

Leighton Contractors (Asia) Ltd

KCRC Light Rail Extension - Civil, Permanent Way, Traction Power and Overhead Line

**Monthly EM&A Report
February 2004**

Author TSANG KWOK FAI

Checker SHARIFAH OR

Approver COLEMAN NG

EA00770/R36/1

March 2004

This report has been prepared for Leighton Contractors (Asia) Ltd in accordance with the terms and conditions of appointment for KCRC Light Rail Extension - Civil, Permanent Way, traction Power and Overhead Line dated November 2001. Hyder Consulting Limited cannot accept any responsibility for any use of or reliance on the contents of this report by any third party.

TABLE OF CONTENTS

EXECUTIVE SUMMARY

1. BACKGROUND INFORMATION

- 1.1 Project Information
- 1.2 Construction Programme
- 1.3 Project Organisation and Management

2. SUMMARY OF EM&A REQUIREMENT

- 2.1 Air Quality
- 2.2 Noise
- 2.3 Water Quality

3. SUMMARY OF CONSTRUCTION ACTIVITIES

- 3.1 Construction Activities
- 3.2 EPD Permits/Licences
- 3.3 Environmental Mitigation Implementation Schedule

4. MONITORING RESULTS

- 4.1 Air Quality
- 4.2 Noise
- 4.3 Water Quality
- 4.4 Summary of Exceedances

5. NON-COMPLIANCE AND DEFICIENCY

- 5.1 Site Inspection/Audit by CET
- 5.2 Site Audit by IEC

6. WASTE MANAGEMENT

7. LANDSCAPE AND VISUAL IMPACT

8. CULTURAL HERITAGE

9. COMPLAINT

10. SUMMARY OF NOTIFICATION OF SUMMONS, SUCCESSFUL PROSECUTIONS AND CORRECTIVE ACTIONS

11. FUTURE KEY ISSUES

12. CONCLUSION

LIST OF TABLES

Table 2.1	List of Air Monitoring Locations
Table 2.2	Derivation of Action and Limit Levels for 24-Hour Air Quality Monitoring
Table 2.3	Derivation of Action and Limit Levels for 1-Hour Air Quality Monitoring
Table 2.4a	Event Contingency Plan for Action Level Exceedance
Table 2.4b	Event Contingency Plan for Limit Level Exceedance
Table 2.5	Event Contingency Plan for Complaints Handling
Table 2.6	List of Noise Monitoring Locations
Table 2.7	Action and Limit Levels for Construction Noise, dB(A)
Table 4.1	Results of Air Quality Impact Monitoring
Table 4.2	Results of Noise Impact Monitoring During Non-Restricted Hour
Table 4.3	Summary of Exceedances

LIST OF FIGURES

Figure 1.1	Project Site at Tin Shui Wai
Figure 1.2	Project Site at Pui To Road, Tuen Mun
Figure 1.3	Project Site at Lam Tei
Figure 1.4	Project Site at Tin Shui Wai Phase 4
Figure 1.5	Organisation and Communication Path
Figure 2.1	Monitoring Location at Tin Shui Wai
Figure 2.2	Monitoring Location at Tin Shui Wai
Figure 2.3	Monitoring Location at Tin Shui Wai
Figure 2.4	Monitoring Location at Tuen Mun
Figure 2.5	Monitoring Location at Tuen Mun
Figure 2.6	Monitoring Location at Lam Tei
Figure 2.7	Monitoring Location at Tin Shui Wai
Figure 2.8	Monitoring Location at Tin Shui Wai

LIST OF APPENDICES

Appendix A	Summary of Air Quality Impact Monitoring Results
Appendix B	Summary of Noise Impact Monitoring Results
Appendix C	Effluent Discharge Sampling Location
Appendix D	Environmental Mitigation Implementation Schedule (EMIS)
Appendix E	Complaints Log
Appendix F	Monitoring Schedule for the Next Three Months
Appendix G	Comments and Response
Appendix H	List of Environmental Licence/Permit
Appendix I	Equipment Calibration and Certification Record
Appendix J	Site Inspection Checklist
Appendix K	Summary of Notification of Summons and Status
Appendix L	Construction Programme for the Next Three Months
Appendix M	NoE Log

EXECUTIVE SUMMARY

Leighton, the main Contractor for KCRC Light Rail Extension Contract No. CC230, set up an Environmental Team to undertake the Environmental Monitoring and Audit (EM&A) works in accordance with the EM&A Manual. Hyder has been employed as the Contractor's Environmental Team (CET). This is the monthly EM&A report which summarises the impact monitoring and auditing data for February 2004.

Construction Programme

In Tuen Mun Area (including Lam Tei), major site construction activities undertaken during non-restricted hours in February 2004 included re-construction of stop platform ramp and staircase, permanent site formation (slope filling), demolition of the old LRT viaduct, road reinstatement and hard landscaping works, utility diversion, removal of redundant LRT existing track and associated overhead line systems, falsework erection for new pedestrian footbridge, mini-piling works, ballast track connections, reinstatement of the nullah wall and superstructure construction works LRT viaduct. Construction activities during restricted hours included DSD maintenance work nearby Nullah widening, remedial works to LRT track and traction power overhead lines, erection of new footbridge, removal of temporary footbridge, erection of parapet on viaduct and preparation work for installation noise enclosure.

