



PROJECT No.: TCS/00116/03

ISSUE No.: 1

**HONG KONG DRAINAGE SERVICES DEPARTMENT
CONTRACT NO. DC/2000/08
VILLAGE FLOOD PROTECTION WORKS FOR WANG
CHAU, MAI PO LO WAI AND MAI PO SAN TSUEN AND
DRAINAGE IMPROVEMENT WORKS AT TAN KWAI
TSUEN**

**ENVIRONMENTAL MONITORING & AUDIT (EM&A)
REPORT – OCTOBER 2004 (REVISION A)**

PREPARED FOR
CHING CHIT CHEUNG CONSTRUCTION CO., LIMITED

| Quality Index | | | |
|-----------------|------------------------|---|---|
| Date | Reference No. | Prepared by | Approved By |
| 5 November 2004 | TCS/00116/03/600/R0854 | Kin Hoo Ho (Environmental Consultant) | Cliff Lam (Environmental Team Leader) |
| | |  |  |

This report has been prepared by Action-United Environmental Services & Consulting with all reasonable skill, care and diligence within the terms of the Agreement with the client, incorporating our General Terms and Conditions of Business and taking account of the resources devoted to it by agreement with the client.

We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.

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Ove Arup & Partners
奧雅納工程顧問

Our ref: 23597/L081/ST/F1/swst

Date: 5 November 2004

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ARUP

By Fax & By Post
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Dear Sir,

Agreement No DP 01/2002

Hire of Services for an Independent Environmental Checker for Contract No DC/2000/08 Village Flood Protection Works for Wang Chau, Mai Po Lo Wai and Mai Po San Tsuen and Drainage Improvement Works at Tan Kwai Tsuen

Verification of EM&A Report for October 2004 (Revision A)

We refer to the ET's letter dated 3 November 2004 (ref. TCS/00116/03/300/L0858) and subsequent fax dated 5 November 2004 (ref. TCS/00116/03/300/F0860) regarding the captioned subject.

We hereby verify that the captioned report shall be submitted to the EPD in accordance with the requirement as stipulated in the FEP.

If you require any further information, please do not hesitate to contact the undersigned or our Mr Fredrick Leong at 2268 3639.

Yours faithfully,



Sam Tsoi
Independent Environmental Checker

| | | | |
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Abbreviations

| | |
|--------|---|
| A1 | Air Sensitive Receiver |
| AUES | Action United Environmental Services |
| ET | Environmental Team |
| DSD | Drainage Services Department |
| EAP | Event and Action Plan |
| EIA | Environmental Impact Assessment |
| EM&A | Environmental Monitoring and Audit |
| EP | Environmental Permit |
| EPD | Environmental Protection Department |
| FEP | Further Environmental Permit |
| HOKLAS | The Hong Kong Laboratory Accreditation Scheme |
| HVS | High Volume Sampler |
| IEC | Independent Environmental Checker |
| N1 | Noise Sensitive Receiver |
| QA/QC | Quality Assurance and Quality Control |
| TAT | Trigger/ Action/ Target |
| TSP | Total Suspended Particulates |
| W(D)1 | Water Sensitive Receiver (Down Stream) |
| W(U)1 | Water Sensitive Receiver (Up Stream) |

Executive Summary

Ching Chit Cheung Construction Co., Ltd. (The Contractor) was awarded the Contract DC/2000/08 by the Drainage Services Department (DSD) to undertake the Village Flood Protection Works for Wang Chau, Mai Po Lo Wai and Mai Po San Tsuen and Drainage Improvement Works at Tan Kwai Tsuen (the Project).

Action-United Environmental Services and Consulting (AUES) was commissioned by the Contractor to undertake an impact Environmental Monitoring and Audit (EM&A) program for this project.

This report presents the findings of the impact EM&A reporting month (No. 25) for the Project from **27 September to 26 October 2004** in accordance with the Environmental Monitoring & Audit (EM&A) Manual.

Environmental Monitoring and Audit Progress

The impact EM&A program was undertaken in accordance with the EM&A manual. A summary of the monitoring activities in this reporting month is listed below:

- 1-Hr TSP Monitoring 15 Events
- 24-Hr TSP Monitoring 5 Events
- Noise Monitoring 9 Events
- Water Quality Monitoring 13 Monitoring Days
- Site Inspection 4 Times
- Waste Management Audit 1 Time

Air Quality

Five Trigger-level and one Action-level exceedances in 1-Hr TSP monitoring at A1 sensitive receiver station were recorded on 20 and 26 October 2004. All measurements in 24-Hr TSP monitoring were below the TAT levels in this reporting month.

Construction Noise

All noise levels measured at N1 were below the target level. No complaint was received in this reporting month.

Water Quality

No exceedance in water quality was recorded in this reporting month.

Summary of Environmental Exceedance

A summary of environmental exceedance for air, noise and water in this reporting period is presented below:

| Env. Quality | Parameters | % Exceedance | Investigation & Corrective Actions |
|---------------|---------------------|--------------|------------------------------------|
| Air Quality | 1-Hr TSP | 40 | ET investigation completed # |
| | 24-Hr TSP | 100 | NA |
| Noise | Leq (30min) Daytime | 100 | NA |
| Water Quality | Suspended Solids | 100 | NA |
| | Total Zinc Level | 100 | NA |

Details of any exceedances recorded by the ET are presented in Appendix M.

Ecological Monitoring

Ecological monitoring at the Mai Po Village Egrettry this year was completed on 22 May 2004.

Environmental Complaints

No environmental complaint was received in this reporting month.

Environmental Summons

No summon or prosecution related to environmental issue was received in this reporting month.

Site Inspection and Audit

Four environmental site inspections were carried out jointly by representatives of the IEC, the Engineer and the Contractor's environmental staff on 5, 11, 14 and 21 October 2004. The ET undertook an independent site and waste management audit on 21 October 2004.

