

MTR Corporation Limited

ROAD WORKS at WEST KOWLOON

(No. EP-366/2009/A)

Environmental Monitoring and Audit Report No. 56
(February 2016)

Verified by : 
Position : Independent Environmental Checker
Date : 9 March 2016


MTR Corporation Limited

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Environmental Monitoring and Audit Report No. 56

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Certified by : 
Position : Environmental Team Leader
Date : 9 March 2016



ROADWORKS AT WEST KOWLOON



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EXECUTIVE SUMMARY

This is the 56th monthly Environmental Monitoring and Audit (EM&A) Report presenting the EM&A works undertaken during the period from 1 to 29 February 2016 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 three (3) noise monitoring locations in the vicinity of Works Area in West Kowloon currently in the interval of once every week since one of the noise monitoring locations has been temporarily suspended since objection has been received from the OC of Sorrento.

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 were detailed in Section 6.

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

For the reporting month, no environmental complaint related to the Roadworks 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 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 in 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 February 2016 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 56th monthly Environmental Monitoring and Audit (EM&A) Report presenting the EM&A works undertaken during the period from 1 to 29 February 2016 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 56th month of civil construction in Works Area in West Kowloon for February 2016. It is anticipated that the civil construction be completed in year 2018. The updated construction activity is provided in Section 8. Major construction activities undertaken in the reporting month is summarized in the following table.

Contract	Major Construction Activities
810A	Cable detection and trial trench; Backfilling; Excavation; Trimming of concrete footing; Temporary road diversion; Pump test; Construction of Lin Cheung Road (LCR) Lower Underpass Base and Wall; Noise panels installation works and painting works; and Concrete trimming of existing concrete footings
810B	Sheet piling, Drainage work and Road diversion
811B	Lin Cheung Road (LCR) underpass northbound (NB) sheet pile wall installation (with pre-boring); and LCR underpass NB (northern section) excavation and reinforced concrete (RC) works

Table 2-1 Major construction activities in the reporting month (February 2016)

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 29 February 2016 is presented in Table 3-1 below:

EP-366/2009/A Clause No.	Document Title	Status
3.4	Monthly Environmental Monitoring and Audit Report (January 2016)	Submitted on 15 February 2016

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
Contract 810A			
1.	Construction Noise Permit (General works)	19 Jan 2016	Granted on 2 Feb 2016 Permit No. GW-RE0104-16, valid from 4 Feb 2016 to 4 May 2016
Contract 810B			
1.	Construction Noise Permit (for Noise Mitigation Deck (NMD))	21 Jan 2016	Granted on 5 Feb 2016 Permit No. GW-RE0112-16, valid from 15 Feb 2016 to 30 Apr 2016
Contract 811B			
1.	No update in the reporting month		

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 ^[1]
<i>High Volume Sampler</i>			
CAM-1	Podium between Sorrento and The Waterfront	515	29 February 2016
CAM-2	Podium next to Tower 3, The Waterfront	1282	2 February 2016
CAM-3	Roof of Lift Building, The Victoria Towers	528	2 February 2016
<i>Orifice Calibrator</i>			
Serial Number		Last Calibration Date	
0438320		12 January 2016	

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

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.

Before and after each series of measurements, the accuracy of the sound level meter should be checked by using an acoustic calibrator generating a known sound pressure level at a known frequency. If the difference between the calibration levels obtained before and after each series of noise measurements is less than 1.0 dB, then the measurements could be considered as valid.

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 4-3.

Monitoring Station ID	Noise Monitoring Location	Serial Number	Last Calibration Date ^[1]
<i>Sound Level Meters</i>			
CNM-1	Man Cheong Street Refuse Station	2701816	12 January 2015
CNM-2 ^[2]	Tower 6, Sorrento	N/A	N/A
CNM-3	Podium next to Tower 3, The Waterfront	2701823	29 January 2015
CNM-4	Tower 2, The Harbour Side	2701886	9 June 2014

Monitoring Station ID	Noise Monitoring Location	Serial Number	Last Calibration Date ^[1]
<i>Calibrator</i>			
Serial Number		Last Calibration Date	
N674902		25 October 2014	

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 4-3 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 4-3 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 4-4 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 4-4 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 were summarized in the following table:

Reporting Month	Inert C&D ^[1] Materials (tonnes)	Non-inert C&D ^[2] Materials (tonnes)	Chemical Waste	
			(litre)	(kg)
Contract 810A ^[3]				
December 2015	0	0	0	0

Reporting Month	Inert C&D ^[1] Materials (tonnes)	Non-inert C&D ^[2] Materials (tonnes)	Chemical Waste	
			(litre)	(kg)
January 2016	0	0	0	0
February 2016	0	0	0	0
Contract 810B ^[4]				
December 2015	28.8	689.7	0	0
January 2016	62.8	183.9	0	0
February 2016	263.9	131.2	0	0
Contract 811B ^[5]				
December 2015	122.0	14.3	0	0
January 2016	0	0	0	0
February 2016	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 and AHK Lam Tei Quarry.
- [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.

The cumulative quantities are summarized as follows.

Inert C&D Materials (tonnes)	Non-inert C&D Materials (tonnes)	Chemical Waste	
		(Litre)	(Kg)
49,567.1	5,026.7	3,075	315

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 24 February 2016 in 810A, 3 February 2016 in 810B and 1 February 2016 in 811B.

Contract	Date of Site Inspections
810A	4/2, 17/2 and 24/2
810B	3/2, 18/2 and 24/2
811B	1/2, 16/2 and 23/2

Table 6-1 Date of site inspections in the reporting month

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.

Item	Description	Contractor's Follow-up Action(s) Undertaken
Contract 810A		
1	No proper wrapping was found at the breaker used opposite to Wui Man Road.	Acoustic blanket has been used to wrap the breaking tip accordingly.

Item	Description	Contractor's Follow-up Action(s) Undertaken
Contract 810B		
1	The haul road leading to the exit of Austin Road West (W) was dry and dusty.	Frontlines were reminded to regular water the haul road to reduce the dust impact.
Contract 811B		
1	Breaking work was in progress without proper noise control at the breaker at the ex-Jordan Road works area.	Acoustic blanket has been used to wrap the breaking tip.

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 thirty-three (33) 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. Also 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 exceedances of Limit Levels were recorded. Actions stipulated under the Event and Action Plan (Table 2.3 of the EM&A Manual) would undertake if exceedance is recorded.

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

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 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.

Contract	Major Construction Activities
810A	Cable detection and trial trench; Backfilling; Excavation; Trimming of concrete footing; Traffic deck tie beam/ bracing modification; Pre-boring for sheet pile; Sheet pile installation; Temporary road diversion; Strut installation; Removal of culvert; Pump test; Construction of LCR Lower Underpass Base and Wall; Noise panels installation works and painting works; and Concrete trimming of existing concrete footings
810B	Sheet piling; Drainage work and Road diversion
811B	Lin Cheung Road (LCR) underpass northbound (NB) sheet pile installation (with pre-boring); and LCR underpass NB (northern section) excavation and reinforced concrete (RC) works

Table 8-1 Summary of construction works in the coming month (March 2016)

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 29 February 2016. The major construction activities in the reporting period included excavation and piling works in the West Kowloon Works Areas for the Roadworks.