In Tin Shui Wai Area, major site construction activities undertaken during non-restricted hours in February 2004 included road reinstatement and utility diversion works, overhead line installation and alteration work, installation of noise barrier, ballast track construction, platform construction and additional drainage works. Construction activities during restricted hours included remedial / adjustment work to LRT track, overhead line and associated equipment, and installation of noise barrier.

EPD Permits/Licences

There were thirteen valid Construction Noise Permits (CNP) during the reporting month.

Air Quality Impact Monitoring

No exceedance of action / limit level was recorded during the reporting month. The monitoring results indicate that the construction activities carried out in February 2004 were in full compliance with the air quality criteria for the project.

Noise Impact Monitoring

No exceedance of limit level was recorded during the reporting month. The monitoring results indicate that the construction activities carried out in February 2004 were in full compliance with the noise criteria for the project.

Water Quality Impact Monitoring

Bi-monthly water sampling for SS analysis at effluent discharge points was scheduled to carry out in the reporting month. However, informed by the Contractor that there was no effluent discharged from the discharge point throughout the reporting month because most of the works has been substantially completed. As a result, no water sampling was carried out during the reporting month. The water sampling will resume once instruction is received from the Contractor.

Waste Management

72 m³ of waste from sewage holding tanks and 224 m³ of general office waste were disposed of to Pillar Point Sewage Treatment Works and WENT Landfill respectively in February 2004.

Environmental Auditing

The CET site inspections were carried out on 2, 9, 16 and 23 of February 2004. No significant deficiency was observed throughout the reporting month.

Site audit was undertaken by the IEC on 27 February 2004. No Non-Compliance (NC) was issued by the IEC, however, the Contractor was reminded to conduct restricted hours noise monitoring for the night work being undertaken outside Tuen Mun Police Station, to provide wheel washing and to display the Environmental Permit at the exit of Tuen Mun Mj7. Besides, they were also reminded to clean up the site exit and to cover the stack of cement bags at Tin Shui Wai Junction L.

Complaints

No complaint was received during the reporting month.

Notification of Summons, Successful Prosecutions and Corrective Actions

No Notification of Summons was received during the reporting month.

Future Key Issues

The major civil construction work for Tin Shui Wai has been substantially completed and the forecast of construction work for the upcoming three months at Tuen Mun and Lam Tei will be very similar in nature to those carried out during the reporting month. Therefore, the environmental impacts arising from the works are expected to be minimal.

1. BACKGROUND INFORMATION

1.1 PROJECT INFORMATION

The existing Light Rail (LR) system was introduced to serve residents of Tuen Mun and Yuen Long in September 1988 with an initial network of 24km, 6 routes and 41 stops. To cater for the continual development and population growth of the Northwest New Territories, the LR had further expanded in Tuen Mun and Tin Shui Wai in stages since early 1990s. In March 1995, Phase 3 of Tin Shui Wai Extension, the last portion of the existing LR extension works, was put into passenger service. The whole LR network now comprises 32km of double track, 8 routes and 57 stops. The average daily patronage in 1998 was 350,000 including 37,000 on LR feeder bus.

For the study in Tin Shui Wai Reserve Zone and Grade Separation of the LRT with Pui To Road and Tsing Lun Road in Tuen Mun, the light railway in Tin Shui Wai Reserve Zone is approximately 2.6km long and has 6 stops. The grade separation works in Tuen Mun involves elevating the existing trackworks near Junctions J6, Mj7, Mj8 and LT1. The Project sites at Tin Shui Wai, Tuen Mun Pui To Road, Lam Tei and Tin Shui Wai Phase 4 are shown in Figures 1.1, 1.2, 1.3 and 1.4 respectively.

The future horizontal alignment would generally follow the existing alignment. For the viaduct at LT1, a safety enclosure will be provided for the entire viaduct and paved track would be employed due to the constraints imposed by the overhead electricity power lines. Temporary track diversion will be located directly to the west of the existing track. The temporary track will be on ballast and at grade. The works at LT1 are an option under Contract CC230.

For the viaduct section in Pui To Road Grade Separation, a composite structure consisting of a concrete deck supported by steel portals will be adopted. All the steel elements of the portals will be encased in concrete. Except for the track directly underneath the deck of the future West Rail Tuen Mun Station, ballast track will be employed.

Temporary track diversion in Pui To Road will be close to the existing track. All steel elements of the temporary structure will also be encased in concrete.

The proposed light rail extension starts from the West Rail Tin Shui Wai (TIS) Station, runs across Tin Fuk Road at Junction C and extends along Tin Shing Road to Stop 500 at Tin Wing Road. The proposed alignment is approximately 1.5km and has 5 stops. Rectifier station R14 is located about 70m to the east of Junction C. The project site is shown in Figure 1.4.

The track in TIS Phase 4 is on ballast and at-grade for most of the sections, except on the concrete viaduct across Junction C (i.e. the junction between Tin Fuk Road and Tin Shing Road). Direct fixation will be used in the concrete viaduct.

1.2 CONSTRUCTION PROGRAMME

The construction work is commenced in September 2001. The construction period would last for approximately 3 years and would overlap with the construction work for the grade separation in Pui To Road and Tsing Lun Road.

