

Highways Department


Contract No.
HY/2007/14 Widening of
Tuen Mun Road at
Tsing Tin Interchange

Monthly Environmental
Monitoring and Audit
Report – January 2010

Revision 2



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Executive Summary

This is the fifteen monthly Environmental Monitoring and Audit (EM&A) report prepared by Ove Arup & Partners Hong Kong Limited (Arup), the designated Environmental Team (ET), for the Project “Widening of Tuen Mun Road at Tsing Tin Interchange”. This report presents the results of EM&A works conducted in the month of January 2010 (1 to 28 January 2010).

The Project was substantially completed on 9 January 2010. In accordance with the EM&A manual Clause 10.5.1, the letter regarding to terminate the construction phase EM&A programme was issued to HyD with IEC’s endorsement. As agreed by HyD, the construction phase EM&A programme was terminated on 28 January 2010.

There are some remaining works including E&M activities or minor civil works which will be carried out during restricted hours. The relevant Construction Noise Permits (CNPs) will be granted by the Environmental Protection Department. It is anticipated that no significant environmental impact would be contributed from the remaining works.

In the reporting month, the following activities took place for the Project:

- Site clearance;
- Fabrication of the sign gantry; and
- Road re-construction.

Monitoring of 1-hour and 24-hour Total Suspended Particulates (TSP) and noise during non-restricted hours was performed and the results were checked and reviewed. Site audits were conducted on weekly basis. The implementation of the environmental mitigation measures, Event and Action Plans and environmental complaint handling procedures were checked.

Impact monitoring was carried out at three sensitive receivers including AM1(a), AM3(a) and TLLF(a) during the reporting month.

Environmental Monitoring Works – Breaches of Action and Limit Levels

Air Quality

All measured 1-hour and 24-hour TSP concentrations in the reporting month were below the Action and Limit (AL) Levels.

Noise

All noise measurements during non-restricted hours in the reporting month were below the Action and Limit (AL) Levels. The construction works carried out by the Contractor within the restricted hours was found to fully comply with the conditions of the CNP.

Landscape and Visual Audit

In accordance with the Clause 2.7 of the EP, seven numbers of trees within the site shall be transplanted to their designed transplanted locations prior to the operational phase of the Project.

Four (tree no. 1, 16, 35 and 169) out of the seven trees were fell prior to the commencement of the construction due to typhoon and tree no. 63 was dead after transplanting in March 2009. Interim transplanting of one tree (tree no. 411) was completed and one tree (tree no. 69) was relocated to new transplanting location in April 2009.

In accordance with Tree Assessment Schedule in Appendix 10.1 of the EIA Report, forty-seven trees of LR1 and LR2, including the seven trees mentioned above, would be affected as a result of the construction works. In the reporting period, these forty trees have been removed. Twenty-eight of them were already felled. In order to minimize the quantities of felled trees, the remaining twelve trees were transplanted to Siu Lang Shui Road as agreed by LCSD and ER. No significant change on their status was noted during the reporting period.

Thirty-five numbers of trees, which shall be retained in the site according to the Tree Assessment Schedule in Appendix 10.1 of the EIA Report, were damaged due to the typhoons prior to the commencement of the construction.

In accordance with the Clause 2.8 of the EP, compensatory planting of forty-seven number of trees was carried out prior the operational phase.

Waste Disposal

Inert C&D materials with estimated amount of 40 m³ were generated in the reporting month and were disposed of at public fill. It was advised from the Contractor that determination of the actual amount of waste generation is still in progress so the relevant information will be presented on the next EM&A report.

Environmental Licensing and Permitting

Permits or licenses granted to the Project included the Environmental Permit of the Project (EP-302/2008/B), Discharge License under WPCO (EP760/425/013454/I), Construction Noise Permit under NCO (GW-RW0584-09 & GW-RW0014-10), Chemical Waste Producer Registration under WDO (WPN5111-425-C1186-09).

Environmental Auditing

A total of 3 environmental site audits were conducted on a weekly basis in January 2010. No non-conformance to the environmental requirements was identified during the reporting period.

Complaint Log

No complaint in relation to the environmental issues was made against the Project in the reporting period.

Notifications of Summons and Successful Prosecutions

No summonses or prosecutions related to the environmental issues were made against the Project in the reporting period.

Reporting Changes

There were no reporting changes in the reporting month.

Future Key Issues

The remaining works are mainly E&M activities or minor civil works which will be carried out during restricted hours. The relevant Construction Noise Permits (CNPs) will be granted by the Environmental Protection Department. It is anticipated that no significant environmental impact would be contributed from the remaining works in the coming month.

1 Environmental Status

1.1 Construction Programme

An up-to-date 3-month rolling construction programme to January 2010 is attached in **Appendix A**.

The construction activities were carried out together with all necessary mitigation measures stipulated in the EIA report.

1.2 Work Undertaken During the Month

The major construction activities carried out by the Contractor in the reporting month are summarised in **Table 1-1**. Locations of the construction activities are illustrated in **Figure 1-1**. Contacts of key environmental staff of the Project are shown in **Table 1-2**.

Table 1-1 Major construction activities in the reporting month

Construction Activities	Location (1)	Daily Excavation Rate
Site clearance	Whole Site Area	Range: 0 to 1.5 m ³
Fabrication of the sign gantry	Whole Site Area	
Road re-construction	Whole Site Area	

Figure 1-1 Locations of the major construction activities

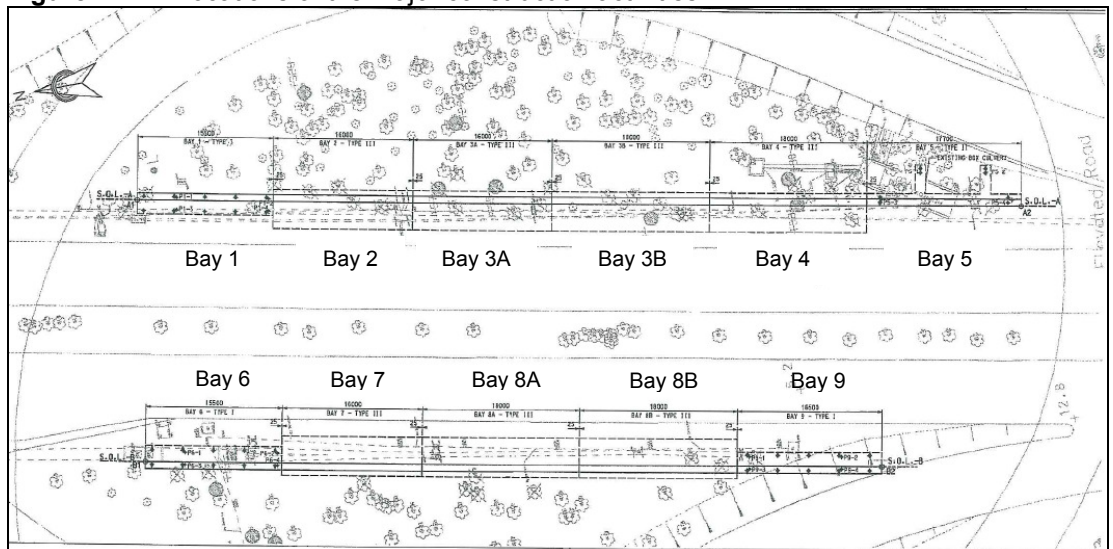


Table 1-2 Contacts of key environmental staff

Organization	Name	Telephone
Environmental Protection Department		
Environmental Protection Officer (Strategic Assessment) ²²	Thomas To	2835 1103
Engineer's Representative		
Highways Department		
Senior Engineer	C.W. Ng	2762 4067
Independent Environmental Checker		
Hyder Consulting Ltd		
Principle Environmental Consultant	Antony Wong	2911 2744
Environmental Team		
Ove Arup & Partners Hong Kong Ltd		
Environmental Team Leader	Coleman Ng	2268 3097
Contractor		
China Harbour Engineering Company Limited		
Project Manager	Chan Man	9464 1468
Site Agent	Gordon Ng	9203 7503
Project Engineer	Jeffery Wong	6070 0143
Safety and Environmental Officer	Brian Cheung	5168 7867
Environmental Supervisor	W.P. Wong	9876 2132

1.3 Project Area, Sensitive Receivers and Environmental Monitoring Locations

The project area and the location of the sensitive receivers and monitoring stations are shown in **Figures 1-2 and 1-3** respectively, while **Table 1-3** shows the detail correspondences of monitoring stations.

Figure 1-2 Site location plan

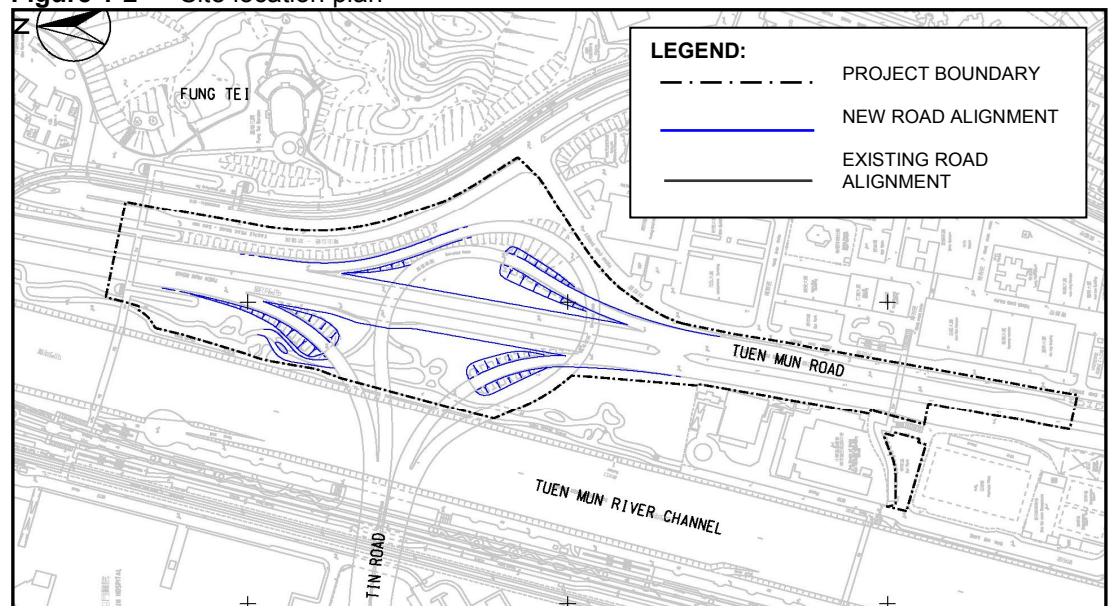


Figure 1-3 Location of environmental sensitive receivers and monitoring stations

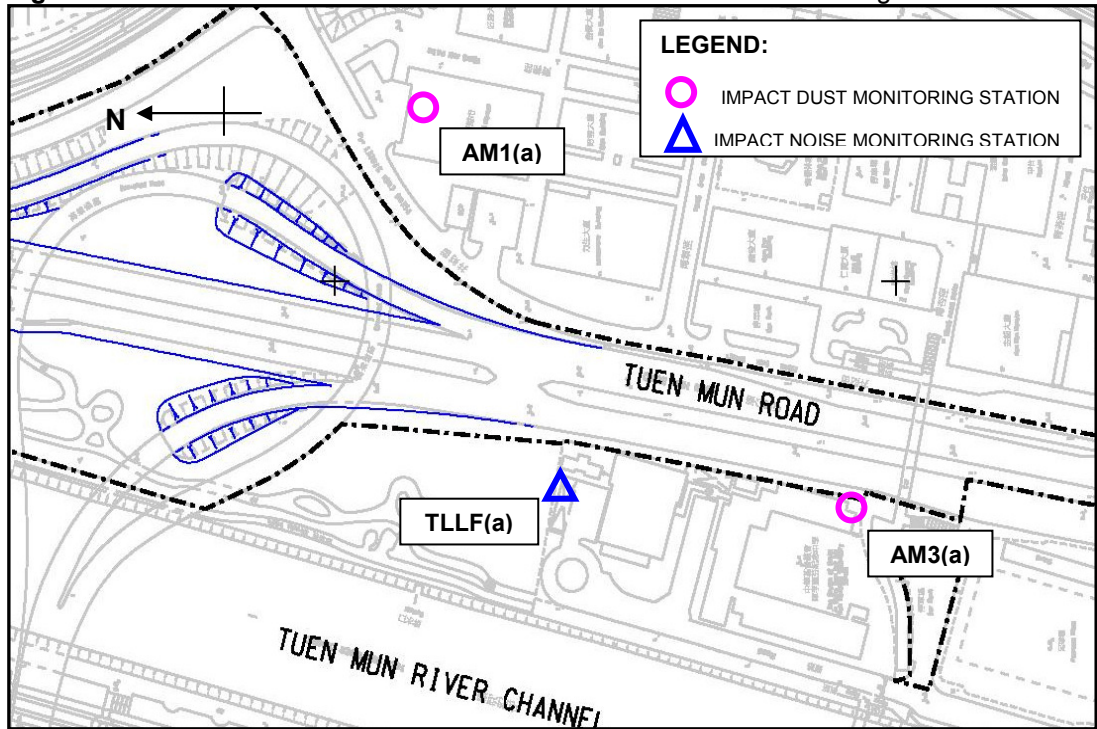


Table 1-3 Summary of impact air quality and noise monitoring stations

ID	Premise	Address	Monitoring Location Detail
Air			
AM1(a)	Kwong Choi Market	2 Tsing Min Path	Roof-top of the market office at the market garden
AM3(a)	The Church of Christ in China Tam Lee Lai Fun Memorial Secondary School	10 San Wo Lane	Ground-floor garden at the corner of the school
Noise			
TLLF(a)	The Church of Christ in China Tam Lee Lai Fun Memorial Secondary School	10 San Wo Lane	Car park of the school, facing to the construction area.

1.4 Status of Environmental Licensing and Permitting

All permits/licences inspected in the reporting month are summarised in **Table 1-4**. They are all properly kept by the contractor at their site office.

Table 1-4 Summary of environmental licensing and permit status

Types of Permits / Licenses	Reference No.	Valid from	Valid to
Environmental Permit	EP-302/2008 EP-302/2008/A EP-302/2008/B	19 February 2008 25 March 2008 15 April 2009	Superseded Superseded N/A
Notification of Construction Work under APCO	001031161	N/A	N/A
Discharge Licence under WPCO	EP760/425/013454/I	1 August 2008	31 August 2013
Construction Noise Permit	GW-RW0584-09*	24 December 2009	21 June 2010
	GW-RW0014-10	13 January 2010	12 July 2010
Chemical Waste Producer Registration	WPN5111-425-C1186-09	17 July 2008	N/A
Billing account for disposal of construction waste	7007413	N/A	N/A

* GW-RW0584-09 was superseded by GW-RW0014-10 from 13 January 2010.

2 Implementation Status

During weekly site inspections, the environmental protection, and pollution control/mitigation measures in accordance with the requirements stipulated in the EIA report were observed. Here below summarises the key observations and ET's corresponding recommendations while the Contractor's response and follow-up status are described in Section 7.1.

Waste / Chemical Waste Management

- Chemicals placing on the ground without drip tray were observed. The Contractor shall provide drip tray to avoid potential contamination.

Dust Mitigation Measures

- Small amount mud on the slip road surface at site entrance was observed. The Contractor shall maintain the road clear.

3 Air Monitoring

3.1 Air Monitoring Requirements

Monitoring Parameters

Air quality monitoring shall be measured in terms of the TSP levels for both 24-hour and 1-hour periods.

Monitoring Frequency

Dust monitoring was carried out during the reporting month. The monitoring parameters and frequency are summarised in **Table 3-1**.

Table 3-1 TSP monitoring parameters and frequency

Parameters	Monitoring Frequency	Time Period	No. of Measurement at each Location
24-hour TSP	Once every six days	0000 – 2400	1
1-hour TSP	Three times every six days	0700 – 1900	1

Monitoring Locations

In accordance with the EM&A Manual and the subsequent Baseline Report, two air quality monitoring locations during construction stage are required, namely:

- (i) Kwong Choi Market at 2 Tsing Min Path (AM1(a)); and
- (ii) The Church of Christ in China Tam Lee Lai Fun Memorial Secondary School at 10 San Wo Lane (AM3(a)).

Wind Monitoring

Wind monitoring data including wind speed and wind directions shall be collected from Hong Kong Observatory – Tuen Mun Wind Monitoring Station.

Environmental Quality Performance Limits

The monitoring results will be checked against the Action and Limit levels described in the Baseline Report, of which they are excerpted and summarised in **Tables 3-2**.

Table 3-2 Action and Limit levels for air quality

Level	Air Monitoring Stations			
	AM1(a)		AM3(a)	
	1-hour TSP	24-hour TSP	1-hour TSP	24-hour TSP
Action Level, $\mu\text{g}/\text{m}^3$	323	161	305	168
Limit Level, $\mu\text{g}/\text{m}^3$	500	260	500	260

3.2 Air Monitoring Methodology

3.2.1 Monitoring Equipment

High Volume Sampler (HVS) was used to monitor the 24-hour and 1-hour TSP. **Table 3-3** shows the equipment used for the air quality monitoring.

Table 3-3 Air quality equipment list for the air quality monitoring

Equipment	Manufacturer & Model No	Measurement Parameter	Quantity
High Volume Sampler	GS-2310105 & TE-5170	1- hour and 24-hour TSP	2
Fibreglass Filter	G810		40
HVS Calibration Kit	GMW-2535		1

3.2.2 Maintenance and Calibration

The HVSs and their accessories were frequently checked and maintained in accordance with the manufacturer's operation and maintenance manual. The maintenance included checking of supporting screen and gasket, as well as routine replacement of motor carbon brushes for the blower motor. The power cords and power supply were checked each time before sampling to ensure proper operation.

The HVSs were calibrated at 2-month intervals using GMW-2535 calibration kit which is re-calibrated by the manufacturer after one year of use. The calibration spreadsheets of the HVS and calibration certificate of the calibration kit are provided in **Appendix B**.

3.2.3 Monitoring Procedures

Specifications of the HVS are as follows:

- 0.6 – 1.7 m³/min (20 – 60SCFM);
- Equipped with a timing/control device with +/- 5 minutes accuracy for 24 hours operation;
- Installed with elapsed time meter with +/- 2 minutes accuracy for 24 hours operation;
- Capable of providing a minimum exposed area of 406 cm² (63in²);
- Flow control accuracy: +/-2.5% deviation over 24-hr sampling period;
- Equipped with a shelter to protect the filter and sampler;
- Incorporated with an electronic mass flow rate controller or other equivalent devices;
- Equipped with a flow recorder for continuous monitoring;
- Provided with a peaked roof inlet;
- Incorporated with a manometer;
- Able to hold and seal the filter paper to the sampler housing at horizontal position;
- Easy to change the filter; and
- Capable of operating continuously for 24-hour period.

The HVSs were equipped with an electronic mass flow controller and calibrated against a traceable standard at regular intervals. All equipment, calibration kit and filter papers were clearly labelled.

The relevant data including temperature, pressure, weather conditions, elapsed-time meter reading for the start and stop of the sampler, identification and weight of the filter paper, and other special phenomena observed and work progress of the concerned site were recorded.

A HOKLAS accredited laboratory (ALS Technichem (HK) Pty Ltd (HOKLAS no.: 066)), in accordance with their standard QA/QC procedures, with constant temperature and humidity control as well as equipped with necessary measuring and conditioning instruments to handle the 1-hour and 24-hour TSP samples was employed for sample analysis, and equipment calibration and maintenance. Filter papers of size 8"x10" were labelled before sampling. They were inspected clean with no pin holes and conditioned in a humidity controlled chamber for over 24-hr and be pre-weighed before use for the sampling.

After 1-hour and 24-hour sampling, the filter papers loaded with dust were kept in a clean and tightly sealed plastic bag, and then returned to the laboratory for reconditioning in the humidity controlled chamber followed by accurate weighing by an electronic balance with readout down to 0.1 mg. All the collected samples were kept in a good condition for 6 months before disposal.

3.3 Monitoring Results and Observations

3.3.1 Weather Condition

No adverse weather conditions, in particular adverse wind speed & wind direction and fog & rain that may significantly affect or invalidate the collected monitoring data, were registered during the reporting period.

