Stanger Asia

# ENVIRONMENTAL MONITORING AND AUDIT REPORT

## FOR

## CONTRACT No. CV/2002/13

## FILL BANK AT TUEN MUN AREA 38

## SEPTEMBER 2003

**(Revision No. 0)**

Report No.: ET11868

Certified by: _____ Date: 13/10/2003

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## EXECUTIVE SUMMARY.

This is the 3rd monthly Environmental Monitoring and Audit (EM&A) report for Contract No. CV/2002/13 – Fill Bank at Tuen Mun Area 38. The site has been in operation as a public filling area as part of the reclamation. It is operated from 08:00 to 20:00 except during the Chinese New Year holidays to provide a stable outlet for public fill to serve the construction industry. This report covers the monitoring works conducted during the month of September 2003.

### Construction Activities for the Reported Period.

- Collection of public fill from land access and marine access.
- Tree planting.
- Construction of combined reception and exit offices, weighbridges and queuing area.
- Erection of hoarding.

### Air Quality Monitoring.

Two stations (A1 and A2) have been identified as the locations for the monitoring of 24-hour and 1-hour Total Suspended Particulates (TSP). The Monitoring of 24-hour TSP was carried out on six occasions at A1 and on five occasions at A2. Monitoring of 1-hour TSP was carried out on eighteen occasions at A1 and on fifteen occasions at A2. No monitoring was conducted at A2 on 29.09.2003 due to failure of electricity. This will be made up in the next reporting period. There was no exceedance to the set Action and Limit levels for both parameters at both stations during the reporting period.

The wind monitoring station has yet to be installed. This will be carried out in October 2003. Wind speed and direction data from the station will be provided in the next reporting month.

### Water Quality Monitoring.

In accordance with EM&A Manual *Section 6.3*, the water quality monitoring data obtained from the Reclamation Project (CV/2000/01) was used as the impact monitoring data, no duplication of water quality monitoring being required. The monitoring data was obtained through CED in the reporting period.

The water quality monitoring of the Reclamation Project (CV/2000/01) was completed on 24.09.2003 and that of the Fill Bank Project (CV/2002/13) has commenced on 27.09.2003.

Water quality in terms of turbidity, dissolved oxygen, suspended solids, temperature, and salinity, was carried out on thirteen occasions at FM1, FM2, FC1 and FC2. There were 21 Action (3 – D.O. - Surface & Middle, 11 – D.O. – Bottom, 1 – Turb., and 6 – SS) and 11 Limit (4 – D.O. – Surface & Middle, 1 – Turb., and 6 - SS) Level exceedances during the reporting period. Although there was surface runoff generated on-site due to rainfall, this runoff was desilted via catchpits, sand and silt removal facilities and intercepting channels. Hence the aforementioned exceedances are not believed to be associated with the works at the Fill Bank.

**Landscape Audit**

In this reporting period, there was no specific site observation regarding the landscape aspect.

**Waste Management.**

168,000$m^3$ public fill was collected to stockpiling area. 5.64t C&D waste and general refuse were disposed of at WENT Landfill. Chemical waste generated was stored in temporary storage area.

**Complaints and Notifications of Summonses and Successful Prosecutions.**

No complaints or notification of summonses received this reported period.

**Site Inspections.**

Four weekly site inspections were conducted on 4th, 11th, 17th and 24th September 2003. Major observations are summarised in the following table.

| Observations | Actions by Contractor | Outcome |
|---|---|---|
| The automatic wheel washing facility was not operating. Vehicles were not cleaned before leaving the site. (11th & 17th September 2003) | Operation resumed as soon as possible. Labour deployed to conduct manual wheel washing. | Most vehicles were cleaned before leaving the site. (24th September 2003) |
| Some haul roads and work sites were dry although watering was in operation. (11th September 2003) | Increased the frequency of watering on those busy areas. | Situation improved. (17th September 2003) |
| Stockpiling of materials near waterfront. (11th, 17th & 24th September 2003) | Removed and reduced the stockpiles. | Situation improved. (29th September 2003) |
| Generator and chemical drums were stored on bare ground. (17th September 2003) | Placed generator and chemical drums in drip trays. | Some chemical drums were stored in drip trays. (24th September 2003) |
| Stagnant water was observed. (11th & 17th September 2003) | Cleared the drainage channels to drain away stagnant water. | Drainage channels were cleared and pools were filled. (24th September 2003) |
| The public roads around the site entrance were dusty. (24th September 2003) | Operated the road cleaner more frequently. | Situation improved. (29th September 2003) |

