


MTR Corporation Limited

ROAD WORKS at WEST KOWLOON

(No. EP-366/2009)

Environmental Monitoring and Audit Report No. 01

(July 2011)

Verified by :   
Position : Independent Environmental Checker  
Date : 12 August 2011

MTR Corporation Limited

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Position

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Environmental Team Leader

Date

:

12 AUG 2011



# ROADWORKS AT WEST KOWLOON



Environmental Monitoring and Audit Report  
July 2011

## **EXECUTIVE SUMMARY**

This is the 1st monthly Environmental Monitoring and Audit (EM&A) Report presenting the EM&A works undertaken during the period from 8 to 31 July 2011 for the Road Works at West Kowloon (hereinafter referred to “the Roadworks” or “the Project”) in accordance with the EM&A Manual and the requirement under EP-366/2009.

### ***Air Quality***

Air quality monitoring was conducted for 24-hour Total Suspended Particulates (TSP) at three (3) air quality monitoring locations in the vicinity of Works Area in West Kowloon in the reporting month.

Please refer to the section “Environmental Complaints/Exceedance/Non-compliance/Summons and Prosecution” below for the exceedance in air quality in the reporting month.

### ***Airborne Noise***

Airborne noise was measured in terms of  $L_{eq(30min)}dB(A)$  with  $L_{10}$  and  $L_{90}$  measurements as reference at four (4) noise monitoring locations in the vicinity of Works Area in West Kowloon in the interval of once every week.

Please refer to the section “Environmental Complaints/Exceedance/Non-compliance/Summons and Prosecution” below for the noise exceedance in the reporting month.

### ***Environmental Audits***

In this reporting month, regular site inspections attended by representative from MTRCL and Contractors were carried out at 810B in West Kowloon. In addition to the regular site inspections, IEC environmental audits attended by IEC, MTRCL and Contractors were held on monthly basis. Issues observed during these audits are detailed in Section 6.

### ***Environmental Complaints / Exceedance / Non-compliance / Summons and Prosecution***

For the reporting month, there was no environmental complaint referred from EPD. However if environmental complaint received and confirmed due to the works on site, complaint investigation would be conducted in accordance with the complaint handling procedure in the EM&A Manual. Details of complaints are contained in Section 7.

For the reporting month, noise exceedances of air-borne noise Limit Level were recorded at Sorrento (CNM-2) and The Waterfront (CNM-3). There was no noise exceedances of Action Level triggered due to no complaint during daytime hours in the reporting month.

No exceedances of 24-hour TSP Action and Limit Level were recorded during the reporting month.

Actions stipulated under the Event and Action Plan (Table 9.4 of the EM&A Manual) would be implemented if exceedance was recorded, including carrying out investigation to identify the dust source and the Contractor should implement further mitigation measures accordingly to minimize the dust impact.

No non-compliance event was recorded during the reporting period. In the reporting period, no warning or summons was received by MTRCL and the Contractors 810B.

#### ***Works for Coming Month***

Construction works were commenced in July 2011 and the major works were summarized in Table 8-1. Impact monitoring would be continued in coming reporting month accordingly with reference to the EM&A Manual.

#### ***Further Environmental Key Issues***

Air quality impact, airborne noise at the affected sensitive receivers shall continue in the following month. Considering the nature of construction activities, key environmental issues in the coming months include the followings:

- Disposal of C&D waste;
- Dust generation from site activities;
- Noise impact from operating equipment;
- Site water discharge; and
- Chemical wastes.

#### ***Reporting Changes***

In the reporting period, there was no reporting changes.

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## **1. INTRODUCTION**

### ***1.1 Project Background***

In April 2008, the Government of Hong Kong Special Administrative Region (HKSAR) requested MTR Corporation Limited (MTRCL) to proceed with further planning and design of the Hong Kong section of the Guangzhou-Shenzhen-Hong Kong Express Rail Link, which runs from the West Kowloon Terminus (WKT) to the boundary at Huanggang.

Upon the opening of the WKT of XRL and the development of the West Kowloon Cultural District (WKCD), additional road traffic capacity and network restructuring would be required through and within the West Kowloon Reclamation Area (WKRA). Roads namely D1A, D1, Lin Cheung Road – Austin Road West Underpass and upgrading of Austin Road West would be used to accommodate the anticipated increase in road traffic.

### ***1.2 Coverage***

This is the 1st monthly Environmental Monitoring and Audit (EM&A) Report presenting the EM&A works undertaken during the period from 8 to 31 July 2011 for the Roadworks in accordance with the EM&A Manual and the requirement under Environmental Permit No. EP-366/2009.

## 2. PROJECT INFORMATION

### 2.1 *Project Management Organisation and Management Structure*

The project management organisation chart and contact of key personnel are shown in Appendix B.

### 2.2 *Construction Activities*

This report marked the 1st month of civil construction in Works Area in West Kowloon for July 2011. It is anticipated that the civil construction be completed in year 2014. The updated construction activity is provided in Section 8. Major construction activities undertaken in the reporting month is summarized in the following table.

<b>Contract</b>	<b>Major Construction Activities</b>
810B	Bore piling, Pre-drilling, Construction of temporary traffic deck

**Table 2-1** Major construction activities in July 2011



### 3. ENVIRONMENTAL STATUS

#### 3.1 *Status of Implementation of mitigation measures*

Environmental mitigation measures recommended in the EIA report were implemented and their implementation status is summarized in Appendix C.

#### 3.2 *Status of Submissions under EP*

A summary of the submissions submitted under the EP for this Project as at 31 July 2011 is presented in Table 3-1 below:

<b>EP-366/2009 Clause No.</b>	<b>Document Title</b>	<b>Status</b>
2.1	Establishment of ET	Established
2.2	Employment of IEC	Established
2.3	Management Organization of Main Construction Companies	Submitted on 9 June 2011.
2.5	Works Schedule	7 April 2011
2.6	Location Plans	Deposited on 24 June 2011
2.7	Review Report	27 April 2011
3.3	Baseline Monitoring Report	Submitted on 6 June 2011 and comments received on 19 July 2011. Revision is under preparation.

**Table 3-1** Summary of the status of submissions submitted under the EP in the reporting month

#### 3.3 *Status of Permit/License/Notifications*

A summary of the status of permits, licences and notifications on environmental protection made, applied or approved under this Project during the previous and reporting month is presented in Table 3-2 below. The Environmental Permit No. EP-366/2009 issued by EPD was used for the Roadworks under the XRL project.

Item	Item Description	Application Date	Permit Status
<i>Contract 810B</i>			
1	Construction Noise Permit	16 May 2011	Granted on 23 Jun 2011 Licence No. GW-RE0427-11, valid from 27/06/2011 to 29/11/2011
2	Dumping Permit for Type 2 marine sediment	8 Jun 2011	Granted on 25 Jun 2011 Permit No. EP/MD/12-035, valid from 28/6/2011 to 27/07/2011

**Table 3-2** Summary of the status of permits, licences and notifications made, applied and approved under this Project during the previous and reporting month

## **4. SUMMARY OF EM&A REQUIREMENT**

### ***4.1 Air Quality***

#### ***4.1.1 Air Quality Parameters***

In accordance to the EM&A Manual, 24-hour Total Suspended Particulates (TSP) levels were measured at three (3) air monitoring locations in accordance with the EM&A Manual. Monitoring was undertaken at each monitoring location once per every 6 days. Information such as date of monitoring, duration, weather condition, equipment used and monitoring results shall be recorded on the field data sheet developed for the Project. Monitoring results are summarized in Section 5.

#### ***4.1.2 Monitoring Methodology and Calibration***

Monitoring was undertaken to establish for 24-hour Total Suspended Particulates (TSP) at three (3) monitoring locations in the vicinity of the Works Area in West Kowloon. Monitoring of 24-hour TSP was carried out using a high volume sampler (HVS) according to Part 50 Chapter 1 Appendix B, Title 40 of the Code of Federal Regulations of the USEPA.

The sampling procedure follows to that described Part 50 Chapter 1 Appendix B, Title 40 of the Code of Federal Regulations of the USEPA. TSP is sampled by drawing air through a conditioned, pre-weighed filter paper inside the high volume sampler at a controlled rate. After 24-hour sampling the filter paper with retained particles shall be collected and returned to HOKLAS accredited laboratory (ALS Technichem (HK) Pty Ltd) for drying in a desiccators followed by accurate weighing. TSP levels are calculated from the ratio of the mass of particulate retained on the filter paper to the total volume of air sampled.

The flow rate of the high volume sampler with mass flow controller was calibrated using an orifice calibrator. Initial calibration (five points) was conducted upon installation and prior to commissioning. Calibration was carried out every six months. The detail of calibration is shown in Table 4-1 below. The samplers shall be properly maintained. Prior to dust monitoring commencing, appropriate checks shall be made to ensure that all equipment and necessary power supply are in good working condition.

<b>Monitoring Station ID</b>	<b>Air Quality Monitoring Location</b>	<b>HVS Serial Number</b>	<b>Last Calibration Date</b>
CAM-1	Podium between Sorrento and The Waterfront	515	2 June 2011
CAM-2	Podium next to Tower 3, The Waterfront	1282	2 June 2011
CAM-3	Roof of Lift Building, The Victoria Towers	528	2 June 2011

**Table 4-1** Calibration details of HVS

#### **4.1.3 Monitoring Location**

According to the EM&A Manual, air quality monitoring was carried out at the locations as shown in Table 4-1 above. The monitoring locations are illustrated in Appendix D.

#### **4.1.4 Action and Limit Levels**

With reference to the baseline monitoring results, the Action and Limit Levels for the 24-hour TSP monitoring derived are shown in Table 4-2. For reference purpose, the Action and Limit Levels for 1-hr TSP monitoring are included, too. In the case of exceedance of Action and/or Limit levels for air quality occur, the Event and Action Plan as stipulated the EM&A Manual / shown in Table 4-3 shall be implemented.

<b>Monitoring Station ID</b>	<b>1-hour TSP Level in <math>\mu\text{g}/\text{m}^3</math></b>		<b>24-hour TSP Level in <math>\mu\text{g}/\text{m}^3</math></b>	
	Action Level	Limit Level	Action Level	Limit Level
CAM-1	298.4	500	168.8	260
CAM-2	295.6	500	155.9	260
CAM-3	319.4	500	179.3	260

**Table 4-2** Action and Limit Levels for Air Quality

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
<b>ACTION LEVEL</b>				
1. Exceedance for one sample	1. Identify source, investigate the causes of complaint and propose remedial measures; 2. Inform IEC and ER; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency to daily.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method.	1. Notify Contractor.	1. Rectify any unacceptable practice; 2. Amend working methods if appropriate.
2. Exceedance for two or more consecutive samples	1. Identify source; 2. Inform IEC and ER; 3. Advise the ER on the effectiveness of the proposed remedial measures; 4. Repeat measurements to confirm findings; 5. Increase monitoring frequency to daily; 6. Discuss with IEC and ER (together with the Contractor) on remedial actions required; 7. If exceedance continues, arrange	1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and ER (together with the Contractor) on possible remedial measures; 4. Advise the ET/ER on the effectiveness of the proposed remedial measures; 5. Supervise Implementation of remedial measures.	1. Confirm receipt of notification of exceedance in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented.	1. Submit proposals for remedial to ER within three working days of notification; 2. Implement the agreed proposals; 3. Amend proposal if appropriate.

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
	meeting with IEC and ER; 8. If exceedance stops, cease additional monitoring.			
<b>LIMIT LEVEL</b>				
1. Exceedance for one sample	<ol style="list-style-type: none"> <li>Identify source, investigate the causes of exceedance and propose remedial measures;</li> <li>Inform IEC, ER, Contractor and EPD;</li> <li>Repeat measurement to confirm finding;</li> <li>Increase monitoring frequency to daily;</li> <li>Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results.</li> </ol>	<ol style="list-style-type: none"> <li>Check monitoring data submitted by ET;</li> <li>Check Contractor's working method;</li> <li>Discuss with ET and ER (together with the Contractor) on possible remedial measures;</li> <li>Advise the ER on the effectiveness of the proposed remedial measures;</li> <li>Supervise implementation of remedial measures.</li> </ol>	<ol style="list-style-type: none"> <li>Confirm receipt of notification of exceedance in writing;</li> <li>Notify Contractor;</li> <li>Ensure remedial measures properly implemented.</li> </ol>	<ol style="list-style-type: none"> <li>Take immediate action to avoid further exceedance;</li> <li>Submit proposals for remedial actions to ER with a copy to IEC within three working days of notification;</li> <li>Implement the agreed proposals;</li> <li>Amend proposal if appropriate.</li> </ol>
2. Exceedance for two or more consecutive samples	<ol style="list-style-type: none"> <li>Notify IEC, ER, Contractor and EPD;</li> <li>Identify source;</li> <li>Repeat measurement to confirm findings;</li> </ol>	<ol style="list-style-type: none"> <li>Discuss amongst ER, ET, and Contractor on the potential remedial actions;</li> <li>Review Contractor's remedial actions whenever necessary to</li> </ol>	<ol style="list-style-type: none"> <li>Confirm receipt of notification of exceedance in writing;</li> <li>Notify Contractor;</li> <li>In consultation with the</li> </ol>	<ol style="list-style-type: none"> <li>Take immediate action to avoid further exceedance;</li> <li>Submit proposals for remedial actions to ER</li> </ol>

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
	<p>4. Increase monitoring frequency to daily;</p> <p>5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented;</p> <p>6. Arrange meeting with IEC and ER to discuss the remedial actions to be taken;</p> <p>7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results;</p> <p>8. If exceedance stops, cease additional monitoring.</p>	<p>assure their effectiveness and advise the ER accordingly;</p> <p>3. Supervise the implementation of remedial measures.</p>	<p>IEC, agree with the Contractor on the remedial measures to be implemented;</p> <p>4. Ensure remedial measures properly implemented;</p> <p>5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated.</p>	<p>with a copy to IEC within three working days of notification;</p> <p>3. Implement the agreed proposals;</p> <p>4. Revise and resubmit proposals if problem still not under control;</p> <p>5. Stop the relevant portion of works as determined by the ER until the exceedance is abated.</p>

**Table 4-3** Event and Action Plan for Air Quality

## 4.2 Air-borne Noise

### 4.2.1 Noise Parameters

In accordance to the EM&A Manual, construction noise monitoring shall be conducted to obtain one set of 30-minute measurement at each monitoring station between 0700 and 1900 hours on normal weekdays at a frequency of once per week when construction activities are underway. The  $L_{eq}$ ,  $L_{10}$  and  $L_{90}$  were also recorded at the specified interval.

### 4.2.2 Monitoring Methodology and Calibration

As referred to the Technical Memorandum (TM) issued under the NCO, sound level meters in compliance with the International Electrotechnical Commission Publications 651: 1979 (Type 1) and 804: 1985 (Type 1) specifications shall be used for carrying out the noise monitoring.

Immediately prior to and following each noise measurement the accuracy of the sound level meter should be checked using an acoustic calibrator generating a known sound pressure level at a known frequency. Measurements may be accepted as valid only if the difference between calibration levels obtained before and after the noise measurement is less than 1.0 dB.

The sound level meters and calibrator are verified by the certified laboratory or manufacturer at a regular interval to ensure they perform to the same level of accuracy as stated in the manufacturer's specifications. Detail of calibration is shown in Table 4-4 below and Appendix G.

