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EXECUTIVE SUMMARY

This is the first monthly Environmental Monitoring and Audit (EM&A) report prepared by Maunsell Environmental Management Consultants Limited (MEMCL), the designated Environmental Team (ET), for the Project "Penny's Bay Reclamation Stage 2". This report presents the results of EM&A works conducted in the month of July 2003 (21 to 31 July 2003).

In the reporting month, the following construction activities took place:

- Sediment dredging by grab dredgers;
- Sandfilling by barge;
- Seawall construction.

The total dredged volume in the month was 22,450 m^3 and the daily average dredging rate was 3,742 m^3 per day. The total sand filled volume in the month was 5,315 m^3 and the daily average filling rate was 531.5 m^3 per day. The total volume of uncontaminated materials dumped at East Nine Pins in the reporting period was 29,550 m^3.

Monitoring of 24-hour Total Suspended Particulates (TSP), noise, water quality and ecology was performed and the results were checked and reviewed. Site audits were conducted on weekly basis. The implementation of the environmental mitigation measures, Event and Action Plans and environmental complaint handling procedures were also checked.

Environmental Monitoring Works

Air Quality
All measured 24-hour TSP concentrations in the reporting month were below the Action and Limit (AL) Levels.

Noise
All measured noise levels during daytime and evening time were below the Action and Limit (AL) Levels in the reporting month.

Three exceedances of limit level during night-time were recorded on 31 July. All measured noise levels were within the range of the baseline level. ET's assessment has shown that these were not due to works of Reclamation Stage 2 and this has been confirmed by the IEC.

Water Quality
Five, one and one monitoring sessions were scheduled for discrete marine water quality, ammonia nitrogen and total inorganic nitrogen and, TBT/PAHs and PCBs monitoring respectively. Monitoring was performed on schedule other than 23 July when monitoring for flood tide was cancelled due to issue of Strong Wind Signal No.3 by the Hong Kong Observatory.

Eleven exceedances were recorded in the reporting month. The ET considered that the exceedances were not attributed to the works of Reclamation Stage 2. The IEC has carried out an assessment of the data based on the NOE submissions of 21 and 27 July and concluded that the NOE's recorded on 21 and 27 July were not due to the works and no further action is required.

DO and turbidity levels recorded at Cheung Sha Wan continuous water quality monitoring station was

generally comparable with those obtained from discrete marine water quality monitoring.

Terrestrial Ecology
Field survey of White-bellied Sea Eagles was conducted on 26 July. Roosting, soaring and foraging activities were recorded in the reporting month. During the survey in July, a single White-bellied Sea Eagle, considered to be the male, was observed at the monitoring site for a short period during the monitoring day. There was no evidence to indicate that the works at Penny's Bay have disturbed the White-bellied Sea Eagles.

Marine Mammal Monitoring
Marine mammal survey was conducted on 28 July 2003. No dolphin or porpoise was observed on the day. No disturbance to the marine mammals due to construction activities was evidenced in the reporting month.

Subtidal Monitoring
No subtidal monitoring was scheduled for the month. The first subtidal monitoring is scheduled in August 2003 and the monitoring frequency is once every six months.

Environmental Licensing and Permitting
Permits granted to the Project include the Environmental Permit for the Project, construction noise permit and dumping permit. Information of these permits is provided in Table 8.1.

Implementation Status of Environmental Mitigation Measures
Stagnant water was observed in drip trays at Portion B4. The Contractor was reminded to remove them as soon as possible. The Contractor was registered as a chemical waste producer at the end of July. The Contractor indicated that a chemical waste storage area would be set up by August.

Environmental Complaints and Prosecution
No complaint, summons or prosecutions related to environmental issues was made against the Penny's Bay Reclamation Project in the reporting period.

Future Key Issues
Key issues to be considered in the coming month include:

- Generation of dust from activities on-site
- Noise from operating equipment and machinery on-site
- Loss of sediment from dredging and filling
- Storage of chemicals/fuel and chemical waste/waste oil on site

1. INTRODUCTION

Background

1.1 Maunsell Environmental Management Consultants Limited (MEMCL) (hereinafter called the "ET") was appointed by Gammon Skanska Limited (GSL) (hereinafter called the "Contractor") to undertake Environmental Monitoring and Audit for "Penny's Bay Reclamation Stage 2" (hereinafter called the "Project"). Under the requirements of Section 4 of Environmental Permit EP-054/2000/D, EM&A programme as set out in the EM&A Manual is required to be implemented. In accordance with the EM&A Manual, environmental monitoring of air quality, noise, water quality and ecology are required for the Project.

1.2 Construction for the Project commenced on 21 July. This report summarises the environmental monitoring and audit works for the Project in July 2003 (from 21 to 31 July 2003).

Project Organisation

1.3 The structure of the environmental management team is shown in Figure 1.1. Contacts of key environmental staff of the Project are shown in Appendix O.

Construction Works undertaken during the Reporting Month

1.4 Construction commenced on 21 July. The major construction activities undertaken in the reporting month were seawall construction, sand filling by barge and sediment dredging by grab dredger which commenced on 21, 22 and 26 July respectively. The total volume of dredged material in the month was 22,450 m^3 (in-situ volume) and the daily average dredging rate was 3,742 m^3 per day. The total sand filled volume in the month was 5,315 m^3 and the daily average filling rate was 531.5 m^3 per day. Uncontaminated materials were dumped at East Nine Pins. The total dumped volume in the reporting period was 29,550 m^3. Daily records of dredged / dumped and sandfilled volumes are presented in Appendix A.

1.5 A layout plan of the Project is provided in Figure 1.2.

1.6 The estimated amounts of different types of waste generated by the activities of the Project in the month are shown in Table 1.1.

