

MTR Corporation Limited

ROAD WORKS at WEST KOWLOON

(No. EP-366/2009/A)

Environmental Monitoring and Audit Report No. 39  
(September 2014)

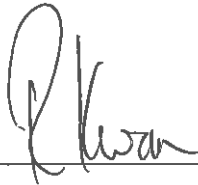
Verified by :   
Position : Independent Environmental Checker  
Date : 14 October 2014

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Certified by :   
Position : Environmental Team Leader  
Date : 14 October 2014



# ROADWORKS AT WEST KOWLOON



Environmental Monitoring and Audit Report No. 39  
September 2014

## **EXECUTIVE SUMMARY**

This is the 39<sup>th</sup> monthly Environmental Monitoring and Audit (EM&A) Report presenting the EM&A works undertaken during the period from 1 to 30 September 2014 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/A.

### ***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 exceedances in air quality in the reporting month.

### ***Air-borne Noise***

Air-borne 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 air-borne noise exceedances in the reporting month.

### ***Environmental Audits***

In this reporting month, regular site inspections attended by representative from MTRCL and Contractors were carried out at 810A, 810B and 811B at 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 inspections and audits are detailed in Section 6.

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

For the reporting month, no environmental complaint was referred from EPD. Complaint investigations would be conducted in accordance with the complaint handling procedure in the EM&A Manual when receive.

No exceedance of both air-borne noise Action and Limit Levels was recorded in the reporting month.

No exceedance of both 24-hour TSP Action and Limit Levels was recorded during the reporting month.

No environmental incident/event related to Roadworks was recorded during the reporting period. Besides, in the reporting period, no summons, no non-compliances and no prosecutions was received related to the Roadworks by MTRCL and/or the Contractors of 810A, 810B and 811B.

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

The construction works were continued in the reporting month of September 2014 and the major works for the following month were summarized in Table 8-1. Impact monitoring has been continued in the reporting month with reference to the EM&A Manual.

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

Air quality impact and air-borne 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 were 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 Express Rail Link (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 39<sup>th</sup> monthly Environmental Monitoring and Audit (EM&A) Report presenting the EM&A works undertaken during the period from 1 to 30 September 2014 for the Road Works in accordance with the EM&A Manual and the requirement under Environmental Permit No. EP-366/2009/A which was issued on 18 June 2012.

## 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 39<sup>th</sup> month of civil construction in Works Area in West Kowloon for September 2014. It is anticipated that the civil construction be completed in year 2015 or early 2016. 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>
810A	Telecom Cable Slewing; Removal of abandon foul sewer; Bored pile head trimming; Excavation; Strut installation; Bore piling; Pre-drilling; Sheet pile installation; Culvert wall removal; Backfilling; Pipe pile wall; Grout curtain; Pile cap construction; Bearing installation; and Pier column construction
810B	Sheet piling, Drainage work and Road diversion
811B	Forming temporary road for shifting Lin Cheung Road towards west; and Removal of a portion of temporary footbridge

**Table 2-1** Major construction activities in September 2014



### 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 30 September 2014 is presented in Table 3-1 below:

<b>EP-366/2009/A Clause No.</b>	<b>Document Title</b>	<b>Status</b>
3.4	Monthly Environmental Monitoring and Audit Report (August 2014)	Submitted on 11 September 2014.

**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 the 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/A issued by EPD was used for the Road Works under the XRL project.

Item	Item Description	Application Date	Permit Status
<b><i>Contract 810A</i></b>			
1	Construction Noise Permit (General Works)	5 Sept 2014	Granted on 19 Sept 2014 Permit No. GW-RE1050-14, valid from 24 Sept 2014 to 24 Oct 2014
2	Construction Noise Permit (General Works)	17 Sept 2014	Granted on 30 Sept 2014 Permit No. GW-RE1114-14, valid from 9 Oct 2014 to 8 Apr 2015
3	Construction Noise Permit (General Works)	19 Sept 2014	Granted on 23 Sept 2014 Permit No. GW-RE1101-14, valid from 24 Sept 2014 to 5 Oct 2015
<b><i>Contract 810B</i></b>			
1	Construction Noise Permit (General Works)	26 Aug 2014	Granted on 11 Sept 2014 Permit No. GW-RE1025-14, valid from 15 Sept 2014 to 14 Mar 2015
2	Dumping Permit for Type 2 marine sediment	30 Aug 2014	Granted on 17 Sept 2014 Permit No. EP/MD/15-115, valid period - 22 Sept 2014 to 21 Oct 2014
<b><i>Contract 811B</i></b>			
1	Construction Noise Permit (LCR (N/B) west flip road resurfacing)	18 Aug 2014	Granted on 4 Sep 2014 Permit No. GW-RE0988-14, valid from 6 Sep 2014 to 28 Sep 2014
2	Construction Noise Permit (Road resurfacing at D1A (N) Road)	18 Aug 2014	Granted on 11 Sep 2014 Permit No. GW-RE0980-14, valid from 13 Sep 2014 to 28 Sep 2014

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Item	Item Description	Application Date	Permit Status
3	Construction Noise Permit (Sewer wall drilling of blocked sewer at D1A (N) Road)	29 Aug 2014	Granted on 11 Sep 2014 Permit No. GW-RE1049-14, valid from 15 Sep 2014 to 14 Oct 2014

**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 details of calibration are shown in Table 4-1 and Appendix H. 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.

Monitoring Station ID	Air Quality Monitoring Station	HVS Serial Number	Last Calibration Date
CAM-1	Podium between Sorrento and The Waterfront	515	19 September 2014
CAM-2	Podium next to Tower 3, The Waterfront	1282	19 September 2014
CAM-3	Roof of Lift Building, The Victoria Towers	528	23 September 2014

**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.

Monitoring Station ID	1-hour TSP Level in $\mu\text{g}/\text{m}^3$		24-hour TSP Level in $\mu\text{g}/\text{m}^3$	
	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

## 4.2 Air-borne Noise

### 4.2.1 Noise Parameters

In accordance to the EM&A Manual, construction air-borne 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. Sound Level Meters Model B&K 2250, which complies with the above-mentioned specifications, were used for construction 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. Details of the calibration record are shown in Table 4-4.

Monitoring Station ID	Noise Monitoring Location	Serial Number	Last Calibration Date <sup>[1]</sup>
<i>Sound Level Meters</i>			
CNM-1	Man Cheong Street Refuse Station	2701816	9 January 2014
CNM-2 <sup>[2]</sup>	Tower 6, Sorrento	2701826	28 January 2014
CNM-3	Podium next to Tower 3, The Waterfront	2701823	19 December 2013
CNM-4	Tower 2, The Harbour Side	2701886	9 June 2014

Monitoring Station ID	Noise Monitoring Location	Serial Number	Last Calibration Date <sup>[1]</sup>
<i>Calibrator</i>			
<b>Serial Number</b>		<b>Last Calibration Date</b>	
N674902		26 October 2013	

Notes: [1] Next calibration date to be confirmed.

[2] Due to the objection from the OC of Sorrento was received on 6-Aug-2014, monitoring at Tower 6, Sorrento (CNM-2) has been temporarily suspended. Monitoring would be resumed subject to an alternative location could be determined in the vicinity with consent.

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

### 4.2.3 Monitoring Location

According to the EM&A Manual, air-borne 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 air-borne noise are shown in Table 4-5 below.

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 Air-borne Construction Noise

## **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. The weather condition during the monitoring period is summarized in Appendix G.

In the reporting month, no exceedance was recorded at both 24-hour TSP Action and Limit Levels. Actions stipulated under the Event and Action Plan (Table 3.3 of the EM&A Manual) would be undertaken and the monitoring frequency would be increased if exceedance is recorded.

### **5.2 *Noise***

The monitoring schedule is shown in Appendix E. Results of measured air-borne noise level, in terms of  $L_{eq(30min)}$  and graphical presentations are presented in Appendix F. The weather condition during the monitoring period is summarized in Appendix G.

In the reporting month, no exceedance was recorded at air-borne noise Limit Levels. Actions stipulated under the Event and Action Plan (Table 2.3 of the EM&A Manual) would be undertaken if exceedance is recorded.

Apart from the above, no air-borne noise exceedance of Action Levels was recorded in the reporting month.

### **5.3 *Waste Management***

The quantities of waste disposed from the Project in the reporting month with the previous 2 months was summarized in the following table:



Reporting Month	Inert C&D <sup>[1]</sup> Materials (tonnes)	Non-inert C&D <sup>[2]</sup> Materials (tonnes)	Chemical Waste	
			(litre)	(kg)
<b>Contract 810A</b> <sup>[3]</sup>				
July 2014	0	0	0	0
August 2014	0	0	0	0
September 2014	0	0	0	0
<b>Contract 810B</b> <sup>[4]</sup>				
July 2014	176.9	89.6	0	0
August 2014	0	100.2	0	0
September 2014	7.5	86.8	0	0
<b>Contract 811B</b> <sup>[5]</sup>				
July 2014	0	0	0	0
August 2014	0	0	0	0
September 2014	0	0	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 810A include WENT Landfill.
- [4]. 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.
- [5]. Alternative disposal sites for inert C&D material from Contract 811B include Central-Wan Chai Bypass, Contract HK12/02 CRIII, Lim Wan EPD Sludge Treatment Plant (EP/SP/58/08) 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 810A, 810B and 811B 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 10 September 2014 in 810A, 3 September 2014 in 810B and 8 September 2014 in 811B.

<b>Contract</b>	<b>Date of Site Inspections</b>
810A	4/9, 10/9, 18/9 and 25/9
810B	3/9, 10/9, 17/9 and 24/9
811B	2/9, 8/9, 17/9, 23/9 and 30/9

**Table 6-1** Date of site inspections in September 2014

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>
<b>Contract 810A</b>		
1	The dust control was not properly applied when stockpile was idling at the works area at Lin Cheung Road	Tarpaulin has been used to cover the stockpile when idling on site.

