

China Harbour Engineering Company (Group)

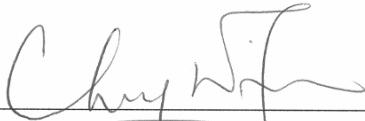
Contract No. CV/2002/09

**Tai O Development
Sheltered Boat Anchorage**

**Environmental Monitoring and Audit
Monthly Report (November 2003)**

(Version 1.0)

Certified By



(Environmental Team Leader)

REMARKS:

The information supplied and contained within this report is, to the best of our knowledge, correct at the time of printing.

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CINOTECH CONSULTANTS LTD

Room 1601-1610, Delta House,
3 On Yiu Street,

Shatin, NT, Hong Kong

Tel: (852) 2151 2083 Fax: (852) 3107 1388

Email: info@cinotech.com.hk

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ABBREVIATION AND ACRONYM

| | |
|-----------|--|
| AL Levels | Action and Limit Levels |
| E / ER | Engineer/Engineer's Representative |
| EIA | Environmental Impact Assessment |
| EM&A | Environmental Monitoring and Audit |
| EMIS | Environmental Mitigation Implementation Schedule |
| EP | Environmental Permit |
| EPD | Environmental Protection Department |
| ET | Environmental Team |
| IEC | Independent Environmental Checker |
| RE | Resident Engineer |
| QA/QC | Quality Assurance / Quality Control |
| SLM | Sound Level Meter |
| WMP | Waste Management Plan |

EXECUTIVE SUMMARY

Introduction

1. This is the eighth monthly Environmental Monitoring and Audit (EM&A) Report prepared by Cinotech Consultants Limited (the ET) for the project “Tai O Development – Sheltered Boat Anchorage” (the Project). This document reported the findings of EM&A Works conducted in November 2003.
2. The construction activities undertaken in this reporting month were:
 - Site investigation at seawall and promenade deck
 - Dredging works at Breakwater and loading jetty No. 3 by grab dredger and derrick lighter
 - Sheet piling by oscillator
 - Dismantle steel-structure police guard house
 - Fencing the preserved mangrove
 - Installation of tidal exchange along seawall
 - Pre-drilling at seawall
 - Rock filling at seawall

Environmental Monitoring Works

3. Environmental monitoring for the Project was performed regularly as stipulated in the EM&A Manual and the results were checked and reviewed. Site audits were conducted once a week. The implementation of the environmental mitigation measures, Event Action Plans and environmental complaint handling procedures were also checked.
4. Summary of the non-compliance of the reporting month is tabulated Table I.

Table I Summary Table for Non-compliance Recorded in the Reporting Month

| Media / Nature | No of Exceedances | | Action Taken | Results of action taken | Remarks |
|----------------|-------------------|-------------|--------------|-------------------------|---|
| | Action Level | Limit Level | | | |
| Noise | 0 | 1 | N.A. | N.A. | No further exceedance was recorded for continual measurement. |
| Water Quality | | | | | |
| DO | 26 | 91 | N.A. | N.A. | The exceedances were not due to the Project works. |
| Turbidity | 7 | 24 | | | |
| SS | 1 | 23 | | | |

Construction Noise

5. All construction noise monitoring was conducted as scheduled in the reporting month.
6. As the Contractor has granted the Construction Noise permit on restricted hours including 1900 – 2300 on weekdays and General Holidays including Sundays (CNP no. GW-UW0285-03), noise monitoring works on restricted hour were conducted.

7. One noise limit level exceedance was recorded during the evening-time monitoring at N1 on 7 November 2003. No further exceedance was recorded for the continual measurement on 10 November 2003 at the same monitoring station.

Water Quality

8. Water quality monitoring was conducted as scheduled in this reporting month, except that monitoring works at A1 and A2 on 26 November 2003 during mid-flood tide were cancelled since the two stations were not accessible during the monitoring exercise.
9. A total of 26 Action Level exceedances and 91 Limit Level exceedances for DO levels were reported. However, the exceedances were due to the seasonal effect and no direct evidence showed that the exceedances were due to the Project works. The exceedances were all considered to be invalid.
10. A total of 7 Action Level exceedances and 24 Limit Level exceedances for turbidity were recorded. For suspended solids, 1 Action Level exceedance and 23 Limit Level exceedances were recorded. However, the exceedances were due to the influence from Pearl River and no direct evidence showed that the exceedances were due to the Project works. The exceedances were all considered to be invalid.