The works programme for the project is to be finalised by the Contractor. The CET Leader shall make reference to the actual works progress and programme during the construction stage to schedule the EM&A works, and the Contractor shall provide the respective information to the CET Leader for formulating the EM&A schedule.

1.3 PROJECT ORGANISATION AND MANAGEMENT

An Environmental Team is set up for the Project construction phase. The organisation and lines of communication with respect to environmental works are shown in Figure 1.5.

In general, CET is responsible for regular on-site monitoring and audits/inspection on environmental issues and for reporting to the Contractor any potential environmental deficiencies. The Independent Environmental Checker (IEC) is responsible for carrying out the formal audit and verifying the overall environmental performance. Finally, the Environmental Manager of KCRC will manage the IEC who would review the reports prior to the submission to EPD.

2. SUMMARY OF EM&A REQUIREMENT

2.1 AIR QUALITY

2.1.1 Air Quality Parameters

Monitoring and audit of the Total Suspended Particulates (TSP) levels shall be carried out by the CET to ensure that any deteriorating air quality could be readily detected and timely action taken to rectify the situation.

1-hour and 24-hour TSP levels will be measured to indicate the impacts of construction dust on air quality. The TSP levels shall be measured by following the standard high volume sampling method as set out in the Title 40 of the Code of Federal Regulations, Chapter 1 (Part 50), Appendix B. Upon approval by the ER, 1-hour TSP levels can be measured by direct reading methods which are capable of producing comparable results as that by the high volume sampling method, to indicate short event impacts.

All relevant data including temperature, pressure, weather conditions, elapsed-time meter reading for the start and stop of the sampler, identification and weight of the filter paper, and other special phenomena and work progress of the concerned site etc. shall be recorded down in details.

2.1.2 Monitoring Equipment/Calibration

High Volume Air Sampler (HVAS) - Model GMW GS2310-105 is used for 24-hour TSP monitoring. It complies with the USEPA specifications in Appendix B Part 5 - Reference Method for the Determination of Suspended Particulate matter in the Atmosphere (High-Volume Method) of the Code of Federal Regulation dated July 1, 1991.

Calibration Kit Model - G2523 are used for calibration of the HVAS. Recalibration will be carried out in accordance with the requirements stated in the manufacturers' operating manual. The calibration worksheets are presented in Appendix I.

2.1.3 Monitoring Locations

Thirteen monitoring locations have been identified for air quality monitoring in the Particular Specification (PS) as part of the contractual requirement. Table 2.1 presents a list of the monitoring locations in the PS and also identified name of these locations. The monitoring locations at Tin Shui Wai, Tuen Mun and Lam Tei are shown in Figures 2.1 to 2.8.

Figure No. in EIA Report	ASR No.	Description (in accordance with the PS)	Identified Name	Monitoring Equipment Placement
GSA021/04/D0 3/001	MA120	Tin Shui Wai Area 31, Phase 1 Primary School	The HKFYG Lee Shau Kee Primary School (Monitoring Terminated)	Roof (7/F)
GSA021/04/D0 3/003	MA123A	Tin Shui Wai Area 102, Phase 1, Block 4	Ancillary Facilities Block, Tin Chak Estate (replacement) (Monitoring Terminated)	Roof (7/F)
GSA021/04/D0 3/003	MA129A	Tin Shui Wai Area 102, Phase 5, Block 17	Ancillary Facilities Block, Tin Yuet Estate (replacement) (Monitoring Terminated)	Roof (7/F)
GSA021/04/D0 3/002	MA155	Tin Shui Area 30, Kindergarten	Tin Wah Estate-Assembly of God Paul Church Kindergarten	Roof (7/F)
GSA021/01/D0 3/001	MA42A	Fire Station and Ambulance Depot	Pui To Road Mj7 – 1- storey Store Room (replacement)	Top of Store Room
GSA021/01/D0 3/002	MA50	Tuen Mun Town Plaza	Tuen Mun Town Plaza	Podium (3/F)
GSA021/01/D0 3/001	MA45	Tuen Mun Station PDS221 Topside development (future development)	Holy Redeemer Catholic Church (replacement)	Roof (7/F)
GSA021/02/D0 3/001	MA65	2-storey residential house next to Ng Lau Road	Sun Hing Tsuen, Ng Lau Road.	G/F
GSA021/03/D0 3/001	MA2A	Yiu Foo House, Tin Yiu Estate	Queen Elizabeth Primary School (replacement) (Monitoring Terminated)	Roof (7/F)
GSA021/03/D0 3/001	MA6	TWGH's Kwok Yat Wai College	TWGH's Kwok Yat Wai College (Monitoring Terminated)	Top of Assembly Hall
GSA021/03/D0 3/002	MA10A	Yau Hong House	Tin Yau Court Car Park (3-storey) (replacement) (Monitoring Terminated)	Roof
GSA021/03/D0 3/002	MA15A	The Church of Christ in China Hong Kong Council Fong Yan Wah School	Tin Yiu Estate II , Yiu Fung House (replacement) (Monitoring Terminated)	G/F
GSA021/03/D0 3/004	MA33	Queen Elizabeth School Old Student's Association Secondary School	Queen Elizabeth School Old Student's Association Secondary School (Monitoring Terminated)	Top of Assembly Hall

Note: The major civil construction work for Tin Shui Wai has been substantially completed and therefore the environmental impacts arising from are expected to be minimal. The EPD / KCRC has approved the termination of the air quality / noise monitoring programme for Tin Shui Wai Phase 4 Extension, with effect from 18 Oct 03; and for Tin Shui Wai Reserve Zone (except ASR/NSR 155), with effect from 1 Nov03.