Monitoring Station ID	Noise Monitoring Location	Serial Number	Last Calibration Date
<i>Sound Level Meters</i>			
CNM-1	Man Cheong Street Refuse Station	2701816	30 December 2010
CNM-2	Tower 6, Sorrento	2701826	17 January 2011
CNM-3	Podium next to Tower 3, The Waterfront	2701823	30 December 2010
CNM-4	Tower 2, The Harbour Side	2701886	26 May 2011



Monitoring Station ID	Noise Monitoring Location	Serial Number	Last Calibration Date
<i>Calibrator</i>			
Serial Number		Last Calibration Date	
N491111		8 December 2010	

Notes: Façade correction of +3dB(A) would be added to the results taken at CNM-3 due to free-field noise measurements.

**Table 4-4** Calibration details of noise monitoring equipments

#### 4.2.3 Monitoring Location

According to the EM&A Manual, noise monitoring was carried out at the locations as shown in Table 4-4 above. The monitoring locations are illustrated in Appendix D.

#### 4.2.4 Action and Limit Levels

The Action and Limit Levels for the construction noise are shown in Table 4-5 below. In the case of non-compliance of Action and/or Limit level, the Event and Action Plan stipulated in the EM&A Manual / shown in Table 4-6 shall be implemented.

Time Period	Action	Limit
0700-1900 hours on normal weekdays	When one documented complaint is received	75 dB(A) for residential premises
		70 dB(A) for school and 65 dB(A) during examination period

**Table 4-5** Action and Limit Levels for Airborne Construction Noise

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
<b>Action Level</b>	<ol style="list-style-type: none"> <li>1. Notify IEC, ER and Contactor</li> <li>2. Carry out investigation</li> <li>3. Report the results of investigation to the IEC, ER and Contactor</li> <li>4. Discuss jointly with the ER and Contactor and formulate remedial measures</li> <li>5. Increase monitoring frequency to check mitigation effectiveness</li> </ol>	<ol style="list-style-type: none"> <li>1. Review the analysed results submitted by the ET</li> <li>2. Review the proposed remedial measures by the Contractor and advise the ER accordingly</li> <li>3. Supervise the implementation of remedial measures</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of failure in writing</li> <li>2. Notify Contractor</li> <li>3. Require Contractor to propose remedial measures for the analysed noise problem</li> <li>4. Ensure remedial measures are properly implemented</li> </ol>	<ol style="list-style-type: none"> <li>1. Submit noise mitigation proposals to ER with copy to IEC and ET</li> <li>2. Implement noise mitigation proposals</li> </ol>
<b>Limit Level</b>	<ol style="list-style-type: none"> <li>1. Notify IEC, ER, EPD and Contractor</li> <li>2. Identify source</li> <li>3. Repeat measurement to confirm findings</li> <li>4. Increase monitoring frequency</li> <li>5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented</li> <li>6. Inform IEC, ER, EPD the causes and actions taken for the</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss amongst ER, ET and Contractor on the potential remedial actions</li> <li>2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly</li> <li>3. Supervise the implementation of remedial measures</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of failure in writing</li> <li>2. Notify Contractor</li> <li>3. Require Contractor to propose remedial measures for the analysed noise problem</li> <li>4. Ensure remedial measures are properly implemented. If exceedance continues, consider what portion of the</li> </ol>	<ol style="list-style-type: none"> <li>1. Take immediate action to avoid further exceedance</li> <li>2. Submit proposals for remedial actions to ER with copy to IEC and ET</li> <li>3. Implement the agreed proposals</li> <li>4. Revise and resubmit proposals if problem</li> </ol>

	<p>exceedances</p> <p>7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results</p> <p>8. If exceedance stops, cease additional monitoring</p>		<p>work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated</p>	<p>still not under control</p> <p>5. Stop the relevant portion of works as determined by the ER until the exceedance is abated</p>
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**Table 4-6** Event and Action Plan for Construction Air-borne Noise Monitoring

## 5. MONITORING RESULT

### 5.1 *Air Quality*

The monitoring schedule is shown in Appendix E. Results of 24-hour TSP level and the graphical presentation of monitoring results are shown in Appendix F.

In the reporting month, no exceedance of 24-hr TSP Action and Limit Level was recorded. Actions stipulated under the Event and Action Plan (Table 9.4 of the EM&A Manual) was implemented for all exceedances and monitoring frequency was increased if exceedance was recorded.

### 5.2 *Noise*

The monitoring schedule is shown in Appendix E. Results of measured noise level, in terms of  $L_{eq(30min)}$  and graphical presentations are presented in Appendix F.

In the reporting month, noise exceedances of air-borne noise Limit Level were recorded at Sorrento (CNM-2) on 26 July 2011 and The Waterfront (CNM-3) on 14, 21 and 28 July 2011.

For the noise exceedance at CNM-2, actions identified in the Event and Action Plan (Table 3.4 of the EM&A Manual) were undertaken. The ER, IEC and Contractors were informed of the exceedance. Upon investigation, the exceedance might possible be due to construction works by the Contractors of 810B. The Contractors were reminded to provide noise mitigation measures to minimize the noise impact.

Regarding to the noise exceedances at The Waterfront (CNM-3), actions identified in the Event and Action Plan (Table 3.4 of the EM&A Manual) were undertaken. The ER, IEC and Contractor were informed of the exceedances. The investigation result revealed that noise source may possibly due to works by 810B Contractor. Additional noise mitigation measures proposed by the

Contractor were reviewed by IEC and ET and implemented on site to minimize the noise impact. Besides, the Contractor was reminded to enhance the noise mitigation measures to comply with the statutory requirement and minimize noise nuisance to the nearby NSRs.

In addition, there was no noise exceedance of Action Level triggered due to no noise complaint during daytime hours received in the reporting month. Please refer to Section 7 for details of complaint.

### 5.3 Waste Management

The quantities of waste disposed from the Project in the reporting month is summarized in the following table:

<b>Reporting Month</b>	<b>Inert C&amp;D <sup>[1]</sup> Materials (tonnes)</b>	<b>Non-inert C&amp;D <sup>[2]</sup> Materials (tonnes)</b>	<b>Chemical Waste (Litre)</b>
<b>Contract 810B<sup>[3]</sup></b>			
July 2011	85.0	1.4	0.0

**Table 5-1** Summary of construction waste generated and disposed

Note:

- [1]. Inert C&D materials include bricks, concrete, building debris, rubble and excavated soil.
- [2]. Non-inert C&D materials include steel, paper / cardboard packaging waste, plastics and other wastes such as general refuse.
- [3]. Alternative disposal sites for inert C&D Material from 810B include Central-Wan Chai Bypass (Typhoon Shelter and HKCEC) and Zhongshan Torch Hi-Tech Zone.

## 6. SITE INSPECTION

Regular site inspections on all environmental aspects under the EM&A Manual were attended by representatives from ET and Contractors. The site inspections were carried out at 810B in West Kowloon and dates are shown in the following table. In addition to the regular site inspections attended by ET and Contractors, monthly IEC environmental audits attended by IEC, ET and Contractors were held on 13 July 2011 in 810B.

<b>Contract</b>	<b>Date of Site Inspections</b>
810B	13/7, 20/7 and 27/7

**Table 6-1** Date of site inspection

All observations have been recorded in the audit checklist and passed to the Contractor together with the appropriate recommended mitigation measures where necessary. The key observations from these site inspections and Contractor's follow-up action are summarized in Table 6-2 below. No non-compliance was observed.

<b>Item</b>	<b>Description</b>	<b>Contractor's Follow-up Action(s) Undertaken</b>
Contract 810B		
1	It was observed that insufficient noise mitigation measures were applied to the equipment at the works areas along Lin Cheung Road.	Acoustic mats have been deployed at the powered mechanical equipments (PMEs) which used along Lin Cheung Road.

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<b>Item</b>	<b>Description</b>	<b>Contractor's Follow-up Action(s) Undertaken</b>
2	It was observed that insufficient air quality control measures were implemented on site apart from the water tanker in general.	The works areas have been regular watered during the dry and windy days. Water sprinklers have been installed along the haul road from barging point to site entrance. Additional water spraying system at excavation / stockpiling areas is planned and implement asap.

**Table 6-2** Summary of site inspections, recommendations and follow-up actions

## **7. NON-COMPLIANCE AND DEFICIENCY**

### **7.1 *Summary of Complaint***

For this reporting month, there was no environmental complaint was referred from EPD. The total number of environmental complaints was 0 since commencement of the construction. The complaints were handled in accordance to the EM&A Manual and relevant parties including the Engineer's Representative and IEC were informed when complaint receives.

### **7.2 *Summary of Exceedance***

In the reporting month, noise exceedances of air-borne noise Limit Level were recorded at Sorrento (CNM-2) on 26 July 2011 and The Waterfront (CNM-3) on 14, 21 and 28 July 2011.

For the noise exceedance at CNM-2, actions identified in the Event and Action Plan (Table 3.4 of the EM&A Manual) were undertaken. The ER, IEC and Contractors were informed of the exceedance. Upon investigation, the exceedance might possible be due to construction works by the Contractors of 810B. The Contractors were reminded to provide noise mitigation measures to minimize the noise impact.

Regarding to the noise exceedances at The Waterfront (CNM-3), actions identified in the Event and Action Plan (Table 3.4 of the EM&A Manual) were undertaken. The ER, IEC and Contractor were informed of the exceedances. The investigation result revealed that noise source may possibly due to works by 810B Contractor. Additional noise mitigation measures proposed by the Contractor were reviewed by IEC and ET and implemented on site to minimize the noise impact. Besides, the Contractor was reminded to enhance the noise mitigation measures to comply with the statutory requirement and minimize noise nuisance to the nearby NSRs.

In addition, there was no noise exceedance of Action Level triggered due to no noise complaint during daytime hours received in the reporting month. Please refer to Section 7.1 above for details.



In the reporting month, no exceedance of 24-hr TSP Action Level was recorded. Actions stipulated under the Event and Action Plan (Table 9.4 of the EM&A Manual) would be implemented for the exceedance and monitoring frequency was increased if applicable.

### ***7.3 Summary of Notification of Summons, Prosecutions, Non-compliance and Corrective Actions***

In the reporting period, no warning, summons and non-compliance was received by MTRCL and the Contractor of 810B.

## 8. FUTURE KEY ISSUES

### 8.1 *Construction Works in Coming Months*

Works to be undertaken for the following months are summarized below. The works presented below is tentative and subject to change in actual construction programme.

<b><i>Contract 810B</i></b>
Bore piling, Pre-drilling, Construction of temporary traffic deck

**Table 8-1** Summary of construction works in coming months

According to the latest programme, civil construction would be continued in coming month. Impact monitoring would be continued according to the construction programme.

### 8.2 *Monitoring Schedule for Next Month*

The tentative schedule of TSP and noise monitoring for the next reporting period is presented in Appendix E.

## 9. CONCLUSIONS

The Report presents the results of EM&A works and the impact monitoring for the construction works of the Roadworks under the XRL project undertaken during the period of 8 July 2011 to 31 July 2011. The major construction activities in the reporting period included foundation works in the West Kowloon Works Areas.

Impact monitoring for air quality and noise were conducted in accordance with the EM&A Manual in the reporting period. There was no Action Level exceedance in airborne noise monitoring in the reporting month. Exceedances of Limit Level in airborne noise monitoring were recorded at Sorrento (CNM-2) and The Waterfront (CNM-3).

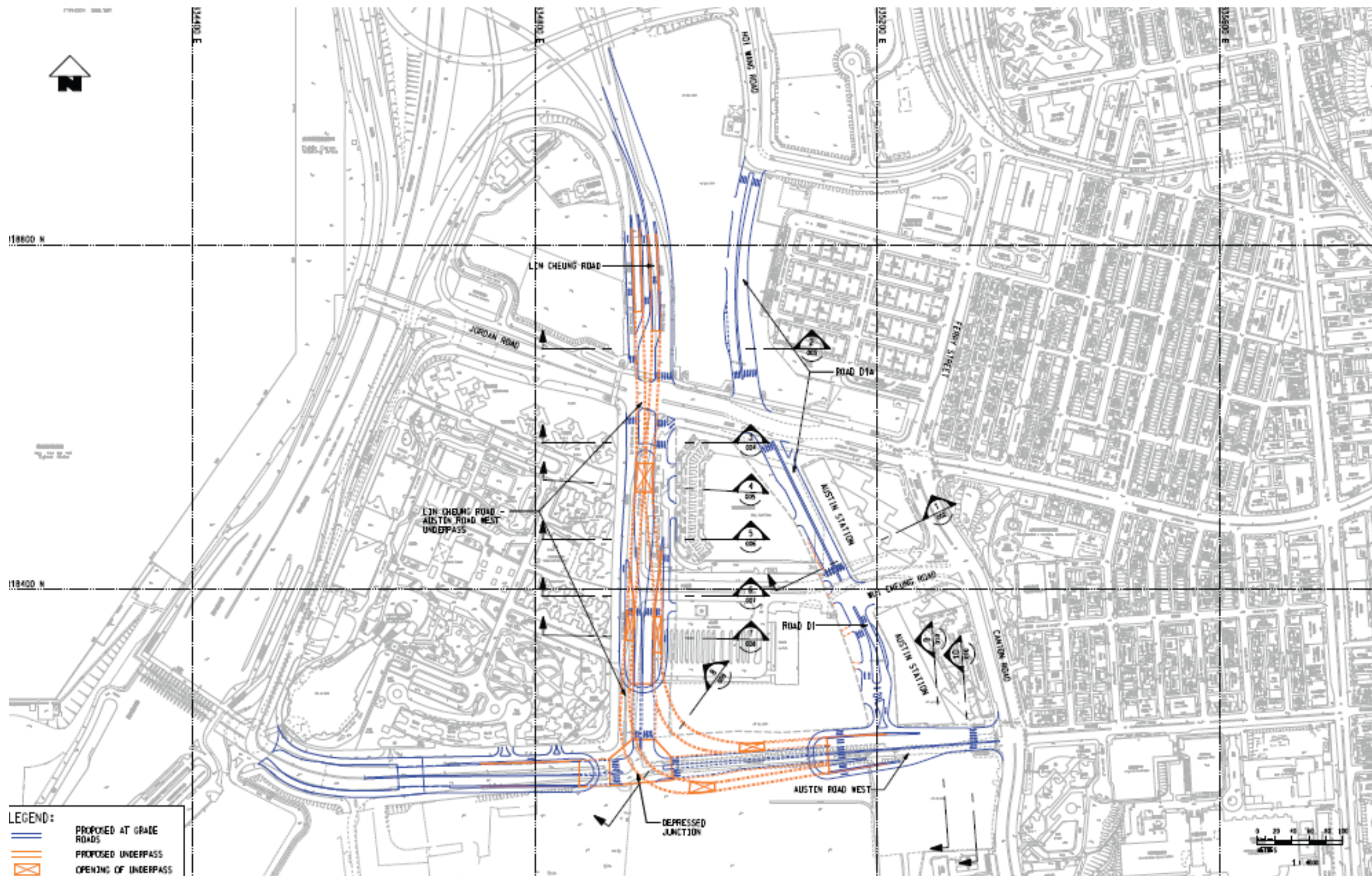
No exceedance of 24-hour TSP Action and Limit Level were recorded in the reporting month.

No complaints, warning, summons and non-compliance was received for the Roadworks in the reporting month. If complaint was received, it should be handled in accordance with the procedures stipulated in the EM&A Manual and investigation would be carried out in accordance with the EM&A Manual.

Site inspections were conducted regularly to monitor proper implementation of environmental pollution control and mitigation measures for the Project. The ET would continue the implementation of the environmental monitoring and audit programme in accordance to the EM&A Manual and to a level consistent with MTRCL's Corporate Sustainability Policy.