Environmental Licenses and Permits

11. License/Permits granted to the Project include the Environmental Permit (EP), Waste Disposal (Chemical Waste) License, Marine Dumping Permits and Construction Noise Permit.

Complaints and Prosecutions

12. No formal environmental complaint and prosecution was received in this reporting month.

Future Key Issues

13. Piling at Promenade Deck and dredging works at anchorage area will be the major construction activities for the coming month. The anticipated environmental impacts will be mainly on noise and water quality due to the piling works.

1. INTRODUCTION

Background

- 1.1 Tai O was formerly one of the largest fishing villages in Hong Kong and was a historical case for fishing boats in the western approaches of Lantau Island and the Pearl River estuary. However, the importance of the fishing industry in Tai O has declined in recent decades, which has resulted in a degradation of its population base.
- 1.2 The formation of the Tai O sheltered boat anchorage is fully supported by the Islands Provisional District Board members and is widely seen as a means of reviving the town's local fishing industry and contributing to the revitalization of Tai O.
- 1.3 Previous consultancies undertaken on behalf of the Civil Engineering Department (CED) to determine the feasibility of construction a sheltered boat anchorage (Agreement No. CE 41/98) Environmental and Drainage Impact Assessment for the Tai O Sheltered Boat Anchorage Study. The original development scheme comprised an 8 ha anchorage for 220 vessels and about 1 ha reclamation for boat maintenance facilities, parking area, bus terminus and a loading/unloading bay.
- 1.4 The original development scheme has been gazette under the Foreshore & Sea-bed (Reclamations) Ordinance in December 2000. Following public consultation and interdepartmental discussion, the scope of the scheme was revised in the adoption of the current development scheme with a reduced area of boat anchorage, shortened breakwater and reduced area of reclamation.
- 1.5 The project now comprises construction of a 4 ha sheltered boat anchorage for small boats/fishing vessels and a breakwater of about 350 m length, formation of about 0.22 ha of land for a future bus terminus, construction of a 0.23 ha promenade, site formation and associated engineering works for a mangrove planting area and restoration of the existing historic seawall.
- 1.6 An Environmental Permit No. EP-144/2002 was issued on 11 Sep 2002 for this project (EP) to the Civil Engineering Department as Permit Holder. An updated Environmental Monitoring and Audit Manual (the EM&A Manual) was prepared to fulfill requirement stipulated in Condition 2.3 of the EP.
- 1.7 The works of the Project is constructed under CED's construction Contract No. CV/2002/09 "Tai O Development – Sheltered Boat Anchorage". The site layout of the Project is shown in Figure 1.1. The Project works were commenced on 14th April 2003.
- 1.8 Cinotech Consultants Limited was commissioned by the China Harbour Engineering Company (Group) (the Contractor) to undertake the Environmental Team (ET) Services for the Project. This is the eighth monthly EM&A report summarizes the EM&A works for the Project in November 2003.

Project Organizations

1.9 Different parties with different levels of involvement in the project organization include:

- Project Proponent – Civil Engineering Department
- Engineer or Engineer’s Representative (E/ER) – Maunsell Consultants Asia Limited (MCAL)
- Contractor – China Harbour Engineering Company (Group)
- Environmental Team (ET) – Cinotech Consultants Limited
- Independent Environmental Checker (IEC) – CH2M-IDC Hong Kong Limited

1.10 The responsibilities of respective parties are detailed in Section 1.19 of the EM&A Manual. The project organization chart is presented in Figure 1.2.

1.11 The key contacts of the Project are shown in Table 1.1.

Table 1.1 Key Project Contacts

| Party | Name | Role | Phone No. | Fax No. |
|------------|--------------------|-----------------------------------|-----------|-----------|
| CED | Mr. William Ng | Project Coordinator | 2760 5821 | 2714 1294 |
| MCAL | Mr. Paul Lau | Engineer | 2685 6504 | 2375 6455 |
| | Ir. Frankie Fan | | 2985 5199 | 2985 5181 |
| Contractor | Mr. Peter Kwan | Project Manager | 2985 6800 | 2985 6881 |
| ET | Dr. Priscilla Choy | The ET Leader | 2151 2083 | 3107 1388 |
| | Mr. KK Chan | Audit Team Leader | 2151 2083 | 3107 1388 |
| | Mr. Henry Leung | Monitoring Team Leader | 2151 2083 | 3107 1388 |
| IEC | Mr. David Yeung | Independent Environmental Checker | 2507 2203 | 2507 2293 |