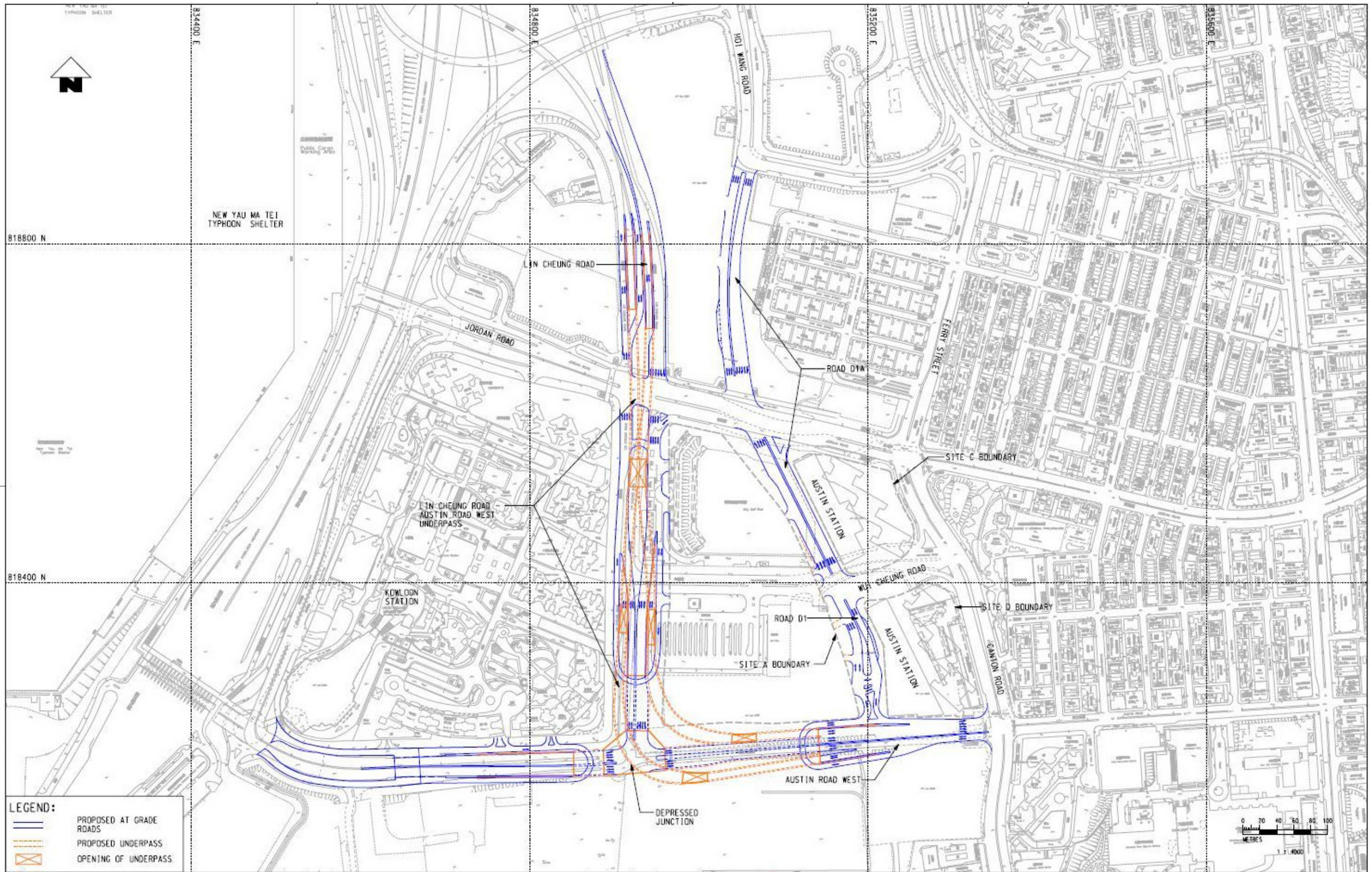
Impact monitoring for air quality and air-borne noise were conducted in accordance with the EM&A Manual in the reporting period. No exceedance of air-borne noise Action and Limit Levels was recorded in the reporting month. No exceedance of both 24-hour TSP Action and Limit Levels was recorded in the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

For the reporting month, no environmental complaint related to the Roadworks was referred from EPD. The complaint would be handled in accordance with the procedures stipulated in the EM&A Manual with investigations when receive. Apart from that, no warnings/non-compliances, no summons and no prosecutions 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



				DRAWN: YJP DESIGNED: TWF CHECKED: KCC APPROVED: PL DATE: 11/MAR./2009				TITLE: ROAD WORKS AT WEST KOWLOON	
				ORIGINATOR: PROJECT DIVISION		TITLE: PROPOSED ROAD WORKS AT WEST KOWLOON			
				CADD 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	DESCRIPTION	BY	DATE	APPROVED	REV	DESCRIPTION	BY	DATE	APPROVED

WORKS AREA for ROAD WORKS

Appendix B

Project Management Organization and Contacts of Key Personnel

Title	Name	Telephone
Engineer's Representative		
Construction Manager (Contract 810A)	Mr. Stephen BOREMAN	2926 9170
Construction Manager (Contract 810B)	Mr. Ashley CALVET	2926 9098
Construction Manager (Contract 810A/811B)	Mr. Albert LAM	2164 2988
Independent Environmental Checker		
Divisional Director	Mr. Eric CHING	2828 5825
Environmental Team		
Environmental Team Leader	Mr. Richard KWAN	2688 1179
Contractors		
<i>Contract 810A</i>		
Principle Project Director	Mr. Adrian CLAMP	3759 9810
Senior Environmental Officer	Mr. Dominic FUNG	3759 9796
<i>Contract 810B</i>		
Project Director	Mr. Jeremy MATTERSON	2472 8050
Environmental Officer	Ms. Diana LEE	2472 9509
<i>Contract 811B</i>		
Project Manager	Mr. Brian GOWRAN	2269 1517
Project Construction Manager	Mr. Roger WONG	2269 1520
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
Noise Control					
3.53 – 3.54	<p>The following quiet PME should be used:</p> <ul style="list-style-type: none"> • Pneumatic breaker (SWL=110dB(A)) • Tracked Excavator Fitted with Hydraulic Breaker (SWL=110dB(A)) • Truck Mixer (SWL=100dB(A)) • Tracked Crane (SWL=101dB(A)) • Dump Truck (SWL=103dB(A)) • Tracked Excavator/Loader (SWL=105dB(A)) • Dozer (SWL=111dB(A)) • Road Roller (SWL=101dB(A)) 	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"> • Only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction program; • Silencers or mufflers on construction equipment should be utilized and should be properly maintained during the construction programme; • Mobile plant, if any, should be sited as far from noise sensitive receivers (NSRs) as possible; • 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; • 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 • Material stockpiles and other structures should be effectively utilized, wherever practicable, in 	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.
Air Quality Control					
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"> • Skip hoist for material transport should be totally enclosed by impervious sheeting. • Every vehicle should be washed to remove any dusty materials from its body and wheels before leaving the construction site. • 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. 	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"> • 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. • 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. • All dusty materials should be sprayed with water prior to any loading, unloading or transfer operation so as to maintain the dusty materials wet. • 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. • The load of dusty materials carried by vehicle leaving a construction site should be covered entirely by clean impervious sheeting to 	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"> 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. 	To reduce the construction air-borne noise impact.	Contractor	Throughout the whole construction phase	Implemented.
Water Quality Control					
5.30 -5.42	<p>General Construction Activities and Construction site run-off::</p> <ul style="list-style-type: none"> The mitigation measures as outlined in the ProPECC PN 1/94 Construction Site Drainage should be adopted where applicable. 	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"> 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 	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"> 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. 	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"> • 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. • 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. • Disposal of chemical wastes should be carried out in compliance with the Waste Disposal Ordinance. 	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"> ➤ Suitable containers should be used to hold the chemical wastes to avoid leakage or spillage during storage, handling and transport. ➤ Chemical waste containers should be suitably labelled, to notify and warn the personnel who are handling the wastes, to avoid accidents. ➤ Storage area should be selected at a safe location on site and adequate space should be allocated to the storage area. 	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"> • Sufficient chemical toilets should be provided in the works areas. A licensed 	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"> 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. 	To control water quality impact from construction site runoff and general construction activities.	Contractor	Throughout the whole construction phase	Implemented.
Waste Management					
6.47	<p>All waste materials should be segregated into categories covering:</p> <ul style="list-style-type: none"> Excavated materials suitable for reuse; Inert C&D materials for disposal off-site; 	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"> • Non-inert C&D materials for disposal at landfills; • Chemical waste; and • General refuse. 	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"> • Training of site personnel in, site cleanliness, proper waste management and chemical handling procedures; • Provision of sufficient waste disposal points and regular collection of waste; • Appropriate measures to minimize windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers; • Regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors; and • Separation of chemical wastes for special handling and appropriate treatment. 	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"> • Sorting of demolition debris and excavated materials from demolition works to recover reusable/ recyclable portions (i.e. soil, broken concrete, metal etc.); • 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; • 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; • Proper storage and site practices to minimize the potential for damage or contamination of construction materials; • Plan and stock construction materials carefully to minimize amount of waste generated and avoid unnecessary 	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"> • Training should be provided to workers about the concepts of site cleanliness and appropriate waste management procedures, including waste reduction, reuse and recycle. 	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.

