# Agreement No. CE 58/2000

Design & Construction Assignment for Widening of Tolo Highway / Fanling Highway between Island House Interchange and Fanling Stage 2 - Between Tai Hang and Wo Hop Shek Interchange

#### **Baseline Monitoring Report**

November 2013

	Name	Signature
Prepared & Checked:	Lemon Lam	1 June
Reviewed & Approved:	Y W Fung	7

Version:	0	Date: 4 November 2013

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Your ref

Hyder-Arup-Black & Veatch Joint Venture c/o Hyder Consulting Limited 47/F Hopewell Centre 183 Queen's Road East Wanchai, Hong Kong

Dear Sir.

6 November 2013 By Fax (2805 5028) & Post

Attn: Mr. James Penny

Widening of Tolo Highway / Fanling Highway between Island House Interchange and Fanling, Stage 2 – Between Tai Hang and Wo Hop Shek Interchange

Environmental Permit No. EP-324/2008/A

Condition 3.2 – Submission of Baseline Monitoring Report for the portion of Stage 2 works under Contract No. HY/2012/06

We refer to the revised Baseline Monitoring Report received on 5 November 2013 submitted by ET via email. Pursuant to EP Condition 3.2, I hereby verify the Baseline Monitoring Report (Version 0) for the portion of works under Stage 2 of the captioned Project which is managed under Contract No. HY/2012/06.

Yours faithfully

for MOTT MACDONALD HONG KONG LIMITED

Terence Kong

Independent Environmental Checker

c.c. HyD – Mr. Chung Lok Chin (Fax: 2714 5198) / Ms. Jackei Yin (Fax: 2761 4864) AECOM – Mr. Y W Fung (Fax: 2891 0305)

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#### **EXECUTIVE SUMMARY**

In accordance with the updated Environmental Monitoring and Audit Manual (updated EM&A Manual dated on October 2013) for the Agreement "Design & Construction Assignment for Widening of Tolo Highway / Fanling Highway between island House Interchange and Fanling, Stage 2 - Between Tai Hang and Wo Hop Shek Interchange (the Project)", baseline monitoring of air quality was required. This report presents the baseline monitoring results performed in October 2013.

As stipulated in the updated EM&A Manual, baseline 1-hour and 24-hour Total Suspended Particulates (TSP) monitoring were conducted at one monitoring station (AM1) for 14 consecutive days. For 1-hour TSP monitoring, measurements were taken three times per day during the same period of 24-hour TSP monitoring. Data collected was reviewed and analysed to establish the Action and Limit Levels for air quality during impact/compliance monitoring throughout the construction period of the Project. Details of the monitoring methodology, location and results are presented in this report.

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#### 1 INTRODUCTION

#### 1.1 Background

- 1.1.1 Tolo Highway and Fanling Highway are the expressways in the North East New Territories (NENT) connecting Sha Tin, Tai Po and Fanling. These highways form a vital part of the strategic Route 9, which links Hong Kong Island to the boundary at Shenzhen. At present, this section of Route 9 is a dual 3-lane carriageway. However, at several major interchanges along this section of Route 9, the highway is a dual-2 lane carriageway only. Severe congestion is a frequent occurrence during the peak periods, particularly in the Kowloon-bound direction.
- 1.1.2 The objective of "Widening of Tolo Highway / Fanling Highway between Island House Interchange and Fanling" is to widen Tolo Highway and Fanling Highway to dual 4-lane carriageway in order to alleviate the current traffic congestion problems and to cope with the increasing transport demands to and from the urban areas and also cross boundary traffic.
- 1.1.3 The proposed widening of Tolo Highway and Fanling Highway between Island House Interchange and Fanling is a Designated Project under the Environmental Impact Assessment Ordinance (Cap. 499) (EIAO). An Environmental Impact Assessment (EIA) Report (the approved EIA Report) together with an Environmental Monitoring and Audit (EM&A) Manual (the approved EM&A Manual) were completed and approved under the EIAO on 14 July 2000 (Register Number: EIA-043/2000).
- 1.1.4 The scope comprises mainly:
  - (i) Widening of a 5.7 km section of Tolo Highway and 3.0 km section of Fanling Highway between Island House Interchange and Wo Hop Shek Interchange from the existing dual 3-lane to dual 4-lane, including construction of new vehicular bridges;
  - (ii) Widening of interchange sections at Island House Interchange, Tai Po North Interchange, and Lam Kam Road Interchange from dual 2-lane to dual 3-lane, including realignment of various slip roads;
  - (iii) Modification and reconstruction of highways, vehicular bridges, underpasses and footbridges.
- 1.1.5 The construction works for "Widening of Tolo Highway / Fanling Highway between Island House Interchange and Fanling" will be delivered in 2 stages i.e. Stage 1 (between Island House Interchange and Tai Hang) and Stage 2 (between Tai Hang and Wo Hop Shek Interchange). This report focuses on Stage 2 only.
- 1.1.6 Stage 2 would be implemented under two works contracts: Contract No. HY/2012/06 "Widening of Fanling Highway Tai Hang to Wo Hop Shek Interchange" and the entrusted portion to CEDD under Contract No. CV/2012/09 "Liantang/Heung Yuen Wai Boundary Control Point Site Formation and Infrastructure Works Contract 3".
- 1.1.7 China State Construction Engineering (Hong Kong) Limited (the Contractor) has commissioned AECOM Asia Company Limited to undertake the Environmental Team (ET) services for Contract No. HY/2012/06 for implementation of all the EM&A works. In accordance with the updated EM&A Manual for the Project which was submitted in October 2013, environmental baseline conditions were established by the ET prior to the commencement of construction of the Project.
- 1.1.8 Baseline monitoring was undertaken and baseline monitoring report was prepared prior to commencement of construction of the Project in accordance with Condition 3.2 of Environmental Permit and the updated EM&A Manual.

