

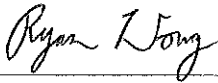

China State – China Railway Joint Venture

CE 28/2004 (GE)

**Landslide Preventive Works at Po Shan Road, Mid-Levels – Design and Construction (Natural Terrain Risk Mitigation Works)**

**Monthly EM&A Report for February 2009**

March 2009

	Name	Signature
Prepared & Checked:	Ryan Wong	
Reviewed & Approved:	Edith Ng	

Version: 0	Date: 13 March 2009
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The information contained in this report is, to the best of our knowledge, correct at the time of printing. The interpretation and recommendations in the report are based on our experience, using reasonable professional skill and judgment, and based upon the information that was available to us. These interpretations and recommendations are not necessarily relevant to any aspect outside the restricted requirements of our brief. This report has been prepared for the sole and specific use of our client and ENSR Asia (HK) Ltd. accepts no responsibility for its use by others.

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**ENSR Asia (HK) Ltd.**

11/F, Grand Central Plaza, Tower 2, 138 Shatin Rural Committee Road, Shatin, NT, Hong Kong  
 Tel: (852) 2893 1551 Fax: (852) 2891 0305 Email: ensrhk@ensr.aecom.com  
 www.ensr.aecom.com www.maunsell.aecom.com

Ref.: MSLPOSHNEM00\_0\_0140L.09

13 March 2009

By Fax (3188 0775) and Post

Engineer's Representative  
Maunsell Geotechnical Services Ltd  
Room 1808, 18/F, Tung Che Comm. Centre  
246 Des Voeux Road West  
Sheung Wan, Hong Kong

Attention: Mr. Freddie Chan

Dear Mr. Chan,

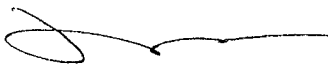
**Re: Agreement No. CE28/2004 (GE)  
Landslide Preventive Works at Po Shan, Mid-levels  
Monthly EM&A Report for February 2009**

Reference is made to the finalized Monthly EM&A Report for February 2009 (Version 0) by the Environmental Team by email on 13 March 2009, we would like to inform that we have no comment on the captioned report.

Please also note that the Monthly EM&A Report had been verified in accordance with the Condition 2.9 of the Environmental Permit No. EP-235/2005/B.

Thank you very much for your kind attention and please do not hesitate to contact the undersigned should you have any queries.

Yours sincerely,



David Yeung  
Independent Environmental Checker

c.c. ENSR

Attn: Ms. Edith Ng

Fax: 2891 0305

**TABLE OF CONTENTS**

	Page
EXECUTIVE SUMMARY .....	1
1. INTRODUCTION .....	2
Background.....	2
Scope of Report.....	2
Project Organization .....	2
Summary of Construction Works.....	3
Summary of EM&A Programme Requirements.....	3
2. AIR QUALITY .....	4
Monitoring Requirements.....	4
Monitoring Equipment.....	4
Monitoring Parameters, Frequency and Duration .....	4
Monitoring Locations.....	4
Monitoring Methodology .....	5
Monitoring Results .....	6
3. NOISE MONITORING .....	7
Monitoring Requirements.....	7
Monitoring Equipment.....	7
Monitoring Locations.....	7
Monitoring Parameters .....	7
Monitoring Methodology .....	7
Monitoring Results .....	8
4. VEGETATION MONITORING .....	9
Monitoring Requirement .....	9
Monitoring Location .....	9
Monitoring Methodology .....	9
Monitoring Results .....	9
5. LANDSCAPE AND VISUAL .....	10
Monitoring Requirement .....	10
Summary of Inspection – 10 February 2009 .....	10
Summary of Inspection – 24 February 2009 .....	11
Next Landscape and Visual Audit Schedule.....	12
6. ENVIRONMENTAL SITE INSPECTION AND AUDIT .....	13
Site Inspection .....	13
Assessment of Environmental Monitoring Results .....	14
Advice on the Solid and Liquid Waste Management Status.....	14
Environmental Licenses and Permits .....	14
Implementation Status of Environmental Mitigation Measures.....	15
Summary of Exceedances of the Environmental Quality Performance Limit.....	15
Summary of Complaints, Notification of Summons and Successful Prosecutions.....	15
7. FUTURE KEY ISSUES.....	16
Construction Programme for the Coming Months .....	16
Key Issues for Coming Month .....	16
Monitoring Schedule for the Coming Months .....	17
8. CONCLUSIONS AND RECOMMENDATIONS .....	18
Conclusions .....	18
Recommendations.....	18

## List of Tables

Table 1.1	Contact Information of Key Personnel .....	3
Table 2.1	Air Quality Monitoring Equipment .....	4
Table 2.2	Air Quality Monitoring Parameters, Frequency and Duration .....	4
Table 2.3	Locations of Air Quality Monitoring Stations .....	4
Table 2.4	Summary of 1-hour TSP Monitoring Results in the Reporting Period .....	6
Table 2.5	Summary of 24-hour TSP Monitoring Results in the Reporting Period .....	6
Table 3.1	Noise Monitoring Equipment.....	7
Table 3.2	Locations of Noise Monitoring Stations.....	7
Table 3.3	Summary of Noise Monitoring Results in the Reporting Period .....	8
Table 6.1	Summary of Environmental Licensing and Permit Status.....	14