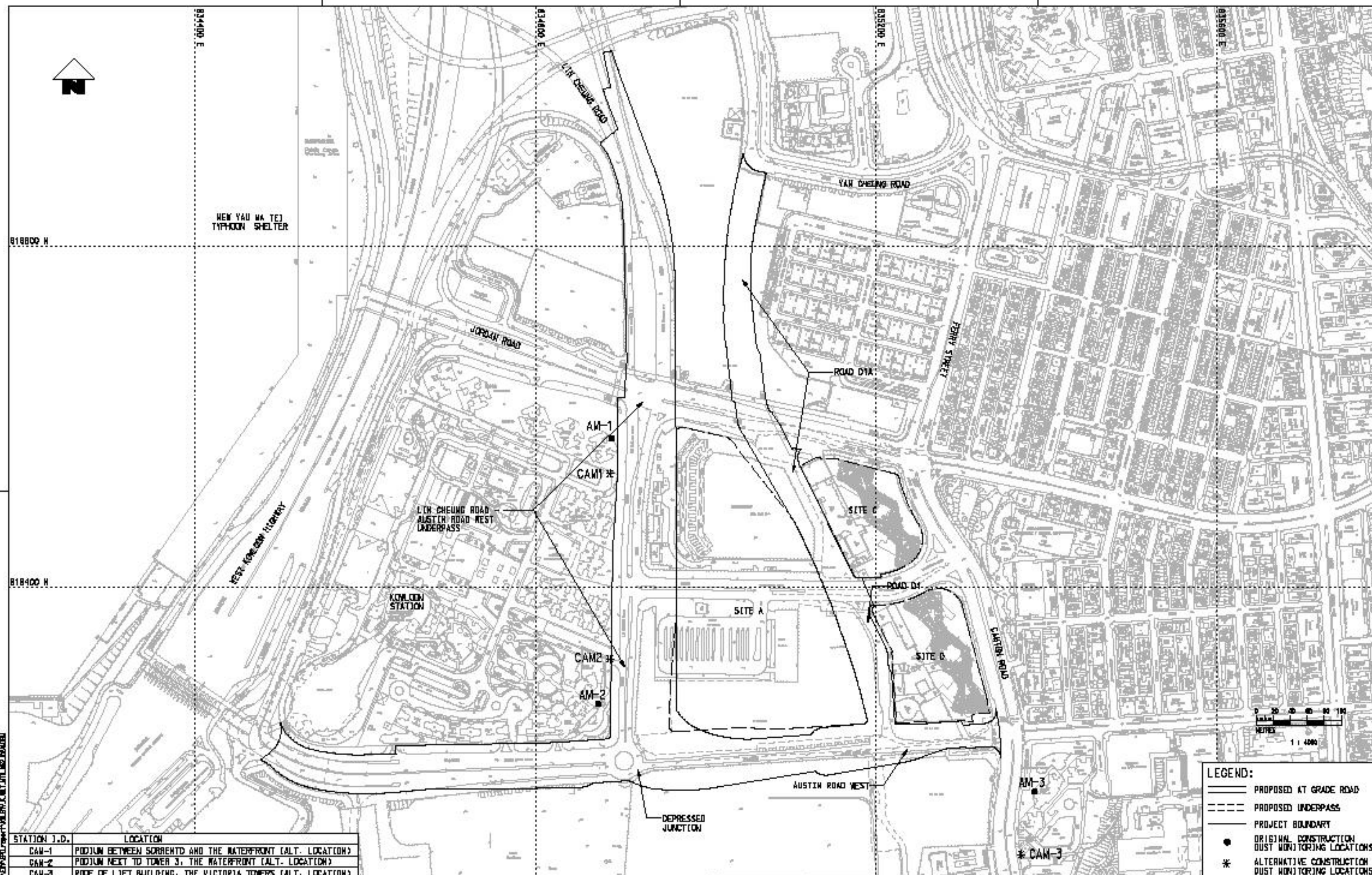
EIA Ref #	Environmental Protection Measures / Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	When to implement the measures?	Implementation Status
6.60	landfill, the haulier must ensure suitable amount of waste would be loaded on different 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 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
6.61	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	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.
Landscape and Visual Management					
Table 7.4	<ul style="list-style-type: none"> 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.

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"> • Existing trees to be retained on site should be carefully protected during construction. • 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. • Compensatory tree planting provided to compensate for felled trees and maintained until end of the establishment period. • Control of night-time lighting glare • 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	MC
CHECKED	
APPROVED	
DATE	03/APR/2011

MTR

EXPRESS RAIL LINK

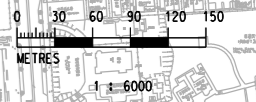
PROJECTS DIVISION | SUSTAINABILITY DEVELOPMENT DEPARTMENT

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	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

MTR

EXPRESS RAIL LINK

ORIGINATOR

PROJECTS DIVISION | **SUSTAINABILITY DEVELOPMENT DEPARTMENT**

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 - February 2016

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

Feb-2016						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1 CAM-1, CAM-2, CAM-3	2	3 CNM-1, CNM-3, CNM-4	4	5 CAM-1, CAM-2, CAM-3	6
7	8	9	10	11 CNM-1, CNM-3, CNM-4 CAM-1, CAM-2, CAM-3	12	13
14	15	16 CNM-1 CAM-1, CAM-2, CAM-3	17 CNM-3, CNM-4	18	19	20
21	22 CAM-1, CAM-2, CAM-3	23 CNM-1	24 CNM-3, CNM-4	25	26	27 CAM-1, CAM-2, CAM-3
28	29					

Tentative Construction Dust (24-hr TSP) and Air-borne Noise Impact Monitoring Schedule - March 2016