Future Key Issues

The construction works of box culvert, pumping station and flood protection wall will continue in the coming construction months. It is expected that construction noise, air and water quality impacts will be of particular environmental concern. Key issues to be considered are as follows:

- Noise mitigation measures on works using powered mechanical plants;
- Dust suppression measures during dry weather conditions particularly along haul roads;
- Discharge of surface water runoff from the work site into nearby river systems; and
- Follow-up improvement on any waste management issues.

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1.0 INTRODUCTION

1.1 PROJECT BACKGROUND

Ching Chit Cheung Construction Co., Ltd. (the Contractor) was awarded the Contract DC/2000/08 from the Drainage Services Department (DSD) to construct the Village Flood Protection Works for Wang Chau, Mai Po Lo Wai and Mai Po San Tsuen and drainage improvement works at Tan Kwai Tsuen (the Project).

Action-United Environmental Services and Consulting (AUES) was commissioned by the Contractor to implement an environmental monitoring and audit (EM&A) program in compliance with the legal and the contractual requirements of the Project.

The construction works at Mai Po Lo Wai and Mai Po San Tsuen is classified under the section of a Designated Project governed by the Environmental Permit system. A Further Environmental Permit (FEP-01/088/2002) was issued to the Contractor on 22 Aug 2002. According to Condition 4.0 of the FEP, an Environmental Monitoring and Audit (EM&A) program is required for Mai Po Lo Wai and Mai Po San Tsuen of this Project.

This monthly EM&A report (No. 25) presents the results of EM&A works conducted in the reporting month of October 2004 (from 27 September to 26 October 2004).

1.2 STRUCTURE OF THE MONTHLY EM&A REPORT

The structure of this EM&A report is organized into 14 sections as follows:

| | |
|-------------------|---|
| Section 1 | Introduction |
| Section 2 | Project Activities |
| Section 3 | Status of Environmental Permit |
| Section 4 | Summary of Impact EM&A Activities in October 2004 |
| Section 5 | Air Quality Monitoring |
| Section 6 | Noise Monitoring |
| Section 7 | Water Quality Monitoring |
| Section 8 | Waste Management |
| Section 9 | Ecological Monitoring |
| Section 10 | Environmental Non-Compliance and Complaint |
| Section 11 | Site Inspection |
| Section 12 | Implementation Status of Mitigation Measures |
| Section 13 | Impact Forecast and Monitoring Schedule for November 2004 |
| Section 14 | Conclusions and Recommendations |

2.0 PROJECT ACTIVITIES

2.1 CONSTRUCTION WORKS IN OCTOBER 2004

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 October 2004

| Site Area | Construction | Description of Construction Activities |
|----------------|---------------|---|
| Wang Chau | Boundary Wall | External Finishing. Installation of Safety Fence. Construction of Last Bay. |
| | Pump House | Cat Ladder Installation. Hand railing installation. Door Installation. |
| | Compound | Grassed concrete slab. Cable ducting. Road pavement Construction. Footpath Construction. Main Gate Installation. |
| Mai Po | | U channels and catch-pit construction. Embankment Grassed Concrete Slab Construction. 150 diameter water pipe laying. Ramp B Construction. Masonry Works. Ramp B Construction. Drainage Works and Cable Ducts in Compound. Box Culvert Sheet-piling. Pump House Internal Finishing. Drainage Works under 3.5 Access Road. Removal of Granular Material Stockpile. |
| Tan Kwai Tsuen | | Making Good Defects. Completion of Outstanding Works. Hydro-seeding and Tree Planting. |

3.0 STATUS OF ENVIRONMENTAL PERMITS

3.1 ENVIRONMENTAL PERMITS

The current status of all environmental permits, licences, and/or notification to EPD for this project as of 26 October 2004 is presented in **Table 3-1**.

Table 3-1 Summary of the Licence/Permit Status

| Item | Item Description | Permit Status |
|------|--|-------------------------------|
| 1 | Further Environmental Permit, FEP-01/088/2002 | Issued on 29 July 2002 |
| 2 | Air Pollution Control (Construction Dust) – Mai Po | Notified EPD on 13 Aug 02 |
| 3 | Air Pollution Control (Construction Dust) – Wang Chau | Notified EPD on 13 Aug 02 |
| 4 | Air Pollution Control (Construction Dust) – Tan Kwai Tsuen | Notified EPD on 13 Aug 02 |
| 5 | Water Pollution Control (Discharge Licence) – Septic Tanks, RE and Contractor's Offices No.IS38N/1 | Issued on 7 February 03 |
| 6 | Chemical Waste Producer Registration – Mai Po WPN: 5113-542-C3234-03 | Issued on 23 October 02 |
| 7 | Chemical Waste Producer Registration – Wang Chau WPN: 5113-528-C3234-01 | Issued on 10 October 02 |
| 8 | Chemical Waste Producer Registration – Tan Kwai Tsuen, WPN: 5211-519-C3234-02 | Issued on 3 October 02 |
| 9 | Water Pollution Control (Discharge Licence) - Tan Kwai Tsuen No.IT301/1 | Valid (4 Feb 03 – 31 Jan 08) |
| 10 | Water Pollution Control (Discharge Licence) – Mai Po No.IS39/1 | Valid (27 Nov 02 – 30 Nov 07) |
| 11 | Water Pollution Control (Discharge Licence) – Wang Chau, No.IU366/1 | Valid (9 Sep 02 – 30 Sept 07) |

4.0 SUMMARY OF EM&A ACTIVITIES IN OCTOBER 2004

24-Hr and 1-Hr TSP:

Five events of 24-Hr TSP and 15 events of 1-Hr TSP monitoring were undertaken at one designated (A1) station during the reporting period.

Noise:

Nine events of construction noise monitoring were undertaken at one designated (N1) station during the reporting period.