## List of Figures

Figure 1.1	Site Layout Plan
Figure 2.1	Locations of Air Quality and Noise Monitoring Stations
Figure 6.1	Environmental Complaint Handling Procedures

## List of Appendices

Appendix A	Project Organization Structure
Appendix B	Construction Programme
Appendix C	Implementation Schedule of Mitigation Measures (EMIS)
Appendix D	Action and Limit Levels for Air Quality and Noise
Appendix E	Calibration Certificates
Appendix F	Air Quality Monitoring Results and Graphical Presentation
Appendix G	Event Action Plan
Appendix H	Weather Data
Appendix I	Noise Monitoring Results and Graphical Presentation
Appendix J	Detailed Landscape and Visual Monitoring Report
Appendix K	ET's Site Inspection Summaries
Appendix L	Monitoring Schedules

## **EXECUTIVE SUMMARY**

The Project “Landslide Preventive Works at Po Shan, Mid-levels – Design and Construction (Natural Terrain Risk Mitigation Works)” (hereafter called “the Project”) includes the installation of about 700 numbers of soil nails and about 60 numbers of raking drains on the natural terrain within the concerned area.

China State – China Railway Joint Venture (CCJV) was commissioned as the Contractor of the Project. ENSR Asia (HK) Ltd. was employed by CCJV as the Environmental Team to carry out the EM&A programme.

The impact environmental monitoring and audit for the Project includes the air quality, noise, ecology, landscape and visual monitoring. The construction of the Project and the EM&A programme commenced on 1 April 2008.

This report documented the findings of EM&A works conducted in the period between 1 and 28 February 2009. As informed by the Contractor, construction activities in the reporting period were:

- Soil nailing works at Portion B2;
- Soil nail head construction at Portion A2 and Portion B1; and
- Rock slope stabilization works at Portion B2, Portion C and Portion D.

### **Breaches of Action and Limit Levels**

There was no action / limit level exceedance recorded for 1-hour and 24-hour TSP monitoring.

In the reporting month, all noise level recorded complied with the limit level.

### **Complaint, Notification of Summons and Successful Prosecution**

There was no complaint, notification of summons and successful prosecution received in the reporting month.

### **Reporting Change**

There was no reporting change required in the reporting month.

### **Future Key Issues**

The weather in the forthcoming month is expected to be wet and windy. The Contractor should provide preventive measures to prevent any muddy runoff, such as proper collection and treatment of the runoff and provide a functional temporary drainage system in site.

It is also recommended to implement all necessary preventive measures to avoid oil leakage on ground / soil, such as provision of drip trays for all oil drums / chemical containers. In the event of oil leakage, the Contractor should properly remove the contaminated soil and dispose of as chemical waste. Construction waste and general refuse should be properly collected and disposed of.

## 1. INTRODUCTION

### Background

- 1.1 The project site is located at the mostly undeveloped hillside above the residential development at Po Shan Road and adjacent to the trimmed back slope on the site of the catastrophic 1972 Po Shan Road failure. Previous studies had been carried out and results indicated that the natural hillside above Po Shan Road is affected by high groundwater level and unfavourable geology. Sub-surface drainage measures by means of sub-horizontal drains had been installed in 1984-85. These measures have been successful in lowering the main ground water table, thus improving the stability of the slopes such that large-scale failure have not occurred in the last twenty years.
- 1.2 The objective of the Project “Landslide Preventive Works at Po Shan, Mid-levels – Design and Construction (Natural Terrain Risk Mitigation Works)” under Contract CE 28/2004 (GE) is to carry out detailed design and supervision of landslide preventive works on local repair of the hillside to minimize slope deterioration and shallow instability.
- 1.3 The proposed landslide preventive works would be constructed to protect the existing residential developments at the toe of the project site.
- 1.4 The scope of works of this Project includes the installation about 700 numbers of soil nails and about 60 numbers of raking drains on the natural terrain within the concerned area. The length of the soil nails is about 20m with a spacing of 2m horizontally and 3m vertically; the length of raking drains is about 10m with a spacing of 5m horizontally and 15m vertically.
- 1.5 The Project is anticipated to complete in 10 months after the commencement of construction.
- 1.6 According to the Environmental Permit (EP-235/2005/B) and the EM&A Manual of the Project, there is a need of an EM&A programme including air quality, noise, ecology, and landscape and visual monitoring.
- 1.7 ENSR Asia (HK) Ltd. (ENSR) was employed by the Contractor, China State – China Railway Joint Venture, as the Environmental Team (ET) to undertake the Environmental Monitoring and Audit (EM&A) works for the Project. In accordance with the EM&A Manual of the Project, environmental monitoring of air quality, noise, ecology, landscape and visual and environmental site inspections would be required for this Project.

### Scope of Report

- 1.8 This is the eleventh monthly Environmental Monitoring and Audit (EM&A) Report under the Contract CE 28/2004 (GE) – Landslide Preventive Works at Po Shan Road, Mid-Levels – Design and Construction (Natural Terrain Risk Mitigation Works). This report presented a summary of the environmental monitoring and audit works, list of activities, and mitigation measures proposed by the ET for the Project in February 2009.