Table 1.1 Estimated Amounts of Waste Generated in July 2003

Waste Type	Examples	Estimated Amount (m^3)	Disposal Locations
Site clearance waste	Vegetation, refuse on land	Nil	Not applicable
C&D waste	Used silt curtains	Nil	Not applicable
Dredged material	Marine sediments	26,150	East Nine Pins Dumping Ground
Chemical waste	Contaminated Sand (site)	Nil	Not applicable

Waste Type	Examples	Estimated Amount (m^3)	Disposal Locations
	Used oil, spent solvent (site)	Nil	Not applicable
	Used oil, spent solvent (vessels)	Nil	Not applicable
	Used spent oil filter (site)	Nil	Not applicable
	Used empty pail (site)	Nil	Not applicable
	Contaminated lube oil (site)	Nil	Not applicable
General waste	Domestic waste (site) collected in garbage bins	60	SENT landfill
	Domestic waste (site) collected in sludge tank	26	Pillar Point Sewage Treatment Works
	Domestic waste (marine)	Nil	Not applicable

Summary of EM&A Requirements

1.7 The EM&A programme requires environmental monitoring for air quality, noise, water quality, terrestrial and marine ecology, and waste management. The EM&A requirements for each parameter are described in subsequent sections, including:

- All monitoring parameters;
- Action and Limit levels for all environmental parameters;
- Event-Action Plans;
- Environmental mitigation measures, as recommended in the project EIA final report;
- Environmental requirements in contract documents.

1.8 The environmental licensing and permits are described in Section 8.

1.9 The advice on the implementation status of environmental protection and pollution control/mitigation measures is summarized in Section 8 of the Report.

2. AIR QUALITY MONITORING

Monitoring Requirements

2.1 24-hour TSP monitoring was conducted to monitor the air quality. Appendix B shows the established Action/Limit Levels for the environmental monitoring works.

Monitoring Equipment

2.2 High volume samplers (HVS - Model GMWS-2310 Accu-Vol) complete with the appropriate sampling inlets were installed for 24-hour TSP sampling. The HVS composed of a motor, a filter holder, a flow controller and a sampling inlet and its performance specification complies with USEPA Standard Title 40, Code of Federation Regulations Chapter 1 (Part 50 Appendix B). Table 2.1 summarises the equipment that was used in the dust-monitoring programme.

Table 2.1 TSP Monitoring Equipment

Equipment	Model
HVS	GMWS 2310 c/w of TSP sampling inlet
Calibration Kit	GMW 25

Monitoring Parameters, Frequency and Duration

2.3 The monitoring parameters and frequency are summarised in Table 2.2. The monitoring schedule for the reporting month is shown in Appendix C.

Table 2.2 Air Quality Monitoring Parameters and Frequency

Location	Parameter	Duration	Frequency
AM1	1-hour TSP	1 hour	3 times every 6 days*
	24-hour TSP	24 hours	Once every six days
AM2	1-hour TSP	1 hour	3 times every 6 days*
	24-hour TSP	24 hours	Once every six days

* This only applies after complaint is made.

Monitoring Locations

2.4 In accordance with the EM&A Manual, two air quality monitoring stations, as shown in Figure 2.1, were selected for 24-hour TSP sampling. Table 2.3 describes the location of the air quality monitoring stations.

Table 2.3 Location of Air Quality Monitoring Stations

ASR No.	Identity / Description
AM1	Penny's Bay Power Station
AM2	Luk Keng Tsuen

Monitoring Methodology

Installation

2.5 The HVSs were installed in the vicinity of the air sensitive receivers. The following criteria were considered in the installation of the HVS.

- A horizontal platform with appropriate support to secure the samplers against gusty wind was provided.
- No two HVSs were placed less than 2 meters apart.
- The distance between the HVS and any obstacles, such as buildings, was at least twice the height that the obstacle protrudes above the HVS.
- A minimum of 2 meters separation from walls, parapets and penthouses was required for rooftop samplers.
- No furnace or incinerator flues were nearby.
- Airflow around the sampler was unrestricted.
- Permission was obtained to set up the samplers and to obtain access to the monitoring stations.

Preparation of Filter Papers by ALS Technichem (HK) Pty Ltd.

- Glass fibre filters, G810 were labeled and sufficient filters that were clean and without pinholes were selected.
- All filters were equilibrated in the conditioning environment for 24 hours before weighing. The conditioning environment temperature was around 25 °C and not variable by more than ±3 °C; the relative humidity (RH) was < 50% and not variable by more than ±5%. A convenient working RH was 40%.
- *ALS Technichem (HK) Pty Ltd.* has comprehensive quality assurance and quality control programmes.

Field Monitoring

- The power supply was checked to ensure the HVS works properly.
- The filter holder and the area surrounding the filter were cleaned.
- The filter holder was removed by loosening the four bolts and a new filter, with stamped number upward, on a supporting screen was aligned carefully.
- The filter was properly aligned on the screen so that the gasket formed an airtight seal on the outer edges of the filter.
- The swing bolts were fastened to hold the filter holder down to the frame. The pressure applied should be sufficient to avoid air leakage at the edges.
- Then the shelter lid was closed and was secured with the aluminum strip.
- The HVS was warmed-up for about 5 minutes to establish run-temperature conditions.
- A new flowrate record sheet was set into the flow recorder.
- The flow rate of the HVS was checked and adjusted at around 1.1 m^3/min. The range specified in the EM&A Manual was between 0.6-1.7 m^3/min.
- The programmable timer was set for a sampling period of 24 hrs $\pm$ 1 hr, and the starting time, weather condition and the filter number were recorded.
- The initial elapsed time was recorded.
- At the end of sampling, the sampled filter was removed carefully and folded in half length so that only surfaces with collected particulate matter were in contact.

- It was then placed in a clean plastic envelope and sealed.
- All monitoring information was recorded on a standard data sheet.
- Filters were sent to *ALS Technichem (HK) Pty Ltd.* for analysis.

Maintenance & Calibration

- The HVSs and their accessories are maintained in good working condition, such as replacing motor brushes routinely and checking electrical wiring to ensure a continuous power supply.
- HVSs are calibrated at bi-monthly intervals using GMW-25 Calibration Kit throughout all stages of the air quality monitoring.

Results and Observations

2.6 Dust monitoring was conducted as scheduled in the reporting month. All monitoring data and graphical presentation of the monitoring results are provided in Appendix D.

2.7 Monitoring of 24-hour TSP was conducted at all monitoring stations on 25 and 31 July.

2.8 Measured 24-hour TSP concentrations in the month were all below the Action/Limit levels. No exceedance of 24-hour TSP Action/Limit levels was reported.

3. NOISE MONITORING

Monitoring Requirements

3.1 Noise monitoring was conducted at three monitoring stations as specified in the EM&A Manual. Appendix B shows the established Action/Limit Levels for noise.