Water Quality:

Thirteen monitoring days of water quality monitoring were undertaken at two designated (W(U)1 & W(D)1) stations during the report period.

The schedule which details all monitoring activities during the reporting month is presented in **Table 4-1**.

Table 4-1 EM&A Activities in October 2004

| Date of Monitoring | | Water Quality | Noise (Leq30) | Air Quality (1-Hr and 24-Hr) | Site Inspection / Waste Audit |
|--------------------|-----|---------------|---------------|------------------------------|-------------------------------|
| 27-Sep-04 | Mon | | | | |
| 28-Sep-04 | Tue | | | | |
| 29-Sep-04 | Wed | | | | |
| 30-Sep-04 | Thu | | | | |
| 1-Oct-04 | Fri | | | | |
| 2-Oct-04 | Sat | | | | |
| 3-Oct-04 | Sun | | | | |
| 4-Oct-04 | Mon | | | | |
| 5-Oct-04 | Tue | | | | |
| 6-Oct-04 | Wed | | | | |
| 7-Oct-04 | Thu | | | | |
| 8-Oct-04 | Fri | | | | |
| 9-Oct-04 | Sat | | | | |
| 10-Oct-04 | Sun | | | | |
| 11-Oct-04 | Mon | | | | |
| 12-Oct-04 | Tue | | | | |
| 13-Oct-04 | Wed | | | | |
| 14-Oct-04 | Thu | | | | |
| 15-Oct-04 | Fri | | | | |
| 16-Oct-04 | Sat | | | | |
| 17-Oct-04 | Sun | | | | |
| 18-Oct-04 | Mon | | | | |
| 19-Oct-04 | Tue | | | | |
| 20-Oct-04 | Wed | | | | |
| 21-Oct-04 | Thu | | | | |
| 22-Oct-04 | Fri | | | | |
| 23-Oct-04 | Sat | | | | |
| 24-Oct-04 | Sun | | | | |
| 25-Oct-04 | Mon | | | | |
| 26-Oct-04 | Tue | | | | |

Remarks:



Sunday or Public Holiday
 Monitoring Event

5.0 AIR QUALITY MONITORING

The potential air quality impact arising from the construction is measured in terms of 1-Hr and 24-Hr Total Suspended Particulates (TSP).

5.1 MONITORING EQUIPMENT

24-Hr TSP Monitoring

The impact dust monitoring of 24-Hr TSP was undertaken in accordance with the Code of Federal Regulations Chapter 1 (Part 50) Appendix B. For all monitoring events, the 24-Hr TSP levels were determined by drawing air through a pre-conditioned, pre-weighed glass fiber filter inside a high volume sampler (HVS) at a controlled flow rate for 24 ± 1 hours.

1-Hr TSP Monitoring

The 1-Hr TSP levels were determined by using the 1-Hr TSP portable meter, which is capable of measuring and recording 1-hour time weighted average dust concentration between 0.01 and 100 mg/m³. **Table 5-1** summarises the equipment that was used in the air quality monitoring program.

Table 5-1 Air Quality Monitoring Equipment

| Equipment | Model |
|----------------------|-----------------------------------|
| 24-Hr TSP Monitoring | |
| HVS | Grasby Anderson GMWS 2310 HVS |
| Calibration Kit | TISCH Model 515N Serial # 9833620 |
| 1-Hr TSP Monitoring | |
| Portable meter | TSI DustTrak Aerosol Monitor |
| | Laser Dust Monitor LD-3 |

5.2 MONITORING LOCATION

The air quality monitoring location is presented in **Table 5-2**. The geographic location of the monitoring station is shown in **Appendix A**:

Table 5-2 Location of Air Monitoring Station

| Monitoring Station | Name of Location | Description |
|--------------------|------------------|---------------------------------------|
| A1 | Mai Po Lo Wai | An open area close to a village house |

5.3 TRIGGER/ACTION/TARGET LEVELS OF AIR QUALITY

The Trigger/Action/Target (TAT) Levels for air quality monitoring were proposed in the baseline monitoring report. The TAT levels for 24-Hr and 1-Hr TSP monitoring are presented in **Table 5-3 and 5-4** respectively.

Table 5-3 Trigger/Action/Target Levels for 24-Hr TSP Monitoring

| Monitoring Station | Name of Location | Trigger Level µg/m ³ | Action Level µg/m ³ | Target Level µg/m ³ |
|--------------------|------------------|------------------------------------|-----------------------------------|-----------------------------------|
| A1 | Mai Po Lo Wai | 114 | 187 | 260 |

Table 5-4 Trigger/Action/Target Levels for 1-Hr TSP Monitoring

| Monitoring Station | Name of Location | Trigger Level ug/m ³ | Action Level ug/m ³ | Target Level ug/m ³ |
|--------------------|------------------|---------------------------------|--------------------------------|--------------------------------|
| A1 | Mai Po Lo Wai | 166 | 333 | 500 |

5.4 MONITORING PROCEDURE AND CALIBRATION DETAILS

Installation

The HVS was placed at the aforesaid location, which was freestanding with no obstruction. The following criteria were considered in the installation of the HVS.

- A horizontal platform with appropriate support to secure the sampler;
- The distance between the sampler and obstacle, such as buildings, must be at least twice the height that the obstacle protrudes above the sampler;
- A minimum of 2 m separation from walls, parapets and penthouses for rooftop samplers;
- A minimum of 2 m separation from any supporting structure measured horizontally;
- No furnace or incinerator flue nearby;
- Unrestricted airflow around the sampler;
- A minimum separation of 20 m from the drip line; and
- Any wire cage used to protect the sampler will not cause any obstruction during monitoring.

Preparation of Filter Papers by HOKLAS-accredited laboratory

- Glass-fibre filters, 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 $\pm 5\%$. A convenient working RH was 40%; and
- *ALS Technichem (HK) Pty Ltd* has comprehensive quality assurance and quality control programs for TSP analysis and has attained HOKLAS accreditation for a range of other environmental testing. The certificate for the laboratory is shown in **Appendix B**.