Appendix A

Works Area



WORKS AREA for ROAD WORKS

## Appendix B

# Project Management Organization and Contacts of Key Personnel

Title	Name	Telephone
<b>Engineer's Representative</b>		
Construction Manager (810 B)	Mr. KS Lim	3575 5723
Senior Construction Engineer (810 B)	Mr. Alex Ma	2926 9169
<b>Independent Environmental Checker</b>		
Divisional Manager	Dr. Anne Kerr	2828 5793
<b>Environmental Team</b>		
Environmental Team Leader	Mr. Glenn Frommer	2688 1552
Deputy Environmental Team Leader	Mr. Richard Kwan	2688 1179
<b>Contractor</b>		
Contract 810B Contractor		
Project Director	Mr. Smollett LEE	6629 4441
Environmental Manger	Mr. Calvin SZE	9205 9277

# Appendix C

## Implementation Status



**Appendix C IMPLEMENTATION SCHEDULE OF THE RECOMMENDED MITIGATION MEASURES****Table C.1 Implementation Schedule for Noise Control (Construction Phase)**

<b>EIA Ref<sup>#</sup></b>	<b>Environmental Protection Measures / Mitigation Measures</b>	<b>Objectives of the Recommended Measures &amp; Main Concern to Address</b>	<b>Who to implement the measures?</b>	<b>When to implement the measures?</b>	<b>Implementation Status</b>
3.53 – 3.54	<p>The following quiet PME should be used:</p> <ul style="list-style-type: none"> <li>▪ Pneumatic breaker (SWL=110dB(A))</li> <li>▪ Tracked Excavator Fitted with Hydraulic Breaker (SWL=110dB(A))</li> <li>▪ Truck Mixer (SWL=100dB(A))</li> <li>▪ Tracked Crane (SWL=101dB(A))</li> <li>▪ Dump Truck (SWL=103dB(A))</li> <li>▪ Tracked Excavator/Loader (SWL=105dB(A))</li> <li>▪ Dozer (SWL=111dB(A))</li> <li>▪ Road Roller (SWL=101dB(A))</li> </ul>	To reduce the construction air-borne noise impact.	Contractor	Throughout the whole construction phase	Planned to implement.
3.55	Use of movable noise barriers, acoustic mats and acoustic sheds for excavator, hand-held pneumatic chipper and etc.	To reduce the construction air-borne noise impact.	MTR / Contractor	Throughout the whole construction phase	Planned to implement.

EIA Ref#	Environmental Protection Measures / Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	When to implement the measures?	Implementation Status
3.57	<p>Good Site Practice:</p> <ul style="list-style-type: none"> <li>▪ Only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction program;</li> <li>▪ Silencers or mufflers on construction equipment should be utilized and should be properly maintained during the construction programme;</li> <li>▪ Mobile plant, if any, should be sited as far from noise sensitive receivers (NSRs) as possible;</li> <li>▪ Machines and plant (such as trucks) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum;</li> <li>▪ Plant known to emit noise strongly in one direction should, wherever possible, be orientated so that the noise is directed away from the nearby NSRs;</li> </ul>	To reduce the construction air-borne noise impact.	MTR / Contractor	Throughout the whole construction phase	To be implemented as per construction programme.

EIA Ref <sup>#</sup>	Environmental Protection Measures / Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	When to implement the measures?	Implementation Status
	and <ul style="list-style-type: none"><li>▪ Material stockpiles and other structures should be effectively utilized, wherever practicable, in screening noise from on-site construction activities.</li></ul>				

**Table C.2 Implementation Schedule for Air Quality Control (Construction Phase)**

EIA Ref#	Environmental Protection Measures / Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	When to implement the measures?	Implementation Status
Table 4.6	The excavation and sandfill areas limited to 30% actively operating and complete watering coverage of these active areas eight times a day.	To reduce the construction air-borne noise impact.	Contractor	Throughout the whole construction phase	To be implemented as per construction programme.
4.77	<p>Implementation of dust suppression measures stipulated in the Air Pollution Control (Construction Dust) Regulation.</p> <ul style="list-style-type: none"> <li>▪ Skip hoist for material transport should be totally enclosed by impervious sheeting.</li> <li>▪ Every vehicle should be washed to remove any dusty materials from its body and wheels before leaving the construction site.</li> <li>▪ The area where vehicle washing takes place and the section of the road between the washing facilities and the exit point should be paved with concrete, bituminous materials or hardcore.</li> <li>▪ Where a site boundary</li> </ul>	To reduce the construction air-borne noise impact.	Contractor	Throughout the whole construction phase	Implemented.

EIA Ref#	Environmental Protection Measures / Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	When to implement the measures?	Implementation Status
	<p>adjoins a road, streets or other accessible to the public, hoarding of not less than 2.4m high from ground level should be provided along the entire length except for a site entrance or exit.</p> <ul style="list-style-type: none"> <li>▪ Every stack of more than 20 bags of cement should be placed in an area sheltered on the top and the 3 sides and be covered entirely by impervious sheeting.</li> <li>▪ All dusty materials should be sprayed with water prior to any loading, unloading or transfer operation so as to maintain the dusty materials wet.</li> <li>▪ The height from which excavated materials are dropped should be controlled to a minimum practical height to limit fugitive dust generation from falling and landing.</li> <li>▪ The load of dusty materials carried by vehicle leaving a construction site should</li> </ul>				

EIA Ref <sup>#</sup>	Environmental Protection Measures / Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	When to implement the measures?	Implementation Status
	<p>be covered entirely by clean impervious sheeting to ensure dust materials do not spread from the vehicle.</p> <ul style="list-style-type: none"> <li>▪ Instigation of an environmental monitoring and auditing program to monitor the construction process in order to enforce controls and modify method of work if dusty conditions arise.</li> </ul>				

**Table C.3 Implementation Schedule for Water Quality Control (Construction Phase)**

EIA Ref #	Environmental Protection Measures / Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	When to implement the measures?	Implementation Status
5.30 -5.42	General Construction Activities and Construction site run-off: <ul style="list-style-type: none"> <li>▪ The mitigation measures as outlined in the ProPECC PN 1/94 Construction Site Drainage should be adopted where applicable.</li> </ul>	To control water quality impact from construction site runoff and general construction activities.	Contractor	Throughout the whole construction phase	Implemented.
5.43	Effluent Discharge <ul style="list-style-type: none"> <li>▪ There is a need to apply to EPD for a discharge licence for discharge of effluent from the construction site under the WPCO. The discharge quality should meet the requirements specified in the discharge licence. Minimum distances of 100 m should be maintained between the discharge points of construction site effluent and the existing seawater intakes. If monitoring of the treated effluent quality from the works areas is required during the construction phase of the Project, the</li> </ul>	To control water quality impact from construction site runoff and general construction activities.	Contractor	Throughout the whole construction phase	Implemented.

EIA Ref <sup>#</sup>	Environmental Protection Measures / Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	When to implement the measures?	Implementation Status
	monitoring should be carried out in accordance with the relevant WPCO licence which is under the ambit of regional office (RO) of EPD.				
5.44	Groundwater <ul style="list-style-type: none"> <li>▪ No contaminated groundwater is anticipated in the works areas. Appropriate measures will be deployed to minimize the intrusion of groundwater into excavation works areas. In case seepage of uncontaminated groundwater occurs, groundwater should be pumped out from the works areas and discharged into the storm system via silt removal facilities. Groundwater from dewatering process should also be discharged into the storm system via silt traps.</li> </ul>	To control water quality impact from construction site runoff and general construction activities.	Contractor	Throughout the whole construction phase	To be implemented as per construction programme.
5.45 -5.47	Accidental Spillage <ul style="list-style-type: none"> <li>▪ Contractor must register as a chemical waste producer if chemical wastes would be</li> </ul>	To control water quality impact from construction site runoff and general construction activities.	Contractor	Throughout the whole construction phase	Implemented.



EIA Ref#	Environmental Protection Measures / Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	When to implement the measures?	Implementation Status
	<p>produced from the construction activities. The Waste Disposal Ordinance (Cap 354) and its subsidiary regulations in particular the Waste Disposal (Chemical Waste) (General) Regulation should be observed and complied with for control of chemical wastes.</p> <ul style="list-style-type: none"> <li>▪ Any service shop and maintenance facilities should be located on hard standings within a bunded area, and sumps and oil interceptors should be provided. Maintenance of vehicles and equipment involving activities with potential for leakage and spillage should only be undertaken within the areas appropriately equipped to control these discharges.</li> <li>▪ Disposal of chemical wastes should be carried out in compliance with the Waste Disposal Ordinance. The Code of Practice on the</li> </ul>				

EIA Ref#	Environmental Protection Measures / Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	When to implement the measures?	Implementation Status
	<p>Packaging, Labelling and Storage of Chemical Wastes published under the Waste Disposal Ordinance details the requirements to deal with chemical wastes. General requirements are given as follows:</p> <ul style="list-style-type: none"> <li>➤ Suitable containers should be used to hold the chemical wastes to avoid leakage or spillage during storage, handling and transport.</li> <li>➤ Chemical waste containers should be suitably labelled, to notify and warn the personnel who are handling the wastes, to avoid accidents.</li> <li>➤ Storage area should be selected at a safe location on site and adequate space should be allocated to the storage area.</li> </ul>				
5.48 - 5.49	Sewage Effluent from Construction Workforce	To control water quality impact from construction site runoff	Contractor	Throughout the whole construction	Implemented.

EIA Ref#	Environmental Protection Measures / Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	When to implement the measures?	Implementation Status
	<ul style="list-style-type: none"> <li>▪ Sufficient chemical toilets should be provided in the works areas. A licensed waste collector should be deployed to clean the chemical toilets on a regular basis.</li> <li>▪ Notices should be posted at conspicuous locations to remind the workers not to discharge any sewage or wastewater into the nearby environment. Regular environmental audit of the construction site will provide an effective control of any malpractices and can encourage continual improvement of environmental performance on site. It is anticipated that sewage generation during the construction phase of the project would not cause water pollution problem after undertaking all required measures.</li> </ul>	and general construction activities.		phase	

**Table C.4 Implementation Schedule for Waste Management (Construction Phase)**

EIA Ref#	Environmental Protection Measures / Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	When to implement the measures?	Implementation Status
6.47	<p>All waste materials should be segregated into categories covering:</p> <ul style="list-style-type: none"> <li>▪ Excavated materials suitable for reuse;</li> <li>▪ Inert C&amp;D materials for disposal off-site;</li> <li>▪ Non-inert C&amp;D materials for disposal at landfills;</li> <li>▪ Chemical waste; and</li> <li>▪ General refuse.</li> </ul>	To implement on-site sorting facilitating reuse and recycling of materials as well as proper disposal of waste.	Contractor	Throughout the whole construction phase	Implemented.
6.50	<p>Recommendations for good site practices during the construction activities include:</p> <ul style="list-style-type: none"> <li>▪ Training of site personnel in, site cleanliness, proper waste management and chemical handling procedures;</li> <li>▪ Provision of sufficient waste disposal points and regular collection of waste;</li> <li>▪ Appropriate measures to minimize windblown litter and dust during transportation of waste by</li> </ul>	To implement on-site sorting facilitating reuse and recycling of materials as well as proper disposal of waste.	Contractor	Throughout the whole construction phase	Implemented.

EIA Ref#	Environmental Protection Measures / Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	When to implement the measures?	Implementation Status
	<p>either covering trucks or by transporting wastes in enclosed containers;</p> <ul style="list-style-type: none"> <li>▪ Regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors; and</li> <li>▪ Separation of chemical wastes for special handling and appropriate treatment.</li> </ul>				
6.51	<p>Recommendations for waste reduction measures include:</p> <ul style="list-style-type: none"> <li>▪ Sorting of demolition debris and excavated materials from demolition works to recover reusable/ recyclable portions (i.e. soil, broken concrete, metal etc.);</li> <li>▪ Segregation and storage of different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal;</li> <li>▪ Encourage collection of aluminium cans by providing separate labelled bins to enable this waste to be segregated from other</li> </ul>	To implement on-site sorting facilitating reuse and recycling of materials as well as proper disposal of waste	Contractor	Throughout the whole construction phase	To be implemented as per construction programme.

EIA Ref#	Environmental Protection Measures / Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	When to implement the measures?	Implementation Status
	<p>general refuse generated by the workforce;</p> <ul style="list-style-type: none"> <li>▪ Proper storage and site practices to minimize the potential for damage or contamination of construction materials;</li> <li>▪ Plan and stock construction materials carefully to minimize amount of waste generated and avoid unnecessary generation of waste; and</li> <li>▪ Training should be provided to workers about the concepts of site cleanliness and appropriate waste management procedures, including waste reduction, reuse and recycle.</li> </ul>				
6.52	<p>The Contractor should prepare and implement a Waste Management Plan (WMP) as a part of the Environmental Management Plan (EMP) in accordance with ETWB TCW No. 19/2005 which describes the arrangements for avoidance, reuse, recovery, recycling, storage, collection, treatment and disposal of different categories of waste to be generated from the</p>	<p>To keep trace of the generation, minimization, reuse and disposal of C&amp;D materials in the Project</p>	Contractor	Throughout the whole construction phase	To be implemented as per construction programme.

EIA Ref#	Environmental Protection Measures / Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	When to implement the measures?	Implementation Status
	construction activities.				
6.56	In order to monitor the disposal of C&D materials and to control fly-tipping at PFRFs or landfills, a trip-ticket system should be established in accordance with ETWB TCW No. 31/2004. A recording system for the amount of waste generated, recycled and disposed, including the disposal sites, should also be set up. Warning signs should be put up and close-circuited television should be installed at the vehicular accesses to remind the designated disposal sites and prevent fly-tipping.	To monitor disposal of waste and control fly-tipping	Contractor	Throughout the whole construction phase	Implemented.
6.58	Wheel wash facilities have to be provided before the trucks leave the works area. This can reduce the introduction of dust to the public road network.	To minimise the dust impact	Contractor	Throughout the whole construction phase	Implemented.
6.59	Wet spoil generated from the construction of pipe pile and diaphragm wall should be treated before disposal at PFRFs. With the agreement from Fill Management Department (FMD) of CEDD, wet spoil would be mixed with dry materials to reduce water	To meet the requirement for disposal at landfill	Contractor	Throughout the whole construction phase	Implemented.

EIA Ref#	Environmental Protection Measures / Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	When to implement the measures?	Implementation Status
	content to less than 25% dry density before disposal, which reduce the impacts to the reception facilities.				
6.60	The waste delivered to landfill should not contain any free water or have water content more than 70% by weight. Concerning the requirement on the truck load of waste to landfill, the haulier must ensure suitable amount of waste would be loaded on different types of trucks used.	To meet the requirement for disposal at landfill	Contractor	Throughout the whole construction phase	Implemented.
6.61	If chemical wastes are produced at the construction site, the Contractor would be required to register with the EPD as a chemical waste producer and to follow the guidelines stated in the <i>Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes</i> .	To properly store the chemical waste within works areas	Contractor	Throughout the whole construction phase	Implemented.
6.64	A trip-ticket system should be operated in accordance with the <i>Waste Disposal (Chemical Waste) (General) Regulation</i> to monitor all movements of chemical waste. The Contractor should employ a licensed collector to transport and dispose of the chemical wastes, to either the approved CWTC at Tsing Yi, or another	To monitor the generation, reuse and disposal of chemical waste	Contractor	Throughout the whole construction phase	Implemented.