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

Mar-2016						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1 CNM-1	2 CNM-4	3 CNM-3	4 CAM-1, CAM-2, CAM-3	5
6	7	8 CNM-1	9 CNM-4	10 CNM-3 CAM-1, CAM-2, CAM-3	11	12
13	14	15 CNM-1	16 CNM-4 CAM-1, CAM-2, CAM-3	17 CNM-3	18	19
20	21 CAM-1, CAM-2, CAM-3	22 CNM-1	23 CNM-4	24 CNM-3 CAM-1, CAM-2, CAM-3	25	26
27	28	29 CNM-1	30 CNM-4 CAM-1, CAM-2, CAM-3	31 CNM-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
	($\mu\text{g}/\text{m}^3$)	($\mu\text{g}/\text{m}^3$)	($\mu\text{g}/\text{m}^3$)
01-Feb-16	13.5	168.8	260.0
05-Feb-16	56.7	168.8	260.0
11-Feb-16	114.4	168.8	260.0
16-Feb-16	50.1	168.8	260.0
22-Feb-16	141.6	168.8	260.0
27-Feb-16	78.5	168.8	260.0

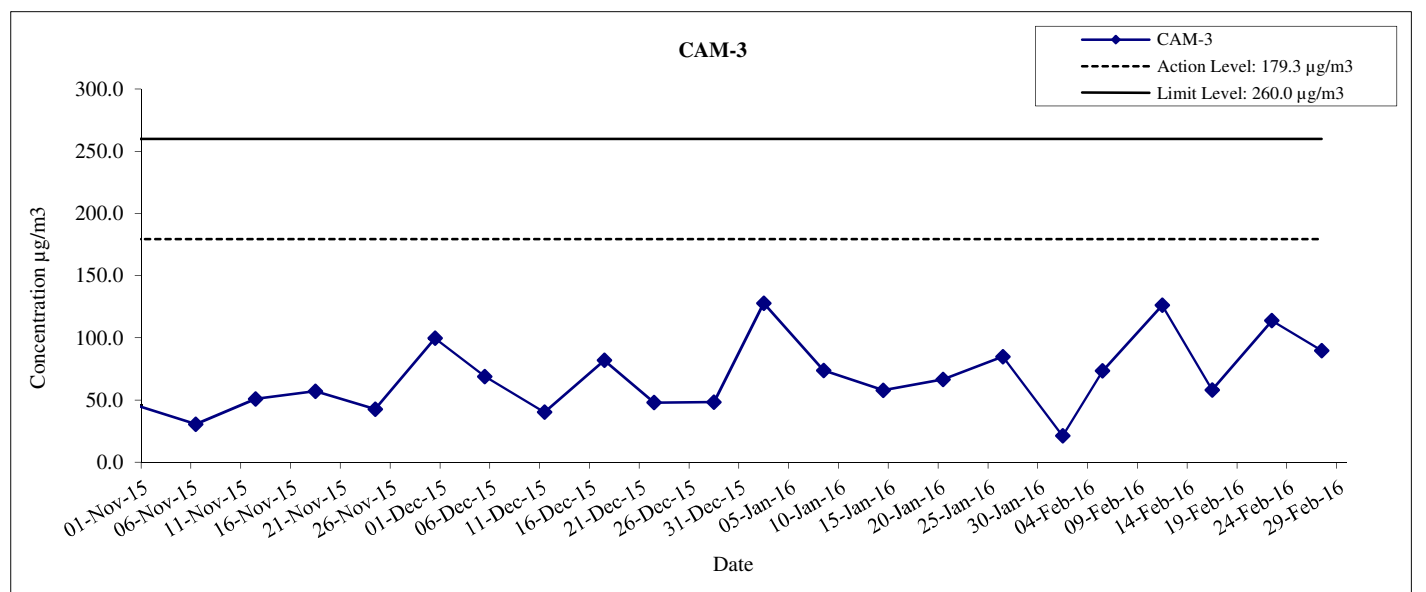
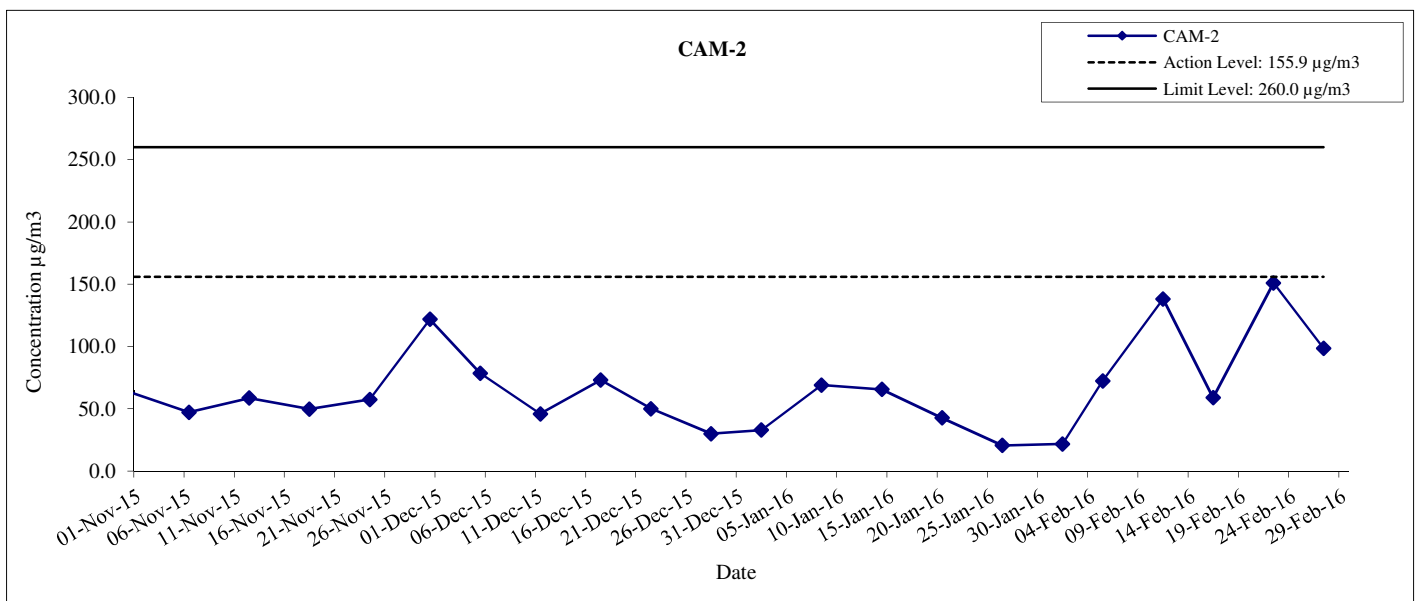
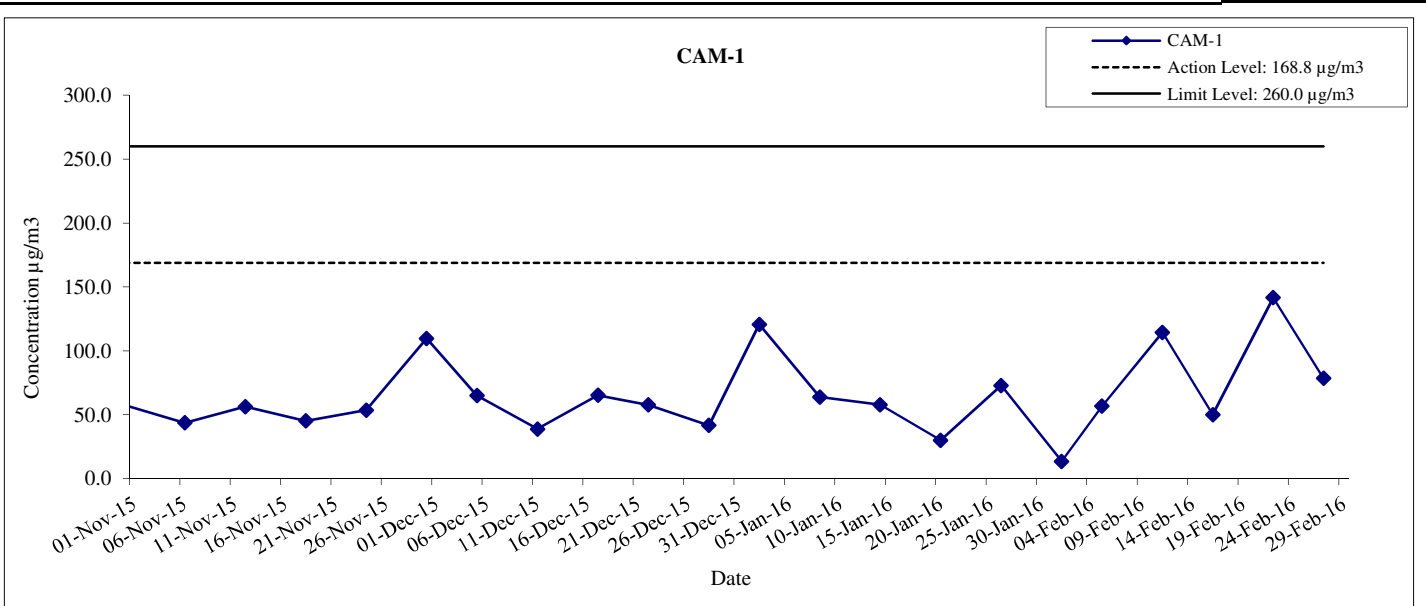
- CAM-2

