

Leighton Contractors (Asia) Ltd

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

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**Monthly EM&A Report  
May 2003**

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## 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 [May 2003](#).

### Construction Programme

In Tuen Mun Area (including Lam Tei), major site construction activities undertaken during non-restricted hours in [May 2003](#) included utility diversions, associated road works, construction of new LRT Stop / viaduct approach ramps / ballast track, installation of viaduct pre-cast parapets / overhead line works, pre-drilling works and piling works. Construction activities during restricted hours included erection of pre-cast viaduct parapets, beams and associated temporary working, cable installation, minor overhead line alterations and installation of overhead line mast & back stay foundations.

In Tin Shui Wai Area, major site construction activities undertaken during non-restricted hours in [May 2003](#) included utility diversions, Stop construction, earthworks & cable laying, installation of overhead line, construction of viaduct approach ramps, construction of track slabs / retaining wall / platform / ballast track, drainage work, works at Stops / Traffic & Customer Services Officers and Rectifier Stations finishing works. Construction activities during restricted hours included overhead line traction power connections, alteration of LRT permanent way track.

### EPD Permits/Licences

Nine Construction Noise Permits (CNP) were issued by EPD during the reporting month.

### Air Quality Impact Monitoring

Air quality monitoring of 24-hour TSP was carried out in accordance with the Contract specific EM&A Manual. No exceedance of Action / Limit Levels was recorded during the reporting month. The monitoring results indicate that the construction activities carried out in May 2003 were in full compliance with the air quality criteria for the project.

### Noise Impact Monitoring

Noise monitoring of  $L_{eq(30\text{ min})}$  was carried out in accordance with the Contract specific EM&A Manual. No exceedance of Limit Levels was recorded during the reporting month. The monitoring results indicate that the construction activities carried out in May 2003 were in full compliance with the noise criteria for the project.

### Water Quality Impact Monitoring

No water quality monitoring was carried out during the reporting month.

### Waste Management

970 m<sup>3</sup> of inert C&D material, 36 m<sup>3</sup> of waste from sewage holding tanks, 240 m<sup>3</sup> of general office waste and 7 x 100kg drums of dry cell batteries were disposed of to Tuen Mun Public Filling Barging Area 38, Pillar Point Sewage Treatment Works, WENT Landfill and Tsing Yi Chemical Waste Treatment Centre respectively in May 2003. In addition, 600 L of waste lube oil was collected by 'Dunwell' – Registered Chemical Waste Collector under trip ticket

system.

#### Landscape and Visual Impact

Landscape works will be carried out at a later stage of the contract. The progress of tree protection and the transplanting programme will be included in the monthly EM&A report when this information is available.

#### Cultural Heritage

The Archaeological Watching Brief Final Report for Tuen Mun (not including Lam Tei) has been submitted to relevant parties in late April 2003. Archaeological monitoring program for Lam Tei has commenced in May 2003. Evaluation of 5 of the sites, namely LT1-C P19, LT1-F P1, LT1-AR7 P1, LT1-E P5 and LT1 AR6 P1 was carried out respectively on 17, 25 and 28 May 2003. There was no evidence of archaeological material.

#### Environmental Auditing

The CET site inspection/audits were carried out on 7, 15, 22 and 29 of May 2003. The Contractor was reminded to cover stockpiles of dusty material, to provide drip trays for oil drums, to provide water spraying for concrete breaking and on dry exposed site area and to direct wastewater from manual washing to desilting facilities before discharge.

Site audit was undertaken by the IEC on 23 May 2003. The Contractor was reminded to keep public road clean and to water the site area for dust suppression more frequently.