Monitoring Equipment

3.2 Integrating Sound Level Meters were employed for noise monitoring. They were Type 1 sound level meters capable of giving a continuous readout of the noise level readings including equivalent continuous sound pressure level (L_{eq}) and percentile sound pressure level (L_x). They comply with International Electrotechnical Commission Publications 651:1979 (Type 1) and 804:1985 (Type 1). Portable electronic wind speed indicator capable of measuring the wind speed in m/s were employed to check the wind speed. Table 3.1 details the noise monitoring equipment used.

Table 3.1 Noise Monitoring Equipment

Equipment	Model
Integrating Sound Level Meter	B&K 2236 or Rion NL 14
Calibrator	B&K 4231
Portable Wind Speed Indicator	Anemometer 840003

Monitoring Parameters, Frequency and Duration

3.3 Noise monitoring was conducted three times per monitoring day, covering all time periods. The monitoring period, duration, parameters and frequency of noise measurement are presented in Table 3.2. The monitoring schedule for the reporting month is provided in Appendix C.

Table 3.2 Noise Monitoring Parameters, Period and Frequency

Time Period	Duration (min)	Parameters	Frequency
Daytime (0700 to 1900)	30	L_{eq}	Once every six days
*Evening (1900 to 2300)	5		
*Night-time (2300 to 0700 of next day)	5		

*Noise monitoring to be conducted only when construction work is in progress.

Monitoring Locations

3.4 In accordance with the EM&A Manual, noise monitoring was conducted at three designated monitoring stations as shown in Figure 3.1. Table 3.3 describes the locations of these monitoring stations.

Table 3.3 Noise Monitoring Locations

NSR No.	Identity / Description
NM1	Sea Crest Villa (Peng Chau)
NM2	Crestmont Villa (Discovery Bay)
NM3	Luk Keng Tsuen

Monitoring Methodology

Field Monitoring

- The Sound Level Meter was set on a tripod at a height of 1.2 m above the ground.
- For free field measurement, the meter was positioned away from any nearby reflective surfaces. For reference, a correction of +3dB(A) was made to the free field measurements.
- The battery condition was checked to ensure the correct functioning of the meter.
- Parameters such as frequency weighting, the time weighting and the measurement time were set as follows:
  - frequency weighting: A
  - time weighting : Fast
  - time measurement : 30 minutes / 5 minutes
- Prior to and after each noise measurement, the meter was calibrated using a Calibrator for 94 dB at 1000 Hz. If the difference in the calibration level before and after measurement was more than 1 dB(A), the measurement would be considered invalid and repeat of noise measurement would be required after re-calibration or repair of the equipment.
- The wind speed was frequently checked with a portable wind meter.
- During the monitoring period, the L_{eq} was recorded. In addition, site conditions and noise sources were recorded on a standard record sheet.
- Noise measurement was paused during periods of high intrusive noise (e.g. dog barking, helicopter noise) if possible. Observations were recorded when intrusive noise was unavoidable.
- Noise monitoring was cancelled in the presence of fog, rain, wind with a steady speed exceeding 5 m/s, or wind with gusts exceeding 10 m/s.
- It is noted that evening and night-time monitoring at all monitoring stations were conducted unattended, as the proprietor did not allow monitoring personnel to attend the equipment during these periods.

Maintenance and Calibration

- The microphone head of the sound level meter and calibrator is cleaned with soft cloth at quarterly intervals.
- The meter and calibrator is sent to Sun Creation Engineering Limited to check and calibrate at yearly intervals.

Results and Observations

3.5 Noise monitoring was conducted at the 3 designated monitoring stations during daytime period on 25 July and for daytime, evening time and night-time period on 31 July in the reporting month.

3.6 All monitoring data and graphical presentation of the monitoring results are provided in Appendix E.

3.7 Construction activities were undertaken during daytime from 21 to 26 July. Construction activities were undertaken 24 hours a day, 7 days a week since 27 July. Therefore, noise levels during restricted hours were also monitored since 31 July.

3.8 No exceedance of limit level during daytime and evening time was recorded in the month.

3.9 Three exceedances of limit level during night-time were recorded at all monitoring stations on 31 July. All measured noise levels were within the range of the baseline level (44.2 – 58.2 for NM1, 40.7 – 59.6 for NM2, 51.8 – 64.6 for NM3 during night-time). ET's assessment has shown that these were not due to the works of Reclamation Stage 2 and this has been confirmed by the IEC.

4. WATER QUALITY MONITORING

Discrete Marine Water Quality Monitoring

Monitoring Requirements

4.1 Marine water quality monitoring was carried out to ensure that any deterioration of water quality was detected, and that timely action was taken to rectify the situation. For marine water quality monitoring, measurements were taken at both mid-flood and mid-ebb tides at three depth locations (i.e., 1 m below surface, mid-depth and 1 m from seabed), where appropriate.

Monitoring Equipment

4.2 Table 4.1 summarised the equipment used for discrete marine water quality monitoring.

Table 4.1 Discrete Marine Water Quality Monitoring Equipment

Equipment	Model and Make
DO and Temperature Measuring Meter	YSI Model 6820 CE-C-M-Y
Salinity Meter	
Turbidimeter	
Water Sampler	Widco or Niskin Water sampler

Monitoring Parameters, Frequency and Duration

4.3 Table 4.2 summarised the monitoring parameters, frequencies and duration of the marine water quality monitoring as required in the EM&A Manual. The monitoring parameters and frequency of water quality monitoring for the month are described in the following sections. The monitoring schedule for the month is provided in Appendix C.

Table 4.2 Discrete Marine Water Quality Monitoring Parameters, Period and Frequency

Monitoring Station	Parameters (unit)	Frequency	No. of Depths
Sensitive Receiver Stations SR1, SR2, SR3, SR4, SR5, SR6, SR7, SR8, SR9 & SR10 *Control Stations* CS1, CS2, CS3, CS4, CS5, CS6 & CS7 *Gradient Stations* G1, G2, G3, G4, G5, G6, G7, G8, G9, G10, G11, G12, G13, G14 & G15	Depth(m) Temperature, (°C) Salinity (ppt) Dissolved Oxygen (mg/L) Dissolved Oxygen Saturation (%) Turbidity (NTU) Suspended Solids (mg/L) Nitrogen (Ammonia)* (NH_3-N) (mg/L) Total Inorganic Nitrogen* (TIN) (mg/L)	Three times per week during mid-ebb & mid-flood tides	3 (Surface, Mid-Depth & Bottom)

* Monitoring would be conducted from commencement of dredging and subject to review after initial two months.