An Independent Environmental Checker (IEC) audit was conducted on 17th September 2003 with Contractor's Representative and Environmental Team. Major observations are summarized in the following table.

| Observations | Actions by Contractor | Outcome |
|---|---|---|
| Seawall was not maintained stockpile free. | Removed and reduced the stockpiles. | Situation improved. (29th September 2003) |
| Automated wheel washing facility was under repair and manual wheel wash ineffective. | Operation resumed as soon as possible. Labour deployed to conduct manual wheel washing effectively. | Situation improved. (24th September 2003) |
| Hoarding at River Trade Terminal was still to be erected. | To erect hoarding as soon as possible. | Erection of hoarding commenced. (29th September 2003) |
| U-channel near the River Trade Terminal was blocked by collapsed slopes. | Cleared the u-channel channels. | The u-channel was cleared. (24th September 2003) |
| Oil drums were not placed in drip trays. | Placed oil drums in drip trays. | Some chemical drums were stored in drip trays. (24th September 2003) |

**Future Key Issues.**

The tentative works activities, predicted impacts and areas of environmental concern for the following month are summarised in the following table.

| Works Activities | Predicted Impacts | Proposed Mitigation Measures |
|---|---|---|
| Collection of public fill from land and marine access. | Dust<br>Water | - Dampening of fill materials.<br>- Stockpile of fill materials near seafront shall be avoided. |
| Erection of hoarding and fencing. | Dust<br><br>Waste | - Dust generating activities shall be conducted with water spray.<br>- C&D waste shall be removed as far as practicable. |
| Combining of reception and exit office. | Waste | - C&D waste shall be removed as far as practicable. |
| Construction of weighbridges and queuing area. | Dust<br>Waste | - Dusty generating activities shall be conducted with water spray.<br>- C&D waste shall be removed as far as practicable. |

# 1. INTRODUCTION.

## 1.1 Background.

Stanger Asia Ltd. has been commissioned by the Penta-Ocean Construction Co. Ltd. to provide an Environmental Team (ET) to monitor air and water quality and audit landscape works for Contract No.CV/2002/13. The team is to take a pro-active role in all issues, which may be of environmental concern during the establishment, operation and decommissioning phases of the Fill Bank at Tuen Mun Area 38..

The Independent Environmental Checker (IEC) appointed for this project is Materialab Consultants Ltd.

In this report, the air and water quality monitoring works and landscape audit conducted for the September 2003 will be detailed and reviewed. All monitoring works were carried in accordance to "*Agreement No, PW 01/2002 Project Profile for Fill Bank at Tuen Mun Area 38, Environmental Monitoring and Audit Manual"*.

## 1.2 Report Structure.

The purpose of this report is to detail and review the air and water quality monitoring works and landscape audit undertaken during September 2003. The impact forecast for the next reporting month and the schedules of monitoring works for the following month is also given.

The report follows the format given below:

| | |
|---|---|
| Section 1 | Introduction and background information to the content of this report. |
| Section 2 | This section gives the information of the project. |
| Section 3 | This section summarises all the environmental permits and licenses. |
| Section 4 | Summary of the EM&A requirements is presented. |
| Section 5 | This section details the implemented mitigation measures. |
| Section 6 | Details monitoring results. |
| Section 7 | Audit the monitoring results. |
| Section 8 | The status for solid and liquid waste management for the site is overviewed. |
| Section 9 | Complaints, notifications of summons and successful prosecutions are summarized. |
| Section 10 | This section gives the predicted impacts of the construction activities. |
| Section 11 | This section gives a conclusion in relation to all monitoring activities. |

## 2. PROJECT INFORMATION.

### 2.1 Site Description.

The works mainly comprise the construction of temporary storm water system, setting up of C&D material loading/unloading facilities, setting up/ refurnishing site facilities, stockpiling of 4.9 million $m^3$ of public fill, and decommissioning of the temporary fill bank.

The site layout plan is shown in Figure 2.1.

### 2.2 Project Organization.

Mr. L.M. Chan is the Engineer's Representative for the Civil Engineering Department, Government of the HKSAR. (Tel: 2762 5602, Fax: 2714 0113).

The Independent Environmental Checker (IEC) for this project is headed by Mr. Joseph Poon - Manager of Materialab Consultants Ltd. (Tel: 2450 8238, Fax: 2450 6138).

