Zen Pacific – China State – Ngo Kee Joint Venture

KCRC CONTRACT CC-601:
CIVIL AND INFRASTRUCTURE WORKS

MONTHLY ENVIRONMENTAL MONITORING AND AUDIT REPORT

(MAY 2003)

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Executive Summary

This report has been prepared to document the impact environmental monitoring works conducted for KCRC West Rail Contract CC601 – Civil and Infrastructure Works. Impact air, noise and water quality monitoring were carried out between 1 and 31 May 2003. No exceedance of Action and Limit Levels was recorded for air, noise and water quality.

ETS-Testconsult Limited (ETL) has been commissioned by Zen Pacific - China State - Ngo Kee Joint Venture (ZPCSNKJV) as Environmental Team (ET) to provide impact Environmental Monitoring and Audit (EM&A) services for the KCRC West Rail Contract CC601 – Civil and Infrastructure Works. ETL is responsible for providing technical staff and monitoring equipment to conduct monitoring procedures for the captioned project.

The Independent Environmental Checker (IEC) carried out monthly site audit on 13 May 2003. By the field observation, several remarks were also made. First, follow up the previous audit on chemical waste, the diesel drums were covered by tarpaulin sheets; Second, follow up the previous audit on air quality, the site entrance and the haul road are wetted; Third, rubbish was stockpile inside storage area. The Contractor was instructed to remove the rubbish immediately and provide photo for record. Moreover, trip tickets for chemical wastes and general refuse were inspected and were found in order.

No generation rate of chemical waste record in this month and no record of surplus excavated materials produced to the public dump in this month.

The IEC had no comment on the April 2003 Monthly EM&A report.

With reference to the work program and by routine site inspection on 19 May 2003, the major environmental impact in May was general earthwork. The Contractor was requested to improve dust suppression measures. The major construction activities from June 2003 to August 2003 include general earth works, passing vehicles, E&M works and landscaping works. In the following three months, the major impacts on the environment will be dust emission from major haul roads. The Contractor was reminded to spray water on haul roads frequently and adopted other suitable dust suppression measures to reduce fugitive dust emission.

Due to the construction works have been substantially completed, some monitoring locations are no longer required effect on 11 March 2003. With approved by IEC and KCRC, following monitoring locations have been terminated:

Monitoring	Terminated Monitoring Stations
Water Monitoring	WU1A, WU1C, WD1A
Noise Monitoring	NSR-3
Air Quality Monitoring	ASR-3

1. INTRODUCTION

1.1 Purpose

The purpose of this report is to present the results for environmental monitoring and audit carried out in May 2003 for the KCRC West Rail's Contract CC-601, Civil and Infrastructure Works. This serves as an indicator to verify whether the construction, operation and post completion phases of an engineering development have an adverse impact on the environment.

2. PROJECT INFORMATION

2.1 Background

As the project background, program and organization are the same as in the Zen Pacific-China State-Ngo Kee Joint Venture (ZPCSNKJV) EM&A Manual, and being approved by KCRC and EPD. For details, please refer to the ZPCSNKJV EM&A Manual.

2.2 Project Program

Please refer to the ZPCSNKJV EM&A Manual.

2.3 Project Organization

The organization and lines of communication with respect to environmental works are shown in Figure 2.1. For other details, please refer to the ZPCSNKJV EM&A Manual.

2.4 Construction Program

According to the construction program provided by ZPCSNKJV, the major construction activities in June 2003 and August 2003 are:

Major construction activities to be carried out in June 2003:
- E & M Works
- Planting
- Landscaping Works

Major construction activities to be carried out in July 2003:
- Planting
- Landscaping works
- E &M Works
- Finishing works

Major construction activities to be carried out in August 2003:
- Landscaping work
- Planting
- E & M Works
- Finishing Works

2.5 Permit/License Status

The permits and licenses applicable are listed in Figure 2.2.

3. ENVIRONMENTAL MONITORING AND AUDIT REQUIREMENTS

3.1 Monitoring Parameters

3.1.1 Air Quality Monitoring

24-hr Total Suspended Particulate (TSP) levels in $\mu g/m^3$ were measured. 1-hr TSP levels in $\mu g/m^3$ were measured at monitoring locations where there are no supply of electricity to substitute for 24-hr TSP measurements temporarily.

3.1.2 Noise Monitoring

30 minutes of L_{eq} (Equivalent continuous sound pressure level), L_{10} (10 percentile sound pressure level) and L_{90} (90 percentile sound pressure level) in A-Weighting measurements were obtained. Six consecutive 5 minutes measurement were used to obtain the 30 minutes L_{eq}, L_{10} and L_{90}.

3.1.3 Water Quality Monitoring

Please refer to the EM&A Manual.

3.2 Environmental Quality Performance Limits

With reference to the Baseline Monitoring data in the CC-601 EIA report, the Action and Limit (A/L) Levels for air, noise and water quality are tabulated as follows: -

Table 3.1 – Action and Limit Levels for 1-hr TSP

Monitoring Station	Location	Parameters	Action level ($\mu g/m^3$)	Limit level ($\mu g/m^3$)
*ASR-10	Village houses along Kam Sheung Road	1-hr TSP	310	500
*ASR-16	Village houses to the east of Ko Po Tsuen	1-hr TSP	310	500

*Action and Limit Levels were not provided in the baseline report because no baseline monitoring was conducted at these locations. References were made from the nearest air quality monitoring stations.