Date	24-hour TSP Monitoring Results	Action Level	Limit Level
	($\mu\text{g}/\text{m}^3$)	($\mu\text{g}/\text{m}^3$)	($\mu\text{g}/\text{m}^3$)
01-Feb-16	21.8	155.9	260.0
05-Feb-16	72.4	155.9	260.0
11-Feb-16	138.2	155.9	260.0
16-Feb-16	58.9	155.9	260.0
22-Feb-16	151.1	155.9	260.0
27-Feb-16	98.6	155.9	260.0

- CAM-3

Date	24-hour TSP Monitoring Results	Action Level	Limit Level
	($\mu\text{g}/\text{m}^3$)	($\mu\text{g}/\text{m}^3$)	($\mu\text{g}/\text{m}^3$)
01-Feb-16	21.1	179.3	260.0
05-Feb-16	73.4	179.3	260.0
11-Feb-16	126.2	179.3	260.0
16-Feb-16	58.1	179.3	260.0
22-Feb-16	113.8	179.3	260.0
27-Feb-16	89.8	179.3	260.0

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



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

Date	Feb-16
APPENDIX	F

APPENDIX F: Noise Monitoring Results

- CNM-1

Date	Noise Monitoring Results	Limit Level	Exceedance?
	Leq, dB(A)	Leq, dB(A)	
03-Feb-16	65	75	N
11-Feb-16	64	75	N
16-Feb-16	66	75	N
23-Feb-16	66	75	N

- CNM-2 ^[b]

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

- CNM-3 ^[a]

Date	Noise Monitoring Results	Limit Level	Exceedance?
	Leq, dB(A)	Leq, dB(A)	
03-Feb-16	75	75	N
11-Feb-16	70	75	N
17-Feb-16	75	75	N
24-Feb-16	75	75	N