Mr. Lok Wah Fung is the Site Agent for Penta-Ocean Construction Co., Ltd. (Tel: 2491 1584, Fax: 2496 0433).

The Environmental Team (ET) for the project is Stanger Asia Ltd. The team is headed by Mr Chris Shenfield – Senior Environmental Scientist. (Tel: 2682 1203, Fax: 2682 0046).

The Organization Chart with the key personnel contacts names and telephone numbers is given in Appendix I.

### 2.3 Construction Programme.

The overall construction programme is given in Appendix IX. Details of the construction activities are listed below.

- Site clearance;
- Construction of storm water drainage system;
- Stockpiling of 4.9 million $m^3$ of public fill;
- Construction of landscape works; and
- Removal of stockpiled public fill.

## 3. ENVIRONMENTAL PERMITS AND LICENSES.

The summary of the status of all environmental permits, licenses and notification for this project as at September 2003 is summarized in the following table.

**Table 3.1 Summary of the Environmental Permits and Licenses**

| Description | Licence/Permit No. | Date of Issue | Date of Expiry | Status |
|---|---|---|---|---|
| Environmental Permit | EP-153/2003 | 13-Feb-03 | -- | Issued |
| Registration of Chemical Waste Producer | WPN5296-421-P2800-03 | 05-Aug-03 | -- | Issued |

## 4. SUMMARY OF EM&A REQUIREMENTS.

### 4.1 Air Quality.

*Monitoring Location.*

The project has two designated locations (A1 & A2) for the monitoring of air quality. A1 is a fixed location in the vicinity of the site office to monitoring the TSP levels at River Trade Terminal and A2 is a movable location to the western boundary of the site that is designed to move as works progress. The air monitoring locations are shown in Figure 4.1.

**Table 4.1 Coordinates of Air Quality Monitoring Stations**

| Station | HK Metric Grid – Easting | HK Metric Grid - Northing |
|---|---|---|
| A1 | 811368 | 825593 |
| A2 | 811126* | 825132* |

** - Coordinates of present location.*

*Methodology*

Measurement of 24-hour and 1-hour TSP levels were carried out in accordance to the high volume sampling method as set out in the Title 40 of the Code of Federal Regulations, Chapter 1 (Part 50). When positioning the high volume samplers, the following requirements have been observed:

- a horizontal platform with appropriate support to secure the high volume sampler against gusty wind, should be provided;
- horizontal distance between the high volume samplers and an obstacle, such as buildings, must be at least twice the height of the obstacle protruding above the high volume samplers;
- a minimum separation of 2 m should be provided from walls, parapets, and penthouses for rooftop high volume samplers;
- a minimum separation of 2 m should be provided from any supporting structure measured horizontally;
- there should not be any furnace or incinerator flues nearby;
- there should be unrestricted airflow around the high volume samplers;
- a minimum separation of 20 m should be provided from the dripline;
- any wire fence and gate employed to protect the high volume samplers should not cause any obstruction during monitoring.

All relevant data including temperature, pressure, weather conditions, elapsed-timer meter reading for the start and finish of the sampling period, identification and weight of the filter paper, and other special phenomena were recorded.

*Monitoring Equipment and Calibration Details.*

Andersen GMW Model GS2310 high volume samplers were used to carry out the monitoring of 24-hour and 1-hour TSP. The high volume sampler is in compliance with the specifications as listed in the Environmental Schedule, given below:

- 0.6 – 1.7 $m^3$/min (20-60 SCFM) adjustable flow range;
- equipped with a timing / control device with 5 minutes accuracy over 24 hours operations;
- installed with elapsed-time meter with 2 minutes accuracy over 24 hours operations;
- capable of providing a minimum exposed area of 406 $cm^2$ (63 $in^2$);
- flow control accuracy: 2.5% deviation over 24-hr sampling period;
- equipped with shelter to protect the filter and sampler;
- incorporated with an electronic mass flow rate controller or other equivalent devices;
- equipped with a flow recorder for continuous monitoring;
- provided with peaked roof inlet, incorporated with manometer;
- able to hold and seal the filter paper to the sampler housing at horizontal position;
- easy to change filter; and
- capable of operating continuously for 24-hr period.

The high volume sampler is calibrated at bi-monthly intervals. The calibration kit (Andersen Model G2535) comprising pressure plates and a transfer standard is traceable to the internationally recognized standard. Calibration records for the high volume sampler is given in Appendix II of this report.