Item	Description	Contractor's Follow-up Action(s) Undertaken
<b>Contract 810B</b>		
1	The rooftop part of the enclosure of the grouting station at the works area at Austin Road West (W) was not properly fixed.	As the work has been completed, the grouting station was removed in the following day of the inspection made.
<b>Contract 811B</b>		
1	Gap was identified between noise barriers when breaking work was in progress at the works area underneath Footbridge No. 14 at Jordan Road	Noise barriers has been maintained to ensure that no gap in between.

**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 referred from EPD. There were a total of twenty-eight (28) environmental complaints counted since the commencement of the construction. The complaint would be handled in accordance to the EM&A Manual and relevant parties including the Engineer's Representative and IEC when receive.

Apart from the above, the Contractors were reminded to ensure that the legal requirements were complied with. As the Environmental Team (ET) of the Project, we will ensure compliance of the requirements stated in the EM&A Manual and closely liaise with the stakeholders to address any environmental concerns.

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

In the reporting month, no air-borne noise exceedance of both Action and Limit Levels was recorded. Actions stipulated under the Event and Action Plan (Table 2.3 of the EM&A Manual) would be undertaken when exceedance is recorded.

No exceedance of both 24-hr TSP Action and Limit Levels was recorded in the reporting month. Actions stipulated under the Event and Action Plan (Table 3.3 of the EM&A Manual) would be undertaken when exceedance is recorded.

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

No notification of environmental warnings from EPD, no summons, no non-compliance and no prosecutions was received related to the Roadworks by MTRCL and the Contractors of 810A, 810B and 811B in the reporting period.

## 8. FUTURE KEY ISSUES

### 8.1 *Construction Works in Coming Months*

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

<b>Contract</b>	<b>Major Construction Activities</b>
810A	Telecom Cable Slewing; Removal of abandon foul sewer; Bored pile head trimming; Excavation; Strut installation; Bore piling; Pre-drilling; Sheet pile installation; Culvert wall removal; Backfilling; Pipe pile wall; Grout curtain; Pile cap construction; Bearing installation; Pier column construction; and Bracing modification
810B	Sheet piling; Drainage work and Road diversion
811B	Forming temporary road for shifting Lin Cheung Road towards west; and Removal of a portion of temporary footbridge

**Table 8-1** Summary of construction works in the coming month (i.e. October 2014)

According to the latest programme, civil construction would be continued in the 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 air-borne 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 1 to 30 September 2014. The major construction activities in the reporting period included foundation works in the West Kowloon Works Areas.

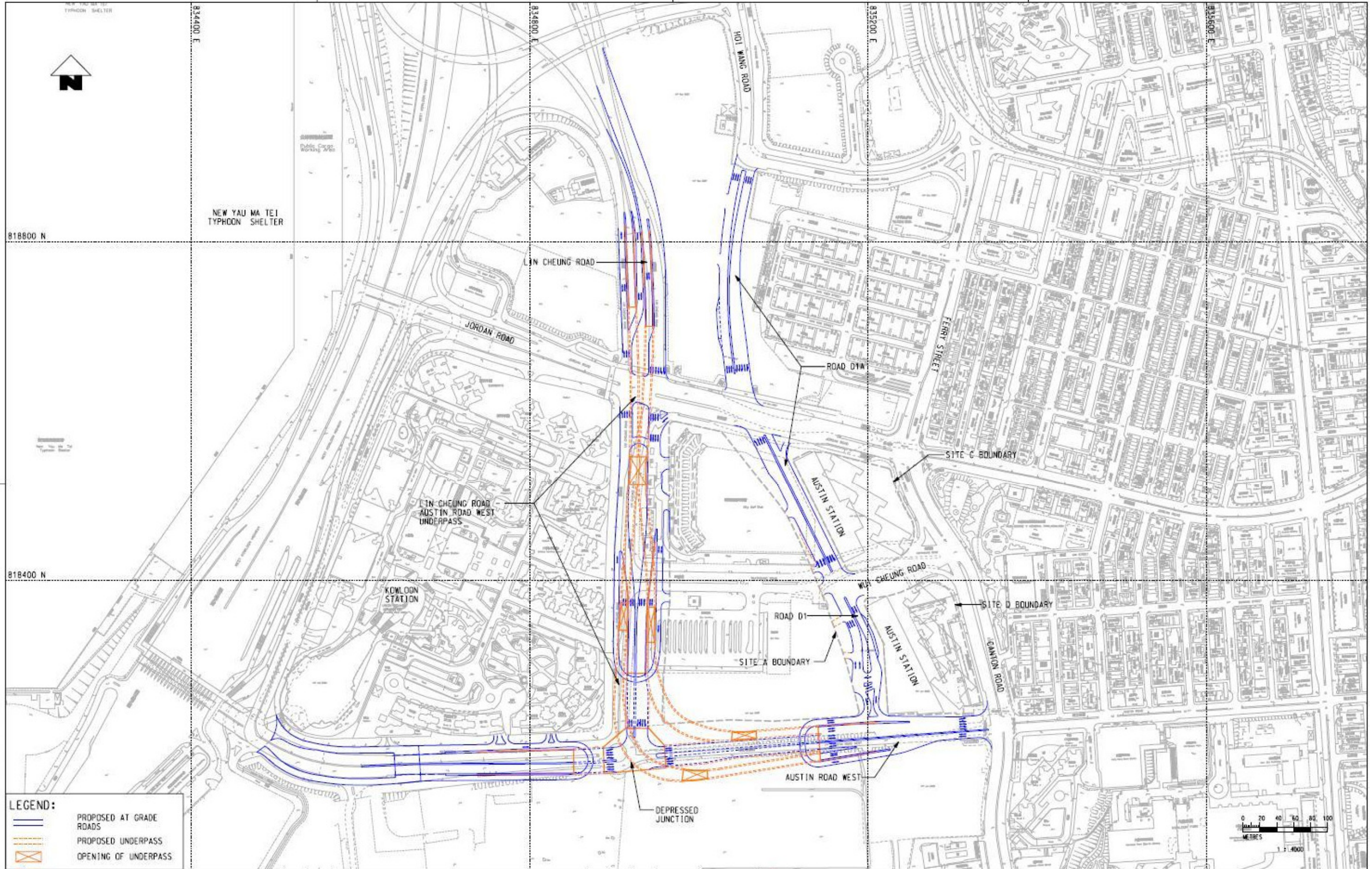
Impact monitoring for air quality and air-borne noise were conducted in accordance with the EM&A Manual in the reporting period. No exceedance of both air-borne noise Action and Limit Levels were recorded in the reporting month. No exceedance of both 24-hour TSP Action and Limit Levels was recorded in the reporting month.

For the reporting month, no environmental complaint was referred from EPD. The complaint would be handled in accordance with the procedures stipulated in the EM&A Manual when receive. Apart from that, no warning, no summons, no prosecutions and no non-compliance were received for Roadworks in the reporting month.

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.

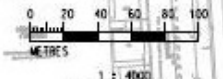
Appendix A

Works Area



**LEGEND:**

	PROPOSED AT GRADE ROADS
	PROPOSED UNDERPASS
	OPENING OF UNDERPASS



				DRAWN YJP DESIGNED TNF CHECKED KCC APPROVED PL DATE 11/MAR./2009				TITLE <b>ROAD WORKS AT WEST KOWLOON</b>	
				OPERATOR PROJECT DIVISION				PROPOSED ROAD WORKS AT WEST KOWLOON	
				CADW REF. NOL_ERL_300_C_WKT_ENS_M62_001A.dgn				SCALE 1 : 4000 (A3)	
								FIGURE NO. NOL/ERL/300/C/WKT/ENS/M62/001	
								REV. A	

WORKS AREA for ROAD WORKS



## Appendix B

# Project Management Organization and Contacts of Key Personnel

<b>Title</b>	<b>Name</b>	<b>Telephone</b>
<b>Engineer's Representative</b>		
Construction Manager (Contract 810A)	Mr. Stephen BOREMAN	2926 9170
Construction Manager (Contract 810B)	Mr. KS LIM	2926 9098
Construction Manager (Contract 810A/811B)	Mr. Albert LAM	2164 2988
<b>Independent Environmental Checker</b>		
Divisional Manager	Dr. Anne KERR	2828 5793
<b>Environmental Team</b>		
Environmental Team Leader	Mr. Richard KWAN	2688 1179
<b>Contractors</b>		
<b><i>Contract 810A</i></b>		
Principle Project Director	Mr. Wes JONES	3759 9810
Senior Environmental Officer	Mr. Dominic FUNG	3759 9796
Environmental Officer	Ms. Shirley LUI	3759 9791
<b><i>Contract 810B</i></b>		
Project Director	Mr. Jeremy MATTERSON	2472 8050
Environmental Manger	Mr. Calvin SZE	2472 9509
Environmental Officer	Ms. Cheese POON	2472 9510
<b><i>Contract 811B</i></b>		
Project Manager	Mr. Chris WILLIAMS	2269 1518
Project Quality and Environmental Manager	Mr. Michael LENEY	2269 1505
Environmental Officer	Ms. Sammie CHAN	2269 1507

# Appendix C

## Implementation Status

**Appendix C IMPLEMENTATION SCHEDULE OF THE RECOMMENDED MITIGATION MEASURES FOR 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
<b>Noise Control</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	Implement as per the construction programme.
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.	Contractor	Throughout the whole construction phase	Movable noise barriers have been made and placed at the excavation zone or the works areas that will generate noise nuisance, if applicable.