Field Monitoring

- The power supply was checked to ensure that the HVS worked 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 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 secured with the aluminum strip;
- The HVS was warmed-up for about 5 minutes to establish run-temperature conditions;
- A new flow rate record sheet was set into the flow recorder;
- The flow rate of the HVS was checked and adjusted at around 1.1 m³/min. The range specified in the EM&A Manual was between 0.6-1.7 m³/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; and
- Filters were sent to *ALS Technichem (HK) Pty Ltd* for analysis.

Maintenance & Calibration

- The HVSs and their accessories was maintained in good working condition, such as routinely replacing motor brushes and checking electrical wiring to ensure a continuous power supply;
- The HVSs were calibrated at bi-monthly intervals using TE-5025A TISCH Calibration Kit throughout all stages of the air quality monitoring; and
- The portable dust meter was calibrated by the manufacturer before the instrument was shipped to the site. The zero response of the instrument was checked before and after each monitoring event. The schedule of calibration and/or certificates is provided in *Appendix C*.

5.5 IMPACT AIR QUALITY MONITORING RESULTS AND AUDITS

The ET carried out five 24-Hr and fifteen 1-Hr TSP monitoring events at monitoring station A1 in this reporting month. The monitoring data is presented in *Table 5-5* below and graphical presentations of the monitoring results are provided in *Appendix D*.

Table 5-5 Impact Air Quality Monitoring Results

| Monitoring Date | 24-Hr TSP (ug/m ³) | 1-Hr TSP (ug/m ³) | | |
|-----------------|--------------------------------|---------------------------------|---------------------------------|---------------------------------|
| | | 1 st TSP Measurement | 2 nd TSP Measurement | 3 rd TSP Measurement |
| 2-Oct-04 | 104 | 104 | 95 | 121 |
| 8-Oct-04 | 113 | 124 | 116 | 133 |
| 14-Oct-04 | 69 | 110 | 135 | 104 |
| 20-Oct-04 | 95 | 272* | 251* | 306* |
| 26-Oct-04 | 105 | 309* | 350** | 328* |

* *Trigger level exceedance*

** *Action level exceedance*

During 1-Hr TSP monitoring this month, five Trigger-level and one Action-level exceedances were recorded on 20 and 26 October 2004. No increase in construction activity was undertaken and dust mitigation measures were implemented on the days of exceedance. On site observations recorded no dusty conditions from the area of works during monitoring on both days. Generally low visibility and poor air quality at Mai Po (not caused by construction works) was observed by field staff on both days. The area of works was also located downwind in relation to the air sensitive receiver. No source of exceedances from construction activity could be identified and the ET concludes that the exceedances are not project related.

All 24-Hr TSP levels measured at A1 were below their respective TAT levels.

The monitoring schedule for TSP monitoring events is presented in *Table 4-1*. The meteorological data for this month was recorded by the Hong Kong Observatory (HKO) at Lau Fau Shan station and is presented in *Appendix F*.

6.0 NOISE MONITORING

6.1 MONITORING EQUIPMENT

An Integrating Sound Level Meter was used for noise monitoring. It is a Type 1 sound level meter 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). It complies with International Electrotechnical Commission Publications 651:1979 (Type 1) and 804:1985 (Type 1). A portable electronic wind speed indicator capable of measuring the wind speed in m/s was employed to check the wind speed. **Table 6-1** details the noise monitoring equipment used.

Table 6-1 Noise Monitoring Equipment

| Equipment | Model |
|-------------------------------|--|
| Integrating Sound Level Meter | Bruel & Kjaer 2238 |
| Calibrator | Bruel & Kjaer 4231 Acoustical Calibrator |
| Portable Wind Speed Indicator | Testo Anemometer |

6.2 MONITORING LOCATION

The noise monitoring was undertaken at one designated monitoring location as shown in **Table 6-2** and geographically in **Appendix A**.

Table 6-2 Location of Noise Monitoring Station

| Monitoring stations | Location | ASR* | Description |
|---------------------|---------------|------|--|
| N1 | Mai Po Lo Wai | A | Village house - Facing the construction site |

*ASR refers to Area Sensitivity Rating as defined in the Technical Memorandum under the Noise Control Ordinance.

6.3 TRIGGER/ACTION/TARGET LEVELS OF CONSTRUCTION NOISE

The Trigger/Action/Target (TAT) Levels for noise monitoring were adopted from the baseline monitoring data. **Table 6-3** and **Table 6.4** presents the established TAT levels for the noise monitoring.

Table 6-3 Trigger / Action Levels for Construction Noise

| Time Period | | Trigger Level | Action Level |
|------------------|---|---|--|
| Normal hours | 07:00-19:00 hrs on normal weekdays | Receipt of a single documented complaint of construction noise level. | Receipt of more than one documented complaint of construction noise in any two weeks period on the same event or at the same location. |
| Restricted hours | 07:00-23:00 hrs on public holidays; and 19:00-23:00 hrs on all other days | | |
| | 23:00-07:00 hrs of next day | | |

Table 6-4 Target Levels for Construction Noise

| Time Period | | Target Level |
|------------------|---|---|
| Normal hours | 07:00-19:00 hrs on normal weekdays | Leq (30 min) 75 dB(A) Leq (30 min) 70 dB(A) for schools and 65 dB(A) during examination periods. |
| Restricted hours | 07:00-23:00 hrs on public holidays; and 19:00-23:00 hrs on all other days | 60 dB(A) for ASR* "A" Areas |
| | 23:00-07:00 hrs of next day | 45 dB(A) for ASR* "A" Areas |

*ASR refers to Area Sensitivity Rating as defined in the Technical Memorandum of Noise Control Ordinance.