3.3.2 Air Quality Monitoring Results

Monitoring of 1-hour TSP was conducted at all monitoring stations on 2, 8, 14, 20 and 26 January 2010, while monitoring of 24-hour TSP was conducted on 4, 9, 15, 21 and 27 January 2010. All monitoring data and graphical presentation of the monitoring results are provided in **Appendix C** and are summarised in **Table 3-4**. The graphical presentation of the monitoring results over past four months (October 2009 to January 2010) is provided in **Appendix C**. Wind data during the reporting period is presented in **Appendix D**.

Table 3-4: Summary of impact air quality monitoring results in the reporting month

Location	Average 1-hr TSP Concentration, $\mu\text{g}/\text{m}^3$ (Range)	Average 24-hr TSP Concentration, $\mu\text{g}/\text{m}^3$ (Range)
AM1(a)	36 (6 – 121)	42 (17 – 88)
AM3(a)	57 (6 – 256)	73 (42 – 162)

All measured 1-hour and 24-hour TSP concentrations in the reporting month were below the Action/Limit Level. No exceedance of action and limit level was found.

3.3.3 General Observations

Major construction works including road re-construction was implemented during the reporting month.

Observable dust generation from activities on-site, such as vehicular movements along unpaved area, excavation and demolition, had been noticed at the monitoring location during the air monitoring period.

4 Noise Monitoring

4.1 Noise Monitoring Requirements

Monitoring Parameters

Construction noise shall be measured in terms of the A-weighted equivalent continuous sound pressure level (L_{eq}). L_{10} and L_{90} shall also be recorded as supplementary reference information for data auditing.

Monitoring Frequency

Noise measurements shall be conducted on a weekly basis. The monitoring time periods, monitoring parameters and frequency are summarised in **Table 4-1**.

Table 4-1 Construction noise monitoring parameters and frequency

Time Period (when construction activity is found)	Parameters	Monitoring Frequency	No. of Measurement at each Location
Between 0700-1900 hours on normal weekdays	$L_{eq}(30 \text{ min})$	Once per week	1
Between 1900-2300 hours on normal weekdays	$L_{eq}(5 \text{ min})^*$		3 (consecutive)*
Between 2300-0700 hours of next day			
Between 0700-1900 hours on holidays			

* If works are to be carried out during restricted hours, the conditions stipulated in the Construction Noise Permit (CNP) issued by the Noise Control Authority have to be followed.

Monitoring Location

In accordance with the EM&A Manual and the subsequent Baseline Report, one noise monitoring location during construction stage is required, namely:

- (i) The Church of Christ in China Tam Lee Lai Fun Memorial School at 10 San Wo Lane (TLLF(a)).

Environmental Quality Performance Limits

The monitoring results will be checked against the Action and Limit levels described in the Baseline Report, of which they are excerpted and summarised in **Tables 4-2**.

Table 4-2 Action and Limit levels for construction noise

Time Period	Action Level	Limit Level dB(A)
0700 - 1900 hours on normal weekdays	When one documented complaint is received	70 / 65 (Note 1)
0700 - 2300 hours on holiday; and 1900 – 2300 hours on all other days		70 (Note 2)
2300 – 0700 hours of next day		55 (Note 2)

Notes:

1. For normal day-time working hours, the noise criteria are 70 dB(A) and 65 dB(A) for normal reaching periods and examination period respectively.
2. If works are to be carried out during restricted hours, the conditions stipulated in the Construction Noise Permit (CNP) issued by the Noise Control Authority have to be followed.

4.2 Noise Monitoring Methodology

4.2.1 Monitoring Equipments

Noise level was measured by a Sound Level Meter (SLM) in terms of A-weighted equivalent continuous sound pressure level. L_{eq} , L_{10} and L_{90} were recorded as supplementary information for data auditing. **Table 4-3** shows the equipment list of the noise monitoring.

Table 4-3 Noise equipment list for noise monitoring

Equipment	Manufacturer & Model No.	Serial no.	Precision Grade	Qty.
Integrated SLM	Brüel & Kjær 2238	2562763	IEC 651 Type 1	1
½" free-field microphone	Brüel & Kjær 4188	2658599	IEC 804 Type 1	1
Windshield	Brüel & Kjær UA0237	N/A		1
Acoustical calibrator	Brüel & Kjær 4231	2314016	IEC 942 Type 1	1

4.2.2 Maintenance and Calibration

The SLM and calibrator in compliance with the International Electrotechnical Commission (IEC) Publication 651:1979 (Type 1) specifications as referenced in the Technical Memorandum on Noise from Construction Work other than Percussive Piling (GW-TM) were used. The calibration certificates for the noise equipments are provided in **Appendix E**.

SLM complying with the standards of IEC 651 (Fast, Slow, Impulse rms detector tests) and IEC 804 (L_{eq} functions) and acoustical calibrator model no. 4231 complying with IEC 942 were adopted for the noise measurement. Upon expiry of calibration, both equipments will be calibrated in-house using Brüel & Kjær (B&K) calibrator model no. 4226 annually. The 4226 calibrator is annually calibrated under the accreditation of United Kingdom Accreditation Service. The in-house calibration that has been undertaken can be traced back to the National Physical Laboratory. The calibration certificates for the noise equipments are given in **Appendix E**.

4.2.3 Monitoring Procedures

- The SLM and battery were checked to ensure that they are in proper condition. The SLM was set on a tripod at 1.2m above ground and at least 1m from the exterior of the building façade;
- Before conducting the measurement, the SLM was calibrated by an acoustical calibrator;
- Measurement parameter was set to A-weighted sound pressure level. The time weighting was set in fast response and the time period of measurement at 30 minutes;
- Wind speed was checked during noise monitoring to ensure the steady wind speed does not exceed 5m/s, or wind with gusts does not exceed 10m/s;
- Any abnormal conditions that generated intrusive noise during the measurement was recorded on the field record sheet;
- After each measurement, the equivalent continuous sound pressure level (L_{eq}), L_{10} and L_{90} were recorded on the field record sheet;
- After conducting the measurement, the SLM was calibrated by an acoustical calibrator; and
- The SLM was re-calibrated by the acoustical calibrator to confirm that there is no significant drift of reading. Measurements shall be accepted as valid only if the calibration levels before and after the noise measurement agrees to within 1.0 dB.

4.3 Monitoring Results and Observations

4.3.1 Weather Condition

The weather condition was mainly sunny during the noise monitoring period in the reporting month.

4.3.2 Noise Monitoring Results

Non-restricted Hours

Monitoring of the construction noise level was conducted during non-restricted hours on 8, 14, 21 and 26 January 2010 at TLLF(a). All monitoring data and graphical presentation of the monitoring results are provided in **Appendix F** and are summarised in **Table 4-4**. The graphical presentation of the monitoring results over past four months (October 2009 to January 2010) is also provided in **Appendix F**.

Table 4-4 Summary of impact noise monitoring in the reporting month

Date	Set	Start Time	End Time	Baseline* (Same period of the Day-time)	Impact Monitoring Result*	Impact Noise* after baseline correction	Limit Level
				Leq (30-min), dB(A)	Leq (30-min), dB(A)	Leq (30-min), dB(A)	dB(A)
8 Jan 10	First	10:00	10:30	74	70	/	70
14 Jan 10	First	09:30	10:00	74	70	/	65
	Second	10:00	10:30	74	70	/	
20 Jan 10	First	10:00	10:30	74	70	/	
	Second	10:30	11:00	74	70	/	
26 Jan 10	First	11:30	12:00	74	70	/	70

Note (*): Façade correction was included.

Restricted Hours

In the reporting month, night work (sign gantry installation) activity was carried out during restricted hours on 14 to 16 January 2010. The granted Construction Noise Permit (CNPs), no. GW-RW0014-10, was issued by EPD for the related activities before the works commencement. The Contractor strictly followed the conditions stipulated in the CNPs. There was no non-compliance was recorded during reporting month.

4.3.3 Exceedance of Limit Levels for Construction Noise

Based on the information provided by the school, their examination would be conducted between 11 to 21 January 2010, so the limit level of the construction noise was 65dB(A) during the said monitoring events. Two limit level exceedance for noise measurement during non-restricted hours were recorded on 14 and 21 January 2010. On-site observations during the noise monitoring revealed that the noise source was mainly the traffic noise along Tuen Mun Road although it was also observed that the Contractor was undertaking the noise barriers construction works.

Together with the on-site observations and interpretation from the monitoring results, construction noise was considered insignificant and below the noise limit level. It was therefore concluded that the noise exceedance was not related to the construction activities. No further actions were applicable. It was however recommended that the Contractor shall maintain the existing practices stipulated in the EIA report in order to minimise the potential noise impact in future.

4.3.4 General Observations

The construction site had been under normal operation during the noise monitoring period and no unusual operation was observed. Traffic noise had been noticed at the monitoring location during the noise monitoring period.

5 Landscape and Visual Monitoring

5.1 Landscape and Visual Impact Monitoring Requirements

Monitoring Requirement

In accordance with the EM&A Manual, a landscape auditor, as a member of the ET, is responsible for conducting the baseline review and monitoring the implementation of the landscape and visual mitigation measures during construction phase in accordance with the EIA report. Purposes of the review are:

- to check the status of the landscape resources within, and immediately adjacent to, the construction sites and works areas;
- to determine whether any change has occurred to the status of the landscape resources since the EIA;
- to determine whether amendments in the design of the landscape and visual mitigation measures are required for those changes; and
- to recommend any necessary amendments to the design of the landscape and visual mitigation measures.

The design, implementation and maintenance of landscape and visual mitigation measures shall be checked monthly to ensure that they are fully required. Any potential conflicts between the proposed landscape measures and any other project works or operational requirements shall also be recorded for the Contractor to resolve in early stage, without compromising the intention of the mitigation measures.

Monitoring Parameters

The components of assessed parameter of landscape resource is summarised below:

- Landscape Resource along the roadside planting at Tsing Tin Interchange (LR1); and
- Landscape Resource at Castle Peak Road (San Hui) Park (LR2).

Audit Frequency

The landscape and visual monitoring and audit shall be undertaken once a month throughout the construction period and operational phase.

Audit Location

The landscape and visual monitoring and audit shall be conducted throughout the entire site area.

5.2 Audit Results

In the reporting month, landscape and visual site audit in accordance with the requirements stipulated in the EM&A manual was conducted on 14 January 2010.

In accordance with the Clause 2.7 of the EP, seven numbers of trees (tree no. 1, 16, 35, 63, 69, 169 and 411) within the site shall be transplanted to their designed transplanted locations prior to the operational phase of the Project. Tree no.63 was dead after transplanting in March 2009 and tree no. 69 had been transplanted to new transplanting location in April 2009. Status of other six trees was no significant change during the reporting period and their respective mitigation measures was described in the previous monthly EM&A report. Status of the trees including their respective mitigation measures is summarised in **Table 5-1**.

Table 5-1 Status of tree transplantation

Tree no.	Location	Botanical Name	Status	Measures
1	LR1	<i>Melaleuca quinquenervia</i> 白千層	Fell by Typhoon	To be compensated by a tree at designated

Tree no.	Location	Botanical Name		Status	Measures
					location
16	LR1	<i>Melaleuca quinquenervia</i>	白千層	Fell by Typhoon	To be compensated by a tree at designated location
35	LR1	<i>Melaleuca quinquenervia</i>	白千層	Fell by Typhoon	To be compensated by a tree at designated location
63	LR1	<i>Gossampinus malabarica</i>	木棉	Dead after transplanting	To be compensated by a tree at designated location
69	LR1	<i>Melia azedarach</i>	森樹	Completion of relocation to new transplanting location	Not applicable
169	LR2	<i>Melaleuca quinquenervia</i>	白千層	Fell by Typhoon	To be compensated by a tree at designated location
411	LR2	<i>Melaleuca quinquenervia</i>	白千層	Completion of interim transplant within the site	To be transplanted at designated location

In accordance with Tree Assessment Schedule in Appendix 10.1 of the EIA Report, forty-seven trees of LR1 and LR2 would be affected as a result of the construction works. Seven of them, as described above, were proposed to be transplanted to their designated locations before operational phase, while the remaining forty trees were proposed to be felled during the construction phase. No significant change on their status was noted during the reporting period.

Thirty-five numbers of trees, which shall be retained in the site according to the Tree Assessment Schedule in Appendix 10.1 of the EIA Report, were damaged due to the typhoons prior to the commencement of the construction. Observations during the monthly inspection summarized in **Table 5-2**.

Table 5-2 Status of forty trees to be affected during the construction stage

ID No.	Tree affected			Current Status
	No.	Botanical Name		
LR1	9	<i>Acacia confusa</i>	台灣相思	Transplanted to Siu Lang Shui Road
	10	<i>Acacia confusa</i>	台灣相思	Transplanted to Siu Lang Shui Road
	15	<i>Acacia confusa</i>	台灣相思	Transplanted to Siu Lang Shui Road
	17	<i>Acacia confusa</i>	台灣相思	Felled
	31	<i>Acacia confusa</i>	台灣相思	Felled
	32	<i>Acacia confusa</i>	台灣相思	Felled
	33	<i>Hibiscus tiliaceus</i>	黃槿	Felled
	34	<i>Hibiscus tiliaceus</i>	黃槿	Felled
	45	<i>Acacia confusa</i>	台灣相思	Felled
	46	<i>Thevetia peruviana</i>	黃花夾竹桃	Felled by Typhoon
	47	<i>Acacia confusa</i>	台灣相思	Felled
	48	<i>Hibiscus tiliaceus</i>	黃槿	Transplanted to Siu Lang Shui Road

ID No.	Tree affected		Current Status
	No.	Botanical Name	
	49	<i>Acacia confusa</i> 台灣相思	Felled
	50	<i>Hibiscus tiliaceus</i> 黃槿	Transplanted to Siu Lang Shui Road
	51	<i>Hibiscus tiliaceus</i> 黃槿	Transplanted to Siu Lang Shui Road
	52	<i>Hibiscus tiliaceus</i> 黃槿	Felled
	53	<i>Acacia confusa</i> 台灣相思	Transplanted to Siu Lang Shui Road
	54	<i>Hibiscus tiliaceus</i> 黃槿	Transplanted to Siu Lang Shui Road
	55	<i>Hibiscus tiliaceus</i> 黃槿	Felled
	56	<i>Hibiscus tiliaceus</i> 黃槿	Transplanted to Siu Lang Shui Road
	57	<i>Hibiscus tiliaceus</i> 黃槿	Transplanted to Siu Lang Shui Road
	58	<i>Acacia confusa</i> 台灣相思	Felled
	59	<i>Hibiscus tiliaceus</i> 黃槿	Transplanted to Siu Lang Shui Road
	60	<i>Acacia confusa</i> 台灣相思	Felled
	61	<i>Melaleuca quinquenervia</i> 白千層	Transplanted to Siu Lang Shui Road
	62	<i>Acacia confusa</i> 台灣相思	Felled
	64	<i>Hibiscus tiliaceus</i> 黃槿	Felled
	65	<i>Melia azedarach</i> 森樹	Felled
	293	<i>Hibiscus tiliaceus</i> 黃槿	Felled
LR2	155	<i>Acacia confusa</i> 台灣相思	Felled
	156	<i>Acacia confusa</i> 台灣相思	Felled
	163	<i>Melaleuca quinquenervia</i> 白千層	Felled
	165	<i>Acacia confusa</i> 台灣相思	Felled
	167	<i>Acacia confusa</i> 台灣相思	Felled
	168	<i>Acacia confusa</i> 台灣相思	Felled
	170	<i>Hibiscus tiliaceus</i> 黃槿	Felled
	171	<i>Hibiscus tiliaceus</i> 黃槿	Felled
	172	<i>Acacia confusa</i> 台灣相思	Felled
	173	<i>Acacia confusa</i> 台灣相思	Felled
	174	<i>Acacia confusa</i> 台灣相思	Felled

In accordance with the Clause 2.8 of the EP, compensatory planting of forty-seven number of trees was carried out prior the operational phase. The locations of the compensatory tree were shown in **Appendix G**. Furthermore, based on the updated information provided by the contractor and the site inspections, no significant change on the tree status was noted during the reporting month.

5.3 Implementation Status of Consultation Phase Landscape and Visual Mitigation Measures

The design, implementation and maintenance of landscape and mitigation measures, listed in Table 8.2 of the EM&A manual, were checked during the monthly site audit. No non-compliance has been triggered. Summary of the implementation status of Construction Phase Landscape and Visual Mitigation Measures is presented in the Environmental Mitigation Implementation Schedule (EMIS) in **Appendix H**.

5.4 Recommendations, Corrective Actions and Outstanding Issues

The recommendations, corrective actions or outstanding issues in relation with the landscape and visual monitoring are as follows:

- Tree Survey and Felling Plans and Tree Schedule should be revised in accordance with actual conditions on site, such as tree location and missing trees, for future monitoring;
- The Contractor was reminded to properly store, segregate and dispose of the felled trees;
- The Contractor was reminded to water and fertilise the trees regularly and submit the records of the works to RE;
- When retained trees were prone to be disturbed by nearby construction works, protective fencing should be erected around the trees before commencement of works;
- Where construction of protective fencing was impractical, the trunks of retained trees should be protected from abrasion by wrapping with hessian sacking, and strapping with pallet timbers secured with wire;
- Any debris and wood produced as a result of pruning, felling and cavity work performed on trees should be collected and removed from site properly; and
- The Contractor was reminded to keep 7m protect zone and properly fenced for tree no.69;
- The Contractor was reminded to avoid trunks damage during the construction works and, takes the proper remedial measures immediately and tree protection when damage was observed; and
- The Contractor was reminded to avoid the materials storage too close to the trees.

6 Waste Disposal

The estimated amounts of different types of waste generated by the activities of the Project in the month are shown in **Table 6-1**. It was advised from the Contractor that determination of the actual amount of wastes generation is still in progress so the relevant information will be presented on the final EM&A report. Actual amounts of waste generated in December 2009 are shown in **Table 6-2**. The monthly summary waste flow table is provided in **Appendix I**.

Table 6-1 Estimated amounts of waste generated in the reporting month

Waste Type	Estimated Amount	Actual Amount	Disposal Locations
Inert C&D Waste	40 m ³	To be presented in final EM&A report	Disposal of at fill bank at Tuen Mun Area 38
Metals	2 kg		Recycle collector
Paper/cardboard packaging	10 kg		Recycle collector
Chemical Waste	500 kg		Disposal of at Dunwell Ind. Ltd.
General Refuse	20 m ³		Disposal of at WENT landfill

Table 6-2 Actual amounts of waste generated in previous month (December 2009)

Waste Type	Estimated Amount	Actual Amount	Disposal Locations
Inert C&D Waste	285 m ³	285 m ³	Disposal of at fill bank at Tuen Mun Area 38
Metals	4 kg	4 kg	Recycle collector
Paper/cardboard packaging	10 kg	10 kg	Recycle collector
Chemical Waste	300 kg	300 kg	Disposal of at SENT landfill
General Refuse	5 m ³	5 m ³	Disposal of at WENT landfill

7 Environmental Performance

7.1 Environmental Site Inspection

Environmental site inspections were carried out on a weekly basis to monitor environmental issues on the construction sites to ensure that all mitigation measures were implemented timely and properly. The site inspections were carried out on 6, 14 and 21 January 2010. A summary of the site inspections is presented in **Table 7-1**.

Table 7-1 Key findings of weekly environmental site audit in the reporting month

Inspection Date	Key Observations and Recommendations	CT's Response / Environmental Outcome	Follow up Status / Closed Date
6 Jan 10	Chemicals placed on the ground without drip tray were observed. The Contractor shall provide drip tray to avoid potential contamination.	Agreed with the ET's advice	Chemicals had been removed. Closed on 14 Jan 10.
6, 14 Jan 10	Small amount mud on the slip road surface at site entrance was observed. The Contractor shall maintain the road clear.	Agreed with the ET's advice	Slip road surface had been cleaned. Closed on 21 Jan 10.
21 Jan 10	The site condition was generally satisfactory.	-	-

7.2 Non-Compliance Record

There was no non-compliance record identified in the reporting month.

7.3 Complaint Record

There was no environmental complaint received in the reporting month.

7.4 Notification of Summons and Successful Prosecution

No summons or prosecutions related to environmental issues were received or made against the Project in the reporting month.

7.5 Review of Reasons of Non-Compliance

There was no non-compliance identified during the reporting month so review of the non-compliance was not required.