### Project Organization

- 1.9 The project organization is shown in Appendix A. The key personnel contact names and numbers are summarized in Table 1.1

**Table 1.1 Contact Information of Key Personnel**

Party	Position	Name	Telephone	Fax
CEDD	Senior Engineer	H. W. Sun	2762 5375	2714 0247
ER (MGS)	Resident Engineer	Freddie Chan	3188 0400	3188 0775
	Assistant Resident Engineer	S. F. Chau	3188 0400	3188 0775
IEC (ENVIRON)	Independent Environmental Checker	David Yeung	3743 0788	3548 6988
Contractor (CCJV)	Project Manager	C. Y. Mak	3188 0538	3188 1710
	Safety and Environmental Officer	Ken Fong	3188 0538	3188 1710
ET (ENSR)	ET Leader	Edith Ng	3105 8525	2891 0305

### Summary of Construction Works

- 1.10 The Contactor has carried out major activities in the reporting month. Details of the works undertaken in this reporting period are listed below:
- Soil nailing works at Portion B2;
  - Soil nail head construction at Portion A2 and Portion B1; and
  - Rock slope stabilization works at Portion B2, Portion C and Portion D.
- 1.11 The general layout plan of the Project site showing the contract area is shown in Figure 1.1. The construction programme is provided in Appendix B.
- 1.12 The mitigation measures implementation schedule are presented in Appendix C.

### Summary of EM&A Programme Requirements

- 1.13 The EM&A programme required environmental monitoring for air quality, noise, ecology and landscape and visual and environmental site inspections for air quality, noise, ecology, landscape and visual and waste management. The EM&A requirements for each parameter described in the following sections include:
- All monitoring parameters;
  - Monitoring schedules for the reporting month and forthcoming months;
  - Action and Limit levels for all environmental parameters;
  - Event / Action Plan;
  - Environmental mitigation measures, as recommended in the Project EIA study final report; and
  - Environmental requirement in contract documents.

## 2. AIR QUALITY

### Monitoring Requirements

- 2.1 In accordance with the EM&A Manual, 1-hour and 24-hour TSP levels at 2 air quality monitoring stations were established. Impact 1-hour and 24-hour TSP monitoring was conducted for at least once every 7 days during the construction phase of the Project. The Action and Limit level of the air quality monitoring is provided in Appendix D.

### Monitoring Equipment

- 2.2 24-hour TSP air quality monitoring was performed using High Volume Sampler (HVS) located at each designated monitoring station. The HVS meets all the requirements of the EM&A Manual. Portable direct reading dust meters were used to carry out the 1-hour TSP monitoring. Table 2.1 summarises the equipment used.

**Table 2.1 Air Quality Monitoring Equipment**

Equipment	Model
High Volume Sampler	GS 2310 Accu-vol system
Calibrator	GMW 25
1-hour TSP Dust Meter	Laser Dust Monitor – Model LD-3

### Monitoring Parameters, Frequency and Duration

- 2.3 Table 2.2 summarizes the monitoring parameters, frequency and duration of impact TSP monitoring.

**Table 2.2 Air Quality Monitoring Parameters, Frequency and Duration**

Monitoring Station	Parameter	Frequency and Duration
CA1 & CA2	24-hour TSP	At least once every 7 days
	1-hour TSP	At least 3 times every 7 days

### Monitoring Locations

- 2.4 Both monitoring stations were set up at the proposed locations in accordance with EM&A Manual. Table 2.3 describes details of the two monitoring stations. The monitoring locations are shown in Figure 2.1.

**Table 2.3 Locations of Air Quality Monitoring Stations**

Monitoring Station	Identity / Description
CA1	Access road to Po Shan Mansions
CA2	Podium of Hamilton Court



## Monitoring Methodology

### 24-hour TSP Monitoring

#### Installation

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

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

#### Preparation of Filter Papers

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

#### Field Monitoring

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

#### Maintenance and Calibration

- The HVS and its accessories are maintained in good working condition, such as replacing motor brushes routinely and checking electrical wiring to ensure a continuous power supply.
- HVSs are calibrated using GMW-25 Calibration Kit prior to the commencement of baseline air

quality monitoring, and will be calibrated at bi-monthly intervals throughout all stages of the impact monitoring.

- Calibration records are shown in Appendix E.

### 1-hour TSP Monitoring

#### Measuring Procedures

2.6 The measuring procedures of the 1-hour dust meter are in accordance with the Manufacturer's Instruction Manual as follows:

- Set POWER to "ON", push BATTERY button, make sure that the meter's indicator is in the range with a red line and allow the instrument to stand for about 3 minutes (Then, the air sampling inlet has been capped).
- Push the knob at MEASURE position.
- Push "O-ADJ" button. (Then meter's indication is 0).
- Push the knob at SENSI ADJ position and set the meter's indication to S value described on the Test Report using the trimmer for SENSI ADJ.
- Pull out the knob and return it to MEASURE position.
- Push "START" button.