6.4 MONITORING PROCEDURE AND CALIBRATION DETAILS

Field Monitoring

- The Sound Level Meter is set on a tripod at a height of 1.2 m above the ground.
- For free field measurement, the meter is positioned away from any nearby reflective surfaces. For reference, a correction of +3dB(A) is made to the free field measurements.
- The battery condition is checked to ensure the correct functioning of the meter.
- Parameters such as frequency weighting, the time weighting and the measurement time is set as follows:
 - Frequency weighting : A
 - Time weighting : Fast
 - Time measurement : 30 minutes / 5 minutes
- Prior to 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 are more than 1 dB(A), the measurement will be considered invalid and repeat of noise measurement will 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} , L_{90} and L_{10} were recorded. In addition, site conditions and noise sources were recorded on a standard record sheet.
- During normal construction working hours (0700-1900 Monday to Saturday), monitoring of $L_{Aeq, 30min}$ noise levels (as six consecutive $L_{Aeq, 5min}$ readings) were carried out.
- Noise measurement was paused during periods of high intrusive noise (e.g. dog barking, human noise or another sources are not come from the construction works) if possible. Observations were recorded when intrusive noise was unavoidable.

Maintenance and Calibration

- The microphone head of the sound level meter and calibrator is cleaned with soft cloth at quarterly intervals.
- The meter was sent to a HOKLAS laboratory for calibration at yearly intervals. The schedule of calibration and certificates are provided in **Appendix C**.

6.5 NOISE MONITORING RESULTS AND AUDITS

Construction noise monitoring was carried out at one designated monitoring station. Nine monitoring days were carried out in this reporting month. The noise monitoring results are tabulated in **Table 6-5** and graphical presentations of the monitoring results are provided in **Appendix E**.

Table 6-5 Summary of Construction Noise Monitoring Results

| Date | Start Time | End Time | 1st Leq5 | 2nd Leq5 | 3rd Leq5 | 4th Leq5 | 5th Leq5 | 6th Leq5 | Leq(30) dB(A) | Corrected * Leq(30) dB(A) | Target Level |
|-----------|------------|----------|----------|----------|----------|----------|----------|----------|---------------|---------------------------|--------------|
| 27-Sep-04 | 13:09 | 13:39 | 49.3 | 51.5 | 50.4 | 52.6 | 55.0 | 53.5 | 52.5 | 55.5 | 75.0 |
| 28-Sep-04 | 10:34 | 11:04 | 51.6 | 50.9 | 52.4 | 54.3 | 48.8 | 50.7 | 51.8 | 54.8 | 75.0 |
| 4-Oct-04 | 13:02 | 13:32 | 50.2 | 49.6 | 51.2 | 53.4 | 52.2 | 55.0 | 52.3 | 55.3 | 75.0 |
| 6-Oct-04 | 10:32 | 11:02 | 51.2 | 54.5 | 50.2 | 54.0 | 48.8 | 54.9 | 52.8 | 55.8 | 75.0 |
| 11-Oct-04 | 14:53 | 15:23 | 53.2 | 51.6 | 49.4 | 52.3 | 50.5 | 51.0 | 51.5 | 54.5 | 75.0 |
| 13-Oct-04 | 10:34 | 11:04 | 51.2 | 53.0 | 49.8 | 50.6 | 50.4 | 48.3 | 50.8 | 53.8 | 75.0 |
| 18-Oct-04 | 11:00 | 11:30 | 54.6 | 55.4 | 56.0 | 53.9 | 52.0 | 51.8 | 54.2 | 57.2 | 75.0 |
| 20-Oct-04 | 13:17 | 13:47 | 48.6 | 49.4 | 49.8 | 50.3 | 48.8 | 51.4 | 49.8 | 52.8 | 75.0 |
| 25-Oct-04 | 10:15 | 10:45 | 53.3 | 51.5 | 57.2 | 52.9 | 50.1 | 49.6 | 53.3 | 56.3 | 75.0 |

Remark: * An Acoustic Correction of +3 dB(A) was made as free field measurements were undertaken.

All noise levels measured at N1 were below the target level.

No complaint was received in this reporting month. The construction noise monitoring schedule is presented in **Table 4-1**. The meteorological data for this month was recorded the HKO Lau Fau Shan station and is presented in **Appendix F**.

7.0 WATER QUALITY MONITORING

7.1 MONITORING EQUIPMENT

The equipment for the water quality monitoring presented in **Table 7-1**.

Table 7-1 Water Quality Monitoring Equipment

| Equipment | Model / Description |
|--------------------------|---|
| Water Depth Detector | Steel Ruler |
| Water Sampling Equipment | Telfon bailor |
| Thermometer | YSI Model 55 |
| Sample Container | High density polythene bottles (provided by laboratory) |
| Storage Container | Cool box with ice pack |

7.2 MONITORING LOCATIONS

Water quality monitoring was undertaken at the two designated locations as shown in **Table 7-2** and geographically in **Appendix A**. The water samples were analysed for Suspended Solids and Total Zinc.

Table 7-2 Locations of Marine Water Monitoring Stations

| Station | Location |
|---------|-------------------------------------|
| W(U)1 | Upstream of site - Control Station |
| W(D)1 | Downstream of site - Impact Station |

7.3 TRIGGER/ACTION/TARGET LEVELS OF WATER QUALITY

The Trigger/Action/Target (TAT) Levels for water monitoring were proposed in the baseline monitoring report. The TAT levels for water quality monitoring are presented in **Table 7-3**.