8 Future Key Issues

8.1 Key Issues for the Coming Month

The remaining works are mainly E&M activities or minor civil works which will be carried out during restricted hours. The relevant Construction Noise Permits (CNPs) will be granted by the Environmental Protection Department. It is anticipated that no significant environmental impact would be contributed from the remaining works in the coming month.

9 Conclusions and Recommendations

9.1 Conclusions

The construction phase of the Project was commenced on 2 October 2008. The EM&A programme has been implemented since then, including air quality, noise, landscape and visual and environmental site audits.

No complaint, summons or prosecution related to environmental issues was received during the reporting month.

Weekly environmental site audit was carried out during the reporting month. The major environmental concerns were related to air quality, water quality, landscape and visual impact, waste management as well as handling of chemical waste.

9.2 Recommendations

The remaining works are mainly E&M activities or minor civil works which will be carried out during restricted hours. The relevant Construction Noise Permits (CNPs) will be granted by the Environmental Protection Department. The conditions stipulated in CNPs should be strictly followed when the remaining works were carried out during the restricted hours.

10 Reference

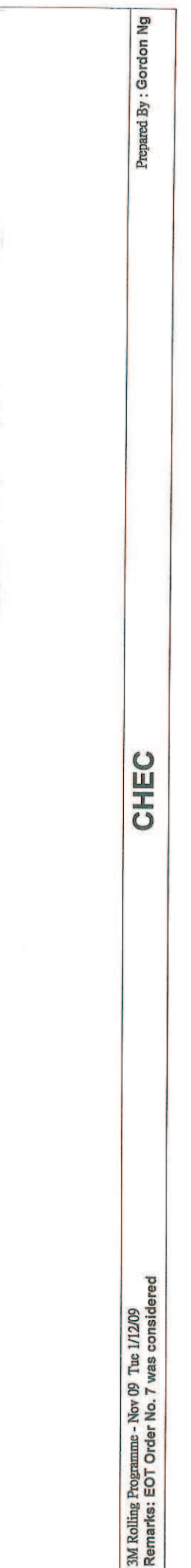
- 1) Maunsell Consultants Asia Ltd. December 2007. Quotation Ref No. Hy(S)Q/026/2006 Widening of Tuen Mun Road at Tsing Tin Interchange – Environmental Monitoring & Audit Manual.
- 2) Ove Arup & Partners Hong Kong Limited. September 2008. Contract No. HY/2007/14 Widening of Tsing Tin Interchange – Baseline Monitoring Report (Revision_6)

Appendix A

**Construction
Programme**

3 Month Rolling Programme

ID	Task Name	Duration	Start	Finish	Predecessors	% Complete
1	Letter of Acceptance	0 days	Fri 30/5/08	Fri 30/5/08		0%
2	Project Commencement	0 days	Fri 6/6/08	Fri 6/6/08		0%
3	Revised SECTION 1 Completion	0 days	Tue 15/12/09	Tue 15/12/09		0%
4	Revised SECTION 3 Completion	0 days	Thu 24/12/09	Thu 24/12/09		0%
5	Permanent Works Design	232 days	Fri 6/6/08	Wed 11/3/09		100%
21	TTA & General Submission	322 days	Fri 6/6/08	Thu 2/7/09		99%
31	SECTION 1	450 days	Sat 26/7/08	Thu 21/1/10		99%
32	Tuen Mun Road South Bound	450 days	Sat 26/7/08	Thu 21/1/10		89%
33	Noise Barrier Foundation	241 days	Sat 26/7/08	Sat 16/5/09		100%
46	Road Works	203 days	Mon 18/5/09	Thu 14/1/10		69%
47	Road pavement & drainage for widen lane (lane 1)	60 days	Mon 18/5/09	Tue 28/7/09	45	100%
48	Re-construct existing slow lane (lane 2)	15 days	Sun 29/11/09	Wed 16/12/09	48,96,100	50%
49	Re-construct existing flat lane (lane 3)	23 days	Thu 17/12/09	Thu 14/1/10	49	0%
51	Sign Gantry	294 days	Mon 2/2/09	Thu 21/1/10		86%
52	Construct eastern sign gantry footing (SG1)	30 days	Mon 2/2/09	Sat 7/3/09		100%
53	Construct middle sign gantry footing (SG1)	25 days	Mon 2/2/09	Mon 2/3/09		100%
54	Construct western sign gantry footing (SG1)	25 days	Thu 17/12/09	Sat 16/1/10	40	100%
55	Fabrication of sign gantry (SG1)	90 days	Sun 27/9/09	Wed 13/1/10	29	75%
56	Erection the sign gantry (Slip D)	2 days	Mon 18/1/10	Tue 19/1/10	56,55,53,54	100%
57	Erection the sign gantry (TMR SB)	2 days	Wed 20/1/10	Thu 21/1/10	56,55,53,54,57	0%
59	Tuen Mun Road North Bound	394 days	Wed 3/9/08	Wed 23/12/09		97%
60	Noise Barrier Foundation	134 days	Mon 15/9/08	Wed 25/2/09		100%
72	Road Works	262 days	Thu 12/2/09	Wed 23/12/09		95%
73	Existing UJ diversion	12 days	Thu 12/2/09	Wed 25/2/09	69FS,9 days	100%
74	Road pavement & drainage for widen lane (lane 1)	88 days	Thu 26/2/09	Mon 15/6/09	74,71	100%
75	Re-construct existing slow lane (lane 2) & 450mm pipe	50 days	Sat 22/8/09	Tue 20/10/09	75,114,118,86	100%
76	Re-construct existing fast lane (lane 3) & 450mm pipe	40 days	Sat 7/11/09	Wed 23/12/09	76	75%
77	High Mast Lighting and CCTV	177 days	Wed 3/9/08	Mon 6/4/09		91%
78	SECTION 3	318 days	Mon 29/12/08	Wed 20/1/10		96%
79	Tuen Mun Road South Bound	318 days	Mon 29/12/08	Wed 20/1/10		93%
91	Slip Road D	196 days	Mon 16/3/09	Sat 7/11/09		100%
92	Slip Road C	254 days	Mon 29/12/08	Wed 4/11/09		100%
93	Sign Gantry	67 days	Mon 2/11/09	Wed 20/1/10		45%
101	Fabrication of sign gantry (SG2)	60 days	Mon 2/11/09	Tue 12/1/10		50%
102	Erection the sign gantry (TMR SB)	7 days	Wed 13/1/10	Wed 20/1/10	102	0%
103	Noise Barrier Erection	30 days	Fri 7/8/09	Thu 10/9/09		100%
104	Tuen Mun Road North Bound	191 days	Mon 29/12/08	Fri 21/8/09		100%
109	Slip Road A	184 days	Mon 29/12/08	Thu 13/8/09		100%
110	Slip Road B	191 days	Mon 29/12/08	Fri 21/8/09		100%
111	Noise Barrier Erection	25 days	Fri 29/5/09	Fri 26/6/09		100%



Appendix B

**Calibration
Spreadsheets of the
High Volume Samplers
and Calibration
Certificate of
Calibration Kit**



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

AIR POLLUTION MONITORING EQUIPMENT

ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date -. Feb 23, 2009 Rootsometer S/N 9833620 Ta (K) - 293
 Operator Tisch Orifice I.D. - 1378 Pa (mm) - 765.81

PLATE OR Run #	VOLUME START (m3)	VOLUME STOP (m3)	DIFF VOLUME (m3)	DIFF TIME (min)	METER DIFF Hg (mm)	ORFICE DIFF H2O (in.)
1	NA	NA	1.00	1.4180	3.2	2.00
2	NA	NA	1.00	0.9970	6.4	4.00
3	NA	NA	1.00	0.8930	7.9	5.00
4	NA	NA	1.00	0.8520	8.8	5.50
5	NA	NA	1.00	0.7030	12.8	8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)	Va	(x axis) Qa	(y axis)
1.0205	0.7197	1.4317	0.9958	0.7022	0.8748
1.0162	1.0192	2.0247	0.9915	0.9945	1.2371
1.0142	1.1357	2.2637	0.9896	1.1082	1.3831
1.0130	1.1890	2.3742	0.9885	1.1602	1.4506
1.0077	1.4334	2.8633	0.9832	1.3987	1.7495
Qstd slope (m) =		2.00826	Qa slope (m) =		1.25754
intercept (b) =		-0.01649	intercept (b) =		-0.01008
coefficient (r) =		0.99995	coefficient (r) =		0.99995
y axis = SQRT[H2O(Pa/760) (298/Ta)]			y axis = SQRT[H2O(Ta/Pa)]		

CALCULATIONS

$$Vstd = \text{Diff. Vol} [(Pa - \text{Diff. Hg}) / 760] (298 / Ta)$$

$$Qstd = Vstd / \text{Time}$$

$$Va = \text{Diff Vol} [(Pa - \text{Diff Hg}) / Pa]$$

$$Qa = Va / \text{Time}$$

For subsequent flow rate calculations:

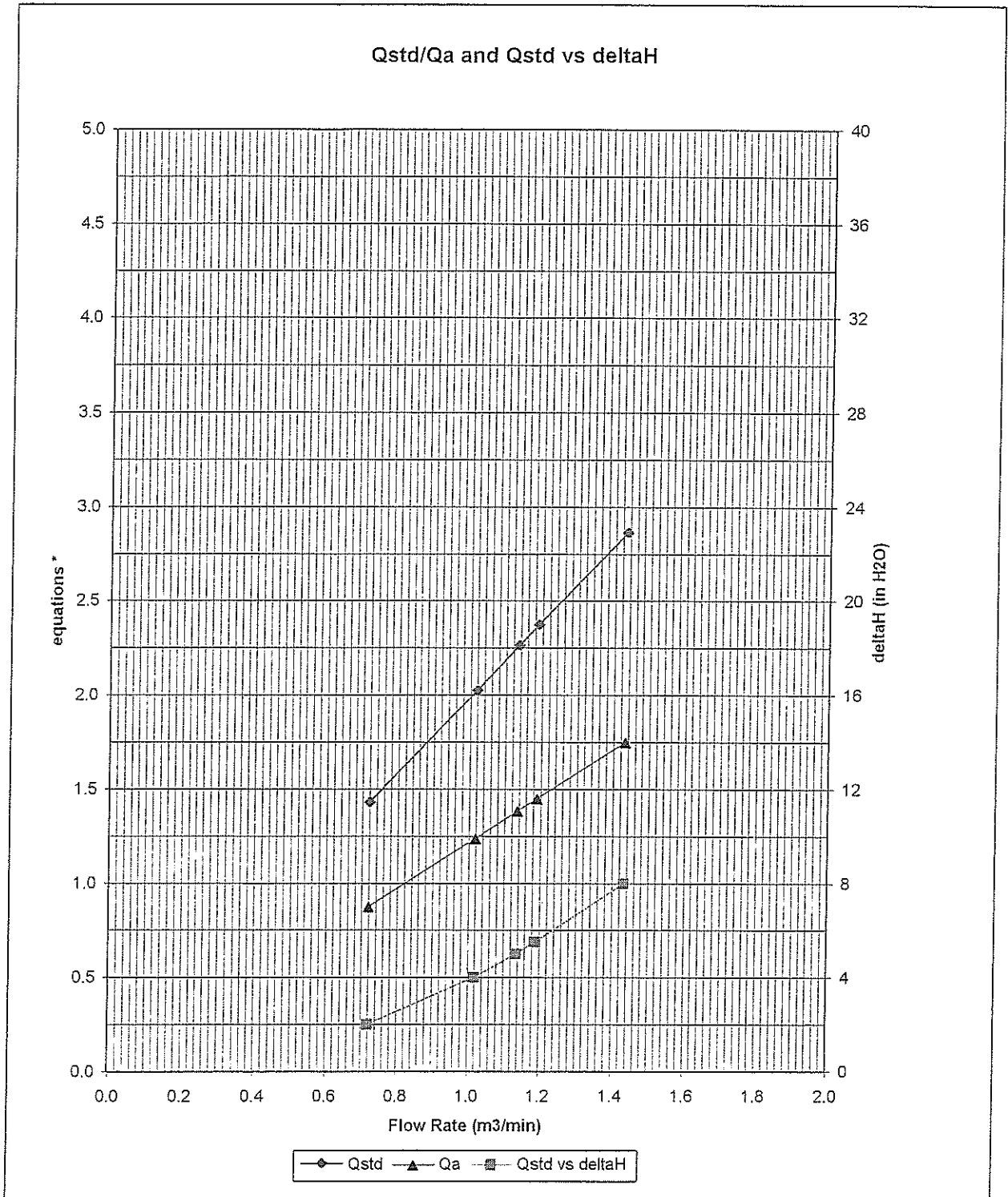
$$Qstd = 1/m \{ [\text{SQRT}(H2O(Pa/760) (298/Ta))] - b \}$$

$$Qa = 1/m \{ [\text{SQRT} H2O(Ta/Pa)] - b \}$$



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 WWW.TISCH-ENV.COM

AIR POLLUTION MONITORING EQUIPMENT



* y-axis equations:

Qstd series:
$$\sqrt{\Delta H \left(\frac{P_a}{P_{std}} \right) \left(\frac{T_{std}}{T_a} \right)}$$

Qa series:
$$\sqrt{(\Delta H (T_a / P_a))}$$

1378

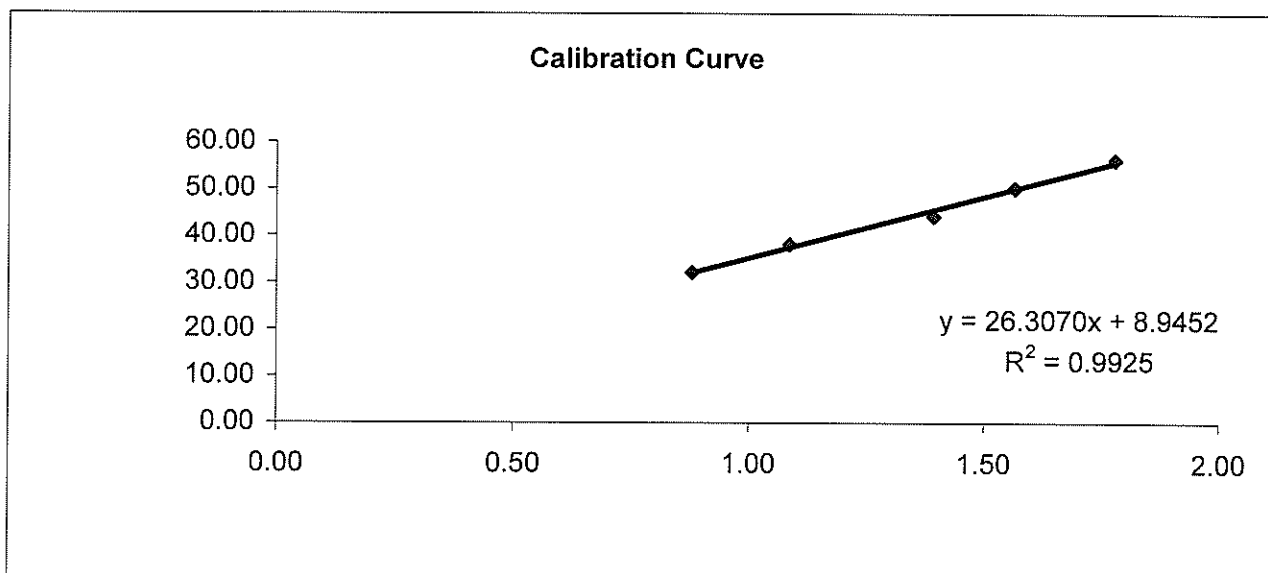
Ove Arup Partners (Hong Kong) Limited

High Volume Air Sampler Calibration Worksheet

Calibration date	26-Nov-09	Barometric pressure	762 mm Hg
Calibration due date	25-Jan-10	Temperature (°C)	23 °C
Sampler location	TT1-Roof, Kwong Choi Market	Temperature (K)	296 K
Sampler model	TE-5170	P _{std}	760 mm Hg
Sampler serial number	0521	T _{std}	298 K

Calibrator model	GMW-2535
Calibrator serial number	1378
Slope of the standard curve, m _s	2.00216
Intercept of the standard curve, b _s	-0.02053

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	3.00	32.00	0.88	32.15
7	4.60	38.00	1.09	38.18
10	7.60	44.00	1.39	44.21
13	9.60	50.00	1.57	50.23
18	12.40	56.00	1.78	56.26



Linear Regression

Sampler slope (m) :	26.3070
Sampler intercept (b) :	8.9452
Correlation coefficient (R ²) :	0.9925

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

Performed by:

Date: 26/11/09

Checked by: Kam

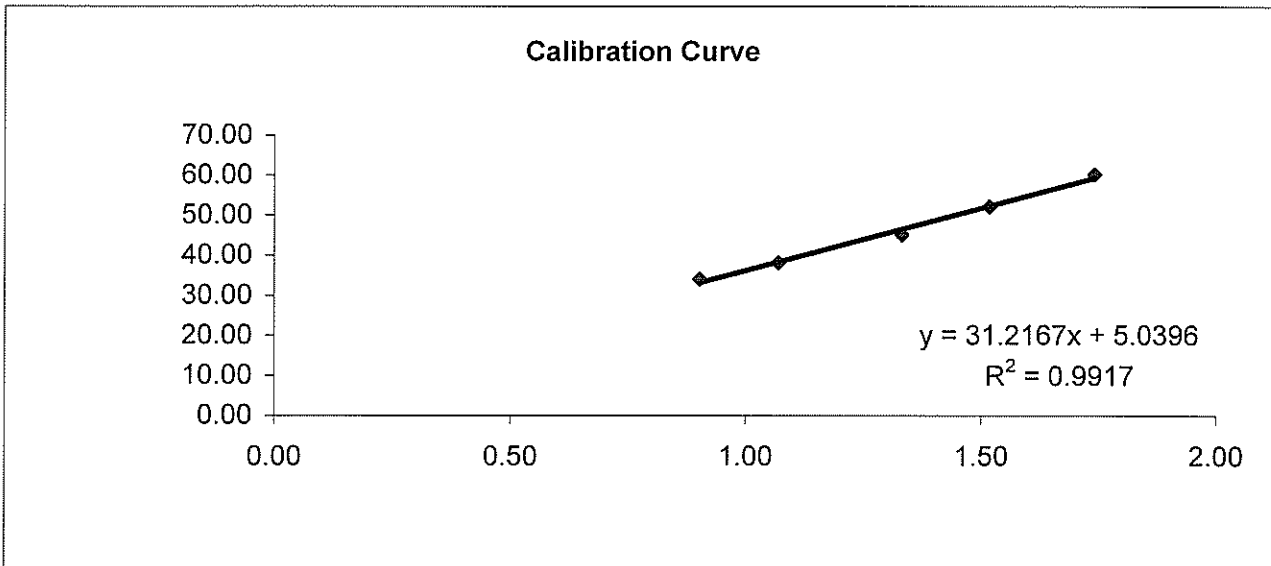
Date: 26/11/09

Ove Arup Partners (Hong Kong) Limited

High Volume Air Sampler Calibration Worksheet

Calibration date	26-Nov-09	Barometric pressure	762 mm Hg
Calibration due date	25-Jan-10	Temperature (°C)	23 °C
Sampler location	TT2 - G/F Tam Lee Lai Fun Memorial School	Temperature (K)	296 K
Sampler model	TE-5170	P _{std}	760 mm Hg
Sampler serial number	0523	T _{std}	298 K
Calibrator model	GMW-2535		
Calibrator serial number	1378		
Slope of the standard curve, m _s	2.00826		
Intercept of the standard curve, b _s	-0.01649		



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	3.20	34.00	0.90	34.16
7	4.50	38.00	1.07	38.18
10	7.00	45.00	1.33	45.21
13	9.10	52.00	1.52	52.24
18	12.00	60.00	1.74	60.28



Linear Regression

Sampler slope (m) : **31.2167**
 Sampler intercept (b) : **5.0396**
 Correlation coefficient (R²) : **0.9917**

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

Performed by: 
 Checked by: 