#### 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.

## **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 2.7.

Figure No.*	ASR No.	Description (in accordance with the PS)	Identified Name	Monitoring Equipment Placement
GSA021/04/D03 /001	MA120	Tin Shui Wai Area 31, Phase 1 Primary School	The HKFYG Lee Shau Kee Primary School	Roof (7/F)
GSA021/04/D03 /003	MA123A	Tin Shui Wai Area 102, Phase 1, Block 4	Ancillary Facilities Block, Tin Chak Estate (replacement).	Roof (7/F)
GSA021/04/D03 /003	MA129A	Tin Shui Wai Area 102, Phase 5, Block 17	Ancillary Facilities Block, Tin Yuet Estate (replacement).	Roof (7/F)
GSA021/04/D03 /002	MA155	Tin Shui Area 30, Kindergarten	Tin Wah Estate- Assembly of God Paul Church Kindergarten	Roof (7/F)
GSA021/01/D03 /001	MA42A	Fire Station and Ambulance Depot	Pui To Road Mj7 – 1-storey Store Room (replacement)	Top of Store Room
GSA021/01/D03 /002	MA50	Tuen Mun Town Plaza	Tuen Mun Town Plaza	Podium (3/F)
GSA021/01/D03 /001	MA45	Tuen Mun Station PDS221 Topside development (future development)	Holy Redeemer Catholic Church (replacement)	Roof (7/F)
GSA021/02/D03 /001	MA65	2-storey residential house next to Ng Lau Road	Sun Hing Tsuen, Ng Lau Road.	G/F
GSA021/03/D03 /001	MA2A	Yiu Foo House, Tin Yiu Estate	Queen Elizabeth Primary School (replacement)	Roof (7/F)
GSA021/03/D03 /001	MA6	TWGH's Kwok Yat Wai College	TWGH's Kwok Yat Wai College	Top of Assembly Hall
GSA021/03/D03 /002	MA10A	Yau Hong House	Tin Yau Court Car Park (3-storey) (replacement)	Roof
GSA021/03/D03 /002	MA15A	The Church of Christ in China Hong Kong Council Fong Yan Wah School	Tin Yiu Estate II , Yiu Fung House (replacement)	G/F
GSA021/03/D03 /004	MA33	Queen Elizabeth School Old Student's Association Secondary School	Queen Elizabeth School Old Student's Association Secondary School	Top of Assembly Hall

**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 2.7.

Figure No.*	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	Roof (7/F)
GSA021/04/D02 /003	MN123A	Tin Shui Wai Area 102, Phase 1, Block 4	Ancillary Facilities Block, Tin Chak Estate (replacement)	Roof (7/F)
GSA021/04/D02 /003	MN129A	Tin Shui Wai Area 102, Phase 5, Block 17	Ancillary Facilities Block, Tin Yuet Estate (replacement)	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	Top of Assembly Hall
GSA021/03/D02 /002	MN10A	Yau Hong House	Tin Yau Court Car Park (3-storey) (replacement)	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)	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	Top of Assembly Hall

**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 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 [May 2003](#) included the following:



#### Tuen Mun Area (including Lam Tei)

- Utility diversions in progress, i.e. PCCW cables; storm water drains and Water mains;
- Associated road works are progressing at Mj8 area;
- Construction of the new Kin On LRT Stop is progressing on Pui To Road;
- Construction of Mj7 West and North viaduct approach ramps;
- Ballast track construction is ongoing at junction 6 & Mj7 viaducts;
- Installation of viaduct pre-cast parapets is ongoing in Mj7 junction;
- Overhead line installation work is progressing;
- Pre-drilling works are progressing at LT1;
- Piling works at LT1 have commenced.

#### Tin Shui Wai Area

- Utility diversions are in progress, i.e. Storm / surface water drains;
- Stop 468 construction work at Junction L is ongoing;
- Earthworks & cable laying along the Light Rail permanent way is in progress;
- Overhead line installation work is progressing;
- Construction of track slabs at several road junctions is ongoing;
- Construction work at many Stops is in progress, i.e. 435, 450, 455, 468, 480, 500, 510, 520, 530 and 540;
- Retaining wall construction, platform construction and drainage work are progressing at the new Tin Shui Wai LRT Terminus (Stop 550);
- Work at Traffic & Customer Service Offices T04 and T05 is proceeding;
- Finishing work is near completion at Rectifier Stations R14, R15 and R16;
- Ballast track construction is substantially complete in Phase 4 and the Reserve Zone.