Table 7-3 Trigger / Action / Target Levels for Water Quality

| Parameter | Trigger Level | Action Level | Target Level |
|-------------------------|--|---|--|
| Suspended Solids (mg/L) | Trigger Level is exceeded if Suspended Solids (SS) at water sampling station W(D)1 exceeds 203mg/L and 120% of the SS level at the upstream control water sampling station W(U)1 on the same monitoring day. | Action Level is exceeded if Suspended Solids (SS) at water sampling station W(D)1 exceeds 203mg/L and 130% of the SS level at the upstream control water sampling station W(U)1 on the same monitoring day. | Target Level is exceeded if SS at water sampling station W(D)1 exceeds 203 mg/L and 130% of the SS level at water sampling station W(U)1 for three consecutive monitoring days. |
| Total Zinc (ug/L) | Trigger Level is exceeded if Zinc at water sampling station W(D)1 exceeds 145 ug/L, and 120% of the zinc level at the upstream control water sampling station W(U)1 on the same monitoring day. | Action Level is exceeded if Zinc at water sampling station W(D)1 exceeds 145ug/L and 130% of the zinc level at the upstream water sampling station W(U)1 on the same monitoring day. | Target Level is exceeded if Zinc at water sampling station W(D)1 exceeds 145ug/L and 130% of the zinc level at water sampling station W(U)1 for three consecutive monitoring days. |

7.4 MONITORING METHODOLOGY

Sampling

A steel ruler is used for the determination of water depth at each designated monitoring station. As the water column at the monitoring station was less than 1.5 m at the time of sampling, one water sample was taken in the middle of the water column.

Water samples are collected using a telfon bailor and the samples were stored in high-density polythene bottles. Sampling 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 analysis of suspended solids and zinc.

The results of the in-situ measurements were recorded on the field data sheets and subsequently inputted into a computer database for data interpretation.

Laboratory Analysis

All laboratory work was carried out by a local HOKLAS-accredited laboratory. The analyses followed the standard methods according to the APHA Standard Methods for the Examination of Water and Wastewater unless otherwise specified. The analytical methods of the water samples are presented in **Table 7-4** below:

Table 7-4 Analytical Methods of Water Samples

| Determinants | Testing Method | Detection Limit |
|------------------|-----------------|-----------------|
| Suspended Solids | APHA 19ed 2540D | 2 mg/L |
| Zinc | APHA 17ed 3111B | 10 ug/L |

7.5 WATER MONITORING RESULTS AND AUDITS

There were a total of 13 monitoring days in this reporting month. The monitoring schedule for water quality monitoring activities is presented in **Table 4-2**. A full set of the impact water monitoring data is presented in **Appendix G** and graphically illustrated in **Appendix H**. The monitoring results of suspended solids and total zinc are summarized in **Table 7-5**.

Table 7-5 Summary of Impact Water Quality Monitoring Results

| Control Station (Upstream) W(U)1 | Suspended Solids (mg/L) | Total Zinc (ug/L) |
|--------------------------------------|-------------------------|-------------------|
| Mean | 13 | 13 |
| Max | 30 | 18 |
| Min | 5 | 10 |
| Impact Station (Downstream) W(D)1 | Suspended Solids (mg/L) | Total Zinc (ug/L) |
| Mean | 35 | 18 |
| Max | 160 | 42 |
| Min | 9 | 10 |

No exceedance in water quality for the impact monitoring station W(D)1 was recorded in this reporting month.

8.0 WASTE MANAGEMENT

The ET carried out a waste management audit on 21 October 2004. A summary of the waste audit findings and follow up actions are presented in **Table 8-1**. The waste audit findings are presented in **Appendix L** and some observations are noted as follows:

ET's Waste Audit Findings and recommendations:

- Trip ticket records of waste disposal at licensed sites were taken;
- Recycling bins were provided onsite for recyclable materials;
- Oil drums/containers were provided with a drip tray to prevent fuel spillage from contaminating the soil; and
- General refuse was collected in skips or waste areas before disposal.

Table 8-1 Summary of Waste Audit Findings and Follow Up Action

| Item | Aspects | Key Audit Findings | Date Observed |
|-------------------------|---------|----------------------------|-----------------|
| Site Observation | | | |
| 1 | Waste | No waste issues to report. | 21 October 2004 |
| Follow Up Action | | | |
| 1 | Waste | N/A | |

Records of Waste Quantities

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

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

The quantities of waste disposed in this reporting month are summarized in **Table 8-2**.

Table 8-2 Summary of Quantities of Waste for Disposal

| Type of Waste | Quantity | Disposal Location |
|--|----------|---------------------------------------|
| Excavated Material (Contaminated) (m ³) | Nil | From Mai Po site to East Sha Chau |
| Excavated Material (Uncontaminated) (m ³) | Nil | From Mai Po site to South Cheung Chau |
| Soil Material from Wang Chau (m ³) | Nil | WENT |
| Soil and Hard Inert Material from Tan Kwai Tsuen (tons) | Nil | Fill Bank Tuen Mun Area 38 |
| Construction & Demolition Material (Inert) (m ³) | Nil | NA |
| Construction & Demolition Material (Non-inert) (m ³) | Nil | NA |
| Chemical Waste from Mai Po (litres) | Nil | Collected by Enviropace |
| Chemical Waste from Wang Chau (litres) | Nil | Collected by Enviropace |
| General Waste from Mai Po (tons) | 54.57 | NENT |
| General Waste from Wang Chau (tons) | 25.86 | NENT |

9.0 ECOLOGICAL MONITORING

The ecological assessment reported in the EIA recommended ecological monitoring and audit to be carried out at the Mai Po Village Egretty.

9.1 MONITORING PARAMETERS AND FREQUENCY

The monitoring of the egretty is carried out during the construction phase of the project to identify and evaluate any impacts from the village flood protection works. Annual counts and species identification of nesting birds are conducted during the nesting season from April through to July. Nest productivity is estimated from sample numbers of eggs and chicks in nests at the egretty. The nest occupancy and productivity is then determined based on 4 counts at the egretty, conducted between 1 April and 31 July. Trends in numbers and species representation at the egretty are assessed for any indications of adverse impacts from channel construction. The monitoring results are reported in the relevant monthly report.

9.2 MONITORING LOCATION

The monitoring location of the egretty is at Mai Po Lo Wai and Mai Po San Tsuen in accordance with the EM&A Manual.