Table 2.1 List of Air Monitoring Locations

2.1.4 Action and Limit Levels

The baseline monitoring results form the basis for determining the air quality criteria for the impact monitoring. The CET shall compare the impact monitoring results with air quality criteria set up for 24-hr TSP and 1-hr TSP. Table 2.2 and Table 2.3 show the air quality criteria for 24-hr and 1-hr respectively, namely Action and Limit levels to be used. Should non-compliance of the air quality criteria occurs, the CET, the Engineer and the Contractor shall undertake the relevant action in accordance with the Event Contingency Plan (ECP) in Tables 2.4a and 2.4b.

In addition, the ECP for complaints handling is shown in Table 2.5.

Level	Total Suspended Particulates ($\mu\text{g m}^{-3}$)
Baseline	Derived from physical measurements prior to construction commencing
Action	For baseline $< 108 \mu\text{g m}^{-3}$, average of 130% of baseline and the Limit level
	For $108 < \text{baseline} < 154 \mu\text{g m}^{-3}$, $200 \mu\text{g m}^{-3}$
	For Baseline $> 154 \mu\text{g m}^{-3}$, 130% of baseline level
Limit	AQO for TSP : $260 \mu\text{g m}^{-3}$ averaged over 24-hours

Table 2.2 Derivation of Action and Limit Levels for 24-Hour Air Quality Monitoring

Level	Total Suspended Particulates ($\mu\text{g m}^{-3}$)
Baseline	Derived from physical Measurements prior to construction commencing
Action	For baseline $< 154 \mu\text{g m}^{-3}$, average of 130% of baseline and the Limit level
	For $154 < \text{baseline} < 269 \mu\text{g m}^{-3}$, $350 \mu\text{g m}^{-3}$
	For baseline $> 269 \mu\text{g m}^{-3}$, 130% of baseline level
Limit	$500 \mu\text{g m}^{-3}$

Table 2.3 Derivation of Action and Limit Levels for 1-Hour Air Quality Monitoring

Step	Day	Action	Contractor/ CET	ER	IEC
1.	1	Identify exceedance from monitoring data and initiate corrective action. Submit data to ER with observed source(s) of pollution.	■		
2.	1	Input monitoring data and observed pollution source(s) into WREMS on same day when data is submitted from CET. WREMS will automatically generate a Notice of Exceedance (NOE) and send it to the IEC via email.		■	
3.	1	On same day of receipt of the NOE, check monitoring data trend and Contractor's work method. Decide if a formal NOE will be issued. If so, forward the NOE via email to KCRC and ER. If not, close the Exceedance record in the WREMS.			■ □
4.	1	Confirm receipt of NOE to IEC.		■	
5.	1	Issue NOE to Contractors and remind their contractual obligations.		■	
6.	2	Propose remedial measures to ER within 1 working day of receipt of NOE.	■	□	
7.	2	Review and agree the proposed remedial measures and make recommendations where necessary.		■ □	■ □
8.	2	Implement the proposed remedial measures once they have been agreed.	■		
9.	-	Arrange site visit to ensure implementation of the agreed remedial measures.		■	■
10.	-	Increase monitoring frequency to assess effectiveness of remedial measures. (Be specific about the frequency for the different parameters. e.g. once every 3 days for 24-hr dust, daily for 1-hr dust) Submit monitoring data to ER for entering into the WREMS once they are available.	■		
11.	-	If exceedance continues, arrange meeting with Contractor and ER to review the implemented remedial measures and identify further remedial measures. Go to step 8. If exceedance stops for 3 consecutive monitoring, resume normal monitoring frequency.	■	■ □	■
12.	-	Inform IEC the closure of exceedance.		■	
13.	-	Close the exceedance record in the WREMS.			■

Table 2.4a Event Contingency Plan for Action Level Exceedance

Step	Day	Action	Contractor/ CET	ER	IEC
1.	1	Identify exceedance from monitoring data and initiate corrective action. Submit data to ER with observed source(s) of pollution.	■		
2.	1	Input monitoring data and observed pollution source(s) into WREMS on same day when data is submitted from CET. WREMS will automatically generate a Notice of Exceedance (NOE) and send it to the IEC via email.		■	
3.	1	On same day of receipt of the NOE, check monitoring data trend and Contractor's work method. Decide if a formal NOE will be issued. If so, forward the NOE via email to KCRC and ER. If not, close the Exceedance record in the WREMS.			■ □
4.	1	Confirm receipt of NOE to IEC on receipt of NOE.		■	
5.	1	Issue NOE to Contractors and remind their contractual obligations.		■	
6.	1	Take immediate action to avoid further exceedance.	■		
7.	2	Propose remedial measures to ER within 1 working days of receipt of NOE.	■	□	
8.	2	Review and agree with the proposed remedial measures and make recommendations where necessary.		■ □	■ □
9.	2	Implement the proposed remedial measures once they have been agreed.	■		
10.	-	Arrange site visit to ensure implementation of agreed remedial measures.		■	■
11.	-	Increase monitoring frequency to assess effectiveness of remedial measures. (Be specific about the frequency for the different parameters. e.g. daily for all parameters) Submit monitoring data to ER for entering into the WREMS once they are available.	■		
12.	-	If exceedance continues, arrange meeting with Contractor and ER to review the implemented remedial measures and identify further remedial measures. Go to step 9. If exceedance stops for 3 consecutive monitoring, resume normal monitoring frequency.	■	■ □	■
13.	-	Inform IEC the closure of exceedance.		■	
14.	-	Close the exceedance record in the WREMS.			■