Construction Programme

1.12 The construction activities undertaken in this reporting month were:

- Site investigation at seawall and promenade deck
- Dredging works at Breakwater and loading jetty No. 3 by grab dredger and derrick lighter
- Sheet piling by oscillator
- Dismantle steel-structure police guard house
- Fencing the preserved mangrove
- Installation of tidal exchange along seawall
- Pre-drilling at seawall
- Rock filling at seawall

Summary of EM&A Requirements

1.13 The EM&A programme requires construction phase monitoring for water quality and noise as well as environmental site audits. The EM&A requirements are described in following 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 study final report; and
- Environmental requirements in contract documents.

1.14 The advice on the implementation status of environmental protection and pollution control/mitigation measures is summarized in Section 4 of this report.

1.15 This report presents the monitoring results, observations, locations, equipment, period, methodology and QA/QC procedures of the required monitoring parameters, namely noise levels, water quality and audit works for the Project in this reporting month.

2. NOISE

Monitoring Requirements

- 2.1 Noise monitoring was conducted in accordance with the EM&A Manual. Appendix A shows the established Action and Limit Levels for the environmental monitoring works.

Monitoring Locations

- 2.2 Noise monitoring was conducted at four designated monitoring stations, namely N1, N9, N11 and N17, as summarized in Table 2.1. Figure 2.1 shows the locations of these stations.

Table 2.1 Noise Monitoring Stations

| Monitoring Station | Location |
|--------------------|--|
| N1 | Ground level of No. 26B Shek Tsai Po |
| N9 | Roof top of Tai O Primary School |
| N11 | Roof top of Lung Tin Court, Wing Tin House |
| N17 | Roof top of one village house at Nam Chung Tsuen |

Monitoring Equipment

- 2.3 Table 2.2 summarizes the noise monitoring equipment model being used. Copies of calibration certificates are attached in Appendix B.

Table 2.2 Noise Monitoring Equipment

| Equipment | Model and Make | Qty. |
|-------------------------------|-------------------------------|------|
| Integrating Sound Level Meter | B&K Model 2238 | 5 |
| Calibrator | B&K 4231 | 2 |
| Wind Speed Anemometer | Vane Anemometer, Model 451104 | 1 |

Monitoring Parameters, Frequency and Duration

- 2.4 Table 2.3 summarizes the monitoring parameters, frequency and total duration of monitoring. The noise monitoring schedule is shown in Appendix C.

Table 2.3 Noise Monitoring Parameters, Frequency and Duration

| Monitoring Stations | Parameter* | Period | Frequency | Measurement |
|---------------------|---|---|----------------------------|-------------|
| N1 | $L_{eq}(30 \text{ min.}) / 3 \times Leq(5 \text{ min}) \text{ dB(A)}$ | 1. 0700-1900 hrs. on weekdays 2. 1900-2300 hours 3. 0700-1900 hours on holidays | Once a week in each period | Free field |
| N9 | | | | Facade |
| N11 | | | | Facade |
| N17 | | | | Facade |

$L_{eq}(30\text{-min})$ will be taken at all four stations for the time period between 0700-1900 hours on normal weekdays.

Three consecutive $L_{eq}(5\text{-min}) \text{ dB(A)}$ will be taken at Stations N1, N11 and N17 for the time period between 1900-2300 hours and 0700-1900 on holidays, if construction works are carried out in these periods.

Monitoring Methodology and QA/QC Procedures

- The Sound Level Meter was set on a tripod at a height of 1.2 m above the ground.
- 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 : L_{eq} (30 min) for daytime noise monitoring /
3 consecutive L_{eq} (5 min) for restricted hour noise monitoring
- Prior to and after each noise measurement, the meter was calibrated using a Calibrator for 94.0 dB at 1000 Hz. If the difference in the calibration level before and after measurement was more than 1.0 dB, 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 the portable wind meter.
- At the end of the monitoring period, the L_{eq} , L_{90} and L_{10} were 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 if possible and observation was recorded when intrusive noise was not avoided.
- Noise monitoring was cancelled in the presence of fog, rain, and wind with a steady speed exceeding 5 m/s, or wind with gusts exceeding 10 m/s.

Maintenance and Calibration

- 2.5 The microphone head of the sound level meter and calibrator was cleaned with soft cloth regularly.
- 2.6 The meters were sent to the supplier to check and calibrate on yearly intervals.