MONITORING METHODOLOGY

A combined monitoring methodology is used consisting of nest counting from a distance which determines the nesting population of the study area and egg counting / hatching which determines the breeding success of the egrets. Little Egrets are the target species of this monitoring exercise as they accounted for 40% of the total nests in the Mai Po Village Egretty in 2002. A maximum of 30 Little Egret nests will be used to determine the breeding success of the population and where possible other nesting ardeids will also be monitored.

Nests or trees are to be tagged with a red ribbon and marked with a numbered plastic label. Each nest is visited on average once every 3 weeks with the main focus during the peak-breeding season. The first and second surveys are aimed at investigating clutch size and hatching success. Sufficient time (about 21 days) will be given to allow the eggs to hatch so that the hatching success of the eggs can be estimated. A mirror attached to a pole will be used to view nests that are high from the ground. A digital camera will be used to record the contents of each nest during every visit.

The hatching success of a tagged nest is defined as the number of chicks hatched divided by the clutch size. The clutch size is determined as the total number of eggs present before hatching occurs in the monitoring sample under study. Those nests where re-visits are not possible due to the loss of tags or labels will not be considered in the estimation of clutch size and hatching success.

Monitoring Equipment

The main equipment used for the breeding success monitoring and the nesting population count is presented as follows:

Table 9-1 Ecological Monitoring Equipment

| Equipment | Model |
|---------------------------------|-------------------|
| Binoculars | Leica 10x42 |
| Digital Camera | Leica Digilux 4.3 |
| Retractable Pole Mounted Mirror | Approx. 5 Metres |

ECOLOGICAL MONITORING AND AUDIT

Ecological monitoring of the Mai Po village egretty this year commenced on 18 April 2004 and was completed on 22 May 2004.

10.0 ENVIRONMENTAL NON-COMPLIANCE AND COMPLAINT

10.1 ENVIRONMENTAL COMPLIANCE REQUIREMENT

Should there be any work related monitoring exceedance of TAT Levels, the Event and Action Plan (EAP) will be followed. The EAP is as outlined in the EM&A Manual.

SUMMARY OF MONITORING EXCEEDANCES

Air Quality Monitoring

Five Trigger-level and one Action-level exceedances in 1-Hr TSP monitoring at A1 sensitive receiver station were recorded on 20 and 26 October 2004. All measurements in 24-Hr TSP monitoring were below the TAT levels in this reporting month.

Construction Noise Monitoring

No exceedance on construction noise monitoring was recorded this reporting month.

Water Quality Monitoring

No exceedance in water quality monitoring was recorded in this reporting month.

SUMMARY OF ENVIRONMENTAL COMPLAINTS

No environmental complaint was received in this reporting month. A statistical summary of environmental complaints since project commencement is presented in **Table 10-1**.

Table 10-1 Statistical Summary of Environmental Complaints

| Reporting Month | Complaint Statistics | | |
|-----------------|----------------------|------------|------------------|
| | Frequency | Cumulative | Complaint Nature |
| September 2002 | 0 | 0 | N/A |
| October 2002 | 0 | 0 | N/A |
| November 2002 | 0 | 0 | N/A |
| December 2002 | 0 | 0 | N/A |
| January 2003 | 0 | 0 | N/A |
| February 2003 | 0 | 0 | N/A |
| March 2003 | 0 | 0 | N/A |
| April 2003 | 0 | 0 | N/A |
| May 2003 | 0 | 0 | N/A |
| June 2003 | 0 | 0 | N/A |
| July 2003 | 0 | 0 | N/A |
| August 2003 | 0 | 0 | N/A |
| September 2003 | 0 | 0 | N/A |
| October 2003 | 0 | 0 | N/A |
| November 2003 | 0 | 0 | N/A |
| December 2003 | 0 | 0 | N/A |
| January 2004 | 0 | 0 | N/A |
| February 2004 | 0 | 0 | N/A |
| March 2004 | 0 | 0 | N/A |
| April 2004 | 0 | 0 | N/A |
| May 2004 | 0 | 0 | N/A |
| June 2004 | 0 | 0 | N/A |
| July 2004 | 0 | 0 | N/A |
| August 2004 | 0 | 0 | N/A |
| September 2004 | 0 | 0 | N/A |
| October 2004 | 0 | 0 | N/A |

ENVIRONMENTAL SUMMONS

No summon was received in this reporting month. A statistical summary of legal proceedings since project commencement is presented in **Table 10-2**.

Table 10-2 Statistical Summary of Environmental Summons

| Reporting Month | Summon Statistics | | |
|-----------------|-------------------|------------|-------------------|
| | Frequency | Cumulative | Nature of Summons |
| September 2002 | 0 | 0 | N/A |
| October 2002 | 0 | 0 | N/A |
| November 2002 | 0 | 0 | N/A |
| December 2002 | 0 | 0 | N/A |
| January 2003 | 0 | 0 | N/A |
| February 2003 | 0 | 0 | N/A |
| March 2003 | 0 | 0 | N/A |
| April 2003 | 0 | 0 | N/A |
| May 2003 | 0 | 0 | N/A |
| June 2003 | 0 | 0 | N/A |
| July 2003 | 0 | 0 | N/A |
| August 2003 | 0 | 0 | N/A |
| September 2003 | 0 | 0 | N/A |
| October 2003 | 0 | 0 | N/A |
| November 2003 | 0 | 0 | N/A |
| December 2003 | 0 | 0 | N/A |
| January 2004 | 0 | 0 | N/A |
| February 2004 | 0 | 0 | N/A |
| March 2004 | 0 | 0 | N/A |
| April 2004 | 0 | 0 | N/A |
| May 2004 | 0 | 0 | N/A |
| June 2004 | 0 | 0 | N/A |
| July 2004 | 0 | 0 | N/A |
| August 2004 | 0 | 0 | N/A |
| September 2004 | 0 | 0 | N/A |
| October 2004 | 0 | 0 | N/A |

11.0 SITE INSPECTION

Four environmental site inspections were carried out jointly by representatives of the IEC, the Engineer and the Contractor's environmental staff on 5, 11, 14 and 21 October 2004. The ET undertook an independent site and waste management audit on 21 October 2004.