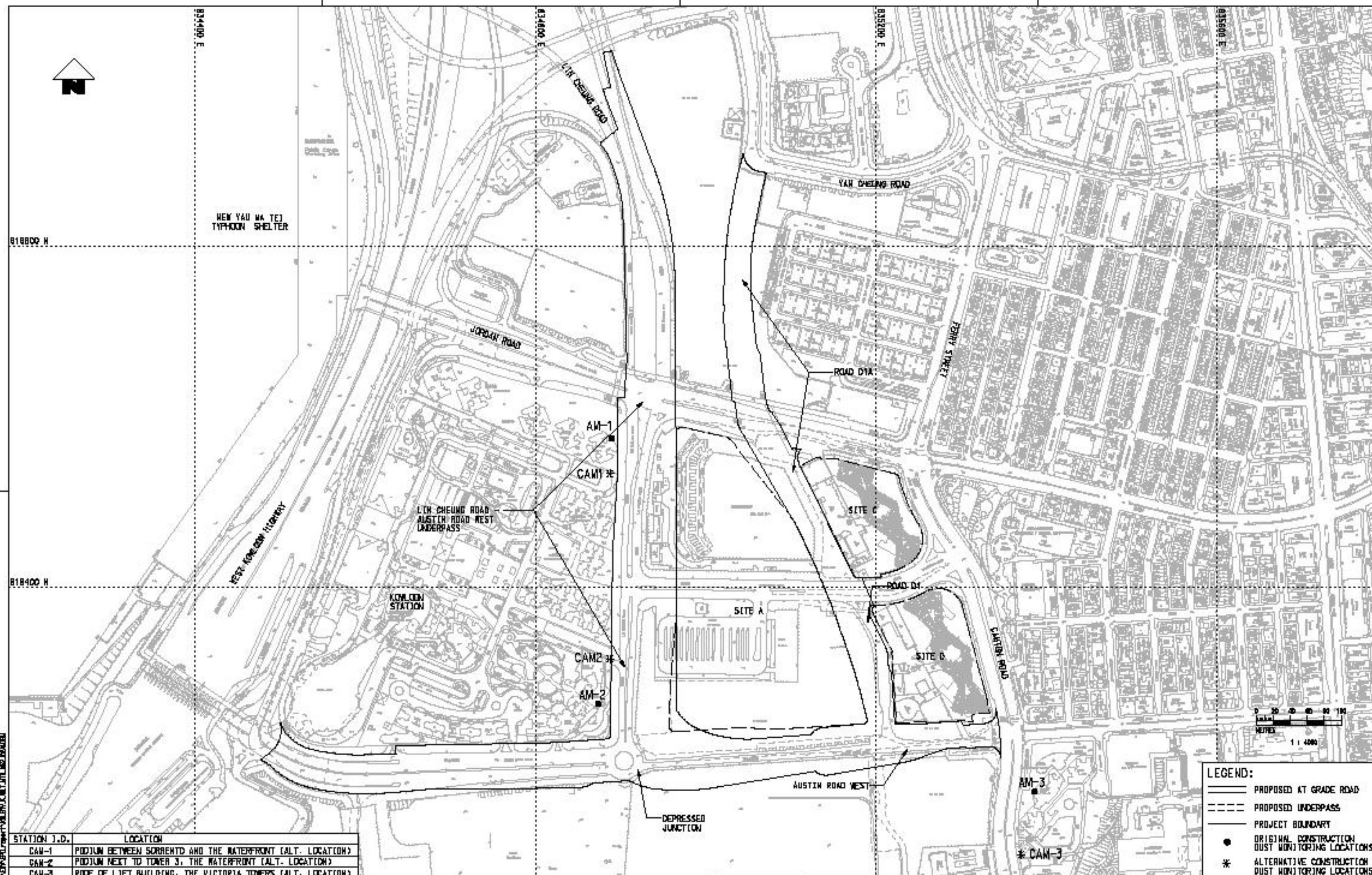
EIA Ref#	Environmental Protection Measures / Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	When to implement the measures?	Implementation Status
	licensed facility, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.				
6.65	General refuse should be stored in enclosed bins or compaction units separate from C&D materials and chemical waste. A reputable waste collector should be employed by the contractor to remove general refuse from the site, separately from C&D materials and chemical wastes. Preferably, an enclosed and covered area should be provided to reduce the occurrence of wind blown light material.	To properly store and separate from other C&D materials for subsequent collection and disposal	Contractor	Throughout the whole construction phase	Implemented.
6.66	The recyclable component of general refuse, such as aluminium cans, paper and cleansed plastic containers should be separated from other waste. Provision and collection of recycling bins for different types of recyclable waste should be set up by the Contractor. The Contractor should also be responsible for arranging recycling companies to collect these materials. The non-recyclable components should be collected by licensed collectors employed	To facilitate recycling of recyclable portions of refuse	Contractor	Throughout the whole construction phase	Implemented.

EIA Ref#	Environmental Protection Measures / Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	When to implement the measures?	Implementation Status
	by the Contractor on daily basis to avoid any adverse impacts on storage of refuse, which would be disposed of at designated landfills.				
6.67	The Contractor should carry out an education programme for workers in avoiding, reducing, reusing and recycling of materials generation. Posters and leaflets advising on the use of the bins should also be provided in the sites as reminders.	To raise workers' awareness on recycling issue	Contractor	Throughout the whole construction phase	Implemented.

**Table C.5 Implementation Schedule for Landscape and Visual (Construction Phase)**

<b>EIA Ref#</b>	<b>Environmental Protection Measures / Mitigation Measures</b>	<b>Objectives of the Recommended Measures &amp; Main Concern to Address</b>	<b>Who to implement the measures?</b>	<b>When to implement the measures?</b>	<b>Implementation Status</b>
Table 7.4	Topsoil, where identified, should be stripped and stored for re-use in the construction of the soft landscape works.	To minimize landscape and visual impacts during construction phase	Contractor	Throughout the whole construction phase	Implemented.
Table 7.4	Existing trees to be retained on site should be carefully protected during construction.	To minimize landscape and visual impacts during construction phase	Contractor	Throughout the whole construction phase	Implemented.
Table 7.4	Tree unavoidably to be affected by the works should be considered for transplanting in accordance with ETWB TCW No. 3/2006 - Tree Preservation and maintained until end of the establishment period. Detailed tree transplanting proposal should be submitted to seek relevant government department's approval in detailed design stage.	To minimize landscape and visual impacts during construction phase	Contractor	Throughout the whole construction phase	Implemented.
Table 7.4	Compensatory tree planting provided to compensate for felled trees and maintained until end of the establishment period.	To minimize landscape and visual impacts during construction phase	Contractor	Throughout the whole construction phase	Implemented.
Table 7.4	Control of night-time lighting glare	To minimize landscape and visual impacts during construction phase	Contractor	Throughout the whole construction phase	Implemented.
Table 7.4	Erection of decorative screen hoarding compatible with the surrounding setting.	To minimize landscape and visual impacts during construction phase	Contractor	Throughout the whole construction phase	Implemented.

Appendix D  
Monitoring Locations



**LEGEND:**

- PROPOSED AT GRADE ROAD
- - - PROPOSED UNDERPASS
- PROJECT BOUNDARY
- ORIGINAL CONSTRUCTION DUST MONITORING LOCATIONS
- \* ALTERNATIVE CONSTRUCTION DUST MONITORING LOCATIONS

STATION I.D.	LOCATION
CAM-1	PODIUM BETWEEN SORRENTO AND THE WATERFRONT (ALT. LOCATION)
CAM-2	PODIUM NEXT TO TOWER 3, THE WATERFRONT (ALT. LOCATION)
CAM-3	ROOF OF LEFT BUILDING, THE VICTORIA TOWERS (ALT. LOCATION)

NO.	DESCRIPTION	BY	DATE	APPROVED BY
A1	FIRST DRAFT			

DRAWN	YCC
DESIGNED	
CHECKED	MC
APPROVED	
DATE	03/APR/2011

**MTR**

**EXPRESS RAIL LINK**

PROJECTS DIVISION | SUSTAINABILITY DEVELOPMENT DEPARTMENT

FILE NO. XRL/ENV/L/WKT/MTR/M62/102A1.DWG

TITLE	ROADWORKS AT WEST KOWLOON LOCATIONS OF CONSTRUCTION DUST MONITORING STATIONS
SCALE	1:4000 @ A1
REVISION NO.	XRL/ENV/L/WKT/MTR/M62/102
REV	A1

1. This drawing is the property of the MTR Corporation Limited. It is to be used only for the project and site specified. It is not to be used for any other purpose without the written consent of the MTR Corporation Limited.

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**LEGEND:**

ID NO.	NOISE MONITORING STATION
CNM - 1	MAN CHEONG STREET REFUSE STATION (ALTERNATIVE LOCATION)
CNM - 2	TOWER 6, SORRENTO
CNM - 3	PODIUM NEXT TO TOWER 3, THE WATERFRONT (ALTERNATIVE LOCATION)
CNM - 4	TOWER 2, THE HARBOUR SIDE

**LEGEND:**

- PROPOSED AT GRADE ROAD
- PROPOSED UNDERPASS
- PROJECT BOUNDARY
- 300m STUDY AREA
- ORIGINAL CONSTRUCTION NOISE MONITORING LOCATIONS
- ALTERNATIVE NOISE MONITORING LOCATION

REV	DESCRIPTION	BY	DATE	APPROVED
A1	FIRST DRAFT	YCC	19MAY11	

REV	DESCRIPTION	BY	DATE	APPROVED
A1	FIRST DRAFT	YCC	19MAY11	

DRAWN	YCC
DESIGNED	
CHECKED	MC
APPROVED	
DATE	03/MAY/2011

**MTR**

**EXPRESS RAIL LINK**

ORIGINATOR  
**PROJECTS DIVISION** | **SUSTAINABILITY DEVELOPMENT DEPARTMENT**

CADD REF. XRLNV\_K\_WKT\_MTR\_M52\_101A1.DGN

TITLE	<b>ROADWORK AT WEST KOWLOON LOCATION OF CONSTRUCTION NOISE MONITORING STATION</b>	
SCALE	1:6000 @ A3	
DRAWING NO.	XRLNV/K/WKT/MTR/M52/101	
REV.	A1	

Appendix E  
Monitoring Schedule

## Actual Construction Dust (24-hr TSP) and Air-borne Noise Impact Monitoring Schedule - July 2011

Notes: **TSP** denotes Total Suspended Particulates

Jul-2011						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1					1	2
3	4	5	6	7	8	9
10	11	12 CAM-1, CAM-2, CAM-3	13	14 CNM-1, CNM-2, CNM-3	15	16
17	18 CAM-1, CAM-2, CAM-3	19 CNM-1, CNM-2, CNM-3	20	21	22	23 CAM-1, CAM-2, CAM-3
24	25	26 CNM-1, CNM-2, CNM-3	27	28	29 CAM-1, CAM-2, CAM-3	30
31						



## Tentative Construction Dust (24-hr TSP) and Air-borne Noise Impact Monitoring Schedule - August 2011

Notes: **TSP** denotes Total Suspended Particulates

<b>Aug-2011</b>						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1	2	3	4 CAM-1, CAM-2, CAM-3	5 CNM-1, CNM-2, CNM-3	6
7	8	9	10 CAM-1, CAM-2, CAM-3	11	12 CNM-1, CNM-2, CNM-3	13
14	15	16 CAM-1, CAM-2, CAM-3	17	18	19 CNM-1, CNM-2, CNM-3	20
21	22 CAM-1, CAM-2, CAM-3	23	24	25	26 CNM-1, CNM-2, CNM-3	27 CAM-1, CAM-2, CAM-3
28	29	30	31			

Appendix F  
Graphical Plots of  
Monitoring Results

## APPENDIX F: Air Quality Monitoring Results - 24-hour TSP Monitoring

### - CAM-1

Date	24-hour TSP Monitoring Results	Action Level	Limit Level
	( $\mu\text{g}/\text{m}^3$ )	( $\mu\text{g}/\text{m}^3$ )	( $\mu\text{g}/\text{m}^3$ )
12-Jul-11	35.2	168.8	260.0
18-Jul-11	30.4	168.8	260.0
23-Jul-11	18.8	168.8	260.0
29-Jul-11	42.5	168.8	260.0