#### Maintenance and Calibration

- The 1-hour TSP meter would be checked at 3-month intervals and calibrated at 1-year intervals throughout all stages of the air quality baseline monitoring. Calibration records are shown in Appendix E.

### **Monitoring Results**

2.7 The monitoring results for 1-hour TSP and 24-hour TSP are summarized in Table 2.4 and 2.5 respectively and the monitoring results are provided in Appendix F.

**Table 2.4 Summary of 1-hour TSP Monitoring Results in the Reporting Period**

	<b>Average (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Range (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Action Level (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Limit Level (<math>\mu\text{g}/\text{m}^3</math>)</b>
<b>CA1</b>	73.6	69.0 – 79.4	309.3	500
<b>CA2</b>	70.1	64.3 – 73.9	319.6	500

**Table 2.5 Summary of 24-hour TSP Monitoring Results in the Reporting Period**

	<b>Average (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Range (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Action Level (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Limit Level (<math>\mu\text{g}/\text{m}^3</math>)</b>
<b>CA1</b>	45.8	26.3 – 84.0	166.8	260
<b>CA2</b>	42.7	36.7 – 51.3	187.0	260

2.8 Air quality monitoring was carried out for both 1-hour TSP and 24-hour TSP at all the monitoring stations in the reporting month.

2.9 The air quality monitoring results, in terms of 1-hour TSP and 24-hour TSP, were below the action and limit level at both monitoring locations in the reporting month. The event action plan is annexed in Appendix G.

2.10 Weather information including wind speed and wind direction is annexed in Appendix H. The information was obtained from Hong Kong Observatory Victoria Peak Automatic Weather Station and Central Pier Anemometer Station.

### 3. NOISE MONITORING

#### Monitoring Requirements

- 3.1 In accordance with the EM&A Manual, impact noise levels should be obtained at 2 noise monitoring stations. Impact noise monitoring was conducted for at least once per week during the construction phase of the Project. The Action and Limit level of the noise monitoring is provided in Appendix D.

#### Monitoring Equipment

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

**Table 3.1 Noise Monitoring Equipment**

Equipment	Model
Integrating Sound Level Meter	Rion NL-31
Calibrator	Rion NC-73

#### Monitoring Locations

- 3.3 Two monitoring stations were set up in accordance with EM&A Manual. Table 3.2 describes details of the two monitoring stations. The monitoring locations are shown in Figure 2.1.

**Table 3.2 Locations of Noise Monitoring Stations**

Monitoring Station	Identity / Description
CN1	Block A, Po Shan Mansions
CN2	Block A, Po Shan Mansions

#### Monitoring Parameters

- 3.4 One set of 30-mins measurement at each monitoring station between 0700 and 1900 on normal weekdays at a frequency of once per week was required to determine the impact noise level.  $L_{eq}$ ,  $L_{10}$  and  $L_{90}$  would be recorded.

#### Monitoring Methodology

##### Monitoring Procedures

- The Sound Level Meter was set on a tripod at a height of 1.2 m above the ground.
- Façade measurements were made at all three monitoring locations.
- 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 minutes) during non-restricted hours i.e. between 07:00 and 19:00 on normal weekdays
- Prior to and after each noise measurement, the meter was calibrated using a Calibrator for 94 dB at 1000 Hz. If the difference in the calibration level before and after measurement was more than 1 dB(A), the measurement would be considered invalid and repeat of noise measurement would be required after re-calibration or repair of the equipment.
- The wind speed was frequently checked with a portable wind meter.

- During the monitoring period, the  $L_{eq}$ ,  $L_{10}$  and  $L_{90}$  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 (e.g. dog barking, helicopter noise) if possible. Observations were recorded when intrusive noise was unavoidable.
- Noise monitoring was cancelled in the presence of fog, rain, wind with a steady speed exceeding 5 m/s, or wind with gusts exceeding 10 m/s.

Maintenance and Calibration

- The microphone head of the sound level meter and calibrator is cleaned with soft cloth at quarterly intervals.
- The meter should be checked and calibrated at yearly intervals.
- Calibration details for the sound level meter and calibrator are provided in Appendix E.

**Monitoring Results**

3.5 The monitoring results for noise are summarized in Table 3.3 and the monitoring data is provided in Appendix I.

**Table 3.3 Summary of Noise Monitoring Results in the Reporting Period**

	<b>Average, dB(A), <math>L_{eq}</math> (30 mins)</b>	<b>Range, dB(A), <math>L_{eq}</math> (30 mins)</b>	<b>Limit Level, dB(A), <math>L_{eq}</math> (30 mins)</b>
<b>CN1</b>	54.7	53.3 – 55.9	75.0
<b>CN2</b>	53.7	52.0 – 55.0	75.0

- 3.6 There was no noise complaint received in the reporting month, hence, no action level exceedance was recorded. At both monitoring locations, CN1 and CN2, all the monitoring results (daytime) were below the limit level of 75 dB(A).
- 3.7 All the monitoring results lied within the range of the predicted noise levels in the EIA report.
- 3.8 Major noise sources during the noise monitoring included the construction activities from the Project and another project under the same contract (concurrent project) carried out in the vicinity and nearby traffic noise.