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; and</li> <li>• Material stockpiles and other structures should be effectively utilized, wherever practicable, in</li> </ul>	To reduce the construction air-borne noise impact.	Contractor	Throughout the whole construction phase	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
3.57	screening noise from on-site construction activities	To reduce the construction air-borne noise impact.	Contractor	Throughout the whole construction phase	Implemented as per construction programme.
<b>Air Quality Control</b>					
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 as recommended.	To reduce the construction air-borne noise impact.	Contractor	Throughout the whole construction phase	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> </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
4.77	<ul style="list-style-type: none"> <li>• Where a site boundary 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.</li> <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 be covered entirely by clean impervious sheeting to</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
4.77	<p>ensure dust materials do not spread from the vehicle.</p> <ul style="list-style-type: none"> <li>Investigation 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>	To reduce the construction air-borne noise impact.	Contractor	Throughout the whole construction phase	Implemented.
<b>Water Quality Control</b>					
5.30 -5.42	<p>General Construction Activities and Construction site run-off::</p> <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	<p>Effluent Discharge</p> <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</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
5.43	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 monitoring should be carried out in accordance with the relevant WPCO licence which is under the ambit of regional office (RO) of EPD.	To control water quality impact from construction site runoff and general construction activities.	Contractor	Throughout the whole construction phase	Implemented.
5.44	<p>Groundwater</p> <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. Ground water 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	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
5.45 -5.47	<p>Accidental Spillage</p> <ul style="list-style-type: none"> <li>• Contractor must register as a chemical waste producer if chemical wastes would be 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.</li> <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.</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
5.45 -5.47	<p>The Code of Practice on the 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>	To control water quality impact from construction site runoff and general construction activities.	Contractor	Throughout the whole construction phase	Implemented.
5.48 -5.49	<p>Sewage Effluent from Construction Workforce</p> <ul style="list-style-type: none"> <li>• Sufficient chemical toilets should be provided in the works areas. A licensed</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
5.48 -5.49	<p>waste collector should be deployed to clean the chemical toilets on a regular basis.</p> <ul style="list-style-type: none"> <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>	To control water quality impact from construction site runoff and general construction activities.	Contractor	Throughout the whole construction phase	Implemented.
<b>Waste Management</b>					
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> </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
6.47	<ul style="list-style-type: none"> <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 either covering trucks or by transporting wastes in enclosed containers;</li> <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>	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
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 general refuse generated by the workforce;</li> <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</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 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
6.51	<p>generation of waste; and</p> <ul style="list-style-type: none"> <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>	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 as per construction programme.
6.52	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 construction activities.	To keep trace of the generation, minimization, reuse and disposal of C&D materials in the Project	Contractor	Throughout the whole construction phase	Implemented as per construction programme.
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.
6.60	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	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
6.60	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.
6.56	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.
6.59	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 content to less than 25% dry density before disposal, which reduce the impacts to the reception facilities.	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	To properly store the chemical waste within works areas	Contractor	Throughout the whole construction	Implemented.

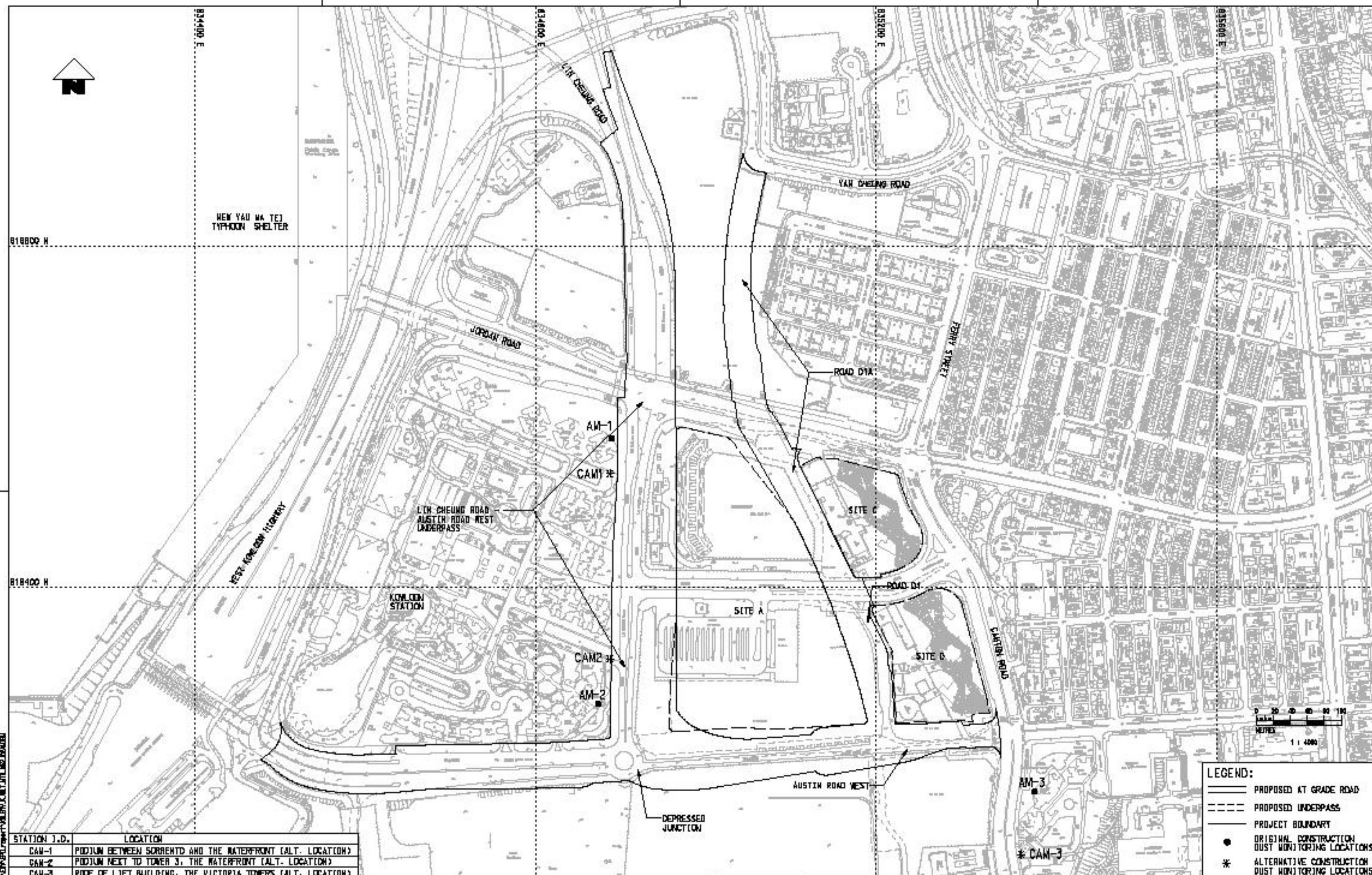


EIA Ref #	Environmental Protection Measures / Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	When to implement the measures?	Implementation Status
6.61	required to register with the EPD as a chemical waste producer and to follow the 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	phase 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 licensed facility, in accordance with the <i>Waste Disposal (Chemical Waste) (General) Regulation</i> .	To monitor the generation, reuse and disposal of chemical waste	Contractor	Throughout the whole construction phase	Implemented.
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.

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
6.66	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 by the Contractor on daily basis to avoid any adverse impacts on storage of refuse, which would be disposed of at designated landfills.	To facilitate recycling of recyclable portions of refuse	Contractor	Throughout the whole construction phase	Implemented.
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.
<b>Landscape and Visual Management</b>					
Table 7.4	<ul style="list-style-type: none"> <li>Topsoil, where identified, should be stripped and stored for re-use in the construction of the soft landscape works.</li> </ul>	To minimize landscape and visual impacts during construction phase	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
Table 7.4	<ul style="list-style-type: none"> <li>• Existing trees to be retained on site should be carefully protected during construction.</li> <li>• 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.</li> <li>• Compensatory tree planting provided to compensate for felled trees and maintained until end of the establishment period.</li> <li>• Control of night-time lighting glare</li> <li>• Erection of decorative screen hoarding compatible with the surrounding setting.</li> </ul>	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 LIFT BUILDING, THE VICTORIA TOWERS (ALT. LOCATION)

NO.	DESCRIPTION	BY	DATE	APPROVED BY
A1	FIRST DRAFT			

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

**MTR**

**EXPRESS RAIL LINK**

PROJECTS DIVISION | SUSTAINABILITY DEVELOPMENT DEPARTMENT

FILE NO. XRL/ENV/L/WT/MTR/M62/102

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

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**LEGEND:**

ID NO.	NOISE MONITORING STATION
CNM - 1	MAN CHEONG STREET REFUSE STATION (ALTERNATIVE LOCATION)
CNM - 2	TOWER 6, SORRENTO (Temporarily suspended)
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	REV	DESCRIPTION	BY	DATE	APPROVED
A1	FIRST DRAFT	YCC	05MAY11						

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

**EXPRESS RAIL LINK**  
 PROJECTS DIVISION | SUSTAINABILITY DEVELOPMENT DEPARTMENT  
 ORIGINATOR  
 CADD REF. XRLNV\_K\_WKT\_MTR\_M52\_101A1.DGN

TITLE	ROADWORK AT WEST KOWLOON LOCATION OF CONSTRUCTION NOISE MONITORING STATION	
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 - September 2014

Notes: **TSP** denotes Total Suspended Particulates

\* denotes that the noise monitoring at CNM-2 has been temporarily suspended since objection was received from the OC of Sorrento

Sep-2014						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1 CNM-1, CNM-3, CNM-4	2	3	4 CAM-1, CAM-2, CAM-3	5	6
7	8 CNM-1, CNM-3, CNM-4	9	10 CAM-1, CAM-2, CAM-3	11	12	13
14	15	16 CAM-1, CAM-2, CAM-3	17 CNM-1, CNM-3, CNM-4	18	19	20
21	22 CNM-1, CNM-3, CNM-4 CAM-1, CAM-2, CAM-3	23	24	25	26	27 CAM-1, CAM-2, CAM-3
28	29 CNM-1, CNM-3, CNM-4	30				