Table 3.2 – Action and Limit Levels for 24-hr TSP

Monitoring Station	Location	Parameters	Action Level ($\mu g/m^3$)	Limit Level ($\mu g/m^3$)
ASR-14	Kat Hing Garden	24-hr TSP	151	260

Table 3.3 – Noise Action and Limit Levels

Monitoring station	Description	Action Level (dBA)	Limit Level (dBA)
NSR-10 Village Houses along Kam Sheung Road	0700-1900 hrs on normal weekdays 0700-2300 hrs on holidays 1900-2300 hrs on all other days 2300-0700 hrs of next day	When one documented complaint is received	75 65 65 50
NSR-13 Low-rise Residential DD109, Lot 336 Kam Sheung Road, Kam Tin	0700-1900 hrs on normal weekdays 0700-2300 hrs on holidays 1900-2300 hrs on all other days 2300-0700 hrs of next day	When one documented complaint is received	75 65 65 50
NSR-14 Kat Hing Garden	0700-1900 hrs on normal weekdays 0700-2300 hrs on holidays 1900-2300 hrs on all other days 2300-0700 hrs of next day	When one documented complaint is received	75 65 65 50
NSR-16 Village Houses to the East of Ko Po Tsuen	0700-1900 hrs on normal weekdays 0700-2300 hrs on holidays 1900-2300 hrs on all other days 2300-0700 hrs of next day	When one documented complaint is received	75 65 65 50

Table 3.4 – Water Quality Action and Limit Levels

Monitoring Locations	Parameter	Action Level	Limit Level
U1B	DO (mg/L)	0.44	0.42
	SS (mg/L)	626 mg/L and 120% of the upstream control station's SS at the same tide on the same day	709 mg/L and 130% of the upstream control station's SS at the same tide on the same day
	Turbidity (NTU)	506 NTU and 120% of the upstream control station's turbidity at the same tide on the same day	564 NTU and 130% of the upstream control station's turbidity at the same tide on the same day
D2	DO (mg/L)	0.44	0.42
	SS (mg/L)	626 mg/L and 120% of the upstream control station's SS at the same tide on the same day	709 mg/L and 130% of the upstream control station's SS at the same tide on the same day
	Turbidity (NTU)	506 NTU and 120% of the upstream control station's turbidity at the same tide on the same day	564 NTU and 130% of the upstream control station's turbidity at the same tide on the same day

3.3 Event-Action Plans

Please refer to the ZPCSNKJV EM&A Manual for details.

3.4 Implementation Status of Environmental Protection, Mitigation and Pollution Control Measures

To alleviate adverse impacts on the environment during construction phase, the Contractor has taken mitigation and pollution control measures. The implementation status will be audited each month and is attached in Appendix A.

4. IMPACT ENVIRONMENTAL MONITORING

4.1 Monitoring Program

With reference to the West Rail EM&A Manual, the following environmental monitoring program has been implemented:

Table 4.1 – Environmental Monitoring Program

Type of Monitoring	Parameters	Location	Frequency
Air Quality Impact Monitoring (24-hr TSP)	1 set of 24-hour TSP	ASR- 14	Once every 6 days
Air Quality Impact Monitoring (1-hr TSP)	3 sets of 1-hour TSP	ASR- 10 * and 16 *	Once every 6 days
Noise Monitoring	6 sets of 5 min. L_{eq}, L_{10} & L_{90}	NSR- 10, 13, 14 and 16	Once every 6 days
Water Quality Impact Monitoring	DO, DO% saturation, turbidity, temperature, salinity, pH & SS	U1B and D2	Three times per week

3 sets of 1-hour TSP were measured, temporarily, at locations with an asterisk due to shortage of power supply. The table below shows the monitoring schedule for June 2003 to August 2003.

Table 4.2 – Monitoring Schedule from June 2003 to August 2003

Type of Monitoring	June 2003	July 2003	August 2003
Air Quality Monitoring (24-hr TSP)	02, 07, 13, 19, 25, 30	05, 11, 17, 23, 29	04, 09, 15, 21, 27
Air Quality Monitoring (1-hr TSP)	02, 07, 13, 19, 25, 30	05, 11, 17, 23, 29	04, 09, 15, 21, 27
Noise Monitoring	02, 07, 13, 19, 25, 30	05, 11, 17, 23, 29	04, 09, 15, 21, 27
Water Quality Monitoring	02, 06, 07, 09, 11, 13, 16, 18, 20, 23, 25, 27, 30	02, 04, 07, 09, 11, 14, 16, 18, 21, 23, 25, 28, 30	01, 04, 06, 08, 11, 13, 15, 18, 20, 22, 25, 27, 29

4.2 Air Quality Monitoring

4.2.1 Monitoring Method

Detail of the monitoring method is attached in Appendix B.

4.2.2 Monitoring Equipment and Calibration Details

Detail of the monitoring equipment and calibration information is attached in Appendix B. Copies of calibration certificates are provided to the Engineer.

4.2.3 Parameters Monitored

24-hr and 1-hr TSP levels in $\mu g/m^3$ were measured. Information such as weather conditions during monitoring and other factors that might affect the monitoring results were also recorded.