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#### 1.2 Purpose of Baseline Monitoring Report

- 1.2.1 The purpose of this report is to review the baseline conditions of air quality, at the Project site, and to establish baseline levels for air quality in accordance with the updated EM&A Manual. These levels would be used as the basis for assessing environmental impact and compliance during construction of the Project.
- 1.2.2 This baseline monitoring report presents the baseline monitoring requirements, methodologies and monitoring results of air quality described in the updated EM&A Manual.
- 1.2.3 This baseline report presents the monitoring works conducted in October 2013 for air quality monitoring at one station (AM1). A layout plan of the Project is provided in **Figure 1.1**.

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#### 2 AIR QUALITY MONITORING

#### 2.1 Monitoring Requirements

2.1.1 In accordance with the updated EM&A Manual, baseline 24-hour and 1-hour TSP levels at one air quality monitoring station should be established by conducting baseline 1-hour and 24-hour TSP monitoring for at least 14 consecutive days prior to commencement of construction of the Project.

#### 2.2 Monitoring Equipment

2.2.1 24-hour TSP air quality monitoring was performed using High Volume Sampler (HVS) located at the proposed monitoring station. The HVS meets all the requirements of the updated EM&A Manual. Portable direct reading dust meters were used to carry out the 1-hour TSP monitoring. Brand and model of the equipment is given in **Table 2.1**. The calibration certificates of the monitoring equipments are provided in **Appendix A**.

Table 2.1 Air Quality Monitoring Equipment

Equipment	Brand and Model
High Volume Sampler (24-hour TSP)	Tisch Total Suspended Particulate Mass Flow Controlled High Volume Air Sampler (Model No. TE-5170)
Portable direct reading dust meter (1-hour TSP)	Sibata Digital Dust Monitor (Model No. LD-3 or LD-3B)

#### 2.3 Monitoring Location

2.3.1 The monitoring station was set up at the proposed location in accordance with updated EM&A Manual. **Table 2.2** describes details of the monitoring station. The locations are shown in **Figure 1.2**.

Table 2.2 Location of Air Quality Monitoring Station

Location	Monitoring Station	
AM1 (SR2)	Fanling Government Secondary School	

#### 2.4 Monitoring Parameters, Frequency and Duration

2.4.1 **Table 2.3** summarizes the monitoring parameters, frequency and duration of air quality monitoring.

Table 2.3 Air Quality Monitoring Parameters, Frequency and Duration

Parameter	Frequency and Duration	
24-hour TSP	Daily, for 14 consecutive days	
1-hour TSP	3 times per day, for 14 consecutive days	

#### 2.5 Monitoring Methodology

#### 2.5.1 24-hour TSP Monitoring

- (a) The HVS was installed in the vicinity of the air sensitive receivers. The following criteria were considered in the installation of the HVS.
  - (i) A horizontal platform with appropriate support to secure the sampler against gusty wind to be provided.
  - (ii) Samplers placed at least 2 meters apart.

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- (iii) The distance between the HVS and any obstacles, such as buildings, was at least twice the height that the obstacle protrudes above the HVS.
- (iv) A minimum of 2 meters horizontal separation from walls, parapets and penthouse for rooftop samplers.
- (v) A minimum 2 meters horizontal separation from any supporting structure.
- (vi) No furnace or incinerator flue nearby.
- (vii) Airflow around the sampler to be unrestricted.
- (viii) The sampler should be located more than 20 meters from any dripline.
- (ix) Any wire fence and gate, required to protect the sampler, should not obstruct the monitoring process.
- (x) Permission to be obtained to set up the samplers and access to the monitoring stations.
- (xi) A secured supply of electricity to be obtained to operate the samplers.

#### (b) Preparation of Filter Papers

- (i) Glass fibre filters, G810 were labelled and sufficient filters that are clean and without pinholes will be selected.
- (ii) All filters will be equilibrated in the conditioning environment for 24 hours before weighing. The conditioning environment temperature was around 25 °C and not variable by more than ±3 °C; the relative humidity (RH) would be 50% and not variable by more than ±5%. A convenient working RH would be 40%.
- (iii) All filter papers were prepared and analysed by ALS Technichem (HK) Pty Ltd., which is a HOKLAS accredited laboratory and has comprehensive quality assurance and quality control programmes.

#### (c) Field Monitoring

- (i) The power supply was checked to ensure the HVS works properly.
- (ii) The filter holder and the area surrounding the filter were cleaned.
- (iii) The filter holder was removed by loosening the four bolts and a new filter, with stamped number upward, on a supporting screen was aligned carefully.
- (iv) The filter was properly aligned on the screen so that the gasket formed an airtight seal on the outer edges of the filter.
- (v) The swing bolts were fastened to hold the filter holder down to the frame. The pressure applied was sufficient to avoid air leakage at the edges.
- (vi) Then the shelter lid was closed and was secured with the aluminium strip.
- (vii) The HVS was warmed-up for about 5 minutes to establish run-temperature conditions.
- (viii) A new flow rate record sheet was set into the flow recorder.
- (ix) The flow rate of the HVS was checked and adjusted at around 1.1 m<sup>3</sup>/min. The range specified in the EM&A Manual is between 0.6-1.7 m<sup>3</sup>/min.
- (x) The programmable digital timer was set for a sampling period of 24 hrs + 5 mins., and the starting time, weather condition and the filter number were recorded.
- (xi) The initial elapsed time was recorded.
- (xii) At the end of sampling, the final flow rate of the HVS was checked and recorded.
- (xiii) The final elapsed time was recorded.
- (xiv) The sampled filter was removed carefully and folded in half length so that only surfaces with collected particulate matter were in contact.
- (xv) It was then placed in a clean plastic envelope and sealed.
- (xvi) All monitoring information was recorded on a standard data sheet.
- (xvii) Filters were then sent to ALS Technichem (HK) Pty Ltd. for analysis.

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#### (d) Maintenance and Calibration

- (i) The HVS and its accessories are maintained in good working condition, such as replacing motor brushes routinely and checking electrical wiring to ensure a continuous power supply.
- (ii) HVS was calibrated at bi-monthly intervals using TE-5025A Calibration Kit throughout all stages of the air quality monitoring.
- (iii) Calibration certificate of the HVS is provided in **Appendix A**.