Date: 26/11/09
 Date: 26/11/09

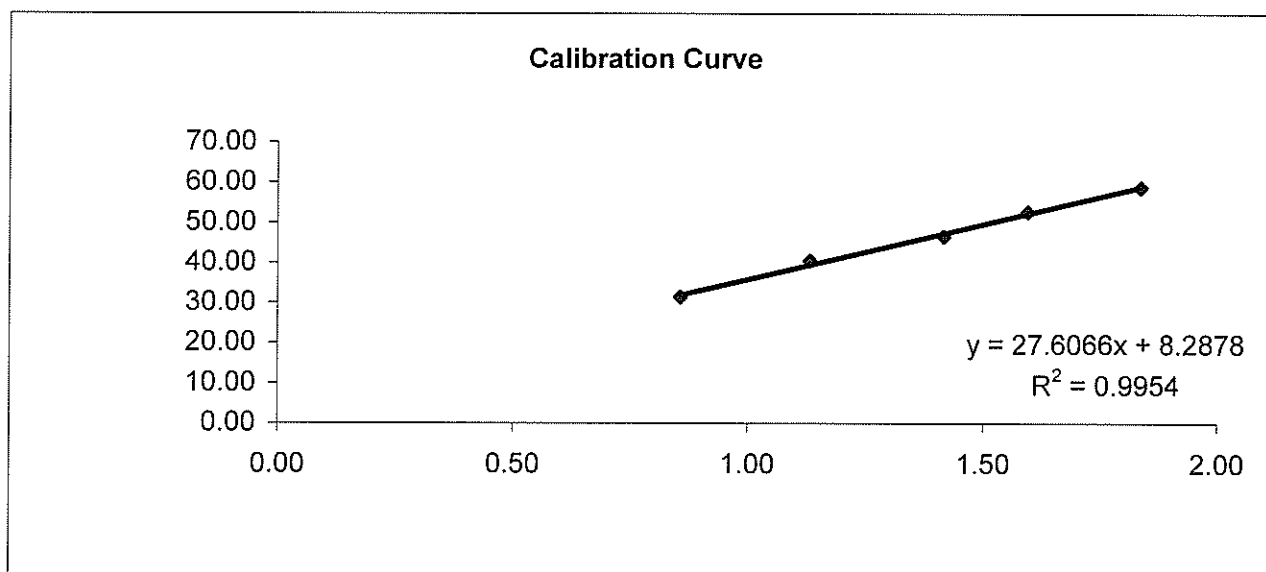
Ove Arup Partners (Hong Kong) Limited

High Volume Air Sampler Calibration Worksheet

Calibration date	25-Jan-10	Barometric pressure	763 mm Hg
Calibration due date	26-Mar-10	Temperature (°C)	18 °C
Sampler location	TT1-Roof, Kwong Choi Market	Temperature (K)	291 K
Sampler model	TE-5170	P _{std}	760 mm Hg
Sampler serial number	0521	T _{std}	298 K

Calibrator model	GMW-2535
Calibrator serial number	1378
Slope of the standard curve, m _s	2.00216
Intercept of the standard curve, b _s	-0.02053

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	2.80	31.00	0.86	31.43
7	4.90	40.00	1.13	40.56
10	7.70	46.00	1.42	46.64
13	9.80	52.00	1.60	52.73
18	13.00	58.00	1.84	58.81



Linear Regression

Sampler slope (m) :	27.6066
Sampler intercept (b) :	8.2878
Correlation coefficient (R ²) :	0.9954

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

Performed by: _____

Date: 25/1/10

Checked by: _____

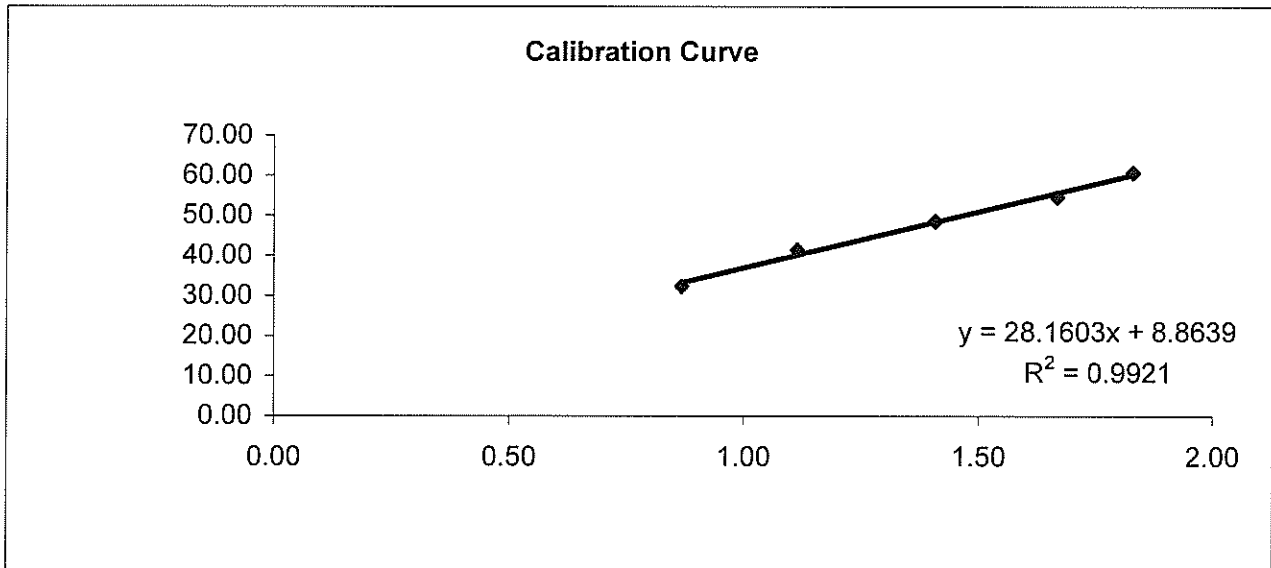
Date: 25/1/10

Ove Arup Partners (Hong Kong) Limited

High Volume Air Sampler Calibration Worksheet

Calibration date	25-Jan-10	Barometric pressure	763 mm Hg
Calibration due date	26-Mar-10	Temperature (°C)	18 °C
Sampler location	TT2 - G/F Tam Lee Lai Fun Memorial School	Temperature (K)	291 K
Sampler model	TE-5170	P _{std}	760 mm Hg
Sampler serial number	0523	T _{std}	298 K
Calibrator model	GMW-2535		
Calibrator serial number	1378		
Slope of the standard curve, m _s	2.00826		
Intercept of the standard curve, b _s	-0.01649		

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	2.90	32.00	0.87	32.45
7	4.80	41.00	1.11	41.57
10	7.70	48.00	1.41	48.67
13	10.80	54.00	1.67	54.75
18	13.00	60.00	1.83	60.84



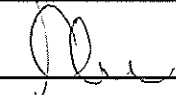
Linear Regression

Sampler slope (m) : **28.1603**
 Sampler intercept (b) : **8.8639**
 Correlation coefficient (R²) : **0.9921**

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

Performed by: 

Date: 25/1/10

Checked by: 

Date: 25/1/10

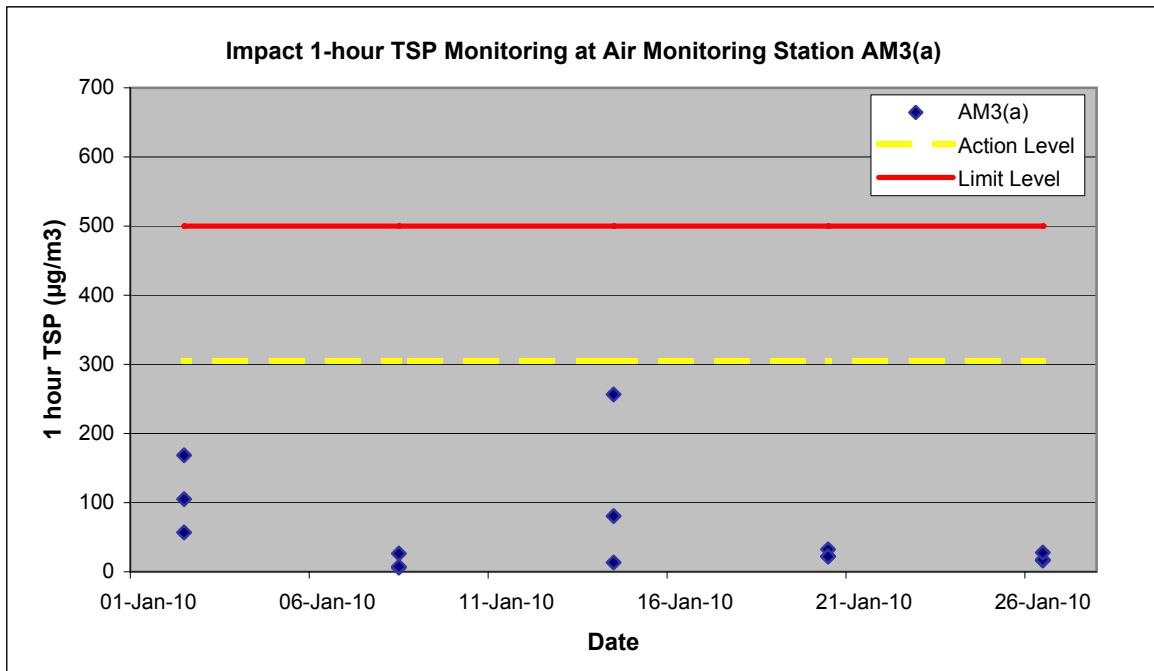
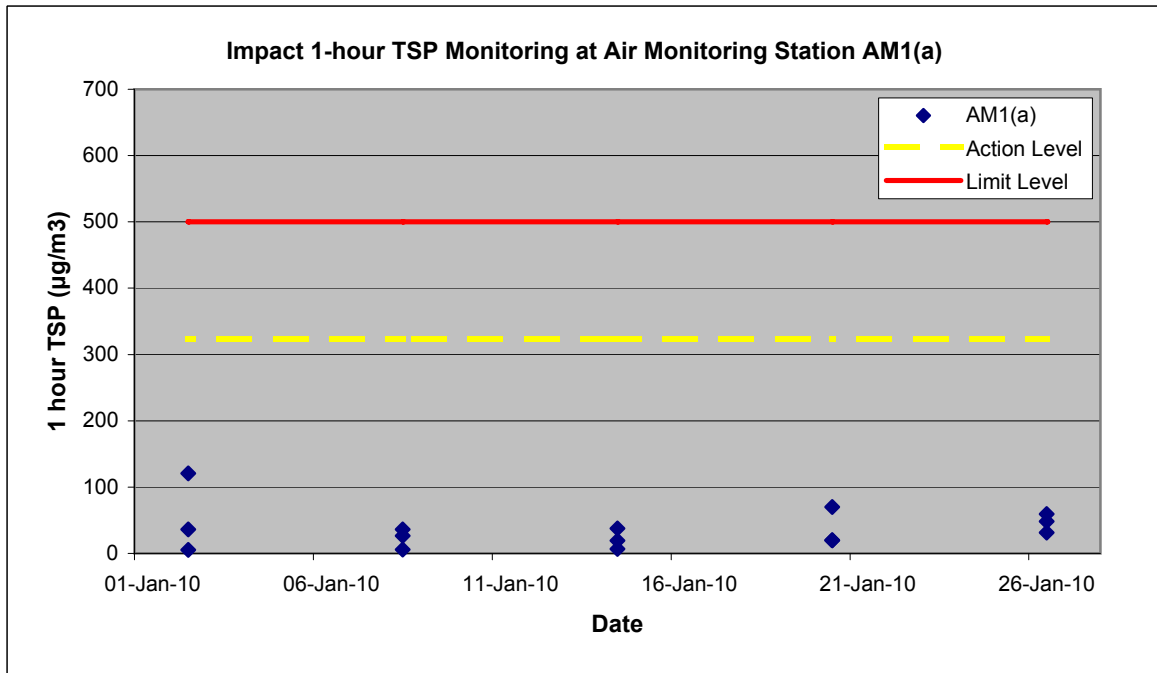
Appendix C

**Impact Air Monitoring
Results**

**Contract No. HY/2007/14 - Widening of Tuen Mun Road at Tsing Tin Interchange
Impact Air Monitoring Result - 1 hour TSP**

Filter No.	Month	Date	Receptor No.	Weather condition	Site condition	Pressure (mmHg)		Temperature (oC)		Flow Recorder Reading (CFM)		Filter Weight (g)		TSP weight (g)	Flow Rate (m ³ /min)		Average Flow Rate (m ³ /min)	Elapse Time		Sampling Time	Total vol. (m ³)	AM1(a)	AM3(a)
						Initial	Final	Initial	Final	Initial	Final	Initial	Final		Initial	Final		Start	Finish				
100516	Jan-10	2-Jan-10	TT1-1	Fine	Normal Operation	762.0	762.0	17.0	17.0	40.0	40.0	2.8421	2.8425	0.0004	1.2033	1.2033	1.2033	10728.31	10729.31	60.00	72.20	5.5	
100611	Jan-10	2-Jan-10	TT1-2	Fine	Normal Operation	762.0	762.0	17.0	17.0	40.0	40.0	2.8305	2.8331	0.0026	1.2033	1.2033	1.2033	10729.31	10730.31	60.00	72.20	36.0	
100612	Jan-10	2-Jan-10	TT1-3	Fine	Normal Operation	762.0	762.0	17.0	17.0	40.0	40.0	2.8320	2.8407	0.0087	1.2033	1.2033	1.2033	10730.31	10731.31	60.00	72.20	120.5	
100613	Jan-10	2-Jan-10	TT2-1	Fine	Normal Operation	762.0	762.0	17.0	17.0	40.0	40.0	2.8790	2.8829	0.0039	1.1392	1.1392	1.1392	10304.18	10305.18	60.00	68.35		57.1
100629	Jan-10	2-Jan-10	TT2-2	Fine	Normal Operation	762.0	762.0	17.0	17.0	40.0	40.0	2.8326	2.8398	0.0072	1.1392	1.1392	1.1392	10305.18	10306.18	60.00	68.35		105.3
100630	Jan-10	2-Jan-10	TT2-3	Fine	Normal Operation	762.0	762.0	17.0	17.0	40.0	40.0	2.8752	2.8867	0.0115	1.1392	1.1392	1.1392	10306.18	10307.18	60.00	68.35		168.3
100826	Jan-10	8-Jan-10	TT1-1	Fine	Normal Operation	764.0	764.0	21.0	21.0	40.0	40.0	2.8530	2.8556	0.0026	1.1948	1.1948	1.1948	10755.31	10756.31	60.00	71.69	36.3	
100827	Jan-10	8-Jan-10	TT1-2	Fine	Normal Operation	764.0	764.0	21.0	21.0	40.0	40.0	2.8441	2.8460	0.0019	1.1948	1.1948	1.1948	10756.31	10757.31	60.00	71.69	26.5	
100828	Jan-10	8-Jan-10	TT1-3	Fine	Normal Operation	764.0	764.0	21.0	21.0	40.0	40.0	2.8460	2.8464	0.0004	1.1948	1.1948	1.1948	10757.31	10758.31	60.00	71.69	5.9	
100829	Jan-10	8-Jan-10	TT2-1	Fine	Normal Operation	764.0	764.0	21.0	21.0	40.0	40.0	2.8440	2.8444	0.0004	1.1320	1.1320	1.1320	10331.18	10332.18	60.00	67.92		5.9
100830	Jan-10	8-Jan-10	TT2-2	Fine	Normal Operation	764.0	764.0	21.0	21.0	40.0	40.0	2.8438	2.8456	0.0018	1.1320	1.1320	1.1320	10332.18	10333.18	60.00	67.92		26.5
100831	Jan-10	8-Jan-10	TT2-3	Fine	Normal Operation	764.0	764.0	21.0	21.0	40.0	40.0	2.8680	2.8685	0.0005	1.1320	1.1320	1.1320	10333.18	10334.18	60.00	67.92		7.4
100641	Jan-10	14-Jan-10	TT1-1	cloudy	Normal Operation	765.0	765.0	19.0	19.0	40.0	40.0	2.8508	2.8522	0.0014	1.2010	1.2010	1.2010	10782.31	10783.31	60.00	72.06	19.4	
100642	Jan-10	14-Jan-10	TT1-2	cloudy	Normal Operation	765.0	765.0	19.0	19.0	40.0	40.0	2.8692	2.8719	0.0027	1.2010	1.2010	1.2010	10783.31	10784.31	60.00	72.06	37.5	
100644	Jan-10	14-Jan-10	TT1-3	cloudy	Normal Operation	765.0	765.0	19.0	19.0	40.0	40.0	2.7921	2.7926	0.0005	1.2010	1.2010	1.2010	10784.31	10785.31	60.00	72.06	6.9	
100645	Jan-10	14-Jan-10	TT2-1	cloudy	Normal Operation	765.0	765.0	19.0	19.0	40.0	40.0	2.8292	2.8301	0.0009	1.1373	1.1373	1.1373	10358.18	10359.18	60.00	68.24		13.2
100792	Jan-10	14-Jan-10	TT2-2	cloudy	Normal Operation	765.0	765.0	19.0	19.0	40.0	40.0	2.8067	2.8122	0.0055	1.1373	1.1373	1.1373	10359.18	10360.18	60.00	68.24		80.6
100793	Jan-10	14-Jan-10	TT2-3	cloudy	Normal Operation	765.0	765.0	19.0	19.0	40.0	40.0	2.8426	2.8601	0.0175	1.1373	1.1373	1.1373	10360.18	10361.18	60.00	68.24		256.4
100833	Jan-10	20-Jan-10	TT1-1	Fine	Normal Operation	761.0	761.0	21.0	21.0	40.0	40.0	2.8680	2.8694	0.0014	1.1918	1.1918	1.1918	10809.31	10810.31	60.00	71.51	19.6	
100834	Jan-10	20-Jan-10	TT1-2	Fine	Normal Operation	761.0	761.0	21.0	21.0	40.0	40.0	2.8567	2.8581	0.0014	1.1918	1.1918	1.1918	10810.31	10811.31	60.00	71.51	19.6	
100853	Jan-10	20-Jan-10	TT1-3	Fine	Normal Operation	761.0	761.0	21.0	21.0	40.0	40.0	2.8607	2.8657	0.0050	1.1918	1.1918	1.1918	10811.31	10812.31	60.00	71.51	69.9	
100841	Jan-10	20-Jan-10	TT2-1	Fine	Normal Operation	761.0	761.0	21.0	21.0	40.0	40.0	2.8423	2.8445	0.0022	1.1294	1.1294	1.1294	10385.18	10386.18	60.00	67.76		32.5
100842	Jan-10	20-Jan-10	TT2-2	Fine	Normal Operation	761.0	761.0	21.0	21.0	40.0	40.0	2.8471	2.8486	0.0015	1.1294	1.1294	1.1294	10386.18	10387.18	60.00	67.76		22.1
100843	Jan-10	20-Jan-10	TT2-3	Fine	Normal Operation	761.0	761.0	21.0	21.0	40.0	40.0	2.8485	2.8500	0.0015	1.1294	1.1294	1.1294	10387.18	10388.18	60.00	67.76		22.1
100871	Jan-10	26-Jan-10	TT1-1	Fine	Normal Operation	766.0	766.0	17.0	17.0	40.0	40.0	2.8286	2.8308	0.0022	1.1744	1.1744	1.1744	10836.31	10837.31	60.00	70.46	31.2	
100872	Jan-10	26-Jan-10	TT1-2	Fine	Normal Operation	766.0	766.0	17.0	17.0	40.0	40.0	2.8350	2.8392	0.0042	1.1744	1.1744	1.1744	10837.31	10838.31	60.00	70.46	59.6	
100873	Jan-10	26-Jan-10	TT1-3	Fine	Normal Operation	766.0	766.0	17.0	17.0	40.0	40.0	2.8476	2.8510	0.0034	1.1744	1.1744	1.1744	10838.31	10839.31	60.00	70.46	48.3	
100874	Jan-10	26-Jan-10	TT2-1	Fine	Normal Operation	766.0	766.0	17.0	17.0	40.0	40.0	2.8390	2.8401	0.0011	1.1308	1.1308	1.1308	10412.18	10413.18	60.00	67.85		16.2
100875	Jan-10	26-Jan-10	TT2-2	Fine	Normal Operation	766.0	766.0	17.0	17.0	40.0	40.0	2.8438	2.8450	0.0012	1.1308	1.1308	1.1308	10413.18	10414.18	60.00	67.85		17.7
100876	Jan-10	26-Jan-10	TT2-3	Fine	Normal Operation	766.0	766.0	17.0	17.0	40.0	40.0	2.8276	2.8295	0.0019	1.1308	1.1308	1.1308	10414.18	10415.18	60.00	67.85		28.0