Monitoring Locations

4.4 In accordance with the EM&A Manual, thirty-two stations (10 Sensitive Receiver Stations, 7 Control Stations and 15 Gradient Stations) were designated for discrete marine water quality monitoring. The ten Sensitive Receiver (SR) Stations were chosen on the basis of their proximity to the reclamation and thus the greatest potential for water quality impacts, the seven Control Stations (CS) were chosen to facilitate comparison of the water quality of the SR stations with ambient water quality conditions and, the fifteen Gradient Stations (G) were chosen to assist in the identification of the source of any impact. The locations of these monitoring stations are summarized in Table 4.3 and depicted in Figure 4.1.

Table 4.3 Discrete Marine Water Quality Monitoring Locations

Type	Location	HK Metric Grid E	HK Metric Grid N
Control Stations	CS1	818 678	823 526
	CS2	817 764	820 890
	CS3	826 137	822 377
	CS4	825 255	814 229
	CS5	823 171	810 014
	CS6	825 871	824 880
	CS7	819 888	808 851
Gradient Stations	G1	824 506	821 250
	G2	824 506	819 229
	G3	826 256	818 219
	G4	822 756	818 219
	G5	821 272	822 301
	G6	822 500	823 400
	G7	824 222	822 150
	G8	823 904	820 689
	G9	824 159	820 632
	G10	821 000	816 000
	G11	821 055	814 210
	G12	820 000	813 000
	G13	824 090	824 242
	G14	822 438	814 903
	G15	821 043	810 667
Sensitive Receiver Stations	SR1	825 607	816 216
	SR2	820 268	817 870
	SR3	821 033	819 153
	SR4	823 827	823 208
	SR5	823 827	823 705
	SR6	824 511	823 518
	SR7	823 810	823 590
	SR8	818 766	811 267
	SR9	819 133	810 932
	SR10	818 700	810 600

Monitoring Methodology

Instrumentation

4.5 A multiparameter meter (Model YSI 6820 CE-C-M-Y) was used to measure dissolved oxygen, temperature, salinity and turbidity.

Operating/Analytical Procedures

4.6 A Global Positioning System (GPS) was used to ensure that the correct location was selected prior to sample collection.

4.7 A portable, battery-operated echo sounder was used for the determination of water depth at

each designated monitoring station.

4.8 All in-situ measurements were taken at 3 water depths, namely 1m below water surface, mid-depth, and 1m from seabed, except where the water depth was less than 6m, the mid-depth measurement was omitted. If the water depth was less than 3m, only the mid-depth position was monitored.

4.9 At each measurement/sampling depth, two consecutive measurements of dissolved oxygen content and turbidity were taken. The probes were retrieved out of the water after the first measurement and then re-deployed for the second measurement. Where the difference in the value between the first and second readings of each set was more than 25% of the value of the first reading, the reading was discarded and further readings were taken.

4.10 Water samples were collected using the water samplers and the samples were stored in high-density polythene bottles. Water samples collected were well-mixed in the water sampler prior to pre-rinsing and transferring to sample bottles. Sample bottles were pre-rinsed with the same water samples. The sample bottles were then packed in cool-boxes (cooled at $4^{O}C$ without being frozen), and delivered to *ALS Technichem (HK) Pty Ltd.* for the analysis of suspended solids concentrations. The analysis followed APHA *Standard Methods for the Examination of Water and Wastewater* 19^{th} Edition 2540D. *ALS Technichem (HK) Pty Ltd.* has comprehensive quality assurance and quality control programmes. For QA/QC procedures, one duplicate samples of every batch of 20 samples was analyzed. The QA/QC results are summarized in Appendix H.

Maintenance and Calibration

4.11 All in situ monitoring instruments would be calibrated and certified by *Wellab Ltd.* at 3-monthly intervals throughout all stages of the water quality monitoring programme.

4.12 The dissolved oxygen probe of YSI 6820 was calibrated once a day by wet bulb method. Before the calibration routine, the sensor for dissolved oxygen was thermally equilibrated in water-saturated air. Calibration cup is served as a calibration chamber and it was loosened from airtight condition before it is used for the calibration. Calibration was carried out in a water sample with a known concentration of dissolved oxygen. The sensor was immersed in the water and after thermal equilibration, the known mg/L value was keyed in and the calibration was carried out automatically.

4.13 The turbidity probe of YSI 6820 is calibrated two times a month. Before the measurement, a zero check in distilled water was performed with the turbidity probe of YSI 6820. The probe was calibrated with a solution of known NTU.

Results and Observations

4.14 Appendix F1 presents the discrete marine water quality monitoring data and Appendix F2 shows the graphical presentation of the monitoring results. Note that in Appendix F1, the "sea condition" is given as indicative information and does not necessarily adhere to any standard sea state descriptions. In general, "calm" means small or no waves were observed; "rough" includes white-capped sea or rougher; and "moderate" means all conditions in between "calm" and "rough". Key findings and observations for water quality monitoring are presented below.

4.15 Discrete marine water quality monitoring commenced on 21 July where five monitoring sessions were scheduled in the reporting month. Monitoring of ammonia nitrogen (NH_3N) and total inorganic nitrogen (TIN) commenced on 29 July. Monitoring results of NH_3N and TIN would be provided in Monthly EM&A Report for August 2003. Monitoring at all designated monitoring stations were performed on schedule other than 23 July when monitoring for flood tide was cancelled due to issue of Strong Wind Signal No.3 by the Hong Kong Observatory.

4.16 Total number of exceedances for dissolved oxygen, turbidity and suspended solids at each sensitive receiver for the month are summarised in Table 4.4.