#### 2.5.2 1-hour TSP Monitoring

#### (a) Measuring Procedures

The measuring procedures of the 1-hour dust meter are in accordance with the Manufacturer's Instruction Manual as follows:

- (i) Turn the power on.
- (ii) Close the air collecting opening cover.
- (iii) Push the "TIME SETTING" switch to [BG]
- (iv) Push "START/STOP" switch to perform background measurement for 6 seconds.
- (v) Turn the knob at SENSI ADJ position to insert the light scattering plate.
- (vi) Leave the equipment for 1 minute upon "SPAN CHECK" is indicated in the display.
- (vii) Push "START/STOP" switch to perform automatic sensitivity adjustment. This measurement takes 1 minute.
- (viii) Pull out the knob and return it to MEASURE position.
- (ix) Push the "TIME SETTING" switch the time set in the display to 3 hours.
- (x) Lower down the air collection opening cover.
- (xi) Push "START/STOP" switch to start measurement.

#### (b) Maintenance and Calibration

(i) The 1-hour TSP meter was calibrated at 1-year intervals against a continuous particulate TEOM Monitor, Series 1400ab. Calibration certificates of the Laser Dust Monitors are provided in **Appendix A**.

#### 2.6 Results and Observations

- 2.6.1 The baseline 24-hour and 1-hour TSP monitoring were carried out at monitoring station AM1 from 12 October 2013 to 29 October 2013. As the Fanling Government Secondary School did not open on the public holidays, therefore no monitoring were conducted on 13, 14, 20 and 27 October 2013. Weather conditions during baseline monitoring period were mostly sunny. Major dust sources were from nearby traffic emissions. Generally, the monitoring results represented background air quality at the monitoring stations. The baseline monitoring schedule is provided in **Appendix B**.
- 2.6.2 The baseline monitoring results for 24-hour TSP and 1-hour TSP are summarized in **Table 2.4** and **Table 2.5** respectively. Detailed air quality monitoring results are presented in **Appendix C**.

Table 2.4 Summary of 24-hour TSP Baseline Monitoring Results

Parameter	Monitoring Location	Average (μg/m³)	Range (µg/m³)
24-hour TSP Level in µg/m³	AM1	108.7	63.0 – 140.0

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Table 2.5 Summary of 1-hour TSP Baseline Monitoring Results

Parameter	Monitoring Location	Average (μg/m³)	Range (µg/m³)
1-hour TSP Level in µg/m³	AM1	104.4	56.6 – 176.6

#### 2.7 Event and Action Levels

2.7.1 The Action and Limit Levels (AL Levels) for air quality monitoring were based on the criteria adopted from the EM&A Manual as presented in **Table 2.6.** 

Table 2.6 Derivation of Action and Limit Levels for Air Quality

Parameters	Action	Limit
24-hour TSP Level in µg/m <sup>3</sup>	<ul> <li>For baseline level ≤200 µg/m³, Action level = (130% of baseline level + Limit level) / 2</li> </ul>	260 μg/m <sup>3</sup>
	<ul> <li>For baseline level &gt;200 μg/m3, Action level = Limit level</li> </ul>	
1-hour TSP Level in μg/ m <sup>3</sup>	<ul> <li>For baseline level ≤384 µg/m³, Action level = (130% of baseline level + Limit level) / 2</li> </ul>	500 μg/m <sup>3</sup>
	<ul> <li>For baseline level &gt;384 μg/m³, Action level = Limit level</li> </ul>	

2.7.2 Following the criteria shown in **Table 2.6**, the AL Levels for 24-hour and 1-hour TSP are derived and presented in **Tables 2.7 & 2.8** respectively.

Table 2.7 Derived Action and Limit Levels for 24-hour TSP

Parameter	Monitoring Location	Action Level (µg/m³)	Limit Level (µg/m³)
24-hour TSP Level in µg/m <sup>3</sup>	AM1	200.7	260

Table 2.8 Derived Action and Limit Levels for 1-hour TSP

Parameter	Monitoring Location	Action Level (µg/m³)	Limit Level (µg/m³)
1-hour TSP Level in µg/m³	AM1	317.8	500

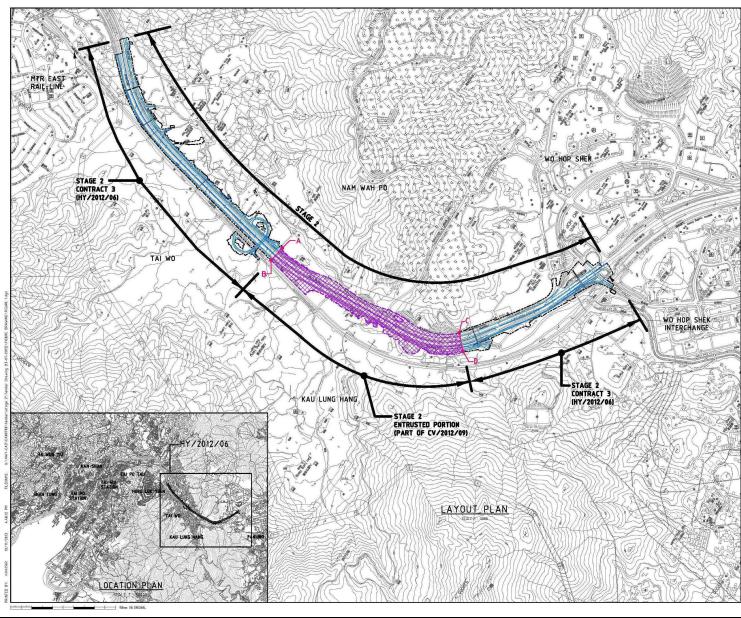
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#### 3 CONCLUSIONS

- 3.1.1 Baseline air quality monitoring was carried out at monitoring station AM1 from 12 October 2013 to 29 October 2013. Action Levels for air quality was derived from the baseline monitoring results.
- 3.1.2 No construction activity was undertaken in the vicinity of the monitoring station during baseline monitoring period and therefore the baseline monitoring results is representative of the baseline condition for the Project.