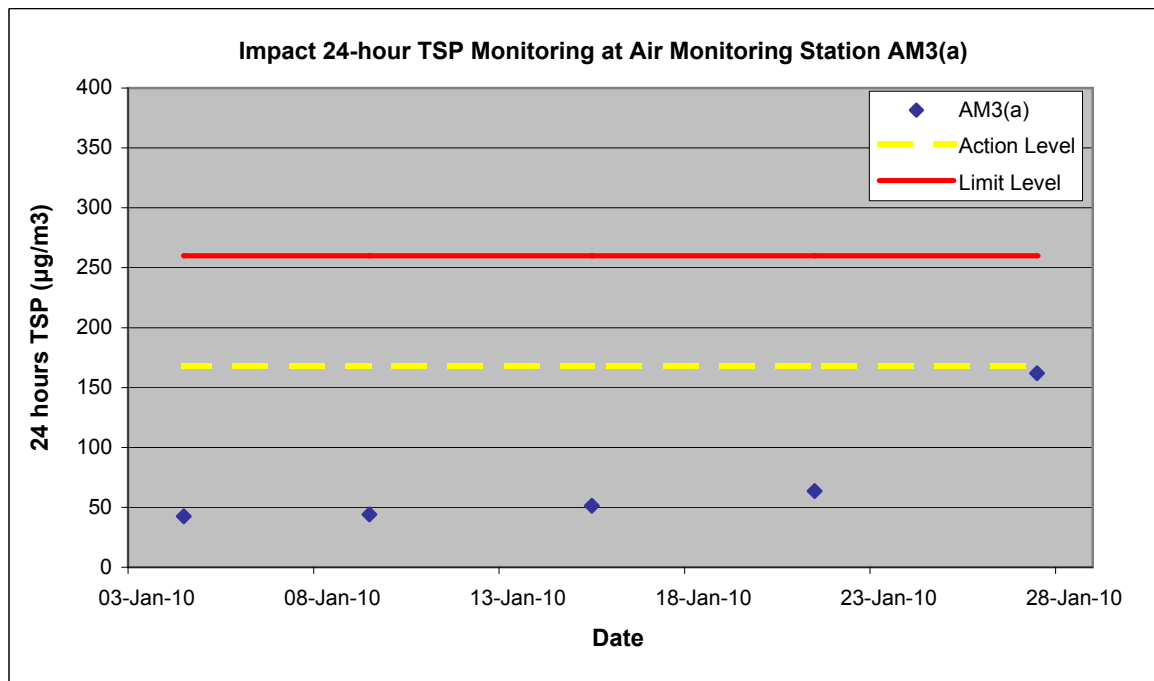
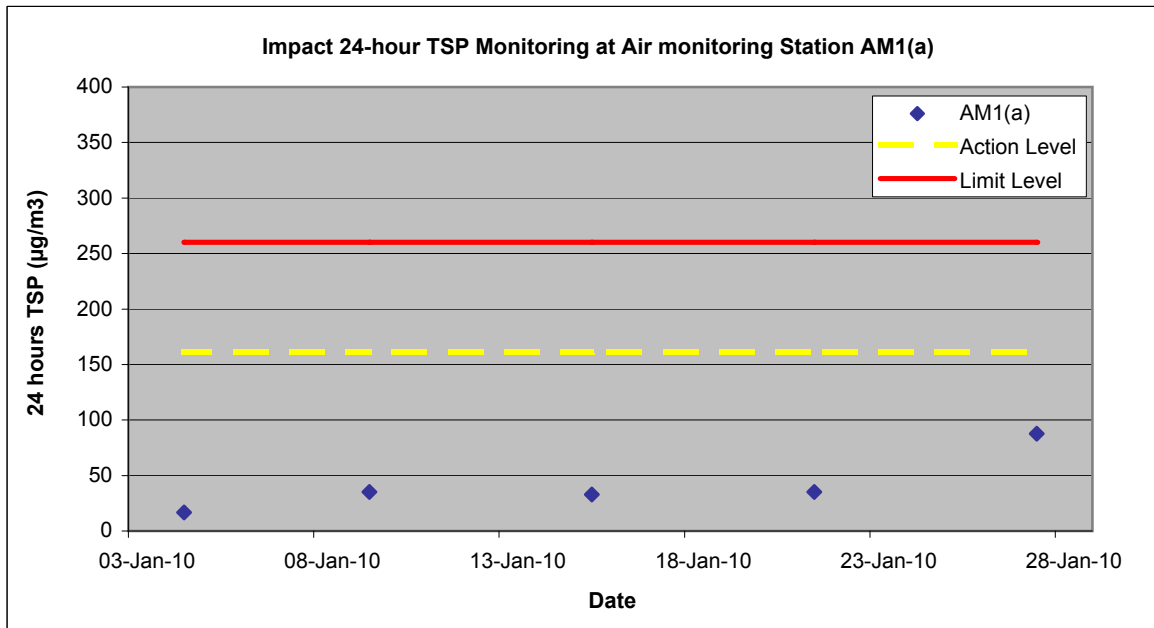
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Max	120.5	256.4
Min	5.5	5.9

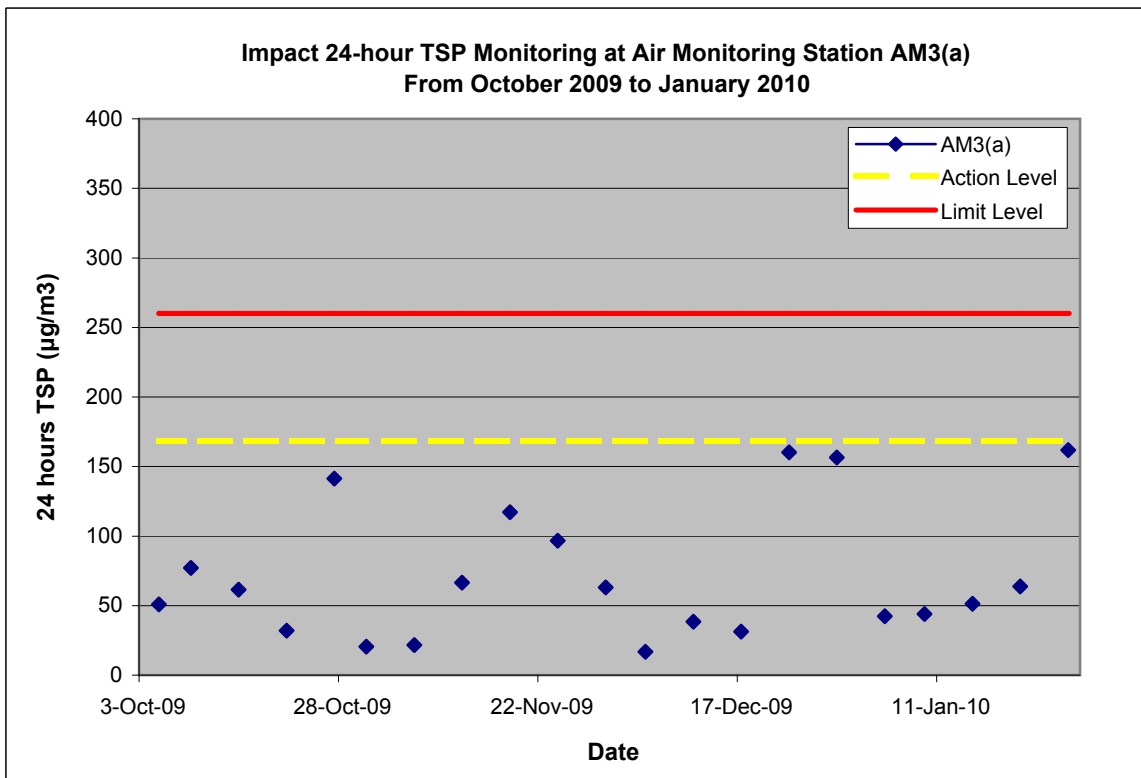
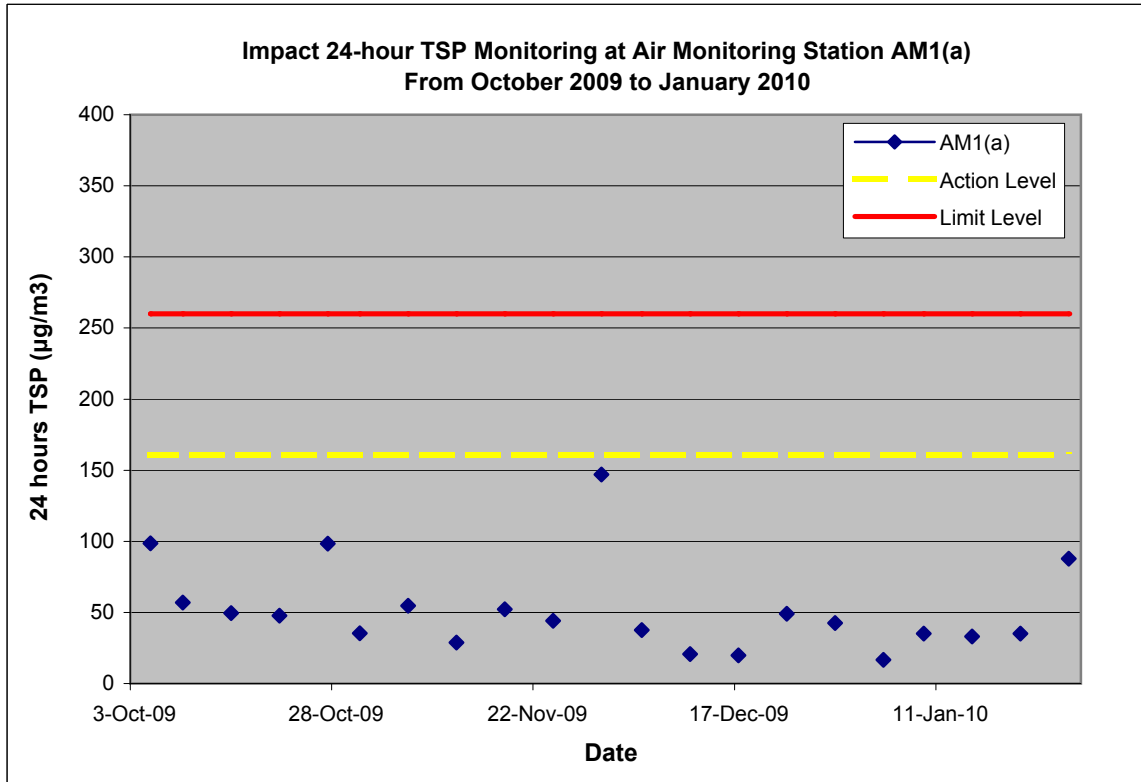


**Contract No. Hy/2007/14 - Widening of Tuen Mun Road at Tsing Tin Interchange
Impact Air Monitoring Result - 24 hours TSP**

Filter No.	Month	Date	Receptor No.	Weather condition	Site condition	Pressure (mmHg)		Temperature (oC)		Flow Recorder Reading (CFM)		Weight (g)		TSP weight (g)	Rate (m ³ /min)		Average Flow Rate (m ³ /min)	Elapse Time		Sampling Time	Total vol. (m ³)	AM1(a)	AM3(a)
						Initial	Final	Initial	Final	Initial	Final	Initial	Final		Initial	Final		Start	Finish				
100632	Jan-10	4-Jan-10	TT1	Fine	Normal Operation	765.0	765.0	15.0	15.0	40.0	40.0	2.8646	2.8935	0.0289	1.2117	1.2117	1.2117	10731.31	10755.31	1440.00	1744.85	16.6	
100631	Jan-10	4-Jan-10	TT2	Fine	Normal Operation	765.0	765.0	15.0	15.0	40.0	40.0	2.8768	2.9468	0.0700	1.1463	1.1463	1.1463	10307.18	10331.18	1440.00	1650.67		42.4
100615	Jan-10	9-Jan-10	TT1	Fine	Normal Operation	763.0	763.0	18.0	20.0	40.0	40.0	2.8727	2.9335	0.0608	1.2017	1.1964	1.1991	10758.31	10782.31	1440.00	1726.63	35.2	
100791	Jan-10	9-Jan-10	TT2	Fine	Normal Operation	763.0	763.0	18.0	20.0	40.0	40.0	2.8551	2.9270	0.0719	1.1378	1.1334	1.1356	10334.18	10358.18	1440.00	1635.26		44.0
100844	Jan-10	15-Jan-10	TT1	Fine	Normal Operation	763.0	763.0	15.0	17.0	40.0	40.0	2.8682	2.9256	0.0574	1.2096	1.2043	1.2070	10785.31	10809.31	1440.00	1738.01	33.0	
100846	Jan-10	15-Jan-10	TT2	Fine	Normal Operation	763.0	763.0	15.0	17.0	40.0	40.0	2.8490	2.9333	0.0843	1.1445	1.1400	1.1423	10361.18	10385.18	1440.00	1644.84		51.3
100860	Jan-10	21-Jan-10	TT1	Fine	Normal Operation	766.0	765.0	13.0	14.0	40.0	40.0	2.8492	2.9106	0.0614	1.2182	1.2144	1.2163	10812.31	10836.31	1440.00	1751.47	35.1	
100861	Jan-10	21-Jan-10	TT2	Fine	Normal Operation	766.0	765.0	13.0	14.0	40.0	40.0	2.8501	2.9556	0.1055	1.1517	1.1485	1.1501	10388.18	10412.18	1440.00	1656.14		63.7
100852	Jan-10	27-Jan-10	TT1	Fine	Normal Operation	765.0	766.0	16.0	16.0	40.0	40.0	2.8530	3.0017	0.1487	1.1759	1.1769	1.1764	10839.31	10863.31	1440.00	1694.02	87.8	
100216	Jan-10	27-Jan-10	TT2	Fine	Normal Operation	765.0	766.0	16.0	16.0	40.0	40.0	2.8760	3.1401	0.2641	1.1323	1.1333	1.1328	10415.18	10439.18	1440.00	1631.23		161.9

Average	41.5	72.7
Max	87.8	161.9
Min	16.6	42.4

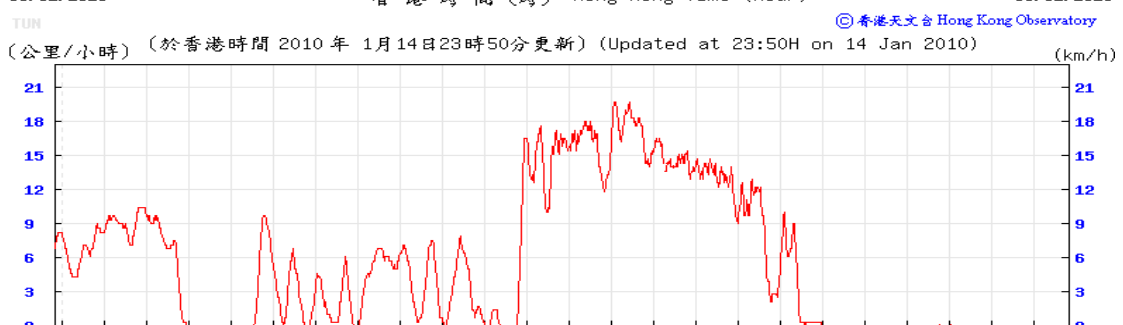
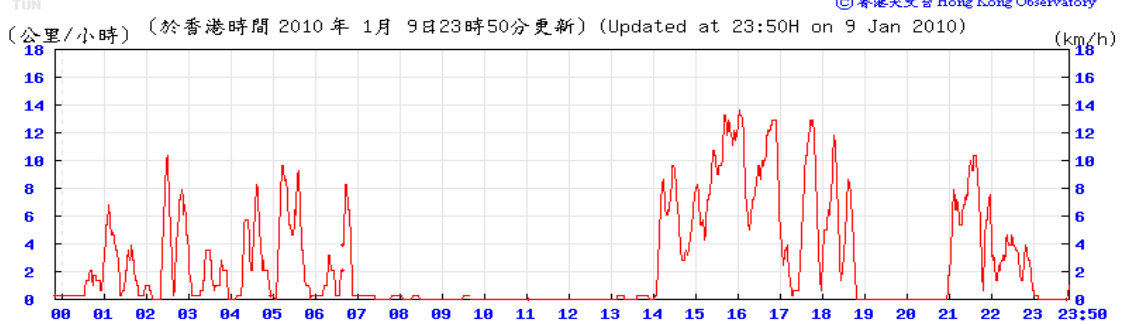
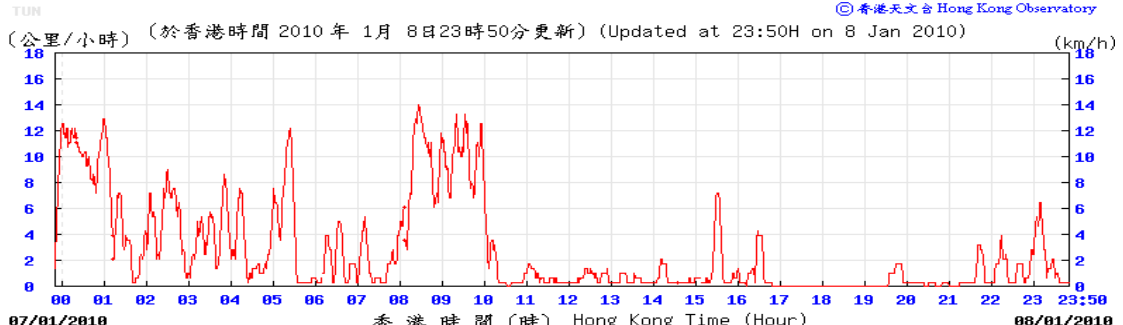
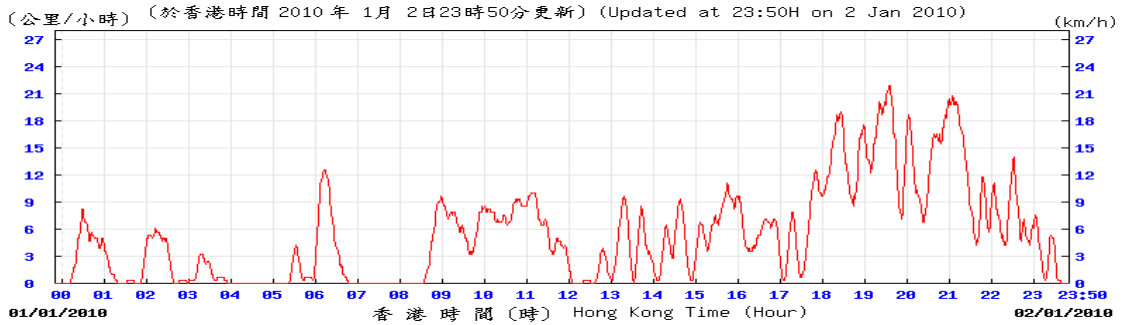