## Tentative Construction Dust (24-hr TSP) and Air-borne Noise Impact Monitoring Schedule - October 2014

Notes: **TSP** denotes Total Suspended Particulates

\* denotes that the noise monitoring at CNM-2 has been temporarily suspended since objection was received from the OC of Sorrento

Oct-2014						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1	2	3 CAM-1, CAM-2, CAM-3	4
5	6 CNM-1, CNM-3, CNM-4	7	8 CAM-1, CAM-2, CAM-3	9	10	11
12	13 CNM-1, CNM-3, CNM-4	14 CAM-1, CAM-2, CAM-3	15	16	17	18
19	20 CNM-1, CNM-3, CNM-4 CAM-1, CAM-2, CAM-3	21	22	23	24	25 CAM-1, CAM-2, CAM-3
26	27 CNM-1, CNM-3, CNM-4	28	29	30	31 CAM-1, CAM-2, CAM-3	

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
	( $\mu\text{g}/\text{m}^3$ )	( $\mu\text{g}/\text{m}^3$ )	( $\mu\text{g}/\text{m}^3$ )
04-Sep-14	43.0	168.8	260.0
10-Sep-14	41.1	168.8	260.0
16-Sep-14	41.3	168.8	260.0
22-Sep-14	79.6	168.8	260.0
27-Sep-14	45.0	168.8	260.0

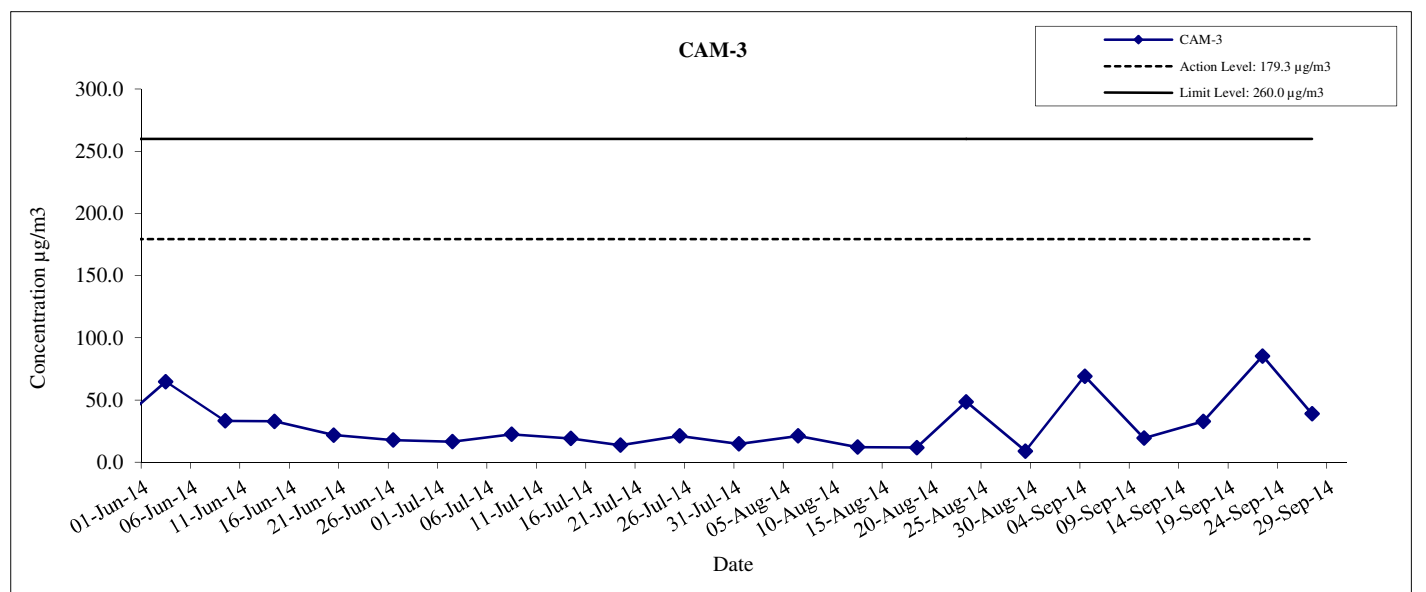
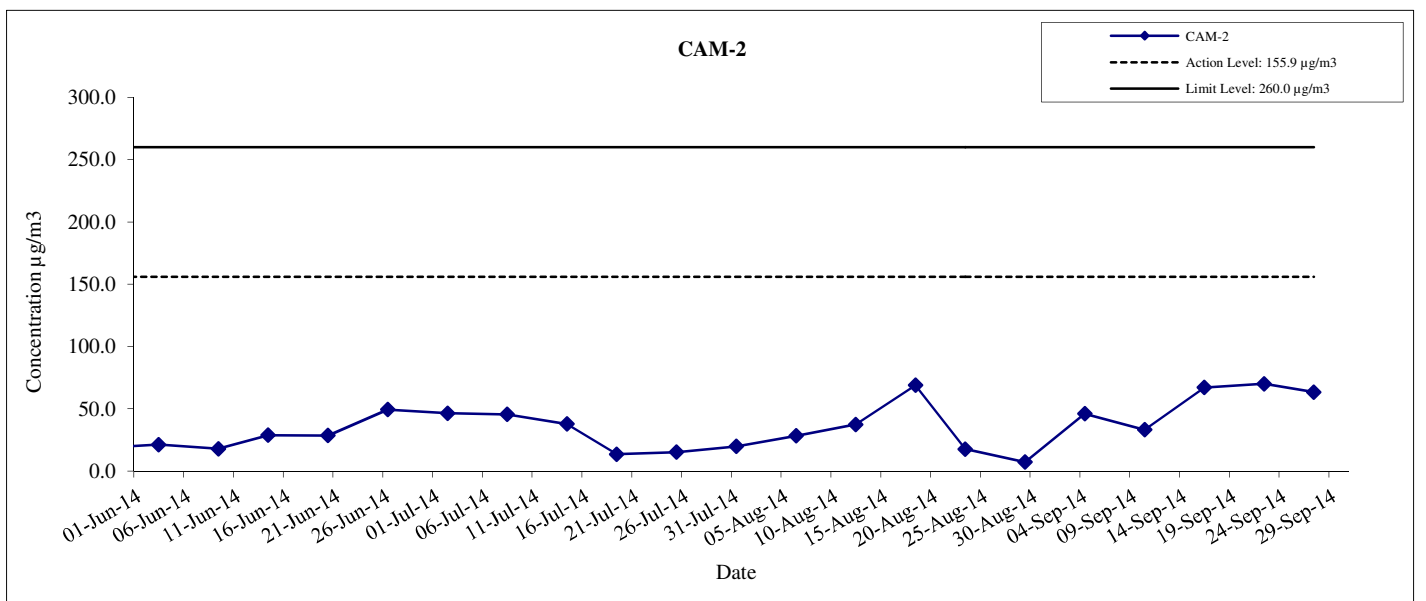
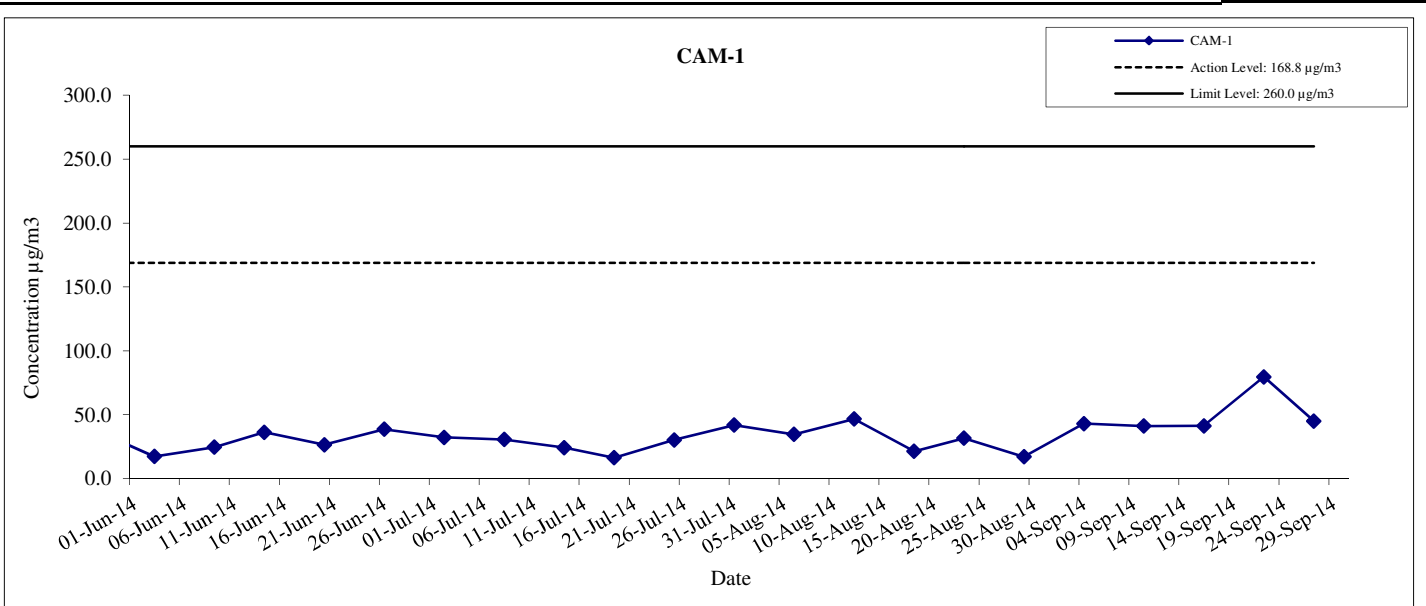
### - CAM-2