FIGURE	



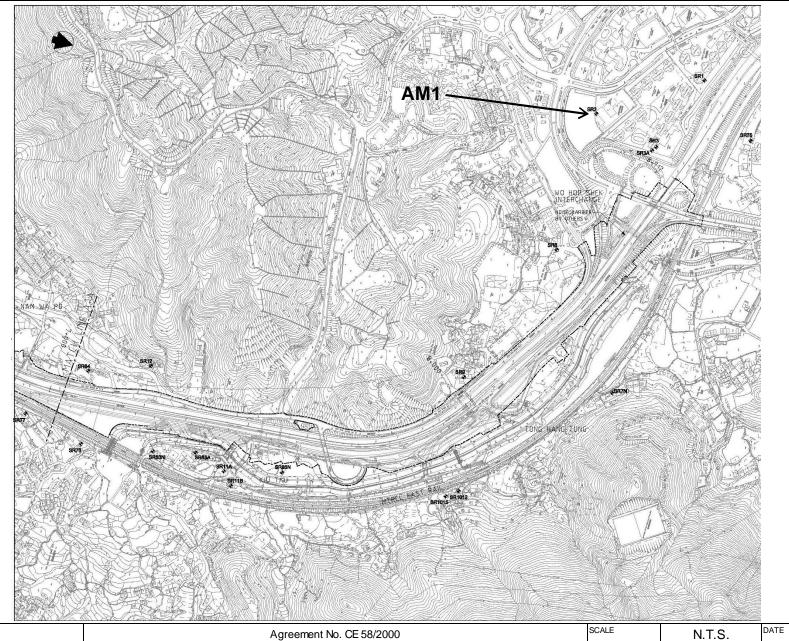
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**Layout Plan** 

SCALE	N.T.S.	DATE	28-Oct-	13
CHECK	FYW	DRAWN	LL	
JOB NO.		DR AW II	NG NO.	REV
	60307376	Figure 1.1		1



**A**ECOM

Design & Construction Assignment for Widening of Tolo Highway / Fanling Highway between Island House Interchange and Fanling, Stage 2 - Between Tai Hang and Wo Hop Shek Interchange

SCALE	N.T.S.	DATE	28-Oct-13		
CHECK	FYW	DRAWN	LL		
JOB NO.		DR AW II	NG NO.	REV	
	60307376	Figure 1.2		1	

# **APPENDIX A**

**Calibration Certificates of Monitoring Equipment** 



TISCH ENVIROMENTAL, INC. 145 SOUTH MIAMI AVE. VILLAGE OF CLEVES, 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 - De Operator		Rootsmeter Orifice I.I		0438320 0843	Ta (K) - Pa (mm) -	293 - 751.84
PLATE OR Run #	VOLUME START (m3)  NA NA	VOLUME STOP (m3)  NA NA	DIFF VOLUME (m3) 1.00	DIFF TIME (min) 	METER DIFF Hg (mm) 3.2 6.4	ORFICE DIFF H2O (in.)  2.00 4.00
3 4 5	NA NA NA	NA NA NA	1.00 1.00 1.00	0.8850 0.8420 0.6930	8.0 8.8 12.9	5.00 5.50 8.00

#### DATA TABULATION

Vstd (	x axis) Qstd	(y axis)	Va	(x axis) Qa	(y axis)
0.9976 0.9953 0.9943	0.7136 1.0118 1.1247 1.1809 1.4269	1.4186 2.0061 2.2429 2.3524 2.8371	0.9957 0.9915 0.9893 0.9883 0.9828	0.7092 1.0056 1.1178 1.1737 1.4182	0.8828 1.2485 1.3959 1.4640 1.7657
Qstd slope intercept coefficient	(b) = t (r) = 	1.99238 -0.00351 0.99992	 Qa slope intercept coefficie	(b) =	1.24760 -0.00219 0.99992

#### CALCULATIONS

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

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

For subsequent flow rate calculations:

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

# Total Suspended Particulates (TSP) Sampler Field Calibration Report

Station	Fanling Govern	iment Seconda	ry School (AM2)		Operator:	Suen Hon	Yeung
Dates	11-Oct-13				Next Due Date:	11-Dec	<b>⊱13</b>
				V	erified Against:	O.T.S	0843
Equipment No.:	A-001-74T			Expiration Date: 6-Dec-13			
			Ambient C	ondition		_	
Tempera	iture, Ta	302.1	ıre, Pa	760.2	mmHg		
		Oı	ifice Transfer Sta	ndard Informat	tion		
Equipme	ent No.:	0843	Slope, mc	1.99	238	Intercept, bc	-0.00351
Last Calibr	ation Date:	6-Dec-12	,	nc x Qstd + bc =	- [U w (Da/760)	- (200/Ta)1/2	
Next Calibr	ation Date:	6-Dec-13		ne x Qsta + be -	- [H X (Fa//00)	X (298/12)]	
			Calibration of	TSP Sampler			
Calibration	Н		10	Qstd	W	[ΔW x (Pa/760) x	(208/Ta)1 <sup>1/2</sup>
Point	in. of water	[H x (Pa/76	50) x (298/Ta)] <sup>1/2</sup>	(m³/min) <b>X - axis</b>	in. of oil	Y-axi	
1	7.1		2.65	1.33	5.5	2.33	
2	6.1		2.45	1.23	4.7	2.15	
3	5.1		2.24	1.13	4.2	2.04	
. 4	3.4		1.83	0.92	2.9	1.69	
5	2.3		1.51	0.76	2.1	1.44	
By Linear Regr	ession of Y on 2	X					
Slope, mw =	1.5498	_	]	Intercept, bw =		0.265	5
Correlation C	oefficient* =	0	9990				
<u> </u>							
			Set Point Ca	lculation		·	
From the TSP Fi	ield Calibration (	Curve, take Qs	$td = 1.21 \text{ m}^3/\text{min} (4)$	3 CFM)			
From the Regres	sion Equation, tl	ne "Y" value a	ccording to				
		m x	Qstd + b = [W x (P)]	'a/760) x (298/T	a)]" <sup>2</sup>		
Therefore 5	Set Point W = ( 1	n v Ostd + h ) <sup>2</sup>	x (760 / Pa) x ( T	'a / 208 ) —	4	.64	
Therefore,	3011 OM: W - ( )	n A Qsiu ( U )	X(700/14)X(1	a / 290 ) -		.04	
*If Correlation C	Coefficient < 0.99	90, check and	ecalibrate again.			<u> </u>	
			-				
						c۸	
Remarks:	1. This high vol	ume sampler is	s primary / <del>collocate</del>	ed# TSP sampler	(#: delete as at	ppropriate)	
			<del>-</del>				
-							

