	fine/dry/moderate/fresh	0	24	18	61	E
15-May-08	Thu	fine/dry/haze/hot/moderate	0	24.3	16.5	68	E
16-May-08	Fri	fine/dry/haze/hot/moderate	0	24.3	9.5	69.5	S/SE
17-May-08	Sat	cloudy/sunny intervals/moderate	0	24.2	10	68	S/SE
18-May-08	Sun	cloudy/sunny intervals/moderate	Trace	25.7	6.5	82	S
19-May-08	Mon	cloudy/rain/moderate	20.1	22.7	11.5	94	NW
20-May-08	Tue	cloudy/overcast/ rain/fresh/strong	32.9	20.6	19.5	94	E/NE
21-May-08	Wed	cloudy/a few showers/moderate	Trace	22.4	26.5	92	E
22-May-08	Thu	cloudy/rain/mist/moderate	1.4	24.5	20.5	91	E
23-May-08	Fri	sunny periods/isolated showers/moderate	0.3	26.5	13.5	85.5	E
24-May-08	Sat	hot/sunny periods/isolated showers/moderate	0.4	28.1	9	86.5	S/SE
25-May-08	Sun	sunny periods/a few showers/moderate/fresh	0.3	27.1	14	90.5	S/SE
26-May-08	Mon	sunny periods/a few showers/moderate/fresh	9.9	27.4	10	88.5	S/SE
27-May-08	Tue	a few showers/sunny periods/moderate/fresh	Trace	28.3	9	88.5	S
28-May-08	Wed	scattered showers/squally thunderstorms/sunny intervals/moderate/fresh	6.9	27	15.5	88	S/SW
29-May-08	Thu	cloudy/rain/squally thunderstorms/moderate/fresh	60.6	25.9	9	96.5	S/SW
30-May-08	Fri	cloudy/overcast/rain/squally thunderstorms/moderate/fresh	39	26.6	9.5	93.5	S
31-May-08	Sat	cloudy/rain/ thunderstorms/moderate	0.7	10.7	95	S/SE	25.5

Appendix H

Three-Month Rolling Program