Table 4.4 Water Quality Exceedance Summary

Station	Exceedance Level	DO (S&M)		DO (Bottom)		Turbidity		SS		Total	
		Ebb	Flood	Ebb	Flood	Ebb	Flood	Ebb	Flood	Ebb	Flood
SR 1	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
SR 2	Action	0	0	0	0	1	3	0	1	1	4
	Limit	0	0	0	0	0	0	1	0	1	0
SR 3	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
SR 4	Action	0	0	0	0	0	0	0	2	0	2
	Limit	0	0	0	0	0	1	0	0	0	1
SR 5	Action	0	1	1	0	0	0	0	0	1	1
	Limit	0	0	0	0	0	0	0	0	0	0
SR 6	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
SR 7	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
SR 8	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
SR 9	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
SR 10	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
Total	**Action**	0	1	1	0	1	3	0	3	9	
	Limit	0	0	0	0	0	1	1	0	2	

Note: S = Surface, M = Mid-depth

4.17 Eleven exceedances were reported in the reporting month. The ET considered the exceedances were mainly due to local effects andhe exceedances were not attributed to the works of reclamation Stage 2. The IEC has carried out an assessment of the data based on the NOE submissions of 21 and 27 July and concluded that the NOE's recorded on 21 and 27 July were not due to the works and no further action is required.

4.18 The QA/QC results for laboratory testing in the month were acceptable. The QA/QC results are summarized in Appendix H.

Dissolved Oxygen

4.19 Two exceedances were recorded in the reporting month at SR5 on 21 and 25 July. The ET considered the exceedances were not due to the works as neither dredging nor filling activities was carried out on both 21 and 25 July.

Turbidity

4.20 Exceedances of turbidity level were recorded in the reporting month at SR2 (4) on 21, 25, 27 and 29 July and at SR4 (1) on 29 July. For SR2, exceedances were recorded at both mid-ebb (1) and mid-flood (3) tide. The ET considered the exceedances at SR2 were not due to the works as no dredging or filling activities was conducted on the day when the ebb tide exceedance was recorded and SR2 is located upstream of Reclamation Stage 2 works area during flood tide. For SR4, exceedance was recorded at mid-flood tide on 29 July. The ET considered that the turbidity level recorded at upstream gradient stations G8 and G9 (stations closer to the construction site) were lower than that recorded at SR4 (station further downstream) on the monitoring day which suggest that the exceedance at SR4 was not due to works of Reclamation Stage 2.

Suspended Solids

4.21 Exceedances of suspended solids level were recorded in the reporting month at SR2 (2) on 21 and 29 July and at SR4 (2) on 27 and 29 July. For SR2, exceedances were recorded at both mid-ebb (1) and mid-flood (1) tide. The ET considered the exceedances at SR2 were not due to the works as the suspended solids level at G4 (station closer to the construction site) was much lower than that recorded at SR2 and SR2 is located upstream of Reclamation Stage 2 works area during flood tide. For SR4, exceedances were recorded at mid-flood (2) tide. The ET considered that the suspended solids level recorded at upstream gradient stations G1, G7, G8 and G9 (stations closer to the construction site) were lower than that recorded at SR4 (station further downstream) which suggest that the exceedance at SR4 was not due to works of Reclamation Stage 2.

Monitoring of TBT/PAHs/PCBs

Monitoring Requirements

4.22 Monitoring of Tributyl Tin (TBT), Polycyclic Aromatic Hydrocarbons (PAHs) and Polychlorinated Biphenyls (PCBs) levels in waters before and during the initial phases of dredging operations in Penny's Bay is required under Clause 2.15 of the Permit.

Monitoring Equipment

4.23 Table 4.5 summarises the equipment used for the monitoring of TBT, PAHs and PCBs.

Table 4.5 TBT, PAHs and PCBs Monitoring Equipment

Equipment	Model and Make
Water Sampler	Widco or Niskin Water sampler

Monitoring Parameters, Frequency and Duration

4.24 Table 4.6 summarised the monitoring parameters, frequencies and duration of the monitoring of TBT, PAHs and PCBs. The monitoring parameters and frequency of TBT, PAHs and PCBs monitoring for the month are described in the following sections. The monitoring schedule for the month is provided in Appendix C.

Table 4.6 TBT, PAHs and PCBs Monitoring Parameters, Period and Frequency

Monitoring Station	Parameters (unit)	Frequency	No. of Depths
TPP1, TPP2, TPP2, TPP3, TPP4, TPP5, TPP6 & TPP7	Tributyl Tin (TBT, µg/L), Polycyclic Aromatic Hydrocarbons (PAHs, µg/L), Polychlorinated Biphenyls (PCBs, µg/L)	Two times within one week during mid-ebb and mid-flood tides before dredging Three times per week during mid-ebb and mid-flood tides during dredging (subject to review after 2 months monitoring)	3 (Composite Sample of Surface, Mid-Depth & Bottom)

Monitoring Locations

4.25 In accordance with the EM&A Manual, seven stations were designated for TBT, PAHs and PCBs monitoring. The locations of these monitoring stations are summarized in Table 4.7 and depicted in Figure 4.2.

Table 4.7 TBT, PAHs and PCBs Monitoring Locations

Location	HK Metric Grid E	HK Metric Grid N
TPP1	823 798	823 630
TPP2	823 842	823 165
TPP3 (Control)	826 327	818 446
TPP4	824 084	819 562
TPP5	823 238	818 568
TPP6	823 800	820 000
TPP7	819 133	810 932

Monitoring Methodology

4.26 Water samples were collected using the water samplers and the samples were stored in high-density polythene bottles. Water samples collected were well-mixed in the water sampler prior to pre-rinsing and transferring to sample bottles. Sample bottles were pre-rinsed with the same water samples. The sample bottles were then packed in cool-boxes (cooled at 4°C without being frozen), and delivered to *ALS Technichem (HK) Pty Ltd.* for the analysis. The Standard Methods for Laboratory Analysis of Water Samples are summarised in Table 4.8. *ALS Technichem (HK) Pty Ltd.* has comprehensive quality assurance and quality control programmes.

4.27 A Global Positioning System (GPS) was used to ensure that the correct location was selected prior to sample collection.

4.28 A portable, battery-operated echo sounder was used for the determination of water depth at

each designated monitoring station.

Table 4.8 Standard Methods for Laboratory Analysis of Water Samples

Parameter	Preparation Method	Testing Method
TBT	UNEP/IOC/IAEA*	
PAHs (light)	USEPA 1311	USEPA 8270
PAHs (heavy)	USEPA 1311	USEPA 8270
Total PCBs	USEPA 1311	USEPA 8082

*IAEA's Marine Environment Laboratory reference methods available from UNEP/Water or Marine Environmental Studies Laboratory at IAEA Marine Environment Laboratory.