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Type: Manu	: ifacturer/Brand:		-	Laser D SIBATA	ust Mon	itor		
Mode	l No.:		-	LD-3				
Equip	ment No.:		_	A.005.07	7a			
Sensi	tivity Adjustment	Scale Set	ting: _	557 CP	М			
Opera	ator:		_	Mike Sh	ek (MSKI	M)		
Standa	ard Equipment			3300				
Equip	ment:	Dun	procht 9 De	taabaiak	TEOM®			
Venue			precht & Pa			- h 1\		
Mode			erport (Pui ` es 1400AB	ring Seco	ondary S	cnooi)		
Serial		Con		0AB2198	00000			
Serial	NO.	Sen:				V . 40500		
Last C	Calibration Date*		May 2013	00C1436	09003	K <sub>o</sub> : _12500		
Lasi	Dalibration Date	10 10	1ay 2015					
*Remar	ks: Recommend	led interval	for hardwa	re calibra	tion is 1	year		
Calibra	tion Result			4				
				180				
	tivity Adjustment					_ <i>557</i> CP		
Sensit	tivity Adjustment	Scale Sett	ing (After Ca	alibration	):	_ <i>557</i> CP	'M	
Hour	Date		ime	Ambient		Canaantustis1	T. ( )	T 0 11
Hour	(dd-mm-yy)	! !	me	1,000,000,000		Concentration <sup>1</sup> (mg/m <sup>3</sup> )	Total Count <sup>2</sup>	Count/
	(dd-mm-yy)			Condition		Y-axis	Count	Minute
				Temp (°C)	R.H. (%)	I -axis		X-axis
1	18-05-13	12:30	- 13:30	28.1	78	0.04714	1887	31.45
2	18-05-13	13:30	- 14:30	28.1	78	0.04932	1970	32.83
3	18-05-13	14:30	- 15:30	28.2	77	0.05156	2056	34.27
4	18-05-13		- 16:30	28.1	78	0.05083	2026	33.77
Note:				1		shnick TEOM®	2020	00.77
,,,,,,	2. Total Count					IOTHTION TEOM		
	3. Count/minut							
					,			
	ar Regression of	Y or X						
	(K-factor):		0.0015					
Correla	ation coefficient:		0.9978					
Validity	y of Calibration F	Record:	_17 May 20	014				
Remark	s:							
			**************************************					
								65
2								
					. /			
OC Re	viewer VW F	una	Signat	ure:	11/	Data	· 20 May	, 2012

Model N Equipm Sensitiv	ent No.: vity Adjustment	Scale Settir	ng:	Laser D SIBATA LD-3 A.005.0 702 CF	8a	nitor		
Operato	or:			Mike Sh	ek (MSŁ	(M)		
Standard	d Equipment	1100 1000 - 000						
	No.: No: Nibration Date*:	Cybe Serie Contr Sense 18 Ma	or: <u>12</u> ay 2013	Ying Sec 20AB2198 200C1436	ondary 3 899803 859803	School) K <sub>o</sub> : _12	500	
	s: Recommend	ed interval t	or nardwa	are calibra	ation is 1	year	meaning at	7. % to 32 - 12 - 12 - 12 - 12 - 12 - 12 - 12 -
Calibrati	on Result		- 10 to 10 t					
	rity Adjustment rity Adjustment					702 702	CPM CPM	
Hour	Date (dd-mm-yy)	Tim	Time		lition R.H. (%)	Concentration <sup>1</sup> (mg/m <sup>3</sup> ) <b>Y-axis</b>	Total Count <sup>2</sup>	Count/ Minute <sup>3</sup> <b>X-axis</b>
1	18-05-13	12:30 -	13:30	(°C) 28.1	78	0.04714	1764	29.40
2	18-05-13	13:30 -	14:30	28.1	78	0.04932	1846	30.77
3	18-05-13	14:30 -	15:30	28.2	77	0.05156	1935	32.25
4	18-05-13	15:30 -	16:30	28.1	78	0.05083	1899	31.65
By Linear Slope (h Correlat	2. Total Count 3. Count/minut Regression of (-factor): tion coefficient:	was logged e was calcu Y or X	by Laser lated by (* 0.0016 0.9976	Dust Mor Total Cou	nitor	tashnick TEOM <sup>®</sup>		
Validity	of Calibration F	Record: _	17 May 2	014				
Remarks:								
	iower: VW E		Signa		h/	,		) May 2012