Date	24-hour TSP Monitoring Results	Action Level	Limit Level
	( $\mu\text{g}/\text{m}^3$ )	( $\mu\text{g}/\text{m}^3$ )	( $\mu\text{g}/\text{m}^3$ )
04-Sep-14	46.1	155.9	260.0
10-Sep-14	33.2	155.9	260.0
16-Sep-14	67.2	155.9	260.0
22-Sep-14	70.1	155.9	260.0
27-Sep-14	63.4	155.9	260.0

### - CAM-3

Date	24-hour TSP Monitoring Results	Action Level	Limit Level
	( $\mu\text{g}/\text{m}^3$ )	( $\mu\text{g}/\text{m}^3$ )	( $\mu\text{g}/\text{m}^3$ )
04-Sep-14	69.1	179.3	260.0
10-Sep-14	19.3	179.3	260.0
16-Sep-14	32.8	179.3	260.0
22-Sep-14	85.4	179.3	260.0
27-Sep-14	38.9	179.3	260.0

Remark: 1. Bold value indicated an Action level exceedance  
 2. Bold & Italic value indicated an Limit level exceedance



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

**Graphical Presentation of 24-hour TSP Monitoring  
Results for Location CAM-1, CAM-2 and CAM-3**

**Date**

**Sep-14**

**APPENDIX**

**F**

## APPENDIX F: Noise Monitoring Results

### - CNM-1

Date	Noise Monitoring Results	Limit Level	Exceedance?
	Leq, dB(A)	Leq, dB(A)	
01-Sep-14	65	75	N
08-Sep-14	66	75	N
17-Sep-14	69	75	N
22-Sep-14	66	75	N
29-Sep-14	64	75	N

### - CNM-2 <sup>[b]</sup>

Date	Noise Monitoring Results	Limit Level	Exceedance?
	Leq, dB(A)	Leq, dB(A)	
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

### - CNM-3 <sup>[a]</sup>

Date	Noise Monitoring Results	Limit Level	Exceedance?
	Leq, dB(A)	Leq, dB(A)	
01-Sep-14	74	75	N
08-Sep-14	73	75	N
17-Sep-14	75	75	N
22-Sep-14	74	75	N
29-Sep-14	74	75	N

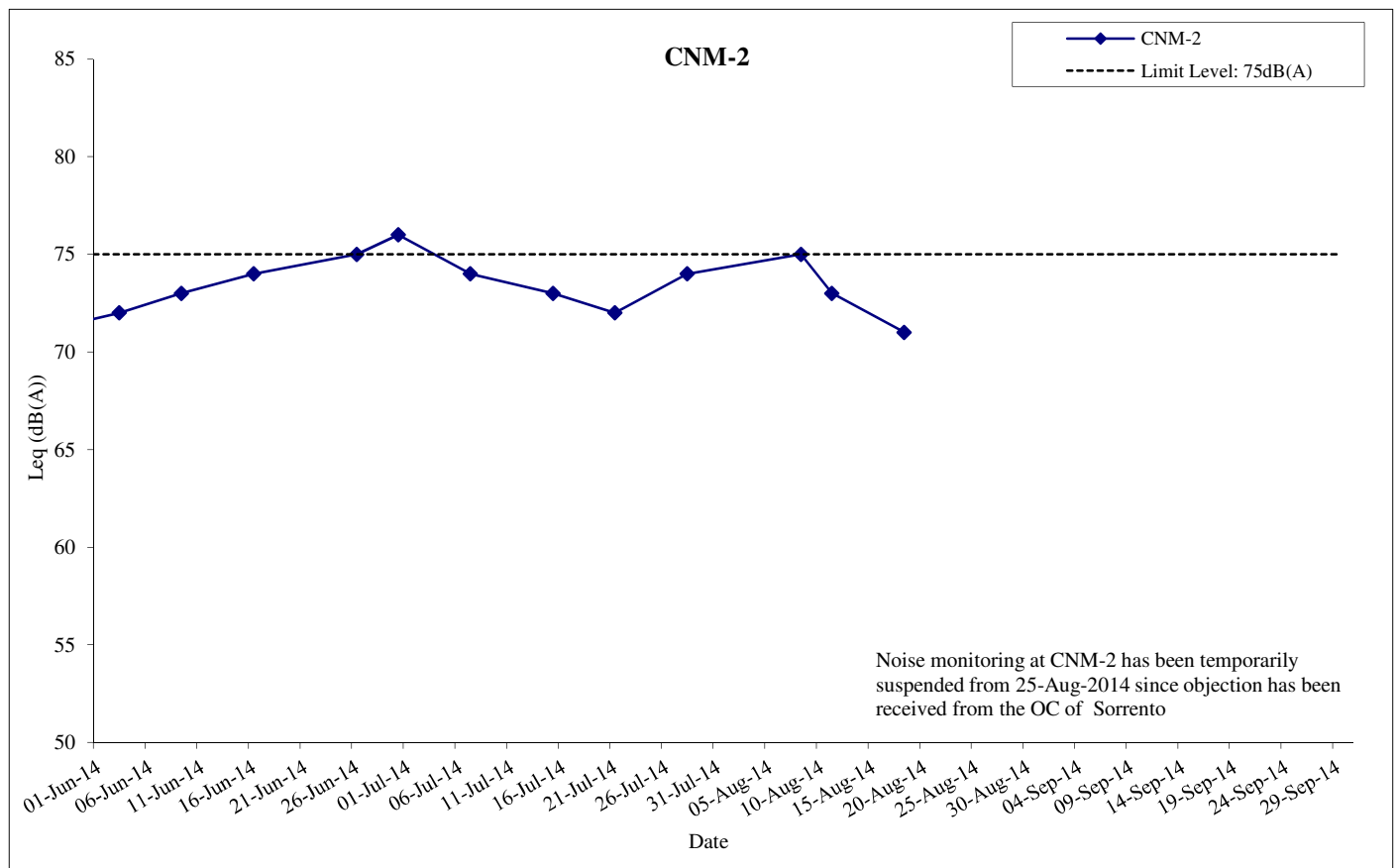
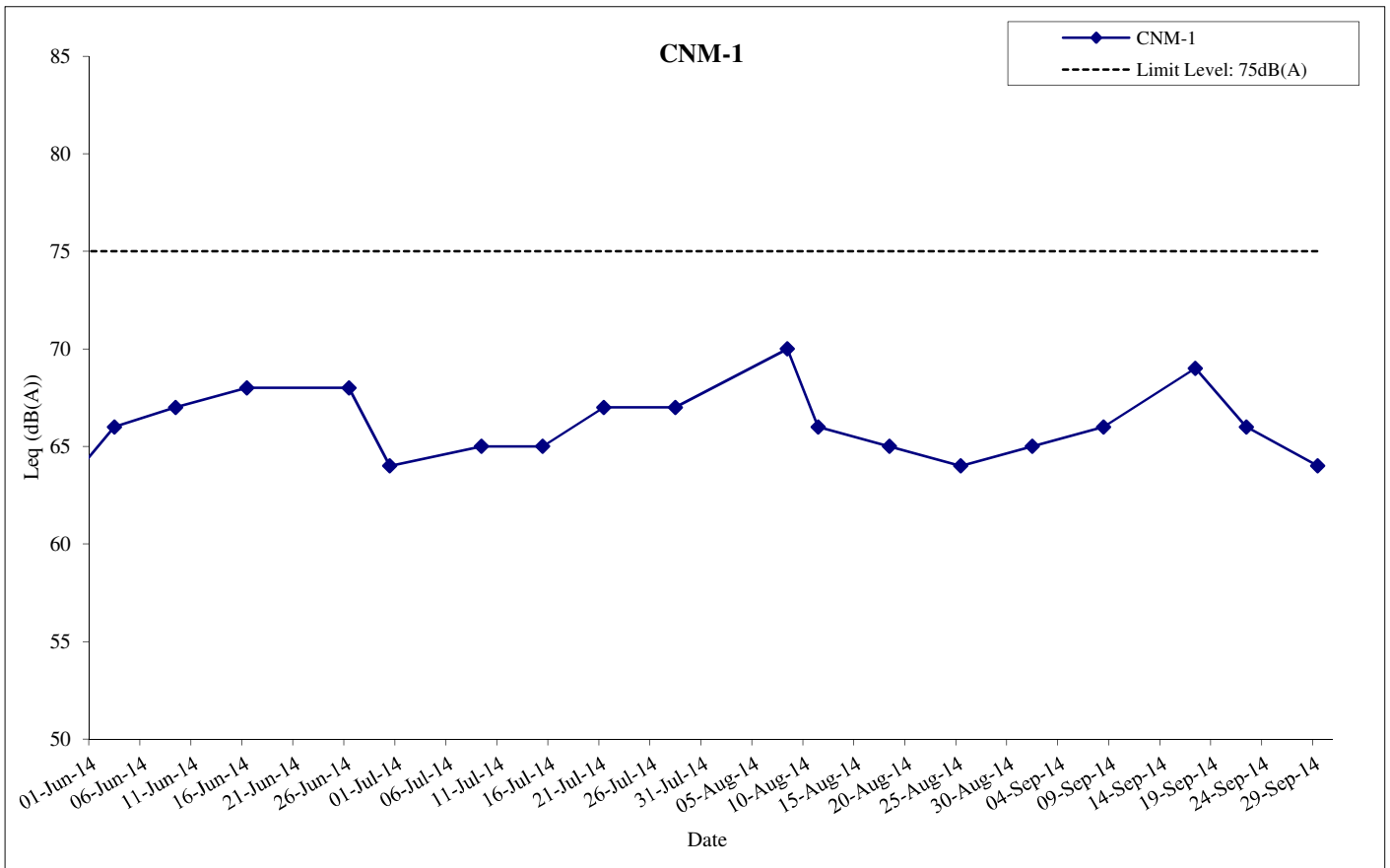
### - CNM-4