4.2.4 Monitoring Locations

Three locations were identified as the Air Sensitive Receivers (ASRs) and therefore are chosen as air quality monitoring stations. They are namely ASR-10 (Village houses along Kam Sheung Road), ARS-14 (Kat Hing Garden) and ASR-16 (Village houses to the East of Ko Po Tsuen) respectively. Locations of the monitoring stations are shown in Figure 4.1. As construction works have been substantially completed, monitoring locations; ASR-1, ASR-2, ASR-4, ASR-6, ASR-8, ASR-11 and ASR-13 were terminated from 11 January 2003. Moreover, location ASR-3 was terminated from11 March 2003.

4.2.5 Monitoring Frequency, Duration and Period

Air quality monitoring was carried out at six-day intervals. At each monitoring station for 24-hr TSP sampling was conducted. Due to shortage of electricity supply, two sets of 1-hr TSP measurements were conducted at ASR - 10 and 16 temporarily. The table below shows the time schedule for air quality monitoring in May 2003.

Table 4.3 – Schedule for 24-hr TSP Air Quality Monitoring

Location	Date and Start Time of Monitoring (May 2003)				
ASR-14	03/05/2003 (11:15)	09/05/2003 (17:38)	15/05/2003 (11:18)	21/05/2003 (16:02)	27/05/2003 (15:58)

Table 4.4 – Schedule for 1-hr TSP Air Quality Monitoring

Location	Date and Time of Monitoring (May 2003)				
ASR-10	03/05/2003 (11:25-12:25)	03/05/2003 (12:25-13:25)	03/05/2003 (13:25-14:25)	09/05/2003 (15:51-16:51)	09/05/2003 (16:51-17:51)
	09/05/2003 (17:51-18:51)	15/05/2003 (08:25-09:25)	15/05/2003 (09:25-10:25)	15/05/2003 (10:25-11:25)	21/05/2003 (15:20-16:20)
	21/05/2003 (16:30-17:30)	21/05/2003 (17:58-18:58)	27/05/2003 (14:00-15:00)	27/05/2003 (15:00-16:00)	27/05/2003 (16:00-17:00)
ASR-16	03/05/2003 (11:40-12:40)	03/05/2003 (12:40-13:40)	03/05/2003 (13:40-14:40)	09/05/2003 (15:40-16:40)	09/05/2003 (16:40-17:40)
	09/05/2003 (17:40-18:40)	15/05/2003 (09:10-10:10)	15/05/2003 (10:10-11:10)	15/05/2003 (11:10-12:10)	21/05/2003 (14:30-15:30)
	21/05/2003 (15:32-16:32)	21/05/2003 (16:44-17:44)	27/05/2003 (14:42-15:42)	27/05/2003 (15:42-16:42)	27/05/2003 (16:42-17:42)

4.2.6 Monitoring Results

There was no exceedance of A/L Levels. The main contributing factors to air quality include excavation, general earthwork and passing by vehicles and dump trucks. Details of the air quality monitoring results are tabulated in Appendices C and D.

4.3 Noise Monitoring

4.3.1 Monitoring Methodology

Detail of the methods used is presented in Appendix B.

4.3.2 Monitoring Equipment and Calibration Details

Detail of the monitoring equipment and calibration details is attached in Appendix B.

4.3.3 Parameters Monitored

Six consecutive 5-min L_{eq}, L_{10} and L_{90}, in other words L_{eq} (30min), were measured at all noise monitoring locations during non-restricted hours. Other information such as weather conditions and factors affecting the monitoring results were also recorded.

4.3.4 Monitoring Locations

Four locations were identified as the Noise Sensitive Receivers (NSRs) and were chosen as the noise monitoring stations. They are: NSR-10 (Village houses to the South of Kam Sheung Road), NSR-13 (Low-rise residential DD109, Lot336Kam Sheung Road, Kam), NSR-14 (Kat Hing Garden) and NSR-16 (Village houses to the East of Ko Po Tsuen. The locations of monitoring stations are shown in Figure 4.1. As construction works have been substantially completed, monitoring locations; NSR-1, NSR-2, NSR-4, NSR-6, NSR-8 and NSR-11 were terminated from 11 January 2003. Moreover, location NSR-3 was terminated from11 March 2003.

4.3.5 Monitoring Frequency, Duration and Period

Noise monitoring was carried out once every six days. At each monitoring station, 6 sets of 5-minute L_{eq}, L_{10} and L_{90} were measured. Table 4.5 shows the schedule for noise monitoring in May 2003.

Table 4.5 – Schedule for Noise Monitoring

Station No.	Date and Start Time of Monitoring (May 2003)				
NSR-10	03/05/2003 (-----)	09/05/2003 (15:53)	15/05/2003 (08:28)	21/05/2003 (18:00)	27/05/2003 (14:02)
NSR-13	03/05/2003 (-----)	09/05/2003 (18:07)	15/05/2003 (09:55)	21/05/2003 (17:00)	27/05/2003 (14:45)
NSR-14	03/05/2003 (-----)	09/05/2003 (17:25)	15/05/2003 (10:48)	21/05/2003 (15:50)	27/05/2003 (15:28)
NSR-16	03/05/2003 (-----)	09/05/2003 (15:42)	15/05/2003 (09:12)	21/05/2003 (14:32)	27/05/2003 (14:45)

Remark: The monitoring on 03 May 2003 was cancelled due to rainy

4.3.6 Monitoring Results

There was no exceedance of A/L Levels this month. The main contributing factors to noise level were lifting, excavation passing by dump trucks and vehicles, and general earthwork. Details of noise monitoring results are shown in Appendix E.