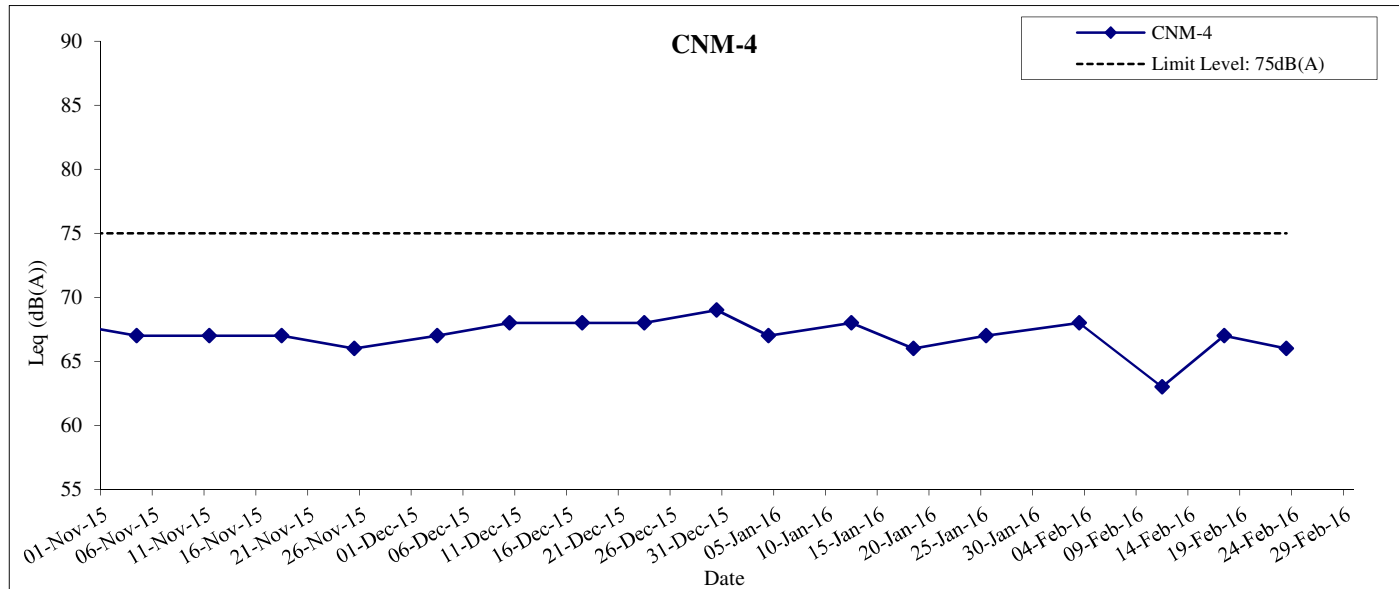
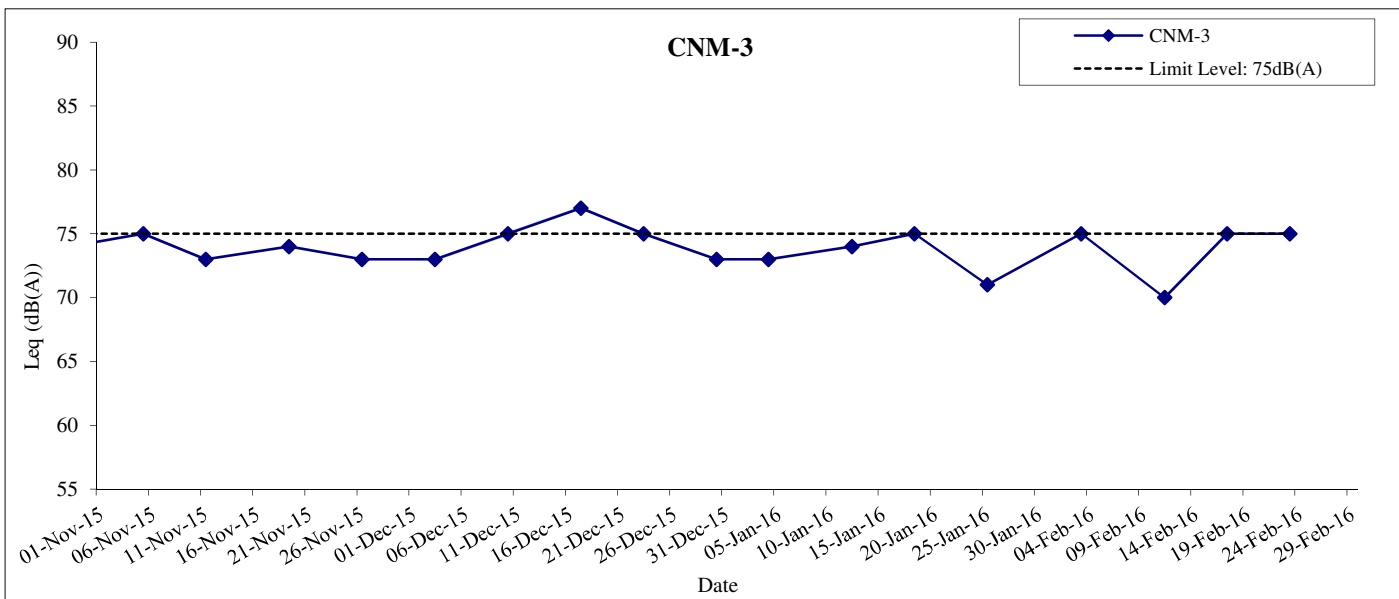
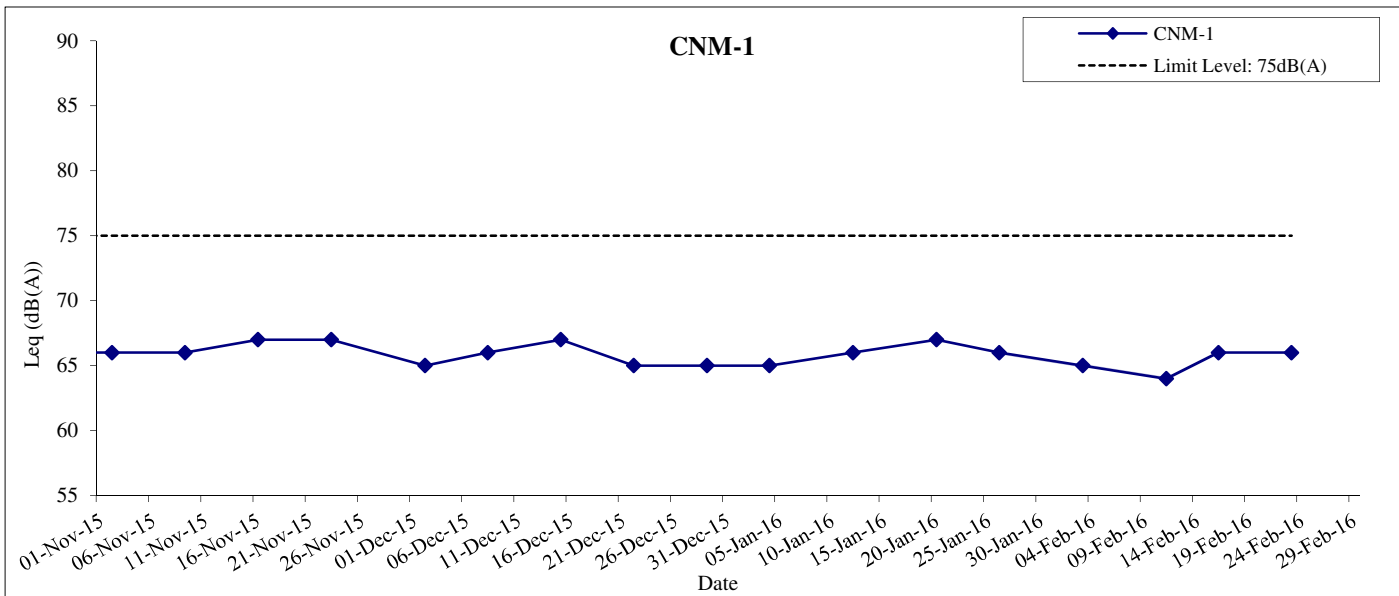
- CNM-4

Date	Noise Monitoring Results	Limit Level	Exceedance?
	Leq, dB(A)	Leq, dB(A)	
03-Feb-16	68	75	N
11-Feb-16	63	75	N
17-Feb-16	67	75	N
24-Feb-16	66	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.



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**Graphical Presentation of Noise Monitoring Results for
Locations CNM-1, CNM-3 & CNM-4**

Date	Feb-16
APPENDIX	F

Appendix G

Meteorological Data

**EXTRACT OF METEOROLOGICAL OBSERVATIONS FOR HONG KONG,
FEBRUARY 2016 (Table 1)**

Date FEBRUARY	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	1022.2	15.6	12.4	10.7	11.2	93	96	11.3
2	1024.4	11.2	10.4	9.4	6.8	79	94	Trace
3	1023.6	14.3	12.5	10.3	8.6	77	88	Trace
4	1021.8	18.8	15.2	13.3	10.9	76	45	-
5	1021.2	18.6	14.8	12.3	8.4	66	18	-
6	1024.9	17.4	13.6	11.2	-0.3	39	13	-
7	1026.1	18.1	13.7	9.9	-1.7	36	2	-
8	1023.9	19.6	14.8	11.6	4.3	52	0	-
9	1020.8	21.2	16.7	12.7	7.2	54	29	-
10	1017.5	17.3	16.6	15.3	9.8	64	77	0.2
11	1014.9	22.4	18.8	17.2	16.4	86	80	Trace
12	1013.4	21.6	19.2	17.6	18.5	95	86	0.1
13	1012.5	25.9	23.1	21.3	21.1	89	76	-
14	1014.8	24.6	21.7	17.4	18.1	81	82	Trace
15	1024.3	17.5	13.2	11.4	6.6	64	88	0.3
16	1025.4	15.1	12.8	10.9	6.0	63	89	-
17	1024.1	14.4	12.9	11.6	8.9	77	91	1.7
18	1021.9	15.0	13.7	11.7	11.8	89	95	3.4
19	1020.3	16.3	15.3	14.6	13.3	88	94	4.4
20	1023.2	20.1	16.0	12.5	9.6	67	55	2.4
21	1022.2	15.9	15.0	14.7	11.0	77	82	Trace
22	1020.6	17.6	16.1	14.6	14.7	91	88	0.5
23	1022.3	16.7	15.5	13.7	14.3	92	88	0.5

Date FEBRUARY	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)				
24	1027.5	15.5	13.7	12.3	10.0	78	88	Trace
25	1028.9	16.8	14.8	13.5	10.5	76	87	-
26	1027.4	17.6	15.2	14.0	11.6	79	88	Trace
27	1024.7	17.5	15.5	13.8	11.7	79	79	Trace
28	1023.8	20.9	16.6	13.3	11.5	72	49	-
29	1024.4	24.8	18.5	14.4	10.1	61	19	-
Mean/Total	1022.2	18.2	15.5	13.4	10.4	74	68	24.8
Normal*	1018.5	18.9	16.8	15.0	13.0	80	74	54.4
Station	Hong Kong Observatory							