*Laboratory Measurement.*

Laboratory measurements were carried out in Stanger Asia Ltd. own HOKLAS accredited laboratory with constant temperature and humidity control, and equipped with necessary measuring and conditioning instruments.

Clean filter papers of size 8”x10” with no pinholes were labelled before sampling. They were conditioned in a dessicator with less than 50% relative humidity for over 24 hours and pre-weighed before use for sampling.

After sampling, the filter papers loaded with dust were kept in a clean and tightly sealed plastic bag. The filter papers were then returned to the laboratory for reconditioning in the dessicator with less than 50% relative humidity followed by accurate weighing on an electronic balance regularly calibrated against a traceable standard and readable to 0.1 mg.

Stanger Asia Ltd. operates comprehensive quality assurance and quality control programmes. For QA/AC procedures, all filters were equilibrated and weighed repeatedly until the difference of two consecutive results was less than 0.5 mg.

*Monitoring Parameters Frequency.*

**Table 4.2 Air Quality Monitoring Frequency**

| Monitoring Locations | Parameter | Frequency |
|---|---|---|
| A1 & A2 | 24-hr TSP | Once in every six days |
| | 1-hr TSP | Three times in every six days |

*Action and Limit Levels.*

The Action levels for air quality monitoring were established from the impact monitoring data of Contract No. CV/2000/01 prior to the commencement of the fill bank utilising the criteria laid out in *section 4.7* of the EM&A Manual for the project. The Limit levels for air quality monitoring has been set in line with statutory guidelines for air quality in Hong Kong. Action and Limit levels for both 24-hour and 1-hour TSP are given in the following table.

**Table 4.3 Action and Limit Levels for the Project**

| Parameter Monitored | Action Level, $\mu g/m^3$ | Limit Level, $\mu g/m^3$ |
|---|---|---|
| 1-hour TSP | 344 | 500 |
| 24-hour TSP | 192 | 260 |

## 4.2 Water Quality.

In accordance with the EM&A Manual, as water quality monitoring is currently conducted under Stage 2 Reclamation Works (Contract No. CV/2000/01), it is not necessary to repeat the water quality monitoring. The water quality monitoring of the Reclamation Project (CV/2000/01) was completed on 24.09.2003 and that of the Fill Bank Project (CV/2002/13) commenced on 27.09.2003.

*Monitoring Locations.*

The EM&A Manual produced for this project has proposed two monitoring stations (FM1 & FM2) and two control stations (FC1 & FC2) for the carrying out of water quality monitoring. Control Station FC1 will act as upstream control station for the mid-ebb tide with control station FC2 acting as upstream control stations for the mid-flood tide.

The designated monitoring stations are shown in Figure 4.2.

*Methodology (Fill Bank Project).*

Measurements are taken at three water depths, namely 1m below water surface, mid-water and 1m above seabed at both mid-flood and mid-ebb tides, except where the water depth less than 6m, when the mid-depth station may be omitted. Should the water depth have been less than 3m, only the mid-depth was monitored.

Two measurements of turbidity, dissolved oxygen (mg/L), dissolved oxygen (% saturation) and temperature at each depth of each station is taken. The probes are removed from the water after the first measurement and then redeployed for the second measurement. If the difference between in value between the first and second reading of each set is more than 25% of the value of the first reading, the readings are discarded and further readings taken. Replicate samples of suspended solids measurements are taken at each depth and at each water quality monitoring and control station. The samples are kept in a chilled condition during delivery to the laboratory ad before commencement of analysis. For the purpose of evaluating the water quality, all values for suspended solids and turbidity shall be depth-averaged.

During monitoring works the following shall also be recorded:

- monitoring location;
- depth of water;
- time;
- weather conditions including ambient temperature;
- water temperature;

*Monitoring Equipment (Fill Bank Project).*

The following equipment was employed for routine water quality monitoring.

- Dissolved Oxygen meter: YSI model 58 with stirrer
- Turbidity meter: Hach 2100P
- Echo sounder: Hummingbird 100SX
- Water sampler: Kahlisco 135WB203
- GPS receiver: Trimble NT2002D
- Thermometer: YSI model 58

*Monitoring Equipment Calibration Details (Fill Bank Project).*

All on-site monitoring equipment was calibrated three-monthly at Stanger Asia's HOKLAS accredited laboratory. An on-site calibration check was carried out prior to the taking of measurements in accordance with standard water quality monitoring procedures.