Table 2.4b Event Contingency Plan for Limit Level Exceedance

Step	Day	Action	Contractor/ CET	KCR C	ER	IEC
1.	1	Party receiving complaint shall create a new complaint record in the WREMS. If the Contractor receives a complaint, the Contractor shall pass the information to the ER for entering into the WREMS. WREMS then automatically sends a Notification of Complaint to KCRC, ER and IEC via email.	■	■	■	
2.	1	ER forward the complaint to Contractor/CET if that is not already received by the Contractor.		■		
3.	2	Within 1 working day after the receipt of the Notification of Complaint, provide ER relevant works site information, e.g. types and locations of construction works.	■		□	
4.	2	Investigate the complaint to determine its validity, and to assess whether the source of the problem is due to the works activities. Report the validity of the complaint to KCRC and ER.				■ □
5.	2	If complaint is valid and due to works, ER shall notify the Contractor. If complaint is invalid or not due to works, Go to Step 11.			■	
6.	2	Propose mitigation measures to ER within 1 working day of the receipt of the Notification.	■		□	
7.	2	Review and agree with the proposed mitigation measures and make recommendations where necessary.			■ □	■ □
8.	2	Implement the mitigation measures once they have been agreed.	■			
9.	4	Audit the implementation of the proposed mitigation measures on site within 2 working days after the measures have been agreed.			■ □	■ □
10.	-	Undertake additional monitoring to verify the situation where necessary.	■			
11.	4	Report the investigation results and subsequent actions taken to ER within 2 working days after the implementation of mitigation measures.	■		□	
12.	5	Respond to the complainant within 1 working day after receiving the investigation report.		■		
13.	25	If no further comments or complaints are received from the complainant within 20 working days after responding to the complainant, close the complaint record in the WREMS. If the complainant has further comments or complaints on the same issue, notify other parties on the same day and go to step 2.		■	■ □	

■ action party

□ enter comments/proposals into the appropriate exceedance record in WREMS where applicable.

CET – Contractor's Environmental Team

IEC – Independent Environmental Checker

KCRC – Designated personnel at KCRC

ER –Engineer's Representative

WREMS – West Rail Environmental Management System

Table 2.5 Event Contingency Plan for Complaints Handling

2.2 NOISE

2.2.1 Noise Parameters

The construction noise level should be measured in terms of equivalent A-weighted sound pressure level (L_{eq}) in decibels (dB). Monitoring of $L_{eq(30 \text{ min})}$ ($6 \times L_{eq(5 \text{ min})}$) is carried at the noise monitoring locations once every week during normal construction working hours (07:00-19:00 hours Monday to Saturday). Restricted hour noise monitoring (19:00-07:00 hours or any time on general holidays including Sunday) in terms of $L_{eq(15 \text{ min})}$ should be undertaken if construction activities are being undertaken during restricted hours under the conditions of valid Construction Noise Permits (CNPs).

The two statistical sound levels L_{10} and L_{90} ; the level exceeded for 10 and 90 percent of the time respectively, is also recorded during monitoring. Major noise sources observed, both on-site and off-site, will be recorded on the data record sheet. All measured data are provided in the electronic format and results are recorded to the nearest 0.1 dB.

2.2.2 Monitoring Methodology

Sound level meters, which comply with the International Electrotechnical Commission (IEC) Publication 651:1979 (Type 1) and 804:1985 (Type 1) specification as referred to the Technical Memorandum (TM) issued under the Noise Control Ordinance (NCO), are used. Continuous baseline noise for the A-weighted levels L_{eq} , L_{10} and L_{90} are measured over a two week period, sampling period of 5 minutes is used throughout the monitoring. Average, by sound power, of six consecutive 5 minutes readings is used to provide $L_{eq(30 \text{ min})}$ for non-restricted hours (07:00-19:00 hours Monday to Saturday) and three consecutive $L_{eq(5 \text{ min})}$ reading is used to provide $L_{eq(15 \text{ min})}$ for the restricted period. A facade correction of 3dB(A) will be applied to measurements which are carried out under free field conditions.

During the impact monitoring, parameters such as dates, weather conditions, equipment used, measurement results and major noise sources are recorded on the field data record sheet. In relation to the monitored noise levels, other noise sources such as road traffic may make a significant contribution to the overall noise environment. Therefore, the results of noise monitoring activities will take into account such as influencing factors, which may not have been presented during the baseline monitoring period. All measurements are recorded to the nearest 0.1dB(A).

2.2.3 Monitoring Equipment/Calibration

Bruel & Kjaer (B&K) Precision Integrating Sound Level Meters of Type 2238 in compliance with the International Electrotechnical Commission Publication 651: 1979 (Type 1) and 804: 1985 (Type 1) Specifications, stated in the TM issued under the NCO, are used for impact monitoring.