Results and Observations

4.29 TBT, PAHs and PCBs monitoring commenced on 29 July. Monitoring at all designated monitoring stations were performed on schedule. Monitoring results would be provided in Monthly EM&A Report for August 2003.

Continuous Marine Water Quality Monitoring

Monitoring Requirements

4.30 In accordance with Clause 26.33 of Particular Specification Section 26, 24-hour continuous water quality monitoring at Ma Wan and Cheung Sha Wan FCZs were required to be conducted to closely monitor the impacts of works on water quality throughout the duration of the marine works. The monitoring data should be transmitted in real time to the ET, ENPO, EPD, AFCD and ER's offices. The ET should perform data auditing, analyse monitoring data and submit monitoring data to the ER, ENPO, AFCD and EPD. Also, the ET should report the 24-hr continuous water quality monitoring data in the monthly EM&A reports.

Monitoring Equipment

4.31 Table 4.9 summarises the equipment of continuous marine water quality monitoring.

Table 4.9 Continuous Marine Water Quality Monitoring Equipment

Equipment	Model
Data Acquisition System	YSI 6200
Multi-Sensor Probe	YSI 6820
Dissolved Oxygen Sensor	YSI 6562
Temperature & Conductivity Sensor	YSI 6560
Turbidity Sensor	YSI 6026

Monitoring Parameters, Frequency and Duration

4.32 Table 4.10 summarizes the monitoring parameters and frequencies of continuous marine water quality monitoring.

Table 4.10 Continuous Marine Water Quality Monitoring Parameters, Period and Frequency

Monitoring Station	Parameters (unit)	Frequency	No. of Depths
Ma Wan Fish Culture Zone Cheung Sha Wan Fish Culture Zone	Temperature, (°C) Salinity (ppt) Dissolved Oxygen (mg/L) Dissolved Oxygen Saturation (%) Turbidity (NTU)	Continuous	1 to 2 m below water surface (stations mounted on floating platforms)

Monitoring Locations

4.33 The locations of the two continuous marine water quality monitoring stations at Ma Wan and Cheung Sha Wan Fish Culture Zone are summarized in Table 4.11 and depicted in Figure 4.3.

Table 4.11 Continuous Marine Water Quality Monitoring Locations

Type	Location	HK Metric Grid E	HK Metric Grid N
Continuous Monitoring Stations	Ma Wan	823784	823766
	Cheung Sha Wan	818954	811025

Monitoring Methodology

Operation

4.34 Continuous water quality monitoring stations were provided at Ma Wan and Cheung Sha Wan FCZ. The monitoring probes were located at offshore fish racks at both Ma Wan FCZ (about 100 metres from shore) and Cheung Sha Wan FCZ (about 800 metres from shore). Small buoys were placed on the sea surface to indicate the locations of these two monitoring probes. Data loggers and modems were placed inside a storage house on nearby fish rafts.

4.35 Water quality parameters of dissolved oxygen, turbidity, salinity and temperature were measured at intervals of 5 minutes. The monitoring data were then transmitted to ER, ENPO, EPD, AFCD and MEMCL Head Office at regular intervals via modems and telephone lines. All these devices were programmed to operate 24 hours a day, 7 days a week.

Maintenance and Calibration

4.36 The following practices were implemented to enhance the reliability of the equipment:

- Both sites were visited by ET's field staff at least twice a week to clean and maintain the equipment;
- All probes were calibrated at least once a week. Calibration method follows those outlined in

Section 4.11 to 4.13.

Results and Observations

4.37 Cheung Sha Wan continuous water quality monitoring station was taken over on 21 July. Appendix G presents the water quality monitoring data and graphical presentation of the monitoring results obtained from Cheung Sha Wan continuous water quality monitoring station. Ma Wan continuous water quality monitoring station was operated and maintained by Contract No. CV/2000/09 Infrastructure for Penny's Bay, Contract 1 in the reporting month.

4.38 Periods of high turbidity levels were recorded at Cheung Sha Wan on 23 July. After inspections, these high readings were caused by bio-fouling of the equipment. Turbidity levels dropped back to the normal levels after maintenance.

4.39 Due to data logger malfunction, no dissolved oxygen and turbidity data was recorded at Cheung Sha Wan station, between 28 July to 31 July.

4.40 Apart from the affected period mentioned above, DO and turbidity levels recorded from discrete and continuous water quality monitoring are similar in magnitude. Direct comparison is not possible since these monitoring were not conducted at the exact same location.

5. TERRESTRIAL ECOLOGY

Monitoring Requirements

5.1 Monitoring of the White-bellied Sea Eagles at Pa Tau Kwu was required to be conducted by an avian specialist as specified in the EM&A Manual. Appendix L shows the Event and Action Plan for the monitoring works.

Monitoring Equipment

5.2 Equipment used for the monitoring includes Fieldscope 20-60x and Binocular 10x.

Monitoring Parameters, Frequency and Duration

5.3 Field surveys for the White-bellied Sea Eagles were to be conducted twice per month during periods of breeding activity (October to April), and once per month at other times of the year. Information on the responses to any disturbances, behaviour, and breeding activity of the White-bellied Sea Eagles was recorded. The monitoring frequency for the month are described in the following sections. The monitoring schedule for the month is provided in Appendix C.

Monitoring Locations

5.4 In accordance with the EM&A Manual, monitoring of the White-bellied Sea Eagles was conducted at Pa Tau Kwu. The monitoring location is shown at Figure 5.1.

Monitoring Methodology

5.5 Each monitoring survey was undertaken at Pa Tau Kwu, about 100 m from the nest to avoid disturbance to the normal behaviour of the White-bellied Sea Eagles.

5.6 Activities of the White-bellied Sea Eagles, including feeding, perching/roosting, preening, soaring, flying, nesting, and territorial guarding and the time spent on each activity, were recorded. The responses and reactions to any disturbance to the White-bellied Sea Eagles were also recorded.