**EXTRACT OF METEOROLOGICAL OBSERVATIONS FOR HONG KONG,
FEBRUARY 2016 (Table 2)**

Date FEBRUARY	Number of hours of Reduced Visibility# (hours)	Total Bright Sunshine (hours)	Daily Global Solar Radiation (MJ/m ²)	Total Evaporation (mm)	Prevailing Wind Direction (degrees)	Mean Wind Speed (km/h)
1	0	-	2.39	1.2	020	31.9
2	0	-	3.55	1.1	010	27.3
3	1	0.3	8.48	1.7	040	21.3
4	18	9.2	17.42	3.0	040	9.1
5	5	10.1	19.06	5.9	020	24.4
6	0	10.2	20.26	3.9	020	44.7
7	0	10.2	21.46	6.0	020	20.5
8	0	10.2	21.65	2.4	040	16.7
9	0	10.2	20.00	4.7	040	17.2

Date FEBRUARY	Number of hours of Reduced Visibility# (hours)	Total Bright Sunshine (hours)	Daily Global Solar Radiation (MJ/m²)	Total Evaporation (mm)	Prevailing Wind Direction (degrees)	Mean Wind Speed (km/h)
10	0	0.1	4.84	1.4	040	22.0
11	8	2.4	11.52	2.1	040	15.8
12	1	0.6	6.89	0.4	030	13.9
13	0	3.5	10.58	1.5	200	10.2
14	0	3.9	12.16	5.6	020	15.3
15	0	-	3.90	2.5	020	33.5
16	0	0.7	9.03	2.3	020	23.5
17	0	-	2.90	0.5	020	19.2
18	5	-	4.09	1.7	040	18.6
19	7	-	1.54	0.8	040	22.2
20	0	5.9	14.64	3.1	020	23.9
21	11	-	3.33	1.4	070	44.7
22	10	0.3	6.13	0.2	050	24.4
23	1	-	2.59	1.7	020	19.3
24	0	-	6.32	2.3	020	28.0
25	0	0.1	6.58	1.2	020	20.4
26	7	0.2	7.28	1.8	030	15.2
27	5	5.0	15.89	3.0	020	9.1
28	4	9.5	21.09	4.0	020	9.2
29	7	10.7	23.04	5.3	040	16.9
Mean/Total	90	103.3	10.64	72.7	020	21.3
Normal*	138.6 [§]	94.2	9.39	59.9	070	24.5
Station	Hong Kong International Airport	King's Park			Waglan Island	

The minimum pressure recorded at the Hong Kong Observatory was 1010.5 hectopascals at 1602 HKT on 13 February.

The maximum air temperature recorded at the Hong Kong Observatory was 25.9 degrees C at 1439 HKT on 13 February.

The minimum air temperature recorded at the Hong Kong Observatory was 9.4 degrees C at 0615 HKT on 2 February.

The maximum gust peak speed recorded at Waglan Island was 65 kilometres per hour from 010 degrees at 0859 HKT on 6 February.

The maximum 1-minute mean rainfall rate recorded at King's Park was 16 millimetres per hour at 0827 HKT on 10 February.

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.

^ In case the data are not available from Waglan Island, observations of Cheung Chau or other nearby weather stations will be incorporated in computing the Prevailing Wind Direction and Mean Wind Speed.

* 1981 – 2010 Climatological Normal, unless otherwise specified

§ 1997 – 2015 Mean value

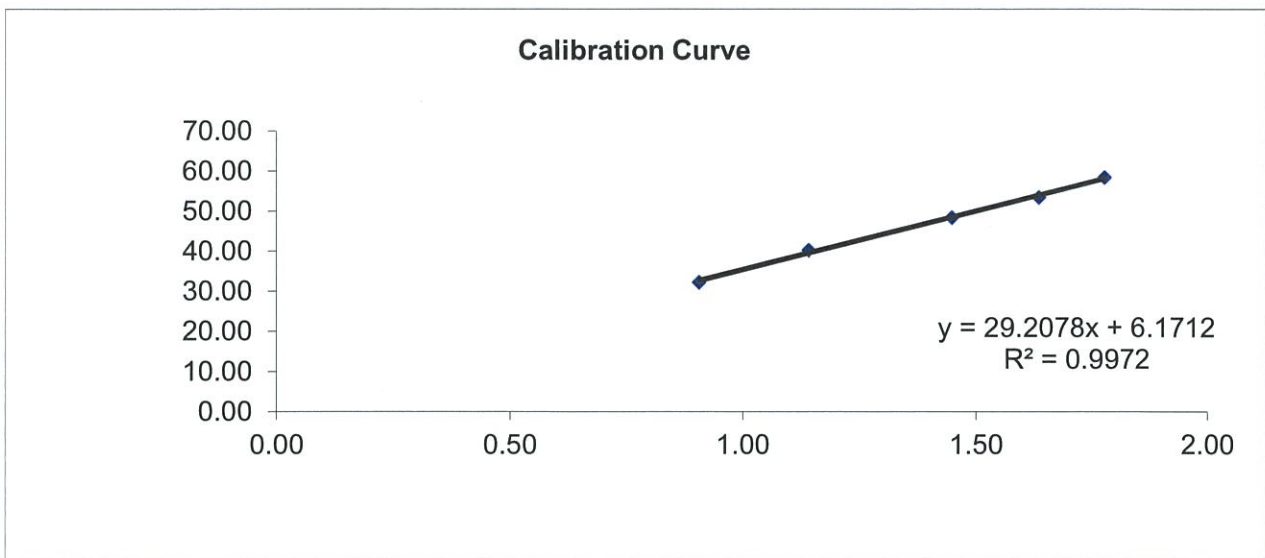
Appendix H
Calibration Certificate of
High Volume Samplers

Ove Arup Partners (Hong Kong) Limited

High Volume Air Sampler Calibration Worksheet

Calibration date	29-Feb-16	Barometric pressure	763.9 mm Hg
Next Calibration date	27-Aug-16	Temperature (°C)	22 °C
	AM15 (XRL)/CAM-1(Roadworks at West Kowloon) - Between Sorrento and Waterfront		
Sampler location	Sorrento and Waterfront	Temperature (K)	295 K
Sampler model	TE-5170	P _{std}	760 mm Hg
Sampler serial number	515	T _{std}	298 K
Calibrator model	GMW-2535		
Calibrator serial number	2421		
Slope of the standard curve, m _s	2.07019		
Intercept of the standard curve, b _s	-0.04612		

Resistance Plate No.	Manometer Reading (inch H ₂ O)	Flow Recorder Reading (CFM)	Calculated Q _{std} (m ³ /min)	Continuous Flow Recorder Reading IC (CFM)
5	3.30	32.00	0.91	32.24
7	5.30	40.00	1.14	40.31
10	8.60	48.00	1.45	48.37
13	11.00	53.00	1.64	53.41
18	13.00	58.00	1.78	58.44



Linear Regression

Sampler slope (m) : **29.2078**
 Sampler intercept (b) : **6.1712**
 Correlation coefficient (R²) : **0.9972**

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

Performed by: 

Date: 29/2/2016

Checked by: 

Date: 29/2/2016

Approved by: 