4.4 Water Quality Monitoring

4.4.1 Monitoring Method

Detail of the monitoring method is attached in Appendix B.

4.4.2 Monitoring Equipment and Calibration Details

Details of monitoring equipment and calibration records are attached in Appendix B.

4.4.3 Parameters Monitored

Monitoring of turbidity in Nephelometric Turbidity Units (NTU), Dissolved Oxygen (DO) in mg/L and Suspended Solids (SS) in mg/L were carried out to ensure that deterioration in water quality could be readily detected and timely action could be taken to rectify the situation. The former two parameters were measured in-situ while the latter was determined in the laboratory.

In association with the water quality parameters, some relevant data were also measured, such as monitoring location/position, time, water depth, water temperature, pH, salinity, DO saturation, weather conditions and work underway at the construction site.

4.4.4 Monitoring Locations

With reference to the ZPCSNKJV EM&A Manual, the two monitoring locations chosen are: WU1B and WD2. The locations for water monitoring are shown in Figure 4.2.

Please note that water sampling was ceased in location D1 from 12 July 2000 owing to the diverted river. With the approval from EPD and KCRC, the Contractor had selected another monitoring location at D1A.

As construction works have been substantially completed, monitoring locations WU2 was terminated from 11 January 2003. Moreover, locations WU1A, WU1C and WD1A were terminated from11 March 2003.

4.4.5 Monitoring Frequency, Duration and Period

Water quality monitoring was carried out three times per week. Table 4.7 shows the schedule for water quality monitoring in May 2003.

4.4.6 Monitoring Results

There was no exceedance of action and limit level for all collected data. The main contributing factors to water quality included passing dump trucks and general earthwork. Details of the water quality monitoring results are in Appendix F.

Table 4.7 – Schedule for Water Quality Monitoring

May 2003						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1	2 ▼	3
4	5 ▼	6	7 ▼	8	9 ▼	10
11	12 ▼	13	14 ▼	15	16 ▼	17
18	19 ▼	20	21 ▼	22	23 ▼	24
25	26 ▼	27	28 ▼	29	30 ▼	31

▼ Water quality monitoring at U1A, U1B, U1C, U2, D1A and D2.

4.5 Waste Management

4.5.1 Excavated Materials

According to the Contractor, the surplus excavated materials produced were disposed in the public filling area in Tuen Mun. The earth dumping in private lots was ceased in July 2001. Excavated materials dumping quantities are listed in Appendix I. No excavated materials disposed in this month.

4.5.2 Chemical Waste

The storage areas for chemical wastes were used solely for the temporary storage of chemical waste. Chemical waste collector should be collected the chemical wastes regularly. Mainly chemical waste was spent lubricant oil, fuel and grease. No chemical waste was generated in this month.

4.5.3 Construction Waste

Careful design, planning and good site management, the ordering and wasting of materials such as concrete, mortars and cement grouts were minimized. Wooden panels were reused.

4.5.4 General refuse

General refuse was generated largely by food service activities for site workers. Bins were provided for containment prior to disposal of such waste. Aluminum cans and individual collectors often recover glass bottles from the waste stream if they are segregated or easily accessible, so separate labeled bins for their deposit was provided wherever feasible. Office wastes were reduced through recycling of paper if volumes are large enough to warrant collection. There was encourage environmental awareness and to reduce waste by:

- Reducing the number of photo copies to a minimum
- By copying on both sides of paper for internal documents and external documents where appropriate. General refuse generated on-site was stored in enclosed bins and collected by Strong Base Environmental Services & Engineering Co. Ltd.

The total amount of office waste produced in this month was recorded 6 of trucks of rubbishes. The records were inspected by IEC on site audit.

5. SITE INSPECTION

The Independent Environmental Checker (IEC) carried out monthly site audit on 13 May 2003. By the field observation, several remarks were also made. First, follow up the previous audit on chemical waste, the diesel drums were covered by tarpaulin sheets; Second, follow up the previous audit on air quality, the site entrance and the haul road are wetted; Third, rubbish was stockpile inside storage area. The Contractor was instructed to remove the rubbish immediately and provide photo for record. Moreover, trip tickets for chemical wastes and general refuse were inspected and were found in order.

Furthermore, the ET was conducted site inspection on 19 May 2003. No non-compliance and other observations made in this month.

6. RESULTS

All noise-monitoring results were complied with the A/L Levels this month. The sources of noise observed from construction site include passing by dump trucks/vehicles and general earth works. Other sources of noise contributing to the noise levels were adjacent construction sites activities and dogs barking.

In general, the air monitoring results in May 2003 was satisfactory. No exceedance of the A/L Levels was recorded. Although dust levels measured were within A/L Levels, the Contractor was still reminded by the IEC to spray water more frequency on haul roads, paved road outside Contractor's storage area and transported materials in order to reduce fugitive dust generation.

For the water quality monitoring, No exceedance was found at the downstream station therefore the pollution source was probably not evolved from construction activities within this site. For the results were satisfactory in this month. As observed by the ET, the main construction activities at the site were general earthworks and site transportation. The Contractor was reminded that silt surface run-off and ground water should be treated properly before discharging.

7. RECORD OF COMPLAINTS AND NOTIFICATION OF SUMMONS

No summon was received this month. A summary record of notification of summons for Contract CC-601 is tabulated below for reference.