## 4. VEGETATION MONITORING

### Monitoring Requirement

- 4.1 As required under Environmental Permit No. EP-235/2005/B, the Permit Holder is required to carry out monitoring of the plant species of conservation interest to check on the health and condition of the plants twice a month during the construction period of the Project.
- 4.2 It is required to undertake the ecological tasks to fulfill the requirements of the Environmental Permit (EP). As required by Conditions 2.11 and 3.5 of the EP, a suitably qualified ecologist with 7 or more years of relevant experience shall be employed to conduct the ecological monitoring.

### Monitoring Location

- 4.3 The ecological monitoring was carried out for plant individuals of conservation interest identified within the proposed works area.

### Monitoring Methodology

- 4.4 The ecological monitoring was conducted twice in the reporting month on 10 and 24 February 2009 by Ms. Gigi C C Lam, who had over 7 years of relevant ecological experience.
- 4.5 The plants of conservation interest, which were tagged during the baseline survey, were checked during each monitoring.

### Monitoring Results

- 4.6 Site clearance, soil nailing and scaffolding works were in progress during the monitoring visits.
- 4.7 The 4 individuals of vegetation of conservation interest (V015, V016, V017 and V018) were still missing.
- 4.8 A large area of leaked grout and muddy run-off was found in most soil nailing works areas. The plant species of conservation interest (such as V022 to V035) located within these areas were almost wiped out and cannot be located on site during the monitoring visits.
- 4.9 The leaves of vegetation located near the operation area of soil nailing works were covered heavily with dust and were subsequently washed by the Contractor upon request.
- 4.10 Some recently dead trees were recorded within the works area. The Contractor advised that the report on dead trees found within works area will be provided before February 2009.

## 5. LANDSCAPE AND VISUAL

### Monitoring Requirement

- 5.1 During the construction phase of the Project, landscape and visual monitoring should be carried out bi-weekly by a Registered Landscape Architect (RLA) to check if the design, implementation and maintenance of the landscape and visual mitigation measures are fully realized. A detailed report is annexed in Appendix J.

### Summary of Inspection – 10 February 2009

#### Matters Arising from Previous Inspections

- 5.2 It was still observed that cleansing of fine dust deposited on trees was still outstanding. The Contractor was reminded to hose down the trees on a regular basis to prevent adverse affects on tree growth in future.
- 5.3 It was still observed that the Contractor had not removed the dead trees, including a tree with rotten trunk at the base located near existing tree T534. The Contractor was recommended to remove all the dead and rotten trees away from the footpath area for safety.
- 5.4 It was still observed that rectification of many of the tree identification numbers for the existing retained trees were outstanding. The Contractor was reminded to re-instate the tree numbers on existing trees for ease of reference as soon as possible.
- 5.5 It was noted that compensatory planting proposal for the replacement of dead tree T611 was outstanding. The Contractor was recommended to seek Engineer's agreement on the replacement planting as soon as possible.
- 5.6 It was noted that the Contractor's clarification of the status of existing trees T516, T517, T666, and T698 located immediately outside of the works boundary was outstanding. The Contractor was reminded to provide necessary information as soon as possible.

#### Protection of Existing Trees

- 5.7 It was observed that the Contractor had stockpiles subsoil drain pipes against existing trees. The Contractor was requested to clear the drain pipes away from the trees as soon as possible.
- 5.8 It was observed that the Contractor had stockpiled bags of excavated soil at base of existing trees. The Contractor was requested to clear the soil bags away from the trees as soon as possible.
- 5.9 It was observed that some excavation for soil nail heads concreting area was larger than necessary, causing unnecessary damage to the existing tree roots. The Contractor was reminded that the excavation of soil nail areas should be kept to the minimum to minimize damage to the existing trees.

#### Recommendations

- 5.10 The Contractor was recommended to clear and remove dead / rotten trees from site for safety.
- 5.11 The Contractor was reminded to rectify all ineligible tree ID numbers for all existing trees.
- 5.12 The Contractor was recommended to clarify the status of missing trees as soon as possible.
- 5.13 The Contractor was recommended to seek Engineer's agreement on the replacement planting for dead tree.

- 5.14 The Contractor was recommended to clear the construction materials away from existing tree and not to stockpile materials against trees in future.
- 5.15 The Contractor was recommended to minimize the excavation of soil nail head areas for concreting as far as practicable in order to minimize damage to existing tree roots.

### **Summary of Inspection – 24 February 2009**

#### Matters Arising from Previous Inspections

- 5.16 The Contractor had hosed down some of the fine dust previously found deposited on trees. The Contractor was reminded to hose down the trees on a regular basis to prevent adverse affects on tree growth in future.
- 5.17 The Contractor had cleared the stockpile of subsoil drain pipes away from the trees as previously identified.
- 5.18 The Contractor had cleared away the stockpile of soil bags previously observed placed at base of existing trees. However, new stockpile of excavated soil bags and a small boulder was observed placed against another existing tree. The Contractor was reminded to clear it away as soon as possible.
- 5.19 It was still observed that the Contractor had not removed the dead trees, including a tree with rotten trunk at the base located near existing tree T534. The Contractor was recommended to remove all the dead and rotten trees away from the footpath area for safety.
- 5.20 It was still observed that rectification of many of the tree identification numbers for the existing retained trees were outstanding. The Contractor was reminded to re-instate the tree numbers on existing trees for ease of reference as soon as possible.
- 5.21 It was noted that compensatory planting proposal for the replacement of dead tree T611 was outstanding. The Contractor was recommended to seek Engineer's agreement on the replacement planting as soon as possible.
- 5.22 It was noted that the Contractor's clarification of the status of existing trees T516, T517, T666, and T698 located immediately outside of the works boundary was outstanding. The Contractor was reminded to provide necessary information as soon as possible.