Results and Observations

Introduction

5.7 In the reporting month, field survey was conducted on 26 July between 8:45am and 5:45pm. The monitoring results are summarised and presented in Table 5.1

5.8 Photographic records of the White-bellied Sea Eagle were presented in Figure 5.2.

Table 5.1 Time Allocation (%) for White-bellied Sea Eagle (female and male) activity at Pa Tau Kwu in July 2003

Weather Conditions	**Sunny**	
Activities	**Individual A (female)**	**Individual B (male)**
Feeding	0%	0%
Territorial guarding	0%	0%
Roosting/ Preening	0%	2.0%
Soaring nearby	0%	<1%
Distant flight/ foraging	0%	98%
Incubating	0%	0.0%
Total	100%	100%

Note: Distant flight/foraging includes out of sight time.

Breeding activity

5.9 The monitoring month is outside the breeding season. No breeding activity was recorded.

General observations

5.10 During the monitoring visit (26 July), which took place 2 days after Typhoon Imbudo, one White-bellied Sea Eagle, thought to be the male bird, was recorded. It appeared to be in a healthy condition. The female bird, however, was not observed throughout the observation period. Through monitoring work conducted for a related project (Infrastructure for Penny's Bay, Contract 1), it is known that both the male and female White-bellied Sea Eagles were present at the site earlier in the month (4th July).

5.11 The White-bellied Sea Eagle (considered to be the male) was observed for a short period at the start of the monitoring period when it was seen perching in nearby trees. For the remainder of the monitoring visit, the White-bellied Sea Eagle was engaged in distant flight and spent most of the time out of view from the observer.

Disturbance

5.12 On and prior to the monitoring day, works for the project involved seawall construction activities more than 1km from the nest. No behaviours indicating disturbance to the WBSE from these construction works at the Penny's Bay site were observed.

Conclusion

5.13 White-Bellied Sea Eagle monitoring was undertaken on 26 July, two days following severe weather conditions from Typhoon Imbudo. A single White-bellied Sea Eagle, considered to be the male, was observed at the monitoring site for a short period during the monitoring day. The female bird was not recorded. It appeared that the male bird was in healthy condition. No behaviour to indicate disturbance from the project works was recorded during the observation period.

6. MARINE MAMMAL MONITORING

Monitoring Requirements

6.1 Construction-phase marine mammal monitoring is required to be conducted by a qualified research team to evaluate whether there have been any effects on the animals.

Monitoring Equipment

6.2 Table 6.1 summarises the equipment used for the marine mammal monitoring.

Table 6.1 Marine Mammal Monitoring Equipment

Equipment	Model
Global Positioning System (GPS)	Magellan NAV 5000D
Camera	Canon auto-focus camera with 300m zoom lens
Laser Binoculars	Busnell Yardage Pro
Marine Binocular	Fujinon 7 × 50 marine binocular with compass

Monitoring Parameter, Frequencies and Duration

6.3 Marine mammal monitoring is required twice per month. The monitoring data should be compatible with, and should be made available for, long-term studies of small cetacean ecology in Hong Kong. The monitoring frequency for the month are described in the following sections. The monitoring schedule for the month is provided in Appendix C.

Monitoring Location

6.4 The marine mammal monitoring was conducted at East Lantau. The detailed monitoring location with transect lines are shown in Figure 6.1.

Monitoring Procedures

6.5 Line transect surveying techniques have now been standardised in Hong Kong Special Administrative Region Waters, in order to ensure that data from all surveys are directly comparable.

6.6 Survey boat was equipped with an open upper deck, which allowed for observer eye levels at 4-5m above water level and relatively unobstructed forward visibility between 270^0 and 90^0. When monitoring started, the boat travelled along the transects at a speed of approximately 7-8 knots (13-15 km/hr).

6.7 On arrival at East Lantau survey area, the survey vessel, containing four vessel-based survey personnel proceeded along transects in the vicinity of the reclamation area. On the return

journey, observations for incidental dolphin sightings were undertaken. Observations continued until the boat reached the designated arrival/departure pier.

Vessel-based Observations

6.8 A critical consideration in the survey was to ensure a strict timed quantification of "sighting effort" in order to maximise the comparative value of the field survey results. The time and position for the start and end of a period of intensive, uninterrupted effort and the sighting conditions associated with it were recorded. The collection of effort data allowed comparisons to be made with a single study as well as between studies. Strict recording of time, speed, position and distance travelling along the designated transect ("on-effort") were recorded. Time spent during any deviation from the transect was recorded as "off-effort". This effort data allowed dolphin abundance to be calculated using line transect methodology.

6.9 Vessel-based transect observations by a 4 person team were conducted by searching the 180^0 degree swath in front of the survey vessel ($270^0 - 90^0$). The area behind the vessel was not searched, although dolphins observed here can be recorded as off-effort sightings. There were four survey personnel on board the vessel. A primary observer scanned the entire search path ($270^0 - 90^0$) continuously with 7x50 marine binoculars with the second member of the team designated the data recorder, scanned the same area with naked eyes and occasional binocular checks. The third observer rotated into the observation team after half an hour, thus relieving one of the initial team members. Observers were shifted every half-hour. While on-effort, observers were instructed to ignore potential sighting cues that could bias the sighting distance calibration (e.g. pair-trawl fishing vessels).

6.10 A Global Positioning System should be available onboard during every field survey.

6.11 Sighting records for the initial sighting with time, position, distance, and angle data were recorded during the survey, and verified between primary observer and data recorder. All other information, such as sea state, weather conditions (Beaufort Scale), as well as notes on dolphin group size, age classes, behaviour, association with fishing boat, direction of movement, response to boat and others were completed at the end of the sighting. Standard forms for all dolphin monitoring were used.

Results and Observations

6.12 Marine mammal survey was conducted on 28 July. The weather was cloudy.

6.13 No dolphin or porpoise was observed during the survey.

6.14 No other factor, including weather conditions, that might have affected the results of the monitoring was observed.

6.15 No disturbance to the marine mammals due to construction activities was observed in the reporting month.

7. SUBTIDAL MONITORING

Monitoring Requirements

7.1 No subtidal monitoring was scheduled for the month. The first subtidal monitoring is scheduled in August 2003 and the monitoring frequency is once every six months.

8. ENVIRONMENTAL AUDIT

Site Environmental Audit

8.1 The first site audit was conducted on 25 July and site audit would be carried out once per week to monitor environmental issues on the construction sites to ensure that all mitigation measures were implemented timely and properly. The summary of site audit on 25 July is attached in Appendix J.