Equipment calibration details were given in Appendix II.

*Laboratory Analysis (Fill Bank Project).*

The laboratory measurements of suspended solids were carried out at Stanger Asia Limited, a HOKLAS accredited laboratory in accordance with Method No. 2540D 17th Edition of APHA.

Stanger Asia operates a comprehensive quality assurance and quality control programmes for QA/AC procedures in accordance with the requirements of HOKLAS accreditation, all filters were equilibrated and weighted repeatedly until the difference of two consecutive results is less than 0.5 mg.

*Monitoring Parameters and Frequency.*

**Table 4.4 Water Quality Monitoring Frequency**

| Monitoring Locations | Monitoring Parameters | Frequency | Requirements |
|---|---|---|---|
| Designated Control Stations: FC1 & FC2.<br><br>Designated Monitoring Stations: FM1 & FM2. | Temperature, Salinity, Dissolved Oxygen, Turbidity, Suspended Solids. | Three days per week. | At three depths during mid-ebb and mid-flood tides. |

*Action and Limit Levels.*

The Action and Limit levels for water quality monitoring were established from the impact monitoring data of Contract No. CV/2000/01 prior to the commencement of the fill bank utilising the criteria laid out in *section 6.8* of the EM&A Manual for the project.

**Table 4.5 Action and Limit Level for Water Quality**

| Parameter | Action level | Limit level |
|---|---|---|
| Dissolved Oxygen in mg/L.<br><br>Surface & Middle<br><br>Bottom. | <br><br><4.78mg/L<br><br><4.16mg/L | <br><br><4mg/L<br><br><2mg/L |
| Suspended Solids (SS) in mg/L (depth-averaged) | >120% of upstream control station's SS at the same time of the same day. | >130% of upstream control station's SS at the same tide of the same day . |
| Turbidity (Tby) in NTU | >120% of upstream control station's Tby at the same tide of the same day. | >130% of upstream control station's Tby at the same tide of the same day. |

All the figures given in the table are used for reference only and the EPD may amend the figures whenever necessary.

## 4.3 Event and Action Plans.

The Event and Action Plans for air and water are attached in Appendix III of this report.

## 5. IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURES.

The contractor implemented various environmental mitigation measures as recommended in the Project Profile and Environmental Permit. The implementation status is attached in Appendix IV and summarised as follows:

- Wheel washing facilities were provided at the exit point of the site and the wheel washing bay was cleared regularly.
- Slopes were compacted as far as practicable.
- Site accesses were covered with concrete.
- Waste collection points were maintained and cleaned on a regular basis.
- Hoarding was erected along Lung Mun Road and being erected near River Trade Terminal.
- Most oil drums were put in drip trays.
- Water trucks were in operation.
- Buffer tree planting was in progress.

## 6. MONITORING RESULTS.

### 6.1 Completed Monitoring Works.

Table 6.1 gives the completed monitoring works for the reported period.

**Table 6.1 Completed Monitoring Works for September 2003**

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|
| | **September 1**<br>24 – hr TSP<br>1 – hr TSP<br>WQM<br>(Ebb: 16:06)<br>(Flood: 09:56) | **2** | **3**<br>WQM<br>(Ebb: 17:56)<br>(Flood: 12:30)<br>Site Inspection | **4** | **5** | **6**<br>WQM<br>(Ebb: 09:32)<br>(Flood: 17:42)<br>24 – hr TSP<br>1 – hr TSP |
| **7** | **8**<br>WQM<br>(Ebb: 11:28)<br>(Flood: 18:47) | **9** | **10**<br>WQM<br>(Ebb: 12:55)<br>(Flood: 06:11)<br>Site Inspection | **11**<br>24 – hr TSP<br>1- hr TSP | **12** | **13**<br>WQM<br>(Ebb: 14:30)<br>(Flood: 08:13) |
| **14** | **15**<br>WQM<br>(Ebb: 15:25)<br>(Flood: 09:32) | **16** | **17**<br>24 – hr TSP<br>1 – hr TSP<br>WQM<br>(Ebb: 16:27)<br>(Flood: 11:15)<br>Site Inspection | **18** | **19**<br>WQM<br>(Ebb: 06:26)<br>(Flood: 18:58) | **20** |
| **21** | **22**<br>WQM<br>(Ebb: 10:07)<br>(Flood: 17:50) | **23**<br>24 – hr TSP<br>1 – hr TSP | **24**<br>WQM<br>(Ebb: 11:46)<br>(Flood: 18:38)<br>Site Inspection<br>Landscape<br>Audit | **25** | **26** | **27**<br>WQM<br>(Ebb: 13:46)<br>(Flood: 07:25) |
| **28** | **29**<br>24 – hr TSP<br>1 – hr TSP<br>(A1 only) | **30**<br>WQM<br>(Ebb: 15:51)<br>(Flood: 10:05) | | | | |