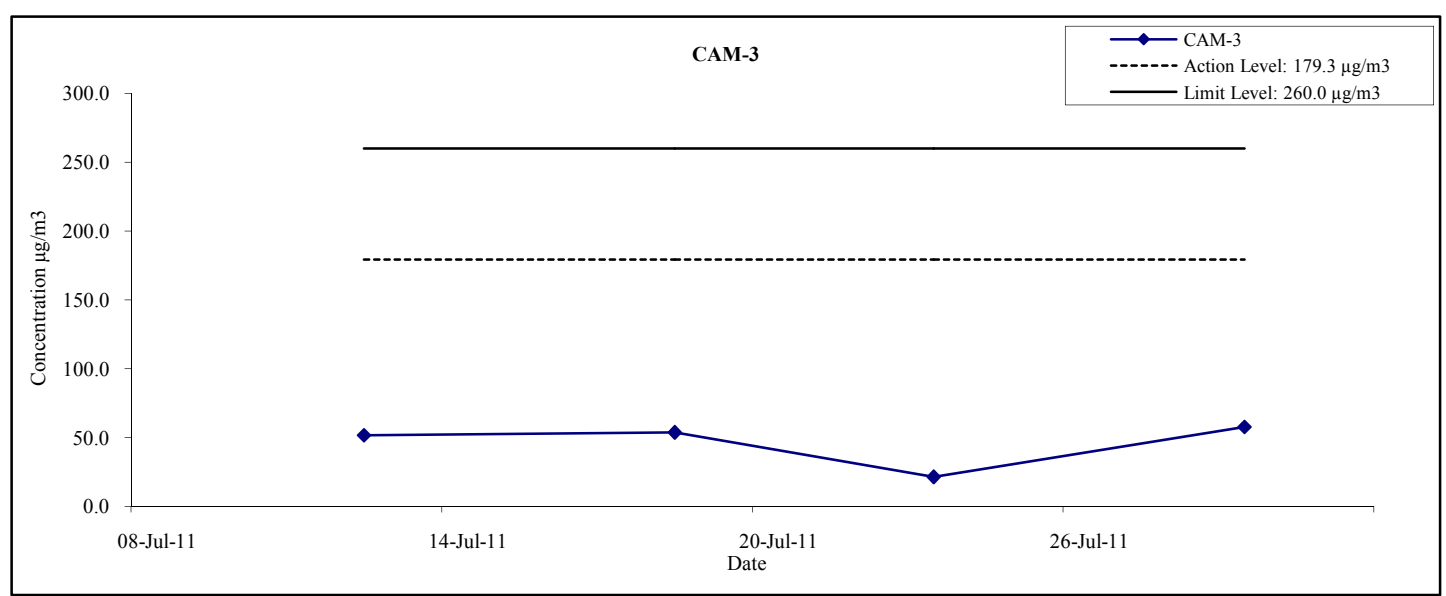
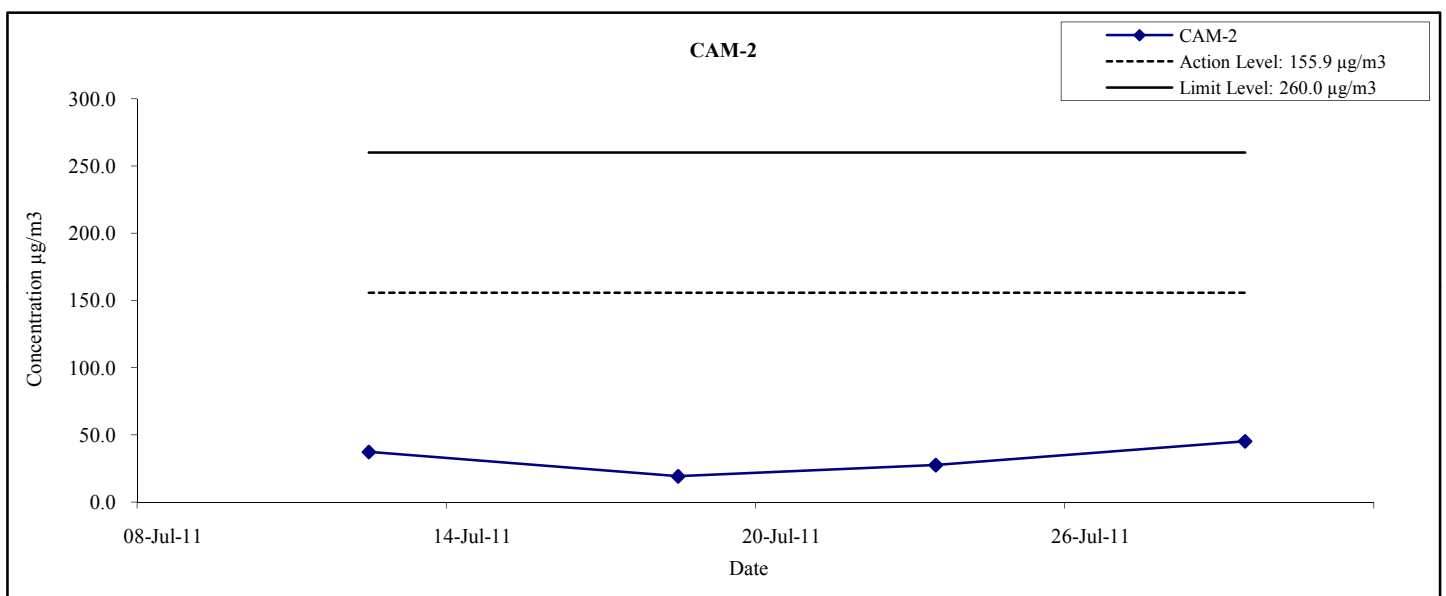
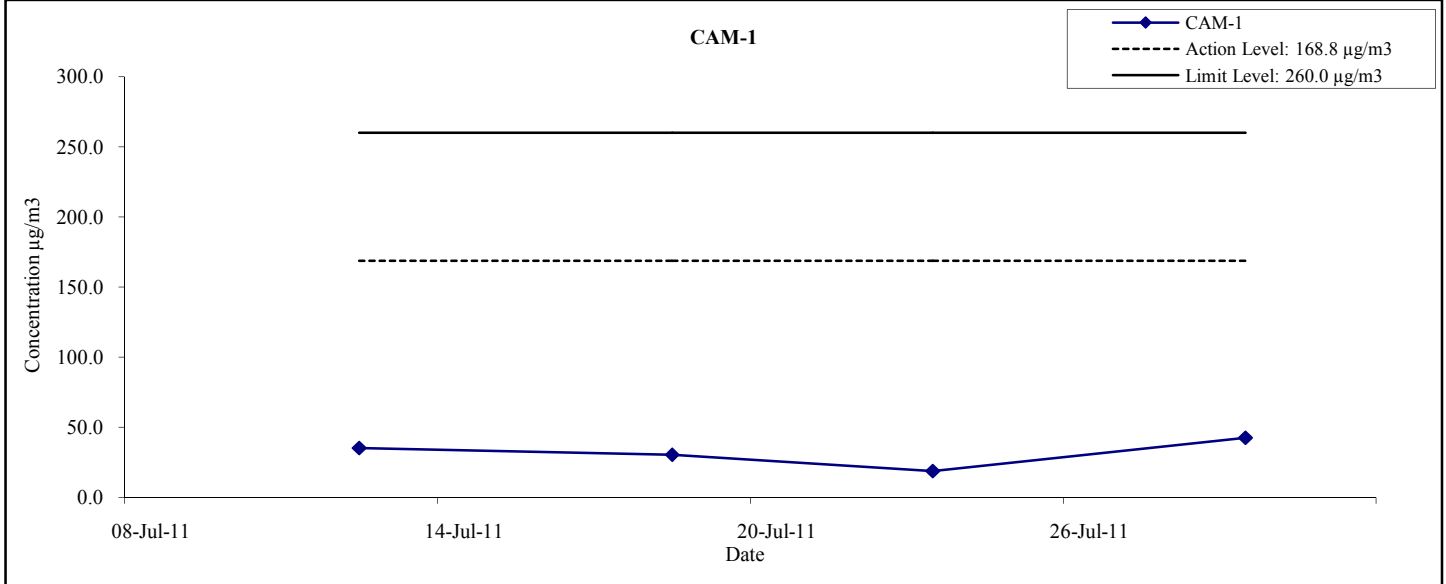
### - CAM-2

Date	24-hour TSP Monitoring Results	Action Level	Limit Level
	( $\mu\text{g}/\text{m}^3$ )	( $\mu\text{g}/\text{m}^3$ )	( $\mu\text{g}/\text{m}^3$ )
12-Jul-11	37.4	155.9	260.0
18-Jul-11	19.3	155.9	260.0
23-Jul-11	27.7	155.9	260.0
29-Jul-11	45.4	155.9	260.0

### - CAM-3

Date	24-hour TSP Monitoring Results	Action Level	Limit Level
	( $\mu\text{g}/\text{m}^3$ )	( $\mu\text{g}/\text{m}^3$ )	( $\mu\text{g}/\text{m}^3$ )
12-Jul-11	51.7	179.3	260.0
18-Jul-11	53.7	179.3	260.0
23-Jul-11	21.3	179.3	260.0
29-Jul-11	57.7	179.3	260.0

Remark:      **Bold value** indicated an Action level exceedance  
                  **Bold & Italic value** indicated an Limit level exceedance



	Hong Kong Section of Guangzhou-Shenzhen-Hong Kong Express Rail Link	Date	Jul-11
	<b>Graphical Presentation of 24-hour TSP Monitoring Results for Location CAM-1, CAM-2 and CAM-3</b>	APPENDIX	F

## APPENDIX F: Noise Monitoring Results

### - CNM-1

Date	Noise Monitoring Results	Limit Level	Exceedance?
	Leq, dB(A)	Leq, dB(A)	
14/07/2011	69	75	N
19/07/2011	69	75	N
26/07/2011	69	75	N

### - CNM-2

Date	Noise Monitoring Results	Limit Level	Exceedance?
	Leq, dB(A)	Leq, dB(A)	
14/07/2011	75	75	N
19/07/2011	74	75	N
26/07/2011	77	75	Y

### - CNM-3

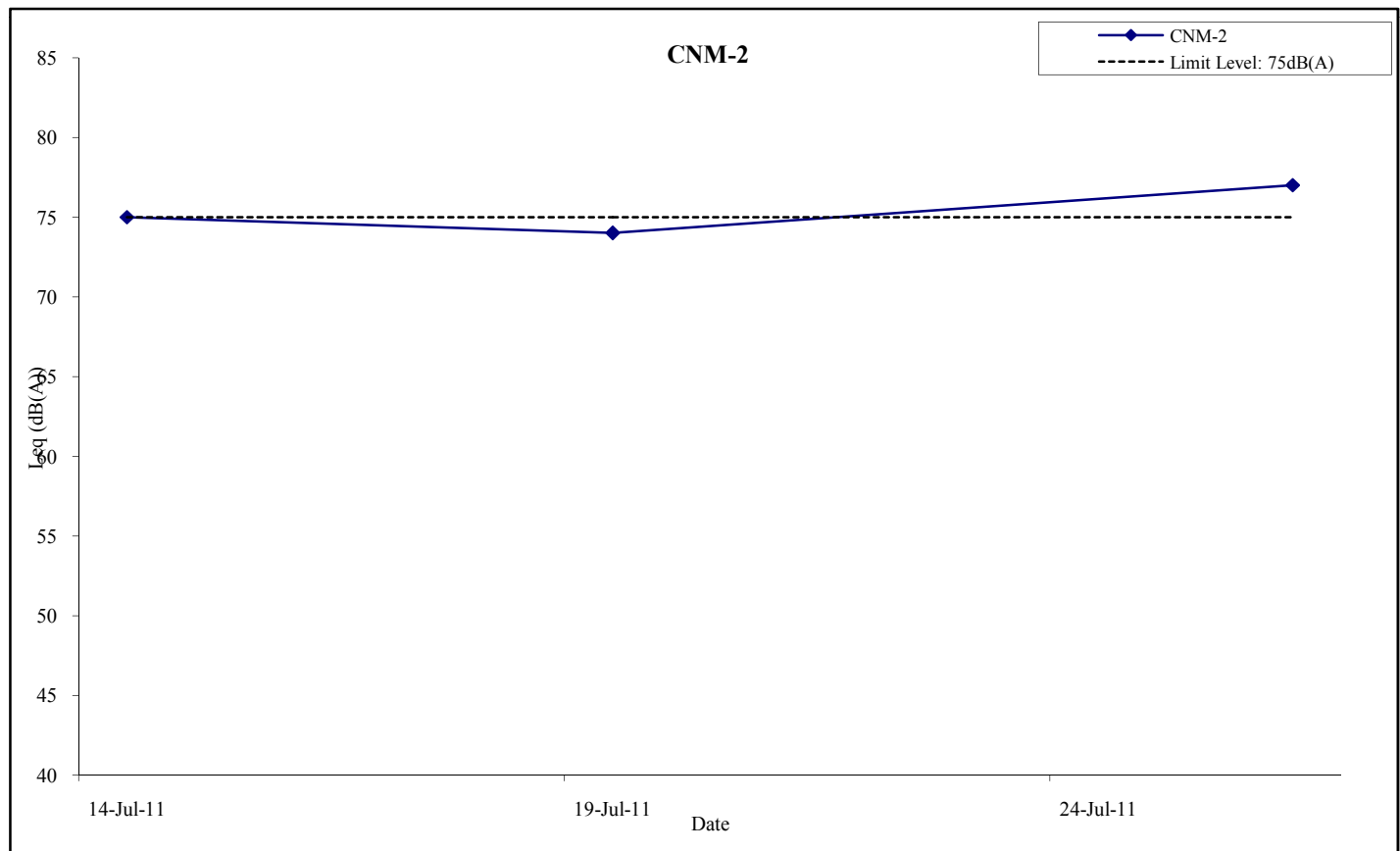
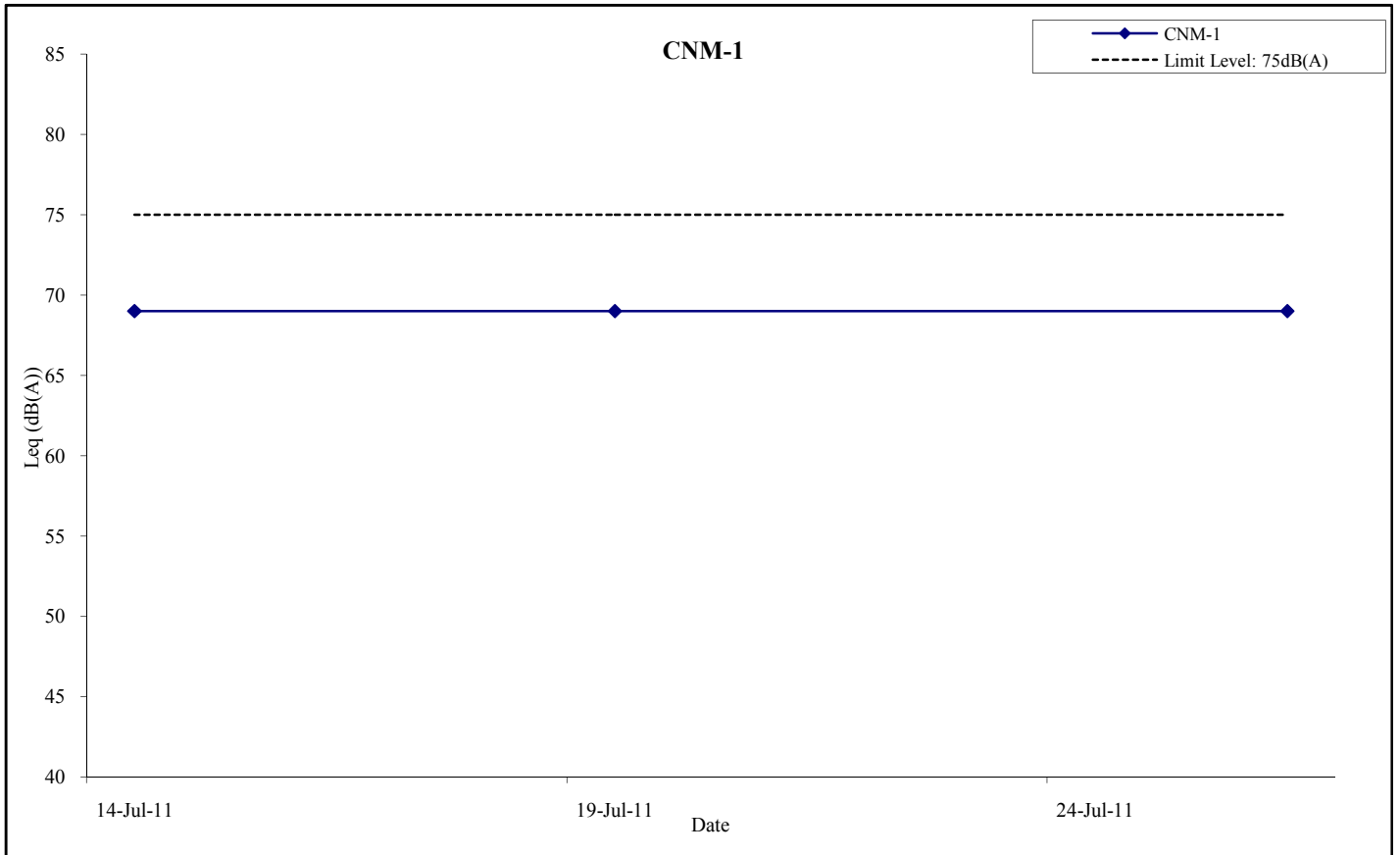
Date	Noise Monitoring Results	Limit Level	Exceedance?
	Leq, dB(A)	Leq, dB(A)	
14/07/2011	79	75	Y
21/07/2011	82	75	Y
28/07/2011	78	75	Y

### - CNM-4

Date	Noise Monitoring Results	Limit Level	Exceedance?
	Leq, dB(A)	Leq, dB(A)	
14/07/2011	65	75	N
19/07/2011	66	75	N
26/07/2011	65	75	N

Note:

- Noise limit level of the station, which is school, is 70dB(A) on normal weekdays and 65dB(A) during examination period.