Review of Environmental Monitoring Procedures

8.2 The monitoring works conducted by the monitoring team were inspected regularly. The following observations have been recorded for the monitoring works:

Air Quality Monitoring

- The monitoring team recorded all observations around the monitoring stations within and outside of the construction site.
- The monitoring team recorded the temperature, air pressure and weather conditions on the monitoring day.

Noise Monitoring

- The monitoring team recorded all observations around the monitoring stations, which might affect the monitoring result.
- Major noise sources were identified and recorded. Other intrusive noise attributing to the result was trimmed off by pausing the monitoring temporarily.

Water Quality Monitoring

The monitoring team recorded all observations around the monitoring stations, which might affect the monitoring results.

- Major water pollution sources were identified and recorded.

Ecology Monitoring

- The avian specialist recorded all observations around the monitoring location, which might affect the result.
- Major disturbances, if any, were identified and recorded.

Status of Environmental Licensing and Permitting

8.3 All permits/licences obtained as of July 2003 are summarised in Table 8.1.

Table 8.1 Summary of Environmental Licensing and Permit Status

Permit No.	Valid Period		Section	Status
	From	To		
Environmental Permit				
EP-054/2000/D	06/03/03	N/A	Reclamation of about 280 ha. of land at Penny's Bay, construction of about 3.3 km of seawall, two ferry piers and construction of about 1.5km long open drainage channel.	Valid
Construction Noise Permit				
GW-UW0508-03	23/07/03	20/01/04	Derrick barge, tug boat, grab dredger, hopper barge, pelican barge, generator, lorry with crane at Penny's Bay (evening and night-time).	Valid
Dumping Permit				
EP/MD/04-019	19/06/03	30/09/03	Hopper barge.	Valid

Implementation Status of Environmental Mitigation Measures

8.4 During site inspection on 25 July, the following observations and recommendations were made.

Dust Mitigation Measures

8.5 No violation was observed during site inspections in the month.

Water Quality Mitigation Measures

8.6 Silt curtains were maintained regularly.

Noise

8.7 Quiet plants were adopted for construction activities.

Ecology

8.8 No violation was observed during site inspections in the month.

Waste / Chemical Management

8.9 Stagnant water was observed in drip trays at Portion B4. The Contractor was reminded to remove them as soon as possible.

8.10 The Contractor was registered as a chemical waste producer at the end of July. The Contractor indicated that a chemical waste storage area would be set up by August.

Landscape and Visual

8.11 No violation was observed during site inspections in the month.

Environmental Mitigation Implementation Schedule (EMIS)

8.12 According to the Environmental Permit, the mitigation measures detailed in the permits are required to be implemented. An updated summary of the EMIS is presented in Appendix K.

Implementation Status of Event/Action Plans

8.13 The Event and Action Plans for air quality, noise, water quality and white-bellied sea eagle are presented in Appendix L.

8.14 No exceedance of Action/Limit Levels for 24-hour TSP concentrations was reported in the month.

8.15 No exceedance of noise limit level during daytime and evening time was recorded in the month and all exceedances of noise limit level during night-time were within the range of baseline survey. No action was required to be carried out.

8.16 All exceedances of water quality were not due to the works of Reclamation Stage 2. No action was required to be carried out.

Implementation Status of Environmental Complaint Handling Procedures

Summary of the Complaints and Prosecutions

8.17 Appendix M presents the environmental complaint flow diagram of the Project. No complaint, summons or prosecution related to environmental issues was received or made against the Project in the reporting month.

9. FUTURE KEY ISSUES

Key Issues for the Coming Month

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

- Generation of dust from activities on-site
- Noise from operating equipment and machinery on-site
- Loss of sediment from dredging and filling
- Maintenance of silt curtains
- Storage of chemicals/fuel and chemical waste/waste oil on site

Construction Program for the Next 3 Months

9.2 The construction programme for the whole contract is shown in Appendix N.

10. CONCLUSIONS AND RECOMMENDATIONS

Conclusions

10.1 Environmental impact monitoring was performed since 21 July. All monitoring results in the reporting month were checked and reviewed.

10.2 All measured 24-hour TSP concentrations in the month were below the Action and Limit (AL) Levels.

10.3 Three exceedances of limit level during night-time were recorded on 31 July. All measured noise levels were within the range of the baseline level. ET's assessment has shown that these were not due to the works of Reclamation Stage 2 and this has been confirmed by the IEC.

10.4 Eleven water quality exceedances were recorded in the reporting month. The ET considered the exceedances were not attributed to the works of Reclamation Stage 2. The IEC has carried out an assessment of the data based on the NOE submissions of 21 and 27 July and concluded that the NOE's recorded on 21 and 27 July were not due to the works and no further action is required.

10.5 DO and turbidity levels recorded at continuous marine water quality monitoring station at Cheung Sha Wan was generally comparable with those obtained from discrete marine water quality monitoring.

10.6 A single White-bellied Sea Eagle, considered to be the male, was observed at the monitoring site for a short period during the survey in the reporting month. There was no evidence to indicate that the works of Reclamation Stage 2 have disturbed the White-bellied Sea Eagles.

10.7 No dolphin or porpoise was observed in the reporting month. No disturbance to the marine mammals due to construction activities was therefore observed in the reporting month.

10.8 No complaint, summons or prosecutions related to environmental issues was made against the Penny's Bay Reclamation Project in the reporting period.

Recommendations

10.9 According to the environmental audit performed in the reporting month, the following recommendations are made:

Dust Impact

- To prohibit any open burning on site.
- To regularly maintain the machinery and vehicles on site.
- To follow up any exceedance caused by the construction works.
- To implement dust suppression measures on dry surfaces.

Noise Impact

- To inspect the noise sources from inside and outside of the site.
- To follow up any exceedance caused by the construction works.

- To space out noisy equipment and position as far away as possible from sensitive receivers.

Water Impact

- To regularly maintain the silt curtains and make sure they are in the right positions.
- To complete the construction of seawall as early as practicable.

Waste/Chemical Management

- To check for any accumulation of waste materials or rubbish on site.
- To avoid any discharge of chemical waste or oil directly from the site.