*Notes:* *1. 24 –hr TSP (monitored once every 6 days) at monitoring locations A1 and A2.*
*2. 1 hour TSP (monitored three times every six days when highest level of dust generation expected) at monitoring locations A1 and A2.*
*3. WQM - water quality monitoring three times per week, on mid-flood and mid-ebb tides. Days of monitoring to be separated by at least 36 hours. Monitoring locations FC1, FM1, FM2 & FC2.*
*4. Site inspections to be carried out once per week.*
*5. Auditing of landscape works to be carried out once per month.*

## 6.2 Air Quality Monitoring.

Impact monitoring of 24-Hour TSP was conducted on six occasions at A1 and on five occasions at A2, with the monitoring of 1-Hour TSP being conducted on eighteen occasions at A1 and on fifteen occasions at A2 this reported period. Due to failure of electricity, monitoring at A2 on 29.9.2003 was cancelled and it will be made up in the next reporting period.

The wind monitoring station has yet to be installed. This will be carried out in October 2003. ET, therefore, used the meteorological data obtained from Hong Kong Observatory during this reporting period. The data was given in Appendix XI.

The monitoring records for 24-hour and 1-hour TSP are given in the following table. Details of monitoring results are given in Appendix V**.** The results are presented graphically in Figures 6.1 and 6.2.

**Table 6.2 Results of 24-hour TSP Monitoring**

| Date | A1, µg/m$^3$ | Exceedance (Y/N) | A2, µg/m$^3$ | Exceedance (Y/N) |
|---|---|---|---|---|
| 01-Sept-2003 | 158 | N | 185 | N |
| 06-Sept-2003 | 36 | N | 64 | N |
| 11-Sept-2003 | 130 | N | 175 | N |
| 17-Sept-2003 | 107 | N | 42 | N |
| 23-Sept-2003 | 123 | N | 153 | N |
| 29-Sept-2003 | 163 | N | - | - |
| Action Level | 192 µg/m3 | | | |
| Limit Level | 260 µg/m$^3$ | | | |

**Table 6.3 Results of 1-hour TSP Monitoring**

| Date | A1, µg/m$^3$ | Exceedance (Y/N) | A2, µg/m$^3$ | Exceedance (Y/N) |
|---|---|---|---|---|
| 01-Sept-2003 | 270 | N | 309 | N |
| 01-Sept-2003 | 329 | N | 243 | N |
| 01-Sept-2003 | 209 | N | 204 | N |
| 06-Sept-2003 | 318 | N | 334 | N |
| 06-Sept-2003 | 232 | N | 128 | N |
| 06-Sept-2003 | 95 | N | 328 | N |
| 11-Sept-2003 | 246 | N | 338 | N |
| 11-Sept-2003 | 240 | N | 217 | N |
| 11-Sept-2003 | 318 | N | 278 | N |
| 17-Sept-2003 | 100 | N | 64 | N |
| 17-Sept-2003 | 86 | N | 65 | N |
| 17-Sept-2003 | 71 | N | 84 | N |
| 23-Sept-2003 | 248 | N | 330 | N |
| 23-Sept-2003 | 188 | N | 299 | N |
| 23-Sept-2003 | 221 | N | 193 | N |
| 29-Sept-2003 | 324 | N | - | N |
| 29-Sept-2003 | 193 | N | - | N |
| 29-Sept-2003 | 205 | N | - | N |
| Action Level | 344 µg/m$^3$ | | | |
| Limit Level | 500 µg/m$^3$ | | | |

## 6.4 Water Quality Monitoring.

According to the EM&A Manual, water quality data was provided from water quality monitoring works currently conducted under Contract No. CV/2000/01 via CED. The water quality monitoring of the Reclamation Project (CV/2000/01) was completed on 24.09.2003 and that of the Fill Bank Project (CV/2002/13) has commenced on 27.09.2003. Water monitoring was carried out on thirteen occasions at FM1, FM2, FC1 and FC2.