#### Protection of Existing Trees

- 5.23 It was found that a termite tube had infected the dead tree T511 at the corner of footpath stair. The Contractor was request to urgently remove the infected dead tree for consideration of safety of the workers and the public in future.

#### Recommendations

- 5.24 The Contractor was recommended to clear the soil bags and boulder away from existing tree and not to stockpile materials against trees in future.
- 5.25 The Contractor was reminded to rectify all ineligible tree ID numbers for all existing trees.
- 5.26 The Contractor was recommended to remove dead / rotten trees from site for safety, especially T511 which was now found infected by termite. The Contractor was also reminded to record and report all dead trees as found on site to the Engineer for record.
- 5.27 The Contractor was recommended to clarify the status of missing trees as soon as possible.

- 5.28 The Contractor was recommended to seek Engineer's agreement on the replacement planting for dead tree.

**Next Landscape and Visual Audit Schedule**

- 5.29 The landscape and visual audits in the next reporting month was tentatively scheduled to 10 and 24 March 2009.



## 6. ENVIRONMENTAL SITE INSPECTION AND AUDIT

### **Site Inspection**

- 6.1 Site Inspections were carried out on a weekly basis to monitor the implementation of proper environmental pollution control and mitigation measures for the Project. In the reporting month, 4 site inspections were carried out on 3, 10, 17 and 24 February 2009. The detail findings of the landscape and visual audits in the reporting month are presented separately in Section 5. The environmental site inspection summaries are attached in Appendix K. Particular observations are described below.

### **Air Quality**

- 6.2 No adverse observation was identified in the reporting month.

### **Noise**

- 6.3 No adverse observation was identified in the reporting month.

### **Water Quality**

- 6.4 Exposed sediment was observed accumulated on the slope of Row Y and on the platform of Row AJ. The Contractor was reminded to clear the exposed sediment regularly.
- 6.5 Deposited silt was observed accumulated inside the u-channel at Row R. The Contractor was reminded to clear the u-channel regularly.

### **Chemical and Waste Management**

- 6.6 No adverse observation was identified in the reporting month.

### **Ecology**

- 6.7 Four individuals tagged vegetation of conservation interest (V015, V016, V017 and V018) were still missing.
- 6.8 A large number of plant species of conservation interested were affected by construction activities. Muddy runoff and grout leakage were observed within works areas.
- 6.9 The leaves of vegetation near soil nailing areas were covered heavily with soil / dust.
- 6.10 Some recently dead trees were recorded within works areas.

### **Landscape and Visual**

- 6.11 It was still observed that cleansing of fine dust deposited on trees was still outstanding. The Contractor was reminded to hose down the trees on a regular basis to prevent adverse affects on tree growth in future.
- 6.12 It was still observed that the Contractor had not removed the dead trees, including a tree with rotten trunk at the base located near existing tree T534. The Contractor was recommended to remove all the dead and rotten trees away from the footpath area for safety.
- 6.13 It was still observed that rectification of many of the tree identification numbers for the existing retained trees were outstanding. The Contractor was reminded to re-instate the tree numbers on existing trees for ease of reference as soon as possible.

- 6.14 It was noted that compensatory planting proposal for the replacement of dead tree T611 was outstanding. The Contractor was recommended to seek Engineer’s agreement on the replacement planting as soon as possible.
- 6.15 It was noted that the Contractor’s clarification of the status of existing trees T516, T517, T666, and T698 located immediately outside of the works boundary was outstanding. The Contractor was reminded to provide necessary information as soon as possible.
- 6.16 It was observed that the Contractor had stockpiled subsoil drain pipes and bags of excavated soil against existing trees. The Contractor was requested to clear the drain pipes and soil bags away from the trees as soon as possible.
- 6.17 It was observed that some excavation for soil nail heads concreting area was larger than necessary, causing unnecessary damage to the existing tree roots. The Contractor was reminded that the excavation of soil nail areas should be kept to the minimum to minimize damage to the existing trees.
- 6.18 It was found that a termite tube had infected the dead tree T511 at the corner of footpath stair. The Contractor was request to urgently remove the infected dead tree for consideration of safety of the workers and the public in future.

**Assessment of Environmental Monitoring Results**

- 6.19 All monitoring results were audited against the Action / Limit levels and any exceedance would be validated and issued when necessary.
- 6.20 The monitoring results in the reporting period were comparable with the EIA predictions. Detailed discussions are given in Section 2 and 3.