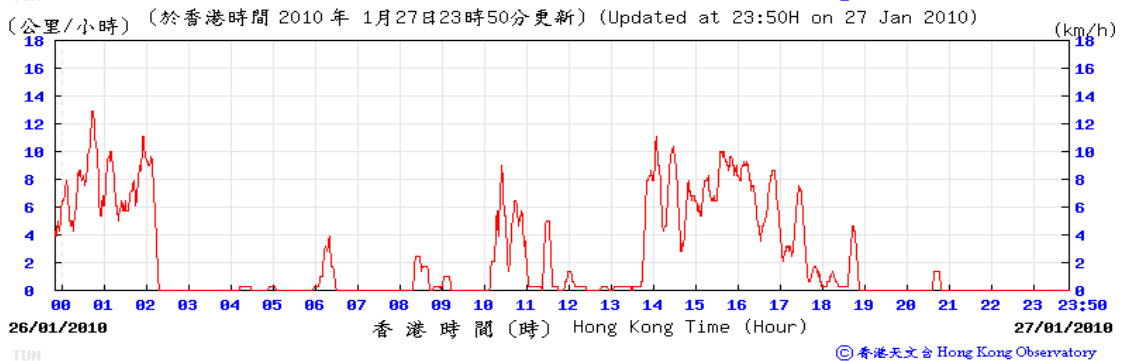
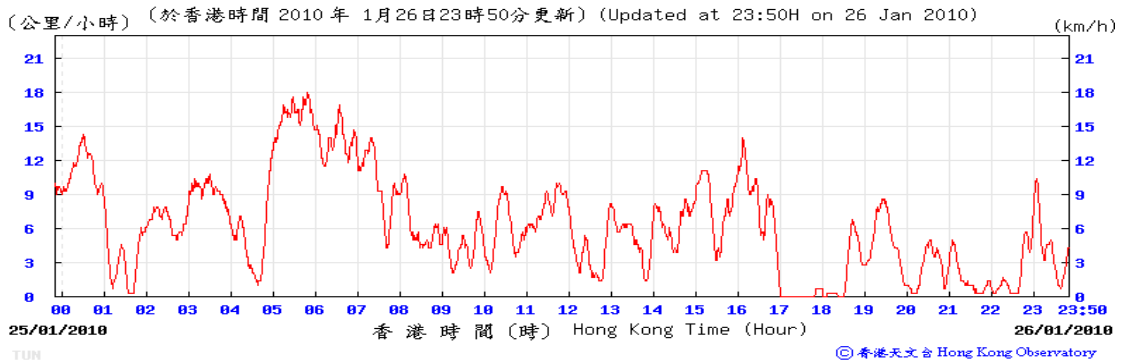
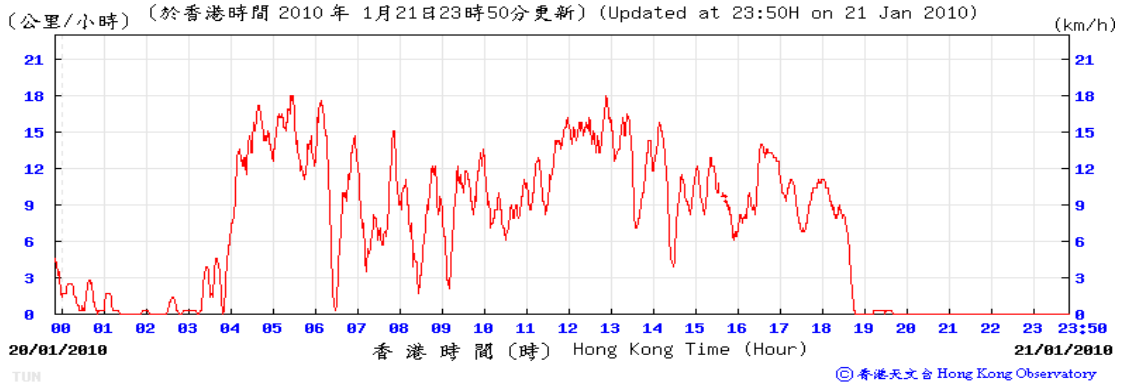
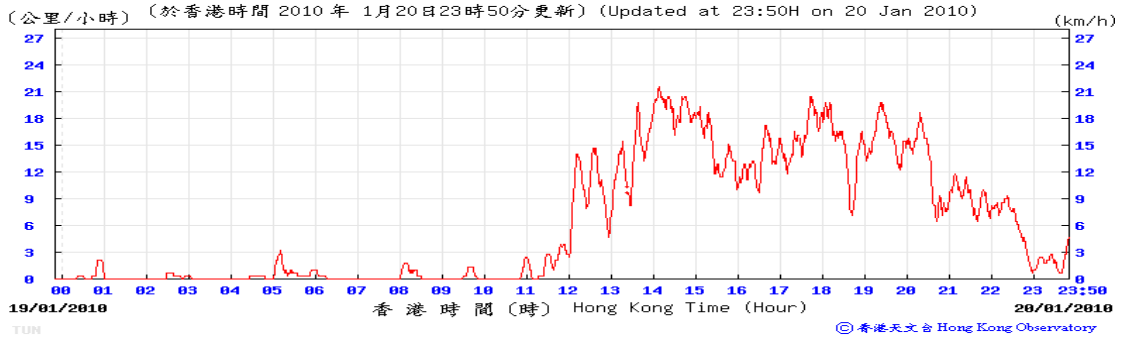
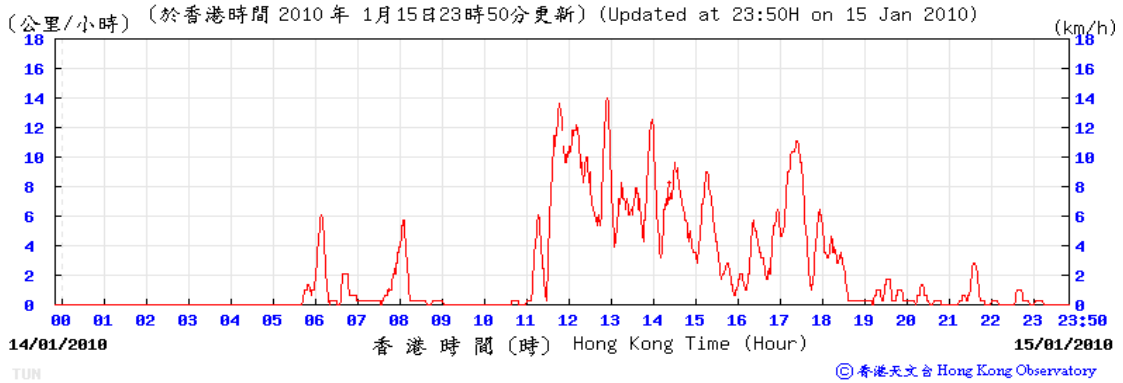


Appendix D

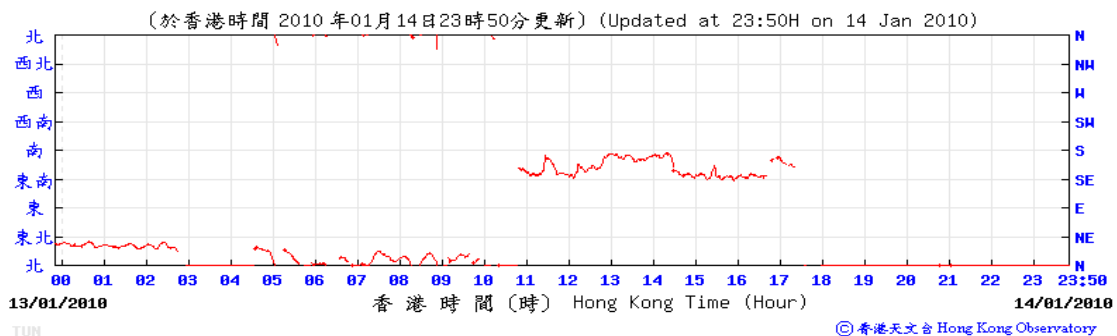
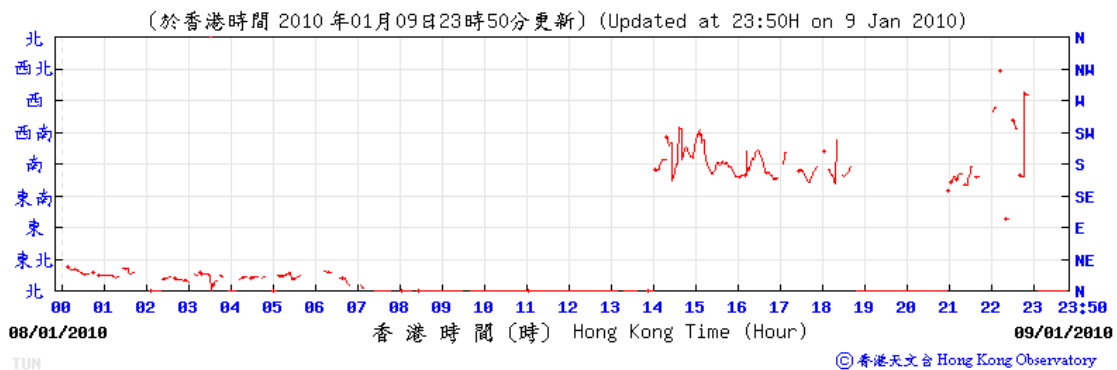
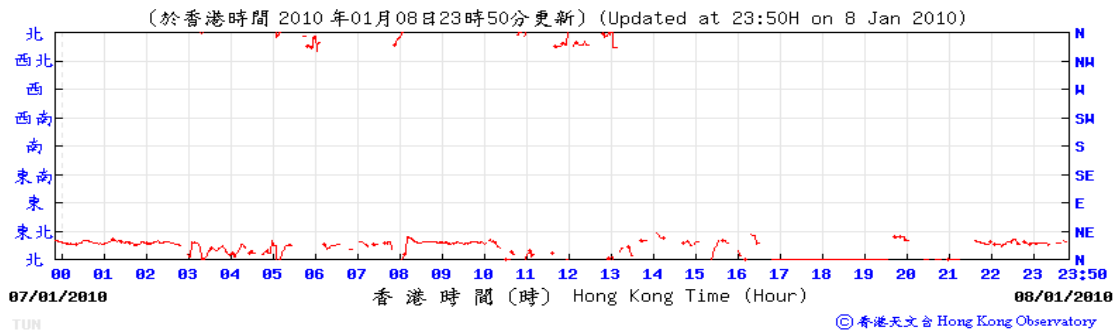
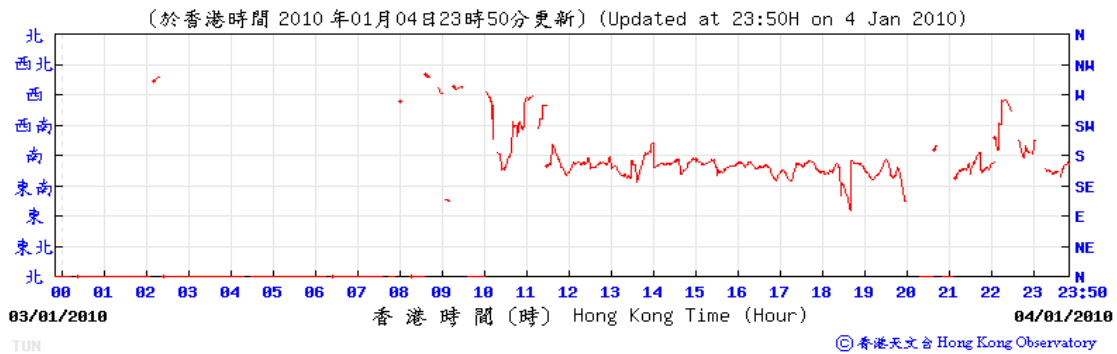
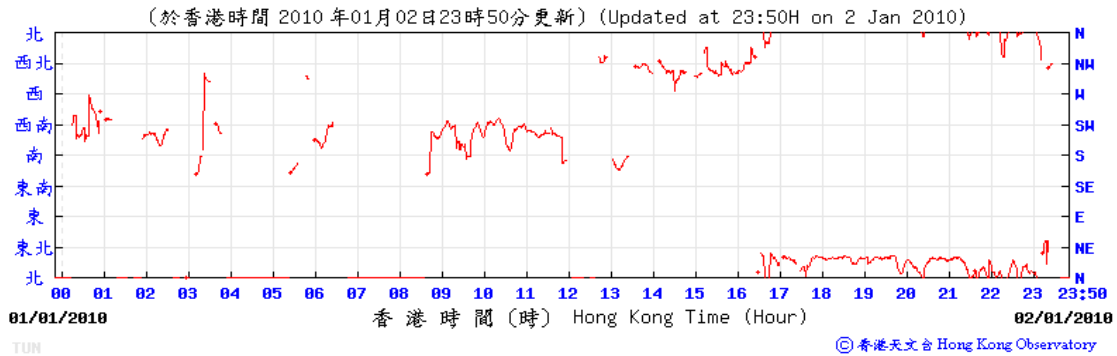
Wind Data

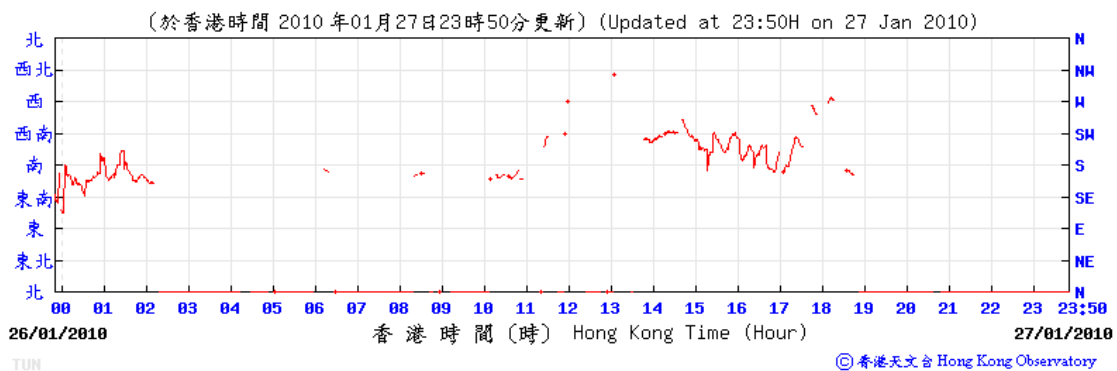
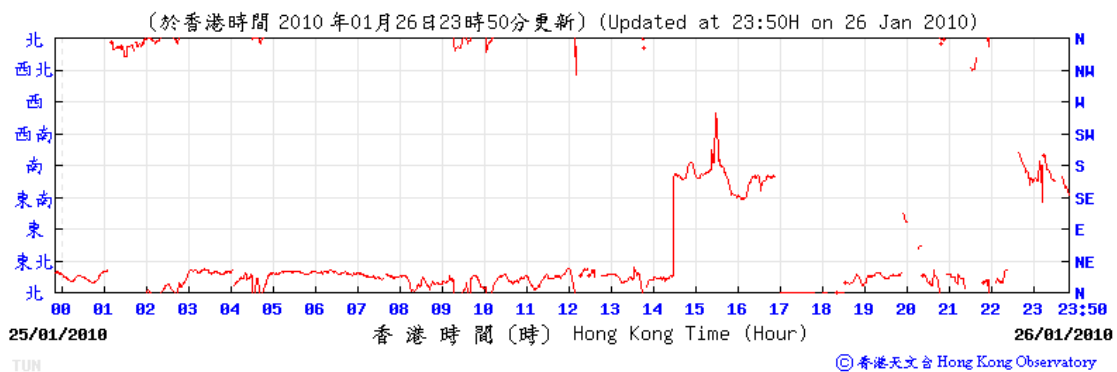
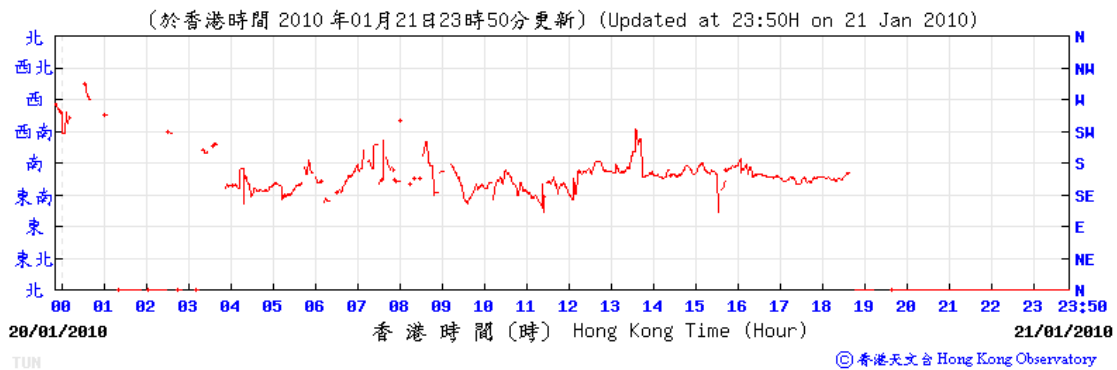
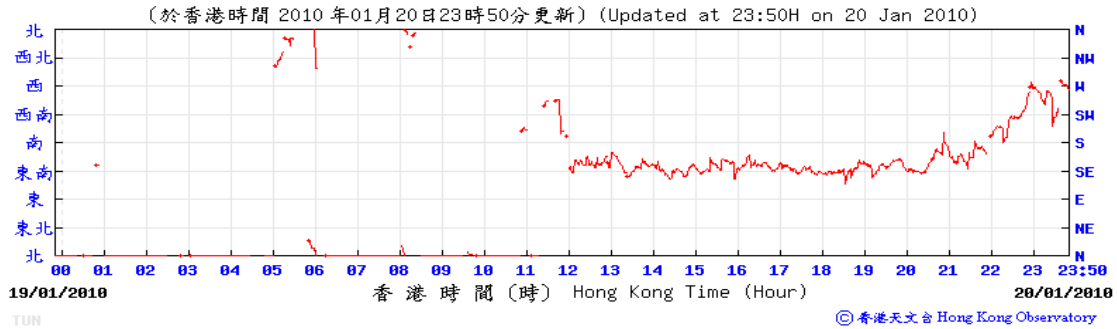
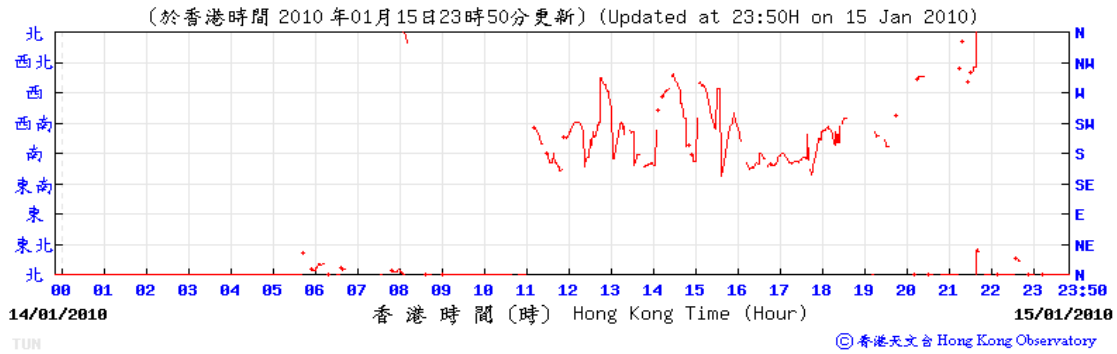
Wind Monitoring Data – Wind Speed during Air Quality Monitoring in January 2010





Wind Monitoring Data – Wind Direction during Air Quality Monitoring in January 2010





Appendix E

**Calibration Certificate
of Sound Level Meter
and Acoustical
Calibrator**

Campbell Associates Ltd
 5b Chelmsford Road Industrial Estate
 GREAT DUNMOW, Essex, CM6 1HD
 www.campbell-associates.co.uk



Certificate of Calibration

Certificate No.: U4212

CALIBRATION

0789

Test object : Sound Calibrator
Manufacturer: Brüel and Kjær
Type : 4226
Serial no: 1531372

Customer: Ove Arup & Partners Ltd
 Acoustics
 Saint Giles Hall, Pound Hill
 Cambridge, Cambridgeshire, CB3 0AE

Order No: Verbal

Measurement Results:	Level	Level Stability	Frequency	Frequency Stability	Distortion
1:	93.98 dB	0.06 dB	251.27 Hz	0.01 %	0.20 %
2:	93.98 dB	0.06 dB	251.27 Hz	0.01 %	0.20 %
3:	93.98 dB	0.06 dB	251.27 Hz	0.01 %	0.20 %
Result (Average):	93.98 dB	0.06 dB	251.27 Hz	0.01 %	0.20 %
Expanded Uncertainty:	0.10 dB	0.02 dB	0.25 Hz	0.01 %	0.10 %
Degree of Freedom:	>100	>100	>100	>100	>100
Coverage Factor:	2.00	2.00	2.00	2.00	2.00

The stated level is relative to 20µPa.

The stated level is valid at reference conditions. The following correction factors have been applied during the measurement:

Pressure : 0.00055 dB/kPa Temperature : 0.002 dB/°C Relative humidity : 0.000 dB/%RH Load volume : 0.000 dB/mm³

The reported expanded uncertainty of measurements is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%. Where the degrees of freedom are insufficient to maintain this confidence level then the coverage factor is increased to maintain this confidence level. The uncertainty has been calculated in accordance with UKAS requirements.