Results for water quality monitoring are summarised in the following tables. Details of monitoring results are presented in Appendix VI. Graphical presentations of the results are shown in Figure 6.3 – Figure 6.10.

**Table 6.4 Summary of Water Quality Monitoring Data**

| Sample Location | Surface & Middle Averaged Dissolved Oxygen (Range), mg/L | Bottom Averaged Dissolved Oxygen (Range), mg/L | Depth Averaged Turbidity (Range), NTU | Depth Averaged Suspended Solids (Range), mg/L |
|---|---|---|---|---|
| FM1 | 5.36 (3.71-8.48) | 4.86 (3.09-8.04) | 8.55 (4.67-23.40) | 16.3 (4.3-14.0) |
| FM2 | 5.35 (3.72-8.15) | 5.03 (3.05-8.29) | 9.15 (4.48-22.40) | 9.0 (4.3-18.7) |
| FC1 | 5.50 (3.87-10.14) | 5.09 (3.14-10.08) | 8.31 (5.25-18.50) | 7.8 (3.7-15.3) |
| FC2 | 5.34 (3.90-8.31) | 5.00 (3.23-8.55) | 8.79 (5.08-21.38) | 8.4 (3.3-17.7) |

# 7. AUDIT REPORT.

## 7.1 Air Quality Monitoring.

No exceedance to set Action and Limit levels for either 24 or 1-Hour TSP monitoring was recorded at air monitoring station A1 and A2 in this reported period.

Elevated results below the Action limit were reported for this month's monitoring data. The Contractor is reminded to implement and maintain all necessary mitigation measures to suppress dust generation.

## 7.2 Water Quality Monitoring.

There were number of exceedances to Action Level and Limit Level for all parameters in this reported period. Total number of exceedances in the reporting month is summarized in Table 7.1

**Table 7.1 Number of Water Quality Exceedances in The Reporting Period**

| Parameter | Number of Occasions Monitored | Exceedance Level | | Total |
|---|---|---|---|---|
| | | Action | Limit | |
| Surface & Middle Dissolved Oxygen | 52 | 3 | 4 | 7 |
| Bottom Dissolved Oxygen | 52 | 11 | 0 | 11 |
| Turbidity | 52 | 1 | 1 | 2 |
| Suspended Solids | 52 | 6 | 6 | 12 |
| Total | 208 | 21 | 11 | 32 |

There were 21 Action and 11 Limit level exceedances during the reporting period. Details of exceedances are presented in the water quality monitoring data in Appendix VI. These exceedances were considered not related to the Fill Bank Project.

Exceedances of dissolved oxygen to the Action Level were reported frequently. These exceedances were not attributed to the Project, as for all cases the water at the control station was also depleted of oxygen. These exceedances were possibly due to natural seasonal variation.

All exceedances of turbidity and suspended solids to the daily values from the control stations were minor and not believed to be related to the Project as most of the data was well below the monitoring results obtained during the baseline monitoring period. Some elevated results were obtained for monitoring conducted during, or after rainfall. Although there would have been surface runoff generated on-site due to rainfall, this runoff would have been desilted via catchpits, sand and silt removal facilities and intercepting channels. Therefore, the exceedances were not believed to be associated with the Project. These exceedances were possibly due to Pearl River flow and discharge from the nearby shoreline and associated outfalls.

Although the exceedances for this reported month were not considered to be related to the Fill Bank Project, the contractor is reminded to implement and maintain all necessary mitigation measures to avoid deteriorating the water quality.

## 7.3 Site Inspections.

Four weekly site inspections were conducted on 4th, 11th, 17th and 24th September 2003. Observations by ET, action by the Contractor and outcome are summarised in the following table.

**Table 7.2 Summary of Findings, Actions and Outcomes of Site Inspection by ET**

| Observations | Actions by Contractor | Outcome |
|---|---|---|
| The automatic wheel washing facility was not operating. Vehicles were not cleaned before leaving the site. (11th & 17th September 2003) | Operation resumed as soon as possible and deployed labour to conduct manual wheel washing. | Most vehicles were cleaned before leaving the site. (24th September 2003) |
| Some haul roads and work sites were dry although watering was in operation. (11th September 2003) | Increased the frequency of watering on those busy areas. | Situation improved. (17th September 2003) |
| Stockpiling of materials near waterfront. (11th, 17th & 24th September 2003) | Removed and reduced the stockpiles. | Situation improved. (29th September 2003) |
| Generator and chemical drums were stored on bare ground. (17th September 2003) | Placed generator and chemical drums in drip trays. | Some chemical drums were stored in drip trays. (24th September 2003) |
| Stagnant water was observed. (11th & 17th September 2003) | Cleared the drainage channels to drain away stagnant water. | Drainage channels were cleared and pools were filled. (24th September 2003) |
| The public roads around the site entrance were dusty. (24th September 2003) | Operated the road cleaner more frequently. | Situation improved. (29th September 2003) |