Hong Kong Section of Guangzhou-Shenzhen-Hong Kong  
Express Rail Link

**Graphical Presentation of Noise**

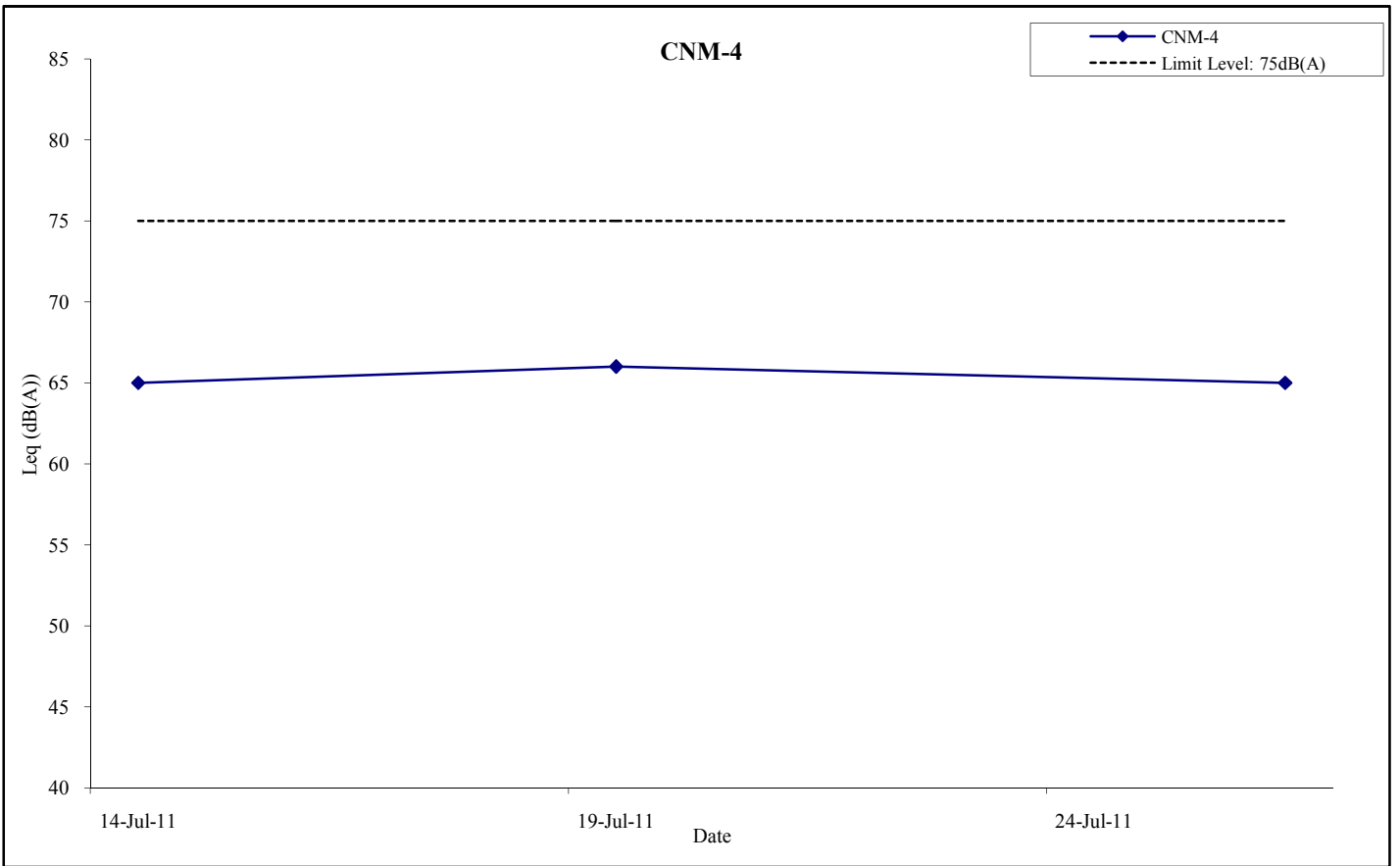
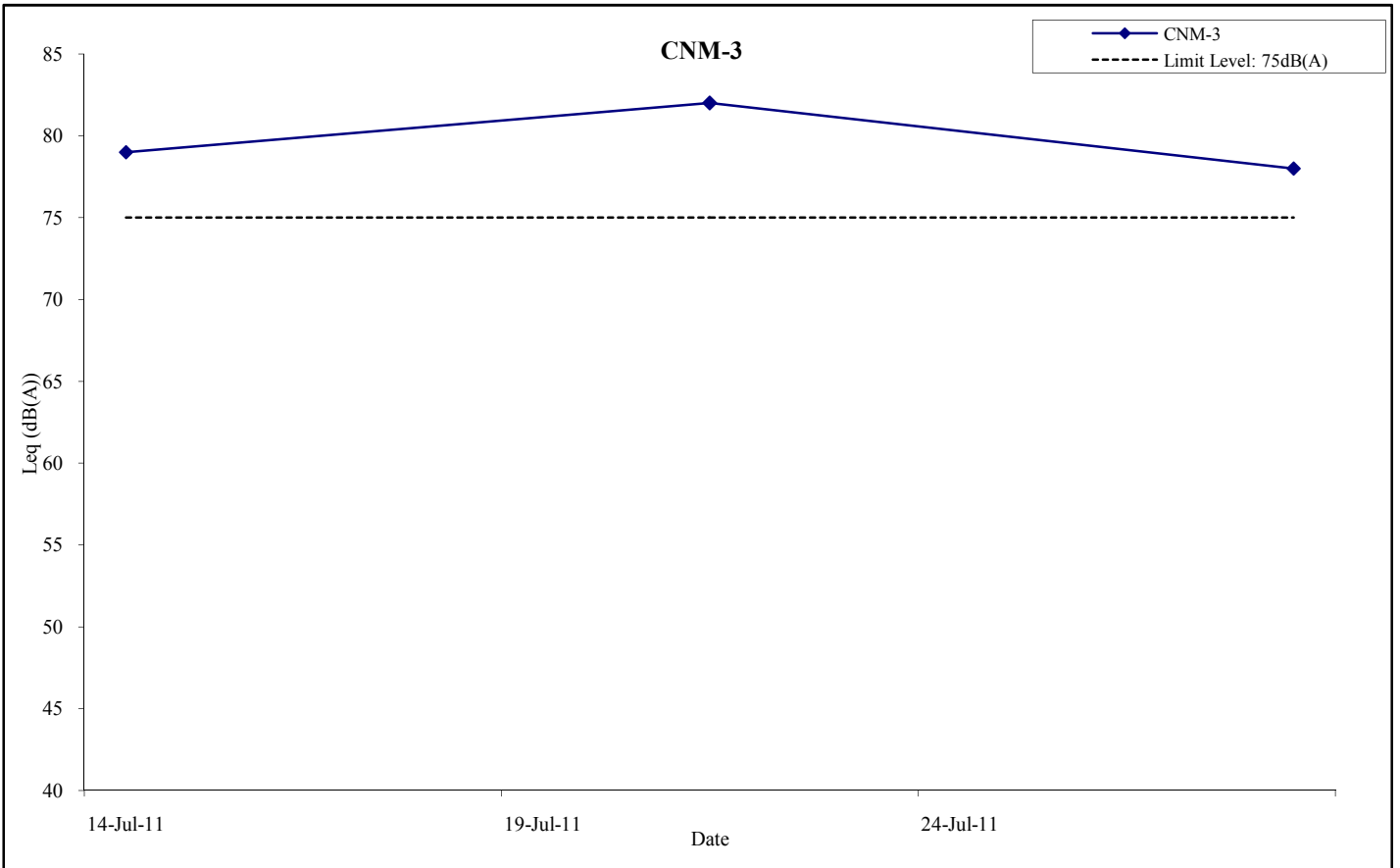
**Monitoring Results for Location CNM-1 and CNM-2**

Date

**Jul-11**

APPENDIX

**F**



Hong Kong Section of Guangzhou-Shenzhen-Hong Kong  
 Express Rail Link  
**Graphical Presentation of Noise**  
**Monitoring Results for Location CNM-3 and CNM-4**

Date	Jul-11
APPENDIX	F

Appendix G  
Calibration Certificates of  
SLM and HVS





輝創工程有限公司

Sun Creation Engineering Limited Calibration and Testing Laboratory

Certificate No. : C107035

## Certificate of Calibration

*This is to certify that the equipment*

*Description : Sound Level Meter*

*Manufacturer : Bruel & Kjaer*

*Model No. : 2250-L*

*Serial No. : 2701816*

*has been calibrated for the specific items and ranges.  
The results are shown in the Calibration Report No. C107035.*

*The equipment is supplied by*

*Co. Name : EDMS Tech Ltd.*

*Address : Room 1009, 10/F., World Wide House,  
19 Des Voeux Road Central, Hong Kong*

*Date of Issue : 30 December 2010*

*Certified by :*

*KC Lee*

The test equipment used for calibration are traceable to the National Standards as specified in this report.  
This report shall not be reproduced except in full and with prior written approval from this laboratory.

Calibration and Testing Laboratory of Sun Creation Engineering Limited

c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

Tel: 2927 2606

Fax: 2744 8986

E-mail: callab@suncreation.com

Website: www.suncreation.com



## Calibration Report

### ITEM TESTED

DESCRIPTION : Sound Level Meter  
MANUFACTURER : Bruel & Kjaer  
MODEL NO. : 2250-L  
SERIAL NO. : 2701816

### TEST CONDITIONS

AMBIENT TEMPERATURE :  $(23 \pm 2)^{\circ}\text{C}$  RELATIVE HUMIDITY :  $(55 \pm 20)\%$   
LINE VOLTAGE : ---

### TEST SPECIFICATIONS

Calibration check

DATE OF TEST : 30 December 2010

JOB NO. : IC10-3290

### TEST RESULTS

The results apply to the particular unit-under-test only.  
All results are within manufacturer's specification.  
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies, USA
- Fluke Everett Service Center, USA
- Rohde & Schwarz Laboratory, Germany
- The Bruel & Kjaer Calibration Laboratory, Denmark

Tested by :

  
L L Cheung

Date : 30 December 2010

The test equipment used for calibration are traceable to the National Standards as specified in this report.  
This report shall not be reproduced except in full and with prior written approval from this laboratory.

## Calibration Report

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 24 hours, and switched on to warm up for over 10 minutes before the commencement of the test.
2. Self-calibration using the laboratory acoustic calibrator was performed before the test from 6.1.1.2 to 6.3.2.
3. The results presented are the mean of 3 measurement at each calibration point.
4. Test equipment :

<u>Equipment ID</u>	<u>Description</u>	<u>Certificate No.</u>
CL280	40 MHz Arbitrary Waveform Generator	C100067
CL281	Multifunction Acoustic Calibrator	C1006860

5. Test procedure : MA101N.

6. Results :

### 6.1 Sound Pressure Level

#### 6.1.1 Reference Sound Pressure Level

##### 6.1.1.1 Before Self-Calibration

UUT Setting		Applied Value		UUT Reading (dB)
Range (dB)	Main	Level (dB)	Freq. (kHz)	
20 - 140	LAF (SPL)	94.00	1	93.3

##### 6.1.1.2 After Self-Calibration

UUT Setting		Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Main	Level (dB)	Freq. (kHz)		
20 - 140	LAF (SPL)	94.00	1	94.0	± 1.1

##### 6.1.2 Linearity

UUT Setting		Applied Value		UUT Reading (dB)
Range (dB)	Main	Level (dB)	Freq. (kHz)	
20 - 140	LAF (SPL)	94.00	1	94.0 (Ref.)
		104.00		104.0
		114.00		114.0

IEC 61672 Class 1 Spec. : ± 0.6 dB per 10 dB step and ± 1.1 dB for overall different.

The test equipment used for calibration are traceable to the National Standards as specified in this report.  
This report shall not be reproduced except in full and with prior written approval from this laboratory.

## Calibration Report

### 6.2 Time Weighting

UUT Setting		Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Main	Level (dB)	Freq. (kHz)		
20 - 140	LAF (SPL)	94.00	1	94.0	Ref.
	LAS (SPL)			94.0	± 0.3

### 6.3 Frequency Weighting

#### 6.3.1 A-Weighting

UUT Setting		Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Main	Level (dB)	Freq.		
20 - 140	LAF (SPL)	94.00	63 Hz	67.8	-26.2 ± 1.5
			125 Hz	77.9	-16.1 ± 1.5
			250 Hz	85.4	-8.6 ± 1.4
			500 Hz	90.8	-3.2 ± 1.4
			1 kHz	94.0	Ref.
			2 kHz	95.2	+1.2 ± 1.6
			4 kHz	94.9	+1.0 ± 1.6
			8 kHz	92.6	-1.1(+2.1 ; -3.1)
			12.5 kHz	89.5	-4.3(+3.0 ; -6.0)

#### 6.3.2 C-Weighting

UUT Setting		Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Main	Level (dB)	Freq.		
20 - 140	LCF (SPL)	94.00	63 Hz	93.2	-0.8 ± 1.5
			125 Hz	93.9	-0.2 ± 1.5
			205 Hz	94.0	0.0 ± 1.4
			500 Hz	94.1	0.0 ± 1.4
			1 kHz	94.0	Ref.
			2 kHz	93.9	-0.2 ± 1.6
			4 kHz	93.2	-0.8 ± 1.6
			8 kHz	90.7	-3.0 (+2.1 ; -3.1)
			12.5 kHz	87.6	-6.2 (+3.0 ; -6.0)

The test equipment used for calibration are traceable to the National Standards as specified in this report.  
This report shall not be reproduced except in full and with prior written approval from this laboratory.

## *Calibration Report*

Remarks :- Mfr's Spec. : IEC 61672 Class 1

- Uncertainties of Applied Value :

94 dB : 63 Hz - 125 Hz	: ± 0.35 dB
250 Hz - 500 Hz	: ± 0.30 dB
1 kHz	: ± 0.20 dB
2 kHz - 4 kHz	: ± 0.35 dB
8 kHz	: ± 0.45 dB
12.5 kHz	: ± 0.70 dB
104 dB : 1 kHz	: ± 0.10 dB (Ref. 94 dB)
114 dB : 1 kHz	: ± 0.10 dB (Ref. 94 dB)
  
- The uncertainties are for a confidence probability of not less than 95 %.

Note :

The values given in this Calibration Report only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.



輝創工程有限公司

Sun Creation Engineering Limited Calibration and Testing Laboratory

Certificate No. : C110281

## Certificate of Calibration

*This is to certify that the equipment*

*Description : Sound Level Meter*

*Manufacturer : Bruel & Kjaer*

*Model No. : 2250-L*

*Serial No. : 2701826*

*has been calibrated for the specific items and ranges.  
The results are shown in the Calibration Report No. C110281.*

*The equipment is supplied by*

*Co. Name : EDMS Tech Ltd.*

*Address : Room 1009, 10/F., World Wide House,  
19 Des Voeux Road Central, Hong Kong*

*Date of Issue : 17 January 2011*

*Certified by :*

*K C Lee*

The test equipment used for calibration are traceable to the National Standards as specified in this report.  
This report shall not be reproduced except in full and with prior written approval from this laboratory.

Calibration and Testing Laboratory of Sun Creation Engineering Limited

c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

Tel: 2927 2606

Fax: 2744 8986

E-mail: callab@suncreation.com

Website: www.suncreation.com



輝創工程有限公司

Sun Creation Engineering Limited Calibration and Testing Laboratory

Report No. : C110281

## Calibration Report

### ITEM TESTED

DESCRIPTION : Sound Level Meter  
MANUFACTURER : Bruel & Kjaer  
MODEL NO. : 2250-L  
SERIAL NO. : 2701826

### TEST CONDITIONS

AMBIENT TEMPERATURE :  $(23 \pm 2)^{\circ}\text{C}$  RELATIVE HUMIDITY :  $(55 \pm 20)\%$   
LINE VOLTAGE : ---

### TEST SPECIFICATIONS

Calibration check

DATE OF TEST : 17 January 2011

JOB NO. : IC10-3290

### TEST RESULTS

The results apply to the particular unit-under-test only.  
All results are within manufacturer's specification.  
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- The Bruel & Kjaer Calibration Laboratory, Denmark
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA
- Agilent Technologies, USA

Tested by :

  
L L Cheung

Date : 17 January 2011

The test equipment used for calibration are traceable to the National Standards as specified in this report.  
This report shall not be reproduced except in full and with prior written approval from this laboratory.