Results and Observations

- 2.7 Noise monitoring was performed at the four designated locations during the daytime period (0700 to 1900) as scheduled in this reporting month.
- 2.8 As the Contractor was granted the Construction Noise permit on restricted hours including 1900 – 2300 on weekdays and General Holidays including Sundays (CNP no. GW-UW0285-03), noise monitoring works during restricted hours were also conducted at Stations N1, N11 and N17.
- 2.9 The details of the monitoring results and graphical presentations are shown in Appendix D. The weather during the monitoring sessions was mainly sunny. Weather conditions information is provided in Appendix D.
- 2.10 One noise limit level exceedance was recorded during the evening-time monitoring at N1 on 7 November 2003. Continual measurement was taken on 10 November 2003 to confirm the validity of the exceedance and no further exceedance was recorded.
- 2.11 The major noise sources identified at these designated stations were road and marine traffic noises.

3. WATER QUALITY

Monitoring Requirements

- 3.1 Water quality monitoring was conducted in accordance with the EM&A Manual. Appendix A shows the established Action Limit Levels for the environmental monitoring parameters.

Monitoring Equipment

- 3.2 The water sampler used for water quality monitoring was Kahlsico Water-Bottle Model 135DW150, except at Stations A1 and A2. The sampler with associated equipment complied with the specifications stipulated in the EM&A Manual.
- 3.3 Due to the shallow water depth at Stations A1 and A2 (Refer to Table 3.3), the above-mentioned water sampler could not be used for water sampling at these stations. Water samples at these two stations were directly taken into polyethylene bottles.
- 3.4 Table 3.1 summarizes the equipment used in the water quality monitoring program. All the monitoring equipment complied with the specifications stipulated in the EM&A Manual. Copies of the calibration certificates of are attached in Appendix B.

Table 3.1 Water Quality Monitoring Equipment

| Equipment | Model and Make | Qty. |
|--------------------------------------|---------------------------------------|------|
| Water Sampler* | Kahlsico Water-Bottle Model 135DW 150 | 1 |
| Multi-parameter Water Quality System | YSI 6820 | 2 |
| Monitoring Position Equipment | “Magellan” Handheld GPS Model GPS-320 | 1 |

Notes:

* For Stations W1 to W5 only.

Monitoring Parameters, Frequency and Duration

- 3.5 Table 3.2 summarizes the monitoring parameters, monitoring period and frequencies of water quality monitoring.

Monitoring Locations

- 3.6 In accordance with the EM&A Manual, five water quality monitoring locations (Stations W1 to W5) were specified for baseline water quality monitoring. Two more locations (Stations A1 and A2) were added for water quality monitoring upon requested by the Independent Environmental Checker (IEC) and agreed by the Engineer. Table 3.3 describes the locations of the monitoring stations. The monitoring locations are also shown on Figure 3.1.

Table 3.2 Frequency and Parameters of Water Quality Monitoring

| Station | Parameters | Frequency | No. of depth | No. of samples |
|---------|---|------------------|--------------|---|
| W1 | DO, SS, turbidity, salinity, pH & temperature | 3 times per week | 3 | 2 per monitoring day (1 for mid-ebb and 1 for mid-flood) |
| W2 | | | 3 | |
| W3 | | | 3 | |
| W4 | | | 3 | |
| W5 | | | 1* | |
| A1 | | | 1* | |
| A2 | | | 1* | |

Notes:

* The recorded water depths at Stations A1 and A2 were less than 3 m during the monitoring; only 1 sample at mid-depth was taken each time.

Table 3.3 Water Quality Monitoring Locations

| ID | Locations | Co-ordinates | |
|------|----------------------|--------------|----------|
| | | Easting | Northing |
| W1* | Outer Bay | 802250 | 813200 |
| W2* | Outer Bay | 801900 | 812710 |
| W3* | Outer Bay | 801850 | 812060 |
| W4* | Outer Bay | 802050 | 811530 |
| W5* | Mouth of Tai O Creek | 803844 | 812839 |
| A1** | Salt Pan | 803799 | 812606 |
| A2** | Salt Pan | 803899 | 812198 |

Notes:

* In accordance with the EM&A Manual.

** Requested by IEC and agreed by the Engineer.

Monitoring Methodology, Calibration Details and QA/QC Procedures***Instrumentation***

- 3.7 A multi-parameter meter (Model YSI 6820 CE-C-M-Y) was used to measure DO, turbidity, salinity, pH and temperature.