Major site construction activities undertaken during restricted hour in [May 2003](#) included the following:

#### Tuen Mun Area (including Lam Tei)

- Erection of pre-cast viaduct parapets at Mj7 junction area, Tuen Mun;
- Erection of pre-cast viaduct beams and associated temporary working platforms at Mj7 junction on Pui To Road & Mj7 north work area;
- Cable installation along existing LRT reserve from Ho Tin Stop (Tuen Mun) to Yuen Long Terminus;
- Minor overhead line alterations in Tuen Mun;
- Installation of overhead line mast & back stay foundations at LT1.

#### Tin Shui Wai Area

- Overhead line traction power connections at junctions B, I, J and Stop 500;
- Alteration of LRT permanent way track at Stop 500 and junctions B, I and J.

### **3.2 EPD PERMITS/LICENCES**

Nine Construction Noise Permits (CNP) were issued and one was refused to grant by EPD during the reporting month. Tables H1 and H2 presented in Appendix H

summarize the Environmental Licences and Construction Noise Permits (CNP) 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	06-May-03 <sup>(1)</sup>	85.94
			14-May-03	103.34
			19-May-03	114.65
			26-May-03	123.08
Tuen Mun Town Plaza (MA50)	160	260	05-May-03	65.49
			12-May-03	86.68
			19-May-03	97.61
			26-May-03	108.90
Assembly of God Paul Church Kindergarten (MA155)	180	260	06-May-03 <sup>(1)</sup>	73.78
			14-May-03	103.69
			21-May-03	87.41
			28-May-03	101.27
Holy Redeemer Catholic Church (MA45)	164	260	05-May-03	66.05
			12-May-03	88.60
			19-May-03	74.30
			26-May-03	86.89
QE School Old Student's Association Primary School (MA2A)	185	260	06-May-03 <sup>(1)</sup>	90.73
			14-May-03	113.05
			21-May-03	103.87
			28-May-03	120.30
TWGH's Kwok Yat Wai College (MA6)	186	260	06-May-03 <sup>(1)</sup>	116.40
			14-May-03	129.60
			21-May-03	143.70
			28-May-03	137.81
QE School Old Student's Association Secondary School (MA33)	181	260	06-May-03 <sup>(1)</sup>	86.03
			14-May-03	91.23
			21-May-03	99.57
			28-May-03	107.79
HKFYG Lee Shau Kee Primary School	167	260	06-May-03 <sup>(1)</sup>	75.71
			14-May-03	97.52

Location	Action level (µg/m <sup>3</sup> )	Limit level (µg/m <sup>3</sup> )	Date	TSP (24hr) (µg/m <sup>3</sup> )
(MA120)			21-May-03	88.97
			28-May-03	80.49
Tin Yiu Estate II (MA15A)	163	260	06-May-03 <sup>(1)</sup>	71.87
			14-May-03	89.75
			21-May-03	100.94
			28-May-03	99.37
Tin Yau Court (MA10A)	200	260	06-May-03 <sup>(1)</sup>	93.33
			14-May-03	98.62
			21-May-03	111.57
			28-May-03	90.09
San Hing Tsuen (MA65)	200	260	05-May-03	77.49
			12-May-03	93.74
			19-May-03	117.87
			26-May-03	145.66
Tin Chak Estate (MA123A)	184	260	06-May-03 <sup>(1)</sup>	74.66
			14-May-03	90.47
			21-May-03	80.37
			28-May-03	86.96
Tin Yuet Estate (MA129A)	169	260	06-May-03 <sup>(1)</sup>	85.35
			14-May-03	110.20
			21-May-03	78.58
			28-May-03	70.49

Notes: (1) Rescheduled from 7 May 03 due to public holiday.