Table 7.1 – Summary of Notification of Summons for Contract CC-601

Month	Date	Location	Details	Follow-up action
August 1999	17/8/99	West Rail Phase I Contract No. CC-601	Construction works not carried out in accordance with the requirements of the Air Pollution Control (Construction Dust) Regulation for the control of dust emission	Enhance wheel washing in site exits
September 1999	1/9/99	West Rail Depot and Station	Construction works not carried out in accordance with the requirements of the Air Pollution Control (Construction Dust) Regulation for the control of dust emission	Enhance wheel washing in site exits
	9/9/99	West Rail Phase I Contract No. CC-601	Waste water mis-directed to inland waters without any treatment Effluent quality unlikely to meet the license limit	Use sedimentation tank to screen effluent
October 1999	5/10/99	Ko Po Tsuen Exit, Kam Tin Road	Construction works not carried out in accordance with the requirements of the Air Pollution Control (Construction Dust) Regulation for the control of dust emission	Enhance wheel washing in site exits
		Construction site exit point at Kam Tin Road	Construction works not carried out in accordance with the requirements of the Air Pollution Control (Construction Dust) Regulation for the control of dust emission	Enhance wheel washing in site exits
January 2000	14/1/00	West Rail Phase I Contract No. CC-601 Construction site – near Kam On Garden	Effluent quality unlikely to meet the license limit Inadequate treatment provided to meet the license limit	Use sedimentation tank to screen effluent
	18//1/00	West Rail Phase I Contract No. CC-601 Construction site (earthworks by Flame Construction Co.)	Effluent unlikely to meet the license limit Improper design operation/maintenance of treatment facility and resulted in discharge of substandard treated effluent. Problems identified included capacity/efficiency of desilting tank could not cope with influent quality/quantity.	Regular clean up of sedimentation tanks
	18/1/00	West Rail Phase I Contract No. CC-601 Construction site (Bored Piling works by Ming Wah)	Effluent unlikely to meet the license limit Improper design operation/maintenance of treatment facility and resulted in discharge of substandard treated effluent. Problems identified included capacity/efficiency of desilting tank could not cope with influent quality/quantity.	Regular clean up of sedimentation tanks
February 2000	1/2/00	Kam Sheung Road, West Rail Phase I, CC-601	Dust emission for the construction activities on site causing/contribution to air pollution	Enhance wheel washing in site exits
	16/2/00	Kam Tin Road Exit	Construction works not carried out in accordance with the requirements of the Air Pollution Control (Construction Dust) Regulation for the control of dust emission	Enhance wheel washing in site exits
August 2000	31/5/00	West Rail Phase I Contract No. CC-601 Construction site	Effluent unlikely to meet the license limit	Regular clean up of sedimentation tanks
November 2000	5/11/00	West Rail Phase I Contract No.CC-601 Construction Site	Used powered mechanical equipment to carry out construction works in a general holiday in respect of which a construction noise permit was not in force.	Subcontractor's works was stopped.
November 2000	12/11/00	West Rail Phase I Contract No.CC-601 Construction Site	Used powered mechanical equipment to carry out construction works in a general holiday in respect of which a construction noise permit was not in force	Subcontractor's works was stopped.
February 2001	6/2/01	West Rail Phase I Contract No.CC-601 Construction Site	Did not provide vehicle washing facilities at every discernible vehicle exit point. Did not wash every vehicle that left the site. Did not covered load of dusty materials on vehicle that left the site.	Enhance truck washing in site exits

	9/2/01	West Rail Phase I Contract No.CC-601 Construction Site	Did not provide vehicle washing facilities at every discernible vehicle exit point. Did not wash every vehicle that left the site. Did not covered load of dusty materials on vehicle that left the site.	Enhance truck washing in site exits

8. CONCLUSION

Environmental monitoring and site inspection were performed as scheduled in May 2003. All monitoring results were checked and reviewed.

No Action / Limit Level exceedance on 1-hour TSP, 24-hour TSP, noise and water quality were recorded in the reporting month.

Environmental mitigation measures recommended in the EM&A manual for the construction activities were implemented in the reporting month. There was no complaint, notification of summons and prosecution received in this month.

The environmental performance of the Project was generally satisfactory.

9. FUTURE KEY ISSUES

The major construction works planned to be carried out in next three months and their possible impact is tabulated below for reference.

Table 9.1 – Construction Plan for CC-601 June 2003 to August 2003

Month	Works Planned to be Carried Out	Impact Prediction	Mitigation Measures
June 2003	- Planting - Landscaping works - E & M Works - Finishing Works	- Dust generated from dry haul road and transported materials	- Water haul road - Restrict the vehicle speed limit of 15 kph. - Provide wheel washing facilities
July 2003	- Planting - Landscaping works - E & M Works - Finishing Works	- Dust generated from dry haul road and transported materials	- Water haul road - Restrict the vehicle speed limit of 15 kph. - Provide wheel washing facilities
August 2003	- Planting - Landscaping works - E & M Works - Finishing Works	- Dust generated from dry haul road and transported materials	- Water haul road - Restrict the vehicle speed limit of 15 kph. - Provide wheel washing facilities

Appendix A

Implementation Status of Environmental Protection, Mitigation and Pollution Control Measures