Calibration and Testing Laboratory of Sun Creation Engineering Limited

c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong  
Tel: 2927 2606 Fax: 2744 8986 E-mail: callab@suncreation.com Website: www.suncreation.com

Page 1 of 3

## Calibration Report

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 24 hours, and switched on to warm up for over 10 minutes before the commencement of the test.
2. Self-calibration using the laboratory acoustic calibrator was performed before the test from 6.1.1.2 to 6.3.2.
3. The results presented are the mean of 3 measurement at each calibration point.
4. Test equipment :

<u>Equipment ID</u>	<u>Description</u>	<u>Certificate No.</u>
CL280	40 MHz Arbitrary Waveform Generator	C100067
CL281	Multifunction Acoustic Calibrator	C1006860

5. Test procedure : MA101N.

6. Results :

### 6.1 Sound Pressure Level

#### 6.1.1 Reference Sound Pressure Level

##### 6.1.1.1 Before Self-Calibration

UUT Setting		Applied Value		UUT Reading (dB)
Range (dB)	Main	Level (dB)	Freq. (kHz)	
20 - 140	LAF (SPL)	94.00	1	93.8

##### 6.1.1.2 After Self-Calibration

UUT Setting		Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Main	Level (dB)	Freq. (kHz)		
20 - 140	LAF (SPL)	94.00	1	94.0	± 1.1

### 6.1.2 Linearity

UUT Setting		Applied Value		UUT Reading (dB)
Range (dB)	Main	Level (dB)	Freq. (kHz)	
20 - 140	LAF (SPL)	94.00	1	94.0 (Ref.)
		104.00		104.0
		114.00		114.0

IEC 61672 Class 1 Spec. : ± 0.6 dB per 10 dB step and ± 1.1 dB for overall different.

### 6.2 Time Weighting

UUT Setting		Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Main	Level (dB)	Freq. (kHz)		
20 - 140	LAF (SPL)	94.00	1	94.0	Ref.
	LAS (SPL)			94.0	± 0.3

The test equipment used for calibration are traceable to the National Standards as specified in this report.  
This report shall not be reproduced except in full and with prior written approval from this laboratory.



## Calibration Report

### 6.3 Frequency Weighting

#### 6.3.1 A-Weighting

UUT Setting		Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Main	Level (dB)	Freq.		
20 - 140	LAF (SPL)	94.00	63 Hz	67.8	-26.2 ± 1.5
			125 Hz	77.8	-16.1 ± 1.5
			250 Hz	85.3	-8.6 ± 1.4
			500 Hz	90.7	-3.2 ± 1.4
			1 kHz	94.0	Ref.
			2 kHz	95.2	+1.2 ± 1.6
			4 kHz	94.9	+1.0 ± 1.6
			8 kHz	92.5	-1.1(+2.1 ; -3.1)
			12.5 kHz	89.4	-4.3(+3.0 ; -6.0)

#### 6.3.2 C-Weighting

UUT Setting		Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Main	Level (dB)	Freq.		
20 - 140	LCF (SPL)	94.00	63 Hz	93.2	-0.8 ± 1.5
			125 Hz	93.8	-0.2 ± 1.5
			205 Hz	94.0	0.0 ± 1.4
			500 Hz	94.0	0.0 ± 1.4
			1 kHz	94.0	Ref.
			2 kHz	93.8	-0.2 ± 1.6
			4 kHz	93.1	-0.8 ± 1.6
			8 kHz	90.6	-3.0 (+2.1 ; -3.1)
			12.5 kHz	87.5	-6.2 (+3.0 ; -6.0)

Remarks :- Mfr's Spec. : IEC 61672 Class 1

- Uncertainties of Applied Value : 94 dB : 63 Hz - 125 Hz : ± 0.35 dB  
 250 Hz - 500 Hz : ± 0.30 dB  
 1 kHz : ± 0.20 dB  
 2 kHz - 4 kHz : ± 0.35 dB  
 8 kHz : ± 0.45 dB  
 12.5 kHz : ± 0.70 dB  
 104 dB : 1 kHz : ± 0.10 dB (Ref. 94 dB)  
 114 dB : 1 kHz : ± 0.10 dB (Ref. 94 dB)
- The uncertainties are for a confidence probability of not less than 95 %.

Note :

The values given in this Calibration Report only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

The test equipment used for calibration are traceable to the National Standards as specified in this report. This report shall not be reproduced except in full and with prior written approval from this laboratory.



輝創工程有限公司

Sun Creation Engineering Limited Calibration and Testing Laboratory

Certificate No. : C107034

# Certificate of Calibration

*This is to certify that the equipment*

*Description : Sound Level Meter*

*Manufacturer : Bruel & Kjaer*

*Model No. : 2250-L*

*Serial No. : 2701823*

*has been calibrated for the specific items and ranges.  
The results are shown in the Calibration Report No. C107034.*

*The equipment is supplied by*

*Co. Name : EDMS Tech Ltd.*

*Address : Room 1009, 10/F., World Wide House,  
19 Des Voeux Road Central, Hong Kong*

*Date of Issue : 30 December 2010*

Certified by :

*K C Lee*

The test equipment used for calibration are traceable to the National Standards as specified in this report. This report shall not be reproduced except in full and with prior written approval from this laboratory.

Calibration and Testing Laboratory of Sun Creation Engineering Limited

c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

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E-mail: callab@suncreation.com

Website: www.suncreation.com



輝創工程有限公司

Sun Creation Engineering Limited Calibration and Testing Laboratory

Report No. : C107034

## Calibration Report

### ITEM TESTED

DESCRIPTION : Sound Level Meter  
MANUFACTURER : Bruel & Kjaer  
MODEL NO. : 2250-L  
SERIAL NO. : 2701823

### TEST CONDITIONS

AMBIENT TEMPERATURE :  $(23 \pm 2)^{\circ}\text{C}$  RELATIVE HUMIDITY :  $(55 \pm 20)\%$   
LINE VOLTAGE : ---

### TEST SPECIFICATIONS

Calibration check

DATE OF TEST : 30 December 2010

JOB NO. : IC10-3290

### TEST RESULTS

The results apply to the particular unit-under-test only.  
All results are within manufacturer's specification.  
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies, USA
- Fluke Everett Service Center, USA
- Rohde & Schwarz Laboratory, Germany
- The Bruel & Kjaer Calibration Laboratory, Denmark

Tested by :

  
L L Cheung

Date : 30 December 2010

The test equipment used for calibration are traceable to the National Standards as specified in this report.  
This report shall not be reproduced except in full and with prior written approval from this laboratory.

Calibration and Testing Laboratory of Sun Creation Engineering Limited

c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

Tel: 2927 2606

Fax: 2744 8986

E-mail: callab@suncreation.com

Website: www.suncreation.com

Page 1 of 4

## Calibration Report

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 24 hours, and switched on to warm up for over 10 minutes before the commencement of the test.
2. Self-calibration using the laboratory acoustic calibrator was performed before the test from 6.1.1.2 to 6.3.2.
3. The results presented are the mean of 3 measurement at each calibration point.
4. Test equipment :

<u>Equipment ID</u>	<u>Description</u>	<u>Certificate No.</u>
CL280	40 MHz Arbitrary Waveform Generator	C100067
CL281	Multifunction Acoustic Calibrator	C1006860

5. Test procedure : MA101N.

6. Results :

### 6.1 Sound Pressure Level

#### 6.1.1 Reference Sound Pressure Level

##### 6.1.1.1 Before Self-Calibration

UUT Setting		Applied Value		UUT Reading (dB)
Range (dB)	Main	Level (dB)	Freq. (kHz)	
20 - 140	LAF (SPL)	94.00	1	93.7

##### 6.1.1.2 After Self-Calibration

UUT Setting		Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Main	Level (dB)	Freq. (kHz)		
20 - 140	LAF (SPL)	94.00	1	94.0	± 1.1

##### 6.1.2 Linearity

UUT Setting		Applied Value		UUT Reading (dB)
Range (dB)	Main	Level (dB)	Freq. (kHz)	
20 - 140	LAF (SPL)	94.00	1	94.0 (Ref.)
		104.00		104.0
		114.00		114.0

IEC 61672 Class 1 Spec. : ± 0.6 dB per 10 dB step and ± 1.1 dB for overall different.

The test equipment used for calibration are traceable to the National Standards as specified in this report.  
This report shall not be reproduced except in full and with prior written approval from this laboratory.

## Calibration Report

### 6.2 Time Weighting

UUT Setting		Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Main	Level (dB)	Freq. (kHz)		
20 - 140	LAF (SPL)	94.00	1	94.0	Ref.
	LAS (SPL)			94.0	± 0.3

### 6.3 Frequency Weighting

#### 6.3.1 A-Weighting

UUT Setting		Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Main	Level (dB)	Freq.		
20 - 140	LAF (SPL)	94.00	63 Hz	67.8	-26.2 ± 1.5
			125 Hz	77.9	-16.1 ± 1.5
			250 Hz	85.4	-8.6 ± 1.4
			500 Hz	90.8	-3.2 ± 1.4
			1 kHz	94.0	Ref.
			2 kHz	95.2	+1.2 ± 1.6
			4 kHz	94.9	+1.0 ± 1.6
			8 kHz	92.6	-1.1(+2.1 ; -3.1)
			12.5 kHz	89.5	-4.3(+3.0 ; -6.0)

#### 6.3.2 C-Weighting

UUT Setting		Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Main	Level (dB)	Freq.		
20 - 140	LCF (SPL)	94.00	63 Hz	93.2	-0.8 ± 1.5
			125 Hz	93.9	-0.2 ± 1.5
			205 Hz	94.0	0.0 ± 1.4
			500 Hz	94.1	0.0 ± 1.4
			1 kHz	94.0	Ref.
			2 kHz	93.9	-0.2 ± 1.6
			4 kHz	93.2	-0.8 ± 1.6
			8 kHz	90.7	-3.0 (+2.1 ; -3.1)
			12.5 kHz	87.6	-6.2 (+3.0 ; -6.0)

The test equipment used for calibration are traceable to the National Standards as specified in this report.  
This report shall not be reproduced except in full and with prior written approval from this laboratory.

## *Calibration Report*

Remarks :- Mfr's Spec. : IEC 61672 Class 1

- Uncertainties of Applied Value :

94 dB : 63 Hz - 125 Hz	: ± 0.35 dB
250 Hz - 500 Hz	: ± 0.30 dB
1 kHz	: ± 0.20 dB
2 kHz - 4 kHz	: ± 0.35 dB
8 kHz	: ± 0.45 dB
12.5 kHz	: ± 0.70 dB
104 dB : 1 kHz	: ± 0.10 dB (Ref. 94 dB)
114 dB : 1 kHz	: ± 0.10 dB (Ref. 94 dB)
  
- The uncertainties are for a confidence probability of not less than 95 %.

Note :

The values given in this Calibration Report only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.



輝創工程有限公司

Sun Creation Engineering Limited Calibration and Testing Laboratory

Certificate No. : C112947

## *Certificate of Calibration*

*This is to certify that the equipment*

*Description : Sound Level Meter*

*Manufacturer : Bruel & Kjaer*

*Model No. : 2250-L*

*Serial No. : 2718886*

*has been calibrated for the specific items and ranges.  
The results are shown in the Calibration Report No. C112947.*

*The equipment is supplied by*

*Co. Name : EDMS Tech Ltd.*

*Address : Room 1009, 10/F., World Wide House,  
19 Des Voeux Road Central, Hong Kong*

*Date of Issue : 26 May 2011*

*Certified by :*   
H C Chan

The test equipment used for calibration are traceable to the National Standards as specified in this report.  
This report shall not be reproduced except in full and with prior written approval from this laboratory.

Calibration and Testing Laboratory of Sun Creation Engineering Limited

c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong  
Tel: 2927 2606 Fax: 2744 8986 E-mail: callab@suncreation.com Website: www.suncreation.com



輝創工程有限公司

Sun Creation Engineering Limited Calibration and Testing Laboratory

Report No. : C112947

## Calibration Report

### ITEM TESTED

DESCRIPTION : Sound Level Meter  
MANUFACTURER : Bruel & Kjaer  
MODEL NO. : 2250-L  
SERIAL NO. : 2718886

### TEST CONDITIONS

AMBIENT TEMPERATURE :  $(23 \pm 2)^{\circ}\text{C}$  RELATIVE HUMIDITY :  $(55 \pm 20)\%$   
LINE VOLTAGE : ---

### TEST SPECIFICATIONS

Calibration check

DATE OF TEST : 25 May 2011

JOB NO. : IC11-1292

### TEST RESULTS

The results apply to the particular unit-under-test only.  
All results are within manufacturer's specification.  
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- The Bruel & Kjaer Calibration Laboratory, Denmark
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA
- Agilent Technologies, USA

Tested by :

  
K C Lee

Date : 26 May 2011

The test equipment used for calibration are traceable to the National Standards as specified in this report.  
This report shall not be reproduced except in full and with prior written approval from this laboratory.

Calibration and Testing Laboratory of Sun Creation Engineering Limited

c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong  
Tel: 2927 2606 Fax: 2744 8986 E-mail: callab@suncreation.com Website: www.suncreation.com

Page 1 of 3



## Calibration Report

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 24 hours, and switched on to warm up for over 10 minutes before the commencement of the test.
2. Self-calibration using laboratory acoustic calibrator was performed before the test from 6.1.1.2 to 6.3.2.
3. The results presented are the mean of 3 measurements at each calibration point.
4. Test equipment :

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C110018
CL281	Multifunction Acoustic Calibrator	C1006860

5. Test procedure : MA101N.

6. Results :

### 6.1 Sound Pressure Level

#### 6.1.1 Reference Sound Pressure Level

##### 6.1.1.1 Before Self-calibration

UUT Setting		Applied Value		UUT Reading (dB)
Range (dB)	Main	Level (dB)	Freq. (kHz)	
20 - 140	LAF (SPL)	94.00	1	93.7

##### 6.1.1.2 After Self-calibration

UUT Setting		Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Main	Level (dB)	Freq. (kHz)		
20 - 140	LAF (SPL)	94.00	1	93.9	± 1.1

### 6.1.2 Linearity

UUT Setting		Applied Value		UUT Reading (dB)
Range (dB)	Main	Level (dB)	Freq. (kHz)	
20 - 140	LAF (SPL)	94.00	1	93.9 (Ref.)
		104.00		103.9
		114.00		113.9

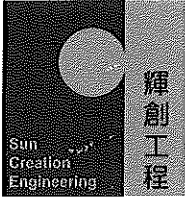
IEC 61672 Class 1 Spec. : ± 0.6 dB per 10 dB step and ± 1.1 dB for overall different.

### 6.2 Time Weighting

UUT Setting		Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Main	Level (dB)	Freq. (kHz)		
20 - 140	LAF (SPL)	94.00	1	93.9	Ref.
	LAS (SPL)			93.9	± 0.3

The test equipment used for calibration are traceable to the National Standards as specified in this report.  
This report shall not be reproduced except in full and with prior written approval from this laboratory.