**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 May 2003 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 <sub>eq(30 min)</sub>	L <sub>10</sub>	L <sub>90</sub>
*Assembly of God Paul Church Kindergarten (MN155)	06-May-03 <sup>(1)</sup>	80	62.7	66.2	58.4
	15-May-03		66.1	67.8	60.3
	22-May-03		70.5	72.7	66.0
	29-May-03		68.4	70.5	64.0
*Tuen Mun Town Plaza (MN50)	05-May-03	75	67.5	70.5	61.8
	12-May-03		69.3	72.5	64.2

Location	Date	Limit Level dB(A)	Average Impact noise measurement (30 min.) dB(A)		
			L <sub>eq(30 min)</sub>	L <sub>10</sub>	L <sub>90</sub>
	19-May-03		67.5	70.2	64.2
	26-May-03		67.1	70.0	62.8
Kam Wah Garden (MN48)	06-May-03 <sup>(2)</sup>	75	70.2	72.9	65.2
	12-May-03		69.1	71.8	65.3
	19-May-03		71.9	75.1	67.1
	26-May-03		70.7	74.7	67.2
*HKFYG Lee Shau Kee Primary School (MN120)	06-May-03 <sup>(1)</sup>	80	68.0	71.0	63.6
	15-May-03		71.0	72.9	66.7
	22-May-03		65.8	67.7	62.4
	29-May-03		64.8	65.8	60.4
*QE School Old Student's Association Secondary School (MN33)	07-May-03 <sup>(1)</sup>	80	73.2	74.6	68.2
	15-May-03		72.2	73.7	66.7
	22-May-03		66.8	68.5	63.4
	29-May-03		66.2	68.1	62.7
Tin Yiu Estate II (MN15A)	07-May-03 <sup>(1)</sup>	75	59.3	61.0	54.8
	15-May-03		63.3	65.6	59.4
	22-May-03		59.8	62.4	56.0
	29-May-03		59.3	62.2	57.3
*Tin Yau Court (MN10)	07-May-03 <sup>(1)</sup>	75	67.5	69.3	63.3
	15-May-03		65.3	67.7	60.8
	22-May-03		69.4	71.8	63.7
	29-May-03		67.2	70.6	62.8
*TWGH's Kwok Yat Wai College (MN6)	02-May-03 <sup>(3)</sup>	80	66.7	58.9	59.1
	07-May-03 <sup>(1)</sup>		69.8	72.5	64.5
	15-May-03		70.3	72.7	65.7
	22-May-03		68.2	70.6	65.0
	29-May-03		66.9	69.0	61.5
*San Hing Tsuen (MN65)	06-May-03	75	72.8	77.3	67.4
	13-May-03		71.4	74.9	67.4
	20-May-03		72.4	75.4	73.1
	27-May-03		72.8	75.8	63.6
*Tin Chak Estate (MN123A)	06-May-03 <sup>(1)</sup>	75	67.0	68.8	60.0
	15-May-03		63.4	65.5	58.9
	22-May-03		65.5	67.2	62.9
	29-May-03		64.6	66.1	61.1
*Tin Yuet Estate (MN129A)	06-May-03 <sup>(1)</sup>	75	62.7	65.6	58.3
	15-May-03		67.7	70.2	65.4
	22-May-03		64.3	66.2	61.1
	29-May-03		64.2	65.9	60.6

Note:

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

(1) Rescheduled from 8 May 03 due to public holiday.

(2) Postponed from 5 May 03 due to raining.

(3) Rescheduled from 1 May 03 due to public holiday.

**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 May 2003 were in full compliance with the noise criteria for the project.

**4.3 WATER QUALITY**

No water quality monitoring was carried out during the reporting month. Bi-monthly water sampling for SS analysis will be carried out in June 2003.

**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	52	0	0%	0	0%
Noise Non-Restricted hour	45	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 inspection/audit was carried out on 7, 15, 22 and 29 of May 2003. 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 23 May 2003. A copy of the site audit checklist and details of observations/deficiencies and proposed corrective actions is presented in Appendix J.

**6. WASTE MANAGEMENT**

970 m<sup>3</sup> of inert C&D material, 36 m<sup>3</sup> of waste from sewage holding tanks, 240 m<sup>3</sup> of general office waste and 7 x 100kg drums of dry cell batteries were disposed of to Tuen Mun Public Filling Barging Area 38, Pillar Point Sewage Treatment Works, WENT Landfill and Tsing Yi Chemical Waste Treatment Centre respectively in May 2003. In addition, 600 L of waste lube oil was collected by 'Dunwell' – Registered Chemical Waste Collector under trip ticket system.