Appendix B

Monitoring Methodology and Calibration Details of Monitoring Equipment

Summary of Monitoring Method

Type of Monitoring	Method
Water	Water samples will be taken at mid-depth For in-situ parameters, turbidity and D.O. measurements shall be made during the descending and ascending of the sensor. If the difference between the measured values at any one depth is greater than 25%, the measurement shall be repeated until and acceptable match is made. If no match is achieved than the equipment shall be checked for accurate calibration or malfunction. Water samples shall be taken from flouring water whenever possible. Samples collected shall be stored in plastic bottles and packed in ice-pack (cooled to 4°C without being frozen) and delivered to laboratory as soon as possible for suspended solids determination.
Air	24-hr TSP level is measured in accordance with the standard high volume sampling method as set out in the Title 40 of the Code of Federal Regulations (40CFR), Chapter 1 (Part 50), Appendix B. With this method, air is drawn through a high volume sampler (HVS) fitted with a pre-conditioned and pre-weighted filter paper at a controlled rate. After sampling for 24 hours, the filter paper with retained particles is collected and returned to laboratory for drying in a desiccator followed by accurate weighing. The 24-hr TSP levels are then calculated from the ratio of the mass of particulates retained on the filter paper to the total volume of air samples. The portable dust meter was used to measure the short-term (1 hour) air quality. Prior to each sampling event, the dust meter was zeroed and the flow was checked as per the requirements of the manufacturer. During sampling, the dust meter was positioned at least 1m from ground and facing the work site. Regular maintenance of the equipment is required and was carried out as per the maintenance procedure of the equipment manufacturer.
Noise	30 minutes of L_{eq}, L_{10} and L_{90} in A-weighting were conducted at logging interval of 5 minutes. Sound level meter and calibrator are complied with the International Electro technical Commission (IEC) Publication 651: 1979 (Type 1) and 804: 1985 (Type 1) specification. The sound level meter is supplied and used with manufacturers recommended windshield and with a tripod. The monitoring is performed at a height approximately 1.2m above the ground in free field condition.

Calibration Details of Monitoring Equipment

Type of monitoring	Parameter monitored	Monitoring Equipment	Date of Calibration	Calibration Due Date	Equipment No. / Serial No.
Water	Dissolved Oxygen (mg/L) Dissolved Oxygen Saturation (%) Temperature	YSI Model Dissolved Oxygen Meter YSI 5739 Probe YSI 5795A Submersible Stirrer	21-02-2003 14-05-2003	21-05-2003 13-06-2003	ET/0510/010
	Turbidity (NTU)	HACH Model 2100P Turbid meter	23-02-2003 23-05-2003	23-05-2003 22-08-2003	ET/0505/004
	PH	Orion 290A Portable pH Meter	24-04-2003 09-05-2003 23-05-2003	08-05-2003 23-05-2003 06-06-2003	ET/0509/003
	Salinity (ppt)	YSI Model 30 Conductivity Meter	02-06-2002	02-06-2003	ET/0527/001
	Flow Rate (m/s)	Global Flow Probe Model FP201	---	---	
Air	24-hr TSP ($\mu g/m^3$)	Anderson GMWS-2310 High Volume Air Sampler	07-04-2003	06-06-2003	ET/601/014
	1-hr TSP ($\mu g/m^3$)	Dust Trak 8520	23-03-2003 23-03-2003	22-05-2003 22-05-2003	15114 15115
Noise	Noise Level (dB_A) Measurement	Rion NL-14 Precision	12-08-2002	12-08-2003	10641288
	Calibration of Sound Level Meter	Rion NC-73 Sound Level Calibrator	12-08-2002	12-08-2003	10865917
	Wind Speed (m/s) Measurement	TSI Model 8340 Air Velocity Meter	19-07-1999	Initial calibration only	ET/0529/001

Appendix C

Air Quality Monitoring Results
(24-hr TSP)

24-Hour TSP Monitoring Data

Monitoring Location : ASR-14 (Kat Hing Garden)

Date	Sampling start time	Elapsed time reading (hr.)		Flow Rate (m^3/min)			Weight of filter paper (g)			Total Volume (m^3)	Weather condition	Total suspended particulate ($\mu g/m^3$)	Contributing factors
		Start	Finish	Start	Finish	Average	Initial	Final	Diff.				
03/05/2003	11:15	5394.55	5419.11	1.07	1.07	1.07	2.814	2.855	0.041	1576.8	Rainy	26	No construction activities observed
09/05/2003	17:38	5419.11	5443.60	1.00	1.00	1.00	2.844	2.940	0.096	1469.4	Cloudy	65	Excavation and vehicle passing by
15/05/2003	11:18	5443.60	5468.14	1.02	1.02	1.02	2.828	2.877	0.049	1501.8	Clear	33	No construction activities observed
21/05/2003	16:02	5468.14	5492.83	1.05	1.05	1.05	2.851	2.992	0.141	1555.5	Clear	91	Dump truck's passing by
27/05/2003	15:58	5492.83	5517.71	1.02	1.02	1.02	2.869	2.972	0.103	1522.7	Clear	68	No construction activities observed

Appendix D

Air Quality Monitoring Results
(1-hr TSP)

Monitoring Location: ASR-10 (Village Houses along Kam Sheung Road)