Records : K:\C\Calibration\Nor-1504\Nor-1018 CalCal\2008\BNK4226_250Hz_1531372_M1.nmf

Environmental conditions:	Pressure :	Temperature :	Relative humidity :
Reference conditions:	101,325 kPa	23,0 °C	50 %RH
Measurement conditions :	100.503 ± 0.009 kPa	22.3 ± 2.7 °C	55.9 ± 11.8 %RH

Date received : 15/08/2008
 Date of calibration: 20/08/2008
 Date of issue: 31/10/2008
 Engineer

 David Egan

Supervisor

 Ian Campbell MSc MIOA

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to recognised national standards, and to the units of measurement realised at the National Physical Laboratory or other recognised national standards laboratories. This certificate may not be reproduced other than in full without the prior written approval of the issuing laboratory.

Certificate number: U 4212

Preconditioning

The equipment was preconditioned for more than 4 hours in the specified calibration environment

Calibration and verification performed

The calibrator has been tested as described in the following annexes to BS EN IEC60942:2003 Sound Calibrators; B3.4 for sound pressure level, B3.5 for frequency, B3.6 for total distortion and A4.4 for short term stability of the pressure level.

Method of Calibration

Calibration has been performed as set out in the CA Technical procedures TP01 & 2 as appropriate.

Instruments and Program

A complete list of instruments, hardware and software that has been used for this calibration is available from the calibration laboratory on request.

Traceability

The measured values are traceable to the following laboratories:

Sound Pressure Level: National Physical Laboratory United Kingdom

Voltage: National Physical Laboratory United Kingdom

Frequency: National Physical Laboratory United Kingdom

Ambient Pressure: National Physical Laboratory United Kingdom

Temperature & Relative Humidity: National Physical Laboratory United Kingdom

Comment


Calibrated as received, no adjustments made

Other levels at this frequency produce 104 dB = 103.8 dB and 114 dB – 113.97 (non UKAS data)

Notes:

The sound pressure level generated by the calibrator in its WS2 configuration was measured five times by a GRAS-40AG microphone and averaged. The results of three replications and the mean of the mean of the measurements obtained are given in the measurement results table in this certificate. The frequency and distortion were measured in a similar manner. The figures in **BOLD** are the final results; a small correction factor may need to be added to the sound pressure level quoted here if the device is used to calibrate a sound level meter that is fitted with a free field response microphone. See manufacturer's handbooks for full details of this and other corrections that may be applicable.

Measurements performed by

 Campbell
Associates

Sonitus House, 5b Chelmsford Road Industrial Estate, Great Dunmow, GB-CM6 1HD

Tel (+44) 01371 871030 Fax (+47) 01371 879106

email calibration@campbell-associates.co.uk

Page 2 of 2

Campbell Associates Ltd
 5b Chelmsford Road Industrial Estate
 GREAT DUNMOW, Essex, CM6 1HD
 www.campbell-associates.co.uk



Certificate of Calibration

Certificate No.: U4213

CALIBRATION

0789

Test object : Sound Calibrator
 Manufacturer: Brüel and Kjær
 Type : 4226
 Serial no: 1531372

Customer: Ove Arup & Partners Ltd
 Acoustics
 Saint Giles Hall, Pound Hill
 Cambridge, Cambridgeshire, CB3 0AE
 Order No: Verbal

Measurement Results:	Level	Level Stability	Frequency	Frequency Stability	Distortion
1:	94.00 dB	0.06 dB	1005.07 Hz	0.00 %	0.20 %
2:	94.00 dB	0.06 dB	1005.07 Hz	0.00 %	0.20 %
3:	94.00 dB	0.06 dB	1005.08 Hz	0.00 %	0.20 %
Result (Average):	94.00 dB	0.06 dB	1005.07 Hz	0.00 %	0.20 %
Expanded Uncertainty:	0.10 dB	0.02 dB	1.01 Hz	0.01 %	0.01 %
Degree of Freedom:	>100	>100	>100	57	>100
Coverage Factor:	2.00	2.00	2.00	2.05	2.00

The stated level is relative to 20µPa.

The stated level is valid at reference conditions. The following correction factors have been applied during the measurement:

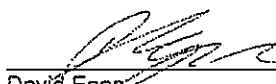
Pressure : 0.00055 dB/kPa Temperature : 0.002 dB/°C Relative humidity : 0.000 dB/%RH Load volume : 0.000 dB/mm³

The reported expanded uncertainty of measurements is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%. Where the degrees of freedom are insufficient to maintain this confidence level then the coverage factor is increased to maintain this confidence level. The uncertainty has been calculated in accordance with UKAS requirements.

Records : K:\C\Calibration\Nor-1504\Nor-1018 CalCal\2008\BNK4226_1K_1531372_M2.nmf

Environmental conditions:	Pressure :	Temperature :	Relative humidity :
Reference conditions:	101,325 kPa	23,0 °C	50 %RH
Measurement conditions :	100.513 ± 0.003 kPa	22.1 ± 2.3 °C	57.2 ± 9.9 %RH

Date received : 15/08/2008
 Date of calibration: 20/08/2008
 Date of issue: 31/10/2008
 Engineer



 David Egan

Supervisor



 Ian Campbell MSc MIOA

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to recognised national standards, and to the units of measurement realised at the National Physical Laboratory or other recognised national standards laboratories. This certificate may not be reproduced other than in full without the prior written approval of the issuing laboratory.



Certificate number: U 4213

Preconditioning

The equipment was preconditioned for more than 4 hours in the specified calibration environment

Calibration and verification performed

The calibrator has been tested as described in the following annexes to BS EN IEC60942:2003 Sound Calibrators; B3.4 for sound pressure level, B3.5 for frequency, B3.6 for total distortion and A4.4 for short term stability of the pressure level.

Method of Calibration

Calibration has been performed as set out in the CA Technical procedures TP01 & 2 as appropriate.

Instruments and Program

A complete list of instruments, hardware and software that has been used for this calibration is available from the calibration laboratory on request.

Traceability

The measured values are traceable to the following laboratories:

Sound Pressure Level: National Physical Laboratory United Kingdom

Voltage: National Physical Laboratory United Kingdom

Frequency: National Physical Laboratory United Kingdom

Ambient Pressure: National Physical Laboratory United Kingdom

Temperature & Relative Humidity: National Physical Laboratory United Kingdom

Comment


Calibrated as received, no adjustments made

Other levels at this frequency give 104 dB = 104.0 dB and 114 dB = 113.98 dB (Non UKAS data)

Notes:

The sound pressure level generated by the calibrator in its WS2 configuration was measured five times by a GRAS-40AG microphone and averaged. The results of three replications and the mean of the mean of the measurements obtained are given in the measurement results table in this certificate. The frequency and distortion were measured in a similar manner. The figures in **BOLD** are the final results; a small correction factor may need to be added to the sound pressure level quoted here if the device is used to calibrate a sound level meter that is fitted with a free field response microphone. See manufacturer's handbooks for full details of this and other corrections that may be applicable.

Measurements performed by

 Campbell Associates

Sonitus House, 5b Chelmsford Road Industrial Estate, Great Dunmow, GB-CM8 1HD

Tel (+44) 01371 871030 Fax (+47) 01371 879106

email calibration@campbell-associates.co.uk

Page 2 of 2

Level 5 Festival Walk
80 Tat Chee Avenue
Kowloon Tong, Kowloon
HONG KONG

AAc Certificate No. 2009001

Tel: +852 2268 3216

Fax: +852 2268 3950

CERTIFICATE OF CONFORMITY

<u>Description of Test Instrument</u>	<u>Type No</u>	<u>Serial No</u>
Bruel & Kjaer 4231Acoustic Calibrator	4231	2314016

Date of Test: 05 August 2009

Carried out by: Mitch Law

Approved by: William Ng

Signature: *Mitch Law*

Signature: *William Ng*

Ambient Conditions During Test	
Atmospheric Pressure:	1KPa
Air Temperature:	22°C
Relative Humidity:	60%

This document is to certify that the above Test Instrumentation did conform to the manufacturer's original specification on the date of the test. Any adjustments that were required to bring the instrumentation back into specification are duly noted in this document. The tests were carried out using the reference calibrator described below.

<u>Description of Reference Calibrator</u>	<u>Type No</u>	<u>Serial No</u>
Brüel & Kjær Multi Frequency Calibrator	4226	1531372
Brüel & Kjær Coupler	UA0915	1531372

Certificate of Calibration Serial No.	U4212, U4213
By Campbell Associates Ltd Calibration Date:	20 August 2008
NAMAS Accredited Calibration Laboratory No.	0789

The reference calibrator, Type 4226, has traceable calibration back to National Measurement Standards. As such it is used as Arup Acoustics own 'Primary Standard' and is used only for controlled laboratory calibration tests on all sound measuring equipment owned by Arup Acoustics.

Level 5 Festival Walk
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AAc Certificate No. 2009006

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CERTIFICATE OF CONFORMITY

<u>Description of Test Instrument</u>	<u>Type No</u>	<u>Serial No</u>
Brüel & Kjær Sound Level Meter Kit	2238	2562763
Brüel & Kjær ½ " Microphone Kit	4188	2658599

Date of Test: 05 August 2009

Carried out by: Mitch Law

Approved by: William Ng

Signature: 

Signature: 

Ambient Conditions During Test	
Atmospheric Pressure:	1KPa
Air Temperature:	21°C
Relative Humidity:	60%

This document is to certify that the above Test Instrumentation did conform to the manufacturer's original specification on the date of the test. Any adjustments that were required to bring the instrumentation back into specification are duly noted in this document. The tests were carried out using the reference calibrator described below.

<u>Description of Reference Calibrator</u>	<u>Type No</u>	<u>Serial No</u>
Brüel & Kjær Multi Frequency Calibrator	4226	1531372
Brüel & Kjær Coupler	UA0915	1531372

Certificate of Calibration Serial No. U4212, U4213
By Campbell Associates Ltd Calibration Date: 20 August 2008
NAMAS Accredited Calibration Laboratory No. 0789

The reference calibrator, Type 4226, has traceable calibration back to National Measurement Standards. As such it is used as Arup Acoustics own 'Primary Standard' and is used only for controlled laboratory calibration tests on all sound measuring equipment owned by Arup Acoustics.

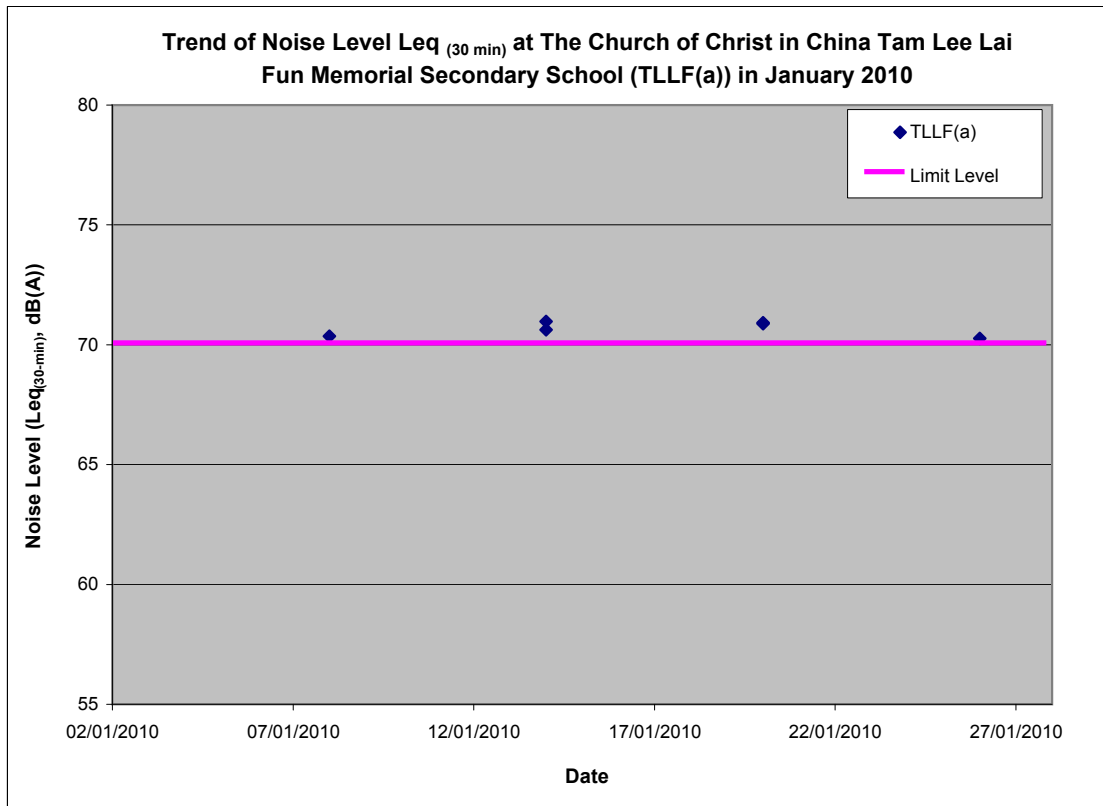
Appendix F

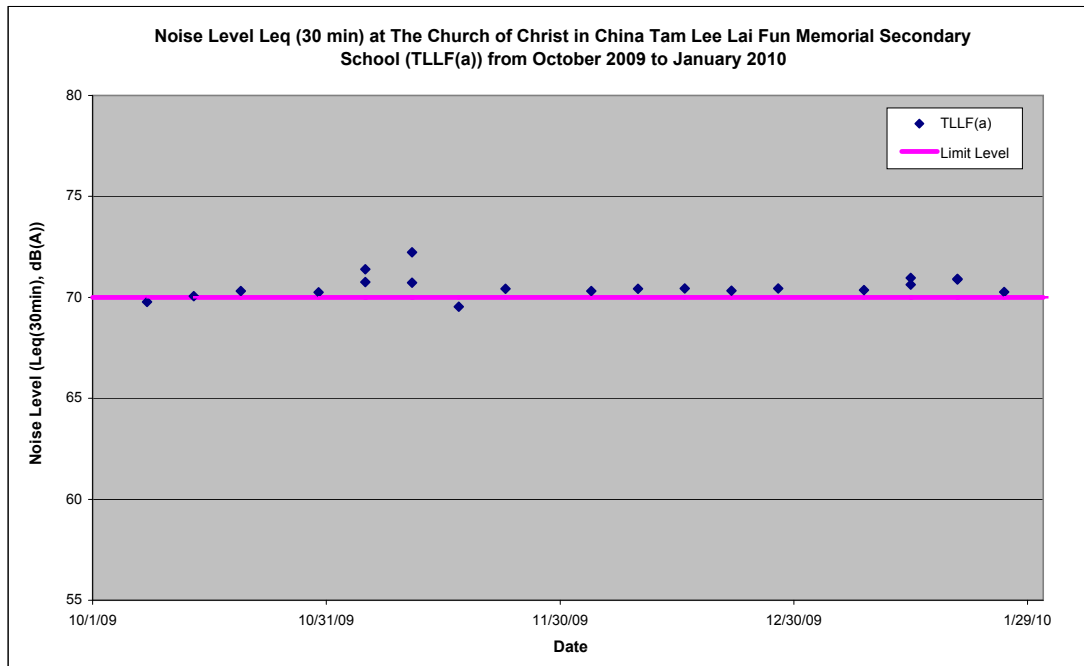
**Impact Noise
Monitoring Results**

**The Church of Christ in China Tam Lee Lai Fun Memorial Secondary School, TLLF(a)
 Day-time Noise Monitoring Data**

Note (*): Façade correction is included.

Date	Start Time	L _{eq} (5-min), dB(A)	L _{eq} (30-min), dB(A)*	L10 (5min), dB(A)	L10 (5-min), dB(A)*	L ₉₀ (5min), dB(A)	L ₉₀ (5min), dB(A)*
8-Jan-10	10:00 AM	67.9	70.4	71.0	74.1	64.0	65.6
	10:05 AM	67.4		71.0		63.0	
	10:10 AM	67.2		71.5		62.0	
	10:15 AM	66.8		71.0		62.0	
	10:20 AM	67.4		71.0		62.0	
	10:25 AM	67.4		71.0		62.0	
14-Jan-10	9:30 AM	67.9	70.6	72.0	75.0	64.0	66.1
	9:35 AM	67.2		72.0		63.0	
	9:40 AM	67.5		72.0		62.0	
	9:45 AM	67.9		72.0		62.5	
	9:50 AM	67.6		72.0		64.0	
	9:55 AM	67.6		72.0		62.5	
14-Jan-10	10:00 AM	67.5	71.0	72.0	74.3	62.5	65.5
	10:05 AM	68.3		71.5		63.0	
	10:10 AM	67.4		71.5		63.0	
	10:15 AM	68.2		71.0		62.0	
	10:20 AM	68.4		71.0		62.0	
	10:25 AM	67.9		70.5		62.5	
20-Jan-10	10:00 AM	67.4	70.9	70.0	73.9	64.0	66.2
	10:05 AM	67.0		71.0		62.0	
	10:10 AM	68.3		71.0		63.0	
	10:15 AM	68.4		71.5		63.0	
	10:20 AM	68.1		71.0		63.0	
	10:25 AM	67.9		71.0		64.0	
20-Jan-10	10:30 AM	67.2	70.9	71.0	73.3	63.5	66.2
	10:35 AM	67.9		70.0		63.0	
	10:40 AM	68.4		70.0		64.0	
	10:45 AM	67.5		70.5		63.0	
	10:50 AM	68.3		70.0		63.0	
	10:55 AM	68.1		70.0		62.5	
26-Jan-10	11:30 AM	66.9	70.3	71.0	74.0	62.0	65.9
	11:35 AM	67.4		72.0		64.0	
	11:40 AM	67.2		71.0		63.0	
	11:45 AM	67.4		70.5		63.0	
	11:50 AM	67.2		70.0		62.0	
	11:55 AM	67.5		71.0		63.0	
Average			70.7		74.1		65.9
Minimum			70.3		73.3		65.5
Maximum			71.0		75.0		66.2



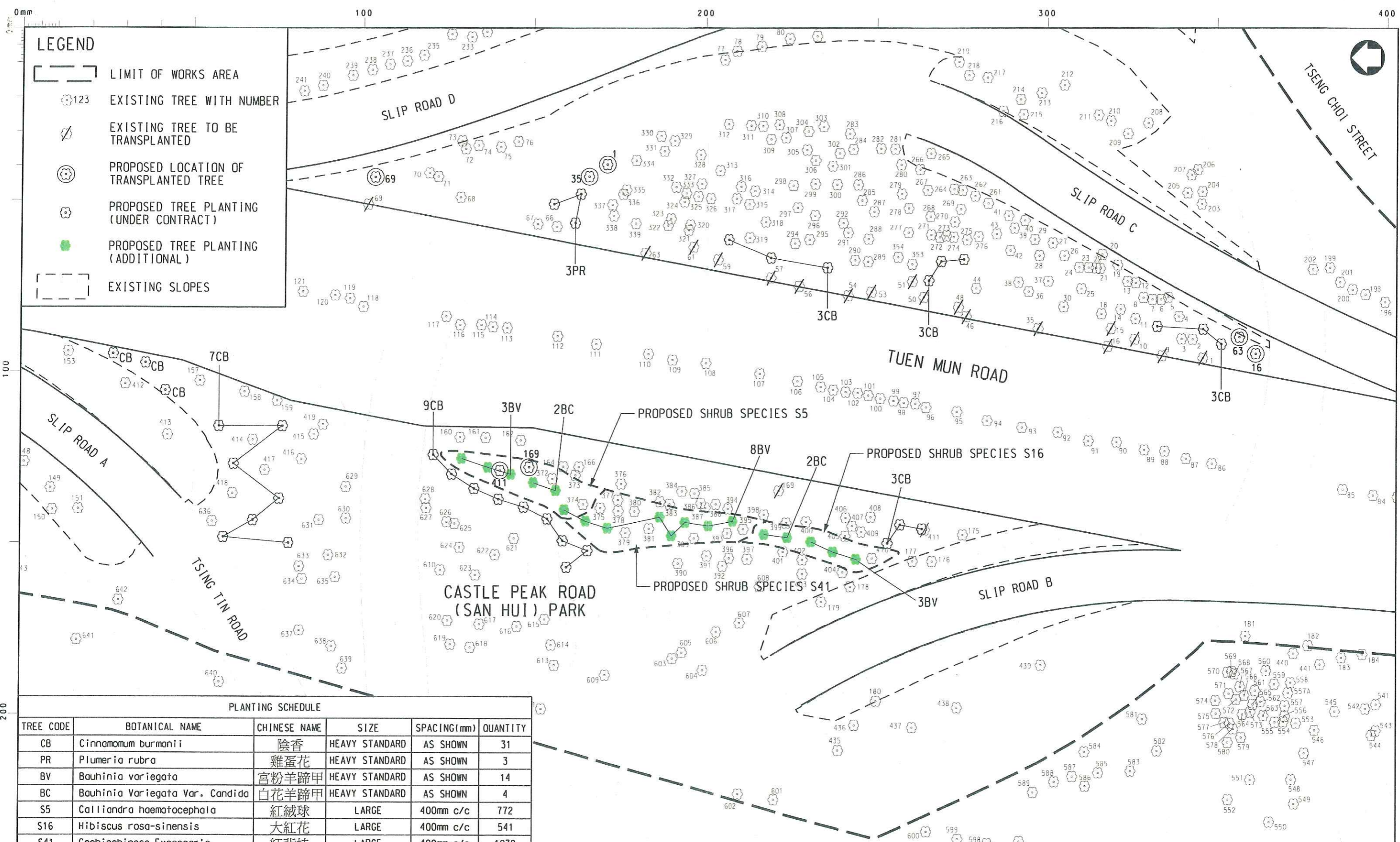


Notes:

(1) All noise results exceeding limit level were not project-related.