Operating/Analytical Procedures

- 3.8 At each measurement, two consecutive measurements of salinity, turbidity, pH and temperature 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.
- 3.9 For SS measurement, grab samples were collected. Water samples of about 500 ml were collected and stored in polyethylene bottles. The sample bottles were packed into an ice-box and delivered to a HOKLAS Laboratory, WELLAB Ltd., for the analysis of suspended solids contents within 24 hours.

Maintenance and Calibration

- 3.10 Before each round of monitoring, a zero check in distilled water was performed with the turbidity probe of YSI 6820. The probe was kept in wet condition and then calibrated with a solution of known NTU.
- 3.11 Quality Control Reports for SS analysis by the HOKLAS-accredited laboratory, WELLAB Ltd. are attached in Appendix E.

Results and Observations

- 3.12 The monitoring data and graphical presentations of the monitoring results are shown in Appendix F. Note that in Appendix F, 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”.
- 3.13 Water quality monitoring was conducted as scheduled in this reporting month, except that monitoring works at A1 and A2 on 26 November 2003 during mid-flood tide were cancelled since the two stations were not accessible during the monitoring exercise.
- 3.14 The weather during the monitoring session was mainly sunny.
- 3.15 Dissolved oxygen levels (for all depths and tides) were fluctuating. A total of 26 Action Level exceedances and 91 Limit Level exceedances for DO levels were reported at all monitoring stations on 3rd, 5th, 7th, 10th, 12th, 14th, 17th, 19th, 21st, 24th, 26th and 28th November 2003.
- 3.16 A total of 7 Action Level exceedances and 24 Limit Level exceedances for turbidity were recorded. For SS, 1 Action Level exceedance and 23 Limit Level exceedances were recorded. The exceedances were recorded at monitoring stations W1, W2, W3, W4 and A2 on 3rd, 7th, 10th, 12th, 14th, 17th, 19th, 21st, 24th, 26th and 28th November 2003.
- 3.17 Table 3.4 summarizes the number of exceedances of DO, turbidity and SS levels for ebb and flood tides in the reporting month. The details of exceedances and the associated action taken are summarized in Appendix G.
- 3.18 Comparison of total number of exceedances of this reporting month with the last two reporting months is summarized in Table 3.5.
- 3.19 The DO level exceedances were considered not directly related to the Project due to the followings reasons:
- Among 117 exceedances recorded in the reporting month, only 8 exceedances were recorded at A1, A2 and W5, which were closer to the dredging site of the Project.
 - DO levels recorded at Stations A1, A2 and W5, even exceedances were recorded, were usually higher than those recorded at Stations W1 to W4 for the same monitoring events.

- DO levels may be affected by many other factors, e.g., salinity and water temperature. Graphical presentations of the variations of salinity and water temperature are shown in Appendix F. In addition, the average water temperature at all monitoring stations during baseline monitoring period was 20.7°C, that in November 2003 was 24.3°C.
- Therefore, one possible reason for the increase of DO exceedance when compared with previous months may be due to the seasonal effects.
- It is noteworthy as the Air Temperature decreased from September 2003 to November 2003, the number of DO exceedances per monitoring day also decreased from 13.77 to 9.75.

3.20 The turbidity and SS level exceedances were considered not directly related to the Project due to the followings reasons:

- All the exceedances of SS and Turbidity levels were recorded at W1 to W4, but not at A1, A2 and W5 which are closer to the project site, except one limit level exceedance of Turbidity was recorded at A2. This can be explained by the fact that the SS and turbidity were brought about from the Pearl River Delta region rather than the project itself.
- During the monitoring event for which limit level exceedance was recorded at A2, as observed by the monitoring team, wastewater was discharged from two outfalls near Nam Chung Tsuen.
- It is noteworthy that the monitoring location at W4 (Control Point) is sheltered from the hinterland and hence the low levels of turbidity and SS at W4 cannot reflect the influence of tidal effect on turbidity and SS to the impact stations W1 – W3 at mid-flood tide.
- Limit level exceedances for turbidity and SS were recorded at impact monitoring stations whereas low levels of turbidity and SS were recorded at the control station (W1 at mid-ebb tide and W4 at mid-flood tide) at the corresponding tide.
- The SS and turbidity levels at W1 to W4, even exceedances were recorded, were well below the baseline levels.