Date	Sampling Time (hh:mm)		Flow rate (L/min)	1-hr TSP (μg / m^3)			Weather Condition	Contributing factors
	Start	Finish		Average	Minimum	Maximum		
03/05/2003	11:25	12:25	1.5	96	34	259	Rainy	No construction activities observed
	12:25	13:25	1.5	90	28	268	Rainy	
	13:25	14:25	1.5	107	51	237	Rainy	
09/05/2003	15:51	16:51	1.5	253	176	510	Cloudy	Vehicle's passing by and excavation
	16:51	17:51	1.5	266	182	497	Cloudy	
	17:51	18:51	1.5	223	168	439	Cloudy	
15/05/2003	08:25	09:25	1.5	126	60	721	Clear	General earth work
	09:25	10:25	1.5	184	92	933	Clear	
	10:25	11:25	1.5	175	88	904	Clear	
21/05/2003	15:20	16:20	1.5	152	107	517	Clear	Dump truck's passing and excavation
	16:30	17:30	1.5	147	92	496	Clear	
	17:58	18:58	1.5	135	88	481	Clear	
27/05/2003	14:00	15:00	1.5	164	85	976	Clear	No construction activities observed
	15:00	16:00	1.5	218	141	1490	Clear	
	16:00	17:00	1.5	193	98	1150	Clear	

Monitoring Location : ASR-16 (Village Houses to the East of Ko Po Tsuen)

Date	Sampling Time (hh:mm)		Flow rate (L/min)	1-hr TSP (μg / m^3)			Weather Condition	Contributing factors
	Start	Finish		Average	Minimum	Maximum		
03/05/2003	11:40	12:40	1.5	130	62	675	Rainy	No construction activities observed
	12:40	13:40	1.5	116	53	514	Rainy	
	13:40	14:40	1.5	92	48	479	Rainy	
09/05/2003	15:40	16:40	1.5	278	184	502	Cloudy	Vehicle's passing by and excavation
	16:40	17:40	1.5	254	193	485	Cloudy	
	17:40	18:40	1.5	212	171	425	Cloudy	
15/05/2003	09:10	10:10	1.5	180	90	975	Clear	General earth work
	10:10	11:10	1.5	246	115	1320	Clear	
	11:10	12:10	1.5	197	98	1040	Clear	
21/05/2003	14:30	15:30	1.5	131	81	376	Clear	Dump truck's passing by
	15:32	16:32	1.5	116	78	411	Clear	
	16:44	17:44	1.5	127	79	397	Clear	
27/05/2003	14:42	15:42	1.5	242	126	1650	Clear	No construction activities observed
	15:42	16:42	1.5	225	120	1540	Clear	
	16:42	17:42	1.5	194	114	1030	Clear	

Appendix E

Noise Monitoring Results

Monitoring Location: NSR-10 (Village Houses to the South of Kam Sheung Road)

Date	Sampling Time (hh:mm)		Noise Level dB(A)*			Weather condition	Wind speed (m/s)	Contributing factors
	Start	Finish	L_{90}	L_{10}	L_{eq}			
09/05/03	15:53	16:23	56.5	60.7	58.8	Cloudy	0.50	Vehicle's passing by and excavation
15/05/03	08:28	08:58	50.9	55.7	53.4	Clear	1.15	General earth work
21/05/03	18:00	18:30	58.5	61.9	60.6	Clear	1.42	Dump truck's passing by and excavation
27/05/03	14:02	14:32	56.7	61.9	59.3	Clear	0.84	No construction activities observed inside, vehicle's passing by outside of project site

* The results were recorded in free-field condition. Adding 3dB(A) is required for façade correction

Monitoring Location: NSR-13 (Low-rise residential DD109, Lot 336 Kam Sheung Road, Kam Tin)

Date	Sampling Time (hh:mm)		Noise Level dB(A)*			Weather condition	Wind speed (m/s)	Contributing factors
	Start	Finish	L_{90}	L_{10}	L_{eq}			
09/05/03	18:07	18:37	50.6	54.2	53.0	Cloudy	0.30	Vehicle's passing by
15/05/03	09:55	10:25	51.3	56.4	53.6	Clear	1.13	No construction activities observed
21/05/03	17:00	17:30	58.2	59.8	59.0	Clear	1.39	Dump truck's passing by
27/05/03	14:45	15:15	53.0	58.3	55.8	Clear	1.17	General earth work inside, vehicle's passing by outside of project site

* The results were recorded in free-field condition. Adding 3dB(A) is required for facade correction

Monitoring Location: NSR-14 (Kat Hing Garden)

Date	Sampling Time (hh:mm)		Noise Level dB(A)*			Weather condition	Wind speed (m/s)	Contributing factors
	Start	Finish	L_{90}	L_{10}	L_{eq}			
09/05/03	17:25	17:55	54.6	58.7	56.8	Cloudy	0.50	Vehicle's passing by and excavation
15/05/03	10:48	11:18	54.1	59.4	56.9	Clear	0.67	No construction activities observed
21/05/03	15:50	16:20	58.3	60.4	59.4	Clear	1.29	Dump truck's passing by
27/05/03	15:28	15:58	50.2	55.3	52.5	Clear	0.96	No construction activities observed

* The results were recorded in free-field condition. Adding 3dB(A) is required for façade correction

Monitoring Location : NSR-16 (Village Houses to the East of Ko Po Tsuen)

Date	Sampling Time (hh:mm)		Noise Level dB(A)*			Weather condition	Wind speed (m/s)	Contributing factors
	Start	Finish	L_{90}	L_{10}	L_{eq}			
09/05/03	15:42	16:12	60.5	66.5	64.4	Cloudy	0.80	Vehicle's passing by and excavation
15/05/03	09:12	09:42	57.8	63.0	60.4	Clear	2.05	General earth work inside, vehicle's passing by outside of project site
21/05/03	14:32	15:02	58.8	61.6	60.4	Clear	2.31	Dump truck's passing by
27/05/03	14:45	15:15	52.0	56.8	54.5	Clear	1.65	General earth work