Equipment:	Type: Manufacturer/Brand: Model No.: Equipment No.: Sensitivity Adjustment Scale Setting: Operator:  Standard Equipment				Laser Do SIBATA LD-3 A.005.09 797 CPI Mike She	a VI			
Venue:   Cyberport (Pui Ying Secondary School)	Standa	ra Equipment							
Sensitivity Adjustment Scale Setting (Before Calibration):	Venue:Cyberport (FModel No.:Series 1400,Serial No:Control:Sensor:				Ying Seco DAB21989	ndary So 99803		1	
Sensitivity Adjustment Scale Setting (Before Calibration):	*Remar	ks: Recommend	ed interval fo	or hardwai	re calibra	tion is 1 y	/ear		
Sensitivity Adjustment Scale Setting (Before Calibration):	Calibra	tion Result						108.78.	
Condition   Temp   R.H.   Y-axis   Count   X-axis	Sensit	tivity Adjustment	All the second flower both and the first flower.						
1       18-05-13       12:30       -       13:30       28.1       78       0.04714       1885       31.42         2       18-05-13       13:30       -       14:30       28.1       78       0.04932       1965       32.75         3       18-05-13       14:30       -       15:30       28.2       77       0.05156       2059       34.32         4       18-05-13       15:30       -       16:30       28.1       78       0.05083       2024       33.73         Note:       1. Monitoring data was measured by Rupprecht & Patashnick TEOM®         2. Total Count was logged by Laser Dust Monitor       3. Count/minute was calculated by (Total Count/60)         By Linear Regression of Y or X       Slope (K-factor):       0.0015         Correlation coefficient:       0.9973         Validity of Calibration Record:       17 May 2014    Remarks:	Hour		Tim	е	Cond Temp	dition R.H.	(mg/m <sup>3</sup> )		Count/ Minute <sup>3</sup> <b>X-axis</b>
3			12:30 -	13:30	<del></del>	78	0.04714	1885	31.42
4 18-05-13 15:30 - 16:30 28.1 78 0.05083 2024 33.73   Note: 1. Monitoring data was measured by Rupprecht & Patashnick TEOM® 2. Total Count was logged by Laser Dust Monitor 3. Count/minute was calculated by (Total Count/60)   By Linear Regression of Y or X Slope (K-factor): 0.0015 0.9973   Correlation coefficient: 0.9973    Validity of Calibration Record:    17 May 2014    Remarks:									
Note: 1. Monitoring data was measured by Rupprecht & Patashnick TEOM® 2. Total Count was logged by Laser Dust Monitor 3. Count/minute was calculated by (Total Count/60)  By Linear Regression of Y or X Slope (K-factor): 0.0015 Correlation coefficient: 0.9973  Validity of Calibration Record: 17 May 2014  Remarks:								1.00-90010000000000000000000000000000000	
2. Total Count was logged by Laser Dust Monitor 3. Count/minute was calculated by (Total Count/60)  By Linear Regression of Y or X Slope (K-factor):  Correlation coefficient:  0.9973  Validity of Calibration Record:  17 May 2014  Remarks:								2024	33.73
Remarks:	By Linea Slope	2. Total Count 3. Count/minut ar Regression of (K-factor):	was logged e was calcul Y or X	by Laser I ated by (T <i>0.0015</i>	Dust Mon	itor	ishnick TEOM®		
6	Validit	y of Calibration F	Record: _	17 May 20	014				
QC Reviewer: YW Fung Signature: // Date: 20 May 2013						- h			

Type:	footurer/Drond			Laser Du SIBATA	ıst Moni	tor		
Model	facturer/Brand:		_	LD-3				
	ment No.:		_	A.005.10a				
	tivity Adjustment	Scale Setting:	_	753 CPI				
Opera	itor:		_	Mike She	k (MSKN	М)		
Standa	rd Equipment	***						
		_			TEO 1 48			
Equip				tashnick		ahaal)		
Venue Model		Series 1		ring Seco	muary S	CHOOI)	001000.1 50	
Serial		Control:		DAB21989	20803			
Serial	NO.	Sensor:	10 Section 1	00C14365	200-00-00-00-00-00-00-00	K <sub>o</sub> : 1250	10	
Last C	Calibration Date*:			00014300	9003	N <sub>0</sub> . 1250	U	
	ks: Recommend	-		re calibrat	tion is 1 v	vear		
	tion Result		- Tarawa	- Combra				
Calibra	tion Result							
	ivity Adjustment ivity Adjustment						PM PM	
Hour	Date	Time		Amb	pient	Concentration <sup>1</sup>	Total	Count/
11001	(dd-mm-yy)	,		Condition Temp R.H.		(mg/m <sup>3</sup> )	Count <sup>2</sup>	Minute <sup>3</sup>
	( ( ( ) ) ) )					Y-axis	70 000 0000 No manusia	X-axis
				(°C)	(%)	10 April 10		
1	18-05-13	12:30 -	13:30	28.1	78	0.04714	1886	31.43
2	18-05-13	13:30 -	14:30	28.1	78	0.04932	1968	32.80
3	18-05-13	14:30 -	15:30	28.2	77	0.05156	2061	34.35
4	18-05-13	15:30 -	16:30	28.1	78	0.05083	2026	33.77
Note:	Total Count     Count/minut	was logged by te was calcula	y Laser [	Dust Mon	itor	ashnick TEOM <sup>®</sup>		
	ar Regression of		0045					
	(K-factor):		.0015					
Correl	ation coefficient:	_0	.9983					
Validit	y of Calibration F	Record: 1	7 May 20	014				
Remark	s:							
								4
				E	<del>130 - 11 - 11 - 1</del>		****	
QC Re	eviewer: YW F	-ung	Signat	ture:	y	Da	te: <u>20 Ma</u>	y 2013

Model Equip	ment No.: tivity Adjustment	Scale Settin	g: _	Laser Du SIBATA LD-3 A.005.11 799 CPI Mike She	а И			
Standa	rd Equipment							
Equipo Venue Model Serial Last C	ment: e:   No.:	Cyber Series Contro Senso 18 Ma	or: <u>120</u> ny 2013	Ying Seco DAB21989 DOC14369	99803 99803	K <sub>o</sub> : <u>12500</u>		
Calibra	tion Result			4				
Sensit	tivity Adjustment					799 CP		
Hour	Date (dd-mm-yy)	Tim	ne		oient dition R.H. (%)	Concentration <sup>1</sup> (mg/m³) <b>Y-axis</b>	Total Count <sup>2</sup>	Count/ Minute <sup>3</sup> X-axis
1	18-05-13	12:15 -	13:15	28.1	78	0.04685	1871	31.18
2	18-05-13	13:15 -	7 77 70	28.1	78	0.04941	1979	32.98
3	18-05-13	14:15 -		28.2	77	0.05127	2055	34.25
4	18-05-13	15:15 -	10.10	28.1	78	0.05060	2021	33.68
Slope Correl	2. Total Count 3. Count/minut ar Regression of (K-factor): ation coefficient: y of Calibration F	was logged te was calcu Y or X	by Laser I	Oust Mon otal Cou	itor	ashnick TEOM <sup>®</sup>		
Remark	SS:				-			
QC Re	eviewer: _ <i>YW F</i>	-ung	Signa	ture:	4	Date	e: _20 Ma	y 2013