Table 3.4 Total Number of Exceedances in November 2003

| Station | Exceedance Level | DO | | Turbidity | | SS | |
|------------------------|----------------------|---------|-----------|-----------|-----------|---------|-----------|
| | | 12 | | 12 | | 12 | |
| No. of monitoring days | | | | | | | |
| Tide | | Mid-Ebb | Mid-Flood | Mid-Ebb | Mid-Flood | Mid-Ebb | Mid-Flood |
| A1 | Action | 2 | 1 | 0 | 0 | 0 | 0 |
| | Limit | 0 | 0 | 0 | 0 | 0 | 0 |
| | Total | 2 | 1 | 0 | 0 | 0 | 0 |
| | Total/Monitoring Day | 0.17 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 |
| A2 | Action | 0 | 1 | 0 | 0 | 0 | 0 |
| | Limit | 0 | 0 | 0 | 1 | 0 | 0 |
| | Total | 0 | 1 | 0 | 1 | 0 | 0 |
| | Total/Monitoring Day | 0.00 | 0.08 | 0.00 | 0.08 | 0.00 | 0.00 |
| W1 | Action | 2 | 3 | 0 | 1 | 0 | 0 |
| | Limit | 11 | 11 | 0 | 3 | 0 | 3 |
| | Total | 13 | 14 | 0 | 4 | 0 | 3 |
| | Total/Monitoring Day | 1.08 | 1.17 | 0.00 | 0.33 | 0.00 | 0.25 |
| W2 | Action | 1 | 3 | 2 | 0 | 0 | 1 |
| | Limit | 10 | 12 | 1 | 4 | 2 | 4 |
| | Total | 11 | 15 | 3 | 4 | 2 | 5 |
| | Total/Monitoring Day | 0.92 | 1.25 | 0.25 | 0.33 | 0.17 | 0.42 |
| W3 | Action | 2 | 3 | 1 | 2 | 0 | 0 |
| | Limit | 11 | 12 | 3 | 4 | 2 | 4 |
| | Total | 13 | 15 | 4 | 6 | 2 | 4 |
| | Total/Monitoring Day | 1.08 | 1.25 | 0.33 | 0.50 | 0.17 | 0.33 |
| W4 | Action | 2 | 3 | 1 | 0 | 0 | 0 |
| | Limit | 13 | 9 | 7 | 1 | 8 | 0 |
| | Total | 15 | 12 | 8 | 1 | 8 | 0 |
| | Total/Monitoring Day | 1.25 | 1.00 | 0.67 | 0.08 | 0.67 | 0.00 |
| W5 | Action | 1 | 2 | 0 | 0 | 0 | 0 |
| | Limit | 2 | 0 | 0 | 0 | 0 | 0 |
| | Total | 3 | 2 | 0 | 0 | 0 | 0 |
| | Total/Monitoring Day | 0.25 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 |
| Sum | Action | 10 | 16 | 4 | 3 | 0 | 1 |
| | Limit | 47 | 44 | 11 | 13 | 12 | 11 |
| | Total | 57 | 60 | 15 | 16 | 12 | 12 |
| | Total/Monitoring Day | 4.75 | 5.00 | 1.25 | 1.33 | 1.00 | 1.00 |
| Total | Action | 26 | | 7 | | 1 | |
| | Limit | 91 | | 24 | | 23 | |
| | Total | 117 | | 31 | | 24 | |
| | Total/Monitoring Day | 9.75 | | 2.58 | | 2.00 | |

Table 3.5 Total Number of Water Quality Exceedances in November 2003 and the Previous Months

| Parameter | Exceedance Level | September 03 | October 03 | November 03 |
|-------------------------------|------------------------|--------------|------------|-------------|
| No. of monitoring days | | 13 | 14 | 12 |
| DO | Action | 13 | 44 | 26 |
| | Limit | 166 | 136 | 91 |
| | Total | 179 | 180 | 117 |
| | Cumulative | 720 | 900 | 1017 |
| | Total / Monitoring Day | 13.77 | 12.86 | 9.75 |
| Turbidity | Action | 7 | 3 | 7 |
| | Limit | 33 | 26 | 24 |
| | Total | 40 | 29 | 31 |
| | Cumulative | 122 | 151 | 182 |
| | Total / Monitoring Day | 3.08 | 2.07 | 2.58 |
| SS | Action | 4 | 1 | 1 |
| | Limit | 35 | 29 | 23 |
| | Total | 39 | 30 | 24 |
| | Cumulative | 118 | 148 | 172 |
| | Total / Monitoring Day | 3.00 | 2.14 | 2.00 |
| Total | Action | 24 | 48 | 34 |
| | Limit | 234 | 191 | 138 |
| | Total | 258 | 239 | 172 |
| | Cumulative | 960 | 1199 | 1371 |
| | Total / Monitoring Day | 19.85 | 17.07 | 14.33 |
| Cumulative | Action | 91 | 139 | 173 |
| | Limit | 869 | 1060 | 1198 |
| | Total | 960 | 1199 | 1371 |