The Independent Environmental Checker (IEC) conducted at audit on 17th September 2003. The major observations were summarized in the following table.

**Table 7.3 Summary of Findings, Actions and Outcomes of Site Inspection by IEC**

| Observations | Actions by Contractor | Outcome |
|---|---|---|
| Seawall was not maintained stockpile free. | Removed and reduced the stockpiles. | Situation improved. (29th September 2003) |
| Automation wheel washing facility was under repair and manual wheel wash ineffective. | Operation resumed as soon as possible and deployed labour to conduct manual wheel washing effectively. | Situation improved. (24th September 2003) |
| Hoarding at River Trade Terminal was still to be erected. | To erect hoarding as soon as possible. | Erection of hoarding commenced. (29th September 2003) |
| U-channel near the River Trade Terminal was blocked by collapsed slopes. | Cleared the u-channel channels. | The u-channel was cleared. (24th September 2003) |
| Oil drums were not placed in drip trays. | Placed oil drums in drip trays. | Some chemical drums were stored in drip trays. (24th September 2003) |

## 7.4 Landscape and Visual.

A landscape audit was conducted on 24th September 2003. Hoarding has been erected along Lung Mun Road. Buffer trees were being planted along the northern perimeter of the site. As indicated by the Contractor, slopes of the fill bank will be covered or hydroseeded as far as practicable.

## 8. WASTE MANAGEMENT.

168,000$m^3$ public fill was collected to stockpiling area. 5.64t C&D waste and general refuse were disposed of at WENT Landfill. Chemical waste generated was stored in temporary storage area.

The contractor is reminded to store all chemical drums and generators in drip trays to avoid land contamination from spillage of chemicals. The valve of the trays shall be sealed. Covers can also be provided to reduce accumulation of standing water from rainfall inside the trays.

## 9. COMPLAINTS, NOTIFICATIONS OF SUMMONSES AND SUCCESSFUL PROSECUTIONS.

No complaints received this month. Complaint Log is attached in Appendix VII. Cumulative statistics on complaints, notifications of summonses and successful prosecutions are attached in Appendix VIII.

## 10. FUTURE KEY ISSUES.

The following are the scheduled construction activities for the next reported period. Scheduled monitoring activities for the following month are given in Appendix IX.

**Table 10.1 Works Programme for October 2003**

| Works Activities | Predicted Impacts | Proposed Mitigation Measures |
|---|---|---|
| Collection of public fill from land and marine access. | Dust<br>Water | - Wet the fill materials.<br>- Stockpile of fill materials near seafront shall be avoided. |
| Erection of hoarding and fencing. | Dust<br><br>Waste | - Dust generating activities shall be conducted with water spray.<br>- C&D waste shall be removed as far as practicable. |
| Combine reception and exit office. | Waste | - C&D waste shall be removed as far as practicable. |
| Construction of weighbridges and queuing area. | Dust<br><br>Waste | - Dust generating activities shall be conducted with water spray.<br>- C&D waste shall be removed as far as practicable. |

## 11. CONCLUSION.

All results for the air quality monitoring conducted this month were acceptable with no exceedance to set Action or Limit levels for either 24 or 1-Hour TSP level being recorded at monitoring locations A1 (vicinity of Engineer's Office) and A2 (western site boundary). However some elevated results, when compared to baseline data, were noted in this reported period. The Contractor is reminded to implement and maintain all the required mitigation measures in relation to air quality.

In relation to the monitoring of water quality, there were 21 Action and 11 Limit level exceedances during the reporting period. Since surface runoff generated on-site due to rainfall would have been desilted via catchpits, sand and silt removal facilities and intercepting channels, these exceedances were not considered to be associated with the Fill Bank Project. However, the contractor is reminded to implement and maintain all necessary mitigation measures to avoid deteriorating the water quality.

No specific observation was reported from landscape audit.