**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) was completed in November 2002 and the Archaeological Watching Brief Final Report was submitted to relevant parties in late April 2003.

For Lam Tei area, a raised via-duct for KCRC light rail track is under construction for which 183 footings (pile caps) will be installed to depths up to 80m. Archaeological watching brief was undertaken during pile cap construction. A monitoring program of 5% representing a minimum of 10 pile cap sites has started in May 2003.

Evaluation of 5 of the sites was carried out respectively on 17, 25 and 28 May 2003. There was no evidence of archaeological material. The findings are summarised in Table 8.1.

Details of archaeological monitoring methodology, archaeological watching brief monthly progress report for May 2003 and monitoring locations are appended in Appendix N1, N2 and N2 respectively.

Monitoring Date	Monitoring Location	Depth	Summary Stratigraphy
17 May 03	LT1-C P19	0-2.5m	FILL Orange-rock fragments in orange sand matrix.
		2-6m	Alluvium. Grey coarse sandy alluvium.
		6-8.5m	Alluvium. Dark grey silty clay.
		8.5-10m	Old land surface. Base of alluvium.
		10m	Weathered volcanic bedrock. Orange iron-stained slightly kaolinised bedrock.
		12m	As above.
17 May 03	LT1-F P1	0-2.5m	FILL Orange-rock fragments in orange sand matrix.
		2.5m	Old land surface. Orange clays with weathered parent material.
		2.5-4m	Weathered volcanic bedrock. Orange iron-stained slightly kaolinised bedrock.
		4-6m	As above.
25 May 03	LT1-AR7 P1	0-3.5m	FILL. Orange-rock fragments in orange sand matrix.
		3.5m	Alluvium. Dark grey silty sand.
		4m	Weathered volcanic bedrock. Orange iron-stained slightly kaolinised bedrock.
		5m	As above.
28 May 03	LT1-E P5	0-2m	FILL. Orange-rock fragments in orange sand matrix.

Monitoring Date	Monitoring Location	Depth	Summary Stratigraphy
		2-2.5m	Old land surface. Orange clay with fragments of volcanic parent material.
		2.5-10m	Weathered volcanic bedrock. Orange iron-stained slightly kaolinised bedrock.
28 May 03	LT1 Ar6 P1	0-2m	FILL. Orange-rock fragments in orange sand matrix.
		2m	Lack organic fine sandy clay with modern rubbish (modern village debris, glass and pottery).
		2-3m	As above.
		4m	Eathered volcanic bedrock. Orange iron-stained slightly kaolinised bedrock.
		5m	As above.
		6m	As above.

*No archaeological artifacts, cultural remains or palaeo-environmental remains were noted during pile excavation.*

**Table 8.1 Summary of Archaeological Monitoring Results**

**9. COMPLAINT**

No complaints were received during the reporting month.

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

No Notification of Summons was 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 forecast of construction work for the upcoming three months will be very similar in nature to those carried out during the month of [May 2003](#). The results for air quality, water quality and noise impact monitoring for the upcoming three months are expected to be similar to those measured in [May 2003](#).

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 [May 2003](#) 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.

The CET site inspection/audits were carried out on 7, 15, 22 and 29 of May 2003. The Contractor was reminded to cover stockpiles of dusty material, to provide drip trays for oil drums, to provide water spraying for concrete breaking and on dry exposed site area and to direct wastewater from manual washing to desilting facilities before discharge.

Site audit was undertaken by the IEC on 23 May 2003. The Contractor was reminded to keep public road clean and to water the site area more frequently.

970 m<sup>3</sup> of inert C&D material, 36 m<sup>3</sup> of waste from sewage holding tanks, 240 m<sup>3</sup> of general office waste, 7 x 100kg drums of dry cell batteries and 600 L of waste lube oil were disposed of in May 2003.

Evaluation of 5 of the sites, at Lam Tei was carried out respectively on 17, 25 and 28 May 2003. There was no evidence of archaeological material.

No Notification of Summons was received during reporting month.

No complaint was received during reporting month.