4. ENVIRONMENTAL AUDIT

Site Audits

- 4.1 Site audits were carried out on weekly basis to monitor the timely implementation of proper environmental management practices and mitigation measures in the Project site.
- 4.2 Site audits were conducted on 5th, 13th, 19th and 26th November 2003. The summaries of site audits are attached in Appendix H.

Review of Environmental Monitoring Procedures

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

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 result.
- The monitoring team recorded the weather and sea conditions on the monitoring day.

Status of Environmental Licensing and Permitting

- 4.4 All valid permits/licenses are summarized in Table 4.1.

Status of Waste Management

- 4.5 The amounts of wastes generated by the activities of the project in November 2003 are shown in Appendix M.
- 4.6 The solid waste generated from the Project was mainly uncontaminated dredged sediment. No violation was observed during site inspections.

Table 4.1 Summary of Environmental Licensing and Permit Status

| Permit No. | Date of Approval | Valid Period | | Section | Status |
|--|------------------|--------------|--------------------|--|--------|
| | | From | To | | |
| Environmental Permit | | | | | |
| EP-144/2002 * a copy was attached in the monthly report of April 2003 | 11/09/02 | 12/07/02 | End of the Project | Construction of 4 ha. sheltered boat anchorage for small boats/fishing vessels including a breakwater of about 350 m long and associated marine access channels, construction of 0.23 ha. promenade including landing steps, formation of about 0.22 ha. of land for future bus terminus, site formation and associated engineering works for a mangrove planting area in the disused Tai O salt pans and restoration of the existing historic seawall of about 630 m. | Valid |
| Construction Noise Permit | | | | | |
| GW-UW0285-03 * a copy was attached in the monthly report of September 2003 | 09/09/03 | 09/09/03 | 03/03/03 | Use of powered mechanical equipment for carrying out construction work at Typhoon Shelter, Tai O, Lantau Island, HK at 0700-2300 on general holidays and at 1900-2300 on any day not being a general holiday | Valid |
| Marine Dumping Permit | | | | | |
| EP/MD/04-059 * a copy was attached in the monthly report of September 2003 | 24/09/03 | 04/10/03 | 03/04/04 | Disposal of dredged sediment at East Sha Chau Contaminated Mud Disposal Site – Pit IVb | Valid |
| EP/MD/04-073 * a copy is attached in Appendix N | 14/10/03 | 22/10/03 | 21/12/03 | Disposal of dredged sediment at East Sha Chau Contaminated Mud Disposal Site – Pit IVc | Valid |
| Waste Disposal (Chemical Waste) | | | | | |
| WPN: 5111-944-C2397-08 * a copy was attached in the monthly report of April 2003 | 25/04/03 | 25/04/03 | End of the Project | Disposal of chemical waste such as waste lubricating oil and diesel oil arising from construction work. | Valid |

Implementation Status of Environmental Mitigation Measures

- 4.7 During the subsequent site inspections in this reporting month, the following observations and recommendations were made.

Chemical and Waste Management

- 4.8 On 13th November 2003, several large drip trays were installed by the Contractor on the grab dredger for storage of liquid oil drums.
- 4.9 A little amount of oil spillage was observed beside drip tray near the site entrance on 13th November 2003.

Water Quality

- 4.10 Following up the last audit on 31st October 2003, stagnant water near Bus Terminal was cleared up on 5th November 2003.
- 4.11 Some sand materials were observed in the sea around the conveyor barge on 19th November 2003. The Contractor was advised to provide mitigation measures to minimize and avoid the splashing of material during filling activities. The situation was improved during the follow-up audit on 26th November 2003.

Air Quality

- 4.12 On 26th November 2003, fugitive dust emission was observed during the uploading of rock materials by a crane barge. The Contractor was reminded to provide dust suppression measure for similar works.