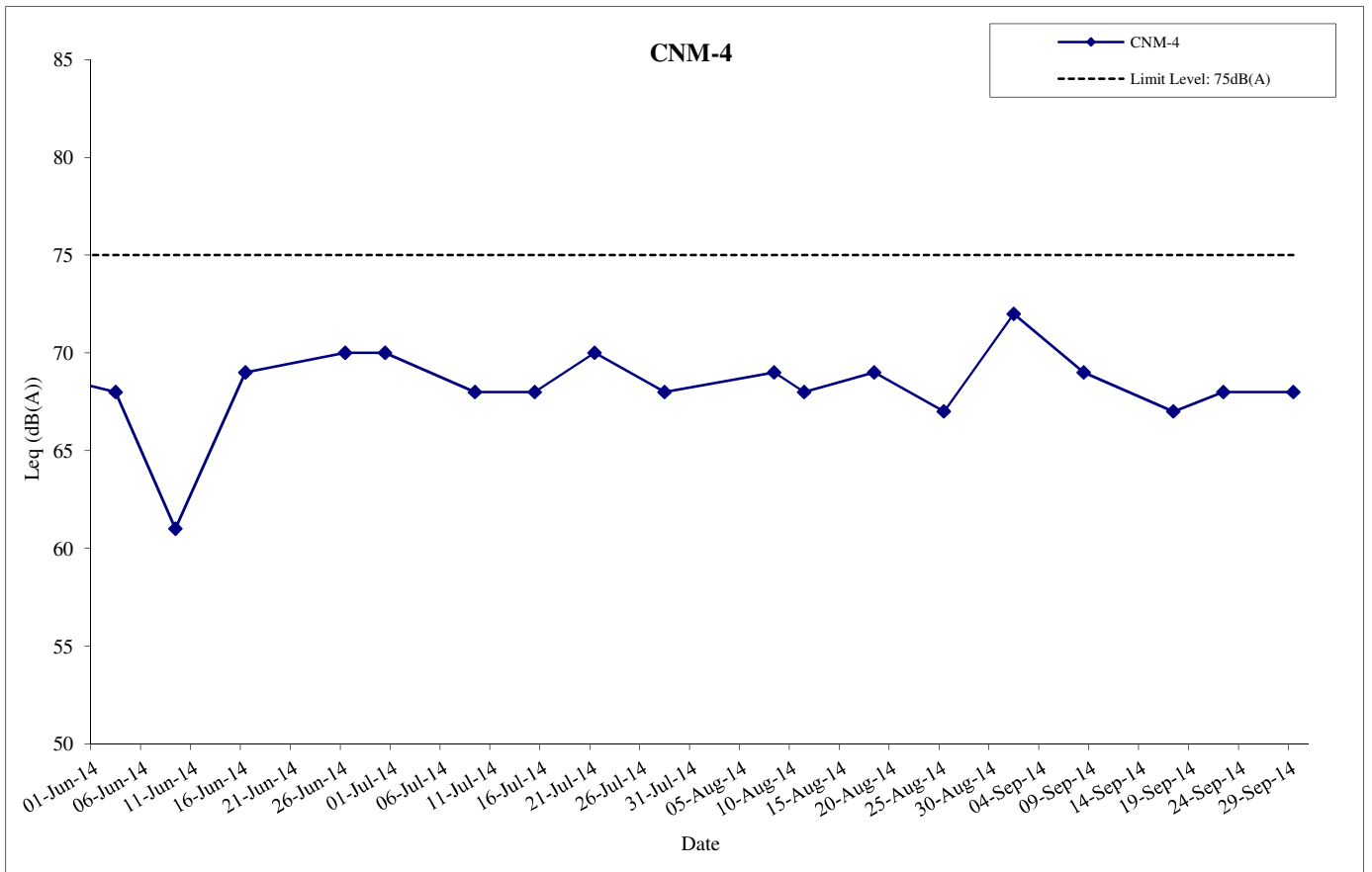
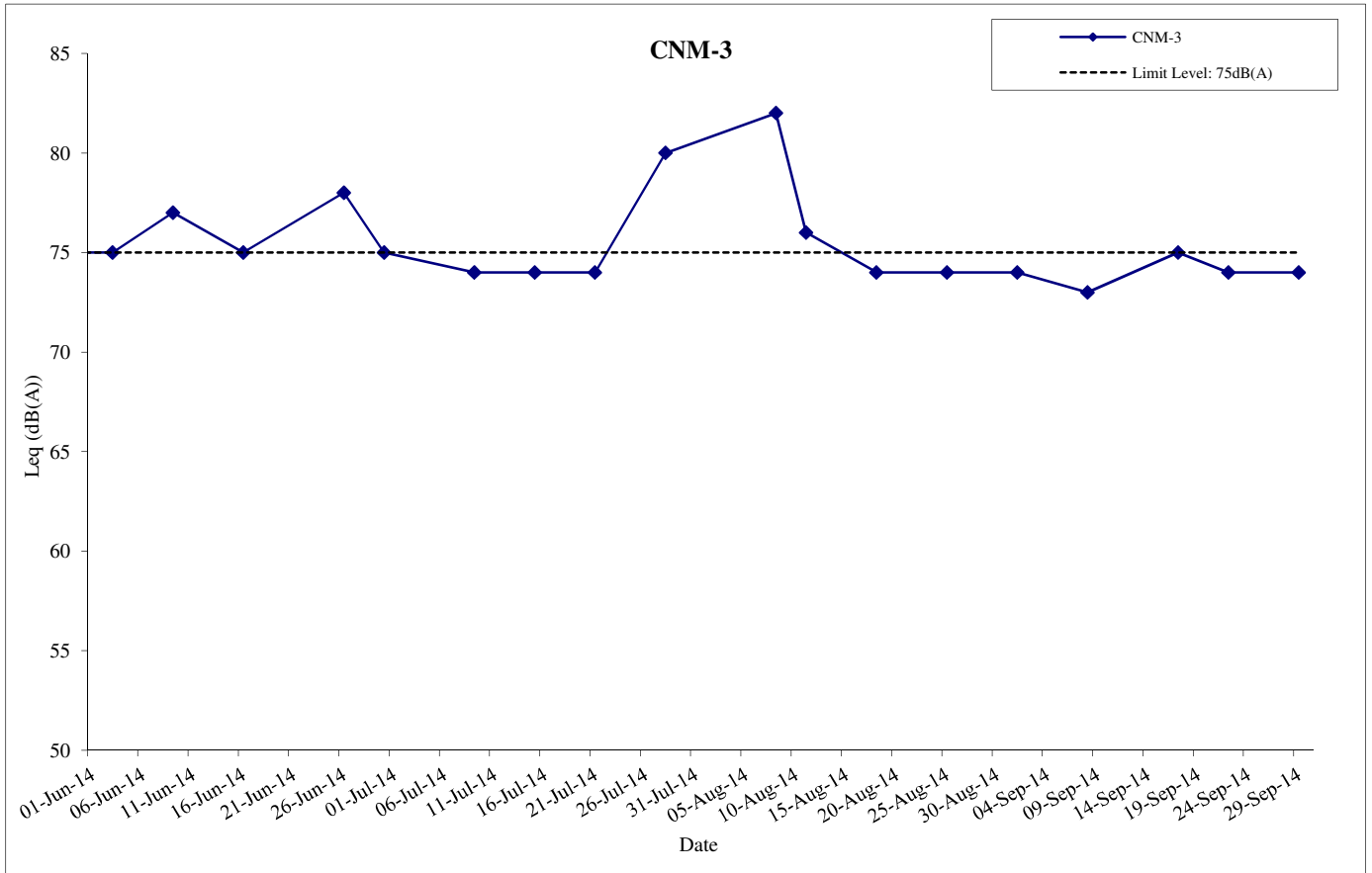
Date	Noise Monitoring Results	Limit Level	Exceedance?
	Leq, dB(A)	Leq, dB(A)	
01-Sep-14	72	75	N
08-Sep-14	69	75	N
17-Sep-14	67	75	N
22-Sep-14	68	75	N
29-Sep-14	68	75	N

**Note:**

[a]. Facade correction of +3dB(A) would be added to the results taken at CNM-3 due to free-field noise measurements.

[b]. Noise monitoring has been temporarily suspended from 25-Aug-2014 since objection has been received from the OC of Sorrento.