**Advice on the Solid and Liquid Waste Management Status**

- 6.21 The Contractor is registered as a chemical waste producer for this Project. The Chemical Waste Storage Area located at the Contractor’s site office area was properly maintained in the reporting month.
- 6.22 As advised by the Contractor, 2.26 ton of non-inert C&D waste and 16.31 ton of inert C&D waste were disposed offsite to SENT landfill and Chai Wan respectively in the reporting month. C&D waste generated was reused on site as much as possible.

**Environmental Licenses and Permits**

- 6.23 The environmental licenses and permits for this Project and valid in the reporting month is summarized in Table 6.1.

**Table 6.1 Summary of Environmental Licensing and Permit Status**

Description	Permit No.	Valid Period		Remarks
		From	To	
Environmental Permit	EP-235/2005/B	23/11/07	--	- Installation of about 700 nos. of soil nails and about 60 nos. of raking drains in the natural terrain; - Rock slope stabilisation works at upper portion of the natural terrain; and - Other associated works.

Registration as a Chemical Waste Producer	5213-141-C3250-02	13/12/06	--	Spent lubricating oil and mineral oil
Effluent Discharge License	EP880/W10/XX0261	07/11/06	31/12/11	--
Notification of Constriction Work under APCO (Construction Dust)	001012125	18/07/06	--	--

### Implementation Status of Environmental Mitigation Measures

- 6.24 In response to the site audit findings, the Contractor carried out corrective actions.
- 6.25 A summary of the Implementation Schedule of Mitigation Measures (EMIS) is presented in Appendix C. Most of the necessary mitigation measures were implemented properly.

### Summary of Exceedances of the Environmental Quality Performance Limit

- 6.26 All 1-hour TSP, 24-hour TSP and noise monitoring results complied with the Action / Limit levels.
- 6.27 No exceedance was recorded in the reporting month.

### Summary of Complaints, Notification of Summons and Successful Prosecutions

- 6.28 The Environmental Complaint Handling Procedure is annexed in Figure 6.1.
- 6.29 No environmental complaint, notification of summons and successful prosecutions was received in the reporting month.

## 7. FUTURE KEY ISSUES

### Construction Programme for the Coming Months

7.1 The construction programme for the Project is provided in Appendix B.

7.2 The major construction work in March 2009 will be:

- Soil nailing works at Portion B2;
- Construction of soil nail heads at Portion A2 and Portion B1; and
- Rock slope stabilization works at Portion B2, Portion C and Portion D.

### Key Issues for Coming Month

7.3 Key issues to be considered in the coming month included:

- Sufficient dust suppression measures should be maintained;
- Collection of construction waste should be carried out regularly;
- Site runoff should be properly collected and treated prior to discharge;
- Construction activities should avoid causing damage to the trees and to plants species of conservation interest; and
- Quieter powered mechanical equipment should be used.

7.4 The following mitigation measures are required:

#### ***Air Quality Impact***

- Regular watering should be used during soil nailing;
- Dusty material stockpiled should be completely covered;
- Dusty activities should be re-scheduled if high-wind conditions encountered;
- Open burning should be strictly prohibited;
- All dusty vehicle loads transporting to, from and between site locations should be covered with tarpaulin;
- Vehicle wheel and body washing facilities should be used at all exit points of the site;
- Wind shield, dust extraction units or water spraying should be used at the loading points.

#### ***Construction Noise Impact***

- Quieter powered mechanical equipment should be used;
- Insulating fabric should be used for drill rigs during drilling process;
- Noise generating construction works should be carried out during daytime only;
- Noise barriers or other measures should be used to minimize disturbance to the bat roost;
- Plant on site should be properly maintained and serviced regularly;
- Mobile plants should be sited as far from NSRs as possible;
- Machines and plant in intermittent use should be throttled down;
- Strong noise emitting plants, wherever possible, should be oriented so that noise is directed away from the nearby NSRs;
- Material stockpiles, wherever possible, should be effectively utilized to screen noise from construction activities;
- Movable noise barrier with surface mass in excess of 7kg/m<sup>2</sup> should be used for PME wherever possible;
- Noise insulating fabric should be adopted for drill rig operating in Works Area E.

#### ***Water Quality Impact***

- Prevent runoff water from entering the nearby water-bodies;
- Silt traps and oil / grease separators should be regularly cleaned and maintained;
- Outlet pipe extending above the slope surface should be installed;
- Air should be used as the flushing medium of the drilling equipment;
- Earth bunds or sand bag barriers should be provided on-site to direct storm water to silt removal facilities;

- Exposed slope / soil surface and opened stockpile of more than 50m<sup>3</sup> should be covered with tarpaulin;
- Oils and fuels should be used and stored in designated area.

#### ***Chemical and Waste Management***

- Debris and rubbish on-site should be collected, handled and disposed of properly;
- Waste skips should be provided to collect general refuse and construction wastes;
- Soil contamination with fuel leaked from construction plants should be removed off-site;
- Sufficient waste disposal points with regular collection should be provided;
- Appropriate measures should be provided to minimize windblown litter and dust during transportation of waste;
- Different containers should be used to segregate and store different types of waste;
- Encourage collection of aluminum cans, PET bottles and paper by providing separate bins;
- Unused chemicals should be recycled wherever possible;
- Proper storage and site practices should be adopted to minimize the potential for damage and contamination of construction materials;
- Oils and fuels should be stored in designated area;
- Plan and stock construction materials carefully to minimize waste generation.