Model Equipi Sensit Opera	ment No.: ivity Adjustment tor: rd Equipment			:	Laser Du SIBATA LD-3B A.005.13 643 CPI Mike She	a M k (MSKN			
Venue: Cyberport (P							chool)		
Model			200000000000000000000000000000000000000	1400AB					
Serial	No:		ntrol:		AB21989				
			sor:	-	00C14365	59803	K <sub>o</sub> : <u>125</u> 0	00	
Last C	alibration Date*:	_181	иау	2013					
*Remar	ks: Recommend	ed interva	l for	hardwar	e calibrat	ion is 1 y	/ear		
Calibra	tion Result								
	ivity Adjustment ivity Adjustment			•		•		CPM CPM	
Hour	Date	Т	ime		Amb		Concentration <sup>1</sup>		Count/
	(dd-mm-yy)				Conc		(mg/m <sup>3</sup> )	Count <sup>2</sup>	Minute <sup>3</sup>
					Temp	R.H.	Y-axis		X-axis
1	18-05-13	12:15		13:15	(°C) 28.1	(%) 78	0.04685	1867	31.12
2	18-05-13	13:15	_	14:15	28.1	78	0.04941	1975	32.92
3	18-05-13	14:15	-	15:15	28.2	77	0.05127	2048	34.13
4	18-05-13	15:15	_	16:15	28.1	78	0.05060	2017	33.62
Note:	<ol> <li>Total Count</li> <li>Count/minut</li> </ol>	was logge e was cal	ed by	y Laser D	Oust Moni	tor	shnick TEOM <sup>®</sup>		
	ar Regression of	Y or X	_						
	(K-factor):			.0015					
	ation coefficient: y of Calibration F	Secord:	-	.9986 7 May 20	014				
valian	y or canoration	(000) 4.		, may 20	<u> </u>				
Remark	s:								
QC Re	eviewer: YW F	ung		Signat	ure:	4/	Da	ate: _20 Ma	ay 2013

Type:				Laser Do	ust Moni	itor		
Manu Mode	facturer/Brand:		-	SIBATA LD-3B		-		
	ment No.:		3 <u>~</u>	A.005.14	la	(1) (2) (4) (4) (4) (4) (4) (4) (4) (4) (4) (4		
	tivity Adjustment	Scale Sett	ing:	786 CPI				
Opera	ator:		_	Mike She	ek (MSKI	M)		
Standa	rd Equipment	B 4.1		-				
	• •					0900 4 50		
Equip			precht & Pa					
Venue			erport (Pui	Ying Seco	ondary So	chool)		
Model Serial		Con	es 1400AB	0AB2198	00002		1. (85)	
Seriai	NO.	Sens	100,000,000,000	00C1436	THE AREA OLD THE AREA	K <sub>o</sub> : 12500	7	
Last C	Calibration Date*:		May 2013	0001430	39003	N <sub>0</sub> . 12300	,	
*Remar	ks: Recommend	ed interval	for hardwa	re calibra	tion is 1	year		
Calibra	tion Result							
		0 1 0 "		O 1:1 1:		700	<b></b>	
	tivity Adjustment		- ·				PM	
Sensit	tivity Adjustment	Scale Sett	ing (After C	alibration	):	_786 CF	PM	
Hour	Date	Ti	me	Aml	pient	Concentration <sup>1</sup>	Total	Count/
riour	(dd-mm-yy)		1110		dition	(mg/m <sup>3</sup> )	Count <sup>2</sup>	Minute <sup>3</sup>
	(44 ) ) )			Temp	R.H.	Y-axis		X-axis
				(°C)	(%)	VIII   SIRBA (1940-1977)		1 2005 to 3 descriptions
1	18-05-13	12:15	- 13:15	28.1	78	0.04685	2005	33.42
2	18-05-13	13:15	- 14:15	28.1	78	0.04941	2121	35.35
3	18-05-13	14:15	- 15:15	28.2	77	0.05127	2194	36.57
4	18-05-13	15:15	- 16:15	28.1	78	0.05060	2167	36.12
Note:						ashnick TEOM®		
	2. Total Count							
	3. Count/minut	e was calc	culated by (	i otal Cou	nt/60)			
By Line:	ar Regression of	Y or X						
	(K-factor):	1 01 7	0.0014					
	ation coefficient:		0.9987		-			
					,			
Validit	y of Calibration F	Record:	_17 May 2	014				
Remark	is:		and the second s		ja veiki sa			
								34
				1777		/		
					6/			
QC Re	eviewer: YW F	ung	_ Signa	ture:		Dat	e: _20 Ma	y 2013

# **APPENDIX B**

**Baseline Monitoring Schedule** 

## Agreement No. CE 58/2000

# Design & Construction Assignment for Widening of Tolo Highway / Fanling Highway between Island House Interchange and Fanling Stage 2 - Between Tai Hang and Wo Hop Shek Interchange

# **Environmental Baseline Monitoring Schedule**

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1-Oct	2-Oct	3-Oct	4-Oct	5-Oct
6-Oct	7-Oct	8-Oct	9-Oct	10-Oct	11-Oct	12-Oct
						Air Quality Monitoring (AM1)
13-Oct	14-Oct	15-Oct	16-Oct	17-Oct	18-Oct	19-Oct
Public Holiday	Public Holiday	Air Quality Monitoring (AM1)				
20-Oct				24-Oct	25-Oct	
Public Holiday	Air Quality Monitoring (AM1)					
27-Oct	28-Oct	29-Oct	30-Oct	31-Oct		
Public Holiday	Air Quality Monitoring (AM1)	Air Quality Monitoring (AM1)				