Prior to and following each noise measurement, the accuracy of the sound level meter is checked using an acoustic calibrator (B&K Type 4231) generating a known sound pressure level at a known frequency. Measurements are considered as valid only if the calibration level from before and after the noise measurement agree to within 1 dB.

2.2.4 Monitoring Locations

Eleven monitoring locations have been identified in the Particular Specification (PS) for noise monitoring as part of the Contractor's contractual requirement. Table 3.1 presents a list of the monitoring locations in the PS and also identified name of these locations. The monitoring locations at Tin Shui Wai, Tuen Mun, Lam Tei and Tin Shui Wai Phase 4 are shown in Figures 2.1 to 2.8.

Figure No. in EIA Report	NSR No.	Description (in accordance with the PS)	Identified Name	Monitoring Equipment Placement
GSA021/04/D02 /001	MN120	Tin Shui Wai Area 31, Phase 1 Primary School	The HKFYG Lee Shau Kee Primary School (Monitoring Terminated)	Roof (7/F)
GSA021/04/D02 /003	MN123A	Tin Shui Wai Area 102, Phase 1, Block 4	Ancillary Facilities Block, Tin Chak Estate (replacement) (Monitoring Terminated)	Roof (7/F)
GSA021/04/D02 /003	MN129A	Tin Shui Wai Area 102, Phase 5, Block 17	Ancillary Facilities Block, Tin Yuet Estate (replacement) (Monitoring Terminated)	Roof (7/F)
GSA021/04/D02 /002	MN155	Tin Shui Area 30, Kindergarten	Tin Wah Estate-Assembly of God Paul Church Kindergarten	Roof (7/F)
GSA021/01/D02 /002	MN50	Tuen Mun Town Plaza	Tuen Mun Town Plaza	Podium (3/F)
GSA021/01/D02 /001	MN48	Tuen Mun Station PDS221 Topside development (future development)	Kam Wah Garden (replacement)	Podium (3/F)
GSA021/02/D02 /001	MN65	2-storey residential house next to Ng Lau Road	Sun Hing Tsuen, Ng Lau Road	G/F
GSA021/03/D02 /001	MN6	TWGH's Kwok Yat Wai College	TWGH's Kwok Yat Wai College (Monitoring Terminated)	Top of Assembly Hall
GSA021/03/D02 /002	MN10A	Yau Hong House	Tin Yau Court Car Park (3-storey) (replacement) (Monitoring Terminated)	Roof
GSA021/03/D02 /002	MN15A	The Church of Christ in China Hong Kong Council Fong Yan Wah School	Tin Yiu Estate II – Yiu Fung House (replacement) (Monitoring Terminated)	G/F
GSA021/03/D02 /004	MN33	Queen Elizabeth School Old Student's Association Secondary School	Queen Elizabeth School Old Student's Association Secondary School (Monitoring Terminated)	Relocated to G/F from original position (top of Assembly Hall) since August 2003 due to works being carried out on the assembly hall building.

Note: The major civil construction work for Tin Shui Wai has been substantially completed and therefore the environmental impacts arising from are expected to be minimal. The EPD / KCRC has approved the termination of the air quality / noise monitoring programme for Tin Shui Wai Phase 4 Extension, with effect from 18 Oct 03; and for Tin Shui Wai Reserve Zone (except ASR/NSR 155), with effect from 1 Nov03.

Table 2.6 List of Noise Monitoring Locations

2.2.5 Action and Limit Levels

The Action and Limit Levels for construction noise is shown in Table 2.7. The construction site is located within the designated area EPD/NP/NT-04 and the Area Sensitivity Rating (ASR) is classified as “C”, for urban area which are indirectly affected by the Influencing Factor (IF).

In cases where exceedances of Action level occur, since Action Level is based on receiving documented complaints, ECP for Complaints Handling (Table 2.5) should be implemented. If exceedance of the Limit Level occurs, ECP for Limit Level Exceedance (Table 2.4a) should be implemented.

Time Period	Action	Limit
0700-1900 on normal weekdays;	When one or more documented complaints are received	75dB(A)*
restricted hours (1900-0700 on any day including general holiday and Sunday)	When one or more documented complaints are received	refer to relevant valid Construction Noise Permit (CNP) listed in Section 3.2

Notes: The ASR for the site is classified as “C”, which is for urban area indirectly affected.

*Between 0700-1900 on normal weekdays, the construction noise limit for schools with noise insulation is 80dB(A) during normal term time and 75dB(A) during examination period.

Table 2.7 Action and Limit Levels for Construction Noise, dB(A)

2.3 WATER QUALITY

2.3.1 Water Quality Parameters

Monitoring of the suspended solids (SS) was carried out by the CET at designated discharge points once every two months in accordance with the relevant Contractor’s effluent discharge licences issued by EPD.

2.3.2 Monitoring Methodology

Water samples for SS measurements are collected in high density polythene bottles, packed in ice (cooled to 4°C without being frozen), and delivered to a HOKLAS accredited laboratory as soon as possible after collection.

Analysis of SS is carried out in a HOKLAS or other international accredited laboratory. Water samples of about 500ml were collected from the monitoring locations. The SS determination should be conducted within 24 hours after collection of the water samples. The SS determination has followed APHA 19ed 254D or equivalent methods subject to approval of EPD.