A summary of the site inspection findings and the follow up actions are presented in **Table 11-1** and **Appendix K**. Details of the ET's waste management audit is presented in **Appendix L**.

Table 11-1 Summary of Site Inspection Findings and Follow Up Action

| Item | Aspects | Key Audit Findings | Date Observed |
|---|---------|--|---------------|
| Site Observation | | | |
| 1 | All | No Environmental Issues to Report This Month | N/A |
| Follow Up Action On Above Observation Points | | | |
| 1 | All | N/A | |

12.0 IMPLEMENTATION STATUS OF MITIGATION MEASURES

The Contractor has been implementing the required environmental mitigation measures according to the Environmental Mitigation Implementation Schedule. A summary of the implementation status of the mitigation measures is presented in **Appendix I**.

13.0 IMPACT FORECAST AND MONITORING SCHEDULE FOR NOVEMBER 2004

13.1 KEY ISSUES FOR THE COMING MONTH

Construction works for the box culvert; the pumping station and the flood protection wall will continue in the coming construction month. Any potential dust, noise and water quality impact due to works will be carefully monitored. Key issues to be considered in the coming month include:

- Construction noise impact due to construction works at Mai Po Lo Wai and Mai Po San Tsuen;
- Air quality impact due to vehicular movement and loading and unloading of construction material;
- Water quality impact due to surface water runoff particularly during the rainy season; and
- Follow-up management of chemical and general waste issues if any.

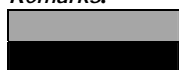
13.2 UPCOMING EM&A SCHEDULE IN NOVEMBER 2004

The EM&A schedules for the coming reporting month is presented as follows:

Table 13-1 Upcoming EM&A Schedule in November 2004

| <i>Date of Monitoring</i> | | Water Quality | Noise (Leq30) | Air Quality (1-Hr and 24-Hr) | Site Inspection / Waste Audit |
|---------------------------|-----|---------------|---------------|-------------------------------|-------------------------------|
| 27-Oct-04 | Wed | | | | |
| 28-Oct-04 | Thu | | | | |
| 29-Oct-04 | Fri | | | | |
| 30-Oct-04 | Sat | | | | |
| 31-Oct-04 | Sun | | | | |
| 1-Nov-04 | Mon | | | | |
| 2-Nov-04 | Tue | | | | |
| 3-Nov-04 | Wed | | | | |
| 4-Nov-04 | Thu | | | | |
| 5-Nov-04 | Fri | | | | |
| 6-Nov-04 | Sat | | | | |
| 7-Nov-04 | Sun | | | | |
| 8-Nov-04 | Mon | | | | |
| 9-Nov-04 | Tue | | | | |
| 10-Nov-04 | Wed | | | | |
| 11-Nov-04 | Thu | | | | |
| 12-Nov-04 | Fri | | | | |
| 13-Nov-04 | Sat | | | | |
| 14-Nov-04 | Sun | | | | |
| 15-Nov-04 | Mon | | | | |
| 16-Nov-04 | Tue | | | | |
| 17-Nov-04 | Wed | | | | |
| 18-Nov-04 | Thu | | | | |
| 19-Nov-04 | Fri | | | | |
| 20-Nov-04 | Sat | | | | |
| 21-Nov-04 | Sun | | | | |
| 22-Nov-04 | Mon | | | | |
| 23-Nov-04 | Tue | | | | |
| 24-Nov-04 | Wed | | | | |
| 25-Nov-04 | Thu | | | | |
| 26-Nov-04 | Fri | | | | |

Remarks:



Sunday or Public Holiday

Monitoring Event

13.3 CONSTRUCTION WORKS FOR THE 3 MONTHS ROLLING PROGRAM

The construction works for the 3 months rolling program is included in *Appendix J*.

14.0 CONCLUSIONS AND RECOMMENDATIONS

The EM&A program in October 2004 was undertaken in accordance with the EM&A manual. A summary of environmental exceedances for air, noise and water quality in this reporting month is presented as follows:

Summary of Environmental Exceedance

| Env. Quality | Parameters | % Exceedance | Investigation & Corrective Actions |
|---------------|---------------------|--------------|------------------------------------|
| Air Quality | 1-Hr TSP | 40 | ET investigation completed # |
| | 24-Hr TSP | 100 | NA |
| Noise | Leq (30min) Daytime | 100 | NA |
| Water Quality | Suspended Solids | 100 | NA |
| | Total Zinc Level | 100 | NA |

Details of any monitoring exceedances recorded by the ET are presented in *Appendix M*.

Air Quality Monitoring

Five Trigger-level and one Action-level exceedances in 1-Hr TSP monitoring at A1 sensitive receiver station were recorded on 20 and 26 October 2004. All measurements in 24-Hr TSP monitoring were below the TAT levels in this reporting month.

Construction Noise Monitoring

All noise levels measured at N1 were below the target level. No complaint was received in this reporting month.

Water Quality Monitoring

No exceedance in water quality impact was recorded this reporting month.

Ecology

No monitoring was required in this reporting month.

Environmental Complaint/Summons

No environmental complaint or summons was received during the reporting month.

Recommendations

The contractor should continue to follow the key recommendations below:

- Ensure that no muddy material is carried out onto the public road;
- Increase frequency of water spraying along haul roads;
- Keep surface water channels clean from silt; and
- Exposed slopes should be protected to prevent dust generation.

The ET will keep track on the EM&A program to ensure compliance of environmental requirements and the proper implementation of all necessary mitigation measures.