Noise and Permit / Licenses

- 4.13 No violation was observed during subsequent site inspections.

Environmental Mitigation Implementation Schedule (EMIS)

- 4.14 According to the Environmental Permit and the EM&A Manual, the mitigation measures detailed in the documents are required to be implemented. An updated summary of the EMIS is presented in Appendix J.

Implementation Status of Event Action Plans

- 4.15 The Event Action Plans for noise and water quality are presented in Appendix I.
- 4.16 Noise monitoring works were conducted on both daytime and restricted hours as the Contractor was granted a CNP for construction works on restricted hours (CNP no. GW-UW0285-03).
- 4.17 One noise limit level exceedance was recorded during the evening-time monitoring at N1 on 7 November 2003. No further exceedance was recorded for the continual measurement on 10 November 2003 at the same monitoring station.
- 4.18 A total of 26 Action Level exceedances and 91 Limit Level exceedances for DO levels

were reported. However, the exceedances were due to the seasonal effect and no direct evidence showed that the exceedances were due to the Project works. The exceedances were all considered to be invalid.

- 4.19 A total of 7 Action Level exceedances and 24 Limit Level exceedances for turbidity were recorded. For suspended solids, 1 Action Level exceedance and 23 Limit Level exceedances were recorded. However, the exceedances were due to the influence from Pearl River and no direct evidence showed that the exceedances were due to the Project works. The exceedances were all considered to be invalid.

Summary of Complaints and Prosecutions

- 4.20 No formal environmental complaint or prosecution related to the Project works was received since the commencement of the Project.

5. FUTURE KEY ISSUES

Key Issues for the Coming Month

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

- Transport of dredged materials by hopper barges.
- Noise from operation of the equipment and machinery on-site.
- Wastewater discharge from site.
- Storage of chemicals/fuel and chemical waste/waste oil on site.

Monitoring Schedule for the Next Month

5.2 The tentative environmental monitoring schedule for the next month is shown in Appendix D.

Construction Program for the Next Month

5.3 The tentative construction program for the coming three months is provided in Appendix K.

6. CONCLUSIONS AND RECOMMENDATIONS

Conclusions

- 6.1 Environmental monitoring works were performed in this reporting month and all monitoring results were checked and reviewed.
- 6.2 Noise monitoring works were conducted on both daytime and restricted hours as the Contractor was granted a CNP for construction works on restricted hours (CNP no. GW-UW0285-03).
- 6.3 One noise limit level exceedance was recorded during the evening-time monitoring at N1 on 7 November 2003. No further exceedance was recorded for the continual measurement on 10 November 2003 at the same monitoring station.
- 6.4 Water quality monitoring was conducted as scheduled in this reporting month, except that monitoring works at A1 and A2 on 26 November 2003 during mid-flood tide were cancelled since the two stations were not accessible during the monitoring exercise.
- 6.5 A total of 26 Action Level exceedances and 91 Limit Level exceedances for DO levels were reported. However, the exceedances were due to the seasonal effect and no direct evidence showed that the exceedances were due to the Project works. The exceedances were all considered to be invalid.
- 6.6 A total of 7 Action Level exceedances and 24 Limit Level exceedances for turbidity were recorded. For suspended solids, 1 Action Level exceedance and 23 Limit Level exceedances were recorded. However, the exceedances were due to the influence from Pearl River and no direct evidence showed that the exceedances were due to the Project works. The exceedances were all considered to be invalid.
- 6.7 No formal environmental complaint and prosecution was received since the commencement of the Project.

Recommendations

- 6.8 According to the environmental audit performed in this reporting month, the following recommendations were made:

Dust Impact

- To prohibit any open burning on site.
- To regularly maintain the machinery and vehicles on site.
- To implement dust suppression measures (e.g., water spraying, covering with impervious sheets and vehicle speed control) on all haul roads, stockpiles and 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 activities.
- To space out noisy equipment and position as far as possible from sensitive receivers.
- To provide temporary noise barrier as minimize the noise nuisance from the construction site.

Water Impact

- To monitor loading of hopper barges.
- To identify any wastewater discharges from site.
- To minimise loss of sediment from grab \ suction pipes during dredging.
- To follow up any exceedance caused by the construction works.

Waste/Chemical Management

- To check for any accumulation of waste materials or rubbish on site.
- To avoid any oil leakage from the equipments within the construction site.
- To remove ponding water regularly in drip trips on site.