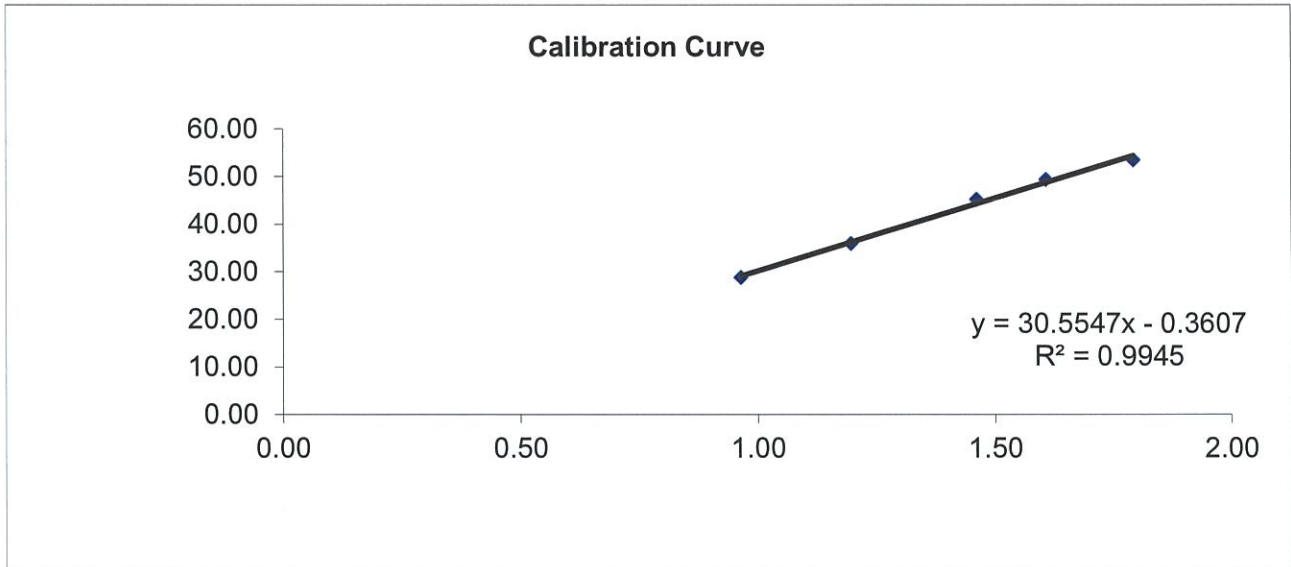
Date: 29/2/2016

Ove Arup Partners (Hong Kong) Limited

High Volume Air Sampler Calibration Worksheet

Calibration date	2-Feb-16	Barometric pressure	765.2 mm Hg
Next Calibration date	31-Jul-16	Temperature (°C)	11 °C
Sampler location	AM16 (XRL)/CAM-2(Roadworks at West Kowloon) - Waterfront	Temperature (K)	284 K
Sampler model	TE-5170	P _{std}	760 mm Hg
Sampler serial number	1282	T _{std}	298 K
Calibrator model	GMW-2535		
Calibrator serial number	2421		
Slope of the standard curve, m _s	2.07019		
Intercept of the standard curve, b _s	-0.04612		

Resistance Plate No.	Manometer Reading (inch H ₂ O)	Flow Recorder Reading (CFM)	Calculated Q _{std} (m ³ /min)	Continuous Flow Recorder Reading IC (CFM)
5	3.60	28.00	0.96	28.78
7	5.60	35.00	1.20	35.97
10	8.40	44.00	1.46	45.23
13	10.20	48.00	1.61	49.34
18	12.70	52.00	1.79	53.45



Linear Regression

Sampler slope (m) : **30.5547**
 Sampler intercept (b) : **-0.3607**
 Correlation coefficient (R²) : **0.9945**

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

Performed by: _____
 Checked by: _____
 Approved by: _____

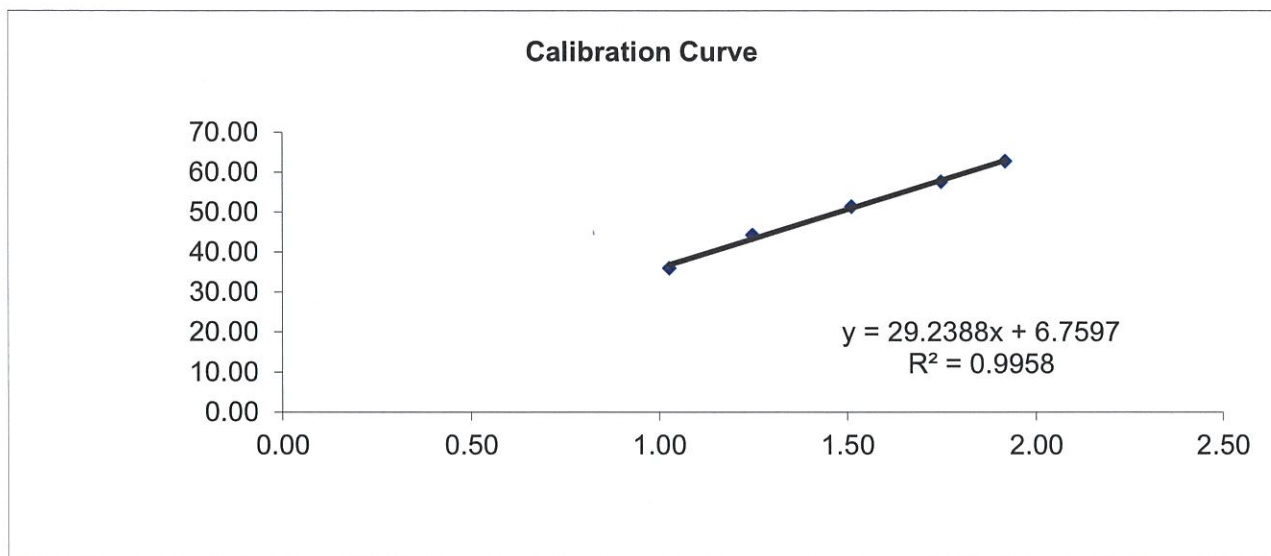
Date: 2/2/2016
 Date: 2/2/2016
 Date: 2 Feb 2016

Ove Arup Partners (Hong Kong) Limited

High Volume Air Sampler Calibration Worksheet

Calibration date	2-Feb-16	Barometric pressure	765.2 mm Hg
Next Calibration date	31-Jul-16	Temperature (°C)	11 °C
	AM17 (XRL)/CAM-3(Roadworks at West Kowloon) - The Victoria		
Sampler location	Towers	Temperature (K)	284 K
Sampler model	TE-5170	P _{std}	760 mm Hg
Sampler serial number	528	T _{std}	298 K
Calibrator model	GMW-2535		
Calibrator serial number	2421		
Slope of the standard curve, m _s	2.07019		
Intercept of the standard curve, b _s	-0.04612		

Resistance Plate No.	Manometer Reading (inch H ₂ O)	Flow Recorder Reading (CFM)	Calculated Q _{std} (m ³ /min)	Continuous Flow Recorder Reading IC (CFM)
5	4.10	35.00	1.03	35.97
7	6.10	43.00	1.25	44.20
10	9.00	50.00	1.51	51.39
13	12.10	56.00	1.75	57.56
18	14.60	61.00	1.92	62.70



Linear Regression

Sampler slope (m) : **29.2388**
 Sampler intercept (b) : **6.7597**
 Correlation coefficient (R²) : **0.9958**

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

Performed by: _____

Date: 2/2/2016

Checked by: _____

Date: 2/2/2016

Approved by: _____

Date: 2 Feb 2016