輝創工程有限公司

Sun Creation Engineering Limited Calibration and Testing Laboratory

Certificate No. : C106677

## Certificate of Calibration

*This is to certify that the equipment*

*Description : Sound Level Calibrator*

*Manufacturer : ---*

*Model No. : ND9*

*Serial No. : N491111*

*has been calibrated for the specific items and ranges.  
The results are shown in the Calibration Report No. C106677.*

*The equipment is supplied by*

*Co. Name : EDMS Tech Ltd.*

*Address : Room 1009, 10/F., World Wide House,  
19 Des Voeux Road Central, Hong Kong*

*Date of Issue : 8 December 2010*

*Certified by :*

*K C Lee*

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Calibration and Testing Laboratory of Sun Creation Engineering Limited

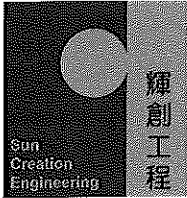
c/o 4/F. Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

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Website: www.suncreation.com



輝創工程有限公司

Sun Creation Engineering Limited Calibration and Testing Laboratory

Report No. : C106677

## Calibration Report

### ITEM TESTED

DESCRIPTION : Sound Level Calibrator  
MANUFACTURER : ---  
MODEL NO. : ND9  
SERIAL NO. : N491111

### TEST CONDITIONS

AMBIENT TEMPERATURE :  $(23 \pm 2)^{\circ}\text{C}$  RELATIVE HUMIDITY :  $(55 \pm 20)\%$   
LINE VOLTAGE : ---

### TEST SPECIFICATIONS

Calibration

DATE OF TEST : 7 December 2010

JOB NO. : IC10-3077

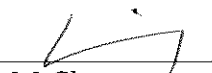
### TEST RESULTS

The results apply to the particular unit-under-test only.  
All results are within manufacturer's specification. (after adjustment)  
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- The Bruel & Kjaer Calibration Laboratory, Denmark
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA
- Agilent Technologies, USA

Tested by :

  
L L Cheung

Date : 8 December 2010

The test equipment used for calibration are traceable to the National Standards as specified in this report.  
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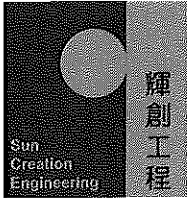
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# Calibration Report

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 24 hours before the commencement of the test.
2. The results presented are the mean of 3 measurements at each calibration point.
3. Test equipment :

<u>Equipment ID</u>	<u>Description</u>	<u>Certificate No.</u>
CL130	Universal Counter	C103289
CL281	Multifunction Acoustic Calibrator	C1006860
TST150A	Measuring Amplifier	C101008

4. Test procedure : MA100N.

5. Results :

5.1 Sound Level Accuracy

5.1.1 Before Adjustment

UUT Nominal Value	Measured Value (dB)	Mfr's Spec. (dB)	Uncertainty of Measured Value (dB)
94 dB, 1 kHz	* 94.9	± 0.3	± 0.2
114 dB, 1 kHz	* 114.9		± 0.3

\* Out of Mfr's Spec.

5.1.2 After Adjustment

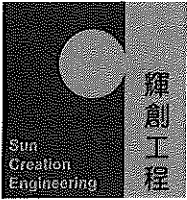
UUT Nominal Value	Measured Value (dB)	Mfr's Spec. (dB)	Uncertainty of Measured Value (dB)
94 dB, 1 kHz	94.0	± 0.3	± 0.2
114 dB, 1 kHz	114.0		± 0.3

5.2 Frequency Accuracy

5.2.1 Before Adjustment

UUT Nominal Value (kHz)	Measured Value (kHz)	Mfr's Spec.	Uncertainty of Measured Value (Hz)
1	1.000	1 kHz ± 0.1 %	± 0.1

The test equipment used for calibration are traceable to the National Standards as specified in this report.  
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# Calibration Report

## 5.2.2 After Adjustment

UUT Nominal Value (kHz)	Measured Value (kHz)	Mfr's Spec.	Uncertainty of Measured Value (Hz)
1	1.000	1 kHz $\pm$ 0.1 %	$\pm$ 0.1

Remark : - The uncertainties are for a confidence probability of not less than 95 %.

### Note :

The values given in this Calibration Report only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

The test equipment used for calibration are traceable to the National Standards as specified in this report. This report shall not be reproduced except in full and with prior written approval from this laboratory.

Calibration and Testing Laboratory of Sun Creation Engineering Limited

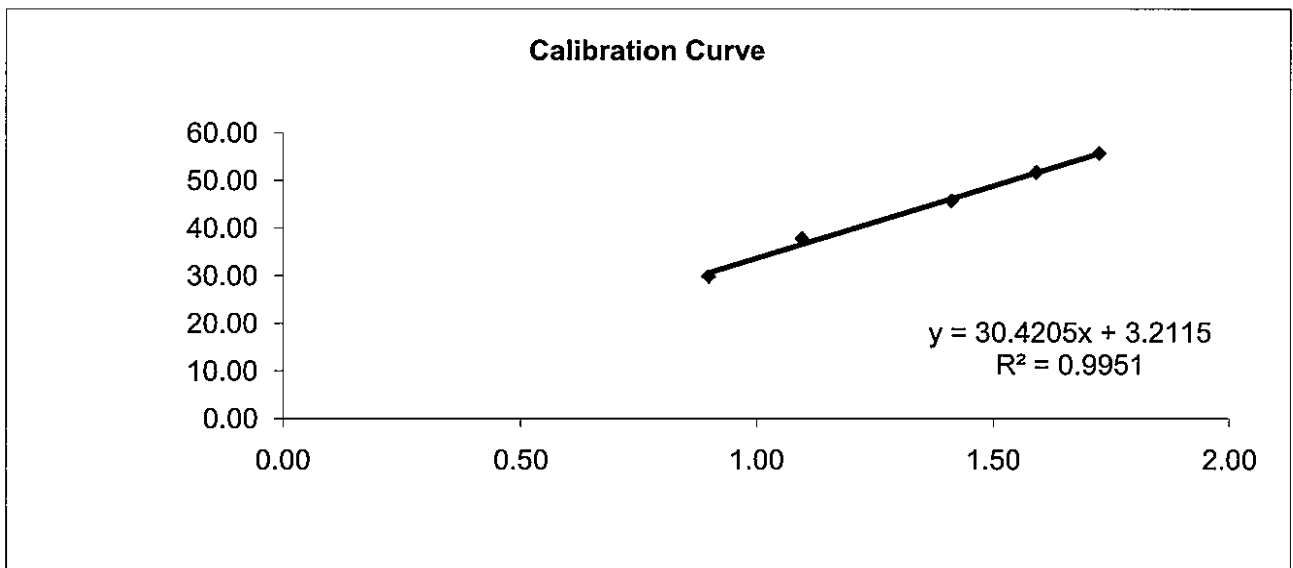
c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong  
Tel: 2927 2606 Fax: 2744 8986 E-mail: callab@suncreation.com Website: www.suncreation.com

# Ove Arup Partners (Hong Kong) Limited

## High Volume Air Sampler Calibration Worksheet

Calibration date	2-Jun-11	Barometric pressure	757 mm Hg
Next Calibration date	29-Nov-11	Temperature (°C)	28 °C
Sampler location	AM15 (XRL) / CAM-1 (Roadworks at West Kowloon)	Temperature (K)	301 K
Sampler model	TE-5170	P <sub>std</sub>	760 mm Hg
Sampler serial number	515	T <sub>std</sub>	298 K
Calibrator model	GMW-2535		
Calibrator serial number	1378		
Slope of the standard curve, m <sub>s</sub>	2.01406		
Intercept of the standard curve, b <sub>s</sub>	-0.03206		

Resistance Plate No.	Manometer Reading (inch H <sub>2</sub> O)	Flow Recorder Reading (CFM)	Calculated Q <sub>std</sub> (m <sup>3</sup> /min)	Continuous Flow Recorder Reading IC (CFM)
5	3.20	30.00	0.90	29.79
7	4.80	38.00	1.10	37.74
10	8.00	46.00	1.41	45.68
13	10.20	52.00	1.59	51.64
18	12.00	56.00	1.72	55.61



**Linear Regression**

Sampler slope (m) : **30.4205**  
 Sampler intercept (b) : **3.2115**  
 Correlation coefficient (R<sup>2</sup>) : **0.9951**

**Correlation coefficient is greater than 0.9900 and the calibration result is accepted.**

Performed by: \_\_\_\_\_  
 Checked by: \_\_\_\_\_  
 Approved by: \_\_\_\_\_

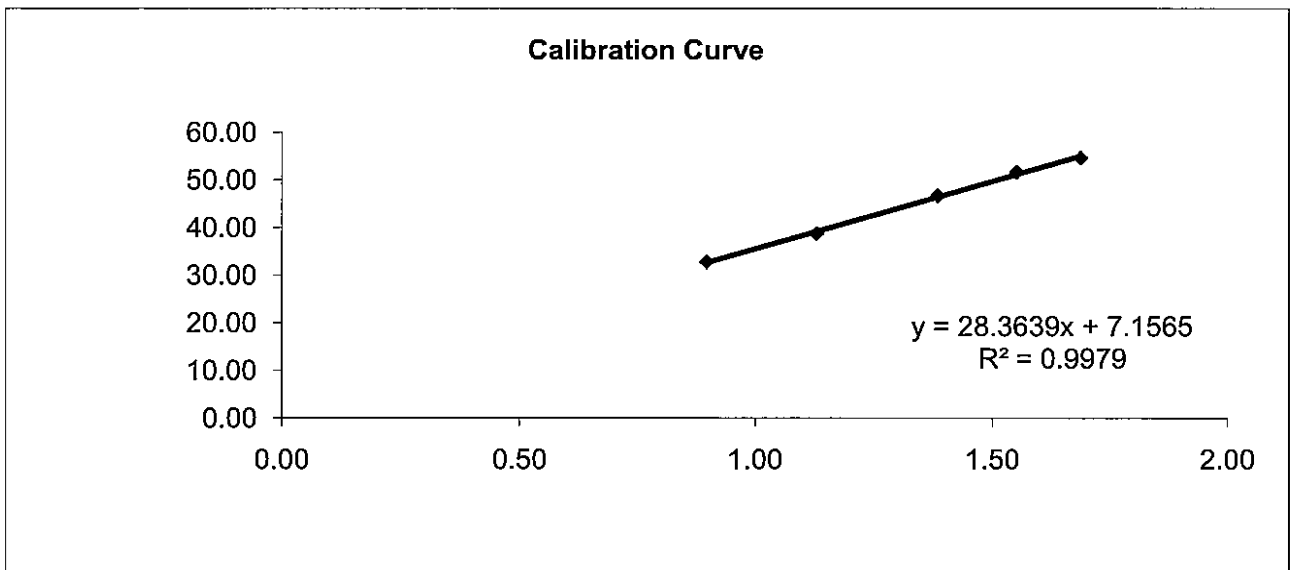
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 Date: 3-6-11

# Ove Arup Partners (Hong Kong) Limited

## High Volume Air Sampler Calibration Worksheet

Calibration date	2-Jun-11	Barometric pressure	757 mm Hg
Next Calibration date	29-Nov-11	Temperature (°C)	28 °C
Sampler location	AM16 (XRL) / CAM-2 (Roadworks at West Kowloon)	Temperature (K)	301 K
Sampler model	TE-5170	P <sub>std</sub>	760 mm Hg
Sampler serial number	1282	T <sub>std</sub>	298 K
Calibrator model	GMW-2535		
Calibrator serial number	1378		
Slope of the standard curve, m <sub>s</sub>	2.01406		
Intercept of the standard curve, b <sub>s</sub>	-0.03206		

Resistance Plate No.	Manometer Reading (inch H <sub>2</sub> O)	Flow Recorder Reading (CFM)	Calculated Q <sub>std</sub> (m <sup>3</sup> /min)	Continuous Flow Recorder Reading IC (CFM)
5	3.20	33.00	0.90	32.77
7	5.10	39.00	1.13	38.73
10	7.70	47.00	1.38	46.67
13	9.70	52.00	1.55	51.64
18	11.50	55.00	1.69	54.62



**Linear Regression**

Sampler slope (m) : **28.3639**  
 Sampler intercept (b) : **7.1565**  
 Correlation coefficient (R<sup>2</sup>) : **0.9979**

**Correlation coefficient is greater than 0.9900 and the calibration result is accepted.**

Performed by: \_\_\_\_\_  
 Checked by: \_\_\_\_\_  
 Approved by: \_\_\_\_\_

Date: 2-6-11  
 Date: 2-6-11  
 Date: 3-6-11

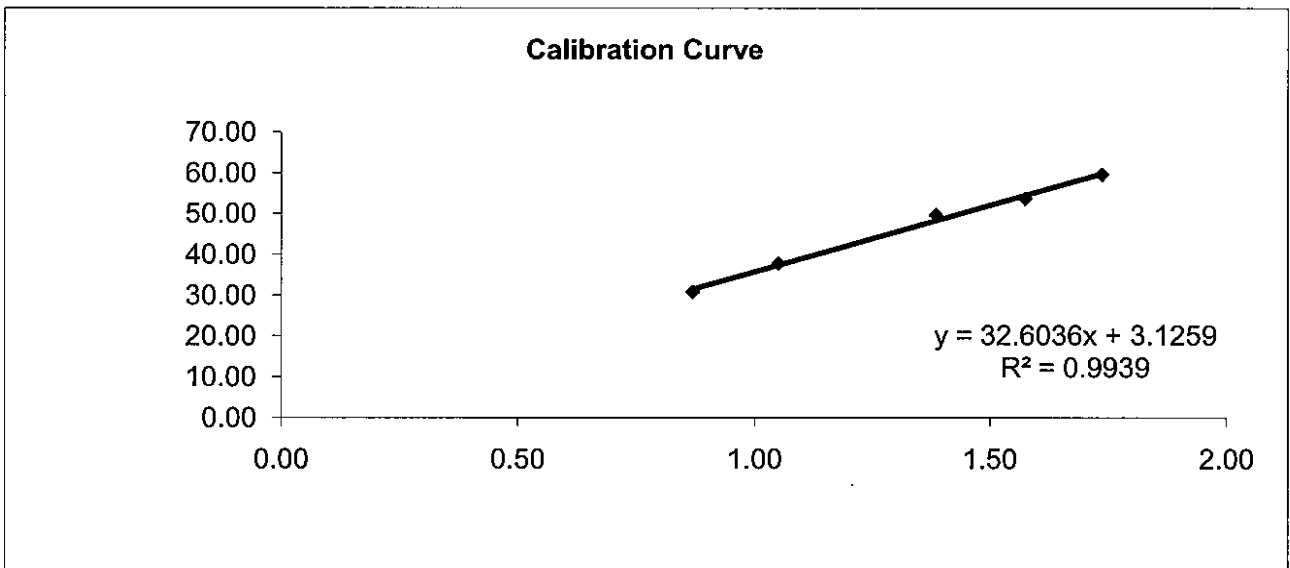


# Ove Arup Partners (Hong Kong) Limited

## High Volume Air Sampler Calibration Worksheet

Calibration date	2-Jun-11	Barometric pressure	757 mm Hg
Next Calibration date	29-Nov-11	Temperature (°C)	28 °C
Sampler location	AM17 (XRL) / CAM-3 (Roadworks at West Kowloon)	Temperature (K)	301 K
Sampler model	- Roof of Lift Building, The Victoria Towers	P <sub>std</sub>	760 mm Hg
Sampler serial number	TE-5170	T <sub>std</sub>	298 K
Sampler serial number	528		
Calibrator model	GMW-2535		
Calibrator serial number	1378		
Slope of the standard curve, m <sub>s</sub>	2.01406		
Intercept of the standard curve, b <sub>s</sub>	-0.03206		

Resistance Plate No.	Manometer Reading (inch H <sub>2</sub> O)	Flow Recorder Reading (CFM)	Calculated Q <sub>std</sub> (m <sup>3</sup> /min)	Continuous Flow Recorder Reading IC (CFM)
5	3.00	31.00	0.87	30.78
7	4.40	38.00	1.05	37.74
10	7.70	50.00	1.38	49.65
13	10.00	54.00	1.58	53.62
18	12.20	60.00	1.74	59.58



**Linear Regression**

Sampler slope (m) : **32.6036**  
 Sampler intercept (b) : **3.1259**  
 Correlation coefficient (R<sup>2</sup>) : **0.9939**

**Correlation coefficient is greater than 0.9900 and the calibration result is accepted.**

Performed by: \_\_\_\_\_  
 Checked by: \_\_\_\_\_  
 Approved by: \_\_\_\_\_

Date: 2-6-11  
 Date: 2-6-11  
 Date: 3-6-11