#### ***Ecological Impact***

- Soil nail installation should avoid / minimize damage of root system to the existing plants;
- Fences should be erected along the boundary of the works area
- Disturbance to the natural woodland and shrubland habitats should be minimized by preventing tipping, vehicle movements and encroachment of personnel onto the adjacent area;
- Permanent casing should be provided to the drillhole of soil nail;
- Placement of equipment or stockpile should be located in designated areas to minimize disturbance to natural or moderate-high ecological value habitats;
- Construction activities should be restricted to works areas;
- Disturbance to existing vegetation should be minimized wherever possible.

#### ***Landscape and Visual Impact***

- Designation of “no-intrusion zones” and record any trespass and damage to existing vegetation;
- Soil nails on site should avoid tree trunks and tree roots;
- Dust and erosion control should be provided for exposed soil;
- For tree planting operations, method statement should be checked against specification requirements;
- All retained trees within the working boundary should be checked regularly;
- Control over appearance of hoarding, construction plants / machines;
- Security floodlights should be carefully selected to avoid light pollution.

#### **Monitoring Schedule for the Coming Months**

- 7.5 The tentative schedule for environmental monitoring in March 2009 is provided in Appendix L.

## 8. CONCLUSIONS AND RECOMMENDATIONS

### Conclusions

- 8.1 The construction phase of the project commenced in April 2008.
- 8.2 1-hour TSP and 24-hour TSP monitoring was carried out in the reporting month. All monitoring results complied with the action / limit level. No exceedance was recorded.
- 8.3 All impact daytime noise monitoring results complied with the limit level in the reporting month.
- 8.4 Environmental site inspections were carried out 4 times in February 2009. Recommendations on remedial actions were given to the Contractor for the deficiencies identified during the site audit.
- 8.5 Two landscape and visual audits were carried out in the reporting month. Some excavation for soil nail heads concreting area was larger than necessary, causing unnecessary damage to the existing tree roots. The Contractor was reminded that the excavation of soil nail areas should be kept to the minimum to minimize damage to existing trees. Also, a termite tube had infected the dead tree T511. The Contractor was request to urgently remove the infected dead tree for consideration of safety of the workers and the public in future.
- 8.6 Two ecological audits were carried out in the reporting month. The Contractor was reminded to take all necessary actions to prevent the re-occurrence of grout leakage to the surrounding natural environment. All tagged plants of conservation interest in the affected area should be located and fenced off properly with clear sign to avoid any further damage and restrict any unauthorized access of site workers to the area. Proper measures should be taken to avoid excessive muddy runoff from the running down to the natural area near the operation works. The leaves of vegetation within works areas should be washed regularly to avoid excessive dust deposition. All recently dead trees found within works areas should be reported to relevant government department(s) for record purpose.
- 8.7 No environmental complaint, notification of summons and prosecution was received in the reporting month.

### Recommendations

- 8.8 According to the environmental site inspections performed in the reporting month, the following recommendations were provided:

#### ***Air Quality Impact***

- Soil nail workstations on site should be properly enclosed.

#### ***Construction Noise Impact***

- Nil

#### ***Water Quality Impact***

- Sedimentation tanks on site should be properly maintained;
- Site effluent must be collected and treated prior to discharge to public drain;
- U-channels should be kept clear of mud, debris, leaves, construction waste and materials; and
- Soil and exposed earth at all working platforms and slopes should be cleaned up.

#### ***Chemical and Waste Management***

- Drip trays should be provided to all plants and chemical containers on site;
- Oils and fuels should be stored in designated area;
- Empty chemical containers should be disposed of as chemical waste;
- C&D waste, debris and general refuse on-site should be collected, handled and disposed of properly; and
- Waste skips should be provided to collect general refuse and construction wastes.

***Ecological Impact***

- The Contractor was reminded to take all necessary actions to prevent grout leakage and muddy run-off to the surrounding natural environment;
- Regular watering should be carried out to wash dust covered on leaves of vegetation;
- All plant species of conservation interest should be fenced off properly with clear sign, especially for those located near major access road and areas likely to be impacted by construction activities; and
- Site runoff should be directed towards regularly cleaned and maintained silt trap facilities to prevent sedimentation impact.
- All recently dead trees found within works areas should be reported to relevant government department(s) for record purpose.

***Landscape and Visual Impact***

- Dead / rotten trees, especially T511 which was now found infected by termite, should be removed from site for safety. The Contractor was also reminded to record and report all dead trees as found on site to the Engineer for record;
- All ineligible tree identification numbers should be rectified for all existing trees;
- The status of missing trees should be clarified as soon as possible;
- Engineer's agreement on the replacement planting for dead tree should be sought;
- Construction materials, soil bags and boulders should be kept clear from existing tree and should not be placed against trees in future;
- Fine dust deposited on trees due to soil nailing works should be hosed down from trees as soon as possible; and
- The Contractor was recommended to minimize the excavation of soil nail head areas for concreting as far as practicable in order to minimize damage to existing tree roots.