Appendix G

**Location of
Compensatory Tree**



LEGEND

- [---] LIMIT OF WORKS AREA
- ⊗123 EXISTING TREE WITH NUMBER
- ⊗ EXISTING TREE TO BE TRANSPLANTED
- ⊗ PROPOSED LOCATION OF TRANSPLANTED TREE
- ⊗ PROPOSED TREE PLANTING (UNDER CONTRACT)
- PROPOSED TREE PLANTING (ADDITIONAL)
- [---] EXISTING SLOPES

PLANTING SCHEDULE

TREE CODE	BOTANICAL NAME	CHINESE NAME	SIZE	SPACING(mm)	QUANTITY
CB	<i>Cinnamomum burmanii</i>	陰香	HEAVY STANDARD	AS SHOWN	31
PR	<i>Plumeria rubra</i>	雞蛋花	HEAVY STANDARD	AS SHOWN	3
BV	<i>Bauhinia variegata</i>	宮粉羊蹄甲	HEAVY STANDARD	AS SHOWN	14
BC	<i>Bauhinia Variegata</i> Var. <i>Candida</i>	白花羊蹄甲	HEAVY STANDARD	AS SHOWN	4
S5	<i>Calliandra haematocephala</i>	紅絨球	LARGE	400mm c/c	772
S16	<i>Hibiscus rosa-sinensis</i>	大紅花	LARGE	400mm c/c	541
S41	<i>Cochinchinese Excoecaria</i>	紅背桂	LARGE	400mm c/c	1079

drawing title

UPGRADING OF SOFT LANDSCAPING AT SAN HUI PARK

designed S.H. YEUNG	SIGNED 23/07/09	drawn M.W. YAN	SIGNED 23/07/09	drawing no. HMWHY0714-SK0024	scale 1:500
checked K.C. LAI	SIGNED 23/07/09	approved C.K. WONG	SIGNED 23/07/09	© COPYRIGHT RESERVED	
MAJOR WORKS PROJECT MANAGEMENT OFFICE				 HIGHWAYS DEPARTMENT HONG KONG	

C:\CDMS\MW\dms06077\HMWHY0714-SK0024.dgn

Appendix H

**Updated Summary of
Environmental
Mitigation
Implementation
Schedule**

Summary of Environmental Mitigation Implementation Schedule

EIA Ref #	Mitigation Measures	Location / Timing	Status *
Air Quality Control			
S3.8.1	Implementation of dust suppression measures stipulated in Air Pollution Control (Construction Dust) Regulation. <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 a 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 hardcores • where a site boundary adjoins a road, streets or other accessible to the public, hording 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 covered entirely by impervious sheeting places in an area sheltered on the top and the 3 sides • 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 unloading • the load of dusty materials carried by vehicle leaving a construction site should be covered entirely by clean impervious sheeting to ensure dust materials do not leak from the vehicle • instigation of an environmental monitoring and auditing program to monitor the construction process in order to enforce controls and modify method of work if dusty conditions arise 	Work site / during construction	 ✓ ✓ N/A ✓ N/A ✓ N/A N/A N/A
Noise Control			
S4.8.1	Use of quiet powered mechanical equipment	Work Sites / During Construction	N/A
S4.8.5 – S4.8.6	Road paving - Adoption of quiet PMEs, movable noise barrier and scheduling of PMEs during normal teaching period, only one PME to be operated and the work area not less than 22m from NSR TLLF or cease operation of PMEs if work area less than 30m from NSR TLLF during examination period. The barrier material shall have a surface mass of	Work Site for road paving, road marking and construction of noise barrier in the vicinity of	N/A

Notes (*): ✓ – Compliance; N/A - Not Applicable; N/O – Not Observed; Rdr – Reminder; Obs – Observation; N/C - Non Compliance

EIA Ref #	Mitigation Measures	Location / Timing	Status *
	not less than 14 kg/m ² on skid footing with 25mm thick internal sound absorptive lining.	NSR TLFF (The Church of Christ in China Tam Lee Lai Fun Memorial Secondary School) / During Construction	
S4.8.5 & S4.8.7	Road marking - Adoption of quiet PMEs and movable noise barrier during normal teaching period and examination period. The work area should be located not less than 18m from NSR TLLF during examination period. The barrier material shall have a surface mass of not less than 14 kg/m ² on skid footing with 25mm thick internal sound absorptive lining.	Work Site for road marking in the vicinity of NSR TLFF / During Construction	N/A
S4.8.5 & S4.8.8	Construction of noise barrier - Adoption of quiet PMEs and movable noise barrier during examination period, piling operation for construction of noise barrier would also be ceased during examination period. The barrier material shall have a surface mass of not less than 14 kg/m ² on skid footing with 25mm thick internal sound absorptive lining.	Work Site for construction of noise barrier in the vicinity of NSR TLFF / During Construction	N/A
S4.9.2	<p><i>Good Site Practice:</i></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 program. • Mobile plant, if any, should be sited as far away from NSRs as possible. • Machines and plant (such as trucks) that may be in intermittent use should be shut down between works 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. • Material stockpiles and other structures should be effectively utilized, wherever practicable, in screening noise from on-site construction activities. • Scheduling the noisy work to be conducted in non-school hours or long holiday such as summer vacation as possible. 	Work Sites / During Construction	<p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>N/O</p> <p>N/A</p> <p>N/A</p>
Water Quality Control			

Notes (*): ✓ – Compliance; N/A - Not Applicable; N/O – Not Observed; Rdr – Reminder; Obs – Observation; N/C - Non Compliance

EIA Ref #	Mitigation Measures	Location / Timing	Status *
S5.7.2	<p><i>Measures for Tuen Mun River Channel</i></p> <ul style="list-style-type: none"> • Site runoff would be directed towards regularly cleaned and maintained sand traps, silt traps and where appropriate. • Oil/grease separators to minimise risk of sedimentation and pollution to the River Channel. • Debris and rubbish generated on-site would be collected, handled and disposed of properly. • The stockpile or temporary storage area and chemical waste storage area shall be located at least 30m away from Tuen Mun River Channel. 	Work site / During the construction period	<p>✓</p> <p>N/A</p> <p>✓</p> <p>✓</p>
S5.7.3	<p><i>Construction Runoff and Drainage</i></p> <p>The site practices outlined in ProPECC PN 1/94 “Construction Site Drainage” shall be implemented including:</p> <ul style="list-style-type: none"> • Sand/silt removal facilities such as sand traps, silt traps or sediment basins shall be provided to remove sand/silt particles from runoff to meet the requirements of the Technical Memorandum standard under the Water Pollution Control Ordinance. The design of silt removal facilities should be based on the guidelines provided in ProPECC PN 1/94. All drainage facilities and erosion and sediment control structures should be inspected monthly and maintained to ensure proper and efficient operation at all times and particularly during rainstorms. • Water pumped out from foundation excavations should be discharged into silt removal facilities. • Careful programming of the works to minimise surface excavations during the rainy season. If excavation of soil cannot be avoided during the rainy season, or at any time of year when rainstorms are likely, exposed slope surfaces should be covered by a tarpaulin or other means. Other measures that need to be implemented before, during, and after rainstorms are summarized in ProPECC PN 1/94. • Exposed soil surface shall be protected by paving as soon as possible to reduce the potential of soil erosion. • Open stockpiles of construction materials on site shall be covered with tarpaulin or similar fabric during rainstorms. 	Work site / During the construction period	<p>✓</p> <p>N/A</p> <p>N/A</p> <p>N/A</p> <p>N/A</p>

Notes (*): ✓ – Compliance; N/A - Not Applicable; N/O – Not Observed; Rdr – Reminder; Obs – Observation; N/C - Non Compliance

EIA Ref #	Mitigation Measures	Location / Timing	Status *
S5.7.4 – S5.7.5	<p><i>Sewage from General Construction Activities</i></p> <p>Debris and rubbish generated on-site shall be collected, handled and disposed of properly to avoid entering the nearby nullah and stormwater drains. Stockpiles of cement and other construction material should be kept covered when not being used.</p> <p>Oils and fuels should only be used and stored in designated areas which have pollution prevention facilities. All fuel tanks and storage areas shall be provided with locks and be sited on sealed areas, within bunds of a capacity equal to 110% of the storage capacity of the largest tank. The bund should be drained of rainwater after a rain event.</p>	Work site / During the construction period	<p>✓</p> <p>✓</p>
S5.7.6	<p><i>Sewage Effluent</i></p> <p>Temporary sanitary facilities, such as portable toilets, shall be employed on-site. A licensed contractor would be responsible for appropriate disposal and maintenance of these facilities.</p>	Work site and adjacent water / During the design and construction period.	✓
Waste Management			
S6.6.1	<p><i>Good Site Practices</i></p> <p>Recommendations for good site practices during the construction activities include:</p> <ul style="list-style-type: none"> • nomination of an approved person, such as a site manager, to be responsible for good site practices, arrangements for collection and effective disposal to an appropriate facility, of all wastes generated at the site; • training of site personnel in proper waste management and chemical waste handling procedures; • provision of sufficient waste disposal points and regular collection for disposal; • appropriate measures to minimise 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 • recording system for the amount of wastes generated, recycled and disposed of (including the disposal sites). 	Work site / During the construction period	<p>N/O</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p>
S6.6.2	<p><i>Waste Reduction Measures</i></p> <p>Waste reduction is best achieved at the planning and design stage, as well as by</p>	Work site / During planning and design	

Notes (*): ✓ – Compliance; N/A - Not Applicable; N/O – Not Observed; Rdr – Reminder; Obs – Observation; N/C - Non Compliance

EIA Ref #	Mitigation Measures	Location / Timing	Status *
	<p>ensuring the implementation of good site practices. Recommendations to achieve waste reduction include:</p> <ul style="list-style-type: none"> • 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; • to encourage collection of aluminium cans, PET bottles and paper, separate labelled bins shall be provided to segregate these wastes from other general refuse generated by the work force; • any unused chemicals or those with remaining functional capacity shall be recycled; • use of reusable non-timber formwork to reduce the amount of C&D material. • prior to disposal of C&D waste, it is recommended that wood, steel and other metals shall be separated for re-use and / or recycling to minimise the quantity of waste to be disposed of to landfill; • proper storage and site practices to minimise the potential for damage or contamination of construction materials; and • plan and stock construction materials carefully to minimise amount of waste generated and avoid unnecessary generation of waste. 	stage, and construction stage	<p>N/A</p> <p>N/O</p> <p>N/O</p> <p>N/O</p> <p>N/O</p> <p>N/O</p>
S6.6.4	<p><i>General Refuse</i></p> <p>General refuse should be stored in enclosed bins or compaction units separate from C&D material. A licensed waste collector should be employed by the contractor to remove general refuse from the site, separately from C&D material.</p> <p>A collection area should be provided where wastes can be stored and loaded prior to removal from site. An enclosed and covered area is recommended to reduce the occurrence of 'wind blow' light material.</p>	Work site / During the construction period	<p>✓</p> <p>N/O</p>
S6.6.5	<p><i>Chemical Wastes</i></p> <p>After use, chemical wastes (for example, cleaning fluids, solvents, lubrication oil and fuel) should be handled according to the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. Spent chemicals should be collected by a licensed collector for disposal at the CWTF or other licensed facility in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.</p>	Work site / During the construction period	<p>✓</p>

Notes (*): ✓ – Compliance; N/A - Not Applicable; N/O – Not Observed; Rdr – Reminder; Obs – Observation; N/C - Non Compliance

EIA Ref #	Mitigation Measures	Location / Timing	Status *
S6.6.6 & 6.6.7	<p><i>Construction and Demolition Material</i></p> <p>Excavated fill material shall be reused on-site as backfill material as far as possible. The material to be disposed at public fill reception facility shall be free from marine mud, household refuse, plastic, metals, industrial and chemical waste, animal and vegetable matter, and other material considered to be unsuitable by the Filling Supervisor.</p>	Work site / During the construction period	✓
Hazard to Life			
S8.8.4	<ul style="list-style-type: none"> The number of workers on site during construction stage should be kept as the level as assessed in this report. Emergency evacuation procedures should be formulated and Highways Department (HyD) should ensure all workers on site should be familiar with these procedures as well as the route to escape in case of gas release incident occur. Relevant Departments, such as Water Supplies Department and Fire Services Department, should be consulted during the development of Emergency procedures. Diagram showing the escape routes to a safe place should be posted in the site notice boards and at the entrance/exit of site. The emergency procedures should specify means of providing a rapid and direct warning (e.g. Siren and Flashing Light) to construction workers in the event of chlorine gas release in the Tuen Mun Water Treatment Works (TMWTW). The construction site officer of HyD should establish a communication channel with the TMWTW operation personnel during construction stage. In case of any hazardous incidents in the treatment works, operation personnel of TMWTW should advise the site officer to evacuate the construction workers. 	Works area/ During construction phase	N/O N/O N/O
S8.8.5	Induction Training should be provided to any staff before working on site at the Tsing Tin Interchange work site.	Works area/ During construction phase	N/O
S8.8.6	Periodic drills should be coordinated and conducted to ensure all construction staffs are familiar with the evacuation procedures. Upon completion of the drills, a review on every step taken should be conducted to identify area of improvement.	Works area/ During construction phase	N/O
Ecology			
S9.7.2	Construction activities would be confined to developed areas of low ecological value, and there would be no direct impact to other habitats within the Assessment Area.	Works area / During construction phase	✓
S9.7.4	To mitigate the noise impacts to habitats and associated wildlife within and adjacent to	Works area / During	✓

Notes (*): ✓ – Compliance; N/A - Not Applicable; N/O – Not Observed; Rdr – Reminder; Obs – Observation; N/C - Non Compliance

EIA Ref #	Mitigation Measures	Location / Timing	Status *
	the proposed works area, quiet mechanical plants and well-maintained plants should be used wherever possible. Noise-emitting construction plant should be installed away from the egret as far as practical. Schedule of construction programme should be carefully planned to avoid noise-generating construction activities with high disturbance impact during the breeding seasons of the ardeids (i.e. mid-March to August).	construction phase	
S9.7.5	<p>Noise barrier should also be implemented to mitigate the noise impact in operation phase. To minimize the bird collision impact, precautionary and bird-friendly approach to noise barrier design should be implemented:</p> <ul style="list-style-type: none"> • The transparent materials of the noise barriers would be non-glaring and not light-reflective. • Noise barrier panels would be with either tinted materials, embedded opaque stripes or superimposed patterns of thin opaque stripes. • Noise barrier would be made visible to birds, such as putting falcon stickers on the transparent panels. 	Works area / during construction phase	<p>N/O</p> <p>N/O</p> <p>N/O</p>
S9.7.7	<p>Standard good site practice measures should be implemented throughout the construction phase. The measures should include:</p> <ul style="list-style-type: none"> • Placement of equipment in designated works areas selected on existing disturbed land. • Construction activities should be restricted to the proposed works area that would be clearly demarcated. • The proposed works area should be reinstated immediately after completion of the works. • Open burning on proposed works sites is illegal, and should be strictly enforced. • Waste skips should be provided to collect general refuse and construction wastes. The wastes should be disposed of timely and properly off-site. • Any soil contamination with fuel leaked from construction plants should be removed off-site. 	Works area / during construction phase	<p>N/A</p> <p>✓</p> <p>N/O</p> <p>✓</p> <p>N/O</p> <p>✓</p>
S9.7.8	To minimize the construction dust impact to the vegetation within and in vicinity of the proposed works area, the following mitigation measures as listed below should be implemented:	Works area / During construction phase	

Notes (*): ✓ – Compliance; N/A - Not Applicable; N/O – Not Observed; Rdr – Reminder; Obs – Observation; N/C - Non Compliance

EIA Ref #	Mitigation Measures	Location / Timing	Status *
	<ul style="list-style-type: none"> • Regular watering should be used during the construction stage. • Any aggregate or dusty material storage piles should be completely covered. • Minimum practical height for dropping of excavated material should be applied. 		✓ N/O N/O
S9.7.9	To minimize the indirect impacts to the nearby Tuen Mun River Channel, the following measures should be implemented: <ul style="list-style-type: none"> • Any runoff and drainage water with high levels of suspended solids should be prevented from entering the nearby water-bodies. • Site runoff should be directed towards regularly cleaned and maintained silt traps and oil/grease separators to avoid and minimise the risk of sedimentation and pollution of the nearby stream courses and drainage culvert. • The silt and oil/grease separators should be appropriately designed for the local drainage and ground conditions. • Debris and rubbish generated on-site should be collected, handled and disposed of properly. 	Works area / during construction phase	✓ ✓ N/O ✓
S9.7.10	Compensatory planting of a ratio not less than 1:1 ratio in terms of quality and quantity should be provided to compensate for the loss of roadside trees due to the construction works.	Works area / during construction phase	✓
Landscape and Visual			
Table 10.6	CM1 Topsoil, where identified and practical, should be stripped and stored for re-use in the construction of the soft landscape works.	Work site / During Construction Phase	N/O
Table 10.6	CM2 Existing trees to be retained on site should be carefully protected during construction.	Work site / During Construction Phase	✓
Table 10.6	CM3 Trees unavoidably affected by the works should be transplanted where practical.	Work site / During Construction Phase	✓
Table 10.6	CM4 Compensatory tree planting should be provided to compensate for felled trees.	Work site / During Construction Phase	✓
Table 10.6	CM5 Control of night-time lighting.	Work site / During Construction Phase	✓
Table 10.6	CM6 Erection of decorative screen hoarding compatible with the surrounding setting.	Work site / During Construction Phase	N/O

Notes (*): ✓ – Compliance; N/A - Not Applicable; N/O – Not Observed; Rdr – Reminder; Obs – Observation; N/C - Non Compliance

Appendix I

**Monthly Summary
Waste Flow Table**

Name of Department : Hyd

Contract No. : HY/2007/14

Monthly Summary Waste Flow Table for 2010 (year)

Month	Actual Quantities of Inert C&D Materials Generated Monthly					Actual Quantities of C&D Wastes Generated Monthly					
	Total Quantity Generated (in '000m ³)	Hard Rocks and Large Broken Concrete (in '000m ³)	Reused in the Contract (in '000m ³)	Reused in other Projects (in '000m ³)	Disposed as Public Fill (in '000m ³)	Imported Fill (in '000m ³)	Metals (in '000 kg)	Paper/ cardboard packaging (in '000kg)	Plastics (see Note 3) (in '000kg)	Chemical Waste (in '000kg)	Others, e.g. general refuse (in '000m ³)
Jan	0.040	0	0	0	0.040	0	0.002	0.010	0	0.5	0.020
Feb											
Mar											
Apr											
May											
June											
Sub-total											
July											
Aug											
Sept											
Oct											
Nov											
Dec											
Total											

Notes: (1) Not Used.

(2) The waste flow table shall also include C&D materials that are specified in the Contract to be imported for use at the Site.

(3) Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material