* The results were recorded in free-field condition. Adding 3dB(A) is required for façade correction

Appendix F

Water Quality Monitoring Results

Monitoring Location: U1B

Date	Sampling start time	Water depth (m)	Temp (°C)	DO (mg/L)	DO saturation (%)	Turbidity (NTU)	PH	Salinity (ppt)	Flow rate (m/s)	SS (mg/L)	Weather condition	Contributing factors
02/05/03	17:43	0.2	25.2	4.17	50.9	43.3	6.82	0.1	0.3	19	Clear	No construction activities observed
05/05/03	16:05	0.6	21.9	6.69	83.1	71.3	7.66	0.1	0.5	74	Clear	No construction activities observed
07/05/03	17:00	0.3	26.0	5.80	71.8	31.1	6.61	0.1	0.3	24	Cloudy	No construction activities observed
09/05/03	16:42	0.3	28.8	4.99	69.7	78.2	7.65	0.2	0.3	64	Cloudy	No construction activities observed
12/05/03	16:08	0.3	26.5	4.16	49.8	52.4	7.07	0.1	0.3	50	Clear	No construction activities observed
14/05/03	15:50	0.3	30.4	4.66	70.9	43.4	7.30	0.1	0.2	19	Clear	No construction activities observed
16/05/03	14:25	0.4	21.1	4.11	55.4	33.3	7.47	0.3	0.2	28	Clear	No construction activities observed
19/05/03	17:45	0.5	27.4	5.36	67.4	28.9	7.55	0.1	0.1	22	Cloudy	No construction activities observed
21/05/03	14:08	0.4	31.9	5.94	67.5	18.0	7.77	0.2	0.2	16	Clear	No construction activities observed
23/05/03	15:04	0.4	28.8	4.46	54.9	43.6	6.84	0.1	0.2	27	Clear	No construction activities observed
26/05/03	10:16	0.5	28.0	5.72	72.9	147	7.67	0.1	0.2	100	Clear	No construction activities observed
28/05/03	17:55	0.4	27.5	4.83	62.5	49.1	7.27	0.1	0.2	41	Clear	No construction activities observed
30/05/03	10:40	0.3	28.8	9.34	120.8	67.2	7.96	0.2	0.2	25	Clear	No construction activities observed

Monitoring Location: D2

Date	Sampling start time	Water depth (m)	Temp (°C)	DO (mg/L)	DO saturation (%)	Turbidity (NTU)	pH	Salinity (ppt)	Flow rate (m/s)	SS (mg/L)	Weather conditions	Contributing factors
02/05/03	18:10	0.3	25.4	4.50	55.3	30.5	6.75	0.1	0.3	15	Clear	No construction activities observed
05/05/03	16:30	1.2	21.4	6.18	80.7	64.0	7.59	0.2	0.2	68	Clear	No construction activities observed
07/05/03	17:19	0.4	26.0	4.38	52.8	37.3	6.71	0.1	0.3	34	Cloudy	No construction activities observed
09/05/03	17:17	0.5	29.1	5.24	71.3	54.0	7.50	0.2	0.3	45	Cloudy	No construction activities observed
12/05/03	16:59	0.4	26.7	3.89	46.6	46.4	7.27	0.1	0.3	36	Clear	Excavation and dump truck's passing by
14/05/03	16:10	0.5	31.7	4.85	79.6	87.0	8.24	0.1	0.3	76	Clear	No construction activities observed
16/05/03	14:55	0.4	21.3	3.84	51.9	37.4	7.61	0.3	0.1	43	Clear	No construction activities observed
19/05/03	17:20	0.4	29.0	3.80	49.5	36.4	7.75	0.3	0.3	30	Cloudy	No construction activities observed
21/05/03	14:41	0.5	32.1	4.07	56.7	12.5	7.86	0.2	0.2	21	Clear	No construction activities observed
23/05/03	15:48	0.5	29.2	3.00	37.0	65.7	7.20	0.1	0.2	28	Clear	No construction activities observed
26/05/03	10:45	0.6	28.3	4.23	58.8	132	7.71	0.3	0.2	69	Clear	No construction activities observed
28/05/03	18:14	0.5	28.1	3.64	47.3	71.1	7.73	0.1	0.2	62	Clear	No construction activities observed
30/05/03	11:05	0.3	29.9	6.74	93.8	35.0	7.76	0.2	0.2	27	Clear	No construction activities observed

Appendix G

IEC's Comment on Site Inspection

Appendix H

Contractor's Response to Comments On Last Month's Report

Appendix I

Quantity of Dumping

KOWLOON-CANTON RAILWAY CORPORATION
WEST RAIL
DESIGN REVIEW RECORD

CONTRACT: CC-601 DELIVERABLE: Monthly EM&A Report (April 2003) DATE: May 2003
CONSULTANT: MEMCL TYPE: PAGE: Page 1 of 1

Comments on CC-601 Monthly Environmental Monitoring and Audit Report – April 2003

ITEM NO.	REVIEW BY	DOCUMENT REFERENCE	COMMENTS	CONTRACTOR'S RESPONSE
1.	------	---------	----------	----------

Figure 2.1 Contract CC-601 Environmental Management Structure