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

Graphical Presentation of Noise Monitoring Results for Locations CNM-3 and CNM-4

Date

Sep-14

APPENDIX

F

Appendix G  
Meteorological Data



**EXTRACT OF METEOROLOGICAL OBSERVATIONS FOR HONG KONG,  
SEPTEMBER 2014 (Table 1)**

Date SEPTEMBER	Mean Pressure (hPa)	Air Temperature			Mean Dew Point Temperature (deg. C)	Mean Relative Humidity (%)	Mean Amount of Cloud (%)	Total Rainfall (mm)
		Maximum (deg. C)	Mean (deg. C)	Minimum (deg. C)				
1	1010.5	32.7	29.5	27.1	25.6	80	57	2.2
2	1010.8	32.2	29.4	27.4	24.4	75	36	-
3	1009.3	32.8	29.8	27.6	24.6	75	33	-
4	1006.9	31.6	29.2	27.4	24.8	77	51	6.7
5	1007.2	32.7	29.7	27.9	25.7	80	65	Trace
6	1007.7	33.6	29.9	27.7	25.0	75	52	Trace
7	1007.5	32.9	29.8	28.3	25.6	79	79	0.6
8	1007.0	31.0	29.1	27.5	25.9	83	86	3.0
9	1007.9	32.5	29.7	28.0	25.0	76	52	-
10	1008.1	33.9	30.0	28.1	24.9	75	59	Trace
11	1008.0	34.1	30.3	28.1	25.3	75	73	Trace
12	1006.3	31.6	28.0	26.1	25.8	88	86	32.1
13	1006.0	32.1	29.0	26.9	26.1	85	65	6.2
14	1006.1	33.4	29.8	27.6	25.8	80	46	0.5
15	1001.8	33.2	29.2	26.4	25.1	79	75	17.6
16	1003.6	28.8	27.3	26.2	25.2	89	87	51.6
17	1011.2	30.5	28.1	26.6	25.9	88	85	7.7
18	1012.0	32.5	29.1	26.9	25.1	79	32	Trace
19	1006.8	32.2	29.9	27.4	25.3	77	35	0.3
20	1004.0	33.0	29.2	26.7	22.1	66	63	-
21	1005.3	29.9	27.2	25.7	20.2	66	71	-
22	1007.1	29.6	27.2	25.2	20.8	68	64	Trace

Date SEPTEMBER	Mean Pressure (hPa)	Air Temperature			Mean Dew Point Temperature (deg. C)	Mean Relative Humidity (%)	Mean Amount of Cloud (%)	Total Rainfall (mm)
		Maximum (deg. C)	Mean (deg. C)	Minimum (deg. C)				
23	1008.6	30.1	27.5	25.6	22.1	72	47	-
24	1011.0	29.9	28.1	26.4	23.3	76	69	Trace
25	1012.1	31.2	28.5	26.8	23.8	76	53	-
26	1012.5	31.4	28.4	27.2	23.8	77	61	0.7
27	1013.0	31.7	28.7	27.0	24.2	77	30	-
28	1012.2	32.8	29.1	26.7	24.1	75	28	-
29	1011.4	32.4	29.3	27.2	23.9	73	29	-
30	1011.1	33.6	29.6	27.1	25.3	78	43	11.4
Mean/Total	1008.4	32.0	29.0	27.0	24.5	77	57	140.6
Normal*	1008.9	30.1	27.7	25.8	23.4	78	66	327.6
Station	Hong Kong Observatory							

**EXTRACT OF METEOROLOGICAL OBSERVATIONS FOR HONG KONG,  
SEPTEMBER 2014 (Table 2)**

Date SEPTEMBER	Number of hours of Reduced Visibility# (hours)	Total Bright Sunshine (hours)	Daily Global Solar Radiation (MJ/m <sup>2</sup> )	Total Evaporation (mm)	Prevailing Wind Direction (degrees)	Mean Wind Speed (km/h)
1	0	9.2	23.12	6.0	140	11.6
2	0	9.1	20.03	5.5	230	7.6
3	0	10.9	23.81	6.2	260	20.7
4	3	5.8	12.57	3.3	080	10.4
5	0	7.1	20.99	5.1	080	21.2
6	0	10.7	22.58	6.0	100	18.0

<b>Date</b> <b>SEPTEMBER</b>	<b>Number of hours</b> <b>of Reduced</b> <b>Visibility#</b> <b>(hours)</b>	<b>Total</b> <b>Bright</b> <b>Sunshine</b> <b>(hours)</b>	<b>Daily</b> <b>Global</b> <b>Solar</b> <b>Radiation</b> <b>(MJ/m<sup>2</sup>)</b>	<b>Total</b> <b>Evaporation</b> <b>(mm)</b>	<b>Prevailing</b> <b>Wind</b> <b>Direction</b> <b>(degrees)</b>	<b>Mean</b> <b>Wind</b> <b>Speed</b> <b>(km/h)</b>
7	0	4.6	17.02	3.9	070	33.0
8	0	1.8	11.44	3.4	180	18.3
9	0	9.7	21.41	4.7	220	10.4
10	0	8.3	18.05	3.5	180	8.3
11	0	8.7	21.74	7.1	090	14.7
12	0	2.0	10.36	1.5	070	32.8
13	0	8.9	22.01	4.9	170	18.9
14	0	9.8	22.79	6.4	080	14.6
15	0	5.8	15.97	N.A.	070	41.2
16	0	0.1	5.71	2.2	150	58.6
17	0	1.3	6.84	1.7	150	32.7
18	0	10.7	23.04	5.1	180	9.3
19	7	6.0	13.44	6.0	310	12.8
20	0	9.1	20.79	5.5	030	26.9
21	0	2.6	9.61	4.4	020	22.8
22	0	7.0	13.06	4.2	030	13.6
23	0	5.0	11.87	3.0	030	9.0
24	12	4.0	8.36	1.9	350	5.5
25	6	3.5	8.77	2.8	200	7.8
26	0	4.2	11.72	4.1	350	7.5
27	0	10.7	22.23	3.3	170	8.1
28	0	10.3	20.99	6.4	150	5.7
29	0	9.2	19.74	5.2	230	8.3
30	6	6.9	14.65	6.4	310	11.3

<b>Date</b> <b>SEPTEMBER</b>	<b>Number of hours of Reduced Visibility# (hours)</b>	<b>Total Bright Sunshine (hours)</b>	<b>Daily Global Solar Radiation (MJ/m<sup>2</sup>)</b>	<b>Total Evaporation (mm)</b>	<b>Prevailing Wind Direction (degrees)</b>	<b>Mean Wind Speed (km/h)</b>
Mean/Total	34	203.0	16.49	129.7 <sup>^</sup>	080	17.4
Normal*	90.6 <sup>§</sup>	172.3	14.61	125.9	090	22.6
Station	Hong Kong International Airport	King's Park			Waglan Island	

The minimum pressure recorded at the Hong Kong Observatory was 998.7 hectopascals at 1606 HKT on 16 September.

The maximum air temperature recorded at the Hong Kong Observatory was 34.1 degrees C at 1454 HKT on 11 September.

The minimum air temperature recorded at the Hong Kong Observatory was 25.2 degrees C at 0644 HKT on 22 September.

The maximum gust peak speed recorded at Waglan Island was 112 kilometres per hour from 090 degrees at 0015 HKT on 16 September.

The maximum instantaneous rate of rainfall recorded at the Hong Kong Observatory was 330 millimetres per hour at 0940 HKT on 16 September.

- # Reduced visibility refers to visibility below 8 kilometres when there is no fog, mist, or precipitation.
- The visibility readings at the Hong Kong International Airport are based on hourly observations by professional meteorological observers in 2004 and before, and average readings over the 10-minute period before the clock hour of the visibility meter near the middle of the south runway from 2005 onwards. The change of the data source in 2005 is an improvement of the visibility assessment using instrumented observations following the international trend.
  - Before 10 October 2007, the number of hours of reduced visibility at the Hong Kong International Airport in 2005 and thereafter displayed in this web page was based on hourly visibility observations by professional meteorological observers. Since 10 October 2007, the data have been revised using the average visibility readings over the 10- minute period before the clock hour, as recorded by the visibility meter near the middle of the south runway.

\* 1981 – 2010 Climatological Normal, unless otherwise specified

§ 1997 – 2013 Mean value

<sup>^</sup> Total for 29 days

## Appendix H

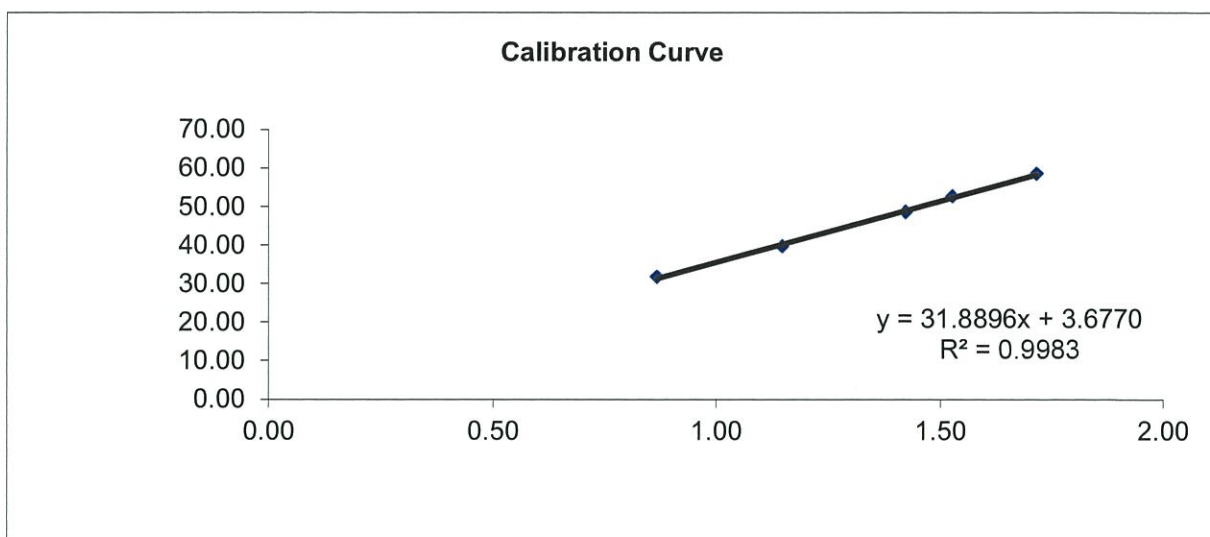
### Calibration Certificates of HVS

# Ove Arup Partners (Hong Kong) Limited

## High Volume Air Sampler Calibration Worksheet

Calibration date	19-Sep-14	Barometric pressure	756.8 mm Hg
Next Calibration date	18-Mar-15	Temperature (°C)	27.7 °C
Sampler location	AM15 (XRL)/CAM-1(Roadworks at West Kowloon) - Between Sorrento and Waterfront		
Sampler model	TE-5170	Temperature (K)	300.7 K
Sampler serial number	515	P <sub>std</sub>	760 mm Hg
		T <sub>std</sub>	298 K
Calibrator model	GMW-2535		
Calibrator serial number	2421		
Slope of the standard curve, m <sub>s</sub>	2.0458		
Intercept of the standard curve, b <sub>s</sub>	0.0019		