2.3.3 Monitoring Locations

The water quality monitoring locations should be set at all discharge points. Due to the nature of work programmes, the discharge points may change from time to time. The actual number of the monitoring stations will depend on the number of the discharge point at a time.

3. SUMMARY OF CONSTRUCTION ACTIVITIES

3.1 CONSTRUCTION ACTIVITIES

Major site construction activities undertaken during non-restricted hours in February 2004 included the following:

Tuen Mun Area (including Lam Tei)

- Re-construction of Pui To Stop Platform Ramp and Staircase is progressing;
- Tuen Mun Town Park permanent site formation (slope filling) has been working;
- Demolition of the old LRT San Fat viaduct ;
- Road reinstatement and hard landscaping works are progressing at Mj7 & j6 (Pui To Road & Heung Sze Wui Road) work areas;
- Utility diversion work is in progress, i.e. water mains, storm water drains, foul sewer and PCCW cables;
- Removal of redundant LRT Existing track and associated overhead line systems is ongoing;
- Falsework erection for the new Heung Sze Wui Road pedestrian footbridge is progressing;
- Mini-piling works for the Tuen Mun West Rail Station propping work at the former San Fat Stop area is progressing;
- Ballast track connections at Tuen Mun Town Centre Stop are complete;
- Reinstatement of the Nullah wall at Mj7 is in progress;
- Superstructure construction works for Lam Tei LRT Viaduct are progressing.

Tin Shui Wai Area

- Road reinstatement and utility diversion works on Junction L, i.e. storm / surface water drainage, are in progress;
- Overhead line installation and alteration work is progressing;
- Installation noise barrier at TSW West Rail Station has been working;
- Platform construction and additional drainage works are complete at the new LRT Terminus (Stop 550);
- Ballast track construction is complete in Phase 4 and the Reserve Zone.

Major site construction activities undertaken during restricted hour in February 2004 included the following:

Tuen Mun Area (including Lam Tei)

- DSD maintenance work nearby Nullah widening.
- Remedial works to LRT track and traction power overhead lines at J6 South, J6 East & Mj7 North work areas,
- Erection of new footbridge at Tuen Mun Heung Sze Wu Road.
- Removal of temporary footbridge at Tuen Mun Heung Sze Wu Road.
- Erection of parapet on viaduct at LT 1
- Prepare work for installation noise enclosure at West Rail Tuen Mun Station.

Tin Shui Wai Area

- Remedial / adjustment work to LRT track, overhead line and associated

equipment at Stop 500 & junctions B, I, J and V.

- Installation Noise barrier at West Rail Station Tin Shui Wai.

3.2 EPD PERMITS/LICENCES

There were thirteen valid Construction Noise Permits (CNP) during the reporting month. Appendix H summarize the Environmental Licences and Construction Noise Permits (CNPs) for the Project.

3.3 ENVIRONMENTAL MITIGATION IMPLEMENTATION SCHEDULE

The schedule for implementation of the construction phase mitigation measures has been extracted from the Contractor's Environmental Management Plan and is presented in Appendix D.

4. MONITORING RESULTS

4.1 AIR QUALITY

Results of 24-hours TSP level are shown in Table 4.1. Detailed results, including weather conditions and the graphical presentations are included in Appendix A.

Location	Action level ($\mu\text{g}/\text{m}^3$)	Limit level ($\mu\text{g}/\text{m}^3$)	Date	TSP (24hr) ($\mu\text{g}/\text{m}^3$)
Store Room-[Fire Station] (MA42A)	182	260	02-Feb-04	84.67
			09-Feb-04	72.13
			16-Feb-04	76.37
			23-Feb-04	94.49
Tuen Mun Town Plaza (MA50)	160	260	02-Feb-04	84.38
			09-Feb-04	70.00
			16-Feb-04	84.27
			23-Feb-04	95.76
Assembly of God Paul Church Kindergarten (MA155)	180	260	02-Feb-04	76.10
			09-Feb-04	59.52
			16-Feb-04	70.69
			23-Feb-04	93.39
Holy Redeemer Catholic Church (MA45)	164	260	02-Feb-04	62.58
			09-Feb-04	65.88
			16-Feb-04	68.78
			23-Feb-04	76.40
San Hing Tsuen (MA65)	200	260	02-Feb-04	79.23
			09-Feb-04	93.17
			16-Feb-04	81.17
			23-Feb-04	104.39

Table 4.1 Results of Air Quality Impact Monitoring

No Exceedance of Action / Limit Levels was recorded during the reporting month. The monitoring results indicate that the construction activities carried out in February

2004 were in full compliance with the air quality criteria for the project.

4.2 NOISE

Results of noise monitoring are shown in Table 4.2. Detailed data, including weather conditions, monitoring time and graphical presentations are included in Appendix B. A facade correction of 3dB(A) has been applied to measurements carried out under free field conditions.