**Baseline Air Quality Monitoring Station** 

AM1 Fanling Government Secondary School

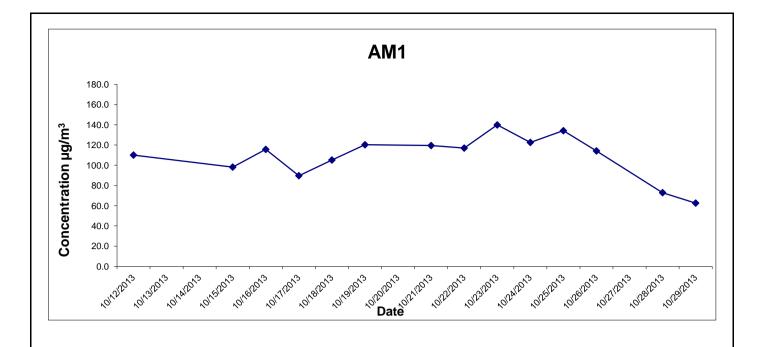
# APPENDIX C

**Baseline Air Quality Monitoring Results** 

# Appendix C Baseline Air Quality Monitoring Results

#### 24-hour TSP Monitoring Results at Station AM1 - Fanling Government Secondary School

Date	Weather	Air	Atmospheric	Flow Rate	e (m³/min.)	Av. flow	Total vol.	Filter W	/eight (g)	Particulate	Elaps	e Time	Sampling	Conc.
	Condition	Temp. (°C	Pressure(hPa)	Initial	Final	(m³/min)	(m <sup>3</sup> )	Initial	Final	weight(g)	Initial	Final	Time(hrs.)	(µg/m³)
12-Oct-13	Sunny	26.2	1011.0	1.314	1.314	1.314	1892.2	2.8127	3.0210	0.2083	2865.65	2889.65	24.00	110
15-Oct-13	Sunny	25.6	1013.5	1.314	1.314	1.314	1892.2	2.7860	2.9719	0.1859	2889.65	2913.65	24.00	98
16-Oct-13	Sunny	24.7	1017.2	1.314	1.314	1.314	1893.2	2.8185	3.0374	0.2189	2913.65	2937.65	24.00	116
17-Oct-13	Fine	24.0	1018.9	1.314	1.314	1.314	1852.7	2.8160	2.9822	0.1662	2937.65	2961.15	23.50	90
18-Oct-13	Fine	23.2	1018.4	1.314	1.314	1.314	1891.4	2.8094	3.0083	0.1989	2961.15	2985.14	23.99	105
19-Oct-13	Fine	23.0	1017.8	1.314	1.314	1.314	1892.2	2.8168	3.0445	0.2277	2985.14	3009.14	24.00	120
21-Oct-13	Fine	22.8	1015.2	1.314	1.314	1.314	1892.2	2.8039	3.0301	0.2262	3009.14	3033.14	24.00	120
22-Oct-13	Sunny	22.7	1015.6	1.314	1.314	1.314	1892.2	2.8010	3.0224	0.2214	3033.14	3057.14	24.00	117
23-Oct-13	Sunny	21.9	1014.5	1.314	1.314	1.314	1892.2	2.8071	3.0718	0.2647	3057.14	3081.14	24.00	140
24-Oct-13	Sunny	21.3	1013.1	1.314	1.314	1.314	1892.2	2.8102	3.0422	0.2320	3081.14	3105.14	24.00	123
25-Oct-13	Sunny	21.6	1015.4	1.314	1.314	1.314	1884.3	2.8071	3.0600	0.2529	3105.14	3129.04	23.90	134
26-Oct-13	Sunny	19.4	1018.3	1.314	1.314	1.314	1892.2	2.8266	3.0427	0.2161	3129.04	3153.04	24.00	114
28-Oct-13	Sunny	20.9	1018.7	1.314	1.314	1.314	1892.2	2.8189	2.9569	0.1380	3153.04	3177.04	24.00	73
29-Oct-13	Sunny	22.1	1018.6	1.314	1.314	1.314	1890.6	2.8083	2.9266	0.1183	3177.04	3201.02	23.98	63
												_	Average	108.7
													Min	63.0
													May	1/0 0



Agreement No. CE 58/200

Project No.: 60307376

Design & Construction Assignment for Widening of Tolo Highway / Fanling Highway between Island House Interchange and Fanling

Date: November 2013

Stage 2 - Between Tai Hang and Wo Hop Shek Interchange

Graphical Presentation of Baseline 24-hour TSP Monitoring Results



Appendix C

# Appendix C Baseline Air Quality Monitoring Results

# 1-hour TSP Monitoring Results at Station AM1 Fanling Government Secondary School

_	Start	1st Hour	2nd Hour	3rd Hour
	Time	Conc.	Conc.	Conc.
Date	(hh:mm)	(µg/m³)	(µg/m³)	(µg/m³)
12-Oct-13	9:30	83.2	83.2	83.4
15-Oct-13	9:37	59.0	59.1	59.2
16-Oct-13	9:45	106.0	105.9	106.3
17-Oct-13	9:35	176.0	176.2	176.6
18-Oct-13	9:45	80.0	80.2	80.3
19-Oct-13	9:36	103.9	103.9	103.7
21-Oct-13	9:40	121.0	121.1	121.2
22-Oct-13	9:45	127.5	127.3	127.4
23-Oct-13	9:48	137.0	136.8	136.7
24-Oct-13	9:35	95.0	95.1	95.2
25-Oct-13	9:42	124.3	124.4	124.4
26-Oct-13	9:45	96.0	96.0	96.1
28-Oct-13	9:37	94.9	94.8	94.8
29-Oct-13	9:39	56.6	56.6	56.6
			Average	104.4
			Min	56 G

Max

176.6