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	32.00	0.87	31.79
7	5.60	40.00	1.15	39.74
10	8.60	49.00	1.42	48.68
13	9.90	53.00	1.53	52.65
18	12.50	59.00	1.72	58.61



**Linear Regression**

Sampler slope (m) : **31.8896**  
 Sampler intercept (b) : **3.6770**  
 Correlation coefficient (R<sup>2</sup>) : **0.9983**

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

Performed by:   
 Checked by:   
 Approved by:

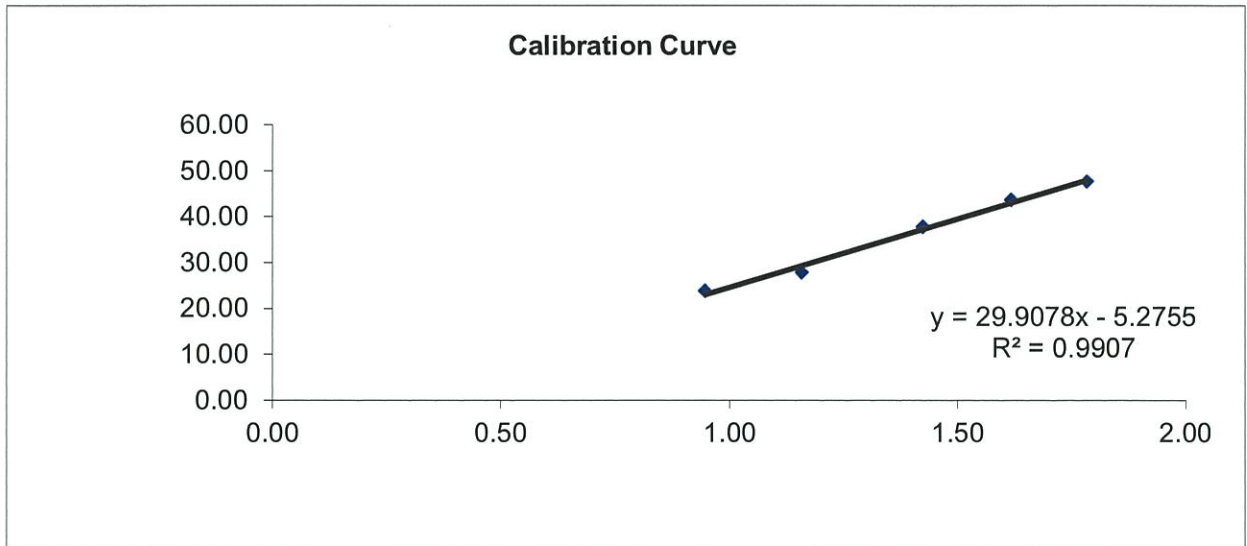
Date: 19 Sep 2014  
 Date: 19 Sep 2014  
 Date: 19 Sep 2014

# Ove Arup Partners (Hong Kong) Limited

## High Volume Air Sampler Calibration Worksheet

Calibration date	19-Sep-14	Barometric pressure	756.8 mm Hg
Next Calibration date	18-Mar-15	Temperature (°C)	27.7 °C
Sampler location	AM16 (XRL)/CAM-2(Roadworks at West Kowloon) - Waterfront	Temperature (K)	300.7 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	2421		
Slope of the standard curve, m <sub>s</sub>	2.0458		
Intercept of the standard curve, b <sub>s</sub>	0.0019		

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	3.80	24.00	0.95	23.84
7	5.70	28.00	1.16	27.82
10	8.60	38.00	1.42	37.75
13	11.10	44.00	1.62	43.71
18	13.50	48.00	1.78	47.68



**Linear Regression**  
 Sampler slope (m) : **29.9078**  
 Sampler intercept (b) : **-5.2755**  
 Correlation coefficient (R<sup>2</sup>) : **0.9907**

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

Performed by: \_\_\_\_\_

Date: 19 Sep 2014

Checked by: \_\_\_\_\_

Date: 19 Sep 2014

Approved by: \_\_\_\_\_

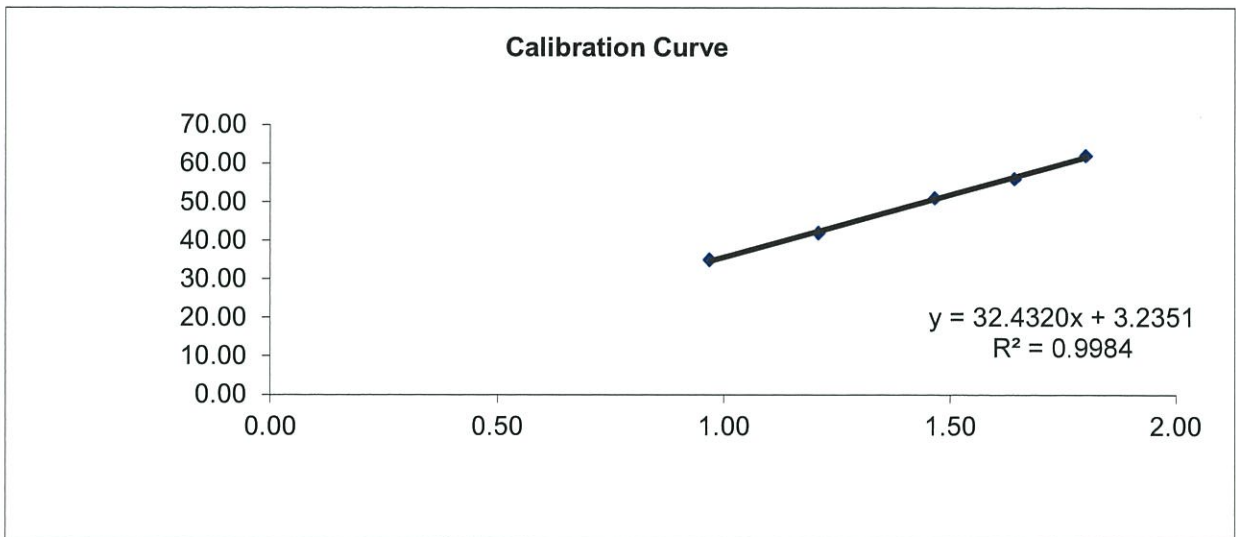
Date: 19 Sep 2014

# Ove Arup Partners (Hong Kong) Limited

## High Volume Air Sampler Calibration Worksheet

Calibration date	23-Sep-14	Barometric pressure	757.5 mm Hg
Next Calibration date	22-Mar-15	Temperature (°C)	24 °C
	AM17 (XRL)/CAM-3(Roadworks at West Kowloon) - The Victoria		
Sampler location	Towers	Temperature (K)	297 K
Sampler model	TE-5170	P <sub>std</sub>	760 mm Hg
Sampler serial number	528	T <sub>std</sub>	298 K
Calibrator model	GMW-2535		
Calibrator serial number	2421		
Slope of the standard curve, m <sub>s</sub>	2.06238		
Intercept of the standard curve, b <sub>s</sub>	-0.02415		

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	3.90	35.00	0.97	35.00
7	6.10	42.00	1.21	42.00
10	9.00	51.00	1.47	51.00
13	11.30	56.00	1.64	56.00
18	13.60	62.00	1.80	62.00



**Linear Regression**

Sampler slope (m) : **32.4320**  
 Sampler intercept (b) : **3.2351**  
 Correlation coefficient (R<sup>2</sup>) : **0.9984**

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

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

Date: 23 Sep 2014  
 Date: 23 Sep 2014  
 Date: 19 Sep 2014





TISCH ENVIRONMENTAL, INC.  
 145 SOUTH MIAMI AVE  
 VILLAGE OF CLEVELAND, OH  
 45002  
 513.467.9000  
 877.263.7610 TOLL FREE  
 513.467.9009 FAX

ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - Jan 27, 2014 Rootmeter S/N 0438320 Ta (K) - 293  
 Operator Tisch Orifice I.D. - 2421 Pa (mm) - 754.38

PLATE OR Run #	VOLUME START (m3)	VOLUME STOP (m3)	DIFF VOLUME (m3)	DIFF TIME (min)	METER	ORFICE
					DIFF Hg (mm)	DIFF H2O (in.)
1	NA	NA	1.00	1.4360	3.2	2.00
2	NA	NA	1.00	1.0120	6.4	4.00
3	NA	NA	1.00	0.9090	7.9	5.00
4	NA	NA	1.00	0.8650	8.8	5.50
5	NA	NA	1.00	0.7140	12.7	8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)	Va	(x axis) Qa	(y axis)
1.0052	0.7000	1.4209	0.9957	0.6934	0.8814
1.0010	0.9891	2.0095	0.9915	0.9798	1.2464
0.9989	1.0989	2.2467	0.9894	1.0885	1.3936
0.9977	1.1535	2.3564	0.9883	1.1426	1.4616
0.9925	1.3901	2.8419	0.9831	1.3769	1.7627
Qstd slope (m) = 2.06238			Qa slope (m) = 1.29142		
intercept (b) = -0.02415			intercept (b) = -0.01498		
coefficient (r) = 0.99994			coefficient (r) = 0.99994		
y axis = SQRT[H2O(Pa/760) (298/Ta)]			y axis = SQRT[H2O(Ta/Pa)]		

CALCULATIONS

Vstd = Diff. Vol [(Pa-Diff. Hg)/760] (298/Ta)  
 Qstd = Vstd/Time

Va = Diff Vol [(Pa-Diff Hg)/Pa]  
 Qa = Va/Time

For subsequent flow rate calculations:

Qstd = 1/m{ [SQRT(H2O(Pa/760) (298/Ta))] - b}  
 Qa = 1/m{ [SQRT H2O(Ta/Pa)] - b}