Location	Date	Limit Level dB(A)	Average Impact noise measurement (30 min.) dB(A)		
			L _{eq(30 min)}	L ₁₀	L ₉₀
*Assembly of God Paul Church Kindergarten (MN155)	02-Feb-04	80	62.3	64.1	57.8
	09-Feb-04		63.0	65.1	59.7
	16-Feb-04		65.8	67.9	63.1
	23-Feb-04		68.8	71.0	65.0
*Tuen Mun Town Plaza (MN50)	02-Feb-04	75	65.5	67.2	62.9
	09-Feb-04		65.2	67.3	61.3
	16-Feb-04		70.3	72.0	66.1
	23-Feb-04		70.4	72.4	66.3
Kam Wah Garden (MN48)	02-Feb-04	75	68.3	69.8	64.4
	09-Feb-04		70.3	71.6	64.4
	16-Feb-04		70.7	74.1	68.3
	23-Feb-04		71.7	74.0	67.6
*San Hing Tsuen (MN65)	02-Feb-04	75	65.8	68.3	63.0
	09-Feb-04		66.0	68.5	63.5
	16-Feb-04		67.3	68.7	62.5
	23-Feb-04		67.3	69.2	62.6

Remarks:

* Measurement undertaken at free field condition and façade correction of 3dB(A) had been added..

Table 4.2 Results of Noise Impact Monitoring During Non-Restricted Hour

No Exceedance of Limit Level was recorded during the reporting month. The monitoring results indicate that the construction activities carried out in February 2004 were in full compliance with the noise criteria for the project.

4.3 WATER QUALITY

Bi-monthly water sampling for SS analysis at effluent discharge points in accordance with EPD effluent discharge licences in Tuen Mun area, Lam Tei area and Tin Shui Wai area was scheduled to carry out in the reporting month. However, informed by the Contractor that there was no effluent discharged from the discharge point throughout the reporting month because most of the works has been substantially completed. As a result, no water sampling was carried out during the reporting month. The water sampling will resume once instruction is received from the Contractor.

4.4 SUMMARY OF EXCEEDANCES

A summary table of exceedances for the air quality and noise are shown in Table 4.3.

Exceedance	Total no. of measurement	Action Level Exceedance	% of Action Level Exceedance	Limit Level Exceedance	% of Limit Level Exceedance
Air Quality	20	0	0%	0	0%
Noise Non-Restricted hour	16	N/A	N/A	0	0%

Note: "N/A" - no action level for noise monitoring relates to number of documented complaints received; no action level was set for water quality monitoring.

Table 4.3 Summary of Exceedances

No Notice of Exceedance (NoE) was received in the reporting month.

5. NON-COMPLIANCE AND DEFICIENCY

5.1 SITE INSPECTION/AUDIT BY CET

The CET site inspections were carried out on 2, 9, 16 and 23 of February 2004. All observations have been recorded in the audit checklist and passed to the Contractor together with the appropriate recommended mitigation measures where necessary. Details of observations/deficiencies and proposed corrective actions are presented in Appendix J.

5.2 SITE AUDIT BY IEC

Site audit was undertaken by the IEC on 27 February 2004. A copy of the site audit checklist and details of observations/deficiencies and proposed corrective actions is presented in Appendix J.

No Non-Compliance (NC) was issued by the IEC, however, the Contractor was reminded to conduct restricted hours noise monitoring for the night work being undertaken outside Tuen Mun Police Station, to provide wheel washing and to display the Environmental Permit at the exit of Tuen Mun Mj7. Besides, they were also reminded to clean up the site exit and to cover the stack of cement bags at Tin Shui Wai Junction L.

6. WASTE MANAGEMENT

72 m³ of waste from sewage holding tanks and 224 m³ of general office waste were disposed of to Pillar Point Sewage Treatment Works and WENT Landfill respectively in February 2004.

7. LANDSCAPE AND VISUAL IMPACT

Landscape works will be carried out at a later stage of the contract. The progress of trees protection and transplanting programme will be included in the monthly EM&A

report when those information is available.

8. CULTURAL HERITAGE

The archaeological watching brief for Tuen Mun area (not including Lam Tei) and Lam Tei area were completed in November 2002 and August 2003 respectively. The Archaeological Watching Brief Final Report for Tuen Mun area (not including Lam Tei) and Lam Tei area were submitted to relevant parties in April 2003 and December 2003 respectively.

9. COMPLAINT

No complaint was received during the reporting month.

10. SUMMARY OF NOTIFICATION OF SUMMONS, SUCCESSFUL PROSECUTIONS AND CORRECTIVE ACTIONS

There has been no Notification of Summons received during the reporting month.

Appendix K summarizes the information on notification of summons and prosecutions received since the commencement of the Project.

11. FUTURE KEY ISSUES

Appendix L presents the construction programme for the next three months. The major civil construction work for Tin Shui Wai has been substantially completed and the forecast of construction work for the upcoming three months at Tuen Mun and Lam Tei will be very similar in nature to those carried out during the reporting month. Therefore, the environmental impacts arising from the works are expected to be minimal.

A weekly monitoring schedule for the next three months is presented in Appendix F of this report.

12. CONCLUSION

Air quality and noise monitoring has been undertaken in February 2004 in accordance with the contract specific EM&A Manual. No Exceedances of Action / Limit Levels for the air quality and noise were recorded during the reporting month.

No Non-Compliance was issued by the IEC during the monthly site inspection in the reporting month.

72 m³ of waste from sewage holding tanks and 224 m³ of general office waste were disposed offsite in February 2004.

There have been no Notification of Summons / complaint received during reporting month.